224 New Customhouse
Denver 2, Colorado

January 24, 1955

2/25

Memorandum

To: Secretary to the Operating Committee

From: Field Team, Region III

Subject: Report of Examination, DMEA Docket No. 3435, (Uranium), American Uranium Corporation, Little Doe Mine, Santa Cruz County, Arizona

Enclosed are the original and three copies of the report pertaining to the above application.

We recommend that the application for Exploration assistance in the amount of $264.081.91 be denied.

W. M. TRAVER

W. M. Traver

E. N. Harshman

E. N. Harshman

Reviewed by
DMEA OPERATING COMMITTEE

2-4-55
(date)

TRANSMITTED

JAN 24 1955

November 19, 1954

Memorandum

To : W. H. King, Chief, Mining Division, Region IV

From : Chief, Mining Methods Br., Mining Div., Region IV

Subject : Report, Docket DMEA-3435, American Uranium Corp.'s Little Dee No. 1 Uranium Claim, Ore Blanco Mining District, Santa Cruz County, Ariz.

Enclosed are original and 10 copies of the section on Summary, Conclusions and Recommendations by T. M. Rosalo of the Bureau of Mines and L. Bryner of the Geological Survey, and the section on Engineering by Rosalo for the above report. As the examiners felt that no significant amount of uranium ore would be found by additional exploratory work on this property, they recommended that Government exploration assistance be denied the applicant. I concur with this recommendation.

The Geological Survey has the brochure.

Walter R. Storms

Walter R. Storms

cc W. H. King (10)
J. N. Faick
DMEA-3435
DF

WRStorms:frj

Reviewed By
DMEA OPERATING COMMITTEE
2-4-55
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA-3435, American Uranium Corporation's Little Joe No. 1 Uranium Claim Oro Blanco Mining District Santa Cruz County, Arizona

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

L. Brymer, Geologist
U. S. Geological Survey

November 1954

Reviewed by
DMEA OPERATING COMMITTEE
2-4-55
(date)

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By T. M. Renaldo[1] and L. Bryner[2]

The Little Doe No. 1 mining claim in Santa Cruz County, Ariz. was visited by examiners for the Defense Minerals Exploration Administration in connection with an application for Governmental aid by the American Uranium Corp. The application, docketed as DMEA-3435, contained a proposed project designed to test for uranium ores. Proposed work, costing an estimated $264,081.91, involved road building, diamond drilling, construction of a surface mine plant, shaft sinking, drifting, and raising.

The Little Doe No. 1 claim probably first was explored during World war I for copper. At that time, completion of essentially all of the present workings resulted in little or no production. The claim then was inactive to early 1952 when James A. Woolsey of Tucson mined and shipped about 5 tons of oxide ore containing 3.21 percent copper, 2.7 percent lead, and 3.68 ounces silver and 0.01 ounce gold per ton. Shortly thereafter, Woolsey discovered the presence of radioactive material at a few places in the old workings. Since then, work on the claim has been confined to examinations for radioactivity by Woolsey and associates, and by the Atomic Energy Commission.

Anomalous radio activity is confined to the workings in the northern portion of an elongated zone of manganese- and iron-stained silicified rhyolite that crops out boldly for a length

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1/ Mining engineer, U. S. Bureau of Mines
2/ Geologist, U. S. Geological Survey

Reviewed by
DMEA OPERATING COMMITTEE

2-4-55
(date)

of about 900 feet. The zone, a few feet to 80 feet in width, strikes northwesterly and dips almost vertically. It is bordered by comparatively unaltered, white to gray rhyolite.

The silicified zone is characterized by numerous almost vertical fractures trending in various directions and intersecting each other. The fractures and much of the outcrop are stained with manganese oxides. Hematite and copper oxides coat some of the fractures, especially near intersections with other fractures. Anomalous radioactivity seems to be localized where relatively persistent fractures intersect. Hematite and copper oxides apparently are associated with this anomalous radioactivity. A specimen from one of the more highly radioactive places in the deposit was examined by the U. S. Bureau of Mines and found to contain uranium in the form of kasolite, uranophane, and sporadic grains of torbernite. It also contained quartz, feldspar, malachite, azurite, chrysocolla, ilmenite, cerussite, smithsonite, and manganese oxides.

The exploratory workings are confined to the silicified rhyolite, and comprise 5 shallow pits, a 20-feet trench to the portal of a 15-foot adit, a 7-foot trench up to 4 feet deep, Pit "A", 20 feet by 5 feet by 8 to 18 feet deep, and inaccessible shafts "A" and "B", 58 and 53 feet deep, respectively.

Numerous readings for radioactivity were taken in and adjacent to the accessible workings with the result that anomalous radioactivity was found to occur only at Shaft "B", Pit "A", and the dump containing rock from Pit "A".

At pit "A", where the highest uranium assays were obtained, the radioactivity is concentrated in areas of not more than a few square feet, and these areas show no tendency to persist in depth. The chemical assays of 5 samples taken by Defense Minerals Exploration Administration and Atomic Energy Commission examiners in pit "A" ranged from 0.052 to 0.18 percent U_3O_8 and averaged 0.106 percent. At the collar of shaft "B" anomalous radioactivity was noted only in a half-inch wide veinlet of copper, manganese, and iron oxides along a northwesterly trending fracture. An Atomic Energy Commission sample of this veinlet and about one foot of adjoining fractured rock assayed radiometrically 0.01 percent U_3O_8. The same examiners obtained scintillometer readings at several places in the shaft. These readings, taken halfway down the shaft and at the bottom of the shaft, indicated about the same amount of radioactivity as in the sample near the collar of the shaft.

Our conclusion is that uranium, copper, and lead mineralization, in amounts of more than academic interest, are confined to small pods and lenses at scattered fracture intersections, in Pit "A". There are no measured reserves. The indicated and inferred reserves of this deposit are not estimated; these probably amount to less than 1 ton of material containing 0.10 percent U_3O_8 and 6 percent combined copper and lead per foot of depth.

It is recommended that the requested assistance be denied because the potential reserves of uranium, copper and lead ores are not significant.

The Phoenix office of the Atomic Energy Commission was consulted regarding this deposit.

DMEA-3435, AMERICAN URANIUM CORPORATION'S LITTLE DOE NO. 1 URANIUM CLAIM ORO BLANCO MINING DISTRICT SANTA CRUZ COUNTY, ARIZONA

Engineering Report

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

November 1954

Reviewed by
DMEA OPERATING COMMITTEE
2-4-55
(date)

DMEA-3435, AMERICAN URANIUM CORPORATION'S

LITTLE DOE NO. 1 URANIUM CLAIM
ORO BLANCO MINING DISTRICT
SANTA CRUZ COUNTY, ARIZONA

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Description of deposit	3
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ILLUSTRATIONS

Figure		Following page
1	Location map	1
2	Geologic and assay map	(in Geological Report)

INTRODUCTION

The Little Bee No. 1 mining claim in Santa Cruz County, Ariz. was visited by examiners for the Defense Minerals Exploration Administration in connection with a request by the American Uranium Corp. for Governmental aid as authorized by the Defense Production Act of 1950 and its amendments. The application, dated July 28, 1954, requested assistance on a proposed project designed to explore for commercial deposits of uranium ore. Proposed explorations, costing an estimated total of $264,081.91, involved road building, diamond drilling, construction of a surface mine plant, shaft sinking, drifting, and raising.

The Uranium Commodity Committee reviewed the application, which had been docketed as DMEA-3435, and referred it to the Field Team of Region IV for investigation and recommendation. Field investigations were carried out October 27 and 29, 1954 by T. M. Rennie, mining engineer, U. S. Bureau of Mines, and L. Bryner, geologist, U. S. Geological Survey.

LOCATION, PHYSICAL FEATURES AND CLIMATE

The Little Bee No. 1 claim is situated in the north ½, sec. 20, T. 22 S., R. 10 E., Ore Blanco mining district, Santa Cruz County, Ariz. It is about 5 air miles south of Arivaca village (figure 1). Arivaca is accessible from Tucson, Ariz. by driving south on U. S. Highway 89 to Kinsley's Ranch, a distance of about 33 miles, and thence southwesterly 23.3 miles on a County-maintained

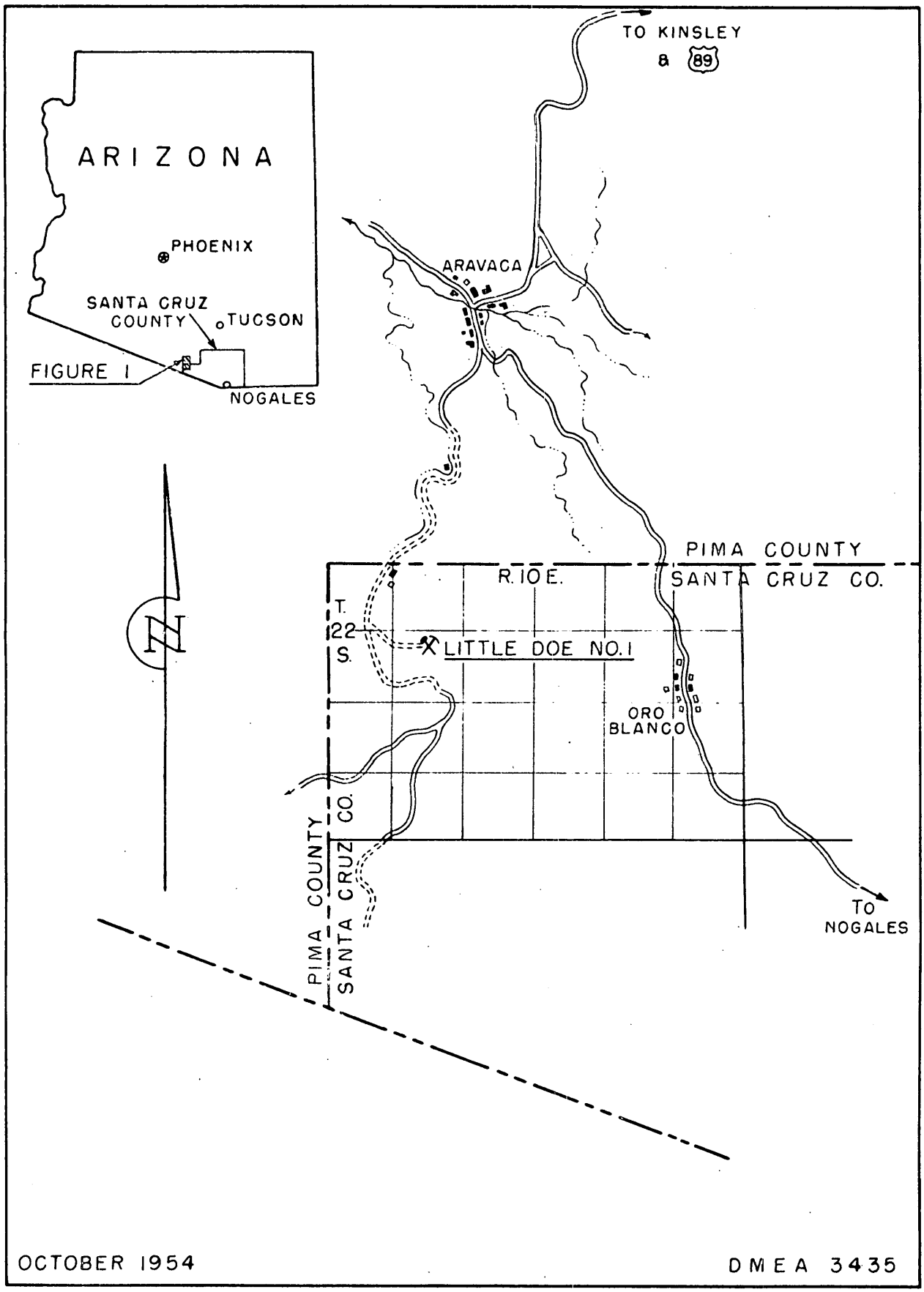

FIGURE 1. - LOCATION MAP - LITTLE DOE NO. 1 CLAIM
AMERICAN URANIUM CORPORATION SANTA CRUZ COUNTY, ARIZONA

dirt road. To reach the claim from Arivaca, drive south 9.6 mile on the Ruby-Nogales road to the junction with the signed Fulerton road that branches to the right, proceed southwesterly 3.5 miles on the Fulerton road to Fraguita Wash, thenfollow this wash upstream for 1.1 miles. Here, a road branching to the left is followed 0.8 mile to the foot of a dump at the main mine workings. Much of the road from Arivaca is rough and the last 0.8 mile is too rough and steep for transportation by other than 4-wheel-drive vehicles.

The claim is situated in a moderately rugged area on the west flank of the Ore Blanco Mountains. The altitude at the mine workings is about 4,280 feet. The highest point in the area, 5,370 feet, is on Fraguita Peak at about three-quarters of a mile east of the claim. Drainage is westerly to Fraguita Wash.

Vegetation is confined mainly to a fairly heavy growth of scrub oak along drainage beds, and forage grasses on hillsides.

The climate is characteristic of the zones of intermediate altitudes in southern Arizona. Summers are hot and winters are mild. Annual precipitation of probably about 15 inches occurs mainly as heavy rainfalls during the summer and light showers during the winter.

HISTORY AND PRODUCTION

The Little Doe No. 1 claim probably first was explored during World War I for copper. Essentially all of the present workings were completed at that time. Field evidence indicates little or no

ore was produced. The claim then was inactive to early 1952 when James A. Woolsey of Tucson mined and shipped about 5 tons of oxide ore containing 3.21 percent copper, 2.7 percent lead, and 3.68 ounces of silver and 0.01 ounce gold per ton. Shortly thereafter, Woolsey discovered the presence of radioactive material at a few places in the old workings. Since then, activity on the claim has been confined to examinations for radioactivity by Woolsey and associates, and by the Atomic Energy Commission.

PROPERTY AND OWNERSHIP

The property is confined to one unpatented lode mining claim, the Little Doe No. 1. It is owned by Miss Ada Gallen of Tucson, Ariz. and presently is held under a lease agreement by the applicant, the American Uranium Corp., 270 Church Avenue, Tucson, Ariz. Officers of the corporation are: James A. Woolsey, president; Othe Kinsley, vice-president; and Hymen D. Goldberg, secretary.

DESCRIPTION OF THE DEPOSIT

The dominant geologic feature of the Little Doe claim is an elongated zone of manganese- and iron-stained silicified rhyolite that crops out boldly for a length of about 900 feet. The zone, a few feet to 80 feet in width, has an average strike of N. 35° W. and a dip that appears to be nearly vertical. It is bordered by comparatively unaltered, white to gray-colored rhyolite.

The exploratory workings are largely confined to the northern 300-foot portion of the fractured and silicified rhyolite (figure 2). They comprise: 5 shallow pits; a 20-foot trench to the portal of a

15-feet adit; a 7-feet trench up to 4 feet deep; Pit "A", 20 feet by 5 feet by 8 to 18 feet deep; and inaccessible shafts "A" and "B", respectively 58 and 53 feet deep. In this area, the silicified rhyolite and adjacent country rock is traversed by numerous weak and discontinuous fractures. The principal fractures dip steeply and strike either northwesterly, northeasterly, nearly east-west, or nearly north-south.

Numerous measurements of radioactivity were taken with a Beta Gamma Survey Meter, A.E.C. Model SGM-18A, Serial No. 125, manufactured by El Tronics, Inc., Philadelphia, Penn. During a reconnaissance of the property, it was found practical to use the 2.0 scalefor all measurements. Figure 2 shows the measurements as milliroentgens per hour for as many places as practical.

The background count was found to be 0.05 mr/hr. Meter readings essentially the same as the background count were obtained at all places except in pit "A", on the dump containing rock from pit "A", and at the collar of Shaft "B".

Pit "A" explores a highly fractured zone in the silicified rhyolite at the hanging wall of a fairly strong fracture that strikes N. 80° E. and dips about 80° to the north. Other steeply dipping fractures, that strike N. 85° W. and N. 65° W., cross the main fracture. Oxides of iron and manganese stain much of the rock and occur sporadically as fracture coatings. Copper oxides

also occur as fracture coatings, but are relatively scarce. A rock specimen taken by James Woolsey from one of the more highly mineralized zones was examined by Lamar Evans, petrographer, U. S. Bureau of Mines, Tucson, Ariz. The specimen, UP-132, contained quartz, feldspars, malachite, azurite, chrysocolla, limonite, cerrussite, smithsonite, and manganese oxide. Uranium was present as kasolite, uranophane, and sporadic grains of torbenite. Radiometric tests indicated that the specimen contained 0.50 percent equivalent U_3O_8. During the field investigations by the Defense Minerals Exploration Administration examiners, significant radioactivity was noted in pit "A" only at the 3 most highly mineralized zones reported by the Atomic Energy Commission.

Shaft "B" explores a fractured zone at the intersection of northwesterly and northeasterly-trending fractures of steep dip. Significant radioactivity was noted only at a half inch wide stringer of copper, and iron, and manganese oxides along a northwesterly trending fracture. This zone was sampled by engineers of the Atomic Energy Commission who also took scintillometer readings at several places in the shaft.

ORE RESERVES

Analyses of Samples

Number AEC	Number DMEA	Description, by DMEA engineers	Assay U_3O_8 Radiometric AEC	Radiometric DMEA	Chemical AEC	Chemical DMEA
F8269	11432	Pit "A" chip sample across 18" zone	0.01	0.06	-	0.052
F8270		" not accessible	0.06	-	0.06	-
F8271	11433	" chip sample across 6" zone	0.16	0.22	0.116	0.180
F8268		" sample across 15" zone	0.12	-	0.125	-
F8267		Shaft "B", 12 in. wide breccia zone in which radioactivity was confined to ½ in. veinlet	0.01	-	-	-

There are no measurable reserves of uranium or copper-lead-bearing rock at either of the 2 mineralized zones.

The indicated and inferred reserves are confined to the zone of Pit "A". They amount to probably less than 1 ton per foot of depth of material containing 0.10 percent U_3O_8 and 6 percent combined copper and lead.

CONCLUSIONS AND RECOMMENDATIONS

The engineers for the Atomic Energy Commission concluded that the deposit "will warrant further attention after the proposed development work has been completed". They made no recommendations.

The recommendation of this report is that the requested assistance be denied because the deposit does not contain significant amounts of uranium, copper or lead ores.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

TRANSMITTED

JAN 24 1955

January 19, 1955

Memorandum

To: Field Team, Region III

From: E. N. Harshman

Subject: DMEA Docket 3435 (uranium), American Uranium Corporation, Little Doe Mine, Santa Cruz County, Arizona

Enclosed are the original and 10 copies of a geologic report by Leonid Bryner, U. S. Geological Survey, on the above subject property.

Secondary uranium minerals occur along fractures in a silicified zone or belt in rhyolite. The silicified zone is about 900 feet long and from a few feet to 80 feet wide. Shallow exploratory workings are limited to the northern end of the belt.

In the shallow workings uranium is associated with secondary copper, lead, zinc, manganese, and iron minerals and appears to be concentrated at the intersections of several of the more persistent fractures.

Although samples taken by the AEC and the U. S. Bureau of Mines across widths of from one-half foot to 2 feet contained as much as 0.18 percent U_3O_8, the uranium appears to be present in narrow, lenticular stringers separated by barren silicified rhyolite.

Bryner concludes that the proposed exploration will not lead to the discovery of significant deposits of primary or secondary uranium ore and therefore recommends that the application for exploration assistance be denied.

I concur with this recommendation.

The Geological Survey copy of the application is returned herewith.

E. N. Harshman

E. N. Harshman
Member, Field Team

Reviewed by
DMEA OPERATING COMMITTEE
2-4-55
(date)

Enclosures (12)

TRANSMITTED

JAN 24 1954

Box 4126 University Station
Tucson, Arizona

January 12, 1954

MEMORANDUM

TO: E. N. Harshman

FROM: J. N. Faick

SUBJECT: Little Doe No. 1 Claim, Ore Blanco Mining District
Santa Cruz County, Arizona (Uranium) DMEA 3435

Enclosed are the original and ten carbon copies of a report of examination by Larry Bryner on the above subject property. This report, which recommends denial of government participation in exploration, has my approval.

J. N. Faick

JNF:mm

cc Harshman (10)
Storms

P.S. The brochure is enclosed.

Reviewed by
DMEA OPERATING COMMITTEE
2-4-55
(date)

LITTLE DOE NO. 1 CLAIM

ORO BLANCO MINING DISTRICT

SANTA CRUZ COUNTY, ARIZONA

(URANIUM)

DMEA 3435

GEOLOGY

By

Leonid Bryner
Geologist, U. S. Geological Survey

Reviewed by
DMEA OPERATING COMMITTEE

2-4-55
(date)

LITTLE BOB NO. 1 CLAIM

ORO BLANCO MINING DISTRICT

SANTA CRUZ COUNTY, ARIZONA

(URANIUM)

DMEA 3435

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ILLUSTRATIONS

Fig. 1 LOCATION MAP	See Engineering Report
Fig. 2 GEOLOGIC AND ASSAY MAP	Following Page 3

INTRODUCTION

In an application to the Defense Minerals Exploration Administration, dated July 28, 1954, Mr. James A. Woolsey, president of the American Uranium Corporation, requested government participation in an exploration program estimated to cost $264,081.91, to explore for uranium on the Little Boe No. 1 Claim. The claim is located about 5 miles south of Arivaca in the north half of Sec.20, T.22 S., R.10 E., Santa Cruz County, Arizona. To reach the claim from Arivaca drive south 0.6 mile on the Ruby-Nogales road to the junction with the Fulerton road that branches to the right; proceed southwesterly 3.5 miles on the Fulerton road to Fresquita Wash; then follow this wash upstream for 1.1 miles. Here a road branching to the left is followed 0.8 mile to the foot of a dump at the workings. Much of the road from Arivaca is rough and the last 0.8 mile is strictly a jeep road.

The claim is on the west flank of the Oro Blanco Mountains at an altitude of about 4,250. The property is confined to the one unpatented lode mining claim, owned by Miss Ada Gallen of Tucson and held under lease by the applicant.

On December 17, 1952 and May 27, 1953 the property was examined by geologists of the Atomic Energy Commission. The reports and sample data from these two examinations are utilized in the following report. The first AEC report recommended "detailed geologic and radiometric investigations," and the second AEC report recommended "further attention after the proposed development work has been completed." Apparently this development work was never undertaken.

The examination for the present report was made on October 27 and 29, 1954, by T. M. Romslo of the U. S. Bureau of Mines and Leonid Bryner of the U. S. Geological Survey. On October 27 the examiners were assisted by Wesley and Joseph G. O'Brien. In the following report the potentialities of the Little Boe Mine are appraised and the conclusion is reached that it does not show promise of any significant tonnage of uranium ore.

GEOLOGY

Several miles north of the mine area there is a thick sequence of coarse, clastic beds probably belonging to the Cretaceous Comanche series. These beds have a northwesterly strike and steep dips. In the immediate vicinity of the mine the rocks are volcanic, but judging by the similarity in attitude to the nearby Comanche beds, these volcanics may form part of a conformable sequence of rocks that includes the Comanche series. The volcanics are likely to be of Cretaceous or Tertiary age.

The Little Boe Mine is in a light gray, porphyritic rhyolite which contains phenocrysts of orthoclase and quartz. Primary flow structures in the rhyolite indicate a north-northwesterly strike and an almost vertical dip. In a draw about one thousand feet southsoutheast of the mine a chilled border in the rhyolite indicates that there was more than one flow.

Within the rhyolite there is a northwesterly-trending discontinuous silicified belt about 900 feet long and from a few feet to 80 feet in width (fig. 2). Steeply dipping, variously oriented fractures are numerous in the silicified belt. The silicified rhyolite forms a bold outcrop along a slope of the Oro Blanco Mountains and apparently marks the position of a fault zone. The mine workings are confined to the north half of the silicified belt. These workings consist of five shallow pits, a 20-foot trench to the portal of a 15-foot adit, a 7-foot trench up to 4 feet in depth, an open cut, designated Pit A, and two shallow shafts, designated Shaft A and Shaft B (fig. 2). Radioactive minerals attain maximum concentration in certain fractures and fracture intersections in Pit A.

A specimen of ore (WP-132) was submitted to the U. S. Bureau of Mines by the applicant, prior to the examination. The analysis of this specimen by L. G. Evans, of the Bureau of Mines, showed kasolite ($PbO.UO_3.SiO_2.H_2O$), uranophane ($CaO.2UO_3.2SiO_2.7H_2O$), and sparse torbernite ($Cu(UO_2)_2.P_2O_5.12H_2O$). These are secondary uranium minerals. This same analysis revealed malachite, azurite and chrysocholla as well as limonite, cerrusite, smithsonite, manganese oxides, quartz and feldspar. The copper oxides, kasolite or uranophane, and iron and manganese oxides were recognized megascopically as fracture coatings, but the other minerals were not identified in the field. Uranophane and kasolite could not be distinguished in the field. The kasolite (?), where it could be best observed, appeared in rosettes. In some of these rosettes individual needles of kasolite alternate with needles of malachite. Silver and traces of gold have been recovered from the ore but the mineral form of these elements is not known.

Anomalous radioactivity is strongest and is confined mainly to the immediate vicinity of Pit A, Shaft A, and Shaft B. At these three places the uranium minerals appear to be concentrated along the more persistent fractures and at the intersections of fractures. In Pit A the strongest uranium showings occur where a fracture zone that trends N 50°-60°W intersects fractures that trend due N to N10°W. The inserts of Pit A in figure 2 show the spatial relationship between fracturing and radioactivity in the rock.

The uranium minerals are associated with copper oxides to the extent that the strongest radioactivity has been found where copper oxides occur in relative abundance (fig. 2). Also, the uranium minerals seem to be associated with hematite though to a less marked degree than with copper.

A possible reason for the localization of ore minerals in this deposit may be the relative competency of the silicified rhyolite as compared to the surrounding rock. This feature would have allowed for the formation, under stress, of relatively persistent fractures in the silicified rock. Such fractures probably would afford the best access to ore-bearing solutions. The reason for the silicified zone in the rhyolite is not known, but features such as slickensides on one of the fracture faces, and thin zones of brecciation suggest that this zone of silicification corresponds to a zone of faulting. If such is the case, it is likely that silicification of the rhyolite is a secondary feature caused by solutions that traveled along a fault zone in the rhyolite.

Assuming that the deposit originally contained primary uranium minerals, which probably is the case, it seems to correspond to King, Moore, and Kinrich's [1] "quartz-sulphide-carbonate-hematite" type. Although pitchblende has been found to depths as great as 3700 feet at the Sunshine Mine in Idaho, according to King, Moore and Kinrich's [2], "the vertical range in which pitchblende occurs in each place, however, appears to be rather short -- about 200 to 400 feet." The Little Doe deposit, therefore, is believed to have a short vertical range.

PRODUCTION AND GRADE

The Little Doe property started as a copper prospect. Judging from the small extent of the workings the production was small. The only recorded shipment, made early in 1952, is 5 tons from near the east end of Pit A. This 5 tons contained 3.21 percent copper, 2.7 percent lead, 3.68 ounces of silver, and 0.01 ounce of gold. Uranium was not recognized in the deposit until later.

The locations, widths and grades of samples in Pit A is shown in figure 2. The best assays range from 0.116 to 0.180 U_3O_8 (AEC, F62671 and F62668; USBM 11433) and are from samples selected near the fracture intersections mentioned on page 4. These samples average a little over a foot in length and were cut across the trend of the mineralized zone. However, the sample lengths do not represent

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1/ King, R.U., Moore, F.B., and Kinrich, E.N.; Pitchblende Deposits in the United States: Selected Papers on the Uranium Deposits in the United States, Geological Survey Circular 220, pp. 8-10, 1952.

2/ Idem.

the width of a zone of maximum radioactivity. In the two USBM samples the maximum radioactivity occurred in a single zone only 2 or 3 inches wide and the overall grade of the sample is an average of these thin, higher grade stringers and the surrounding lower grade rock. In the two USBM samples and three of the AEC samples for which both chemical and radioactive assays were made, the radiometric values were slightly higher than the chemical. An AEC sample taken at the collar of Shaft B across an almost vertically dipping fracture zone gave a radiometric assay of 0.01. Radioactivity of this low order is found in many places in the silicified rhyolite outside of the two shafts and Pit A. In Pit A and in Shaft B no indication of an increase of radioactivity with an increase of depth was found. In fact, the relatively high grade spot at the west end of Pit A was traced downward from the brink of the pit by Geiger Counter, and was found to die out at a depth of five or six feet.

EXPLORATION

The deposit has not been explored to any greater extent than the small workings shown in figure 2. Exploration proposed by the applicant includes road building, diamond drilling, construction of a surface mine plant, shaft sinking, drifting, and raising.

RESERVES

A very small amount of uranium is concentrated in certain fractures and fracture intersections mainly in Pit A. The indicated and inferred reserves of Pit A are estimated to be less than one ton of material containing 0.10 percent U_3O_8 and 6 percent combined copper

and lead. Probably a small amount of pitchblende, and consequently higher grade rock, can be found below the present workings. But geologic conditions indicate that there is very little promise of finding a significant tonnage of uranium ore in this deposit.

CONCLUSIONS AND RECOMMENDATIONS

Because of the improbability of discovering a significant tonnage of uranium ore on the Little Bee No. 1 Claim government participation in the exploration of this deposit should be denied.

1/31/55 gle

224 New Customhouse
Denver 2, Colorado

January 24, 1955

Memorandum

To: Secretary to the Operating Committee

From: Field Team, Region III

Subject: Report of Examination, DMEA Docket No. 3435, (Uranium), American Uranium Corporation, Little Doe Mine, Santa Cruz County, Arizona

Enclosed are the original and three copies of the report pertaining to the above application.

We recommend that the application for Exploration assistance in the amount of $264.081.91 be denied.

W. M. TRAVER
W. M. Traver

E. N. Harshman
E. N. Harshman

TRANSMITTED

JAN 24 1955

November 19, 1954

Memorandum

To : W. H. King, Chief, Mining Division, Region IV

From : Chief, Mining Methods Br., Mining Div., Region IV

Subject : Report, Docket DMLA-3435, American Uranium Corp.'s Little Doe No. 1 Uranium Claim, Oro Blanco Mining District, Santa Cruz County, Ariz.

Enclosed are original and 10 copies of the section on Summary, Conclusions and Recommendations by T. M. Romslo of the Bureau of Mines and L. Dryner of the Geological Survey, and the section on Engineering by Romslo for the above report. As the examiners felt that no significant amount of uranium ore would be found by additional exploratory work on this property, they recommended that Government exploration assistance be denied the applicant. I concur with this recommendation.

The Geological Survey has the brochure.

Walter R. Storms

Walter R. Storms

CC W. H. King (10)
J. N. Faick
DMLA-3435
DF

WRStorms:frj

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA-3435, American Uranium Corporation's Little Joe No. 1 Uranium Claim Oro Blanco Mining District Santa Cruz County, Arizona

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

L. Brynor, Geologist
U. S. Geological Survey

November 1954

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By T. N. Ronzio[1] and L. Fryner[2]

The Little Doe No. 1 mining claim in Santa Cruz County, Ariz. was visited by examiners for the Defense Minerals Exploration Administration in connection with an application for Governmental aid by the American Uranium Corp. The application, docketed as DMEA-3435, contained a proposed project designed to test for uranium ores. Proposed work, costing an estimated $264,081.91, involved road building, diamond drilling, construction of a surface mine plant, shaft sinking, drifting, and raising.

The Little Doe No. 1 claim probably first was explored during World War I for copper. At that time, completion of essentially all of the present workings resulted in little or no production. The claim then was inactive to early 1952 when James A. Woolsey of Tucson mined and shipped about 5 tons of oxide ore containing 3.21 percent copper, 2.7 percent lead, and 3.68 ounces silver and 0.01 ounce gold per ton. Shortly thereafter, Woolsey discovered the presence of radioactive material at a few places in the old workings. Since then, work on the claim has been confined to examinations for radioactivity by Woolsey and associates, and by the Atomic Energy Commission.

Anomalous radio activity is confined to the workings in the northern portion of an elongated zone of manganese- and iron-stained silicified rhyolite that crops out boldly for a length

1/ Mining engineer, U. S. Bureau of Mines
2/ Geologist, U. S. Geological Survey

of about 900 feet. The zone, a few feet to 80 feet in width, strikes northwesterly and dips almost vertically. It is bordered by comparatively unaltered, white to gray rhyolite.

The silicified zone is characterized by numerous almost vertical fractures trending in various directions and intersecting each other. The fractures and much of the outcrop are stained with manganese oxides. Hematite and copper oxides coat some of the fractures, especially near intersections with other fractures. Anomalous radioactivity seems to be localized where relatively persistent fractures intersect. Hematite and copper oxides apparently are associated with this anomalous radioactivity. A specimen from one of the more highly radioactive places in the deposit was examined by the U. S. Bureau of Mines and found to contain uranium in the form of kasolite, uranophane, and sporadic grains of torbernite. It also contained quartz, feldspar, malachite, azurite, chrysocolla, limonite, cerussite, smithsonite, and manganese oxides.

The exploratory workings are confined to the silicified rhyolite, and comprise 5 shallow pits, a 20-foot trench to the portal of a 15-foot adit, a 7-foot trench up to 4 feet deep, Pit "A", 20 feet by 5 feet by 8 to 18 feet deep, and inaccessible shafts "A" and "B", 58 and 53 feet deep, respectively.

Numerous readings for radioactivity were taken in and adjacent to the accessible workings with the result that anomalous radioactivity was found to occur only at Shaft "B", Pit "A", and the dump containing rock from Pit "A".

At pit "A", where the highest uranium assays were obtained, the radioactivity is concentrated in areas of not more than a few square feet, and these areas show no tendency to persist in depth. The chemical assays of 5 samples taken by Defense Minerals Exploration Administration and Atomic Energy Commission examiners in pit "A" ranged from 0.052 to 0.18 percent U_3O_8 and averaged 0.106 percent. At the collar of shaft "B" anomalous radioactivity was noted only in a half-inch wide veinlet of copper, manganese, and iron oxides along a northwesterly trending fracture. An Atomic Energy Commission sample of this veinlet and about one foot of adjoining fractured rock assayed radiometrically 0.01 percent U_3O_8. The same examiners obtained scintillometer readings at several places in the shaft. These readings, taken halfway down the shaft and at the bottom of the shaft, indicated about the same amount of radioactivity as in the sample near the collar of the shaft.

Our conclusion is that uranium, copper, and lead mineralization, in amounts of more than academic interest, are confined to small pods and lenses at scattered fracture intersections, in Pit "A". There are no measured reserves. The indicated and inferred reserves of this deposit are not estimated; these probably amount to less than 1 ton of material containing 0.10 percent U_3O_8 and 6 percent combined copper and lead per foot of depth.

It is recommended that the requested assistance be denied because the potential reserves of uranium, copper and lead ores are not significant.

The Phoenix office of the Atomic Energy Commission was consulted regarding this deposit.

DMEA-3435, AMERICAN URANIUM CORPORATION'S LITTLE DOE NO. 1 URANIUM CLAIM ORO BLANCO MINING DISTRICT SANTA CRUZ COUNTY, ARIZONA

Engineering Report

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

November 1954

BMEA-3435, AMERICAN URANIUM CORPORATION'S

LITTLE DOE NO. 1 URANIUM CLAIM
ORO BLANCO MINING DISTRICT
SANTA CRUZ COUNTY, ARIZONA

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Figure		Following page
1	Location map	1
2	Geologic and assay map	(in Geological Report)

INTRODUCTION

The Little Dee No. 1 mining claim in Santa Cruz County, Ariz. was visited by examiners for the Defense Minerals Exploration Administration in connection with a request by the American Uranium Corp. for Governmental aid as authorized by the Defense Production Act of 1950 and its amendments. The application, dated July 28, 1954, requested assistance on a proposed project designed to explore for commercial deposits of uranium ore. Proposed explorations, costing an estimated total of $254,081.81, involved road building, diamond drilling, construction of a surface mine plant, shaft sinking, drifting, and raising.

The Uranium Commodity Committee reviewed the application, which had been docketed as DMEA-3415, and referred it to the Field Team of Region IV for investigation and recommendation. Field investigations were carried out October 27 and 29, 1954 by T. M. Rumble, mining engineer, U. S. Bureau of Mines, and L. Bryner, geologist, U. S. Geological Survey.

LOCATION, PHYSICAL FEATURES AND CLIMATE

The Little Dee No. 1 claim is situated in the north ½, sec. 20, T. 22 S., R. 10 E., Ore Blanco mining district, Santa Cruz County, Ariz. It is about 5 air miles south of Arivaca village (figure 1). Arivaca is accessible from Tucson, Ariz. by driving south on U. S. Highway 89 to Kinsley's Ranch, a distance of about 33 miles, and thence southeasterly 23.3 miles on a county-maintained

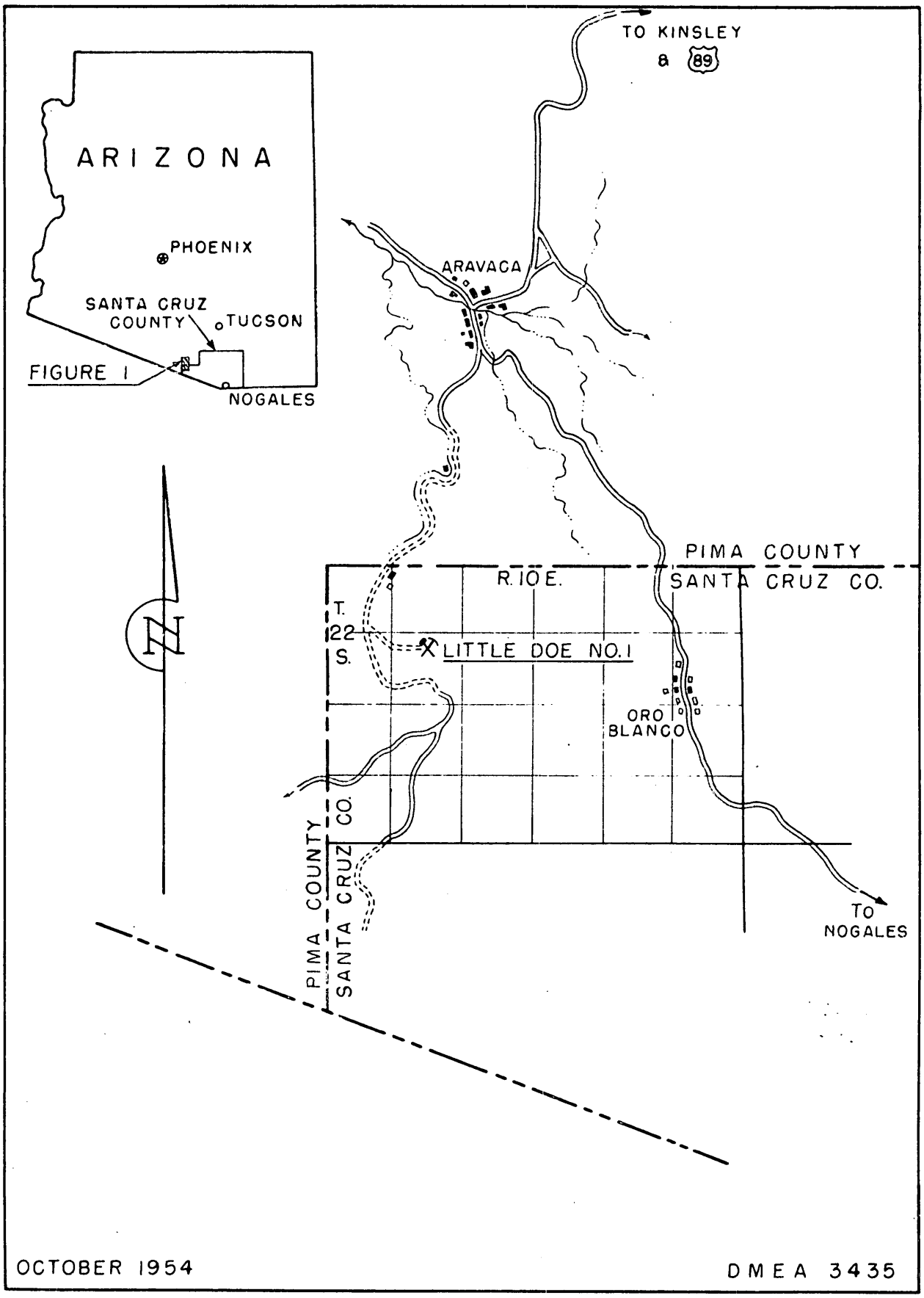

FIGURE 1. - LOCATION MAP - LITTLE DOE NO. 1 CLAIM
AMERICAN URANIUM CORPORATION SANTA CRUZ COUNTY, ARIZONA

dirt road. To reach the claim from Arivaca, drive south 0.6 mile on the Ruby-Nogales road to the junction with the signed Fulerton road that branches to the right, proceed southwesterly 3.5 miles on the Fulerton road to Fraguita Wash, thenfollow this wash upstream for 1.1 miles. Here, a road branching to the left is followed 0.8 mile to the foot of a dump at the main mine workings. Much of the road from Arivaca is rough and the last 0.8 mile is too rough and steep for transportation by other than 4-wheel-drive vehicles.

The claim is situated in a moderately rugged area on the west flank of the Ore Blanco Mountains. The altitude at the mine workings is about 4,250 feet. The highest point in the area, 5,370 feet, is on Fraguita Peak at about three-quarters of a mile east of the claim. Drainage is westerly to Fraguita Wash.

Vegetation is confined mainly to a fairly heavy growth of scrub oak along drainage beds, and forage grasses on hillsides.

The climate is characteristic of the zones of intermediate altitudes in southern Arizona. Summers are hot and winters are mild. Annual precipitation of probably about 15 inches occurs mainly as heavy rainfalls during the summer and light showers during the winter.

HISTORY AND PRODUCTION

The Little Doe No. 1 claim probably first was explored during World War I for copper. Essentially all of the present workings were completed at that time. Field evidence indicates little or no

ore was produced. The claim then was inactive to early 1952 when James A. Wealsey of Tucson mined and shipped about 5 tons of oxide ore containing 3.21 percent copper, 2.7 percent lead, and 3.68 ounces of silver and 0.01 ounce gold per ton. Shortly thereafter, Wealsey discovered the presence of radioactive material at a few places in the old workings. Since then, activity on the claim has been confined to examinations for radioactivity by Wealsey and associates, and by the Atomic Energy Commission.

PROPERTY AND OWNERSHIP

The property is confined to one unpatented lode mining claim, the Little Doe No. 1. It is owned by Miss Ada Gallen of Tucson, Ariz. and presently is held under a lease agreement by the applicant, the American Uranium Corp., 270 Church Avenue, Tucson, Ariz. Officers of the corporation are: James A. Wealsey, president; Othe Kinsley, vice-president; and Hyman D. Goldberg, secretary.

DESCRIPTION OF THE DEPOSIT

The dominant geologic feature of the Little Doe claim is an elongated zone of manganese- and iron-stained silicified rhyolite that crops out boldly for a length of about 900 feet. The zone, a few feet to 80 feet in width, has an average strike of N. 35° W. and a dip that appears to be nearly vertical. It is bordered by comparatively unaltered, white to gray-colored rhyolite.

The exploratory workings are largely confined to the northern 300-foot portion of the fractured and silicified rhyolite (figure 2). They comprise: 5 shallow pits; a 20-feet trench to the portal of a

15-feet adit; a 7-feet trench up to 4 feet deep; Pit "A", 20 feet by 5 feet by 8 to 18 feet deep; and inaccessible shafts "A" and "B", respectively 58 and 53 feet deep. In this area, the silicified rhyolite and adjacent country rock is traversed by numerous weak and discontinuous fractures. The principal fractures dip steeply and strike either northwesterly, northeasterly, nearly east-west, or nearly north-south.

Numerous measurements of radioactivity were taken with a Beta Gamma Survey Meter, A.E.C. Model SGM-18A, Serial No. 125, manufactured by El Tronics, Inc., Philadelphia, Penn. During a reconnaissance of the property, it was found practical to use the 2.0 scale for all measurements. Figure 2 shows the measurements as milliroentgens per hour for as many places as practical.

The background count was found to be 0.05 mr/hr. Meter readings essentially the same as the background count were obtained at all places except in pit "A", on the dump containing rock from pit "A", and at the collar of Shaft "B".

Pit "A" explores a highly fractured zone in the silicified rhyolite at the hanging wall of a fairly strong fracture that strikes N. 80° E. and dips about 85° to the north. Other steeply dipping fractures, that strike N. 85° W. and N. 65° W., cross the main fracture. Oxides of iron and manganese stain much of the rock and occur sporadically as fracture coatings. Copper oxides

also occur as fracture coatings, but are relatively scarce. A rock specimen taken by James Woelsey from one of the more highly mineralized zones was examined by Lamar Evans, petrographer, U. S. Bureau of Mines, Tucson, Ariz. The specimen, UP-132, contained quartz, feldspars, malachite, azurite, chrysocolla, limonite, cerrussite, smithsonite, and manganese oxide. Uranium was present as kasolite, uranophane, and sporadic grains of torbenite. Radiometric tests indicated that the specimen contained 0.50 percent equivalent U_3O_8. During the field investigations by the Defense Minerals Exploration Administration examiners, significant radioactivity was noted in pit "A" only at the 3 most highly mineralized zones reported by the Atomic Energy Commission.

Shaft "B" explores a fractured zone at the intersection of northwesterly and northeasterly-trending fractures of steep dip. Significant radioactivity was noted only at a half inch wide stringer of copper, and iron, and manganese oxides along a northwesterly trending fracture. This zone was sampled by engineers of the Atomic Energy Commission who also took scintillometer readings at several places in the shaft.

ORE RESERVES

Analyses of Samples

Number AEC	Number DMEA	Description, by DMEA engineers	Assay U_3O_8 Radiometric AEC	Radiometric DMEA	Chemical AEC	Chemical DMEA
F8269	11432	Pit "A" chip sample across 18" zone	0.01	0.06	-	0.052
F8270		" not accessible	0.06	-	0.06	-
F8271	11433	" chip sample across 6" zone	0.16	0.22	0.116	0.180
F8268		" sample across 15" zone	0.12	-	0.125	-
F8267		Shaft "B", 12 in. wide breccia zone in which radioactivity was confined to ½ in. veinlet	0.01	-	-	-

There are no measurable reserves of uranium or copper-lead-bearing rock at either of the 2 mineralized zones.

The indicated and inferred reserves are confined to the zone of Pit "A". They amount to probably less than 1 ton per foot of depth of material containing 0.10 percent U_3O_8 and 6 percent combined copper and lead.

CONCLUSIONS AND RECOMMENDATIONS

The engineers for the Atomic Energy Commission concluded that the deposit "will warrant further attention after the proposed development work has been completed". They made no recommendations.

The recommendation of this report is that the requested assistance be denied because the deposit does not contain significant amounts of uranium, copper or lead ores.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

TRANSMITTED
JAN 24 1955

January 19, 1955

Department of the Interior
Defense Minerals Administration
RECEIVED
JAN 24 1955

Memorandum

To: Field Team, Region III

From: E. N. Harshman

Subject: DMEA Docket 3435 (uranium), American Uranium Corporation, Little Doe Mine, Santa Cruz County, Arizona

Enclosed are the original and 10 copies of a geologic report by Leonid Bryner, U. S. Geological Survey, on the above subject property.

Secondary uranium minerals occur along fractures in a silicified zone or belt in rhyolite. The silicified zone is about 900 feet long and from a few feet to 80 feet wide. Shallow exploratory workings are limited to the northern end of the belt.

In the shallow workings uranium is associated with secondary copper, lead, zinc, manganese, and iron minerals and appears to be concentrated at the intersections of several of the more persistent fractures.

Although samples taken by the AEC and the U. S. Bureau of Mines across widths of from one-half foot to 2 feet contained as much as 0.18 percent U_3O_8, the uranium appears to be present in narrow, lenticular stringers separated by barren silicified rhyolite.

Bryner concludes that the proposed exploration will not lead to the discovery of significant deposits of primary or secondary uranium ore and therefore recommends that the application for exploration assistance be denied.

I concur with this recommendation.

The Geological Survey copy of the application is returned herewith.

E. N. Harshman

E. N. Harshman
Member, Field Team

Enclosures (12)

TRANSMITTED

JAN 24 1955

Box 4126 University Station
Tucson, Arizona

January 12, 1954

MEMORANDUM

TO: E. N. Harshman

FROM: J. N. Faick

SUBJECT: Little Doe No. 1 Claim, Ore Blanco Mining District
Santa Cruz County, Arizona (Uranium) DMEA 3435

Enclosed are the original and ten carbon copies of a report of examination by Larry Bryner on the above subject property. This report, which recommends denial of government participation in exploration, has my approval.

J. N. Faick

JNF:ms

cc Harshman (10)
Storms

P.S. The brochure is enclosed.

LITTLE DOE NO. 1 CLAIM

ORO BLANCO MINING DISTRICT

SANTA CRUZ COUNTY, ARIZONA

(URANIUM)

DMRA 3435

GEOLOGY

By

Leonid Bryner
Geologist, U. S. Geological Survey

LITTLE BOX NO. 1 CLAIM

ORO BLANCO MINING DISTRICT

SANTA CRUZ COUNTY, ARIZONA

(URANIUM)

IMEA 3435

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Fig. 1 LOCATION MAP	See Engineering Report
Fig. 2 GEOLOGIC AND ASSAY MAP	Following Page 3

INTRODUCTION

In an application to the Defense Minerals Exploration Administration, dated July 28, 1954, Mr. James A. Woolsey, president of the American Uranium Corporation, requested government participation in an exploration program estimated to cost $264,081.91, to explore for uranium on the Little Doe No. 1 Claim. The claim is located about 5 miles south of Arivaca in the north half of Sec.20, T.22 S., R.10 E., Santa Cruz County, Arizona. To reach the claim from Arivaca drive south 0.6 mile on the Ruby-Nogales road to the junction with the Fulerton road that branches to the right; proceed southwesterly 3.5 miles on the Fulerton road to Fraguita Wash; then follow this wash upstream for 1.1 miles. Here a road branching to the left is followed 0.8 mile to the foot of a dump at the workings. Much of the road from Arivaca is rough and the last 0.8 mile is strictly a jeep road.

The claim is on the west flank of the Oro Blanco Mountains at an altitude of about 4,250. The property is confined to the one unpatented lode mining claim, owned by Miss Ada Gallen of Tucson and held under lease by the applicant.

On December 17, 1952 and May 27, 1953 the property was examined by geologists of the Atomic Energy Commission. The reports and sample data from these two examinations are utilized in the following report. The first AEC report recommended "detailed geologic and radiometric investigations," and the second AEC report recommended "further attention after the proposed development work has been completed." Apparently this development work was never undertaken.

The examination for the present report was made on October 27 and 29, 1954, by T. M. Rumsle of the U. S. Bureau of Mines and Leonid Bryner of the U. S. Geological Survey. On October 27 the examiners were assisted by Wesley and Joseph G. O'Brien. In the following report the potentialities of the Little Doe Mine are appraised and the conclusion is reached that it does not show promise of any significant tonnage of uranium ore.

GEOLOGY

Several miles north of the mine area there is a thick sequence of coarse, clastic beds probably belonging to the Cretaceous Comanche series. These beds have a northwesterly strike and steep dips. In the immediate vicinity of the mine the rocks are volcanic, but judging by the similarity in attitude to the nearby Comanche beds, these volcanics may form part of a conformable sequence of rocks that includes the Comanche series. The volcanics are likely to be of Cretaceous or Tertiary age.

The Little Doe Mine is in a light gray, porphyritic rhyolite which contains phenocrysts of orthoclase and quartz. Primary flow structures in the rhyolite indicate a north-northwesterly strike and an almost vertical dip. In a draw about one thousand feet south-southeast of the mine a chilled border in the rhyolite indicates that there was more than one flow.

Within the rhyolite there is a northwesterly-trending discontinuous silicified belt about 900 feet long and from a few feet to 80 feet in width (fig. 2). Steeply dipping, variously oriented fractures are numerous in the silicified belt. The silicified rhyolite forms a bold outcrop along a slope of the Oro Blanco Mountains and apparently marks the position of a fault zone. The mine workings are confined to the north half of the silicified belt. These workings consist of five shallow pits, a 20-foot trench to the portal of a 15-foot adit, a 7-foot trench up to 4 feet in depth, an open cut, designated Pit A, and two shallow shafts, designated Shaft A and Shaft B (fig. 2). Radioactive minerals attain maximum concentration in certain fractures and fracture intersections in Pit A.

A specimen of ore (UP-132) was submitted to the U. S. Bureau of Mines by the applicant, prior to the examination. The analysis of this specimen by L. G. Evans, of the Bureau of Mines, showed kasolite ($PbO.UO_3.SiO_2.H_2O$), uranophane ($CaO.2UO_3.2SiO_2.7H_2O$), and sparse torbernite ($Cu(UO_2)_2.P_2O_5.12H_2O$). These are secondary uranium minerals. This same analysis revealed malachite, azurite and chrysocholla as well as limonite, cerrusite, smithsonite, manganese oxides, quartz and feldspar. The copper oxides, kasolite or uranophane, and iron and manganese oxides were recognized megascopically as fracture coatings, but the other minerals were not identified in the field. Uranophane and kasolite could not be distinguished in the field. The kasolite (?), where it could be best observed, appeared in rosettes. In some of these rosettes individual needles of kasolite alternate with needles of malachite. Silver and traces of gold have been recovered from the ore but the mineral form of these elements is not known.

Anomalous radioactivity is strongest and is confined mainly to the immediate vicinity of Pit A, Shaft A, and Shaft B. At these three places the uranium minerals appear to be concentrated along the more persistent fractures and at the intersections of fractures. In Pit A the strongest uranium showings occur where a fracture zone that trends N 50°80°W intersects fractures that trend due N to N10°W. The inserts of Pit A in figure 2 show the spatial relationship between fracturing and radioactivity in the rock.

The uranium minerals are associated with copper oxides to the extent that the strongest radioactivity has been found where copper oxides occur in relative abundance (fig. 2). Also, the uranium minerals seem to be associated with hematite though to a less marked degree than with copper.

A possible reason for the localization of ore minerals in this deposit may be the relative competency of the silicified rhyolite as compared to the surrounding rock. This feature would have allowed for the formation, under stress, of relatively persistent fractures in the silicified rock. Such fractures probably would afford the best access to ore-bearing solutions. The reason for the silicified zone in the rhyolite is not known, but features such as slickensides on one of the fracture faces, and thin zones of brecciation suggest that this zone of silicification corresponds to a zone of faulting. If such is the case, it is likely that silicification of the rhyolite is a secondary feature caused by solutions that traveled along a fault zone in the rhyolite.

Assuming that the deposit originally contained primary uranium minerals, which probably is the case, it seems to correspond to King, Moore, and Minrich's [1] "quartz-sulphide-carbonate-hematite" type. Although pitchblende has been found to depths as great as 3700 feet at the Sunshine Mine in Idaho, according to King, Moore and Minrich's [2], "the vertical range in which pitchblende occurs in each place, however, appears to be rather short -- about 200 to 400 feet." The Little Doe deposit, therefore, is believed to have a short vertical range.

PRODUCTION AND GRADE

The Little Doe property started as a copper prospect. Judging from the small extent of the workings the production was small. The only recorded shipment, made early in 1952, is 5 tons from near the east end of Pit A. This 5 tons contained 3.21 percent copper, 2.7 percent lead, 3.68 ounces of silver, and 0.01 ounce of gold. Uranium was not recognized in the deposit until later.

The locations, widths and grades of samples in Pit A is shown in figure 2. The best assays range from 0.116 to 0.180 U_3O_8 (AEC, F8271 and F8268; USBM 11433) and are from samples selected near the fracture intersections mentioned on page 4. These samples average a little over a foot in length and were cut across the trend of the mineralized zone. However, the sample lengths do not represent

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1/ King, R.U., Moore, F.B., and Minrichs, E.H.; Pitchblende Deposits in the United States: Selected Papers on the Uranium Deposits in the United States, Geological Survey Circular 220, pp. 8-10, 1952.
2/ Idem.

the width of a zone of maximum radioactivity. In the two USBM samples the maximum radioactivity occurred in a single zone only 2 or 3 inches wide and the overall grade of the sample is an average of these thin, higher grade stringers and the surrounding lower grade rock. In the two USBM samples and three of the AEC samples for which both chemical and radioactive assays were made, the radiometric values were slightly higher than the chemical. An AEC sample taken at the collar of Shaft B across an almost vertically dipping fracture zone gave a radiometric assay of 0.01. Radioactivity of this low order is found in many places in the silicified rhyolite outside of the two shafts and Pit A. In Pit A and in Shaft B no indication of an increase of radioactivity with an increase of depth was found. In fact, the relatively high grade spot at the west end of Pit A was traced downward from the brink of the pit by Geiger Counter, and was found to die out at a depth of five or six feet.

EXPLORATION

The deposit has not been explored to any greater extent than the small workings shown in figure 2. Exploration proposed by the applicant includes road building, diamond drilling, construction of a surface mine plant, shaft sinking, drifting, and raising.

RESERVES

A very small amount of uranium is concentrated in certain fractures and fracture intersections mainly in Pit A. The indicated and inferred reserves of Pit A are estimated to be less than one ton of material containing 0.10 percent U_3O_8 and 6 percent combined copper

and lead. Probably a small amount of pitchblende, and consequently higher grade rock, can be found below the present workings. But geologic conditions indicate that there is very little promise of finding a significant tonnage of uranium ore in this deposit.

CONCLUSIONS AND RECOMMENDATIONS

Because of the improbability of discovering a significant tonnage of uranium ore on the Little Doe No. 1 Claim government participation in the exploration of this deposit should be denied.

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

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

Not to be filled in by applicant

Docket No. 3435
Metal or Mineral Uranium
Date Received
Estimated Cost $264,082
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: AMERICAN URANIUM CORPORATION, 270 N. Church, Tucson, Arizona
President - James A. Woolsey, 3127 North Stone Avenue, Tucson, Arizona
Vice-President- Otho V. Kinsley, Amado, Arizona
Secretary-Treasurer - Hymen D. Goldberg, 270 North Church, Tucson, Arizona

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

(*c*) If a corporation, add to above statement, titles, names and addresses of officers. See 1 (a)

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

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

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract The land to be explored consists of one unpatented lode mining claim lying in the North Half (N½), Section 20, Township 22 South, Range 10 East, G.&S.R.B.&M., Oro Blanco Mining District, Santa Cruz County, Arizona.

(*b*) State any mine name by which the property is known. Little Doe No. 1

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Lease with option to purchase

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

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

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. Book 28 of Notices of Mining Locations, page 133, Santa Cruz County, Arizona.

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

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

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

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

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

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore Uranium
See annexed sheets.

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

(*c*) The work will start within ..... days and be completed within ..... months from the date of an exploration project contract. Promptly

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

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

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.). See annexed sheets for all parts of Item 6.

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

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

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

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

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

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

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

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

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

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

☐ Money ☒ Use of equipment owned by you ☒ Other

Explain in detail on acompanying paper.

CERTIFICATION

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

Dated July 28, 1954

AMERICAN URANIUM CORPORATION
(Applicant)

By James A. Woolsey
President

ATTEST:

By Hymen D. Goldberg
Secretary

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

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

APPLICATION 4 (a) PURSUANT TO DMEA ORDER NO. 1
OF
AMERICAN URANIUM CORPORATION

4. Physical Description.

(a) No mining operations are now being conducted and former operations were of a general exploratory nature. Of ten workings within the claim boundaries, five are shallow pits ranging in depth from 5 to 10 feet; one is an adit crosscut 45 feet long; two are nearly vertical shafts, 52 and 58 feet deep respectively; one pit or sub-surface stope in the vein is 19 feet long and varies in depth from 11 to 19 feet; and one shallow surface trench is 7 feet long, varying in depth up to 4 feet. For locations of these workings see figures 2 and 3. The workings aggregate 266 feet of exploration and cover about 350 feet of the strike length of the mineralized fault zone. All of the workings are open and readily accessible, excepting only the two shafts which are without ladders.

(b) There is no current production. Production in the past was from the sub-surface stope and was limited to trial shipments of ore containing secondary copper minerals and a little gold and silver. Mining operations proved unprofitable and were discontinued. There are no ore reserves within the present status of development although they are within the realm of possibility. Geologic evidence favors an increase in ore deposition and enrichment at depth. This condition may also apply to an increase in the present surface uranium mineralization.

(c) The Little Doe Mine lies at an elevation of 4250 feet on the lower West slope of the northward trending Cobre Ridge, a dominant physiographic feature of the Oro Blanco Mountains which constitute the eastern portion of an extensive uplifted dissected table land covering the southwestern portion of Santa Cruz County and a considerable portion of adjoining Pima County. Cobre Ridge has a crest line averaging 4500 feet above sea level and a high point of 5370 feet on Fraguita Peak, which is about 3/4's of a mile east of the Little Doe Mine.

The local topography consists of a series of southwesterly trending ridges, spurs of Cobre Ridge, and low rounded hills with the drainage westerly and southwesterly into Fraguita Wash, a tributary of the larger Arivaca Wash lying to the north. The area is shown in the 15 Minute Arivaca Quadrangle, Edition of 1943, Published by the Geological Survey.

Uplift of the Oro Blanco - San Luis Mountain block is believed to have begun in early Cretaceous time and to have extended well into Tertiary time with the climax of tectonic activity reached in Laramide time. Much of the range is made up of the

following sequence of rocks: Beginning with a pre-Cambrian basement complex; post-Paleozoic schists; Cretaceous sediments (including Oro Blanco Conglomerate); Older Volcanics (chiefly andesite and rhyolite); Monzonite; Diorite (with variations); Tertiary lavas; and minor intrusives. The petrological pattern is complex and in all but a few places the rocks remain undifferentiated.

A series of E-W faults on the east side of Cobre Ridge are the locale of the most noted ore deposits in the Oro Blanco Mountains. On the west side the most noted ore bearing fault is that of the Little Doe Mine, which lies chiefly in a contact zone of what has been provisionally classed as monzonite porphyry and a light acidic rhyolite. The zone has considerable width and strike length trending southeasterly and apparently crossing Cobre Ridge at a considerable distance away at a sharp angle. The monzonite appears to have invaded the rhyolite locally replacing it, forming a wide silicified zone which, because of its erosion resistant qualities, projects above the surface in the form of massive rugged outcrops extending a considerable distance along the fault strike.

The Little Doe ore deposits are genetically related to a quartz-diorite which invaded the monzonite and rhyolite. They are of the vein type consisting chiefly of mineralized shear zones and minor quartz filled fissures the whole appearing as short closely spaced lenses dipping steeply to the northwest. Although the fault zone appears to be mineralized over a considerable width the fissuring and mineralization appears to be most intense in the first two or three feet next to the fault wall. No primary ore minerals are in evidence but their oxidation products indicate they are epigenetic hypogene in origin and epithermal in their mineral associations. The depth of the oxide zone is unknown but structural evidence would indicate it may extend downward as much as 200 feet.

The mine was explored and worked for its copper ore which at its best did not exceed 4%, with a very small amount of gold and silver. The presence of uranium minerals in the ore was not suspected until quite recently. An analysis of a sample of the average ore by the Metallurgical Division of the US Bureau of Mines gave the following results: (Qualitative only) - Quartz - Feldspar - Malachite - Azurite - Chrysocolla - Limonite - Small amounts of Cerussite and Smithsonite - and Manganese Oxides. The uranium minerals present were: Kasolite - Uranophane and sporadic grains of Torbernite. Certain radioactive tests indicate the sample contains 0.50 percent equivalent U_3O_8.

The reasons for wishing to explore the Little Doe vein is because of the widespread radioactivity emanating from a strong deep seated fault zone. When examined by A.E.C. Field Engineers radioactivity was found to be particularly strong in Sections 2 and 3. See Figure 3. In Works #4 (sub-surface stope)

they reported readings of as high as 500 - 600 Cps. Others have since confirmed these. High readings were also obtained in Wks #9 (52 ft. Shaft), and Section #4 (See Figs. 2 &3). At this latter location other Scintillometer readings showed a radioactive zone over 100 feet wide across the strike of the fault zone. This is one of the places it is planned to diamond drill. (See Core Drilling Diagrams, See Fig. 5, Section #4).

This mine occupies a favorable location in an extensive area of vast unknown uranium bearing potentialities. The fact that many small mines in the district show wide spread radioactivity furnishes incentive for more systematic and extensive investigation. There are many encouraging signs present in the search for uranium in this region and at least one mine should be explored and investigated at depth to determine the true potentialities of the area. The Little Doe Mine is favorably situated for this purpose and its exploration will establish whether or not this area may be relied upon as a source of uranium ore.

(d) Accessibility, etc. - See Arizona Highway Map for information on roads leading into the area from Tucson or Nogales. For roads from Arivaca to the mine see Fig. 1 attached to answers to questions. It is sixty (60) miles from Tucson to Arivaca, via 36 miles of Highway #89 to Arivaca Junction, Kinsley Ranch, and 24 miles over an improved dirt road to Arivaca; then seven (7) miles of ranch and primitive roads, some of which occupy the stream beds of dry washes. The last 2.9 miles are rough but passable; if put to continuous use they would require some rehabilitation. The last 1300 feet should be rerouted because of steep impractical grades.

The nearest important supply point is Tucson, 67 miles by the aforementioned roads. The nearest RR shipping point is Amado Siding on the Tucson-Nogales Branch of Southern Pacific Railroad at a point about 36 miles south of Tucson, 2.3 miles from Arivaca Jct., and a total of 34.4 miles from the mine.

(e) Availability of:

Manpower. - Miners, mechanics and laborers are relatively abundant now in the Pima-Santa Cruz area.

Materials and supplies. - Can be had in almost any character and quantity in Tucson.

Equipment. - Can be had locally for contracting use, but for purchase or rental it must be procured from a larger machinery shopping center.

Water. - The country is arid with no nearby springs or running water except during short periods in the rainy season about two months in duration. The nearest well or tank is at Las

Jarillos Ranch, two miles from the mine. A shallow well sunk in Fraguita Wash (the principal drainage channel of the immediate area) at a point about .8 mile from the mine might furnish enough water for engine cooling or light domestic uses. The permanent water table in the mine may not be reached under 400 feet from the surface.

Power. - The nearest available source of public electric power is about 35 direct miles from the mine. Diesel or gasoline power may be used as an alternative.

5. The Exploration Project.

(a) Exploration is specifically for commercial deposits of uranium ores as the result of strong uranium radioactivity revealed at various points on the property by Geiger Counter and Scintillometer.

(b) The proposed work consists of several phases and begins with the rehabilitation and partial rerouting of the present access road which is made necessary because of its general roughness and its steep impractical grades. Of the 2.8 miles of road included in this phase all but a few hundred feet of it near the mine can be rehabilitated in short order by a bulldozer and blade. One short section near the mine requires some blasting and bulldozing to remove a short steep grade. A short distance beyond this point the road should be rerouted a distance of 1600 feet to the mine. This new construction requires some blasting and considerable bulldozing. See Fig. 2.

The next phase of the exploration project concerns the core drilling of the mineralized fault zone for a distance of 400 feet of its strike length. This distance has been divided into sections of various lengths; each section includes structural conditions believed to be favorable to ore deposition. The drilling program calls for 8 holes, two in each section, collared from the same setup and planned to intersect the fault formation as nearly as possible at right angles to its strike. For details see Fig. 5. The following schedule is based on a careful survey.

Section	Footage: Upper Hole	Footage: Lower Hole	Total Feet	Vertical Depth Reached
1	210	385	595	410 Feet
2	205	400	605	385 Feet
3	215	400	615	425 Feet
4	225	385	608	400 Feet
	853	1570	2423	

The next phase concerns excavation and levelling of an area of 4500 sq. ft. to provide room for mine buildings. This involves the removal of approximately 800 cu. yds. of material by blasting and bulldozing. See Fig. 7.

Mine Buildings. - Consisting of:

Hoist House - With concrete foundation for hoist. (12x16)
Compressor House - 12x14
Shop & Tool House - 14x20
Change House - 12x18
Latrine - 4x5
Timber Shed - 12x16
Ore Bin - 50 Tons
Head Frame - 40 Feet
Powder Magazine - 5x7x12

Note. - The above service buildings are of light wooden frame sheathed in galvanized corrugated iron or aluminum. The timber shed is open on all sides. The ore bin is constructed of heavy timber and planking with bottom lined with steel plates. The head frame is constructed of 8x10, 8x8, and 6x8 timbers with all necessary bracing, steel tie rods, angle plates, etc. The above buildings are complete with doors, windows and all necessary hardware.

Underground exploration consisting of:

A vertical two compartment shaft 420 feet deep with levels at 100 ft. intervals, each level extending 300 ft. north and 100 ft. south of the shaft respectively; four raises, three north and one south of the shaft, each extending from the bottom level to a short distance above the top level. See Fig. 6.

Footage represented:

Shaft	420 feet	
Drifts. . . 4 @ 400 ft.	1600 feet	
Raises. . . 3 @ 350 ft.	1050 feet	
Raise . . . 1 @ 325 ft.	325 feet . .	3395 ft

The shaft projects the present 52' shaft (Fig. 2) down to 420 feet, involving its enlargement to planned section followed by the sinking of 368 feet of new shaft. The overall excavation section is between 13' x 8' and 12' x 7' producing 6.5 to 8 tons of ore or waste per vertical foot of shaft. The shaft to have two compartments with the overall timbered section 11'4" x 6'10", including lagging, and the inside measurements are: Hoistway 5'x4' 10", and Manway 4'10"x4'. Timber sets at 5' centers, consisting of

8x8 plates and ends with 6x8 dividers, 8x8 posts, 6x8 posts; 2x10 lagging; and 3/4" hanging rods on all sets. Hoistway will be blocked off from manway by one inch lining boards with 4x6 surfaced guides. There will be platforms and staggered ladders in manway.

Materials used per set:

Lumber: Maximum 780 Bf.
Steel rods, nuts, washers, nails: 40 lbs.

In addition to the regular timber sets (80), four station sets are required. Each of these require 1130 Bf. lumber and 25 lbs. of steel items or a total of 3752 Bf. lumber and 100 lbs. steel items

Total lumber required for shaft . . . . . 66,920 Bf.
Total steel items . . . . . 3,140 lbs.

Air & Water Service:

Air Piping . . . . . 450 ft. 2 1/2" BI
Valves & Fittings
Water Piping . . . . . 450 ft. 1" BI
Valves & Fittings

The above includes all materials used in the shaft excepting drilling and blasting supplies.

Drifting:--

Four 5x7 drifts, each 300 feet north of the shaft and 100 feet south of the shaft for a total of 1600 feet. Two drifts to be run simultaneously with an advance of 5 feet each per day. See Fig. 6.

Materials used:--

Tramways: 1520 feet, consisting of 1215 lbs. 12# rails, 825 4x4x2'6" ties, 3300 3/8x3" spikes, 180 splice bars, and 660 1/2x 1 3/4" bolts.

Pipelines:
Air - 1440 feet of 1 1/2" BI pipe with fittings
Water - 1440 feet of 1" BI pipe with fittings.

Muck Sheets - 4 4x8x1/8"

Drill Bits - 3467 throw away bits

Blasting Supplies:
Powder - 27,664 lbs.
Caps - 6,000
Fuse - 46,080 feet

Carbide - 1600 lbs.

Labor, power and other charges in Estimates of Costs.

Raising:--

Four raises are planned - 3 of 350 feet each and one of 325 feet. See Fig. 6. Total footage will be 1291', divided into two compartments, ore or waste chute 4'6"x4' and manway 4'x3', 8x8 dividers 5' centers, chute unlined excepting next to the manway. Manway has ladders and a resting platform at 12 feet intervals. Each chuteway is equipped with the usual wooden draw-off chute at the bottom.

Materials used:--

Lumber	25,500	Board Feet
Wedges	1,648	
Nails.	500	lbs.
Carbide.	1,300	lbs.
Drill Bits	2,925	throw away bits
Powder	26,000	lbs.
Caps	4,500	
Fuse	59,490	Feet
Air Pipe & Fittings.	1,320	Ft. 1½" BI
Water Pipe & Fittings.	1,320	Ft. 1" BI

(c) The work will start immediately on receipt of contract and be completed in detail as follows:

#1 Road Work - 15 days
#2 Core Drilling - 75 days
#3 Surface excavating - 8 days
#4 Shaft sinking - 120 days
#5 Drifting - 170 days
#6 Probing (By means of raising) - 110 days
TOTAL - 498 days

Two or more operations carried on simultaneously and with longer hours on core drilling would reduce the total by at least 88 days.

(d) The applicant, American Uranium Corporation, consists of four members, each with a record of success and wide experience in his line. James A. Woolsey, President, holds a responsible position with the Southern Pacific Railroad and is an inventor of some note. Otho Kinsley, Vice-President, is a prominent resort owner, well drilling contractor, road builder and mine operator. Hymen D. Goldberg, Secretary, is a practicing attorney in Tucson. Joseph G. O'Brien, Engineer and Geological Consultant, is a mining engineer of forty years' experience and is the author of maps, drawings and technical data, including that accompanying this application. He will supervise the work involved.

6. Estimate of Costs. (See annexed sheets).

7. (b) The corporation's share of the cost will be furnished in the following manner:

The corporation will hire all equipment necessary from Mr. Otho Kinsley, who will turn back to the corporation all sums received therefor. Also, there will be turned back to the corporation all sums due for supervision, engineering and geological services and administrative services. In addition, there will be available to the corporation for use in this project all sums that it may earn in connection with other mining operations, as well as from the sale of any of its stock.

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6. Estimate of Costs.

(a) Independent contracts - All work will be performed by and under the supervision of the American Uranium Corporation, except for minor portions as occasion may require.

ITEM ONE - ACCESS ROAD - (See Page 4 and Figure 2) - Includes blading, reducing grades, rerouting and construction of approximately 1500 feet of road.

Use of bulldozer for 15 days at $16.50 per hour	$ 2,475.00	
Use of Portable 105 Cfm air compressor, jackhammer and two sets steel at $2.50 per hour	375.00	
Blasting Supplies	250.00	
Labor	375.00	
Supervision - $500.00 per month for .6 months	300.00	
TOTAL		$ 3,775.00

ITEM TWO - CORE DRILLING - (See Page 4 and Figure 5)

Eight holes aggregating 2423 feet at $7.50 per foot.	$ 18,172.50	
Supervision - $500.00 per month for 3 months.	1,500.00	
TOTAL		$19,672.50

ITEM THREE - SURFACE LEVELING - (See Page 4 and Figure 7)

Providing an area of 4500 sq. ft. for service building sites. Removing approximately 800 cubic yds. of material; use of bulldozer, portable air equipment, blasting supplies, at $3.00 per cu. yd . . .	$ 2,400.00	
Supervision at $500.00 per month for .33 months.	165.00	
TOTAL		$2,565.00

ITEM FOUR - SERVICE BUILDINGS AND MINE STRUCTURES (See Page 4 and Figure 7)

Seven service buildings with an aggregate floor space of 1118 sq. ft. at a cost of $3.18 per sq ft. .	$ 3,555.24	
One 50 ton ore bin at $36.00 per ton capacity.	1,800.00	
One 40 foot headframe designed for fast hoisting of heavy loads at $87.50 per vertical ft.	3,500.00	
Materials used in building structures, including 16,100 B.F. of lumber, 3,800 sq. ft. corrugated galvinized iron or aluminum, 600		

lbs. of nails, 450 lbs. steel rods, 50 lbs. nuts, washers and bolts, doors, windows and also labor . . . . . $ 8,855.24

TOTAL

ITEM FIVE - INSTALLATION OF HEAVY OPERATING EQUIPMENT (See answers to Question D) Weight estimated at 11 tons

Installation and dismantling. . . .	$ 500.00	
Estimated transportation cost based on a 400 mile round trip at 15¢ per ton mile.	660.00	
TOTAL		$ 1,160.00

ITEM SIX - UNDERGROUND EXPLORATION - (See Page 5 and Figure 6)

First there will be a two compartment shaft 420 feet deep with stations for levels at 100 ft. intervals. Materials to be used are:

Lumber - 66,834 B.F. at $130.00 per M delivered	$ 8,688.42	
Steel rods - 3500 lbs at 15¢ per lb.	525.00	
Nuts and washers - 400 lbs at 25¢ per lb.	100.00	
Guide bolts, washers and nuts . .	100.00	
Station hardware, hinges, washers, nuts and bolts.	50.00	
Wire nails - 900 lbs at 18¢ per lb.	162.00	
TOTAL		$ 9,625.42

Drilling supplies - Using throw away bits, each with an average service of 6 ft. of drilling, requiring a total of 1800 bits. . .	$ 396.00	
Steel loss through breakage estimated at 1 lb. per foot of shaft at 60¢ per lb	252.00	
Lighting - Surface - Gasoline lanterns 3 gals. per night or 330 gals at 40¢ each	$ 132.00	
Lighting - Underground - 2 lbs of carbide per foot of shaft at 20¢ per lb.	168.00	

Air and Water Pipe and Fittings:

450 ft. of 2½" pipe and fittings. .	$ 562.50
450 ft. of 1" pipe and fittings . .	177.00
35 pipe hangers	30.00

Water service - Hauled from a spring two miles away from mine. Used for drilling and also for cooling engine

200 gal. per day for 110 days at $12.00 per day.	$ 1,320.00

Blasting Supplies

20,000 lbs of powder at 20¢ each. .	$ 4,000.00
35,000 ft. of fuse at .0131	458.50
4000 caps at 3¢ each.	120.00

Equipment (See D) - All rented on the basis of $900.00 per 25 day month or $36.00 per day for approximately 110 days in shaft sinking.

Equipment consists of 50 HP hoist and cable 340-360; Cfm portable air compressor; 12 set os 1" Hex Hollow Drill steel; 2 steel ore or waste buckets; 1200 lbs. cap; 1 ton skip; 3 - 18 cu. ft. ore or waste cars; 3 heavy sinkers for shaft; 4 sets of hoses, couplings, etc	$ 3,960.00
Freight, installation and dismantling on a pro rata basis.	110.00
Upkeep.	500.00

Power -

Compressor - 11 gal. gasoline per ft. of shaft.	$ 1,116.40
Hoist - 9 gal. gasoline per foot of shaft	831.60

Labor -

Total of 15 man crew, including 7 miners, 1 miner's helper, 3 hoist men; 3 laborers, and one timber

framer and mechanic. Payroll, including taxes and insurance for 110 days	$30,688.90
Supervisor for 4½ months at $500.00 per month	2,250.00
Engineer and geological consultant 4½ months at $500.00 per month. . . .	2,250.00
Accounting - $50.00 per month for 4½ months.	225.00
Clerk-bookkeeper - $200.00 per month for 4½ months	900.00
Tax and insurance of supervisor, engineer and clerk-bookkeeper	810.00
First aid supplies.	100.00

SUMMARY OF SHAFT SINKING OPERATIONS

Equipment	- Installation, rental and freight . .	$ 4,070.00
	Maintenance.	500.00
Power	- Compressor 4620 gals. gasoline . . .	$ 1,116.40
	Hoist 3780 gals. gasoline.	831.60
Drilling Supplies	- Broken steel	$ 252.00
	Drill bits	396.00
Lighting	- Carbide and gasoline	$ 300.00
Air and Water Piping		$ 769.50
Water service.		$ 1,320.00
Blasting Supplies.		$ 4,578.50
Timbering.		$ 9,625.42
Labor.		$30,688.90
Supervision.		$ 2,250.00
Engineer and geological services		$ 2,250.00
Clerk-Bookkeeper		$ 900.00
Taxes and insurance on management and supervision		$ 810.00
Accounting Services.		$ 225.00
First Aid Supplies		$ 100.00
Liability and hazard insurance		$ 1,500.00
		$62,078.32

Total Carried Forward	$62,078.32
Contingencies and miscellaneous at 7½%	4,655.87
Total Cost of 420' of Exploration	$66,734.19
Cost Per Foot	158.89

UNDERGROUND EXPLORATION (Continued)

DRIFTS - Aggregating 1600 feet are driven on the 100 ft., 200 ft., 300 ft. and 400 ft. levels, each 300 ft. north and 100 ft. south of the shaft. A drift section is 5x7 making a total area of 35 sq. ft. At approximately 3 tons of material per foot, there will be a total of 4800 tons.

WORK CYCLE - Will be drilling, blasting, ventilating, mucking and track laying. Work will be staggered in two phases with a minimum advance of 5 ft. in each phase, or 10 feet per day, working two shifts per day - 24½ or 25 days per month. The drifts require no timbering. Ore pockets or chutes included under Raises.

Drilling -

Loss of steel through breakage approximately .4 lb. per ft. of drift or 160 lbs. @ 60¢	$ 384.00
Drill bits 6' - 5600 @ 22¢.	1,232.00

Lighting -

Underground - 2000 lbs. Carbide @ 20¢	$ 400.00
Surface - 450 gals. gasoline @ 40¢.	180.00

Air & Water Piping -

1600' 2" BI pipe & fittings @ 45¢.	$ 770.00
1600' 1" BI pipe & fittings @ 25¢	400.00

Water Service -

200 gals. per day for drilling and cooling water for 170 days @$12.00	$ 2,040.00

Blasting Supplies -

42,000 lbs. powder @ 20¢.	$ 8,400.00
55,000 ft. fuse @ 0.0131.	720.50

9,000 caps @ 3¢	$ 270.00

Equipment -

Same rates as for sinking - 170 days @ $36.00.	$ 6,120.00
Frt. & Inst. Pro rata @ 47.12% of $1150.00.	542.35
Lubrication	550.00
Maintenance	700.00

Power
Compressor -

8 gals gasoline per ft of drift 12,800 gals @ 22¢	$ 2,688.00

Hoist -

7 gals. of gasoline per ft of drift 8000 gals @ 22¢	2,464.00

Tramways -

4 levels with 1600 ft of track-18" Ga. 12 lb. T Rails - 12,808 lbs. @ 15¢	$ 1,921.20
Track spikes - 3/8x3 - 460 lbs @ 21¢	96.60
Splice Bars - 190 @ 69¢	131.10
Ties - 4x4x2½ - 800 - 2667 Bf @ 13¢	346.72
Bolts & Nuts - ½x1 3/4 - 88 lbs @ 25¢	22.00

Labor -

(13 man crew) - 3 miners - 4 muckers & helpers - 3 hoistmen - 3 laborers - Payrool with all charges for 170 days.	$38,115.70

Supervision - $500.00 per month for 7.125 months.	3,562.50
Engineer & Geological Consultant - $500.00 per month for 7.125 months.	3,562.50
Accounting - $50.00 per month for 7.125 months	356.25
Clerk-Bookkeeper - $200.00 per month for 7.125 months.	1,425.00
Taxes and Insurance of Supervisor, Engineer and Clerk-Bookkeeper.	1,282.50
First Aid Supplies	100.00

SUMMARY OF DRIFTING OPERATIONS

Equipment	$ 7,912.35
Lighting	580.00
Air & Water Piping	1,170.00
Water Service	2,040.00
Power	5,152.00
Drilling Supplies	1,616.00
Blasting Supplies	9,390.50
Tramways	2,517.62
Labor	38,115.70
Supervision	3,562.50
Engineer & Geological Consultant	3,562.50
Accounting	356.25
Clerk-Bookkeeper	1,425.00
Taxes and Insurance	1,282.50
First Aid	100.00
	$ 78,782.92
Contingencies and Miscellaneous @ 7½%	4,908.72
Total Cost of 1600' of Drifting	$ 83,691.64
Cost Per Foot	52.31

PROBING - (by means of raises) Four vertical raises extending from the 4" level up through the 3", 2" and a little above the 1" level. See Fig. 6. Three raises are 350' each and one 325' for a total of 1375'. Individually there are 12 raises 93 feet each. Three are 50' each and one 25' for a total of 1291 feet of actual raising. The overall crossection is 8'x4' - 32 sq. ft. - 2.66 tons per vertical ft., or a total 3446 tons of material removed.

The raises are divided into two compartments - an ore or waste pocket, 4' 6" x 4' and a manway 4'x3'. The ore or waste pocket is untimbered excepting for a draw chute at the level and is divided from the manway by tight planking from top to bottom. The timbering in the manway consists of a line of 8x8 stulls with 6' centers, set in hitches in the walls and lined on the ore pocket side with 2" planking. Ladders are installed in the manway with safety platforms every 12 feet.

The 16 raises will require, with draw chutes, 27,500

Bf of lumber @ 13¢.	$ 3,575.00
2200 wedges @ 5¢.	110.00
700 lbs wire nails @ 18¢.	126.00

Air & Water Piping -

1500' 1½" BI pipe @ 35¢	$ 525.00
1500' 1½" Fittings.	60.00
1500' 1" BI pipe @ 25¢.	375.00
12 fittings	50.00

Water Service - Drilling & Engine Cooling

200 gals per day for 140 days @ $12.00. .	$ 1,680.00

Lighting - Underground - 1½ lb. Carbide per ft. of

raise - 1935 lbs @ 20¢.	$ 387.00
Surface - 400 gals gasoline @ 40¢	160.00

Equipment - Rental - Same rate as in sinking and

drifting - $36.00 per day for 140 days. .	$ 5,040.00
Frt. & Instal. pro rata - 40.3% of $1150.00.	470.00
Lubrication	400.00

Power-Compressor - 7 gals gas per ft of raise -

1291' @ 7 gals. gasoline @ 22¢.	$ 1,988.14
Hoist - 6 gals. gasoline per ft - 7746 gals @22¢.	1,704.12

Drilling - Drill breakage - Approximately .4 lb. per

ft of raise - 516 lbs @ 60¢	$ 309.60
Drill bits - 6' per bit - 3600 @ 22¢. . .	756.00

Blasting Supplies--

32,000 lbs powder @ 20¢	$ 6,400.00
65,490 ft fuse @ .0131¢	849.32
5,000 caps @ 3¢.	150.00

Labor - 15 man crew - 4 miners - 3 helpers - 2 trammers - 3 hoist men - 3 laborers- 140 days.	$37,608.20
Supervision - $500.00 per month for 5.875 months	2,937.50
Engineer & geological services - 5.875 months at $500.00 per month	2,937.50
Accounting - $50.00 per month for 5.875 months .	293.75
Clerk-Bookkeeper at $200.00 for 5.875 months . .	1,175.00
Taxes and Insurance on management and supervision.	1,057.50
First Aid.	100.00

SUMMARY OF PROBING OPERATIONS

Equipment.	$ 5,910.00
Lighting	547.00
Air & Water Piping	1,010.00
Water service.	1,680.00
Power.	3,692.26
Drilling supplies.	1,065.60
Blasting supplies.	7,399.32
Timbering.	3,811.00
Labor.	37,608.20
Supervision.	2,937.50
Engineer and Geological services	2,937.50
Accounting....	293.75
Clerk-Bookkeeper	1,175.00
Taxes and insurance on management and supervision	1,057.50
First Aid Supplies	100.00
	$71,224.73
Contingencies and Miscellaneous @ 7½%.	5,341.85
Total Cost of 1291' of Probing (Raises)	$76,566.58
Cost per foot	59.31

6. (b) Labor Schedule - Average Crews -

Shaft - 15 man crew: 7 miners, 1 general helper, 3 hoist men, 3 laborers, 1 timber framer and mechanic.

Drifts- 13 man crew: 3 miners, 4 muckers and miner's helpers, 3 hoist men, 3 laborers.

Probing (Raises) - 15 man crew: 4 miners, 3 helpers, 2 trammers, 3 hoist men, 3 laborers.

Supervision - $500.00 per month.

Engineering and Geological services - $500.00 per month.

Clerk-Bookkeeper - $200.00 per month.

Accounting Services - $50.00 per month.

The following wage schedule is applicable to the above operations:

Class	Scale Daily	Payroll Charges	Total
Miners - Shaft	$ 18.00	$ 2.59 @ 14.4%	$ 20.59
" " - Other	16.00	2.30 "	18.30
Muckers - Shaft	16.00	2.30 "	18.30
" " - Others	15.00	2.16 "	17.16
Laborers - UG	14.00	2.02 "	16.02
" " " - Surface	13.00	1.87 "	14.87
Hoistmen -	15.00	2.16 "	17.16
Timber Framer	18.00	2.59 "	20.59

*Note - All payroll charges come to 14.4% of payroll.

(c) Operating materials and supplies - Small equipment and tools.

2 - 4# Hammers.	@	$ 3.50 . . .	$ 7.00
1 - 8# Hammer	@	5.00 . . .	5.00
1 - 10# Hammer.	@	5.50 . . .	5.50
8 - Drifting Picks.	@	4.50 . . .	36.00
4 - Square Point Shovels.	@	4.50 . . .	18.00
6 - Round Point Shovels	@	4.25 . . .	25.50
4 - 4'x6'x¼" Steel Sheets	@	40.44 . . .	161.76
2 - Pinch Bars - 3/4"	@	1.50 . . .	3.00
2 - Scaling Bars - 7/8" x 6	@	2.50 . . .	5.00

1 -	Track Level	@ $ 2.25	$ 2.25
1 -	Track Wrench.	@ .50	.50
1 -	Track Gauge - (Make).	@ .00	.00
2 -	3' Timber Saws.	@ 4.75	9.50
1 -	Miners Axe.	@ 3.75	3.75
1 -	Steel Scraper - 8'.	@ 1.50	1.50
1 -	Steel Scraper - 6'.	@ 1.50	1.50
4 -	Plumb Bobs with string.	@ 4.00	16.00
6 -	Loading Sticks - Round - 8'	@ .75	4.50
1 -	Cap Crimper	@ .75	.75
1 -	Hose Clamping Machine	@ 6.00	6.00
1 -	Steel Tape - 100 ft	@ 10.50	10.50
2 -	Carbide Lamps	@ 3.00	6.00
2 -	Carbide Lamps	@ 1.75	3.50
3 -	Hardboiled Hats	@ 6.00	18.00
6 -	Pick Handles.	@ 1.25	7.50
3 -	Axe Handles	@ 1.25	3.75
2 -	Maul Handles.	@ 1.00	2.00
1 -	Forge and Hand Blower	@ $65.00	$ 65.00
1 -	Lot Blacksmith Coal - 200#.	@ .03	6.00
1 -	125 # Anvil	@ 40.00	40.00
3 -	Prs. Blacksmith Tongs	@ 1.50	4.50
3 -	Cold Chisels.	@ .75	2.25
1 -	Hot Cutter.	@ 2.50	2.50
1 -	Hardie.	@ 1.50	1.50
2 -	Ball Pein Hammers	@ 2.00	4.00
1 -	Set of 12 files	@	7.00
1 -	Bench Vise.	@ 35.00	35.00
1 -	Hacksaw - and extra blades.	@ 6.25	6.25
1 -	Hand Grinder - 8" Wheel	@ 12.00	12.00
1 -	Bolt Stock and Dies	@ 15.00	15.00
1 -	Pipe Vise	@ 10.50	10.50
1 -	Pipe Cutter	@ 7.50	7.50
6 -	Stilson Wrenches - 10" - 14" - 18 - 24	@ 20.00	20.00
1 -	Pipe Stock & Dies - ½" to 1".	@ 18.00	18.00
1 -	Pipe Stock & Dies - 1¼" to 2½".	@ 35.00	35.00
2 -	Crescent Wrenches - 10" - 16"	@ 4.25	4.25
2 -	Pliers - 6" & 10"	@ 3.25	3.25
1 -	Set of Open End Wrenches.	@ 7.50	7.50
1 -	Tin Snips - 14"	@ 2.75	2.75
1 -	Pkg. Emery cloth.	@ .40	.40
1 -	Pkg. Sand Paper	@ .25	.25
1 -	Set of Wrenches for Compressor.	@ 5.50	5.50
1 -	Carpenters Square	@ 2.50	2.50
1 -	Timber Axe.	@ 3.75	3.75
1 -	Hand Axe.	@ 3.50	3.50
1 -	Docking Saw - 30"	@ 4.25	4.25

4 -	Screw Drivers . . . . . @	$ 2.90 . . .	$ 2.90
1 -	Carpenters Level. . . . . @	5.00 . . .	5.00
2 -	Claw Hammers. . . . . @	2.25 . . .	4.50
1 -	Brace & Set of Bits . . . . . @	11.25 . . .	11.25
3 -	Chisels . . . . . @	6.25 . . .	6.25
2 -	Carpenters saws . . . . . @	8.50 . . .	8.50
1 -	Rip Saw . . . . . @	3.75 . . .	3.75
2 -	Brooms. . . . . @	2.00 . . .	4.00
1 -	Bndl. of Waste - 40#. . . . . @	.20 . . .	8.00
1 -	One Ton Chain Blocks. . . . . @	65.00 . . .	65.00
1 -	One Set of Falls with 200' 5/8 rope. . . . . @	10.00 . . .	10.00
1 -	Steel Wheelbarrow . . . . . @	15.00 . . .	15.00
3 -	Pyrene Fire Extinguishers . . . . @	20.00 . . .	20.00
6 -	Gasoline Lamps. . . . . @	12.50 . . .	75.00
1 -	First Aid Kit . . . . . @	22.00 . . .	22.00
1 -	12" Signal Gong . . . . . @	26.00 . . .	26.00
2 -	Hand Oilers . . . . . @	1.10 . . .	2.20
1 -	Alemite Grease Gun. . . . . @	12.00 . . .	12.00
1 -	Funnel - 10". . . . . @	2.00 . . .	2.00
-	10 lbs. light grease. . . . . @	.40 . . .	4.00
-	10 lbs. heavy grease. . . . . @	.50 . . .	5.00
-	5 gals. kerosene . . . . . @	.45 . . .	2.25
-	Miscellaneous Items	. . .	50.00
			$1,061.76

The aforegoing list includes mostly tools and few supplies. Operating materials and supplies are already incorporated into the various operation costs - such as blasting supplies, fuels, drills, etc. It would be the policy of the operator to bring in supplies bimonthly, always having a two weeks reserve above current usage.

(d) Operating Equipment. - No equipment will be furnished by the operator. All equipment used on the project will be had on a rental or rental purchase basis. The equipment to consist of a 50 HP Gasoline Hoist with 650 feet of 7/8" cable; one ton skip; 2 ore or waste buckets of 1200 lbs. capacity each (for shaft sinking); 1 - 18 cu. ft. ore car; three 60 lb. sinkers (one as a standby); 600 lbs. 1" Hex Hollow Drill Steel; 3 air hoses 1" x 50' with couplings; 3 water hoses 3/4" with couplings; one portable compressor, 340 - 360 Cfm; one extra air receiver 4'x12'. All necessary fittings and valves.

When the shaft is completed the three sinkers and the two ore buckets will be returned and replaced with two more ore cars, two drifters and still later by two stopers. The rental of this equipment is placed at $700.00 per month of 25 working days. Probably arrangements can be made to have this rental apply on a

purchase contract. The operating company to keep the equipment in repair and to transport it to and from the place of rental at their expense. See the fourth paragraph (Equipment) on page C.

(e) Rehabilitation and repairs. - None

(f) New Buildings, etc. - See Fig. 7

Seven service buildings and two mine structures are planned as follows:

Hoist House	12x16 - Floor Space	192 sq. ft.	$ 812.00
Compressor House	12x14 - " "	168 " "	541.00
Shop & Tool House	14x20 - " "	280 " "	793.00
Change House	12x18 - " "	216 " "	737.00
Latrine	4x5 - " "	20 " "	148.00
Timber Shed	12x16 - " "	192 " "	268.00
Powder Magazine	5x7x12- " "		285.24
Ore Bin	50 tons capacity		1,800.00
Headframe	40 ft. high		3,500.00
		TOTAL	$8,855.24

The service buildings are of light frame construction sheathed with galvanized corrugated iron. The timber framing shed is open on all sides. The indicated cost of the hoist house includes the cost of the cement foundation for the hoist. The ore bin has a frame of heavy timber with a lining of planking and a steel covered bottom. The headframe is 38-40 feet high, constructed of 8x10, 8x8 and 6x8 timbers, cross and angle braced, steel tie rods, angle anchor plates, etc. The powder magazine consists of a semi-tunnel between rocky outcroppings, timber frame, lined with planking, galvanized roof covering, and over all a heavy covering of dirt to protect it from stray bullets. In the aforegoing buildings and structures the following materials were used: Lumber - 16,100 Bf; Galvanized iron - 3800 sq. ft.; Nails - 600 lbs.; Steel rods - 450 lbs; Nuts, Washers and Bolts - 50 lbs; 22 Window sashes, 10 Doors, 20 prs. hinges, 10 hasps and locks. In the heavy structures, special timbers of extra length are to be used in the headframe, costing approximately $150.00 per M besides labor and supervision. Total Cost $8,855.24.

(g) Miscellaneous repairs and maintenance of major operating

equipment. This largely depends on the condition of the equipment when received and on the care it gets from those who handle it. Based on past experience and barring major breakdowns, the following figures are believed to be fair estimates of repairs and maintenance on the following equipment:

Hoist, cable and skip	$ 50.00	per month of 25 days
Compressor.	60.00	" " " " "
Air Drills.	30.00	" " " " "
Air hoses and drill steel	50.00	" " " " "

The above figures apply to an operation of three air drills at a peak of not to exceed 12 hours out of 24.

All payroll charges in Arizona (State and Federal) amount to 14.4% of the wages or salary paid. - $14.40 per $100.00 wages paid.

(h) Contingencies. - A 7½% contingency allowance has been made and is included in the aforegoing cost estimates to cover overhead, interruptions, delays, work stoppages or other conditions beyond our control.

COST ESTIMATES SUMMARY

Access Road	$ 3,775.00	
Core Drilling	19,672.50	
Surface Levelling	2,565.00	
Service Buildings	8,855.24	$ 34,867.74
Installation of Heavy Equipment.	1,160.00	1,160.00
Shaft	66,734.19	
Drifts.	83,691.64	
Probing (Raises).	76,566.58	226,992.41
Tools and Supplies.	1,061.76	1,061.76
TOTAL COST OF EXPLORATION PROJECT		$264,081.91

STEVENSON AND GOLDBERG
ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

AGREEMENT OF LEASE

AGREEMENT made this 2nd day of July, 1954, by and between ADA CALLEN, a single woman, of the City of Tucson, County of Pima and State of Arizona, party of the first part, hereinafter referred to as Lessor, and AMERICAN URANIUM CORPORATION, an Arizona corporation, with its office at 270 North Church Avenue, Tucson, Arizona, party of the second part, hereinafter referred to as Lessee,

W I T N E S S E T H:

In consideration of the mutual covenants hereinafter set forth the parties hereto hereby agree as follows:

1. The Lessor hereby leases to the Lessee, and the Lessee hereby rents from the Lessor for a period of twenty (20) years from the date hereof the premises embraced in the mining location in the office of the Recorder of Santa Cruz County, which mining claim is known as Little Doe No. 1, said notice having been recorded on July 1, 1954, in Book 28 of Notice of Mining Location at page 133.

2. The Lessee shall pay to the Lessor, her heirs and assigns, a royalty of ten per cent (10%) of all ores mined from said lands or any part thereof until such time as the Lessee will have recouped from such mining operations its original costs, including testing and operation. Thereafter the Lessee shall pay to the Lessor a royalty of twelve and one-half per cent (12½%) of all ores mined and produced, with an additional bonus of two and one-half per cent (2½%) of all ores assaying more than two per cent (2%) of uranium, making a total royalty of fifteen per cent (15%). Proportionate royalties shall be paid to the Lessor on any and all bonuses received on ores mined or produced from said premises.

3. Lessor authorizes the Lessee to deal with refer-

to the lands hereby lease with the Atomic Energy Commission, the Defense Minerals Exploration Administration or any other state or federal governmental agency, and for that purpose, hereby authorizes the Lessee to execute, either in its own nor or in the name of the Lessor, any and all documents or instruments that may be necessary in connection therewith.

4. The Lessee agrees to examine and check said land and make such tests as it sees fit to determine the presence of various minerals therein and the advisability of mining same. It shall also perform all work necessary from time to time and cause all necessary documents to be prepared, executed and filed, at its own expense, to the end that the interests of the Lessor in the mining claim shall be preserved and shall be converted into a patent for said lands at the earliest practicable time.

5. The Lessee agrees that it shall and will perform a minimum of one thousand (1,000) man hours of work each six (6) months period of this lease. In the event that it should use mechanical equipment in the performance of its work, then such use of machinery shall be deemed as the performance of man hour labor or services and the cost of man hours will be computed by dividing the cost of such use, including an amount equal to the cost of rental of like equipment at the prevailing rate, by the hourly wage of mining labor in the general area. The neglect, failure or refusal of the Lessee to perform one thousand man hours of labor as herein defined within any six months period during the period of this lease shall give the Lessor the right to terminate the same upon giving thirty (30) days written notice thereof to the Lessee by registered mail addressed to the Lessee at the address hereinabove set forth. In the event that the Lessee does not remedy such default within such period of thirty days then all of the rights granted to it hereunder shall be terminated and this agreement shall be at an end. In the event that the uranium

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ore deposits are insufficient to allow the Lessee to operate the mine upon the property at a reasonable profit, then the Lessee may terminate this lease by sending notice of termination by registered mail to the Lessor. If, due to circumstances beyond the control of the Lessee, such as an act of God, floods, tornadoes, cave-ins, explosions, strikes, scarcity of materials or equipment, war and other like circumstances, the Lessee is unable to perform the man hours and services herein set forth, then it shall be relieved of the duty to perform said man hours of labor until the said circumstances are alleviated.

6. The Lessor covenants that she is the owner of the mining claim hereby leased and that she has full power and authority to make this agreement.

7. The Lessor shall perform any and all necessary acts and things that may be required to validate the mining claim embraced herein, including annual assessment work, as required by the statutes, laws and regulations pertinent thereto.

8. The Lessee shall work the mining claim in a manner necessary to good and economical mining so as to take the greatest amount of commercial ore feasible to be mined from the said claim, with due regard to the development and removal of ores from said mining claim. The second party shall comply at all times with the laws, rules and regulations now or hereafter enacted or promulgated by the United States Government, the State of Arizona and any of the agencies or instrumentalities of either of them. It shall also comply with provisions relating to workmen's compensation, as provided by laws pertinent thereto.

9. All royalties payable hereunder shall be paid to the Lessor, her heirs, executors, administrators and assigns, on or before the 25th day of each consecutive calendar month or as soon thereafter as payment is made by the Atomic Energy Commission or other governmental authority authorized and empowered to pay

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for uranium ores; royalties on other ores and minerals shall be paid on or before the 25th day of each month for ores mined and marketed during the preceding month. Royalties shall be paid on the basis of accepted mill runs or smelter returns to the Lessor, by the purchaser of said ore, who shall be authorized to make such payment direct to the Lessor by the Lessee herein, subject to existing law.

10. The Lessee shall have the option, during the term of this lease, to purchase the mining claim hereby leased, whether a patent therefor will have been issued or not, for the sum of $100,000.00 and shall receive credit against said sum for all royalties theretofore paid under the terms hereof.

11. The Lessee shall not assign this agreement or any rights thereunder, nor sublet the premises embraced hereby, without first having obtained the written consent of the Lessor.

12. The parties agree to cooperate with each other and to execute any and all documents or instruments that may be necessary to carry out the purposes and objects of this agreement.

IN WITNESS WHEREOF the first party has hereunto set her hand and the second party has caused this instrument to be duly executed by its proper corporate officers and its seal affixed on the day and year first above written.

/s/ ADA GALLEN
ADA GALLEN - First Party

ATTEST:

/s/ HYMEN D. GOLDBERG
Secretary

(CORPORATE SEAL)

AMERICAN URANIUM CORPORATION

By /s/ JAMES A. WOOLSEY
President
Party of the Second Part

STEVENSON AND GOLDBERG
ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

STATE OF ARIZONA }
County of Pima } ss.

The foregoing instrument was acknowledged before me this 2nd day of July, 1954, by ADA GALLEN, a single woman.

ROSE E. MILLAR
Notary Public

My Commission Expires:
June 26, 1956

(NOTARIAL SEAL)

STATE OF ARIZONA }
County of Pima } ss.

On July 2, 1954, before me personally appeared HYMEN D. GOLDBERG, to me personally known, who by me being duly sworn upon his oath did say that he is the Secretary of American Uranium Corporation, a corporation organized under the laws of the State of Arizona; that James A. Woolsey is the President of said corporation; that he knows the signature of the said James A. Woolsey; that the said James A. Woolsey executed the foregoing agreement as President for and on behalf of said corporation; and that he executed the same and caused the seal of the corporation to be affixed thereto on behalf of said corporation by authority of its Board of Directors; that thereupon he, the said Hymen D. Goldberg, attested the same as Secretary of said corporation, all pursuant to the authority of the Board of Directors of said corporation.

ROSE E. MILLAR
Notary Public

My Commission Expires:
June 26, 1956

(NOTARIAL SEAL)

STEVENSON AND GOLDBERG
ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

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

Not to be filled in by applicant

Docket No. _____
Metal or Mineral _____
Date Received _____
Estimated Cost _____
Participation (Government %) _____

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: AMERICAN URANIUM CORPORATION, 270 N. Church, Tucson, Arizona
President - James A. Hoolsey, 3127 North Stone Avenue, Tucson, Arizona
Vice-President- Otho V. Hinsley, Arado, Arizona
Secretary-Treasurer - Myron D. Goldberg, 270 North Church, Tucson, Arizona

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

(*c*) If a corporation, add to above statement, titles, names and addresses of officers. See 1 (a)

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

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

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract The land to be explored consists of one unpatented lode mining claim lying in the North Half (N½), Section 20, Township 22 North, Range 10 East, G.&S.R.B.&M., Cre Blanco Mining District, Santa Cruz County, Arizona.

(*b*) State any mine name by which the property is known. Little Boy No. 1

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Lease with option to purchase

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

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

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. Book 2 of Notices of Mining Locations, page 133, Santa Cruz County, Arizona.

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

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

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

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

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

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore Uranium
See annexed sheets.

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

(*c*) The work will start within ..... days and be completed within ..... months from the date of an exploration project contract. Promptly

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

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

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.). See annexed sheets for all parts of Item 6.

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

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

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

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

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

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

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

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

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

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

☐ Money ☒ Use of equipment owned by you ☒ Other

Explain in detail on acompanying paper.

CERTIFICATION

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

Dated July 19, 1954

AMERICAN URANIUM CORPORATION
(Applicant)

By James A. Woolley
President

ATTEST:

By Hymen D. Goldberg
Secretary

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

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APPLICATION 4 (a) PURSUANT TO DMEA ORDER NO. 1
OF
AMERICAN URANIUM CORPORATION

4. Physical Description.

(a) No mining operations are now being conducted and former operations were of a general exploratory nature. Of ten workings within the claim boundaries, five are shallow pits ranging in depth from 5 to 10 feet; one is an adit crosscut 45 feet long; two are nearly vertical shafts, 52 and 58 feet deep respectively; one pit or sub-surface stope in the vein is 19 feet long and varies in depth from 11 to 19 feet; and one shallow surface trench is 7 feet long, varying in depth up to 4 feet. For locations of these workings see figures 2 and 3. The workings aggregate 266 feet of exploration and cover about 350 feet of the strike length of the mineralized fault zone. All of the workings are open and readily accessible, excepting only the two shafts which are without ladders.

(b) There is no current production. Production in the past was from the sub-surface stope and was limited to trial shipments of ore containing secondary copper minerals and a little gold and silver. Mining operations proved unprofitable and were discontinued. There are no ore reserves within the present status of development although they are within the realm of possibility. Geologic evidence favors an increase in ore deposition and enrichment at depth. This condition may also apply to an increase in the present surface uranium mineralization.

(c) The Little Doe Mine lies at an elevation of 4250 feet on the lower West slope of the northward trending Cobre Ridge, a dominant physiographic feature of the Oro Blanco Mountains which constitute the eastern portion of an extensive uplifted dissected table land covering the southwestern portion of Santa Cruz County and a considerable portion of adjoining Pima County. Cobre Ridge has a crest line averaging 4500 feet above sea level and a high point of 5370 feet on Fraguita Peak, which is about 3/4's of a mile east of the Little Doe Mine.

The local topography consists of a series of southwesterly trending ridges, spurs of Cobre Ridge, and low rounded hills with the drainage westerly and southwesterly into Fraguita Wash, a tributary of the larger Arivaca Wash lying to the north. The area is shown in the 15 Minute Arivaca Quadrangle, Edition of 1943, Published by the Geological Survey.

Uplift of the Oro Blanco - San Luis Mountain block is believed to have begun in early Cretaceous time and to have extended well into Tertiary time with the climax of tectonic activity reached in Laramide time. Much of the range is made up of the

following sequence of rocks: Beginning with a pre-Cambrian basement complex; post-Paleozoic schists; Cretaceous sediments (including Oro Blanco Conglomerate); Older Volcanics (chiefly andesite and rhyolite); Monzonite; Diorite (with variations); Tertiary lavas; and minor intrusives. The petrological pattern is complex and in all but a few places the rocks remain undifferentiated.

A series of E-W faults on the east side of Cobre Ridge are the locale of the most noted ore deposits in the Oro Blanco Mountains. On the west side the most noted ore bearing fault is that of the Little Doe Mine, which lies chiefly in a contact zone of what has been provisionally classed as monzonite porphyry and a light acidic rhyolite. The zone has considerable width and strike length trending southeasterly and apparently crossing Cobre Ridge at a considerable distance away at a sharp angle. The monzonite appears to have invaded the rhyolite locally replacing it, forming a wide silicified zone which, because of its erosion resistent qualities, projects above the surface in the form of massive rugged outcrops extending a considerable distance along the fault strike.

The Little Doe ore deposits are genetically related to a quartz-diorite which invaded the monzonite and rhyolite. They are of the vein type consisting chiefly of mineralized shear zones and minor quartz filled fissures the whole appearing as short closely spaced lenses dipping steeply to the northwest. Although the fault zone appears to be mineralized over a considerable width the fissuring and mineralization appears to be most intense in the first two or three feet next to the fault wall. No primary ore minerals are in evidence but their oxidation products indicate they are epigenetic hypogene in origin and epithermal in their mineral associations. The depth of the oxide zone is unknown but structural evidence would indicate it may extend downward as much as 200 feet.

The mine was explored and worked for its copper ore which at its best did not exceed 4%, with a very small amount of gold and silver. The presence of uranium minerals in the ore was not suspected until quite recently. An analysis of a sample of the average ore by the Metallurgical Division of the US Bureau of Mines gave the following results: (qualitative only) - Quartz - Feldspar - Malachite - Azurite - Chrysocolla - Limonite - Small amounts of Cerussite and Smithsonite - and Manganese Oxides. The uranium minerals present were: Kasolite - Uranophane and sporadic grains of Torbernite. Certain radioactive tests indicate the sample contains 0.50 percent equivalent U_3O_8.

The reasons for wishing to explore the Little Doe vein is because of the widespread radioactivity emanating from a strong deep seated fault zone. When examined by A.E.C. Field Engineers radioactivity was found to be particularly strong in Sections 2 and 3. See Figure 3. In Works #4 (sub-surface stope)

they reported readings of as high as 500 - 600 Cps. Others have since confirmed these. High readings were also obtained in Wks #9 (52 ft. Shaft), and Section #4 (See Figs. 2 &3). At this latter location other Scintillometer readings showed a radioactive zone over 100 feet wide across the strike of the fault zone. This is one of the places it is planned to diamond drill. (See Core Drilling Diagrams, See Fig. 5, Section #4).

This mine occupies a favorable location in an extensive area of vast unknown uranium bearing potentialities. The fact that many small mines in the district show wide spread radioactivity furnishes incentive for more systematic and extensive investigation. There are many encouraging signs present in the search for uranium in this region and at least one mine should be explored and investigated at depth to determine the true potentialities of the area. The Little Doe Mine is favorably situated for this purpose and its exploration will establish whether or not this area may be relied upon as a source of uranium ore.

(d) Accessibility, etc. - See Arizona Highway Map for information on roads leading into the area from Tucson or Nogales. For roads from Arivaca to the mine see Fig. 1 attached to answers to questions. It is sixty (60) miles from Tucson to Arivaca, via 36 miles of Highway #89 to Arivaca Junction, Kinsley Ranch, and 24 miles over an improved dirt road to Arivaca; then seven (7) miles of ranch and primitive roads, some of which occupy the stream beds of dry washes. The last 2.9 miles are rough but passable; if put to continuous use they would require some rehabilitation. The last 1300 feet should be rerouted because of steep impractical grades.

The nearest important supply point is Tucson, 67 miles by the aforementioned roads. The nearest RR shipping point is Amado Siding on the Tucson-Nogales Branch of Southern Pacific Railroad at a point about 36 miles south of Tucson, 2.3 miles from Arivaca Jct., and a total of 34.4 miles from the mine.

(e) Availability of:

Manpower. - Miners, mechanics and laborers are relatively abundant now in the Pima-Santa Cruz area.

Materials and supplies. - Can be had in almost any character and quantity in Tucson.

Equipment. - Can be had locally for contracting use, but for purchase or rental it must be procured from a larger machinery shopping center.

Water. - The country is arid with no nearby springs or running water except during short periods in the rainy season about two months in duration. The nearest well or tank is at Las

Jarillos Ranch, two miles from the mine. A shallow well sunk in Fraguita Wash (the principal drainage channel of the immediate area) at a point about .8 mile from the mine might furnish enough water for engine cooling or light domestic uses. The permanent water table in the mine may not be reached under 400 feet from the surface.

Power. - The nearest available source of public electric power is about 35 direct miles from the mine. Diesel or gasoline power may be used as an alternative.

5. The Exploration Project.

(a) Exploration is specifically for commercial deposits of uranium ores as the result of strong uranium radioactivity revealed at various points on the property by Geiger Counter and Scintillometer.

(b) The proposed work consists of several phases and begins with the rehabilitation and partial rerouting of the present access road which is made necessary because of its general roughness and its steep impractical grades. Of the 2.8 miles of road included in this phase all but a few hundred feet of it near the mine can be rehabilitated in short order by a bulldozer and blade. One short section near the mine requires some blasting and bulldozing to remove a short steep grade. A short distance beyond this point the road should be rerouted a distance of 1600 feet to the mine. This new construction requires some blasting and considerable bulldozing. See Fig. 2.

The next phase of the exploration project concerns the core drilling of the mineralized fault zone for a distance of 400 feet of its strike length. This distance has been divided into sections of various lengths; each section includes structural conditions believed to be favorable to ore deposition. The drilling program calls for 8 holes, two in each section, collared from the same setup and planned to intersect the fault formation as nearly as possible at right angles to its strike. For details see Fig. 5. The following schedule is based on a careful survey.

Section	Footage Upper Hole	Footage Lower Hole	Total Feet	Vertical Depth Reached
1	210	385	595	410 Feet
2	205	400	605	385 Feet
3	215	400	615	425 Feet
4	225	385	608	400 Feet
	853	1570	2423	

The next phase concerns excavation and levelling of an area of 4500 sq. ft. to provide room for mine buildings. This involves the removal of approximately 800 cu. yds. of material by blasting and bulldozing. See Fig. 7.

Mine Buildings. - Consisting of:

Hoist House - With concrete foundation for hoist. (12x16)
Compressor House - 12x14
Shop & Tool House - 14x20
Change House - 12x18
Latrine - 4x5
Timber Shed - 12x16
Ore Bin - 50 Tons
Head Frame - 40 Feet
Powder Magazine - 5x7x12

Note. - The above service buildings are of light wooden frame sheathed in galvanized corrugated iron or aluminum. The timber shed is open on all sides. The ore bin is constructed of heavy timber and planking with bottom lined with steel plates. The head frame is constructed of 8x10, 8x8, and 6x8 timbers with all necessary bracing, steel tie rods, angle plates, etc. The above buildings are complete with doors, windows and all necessary hardware.

Underground exploration consisting of:

A vertical two compartment shaft 420 feet deep with levels at 100 ft. intervals, each level extending 300 ft. north and 100 ft. south of the shaft respectively; four raises, three north and one south of the shaft, each extending from the bottom level to a short distance above the top level. See Fig. 6.

Footage represented:

Shaft		420 feet	
Drifts. . .	4 @ 400 ft.	1600 feet	
Raises. . .	3 @ 350 ft.	1050 feet	
Raise . . .	1 @ 325 ft.	325 feet	. . 3395 ft

The shaft projects the present 52' shaft (Fig. 2) down to 420 feet, involving its enlargement to planned section followed by the sinking of 368 feet of new shaft. The overall excavation section is between 13' x 8' and 12' x 7' producing 6.5 to 8 tons of ore or waste per vertical foot of shaft. The shaft to have two compartments with the overall timbered section 11'4" x 6'10", including lagging, and the inside measurements are: Hoistway 5'x4' 10", and Manway 4'10"x4'. Timber sets at 5' centers, consisting of

8x8 plates and ends with 6x8 dividers, 8x8 posts, 6x8 posts; 2x10 lagging; and 3/4" hanging rods on all sets. Hoistway will be blocked off from manway by one inch lining boards with 4x6 surfaced guides. There will be platforms and staggered ladders in manway.

Materials used per set:

Lumber: Maximum 780 Bf.
Steel rods, nuts, washers, nails: 40 lbs.

In addition to the regular timber sets (80), four station sets are required. Each of these require 1130 Bf. lumber and 25 lbs. of steel items or a total of 3752 Bf. lumber and 100 lbs. steel items

Total lumber required for shaft . . . . . 66,920 Bf.
Total steel items . . . . . 3,140 lbs.

Air & Water Service:

Air Piping . . . . . 450 ft. 2 1/2" BI
Valves & Fittings
Water Piping . . . . . 450 ft. 1" BI
Valves & Fittings

The above includes all materials used in the shaft excepting drilling and blasting supplies.

Drifting:--

Four 5x7 drifts, each 300 feet north of the shaft and 100 feet south of the shaft for a total of 1600 feet. Two drifts to be run simultaneously with an advance of 5 feet each per day. See Fig. 6.

Materials used:--

Tramways: 1520 feet, consisting of 1215 lbs. 12# rails, 825 4x4x2'6" ties, 3300 3/8x3" spikes, 180 splice bars, and 660 1/2x 1 3/4" bolts.

Pipelines:
Air - 1440 feet of 1 1/2" BI pipe with fittings
Water - 1440 feet of 1" BI pipe with fittings.

Muck Sheets - 4 4x8x⅛"

Drill Bits - 3467 throw away bits

Blasting Supplies:
Powder - 27,664 lbs.
Caps - 6,000
Fuse - 46,080 feet

Carbide - 1600 lbs.

Labor, power and other charges in Estimates of Costs.

Raising:--

Four raises are planned - 3 of 350 feet each and one of 325 feet. See Fig. 6. Total footage will be 1291', divided into two compartments, ore or waste chute 4'6"x4' and manway 4'x3', 8x8 dividers 5' centers, chute unlined excepting next to the manway. Manway has ladders and a resting platform at 12 feet intervals. Each chuteway is equipped with the usual wooden draw-off chute at the bottom.

Materials used:--

Lumber	25,500	Board Feet
Wedges	1,648	
Nails.	500	lbs.
Carbide.	1,300	lbs.
Drill Bits	2,925	throw away bits
Powder	26,000	lbs.
Caps	4,500	
Fuse	59,490	Feet
Air Pipe & Fittings.	1,320	Ft. 1½" BI
Water Pipe & Fittings.	1,320	Ft. 1" BI

(c) The work will start immediately on receipt of contract and be completed in detail as follows:

#1 Road Work - 15 days
#2 Core Drilling - 75 days
#3 Surface excavating - 8 days
#4 Shaft sinking - 120 days
#5 Drifting - 170 days
#6 Probing (By means of raising) - 110 days
TOTAL - 498 days

Two or more operations carried on simultaneously and with longer hours on core drilling would reduce the total by at least 88 days.

(d) The applicant, American Uranium Corporation, consists of four members, each with a record of success and wide experience in his line. James A. Woolsey, President, holds a responsible position with the Southern Pacific Railroad and is an inventor of some note. Otho Kinsley, Vice-President, is a prominent resort owner, well drilling contractor, road builder and mine operator. Hyman D. Goldberg, Secretary, is a practicing attorney in Tucson. Joseph O. O'Brien, Engineer and Geological Consultant, is a mining engineer of forty years' experience and is the author of maps, drawings and technical data, including that accompanying this application. He will supervise the work involved.

6. Estimate of Costs. (See annexed sheets).

7. (b) The corporation's share of the cost will be furnished in the following manner:

The corporation will hire all equipment necessary from Mr. Otho Kinsley, who will turn back to the corporation all sums received therefor. Also, there will be turned back to the corporation all sums due for supervision, engineering and geological services and administrative services. In addition, there will be available to the corporation for use in this project all sums that it may earn in connection with other mining operations, as well as from the sale of any of its stock.

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6. Estimate of Costs.

(a) Independent contracts - All work will be performed by and under the supervision of the American Uranium Corporation, except for minor portions as occasion may require.

ITEM ONE - ACCESS ROAD - (See Page 4 and Figure 2) - Includes blading, reducing grades, rerouting and construction of approximately 1500 feet of road.

Use of bulldozer for 15 days at $16.50 per hour	$ 2,475.00	
Use of Portable 105 Cfm air compressor, jackhammer and two sets steel at $2.50 per hour	375.00	
Blasting Supplies	250.00	
Labor	375.00	
Supervision - $500.00 per month for .6 months	300.00	
TOTAL		$ 3,775.00

ITEM TWO - CORE DRILLING - (See Page 4 and Figure 5)

Eight holes aggregating 2423 feet at $7.50 per foot.	$ 18,172.50	
Supervision - $500.00 per month for 3 months.	1,500.00	
TOTAL		$19,672.50

ITEM THREE - SURFACE LEVELING - (See Page 4 and Figure 7)

Providing an area of 4500 sq. ft. for service building sites. Removing approximately 800 cubic yds. of material; use of bulldozer, portable air equipment, blasting supplies, at $3.00 per cu. yd . . .	$ 2,400.00	
Supervision at $500.00 per month for .33 months.	165.00	
TOTAL		$2,565.00

ITEM FOUR - SERVICE BUILDINGS AND MINE STRUCTURES (See Page 4 and Figure 7)

Seven service buildings with an aggregate floor space of 1118 sq. ft. at a cost of $3.18 per sq ft. .	$ 3,555.24	
One 50 ton ore bin at $36.00 per ton capacity.	1,800.00	
One 40 foot headframe designed for fast hoisting of heavy loads at $87.50 per vertical ft.	3,500.00	
Materials used in building structures, including 16,100 B.F. of lumber, 3,800 sq. ft. corrugated galvinized iron or aluminum, 600		

lbs. of nails, 450 lbs. steel rods, 50 lbs. nuts, washers and bolts, doors, windows and also labor . . .

TOTAL $ 8,855.24

ITEM FIVE - INSTALLATION OF HEAVY OPERATING EQUIPMENT (See answers to Question D) Weight estimated at 11 tons

Installation and dismantling. . . .	$ 500.00	
Estimated transportation cost based on a 400 mile round trip at 15¢ per ton mile.	660.00	
TOTAL		$ 1,160.00

ITEM SIX - UNDERGROUND EXPLORATION - (See Page 5 and Figure 6)

First there will be a two compartment shaft 420 feet deep with stations for levels at 100 ft. intervals. Materials to be used are:

Lumber - 66,834 B.F. at $130.00 per M delivered	$ 8,688.42	
Steel rods - 3500 lbs at 15¢ per lb.	525.00	
Nuts and washers - 400 lbs at 25¢ per lb.	100.00	
Guide bolts, washers and nuts . .	100.00	
Station hardware, hinges, washers, nuts and bolts.	50.00	
Wire nails - 900 lbs at 18¢ per lb.	162.00	
TOTAL		$ 9,625.42

Drilling supplies - Using throw away bits, each with an average service of 6 ft. of drilling, requiring a total of 1800 bits. . .	$ 396.00	
Steel loss through breakage estimated at 1 lb. per foot of shaft at 60¢ per lb	252.00	
Lighting - Surface - Gasoline lanterns 3 gals. per night or 330 gals at 40¢ each	$ 132.00	
Lighting - Underground - 2 lbs of carbide per foot of shaft at 20¢ per lb.	168.00	

Air and Water Pipe and Fittings:

450 ft. of 2½" pipe and fittings. .	$ 562.50
450 ft. of 1" pipe and fittings . .	177.00
35 pipe hangers	30.00

Water service - Hauled from a spring two miles away from mine. Used for drilling and also for cooling engine

200 gal. per day for 110 days at $12.00 per day.	$ 1,320.00

Blasting Supplies

20,000 lbs of powder at 20¢ each. .	$ 4,000.00
35,000 ft. of fuse at .0131	458.50
4000 caps at 3¢ each.	120.00

Equipment (See D) - All rented on the basis of $900.00 per 25 day month or $36.00 per day for approximately 110 days in shaft sinking.

Equipment consists of 50 HP hoist and cable 340-360; Cfm portable air compressor; 12 set os 1" Hex Hollow Drill steel; 2 steel ore or waste buckets; 1200 lbs. cap; 1 ton skip; 3 - 18 cu. ft. ore or waste cars; 3 heavy sinkers for shaft; 4 sets of hoses, couplings, etc	$ 3,960.00
Freight, installation and dismantling on a pro rata basis.	110.00
Upkeep.	500.00

Power -

Compressor - 11 gal. gasoline per ft. of shaft.	$ 1,116.40
Hoist - 9 gal. gasoline per foot of shaft	831.60

Labor -

Total of 15 man crew, including 7 miners, 1 miner's helper, 3 hoist men; 3 laborers, and one timber

framer and mechanic. Payroll, including taxes and insurance for 110 days	$30,688.90
Supervisor for 4½ months at $500.00 per month	2,250.00
Engineer and geological consultant 4½ months at $500.00 per month. . . .	2,250.00
Accounting - $50.00 per month for 4½ months.	225.00
Clerk-bookkeeper - $200.00 per month for 4½ months	900.00
Tax and insurance of supervisor, engineer and clerk-bookkeeper	810.00
First aid supplies.	100.00

SUMMARY OF SHAFT SINKING OPERATIONS

Equipment	- Installation, rental and freight . .	$ 4,070.00
	Maintenance.	500.00
Power	- Compressor 4620 gals. gasoline . . .	$ 1,116.40
	Hoist 3780 gals. gasoline.	831.60
Drilling Supplies	- Broken steel	$ 252.00
	Drill bits	396.00
Lighting	- Carbide and gasoline	$ 300.00
Air and Water Piping		$ 769.50
Water service.		$ 1,320.00
Blasting Supplies.		$ 4,578.50
Timbering.		$ 9,625.42
Labor.		$30,688.90
Supervision.		$ 2,250.00
Engineer and geological services		$ 2,250.00
Clerk-Bookkeeper		$ 900.00
Taxes and insurance on management and supervision		$ 810.00
Accounting Services.		$ 225.00
First Aid Supplies		$ 100.00
Liability and hazard insurance		$ 1,500.00
		$62,078.32

Total Carried Forward	$62,078.32
Contingencies and miscellaneous at 7%	4,655.87
Total Cost of 420' of Exploration	$66,734.19
Cost Per Foot	158.89

UNDERGROUND EXPLORATION (Continued)

DRIFTS - Aggregating 1600 feet are driven on the 100 ft., 200 ft., 300 ft. and 400 ft. levels, each 300 ft. north and 100 ft. south of the shaft. A drift section is 5x7 making a total area of 35 sq. ft. At approximately 3 tons of material per foot, there will be a total of 4800 tons.

WORK CYCLE - Will be drilling, blasting, ventilating, mucking and track laying. Work will be staggered in two phases with a minimum advance of 5 ft. in each phase, or 10 feet per day, working two shifts per day - 24½ or 25 days per month. The drifts require no timbering. Ore pockets or chutes included under Raises.

Drilling -

Loss of steel through breakage approximately .4 lb. per ft. of drift or 160 lbs. @ 60¢	$ 384.00
Drill bits 6' - 5600 @ 22¢.	1,232.00

Lighting -

Underground - 2000 lbs. Carbide @ 20¢	$ 400.00
Surface - 450 gals. gasoline @ 40¢.	180.00

Air & Water Piping -

1600' 2" DI pipe & fittings @ 45¢.	$ 770.00
1600' 1" DI pipe & fittings @ 25¢	400.00

Water Service -

200 gals. per day for drilling and cooling water for 170 days @$12.00	$ 2,040.00

Blasting Supplies -

42,000 lbs. powder @ 20¢.	$ 8,400.00
55,000 ft. fuse @ 0.0131.	720.50

9,000 caps @ 3¢	$ 270.00

Equipment -

Same rates as for sinking - 170 days @ $36.00.	$ 6,120.00
Frt. & Inst. Pro rata @ 47.12% of $1150.00.	542.35
Lubrication	550.00
Maintenance	700.00

Power
Compressor -

8 gals gasoline per ft of drift 12,800 gals @ 22¢	$ 2,688.00

Hoist -

7 gals. of gasoline per ft of drift 8000 gals @ 22¢	2,464.00

Tramways -

4 levels with 1600 ft of track-18" Ga. 12 lb. T Rails - 12,808 lbs. @ 15¢	$ 1,921.20
Track spikes - 3/8x3 - 460 lbs @ 21¢	96.60
Splice Bars - 190 @ 69¢	131.10
Ties - 4x4x2½ - 800 - 2667 Bf @ 13¢	346.72
Bolts & Nuts - ½x1 3/4 - 88 lbs @ 25¢	22.00

Labor -

(13 man crew) - 3 miners - 4 muckers & helpers - 3 hoistmen - 3 laborers - Payrool with all charges for 170 days.	$38,115.70
Supervision - $500.00 per month for 7.125 months.	3,562.50
Engineer & Geological Consultant - $500.00 per month for 7.125 months.	3,562.50
Accounting - $50.00 per month for 7.125 months	356.25
Clerk-Bookkeeper - $200.00 per month for 7.125 months.	1,425.00
Taxes and Insurance of Supervisor, Engineer and Clerk-Bookkeeper.	1,282.50
First Aid Supplies	100.00

SUMMARY OF DRIFTING OPERATIONS

Equipment.	$ 7,912.35
Lighting	580.00
Air & Water Piping	1,170.00
Water Service.	2,040.00
Power.	5,152.00
Drilling Supplies.	1,616.00
Blasting Supplies.	9,390.50
Tramways	2,517.62
Labor.	38,115.70
Supervision.	3,562.50
Engineer & Geological Consultant	3,562.50
Accounting	356.25
Clerk-Bookkeeper	1,425.00
Taxes and Insurance.	1,282.50
First Aid.	100.00
	$ 78,782.92
Contingencies and Miscellaneous @ 7½%.	4,908.72
Total Cost of 1600' of Drifting	$ 83,691.64
Cost Per Foot	52.31

PROBING - (by means of raises) Four vertical raises extending from the 4" level up through the 3", 2" and a little above the 1" level. See Fig. 6. Three raises are 350' each and one 325' for a total of 1375'. Individually there are 12 raises 93 feet each. Three are 50' each and one 25' for a total of 1291 feet of actual raising. The overall crossection is 8'x4' - 32 sq. ft. - 2.66 tons per vertical ft., or a total 3446 tons of material removed.

The raises are divided into two compartments - an ore or waste pocket, 4' 6" x 4' and a manway 4'x3'. The ore or waste pocket is untimbered excepting for a draw chute at the level and is divided from the manway by tight planking from top to bottom. The timbering in the manway consists of a line of 8x8 stulls with 6' centers, set in hitches in the walls and lined on the ore pocket side with 2" planking. Ladders are installed in the manway with safety platforms every 12 feet.

The 16 raises will require, with draw chutes, 27,500

Bf of lumber @ 13¢.	$ 3,575.00
2200 wedges @ 5¢.	110.00
700 lbs wire nails @ 18¢.	126.00

Air & Water Piping -

1500' 1½" BI pipe @ 35¢	$ 525.00
1500' 1½" Fittings.	60.00
1500' 1" BI pipe @ 25¢.	375.00
12 fittings	50.00

Water Service - Drilling & Engine Cooling

200 gals per day for 140 days @ $12.00. .	$ 1,680.00

Lighting - Underground - 1½ lb. Carbide per ft. of

raise - 1935 lbs @ 20¢.	$ 387.00
Surface - 400 gals gasoline @ 40¢	160.00

Equipment - Rental - Same rate as in sinking and

drifting - $36.00 per day for 140 days. .	$ 5,040.00
Frt. & Instal. pro rata - 40.3% of $1150.00.	470.00
Lubrication	400.00

Power-Compressor - 7 gals gas per ft of raise -

1291' @ 7 gals. gasoline @ 22¢.	$ 1,988.14
Hoist - 6 gals. gasoline per ft - 7746 gals @22¢.	1,704.12

Drilling - Drill breakage - Approximately .4 lb. per

ft of raise - 516 lbs @ 60¢	$ 309.60
Drill bits - 6' per bit - 3600 @ 22¢. . .	756.00

Blasting Supplies--

32,000 lbs powder @ 20¢	$ 6,400.00
65,490 ft fuse @ .0131¢	849.32
5,000 caps @ 3¢.	150.00

Labor - 15 man crew - 4 miners - 3 helpers - 2 trammers - 3 hoist men - 3 laborers- 140 days.	$37,608.20
Supervision - $500.00 per month for 5.875 months	2,937.50
Engineer & geological services - 5.875 months at $500.00 per month	2,937.50
Accounting - $50.00 per month for 5.875 months .	293.75
Clerk-Bookkeeper at $200.00 for 5.875 months . .	1,175.00
Taxes and Insurance on management and supervision.	1,057.50
First Aid.	100.00

SUMMARY OF PROBING OPERATIONS

Equipment.	$ 5,910.00
Lighting	547.00
Air & Water Piping	1,010.00
Water service.	1,680.00
Power.	3,692.26
Drilling supplies.	1,065.60
Blasting supplies.	7,399.32
Timbering.	3,811.00
Labor.	37,608.20
Supervision.	2,937.50
Engineer and Geological services	2,937.50
Accounting....	293.75
Clerk-Bookkeeper	1,175.00
Taxes and insurance on management and supervision	1,057.50
First Aid Supplies	100.00
	$71,224.73
Contingencies and Miscellaneous @ 7½%.	5,341.85
Total Cost of 1291' of Probing (Raises)	$76,566.58
Cost per foot	59.31

6. (b) Labor Schedule - Average Crews -

Shaft - 15 man crew: 7 miners, 1 general helper, 3 hoist men, 3 laborers, 1 timber framer and mechanic.

Drifts- 13 man crew: 3 miners, 4 muckers and miner's helpers, 3 hoist men, 3 laborers.

Probing (Raises) - 15 man crew: 4 miners, 3 helpers, 2 trammers, 3 hoist men, 3 laborers.

Supervision - $500.00 per month.

Engineering and Geological services - $500.00 per month.

Clerk-Bookkeeper - $200.00 per month.

Accounting Services - $50.00 per month.

The following wage schedule is applicable to the above operations:

Class	Scale Daily	Payroll Charges		Total
Miners - Shaft	$ 18.00	$ 2.59	@ 14.4%	$ 20.59
" " - Other	16.00	2.30	"	18.30
Muckers - Shaft	16.00	2.30	"	18.30
" " - Others	15.00	2.16	"	17.16
Laborers - UG	14.00	2.02	"	16.02
" " " - Surface	13.00	1.87	"	14.87
Hoistmen -	15.00	2.16	"	17.16
Timber Framer	18.00	2.59	"	20.59

*Note - All payroll charges come to 14.4% of payroll.

(c) Operating materials and supplies - Small equipment and tools.

2 - 4# Hammers.	@ $ 3.50 . . .	$ 7.00
1 - 8# Hammer	@ 5.00 . . .	5.00
1 - 10# Hammer.	@ 5.50 . . .	5.50
8 - Drifting Picks.	@ 4.50 . . .	36.00
4 - Square Point Shovels.	@ 4.50 . . .	18.00
6 - Round Point Shovels	@ 4.25 . . .	25.50
4 - 4'x6'x¼" Steel Sheets	@ 40.44 . . .	161.76
2 - Pinch Bars - 3/4"	@ 1.50 . . .	3.00
2 - Scaling Bars - 7/8" x 6	@ 2.50 . . .	5.00

1 -	Track Level	@ $ 2.25	$ 2.25
1 -	Track Wrench.	@ .50	.50
1 -	Track Gauge - (Make)	@ .00	.00
2 -	3' Timber Saws.	@ 4.75	9.50
1 -	Miners Axe.	@ 3.75	3.75
1 -	Steel Scraper - 8'	@ 1.50	1.50
1 -	Steel Scraper - 6'	@ 1.50	1.50
4 -	Plumb Bobs with string.	@ 4.00	16.00
6 -	Loading Sticks - Round - 8'	@ .75	4.50
1 -	Cap Crimper	@ .75	.75
1 -	Hose Clamping Machine	@ 6.00	6.00
1 -	Steel Tape - 100 ft	@ 10.50	10.50
2 -	Carbide Lamps	@ 3.00	6.00
2 -	Carbide Lamps	@ 1.75	3.50
3 -	Hardboiled Hats	@ 6.00	18.00
6 -	Pick Handles.	@ 1.25	7.50
3 -	Axe Handles	@ 1.25	3.75
2 -	Maul Handles.	@ 1.00	2.00
1 -	Forge and Hand Blower	@ $65.00	$ 65.00
1 -	Lot Blacksmith Coal - 200#.	@ .03	6.00
1 -	125 # Anvil	@ 40.00	40.00
3 -	Prs. Blacksmith Tongs	@ 1.50	4.50
3 -	Cold Chisels.	@ .75	2.25
1 -	Hot Cutter.	@ 2.50	2.50
1 -	Hardie.	@ 1.50	1.50
2 -	Ball Pein Hammers	@ 2.00	4.00
1 -	Set of 12 files	@	7.00
1 -	Bench Vise.	@ 35.00	35.00
1 -	Hacksaw - and extra blades.	@ 6.25	6.25
1 -	Hand Grinder - 8" Wheel	@ 12.00	12.00
1 -	Bolt Stock and Dies	@ 15.00	15.00
1 -	Pipe Vise	@ 10.50	10.50
1 -	Pipe Cutter	@ 7.50	7.50
6 -	Stilson Wrenches - 10" - 14" - 18 - 24	@ 20.00	20.00
1 -	Pipe Stock & Dies - ½" to 1".	@ 18.00	18.00
1 -	Pipe Stock & Dies - 1¼" to 2½".	@ 35.00	35.00
2 -	Crescent Wrenches - 10" - 16"	@ 4.25	4.25
2 -	Pliers - 6" & 10"	@ 3.25	3.25
1 -	Set of Open End Wrenches.	@ 7.50	7.50
1 -	Tin Snips - 14"	@ 2.75	2.75
1 -	Pkg. Emery cloth.	@ .40	.40
1 -	Pkg. Sand Paper	@ .25	.25
1 -	Set of Wrenches for Compressor.	@ 5.50	5.50
1 -	Carpenters Square	@ 2.50	2.50
1 -	Timber Axe.	@ 3.75	3.75
1 -	Hand Axe.	@ 3.50	3.50
1 -	Docking Saw - 30"	@ 4.25	4.25

4 -	Screw Drivers	@ 2.90	2.90
1 -	Carpenters Level	@ 5.00	5.00
2 -	Claw Hammers	@ 2.25	4.50
1 -	Brace & Set of Bits	@ 11.25	11.25
3 -	Chisels	@ 6.25	6.25
2 -	Carpenters saws	@ 8.50	8.50
1 -	Rip Saw	@ 3.75	3.75
2 -	Brooms	@ 2.00	4.00
1 -	Bndl. of Waste - 40#	@ .20	8.00
1 -	One Ton Chain Blocks	@ 65.00	65.00
1 -	One Set of Falls with 200' 5/8 rope	@ 10.00	10.00
1 -	Steel Wheelbarrow	@ 15.00	15.00
3 -	Pyrene Fire Extinguishers	@ 20.00	20.00
6 -	Gasoline Lamps	@ 12.50	75.00
1 -	First Aid Kit	@ 22.00	22.00
1 -	12" Signal Gong	@ 26.00	26.00
2 -	Hand Oilers	@ 1.10	2.20
1 -	Alemite Grease Gun	@ 12.00	12.00
1 -	Funnel - 10"	@ 2.00	2.00
-	10 lbs. light grease	@ .40	4.00
-	10 lbs. heavy grease	@ .50	5.00
-	5 gals. kerosene	@ .45	2.25
-	Miscellaneous Items		50.00
			$1,061.76

The aforegoing list includes mostly tools and few supplies. Operating materials and supplies are already incorporated into the various operation costs - such as blasting supplies, fuels, drills, etc. It would be the policy of the operator to bring in supplies bi-monthly, always having a two weeks reserve above current usage.

(d) Operating Equipment. - No equipment will be furnished by the operator. All equipment used on the project will be had on a rental or rental purchase basis. The equipment to consist of a 50 HP Gasoline Hoist with 650 feet of 7/8" cable; one ton skip; 2 ore or waste buckets of 1200 lbs. capacity each (for shaft sinking); 1 - 18 cu. ft. ore car; three 60 lb. sinkers (one as a standby); 600 lbs. 1" Hex Hollow Drill Steel; 3 air hoses 1" x 50' with couplings; 3 water hoses 3/4" with couplings; one portable compressor, 340 - 360 Cfm; one extra air receiver 4'x12'. All necessary fittings and valves.

When the shaft is completed the three sinkers and the two ore buckets will be returned and replaced with two more ore cars, two drifters and still later by two stopers. The rental of this equipment is placed at $700.00 per month of 25 working days. Probably arrangements can be made to have this rental apply on a

chase contract. The operating company to keep the equipment in repair and to transport it to and from the place of rental at their expense. See the fourth paragraph (Equipment) on page C.

(e) Rehabilitation and repairs. - None

(f) New Buildings, etc. - See Fig. 7

Seven service buildings and two mine structures are planned as follows:

Hoist House	12x16 - Floor Space	192 sq. ft.	$ 812.00
Compressor House	12x14 - " "	168 " "	541.00
Shop & Tool House	14x20 - " "	280 " "	793.00
Change House	12x18 - " "	216 " "	737.00
Latrine	4x5 - " "	20 " "	148.00
Timber Shed	12x16 - " "	192 " "	268.00
Powder Magazine	5x7x12- " "		285.24
Ore Bin	50 tons capacity		1,800.00
Headframe	40 ft. high		3,500.00
		TOTAL	$8,855.24

The service buildings are of light frame construction sheathed with galvanized corrugated iron. The timber framing shed is open on all sides. The indicated cost of the hoist house includes the cost of the cement foundation for the hoist. The ore bin has a frame of heavy timber with a lining of planking and a steel covered bottom. The headframe is 38-40 feet high, constructed of 8x10, 8x8 and 6x8 timbers, cross and angle braced, steel tie rods, angle anchor plates, etc. The powder magazine consists of a semi-tunnel between rocky outcroppings, timber frame, lined with planking, galvanized roof covering, and over all a heavy covering of dirt to protect it from stray bullets. In the aforegoing buildings and structures the following materials were used: Lumber - 16,100 Bf; Galvanized iron - 3800 sq. ft.; Nails - 600 lbs.; Steel rods - 450 lbs; Nuts, Washers and Bolts - 50 lbs; 22 Window sashes, 10 Doors, 20 prs. hinges, 10 hasps and locks. In the heavy structures, special timbers of extra length are to be used in the headframe, costing approximately $150.00 per M besides labor and supervision. Total Cost $8,855.24.

(g) Miscellaneous repairs and maintenance of major operating

equipment. This largely depends on the condition of the equipment when received and on the care it gets from those who handle it. Based on past experience and barring major breakdowns, the following figures are believed to be fair estimates of repairs and maintenance on the following equipment:

Hoist, cable and skip	$ 50.00	per month of 25 days
Compressor.	60.00	" " " " "
Air Drills.	30.00	" " " " "
Air hoses and drill steel	50.00	" " " " "

The above figures apply to an operation of three air drills at a peak of not to exceed 12 hours out of 24.

All payroll charges in Arizona (State and Federal) amount to 14.4% of the wages or salary paid. - $14.40 per $100.00 wages paid.

(h) Contingencies. - A 7½% contingency allowance has been made and is included in the aforegoing cost estimates to cover overhead, interruptions, delays, work stoppages or other conditions beyond our control.

COST ESTIMATES SUMMARY

Access Road	$ 3,775.00	
Core Drilling	19,672.50	
Surface Levelling	2,565.00	
Service Buildings	8,855.24	$ 34,867.74
Installation of Heavy Equipment.	1,160.00	1,160.00
Shaft	66,734.19	
Drifts.	83,691.64	
Probing (Raises).	76,566.58	226,992.41
Tools and Supplies.	1,061.76	1,061.76
TOTAL COST OF EXPLORATION PROJECT		$264,081.91

STEVENSON AND GOLDBERG
ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

AGREEMENT OF LEASE

AGREEMENT made this 2nd day of July, 1954, by and between ADA GALLEN, a single woman, of the City of Tucson, County of Pima and State of Arizona, party of the first part, hereinafter referred to as Lessor, and AMERICAN URANIUM CORPORATION, an Arizona corporation, with its office at 270 North Church Avenue, Tucson, Arizona, party of the second part, hereinafter referred to as Lessee,

W I T N E S S E T H:

In consideration of the mutual covenants hereinafter set forth the parties hereto hereby agree as follows:

1. The Lessor hereby leases to the Lessee, and the Lessee hereby rents from the Lessor for a period of twenty (20) years from the date hereof the premises embraced in the mining location in the office of the Recorder of Santa Cruz County, which mining claim is known as Little Doe No. 1, said notice having been recorded on July 1, 1954, in Book 28 of Notice of Mining Location at page 133.

2. The Lessee shall pay to the Lessor, her heirs and assigns, a royalty of ten per cent (10%) of all ores mined from said lands or any part thereof until such time as the Lessee will have recouped from such mining operations its original costs, including testing and operation. Thereafter the Lessee shall pay to the Lessor a royalty of twelve and one-half per cent (12½%) of all ores mined and produced, with an additional bonus of two and one-half per cent (2½%) of all ores assaying more than two per cent (2%) of uranium, making a total royalty of fifteen per cent (15%). Proportionate royalties shall be paid to the Lessor on any and all bonuses received on ores mined or produced from said premises.

3. Lessor authorizes the Lessee to deal with refer-

to the lands hereby lease with the Atomic Energy Commission, the Defense Minerals Exploration Administration or any other state or federal governmental agency, and for that purpose, hereby authorizes the Lessee to execute, either in its own nor or in the name of the Lessor, any and all documents or instruments that may be necessary in connection therewith.

4. The Lessee agrees to examine and check said land and make such tests as it sees fit to determine the presence of various minerals therein and the advisability of mining same. It shall also perform all work necessary from time to time and cause all necessary documents to be prepared, executed and filed, at its own expense, to the end that the interests of the Lessor in the mining claim shall be preserved and shall be converted into a patent for said lands at the earliest practicable time.

5. The Lessee agrees that it shall and will perform a minimum of one thousand (1,000) man hours of work each six (6) months period of this lease. In the event that it should use mechanical equipment in the performance of its work, then such use of machinery shall be deemed as the performance of man hour labor or services and the cost of man hours will be computed by dividing the cost of such use, including an amount equal to the cost of rental of like equipment at the prevailing rate, by the hourly wage of mining labor in the general area. The neglect, failure or refusal of the Lessee to perform one thousand man hours of labor as herein defined within any six months period during the period of this lease shall give the Lessor the right to terminate the same upon giving thirty (30) days written notice thereof to the Lessee by registered mail addressed to the Lessee at the address hereinabove set forth. In the event that the Lessee does not remedy such default within such period of thirty days then all of the rights granted to it hereunder shall be terminated and this agreement shall be at an end. In the event that the uranium

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ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

ore deposits are insufficient to allow the Lessee to operate the mine upon the property at a reasonable profit, then the Lessee may terminate this lease by sending notice of termination by registered mail to the Lessor. If, due to circumstances beyond the control of the Lessee, such as an act of God, floods, tornadoes, cave-ins, explosions, strikes, scarcity of materials or equipment, war and other like circumstances, the Lessee is unable to perform the man hours and services herein set forth, then it shall be relieved of the duty to perform said man hours of labor until the said circumstances are alleviated.

6. The Lessor covenants that she is the owner of the mining claim hereby leased and that she has full power and authority to make this agreement.

7. The Lessor shall perform any and all necessary acts and things that may be required to validate the mining claim embraced herein, including annual assessment work, as required by the statutes, laws and regulations pertinent thereto.

8. The Lessee shall work the mining claim in a manner necessary to good and economical mining so as to take the greatest amount of commercial ore feasible to be mined from the said claim, with due regard to the development and removal of ores from said mining claim. The second party shall comply at all times with the laws, rules and regulations now or hereafter enacted or promulgated by the United States Government, the State of Arizona and any of the agencies or instrumentalities of either of them. It shall also comply with provisions relating to workmen's compensation, as provided by laws pertinent thereto.

9. All royalties payable hereunder shall be paid to the Lessor, her heirs, executors, administrators and assigns, on or before the 25th day of each consecutive calendar month or as soon thereafter as payment is made by the Atomic Energy Commission or other governmental authority authorized and empowered to pay

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270 NORTH CHURCH
TUCSON 10, ARIZONA

for uranium ores; royalties on other ores and minerals shall be paid on or before the 25th day of each month for ores mined and marketed during the preceding month. Royalties shall be paid on the basis of accepted mill runs or smelter returns to the Lessor, by the purchaser of said ore, who shall be authorized to make such payment direct to the Lessor by the Lessee herein, subject to existing law.

10. The Lessee shall have the option, during the term of this lease, to purchase the mining claim hereby leased, whether a patent therefor will have been issued or not, for the sum of $100,000.00 and shall receive credit against said sum for all royalties theretofore paid under the terms hereof.

11. The Lessee shall not assign this agreement or any rights thereunder, nor sublet the premises embraced hereby, without first having obtained the written consent of the Lessor.

12. The parties agree to cooperate with each other and to execute any and all documents or instruments that may be necessary to carry out the purposes and objects of this agreement.

IN WITNESS WHEREOF the first party has hereunto set her hand and the second party has caused this instrument to be duly executed by its proper corporate officers and its seal affixed on the day and year first above written.

/s/ ADA GALLEN
ADA GALLEN - First Party

ATTEST:

/s/ HYMEN D. GOLDBERG
Secretary

(CORPORATE SEAL)

AMERICAN URANIUM CORPORATION

By /s/ JAMES A. WOOLSEY
President
Party of the Second Part

STEVENSON AND GOLDBERG
ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

STATE OF ARIZONA)
) ss.
County of Pima)

The foregoing instrument was acknowledged before me this 2nd day of July, 1954, by ADA GALLEN, a single woman.

ROSE E. MILLAR
Notary Public

My Commission Expires:
June 26, 1956

(NOTARIAL SEAL)

STATE OF ARIZONA)
) ss.
County of Pima)

On July 2, 1954, before me personally appeared HYMEN D. GOLDBERG, to me personally known, who by me being duly sworn upon his oath did say that he is the Secretary of American Uranium Corporation, a corporation organized under the laws of the State of Arizona; that James A. Woolsey is the President of said corporation; that he knows the signature of the said James A. Woolsey; that the said James A. Woolsey executed the foregoing agreement as President for and on behalf of said corporation; and that he executed the same and caused the seal of the corporation to be affixed thereto on behalf of said corporation by authority of its Board of Directors; that thereupon he, the said Hymen D. Goldberg, attested the same as Secretary of said corporation, all pursuant to the authority of the Board of Directors of said corporation.

ROSE E. MILLAR
Notary Public

My Commission Expires:
June 26, 1956

(NOTARIAL SEAL)

STEVENSON AND GOLDBERG
ATTORNEYS AND COUNSELLORS AT LAW
270 NORTH CHURCH
TUCSON 10, ARIZONA

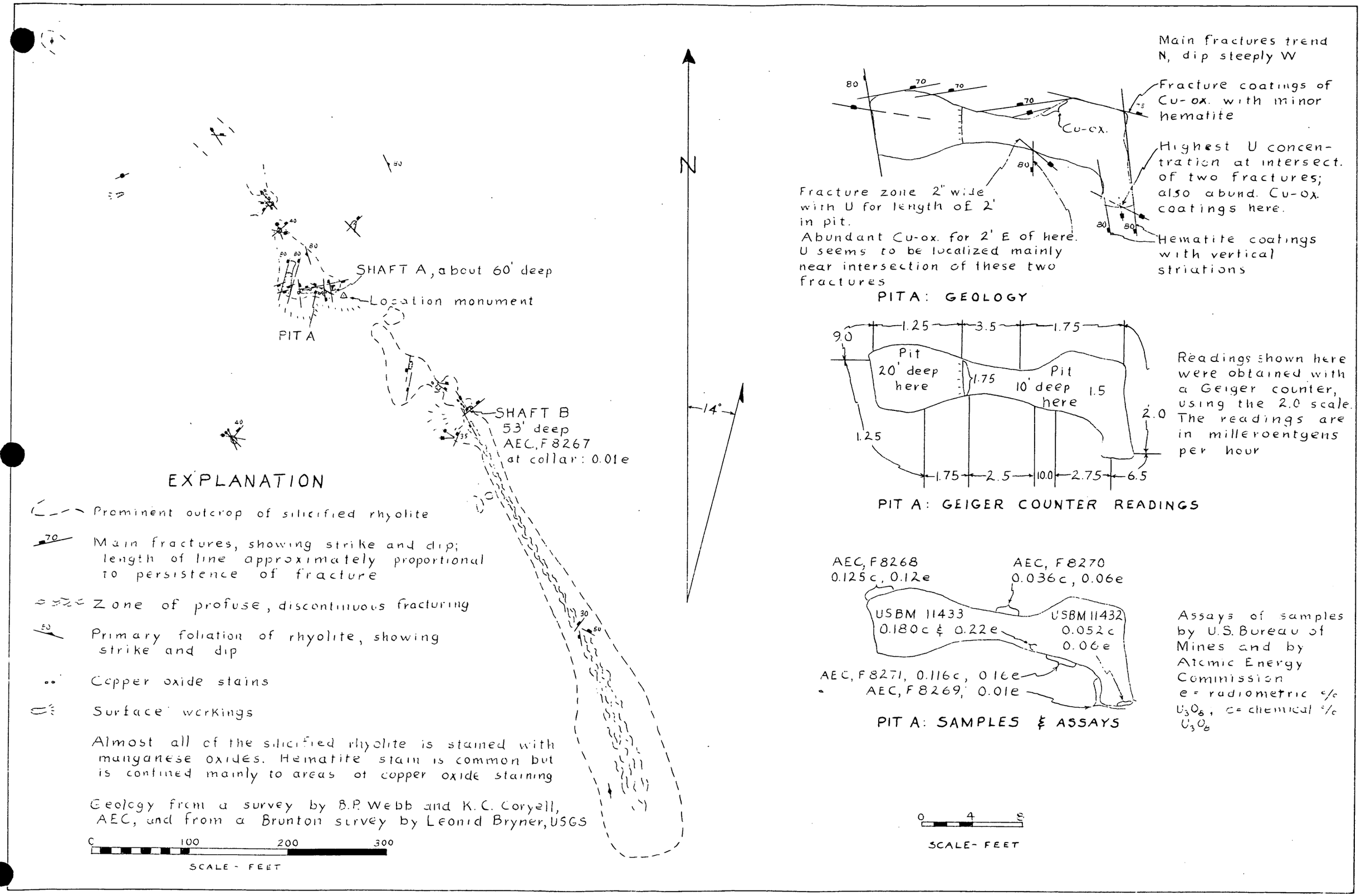
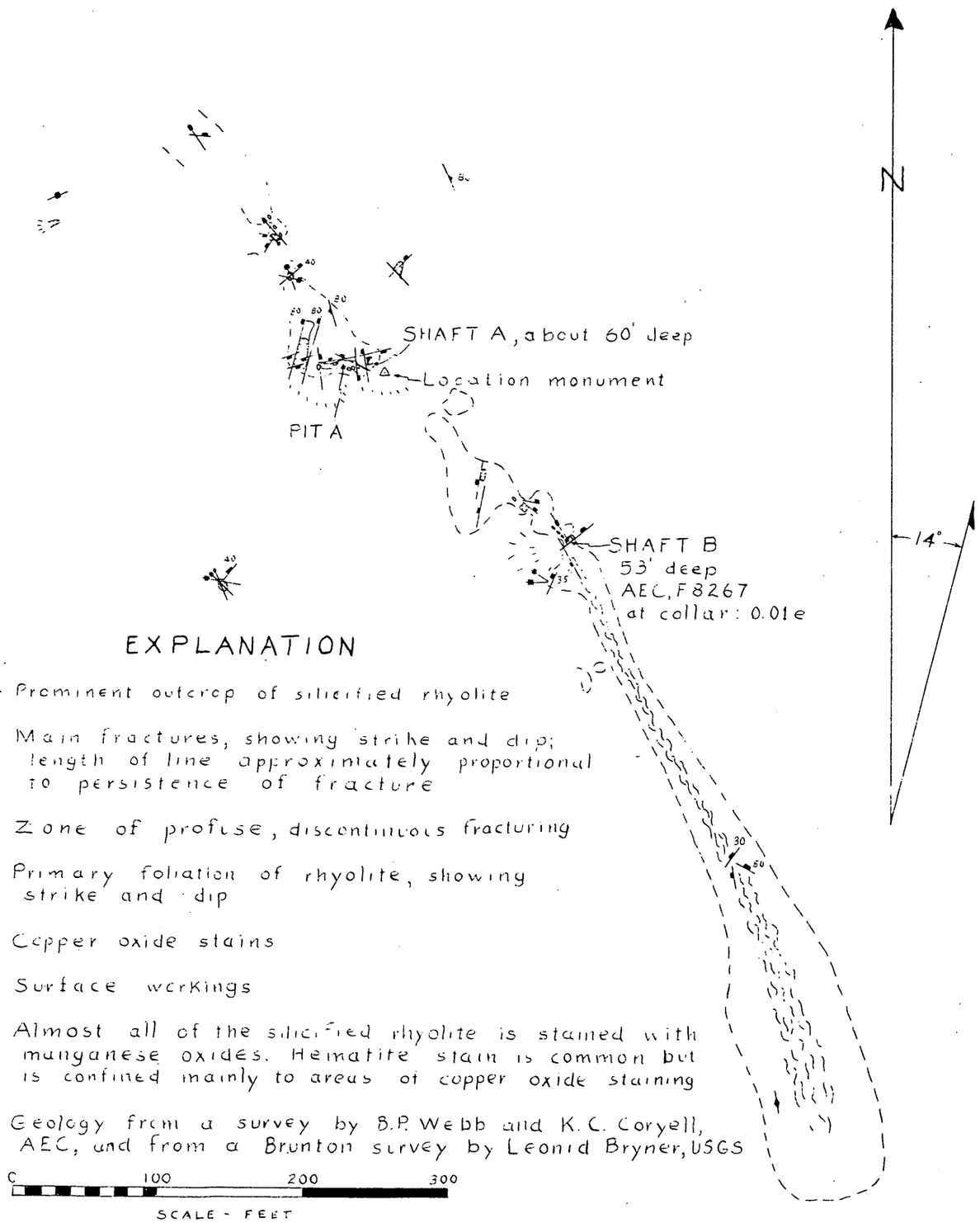
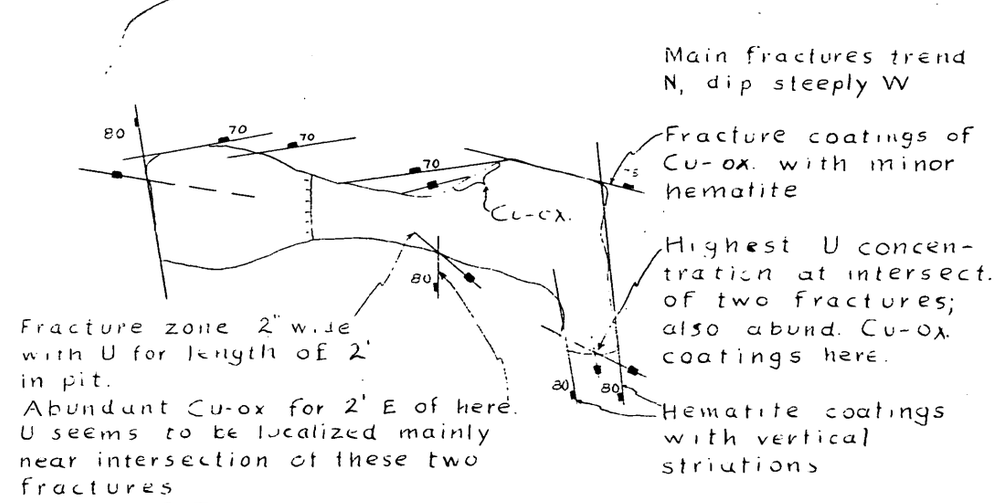


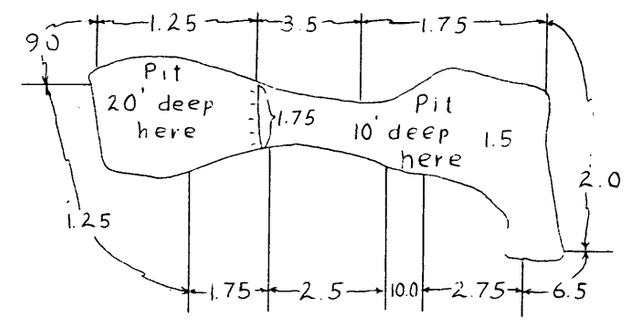
FIGURE 2.- GEOLOGIC AND ASSAY MAP, LITTLE DOE NO.1 MINE, SANTA CRUZ COUNTY, ARIZONA

DMEA 3435



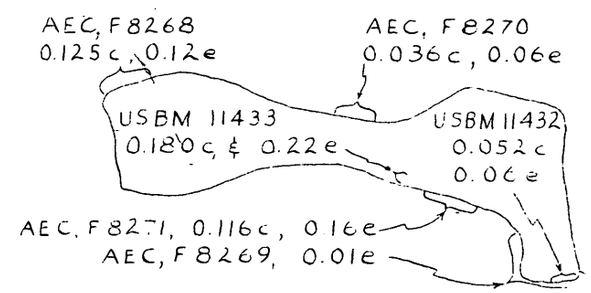


PIT A: GEOLOGY



Readings shown here were obtained with a Geiger counter, using the 2.0 scale. The readings are in milleroentgens per hour

PIT A: GEIGER COUNTER READINGS



PIT A: SAMPLES & ASSAYS

Assays of samples by U.S. Bureau of Mines and by Atomic Energy Commission
e = radiometric % U_3O_8; c = chemical % U_3O_8

0 4 8
SCALE - FEET

FIGURE 2.- GEOLOGIC AND ASSAY MAP, LITTLE DOE NO.1 MINE, SANTA CRUZ COUNTY, ARIZONA

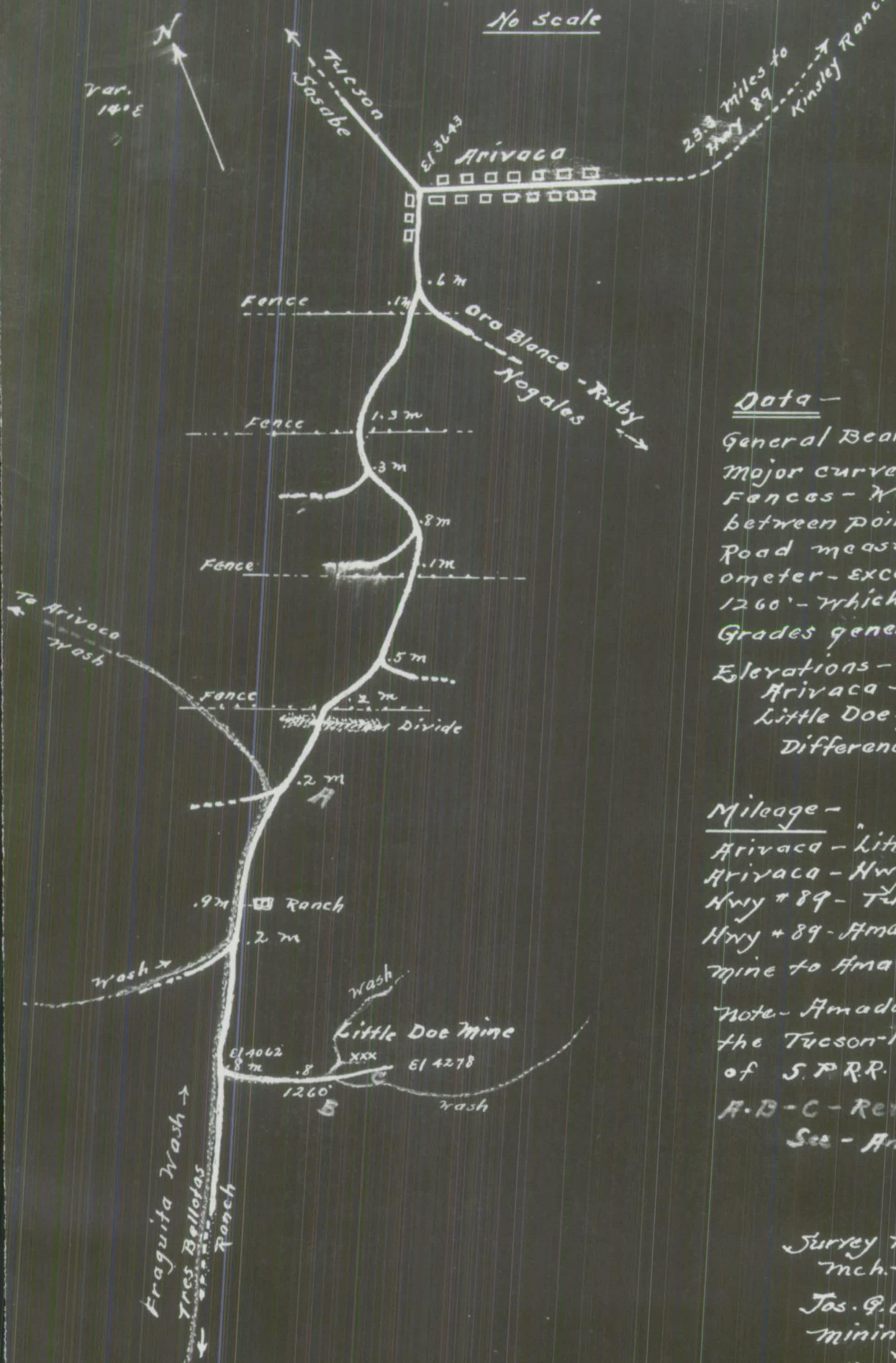
DMEA 3435

ROAD MAP

Arivaca-to-Little Doe Mine

No Scale

Fig. 1



Data –

General Bearing – S 10° West – Major curves – Branch roads – Fences – Washes and mileage between points indicated – Road measurements by speedometer – excepting the last 1260' – which was taped – Grades generally ascending.

Elevations –

Arivaca	3643'
Little Doe	4278'
Difference	635'

Mileage –

Arivaca – "Little Doe"	7.1 m
Arivaca – Hwy #89	23.3 m
Hwy #89 – Tucson	33.0 m
Hwy #89 – Amado Siding	2.3 m
Mine to Amado Siding	32.7 m

Note – Amado Siding is on the Tucson-Nogales branch of S.P.R.R.

A-B-C – Refer to road Work See – Answers to Questions

Survey + Map – Mch. – 4, 1954.

Jos. G. O'Brien
Mining Engineer,
Amado, Arizona.

Fig 2

LITTLE DOE LODE MINING CLAIM

Oro Blanco Mining District - Santa Cruz County - Arizona

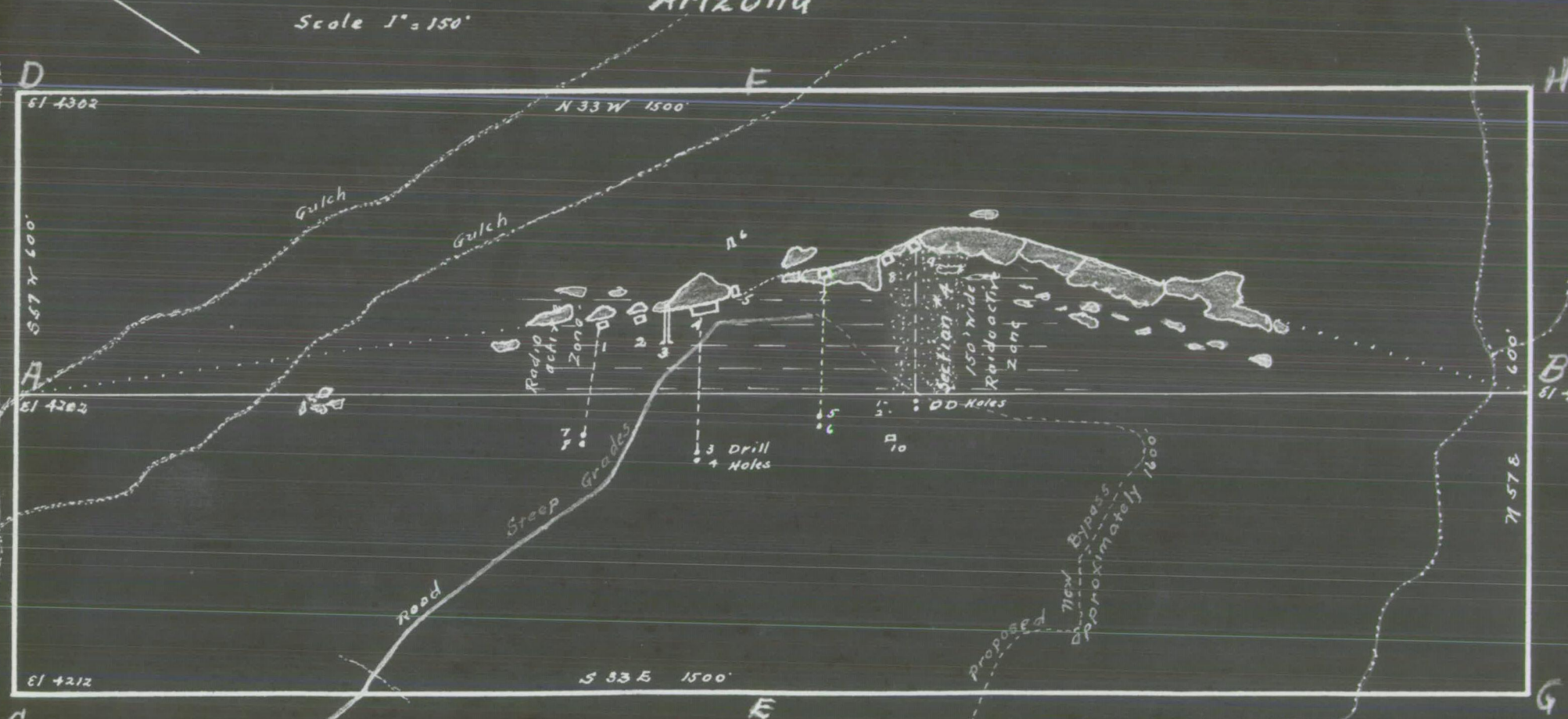


Fig 2 - Shows -

Claim boundries - Gulches - Roads - Workings (See Fig. 3) - Elevations - Known radioactive areas with proposed core drill holes (Diagrams in Fig 5.) - One longitudinal and three cross sections showing character of terrain (See Figs. 3 + 4) -

Chief Geologic Surface Feature - Massive siliceous mineralized outcroppings extending for over 800 feet along a strong fault zone - on a contact of monzonite porphyry and an early rhyolite - Lenticular shear zones within the fault zone contain secondary copper minerals and a little gold and silver - low in value - Radioactivity is strong at various points along the fault zone - Only a portion of this has been tested for radioactivity.

Measurements and locations approximate
Survey and Drawing - Mch - 1954

Jos. G. O'Brien E.M.
Amado, Arizona

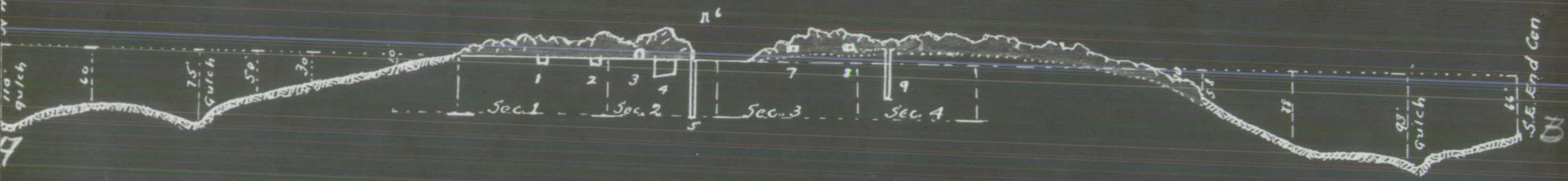
LITTLE DOE CLAIM

Fig. 3

Section - along outcroppings

Scale 1" = 150'

← N 33 W - S 33 E →



Drawing shows - Profile along survey line - Elevations - Gulches - Locations of various workings - Outcroppings shown in color -

Workings

No. 1 - Pit - 6'x5'x7'
" 2 - Pit - 6'x5'x7'
" 3 - Adit cross cut - 5'x7'x45'
" 4 - Sub-surface stope - 19'x5'x11-19' deep
" 5 - Shaft - 6'x4.5'x58'
" 6 - cut - 7'x4'x0-4'
" 7 - Pit - 6'x5'x5-10'
" 8 - Pit - 7'x5'x8'
" 9 - Shaft - 7'x6'x52'
" 10 - assessment work -

Sections marked for core drilling shown by red lines -

Locations + Measures approximate

Survey + Drawing
Mch - 1954
By
Jas. G. O'Brien
Mining Engineer
Amado, Arizona

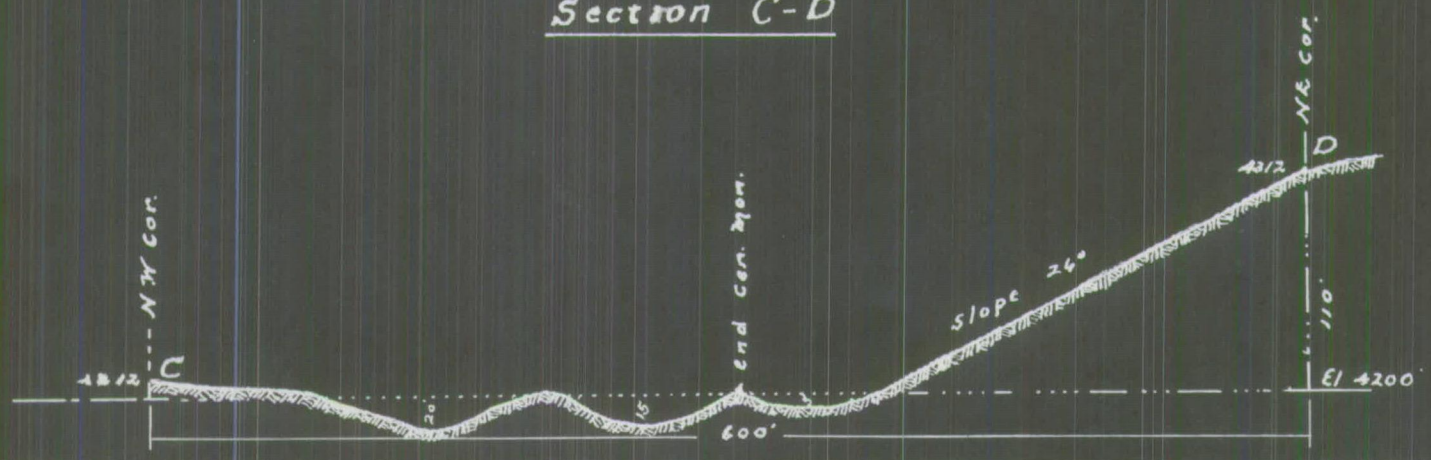
CROOS SECTIONS - LITTLE DOE CLAIM

Fig. 4

← SW — NE →

Scale 1" = 100'

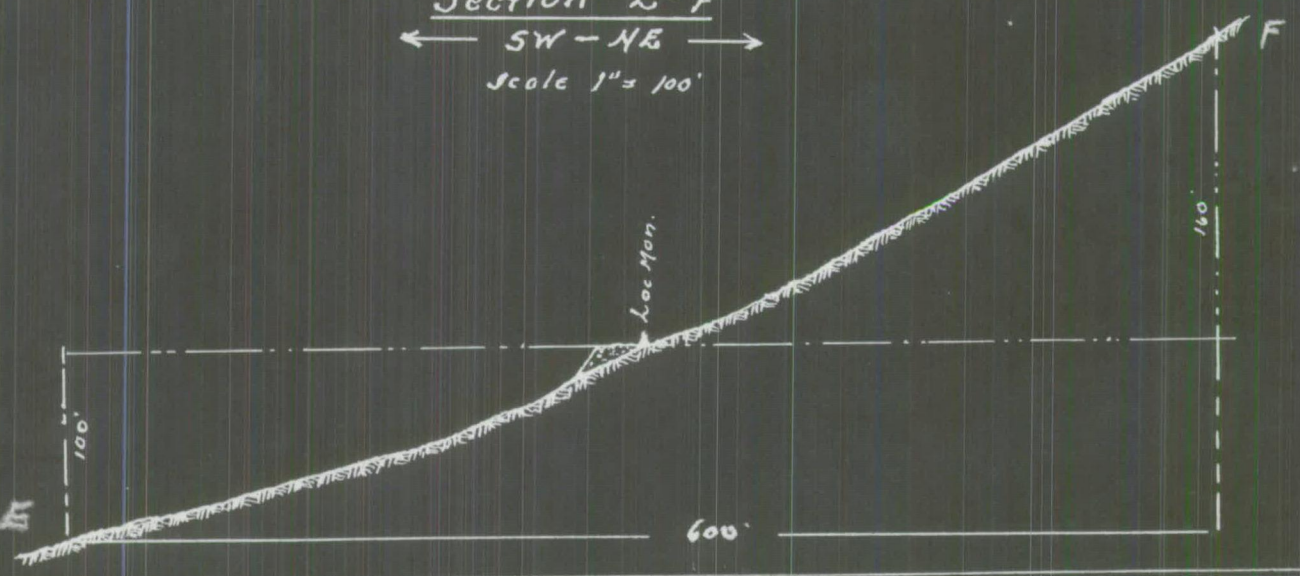
Section C-D



Section E-F

← SW — NE →

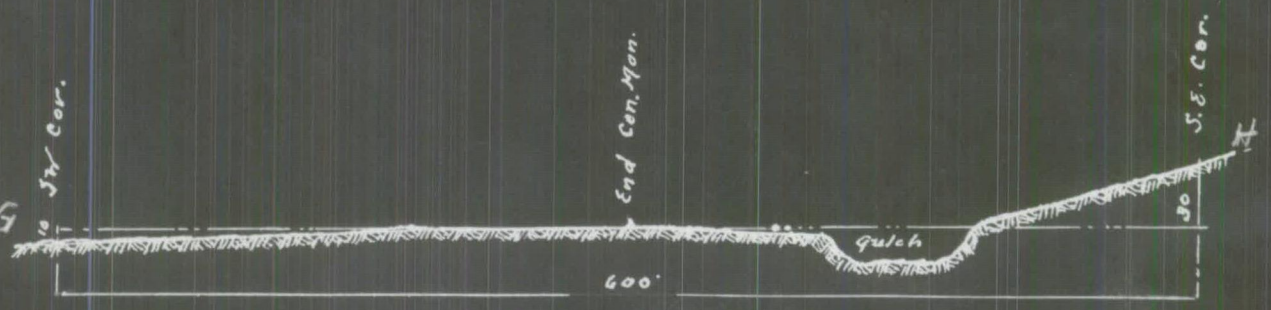
Scale 1" = 100'



Section G-H

← SW — NE →

Scale 1" = 100'



Drawings Approximate

Survey & Drawing
By
Jos. G. O'Brien
Mining Engineer

Mch - 1959
Amado Arizona

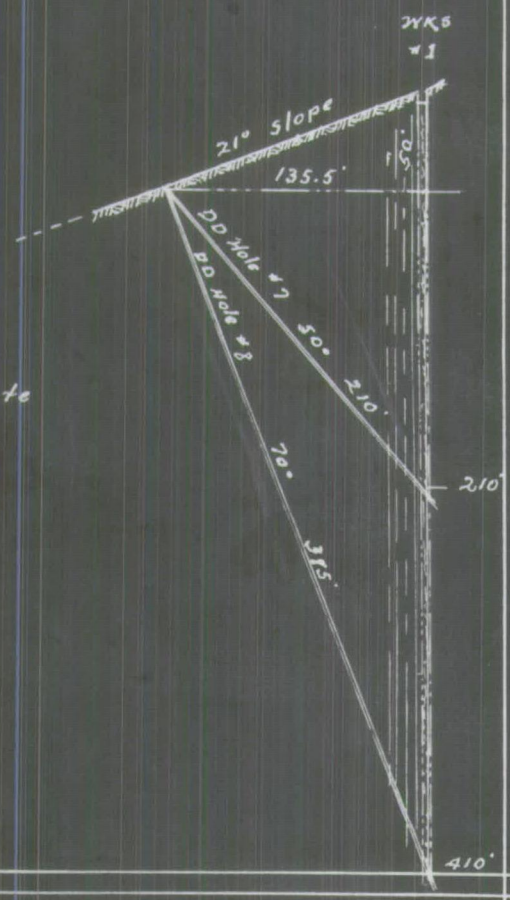
Fig. 5

CORE DRILL HOLES — LITTLE DOE MINE

Diagram - Section 1.-

Scale 1" = 100'

N 50° E →



All Drawings Approximate

Diagram - Section 2 -

Scale - 1" = 100'

N 8° W →

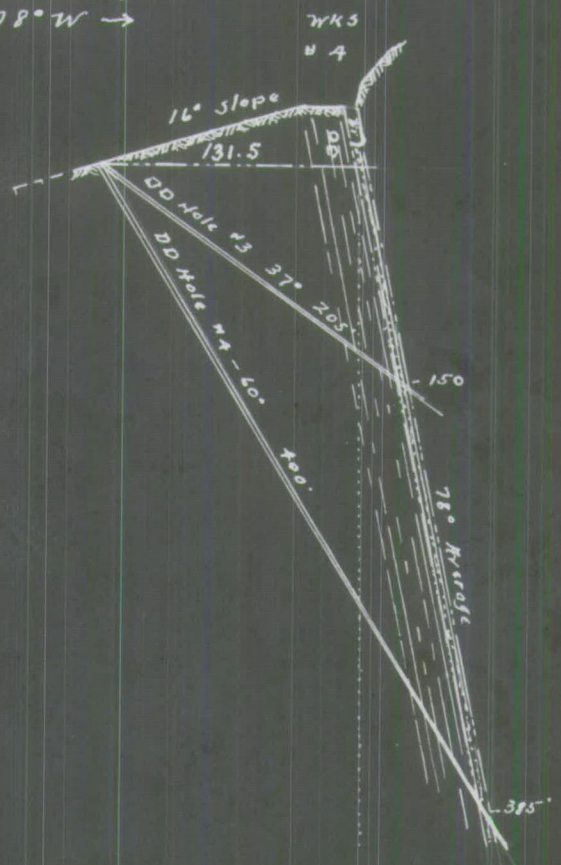


Diagram - Section 3 -

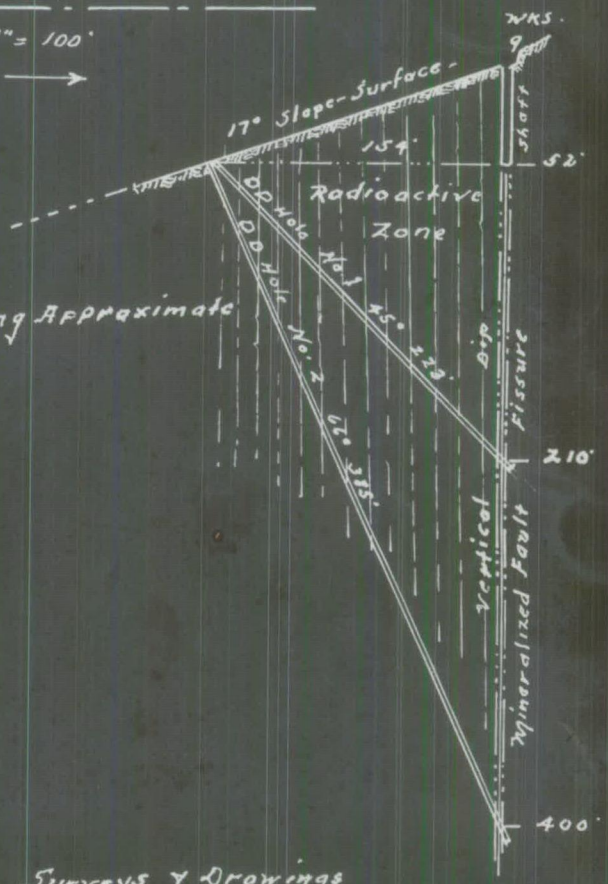
Scale - 1" = 100'

N 42° E →

Diagram - Section 4 -

Scale 1" = 100'

N 50° E →



Drawing Approximate

Surveys & Drawings
Mch - 1954

Jos. G. O'Brien Mining Engineer
Amado - Arizona

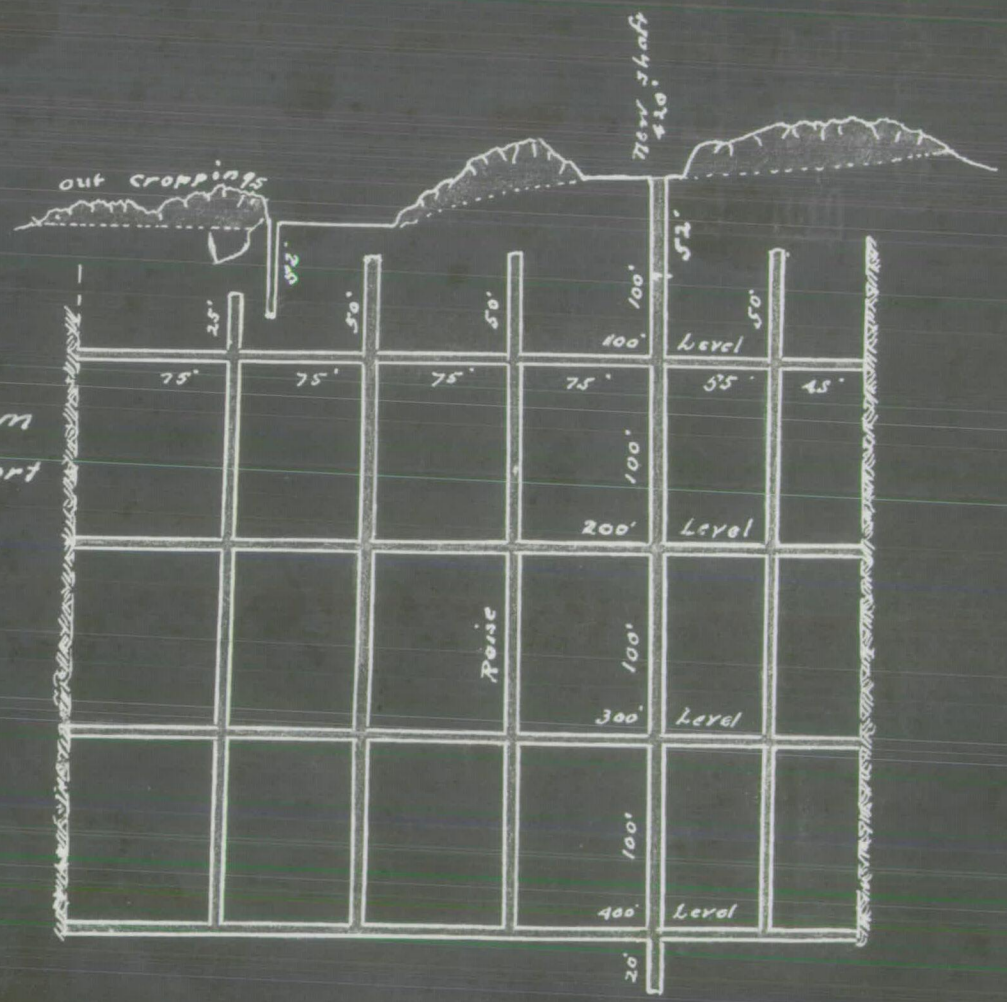
Fig. 6.

LITTLE DOE MINE

Scale 1" = 100'

LONGITUDINAL SECTION OF PROPOSED EXPLORATION WORK -

← NW — SE →



LEGEND

Proposed Exploration work shown in Red -

DATA -

Enlarging 52' shaft to scheduled size and sinking 368' of new shaft - to a total of 420' -

Levels - aggregating 1600' driven at 100' intervals - 300' North and 100' S of the shaft.

Raises - (4) - driven from the bottom level up through the 3" - 2" to a short distance above the first level -

Summary

Shaft	420'
Levels	1600'
Raises (3)	1050'
Raise (1)	325'
Total -	3395'

Survey & Drawing
By
Jos. G. O'Brien E.M
4/12/54
Amado, Ariz

LITTLE DOE MINE

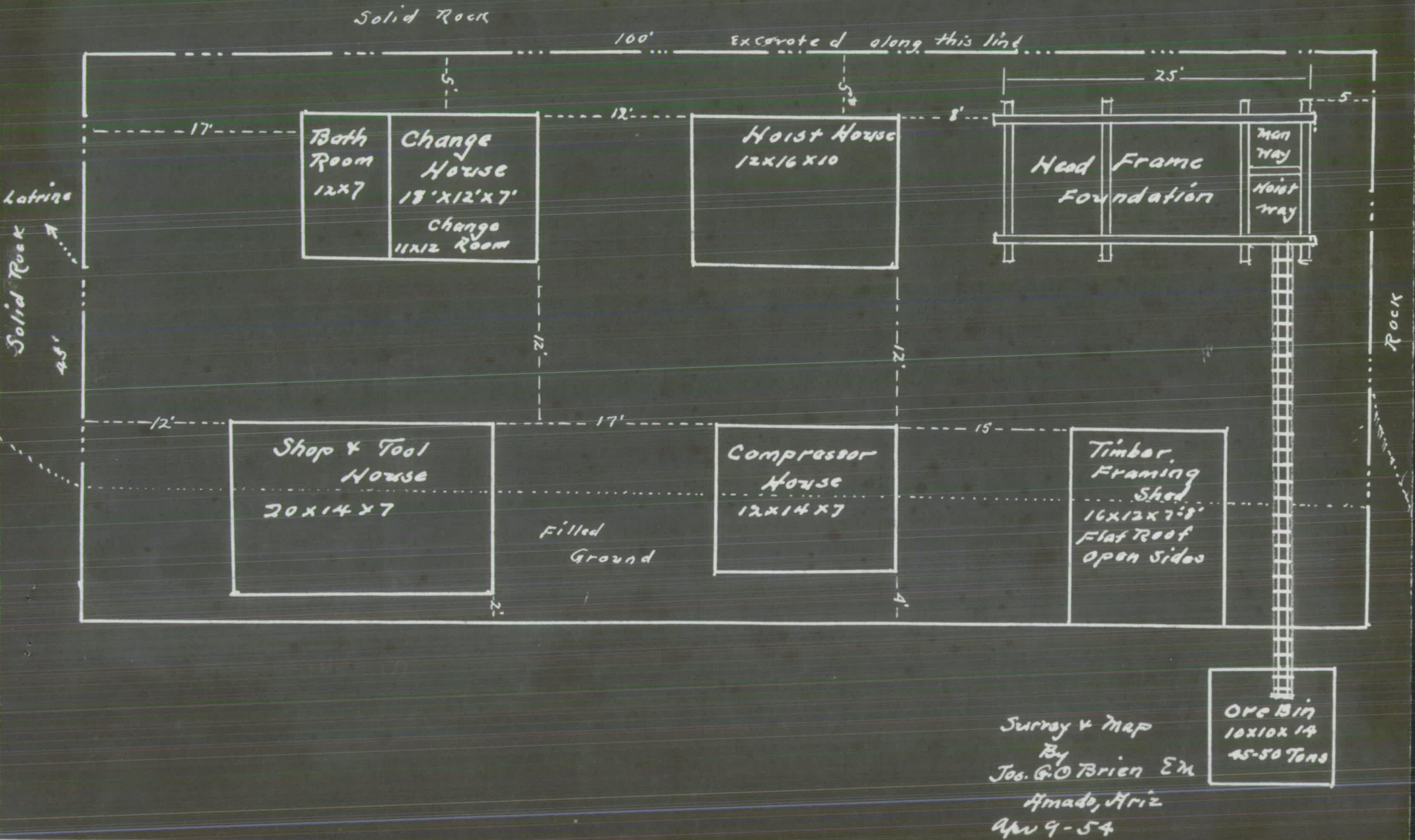
Surface Buildings

Fig. 7.

Scale 1" = 10'

← NW — SE →

45x100 = 4500 sq. ft



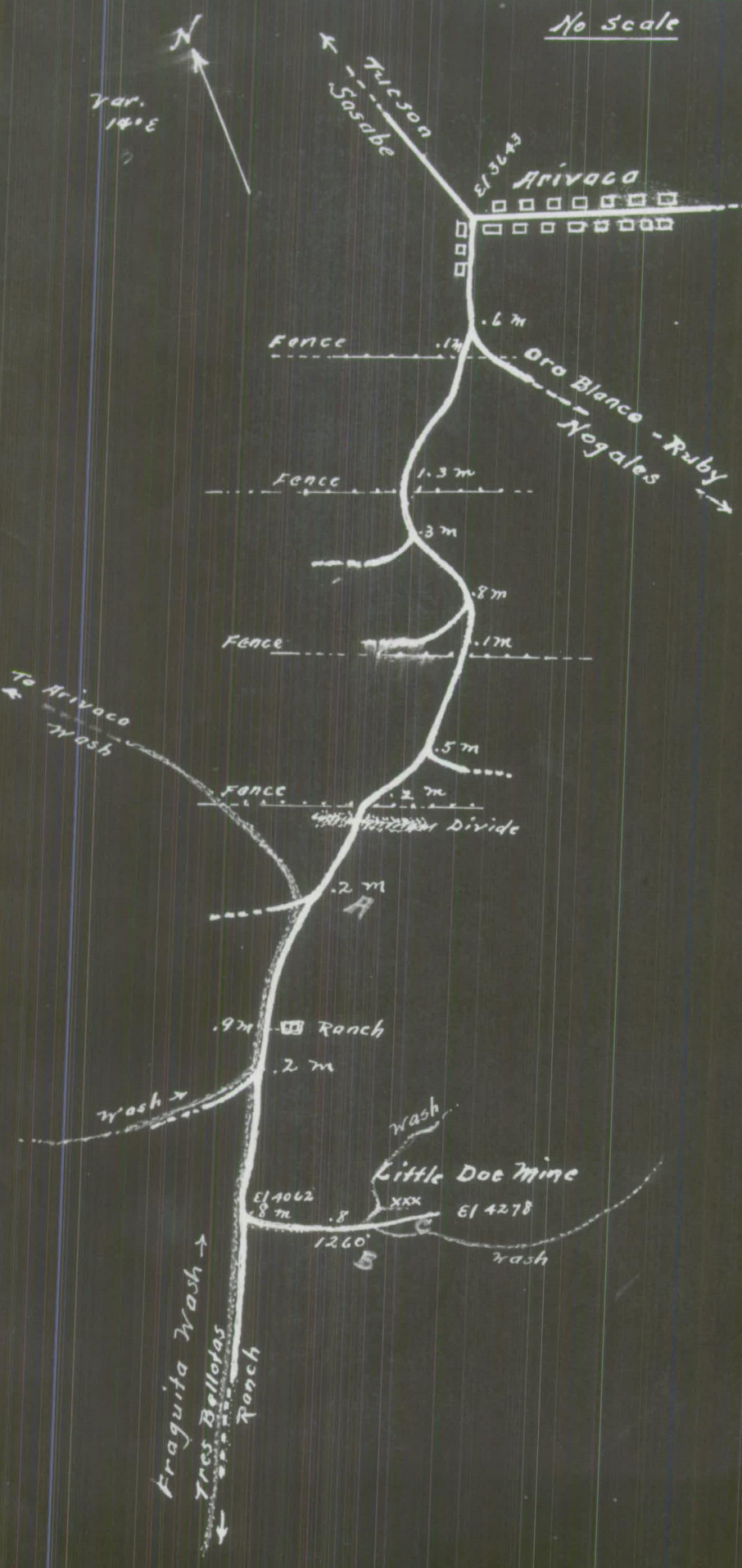
Survey & Map
By
Jos. G. O'Brien E.M.
Amado, Ariz
Apr 9-54

ROAD MAP

Fig. 1

Arivaca-to-Little Doe Mine

No Scale



Data –

General Bearing – S 10° West – Major curves – Branch roads – Fences – Washes and mileage between points indicated – Road measurements by Speedometer – excepting the last 1260' – which was taped – Grades generally ascending.

Elevations –

Arivaca ---	3643'
Little Doe ---	4278'
Difference	635'

Mileage –

Arivaca – "Little Doe" ---	7.1 m
Arivaca – Hwy #89 ----	23.3 m
Hwy #89 – Tucson ----	33.0 m
Hwy #89 – Amado Siding –	2.3 m
Mine to Amado Siding –	32.7 m

Note – Amado Siding is on the Tucson-Nogales branch of S.P.R.R.

A-B-C – Refer to road Work See – Answers to Questions

Survey + Map –
Mch. – 4, 1954.

Jas. G. O'Brien
Mining Engineer.
Amado, Arizona.

LITTLE DOE LODE MINING CLAIM

Fig 2

Oro Blanco Mining District - Santa Cruz County - Arizona

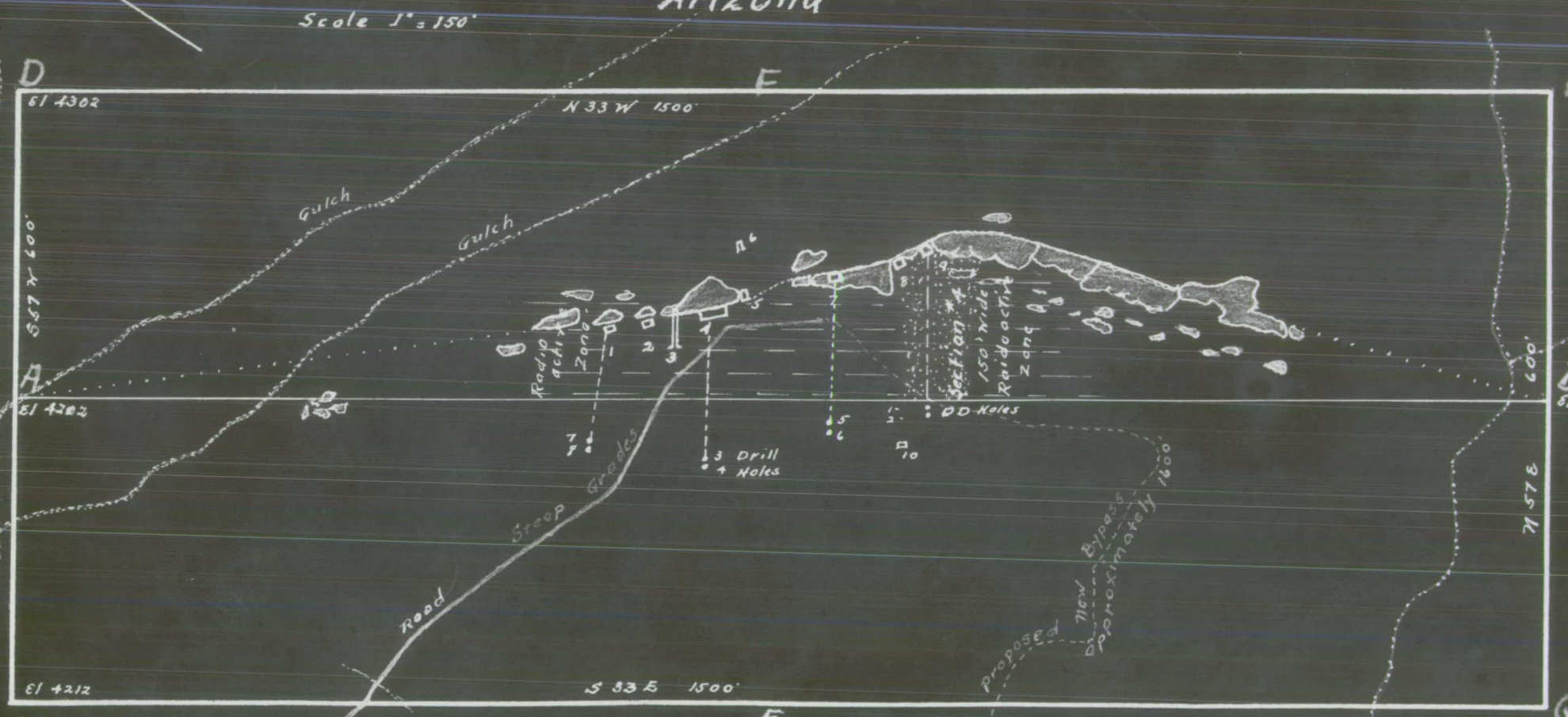


Fig 2 - Shows -

Claim boundries - Gulches - Roads - Workings (See Fig. 3) - Elevations - Known radioactive areas with proposed core drill holes (Diagrams in Fig 5.) - One longitudinal and three cross sections showing character of terrain (See Figs. 3 + 4) -

Chief Geologic Surface Feature - Massive siliceous mineralized outcroppings extending for over 800 feet along a strong fault zone - on a contact of monzonite porphyry and an early rhyolite - Lenticular shear zones within the fault zone contain secondary copper minerals and a little gold and silver - low in value - Radioactivity is strong at various points along the fault zone - Only a portion of this has been tested for radioactivity.

Measurements and locations approximate
Survey and Drawing - Inch - 1954

Jos. G. O'Brien E.M.
Amado, Arizona

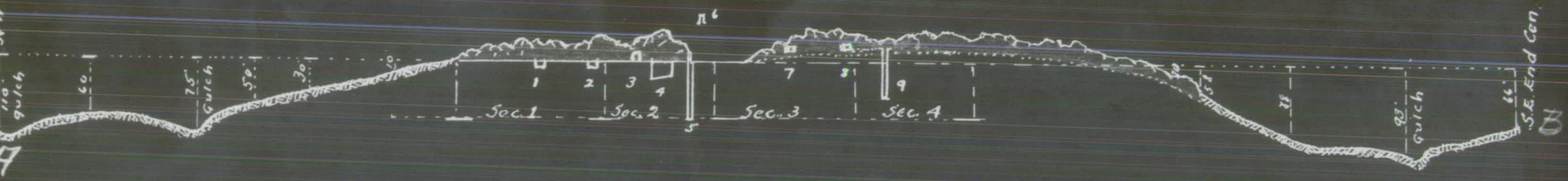
LITTLE DOE CLAIM

Fig. 3

Section - along outcroppings

Scale 1" = 150'

← N 33 W - S 33 E →



Drawing shows - Profile along survey line - Elevations - Gulches - Locations of various workings - Outcroppings shown in color -

Workings

No. 1 - Pit - 6'x5'x7'
" 2 - Pit - 6'x5'x7'
" 3 - Adit cross cut - 5'x7'x45'
" 4 - Sub-surface Stope - 19'x5'x11'-19' deep
" 5 - Shaft - 6'x4.5'x58'
" 6 - cut - 7'x4'x0'-4'
" 7 - Pit - 6'x5'x5'-10'
" 8 - Pit - 7'x5'x8'
" 9 - Shaft - 7'x6'x52'
" 10 - assessment work -

Sections marked for core drilling shown by red lines -

Locations + Measures approximate

Survey + Drawing
Mch - 1954
By
Jas. G. O'Brien
Mining Engineer
Amado, Arizona

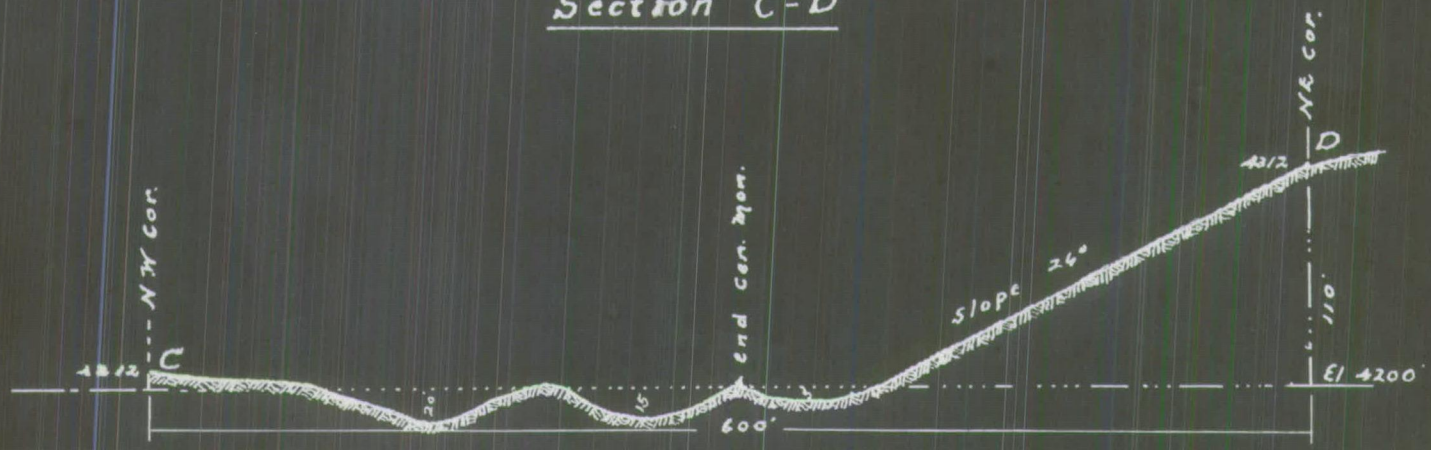
CROOS SECTIONS - LITTLE DOE CLAIM

Fig. 4

← SW — NE →

Scale 1" = 100'

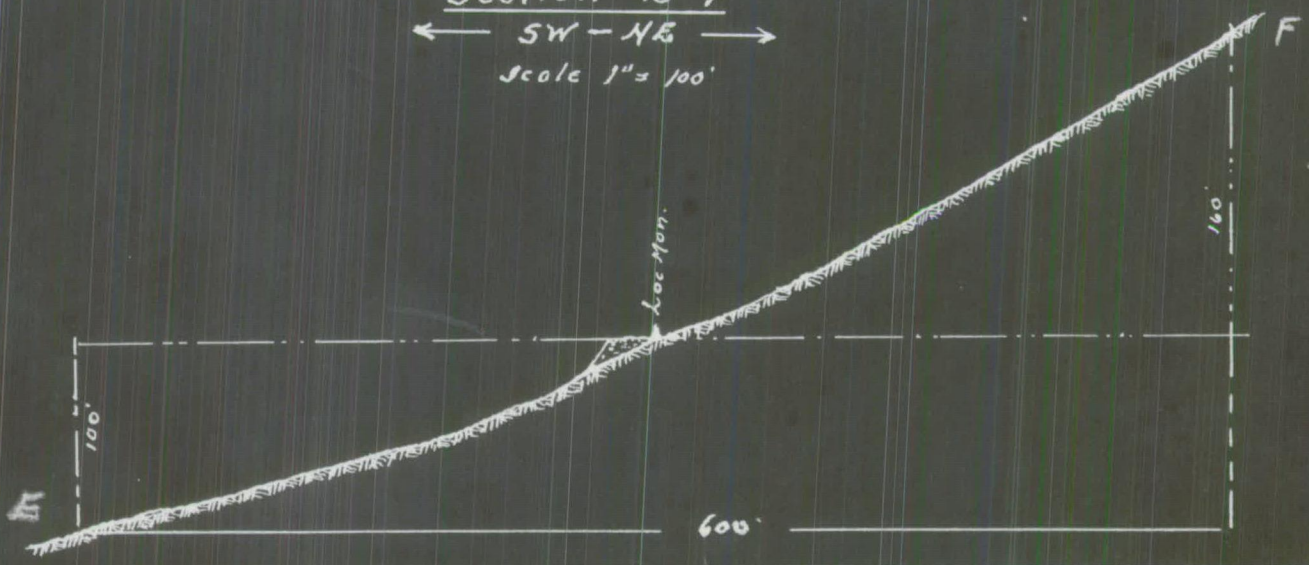
Section C-D



Section E-F

← SW — NE →

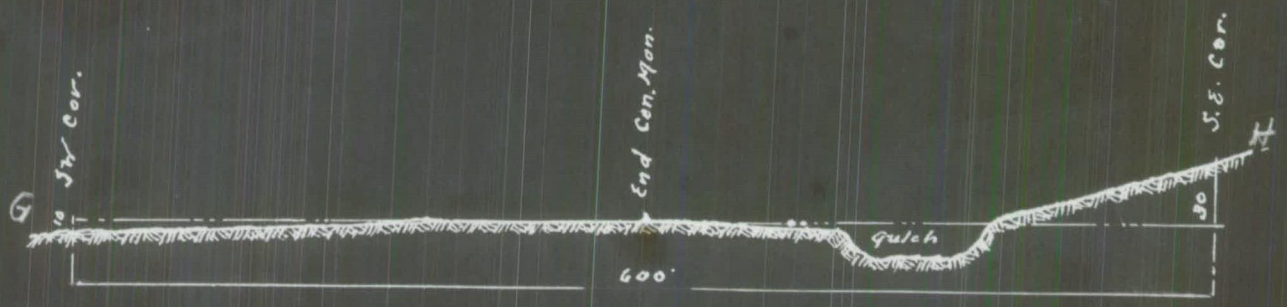
Scale 1" = 100'



Section G-H

← SW — NE →

Scale 1" = 100'



Drawings Approximate

Survey & Drawing
By
Jos. G. O'Brien
Mining Engineer

Mch - 1959
Amado, Arizona

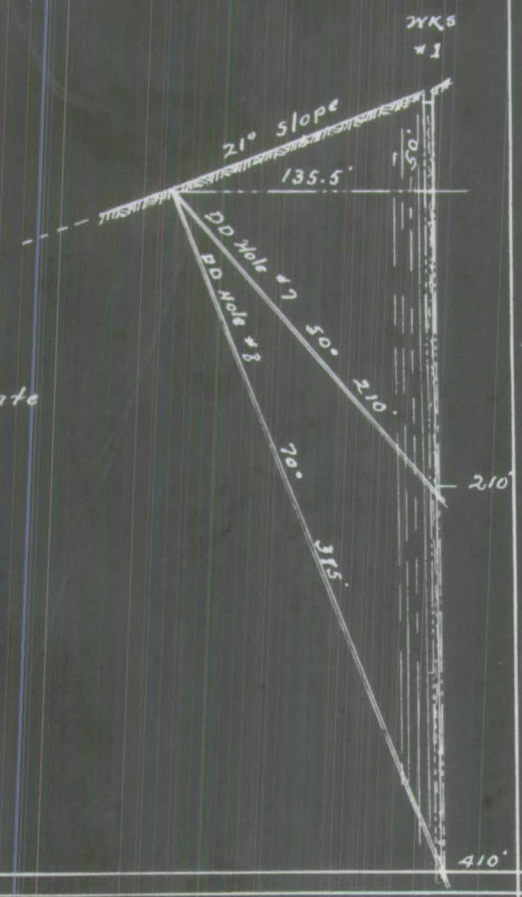
Fig. 5

CORE DRILL HOLES

Diagram - Section 1. -

Scale 1" = 100'

N 50° E →



All Drawings Approximate

LITTLE DOE MINE

Diagram - Section 2 -

Scale - 1" = 100'

N 8° W →

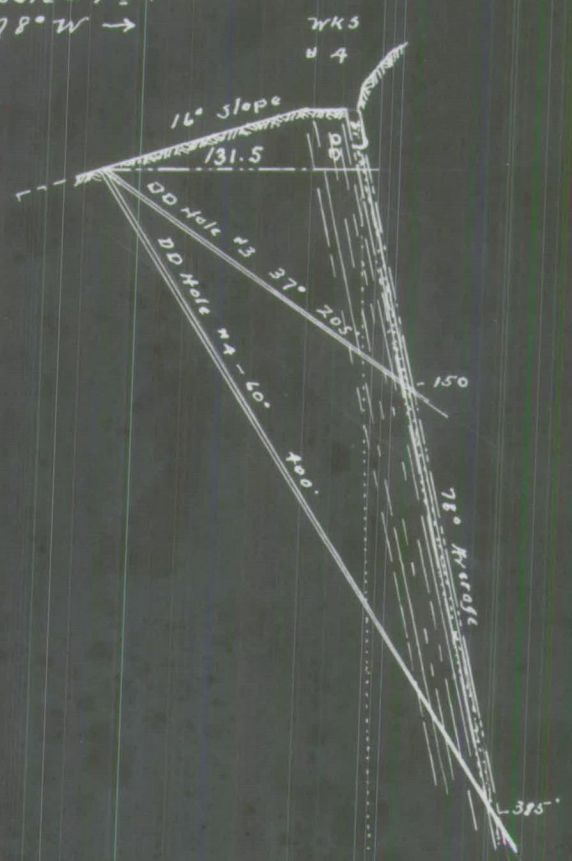


Diagram - Section 3 -

Scale - 1" = 100'

N 42° E →

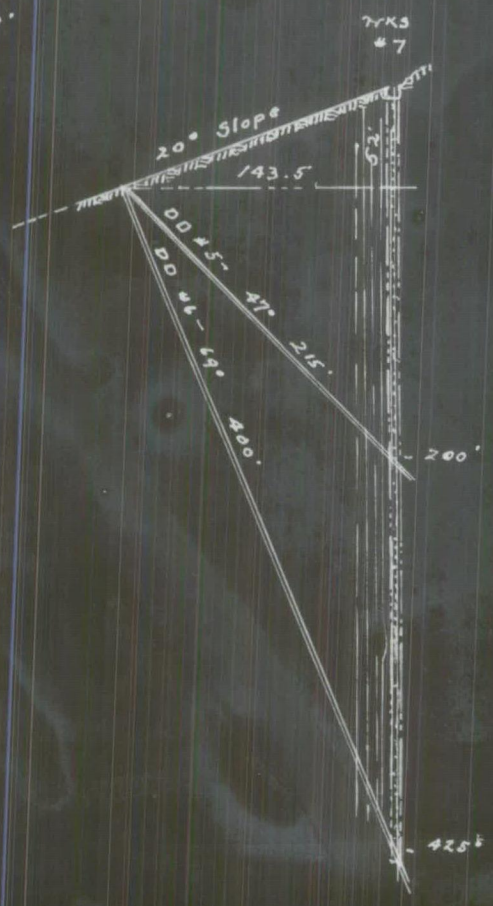
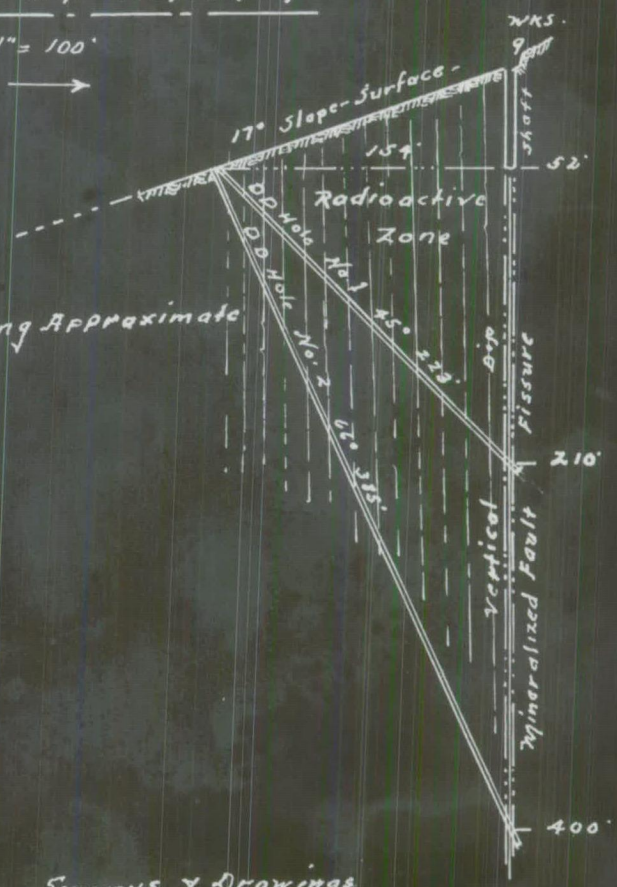


Diagram - Section 4 -

Scale 1" = 100'

N 50° E →



Drawing Approximate

Surveys & Drawings
Mch - 1954

Jos. G. O'Brien Mining Engineer

Fig. 6.

LITTLE DOE MINE

Scale 1" = 100'

LONGITUDINAL SECTION OF PROPOSED EXPLORATION WORK -

← NW — SE →

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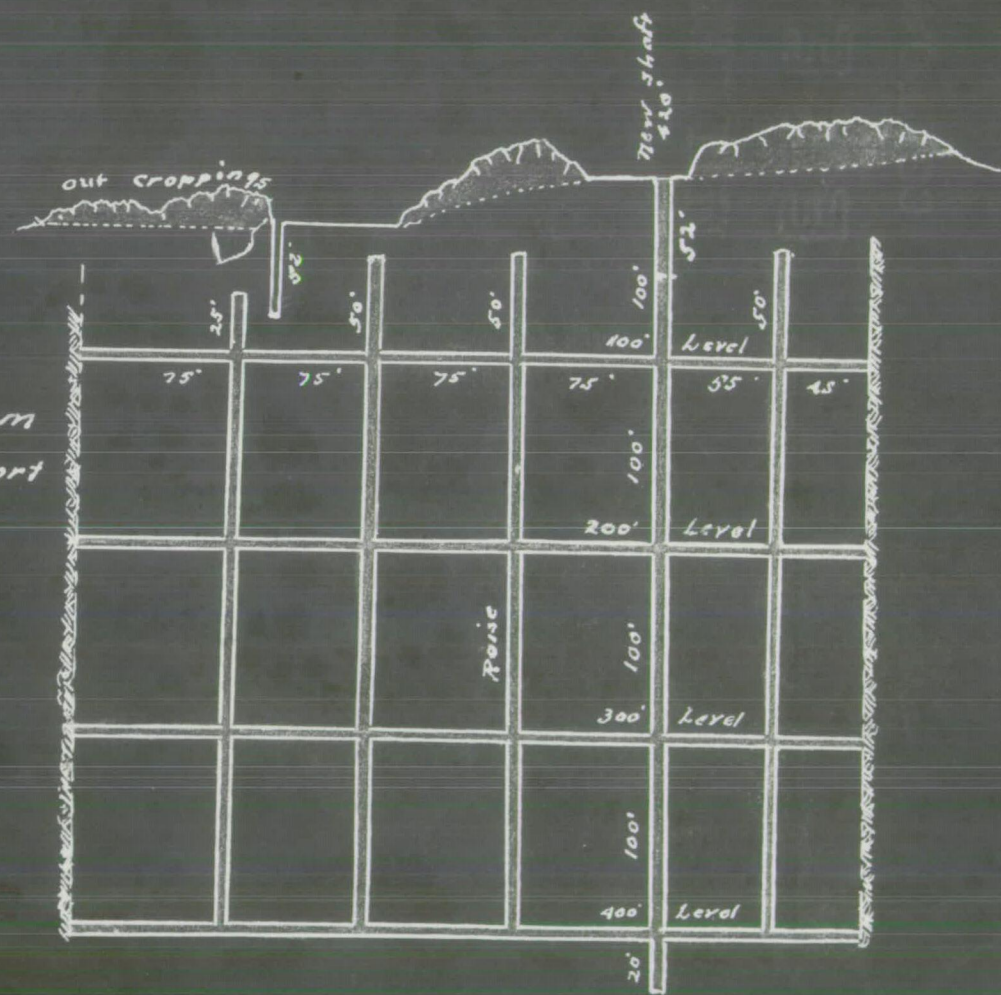
Raises - (4) - driven from the bottom level up through the 3" - 2" to a short distance above the first level -

Summary

Shaft ..... 420'
Levels ..... 1600'
Raises ..(3)..... 1050'
Raise ..(1)..... 325'
Total - 3395'



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LITTLE DOE MINE

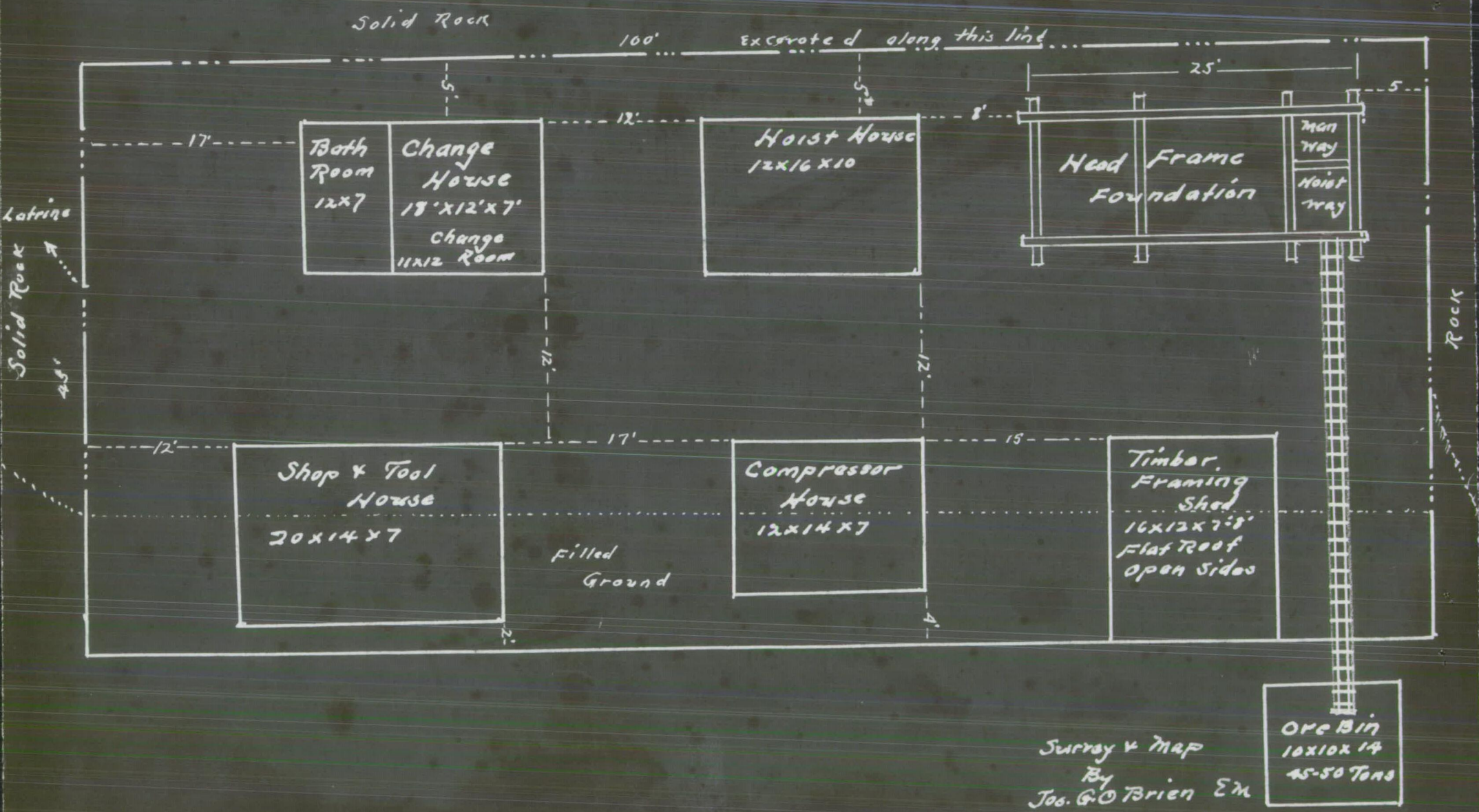
Surface Buildings

Fig. 7.

Scale 1" = 10'

← NW — SE →

45 x 100 = 4500 sq. ft



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