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STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Mr. Robert E. Adams, Chief
Operations Control & Statistics Division

DATE: April 26, 1954

FROM : Iron and Ferro-Alloys Division, DMEA

SUBJECT: Docket No. DMEA-3191 - Tungsten
Copper Canyon Mining Company
Copper Canyon Mine
Lander County, Nevada

The above-captioned docket has been removed from the active files of this division and is sent to you herewith since the applicant notified the Field Team by letter of April 6, 1954, that he wished to withdraw his application.

WSMartin
Chief, Iron and Ferro-Alloys Division

Attachment

Docket
Martin

Mr. Robert E. Adams, Chief
Operations Control & Statistics Division

April 26, 1954

Iron and Ferro-Alloys Division, DMEA

Docket No. DMEA-3191 - Tungsten
Copper Canyon Mining Company
Copper Canyon Mine
Lander County, Nevada

The above-captioned docket has been removed from the active files of this division and is sent to you herewith since the applicant notified the Field Team by letter of April 6, 1954, that he wished to withdraw his application.

SIGNED
Chief, Iron and Ferro-Alloys Division

Attachment

cc: Docket
Adm. Read. File
Field Team, Reg. 3
Code 400

R.C.S.

Docket

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

1012 Flood Building
870 Market Street
San Francisco 2, Calif.

April 15, 1954

Memorandum

To: George C. Selfridge, Chairman, Operating Committee, DMEA, Interior Building, Washington 25, D. C.

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket No. DMEA-3191 - Tungsten
Copper Canyon Mining Company
Copper Canyon Mine
Lander County, Nevada

Reference is made to your letter dated November 5, 1953, requesting a field examination of the subject property. The examination has been made and there are attached four copies of a report entitled "DMEA-3191, Copper Canyon Tungsten Deposit, Lander County, Nevada," by Russell R. Trengove, Mining Engineer, U. S. Bureau of Mines, and R. J. Roberts, Geologist, U. S. Geological Survey, dated March 31, 1954.

In view of Mr. Robert H. Raring's letter dated April 6, 1954, of which copies were sent to you attached to our memorandum dated April 9, requesting that the application be withdrawn, no further action on this application is necessary at this time.

H. C. Miller
Executive Officer
DMEA Field Team, Region III

Attachment

Copy to: Roscoe Smith, USGS
A. C. Johnson, Reno

Reviewed by
DMEA OPERATING COMMITTEE
4-23-54
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMEA-3191, Copper Canyon Tungsten Deposit

Lander County, Nevada

Russell R. Trengove, Mining Engineer
U. S. Bureau of Mines

R. J. Roberts, Geologist
U. S. Geological Survey

March 31, 1954

Reviewed by
DMEA OPERATING COMMITTEE
4-23-54
(date)

EXAMINATION REPORT

Docket No.: DMEA-3191 (Tungsten)

Name and address of applicant: Robert H. Raring, Gen. Mgr.
Copper Canyon Mining Co.,
Battle Mountain, Nev.

Name and location of property: Copper Canyon Tungsten Deposit
Lander County, Nevada

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

An engineer of the Bureau of Mines examined the Copper Canyon tungsten deposit in January 1954. The property is situated 18 miles south of Battle Mountain, Nev. The purpose of the examination was to determine if the geological conditions and the grade of mineralization were favorable to justify approval of an application for a Government loan and also to determine the best site for the proposed drilling program. The total estimated cost of a proposed amendment, which was not submitted by the applicant, for a maximum of 3,000 feet of drilling amounts to $19,300.

The ore mineral is scheelite. The International Smelting & Refining Co., a subsidiary of the Anaconda Mining Co., did considerable development work, and exploring by 30,000 feet of diamond drilling for lead-zinc ore from 1936 to 1941. One of the diamond drill holes (DDH 9) that extended below the 700 level had an intercept 100 feet long that assayed 0.56% WO_3. Other drill hole cores also showed notable amounts of scheelite, but no ore grade material was found.

INTRODUCTION

An application for a Government loan under sec. 202 of the Defense Production Act of 1950 was made by Robert H. Raring, general manager, Copper Canyon Mining Co. on October 12, 1953. An engineer of the Bureau of Mines examined the property in January 1954. He was accompanied by Robert H. Raring, general manager.

PROPERTY AND OWNERSHIP

Property holdings comprise 19 patented lode claims, 17 unpatented lode claims, and 3 unpatented placer claims. The concentrator and mine are in the NW 1/4 SW 1/4 and the SW 1/4 NW 1/4, sec. 27, T. 31 N., R. 43 E.

The Copper Canyon Mining Co. is the owner, with main offices at 25 Broad St., New York City. Principal officers are L. E. Whicher, president, New York City, and Robert H. Raring, vice president and general manager, Battle Mountain, Nev.

HISTORY AND PRODUCTION[1/]

The first recorded mining operations at Copper Canyon were carried on by an English company, who purchased the property about 1870 and worked it continuously for a period of about 10 years. This company opened up two lodes - on one of which they sank a shaft to a depth of 590 feet. It is stated more than 40,000 tons of oxide ores were shipped to Swansea, Wales, and that these shipments averaged 50 percent copper. The company also owned

1/ This section is from the files of the Copper Canyon Mining Co.

and operated a concentrating plant, which was situated on Willow Creek, 2-1/2 miles from the mine. After remaining idle for a period of five years, the mine was sold to a local company. The local company sold the old mill and allowed the property to remain idle until 1897, when it was acquired by the Glasgow and Western Exploration Co., Limited, who reopened the mine, equipped it with new machinery, and commenced more or less active mining operations, stoping out the old pillars and other ore left standing by the previous operators. During the years 1898, 1899, and 1900, according to old company records, there was extracted about 2,000 tons of 12 percent copper ore from the old workings, and in 1907 the mine produced 844 tons of the same grade ore. In 1907, the mine was shut down and the machinery dismantled. The workings caved in and became inaccessible below the 90-foot level.

About 1912, the Glasgow & Western Exploration Co. erected a leaching plant at Copper Canyon to treat low-grade oxidized copper ores, but it was metallurgically unsuccessful, as an extraction of only 47 percent was obtained. In 1914 the Glasgow & Western Exploration Co. ceased operations, and in 1916 the newly formed Copper Canyon Mining Co. acquired the Copper Canyon mines. During World War I, between August 1916 and December 1918, the company shipped 22,481 tons of ore averaging 9 percent copper. This production was made from the Estes vein between the 188-foot level and the surface and from the Willow Creek dump. The ore was hauled to Dillon, a point on the Nevada Central rail-

road to the smelters at Garfield, Utah.

After World War I, the mine was inactive until 1927, when lessee production started. In 1935, after the discovery of gold in 1932 by lessees, the company reorganized, and development was conducted by the Copper Canyon Mining Co. from 1936 to 1941. In 1941 the property was taken over by a susidiary of the Anaconda Mining Co., the International Smelting & Refining Co., on an operating agreement basis. They did considerable development work and exploring by core drilling. The development included 30,000 feet of diamond drilling. This drilling disclosed a lead-zinc ore body, but no effort was made to mine it at that time. Production of copper, silver, and gold ore continued until December 1945, when the property, with all improvements and equipment, was returned to the Copper Canyon Mining Co. This company continued mining copper ore until the premium on copper was dropped in July 1947. At that time production ceased, and operations were started on sinking the shaft 218 feet to the 700 level. This was completed January 1, 1948, but the 700-level drift did not reach the lead-zinc ore in the hornfels until July 1948 because of the large flow of water encountered while the drift was being advanced. Mining the ore body started immediately, and the first lead-zinc ore was put through the mill August 9, 1948. From August 9, 1948 to October 15, 1952, when operations ceased, 193,470 dry tons were milled.

The annual production since 1935 is as follows:

Year	Tons	Oz. Au	Oz. Ag	Lb. Cu	Lb. Pb	Lb. Zn
1935	1,970	1,232.92	3,975.8	29,926		
1936	574	382.53	2,577.0	4,744		
1937	1,576	491.80	2,692.3	160,879		
1938	3,956	1,600.35	7,802.7	478,114		
1939	6,283	1,389.85	12,791.1	699,510		
1940	7,109	1,333.22	13,561.8	724,180		
1941	1,631	205.42	2,788.2	164,324		
1942 1/	85,640	4,687.98	47,502.8	1,127,019		
1943	99,582	7,928.19	85,772.7	1,769,710		
1944	76,544	6,064.70	91,144.7	1,130,893		
1945	47,935	5,638.11	52,765.0	617,542		
1946	76,714	3,470.11	58,762.3	958,314		
1947	35,764	2,816.64	22,442.1	537,284		
1948	16,814	894.21	26,119.0	45,120	399,788	236,861
1949	72,132	1,213.80	194,077.0	126,197	2,808,904	1,343,658
1950	34,430	525.73	77,742.0	84,820	1,126,258	513,488
1951	15,890	339.63	34,983.0	42,740	501,680	250,360
1952	54,204	857.83	122,701.0	96,858	1,716,963	744,978

1/ Mill started Feb. 26, 1942.
Closed Oct. 15, 1952

LOCATION AND PHYSICAL FEATURES

The Copper Canyon mine is in Lander County, Nev. (fig. 1), 18 miles south-southwest of Battle Mountain, a town on U. S. Highway 40 and on the Southern Pacific and Western Pacific Railroads. Battle Mountain is 220 miles northeast of Reno, Nev., and 310 miles west of Salt Lake City, Utah.

The property is in the Battle Mountain district, which is comprised of a series of steep northward-trending mountains bounded on the east by Reese River Valley and on the west by Buffalo Valley.

Altitudes range from 4,600 feet in the valley to 8,265 feet on Antler Peak, a few miles north. The mine is at an altitude of 5,700 feet in Copper

Canyon, which is on the rugged west slope of a northward-trending ridge near the south end of the range.

Climate in the area is semi-arid, with hot, dry summers and moderately cold winters. Precipitation occurs usually as snow, with occasional rains during the fall and spring. Vegetation consists of sagebrush and desert grass.

Water for milling purposes is obtained from the mine. Water for domestic purposes is purchased from the Natomas Co., which operates a gold dredge to the south. It is pumped from their reservoir, 1 mile distant. They obtain their water from Willow Creek and also from a well in the valley. Water can also be pumped from a 203-foot well owned by the Copper Canyon Mining Co., through 15,600 feet of 6-inch pipe line to a 112,000-gallon storage reservoir situated above the mill.

The mine is accessible by 12 miles of hardsurfaced road and 6 miles of gravel road from the town of Battle Mountain.

Freight and express shipments and telegraphic communications are handled through the railroad station at Battle Mountain. Daily postal service is maintained by truck from the Battle Mountain post office.

The camp can accommodate 27 families and 56 single men. It consists of 14 bunk houses for single men, 27 family homes, a boarding house capable of seating 90 men, a grocery store, office, and staff house.

Power for the mine and mill is obtained from three Diesel engines of 600 horsepower each direct-connected to 475 k.v.a. generators. When

the mine is not in operation, power for the camp and mine buildings is obtained from the Natomas Co.

THE MINE WORKINGS AND MILL

The mine workings and mill are fully described in Report of Investigations 4774 "Investigation of Copper Canyon Lead-Zinc Deposit, Lander County, Nev." by Russell R. Trengove.

At the cessation of operations October 15, 1952, equipment on the 700-level was removed and stored on the 500-level and the surface. The water in the shaft was estimated to be about 70 feet below the 500-level at the time of the examination.

It is believed that if the proposed exploration from the 500-level was expedited, the project would be completed before pumping would be necessary.

GEOLOGY

The rocks in the Copper Canyon area include sedimentary rocks of Paleozoic age that belong to the Harmony, Battle, and Pumpernickel formations. These rocks have been intruded by quartz monzonite and have been recrystallized and metamorphosed to hornfels.

The oldest sedimentary unit is the Harmony formation (Ch) which is composed of sandstone and shale. This unit is overlain unconformably by the Battle formation. In the mine area (figs. 2, 3, and 4) the Battle formation consists of three members: A lower member of calcareous conglomerate (Cbl); a middle member of calcareous hornfels and conglom-

erate (Cbm); and an upper member of quartzite (Cbu). The Pumpernickel formation is composed of chert and shale. In the mine area it is found in the hanging wall of the Virgin fault in the upper plate of the Golconda thrust.

Quartz monzonite cuts the sedimentary units and is in contact with the Pumpernickel and upper Battle formations in the Farren tunnel area. The productive workings are 600 feet or more south of the quartz monzonite.

The rocks in the mine area are cut by two principal sets of normal faults: (1) North-trending faults that dip steeply west such as the Virgin fault; and (2) northwestward trending faults that dip northeast. Both sets of faults are mineralized. A thrust fault which brings the Pumpernickel formation over the Battle formation comes into the mine area but is not exposed at the surface; presumably it was dropped down on the hanging wall of the Virgin fault below the Farren tunnel level.

A wedge of the upper conglomerate (Cbu) is exposed in the hanging wall of the Virgin fault on the Farren tunnel level; the wedge was not differentiated on figure 3 because it is small and does not affect the general geologic picture.

ORE DEPOSITS

The ore bodies that have been mined at Copper Canyon are gold-copper ore bodies from the lower member of the Battle formation and lead-zinc ore bodies from the middle member. These ore bodies were localized along bedding in crushed zones parallel to faults or at the intersections of

faults.

The ore minerals in the gold-copper bodies are mainly pyrite and chalcopyrite, the ore minerals in lead-zinc bodies are mainly pyrite, galena, and sphalerite. The gold-copper and lead-zinc ore bodies ranged from a few thousand tons to more than 100,000 tons. The average tenor of ore mined was low (see production table), but the metallization was fairly uniform and large blocks were mined with shrinkage stoping methods. Scheelite veins and pods were found locally in the lead-zinc ore bodies and in the calcareous hornfels of the middle member, but no persistent ore bodies were found in the stoped areas. One drill hole (DDH. 9) that extended below the 700 level had an intercept 100 feet long that assayed 0.56% WO_3; other drill hole cores also showed notable amounts of scheelite, but no ore grade material was found. The wide distribution of the scheelite so far from any known contact between calcareous beds and quartz monzonite raised the question as to whether larger bodies of higher grade material might not occur in favorable units near the contact.

There is no direct method of evaluating the likelihood of the discovery of commercial tungsten ore near the contact, but the project appears to be a good geologic bet. Many of the contact areas of the intrusive bodies in this part of Nevada contain tungsten bodies, and two areas, the Mill City and Osgood Mountain (Getchell) districts have notable productions. Tungsten ores in nearby areas such as the Osgood range are commonly within a few tens of feet of the contact. In view of the promising scheelite

showings found elsewhere in the Copper Canyon mine, the Cbm-quartz monzonite contacts would appear to be a worthwhile objective.

PROPOSED EXPLORATION

The applicant proposed a drilling program from the 500 level to explore the Cbm-quartz monzonite contact in the footwall of the Virgin fault. The holes were to be drilled along the strike of the middle hornfels to the quartz monzonite contact. This contact zone has not been previously explored in the workings because it is about 600 feet from the nearest stopes. The geologic reasoning followed by the applicant in setting up the project seems sound, but an alternate method for reaching the proposed objective should be considered.

There are two ways to reach the proposed objective which will be discussed below under two plans, Plan I and Plan II (figs. 2 and 3):

Plan I is to drill from the Farren tunnel near the point where it crosses the Virgin fault. Two holes are suggested for the initial stage; one is to be directed about N. 30° E., down 40°, and the other is to be directed about N. 63° E., down 40°. These holes will total about 650 feet; provision should be made for an additional 850 feet of drilling to be fanned out to explore promising areas along the contact. The locations of the additional holes should be determined by mutual agreement between representatives of the company, Bureau of Mines, and Geological Survey.

Plan II is to drill from the 500 level northward to the contact. This plan is a modification of the applicants plan taking into account Mr. Thayer's suggestions. Two holes are suggested for the initial stage; one is to be directed about N. 2° W., down 10°, and the other is to be directed N. 6° E., down 10°. These holes will total about 1500 feet; provision should be made for an additional 1500 feet of drilling to test other promising areas along the contact. The locations of the additional holes should be determined by mutual agreement between representatives of the company, Bureau of Mines, and Geological Survey.

Plan I has the advantage that the distance from the drill site to the target is shorter. Possibly a total of 1,500 feet of drilling would adequately test the contact area. The disadvantages of the plan would be that most of the drilling would be in chert and shale of the Pumpernickel formation; there would be little chance of the discovery of tungsten bodies in this formation.

Plan II would be more costly as the distance from the 500 level face to the target is greater than in Plan I, but would offer several advantages. Plan II would have the one major advantage that the drill holes would follow units that have been productive elsewhere in the mine, and which might contain tungsten ore bodies between the present faces and the contact. From this standpoint it therefore seems desirable to choose Plan II over Plan I, despite the greater cost. Moreover, there is some uncertainty about the

position of the Cbm unit below the Cbu unit in the Farren tunnel area, (see fig. 3). In the event that the contact between Cbm and quartz monzonite dips to the southwest instead of being nearly vertical as shown, the initial holes might well miss the target area. In Plan II the holes will be drilled along the strike and will therefore be directed toward the contact. They will cut the contact objective regardless of the dip, and will give more information on the underground structure than any other approach.

COMPARISON OF COSTS OF METHODS I and II

Plan I - Farren Tunnel

The Farren Tunnel 1350 feet in length and said to have been driven in 1914 has not been in use since that time. The floor of the tunnel is covered with from one to two feet of muck the entire distance, and in two locations the back is caved up to 20 feet in height. Access to the face, however, was possible by crawling over these muck piles. Considerable excavation would also be necessary in blasting a diamond drill site at the face. Removal of this muck would necessitate the installation of a track and mine cars and hand tramming to the dump at the portal. This long tram can not be eliminated as there are no winzes or open stopes adjacent to the tunnel which could be used to dispose of the muck. Considerable timbering and lagging would also be required at the two badly caved locations. A rough estimate of the labor cost in performing the above work is as follows:

100 man shifts @ $12.50	$1,250

In addition, 1400 feet of air line and 1400 feet of water line would have to be purchased and installed.

1400 feet 2-inch pipe @ $0.78	$1,092	
1400 feet 1-inch pipe @ $0.31	434	
Labor installing & removing pipe 6 man days @ $12.50	75	
Total	$2,850	less salvage value of pipe

Plan II - 500-level

The track, air and water lines are installed and the old diamond drill station is believed to be large enough for the proposed drill holes. Except for cleaning the floor of the 500-level drift, estimated to cost $100, drilling could be started immediately after checking valves on company owned 350 c.f.m. air compressor - estimated cost of $200. Drilling would be done on a two 8-hour shift basis daily which will require two hoistman @ $12.50 per day. The cost of the hoistmen will be incorporated into the per foot of drilling cost.

For a maximum of 3,000 feet of drilling, using an average of 30 feet of advance per day, 200 hoistmen shifts will be required.

200 shifts @ $12.50 = $2,500

Summary

Cleaning 500-level drift	$100
Checking air compressor	200
Hoistmen	2500
	$2800

The difference in costs of the two methods would be in favor of Plan I. However, it would be small - amounting to the salvage value of the pipe.

Estimated costs of amended application which was not furnished by the applicant

Summary for 3,000 feet of drilling

Cleaning 500-level drift	$100	
Checking air compressor	200	
Hoistmen, 200 shifts @ $12.50	2,500	
3,000 feet of AX drilling @ $5.00	15,000	
Supervision - 3 months @ $500.00	1,500	
Total	$19,300	or $6.43 per foot of drilling

RECOMMENDATIONS AND CONCLUSIONS

The Bureau of Mines and Geological Survey concur in the following conclusions:

1. In view of the promising scheelite showing in DDH 9 (100 feet of 0.56% WO_3) and elsewhere in the Copper Canyon mine, the calcareous hornfels (Cbm) - quartz monzonite (Cbu) contacts would appear to be a worthwhile object. This contact zone has not been previously explored.

2. Plan II - 500-level is preferred rather than Plan I - Farren Tunnel for the following reasons:

a. Although Plan I may be less costly than Plan II, there would be a delay of possibly two months making the face of the Farren Tunnel accessible for drilling operations. Drilling could be started after cleaning debris from the 500-level tracks - possibly two or three days.

b. No drilling site excavation is necessary on the 500-level and air and water lines are installed.

c. The position of the Cbm-Cbu contact below the Farren Tunnel is unknown. Although the target area as shown on Exhibit C is a shorter distance from the Farren Tunnel than the 500-level, most of the drilling would be in chert and shale of the Pumpernickel formation with little chance of the discovery of tungsten bodies in this formation.

d. Drilling from the 500-level (Plan II) would have the advantage that the drill holes would follow calcareous hornfels (Cbm) that have been productive elsewhere in the mine.

e. Because of the uncertainty about the position of the (Cbm) unit below the (Cbu) unit, in the Farren Tunnel area (fig. 3), the initial holes from the Farren Tunnel (Plan I) might miss the target area and diamond drill footage would be increased.

f. In Plan II (500-level) the holes will be drilled along the strike and will therefore be directed toward the contact.

g. The proposed exploration is for tungsten and not for copper, lead or zinc.

h. The proposed exploration will be on Washington claim, Lot No. 1843 (patented).

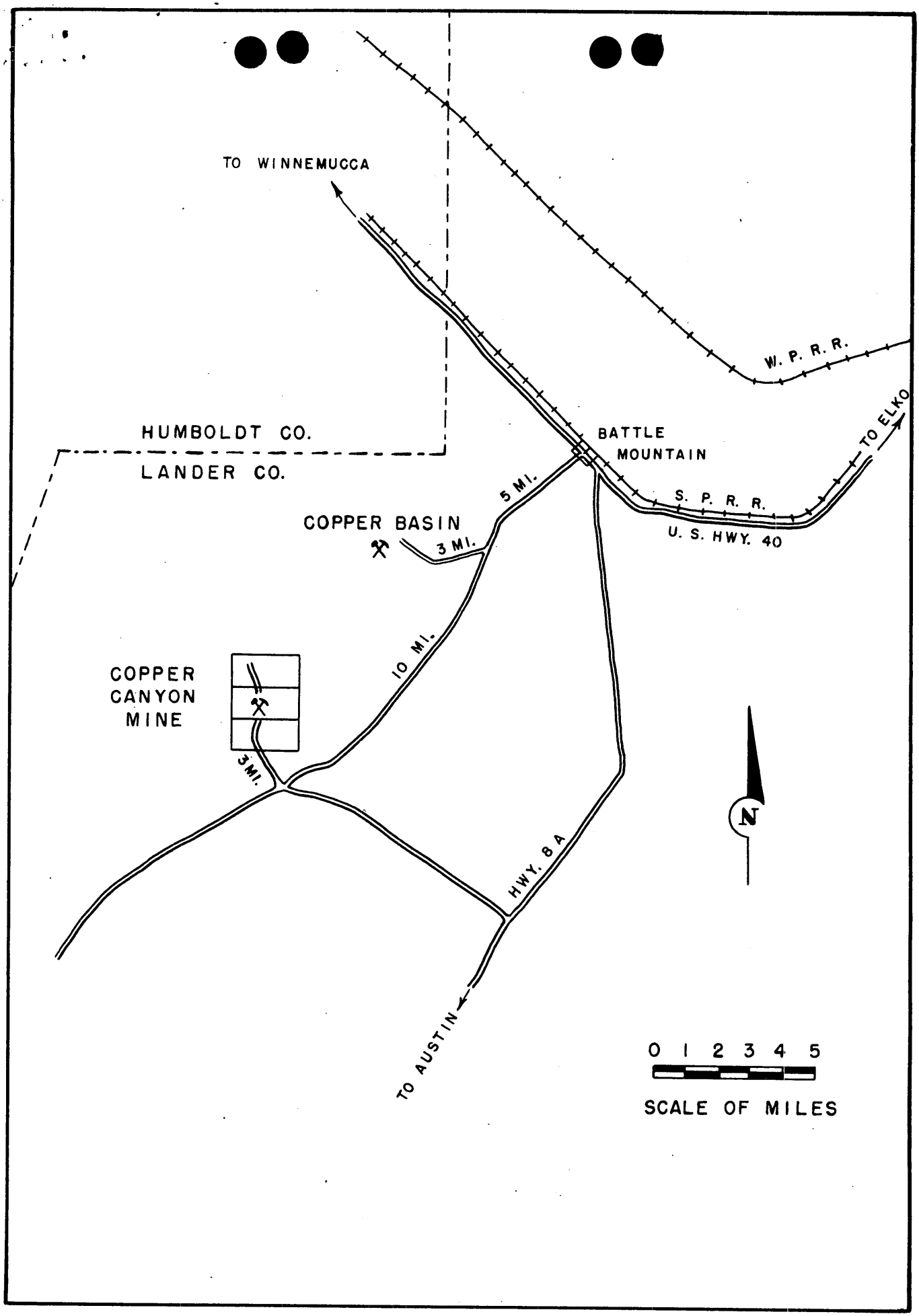

Figure 1.- Location map.

400

DOCKET
SURNAME
Rutledge
Martin

APR 15 1954

Mr. Frank T. Batson
Director, Office of Loans
Reconstruction Finance Corporation
Washington 25, D. C.

Re: Copper Canyon Mining Company
Battle Mountain, Nevada

Dear Mr. Batson:

Reference is made to the correspondence relative to the application of the captioned company for an Exploration Project Contract with the Government, our Docket No. DMA 3191 - Tungsten.

Enclosed is a copy of letter of April 6, 1954, from Mr. Robert K. Baring, of the Copper Canyon Mining Company, requesting that the referenced application be withdrawn. Accordingly we shall remove the application from our active files.

If, as suggested in the above letter, a new application covering the same property should be received later from another operator, we would then be better prepared to evaluate the request. Our Field Team has now prepared a report with recommendations which will be sent to us in the near future and kept in our files for use in such an eventuality.

Sincerely yours,

C. O. Mittendorf (for

Administrator

Enclosures

FARutledge:fcc
4-14-54
cc to: Docket
Code 400
FT. Reg. 3
Oper. Comm.
Adm. Reading File
R. W. Geehan, USBM
T. P. Thayer, USGS

R.G.L.

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

Docket

1012 Flood Bldg.
870 Market Street
San Francisco 2, Calif.

April 9, 1954

Air Mail

Memorandum

To: G. C. Selfridge, Chairman, Operating Committee, DMEA, Washington, D. C.

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA-3191 - Tungsten
Copper Canyon Mining Company
Copper Canyon Mine, Lander County, Nevada

Answering your teletype of April 9, a joint field examination in connection with subject application was completed and a report submitted to this office on March 18. However, after the report was reviewed by H. C. Miller and Roscoe M. Smith, it was found necessary to return it to the field for several revisions and corrections. Up to this writing, the revised report has not been returned to this office, but as soon as it is received the required number of copies will be mailed to you.

We might mention that the engineer and geologist are in agreement that a drilling program is warranted to explore the Cbm-quartz monzonite contact in the footwall of the virgin fault.

In this morning's mail we received a letter, dated April 6, 1954, from Mr. Robert H. Raring, of the Copper Canyon Mining Company, requesting that subject exploration application be withdrawn. Two copies of Mr. Raring's letter are attached for whatever action you may wish to take.

S. Ricker for
H. C. Miller, Executive Officer
DMEA Field Team, Region III

Attachment

Copy to: R. M. Smith, USGS
A. C. Johnson, Reno

Copy [illegible]

Copper Canyon Mining Company

25 BROAD STREET
NEW YORK CITY

MINES: BATTLE MOUNTAIN, NEVADA

Battle Mountain, Nevada
April 6, 1954

Executive Officer
DMEA Field Team, Region III
1012 Flood Bldg.,
870 Market Street
San Francisco 2 California

Re: DMEA-3191, Tungsten
Copper Canyon Mine

Dear Sir:

With reference to cited Docket embracing DMEA assistance in diamond-drilling certain tungsten occurrences in the Copper Canyon Mine, please be advised:

That our New York Office seems reluctant to finance its share of cost of the program and we must, therefore, ask that the Application be withdrawn.

It now appears more than likely that the mine will be brought back into production within the near future, under different operating arrangement. It might develop that the new operator would desire to go ahead with the tungsten program and in such case, we would ask your cooperation in reactivating the Application.

Thanking you for your kind assistance with the Application and with assurances that we still hope to get the holes drilled, we are

Very truly yours,

COPPER CANYON MINING COMPANY

by Robert H. Raring

Robert H. Raring

cc - Mr. A. C. Johnson, Chief
Mining Division, Region III
USBM, Reno

Martin
Bjornson
Wetherdorf

Dept. of the Interior
Defense Minerals Exploration
Administration

14X4401(01) Revolving Fund,
Defense Production Act,
Interior (Allocated Working
Fund to the Office of the Secy.)

APR 9 1954

T E L E T Y P E

To: Mr. H. C. Miller, DMEA Executive Officer, Region III,
San Francisco, California

Reourlet February 15, Copper Canyon Mining Company, Docket DMEA 3191 Tungsten. We understand from your February DMEA summary that you will send report we requested "in a few days." To assist us to cooperate with R.F.C., please teletype essential features of your recommendations if report not already mailed.

George C. Selfridge

G. C. Selfridge (246)
Chairman, Operating Committee

Copy to: Docket
FT, Reg. 3 confirmation
Code 400
Oper. Committee
Adm. Read. File
Audits .Divn., Bur. Mines
R. W. Geehan, USBM
T. P. Thayer, USGS

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4 8/54

RECONSTRUCTION FINANCE CORPORATION

WASHINGTON 25, D. C.

April 6, 1954

3191

WSM

Mr. C. O. Mittendorf
Administrator
Defense Minerals Exploration Administration
United States Department of the Interior
Washington 25, D. C.

3191

Re: Copper Canyon Mining Company
Battle Mountain, Nevada

Dear Mr. Mittendorf:

Reference is made to my letter dated February 10, 1954, which had reference to your letter dated November 5, 1953 addressed to Mr. Leo Nielson, Secretary of this Corporation, relative to the captioned company.

It will be appreciated if you will furnish us with the information requested in the last paragraph of my letter at your earliest convenience in order that we may dispose of a request which has been held in abeyance for several months.

Yours very truly,

Frank T. Ronan

Frank T. Ronan
Director, Office of Loans

Feb. monthly report of Region said "will send report in a few days."

ls

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 8 1954

FILE COPY
SURNAME:

UNITED STATES
DEPARTMENT OF THE INTERIOR

140

DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C.

FEB 1 5 1954

Rubin
Hofflund
Martin
Rutledge
Talbert
Selfridge
Hedges
Matheson

Mr. H. C. Miller, Executive Officer
DMEA Field Team, Region III
1012 Flood Building
870 Market Street
San Francisco 2, California

Re: Docket No. DMEA-3191 (Tungsten)
Copper Canyon Mining Company
Copper Canyon Mine
Lander County, Nevada

Dear Mr. Miller:

Reference is made to the subject docket and to the copy sent you of our letter of November 5, 1953, to Mr. Leo Nielson, Secretary, Reconstruction Finance Corporation, concerning it.

The reply to the above letter stated that RFC's loan to Ord Mercury Mine, to which we referred, was of a different type from that Corporation's loans to Copper Canyon Mining Company. Consequently, we have been asked to advise RFC of the estimated cost of the proposed exploration, the Government's share which would be repayable out of production operations, and the estimated time that would elapse before such exploration could be completed and a determination made as to the existence of ore in commercial quantities. It will be appreciated, therefore, if you will send us a brief summary of the results, to date, of your review made in accordance with our letter to you of November 5, 1953. Such information is necessary in order to negotiate further with RFC.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GCS)

HCRubin/emd 2/11/54
Copy to: Docket T.P.Thayer
Adm. R. File
Op. Comm.
W. S. Martin
R. W. Geehan, USBM

Approved: J.L.Hofflund H.C.Rubin

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

D. M. Larrabee (GCS)
Member, Geological Survey

R.C.S. 2-15-54

RECONSTRUCTION FINANCE CORPORATION

WASHINGTON 25, D. C.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
FEB 11 1954

February 10, 1954

Mr. C. O. Mittendorf
Administrator,
United States Department of the Interior
Defense Minerals Exploration Administration
Washington 25, D. C.

Re: Copper Canyon Mining Co.
Battle Mountain, Nevada

3191

Dear Mr. Mittendorf:

Further reference is made to your letter of November 5, 1953 to Mr. Leo Nielson, Secretary, and Mr. H. R. Rutland's reply of November 24, 1953, regarding an arrangement for repayment from production of the Government's portion of an exploration project that is being considered on the properties of the Copper Canyon Mining Company. This matter was discussed by telephone today between one of our Engineers, Mr. Merle M. Repass and Mr. Frank E. Johnson, Deputy Administrator.

Your letter refers to a previous arrangement whereby RFC interposed no objection to an exploration program on the Ord Mercury Mine that provided you would be repaid from production. It should be pointed out that in the case of the Ord Mercury Mine our loan was payable only out of the proceeds of production as we had no right of foreclosure to sell the property. It, therefore, was of paramount importance to our interests that the property operate and we accordingly made no objection to the exploration contract with your Administration.

We have two loans to Copper Canyon Mining Company that are delinquent but which are secured by a foreclosable mortgage on the property. Since the principal collateral value is in surface plant and equipment which are subject to depreciation and as taxes are accruing on the property, it is problematical as to how long we will continue to withhold foreclosure proceedings—especially as RFC is now in process of liquidation. Furthermore, it is presumed you would not want to enter into any agreement for exploration work with Copper Canyon Mining Company if there is any possibility of our foreclosing on the property before you could complete your program.

Accordingly, before we give an answer to your letter of November 5, 1953, it would be appreciated if you advise this

Corporation of the estimated cost of the exploration program to be paid out of operations and also the estimated time that would elapse before the program is completed and a determination as to the existence of commercial ore.

Very truly yours,

Frank T. Ronan

Frank T. Ronan
Director, Office of Loans

Docket

January 25, 1954

Memorandum

To: Robert W. Geehan, Ferrous Metals and Alloys Branch
Washington, D. C.

WSM

From: Chief, Mining Division, Region III

Subject: DMEA, 3191, Copper Canyon

Reference is made to your memorandum of January 19, 1954 to Mr. Russell R. Trengove:

The Bureau diamond drill cores were lamped by both Mr. Trengove and by Jacques F. Robertson, geologist of the U. S. Geological Survey. No scheelite was found in the cores. The cores are filed in the U. S. Bureau of Mines core library at Reno, Nevada.

Diamond drill hole No. 9 was drilled by the International Smelting and Refining Co. The 100-feet intercept of scheelite, assaying 0.56% WO_3, was lamped by Roscoe M. Smith, geologist of the U. S. Geological Survey. The core is filed at the Copper Canyon mine.

The report on the Copper Canyon DMEA application by Mr. Trengove is complete except for some expected information from Mr. Robert Raring, general manager, on a revised application which will eliminate some of the proposed charges. There is also some question, according to Mr. Raring, whether or not the Copper Canyon Mining Co. are in a position to assume 25 percent of the cost of the proposed exploration.

A. C. Johnson

Copy retained (

W. S. Martin

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

January 19, 1954

Memorandum

To: Russell R. Trengrove, Mining Division, Region III
Reno, Nevada

From: Robert W. Geehan, Ferrous Metals and Alloys Branch

Subject: DMEA 3191, Copper Canyon

The Washington staff of DMEA has requested information regarding Bureau drilling at the subject property, which you described in R.I. 4774. They specifically wish to know if the core was lamped for scheelite and, if not, whether the core is available for lamping. I will appreciate any information you have available on this subject.

Best regards.

Robert W. Geehan

cc: James Hopkins, DMEA, Room 3538

RECONSTRUCTION FINANCE CORPORATION

WASHINGTON 25, D. C.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
NOV 25 1953

November 24, 1953

Hackett WSM
3191 Bungalow

Mr. C. O. Mittendorf, Administrator
United States Department of the Interior
Defense Minerals Exploration Administration
Washington 25, D. C.

Re: Copper Canyon Mining Co.
Battlemountain, Nevada

Dear Mr. Mittendorf:

Your letter of November 5, 1953, addressed to Mr. Leo Nielson, with reference to the captioned loan, has been referred to this Division for reply.

We regret that we are not, at this time, in a position to advise you with respect to the proposal outlined therein. Our Los Angeles Loan Agency has been requested to furnish us a report on the current status of the loan and immediately upon receipt of the requested information we shall advise you further.

Yours very truly,

H. R. RUTLAND, Chief
Liquidation Division
Office of Loans

now out for F.T. expansion for 11/25

140

FILE COPY
SURNAME:

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

Gilkone
Purin
Martin
Talbot
Hedges
Lindrel
Selfridge
Johnson

NOV 5 1953

Mr. Leo Nielson
Secretary, Reconstruction
Finance Corporation
Washington 25, D. C.

My dear Mr. Nielson:

There is pending in one of our regional offices an application of the Copper Canyon Mining Company (Docket No. DMEA-3191) for an Exploration Project Contract with the Government for the property known as the Copper Canyon property located in Sections 21, 22, 27, and 28, T. 31 N., R. 45 E., Mount Diablo Base and Meridian, Lander County, Nevada. This property consists of 19 patented and 20 unpatented mining claims.

The applicant states:

> "The property is encumbered by an RFC exploration loan granted in December 1947 in principal amount of $130,000 for purpose of deepening the three-compartment vertical Julie shaft so as to permit mining of lead-zinc ore bodies that have been previously diamond drilled. A sum of $15,000 has been paid on principal of this loan, but the balance, with accrued interest, approximates $140,000."

A copy of our proposed Exploration Project Contract form on which this Exploration Project Contract may be drawn is enclosed for your inspection. The property is to be investigated, and the estimated cost of the project is as yet not determined, but the Government would contribute 75 percent of any cost. This contribution would be repayable to the Government only if the Government considers and certifies "that a discovery or development from which production may be made has resulted from the exploration work," and the Government has a lien upon the property and upon any production to secure this repayment.

Ordinarily, Defense Minerals Exploration Administration would require the subordination agreement of a prior encumbrancer as a prerequisite to entering into an Exploration Project Contract, because if all the proceeds from the

R. G. 11-5-53

operation of mining property for ten years were used to pay off the encumbrancer's loan, there would then be nothing remaining to pay any royalties to Defense Minerals Exploration Administration. However, in the case of the Reconstruction Finance Corporation, it would seem unnecessary to require any such formal subordination.

In your letter to me of October 27, 1952, in the case of Ord Mercury Mine, you wrote:

> "I wish to advise that this Corporation interposes no objection to the proposed exploration project referred to in your aforesaid letter and in the event commercial production of ore results, this Corporation will not object to the payment from proceeds of production of royalties due the Government under the contract."

It would be appreciated if you would write us at your earliest convenience if your response would be similar in this case, because we do not want to make an investigation of this property until we have first had such a reply from you.

Sincerely yours,

C. O. Mittendorf (for)

Administrator

Enclosure

AEKane/ep/emd 11/3/53
Copy to: Docket
Adm. R. File
C. O. Mittendorf
Reg. III (2)
W. S. Martin
J. L. Hofflund
A. E. Kane
chron.
pending

FILE COPY
SURNAME:

400 Rutledge
Martin
Geehan
Arkay
Selfridge
Eckhardt

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

NOV 5 1953

Mr. H. C. Miller, Executive Officer
DMEA Field Team, Region III
1012 Flood Building
870 Market Street
San Francisco 2, California

Re: Docket No. DMEA 3191 - Tungsten
Copper Canyon Mining Company
Copper Canyon mine
Lander County, Nevada

Dear Mr. Miller:

Reference is made to the above-docketed application for exploration assistance which is being referred to your office for review and a field examination of the property if required.

A memorandum by T. P. Thayer, Geological Survey, has been prepared and is enclosed for your information. As Mr. Thayer requested, a copy of this letter is being sent to Mr. R. J. Roberts in order that he may forward to the Field Team a recent geologic report on the subject property.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GVB)

APPROVED:

J. H. Hedges

Member, Bureau of Mines (GVB)

A. R. Kinkel, Jr.

Member, Geological Survey (GVB)

FARutledge:foc 10-30-53
cc: Docket
Code 400
FT. Reg. 3
Admr. Reading File
Operating Comm.
R. W. Geehan, USBM
T. P. Thayer, USGS
R. J. Roberts

R.C.J. 11-5-53

FILE COPY
SURNAME:

400
Rutledge
Martin
Geehan
Alkane
Hedges
Lathrop
Thompson

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

NOV 5 1953

Mr. Robert H. Raring
Vice President
Copper Canyon Mining Company
Battle Mountain, Nevada

Re: Docket No. DMEA 3191 - Tungsten
Copper Canyon mine
Lander County, Nevada

Dear Mr. Raring:

Reference is made to the above-docketed application for exploration assistance which has been reviewed by the Iron and Ferro-Alloys Division of the Defense Minerals Exploration Administration and referred to Mr. H. C. Miller, Executive Officer, DMEA Field Team, Region III, 1012 Flood Building, 870 Market Street, San Francisco 2, California, for review and possibly a field examination of the property.

Any assistance that you can render the members of the Field Team will be appreciated.

Sincerely yours,

C. O. Mittendorf (RW)

Administrator

FARutledge:foc
10-30-53

cc: Docket
Code 400
FT. Reg. 3
Operating Comm.
Admr. Reading File
R. W. Geehan, USBM
T. P. Thayer, USGS

R.G.G.
11-5-53

IN REPLY REFER TO:

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

October 26, 1953

Memorandum

WSM

To: W. S. Martin, DMEA

From: T. P. Thayer, USGS

Subject: 3191-Tungsten
Copper Canyon Mining Company
Battle Mountain, Nevada

The applicant proposes about 2000 feet of diamond drilling from a point on the 500-foot level to explore possibilities of tungsten ore in the middle member of the Battle formation near the contact with monzonite porphyry. The proposal has been discussed with Mr. R. J. Roberts of the Geological Survey, who is familiar with the mine.

Although the basis of the proposal seems geologically sound, that there is tungsten mineralization in the middle member of the Battle formation, the location of the exploration target is open to discussion. The section through the Farren tunnel shows the monzonite porphyry contact, at a point apparently only 200 feet above the top of the middle member - the presumed tungsten horizon. If the situation is as shown 2000 feet of drilling from the end of the Farren tunnel in the footwall of the Virgin fault would give a great deal more footage in the promising zone near the monzonite porphyry. This area is not much farther from the present workings than the target proposed by the applicant.

The answer to the question involves three factors: (1) How well is the position of the Cbu-Cbm contact known below the end of the Farren Tunnel? (2) How well is the position of the porphyry contact known in the proposed target area, (3) How much of the proposed exploration is for metals other than tungsten?

Question 1. How closely can the position of the Cbu-Cbm contact be determined? If anywhere nearly correctly shown, the distance to favorable tungsten ground is much shorter than in the area proposed.

Copy retained 400

Question 2. The map and sections show only four points on the monzonite porphyry contacts, two on the surface and two in the Farren Tunnel, on opposite sides of the Virgin fault. Presumably, the contacts on the plan are projected mainly from the surface, but this is not indicated. It seems rather important in prospecting for tungsten to understand the relations of the porphyry masses in the area 10750 to 11250 N and 9750 to 10250 E. The indicated trends of the contacts suggest two bodies or a narrow reentrant to the north. Whichever is the case, would not this area be the most promising place to look for tungsten?

If the contact swings as postulated, how much longer might the proposed drill holes have to be to reach it? The porphyry is shown as cut by the Virgin fault, so the position of the contact on the surface cannot be projected below the fault, where the proposed target area lies.

Question 3. The proposed drill holes lie within the productive lead-zinc horizon, and presumably it is hoped some ore will be found, although Bureau of Mines drill hole B-9 was essentially barren. Should not the Government participation be on the basis of partly for lead-zinc and partly for tungsten?

If more information is available on the porphyry contacts in the area described above, the Field Team should present it. If not, I believe more reasons should be given as to why drilling should not be done from the Farren Tunnel. Holes fanned from the tunnel north of the Virgin fault would quickly establish the position of the top of the Cbm and the porphyry, and would be directed to explore the thickness of the Cbm most advantageously. Any ore found in this area could be developed from the 500 level.

Recommendation:

The dockets should be referred to the Field Team for answers to the questions above, and setting up of cost figures.

If copies of the letter transmitting the docket to the Field Team and this memorandum are sent to Mr. R. J. Roberts, Room 208, 222 S. West Temple Street, Salt Lake City, Utah, he will forward a geologic report to Reno, saving some time in processing.

T. P. Thayer

T. P. Thayer

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

Mr. Robert H. Raring
General Manager
Copper Canyon Mining Company
Battle Mountain, Nevada

October 19, 1953
Subject: DMEA-3191
Re: Exploration Assistance
Copper Canyon Mine

Dear Mr. Raring:

The receipt of your application dated October 12, 1953, for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-3191 and referred to the Iron and Ferro-Alloys Division.

Kindly refer to DMEA-3191 in any future correspondence relating to your application.

Sincerely yours,

ROBERT E. ADAMS

Robert E. Adams
Chief, Operations Control
and Statistics Division

Copper Canyon Mining Company

BATTLE MOUNTAIN, NEVADA

October 12, 1953

ROBERT H. RARING
General Manager
BATTLE MOUNTAIN, NEVADA

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
OCT 19 1953

L. E. WHICHER, President
25 Broad Street
NEW YORK CITY, N. Y.

Defense Minerals Exploration Administration
United States Department of the Interior
Washington 25 D. C.

Gentlemen:

Submitted herewith in quadruplicate is Application for assistance of your Agency in diamond drilling for tungsten in the Copper Canyon Mine, submitted under provisions of the Defense Production Act of 1950, as amended.

Very truly yours,

COPPER CANYON MINING COMPANY

by Robert H. Raring
Robert H. Raring

Encls: (in quad)

Form MF-103
Continuation Sheets (10)
District Claim Map - Exhibit "A"
Composite Plan, 500 & 700 Levels - Exhibit "B"
Longitudinal Section - Exhibit "C"
Farren Tunnel Section - Exhibit "D"

cc - Mr. L. E. Whicher

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
OCT 19 1953

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

Not to be filled in by applicant

Docket No. DMEA-3191
Metal or Mineral
Date Received 10-19-53
Estimated Cost
Participation (Government %)

INSTRUCTIONS

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

Copper Canyon Mining Company, Battle Mountain, Nevada

A Delaware corporation

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

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

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

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

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract

See attached sheets

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

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

Owner

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

(*e*) If you own the land, describe any liens or encumbrances on it

See attached sheets

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

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

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

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

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

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

5. *The exploration project.*—(*a*) [redacted]e mineral or minerals for which you w[redacted]plore ---Tungsten (scheelite)

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

(*c*) The work will start within ---30--- days and be completed within ---90--- ~~months~~ days from the date of an exploration project contract.

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

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

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

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

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

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

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

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

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

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

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

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

(*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 ---October 12---, 195-3

COPPER CANYON MINING COMPANY
(Applicant)

By Robert H Laring

Gen. Manager

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

COPPER CANYON MINING COMPANY
Battle Mountain, Nevada

Continuation Sheets to accompany DMEA Form MF-103

1.(c) Names and addresses of officers of the Company are:

Chairman of the Board: Mr. L. E. Whicher, Room 1636, 25 Broad Street, New York 4 N. Y.

President: Mr. Jack Maloy, address same as above

Vice President: Mr. Robert H. Raring, Battle Mountain, Nevada

Secretary: Mr. Sidney L. Sherman, Room 1636, 25 Broad Street, NY 4 NY

3.(a) Applicant's holdings are in the vicinity of Battle Mountain, Lander County, Nevada and are colored in red on map submitted as exhibit to this Application.

Specifically, the Applicant has two mining properties:

a. - Copper Basin Property located six miles southwest of Battle Mountain and comprising 27 patented lode mining claims, 28 lode locations, 16 placer locations, and 280 acres of patented agricultural land, totaling approximately 1200 acres. This property has developed copper orebodies but is not equipped for operation.

b. - Copper Canyon Property located 18 miles southwest of Battle Mountain, fully equipped with 350 ton flotation mill, power plant, shops, offices, housing, etc and comprising 19 patented lode mining claims, 17 lode locations, 3 placer locations and 720 acres of patented agricultural land, totaling approximately 1400 acres.

Application for the DMEA project as will be described herein relates to work at the Copper Canyon Property, located in Sections 21, 22, 27, and 28 of T 31 N, R 43 E, Mount Diablo Base & Meridian, Lander County, Nevada.

3.(b) See Form
(c) See Form
(d) Not pertinent; Applicant owns the Property.
(e) Currently a suit has been entered by the District Attorney of Lander County for collection of delinquent property taxes but settlement of same can be expected within near future.

The Property is encumbered by an RFC Exploration Loan granted in December 1947 in principal amount of $130,000 for purpose of deepening the three compartment vertical Julie Shaft so as to permit mining of lead-zinc orebodies that had been previously diamond drilled. A sum of $15,000 has been paid on principal of this loan but the balance, with accrued interest, approximates $140,000.

3.(f) Listing of Patented Lode Mining Claims in Copper Canyon Group:

Claim	Sur. No.
Virgin Lode	Lot No. 37
Mary Louise Lode	Lot No. 38
Mountain Rook Lode	Lot No. 39
Ethel C. Lode	Lot No. 1842
Washington	Lot No. 1843
East Lake Superior	Lot No. 1844
Copper Queen	4175
Eagle	4175
Yellow Jacket	4175
Reona	4175
Salt Lake	4175
Salt Lake No. 1	4175
Salt Lake No. 2	4175
Salt Lake No. 4	4175
Salt Lake No. 5	4175
John John	4175
Blue Jacket	4175
Comet	4175
Lucy	4175

Listing of Unpatented claims, lode and placer, with recording data:

Claim	Recording Book	Recording Page
Southern Belle	14	150
Bayou	14	150
Tomahawk	13	343
Keystone	13	343
Tecumsah	13	346
Climax	13	344
Inspiration	13	344
Hecla	13	345
Last Chance	13	345
Polaris	13	346
Happy Thought #1	14	293
Happy Thought #2	14	294
Midas	13	103
Evening Star	13	102
Salt Lake No. 3	13	103
Washington Fraction	13	443
Salt Lake Fraction	13	476
Homestake Placer	8	40
Guy Davis Placer	8	40
July Fraction Placer	10	433

Above listing of filings on unpatented mining claims relate to office of the County Recorder at the Courthouse in Austin, Lander County, Nevada

4.(a) Currently mining operations are suspended at the Copper Canyon Mine. Shut-down was made October 15, 1952 as a result of declines in prices of lead and zinc.

Copper Canyon Mining Company
Battle Mountain, Nevada

September 30, 1953

4.(a) Cont'd. The Copper Canyon Mine is an old mine, having been discovered about 1864. Early production of high grade copper ore was shipped crude to Swansea, Wales. In 1916 present owners acquired property and worked it intensively during World War I. A long shut down period resulted from 1920-35 when the Mine was inactive except for small scale lessee work.

In 1935 the present Company retooled and undertook a development program that culminated in lease being taken by the International Smelting and Refining Company in Spring of 1941. International (Anaconda subsidiary) thereupon built a new and modern camp, sunk a new three compartment shaft (Julie Shaft), built a mill and all related facilities. The Mill began operation in February 1942 - shortly after Pearl Harbor.

The Mine was intensively worked during World War II by International but, upon expiration of the lease, the property with improvements reverted back to owners, the Copper Canyon Mining Company, on December 1, 1945. Copper Canyon continued the gold-copper work until July 1947 when, because of inflationary conditions and termination of the Premium Price Plan on copper, decision was made to sink the Julie Shaft to the previously diamond-drilled lead-zinc orebody. This involved 218 feet of sinking with several thousand feet of lateral work.

Lead-zinc milling began in October 1948 and continued - except for a suspension for repair of fire damage in summer of 1950 - up until October 1952. Lead-zinc ores are far from being exhausted but present day cost-price relationships makes working them unattractive.

No exact figures can be given on value of total production of the Copper Canyon Mine but it doubtless is in order of $15,000,000. Accurate records have been kept since 1935 and the period therefrom breaks down into three periods:

a. - Period from 1935 thru 1941: shipments of crude ore (no mill) totaled 23,099 dry tons containing 6,636.1 oz/Au, 46,189 oz/Ag and 2,231,677 lbs Cu.

b. - Period from February 26, 1942 thru 1947 (milling gold-copper ores) Total 422,179 dry tons milled recovering 30,937.6 oz/Au, 363,813 oz/Ag and 6,233,885 lbs Cu.

c. - Period from October 1948 thru to October 15, 1952 (milling lead-zinc ores) Total 196,266 dry tons milled recovering 3,873.4 oz/Au, 462,921 oz/Ag, 398,877 lbs Cu, 6,613,593 lbs Pb, and 3,124,345 lbs Zn.

The Mine is principally developed by the Julie three compartment vertical shaft, 728 feet deep, from which production levels have been cut at 200, 300, 500 and 700 intervals. Lead-zinc work is confined to bottom or 700 foot Level; upper levels produced gold-copper ores.

Mine plant consists of diesel power plant with three (3) Busch-Sulzer 600 hp diesel engines installed, a complete and modern 350 ton per day differential flotation mill, assay office, shops, offices, bunk and boarding house facilities for 55 single men and 27 modern family dwellings. Water supply is from wells and surface flow of Willow Creek

in adjoining canyon. Water supply is abundant at 200 gpm.

Applicant owns decsribed property except for encumbrances noted in 3(e).

Mine is completely accessible for examination down to and including the 500 Level. The bottom or 700 Level is now under water, mine pumping having been suspended when the Mine was shut down October 15, 1952.

4.(b) - For mine production, please note preceeding paragraph.

On present lead-zinc prices, ore reserves are very limited. Development is backward so that proved lead-zinc reserves are on order of 50,000 tons that will average

0.02 oz/Au per ton
2.50 " Ag "
0.20% Cu
2.00% Pb
1.00 % Zn

Probable and possible reserves of this type and grade of ore are considered great. Formal development, however, lags because markets have been (since March 1949) so unsteady that formulating and executing long range developments programs have been ruled out.

This application does not bear on lead-zinc exploration; it is atungsten project as will be explained later.

4.(c) Copper Canyon mineralization is related to a Mesozoic porphyry (locally called the "John John" porphyry) that lies just north of the Mine. This rock intruded upper Paleozoic sediments (Pennsylvanian and Mississippian) resulting in contact metamkrphism, replacement and filling.

Mining to date has been confined to brecciated fault zone where the cementing chlorite of the breccia has been replaced by pyrite-chalcopyrite (as is case with gold-copper ore) or by galena and sphalerite (as is case with the lead-zinc ores. Lithology exercised dominant control in determining type of mineralization. In the siliceous facies, the pyrite-chalcopyrite mineralization is found whereas the galena-sphalerite metallization follows the limey members, as could be expected.

The breccia zones are formed in "trough"s formed by intersection of a northwest striking easterly dipping fissure system with bed strike northward on a steep westerly dip. These trough-like zones can become wide, in one instance running up to 200 feet in width. Vertical range of 100 feet or so is not unusual.

Mineralized bed is called the Battle Formation that averages about 800 feet thick. The basal member is a siliceous conglomerate of about 200 feet in thickness. In it is found the gold-copper mineralization. The middle member, about 400 feet thick, is an altered dolomtic limestone or hornfels and in it occurs the lead-zinc mineralization. The upper 200 feet of the Battle Formation is a rather even textured

quartzite that has not been highly productuve horizon.

In upper levels, secondary copper metallization was notable and was responsible for discovery of the Mine and its early spectacular production. Such secondary copper ores are now largely exhausted, however.

For more complete geologic description of the Mine, reference is made to geologic quadrangle map series of the U S Geological Survey, "Geology of the Antler Peak Quadrangle, Nevada" by R. J. Roberts (1951).

The Mine has also been described in U S Bureau of Mines Information Circular No. 7043 by William O. Vanderburg (1939) and a lead-zinc drilling program therein described by U S Bureau of Mines Report of Investigation No. 4774 "Investigation of Copper Canyon Lead-Zinc Deposit, Lander County, Nevada" by Russell R. Trengove (1951). This latter gives a much more up-to-date picture of the property and installation than the Vanderburg circular which is now somewhat out of date.

There is submitted herewith a plan and longitudinal prints covering proposed drilling for tungsten on which discussion will follow later. There is no need to return these prints.

4.(d) - The Copper Canyon Mine lies 18 miles southwest of Battle Mountain by road, 14½ miles of which are black-topped, all weather macadam. The final 3½ miles is by graveled county road in good condition.

Battle Mountain is the shipping and mail point. It lies astride both the Southern Pacific and Western Pacific railroads and is on U S Highway 40, 312 miles west of Salt Lake City, Utah and 225 miles east of Reno, Nevada.

Weather conditions are good; climate is semi-arid and winter snowfalls rarely impede year-round work. Collar of the Julie Shaft is at an elevation of 5712 feet above sea level.

As noted previously, the Mine has accomodations for 55 single men and 27 families. Additional residence facilities exist at Battle Mountain and, in previous operation, some personnel commuted between town and the Mine as the drive requires but 30 minutes time. The Mine camp is served by a school bus and children and taken to Battle Mountain for school sessions.

4.(e) Manpower as needed for this project is available locally. The Mine is fully equipped and no additional equipment would be needed. Water and power facilities are installed and much more than adequate for requirements of this program.

5.(a) Tungsten (scheelite).

(b) During time when the International Smelting and Refining Company had the Copper Canyon Mine under lease, some attention was given to lamping for scheelite in diamond drill core, of holes that were drilled in exploration of copper-gold or lead-zinc orebodies. Notable tungsten content was uncovered in some holes drilled through the middle (hornfels) member of the Battle Formation even though the holes were 1,000 feet or so from the contact of hornfels with the monzonite.

Assays on intercepts of two of the holes, by Union Assay office of Salt Lake City, gave the following results:

Hole No.	Intercept	Assay
9	571.2 - 671.4	0.56% WO3
24	20.9 - 36.6	0.43%

Seven samples of waste dump material from the Mine gave an average of 0.81% WO3 and lamp surveys of the levels revealed widespread scheelite metallization, locally in commercial concentrations.

The mill at that time (1942) was busy treating copper and thus the above tungsten results were filed away as being matters of academic interest. Later, when the Julie Shaft had been sunk and the new 700 Level cut, the top of ore intercept of DDH 9, as reported above, was still 82 feet vertically below the 700 Level and thus would be inaccessible for mining unless the Shaft were deepened and a new and lower level cut, obviously a time-consuming and costly operation.

In view of the widespread tungsten showings in the Mine, it seems desirable to explore the middle (hornfels) member of the Battle Formation (colored green on accompanying maps) where it comes in contact with the Quartz Monzonite Porphyry (Mp - colored red on maps). The logical place to test this contact is north of the 500 Level working, vertically between the 500 and 700 foot Levels for discoveries made in this sector would thus be accessible by compartively short drives from existing faces.

The point might be brought up here that the Farren Tunnel offers logical point of attack. Objection on this score is that the greater part of the Farren Tunnel (all of it in hangingwall of the Virgin Fault) is in the upper plate of the Golconda Overthrust (cf Roberts' discussion in text of Antler Peak Quadrangle Map) and thus stays in the overthrust Pumpernickel Formation, a member composed of cherty beds and quartzites, not especially favorable host rocks for scheelite occurrences. Furthermore, driving the Farren Tunnel ahead, in footwall of the Virgin, offers no guarantee that it would intercept the contact of the two critical members, the hornfels and monzonite porphyry. Tooling up for such a project would be more expensive than drilling from more convenient points and the results less certain.

It is proposed to drill three exploratory diamond drill holes into "target area" cross-hatched in black ink of the three section maps submitted herewith, marked Exhibits "B", "C", and "D". It is anticipated that the contact will be reached about 700 feet northward of face of 523 Drift (Coors 10,477N, 10,195E on 500 Level). The first hole should be drilled on line N 35 W at minus 17 degrees. It should be

terminated upon reaching the contact. If promising showings are encountered, then additional holes should be planned after consultation with U S Geological Survey and Bureau of Mines representatives.

The project, as outlined herein, embraces three (3) exploratory diamond drill holes of about 700 feet each for a total of 2100 feet of hole.

5.(c) See Form

5.(d) Applicant (Copper Canyon Mining Company) has controlled and intermittently operated the Copper Canyon Mine since 1916. During that time, metal production has approximated $10,000,000 of which 620,000 dry tons have been concentrated.

The work would be under supervision of Applicant's General Manager, Mr. Robert H. Raring. Mr. Raring has been associated with Applicant since 1936 except for period 1941-45 when he served with the Air Force. He is a graduate mining engineer, holdings B. S. and E. M. degrees from Lehigh University and a M.S. (Met) degree from School of Mines, University of Idaho. He has previously been associated with mining operations in British Columbia, Canada, and in Ecuador, South America.

6.(a) None.

6.(b) Labor, supervision, consultants: Estimated daily labor cost of this program is as follows: (one eight hour shift daily except Sunday):

	Estimated Daily Pay
Driller	$25.00
Helper	15.00
Hoistman-compressman	15.00
Cager-roustabout	12.50
Supervision	20.00
Total	$87.50

On average daily footage of 30 feet (based on past drilling), this breaks down to a cost of $2.92 per foot.

Of above personnel, hoistman-compressorman would run the hoist, providing access to 500 Level, start up and watch compressor, and attend to charging the electric cap lamps.

Cager-roustabout would "run errands" for the drill crew, facilitating their work by seeing necessary supplies are always on hand, etc etc.

Supervisor would attend to coordinating the effort, core and sludge handling, office work, etc.

6.(c) Operating materials and supplies: Daily power consumption (eight hour shift) is based on 35 KW rating on the compressor (500 cfm I-R) with power at $0.033 per Kwh. This calculates to 280 Kwh per 8 hr shift or $9.24 for power. Round this figure out to $10.00 for power.

6.(c) Cont'd Thus daily power and water costs are estimated

	Cost
Power	$10.00
Water	1.00
Total	$11.00 or $0.37 per foot of hole

Bit cost is estimated at $1.00 per foot of hole. This might be somewhat high on basis of drilling experience in the Mine but should be allowed to stand to cover possible loss of a bit, etc.

The materials and power item thus summarizes:

	Cost per Foot
Power & water	$0.37
Bits	1.00
Total	$1.37 per foot of hole

6.(d)

6.(d) Operating Equipment: Applicant proposes use-allowance basis for equipment, as follows:

	Daily Cost
Drill & accessories	$10.00
Compressor	15.00
Total	$25.00

6.(e) Rehabilitation and Repairs: Certain preparatory work is necessary which is described as follows:

(1) - Stringing new power cable down Shaft to 500 Level. This involves hanging new 3-conductor #4-0 neoprene jacketed cable from power plant to 500 Station. The cable is on hand and will be furnished by Applicant. It is estimated that four men will require two shifts to complete this job for a cost of $125.00

(2) - Clean-up of 500 Level - estimate thr e men for two shifts preparing drill station, cleaning up track and ditch, etc. Estimate cost at $100.00

(3) - Compressor "tune-up." It is recommended that the compressor which would be used on this project (Ingersoll-Rand Model K-500, 500 cfm electric-driven, two stage) be "tuned-up." Mainly involved would be checking on compressor valves and valve springs, etc to insure unit is operating at good efficiency. Estimate cost of service plus possible replacement parts at $200.00. A factory mechanic would be called in for this job. (Mechanic available from Nevada Equipment Service Inc. at Reno).

6.(f) None.

6.(g) Miscellaneous. It is estimated that allowance should be made for sampling the final 100 feet of each hole. If sample is taken every five feet, provision should thus be made for 20 samples per hole at cost of $5.00 per determination or $100 total per hole.

Industrial insurance is at rate of $7.20 per $100 on underground (mine) labor which includes hoistman. Social security tax is 1½% and Nevada State Employment Security Tax is 0.1% for the Copper Canyon Mine. Thus the daily tax rate is

Industrial Insurance	7.20
Social Security	1.50
Unemployment	0.10
Total	8.80%

Since it is noted in 6.(b) that the daily labor cost will estimate at $87.50, the daily tax will be $7.70 or (on 30 foot daily average) $0.26 per foot of hole.

It is planned to drill the holes at AX, holding an EX bit in reserve. To extent possible, holes would be finished on AX but in those cases where casing would be necessary, request is made to drop down to finish on an EX bit. Practical consideration would have to govern on this point , idea being to get an AX hole ~~is~~ if cost of such is not unreasonable.

There should be an initial stockage of four (4) AX bits and two (2) EX bits and, in addition, about 200 feet of AX casing. Estimate of this initial stockage (replacement being taken care of by bit allowance under 6.(c), is as follows:

Four AX bits at $125 each	$500.00
Two EX bits at $100 each	200.00
200 ft AX casing at $1.00 per foot	200.00
Total	$900.00

Amortized over the full 2,000 feet of hole, this initial stockage breaks down to $0.45 per foot of hole. Possibly this item should have been included under Par 6.(d).

6.(h) Contingencies. It is suggested that allowance be made at rate of $0.50 per foot for contingencies, items or breakdowns that cannot be predicted.

C O S T S U M M A R Y

The cost of the program, based on an "outside" total of 2,000 linear feet of hole, is as follows:

Copper Canyon Mining Company Battle Mountain, Nevada

6.56
2000
$13,120.00

Ref. Par.	Item	Cost per Foot
6.(b)	Labor, etc	$2.92
(c)	Op materials & supplies	1.37
(d)	Equipment	0.84
(e)	Rehabilitation & repairs	0.22
(f)	New buildings	0.00
(g)	Miscellaneous	0.71
(h)	Contingencies	0.50
	Total	$6.56 per foot of hole.

Of the above, attention is invited to certain of the items that are non-recurring in nature, i.e. - Item 6.(e) in amount of $0.22 per foot and Item 6.(g) for initial stockage of bits and casing in amount of $0.45 per foot. The bits and casing procured under this latter could, at termination of project, be turned back to DMEA or, if desired, Applicant would agree to buy same from DMEA at fair depreciated value.

7.(a) Yes.

7.(b) Applicant will furnish equipment and one of required personnel (supervision). A breakdown of cost propotionment between DMEA and Applicant is as follows: (basis per foot of hole):

DMEA Share	Ref Paragraph	Applicant Share
$2.25	6.(b)	$0.67
1.37	(c)	0.00
0.00	(d)	0.84
0.22	(e)	0.00
0.00	(f)	0.00
0.71	(g)	0.00
0.25	(h)	0.25
$4.80	Totals	$1.76

Above distribution is proposed, subject to approval by DMEA. Applicant is prepared to carry out its end on above basis.

6.56 x 0.75 = 4.32

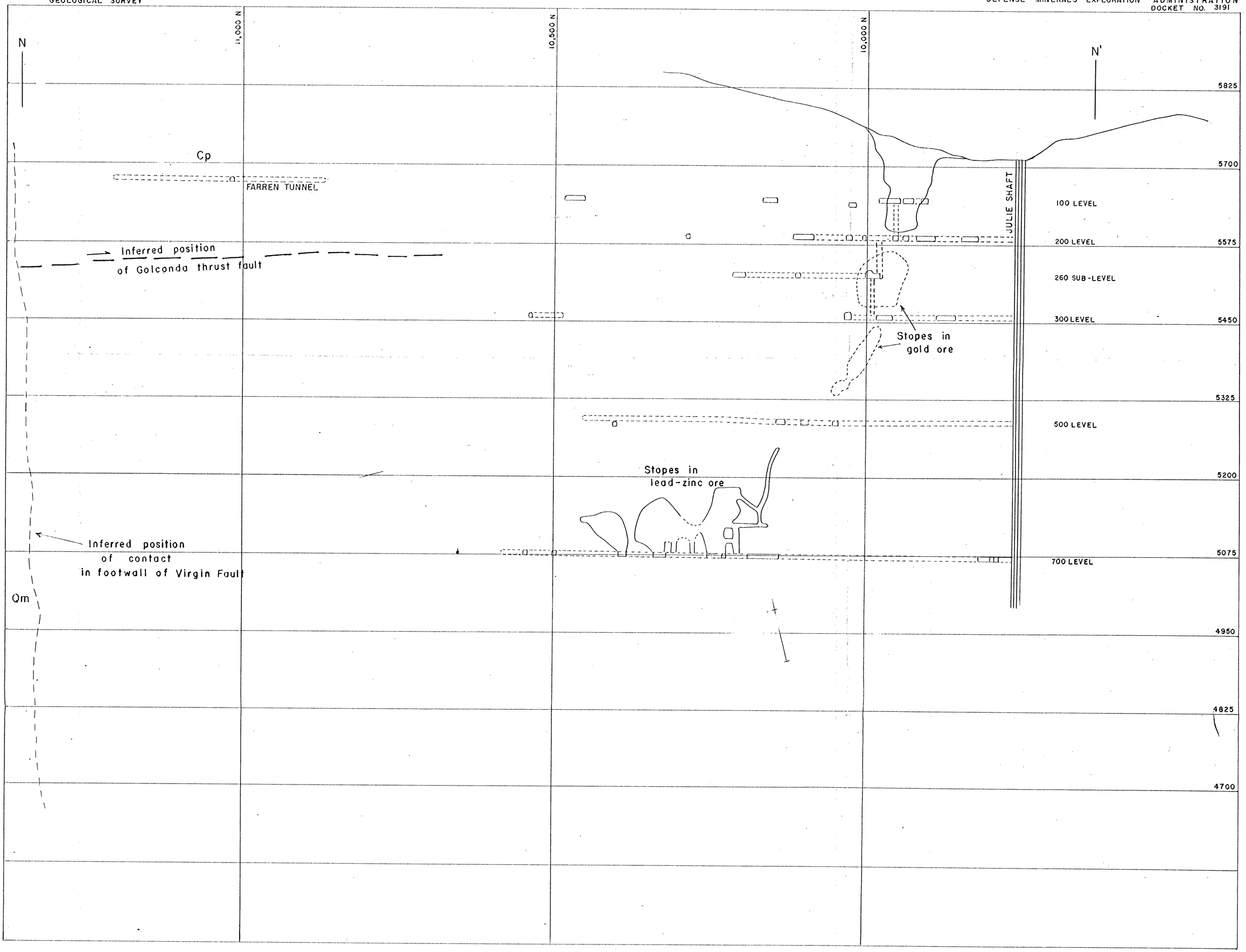


FIGURE 4

CROSS SECTION N–N'
COPPER CANYON MINE

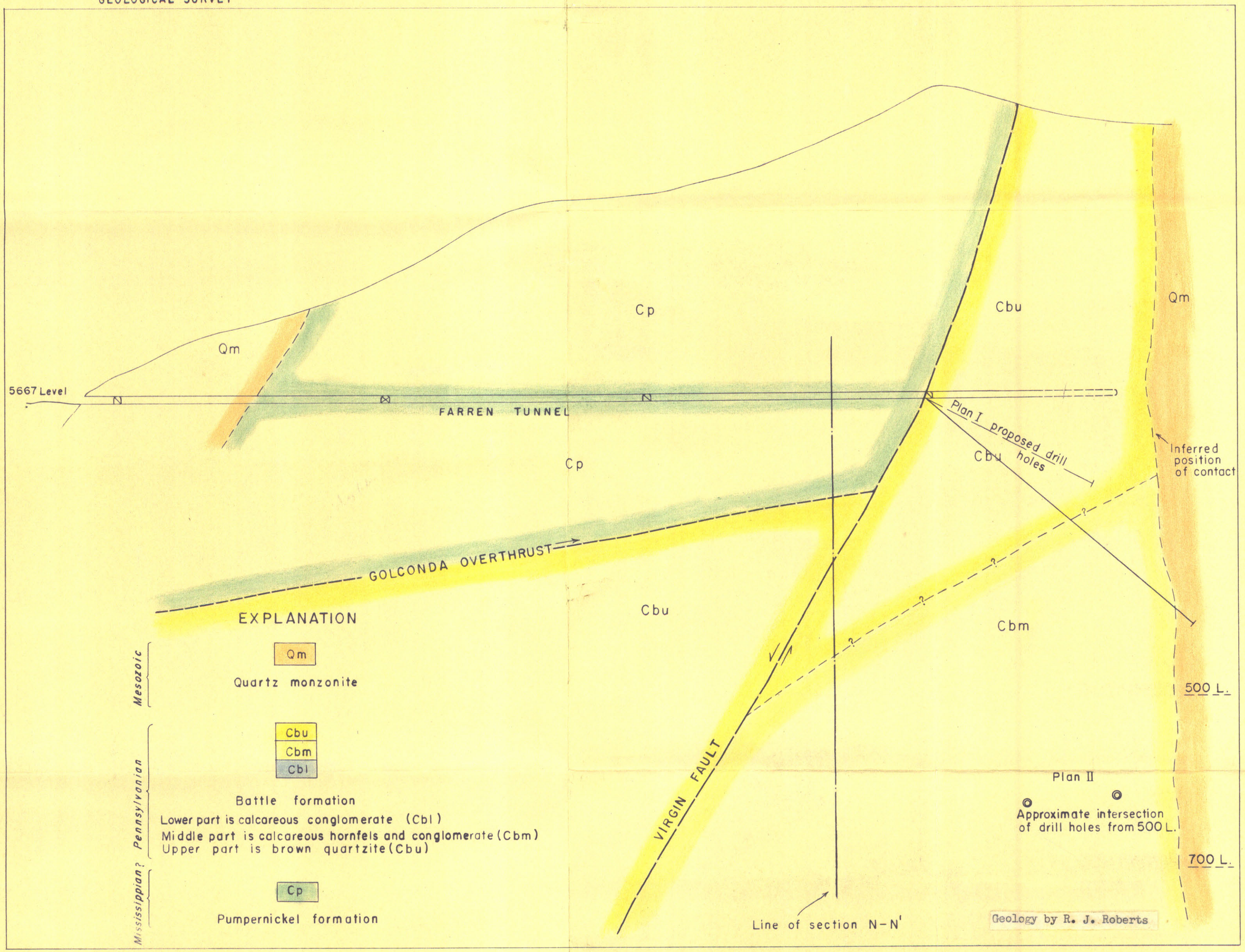


FIGURE 3

SECTION ALONG FARREN TUNNEL
COPPER CANYON MINE

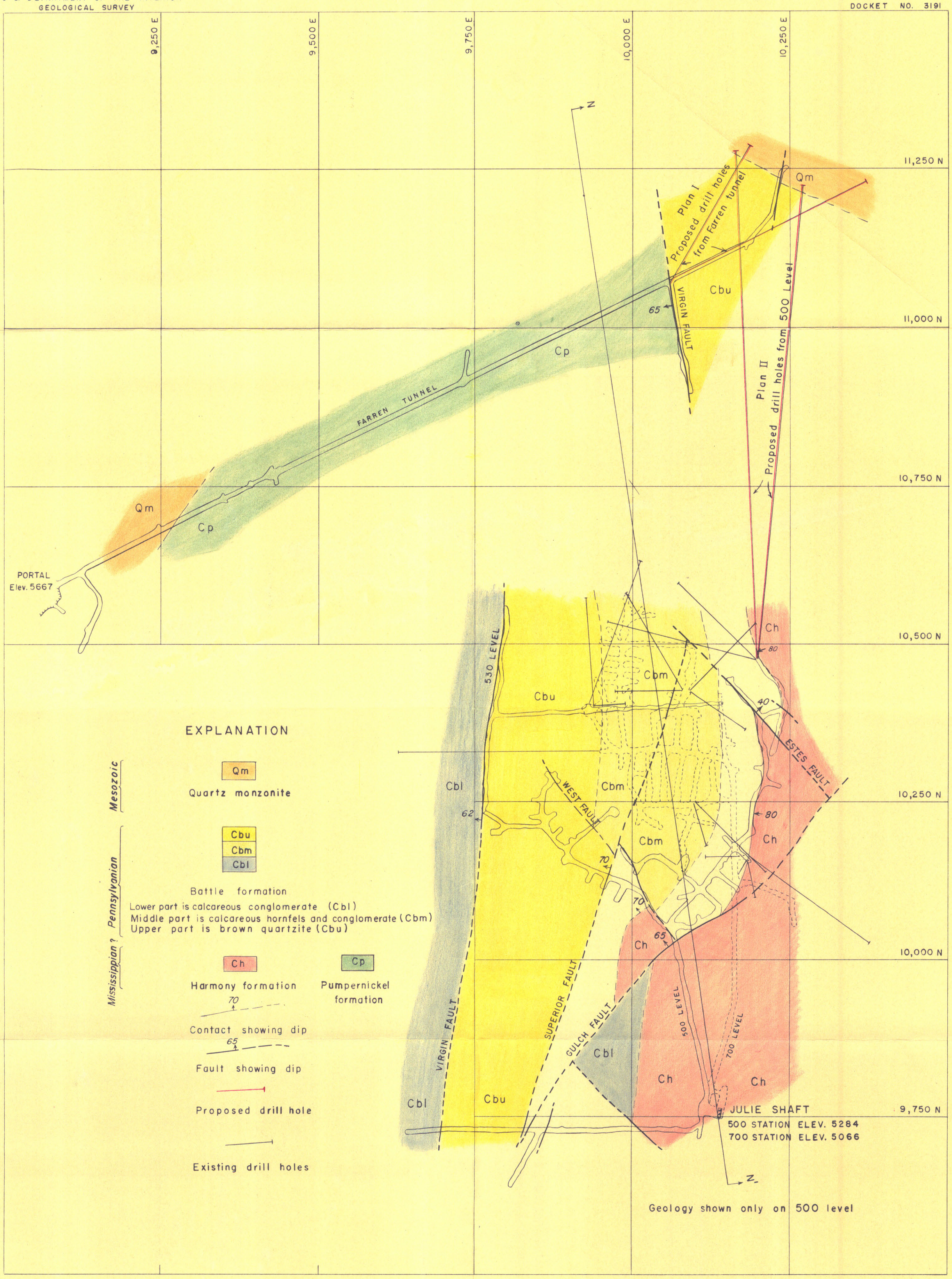


FIGURE 2

MAP OF THE 500, 700 AND FARREN TUNNEL LEVELS
COPPER CANYON MINE

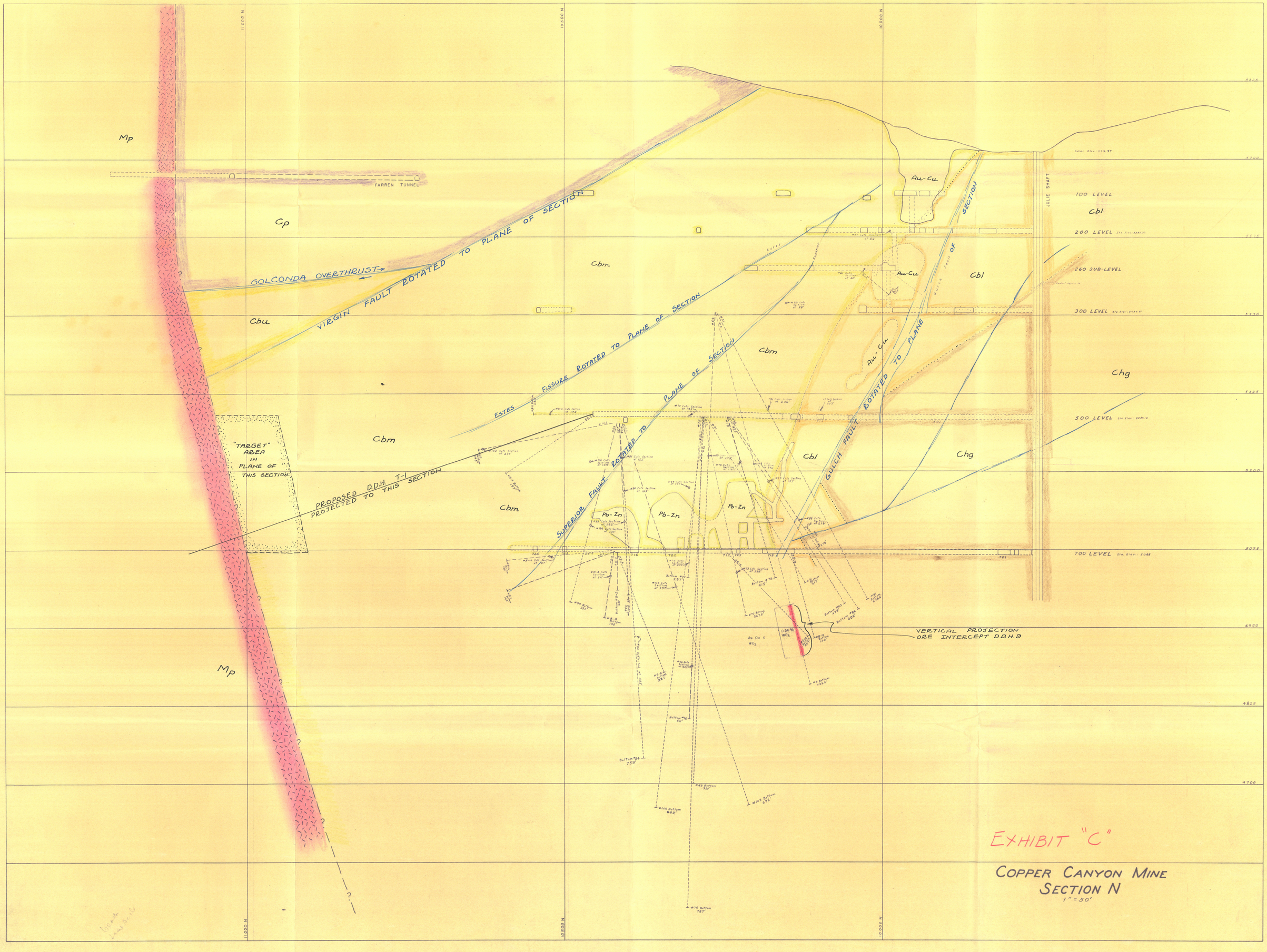
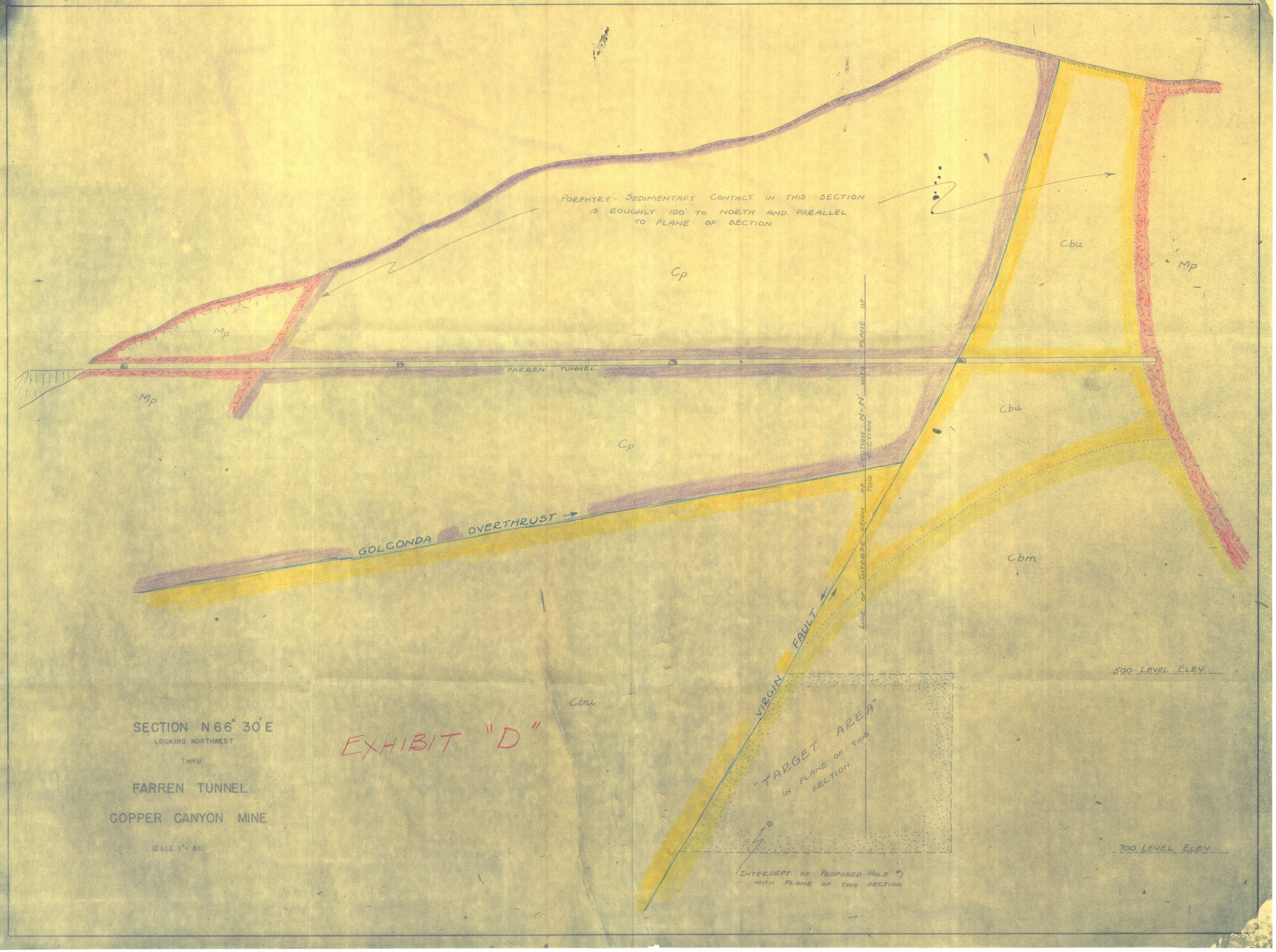


EXHIBIT "C"

COPPER CANYON MINE
SECTION N
1" = 50'


PORPHYRY - SEDIMENTARY CONTACT IN THIS SECTION
IS ROUGHLY 100' TO NORTH AND PARALLEL
TO PLANE OF SECTION.
Cp
Mp
Mp
Mp
FARREN TUNNEL
Cp
Cbu
Cbu
Cbu
Cbm
GOLCONDA OVERTHRUST
LINE OF INTERSECTION N-N' WITH PLANE OF
SECTION OF THIS SECTION
VIRGIN FAULT
"TARGET AREA"
IN PLANE OF THIS
SECTION
INTERCEPT OF PROPOSED HOLE #1
WITH PLANE OF THIS SECTION.
500 LEVEL ELEV.
700 LEVEL ELEV.
SECTION N 66° 30' E
LOOKING NORTHWEST
THRU
FARREN TUNNEL
COPPER CANYON MINE
SCALE 1" = 80'
EXHIBIT "D"

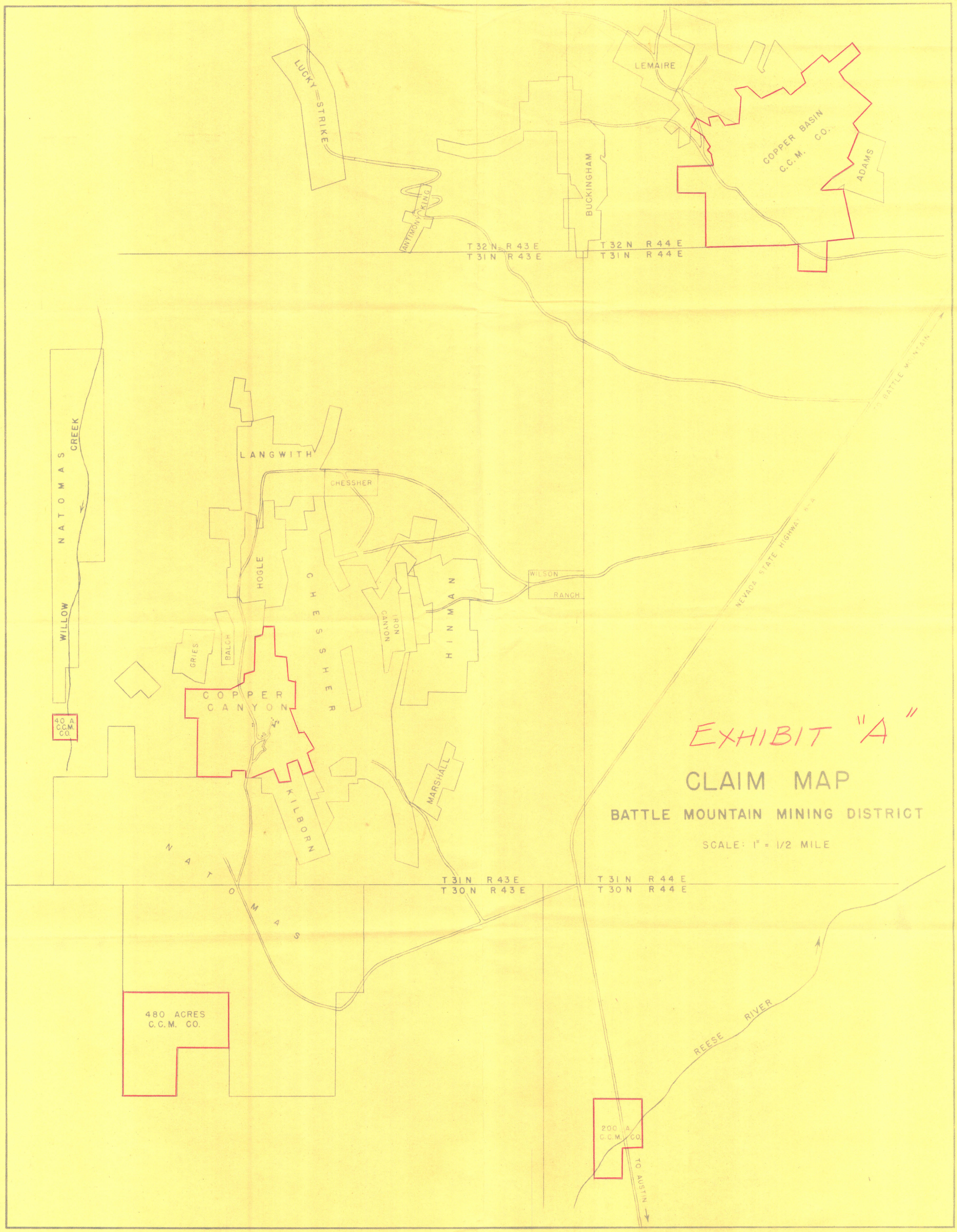
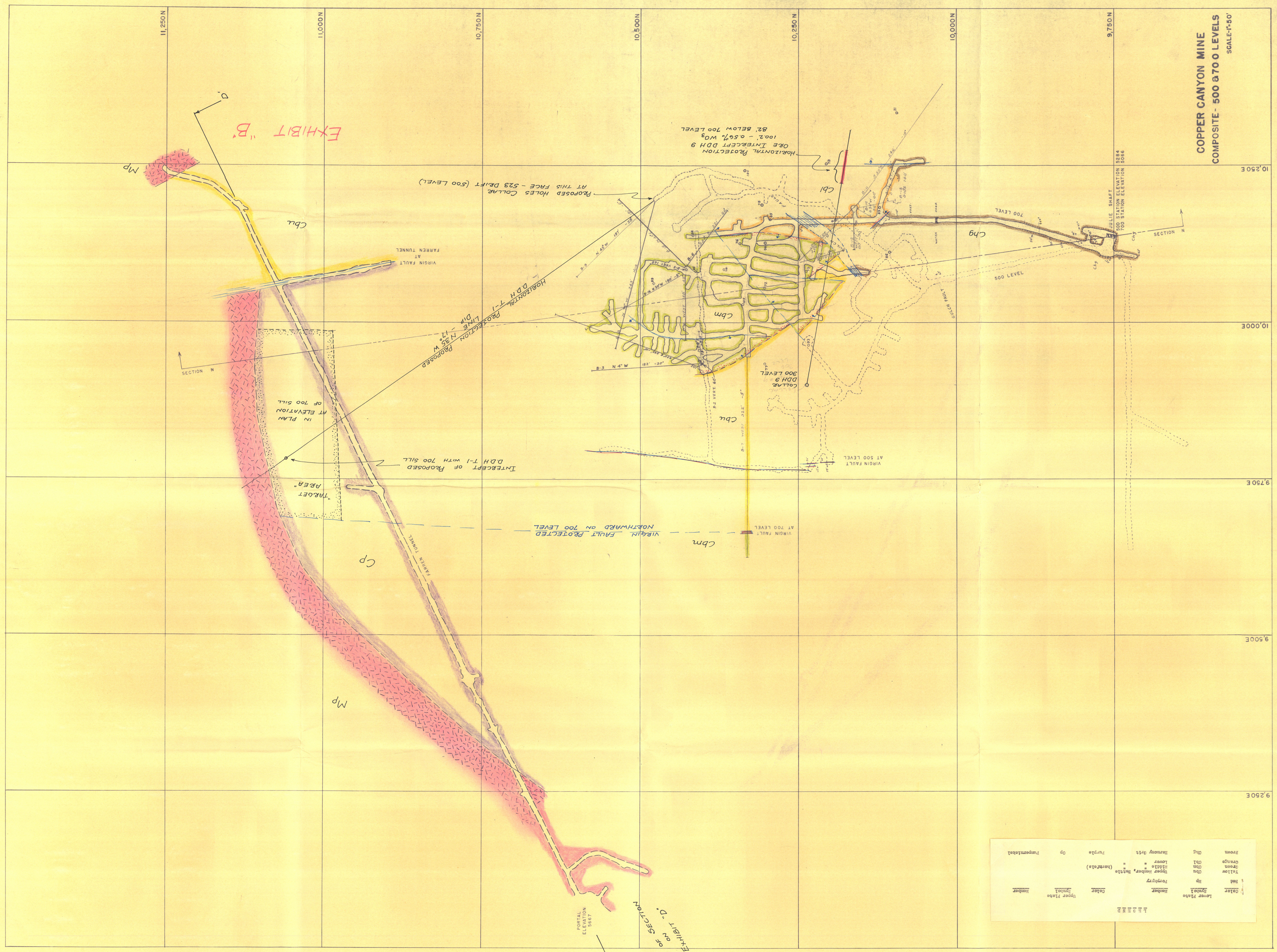


EXHIBIT "A"

CLAIM MAP

BATTLE MOUNTAIN MINING DISTRICT

SCALE: 1" = 1/2 MILE


COPPER CANYON MINE
COMPOSITE - 500 & 700 LEVELS
SCALE-1"=50'
11,250 N
11,000 N
10,750 N
10,500 N
10,250 N
10,000 N
9,750 N
10,250 E
10,000 E
9,750 E
9,500 E
9,250 E
JULIE SHAFT
500 STATION ELEVATION 5284
700 STATION ELEVATION 5066
700 LEVEL
500 LEVEL
SECTION N
GULCH FAULT
Chg
Cbl
Cbu
Cbm
Mp
Cp
COLLAR DDH 9 300 LEVEL
B-2 VERT. 60'
B-3 N 4° W 182' -26°
B-5 VERT. 160'
B-8 N 65° W 187' -28°
HORIZONTAL PROJECTION OF INTERCEPT DDH 9 100' - 0.56% WO3 82' BELOW 700 LEVEL
PROPOSED HOLES COLLAR AT THIS FACE - 523 DRIFT (500 LEVEL)
HORIZONTAL PROJECTION PROPOSED DDH T-1 LINE N 35° W DIP -17°
VIRGIN FAULT AT FARREN TUNNEL
VIRGIN FAULT AT 500 LEVEL
VIRGIN FAULT AT 700 LEVEL
VIRGIN FAULT PROJECTED NORTHWARD ON 700 LEVEL
FARREN TUNNEL
INTERCEPT OF PROPOSED DDH T-1 WITH 700 SILL
IN PLAN AT ELEVATION OF 700 SILL
"TARGET AREA"
EXHIBIT "B"
D
LINE OF SECTION EXHIBIT "D"
PORTAL ELEVATION 5667
LEGEND
Color | Lower Plate Symbol | Member | Color | Upper Plate Symbol | Member
Red | Jp | Porphyry
Yellow | Cbu | Upper Member, Bethlehem
Green | Cbm | Middle " "
Orange | Cbl | Lower " " (Horizon)
Brown | Chg | Harmony Grits | Purple | Cp | Pumpernickel