WYOMING STATE GEOLOGICAL SURVEY

ZINC-LEAD-COPPER-SILVER-GOLD-MASSIVE SULFIDE MINERALIZATION AT THE BROADWAY MINE, SIERRA MADRE, WYOMING

by

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MINERAL REPORT MR92-4

Laramie, Wyoming
1992

Geological Survey of Wyoming
Mineral Report MR92-4

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Location and accessibility

On June 3rd, 1992, I briefly examined the Broadway property on the East Fork Creek in the SW/4 section 32, T13N, R83W of the Dudley Creek 7 1/2 minute quadrangle. The property is accessible by the Blackhall Mountain Forest road running 19 miles south of Encampment. The last 2 1/2 miles are on rough jeep trail which was scheduled to be reclaimed by the Forest Service later in the summer.

Previous reclamation of the property has destroyed all field relationships on the property. The old shafts, trenches, and outcrops have all been buried, and ore samples are scattered all over the mineralized area.

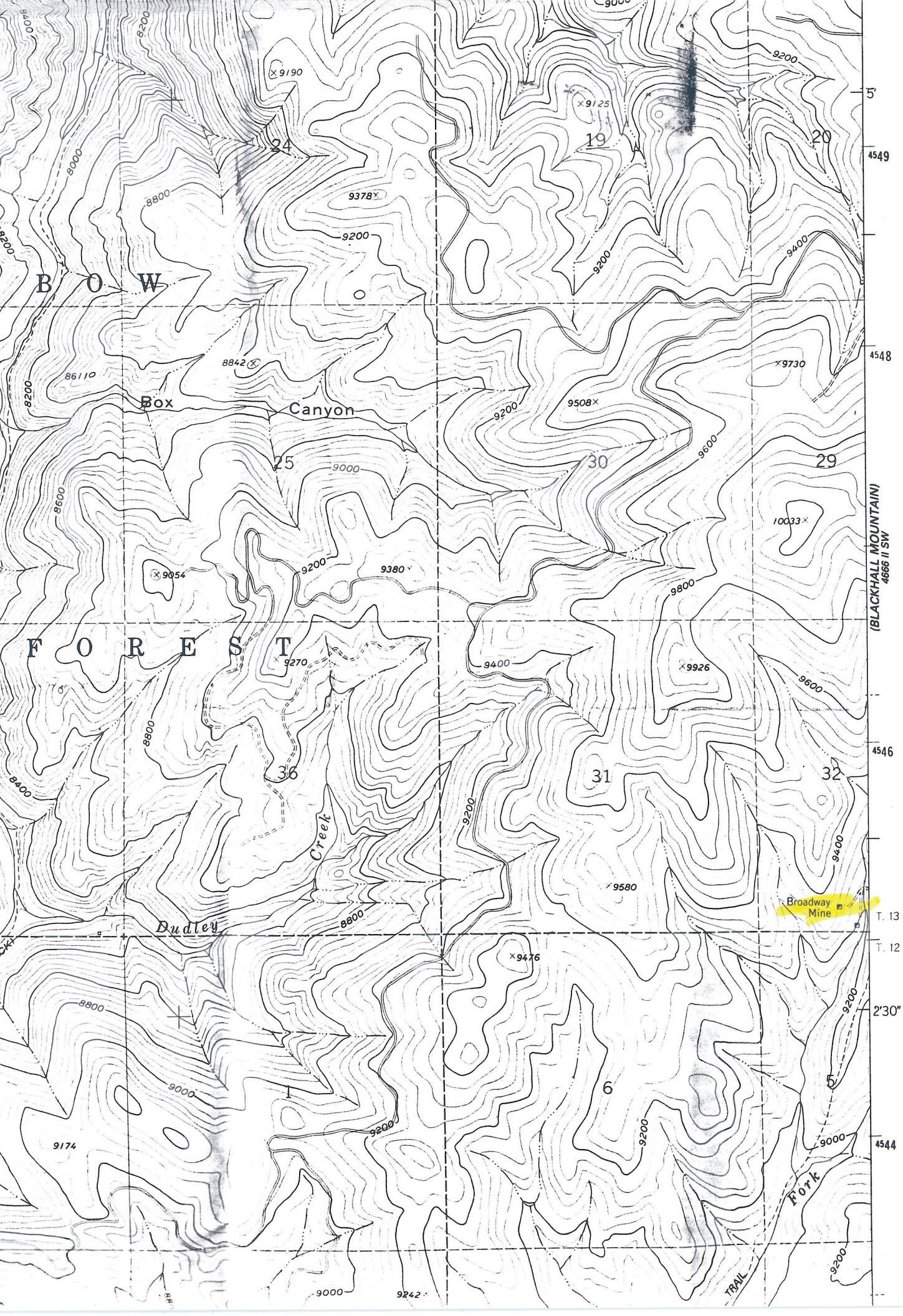
Exploration History

Early activity The available records indicate the Broadway property has had a long period of exploration activity. The property was initially staked by Bill Sodder in 1904 who sunk a 20 foot deep shaft in search of gold. In 1927, B.L. Bensen acquired the property and sunk three additional shafts of about the same depth.

Bureau of mines The U.S. Bureau of Mines examined the property in 1942 collecting samples from the mine workings. According to Osterwald (1947), the Bureau of Mines collected five character samples and one channel sample. These included: (1) a channel sample along the west side of shaft No. 1, about 4 feet from the bottom (Table 1); (2) a sample from the mine dump of the No. 2 shaft; (3) a sample from the No. 3 shaft; (4) rock chips from an outcrop near the No. 3 shaft; (5) a selected sample from the No. 1 shaft; (6) another selected sample from the No. 1 shaft. A platinum group metal was identified by spectrograph in very small amounts in the samples.

Table 1. U.S. Bureau of Mines assay results.

sample #	Zn(%)	Pb(%)	Cu(%)	S(%)
(1)	12.5	1.9	0.02	7.65
(2)	4.2	1.9	--	--
(3)	0.0	1.0	--	--
(4)	0.0	0.5	--	--
(5)	10.2	0.9	--	--
(6)	5.2	1.5	--	--


B O W
Box Canyon
F O R E S T
Dudley Creek
Broadway Mine
(BLACKHALL MOUNTAIN)
4666 II SW
T. 13 N.
T. 12 N.
2'30"
TRAIL
Fork
24
19
20
25
30
29
36
31
32
6
5
9190
9125
9378
8842
9730
9508
10033
9054
9380
9270
9926
9580
9476
9174
9242
4549
4548
4546
4544

Geological Survey of Wyoming, early investigations F.W. Osterwald with the Geological Survey of Wyoming examined the Broadway mine in 1947, and produced a geologic map of property (Plate 1). Osterwald noted the the property had been examined by geologists with New Jersey Zinc.

Osterwald (1947) reported the ore zone was 1,000 feet long and about 50 feet wide, and continued under a heavily wooded area. The ore mineralogy included massive sphalerite and minor galena with local disseminated chalcopyrite, chalcocite, and covellite. Small amounts of secondary malachite and chrysocolla were observed. The ore content was described to range from 3 to 35% throughout the property. Near shaft No. 1 was a grey and white gneissic rock hosting 1 to 5% disseminated chalcocite, chalcopyrite, and bornite.

The ore was described as being localized along the contact of a granite and a complex of gneiss, amphibolite, gabbro, and diorite. Considerable amount of granite pegmatite was associated with the ore zone. The dip of the ore body varies from 50°SE to 50°NW. The gneisses and amphibolites have been fractured and recrystallized near the contact with granite. Ore has replaced the amphibolites where they have been sheared. Replacement was controlled by a set of northwest trending cross-fractures. The ore deposit is zoned as copper is concentrated near the Sodder shaft and zinc near the No. 1 shaft (Osterwald, 1947).

Analyses of grab sample material was reported by Root of the Geological Survey of Wyoming (Table 2).

Table 2. Geochemical analyses of Broadway mine samples, no rock descriptions given.

description	Cu(%)	Pb(%)	Zn(%)	Ag(opt)	Au(ppm)
Above shaft 1	0.82	1.0	0.04	9.1	0.5
Blake #1	0.003	1.2	6.9	0.11	0.1
Lower #1	0.44	1.0	0.031	1.5	0.3
Lower #2	0.065	0.52	2.3	0.35	0.4

Bunker Hill Mining Company Bunker Hill Mining Company explored the property during the 1966 and 1967 field seasons. During this period, geologic exploration consisted of mapping, sampling, trenching, and drilling. Nine shallow drill holes totaling 850 feet were completed, two of which intersected significant mineralization. The best drill intercept was near the No. 2 shaft, and encountered 20.5 feet of 8% Zn. Based on a small amount of data it was estimated that some of the ore in sight in a small area of 150 feet by 8 feet by 100 feet deep consisted of 12,000 tons of 10% Zn.

DeNault DeNault (1967) conducted a thesis project of the Broadway property, mapping the area around the property and collecting stream sediment samples. At the same time, he completed a small soil geochem survey indicating the property to be anomalous in lead and zinc.

Petrographic work at this time identified the host rock pyroxenite to typically consist of diopside with minor enstatite replaced entirely or partially by spessartine. One sample examined by DeNault contained 35% olivine.

Amselco Amselco examined the Broadway property in 1976. In the following year of 1977, they drilled the deposit and also completed zinc, lead, and copper soil geochem surveys over a relatively large area. The surveys identified a 3,000 foot long copper soil geochem anomaly, a 2,200 foot long, 100 to 1,000 foot wide zinc soil anomaly, and a 1,500 foot long lead soil geochem anomaly.

Mineralization was recognized as massive zinc, lead, and copper sulfide associated with a lens of tightly folded pyroxene-garnet rock. The pyroxenite was traced for nearly 1,400 feet on the surface.

1992 Field Work On June 3rd, 1992, the Broadway property was briefly examined by the Geological Survey of Wyoming, and a suite of samples were collected from the property for geochemical analyses. Ore sample specimens collected during this investigation consisted of banded massive sphalerite with lesser galena in a matrix of tremolite and spessartine, and granodiorite with disseminated chalcopyrite and chalcocite. The host rock of the massive sulfide is a pyroxene-spessartine hornfels and appears to be typical of skarn.

Five samples collected for assay included: (1) BW1-92, a limonite-stained felsite; (2) BW2-92, granodiorite with disseminated chalcopyrite and chalcocite; (3) BW3-92, sphalerite-galena-bearing pyroxenite hornfels; (4) BW5-92, spessartine-calcite-quartz-pyroxene-actinolite hornfels with massive sphalerite and minor galena; and (5) BW6-92, spessartine-calcite-diopside-actinolite hornfels with massive sphalerite and a trace of galena. The samples were highly anomalous in zinc, lead, gold, and silver (Table 3).

Table 3. Rock analyses of samples collected in 1992.

sample #	Zn(%)	Pb(%)	Cu(%)	Au(ppb)	Ag(opt)	Pt(ppb)	Pd(ppb)
BW1-92	0.31	0.30	0.77	3,278	2.0	--	--
BW2-92	0.02	0.75	1.82	1,604	12.18	--	--
BW3-92	4.34	5.66	0.18	156	1.37	--	--
BW5-92	7.66	0.69	0.05	104	0.2	<5	2
BW6-92	8.17	0.62	--	215	0.29	--	--

References Cited

DeNault, K.J., 1967, Geology and distribution of copper, lead, and zinc in streams and soil - Broadway mine area, Carbon County, Wyoming: University of Wyoming M.S. thesis, 45 p.

Osterwald, F.W., 1947, Report of geologic investigation of the Broadway lead-zinc claim, Carbon County, Wyoming: Geological Survey of Wyoming Mineral Report 47-2 (unpublished), 4 p.

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BONDAR-CLEGG

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

Geochemical
Lab Report

DATE PRINTED: 30-JUN-92

REPORT: V92-32097.0 (COMPLETE)

PROJECT: D692-V PAGE 1A

SAMPLE NUMBER	ELEMENT UNITS	AU PPB	PT PPB	PD PPB	Ag PPM	Cu PPM	Pb PPM	Zn PPM	LA PPM	CE PPM	Nd PPM	Sm PPM
R2 BC2-92									7	10	<10	1.0
R2 BC5-92									218	524	190	35.6
R2 BC6-92									7	8	<10	0.9
R2 BW1-92*		3278			>50.0	7740	2950	3120				
R2 BW2-92		1604			>50.0	>20000	7539	196				
R2 BW3-92		156			47.1	1829	>10000	>20000				
R2 BW5-92		104	<5	2	6.7	482	6880	>20000				
R2 BW6-92		215			9.9		6177	>20000				

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BONDAR-CLEGG

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

Certificate of Analysis

REPORT: V92-32097.6 (COMPLETE)

DATE PRINTED: 10-JUL-92

PROJECT: D692-V

SAMPLE NUMBER	ELEMENT UNITS	Ag OPT	Cu PCT	Zn PCT	Pb PCT
R2 BW1-92		2.00			
R2 BW2-92		12.18	1.82		
R2 BW3-92				4.34	5.66
R2 BW5-92				7.66	
R2 BW6-92				8.17	

REPORT OF GEOLOGIC INVESTIGATION OF THE BROADWAY LEAD-ZINC CLAIM, CARBON COUNTY, WYOMING.

The Broadway Claim is located in section 7, T. 13 N., R. 83 W., on Coon Creek, Carbon County, Wyoming. The area is heavily forested, and lies within the boundaries of the Medicine Bow National Forest at an elevation of approximately 9300 feet. The claim is 19 miles from Encampment, Wyoming, via the Blackhall Mountain Forest Trail, and may be reached only by foot, jeep, or horseback. The last 2.6 miles of the route are over a rough, little used trail.

According to Mr. B.E. Benson, of Encampment, the claim was originally staked by Bill Sodder, about 1907, and the so-called Sodder shaft was sunk at that time. Later Mr. Benson acquired the claim and the three Broadway shafts were put down by him. All of the shafts were accessible when visited except Broadway #3, which is completely caved. The Sodder shaft and Broadway nos. 1 and 2 are about 20 feet deep. The property was examined by the U.S. Bureau of Mines in 1942, and a brief report prepared but not published. Analyses of samples from the various shafts accompanied the report. Maps and other information contained in the report are marked "Confidential - for use of government agencies only." The claim was visited and sampled in the early summer of 1947 by two men from the New Jersey Zinc Company. The present field work was carried on during the first week of August, 1947, and consisted of surface mapping with plane table and telescopic alidade on a scale of one inch equals fifty feet, together with a brief examination of the various shafts. Mr. Benson is the present owner of the property, and he is associated with Mr. Wallace Collins. of Clio, Michigan, and Mr. Bishop, of McCook, Nebraska, who are partners.

The ore zone, as shown on the accompanying map, is about 1000 feet long and about 50 feet wide on the surface. Exact dimensions of the zone were difficult to obtain because the area is heavily wooded and covered by alluvium and fallen timber. Similar ore in small amounts is found in scattered outcrops and old prospect pits near the Broadway claim.

The ore minerals consist mainly of sphalerite with a minor amount of galena. Locally chalcopyrite, chalcocite and covellite are present, usually as finely disseminated grains. Small amounts of malachite and chrysocolla are present in surface outcrops. Usually the ore is massive, but occasionally there may be up to 40 percent open space. Though the mapped zone ranges in ore content from 3 to 35 percent, no reliable estimate of average ore percentage may be made, because the poor exposures and the small extent to which the property is developed. An inaccessable tunnel located halfway down the west wall of shaft #1 contains a gray and white gneissic rock which bears 1 to 5 per cent finely disseminated chalcocite, chalcopyrite and bornite. No exposures of this rock were found at the surface, but specimens were collected from the dump.

The following statements are taken from a letter by M.E. Volin for Paul T. Allsman, Chief, Salt Lake City Division, Minning Branch, U.S. Bureau of Mines, to Dr. H.G. Fisk, Director, Natural Resources Research Institute, University of Wyoming, and are quoted from the Bureau of Mines report on the Broadway property

"Exposures of sphalerite with minor amounts of galena, silver, and gold have been developed to such a small extent that a just appraisal of the extent of the ore body cannot be made. Five character samples and one channel sample taken during the examination are described as follows:

1. A channel sample along the ends and west side of No. 1 shaft, 4 feet above the bottom, assayed 12.5 percent zinc, 1.9 percent lead, 0.02 percent copper and 7.65 percent sulfur.

2. A sample from a no. 2 shaft dump assayed 4.2 percent zinc and 1.9 percent lead.

3. A sample from no. 3 shaft dump assayed nil zinc and 1.0 percent lead. Chips from the outcrop near No. 3 shaft assayed nil zinc and 0.5 percent lead.

4. A selected character sample of the primary ore from No. 1 shaft assayed 10.2 percent zinc and 0.9 percent lead.

5. Another selected character sample from no. 1 shaft assayed 5.2 percent zinc and 1.5 percent lead.

A platinum group metal in very small amounts in the samples was identified by spectrograph."

The report recommended diamond drilling to determine the extent of the possible ore body, but these recommendations are now out of date."

The ore is localized along the contact of a granite and a complex group of gneisses, amphibolites, gabbros, and extremely coarse-grained rocks of dioritic composition. There is a considerable amount of granite pegmatite associated with the ore zone.

Because exposures in the area are poor, little structural data can be obtained on the surface. Dip of the ore body varies from 50° SE to 50° NW in the various shafts. In the shafts soft yellow limonitic material may be found which usually underlies the ore body. This material is probably localized along fractures. The gneisses and amphibolites have been fractured and recrystallized near the contact with the granite. Ore has replaced the amphibolites where they have been sheared without recrystallization. The replacement has apparently been controlled by a set of northwest trending cross-fractures. It is believed the ore deposition followed the fracturing, injection of pegmatites, and recrystallization. The limonitic material which follows some of the fractures is believed to have been

the result of downward percolation of surface waters. The deposit is zoned to a certain extent, as copper minerals are most highly concentrated near the Sodder shaft (NE end of the ore zone) and zinc minerals near Broadway nos. 1 and 2.

No accurate prediction of the probable extent of the ore body can be made at this time. Surface exposures are poor and development work limited to timbered shafts. If further development work is undertaken, trenches should be dug to more accurately determine the attitude and size of the ore body.

Signed,

F. W. Osterwald, Assistant Geologist
Geological Survey of Wyoming

31 August 47

THE GEOLOGICAL SURVEY OF WYOMING
Horace D. Thomas, State Geologist

OPEN FILE REPORT 47-1

GEOLOGIC RECONNAISSANCE MAP OF THE BROADWAY LEAD-ZINC CLAIM

SEC. 7, T. 12 N., R. 83 W., CARBON COUNTY, WYOMING

Geology by F. W. Osterwald
Plane table by John Albanese
August 1947

SCALE
0 25 50 100
FEET

(Contour Interval- 10 Feet)

EXPLANATION

- Lithologic Boundary
- Lithologic Boundary Inferred
- Outcrop Limit of Ore
- 70° Strike & Dip of Foliation With Amount of Dip
- 35° Plunge of Axis of Drag Fold
- 9300' Topographic Contours With Elevation
- Shaft
- Prospect Pit

ROCK TYPES

QUATERNARY

Qal — Alluvium

PRE-CAMBRIAN

ore — 5-35% Ore (mainly sphalerite with lesser galena & minor chalcocite, chalcopyrite & oxides)

gr — Granites

gn — Gneisses, Gabbros, Amphibolites