DMA Examining Team Report
on Scotchman (Blue Creek) Mine
Sanders County, Montana

(DMA Docket No. 207)

by
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RECOMMENDATIONS

The small lowgrade reserves of Scotchman mine do not justify any direct loan or procurement contract for production of lead and zinc ore. No exploration loan on matching basis is recommended due to a structural setting which is believed to limit the continuity of the Scotchman lode.

APPLICANTS

The application for Government assistance is submitted by A. M. and W. W. Derr, both residents of Clark Fork, Idaho. The partnership was organized by A. M. Derr, lessee of the Scotchman mine, and a farm owner and operator of a small lumber mill in the district. W. W. Derr, his cousin, is a local miner, who previously had successfully leased and operated several mines on a small scale.

LOCATION

The Scotchman or Blue Creek mine is about 18 miles east of Clark Fork, Idaho and about 8 miles north of Idaho highway No. 3. The nearest railroad station is Noxon on the Northern Pacific Railway about 9 miles from the mine.

The property consists of 6 patented and 3 unpatented claims. The patented claims, namely, Scotchman Nos. 6, 6½ and 7, Blue Creek Nos. 1 and 2, and Hillside Lode, are recorded as survey No. 10568 in volume 31 of Deed Records, Page 54 of Sanders County, Montana. The unpatented claims, Scotchman No. 5, Blue Creek No. 3 and Hillside No. 2 are northeast of the patented claims. The Broken Hill mine property adjoins the Scotchman claims to the southeast. This mine, unactive for many years, is owned by the Federal Mining and Smelting Company of Idaho.

copy of report & map to USGS (Spokane) 3/23/54.

OWNERSHIP

The property is owned by the Blue Creek Mining Company of Sandpoint, Idaho. Since August 1950 it is held by A. M. Derr under a 5 year lease contract with option to purchase for $150,000 paid on royalty basis of ten percent of the value of the ore on net smelter returns. Automatic renewal of contract is provided, if royalties for the first 5 years total or exceed $10,000.

HISTORY AND PAST PRODUCTION

The property was acquired by late Dr. C. P. Stackhouse of Sandpoint, Idaho, who organized the Blue Creek Mining Company for its development. It is reported that more than $100,000 had been spent and one car of ore shipped before the year of 1928. An adit and other underground workings about 1700 feet in total length were driven for exploration. The mine resumed its operations in 1937 and 1938. The drift on the "Scotchman lode" was continued, a 40 foot incline was sunk, and some ore was mined. Mr. A. M. Derr, the applicant, states that, when working as assayer and mill superintendent at the Hope Silver Lead mine at Clark Fork, Idaho, about 300 tons of ore averaging 9.0 percent Zn and 11.0 percent Pb from Scotchman mine were milled and beneficiated to a lead concentrate. An attempt by the DMA team to check the mill records regarding the grade of heads and concentrate received was unsuccessful.

A small lot of sorted ore was shipped to Bunker Hill Smelter, Kellogg, Idaho in May 1950. The assay of the lot was as follows:

Pb - 18.8 percent	Cu - 0.0	Bi - 0.0
Zn - 16.6 percent	S -18.4	Fe -17.6
Au - 0.08 oz/tn	Sb - 0.0	CaO- 1.8
Ag - 5.2 oz/tn	As - 1.22	Ins-14.0

The high arsenic content of the above ore shipment provoked the following comment by the Anaconda Mining Company to the lessee: "arsenic content of 1.22 percent is much higher than we would care to accept even in zinc concentrate....this ore would produce a concentrate that you would have difficulty disposing of to any electrolytic zinc plant..."

DESCRIPTION OF PROPOSAL

The applicants request a loan to the amount of $50,000. They propose to acquire unspecified mining equipment ($10,000), supplies ($10,000), In addition working fund is estimated at $10,000 to cover mining and transportation and $20,000 for necessary development work for production between 600 and 1,000 tons of ore per month. The ore will be shipped directly by truck to Golgonda Mill near Wallace, Idaho for beneficiation to lead and zinc concentrates that can be sold to Bunker Hill smelter. Payment of $5.00 per ton of ore milled is committed for the return of DMA loan.

TECHNICAL FEASIBILITY

Geologic Setting

The Scotchman or Blue Creek mine explores the Blue Creek fault zone. This fault, which within the mine workings trends N. 20° W. and dips very steeply southwestward, is here entirely within the Ravalli formation of the Belt series. Fine-grained gray quartzite and dark argillite of the upper part of the formation constitute the west block of the fault, and have been brought in contact with similar rocks on the east side of the fault which here belong to the lower part of the formation 1/.

According to A. L. Anderson 2/ the surface showing of the Blue Creek deposit is very inconspicuous. W. W. Derr spent several hours during the team's examination in an attempt to trace the vein along the steep canyon side without success. No attempt was made by the team to examine the surface.

The fault zone appears to consist of two distinct shears about 60 feet apart with a relatively unsheared block of rock lying between.

In the central part of the mine (see fig. 1) a linking shear zone, flatter in dip and slightly more westerly in strike than the main faults, extends from the footwall fault of the zone to the hanging wall fault. This relatively low-angle shear zone has controlled the only known ore in the mine.

1/ Gibson, Russell, Geology and Ore Deposits of the Libby Quadrangle, Montana; U. S. Geol. Survey Bull., 956, pl. 1, 1948.

2/ Anderson, A. L., Geology and Ore Deposits of the Clark Fork District, Idaho; Idaho Bur. Mines and Geol. Bull. 12, p. 108, 1930.

The sheared rocks have been more or less completely replaced by quartz and coarse-grained pyrite in a zone which ranges up to 10 feet in width.

This zone, which generally has a sharp footwall, grades upward into a zone of less intense silicification which extends either to the hanging wall of the Blue Creek fault zone or to a higher linking shear. The mineralized shear is exposed in the workings for about 325 ft. At the south end, for a distance of 80 ft. from its junction with the main footwall fault, the linking shear is not strongly replaced with quartz and is but scantily mineralized.

The ore occurs chiefly as distinct streaks of a very fine-grained mixture of dark-colored sphalerite and galena which parallel and lie within the quartz replacement zone. According to Anderson 3/, pyrrhotite and arsenopyrrite are abundant and may approximate the quantity of valuable sulphides. Assays for arsenic (fig. 1) show that arsenopyrite makes up only about two percent of the ore streaks and is practically absent from the enclosing quartz-pyrite zone. The main ore streak in the stoped area is from 8 to 12 inches in width where observed and lies in the center of the mineralized zone. South of the stope a continuous streak extends along the footwall of the quartz replacement zone for more than 130 feet with an average thickness of 3 3/4 inches. Several short discontinuous streaks occur locally above this. The quartz-pyrite zone contains isolated crystals and small patches of sphalerite and galena, rarely totalling more than a few percent.

No ore has been found along the main bounding faults of the Blue Creek fault zone in the Scotchman mine, although they are exposed in a number of places. The workings follow the footwall fault of the zone for a total distance of about 670 feet. In the northern part of the workings, the fault is marked by a silicified seam, locally widening to several feet which here and there contains a little pyrite and a few specks of chalcopyrite and galena. In the south end of the workings the fault zone is strongly argillized but generally barren of quartz or mineralization. The hanging wall fault is exposed in three places by crosscuts, only one of which shows mineralization. Because of this, it is doubted that further exploration along the bounding faults is warranted.

3/ Anderson, A. L., Geology and Ore Deposits of the Clark Fork District, Idaho. Idaho Bur. of Mines and Geol., Bull. 12, p. 107, Plates X and XI, 1930.

Beginning at a point about 550 feet in from the portal, a section of the main adit nearly 90 feet long is lagged and spilled through unconsolidated pebble and cobble gravels. This section is very wet, the flow varying with the amount of surface runoff. It was estimated that on May 8 a minimum of 1,500 gallons of water per minute issued from the walls and back in the gravel zone. Careful observations could not be made but it appeared that the gravels extend little, if any, below the floor of the adit and represent the base of an old channel, probably fluvio-glacian in origin.

Although the exact course of this channel is unknown, it seems certain that it will cut out the ore zone a short distance north of the present north face of the stope. Figure 1 arbitrarily indicates the intersection at the altitude of the level. Above the level the channel will, of course, be wider. Due to the probability that the favorable linking shear zone would be entirely above the level at a point north of the channel, and hence largely or completely eroded away, the total ore reserves are thought to lie south of the channel.

Mine Workings

The workings of the Scotchman mine are shown on the enclosed map (fig. 1). They are accessible except the flooded incline and the west part of the tunnel. Between 80 and 100 feet of the tunnel are caved and would have to be cleaned out and retimbered for ore haulage through the west portal.

Reserves

The indicated and inferred reserves are estimated by the team at 7,100 tons with a grade of 6.3 percent combined lead and zinc for a true width of 40 inches. The reserves are arbitrarily classified as 50 percent indicated and 50 percent inferred.

The estimate was made by assuming that mineralization of the average grade exposed on the level (north of the southern sample) will extend northwards to the assumed position of the gravel channel and above and below the level for the full extent of the linking shear zone.

Data used in estimating tonnage:

Horizontal width: 50 inches (4.17 feet)
Average strike length: 235 feet
Average vertical height: 100 feet
Volume: 98,000 cubic feet
at 12 cubic feet per ton: 8,200 tons

It is estimated that of this tonnage about 1,100 tons have already been mined, leaving a reserve of 7,100 tons.

Data collected in mapping indicates that the sample locations south of the stope were chosen by the team where the average thickness of the high-grade streaks was 27 percent greater than the average for the segment between the stope and the southern sample; also, sample CCP 201, taken at the north end of the stope is considered more nearly representative of the stope area than the high-grade sample CCP 208 taken at the top of the stope from the richest ore exposed in the mine. Accordingly in computing the weighted average of the high-grade streaks, 27 percent was deducted from the thickness of those samples south of the stope, and the data for sample CCP 201 substituted for the high-grade sample CCP 208.

Data used in estimating grade:

Weighted average of high-grade streaks			Arithmetic average of quartz-pyrite zone			Weighted average of 50-inch stoping width		
True thickness (inches)	Percent Pb	Percent Zn	Min. thickness (inches)*	Percent Pb	Percent Zn	True thickness (inches)	Percent Pb	Percent Zn
11.6	6.11	6.74	32	1.27	2.33	40	2.67	3.61

* Locally, at sample 207, thickness is only 12½ inches.

A stoping width of 50 inches has been chosen as the narrowest which would stope all the high-grade streaks exposed on the level. A further reduction in stope width would lower the grade, unless the width were reduced to a point where mining becomes inefficient.

If the samples are assumed to be representative as taken, the following grade is indicated for a stoping width of 50 inches: Pb - 3.34 percent; Zn - 4.24 percent.

Mining

The applicants propose to mine the ore by open stoping. Rock conditions are favorable for such mining, but to attain an acceptable grade selective mining and hand sorting would have to be employed. Considering the results of sampling and the geology, such a method can be used only locally within the mine and it is believed that it would yield but a small tonnage with a prohibitive mining cost.

Milling

Experimental milling of the ore would be necessary to determine the optimum recovery and grade of lead and zinc concentrates. A. L. Anderson 4/ believes that very fine grinding would be necessary for a good separation of concentrates because of the intimate association of very fine-grained galena and sphalerite.

FACILITIES AND EQUIPMENT

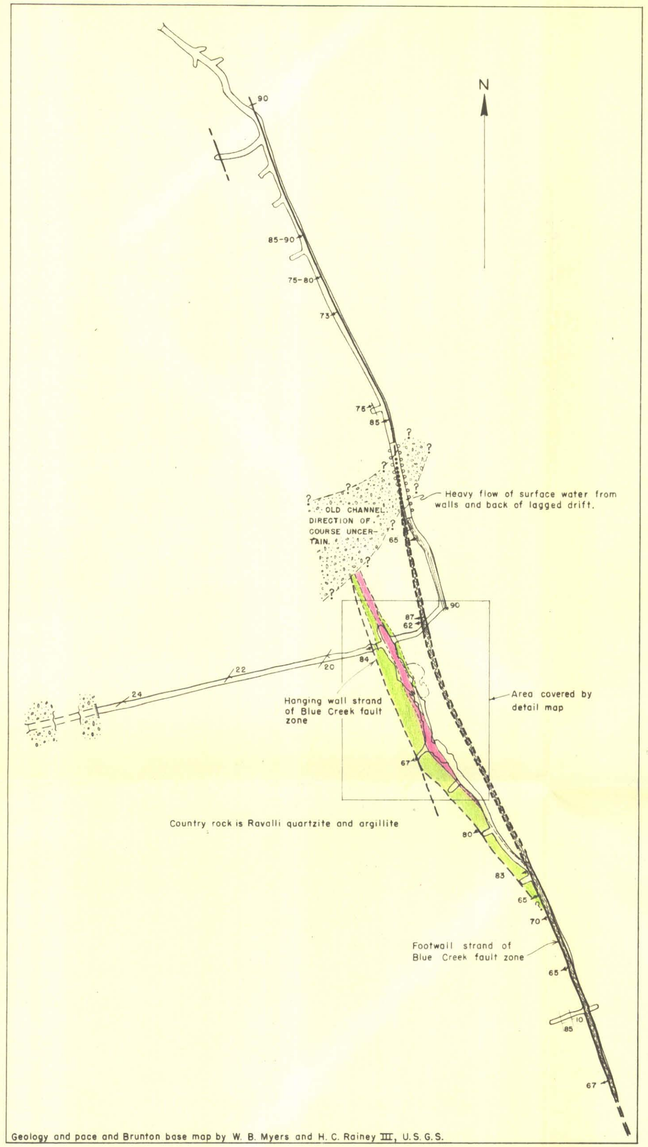
No usable buildings are at the mine. Some lumber and other building materials can be salvaged from an old compressor shed and dilapidated bunkhouse.

Mining equipment and tools are absent. Diesel or gasoline driven compressor, pump, drills, pipes and tools have to be purchased. Mr. A. M. Derr owns a bulldozer, and several trucks that supposedly will be transferred from logging operations for road maintenance and ore transportation.

DISCUSSION

The average grade of ore stated in the application is not confirmed by the examination. The estimated ore reserves at the Scotchman mine are too small to warrant any mining loan or a procurement contract. An exploration loan on matching basis is not justified as the structure appears to preclude a considerable increase of ore reserves for the known vein.

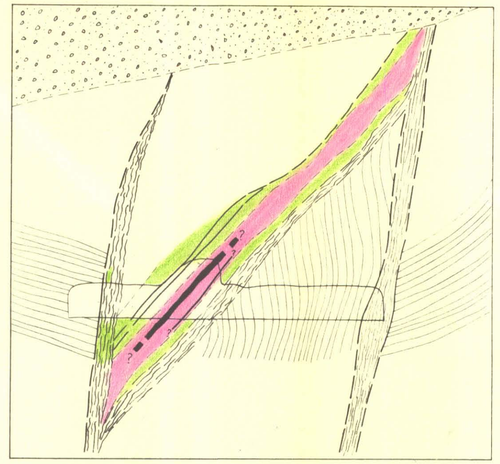
Ibid, p. 107 and pls. X and XI.



Geology and pace and Brunton base map by W. B. Myers and H. C. Rainey III, U.S.G.S.

GEOLOGIC SKETCH MAP OF SCOTCHMAN MINE

0 50 100 200 300 400 Feet



SECTION ALONG LINE A-B IN STOPE AREA

0 10 20 40 60 80 Feet

ASSAYS OF D.M.A. SAMPLES FROM SCOTCHMAN MINE

HIGH-GRADE STREAKS
(Sphalerite, galena, pyrrhotite, and minor arsenopyrite; includes thin streaks of waste and the quartz-pyrite zone.)

QUARTZ-PYRITE ZONE
(Quartz, pyrite, minor sphalerite, galena and pyrrhotite.)

Sample No.	True thickness of sample in inches	Pb %	Zn %	True thickness of sample in inches	Pb %	Zn %	Au oz./ton	Ag oz./ton	As %
CCP 201-202	17	6.9	5.9	42	2.8	2.0			
CCP 203-204	5	2.6	5.3	32	0.3	1.2			
CCP 205-206	17	4.3	6.9	56	0.2	3.9			
CCP 208-209	9	28.8	21.4	52	1.0	1.4			
CCP 207	8.5	7.8	11.5	12.5‡	0.25*	2.33*			
Composite CCP 201-203-205-208 (High-grade streaks)							0.02	0.20	1.0
Composite CCP 202-204-206-209 (Quartz-pyrite zone)							0.005	0.20	<0.05

‡ Not sampled. Thickness taken from map.
* Not sampled. Assumed from average of CCP 204 and CCP 206.

EXPLANATION

Unconsolidated channel gravel

Quartz-pyrite rock (Contains minor amounts of sphalerite and galena)

Silicified zone

High-grade sphalerite-galena-pyrrhotite streaks showing true thickness

Medium-grade sphalerite-galena-pyrrhotite(?) ore lenses

Gradational contact

Fault, showing dip

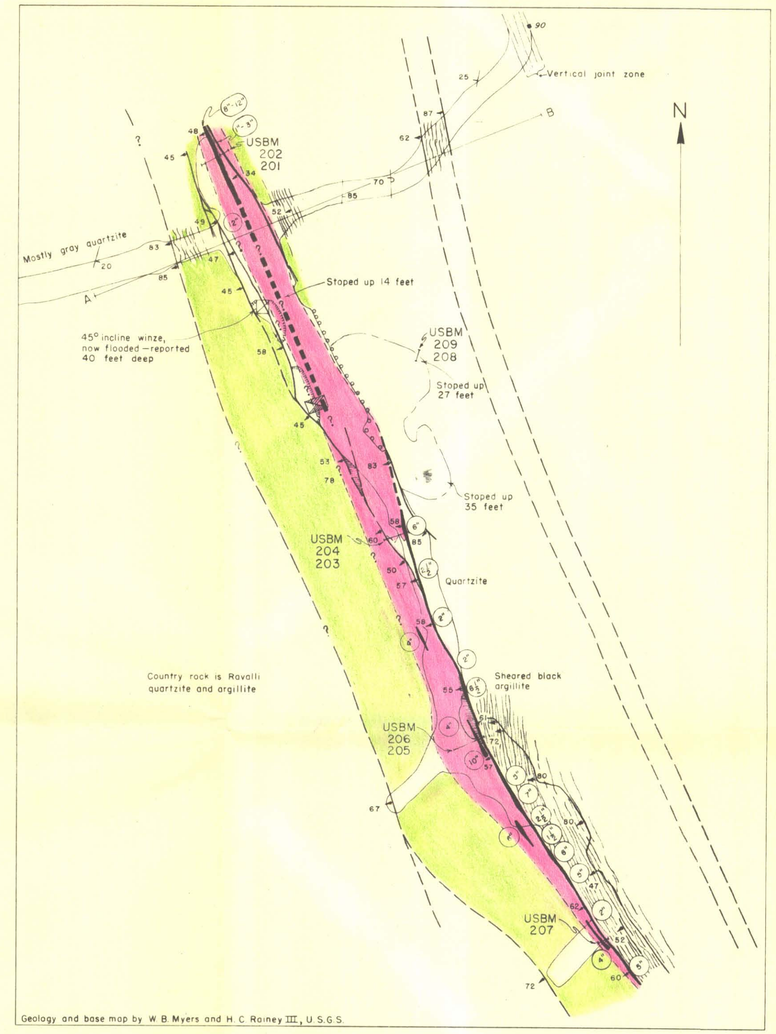
Shear zone

Attitude of beds

Lagging along drift

Caved workings

Stope outline



Geology and base map by W. B. Myers and H. C. Rainey III, U.S.G.S.

DETAILED GEOLOGIC MAP OF STOPE AREA

0 10 20 40 60 80 Feet

GEOLOGIC SKETCH MAP, DETAILED GEOLOGIC MAP AND SECTION OF STOPE AREA OF SCOTCHMAN MINE, SANDERS COUNTY, MONTANA