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

22h New Customhouse
Denver 2, Colorado

March 18, 1952

Memorandum

To: Chairman, Operating Committee, DMPA, Washington, D. C.

From: Field Team, Region IV

Subject: Final Report, DMA-1915, U. S. Fluorspar and Manganese Inc., Chaffee County, Colorado

Enclosed are the original and three copies of the final report on the application of the U. S. Fluorspar and Manganese, Inc.

The applicant has requested a production loan of $30,000 for mill improvements, a laboratory and office, mining and haulage equipment, and working capital.

Examination of the property revealed no measured ore and the indicated and inferred ore reserves are low grade fluorspar averaging 26% CaF_2 and 48% SiO_2.

Metallurgical tests on a representative sample of surface ore from the deposit indicate that the ore could not be effectively washed and screened to make a suitable flotation mill feed. Metallurgical tests indicate that acid grade concentrate could not be made from a representative sample of vein ore.

It is recommended that the application of the U. S. Fluorspar and Manganese Inc. for a production loan be denied.

cc: WMTraver w/copy of Final Report
AHKoschmann w/copy of final report
DMA Final Report

W. H. King
W. H. KING for
J. H. East, Jr.

A. H. Koschmann
A. H. Koschmann

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

March 18, 1952

Memorandum

To: Field Team, Region IV

From: Acting Chief, Mining Division, Region IV

Subject: DMA Docket 1915, U. S. Fluorspar and Manganese, Inc., Chaffee County, Colorado

Enclosed are the original and seven copies of the final report on the application of U. S. Fluorspar and Manganese, Inc. by R. L. Bolmer of the Bureau of Mines.

There is no measured ore and the examiners recommend that this application for a production loan be denied.

We concur with this recommendation.

W. H. King

W. H. King

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C.
200 New Customhouse
Denver 2, Colorado

February 28, 1952

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 1915, U. S. Fluorspar and Manganese Corporation, Brown Canon Fluorspar Deposit, Chaffee County, Colorado

Enclosed are 8 copies of the geologic report by Ward B. Meek covering subject docket.

The applicant has requested a production loan of $30,000 for mill improvements, a laboratory and office, mining and haulage equipment, and working capital. Meek's field investigation shows that the subject property has no measured ore reserves, only indicated and inferred reserves of low grade fluorspar averaging approximately 26% CaF_2 and 48% SiO_2. The property might merit an exploration loan, but Meek recommends that the request for a production loan be denied.

I concur with this recommendation.

The brochure is enclosed.

A. H. Koschmann
A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (9)

Mining Division
Date Rec'd.
FEB 14 1952
BUREAU OF MINES
Denver, Colorado

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20
Denver Federal Center
Denver 14, Colorado
February 14, 1952

W. H. K.

Memorandum

To: Acting Chief, Mining Division, Region IV

From: Chief, Colorado Branch, Mining Division

Subject: DMA 1915, U. S. Fluorspar and Manganese, Inc., Chaffee County, Colorado

Please find enclosed the original and seven copies of the "Summary, Conclusions, and Recommendations" on the above docket, by R. L. Bolmer, W. B. Meek, and A. T. Sweet, and the identical number of copies of Bolmer's engineering report and Sweet's metallurgical report.

Bolmer estimates capital expenditures to prepare the property for operation at $17,500.00, leaving a balance of $12,500.00 from a $30,000.00 direct loan for operating capital. He estimates production costs at $5.65 per ton mined.

Repayment of the $30,000.00 loan on a 5 percent royalty of the net return would require reserves of 73,000 tons of ore averaging 20.5 percent CaF_2, or 125,000 tons of ore averaging 12.6 percent CaF_2. In Bolmer's opinion, the deposits do not contain anywhere near such tonnages of measured ore, but they do merit exploration.

According to the metallurgical report, tests on a representative sample of surface ore from the deposits cannot be effectively washed and screened to make a suitable flotation mill feed, nor can acid-grade concentrates be made from a representative sample of vein ore.

In addition, judging from past experience, there is considerable question regarding the managerial ability of the applicant.

Bolmer recommends denial of the application for a direct loan of $30,000.00 on the basis of insufficient measured ore reserves. I concur.

The brochure submitted with the instructions of the Region IV Field Team to make a geologic, metallurgic, and engineering investigation is also enclosed.

W. M. Traver, Jr.

W. M. Traver, Jr.

enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMA-1915, U. S. Fluorspar and Manganese, Inc.

Chaffee County, Colorado

Fluorspar

R. L. Bolmer, Mining Engineer
Bureau of Mines

W. B. Meek, Geologist
U. S. Geological Survey

A. T. Sweet, Metallurgist
Bureau of Mines

February 12, 1952

U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

Summary, Conclusions, and Recommendations

By R. J. Belmer
Mining Engineer
Bureau of Mines

and

W. R. Meek
Geologist
U. S. Geological Survey

and

A. T. Smart
Metallurgist
Bureau of Mines

U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By R. L. Bolmer and W. B. Meek

The U. S. Fluorspar and Manganese, Inc., has applied for a direct Defense Minerals Exploration Administration loan of $30,000.00 for the purpose of improving its mill, purchasing mining equipment, and providing working capital to prepare its property located in the Browns Canyon district in Chaffee County, Colo., for production of acid-grade fluorspar concentrates.

In its application, the company proposed to mine 30,000 tons by surface methods from the Chimney Hill vein at a rate of 100 tons daily. The property was examined on December 5 and 6, 1951, by an engineer and metallurgist of the Bureau of Mines and a geologist of the U. S. Geological Survey. During the examination, the representative of the applicant company indicated its intention also to mine from the surface a second vein on nearby Manganese Hill (Bancroft No. 1 vein).

The deposits on the property consist of two mineralized zones or veins in which fluorite and silica were deposited in sheared and brecciated zones in granite and rhyolite. The two zones are known locally as the Chimney Hill vein and the Manganese Hill or Bancroft No. 1 vein, and one or both probably are extensions of veins extending south and east into more productive areas of the Browns Canyon district.

The deposits have had a small production of metallurgical and ceramic-grade spar from surface and underground development accomplished by former operating organizations. The development by former operators was for the most part unsystematic, and much of the earlier workings are inaccessible because of caved or flooded conditions. Development and exploration of the deposit were not carried ahead of actual mining operations, and measurable or blocked ore reserves do not exist in the accessible sections of the deposit.

Certain tonnages of fluorspar were indicated or inferred from samples taken in the accessible workings, from past production of the property and from geological indications of the extension of the mineralized zones both laterally and with depth. About 150,000 tons of fluorspar averaging approximately 21 percent CaF_2 was indicated or inferred in the Chimney Hill deposit; however, by mining this zone selectively a grade of 35 percent CaF_2 might be maintained but the tonnage reduced to 90,000. The Manganese Hill zone contains 100,000 tons of indicated and inferred ore averaging 15 percent CaF_2. Exploration and development work would be necessary before these reserves could be considered as sufficiently well established to justify consideration of them as a basis for a direct loan.

Approximately 30,000 tons of indicated or inferred fluorspar averaging about 21 percent CaF_2 occurs near the surface of Chimney Hill and could be mined by surface methods. The zone through Manganese Hill contains an equal tonnage minable from

the surface but at a grade of 12 to 13 percent CaF_2 and dilution in mining this zone from the surface must be expected.

The amount requested should be ample for the applicants' proposal to put the mill into operating condition and to provide for surface mining for about one month at the proposed rate. Such an operation could be profitable if acid-grade concentrates were produced from the higher grade Chimney Hill deposit. Metallurgical tests, however, indicate that quartz is too intimately associated with the fluorite for the production of acid-grade spar. A ceramic-grade concentrate was produced in laboratory tests by fine grinding, but only a marginal profit could be expected from such production. Metallurgical tests also indicated that the low-grade fluorspar minable from the surface of Manganese Hill can not be washed and beneficiated sufficiently by preliminary treatment to produce a suitable flotation mill feed.

It is concluded that sufficient reserves of fluorspar might be developed through systematic exploration to justify the equipping of the mine and the rehabilitation of the mill to produce a metallurgical or ceramic-grade product. In its present status, however, the property does not contain measurable reserves of fluorspar and the proposal by the applicants is premature until such reserves can be shown to exist.

It is recommended that the application for a direct Defense Minerals Exploration Administration loan of $30,000.00 by U. S. Fluorspar and Manganese, Inc., be denied.

U. S. FLUORSPAR AND MANGANESE CORPORATION

BROWN CANON FLUORSPAR DEPOSIT

CHAFFEE COUNTY, COLORADO

DMA DOCKET 1915

Geologic Report

By Ward B. Meek
U. S. Geological Survey

U. S. FLUORSPAR AND MANGANESE CORPORATION
CHAFFEE COUNTY, COLORADO

INTRODUCTION

The United States Fluorspar and Manganese Corporation has applied for a production loan of $30,000 on its Brown Canyon fluorspar deposit eight miles northwest of Salida in Chaffee County, Colorado. This loan is for mill improvements, a laboratory and office, mining and haulage equipment, and working capital. Since there is essentially no measured ore, the loan should not be granted.

The property has been explored by various shafts, winzes, adits, pits, and bulldozer trenches. These are shown on figs. 2, 3, and 4.

Production records for the mine are fragmentary, but probably about 2500 tons of ore have been marketed. Most shipments were of the hand-sorted mineral, or of mill concentrates for which the crude tonnage is not given. The most dependable figures are for 1943-44 when 1343 tons were produced with a content of 26.01 percent CaF_2. This ore reportedly was mined in the driving of the lower inclined adit on Bancroft No. 1 vein.

GEOLOGY

The oldest country rock is pre-Cambrian granite containing pegmatite zones and enclosing some schist which may have been derived by shearing of the granite. These rocks are overlain by Tertiary rhyolite which apparently forms erosional outliers, at least some of which have been preserved by down-faulting.

Bancroft No. 1 vein occupies a fault zone that strikes N. 70° E. and dips steeply and variably north (figs. 2 and 4). It is enclosed by granite which has been sheared and hydrothermally altered. The mineralized granite is friable where weathered; it contains considerable clay and iron oxide, and traces of psilomelane. Accessible outcrops show no definite vein, but the altered rock is cut by many veinlets of fluorite, a few of which are as much as 6 inches wide. The rock is also impregnated, and probably replaced, by fluorite over a zone ranging from 4 to 72 feet in width. D. C. Cox visited the property in 1944 when the adits were still open. In an unpublished report for the U. S. Geol. Survey, he states: ". . Two inclines now expose the Manganese Hill deposit" (Bancroft No. 1 vein). "One about 300 feet long, and inclining at an angle of 10°, exposes an ore body 2-4 feet in width for a distance of about 200 feet from the portal. The part of the vein exposed in the last 100 feet of the incline is very low grade. The other incline is about 150 feet long; it was started from the same portal but is steeper, inclining about 35°. The ore appears to average 4-5 feet in width, and several samples of the vein are reported to have contained approximately 45 percent CaF_2."

H. W. C. Prommel, formerly with the U. S. Bureau of Mines, sampled the upper incline for 180 feet in 1943 and reported an average width of 6.6 feet and a CaF_2 content of 23.3 percent. No sampling of the lower incline has been reported.

The Chimney Hill (also Trifoni Hill ?) vein follows a fault that strikes N. 60° W. and dips steeply and variably north and south (figs. 2 and 3). It is of a different character than the Bancroft No. 1 vein

owing to the hard, relatively impervious rhyolite that encloses the best exposures of it, and also owing to the fact that some silicification of the walls preceded the fluorite mineralization. The ore is in rather well-defined lenses 20-70 feet long and 8-12 feet wide. Sample No. 8 (fig. 2) was taken from granite which forms the southwest wall of the vein at that point; this granite is cut by veinlets and impregnated with fluorite similarly to Bancroft No. 1 vein.

A split from Chimney Hill vein near the western end of its exposure strikes nearly parallel with the Bancroft No. 1 vein but has mineralization identical with the main Chimney Hill vein.

The Chimney Hill ore bodies have been explored underground by two shafts, a winze, and two levels. Water is standing in the winze and the deeper shaft within 10 feet of the upper adit. The lower drift is, therefore, inaccessible, and there are no known reports of what it disclosed.

MANGANESE

The applicant mentions a manganese vein 7 feet wide from which he took a sample that assayed 37.34 percent Mn. The only evidence of manganese ore found by the Field Team was a stockpile of about a ton of fluorspar impregnated with psilomelane; this ore was obtained from a pocket in the drift on Bancroft No. 1 vein. According to information given by Mr. Bancroft, General Manager for U. S. Fluorspar and Manganese Corp., it is probable that this small pile contains most of the manganese ore encountered. A sample from this pile was assayed by the U. S. Bureau of Mines; it contained 17.2 percent Mn. The only manganese observed elsewhere is in a mixture of psilomelane and hematite that forms coatings on fractures. There is no indication of minable manganese ore.

ORE RESERVES

Figures 3 and 4 show blocks of indicated and inferred ore. Although some of the ore in the vicinity of the Chimney Hill shafts might be classed as measured, the amount is not significant, and it was lumped with the indicated ore surrounding it. The individual blocks of vein material, the ore believed to be recoverable from them, and the content of CaF_2 and SiO_2 are shown on figs. 3 and 4 and are tabulated below. Between the lenses of ore in the vein material blocked out, there are zones of mineralized rock which are not ore and, consequently, were not sampled. It is estimated that about 60 percent of the vein, roughly 150,000 tons, is ore which assays about 26 percent CaF_2 and 48 percent SiO_2.

TABULATED ORE RESERVES

	Tons of vein material blocked	Tons of ore estimated recoverable	Average % CaF_2 in ore	Average % SiO_2 in ore
		Indicated Ore		
Chimney Hill	43,073 x 0.6	25,844	31.0	46.8
Bancroft No. 1	42,322 x 0.6	25,393	16.1	55.8
	85,395 x 0.6	51,237		
		Inferred Ore		
Chimney Hill	106,621 x 0.6	63,973	35.5	39.5
Bancroft No. 1	61,551 x 0.6	36,930	14.6	56.7
	168,172 x 0.6	100,903		

If the low-grade vein material between ore lenses cannot be successfully sorted out or left in place by selective mining, then the tonnage will remain at about 250,000 tons but the percentage of CaF_2 will be substantially decreased.

METALLURGICAL TESTS

Metallurgical tests run by the U. S. Bureau of Mines show that the successful operation of this deposit depends on sorting out of chunks of metallurgical grade spar and on the making and marketing of a ceramic grade flotation product. This appears to be feasible.

SUMMARY AND CONCLUSIONS

The U. S. Fluorspar and Manganese Corp. has asked for a production loan of $30,000 on its Brown Canyon property near Salida, Colorado. This land has been haphazardly explored by various surface and underground openings.

The fluorite is a filling in minor fault fissures that cut Tertiary rhyolite, and an impregnation and replacement along a fault zone that is mostly in pre-Cambrian granite.

Production records for the mine are fragmentary, but at least 2500 tons of ore have been produced. From 1943 to 1944 a total of 1343 tons of ore were marketed with an average content of 26.01 percent CaF_2.

There is a reserve of about 150,000 tons of indicated and inferred ore averaging approximately 26 percent CaF_2 and 48 percent SiO_2. Some of this could be sorted and sold as metallurgical grade ore, or, possibly, as acid grade. The U. S. Bureau of Mines believes that the average grade ore can be refined successfully to ceramic grade ore by grinding and flotation.

Manganese oxides form sporadic coatings and impregnations, but there is no manganese ore.

The applicants are not qualified technically to manage either the mine or the mill, and they must employ a capable supervisor before success can be expected from future operations.

RECOMMENDATION

Although these deposits merit further exploration and development, there are essentially no reserves of measured ore. Consequently, it is recommended that the request for a production loan of $30,000 be denied.

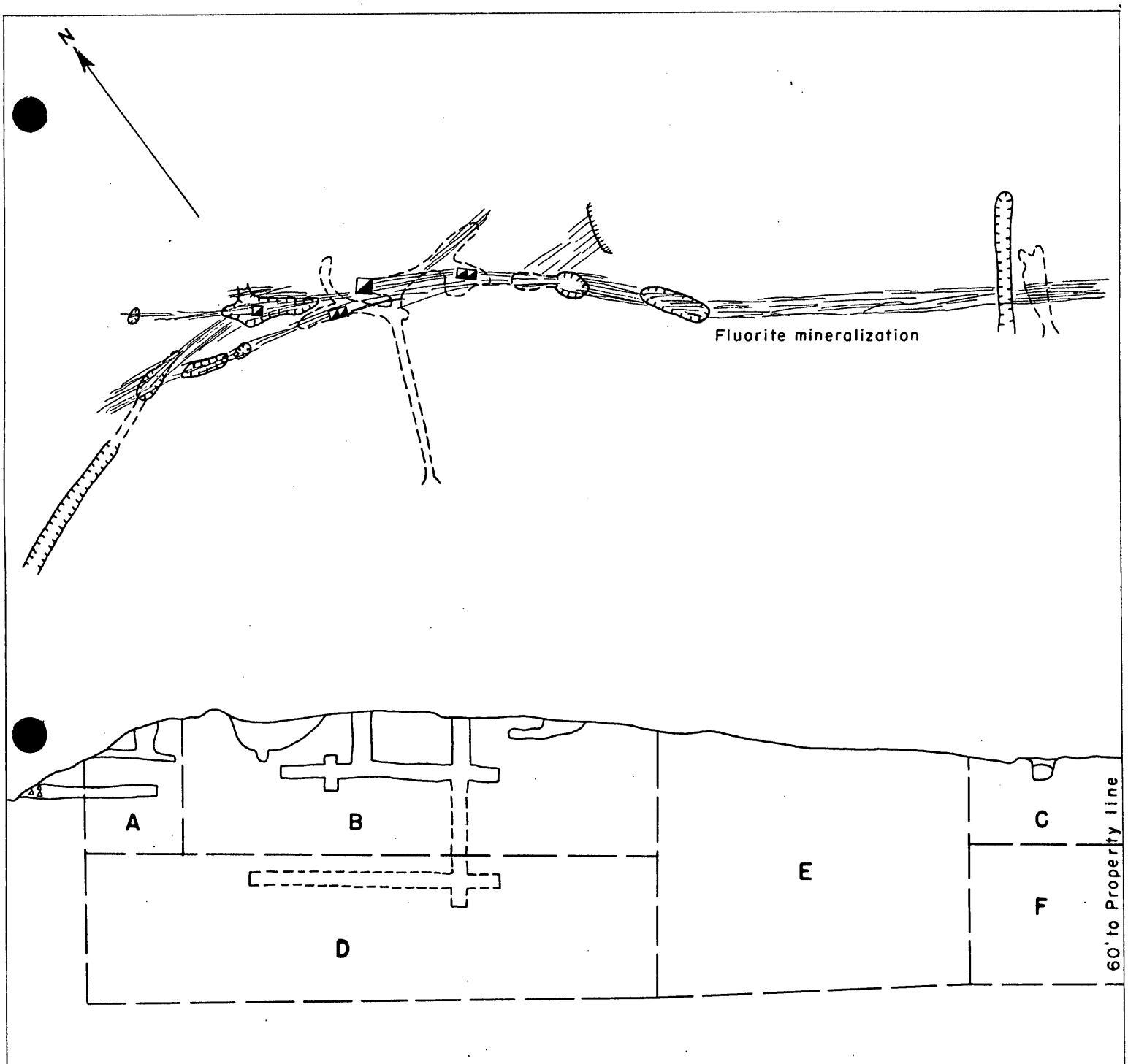

Figure 3

ORE BLOCKS

Block	Tons	%CaF_2	% SiO_2
		Indicated Ore	
A	7,005	33.8	40.8
B	27,818	26.3	48.6
C	8,250	45.8	31.7
		Inferred Ore	
D	38,468	27.8	47.1
E	40,881	38.5	41.7
F	27,272	45.8	31.7

Tonnages given above should be discounted 40% to compensate for waste between ore lenses.

Department of Interior
U.S. GEOLOGICAL SURVEY

U. S. FLUORSPAR and MANGANESE CORP.
Brown Canon, Chaffee County, Colorado
Chimney Hill Vein

SCALE
0 50 100 200 FT.

DMEA Docket 1915 December 1951

Ore zones by W. B. Meek. Mine workings after a map by C. M. Harrer, U. S. Bureau of Mines.

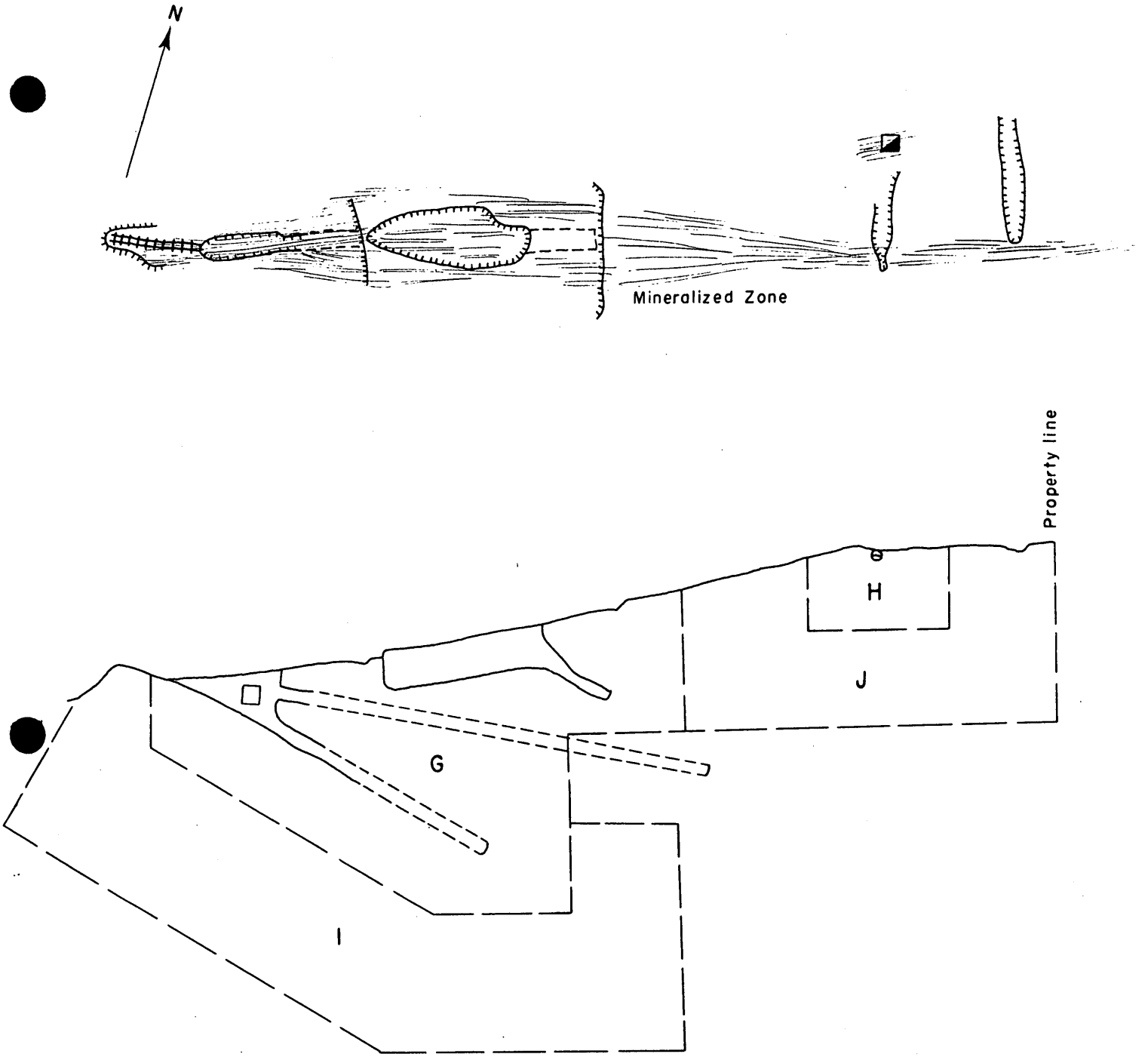

Figure 4

ORE BLOCKS

Block	Tons	% CaF_2	% SiO_2
		Indicated Ore	
G	39,595	16.6	55.9
H	2,727	10.2	55.8
		Inferred Ore	
I	41,665	16.6	55.9
J	19,886	10.0	58.5

Tonnages given above should be discounted 40% to compensate for waste between ore lenses.

Department of Interior
U.S. GEOLOGICAL SURVEY

U. S. FLUORSPAR and MANGANESE CORP.
Brown Canon, Chaffee County, Colorado
Bancroft No. I Vein

SCALE
0 50 100 200 FT.

DMEA Docket 1915 December 1951

Ore zones by W. B. Meek. Mine workings partly after a map by C. M. Harrer, U.S. Bureau of Mines.

U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

Engineering Report

By R. L. Palmer
Mining Engineer
Bureau of Mines

U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

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U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

ENGINEERING REPORT

By

R. L. Bolmer

INTRODUCTION

Field examination of the property of U. S. Fluorspar and Manganese, Inc., in Chaffee County, Colo., was completed December 5, 1951, by an engineer and metallurgist of the Bureau of Mines and a geologist of the Geological Survey. Mr. F. L. Bancroft, secretary-treasurer of the corporation, was present during the examination. The corporation has applied for a direct Defense Minerals Administration loan of $30,000.00. The purpose of the loan is for mill improvements, a laboratory and office, mining and haulage equipment, and working capital. The application is based on the premise that 30,000 tons of ore can be mined from the Chimney Hill vein by open-cut methods.

ACKNOWLEDGMENTS

The courtesy and cooperation of Mr. F. L. Bancroft, secretary-treasurer of the U. S. Fluorspar and Manganese, Inc., in showing the examiners around the property and providing former operating records for inspection is gratefully acknowledged. Acknowledgment is also made to W. B. Meek, geologist, U. S. Geological Survey, and A. T. Sweet, metallurgist, U. S. Bureau of Mines, for their cooperation

and assistance in preparing this report. Former reports on this property by Bureau of Mines and Geological Survey personnel and others were referred to in the preparation of the report. The map and sections in figure 2 were, for the most part, taken from a report by C. M. Harrer, U. S. Bureau of Mines, made in January 1950. Sampling records from Harrer's report and from H. W. C. Prommel, U. S. Bureau of Mines, in 1943, were drawn upon in the compilation of ore reserves.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The area under development is in sec. 28, T. 51 N., R. 8 E., N. M. P. M., in the Browns Canyon district, Chaffee County, Colo. (fig. 1), approximately 10 miles northwest of Salida in the Arkansas River Valley. U. S. Highway 285, a surfaced, all-weather road from Denver to Salida Junction, passes through the property. The mine and mill are about one-half mile east of this highway via County Highway 60 and a private company road. The property is covered sparsely by timber. The 20 acres under development are low and hilly and readily accessible at all times. The altitude of the mine and mill is approximately 7,600 feet. The climate is mild and the average snowfall light, making year-around operations possible. Sufficient water is available in Three Mile Creek, a permanent stream passing through the property. Electric power from local Rural Electrification Association lines

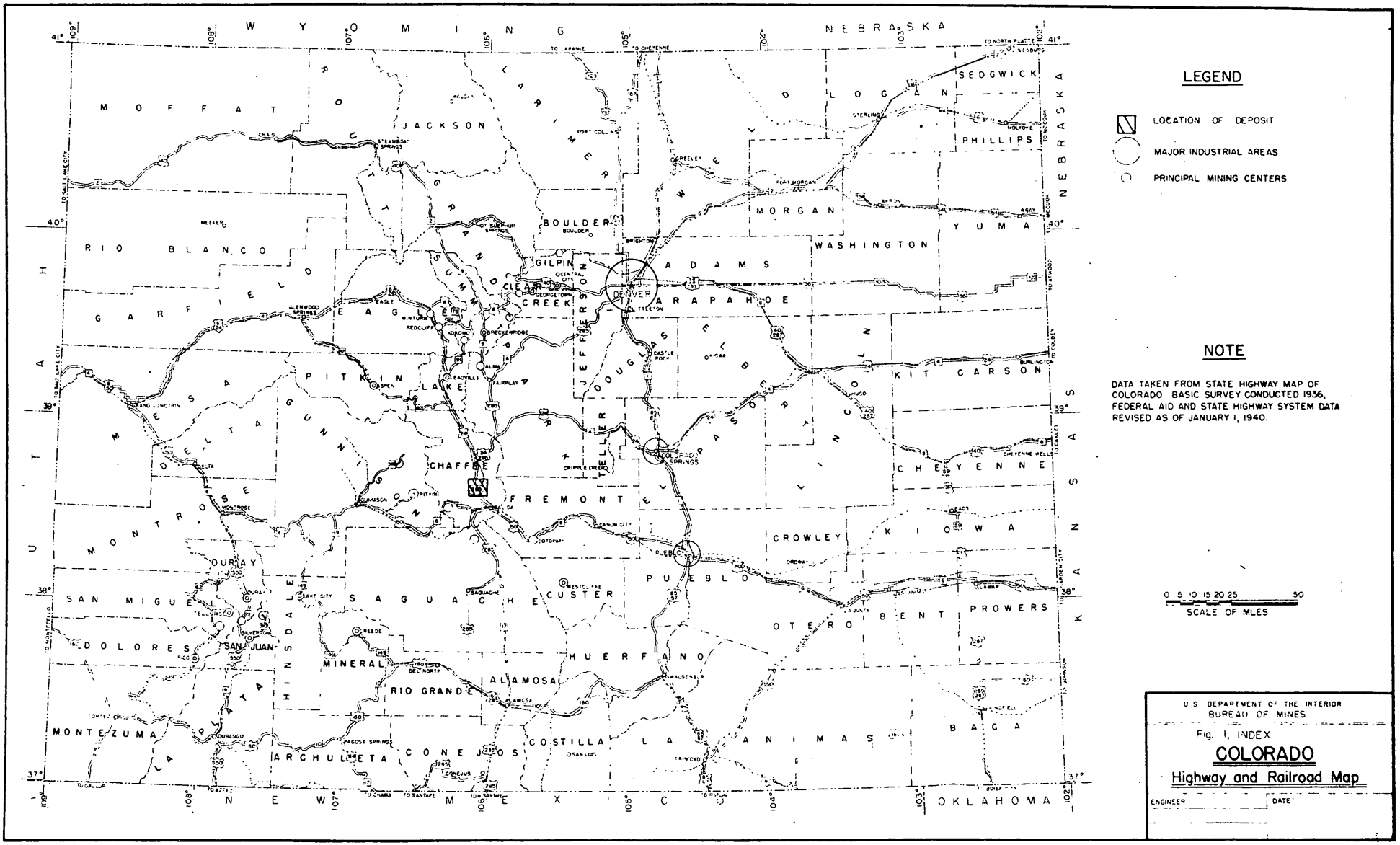


FIG. 1 LOCATION MAP U. S. FLUORSPAR & MANGANESE INC. CHAFFEE CO., COLO. DMA 1915

is available on the property. General mining supplies are obtained in Salida or in Denver, 146 miles distant on U. S. Highway 285 and 215 miles distant by rail from Salida. The nearest shipping point is Browns Canyon, a siding on the main line of the Denver and Rio Grande Western Railroad, 4 miles by road from the mill.

HISTORY AND PRODUCTION

The Browns Canyon district, a triangular-shaped area of about 5 square miles, has produced since 1929 approximately 135,000 tons of fluorspar averaging 30 to 50 percent CaF_2. During the four war years, 1942-45, production was 80,000 tons. The district has no production at the present time. The southern and most productive area of the district was acquired recently by the Allied Chemical Corporation and the mines and mills on their property closed. The northern portion of the district is held by Commercial Minerals, Inc., of Salida, whose present activity is confined to annual assessment work. The U. S. Fluorspar and Manganese, Inc., property comprises the western apex of the district.

The property originally was known as the Morgan ranch. Stephen Trefone and associates, of Salida, obtained an option on the property and worked the deposit intermittently in a crude and unsystematic manner. The development consisted of two shafts, 50 and 100 feet deep, three short tunnels, and a few hand dug pits in the Chimney Hill section. Some fluorspar was shipped but all records were lost.

In 1939 an option on the property was sold to the Chaffee County Fluorspar Corporation who developed the Manganese Hill area by means of bulldozer stripping and by driving an incline. The system of mining was gophering for metallurgical spar; broken rock was screened over a 1-1/2-inch grizzly and sorted. From ore saved in driving the incline and from selective mining in old workings, seven carloads of metallurgical spar were hand sorted and shipped to the Colorado Fuel and Iron Corporation, Pueblo, in 1943. These shipments varied between 85 and 96 percent CaF_2 and contained as high as 9 percent silica. During this same period 1,343 tons of screening and sorting rejects averaging 26 percent CaF_2 were shipped to the mill of the nearby Kramer Mines, Inc. The company purchased a mill in 1943 and moved it to the property but work on it was suspended when only the building and foundations were complete.

In 1945, the Chaffee County Fluorspar Corporation was in bankruptcy and the U. S. Fluorspar, Inc., was organized to purchase its assets. The new organization completed a flotation mill on the property but only operated it spasmodically. Incomplete records for 1946 show 196 tons of bulk CaF_2 concentrates (probably hand sorted) were shipped as metallurgical spar and 288 tons bagged CaF_2 concentrates (probably milled) were shipped as ceramic spar. In 1950, the affairs of the U. S. Fluorspar, Inc., were in bankruptcy and the present U. S. Fluorspar and Manganese, Inc., was organized and purchased the assets of the former companies. The active officer of the present

corporation, P. L. Bancroft, was president of both the Chaffee County Fluorspar Corporation and the U. S. Fluorspar, Inc., organizations.

It is estimated that the total production of fluorspar from this property has been between 2,500 and 5,000 tons of crude ore.

OWNERSHIP AND EXTENT

The assets of the bankrupt companies included 558 acres of patented land located in secs. 21, 22, 28, and 29, T. 51 N., R. 8 E., N. M. P. M. The purchase price of $125,000.00 paid by the present organization included this land as well as the mining and milling equipment, mill buildings, a frame house on U. S. Highway 285, and also water rights on Three Mile Creek. The property is continuous and extends both east and west of the highway. The area with exposed fluorspar mineralization containing the mine development and the mill site is within the SW. 1/4 NW. 1/4 of sec. 28.

DESCRIPTION OF THE DEPOSITS

Two distinct zones of fluorspar mineralization occur near the property's eastern boundary. Geologically the two may be related; however, present development has not shown interconnection. They are referred to as Chimney Hill (also Spar or Blowout Hill) and Manganese Hill (also Bancroft No. 1 vein). The zone on Manganese Hill is an extension of a fluorspar zone which can be traced eastward for more than a mile across the Commercial Minerals' property. Many stringers and pods of high-grade spar have been exposed in this direction. The

Chimney Hill zone is on a general projection of a more continuous and productive vein towards the southeast. Its actual relationship to this productive vein, however, is controversial.

Fluorspar mineralization can be traced intermittently on the surface of Chimney Hill from the eastern property line for 800 feet. Beyond this distance, shallow trenches in the alluvium cover have disclosed no mineralization. The zone trends N. 45° W. and is nearly vertical. Locally individual stringers or veinlets may strike in any direction and vary from flat to vertical in short distances. The zone was observed to a depth of 60 feet below the hill top. Openings below this depth were flooded. A lower level at a depth of 100 feet below the surface and a shaft to a depth of 130 feet were reported. The zone of mineralization was observed as wide as 20 feet on the surface and small veinlets might extend even farther; however, the average width of mineralization was 9 to 15 feet.

Fluorite and silica were deposited in a shear and brecciated zone which served as channels for the ascending solutions. Mineralization for the most part was confined to these channels but in places has replaced the rhyolite or granite wall rock. Some post-mineralization movement has occurred. The lengths, widths, and continuity of the veinlets in the zone thus are variable.

The fluorspar is fine-grained to microgranular. It forms veins ranging from a fraction of an inch to solid masses more than a foot thick. Botryoidal masses are found grouped around

cores of country rock. The color varies from colorless to white, green, purple, and brown and it is frequently banded in appearance. Silica is associated with the fluorspar in the forms of chert or chalcedony. It is intergrown with fine-grained fluorspar and there are gradations between soft, pure fluorspar and hard chalcedony. Silica inclusions, -400 to +1600 mesh, are present in fluorite grains and fine grinding is necessary for maximum liberation. Many fluorite grains and much of the gangue material have coatings of iron oxide and clay.

Lenses of fluorspar 20 to 70 feet in length and up to 8 feet in width were mined from Chimney Hill. Walls of lenses grade into altered rhyolite with various degrees of silicification. Areas between lenses grade into low-grade fluorspar to altered and silicified rhyolite. Lenses pinch out vertically and horizontally to widths of a few inches or less and continuity between lenses, if present, is difficult to trace. The zone contains fluorspar over a considerable area but it is relatively sparsely distributed. It is doubtful that a definite mill feed, either in grade or tonnage, could be maintained by selective underground mining.

The lenses of fluorspar mined from the developed sections of Chimney Hill to the accessible depth of 60 feet did not exceed 25 percent of the zone. These lenses probably represented the higher grade fluorspar in the zone (30-60 percent CaF_2) which was screened and up-graded by sorting to metallurgical spar.

An estimated additional 35 percent of the zone probably runs 15 to 30 percent CaF_2. Thus, 60 percent of the zone carrying 15 to 60 percent CaF_2 is estimated as minable by underground methods. The zone as a unit could be mined by open-cut methods to a depth of about 60 feet or the water level. A greater width than by underground methods could be taken but the dilution would be considerable, probably to 20 percent CaF_2. The wall rock within the zone for the most part is silicified and hard. Underground openings would stand short periods unsupported but haulage levels and shafts would require timbering. Open stoping underground would require stull timbering at irregular intervals and lean or barren areas might be left as pillars. Shrinkage methods probably would be unsuitable due to irregularities of the ore in the zone and, if employed, dilution would be high.

The fluorspar zone on Manganese Hill can be traced intermittently southwest from the east property line nearly 600 feet after which the surface is covered by alluvium. The zone trends S. 72° W. and is nearly vertical. Mineralization is deposited in a sheeted zone which in places along the surface has been exposed to widths of 30 feet or more; however, mineralization is more intense 8 to 12 feet through the center of the zone. The depth as exposed by accessible workings is 65 feet below the surface. A lower level, at present caved and inaccessible, was reported which may indicate an explored depth of 130 to 150 feet below the surface.

The brecciated zone occurs in a coarse-grained granite which has been highly altered and veinlets of fluorspar as well as botryoidal masses of fluorspar extend into it for considerable distances, making screening, washing, and milling imperative for large scale operations. Near the surface the altered granite is loose and sandy and would not stand unsupported. The lower level was reported as not timbered and has caved. It was reported that the granite and fluorspar were harder and less fractured at greater depths below the surface.

Open vugs and water courses are common along the veins of this zone on the adjoining property. Some have been partly filled with manganese oxide. Trenches on Manganese Hill near the property line expose some manganese oxide-bearing rock. A small quantity of similiar material had been sorted and was piled on the dump of the incline. This material reportedly was taken from a vein exposed on the lower level off the incline which is now caved. The manganese vein was reported parallel to the fluorspar zone mined near the end of this level.

MINABLE ORE RESERVES

In this type of deposit, a mineralized zone containing erratic lense-type enrichments, extensive development is required before ore can be measured within safe limits. Lenses in such a deposit can not be projected more than a few feet beyond an exposure and even the mineralized zone requires closely spaced exposures for reasonable assurance of continuity. The development of both areas was erratic and for the most part the underground

development that was performed and would be critical in the measurement of ore reserves was inaccessible. There was no attempt to block out ore ahead of actual mining.

The continuity of veins was established only to a minor degree by workings in the Chimney Hill zone. Fluorspar mineralization was observed underground mostly as isolated patches left in mining or as veinlets crossing through existing development. Sampling many of these exposures was impractical as dimensions could not be assigned. The patches of fluorspar were of very limited extent and many of the veins penetrated the walls and could not be projected to other workings or to the surface.

Because the sites available for inspection, measurement, and sampling were too widely or otherwise inappropriately spaced to outline the ore completely or to establish its grade throughout, measured ore is not considered present in the Chimney Hill zone. Because of the inaccessible underground workings and the widely spaced and shallow surface development, like reasoning must be applied to the Manganese Hill zone. Both zones do contain a tonnage of indicated ore, the amount and grade of which is based upon observation, the widely spaced sampling (sample location and analyses are shown on figure 2), the reported lower workings, and past production from the deposit. Inferred ore based on geologic assumptions exists also. The areas assigned as indicated and inferred ore are shown on the sections on figure 2. Table 1 summarizes the tonnages of indicated and inferred ore calculated for the two zones on the property.

TABLE 1. - Ore reserves

	Indicated		Inferred		Total	
	Tons	%CaF_2	Tons	%CaF_2	Tons	%CaF_2
Chimney Hill	44,193	31.7	105,491	37.2	149,684	35.5
Manganese Hill	40,085	16.0	63,265	14.2	103,350	14.9
Total	84,278	24.2	168,756	28.5	253,034	27.1

For the most part the openings underground in Chimney Hill or on the surface that were accessible for sampling were driven on the higher- or medium-grade lenses. Surface cuts which would expose the zone as it occurs between the lenses, the leaner or barren sections of the zone, have not been made or have been covered over. Therefore, an adjustment should be made in the total of 150,000 tons of indicated and inferred reserves from this zone averaging 35.5 percent CaF_2. It is estimated from the amount mined from Chimney Hill and from other observations that this grade is representative of about 60 percent of the zone. In mining the zone as a whole, such as by surface methods, a grade of about 21.3 percent CaF_2 could be expected. The higher grade might be maintained by selective underground mining but at a reduction in tonnage to about 90,000 tons.

In table 2, the indicated and inferred reserves from both zones which are minable by surface methods are summarized. The Chimney Hill zone is considered minable by this method to the water level which varies from 60 to 30 feet below the surface. Mining the entire zone to a width of 9 to 15 feet would reduce

the calculated grade of 34.2 percent CaF_2 to about 20.5 percent. This would be considered a suitable mill feed but probably could be improved by preliminary washing. The wall rock in this zone is considered sufficiently hard to stand vertically to this depth without appreciable sluffing and dilution of the ore. The indicated and inferred tonnages below the water level must be mined by underground methods, probably by means of vertical shafts.

TABLE 2. - Reserves minable by surface methods

	Indicated		Inferred		Total	
	Tons	%CaF_2	Tons	%CaF_2	Tons	%CaF_2
Chimney Hill	22,608	31.2	11,961	40.0	34,569	34.2
Manganese Hill	20,183	13.0	13,758	12.0	33,941	12.6
Total	42,791	22.6	25,719	25.0	68,510	23.5

The Manganese Hill zone could be stripped to a depth of about 60 feet below the surface. About 34,000 tons are indicated or inferred to this depth at widths of 6 to 20 feet and averaging 12.6 percent CaF_2. The surface here, however, is weathered and soft and vertical walls would be impossible to maintain. A side slope of 60° might be necessary to reach a 60-foot depth and dilutions of 175 to 575 percent through the various widths mined could be expected. Even with the diluting rock running 2 percent CaF_2, a combined grade of over 7 percent CaF_2 could not be expected. The barren or lean wall material might be mined separately but at an additional handling cost and an average grade maintained between 8 to 10 percent CaF_2. The

dilution will depend upon how well the wall rock will stand with depth, and, if it requires sloping, how much can be easily separated. Whether the grade of material obtainable by surface methods in this zone is economical to mine and mill depends upon the recovery and up-grading from preliminary washing and jigging operations.

The ore mined previously at greater depths was reported as higher grade and as having harder and stronger walls. It is doubtful that either will improve materially before the limits of surface mining are reached. Ore indicated and inferred below a depth of 60 feet must be extracted by underground methods through adits or vertical or inclined shafts into the hill.

PRESENT STATUS

Exploration and Development

The zone through Chimney Hill was developed on the surface by about four shallow pits and four trenches, one underhand stope and one short combination inclined shaft and stope. Two short adits were driven into the western slope of the hill. The lower adit was caved; the upper terminated in a small stope open to the surface. An underground level 50 feet below the hill top contained 250 feet of drifting and crosscutting and was opened by a 135-foot adit and two vertical shafts. One shaft terminated at the level; the other extended to a reported depth of 130 feet and was timbered tightly to a depth of 60 feet at least. The water level in the deeper shaft and in a short winze below the level was within 10 feet of the level or 60 feet below the surface. A second level

100 feet below the surface and containing 150 feet of drifting was reported driven from the deeper shaft.

The zone through Manganese Hill was developed by bulldozer stripping and inclines driven northwesterly into the hill. Two inclines driven from the same portal, but at slightly different bearing and different grade, were reported; however, caving prevented examination of these for the most part. The remains of what was reportedly a 210-foot incline sloping 10° was accessible for 70 feet. According to old maps, this incline followed the northern edge of the zone but at depth was swung to the south into the center of the zone. The old maps also show a level drift 85 feet in length off this incline towards the portal. This level, 60 feet below the surface, paralleled the incline but was below and slightly south of it in the central part of the zone. Some stoping above this drift into the incline was indicated. The material mined from the open pit shown on the section probably was glory-holed into the incline through stopes and raises along its lower portion. A second incline beginning 25 feet inside the portal of the first was reported driven at 25° and more in the center of the mineralized zone. It was caved and inaccessible but was reported to be at least 150 feet in length and probably passed through the level off the first incline. Drifting in both directions from near the bottom of the steeper incline was reported but its extent is unknown. Water was reported from these lower workings.

The area extending from the portal to the northeastern limit of the open pit probably was developed in part to the

depth of the steeper incline and the high grade lenses, stringers, and veinlets above were stoped. The size of the pit and the depth below the surface to which it has caved indicate a considerable volume has been removed from below.

All features of the two deposits described above are shown on figure 2.

Mining and Milling Equipment and Other Facilities

The buildings or structures listed below were located on the property in the vicinity of the developed sections on Chimney and Manganese Hills. Their condition unless otherwise noted is good.

36 ft. x 106 ft.	Mill building. Step-up construction, frame supports, wood sheathing, tar paper sides and roof, concrete floors and foundations.
12 ft. x 18 ft.	Explosive house. Wooden. (needs repair)
32 ft. x 12 ft.	Laboratory, foreman's office. Wooden. (needs repair)
10 ft. x 10 ft.	Blacksmith shop. Metal. (needs repair)
12 ft. x 18 ft.	Compressor house. Metal.
15 ft. x 18 ft.	Pump house. Metal.
10 ft. x 24 ft.	Mill boiler house. Wooden.
12 ft. x 12 ft. x 10 ft.	Ore bin. Wooden, v-bottom.
6 ft. x 6 ft. x 12 ft.	Ore chute. Wooden.
12 ft. x 12 ft.	Tool shed. Wooden. (needs repair)
20-ton capacity	Loading bin and chute. Wooden.

In addition, a 5-room frame house, presently occupied by the caretaker and his family, is located on the property adjacent

to U. S. Highway 285. A loading ramp located at the Browns Canyon siding was reported as owned by the company.

The following major items of equipment applicable to a mining operation were observed in the buildings or on the ground in the area. Equipment on the property applicable to a mill and to a milling operation is discussed in the metallurgical report.

Gardner-Denver WBG 7 x 5-3/4 x 5 air compressor. Stationary, water-cooled. Belt driven by 40 hp., 440-volt, 3-phase, 60-cycle motor. Complete with starting compensator and switches. (good condition)

Steel air receiver. 3 ft. D. x 9 ft.

2 Gardner-Denver sinkers. Light weight. (used)

2 Gardner-Denver R91 stopers. (used)

1 Gardner-Denver D79 drifter. Crank-mounted. (used)

Cylindrical-drum hoist with gears, controls, indicator, sheave, etc. 400 feet 1/2-in. wire rope. 22 hp. GE induction motor, starting compensator, and switches. (good condition)

4 End-dump mine cars. 24 in. x 48 in. x 18 in. (poor)

3 Side-dump mine cars. 1-yard. (fair)

2 1/4-ton steel hoisting buckets.

Sampson jaw crusher, approximately 6 in. x 8 in., belt-driven by 40 hp., 575 r.p.m. Allis-Chalmers electric motor.

Steel grizzly. 3 ft. x 14 ft., 1-inch spacing.

Worthington centrifugal pump. (capacity unknown) Direct connected to 1 hp., 440-volt, 3-phase, 60-cycle motor.

Water storage tank, steel, 25,000-gallon capacity. 21 ft. D. x 10 ft.

The other major items of equipment observed which would be applicable to a mining operation must be classed as junk. The replacement parts and repair work required to put them in operating condition would be uneconomical and should not be considered. In most cases, the equipment listed above could be used in lieu of the other items.

PRODUCTION PLAN AND COSTS

The applicants do not propose exploration or development work. They do propose immediate mining of 100 tons of fluorspar per day from the surface and concentrating the washed ore into acid-grade concentrates. Their ability to produce acid-grade concentrates from the grade of ore indicated and inferred on the property with the equipment available is discussed under the metallurgical report. Their ability to mine this grade ore at the proposed rate depends upon future exploration and development work to prove the existence of the ore in grade and tonnage.

If the existence of sufficient ore is established along the surface, mining could begin with only a small capital expenditure. The purchase of drill steel and bits, air and water pipe, and hose in addition to equipment already on the property would permit surface mining from either zone. These items could be purchased, the drilling equipment repaired, and power connected to the compressor for about $1,500.00. Repairs to the office and other necessary buildings should not exceed $500.00. A

bulldozer for stripping and loading and a truck for hauling crushed and washed ore to the mill could be rented, both probably for $10.00 per hour with operator and driver included.

No expense is anticipated for access roads and both power and water are available on the property. Limited labor, predominately Spanish-American, is available in the Salida area.

Two miners with one or two helpers should mine 100 tons per day from the surface. Mining costs, including labor, supplies, rentals, and power, should be from $1.50 to $1.75 per ton. The Chimney Hill zone which is harder probably would entail greater breaking costs and the overall mining costs would approach the higher figure. Manganese Hill is softer and, even with the necessity for sloping the walls, should be cheaper to mine. Underground mining is not considered at present; costs, however, probably would be triple the surface mining costs. Underground production could not reach 100 tons per day without extensive development. The grade, however, could be expected to be higher from selective mining.

The cost to rehabilitate the mill is estimated at $15,000.00. A laboratory could be established in the mill, including the cost of glassware and chemicals, for $500.00. Milling costs are estimated at $3.00 per ton and include any primary crushing and washing at the mine. Transportation of concentrates to the railroad will be about $0.40 per ton.

Supervision, including a superintendent, mine and mill foremen, and office help, should be about $1,600.00 per month, or $0.73 per ton. Payroll taxes and insurance would amount to about $0.10 per ton.

Capital Expenditures

Mining equipment	$ 1,500.00
Repairs to buildings	500.00
Mill rehabilitation	15,000.00
Laboratory	500.00
Total	$17,500.00

A loan of $30,000.00 would leave $12,500.00 for working capital after the above capital expenditures. This amount would enable the company to operate for approximately one month after which returns from the sale of concentrates should be realized.

Operating Cost Per Ton Mined

Mining	$1.75
Milling	3.00
Transportation of concentrates	.07
Taxes, insurance	.10
Supervision, office	.73
Total	$5.65

The grade of ore indicated and inferred minable by surface methods from Chimney Hill is 20.5 percent CaF_2. Production of acid-grade concentrates would require a concentration ratio of 4.73 to 1. On a basis of 80 percent overall milling recovery, 0.169 tons of concentrates would be produced from each ton mined. The present price of acid-grade spar is $60.00 f. o. b. consumer. Freight rates to midwestern markets are $11.04 to $13.59 per ton. The applicants' net return per ton of concentrates produced would be $48.96; their net return per ton mined would be $8.27. They would realize $2.62 per ton mined from the surface of Chimney Hill before taxes, repayment of the loan, and amortization of capital.

The material near the surface on Manganese Hill averages 12.6 percent CaF_2 and would require a concentration ratio of 7.7 to 1 for acid-grade spar. With the same assumptions as above, 0.1 ton of concentrates would be produced for each ton mined and the company would net $5.09. Mining costs should be $0.25 per ton less for this zone and milling costs probably would be reduced through a reduction in bulk by preliminary washing. The mining of this zone from the surface would be a marginal operation. The amount realized would depend upon how much dilution can be avoided during mining and how effective preliminary washing of the ore will be in up-grading the mill feed with a high reduction in bulk but low loss of CaF_2.

A 5 percent royalty on net smelter return, or in this case on net concentrate sales, for repayment of the loan would be $2.45 per ton of concentrates produced, or $0.41 per ton mined from Chimney Hill and $0.24 per ton mined from Manganese Hill. The net value to the company of each ton mined from Chimney Hill thus would be $2.21. For the repayment to the Government of a $30,000.00 loan, 73,000 tons of ore averaging 20.5 percent CaF_2 or 125,000 tons of ore averaging 12.6 percent CaF_2 must be mined. The deposit may contain these tonnages or more but, in its present status, the tonnages must be classed partly as indicated but mostly as inferred ore. It does not contain developed or measurable ore.

PROPOSED FINANCING

The applicants apparently are unable to commence operations without financial aid. They state that private sources are uninterested in financing a mining operation on their property. This may be true and probably is due in part to the financial difficulties and management of former operations. It is believed, however, that the land and facilities owned by the company should be sufficient security to a private lender for at least a larger portion of the amount requested. It is not known whether the applicant company would be able to participate on a matching basis for a Government exploration loan.

CONCLUSIONS

A.

It is concluded that a loan to U. S. Fluorspar and Manganese, Inc., in the amount of $30,000.00 would be ample for the following proposals made by the company but not in the proportions designated in their application:

1. The rehabilitation of their mill to produce fluorspar concentrates,
2. The purchase or rental of supplemental mining equipment for the anticipated daily production,
3. Working capital until concentrate sales could be realized.

B.

It is concluded also that the anticipated mining rate of 100 tons daily is technically feasible by surface methods, that estimated production costs indicate a profitable but marginal operation at this rate under present market conditions,

that the labor, water, and power supplies are ample for this rate, and that the property is accessible, close to a shipping point, and has a favorable climate.

C.

It is concluded further that a sufficient tonnage of fluorspar in measurable quantities to supply the mill at the anticipated rate can not be proven by the present mine exploration or development and that the request of a loan for or because of items under A. and B. above is premature until the existence of such tonnage can be proven and is measurable in quantity and mineral content.

D.

It is concluded from the past history of the property that the financial difficulties of its previous operators have been due in a great part to poor and inexperienced management. Because the active officer of the applicant company also headed both the former operating organizations, improvements in the property's management can not be anticipated.

E.

It is concluded that the fluorspar deposits on this property merit exploration based upon standard engineering principles and that there is reasonable assurance such explora- might disclose sufficient tonnage of milling-grade ore to justify the rehabilitation of the mill and other facilities for production.

RECOMMENDATIONS

It is recommended that a production loan in the amount of $30,000.00 to U. S. Fluorspar and Manganese, Inc., for the purpose of rehabilitating its mining and milling facilities and providing working capital for the production of fluorspar concentrates be denied on the basis of insufficient measurable ore reserves.

U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

Metallurgical Report

By A. T. Smogt
Metallurgist
Bureau of Mines

U. S. FLUORSPAR AND MANGANESE, INC.
CHAFFEE COUNTY, COLORADO

METALLURGICAL REPORT

By

A. T. Sweet

This report summarizes testing of metallurgical samples submitted by R. L. Bolmer, Colorado Branch, Mining Division, and A. T. Sweet, metallurgist, from the property of the U. S. Fluorspar and Manganese, Inc., Chaffee County, Colo.

Washing tests and screen analyses on a composite of samples 5 and 5A, and a number of flotation tests on a weighted composite of samples 4, 8, 10, and 11 were conducted at the Salt Lake Experiment Station. The results are discussed under separate headings as reported by C. H. Schack.

Composite of Samples 5 and 5A

A large composite sample was made by mixing samples 5 and 5A. The composite was crushed to 1 inch and tumbled with water in a large mill without balls for one-half hour. The washed ore was then screen sized with the following results:

Size Fraction	Weight, Percent	Assay, Percent CaF_2	Distribution, Percent CaF_2
+1/2-inch	18.8	8.1	34.3
+4-mesh	19.9	5.8	26.1
+10-mesh	21.5	2.2	10.7
+20-mesh	13.3	2.2	6.6
+48-mesh	11.6	2.1	5.5
+100-mesh	5.2	4.0	4.8
+200-mesh	2.8	7.4	4.8
-200-mesh	6.9	4.7	7.2
Calculated head	100.0	4.4	100.0

As indicated by the data, there is some enrichment of the coarsest fraction of the ore. About 60 percent of the fluorite can be recovered in the plus 4-mesh fractions as a product assaying 6.9 percent CaF_2. However, in our judgment, the enrichment and recovery are too low to have practical significance.

Composite of Samples 4, 8, 10, and 11

This weighed composite sample assayed 23.1 percent CaF_2 and we made a series of tests on the composite sample endeavoring to produce an acid-grade concentrate by flotation methods. Samples were ground to minus 48-, 100-, 150-, and 200-mesh. The fluorite was floated and cleaned after boiling the pulp with reagents. We also tried a test wherein the ore pulp was deslimed prior to boiling and flotation because the finely ground ore contains an abundance of colloidal material that we found extremely difficult to thicken and filter. None of the tests were successful in producing an acid-grade product. The best results were obtained by grinding the ore through 100-mesh, boiling the pulp with 10 pounds Na_2CO_3, 1.5 pounds sodium silicate, and 2 pounds oleic acid per ton of ore. The results of this test are given in the following table:

Product	Weight, Percent	Assay, Percent CaF_2	Distribution, Percent CaF_2
Final concentrate	19.2	96.9	83.3
Third cleaner tailing	.5	78.6	1.7
Second cleaner tailing	1.0	64.1	2.9
First cleaner tailing	5.4	23.9	5.8
Rougher tailing	73.9	1.9	6.3
Calculated heads	100.0	22.3	100.0

A high recovery of the fluorite was made in a product assaying 96.9 percent CaF_2 by using the boiling procedure in making the rougher float and then cleaning the concentrate three times. The rougher tailing product proved very difficult to thicken and filter because of the presence of colloidal gangue in the ore pulp which had to be kept dispersed with sodium carbonate to permit flotation of the fluorite.

A microscopic study of the final flotation concentrate revealed that it contained quartz as minute grains 400- to 800-mesh in size locked with fluorite. This fact coupled with the poor selectivity obtained in the third cleaning stage indicates further cleaning of the final concentrate would not reject additional gangue and thus produce a product meeting acid-grade specifications.

From the results of our testing, we conclude that ore represented by the composite of samples 5 and 5A cannot be effectively washed and screened to make a suitable flotation mill feed. Further, ore represented by a composite of samples 4, 8, 10, and 11 cannot be concentrated by flotation methods to acid grade even when fine grinding and multiple cleaning stages are employed. The principal difficulty of concentrating the ore to acid grade is caused by a very intimate association of quartz with fluorite preventing liberation, and to the presence in the ore of considerable colloidal rock decomposition products that will cause troubles in thickening and filtering the flotation tailings.

THE MILL

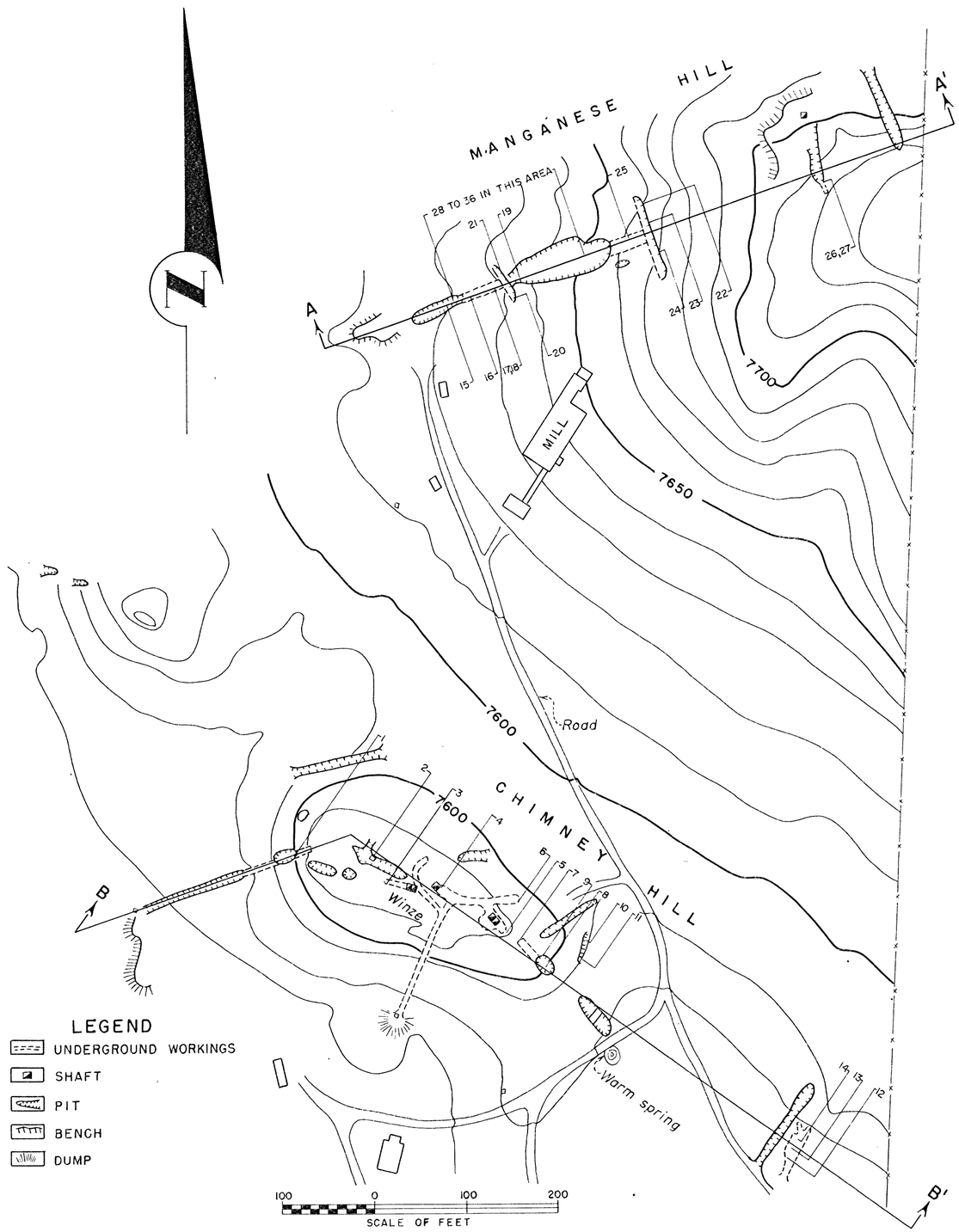
A 100-ton capacity flotation mill is on the property. This can easily be increased to 150 tons. The mill, recently leased to one of the nearby producers, was returned to the owners in some disrepair.

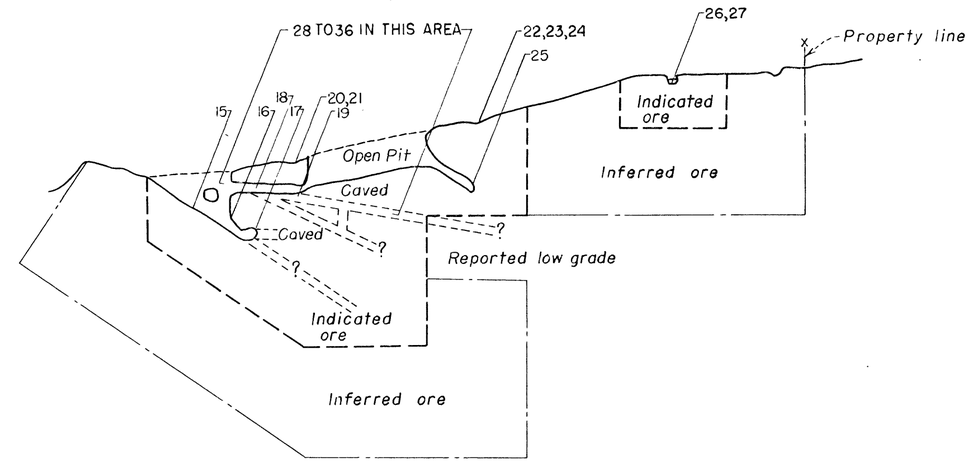
The ore from the mill storage bins is fed through a 10-foot by 16-foot Blake primary crusher and ground in a 6-foot by 8-foot Marcy in closed circuit with a 3-foot Akins classifier. This unit should be reset to eliminate a bucket elevator now in the circuit. A 5-foot Denver Equipment Company conditioner is followed by two banks of Denver Equipment Company flot cells and one unit of three cells of Fagergren (93) flot cells. From a 12-foot Dorr thickener, the pulp goes to a home-made drum filter which will have to be replaced. The flot cells have been left in bad condition and the Fagergren units should be replaced. Much of the piping throughout the mill has been cut and damaged and will have to be replaced.

A 4-foot by 30-foot rotary dryer fired with a No. 3 Denver Equipment Company burner appears to be operative and the conveying system to product bins is adequate but should be protected against dust loss.

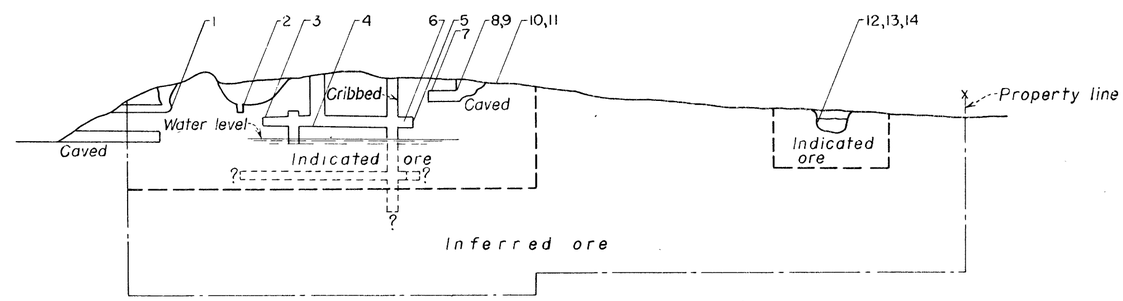
The building is in fair condition and the necessary repairs and additions can be made in a few weeks with about $15,000.00 expenditure.

The mill is located 9 miles north of Salida with adequate tailings disposal. Water is available. The property is said to cover 490 acres and a ranch-type house, a tool shed, transformer house, laboratory, and shop belong to the company.





MANGANESE HILL - SECTION A-A'



CHIMNEY HILL - SECTION B-B'

Sample No.	Width Feet	ASSAY %						Sample No.	Width Feet	ASSAY %					
		CaF_2	$CaCO_3$	SiO_2	Al_2O_3	Insol	S.			CaF_2	$CaCO_3$	SiO_2	Al_2O_3	Insol	S.
1	10	33.8	0.7	40.8	6.0	54.0	.20	19	6	9.4	0.4	60.4	9.6	79.2	.12
2	5	35.5	0.5	44.4	5.2	55.6	.11	20	36	6.95	1.05	60.8	11.6	82.4	.03
3	4	38.3	1.05	36.0	8.0	48.8	.23	21	36	1.65	1.05	64.4	12.0	87.2	.04
4	12	28.2	0.4	46.4	7.2	61.2	.27	22	11.5	1.65	3.55	64.0	11.2	82.4	.06
5	6	24.7	0.6	53.2	5.6	64.8	.33	23	26.5	4.85	2.5	61.6	10.8	82.8	.04
6	6	31.8	0.6	49.2	4.8	57.6	.16	24	28	8.2	1.25	61.6	9.6	80.8	.04
7	8.5	47.0	0.55	33.6	5.2	42.4	.11	25	12	12.0	0.6	60.4	7.6	74.8	.17
8	8.6	4.3	1.95	56.4	14.0	80.0	.07	26	6	14.6	1.05	58.0	9.6	69.2	.05
9	10	18.2	1.05	61.6	6.4	73.6	.03	27	6	5.7	2.5	53.6	13.6	69.2	.12
10	11	1.95	15.35	58.0	8.8	75.6	.08	28	8	29.2	1.05	43.6	—	—	—
11	10.5	3.2	1.95	62.8	13.2	84.4	.27	29	6.7	40.3	1.05	36.4	—	—	—
12	5	42.9	0.4	34.0	6.0	46.4	.21	30	5	17.65	NIL	56.8	—	—	—
13	5	60.3	0.6	20.0	3.6	27.2	.37	31	4.7	6.1	0.7	55.2	—	—	—
14	5	34.3	0.4	41.2	5.2	56.8	.27	32	4.2	5.85	0.35	62.8	—	—	—
15	9	34.3	0.8	42.4	6.8	54.0	.11	33	7	6.4	1.05	59.2	—	—	—
16	7	35.8	0.9	41.6	6.4	53.2	.10	34	7	37.65	1.25	36.4	—	—	—
17	10	15.7	0.55	59.2	9.6	74.0	.06	35	5	17.5	0.7	57.6	—	—	—
18	7	52	0.3	61.2	12.4	85.6	.30	36	5.3	11.1	0.55	60.0	—	—	—

COLORADO BRANCH-MINING DIVISION-REGION IV
BUREAU OF MINES

FIG. 2- PLAN & SECTIONS, U.S. FLUORSPAR & MANGANESE INC., CHAFFEE CO., COLO. DMA 1915