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

[illegible], New Customhouse
Denver 2, Colorado

October 17, 1951

Memorandum

To: Executive Secretary, Defense Minerals Administration

From: DMA Field Team, Region IV

Subject: Final Report, DMA Docket 1137, H. E. McCrey, applicant, Greenleaf, Lucky, Valley, Howard, and Huerfano Fluorspar Properties, Cooks Peak (Fluorite Ridge) Mining District, Luna County, N. Mexico

Enclosed herewith are the original and two copies of the report on the subject docket.

We concur with the conclusions and recommendations of the examining team that the development loan of $513,100 be denied.

The brochure is enclosed.

J. H. East, Jr.

Per A. H. Koschmann

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

Mining Division
Region IV

October 12, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report - DMA Docket 1137, H. E. Mc Cray, applicant; Greenleaf, Lucky, Valley, Howard, and Huerfano Fluorspar Properties, Cooks Peak (Fluorite Ridge) Mining District, Luna County, N. Mexico.

The application is for a production loan amounting to $513,100 for the purpose of development on the Greenleaf No. 1, Lucky, Valley, Howard and Huerfano fluorspar deposits and constructing, milling and other facilities.

The engineer estimates ore reserves of 30,000 tons, including indicated and inferred ore containing 65 to 70 per cent CaF_2. The net value of the ore with an estimated profit of $3.50 per ton would be $105,000. Therefore it is concluded that ore reserves are inadequate to guarantee amortization of the loan from profits.

It is recommended that the production loan be denied. However geological conditions are favorable for discovering a greater tonnage at several locations and exploration should be considered favorable if the operator is willing and financially able to match funds. The chances of discovering a considerable tonnage of lower grade fluorspar are good and then exploration should be considered favorably if metallurgical tests indicate they can be beneficiated profitably.

P. T. Alls[redacted]

Enclosure

Arizona-New Mexico Branch
SOUTHWEST EXPERIMENT STATION
Box 4097
UNIVERSITY STATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
MINING DIVISION
REGION IV

Mining Division
Date Rec'd.
OCT 12 1951
BUREAU OF MINES
TUCSON, ARIZONA

Denver, Colorado
October 9, 1951

Memorandum

To : Paul T. Allsman, Denver, Colorado

From : Chief, Arizona-New Mexico Br., Mining Div., Region IV

Subject : Final Report, DMA Docket 1137, H. E. McCray's Greenleaf, Lucky, Valley, Howard, and Huerfano Fluorspar Properties, Cooks Peak (Fluorite Ridge) Mining District, Luna County, N. Mex.

Enclosed are original and 7 copies of the above report by L. L. Farnham of the Bureau of Mines. As Elliot Gillerman of the Geological Survey, who was supposed to co-operate with Farnham on this examination, was sick when Farnham arrived at the property, no separate geological report will be submitted.

Because of insufficient ore reserves, Farnham has recommended that the production loan be denied. However, he recommends that an exploration loan be given consideration, if the applicant should apply for one.

I concur with Farnham's recommendations.

Brochure is enclosed.

Walter R. Storms

Walter R. Storms

CC P. T. Allsman
C. A. Anderson
DMA-1137
DF

FOR VICTORY
BUY UNITED STATES SAVINGS BONDS AND STAMPS

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

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMA-1137, H. A. McCray's Greenleaf, Lucky, Valley, Howard, and Huerfano Fluorspar Properties Cooks Peak (Fluorite Ridge) Mining District Luna County, New Mexico

L. L. Farnham, Mining Engineer
U. S. Bureau of Mines

October 1951

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By L. L. Farnham 1/

In May 1951, H. E. McCray applied to the Defense Minerals Administration for a production loan amounting to $513,100. This application was docketed as DMA-1137. The funds requested were to be used for the rehabilitation, equipment, and the further development of 5 fluorite properties known as the Greenleaf No. 1, Lucky, Valley, Howard and Huerfano. It also was proposed to erect a sink-float plant for the treatment of the fluorspar ores that would be produced from these and other properties in the vicinity.

The mines are located about 13 miles north of Deming in the Fluorite Ridge area of Luna County, New Mexico. For the past 20 years the district has been a rather important source of high-grade fluorspar ore.

The prinicipal deposits are found within a comparatively narrow belt extending for several miles in a northwesterly direction. Fluorite has been deposited in the faults and fracture zone in both the sedimentary and younger intrusive rocks. The mineable ore bodies of the higher grade deposits vary greatly in size and shape, ranging from narrow crooked veins to short pods and overlapping lenses which pinch and swell abruptly. In the undeveloped low-grade deposits the crystalline fluorite occurs in a network of narrow veinlets and small lenses within areas of intense brecciation.

1/ Mining Engineer, Bureau of Mines

The Greenleaf mine has been the principal producer and is the deepest in the district. There the extremely irregular ore bodies are localized in a major zone of shearing. Within this brecciated area, ranging in width from 20 to 70 feet, 5 or more nearly parallel overlapping fractures have been productive over a length of some 400 feet. Based on the production from the lower levels, the estimated ore reserves for the downward extension of the Greenleaf deposit amount to 10,000 tons of indicated and 13,000 tons of inferred ore. An additional 5,000 tons was inferred as existing in the upper undeveloped areas, so the total reserves of the Greenleaf are of the order of 30,000 tons, containing between 65 and 70 percent CaF_2. The difference between the average value of the ore and the estimated production costs showed a profit of $3.50 a ton, or $105,000 as the net value of the reserves.

No profitable fluorspar reserves were apparent in the other deposits.

As the estimated ore reserves of the Greenleaf are insufficient to justify the requested loan it is recommended that the application for a production loan be denied.

However, it appears that the Greenleaf would warrant further exploration and the potentialities of the Howard and Huerfano prospects would be worthy of additional exploration if a means was found to concentrate the fluorite in these lower grade deposits.

Therefore, it is recommended that if an application is made for an exploration loan that it be given consideration.

DMA-1137, H. E. McCRAY'S GREENLEAF, LUCKY, VALLEY,
HOWARD, AND HUERFANO FLUORSPAR PROPERTIES
COOKS PEAK (FLUORITE RIDGE) MINING DISTRICT
LUNA COUNTY, NEW MEXICO

Engineering Report

By L. L. Farnham,
Mining Engineer
U. S. Bureau of Mines

October 1951

G-1137, M. E. McCray's Greenleaf, Lucky, Valley, Howard, and Huerfano Fluorspar Properties
Cooks Peak (Florida Ridge) Mining District
Luna County, New Mexico

CONTENTS

	Page
Engineering report	
Introduction	1
Acknowledgements	1
Location and physical features	1
History and production	2
Ownership and extent	3
Description of the deposits	3
Ore reserves	8
Present status	11
Mining equipment	13
Project proposals	13
Mining methods and costs	14
Milling methods and costs	16
Summary	17
Conclusions and recommendations	18

ILLUSTRATIONS

Figure		Following page
1	Location map	2
2	Greenleaf 367' level	4
3	Greenleaf 400' level	4
4	Greenleaf longitudinal section	4
5	Greenleaf cross section	4
6	Lucky mine	6
7	Valley mine	7
8	Huerfano claim map	7

INTRODUCTION

This report gives the results of the investigation of the Greenleaf, Lucky, Valley, Howard, and Huerfano fluorspar properties, made in connection with the loan application of H. E. McCray of Deming, N. Mex., to the Defense Minerals Administration. The writer visited the properties during the week of September 10, 1951.

The applicant requested a production loan of $513,100 to be used for the equipment and development of the 5 properties and the erection of a suitable heavy-media plant for the beneficiation of the fluorspar ores of the area.

ACKNOWLEDGMENTS

The writer wishes to thank H. E. McCray for his assistance during the examination. Acknowledgments also are made to the engineers and geologists of the Bureau of Mines and Geological Survey whose former work supplied much of the data used in this report.

LOCATION AND PHYSICAL FEATURES

The Greenleaf, Lucky, Valley, Howard, and Huerfano fluorspar claims are situated in the Cooks Peak mining district of Luna County, N. Mex. The properties, all within a radius of 2.5 miles from the Greenleaf, are in the so-called Fluorite Ridge area which is a part of the southwestern end of the Cooks Range. The Greenleaf group is 13 miles by road north of Deming, N. Mex. The mine is reached by traveling 1.5 miles north from Deming on U. S. Highway 266, then eastward on State Highway 26 for 6.3 miles to a branch road running

northwesterly. It is 5 miles over this branch road to the Greenleaf camp (fig. 1). The Greenleaf, Valley, and Lucky claims all lie on the level valley floor at the southeastern end of Fluorite Ridge. The Muerfano group lies well up on the southerly slope of the ridge about 2 miles northeast of the Greenleaf. The Howard property, about 2.5 miles southeast, is located in the outlying rounded hills which form the southern termination of the Cooks Range. The region is sparsely covered with desert vegetation. The altitude of the various properties ranges from 4,800 to 5,000 feet above sea level.

HISTORY AND PRODUCTION

Some production of fluorspar from the Fluorite Ridge area was made as early as 1907. Although the district since has been a rather important source of fluorspar ores, there is no authentic information as to the total production of the district, or of the individual mines. The Greenleaf started producing in 1939 and operated almost continuously until early in 1945. During that period some 30,000 tons of fluorspar is said to have been produced. Following a period of inactivity it was acquired in 1948 by M. E. McCray and since that time an additional 10,000 tons of ore have been shipped from the Greenleaf.

The total production coming from the Lucky deposit is said to have amounted to 4,000 tons.

The narrow Valley vein has been worked intermittently by lessees, and judged by the volume of the accessible stopes, has produced perhaps 1,000 tons of high-grade fluorspar ores.

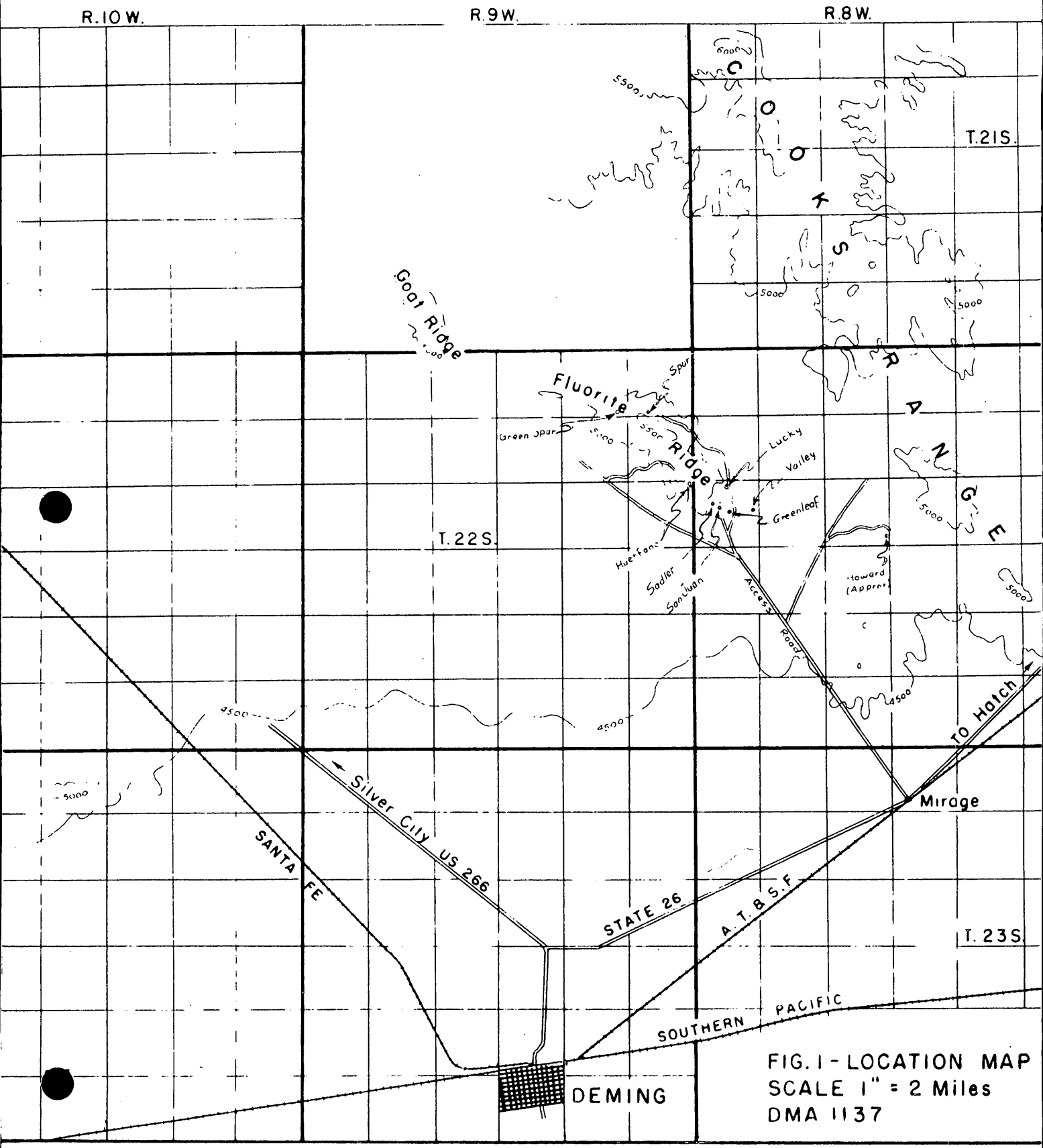


FIG. 1 - LOCATION MAP
SCALE 1" = 2 Miles
DMA 1137

No production has resulted from the prospect openings on the Howard, and little if any marketable fluorspar has come from the Huerfano claims.

OWNERSHIP AND TENURE

The Greenleaf group, consisting of 3 unpatented mining claims, is owned by W. D. Howard of Deming, N. Mex. The applicant, doing business under the name of the Burro Chief Mines, has a lease and option to purchase this property for $150,000, payable at the rate of 10 percent royalty on the gross value of the ore produced. Royalty payments to date have amounted to about $15,000.

The applicant holds a lease and option on the 3 claims comprising the Lucky group, but he has recently sub-leased the mine to other parties.

The controlling interest in the 2 Valley claims, as well as the Howard, is held by the applicant.

The 3 Huerfano claims, a part of the Green Spar group, are optioned to the applicant for $30,000, payable at the rate of 10 percent royalty on the gross value of the ore produced.

DESCRIPTION OF THE DEPOSITS

The consolidated rocks of the Fluorite Ridge area range in age from pre-Cambrian to Tertiary. An intrusive mass of monzonite porphyry, thought to underlie most of the district has tilted and arched the older rocks. The principal fluorite deposits appear to occupy a comparatively narrow belt several miles long that trends

in a northwesterly direction, roughly parallel to the crest line of Fluorite Ridge (fig. 1).

The relatively short individual fissure zones with which the fluorspar ores are associated have northerly to northeasterly strikes more or less transverse to the trend of the productive belt. What structural condition is responsible for this diversity of trend between that of the belt and the strike of the individual deposits is not apparent. Fluorite has been deposited in the faults and fracture zones in both the sedimentary and intrusive rocks. It has been reported that the deposits seemingly are more productive in the monzonite than in the sediments. Much of the fluorspar ore that has been produced in the area was especially high-grade and consisted largely of coarse massive crystals of green fluorite, which was readily hand-sorted.

Sorting resulted in two products, metallurgical flux and a mill-grade fluorspar. The former, or highest grade material was shipped directly to the steel industry while the mill ore, if containing at least 50 percent CaF_2, was sold to local flotation mills. Thus mining has been restricted to the highest grade deposits with the result that material containing less than 50 percent CaF_2 remains unmined and unexplored.

There is no evidence in any of the mines discussed in this report, that would indicate the fluorite deposits have been bottomed. They appear to have maintained their former quality and quantity of ore

GREENLEAF MINE
367 Ft. Level
After U.S.G.S.
Scale 1" = 30'
FIG. 2 - DMA 1137

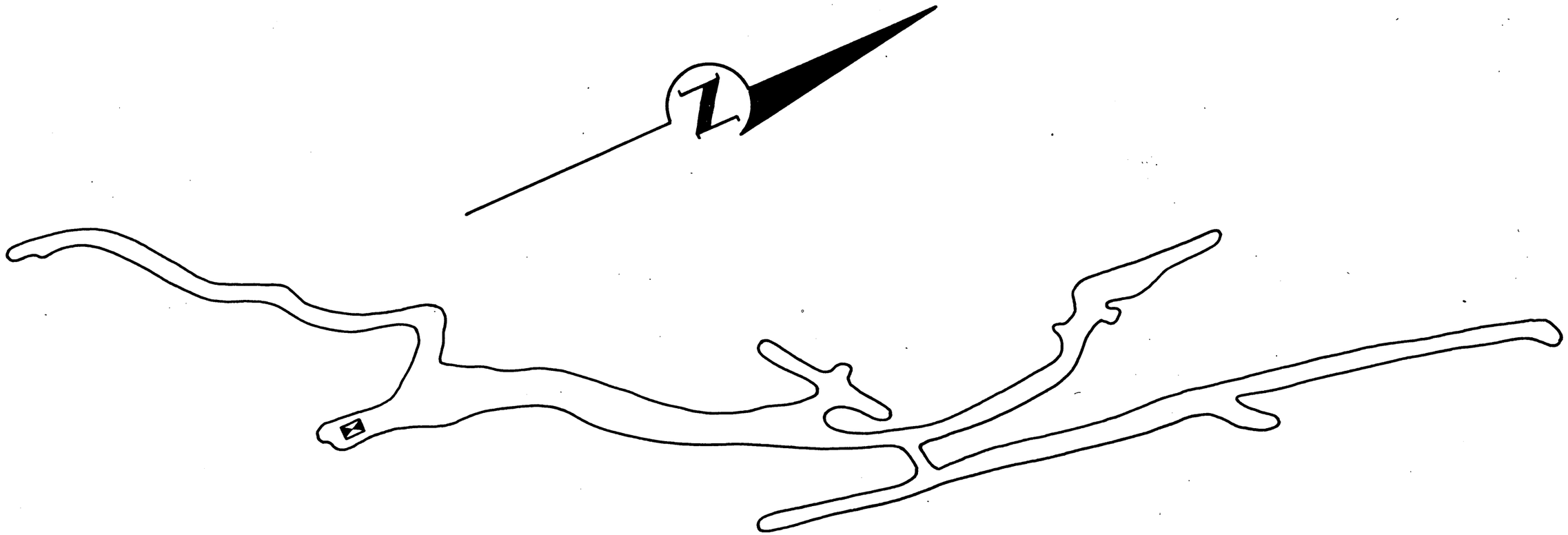
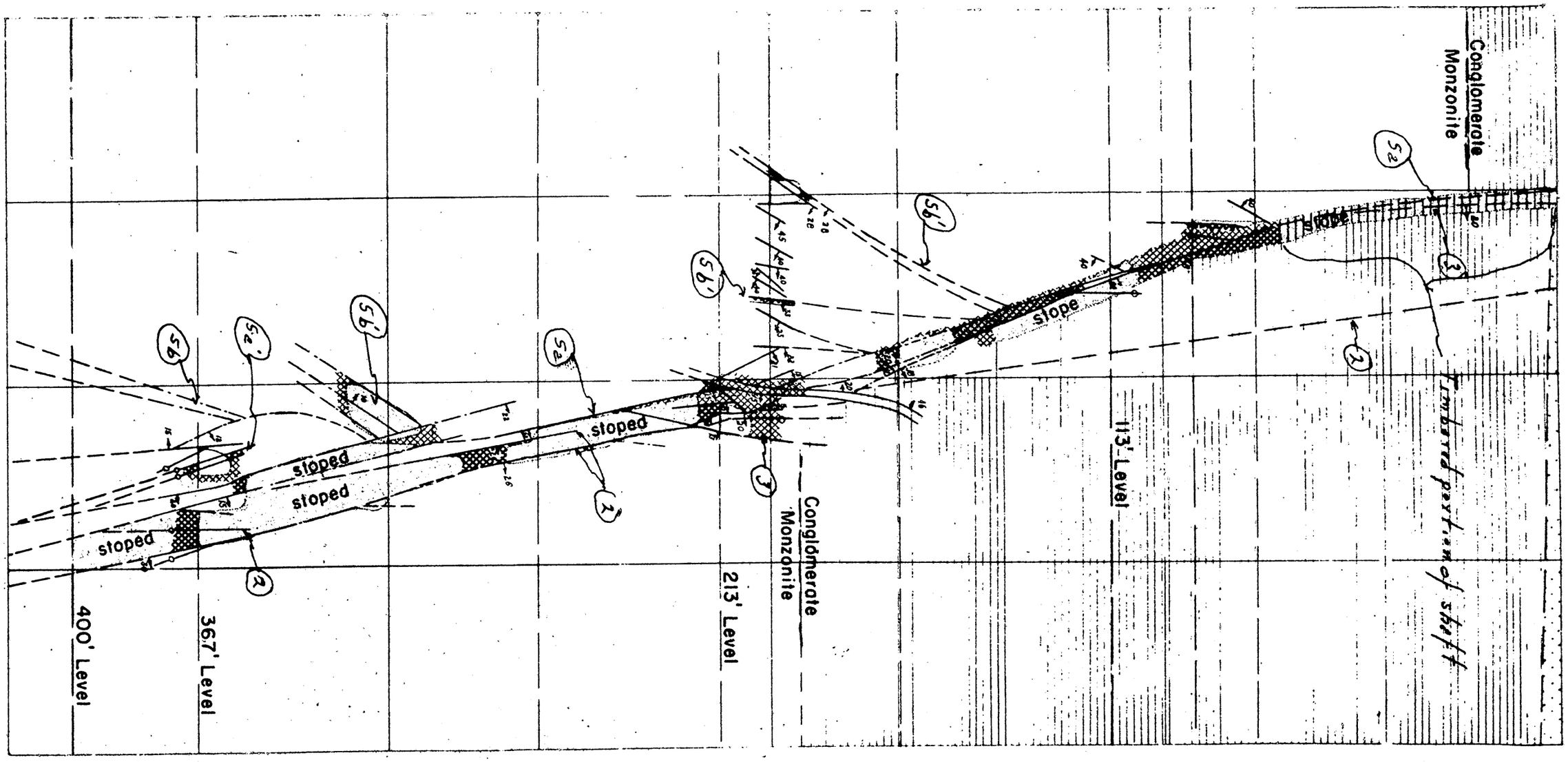


Figure 3 - 400 ft. level of Greenleaf Mine
Scale 1" = 30'
DMA 1137



GREENLEAF MINE
Cross Section Thru Shaft
Scale 1" = 30'
FIG. 5 - DMA 1137

downward to the full extent of exploration (400 feet). Though the deposits are classed as epithermal, there is no way, short of exploration, of determining their ultimate depth extension.

The Greenleaf Deposit

The Greenleaf No. 1 mine is the deepest (440 feet) and probably the principal producer of the district. Fluorite occurs in a shear zone of closely spaced intersecting fractures. The width of the intensively brecciated zone ranges from 20 to 75 feet. Its productive length, as exposed by the surface exploration performed by the Bureau of Mines in 1943, appears limited to about 300 feet. The average strike of the fluorite bearing zone is N. 20° E. with an easterly dip of about 80°.

The deposit outcropped in a coarse conglomerate. Underlying monzonite was encountered on the footwall of the zone at a depth of some 25 feet. The conglomerate continued on down in the hanging wall section for about 200 feet, below which both walls of the deposit are in the monzonite (fig. 4). Very irregularly-shaped ore bodies of various sizes have been mined in at least 5 of the nearly parallel overlapping fractures. The individual orebodies consist of lenses, pods, and narrow zinuous veins. The width of the massive high-grade fluorspar bodies ranges from inches to as much as 12 feet. The central portion of one short lense was said to have swelled to a width of 23 feet. In many of the wider ore bodies, ribs and irregular horses of low-grade material often separate the better

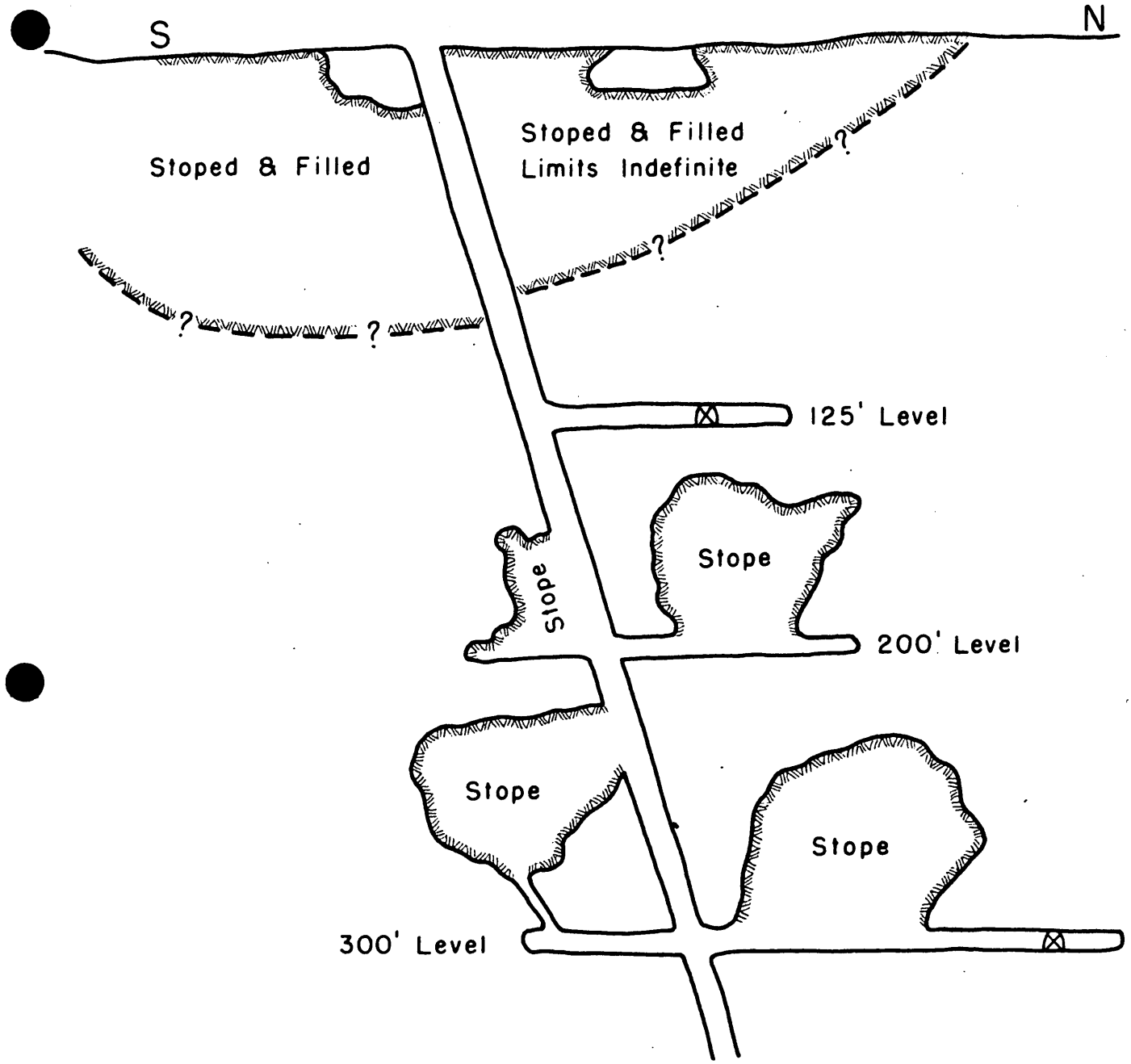
strands of fluorite. The oreshoots pinch and swell abruptly, both along the strike and the dip, so it is impossible to predict their individual continuity. Some are not continuous for any considerable distance, but where they pinch, the ore on other overlapping fractures often widens. Thus, in a general way, the relative amount of ore contained in the zone as a whole may remain fairly constant for a considerable distance downward. For this deposit the records of past production appear to be the only means of estimating future ore reserves.

The Lucky Deposit

The Lucky mine is some 2,000 feet northwest of the Greenleaf No. 1 shaft. There as in the Greenleaf the fluorite mineralization is localized in a zone of intersecting fractures which outcrop in conglomerate near the monzonite contact. The ore occurs in narrow veins and isolated lenses in the fault breccias. The strike of the deposits varies from north to N. 30° E. The dip is about 60° easterly. The scattered higher grade fluorspar ore bodies range in length from 20 to 60 feet. Their height is often comparable to their length and they have seldom exceeded 30 inches in width.

The Valley Deposit

The valley vein lies about 4,000 feet east of the Greenleaf shaft. The fluorite occurs in irregular lenticular sheets along a narrow single vein, which is traceable on the surface for about 1,000

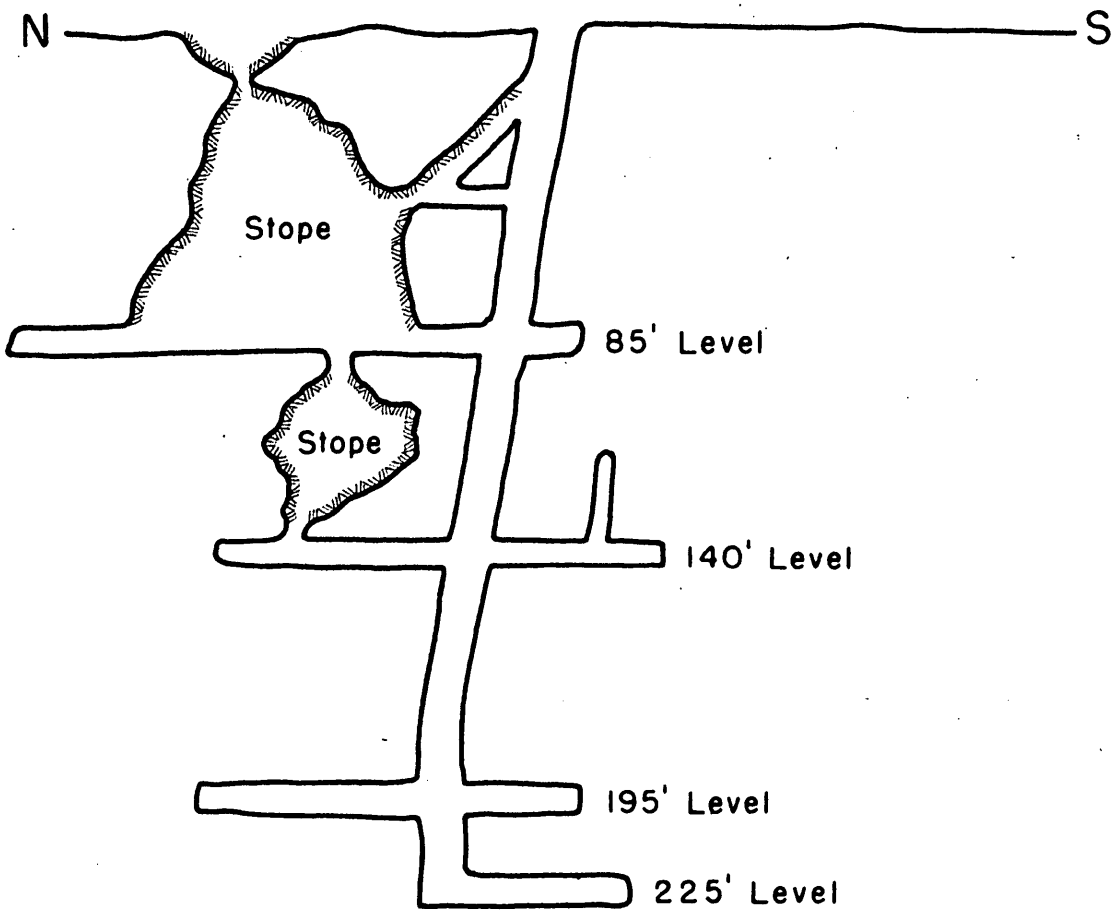


Sketch Map
LUCKY MINE
Cooks Peak Mining District
Luna County, New Mexico
LONGITUDINAL SECTION
Scale 1" = 50'
FIG. 6 — DMA 1137

feet. Two areas within the vein have been productive. One lies immediately north of the shaft and the other is several hundred feet to the south (fig. 7). The southerly oreshoot was mined from the surface to an unknown depth by underhand stopes. The vein area lying between the two oreshoot areas has not been developed. As observed in the accessible portion of the mine, the stope lengths ranged from 30 to 60 feet with widths varying from 18 to 30 inches.

The Huerfano Deposit

The Huerfano deposit is about 2 miles by road from the Greenleaf. There fluorite occurs in a network of short veinlets, small pods and stringers in what appears to be an elliptical shaped fault breccia. The mineralization has an exposed areal extent of approximately 75 by 130 feet. The deposit occurs in the older sedimentary rocks and has been explored by four shallow shafts (fig. 8). The attitude and boundaries of the mineralization were not exposed. It appears that none of the individual fluorite bodies were large enough to permit of selective mining. The dumps resulting from the shafts all were well mineralized with crystalline fluorite. If it was found possible to concentrate the fluorite in this material, the deposit, due to its size, would appear to justify further exploration as a source of low-grade fluorspar ore.



Sketch Map
VALLEY MINE
Cooks Peak Mining District
Luna County, New Mexico
LONGITUDINAL SECTION
Scale 1" = 50'
FIG. 7 — DMA 1137

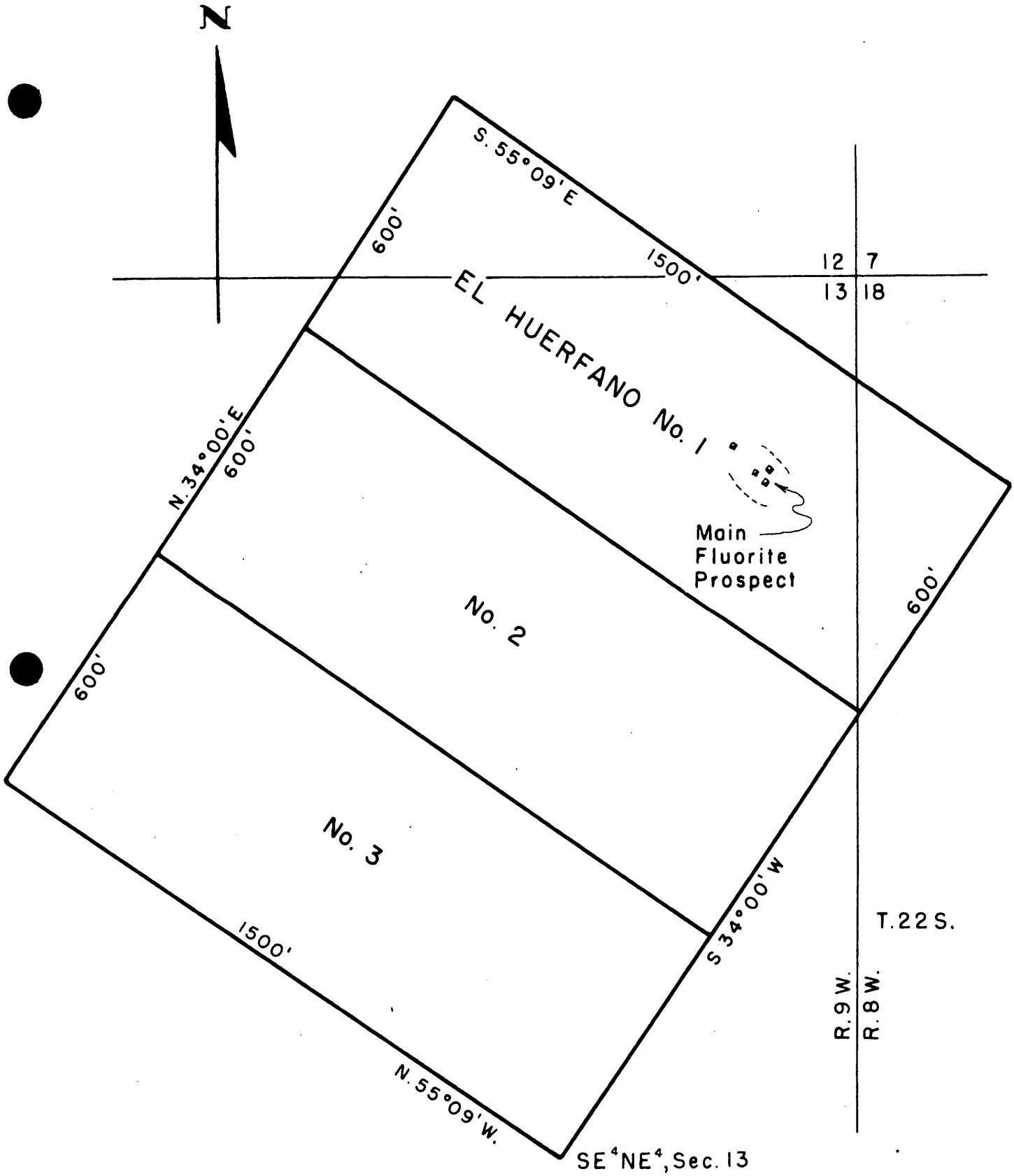


FIGURE 8
EL HUERFANO GROUP
SCALE 1" = 300'
DMA 1137

The Howard Deposit

The Howard claim was not visited by the writer. It is located about 2.5 miles southeast of the Greenleaf. According to the applicant the deposit is in a wide quartzite breccia through which stringers and small narrow lenses of fluorite occur frequently enough to constitute a low-grade ore body similar to the Muerfano. No doubt further exploration is warranted on the Howard if a method of treating such lower-grade material is economically possible.

ORE RESERVES

Greenleaf Mine

The mines of the Fluorite Ridge area have all been worked on a "pay as you go" basis so no developed fluorspar ore exists in any of the properties.

The Greenleaf shaft, the deepest in the district, has attained a depth of about 440 feet, and according to all reports the high-grade fluorite bodies extended to the full depth of the shaft. At the time of this examination the water stood about 20 feet below the 367-feet level,[1] so the bottom level (400-feet) was flooded.

According to the applicant's records, during 1949 and 1950 the Greenleaf mine produced 8,773 tons of ore, averaging about 70 percent CaF_2. Of this total tonnage, 4,038 tons (46 percent) was sold as metallurgical flux and 4,735 tons (54 percent) was sold to local

1/ The 367-feet level is designated the 350 level on the maps.

flotation mills. The average gross value of the 8,773 tons was $16.43 a ton. About 8,200 tons of this production was mined in the area lying between the 367-and the 400-foot levels. Thus this level interval of 33 feet on the dip of the deposit produced about 250 tons per foot. On that basis about 10,000 tons of ore would be indicated in the area between the 400-foot level and the bottom of the shaft (440 feet). Assuming a like continuity of the deposit to an additional depth of 60 feet below the bottom of the shaft, the inferred ore would amount to 15,000 tons. Thus based on the past experience of the lower portion of the mine, the total indicated and inferred reserves would be for the downward extension of the deposit, of the order of 25,000 tons averaging about 70 percent CaF_2. The upper half of the mine has not been as productive as the lower half. Some writers have attributed this to the fact that the lower half is in monzonite which may be a more favorable host rock. However, as shown on the longitudinal section, a considerable area in the upper half of the mine has not been developed to the full extent of the mineralization as has the lower half. The applicant has and is now conducting further exploration in this upper part of the mine. The results of this work would indicate that an appreciable amount of ore still remains in the area above the 213-foot level.

From the writer's observations it would seem that 5,000 tons of approximately 60 percent ore could be reasonably inferred as existing in the area lying between the 213-level and the surface. Thus

the total ore reserves for the Greenleaf deposit are estimated as 10,000 tons of indicated ore containing 70 percent CaF_2, and 20,000 tons of inferred ore containing about 68 percent CaF_2.

Lucky Mine

There are no measured ore reserves in the present workings of the Lucky property and little if any material that contains sufficient CaF_2 that it could be classed as indicated ore. Based on past production the inferred reserves of high-grade fluorspar would be of the order of about 1,500 tons per 100 feet of depth. Considerable low-grade material remains in the mine and several unexplored fluorite veins outcrop west of the present workings. The monzonite porphyry no doubt underlies the mine at no great depth and should it prove a better host rock than the conglomerate, as some believe, then the Lucky may be more productive at a greater depth than it has been in the past.

Valley Mine

All the better grade fluorspar ore wide enough to be mineable has been stoped in the accessible workings of the Valley mine. Narrow but high-grade ore has persisted to the bottom of the shaft (235 feet). A limited amount of lateral work from the shaft on 3 short levels exposed about 600 tons of mineable ore. Several old underhand stopes, located on the vein outcrop about 300 feet north of the shaft, indicate that the shoot of ore mined here was longer

and wider than the ore that was found in the vicinity of the shaft. Further exploration of the Valley vein is necessary before any estimate of reserves can be made.

Howard and Huerfano Deposits

Both the Howard and Huerfano prospects are unsampled surface showings of low-grade fluorspar. No estimates of ore reserves are possible.

PRESENT STATUS

Greenleaf Mine

Mine levels have been driven from an incline shaft that attempted to follow one of the ore bodies in the Greenleaf deposit. Former lessees of the mine robbed both the shaft and level pillars, so now the shaft for the most part is a crooked skidway through the old stopes. Only 2 of the upper levels are accessible. They are the 113-and 213-foot levels, which the applicant has recently rehabilitated. The 367-foot level, also known as the 380, was largely accessible at the time of this examination, while the bottom level (400) was flooded. A minimum inflow of 250 gallons of water a minute is reported to have been encountered a short distance below the 367-foot level. Because of this water and the lack of dependable power, great difficulty and excessive cost was experienced in the sinking of the shaft to its present depth.

At the time of this examination a crew of 7 men, under the supervision of the applicant, was employed in development work on 2 of the upper levels. This work consisted of drifting and cross-cutting on the 113 level, and the driving of an incline raise from the 213 level to the surface. This work had disclosed considerable ore. When completed it also will aid the much needed ventilation of the mine.

During 1949 and 1950 the bottom, or 400-foot level was developed and all the ore found was stoped between this level and the level above (367).

Lucky mine

Since filing the application for Government aid, the applicant has sub-leased the Lucky property to other parties. The mine was being equipped with a hoist and compressor at the time of this visit. The Lucky deposit has been developed by a 300-foot incline shaft and 3 short levels. Several old stopes that reached the surface were filled, four other stopes lying above the 300 level are shown on figure 6.

Howard and Huerfano

A 30-foot shaft and some surface cuts comprise the work on the Howard claim.

The Huerfano deposit has been prospected by 4 shallow shafts, all of which were inaccessible at the time of the examination.

MINING EQUIPMENT

The Greenleaf is the only one of the 5 properties, covered in this report, that is equipped for mining. Three portable Diesel-driven electric power units, with a combined capacity of 165 K.W., were principally used for the operation of 3 two-stage water pumps. Air for drilling was furnished by two portable compressors, one of 115 cfm was driven by electric power and the other of 330 cfm was direct connected to a Diesel engine.

A small single-drum hoist was geared to a Chevrolet engine and used butane as fuel. Ore was trammed to the shaft in buckets mounted on dolly cars. Timber skids served as guides for the bucket in the shaft. A short timber headframe, with ore bins, completed the shaft equipment. A hoist house, power house, 3 small frame dwellings, and an office constituted the mine buildings.

PROJECT PROPOSALS

R. E. McGray, doing business under the name of Burro Chief Mines, has requested a government loan totaling $51,100 for the production of fluorspar ore from 5 properties located in the Fluorite Ridge area of Luna County, N. Mex. The nature and amount of the expenditures, as listed in the application, are as follows:

Concentration Plant (Sink-Float)	$36,000
Crushing and screening plant	35,000
Bins, scales, etc.	16,000
Construction costs	21,000
Mine equipment	82,600
Power line and sub-station	22,000
Shaft rehabilitation	15,000
Mine development	160,000
Pumping equipment	5,500
Camp construction	30,000
Laboratory and research	15,000
Working capital and current obligations	75,000
Total	$513,100

These proposed expenditures are so general in their nature as they relate to the equipment and development of the individual mines that it is impossible to judge of their feasibility or adequacy.

No information was furnished showing whether or not the fluorspar ores of the district were amenable to concentration by the sink-float process.

It is evident from the foregoing pages of this report that the ore reserves are insufficient to justify the erection of a plant at this time, even though the ores were found to be amenable to economical concentration. Further exploration of the deposits would be necessary before contemplating such large-scale expenditures as are proposed in the loan application.

MINING METHODS AND COSTS

The wider ore bodies of the district were mined by shrinkage methods while the narrower vein areas were extracted in open stopes, working from stull-supported platforms. The walls of the ore bodies

are strong and stand well, with little if any support. No serious dilution of the ore is reported to have resulted from the use of these methods, though conditions may differ below the water level.

The wage rates prevailing at the Greenleaf mine at the time of this examination were much lower than those of many other mining districts of the Southwest. The hourly wage rates being paid the present crew at the Greenleaf, are given below:

Mine foreman	$1.875	per	hour
Mechanic	1.50	"	"
Miners	1.25	"	"
Helpsman	1.20	"	"
Muckers	1.10	"	"
Ore sorters	1.10	"	"

According to the applicant the present mining cost at the Greenleaf is about $6 a ton. This does not include general supervision, development, royalties, or taxes, and evidently applies only to the mining of ore from the upper levels which are above the water level. It appears that at least $3.50 a ton should be added to this figure to cover the cost of development, pumping and supervision when mining the deeper ores. Thus the mining and development costs are estimated ad $9.50 a ton for the Greenleaf mine. The development and mining costs of the narrower veins at the Lucky and Valley properties will probably approach $18 a ton.

Not enough is known of the characteristics of the Howard and Huerfano deposits to permit cost estimation at this time. However, much cheaper mining methods no doubt can be employed on these larger deposits.

MILLING METHODS AND COSTS

Hand sorting of the mine-run ore has been the only method of grading the fluorspar ores produced in the Fluorite Ridge area. The ore as it came from the mine usually was dumped from the hoisting bucket onto an inclined grizzley, the oversize of which was raked onto a platform built over the top of a divided ore bin. The coarse waste was rejected from the grizzley oversize while the larger pieces of fluorite were picked out and dropped into one of the bins. The ore remaining after removing the coarse high-grade was shoveled into another bin where it joined the grizzley undersize. The coarse hand-picked fluorite was sold f.o.b. cars in Deming as metallurgical flux. The other portion of the ore, including the material that passed through the grizzley, was sold to local flotation mills.

Two mills, which buy fluorspar ores, are available to the producers of the area. The General Chemical Corp. has a flotation mill in Deming, and the Shattuck-Denn Mining Corp. buys ores at its plant located at Los Lunas, N. Mex. The current schedule of payments for fluorspar ore at the Deming mill of the General Chemical Corp. is as follows:

Percent, CaF_2	Paid per ton, f.o.b. mill at Deming
50	$7.00
60	9.50
70	13.10
80	15.70

The trucking charges on ore from the Greenleaf mine to Deming is $1.25 a ton. The rail freight on fluorspar ores from Deming to Los Lunas is $4.00 a ton, irrespective of its value. Both custom mills are reluctant to accept ore containing less than 30 percent CaF_2 and will not buy material that contains less than 40 percent CaF_2.

The royalty as shown in the calculations is based on the gross value of the ore produced in the Greenleaf during 1949 and 1950, which averaged $16.43 a ton. Hence under the terms of the contract the royalty would average $1.64 a ton.

Summary

The estimated operating costs at the Greenleaf mine are as follows:

Mining and development	$9.50	a ton
Marketing (trucking to Deming)	1.25	" "
Royalty	1.64	" "
Overhead	0.50	" "
Total	$12.89	

During 1949 and 1950 the ore produced from the lowest level of the Greenleaf mine had an average realized value of $16.43 a ton. Thus if the future production has a comparable value, the estimated profit on the deeper ores of the Greenleaf would be about $3.50 a ton, before taxes and depreciation.

The 5,000 tons of inferred ore existing in the upper half of the mine will have lower mining costs but the grade will be lower, so the resulting profit will probably be comparable to $3.50 a ton as estimated for the deeper ore.

The high mining cost of the narrow veins at the Lucky and Valley deposits would no doubt prevent their profitable operation at this time. No market is available for the low-grade fluorspar that exists on the Howard and Huerfano claims.

CONCLUSIONS AND RECOMMENDATIONS

No measured fluorspar ore exists in any of the mines described in this report. The Greenleaf is the only one of the group that contains appreciable ore reserves. Based on its production, and presuming the downward continuity of the Greenleaf deposit for an additional 100 feet below the bottom level there would be, in this part of the mine, 10,000 tons of indicated ore and 20,000 tons of inferred ore. An additional 3,000 tons was inferred as existing in the upper undeveloped areas of the mine, so the total ore reserves amount to 30,000 tons with an average content of between 65 and 70 percent CaF_2.

The profit that could be expected from the mining of this ore was estimated at $3.50 a ton, so the total ore reserves in the Greenleaf mine would have a net value of about $105,000, before taxes and depreciation.

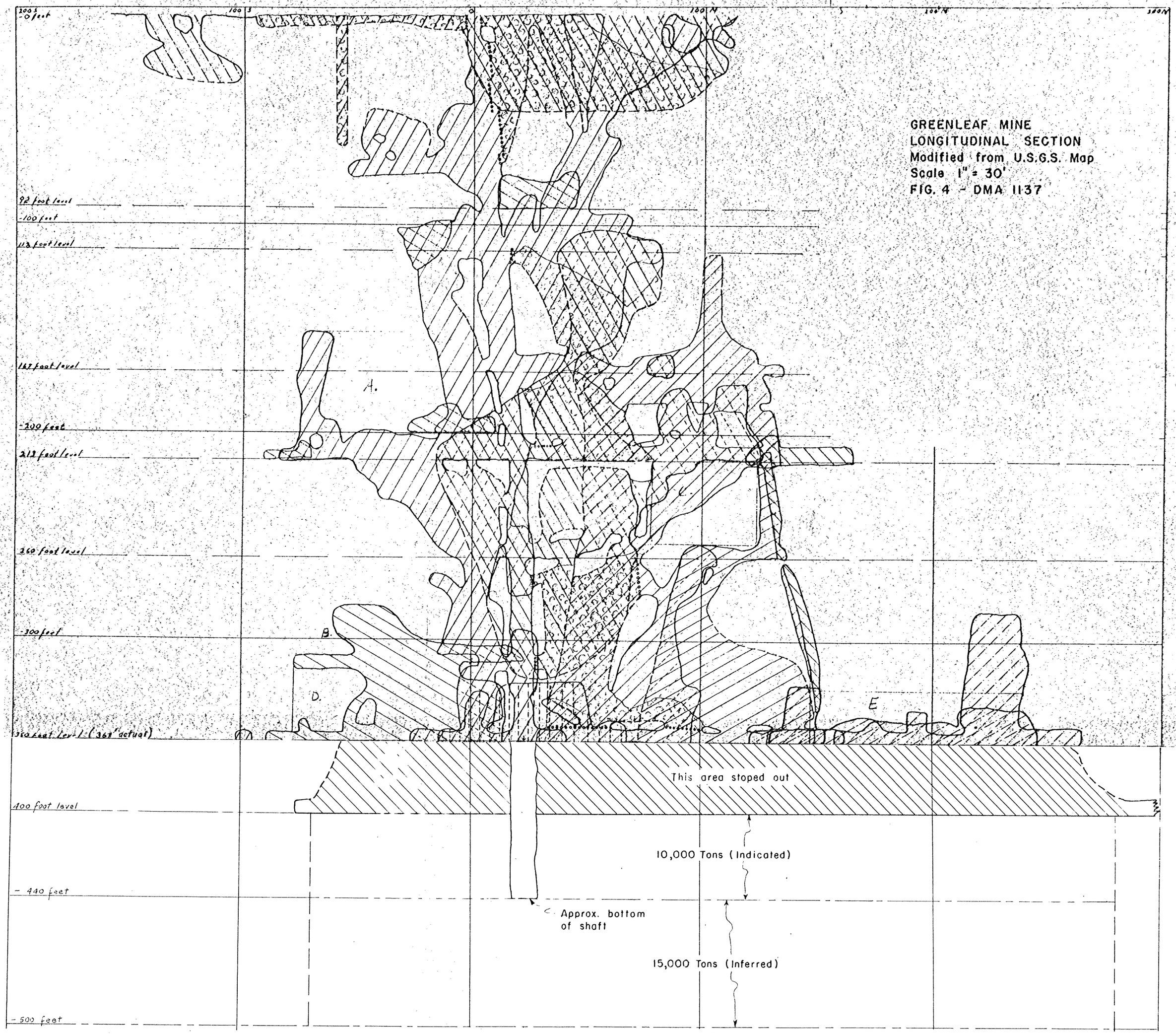
There is no evidence that would appear to limit the further extension of the deposits in depth so it is possible that additional exploration could materially increase the present ore reserves of the Greenleaf and in some of the other deposits as well.

However, at this time, the reserves that appear to be reasonably assured are insufficient to justify the loan as requested. Therefore it is recommended that the application for a production loan be denied.

Under present conditions the profitable fluorite reserves of the district are limited to a very few of the highest grade deposits. Surface prospecting has indicated the possibility that a substantial tonnage of low-grade fluorspar might be present on the Howard and Huerfano claims, and probably on other properties in the district as well. If sink-float, or some other means could be found to profitably concentrate these ores, it appears that the potential reserves of fluorite occurring in these larger bodies could prove to be of greater significance than the potential of the smaller high-grade deposits. Hence metallurgical testing of representative samples of these lower grade ores seems advisable, and if successful, further exploration then would be justifiable on the Howard and Huerfano deposits.

The Greenleaf deposit would probably warrant additional exploration in depth.

The applicant was informed of the procedure for obtaining an exploration lease and was furnished with the proper forms for making such a request. It is recommended, if an application is made for an exploration lease, that it be given consideration.


GREENLEAF MINE
LONGITUDINAL SECTION
Modified from U.S.G.S. Map
Scale 1" = 30'
FIG. 4 - DMA 1137
200 S
-0 feet
100 S
0
100 N
200 N
300 N
92 foot level
-100 feet
113 foot level
187 foot level
-200 feet
212 foot level
250 foot level
-300 feet
350 foot level (367' actual)
400 foot level
- 440 feet
- 500 feet
A.
B.
C.
D.
E
This area stoped out
10,000 Tons (Indicated)
Approx. bottom of shaft
15,000 Tons (Inferred)