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PRINTED: 02/01/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: MCFADDEN PEAK FLUORSPAR

ALTERNATE NAMES:
MACK CLAIMS
WESTERN FLUORSPAR PROPERTY

GILA COUNTY MILS NUMBER: 367

LOCATION: TOWNSHIP 7 N RANGE 13 E SECTION 35 QUARTER C
LATITUDE: N 33DEG 54MIN 30SEC LONGITUDE: W 110DEG 59MIN 00SEC
TOPO MAP NAME: MCFADDEN PEAK - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
FLUORINE FLUORSPAR

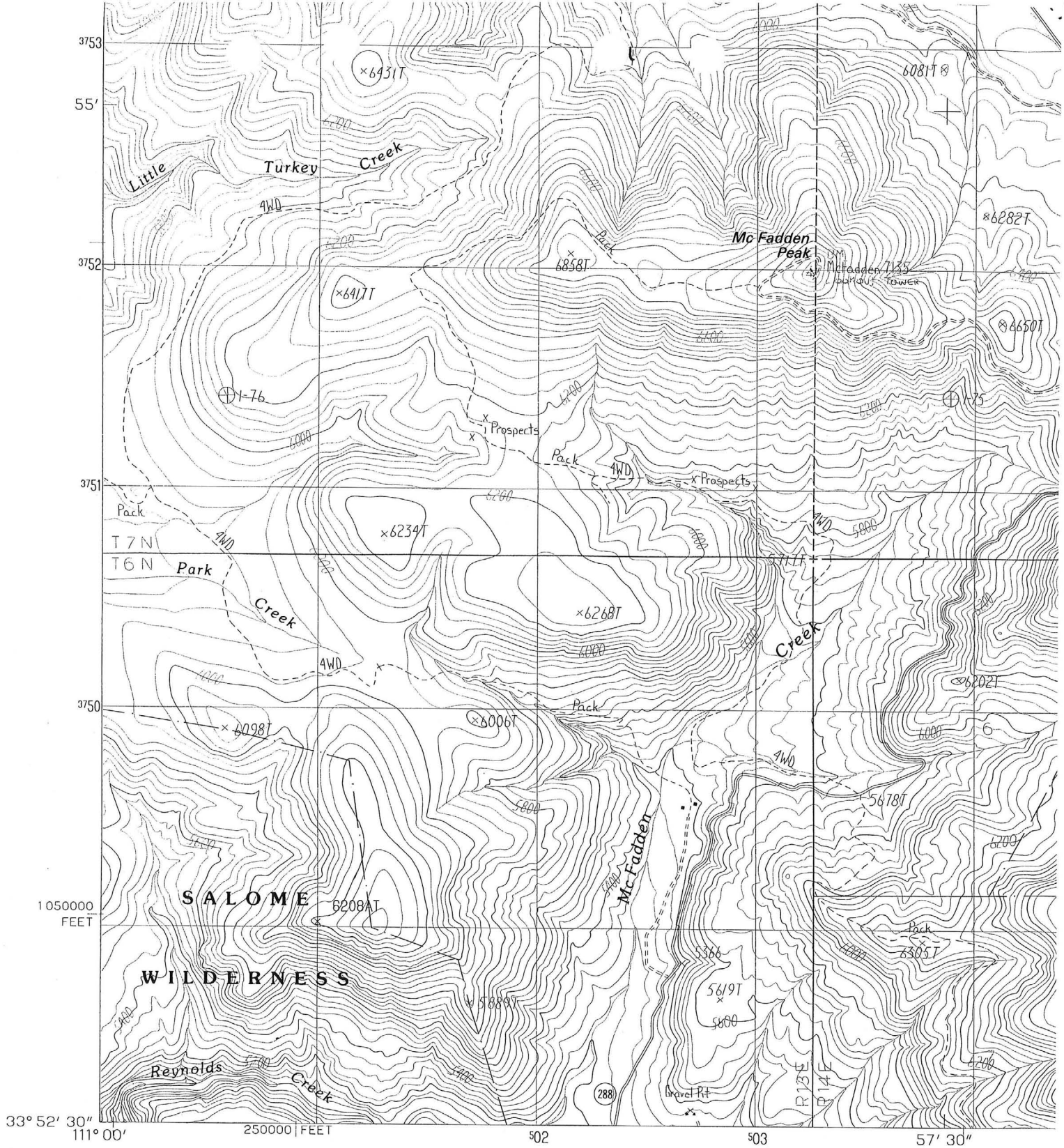
BIBLIOGRAPHY:
ADMMR MCFADDEN PEAK FLUORSPAR FILE
BLM AMC FILE 57642
ADMMR CARD FILE
MSHS MINE INFORMATION SUPP
CLAIMS EXTEND INTO SEC 36

McFADDEN PEAK FLUORSPAR MINE

GILA COUNTY
SIERRA ANCHA DIST.
T7N, R13E, sec 36, SW ¼

References:

USGS MF 1162-B
USGS MF 1162-H



PRODUCED BY THE UNITED STATES GEOLOGICAL SURVEY
CONTROL BY . . . . . USGS, NOS/NOAA
COMPILED FROM AERIAL PHOTOGRAPHS TAKEN. 1981
FIELD CHECKED . . . . . 1983 MAP EDITED 1986
PROJECTION . . . . . TRANSVERSE MERCATOR
GRID: 1000-METER UNIVERSAL TRANSVERSE MERCATOR . . . . . ZONE 12
10,000-FOOT STATE GRID TICKS. . . . . ARIZONA, EAST ZONE
UTM GRID DECLINATION . . . . . 0°02' EAST
1986 MAGNETIC NORTH DECLINATION . . . . . 12°30' EAST
VERTICAL DATUM . . . . . NATIONAL GEODETIC VERTICAL DATUM OF 1929
HORIZONTAL DATUM . . . . . 1927 NORTH AMERICAN DATUM

To place on the predicted North American Datum of 1983, move the projection lines as shown by dashed corner ticks (1 meter south and 62 meters east)

There may be private inholdings within the boundaries of any Federal and State Reservations shown on this map

All marginal data and lettering generated and positioned by automated type placement procedures

Where omitted, land lines have not been established

McFADDEN PEAK, GILA CO.
T7N
R13E
Sec 35-36

1 1000 1 1000

PROVISIONAL MAP
Produced from original manuscript drawings. Information shown as of date of photography.

MCFADDEN PEAK FLUORSPAR MINE GILA COUNTY

KAP WR 5/21/82: Joe Soper, U. S. Bureau of Mines, IFOC Denver, is involved in a MAS study on fluorspar. He is particularly interested in the McFadden deposit.

NJN WR 10/9/87: Ben McGowen (card) visited and reported that he wants to lease various properties that were formerly his uncle's, Woody Nichols. He also reported that he has additional data on these properties which is not in our file system. Examples of some of the properties he does own (in some cases with his sister-in-lw) are the McFaden Peak Fluorspar (file) Gila County. He reported it is still leased to Western Fluorspar (card) ie. Vic Randolf (card), and that the group would be glad to co-venture at this time. Also, in the not too distant future, the property will be solely controlled by Mr. McGowen. Mr. McGowan promised he would be organizing materials in the winter, closing up his affairs in Maryland and will visit and supply file infomration in the spring of '88.

Do Not REPRODUCE

McFADDEN PEAK FLUORSPAR MINE

GILA CO.
FLUORINE DIST.

KP WR 1/9/79 - Mr. John R. Bogert reported on operations at the McFadden Peak Fluorspar Mine, the property which is leased from Woody Nichols of Globe is the subject of ore delineation and development project by the lease holder Triangle Mining Company, a wholly owned company of J.A. Terteling and Sons Company, Boise, Idaho. The project is coordinated by John Bogert, a consultant for Terteling, in the local Terteling office, 4350 E. Camelback Rd., Suite 200-D, Phx, Az. 85018, Ph. 959-7220. Daily operations at the mine are under the supervision of Terteling Engineer, John Clouser, 225 B. Hunter Drive, Globe, Az. 85501, Ph. 425-2163. Work began by the firm at the mine in June of 1978, and is continuing as of January 9, 1979. Thus far 500,000 tons of fluorspar ore has been blocked out by drilling. The deposit is reported to have a 6,000 ft. strike length. Once the drilling project (using two Longyear drills) is completed, the deposit will be evaluated for operation. Construction of a new processing facility is among many alternatives that will be considered. Capital expenditure, if the property were developed, could be in the $1-2 million range. 2/8/79 a.p.

KP WR 5/16/79 - The Tonto Mill is presently processing fluorspar ore from the McFadden Peak Mine, Fluorine District, Gila Co. The property owned by Woody Nichols of Globe is being operated by Western Fluorspar. J.A. Terteling and Sons, Boise, Idaho through its totally owned Triangle Mining Company, is reported to still be holding an option on the mine. Pincock, Allen and Holt of Tucson have reportedly completed a feasibility study on a 200 tpd mill for the property. The fluorspar concentrate from the Tonto Mill is presently being shipped to Allied Chemical in Southern California. 6/26/79 a.p.

KP WR 7/5/79 - John Bogert, phone (602) 959-7220, reported Turteling is still interested in the McFadden Peak Fluorspar Mine, Fluorine Distirct, Gila Co. They have had Pincock, Allen & Holt, Inc. do a design and cost estimate on a 200-ton per day mill, along with power station, water right acquisition, employees' camp and tailing disposal facility. Initial mining plan considerations would start open pit and then extend underground. He reported that the west end of the deposit is rather shallow, while the east end is wider and deeper. Open pit mining of the east end would be visible from the Arizona Highway 288. John Clouser, who was supervising exploration work at the mine is now working in Nevada. 8/7/79 a.p.

McFADDEN PEAK FLUORSPAR MINE Do Not REPRODUCE GILA CO.

KP/WR 12/15/78 - John Clouser, 225 E. Hunter Drive, Globe 85501, has optioned Woody Nichols McFadden Peak Fluorspar Property on the south slope of McFadden Peak, Fluorine District, Gila Co. Clouser is running a drilling project to delineate more fluorspar ore. He reported that Western Fluorspar is not now shipping from the property. 6/8/79 a.p.

MCFADDEN PEAK FLUORSPAR MINE

GILA COUNTY
FLUORINE DISTRICT

WR GW 10/1/73 - Floyd Everett, USBM Phoenix, called for information regarding U. S Steel drilling of the McFaddin Peak Flourspar, saying he had met a U. S. Steel geologist in Denver who told him they had quit drilling. I have no information as to the results.

WR GW 10/30/73 - Mr. Howe of Tonto Mining and Milling Company mill at Punkin Center stated that if and when the price of spar goes to $70.00 per ton that they will probably get spar from the McFadden Peak deposit, which was recently drilled and turned down by U. S. Steel Company.

WR GW 2/21/74 - Jerry Irvin telephoned regarding McFadden Flourspar. He said someone called "The Evans Group" is trying to promote it. When Tonto Basin Mining and Milling Company was in operation their mine supt. was John Evans. He could have gotten the property when U. S. Steel Company dropped it after their drilling.

WR GW 12/2/75 - Vic Kral telephoned from Kingman and stated during the conversation that no spar was being mined at the McFadden Peak mine of Woody Nickols as previously reported.

WR KAP 3/25/76 - In a telephone conversation with Jack Hamilton at Tonto Mining & Milling Company, learned that they are milling fluorspar from Woody Nichols property on McFadden Peak. The McFadden Peak property (claim names not known)had been previously explored by U. S. Steel Corporation. Road to mine has been completed but is reportedly difficult to negotiate with Tonto's large highway ore trucks. The flourspar (flourite ore) runs 60% CaF_2; 800 tons are piled at the mill and 200 tons are piled at the mine.

WR KAP 4/28/76 - Field interview with Jack Hamilton at Tonto Mining and Milling. They are still milling flourspar from the McFadden Peak property.

WR GWI 6/23/76 - Mine visit - McFadden Peak Fluorspar. Operated by Tonto Mining & Milling Co. Gate locked because of afternoon fire hazard. This property appears to be the Jerky claim, but the location on the topographic map should be checked.

Western Prospector & Miner July, 1976. "Mining of fluorspar on the McFadden Peak property in the Sierra Ancha Mountains is currently underway by the Tonto Basin Mining and Milling Company. The firm is milling the ore in their Punkin Center plant."

KAP WR 1/2/81: Victor S. Randolph, 3550 N. Central, Phoenix, Arizona 85012, of Western Fluorspar, reported that they have a lease on the McFadden Peak Fluorspar Deposit from the Nichols Estate in Globe. The mine has been shut down since the Tonto Mill in Tonto Basin was closed. They are presently looking for a development partner to build a mill at the mine and put it in operation. The McFadden Peak Deposit is held by unpatented mining claims known as the Mack. It is likely that there are a number of "Mack" Claims. Past operating difficulties could best be divided into two problem areas. First, the necessity of a long arduous haul to the Tonto Mill and secondly, sloppy mining by various mining contractors.

United States Department of the Interior

BUREAU OF MINES

BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

Intermountain Field Operations Center

Barium King file

July 30, 1976

Re: Grant G0254012

Mr. John H. Jett, Director
Arizona Department of Mineral Resources
Mineral Building, Fairgrounds
Phoenix, Arizona 85007

Dear John:

I am enclosing copies of the sample analysis reports for the Macfadden, Bluebird, and Barium King fluorspar samples that you asked the Bureau to have run for CaF_2. These were not completed in time to be included in your final report on fluorspar; however, you may want to include them in your files for future reference.

Sincerely yours,

Richard A. Salisbury

Richard A. Salisbury
Geologist

Enclosure

File assay reports in applicable files

MPLE ANALYSIS REPORT

Samples submitted by: Rice – Denver Date: 3/1/76

mple No.	SiO_2	CaF_2								
Mcfarlin #1	24.1	75.9								
#2	15.2	73.8								
#3	12.1	60.1								
#4	4.3	89.9								
#5	14.1	77.4								
bird #1	10.0	77.4								
#2	28.3	57.7								
#3	41.7	51.4								
#4	77.3	0.3								
14912	21.2	66.9								

rks:

rted as A. g/l
B. µg/ml
C. %
D. ppm
E. oz/ton

element unless otherwise noted.
oxide

Analyst WBarry Date 4/8/76

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Victor S. Randolph

   Address: 3550 N. Central Avenue, Phoenix 85012, phone 277-7879

2. Mine: MacFadden Peak Fluorspar Mack Claims 3. No. of Claims - Patented ____ Unpatented ____

4. Location: ____

5. Sec ____ Tp ____ Range ____ 6. Mining District Fluorine

7. Owner: Nichols Estate, Blobe Arizona

8. Address: ____

9. Operating Co.: Western Fluorspar Ltd.

10. Address: 3550 N. Central Avenue, Phoenix, Arizona 85012

11. President: ____ 12. Gen. Mgr.: ____

13. Principal Metals: Fluorspar 14. No. Employed: ____

15. Mill, Type & Capacity: None

16. Present Operations: (a) Down ☒ (b) Assessment work ☐ (c) Exploration ☐
    (d) Production ☐ (e) Rate ____ tpd.

17. New Work Planned: Searching for development partner. A mill (flotation) is needed at the mine site.

18. Miscl. Notes: The underground mine shut down simultaneous with the closing of the Tonto Mill. Prior to closing, the mine was operated by a number of contractors. Some were capable and as Mr. Randolph reported, others were not. Grade control was a major problem of the poor operators. Grade control can apparently make the difference between 50 and 70% CaF_2 in the mill feed.

Date: January 2, 1981

Ken A. Phillips
(Signature)

Ken A. Phillips
(Field Engineer)

IN REPLY REFER TO:

United States Department of the Interior

OFFICE OF HEARINGS AND APPEALS
INTERIOR BOARD OF LAND APPEALS
4015 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22203

Copy in
Woodie Nichols
Illegible file

ESTATE OF WOODIE NICHOLS

IBLA 83-140 Decided January 4, 1983

Appeal from decision of Arizona State Office, Bureau of Land Management, declaring unpatented mining claims abandoned and void. A MC 57480 through A MC 57485, A MC 57608 through A MC 57633, A MC 65066, A MC 65067, and A MC 80492.

Affirmed.

1. Federal Land Policy and Management Act of 1976: Recordation of Affidavit of Assessment Work or Notice of Intention to Hold Mining Claim—Mining Claims: Recordation

Under sec. 314 of the Federal and Land Policy and Management Act of 1976, 43 U.S.C. § 1744 (1976), the owner of a mining claim located before Oct. 21, 1976, must file with the proper office of the Bureau of Land Management, on or before Oct. 22, 1979, a copy of the recorded notice of location and a notice of intention to hold the claim or evidence of assessment work performed on the claim, and prior to Dec. 31 of each calendar year thereafter a copy of the evidence of assessment work performed for that year or a notice of intention to hold the claim. There is no provision for waiver of this mandatory requirement, and where evidence of assessment work is not filed, for any reasons, the consequence must be borne by the claimant.

2. Federal Land Policy and Management Act of 1976: Recordation of Mining Claims and Abandonment—Mining Claims: Abandonment

The conclusive presumption of abandonment which attends the failure to file an instrument required by 43 U.S.C. § 1744

INDEX CODE:
43 CFR 3833.2-1
43 CFR 3833.4(a)

(1976) is imposed by the statute itself. A matter of law, it is self-operative and does not depend upon any act or decision of an administrative official. In enacting the statute, Congress did not invest the Secretary with authority to waive or excuse noncompliance with the statute, or to afford claimants any relief from the statutory consequences.

3. Administrative Procedure: Adjudication—Evidence: Generally—Evidence: Presumptions—Federal Land Policy and Management Act of 1976: Recordation of Affidavit of Assessment Work or Notice of Intention to Hold Mining Claim—Mining Claims: Abandonment

Although, at common law, abandonment of a mining claim can be established only by evidence demonstrating that it was the claimant's intention to abandon it and that he, in fact, did so, in enacting the Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1744 (1976), Congress specifically placed the burden upon the claimant to show by his compliance with FLPMA's requirements that the claim has not been abandoned, and any failure of compliance produces a conclusive presumption of abandonment. Accordingly, extraneous evidence that a claimant intended not to abandon his claim may not be considered in such cases.

APPEARANCES: Ben N. McGowen, Esq., Scottsdale, Arizona, for appellant.

OPINION BY ADMINISTRATIVE JUDGE HENRIQUES

Appeal has been taken on behalf of the Estate of Woodie Nichols from the Arizona State Office, Bureau of Land Management (BLM), decision of October 14, 1982, which declared the unpatented Sterling 1A through 6A, Star #1 through #27, Pan #19, and Pan #20 lode mining claims, A MC 57480 through A MC 57485, A MC 57608 through A MC 57633, A MC 65066, A MC 65067, and A MC 80492, abandoned and void because no proof of labor or notice of intention to hold the claims was filed with BLM on or before October 22, 1979, as required by section 314 the Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. § 1744 (1976), and 43 CFR 3833.2-1. The claims had been located in 1954 and 1956, and copies of the location notices were recorded with BLM in August, September, and October, 1979, as required by FLPMA.

On appeal, it is contended that the claims may be forfeited, but they were not abandoned. It is asserted that the assessment work was performed in 1979, and was recorded in Gila County, Arizona, August 20, 1979. A copy of the proof of labor accompanied the appeal. Woodie Nichols was 79 years of age in 1979, and was in very poor health. He died December 19, 1979. Appellant seeks relief from the forfeiture of the claims.

[1] Section 314 of FLPMA specifies that the owner of a pre-FLPMA unpatented mining claim must file evidence of assessment work or a notice of intention to hold the claim on or before October 22, 1979, and prior to December 31 of every calendar year thereafter. Such filing must be made both in the office where the notice or certificate of location is recorded, i.e., the county recorder's office, and in the proper office of BLM. These are separate and distinct requirements. Compliance with the one does not constitute compliance with the other. Accomplishment in the proper county of a proper recording of evidence of assessment work or a notice of intention to hold the mining claim does not relieve the claimant from recording a copy of the instrument in the proper office of BLM under FLPMA and the implementing regulations. Enterprise Mines, Inc., 58 IBLA 372 (1981);[a] Johannes Soyland, 52 IBLA 233 (1981).[b] The filing requirements of section 314 of FLPMA are mandatory, not discretionary. Failure to comply is conclusively deemed to constitute an abandonment of the claim by the owner and renders the claim void. Enterprise Mines, Inc., supra; Fahey Group Mines, Inc., 58 IBLA 88 (1981);[c] Lynn Keith, 53 IBLA 192, 88 I.D. 369 (1981);[d] James V. Brady, 51 IBLA 361 (1980);[e] 43 U.S.C. § 1744(c) (1976); 43 CFR 3833.4(a). Congress imposed that consequence in enacting FLPMA. The responsibility for complying with the recordation requirements of FLPMA rests with appellant. This Board has no authority to excuse failure to comply with the statutory requirements of recordation or to afford any relief from the statutory consequences. Lynn Keith, supra.

[2] Arguments similar to those here presented were considered by the Board in Lynn Keith, supra. There we held

> [t]he conclusive presumption of abandonment which attends the failure to file an instrument required by 43 U.S.C. § 1744 (1976) is imposed by the statute itself, and would operate even without the regulations. See Northwest Citizens for Wilderness Mining Co., Inc. v. Bureau of Land Management, Cir. No. 78-46 (D. Mont. June 19, 1979). A matter of law, the conclusive presumption is self-operative and does not depend upon any act or decision of an administrative official. In enacting the statute, Congress did not invest the Secretary of the Interior with authority to waive or excuse noncompliance with the statute, or to afford claimants any relief from the statutory consequences. Thomas F. Byron, 52 IBLA 49 (1981).[f]

53 IBLA at 196, 88 I.D. at 371-72.

[3] Appellant argues that there was no intention to abandon any of these mining claims. That issue has been considered by the Board in earlier cases, such as John Murphy, 58 IBLA 75 (1981).[g] In that case, the Board said:

For footnotes see:
69 IBLA 386

Appellants also argue that the use of the term "abandonment" in section 314(c) indicates a significantly different legal connotation from the term "forefeiture," which latter term, appellants note, is typically applied to the invalidation of mining claims for failing to properly record or otherwise perfect claims under Federal statutes. Appellants assert that Congress deliberately chose the term "abandonment" over the term "forfeiture," thus showing Congressional intent to void only stale mining claims as opposed to recently-worked claims like appellants'. They argue that they could not have abandoned their claims because they had no intent to do so and because they colorably complied with section 314. The essence of this argument was presented to this Board in Lynn Keith, supra, in which we said:

> At common law, evidence of the abandonment of a mining claim would have to establish that it was the claimant's intention to abandon and that he in fact did so. Farrell v. Lockhart, 210 U.S. 142 (1908); 1 Am. Jur. 2d, Abandoned Property §§ 13, 16 (1962). Almost any evidence tending to show to the contrary would be admissible. Here, however, in enacted legislation, the Congress has specifically placed the burden on the claimant to show that the claim has not been abandoned by complying with the requirements of the Act, and any failure of compliance produces a conclusive presumption of abandonment. Accordingly, extraneous evidence that a claimant intended not to abandon may not be considered. [Emphasis in original.]

Lynn Keith, supra at 197, 88 I.D. at 372.

58 IBLA at 82-83.

This result is ineluctable because the fundamental purpose of section 314 is to provide for recordation of certain named instruments. Compliance with this statute requires, by its nature, that the instruments be properly and timely delivered to the prescribed offices, and if this is not accomplished, a claimant's good faith subjective intent to comply is no cure.

Although there have been attacks on the recordation requirements of FLPMA as being unconstitutional, the courts have validated section 314, including section 314(c) specifically. For example, when presented with the argument that the conclusive presumption of abandonment acts as a forfeiture statute violative of due process, the Ninth Circuit, in Western Mining Council v. Watt, 643 F.2d 618, 629 (9th Cir.), cert. denied, 102 S. Ct. 567 (1981), stated: "We reject plaintiffs' conclusion that the provisions of section 1744(c) are unreasonably harsh in requiring that mining claims be conclusively presumed to be abandoned upon failure to file." 1/ Thus, the

1/ In this opinion, the Ninth Circuit relied extensively upon the reasoning and language of Topaz Beryllium Co. v. United States, 479 F. Supp. 309 (D. Utah 1979), aff'd, 649 F.2d 775 (10th Cir. 1981).h

h) GFS(MIN) JD-1(1981)

statute's clear provision for conclusive abandonment requires us, on these facts, to find that the decision below is correct. We regret the harshness of this unavoidable result. The claims may be relocated subject to any valid intervening rights of third parties or of the United States, and assuming the present availability of the land to mining location, by filing applicable instruments, based on new location dates, as prescribed by the statute and the regulations.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed.

Douglas E. Henriques
Administrative Judge

We concur:

Will A. Irwin
Administrative Judge

Anne Poindexter Lewis
Administrative Judge

Footnotes from 69 IBLA 384:
a) GFS(MIN) 369(1981)
b) GFS(MIN) 47(1981)
c) GFS(MIN) 324(1981)
d) GFS(MIN) 86(1981)
e) GFS(MIN) 22(1981)
f) GFS(MIN) 29(1981)
g) GFS(MIN) 322(1981)

FEASIBILITY STUDY

OF THE

McFADDEN PEAK FLUORSPAR PROPERTY

GILA COUNTY, ARIZONA

FOR

TRIANGLE MINING COMPANY

ADDENDUM 1

TO

PHASE 1

1 of 2

March 1979

PINCOCK, ALLEN & HOLT, INC.
4420 East Speedway Blvd.
Tucson, Arizona 85712

FEASIBILITY STUDY

OF THE

McFADDEN PEAK FLUORSPAR PROPERTY

GILA COUNTY, ARIZONA

FOR

TRIANGLE MINING COMPANY

ADDENDUM 1

TO

PHASE 1

March 1979

PINCOCK, ALLEN & HOLT, INC.
4420 East Speedway Blvd.
Tucson, Arizona 85712

TABLE OF CONTENTS

Introduction

This report is an addendum to the December 1978 report entitled "Feasibility Study of the McFadden Peak Fluorspar property Gila County, Arizona, for Triangle Mining Company - Phase I".

This report is being issued to:

1. Report additional information on the drilling program since December 7 as it affects the ore reserve estimates.

2. Adjust the mining costs based on an in-depth review of mine planning and analysis of labor and capital costs presented in the December report.

3. Recalculate the financial analysis based on 1 and 2 above.

This addendum should be routed to all holders of the December 1978 report and form an intregal part of that document.

Summary

Core drilling has been slowed down over the past three months because of inclement weather conditions with only about 330 feet of progress being reported. However, core logs of holes T-11, T-14 and T-15 do not strengthen the inferred reserve picture. On this basis we have deleted the 600,000 ton reserve estimate from our economic analysis. A copy of Dr. Peters letter addressed to Mr. John F. Clouser, regarding the current drill core logging, is in Appendix I of this report.

We have developed a cash flow analysis for 450,000 tons and 500,000 tons of reserves with the adjusted mining costs and the land payment of 974,000 dollars. In addition we have developed the cash flow analysis for 450,000 tons of reserves and a land payment of 200,000 dollars. The DCF-ROI for the three cases are shown below.

Case 1 - 450,000 tons reserve - $974,000 land payment
4.33% DCFROI

Case 2 - 500,000 tons reserve - $974,000 land payment
5.98% DCFROI

Case 3 - 450,000 tons reserve - $200,000 land payment
8.61 DCFROI

The details of these analyses are developed in the financial analysis section of this report, pages one through eighteen.

The estimated underground mining cost has been increased from $14.99 per ton of ore in the December report to the present estimate of $26.75 per ton of ore. The increase reflects additional labor and supplies that we believe will be necessary to sustain a production rate of 280 tons per day, five days a week, 250 days per year. These additional costs became apparent when the PAH staff made an in-depth review of the December Mining plan and estimate. The details of the latest mining cost estimate are presented in the underground mining section of this addendum report, pages 19 through 44.

The net result of these changes is to shift the projected economics from a DCF-ROI of approximately 20% to a DCF-ROI of 4% for the 450,000 ton reserve. This illustrates the sensitivity of the DCF-ROI calculation to shifts in ore reserves, capital and operating costs.

Review of milling costs and procedures does not appear in this Addendum. This information remains unchanged from the data included in the original report of December 1978.

Financial Analysis

We have re-run the preliminary financial analysis of the project using the mill recoveries and sale price, from the December report. We have again used the standard method of discounted cash flow analysis. In other words, we have calculated the discounted cash flow return on investment (DCF-ROI) represented by the annual net cash flows. (See Tables 3-1, 3-2, and 3-3.) Costs are in late 1978 dollars and inflation was not taken into account.

Since the ore reserves are not fully delineated, analysis of two cases were made. Case I was a 450,000 ton reserve (Table 3-1), Case II was a 500,000 ton reserve (Table 3-2). Since the purchase price was not finalized at this time, Case III was run to determine the rate of return with a purchase price of 200,000 dollars instead of the 974,000 dollars used for Cases I and II.

For Cases I and II the land payment to Western Fluorspar of 974,000 dollars was spread out according to instruction from Mr. John Bogert, with no interest charged. The lease payment to Mr. Woodie Nichols was included in the operating costs for all cases.

The following paragraphs are descriptions and explanations of the categories used in the cases. On page 5a is given a chart summarizing the mining plan and costs:

1. Ore Milled and Ore for which Payment is Received

These are two separate entries in the table(s). The reason is that we have assumed a two-month time lag between mining and milling of ore and receipt of payment for the product derived from the ore. This eliminates the need for treating working capital as a separate item since spare parts inventories have been allowed for in the mill capital cost.

2. Sales

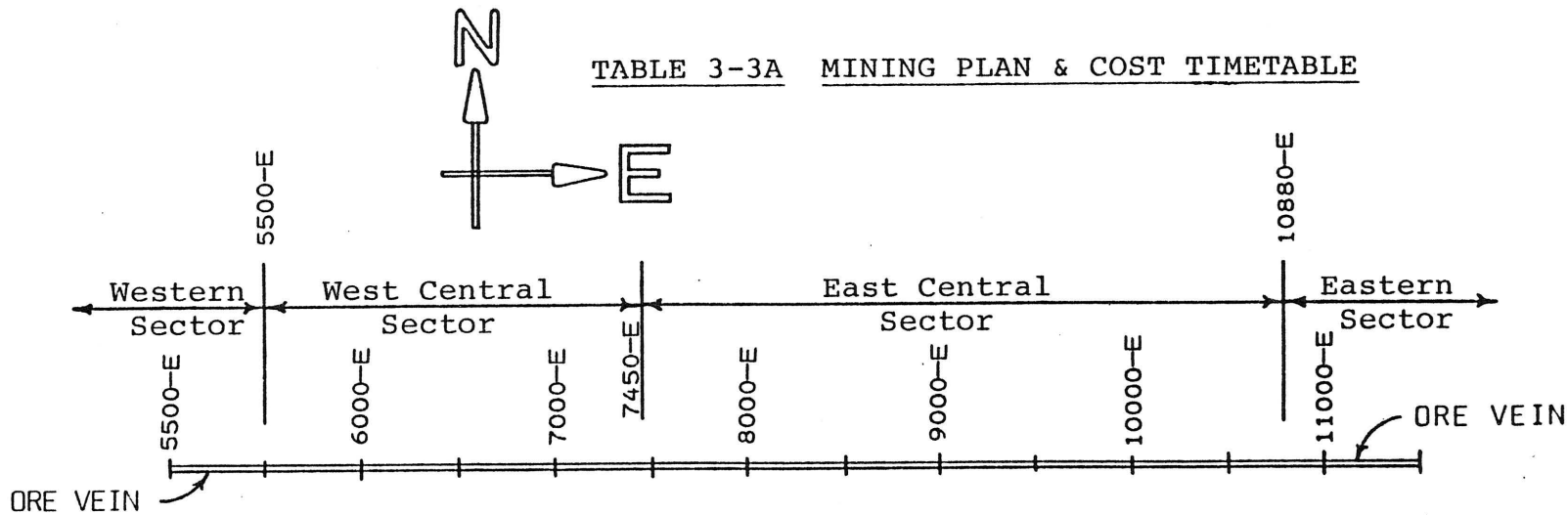
Sales are based on a price of $57.28 per dry short ton of ore fed to the mill. This price reflects sales of 50% metallurgical grade, at a product value of $80.54, and 50% acid grade at a product value of $98.54, delivered to Mesa. The methods used to arrive at these prices are described in greater detail in the metallurgical section of the report on page 151*.

3. Freight to Railhead

This is the freight cost for moving product from

*Refer to December 1978 Phase 1 Report.

TABLE 3-3A MINING PLAN & COST TIMETABLE



Total Recoverable Ore:	0 tons	90,000 tons	289,000 tons to 339,000 tons	71,000 tons
Mining Method:		Underground	Underground	Open Pit
Mining Costs/Ton:		$26.75	$26.75	$7.31
Pre-Prod. Development Costs:		$240,400 in Year 1979		$245,000 in Year 1980
Mine Capital Expenditures:		$295,000 in Year 1979		-0-
Land Reclamation Costs:		-0-	-0-	$450,000 in Year 1986
Tonnage By Year:				
1979		6,000	--	--
1980		70,000	--	--
1981		14,000	--	56,000
1982		--	55,000	15,000
1983		--	70,000	--
1984		--	70,000	--
1985		--	70,000	--
1986		--	24,000	--

the mill to the railhead in Mesa. The unit cost is $7.81 per dry short ton of product, which equates to $5.06 per dry short ton of ore fed to the mill. The method used to arrive at these costs is detailed in the metallurgical section on page 151*.

4. Severance Tax

The severance tax (an Arizona tax) is 2.5 percent of sales less freight from the mill to the railroad.

5. Gross Income from Mining

Gross income from mining is the amount against which the percentage depletion rate is applied to calculate statutory depletion. The depletion allowance is, of course, limited to 50 percent of net before depletion. This is explained further below under Depletion.

6. Development Cost

This is the pre-production mine development costs. In the mining business it is often referred to as "primary development", as opposed to operating development or stope preparation. There are three

*Refer to December 1978 Phase 1 Report

sectors of the vein which must be developed. the West Central, containing approximately 90,000 tons of ore which must be mined underground, the Eastern Sector open pit containing approximately 71,000 tons, and the East Central Sector underground which contains the remaining ore.

The development drilling and engineering evaluation costs of 315,000 dollars were included in 1978. The East and West Central Sector development has been allowed for in 1979. The amount is 240,400 dollars. The Eastern Sector open pit has been allowed for in 1980. The amount is 245,000 dollars which covers clearing trees and stripping.

Reclamation of the open pit land has been allowed for in 1986. The amount is 450,000 dollars which includes replacing the excavated material and planting trees.

There are various possible tax treatments of mine development costs. At extremes are the alternatives of (a) deducting all development expenses as incurred, and (b) capitalizing all development costs and amortizing them on some basis acceptable to the

Internal Revenue Service. With respect to what constitutes mine development expense, there are again varying opinions and tax treatments. For example, some companies deduct the cost of mining machinery that goes underground in the year of acquisition; others do not.

For this financial analysis, we have deducted all mine development costs in the year in which they are incurred. We have, however, not treated mining machinery as development expense, but only have so treated such items as excavation and support of underground items. We have thus been a little conservative.

The deductions for primary development before there is sufficient revenue to cover gives rise to operating losses in the early years, which are then carried forward (see Tables 3-1, 3-2, and 3-3) against taxable income in later years. Note that operating losses carried forward do not affect the depletion deduction in the year into which they are carried, but if development costs were capitalized and amortized, they would reduce income subject to depletion.

7. Land Lease

This is the land lease payment to Mr. Woodie Nichols. This amounts to a fixed yearly amount of $30,000 plus $1.00 per ton of ore for each ton over 40,000 tons.

8. Mining and Milling Costs

These are the usual cash operating costs for stope preparation (operating development), extraction of ore, and concentration into a salable product. The mining costs were not the same each year due to the different mining methods used. Underground mining costs were taken at $26.75 per ton, open pit at $7.31 per ton of ore. Milling costs were constant at $10.80 per ton of ore.

9. General and Administrative Cost

This again is a cash operating cost and is a difficult one to estimate accurately. It includes salaries of a manager at $40,000 per year, accountant at $27,000 per year, and a clerk at $16,000 per year. Insurance is assumed to cost 1.5% of total capital. Miscellaneous such as road and building maintenance, office supplies, etc. are assumed to be $10,000 per

year. For the Year 1979, when the plant was starting up, six months of the $133,000 was included. At the end of production when the ore body was being depleted a ratio of the last year's production over the previous year's production was taken of the $133,000. The General and Administrative also includes property tax which in Arizona is assessed against the value of reserves as well as tangible personal property. We have estimated this tax at $1.00 per ton of ore milled on a preliminary basis.

10. Depreciation

Depreciation of plant and equipment has been taken on a units-of-production basis with tons of ore milled as the units of production. Salvage value has been assumed to be five percent of the cost of machinery and equipment and is added back in on the last year of operation.

11. Depletion

The depletion deduction is computed each year by two methods known as cost depletion and percentage (statutory) depletion. Cost depletion is always

available while percentage depletion is only available in years in which there is positive net before depletion. In each year, both cost and percentage depletion deductions are calculated, and the larger of two may be taken. Cost depletion is, however, no longer available once the cost basis in the property is recovered through depletion deductions, while percentage depletion is unrelated to the adjusted basis in the property.

In the case of fluorspar, the percentage depletion rate is 22 percent. This is applied to gross income from mining. The percentage depletion deduction is limited, however, to fifty percent of net before depletion.

12. Taxable Income before Carry Forward of Operating Losses

This is simply net before depletion minus the depletion deduction. If there are no operating losses in prior years which can be carried forward against this amount, it is taxable income.

13. Operating Loss Carried Forward

This is the operating losses of early years due to mine development costs.

14. Income Taxes

We have estimated both federal and state income taxes. The taxes were calculated using the expressions:

FIT = 0.48 (TI - SIT) - $6,500

SIT = 0.105 (TI - FIT_ - $ 280

in which FIT is federal income tax

SIT is state income tax

TI is taxable income.

We first estimated federal income tax before investment tax credit and before the minimum tax on preference income. The investment tax credit was then estimated. We assumed that 500,000 dollars of the initial investment in plant and equipment would qualify for the full ten percent credit. The credit was used as fast as the law permits, specifically in any year it is equal to the first 25,000 dollars of taxes plus one-half of the tax in excess of 25,000 dollars. The credit can be carried forward.

The difference between the percentage depletion deduction and the adjusted basis in a mineral property is a preference item under the federal minimum

tax regulation. The tax is 15 percent of the sum of preference items less the federal income tax (as reduced by the investment tax credit) before the minimum tax on preference items. This minimum tax has been taken into account in our estimates of the federal income tax.

The Arizona income tax regulations follow the federal code.

15. Land Payment

This is the amount to be paid to acquire Western Fluorspar's lease in the mining claims owned by Mr. Woodie Nichols. The total amount used in the financial analysis was 974,000 dollars. This was spread out according to instructions from Mr. John Bogert, as follows:

Year	Amount
1978	$280,000
1979	109,199
1980	129,732
1981	129,732
1982	129,732
1983	129,732
1984	65,873

No interest charge is included as a penalty for spreading the payments out, since such interest

is not a proper deduction in computation of cash flow for valuation of the property.

16. Plant and Equipment

This is the cost of buildings, machinery and equipment for the mine and mill. These are the amounts recovered by the depreciation deduction. In Year 1979, capital expenditures of 295,000 dollars were made for the West Central Mine, and 2,366,598 dollars for the mill.

17. Cash Flow

Cash flow is defined in the normal manner as net income plus depreciation, depletion, and salvage, and less capital expenditures for land, plant, and equipment.

No interest costs are deducted to arrive at cash flows. The cost of capital is included with the discount rate used to estimate net present value.

18. DCFROI

The DCFROI(s) for the three cases were estimated by calculating the net present value of the cash flows

shown in Tables 3-1, 3-2, and 3-3 at varying discount rates until a discount rate was found that brought the net present value to zero. This discount rate is the DCFROI.

The DCFROI's for the three cases are shown here:

Case I	- 450,000 ton reserve $974,000 purchase price	DCF-ROI = 4.33%
Case II	- 500,000 ton reserve $974,000 purchase price	DCF-ROI = 5.98%
Case III	- 450,000 ton reserve $200,000 purchase price	DCF-ROI = 8.61%

Table 3-1

CASE I - 450,000 TONS ORE (U.S. Dollars)

Project Year		1978	1979	1980	1981	1982	1983	1984	1985	1986
Ore Mined, DST		0	6,000	70,000	70,000	70,000	70,000	70,000	70,000	24,000
Ore PMT received		0	5,000	59,333	70,000	70,000	70,000	70,000	70,000	35,667
Sales	$	0	286,400	3,398,613	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	2,042,987
Freight, mill to rails	$	0	30,360	354,200	354,200	354,200	354,200	354,200	354,200	121,440
Severence tax @ 2.5%	$	0	6,401	76,110	91,385	91,385	91,385	91,385	91,385	48,039
Gross Income Mining	$	0	249,639	2,968,303	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	1,871,503
Costs:										
Mine Development	$	315,000	240,400	245,000	0	0	0	0	0	450,000
Lease pmt. to Nichols	$	0	30,000	59,997	59,997	59,997	59,997	59,997	59,997	30,000
Mining per schedule	$	0	160,500	1,872,500	784,000	1,580,600	1,872,500	1,872,500	1,872,500	642,000
Milling @ $10.88/ton	$	0	65,280	761,600	761,600	761,600	761,600	761,600	761,600	261,120
G&A	$	0	72,500	203,000	203,000	203,000	203,000	203,000	203,000	69,600
Depreciation	$	0	33,714	393,325	393,325	393,325	393,325	393,325	393,325	134,854
Total Costs	$	315,000	602,394	3,535,422	2,201,922	2,998,522	3,290,422	3,290,422	3,290,422	1,587,574
Net before depletion	$	-315,000	-352,755	-567,119	1,362,093	565,493	273,593	273,593	273,593	285,934
Depletion allowance	$	0	12,987	151,511	681,046	282,746	151,511	151,511	151,511	142,967
Taxable Income	$	-315,000	-365,742	-718,630	681,046	282,746	122,082	122,082	122,082	142,967
Oper. loss carried fwd.	$	0	0	0	681,046	282,746	122,082	122,082	122,082	69,333
Taxable income after loss carry forward	$	-315,000	-365,742	-718,630	0	0	0	0	0	73,634
Federal income tax	$	0	0	0	0	23,144	22,727	22,727	22,727	22,129
State income tax	$	0	0	0	0	0	0	0	0	0
Net income (operating loss added back in)	$	-315,000	-365,742	-718,630	681,046	259,603	99,355	99,355	99,355	120,838
Depreciation, depletion, & salvage	$	0	46,701	544,836	1,074,372	676,072	544,836	544,836	544,836	410,901
Plant & equipment	$	0	-2,661,598	0	0	0	0	0	0	0
Land	$	-280,000	-109,199	-129,732	-129,732	-129,732	-129,732	-65,873	0	0
Cash Flow	$	-595,000	-3,089,838	-303,526	1,625,686	805,942	514,459	578,318	644,191	531,739

FROI = 4.33 percent

Table 3-2

CASE II - 500,000 TONS ORE (U. S. Dollars)

		1978	1979	1980	1981	1982	1983	1984	1985	1986
Ore Mined, DST		0	6,000	70,000	70,000	70,000	70,000	70,000	70,000	74,000
Ore PMT received		0	5,000	59,333	70,000	70,000	70,000	70,000	70,000	85,667
Sales	$	0	286,400	3,398,613	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	4,906,987
Freight, mill to rail	$	0	30,360	354,200	354,200	354,200	354,200	354,200	354,200	374,440
Severence tax @ 2.5%	$	0	6,401	76,110	91,385	91,385	91,385	91,385	91,385	113,314
Gross Income Mining		0	249,639	2,968,303	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	4,419,233
Costs:										
Mine Development	$	315,000	240,400	245,000	0	0	0	0	0	450,000
Lease pmt. to Nichols	$	0	30,000	59,997	59,997	59,997	59,997	59,997	59,997	64,003
Mining per schedule	$	0	160,500	1,872,500	784,000	1,580,600	1,872,500	1,872,500	1,872,500	1,979,500
Milling @ $10.88/ton	$	0	65,280	761,600	761,600	761,600	761,600	761,600	761,600	805,120
G&A	$	0	72,500	203,000	203,000	203,000	203,000	203,000	203,000	207,000
Depreciation	$	0	30,342	353,993	353,993	353,993	353,993	353,993	353,993	374,221
Total Costs	$	315,000	599,022	3,496,090	2,162,590	2,959,190	3,251,090	3,251,090	3,251,090	3,879,843
Net before depletion	$	-315,000	-349,383	-527,787	1,401,425	604,825	312,925	312,925	312,925	539,390
Depletion allowance	$	0	11,688	136,360	700,713	302,413	156,463	156,463	156,463	269,695
Taxable Income	$	-315,000	-361,071	-664,147	700,713	302,413	156,463	156,463	156,463	269,695
Oper. loss carried fwd.	$	0	0	0	700,713	302,413	156,463	156,463	24,167	0
Taxable income after loss carry forward	$	-315,000	-361,071	-664,147	0	0	0	0	132,296	269,695
Federal income tax	$	0	0	0	0	26,576	23,469	23,469	35,432	129,177
State income tax	$	0	0	0	0	0	0	0	2,172	14,474
Net income (operating loss added back in)	$	-315,000	-361,071	-664,147	700,713	275,837	132,993	132,993	118,859	126,043
Depreciation, depletion, & salvage	$	0	42,030	490,353	1,054,705	656,405	510,455	510,455	510,455	776,995
Plant & equipment	$	0	-2,661,598	0	0	0	0	0	0	0
Land	$	-280,000	-109,199	-129,732	-129,732	-129,732	-129,732	-65,873	0	0
Cash Flow	$	-595,000	-3,089,838	-303,526	1,625,686	802,510	513,717	577,576	629,314	903,039

DCFROI = 5.98 percent

Table 3-3

CASE III - 450,000 TONS ORE, $200,000 PURCHASE PRICE

roject Year		1978	1979	1980	1981	1982	1983	1984	1985	1986
re Mined, DST		0	6,000	70,000	70,000	70,000	70,000	70,000	70,000	24,000
re PMT received		0	5,000	59,333	70,000	70,000	70,000	70,000	70,000	35,667
ales	$	0	286,400	3,398,613	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	2,042,987
reight, mill to rails	$	0	30,360	354,200	354,200	354,200	354,200	354,200	354,200	121,440
everence tax @ 2.5%	$	0	6,401	76,110	91,385	91,385	91,385	91,385	91,385	48,039
ross Income Mining	$	0	249,639	2,968,303	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	1,873,508
osts:										
ine Development	$	315,000	240,400	245,000	0	0	0	0	0	450,000
ease pmt. to Nicholas	$	0	30,000	59,997	59,997	59,997	59,997	59,997	59,997	30,000
ining per schedule	$	0	160,500	1,872,500	784,000	1,580,600	1,872,500	1,872,500	1,872,500	642,000
illing @ $10.88/ton	$	0	65,280	761,600	761,600	761,600	761,600	761,600	761,600	261,120
&A	$	0	72,500	203,000	203,000	203,000	203,000	203,000	203,000	69,600
epreciation	$	0	33,714	393,325	393,325	393,325	393,325	393,325	393,325	134,854
otal Costs	$	315,000	602,394	3,535,422	2,201,922	2,998,522	3,290,422	3,290,422	3,290,422	1,587,574
et before depletion	$	-315,000	-352,755	-567,119	1,362,093	565,493	273,593	273,593	273,593	285,934
epletion allowance	$	0	2,667	31,111	681,046	282,746	136,796	136,796	136,796	142,967
ixable Income	$	-315,000	-355,422	-598,230	681,046	282,746	136,796	136,796	136,796	142,967
er. loss carried fwd.	$	0	0	0	681,046	282,746	136,796	136,796	31,266	0
ixable income after ss carry rward	$	-315,000	-355,422	-598,230	0	0	0	0	105,531	142,967
deral income tax	$	0	0	0	77,224	42,412	20,519	20,519	27,336	56,290
ate income tax	$	0	0	0	0	0	0	0	0	0
t income (operating ss added back in)	$	-315,000	-355,422	-598,230	603,923	240,335	116,277	116,277	109,461	86,677
preciation, deple- on, & salvage	$	0	36,381	424,436	1,074,372	676,072	530,122	530,122	530,122	410,901
ant & equipment	$	0	-2,661,598	0	0	0	0	0	0	0
nd	$	-200,000	0	0	0	0	0	0	0	0
sh Flow	$	-515,000	-2,980,639	-173,794	1,678,194	916,406	646,399	646,399	639,582	497,578

FROI = 8.61 percent

Underground Mining

Estimated ore reserves of the central sector of the deposit, extending from Coordinate 5500-E to Coordinate 10880-E total 424,600 tons. The vein occurs in competent host rocks and the vertical dimension of the vein in a major portion of this zone is such that it would mean unfavorable waste to ore ratios for surface extraction. Drilling and blasting for removal of the wallrock to expose the spar would be costly. Underground mining is therefore planned for this zone. It is divided into two separate areas:

1. West Central

   This sector extends from the existing drift portal at Coordinate 7450-E to Coordinate 5500-E and ore reserves are estimated to total 113,900 tons, not including tonnage extracted by Western Fluorspar. Minable ore excluding pillars totals 90,000 tons.

2. East Central

   This sector extends from Coordinate 7450-E to Coordinate 10880-E and is estimated to have reserves of 310,700 tons. Minable ore excluding pillars totals approximately 250,000 tons.

This portion of the deposit would be mined after strip mining is completed. It would be extracted through an access drift collared approximately 3400 ft east of the existing mine portal, at Coordinate 10880-E and an approximate elevation of 5740 ft.

The plan obviates the proposed adit at 9470-E and 10,000-N as outlined in the Preliminary Report, October, 1978, and reduces the capital and preproduction costs accordingly.

Underground Method

The underground method selected for all underground mining is underhand bench with draw point loading. This method is illustrated in Figure 5-3 and 6-2, Proposed Underground Mining with Topography, and Figure 6-3, Typical Stope Development and Mining.

Deciding factors in selecting the method were:

Maximum ground control

Minimum dilution

No underground inventory of ore required

Minimum stope preparation and chute construction

Safety

As part of the mine layout, an estimate of the stope widths and pillar widths was required for determining minable ore reserves and costing out underground mining. For this initial stage of mine design and ore reserve calculations, stope widths of 82 ft and pillar widths of 18 ft should be feasible. To help reduce dilution and prevent loose rock from falling, rock bolting and wire mesh of the hanging wall should be considered. Each pillar should be oriented with its long axis down the dip of the vein and continuous because of the high frequency and low shear strength of geologic structures parallel to the vein.

A complete rock mechanics study was not considered necessary at this stage in the project. If feasibility is established, a rock testing program should be made, and stope widths and pillar dimensions should be re-evaluated. (See Appendix, Preliminary Rock Mechanics Study).

The underground mining method is described as follows:

The vein is divided into ore blocks 100 ft long along the strike and extending from the working level to surface, or the level above, as the case may be. This block length is based on the preliminary rock mechanics study.

The main haulage drift is driven in the footwall leaving an approximate pillar width of 20 ft between the footwall and haulage drift.

Block development for each stope section consists of a draw point turnout, driven at an angle from the haulage drift to the hanging wall of the vein to facilitate loading, at the block center line. A development and extraction raise is then driven on ore from the face of the crosscut to surface following the centerline of the ore block. Two additional draw point turnouts are driven to the vein hanging wall east and west of the center crosscut on 26 ft centers leaving 18 ft pillars between.

Extraction raises from these adjacent draw points are driven on the vein for a distance of 6 ft above the back of the draw point turnout crosscut.

After the development raise is connected to surface, or the level above, and the raise stripped of timber and air and water lines, underhand benching commences on the vien, adjacent to the raise opening. Each bench is carried six ft along the vien and six ft down dip. The initial blast consists of one cut to form the first

bench each side of the central raise. These benches are cleaned off after the blast by mucking the residual broken ore into the central raise. Drilling continues at the surface as before and on each bench maintaining the six ft dimension for each round. After blasting, two benches are cleaned into the central raise, the uppermost bench being mucked off first so drilling can commence as soon as the third surface round is completed. All three rounds are now blasted and mucked into the central raise. The three benches each side (six in all) are carried down dip until the extraction raises, east and west of the central raise, are exposed thereby forming three extraction openings. The crew then moves back to the surface and repeats the procedure, leaving an open stope 82 ft wide bounded by the 18 ft vertical pillars to the east and west when completed.

After each blast, the hanging and footwall are scaled and ground support placed if required, be it rock bolts, timber stulls with headboards, or some combination of bolts and cyclone fencing. In this manner, the walls are made safe before the crew blasts another series of benches. Blast holes are drilled in the ore only using the exposed bench face as a guide.

If a second lift is to be removed, it will be necessary to bulkhead the vein opening above the level elevation before stoping operations are conducted below.

The above described procedure is followed for each block in succession until all "block-ore" is extracted. The salvage operation follows and may recover 45% of the pillars.

Ventilation

Ventilation must be adequate in all development and stoping areas, with special attention to those areas where diesel equipment may be utilized.

Ventilation intake will be through the main haulage drift in the west central sector with exhaust to surface through the active stopes and designated exhaust raises.

Intake for the east central sector will be through the east haulage drift with exhaust to surface through active stoped and designated exhaust raises.

Electric axivane fans will provide ventilation for development headings.

Production Requirements

Annual milling rate	70,000	tons per year
Daily milling rate (7 days/week)	200	tons per day
Daily mining rate (5 days/week)	280	tons per day

West Central Sector

Initial underground production will come from the west central sector where stope blocks can be developed by advancing the existing drift and driving the necessary block development raises to surface.

This production will be trammed by battery locomotive to the portal ore bins and by truck to the mill.

Rehabilitation of the existing drift and track will be required to assure efficient tramming before preproduction development and stope preparation can be started. This is estimated to take 2 to 3 weeks.

The west central sector ore reserves, above the drift elevation, total approximately 90,000 tons of minable ore, sufficient for a one year operation. The daily tonnage will be produced from two operating stopes plus the modest production

generated by development and stope preparation work, principally raising.

The average stope block contains approximately 5,400 tons and will be in production about 1.9 months, allowing for downtime, after block development and preparation are completed. At this rate, disregarding development and stope preparation ore, it will be necessary to provide a replacement stope every 39-day working period.

Stope Development Totals

		Advance/Day
Drifting	= 100 ft ÷ 39	2.6 ft
Turnouts (3)	= 75 ft ÷ 39	1.9 ft
Raising	= 172 ft ÷ 39	4.4 ft
		8.9 ft

Stope Preparation Totals

Prep raises = 12 ft (two at 6 ft included above)

To ensure uninterrupted stope ore production allowing for unscheduled downtime, it will be necessary to have at least three stopes prepared for production at all times. Therefore, preproduction development and stope preparation is required as follows:

Stope Development

Drifting	525 ft
Raising	516 ft

East Central Sector

The bulk of the ore reserves lie in the east central sector and extends from Coordinate 7480-E to 10880-E. Vertically, the ore extends from elevation 5740 ft to elevation 5950 ft (as presently known). Minable ore totals 250,000 tons and will be mined by the underhand bench method as in the west central sector.

Development of the east central sector is scheduled to start after pit production is completed or operations have shifted eastward sufficiently to allow both projects to proceed without interference.

Manpower

Current wages for underground mining personnel plus fringe benefits of 35%, coupled with a production rate of 280 tpd, make mining costs extremely labor sensitive. For example, the addition of one worker to the daily expenditures can affect the mining cost per ton approximately $0.30. It, therefore, behooves mine management personnel to be cost and

productivity conscious; each man must perform a full shift's work. The estimated manpower is the minimum required to produce 280 tons per day and supervision must insist on maximum productivity to meet production goals.

Mine administrative costs also have considerable impact and supervisory personnel must be limited to one man per shift. It is preferred that the day shift be supervised by the mine superintendent with a shift boss supervising the second shift. The maximum number of employees per shift is 20, and each working place may be visited, at least twice per shift. A project manager, accountant and clerk are included in the general administrative costs (p. 20, sec. 9) of the Phase I report.

Duties

1. Development Crews (4 men, day shift only)
   - A. Muck out with service only from motor crew
   - B. Drill and blast
   - C. Work two faces whenever possible:
     - Main heading
     - Turnout or raise
   - D. Drive development and prep. raises
     - Development raise

Prep. raise

Install raise timber

2. Stope Crews (8 men/shift, 2 shifts per day)

   A. Strip timber from development raise

   B. Drill and blast

   C. Muck off benches

   D. Install necessary timber and roof bolts

   E. Drive prep. raises when required (12 ft/stope block)

   F. Transport explosives and supplies to working face

3. Motor Crews (2 men/shift, 3 shifts per day)

   A. Supply development crews with cars as required

   B. Supply loader operator (draw points) with cars as required

   C. Move supply trucks from patio to underground timber or supply stations as required

   D. Place and remove batteries on/from charging racks

4. Pipe and Track (2 men, day shift only)

   A. Install track in development heading (haulage)

   B. Install track in turnouts to draw points

   C. Transport track as required in headings

D. Transport ties and other supplies as needed

E. Install pipe as required

F. Install vent tube as required

5. Topman (1 man, day shift only)

A. Receive and dispatch supplies - place supplies in supply room

B. Move explosives from surface magazine to powder car and unload at underground magazine

C. Break boulders on grizzly when required

D. Perform other odd jobs as directed.

6. Mechanic (1 man, day shift only)

A. Maintain rock drills, feed legs and stopers as required, in operating condition

B. Maintain haulage equipment

C. Maintain rocker shovels

D. Maintain mechanical elements of battery locomotives and fans

E. Maintain compressors, mechanical elements of generator sets, pumps

F. Maintain company vehicles

G. Repair chute gates, etc., as required.

7. Electrician (1 man, day shift only)

A. Attend and maintain mine lamps

B. Install and maintain surface and underground lighting and fan circuits

C. Install and maintain mine fans

D. Maintain generators

E. Maintain electrical circuits

8. Repair Crew (2 men, day shift only)

A. Repairs to timber in:

(1) Drifts

(2) Escapeways

B. Repairs to chutes and bins

C. Miscellaneous surface and underground maintenance

D. Construct underground magazines and toolrooms

9. Labor (1 man, day shift only)

A. Supplies to underground

B. Track and ditch cleaning

C. Assist where necessary

Operating Labor Cost

Administrative Labor

Mine Supt.	$ 35,000	35,000
Shift Boss	20,000	20,000
Engineer	25,000	25,000
		$ 80,000

Direct Labor

Underground	Number per shift	Shifts per day	Total per day	$ per manshift	Total cost per day
Miner (stope)	4	2	8	86.40	691.20
Miner (dev)	2	1	2	86.40	172.80
Miner (repair)	1	1	1	86.40	86.40
Miner Helper (stope)	4	2	8	70.20	561.60
Miner Helper (dev)	2	1	2	70.20	140.40
Miner Helper (repair)	1	1	1	70.20	70.20
Motorman	1	3	3	75.50	226.50
Swamper	1	3	3	70.20	210.60
Mucker Operator	1	3	3	75.50	226.50
Pipe and track	1	1	1	75.50	75.50
Pipe and track helper	1	1	1	70.20	70.20
Labor	1	1	1	70.20	70.20
	20		34		2602.10
Surface					
Mechanic	1	1	1	86.40	86.40
Electrician	1	1	1	86.40	86.40
Topman	1	1	1	70.20	70.20
	3		3		243.00
TOTAL DIRECT LABOR	23		37		2845.10

COST SUMMARY

Preproduction Costs

Capital Purchases	$ 295,000
Development	222,100
G & A	18,300
Total	$ 535,400

Operating Costs

	$/Ton
Development & Stope Preparation	2.80
Mining	12.80
Support & Services	5.14
G & A	1.57
	22.31
Contingency at 20%	4.44
	$ 26.75

CAPITAL EXPENDITURES

Buildings		
Office	$ 10,000	
Shop - Mechanical-Electrical	5,000	
Compressor shed	1,500	
Generator shed	1,500	
Miscellaneous installations		
Sanitation	2,000	
Powder magazine	2,000	
		$ 22,000
Equipment		
Compressor (used)	$ 18,500	
Rocker shovels (2-used)	12,000	
Mine cars (10-used)	2,500	
Mine lamps & safety equip. (new)	4,000	
Generator 150 KVA (new)	45,000	
Rock drills (feed leg)	5,500	
Rock drills (sinkers-5)	8,000	
Rock drills (stopers-3)	6,000	
Air receiver	2,500	
Fans, vent (3-used)	4,500	
Used locomotive (2)	13,000	
Transformers (2) 440V-110V	1,000	
Tugger (2) AW 80 or equivalent (used)	2,000	
Underground supply trucks	1,000	
		$125,500

Water Supply		
Tank (1 on site)	$ 500	
Pumps (well & surface)	5,000	
		$ 5,500
Transportation Equipment		
Dump truck (haul-mine to mill)	15,000	
Pick-up	6,000	
Stake body-supplies haulage	9,000	
Motor grader (used)	35,000	
		65,000
Shop Equipment		
Welding outfits-Drill press & forge,	4,850	
Drill sharpeners (2) air powered	2,500	
Power saws (used) - chain	500	
- Skill	500	
Lubricating gun	100	
Vise	50	
Inventory - parts	20,000	
Miscellaneous	10,000	
		38,500
Subtotal Capital Purchases		256,500
Contingency at 15%		38,500
Total capital purchases		295,000

PREPRODUCTION DEVELOPMENT

Environmental		
Plan of operation and approval		$ 10,000
Access Roads		
Includes reconditioning of existing roads		5,000
Personnel		
Acquisition and training		5,000
Engineering & Technical Services		6,000
Surface		
Recondition mine patio area	$ 500	
Reconstruct ore & waste trestle	5,000	
Level area outside mine portal	500	
		6,000
Underground Preproduction		
Recondition & repair main haulage drive-labor	1,500	
Supplies	1,000	
Survey of existing openings and prepare maps and sections	6,000	
Drive footwall haulage drift and turnouts (530 ft @ $100 = /ft)	53,000	
Drive development raises (480 ft @ 120-/ft)	57,600	
Drive 6-6 ft preparation raises @ $100-/ft	3,600	
Stripping development raises	1,400	
		$124,100

Other		
Power	$ 11,500	
Surface haul	1,000	
Miscellaneous	24,500	
		$ 37,000
Subtotal Preproduction Development		193,100
Contingency at 15%		29,000
Total Preproduction Development		$222,100

General & Administration

Mine Superintendent		
1 @35,000/yr x 1/3 yr	=	$ 11,700
Shift Boss		
1 @20,000/yr x 1/3 yr	=	6,600
		$ 18,300

Direct Operating Costs

DEVELOPMENT AND STOPE PREPARATION

Labor

Miners (2 @ $86.40/day + bonus)	$ 212.80
Helpers (2 @ $70.20/day + bonus)	180.40
	$ 393.20/day

		Cost/ft
Drifting	$196.60 ÷ 4.5 ft/day =	43.69
Raising	$196.60 ÷ 4.4 ft/day =	44.68

Drifting

Supplies:	Cost/ft	Cost/ton
Drilling	8.00	0.13
Blasting	11.03	0.18
Mucking	3.33	0.05
Track	6.00	0.10
Service lines	5.75	0.09
Ground support	2.10	0.03
Tramming	3.33	0.05
Miscellaneous	4.73	0.08
Sub total supplies:	44.27	0.71
Labor:	43.69	0.70
Total Cost Drifting	$ 87.96	$ 1.41
Total Special Openings		.05
Total Diamond Drilling		.10

Raising

	Cost/ft	Cost/ton
Supplies:		
Drilling	$ 6.82	0.11
Blasting	14.12	0.22
Tramming	2.72	0.04
Service lines & Ground Support	10.82	0.17
Sub total supplies	34.48	0.54
Labor	44.68	0.70
Total Raising	$ 79.16	$ 1.24
Total Development and Stope Preparation		$ 2.80

MINING (280 tpd from 2 stope blocks)

Labor:		
8 miners/day @ $86.40 + bonus	$ 851.20	
8 helpers/day @ $70.20 + bonus	721.60	
Sub total labor	$1,572.80	$ 5.62
Supplies:		
Drilling		0.89
Blasting		1.17
Ground support		1.10
Miscellaneous		0.57
Sub total supplies		$ 3.73
Total stoping		$ 9.35

			Cost/ton
Loading and Hauling (3 shift/day)			
Labor:			
Shovel Operator	3 @ $75.50	$ 226.50	
Motorman	3 @ $75.50	226.50	
Helper	3 @ $70.20	210.60	
Sub total labor		$ 663.60	$ 2.37
Supplies: (Haulage equipment)			
Shovel			0.26
Motors			0.32
Cars			0.31
Track repair			.05
Miscellaneous			.04
Sub total supplies			$ 0.98
Total loading & Hauling			$ 3.35
Surface haulage			.10
Total Mining			$ 12.80

SUPPORT

Labor:	$/day	Cost/ton
Pipe & track	75.50	
Helper	70.20	
Mechanic	86.40	
Electrician	86.40	
Helper	70.20	
Topman	70.20	
Miner	86.40	
Helper	70.20	
Sub total labor	$615.50	$ 2.20
Supplies:		
Estimated at 40% of total labor & supply cost		1.47
Total support		$ 3.67

SERVICES

Power:	H.P.	Cost/ton
Office	5	
Shops	10	
Fans	100	
Battery Charging	15	
Pumps	10	
Miscellaneous	10	
	150	

$$\frac{150 \text{ HP} \times 746 \text{ kw/hp}}{.80 \text{ (eff)}} \times 24 \text{ hrs} \times \frac{\$ .04/\text{kw hr}}{1000} = \$135/\text{day}$$

$$\frac{\$135.00/\text{day}}{280 \text{ tons/day}} = .48$$

Compressed air:

1000 cfm @ $12/hr x 21 hrs/day = $252/day

$$\frac{\$252/\text{day}}{280/\text{tons/day}} = .90$$

Ventilation	.02
Pumping	.05
Communications	.01
Sewage disposal	.01
Sub total services	1.47
Total support and service	5.14

G and A

Salaried Personnel:	$/yr	Cost/ton
Mine Superintendent	35,000	
Shift Boss	20,000	
Engineer	25,000	
Sub total salaries	$ 80,000	$ 1.14

Supplies:	$/yr	
Office	2,000	
Mine changehouse	1,000	
Engineering	2,000	
Safety and training	18,000	
Lamps	2,000	
Miscellaneous	5,000	
Sub total supplies	$30,000	$ 0.43

Total G and A		1.57
Contingency 20%		4.44
Grand total Cost/ton		$ 26.75

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Tucson, AZ 85712
February 28, 1979

Mr. John F. Clouser
225 B Hunter Drive
Globe, AZ 85501

Re: Current Drill Core Logging, McFadden Peak Fluorspar Property, Gila County, Arizona.

Dear John:

This letter report, based on my logging of core at Globe on February 15, includes my recommendations for Hole T-16 ($T\text{-}K_2$), the updated logs for drill holes T-11 and T-14, and the log for T-15. I am also including some blank drill logging forms. The photographs of drill core taken on February 15 have now been developed; this completes the photography for all holes except for some parts of T-8, T-10, and T-11.

In logging the deeper core from T-11, some light blue fluorite with vein quartz was recognized in fragments of core at 243 feet. Core recovery was almost zero in the last five foot run, but I feel certain that this was in the vein. A plot of this data on Figure 5-18 of the December report from Pincock, Allen and Holt shows that the vein should be the same as intersected in Western's hole WN-8, but with a near-vertical dip. The projected surface location of the vein, in overburden, is about as shown in Figures 5-3 of the Pincock, Allen and Holt report.

In logging the deeper core from hole T-14, there is enough evidence of mineralization in zone of core loss and void from 181 feet to 200 feet to place the vein there. This agrees with the vein intercepts in T-10 and T-12, and it verifies the expected vein dip of 78^{o}-80^{o} to the South.

A projection of the data from the sites of holes T-10 through T-14 brings the surface projection of the vein to a position between 50 feet and 100 feet to the North of the site for Hole T-15 and proposed hole T-16. With a dip of 80°, this would have brought the vein intercept in T-15 to a position between 65 feet and 140 feet. I believe that the intercept was in the non-core part of the hole, since coring began at 120' in diabase with a few fragments of vein quartz (possibly from the hole walls).

A plan for hole T-16 is now in order:

1. Direction N 10° W, same as T-15.

2. Inclination minus 65 degrees.

3. Coring from the base of overburden or as soon as core can be recovered.

4. Total depth 320 feet unless the vein is intersected earlier.

The vein will be intersected in diabase at approximately 70 feet if it is in the closest position and has a steep dip, at approximately 130 feet if it is in the farther position and has a flatter dip, and at approximately 290 feet if it is in the far position and nearly vertical. From all indications, the dip is steep, but coring should begin as close to the surface as possible or the cuttings should be saved at approximately five-foot intervals in case the dip has flattened.

No plan can be made yet for hole T-17. It may be drilled from the same site as T-16 or from site T-L, depending upon evidence.

As I mentioned on February 15, I would like to have one of the pulps from Hole T-12 assayed again and a second sample from T-12 assayed by Skyline labs. The assay results from Rocky Mountain Geochemical are obviously incorrect, and I would like to have a correction factor. This should not cost more than about $25. I would also like to have a thin section made, at a cost of about $10 from the T-12 core sample taken on February 15.

I hope that the weather improves and that your plans to begin hole T-16 early in March can go ahead. I will be glad to come up and log core whenever you wish and I will be glad to discuss the drilling of the hole at any time you wish to call.

It was a pleasure working with you in Globe, and I am looking forward to seeing you again.

Sincerely yours,

William C. Peters

William C. Peters

WCP:cb

cc :John Bogert

DRILL HOLE LOG

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			T-14
PROJECT NUMBER	DATE DRILLED		LOGGED Feb 15, 1979 BY W C Peters	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 5 OF 6

DEPTH	GRAPHIC LOG	Box. NO. & BROKEN ZONE NOTES	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
	Log on p.4		Confirmation of field log on p.4. Begins w/ Box 10 at 181'.			
180		10	No core recovery; includes apparent void 186'-190'	33		187' Cemented & lost mud.
185	?					
190			190-200' ravelled frags of buff-brn Hnfls, Qzt, & Argillite w/ few frags of drusy vein qz. Vein quartz includes apparent voids after fluorite.			Core recovery 190'-200' 10%
195	Vein Qz					190'-218' repeated cementing
200		Intense Fracts	200-234 Hnfls spotted, buff-brn, fine lamin. w/ red-brn FeOx bleeding on frs.			Core recovery 200'-208' 100%
205						
210		11		100		
215						Intense red-brn FeOx bleeding 215-234
		12		100		

DRILL HOLE LOG

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			T-14
PROJECT NUMBER	DATE DRILLED		LOGGED BY	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 6 OF 6

DEPTH	GRAPHIC LOG	Box. NO. & Broken Zone Notes	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
225						
		13		100		
230						
235			234-252 Hnfls, spotted, gray-green laminated w/ weak brn-red FeOx bleeding.			
		14		100		
240						
		15		90		
245						
250			TD - 252' No AET taken			
5						
0						
5						

DRILL HOLE LOG

A-6

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			T-11
PROJECT NUMBER	DATE DRILLED		LOGGED Feb 15, 1979 BY W. C. Peters	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 6 OF 6

DEPTH	GRAPHIC LOG	Box. NO. & BROKEN ZONE NOTES	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
	on p. 5		(Confirmation of field log on p. 5. Begins w/ box 4 of 18-A. 10-A is deepened T-11.			
205		4	Hnfls-to-Argillite, Lgy-dgy-brn, fine laminated w/ minor Qz±, Lgy, fi gr, X-lamin.	100		
210						
215		5		90		
220	gouge					
225		6		100		
230						
235		7 Intense Fract.		56		
240			238-243 Hnfls Lgy-dgy laminated, as ravelled fragments. Vein Qz and minor Lt blue fluorite in frags.			238-243, 5' run w/ 1.5' recovery (30%)
245			TD - 243 AET 162' -69° Assays see p. 5.			

DRILL HOLE LOG

COORDINATES		COLLAR	TD	HOLE NO.
NORTH 11015 N (Apx)	EAST 11335 E (Apx)	5821' el (Apx) N 10 W - 45°	325'	T-15
PROJECT NUMBER 135.01	DATE DRILLED		LOGGED BY Feb 15, 1979 W.C. Peters	
DRILL RIG Longyear 44	HOLE DIAMETER NX	DRILL DDH	Longyear DRILLER C. Edlund	PAGE NO. 1 OF 5

DEPTH	GRAPHIC LOG	BOX NO. & BROKEN ZONE NOTES	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
			0 - 120' Weathered diabase			Rotary Rock bit in Diabase to 120 Ft.
120		1	120 - 121.5 Q3 + med gr., brn-pink-red w/ frags of veinq3.	86	27	
125	gouge		121.5 - 125.3 Diabase Lgy - dgy, locally pink w/ 1/4" q3 - calcite vlts			125.5 - 129 Gouge & argillic alteration
130		2	125.3 - 234 Diabase, as above, w/ few veinlets grain size med at 126 to fine at 234. Pink color decreases & disappears near 234'	100	11	
140		3		71	08	
145						

DRILL HOLE LOG

A-8

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			T-15
PROJECT NUMBER	DATE DRILLED		LOGGED BY	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 2 OF 5

DEPTH	GRAPHIC LOG	BOX NO. & BROKEN ZONE NOTES	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
		4		100	16	
155						
						160-172' ¼" Veinlet Swarm @3- calcite
160						
		5	← Slickensides →	79	13	
165						
170						
		6		100	43	
175						
180						
		7		100	22	182-185 ¼" veinlet Swarm @3- calcite
185		Slicken-Sides				
190						
		8		100	31	
195						

DRILL HOLE LOG

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			
PROJECT NUMBER	DATE DRILLED		LOGGED BY	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 3 OF 5

DEPTH	GRAPHIC LOG	Box. NO. & Broken Zone Notes	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
205		9		100	16	
210		10		100	20	
215		11		95	26	
220						
225		12		42	05	
230						
235			234-252 Qz+, fi gr. buff to red w/ Lt yellow FeOx			
240		Intense Fract.				240-246 recovered only 6" of core, Qz+.
245		13 gouge FeOx	Gouge & FeOx yel-brn 246-252.	28	0	

DRILL HOLE LOG

A-10

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			
PROJECT NUMBER	DATE DRILLED		LOGGED BY	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 4 OF 5

DEPTH	GRAPHIC LOG	Box. NO. & BROKEN ZONE NOTES	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
			252-260, Q3t, fi gr. buff to white w/ abundant Lt yellow FeOx (white marker?)			246-270 ravelled pieces w/ q3 vlts (vvqqy q3)
255		Intense Fract.				
260			260-270 Q3t, fi gr., buff to Lqy			
265						
270						
		14	270-279 Q3t, fi gr, buff & Argillite, banded dgy-Lgy-buff, inter-laminated. w/ few 1/4" vlts of q3 & gouge	100	43	Bddg 65-70° to axis
275						
280		15	279-300 Argillite, Lgy-dgy banded w/ minor Q3t buff, interlaminated.	100	46	
285						
		16	several 1/4" q3 vlts at 292	100	36	
290						
295						
		17		100	69	

DRILL HOLE LOG

A-11

COORDINATES		COLLAR		HOLE NO.
NORTH	EAST			
PROJECT NUMBER	DATE DRILLED		LOGGED BY	
DRILL RIG	HOLE DIAMETER	DRILL	DRILLER	PAGE NO. 5 OF 5

DEPTH	GRAPHIC LOG	Box. NO. & Broken Zone Notes	DESCRIPTION FIELD IDENTIFICATION	CORE REC. %	RQD %	REMARKS
			300-325			
			Argillite,			
			Lgy - dgy - buff			
305		18	banded w/ brn-yel	100	76	
			FeOx stain & thin			
			Vlts of limonite.			
310			Dissem fi gr. pyrite			
			grains.			
		19		100	39	
315						
320						
		20		100	83	
325						
			TD 325'			
			No AET Taken			
			No core assays			
0						
5						
0						
5						

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EXECUTIVE SUMMARY

The McFadden Peak fluorspar property has indicated ore reserves of 450,000 dry short tons of 9.63% C_aF_2 as determined from core samples through December 7, 1978. By milling 70,000 dry short tons per year the property would produce 39,554 dry short tons of acid grade fluorspar at 98% C_aF_2. For marketing, half of the production would be diluted with lime to 75% C_aF_2 and sold as metallurgical grade fluorspar. The prices used for this study of $98.58 per dry short ton of acid grade fluorspar, and $80.54 per dry short ton of metallurgical grade fluorspar, F.O.B. Mesa, Arizona, results in annual sales of $4,009,600. Using the costs developed in this report, and taking into account the state and federal taxes results in a discounted cash flow return on investment of 21.18%.

It is believed that the McFadden Peak ore body is a major Western U.S. Fluorspar resource. The ore grade and its amenability to beneficiation methods are superior to any known Western U.S. deposits. The only known property

with comparable reserves in the Southwestern U.S. is the Lyda K Mine in New Mexico. This property has reported reserves of from 600,000 to 850,000 tons at 45% to 52% C_aF_2. This fluorspar is very siliceous and is reported to be difficult to mill.

Domestic production of metallurgical grade and acid grade fluorspar has continued to decline over the past several years while imports have risen to approximately 81% of the apparent consumption. The major foreign suppliers of fluorspar are Mexico at 60% of total U.S. imports, South Africa at 27%, Spain at 10% and Morocco at 3%. Acid grade comprised 65% of the u.S. fluorspar imports with metallurgical grade including briquets making up the balance during the first quarter of 1978.

The property is presently leased to Western Fluorspar, Ltd. by Woodie J. Nichols. The lease is comprised of 31 unpatened "Mack" mining claims a number of which are not within the area of the mining project. The lease agreement covers 6,000 ft. along the strike of the vein structure. It extends beyond the eastern limit, providing the deposit falls within the boundaries of the "Mack" claims. It is important that any agreement with Western Fluorspar, Ltd. and/or Woodie Nichols specify the property concerned to avoid any subsequent entanglements.

Triangle Mining has secured from Western Fluorspar an option to purchase their lease for $974,000. In addition to this lease purchase, Triangle Mining would pay Woodie Nichols $30,000 per year plus $1.00 per ton for every ton over 40,000 tons per year, to lease the property.

The ore is a vein type fluorspar deposit with an average thickness of 5 ft. The known vein is approximately 6,500 ft. long and it lies generally in an east-west direction. The vein dips approximately 70° toward the south. The proposed mining plan calls for both surface and underground mining methods. For purposes of this analysis, the vein was divided into three sectors, the West Central Sector, the East Central Sector, and the Eastern Sector.

The West Central Sector is planned to come on stream first since it requires the least pre-production development. Its reserves are estimated at 90,000 dry short tons of ore excluding ore already removed by Western Fluorspar and pillars. It is in competent host rock and underground mining is planned due to the unfavorable stripping ratio with surface mining. Pre-production development costs and capital expenditures for West Central Sector mining total $15,859. Mine operating costs are $15.00 per dry short ton of ore.

The Eastern Sector is planned to come on stream second. Its reserves are estimated at 71,000 tons and is planned for open pit mining. Pre-production development costs total $245,000. Land reclamation costs are estimated at $450,000. Mine operating costs are $7.35 per dry short ton of ore.

The East Central Sector is planned to come on stream third. Its recoverable reserves are estimated at 289,000 tons of ore. It is in compent host rock and will be mined underground due to the unfavorable stripping ratio for open pit mining. Pre-production development and capital costs total $247,308. Mine operating costs are $15.00 per dry short ton of ore. Each sector will be capable of supplying ore to the mill at 70,000 tons per year.

The ore is of premium quality for froth flotation concentrating. The calcium fluoride mineral is in the form of a massive crystalline structure. The associated silica is not finely dispersed or tightly interlocked with the calcium fluoride. Because of the relationship of fluoride to silica, fine grinding is not required to liberate gangue from the mineral. Present production being custom milled at Tonto Basin Mill 50 miles away has demonstrated a recovery rate of 87%. An on site mill was designed for a capacity of 70,000 dry short tons per year, with a capital cost of

$2,216,598 and an operating cost of $10.60 per dry short ton of ore. The dilution and pelletizing plant will be located at the property. The final product will be trucked to the rail head at Mesa, Arizona.

As this property is located in a National Forest and approximately 75% of the minable area is visible from State Highway #288, compliance with environmental regulations is magnified. A plan of operations must be filed with the U.S. Forest Service to "show what steps the operator will take for feasible rehabilitation of the area when prospecting or mining is completed". "The plan of operations must be approved by the authorized forest officer before any operations are conducted."

Pincock, Allen & Holt, Inc.
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December 19, 1978

Mr. John Bogert
J.A. Terteling Company
4350 E. Camelback Road
Suite 200-C
Phoenix, Arizona 85018

Dear John:

Per your request we are transmitting 10 copies of the Phase I Feasibility Report on the McFadden Peak Fluorspar Property to your attention. As you are aware, the proposed drilling program is not complete and, therefore, the ore reserves (tonnage and grade) are not fully delineated. We have used three different ore tonnages at 63% CaF_2 grade for developing the project economics.

With one diamond drill continuing in operation on sites K, L, and M, some geologic core logging will be needed. Geologic logging on-site, while the drilling program is in process, is recommended so that the information can be used to plan successive holes.

Dr. W. C. Peters can provide core logging service at the property. This should not take more than 2 days time each 3 weeks. The service would include sampling and photographing of the core and advice on successive drill holes.

Drilling of the projected holes T-A, T-B, and T-C, and subsequent ore reserve holes can be done by non-coring methods. A small down-hole hammer drill is easily placed on site and is much less expensive in cost per foot. Non-core drilling will not require such close geologic logging

as core drilling; the main objective would be to provide thickness and grade of the vein between diamond drill penetrations.

The storage of drill core is an important consideration. At the present storage site in a shed on the property, the cardboard boxes are likely to deteriorate so that core will be lost or mixed. Since all future considerations regarding development and mining depend heavily on examiniation of the core, it is suggested that the core boxes be moved to a safe and dry storage in Tucson or Phoenix. A self-service storage location in Tucson, where the core would be available for technical studies, should cost less than $18.00 per month.

Very truly yours,

Robert Dugger
Project Manager

FEASIBILITY STUDY
OF THE
McFADDEN PEAK FLUORSPAR PROPERTY
GILA COUNTY, ARIZONA

FOR

TRIANGLE MINING COMPANY

PHASE I

TO BE READ AND EVALUATED
IN CONJUNCTION WITH P.A.H.
ADDENDUM I, MARCH 1979,
WHICH IS AN INTREGAL PART
OF THIS DOCUMENT.
Pincock, Allen & Holt, Inc.

December 1978

PINCOCK, ALLEN & HOLT, INC.
4420 East Speedway Blvd.
Tucson, Arizona 85712

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TABLES AND FIGURES

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* * * *

1. INTRODUCTION

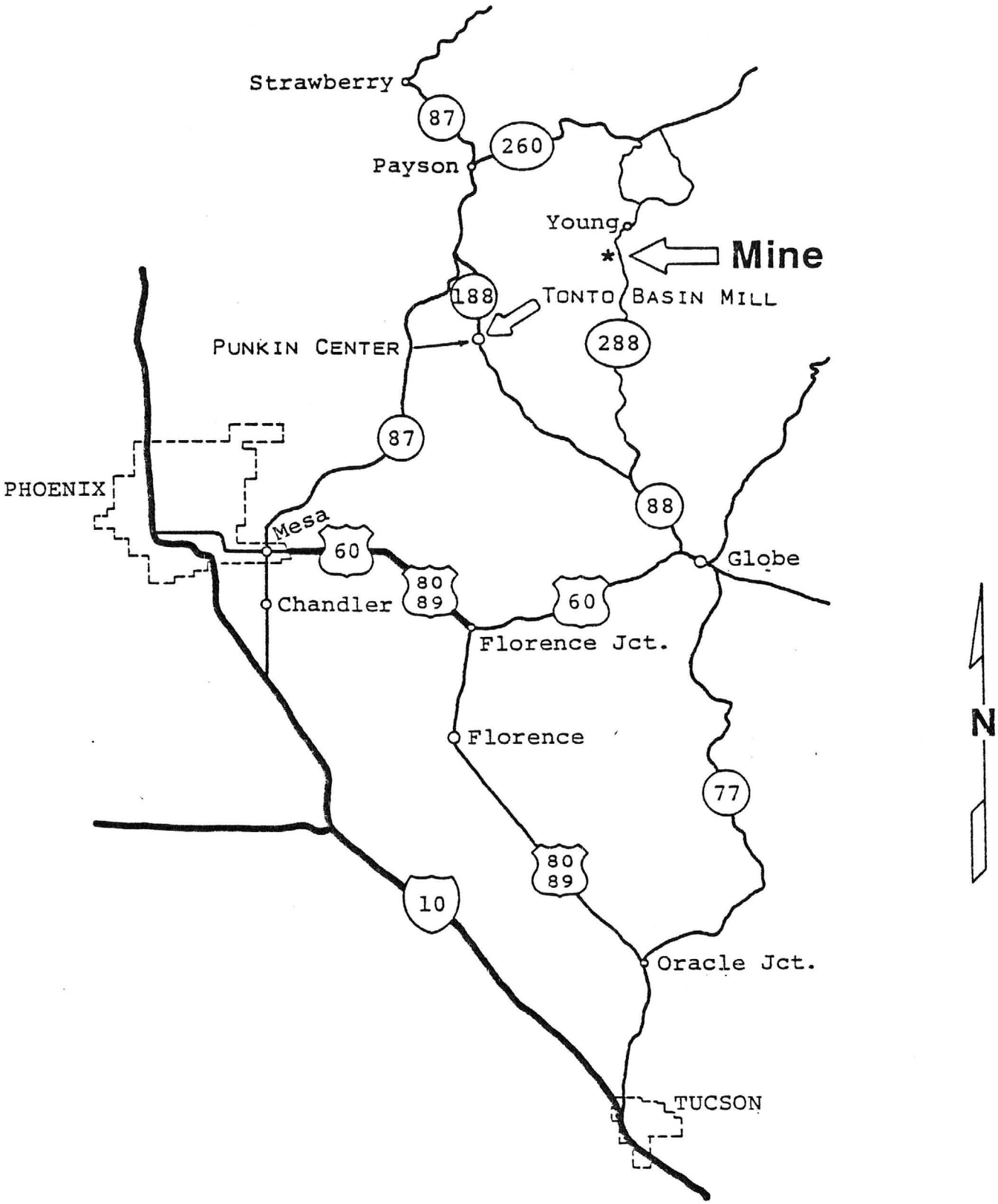
This is a report on the feasibility of developing the McFadden Peak fluorspar property into a profitable mining venture. In this report indicated ore reserves of 450,000 dry short tons of 63% C_aF_2 are estimated. A mining program of both underground and surface methods are used to supply ore to a 70,000 dry short ton per year mill. The mill uses froth flotation methods to produce 39,554 dry short tons of 98% C_aF_2 at a recovery rate of 87%. The concentrate is sold half as acid grade at 98% C_aF_2, and half as metallurgical grade at 75% C_aF_2 by diluting with lime and pelletizing. Yearly sales amount $4,009,600.

It should be noted that this report is being published prior to completion of the recommended drilling program. Because of this, the ore reserves are not fully delineated and economics were developed over a range of indicated and inferred tonnages.

The scope of this study included the following functions:

1. Economic Analysis - Develop the overall economics for ore reserves of 450,000, 500,000 and 600,000 tons, including a cash flow analysis and calculated DCFROI.

2. Geology - Review previous drill hole information and recommend a drilling program, log new drill hole information and estimate geologic reserves.



Location Map

Figure 1-1

3. Mining Methods - Estimate the characteristics of the deposit for amenability to underground and open pit mining methods and develop basic minable reserves with estimated capital and operating costs.

4. Metallurgy - Develop estimate of an extraction method, recovery efficiency, capital and operating costs. Review possible mill sites including the existing Tonto Basin mill.

5. Marketing - Study the market and pricing structure for both acid grade fluorspar and metallurgical grade fluorspar.

The following is a brief history of the McFadden Peak mine up to the point where Triangle Mining Company took an option on the property and engaged Pincock, Allen & Holt, Inc. (PAH) to evaluate the property.

The McFadden Peak mine, located on the southern slope of McFadden Peak, Tonto National Forest, Gila County, Arizona (see location map Figure 1-1), is a vein type fluorspar deposit, the mining claims of which are held by Woodie J. Nichols of Globe, Arizona. The prospect has been known for several years under the names of the "Turkey", "Jerky", and "Mack".

In 1972, United States Steel Corporation became interested in the property and carried out an exploration program consisting of surface mapping, trenching, sampling and diamond drilling. A total of five holes were drilled by the corporation to probe the western section of the vein at depth. Results were apparently negative for U.S. Steel and the prospect was dropped.

On November 19, 1975, Woodie J. Nichols leased the property to Western Fluorspar Ltd., an Arizona limited partnership. Western Fluorspar in turn entered into an agreement with Wade to carry on mining operations. Ore was removed by open cut methods at two principal locations along the strike before production was suspended.

After Wade's open cut mining venture, Western Fluorspar conducted operations on surface and underground in an effort to continue production and develop minable reserves. A diamond drilling program was initiated to follow up the exploration accomplished by U.S. Steel and a total of eight holes were drilled on the east half of the property with promising results. However, limited funds forced suspension of the drilling program and curtailed mining operations, which were plagued by equipment breakdowns, blocky vein walls and a lack of experienced miners.

It was at this point that Triangle Mining became interested in the project and an option agreement was entered into with Western Fluorspar Ltd. Triangle Mining engaged PAH in early June 1978 to make a geological examination and recommend a diamond drilling program which led to the feasibility study.

The following key PAH professional personnel were responsible for the content of their respective section of this report:

Project Manager	R. E. Dugger
Economic Analysis	D. H. Vroom Dr. H.J. Winters, Jr., P.E.
Geology	Dr. W.C. Peters, P.E.
Underground Mining	H. H. Schou, P.E.
Surface Mining	H. W. Bishop, P.E.
Metallurgy	S. M. Moos, P.E. T. T. Biddle
Hydrology	J. J. Wright, P.E.
Marketing	H. B. Woods, U.S. Bureau of Mines Fluorspar Commodity Specialist, retired

2. SUMMARY AND RECOMMENDATIONS

A preliminary financial analysis of the project has been made using three different ore reserve tonnages, since the ore reserves are not fully delineated at this time. We used cost and mill recoveries calculated to date. The sales price and freight rate represent our best assessment of the market and transportation structure. The standard method of discounted cash flow analysis has been used. In other words, we have calculated the discounted cash flow return on investment (DCFROI) represented by the annual net cash flows.

The calculated DCFROI for the three reserve tonnages is as follows:

	Minable Reserve Tonnage	DCFROI %
(1)	450,000 tons	21.18
(2)	500,000	22.77
(3)	600,000	24.26

The McFadden Peak deposit contains an estimated 450,000 tons of minable fluorspar with an average grade of 63% CaF_2. This estimate is based on drill hole information as of December 7, 1978. The tonnage and grade represent indicated ore in the "measured-indicated-inferred" system of classification, with a

confidence level of 70%. The fluorspar deposit can be classified in terms of measured reserves after additional drilling, comprising 9 exploration diamond drill holes to place limits on the mineralization and 15 - 18 development (preproduction) non-core or diamond drill holes to obtain information on the thickness and grade of the reserve blocks. Inferred (possible) ore, based on geologic projection without sample information can only be stated as an additional 30% in tonnage; this allows for a possible total of 600,000 tons in the entire deposit after exploration work and drilling are done beyond the deposit limits that are now apparent.

It is believed that the McFadden Peak ore body is a major Western U.S. fluorspar resource. The ore grade and its amenability to beneficiation methods are superior to any known Western U.S. deposits. The only known property with comparable reserves in the Southwestern U.S. is the Lyda K Mine in New Mexico. This property has reported reserves of from 600,000 to 850,000 tons at 45% to 52% CaF_2, but the ore is very refractory due to the nature of its silica content.

As this property is located in a National Forest and approximately 75% of the minable area is visible from State Highway #288, compliance with environmental regulations is

magnified. A plan of operations must be filed with the U.S. Forest Service to "show what steps the operator will take for feasible rehabilitation of the area when prospecting or mining is completed". "The plan of operations must be approved by the authorized forest officer before any operations are conducted."

A combination of surface and underground mining is proposed for maximum ore extraction. The potential surface mining areas consist of the two extremities of the deposit and are designated as "Western Sector" and "Eastern Sector", respectively. The potential underground mining area is comprised of the central zone and is divided into "West Central" and "East Central" zones.

The proposed mining plan calls for extracting approximately 70,000 tons of ore from the Eastern Sector open pit. The remaining 380,000 tons of ore will be mined underground by underhand benching with draw point loading from the West Central and East Central sections.

The McFadden Peak fluorspar ore is very responsive to standard metallurgical treatment methods. Both froth flotation and heavy media concentration have been considered separately and as combined processes. The results of bench scale tests and a production run on the ore at the Tonto

Basin mill showed that only froth flotation or a combination of heavy media separation and froth flotation should be considered. For the purpose of this report, the economics have been generated on the basis of installing a 200 tpd flotation mill at the mine site. This mill would produce both acid grade fluorspar and metallurgical grade fluorspar pellets.

The possibility of purchasing the Tonto Basin milling facility was evaluated. This evaluation showed that the Tonto Basin mill will not yield the projected profit potential of an on-site facility. This is mainly due to the cost of hauling the raw ore from the mine site to the mill.

Four possible mill sites were evaluated. From an ore haulage standpoint, the most desirable mill site would be on the mill site claims WJ-1 and WH-2 at the mine site. These claims are not included in the present lease arrangement with Western Fluorspar but are held separately by Woodie Nichols. It is understood that Woodie Nichols has been contacted by Triangle Mining regarding acquiring these mill site claims. In order to use these claims for a mill site, sufficient water must be developed to supply the mill. There is presently a small well at the site and pumping tests were run to determine the capacity of this well. From this test, it is believed that sufficient water can be

developed in the mill claim area. Additional land may be required, in addition to the mill claims to develop the required quantity.

The most profitable markets for the McFadden Peak fluorspar would be geographically located west of the Rocky Mountains. In this market area, the Arizona-produced fluorspar would have the freight advantage over fluorspar produced in the southeast and midwestern United States as well as that produced in Mexico.

The major consumers in this western geographical area are Allied Chemical, Pittsburgh, California; Kaiser Steel, Fontana,California; and U.S. Steel, Geneva, Utah. These three companies annually consume approximately 51,000 tons of metallurgical grade and acid grade fluorspar. The production from a 200 tpd mill would equal about 74% of the consumption of these users. However, considering that about 90% of the present consumption of these companies is being supplied from Mexico coming through El Paso or Eagle Pass, Texas, an Arizona-produced fluorspar should have the freight advantage.

It is believed that we have been realistic in our estimate of the value of the fluorspar at the railhead in Mesa, Arizona. However, it is recommended that meetings

be held with Kaiser Steel and U.S.S. Steel to determine their present delivered price. Also, the present freight rate structure from Mesa, Grand Mia, Arizona to these users should be further investigated as we have found inconsistencies in the published rates for fluorspar products from various parts of the United States. With this information, it may be possible to project additional returns for the project.

3. FINANCIAL ANALYSIS

We have made a preliminary financial analysis of the project using certain values for reserves, using costs and mill recoveries calculated to date, and using the best assessment we have been able to make of the price that can be obtained for the product. We have used the standard method of discounted cash flow analysis. In other words, we have calculated the discounted cash flow return on investment (DCFROI) represented by the annual net cash flows. (See Tables 3-1, 3-2, and 3-3.) Costs are in late 1978 dollars and inflation was not taken into account.

Since the ore reserves are not fully delineated at this time, analyis of three cases was made. Case I was a 450,000 ton reserve (Table 3-1), Case II was a 500,000 ton reserve (Table 3-2), and Case III was a 600,000 ton reserve (Table 3-3).

For each case the land payment to Western Fluorspar of $974,000 was spread out according to instructions from John Bogert, with no interest charged. The lease payment to Woodie Nichols was included in the operating costs.

The following paragraphs are descriptions and explanations of the categories used in the cases. On page 17a is given a chart summarizing the mining plan and costs:

1. Ore Milled and Ore For Which Payment Is Received

   These are two separate entries in the table(s). The reason is that we have assumed a two-month time lag between mining and milling of ore and receipt of payment for the product derived from

Table 3-1

CASE I - 450,000 TONS ORE (U.S. Dollars)

	1978	1979	1980	1981	1982	1983	1984	1985	1986
Ore milled, DST	0	6,000	70,000	70,000	70,000	70,000	70,000	70,000	24,000
Ore for which pmt. is received, DST	0	5,000	59,333	70,000	70,000	70,000	70,000	70,000	35,667
Sales	$ 0	286,400	3,398,613	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	2,042,987
Freight, mill to rail	$ 0	30,360	354,200	354,200	354,200	354,200	354,200	354,200	121,440
Severence tax @ 2.5%	$ 0	6,401	76,110	91,385	91,385	91,385	91,385	91,385	48,039
Gross Income Mining	$ 0	249,639	2,968,303	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	1,873,508
Costs:									
Mine Development	$ 315,000	177,445	245,000	171,810	0	0	0	0	450,000
Lease pmt. to Nichols	$ 0	30,000	59,997	59,997	59,997	59,997	59,997	59,997	30,000
Mining per schedule	$ 0	150,000	1,050,000	539,700	950,200	1,050,000	1,050,000	1,050,000	300,000
Milling @ $10.88/ton	$ 0	65,280	761,600	761,600	761,600	761,600	761,600	761,600	261,120
G & A	$ 0	72,500	203,000	203,000	203,000	203,000	203,000	203,000	69,600
Depreciation	$ 0	31,730	370,185	340,609	383,609	383,609	383,609	383,609	131,523
Total Costs	$ 315,000	526,955	2,689,782	2,119,716	2,764,406	2,458,206	2,458,206	2,458,206	1,242,243
Net before depletion	$-315,000	-277,316	278,521	1,444,299	799,609	1,105,809	1,105,809	1,105,809	631,265
Depletion allowance	$ 0	12,987	151,511	722,149	599,804	552,904	552,904	552,904	315,632
Taxable Income	$-315,000	-290,303	127,010	722,149	599,804	552,904	552,904	552,904	315,632
Operating loss carried fwd.	$ 0	0	127,010	478,293	0	0	0	0	0
Taxable income after carry fwd. of operating losses	$-315,000	-290,303	0	243,856	599,804	552,904	552,904	552,904	315,632
Federal income tax	$ 0	0	0	53,617	293,776	289,852	289,852	289,852	163,020
State income tax	0	0	0	19,695	31,853	27,341	27,341	27,341	15,744
Net income*	-315,000	-290,303	127,010	648,837	274,175	235,712	235,712	235,712	136,868
Depreciation, depletion & salvage	$ 0	44,717	521,696	1,105,759	983,414	936,514	936,514	936,514	576,181
Plant and equipment	$ 0	-2,505,012	0	-75,498	0	0	0	0	0
Land	$-280,000	-109,199	-129,732	-129,732	-129,732	-129,732	-65,873	0	0
Cash Flow	$-595,000	-2,859,797	518,974	1,549,366	1,127,857	1,042,494	1,106,353	1,172,226	713,049

DCFROI = 21.18 percent

*Operating loss carry forward is added back for this line

Table 3-2

CASE II - 500,000 TONS ORE (U.S. Dollars)

	1978	1979	1980	1981	1982	1983	1984	1985	1986
Ore milled, DST	0	6,000	70,000	70,000	70,000	70,000	70,000	70,000	74,000
Ore for which pmt. is received, DST	0	5,000	59,333	70,000	70,000	70,000	70,000	70,000	85,667
Sales	$ 0	286,400	3,398,613	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	4,906,987
Freight, mill to rail	$ 0	30,360	354,200	354,200	354,200	354,200	354,200	354,200	374,440
Serverence tax @ 2.5%	$ 0	6,401	76,110	91,385	91,385	91,385	91,385	91,385	113,314
Gross Income Mining	$ 0	249,639	2,968,303	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	4,419,233
Costs:									
Mine Development	$ 315,000	177,445	245,000	171,810	0	0	0	0	450,000
Lease pmt. to Nichols	$ 0	30,000	59,997	59,997	59,997	59,997	59,997	59,997	64,003
Mining per schedule	$ 0	150,000	1,050,000	539,700	956,400	1,050,000	1,050,000	1,050,000	1,050,060
Milling @ $10.88/Ton	$ 0	65,280	761,600	761,600	761,600	761,600	761,600	761,600	805,120
G & A	$ 0	72,500	203,000	203,000	203,000	203,000	203,000	203,000	207,000
Depreciation	$ 0	28,557	333,167	345,008	345,008	345,008	345,008	345,008	364,722
Total Costs	$ 315,000	523,782	2,652,764	2,081,115	2,325,005	2,419,605	2,419,605	2,419,605	2,940,905
Net before depletion	$ -315,000	-274,143	315,539	1,482,900	1,238,210	1,144,410	1,144,410	1,144,410	1,478,328
Depletion allowance	$ 0	11,688	157,770	741,450	619,105	572,205	572,205	572,205	739,164
Taxable Income	$ -315,000	-285,831	157,770	741,450	619,105	572,205	572,205	572,205	739,164
Operating loss carried fwd.	$ 0	0	157,770	443,061	0	0	0	0	0
Taxable income after carry fwd. of operating loss	$ -315,000	-285,831	0	298,389	619,105	572,205	572,205	572,205	739,164
Federal income tax	$ 0	0	0	78,288	304,032	300,169	300,169	300,169	389,415
State income tax	$ 0	0	0	22,831	32,803	28,284	28,284	28,284	36,444
Net income*	$ -315,000	-285,831	157,770	640,332	282,271	243,753	243,753	243,753	313,306
Depreciation, depletion & salvage	$ 0	40,245	490,936	1,086,458	964,113	917,213	917,213	917,213	1,232,912
Plant and equipment	$ 0	-2,504,912	0	-75,498	0	0	0	0	0
Land	$ -280,000	-109,199	-129,732	-129,732	-129,732	-129,732	-65,873	0	0
Cash Flow	$ -595,000	-2,859,697	518,974	1,521,560	1,116,652	1,031,234	1,095,093	1,160,966	1,546,217

DCFROI = 22.77 percent

*Operating loss carry forward is added back for this line

Table 3-3

CASE III - 600,000 TONS ORE

(U.S. Dollars)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Ore milled, DST	0	6,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	34,000
Ore for which pmt. is received, DST	0	5,000	59,333	70,000	70,000	70,000	70,000	70,000	70,000	70,000	45,667
Sales	$ 0	286,400	3,398,613	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	4,009,600	2,615,787
Freight, mill to rail	$ 0	30,360	354,200	354,200	354,200	354,200	354,200	354,200	354,200	354,200	172,040
Serverence tax @ 2.5%	$ 0	6,401	76,110	91,385	91,385	91,385	91,385	91,385	91,385	91,385	61,094
Gross Income Mining	$ 0	249,639	2,968,303	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	3,564,015	2,382,653
Costs:											
Mine Development	$ 315,000	177,445	245,000	171,810	0	0	0	0	450,000	0	0
Lease pmt. to Nichols	$ 0	30,000	59,997	59,997	59,997	59,997	59,997	59,997	59,997	59,997	30,002
Mining per schedule	$ 0	150,000	1,050,000	539,700	956,200	1,050,000	1,050,000	1,050,000	1,050,000	1,050,000	450,160
Milling @ $10.88/ton	$ 0	65,280	761,600	761,600	761,600	761,600	761,600	761,600	761,600	761,600	369,920
G & A	$ 0	72,500	203,000	203,000	203,000	203,000	203,000	203,000	203,000	203,000	98,600
Depreciation	$ 0	23,798	277,639	287,220	287,220	287,220	287,220	287,220	287,220	287,220	139,507
Total Costs	$ 315,000	519,023	2,597,236	2,023,327	2,268,017	2,361,817	2,361,817	2,361,817	2,811,817	2,361,817	1,088,189
Net before depletion	$ -315,000	-269,384	371,067	1,540,688	1,296,198	1,202,198	1,202,198	1,202,198	752,198	1,202,198	1,294,464
Depletion allowance	$ 0	9,740	185,534	770,344	647,999	601,099	601,099	601,099	376,099	601,099	524,184
Taxable Income	$ -315,000	-279,124	185,534	770,344	647,999	601,099	601,099	601,099	376,099	601,099	770,281
Operating loss carried fwd.	$ 0	0	185,534	408,590	0	0	0	0	0	0	0
Taxable income after carry fwd. of operating losses	$ -315,000	-279,124	0	361,754	657,999	601,099	601,099	601,099	376,099	601,099	770,281
Federal income tax	$ 0	0	0	106,954	323,383	315,613	315,613	315,613	195,342	315,613	369,133
State income tax	$ 0	0	0	26,474	33,805	29,696	29,696	29,696	18,699	29,696	41,840
Net Income*	$ -315,000	-279,124	185,534	636,916	290,811	255,789	255,789	255,789	162,057	255,789	359,307
Depreciation, depletion & salvage	$ 0	33,538	463,172	1,057,564	935,219	888,319	888,319	888,319	663,319	888,319	792,716
Plant & equipment	$ 0	-2,505,012	0	-75,498	0	0	0	0	0	0	0
Land	$ -280,000	-109,199	-129,732	-129,732	-129,732	-129,732	-65,873	0	0	0	0
Cash Flow	$ -595,000	-2,859,797	518,974	1,489,250	1,096,298	1,014,377	1,078,236	1,144,109	825,377	1,144,109	1,152,023

DCFROI = 24.26 percent

* Operating loss carry forward is added back for this line

the ore. This eliminates the need for treating working capital as a separate item since spare parts inventories have been allowed for in the mill capital cost.

2. Sales

Sales are based on a price of $57.28 per dry short ton of ore fed to the mill. This price reflects sales of 50% metallurgical grade, at a product value of $80.54, and 50% acid grade at a product value of $98.54, delivered to Mesa. The methods used to arrive at these prices are described in greater detail in the metallurgical section of the report on page 25.

3. Freight To Railhead

This is the freight cost for moving product from the mill to the railhead in Mesa. The unit cost is $7.81 per dry short ton of product, which equates to $5.06 per dry short ton of ore fed to the mill. The method used to arrive at these costs is detailed in the metallurgical section on page 151.

4. Severance Tax

The severance tax (an Arizona tax) is 2.5 percent of sales less freight from the mill to the railroad.

5. Gross Income From Mining

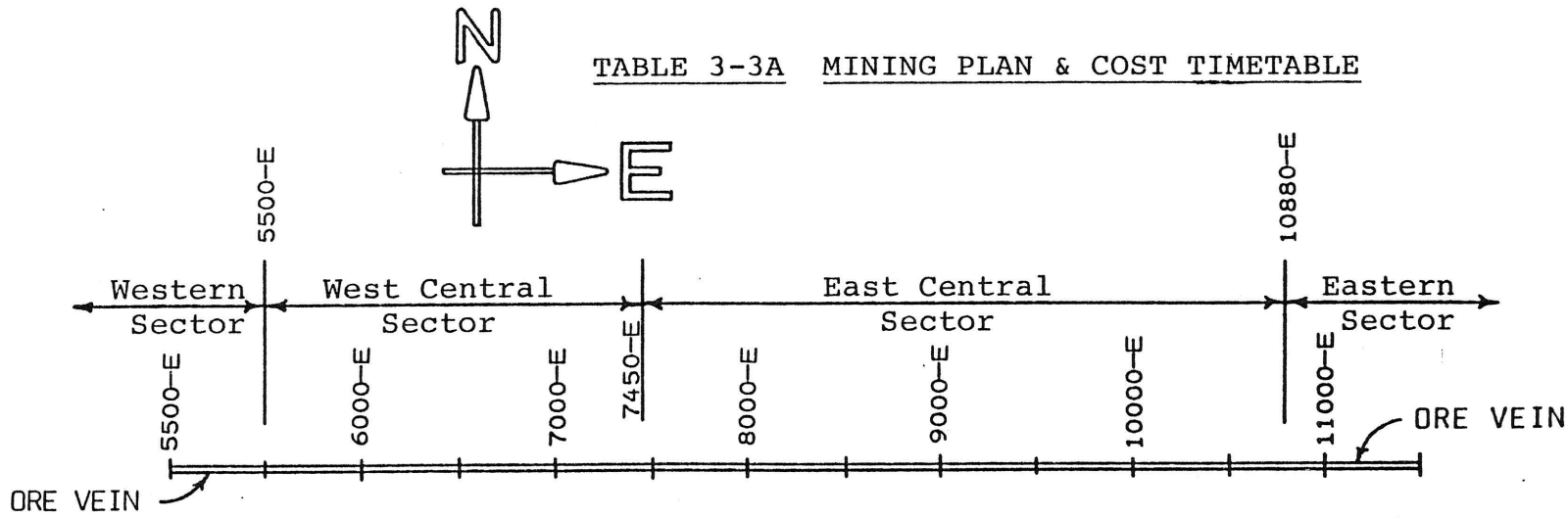
Gross income from mining is the amount against which the percentage depletion rate is applied to calculate statutory depletion. The depletion allowance is, of course, limited to 50 percent of net before depletion. This is explained further below under Depletion.

6. Development Cost

This is the pre-production mine development costs. In the mining business it is often referred to as "primary development", as opposed to operating development or stope preparation. There are three sectors of the vein which must be developed. The West Central, containing approximately 90,000 tons of ore which must be mined underground, the Eastern Sector open pit containing approximately 71,000 tons, and the East Central Sector underground which contains the remaining ore.

The development drilling and engineering evaluation costs of $315,000 were included in 1978. The West Central Sector development has been allowed for in 1979. The amount is $177,445. The Eastern Sector open pit has been allowed for in 1980. The amount is $245,000 which covers clearing trees and stripping. The East Central Sector underground is allowed for in 1981.

TABLE 3-3A MINING PLAN & COST TIMETABLE



Total Recoverable Ore:	0 tons	90,000 tons	289,00 tons	71,000 tons
Mining Method:		Underground	Underground	Open Pit
Mining Costs/Ton:		$14.99	$14.99	$7.35
Pre-Prod. Development Costs:		$177,445 in Year 1979	$171,810 in Year 1981	$245,000 in Year 1980
Mine Capital Expenditures:		$138,414 in Year 1979	$75,498 in Year 1981	-0-
Land Reclamation Costs:		-0-	-0-	$450,000 in Year 1986
Tonnage By Year:				
1979		6,000	--	--
1980		70,000	--	--
1981		14,000	--	56,000
1982		--	55,000	15,000
1983		--	70,000	--
1984		--	70,000	--
1985		--	70,000	--
1986		--	24,000	--

The amount is $171,810. Reclamation of the open pit land has been allowed for in 1986. The amount is $450,000 which includes replacing the excavated material and planting trees.

There are various possible tax treatments of mine development costs. At extremes are the alternatives of (a) deducting all development expenses as incurred, and (b) capitalizing all development costs and amortizing them on some basis acceptable to the Internal Revenue Service. With respect to what constitutes mine development expense, there are again varying opinions and tax treatments. For example, some companies deduct the cost of mining machinery that goes underground in the year of acquisition; others do not.

For this financial analysis, we have deducted all mine development costs in the year in which they are incurred. We have, however, not treated mining machinery as development expense, but only have so treated such items as excavation and support of underground items. We have thus been a little conservative.

The deductions for primary development before there is sufficient revenue to cover it gives rise to operating losses in 1978 and 1979, which are then carried forward (see Tables 3-1, 3-2, and 3-3) against taxable income in 1980 and later years. Note that operating losses carried forward do not affect the depletion deduction in the year into which they are carried, but if development costs were capitalized and amortized, they would reduce income subject to depletion.

7. Land Lease

This is the land lease payment to Woodie Nichols. This amounts to a fixed yearly amount of $30,000, plus $1.00 per ton of ore for each ton over 40,000 tons.

8. Mining and Milling Costs

These are the usual cash operating costs for stope preparation (operating development), extraction of ore, and concentration into a saleable product. The mining costs were not the same each year due to the different mining methods used. Underground mining costs were taken at $15.00 per ton, open pit at $7.31 per ton of ore. Milling costs were constant at $10.88 per ton of ore.

9. General and Administrative Cost

This again is a cash operating cost and is a difficult one to estimate accurately. It includes salaries of a manager at $40,000 per year, accountant at $27,000 per year, and a clerk at $16,000 per year. Insurance is assumed to cost 1.5% of total capital. Miscellaneous such as road and building maintenance, office supplies, etc. are assumed to be $10,000 per year. These give a total cost of $133,000 per year. For the year 1979, when the plant was starting up, 6 months of the $133,000 was included. At the end of production when the ore body was being depleted a ratio of the last year's production over the previous year's production was taken of the $133,000. The General and Administrative also includes property tax which in Arizona is assessed against the value of reserves as well as tangible personal property. We have estimated this tax at $1.00 per ton of ore milled on a preliminary basis.

10. Depreciation

Depreciation of plant and equipment has been taken on a units-of-production basis with tons of ore milled as the units of production. Salvage value has been assumed to be 5 percent of the cost of machinery and equipment.

11. Depletion

The depletion deduction is computed each year by two methods known as cost depletion and percentage (statutory) depletion. Cost depletion is always available while percentage depletion is only available in years in which there is positive net before depletion. In each year, both cost and percentage depletion deductions are calculated, and the larger of two may be taken. Cost depletion is, however, no longer available once the cost basis in the property is recovered through depletion deductions, while percentage depletion is unrelated to the adjusted basis in the property.

In the case of fluorspar, the percentage depletion rate is 22 percent. This is applied to gross income from mining. The percentage depletion deduction is limited, however, to fifty percent of net before depletion.

12. Taxable Income Before Carry Forward of Operating Losses

This is simply net before depletion minus the depletion deduction. If there are no operating losses in prior years which can be carried forward against this amount, it is taxable income.

13. Operating Loss Carried Forward

This is the operating losses of 1978 and 1979 due to mine development costs.

14. Income Taxes

We have estimated both federal and state income taxes. The taxes were calculated using the expressions:

$$FIT = 0.48 \quad (TI - SIT) - \$6,500$$

$$SIT = 0.105 \quad (TI - FIT) - \$ \quad 280$$

in which FIT is federal income tax

SIT is state income tax

TI is taxable income.

We first estimated federal income tax before investment tax credit and before the minimum tax on preference income. The investment tax credit was then estimated. We assumed that $500,000 of the initial investment in plant and equipment would qualify for the full 10 percent credit. The credit was used as fast as the law permits, specifically in any year it is equal to the first $25,000 of taxes plus one-half of the tax in excess of $25,000. The credit can be carried forward.

The difference between the percentage depletion deduction and the adjusted basis in a mineral property is a preference item under the federal minimum tax regulation. The tax is 15 percent of the sum of preference items less the federal income tax (as reduced by the investment tax credit) before the minimum tax on preference items. This minimum tax has been taken into account in our estimates of the federal income tax.

The Arizona income tax regulations follow the federal code.

15. Land Payment

This is the amount to be paid to acquire Western Fluorspar's lease in the mining claims owned by Woodie Nichols. The total amount used in the financial analysis was $974,000. This was spread out according to instructions from Mr. John Bogert, as follows:

Year	Amount
1978	$280,000
1979	109,199
1980	129,732
1981	129,732
1982	129,732
1983	129,732
1984	65,873

No interest charge is included as a penalty for spreading the payments out, since such interest is not a proper deduction in computation of cash flow for valuation of the property.

16. Plant and Equipment

This is the cost of buildings, machinery and equipment for the mine and mill. These are the amounts recovered by the depreciation deduction. In year 1979, capital expenditures of $138,414 were made for the West Central mine, and $2,366,598 for the mill. In 1980 there were no capital expenditures made. In 1981, $75,498 was included for the East Central mine.

17. Cash Flow

Cash flow is defined in the normal manner as net income plus depreciation, depletion, and salvage, and less capital expenditures for land, plant, and equipment.

No interest costs are deducted to arrive at cash flows. The cost of capital is included with the discount rate used to estimate net present value.

18. DCFROI

The DCFROI(s) for the 450,000, 500,000 and 600,000 ton projects were estimated by calculating the net present value of the cash flows shown in Tables 3-1, 3-2, and 3-3 at varying discount rates until a discount rate was found that brought the net present value to zero. This discount rate is the DCFROI.

The DCFROI's for the three cases are as shown here:

	DCFROI
Case I - 450,000 ton reserve	21.18%
Case II - 500,000 ton reserve	22.77%
Case III - 600,000 ton reserve	24.26%

4. MINING CLAIMS

The Western Fluorspar Property leased from Woodie J. Nichols is comprised of 31 unpatented "Mack" mining claims, a number of which are not within the area of the mining project. The lease agreement covers 6000' along the strike of the vein structure but extends beyond the eastern limit providing the deposit falls within the boundaries of "Mack" claims.

Exhibit "A", a part of the lease agreement, was apparently not prepared. Exhibit "B" of the agreement lists certain "Mack" claims and was attached in lieu of Exhibit "A". The latter is incomplete in that not all unpatented mining claims concerned are included, namely 29A, 15A, 24A, 23A and 14A. The group actually consists of 14 unpatented mineral claims.

(From West to East)	Orientation
1. Mack 1A	Parallel to strike bearing
2. Mack 28A	Normal to strike bearing
3. Mack 29A	" " " "
4. Mack 28	" " " "
5. Mack 29	" " " "
6. Mack 20	" " " "

(From West to East)	Orientation
7. Mack 21	Normal to strike bearing
8. Mack 15	" " " "
9. Mack 22	" " " "
10. Mack 12	" " " "
11. Mack 16	" " " "
12. Mack 23	" " " "
13. Mack 24	Parallel to strike bearing
14. Mack 23A	" " " "

Mill Sites

W.J. #1)
) These claims partially overlay Mack #10 mentioned in Exhibit "B".
W.J. #2)

Additional mineral claims covering the possible eastward extension of the mineralized fault structure may become important additions to the deposit. They are held by Woodie Nichols but are not a part of the mineral lease; these are:

(From West to East)

Star #1	Star #3	Star #5	Star #24
Star #20	Star #18	Star #9	Star #10
Star #2	Star #4	Star #7	Star #11
Star #19	Star #6	Star #8	

A patent application being prepared by O.T. Smith, Registered Mineral and Land Surveyor, Globe, Arizona, includes the following listed claims. Refer to Figure 4-1.

Mack #1A	Mack #21	Mill Sites
Mack #28	Mack #15	W.J. #1
Mack #28A	Mack #22	W.J. #2
Mack #29	Mack #12	
Mack #29A	Mack #16	
Mack #20	Mack #23	

Figure No. 4-2 depicts the pertinent claims showing their relationships to the fluorspar outcrop and probable vein projection.

It is important that any agreement with Western Fluorspar Ltd. and/or Woodie Nichols clarify and delineate the property concerned to avoid subsequent entanglements.

5. ORE RESERVES

Review of Western U.S. Fluorspar Deposits

Fluorspar deposits are numerous in the western states, but most are small and most are uneconomic due to narrow vein widths, transportation costs, lack of milling facilities, and difficulties in milling because of fine-grained silica or barite.

In Arizona, there are 56 or more fluorspar occurrences, but the total production has been only about 50,000 tons of material. About a third of this production has come from the Tonto Basin mill at Punkin Center. A visit to the Tonto Basin mines confirmed the general opinion that there are no accessible reserves remaining. Part of the Tonto Basin production is credited to McFadden Peak. The Lone Star mine in the Whetstone Mountains near Tucson has produced about 10,000 tons of spar, but is now idle. Fluorspar has been shipped from now-idle mines at Duncan and in the Castle Dome district near Yuma.

A recent discovery of fluorspar associated with lead-zinc-silver mineralization near Klondike, Arizona, bears some investigation. The discovery was made by Continental Materials Company. Nothing is known of Continental's project except that the main interest is in metals rather than in fluorspar.

Nevada has been a moderate producer, with past production amounting to 700,000 tons of marketable material. The main producer was the Daisy Mine near Beatty. Other moderate-size operations have been at the Wells Cargo mine near Carp and at the Kaiser mine near Fallon. None of the Nevada mines appear to be in current operation on any significant scale.

California has produced very little fluorspar. There are no known reserves.

New Mexico has at least 65 deposits, some of which have produced marketable spar in past years. The largest district, in the Zuni Mountains, has been idle since 1953. The largest reserves in New Mexico are at the Lyda K Mine near Truth or Consequences. Measured, indicated and inferred reserves in the Lyda K vein amount to 500,000 to 650,000 tons of 50% to 55% CaF_2. The fluorspar is very siliceous and is reported to be difficult to mill. The Lyda K was recently explored by Allied Chemical, but there is no known activity now.

Colorado has been the leading western fluorspar producer in past years, but the mines are now idle. A large portion of the state's production has been from Jamestown, near Boulder, and Northgate, in North Park. Allied Chemical, the last operator in both areas, has left Colorado and is now mining fluorspar in Illinois and Kentucky.

Utah has produced fluorspar from half-a-dozen deposits. The principal deposits, in the Thomas Range near Delta, appear to be depleted.

The largest fluorspar reserves in the western states are in Idaho, where the Bayhorse district, near Challis, is reported to have reserves amounting to 3,600,000 tons of 36% CaF_2 in bodies 10 feet to 26 feet thick and in a position for some open pit mining. Sixty-seven or more drill holes have been completed at Bayhorse by the Hanna Mining Company. The only major producer in Idaho has been at Myers Cove, where the mine shipped 18,000 tons of acid grade concentrate in the 1950's.

Geology

The McFadden Peak deposit contains an estimated 450,000 tons of minable fluorspar [illegible] an average grade of 63% CaF_2. The tonnage and grade [illegible] indicated ore in the "measured-indicated-inferred" system of classification, with a confidence limit of 70%. The fluorspar body can be classified in terms of measured reserves after additional drilling, comprising 9 exploration diamond drill holes to place limits on the mineralization and 15 - 18 development (preproduction) non-core or diamond drill holes to obtain information on the thickness and grade of the reserve blocks. Inferred (possible) ore, based on geologic

projection without sample information, can only be stated as an additional 30% in tonnage; this allows for a possible total of 600,000 tons in the entire deposit after exploration work and drilling are done beyond the deposit limits that are now apparent. Detail on ore reserve calculations are provided under the heading "Reserves" in this Section. The proposed drilling program of 9 holes is outlined under "Proposed Drill Holes" in this Section of the report.

Geologic mapping was done from June 16 to August 10, 1978, using two sets of aerial photographs and a photogrammetric map for topographic data. One set of photographs at scales of 1:1200 (1"=100') and 1:4800 (1"=400') was available from Western Fluorspar for a part of the area. These had been flown by Landis Aerial Surveys of Phoenix in 1976, prior to most of the open cut mining and diamond drilling.

A second set of photographs, incorporating control points furnished by O.T. Smith, mineral land surveyor in Globe, was flown by Cooper Aerial Surveys of Tucson and printed at a scale of 1:12,000 (1"=1,000') and 1:14,500. An enlargement to 1:2,400 (1"=200') of the central area was provided by Cooper. Photogrammetric maps by Cooper were provided at scales of 1:1200 and 1:2400.

O.T. Smith's control points for photogrammetry and for geologic mapping were established in several places on the property, at the east and west limits of the area, at the NW section corner of Section 6, T6N, R14E, and at the U.S. Steel and Western Fluorspar drill collars. (See Figure 5-23)

Surface geologic mapping, on the photographs and on photogrammetric base maps, was done by Brunton compass and tape in the critical areas and by photographic location plus compass resection for the remainder of the general area. Geologic reconnaissance was done for approximately one mile to the east and to the west of the property, but no specific geologic mapping was done other than along the Globe-Young highway.

Underground mapping in Western Fluorspar's mine (Site No. 1 in Western's reports) and in a short decline at Site No. 4 was done by Brunton compass and tape. (See Figures 5-7 and 5-8)

Earlier geologic information was available in a U.S. Steel Corporation map of their trenches and in diamond drill hole logs from U.S. Steel and Western Fluorspar. A December 1976 map by Daniel Huckins and drill hole sections by Charles R. Sewell were also available. Copies of this information along with reports made for Western Fluorspar by Nicholas

Caruso and Daniel Huckins are to be included in the final report.

Published geologic information on the area and region includes:

1. Arizona Department of Mineral Resources two page open file report by Victor E. Kral, November 20, 1975, on the Jerky group of claims (now Mack group).

2. Arizona Bureau of Mines Bulletin 182 (1970) "Coal, Oil, Natural Gas, Helium, and Uranium in Arizona" by H.W. Pierce and others. Pages 136-140 describe the stratigraphy of the Dripping Spring Quartzite.

3. U.S.G.S. Bulletin 1168 (1964) "Stratigraphy of the Dripping Spring Quartzite in Southeast Arizona" by H.C. Granger and R.B. Raup. The bulletin provides a regional and general background on stratigraphy of the host rock formation.

4. Arizona Bureau of Mines, Geologic Map of Gila County, Arizona (1959). Scale 1:375,000 (approx. 1"=6 mi.)

5. Arizona Bureau of Mines, Geothermal Project, open file map showing lineaments from Landsat imagery.

Regional Geology

The host formation for fluorspar at McFadden Peak is the Dripping Spring Quartzite, a series of weakly metamorphosed sandstones, arkosic sandstones, silty sandstones, siltstones, and argillites. Metamorphism, caused by diabase sills has changed large portions of the sandstones to quartzite and the siltstones-argillites to spotted hornfels.

The Dripping Spring Quartzite, a member of the Pre-Cambrian Apache Group, is overlain by Mescal Limestone (Apache Group) and by the Cambrian Troy Quartzite. The Troy Quartzite forms a bold rim on the south slope of McFadden Peak, above the mine area.

Underlying the Dripping Spring Quartzite (Figure 5-1) but not exposed in the immediate area of the property are the Pioneer and Scalon Conglomerate Formations (Apache Group) comprising metamorphosed tuff, siltstone, sandstone, and conglomerate. Basement rock in the region, beneath the Scalon Conglomerate, is an older Precambrian crystalline complex.

The Dripping Spring Quartzite has been described in three units, an upper silty member, a middle sandy member, and a lower conglomeratic member. The formation is commonly associated with diabase sills or sheets that were intruded along various bedding planes. The sills range in thickness from a few inches to 1,000 feet and range in extent from small local lenses to several square miles. A generalized stratigraphic section of the Dripping Spring Quartzite for central Arizona is shown in Figure 5-1.

The principal structures in the area and nearby region are an East-West fault that extends for four miles or more and a major North-South-trending monocline (Sierra Ancha Monocline). The McFadden Peak vein occupies a part of the fault and is situated near the axis of the monocline.

Fluorspar occurs in mines and prospects in the region, but none have been described in the immediate vicinity of the McFadden Peak property. Fluorspar has been reported (verbally) in Cherry Creek, a drainage feature four miles to the east of the property, but this has not been verified.

The Bluebird (Packard) fluorspar mine, in the Tonto Basin area 16 miles to the west of McFadden Peak, is on a steeply south-dipping vein system that strikes east-west.

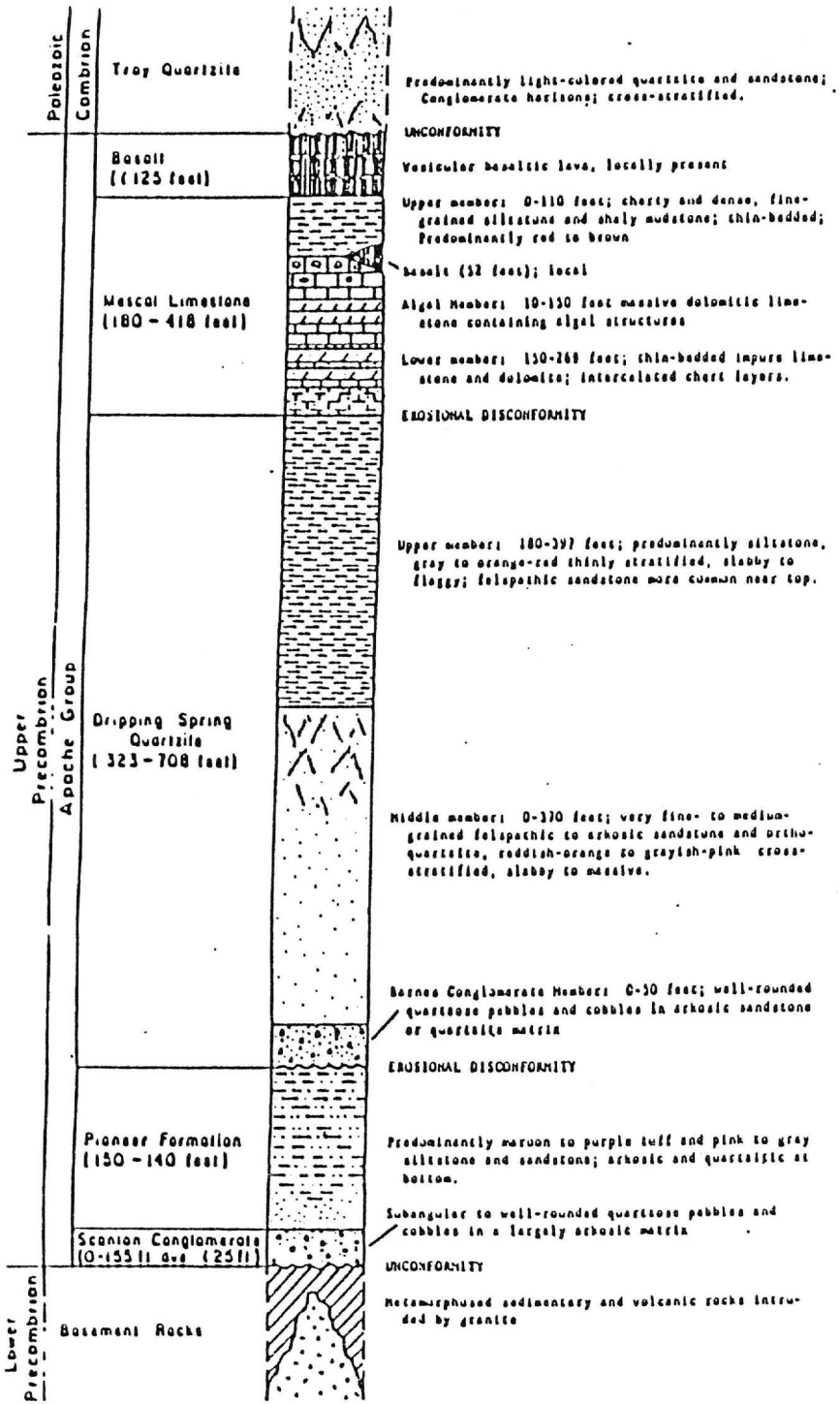


Figure 17. Generalized section of Apache Group, Gila County, Arizona. (After Granger and Raup, 1964.)

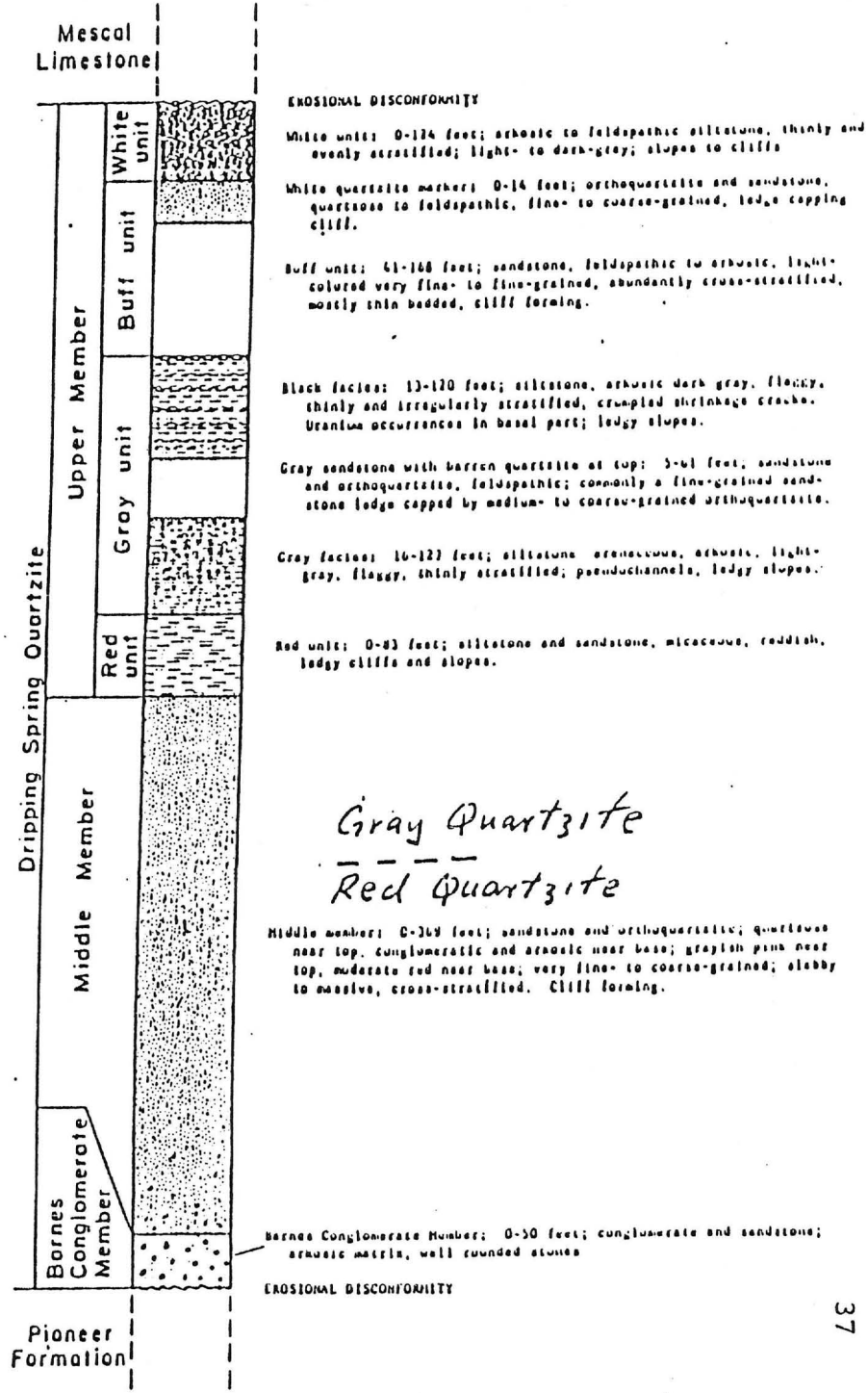


Figure 18. Generalized section of Dripping Springs Quartzite. (After Granger and Raup. 1964.)

FIGURE 5-1

This vein system may be a part of the same fault structure as at McFadden Peak. Kral (1975) reports that "... the general region between these two deposits has a few minor fluorspar occurrences ...". Vein mineralization at the Bluebird mine is in a metamorphosed rhyolite (lowermost Apache Group) and in Precambrian granite. Vein widths at the Bluebird, judging from stopes, range from about 2 feet to 6 feet. The mine has been developed and stoped to a depth of about 400 feet from the highest vein outcrop; the vein outcrop extends for about 500 feet along strike.

The Red Rock mine and the White Cow prospect are a few miles to the northeast of the Bluebird. The Red Rock mine, in a steeply dipping vein that strikes N to E, is in quartzite wallrock, probably part of the Dripping Spring Quartzite. Vein width at the Red Rock appears to range from one foot to six feet in lensing and irregular shoots of mixed fluorspar and quartz. Workings amount to three short adits in a vertical space of about 150 feet; there has been little stoping.

The White Cow prospect is in a prominent zone of white quartz striking N 30 W and dipping steeply SW. The wallrock is granite (either Precambrian or Laramide); the vein consists of thin 6" - 18" siliceous fluorspar stringers in a 5 - 10 foot zone of white quartz. Workings consist of a few trenches and a shallow incline.

Fluorspar production from the Tonto Basin area, material milled at Punkin Center, has been reported by Kral as 20,000 tons (1975). Part of this may have come from McFadden Peak, most probably came from the Bluebird mine.

An ore of considerable interest in the region is uranium. It occurs as veinlets and irregular bedded deposits in the upper member of the Dripping Spring Quartzite. The Mack deposit, mentioned by Pierce in Arizona Bureau of Mines Bulletin 182, p. 272, is developed by a pit on Mack 2A claim near the west end of the fluorspar vein. There has been no production from this deposit. Another uranium prospect, the Easy deposit, is reported to the north of the fluorspar vein on the south slope of McFadden Peak; there has been no production. Fluorspar outcrops and drill core have been checked for radioactivity and no abnormal activity has been found.

Geology of the Deposit

The McFadden Peak deposit is on an east-west vein, with fluorspar mineralization extending easterly from an exposure just west of the property for a distance of 6,000 feet to drill holes T-10 and T-12 in fluorspar vein material (See Figure 5-2). The vein structure continues to the west but does not appear to contain fluorspar beyond the western-most U.S. Steel trench. The eastern third of the fluorspar vein is covered by soil. The

vein should continue to the east of drill hole No. T-10; the structure crosses the Globe-Young highway but it does not seem to contain fluorspar at that point.

Vein widths of fluorspar have been measured at 1.1 feet to 12.9 feet in trenches and drill holes. Trench locations, with vein widths, are shown in Figures 5-3 and 5-4. Drill hole locations and vein intercepts are shown in Figures 5-3 and 5-4.

The vein is relatively continuous in the known area, even though it is interrupted by numerous post-ore cross faults and is brecciated by post ore fault movement along the vein. The cross faults observed in pits and exposures do not appear to have caused much displacement, generally on the order of a few feet. Large cross faults and tangential NW faults may have displaced the vein for as much as 100 feet in a few places, but this has only been assumed from drill hole data and from changes of vein trend in soil covered areas.

The fault occupied by the fluorspar vein is a normal fault, with the hanging wall (south wall) downthrown. The vertical component of fault displacement is estimated from stratigraphic data to range from a few feet to 100 feet, with the most variable throw on the east end of the known area. On an average, the vertical throw on the main vein-fault is 30 to 40 feet.

The known fluorspar area is on the axis of a north-south fold or monocline, with dips relatively flat (slightly to the north and northeast) in the western part of the area and dips increasing to 30° east near drill hole T-10.

Wallrock in the exposed and drilled parts of the vein is Dripping Spring Quartzite and diabase, with the following stratigraphic thicknesses estimated from surface and drill hole data:

Upper Member, Gray unit, 150 feet +, including
Gray sandstone facies (60 ft.)
Gray facies (45 ft.)
Red unit (40 ft.)

Middle Member, 320 feet, including
Light gray-pink quartzite (70-90 ft.)
Red quartzite (230 ft.)

Barnes Conglomerate Member, 12-40 ft.

Pioneer Formation, 20 ft. +

The thickness of diabase sills varies considerably. A lensing sill at the number 4 site workings is only 10-30 feet thick at most. A sill penetrated in holes WN-9 and WN-9 ranges from 20 feet to 100 feet thick. To the east of WN-9, the same sill may be 150 feet thick, judging from weathered diabase soil and differences in elevation.

Wallrock appears to control the fluorspar mineralization in the following way (Figures 5-5 and 5-6). In places where either wall of the vein is formed by the hornfels and argillite of the upper member or by the light gray-pink quartzite facies of the middle member (Figure 5-7), the vein filling is fluorspar. Where both walls are the red quartzite facies of the middle member, the fluorspar gives way to a silica-rich and fluorite-poor vein. The latter condition can be seen in the U.S. Steel drill holes (JF series), and in drill holes T-5, T-6 and T-8. The causes for impoverishment of the vein in the lower and more massive red quartzite are probably chemical and physical -- the massive red quartzite is less reactive than the silty quartzite, and the massive quartzite tends to disperse the fractures. In any event, a complete quartzite environment on both walls appears to have provided a better locale for silica deposition than for fluorite deposition.

Diabase wallrock has some measure of control on the width of fluorspar mineralization, but it is less distinct. In the decline at Site 4, the massive crystalline fluorspar portion of the vein (in contrast to brecciated vein wallrock and mixed wallrock-"sugar spar" fine breccia) appears to widen very slightly where the hanging wall changes from diabase to hornfels (Figure 5-8). In the open cut workings at Site 4, however, stoping appears to have been done at equal width in

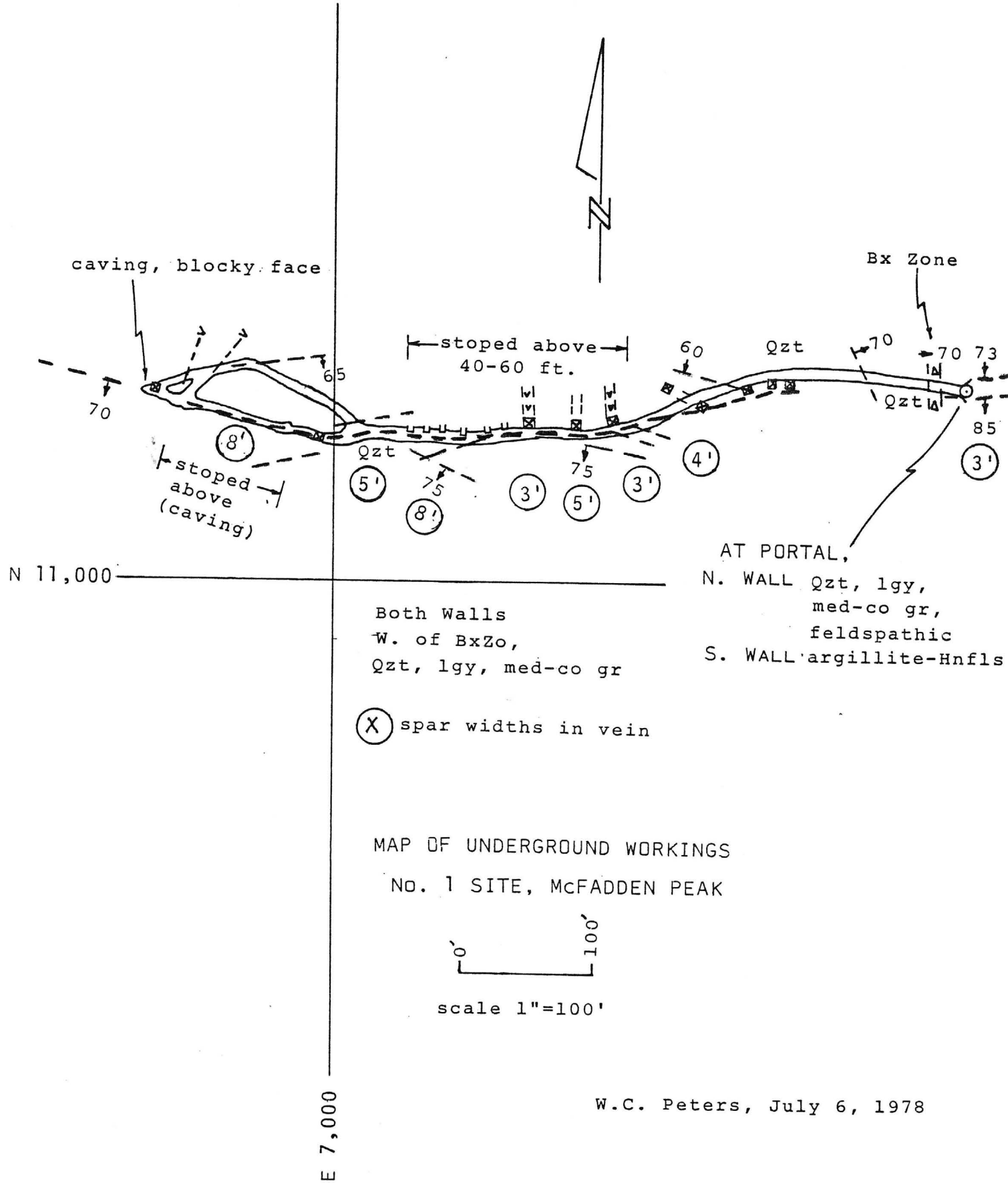
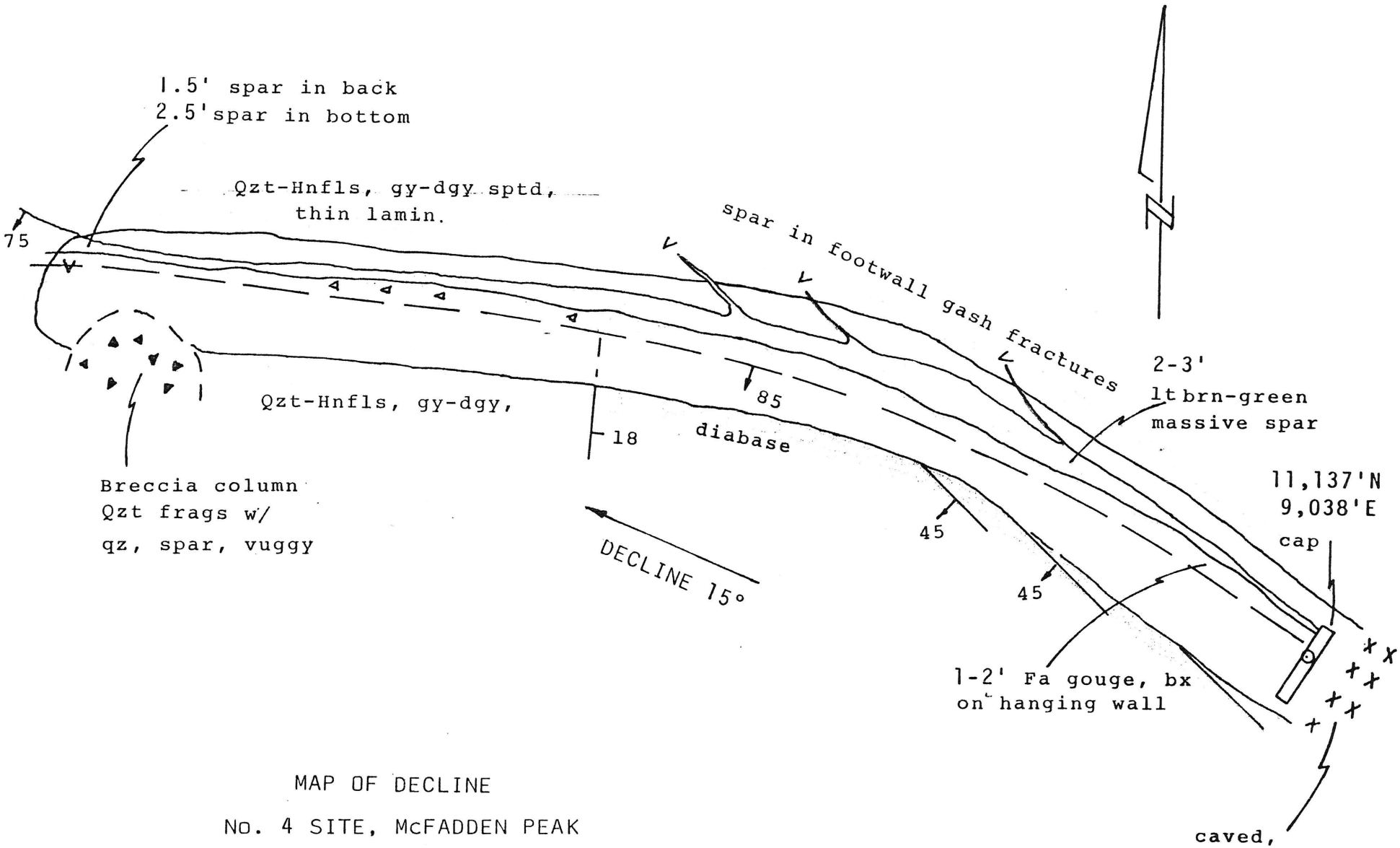

caving, blocky face
Bx Zone
stoped above
40-60 ft.
Qzt
70
65
60
70
70
73
85
Qzt
Qzt
8'
stoped
above
(caving)
5'
8'
3'
5'
3'
4'
3'
75
75
N 11,000
AT PORTAL,
N. WALL Qzt, lgy,
med-co gr,
feldspathic
S. WALL argillite-Hnfls
Both Walls
W. of BxZo,
Qzt, lgy, med-co gr
(X) spar widths in vein
MAP OF UNDERGROUND WORKINGS
NO. 1 SITE, McFADDEN PEAK
0'
100'
scale 1"=100'
W.C. Peters, July 6, 1978
E 7,000

Figure 5-7



MAP OF DECLINE

No. 4 SITE, McFADDEN PEAK

0 10'

scale 1"=10'

W.C. Peters, July 6, 1978

Figure 5-8

diabase and hornfels hanging wall areas. It appears that fluorspar mineralization should be of normal width where one wall is in diabase, and the opposite wall is in silty quartzite, argillite, or hornfels.

Vein mineralogy at McFadden Peak is relatively simple: coarse crystalline fluorite (light gray - light purple - light green) with quartz and minor calcite. Very minor amounts of barite, pyrite, galena, and oxidized copper minerals have been noted in a few places. The vein texture is typical of epithermal fluorite veins: massive and coarse crystalline with vugs and druses and with occasional open spaces bounded by coarse crystalline crusts. Most of the fluorite is massive, with color banding parallel to the walls. There are, however, zones of post-mineralization faulting along the walls in which 10% to 30% of the vein consists of fluorite-bearing gouge and finely brecciated fluorite "sugar spar".

Lateral and vertical zoning of mineralogy within the vein appears to reflect the wallrock composition rather than a broader depth-temperature condition during mineralization. It would be expected, judging from epithermal fluorite veins elsewhere, that barite and calcite should increase in amount at the ends of the fluorspar vein; there is no indication of this in the known portion of the deposit at McFadden Peak, the

vein ends in a silica-rich zone on the west as it passes from hornfels-argillite-fine grained gray quartzite into massive red quartzite. It would also be expected that silica and sulphide mineralization should increase gradually with depth. Silica increases with depth at McFadden Peak, but abruptly with a change in lithology on the hanging wall rather than gradually. The minor sulphide mineralization and iron oxide voids from sulphide minerals do not appear to increase appreciably with depth.

Wallrock alteration is quite apparent in a narrow (5 to 10 foot) zone of silicification on both walls in surface exposures of the vein. It is also evident in some drill holes where the hanging wallrock is silicified and cut by quartz stringers within 20 to 30 feet of the vein.

The geometry of the McFadden Peak vein is relatively uniform. The vein dips to the south at 65 to 80 degrees, with the steeper dips on the west end of the vein. Gash joints contain veinlets of fluorspar in both walls and there are a few areas of vein "split" where a separate strand reaches a thickness of several feet.

Sampling and Drilling of the Deposit

The deposit has been drilled by the U.S. Steel Corporation and by Western Fluorspar Company (See Table 5-1, Drill Hole Summary, Figure 5-3, and Figure 5-4). The U.S. Steel holes were planned to intersect the vein at a depth that would indicate a major deposit. In drilling at this depth, the U.S. Steel holes were entirely in the unfavorable zone of massive red quartzite. The importance of wallrock lithology was not known to the U.S. Steel geologists, and no shallower holes were drilled. Western Fluorspar's holes were to a shallow depth, most intersecting the vein at less than 130 feet from the surface; the deepest and eastern-most hole, WN-9, intersected the vein at a vertical depth of 170 feet and beneath a diabase sill, but core recovery was very poor. Fluorite was reported in WN-9 cuttings and some fluorite is visible in broken and abraded pieces of core. Triangle holes T-10 and T-12 have verified the presence of good fluorspar at Western's WN-9 site.

The deposit was trenched and sampled by U.S. Steel along the outcropping portion of the vein (Figures 5-3 and 5-4). The deposit was sampled by Western Fluorspar during mining at Site 1 (current underground mine) and Sites 2, 3 and 4 (abandoned mines and cuts). Sample results from the U.S. Steel project are reliable and have been used in this project. The Western Fluorspar samples were taken into account in this report, but they refer only to general locations in the workings.

The Triangle Mining Company drilling program (Table 5-1 and Figures 5-9 through 5-18) was begun with 4 holes to test the vein in the eastern (soil-covered) part of the known fluorspar vein. Holes T-1 and T-2 penetrated good widths of fluorspar within 190 feet of the surface and in the zone of favorable wallrock. Hole T-3 penetrated fluorspar in the vein at the base of thick overburden and to the east of a cross fault. Hole T-4 did not penetrate the vein but it gave stratigraphic information in the footwall at a point where the top of the vein had been eroded and then covered with overburden.

A second group of 10 holes was drilled by Triangle to test the vein at depth. Holes T-5, T-7 and T-8 intersected the vein structure in the unfavorable massive red quartzite and provided the information needed to determine the wallrock control for the bottom of the fluorspar. Hole 7 confirmed the expected wallrock control in the eastern part of the vein. Hole 9 confirmed the presence of fluorspar in the shallow west end of the property. Holes 10 and 12 penetrated good thicknesses of ore near Western's drill hole WN-9. Hole 13 provided information in the hanging wallrock at depth. Holes 11 and 14 were still in progress on December 7.

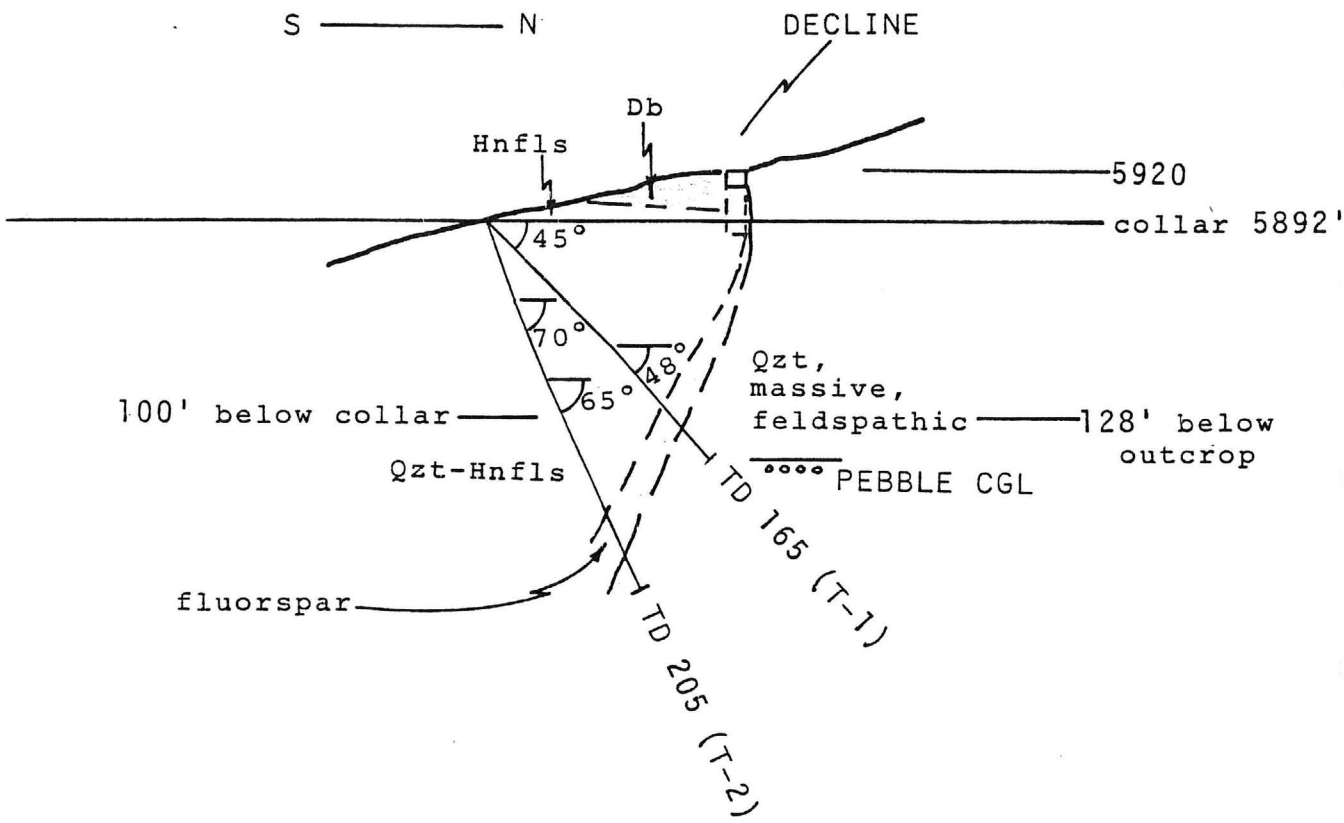
TABLE 5-1

DRILL HOLE SUMMARY

Hole No.	Bearing	Inclin. (Collar)	Hole Depth To Vein	T.D., Ft.	Vein Width (Normal)	Grade % CaF_2 - SiO_2 - $CaCO_3$
			- U.S. Steel Holes -			
JF-1	N22E	-45°	275.7 ft.	334.0	3.17 ft.	35.9 - 61.18 - X
JF-2	N22E	-69°	345 (?)	531.0	13 (?)	57% core recovery Fault Zone
JF-3	N10E	-45°	445 (?)	646.0	(?)	(Silica veinlet)
JF-4	N10E	-65°	279 (?)	549.0	(?)	(Silica veinlet)
JF-5	N10E	-48°	230.8 ft.	401.0	2.00 ft.	42.37 - 53.22 - X
			- Western Fluorspar Holes -			
WN-1	N10E	-45°	85.9 ft.	93.0	4.6 ft.	65+ (est.)
WN-2	N10E	-65°	110.8	135.4	12.9	65+ (est.)
WN-3	N10E	-65°	69.0	86.0	7.0	65+ (est.)
WN-4	N10E	-49°	58.5	75.0	4.5	(? - less than 33% core)
WN-5	N10E	-83°	120.7	144.0	6.3	("high grade CaF_2 sludge")
WN-6	N 1 W	-54°	64.5	117.0	3.5	("vein in fault" ?)
WN-7	N 1 W	-75°	92.5	130.0	7.7	65+ (est.)
WN-8	N 9 W	-65°	87.0	117.0	6.2	65+ (est.)
WN-9	N15W	-43.5°	175.0 (?)	220.0	(?)	(Fault, less than 32% core)
			- Triangle Mining Co. Holes -			
T-1	N 6 W	-45°	130.0 ft.	165.0	7.3 ft.	84.51 - 9.17 - 2.21
T-2	N 6 W	-70°	170.0	205.0	9.1	65.10 - 29.99 - 2.80
T-3	N13E	-75°	72.0 (-)	115.0	2.3 (+)	------
T-4	--	Vert.	31.0 (-)	164.0	(?)	Vein in overburden
T-5	N10W	-70° (?)	401.0	426.0	(?)	Veinlet below 90' zone of quartz-filled fractures
T-6	N12E	-60°	163.5	211.0	6.5	Vein silica, vuggy, with traces of CaF_2
T-7	N 5 W	-57°	220.0	301.0	2.0 (?)	2 ft. void, no core

DRILL HOLE SUMMARY , CONT.

Hole No.	Bearing	Inclin. (Collar)	Hole Depth To Vein	T.D., Ft.	Vein Width (Normal)	Grade % CaF_2 - SiO_2 - $CaCO_3$
T-8	N 1 E	-63°	133.5 ft.	161.0	5.0 ft.	Vein silica, breccia, with traces of CaF_2
T-9	N13W	-63°	167.5	211.0	4.5	Spar, gouge and breccia
T-10	N 2 W	-62°	122.0	166.0	8.7	High grade spar
T-11	N 9 W	-66°	126.0	--	2.0 (?)	Void, in progress Dec. 7
T-12	N 2 W	-45°	92.0	124.0	11.0	High grade spar
T-13	--	Vert.	--	320.0	--	------
T-14	N 2 W	-75°	--	--	--	In progress Dec. 7

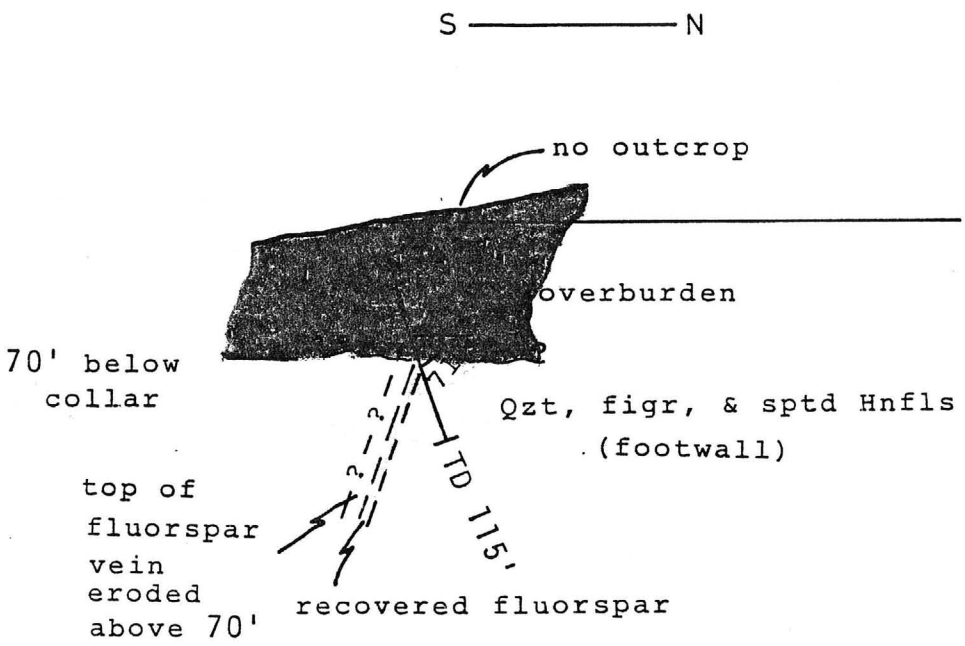


DRILLHOLE CROSS SECTION - T-1 AND T-2

0 100

scale 1"=100'

Figure 5-9

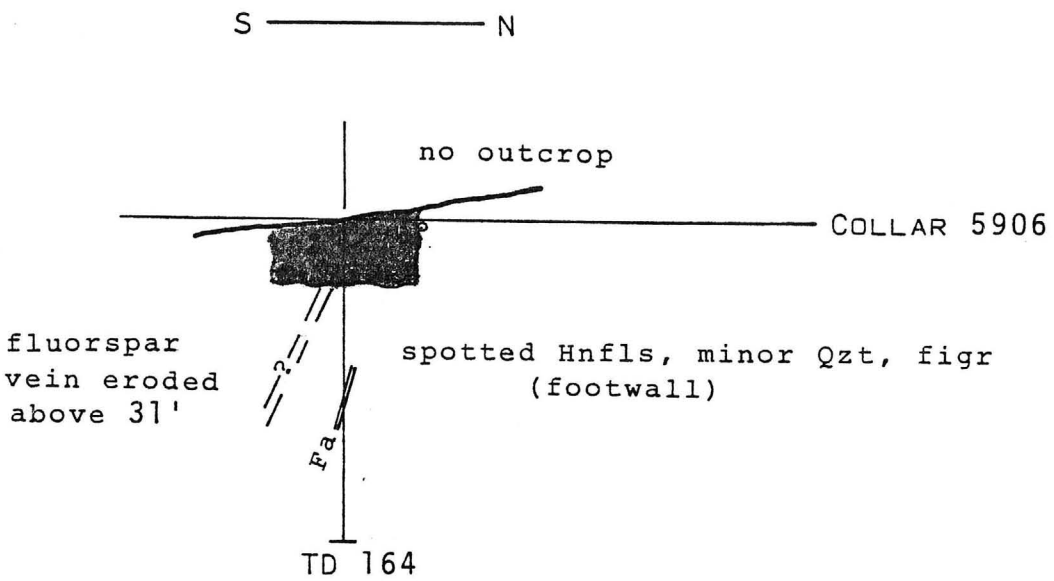


DRILLHOLE CROSS SECTION T-3

0 100

scale 1"=100'

Figure 5-10



DRILLHOLE CROSS SECTION T-4

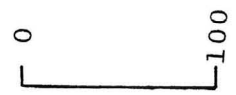
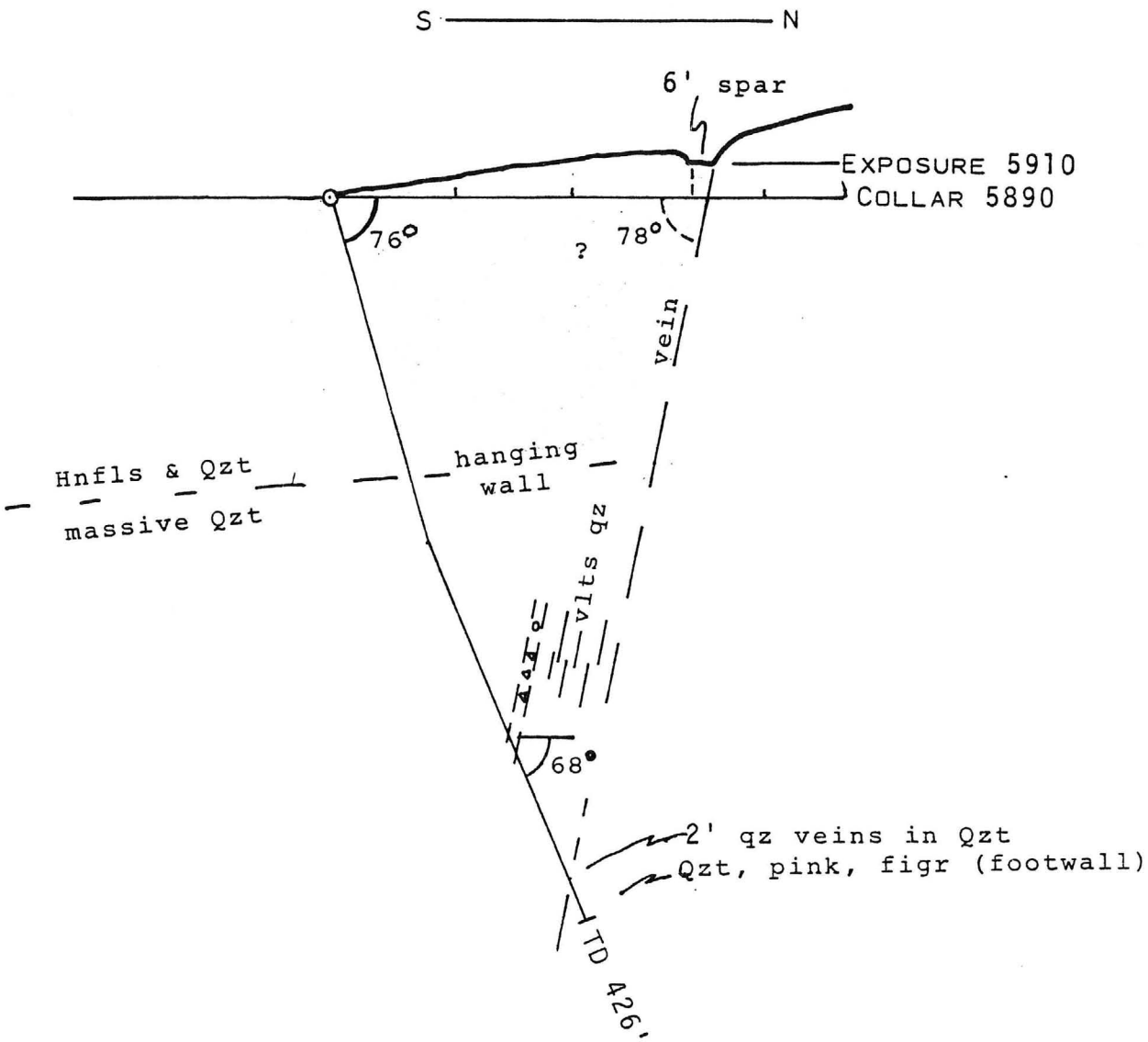
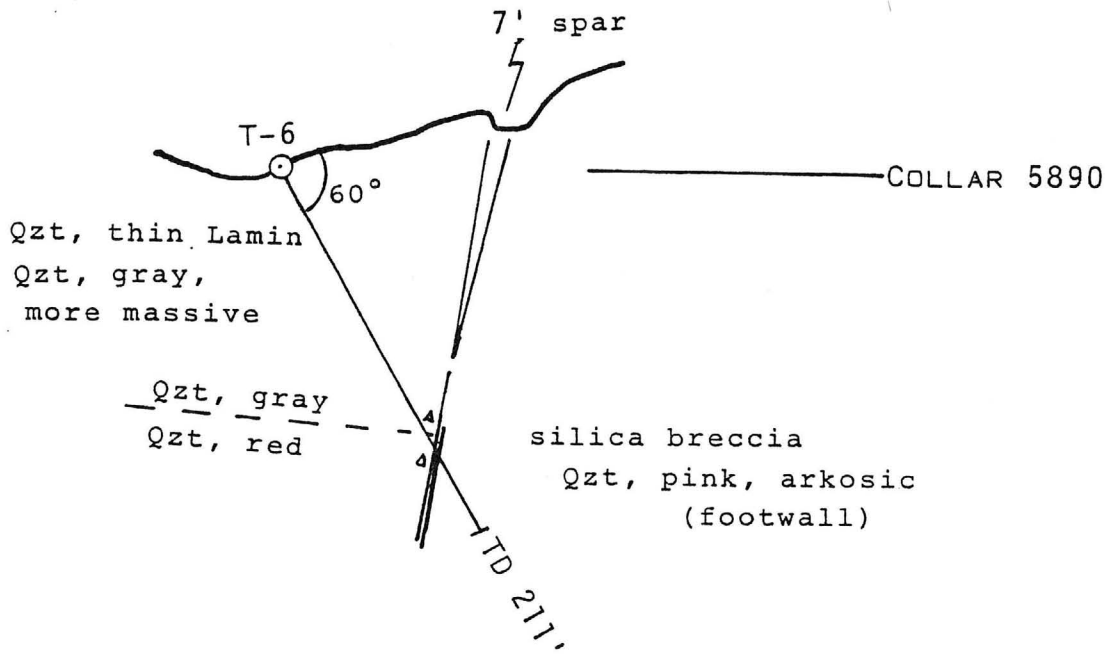


Figure 5-11

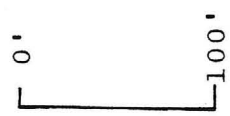


DRILLHOLE CROSS SECTION T-5

Figure 5-12

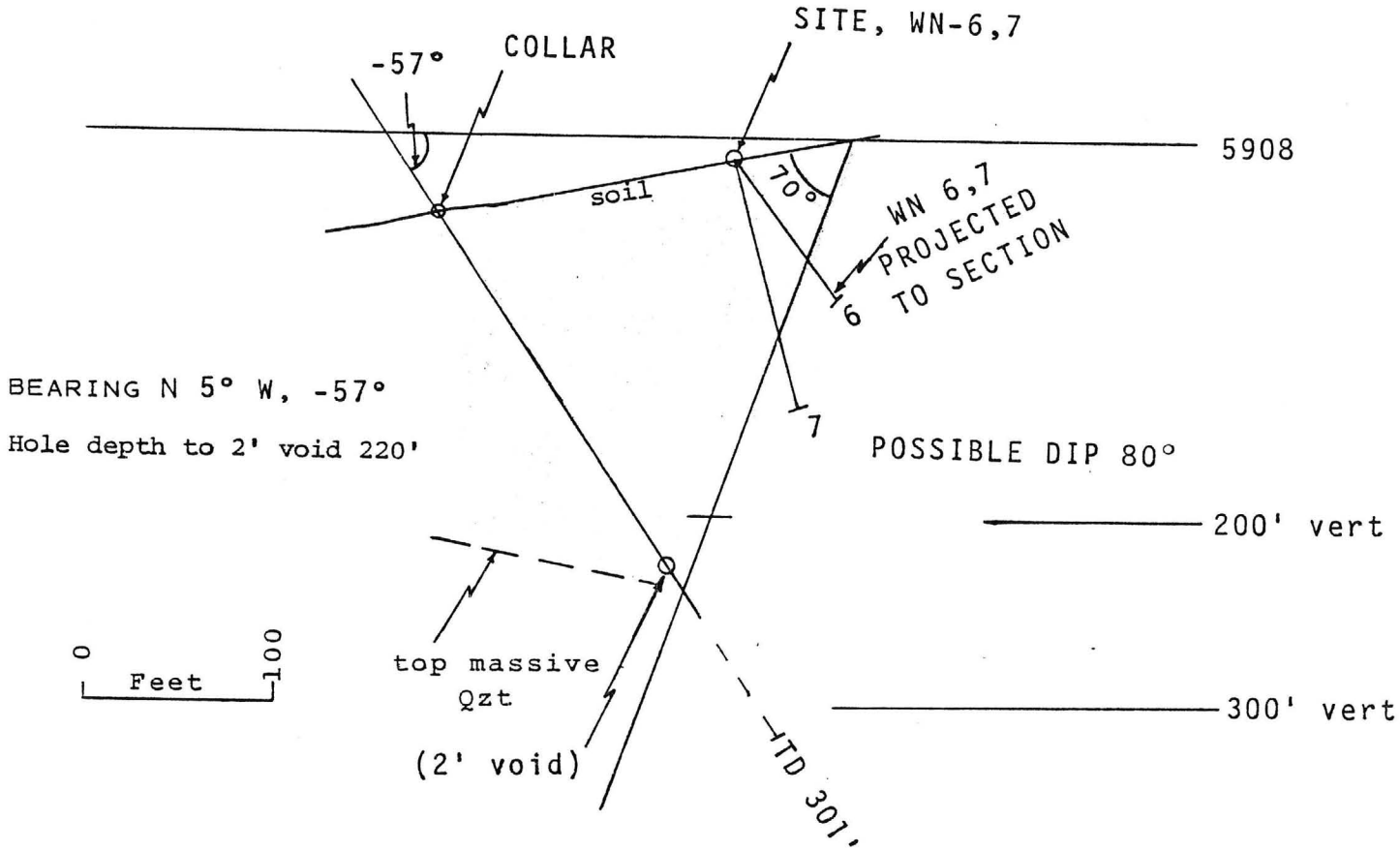


DRILLHOLE CROSS SECTION T-6



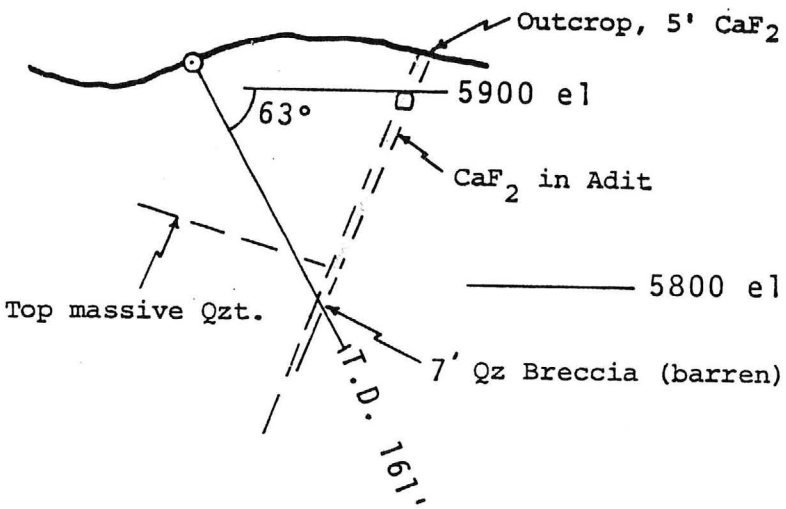
scale 1"=100'

Figure 5-13



DRILLHOLE T-7

Figure 5-14

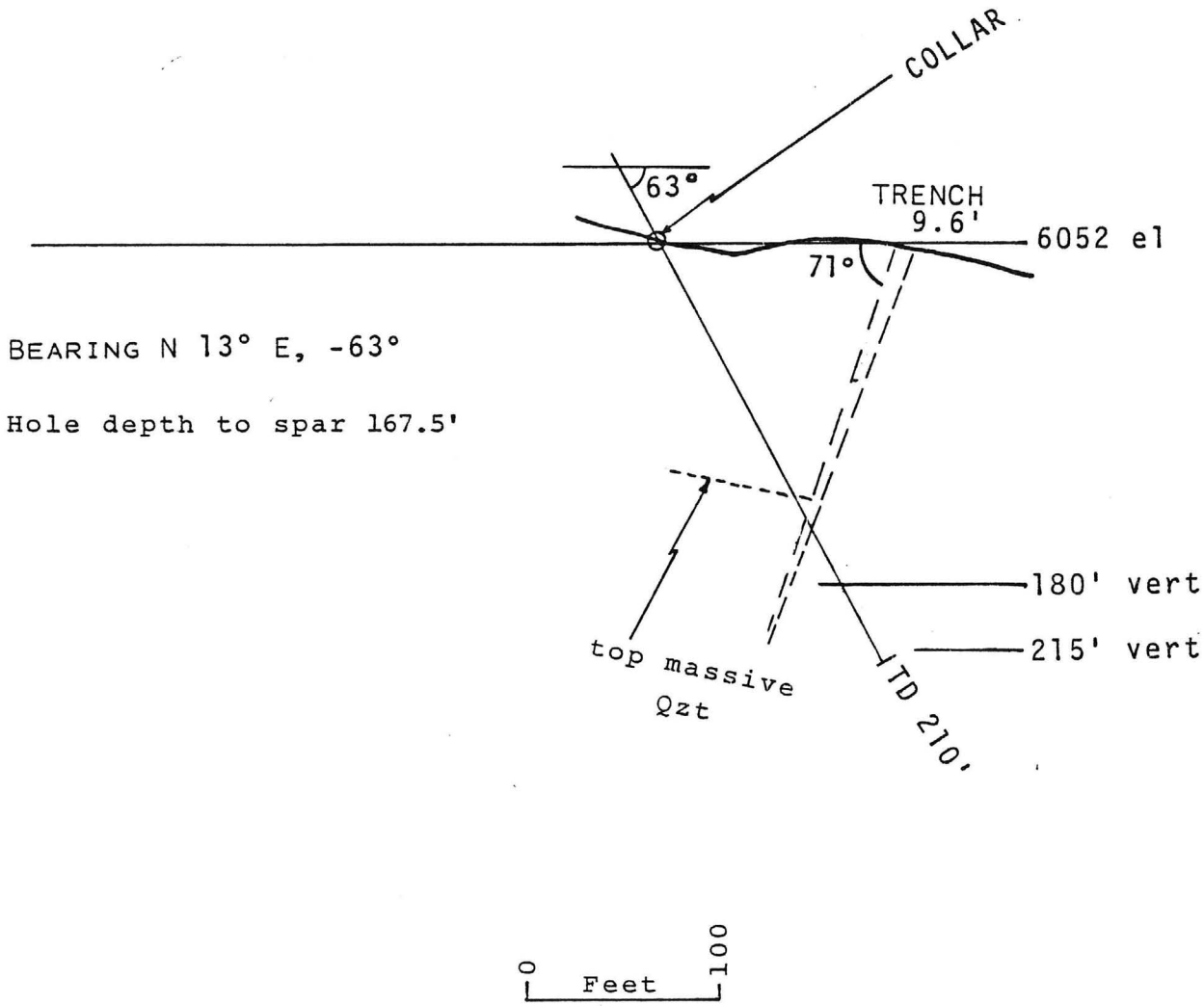


BEARING N 1° E
Hole depth to barren quartz vein 133'

0 100
Feet

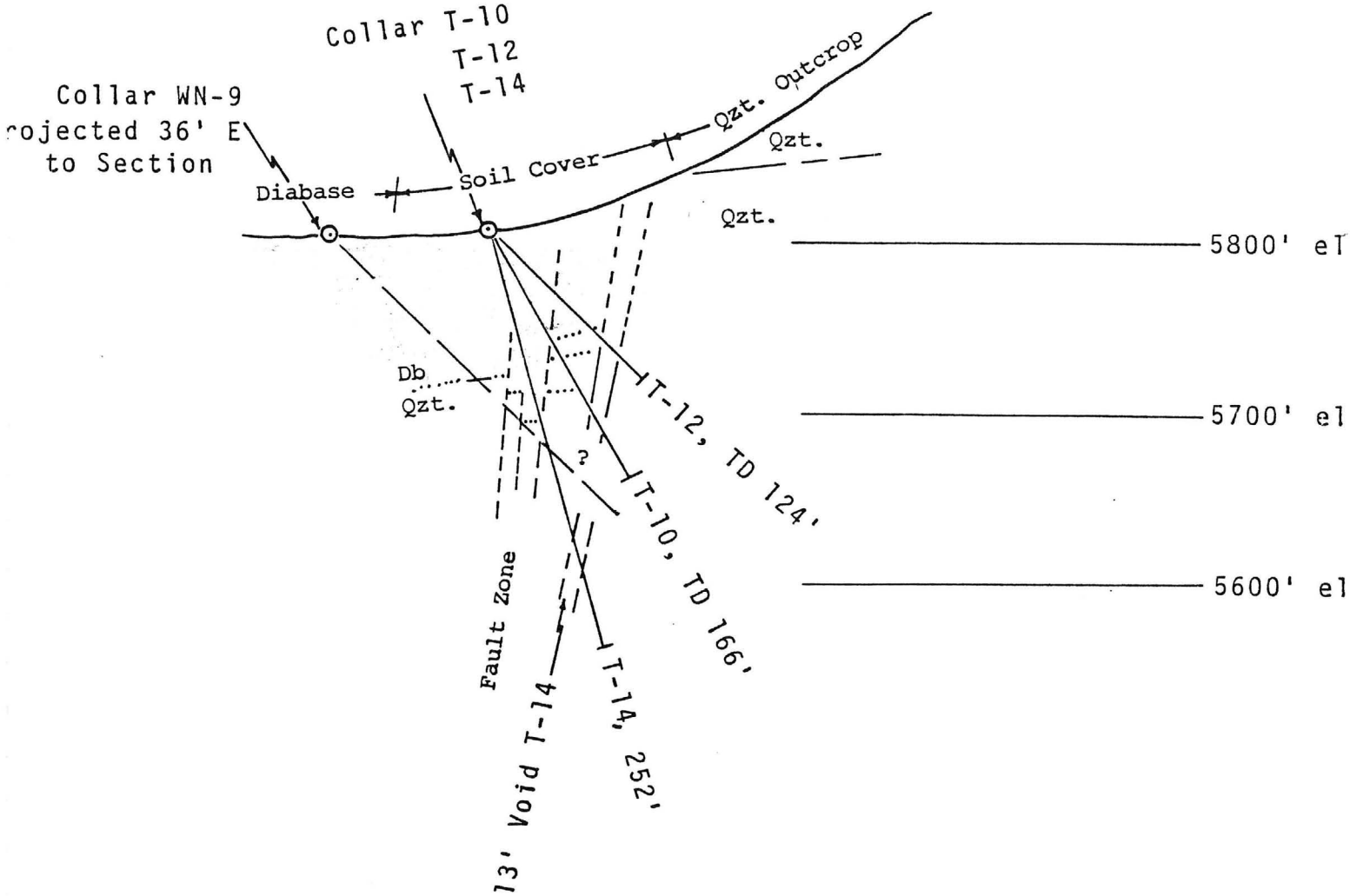
DRILLHOLE T-8

Figure 5-15



DRILLHOLE T-9

Figure 5-16

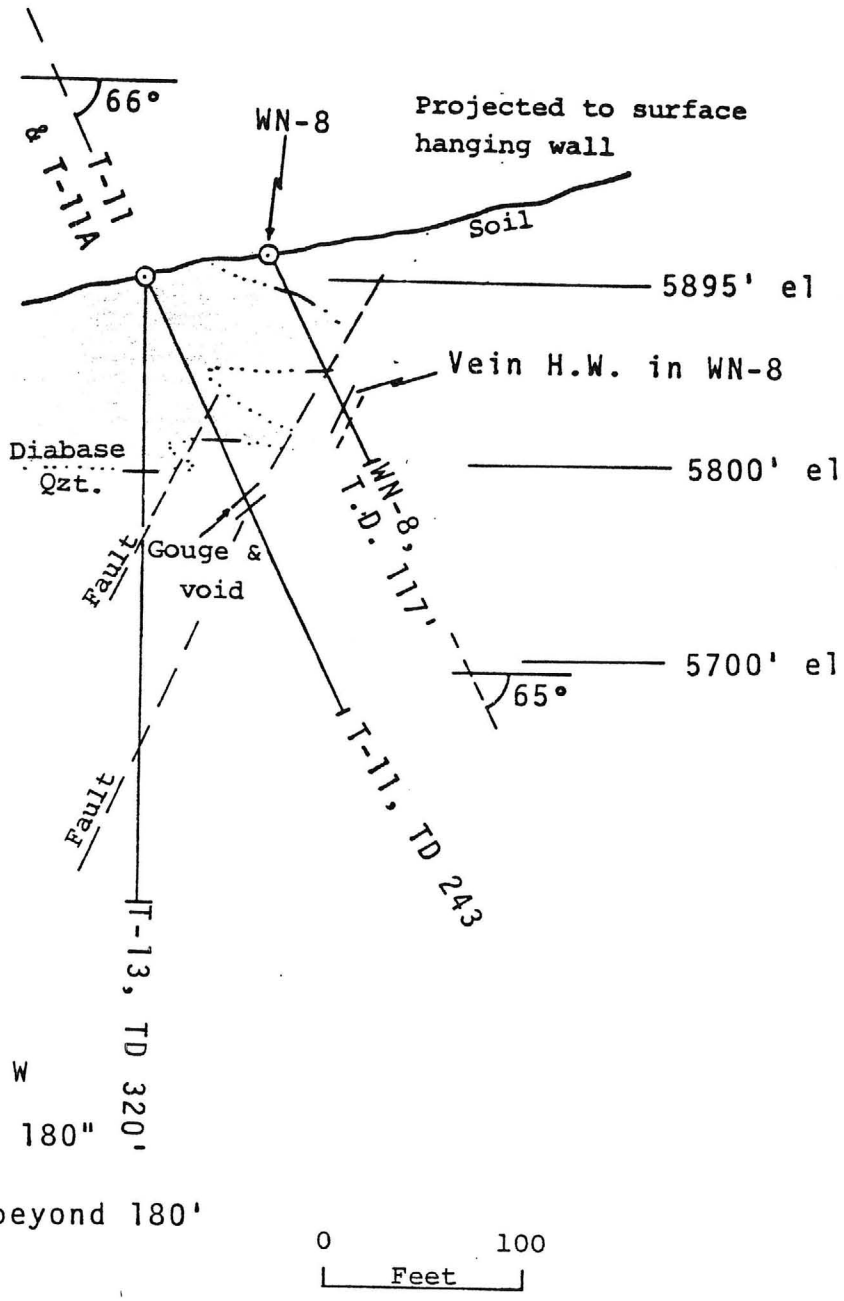


BEARING N 2° W
T-10, -61° 40'
Hole depth to spar 121.5'
T-12, -45°
Hole depth to spar 94'
T-14, -75°

0 100
Feet

DRILLHOLES T-10
T-12
T-14

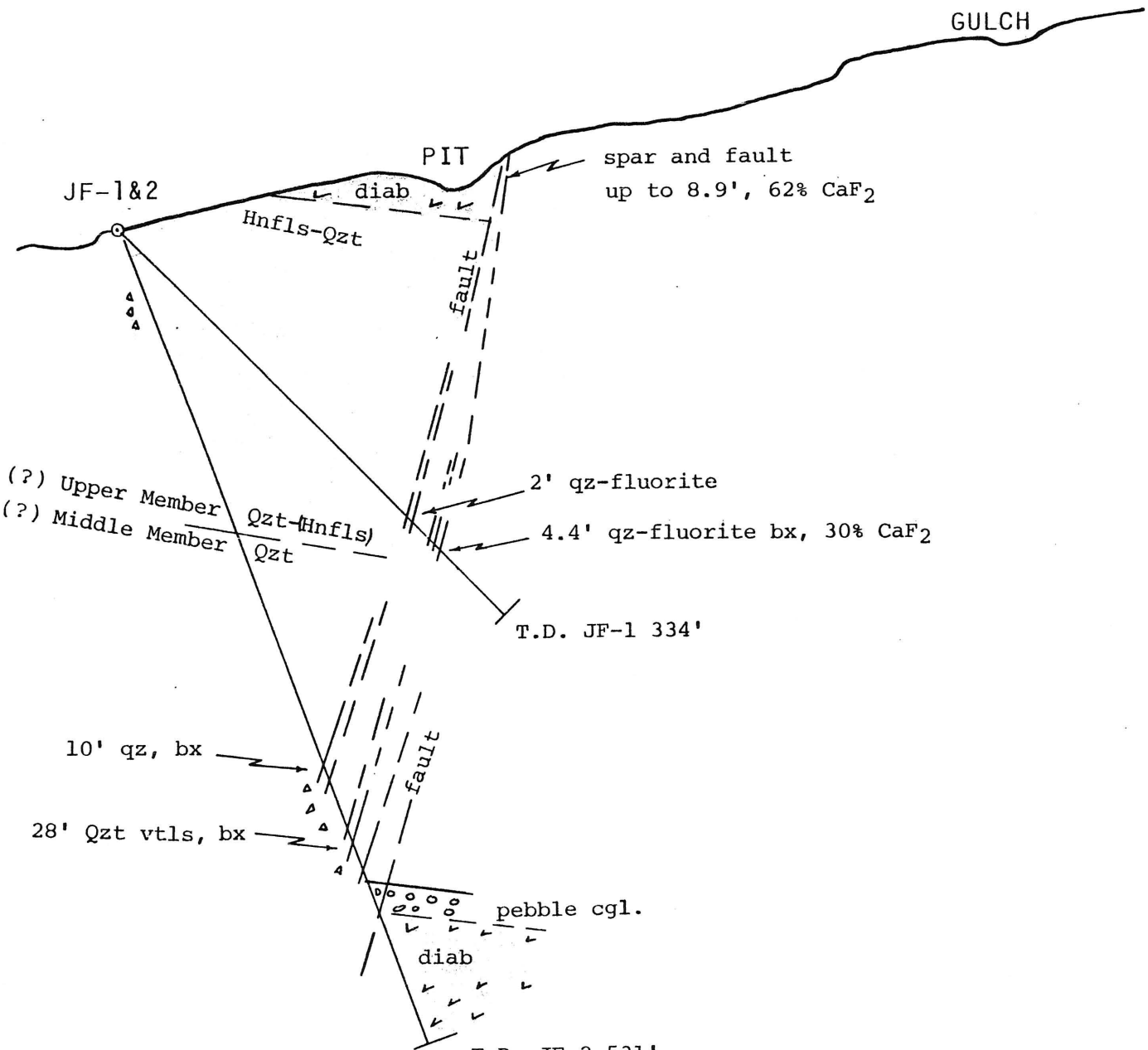
Figure 5-17



DRILLHOLES T-11

T-13

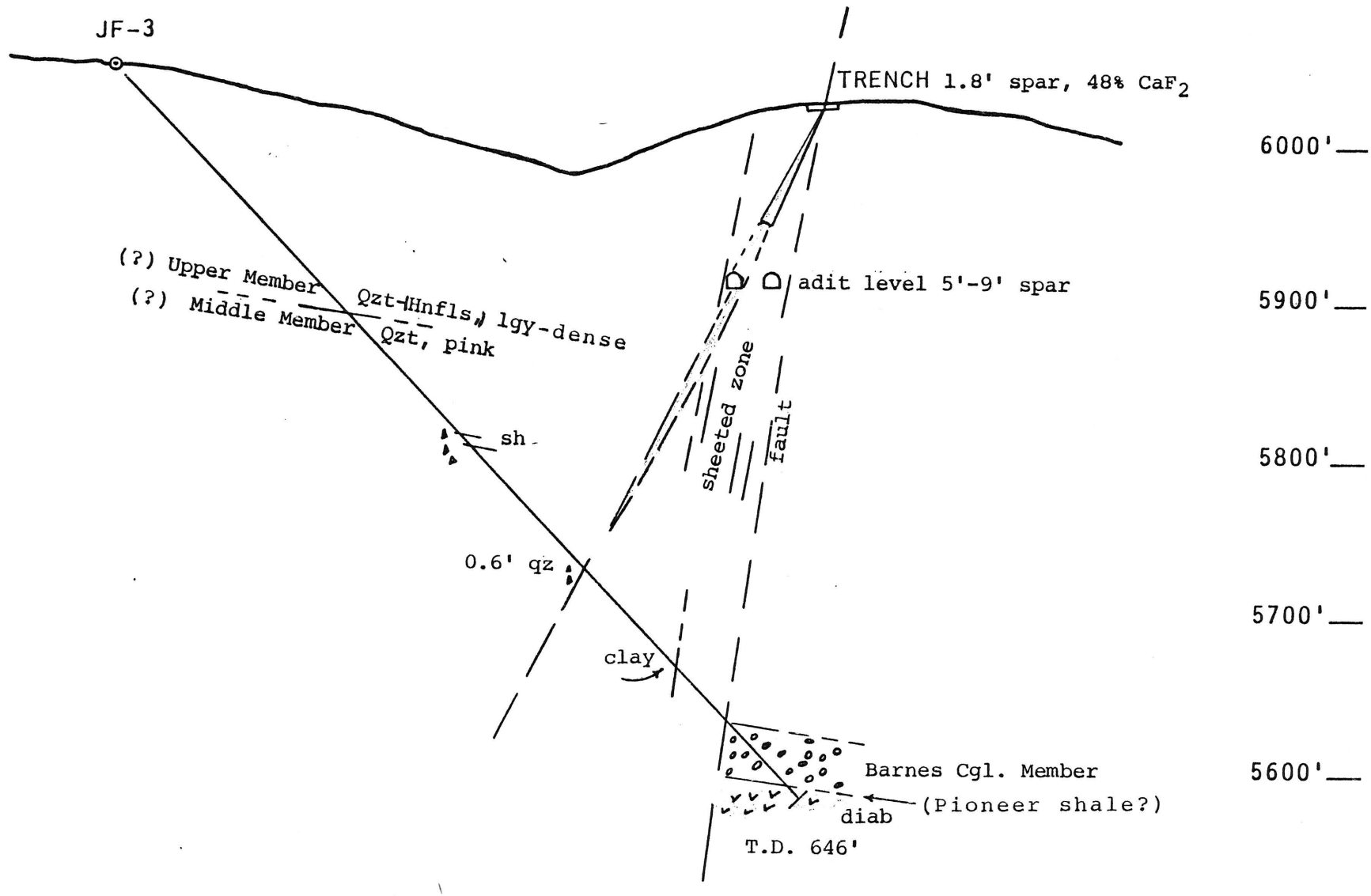
Figure 5-18



DRILLHOLE CROSS SECTION - JF-1&2

SCALE 1"=100'

Figure 5-19



DRILLHOLE CROSS SECTION - JF-3

SCALE 1"=100'

Figure 5-20

Proposed Drill Holes

As of December 7, 1978, 9 additional drill holes are proposed in order to verify the indicated ore reserves and to establish the bottom limit of mineralization. The first six holes to be drilled should be on the east end and in the following sequence:

T-K (1)

T-K (2)

T-L (1)

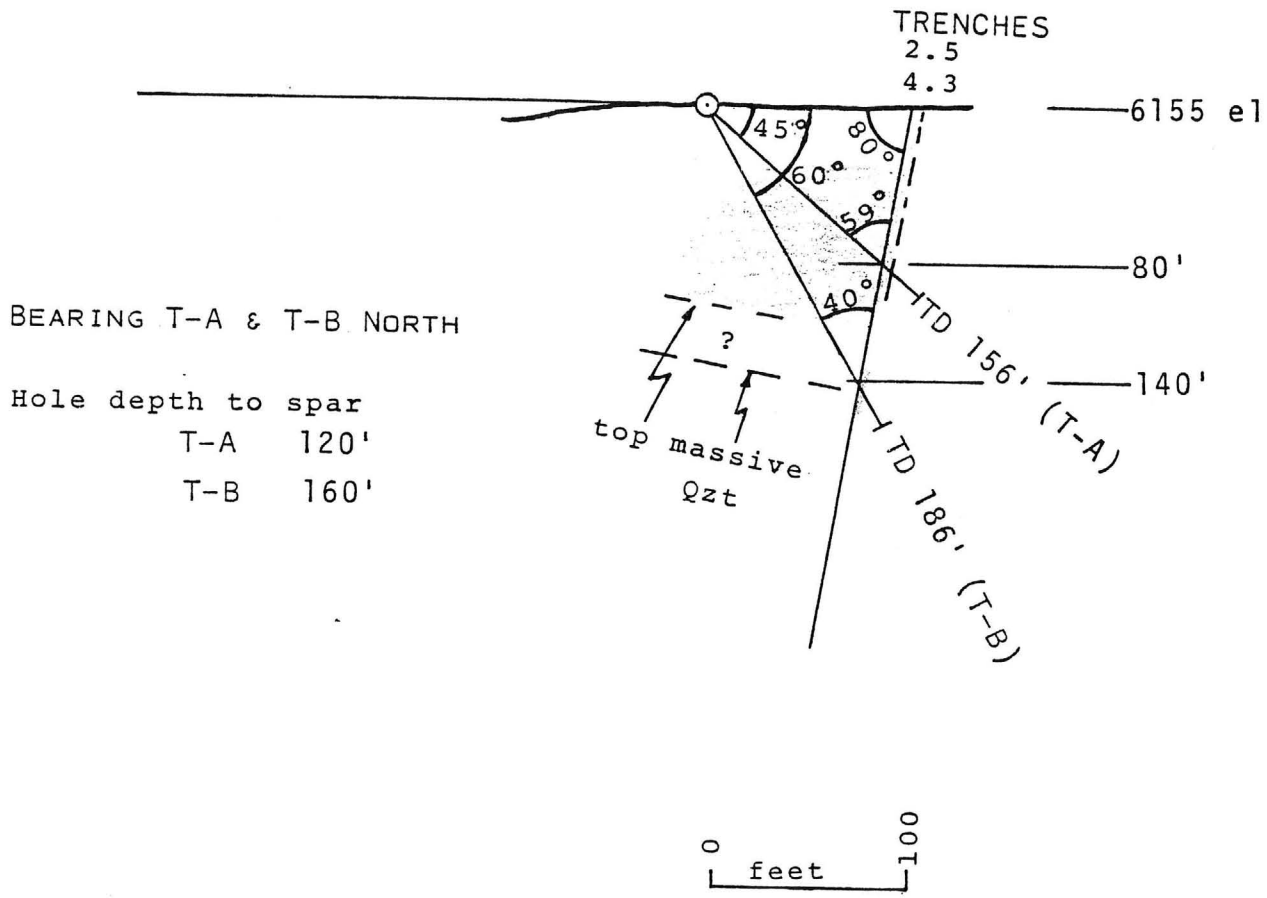
T-L (2)

T-M (1)

T-M (2)

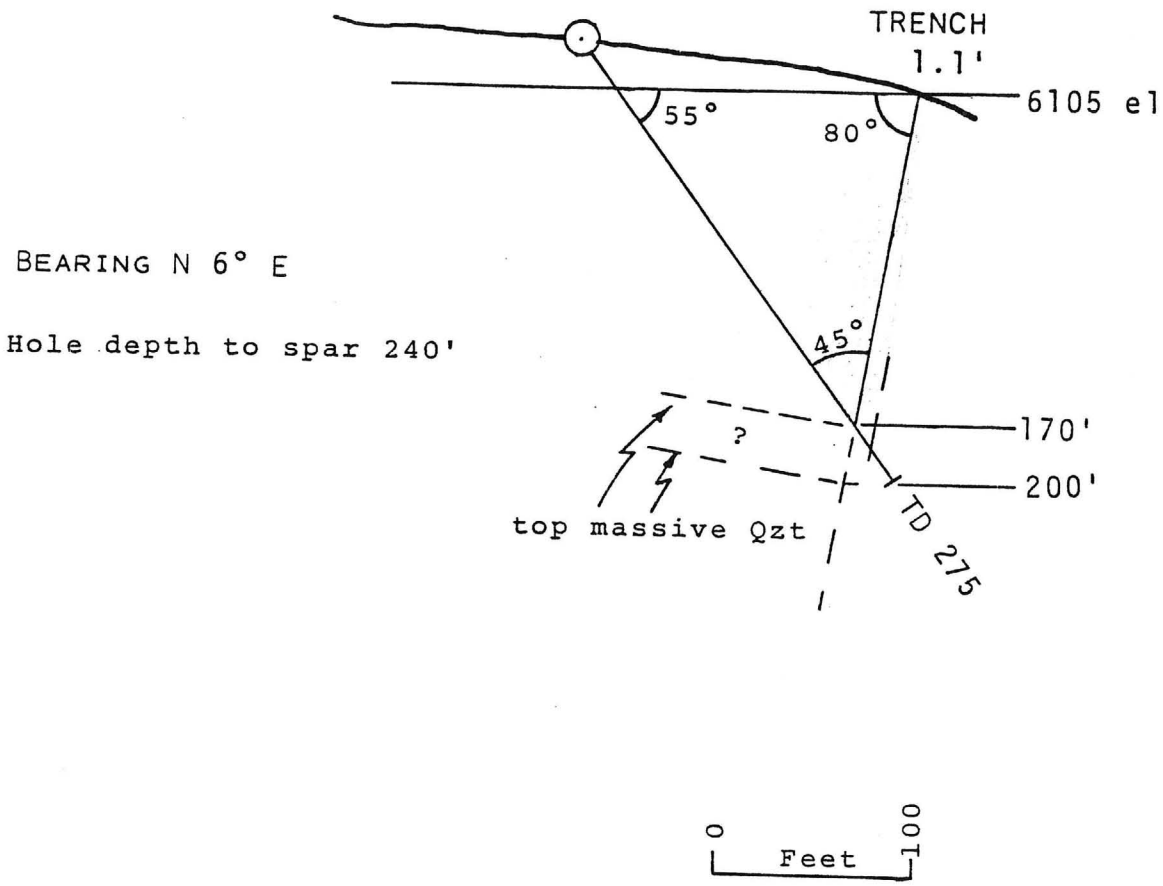
The locations of all holes drilled to date (through T-14) and the locations of the proposed holes T-A, T-B, T-C, T-K, T-L, and T-M are shown in Figure 5-3. Expected vein intercepts in proposed holes T-A, T-B, and T-C are shown in cross section in Figures 5-21 and 5-22.

Table -2 lists proposed holes T-A, T-B and T-C with expected collar elevation, location, bearing, inclination, hole depth to the vein, and objective.



PROPOSED DRILLHOLES T-A AND T-B

Figure 5-21



PROPOSED DRILLHOLE T-C
(to intersect vein
in Hnfls near
Qzt contact)

Figure 5-22

Sites K and L have been prepared. Hole T-K (1) should be directed N 10° W and inclined at -45°. It should hit fluorspar mineralization at a depth in the hole between 150 feet and 240 feet, depending upon the actual dip of the vein and the projection of the vein beneath soil cover. Hole T-K (2), from the same site, should be inclined more steeply (65 to 75°) with the actual inclination based on information from hole T-K (1). Hole T-K (2) should prove the existence of fluorspar at vertical depths of 200 to 400 feet beneath the surface, depending upon dip of the vein.

Hole T-L (1) should also be directed approximately north and should also be inclined at -45°. Hole T-L (2), from the same site, and holes T-M (1) and T-M (2) should be planned on the basis of information from the earlier holes. The site for holes T-M (1) and T-M (2) is in an appropriate and accessible location, but has not yet been prepared.

TABLE 5-2

PROPOSED DRILL HOLES

(Not in sequence of drilling. Sequential numbers to be assigned as sites occupied)

No.	Collar Elev.	Collar Location N	E	Bearing	Inclin.	Hole Depth to Vein	Objective
T-A	6155'	11,438	5,362	North	45°	130'	Vein at 90', W end
T-B	6155'	11,438	5,362	North	60°	186'	Vein at 140', W end
T-C	6122'	11,212	6,190	N 6 E	55°	240'	Vein at 170', between No. 1 mine and JF-4,5

Reserves

A working estimate of 450,000 tons of indicated ore at a grade of 63% CaF_2 has been established on the basis of surface samples, drill holes, mine workings and geologic data. The confidence limit is 70% (30% high and 30% low) which gives a range of 300,000 tons to 600,000 tons of the deposit.

Drill holes T-11 and T-14, now in progress, and proposed drill holes from site T-K are particularly critical. If the vein thickness and position are confirmed, then the 450,000 ton figure will be strengthened.

A. Reserve Calculations

1. Volume and Tonnage - Fluorspar mineralization in the McFadden Peak vein from the westernmost exposure in the U.S. Steel trench to a position east of drill holes T-10 and T-12 is shown in Figure 5-4 as blocks in vertical section along line A-A'. The vein has been projected to the plane of section at right angle (normal) to the section.

   Area measurements for calculating the cubic feet contained in each block have been corrected for overburden thickness (principally in blocks