DMEA Form 9

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration

OFFICIAL DOCKET FILE

DMEA NO. 5627 7

Application (Denied ✓
(~~Withdrawn~~
(After disposition, delete items not applicable)

Contract (Terminated - not Certified
(Cancelled
(Terminated - Certified
(Royalty Agreement

This is the official contract file containing all official records of the project. The records contained in the files are checked and are arranged in this order:

Left Side

Interim Royalty Audits
Reports of Royalty Review
Certification of Discovery
Certificate of Audit (Final)
Interim Audit(s)
Report of Review
Termination Notice or Agreement
Recision Notice
Assignment of Contract
Contract Amendments (latest on top)
Contract with all exhibits and annexes
Owner's Consent to Lien
Subordination Agreement
✓Leases and assignments of leases
✓Application and attachments
(3) ✓Envelope for maps

Right Side

Project summary
Work completed analysis
All other material is filed in chronological order with correspondence including the following reports as checked:

Final Field Team Report (Tab)
Operator's Final Report
(2R) Interim Reports
(2R) Operator's monthly reports and all attachments (latest on top)
✓On-site Exam Report(s) (Tab)
(4) Settlement Sheets

When the volume of records is expected to warrant additional folders, or when convenience of reference warrants separate folders for certain records, they should be set up in this order:

Left Side

Folder No. 2: (In chron. order)
Interim Summary Reports by W. O. Engineers

Right Side

Operator's Semi-Annual Report for Certified Project, Field Team Interim Reports, Operator's Monthly Report with transmittal, narrative, maps, and Field Team review.

Folder No. 3: Maps (Use pocket folder or envelope. Fold maps with title block out and show reference to related document or correspondence.)

Folder No. 4: Settlement Sheets

Folder No. 5: Drill Logs

DMA Form 1

DEFENSE MINERALS ADMINISTRATION
Control Slip

CONTROLLED DOCUMENT

DMA Docket No. 4277

DO NOT DETACH THIS SLIP

Action on this document is recorded and controlled in Reports and Records Branch. Any movement of this document between divisions or offices of DMA or movement outside DMA must be reported to the Reports and Records Branch. Actions taken that affect status of the case must also be reported.

This document has been recorded as

Any action taken to change the type of request for assistance must be promptly reported to the Reports and Records Branch. Use DMA Form 2 for submitting these reports.

Routing Slip

To:	Base Metals Division	Date	5/7/56
To:	Op. Comm	Date	6/25/56
To:	F.C. Johnson	Date	6-27-56
To:	[illegible]	Date	6-27-56
To:	Base Metals	Date	6/28/56
To:	130	Date	1/17/57
To:	110	Date	1-18-57
To:	100	Date	1-18-57
To:	500	Date	1/22/57
To:	130	Date	2/13/57
To:	110	Date	2-15-57
To:	100 225	Date	2-15-57
To:		Date	
To:		Date	
To:		Date	

DO NOT DETACH

CONTROLLED DOCUMENT

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

April 30, 1956

224 New Customhouse
Denver 2, Colorado

RECEIVED
MAY 2 - 1956

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Field Team, Region III

Subject: Application for DMEA aid (Lead) Cordillera Mining Company, (Sein Fein Mine), Graham County, Arizona

Enclosed are three copies of the subject application in the amount of $34,450.00. One copy of the application is being retained in our file.

DMEA Field Team, Region III

W. M. Traver
Executive Officer, DMEA
Field Team, Region III

Enclosures

OFFICIAL BUSINESS

Mr. Jay L. Chambers
Defense Minerals Exploration Administration
Interior Building
Washington 25, D.C.

CORDILLERA MINING COMPANY
Post Office Box 664
GRAND JUNCTION, COLORADO

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

SEIN FEIN MINE

INDEX

Application Form

Added Sheets for Explanation

Appendix A --- Chain-of-Title Documents

Appendix B --- Past Production Figures

Appendix C --- Geological Report by George C. Heikes.
Accompanying Claim Map.
Accompanying mine working map.

Appendix D --- Mine Map
a) Existing Sein Fein workings and ore shoots.
b) Estimated workings and ore shoots of adjacent mine.
c) Projected DMEA exploration.

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

DMEA
Date Rec'd
APR 30 1956

Form Approved.
Budget Bureau No. 42-R1035.2.

BUREAU OF MINES
Denver, Colorado

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. 4277
Metal or Mineral Lead
Date Received May 2, 1956
Estimated Cost $34,450.00
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: Cordillera Mining Co.
P. O. Box 664
Grand Junction, Colo.

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized. See attached sheets.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers. See attached sheets.

(*d*) If a partnership, add to the above statement the names and addresses of all partners. Not applicable.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract See attached sheets.

(*b*) State any mine name by which the property is known. Sein Fein Mine.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Attached sheets and Appendix A

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it None

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

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MAY 2 - 1956

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5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore lead

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc.

(*c*) The work will start within 30 days and be completed within 8 months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)? Yes

(*b*) How do you propose to furnish your share of the costs?

[XX] Money [XX] Use of equipment owned by you [ ] Other

Explain in detail on acompanying paper.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated April 27, 1956

Cordillera Mining Co.
(Applicant)

By James F. Martin

James F. Martin

President

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

1. (b) Applicant:

Cordillera Mining Co., (a Colorado Corporation)
P. O. Box 664
Grand Junction, Colorado.

(c) Officers:

Mr. James F. Martin, President
P. O. Box 664
Grand Junction, Colorado.

Mr. Albin Anderson, Vice-President
127 N. 4th Street
Grand Junction, Colorado.

Mr. Leslie E. Arend, Secretary-Treasurer
West of Palisade, Colorado.

In addition the Balboa Mining & Development Company, a Colorado Corporation, P. O. Box 861, Grand Junction, Colorado, possesses a one-third interest together with Cordillera in the Sein Fein Mine.

Officers of Balboa Mining & Development Company are:

Mr. George C. Heikes, President
149 Galli Ave.
Los Altos, California.

Mr. William M. Spencer, Jr., Vice-President
P. O. Box 861
Grand Junction, Colorado.

Mr. Laurence G. Duerig, Secretary-Treasurer
98 Michaels Way
Atherton, California.

3. (a) This application covers eight unpatented contiguous lode claims and one camp site claim in SW¼ of Section 19 and NW¼ of Section 30, Township 5 South, Range 20 East in the Aravaipa Mining District, Graham County, Arizona.

These claims are as follows:

Name of Claim	Recorded in records of Graham County, Arizona, Book	Page.
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp Site	33	412

(b) The mine is known as the Sein Fein Mine.

(c) The applicant, Cordillera Mining Company, together with Balboa Mining and Development Company, co-lessee, is the assignee of a Lease and Option to Purchase on the Sein Fein Mine. The Lease and Option was acquired from the owners of the property by Dean Nicholson who, with written consent of owners, assigned his rights to Cordillera Mining Company and Balboa.

(d) See Appendix A for chain-of-title documents.

(e) There are no liens or encumbrances on the property.

(f) See 3 (a) above.

4. (a) See Appendix D for map of Sein Fein Mine workings and adjoining property.

The Sein Fein Mine has been developed to a depth of 607.7 feet by an inclined shaft dipping from 28 to 43 degrees following the vein. In addition drifts have been extended to the east and west on nine separate levels for the purpose of exploring, developing, and mining. See map for location of drifts and ore shoots.

Since Cordillera acquired its interest in the Sein Fein Mine, the shaft has been extended from a depth of 425 feet to the present 607.7 feet, an 8th level has been extended to the east and a 9th level has been extended to the west. Although no ore was mined during this period, extensive alteration and mineralization was encountered.

A fire on November 16, 1955, destroyed some of the existing production facilities, particularly the head frame, hoist house, hoist motor, and part of the ore bin. Track to the bottom of the incline remains in place, compressor, truck and other equipment is on the property.

All mine workings and faces are currently accessible.

(b) No ore reserves exist at present, nor is there current production. Past production (summarized) as determined from available settlement sheets was as follows:

Period	Total-dry tons	Pb %	Zn %	Ag oz.	Au oz.
July-Dec.1950	869.7	17.55	5.08	2.5	.302
Jan-Dec.1951	1,872.4	18.04	2.78	2.36	.235
Jan-Aug.1952	889.0	14.98	1.25	1.77	.113
Totals-Averages	3,631.1	16.86	3.03	2.21	.223

See Appendix B for details of past production.

4. (c) The Aravaipa District lies on the southwestern slopes of the Santa Teresa and Turnbull ranges. The Cretaceous beds and Tornado limestones, which are Mississippian and Pennsylvanian in age, are intruded by a granite batholith which forms the main high portions of the Santa Teresa and Turnbull mountains. A rhyolite porphyry of approximately the same age as the granite outcrops as an irregular belt along the western edge of the granite batholith. Rhyolitic dikes are prominent in several parts of the area.

The Sein Fein Mine lies in one of the rhyolite intrusives very near a contact between the Tornado limestone and the rhyolite as shown on the map of the workings in Appendix D.

Compressive stresses deformed the region and created faulting and the Sein Fein Mine lies in a fault zone in the rhyolite near a contact.

The deposits are vein deposits that occur in the fault zone in the form of shoots. Undoubtedly footwall fracturing along certain zones creates the repetition of ore shoots. These ore shoots are up to 1000 feet in depth, 350 feet in length on the strike and 16 feet in thickness.

The deposits are oxide at the surface with an increasing sulphide content with depth.

The ore in the Sein Fein Mine has a higher lead to zinc ratio than that found in the Head Center Mine to the east. This would indicate that the mineralization came from the west thus creating a strong possibility of ore shoots to the west of the presently known area.

As shown on the map in Appendix D, the alteration and mineralization on the 6th level west would indicate the capping of an ore body lying under the level at this point. The deepening of the inclined shaft and drifting to the west on the 9th level was done by Cordillera to explore for the indicated ore body. Alteration and mineralization, as shown, in the incline and on the 9th level west also would indicate the presence of the ore body that is believed to exist.

As similar alteration and mineralization has been found on the outer limits of ore bodies mined in the past, it is the belief of those associated with Cordillera Mining Company that a new ore shoot exists in this area that should be fully explored and it is on the basis of this strong indication that Cordillera submits this application for aid in exploration.

Included with this application in Appendix C is a report on the Sein Fein Mine by Mr. George C. Heikes, a consulting mining geologist.

4. (d) The mine is readily accessible by an excellent graded road running from the intersection with U. S. Highway 70 some 13 miles west of Safford, Arizona to the mine. The Southern Pacific Railroad has a siding and loading ramp at Cork, Arizona, the highway intersection. Total ore haulage on the graded road from the mine to Cork is 50 miles.

From Cork, Arizona, the ore can be shipped 225 miles by rail to the El Paso smelter of the American Smelting & Refining Company or to the custom mill at Deming, New Mexico, also operated by the American Smelting & Refining Company.

There are five cabins on the property and the REA power line has been extended to the camp providing electric power. In addition, excellent housing is presently available in the Aravaipa Valley near Klondyke, Arizona.

The mine and camp are 12 miles from the general store and postoffice at Klondyke, Arizona, where a grade school is located.

(e) Adequate manpower is available in the area and materials and supplies can be obtained in Safford, Arizona, 63 miles from the mine. Overnight service to Safford from Phoenix is available on special items. All required heavy equipment is available at the mine or can be readily obtained in the area.

Culinary water is obtained from springs and mine water is available from waste pumped from the adjoining mine.

Fuel for heating and power is delivered to the mine from Safford in bulk lots. Power at the mine is supplied by a small generator.

5. (a) This application is for exploration for lead.

(b) Proposed exploration (see map Appendix D) consists of the following:

(1) Extension of the incline shaft down the vein 300 feet.
(2) A drift to the west 300 feet in the vein from the new bottom of the incline.
(3) Two diamond drill holes each 500 feet in length extended from the end of the west drift of the 6th level into the footwall of the vein to explore for the contact between the rhyolite and limestone and to explore for the extension of the Sein Fein fault in the limestone.

In addition, because of destruction by fire of some of the existing production facilities, it will be necessary to rebuild the head-frame, hoist house, and a portion of the ore bin and to install a new

5. continued.

hoist, hoisting rope and skip in order to recommence exploration and development in the mine.

(c) The work will start within 30 days and be completed within 8 months from date of an exploration project contract.

(d) The work will be under the direct supervision of Mr. James F. Martin, President of Cordillera Mining Company. Mr. Martin has been in mining for 26 years, including 3 years with Phelps-Dodge, 5 years with Anaconda and 2 years with Empire Lead and Zinc. For the past 5 years he has been an independent operator of mines.

Mr. Lean Nicholson, a graduate mining engineer and former operator of the Sein Fein Mine, will also participate in the management of the exploration program.

6. (a) Independent contracts:

1000 feet of underground drilling @ $5.00 per foot	$ 5,000.00

Sign?

(b-e g,h) It is the belief of Cordillera that a unit-cost contract would be the most suitable form to cover the cost of sinking and drifting.

Past experience shows costs to be:

Sinking $42.00 per foot
Drifting 31.00 per foot

Sign.

Total cost of sinking and drifting:

300 feet @ $42.00	$12,600.00
300 feet @ 31.00	9,300.00

(f) Rebuilding surface plant:

Hoist	$2,500.00	
Hoist rope	500.00	
Skip	250.00	
Lumber	1,000.00	
Sheave	75.00	
Fuel tank and fittings	50.00	
Bell	25.00	
Miscellaneous	500.00	
	$4,900.00	
Labor	2,000.00	
Freight	650.00	$ 7,550.00
		$34,450.00

7. (a) Cordillera and Balboa have sufficient funds to finance their share of the project.

(b) Cordillera and Balboa propose to furnish their share of the costs through money and use of owned equipment.

Use-allowance schedule of owned equipment:

Item	Use-allowance
Compressor	¢300.00 per month ?
Drill and tools	100.00 " "
Truck	100.00 " "

APPENDIX A

Chain-of-Title Documents

B.J.R.

LEASE AND OPTION TO PURCHASE

THIS AGREEMENT made and entered into this 1st day of April, 1985 by and between NELL F. HARWOOD, one fifth owner, and with approval by Power of Attorney of other one fifth owners, namely, JEAN A. HARWOOD, MAX W. HARWOOD, MAE HARWOOD SCHACHT and HARRIETT HARWOOD GATES whose address for the purpose of this agreement is 1321 W. Wilshire Dr., Phoenix, Arizona., herein called Lessors, and DEAN NICHOLSON whose address is 1920 Yalecrest Ave., Salt Lake City, Utah, herein called Lessee.

WITNESSETH:

All those certain unpatented lode mining claims situated in the Aravaipa Mining District, Graham County, Arizona, the names of which, together with the location notices thereof, are recorded in the office of the County Recorder of the said Graham County, Arizona, in the books of Mine Locations at the pages set opposite their names respectively as follows, to wit:

Name of Claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	361
Corning No. 4	29	362
Corning No. 5	29	364

The Lessor has acquired a Quit Claim Deed from E. H. Lunfquist and Raymond Pointer covering the Camp Site Lode Claim situated in said District which is covered by Location Notice of record in the Office of the County Recorder of said Graham County, Arizona in Book 33 of Mines, at Page 418.

1. Immediately upon the execution of this agreement and prior to the taking of possession of said claims by the Lessee, a No-Lien Notice required by the laws of Arizona shall be filed by the Lessees in the Office of the County Recorder of Graham County, Arizona and copies of such No-Lien Notice shall be posted at the collar of all shafts, tunnels, adits and entrances to all workings

house and offices on said property and it shall be the duty of the Lessee to keep the notices continously posted as aforesaid during the life of this agreement. The Lessee, after the filing and posting of said notices, shall have the right of immediate possession to all the claims included in this agreement.

2. The Lessee hereby agrees to do all assessment work required to be done by the state and federal governments to retain title to the claims, and to file all necessary AFFIDAVITS in the name of the Lessors with the proper governing officials. In addition, during all times that the Lessee is in possession hereunder, he shall protect said property from trespasses, claim jumping, or other encroachments initiated by third parties during the period of time that the Lessee is in possession. Protection of title and possession as the result of encroachments prior to the possession of the Lessee shall be the obligation and responsibility of the Lessors. The Lessee shall be required to do said assessment work and file said affidavits during each fiscal year (July 1 to June 30). The Lessee further agrees to pay all taxes assessed by any governmental agency against said property during any time that this lease is in effect. The obligation under this clause are separate and in addition to any and all obligations concerning royalty and purchase price.

3. The rents and royalties payable on ores shipped from said properties and as rental for equipment and improvements on said property shall be a percentage of the net smelter returns after its usual deductions for metallurgical and other losses, costs of treatment and the truck and railroad haul from the mine to the smelter. Such percentages are to be applied on a minimum royalty of $500.00 per month, beginning August 1, 1955 and continuing for the term of this lease unless otherwise provided; and are as follows:

> On all ores extracted and shipped by the Lessee from said mining claims, 10% on ores up to $20.00 as shown by the receiving smelter after paid deductions, and on all ores from $20.01 to $30.00, 12% of said smelter returns; on ores from $30.01 to $40.00, 15% of said smelter returns; on ores from $40.01 to $50.00, 17% of said smelter returns all ores $50.00 and over 20%.

If during the life of this lease metal prices on the ores are shown by the net smelter return sink below $12.00 per ton; the Lessee may be relieved of work performance until metal prices rise above $12.00 per ton for a period of sixty (60) days tereafter, be it hereby agreed that Lessee during said period guarantee a minumum royalty of $100.00 per month together with annual assessment work.

4. It is agreed that all ores or concentrates shall be smelted at the smelter of American Smelting and Refining Company at El Paso, Texas, until such time as another smelter may be designated in case said smelter is unable to handle said ores, provided that the substitute smelter has available umpire assayers.

5. In the event of any federal agency during the term of this Lease, or as it may be extended with the consent of said parties, agency pays to Lessee any bonus, premium or subsidy on metals recovered by said smelter, such bonuses, premiums, and subsidies shall be added to the net smelter returns and the Lessor shall receive the percentages heretofore recited on the value of the ores as augomented by said bonuses, premiums and subsidies. In the event of any Federal agency assists the operation by unsecured development allowances, such allowances shall belong to the Lessee.

6. All work done upon said claims shall be done in a good and miner like manner within the absolute discretion of the Lessee and free from any control and supervision of the Lessor, and all work shall be in compliance with the rules and regulations of the Arizona State Mining Inspector.

7. The Lessee, at his own expense, may at any time during the term of this lease cause any one or more of said mining claims to be patented and he shall have the right to amend Location Notices. If it appears under a survey that there is any vacant public domain within the exterior boundaries lines of said claims projected to meet, the Lessee shall locate such vacant public domain with the location being made in the name of the Lessor or its nominees but all such locations shall be deemed to under the terms of this Lease.

8. The Lessee shall promptly pay for all claims for labor, materials, services and equipment incurred by him and at all times the Lessee shall keep said premises free from any liens of any nature whatsoever created by him. The Lessee shall obtain and keep in force during the life of this Lease adequate insurance under Workman's Compensation Act or under the Employers' Liability Law for injuries or deaths from accidents in said operations and from all claims from the public liability and damage or the Lessee may insure his employees and the operation of the Lease with Lloyds of London covering injuries and all deaths of the employees from accidents arising out of said employment.

9. If the Lessee may at any time after thirty (30) days notice to said ELLA F. HARWOOD, 1521 N. Ilshire Dr., Phoenix, Ariz., surrender this Lease and be released of any liability whatsoever to continue under the terms of this lease but the Lessee shall prior to said cancellation pay all outstanding accounts incurred by him. Concurrently with the cancellation, the Lessee shall execute and deliver to the Lessor his Quit Claim Deed covering said claims.

10. Should the Lessee operate or cause to be operated any motor vehicles such operation shall be adequately insured against liability.

11. At any time during the life of this Agreement or within Ninety (90) days thereafter, the Lessee shall have the right to enter said premises and remove all improvements and equipment and machinery placed upon said property by him at his expense but such right of removal shall not extend to ladders, timbers, rails, ties and plates placed beneath the surface but the Lessor shall not be obligated for the care and custody of said equipment and machinery.

12. At all reasonable working hours during the life of this Agreement, the Lessor or its authorized Agents shall have the right to go upon said premises and the Lessor shall be entitled to copies of all progress reports, mine and surface maps and

assay maps made by the Lessee.

13. The Lessee is hereby granted an option to buy the property herein leased for the sum of Twenty Five Thousand Dollars ($25,000.00) after at least Fifty Thousand Dollars ($50,000.00) has been paid as royalty hereunder. Said price shall be paid in cash within two years, in equal quarterly payments, after the Lessee gives written notice to the lessors that said option is exercised and shall be in addition to any and all royalty payments properly payable prior to the actual payment of Twenty Five Thousand Dollars ($25,000.00) purchase price.

14. This lease shall not be assigned by the Lessee without the written consent of the Lessors herein first obtained. This lease shall extend to and be binding upon the heirs, successors and assigns of the respective parties hereto.

15. The Lessor shall have the right to cancel this Lease without any liability whatsoever if the Lessee fails to perform the obligations herein imposed upon him.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and year first written above.

Dean Nicholson
Dean Nicholson

Zella F. Harwood
Zella F. Harwood

STATE OF ~~ARIZONA~~ UTAH)
) SS
COUNTY OF MARICOPA)

On this 9th day of April 1955, before me, the undersigned, a Notary Public duly commissioned and acting within and for the County and State aforesaid, personally appeared Zella F. Harwood known to me to be the person whose name is subscribed to the within instrument, and acknowledged that she executed the same for the purposes therein contained.

Witness my hand and official seal the day and year herein above written.

4-22-58
My commission expires

Notary Public

My Commission Expires: April 24, 1957

Clyde C. Daughton
Notary Public

STATE OF UTAH
COUNTY OF Salt Lake } SS

On this 7th day of April 1955, before me, the undersigned, a Notary Public duly commissioned and acting within and for the County and State aforesaid, personally appeared DEAN NICHOLSON known to me to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

Witness my hand and official seal the day and year herein above written.

Commission expires

Notary Public

AMENDMENT TO LEASE AND OPTION TO PURCHASE

WHEREAS, ZELLA F. HARWOOD, on behalf of herself and on behalf of JEAN A. HARWOOD, MAX W. HARWOOD, MAE HARWOOD SCHACHT and HARRIET HARWOOD GATES by their respective powers of attorney, hereinafter called the Lessors, and DEAN NICHOLSON, hereinafter called the Lessee, did enter into a lease and option to purchase agreement, dated April 1, 1955, hereinafter called Agreement, relating to certain unpatented lode mining claims therein described and set forth; and

WHEREAS, it is the mutual desire of said Lessors and said Lessee to amend said Agreement as hereinafter set forth;

NOW, THEREFORE, In consideration of Ten ($10.00) Dollars paid by each of the parties to the other, the respective receipts of which are hereby acknowledged, and for other valuable consideration, the parties do agree to amend said lease and option to purchase agreement as follows:

1. Paragraph number 3 of said Agreement is hereby deleted and the following substituted in lieu thereof:

"3. The rents and royalties payable on ore shipped from said properties and as rental for equipment and improvements on said property shall be a percentage of the net smelter returns after its usual deductions for metallurgical and other losses, costs of treatment and the truck and railroad haul from the mine to the smelter. Such percentages are to be applied on a minimum royalty of $500.00 per month, beginning August 1, 1955, and continuing for the term of this lease unless hereinafter provided. Said royalty percentages shall be based on the following sliding scale:

Net Smelter Return Per Ton	Percentage of Royalty
$12.01 to $20.00	10%
$20.01 to $30.00	12½%
$30.01 to $40.00	15%
$40.01 to $50.00	17½%
$50.00 and over	20%

However, it is mutually agreed that in the event the value of the net smelter returns as described herein decreases to $12.00 or less per ton of ore shipped or that in the event Lessee is unable to ship fifty (50) or more tons of ore because of the lack of same showing in the development drifts in the mine but is forced to spend the major portion of his efforts in development work in search of said ore, then the Lessee shall pay the Lessors a minimum royalty of $100.00 a month, said $100.00 payments to be sufficient for the Lessee to hold and to operate said mine, and said payments shall be credited toward any future royalty payments made from actual ore shipments. It is further agreed and understood that all royalty payments, or payments in lieu of royalty as above provided, shall be paid to the Lessors on or before the first day of each and every month, and should said payments be mailed to Lessors or their agent, such mailing shall be post-marked on or before said first day of the month."

2. Paragraph number 13 of said Agreement is hereby deleted and the following substituted in lieu thereof:

"13. The Lessee is hereby granted an option to buy the property herein leased for the sum of Twenty Five Thousand ($25,000.00) Dollars payable under the following conditions and on the following terms:

a. This option cannot be exercised until at least Fifty Thousand ($50,000.00) Dollars of royalty payments, either from ore shipments or by minimum monthly royalty payments, has been paid to the Lessors.

b. Said Twenty Five ($25,000.00) Dollars shall be paid in cash within two years after the Lessee has given to the Lessors written notice of the exercising of said option and shall be paid in equal quarter-annual installments of Three Thousand One Hundred Twenty Five ($3,125.00) Dollars during said two years, the first installment falling due three (3) months after the date of said written notice.

c. It is agreed that from the day notice is given of intention to exercise the option no further royalty payments shall be made to the Lessors on said ore thereafter mined or extracted so long as the above described option payments are being made. However, no royalty payments made before the exercising of said option on ore mined or extracted prior to said date shall be credited toward payment of the Twenty Five Thousand ($25,000.00) Dollars.

d. In the event the option is exercised and in the event any of the eight quarter-annual payments remains unpaid more than thirty (30) days after its due date, then the exercise of said option shall be cancelled and all quarter-annual payments made until the time

of default shall be credited against royalty payments otherwise payable (if said option had not been exercised) since the date of the notice of the exercise of said option. In the event quarter-annual payments made prior to default exceed the royalty payments otherwise payable, then no further royalty payments shall be made until the royalties otherwise payable equal the quarter annual payments made. In the event the royalty payments otherwise payable exceed the quarter-annual payments made to the date of default, then the Lessee shall, within thirty (30) days of the default of the last quarter-annual payment, pay to the Lessors the difference between royalty payments otherwise payable and the quarter-annual payments made.

e. It is mutually agreed that in the event the Lessee defaults on quarter-annual payments and the exercise of the option to purchase the property is cancelled, the Lessee shall remain in possession of the property, continuing to mine same so long as he is otherwise fulfilling the terms of the lease under said Agreement and so long as proper royalty adjustments have been made under the terms of paragraph sub (d) above.

f. In the event the exercising of said option is cancelled, the Lessee shall have the right at any further time during his possession of the property to again exercise the said option for Twenty Five Thousand ($25,000.00) Dollars under the terms above described.

g. The Lessee is further hereby granted a six (6) month option from the date of this agreement to purchase said mine for Seventy One Thousand Five Hundred Fifty ($71,750.00) Dollars payable in cash before the end of said six (6) months. In the event Lessee shall exercise this option to purchase within three (3) months from the date of this agreement, the total purchase price shall be Sixty Seven Thousand Five Hundred ($67,500.00) Dollars, provided said purchase price is paid in cash on or before the expiration of said three (3) months period. Notice of intent to exercise the option under this sub-paragraph (g) shall be in writing sent by the Lessee to the Lessors by registered mail. Royalty payments on ore mined or extracted as described herein shall continue until the date when the final cash payment for the purchase of this property shall be made, under either of the above options. Upon payment of the total purchase price under either option, royalty payments shall cease as to all ore thereafter mined or extracted and all the right, title and interest of the Lessors in and to the said claims and improvements thereon shall pass by Quit Claim Deed of the Lessors to the Lessee. The time in which full cash payment is paid over to the Lessors shall determine which of the above two options and purchase price applies, regardless of which option the Lessor initially gives notice upon."

3. Paragraph number 15 of said Agreement is hereby deleted and the following substituted in lieu thereof:

> "15. The Lessors shall have the right to terminate this lease without any liability whatsoever if the Lessee fails to perform the obligations herein imposed upon him, PROVIDED, however, that Lessors give Lessee written notice by registered mail describing in detail in what manner, respect and how the Lessee is in default herein and why said lease should be terminated; PROVIDED, however, that the Lessee shall then have thirty (30) days from the date of said registered notice to cure the default or defaults. It is mutually agreed that the said Agreement shall not be terminated unless the alleged default or defaults remain uncured after thirty (30) days following the giving of said notice."

6. All other terms and provisions of the said Agreement, together with the amendments above set forth, shall be and remain in full force and effect from the date of this agreement and henceforth.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals this 27th day of December 1955, 1956, to this and to an instrument of like tenor.

Zella F. Harwood
Zella F. Harwood

JEAN A. HARWOOD, MAX W. HARWOOD, MAE HARWOOD SCHACHT and HARRIET HARWOOD GATES

By Zella F. Harwood
Their Attorney in Fact
Pursuant to Power of Attorney
LESSORS

Alan Nicholson
LESSEE

CONSENT TO ASSIGNMENT

ZELLA F. HARWOOD and Jean A. Harwood, Max W. Harwood, Mae Harwood Schacht and Harriett Harwood Gates, by their attorney, Zella F. Harwood, does hereby consent and authorize DEAN NICHOLSON to assign all of his right, title and interest in that certain lease and option to purchase, dated April 1, 1955, between the said Zella F. Harwood, Jean A. Harwood, Max W. Harwood, Mae Harwood Schacht and Harriett Harwood Gates, named as Lessors, and Dean Nicholson, named as Lessee, to the Cordillera Mining Company, said lease and option to purchase concerning the following claims, to-wit:

Wild Cat Mine	Book 29	Page 353
Hoover Mine	Book 29	Page 357
Baboon Mine	Book 29	Page 358
Corning No. 1	Book 29	Page 359
Corning No. 2	Book 29	Page 360
Corning No. 3	Book 29	Page 356
Corning No. 4	Book 29	Page 355
Corning No. 5	Book 29	Page 354

The Lessor has acquired a Quit Claim Deed from E. H. Lundquist and Raymond Pointer covering the Camp Site Lode Claim situated in said District which is covered by Location Notice of record in the Office of the County Recorder of said Graham County, Arizona in Book 33 of Mines, at Page 412.

The purpose of this consent is to comply with Section 14 of that certain lease hereinbefore stated, and by this consent said Section 14 has been complied with.

The said Zella F. Harwood has in her possession a Power of Attorney from the remaining owners of said property constituting and appointing the said Zella F. Harwood their attorney to transact business concerning these claims.

IT IS FURTHER UNDERSTOOD AND AGREED that the said Dean Nicholson will remain the active manager and supervisor regarding the operation of these claims.

Zella F. Harwood (SEAL)
ZELLA F. HARWOOD

[illegible]

[illegible] Harwood, Max [illegible] Harwood, [illegible] by their [illegible] and authorize [illegible] all of his right, title and interest in that certain lease with option to purchase, dated April 1, 1935, between [illegible] Harwood, [illegible] Harwood, [illegible] named as Lessors, [illegible] Cordillera Mining Company, its assignee or nominee (as said Cordillera Mining Company [illegible] said lease and [illegible] to purchase those certain unpatented lode mining claims described in said lease and option to purchase as follows:

Wild Cat Mine	[illegible]	[illegible]
Discover Mine	[illegible]	[illegible]
Gubson Mine	[illegible]	[illegible]
Corning No. 1	[illegible]	[illegible]
Corning No. 2	Book [illegible]	Page 150
Corning No. 3	Book 2[illegible]	Page 156
Corning No. 4	Book [illegible]	Page 157
Corning No. 5	Book 2[illegible]	Page [illegible]

[illegible] Lessor [illegible] claim [illegible] from [illegible] lying [illegible] Mining [illegible] district [illegible] record in [illegible] County Recorder of said [illegible] Arizona, in Book 33 of Mines, [illegible]

The purpose of this consent is to comply with Section 14 of that certain lease [illegible] by this consent said Section 14 has been complied with.

The said Zella P. Harwood has in her possession a Power of Attorney from each of the remaining owners of said property constituting and appointing the said Zella P. Harwood his attorney to transact business concerning these claims; and the said Zella

[illegible] agrees that at the time of signing this consent, none of said powers of attorney has been revoked.

This consent to assignment is in confirmation and [illegible] of a like consent given to the said Dean Nicholson prior hereto.

Date: [illegible], 1983.

Zella F. Harwood

Jean A. Harwood, Max H. Harwood, Mae Harwood Schacht and Harriett Harwood Gates

By Zella F. Harwood
Their Attorney in Fact
Pursuant to Power of Attorney

A S S I G N M E N T

THIS ASSIGNMENT made this 29th day of December, 1955, between DEAN NICHOLSON, hereinafter called the Assignor, and CORDILLERA MINING COMPANY, a Colorado corporation, and FREDERICK L. ANDERSON, LEE VAN ATTA, HAZEN P. SLAGEL and LAURENCE DUERIS, a limited partnership doing business under the firm name and style of Flanders Mining Company, hereinafter called Assignees;

WITNESSETH:

WHEREAS, the Assignor is the lessee and optionee under a lease and option to purchase certain unpatented lode mining claims situated in the Aravaipa Mining District, Graham County, Arizona, from Zella F. Harwood, Jean A. Harwood, Max W. Harwood, Mae Harwood Schacht and Harriett Harwood Gates, which lease and option to purchase is dated April 1, 1955 and was amended December _____, 1955, and which claims are recorded in the Office of the County Recorder of said Graham County, as follows:

Name of Claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp Site	33	412

; and

WHEREAS, the Assignor has the consent of the owners of said claims named as lessors in said lease and option to purchase, to make this assignment.

NOW, THEREFORE, the Assignor, in consideration of the sum of Ten ($10.00) Dollars to him paid by the Assignees, the receipt whereof is hereby acknowledged, and for other valuable consideration, does hereby assign, transfer and set over unto the

said Assignees, both of them and as between them in such proportion as they may agree, all of the right, title and interest of the Assignor in and to the above described lease and option to purchase, as amended, to have and to hold the same unto the said Assignees, their respective heirs, executors, administrators, legal representatives and assigns forever, subject, nevertheless, to the terms, conditions and stipulations contained in said lease and option to purchase, as amended.

AND THE ASSIGNEES, in consideration of this assignment, hereby covenant and agree to and with the Assignor that the Assignees will observe and perform all the terms, conditions and stipulations in said lease and option to purchase which are by the Assignor to be observed and performed thereunder, and the Assignor warrants that said lease and option to purchase is in full force and effect, that he has the sole right to make this assignment, and that there is no uncured default therein nor breach thereof.

The Assignor acknowledges that the designation of the Assignees herein is at the request of said Cordillera Mining Company.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and year first written above, to this and to an instrument of like tenor.

Alan Kuleolion (SEAL)
Assignor

CORDILLERA MINING COMPANY
By James F. Martin (SEAL)
its President

FLANDERS MINING COMPANY
By William McGrenery Jr. (SEAL)
their authorized agent
Assignees

A G R E E M E N T

THIS AGREEMENT, Made this 29th day of December, 1955, between CORDILLERA MINING COMPANY, a Colorado corporation, hereinafter called Cordillera, and FREDERICK L. ANDERSON, LEE VAN ATTA, HAZEN P. SLAGEL and LAURENCE DUERIG, a limited partnership doing business under the firm name and style of FLANDERS MINING COMPANY, hereinafter called Flanders,

WITNESSETH:

WHEREAS, One DEAN NICHOLSON was the Lessee under a certain Lease and Option to Purchase dated April 1, 1955, and amended December 28, 1955, relating to those certain unpatented lode mining claims (sometimes called Sein Fein lead mine properties) situated in the Aravaipa Mining District, Graham County, Arizona, recorded in the office of the County Recorder of said Graham County in the books of Mine Locations under the names, books and pages set forth as follows:

Name of Claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp Site	33	412

hereinafter called the "lease"; and

WHEREAS, By instrument dated December 29, 1955, said Nicholson assigned, transferred and set over all of his right, title and interest in and to said lease unto Cordillera and Flanders, both of them and as between them in such proportion as they may agree; and

WHEREAS, One JAMES F. MARTIN, at all times material hereto, was and is President of Cordillera; and

WHEREAS, Flanders paid to said Martin Fifteen Hundred ($1500.00) Dollars on July 29, 1955, and the further sum of Eighty-five Hundred ($8500.00) Dollars on August 3, 1955; and

WHEREAS, Said Martin has paid to the said Nicholson the sum of Nine Thousand ($9,000.00) Dollars as part consideration for the right, by agreement with said Nicholson dated June 1, 1955, to secure said assignment and, pursuant to said right, has procured said assignment for Cordillera and Flanders by instrument dated December 29, 1955; and

WHEREAS, The said Martin, by further agreement with said Nicholson dated December 28, 1955, has agreed to pay to the said Nicholson the further consideration valued at Six Thousand ($6,000.00) Dollars, pursuant to an agreement between said Martin and said Nicholson fixing the total consideration for said assignment at Fifteen Thousand ($15,000.00) Dollars; and

WHEREAS, Said Martin has caused the sum of One Thousand ($1,000.00) Dollars to be transferred to Cordillera; and

WHEREAS, Cordillera has the personnel available to manage the exploration, development and mining of properties under said lease;

NOW, THEREFORE, In consideration of Ten ($10.00) Dollars paid by each of the parties to this agreement to the others, the several receipts of which the respective parties hereto hereby acknowledge, and in consideration of the mutual promises and undertakings hereinafter set forth, the parties hereto do hereby agree as follows;

Interest of Parties

1. The interests of the parties in and to said lease are in the following proportion: The interest of Cordillera therein is sixty-six and two-thirds (66 2/3%) per cent and the interest of Flanders is thirty-three and one-third (33 1/3%) per cent.

Cordillera to Control Operations

2. Cordillera shall have the exclusive control and management of the prospecting, exploration and mining of the properties under said lease; and Cordillera shall not be liable for any loss or damage suffered by Flanders by virtue of this agreement unless the same is caused by wilful or wanton neglect or misconduct on the part of Cordillera.

Cordillera Assumes Martin's Obligations to Flanders

3. Cordillera assumes the obligations incurred by the said Martin in receiving from Flanders the above-mentioned sums totaling Ten Thousand ($10,000.00) Dollars, and, together with the additional Four Thousand ($4,000.00) of consideration advanced or to be advanced by Flanders pursuant to paragraph no. 7, below, will credit said Fourteen Thousand ($14,000.00) as follows:

a. Seven Thousand ($7,000.00) Dollars thereof to the account of "Sein Fein lead mine properties, by Flanders Mining Company, acquisition cost of one-third (1/3) interest."

b. Seven Thousand ($7,000.00) Dollars to the account of "Sein Fein lead mine properties, advance from Flanders Mining Company, working capital."

Source of Working Capital

4. The respective contributions of Cordillera and Flanders to working capital required under said lease shall be in the proportion set forth in paragraph no. 1, above; Flanders shall make additional contributions to said working capital in such amounts as Cordillera, from time to time, may request in writing; provided, however, that no such request shall be made by Cordillera until the sum of Fourteen Thousand ($14,000.00) Dollars has been contributed by Cordillera to working capital for the purposes of said lease, and provided, further, that, thereafter, all such requests are subject to the provisions of paragraph no. 9, below.

Net Profits

5. The net profits derived from the operation of the properties under said lease shall be shared by Cordillera and by Flanders in the proportion set forth in paragraph no. 1, above; "Net profits" shall mean net mill proceeds derived from the sale of ores extracted from said properties, less all expense directly

chargeable to the mining, milling and hauling of said ore, including the expense of maintaining mining facilities and roads on said properties and including such part of the overhead of Cordillera (including, but not limited to, insurance, taxes and office expense)fairly chargeable to the operation of a district or field office maintained solely for said mining facilities.

Cordillera to Protect Flanders

6. Cordillera will secure and maintain all manner of insurance to provide security for Flanders, or to indemnify them from any loss, damage, liability or action originating in any insurable hazard of damage to real or personal property and of injury to any person in circumstances warranting the recovery of a judgment against Flanders in a court of competent jurisdiction, all by reason of and during the operation by Cordillera of the properties under said lease pursuant to paragraph no. 2, above.

Parties Assume Nicholson Agreement with Martin

7. Flanders having agreed to deliver to said Martin One Thousand ($1,000.00) Dollars and 15,000 shares of common stock of Balboa Mining and Development Company, valued at Three Thousand ($3,000.00) Dollars, and Cordillera having agreed to deliver to said Martin 20,000 shares of common stock of Cordillera valued at Two Thousand ($2,000.00) Dollars, all for delivery to said Nicholson, and the parties having acquired the beneficial rights under the said agreements between Martin and Nicholson, and having made said Martin whole to the extent of Nine Thousand ($9,000.00) Dollars heretofore paid by him to said Nicholson, do hereby assume the obligations of said agreements and of said lease thereby assigned.

Cordillera Books Open to Flanders

8. The books and records of Cordillera relating to the operation of the properties under said lease shall be kept in accordance with regular accounting principles consistently applied, so that costs can be readily ascertained and shall be open to inspection by Flanders at all reasonable times; said books

shall be audited annually by a mutually acceptable certified public accountant. If Flanders desire an audit of said books independent of the audit had by Cordillera, such independent audit shall be at the sole expense of Flanders.

Amount of Working Capital

9. Whenever during the life of this agreement either party refuse, neglect or fail to contribute further to working capital within two weeks after Cordillera has notified Flanders in writing of the need for additional working capital (as provided in paragraph no. 4, above), then the party not contributing shall not participate in any net profit distribution or in distribution upon liquidation until the party contributing has recovered, either from net profits or from the proceeds of liquidation, 150 per cent of that amount of working capital it has contributed in in excess of its working interest share. For example, should Flanders contribute $10,000.00 and Cordillera $20,000.00 to working capital, then should Cordillera contribute an additional $3,000.00 to working capital without Flanders contributing anything, then should there be a subsequent distribution of net profits or of the proceeds of liquidation, Cordillera shall receive the first $4,500.00 from net profits or from the proceeds of liquidation before Flanders shall receive anything, and thereafter net profits or the proceeds of liquidation shall be distributed on a 2/3 - 1/3 basis to Cordillera and to Flanders respectively. It is agreed that whenever the total working capital contributions of both parties together shall amount to $75,000.00 (including the amounts already contributed), then the parties shall reach a new understanding to contribute further working capital or barring this shall arrange to dispose of their respective interests in the properties under said lease. If working capital is exhausted and if Cordillera refuses to request addtional working capital from Flanders or having requested additional working capital from

Flanders, fails to contribute its own proper share thereof, then Flanders shall have the option to assume operation of said mining properties and to assume the duties and obligations of the operator by giving Cordillera notice in writing of their intention to do so at least two weeks prior to realizing that intention, or, by a like notice of their intentions, to move for liquidation of this joint enterprise pursuant to law.

Payment of Net Profit

10. The net profit defined in paragraph no. 5, above, shall be divided and paid over every three months; the share of net profits due to Cordillera shall be retained in the operations and be credited to the account of Cordillera as its contribution to working capital until its contributions to working capital shall amount to twice the contributions or advances to working capital credited to Flanders.

Division of Funds Arising from Operations

11. Upon the termination of this agreement, whether by surrender or sale of the said lease, or otherwise, the net funds to the credit of the operations herein jointly undertaken, after the inclusion of all realized and accrued, chargeable to the operation of the properties under said lease (meaning the deductions defined in paragraph no. 5, above) shall be divided between Cordillera and Flanders in compliance with paragraph no. 1, above, as governed by paragraph no. 9, above.

landers o Have ight to nspect ining ecords

12. Not more frequently than once each month, and then only upon written request, Flanders shall be furnished summaries of all geologic information on the properties subject to said lease.

Assent Assignment

13. (a) Each party hereto shall have the right to sell, assign, mortgage, deed in trust or otherwise hypothecate or dispose of his working interest in any joint property or in the production therefrom, or the proceeds thereof, or in any jointly owned materials or equipment, provided that (i) every such

transfer shall be subject to the provisions of this agreement and shall be expressly so made by the transferor and so acknowledged in writing by the transferee, and (ii) no such transfer shall be made of less than the transferor's entire interest in the subject matter of the transfer. Each party hereto agrees that he will make no such transfer except as herein provided and permitted. No party hereto shall in any way be relieved of any accrued obligations or liabilities under this agreement as a result of any such transfer, but any party hereto who transfers his working interest in any joint property shall thereupon be relieved of all unaccrued obligations and liabilities hereunder with respect to such property, except to bear his proportionate share of the cost of performing any other work in which he had previously elected or was otherwise obligated to participate. The transferee of the entire working interest of any party hereto in any joint property shall be deemed to be a "party hereto" as that term is used in this agreement.

(b) No party hereto shall be bound by or need recognize any such transfer or change of ownership, however accomplished, unless and until he is furnished with written evidence thereof. If such transfer or change of ownership is accomplished by assignment, the written evidence thereof shall consist of a certified copy of the instrument of assignment.

(c) If Cordillera transfers or assigns its interest hereunder, thereby terminating its position as operator of said property, the new operator shall be designated by mutual agreement of such parties as then may possess interests in said property secured pursuant to this agreement.

Agreement Binding on Successors

14. The rights and benefits herein shall inure to and the duties and obligations herein shall be binding on the

parties hereto and their respective heirs, successors, legal representatives and assigns.

WITNESS The hands and seals of the parties affixed hereto by their respective agents thereto duly authorized, to this and to an instrument of like tenor, the year and day first above written, in Grand Junction, Colorado.

CORDILLERA MINING COMPANY
(Corporate Seal)

By James F. Martin
its President

FREDERICK L. ANDERSON, LEE VAN ATTA, HAZEN P. SLAGEL and LAURENCE DUERIG d/b/a/ FLANDERS MINING COMPANY

By Laurence Duerig (SEAL)
Partner

I acknowledge the verity of all references to me.

James F. Martin
James F. Martin

CONSENT TO ASSIGNMENT

WHEREAS, ZELLA F. HARWOOD, on behalf of herself and on behalf of JEAN A. HARWOOD, MAX W. HARWOOD, MAE HARWOOD SCHACHT and HARRIETT HARWOOD GATES, by their respective powers of attorney, hereinafter called the Lessors, and DEAN NICHOLSON, hereinafter called the Lessee, did enter into a lease and option to purchase agreement, dated April 1, 1955, hereinafter called Agreement, relating to certain unpatented lode mining claims therein described and set forth; and

WHEREAS, by mesne assignments, FREDERICK L. ANDERSON, LEE VAN ATTA, HAZEN P. SLAGEL and LAURENCE DUERIG, a limited partnership doing business under the firm name and style of FLANDERS MINING COMPANY, hereinafter called Flanders, are the owners of a one-third (1/3) interest in as assignees thereof; and

WHEREAS, Flanders desire to assign their interest to others; and

WHEREAS, the Lessors are the owners of those certain unpatented lode mining claims situated in the Aravaipa Mining District, Graham County, Arizona, recorded in the office of the County Recorder of said Graham County in the books of Mine Locations under the names, books and pages set forth as follows:

Name of Claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp Site	33	412

; and

WHEREAS, JAMES F. MARTIN is one in whose judgment in the measures to best develop the above described properties the Lessors repose confidence;

NOW, THEREFORE, in consideration of Ten ($10.00) Dollars paid to said Lessors by Flanders, the receipt of which is hereby acknowledged, the Lessors do hereby authorize the said James F. Martin to exercise on their behalf the right to consent to the assignment by Flanders to any person, partnership or corporation approved by said James F. Martin, in compliance with Paragraph 14 of said Agreement dated April 1, 1955, and said Lessors do further authorize said James F. Martin to consent, on their behalf, to any subsequent assignments of interest by the assignee of said Flanders or any subsequent assignee claiming by or through said Flanders.

The purpose of this consent is to comply with Section 14 of that certain lease hereinbefore stated.

The said Zella F. Harwood has in her possession a power of attorney from each of the remaining owners of said property constituting and appointing the said Zella F. Harwood ~~her~~ their attorney to transact business concerning these claims; and the said Zella F. Harwood represents that at the time of signing this consent, none of said powers of attorney has been revoked.

Dated December 30th, 1955.

Zella F. Harwood
Zella F. Harwood

JEAN A. HARWOOD, MAX H. HARWOOD,
MAE HARWOOD SCHACHT and HARRIETT
HARWOOD GATES

By Zella F. Harwood
Zella F. Harwood
Their Attorney-in-fact pursuant
to power of attorney

CONSENT TO ASSIGNMENT

WHEREAS, ZELDA F. HARWOOD, on behalf of herself and on behalf of JEAN A. HARWOOD, MAX W. HARWOOD, MAX HARWOOD SCHACHT and HARRIETT HARWOOD GATES, by their respective powers of attorney, hereinafter called the Lessors, and DEAN NICHOLSON, hereinafter called the Lessee, did enter into a lease and option to purchase agreement, dated April 1, 1955, hereinafter called Agreement, relating to certain unpatented lode mining claims therein described and set forth; and

WHEREAS, by mesne assignments, FREDERICK L. ANDERSON, LEE VAN ATTA, HAYES P. SLATER and LAURENCE DUERIG, a limited partnership doing business under the firm name and style of FLANDERS MINING COMPANY, hereinafter called Flanders, are the owners of a one-third (1/3) interest in as assignees thereof; and

WHEREAS, Flanders desire to assign their interest to others; and

WHEREAS, the Lessors are the owners of those certain unpatented lode mining claims situated in the Aravaipa Mining District, Graham County, Arizona, recorded in the office of the County Recorder of said Graham County in the books of Mine Locations under the names, books and pages set forth as follows:

Name of Claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp Site	33	412

; and

WHEREAS, JAMES W. MARTIN is one in whose judgment in the measures to best develop the above described properties the Lessors repose confidence;

As [illegible] by document titled "[illegible]nt to Assignment" dated December 30, 1955, the said Lessors confirm this confidence in the said Martin and authorize him on their behalf to exercise the right to consent to the assignment by Flanders to any third party, or to any subsequent assignments of interest by the assignee of said Flanders or any subsequent assignee claiming by or through said Flanders;

NOW THEREFORE, in consideration of Ten ($10.00) Dollars paid to the said Martin by Flanders, the receipt of which is hereby acknowledged, the said Martin does hereby consent on behalf of the Lessors to the assignment by Flanders of its one third (1/3) interest in the said lease to Salbos Mining and Development Company, a Colorado corporation.

The purpose of this consent is to comply with Section 14 of that certain lease hereinbefore stated, and to comply with the "Consent to Assignment" executed by the Lessors on December 30, 1955 as hereinbefore stated.

Dated December 30, 1955.

James F. Martin

James F. Martin

ASSIGNMENT

This Assignment made and entered [illegible] of the 30th day of December, 1955, by and between Planners Mining Company, a co-partnership composed of FREDERICK L. ANDERSON, [illegible] ATTA, LAWRENCE G. DUERIG, and HAZEN P. SLAGEL, Assignor, First Party, and BALBOA MINING AND DEVELOPMENT COMPANY, A Colorado Corporation, Assignee, Second Party,

WITNESSETH:

1. Assignor is the holder of an interest in a lease and option to purchase covering the following mining claims located in Graham County, Arizona:

Name of Claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp Site	33	412

said claims being sometimes collectively referred to as the "Sein Fein Mine".

2. This assignment is being executed to transfer all of the interest of said Assignor in said claims to Assignee.

NOW THEREFORE:

1. The Assignor hereby assigns, sets over and transfers to Assignees all his right, title and interest in and to the following agreements:

a. That certain Lease and Option to Purchase agreement dated April 1, 1955, by and between Zella F. Harwood, one fifth owner, and with approval by Power of Attorney of other one fifth owners, namely, Jean A. Harwood, Max W. Harwood, Mae Harwood Schacht, and Harriett Harwood Gates, Lessors, and Dean Nicholson, Lessee, as said Lease and Option to Purchase has been amended by one undated Consent to Assignment and one Consent to Assignment dated December 18, 1955, both Consents being signed by Zella F. Harwood.

b. That certain Memorandum of Agreement dated June 1, 1955, by and between Dean Nicholson, Lessee, and James F. Martin, Assignee.

c. That certain letter agreement dated August 1, 1955, addressed to Flanders Mining Company and signed by James F. Martin.

d. That certain Assignment dated December 29, 1955, by and between Dean Nicholson, Assignor, and Cordillera Mining Company, a Colorado Corporation, and Frederick L. Anderson, Leo Van Atta, Hazen P. Slagel, and Laurence G. Duerig, a limited partnership doing business as Flanders Mining Company, Assignees.

2. For and in consideration of this Assignment, Assignee does hereby agree to pay Assignor ten dollars ($10.00), the receipt of which, is hereby acknowledged, and other good and valuable considerations, and does hereby covenant and agree to observe and perform all the terms, conditions and stipulations as set forth in the above described agreements.

3. Assignor warrants that said Lease and Option to Purchase is in full force and effect and that there is no incurred default therein nor breach thereof.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals the day and year first above written.

FLANDERS MINING COMPANY

William H. Spencer

William H. Spencer, Jr. Agent
ASSIGNOR

BALBOA MINING AND DEVELOPMENT CO.

William H. Spencer

William H. Spencer, Jr. - Vice Pres.
ASSIGNEE

DETAILED PURCHASE AGREEMENT

THIS AGREEMENT, made this 31st day of December, 1955, by and between FLANDERS MINING COMPANY, a partnership, composed of Frederick L. Anderson, Lee Van Atta, Hazen P. Slagel, and Laurence G. Duerig, (hereinafter called "FLANDERS"), and BALBOA MINING AND DEVELOPMENT COMPANY, A Colorado Corporation, (hereinafter called "BALBOA").

I. RECITALS:

1. Reference is made to the following documents:

a) "Lease and Option to Purchase (hereinafter called "said lease") dated April 1, 1955, between Zella Harwood, et al, as Lessor and Dean Nicholson, as Lessee, wherein Nicholson leases certain Sein Fein mining claims and mine (hereinafter called "said claims") from the said Harwood.

b) "Memorandum of Agreement" dated June 1, 1955 between Nicholson and James F. Martin wherein Martin options for purchase the right, title and interest of Nicholson in said claims derived from said lease.

c) "Letter Agreement" dated August 1, 1955 between Martin and Flanders Mining Company wherein Flanders agrees to purchase 1/3 of such rights as Martin may purchase under the said "Memorandum of Agreement".

d) "Consent to Assignment", undated, between Nicholson and Harwood, et al.

e) "Consent to Assignment" dated December 18, 1955 between Nicholson and Harwood, et al.

f) "Assignment" dated December 29, 1955 between Nicholson as Assignor and Flanders and Cordillera Mining Company as Assignees wherein Nicholson assigns all of his right, title, and interest in said lease to Flanders and Cordillera.

g) "Amended Agreement" dated December 28, 1955 between Martin and Nicholson wherein the terms, amounts and forms of compensation to Nicholson are set forth in detail.

h) "Agreement" dated December 29, 1955 between Flanders and Cordillera wherein the parties mutually agree on the working interest in said lease each is to possess, the extent that each is to compensate Nicholson, and the terms under which Cordillera shall operate the said claims.

i) Assignment dated December 30, 1955, between Flanders and Balboa wherein Flanders assigns its right, title and interest as derived from the above described documents to Balboa.

2. The above described documents shall hereinafter collectively be called "said documents".

3. Balboa and Flanders desire hereby to enter into a Detailed Purchase Agreement.

II. NOW THEREFORE, the parties mutually agree as follows:

A. Flanders agrees and represents as follows:

1. Flanders has executed an assignment wherein it has transferred all of its right, title and interest in the said lease to Balboa.

2. Flanders represents and warrants that as of December 30, 1955 the said lease was in full force and effect and that the Lessor had taken no action to serve notice or foreclose under the terms of said lease.

3. Flanders further represents and warrants that as of December 30, 1955, its total expenditures on and in connection with the said claims amounted to $10,000.00

B. Balboa agrees as follows:

1. Balboa agrees to assume and to undertake fulfillment of all the obligations, commitments, and responsibilities heretofore belonging to Flanders under the terms and provisions of the said documents.

2. Balboa agrees to reimburse Flanders for the full $10,000.00 expenditure made by Flanders out of the net profits realized by Balboa from the said claims, as said net profits have been described in the Agreement dated December 29, 1955 described in Paragraph I,(1, h) above, said reimbursement to occur as follows:

a) Flanders shall receive 100% of the first $7,500.00 of net profits received by Balboa from the operation of the said

claims.

b) Thereafter, Flanders shall receive 50% of the subsequent net profits received by Balboa from the operation of the said claims until Flanders shall have received an additional $2,500.00, or $10,000.00 in all.

c) In the event that Balboa should sell its interest in the said claims under the provisions of paragraph II, (B, 3) below, Flanders shall receive that portion of the sale price as shall make its total reimbursement equal $10,000.00.

3. Balboa agrees that it will not sell, transfer, or assign any or all of its interest in the said claims without the written consent of Flanders.

C. Both parties mutually agree that all of the obligations of Balboa to Flanders under the terms of this agreement shall terminate as soon as Flanders shall have been reimbursed to the full extent of $10,000.00.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed and sealed as of the day and year first above written.

FLANDERS MINING COMPANY

By Lawrence E. Dueing
Partner

ATTEST

Lawrence E. Dueing
Secretary

BALBOA MINING AND DEVELOPMENT CO.

By William M. Inman Jr.
Vice-president

APPENDIX B

Past Production Figures.

Cordillera Mining Company
P. O. Box 664, Grand Junction, Colo.

Sein Fein Production, July, 1950 - August, 1952:

Date	Dry Weight (tons)	Gross Value per ton	Assay Values Lead	Copper	Gold	Silver
7-10-50	28.293	$28.11	11.75%		.288 oz.	1.75 oz.
7-21-50	46.307	30.24	13.7	1.095%	.24	2.3
8-7-50	60.192	32.04	13.35	1.005	.32	2.4
7-28-50	52.885	28.29	12.3		.27	2.05
8-8-50	52.06	26.24	11.9		.205	2.0
8-8-50	63.974	34.97	14.8	1.115	.303	2.0
8-31-50	57.529	39.65	14.1	1.12	.42	2.3
9-7-50	54.463	46.12	14.475	1.455	.565	2.35
9-28-50	58.841	57.56	18.6	1.145	.395	2.4
9-26-50	55.035	55.96	18.95		.3325	2.4
10-11-50	55.123	62.59	21.25	1.10	.335	2.9
10-24-50	56.739	61.81	21.6		.30	2.65
10-31-50	57.692	64.92	23.2	1.145	.248	2.95
11-8-50	51.547	74.13	24.65	2.60	.145	3.45
12-5-50	55.383	69.24	22.8	1.73	.23	3.05
12-5-50	63.687	70.42	23.3	1.68	.2325	2.95
1-2-51	58.592	65.56	22.25	1.335	.22	2.45
1-29-51	57.787	55.93	19.8	1.125	.15	2.4
3-6-51	56.508	46.86	15.35	1.025	.26	2.1

Date	Dry Weight (tons)	Gross Value per ton	Assay Values Lead	Copper	Gold	Silver
3-2-51	53.476	$49.12	15.35%	1.19%	.307 oz.	2.3 oz.
3-8-51	61.047	52.93	16.8%	1.245	.2925	2.5
3-15-51	56.563	60.79	19.05	1.24	.34	2.8
3-21-51	58.503	66.50	20.5	1.705	.315	3.95
3-27-51	62.1	65.15	21.3	1.48	.2425	3.5
4-9-51	51.298	55.55	18.75	1.205	.2175	2.4
4-25-51	57.033	61.35	19.85		.335	2.1
4-20-51	54.549	42.10	15.95		.08	1.55
5-4-51	55.076	64.34	19.65	1.425	.365	3.35
5-3-51	56.244	68.78	22.15	1.58	.28	3.25
5-22-51	47.606	48.92	16.2	1.205	.22	2.6
5-25-51	56.191	55.57	19.05	1.16	.195	2.5
6-5-51	57.073	57.69	18.1	1.24	.34	2.2
6-12-51	53.533	52.60	16.75	1.055	.32	2.0
6-12-51	56.925	53.12	17.95		.2375	2.15
7-18-51	51.546	48.96	17.1	1.015	.165	2.65
7-27-51	53.949	47.20	15.0	1.565	.24	2.2
7-31-51	49.582	42.52	15.0	1.22	.14	1.9
8-16-51	45.74	39.86	14.1	1.30	.1175	2.15
8-29-51	49.688	35.76	13.05	1.04	.115	1.8

Date	Dry Weight (tons)	Gross Value per ton	Assay Values Lead	Copper	Gold	Silver
9-13-51	60.35	$46.88	16.3%	1.315%	.145 oz.	2.3 oz.
9-28-51	50.463	53.10	17.15		.3025	2.2
10-4-51	54.115	40.96	13.1		.275	1.85
10-11-51	56.783	77.97	25.6		.358	2.5
10-15-51	47.947	47.46	12.6		.3925	1.9
10-24-51	49.242	70.30	21.8		.223	2.1
10-29-51	57.693	70.41	21.45	1.60	.185	2.5
11-12-51	60.485	70.61	21.45	1.895	.16	2.5
11-23-51	62.797	45.32	13.85	1.01	.21	1.8
12-3-51	55.4	61.05	19.5	1.19	.14	1.9
12-11-51	57.023	64.76	21.4	1.00	.095	1.9
1-2-52	54.883	38.85	12.95		.0975	1.75
1-9-52	55.443	38.48	13.0		.0825	1.7
1-19-52	55.024	46.04	14.75		.145	1.9
2-26-52	52.294	52.95	17.2		.1175	2.25
3-4-52	51.391	45.21	14.69	1.12	.1125	1.9
3-13-52	54.903	62.91	19.5	1.655	.125	2.75
4-4-52	50.15	45.10	13.35		.257	1.6
4-22-52	53.421	32.33	10.95		.10	1.2

Date	Dry Weight (tons)	Gross Value per ton	Assay Values Lead	Copper	Gold	Silver
5-2-52	49.941	$39.98	13.4%		.105 oz.	1.2 oz.
5-22-52	42.527	37.88	15.9		.1075	1.8
5-14-52	49.680	36.21	12.95		.10	1.4
6-3-52	48.776	44.16	18.1		.14	1.9
6-4-52	56.28	44.27	17.75		.17	1.85
7-9-52	59.425	43.20	16.2		.1725	1.95
7-29-52	55.262	36.70	13.92		.145	1.8
8-12-52	47.639	33.64	12.75		.15	1.5
8-25-52	51.912	45.07	17.4		.13	1.6
	3,631.17 tons (total)	$50.62 (average)	17.145%	.766%	.2248 oz	2.24 oz

APPENDIX C

Geological Report by George C. Heikes.

MEMORANDUM

December 7, 1955

To: Mr. James F. Martin
Cordillera Mining Company

From: George C. Heikes
Consulting Mining Geologist

Subject: Sein Fein Mine (lead, zinc, copper, silver, gold) in the Aravaipa Mining District, Graham County, Arizona, Sec. 19 and 30, T 5 S, R 20 E.

The following memorandum concerns my visit to the Sein Fein Mine. I flew to Safford, Arizona, a regular stop on Frontier Airlines, arriving there the morning of October 5th, 1955. Dean Nicholson met me at the airport, drove 12 miles west of Safford on U. S. Hwy. 70 to a loading ramp on the Southern Pacific Railroad at Cork, Arizona. (Loading point for Sein Fein ore which is trucked 50 miles to this point then shipped by rail to A. S. U R. Co. smelter at El Paso, Texas). Then we drove to the mine via the Athletic Mining Co. flotation mill and camp, one mile north of the old town of Klondyke, then 12 miles to the mine at the end of Williamson Canyon. The surface in this area is rocky, barren; ranging from 3200 to 6000 feet above sea level. Collar of the Sein Fein Mine shaft is estimated at 5250 feet above sea level.

Dean Nicholson had leased the Sein Fein Mine from Zella F. Harwood of Phoenix, Arizona in July, 1950. During 1951, Nicholson said he had earned $20,000.00 net on the lease, and obtained an option to purchase the mine for $75,000.00. I understand that Nicholson has now assigned his interest in the lease to you and Flanders Mining Company.

During 1955 the Sein Fein Shaft was extended 182.7 feet below the seventh level and some drifting to the east was done on the eighth level. Some very high grade sulphide ore was opened up on the west side of the shaft at the eighth level, and some other smaller clusters of mineralization were found along the 8th level drift to the east. This ore was in lenses up to a foot thick of fine grained galena (lead sulphide) and sphalerite (zinc sulphide), and chalcopyrite (copper-iron sulphide). The spotty character of the ore suggested that you might be coming near the top of a new oreshoot as this ore appeared to bear no direct relationship to the ore previously produced on the upper levels at the Sein Fein mine. The old ore shoot, indicated on the attached sketch Map No. 2 as the Sein Fein ore shoot, produced several hundred thousand dollars worth of lead ore to the seventh level.

This orebody in the Sein Fein Mine appears to have been a large lenticular shaped body along a thrust or reverse fault structure. The hanging and footwalls of the vein are both in Tertiary rhyolite, although Carboniferous limestone is relatively nearby, as shown an Sketch Map No. 2. There appears to be branches off this main vein that have not been too well explored -

the vein on the Sein Fein Tunnel appears to be one of these and with more exploration may prove to be a mineralized branch vein in the footwalls of the Sein Fein Vein.

While there, I was fortunate in meeting Harvey Horton, VP and General Manager of the Athletic Mining and Smelting Co., of Forth Smith, Arkansas. Athletic owns the mine adjoining the Sein Fein to the east and appears to be a part of the same vein system. Horton invited me to go underground with him. We descended the inclined Head Center Shaft in a skip for 1100 feet or more, got out on the fourteenth level and climbed on down to the bottom of the mine visiting a number of handsome working faces where the ore was solid sulphides 8 to 10 feet thick. Horton said they were then producing about 75 tons per day averaging 16% lead, 5% zinc with some gold, silver, and copper, and mostly from the sixteenth to eighteenth levels. What interested me most was the new or west oreshoot, west of this main shaft, as this was over near the Sein Fein property line. The ore observed on the lower levels of the Head Center Mine was all sulphides, the zinc exceeded the lead content.

This ratio of lead to zinc in the Head Center Mine was in reverse to what it was in the Sein Fein Mine where the lead was higher than the zinc. The Sein Fein shipments ranged from .07 to .3 ounces gold - 1 to 10 ounces silver - 10 to 15% lead - .75% to 2.0% copper - 3.5 to 7.5% zinc per ton.

It is estimated by Dean Nicholson that the Head Center property has produced three or four million dollars worth of ore over the past few years; it is still going strong. With a good stoping width of high grade ore, the vein dipping about 28° to the north, they appear to be making good costs and operating efficiently. As long as the Head Center Mine is in operation, it is pumping all the water and is keeping the Sein Fein Mine dry -- that is one of the reasons why I think it is on the same vein system. A small electrically driven pump can keep the mines dry by pumping only a few hours per day, and this supplies adequate water for drilling, cooling water, and other purposes in the Surface plant.

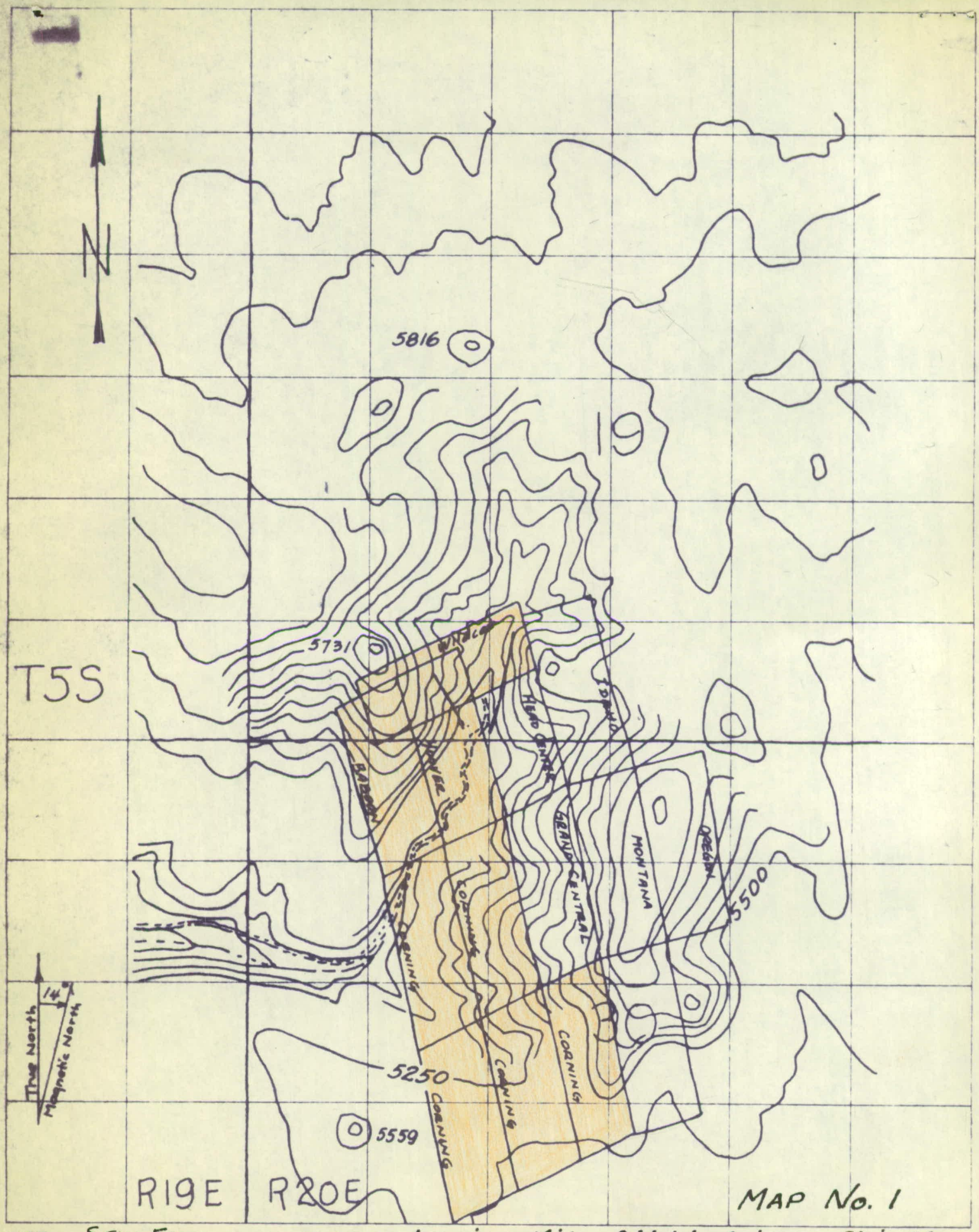
After my trip underground in the Sein Fein and the Head Center Mines, I made a sketch map showing the way I presumed the mine workings and ore shoots to be, and also indicated the factual data such as the surface geology, the direction of the shafts, roads, claims, etc. See Sketch Maps No. 1 and 2 attached.

The available literature on the area is as follows: A reconnaissance map was made by C. P. Ross, in 1925 (U.S.G.S. Bull. 763) but neither the Sein Fein or Head Center Mines had been developed then. Eldred D. Wilson, now Chief Geologist State of Arizona, described the area on page 51 of Vol. XXI No. 2 April, 1950, "Arizona Zinc and Lead Deposits" Part I. During the war the U.S.B.M. prepared a pamphlet on the Head Center by T. C. Denton "Aravaipa lead-zinc deposits" R. I. 4007 which was printed in 1947, at that time the Head Center was only down to the fifth level. As a result of my visit, I believe a more thorough investigation of the area, by Federal and State geological agencies, is warranted.

The future of the Sein Fein Mine depends on good management, adequate working capital, and the proper timing of the production of ore to coincide with suitable metal prices. It is a good geological bet and is well worth further investigation from a mining point of view.

s/ George C. Heikes

GCH:ana



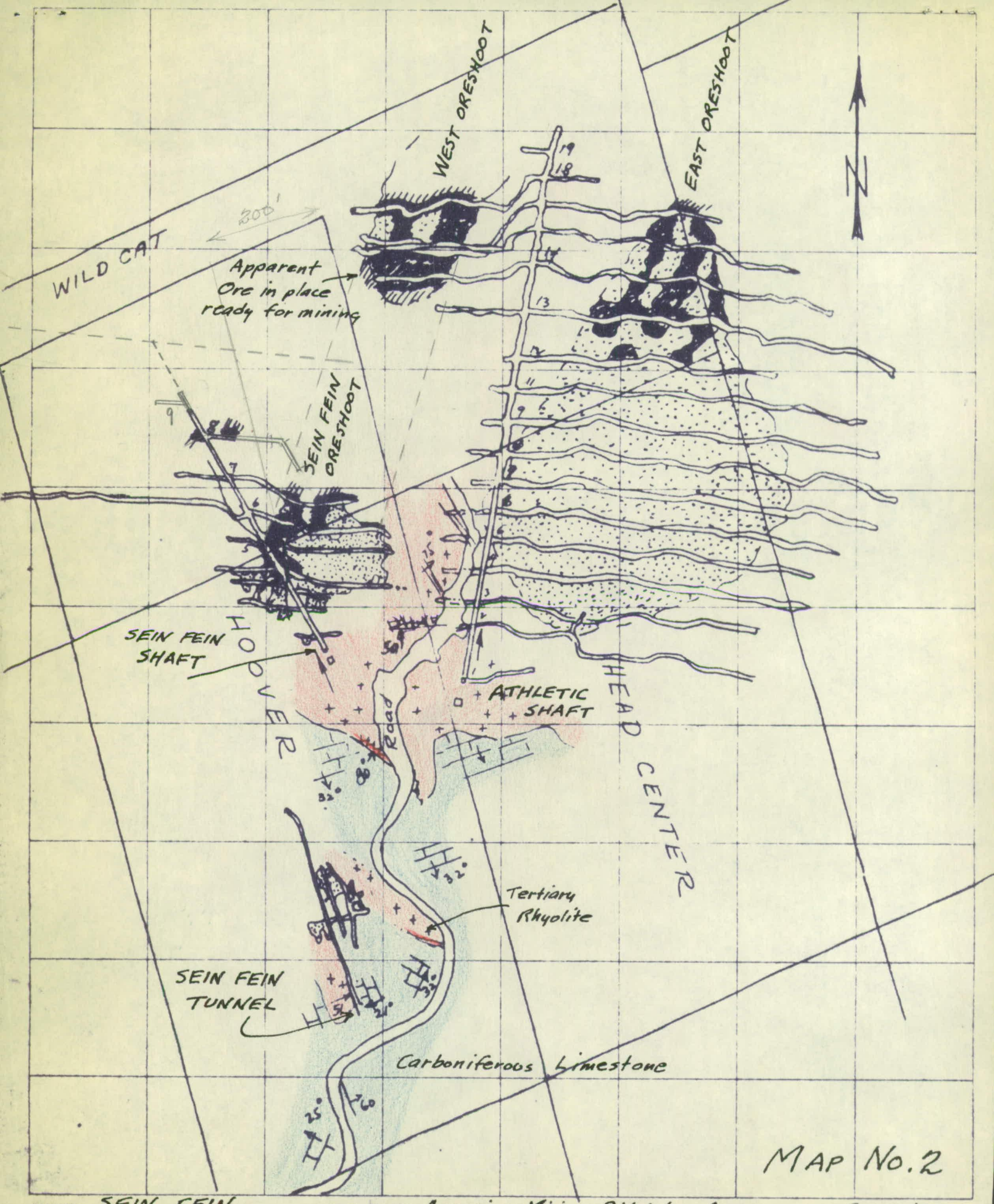
MAP No. 1

MINE SEIN FEIN LOCATION Aravaipa Mining District, Ariz. LEVEL Claim Map

GEOLOGY BY _____ SURVEY _____ DATE _____ SCALE _____

N _____ E _____ EL. _____

TUCSON BLUE PRINT CO. — K & E ALBANENE 195L



MINE SEIN FEIN LOCATION Aravaipa Mining District, Ariz. LEVEL Composite

GEOLOGY BY George C. Heikes SURVEY Sketch Map DATE Oct. 5, 1955 SCALE 1" = 200'

N E T5S, R20E EL. 5000' +

TUCSON BLUE PRINT CO. — K & E ALBANENE 1951

APPENDIX D

Mine Map

a) Existing Sein Fein workings and ore shoots.

b) Estimated workings and ore shoots of adjacent mine.

c) Projected IMEA exploration.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
2/25	Klugescheid	500
	[illegible]	500
2/26	[illegible]	120
"	[illegible]	110
"	Mittendorf	100
2/27	C	225

FEB 26 1957

Mr. William M. Spencer, Jr.
Balboa Mining & Development Co.
Post Office Box 861
Grand Junction, Colorado

Re: Docket No. DMEA-4277 (Lead-Zinc)
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

Dear Mr. Spencer:

We refer to your inquiry, dated February 19, 1957, concerning the cited application.

Under date of February 18, 1957, we wrote to Mr. James F. Martin, president of the Cordillera Mining Company, and communicated to him the decision of the Government with regard to this application.

If you will kindly contact Mr. Martin, I am sure that he will give you all the details of our decision.

As our letters passed in the mail, you have probably already learned what has transpired.

Sincerely yours,

C. O. Mittendorf

Administrator

WPKlugescheid/er 2/25/57
Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Region III (2)
Chron.

8623

Balboa Mining and Development Company
Post Office Box 861
Grand Junction, Colorado

February 19, 1957

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 21 1957

DATE	INITIALS	CODE
2/21	G	220
2/21	Klug	500

Defense Minerals Exploration Administration
United States Department of the Interior
Washington 25, D. C.

Cordillera

Dear Sir:

Reference is made to DMEA loan application Docket 4277, covering the Sein Fein Mine, located in Graham County, Arizona.

Inquiry is made as to the status of this loan application. It is believed that the final application as amended has been forwarded to Washington by the field office in Tucson, Arizona, and that all field examinations have been completed.

Your reply will be appreciated.

Yours very truly,

BALBOA MINING AND DEVELOPMENT CO.

William M. Spencer Jr.

William M. Spencer

WMS:b
cc: W. M. Traver

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
	Klugescheid	500
	Yarnwed	520
2/15	Selfridge	130
2-19		220
2/15	Johnson	110
	Mittendorf	400
		225

Lamb
Kiilsgaard

FEB 18 1957

Mr. James F. Martin, President
Cordillera Mining Company
Post Office Box 664
Grand Junction, Colorado

Re: Docket No. DMEA-4277 (Lead-Zinc)
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

Dear Mr. Martin:

Your application for aid for an exploration project and other data available to us in Washington have been reviewed.

Projects approved by the Defense Minerals Exploration Administration must, in its judgment, show definite promise of yielding materials of acceptable grade in quantities that will significantly improve the mineral supply position for the National Defense Program.

Careful study of all our information, although noting some lead-zinc mineralization on your property, indicates to us that the probability of disclosing significant ore reserves is not sufficiently promising to justify Government participation. We regret to advise you, under these circumstances, that your application for exploration assistance is denied.

We regret the necessity of taking such action, however, it is taken without prejudice to your property. If you do additional work which reveals evidence which could materially alter this opinion, be assured that we will be pleased to consider a new application.

We wish to thank you for your interest in the Defense Minerals Program and for bringing your property to our attention.

Sincerely yours,

C. O. Mittendorf (for)

Administrator

WPKLugescheid/er 2/13 & 15/57
Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Region III (2)
Chron.

8623

DMEA Form 7
(12-56)

500

OFFICIAL FILE COPY

Date	Surname	Code
	Klugeschad	500
		130
		110
		100

225

February 13, 1957

Memorandum

To: The Administrator

From: Chief, Base Metals Division

Subject: Denial of Application, Docket No. DMEA-4277, Cordillera Mining Company, Sein Fein Mine, Graham County, Arizona, Lead-Zinc. Kalegaard

The cited application, dated April 26, 1956, was received in this office May 1.

The Applicant proposed to explore the property by means of 300 feet of inclined shaft, 300 feet of drifting at the bottom of the shaft when completed, and 1,000 feet of diamond drilling in two holes each about 500 feet in length. In addition it proposed to rebuild the surface plant, which had been destroyed by fire, at a cost of $7,500.00. The total estimated cost of the project was $34,450.00.

There is no reserve of ore in the mine at the present time. The deposits are lenticular ore shoots in a brecciated fault zone in rhyolite. The largest one produced about 3,600 tons of ore from 1950 to 1952. The weighted average grade of the shipments from 1950 to 1952 was:

> 17.34 per cent lead, 0.226 ounces of gold, and 2.26 ounces of silver per ton.

The Head Center mine, immediately to the east, contains larger ore shoots than have been found in the Sein Fein mine.

A preliminary investigation of the property was made on September 7, 1956, by W. L. Emerick of the Geological Survey, in company with a representative of the company. At that time the drilling phase was discussed and it was decided to eliminate it from the proposal, as it was purely prospecting.

On October 11, a more detailed examination was made by Emerick and L. A. Stewart, Bureau of Mines. T. M. Romslo, Bureau of Mines, examined the property on November 20.

8623

A prominent fault, trending northwest to west, courses through the rhyolite porphyry in the report area. The fault is traceable for several hundred feet southeastward over the Head Center claim, a neighboring property, and for an unknown distance westward over the Hoover claim (Sein Fein mine).

Examination of the shaft and drifts of the Sein Fein mine showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc mineralization was present. The 6th level was driven for several hundred feet along the strike of the fault zone to the west without encountering more than occasional occurrences of weak mineralization. The 8th and 9th levels did not contain significant occurrences of lead and zinc mineralization. A 9 inch width of lead-zinc mineralization is exposed in the bottom of the incline which might be an indication that more favorable conditions could be expected with depth, or it might merely be a small pocket of ore.

The examining team proposed sinking the shaft 300 feet and then drifting 300 feet close to the bottom of the shaft. This is the same program submitted by the Applicant but with the drilling left out.

The members of the Field Team agreed that a modest exploration program may be warranted but did not agree with the examiners' plan, and considered that 300 feet of sinking without intermediate lateral exploration was not sound practice. They stated:

> "We would concur in DMEA participation in exploration if a project was proposed to explore laterally from the present workings (possibly the 9th level) with subsequent shaft sinking and further lateral exploration, if conditions warrant."

N. E. Nelson of the Geological Survey, in his review of the examination report, also did not concur with the proposal of the examiners but stated that he would concur with a limited staged work program as suggested by the Field Team.

O. M. Bishop, Bureau of Mines, did not consider that any evidence had been presented to warrant further exploration and recommended denial without prejudice.

We wrote to the Field Team and suggested, for their consideration, that, on the strength of the mineralization in the bottom of the shaft, it might be better to sink the shaft 100 feet and then drift up to 300 feet on what would be the 10th level. The idea being that the ore in the shaft might increase in width and that additional information might be acquired. If no results were obtained by the sinking program that were at all encouraging, the project could then be stopped.

We received a reply from the Field Team, dated January 28, in which the following statements were made:

> "After a review of the comments of O. M. Bishop and N. E. Nelson, and a reappraisal of the ore potential of the lower levels of the Sein Fein mine, we conclude that additional work, with DMEA assistance, cannot be justified by the available data. We therefore recommend that the application be denied without prejudice. Should work by the Applicant indicate the presence of significant exploration targets, a new application would receive favorable consideration."

The commodity members of the Geological Survey and the Bureau of Mines concurred with the findings of the Field Team that the application be denied without prejudice.

We concur with the recommendations of the Field Team and the commodity members.

W. R. Griswold

WPKlugescheid/er

Copy to: Docket
Base Metals
Chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION 500
WASHINGTON 25, D. C.

February 13, 1957

Memorandum

To: The Administrator

From: Chief, Base Metals Division

Subject: Denial of Application, Docket No. DMEA-4277, Cordillera Mining Company, Sein Fein Mine, Graham County, Arizona, Lead-Zinc.

The cited application, dated April 26, 1956, was received in this office May 1.

The Applicant proposed to explore the property by means of 300 feet of inclined shaft, 300 feet of drifting at the bottom of the shaft when completed, and 1,000 feet of diamond drilling in two holes each about 500 feet in length. In addition it proposed to rebuild the surface plant, which had been destroyed by fire, at a cost of $7,500.00. The total estimated cost of the project was $34,450.00.

There is no reserve of ore in the mine at the present time. The deposits are lenticular ore shoots in a brecciated fault zone in rhyolite. The largest one produced about 3,600 tons of ore from 1950 to 1952. The weighted average grade of the shipments from 1950 to 1952 was:

> 17.34 per cent lead, 0.226 ounces of gold, and 2.26 ounces of silver per ton.

The Head Center mine, immediately to the east, contains larger ore shoots than have been found in the Sein Fein mine.

A preliminary investigation of the property was made on September 7, 1956, by W. L. Emerick of the Geological Survey, in company with a representative of the company. At that time the drilling phase was discussed and it was decided to eliminate it from the proposal, as it was purely prospecting.

On October 11, a more detailed examination was made by Emerick and L. A. Stewart, Bureau of Mines. T. M. Romslo, Bureau of Mines, examined the property on November 20.

A prominent fault, trending northwest to west, courses through the rhyolite porphyry in the report area. The fault is traceable for several hundred feet southeastward over the Head Center claim, a neighboring property, and for an unknown distance westward over the Hoover claim (Sein Fein mine).

Examination of the shaft and drifts of the Sein Fein mine showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc mineralization was present. The 6th level was driven for several hundred feet along the strike of the fault zone to the west without encountering more than occasional occurrences of weak mineralization. The 8th and 9th levels did not contain significant occurrences of lead and zinc mineralization. A 9 inch width of lead-zinc mineralization is exposed in the bottom of the incline which might be an indication that more favorable conditions could be expected with depth, or it might merely be a small pocket of ore.

The examining team proposed sinking the shaft 300 feet and then drifting 300 feet close to the bottom of the shaft. This is the same program submitted by the Applicant but with the drilling left out.

The members of the Field Team agreed that a modest exploration program may be warranted but did not agree with the examiners' plan, and considered that 300 feet of sinking without intermediate lateral exploration was not sound practice. They stated:

> "We would concur in DMEA participation in exploration if a project was proposed to explore laterally from the present workings (possibly the 9th level) with subsequent shaft sinking and further lateral exploration, if conditions warrant."

N. E. Nelson of the Geological Survey, in his review of the examination report, also did not concur with the proposal of the examiners but stated that he would concur with a limited staged work program as suggested by the Field Team.

O. M. Bishop, Bureau of Mines, did not consider that any evidence had been presented to warrant further exploration and recommended denial without prejudice.

We wrote to the Field Team and suggested, for their consideration, that, on the strength of the mineralization in the bottom of the shaft, it might be better to sink the shaft 100 feet and then drift up to 300 feet on what would be the 10th level. The idea being that the ore in the shaft might increase in width and that additional information might be acquired. If no results were obtained by the sinking program that were at all encouraging, the project could then be stopped.

We received a reply from the Field Team, dated January 28, in which the following statements were made:

> "After a review of the comments of O. M. Bishop and N. E. Nelson, and a reappraisal of the ore potential of the lower levels of the Sein Fein mine, we conclude that additional work, with DMEA assistance, cannot be justified by the available data. We therefore recommend that the application be denied without prejudice. Should work by the Applicant indicate the presence of significant exploration targets, a new application would receive favorable consideration."

The commodity members of the Geological Survey and the Bureau of Mines concurred with the findings of the Field Team that the application be denied without prejudice.

We concur with the recommendations of the Field Team and the commodity members.

W. R. Griswold

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

February 12, 1957

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: Commodity Specialist, Branch of Base Metals

Subject: Region III Field Team memorandum January 28, 1957, DMEA Docket 4277 (lead-zinc), Cordillera Mining Company, Sein Fein Mine, Graham County, Arizona.

In the subject memorandum the Field Team states that after their review of the comments of O. M. Bishop and N. E. Nelson and a reappraisal of the ore potential of the lower levels of the Sein Fein mine, they conclude that additional work, with DMEA assistance, cannot be justified by the available data. Accordingly, they recommend that the application be denied without prejudice.

I concur with the recommendation.

A. D. McMahon

A. D. McMahon

Copy to: Division of Minerals
Branch of Base Metals (2)
Thor Kiilsgaard, U.S.G.S.
F. D. Lamb
F i l e s

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DMEA
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

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IN REPLY REFER TO:
D M E A
RECEIVED 1957

DATE	INITIALS	CODE
2-8	C	220
2-8	WPK	500

February 5, 1957

Re: DMEA 4277
Cordillera Mining Co.
Sein Fein Mine
Graham Co. Ariz.
No Estimate
Lead-zinc

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of Field Team supplementary report.

In a letter of transmittal dated Dec. 31, 1956 the Field Team recommended an alternate and less expensive work program than that proposed by the examiners. I concurred with the Field Team recommendation.

Following a reconsideration of the available data, the Field Team now recommends denial without prejudice of the application.

I concur with this recommendation of the Field Team.

N. E. Nelson

N. E. Nelson

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

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2-5	C	120
2-5	Klug	500

224 New Customhouse
Denver 2, Colorado

January 28, 1957

Memorandum

To: Chairman, Operating Committee, DMEA

From: DMEA Field Team, Region III

Subject: DMEA Docket 4277 (Lead-zinc), Cordillera Mining Company (Sein Fein mine), Graham County, Arizona

Your letter of January 18, 1957, regarding proposed exploration at the Sein Fein mine has been reviewed as have the copies of the memorandum of Bishop and Nelson attached thereto.

We all agree that future work at the Sein Fein mine must be directed toward finding a new ore shoot since extensions of the Sein Fein ore shoot (if any) would lie near or beyond the boundary of the property controlled by the applicant. Mineralized or ore-grade material has been mined in the small stope between the 6th and 7th levels, sampled by the examiners at a point in the shaft between the 7th and 8th levels, and noted in the bottom of the shaft. Exploration below the small stope and below the ore occurrence in the shaft between the 7th and 8th levels has proven beyond a reasonable doubt that these two occurrences do not represent the top of a significant ore shoot. We therefore conclude that the mineralized material in the bottom of the shaft represents another small lens of mineralized material, and that exploration at deeper levels cannot be justified on the basis of this exposure.

In our memorandum of December 31, 1956, transmitting the examination report to you, we stated that we would concur in a small project to explore laterally from the bottom of the present shaft. After a review of the comments of O. M. Bishop and N. E. Nelson and a reappraisal of the ore potential of the lower levels of the Sein Fein mine, we conclude that additional work, with DMEA assistance, cannot be justified by the available data. We therefore recommend

Reviewed by
DMEA OPERATING COMMITTEE
2-4-57
(date)

that the application be denied without prejudice. Should work by the applicant indicate the presence of significant exploration targets, a new application would receive favorable consideration.

DMEA Field Team, Region III

W. M. Traver

E. N. Harshman

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

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Date	Surname	Code
	Klugerfield	500
	Swanson	500
1/18	Selfridge	130
1/18	Johnson	110
	Whitehead	100

JAN 18 1957

Mr. W. M. Traver
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Bldg.
Denver 2, Colorado

Re: Docket No. DMEA-4277 (Lead-Zinc) 1-22-Cir 220
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

500

Dear Mr. Traver:

We have studied the report of the examiners concerning the cited property and would like to present our conclusions for your consideration.

There has been no extensive drifting below the 7th level, and that which was done on the 8th level, to the east, did not find any ore. The rake of the Sein Fein ore body is to the east and it is very possible that had this drift been further extended it might have encountered this ore body. Referring to Map No. 2, from Mr. Heikes' report accompanying the application, one could easily believe that the ore shoot found in the lower levels of the Head Centre mine, to the west of the Athletic shaft, is a continuation of the Sein Fein ore shoot. Any exploration to the east of the Sein Fein shaft could, at best, discover very little ore, provided that the end lines are assumed as the side lines under the apex rights.

The only real hope of finding anything worth while is to discover a new ore body which might lie either at greater depth or further to the west.

The 6th level was driven quite a distance to the west and no ore was discovered and the mineralization was sparse. There is no real indication of ore occurrence in this direction at this depth.

8623

We refer to Fig. 3 of the examiners' report. The examiners took a sample (No. 15020) across 2.7 feet of mineralized material, in the shaft between the 7th and 8th levels, which assayed 12.2 per cent lead, 3.7 per cent zinc, 0.67 per cent copper, and 1.3 oz. of silver per ton. There is some showing of galena at the 8th level at the incline, and there is also some galena showing on the 9th level. There is a nine-inch vein in the bottom of the shaft which was not sampled by the examiners. There is a small mined-out stope on the 7th level which extended a short distance above the 6th level and apparently pinched out. It is conceivable that the small stope and the other mineralization near to and in the bottom of the shaft may be the top of a new ore shoot, as suggested by Mr. Heikes.

Our idea would be to sink the shaft another hundred feet and then drift a distance of up to 300 feet on the 10th level. This drifting could be either to the east or the west or in both directions, whichever proves advisable. We quite agree with the examiners that the drilling proposed would be of little value. The 300-foot extension of the shaft recommended by the examiners might be too large a bite.

Copies of memoranda dated January 7 and 10, 1957, by N. E. Nelson, Geological Survey, and O. M. Bishop, Bureau of Mines, respectively, relating to the Field Team report of the project, are enclosed for your information.

We would appreciate receiving your reactions and suggestions regarding this proposed program at your earliest convenience.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (JCB)

Enclosures

WPKlugescheid/er 1/17/58
Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Chron.

APPROVED:

/s/ O. M. Bishop (JCB)
Member, Bureau of Mines

Thor H. Kiilsgaard (JCB)
Member, Geological Survey

P. S. Our suggestion in the second paragraph of this page is submitted only for Field Team consideration and is not to be considered as a commitment on our part.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

W. R. Griswold 500

January 10, 1957

Re: DMEA 4277; Lead-Zinc; $22,797
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop, Branch of Base Metals

Subject: Field Team Report of December 31, 1956 received January 1, 1957

The applicant company proposes rebuilding surface equipment destroyed by fire in 1955, sinking of an inclined shaft 300 feet on the vein, drifting 300 feet westerly on the vein from the bottom of the shaft, and drilling 1,000 feet of bore hole.

The field examiners note a production of about 4,200 tons since 1948; the ore averaging about 17 percent lead, with 0.22 ounces of gold and 2.26 ounces of silver per ton. The ore occurred as lenses up to 5 feet wide in the upper or hanging wall side of a brecciated fault zone which trends northwesterly and dips from 45° to 20° to the northeast and traverses rhyolite porphyry.

The examiners write, "Examination of the shaft and drifts.... showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc mineralization was present." They also write that the 8th and 9th levels contained no significant mineralization and the 6th and 7th encountered only minor orebodies. An 8- to 9-inch ore showing in the bottom of the incline just below the 9th level is said to be a possible indication of more ore.

No structural or other geologic evidence is given to warrant further exploration nor are there any analyses of the 8- to 9-inch lead-zinc mineralization mentioned at the bottom of the incline.

I recommend denial of the application without predjudice, to any worthwhile program that may be proposed in the future.

O. M. Bishop

O. M. Bishop
Commodity Specialist
Branch of Base Metals

Copy to - Division of Minerals
Mr. Kiilsgaard, Rm. 5222
Mr. Lamb, Rm. 3608
Branch of Base Metals (2)
Files

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

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DMEA
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DATE	INITIALS	CODE
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January 7, 1957

Re: DMEA 4277
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona
Applicant's Estimate $34,450.00
Recommended Estimate $22,797.00
Lead-zinc

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of Field Team Report

The applicant requested assistance in replacing mine plant, deepening an incline, drifting and diamond drilling. The examiners recommend a work program consisting of 300 feet of shaft (incline) sinking and 300 feet of drifting near the bottom of the shaft extended. The underground work would be far below the lowest known important ore shoot. The Field Team questions the propriety of Government participation in the work proposed by the examiners.

The small ore shoots of the Sein Fein mine and the larger ones of the adjoining Head Center mine occur in a pronounced fault zone in rhyolite. As shown on the map, Fig. 2, the fault has an almost east-west strike across the narrow dimension (600') of the claim (Hoover) which contains the Sein Fein mine. Near the easterly side line (the legal end line) of the claim the strike appears to change abruptly to S 45° E. The change in strike may be more apparent than real. No contours are shown and the topography may account for the angle in the trace of the fault. Such a change in strike might account for the 13 short west levels off the Head Center shaft, but again the lack of information makes the inference mere conjecture.

The positions of the ore shoots of the two mines and the comparatively extensive non-productive drifting and shaft sinking in the Sein Fein mine suggest the Head Center shaft is more or less in the center of the trend of mineralization, and most of the deep work in the Sein Fein mine, actual and proposed, tends to diverge from the assumed trend line. Also the long unproductive 6th level west from the Sein Fein shaft tends to discount the proposed shaft extension and drift.

The examiners mention an 8 to 9-inch lead-zinc mineralization in the bottom of the Sein Fein shaft. As it was not sampled and the

9th level drift is short, I presume the showing is not too promising. Otherwise it would have been followed up.

As judged from the information afforded by the maps, the area ahead of the 8th level east and the area in the northeast corner of the claim (Hoover) are more favorable for prospecting, which it would be, than the area to be prospected by the proposed work. Unless already topped the West Oreshoot might extend into the Hoover claim.

Like the Field Team I do not concur with the proposal of the examiners, but I have no adequate alternative. However, I would concur with a limited staged work program as suggested by the Field Team.

N. E. Nelson

N. E. Nelson

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

224 New Customhouse
Denver 2, Colorado

December 31, 1956

RECEIVED APR 2 1957 D.M.E.A.

Memorandum

To: Secretary to the Operating Committee

From: DMEA Field Team, Region III

Subject: Joint Report of Examination Docket DMEA 4277 (lead-zinc) Cordillera Mining Company (Sein Fein Mine) Graham County, Arizona.

Enclosed are the original and three copies of a joint engineering and geologic Report of Examination on the subject property.

The revised proposal of the Applicant, and that recommended by the field examiners, consists of a 300-foot extension of the inclined shaft and 300 feet of drifting from the bottom of the extended shaft, at a total estimated cost of $22,797.00. We believe the cost figures for shaft sinking are too low.

The Field Team, Region III, concur that a modest exploration program at the Sein Fein Mine may be warranted, but we question the propriety of Government participation in the program recommended by the examiners. With no geologic guides with which to delineate favorable and unfavorable areas, we see no justification for exploring 300 feet below the 9th level - a level which is, and under the proposed program will remain, unexplored. Should exploration below the 9th level be warranted, we believe that, from the geological and mining point of view, 300 feet of sinking without intermediate lateral exploration is not sound practice.

Although exploration completed below the 6th level of the Sein Fein Mine has not found a significant amount of ore, we would concur in DMEA participation in exploration if a project was proposed to explore laterally from the present workings (possibly the 9th level) with subsequent shaft sinking and further lateral exploration, if conditions warrant.

Enclosed are 9 copies each of Figures 1 and 3 for your use.

DMEA Field Team, Region III

Reviewed by
DMEA OPERATING COMMITTEE
1/4/57
(date)

By W. M. Traver
W. M. Traver
E. N. Harshman
E. N. Harshman

IN REPLY REFER TO:
DMEA
DEPARTMENT OF THE INTERIOR

DEC 26 1956
REGION III
DENVER, COLORADO

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Defense Minerals Exploration Administration
Denver Federal Center
Denver, Colorado

TRANSMITTED
DEC 31 1956

December 21, 1956

RECEIVED
JAN 3 1957
D.M.E.A.

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: E. N. Harshman

Subject: DMEA Docket 4277 (Lead-zinc), Cordillera Mining Company (Sein Fein mine), Graham County, Arizona

Enclosed are the original and eight copies of a joint examination report by W. L. Emerick, U. S. Geological Survey, T. M. Romslo, U. S. Bureau of Mines, and L. A. Stewart, U. S. Bureau of Mines, in which exploration of the Sein Fein mine is recommended.

The revised proposal of the applicant, and 4277 recommended by the examiners, consists of a 300-foot extension of the inclined shaft and 300 feet of drifting from the bottom of the extended shaft. The estimated total cost of the program is $22,797.

Although a modest exploration program at the Sein Fein mine may be warranted, I question the propriety of Government participation in the program recommended by the examiners.

In summary the report states that geologic conditions as noted in the present workings are not favorable for deposition of large ore bodies, that without a detailed study of the deposit there is no way to predict where favorable conditions for ore deposition

Reviewed by
DMEA OPERATING COMMITTEE
1/4/57
(Date)

in the Sein Fein vein may have existed, and that these unfavorable conditions do not preclude the possibility that additional ore may be found along the Sein Fein vein, either at greater depths or along the strike. I concur with these conclusions, but I do not concur with the recommendations based on them.

It is apparent from figure 2 that additional exploration in the Sein Fein mine cannot be directed toward extending, either laterally or in depth, the Sein Fein ore shoot, but must be directed toward the discovery of now unexposed ore bodies. It also is apparent from figure 2 that almost no exploration has been done from the present 9th level of the mine and that exploration on the 8th level has been restricted to drifting on the vein southeasterly from the shaft. With no geologic guides with which to delineate favorable and unfavorable areas, I see no justification for exploring 300 feet below the 9th level - a level which is, and under the proposed program will remain, unexplored. Furthermore, should exploration below the 9th level be warranted, I believe that, from the geological and mining point of view, 300 feet of sinking without intermediate lateral exploration is not sound practice.

Although exploration completed below the 6th level of the Sein Fein mine has found nothing of significance, I would concur in DMEA participation in exploration if a project was proposed to

explore laterally from the present workings (possibly the 9th level) with subsequent shaft sinking and lateral exploration if conditions warrant.

Field Team action on this application can be taken following your review of the report and the above comments.

E. N. Harshman
Member, Field Team

Enclosures (9)
ENHarshman:mp

MINERAL DEPOSITS
DMEA
RECEIVED
DEC 20 1956
U. S.
GEOLOGICAL SURVEY
DENVER, COLORADO

Box 4126 University Station
Tucson, Arizona

TRANSMITTED
DEC 31 1956

December 14, 1956

MEMORANDUM

To: Executive Officer, DMEA Field Team, Region III

From: T. M. Romslo
W. L. Emerick

Through: W. R. Storms
R. N. Harshman RNH (noted)

Subject: Docket DMEA 4277 (Lead-Zinc), Cordillera Mining Company (Sein Fein Mine), Graham County, Arizona

Enclosed are the original and 8 copies of the field examination report on the above property, recommending approval of the application. Ten additional copies of maps are also enclosed.

Original signed by
T. M. Romslo

T. M. Romslo
U. S. Bureau of Mines

W L Emerick

W. L. Emerick
U. S. Geological Survey

WLE:mm

cc. Trever (8)
King
Storms
Harshman
Emerick

DMEA
DEPARTMENT OF THE INTERIOR
DEC 26 1956
REGION III
DENVER, COLORADO

1/4/57

FOR UNITED STATES GOVERNMENT USE ONLY

TRANSMITTED

DEC 31 1958

ON SITE REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
FRED A. SEATON, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMEA-4277, Cordillera Mining Company (Lead-Zinc)

Sein Fein Mine

Graham County, Arizona

L. A. Stewart, Mining Engineer
U. S. Bureau of Mines

T. M. Romslo, Mining Engineer
U. S. Bureau of Mines

W. L. Emerick, Geologist
U. S. Geological Survey

December 14, 1956

Reviewed by
DMEA OPERATING COMMITTEE
4/4/57

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The Cordillera Mining Company applied for Defense Minerals Exploration Administration assistance to explore their Sein Fein mine in Secs. 19 and 30, T. 5 S., R. 20 E., Graham County, Arizona for lead. The application, docket DMEA-4277, proposed the extension of the inclined shaft down the vein, drifting westward on the vein from the bottom of the incline, and rebuilding a surface plant that was destroyed by fire. Total cost of the project was an estimated $34,450.00.

Prior to July 1950 the Sein Fein property was owned or operated by several people and production amounted to less than 15 tons from both the adit and inclined shaft. In July 1950, Dean Nicholson leased the mine, deepened the inclined shaft, and mined ore from stopes on 7 levels. Nicholson's production from July 1950 through August 1952 amounted to over 3,600 tons of ore with a gross value of $186,000. In addition to deepening the shaft, Nicholson and Cordillera Mining Co. drove 8th and 9th levels from the inclined shaft. All development work was suspended when fire destroyed the hoist and headframe on November 16, 1955.

Sedimentary rocks in the Aravaipa district are intruded by granite and porphyries of rhyolite, andesite, and basalt, and deformed by compressive stresses. A rhyolite porphyry mass intrudes limestone in the area of the Sein Fein mine and the most prominent

structure is a probable thrust fault, trending northwest to west through the rhyolite porphyry in the mine area. Dips of the fault at the surface range from 36° to 45° N., but flatten at depth to low angles ranging from 20° N. to 28° N.

Ore deposits are of the vein type, occurring in the upper part of the brecciated fault zone. Vein thickness ranges from less than an inch to about 5 feet. Ore shoots are lenticular-shaped. Host rock throughout the Sein Fein mine is rhyolite porphyry.

Primary ore minerals in the Sein Fein mine are galena, sphalerite, and some chalcopyrite and pyrite, in a quartz, calcite, and clayey iron-oxide gangue.

Examination of the shaft and drifts of the Sein Fein mine showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc mineralization was present. The 6th level was driven for several hundred feet along the fault zone without encountering more than occasional occurrences of weak lead and zinc mineralization. The mineralization in the 8th and 9th levels is not significant, but there was an 8 to 9-inch width of lead and zinc mineralization in the bottom of the incline. Unfavorable areas along the fault zone might be characteristic between ore bodies in deposits of this type, and in an open space filling type of deposit favorable areas of deposition might end rather abruptly, depending upon structure. Without a detailed study of the deposits it would be difficult to set up criteria for predicting the presence or approach to new ore bodies.

Although mineralogic and structural features in the Sein Fein mine appear unfavorable, these features do not preclude the possible presence of additional ore bodies along the Sein Fein fault zone in more favorable areas, as, for example, at depth, or elsewhere along the strike of the fault zone.

Because of the possibility that more favorable geologic conditions and a significant body of ore may be encountered by the exploration proposed, Government aid is recommended. The proposed explorations involve 300 feet each of shaft sinking and drifting at an estimated total cost of $22,797.00.

DMEA-4277, CORDILLERA MINING COMPANY (LEAD-ZINC)
SEIN FEIN MINE
GRAHAM COUNTY, ARIZONA

CONTENTS

	Page
Introduction	1
Location and accessibility	2
Ownership and extent of property	3
History, production, and grade of ore	6
Present status	8
Geology	8
Ore Reserves	12
Proposed exploration	13
Conclusions and recommendations	19

ILLUSTRATIONS

Figure No.		
1	Location and claim map	Following page 1
2	Areal geology of Sein Fein mine	In folder on back cover
3	Plan of Sein Fein mine and section through shaft	" " " " "

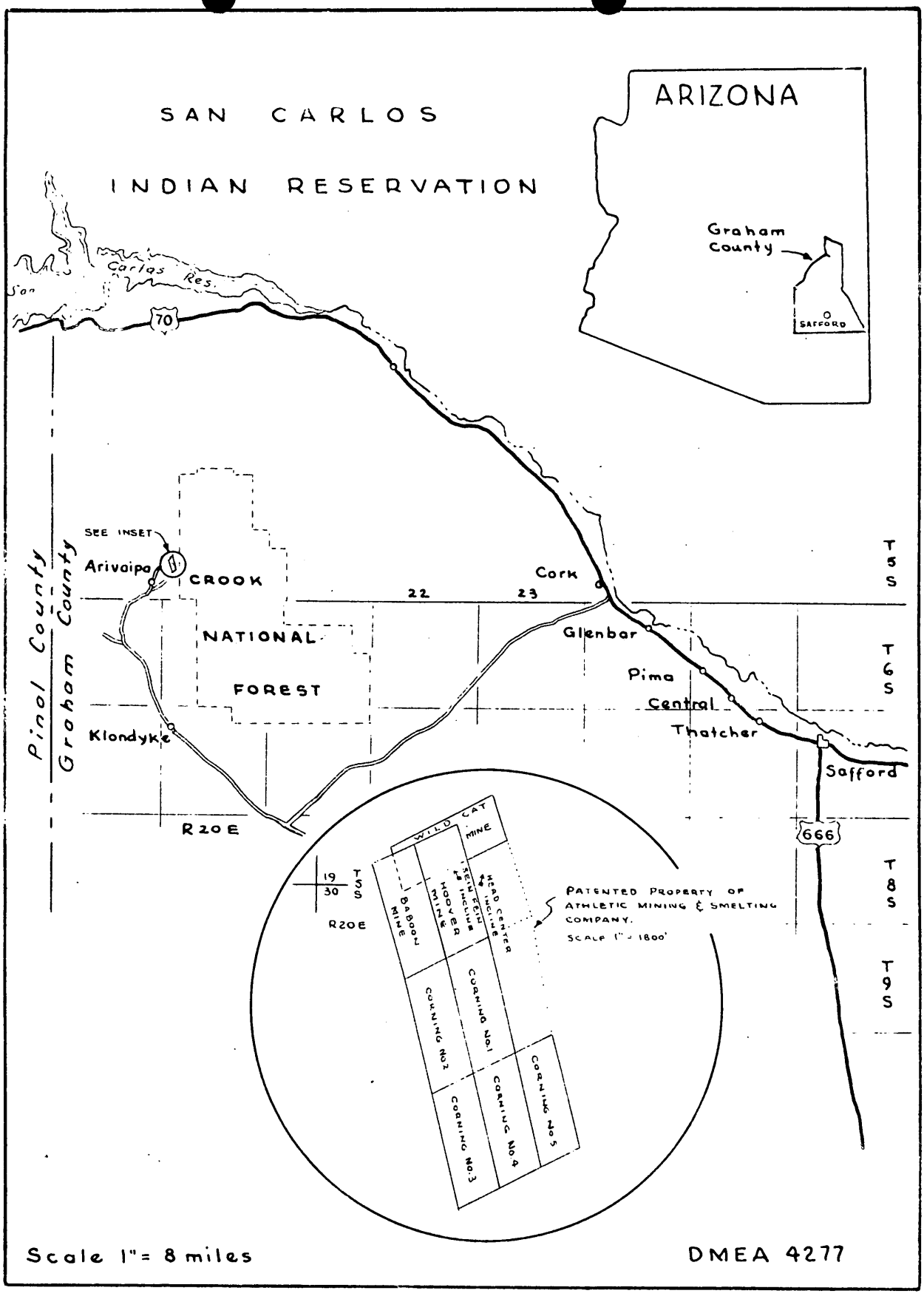

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

INTRODUCTION

The Cordillera Mining Co., whose address is Box 664, Grand Junction, Colorado, applied for Defense Minerals Exploration Administration assistance under docket DMEA-4277 to explore their Sein Fein mine for lead. The property, consisting of 8 contiguous, unpatented mining claims and a nearby campsite claim, is situated in secs. 19 and 30, T. 5 S., R. 20 E., Graham County, Arizona(fig.1).

The proposed exploration consists of extending the inclined shaft down the vein for an additional 300 feet, drifting westward 300 feet on the vein from the bottom of the inclined shaft, and rebuilding the surface plant which was destroyed by fire in 1955. The latter item includes construction of a headframe, hoist house, and ore bin; and the purchase and installation of a hoist, hoisting rope, skip, and minor accessories. Also included in the application was 1,000 feet of diamond drilling. The total cost was estimated at $34,450.00.

Preliminary field investigation of the property was made on September 7, 1956, by W. L. Emerick, geologist, U. S. Geological Survey, in company with Dean Nicholson, representative of the company. At that time the drilling phase was discussed and Nicholson decided to eliminate it from the proposal, as it was in the nature of prospecting.

Later, on October 11, a more detailed examination was made by Emerick and Lincoln A. Stewart, mining engineer, U. S. Bureau of Mines. William M. Spencer, Jr., the applicant's vice president

accompanied the field examiners on their investigation. He was not familiar with the property or with the details of the application, and consequently was unable to furnish data to substantiate the estimated cost of the proposed explorations. Data necessary for completion of the report was personally submitted November 28, 1956 by James F. Martin, President of the company. At that time, Martin conferred with Emerick, Stewart and T. M. Romslo, mining engineer, U. S. Bureau of Mines, who had examined the property November 20.

LOCATION AND ACCESSIBILITY

The Cordillera property is situated in the Aravaipa mining district, at the head of Williamson Canyon in SW¼, sec. 19, and NW¼ sec. 30, T. 5 S., R. 20 E., about 38 airmiles northwest of Safford, Arizona. The mine is reached from Safford according to the following log:

0.0 Leave Safford, travel northwest on paved U. S. Highway 70

9.0 Pass through Pima

15.7 Turn left onto graveled road

41.5 Take right fork

49.4 Pass Klondyke general store and post office

53.2 Take right fork

61.2 Take left fork at Aravaipa (Athletic Mining & Smelting Co. Camp)

63.5 End of road. Sein Fein mine on left and Head Center mine of Athletic Mining & Smelting Co. on right.

The graveled road from the highway is in excellent condition. The portal of the Sein Fein incline is west of the end of the road, about 75 feet up on the hillside, at an approximate altitude of 5,250 feet. Supplies and equipment are hauled from the roadway to the mine portal up a short inclined trackway.

Ore shipped from the property would be trucked 48 miles to Cork Siding, where there is a loading ramp on the Southern Pacific Railway.

OWNERSHIP AND EXTENT OF PROPERTY

The applicant, Cordillera Mining Co., together with the Balboa Mining and Development Co. as co-lessee, is the assignee of a Lease and Option to Purchase on a group of 8 unpatented, contiguous claims and one campsite claim. The Cordillera Co., a Colorado corporation, (James F. Martin,president, Box 664, Grand Junction, Colorado) possesses two-thirds interest in the property; the Balboa Co., likewise a Colorado corporation, (George C. Heikes, president, 149 Galli Ave., Los Altos, California) possesses one-third interest.

The names of claims and the recording data in the Graham County Court House are as follows:

Name of claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No.3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp site	33	412

These claims, owned by Zella F. Harwood and associates, were lease-optioned to Dean Nicholson on April 1, 1955. The application contains copies of the documents recording the complete chain-of-title as follows:

Date	Type of Instrument	
4/ 1/55	Lease and Option to Purchase	Lessor to Dean Nicholson (Lessee)
12/27/55	Amendment to Lease-Option Agreement.	Clarification of items of royalty and purchase price.
12/18/55	Consent to Assignment	Dean Nicholson to Cordillera Mining Co.
12/29/55	Assignment	Dean Nicholson to Cordillera Mining Co. and Flanders Mining Co.
12/29/55	Agreement	Cordillera and Flanders Cos. as to respective proportion of right, title, and interest in claims.
12/30/55	Consent to Assignment	Interest of Flanders Co. to others.
12/30/55	Consent to Assignment	Interest of Flanders Mining Co. to Balboa Mining and Development Co.
12/30/55	Assignment	Flanders Co. to Balboa Co.
12/31/55	Agreement	Monetary agreement between Balboa Co. and Flanders Co.

Figure 1 shows the arrangement of the group of contiguous claims. The location of the Camp Site claim was not shown on the applicant's map, but it is in the valley, a short distance southwest of the group.

It will be noted on figure 2 that the Sein Fein vein, crossing the Hoover Mine claim, dips northward, and the continued downward extension will pass under and north of the Wildcat Mine claim. This was noted by the Chairman of the Operating Committee who, in a letter to W. M. Traver dated June 27, 1956, stated "The projected drift at the bottom of the shaft extended, would appear to run off the Applicant's property unless other claims were located in that vicinity."

However, the Aravaipa district recognizes the law of apex rights. It will be noted in figure 2 that the Athletic Mining & Smelting Co.'s Head Center mine passes under the applicant's Wildcat mine claim; in fact, the major ore shoot now being worked is under the claim.

The outcrop, or apex of the vein on the Hoover Mine claim of Cordillera trends parallel to the end lines. Apex rights in this category are discussed by Ricketts[1/], who states "The owner of a lode mining claim has the exclusive right of possession and enjoyment of the surface within the lines of his location without regard to the width or extent of the vein or lode; but its form controls his surface rights. So, where a claim is located so that the vein or lode crosses the location instead of running lengthwise, the locator does not thereby lose his extralateral rights on the dip

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1/ Ricketts, A. H., American Mining Law, Fourth Edition, Bull. 123, Calif. Dept. of Mineral Resources, Dept. of Mines, 1943. pp. 398-399.

of the vein or lode beyond his end lines, but what he intended for his side lines are treated as his end lines, and he is entitled to the dip between vertical planes through these lines." A footnote further states "It has been the accepted doctrine of the United States Supreme Court for many years that where the strike of the vein crosses the location at right angles, its dip may be followed extralaterally, whatever the direction in which the length of the location may run. If across the strike, the side lines, as it commonly is expressed, become the end lines. Subsequent locators knew as well as the original ones that the determining fact is the direction of the strike, not the first discoverer's guess."

Thus it would appear that no additional claims need to be located north of the Wildcat Mine claim, as far as ownership of the vein material is concerned. However, Mr. Hofflund, Acting Assistant DMEA Solicitor, suggests in a letter dated February 9, 1955 to the DMEA Administrator that when it is known that the target of an exploration contract is the extralateral extension of a lode, the contract should clarify the situation with respect thereto.

HISTORY, PRODUCTION, AND GRADE OF ORE

According to Ross[2/], at the time of his investigation in 1922 the Sein Fein property was owned by Quinn and Finnegan of Klondyke. Previous to this tenancy, the property was owned by H. T. Firth of

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2/ Ross, Clyde P., Geology and Ore Deposits of The Aravaipa and Stanley Mining Districts, Graham County, Ariz. USGS Bull. 763, 1925, p. 100.

Aravaipa. The latter had shipped one carload and the former, two carloads of ore, all of which was mined from an adit on a mineralized shear zone in limestone.

In 1948, at least 10 carloads of ore were produced under the management of Ray Pointer[3/]. It is likely that part of this ore came from workings opened by the inclined shaft.

Dean Nicholson originally leased the Sein Fein mine from Zella F. Harwood and associates in July 1950, and in the period through August 1952 produced over 3,600 tons of ore that was shipped to the American Smelting & Refining Co.'s smelter at El Paso, Texas for a gross value of nearly $186,000. This ore was mined from stopes on both sides of the inclined shaft. During this work the shaft was deepened to 425 feet, and had been worked on 7 levels.

During 1955 the shaft was extended to an inclined depth of 607.7 feet, an 8th level driven 190 feet southeastward, and a 9th level (at the bottom of the shaft) driven westward 40 feet. This development work was suspended when a fire destroyed the hoist and headframe on November 16, 1955. Dean Nicholson's lease-option was assigned to the Cordillera Mining Co. on December 29, 1955.

The value and the weighted average of the content of the Nicholson production during the period of July 1950 through August 1952 has been worked out from docket material said to be a copy of each carload settlement sheet, as follows:

3/ Mining World, Sept. 1948, Vol. 10, No. 10, p. 86.

Year	Dry Weight Tons	$ Gross Value Av./ton	$ Gross Value Total	Percent Lead	Percent Copper	Ounces per ton Gold	Ounces per ton Silver	No. of Shipments
1950	869.75	$49.80	$ 43,317.89	17.79	1.37	0.304	2.52	16
1951	1,872.91	55.80	104,516.93	18.24	1.28	.235	2.37	34
1952	889.03	42.66	37,928.61	15.00	*	.133	1.78	17
Total	3,631.69	$51.15	$185,763.43	17.34		0.226	2.26	67

*Only 2 assays, averaging 1.40%, shown for 1952

PRESENT STATUS

The property is idle at present, and has been since November 1955, when fire destroyed the hoist, headframe and ore bin. The only equipment on the property is a 315 cfm compressor at road level, and 6 mine cars, 2 stopers and 1 jackhammer in the mine.

The mine is accessible throughout, the incline is in good condition with track in place from collar to bottom. There are 2 small frame buildings, in a poor state of repair, at the mine, and 5 habitable cabins at the camp-site claim near Aravaipa.

GEOLOGY

The stratified rocks exposed in the Aravaipa district range from Precambrian to Quaternary and consist of schists, quartzites, limestones, arkosic sandstone, shales, and conglomerates. Granite and porphyries of rhyolite, andesite, and basalt intrude the Cretaceous and older rocks.

The granite occurs as a batholithic mass and the rhyolite, andesite, and basalt porphyries as irregular masses, dikes, and sills. Compressive stresses deformed the region, probably during post-Cretaceous to early Tertiary time, into broad open folds trending northwest to west and broken by faults of low to steep dip. Gravel, sand, and silt of Pliocene age is locally covered by thin alluvium of Quaternary age.

Carboniferous limestone was intruded and deformed by rhyolite porphyry in the area of the Sein Fein mine. The limestone-rhyolite porphyry contact in the area is irregular, sill-like, and in places complicated by post-intrusive faulting[4/].

A prominent fault (Fig. 2), trending northwest to west, courses through the rhyolite porphyry in the report area. The fault is traceable for several hundred feet southeastward over the Head Center claim and for an unknown distance westward over the Hoover Mine claim. The fault zone is brecciated and 10 or more feet wide. Dips at the surface range from 36° N. to 45° N. but flatten at depth to low angles ranging from 20° N. to 28° N. Owing to the low angles of dip, previous workers generally considered the fault to be of thrust origin[5/]. The fault is believed to be pre-mineral[6/] but with some later but not extensive movement along it. Ross[7/] noted that movement occurred along the faults

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4/ Wilson, E. D., Arizona lead and zinc deposits, Vol. XXI, Part I, 1950.
5/ Wilson, E. D., op. cit., 1950
6/ Wilson, E. D., op. cit., 1950
7/ Ross, C. P., Geology and ore deposits of the Aravaipa and Stanley mining districts, Graham Co., Arizona: U. S. Geol. Survey Bull. 763, 1925.

of the district during mineralization, as shown by brecciation of the deposits. Displacement of the hanging wall was probably mostly upward although there appears to be some evidence on slickensides of slight lateral movement. Underground workings show that the fault zone is irregular and curving with local variations in strike and dip common.

The ore deposits in the Sein Fein shaft and drifts are of the vein type, occurring in the upper part of the wide brecciated fault zone. Thickness of the vein ranges from less than an inch to about 5 feet and probably averages about 3 feet. Seams of gouge, or parallel gouge-filled fractures, occur within the vein. In places along the upper edge of the vein there are small open cavities lined with quartz crystals. Stope outlines indicate that the ore shoots were lenticular in shape, and that the back, or hanging wall side of the fault zone was their upper limit. The host rock throughout the mine is rhyolite porphyry.

The vein material at the Sein Fein mine was deposited in open-spaces, or as a fissure filling and there was apparently little alteration of the enclosing rock during deposition of the minerals. Wilson[8/] states "the primary ores were probably deposited by low-temperature ascending hydrothermal solutions along the fault zone in areas of favorable structures".

8/ Wilson, E. D., Op. Cit., 1950.

The primary ore minerals found in the Sein Fein shaft and drifts are galena, sphalerite, and some chalcopyrite and pyrite, in a quartz, calcite, and clayey iron oxide gangue. Applicant's settlement sheets show minor amounts of gold and silver. A chip character sample taken during the examination across 2.7 feet of mineralized material on the west side of the Sein Fein incline, between the 7th and 8th levels (Sample 15020, Fig. 3), assayed 12.2 percent Pb, 3.7 percent Zn, 0.67 percent Cu, 0.04 oz./ton Au, and 1.3 oz./ton Ag.

Oxidation of the galena and sphalerite has not been great, as Figure 3 shows that mining of these minerals began at rather shallow depths below the surface. Wilson[9/] found that the ore bodies along the fault, in the Head Center tunnel and shaft, carried oxidized minerals of zinc, lead, copper, iron, and manganese, in the zone of oxidation. Oxidized lead in the Head Center mine occurred as cerussite, and oxidized sphalerite as smithsonite. Chalcopyrite and pyrite apparently were completely removed in the upper shallow zone of oxidation, forming limonite. The oxides of copper, malachite and azurite, were observed at all depths in the Sein Fein mine and were probably derived from chalcopyrite.

Examination of the shaft and drifts of the Sein Fein mine showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc

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9/ Wilson, E. D., unpublished private report, 1942.

mineralization was present. The 6th level (Fig. 2) was driven for several hundred feet along the strike of the fault zone without encountering more than occasional occurrences of weak mineralization along its length, and the 8th and 9th levels did not contain significant occurrences of lead and zinc mineralization. An 8 to 9-inch width of lead and zinc mineralization exposed in the bottom of the incline might be an indication that more favorable conditions could be expectable with depth, or its presence might be only a local pocket of ore. Unfavorable areas along the fault zone between ore shoots in this type of deposit might characteristically display only occasional and weak mineralization. Without a detailed study of the deposits it would be difficult to set up criteria for predicting the presence or approach to new ore bodies.

Unverified information from an employee of the adjacent Head Center mine stated that present mining in the Head Center mine was in the deeper levels of the main ore shoot east of the shaft.

ORE RESERVES

Applicant states no ore reserves exist at present in the Sein Fein shaft and workings, which was verified by examination of the mine. A former operator, D. Nicholson, produced about 3,600 tons of ore from the mine over a two-year period in 1950 to 1952. His operations appear to have exhausted the mine of indicated as well as inferred reserves.

PROPOSED EXPLORATION

Applicant's Proposal

The originally proposed project of the applicant involved the following:

1,000 feet of underground diamond drilling at $5.00 per foot	$ 5,000.00
Sinking the inclined shaft an additional 300 ft. @ $42.00	12,600.00
300 feet of drifting to the west from the bottom of the shaft @ $31.00	9,300.00
Rebuilding of surface plant	7,550.00
Estimated total cost	$34,450.00

During the preliminary field investigations the applicant's representative requested withdrawal of the item of diamond drilling. The application was further amended November 28, 1956 when James F. Martin, president of the company, conferred with the examining team at Tucson. Mr. Martin said the company had decided to limit requested aid to participation in the costs of the 300 feet of each sinking and drifting. He also reported that the company would equip and rehabilitate the mine and be ready to start sinking the shaft probably by February 1,1957. Detailed estimated costs of all work were submitted by Mr. Martin. As shown below, the estimated total cost is $28,777.87, of which $6,311.01 is for new buildings and rehabilitations at company expense. The remaining $22,466.86, in which the company requests Governmental participation, is for the 300 feet of each shaft sinking and drifting at respective per foot costs of $41.74 and $33.15.

6 a. Independent Contracts:

None

6 b. Labor, Supervision and Consultants:

Rehabilitation of Surface Plant:

50 days:		
2 men @ $16.00/day		$1,600.00

Rehabilitation of Incline:

20 days:		
2 men @ $17.00/day	$ 680.00	
1 man @ $14.50/day	290.00	970.00

Sinking of Incline 300':

133 days (2.25'/day):		
2 men @ $17.00/day	$4,522.00	
1 man @ $14.50/day	1,928.50	6,450.50

Lower Level Drift, 300':

86 days (3.5'/day):		
2 men @ $17.00/day	$2,924.00	
1 man @ $14.50/day	1,247.00	4,171.00

Supervision:

11 months:

1 man @ $300.00/month (Part time)		3,300.00	$16,491.50

6 c. Operating Material and Supplies:

600' of 2" iron pipe @ .60¢	$ 360.00	
100' of 1" air hose @ .85¢	85.00	
100' of ½" water hose @ .50¢	50.00	
250 3' ties @ .48¢ ea.	120.00	
5000 board feet lumber @ $80./1000	400.00	
6,360 lbs. of 16# rail @ 273.20/ton	868.78	
200 lbs. of rail spikes @ $30./100 lbs.	60.00	
Small tools	100.00	
Assorted pipe fittings	150.00	
600' of 12' vent tubing @ $1.25/ft.	750.00	
	$2,943.78	
Less 1/2 for salvage value	1,471.89	$1,471.89

6 c. Operating Material and Supplies - Cont'd

100 cases dynamite @ $11.00/case	$1,100.00		
25 boxes dynamite caps @ $2.00/box	50.00		
12,000' fuse @ $47./3000'	188.00		
3,400 gal. diesel fuel @ .18½/gal.	629.00		
1,000 gal. gasoline @ .28½/gal.	285.00		
10 carbide lamps @ $2.50	25.00		
350 lbs. carbide @ .08/lb.	28.00		
8 picks @ $3.25	26.00		
10 shovels @ $4.65	46.50		
3 6# double jacks @ $2.50	7.50		
50 pieces 4' steel @ $7.55	377.50		
400 throw-away bits @ .25/bit	100.00	$2,862.50	$ 4,334.39

6 d. Operating Equipment:	Cost		11 Months Depreciation
1-315 Ingersoll Rand Compressor	$3,000.00		
1-Chicago Pneumatic stoper	150.00		
1-Thor air drill and leg	750.00		
1-Gardner-Denver slusher	1,200.00		
1-20" slusher bucket	150.00		
1-1 ton skip	400.00		
1-2 ton hoist	2,500.00		
3-1 ton mine cars @ $100.00	300.00		
1-½ ton pick-up	1,500.00	$9,950.00	$ 1,824.13
6 e. Rehabilitation and Repairs:			
Compressor repair	$ 500.00		500.00
6 f. New Buildings, Improvements, Installations:			
1000' hoist rope	$ 500.00		
6000 board feet lumber @ $80./1000	480.00		
Sheave	75.00		
Fuel tank and fittings	50.00		
Bell	25.00		
Miscellaneous nails, bolts, fittings, etc.	500.00		
4 cu. yd. gravel @ $2.00	8.00		
4 sacks cement @ $1.80	7.20		
Freight	650.00	$2,295.20	
Less 1/2 for salvage value		1,147.60	1,147.60
6 g. Miscellaneous:			
Accounting @ $100./mo.	$1,100.00		
Liability insurance	1,000.00		
Social Security	336.80		
Workmen's Compensation	1,288.25		
Unemployment Compensation	505.20		
Travel - mine to supply point 5000 miles @ .05/mile	250.00		4,480.25
			$28,777.87

Unit Cost Breakdown:	Rebuilding	300' Incline	300' Drift
6 b. Labor and supervision	$3,170.00	$ 7,950.50	$5,371.00
6 c. Operating materials	-	2,167.19	2,167.20
6 d. Operating equipment	-	912.07	912.06
6 e. Rehabilitation and repairs	500.00	-	-
6 f. New buildings, improvements	1,147.60	-	-
6 g. Miscellaneous	1,493.41	1,493.42	1,493.42
	$ 6,311.01	$12,523.18	$ 9,943.68

Unit Costs:	
Rebuilding and rehabilitation	$ 6,311.01
300' Incline	41.74/foot
300' Drift	33.15/foot

Examining Team's Proposal

The examining team proposal is essentially the same as the applicant's. It provides for sinking the shaft an additional 300 feet and for drifting 300 feet from a station at 280 to 290 feet from the present bottom of the shaft. The 10 to 20 feet of shaft below the station is for a sump of a depth to be determined by conditions encountered. The shaft shall have a minimum cross section of 5 feet high by 7 feet wide and shall be timbered where necessary. It shall follow, as close as practicable, the potential ore zone along the fault. The drift shall be driven to a minimum cross section of 5 feet wide by 7 feet high in the clear of necessary timber. Prior approval for driving the drift will be necessary since the direction to be followed will be determined by findings in the shaft.

All mineralized zones encountered shall be channel sampled at 5-foot intervals and all samples shall be analysed chemically for lead, zinc and copper. Each tenth sample or a composite of 10 samples shall be assayed for gold and silver.

The estimated total costs of the project are as follows:

300 feet of shaft @ $41.74 per foot		$12,522.00
300 feet of drift @ $33.15 per foot		9,945.00
Assaying		
60 samples for lead, zinc and copper @ $5.25 each	$315.00	
6 samples for gold and silver @ $2.50 each	15.00	330.00
Total estimated costs		$22,797.00

The unit costs of shaft sinking and drifting are those proposed by the applicant. The costs are acceptable because they reportedly are recently attained actual costs. They are materially lower than the examining engineers' following estimated costs for performance of the work under average conditions.

Labor, Supervision and Consultant

Daily operations to consist of 2 shifts daily instead of proposed single shift.

Sinking shaft 300 feet.

75 days @ 4 feet per day

4 men @ $17.00 per day	$5,100.00	
3 men @ $14.50 per day	3,262.50	$ 8,362.50

Drifting 300 feet

50 days @ 6 feet per day

4 men @ $17.00 per day	$3,400.00	
3 men @ $14.50 per day	2,175.00	5,575.00

Supervision

5 months @ $500.00 per month	2,500.00
Total labor and supervision	$16,437.50

Operating Material and Supplies

Applicant's $2,943.78 less 3/4 for salvage value	$2,207.83	
Applicant's non salvagable	2,862.50	5,070.33

Operating Equipment

Depreciation allowance of 5/60 of applicant's $9,950.00	829.17

Miscellaneous

Repairs to equipment	$ 200.00	
Accounting 5 months @ $50.00/mo.	250.00	
Taxes and insurance, 15 percent of $15,687.50	2,353.13	2,803.13
Estimated total cost of project		$25,140.13

Unit Cost Breakdown	300-foot shaft	300-foot drift
Labor and supervision	$ 9,862.50	$6,575.00
Operating materials	2,535.16	2,535.17
Operating equipment	497.50	331.67
Miscellaneous	1,681.88	1,121.25
Estimated total costs	$14,577.04	$10,563.09
Estimated cost per foot	$48.59	$35.21

CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that mineralogic and structural features exposed in the Sein Fein Mine appear unfavorable. All minable reserves have been exhausted from the mine, and exploration work by the former and present operators in driving of the 6th and 8th levels along the fault zone encountered only occasional and weak mineralization. Inasmuch as this type of ore body is an open space filling, the fault zone in most of the Sein Fein Mine apparently was unfavorable, in general, to deposition of any sizable ore body. However, the unfavorable conditions exposed do not preclude the possible presence of additional ore bodies along the Sein Fein fault zone in more favorable areas as, for example, at depth, or elsewhere along the strike of the fault zone. Present ore bodies apparently have barren areas, or areas of only occasional and weak mineralization between them. There does not appear to be any conclusive criteria for determining with certainty the presence or approach to an ore body.

Although present conditions appear to be unfavorable in the Sein Fein workings, there is a possibility that more favorable geologic conditions and a significant body of ore might be encountered by the exploration proposed, that is, by driving the incline downward along the dip of the fault zone and by drifting along the strike of the fault zone. Therefore, Government aid is recommended in a proposed project involving 300 feet of each shaft sinking and drifting, at an estimated total cost of $22,797.00. The applicant can be expected to finance 50 percent of the estimated cost of the project and to complete the proposed explorations in an efficient and acceptable manner.

500

Denver, Colorado

DMEA, Bureau of Mines

[redacted]

Docket Klugerthorn Betty

W. R. Storms, USBM
Tucson, Arizona

December 4, 1956

Please advise when we may expect to receive reports of examination on Dockets DMEA 4277, Cordillera Mining Company and DMEA 4343, Tomb Minerals Corporation.

Original signed by
W. M. TRAVER
W. M. Traver

CONFIRMATION
WMT:jy
cc: Barnhman (2)
Emerick (2)
Sec. Op. Comm. (4)
Docket 4343
Docket 4277
Chron

RECEIVED DEC 6 1956 DMEA

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DMEA
DEPARTMENT OF THE INTERIOR
OCT 31 1956
REGION II
DENVER, COLORADO

October 29, 1956

Air Mail

Mr. James F. Martin, President
Cordillera Mining Co.
Box 664
Grand Junction, Colo.

Re: Docket DMEA-4277,
Sein Fein Lead-Zinc Mine
Graham County, Ariz.

Dorset

My dear Mr. Martin:

As you know, the Sein Fein mine was visited by the field examiners on October 11 in company with Mr. Spencer, who unfortunately, was not familiar with the property or with the details of the application. In writing the report, the DMEA examiners find that they have insufficient data to substantiate the estimated cost of the proposed exploration.

The DMEA Operating Committee has advised us as follows: "There should always be in the Washington docket file of any unit-cost contract, a statement showing a breakdown of the estimated costs upon which agreed unit costs are based. This statement should be in as much detail as if the contract were to be written on an actual-cost basis. The estimated costs should take into consideration the probable salvage value of equipment and nonexpendables, such as pipe, track, etc., purchased for the work."

It is our understanding that your Dean Nicholson has withdrawn the item of underground drilling from the application. Thus the unit-cost phase of the project now consists only of sinking and drifting.

Relative to your item of use-allowance (7-b), it is not the practice of DMEA to pay rental on applicant-owned equipment, but depreciation of such equipment will be allowed, based on an estimated 5-year life, that is, at 1/60 of the equipment value per month of use. In regard to rebuilding the surface plant (item 6-f), we note there is a capital investment required in the purchase of a hoist and necessary accessories. This would require a long form (actual-cost) contract which entails a considerable amount of detailed bookkeeping, monthly cost auditing, review of purchase orders, and strict adherence to

CC W. M. Traver
W. L. Emerick
DMEA-4277
DF

LAStewart:frj

purchase only of items listed in the approved contract. In addition, the Government acquires a 50 percent equity of items purchased, the value of which would have to be repaid to DMEA by sale of the equipment at the completion of the project.

It usually is preferable for both the operator and the Government to work out an agreed unit-cost contract. It would appear to be to your advantage to recalculate the unit cost of sinking and drifting, taking into account all items of your original application. Your calculation should show a detailed break-down of the items of cost, such as labor (including payroll taxes, liability, compensation, etc.), depreciation of capital equipment, supplies, and any other items which you feel should be charged to the project. For our checking purposes it will be necessary that we know the size and estimated present value of the compressor, drills, and truck, as well as the size of the hoist which you have estimated to cost $2,500. We will need the labor scale you expect to pay to the various types of labor required, your estimated daily footage advance in sinking and drifting, and whether you will work one or two shifts daily.

The usual procedure is for the DMEA examiners and the applicant to meet and discuss these details in order to arrive at an agreed unit cost and the amount of work to be done. If possible, we would suggest that you send a man to Tucson who has the authority to discuss these matters with the examiners and to amend your original application, if necessary.

Sincerely yours,

Signed by Walter R. Storms

Walter R. Storms
Superintendent
Southwest Experiment Station

DMEA
Date Rec'd.

JUL 9 1956

BUREAU OF MINES
Denver, Colorado

Docket

Acknowledged
Betty

July 6, 1956

Memorandum

To: W. R. Storms

From: Superintendent, Denver Experiment Station, Reg. III

Subject: Docket DMEA 4277 (Lead-Zinc), Cordillera Mining Company, (Sein Fein Mine), Graham County, Arizona

Enclosed please find the application for Cordillera Mining Company, DMEA 4277, in the amount of $34,450.00.

A field examination and suitable report are required. The completed report should be forwarded directly to the Executive Officer with a copy of the memorandum of transmittal to this office.

JOHN F. SHAW

John F. Shaw

Enclosure

cc: W. M. Traver (3)
W. L. Emerick
Sec. Op. Com (2)

RECEIVED
JUL 12 1956

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

RECEIVED
JUL 5 - 1956

July 2, 1956

224 New Customhouse
Denver 2, Colorado

Memorandum

To: J. F. Shaw (2) (With brochure)
W. L. Emerick

From: Field Team, Region III

Subject: Docket DMEA 4277 (Lead-Zinc) Cordillera Mining Company, (Sein Fein Mine), Graham County, Arizona

Enclosed is the subject application in the amount of $34,450.00. A field examination and suitable covering report are requested.

Your attention is called to the covering letter submitting the application to the Executive Officer for a field examination and also memoranda by H. E. Nelson, Geological Survey, and O. M. Bishop, Bureau of Mines relating to the application.

Please return the brochure to this office with your Report of Examination.

DMEA Field Team, Region III

W. M. TRAVER,

By W. M. Traver
Executive Officer

Enclosures

WMT:ab

cc: Chair. Op. Comm. (2)
Docket 4277
Harshman w/copy of material
Chron.

File Copy
Surname
Klugescheid.
Selfridge.

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

500

JUN 27 1956

Mr. W. M. Traver
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Bldg.
Denver 2, Colorado

Re: Docket No. DMEA-4277 (Lead-Zinc)
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

Dear Mr. Traver:

The cited application for exploration assistance is being referred to your office for consideration, a field examination of the property if warranted, and recommendation.

If the project is favorably considered by the Field Team it will be necessary to obtain a map showing all of the claims which are mentioned in the application. The projected drift, at the bottom of the shaft extended, would appear to run off the Applicant's property unless the other claims are located in that vicinity. The company has also failed to mention the size of drill holes it intends to drill as well as the sizes of the exploration headings it plans to drive.

Copies of memoranda dated May 9, and June 11, 1956, by N. E. Nelson, Geological Survey, and O. M. Bishop, Bureau of Mines, respectively, relating to the project are enclosed for your information.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GCS)

WPKlugescheid/er 6/25/56
Copy to: Docket
Admr & File
Op. Committee
Base metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Chron.

Enclosures

APPROVED:

P. F. Yopes (GCS)
Member, Bureau of Mines

Thor H. Kiilsgaard (GCS)
Member, Geological Survey

R.C.

File Copy
Surname
Klugescheid
Simmons
Yager
Kiilsgaard
Selbridge
Fellstrom

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

JUN 27 1956

Mr. James F. Martin, President
Cordillera Mining Company
Post Office Box 664
Grand Junction, Colorado

Re: Docket No. DMEA-4277 (Lead-Zinc)
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

Dear Mr. Martin:

Your application for Government assistance to explore the cited property has been reviewed by the Base Metals Division of the Defense Minerals Exploration Administration and has been referred to:

Mr. W. M. Traver
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

If the Field Team requires additional information concerning your application, they will contact you at an early date.

Sincerely yours,

C. O. Mittendorf

Administrator

WPKlugescheid/er 6/25/56
Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Region III (2)
Chron.

R.G.L.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

Klugescheid

June 11, 1956

Re: DMEA-4277, Lead,
$34,450
Cordillera Mining Co.,
Sein Fein Mine,
Graham County, Arizona

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop, USBM

Subject: Review of application

The applicant requests assistance in exploration consisting of deepening an incline shaft, drifting and diamond drilling.

The proposed work would explore an ore structure which yielded 3,600 tons of good lead-silver-gold ore in 1950-52, and as such warrants an examination to determine the merit of the proposed work.

I recommend that the application be referred to the Field Team for examination.

O. M. Bishop

O. M. Bishop

Copy to - Mr. Kiilsgaard, Room 5224
Mr. Geehan
Division of Minerals
O. M. Bishop
Files

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
MAY 9 - 1956

May 9, 1956

Re: DMEA 4277
Cordillera Mining Co.
Sein Fein Mine
Graham County, Arizona
$34,450.00 - Lead

Memorandum

To: W. R. Griswold, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of application.

The applicant requests assistance in replacing mine plant damaged by fire, deepening an incline shaft, drifting and diamond drilling.

The proposed underground work and drilling would explore a vein-fault zone from which, during 1950, 1951 and 1952, 3,631.1 tons of good grade lead-silver-gold ore was mined. No ore remains and shaft work and drifting apparently have failed to find more ore.

If the Map No. 2 is correct, it with the information in the Heikes' report concerning the Head Center mine suggest more work in the Sein Fein mine is warranted. As given in the list of claims, page 1, and as shown on Map 1, the Wild Cat claim is part of the Sein Fein property and much of the Head Center mine is in that claim. For reasons not given the west headings from the Athletic Shaft from the surface to the 13th level are short. That untoward rock conditions exist may be inferred. More geologic data are needed.

Referral of the application to the Field Team for appropriate action is recommended.

N. E. Nelson

N. E. Nelson

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

April 30, 1956

224 New Customhouse
Denver 2, Colorado

RECEIVED
MAY 2 - 1956

Mr. James F. Martin, President
Cordillera Mining Company
P. O. Box 664
Grand Junction, Colorado

Re: Application for DMEA Aid (Lead)
(Sein Fein Mine), Graham County,
Arizona

Dear Mr. Martin:

This will acknowledge receipt of your letter dated April 13, 1956 and four copies of the captioned application. Your application has been placed in line for further processing.

Yours very truly,

W. M. TRAVER,

W. M. Traver
Executive Officer, DMEA
Field Team, Region III

HMC:ab

cc: Docket
Chair. Op. Comm. (2)
Harshman
Storms
Chron.

May 7, 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number

There is listed below the assigned docket number to an application recently received from Region III.

DMEA
4277 Cordillera Mining Company

Robert E. Adams
Chief, Operation's Control
and Statistics Division

Subject: DMEA NO. 4277
Re: Sein Fein Mine

The receipt of your application dated April 27, 1956 for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number 4277 and referred to the Base Metals Division.

Kindly identify all future correspondence relating to your application by this docket number.

Sincerely yours,

Robert E. Adams, Chief
Operations Control and
Statistics Division

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

EXTRA COPY
DMEA
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DATE	INITIALS	CODE
2-1	MPK	500

224 New Customhouse
Denver 2, Colorado

January 28, 1957

Memorandum

To: Chairman, Operating Committee, DMEA

From: DMEA Field Team, Region III

Subject: DMEA Docket 4277 (Lead-zinc), Cordillera Mining Company (Sein Fein mine), Graham County, Arizona

Your letter of January 18, 1957, regarding proposed exploration at the Sein Fein mine has been reviewed as have the copies of the memorandum of Bishop and Nelson attached thereto.

We all agree that future work at the Sein Fein mine must be directed toward finding a new ore shoot since extensions of the Sein Fein ore shoot (if any) would lie near or beyond the boundary of the property controlled by the applicant. Mineralized or ore-grade material has been mined in the small stope between the 6th and 7th levels, sampled by the examiners at a point in the shaft between the 7th and 8th levels, and noted in the bottom of the shaft. Exploration below the small stope and below the ore occurrence in the shaft between the 7th and 8th levels has proven beyond a reasonable doubt that these two occurrences do not represent the top of a significant ore shoot. We therefore conclude that the mineralized material in the bottom of the shaft represents another small lens of mineralized material, and that exploration at deeper levels cannot be justified on the basis of this exposure.

In our memorandum of December 31, 1956, transmitting the examination report to you, we stated that we would concur in a small project to explore laterally from the bottom of the present shaft. After a review of the comments of O. M. Bishop and N. E. Nelson and a reappraisal of the ore potential of the lower levels of the Sein Fein mine, we conclude that additional work, with DMEA assistance, cannot be justified by the available data. We therefore recommend

Reviewed by
DMEA OPERATING COMMITTEE
2/4/57
(date)

that the application be denied without prejudice. Should work by the applicant indicate the presence of significant exploration targets, a new application would receive favorable consideration.

DMEA Field Team, Region III

W. M. Traver

E. N. Harshman

Copy to: Chairman (3)
Harshman
Storms
Emerick
Chron.
Docket

ENHarshman:arh

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

EXTRA COPY
DMEA
RECEIVED JAN 11
DATE | INITIALS | CODE

January 10, 1957

Re: DMEA 4277; Lead-Zinc; $22,797
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop, Branch of Base Metals

Subject: Field Team Report of December 31, 1956 received January 1, 1957

The applicant company proposes rebuilding surface equipment destroyed by fire in 1955, sinking of an inclined shaft 300 feet on the vein, drifting 300 feet westerly on the vein from the bottom of the shaft, and drilling 1,000 feet of bore hole.

The field examiners note a production of about 4,200 tons since 1948; the ore averaging about 17 percent lead, with 0.22 ounces of gold and 2.26 ounces of silver per ton. The ore occurred as lenses up to 5 feet wide in the upper or hanging wall side of a brecciated fault zone which trends northwesterly and dips from 45° to 20° to the northeast and traverses rhyolite porphyry.

The examiners write, "Examination of the shaft and drifts.... showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc mineralization was present." They also write that the 8th and 9th levels contained no significant mineralization and the 6th and 7th encountered only minor orebodies. An 8- to 9-inch ore showing in the bottom of the incline just below the 9th level is said to be a possible indication of more ore.

No structural or other geologic evidence is given to warrant further exploration nor is there any analyses of the 8- to 9-inch lead-zinc mineralization mentioned at the bottom of the incline.

I recommend denial of the application without prejudice, to any worthwhile program that may be proposed in the future.

O. M. Bishop

O. M. Bishop
Commodity Specialist
Branch of Base Metals

Copy to - Division of Minerals
Mr. Kiilsgaard, Rm. 5222
Mr. Lamb, Rm. 3608
Branch of Base Metals (2)
Files

EXTRA COPY
D M E A
RECEIVED 1957
DATE | INITIAL | CODE

January 7, 1957
Re: DMEA 4277
Cordillera Mining Company
Sein Fein Mine
Graham County, Arizona
Applicant's Estimate $34,450.00
Recommended Estimate $22,797.00
Lead-zinc

Memorandum

To: W. L. Griswold, Defense Minerals Exploration Administration

From: A. L. Nelson, U. S. Geological Survey

Subject: Review of Field Team Report

The applicant requested assistance in replacing mine plant, deepening an incline, drifting and diamond drilling. The examiners recommend a work program consisting of 300 feet of shaft (incline) sinking and 300 feet of drifting near the bottom of the shaft extended. The underground work would be far below the lowest known important ore shoot. The Field Team questions the propriety of Government participation in the work proposed by the examiners.

The small ore shoots of the Sein Fein mine and the larger ones of the adjoining Head Center mine occur in a pronounced fault zone in rhyolite. As shown on the map, Fig. 2, the fault has an almost east-west strike across the narrow dimension (600'), of the claim (Hoover) which contains the Sein Fein mine. Near the easterly side line (the legal end line) of the claim the strike appears to change abruptly to N 45° E. The change in strike may be more apparent than real. No contours are shown and the topography may account for the angle in the trace of the fault. Such a change in strike might account for the 13 short west levels off the Head Center shaft, but again the lack of information makes the inference mere conjecture.

The positions of the ore shoots of the two mines and the comparatively extensive non-productive drifting and shaft sinking in the Sein Fein mine suggest the Head Center shaft is more or less in the center of the trend of mineralization, and most of the deep work in the Sein Fein mine, actual and proposed, tends to diverge from the assumed trend line. Also the long unproductive 6th level west from the Sein Fein shaft tends to discount the proposed shaft extension and drift.

The examiners mention an 8 to 9-inch lead-zinc mineralization in the bottom of the Sein Fein shaft. As it was not sampled and the

9th level drift is short, I presume the showing is not too promising. Otherwise it would have been followed up.

As judged from the information afforded by the maps, the area ahead of the 8th level east and the area in the northeast corner of the claim (Hoover) are more favorable for prospecting, which it would be, than the area to be prospected by the proposed work. Unless already topped the next crosshoot might extend into the Hoover claim.

Like the Field Team I do not concur with the proposal of the examiners, but I have no adequate alternative. However, I would concur with a limited staged work program as suggested by the Field Team.

N. E. Nelson

N. E. Nelson

cc: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
Chron. file
C. M. Bishop, 3617
NENelson:pbb
G: 1/7/57

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

June 11, 1956

Re: DMEA-4277, Lead,
$34,450
Cordillera Mining Co.,
Sein Fein Mine,
Graham County, Arizona

Memorandum

To: W. R. Griswold, DMEA

From: O. M. Bishop, UMRM

Subject: Review of application

The applicant requests assistance in exploration consisting of deepening an incline shaft, drifting and diamond drilling.

The proposed work would explore an ore structure which yielded 3,600 tons of good lead-silver-gold ore in 1950-52, and as such warrants an examination to determine the merit of the proposed work.

I recommend that the application be referred to the Field Team for examination.

O. M. Bishop

O. M. Bishop

Copy to - Mr. Kiilsgaard, Room 5224
Mr. Geehan
Division of Minerals
O. M. Bishop
Files

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
MAY 9 - 1956

May 9, 1956

Re: DMEA 4277
Cordillera Mining Co.
Sein Fein Mine
Graham County, Arizona
$34,450.00 - Lead

Memorandum

To: W. R. Grimwald, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of application.

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If the Map No. 2 is correct, it with the information in the Heikes' report concerning the Head Center mine suggest more work in the Sein Fein mine is warranted. As given in the list of claims, page 1, and as shown on Map 1, the Wild Cat claim is part of the Sein Fein property and much of the Head Center mine is in that claim. For reasons not given the west headings from the Athletic Shaft from the surface to the 13th level are short. That untoward rock conditions exist may be inferred. More geologic data are needed.

Referral of the application to the Field Team for appropriate action is recommended.

N. E. Nelson

N. E. Nelson

NENelson:iml
G-5/9/56
cc: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
O. M. Bishop, 3617

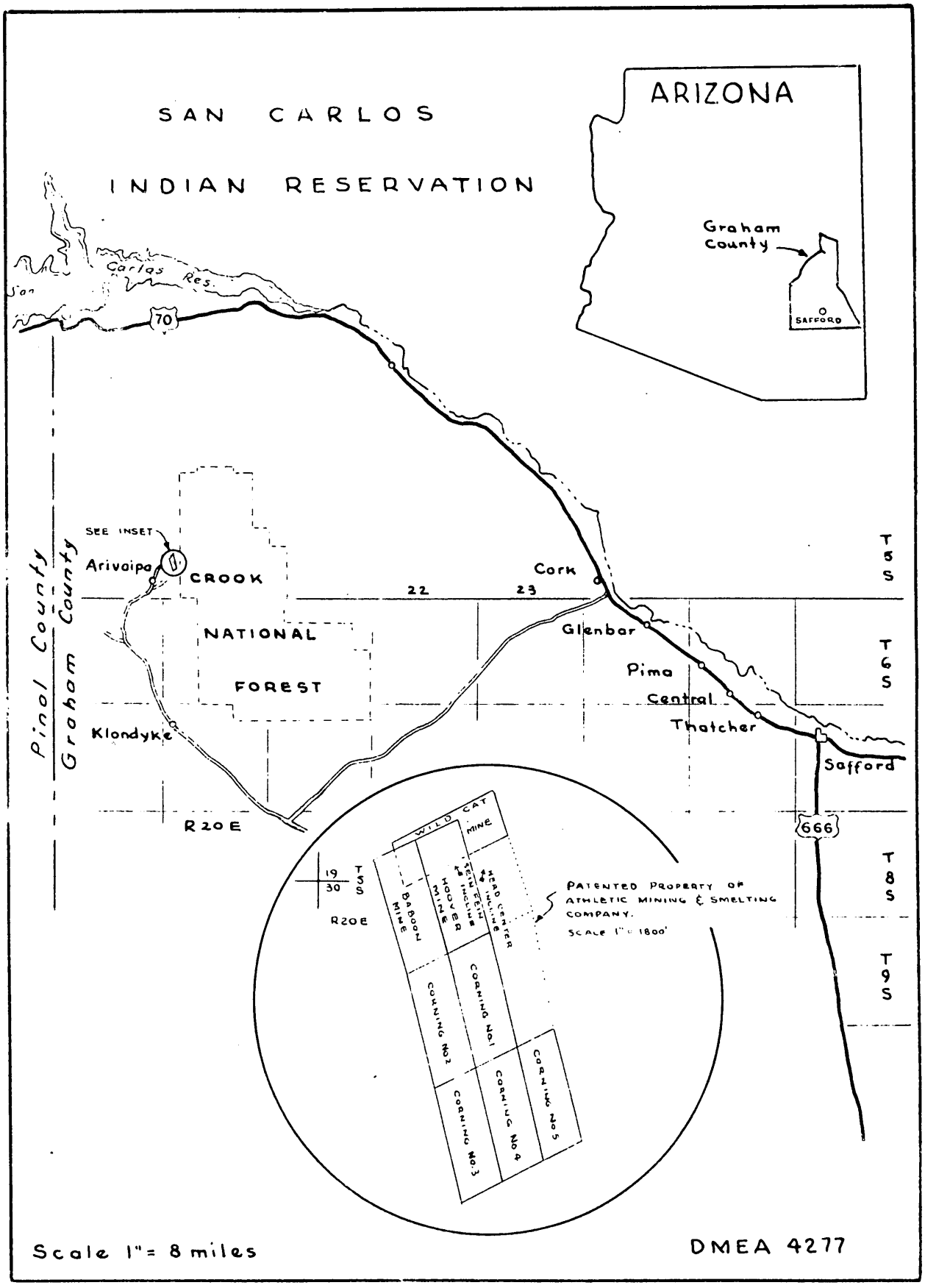
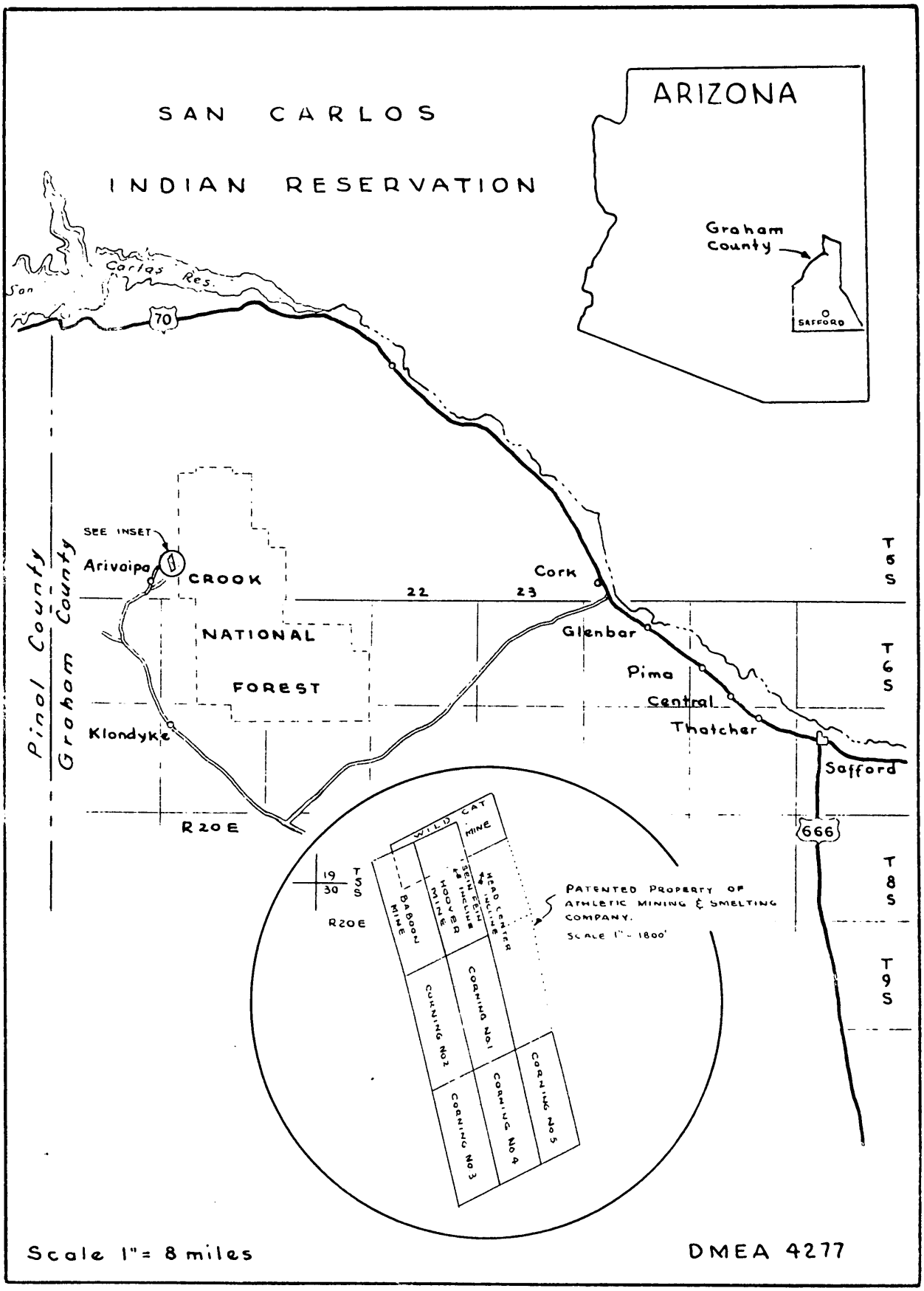


FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.



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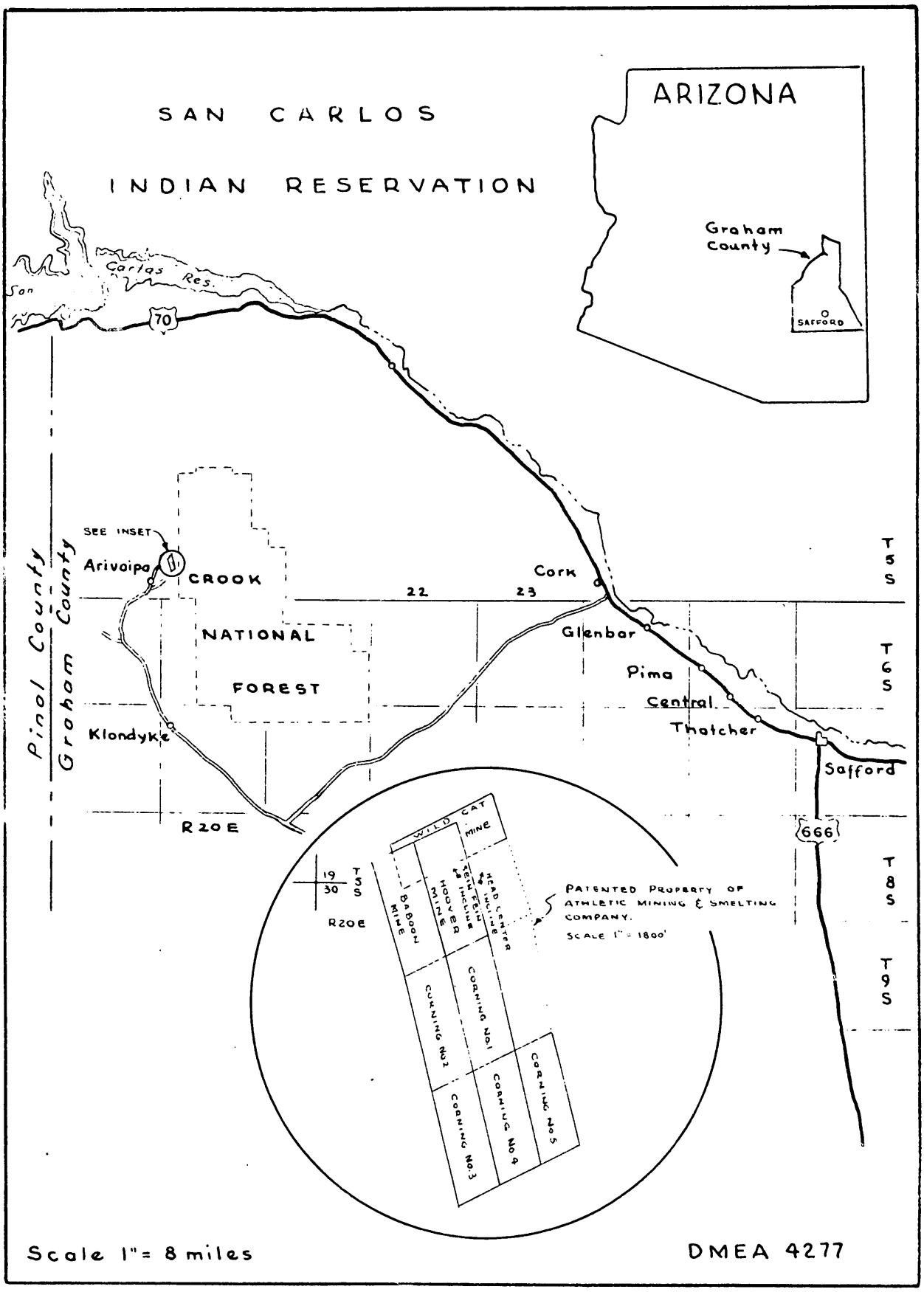

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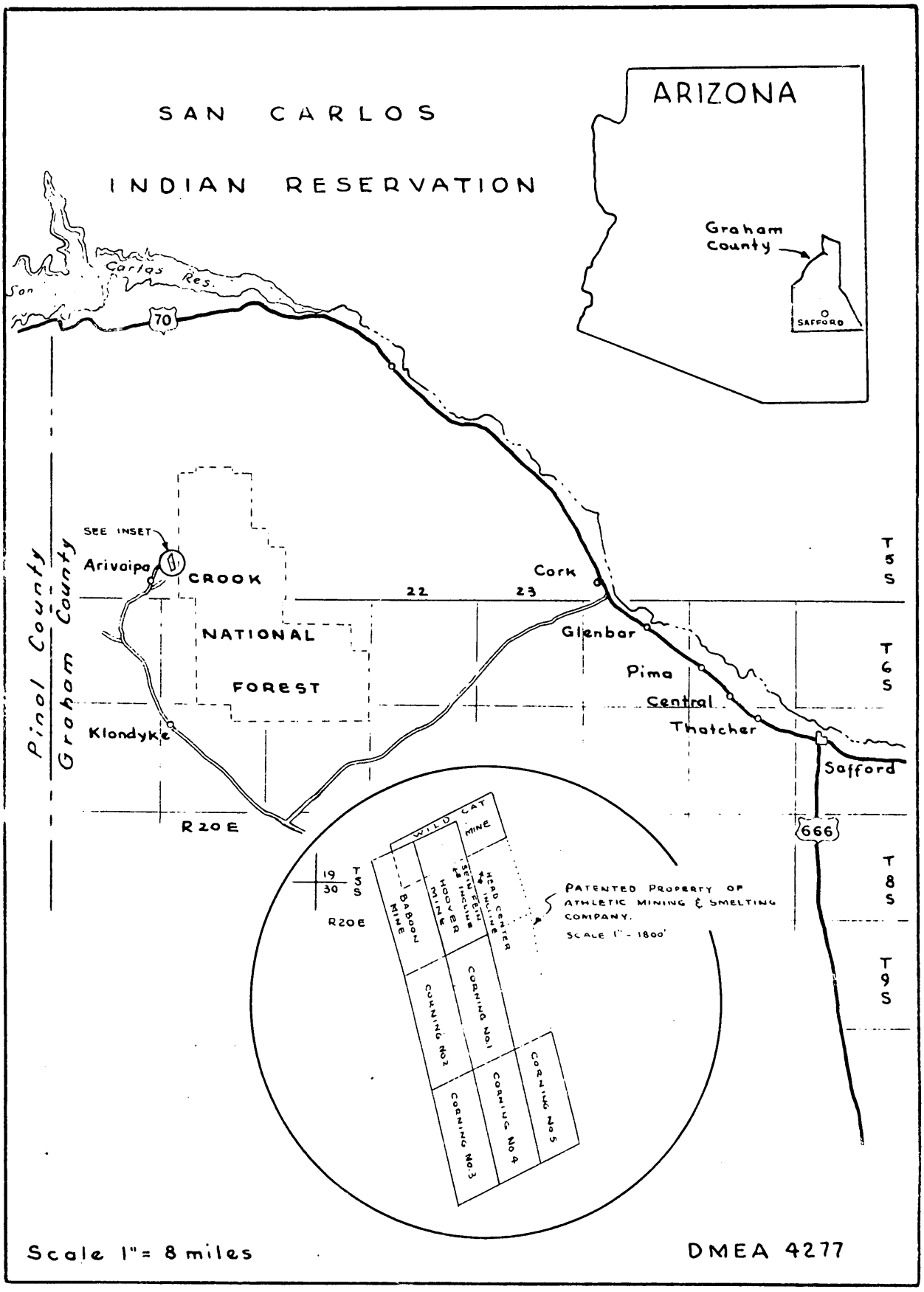
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.



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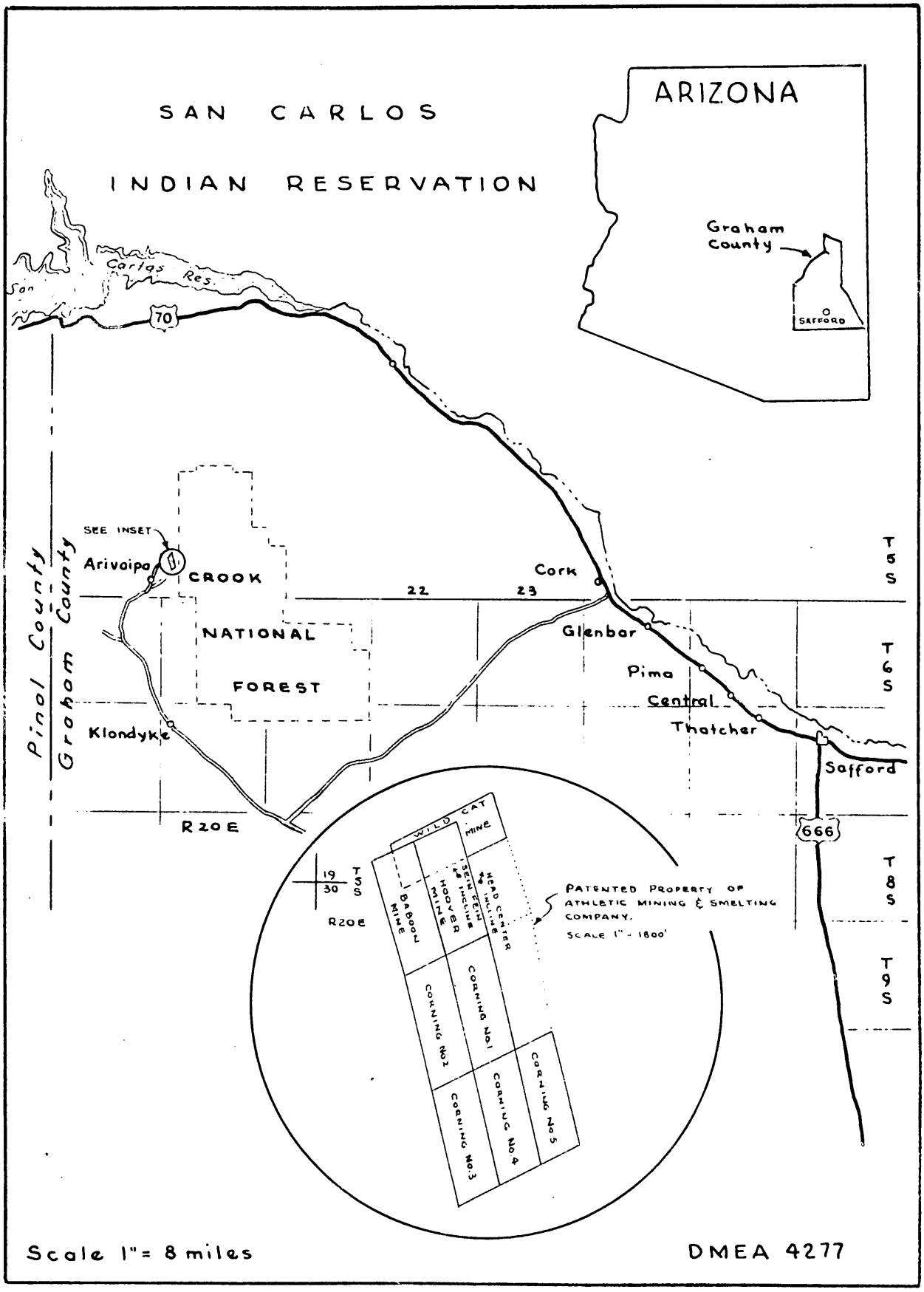
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.



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SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

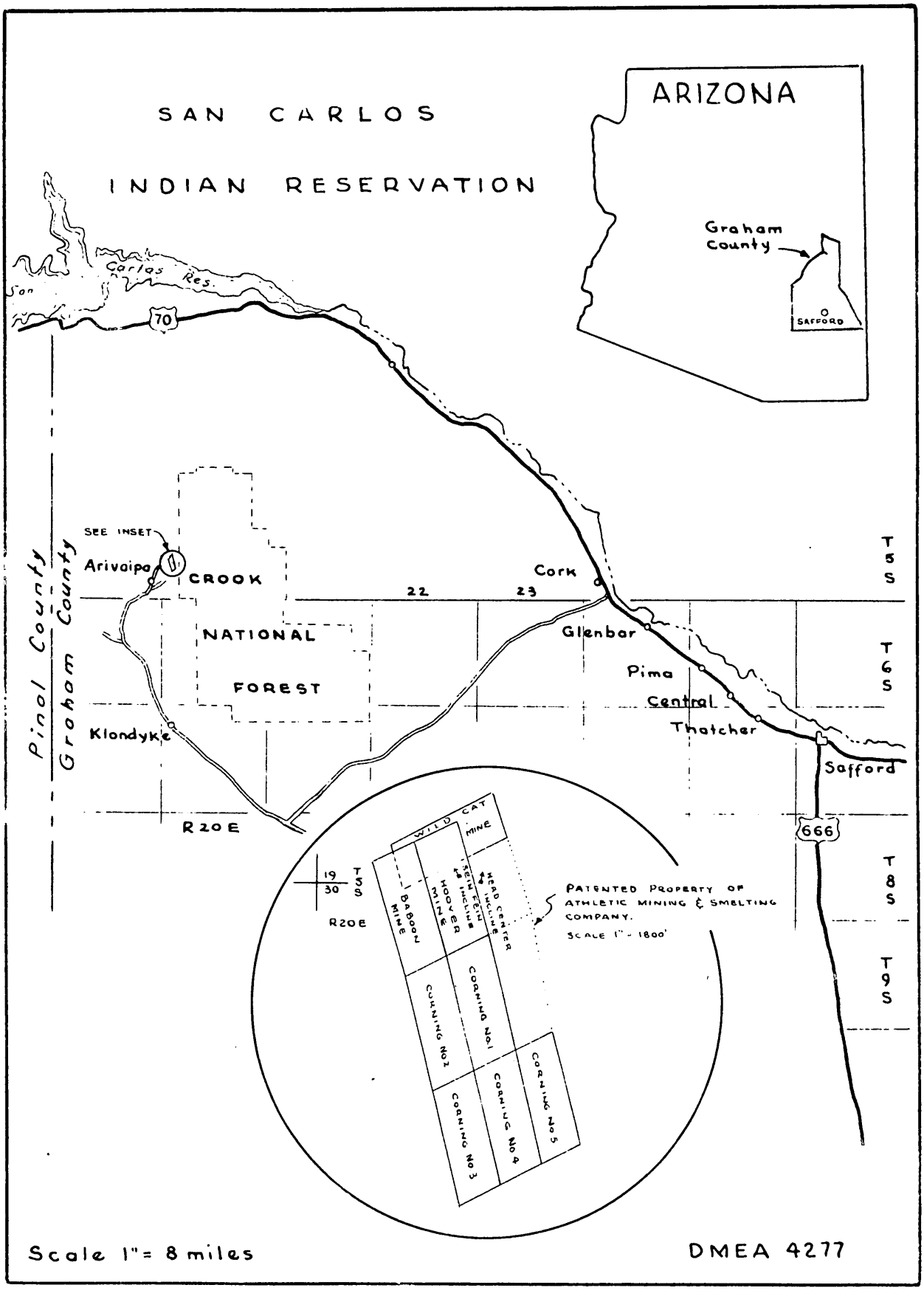

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

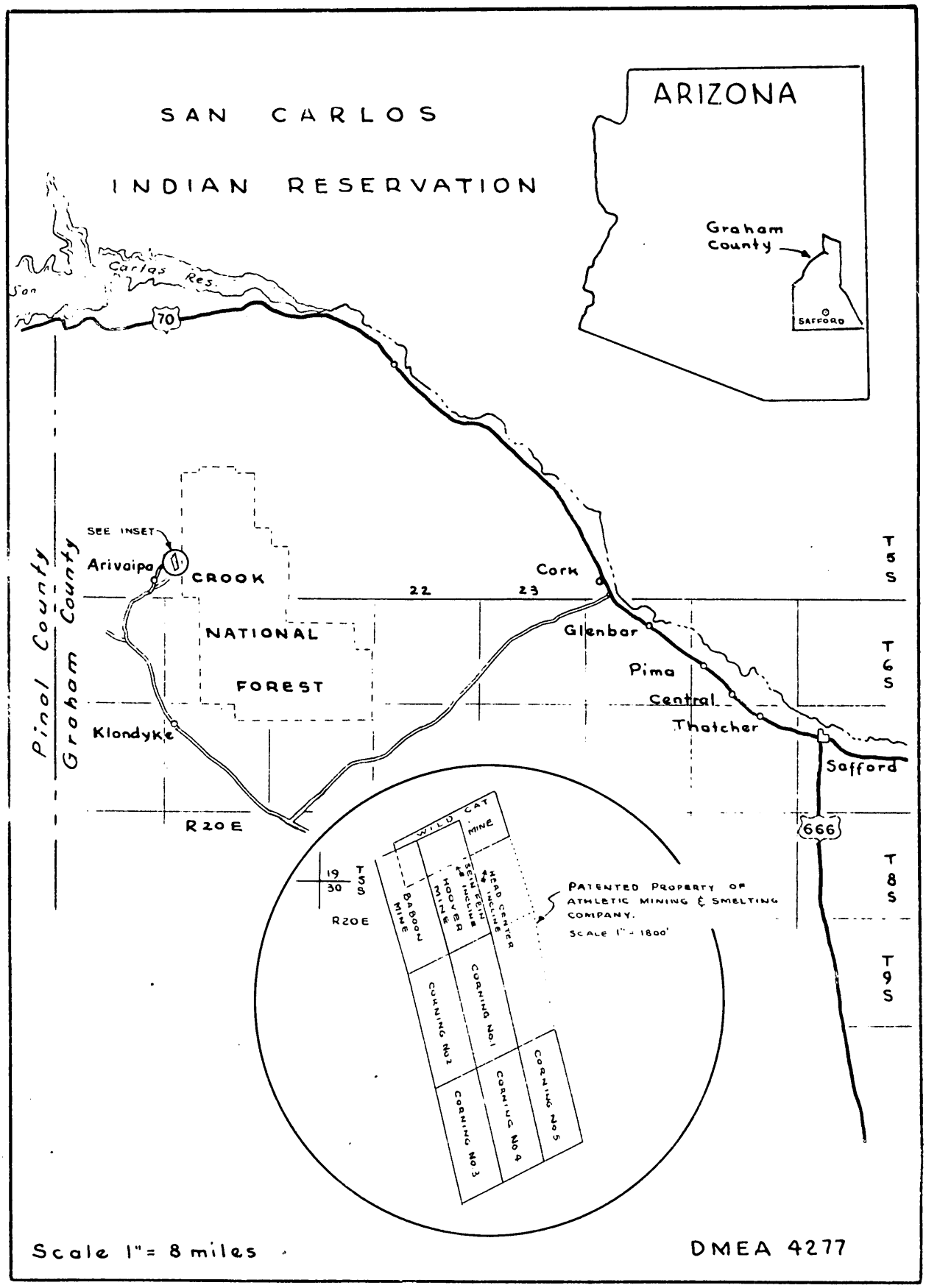

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

JAN 15 1951

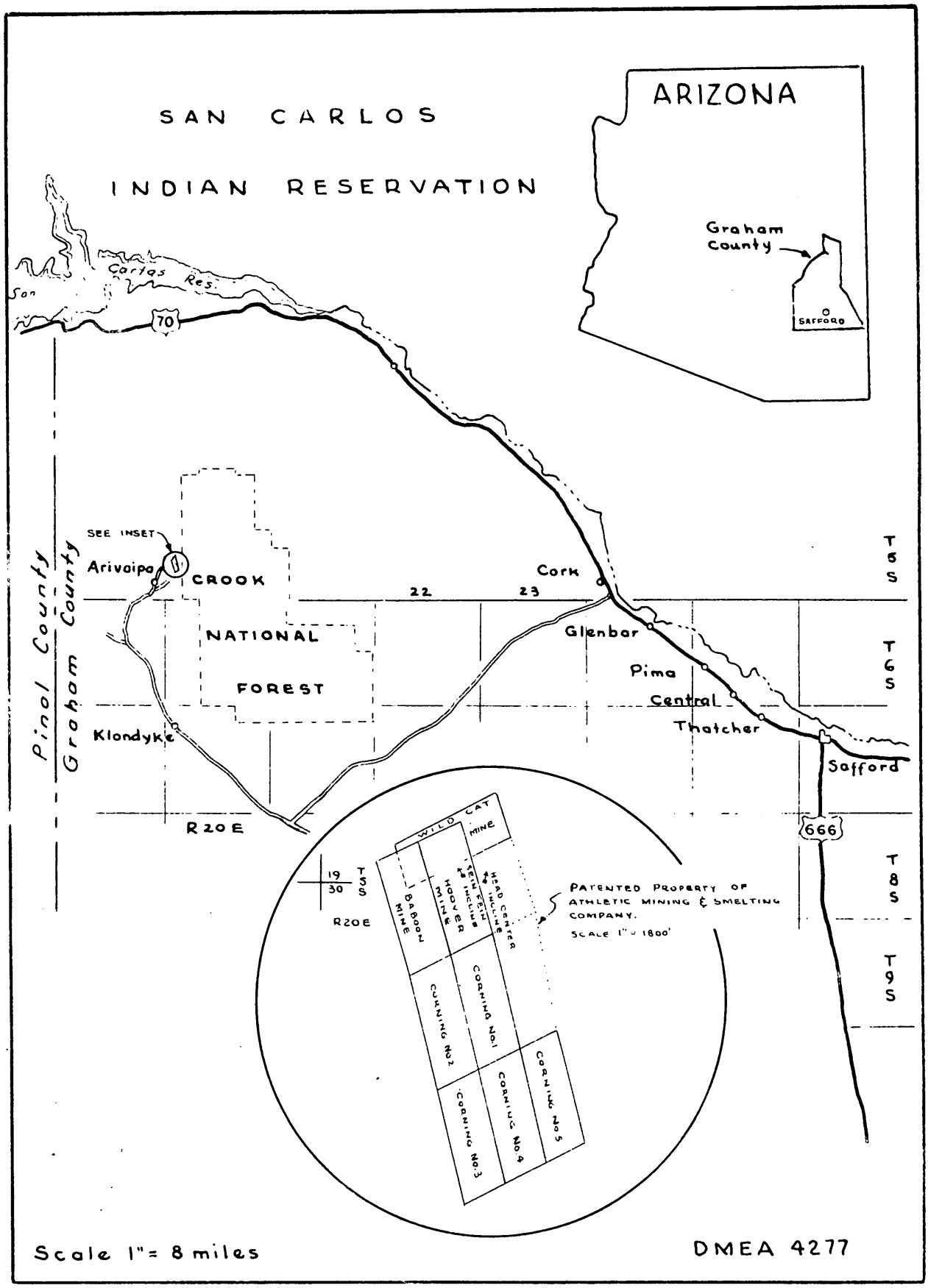

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

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JAN 23 1957

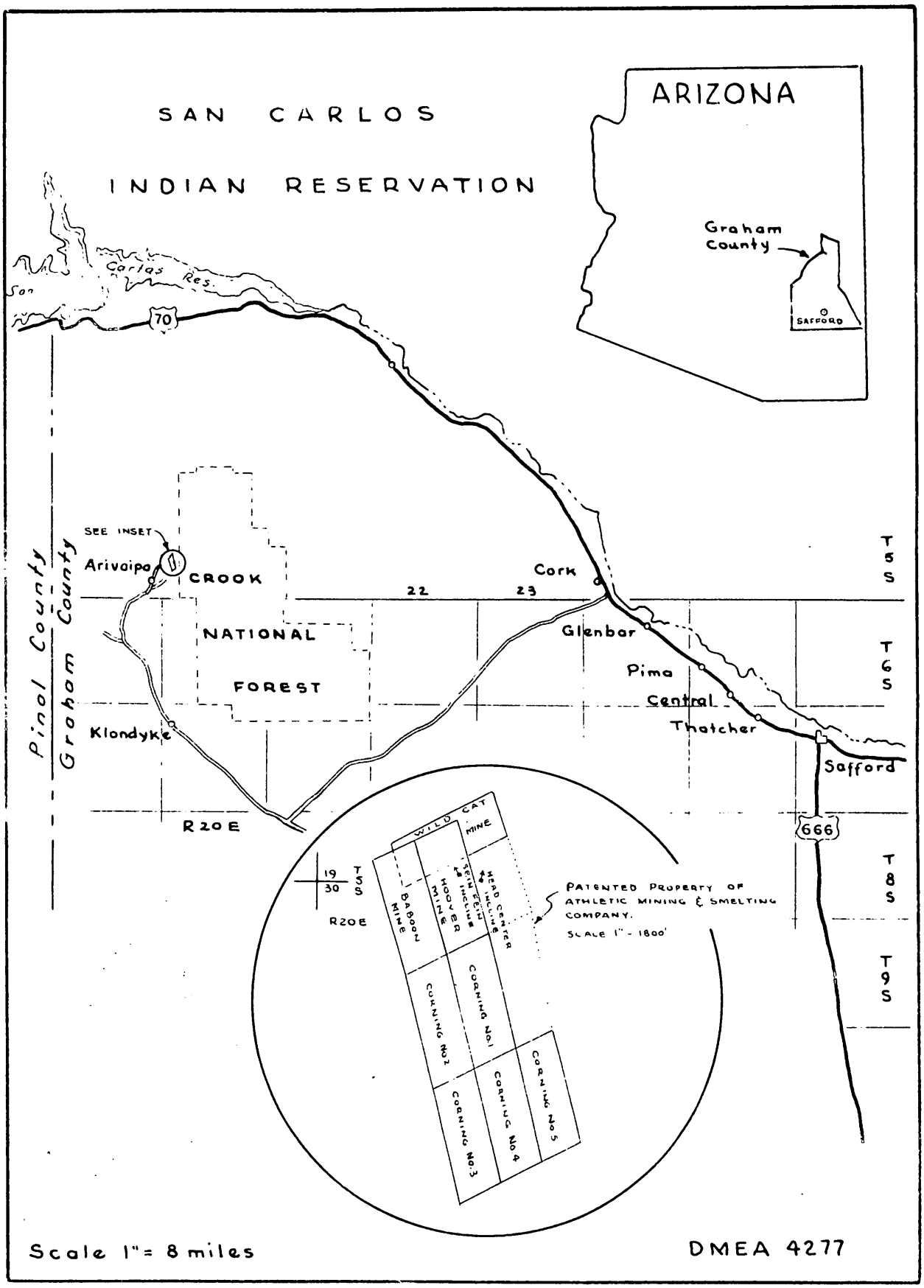

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

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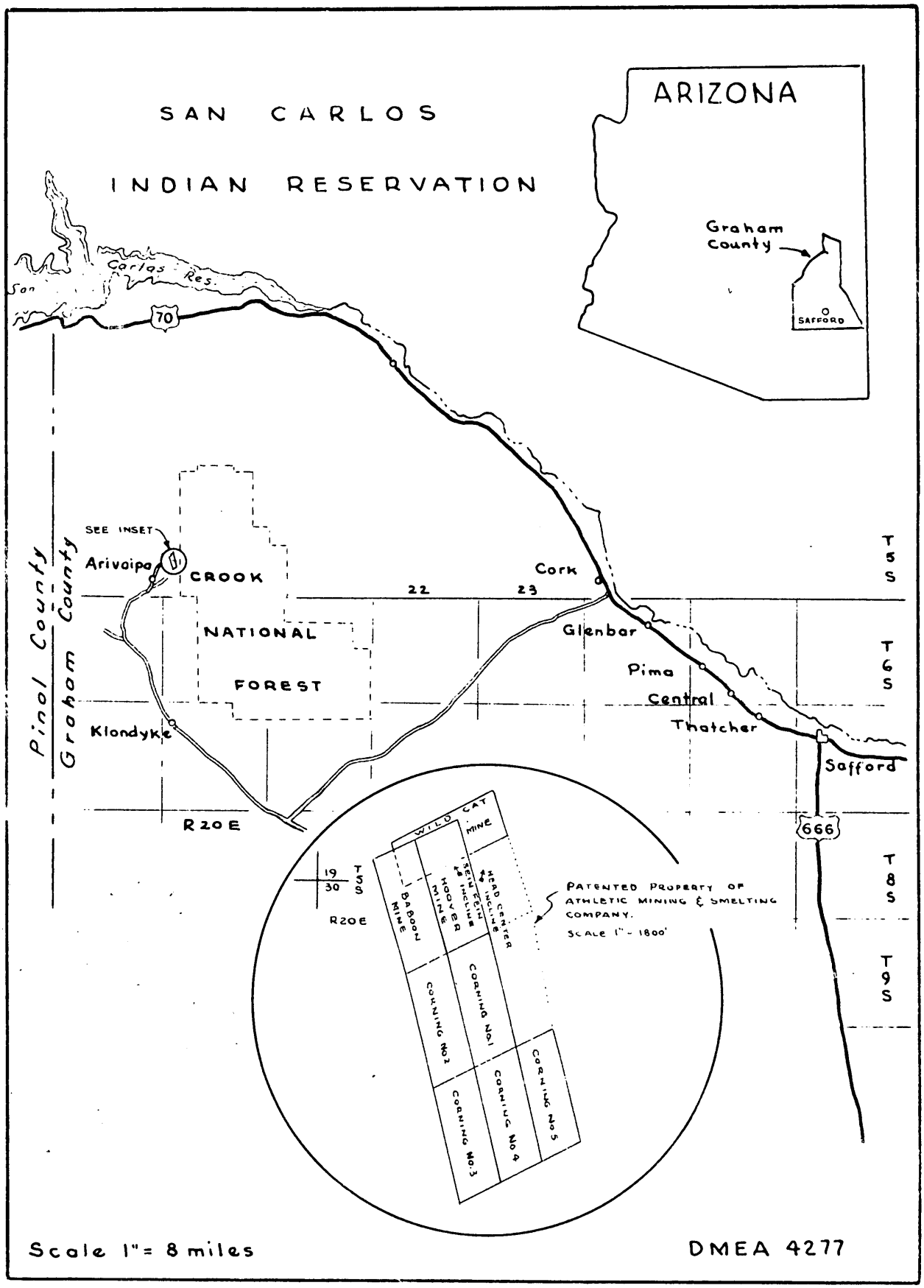
U.M.E.A.



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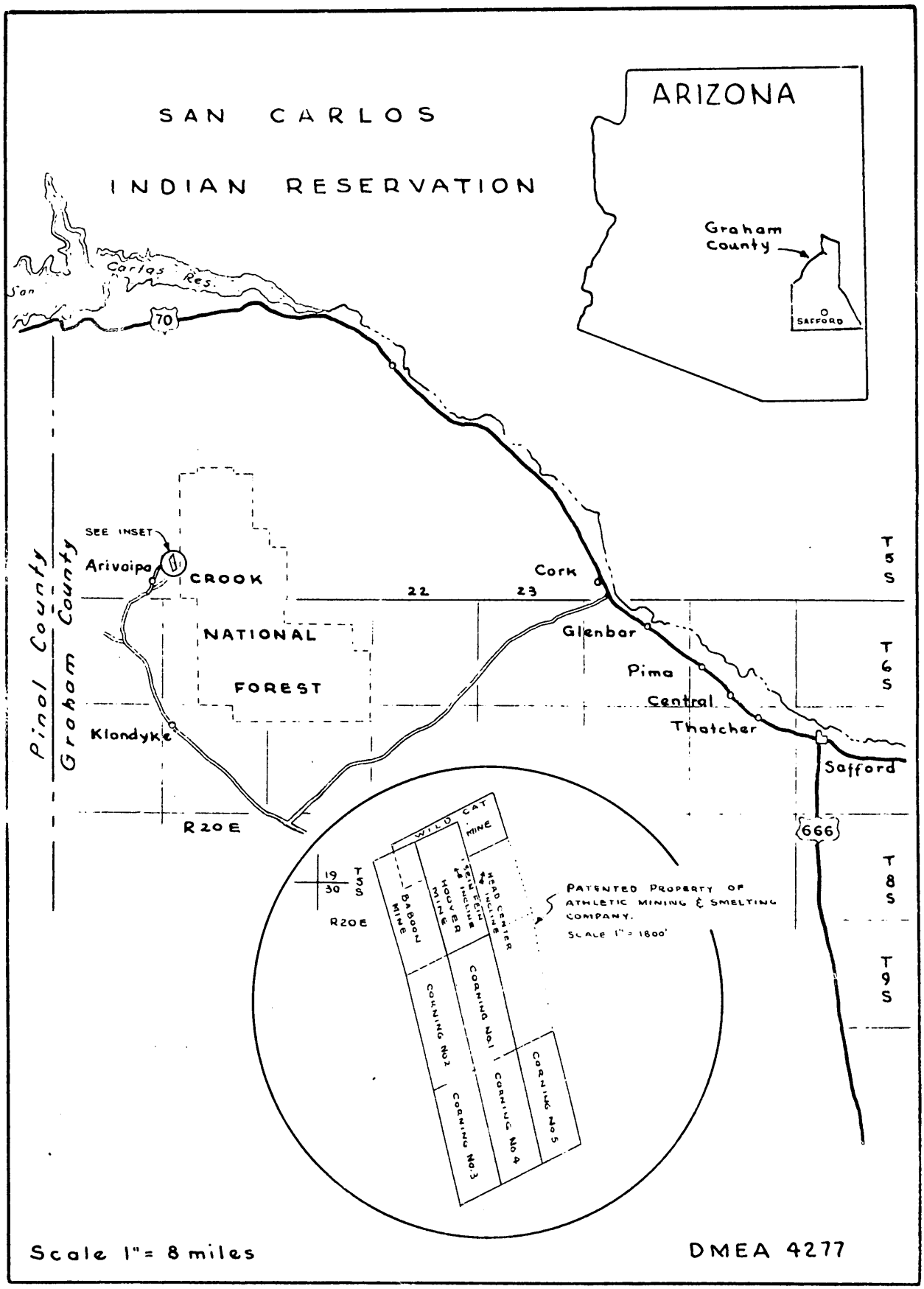

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

JAN 23 '97

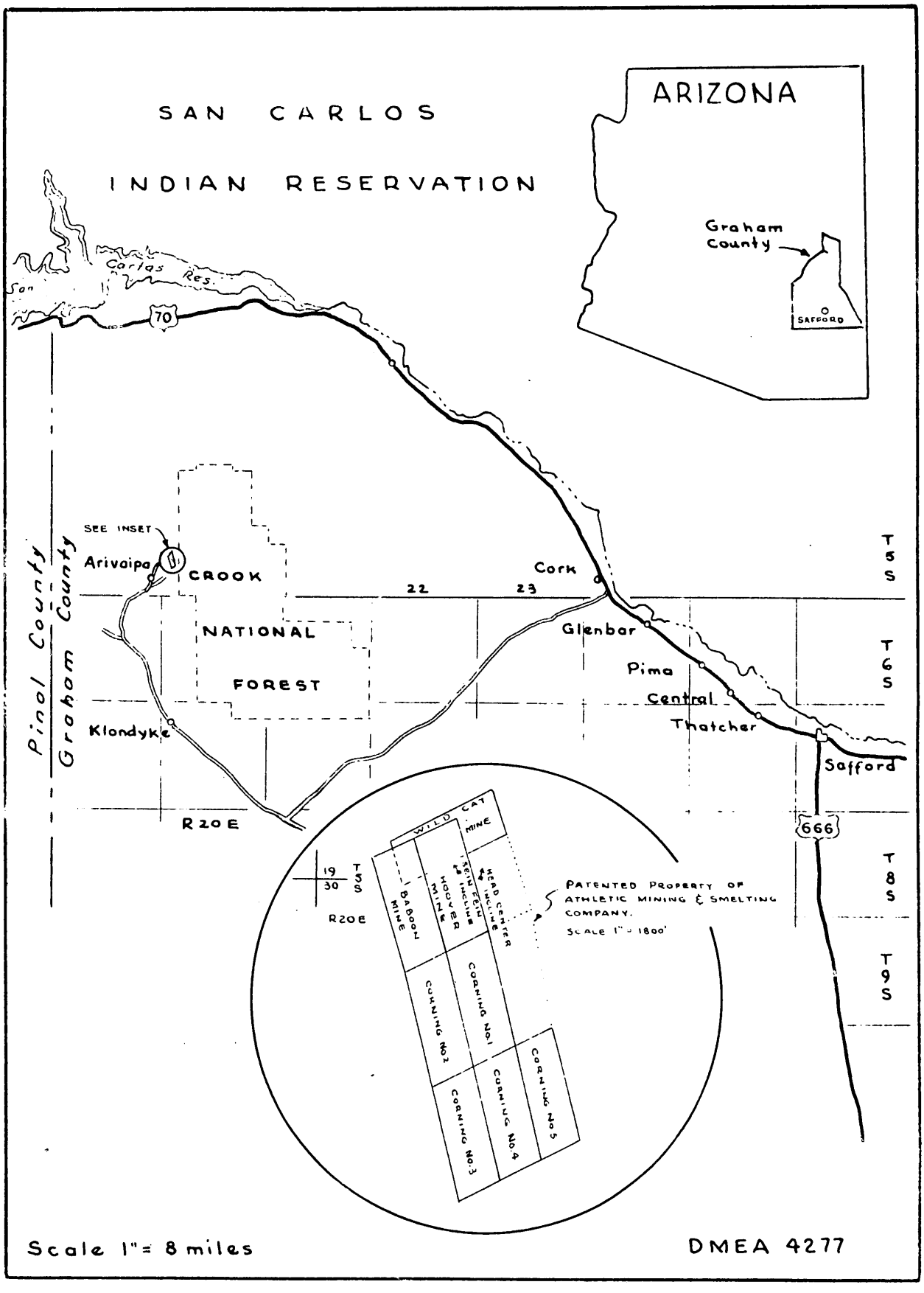

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

COLLEGE
DUBLIN

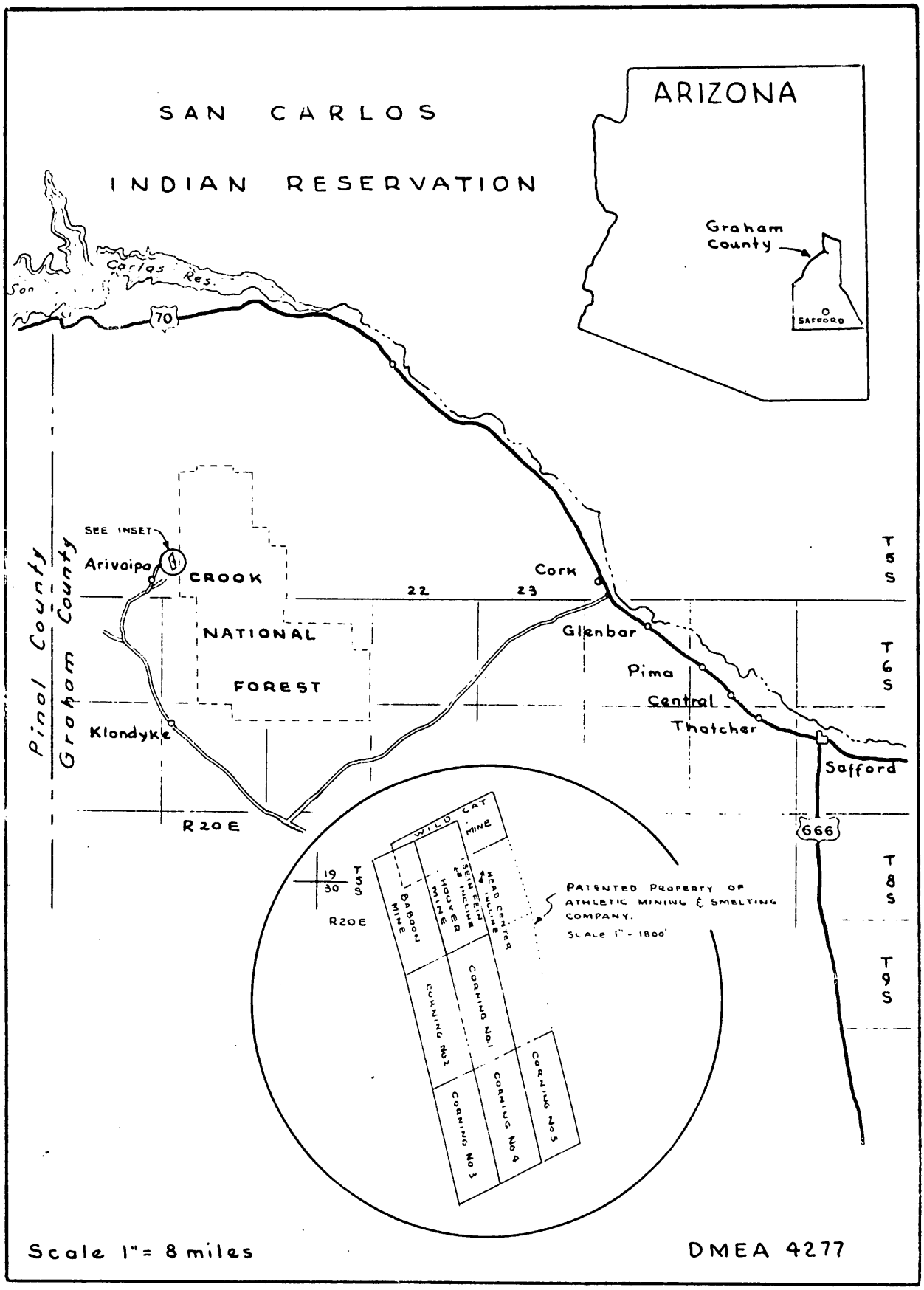

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

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JAN 25 57
U.M.E.A.

Klug.

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

224 New Customhouse
Denver 2, Colorado

RECEIVED JAN 23 1957

December 31, 1956

Memorandum

To: Secretary to the Operating Committee

From: DMEA Field Team, Region III

Subject: Joint Report of Examination Docket DMEA 4277 (lead-zinc) Cordillera Mining Company (Sein Fein Mine) Graham County, Arizona.

Enclosed are the original and three copies of a joint engineering and geologic Report of Examination on the subject property.

The revised proposal of the Applicant, and that recommended by the field examiners, consists of a 300-foot extension of the inclined shaft and 300 feet of drifting from the bottom of the extended shaft, at a total estimated cost of $22,797.00. We believe the cost figures for shaft sinking are too low.

The Field Team, Region III, concur that a modest exploration program at the Sein Fein Mine may be warranted, but we question the propriety of Government participation in the program recommended by the examiners. With no geologic guides with which to delineate favorable and unfavorable areas, we see no justification for exploring 300 feet below the 9th level - a level which is, and under the proposed program will remain, unexplored. Should exploration below the 9th level be warranted, we believe that, from the geological and mining point of view, 300 feet of sinking without intermediate lateral exploration is not sound practice.

Although exploration completed below the 6th level of the Sein Fein Mine has not found a significant amount of ore, we would concur in DMEA participation in exploration if a project was proposed to explore laterally from the present workings (possibly the 9th level) with subsequent shaft sinking and further lateral exploration, if conditions warrant.

Enclosed are 9 copies each of Figures 1 and 3 for your use.

DMEA Field Team, Region III

Original signed by
W. M. TRAVER

W. M. Traver

Original signed by
E. N. HARSHMAN

E. N. Harshman

Enclosures
HMC:ytl
cc
Sec. Op. Comm. (4)
Docket 4277
Harshman
Mining Division
Storms
Emerick
Chron.

1-4-57

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

IN REPLY REFER TO:
DMEA
DEPARTMENT OF THE INTERIOR
DEC 26 1956
REGION III
DENVER, COLORADO

Defense Minerals Exploration Administration
Denver Federal Center
Denver, Colorado

December 21, 1956

TRANSMITTED DEC 31 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: A. N. Harshman

Subject: DMEA Docket 4277 (Lead-zinc), Cordillera Mining Company (Sein Fein mine), Graham County, Arizona

Enclosed are the original and eight copies of a joint examination report by W. L. Emerick, U. S. Geological Survey, T. M. Romslo, U. S. Bureau of Mines, and L. E. Stewart, U. S. Bureau of Mines, in which exploration of the Sein Fein mine is recommended.

The revised proposal of the applicant, and that recommended by the examiners, consists of a 300-foot extension of the inclined shaft and 300 feet of drifting from the bottom of the extended shaft. The estimated total cost of the program is $22,797.

Although a modest exploration program at the Sein Fein mine may be warranted, I question the propriety of Government participation in the program recommended by the examiners.

In summary the report states that geologic conditions as noted in the present workings are not favorable for deposition of large ore bodies, that without a detailed study of the deposit there is no way to predict where favorable conditions for ore deposition

1-4-57

in the Sein Fein vein may have existed, and that these unfavorable conditions do not preclude the possibility that additional ore may be found along the Sein Fein vein, either at greater depths or along the strike. I concur with these conclusions, but I do not concur with the recommendations based on them.

It is apparent from figure 2 that additional exploration in the Sein Fein mine cannot be directed toward extending, either laterally or in depth, the Sein Fein ore shoot, but must be directed toward the discovery of new unexposed ore bodies. It also is apparent from figure 2 that almost no exploration has been done from the present 9th level of the mine and that exploration on the 8th level has been restricted to drifting on the vein southeasterly from the shaft. With no geologic guides with which to delineate favorable and unfavorable areas, I see no justification for exploring 300 feet below the 9th level - a level which is, and under the proposed program will remain, unexplored. Furthermore, should exploration below the 9th level be warranted, I believe that, from the geological and mining point of view, 300 feet of sinking without intermediate lateral exploration is not sound practice.

Although exploration completed below the 6th level of the Sein Fein mine has found nothing of significance, I would concur in EMEA participation in exploration if a project was proposed to

explore laterally from the present workings (possibly the 9th level) with subsequent shaft sinking and lateral exploration if conditions warrant.

Field Team action on this application can be taken following your review of the report and the above comments.

E. N. Harshman
Member, Field Team

Enclosures (9)
ENHarshman:mp

DMEA
DEPARTMENT OF THE INTERIOR

DEC 26 1956
REGION III
DENVER, COLORADO

MINERAL DEPOSITS
DMEA
RECEIVED
DEC 20 1956
U. S.
GEOLOGICAL SURVEY
DENVER, COLORADO

Box 4125 University Station
Tucson, Arizona

TRANSMITTED
DEC 31 1956

December 14, 1956

MEMORANDUM

To: Executive Officer, DMEA Field Team, Region III

From: T. M. Romslo
W. L. Emerick

Through: W. H. Storms
E. E. Kerkhman

Subject: Docket DMEA 4877 (Lead-Zinc), Cordillera Mining Company (Sain Pain Mine), Graham County, Arizona

Enclosed are the original and 8 copies of the field examination report on the above property, recommending approval of the application. Ten additional copies of maps are also enclosed.

Original signed by
T. M. Romslo

T. M. Romslo
U. S. Bureau of Mines

W L Emerick

W. L. Emerick
U. S. Geological Survey

MLE:mm

cc. Trover (8)
King
Storms
Kerkhman
Emerick

1-4-57

FOR UNITED STATES GOVERNMENT USE ONLY

TRANSMITTED

DEC 31 1956

UNITED STATES
DEPARTMENT OF THE INTERIOR
FRED A. SEATON, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMEA-247, Cordillera Mining Company (Lead-Zinc)

Rain Rain Mine

Graham County, Arizona

L. A. Stewart, Mining Engineer
U. S. Bureau of Mines

T. M. Rumsle, Mining Engineer
U. S. Bureau of Mines

W. L. Emerick, Geologist
U. S. Geological Survey

December 14, 1956

1-4-57

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The Cordillera Mining Company applied for Defense Minerals Exploration Administration assistance to explore their Sein Fein mine in Secs. 19 and 30, T. 5 S., R. 20 E., Graham County, Arizona for lead. The application, docket DMEA-4277, proposed the extension of the inclined shaft down the vein, drifting westward on the vein from the bottom of the incline, and rebuilding a surface plant that was destroyed by fire. Total cost of the project was an estimated $34,450.00.

Prior to July 1950 the Sein Fein property was owned or operated by several people and production amounted to less than 15 tons from both the adit and inclined shaft. In July 1950, Dean Nicholson leased the mine, deepened the inclined shaft, and mined ore from stopes on 7 levels. Nicholson's production from July 1950 through August 1952 amounted to over 3,600 tons of ore with a gross value of $186,000. In addition to deepening the shaft, Nicholson and Cordillera Mining Co. drove 8th and 9th levels from the inclined shaft. All development work was suspended when fire destroyed the hoist and headframe on November 16, 1955.

Sedimentary rocks in the Aravaipa district are intruded by granite and porphyries of rhyolite, andesite, and basalt, and deformed by compressive stresses. A rhyolite porphyry mass intrudes limestone in the area of the Sein Fein mine and the most prominent

structure is a probable thrust fault, trending northwest to west through the rhyolite porphyry in the mine area. Dips of the fault at the surface range from 36° to 45° N., but flatten at depth to low angles ranging from 20° N. to 26° N.

Ore deposits are of the vein type, occurring in the upper part of the brecciated fault zone. Vein thickness ranges from less than an inch to about 5 feet. Ore shoots are lenticular-shaped. Host rock throughout the Sein Fein mine is rhyolite porphyry.

Primary ore minerals in the Sein Fein mine are galena, sphalerite, and some chalcopyrite and pyrite, in a quartz, calcite, and clayey iron-oxide gangue.

Examination of the shaft and drifts of the Sein Fein mine showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc mineralization was present. The 6th level was driven for several hundred feet along the fault zone without encountering more than occasional occurrences of weak lead and zinc mineralization. The mineralization in the 8th and 9th levels is not significant, but there was an 8 to 9-inch width of lead and zinc mineralization in the bottom of the incline. Unfavorable areas along the fault zone might be characteristic between ore bodies in deposits of this type, and in an open space filling type of deposit favorable areas of deposition might end rather abruptly, depending upon structure. Without a detailed study of the deposits it would be difficult to set up criteria for predicting the presence or approach to new ore bodies.

Although mineralogic and structural features in the Sein Fein mine appear unfavorable, these features do not preclude the possible presence of additional ore bodies along the Sein Fein fault zone in more favorable areas, as, for example, at depth, or elsewhere along the strike of the fault zone.

Because of the possibility that more favorable geologic conditions and a significant body of ore may be encountered by the exploration proposed, Government aid is recommended. The proposed explorations involve 300 feet each of shaft sinking and drifting at an estimated total cost of $22,797.00.

IBMA-4277, CHINILLERA MINING COMPANY (LEAD-ZINC)
SEIN FEIN MINE
GRAHAM COUNTY, ARIZONA

CONTENTS

	Page
Introduction	1
Location and accessibility	2
Ownership and extent of property	3
History, production, and grade of ore	6
Present status	8
Geology	8
Ore Reserves	12
Proposed exploration	13
Conclusions and recommendations	19

ILLUSTRATIONS

Figure No.		
1	Location and claim map	Following page 1
2	Areal geology of Sein Fein mine	In folder on back cover
3	Plan of Sein Fein mine and section through shaft	" " " " "

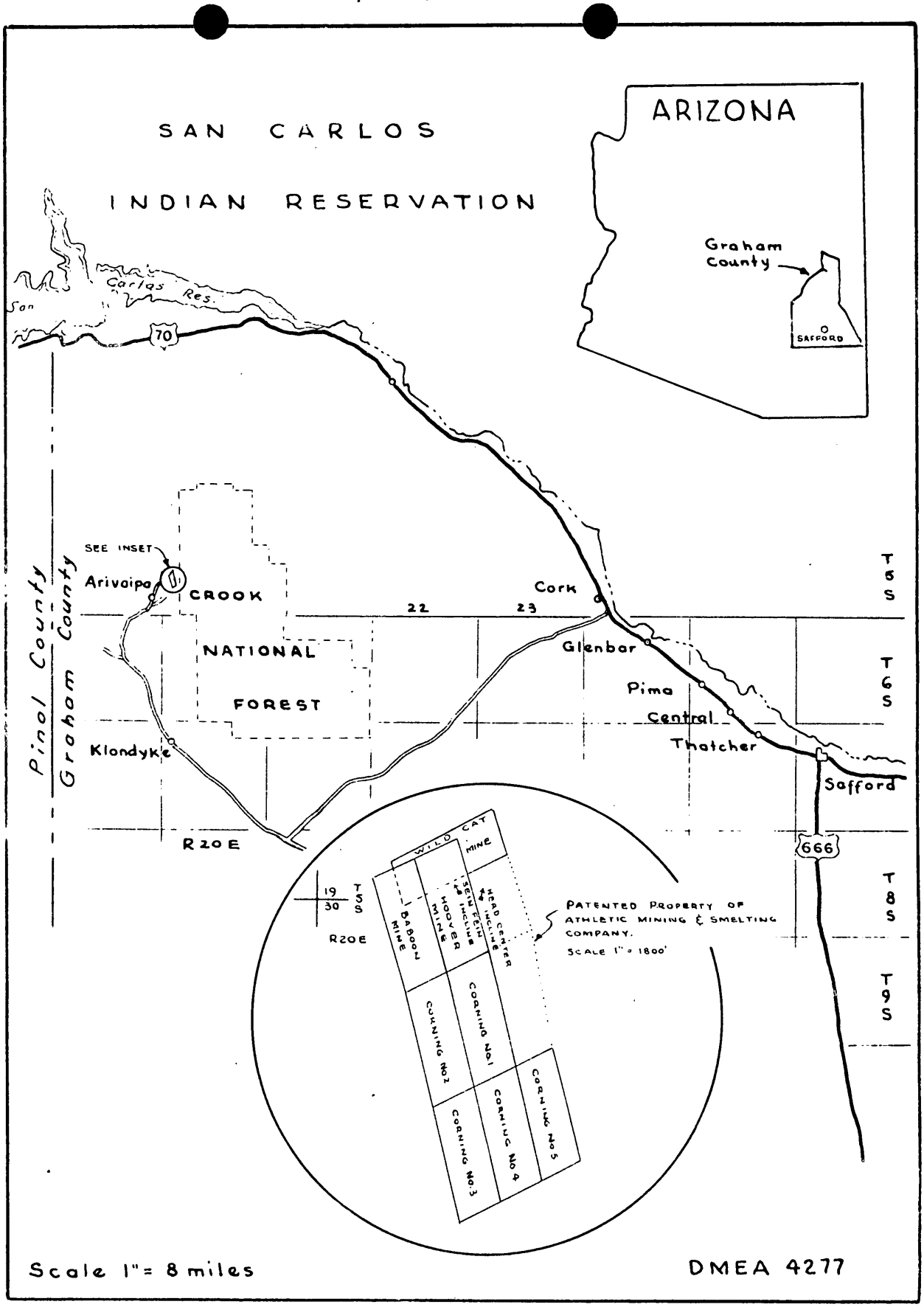

FIG.-1- LOCATION AND CLAIM MAP, CORDILLERA MINING CO.
SEIN FEIN MINE, GRAHAM COUNTY, ARIZ.

INTRODUCTION

The Cordillera Mining Co., whose address is Box 664, Grand Junction, Colorado, applied for Defense Minerals Exploration Administration assistance under docket DMEA-4277 to explore their Sein Fein mine for lead. The property, consisting of 8 contiguous, unpatented mining claims and a nearby composite claim, is situated in secs. 19 and 30, T. 5 S., R. 20 E., Graham County, Arizona(fig.1).

The proposed exploration consists of extending the inclined shaft down the vein for an additional 300 feet, drifting westward 300 feet on the vein from the bottom of the inclined shaft, and rebuilding the surface plant which was destroyed by fire in 1955. The latter item includes construction of a headframe, hoist house, and ore bin; and the purchase and installation of a hoist, hoisting rope, skip, and miner accessories. Also included in the application was 1,000 feet of diamond drilling. The total cost was estimated at $34,450.00.

Preliminary field investigation of the property was made on September 7, 1956, by W. L. Emerick, geologist, U. S. Geological Survey, in company with Dean Nicholson, representative of the company. At that time the drilling phase was discussed and Nicholson decided to eliminate it from the proposal, as it was in the nature of prospecting.

Later, on October 11, a more detailed examination was made by Emerick and Lincoln A. Stewart, mining engineer, U. S. Bureau of Mines. William M. Spencer, Jr., the applicant's vice president

accompanied the field examiners on their investigation. He was not familiar with the property or with the details of the application, and consequently was unable to furnish data to substantiate the estimated cost of the proposed explorations. Data necessary for completion of the report was personally submitted November 26, 1956 by James F. Martin, President of the company. At that time, Martin conferred with Emerick, Stewart and T. M. Romalo, mining engineer, U. S. Bureau of Mines, who had examined the property November 20.

LOCATION AND ACCESSIBILITY

The Cordillera property is situated in the Aravaipa mining district, at the head of Williamson Canyon in SW¼, sec. 19, and NW¼ sec. 30, T. 5 S., R. 20 E., about 38 airmiles northwest of Safford, Arizona. The mine is reached from Safford according to the following log:

0.0 Leave Safford, travel northwest on paved U. S. Highway 70

9.0 Pass through Pima

15.7 Turn left onto graveled road

41.5 Take right fork

49.4 Pass Klondyke general store and post office

53.2 Take right fork

61.2 Take left fork at Aravaipa (Athletic Mining & Smelting Co. Camp)

63.5 End of road. Sein Fein mine on left and Head Center mine of Athletic Mining & Smelting Co. on right.

The graveled road from the highway is in excellent condition. The portal of the Sein Fein incline is west of the end of the road, about 75 feet up on the hillside, at an approximate altitude of 5,230 feet. Supplies and equipment are hauled from the roadway to the mine portal up a short inclined trackway.

Ore shipped from the property would be trucked 40 miles to Cork Siding, where there is a loading ramp on the Southern Pacific Railway.

OWNERSHIP AND EXTENT OF PROPERTY

The applicant, Cordillera Mining Co., together with the Balboa Mining and Development Co. as co-lessees, is the assignee of a Lease and Option to Purchase on a group of 8 unpatented, contiguous claims and one campsite claim. The Cordillera Co., a Colorado corporation, (James F. Martin, president, Box 664, Grand Junction, Colorado) possesses two-thirds interest in the property; the Balboa Co., likewise a Colorado corporation, (George C. Heikes, president, 149 Galli Ave., Los Altos, California) possesses one-third interest.

The names of claims and the recording data in the Graham County Court House are as follows:

Name of claim	Book	Page
Wild Cat Mine	29	353
Hoover Mine	29	357
Baboon Mine	29	358
Corning No. 1	29	359
Corning No. 2	29	360
Corning No. 3	29	356
Corning No. 4	29	355
Corning No. 5	29	354
Camp site	33	412

These claims, owned by Zella F. Harwood and associates, were lease-optioned to Dean Nicholson on April 1, 1955. The application contains copies of the documents recording the complete chain-of-title as follows:

Date	Type of Instrument	
4/ 1/55	Lease and Option to Purchase	Lessor to Dean Nicholson (Lessee)
12/27/55	Amendment to Lease-Option Agreement.	Clarification of items of royalty and purchase price.
12/13/55	Consent to Assignment	Dean Nicholson to Cordillera Mining Co.
12/29/55	Assignment	Dean Nicholson to Cordillera Mining Co. and Flanders Mining Co.
12/29/55	Agreement	Cordillera and Flanders Cos. as to respective proportion of right, title, and interest in claims.
12/30/55	Consent to Assignment	Interest of Flanders Co. to others.
12/30/55	Consent to Assignment	Interest of Flanders Mining Co. to Balboa Mining and Development Co.
12/30/55	Assignment	Flanders Co. to Balboa Co.
12/31/55	Agreement	Monetary agreement between Balboa Co. and Flanders Co.

Figure 1 shows the arrangement of the group of contiguous claims. The location of the Camp Site claim was not shown on the applicant's map, but it is in the valley, a short distance southwest of the group.

It will be noted on figure 2 that the Sein Fein vein, crossing the Hoover Mine claim, dips northward, and the continued downward extension will pass under and north of the Wildcat Mine claim. This was noted by the Chairman of the Operating Committee who, in a letter to W. M. Traver dated June 27, 1956, stated "The projected drift at the bottom of the shaft extended, would appear to run off the Applicant's property unless other claims were located in that vicinity."

However, the Arravaipa district recognizes the law of apex rights. It will be noted in figure 2 that the Athletic Mining & Smelting Co.'s Head Center mine passes under the applicant's Wildcat mine claim; in fact, the major ore shoot now being worked is under the claim.

The outcrop, or apex of the vein on the Hoover Mine claim of Cordillera trends parallel to the end lines. Apex rights in this category are discussed by Ricketts[1/], who states "The owner of a lode mining claim has the exclusive right of possession and enjoyment of the surface within the lines of his location without regard to the width or extent of the vein or lode; but its form controls his surface rights. So, where a claim is located so that the vein or lode crosses the location instead of running lengthwise, the locator does not thereby lose his extralateral rights on the dip

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1/ Ricketts, A. H., American Mining Law, Fourth Edition, Bull. 123, Calif. Dept. of Mineral Resources, Dept. of Mines, 1943. pp. 398-399.

of the vein or lode beyond his end lines, but what he intended for his side lines are treated as his end lines, and he is entitled to the dip between vertical planes through these lines." A footnote further states "It has been the accepted doctrine of the United States Supreme Court for many years that where the strike of the vein crosses the location at right angles, its dip may be followed extralaterally, whatever the direction in which the length of the location may run. If across the strike, the side lines, as it commonly is expressed, become the end lines. Subsequent locators knew as well as the original ones that the determining fact is the direction of the strike, not the first discoverer's guess."

Thus it would appear that no additional claims need to be located north of the Wildcat Mine claim, as far as ownership of the vein material is concerned. However, Mr. Hoffland, Acting Assistant BMEA Solicitor, suggests in a letter dated February 9, 1955 to the BMEA Administrator that when it is known that the target of an exploration contract is the extralateral extension of a lode, the contract should clarify the situation with respect thereto.

HISTORY, PRODUCTION, AND GRADE OF ORE

According to Ross [2], at the time of his investigation in 1922 the Sein Fein property was owned by Quinn and Finnagan of Klondyke. Previous to this tenancy, the property was owned by H. T. Firth of

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2/ Ross, Clyde P., Geology and Ore Deposits of The Aravaipa and Stanley Mining Districts, Graham County, Ariz. USGS Bull. 763, 1925, p. 100.

Aravaipa. The latter had shipped one carload and the former, two carloads of ore, all of which was mined from an adit on a mineralized shear zone in limestone.

In 1948, at least 10 carloads of ore were produced under the management of Hay Pointer[3]. It is likely that part of this ore came from workings opened by the inclined shaft.

Dean Nicholson originally leased the Sein Fein mine from Zella F. Harwood and associates in July 1950, and in the period through August 1952 produced over 3,600 tons of ore that was shipped to the American Smelting & Refining Co.'s smelter at El Paso, Texas for a gross value of nearly $136,000. This ore was mined from stopes on both sides of the inclined shaft. During this work the shaft was deepened to 425 feet, and had been worked on 7 levels.

During 1955 the shaft was extended to an inclined depth of 607.7 feet, an 8th level driven 190 feet southeastward, and a 9th level (at the bottom of the shaft) driven westward 40 feet. This development work was suspended when a fire destroyed the hoist and headframe on November 16, 1955. Dean Nicholson's lease-option was assigned to the Cordillera Mining Co. on December 29, 1955.

The value and the weighted average of the content of the Nicholson production during the period of July 1950 through August 1952 has been worked out from docket material said to be a copy of each carload settlement sheet, as follows:

3/ Mining World, Sept. 1948, Vol. 10, No. 10, p. 66.

Year	Dry Weight Tons	$ Gross Value Av./ton	$ Gross Value Total	Percent Lead	Percent Copper	Ounces per ton Gold	Ounces per ton Silver	No. of Shipments
1950	869.75	$49.80	$ 43,317.89	17.79	1.37	0.304	2.52	16
1951	1,872.91	55.60	104,516.93	18.24	1.20	.235	2.37	34
1952	889.03	42.66	37,928.61	15.00	*	.133	1.76	17
Total	3,631.69	$51.15	$185,763.43	17.34		0.226	2.26	67

*Only 2 assays, averaging 1.40%, shown for 1952

PRESENT STATUS

The property is idle at present, and has been since November 1955, when fire destroyed the hoist, headframe and ore bin. The only equipment on the property is a 315 cfm compressor at road level, and 6 mine cars, 2 stopers and 1 jackhammer in the mine.

The mine is accessible throughout, the incline is in good condition with track in place from collar to bottom. There are 2 small frame buildings, in a poor state of repair, at the mine, and 5 habitable cabins at the camp-site claim near Aravaipa.

GEOLOGY

The stratified rocks exposed in the Aravaipa district range from Precambrian to Quaternary and consist of schists, quartzites, limestones, arkosic sandstone, shales, and conglomerates. Granite and porphyries of rhyolite, andesite, and basalt intrude the Cretaceous and older rocks.

The granite occurs as a batholithic mass and the rhyolite, andesite, and basalt porphyries as irregular masses, dikes, and sills. Compressive stresses deformed the region, probably during post-Cretaceous to early Tertiary time, into broad open folds trending northwest to west and broken by faults of low to steep dip. Gravel, sand, and silt of Pliocene age is locally covered by thin alluvium of Quaternary age.

Carboniferous limestone was intruded and deformed by rhyolite porphyry in the area of the Sein Fein mine. The limestone-rhyolite porphyry contact in the area is irregular, sill-like, and in places complicated by post-intrusive faulting[4].

A prominent fault (Fig. 2), trending northwest to west, courses through the rhyolite porphyry in the report area. The fault is traceable for several hundred feet southeastward over the Head Center claim and for an unknown distance westward over the Hoover Mine claim. The fault zone is brecciated and 10 or more feet wide. Dips at the surface range from 36° N. to 45° N. but flatten at depth to low angles ranging from 20° N. to 28° N. Owing to the low angles of dip, previous workers generally considered the fault to be of thrust origin[5]. The fault is believed to be pre-mineral[6] but with some later but not extensive movement along it. Ross[7] noted that movement occurred along the faults

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4/ Wilson, E. D., Arizona lead and zinc deposits, Vol. XXI, Part I, 1950.
5/ Wilson, E. D., op. cit., 1950
6/ Wilson, E. D., op. cit., 1950
7/ Ross, C. P., Geology and ore deposits of the Aravaipa and Stanley mining districts, Graham Co., Arizona: U. S. Geol. Survey Bull. 763, 1925.

of the district during mineralization, as shown by brecciation of the deposits. Displacement of the hanging wall was probably mostly upward although there appears to be some evidence on slickensides of slight lateral movement. Underground workings show that the fault zone is irregular and curving with local variations in strike and dip common.

The ore deposits in the Sein Fein shaft and drifts are of the vein type, occurring in the upper part of the wide brecciated fault zone. Thickness of the vein ranges from less than an inch to about 5 feet and probably averages about 3 feet. Seams of gouge, or parallel gouge-filled fractures, occur within the vein. In places along the upper edge of the vein there are small open cavities lined with quartz crystals. Stope outlines indicate that the ore shoots were lenticular in shape, and that the back, or hanging wall side of the fault zone was their upper limit. The host rock throughout the mine is rhyolite porphyry.

The vein material at the Sein Fein mine was deposited in open-spaces, or as a fissure filling and there was apparently little alteration of the enclosing rock during deposition of the minerals. Wilson[8] states "the primary ores were probably deposited by low-temperature ascending hydrothermal solutions along the fault zone in areas of favorable structures".

8/ Wilson, E. D., Op. Cit., 1950.

The primary ore minerals found in the Sein Fein shaft and drifts are galena, sphalerite, and some chalcopyrite and pyrite, in a quartz, calcite, and clayey iron oxide gangue. Applicant's settlement sheets show minor amounts of gold and silver. A chip character sample taken during the examination across 2.7 feet of mineralized material on the west side of the Sein Fein incline, between the 7th and 8th levels (Sample 15020, Fig. 3), assayed 12.2 percent Pb, 3.7 percent Zn, 0.67 percent Cu, 0.04 oz./ton Au, and 1.3 oz./ton Ag.

Oxidation of the galena and sphalerite has not been great, as Figure 3 shows that mining of these minerals began at rather shallow depths below the surface. Wilson[9] found that the ore bodies along the fault, in the Head Center tunnel and shaft, carried oxidized minerals of zinc, lead, copper, iron, and manganese, in the zone of oxidation. Oxidized lead in the Head Center mine occurred as cerussite, and oxidized sphalerite as smithsonite. Chalcopyrite and pyrite apparently were completely removed in the upper shallow zone of oxidation, forming limonite. The oxides of copper, malachite and azurite, were observed at all depths in the Sein Fein mine and were probably derived from chalcopyrite.

Examination of the shaft and drifts of the Sein Fein mine showed irregular or only occasional mineralization in lead and zinc. Copper oxides were persistent on all levels whether or not lead and zinc

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9/ Wilson, E. D., unpublished private report, 1942.

mineralization was present. The 6th level (Fig. 2) was driven for several hundred feet along the strike of the fault zone without encountering more than occasional occurrences of weak mineralization along its length, and the 8th and 9th levels did not contain significant occurrences of lead and zinc mineralization. An 8 to 9-inch width of lead and zinc mineralization exposed in the bottom of the incline might be an indication that more favorable conditions could be expectable with depth, or its presence might be only a local pocket of ore. Unfavorable areas along the fault zone between ore shoots in this type of deposit might characteristically display only occasional and weak mineralization. Without a detailed study of the deposits it would be difficult to set up criteria for predicting the presence or approach to new ore bodies.

Unverified information from an employee of the adjacent Head Center mine stated that present mining in the Head Center mine was in the deeper levels of the main ore shoot east of the shaft.

ORE RESERVES

Applicant states no ore reserves exist at present in the Sein Fein shaft and workings, which was verified by examination of the mine. A former operator, D. Michelson, produced about 3,600 tons of ore from the mine over a two-year period in 1950 to 1952. His operations appear to have exhausted the mine of indicated as well as inferred reserves.

PROPOSED EXPLORATION

Applicant's Proposal

The originally proposed project of the applicant involved the following:

1,000 feet of underground diamond drilling at $5.00 per foot	$ 5,000.00
Sinking the inclined shaft an additional 300 ft. @ $42.00	12,600.00
300 feet of drifting to the west from the bottom of the shaft @ $31.00	9,300.00
Rebuilding of surface plant	7,550.00
Estimated total cost	$34,450.00

During the preliminary field investigations the applicant's representative requested withdrawal of the item of diamond drilling. The application was further amended November 28, 1956 when James F. Martin, president of the company, conferred with the examining team at Tucson. Mr. Martin said the company had decided to limit requested aid to participation in the costs of the 300 feet of each sinking and drifting. He also reported that the company would equip and rehabilitate the mine and be ready to start sinking the shaft probably by February 1,1957. Detailed estimated costs of all work were submitted by Mr. Martin. As shown below, the estimated total cost is $28,777.87, of which $6,311.01 is for new buildings and rehabilitations at company expense. The remaining $22,466.86, in which the company requests Governmental participation, is for the 300 feet of each shaft sinking and drifting at respective per foot costs of $41.74 and $33.15.

6 a. **Independent Contracts:**

None

6 b. **Labor, Supervision and Consultants:**

Rehabilitation of Surface Plant:

50 days:		
2 men @ $16.00/day		$1,600.00

Rehabilitation of Incline:

20 days:		
2 men @ $17.00/day	$ 680.00	
1 man @ $14.50/day	290.00	970.00

Sinking of Incline 300':

133 days (2.25'/day):		
2 men @ $17.00/day	$4,522.00	
1 man @ $14.50/day	1,928.50	6,450.50

Lower Level Drift, 300':

86 days (3.5'/day):		
2 men @ $17.00/day	$2,924.00	
1 man @ $14.50/day	1,247.00	4,171.00

Supervision:

11 months:

1 man @ $300.00/month (Part time)	3,300.00	$16,491.50

6 c. **Operating Material and Supplies:**

600' of 2" iron pipe @ .60¢	$ 360.00	
100' of 1" air hose @ .85¢	85.00	
100' of ½" water hose @ .50¢	50.00	
250 3' ties @ .48¢ ea.	120.00	
5000 board feet lumber @ $80./1000	400.00	
6,360 lbs. of 16# rail @ 273.20/ton	868.78	
200 lbs. of rail spikes @ $30./100 lbs.	60.00	
Small tools	100.00	
Assorted pipe fittings	150.00	
600' of 12" vent tubing @ $1.25/ft.	750.00	
	$2,943.78	
Less 1/2 for salvage value	1,471.89	$1,471.89

6 c. **Operating Material and Supplies** - Cont'd

100 cases dynamite @ $11.00/case	$1,100.00		
25 boxes dynamite caps @ $2.00/box	50.00		
12,000' fuse @ $47./3000'	188.00		
3,400 gal. diesel fuel @ .18½/gal.	629.00		
1,000 gal. gasoline @ .28½/gal.	285.00		
10 carbide lamps @ $2.50	25.00		
350 lbs. carbide @ .03/lb.	28.00		
8 picks @ $3.25	26.00		
10 shovels @ $4.65	46.50		
3 6# double jacks @ $2.50	7.50		
50 pieces 4' steel @ $7.55	377.50		
400 three-cross bits @ .25/bit	100.00	$2,862.50	$ 4,334.39

6 d. **Operating Equipment:**

	Cost		11 Months Depreciation
1-315 Ingersoll Rand Compressor	$3,000.00		
1-Chicago Pneumatic stoper	150.00		
1-Thor air drill and leg	750.00		
1-Gardner-Denver slusher	1,200.00		
1-20" slusher bucket	150.00		
1-1 ton skip	400.00		
1-2 ton hoist	2,500.00		
3-1 ton mine cars @ $100.00	300.00		
1-½ ton pick-up	1,500.00	$9,950.00	$ 1,824.13

6 e. **Rehabilitation and Repairs:**

Compressor repair	$ 500.00		500.00

6 f. **New Buildings, Improvements, Installations:**

1000' hoist rope	$ 500.00		
6000 board feet lumber @ $80./1000	480.00		
Sheave	75.00		
Fuel tank and fittings	50.00		
Bell	25.00		
Miscellaneous nails, bolts, fittings, etc.	500.00		
4 cu. yd. gravel @ $2.00	8.00		
4 sacks cement @ $1.80	7.20		
Freight	650.00	$2,295.20	
Less 1/2 for salvage value		1,147.60	1,147.60

6 g. **Miscellaneous:**

Accounting @ $100./mo.	$1,100.00		
Liability insurance	1,000.00		
Social Security	336.80		
Workman's Compensation	1,288.25		
Unemployment Compensation	505.20		
Travel - mine to supply point 5000 miles @ .05/mile	250.00		4,480.25
			$28,777.07

Unit Cost Breakdown:

	Rebuilding	300' Incline	300' Drift
6 b. Labor and supervision	$3,170.00	$ 7,930.50	$5,371.00
6 c. Operating materials	-	2,167.19	2,167.00
6 d. Operating equipment	-	912.07	912.06
6 e. Rehabilitation and repairs	500.00	-	-
6 f. New buildings, improvements	1,147.60	-	-
6 g. Miscellaneous	1,493.41	1,493.42	1,493.44
	$ 6,311.01	$12,523.13	$ 9,943.60

Unit Costs:

Rebuilding and rehabilitation	$ 6,311.01
300' Incline	41.74/foot
300' Drift	33.15/foot

Examining Team's Proposal

The examining team proposal is essentially the same as the applicant's. It provides for sinking the shaft an additional 300 feet and for drifting 300 feet from a station at 280 to 290 feet from the present bottom of the shaft. The 10 to 20 feet of shaft below the station is for a sump of a depth to be determined by conditions encountered. The shaft shall have a minimum cross section of 5 feet high by 7 feet wide and shall be timbered where necessary. It shall follow, as close as practicable, the potential ore zone along the fault. The drift shall be driven to a minimum cross section of 5 feet wide by 7 feet high in the clear of necessary timber. Prior approval for driving the drift will be necessary since the direction to be followed will be determined by findings in the shaft.

All mineralized zones encountered shall be channel sampled at 5-foot intervals and all samples shall be analyzed chemically for lead, zinc and copper. Each tenth sample or a composite of 10 samples shall be assayed for gold and silver.

The estimated total costs of the project are as follows:

300 feet of shaft @ $41.74 per foot		$12,522.00
300 feet of drift @ $33.15 per foot		9,945.00
Assaying:		
60 samples for lead, zinc and copper @ $5.25 each	$315.00	
6 samples for gold and silver @ $2.50 each	15.00	330.00
Total estimated costs		$22,797.00

The unit costs of shaft sinking and drifting are those proposed by the applicant. The costs are acceptable because they reportedly are recently obtained actual costs. They are materially lower than the consulting engineers' following estimated costs for performance of the work under average conditions.

Labor, Supervision and Consultant

Daily operations to consist of 2 shifts daily instead of proposed single shift.

Sinking shaft 300 feet.

75 days @ 4 feet per day

4 men @ $17.00 per day	$5,100.00	
3 men @ $14.50 per day	3,262.50	$ 8,362.50

Drifting 300 feet

30 days @ 6 feet per day

4 men @ $17.00 per day	$3,400.00	
3 men @ $14.50 per day	2,175.00	5,575.00

Supervision

5 months @ $500.00 per month	2,500.00
Total labor and supervision	$16,437.50

Operating Material and Supplies

Applicant's $2,949.78 less 3/4 for salvage value	$2,207.83	
Applicant's men salvageable	2,862.50	5,070.33

Operating Equipment

Depreciation allowance of 5/60 of applicant's $9,950.00	829.17

Miscellaneous

Repairs to equipment	$ 200.00	
Accounting 5 months @ $50.00/mo.	250.00	
Taxes and insurance, 15 percent of $15,637.50	2,353.13	2,803.13
Estimated total cost of project		$25,140.13

Unit Cost Breakdown	300-foot shaft	300-foot drift
Labor and supervision	$ 9,462.50	$6,575.00
Operating materials	2,535.16	2,535.17
Operating equipment	497.50	331.67
Miscellaneous	1,681.88	1,121.25
Estimated total costs	$14,577.04	$10,563.09
Estimated cost per foot	$48.59	$35.21

CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that mineralogic and structural features exposed in the Sein Fein Mine appear unfavorable. All minable reserves have been exhausted from the mine, and exploration work by the former and present operators in driving of the 6th and 8th levels along the fault zone encountered only occasional and weak mineralization. Inasmuch as this type of ore body is an open space filling, the fault zone in most of the Sein Fein Mine apparently was unfavorable, in general, to deposition of any minable ore body. However, the unfavorable conditions exposed do not preclude the possible presence of additional ore bodies along the Sein Fein fault zone in more favorable areas as, for example, at depth, or elsewhere along the strike of the fault zone. Present ore bodies apparently have barren areas, or areas of only occasional and weak mineralization between them. There does not appear to be any conclusive criteria for determining with certainty the presence or approach to an ore body.

Although present conditions appear to be unfavorable in the Sein Fein workings, there is a possibility that more favorable geologic conditions and a significant body of ore might be encountered by the exploration proposed, that is, by driving the incline downward along the dip of the fault zone and by drifting along the strike of the fault zone. Therefore, Government aid is recommended in a proposed project involving 300 feet of each shaft sinking and drifting, at an estimated total cost of $22,797.00. The applicant can be expected to finance 30 percent of the estimated cost of the project and to complete the proposed explorations in an efficient and acceptable manner.

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~~[illegible]~~	RUN / STOP	DMEA - 4277 Base Metals Code 500 X-ter Copies.	RUN / STOP
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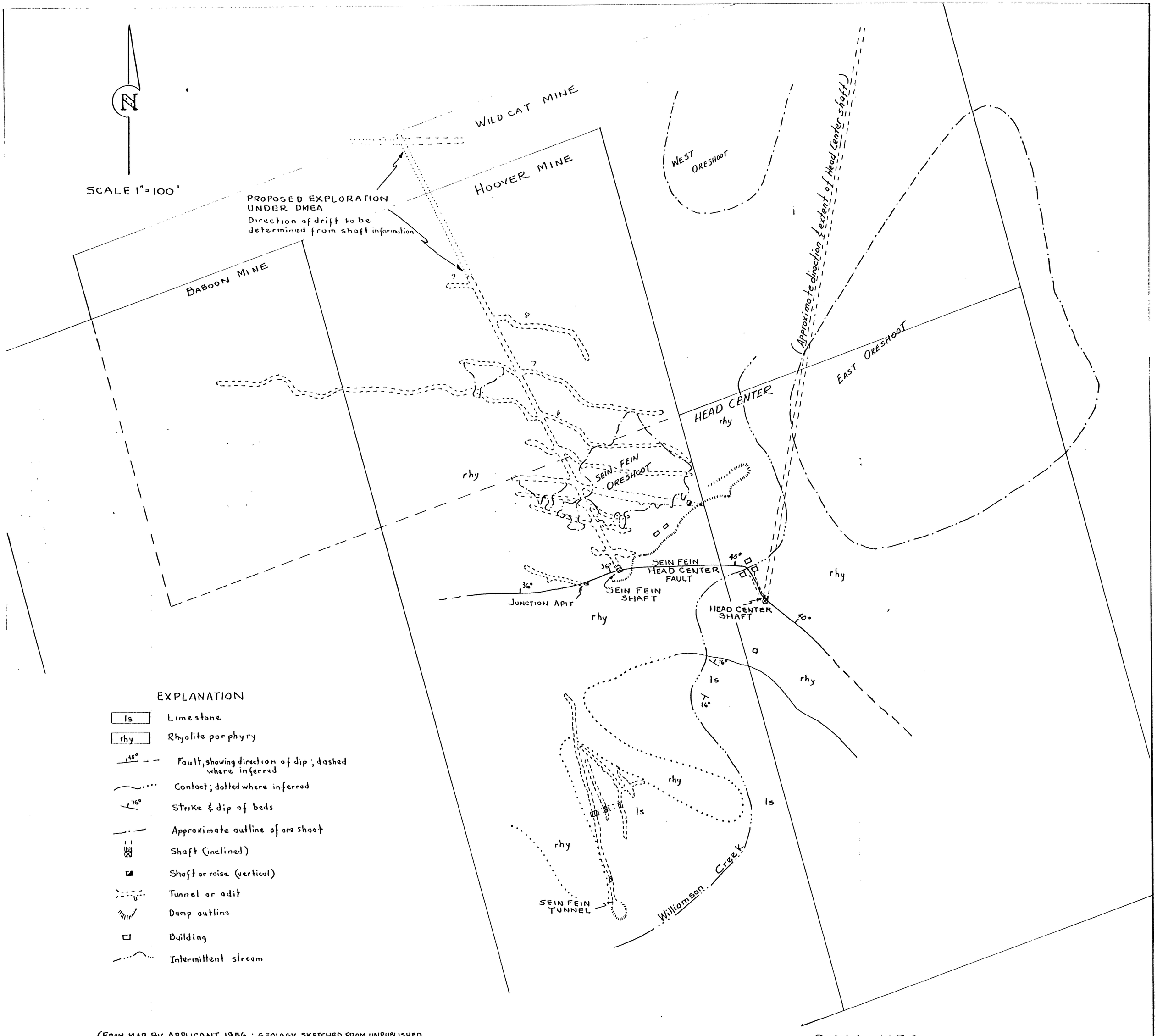
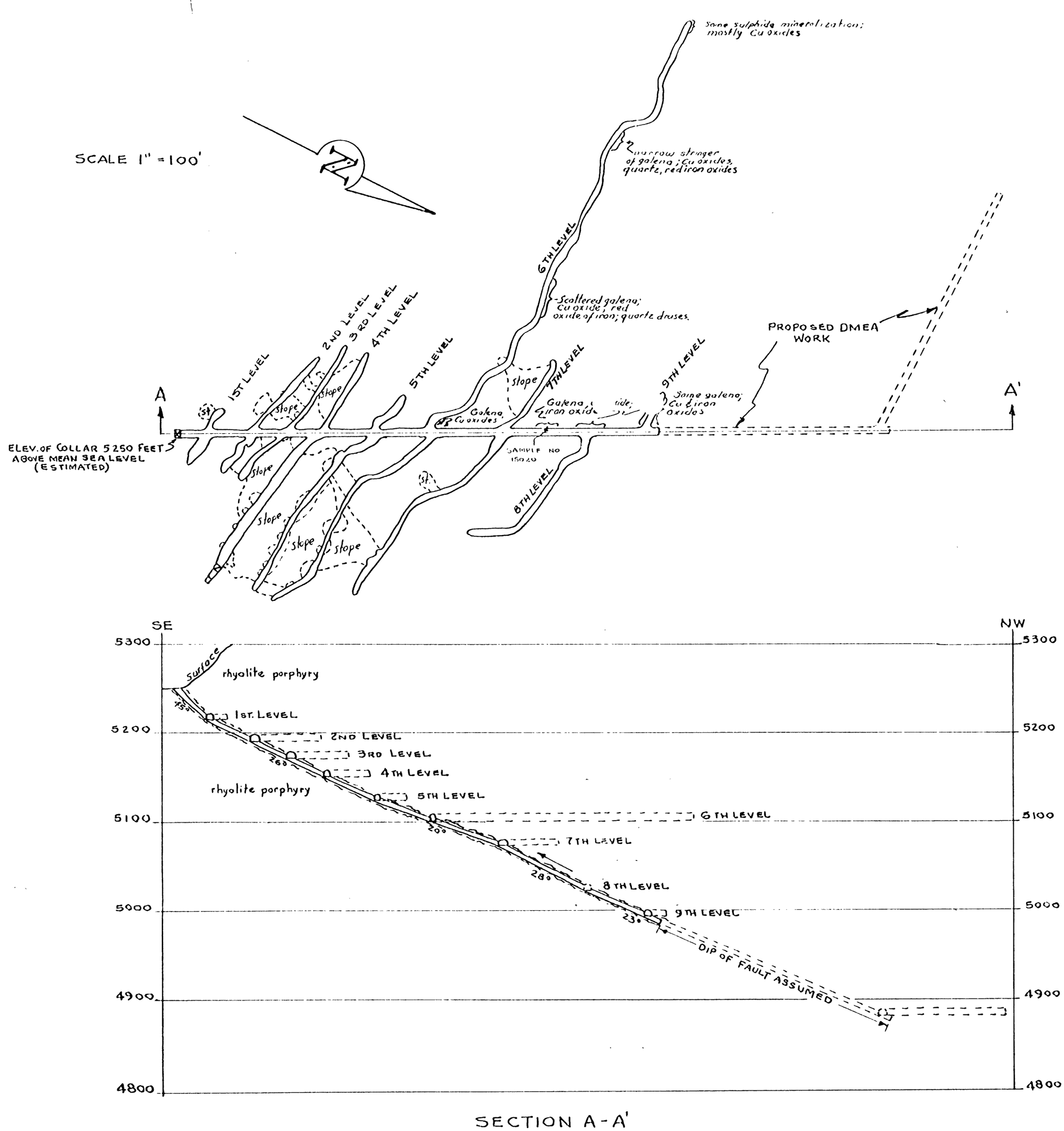


(FROM MAP BY APPLICANT, 1956; GEOLOGY SKETCHED FROM UNPUBLISHED MAP BY E.P. WILSON, 1942; AND BRUNTON & TAPE SURVEY 1956)

DMEA 4277

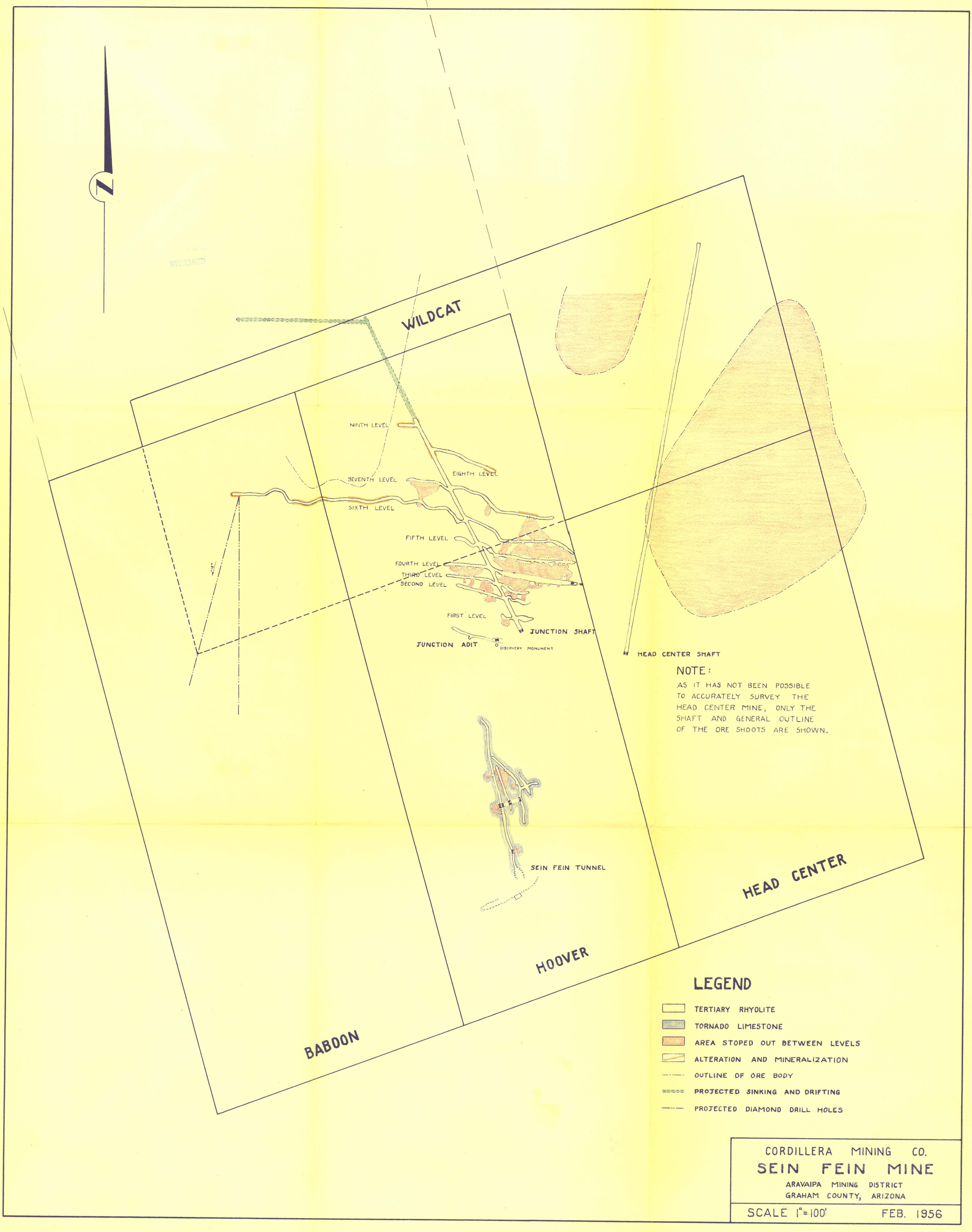
FIGURE 2.- AREAL GEOLOGY AT SEIN FEIN MINE, CORDILLERA MINING COMPANY, GRAHAM COUNTY, ARIZONA



SECTION A-A'

DMEA 4277

FIG.-3-PLAN OF SEIN FEIN MINE AND SECTION THROUGH SHAFT, CORDILLERA MINING COMPANY GRAHAM COUNTY, ARIZONA


N
WILDCAT
NINTH LEVEL
SEVENTH LEVEL
EIGHTH LEVEL
SIXTH LEVEL
FIFTH LEVEL
FOURTH LEVEL
THIRD LEVEL
SECOND LEVEL
FIRST LEVEL
JUNCTION SHAFT
JUNCTION ADIT
DISCOVERY MONUMENT
HEAD CENTER SHAFT
NOTE:
AS IT HAS NOT BEEN POSSIBLE TO ACCURATELY SURVEY THE HEAD CENTER MINE, ONLY THE SHAFT AND GENERAL OUTLINE OF THE ORE SHOOTS ARE SHOWN.
SEIN FEIN TUNNEL
HEAD CENTER
HOOVER
BABOON
LEGEND
TERTIARY RHYOLITE
TORNADO LIMESTONE
AREA STOPED OUT BETWEEN LEVELS
ALTERATION AND MINERALIZATION
OUTLINE OF ORE BODY
PROJECTED SINKING AND DRIFTING
PROJECTED DIAMOND DRILL HOLES
CORDILLERA MINING CO.
SEIN FEIN MINE
ARAVAIPA MINING DISTRICT
GRAHAM COUNTY, ARIZONA
SCALE 1"=100'
FEB. 1956