DMEA Form 9

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration

OFFICIAL DOCKET FILE

DMEA NO. 4461

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(Withdrawn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

9775

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

RECEIVED
SEP 12 1956

224 New Customhouse
Denver 2, Colorado

September 10, 1956

Memorandum

To: Secretary to the Operating Committee, DMEA

From: DMEA Field Team, Region III

Subject: Application for DMEA Aid (Lead-Zinc-Copper), Tech-Ser Mining Company (Caledonian mine), San Juan County, Colorado.

Enclosed are three copies of the subject application, in the amount of $131,320.00. One copy of the application is being retained in our files.

DMEA Field Team, Region III

By W. M. Traver
W. M. Traver
Executive Officer

Enclosures

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

By

TECH-SER MINING COMPANY

For

CALEDONIAN MINE

C O P Y

P. O. Box 517
Silverton, Colorado

DMEA
DEPARTMENT OF THE INTERIOR
SEP 5 1956
REGION III
DENVER, COLORADO

September 2, 1956

Defense Minerals Exploration Administration
Department of the Interior
New Customs House Building
Denver, Colorado

Dear Sirs:

Under separate cover, I am forwarding an application for aid in an exploration project pursuant to DMEA Order 1, under the Defense Production Act of 1950, as amended.

The property for which the application is made is near Silverton. In view of the early snow fall to be expected in this district, I hope that a surface examination, if such is required, can be made within the next two months or the project may have to be postponed until next May or June.

I would appreciate any consideration you may give this problem.

Yours very truly,

TECH-SER MINING COMPANY

R. A. Hildebrand, President

RAH:gw

C O P Y

MF-103
(Revised April 1952)

DMEA
DEPARTMENT OF THE INTERIOR
SEP 10 1956
REGION III
DENVER, COLORADO

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

RECEIVED
SEP 12 1956

DMEA
DEPARTMENT OF THE INTERIOR
SEP 5 1956
REGION III
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. 4461
Metal or Mineral Lead-Zinc-Copper
Date Received 9-12-56
Estimated Cost $131,320.00
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: Tech-Ser Mining Company, P. O. Box 517, Silverton, Colorado

(*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. Colorado Corporation

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

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

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 information sheet.

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

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Lessee

(*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. See Appendix "A" of Exhibit "A"

(*e*) If you own the land, describe any liens or encumbrances on it ~~See attached information sheet.~~

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

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. See attached information sheet

(*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. See attached information sheet.

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

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

16—66551-1

See attached information sheet.

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

(*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 ..... days and be completed within ..... 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)?

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

☒ Money ☒ 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 September 7, 1956

Tech-Sec Mining Co
(Applicant)

By R A Hildebrand
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 (c)

R. A. Hildebrand, President, Silverton, Colorado.

R. M. Hurst, Vice President, P.O. Box 1949, Grand Junction, Colorado

R. T. Brown, Vice President, 525 Chipeta Ave., Grand Junction, Colorado.

B. E. Hartmann, Vice President, c/o Badger Highways Co., Menasha, Wisconsin

3 (a)

Patented Lode Mining Claims and Mill Sites

Name of Claim	Patent Survey No.
Artois Lode Mining Claim	872
Artois Mill Site	872-B
Livingston Lode Mining Claim	876
Livingston Mill Site	876-B
Occident Lode Mining Claims	875
Occident Mill Site	875-B
Tremmore Lode Mining Claim	874
Tremmore Mill Site	874-B
Tantallon Lode Mining Claim	873
Tantallon Mill Site	873-B
Standard Lode Mining Claim	19026
Dundee Lode Mining Claim	19050

Unpatented Lode Mining Claims

Nellie B.
Nellie 1 B
Nellie 2 B
Nellie 3 B
Livingstone - 2 B
Livingstone 3 B
Tantallon 2 B

It is requested that any ore mined from the developed block of ground east of the upper level Caledonian cross-cut be excluded from the exploration contract royalty schedule.

3 (f)

Name of Claim	Book No.	Page No.
Nellie B	183	198
Nellie 1 B	183	199
Nellie 2 B	183	200
Nellie 3 B	183	201
Livingstone 2 B	183	196
Livingstone 3 B	183	197
Tantallon 2 B	183	195

4 (a)

I Mine Workings (See Plates I and II)

(1) Upper Level (accessible and in good condition)

700 feet of cross-cut, 600 feet of drift.

(2) Lower Level (in good condition except for caved portal, accessible through raise from upper level)

860 feet of cross-cut, 850 feet of drift.

(3) Main Raise (in good condition)

235 feet of manway and ore pass connecting the upper and lower level.

(4) Manway raises (in good condition)

3 Manway raises (total 225) provide access into stoped area.

(5) Caved workings (Data from United States Bureau of Mines maps for project No. 1500-858)

(a) Upper East Tunnel
100 feet of cross-cut, 200 feet of drift.

(b) Winze tunnel
30 feet crosscut and 90 feet of drift. Depth of winze is unknown.

(c) Livingston tunnel
180 feet of crosscut, 600 feet of drift.

(d) Occident tunnel
250 feet of drift.

II Production Facilities

Mine Equipment:

1 2-ton electric trammer
6 rocker-dump mine cars
2 end-dump mine cars
1 600 CFM diesel compressor
1 Jackhammer and airleg
2 stopers
3 air tuggers
1 slusher
1 mucking machine

Mine Installations:

1 Butler building bunkhouse
1 ore bin (120 ton capacity)
Rail, air and water line in both upper and lower levels.

III Past Mining Operations

Drifting, crosscutting, raising, sinking, and stoping. (See Plates I and II)

The applicant had no interest or participation in these past mining operations.

IV Present Mining Operations

(1) Retimbering of lower-level portal

(2) Stope preparation of Block B (See Plate 2)

(3) Sublevel drifting to the east from manway into Block A (See Plate 2)

All present operations are carried on in the interest of the applicant.

4 (b)

Past Production

Year	Tons	Assays			
		Oz. Ag	% Pb	% Zn	% Cu
1942-1945	Several hundred	No record of assays			
1948	1,285.9	No record of assays.			
1949	44.4	2.10	4.85	7.70	0.74
1951-1952	583.9	2.19	4.90	6.79	0.74

Current Production- (None)

Ore Reserves

Reserves were calculated on the basis of sample assay and location data (See Plate II) collected by engineers of the U. S. Bureau of Mines, (Project No. 1500-853), Kenneth E. Knapp, and R. A. Hildebrand and R. M. Hurst of the Tech-Ser Mining Company.

Inasmuch as assay data are incomplete, shipping averages of past production were used for average ore grade. This average assay figure was found to be : 2.18 ozs. Ag., 4.90% Pb., 6.88% Zn., 0.74% Cu.

Tonnages were calculated from Plate II

1. Measured ore - none

2. Indicated ore:

Block	Tons
A	7,790
B	5,440
C	1,688
D	1,688
	16,606

3. ~~Developed~~ Inferred Ore:

Block	Tons
E	8,100
F	4,622
G	5,215
H	4,059
K	2,025
L	12,506
M	11,212
	47,830

4 (c) Geology

The Caledonian mine lies within the peripheral zone influenced by the Silverton Caldera.

Failure of the crust during late Mesozoic or early Tertiary time through upthrusting of igneous masses resulted in a radial fracture pattern. Later gravitational adjustment compensating for the large masses of volcanics extruded intermittently during Tertiary time offset the radial fracture pattern along peripheral faults.

These fracture patterns are of present economic importance as they are the loci of the ore deposits of the Silverton district.

The rock formations exposed in the Caledonian area are entirely Tertiary volcanics.

Caledonian Geology

In the vicinity of the Caledonian there are 3 principal steeply dipping fracture patterns. The oldest pattern is believed to be represented by the Occident vein which strikes S. 30° E. It is intersected by the Caledonian and Livingston fracture patterns, striking S. 60° E. and N. 30° E. respectively. These 3 fracture patterns intersect approximately 700 feet west of present mine workings. (See Plate III).

The upper level Caledonian workings are believed to be in the lower portion of a pyroxene-andesite member of the Silverton volcanic series close to the underlying Burns latite contact. The lower level heading exposes a strong quartz-filled fissure carrying minor amounts of sulfide mineralization.

Mineralization and Ore Controls

The ores contained in the Caledonian vein are for the most part base metal sulfides of lead, copper, and zinc with minor amounts of gold and silver. The mineralization is believed to be Tertiary in age, and the ore deposits occur as typical fissure filled shoots.

The localization control is mechanical bearing a direct relationship to the intensity of fracturing and the location of the areas of pre-mineral voids in the fracture zones.

Vertical continuity is dependent on the physical properties of the different host rocks. The order of favorability of rocks in the Caledonian area is as follows: (1) Burns Latite (2) Pyroxene Andesite (3) Eureka Rhyolite.

Exploration to date in the Silverton district has not revealed a definite depth cut-off or "bottoming out" of the ore. In most of the mines the vertical range of workings is limited by the elevation of the lowest surface entry the topography has afforded.

Considering the above mentioned ore controls, the following areas represent promising exploration targets:

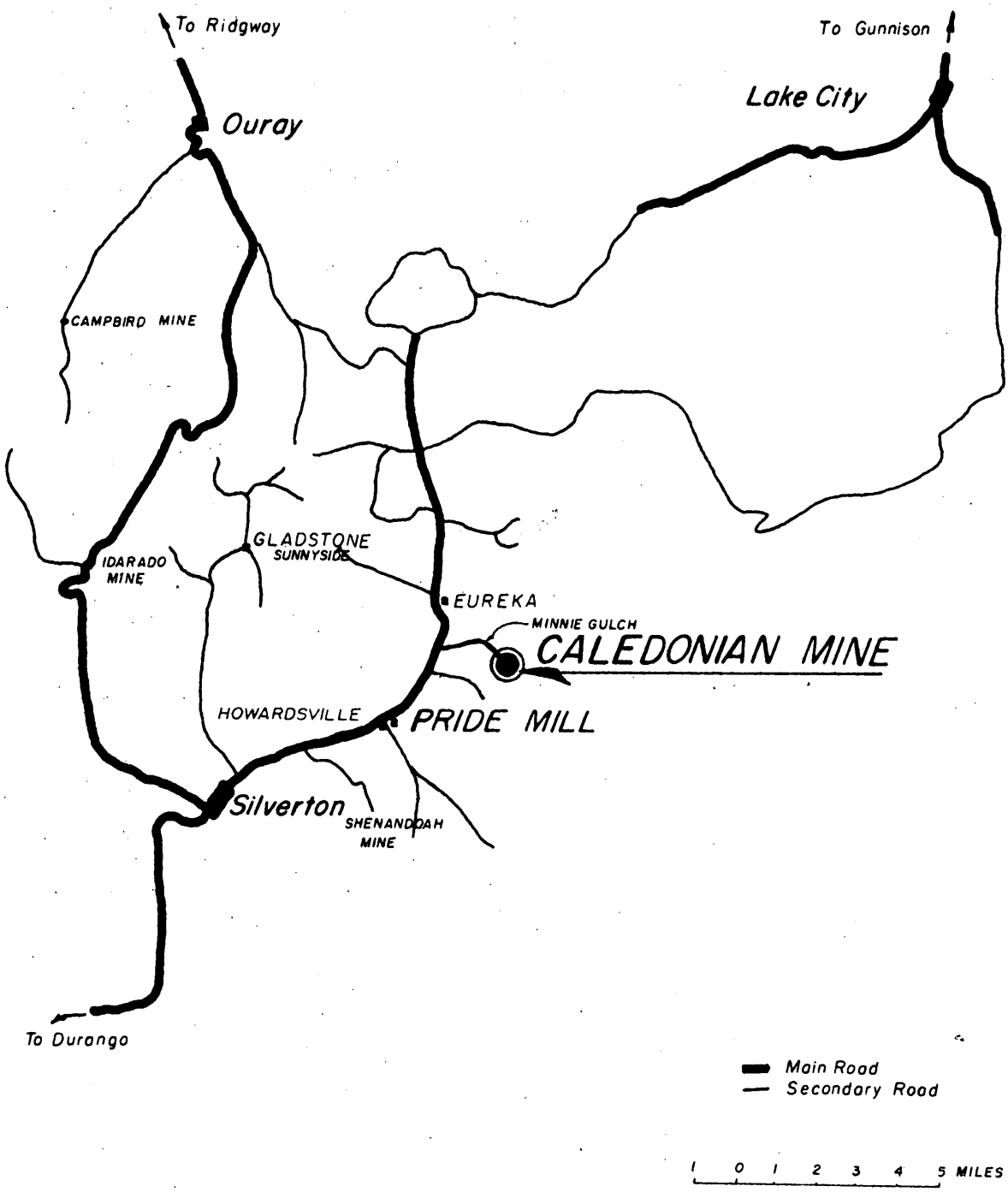
(1) Intersections of faults or fissures where maximum fracturing can be expected.

(2) Zones of vein strike variations where strike-slip movements along warped fault surfaces have dilated the fissure providing space for ore deposition.

(3) Downward extensions of ore shoots into lithologically favorable formations.

4 (d)

The Caledonian mine is situated at an altitude of 11,000 feet in Minnie Gulch, Eureka Mining District, San Juan County, Colorado, 8 miles northeast of Silverton. (See figure 1, Page 6.



LOCATION MAP figure I

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A good mine road (2.3 miles) connects the mine with a maintained gravelled road (5.7 miles) which leads into Silverton.

Silverton is the major supply and residence point for the proposed project. Other supply points are Grand Junction and Denver, 126 miles and 383 miles respectively from Silverton.

Although the narrow-gauge Denver and Rio Grande railraod provides Silverton with a rail head during the summer months, it is generally more practical to truck from Silverton 33 miles to the rail head at Ridgeway.

4 (e)

Skilled labor and supervisory personnel currently employed by the applicant will be available for the project. Materials and supplies needed are available in Silverton. Equipment is on the property.

An adequate supply of water for mining and drinking purposes is available from inside the mine and from a spring near the lower-level portal.

No electricity is available at present and all prime movers will be diesel powered.

5 (a)

Galena, sphalerite and a minor value of chalcopyrite.

5 (b)

The applicant bears in mind the following exploration targets:

(1) The downward extension of block C & D (see Plate II) to the lower level.

(2) Areas of changing strike along the vein containing ore shoots.

(3) The area of intersection of the 8 major fracture patterns.

(4) Downward extensions of any indicated ore shoots.

The objective to explore for undeveloped ore reserves in the above mentioned 4 areas can best be attained by exploratory drifting.

It is proposed that a 2-stage exploration project be carried out. Work under Stage 2 to be carried out only if stage 1 work is completed successfully, and after the project has been re-evaluated.

Stage 1

Exploratory Drift

Advance the lower level Caledonian drift 1200 feet northwest as indicated on Plate III. This drift will have a back to surface exceeding 500 feet.

Stage 2

Exploratory Drift

Advance the Livingston drift 1600 feet northeast as indicated on Plate III. This drift will have 500 feet back to the lower Caledonian level.

It is proposed that the drifts be driven with a 6 by 7 foot cross-section to allow for tracked mechanical loading.

5 (c)

Stage 1 work will start within 10 days and be completed within 12 months from the date of an exploration project contract.

Stage 2 work will start within 1 year and will be completed within 24 months from the date of an exploration project contract.

5 (d)

The operating background and experience of the applicant, the Tech-Ser Mining Company, consist of 14 months of mining and contract drifting experience in the Silverton district. The Tech-Ser Mining Company in addition to operating the Caledonian is the operator of the Osceola mine producing 90 ton of lead-zinc ore per day. Also, the Tech-Ser Mining Company is currently contracting the driving of 1600 feet of drift for Silver Bay Mines, Inc.,

The proposed exploration project will be supervised by Mr. Jack S. Diskin, general superintendent, and Mr. Robert A. Hildebrand, President of the Tech-Ser Mining Company.

1. Jack S. Diskin, graduated from the Colorado School of Mines with the degree of engineer of mines, has had 4 years of varied mining experience in base metals. This experience includes work as a contract miner, mine engineer, and mine superintendent. Mr. Diskin was employed by the Climax Molybdenum Co. (1 year), San Manuel Copper Corporation (2 yrs.), and the Tech-Ser Mining Company.

2. Robert A. Hildebrand, graduated from the Colorado School of Mines with the degree of geological engineer and completed the course in business management from LaSalle University. During the past 2-1/2 years Mr. Hildebrand worked as a geologist and served as treasurer and president of Tech-Ser Mining Company.

6 Estimate of Costs: For detailed explanation, see Exhibit "B".

6 (a) - None

6 (b)

Labor - - - - - - - - - - - - -	$15.00 per ft.	
Supervision - - - - - - - - - -	1.50 per ft.	
Engineering - - - - - - - - - -	1.50 per ft.	$18.00 per ft.

6 (c)

Explosives - - - - - - - - - - -	2.82 per ft.	
Steel and bits - - - - - - - - -	3.15 per ft.	
Fuel - - - - - - - - - - - - - -	0.76 per ft.	6.73 per ft.

6 (d)

Equipment Use Allowance - - - - - - - - - - - - -	7.79 per ft.

6 (e) - None

6 (f) - Installations

Track - - - - - - - - - - - - -	2.50 per ft.	
Pipe - - - - - - - - - - - - -	1.02 per ft.	
Vent tube - - - - - - - - - - -	1.00 per ft.	4.52 per ft.

6 (g) - Miscellaneous - - - - - - - - - - - - - - - - - 5.52 per ft.

6 (h) - Contingencies - The applicant requests that an allowance be made to cover contingencies arising during the course of the exploration project such as unforseen timber requirements and water problems. A 10% allowance should cover any eventualities. 4.34 per foot.

$ 46.90 per foot.

Total cost of Stage 1 Exploratory Drift (1200 x $46.90) = $56,280.00.

Stage 2 Exploratory Drift

It is expected that costs per foot of this drift will equal those of Stage 1 drift. Total cost of Stage 2 Exploratory Drift (1600 x $46.90) = $75,040.00.

7 (a) - Yes

7 (b)

Stage 1 Exploratory Drift

Money - $18,792.00

Use of Equipment - 1200 x $7.79 per ft (See Exhibit "B") = $9,348.00.

Total - $28,140.00

Stage 2 Exploratory Drift

Money - $25,056.00

Use of Equipment - 1600 x $7.79 per ft (See Exhibit "B") = $12,464.00

Total - $37,520.00

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 September 2nd, 1956

(Applicant) Tech-Sec Mining Company

By R. A. Hildebrand
President (R. A. Hildebrand)

R. T. Brown
Secretary (R. T. Brown)

EXHIBIT "B"

6 (b)

Labor

2 miners on contract @ $12.00 per ft.	$ 12.00 per ft.	
1 trammer @ $15.00 per day	3.00 per ft.	$15.00/ft.

Supervision and Engineering

1 Superviser @ $450/mo - 1/3 of time	1.50 per ft.	
1 Engineer @ $450/m - 1/3 of time	1.50 per ft.	3.00/ft.

6 (c)

Explosives

1 Case Powder per 5-foot round	$11.00/round		
25 caps @ $0.0204 per round	0.51/round		
200 ft of fuse @ $0.018 per round	2.60/round	14.11 per round	2.82/ft.

Steel and Bits

2 bits per hole or 50 bits per 5 ft. round @ $0.215/bit is $10.75/round.
1/2 steel per round - $5.00 per round.
Total - $15.75 per round - - - - - - - - - - - - - - - - - 3.15/ft.

Fuel

20 gals. diesel/5-foot round = $3.80/round - - - - - - - - 0.76/ft.

6 (d)

Equipment	Cost	Life in years	% Use Applied to project	Use Allowance per year
1 Machine (Hammer and Jackleg)	$ 800.00	1	100%	$ 800.00
1 Mucking Machine	3,300.00	2	100%	1,650.00
1 Compressor 600 cfm	12,000.00	2	50%	3,000.00
1 Ventilation fan	800.00	2	100%	400.00
6 Mine cars	2,500.00	5	100%	500.00
1 Trammer (2 ton elect)	6,000.00	3	100%	2,000.00
1 Vehicle	2,000.00	2	100%	1,000.00
				$ 9,350.00/yr.
				$ 7.79/ft.

6 (f)

Track

Rail - $15.00/100 lbs. $0.15/lb x 20 lbs/yd x $\frac{1}{3}$ ft/yd.=$1.00/ft.
Track - 2 x $1.00 per ft. - - - - - - - - - - - - - - - - 2.00/ft.
Ties, spikes, bolts and fishplates - - - - - - - - - - - 0.50/ft.

Pipe

Air Line - 3 inch @ $0.80/ft. Water Line - 1 inch @ $0.22/ft. - - - - - - - - - - - - - - - -	$ 1.02/ft.
Vent tube -	1.00/ft.

6 (g)

Miscellaneous

Maintenance - $100.00 per month	1.00/ft.	
Analytical work (1 Assay per 5 ft)	2.00/ft.	
Accounting - $100.00 per month	1.00/ft.	
Workmens Compensation 3.44% of wages @ $18.00/ft.	0.62/ft.	
Federal Unemployment Comp.Ins. @ 3% of wages @ $18.00/ft.	0.54/ft.	
Payroll Taxes @ 2% of Wages @ $18.00/ft.	0.36/ft.	5.52/ft.

Exhibit A

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ECONOMIC EVALUATION OF THE CALEDONIAN MINE, EUREKA MINING DISTRICT, SAN JUAN COUNTY, COLORADO

Date: February 1, 1956

By _____
R. T. Brown

By _____
B. E. Hartmann

By _____
R. A. Hildebrand

ECONOMIC EVALUATION OF THE CALEDONIAN
MINE, EUREKA MINING DISTRICT,
SAN JUAN COUNTY, COLORADO

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Plate I Plan of Underground Workings . . . . .In Pocket

Plate II Vertical Section, Caledonian Vein . .In Pocket

Plate III Caledonian Claims, Surface Features and General Outline of Underground Workings . . In Pocket

ABSTRACT

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The Caledonian mine is located 8 miles northeast of Silverton, Colorado. The property has good access roads and is located 4 miles from the Pride Mill.

The low-cost shrink-stope method of mining can be used in the strong ore and strong wall rock. Milling facilities are available for the treatment of 100 tons of ore per day. There are 4 vein structures on the property which present good exploration possibilities.

About 16,600 tons of ore are indicated by sample data and inspection of mine workings. This tonnage is available for immediate production. An additional 47,830 tons are inferred, and this tonnage is available with a minimum of development. A possible 746,000 tons can be developed by exploring the 4 known vein structures.

An estimated profit of $397,570.00 can be realized from the developed ore. An estimated net of $4,600,000.00 is possible from the development of additional tonnage in the 4 veins. A total expenditure of $72,550.00 should be sufficient to put the mine in production.

INTRODUCTION

The following report was compiled from data supplied by Kenneth Knapp, U. S. Bureau of Mines maps, charts and reports for Project No. 1500-853 and observations by the writers. The writers, R. T. Brown, B. E. Hartmann, and R. A. Hildebrand are stockholders of Tech-Ser Mining Company and have a financial interest in the property.

NAME OF PROPERTY

The name of this property is the Caledonian Mine and in the past has been a silver, lead, zinc, and copper producer.

LOCATION

The Caledonian Mine is located in Minnie Gulch, Eureka Mining District, San Juan County, Colorado. The mine is 8 miles northeast of Silverton, Colorado at an altitude of 11,000 feet. (See Figure I).

CLIMATE AND WORKING SEASON

The 11,000 foot altitude and the rugged mountainous terrain

are responsible for the cool pleasant summers and the rigorous winters common to the San Juan region. The approximate operating season is 7 months without snow-removal equipment. The county road crew will keep roads open for an additional 3 months. During the severe winter of 1951 - 1952 The American Zinc, Lead and Smelting Co. operated without interruption by keeping a D-7 Caterpillar bulldozer on the property. Halftrack-Ski Snowmobiles capable of winter travel under the most severe conditions are available from Bombardier Snowmobile, Ltd. of Valcourt, Quebec, Canada. The cost is approximately $3,400.00 for a 12-passenger snowmobile vehicle.

CLAIMS
(See Plate III)

The following claims make up the Caledonian property:

Artois Lode Mining Claim Survey No. 872
Artois Mill Site Survey No. 872B
Livingstone Lode Mining Claim Survey No. 876
Livingstone Mill Site Survey No. 876B
Occident Mill Site Survey No. 875B
Occident Lode Mining Claim Survey No. 875
TrenmoreLode Mining Claim Survey No. 874
TrenmoreMill Site Survey No. 874B
Tantallon Lode Mining Claim Survey No. 873
Tantallon Mill Site Survey No. 873B
Standard Lode Mining Claim Survey No. 19026
Dundee Lode Mining Claim Survey No. 19050

Unpatented Lode Mining Claims
Nellie B (A)
Nellie 1B
Nellie 2B
Nellie 3B
Livingstone No. 2B
Livingstone No. 3B
Tantallon No. 2B

(Did check these)

ADJOINING AND OTHER NEARBY PROPERTIES

Kittimac - The Kittimac workings are located about 1000 feet east of the Caledonian portal and are believed to lie on the same vein structure as the Caledonian workings. The lowest level of the Kittimac mine is some 300 feet higher in elevation than the main-tunnel level of the Caledonian mine. The property is reported to have 400 feet of ore exposed in the floor of its lowest workings.

Past production is reported to have been in excess of one million dollars gross value. The property is now idle and is believed to have been last operated about 1915.

OWNERSHIP AND TITLE

The Caledonian group is owned by Harry G. Knapp, Kenneth E. Knapp, Martin B. Williams, and Frank A. Williams, Jr., who on

November 1, 1955 leased the property to Tech-Ser Mining Co., a Colorado corporation. A copy of the lease agreement is included in Appendix A of this report.

HISTORY

The original property was known as the Beaton group of mines and was later organized as the Peerless San Juan Mining Co., still later it was reorganized as the Caledonian Mining and Milling Co. and incorporated under the laws of Wyoming. The original property consisted of five lode claims and five mill site claims. Subsequent prospecting resulted in the location of thirteen additional claims, all contiguous with the original claims. Seven lode claims and five mill-site claims are patented. Active development was pursued prior to and during World War I, but work was discontinued a few years later after the driving of a 235-foot raise between the two levels in 1921. Judging from old assay reports, the Caledonian Mining and Milling Co. was moderately active during the years 1928 to 1930, and again in 1937. The mine was in operation again in 1942 to 1945 when an old stope was filled and several hundred tons of ore were shipped. Operators have in the years 1948 and 1949 mined 1285 tons of ore and have shipped to custom mills a total of 1330 tons of both previously broken and newly

mined ore. In 1950, the mine was idle except for some repairs to the timbering in the lower tunnel. The last work was done in 1951-1952 by the American Zinc, Lead and Smelting Co.

Previous known operators are R. C. Beaton, John Leith, Carl H. Peterson, Willard Bascom, and The American Zinc, Lead and Smelting Co. The Tech-Ser Mining Co. acquired a lease on the Caledonian property on November 1, 1955.

PRODUCTION

(a) Past Production

Year	Tons	Assays			
		Oz. Ag.	%Pb	%Zn	%Cu
1942-45	Several hundred	No record of assays.			
1948	1285.9	No record of assays			
1949	44.4	2.10	4.85	7.70	0.74
1951-52	583.9	2.19	4.90	6.79	0.74

(b) Present Production

The Caledonian property is idle at the present time. It is estimated that a production of 50 tons per day could be achieved in approximately 60 days and that this rate could be increased to 100 tons per day within 4 to 6 months.

FACILITIES

(a) Transportation: (See Figure 1)

A paved and graveled road extends from Silverton north to Eureka and passes within 2.3 miles of the mine. The mine road is an improved dirt road having several sharp switchbacks but can readily be traveled by conventional vehicles. The San Juan County Road Maintenance Department will maintain this road when the mine is in operation. A mine road leads from the main portal to the upper-level portal and is in good condition. This road can be used for hauling supplies to the upper level.

(b) Power:

No power facilities are available on the property. Electric power lines pass within 2.3 miles of the property.

(c) Water:

Drinking water is available from a spring located a few feet from the bunkhouse. Ample water for mine use is available within the mine.

(d) Timber:

Timber for mining purposes is available as salvage from the old Caledonian Mill building and from timber growth available on the mill site claims. Cut mine timber can be purchased at

Gunnison, Montrose, and Norwood, Colorado. Mine timbers are also available at higher prices from the Shenandoah Dives property, about 6 miles from the Caledonian mine. It is generally more economical to get timber by the load from the more distant mills.

(e) Housing:

A substantial log bunkhouse (two-stories, 8 rooms) constructed from hand hewn logs (8" x 8") and generally in good condition is available. New windows and doors would allow this bunkhouse to be used for a living place for 10 to 20 men. A new compressor house located at the mine portal houses the compressors and provides work bench facilities. A covered ore bin is located immediately across the road from the mine portal. This bin has a storage capacity of approximately 120 tons.

EXTRACTIVE FACILITIES

The Pride Mill is located at Howardswille 4 miles from the mine. Treatment of ores at the mill is on a per-ton charge basis and is presently $6.00 per ton for small lots.

The operators have indicated a willingness to reduce this rate

to $5.00 per ton and possibly less for shipments which would allow sustained mill operation. The Pride Mill has a capacity of 100 tons per day and attains maximum efficiency at approximately 85 tons per day. The mill capacity could readily be increased to 150 ton per day capacity by addition of a crusher, if conditions should warrant it.

Metallurgical extraction of the ores from the vicinity of Cunningham and Minnie gulches has generally averaged 92% or better. The concentration ratio is approximately 10 to 1 with lead concentrates averaging 50% lead and the zinc concentrate averaging 50% zinc.

The copper and silver values go into the lead concentrate. The Midvale lead smelter of U.S.S.M. & R. pays for the copper and silver at the market price. The shipper is responsible for marketing his own concentrates, paying the mill its treatment charge.

Smelters operated by U. S. Smelting Mining and Refining Co. for lead and zinc are located at Midvale, Utah and Great Falls, Montana.

MINE DEVELOPMENT

Approximately 3,690 feet of drifts, crosscuts and raises have been completed in the Caledonian mine.

(a) Upper Level (good condition)
700 feet of Crosscut, 600 feet of drift

(b) Main Raise (good condition)
235 feet, timbered with manway and orepass

(c) Lower Level (good condition)
860 foot crosscut, 650 foot drift, portal caved

(d) Manway raises (good condition)
A total of 225 feet of manway raises to stopes

(e) Caved Workings -(Data from USBM maps)
1. Upper East tunnel
   100 foot crosscut and 200 foot drift
2. Winze tunnel
   30 foot crosscut and 90 foot drift
   (Winze of unknown depth)

The mine portal is caved and measurements indicate approximately 50 feet of caved area which should be cleaned out and retimbered.

Approximately 1200 feet of the vein has been prospected by these two levels. The amount of vein explored on each level is approximately 600 feet.

GEOLOGY

General:

The areal geology of the Silverton area has been described in detail by Ransome, Cross, Howe, Burbank, and Kelley. (See Bibliography) A brief summary of the regional geologic relationships in the area of the Caledonian mine is presented in this portion of this report.

The San Juan complex began to develop in late Paleozoic time with intermittent cycles of uplift and erosion. By early Tertiary time the overlying Paleozoic and Mesozoic sediments had been removed exposing the pre-Cambrian basement rocks in the central portion of the area surrounded by remnants of those early sediments.

Extreme vulcanism in middle and late Tertiary time deposited some 5,000 feet of flows and breccias over the area in a broad dome.

The Silverton Caldera, or downwarp, gradually formed during the stages of vulcanism to compensate for the tremendous volume of volcanics extruded.

Internal stresses were relieved by peripheral ring faults which are subordinate to the radial fracture patterns surrounding the Silverton center. In latest Tertiary time small intrusive bodies invaded the larger zones of weakness resulting in dikes, small stocks, sills and associated volcanic necks and vents.

The most productive mineral deposits have been located in the primary radial fracture pattern around the fringe of the major peripheral caldera faults. Intersections of these primary fractures with other secondary structural patterns have also produced large bodies of base-metal ores containing variable amounts of gold and silver. The Silverton area has produced, in all, some $500,000,000.00 gross value of metallic ores.

The most productive portions of the veins, vertically, have been found in the lithologically favorable portions of the volcanic series. Deep exploration in some mines, however, indicates that good ore shoots do extend into the lithologically favorable portions of the earlier sediments, particularly in the Ouray District and the western portions of the San Juan complex.

Very late glaciation and subsequent erosion have sculptured the dome into numerous cirques, sharp ridges, deep V-shaped valleys, and many mountains rising to elevations in excess of 13,000 feet.

Climatic conditions for the most part are Alpine particularly in the higher mountains. The area receives abundant snowfall in the winter months and considerable amounts of moisture in the summer.

Local:

The geology of the Minnie Gulch area surrounding and adjacent to the Caledonian mine has not been studied in sufficient detail to adequately explain its many complexities. However, this local area is adjacent to the Cunningham Gulch area, the geology of which has been correlated in sufficient detail to be used as a guide in evaluating observed geologic phenomena in the Minnie Gulch area.

Stratigraphy:

Rocks in the Caledonian area range in age from pre-Cambrian

to Tertiary. With the exception of possible remnants of the Ouray limestone engulfed in the pyroclastics and flows of the Tertiary volcanics there are no known sedimentary rock exposures in the Caledonian area. There are known surface exposures of pre-Cambrian rock to the south and west of the Caledonian mine and workings in mines in the adjacent vicinity have cut Archean schists and gneisses which represent this basement pre-Cambrian complex.

The Tertiary volcanics in this area are basically subdivided into three principal units. The uppermost unit, the Potosi volcanic series, is not present in the Minnie Gulch area. The middle portion of the Tertiary volcanics has been named the Silverton volcanic series and it is with this unit that we are primarily concerned. It is underlain by the San Juan tuff which rests on the Telluride conglomerate. The Telluride conglomerate, which represents a prolonged period of erosion, separates the volcanics of Tertiary age from the Paleozoic and Mesozoic sediments of pre-volcanic origin.

The Caledonian mine workings are believed to be in the lower portion of the pyroxene-andesite member of the Silverton volcanic series and close to the Burns latite-pyroxene-andesite contact. The pyroxene-andesite member is a dark colored massive lava which does not differ greatly in general appearance from the massive facies of the Burns latite. The andesite, however, contains a greater abundance

of pyroxene and much less feldspar than the lower Burns latite member.

The Burns latite formation, approximately 1200-1500 feet thick, is exposed in the lower portions of Minnie Gulch and it comprises the large volume of rock exposed in Minnie Gulch down to its contact with the Eureka rhyolite exposed near the confluence of Minnie Gulch with the Animas River. The Burns latite formation has been subdivided into three principal lithologies; an upper tuff member, a middle latitic flow member, and a lower tuff-breccia member.

The Burns latite rests unconformably on the lower Eureka rhyolite unit and the contact is, for the most part, covered by overburden in the Minnie Gulch area. The upper member of the Eureka rhyolite unit is exposed near the confluence of the Minnie Gulch with the Animas River. The rhyolite has been subdivided by Burbank into an upper flow breccia, a medial tuff breccia, and a lower rhyolite flow. The Eureka rhyolite unit is probably 1800 feet thick in this local area.

The lower-most unit in the Silverton volcanic series is the Picayune andesite unit, however, there are no exposures of the lower portions of the Eureka rhyolite or the Picayune andesite in the immediate vicinity of the Caledonian mine.

Intrusive Rocks:

Many of the smaller fracture patterns contain dikes of andesite or latite. In the immediate vicinity of the Caledonian mine these structures have not been mapped but their age is believed to be older than the base-metal economic ore deposits, as in many cases the dikes have been fractured prior to ore deposition. Their bearing on ore deposition is not known but the dikes probably have in some cases acted as baffles in directing migration of ore solutions.

Structure:

The origin of the Silverton fissure pattern has a direct bearing upon the economic geology of the Caledonian and associated areas because of the intimate relationship between the fissures and the ore deposits.

The significant features of the relationship of the down-faulted central blocks in the Silverton volcanic center, its associated peripheral ring faults, and the surrounding radial primary fracture pattern with secondary intersecting patterns are listed below:

1. There is a striking contrast between the central blocks which are not highly fractured, and the surrounding fringe area which is dissected by a distinct pattern of concentric and radial fissures.

2. The concentric fissures and faults appear to be younger than the radial structural pattern for the radial pattern has been

offset by the arcuate structural pattern.

3. There appears to be a more or less regular distribution of igneous stocks around the fringe area of the marginal caldera faults.

4. The ore deposits of the volcanic centers which account for approximately 75% of the total production of the San Juan volcanic complex are almost without exception associated with the fissures outside of the central downfaulted blocks. In brief, Burbank explains this phenomenon as originating from a systematic failure of the crust by the upthrusting of igneous bodies followed by gravitational adjustments which compensated for the large mass of volcanics extruded. The basic support for this theory seems to be that the radial pattern was in existence before the central block subsided along the peripheral ring faults.

In the immediate vicinity of the Caledonian mine there are three principal fracture patterns. The first and oldest pattern is represented by the Occident vein and trends approximately S 30° E. It in turn is intersected by the Caledonian pattern on a trend of approximately S 60° E and the Livingstone pattern with a trend of approximately N 30° E. These three fracture patterns intersect a short distance to the west of the workings of the Caledonian mine (Plate 2). There are numerous smaller

fractures and fissures parallel to these three trends and sympathetic to them. The Caledonian fracture pattern and the Livingstone fracture pattern are believed to be of the same age. If both structural patterns are oriented into a strain ellipsoid with the Occident fracture representing the long axis of the ellipsoid, the Caledonian and Livingstone fractures would represent the diagonal shear patterns. One outstanding characteristic of the structure of the southern portion of the Silverton volcanic center is that there has been considerable vertical displacement on the peripheral ring faults while there has been only minor differential movement along the radial structural pattern. Voids now containing the ore minerals in the veins are believed to have been caused by either (a) differential movement along the warped fracture planes, and/or (b) surging sub-crustal movement creating tension on competent wall and vein rock resulting in extension fractures. Minor amounts of throw have been noted where secondary structural patterns have cut the radial fracture pattern along the fringe zone outside of the collapsed center.

Ore Deposition:

The San Juan region is, and has been, considered by most authorities to be a continuation of the Colorado mineral belt. The region lies in line with the direct extension of the Colorado Porphyry belt, which is directly related to the Colorado Mineral Belt.

Although there is evidence of pre-Cambrian mineralization and late Mesozoic mineralization of vanadium and chromium on the northern and southern flanks of the San Juan mountains, Tertiary mineralization has accounted for the bulk of the half-billion dollar production from the San Juan volcanic complex.

Ransome (1901, Page 43) has classified the mineral deposits of the Silverton area into three basic categories; veins, stocks, and replacement ore-bodies. Only a few deposits have occurred as replacement bodies and they have been associated with limestones and rhyolites. Veins, however, have accounted for the greatest production in the area. Mineralization in the Caledonian mine is a vein-type deposit and is believed to be early Tertiary in age.

There is an apparent relationship between the intensity of fissuring and the occurrence of ore in all of the localized productive areas. This is no exception in the local area of the Caledonian mine where vein intersections have produced the higher grade ore-bodies. In this local area the lithologically favorable Burns latite and to a lesser degree the pyroxene-andesite overlying the Burns latite have produced the largest tonnages of ore. The underlying rhyolite of Eureka age has been for the most part unproductive except in the Cunningham Gulch area where the upper portion of the Eureka rhyolite has produced large tonnages of ore in the Pride of the West and the Osceola mine.

The ores contained in the Caledonian vein are for the most part base metal sulphides of lead, copper, and zinc with minor amounts of gold and silver. There is evidence in the mine of considerable pre-mineral hydrothermal alteration followed by a stage of barren quartz. Later stresses refractured the zone of weakness generally along both walls of the vein and were followed by the stages of sulphide deposition resulting in a hanging wall and footwall ore zone. The stages of ore deposition were followed by another stage of barren quartz deposited in a post-mineral set of fractures along the zones of weakness. The silver values are thought to be associated with the lead values and the gold is probably deposited in close association with the copper sulphides. Very late fracturing has left voids in the ore-body permitting the circulation of ground waters which have deposited some calcite and quartz. The main products of alteration in the area are quartz, fluoride, epidote and considerable serecite and pyrite.

Inasmuch as the lower minable portions of the Caledonian vein and associate veins are contained in the Burns latite, deep exploration by surface entry or high-angle core drilling may prove large tonnages of base metal ores better in grade than are exposed in the present workings of the Caledonian mine as the Burns latite member of the Silverton volcanic series is noted for its lithologic favorability for deposition of sulphide ore minerals in comparison to the favorability of upper and lower units in the Silverton volcanic series.

ORE RESERVES
(See Plate II)

Reserves were calculated on the basis of sample assay and location data collected by engineers of the U. S. Bureau of Mines, Kenneth E. Knapp, R. A. Hildebrand and R. M. Hurst of the Tech-Ser Mining Co.

Inasmuch as assay data are incomplete, the shipping averages available from past production figures were used for average ore-grade. This average assay figure was found to be 2.18 ozs. Ag., 4.90% Pb., 6.85% Zn., 0.74% Cu., having a gross value of $42.50 at 1956 market prices: Ag. - 90¢; Pb. - 16¢; Zn. - 13-1/2¢; and Cu. - 43¢.

(a) Developed, Indicated Reserves:

Block	Tons	Value per ton	Gross Value
A	7,790	$42.50	$331,075.00
B	5,440	42.50	231,200.00
C	1,688	42.50	71,740.00
D	1,688	42.50	71,740.00
	16,606		$705,755.00

(b) Developed, Inferred Reserves:

Block	Tons	Value per ton	Gross Value
E	8,100	$ 42.50	$ 344,250.00
F	4,622	42.50	196,435.00
G	5,315	42.50	225,887.50
H	4,050	42.50	172,125.00
K	2,025	42.50	86,062.50
L	12,506	42.50	531,505.00
M	11,212	42.50	476,510.00
	47,830		$2,032,775.00

EXPLORATION POSSIBILITIES

There are four veins on the Caledonian property; the Caledonian, the Trenmore, the Occident, and the Livingstone, which present good exploration opportunities for the development of additional ore.

A mineralization factor of 0.1193 tons per square foot was arrived at by computing the total vein area develped by the present workings and dividing by the total indicated and inferred tonnage calculated, as follows:

$$\frac{\text{64,436 tons indicated and inferred}}{\text{540,000 sq. ft. of vein area}} = \text{0.11932 tons / sq. ft. of vein.}$$

This factor was then applied to the approximate vein area represented by the unexplored portions of the four veins within the boundaries of the property.

Results are tabulated below:

Vein	Length Vertical Distance	Vein Area Sq. Ft.	Possible Tons
Caledonian, east of present workings	300 x 220	60,000	7,874
Caledonian, west of present workings	1200 x 450	540,000	64,422
Occident	2400 x 375	900,000	107,370
Livingstone on Livingstone level	3400 x 750	2,550,000	304,215
Trenmore	1500 x 900	1,350,000	161,055
Caledonian, Livingstone level	1700 x 500	850,000	101,405
TOTAL POSSIBLE TONS.....			746,341

Development of the total possible tonnage would require the following amounts of work:

Caledonian vein -	
East of workings	300 ft. of drift
West of workings	1,800 ft. of drift
Below workings on Livingstone level	2,200 ft. of drift
Occident vein -	
Northeast of present workings	2,400 ft. of drift
Livingstone	
Trenmore - vein on Livingstone level	1,500 ft. of drift
	11,600 ft. of drift
Main Raise	1,500 ft. of raise

OPERATIONAL PROCEDURE

Complete stope preparations for blocks B and C.

Clean out and retimber portal on main tunnel level.

Drive finger raises into block M and prepare for stoping.

Block A. can be developed by driving a sub-level over the old stope.

Additional ore reserves may be developed by diamond drill holes (see Plate I) and by extending the main-tunnel level drift to the east and west.

There are several operational approaches open to the operator for attaining immediate production. Choice of operational procedure will depend on the availability of men, equipment, and capital.

PRODUCTION METHODS AND COSTS

Both the wall rock and the ore in the steeply dipping Caledonian vein are extremely strong. The shrinkage stope method of mining the relatively narrow vein will allow practically complete extraction of ore with a minimum of dilution . Upon drawing of the ore, a 200-foot height of wall rock will stand safely unsupported.

Development practice will consist of driving slusher drifts on the vein and driving chute raises on 20-foot centers. Type of access to the stope will depend largely on the length of the ore shoots. Short stopes can be opened up by one stulled or cribbed manway either in the middle or at the end of the stope. Longer stopes will require a manway at each end to assure adequate ventilation.

In calculating the estimated unit costs, direct and indirect costs will be considered. Direct operating costs will be developed under: (1) Mining Costs, (2) Development Costs (3) Management and Supervision Costs (4) Milling Costs (5) Transport Costs (6) Royalty Costs.

Indirect costs are subdivided into Production and Administrative indirect costs.

Direct Costs

(1) Mining Costs

(a) Stope Preparation

Labor

Slusher drifts	0.18 /ton
Chute raises	0.07 /ton
Chute timbering	0.05 /ton
Mainway timbering	0.25 /ton

Supplies

Timber and Powder	0.24 /ton
Steel and bits	0.03 /ton

Equipment Use Allowance

Compressed air	0.02 /ton
Drills	0.01 /ton

Total cost Stope Preparation $0.85 /ton

(b) Breaking Ore

Labor 0.75 /ton

Supplies

Powder	0.25 /ton
Steel and bits	0.20 /ton

Equipment Use Allowance

Compressed air	0.10 /ton
Drills	0.04 /ton

Total cost of breaking ore $1.34 /ton

(c) Ore Haulage

Labor

Stope tramming	0.50 /ton
Main haulage tramming	0.25 /ton

Equipment Use Allowance	0.10 /ton	
Total cost of ore haulage		$0.85 /ton
(d) Dead Work		
Lost time and maintenance		
Total cost of dead work		0.30 /ton
Total Mining Costs		$3.34 /ton

(2) Development Costs

(a) Drifting and Crosscutting		
Labor	0.22 /ton	
Supplies	0.06 /ton	
Equipment Use Allowance	0.03 /ton	
Total cost of drifting and crosscutting		0.31 /ton
(b) Raising		
Total cost of raising		0.04 /ton
(c) Diamond Drilling		
Labor	0.04 /ton	
Supplies	0.04 /ton	
Total cost of diamond drilling		0.08 /ton
Total Development Costs		0.43 /ton

(3) Management and Supervision

Manager and foremen	
Total Management and Supervision	0.40 /ton

(4) Milling

The Pride Mill of Silverton is presently milling custom ore on a contract basis. When assured of a steady supply of ore the mill will take a contract rate of $5.00 per ton.

Total Milling Cost	$5.00 /ton

(5) Transport Charges

(a) Mine to Pride Mill trucking charge	$1.00 /ton
(b) Mill to Ridgway, Colorado, concentrate trucking charge	0.53 /ton
(c) Ridgway to Great Falls, Montana Zn. concentrate, rail freight	1.91 /ton
(d) Ridgway to Midvale, Utah Pb. concentrate rail freight	0.56 /ton
Total Transport Costs	4.00/ton

(6) Royalty

Ten percent of smelter return less transport and milling charge

Total Royalty Cost	1.23 /ton
Total Direct Costs	$14.40 /ton

Indirect Costs

(1) Production

Property and production taxes, depreciation of buildings and non-mining equipment, insurance and miscellaneous

Total Production Indirect Costs	0.40 /ton

(2) Administrative

Clerical and legal expenses, telephone and telegraph, office expenses and miscellaneous

Total Administrative Indirect Cost	$0.28 /ton
Total Indirect Costs	$0.68 /ton
Total Operational Cost	$15.08 /ton

ESTIMATED PROFITS

It is not feasible to calculate the net smelter return exactly as the most economical ratio of milling concentration is unknown. Net smelter return on Caledonian ore, taking into consideration mill losses, will exceed 50% of the gross value of the ore.

In calculating profits, a net smelter return of $21.25 per ton of ore was used based on 50% of the $42.50 gross value of ore.

Mining profit per ton of ore is	$ 6.17
Total profits on developed Indicated and Inferred Ore	397,570.00
Total profits on Possible Ore	4,600,000.00

CAPITAL EXPENDITURES

The availability of developed ore in the Caledonian makes it possible to start operations with a minimum of capital expenditures.

Capital will be needed for (1) equipment and supplies (2) working capital and (3) advance royalty.

Equipment:

Compressor - 600 cfm rotary	$16,000.00	
Trammer - electric battery	4,000.00	
Generator plant	1,000.00	
Mine Cars (12)	2,500.00	
Mucking Machine	3,200.00	
Stopers (2)	1,450.00	
Machines and Jacklegs (2)	1,300.00	
Air tuggers (3)	1,500.00	
Slusher and scraper	1,300.00	
Pumps (2)	500.00	
Vehicles (2)	5,000.00	
Small tools	500.00	
Powder 3 ton	1,300.00	
Steel and bits	3,000.00	
Diamond Drill with fittings	3,000.00	
Miscellaneous	1,000.00	
Total		$46,550.00

Working Capital:

It is advisable to provide funds for 4 months operation until smelter returns become available.

Estimated requirements	$20,000.00
	$66,550.00

Advance Royalty:

Under the terms of the lease contract (Appendix A) one year's royalty must be prepaid. $ 6,000.00

Total Capital Expenditures $72,550.00

As mining of the available ore progresses, a development program, financed out of earnings, can be undertaken.

FINANCIAL SUMMARY

An investment of $72,550.00 representing acquisition of equipment worth $42,250.00 and prepaid expenses totaling $30,300.00 will put the Caledonian Mine into operation.

Mining of the developed ore reserves will yield an estimated profit of $397,570.00. The rate of realizing this profit is estimated to be $175,000.00 per year.

Mining of the possible undeveloped ore could yield an estimated profit of $4,600,000.00. This profit would be earned at a greatly accelerated rate.

Ore reserves presently developed in the Caledonian mine assure a profitable operation requiring relatively small capital expenditures; the possible ore potential in the Caledonian mine that may be developed without additional outside investment offers a high-return venture involving a minimum of risk.

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Appendix A

MINING LEASE

THIS AGREEMENT, made and executed in duplicate on this 1st day of November, A. D., 1955, by and between HARRY G. KNAPP, KENNETH E. KNAPP, MARTIN B. WILLIAMS, and FRANK A. WILLIAMS, JR., hereinafter referred to as lessors, and TECH-SER MINING COMPANY, a Colorado Corporation qualified to do business in Colorado, hereinafter referred to as "Lessee".

WITNESSETH:

I

That lessors, for and in consideration of the rents and royalties to be paid and the covenants and agreements to be kept and performed by lessee as hereinafter set forth, has let and demised and does hereby lease and demise unto lessee the following described mining property situate in the Eureka Mining District, San Juan County, Colorado, to-wit:

Patented Lode Mining Claims or Millsites

Name of Claim	Patent or Mineral Survey Number
Artois Lode Mining Claim	872
Artois Mill Site	872-B
Livingston Lode Mining Claim	876
Livingston Mill Site	876-B
Occident Lode Mining Claim	875
Occident Mill Site	875-B
Trenmore Lode Mining Claim	874
Trenmore Mill Site	874-B

Name of Claim	Patent or Mineral Survey Number
Tantallon Lode Mining Claim	873
Tantallon Mill Site	873-B
Standard Lode Mining Claim	19026
Dundee Lode Mining Claim	19050

Unpatented Possessory Lode Claims

Name of Claim	Record of Location or Relocation Certificate
Nellie A. ?	
Livingston No. 2-A	
Livingston No. 3-A	
Tantallon No. 2-A	

together with all other contiguous claims, patented or unpatented, now or hereafter owned or located by lessors during the term hereof, or any extension hereof; together with all and singular the mines, minerals, lodes and veins within said claims and their dips and spurs and all mining rights appurtenant thereto; and all dumps, improvements, rail, pipe and other fixtures therein and thereon; all water and water rights appertaining thereto and all appurtenances thereto belonging or used in connection therewith, excluding all timber on said claims or millsites except such as may be needed by lessee for use in its mining operations hereunder.

TO HAVE AND TO HOLD the same unto the lessee for a term of five (5) years commencing at 12:00 o'clock noon on the 1st day of November, 1955, and expiring at 12:00 o'clock noon on the 1st day of November, 1960, unless sooner forfeited or otherwise terminated pursuant to the provisions hereof; provided, however, that if lessee shall be in possession and engaged

in active mining operation of the leased premises and shall not be in default in the performance of its obligations under this lease at the time of expiration of said five year term, it shall have the option of renewing and extending this lease for a further term of five (5) years subject to all the terms, covenants, conditions and provisions of this lease and any changes or amendments that may hereinafter be made by agreement of the parties hereto. If lessee shall elect to extend this lease for an additional term as aforesaid, it shall notify lessors of such election by a writing delivered or mailed by registered mail to lessors at the address hereinafter given at least thirty (30) days before the expiration of the then current term. If lessee fails to give such notice, it shall be deemed to have elected not to extend the term.

II

Lessors represent that they own and hold a good fee simple title to the patented lode mining claims hereinbefore described and that lessors claim the right to the possession of the unpatented mining claims with the understanding, however, that within thirty days from the date hereof, said claims will be re-located in the name of Harry G. Knapp by the lessee; that all assessment work and other requirements of law will be performed and complied with in respect to such unpatented mining claims; that all such mining claims, patented or unpatented, and the improvements, fixtures and equipment located therein and thereon, are free and clear of all liens and encumbrances except the 1955 General Taxes, payable in 1956; and that lessors have good right, full power and lawful authority to lease said property for the purposes and on the terms and conditions herein contained. Lessors

further agree, on the written request of lessee, and at lessee's expense, to proceed to apply for patent in the name of the persons who are the record owners thereof, and diligently to prosecute such proceeding to the issuing of final patent with respect to the unpatented mining claims hereinbefore described; that the lessee shall occupy and hold all cross or parallel lodes, spurs, or mineral deposits of any kind which may be discovered by said lessee or any person under it in any manner by working within or from the demised ground as the property of said lessors, and the same and all contiguous property and claims as indicated by the lessors shall be located in the name of the lessors by the lessee with the privilege to the lessee of working the same as a parcel of said demised premises.

Lessee shall each month at the time of paying the royalty hereinafter mentioned pay to the lessors a tunnel use charge of twenty-five cents per ton on ore mined by the lessee and hauled through the Caldonian Tunnels from workings not covered by the lessors claims.

III

In consideration whereof, lessee and lessors hereby further covenant, contract and agree as follows:

1. During the term of this Lease, lessee shall have the right to enter into possession of the leased premises and to prospect and develop the same, and to mine, remove and sell ore therefrom, but all work performed and all improvements made hereunder shall be performed and made in good

workmanlike manner; all workings in the leased premises shall be well and sufficiently timbered and kept retimbered in accordance with good and safe mining practice. Lessors or their duly authorized agent, in writing appointed, shall have the right at all reasonable times to enter into all parts of the property and to inspect and sample the same, and to that end lessee shall render all reasonable assistance. Lessee agrees to maintain maps showing all new underground workings developed by it during the term of this lease, and each month furnish to lessors, without request, a map showing the old workings, all development work, and mining operations of the preceding month.

2. Lessee will do or cause to be done within the time prescribed by law all necessary assessment work upon or for the benefit of all of the unpatented mining claims hereinbefore described to maintain in good standing the possessory rights thereto and will make and file or cause to be made and filed all affidavits of annual labor required by law. Such affidavits shall be filed and recorded in the name and for the benefit of the lessors. Lessee further expressly agrees to expend prior to the termination or surrender of this lease a minimum sum of $10,000 in retimbering, re-opening portals, sinking, diamond drilling, cross cutting, drifting on a vein or raising, such expenditure to be made at the minimum rate of $2,000 per each twelve month period of this lease ending on November 1 of each year, and shall be exclusive of any expenditures made from the proceeds of Government grants made on

account of such work. Lessee further agrees that not less than one-fifth of the total number of stoping shifts worked by lessee in each year (ending November 1) of this lease shall be spent on development work, excluding raising or drifting in the so-called Knapp Stope or Old Stope, and any work done in accordance with the requirements of the preceding sentence shall be considered development work for the purposes of this provision.

3. On all ores taken and sold from the leased premises hereunder, lessee shall pay or cause to be paid to lessors, as rental for said leased premises, a royalty, hereinafter called "earned royalty", based upon the net value of the ore as shown by the net mill returns, or, in the event the ore is shipped direct to a smelter without milling, by the net smelter returns, as follows:

On all ore of a net value up to $50.00 per ton ----------	10%
On all ore of a net value of $50.00 per ton and up to $100.00 per ton --------	15%
On all ore of a net value of $100.00 per ton and over----------	20%

The term "net value" of the ore, as used herein, shall be the gross value as show by the mill returns, or, in the case the ore is shipped direct to a smelter without milling, by smelter returns, less transportation, trucking and mill or smelter treatment charges, as the case may be. Settlement for such earned royalty shall be made on or before the 20th day of each month

for all shipments made during the preceding calendar month. All earned royalties under the terms hereof shall be paid directly to lessors by the purchasing smelter or mill as provided hereinafter and all such payments shall be accompanied by a copy of the ore settlement sheets with full detail. Lessee shall also furnish to lessors on or before the 20th day of each month copies of all weight tickets covering shipments during the preceding month, together with a statement showing the amount of ore removed and development work done during the preceding month. Lessors shall have the right to check the assays and to designate the control assayer, the fees of such control assayer to be paid by lessee. All assay work, controls and umpire procedure shall be in accordance with established milling practice.

It is agreed that lessee at its option may treat such ores at its own mill at the usual and customary milling charges prevailing in the district.

It is further expressly agreed that any and all premium or bonus payments that may hereafter be made by the United States Government, or any agency thereof, upon or for the production of any of the ores or metals produced, shipped and sold from said leased premises during the life of this lease, shall, unless forbidden by law, be divided between lessee and lessors upon the basis of their respective participations in the net proceeds of the ore under the foregoing schedule of royalties. In the event a division of such premium or bonus be permitted by law, the lessors' portion thereof shall be paid to lessors in the manner provided for payment of royalties, accompanied by a statement of the total premium or bonus, showing the computation of the amount due lessors.

The lessee agrees to pay an advance minimum royalty of Three Thousand ($3,000.00) Dollars each six months, such payment to be made on or before November 5 and May 5 of each year, except that Six Thousand ($6,000.00) Dollars, or the two period payments shall be made on or before November 5, 1955; said payments to be applied against earned royalty as earned. It is understood that in each six month period for which an advance minimum royalty is paid, the earned royalty, as earned during said period, shall be retained by the lessee and not paid to lessors until lessee has recouped from such earned royalty in the six month period the amount of Three Thousand ($3,000.00) Dollars advance minimum payment theretofore or concurrently made. All earned royalty in excess of said six month period advance minimum payments (theretofore or concurrently paid) shall be paid direct to the lessors each month as provided above, and each payment, in addition to the ore settlement sheet, shall be accompanied by a statement explaining the status of the earned royalty account with relationship to the advance minimum royalty payment account. All advance royalties when paid are to be the property of the lessors, and in the event of termination of the lease under Paragraph 9, or termination under Paragraph 10 by reason of the failure of the lessee to perform the covenants and conditions herein, said lessee shall have no claim for a refund of the advance royalties, or any part thereof.

All royalty payments whether earned or advances shall be paid to Dr. Harry G. Knapp, Rifle, Colorado, as Trustee for himself and the other lessors herein named, it being understood and agreed that the lessee shall

not be responsible or liable for any of the acts of Dr. Harry G. Knapp acting as Trustee for the distribution of said funds to the lessors.

The lessee shall deliver a copy of this lease to the smelter or ore buyer with instructions to make royalty payments to Dr. Harry G. Knapp as herein provided.

4. Lessee agrees as part of the rental for the leased premises to pay or cause to be paid in lessors' name all general property taxes assessed against the leased premises for each calendar year in which lessee is in possession under this Lease or any extension thereof beginning with the taxes assessed for the calendar year 1955 payable in 1956. If lessee is in possession under this Lease for only a portion of a year, the taxes for that year shall be prorated between lessors and lessee on the basis of the taxes for the last preceding year. In the event the production of ore from the leased premises shall be sufficient in any year to cause assessments of the leased premises for the succeeding year as a producing mine, the taxes which are computed on the basis of such production shall also be paid by lessee, but if lessee shall no longer be in possession of the leased premises under this lease when such taxes based on production become payable, lessee shall be credited as against the amount of such taxes based on production with the amount of general taxes which would be assessed against the property as non-producing property for the last year lessee was in possession. Lessee shall deliver to lessors promptly after payment of

taxes the official tax receipt showing such payment. Lessors agree to pay to lessee on or before February 28, 1956, an amount equal to five-sixths of the 1955 General Property Taxes to be paid by lessee in accordance with the first sentence of this paragraph 4.

5. Lessee agrees before commencing work in or upon the leased premises, to take out and thereafter continuously to carry and keep in force Workmen's Compensation and Occupational Disease Disability Insurance, in full compliance with the laws of Colorado now in effect or as hereafter amended, regardless of the number of employees engaged in the performance of work hereunder.

Lessee further agrees to keep the leased premises and every part thereof free and clear of all mechanics', laborers', miners', materialmens', and other liens, and promptly to pay and discharge all wages and bills for materials and supplies; and to post and keep posted in a conspicuous place upon the leased premises, in the name and on behalf of lessors, a written or printed notice stating that the property is being worked under lease, and that the lessors and owner will not be liable for any labor performed thereon or material or supplies furnished therefor, and that all persons working on the premises or furnishing materials or supplies therefor must look to the Tech-Ser Mining Company, lessee, for payment.

6. Lessors agree that lessee may at any time during the life of this lease sort and ship ores from all surface dumps now or hereafter located on the leased premises, subject to payment of royalties thereon as hereinbefore provided.

7. The lessee agrees that a sub-level will be started over a shrinkage stope before broken ore is drawn; provided, that there is ore in the back at the stope.

8. It is expressly agreed that lessee, without further consent of lessors, shall have the privilege of assigning or of subletting this lease to any person or corporation, but any such assignment or subletting shall not relieve lessee from responsibility for the performance of the covenants and obligations herein on its part to be performed.

9. It is mutually agreed that lessee may surrender this lease at any time upon thirty (30) days notice in writing to lessors, and upon the expiration of such thirty day period this lease shall terminate and lessee shall be relieved of all further obligations hereunder, except such as shall have accrued prior thereto.

10. In the event of a default by lessee in the keeping or performance of any of the lessee's covenants and agreements herein contained, and of lessee's failure to remedy any such default within thirty (30) days after written notice from lessors of such default, lessors may, in writing, declare a forfeiture of this lease, and may thereupon re-enter the leased premises and with or without process of law dispossess lessee and all persons occupying the leased premises, using such force as may be necessary; or lessors may proceed against lessee and all other persons in possession of said premises as guilty of unlawful or forcible detainer, or may pursue any other legal or equitable remedy it may have.

11. In the event of the surrender or termination of this lease, as hereinbefore provided or at the expiration of the term, lessee shall have a period of ninety (90) days thereafter within which to remove from the leased premises the machinery, tools, equipment and supplies of lessee. All rail, pipe and fixed equipment belonging to lessors shall be left in or upon said premises by lessee, in as good condition as when received, except for ordinary wear and deterioration or damage by mining casualty. All rail and pipe, buildings and ore bins furnished by lessee shall be left in place, and other equipment of lessors shall be reasonably protected from the elements. Any air receiver furnished by lessee shall be considered removable equipment.

IV

The lessee agrees that it will obtain and keep in force during the term of this policy insurance against damage by fire and extended coverage; provided the fire insurance companies will write such coverage, said policy or policies to be issued by a recognized, reliable fire insurance company in the name of the lessors, and said policy shall cover the ore bins, power house, and other buildings on the premises, if used. The insurance shall be in an amount to cover the reasonable full value of said buildings; and in the event of loss, the amounts received from the insurance shall be used to replace the lost or damaged buildings.

V

1. All notices required or given under this lease shall be addressed to the parties as follows:

Lessor: Dr. Harry G. Knapp,
Box 1011
Rifle, Colorado

Lessee: Tech-Ser Mining Company,
P. O. Box 1949
Grand Junction, Colorado

2. All the covenants, terms and conditions of this lease shall enure to the benefit of and be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

IN WITNESS WHEREOF, this Agreement has been executed as of the day and year first hereinbefore written.

_____

_____

_____

_____
LESSORS

TECH-SER MINING COMPANY

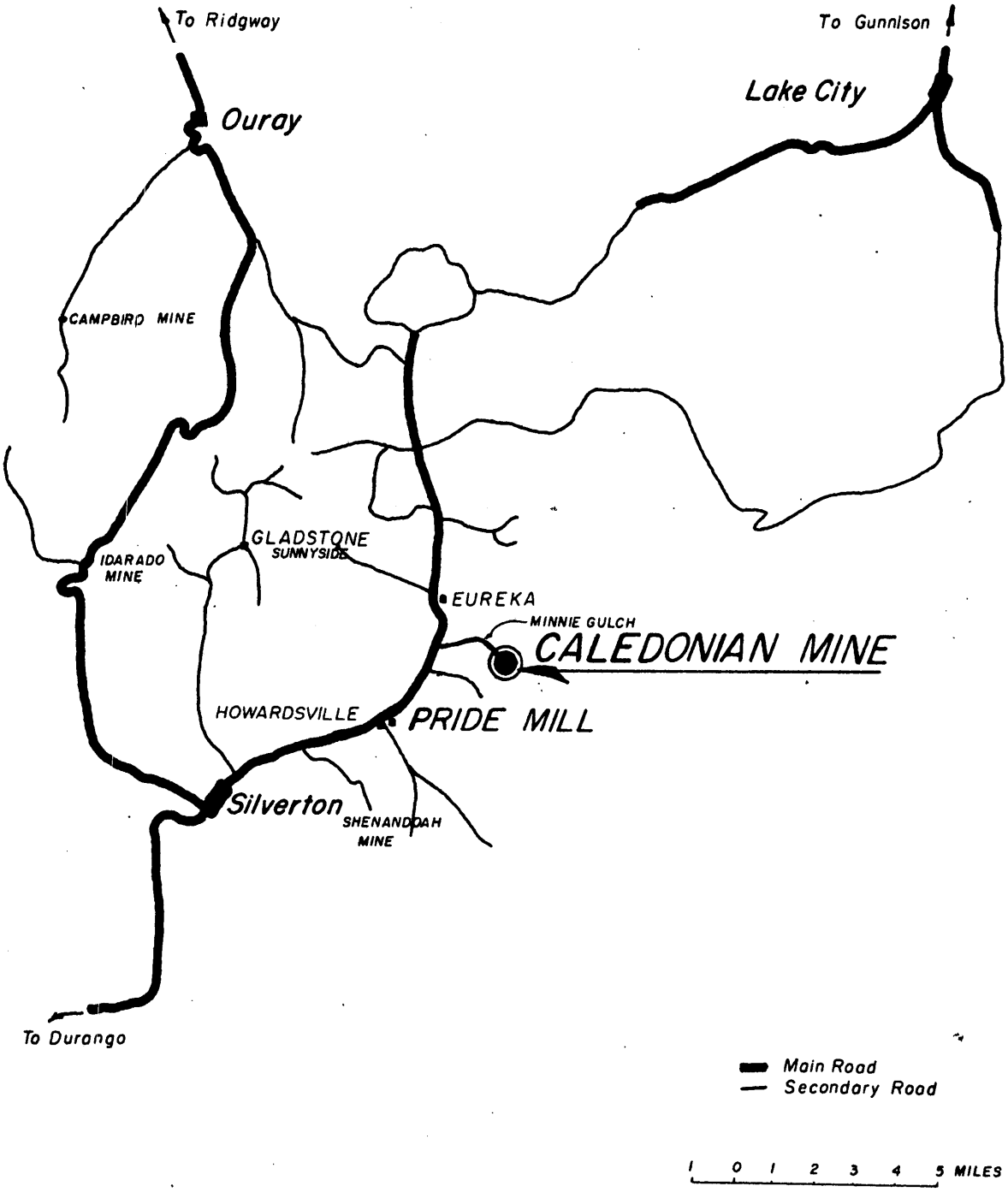
(Corporate Seal)

By_____
Its_____President

ATTEST:

LESSEE

_____
Secretary



LOCATION MAP figure I

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MAR 12 1957

Mr. R. A. Hildebrand, President
Tech-Ser Mining Company
Post Office Box 517
Silverton, Colorado

Re: Docket No. DMEA-4461 (Lead-Zinc-Copper)
Tech-Ser Mining Company
Caledonian Mine
San Juan County, Colorado

Dear Mr. Hildebrand:

Your application for aid for an exploration project and other reports available to us in Washington concerning your application 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 copper, lead and zinc ore on your lease, indicates to us that the probability of disclosing significant ore reserves by your proposed program 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 wish to thank you for your interest in the Defense Mineral Program and for bringing your property to our attention.

Sincerely yours,

C. O. Mittendorf

Administrator

JWAlt/er 3/8/57
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)

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March 8, 1957

Memorandum

To: The Administrator

From: Chief, Base Metals Division

Subject: Denial of Application, Docket No. DMEA-4461, Tech-Ser Mining Company, Caledonian Mine, San Juan County, Colorado (Lead-Zinc-Copper)

Yoze
Kilgoore

The cited application, dated September 7, 1956, was received by this office on September 12. On October 1, the application was referred to the Field Team for their consideration, a field examination if warranted, and recommendation.

The Applicant's proposal consisted of extending the lower Caledonian drift (altitude 11,000 feet) 1,200 feet northwesterly, and extending the Livingstone drift (altitude 10,500 feet) 1,600 feet northeasterly to the intersection with the Caledonian vein. The Applicant estimated that the proposed work would cost $131,320.00.

The Field Team examined the property on October 3, 1956, and their report was received by this office on November 26.

The Caledonian vein has been explored by four crosscut tunnels at elevations between 11,000 and 11,466 feet. The two upper tunnels are caved but apparently drifting along the vein from these adits totaled less than 300 feet. The two lower tunnels, at elevations of 11,000 and 11,235 feet, are called the Lower Main Tunnel and the Upper Tunnel, respectively. In each, the vein has been explored for a distance of a little over 600 feet.

During the period 1942-45, several hundred tons of ore were reportedly produced. The first recorded production from stoping was in 1948. During the period 1948-52, the property had a verified production of 5,566 dry tons of ore. Nearly all of the ore produced from the mine has come from one stope on the Caledonian vein near the east end of the drift on the Lower Main Tunnel level. A small amount of stoping has also been done on the Caledonian vein from the Upper Tunnel level. During 1952, The American Zinc, Lead and Smelting Company produced 1,896.2 dry tons of ore having a weighted average of 0.008 oz. gold and 1.68 ozs. of silver a ton, 4.21% lead, 5.05% zinc, and 0.56% copper.

A drift on the Livingstone vein is accessible. This vein has been drifted on for about 500 feet and is mostly a 2 to 3 inch weakly mineralized fracture; in a few places it reaches 1 foot in width. There has been no stoping on the Livingstone vein.

The intersections of the Caledonian and Livingstone veins, and other possible intersections, cannot be considered targets as it is rather doubtful that the Livingstone, Occident, and Trenmore veins are strong enough to extend to the Caledonian vein. Therefore, the target consists of 1,200 feet of drifting to the west along the Caledonian vein. It is doubtful if this drifting will uncover ore bodies of greater significance than those already exposed. Past records indicate that high-grade ore cannot be expected in this area. As the new drift will trend away from known ore bodies which also become smaller from east to west, possible new ore bodies will probably be smaller than those which have been exposed.

The Field Team and the commodity member, Mr. Bishop, USBM, recommended that the application be denied.

On December 21, 1956, this Division wrote to Mr. Traver advising that due to the grade of ore on the 1100 level, that it might be possible to allow the Applicant to drift on this level to the Livingstone vein.

The Field Team's Supplemental Report dated January, 1957, was received by this office on February 12. The examiners reaffirm the recommendation of the denial to the work initially proposed, in which the Field Team concurs.

We concur with the recommendations of the Field Team and the commodity members of the USGS and USBM that the application be denied.

W. R. Griswold

W. R. Griswold

JWAlt/er

Copy to: Docket
Chron.

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

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DMEA IN REPLY REFER TO:
RECEIVED FEB 19 1957

DATE	INITIALS	CODE
2-19	C	220
2-20	alb.	500

Memorandum

February 18, 1957

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

From: W. P. Williams, U. S. Geological Survey

Subject: Review of Supplemental Report of Examination, DMEA 4461, Tech-Ser Mining Company, Caledonian Mine, San Juan County, Colorado, (lead-zinc-copper).

In a review of the examining team's first Report of Examination, in which denial of the application was recommended, I listed what seemed to be favorable aspects of the property and concluded that DMEA participation in exploration on the property was justifiable.

In their supplemental report the field examiners repeat their recommendation for denial but they offer cost estimates in the event a DMEA contract is awarded the applicant.

The field examiners' main reasons for again recommending denial appear to be that the ore is marginal in grade, that any newly discovered ore bodies are not likely to be as large as the deposits now known in the mine, and that any ore bodies present will become progressively smaller as exploration drifting proceeded westward. According to the examiners' estimates the Government would not regain participating expenditures through royalties from ore sales.

The examining team have reviewed their data on the application and appear to have obtained new information about the proposed project. In reviewing the entire problem, it seems well to defer to the more detailed and precise evaluation of the property that field examination has afforded the examining team. Under those conditions I agree with the findings of the examining team and their recommendations for denial of the application.

W. P. Williams

W. P. Williams

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

February 27, 1957

Re: DMEA 4461; Lead-Zinc-Copper;
$131,320
Tech-Ser Mining Company
Caledonian Mine
San Juan County, Colorado

~~Memorandum~~

To: W. R. Griswold, DMEA

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

Subject: Review of field team Supplemental Report dated February 6, 1957, received February 18, 1957.

The field team and examiners reaffirm their earlier position in this supplemental report and recommend denial of the application. This position is taken and maintained on the grounds that although there is considerable evidence that exploration may lead to discovery of mineralized rock, there is little or no evidence that such material will be commercial and therefore there appears to be no valid reason to undertake the exploration. Net smelter returns in the past have been small. The examiners report 1,933 tons shipped in 1952 brought a net return of but $6.48 per ton although 100 percent of the content at New York prices would total $34.80.

In that same year the American Zinc, Lead, and Smelting Company produced 3,214 tons which yielded 21 ounces gold, 4284 ounces silver, 12 tons of copper, 112 tons of lead and 94 tons of zinc. Such material is clearly submarginal under conditions prevailing in the San Juan area of Colorado.

The examining team also point out that in their opinion the exploration outlined is a third choice site and should only be undertaken if economics are discounted. I concur with the field examiners and field team in recommending denial of the application.

O. M. Bishop

O. M. Bishop

Copy to: Division of Minerals
Mr. Kiilsgaard
Mr. Lamb
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

224 New Customhouse WASHINGTON 25, D. C.
Denver 2, Colorado

February 6, 1957

Memorandum

To: Secretary, Operating Committee, DMEA

From: DMEA Field Team, Region III

Subject: Joint Supplemental Report of Examination, Docket DMEA 4461 (Lead-Zinc-Copper) Tech-Ser Mining Company (Caledonian Mine) San Juan County, Colorado

Enclosed are the original and three copies of the subject report by C. M. Harrer and F. B. Moore, which is in response to the memoranda of review enclosed with your letter of December 20, 1956. We suggest this report be incorporated with the original joint Report of Examination.

The examiners reaffirm the recommendation of denial to the work initially proposed, in which the Field Team concurs.

An alternate work proposal, however, is suggested in the report which is agreeable to the Field Team, should the examiners original recommendation be reversed.

DMEA Field Team, Region III

W. M. Traver

By W. M. Traver
Executive Officer

Enclosures

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RECEIVED FEB 11 1957

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Reviewed by
DMEA OPERATING COMMITTEE
2-15-57
(date)

ON-S.'48
Report

DMEA
DEPARTMENT OF THE INTERIOR

FEB 5 1957
REGION III
DENVER, COLORADO

Building 20
Denver Federal Center
Denver 2, Colorado

REGION III

TRANSMITTED FEB 6 1957

February 4, 1957

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From John F. Shaw
E. N. Harshman

Subject: Docket DMEA 4461 (Lead-Zinc-Copper) Tech-Ser Mining Company, (Caledonian mine) San Juan County, Colo— Joint Supplemental Report of Examination.

Enclosed are original and eight copies of subject report by C. M. Harrer and F. B. Moore.

This report supplements a Joint Engineering and Geologic report submitted by the same men to the Executive Officer, DMEA Field Team, Region III, on November 16, 1956, in which they recommended denial of an application for DMEA assistance in exploring the Caledonian mine for lead, zinc and copper.

In response to the joint report the Commodity Review Board suggested that the exploration program might be warranted. The enclosed report is in answer to that suggestion.

The examiners reaffirm their original recommendation for denial, but have submitted an exploration program and its estimated cost, that could be considered in the event their original recommendation is reversed.

EXTRA COPY
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A. Hourcheran for
John F. Shaw
Supervising Mining Engineer

E. N. Harshman
E. N. Harshman
Member Field Team

JFS:jg
Enclosures

cc: 8
Harshman
DMEA 4461
Chron.

Reviewed by
DMEA OPERATING COMMITTEE
2-15-57
(date)

FOR UNITED STATES GOVERNMENT USE ONLY

TRANSMITTED
FEB 6 1957

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

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY EXAMINING TEAM
REGION III

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 11 1957

DATE	INITIALS	CODE
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DMEA 4461

CALEDONIAN MINE

Tech-Ser Mining Company

San Juan County, Colorado

Lead-Zinc-Copper

Joint Supplemental Report of Examination

By

F. B. Moore
Geologist
Geological Survey

C. M. Harrer
Mining Engineer
Bureau of Mines

January, 1957

Reviewed by
DMEA OPERATING COMMITTEE
2-15-57
(Date)

DMEA 4461

CALEDONIAN MINE
TECH-SER MINING COMPANY
SAN JUAN COUNTY, COLORADO

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SUPPLEMENTAL REPORT OF EXAMINATION

DMEA 4461

CALEDONIAN MINE
Tech-Ser Mining Company
San Juan County, Colorado

INTRODUCTION AND SUMMARY

On November 16, 1956, a Joint Engineering and Geologic Report on the Caledonian mine by F. B. Moore, Geological Survey, and C. M. Harrer, Bureau of Mines, was submitted to the Executive Officer, DMEA Field Team, Region III. The report recommended denial of the application by Tech-Ser Mining Company to explore for lead, zinc, and copper at the above property. Subsequent memoranda from members of the Commodity Review Board have suggested that the property may warrant exploration. The field examiners, admitting that it is a borderline case, wish to stand on the original recommendation.

The geologic report, submitted by the company with the application, is overly optimistic. The 510 feet of "ore" in 680 feet of drift shown on Plate II, N. 75 W. Vertical Section of the Lower Main Tunnel level is simply a guess. The areas outside the stopes have not been sampled. The examining team gave the company the benefit of the doubt and called such areas protore. The various estimates of $17.85 to $21.50 a ton net smelter returns are theoretically possible. If the examining team remembers correctly, settlement sheets shown by the company showed net smelter returns of about $7.50 a ton for this ore. Unfortunately, the team did not copy these figures. However, 1,933 tons of ore shipped in 1952 from the Caledonian vein brought an average net return of $6.48 per ton. (Report by Scott Hazen, Bureau of Mines) The

market value of the Caledonian ore at 1952 prices is $34.80; the current value is $38.32. This, of course, is figuring 100 percent recovery and making no allowance for dilution in mining. The Kittimac mine, which is probably part of the same vein system, produced 23,709 tons of ore between 1908 and 1918. This ore had a gross market value of $164,684 or about $7 a ton. The ore shoots, from the Kittimac through the Caledonian workings, get progressively smaller toward the west. Barring a favorable control by a ring fault to the west, ore bodies in that direction will probably be smaller than those already exposed. Again, the examining team gave the company the benefit of the doubt by stating that ore bodies of equal size to already-discovered ones might be found. In a quick review of the literature on the San Juan region, the examining team found no statement indicating that ore bodies are found at the intersections of the ring faults with the radial faults.

The Livingstone vein, as pointed out on page 9 of the Joint Engineering and Geologic Report, is a narrow fissure weakly mineralized. The company's plans for exploration along this fissure were drawn without the company's geologist ever having seen it. At the suggestion of the examining team, the portal was visited and found to be accessible. The Livingstone adit followed the fissure for nearly 500 feet; the last 40 feet, however, does not follow the fissure. At the end of the adit, a 45-foot crosscut is driven in a direction opposite to that in which the fissure left the adit. Whoever drove the adit apparently did not think the fissure worth following farther and started looking for a new one. As it is nearly 1,600 feet from the end of

the Livingstone adit to a projected intersection with the Caledonian vein, an intersection of the two veins was not considered a target by the examining team.

Realizing that this was a marginal case, the examining team made an attempt to get a "yardstick" on DMEA policy in regard to possible economic returns. Mr. F. E. Johnson, deputy administrator, who was in Denver at the time the Caledonian report was being written, was asked about the DMEA policy. Johnson stated that, in the case of lead-zinc-copper applications, which involve a certain amount of development, there should be a reasonable chance for the Government to get a 50-percent return on its money. The recommendations were made on that basis. Using the company's own figures for expected smelter returns, the Government could expect a 37-percent return if ore were discovered equal to the examining team's reserve figures. Using the company's figures for expected profit and figuring the value of the ore at current prices and 90-percent recovery, the company would lose 83 cents a ton.

If economic considerations are not important, a program could be followed as given below.

The best place to explore is underneath the large (easternmost) ore shoot. The company has not asked for assistance in this area and asked that this ground not be subordinated. In a telephone conversation with R. A. Hildebrand, president of Tech-Ser Mining Company, on January 14, 1957, Hildebrand agreed to subordinate this ground for purposes of exploration. The second best place to explore is by drifting east on the Caledonian vein toward the Kittimac mine.

The company apparently owns only about 200 feet of ground in this direction. The third best place is along the Caledonian vein to the west as proposed by the company. Minimum distance for such a drift would need to be 600 feet as the "ore shoots" appear to be about 400 feet apart along the vein. The nearest mappable ring fault is an estimated 1,800 feet to the west--the exact location with respect to the mine is not known. The Livingstone fissure is not considered a mappable ring fault although the structure may be related to ring faults.

POSSIBLE EXPLORATION

Stage I

Phase 1

Drive a 100-foot crosscut trending N. 21° E. from a point near No. 1 raise on the Lower Main Tunnel level. Cut a drill station, hereafter called No. 1, at the end of the crosscut. This will require widening the crosscut to about 10 feet at the 100-foot point. From the above drill station, drill three holes to cut the Caledonian vein at a depth of 100 feet below the Lower Main Tunnel level at distances of 100 feet apart. A fourth hole, also to cut the Caledonian vein at a depth of 100 feet and 100 feet from the easternmost hole already drilled, to be drilled from station No. 2 (fig. 1). A tabulation of distances and direction of holes is given below. If ore is found in the above holes, four more holes can be drilled under Stage II to cut the vein at a depth of 200 feet below the Tunnel level.

Phase 2

Drift westerly along the Caledonian vein a distance of 1,200 feet as proposed by the company (fig. 2). In this distance, any possible intersections with the Livingstone, Trenmore, and Occident veins should be reached. If favorable intersections are found, exploration of such intersections can be continued under Stage II.

Stage II

Phase 1

Continue the No. 1 drilling-station crosscut an additional 100 feet N. 21° E. and cut a drill station (No. 3) at the face. From drill station No. 3, drill three holes to cut the Caledonian vein 200 feet below the Lower Main Tunnel level. These holes will also cut the vein at distances of 100 feet apart. From drill station No.2, drill one hole to cut the vein at a depth of 200 feet below the Tunnel level, and 100 feet east of the easternmost hole at the 200-foot depth.

Phase 2

Drift, crosscut, and/or raise a maximum distance of 200 feet to explore favorable intersections in the western part of the new Caledonian drift. Costs for the above exploration are given in a separate section.

Tabulation of Drill Holes

Hole No.	Drilled from	Direction	Inclination	Estimated Distance (feet)
1	Sta. 1	S. 82° W.	-38°	200
2	Sta. 1	S. 31° W.	-51°	160
3	Sta. 1	S. 21° E.	-38°	200
4	Sta. 2	N. 16° W.	-45°	170
5	Sta. 3	S. 53° W.	-52°	315
6	Sta. 3	S. 15° W.	-53°	315
7	Sta. 3	S. 14° E.	-45°	350
8	Sta. 2	N. 6° E.	-62°	290
			Total --	2,000

The reason for drilling from the north side of the vein is to take advantage of the dip of the vein and to eliminate small angles between the drill holes and the vein. It is believed that angles under 25° make geologic interpretation very difficult. Also a saving of about 470 feet of drill hole will be effected which is equivalent in cost to 90 feet of crosscut.

ESTIMATED COSTS OF POSSIBLE EXPLORATION

The following are estimated unit costs and the costs of a "possible" exploration program. These costs can be used for any other exploration program which may occur to the DMEA reviewers.

Core drilling should be based finally on three bids by the applicant. In the absence of bids, drilling costs are estimated as follows:

Diamond drilling contract cost, including air	$7.00 per foot
Engineering and geological services	1.00 per foot
Coreboxes	.20 per foot
Contingencies	.10 per foot
Total cost per foot, without analyses.	$8.30

Sampling and assaying ore zone is estimated at $60.00 per hole, sampled in 5-foot intervals.

Cost per drill station is estimated at $100.00

Estimated unit costs for advancing the lower Caledonian level which is now in 1,430 feet from its portal. This unit cost will be basic for all exploration drifting and/or crosscutting.

	Item Cost/ft.	Total Unit Cost/ft.
(1) Independent Contracts:		
None		
(2) Labor and Supervision:		
Labor		
2 miners on labor contract at $12.00 a foot	$12.00	
1 trammer at $15.00 a day	3.00	
Supervision		
1 supervisor at $450/mo., 1/3 time pro rata	$ 1.50	
Technical Services		
Engineering and geological at $0.50 a foot	$ 0.50	
		$17.00

(3) Operating Materials and Supplies:

Timber - none		
Explosives - 1 case powder for 5 ft. round	($11.00)	
25 blasting caps per round	($ 0.51)	
200 ft. of fuse per round	($ 2.60)	
	$14.11	$2.82

	Item Cost/ft.	Total Unit Cost/ft.
Pipe -		
3-inch air line at $0.80 per foot	$ 0.80	
1-inch water line at $0.22 per foot	$ 0.22	
Ventilation pipe at $1.00 a foot	$ 1.00	
Track - New 20 lb. track at $0.15 a lb.	$ 2.00	
Ties, spikes, bolts, fishplates	$ 0.50	
Drill steel and Liddicoat bits bits at $0.215 each	$ 2.75	
Fuel oil, lubricants, gasoline, etc at $4.60 a round	$ 0.92	
		$11.01

(4) Operating Equipment:

Rental - None

Purchase - None

Depreciation - 1 Cleveland H-10 pneumatic rock drill and jackleg $800.00
1 12-B Eimeo Mucking machine $3,300.00
1 600 cfm I. R., Gyro-flow air compressor $12,000.00
1 ventilation fan $ 800.00
6 mine cars, 2-ton rocker bottom, Card Co. $ 2,500.00
1 2-ton Atlas or 1 1/2 ton Mancha locomotive-electric. $ 6,000.00
1 Jeep station wagon $ 2,000.00
$27,400.00

Depreciation allowance per month estimated as 1/60 of cost. $27,400 x 1/60 = $456.67
Advance per month estimated at 100 feet $ 4.57

$ 4.57

(5) Initial Rehabilitation and Repairs:
None. Being done by operator at his own expense.

(6) New Bldgs., Improvements, etc;
None. Being done by operator at his own expense.

	Item Cost/ft.	Total Unit Cost/ft.
(7) Miscellaneous:		
Repairs to Equipment		
Estimated at $1.00 a foot	$ 1.00	
Sampling and Analyses		
Estimated at one analysis for lead, zinc, copper, gold and silver per 10 ft.	$ 1.00	
Payroll Taxes		
Payroll compensation and insurance taxes, etc; 5 percent of $17.00	$ 0.85	
Accounting at $50.00/month	$ 0.50	
		$ 3.35
(8) Contingencies:		
Allow 5 percent for occasional timbering, bad conditions and possible increase in costs. (5% of $34.93 = $1.75 per foot.	$ 1.75	
Total cost of drifting per foot without analyses		$36.68

Cost of the possible exploration program is estimated as follows:

Stage I		Cost
Phase 1.	Drive 100 feet of crosscut on a N. 21° E., bearing to establish core drill station No. 1 at $36.68 per foot.	$ 3,668.00
	Enlarge crosscut for drill station No. 1	$ 100.00
	Core drill holes 1,2, and 3, minimum size AX; 560 feet at $8.30 per foot; from core drill station No. 1	$ 4,648.00
	Core drill hole No. 4, minimum size AX; from core drill station No. 2; 170 feet at $8.30 per foot.	$ 1,411.00
	Enlarge crosscut for core drill station No. 2	$ 100.00
Phase 2.	Drift westerly along the Caledonian vein for 1,200 feet at $36.68 per foot	$44,016.00
	Cost of Stage I without assays	$53,943.00

Stage II		Cost
Phase 1.	Extend the No. core drill station crosscut an additional 100 feet on the N. 21° E., bearing to establish core drill station No. 3; 100 ft. of crosscut at $36.68 per foot	$ 3,668.00
	Enlarge crosscut for drill station No. 3	$ 100.00
	Core drill holes 5, 6, and 7, minimum size AX; 980 feet at $8.30 per foot from core drill station No. 3.	$ 8,134.00
	Core drill holes No. 8 from core drill station No. 2; 290 feet at $8.30 per foot.	$ 2,407.00
Phase 2.	Drift, crosscut and/or raise a maximum of 200 feet to explore favorable intersections in the western part of the new Caledonian drift, at $36.68 per foot.	$ 7,336.00
	Cost of Stage II without assays	$21,645.00
	Cost of Stages I and II, without assays	$75,588.00

Cost of Sampling and Assaying:		Cost
Stage I:	6 - 5-foot sections per core drill hole, assayed for lead, zinc, copper, gold and silver at $8.00 per section; 4 holes at $48.00	$ 192.00
	A maximum of 1,200 feet of drift sampled at 10-foot intervals; 120 samples at $8.00 (only ore shoots or well mineralized zones should actually be sampled.)	$ 960.00
Stage II:	6 - 5-foot sections per core drill hole, assayed for lead, zinc, copper, gold and silver at $8.00 per section; 4 holes at $48.00	$ 192.00
	A maximum of 200 feet of drift or raise sampled at 10-foot intervals; 20 samples at $8.00 (only ore shoots or well mineralized zones should actually be sampled).	$ 160.00
	Total cost of sampling and assays	$ 1,504.00
Total cost of possible exploration program		$77,092.00

Betty

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

224 New Customhouse
Denver 2, Colorado

December 27, 1956

Memorandum

To: E. N. Harshman (w/enclosure)
J. F. Shaw (2) (w/enclosure)

From: DMEA Field Team, Region III

Subject: Docket DMEA 4461 (lead-zinc-copper) Tech-Ser Mining Company (Caledonian Mine) San Juan County, Colorado

Enclosed is a copy of a letter from the Chairman of the Operating Committee, dated December 20, 1956, together with memoranda of review of the joint Report of Examination on the subject docket by O. M. Bishop and W. P. Williams.

Will you please review the letter and the memoranda of review and submit your comments to this office.

Should you agree that some exploration is warranted, please submit a supplemental Report of Examination, including your estimate of costs.

DMEA Field Team, Region III

Original signed by
W. M. TRAVER

By W. M. Traver
Executive Officer

Enclosures

BMC:ytl

cc: Sec. Op. Comm. (2)
Docket 4461
Chron.

File Copy
Surname

J. Cee
Swinwood
Lamb
Wilson
Selfridge
Mittendorf

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

500

DEC 20 1956

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

Re: Docket No. DMEA-4461 (Lead-Zinc-Copper)
Tech-Ser Mining Company
Caledonian Mine
San Juan County, Colorado

Dear Mr. Traver:

This is with reference to the cited property and the report of Field Team in which they recommended that this application be denied. Government exploration assistance.

Copies of memoranda dated December 4 and December 7, 1956, by O. N. Bishop, Bureau of Mines, and W. P. Williams, Geological Survey, respectively, relating to the project, are enclosed for your information.

The views expressed by Mr. W. P. Williams, in his memorandum should be carefully considered before a final decision is made in this case. Actually it is difficult to consider ore of a grade of 2 oz. Ag., 5% Pb., 6% Zn. and 0.75% Cu. as being marginal. Such ore, assuming normal recoveries in milling, should give a net smelter mill head of about $17.85 per ton of crude ore. In any case the DMEA program does not require that the grade of potential target ore be such that it could be placed into immediate commercial operation.

A review of the "Plate II, N 75 W Vertical Section" appears to show that, of some 680 feet of drifting done to date on the Lower Main Tunnel level, 510 feet was in ore. Certainly such a ratio would seem to be encouraging. Obviously this does not necessarily mean that the additional proposed 1200 feet of drifting would give equally favorable results.

R.G.S.

With regards to the proposed Stage II work consisting of drifting on the Livingstone vein, it does not appear worthy of consideration at this time. If the Stage I drifting should intersect the Livingstone vein and this vein should show good values at the point of intersection, drifting on it could then be considered.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (JWB)

Enclosures

APPROVED:

Frank D. Lamb (JWB)
Member, Bureau of Mines

N. E. Nelson (JWB)
Member, Geological Survey

JWAlt/er 12/19/56
Rewritten (12/17 & 18/56)

Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Chron.

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

IN REPLY REFER TO:

RECEIVED
DEC 17 1956
D.M.E.A.

December 7, 1956

12/10/56 - Received by D.M.E.A.

Memorandum

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

From: W. P. Williams, U. S. Geological Survey

Subject: Review of field examination report, DMEA 4461, Tech-Ser Mining Company, Caledonian Mine, San Juan County, Colorado, (lead-zinc-copper).

The examining team recommends denial of the subject application for the principal reasons that, 1) past production records indicate that high-grade ore cannot be expected in the area, and known ore in the mine is of marginal grade, and 2) it is doubtful if the proposed drifting will uncover ore bodies of greater significance than those already exposed.

After reviewing the available information on the area containing the applicant's property the application was reviewed and discussed with Mr. Wilbur S. Burbank, U.S.G.S., who has conducted extensive field studies on the geology and ore deposits of the San Juan region. Upon weighing the merits and disadvantages of the proposed project there seems to be some favorable aspects about the property which might be considered.

To begin with, the known ore at a grade of 2 ounces of silver per ton, 5 percent lead, 6 percent zinc, and 0.75 percent copper would have a gross value of nearly $40 per ton at present prices, which would not be considered marginal by many mine operators. If an ore body of 20,000 tons, the size of the bodies now known in the mine, could be found by the proposed project, such an ore body would have a gross value of about $800,000, or about $560,000 if 70 percent recovery is assumed.

In reviewing the geologic probability of discovering new ore reserves the following considerations might be mentioned. The applicant's property lies within an arcuate belt of ore deposits that bounds the Silverton caldera on the east. Within the arcuate belt ore deposits are found in fissures that radiate outward from the caldera and in or near fissures that are parallel to the walls of the caldera.

Apart from places where the fissures outcrop there are, at present, no specific geologic criteria by which favorable areas may be precisely delineated from unfavorable areas within the Burns latite complex--the ore host. In particular, then, it is not possible to predict

at this time whether the proposed drifting would pass into more favorable or less favorable ground. Some generalizations probably can be made. Because the peripheral fissures and mineralization are probably related to the emplacement of the Silverton caldera it may be expected that the Caledonian fissure will persist as the proposed drift is driven westerly - toward the caldera. Other mineral deposits in the vicinity show that at many places large ore shoots are found on one side or the other of the fissures that are parallel to the caldera walls. As a result, it may be expected that favorable ground would be encountered near the place where the Caledonian fissure intercepts the Livingstone vein.

All things considered, and admittedly without benefit of field examination, it is my impression that exploration work with DMEA participation is justified on the applicant's property. Justification is based on the following principal points:

1) The property is located within a belt of significant mineral deposits.

2) The Caledonian mine now possesses ore shoots of 20,000 ton size.

3) The known deposits in the mine are probably of economic grade.

4) The prospect of finding ore bodies of the size of known deposits appears good.

5) The prospect of finding substantially larger ore bodies as the proposed drift is driven toward the caldera and the Livingstone crossfracture seems good.

The applicant's proposal to drive the shorter, Caledonian drift first as Stage I at a cost of $56,280 appears to be a reasonable approach to the work.

The examining team's reasons for recommending denial of the application are well taken; but the weight of favorable geologic evidence seems greater to me, and I, therefore, recommend that consideration be given to approval of a DMEA contract that would provide at least for the applicant's proposed first stage.

W. P. Williams

W. P. Williams

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

RECEIVED DEC 4 1956 D.M.E.A.

December 4, 1956 12/6/56-Received by [illegible]

Re: DMEA 4461; Pb-Zn-Cu
Tech-Ser Mining Co.
Caledonian Mine
Eureka Mining District
San Juan County, Colorado

Memorandum

To: W. R. Griswold, DMEA

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

Subject: Field team recommendation of November 20, 1956 (received November 28, 1956) on application.

The Caledonian Mine, located about 8 miles northeast of Silverton, Colorado has had limited production for a number of years, from veins of marginal quality.

The field examiners, Harrer (USBM) and Moore (USGS) after reviewing maps, analyses and previous reports and visiting the mine estimate reserves of 7,500 tons of indicated ore and 12,500 tons of inferred ore which will average 2 ounces of silver per ton, 5 percent lead, 6 percent zinc and 0.75 percent copper in ore shoots that average about 5 feet in thickness. The examiners are of the opinion that ore of similar grade and thickness might be developed by additional exploration drifting, but inasmuch as all past mining and exploration in the area has yielded marginal ore, they see no valid reason for the undertaking of additional exploration.

The Caledonia vein is developed through 4 crosscut adits over a vertical extent of 465 feet and over a strike length in excess of 600 feet. The vein ranges from 2 to 12 feet in width, and has poorly defined walls. The mineral content, like other San Juan veins, is complex being a mixture of sphalerite, galena, chalcopyrite, pyrite and quartz. A stope some 170 feet long and 115 feet high was mined to widths of over 12 feet from the Lower Main or 11,000-foot level and some stoping has been done ~~or~~ from the 11,465-foot level. It seems reasonable to assume that the stopes were developed on

the better parts of the exposed ore shoot. On the basis of shipments of the 4,000 tons of ore shipped 1948-52, the mine run of ore does not appear to equal 5 percent lead, 6 percent zinc and 0.75 percent copper. Such ore is not commercial with the high costs that pertain in the San Juans unless a gold-silver content in excess of that indicated by assays exists. The Livingstone vein is accessible over about 500 feet of strike length, but is very weakly mineralized and is mostly less than 1 foot in width. The Occident and Trenmore veins are inaccessible.

In conclusion it would appear that the field examiners conclude that although mineralization exists, further development is not apt to prove commercial ore bodies because the veins are both narrow and lean in mineralization.

The proposed extension of the 11,000-foot drift for 1,200 feet at $46.90 per foot and of the Livingstone drift for 1,600 feet to its projected intersection with the Caledonian vein would be sound exploration only if there are logical reasons to believe that discoveries would be commercial in nature. All the evidence, however, points to the probability that discoveries, if made, would be marginal or submarginal.

I recommend denial, concurring with both field examiners and the Field Team.

O. M. Bishop

O. M. Bishop

Copy to: Division of Minerals
Mr. Kiilsgaard
Mr. Lamb
Mr. Bishop
Files

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

11/30/56 Received by W. A.

224 New Customhouse
Denver 2, Colorado

November 20, 1956

RECEIVED NOV 23 1956 D.M.E.A.

Memorandum

To: Secretary to the Operating Committee

From: DMEA Field Team, Region III

Subject: Joint Report of Examination Docket DMEA 4461 (lead-zinc-copper) Tech-Ser Mining Company (Caledonian Mine) San Juan County, Colorado

Enclosed are the original and three copies of a joint Report of Examination by Frank B. Moore, U.S.G.S. and C. M. Harrer, U.S.B.M, approved by their respective supervisors, E. N. Harshman, Member Region III Field Team, and John F. Shaw, Supervising Mining Engineer.

The Applicant has proposed a far too optimistic program at a cost of $131,320.00 to explore by 2800 feet of drifting and crosscutting. The examiners found no geologic evidence to indicate that drifting west on the Caledonian vein would result in the discovery of larger or higher-grade ore bodies than those already exposed which are small. They recommend denial of the application.

The field team concurs in this recommendation.

DMEA Field Team, Region III

W. M. Traver

By W. M. Traver
Executive Officer

Reviewed by
DMEA OPERATING COMMITTEE
11-26-56
(Date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Building 20
Denver Federal Center
Denver 2, Colorado
November 16, 1956

DMEA
DEPARTMENT OF THE INTERIOR
NOV 20 1956
REGION III
DENVER, COLORADO

TRANSMITTED
NOV 20 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: K. N. Marshman
John F. Shaw

Subject: Joint Engineering and Geologic Report, Docket DMEA 4461, (Lead-Zinc-Copper) Teck-Ser Mining Co., Caledonian Mine, San Juan County, Colorado

We submit the original and 8 copies of a Joint Engineering and Geologic Report on the subject property, examined by Frank B. Moore, Geologist, Geological Survey, and C. N. Harrer, Mining Engineer, Bureau of Mines. The report is based on a field examination made October 3, 1956, to determine feasibility of granting aid in exploring the Caledonian mine near Silverton, San Juan County, Colorado, for lead-zinc-copper ores.

The operator proposed an exploration program consisting of driving 2,800 feet of drifts and crosscuts at an estimated cost of $131,380.00.

The examining team found geologic conditions at the Caledonian mine to be similar to those at other productive mines in the Silverton district, and that an estimated 20,000 tons of marginal-grade ores was exposed in the mine workings, but that higher-grade ore could not reasonably be expected to occur in this particular area.

Consequently, it was recommended that the application be denied.

K. N. Marshman
Member Field Team

Reviewed by
DMEA OPERATIONS OFFICE
11-26-56
(Date)

John F. Shaw
Supervising Mining Engineer

cc 8
KNMarshman
DMEA 4461
Chron.

FOR UNITED STATES GOVERNMENT USE ONLY

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

TRANSMITTED
NOV 20 1956

ON-SITE Report

DEFENSE MINERALS EXPLORATION ADMINISTRATION

JOINT REPORT OF EXAMINATION BY EXAMINING TEAM

REGION III

DMEA 4461

TECH-SER MINING CO.

CALEDONIAN MINE

SAN JUAN COUNTY, COLORADO

Lead-Zinc-Copper

Reviewed by
DMEA OPERATING COMMITTEE
11-26-56
(date)

JOINT ENGINEERING AND GEOLOGIC REPORT

By

Frank B. Moore, Geologist
Geological Survey

C. M. Harrer, Mining Engineer
Bureau of Mines

November 15, 1956

DMEA 4461
TECH-SER MINING COMPANY
CALEDONIAN MINE
SAN JUAN COUNTY, COLORADO

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ILLUSTRATIONS

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2. Claim and exploration map, Tech-Ser Mining Co., Caledonian mine, San Juan County, Colo 13

3. Sampling map, Tech-Ser Mining Co., Caledonian mine, San Juan County, Colo 13

4. Geologic map and section of the Caledonian mine, San Juan County, Colo 13

DMEA 4461
TECH-SER MINING CO.
CALEDONIAN MINE
SAN JUAN COUNTY, COLORADO

INTRODUCTION AND SUMMARY

Tech-Ser Mining Co., P. O. Box 517, Silverton, Colo., a Colorado corporation, has applied for Defense Minerals Exploration Administration assistance to explore the Caledonian mine further for lead, zinc and copper.

The mine is near the head of Minnie Gulch, in the Rio Grande National Forest and the Eureka Mining District, at an altitude of about 11,000 feet.

The property comprises 14 lode claims and 5 mill sites covering about 170 acres.

Tech-Ser Mining Company propose to explore its property by extending the lower Caledonian drift (alt. 11,000 feet) 1,200 feet northwesterly, and extending the Livingstone drift (alt. 10,500 feet) 1,600 feet northeasterly to their intersections with the Caledonian vein. Total cost of the project is estimated at $131,320.00.

A field examination of the property was made October 3, 1956.

The mine is in an area underlain by rocks of the Silverton volcanic series. The vein occupies a radial fault related to a sunken block 8 to 10 miles in diameter. Both the rock type and the structural pattern are similar to those of many productive mines in the Silverton district.

Reserves exposed in present drifts, which total a little over 1,200 feet in length, are estimated at 20,000 tons of marginal-grade lead-zinc-copper ore. Under favorable conditions, an amount of ore equal in size and grade might be discovered by 1,200 feet of additional drifting. Past records indicate that high-grade ore can not be expected in this area.

Several unknown factors, if unfavorable, could greatly reduce the amount of potential reserves.

It is recommended that the application for DMEA assistance be denied.

ACKNOWLEDGMENTS

The following references in the files of the Bureau of Mines, Region III, were consulted for information on the property:

Bascom, Willard (1942) Report on the Caledonian Mine, Minnie Gulch, Silverton, Colo.

Wilfley, C. R. (1943) War Minerals Report, The Caledonian Mine, San Juan County, Colo.

Young, W. E., and Thurber, H. K. (1949), Summary report of strategic minerals examination.

Young, W. E., and Thurber, H. K. (1949), Caledonian Lead-Zinc-Copper Mine, San Juan County, Colo. - Supplement to W. E. Young - 20

Hazen, S. W., Jr., (1953), The Caledonian and Kittimac Lead-Zinc-Copper Mines, Eureka Mining District, San Juan County, Colo.

R. A. Hildebrand, president and J. S. Diskin, superintendent of Tesh-Ser Mining Co., conducted the examining team over the property and furnished all available information on the property.

LOCATION, TOPOGRAPHY AND PHYSICAL FEATURES

The Caledonian mine is in the rugged alpine San Juan Mountains at about 11,000 feet altitude. The property (fig. 1) is in secs. 28, 29, 32 and 33, T. 42 N., R. 6 W., New Mexico principal meridian, in the Eureka Mining District of San Juan County, Colo. The mine is on the south slope of Minnie Gulch and can be reached from Silverton by following Colorado State Highway 110 northeasterly for 7 miles to Minnie Gulch, and then over a Government constructed access road easterly for 2.5 miles.

The access road is steep and rough. The mine can be operated during most winters, except for short periods when very severe weather and snowslides make it inaccessible.

Silverton, the county seat of San Juan County, is the nearest town and is a source of supplies and labor. Water is available the year round from the mine and from Minnie Gulch Creek. Electric power is not available on the property, and mine equipment is actuated by diesel and compressed-air power. The nearest ore concentrating facility is at the Pride of the West mill at Howardsville, 3 miles southwest of the mine. Ore and concentrates from the region are trucked to Ridgeway, 33 miles north of Silverton, and shipped therefrom on the Denver, Rio Grande and Western Railroad.

HISTORY AND PRODUCTION

The property was originally known as the Beaton group. Early-day operators and lessees were R. C. Beaton, John Leith, Carl H. Peterson, Willard Bascom. Later the American Zinc, Lead and Smelting Co., the Peerless San Juan Mining Co., and finally the present operator, Caledonian Mining and Milling Co., controlled the property and mine.

The mine was worked intermittently until 1921, again in 1928-30 and in 1937. Nothing was done from 1937 until 1942 when work was resumed, and during the period 1942-45, several hundred tons of ore were reportedly produced. The first recorded production from stoping was in 1948. During the period 1948-52, the property had a verified production of 5,566 dry tons of ore. Information on the various shipments and their assays are compiled as Annex I of this report.

The present lessees, Tech-Ser Mining Co., are engaged in mining on the upper level, and are opening up the caved portal of the lower tunnel preparatory to mining.

OWNERSHIP AND EXTENT

The claims comprising the Caledonian mine (fig. 2) are owned by Harry G. Knapp, Kenneth E. Knapp, Martin B. Williams and Frank A. Williams, Jr., all of Rifle, Colorado. They granted a 5-year lease on the property to Tech-Ser Mining Co., on November 1, 1955, with an option to extend the lease for an additional 5-year period.

The applicant lists the following claims, comprising about 170 acres, which it holds under lease from the owners. Although some of the unpatented claims listed differ from those mentioned in the lease, all are covered in a clause naming the claims under lease, "together with all other contiguous claims, patented or unpatented, now or hereafter owned or located by lessors during the term of the lease".

Claims under lease to Tech-Ser Mining Company

Name	Type	Size (feet)	Patent Survey No.	Kind
Artois	Lode	300 x 1500	872	Patented
Livingstone	do	300 x 1500	876-A	Do.
Occident	do	300 x 1500	875-A	Do.
Trenmore	do	300 x 1500	874-A	Do.
Tantallon	do	300 x 1500	873-A	Do.
Standard	do	300 x 1500	19026	Do.
Dundee	do	300 x 1500	19050	Do.
Artois	Mill site	421.7 x (643.3) (381.0)	872-B	Do.
Livingstone M.S.	do	295 x 738.3	876-B	Do.
Occident M.S.	do	335.5 x 653	875-B	Do.
Trenmore M.S.	do	311.1 x 700	874-B	Do.
Tantallon M.S.	do	311.1 x 700	873-B	Do.

Name	Type	Size (feet)	Patent Survey No.	Kind
Nellie-B	Lode	600 x 1500	--	Unpatented lode location
Nellie-1B	do	600 x 1500	--	Do.
Nellie-2B	do	600 x 1500	--	Do.
Nellie-3B	do	600 x 1500	--	Do.
Livingstone2B	do	600 x 1500	--	Do.
Livingstone-3B	do	600 x 1500	--	Do.
Tantallon 2B	do	600 x 1500	--	Do.

The applicant requests that any ore mined from the developed block of ground east of the upper level Caledonian crosscut be excluded from any exploration contract royalty schedule.

PRESENT STATUS

Exploration and development

The Caledonian vein has been opened up through four crosscuts (figs. 2 and 3) at altitudes of 11,000, 11,235, 11,255 and 11,465 feet. The lower crosscut (alt. 11,000 ft.) was driven 615 feet to the Caledonian vein. It is reported that so much water was encountered in the vein that a lateral was started 80 feet back from the end of the crosscut and driven westerly and northwesterly around the water course to reach the vein. From here, the Caledonian vein was drifted on northwesterly for 625 feet. A raise, started 125 feet back from the end of the drift, connects the lower and upper levels. The upper level and the raise are accessible. The portal of the lower tunnel was blocked by a cave-in at the time of the examination. The applicant is now engaged in reopening this portal. Access to the lower level was attained through the upper level and the raise; thus the lower level and all stopes and raises therefrom were accessible. On the upper level, the Caledonian vein was cut 480 feet in from the portal of the tunnel and was then drifted on 435 feet southeasterly and 135 feet north-

westerly. The northwest drift was extended 165 feet northerly along a cross fissure. The Upper East tunnel (alt. 11,255 ft.) and the Winze tunnel (alt. 11,465 ft.) were caved and inaccessible. Tech-Ser Mining Co., is now engaged in mining on the upper level and expects to open stopes on the lower level shortly.

Mining, milling and other facilities

The mine was last operated during 1951-52, and is in good condition except for the caved lower tunnel portal. The upper and lower levels are equipped with track and air lines. Ample water is available for mining activities. The surface plant includes several buildings which house the shop and change room, compressor and ore bin. The company is erecting a Butler building to accommodate employees during winter if isolated by snowstorms or slides. Equipment on the property includes:

6 - rocker dump mine cars
2 - end dump mine cars
1 - 600 c.f.m. I.R. Turboflow air compressor
1 - airleg drifter
2 - stopers
3 - air hoists (tuggers)
1 - slusher
1 - Eimco 12B mucking machine
Ample tools and supplies for mining.

The nearest ore concentrator is the Pride of the West differential-flotation mill of 100-ton per day capacity at Howardsville, about 3 miles distant. Ore from the area is also trucked 33 miles to Ridgeway, Colo., and shipped by rail to mills and smelters that offer the better prices.

GEOLOGY

The Caledonian mine is in an area underlain by Tertiary extrusive rocks of the Silverton Volcanic Series. The mine workings are in the Burns latite, a formation known to be a favorable host rock for vein deposits. The formations above and below the latite, pyroxene andesite and Eureka rhyolite respectively are probably somewhat less favorable host rocks.

A large sunken block, 8 to 10 miles in diameter, lies just to the northeast of Silverton. This block is surrounded by a series of marginal faults. A second series of faults radiates outward from the sunken block like the spokes of a wheel. Most of the deposits in the Silverton district are in radial faults. The Caledonian vein is believed to have formed in one of the radial faults on the east side of the sunken block.

The Caledonian vein (on the Tantallon claim) has been explored by four crosscut tunnels at elevations between 11,000 and 11,466 feet (fig. 4). The two upper tunnels are caved but apparently drifting along the vein from these adits totalled less than 300 feet. The two lower tunnels, at elevations of 11,000 and 11,235 feet, are called the Lower Main Tunnel and the Upper Tunnel respectively. In each, the vein has been explored for a distance of a little over 600 feet. About half a mile east of the Caledonian mine, work in the Kittimac mine has exposed a vein which is believed to be the southeasterly extension of the Caledonian vein.

The Caledonian vein strikes from N. 60° W. to N. 75° W. and dips from 70° NE to 80° SW; a strike of N. 75° W. and a dip of 80° NE to vertical is typical. In general, the vein is 2 to 6 feet wide but it widens to 10 or 12 feet in places. A well defined foot or hanging wall is rarely seen and the vein material grades into unaltered wall rock.

Vein minerals are sphalerite, galena, chalcopyrite, pyrite and quartz.

Nearly all the ore produced from the mine has come from one stope on the Caledonian vein near the east end of the drift on the Lower Main Tunnel level. The stope is 170 feet long and 115 feet high and has been mined for a width of over 12 feet. A small amount of stoping has also been done on the Caledonian vein from the Upper Tunnel level. The ore shoots appear to be controlled by a change in strike to N. 60° W. and possibly by a flattening of the dip to the northeast.

The mine has an estimated 7,500 tons of indicated ore and 12,500 tons of inferred ore in the Caledonian vein in the ground opened by the present workings (fig. 4). This ore is marginal in grade and will average about 2 ounces silver per ton, 5 percent lead, 6 percent zinc, and 0.75 percent copper. In addition, it is estimated that a possible 50,000 tons of protore averaging 1 to 3 percent combined sulfides is present. The reserve tonnages for the ore represent a reasonable projection of stoped and sampled areas in the workings and are figured for a 5-foot width. The mine has not been adequately sampled and the grade of the ore is based on past production figures of the company. The tonnage and grade of the protore is an estimate made from a study of the level and stope maps and an underground inspection ("eye ball assay") of the vein material. There are no assay data available from the protore areas.

The reserve figures estimated by the company are ridiculously over-optimistic. The blocks of indicated and inferred ore on the Caledonian vein are extended much farther than sensible mining practice would allow. Much of the ore inferred in the present workings probably should be indicated protore; it is accessible but too low in grade to interest the operators in sampling. The "possible tons" figures are based on

the assumption that the unexplored veins (Occident, Trenmore, and Livingstone) and the unexplored portion of the Caledonian vein are 100 percent mineralized. The Occident vein is an unknown quantity as is the Trenmore, but neither are believed to have produced much ore; both are inaccessible. A drift on the Livingstone vein is accessible, a fact not known by the company's president-geological engineer at the time of the examination. This vein has been drifted on for about 500 feet and is mostly a 2- to 3-inch weakly mineralized fracture; in a few places it reaches 1 foot in width. There has been no stoping on the Livingstone vein.

The intersection of the Caledonian and Livingstone veins, and other possible intersections, cannot be considered targets as it is rather doubtful that the Livingstone, Occident, and Trenmore veins are strong enough to extend to the Caledonian vein. Therefore, the "target" consists of 1,200 feet of drifting to the west along the Caledonian vein. The new drift would be in latite similar to the wall rock in the present workings. It is doubtful if this drifting will uncover ore bodies of greater significance than those already exposed. Past records indicate that high-grade ore cannot be expected in this area and, as the new drift will trend away from known ore bodies which also become smaller from east to west, possible new ore bodies will probably be smaller than those currently exposed.

As shown on the geologic map in the Silverton quadrangle folio, a north-northeast trending fault, related to the series of marginal faults, displaces the Burns latite in the vicinity of the Caledonian mine. The position of this fault relative to the mine workings has not been determined. If this fault is later than the Caledonian vein

and cuts the vein in the area of the proposed westward drift, displacements are such that the Caledonian vein would be lost across the fault.

SAMPLING

The Caledonian mine was examined by engineers of the Bureau of Mines in 1943[1] and 1949[2]. These examinations were made at the request of the owners or lessees. Twenty-five samples were taken by Bureau of Mines engineers during 1943 and 1949. Twenty-three were chip samples taken across the vein at accessible points and two were muckpile grab samples.

According to C. R. Wilfley, the Caledonian mine was sampled by the Reconstruction Finance Corporation during 1942 for information on which to evaluate a loan application. A total of 24 samples were taken of the vein. Fifteen samples across the vein on the upper tunnel level averaged 0.03 ounce gold and 3.01 ounces silver a ton, 4.13 percent lead, 5.49 percent zinc and 1.46 percent copper over an average vein width of 3.5 feet; nine samples taken of the vein in the lower tunnel and stope averaged 0.03 ounce gold and 2.49 ounces silver a ton, 3.97 percent lead and 5.9 percent zinc over an average vein width of 7.3 feet. Mr. Wilfley estimated 9,000 tons of indicated ore on the upper tunnel level and 28,000 tons on the lower level. On this basis, using the results of Reconstruction Finance Corporation sampling, he estimated the average grade of ore as 0.03 ounce gold and 2.62 ounces silver a ton, 4.01 percent lead, 5.8 percent zinc and 1.02 percent copper over a vein width of 6.5 feet.

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[1] Wilfley, C. R., former mining engineer, Denver Field Office, Sept. 24, 1956 (War Mineral Report)

[2] Young, W. E., and Thurber, H. K., mining engineers, Region IV, Mining Division

The weighted average of the 25 samples taken by the Bureau of Mines engineers during 1943 and 1949 is 0.013 ounce gold and 2.22 ounces silver a ton, 4.81 percent lead, 7.15 percent zinc and 1.26 percent copper.

During the examination on October 3, 1956, three additional samples (H-846, 847 and 848) were taken in the lower tunnel level and one (H-849) was taken in the upper tunnel level. These samples assayed as follows:

Sample No.	Width (feet)	Percent		
		Lead	Zinc	Copper
H-846	3.25	9.6	10.7	2.15
H-847	6.0	2.8	4.0	0.75
H-848	3.7	0.05	0.8	0.15
H-849	3.8	0.8	2.3	0.35

More representative of the ore is the average metal content of the 1,896.2 dry tons of ore produced by the American Zinc, Lead and Smelting Co., during November 1952. The weighted average of settlement sheet assays is 0.008 ounce gold and 1.68 ounces silver a ton, 4.21 percent lead, 5.05 percent zinc and 0.56 percent copper.

All available sample locations and assay results are shown on figure 3.

ORE RESERVES

An unpublished report[3/], in the files of the Bureau of Mines, estimates reserves of 5,000 tons of indicated ore and 14,000 tons of inferred ore having an average content of 0.008 ounce gold and 1.65 ounces silver a ton, 4.0 percent lead, 5 percent zinc and 0.56 percent copper.

3/ Hazen, Scott W. (1953): The Caledonian and Kittimac Lead-Zinc-Copper Mines, Eureka Mining District, San Juan County, Colo.

The writer's estimate total reserves of marginal grade ore as 7,500 tons of indicated ore and 12,500 tons of inferred ore. This will average about 2 ounces of silver per ton, 5 percent lead, 6 percent zinc and 0.75 percent copper. In addition, it is estimated that a possible 50,000 tons of protore averaging 1 to 3 percent combined sulfides is present.

PROPOSED EXPLORATION AND COSTS

Tech-Ser Mining Co., propose to explore its property with a two-stage program of drifting at an overall cost of $131,320.00. Stage I would consist of advancing the lower Caledonian drift (alt. 11,000 ft.) 1,200 feet northwesterly along the Caledonian vein. The drift would be 6 by 7 feet in cross-section. This stage is estimated to cost $56,280.00 or $46.90 a foot. Stage II would consist of advancing the Livingstone drift (alt. 10,500 ft.) 1,600 feet northeasterly along the Livingstone vein to the intersection with the Caledonian vein. This stage is estimated to cost $75,040.00 or $46.90 per foot. Each stage would be completed within one year.

CONCLUSIONS AND RECOMMENDATIONS

The proposed 1,200 feet of drifting to the west will be in an unexplored area, away from the known ore deposits in Minnie Gulch. The Kittimac mine is about 2,500 feet east of the Caledonian and the one large ore shoot in the Caledonian is in the easternmost workings. However, the Caledonian vein structure is strong in the western workings. Except for possible displacement of the vein by the north-northeastward trending fault, there is no evidence to indicate any change in the geologic conditions to the west; the rock type should be the same and, lacking

surface maps, there is no reason to predict or deny a possible favorable change in the strike of the vein. As the chance for favorable vein intersections seems remote, the target would be exposing 1,200 feet of vein. It should be noted, however, that the field team was shown no evidence, such as surface maps, that the vein extends this far west.

It is believed that the applicants proposal for Stage II drifting along the Livingstone vein has very little chance of discovering significant deposits of ore. There is no geologic evidence to indicate that drifting along the Caledonian vein to the west will result in the discovery of larger or higher-grade ore bodies than those already exposed; that is, 20,000 tons containing 2 ounces silver per ton, 5 percent lead, 6 percent zinc, and 0.75 percent copper, and an additional 50,000 tons of protore containing 1 to 3 percent combined sulfides. The chances of making such a discovery are dependent upon the continuation of the vein for an adequate distance, the absence of an off-setting cross fault, and the presence of favorable changes in strike (and dip) of the vein.

Because of the above unknown factors and the marginal grade of the ore, it is recommended that the application be denied.

ANNEX I

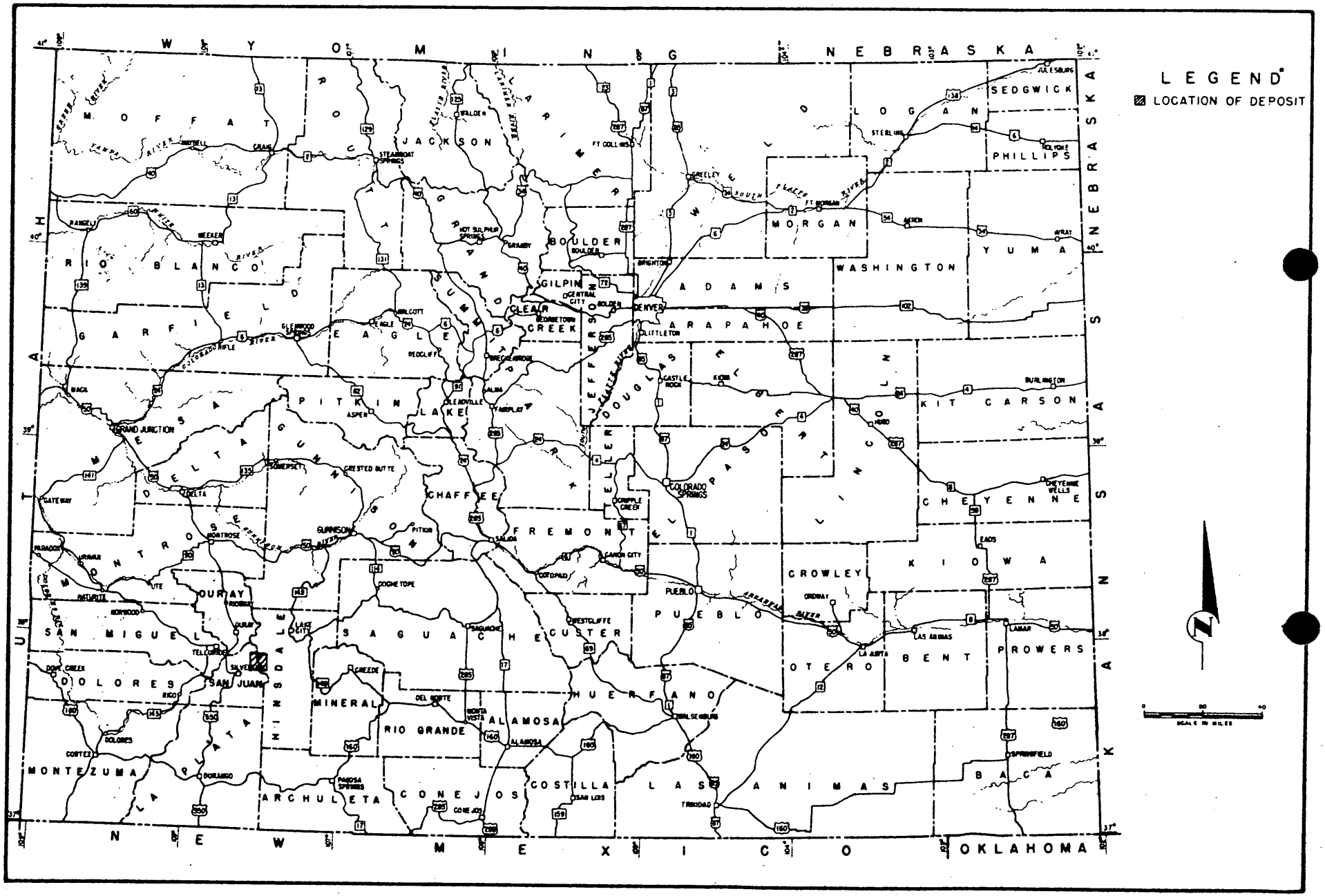
Known production from the Caledonian mine, 1948

Lot No.	Dry Tons	Ounces a ton Gold	Ounces a ton Silver	Percent Copper	Percent Lead	Percent Zinc	Remarks
789	59.1	0.008	2.20	0.65	4.03	4.9	Old stope above lower level. Ore sorted from diluted stope rock mined full vein width of 18 feet. Ore shipped to Mayflower custom mill of Shenandoah-Dives Mining Company
805	54.8	0.007	1.58	0.42	2.81	3.43	
810	89.6	0.01	1.325	0.42	2.8	3.4	
818	132.5	0.01	1.35	0.25	2.45	3.05	
835	142.6	0.01	1.15	0.50	2.5	3.5	
851	154.8	0.01	1.00	0.35	2.05	2.85	
853	100.9	0.01	1.55	0.60	2.6	3.75	
862	115.6	0.01	1.81	0.60	3.25	4.0	
804	54.4	0.008	2.20	0.75	2.78	4.05	New stope above lower level. Ore mined from high grade, footwall part of vein, 6-feet wide. Ore shipped to Mayflower custom mill of Shenandoah-Dives Mining Company
817	79.8	0.003	2.20	0.65	2.5	3.95	
825	48.3	0.005	2.10	0.90	2.7	4.15	
880	91.8	0.005	2.03	0.95	3.45	5.25	
902	161.7	0.005	1.96	0.75	4.5	7.30	
1	50.34	--	1.5	--	5.5	3.7	Sorted dump ore from upper east tunnel. Shipped to Mayflower custom mill, Shenandoah-Dives Mining Co.
2	43.17	0.008	1.48	0.10	3.9	5.1	
3	164.1	0.035	0.92	0.30	1.55	1.5	
			1949				
683	44.3725	--	2.10	0.74	4.73	7.70	
			1950				
			No production				
			1951				
891	76.605	--	2.495	.75	5.7	8.3	Sorted ore shipped by H. G. and K. E. Knapp to Shenandoah-Dives Co. Ore from lower tunnel level stope.
900	17.867	--	2.66	.84	5.5	7.5	
976	37.48	--	1.88	.73	4.2	5.5	
969	29.09	--	2.11	.77	5.8	7.3	
993	127.36	--	2.45	.89	5.7	7.6	

Known production from the Caledonian mine (Cont'd).

1952

Lot No.	Dry Tons	Ounces a ton Gold	Ounces a ton Silver	Percent Copper	Percent Lead	Percent Zinc	Remarks
1005	27.783	--	1.90	.71	4.20	6.20	Shipped by H.G. and K. E. Knapp to the Shenandoah-Dives Mining Co. Ore from stope above lower tunnel level.
1000	101.750	--	2.08	.64	4.45	6.10	
995	60.475	--	2.33	.69	4.25	5.78	
992	60.185	--	1.65	.60	4.05	5.50	
1	395.7	0.008	1.47	0.52	2.9	3.6	Produced by American Zinc, Lead and Smelting Co. in November 1952. The company estimated that there were 900 tons remaining in stopes as of November 20, 1952.
2	247.86	0.009	1.6	0.55	4.25	5.0	
3	517.76	0.009	1.875	0.66	5.4	6.4	
4	335.208	0.007	1.5	0.53	3.5	4.35	
5	399.676	0.007	1.85	0.575	4.1	5.35	


LEGEND
LOCATION OF DEPOSIT
WYOMING
NEBRASKA
UTAH
KANSAS
NEW MEXICO
OKLAHOMA
MOFFAT
RIO BLANCO
GARFIELD
MESA
DELTA
MONTROSE
SAN MIGUEL
DOLORES
MONTEZUMA
LA PLATA
SAN JUAN
OURAY
GUNNISON
PITKIN
EAGLE
JACKSON
GRAND
SUMMIT
CLEAR CREEK
GILPIN
BOULDER
LAKE
CHAFFEE
FREMONT
SAGUACHE
MINERAL
RIO GRANDE
ALAMOSA
CONEJOS
ARCHULETA
CUSTER
HUERFANO
COSTILLA
LAS ANIMAS
PUEBLO
OTERO
BENT
PROWERS
CROWLEY
KIOWA
BACA
ELBERT
DOUGLAS
JEFFERSON
ADAMS
WELD
LARIMER
MORGAN
WASHINGTON
ARAPAHOE
KIT CARSON
CHEYENNE
YUMA
PHILLIPS
SEDGWICK
LOGAN
DENVER
GRAND JUNCTION
ASPEN
CRESTED BUTTE
GUNNISON
MONTROSE
SILVERTON
TELLURIDE
DURANGO
PAGOSA SPRINGS
CONEJOS
SALIDA
CANON CITY
COLORADO SPRINGS
PUEBLO
LA JUNTA
LAS ANIMAS
TRINIDAD
SAN LUIS
ALAMOSA
SAGUACHE
CRESTCLIFFE
LAKE CITY
CREEDE
DEL NORTE
MONTE VISTA
COTOPAXI
GRANBY
HOT SULPHUR SPRINGS
STEAMBOAT SPRINGS
WALDEN
FT COLLINS
GREELEY
FT MORGAN
BRIGHTON
LITTLETON
CENTRAL CITY
BLACK HAWK
BRECKENRIDGE
LEADVILLE
VAIL
EAGLE
GLENWOOD SPRINGS
RIFLE
REDCLIFF
RANGELY
MEEKER
CRAIG
HAYDEN
STERLING
SIDNEY
AKRON
WRAY
BURLINGTON
KIT CARSON
CHEYENNE WELLS
EADS
LAMAR
SPRINGFIELD
JULESBURG
OLYMPIA
CASTLE ROCK
KIOWA
ORDWAY
CRIPPLE CREEK
COCHETOPE
DOLORES
DOVE CREEK
RICO
COSTEZ
DOLORES
MANCOS
CORTEZ
DORANGO
PAGOSA SPRINGS
CONEJOS
SAN LUIS
TRINIDAD
LAS ANIMAS
LA JUNTA
ORDWAY
PUEBLO
CANON CITY
SALIDA
GUNNISON
MONTROSE
GRAND JUNCTION
GATEWAY
DELTA
CRESTED BUTTE
ASPEN
LEADVILLE
VAIL
BRECKENRIDGE
EAGLE
GLENWOOD SPRINGS
RIFLE
REDCLIFF
RANGELY
MEEKER
CRAIG
HAYDEN
STEAMBOAT SPRINGS
WALDEN
FT COLLINS
GREELEY
FT MORGAN
BRIGHTON
LITTLETON
CENTRAL CITY
BLACK HAWK
GRANBY
HOT SULPHUR SPRINGS

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

RECEIVED
OCT - 8 1956

224 New Customhouse
Denver 2, Colorado

October 5, 1956

Memorandum

To: Chairman of the Operating Committee (2)

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA 4461 (lead-zinc-copper) Tech-Ser Mining Company (Caledonian Mine) San Juan County, Colorado

Your letter dated October 1, 1956 stated that an extra copy of the application was enclosed, for the use of the Field Team. The extra copy has not yet arrived in this office. Will you please check to see if the missing copy of the application was misplaced in your office.

W. M. Traver

W. M. Traver

NOTE:
Copy sent 10-3, by Miss Lackoff.
Gray.

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

RECEIVED
OCT - 8 1956

224 New Customhouse
Denver 2, Colorado

October 5, 1956

Memorandum

To: E. N. Marshman
J. F. Shaw (2)

From: DMEA Field Team, Region III

Subject: Docket DMEA 4461 (lead-zinc-copper) Tech-Ser Mining Company (Caledonian Mine, San Juan County, Colorado

Enclosed is a copy of a letter from the Chairman of the Operating Committee, dated October 1, 1956, and memoranda of review of the application by W. P. Williams and O. M. Bishop.

The Bureau of Mines brochure, the only copy received in the Region III office, was forwarded to E. N. Marshman for joint use of the field examiners on their recent trip to San Juan County. You have probably received the survey copy of this application by this time. Will you please return the Bureau of Mines copy to Mr. Shaw for use of the engineer examiner in making the report of examination.

The Bureau of Mines has information in their files on this property which should be of assistance to the field examiners.

DMEA Field Team, Region III

W. M. TRAVER

By W. M. Traver
Executive Officer

Enclosure

WMC:ytl
cc: Sec. Op. Comm. (2)
Docket 4461
Chron.

DMEA
DEPARTMENT OF THE INTERIOR
OCT 10 1956
REGION III
DENVER, COLORADO

October 9, 1956

Memorandum

To: W. M. Traver, Executive Officer, DMEA Field Team, Reg. III

From: Superintendent, Denver Experiment Station, Reg. III

Subject: Docket DMEA 4461 (lead-zinc-copper) Tech-Ser Mining Company (Caledonian Mine) San Juan County, Colorado

The application for Tech-Ser Mining Company, Docket DMEA 4461, was received in this office on October 8, 1956.

A field examination will be made and suitable report prepared by an engineer from the Denver office.

W. H. KING

W. H. King

cc: W. M. Traver (2)
E. N. Harshman
J. F. Shaw
Sec. Op. Com. (2)

File Copy
Surname
J all.
Surnamed
Selfridge

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

500

Oct. 1, 1956

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

Re: Docket No. DMEA-4461 (Lead-Zinc-Copper)
Tech-Ser Mining Company
Caledonian Mine
San Juan County, Colorado

Dear Mr. Traver:

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

In the event that you should consider the application favorably, the Applicant should be requested to obtain a Consent to Lien and Subordination Agreement from the owners of this property.

The property map submitted with the application does not correspond to the listing of the claims contained in the Mining Lease and the claims listed by the Applicant do not correspond to those in the lease.

Copies of memoranda, dated September 18 and September 24, 1956, by W. P. Williams, Geological Survey, and O. M. Bishop, Bureau of Mines, respectively, relating to the project, are enclosed for your information.

Also enclosed is an extra copy of the application for the use of the Field Team.

Sincerely yours,
George C. Selfridge
Chairman, Operating Committee (GCS)

Enclosures

APPROVED:

Frank D. Lamb (GCS)
Member, Bureau of Mines

Thor H. Kiilsgaard (GCS)
Member, Geological Survey

JWAlt/er 9/28/56
Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Chron.

RCG

File Copy
Surname
J. W.
Grimwood
Lamb
Kiilsgaard
Selfridge

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

OCT - 1 1956

Mr. R. A. Hildebrand, President
Tech-Ser Mining Company
Post Office Box 517
Silverton, Colorado

Re: Docket No. DMEA-4461 (Lead-Zinc-Copper)
Tech-Ser Mining Company
Caledonian Mine
San Juan County, Colorado

Dear Mr. Hildebrand:

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 is referred to:

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

If additional information concerning your application is needed, the Field Team will get in touch with you at an early date.

Sincerely yours,

C. O. Mittendorf

Administrator

JWAlt/er 9/28/56
Copy to: Docket
Admr R File
Op. Committee
Base Metals
Mr. Bishop, USBM
Mr. Kiilsgaard, USGS
Region III (2)
Chron.

R.S.K.

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

RECEIVED
OCT - 1 1956

224 New Customhouse
Denver 2, Colorado

September 27, 1956

Memorandum

To: E. N. Harshman

From: Executive Officer, DMEA Field Team, Region III

Subject: DMEA Docket 4461 (lead-zinc-copper) Tech-Ser Mining Company (Caledonian Mine) San Juan County, Colorado

In accordance with your telephone request, attached is the Bureau of Mines copy of the subject application.

W. M. TRAVER

W. M. Traver

WMC:ytl

Enclosures

cc: Sec. Op. Comm. (2)
Shaw (2)
Docket
Chron

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

September 24, 1956

Re: DMEA 4461; Pb-Zn-Cu;
$131,320
Tech-Ser Mining Co.,
Silverton, Colo.
Caledonian Mine
San Juan County, Colo.

Memorandum

To: W. R. Griswold, DMEA

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

Subject: Review of application dated September 7, and received September 12, 1956

The applicant proposes a 2-stage drifting program to explore downward extensions of known ore shoots. Stage I consists of 1,200 feet of drifting from the face of the Lower Main tunnel at 11,000-foot elevation. Stage II which is predicated on success in Stage I provides for 1,600 feet of drifting from the face of the Livingston drift 500 feet below the work of Stage I. Each drift explores a separate vein system and each explores the intersection of the two systems.

Although past production appears to have been some 2,000 tons of mixed lead-zinc-silver-copper ore with a net smelter value of about $21 per ton, there is about 16,000 tons of developed and some 48,000 tons of indicated ore in relatively narrow veins and there appears to be a reasonable expectation that similar ore can be found in depth on the two vein systems to be explored.

I recommend that the application be referred to the Field Team for review and field examination if such be needed.

O. M. Bishop

O. M. Bishop

Copy to: Division of Minerals
Mr. Killsgaard
Mr. Lamb
Mr. Bishop
Files

RECEIVED
SEP 25 1956

IN REPLY REFER TO:

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

RECEIVED
SEP 18 1956

September 18, 1956

Memorandum

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

From: W. P. Williams, U. S. Geological Survey

Subject: Review of application, DMEA 4461, Tech-Ser Mining Company, Caledonian Mine, San Juan County, Colorado, (lead, zinc, copper).

The applicant proposes to explore for lead, zinc, copper, and silver deposits in the old Caledonian mine. The exploration work would consist of a total of 2,800 feet of drifting to be done in two stages. The proposed work would explore for extensions of two known vein systems on two different mine levels.

Past production from the Caledonian mine does not appear to have been large. The applicant estimates 16,606 tons of indicated and 47,830 tons of inferred reserves exist on the property. There is no mining going on at present although the applicant states some mine development and retimbering is being done.

The property should be evaluated in the field. It may be that the proposed project consisting entirely of blind drifting along the two veins, hoping that ore will show up 'with the next round', is not suitable as a DMEA project at this time.

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

W. P. Williams

W. P. Williams

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration
Washington 25, D. C.

September 12, 1956

Tech-Ser Mining Company
P. O. Box 517
Silverton, Colorado

Subject: DMEA-4461
Re: Exploration Assistance
Caledonian Mine

Gentlemen

Your application for exploration assistance, dated September 7, 1956 submitted to our office at Denver, has been assigned Docket Number DMEA-4461 and referred to the Base Metals Division in the Washington office. Kindly identify all future correspondence relating to your application by this Docket Number.

Sincerely yours,

(Sgd) Allen S. Dakan
Allen S. Dakan, Chief
Operations Control and
Statistics Division

Copy to:

Region III. Denver, Colorado
Code 500

3571

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

RECEIVED
SEP - 7 1956

September 5, 1956

224 New Customhouse
Denver 2, Colorado

Mr. R. A. Hildebrand, President
Tech-Ser Mining Company
P. O. Box 517
Silverton, Colorado

Re: Application for DMEA Aid (Lead-Zinc) (Caledonian Mine) San Juan County, Colorado

Dear Mr. Hildebrand:

Returned herewith are four copies of Form MF-103 which accompanied your application for DMEA aid on the Caledonian mine.

Will you please sign and date the Certification on each copy and return them to this office so that we may continue to process your application.

Very truly yours,

W. M. TRAVER,

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

Enclosures

HMC:ab

cc: Sec. Op. Comm. (2)
Harshman
Shaw (2)
Docket
Chron.

U. S. Government Messenger Envelope

Standard Form No. 65 (Rev. 1/46)

1. Use blocks consecutively, one at a
2. Avoid previous block.
3. Write clearly.

NAME OR TITLE OF PERSON, DEPARTMENT, ADDRESS, AND ROOM		NAME OR TITLE OF PERSON, DEPARTMENT, ADDRESS, AND ROOM	
	RUN STOP	Mr. Houk Room 4453 Int.	RUN STOP
Map Information Office U.S. Geological Survey Rm. 1206 General Service Bldg	RUN STOP ~~29A~~		RUN STOP
~~Mr. [illegible]~~ ~~[illegible] Bldg~~	RUN STOP		RUN STOP
Mrs Graffius Room 5219 Interior Branch of Accounts	RUN STOP		RUN STOP
~~L. Brown~~ ~~Distribution~~	RUN STOP		RUN STOP
Mrs. Graffius Room 5219 Interior Branch of Accounts	RUN STOP		RUN STOP
Mr Pompeley Room 230 CSIB	RUN STOP		RUN STOP
Mr. Lewis D. Brown Silver Spring, Maryland	RUN STOP		RUN STOP
Mr ~~Bro~~ Bro # ~~[illegible]~~ 4226 G. S. A.	RUN STOP		RUN STOP
~~Mrs. Winterbottom~~ ~~Room 5012 - Interior~~	RUN STOP		RUN STOP

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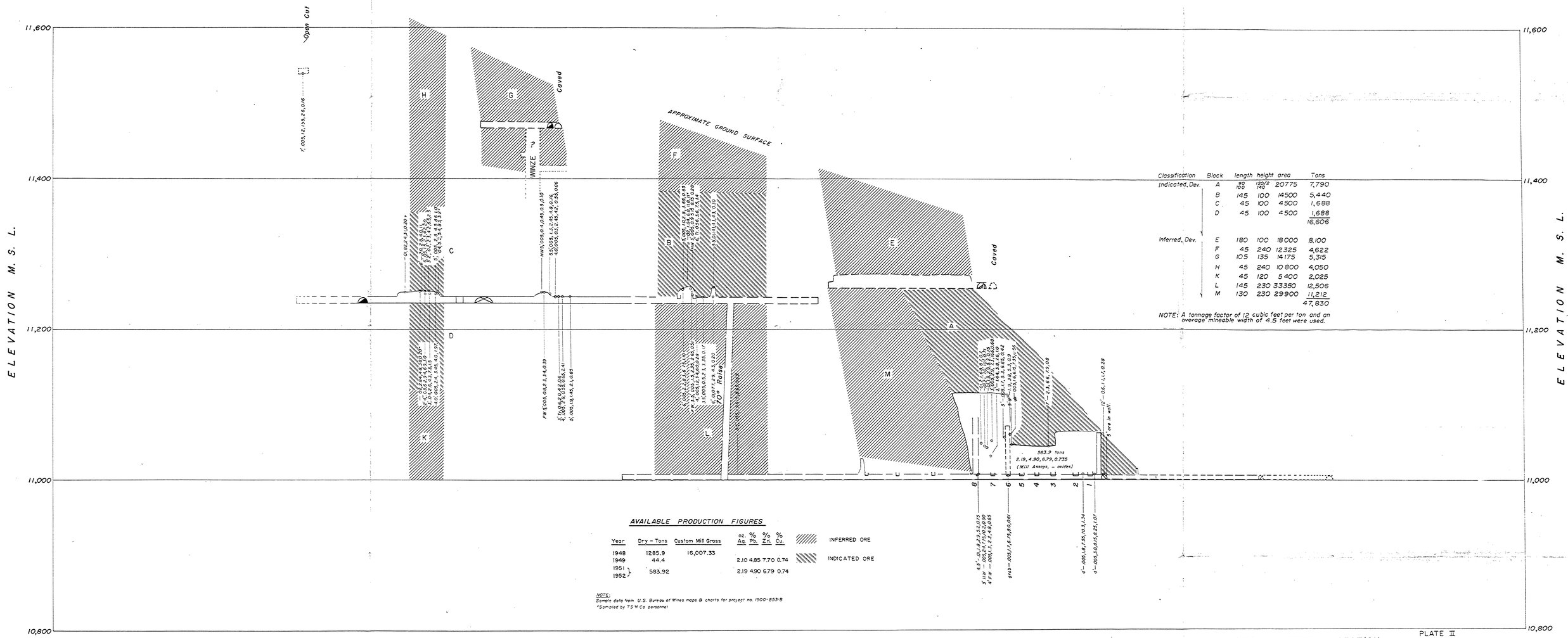
Use other side

16—

Use RUN and STOP only when messenger service between Government buildings in Washington is required. Your mail room has RUN and STOP information.



Classification	Block	length	height	area	Tons
Indicated, Dev.	A	90 / 100	120/2 / 140	20775	7,790
	B	145	100	14500	5,440
	C	45	100	4500	1,688
	D	45	100	4500	1,688
					16,606
Inferred, Dev.	E	180	100	18000	8,100
	F	45	240	12325	4,622
	G	105	135	14175	5,315
	H	45	240	10800	4,050
	K	45	120	5400	2,025
	L	145	230	33350	12,506
	M	130	230	29900	11,212
					47,830

NOTE: A tonnage factor of 12 cubic feet per ton and an average mineable width of 4.5 feet were used.

AVAILABLE PRODUCTION FIGURES

Year	Dry – Tons	Custom Mill Gross	oz. Ag.	% Pb.	% Zn.	% Cu.
1948	1285.9	16,007.33				
1949	44.4		2.10	4.85	7.70	0.74
1951 / 1952	583.92		2.19	4.90	6.79	0.74

INFERRED ORE

INDICATED ORE

NOTE:
Sample data from U.S. Bureau of Mines maps & charts for project no. 1500-853-B
*Sampled by T S M Co personnel

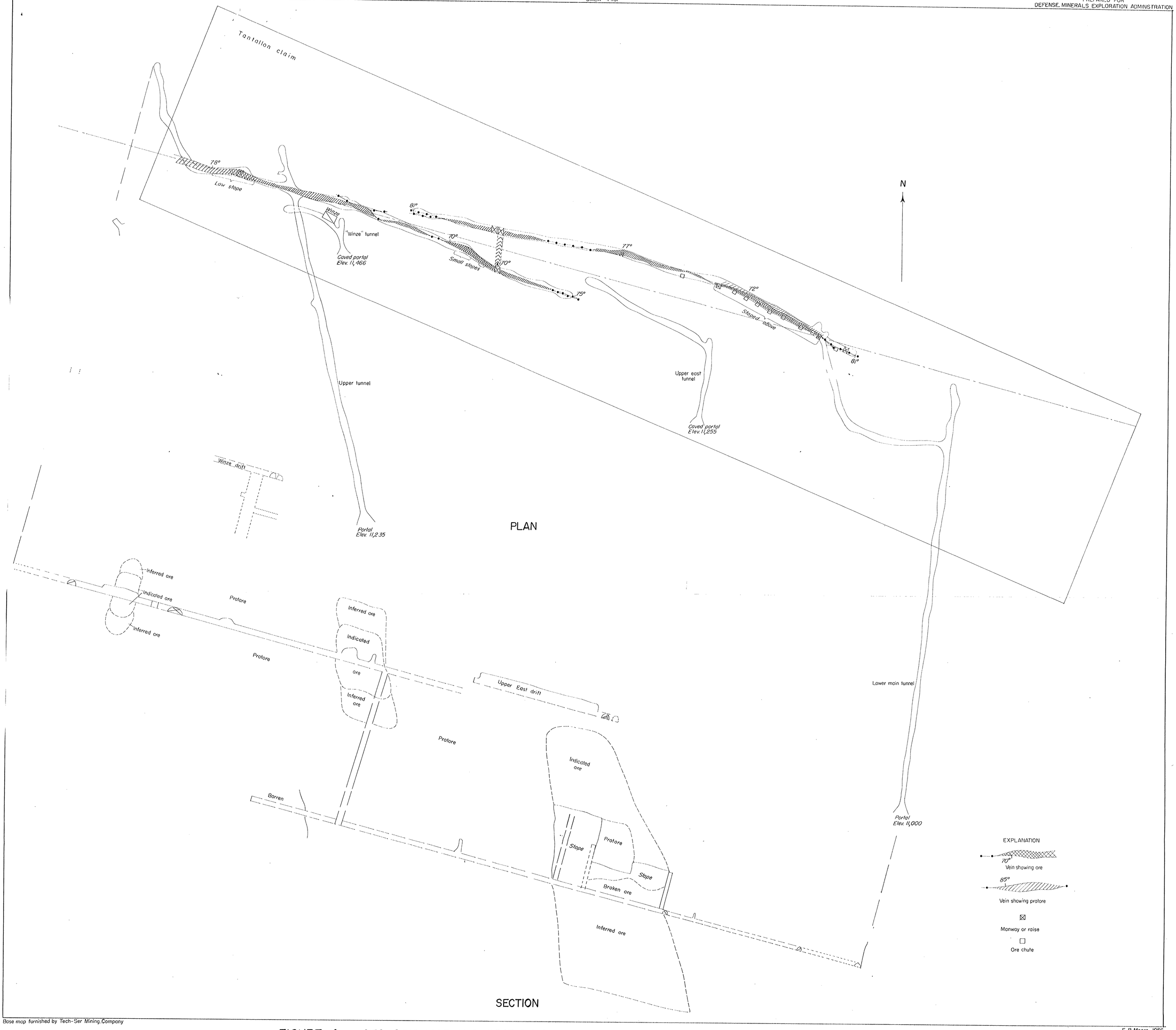
PLATE II

V & H
SCALE 1" = 50'
Tech-Ser Mining Company
1955

N 75 W VERTICAL SECTION
OF UNDERGROUND WORKINGS
CALEDONIAN MINING AND MILLING COMPANY

EUREKA MINING DIST.
SAN JUAN COUNTY, COLORADO

137 N 60,000
105° 9 E 19,805

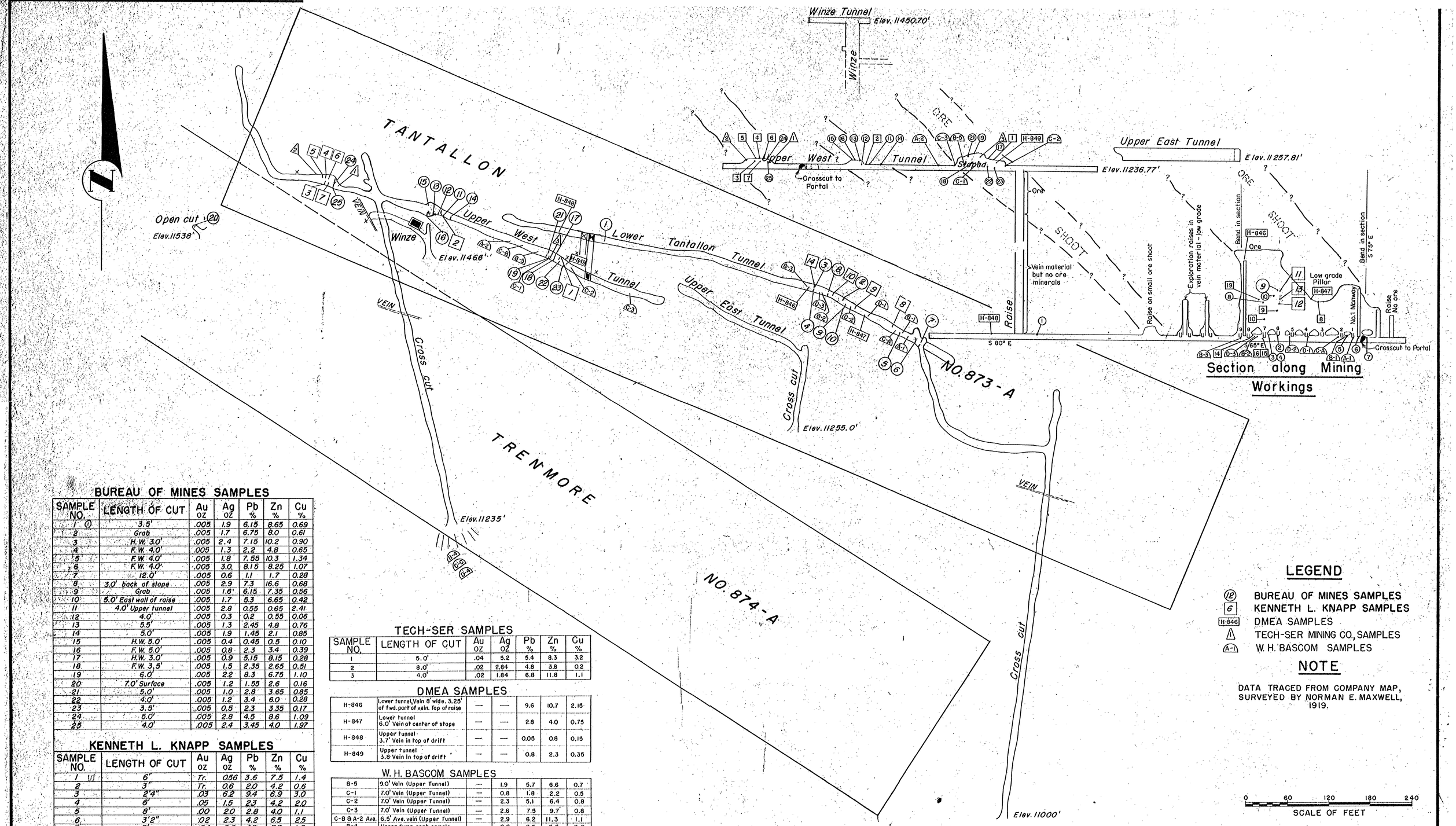


Base map furnished by Tech-Ser Mining Company

F. B. Moore, 1956

FIGURE 4 —. GEOLOGIC MAP AND SECTION OF THE CALEDONIAN MINE, SAN JUAN COUNTY, COLORADO.

50 0 150 Feet



BUREAU OF MINES SAMPLES

SAMPLE NO.	LENGTH OF CUT	Au oz	Ag oz	Pb %	Zn %	Cu %
1 (1)	3.5'	.005	1.9	6.15	8.65	0.69
2	Grab	.005	1.7	6.75	8.0	0.61
3	H.W. 3.0'	.005	2.4	7.15	10.2	0.90
4	F.W. 4.0'	.005	1.3	2.2	4.8	0.65
5	F.W. 4.0'	.005	1.8	7.55	10.3	1.34
6	F.W. 4.0'	.005	3.0	8.15	8.25	1.07
7	12.0'	.005	0.6	1.1	1.7	0.28
8	3.0' back of stope	.005	2.9	7.3	16.6	0.68
9	Grab	.005	1.6'	6.15	7.35	0.56
10	5.0' East wall of raise	.005	1.7	5.3	6.65	0.42
11	4.0' Upper tunnel	.005	2.8	0.55	0.65	2.41
12	4.0'	.005	0.3	0.2	0.55	0.06
13	5.5'	.005	1.3	2.45	4.8	0.76
14	5.0'	.005	1.9	1.45	2.1	0.85
15	H.W. 5.0'	.005	0.4	0.45	0.5	0.10
16	F.W. 5.0'	.005	0.8	2.3	3.4	0.39
17	H.W. 3.0'	.005	0.9	5.15	8.15	0.28
18	F.W. 3.5'	.005	1.5	2.35	2.65	0.51
19	6.0'	.005	2.2	8.3	6.75	1.10
20	7.0' Surface	.005	1.2	1.55	2.6	0.16
21	5.0'	.005	1.0	2.8	3.65	0.85
22	4.0'	.005	1.2	3.4	6.0	0.28
23	3.5'	.005	0.5	2.3	3.35	0.17
24	5.0'	.005	2.8	4.5	8.6	1.09
25	4.0'	.005	2.4	3.45	4.0	1.97

KENNETH L. KNAPP SAMPLES

SAMPLE NO.	LENGTH OF CUT	Au oz	Ag oz	Pb %	Zn %	Cu %
1 (1)	6'	Tr.	0.56	3.6	7.5	1.4
2	3'	Tr.	0.8	2.0	4.2	0.6
3	2'4"	.03	6.2	9.4	6.9	3.0
4	6'	.05	1.5	2.3	4.2	2.0
5	8'	.00	2.0	2.8	4.0	1.1
6	3'2"	.02	2.3	4.2	6.5	2.5
7	3'	.04	2.6	4.3	7.3	1.5
8	7'	.00	2.3	6.8	7.9	0.8
9	5'8"	.00	1.9	3.8	5.3	0.9
10	3'	Tr.	1.44	3.8	7.6	1.0
11	Grab	.01	2.6	8.9	16.0	1.1
12	Grab	.01	2.1	6.8	8.7	0.7
13	Grab	.01	2.1	7.0	10.1	0.71
14	4'5"	.01	1.8	2.9	5.2	0.75
15	Car Grab	.02	3.3	3.8	5.9	0.9
16		.013	2.22	4.81	7.15	1.26

TECH-SER SAMPLES

SAMPLE NO.	LENGTH OF CUT	Au oz	Ag oz	Pb %	Zn %	Cu %
1	5.0'	.04	5.2	5.4	8.3	3.2
2	8.0'	.02	2.84	4.8	3.8	0.2
3	4.0'	.02	1.84	6.8	11.8	1.1

DMEA SAMPLES

H-846	Lower tunnel, Vein 8' wide. 3.25' of fwd. part of vein. Top of raise	—	—	9.6	10.7	2.15
H-847	Lower tunnel 6.0' Vein at center of stope	—	—	2.8	4.0	0.75
H-848	Upper tunnel - 3.7' Vein in top of drift	—	—	0.05	0.8	0.15
H-849	Upper tunnel 3.8 Vein in top of drift	—	—	0.8	2.3	0.35

W. H. BASCOM SAMPLES

B-5	9.0' Vein (Upper Tunnel)	—	1.9	5.7	6.6	0.7
C-1	7.0' Vein (Upper Tunnel)	—	0.8	1.8	2.2	0.5
C-2	7.0' Vein (Upper Tunnel)	—	2.3	5.1	6.4	0.8
C-3	7.0' Vein (Upper Tunnel)	—	2.6	7.5	9.7	0.8
C-B & A-2 Ave.	6.5' Ave. vein (Upper Tunnel)	—	2.9	6.2	11.3	1.1
B-4	Upper dump grab sample	—	2.8	2.5	6.5	2.0
C-C & D-4 Ave.	Upper dump grab sample	—	2.4	3.3	5.8	1.5
A-1	6.0' Vein (Lower Tunnel)	—	3.8	3.1	5.3	0.3
B-1	5.5' Vein (Lower Tunnel)	—	2.6	1.6	4.1	0.6
B-2	5.3' Vein (Lower Tunnel)	—	4.4	8.2	9.8	1.6
B-3	4.5' Vein (Lower Tunnel)	—	2.2	1.9	4.4	1.1
C-A	6.0' Vein (Lower Tunnel)	—	3.6	3.1	5.3	0.3
D-1	6.0' Vein (Lower Tunnel)	—	0.8	2.8	5.2	0.5
D-2	8.0' Vein (Lower Tunnel)	—	2.3	5.1	6.4	0.5
D-3	8.0' Vein (Lower Tunnel)	—	2.6	7.5	9.7	0.8
	Ave. of mill bin fines	—	3.8	4.9	6.6	N.A.

LEGEND

- (12) BUREAU OF MINES SAMPLES
- 6 KENNETH L. KNAPP SAMPLES
- H-846 DMEA SAMPLES
- △ TECH-SER MINING CO. SAMPLES
- A-1 W. H. BASCOM SAMPLES

NOTE

DATA TRACED FROM COMPANY MAP, SURVEYED BY NORMAN E. MAXWELL, 1919.

0 60 120 180 240
SCALE OF FEET

FIGURE 3 - SAMPLING MAP, TECH-SER MINING COMPANY, CALEDONIAN MINE, SAN JUAN COUNTY, COLO. DMEA 4461

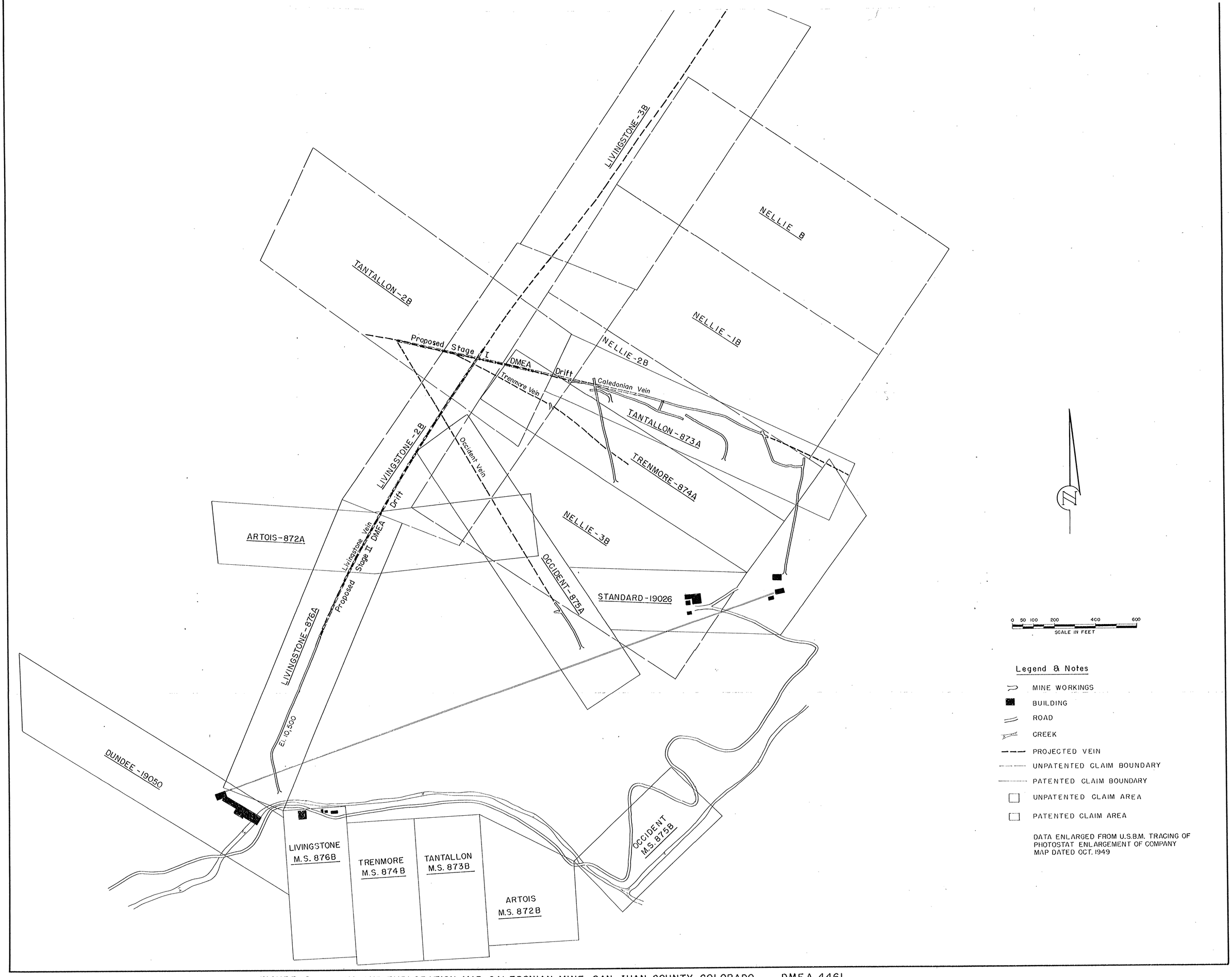


FIGURE 2 - CLAIM AND EXPLORATION MAP, CALEDONIAN MINE, SAN JUAN COUNTY, COLORADO. DMEA 4461

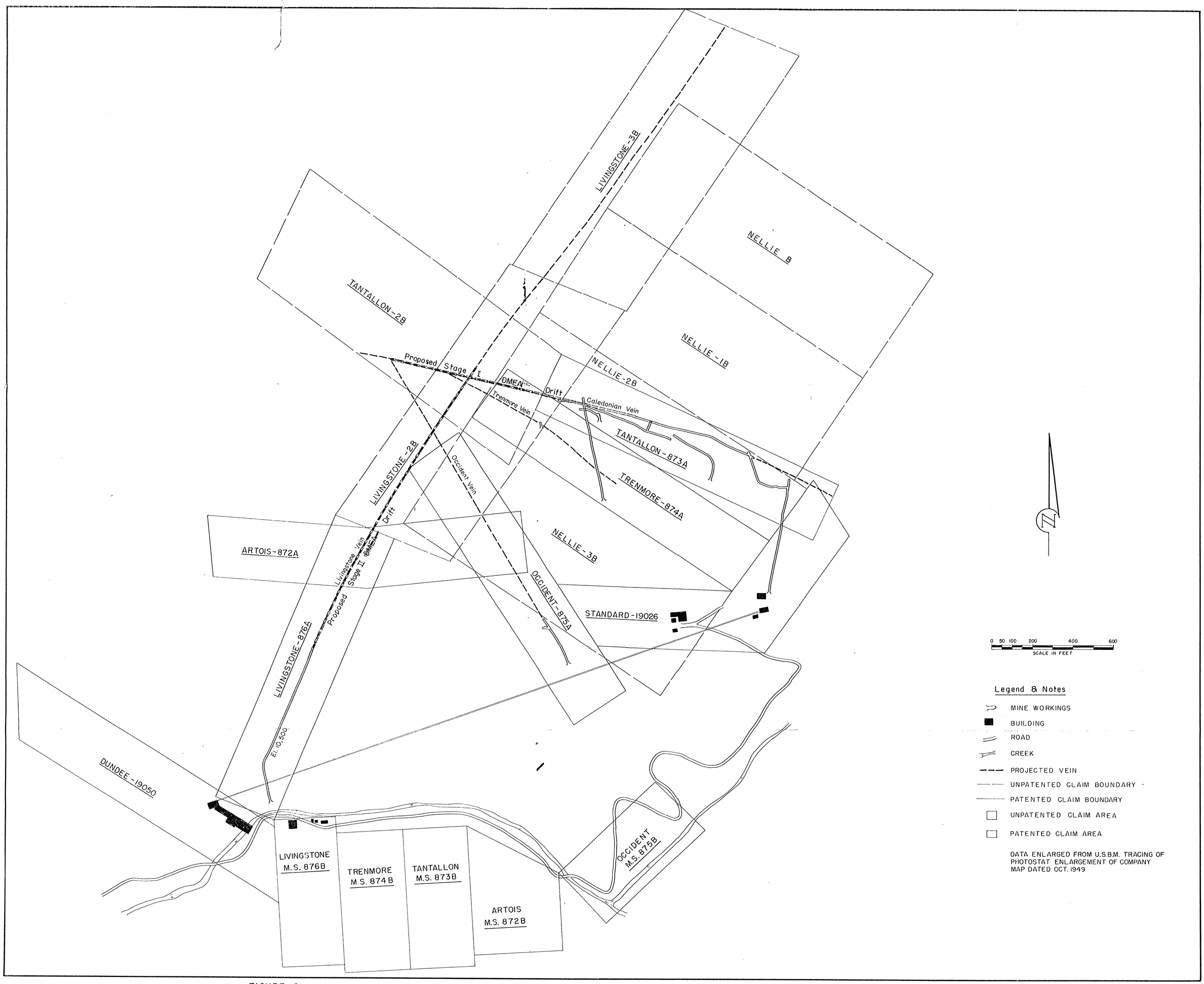


FIGURE 2 - CLAIM AND EXPLORATION MAP, CALEDONIAN MINE, SAN JUAN COUNTY, COLORADO. DMEA 4461

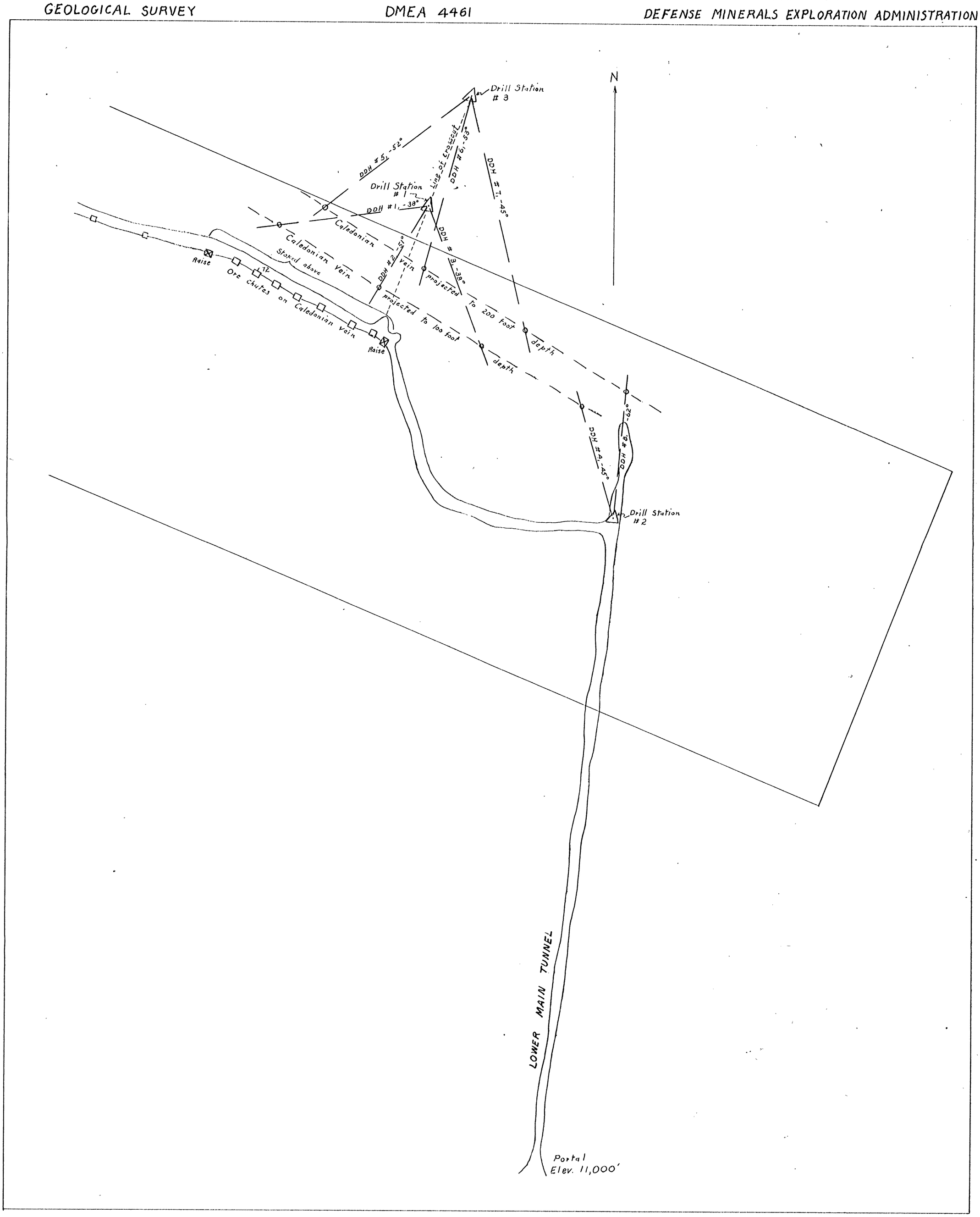
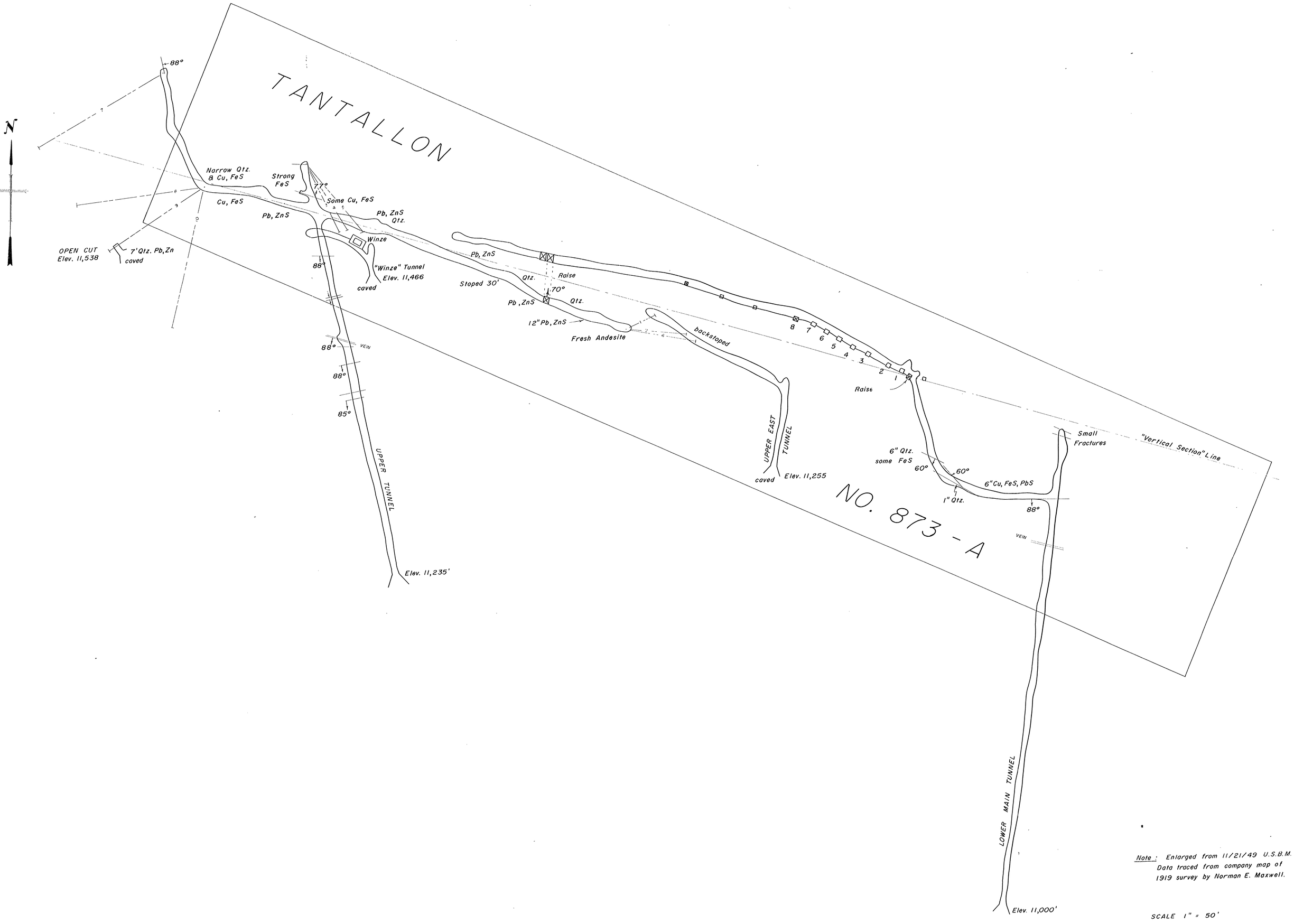


FIGURE 1.- PLAN SHOWING LOCATION OF EXPLORATORY DRILL HOLES, CALEDONIAN MINE, SAN JUAN COUNTY, COLORADO

50 0 50 100 150 FEET



Note: Enlarged from 11/21/49 U.S.B.M. Data traced from company map of 1919 survey by Norman E. Maxwell.

SCALE 1" = 50'

PLATE I

PLAN OF UNDERGROUND WORKINGS
CALEDONIAN MINING AND MILLING COMPANY

SAN JUAN COUNTY, COLORADO

by

Tech-Ser Mining Company

December '55

137 N 60,000
105° 9 E 19,805