Form MF-100
(May 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Form approved.
Budget Bureau No. 42-R1026.

GENERAL TECHNICAL DATA FOR USE UNDER THE DEFENSE PRODUCTION ACT OF 1950

NOT TO BE FILLED IN BY APPLICANT

Docket No. DMEA-2370

Date received 2-11-52

TOC Development Company
c/o R. C. Ellithorpe
Del Norte, Colorado

Name and address of applicant

Date Feb. 1, 1952

INSTRUCTIONS

This form is to be filed with Defense Minerals Administration, Department of the Interior, Washington 25, D. C. It should be accompanied by appropriate application form when a specific type of Government assistance is requested, in the form of (1) loan, (2) purchase contract, (3) Government guarantee of a private loan, (4) priorities or allocation of mining equipment, and maintenance, repair and operating supplies, and (5) other forms of Government assistance that might arise under the Act. Submit four (4) signed copies of the form and accompanying papers. Name and address should be stamped or typed on each sheet of this form and all accompanying papers. *When a question is inapplicable it should be so stated on the form.* Additional sheets may be attached in answering any questions or in supplying additional information. (IF YOU CANNOT ANSWER A QUESTION, SO STATE.) If a question is answered elsewhere indicate where answered. It is not necessary to answer it again.

GENERAL TECHNICAL DATA

Supply the following information on separate sheets, arranged, numbered, and lettered as indicated:

1. Materials produced:
   (*a*) What are the chief mine, mill, or smelter products? Lead--zinc
   (*b*) What are the byproducts, if any? Gold--silver
2. Name(s) and type(s) of mine(s), mill(s), smelter(s), refinery(ies), pit(s), quarry (ies), drilling operation(s). Include old names of property, if any. Show extent of workings, including the following:
   (*a*) Linear feet of shafts.
   (*b*) Linear feet of drifts and crosscuts.
   (*c*) Linear feet of tunnels or adits.
   (*d*) Linear feet of other mine openings (explain briefly).

   Indicate whether mine is flooded or not. Describe any pumping problems. Give size or productive capacity.
3. For each operation listed above supply the following:
   (*a*) Distance and direction from nearest town and shipping point. 2 miles east
   (*b*) Mining district. King Solomon
   (*c*) Township, Section, Range.
   (*d*) County, State. Mineral County, Colorado
4. (*a*) State whether or not property is now in operation, and if in operation, by whom operated.
   (*b*) Are you operating this property as:
   - ☐ Owner.
   - ☐ Lessee.
   - ☐ Contractor.
5. Number of years in production 2 months production--1 year operation

   If not in production or operation, estimated date when production will begin _____
6. Experience of operators:

   Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who manage the project.
7. History:
   (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for suspension of operation.
   (*b*) State briefly the known history and production of adjoining and neighboring properties.
   (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

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8. Names and addresses of Officers, Directors, or Partners, and in addition thereto, the five largest stockholders if applicant is a corporation.

Name and Address (a)	Official Title (If officer is also director indicate by "D") (b)	Total of Annual Salary, Commissions, Bonuses, Etc., Received From Applicant and Affiliates During Last Fiscal Year (c)	Estimated Net Worth Outside of Interest in Applicant (d)	Number of Shares Held in Applicant Corporation		Life Insurance Carried for Benefit of Applicant	
				Common (e)	Preferred (f)	Amount (g)	Net Cash Surrender Value After Loans (h)
	Total		x x x x x			x x x x x	x x x x x

If more lines are needed continue on separate sheet.

9. Capital Stock Issues:

For Corporate Applicants

Item	Authorized (a)	Outstanding (b)	Par Value (c)	Number of Shares Outstanding (d)	Dividend Rate Last Paid* (e)
Common stock	~~xx~~ 2,500	~~xx~~ 2,500	~~xxxx~~ No Par	2,500	none
Preferred stock	$ none	$ none	$ none	none	none

*Indicate period covered.

10. Production:

Item	Kind of Product (a)	1948 Total (b)	1949 Total (c)	1950 Total (d)	Present Average Monthly (e)
1. Quantity of product mined or quarried (Short, long, metric tons; barrels; pounds; etc.)	Lead	350	120	100	120 mo
2. Quantity of product processed (specify unit of measure and type of process)	none	none	none	none	none
3. Quantity and grade of product sold or shipped (specify units of measure)					120

11. Do you contemplate a change in the present average monthly rate of production? If so, state estimated maximum monthly production and basis of change. 500 Tons per month

12. Ore or Mineral Reserves:

(a) Describe the ore or mineral deposit briefly. Accompany the application by any available report on the geology and ore reserves.

See 7

(b) If deposit is other than placer:

(1) Submit assay plans and/or sections showing location and size of proved (measured) and probable (indicated) ore or mineral reserve. none

(2) State the tonnage (indicate type of ton) and grade of each class of ore reserve, as above, and show how computed. Tabulated total ore reserve as follows: See 7(a)

TOTAL ORE OR MINERAL RESERVES

Ore or Mineral Reserve	Estimated Tons (a)	Metal or Mineral Content Per Ton (Grade) (b)	Gross Value Per Ton (c)	Recoverable Unit Value Per Ton (d)	Estimated Cost of Production Per Ton (e)
Measured (proved)					
Indicated (probable)					

(c) If placer:

(1) Give estimated total yardage and average marketable mineral content of each deposit.

(2) Submit map showing location of placer deposit and surrounding area, with all test holes or pits. Submit logs of each hole and test pit with depth and average value of each.

(3) Describe gravel, stating whether fine, medium or coarse; loose, tight, cemented, or frozen, and whether it contains stumps or boulders more than 1 foot in diameter; if so, how large, and in what proportion.

(4) Describe bedrock, giving type (granite, sandstone, shale, etc.) and state whether it is hard or soft, smooth, uneven or rough.

(5) Describe overburden, stating whether loose, tight, or cemented; fine or coarse textured; furnish estimate of average thickness and total amount.

(6) Tabulate the reserves using the form outlined above for ore or mineral reserves.

13. Access Roads:

Give road distances to shipping, supply and residence points, stating kind and condition of roads. Good. 2 miles

14. Water Supply:

State source and quantity of water available for operations and whether sufficient for all seasons of year. Yes; East Willow Creek

15. Power:

State amount of power used, rate per hour, and source thereof. 500 cu. ft. I. P. Compressor

16. Labor:

State number and classes (miners, muckers, millmen, etc.) of men employed during a recent representative payroll period.

17. Equipment and Facilities:

Describe present equipment on the property, including buildings. (State condition.) List major pieces of equipment now owned or controlled and in serviceable condition available for this operation.

18. Are there any particular conditions or circumstances affecting your operations that are not described above? If so, explain. No.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

TOC Development Company (Name of applicant company)

By J. M. French (Signature of authorized official)

February 1, 1952 (Date)

President (Title)

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—63792-1

1. (a) Lead and zinc.

   (b) Gold and silver.

2. Lode mining. Ethel, Solomon and Mexico Lodes.

   (a) 100' of shaft

   (b) 1500' of drifts and crosscuts

   (c) 1400' of tunnels.

   (d) Old workings:

   Approximately 7245' drifts and crosscuts
   Approximately 780' shafts
   Approximately 1750' raises
   Mine requires three hours pumping in 24 hours with 25T Ingersoll Pump.

3. (a) 2 miles east.

   (b) King Solomon.

   (c) Township 41 North, Ranges 1 East and West of the New Mexico Principal Meridian

   (d) Mineral County, Colorado

4. (a) Mine is now in operation

   (b) Lessee

5. 2 months in production - 1 year in operation

6. Applicant was organized to conduct this operation. The three miners have had a combined total of _____ years experience in this area. All of the officers of the company have had many years' mining experience. The president of the company is the owner of a hardware store and has been in the hardware business for _____ years.

   The vice president is a

   The secretary-treasurer has been court reporter in the 12th Judicial District for 35 years and is a successful rancher.

7. (a) Solomon and Ridge Group of Mines.

   The Solomon and Ridge group of mines is on the west side of East Willow Creek canyon, about 2 miles north of Creede. The claims located on this group include the Holy Moses, Ridge, Ethel, Mexico, and Solomon. All these

deposits are in the two divisions of the lower rhyolite. The principal deposit is an anastamosing fissure vein which strikes about N. 7° W. and dips 55° to 85° W.

Underground developments are almost continuous for about 3,300 feet along the strike of the lode. The most extensive developments are on the level of the Solomon tunnel, which is driven westward from the canyon of East Willow Creek at an elevation of about 9,300 feet. This level encounters the vein about 420 feet from the portal, and from the point of intersection a short drift is driven toward the south. About 75 feet to the north the vein splits, inclosing a narrow block of rhyolite. The two branches diverge along their strike and at a point 800 feet from the intersection they are 300 feet apart. The east branch is termed the Ethel vein and the west branch the Solomon vein. In the Ridge tunnel, which is about 90 feet above the Solomon adit, the east vein is termed the Ridge and the west vein the Mexico. The two branches probably join toward the north, but the point of intersection is not shown in the underground developments of the Solomon and Ridge mines. This point, estimated by projecting the two branches in the workings of the Ridge adit, is probably about 1,950 feet north of the south intersection. If this estimate is correct the horse of rhyolite inclosed between the Solomon vein and the Ethel branch is 1,950 feet long and has a maximum width of about 300 feet. Both veins dip as a rule from 55° to 75° W. but at some places are vertical or dip steeply to the east. North of the point which is assumed to be the north intersection the Solomon vein is developed for about 1,000 feet along the strike. At the north face this vein strikes north and dips 75° W. Above this point, at an elevation about 1,100 feet higher, the Holy Moses vein is developed from No. 1 adit level, where it strikes north and dips 56° to 66° W. Although the underground workings are not connected, it is thought that the Solomon and the Holy Moses veins are on the same lode. If this conclusion is correct the lode is approximately a mile long.

On the surface the Solomon and Ethel veins are exposed at several points on the Ridge ground. Brecciation and slickensiding of the walls are evidence of movement, but so far as may be judged from exposures the faulting has involved but one formation. The ores carry some sulphides at the outcrop. Owing to the low content of gold and silver in these veins, however, very little secondary concentration is apparent at or near the surface.

The ore of the Solomon and Ethel veins is composed of galena, blende, pyrite, and a little chalcopyrite in a gangue of green chlorite, talc, and quartz. A little fluorite is present in some of the ore. It carries a small amount of gold, but its silver content is very low. In some of the ore gold and silver together are below $1 a

ton, the lead running as high as 35 per cent. Barite is not abundant in the ore of the vein now exposed, although a little was found in the Holy Moses workings, which are probably on the same vein. Amethystine quartz was not noted, nor is quartz conspicuous in any of the ore. Extensive crushing has taken place since the ore was formed; indeed, both the Solomon and Ethel veins at most places are zones of green gouge with abundant crystals of galena and zinc blende mixed with considerable crushed country rock. At some places the sulphides are powdered and mixed with a greed mud resembling putty. There is probably considerable microscopic silica, but very little is visible in much of the ore.

The veins vary in width from 1 or 2 feet up to 15 feet. In the Ridge Mine, about 250 feet north of the blind shaft on the lower tunnel level, 150 feet up in the stopes, the vein is 10 or 15 feet wide. It dips 72° W. and a smooth slickensided surface is near the footwall. This surface is polished and grooved by movement, and the grooves are inclined in the plane of the vein, dipping about 15° to the south of the line of steepest dip. The vein here consists of white and green mud, carrying many fragments of rhyolite, not highly altered. Here and there streaks of nearly pure zinc blende and galena are included in the crushed mass, and crystals or lumps of the powdered sulphides impregnate the mass. Locally seams of limonite cross the ore and some portions of the vein are oxidized. The sulphides predominate, however, although the ore is within 150 feet of the surface at this point. About 250 feet north of this point, on the adit level, 400 feet below the surface, oxidized ore was found at the north end of the workings.

Where exposed in the Solomon workings the vein is a great crushed zone, and a slickensided fissure runs nearly the whole distance through which the vein is developed. This fissure is in general on the hanging wall of the vein. About 2,000 feet from the portal of the Solomon adit a shaft has been put down about 400 feet. North of the shaft and about 3,150 feet from the portal of the adit, in a raise 70 feet above the tunnel level, 9 feet of concentrating ore is exposed. This consists of zinc blende, galena, some pyrite, and a little limonite and manganese dioxide. The gangue is crushed rhyolite and green chloritic gouge, much like that in parts of the Amethyst vein. The ore carries 30 per cent of zinc and lead, with 1 to 3 ounces of silver and $1 to $2 in gold to the ton.

About 80 feet above tunnel level and 1,100 feet below the surface the sulphides change abruptly to oxides. The ore there consists of cerusite, limonite, manganese dioxide, a little galena and zinc blende, and considerable pyrite. This ore carries about $2.50 to the ton in gold. Two feet above the partly oxidized ore no unaltered sulphides

were noted. The occurrence of oxides along fissures and fractures far below the zone of complete oxidation is conspicuous, as it is also in the Amethyst vein.

From "A Preliminary Report on the Geology and Ore Deposits of Creede, Colorado," by W. H. Emmons and E. L. Larsen, Bulletin 530-E, U.S.G.S., 1912,

Operations suspended because of depressed prices, penalties on zinc, and high costs.

(b) See (a) above.

(c) None

Form MF-103
(Revised June 1951)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.1.

MF-103 Should Be Filed With General Technical Data Form MF-100

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

Not To Be Filled in by Applicant

Docket No. DMEA-2370
Metal or Mineral
Date Received 2-11-52
Amount $
Participation (Government %)

TOC Development Company
c/o R. C. Ellithorpe
Del Norte, Colorado

February 1, 1952

Name and address of applicant

TOC Development Company
c/o R. C. Ellithorpe
Del Norte, Colorado

Date

If you have already filed MF-100, give date filed _____, type of assistance requested _____,

DMA Docket Number (if available) _____

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four copies each, of the signed application form, General Technical Data Form MF-100, and answers to questions as specified, to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive office thereof, with your name and address on each sheet of the application and all accompanying papers. If you have previously filed MF-100, it is not necessary to file it again. However, you should indicate in space provided above the type of assistance previously applied for (loans, procurement contracts, etc.) and DMA Docket Number, if available. *When a question is inapplicable it should be so stated in the form.* Additional sheets should be attached in answering any questions or in supplying additional information. IF YOU CANNOT ANSWER A QUESTION, SO STATE.

1. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.

   (*b*) If you are not the owner of the property, submit a copy of the lease, purchase option, or other agreements under which you are authorized to operate the property with each copy of your application.

   (*c*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

   NOTE: (1) If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*c*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

   (2) If applicant is not the owner of the property or if there are any liens or encumbrances against the property, copy of agreements of claimants, lienors, encumbrancers, and lessors subordinating their interests in the property to the interest of the Government under the Exploration Project Contract will be required for attachment to the Contract.

2. (*a*) What metals or minerals do you expect to find? Lead and zinc.

   (*b*) Furnish statement of the geologic features of your property, giving type of ore deposit and reasons for expecting to find commercial ore bodies. Illustrate with maps or sketches. If you have a geologic or engineering report, or assay maps showing width and grade, please send them with application, stating whether or not you wish to have them returned.

16-64067-2

FEB 11 1952

The information requested in questions 3, 4, 5, 6, 7, 8, and 9 below should be answered specifically and in detail, as this information will be attached to and incorporated as part of the Exploration Project Contract, if such contract is entered into with you by the Government.

ANSWER EACH QUESTION ON SEPARATE SHEETS OF PAPER AND SUBMIT A COPY OF EACH ANSWER FOR EACH COPY OF YOUR APPLICATION.

3. (*a*) Describe fully the proposed work and give the total cost of the project.

   (*b*) State the time required to start the project and to complete it.

4. Submit a map or sketch of the property involved showing a plan (and cross section, if needed) of the present mine workings and the *location of the proposed exploration work* as related to geologic features, such as contacts, veins, ore-bearing beds, etc.

5. Furnish an itemized list of existing facilities, buildings, installations, and fixtures with a statement of the cost of any necessary rehabilitation or repairs to put into useful and operable condition.

6. Furnish a detailed list of additional facilities, buildings, and fixtures to be purchased, installed, or erected by you, with the estimated cost of each item.

7. Furnish a detailed list of operating equipment, separated into items to be—

   (*a*) Rented

   (*b*) Purchased

   (*c*) Furnished by you

   with the rental, purchase price, or depreciation of each item, as the case may be, to be charged as a cost of the project.

8. Furnish an itemized schedule of labor, by numbers and classes (miners, muckers, etc.) and of supervisors by numbers and positions, with the maximum wages or salaries to be paid to each.

9. Furnish a detailed list with estimated cost of each item for materials, supplies, engineering, assaying, accounting, power, water, utilities, and any other items not provided for above.

10. (*a*) How much are you prepared to invest in the proposed project?

    (*b*) Is this amount sufficient to pay your part of the cost of the project, in accordance with the regulations on Government participation (Sec. 9 of MO–5)?

11. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

TOC Development Company
(Name of company)

By J. M. French
(Signature of authorized official)

February 1, 1952
(Date)

President
(Title)

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—64067-2

1. (a) The following described lode mining claims, situate in the King Solomon Mining District in Mineral County, Colorado, to-wit:
The Ethel lode mining Claim, U. S. Survey No 7375
The Solomon lode mining claim, U. S. Survey No 6837
The Mexico lode mining claim, U. S. Survey No. 6837

(b) Applicant is the lessee of the above described property, and copies of the appropriate leases and assignments are attached hereto.

(c) The area upon which the exploration is to be conducted is the same as that described in paragraph "(a)". There are no liens or encumbrances against the above described property.

2. (a) Exploration is for lead and zinc.

(b) For an estimate of the geologic features of the above property, bulletin No. 530-E is referred to the same being "A Preliminery Report on the Geology and Ore Deposite of Creede, Colorado", published by the Interior, United States Geological Survey.

3. (a) The proposed work and total estimated cost of the project are as follows, to-wit:

450 foot drift - Mexico and Solomon No. 1 lower shaft level	$ 15,000.00
Four 100 foot raises spaced 100 feet apart or above	5,000.00
300 foot cross cut - Mexico vein to Ethel vein	8,000.00
200 foot drift on Ethel vein	6,000.00
100 foot shaft at lower level	14,000.00
Total estimated cost	48,000.00

(b) Work on the project has already been commenced and it is estimated that a period of two years time will be required to complete the project.

4. A map of the property involved showing a plan of the present mine workings and the location of the proposed exploration work is attached hereto.

5. Buildings already on property and in use:
Sorting tables
3 ore bins
1 compressor house
1 dry room.

6. It is contemplated that compressor rented, will be purchased.
Cost: Total $ 7584.00
To be paid for $ 510.00 per month. See contract attached.

7. (a) Compressor is rented at $ 510.00 per month

3 water pumps	75.00	"	"
1 I. R. Hoist	50.00	"	"
1 I. R. Drifter	25.00	"	"
1 Jack hammer	25.00	"	"

(b)

(c)
1 Water pumps
2 Mine cars
2 Ore buckets.

8. 3 miners at $ 1.50 per hour
3 muckers at $ 1.08 per hour
1 bookkeeper at $ 50.00 per month.

9. Power is furnished by gasoline motor. Water aveilable from East Willow Creek. Supplies and materials as follows:

Gas & Oil	$ 200.00	per	month
Hdw. & explosives	300.00	"	"
Assaying	50.00	"	"
Bookkeeper.	50.00	"	"

10. (a) $ 24,000.00

(b) Yes

11. All three of the miners are men of long experience in this area. The metals-lead and zinc- are badly needed. The operation is a proven one, in production. The mineral possibilities of the area are well known and proven. Manpower is available and on the job. The project is accessible the year around.

LEASE

THIS AGREEMENT, made this 10th day of August, 1950, by and between C.O.Withrow, 1726 Krameria Street,(Denver, Colorado, party of the first part, hereinafter called the lessor, and Alvin Wintz, of Creede, Mineral County, Colorado; Allen Hosselkus of Creede, Mineral County, Colorado; and R.R. Lehman of Creede, Mineral County, Colorado, parties of the Second part, hereinafter called the lessees.)

WHEREAS, The said C.O.Withrow, the lessor, is the owner of the Mexico Mining Claim, U.S.Mineral Survey 6837, in King Solomon Mining District, Mineral County, Colorado; and

WHEREAS, Alvin Wintz of Creede, Mineral County, Colorado, and Allen Hosselkus of Creede, Mineral County, Colorado, and R.R.Lehman of Creede, Mineral County, Colorado, desire to lease and operate said mine;

NOW, THEREFORE, in consideration of the premises and of the respective promises of the parties hereto, one to the other, and for other valuable considerations, it is agreed as follows:

WITNESSETH, That the said lessor for and in consideration of the rents, covenants and agreements hereinafter expressed to be paid, kept and performed by the lessees, has leased let and demised, unto the said lessees the following described premises, situate, lying and being in the King Solomon Mining District, in the County of Mineral and State of Colorado, to-wit:

> The said Mexico Mining Claim Survey No. 6837 in King Solomon Mining District, Mineral County, Colorado.

TO HAVE AND TO HOLD the same for the purpose of mining, for the term of five (5) years from this date.

The said lessees, for and in consideration of the leasing of said premises, in addition to the covenants and agreements herein contained, covenant and agree that prior to any other work said lessees will sink a shaft to a depth of one hundred (100) feet, or more, before any ore is extracted; and the said lessees agree to commence work on said premises on or before October 1, 1950, and thereafter to work the same in a thorough and minerlike manner, employing at least two men under ground at all times and working at least 40 shifts each calendar month; to keep the same securely timbered, drained and cleared of loose rock and rubbish; to keep accurate accounts, and to render statements to said lessor from time to time as he may demand, showing the amount and character of work done, and to permit lessor or his agents at any time to enter into and inspect said premises or workings therein; to pay to said lessor as rental for said premises the following royalty from the proceeds of all ore extracted, shipped or removed from said premsies, these percentages to be based upon and figured against net smelter returns or net mill returns, bye which is meant the market value of the ore at the mill or smelter less deductions for treatment charges and freight, but not for hauling or any other expenses in connection therewith:

5%	up to	$10.00
7½%	from $10.01 to	15.00
10%	from $15.01 to	20.00
12½%	from $20.01 to	25.00
15%	from $25.01 to	50.00
20%	over	50.00
10%	on all mill ore	

In addition to the above royalties, lessor shall receive and retain 1½% of the net smelter or mill returns on all ore on account of taxes which may at any time be chargeable against hom or the said property herein described or the output thereof, any balance not needed for taxes to be returned to lessee on termination of all liability for any such taxes and said royalties due to the lessor from time to time shall be paid to him directly from the smelter and ore purchasin agency.

All shipments shall be made in the name of both parties hereto, and the smelter or mill will be directed to divide the proceeds in accordance with this contract.

Lessee shall not begin operation under this lease, nor at any time carry on operation hereunder without at all times carrying full workmen's compensation insurance in respect to all of his employees as required by law, and the lessee shall, before beginning operations and at all times thereafter, keep properly posted notices as required by law, both state and federal, stating that he is operating said premises as lessee and that the lessor shall not be responsible for any contracts, debts or liabilities in any connection with or arising out of said operation.

WHEREAS, the said lessee may acquire, own, control or lease certain mining claims adjoining or contiguous to or in the vicinity of the herein demised premises; it is expressly agreed that the said lessee is hereby granted a permanent right and easement, without further payment or rent, to transport over and across or within the demised premises ore and material removed from his own or contiguous claims, and in like manner it is agreed that lessor, or party of the first part, in hereby given and granted a permanent easement and right-of-way to transport and carry at will, rock, ore and material from the premises herein described, over, across or within the contiguous or adjoining claims of lessee, if and when lessor, through himself or those claiming under him, may be mining said above demised premises, and the permanent easement and right-of-way to transport over and across and through the said contiguous claim of the lessee machinery, material and supplies required by him or those claiming under him for mining operations on or within the premises above described; PROVIDED

Any expense in connection with the maintenance or operation of the tunnels or drifts shall be borne by lessee.

Lessee agrees to keep a proper set of books and make and file, in due season, all reports and returns required by either the state or federal governments, and to save the lessor harmless from any fines, assessments or penalties made or levied for failure thereof.

It is agreed that lessee may assign or sublet this lease with the written consent of lessor.

It is agreed that all tracks, rails, or pipes or pipe lines placed upon or within said demised premises shall, at

expiration or termination of this lease, for any cause, belong to and pass to lessor and be not removed by lessee.

And the said lessee furthermore covenants and agrees that in case he fails in any respect to keep and fulfill any one or more of the covenants or agreements herein, expressed or implied, then and in that case, it shall be lawfull for the said lessor to declare said term ended, and with or without process of law to enter upon and take possession of said premises and in such case, and also on the expiration of this lease by limitation, said lessee agrees to surrender, yield and deliver to said lessor quiet and peaceable possession of said premises in good conditions and that time shall be of the essence hereof, and that all of the covenants and agreements herein contained shall extend to and be binding upon the heirs, executors, administrators, successors and lawful assigns of the respective parties hereto, and if it becomes necessary to resort to court action to enforce any of the covenants or agreements herein contained, the lessee agrees to pay all costs, including a reasonable attorney's fee.

It is expressly understood and agreed that any stoppage of work by strike, riots, legal processes, accidents to machinery or workings or obstruction to their use by gas, fire, snow-slide or for any other cause not under the control of the lessee, shall not work a forfeiture of this lease, and such time as the lessee is unable to work the ground specified for any of the above causes shall be added to the life of this lease.

This agreement shall be binding upon and inure to the benefit of the assigns, legal representatives and heirs of the respective parties hereto.

IN WITNESS WHEREOF the parties hereto have executed these presents the day and year first above written.

C. O. WITHROW (SEAL)
Lessor.

ALVIN WINTZ (SEAL)

ALLEN J. HOSSELKUS (SEAL)

R. R. LEHMAN (SEAL)
Lessees

STATE OF COLORADO)
CITY & COUNTY OF DENVER) SS

I, Lurleen V. Essman, a Notary Public in and for the County and State aforesaid, do hereby certify that personally appeared before me C.O.Withrow, the lessor in the foregoing lease and acknowledged the execution of the said lease for the uses and purposes therein expressed.

Given under my hand and notarial seal this 22nd day of September, 1950.
My commission expires August 19, 1953.

LURLEEN V. ESSMAN
Notary Public.

(Notarial Seal)

STATE OF COLORADO)
) SS.
COUNTY OF MINERAL)

I. Wallace I Leary, Notary Public, in and for the County and State aforesaid, do hereby certify that personally appeared before me ALVIN WINTZ, the lessee in the aforementioned lease and acknowledged the execution of the said lease for the uses and purposes therein expressed.

Given under my hand and notarial seal this 15th day of August, 1950.

My Commission expires July 20, 1954

WALLACE I. LEARY,
(Notarial Seal) Notary Public.

STATE OF COLORADO)
) SS.
COUNTY OF MINERAL)

I, Wallace I. Leary, Notary Public, in and for the County and State aforesaid, do hereby certify that personally appeared before me ALLEN HOSSELKUS, the lessee in the foregoing lease, and acknowledged the execution of the said lease for the uses and purposes therein expressed.

Given under my hand and notarial seal this 15th day of August, 1950.

My Commission expires July 20, 1954

WALLACE I. LEARY,
(Notarial Seal). Notary Public.

STATE OF COLORADO)
) SS.
COUNTY OF MINERAL)

I, Wallace I. Leary, a Notary Public, in and for the County and State aforesaid, do hereby certify that personally appeared before me R. R. LEHMAN, the lessee in the foregoing lease and acknowledged the execution of the said lease for the uses and purposes therein expressed.

Given under my hand and notarial seal this 15th day of August, 1950.
My commission expires July 20, 1954.

WALLACE I. LEARY
(Notarial Seal). Notary Public.

LEASE

THIS AGREEMENT, Made this 1st day of August, 1950, by and between Alice P. Hosselkus, Allen Hosselkus, Mrs. J.W. Rafter, Mrs. Pearl Moody, Alex Duncan, Ralph C. Ellithorpe, J.J.Williams and Wallace Wright, parties of the first part, hereinafter called lessors, and Alvin Wintz, R. R. Lehman and Allen Hosselkus, parties of the second part, hereinafter called lessees.

WHEREAS, the parties of the first part, lessors, are the owners of the Solomon lode mining claim, U.S.Survey No. 6837; The Ethel lode mining claim, U.S.Survey No. 7375 and the Ethel Millsite, U.S.Mineral Survey No. 13049, in the King Solomon Mining District, Mineral County, Colorado; and

WHEREAS, Alvin Wintz, R.R.Lehman and Allen Hosselkus desire to lease and operate said mining claims above mentioned;

NOW, THEREFORE, In consideration of the premises and of the respective promises of the parties hereto, one to the other, and for other valuable considerations hereinafter specified, it is agreed as follows;

WITNESSETH: That the said lessors, for and in consideration of the rents, covenants and agreements hereinafter expressed to be paid, kept and performed by the lessees, have leased, let and demised, unto the said lessees the following described premises, situate, lying and being in the King Colomon Mining District, in the County of Mineral and State of Colorado, to-wit:

> The said Solomon lode mining claim, U.S. Survey No. 6837; The Ethel lode mining claim, U.S.Survey No. 7375 and The Ethel Millsite, U.S.Survey No. 13049, in King Solomon Mining District, Mineral County, Colorado.

TO HAVE AND TO HOLD the same for the purpose of mining, for the term of seven (7) years from this date.

WHEREAS, the lessors herein, for and in consideration of the leasing of said premises herein mentioned to the lessees and the granting of permission for the use of ore bins and other buildings now located and erected on the hereinabove leased premises, for the term of this lease, to-wit: Seven (7) Years, the said lessees expressly agree to work said mining claims in a thorough and minerlike manner, employing at least two men under ground at all times and working at least 40 shifts each calendar month; and to keep all drifts securely timbered, drained and cleared of loose rock and rubbish; to keep accurate accounts and keep separate all ore removed from the herein demised premises from ore removed from any and all other mining property, if any, and to render true and correct statements to said lessors from time to time as they are demanded, showing the amount and character of work done, and to permit lessors or their agents at any time to enter into and inspect said premises or workings therein; to pay said lessors as rental for said premises the following royalty from the proceeds of all ore extracted, shipped or removed from said premises, these percentages to be based upon and figured against

net smelter returns or net mill returns, by which is meant the market value of the ore at the mill or smelter less deductions for treatment charges and freight but not for hauling or any other expenses in connection therewith:

5%	up to	$10.00
7½%	from $10.01 to	15.00
10%	from $15.01 to	20.00
12½%	from $20.01 to	25.00
15%	from $25.01 to	50.00
20%	over	50.00 and

10% on all mill concentrates.

In addition to the above royalties, lessors shall receive and retain 1½% of the net smelter or mill returns on all ore on account of taxes which may at any time be chargeable against them or the said property hereinabove described or the output thereof, any balance not needed for taxes to be returned to lessees on termination of all liability for any such taxes, and said royalties due to the lessors from time to time shall be paid to them directly from the smelter and ore purchasing agency.

All shipments shall be made in the name of both parties hereto, and the smelter or mill, are directed to divide the proceeds in accordance with this contract agreement.

Lessees shall not at any time during their operations under this lease carry on operations hereunder, without at all times carrying full workmen's compensation insurance in respect to all of their employees as required by law, and the lessees shall, before beginning operations and at all times thereafter, keep property posted notices as required by law, both state and federal, stating that they are operating said premises as lessees and that the lessors shall not be responsible for any contracts, debts or liabilities in any connection with or arising out of said operations.

Any expense in connection with the maintenance or operation of all tunnels or drifts shall be borne by the lessees.

Lessees agree to keep a proper set of books and make and file, in due season, all reports and returns required by either the state or federal governments, and to save the lessors harmless from any fines, assessments or penalties made or levied for failure thereof.

It is expressly agreed that the lessees may not assign or sublet this lease without the written consent of the lessors.

It is further agreed that all tracks, rails, or pipes or pipe lines placed upon or within said demised premises shall, at the expiration or termination of this lease, for any cause, belong to and pass to the lessors and be not removed by the lessees.

And the said lessees furthermore covenant and agree that in case they fail in any respect to keep and fulfill any one or more of the covenants or agreements herein, expressed or implied, then and in that case, it shall be lawful for the said lessors to declare said term ended, and with or without process of law to enter upon and take possession of said premises and in such case, and also on the expiration of this lease by limitation, said lessees agree to surrender, yield and deliver to said lessors quiet and peaceable

possession of said premises in good condition and that time shall be of the essence hereof, and that all of the covenants and agreements herein contained shall extend to and be binding upon the heirs, executors, administrators, successors and lawful assigns of the respectiveparties hereto,and if it becomes necessary to resort to court action to enforce any of the covenants or agreements herein contained, the lessees agree to pay all costs, including a reasonable attorney's fee.

It is expressly understood and agreed that any stoppage of work by strike, riots, legal processes, accidents to machinery or workings or obstruction of their use by gas, fire, snow-slides or any other cause not under the control of the lessees, shall not work a forfeiture of this lease, and such time as the lessees are unable to work the ground specified for any of the above causes shall be added to the life of this lease.

This agreement shall be binding upon and inure to the benefit of the assigns, legal representatives and heirs of the respective parties hereto.

IN WITNESS WHEREOF the parties hereto have executed these presents the day and year first above written.

ALICE P. HOSSELKUS	(SEAL)	1/8th
ALLEN HOSSELKUS	(SEAL)	1/8th
MRS. J. W. RAFTER	(SEAL)	3/16ths
MRS. PEARL MOODY	(SEAL)	1/8th
ALEX C. DUNCAN	(SEAL)	1/8th
RALPH C. ELLITHORPE	(SEAL)	3/16ths
J. J. WILLIAMS	(SEAL)	1/16th
WALLACE WRIGHT	(SEAL)	1/16th

Parties of the First Part.

ALVIN WINTZ	(SEAL)
R. R. LEHMAN	(SEAL)
ALLEN HOSSELKUS	(SEAL)

Parties of the Second Part.

RATIFICATION AND CONSENT TO EXTENSION

OF LEASE

The undersigned, lessor, in that certain mining lease dated August 1st, 1950, by and between Alice P. Hosselkus, Allen Hosselkus, Mrs. J.W.Rafter, Mrs. Pearl Moody, Alex Duncan, Ralph C. Ellithorpe, J.J.Williams and Wallace Wright, lessors, and Alvin Wintz, R. R. Lehman and Allen Hosselkus, lessees, said lease being for a period of seven (7) years from date, in consideration of the performance of the terms and conditions of said lease by said lessees and the payment of the royalties thereunder hereby consent to an extension of said lease from its expiration dated, to-wit: August 1, 1957, for an additional period of time of seven (7) years from August 1, 1957, under the same terms and conditions contained in said lease of August 1, 1950.

Dated this 7th day of January, 1951	RALPH C. ELLITHORPE, Lessor
Dated this 8th day of January, 1951	ALLEN J. HOSSELKUS, Lessor
Dated this 9th day of January, 1951	W. WALLACE WRIGHT, Lessor
Dated this 9th day of January, 1951	J.J.WILLIAMS, Lessor
Dated this 10th day of January, 1951	PEARL M. MOODY, Lessor
Dated this Jan. 11, 1951	ALICE P. HOSSELKUS, Lessor
Dated this 9th day of January, 1951	ALEX C. DUNCAN, Lessor
Dated this 12 day of January 1951	MRS. J. W. RAFTER, Lessor

ASSIGNMENT OF LEASES

For a good and valuable consideration, the undersigned Alvin Wintz, R. R. Lehman and Allen Hosselkus hereby set over and assign unto TOC Development Company, a Colorado corporation, its successors and assigns, all their right, title and interest in and to the following mining leases:

1. That certain mining lease dated August 1, 1950, wherein Alice P. Hosselkus, Allen Hosselkus, Mrs. J.W.Rafter, Mrs. Pearl Moody, Alex Duncan, Ralph C. Ellithorpe, J.J.Williams and Wallace Wright are lessors, leasing the following described lode mininng claims, situate in the King Solomon Mining District, Mineral County, Colorado, to-wit:

The Solomon Lode Mining Claim, U.S.Survey No. 6837
The Ethel Lode Mining Claim, U.S.Survey No. 7375, and
The Ethel Millsite, U.S.Survey No. 13049.

2. That certain mining lease dated August 10, 1950, wherein C O.Withrow is lessor, and the Mexico Lodg Mining Claim, Survey No. 0837 in King Solomon Mining District, Mineral County, Colorado is demised to the parties of the first part herein.

Together with all extensions to said leases and all rights accruing thereunder.

Witness our hands this 30th day of July, 1951.

ALVIN WINTZ
R. R. LEHMAN
ALLEN HOSSELKUS

STATE OF COLORADO)
) SS.
COUNTY OF MINERAL)

The above and foregoing assignment was acknowledged before me this day by Alvin Wintz, R.R.Lehman and Allen Hosselkus.

Witness my hand and seal this 30th day of July, 1951.

JANE A. OATES
Mineral County Clerk,
Creede, Colorado.

(Seal).

EQUIPMENT LEASE AND OPTION

This agreement made and entered into this 9th day of June, 1951, by and between The Colorado Builders' SupplyCompany of Denver, Colorado, hereinafter called the Lessor, and T. O. C. Development Company of Del Norte, Colorado, hereinafter called the Lessee; WITNESSETH that for and in consideration of the payments to be made by the Lessee to the Lessor, and subject to the terms and conditions as hereinater set forth, the Lessor does hereby lease to the Lessee the following described equipment:

One (1) used Ingersoll-Rand Model HKA-500 Portable Air Compressor, Serial No. 40H38168; on four pneumatic tires,

for a minimum of two months, and thereafter, on a month to month basis, until terminated by thirty (30) days written notice, said notice to be given by either the Lessor or the Lessee.

The Lessor hereby agrees:

1. To deliver the above equipment to T. O. C. Development Company in good order and proper operating condition, on or before the 4th day of June 1951.

2. To grant to the Lessee an Option to Purchase the above equipment during the term of this lease, for the total sum of $7,854.00, including Colorado Sales Tax of $154.00. 100% of all rental payments made by the Lessee prior to the exercise of the Option to Purchase will be applied by the Lessor to the total purchase price.

The Lessee hereby agrees:

1. To pay as rent $500.00, plus any applicable Sales Tax, on the execution of this agreement, and as further rent payable in advance, $500.00 on the fifth day of July and on the fifth day of each and every month thereafter until the termination of this lease. All rental payments subject to Sales Tax.

2. To pay all shipping charges incidental to the transportation of the above described equipment from Denver to Del Norte, Colorado at the beginning, and from Del Norte to Denver, Colorado at the termination of this lease.

3. To notify the Lessor within five (5) calendar days from the date the above equipment is received. Should the equipment be not satisfactory for the above described purpose and in good order and proper operating condition. The failure by the Lessee to so notify the Lessor shall be conclusive evidence that the equipment is satisfactory and in good order and proper operating condition.

4. That the Lessee shall have the right to make any reasonable and proper use of said equipment in the state of Colorado, but at no other location without the written consent of the Lessor.

5. That the Title of said equipment shall remain vested in the Lessor, and the Lessee shall have no right to assign, transfer, or hypothecate this lease or any interest therein, or part with possession of the equipment, or any part thereof, without the written consent of the Lessor being first obtained.

6. That upon the failure of the Lessee to make any payment hereunder, or to perform any other condition hereof, the Lessor shall have the right to declare this lease immediately terminated, and upon such termination, the Lessor may acquire possession of the equipment forthwith by any peaceable means. Such termination will not relieve the Lessee of any obligation herein set forth, nor give the Lessee any claim to any payments theretofore made.

7. That upon the termination of this lease for any reason, the equipment will be returned to the Lessor in good order and in proper operating condition.

Should any dispute arise as to the condition of the equipment upon its return to the Lessor at the termination of this lease, all such disputes shall be determined by three arbitrators, one to selected by the Lessor, the second to be selected by the Lessee, and the third to be selected by the first two arbitrators. Should the first two arbitrators be unable to select a third within ten (10) days of their selection, the selection of the thrid arbitrator shall be made by the presiding judge of the Civil Divisions of THE DENVER DISTRICT COURT. All meetings of the arbitrators shall be held in the City and County of Denver, State of Colorado. The decision of any two of the three arbitrators as to such dispute shall be conclusive and binding on both the Lessor and the Lessee.

IN WITNESS WHEREOF the Lessor and the Lessee have hereunto set their hands the day and year first above written.

THE COLORADO BUILDERS' SUPPLY COMPANY

by C. E. Berry
Lessor

WITNESS:

Marylois McQuire

T. O. C. DEVELOPMENT COMPANY

by J. M. French
Lessee

WITNESS:

R. C. Ellithorpe

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAR 1 1953

224 New Customhouse
Denver 2, Colorado

February 25, 1953

Memorandum

To: Secretary, Operating Committee
Defense Minerals Exploration Administration

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket No. DMEA 2370, Mexico-Solomon Mine, Mineral County, Colorado

Enclosed are four copies of the final report on Docket No. DMEA 2370. The application has been cancelled at the request of the applicant and has been transferred to our inactive files.

W. H. King

W. H. King

Enclosure

Reviewed by
DMEA OPERATING COMMITTEE
3-6-53

Mining Division
Region IV

May 22, 1952

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAR 2 1953

Memorandum

To: Field Team, Region IV

From: Acting Chief, Mining Division, Region IV

Subject: Final Report, DMEA Docket 2370 (Lead) T. O. C. Development Company, Mexico-Solomon Mine, Mineral County, Colorado

Enclosed are nine copies of the engineering report by H. R. Calisbury on the Mexico-Solomon Mine.

The original exploration program, as submitted by the applicant, had an estimated cost of $46,000 but the examining engineers agree that the crosscut to the Ethel vein is not warranted at this time. They recommend drifting and raising on the Mexico-Solomon vein at the present winze level and if these results are favorable to sink the winze 100 feet, at a total cost of $30,000.

We concur in the recommendations of the examining engineers.

W. H. King
W. H. King

Reviewed by
DMEA OPERATING COMMITTEE
3-6-53
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20
Denver Federal Center
Denver 14, Colorado
April 15, 1952

Mining Division
Date Rec'd.
APR 15 1952
BUREAU OF MINES
Denver, Colorado

Memorandum

To: Acting Chief, Mining Division, Region IV

From: Chief, Colorado Branch, Mining Division

Subject: DMA 2370, TOC Development Company (Mexico-Solomon mine), Mineral County, Colorado

Please find enclosed the original and eight copies of the "Summary, Conclusions, and Recommendations", by M. H. Salsbury and J. K. Maclaren, on the above docket, and the same number of copies of Salsbury's engineering report. The brochure submitted with the Region IV Field Team's instructions to make the field examination is also enclosed.

The examining team has eliminated entirely 300 feet of crosscutting and 200 feet of drifting to explore one vein, the Ethel, on the basis of lack of potential. Exploration of two ore shoots on another vein, the Mexico-Solomon, from a so-called Mexico winze level has been revised and scheduled in two phases. The first phase comprises 300 feet of drifting on the vein and 100 feet of raising in one raise on the vein. This is a reduction in the applicant's drifting request of 150 feet and in his raising request of three raises of 100 feet each. The second phase is contingent upon the outcome of the first and suggests that, in the event the first phase is encouraging, a 100-foot winze be sunk below the present Mexico winze level for additional deeper exploration.

The first phase is currently in operation and, if completed before a contract is negotiated, will be eliminated, which may introduce complications.

Salsbury concludes the project has merit, especially if the first phase is successful in proving ore on the present Mexico winze level, and recommends a project for $30,000.00, Government participation - $15,000.00.

I concur with his conclusions and recommendations.

Reviewed by
DMEA OPERATING COMMITTEE
3-6-53
(date)

for W. M. Traver, Jr.

enclosures

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

200 New Customhouse
Denver 2, Colorado

May 18, 1952

Memorandum

To: DMA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 2370, T. S. C. Development Company, Mineral County, Creede, Colorado

Attached are 3 copies of the geological report by Donald K. Maclaren covering DMA Docket 2370, T. S. C. Development Co., Mineral County, Creede, Colorado.

The applicant proposes to explore two veins, the Ethel and Mexico, 90 feet below the adit level (Colorado level). The proposed program includes 450 feet of drifting to the north on the Mexico vein, cross-cutting 300 feet to the Ethel vein, a 200-foot drift on the Ethel vein, 400 feet of raising, and the sinking of a 100-foot winze on the Mexico vein.

It is pointed out by Maclaren that there is an excellent chance of finding lead-zinc ore shoots on the Mexico vein below the adit level, and he recommends that this part of the proposed program be approved. The proposed winze on the Mexico vein should be undertaken as Stage II and only if ore is found in the drift.

Geologic evidence and mine data are inadequate to judge the chances of making a discovery on the Ethel vein. Until that portion of the mine is made accessible for mapping and study, Maclaren recommends that the proposed cross-cut to, and drift on, the Ethel vein be disallowed.

I concur with Maclaren's recommendations.

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

Enclosures (3)

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

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 2370, TDC Development Company

Mexico-Solomon Mine

Mineral County, Colorado

Lead-Zinc

D. R. MacLaren, Geologist
U. S. Geological Survey

M. H. Salsbury, Mining Engineer
Bureau of Mines

April 17, 1952

Reviewed by
DMEA OPERATING COMMITTEE

3-6-53
(date)

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

Summary, Conclusions, and Recommendations

By D. R. MacLaren
Geologist
U. S. Geological Survey

and

M. H. Salsbury
Mining Engineer
Bureau of Mines

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By D. R. MacLaren and M. H. Salsbury

On March 4-5, 1952, personnel of the U. S. Geological Survey and Bureau of Mines examined the operation of the TOC Development Company, a Colorado corporation, on the Mexico, Solomon, and Ethel lode claims, 2 miles north of Creede, Colo. The applicant company has requested a loan of $48,000.00 for drifting, raising, crosscutting, and winzing to explore the Mexico-Solomon and Ethel veins. A revision of the program is recommended in this report at a cost of $30,000.00, Government participation $15,000.00.

Four claims are operated by the TOC Development Company under two leases expiring in 1955 and 1957. The claims, together with their extralateral rights, cover the proposed exploration program adequately.

There is no milling capacity available in the Creede district to handle a continuous production of milling ore from this operation. Smelting ore is trucked 2 miles and shipped by rail to the Arkansas Valley plant of the American Smelting and Refining Company at Leadville, Colo. Most of the ore to be expected will probably be of smelting grade.

The Solomon-Ridge fault strikes N. 9° W. and dips 54° to 87° west. It has been mineralized for more than 3,000 feet along

the strike, between walls of Willow Creek rhyolite. Ore shoots up to several hundred feet in length and depth vary in width from 1 to 15 feet. The ore is composed of galena, sphalerite, pyrite, and some chalcopyrite in a gangue of green chlorite, talc, and finely pulverized quartz.

There are insufficient exposures to prove ore reserves on the property. Three ore shoots--No. 1 on the Mexico-Solomon vein, No. 2 also on the Mexico-Solomon vein further north, and No. 3 on the Ethel, a paralleling vein--have been mined. The possible tonnage remaining in the No. 1 ore shoot is unknown and the grade can only be predicated on recent shipments. Its development is not involved in the present project and the production will not be subject to Government royalty. Where the No. 2 ore shoot is exposed along the Solomon adit, it could contain a maximum indicated reserve of 4,000 tons between the adit level and the Mexico winze level. The value and extent of the No. 3 ore shoot is not established from records and information available and the exploration requested on it is not recommended by the field examiners.

The revised exploration program includes two proposals:

Proposal 1. Continuation of current work being conducted to explore the Mexico-Solomon vein on the Mexico winze level by 300 feet of drifting and 100 feet of raising. Cost, $11,000.00.

Proposal 2. Sink a 100-foot winze on the Mexico-Solomon vein below the Mexico winze level if results of proposal 1 are favorable. Cost, $15,000.00.

Exploration of the Ethel vein requested by the applicant is not recommended.

Additional equipment needed includes a rock drill, hoist, and additional pumping equipment at an estimated cost of $2,500.00.

A diesel-powered compressor on rental with option to purchase is now in use on the property and most of the other equipment in use is rented by the operators.

Manpower required totals four men for the work outlined above, one to act as working foreman. A part time bookkeeper will also be required.

Under the revised program, proposal 1 could be completed in six months and proposal 2 in five months additional, plus any interval between completion of the two proposals, probably one month--or a total of twelve months.

The applicants state that they are able to finance their share of the proposed exploration program up to $24,000.00. The officers of the TOC Development Company are substantial citizens of Del Norte and the working partners are experienced miners well able to carry on the project satisfactorily.

The two proposals, 1 and 2, are both good exploration projects. Proposal 1 might result in the production of as much as 4,000 tons of lead ore from the downward extension of the No. 2 ore shoot well exposed below the old stope on the Solomon adit level. The grade of ore as indicated by Bureau of Mines statistics and smelter settlement sheets is

estimated as 12 percent lead with a maximum recoverable content of 840,000 pounds. The zinc content would be low and no recovery or penalty for zinc would be made by the smelter.

Proposal 2, if found to be advisable, depending on the results of exploration under proposal 1, would explore the possibility of the downward extension of both the No. 1 and No. 2 ore shoots below the Mexico winze level. A reasonable estimate of the ore to be expected is impossible.

Proposal 3 is not recommended on the basis of evidence presented to the examining team. The extent and value of an ore shoot said to exist on the Ethel vein is not verified and the only map showing this ore shoot is inaccurate when compared with the actual workings. If the applicants should make the Ethel vein workings accessible for examination, this decision might be changed.

The total cost of the two proposals, including $2,500.00 for equipment purchase and $1,500.00 for contingencies, is $30,000.00, with Government participation $15,000.00. A loan for that amount is recommended for approval.

It will be necessary at the time the contract is drawn up to verify the status of the current exploration work. Presumably, any ore already developed will not be subject to Government royalty.

T. C. C. DEVELOPMENT COMPANY

MINERAL COUNTY

CRESTED, COLORADO

DANA DOCKET 2370

Geologic Report

by Donald H. Maclaren
U. S. Geological Survey

T. G. C. DEVELOPMENT COMPANY
CREEDE, COLORADO

INTRODUCTION

The T. G. C. Development Co. of Creede, Mineral County, Colorado, has requested the Defense Minerals Exploration Administration to participate in a program of exploration for lead and zinc. The company proposes to spend $48,000 to prospect the Ethel and Mexico veins 90 feet below formerly productive areas by drifting 420 feet to the north on the Mexico vein, cross-cutting 500 feet to the Ethel vein and drifting 200 feet on this vein, doing 400 feet of raising, and sinking a winze 100 feet.

The geological evidence indicates an excellent chance of finding lead-zinc ore shoots on the Mexico vein below the Solomon level, and it is recommended that the proposal to drift along this vein be approved. The proposed winze should await the results of this drifting before being finally approved. There is insufficient evidence available on which to judge the chances of making a discovery on the Ethel vein. Until such evidence can be submitted it must be recommended that the proposal to cross-cut be denied. The proposed raises will fall within the category of mine development and therefore should be denied.

GEOLOGY

The geology of the Creede district has been well described by W. H. Emmons and F. S. Larsen (1923). The bed rock is made up entirely of Tertiary volcanic rocks, for the most part lava flows, with a lesser

number of tuff and breccia deposits, and a few small intrusives. Except for a single andesite formation, all the rocks have been classified as rhyolite and quartz latites. Generally speaking, the lavas dip gently to the north. Local variations in dip are due to block faulting which is prevalent throughout the region. Most of the producing ore bodies were deposited along two major fault zones, the Amethyst and the Solomon-Ridge.

The area of proposed exploration is on the east slope of Campbell Mountain, 2 miles north of Creede along East Willow Creek, (fig. 1). It lies entirely within the Willow Creek rhyolite which is probably about 1,500 feet thick in this area. The Solomon-Ridge fault is exposed about half way up the east slope of Campbell Mountain. It has been traced from a point a few hundred yards south of the Solomon Adit for a little over a mile and a half to the north. It strikes N. 5° W. and dips from 84° to 87° W.

The ore is composed of galena, sphalerite, pyrite, and small amounts of chalcopyrite, in a gangue of green chlorite, talc, and finely pulverized quartz. Post-mineral movement along the fault has resulted in intensely crushed zones of green gouge 1 to 15 feet thick, in which abundant crystals of galena and sphalerite are mixed with fragments of crushed rhyolite. A persistent slickensided fissure follows the vein, for the most part along the hanging wall but occasionally swinging to the footwall. Otherwise the walls are not sharply defined, tending to become lost in a zone of closely spaced shear planes.

The King Solomon Mining Company drove an adit that intersected the vein 450 feet from the portal (fig. 3). The vein was followed for a

short distance to the south, and for over 3,000 feet to the north. Considerable stoping has been done along the north portion. About 70 feet north of the adit the fissure splits into the Ethel vein to the east, and the Mexico vein to the west. The latter has been called progressively from south to north, the Mexico, the Solomon, and the Ridge, but they are all on the same structure and are essentially the same vein.

The first drift north on the Solomon level followed the Ethel vein for some 925 feet. At 880 feet north of the adit a cross-cut was driven to cut the Mexico vein 320 feet west of the Ethel. The Mexico was followed to the north for more than 2,000 feet. Later a drift was driven along the Mexico from the point at which it split with the Ethel to connect with the drift driven north from the cross-cut. About 400 feet north of the cross-cut a winze was sunk on the Mexico to a depth of 420 feet below the Solomon level. Four levels were turned from the winze at 100 foot intervals, and were said to have exploited the most highly productive portion of the mine. Unfortunately these workings are not now accessible, nor were they when Emmons studied the property in 1911 and 1912. Ore has been stoped on the Mexico, above the Solomon level, from a point 400 feet south of the cross-cut for a considerable distance northward. Ore shoot No. 1 (fig. 3) was at least 100 feet long and 90 feet deep to judge from old maps of the Ridge Adit from which it was mined (not shown on the accompanying map). Ore shoot No. 2 was stoped from the Solomon Adit and was at least 100 feet long on the Solomon level. It has been stoped only above the level, but the height of the stope could not be determined. Ore shoot No. 3, on the Ethel vein, is said to have been stoped for a horizontal distance of 300 feet south of

the cross-cut, but this section is now caved and inaccessible. Farther to the north, through the Ridge Lower Adit (not shown), the ethel has been developed for over 1,000 feet, and considerable ore has been mined.

CURRENT EXPLORATION

On the Mexico vein, at a point 800 feet south of the cross-cut the T. O. C. Development Co. has sunk a winze to a vertical depth of 90 feet below the Solomon level. From the bottom a drift has been turned northward. The face was 280 feet north of the winze on the day of the examination. At 100 feet from the winze a raise was started on a narrow streak of ore, but was stopped at 40 feet due to wet and heavy ground. The drift was turned west for a few feet then continued north parallel to the main vein for about 95 feet, at which point it cut a small vein coming in from the hanging wall. This was followed for 35 feet, at which point it joined the main vein. At the junction, where the vein is 7 to 9 feet thick, a small stope was opened from which 99 dry tons of ore averaging 11.07% Pb. and 2.29% Zn. was shipped to the Leadville Smelter. On the day of the examination, March 5, 1942, the face was 50 feet north of the stope and still in ore, but the vein was narrowing somewhat. The assay results of 3 samples taken from the vein on the lower level show:

LOCATION	WIDTH	oz. Au	oz. Ag	% Pb	% Zn	% Cu
280 ft. N of winze	3 ft.	0.01	0.7	4.05	0.25	0.08
5 ft. N of stope	3 ft.	0.02	0.2	1.85	3.20	0.05
50 ft. N of stope	2 ft.	0.02	0.1	0.65	0.10	0.05

SUMMARY AND CONCLUSIONS

The Solomon-Ridge fault strikes N. 9° W. and dips 34° to 67° W. It has been mineralized for more than 3,000 feet along the strike, between walls of Willow Creek rhyolite. Ore shoots, up to at least 100 feet in length and depth, vary in width from 1 to 15 feet. The ore is composed of galena, sphalerite, pyrite, and subordinate chalcopyrite in a gouge of green chlorite, talc, and finely pulverized quartz.

The total production from the Mexico-Ethel vein group has been 34,248 tons of ore that have averaged 11% Pb and 3.6% Zn. Exact figures are lacking, but most of the tonnage has been mined from the Mexico vein and more than half of that has come from below the Solomon level. The proposed work is to be done 90 feet below ore shoots that have been productive in the past. A small shoot of ore has already been encountered on the lower level in the Mexico vein, and it is reasonable to expect to find other and larger ones to the north of the present face.

Information regarding the possibility of finding ore in the southern part of the Ethel vein is meager; it is based on hearsay and an old working section that contains obvious errors and is therefore not reliable. Until such time as the now caved drift is opened up, and/or the presence of a stope of substantial size can be reliably demonstrated, it is recommended that the cross-cut project be denied.

It is advisable and recommended that further work be done laterally on the Mexico vein at the new level before sinking a winze, as more information will show the most advantageous location for such winze.

As the new work is to be done only 90 feet below known ore shoots, any new shoots encountered will have been already blocked on one side.

Therefore, no new information will be gained by raising, and this proposal must be considered as mine development and denied.

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DMEA 6370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

Engineering Report

By M. H. Salsbury
Mining Engineer
Bureau of Mines

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

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* See figure following Geologic Report.

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

ENGINEERING REPORT

By

M. H. Salsbury

INTRODUCTION

On March 4-5, 1952, personnel of the Bureau of Mines and U. S. Geological Survey examined the operation of the TOC Development Company, a Colorado corporation, on the Mexico-Solomon and Ethel lode claims 2 miles north of Creede, Colo., for the purpose of checking the proposals submitted under Defense Minerals Exploration Administration docket 2370, for a loan of $48,000.00, Government participation $24,000.00, to carry on exploration work as follows:

600 feet of drifting
300 feet of crosscutting
400 feet of raising
100 feet of winze sinking

The applicant estimated two years would be required to complete the program which was divided into three phases designated in this report as follows:

Proposal 1. To drift north and raise on the Mexico-Solomon vein from the Mexico winze level to explore the possible downward extension of the No. 2 ore shoot.

Proposal 2. To sink a 100-foot winze below the Mexico winze level to determine if the Mexico-Solomon vein ore shoots continue downward.

Proposal 3. To crosscut to and drift on the Ethel vein at the Monico winze level to explore the possible downward extension of the No. 3 ore shoot.

These proposals are compared with the revisions suggested by the examining team on page 15 of the report.

ACKNOWLEDGMENTS

Data on the property were obtained from the present operators, from records of Mineral County, from bulletins 550-E and 718 of the U. S. Geological Survey, from the Emperius Mining Company, of Creede--operators of a neighboring property, and from the Statistics Branch, Region IV, Bureau of Mines.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The property consists of four mining claims in secs. 18 and 19, T. 42 N., R. 1 E., N. M. P. M., King Solomon Mining District, Mineral County, Colo. (fig. 1). The claims are on the west slope of East Willow Creek 2 miles north of Creede, the nearest supply point and the terminus of the Creede branch of the Denver and Rio Grande Western Railroad.

The area north of Creede is a region of high relief with narrow, steep-walled canyons and, in many cases, sheer cliffs rising from the creek bed. The tops of the ridges between canyons are often 1,200 to 1,500 feet above the canyon floors. Consequently, most mining operations are carried on through adits with accessible portals not far above the creeks and can be continuous throughout the year even though the region is one of heavy snowfall and long winters. The Solomon adit,

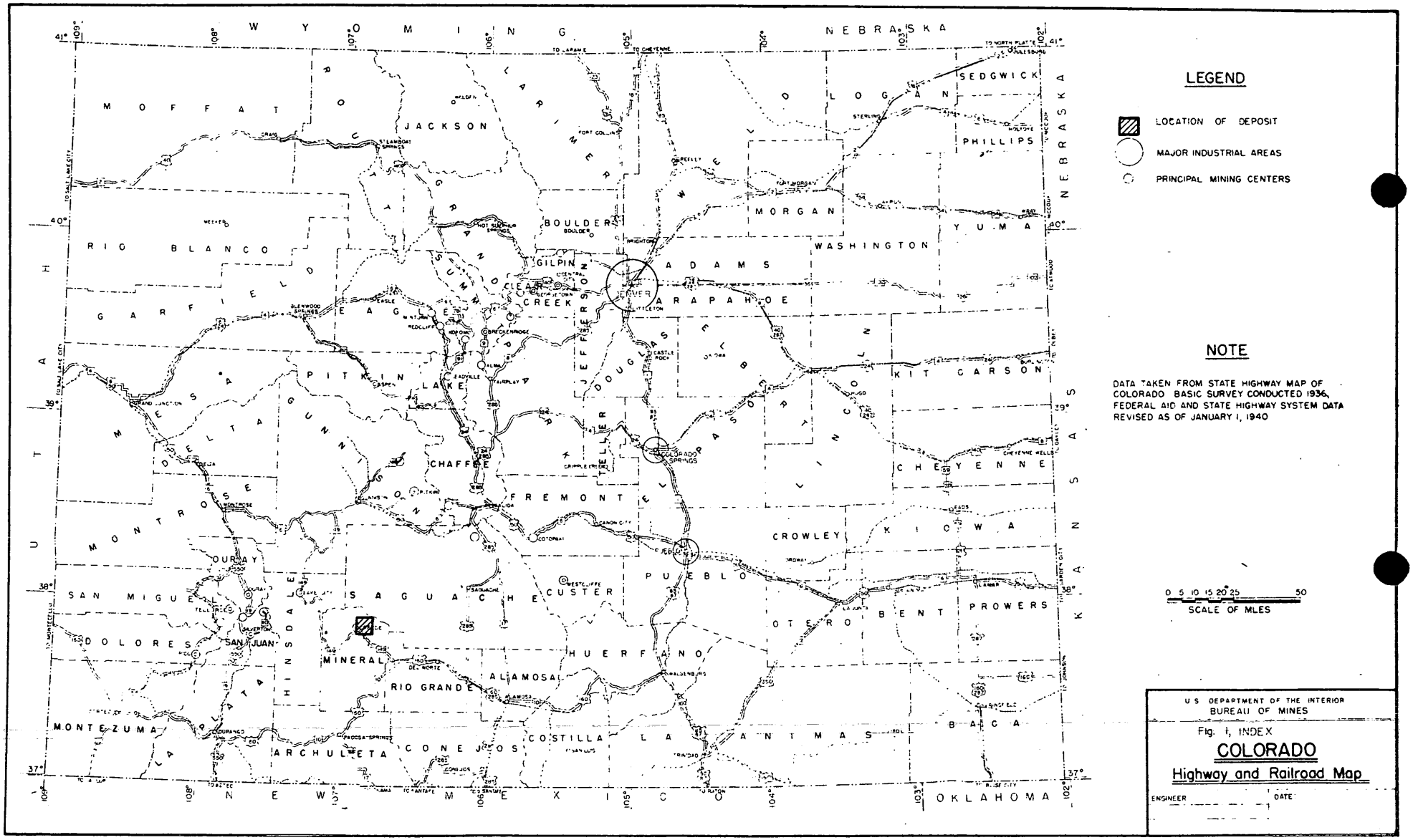

FIG. 1-LOCATION MAP, TOC DEVELOPMENT CO., MINERAL CO. COLORADO., DMEA 2370

at an altitude of 9,411 feet, used by the TOC Development Company, is one of these.

There is ample water for mining operations, but no site suitable for a mill is on the property. Power must be generated at the individual mines. The applicants state that electric power may be obtained later by running a line from the generating plant of the Emperius Mining Company on West Willow Creek.

The only available milling facilities are those of the Emperius Mining Company at Creede. This plant accepts some shipments of outside ore but is not prepared to treat low-grade custom ore in more than occasional shipments.

The Arkansas Valley plant of the American Smelting and Refining Company at Leadville is the nearest market for lead ore of smelting grade. Freight rates on the usual grade of smelting ore from Creede to Leadville are around $4.00 per ton. Treatment charges at the Leadville smelter average about $9.50 per ton.

HISTORY AND PRODUCTION

The history of the Mexico-Solomon-Holy Moses vein dates from the discovery of N. C. Creede in 1889 on the northern end of the vein which he called the Holy Moses. In 1890, C. F. Nelson located the Solomon lode. In the following years, the southern end of this vein and an east trending split, the Ethel vein, were explored and mined above ground water level. Later, winzes were sunk below water level and

ore extracted through pumping operations, reaching an elevation in the Ethel mine of 9,405 feet, just below the present Solomon adit, and in the Solomon mine of 9,000 feet, or approximately 400 feet below the Solomon adit which is the present working heading.

Very little work was done on these claims during the last twenty years until 1945 when a small operation was started through the Solomon adit. Since then, a number of shipments have been made. Table 1 lists smelter shipments from 1945 to date. Table 2, from the records of the Statistics Branch, Region IV, Bureau of Mines, gives the production from the Ethel-Mexico-Solomon group and is probably fairly complete. The periods of operation coincide with the years of high metal prices.

OWNERSHIP AND EXTENT

The Mexico lode, survey number 6837, is owned by C. O. Withrow, 1726 Krameria Street, Denver, Colo., and is leased to Allen Hosselkus, Alvin Wintz, and R. R. Lehman, of Creede, for a term of five years expiring August 10, 1955. Royalty provisions provide for payments of from 5 percent of the net smelter return on $10.00 ore up to 20 percent on ore over $50.00 in value.

The other three claims--the Ethel lode, survey number 7375; Ethel millsite, survey number 13049; and the Solomon lode, survey number 6837--are owned by eight individuals with fractional interests as follows:

TABLE 1. - Smelter shipments from the Mexico-Solomon mine, 1945-52

Date	Mine Lot	Smelter Lot	Shipper	Ounces/ton Au	Ounces/ton Ag	Percent Pb	Percent Zn	Gross Value Per ton	Treatment Per ton	Freight Per ton	Dry tons	Total Taxes and Royalty	Total Net Return to Shipper	Lead at	Silver at	Place Mined
7/30/45	1	4399	New Ridge Mining Company	0.27	1.75	12.2	2.15	$25.85	$5.60	$2.50	51.18	$ 93.56	$ 550.52	$0.065	$0.70625	Not designated
8/3/45	2	4447	" "	.81	7.15	26.12	3.3	60.30	5.60	3.40	43.61	367.83	1,763.13	0.065	0.70625	" "
6/8/49	6	2817	Davis & Winta	.16	1.45	7.66	0.1	20.07	3.70	3.30	52.53	21.52	392.70	0.140	0.90	Mexico
10/24/49	7	3179	" "	.025	2.70	8.0	3.9	19.17	3.70	3.30	52.30	20.07	365.66	0.1345	0.90	Mexico
2/24/49	-	2524	" "	.0175	0.70	4.35	2.255	14.70	3.70	3.30	50.52	7.42	129.22	0.215	0.80	Mexico
11/24/49	1	8808	Winta, Lehman, and Rosenblum	.025	0.90	17.05	5.2	50.81	8.82	3.56	54.02	207.11	1,143.01	0.170	0.90	Solomon
11/48	2	?	Davis & Winta	.115	4.70	8.5	3.05	40.82	9.35	3.66	51.64	86.69	770.54	0.215	0.90	Mexico
1/15/49	3	2980	" "	.115	0.75	6.7	1.50	31.33	9.33	3.30	53.75	23.91	436.63	0.215	0.90	Mexico
12/11/48	1	2612	" "	.04	0.85	9.4	3.25	38.20	9.08	3.60	50.76	80.59	703.33	0.215	0.90	Mexico
7/11/51	1	1045	Winta, Lehman and Rosenblum	.06	0.90	13.85	4.75	45.41	8.85	3.56	54.84	149.62	1,018.41	0.170	0.90	Underhand, below steps are short No. 2 Solomon adit
7/21/51	2	1298	" "	.04	1.35	13.75	4.75	44.93	8.97	3.56	48.15	129.81	877.24	0.170	0.90	" "
1/29/52	1	2629	TXC Development Company	.04	1.25	7.68	.95	30.20	9.25	3.56	57.98	24.82	448.83	0.190	0.90	Mexico winze level - north end are sheet No. 1
1/29/52	2	2630	" "	.12	1.25	12.18	2.5	47.52	9.41	3.56	61.40	189.47	1,291.35	0.190	0.90	" "
2/29/52	3	2793	" "	.19	1.20	11.70	2.85	38.63	9.52	3.56	48.00	200.46	999.73	0.190	0.90	" "
3/22/52	4	2977	" "	.13	1.40	11.60	2.10	34.97	9.33	3.56	51.00	151.86	921.97	0.190	0.90	" "
3/22/52	5	2964	" "	.16	1.45	11.15	2.50	36.43	9.35	3.56	48.00	152.84	928.03	0.190	0.90	" "

TABLE 2. - Production records of Ethel lode, Solomon lode, Mexico lode, King Solomon Mining District, Creede, Colo.

Year	Producing claims in group	Ore Produced (short tons)	Gross Metal Content: Ounces Gold	Ounces Silver	Pounds Copper	Pounds Lead	Pounds Zinc
1901	Solomon	-	-	-	-	-	-
1902-03	"	-	-	-	-	-	-
1904	"	4,900	2,436	273,620	-	-	-
1905	"	12,000	209	8,563	-	2,892,851	1,189,789
1906	Solomon group	9,600	524	8,724	-	2,757,105	944,623
1907	" "	4,779	261	4,247	-	1,250,340	251,339
1908-15	(no production)	-	-	-	-	-	-
1916	Holy Moses-Solomon	619	536	5,197	302	154,855	-
1917	" " "	141	-	2,545	3,610	-	-
1918	" " "	116	14	1,094	-	26,969	-
1919	" " "	2,226	115	2,581	-	362,284	96,279
1920	" " "	-	-	-	-	-	-
1921	Holy Moses, Solomon, Ethel, Cliff	66	89	149	-	26,998	-
1922	" " " " "	69	31	137	-	30,510	-
1923	" " " " "	17	3	21	-	5,890	-
1924-33	(no production)	-	-	-	-	-	-
1934	Holy Moses, Solomon, Ethel, Cliff	32	23	59	-	11,645	-
1935-49	(no production	-	-	-	-	-	-
1950	(smelted ore) Ethel & Solomon	48	1	43	95	16,272	-
1950	(milled ore) " " "	45	3	51	-	5,763	4,003
	Total	34,248	4,245	307,031	4,007	7,540,586	2,477,019

The 31,978 tons of smelter ore (1901-50) contained 7,172,539 pounds of lead which is an average of 11.2 percent lead per ton of ore; the 2,270 tons of mill ore (1901-50) contained 368,047 pounds of lead which is an average of 8.1 percent lead per ton of ore.

Owner	Fraction of Interest
Alice P. Hosselkus	1/8
Allen Hosselkus	1/8
Mrs. T. W. Rafter	3/16
Mrs. Pearl Moody	1/8
Alex Duncan	1/8
Ralph C. Ellithorpe	3/16
J. J. Williams	1/16
Wallace Wright	1/16

These claims are also leased to the above-mentioned Allen Hosselkus, Alvin Wintz, and R. R. Lehman for a ten-year term expiring August 1, 1957, with an extension of seven more years from August 1, 1957, if lease terms are complied with. Royalty schedules are the same as in the Mexico lode lease.

Allen Hosselkus, Alvin Wintz, and R. R. Lehman have assigned both leases to the TOC Development Company without any consideration being involved.

The question has been raised as to whether the claims under lease cover the portions of the Mexico-Solomon vein which, at the level of the current operation, are outside the sidelines of the Mexico and Solomon claims. The claims clearly cover the apex of the Mexico-Solomon vein and, under the law on extra-lateral rights, the vein can be followed to any depth by the owners of the Mexico and Solomon veins. Ore is currently being shipped and credited to the Mexico lode although it is outside the claim sidelines.

The four claims under lease to the TOC Development Company, shown on figure 2, together with the extralateral rights cover the proposed exploration project adequately.

The original leases and assignments were attached to the application of the TOC Development Company.

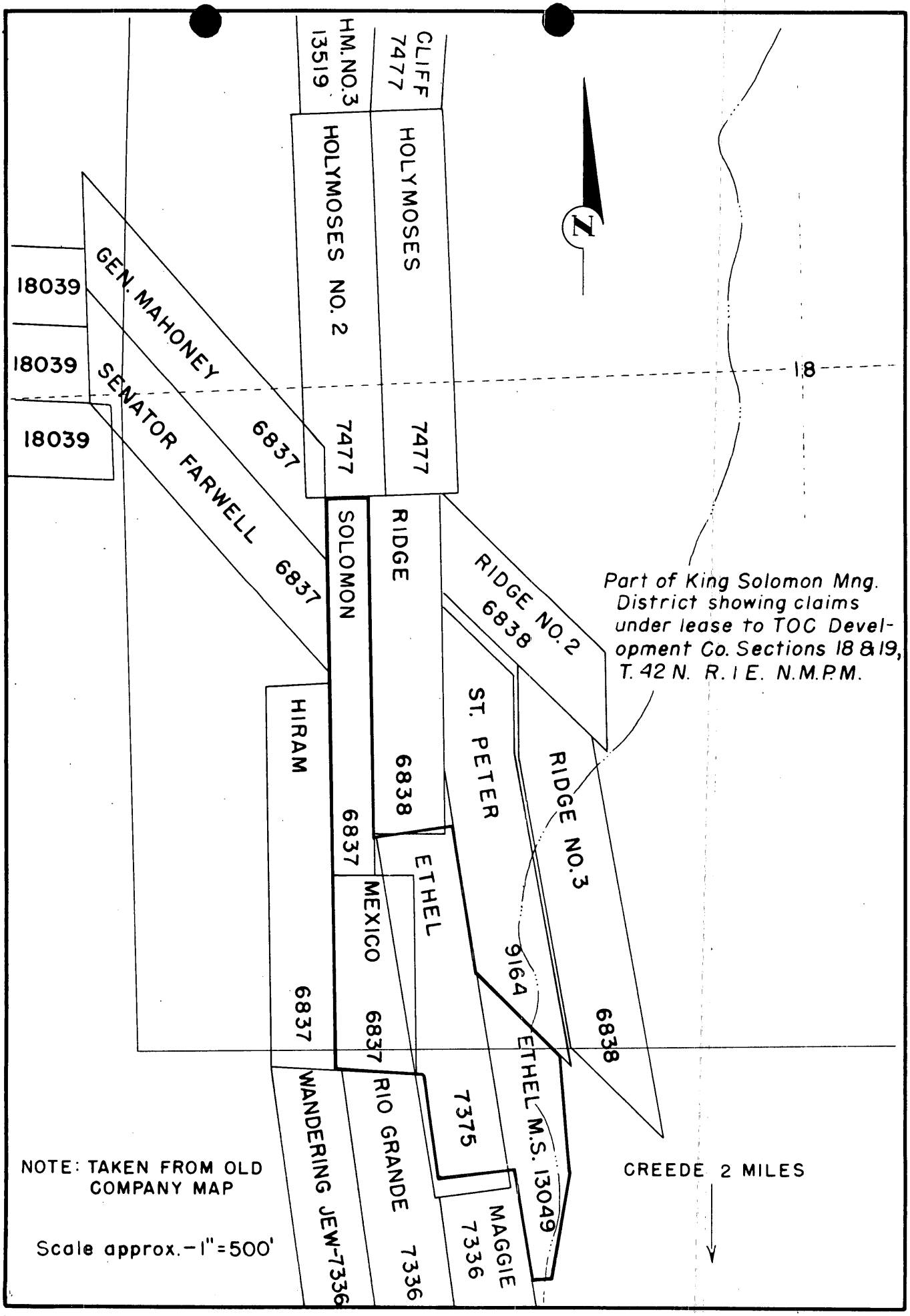

FIG. 2-CLAIM MAP, TOC DEVELOPMENT CO., MINERAL CO. COLORADO., DMEA 2370

No difficulty in obtaining subordination agreements is anticipated except in the case of one of the owners of the Ethel and Solomon lodes. Mr. Ellithorpe, one of the owners, who is also secretary-treasurer of the TOC Development Company, stated that another one of the owners may require a little persuasion.

DESCRIPTION OF THE DEPOSITS

The ore deposits of the Creede area, including the Mexico-Solomon and Ethel veins, are in fissures occupying a premineral fault. In the case of the two veins above, both walls of the fault are in Willow Creek rhyolite, one of several flows which make up the country rock of the Creede district.

There are three main vein systems in the Creede district. One of these, the Mexico-Solomon, and its east-trending split, the Ethel vein, strike a little west of north and dip 55°-88° to the west. They occupy normal premineral faults with the down-thrown side on the west or hanging wall.

The ore shoots contain galena, sphalerite, and pyrite, with a little chalcopyrite, gold, and silver, in a gangue of green chlorite talc with quartz. More or less numerous rhyolite fragments are contained in the gangue. Extensive crushing occurred during postmineral faulting along the same fissure and the chlorite gangue is little more than a fault gouge. The ore may have a width of from a few inches to more than 9 feet. The best ore will run as much as 30-35 percent combined lead and zinc. The lead predominates and the zinc content of direct smelting ores is usually low enough to

escape treatment penalties. The silver content is low on present day ores, 1 to 3 ounces, and gold will run .05 to .15 ounces except in some of the oxidized deposits near surface where it was as much as .50 ounce. There is no zone of secondary enrichment. Oxidization is erratic and lead carbonate as cerrussite is often found far below the zone of complete oxidization, with unaltered sulfides on either wall.

The richness of an ore shoot in this area depends not only on width and amount of mineralization but also on the number of barren rhyolite fragments included in the fault gouge. Ore shoots vary greatly in width, length, and continuity.

There are a number of minor splits of the Mexico-Solomon vein in the west wall. These are exposed in recent work and enrichments in the main vein appear to be associated with the junctions of these splits.

MINABLE ORE RESERVES

The Mexico-Solomon and Ethel veins have been extensively explored above the Solomon adit level, altitude 9,411 feet, as shown on figure 3 which accompanies the geologic report only. It is unlikely that there are any ore reserves above this level.

The Ethel vein on the adit level is not accessible in the section which is reported to be stoped and no estimate of the possible downward extension of such an ore shoot is possible. One longitudinal section of the area contains

obvious errors when compared with the actual workings which can be examined, and the authenticity of this map is therefore questionable. Ore shoot No. 3 (fig. 3) is shown as being intersected by the long crosscut from the Mexico-Solomon vein on the Solomon adit level. Actually, this crosscut intersects the Ethel vein at a barren spot and the No. 3 ore shoot would be south of this crosscut. Other evidence about this ore shoot is hearsay.

On the Mexico-Solomon vein at the Solomon adit level an ore shoot, designated as No. 1 (fig. 3), was mined above an old level 6 feet below the Solomon adit level. These workings are not accessible and width and length of the old stope is unknown. Later workings on the Solomon adit level in the west wall of the vein broke into the stope at several points. If it is continuous, the stope is as much as 250 feet long at the Solomon adit level.

Current operations on the Mexico winze level, 91 feet below the Solomon adit level, altitude 9,320 feet, have cut ore which is probably the downward extension of the north end of this No. 1 ore shoot. Five cars totaling some 250 tons and settling at from 7.68 percent to 12.18 percent lead have been shipped from a short stope 3 to 8 feet wide. The southern extension of this ore shoot is in the east wall of the Mexico winze level drift and the length of the ore at this level is unknown. While ore mined from this ore shoot is not necessarily subject to Government royalties, it is mentioned to indicate the probable grade of ore.

The No. 2 ore shoot on the Mexico-Solomon vein (fig. 3) is exposed in the floor of the Solomon adit level. It has been stoped 3 to 9 feet wide over a length of about 100 feet. A shallow underhand stope was mined by the present operators in 1951, producing two cars from a section of the vein 8 feet wide, 10 feet long, and about 10 feet deep. The average settlement value on this ore was 13.8 percent lead, 1.12 ounces silver, and .05 ounce gold (see table 1). The Bureau of Mines engineer took two samples, S-4 and S-7, from this underhand stope which assayed 20.4 and 14.3 percent lead, respectively (table 3). A cut sample of the vein 4.5 feet wide, taken underneath the track 20 feet north of the underhand stope, assayed 5.4 percent lead (sample S-5, table 3).

Thus, No. 2 ore shoot, exposed on one side and averaging 5 feet in width, 100 feet in length, and 100 feet between the Mexico winze level and the Solomon adit level, might produce a maximum of 4,000 tons of 12 percent lead ore if it is continuous. This ore could be profitably mined with a possible production of 840,000 pounds of recoverable lead which would be subject to Government royalty under the proposed lease.

PRESENT STATUS

Exploration and Development

The Mexico-Solomon and Ethel veins are developed by tunnels and winzes at various levels of which only one--the Solomon adit, altitude 9,411--is open. Drifts on this level, turned off the crosscut from the portal on East Willow Creek,

TABLE 3. - Sample chart

Sample Number	Description	Ounces/ton Au	Ounces/ton Ag	Percent Pb	Percent Zn	Percent Cu
S-4	Grab from Wintz underhand stope on Mexico-Solomon vein in floor of Solomon adit level where smelter lots 1045 and 1238 were mined.	0.070	1.10	20.40	13.10	<0.05
S-5	4.5-foot cut across both hanging wall and footwall streaks, including lean chlorite with rhyolite inclusions between streaks, in floor of Solomon adit level 20 feet north of S-4.	0.005	0.20	3.40	0.50	0.05
S-6	Grab of muck which has fallen out of a streak 6 to 8 inches wide, from back of Ethel vein drift at a point 10 feet north of long crosscut, Solomon adit level.	0.010	0.50	4.80	6.40	<0.05
S-7	Check on sample number S-4.	0.080	0.80	14.30	8.80	<0.05
S-8	3-foot cut across top of face of north drift, Mexico winze level, about 260 feet north of Mexico winze, after round of 3/3/52 (small galena seams, abundant rhyolite fragments).	0.010	0.70	4.05	0.25	0.06
S-9	3-foot cut across back, 5 feet north of 35-foot long stope on north end of ore shoot No. 2, Mexico winze level (2- to 3-inch galena streak with other scattered seams and abundant rhyolite).	0.020	0.20	1.85	8.20	0.05
S-10	2-foot cut across face of north drift, Mexico winze level, after round of 3/4/52 (very little galena showing, with abundant rhyolite), sample taken 50 feet north of stope on ore shoot No. 1.	0.020	0.10	0.65	0.10	0.06

<Less than.

were driven on both the Mexico-Solomon and Ethel veins which proved to be barren until the No. 1 and No. 3 ore shoots were reached, as shown on figure 3. The No. 1 ore shoot had been mined from the Ethel incline previously. The present operators drove around this old stope and connected with the former drift which had been driven to open up ore shoot No. 2, access being had through a long crosscut connecting with the Ethel vein drift. This drift is not open and the vein may be seen only at the crosscut where it was not mined and for a short distance north of the junction with the Mexico-Solomon vein farther south. The stope on the No. 2 ore body is not accessible.

The present operators sank a 100-foot winze in the hanging wall of the Mexico-Solomon vein just south of No. 2 ore shoot and are driving northward on the Mexico winze level, altitude 9,320 feet. The present face is 300 feet north of the winze and about 180 feet from the south end of No. 3 ore shoot, as projected. This drift is being driven currently. It shows low grade values (samples S-8 and S-10, table 3) but is not ore. The presumed north end of No. 1 ore shoot was cut and five carloads of ore were shipped (table 1) from a small stope. The No. 1 ore shoot is in the east wall of the Mexico winze level, south of this stope. The south end and back of the stope are still in ore. A short crosscut in the west wall of the Mexico winze level 100 feet north of the winze cut some ore which is also supposed to be the downward extension of the No. 1 ore shoot. A raise driven on the ore was so wet it had to be abandoned.

Careful checking by the U. S. Geological Survey representative indicates the main vein may still be further west at this point.

Three men and a foreman are currently employed. By April 1 it is estimated that the face of the north drift will be approximately 130 feet from the No. 3 ore shoot at the present rate of progress.

The inflow of water at the winze level requires pumping about 3 out of 24 hours with an Ingersoll-Rand 25T pump which has an estimated capacity of 50 gallons per minute.

Equipment in use at the operation includes:

1 Ingersoll-Rand HKA500, diesel-powered compressor, on rental with option to purchase
3 Ingersoll-Rand 25T pumps, rented
1 Ingersoll-Rand air hoist, rented
1 Ingersoll-Rand drifter, rented
1 Jackhammer, rented
1 Stoper, loaned by Emperius Mining Company
1 Pump, owned
2 Mine cars, owned
2 1,000-pound ore buckets, owned
Miscellaneous small tools and drill steel, owned

Mine maps show the work done further north through the deep Solomon shaft not extending south as far as the Ethel vein crosscut. The office manager for the Emperius Mining Company did the last work through the Solomon winze and he stated that they examined the ore shoot in the vicinity of the winze and did not drift south. Thus, it is fairly safe to assume that the section of the Mexico-Solomon vein now being explored is unmined below the Solomon adit except for the current operation.

PROJECT PROPOSALS, WITH COSTS

The exploration proposals have been revised by the examining team and following is a comparison of the applicants' and the Bureau of Mines estimates for the work:

Applicants' Estimate		Bureau of Mines Estimate	
Exploration			
Proposal 1			
450 feet drift north on Mexico winze level toward No. 2 ore shoot	$15,000.00	300 feet drift north on Mexico winze level toward No. 2 ore shoot at $30.00/foot	$ 9,000.00
4 - 100-foot raises from Mexico winze level	5,000.00	1 - 100-foot raise on Mexico-Solomon vein - tentative (see text) - at $20.00/foot	2,000.00
Proposal 2			
100-foot winze below Mexico winze level to explore Mexico-Solomon vein at depth	14,000.00	100-foot winze below Mexico winze level - tentative (see text) - at $150.00/foot	15,000.00
300 feet crosscut on Mexico winze level to cut Ethel vein	8,000.00	Not recommended	
200 feet drift on Mexico winze level to explore for the No. 3 ore shoot	6,000.00	Not recommended	

Proposal 1, 300 feet of drifting on the Mexico Solomon vein on the Mexico winze level, currently being carried on, is pointed toward determining the downward extension of the No. 2 ore shoot. One 100-foot raise, instead of four 100-foot raises requested by the applicant, included under this proposal is subject to the need of probing for concealed ore not extending to the Mexico winze level.

Proposal 2, sinking a 100-foot winze on the Mexico-Solomon vein below the present Mexico winze level at a favorable location, is contingent on the results of proposal 1.

The 300 feet of crosscut to and 200 feet of drifting on the Ethel vein on the Mexico winze level, requested by the applicant, are not approved due to the lack of evidence that an ore discovery will result.

New Equipment

Equipment purchase not provided for		Jack leg drill for level work	$ 700.00
		Air hoist (if winze is approved)	650.00
		Additional pumping equipment (if winze is approved)	900.00
		Hoisting cable and sheave	100.00
		Miscellaneous (ore bucket, signal systems)	150.00
		Contingencies	1,500.00
Total	$48,000.00	Total	$50,000.00

Transportation

Mule haulage is used on the Solomon adit level, and the road to the adit portal is kept open by Mineral County; no access roads are needed.

Manpower

The proposed development will require five men as follows:

1 Miner at $1.50 per hour
1 Mucker at $1.00 per hour
1 Trammer at $1.00 per hour
1 Foreman at $350.00 per month
1 Bookkeeper (part time) at $60.00 per month

Power

Power requirements would be taken care of by the rented diesel compressor plant now in operation.

Water

There is an ample supply of non-acid water available from pumping operations.

The cost per foot of level work in the Bureau of Mines estimate was arrived at by the following computation:

Cost of drifting or crosscutting (not including purchase of new equipment) based on one heading, 25 shifts per month, 3 feet advance per shift

		Per Month	
Labor:			
1 Miner at $1.50		$312.00	
1 Mucker at $1.08		225.00	
1 Trammer at $1.08		225.00	
1 Foreman		350.00	$1,112.00
Compensation insurance and taxes, 10 percent			111.20
Machinery rental (based on cost depreciated in 60 months):			
Compressor		$130.00	
3 Pumps		75.00	
Miscellaneous equipment; cars, buckets, etc.		25.00	230.00
Supplies:			
Fuel oil and repairs for compressor	$250.00		
Less sale of compressed air to Emperius	100.00	$150.00	
Explosives		250.00	
Drill steel and drill bits		25.00	
Rail and pipe for 75 feet of work		101.00	
Incidentals (carbide, tool sharpening, repairs)		75.00	
Timber at $2.00 per foot		150.00	751.00
Total per month, 75 feet of work			$2,205.10
Cost per foot			$29.40

The applicants are using a compressor costing $7,854.00 on which they have paid, as of March 5, $4,590.00 towards purchase. (See copy of purchase agreement attached to the loan application.) They are selling compressed air to another operator. It is recommended that compressor rental be charged to any operation under the proposed Defense Minerals Exploration Administration contract computed on depreciation in 60 months, $130.90 per month, and that the applicants continue paying for the compressor on their own account. If the Government pays half of the full rental on the compressor, or one half of $510.00 a month until paid for, computed from April 5, 1952, it would have a 2,550/7,854 interest in the equipment when paid for. While the pumps are shown on the footage cost estimate as rental items totaling $75.00 per month, it may be advisable to buy the pumps outright. The accumulated rental would pay for the pumps in 12 months.

The cost of sinking the proposed winze is set at the actual cost of the upper winze plus $1,000.00 to allow for preparation at the collar. It is possible that a raise through to the Solomon adit level above the site of the proposed winze would be advisable to eliminate double handling of muck and supplies. Possibly this raise could be driven in ore.

PRODUCTION PLAN

The applicants estimate it would take 24 months to complete their proposed work. Under the revised program, the Bureau of Mines engineer estimates the time requirements as follows:

Proposal 1 - Drifting 500 feet and raising 100 feet (if approved)	6 months
Proposal 2 - Sinking 100-foot winze below present Mexico winze level	5 months
Total	11 months
Add for preparation and possible delays	1 month
Total	12 months

The property is equipped to produce up to 200 tons of ore monthly. At this rate, the maximum tonnage from the No. 2 ore shoot between the Mexico winze level and the Solomon adit level could be mined in 20 months with a recovery of 840,000 pounds of lead.

Mining methods used in this operation would be typical narrow vein stoping, probably open-stulled stopes. The ore is too sticky to permit successful shrinkage stoping. Some of the barren rhyolite fragments in the gangue can be rejected by sorting.

SUMMARY: COST OF PROJECT

The total cost of the revised exploration program is estimated as follows:

Proposal 1	$11,000.00
Proposal 2	15,000.00
Purchase of equipment	2,500.00
	$28,500.00
Contingencies	1,500.00
Total cost	$30,000.00

The operating costs, not including purchase of equipment, will average about $2,300.00 per month.

The operators may elect to mine ore from the No. 1 ore shoot while advancing the north drift under proposal 1, or they may wish to mine ore found in No. 2 ore shoot while sinking the winze under proposal 2. In either case, they must, of course, prorate the overhead costs, including the supervision, between the different operations.

The indicated profit is estimated on the basis of the possible grade and tonnage of ore. The possible production of the No. 2 ore shoot only is considered although the grade of ore is likely to apply to other stopes.

The content of smelting ore shipped from 1901-50 from the group of mines as reported by the Statistics Branch, Region IV, Bureau of Mines, (table 2) is 11.2 percent lead. The two smelter shipments from the underhand stope on ore shoot No. 2 on the Solomon adit level settled at 13.8 percent. Three of the five cars from the small stope on ore shoot No. 1 on the Mexico winze level ran from 7.68 to 12.18 percent lead. Therefore, the value taken for this estimate is 12 percent lead with 1.25 ounces silver and .12 ounce gold. Based on the smelter schedules of the American Smelting and Refining Company, at Leadville, Colo., with lead at $0.19 per pound and silver at $0.90 per ounce, such an ore would show the following profit per ton:

	Per ton	
Gross value of ore		$38.11
Treatment charges	$9.41	
Freight and tax	4.02	
Control and checking (approximately)	.20	
Royalty and production taxes	3.88	
Royalty to Government on DMEA loan	1.23	
Hauling (mine to railroad)	1.00	19.74
Net to shipper		$18.37
Mining cost (estimated)		11.00
Operating profit		$ 7.37

Considering proposal 1 above on the downward extension of the No. 2 ore shoot with a maximum estimated content of 4,000 tons, the operator can reasonably expect a gross return of $29,000.00 against an exploration cost of about $6,000.00. Stated another way, the operating profit on a production of about 820 tons of ore will equal the exploration cost.

On the same production, the Government would recover $5,000.00 in royalties against an expenditure of $6,000.00 and would need royalty on 4,800 tons to recover the amount of the loan.

No reasonable estimate of ore which might be found under proposal 2 is possible. The exploration might return the amount of the Government loan easily.

PROPOSED FINANCING

The applicants state that they can finance their half of the proposed exploration up to $24,000.00.

CONCLUSIONS

Proposal 1 of the exploration program is a good prospect. There are excellent possibilities for opening up profitable ore with an estimated content of 12 percent lead and a maximum tonnage of 4,000 tons containing 840,000 pounds of recoverable lead. The zinc content would be low and would not be recovered nor penalized. The operators might realize a profit greater than their investment on a production of about 820 tons of ore, but the Government would not recover the amount of the loan with a production of less than 4,800 tons.

While the projected ore shoot No. 2 with a maximum size of 100 feet long, 5 feet wide, and 100 feet between levels might produce a maximum of 4,000 tons, the actual tonnage could be very much less as it may not continue in depth as large as it appears in the floor of the Solomon adit level.

Proposal 2 would be contingent upon results of proposal 1 and should not be carried out unless a good showing of ore is found above the Mexico winze level. If the results of proposal 1 are good, the winze below the Mexico winze level is an excellent prospect to open up the possible downward continuation of both ore shoots Nos. 1 and 2.

Proposal 3, exploration of the Ethel vein, is not recommended. Information available on ore shoot No. 3 is meager and based entirely on hearsay. One old map shows a stope section on ore shoot No. 3 incorrectly when compared with the actual workings. While the stope is indicated as over 300 feet long, this cannot be verified. If the operators open up the Ethel drift and make the old workings available for examination, the decision on the proposal might be changed.

Inasmuch as the operation designated as proposal 1 above is going on currently, it is possible that by the time a Defense Minerals Exploration Administration loan is processed it will have reached its objective. In this event, only proposal 2 would be eligible for a loan.

The officers of the TOC Development Company are substantial citizens of Del Norte, Colo., and the working partners are experienced miners and well qualified to carry on the proposed exploration program.

RECOMMENDATIONS

Proposal 1, 300 feet of drifting at the Mexico winze level on the Mexico-Solomon vein towards the downward extension of the No. 2 ore shoot, is recommended for approval at a cost of $9,000.00. One hundred feet of raising under this proposal is recommended only if it is necessary to explore for the possibility of a concealed ore shoot which might not come down to the Mexico winze level. Cost of the 100 feet of raise is $2,000.00.

Proposal 2, sinking a 100-foot winze on the Mexico-Solomon vein below the present Mexico winze level at a favorable location, is recommended for approval, contingent on the discovery of an ore shoot through the exploration under proposal 1. The total cost of the two proposals is estimated at $30,000.00 as follows:

	Total Cost	Government Participation
Proposal 1	$11,000.00	$ 5,500.00
Proposal 2	15,000.00	7,500.00
Equipment	2,500.00	1,250.00
	$28,500.00	$14,250.00
Contingencies	1,500.00	750.00
Total loan	$30,000.00	$15,000.00

At the time the contract is drawn up, it will be necessary to verify the status of the current exploration work and define the start of the project under the Defense Minerals Exploration Administration loan.

Proposal 3, exploring the Ethel vein, is not recommended.

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

Defense Minerals Administration
RECEIVED
MAR 1 1953

224 New Customhouse
Denver 2, Colorado

February 25, 1953

Memorandum

To: Secretary, Operating Committee
Defense Minerals Exploration Administration

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket No. DMEA 2370, Mexico-Solomon Mine, Mineral County, Colorado

Enclosed are four copies of the final report on Docket No. DMEA 2370. The application has been cancelled at the request of the applicant and has been transferred to our inactive files.

W. H. King
W. H. King

Enclosure

Mining Division
Region IV

May 22, 1952

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAR 1 1953

Memorandum

To: Field Team, Region IV

From: Acting Chief, Mining Division, Region IV

Subject: Final Report, DMEA Docket 2370 (Lead) T. O. C. Development Company, Mexico-Solomon Mine, Mineral County, Colorado

Enclosed are nine copies of the engineering report by M. H. Salisbury on the Mexico-Solomon Mine.

The original exploration program, as submitted by the applicant, had an estimated cost of $48,000 but the examining engineers agree that the crosscut to the Ethel vein is not warranted at this time. They recommend drifting and raising on the Mexico-Solomon vein at the present winze level and if these results are favorable to sink the winze 100 feet, at a total cost of $30,000.

We concur in the recommendations of the examining engineers.

W. H. King

W. H. King

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20
Denver Federal Center
Denver 14, Colorado
April 15, 1952

Mining Division
Date Rec'd.
APR 18 1952
BUREAU OF MINES
Denver, Colorado

Memorandum

To: Acting Chief, Mining Division, Region IV

From: Chief, Colorado Branch, Mining Division

Subject: DMEA 2370, TOC Development Company (Mexico-Solomon mine), Mineral County, Colorado

Please find enclosed the original and eight copies of the "Summary, Conclusions, and Recommendations", by M. H. Salsbury and D. R. MacLaren, on the above docket, and the same number of copies of Salsbury's engineering report. The brochure submitted with the Region IV Field Team's instructions to make the field examination is also enclosed.

The examining team has eliminated entirely 300 feet of crosscutting and 200 feet of drifting to explore one vein, the Ethel, on the basis of lack of potential. Exploration of two ore shoots on another vein, the Mexico-Solomon, from a so-called Mexico winze level has been revised and scheduled in two phases. The first phase comprises 300 feet of drifting on the vein and 100 feet of raising in one raise on the vein. This is a reduction in the applicant's drifting request of 150 feet and in his raising request of three raises of 100 feet each. The second phase is contingent upon the outcome of the first and suggests that, in the event the first phase is encouraging, a 100-foot winze be sunk below the present Mexico winze level for additional deeper exploration.

The first phase is currently in operation and, if completed before a contract is negotiated, will be eliminated, which may introduce complications.

Salsbury concludes the project has merit, especially if the first phase is successful in proving ore on the present Mexico winze level, and recommends a project for $30,000.00, Government participation - $15,000.00.

I concur with his conclusions and recommendations.

Scott W. Hagen
for W. M. Traver, Jr.

enclosures

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

200 New Customhouse
Denver 2, Colorado

May 16, 1952

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 2370, T. O. C. Development Company, Mineral County, Creede, Colorado

Attached are 8 copies of the geological report by Donald R. MacLaren covering DMEA Docket 2370, T. O. C. Development Co., Mineral County, Creede, Colorado.

The applicant proposes to explore two veins, the Ethel and Mexico, 90 feet below the adit level (Solomon level). The proposed program includes 450 feet of drifting to the north on the Mexico vein, cross-cutting 300 feet to the Ethel vein, a 200-foot drift on the Ethel vein, 400 feet of raising, and the sinking of a 100-foot winze on the Mexico vein.

It is pointed out by MacLaren that there is an excellent chance of finding lead-zinc ore shoots on the Mexico vein below the adit level, and he recommends that this part of the proposed program be approved. The proposed winze on the Mexico vein should be undertaken as Stage II and only if ore is found in the drift.

Geologic evidence and mine data are inadequate to judge the chances of making a discovery on the Ethel vein. Until that portion of the mine is made accessible for mapping and study, MacLaren recommends that the proposed cross-cut to, and drift on, the Ethel vein be disallowed.

I concur with MacLaren's recommendations.

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

Enclosures (8)

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

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 2370, TOC Development Company

Mexico-Solomon Mine

Mineral County, Colorado

Lead-Zinc

D. R. MacLaren, Geologist
U. S. Geological Survey

M. H. Salsbury, Mining Engineer
Bureau of Mines

April 17, 1952

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

Summary, Conclusions, and Recommendations

By D. R. MacLaren
Geologist
U. S. Geological Survey

and

M. H. Salsbury
Mining Engineer
Bureau of Mines

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By D. R. MacLaren and M. H. Salsbury

On March 4-5, 1952, personnel of the U. S. Geological Survey and Bureau of Mines examined the operation of the TOC Development Company, a Colorado corporation, on the Mexico, Solomon, and Ethel lode claims, 2 miles north of Creede, Colo. The applicant company has requested a loan of $48,000.00 for drifting, raising, crosscutting, and winzing to explore the Mexico-Solomon and Ethel veins. A revision of the program is recommended in this report at a cost of $30,000.00, Government participation $15,000.00.

Four claims are operated by the TOC Development Company under two leases expiring in 1955 and 1957. The claims, together with their extralateral rights, cover the proposed exploration program adequately.

There is no milling capacity available in the Creede district to handle a continuous production of milling ore from this operation. Smelting ore is trucked 2 miles and shipped by rail to the Arkansas Valley plant of the American Smelting and Refining Company at Leadville, Colo. Most of the ore to be expected will probably be of smelting grade.

The Solomon-Ridge fault strikes N. 9° W. and dips 54° to 87° west. It has been mineralized for more than 3,000 feet along

the strike, between walls of Willow Creek rhyolite. Ore shoots up to several hundred feet in length and depth vary in width from 1 to 15 feet. The ore is composed of galena, sphalerite, pyrite, and some chalcopyrite in a gangue of green chlorite, talc, and finely pulverized quartz.

There are insufficient exposures to prove ore reserves on the property. Three ore shoots--No. 1 on the Mexico-Solomon vein, No. 2 also on the Mexico-Solomon vein further north, and No. 3 on the Ethel, a paralleling vein--have been mined. The possible tonnage remaining in the No. 1 ore shoot is unknown and the grade can only be predicated on recent shipments. Its development is not involved in the present project and the production will not be subject to Government royalty. Where the No. 2 ore shoot is exposed along the Solomon adit, it could contain a maximum indicated reserve of 4,000 tons between the adit level and the Mexico winze level. The value and extent of the No. 3 ore shoot is not established from records and information available and the exploration requested on it is not recommended by the field examiners.

The revised exploration program includes two proposals:

Proposal 1. Continuation of current work being conducted to explore the Mexico-Solomon vein on the Mexico winze level by 300 feet of drifting and 100 feet of raising. Cost, $11,000.00.

Proposal 2. Sink a 100-foot winze on the Mexico-Solomon vein below the Mexico winze level if results of proposal 1 are favorable. Cost, $15,000.00.

Exploration of the Ethel vein requested by the applicant is not recommended.

Additional equipment needed includes a rock drill, hoist, and additional pumping equipment at an estimated cost of $2,500.00.

A diesel-powered compressor on rental with option to purchase is now in use on the property and most of the other equipment in use is rented by the operators.

Manpower required totals four men for the work outlined above, one to act as working foreman. A part time bookkeeper will also be required.

Under the revised program, proposal 1 could be completed in six months and proposal 2 in five months additional, plus any interval between completion of the two proposals, probably one month--or a total of twelve months.

The applicants state that they are able to finance their share of the proposed exploration program up to $24,000.00. The officers of the TOC Development Company are substantial citizens of Del Norte and the working partners are experienced miners well able to carry on the project satisfactorily.

The two proposals, 1 and 2, are both good exploration projects. Proposal 1 might result in the production of as much as 4,000 tons of lead ore from the downward extension of the No. 2 ore shoot well exposed below the old stope on the Solomon adit level. The grade of ore as indicated by Bureau of Mines statistics and smelter settlement sheets is

estimated as 12 percent lead with a maximum recoverable content of 840,000 pounds. The zinc content would be low and no recovery or penalty for zinc would be made by the smelter.

Proposal 2, if found to be advisable, depending on the results of exploration under proposal 1, would explore the possibility of the downward extension of both the No. 1 and No. 2 ore shoots below the Mexico winze level. A reasonable estimate of the ore to be expected is impossible.

Proposal 3 is not recommended on the basis of evidence presented to the examining team. The extent and value of an ore shoot said to exist on the Ethel vein is not verified and the only map showing this ore shoot is inaccurate when compared with the actual workings. If the applicants should make the Ethel vein workings accessible for examination, this decision might be changed.

The total cost of the two proposals, including $2,500.00 for equipment purchase and $1,500.00 for contingencies, is $30,000.00, with Government participation $15,000.00. A loan for that amount is recommended for approval.

It will be necessary at the time the contract is drawn up to verify the status of the current exploration work. Presumably, any ore already developed will not be subject to Government royalty.

T. O. C. DEVELOPMENT COMPANY

MINERAL COUNTY

CREEDE, COLORADO

DMEA DOCKET 2370

Geologic Report

By Donald R. MacLaren
U. S. Geological Survey

T. O. C. DEVELOPMENT COMPANY
CREEDE, COLORADO.

INTRODUCTION

The T. O. C. Development Co. of Creede, Mineral County, Colorado, has requested the Defense Minerals Exploration Administration to participate in a program of exploration for lead and zinc. The company proposes to spend $48,000 to prospect the Ethel and Mexico veins 90 feet below formerly productive areas by drifting 450 feet to the north on the Mexico vein, cross-cutting 300 feet to the Ethel vein and drifting 200 feet on this vein, doing 400 feet of raising, and sinking a winze 100 feet.

The geological evidence indicates an excellent chance of finding lead-zinc ore shoots on the Mexico vein below the Solomon level, and it is recommended that the proposal to drift along this vein be approved. The proposed winze should await the results of this drifting before being finally approved. There is insufficient evidence available on which to judge the chances of making a discovery on the Ethel vein. Until such evidence can be submitted it must be recommended that the proposal to cross-cut be denied. The proposed raises will fall within the category of mine development and therefore should be denied.

GEOLOGY

The geology of the Creede district has been well described by W. H. Emmons and E. S. Larsen (1923). The bed rock is made up entirely of Tertiary volcanic rocks, for the most part lava flows, with a lesser

number of tuff and breccia deposits, and a few small intrusives. Except for a single andesite formation, all the rocks have been classified as rhyolite and quartz latites. Generally speaking, the lavas dip gently to the north. Local variations in dip are due to block faulting which is prevalent throughout the region. Most of the producing ore bodies were deposited along two major fault zones, the Amethyst and the Solomon-Ridge.

The area of proposed exploration is on the east slope of Campbell Mountain, 2 miles north of Creede along East Willow Creek, (fig. 1). It lies entirely within the Willow Creek rhyolite which is probably about 1,500 feet thick in this area. The Solomon-Ridge fault is exposed about half way up the east slope of Campbell Mountain. It has been traced from a point a few hundred yards south of the Solomon Adit for a little over a mile and a half to the north. It strikes N. 9° W. and dips from 54° to 87° W.

The ore is composed of galena, sphalerite, pyrite, and small amounts of chalcopyrite, in a gangue of green chlorite, talc, and finely pulverized quartz. Post-mineral movement along the fault has resulted in intensely crushed zones of green gouge 1 to 15 feet thick, in which abundant crystals of galena and sphalerite are mixed with fragments of crushed rhyolite. A persistent slickensided fissure follows the vein, for the most part along the hanging wall but occasionally swinging to the footwall. Otherwise the walls are not sharply defined, tending to become lost in a zone of closely spaced shear planes.

The King Solomon Mining Company drove an adit that intersected the vein 450 feet from the portal (fig. 3). The vein was followed for a

short distance to the south, and for over 3,000 feet to the north. Considerable stoping has been done along the north portion. About 70 feet north of the adit the fissure splits into the Ethel vein to the east, and the Mexico vein to the west. The latter has been called progressively from south to north, the Mexico, the Solomon, and the Ridge, but they are all on the same structure and are essentially the same vein.

The first drift north on the Solomon level followed the Ethel vein for some 925 feet. At 850 feet north of the adit a cross-cut was driven to cut the Mexico vein 320 feet west of the Ethel. The Mexico was followed to the north for more than 2,000 feet. Later a drift was driven along the Mexico from the point at which it split with the Ethel to connect with the drift driven north from the cross-cut. About 400 feet north of the cross-cut a winze was sunk on the Mexico to a depth of 420 feet below the Solomon level. Four levels were turned from the winze at 100 foot intervals, and were said to have exploited the most highly productive portion of the mine. Unfortunately these workings are not now accessible, nor were they when Emmons studied the property in 1911 and 1912. Ore has been stoped on the Mexico, above the Solomon level, from a point 400 feet south of the cross-cut for a considerable distance northward. Ore shoot No. 1 (fig. 3) was at least 100 feet long and 90 feet deep to judge from old maps of the Ridge Adit from which it was mined (not shown on the accompanying map). Ore shoot No. 2 was stoped from the Solomon Adit and was at least 100 feet long on the Solomon level. It has been stoped only above the level, but the height of the stope could not be determined. Ore shoot No. 3, on the Ethel vein, is said to have been stoped for a horizontal distance of 300 feet south of

the cross-cut, but this section is now caved and inaccessible. Farther to the north, through the Ridge Lower Adit (not shown), the Ethel has been developed for over 1,000 feet, and considerable ore has been mined.

CURRENT EXPLORATION

On the Mexico vein, at a point 500 feet south of the cross-cut the T. O. C. Development Co. has sunk a winze to a vertical depth of 90 feet below the Solomon level. From the bottom a drift has been turned northward. The face was 280 feet north of the winze on the day of the examination. At 100 feet from the winze a raise was started on a narrow streak of ore, but was stopped at 40 feet due to wet and heavy ground. The drift was turned west for a few feet then continued north parallel to the main vein for about 95 feet, at which point it cut a small vein coming in from the hanging wall. This was followed for 35 feet, at which point it joined the main vein. At the junction, where the vein is 7 to 9 feet thick, a small stope was opened from which 99 dry tons of ore averaging 11.07% Pb. and 2.29% Zn. was shipped to the Leadville Smelter. On the day of the examination, March 5, 1952, the face was 50 feet north of the stope and still in ore, but the vein was narrowing somewhat. The assay results of 3 samples taken from the vein on the lower level show:

LOCATION	WIDTH	oz. Au	oz. Ag	% Pb	% Zn	% Cu
260 ft. N of winze	3 ft.	0.01	0.7	4.05	0.25	0.06
5 ft. N of stope	3 ft.	0.02	0.2	1.85	8.20	0.05
50 ft. N of stope	2 ft.	0.02	0.1	0.65	0.10	0.06

SUMMARY AND CONCLUSIONS

The Solomon-Ridge fault strikes N. 9° W. and dips 54° to 87° W. It has been mineralized for more than 3,000 feet along the strike, between walls of Willow Creek rhyolite. Ore shoots, up to at least 100 feet in length and depth, vary in width from 1 to 15 feet. The ore is composed of galena, sphalerite, pyrite, and subordinate chalcopyrite in a gouge of green chlorite, talc, and finely pulverized quartz.

The total production from the Mexico-Ethel vein group has been 34,248 tons of ore that have averaged 11% Pb and 3.6% Zn. Exact figures are lacking, but most of the tonnage has been mined from the Mexico vein and more than half of that has come from below the Solomon level. The proposed work is to be done 90 feet below ore shoots that have been productive in the past. A small shoot of ore has already been encountered on the lower level in the Mexico vein, and it is reasonable to expect to find other and larger ones to the north of the present face.

Information regarding the possibility of finding ore in the southern part of the Ethel vein is meager; it is based on hearsay and an old working section that contains obvious errors and is therefore not reliable. Until such time as the now caved drift is opened up, and/or the presence of a stope of substantial size can be reliably demonstrated, it is recommended that the cross-cut project be denied.

It is advisable and recommended that further work be done laterally on the Mexico vein at the new level before sinking a winze, as more information will show the most advantageous location for such winze.

As the new work is to be done only 90 feet below known ore shoots, any new shoots encountered will have been already blocked on one side.

Therefore, no new information will be gained by raising, and this proposal must be considered as mine development and denied.

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DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

Engineering Report

By M. H. Salsbury
Mining Engineer
Bureau of Mines

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

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* See figure following Geologic Report.

DMEA 2370

TOC DEVELOPMENT COMPANY
MEXICO-SOLOMON MINE
MINERAL COUNTY, COLORADO

ENGINEERING REPORT

By

M. H. Salsbury

INTRODUCTION

On March 4-5, 1952, personnel of the Bureau of Mines and U. S. Geological Survey examined the operation of the TOC Development Company, a Colorado corporation, on the Mexico-Solomon and Ethel lode claims 2 miles north of Creede, Colo., for the purpose of checking the proposals submitted under Defense Minerals Exploration Administration docket 2370, for a loan of $48,000.00, Government participation $24,000.00, to carry on exploration work as follows:

650 feet of drifting
300 feet of crosscutting
400 feet of raising
100 feet of winze sinking

The applicant estimated two years would be required to complete the program which was divided into three phases designated in this report as follows:

Proposal 1. To drift north and raise on the Mexico-Solomon vein from the Mexico winze level to explore the possible downward extension of the No. 2 ore shoot.

Proposal 2. To sink a 100-foot winze below the Mexico winze level to determine if the Mexico-Solomon vein ore shoots continue downward.

Proposal 3. To crosscut to and drift on the Ethel vein at the Mexico winze level to explore the possible downward extension of the No. 3 ore shoot.

These proposals are compared with the revisions suggested by the examining team on page 15 of the report.

ACKNOWLEDGMENTS

Data on the property were obtained from the present operators, from records of Mineral County, from bulletins 530-E and 718 of the U. S. Geological Survey, from the Emperius Mining Company, of Creede--operators of a neighboring property, and from the Statistics Branch, Region IV, Bureau of Mines.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The property consists of four mining claims in secs. 18 and 19, T. 42 N., R. 1 E., N. M. P. M., King Solomon Mining District, Mineral County, Colo. (fig. 1). The claims are on the west slope of East Willow Creek 2 miles north of Creede, the nearest supply point and the terminus of the Creede branch of the Denver and Rio Grande Western Railroad.

The area north of Creede is a region of high relief with narrow, steep-walled canyons and, in many cases, sheer cliffs rising from the creek bed. The tops of the ridges between canyons are often 1,300 to 1,500 feet above the canyon floors. Consequently, most mining operations are carried on through adits with accessible portals not far above the creeks and can be continuous throughout the year even though the region is one of heavy snowfall and long winters. The Solomon adit,

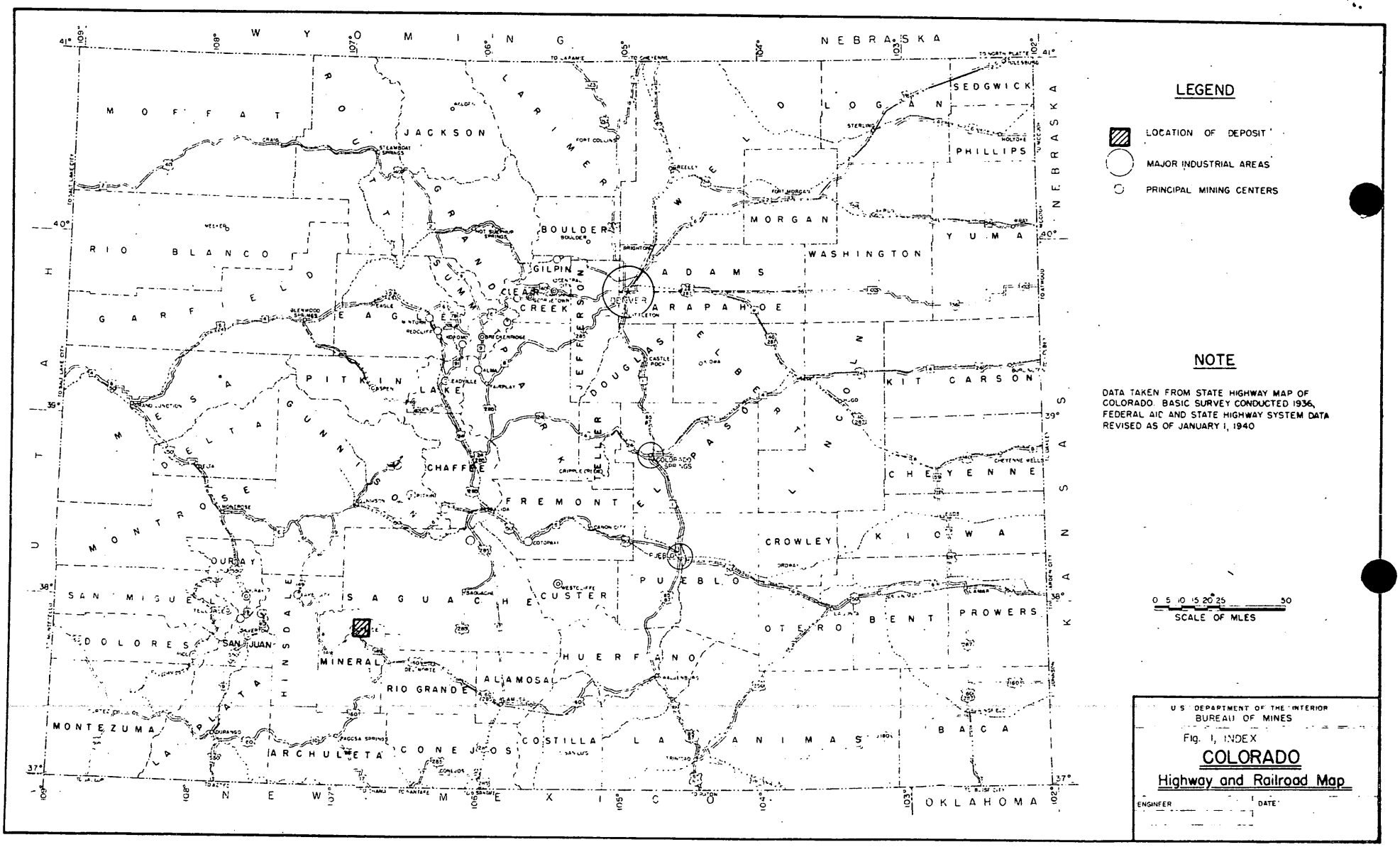

FIG. 1-LOCATION MAP, TOC DEVELOPMENT CO., MINERAL CO. COLORADO., DMEA 2370

at an altitude of 9,411 feet, used by the TOC Development Company, is one of these.

There is ample water for mining operations, but no site suitable for a mill is on the property. Power must be generated at the individual mines. The applicants state that electric power may be obtained later by running a line from the generating plant of the Emperius Mining Company on West Willow Creek.

The only available milling facilities are those of the Emperius Mining Company at Creede. This plant accepts some shipments of outside ore but is not prepared to treat low-grade custom ore in more than occasional shipments.

The Arkansas Valley plant of the American Smelting and Refining Company at Leadville is the nearest market for lead ore of smelting grade. Freight rates on the usual grade of smelting ore from Creede to Leadville are around $4.00 per ton. Treatment charges at the Leadville smelter average about $9.50 per ton.

HISTORY AND PRODUCTION

The history of the Mexico-Solomon-Holy Moses vein dates from the discovery of N. C. Creede in 1889 on the northern end of the vein which he called the Holy Moses. In 1890, C. F. Nelson located the Solomon lode. In the following years, the southern end of this vein and an east trending split, the Ethel vein, were explored and mined above ground water level. Later, winzes were sunk below water level and

ore extracted through pumping operations, reaching an elevation in the Ethel mine of 9,405 feet, just below the present Solomon adit, and in the Solomon mine of 9,000 feet, or approximately 400 feet below the Solomon adit which is the present working heading.

Very little work was done on these claims during the last twenty years until 1945 when a small operation was started through the Solomon adit. Since then, a number of shipments have been made. Table 1 lists smelter shipments from 1945 to date. Table 2, from the records of the Statistics Branch, Region IV, Bureau of Mines, gives the production from the Ethel-Mexico-Solomon group and is probably fairly complete. The periods of operation coincide with the years of high metal prices.

OWNERSHIP AND EXTENT

The Mexico lode, survey number 6837, is owned by C. O. Withrow, 1726 Krameria Street, Denver, Colo., and is leased to Allen Hosselkus, Alvin Wintz, and R. R. Lehman, of Creede, for a term of five years expiring August 10, 1955. Royalty provisions provide for payments of from 5 percent of the net smelter return on $10.00 ore up to 20 percent on ore over $50.00 in value.

The other three claims--the Ethel lode, survey number 7375; Ethel millsite, survey number 13049; and the Solomon lode, survey number 6837--are owned by eight individuals with fractional interests as follows:

TABLE 1. - Smelter shipments from the Mexico-Solomon vein, 1945-52

Date	Mine Lot	Smelter Lot	Shipper	Ounces/ton Au	Ounces/ton Ag	Percent Pb	Percent Zn	Gross Value Per ton	Treatment Per ton	Freight Per ton	Dry tons	Total Taxes and Royalty	Total Net Return to Shipper	Lead at	Silver at	Place Mined
7/30/45	1	4399	New Ridge Mining Company	0.27	1.75	12.2	2.15	$25.85	$5.60	$2.50	51.18	$ 93.58	$ 550.52	$0.065	$0.70625	Not designated
8/3/45	2	4447	" "	.81	7.15	26.12	3.3	60.30	5.60	3.40	43.61	387.83	1,763.13	0.065	0.70625	" "
6/8/49	6	2817	Davis & Wintz	.16	1.45	7.66	0.1	20.07	3.70	3.30	52.53	21.52	392.70	0.140	0.90	Mexico
10/24/49	7	3179	" "	.025	2.70	8.0	3.9	19.17	3.70	3.30	52.30	20.07	365.66	0.1345	0.90	Mexico
2/24/49	-	2524	" "	.0175	0.70	4.35	2.255	14.70	3.70	3.30	50.52	7.42	129.22	0.215	0.80	Mexico
11/24/49	1	8808	Wintz, Lehman, and Hosselkus	.025	0.90	17.05	5.2	50.81	8.82	3.56	54.02	207.11	1,143.01	0.170	0.90	Solomon
11/48	2	?	Davis & Wintz	.115	4.70	8.5	3.05	40.82	9.15	3.66	51.64	86.69	770.54	0.215	0.90	Mexico
1/15/49	3	2980	" "	.115	0.75	6.7	1.50	31.33	9.33	3.30	53.75	23.91	436.63	0.215	0.90	Mexico
12/11/48	1	2612	" "	.04	0.85	9.4	3.25	38.20	9.08	3.60	50.76	80.59	703.33	0.215	0.90	Mexico
7/11/51	1	1045	Wintz, Lehman and Hosselkus	.06	0.90	13.85	4.75	45.41	8.85	3.56	54.84	149.62	1,018.41	0.170	0.90	Underhand, below stope ore shoot No. 2, Solomon adit
7/21/51	2	1238	" "	.04	1.35	13.75	4.75	44.93	8.97	3.56	48.15	129.01	877.24	0.170	0.90	" "
1/29/52	1	2629	TOC Development Company	.04	1.25	7.68	.95	30.20	9.25	3.56	57.98	24.82	448.23	0.190	0.90	Mexico winze level - north end ore shoot No. 1
1/29/52	2	2630	" "	.12	1.25	12.18	2.5	47.52	9.41	3.56	61.40	189.47	1,291.35	0.190	0.90	" "
2/29/52	3	2793	" "	.19	1.20	11.70	2.85	38.83	9.52	3.56	48.00	200.46	999.73	0.190	0.90	" "
3/22/52	4	2977	" "	.13	1.40	11.00	2.10	34.97	9.33	3.56	51.00	151.86	921.77	0.190	0.90	" "
3/22/52	5	2964	" "	.16	1.45	11.15	2.50	36.43	9.35	3.56	48.00	152.84	928.03	0.190	0.90	" "

TABLE 2. - Production records of Ethel lode, Solomon lode, Mexico lode, King Solomon Mining District, Creede, Colo.

Year	Producing claims in group	Ore Produced (short tons)	Gross Metal Content				
			Ounces		Pounds		
			Gold	Silver	Copper	Lead	Zinc
1901	Solomon	-	-	-	-	-	-
1902-03	"	-	-	-	-	-	-
1904	"	4,500	2,436	273,620	-	-	-
1905	"	12,000	209	8,563	[illegible]	2,892,851	1,180,780
1906	Solomon group	9,600	524	8,724	-	2,757,105	944,623
1907	" "	4,779	261	4,247	-	1,250,340	251,339
1908-15	(no production)	-	-	-	-	-	-
1916	Holy Moses-Solomon	619	536	5,197	302	154,855	-
1917	" " "	141	-	2,545	3,610	-	-
1918	" " "	116	14	1,094	-	26,969	-
1919	" " "	2,226	115	2,581	-	362,284	96,274
1920	" " "	-	-	-	-	-	-
1921	Holy Moses, Solomon, Ethel, Cliff	66	89	149	-	26,098	-
1922	" " " " "	60	31	137	-	30,514	-
1923	" " " " "	17	3	21	-	5,890	-
1924-33	(no production)	-	-	-	-	-	-
1934	Holy Moses, Solomon, Ethel, Cliff	32	23	59	-	11,645	-
1935-49	(no production	-	-	-	-	-	-
1950	(smelted ore) Ethel & Solomon	48	1	43	95	16,272	-
1950	(milled ore) " " "	44	3	51	-	5,763	4,003
	Total	34,248	4,245	307,031	4,007	7,540,586	2,477,019

The 31,978 tons of smelter ore (1901-50) contained 7,172,539 pounds of lead which is an average of 11.2 percent lead per ton of ore; the 2,270 tons of mill ore (1901-50) contained 368,047 pounds of lead which is an average of 8.1 percent lead per ton of ore.

Owner	Fraction of Interest
Alice P. Hosselkus	1/8
Allen Hosselkus	1/8
Mrs. T. W. Rafter	3/16
Mrs. Pearl Moody	1/8
Alex Duncan	1/8
Ralph C. Ellithorpe	3/16
J. J. Williams	1/16
Wallace Wright	1/16

These claims are also leased to the above-mentioned Allen Hosselkus, Alvin Wintz, and R. R. Lehman for a ten-year term expiring August 1, 1957, with an extension of seven more years from August 1, 1957, if lease terms are complied with. Royalty schedules are the same as in the Mexico lode lease.

Allen Hosselkus, Alvin Wintz, and R. R. Lehman have assigned both leases to the TOC Development Company without any consideration being involved.

The question has been raised as to whether the claims under lease cover the portions of the Mexico-Solomon vein which, at the level of the current operation, are outside the sidelines of the Mexico and Solomon claims. The claims clearly cover the apex of the Mexico-Solomon vein and, under the law on extra-lateral rights, the vein can be followed to any depth by the owners of the Mexico and Solomon veins. Ore is currently being shipped and credited to the Mexico lode although it is outside the claim sidelines.

The four claims under lease to the TOC Development Company, shown on figure 2, together with the extralateral rights cover the proposed exploration project adequately.

The original leases and assignments were attached to the application of the TOC Development Company.

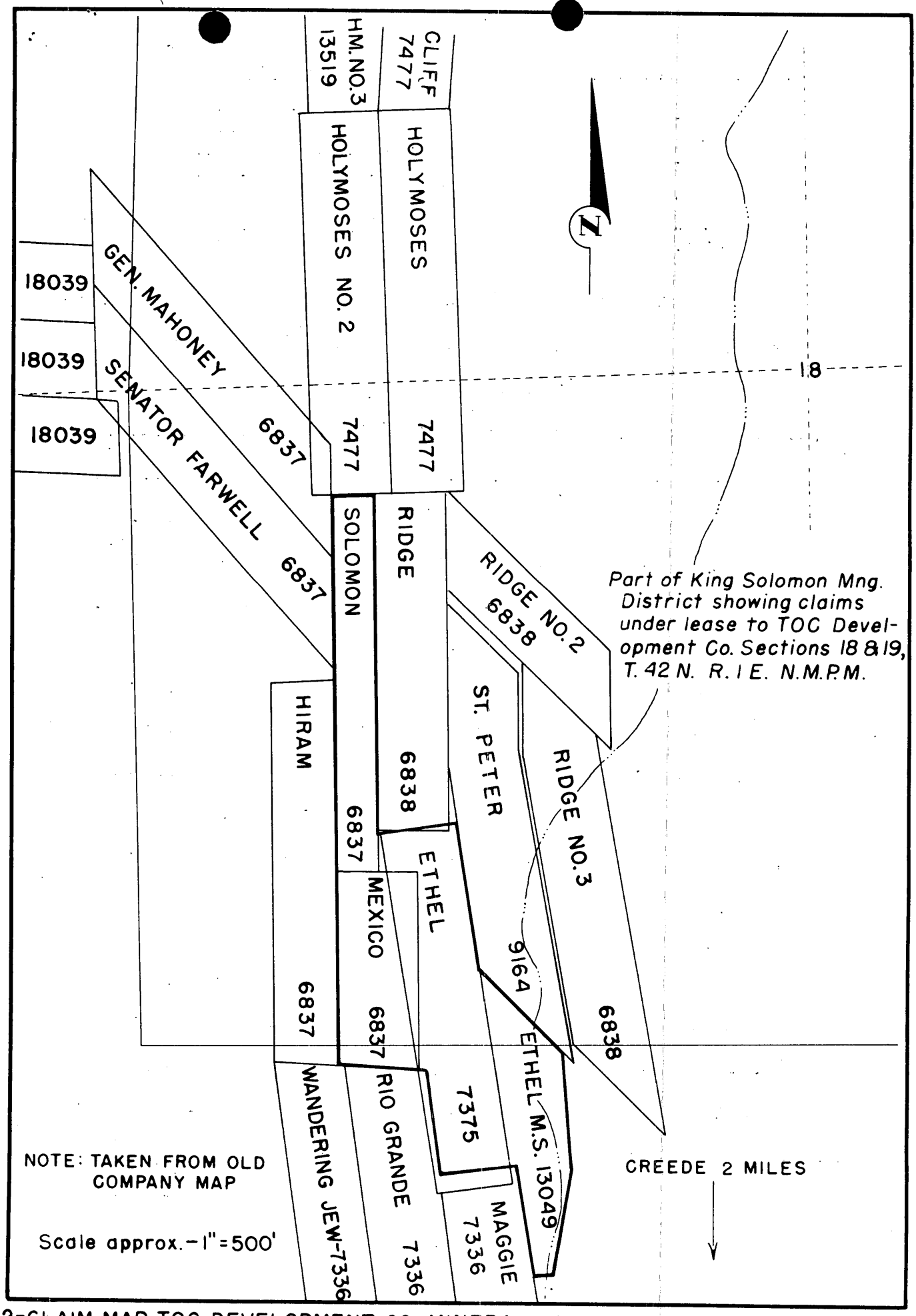

FIG. 2-CLAIM MAP, TOC DEVELOPMENT CO., MINERAL CO. COLORADO., DMEA 2370

No difficulty in obtaining subordination agreements is anticipated except in the case of one of the owners of the Ethel and Solomon lodes. Mr. Ellithorpe, one of the owners, who is also secretary-treasurer of the TOC Development Company, stated that another one of the owners may require a little persuasion.

DESCRIPTION OF THE DEPOSITS

The ore deposits of the Creede area, including the Mexico-Solomon and Ethel veins, are in fissures occupying a premineral fault. In the case of the two veins above, both walls of the fault are in Willow Creek rhyolite, one of several flows which make up the country rock of the Creede district.

There are three main vein systems in the Creede district. One of these, the Mexico-Solomon, and its east-trending split, the Ethel vein, strike a little west of north and dip 55°-88° to the west. They occupy normal premineral faults with the down-thrown side on the west or hanging wall.

The ore shoots contain galena, sphalerite, and pyrite, with a little chalcopyrite, gold, and silver, in a gangue of green chlorite talc with quartz. More or less numerous rhyolite fragments are contained in the gangue. Extensive crushing occurred during postmineral faulting along the same fissure and the chlorite gangue is little more than a fault gouge. The ore may have a width of from a few inches to more than 9 feet. The best ore will run as much as 30-35 percent combined lead and zinc. The lead predominates and the zinc content of direct smelting ores is usually low enough to

escape treatment penalties. The silver content is low on present day ores, 1 to 3 ounces, and gold will run .05 to .15 ounces except in some of the oxidized deposits near surface where it was as much as .50 ounce. There is no zone of secondary enrichment. Oxidization is erratic and lead carbonate as cerrussite is often found far below the zone of complete oxidization, with unaltered sulfides on either wall.

The richness of an ore shoot in this area depends not only on width and amount of mineralization but also on the number of barren rhyolite fragments included in the fault gouge. Ore shoots vary greatly in width, length, and continuity.

There are a number of minor splits of the Mexico-Solomon vein in the west wall. These are exposed in recent work and enrichments in the main vein appear to be associated with the junctions of these splits.

MINABLE ORE RESERVES

The Mexico-Solomon and Ethel veins have been extensively explored above the Solomon adit level, altitude 9,411 feet, as shown on figure 3 which accompanies the geologic report only. It is unlikely that there are any ore reserves above this level.

The Ethel vein on the adit level is not accessible in the section which is reported to be stoped and no estimate of the possible downward extension of such an ore shoot is possible. One longitudinal section of the area contains

obvious errors when compared with the actual workings which can be examined, and the authenticity of this map is therefore questionable. Ore shoot No. 3 (fig. 3) is shown as being intersected by the long crosscut from the Mexico-Solomon vein on the Solomon adit level. Actually, this crosscut intersects the Ethel vein at a barren spot and the No. 3 ore shoot would be south of this crosscut. Other evidence about this ore shoot is hearsay.

On the Mexico-Solomon vein at the Solomon adit level an ore shoot, designated as No. 1 (fig. 3), was mined above an old level 6 feet below the Solomon adit level. These workings are not accessible and width and length of the old stope is unknown. Later workings on the Solomon adit level in the west wall of the vein broke into the stope at several points. If it is continuous, the stope is as much as 250 feet long at the Solomon adit level.

Current operations on the Mexico winze level, 91 feet below the Solomon adit level, altitude 9,320 feet, have cut ore which is probably the downward extension of the north end of this No. 1 ore shoot. Five cars totaling some 250 tons and settling at from 7.68 percent to 12.18 percent lead have been shipped from a short stope 3 to 8 feet wide. The southern extension of this ore shoot is in the east wall of the Mexico winze level drift and the length of the ore at this level is unknown. While ore mined from this ore shoot is not necessarily subject to Government royalties, it is mentioned to indicate the probable grade of ore.

The No. 2 ore shoot on the Mexico-Solomon vein (fig. 3) is exposed in the floor of the Solomon adit level. It has been stoped 3 to 9 feet wide over a length of about 100 feet. A shallow underhand stope was mined by the present operators in 1951, producing two cars from a section of the vein 8 feet wide, 10 feet long, and about 10 feet deep. The average settlement value on this ore was 13.8 percent lead, 1.12 ounces silver, and .05 ounce gold (see table 1). The Bureau of Mines engineer took two samples, S-4 and S-7, from this underhand stope which assayed 20.4 and 14.3 percent lead, respectively (table 3). A cut sample of the vein 4.5 feet wide, taken underneath the track 20 feet north of the underhand stope, assayed 3.4 percent lead (sample S-5, table 3).

Thus, No. 2 ore shoot, exposed on one side and averaging 5 feet in width, 100 feet in length, and 100 feet between the Mexico winze level and the Solomon adit level, might produce a maximum of 4,000 tons of 12 percent lead ore if it is continuous. This ore could be profitably mined with a possible production of 840,000 pounds of recoverable lead which would be subject to Government royalty under the proposed loan.

PRESENT STATUS

Exploration and Development

The Mexico-Solomon and Ethel veins are developed by tunnels and winzes at various levels of which only one--the Solomon adit, altitude 9,411--is open. Drifts on this level, turned off the crosscut from the portal on East Willow Creek,

TABLE 3. - Sample chart

Sample Number	Description	Ounces/ton Au	Ounces/ton Ag	Percent Pb	Percent Zn	Percent Cu
S-4	Grab from Wintz underhand stope on Mexico-Solomon vein in floor of Solomon adit level where smelter lots 1045 and 1238 were mined.	0.070	1.10	20.40	13.10	<0.05
S-5	4.5-foot cut across both hanging wall and footwall streaks, including lean chlorite with rhyolite inclusions between streaks, in floor of Solomon adit level 20 feet north of S-4.	0.005	0.20	3.40	0.50	0.05
S-6	Grab of muck which has fallen out of a streak 6 to 8 inches wide, from back of Ethel vein drift at a point 10 feet north of long crosscut, Solomon adit level.	0.010	0.50	4.80	6.40	<0.05
S-7	Check on sample number S-4.	0.080	0.80	14.30	8.80	<0.05
S-8	3-foot cut across top of face of north drift, Mexico winze level, about 260 feet north of Mexico winze, after round of 3/3/52 (small galena seams, abundant rhyolite fragments).	0.010	0.70	4.05	0.25	0.06
S-9	3-foot cut across back, 5 feet north of 35-foot long stope on north end of ore shoot No. 2, Mexico winze level (2- to 3-inch galena streak with other scattered seams and abundant rhyolite).	0.020	0.20	1.85	8.20	0.05
S-10	2-foot cut across face of north drift, Mexico winze level, after round of 3/4/42 (very little galena showing, with abundant rhyolite), sample taken 50 feet north of stope on ore shoot No. 1.	0.020	0.10	0.65	0.10	0.06

<Less than.

were driven on both the Mexico-Solomon and Ethel veins which proved to be barren until the No. 1 and No. 3 ore shoots were reached, as shown on figure 3. The No. 1 ore shoot had been mined from the Ethel incline previously. The present operators drove around this old stope and connected with the former drift which had been driven to open up ore shoot No. 2, access being had through a long crosscut connecting with the Ethel vein drift. This drift is not open and the vein may be seen only at the crosscut where it was not mined and for a short distance north of the junction with the Mexico-Solomon vein farther south. The stope on the No. 2 ore body is not accessible.

The present operators sank a 100-foot winze in the hanging wall of the Mexico-Solomon vein just south of No. 2 ore shoot and are driving northward on the Mexico winze level, altitude 9,320 feet. The present face is 300 feet north of the winze and about 180 feet from the south end of No. 3 ore shoot, as projected. This drift is being driven currently. It shows low grade values (samples S-8 and S-10, table 3) but is not ore. The presumed north end of No. 1 ore shoot was cut and five carloads of ore were shipped (table 1) from a small stope. The No. 1 ore shoot is in the east wall of the Mexico winze level, south of this stope. The south end and back of the stope are still in ore. A short crosscut in the west wall of the Mexico winze level 100 feet north of the winze cut some ore which is also supposed to be the downward extension of the No. 1 ore shoot. A raise driven on the ore was so wet it had to be abandoned.

Careful checking by the U. S. Geological Survey representative indicates the main vein may still be further west at this point.

Three men and a foreman are currently employed. By April 1 it is estimated that the face of the north drift will be approximately 130 feet from the No. 3 ore shoot at the present rate of progress.

The inflow of water at the winze level requires pumping about 3 out of 24 hours with an Ingersoll-Rand 25T pump which has an estimated capacity of 50 gallons per minute.

Equipment in use at the operation includes:

1 Ingersoll-Rand HKA500, diesel-powered compressor, on rental with option to purchase
3 Ingersoll-Rand 25T pumps, rented
1 Ingersoll-Rand air hoist, rented
1 Ingersoll-Rand drifter, rented
1 Jackhammer, rented
1 Stoper, loaned by Emperius Mining Company
1 Pump, owned
2 Mine cars, owned
2 1,000-pound ore buckets, owned
Miscellaneous small tools and drill steel, owned

Mine maps show the work done further north through the deep Solomon shaft not extending south as far as the Ethel vein crosscut. The office manager for the Emperius Mining Company did the last work through the Solomon winze and he stated that they examined the ore shoot in the vicinity of the winze and did not drift south. Thus, it is fairly safe to assume that the section of the Mexico-Solomon vein now being explored is unmined below the Solomon adit except for the current operation.

PROJECT PROPOSALS, WITH COSTS

The exploration proposals have been revised by the examining team and following is a comparison of the applicants' and the Bureau of Mines estimates for the work:

Applicants' Estimate		Bureau of Mines Estimate	
Exploration			
Proposal 1			
450 feet drift north on Mexico winze level toward No. 2 ore shoot	$15,000.00	300 feet drift north on Mexico winze level toward No. 2 ore shoot at $30.00/foot	$ 9,000.00
4 - 100-foot raises from Mexico winze level	5,000.00	1 - 100-foot raise on Mexico-Solomon vein - tentative (see text) - at $20.00/foot	2,000.00
Proposal 2			
100-foot winze below Mexico winze level to explore Mexico-Solomon vein at depth	14,000.00	100-foot winze below Mexico winze level - tentative (see text) - at $150.00/foot	15,000.00
300 feet crosscut on Mexico winze level to cut Ethel vein	8,000.00	Not recommended	
200 feet drift on Mexico winze level to explore for the No. 3 ore shoot	6,000.00	Not recommended	

Proposal 1, 300 feet of drifting on the Mexico Solomon vein on the Mexico winze level, currently being carried on, is pointed toward determining the downward extension of the No. 2 ore shoot. One 100-foot raise, instead of four 100-foot raises requested by the applicant, included under this proposal is subject to the need of probing for concealed ore not extending to the Mexico winze level.

Proposal 2, sinking a 100-foot winze on the Mexico-Solomon vein below the present Mexico winze level at a favorable location, is contingent on the results of proposal 1.

The 300 feet of crosscut to and 200 feet of drifting on the Ethel vein on the Mexico winze level, requested by the applicant, are not approved due to the lack of evidence that an ore discovery will result.

New Equipment

Equipment purchase not provided for		Jack leg drill for level work	$ 700.00
		Air hoist (if winze is approved)	650.00
		Additional pumping equipment (if winze is approved)	900.00
		Hoisting cable and sheave	100.00
		Miscellaneous (ore bucket, signal systems)	150.00
		Contingencies	1,500.00
Total	$48,000.00	Total	$30,000.00

Transportation

Mule haulage is used on the Solomon adit level, and the road to the adit portal is kept open by Mineral County; no access roads are needed.

Manpower

The proposed development will require five men as follows:

1 Miner at $1.50 per hour
1 Mucker at $1.08 per hour
1 Trammer at $1.08 per hour
1 Foreman at $350.00 per month
1 Bookkeeper (part time) at $50.00 per month

Power

Power requirements would be taken care of by the rented diesel compressor plant now in operation.

Water

There is an ample supply of non-acid water available from pumping operations.

The cost per foot of level work in the Bureau of Mines estimate was arrived at by the following computation:

Cost of drifting or crosscutting (not including purchase of new equipment) based on one heading, 25 shifts per month, 3 feet advance per shift

		Per Month	
Labor:			
1 Miner at $1.50		$312.00	
1 Mucker at $1.08		225.00	
1 Trammer at $1.08		225.00	
1 Foreman		350.00	$1,112.00
Compensation insurance and taxes, 10 percent			111.20
Machinery rental (based on cost depreciated in 60 months):			
Compressor		$130.90	
3 Pumps		75.00	
Miscellaneous equipment; cars, buckets, etc.		25.00	230.90
Supplies:			
Fuel oil and repairs for compressor	$250.00		
Less sale of compressed air to Emperius	100.00	$150.00	
Explosives		250.00	
Drill steel and drill bits		25.00	
Rail and pipe for 75 feet of work		101.00	
Incidentals (carbide, tool sharpening, repairs)		75.00	
Timber at $2.00 per foot		150.00	751.00
Total per month, 75 feet of work			$2,205.10
Cost per foot			$29.40

The applicants are using a compressor costing $7,854.00 on which they have paid, as of March 5, $4,590.00 towards purchase. (See copy of purchase agreement attached to the loan application.) They are selling compressed air to another operator. It is recommended that compressor rental be charged to any operation under the proposed Defense Minerals Exploration Administration contract computed on depreciation in 60 months, $130.90 per month, and that the applicants continue paying for the compressor on their own account. If the Government pays half of the full rental on the compressor, or one half of $510.00 a month until paid for, computed from April 5, 1952, it would have a 2,550/7,854 interest in the equipment when paid for. While the pumps are shown on the footage cost estimate as rental items totaling $75.00 per month, it may be advisable to buy the pumps outright. The accumulated rental would pay for the pumps in 12 months.

The cost of sinking the proposed winze is set at the actual cost of the upper winze plus $1,000.00 to allow for preparation at the collar. It is possible that a raise through to the Solomon adit level above the site of the proposed winze would be advisable to eliminate double handling of muck and supplies. Possibly this raise could be driven in ore.

PRODUCTION PLAN

The applicants estimate it would take 24 months to complete their proposed work. Under the revised program, the Bureau of Mines engineer estimates the time requirements as follows:

Proposal 1 - Drifting 300 feet and raising 100 feet (if approved)	6 months
Proposal 2 - Sinking 100-foot winze below present Mexico winze level	5 months
Total	11 months
Add for preparation and possible delays	1 month
Total	12 months

The property is equipped to produce up to 200 tons of ore monthly. At this rate, the maximum tonnage from the No. 2 ore shoot between the Mexico winze level and the Solomon adit level could be mined in 20 months with a recovery of 840,000 pounds of lead.

Mining methods used in this operation would be typical narrow vein stoping, probably open-stulled stopes. The ore is too sticky to permit successful shrinkage stoping. Some of the barren rhyolite fragments in the gangue can be rejected by sorting.

SUMMARY: COST OF PROJECT

The total cost of the revised exploration program is estimated as follows:

Proposal 1	$11,000.00
Proposal 2	15,000.00
Purchase of equipment	2,500.00
	$28,500.00
Contingencies	1,500.00
Total cost	$30,000.00

The operating costs, not including purchase of equipment, will average about $2,300.00 per month.

The operators may elect to mine ore from the No. 1 ore shoot while advancing the north drift under proposal 1, or they may wish to mine ore found in No. 2 ore shoot while sinking the winze under proposal 2. In either case, they must, of course, prorate the overhead costs, including the supervision, between the different operations.

The indicated profit is estimated on the basis of the possible grade and tonnage of ore. The possible production of the No. 2 ore shoot only is considered although the grade of ore is likely to apply to other stopes.

The content of smelting ore shipped from 1901-50 from the group of mines as reported by the Statistics Branch, Region IV, Bureau of Mines, (table 2) is 11.2 percent lead. The two smelter shipments from the underhand stope on ore shoot No. 2 on the Solomon adit level settled at 13.8 percent. Three of the five cars from the small stope on ore shoot No. 1 on the Mexico winze level ran from 7.68 to 12.18 percent lead. Therefore, the value taken for this estimate is 12 percent lead with 1.25 ounces silver and .12 ounce gold. Based on the smelter schedules of the American Smelting and Refining Company, at Leadville, Colo., with lead at $0.19 per pound and silver at $0.90 per ounce, such an ore would show the following profit per ton:

	Per ton	
Gross value of ore		$38.11
Treatment charges	$9.41	
Freight and tax	4.02	
Control and checking (approximately)	.20	
Royalty and production taxes	3.88	
Royalty to Government on DMEA loan	1.23	
Hauling (mine to railroad)	1.00	19.74
Net to shipper		$18.37
Mining cost (estimated)		11.00
Operating profit		$ 7.37

Considering proposal 1 above on the downward extension of the No. 2 ore shoot with a maximum estimated content of 4,000 tons, the operator can reasonably expect a gross return of $29,000.00 against an exploration cost of about $6,000.00. Stated another way, the operating profit on a production of about 820 tons of ore will equal the exploration cost.

On the same production, the Government would recover $5,000.00 in royalties against an expenditure of $6,000.00 and would need royalty on 4,800 tons to recover the amount of the loan.

No reasonable estimate of ore which might be found under proposal 2 is possible. The exploration might return the amount of the Government loan easily.

PROPOSED FINANCING

The applicants state that they can finance their half of the proposed exploration up to $24,000.00.

CONCLUSIONS

Proposal 1 of the exploration program is a good prospect. There are excellent possibilities for opening up profitable ore with an estimated content of 12 percent lead and a maximum tonnage of 4,000 tons containing 840,000 pounds of recoverable lead. The zinc content would be low and would not be recovered nor penalized. The operators might realize a profit greater than their investment on a production of about 820 tons of ore, but the Government would not recover the amount of the loan with a production of less than 4,800 tons.

While the projected ore shoot No. 2 with a maximum size of 100 feet long, 5 feet wide, and 100 feet between levels might produce a maximum of 4,000 tons, the actual tonnage could be very much less as it may not continue in depth as large as it appears in the floor of the Solomon adit level.

Proposal 2 would be contingent upon results of proposal 1 and should not be carried out unless a good showing of ore is found above the Mexico winze level. If the results of proposal 1 are good, the winze below the Mexico winze level is an excellent prospect to open up the possible downward continuation of both ore shoots Nos. 1 and 2.

Proposal 3, exploration of the Ethel vein, is not recommended. Information available on ore shoot No. 3 is meager and based entirely on hearsay. One old map shows a stope section on ore shoot No. 3 incorrectly when compared with the actual workings. While the stope is indicated as over 300 feet long, this cannot be verified. If the operators open up the Ethel drift and make the old workings available for examination, the decision on the proposal might be changed.

Inasmuch as the operation designated as proposal 1 above is going on currently, it is possible that by the time a Defense Minerals Exploration Administration loan is processed it will have reached its objective. In this event, only proposal 2 would be eligible for a loan.

The officers of the TOC Development Company are substantial citizens of Del Norte, Colo., and the working partners are experienced miners and well qualified to carry on the proposed exploration program.

RECOMMENDATIONS

Proposal 1, 300 feet of drifting at the Mexico winze level on the Mexico-Solomon vein towards the downward extension of the No.2 ore shoot, is recommended for approval at a cost of $9,000.00. One hundred feet of raising under this proposal is recommended only if it is necessary to explore for the possibility of a concealed ore shoot which might not come down to the Mexico winze level. Cost of the 100 feet of raise is $2,000.00.

Proposal 2, sinking a 100-foot winze on the Mexico-Solomon vein below the present Mexico winze level at a favorable location, is recommended for approval, contingent on the discovery of an ore shoot through the exploration under proposal 1. The total cost of the two proposals is estimated at $30,000.00 as follows:

	Total Cost	Government Participation
Proposal 1	$11,000.00	$ 5,500.00
Proposal 2	15,000.00	7,500.00
Equipment	2,500.00	1,250.00
	$28,500.00	$14,250.00
Contingencies	1,500.00	750.00
Total loan	$30,000.00	$15,000.00

At the time the contract is drawn up, it will be necessary to verify the status of the current exploration work and define the start of the project under the Defense Minerals Exploration Administration loan.

Proposal 3, exploring the Ethel vein, is not recommended.

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

224 New Customhouse
Denver 2, Colorado

September 26, 1952

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
SEP 29 1952

Memorandum

To: Secretary to the Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket DMEA 2370, T.O.C. Development Company (Lead-Zinc)

We have just received a letter from J. M. French, President, T.O.C. Development Company, requesting us to place their application on the inactive list until further notice.

W. H. King

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UNITED STATES
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UNITED STATES
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DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C.

224 New Customhouse
Denver 2, Colorado

July 31, 1952

Mr. R. C. Ellithorpe
TOC Development Company
Del Norte, Colorado

Dmea 2370

Dear Mr. Ellithorpe:

We have not received a reply to our letter dated June 10, 1952, in which we enclosed copies of Owner's Consent to Lien, Form MF-203, and requested that they be returned signed by the owners of the Solomon Lode. We also requested photostats or signed copies of the leases and assignments involved in your operation.

If we do not hear from you within 30 days, we will assume that you are no longer interested in exploration assistance and place your application in our inactive file.

Very truly yours,

W. H. King

W. H. King
Executive Officer
Field Team, Region IV

JFS:jp
cc Subj
Chron
Secretary to the Operating Committee (2)
WMTraver
AHKoschmann (2)

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

224 New Customhouse
Denver 2, Colorado

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 26 1952

May 22, 1952

Memorandum

To: Acting Administrator, Defense Minerals Exploration Administration
Attention: Code 210

From: Field Team, Region IV

Subject: Final Report, DMEA Docket 2370, (Lead) T. O. C. Development Company, Mexico-Solomon Mine, Mineral County, Colorado

Exploration assistance in the amount of $30,000 on the Mexico-Solomon Mine has been approved and the contract will be prepared by this office.

Four copies of the final report will be forwarded to you when the contract is signed.

The original and one copy of Form 3b is attached.

W. H. King
W. H. King

A. H. Koschmann
A. H. Koschmann

Region 4 cc.

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

224 New Customhouse
Denver 2, Colorado

May 22, 1952

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 26 1952

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Attention: Code 210

From: Field Team, Region IV

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W. H. King
W. H. King

A. H. Koschmann
A. H. Koschmann

DMA Form 3b.

DEFENSE MINERALS ADMINISTRATION

CONTROLLED DOCUMENT
Revised Abstract

DMEA
~~DMA~~ Docket No. 2370

Change:	From	To
I 1	☐	☐
I 2	☐	☐
I 3	☒	☒
I 4	☐	☐
I 5	☐	☐
I 6	☐	☐
III 1	☐	☒ 5-19-52
III 2	☐	☐
III 3	☐	☐
III 4	☒	☐

Add:

II 7 $ 48,000

II 8 $ 30,000

II 8a % 50

Initials of person preparing sheet H.M.C.

Date sheet prepared 5-19-52

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 26 1952

DMA Form 3b.

DEFENSE MINERALS ADMINISTRATION

CONTROLLED DOCUMENT
Revised Abstract

DMEA
~~DMA~~ Docket No. 2370

Change:	From	To
I 1	☐	☐
I 2	☐	☐
I 3	☒	☒
I 4	☐	☐
I 5	☐	☐
I 6	☐	☐
III 1	☐	☒ 5-19-52
III 2	☐	☐
III 3	☐	☐
III 4	☒	☐

Add:

II 7 $ 48,000

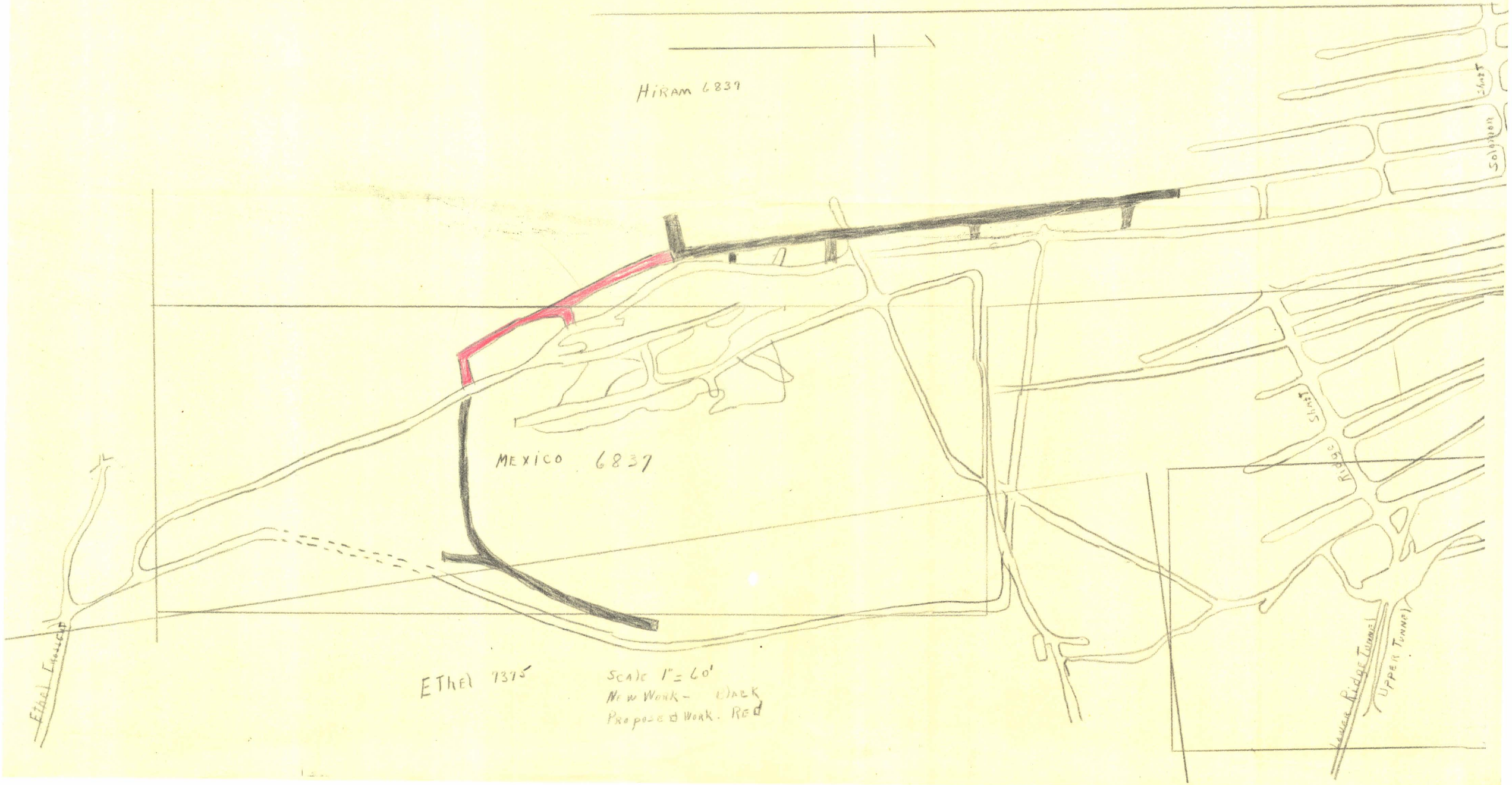
II 8 $ 30,000

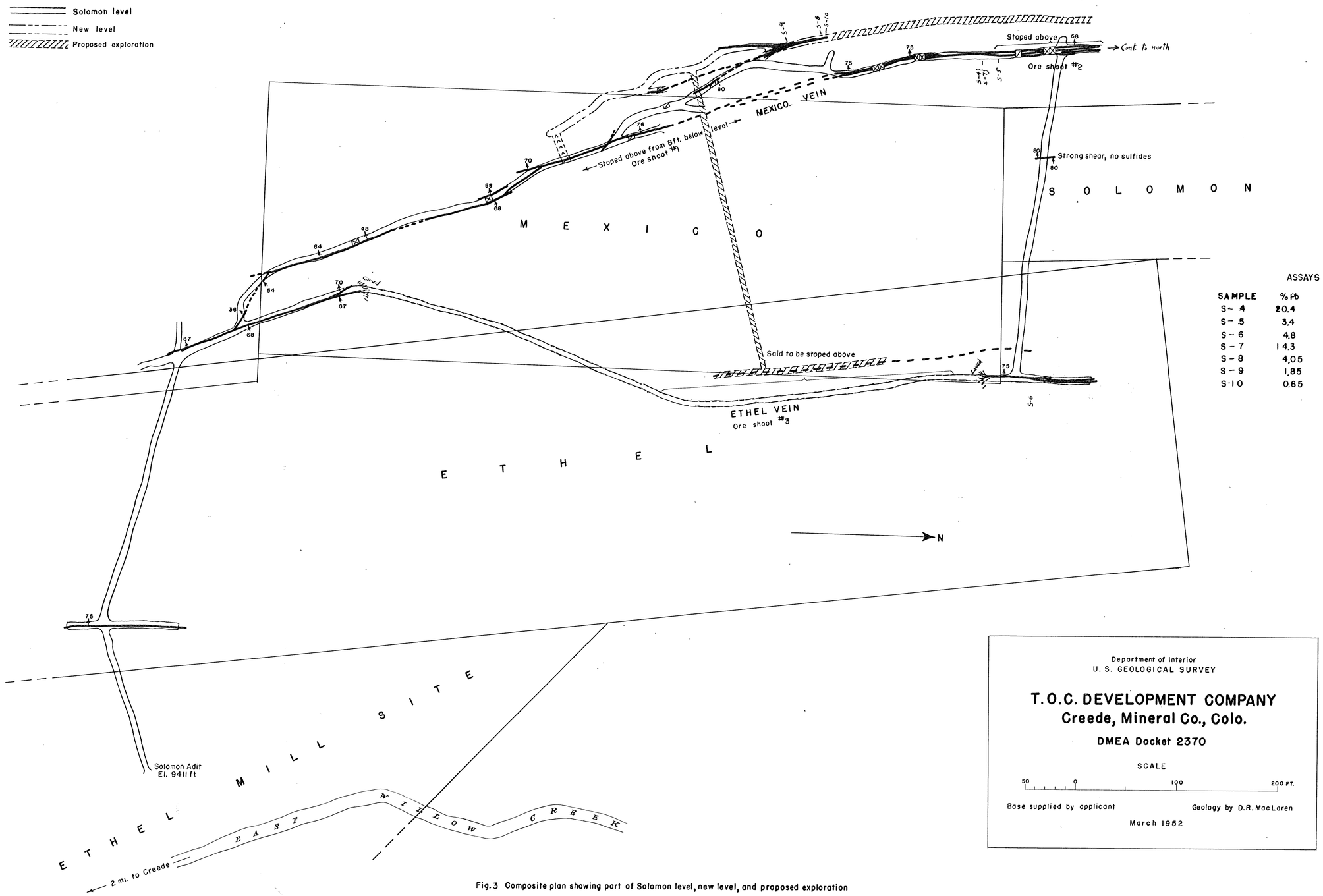
II 8a % 50

Initials of person preparing sheet H.M.C.

Date sheet prepared 5-19-52

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
MAY 26 1952


HIRAM 6839
MEXICO 6837
ETHEL 7375
Ethel Street
Solomon Street
Ridge Street
Lower Ridge Tunnel
Upper Tunnel
SCALE 1" = 60'
New Work - Black
Proposed Work - Red



ASSAYS

SAMPLE	% Pb	% Zn
S-4	20.4	13.1
S-5	3.4	0.5
S-6	4.8	6.4
S-7	14.3	8.8
S-8	4.05	0.25
S-9	1.85	8.2
S-10	0.65	0.1

Department of Interior
U. S. GEOLOGICAL SURVEY

T.O.C. DEVELOPMENT COMPANY
Creede, Mineral Co., Colo.

DMEA Docket 2370

SCALE

50 0 100 200 FT.

Base supplied by applicant

Geology by D.R. MacLaren

March 1952

Fig. 3 Composite plan showing part of Solomon level, new level, and proposed exploration