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LEADVILLE LEAD CORPORATION
500 Ernest & Cranmer Building
17th & Curtis Streets
Denver 2, Colorado

No 3

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

This envelope contains:

Form MF-100 and Answers thereto.

Form MF-103 and Answers thereto.

Exhibits Form MF-100:

Exhibit 1. Contemplated Exploration Program of Leadville Lead Corporation. Report by Prommel incl. of Plates 1 and 2.

Exhibit 2. Prospectus of Leadville Lead Corporation of April 25, 1951.

Exhibit 3. James N. Redman Brochure of April 30, 1947.

Exhibit 4. C. R. Wilfley Report, December, 1948, with maps.

Exhibit 5. C. R. Wilfley Report, November 18, 1949, with maps.

Exhibit 6. W. F. B. Berger Report, December 1, 1948, and 3 page later letter.

Exhibits Form MF-103:

Exhibit A:
Mining lease and option from the Big Chief Mining Company dated August 5, 1945, with various amendments thereto and assignments thereof.

Exhibit B:
Mining lease from Alfred S. Lewrenz, as trustee for the heirs of Robert J. Allison, deceased, dated June 15, 1948, and amendments thereto.

Exhibit C:
Mining lease to Frank Vannatter, dated July 26, 1950, and amendments thereto.

Form MF-100

Exhibit 2.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

PROSPECTUS

LEADVILLE LEAD CORPORATION

500 Ernest & Cranmer Building

Denver 2, Colorado

A Corporation organized under the laws of the State of Colorado, August 25, 1945

AUTHORIZED CAPITAL STOCK

1,000,000 Shares of Common Stock, Par Value $1.00 per share.
No Preferred Stock Authorized.

The date of this Prospectus is April 25, 1951.

BECAUSE THESE SHARES ARE BELIEVED TO BE EXEMPT FROM REGISTRATION THEY HAVE NOT BEEN REGISTERED WITH THE SECURITIES AND EXCHANGE COMMISSION, BUT SUCH EXEMPTION, IF AVAILABLE, DOES NOT INDICATE THAT THE SECURITIES HAVE BEEN EITHER APPROVED OR DISAPPROVED BY THE COMMISSION OR THAT THE COMMISSION HAS CONSIDERED THE ACCURACY OR COMPLETENESS OF THE STATEMENTS IN THIS COMMUNICATION, AND ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

OFFERING

88,236 SHARES OF PREVIOUSLY AUTHORIZED, BUT PRESENTLY UNISSUED COMMON CAPITAL STOCK AT $1.00 PER SHARE.

THE CORPORATION SHALL RECEIVE NOT LESS THAN $0.85 NET ON ALL STOCK SALES.

THE CORPORATION SHALL RECEIVE $1.00 NET ON ALL STOCK SALES MADE DIRECTLY BY THE OFFICERS AND DIRECTORS OF THE CORPORATION.

On sales made by persons other than Officers and Directors, and on sales made by firms or organizations, Corporation shall receive a net price of $0.85 per share, as 15% of the gross sale price shall be allowed, at the discretion of the Officers, as commission for such sales.

	PRICE TO PUBLIC	UNDERWRITER DISCOUNT OR COMMISSION	PROCEEDS TO CORPORATION
	Per Unit	$ .15	Per Unit
	$1.00		$0.85
Total	88,236 Shares	$13,235.40	$75,000.60

741,051 shares have been issued, of which 20,365 shares are presently held in Corporation's Treasury. 258,949 shares are presently unissued.

Cumulative voting of shares is not permitted. No pre-emptive rights are conferred upon shareholders, either by Articles of Incorporation or By-Laws of the Corporation.

THESE ARE SPECULATIVE SECURITIES

THE CORPORATION HAS SOLD ITS STOCK AT VARIOUS PRICES. THE PRICE OF $1.00 PER SHARE IS AN ARBITRARY PRICE ORDERED BY THE BOARD OF DIRECTORS AND IS NOT A REPRESENTATION THAT THIS PRICE IS JUSTIFIED BY THE DEVELOPMENT TO DATE.

NO DEALER, SALESMAN OR OTHER PERSON HAS BEEN AUTHORIZED TO GIVE ANY INFORMATION OR TO MAKE ANY REPRESENTATIONS OTHER THAN THOSE CONTAINED IN THIS PROSPECTUS IN CONNECTION WITH THE OFFERING CONTAINED IN THIS PROSPECTUS, AND, IF GIVEN OR MADE, SUCH INFORMATION OR REPRESENTATION MUST NOT BE RELIED UPON AS HAVING BEEN AUTHORIZED BY THE CORPORATION. THIS PROSPECTUS DOES NOT CONSTITUTE AN OFFERING OR SOLICITATION BY THE CORPORATION OR ITS AGENTS IN ANY STATE IN WHICH THE CORPORATION, ITS AGENT OR UNDERWRITER, ARE NOT QUALIFIED TO ACT AS A DEALER OR BROKER, OR IN WHICH SAID OFFERING MAY NOT BE LAWFULLY MADE. NEITHER THE DELIVERY OF THIS PROSPECTUS, NOR ANY SALE MADE HEREUNDER SHALL, UNDER ANY CIRCUMSTANCES CREATE ANY IMPLICATION THAT THERE HAS BEEN NO CHANGE IN THE AFFAIRS OF THE CORPORATION SINCE THE DATE OF THE ISSUE HEREOF.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

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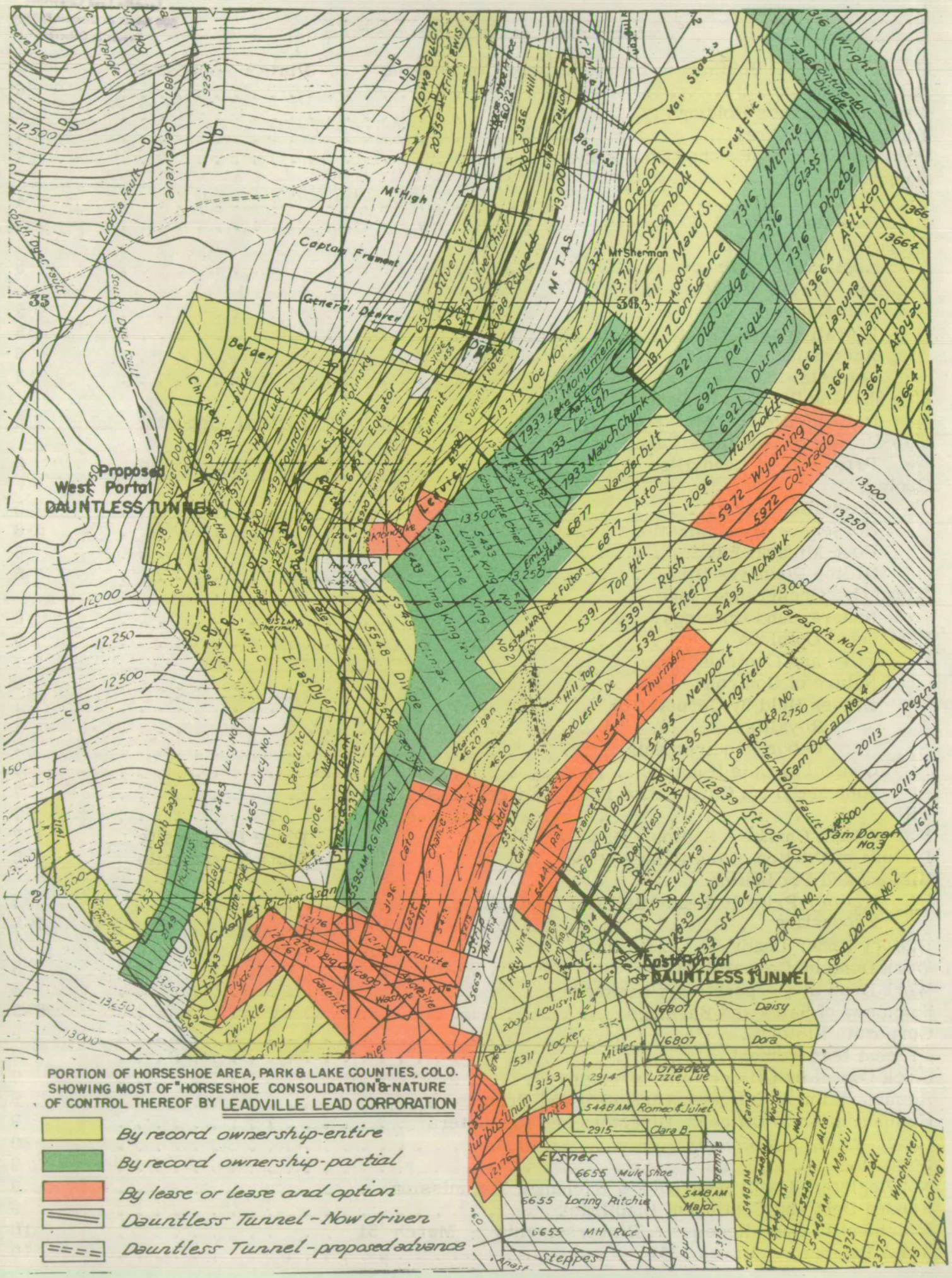

Proposed West Portal DAUNTLESS TUNNEL
East Portal DAUNTLESS TUNNEL
PORTION OF HORSESHOE AREA, PARK & LAKE COUNTIES, COLO. SHOWING MOST OF "HORSESHOE CONSOLIDATION" & NATURE OF CONTROL THEREOF BY LEADVILLE LEAD CORPORATION
By record ownership-entire
By record ownership-partial
By lease or lease and option
Dauntless Tunnel - Now driven
Dauntless Tunnel - proposed advance

Leadville Lead Corporation
(RM) Emma Gulch Claimer Bulletin
Denver, Colorado

INTRODUCTION

LEADVILLE LEAD CORPORATION intends to develop the LEAD-SILVER-ZINC possibilities of its "HORSESHOE CONSOLIDATION" near LEADVILLE, COLORADO.

THE CORPORATION'S MANAGEMENT BELIEVES THE HORSESHOE CONSOLIDATION IS THE LEAST DEVELOPED AND THE MOST PROMISING PORTION OF THE GREAT LEADVILLE DISTRICT, AND THAT IT MAY REPRESENT COLORADO'S LARGEST POTENTIAL SOURCE OF LEAD.

If the Corporation advances the now partially driven DAUNTLESS TUNNEL, (presently 1029 feet long), through MOSQUITO RANGE, for an additional 4650 feet to a proposed opening on the LEADVILLE side of the range, the ore haul from the HORSESHOE CONSOLIDATION mine workings to Leadville will be reduced from 84 miles to 8 miles, thereby effecting a saving of about $5.00 per ton in haulage costs.

Out of the proceeds of this offering, the Corporation purposes to expend approximately $20,000 to drive DAUNTLESS TUNNEL, as an 8' x 8' heading, for 500 feet in the direction of LEADVILLE, also out of funds derived from this offering, to expend not less than $25,000 in other exploration work, including core drilling, all in an attempt to prove ore reserves of sufficient value to justify the then remaining additional drive of 4150 feet required to complete the tunnel.

The Corporation hopes and expects that the results of exploration to be effected by the 500 feet of tunnel drive and by the proposed core drilling will confirm Corporation's opinion that the ore possibilities of HORSESHOE CONSOLIDATION justify the completion of DAUNTLESS TUNNEL.

THE CORPORATION'S HOLDINGS
HORSESHOE CONSOLIDATION

LEADVILLE LEAD CORPORATION, either as owner, or as a lessee, controls in whole, or in part, the HORSESHOE CONSOLIDATION, consisting of 145 patented and 22 unpatented mining claims, with a total area of approximately 1433.434 acres.

Corporation's holdings represent almost a distinct mining district, as they embrace practically 2/3 of the formerly productive portion of the HORSESHOE AREA of the LEADVILLE DISTRICT, (sometimes called EAST LEADVILLE).

The properties lie in PARK and LAKE Counties, 8 miles east of LEADVILLE, 14 miles west of FAIRPLAY, and 102 miles southwest of DENVER.

This Consolidation includes more than 15 hitherto separately operated mine workings. This large territory was never previously assembled under one control.

An astonishing amount of underground work, resulting in large and generally profitable ore production was done separately on the several units of the Consolidation by numerous former operators, entirely by hand, under adverse conditions and under the handicap of inefficient mining and transportation methods and facilities.

Except for the recent exploratory work of LEADVILLE LEAD CORPORATION and its lessees, all of the HORSESHOE CONSOLIDATION mines have been inactive since 1923, when the silver price dropped around 40¢ an ounce, upon expiration of PITTMAN ACT purchase commitments.

The most important units of HORSESHOE CONSOLIDATION are the heretofore largely productive LEAD-SILVER-ZINC mines, known as LAST CHANCE, FULTON and HILLTOP, with a yield, estimated by the engineer, W.F.B. Berger, at more than 5 millions of dollars.

THE HORSESHOE OR EAST LEADVILLE AREA

The HORSESHOE AREA, according to engineers' reports in Corporation's possession, is geologically identical with the MAIN LEADVILLE AREA, - in effect an easterly extension of that highly mineralized district.

Most of the HORSESHOE is isolated from MAIN LEADVILLE by the precipitous MOSQUITO RANGE which separates the eastern and western portions of the LEADVILLE DISTRICT, so that HORSESHOE ores must now be hauled a long distance around the mountain range, to the LEADVILLE markets and railhead.

For these reasons, and because most of the HORSESHOE'S favorable ore horizons are concealed by barren outcropping formations the development of this area lagged far behind that of MAIN LEADVILLE.

The HORSESHOE properties were mined intermittently, between 1870 and 1923, mainly for silver. Within this period, LEAD averaged $.0448 per pound and SILVER averaged $0.863 per ounce. However, in the 24 year period between 1893 and 1917, the SILVER price averaged $0.607 per ounce. The price of LEAD is now 17¢ per pound, and that of SILVER 90¢ per ounce.

During the entire operating history of these mines, no payment was made for ZINC values of HORSESHOE ores consigned to Denver and Leadville smelters. These smelters were not equipped to recover zinc and the shippers were penalized for an excessive zinc content. However, considerable high-grade zinc ore was shipped from HILLTOP in the early 1900s for long distances to zinc smelters, under high freight charges.

POSSIBILITIES OF HORSESHOE CONSOLIDATION

The Corporation believes that the former operators did not thoroughly exploit the HORSESHOE CONSOLIDATION, and that the ore shoots mined by them will be found to continue both downward and longitudinally.

Each of the Consolidation's 3 largest producing ore shoots: ICE PALACE, LIND and STEWART, are believed to have been cut off at each end by post-mineral faults.

Corporation believes it possible that core drilling may demonstrate the continuation of these sizeable ore occurrences in new territory beyond the faults, and it believes that new ore will be found in commercial quantity and grade by the exploration work herein proposed.

The LAST CHANCE, HILLTOP and FULTON workings contain numerous exposures of "remnant ore", left unmined as "marginal" or "unprofitable" by the early day discoverers, because of their adverse operating conditions and because of the then prevailing low metal prices.

The management believes that development of many of these remnant exposures may disclose ore bodies which can be mined profitably under modern methods, and because of the transportation saving which the ultimate completion of the DAUNTLESS TUNNEL will effect.

OBJECTIVES

CORE DRILLING

Corporation proposes to utilize core drilling to explore:

1. The possibilities of extensions, past post-mineral faults, in both the BLUE and WHITE LIMESTONES of ICE PALACE, LIND and STEWART ore shoots;

2. The prospects in both BLUE and WHITE LIMESTONES of slightly developed or wholly undiscovered ore shoots, believed by Corporation to parallel the ICE PALACE, LIND STEWART;

3. The potentialities of the ICE PALACE, LIND and STEWART downward on their dip below the old stopes into the entirely unexplored WHITE LIMESTONE.

DAUNTLESS TUNNEL

The most important exploratory work contemplated by this issue is the advance of the DAUNTLESS TUNNEL 500 feet. This drive, and the following 700 foot advance of the tunnel, (not to be driven with proceeds of this issue), will make possible the exploration of the lower horizons of the LAST CHANCE, FULTON and

HILLTOP, which is the most important function of DAUNTLESS TUNNEL.

The DAUNTLESS TUNNEL is now 1029 feet long, and after the presently proposed 500 feet and the additional 700 feet advance above mentioned have been made, a further 3450 feet advance would bring the tunnel to an emergence on the Leadville side of the mountain range, with a portal location approximately 8 miles from Leadville, thus effecting a great reduction in haulage costs.

Such drive as would be necessary to complete the tunnel will not be made by the Corporation until sufficient ore has been indicated or proven to pay for such a drive from savings in haulage, or for some other good and adequate reason.

PURPOSES OF THIS ISSUE AND APPLICATION OF PROCEEDS THEREOF

The purposes of this issue are:

1. To provide $25,000 for approximately 3000 feet of core drilling to prove or disprove Corporation's theories regarding continuation, both longitudinally and downward of certain previously mined ore shoots and regarding existence of certain hitherto undeveloped mineral occurrences.

2. To provide $20,000 for an advance of the DAUNTLESS TUNNEL for 500', as an 8' x 8' heading, in the direction of ICE PALACE STOPE.

3. To provide $30,000 to make payments on options, quiet title actions, mapping and engineering work, etc., and to carry on the normal business and activities of the Corporation.

Corporation reserves the right to alter or amend this program. It is possible that changes will be made as additional information is derived from preliminary exploration. There is a possibility that some of the funds required under this program will be obtained from governmental loans. Other material factors will also be considered.

This issue will not provide funds for all of the core drilling or tunnel drive which Corporation ultimately contemplates.

LOCATION, ACCESS AND MARKETS

LOCATION

The principal units of the HORSESHOE CONSOLIDATION,(LAST CHANCE, FULTON and HILLTOP), are located in Section 1, Township 10 South, Range 79 West of the 6th Principal Meridian, at the head of FOUR MILE CREEK, on the eastern slopes of MOUNT SHERIDAN and MOUNT SHERMAN of the MOSQUITO RANGE of mountains; all in the HORSESHOE MINING DISTRICT of PARK COUNTY and in the CALIFORNIA MINING DISTRICT of LAKE COUNTY.

ELEVATION AND CLIMATE

These properties are all above timber line, in rugged terrain, and range in surface elevation from 12,000 feet to around 13,000 feet above sea level. Weather conditions are extreme, resulting in long severe winters, with heavy snowfall.

At these elevations and with these weather conditions there is some loss of machine and man power efficiency. As stated, the ground is perpetually frozen upward from a plane which is approximately 12,600 feet above sea level.

ACCESS:

Access to DAUNTLESS TUNNEL from FAIRPLAY is by U. S. Highway 285 to a point approximately 1-1/4 miles southerly from that town, thence over an unsurfaced road, which is a County road, approximately 11 miles to the old townsite of LEAVICK in FOUR MILE CANYON, thence over recently constructed unsurfaced road, approximately 3 miles to the eastern DAUNTLESS TUNNEL portal.

In spite of altitude and adverse climate, underground development through the presently constructed eastern arm of DAUNTLESS TUNNEL is feasible 12 months of the year, as the road between FAIRPLAY and DAUNTLESS can be kept open in the winter without undue difficulty and expense.

Likewise, if DAUNTLESS TUNNEL is completed through MOSQUITO RANGE to the proposed Leadville opening, the road between that point and LEADVILLE can be similarly maintained throughout the winter.

MARKETS

Ores which may be produced by LEADVILLE LEAD CORPORATION from HORSESHOE CONSOLIDATION can be marketed as follows:

1. For ores whose values are preponderantly lead and silver: LEADVILLE- ARKANSAS VALLEY PLANT of AMERICAN SMELTING & REFINING COMPANY.

2. For lead-silver ores, with substantial zinc content: LEADVILLE- RESURRECTION MINING COMPANY'S Selective Flotation Mill.

3. For ores whose values are preponderantly zinc: (a) AMARILLO, TEXAS- zinc smelter of AMERICAN SMELTING & REFINING COMPANY; (b) MIDVALE, UTAH zinc smelter of UNITED STATES SMELTING & REFINING COMPANY.

In each instance delivery of ores to any of these customers constitutes a final sale. Ores of high lead and low zinc content would be consigned to the lead smelter at LEADVILLE. Ores of high zinc and low lead content would be consigned to either the zinc smelter at MIDVALE or at AMARILLO. Ores of nearly equal lead and zinc content would be consigned to RESURRECTION MILL, which operates as a custom mill.

The lead smelter and the selective flotation mills pay for gold or silver present in appreciable amount in the ore. The zinc smelters do not. The lead smelter levies a penalty for any zinc content greater than 8%; the zinc smelters impose a penalty for any appreciable lead content. The selective flotation mills separate the lead and zinc values from the crude ores into lead concentrates and zinc concentrates, respectively.

Selective flotation was not available to any of the former operators of the HORSESHOE CONSOLIDATION.

The Corporation expects to find considerable ore in the old workings containing ZINC values, in addition to LEAD and SILVER, which, for the lack of selective flotation outlets, could not have been marketed previously and which would be commercial today.

GEOLOGY

LEADVILLE GEOLOGY

The area covered by the HORSESHOE CONSOLIDATION is apparently geologically identical with that of the MAIN LEADVILLE AREA, and is believed to be an extension thereof, separated from LEADVILLE by the 2000 foot upthrust of the several faults paralleling the MOSQUITO RANGE.

The surface is largely WHITE PORPHYRY "capping", averaging around 400 feet in thickness, overlying the BLUE or LEADVILLE LIMESTONE.

The BLUE LIMESTONE is underlain, in the order named: by PARTING QUARTZITE, WHITE LIMESTONE, CAMBRIAN QUARTZITE and GRANITE, GNEISS and SCHIST.

HORSESHOE MINERALIZATION

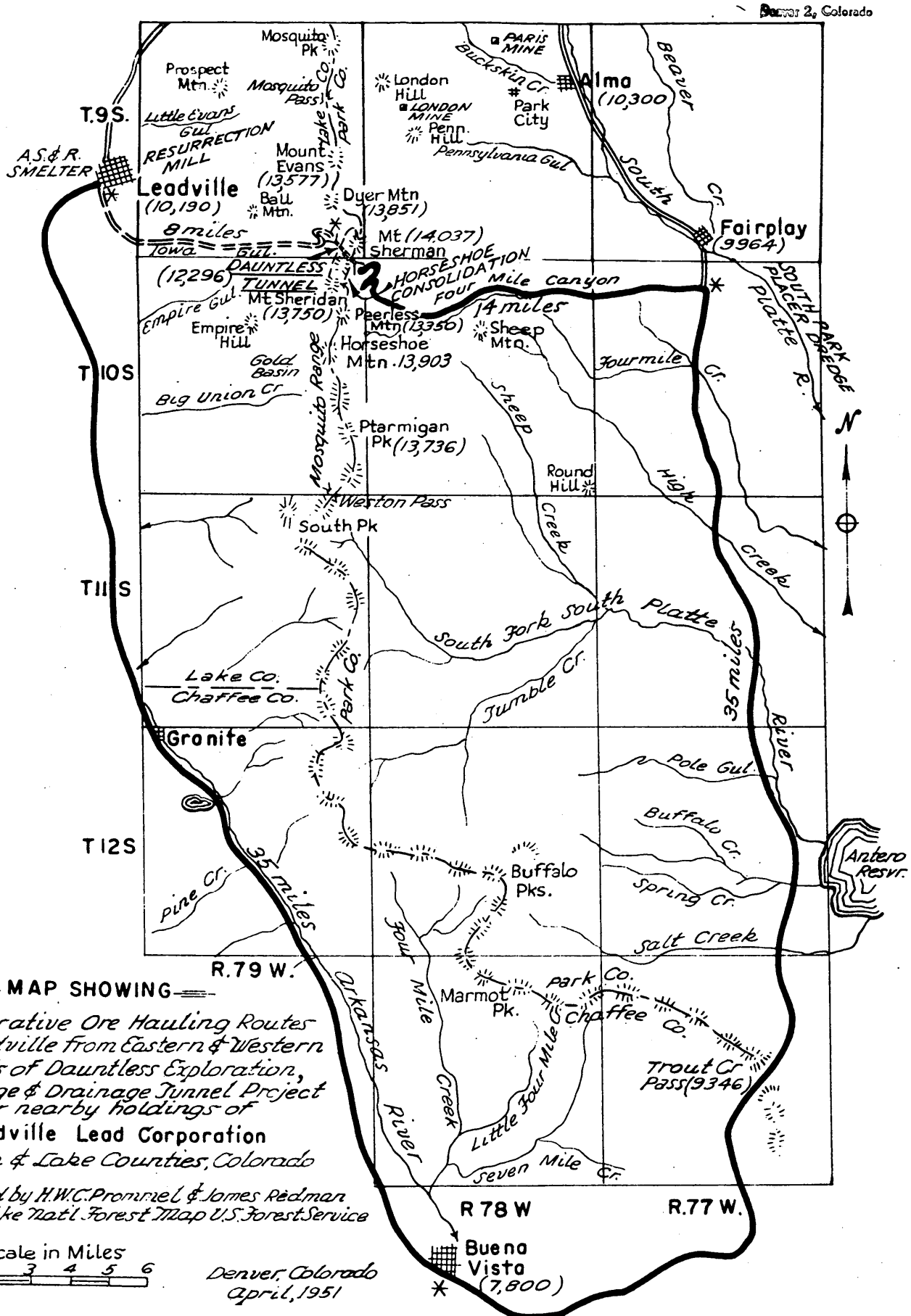
The typical mineralization of the BLUE LIME formation is a replacement of the limestone by base-metal sulfides, which have been subsequently oxidized and leached. The mineralization is therefore a semi-oxidized ore consisting mainly of the oxides and carbonates of lead, copper, zinc and iron, together with considerable sulfides, principally in the form of galena. A small amount of gold and considerable silver is likewise present.

The principal metal values of the BLUE LIME ores are LEAD and SILVER. Gold and copper are present, but in minor amounts.

Masses of galena occur throughout the LAST CHANCE-HILLTOP workings. These occurrences vary in size from specks to lumps, nearly a foot across.

Leadville Lead Corporation
800 Bassett & Cranmer Building
Denver 2, Colorado

Mileage from Proposed West Portal of Dauntless Tunnel to Leadville Ore Markets 8 miles approx. Descent 2,106 ft.



MAP SHOWING

Comparative Ore Hauling Routes to Leadville From Eastern & Western Portals of Dauntless Exploration, Haulage & Drainage Tunnel Project & other nearby holdings of

Leadville Lead Corporation

Park & Lake Counties, Colorado

Compiled by H.W.C. Prommel & James Redman after Pike Natl. Forest Map U.S. Forest Service

Scale in Miles
0 1 2 3 4 5 6

Denver, Colorado
April, 1951

Mileage from present East Portal of Dauntless Tunnel to Leadville Ore Markets 84 miles { Descent 4,496 ft. Ascent ~~2,106 ft.~~ 2,390 ft.

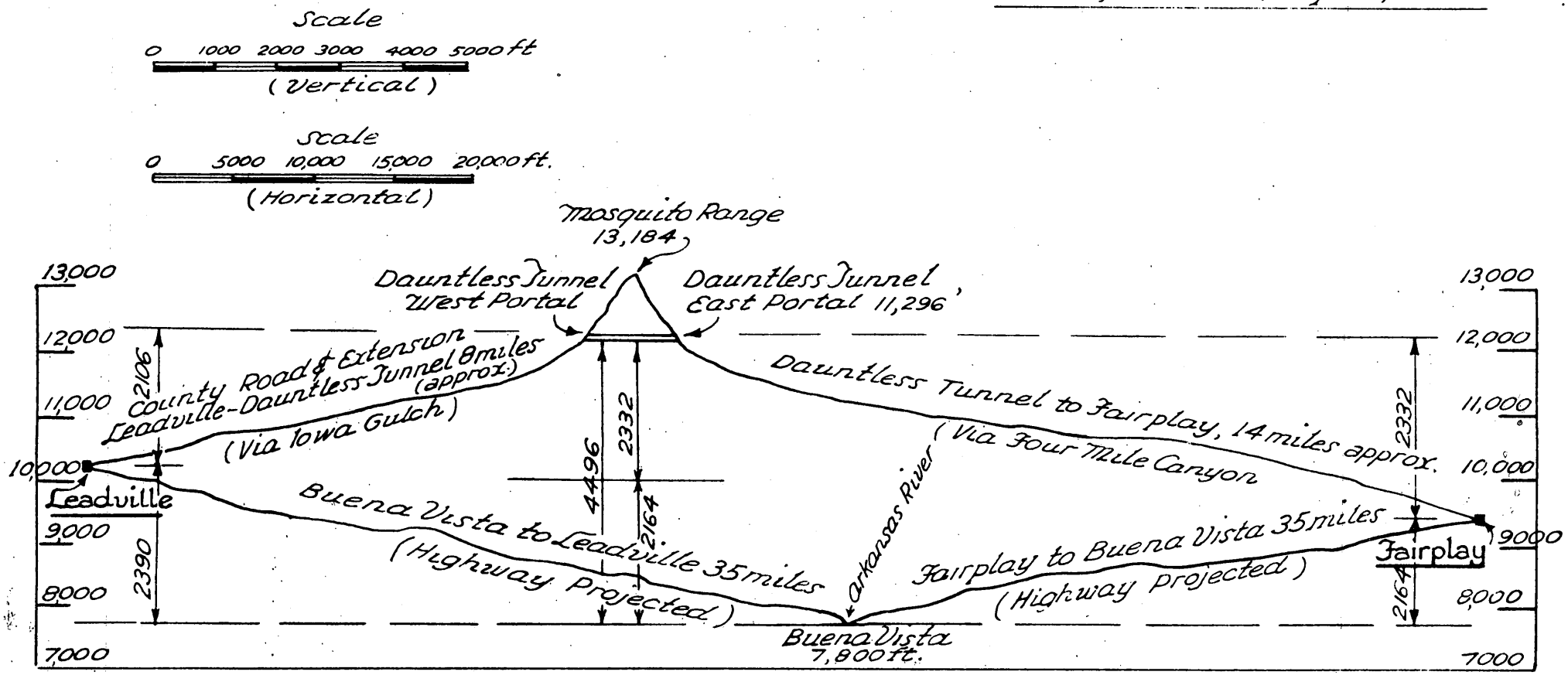
PROFILE SKETCH SHOWING

Elevations & Distances along comparative Ore Hauling Routes to Leadville from Eastern & Western Portals of Dauntless Exploration Haulage, & Drainage Tunnel Project & other nearby holdings of ~

LEADVILLE LEAD CORPORATION

Park & Lake Counties, Colorado

By H. W. C. Prommel
Consulting Geologist & Mining Engineer
Denver, Colorado. April, 1951



Mileage from Proposed West Portal of Dauntless Tunnel to Leadville Ore Markets 8 miles approx. Descent 2,106 ft.

Zinc carbonate and silicate ores have been found in considerable quantity in the HORSESHOE CONSOLIDATION mines, as shown by shipment records and published reports. Elsewhere in LEADVILLE these ZINC minerals have been found in large quantities.

The principal mineral value in the Cambrian Quartzite is usually GOLD.

It is believed that most of the commercial product expected from the HORSESHOE CONSOLIDATION will have considerable lead sulfide of high silver content and will be readily marketable. Some HORSESHOE ores may be highly oxidized and difficult to beneficiate in any custom mill, although their silver content may make them readily marketable at LEADVILLE SMELTER.

Some ores have a zinc content which will be penalized at the LEADVILLE smelter. Once the tunnel is completed, it is believed that lower haulage charges will more than offset possible penalties on the latter type of ore, and will make the mining of such ore a profitable operation.

POST - MINERAL FAULTS

The HORSESHOE CONSOLIDATION is traversed, in part, generally from east to west, by at least 3 roughly paralleling thrust faults, believed to be post-mineral, known as DYER, SHERMAN and SOUTH DYER, and, from north to south, by the LIND FAULT, paralleled by the HILLTOP PORPHYRY DIKE, (occurring between the LIND and STEWART fractures).

Some of these faults are believed to have dislocated and to have concealed the continuation of the ICE PALACE, LIND, STEWART and FULTON ore bodies.

The so-called LAST CHANCE FAULT, or ICE PALACE FRACTURE, offshoots southwesterly from LIND FAULT.

HILLTOP PORPHYRY DIKE

W.F.B. Berger believed that the north-south striking HILLTOP PORPHYRY DIKE and its accompanying LIND-STEWART ORE SHOOTS, all paralleling LIND FAULT, represented the main channel of the mineralization of the HORSESHOE AREA. The HILLTOP PORPHYRY DIKE is traceable for more than half a mile south of the southern end of the HILLTOP MINE workings.

MINED ORE OCCURRENCES & UNDERGROUND WORKINGS

The 4 principal heretofore productive ore shoots of the Consolidation, in order of extent of development and size of mineral output, are:

(a) ICE PALACE, (stoped for around 1200 feet in length, for an estimated width of 30 feet and height of 60 feet); reputed to have yielded about 4 millions of dollars.

(b) LIND, (stoped for approximately 800 feet in length, average width estimated at 15 feet); output unknown.

(c) STEWART, (stoped for roughly the same length and width as LIND); production history not available;

(d) FULTON, (drifted on for around 900 feet; workings presently inaccessible); output unknown.

These ore shoots were developed by laterals and crosscuts driven from the bottoms and from intermediate stations of 3 shafts: LAST CHANCE, (said to be 400 feet deep; now only partially reopened); HILLTOP INCLINE, (or HILLTOP END LINE), 122 deep; MAIN HILLTOP, 507 deep.

A fourth opening, VANNATTER SHAFT, 80' deep, has recently been made by a current lessee on ICE PALACE outcrop in LAST CHANCE claim. The assumed southwesterly extension of ICE PALACE ORE SHOOT will be explored through laterals run from this shaft and from the HILDA TUNNEL.

The HILDA TUNNEL, an adit approximately 561 feet in length, was made around 50 years ago on LAST CHANCE claim. Three winzes were sunk from this adit and laterals were driven from the bottoms of these winzes. W.F.B. Berger stated that commercial production was made from these workings.

Three shafts, all of unknown depth, were sunk on the BADGER BOY claim.

The DAUNTLESS TUNNEL had been advanced westerly for 576 feet, as a 5' x 7' heading, prior to this Corporation's acquisition of the property, and connection had been made previously with laterals from the 119' deep DAUNTLESS SHAFT.

The Corporation, in 1948, and its lessee, Vannatter, in 1949, advanced DAUNTLESS TUNNEL a total distance of 453' as an 8' x 8' heading.

A crosscut, known as BOARDINGHOUSE TUNNEL or LOWER CATO CROSSCUT, was driven in early days, to cut ICE PALACE ORE SHOOT on LAST CHANCE ground. This crosscut connects with ICE PALACE STOPE, and at present is the only point of ingress to LAST CHANCE-HILLTOP underground workings.

ENGINEERS' OPINIONS

Date	Engineer	Title of Engineer
April 11, 1892	W. G. Franklin	Mining Engineer
July 14, 1910) Oct. 20, 1921)	Walter S. Larsh	Engineer of Mines
May 6, 1913	Hugh C. Watson	do
Feb. 15, 1919	Murray F. Crossette	do
June 22, 1919	Herbert C. Enos	do
Aug. 16, 1920	Carl O. Lindberg	do
Dec. 14, 1948	W. F. B. Berger	do
Dec. 20, 1948) Nov. 18, 1949)	C. R. Wilfley	Mining Engineer

Copies of above reports are available for inspection in the office of the Corporation.

PROPERTIES AND CONTROLS

NATURE OF CONTROLS

The HORSESHOE CONSOLIDATION of 145 patented mining claims and 22 locations on Public Domain, or a total of 1433.434 acres is controlled largely by LEADVILLE LEAD CORPORATION, as follows:

BY RECORD OWNERSHIP		Acres	
In entirety of	75 patented claims	691.962	
In part of	24 do	124.507	
In entirety (by tax deeds)	23 do	199.461	
In part (do)	3 do	14.	
By location	22 unpatented "	183.11	
			1213.04
BY LEASE			
Lease & Option to purchase	16 patented claims	119.858	
do do	8 do	14.708	
Lease, without option (entire)	4 do	40.829	
do do do (partial)	8 do	44.999	
			220.394
See attached property map.		1433.431	1433.434

Most of these controls were obtained by the Corporation or by its antecedents between 1942 and 1949. Several previous unsuccessful attempts had been made by others at various times, over a period of 40 years, to effect this Consolidation in order to justify the proposed DAUNTLESS TUNNEL drive.

HILLTOP GROUP OWNERSHIP

This group consists of 9 claims conveyed to Corporation by Warranty Mining Deeds.

CONDITIONS OF HILLTOP CONVEYANCE

Corporation is required, by the terms of one deed, perpetually to pay to a former owner a royalty, based on net smelter returns, of 5% on ores produced from 3 claims of this group: (HILLTOP, PTARMIGAN and LESLIE DE), and 3% on the remaining 6 claims: (TOP HILL, RUSH, ENTERPRISE, VANDERBILT, ASTOR and HUMBOLDT).

The conveyance also requires Corporation to pay taxes on the above group, and otherwise not to jeopardize the former owner's perpetual royalty estate.

LEASES HELD BY CORPORATION

ROYALTIES

The Corporation is required to pay 10% royalty, (net smelter or mill value), on ores produced from the 14 claims of LAST CHANCE GROUP, which royalties apply on the $35,000 option price; and 10% on the ores from RAT and THURMAN claims which are held by lease, without option; and a graduated royalty of 10, 15, 20 & 25%, (net smelter or mill value), on ores from the WYOMING, COLORADO and CLYDE, and portions of the LIME KING Nos. 1, 2 & 3, and LITTLE CHIEF, BROOKLYN, GEORGIA, DIVIDE and CLIMAX, also held by lease without option.

LABOR REQUIREMENTS

The labor requirements of the leases and options, for periods of from 1 to 2 years, may be performed by the advance of the DAUNTLESS TUNNEL. For the remainder of the term of these leases, a maximum of 4700 8-hour, 1 man shifts per year are required. Leases provide that the expenditure of $5.00 is counted equivalent to the performance of one shift.

If present options are exercised, maximum labor requirements will be 2400 shifts per year.

CONTROL OF COLE HOLDINGS

COLE, INC. owns in entirety the BIG CHICAGO claim and 1/2 each of MAUCH CHUNK, LEHIGH and MONUMENT, 25/90 of EMILY and 1/6 of GEORGIA, 3/10 of DIVIDE and 2/5 of CLIMAX claims.

LEADVILLE LEAD CORPORATION has lease on these holdings, together with option to purchase, on or before June 30, 1952, for $10,000.00.

SUBLEASE FROM CORPORATION NOW IN FORCE

Corporation granted FRANK VANNATTER a sublease expiring September 1, 1956, on a 10-acre unit of LAST CHANCE GROUP.

This contract requires sublessee to perform annually 600 shifts of labor of 1 man each and to pay Corporation 5% over-riding royalty, in addition to the royalty due Corporation's lessor.

TITLE

Corporation has obtained abstracts of title to most of the properties included in the HORSESHOE CONSOLIDATION.

The abstracts have been examined either by John G. Reid, or Ben L. Wright Jr., attorneys of Denver, or Charles R. Casey, attorney of Leadville and opinions of these attorneys are available for examination at the Corporation's office.

Most of the titles are now either merchantable or indefeasible. Some quiet title suits have been begun and others are contemplated.

Most of the properties to which no abstracts have been obtained lie at some distance from the area proposed to be explored by the proceeds from this issue.

HISTORY AND PRODUCTION

HISTORY PRIOR TO LEADVILLE LEAD CONTROL

HORSESHOE mineral discoveries antedate those of LEADVILLE proper. Hollister, in "Mines of Colorado", published in 1867, stated that 60 lodes had been discovered in "The Horseshoe". The LAST CHANCE and BADGER BOY were discovered in 1869-1870.

Around 1873, Samuel McMillan and Ben Graham followed a surface outcrop on the LAST CHANCE claim into the hill, northerly, resulting in the mining of a portion of the ICE PALACE ORE SHOOT.

The LAST CHANCE SHAFT was sunk in 1885 for the further development of the ICE PALACE, and the big ore shoot was mined up to the northern end of the LAST CHANCE, at its common boundary with the HILLTOP Group.

According to W.F.B. Berger, the LAST CHANCE operated generally at a profit from 1885 until 1893, when, owing to the low price of silver, the mine ceased to pay and was shut down.

Berger stated that, subsequent to 1893, the mine was operated entirely by lessees and that the owners received considerable royalty from these leases; that, in 1909, the LAST CHANCE was leased to Berger's CHANCE-HILLTOP MINING COMPANY, which lease was operated at a profit until 1912.

Prior to 1885, the owners of LAST CHANCE also owned the then unpatented HILLTOP GROUP. In that year a mine cook, discharged by LAST CHANCE operators,"jumped" the 3 claims of the present Hilltop Group, now known as HILLTOP, PTARMIGAN and LESLIE DE, immediately north of the Last Chance end-line.

This cook and his partners thereafter sunk the shaft on the Hilltop side of the claim boundary, now known as HILLTOP END LINE SHAFT, and began mining ore from the ICE PALACE SHOOT.

Subsequently, Hilltop operators generally mined out the ICE PALACE ore shoot in the Blue Limestone formation from the Last Chance boundary, across the HILLTOP claims to the termination of the ore body against the LIND FAULT.

The mining of this occurrence was not carried below the water level, (the bottom of the perpetually frozen zone, at approximately 12,600 feet above sea level), for the reason that pumping was impracticable.

Later, the two occurrences, styled LIND and STEWART, were discovered as offshoots of the ICE PALACE ore body. Judging from the size of the stopes, apparently a large production was made from the LIND and STEWART shoots.

The last operations of the HILLTOP MINE were those of the HILLTOP SILVER MINING COMPANY, in 1921, and of the lessee SAM DORAN, in 1923.

The Corporation believes, from data in its possession, and, from the traditions of the district, that the HILLTOP and LAST CHANCE operations were, in the main, decidedly profitable.

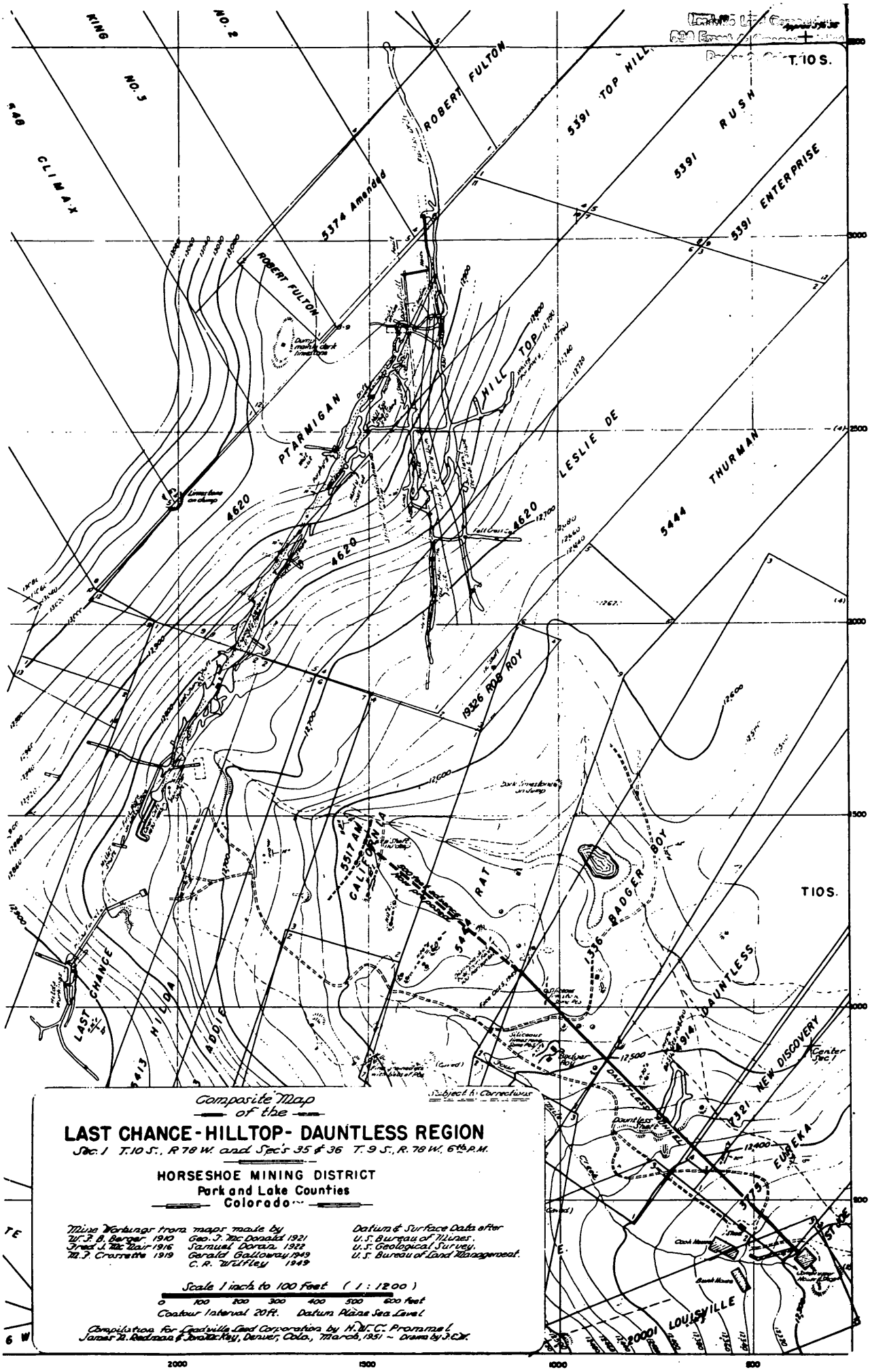
Only meager information is available regarding the history and production of the FULTON, DAUNTLESS, BADGER BOY, FIFTY-NINE, LOCKER, EQUATOR, TOWN TALK, MILLER, LIZZIE LUE and ROMEO & JULIET Mines, all included in the Consolidation, but they are locally credited with a profitable output.

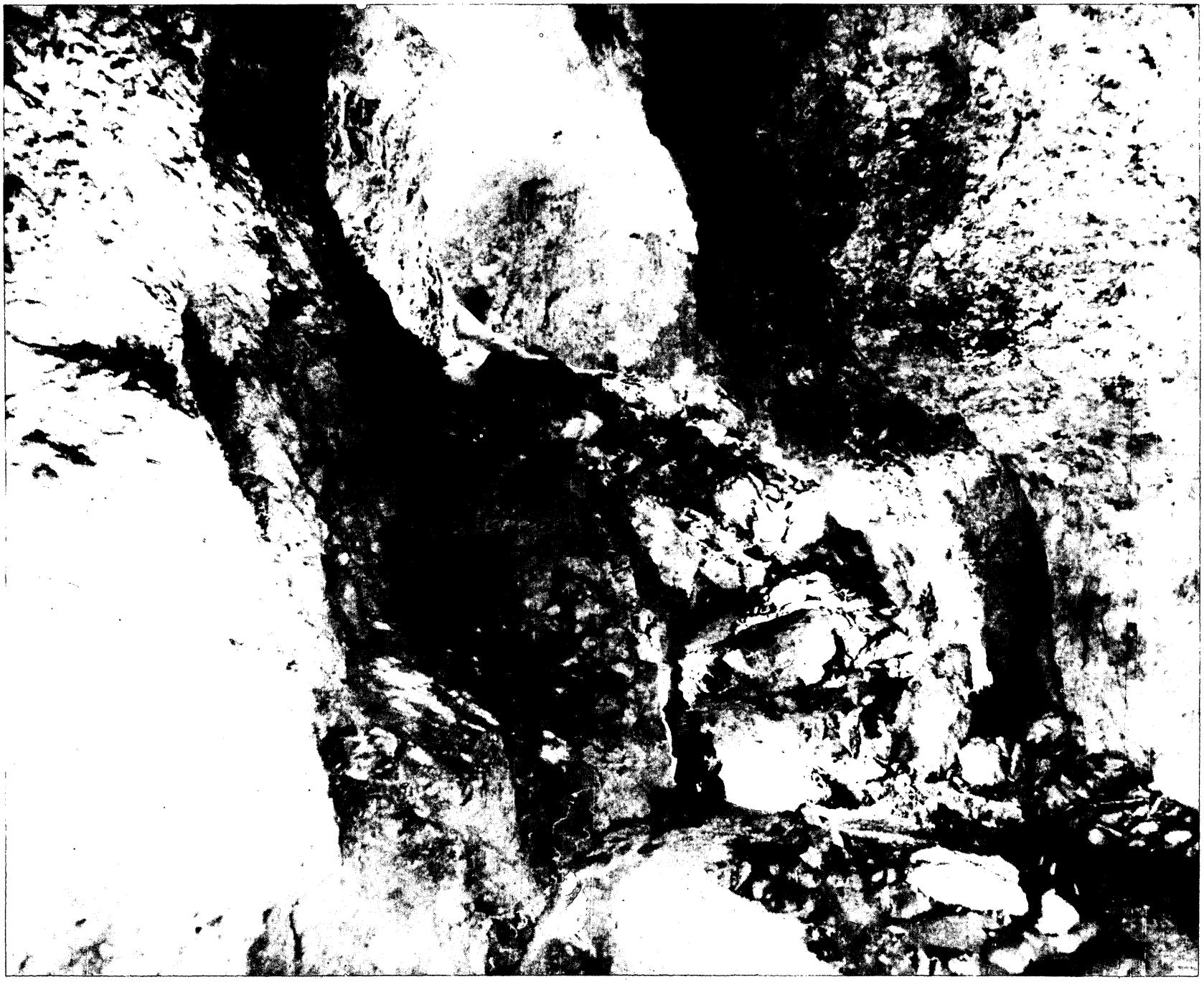
In 1912, the BELVEDERE-LEADVILLE SYNDICATE acquired the DAUNTLESS GROUP and undertook the project of advancing DAUNTLESS TUNNEL through the mountain range to an opening on the Leadville side. Corporation is informed that the project was abandoned because of the inability to secure control of the ground between the two proposed tunnel openings.

LEADVILLE LEAD CORPORATION, on April 30, 1947, compiled a brochure, which was a compilation of all data then in its possession regarding the Consolidation, including historical information and records of previous production. Corporation also has the original ore production records of the CHANCE-HILLTOP MINING COMPANY, covering its operation of the HILLTOP for the years 1908-1916. All of this data is available for examination in the Corporation's office.

PRODUCTION

The total production of the HILLTOP and LAST CHANCE mines is not known, but some of the engineers' reports, listed herein, estimate the production of the ICE PALACE STOPE on LAST CHANCE ground as in excess of one million dollars, and that of the ICE PALACE, LIND and STEWART stopes, on HILLTOP ground, at 4 millions of dollars.


T. 10 S.
T. 10 S.
KING
NO. 2
NO. 5
CLIMAX
ROBERT FULTON
5374 Amended
5391 TOP HILL
5391 RUSH
5391 ENTERPRISE
PTARMIGAN
HILL TOP
LESLIE DE
5444 THURMAN
4620
19326 ROB ROY
5517 AM. CALIFORNIA
RAT
BADGER BOY
LAST CHANCE
HILDA
ADDIE
DAUNTLESS
NEW DISCOVERY
EUREKA
LOUISVILLE
Center Sec. 1
Subject to Corrections
Composite Map
of the
LAST CHANCE - HILLTOP - DAUNTLESS REGION
Sec. 1 T. 10 S., R. 78 W. and Sec's 35 & 36 T. 9 S., R. 78 W., 6th P.M.
HORSESHOE MINING DISTRICT
Park and Lake Counties
Colorado
Mine Workings from maps made by
W. J. B. Berger 1910
Fred J. McNair 1916
M. J. Crossette 1919
Geo. J. McDonald 1921
Samuel Doran 1922
Gerald Galloway 1949
C. R. Wilfley 1949
Datum & Surface Data after
U. S. Bureau of Mines.
U. S. Geological Survey.
U. S. Bureau of Land Management.
Scale 1 inch to 100 Feet (1 : 1200)
0 100 200 300 400 500 600 feet
Contour Interval 20 ft. Datum Plane Sea Level
Compilation for Leadville Land Corporation by H. W. C. Prommel,
James N. Redman & Dorothy May, Denver, Colo., March, 1951 – Drawn by J. C. W.
2000
1500
1000
500



ICE PALACE STOPE - LAST CHANCE MINE

W.F.B. Berger estimated the total output of HILLTOP and LAST CHANCE at $5,200,000. He stated that he arrived at this figure from examination of the original smelter certificates in the Globe Smelter file, then in possession of the Colorado National Bank of Denver. His statement is available for examination in the office of the Corporation.

U. S. Geological Survey Professional Paper 138 (MINING IN COLORADO by Charles W. Henderson), credits the HILLTOP MINE with the following production:

Year	Silver	Lead	Total Value
1888	$ 323,225	$ 353,000	$ 675,225
1889	153,858	148,960	302,818
1890	82,272	69,947	150,219
	$ 559,355	$ 568,907	$ 1,128,262

The price of lead in 1888-1890 inclusive averaged $0.0426 per pound. If the 1888-1890 lead production had been made under 1951 lead prices, the value would be more than 2-1/4 millions of dollars, instead of $568,907.

HISTORY UNDER LEADVILLE LEAD CONTROL

After 1923, all of the Consolidation's properties were inactive until James N. Redman acquired lease on the Hilltop Group in 1943, and through the medium of THE HORSESHOE ZINC COMPANY, undertook the reopening of the HILLTOP END LINE SHAFT.

Between 1943 and 1947, Redman acquired control of most of the other properties now included in present Consolidation. These property controls, including control of the outstanding stock of THE HORSESHOE ZINC COMPANY, were assigned by Redman to LEADVILLE LEAD CORPORATION February 11, 1947.

Thereafter, either directly, or by assignment from Redman, the Corporation obtained the ownership or control of the remainder of the Consolidation.

The Corporation started preliminary work on the properties in September 1947.

WORK DONE BY CORPORATION

1. PROPERTY ACQUISITION:

The Corporation's most important accomplishment was the assembling, under one control, of the many theretofore diversely owned units of the HORSESHOE CONSOLIDATION, representing a total area of approximately 1433 acres.

This work resulted in Corporation's record ownership in entirety of 98 patented and 22 unpatented mining claims, and partial ownership, (undivided interests), in 27 patented claims, representing collectively an area of 1212.93 acres; also leaseholds and options containing 220.394 acres.

It is doubtful, considering present governmental land policy and the fact that patent laws are now more strictly enforced than they were between 1876 and the early 1900s, whether patents covering this large territory could be obtained at all at the present time.

Acquisition of these properties bestowed on Leadville Lead Corporation many extensive mine workings, which can be utilized in Corporation's proposed exploration and development work, thereby effecting a saving to the company of many thousands of dollars.

2. TITLE DETERMINATION:

Determining the titles to Corporation's holdings by procurement of abstracts of title, examination thereof by attorneys, and correction of defects in many of these titles.

3. ROAD CONSTRUCTION:

Acquisition, in the name of PARK COUNTY, of abandoned Colorado and Southern Railway right-of-way for 11 miles between FAIRPLAY and LEAVICK, later converted into a mine access road, mainly at the expense of the County, but partially at the expense of Corporation; construction of a new 3-mile mine access road from LEAVICK to DAUNTLESS TUNNEL, and extension therefrom to several of the main openings of the Consolidation, entirely at the expense of Corporation.

4. HOUSING:

Remodeling of frame bunkhouse near DAUNTLESS TUNNEL portal; erection of a 40' x 40' Quonset portal house and 20' x 60' Quonset bunkhouse, also near Dauntless portal.

5. REOPENING MINE WORKINGS:

Reopening DAUNTLESS TUNNEL and retimbering portions thereof and reopening the DAUNTLESS SHAFT workings connected therewith; reopening the extensive workings of the HILLTOP and LAST CHANCE mines by cleaning out LOWER CATO CROSSCUT on LAST CHANCE claim, connecting with ICE PALACE STOPES; ventilation of these workings and introduction of compressed air line therein; reopening of HILDA TUNNEL and portion of BADGER BOY workings.

Reopening of LAST CHANCE DISCOVERY CUT, (where, in 1869, ICE PALACE ORE SHOOT was discovered as an outcrop), and partially developing ore found by this work.

6. PURCHASE AND INSTALLATION OF EQUIPMENT:

(a) 1 Cummins Diesel Engine driven 445 cu. ft. Gardner-Denver Air compressor; 1 Cummins Diesel Engine driven K.W. electric generating set; 1 gasoline driven electric light plant; 1 15 H.P. power boiler used as a heating plant; 1 gasoline driven arc welding machine;

(b) 1 Mine Car Transfer device; 1 2-machine drill "Jumbo"; 1 G.D. Mucking machine; 1 D-7 Caterpillar Angledozer; 1 D-2 T-2 Caterpillar Traxcavator; 1 1949 Dodge Power Wagon; 1 210 cu. ft. Gardner-Denver Compressor.

7. DAUNTLESS TUNNEL:

Installation of mine rail, compressed air pipe and ventilation pipe in DAUNTLESS TUNNEL and advance of same as an 8' x 8' heading for around 50 feet. Surveying and mapping of the tunnel and surveying for location of proposed western portal on Leadville side of mountain range.

8. ORE PRODUCTION:

In October 1948, as stated, Corporation cleaned out the ICE PALACE Discovery Cut, in order to obtain information regarding the possible southerly extension of this ore shoot.

The work resulted in production of 138 tons of ore, yielding at AS&R Smelter $2295.55, or $16.63 per ton, (exclusive of mining costs). Because of weather conditions, this work was suspended in November 1948. In 1949, this ore exposure was subleased, as recited herein.

WORK DONE BY CORPORATION'S LESSEES

Lessees and sub-lessees of Corporation explored portions of the DAUNTLESS, BADGER BOY and LAST CHANCE properties in 1949-1950. Their operations resulted in partially reopening LAST CHANCE SHAFT and some of old DAUNTLESS workings, further development of the occurrence previously exposed by the Corporation in ICE PALACE DISCOVERY CUT, and in an advance of DAUNTLESS TUNNEL, as an 8' x 8' heading, for 403 feet.

SUMMARY OF SALES AND EARNINGS

As stated herein, in the course of cleaning out the ICE PALACE Discovery Cut on LAST CHANCE, 138 tons of ore were produced by Corporation, which returned $2295.55, or a net, exclusive of mining costs, of $16.63 per ton. This is the only mining of ore so far undertaken by the Corporation.

The Corporation has received royalties from ore produced by the sub-lessees, Van Cooten, Butler and Vannatter, of $380.17.

Royalties were paid to Corporation's lessor, (owner of LAST CHANCE) accruing from ore production of these 3 sub-lessees,

totalling $985.68, which sum is credited to LEADVILLE LEAD CORPORATION on account of its option to purchase LAST CHANCE Group.

CORPORATE HISTORY

LEADVILLE LEAD CORPORATION was incorporated under Colorado law, August 25, 1945, with authorized capital of 300,000 shares, all common, of $1.00 par value each.

On February 5, 1947, authorized capital was increased, by Amendment to Articles of Incorporation, providing for a total of 750,000 shares, all common, of par value of $1.00 each.

On February 15, 1951, authorized capital was again increased to a total of one million shares, all common, of $1.00 par value.

A detailed history of the activities of LEADVILLE LEAD CORPORATION, including prices paid in cash and stock to the original promoters and to others for properties and controls; promotion and organizational management, and previous histories of original promoters, are all available for examination in the Corporation's office. Copy will be sent upon request.

PRESENT MANAGEMENT DIRECTORS AND OFFICERS

Robert G. Risk, Director & President, 401 E. 34th St., Indianapolis, Indiana
George S. Casey, Director & Vice-President, Leadville, Colorado
Ben L. Wright, Jr., Director & Secretary, 1265 Grant St., Denver, Colorado
Francis X. Wieck, Director & Treasurer, 95 Dexter St., Denver, Colorado
Ray N. Peterson, Director, 111 E. Westfield Blvd., Indianapolis, Indiana
Homer R. Bair, Director, 1243 Madison St., Denver, Colorado
John G. Reid, Director, 718 Symes Building, Denver, Colorado

STOCK OWNED OR CONTROLLED BY OFFICERS AND DIRECTORS - APRIL 25, 1951

	Shares	Percentage of outstanding shares exclusive of Treasury Shares
President & Director, Robert G. Risk	52,746	7.75
Vice-President & Director, George S. Casey	5,000	.74
Vice-President, Treasurer and Director, Francis X. Wieck	5,675	.83
Secretary & Director, Ben L. Wright, Jr.	2,901	.42
Director, Ray N. Peterson	19,852	2.91
Director, Homer R. Bair	7,075	1.03
Director, John G. Reid	6,100	.89
	99,349	14.57%

To the best knowledge and belief of the Corporation, no shares are owned by any Officer or Director, either of record, but not beneficially, or beneficially, but not of record, other than as recited above.

REMUNERATION OF OFFICERS, DIRECTORS AND PROMOTERS

ROBERT G. RISK, President and Director, has neither received nor claimed any salary for his services as President. He loaned the Corporation $4550.00, and received $113.17 as interest.

FRANCIS X. WIECK, Vice-President, Treasurer and Director, has received 1600 shares of Corporation's capital stock for his services as Treasurer to March 22, 1951.

JOHN G. REID, Director, has neither received nor claimed any remuneration for his services in that capacity.

GEORGE S. CASEY, Vice-President, BEN L. WRIGHT Jr., Secretary and Director, and HOMER R. BAIR, Director, have not received nor claimed any remuneration for their services in the above capacities.

RAY N. PETERSON, Director, loaned the Corporation $4,750, for which he received $172.47 as interest.

The remuneration of TOM E. McKAY, former Director, and one of the promoters, of JAMES N. REDMAN, former Director and President, and one of the promoters, of ROBERT E. HARVEY and of CLIO L. KEM, both former Presidents and former Directors, are all available in detail in Corporation's office. None of these persons now bears a material relationship to the Corporation.

COMPENSATION TO OFFICERS, DIRECTORS AND PROMOTERS FOR PROPERTIES SOLD TO CORPORATION

ROBERT G. RISK, Director and President, received 2300 shares in consideration of the assignment by Risk to Corporation of a 3% interest in the LAST CHANCE lease and transfer to the Corporation of 1000 shares of THE HORSESHOE ZINC COMPANY stock. These shares were issued before Risk became a Director.

GEORGE S. CASEY, Director and Vice-President, is a stockholder of the GLOBE INVESTMENT COMPANY, which company conveyed to LEADVILLE LEAD CORPORATION interests in certain mining claims, in consideration of 10,000 shares of Corporation's stock, of which 5,000 shares were issued to George S. Casey and his wife as joint tenants. This stock was issued prior to Casey's election as a Director.

The original promoters, JAMES N. REDMAN and TOM E. McKAY, are presently neither officers nor directors of the Corporation, and neither has sufficient stock to place him in a material relationship. A detailed history of considerations paid to Redman and McKay for property is available for examination in the office of the Corporation.

UNDERWRITING AGREEMENTS

No underwriter has been designated. However, any person, other than an Officer or Director effecting sale of stock under this issue will be entitled to a commission of 15%.

LITIGATION

No litigation is pending or imminent, except that Corporation proposes to bring suits to quiet title in order to correct defects in the present titles.

REGISTRATION WITH SECURITIES AND EXCHANGE COMMISSION

Leadville Lead Corporation has not registered with Securities and Exchange Commission.

FUNDED DEBT AND CONTINGENT LIABILITIES

Chattel Mortgages on certain mining machinery, totalling $1600.00 are held by certain stockholders, who are presently creditors of the Corporation.

* *

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

CASH RECEIPTS & DISBURSEMENTS

LEADVILLE LEAD CORPORATION--DENVER, COLORADO

August 25, 1945 - March 31, 1951

RECEIPTS FROM:

Sales of Treasury Stock	$138,144.74
Sales of Capital Stock	113,713.00
Cash Advances	2,683.31
Notes Payable	44,910.00
Ore Sales	2,701.96
Sales of Equipment	1,075.00
Equipment Rentals	300.34
Miscellaneous (Stock Transfers, etc.)	1,127.29
Sale of Placer Claim	250.00
	$304,905.64

DISBURSEMENTS:

Notes Payable	$ 26,960.15
Machinery & Equipment	41,099.51
Properties	25,789.95
Materials & Supplies	22,411.32
Quonsets & Buildings	12,137.83
Wages & Salaries	70,626.16
Boarding House	11,269.19
Automotive Expense	10,673.98
Engineering & Assaying	9,824.82
Withholding Tax	6,419.22
Office Expense	7,389.58
Commissions on Stock Sales	5,293.75
Mine Re-opening	4,706.48
Telephone & Telegraph	4,010.13
Accounting & Legal	10,039.31
Road Construction	2,909.59
Financing Expense	3,396.72
Equipment Rentals	2,431.20
Supervision	1,946.94
Bulldozer Expense	1,534.68
Stock in Other Corporations	1,532.39
State Unemployment Tax	1,934.26
Interest & Bank Charges	3,119.88
Social Security Taxes	1,957.48
Documentary Tax Stamps	1,443.92
Insurance	2,335.77
Incorporation Expense	988.22
Cash Advances	2,774.70
State & County Taxes	4,613.66
Workmen's Compensation Insurance	796.68
Transportation & Travel	1,017.88
Royalties	250.00
Lease Rentals	188.80
General Expense	323.20
Mine & Plant Maintenance	173.50
	$304,320.85
Balance - March 31, 1951	584.79
	$304,905.64

* *

BALANCE SHEET

LEADVILLE LEAD CORPORATION--Denver, Colorado

March 31, 1951

ASSETS

Demand Deposits and Cash on Hand		$ 584.79
Materials & Supplies		13,564.20
Accounts Receivable		360.00
Advance Lease Royalty		250.00
Capital Stock of The Horseshoe Zinc Co. (97.36% owned)		24,417.20
Mine Properties (Freeholds, Leases, etc.) Capitalized Re-opening Costs, etc.		360,302.30
Buildings, including $18,786.72 for Quonsets		39,031.50
Tunnel Construction		47,398.07
Road Construction		24,919.64
Machinery & Equipment	$36,500.81	
Less Allowance for Depreciation	19,133.56	17,367.25
		$528,194.95

LIABILITIES

Notes Payable:			
For Equipment		$ 500.00	
To Individuals for Money Advanced		1,600.00	$ 2,100.00
Accounts Payable:			
Trade Accounts		2,611.98	
Employee's Income Tax		167.55	2,779.53
Purchase Contracts			10,000.00
Accrued:			
Property Taxes (Estimated) and Payroll Taxes			1,919.62
Interest			39.85
			$ 16,839.00
Capital Stock & Deficit:			
Common Stock, $1.00 Par Value, Authorized		$1,000,000.00	
Less: Unissued	$298,849.00		
Treasury	20,365.00	319,214.00	
		$ 680,786.00	
Deficit:			
Capital Surplus	$ 48,764.25		
Earned Surplus	120,665.80	169,430.05	511,355.95
			$528,194.95

* *

MF - 100
Exhibit 5.

Leadville Lead Corporation
500 Ernest & Cranmer Buildin
17th. & Curtis Streets.
Denver 2, Colorado.

CLIFFORD R. WILFLEY
MINING ENGINEER

Denver, Colorado,
Nov. 18, 1949.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

Messrs. J. N. Redman,
Tom E. McKay,
Denver, Colorado.

Gentlemen:

Following are notes on my investigation of the new ore discovered in the Butler lease on the Last Chance mine.

I visited the mine Nov. 13 and 14, 1949, accompanied by Mr. McKay. While snow did not hamper, the very severe high wind and cold weather impeded us considerably.

A transit survey was made, from the head of the incline in the upper Last Chance mine (connecting with the Galloway survey of the mine) out to the face of the Butler Cut and on along the old Last Chance cut. The accompanying sketch entitled "Butler Workings" shows a plan, longitudinal section, and vertical cross section made up from this survey.

The face of the Butler cut was sampled, as shown on the accompanying sketch entitled "Samples, Butler Workings". The portion labelled "Iced Over" was deeply covered with ice; it was generally agreed that to uncover it would be too arduous a job, and would unfairly hold up the lessee's work. It was therefore not sampled. The samples were assayed for my account by the Henry E. Wood Assaying Company of Denver, whose original assay certificate is enclosed.

In the extreme east wall of the cut altered limestone is exposed in a small place. I doubt if this is the east limit of the ore body; rather, it may be a local rib between the lead-silver ore and the usual zinc ore "casing" which should lie farther east. Ore still continues in the west wall.

The ore is highly oxidized, only occasional kernels of galena remaining. The smelter settlement sheets, showing an average of about one-half percent sulfur, show this.

The data are hardly sufficient to predict the extent of this ore body. It appears to me to be a relatively flat replacement of a layer in the Blue Limestone along the Last Chance fissure system, much the same as the main ore body was in the old Last Chance workings. As none of the maps indicates that there has been exploration below or close out laterally, there is room for an ore body of considerable size.

Leadville Lead Company
and Lincoln & Garfield Building
Denver, Colorado

I have examined the original smelter settlement sheets of the American Smelting & Refining Company at Leadville, showing ore shipped from Sept. 3 to Nov. 8, 1949, stated to be the ore mined by Ted Butler from the Butler Cut. A summarization of these is gievn on the following sheet.

I think this is a promising development.

Veru truly yours,

Copy — C R Wilfley

C. R. Wilfley
Mining Engineer

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

ORE SHIPMENTS FROM BUTLER CUT

Smelter settlement sheets of the American Smelting and Refining Company at Leadville, Colorado, showing shipments by Ted Butler . Dates Sept. 3 to Nov. 8, 1949. is stated that two more shipments are en route at this date.

The first eight shipments, amounting to 316.685 dry tons of ore, contained 2,083 ounces silver and 40.87 tons of lead. This gives a weighted average of :

Weighted Average Assay

Silver	6.5 oz. per ton
Lead	12.9 percent

Gold averaged less than 0.02 oz. per ton, copper, traces, iron less than 6 percent, insoluble less than 60 percent, and zinc 0.3 to 2.05 percent. Sulfur averaged less than 1 percent.

Following are the returns:

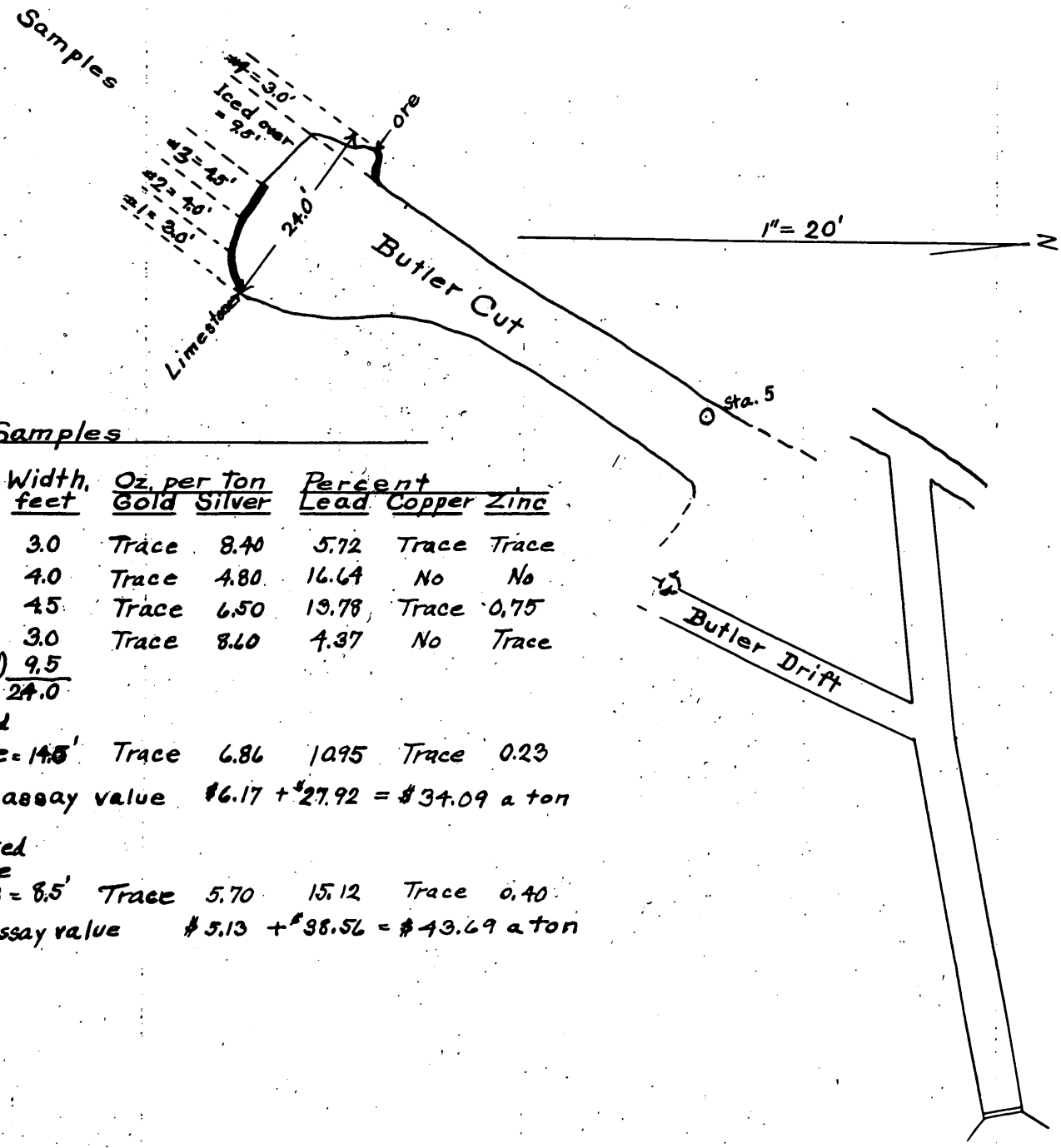
Total value paid for by smelter		$9,865
Smelter treatment charges	$2,756	
Hauling, royalty, etc. deducted	3,023	5,779
Net received by shipper		4,086

CRW

CLIFFORD R. WILFLEY
MINING ENGINEER
2233 GRAPE STREET
DENVER 7, COLORADO

Lucky Lad Corporation
400 Lincoln & Grant Building
Denver 2, Colorado

Samples, Butler Workings
Nov. 14, 1949



Samples

No.	Width, feet	Oz. per Ton Gold	Oz. per Ton Silver	Percent Lead	Percent Copper	Percent Zinc
1	3.0	Trace	8.40	5.72	Trace	Trace
2	4.0	Trace	4.80	16.64	No	No
3	4.5	Trace	6.50	19.78	Trace	0.75
4	3.0	Trace	8.60	4.37	No	Trace
(Iced)	9.5					
	24.0					
Weighted Average = 14.5'		Trace	6.86	10.95	Trace	0.23

Gross assay value $6.17 + $27.92 = $34.09 a ton

Weighted Average Nos. 2 + 3 = 8.5'		Trace	5.70	15.12	Trace	0.40

Gross assay value $5.13 + $38.56 = $43.69 a ton

C.R. Wilfley
Nov. 17, 1949

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

A. M. CAMPBELL — ESTABLISHED 1878 — GAYLE F. FARNHAM

Certificate of Assay

THE HENRY E. WOOD ASSAYING COMPANY

TELEPHONE KEYSTONE 4816 — DENVER 2, COLORADO — 2042 BROADWAY

Nov.17, 1949

We hereby certify that the samples assayed for Clifford R. Wilfley E.M.. gave the following results per ton of 2000 lbs.

MARKED	GOLD OZS.	SILVER OZS.	WET LEAD PER CENT	COPPER PER CENT	ZINC PER CENT	IRON PER CENT	INSOL. PER CENT	SULPHUR PER CENT	PER CENT	VALUE
Sample # 1	Trace	8.40	5.72	Trace	Trace	3.0	feet wide			
2	Trace	4.80	16.64	None	None	4.0	"	"		
3	Trace	6.50	13.78	Trace	0.75	4.5	"	"		
4	Trace	8.60	4.37	None	Trace	3.0	"	"		

Samples in face of Butler Cut, Last Chance mine, Nov. 14, 1949
C.R. Wilfley

Gold at $_____ per ounce
Silver at _____ per ounce
Lead at _____ per 100 lbs.
Copper at _____ per 100 lbs.
Zinc at _____ per 100 lbs.

Charges
$ 18.00

The Henry E. Wood Assaying Co.
By A M Campbell

1-49 2M

CLIFFORD R. WILFLEY
MINING ENGINEER
2233 GRAPE STREET
DENVER 7, COLORADO

Leadville Lead Corporation
809 Ernest & Cranmer Building
Denver 2, Colorado

Apr. 10, 1950

Mr. J. N. Redman,
Taft Hotel,
New York City, N. Y.

Dear Mr. Redman:

At Mr. McKay's request I am enclosing herewith copies of the suggestions and proposal I made you last December, for diamond drilling at the Hilltop Consolidation.

These may serve you as a yardstick now,; but I am not able to make the same proposal at the moment, as Mr. Marshall is not available. My proposal was for a drilling contract to be carried out by Marshall. If he becomes available in the next few months I believe we can make substantially the same price quotations. We would be able to keep two drills operating at once if sufficient compressed air were made available; one EX and one AX sizes.

Referring to my suggestions as to placing of drill holes I might point out that these were designed as exploratory holes in strategic positions but changing conditions and new results from the first holes might make changes in detail advisable. More work might be concentrated on the south and the north ends of the property than in the middle. Similarly, the discovery of ore in any one hole might make it highly desirable to drill additional holes to block out the ore.

Yours very truly,

C R Wilfley

C. R. Wilfley

CLIFFORD R. WILFLEY
MINING ENGINEER
2233 GRAPE STREET
DENVER 7, COLORADO

Leadville Lead Corporation
500 Lincoln & Cramer Building
Denver 2, Colorado

COPY OF STATEMENT OF DEC. 16, 1949

SUGGESTED D.D.HOLES

	Feet	Cost
1...Flat, from face of bottom level, Last Chance south end; pointed SW.	250	$750
2...Down, perpendicular to strata from same setup as No. 1	300	900
3...Flat, pointed SE., parallel to strata, from face of crosscut E. from No. 1	200	600
Two holes pointed E., parallel to strata:		
4...a...From near L.C.Shaft, E. wall stope	600	2,150
5...b...From the crosscut E. 450 feet north of L. C. Shaft	500	1,600
Two flat holes pointed west, run parallel to strata from west wall stope:		
6...a...From crosscut 200 feet N. of Last Chance Shaft	500	1,600
7...b...From crosscut 850 feet N. of Last	400	1,250
Two down holes to test Parting Quartzite and White Limestone:		
8...a... From same setup as No. 6	400	1,250
9...b... From same setup as No. 7	400	1,250
10..Down hole from Hilda tunnel to find depth of strata	200	600
Totals	3,800	$11,950

copy - CR Wilfley

CONTRACT DIAMOND DRILLING--MARSHALL

Leadville Lead Corporation
300 Exch. & Commerce Building
Denver 14, Colorado

Leadville Lead Corporation

Dec. 13, 1949

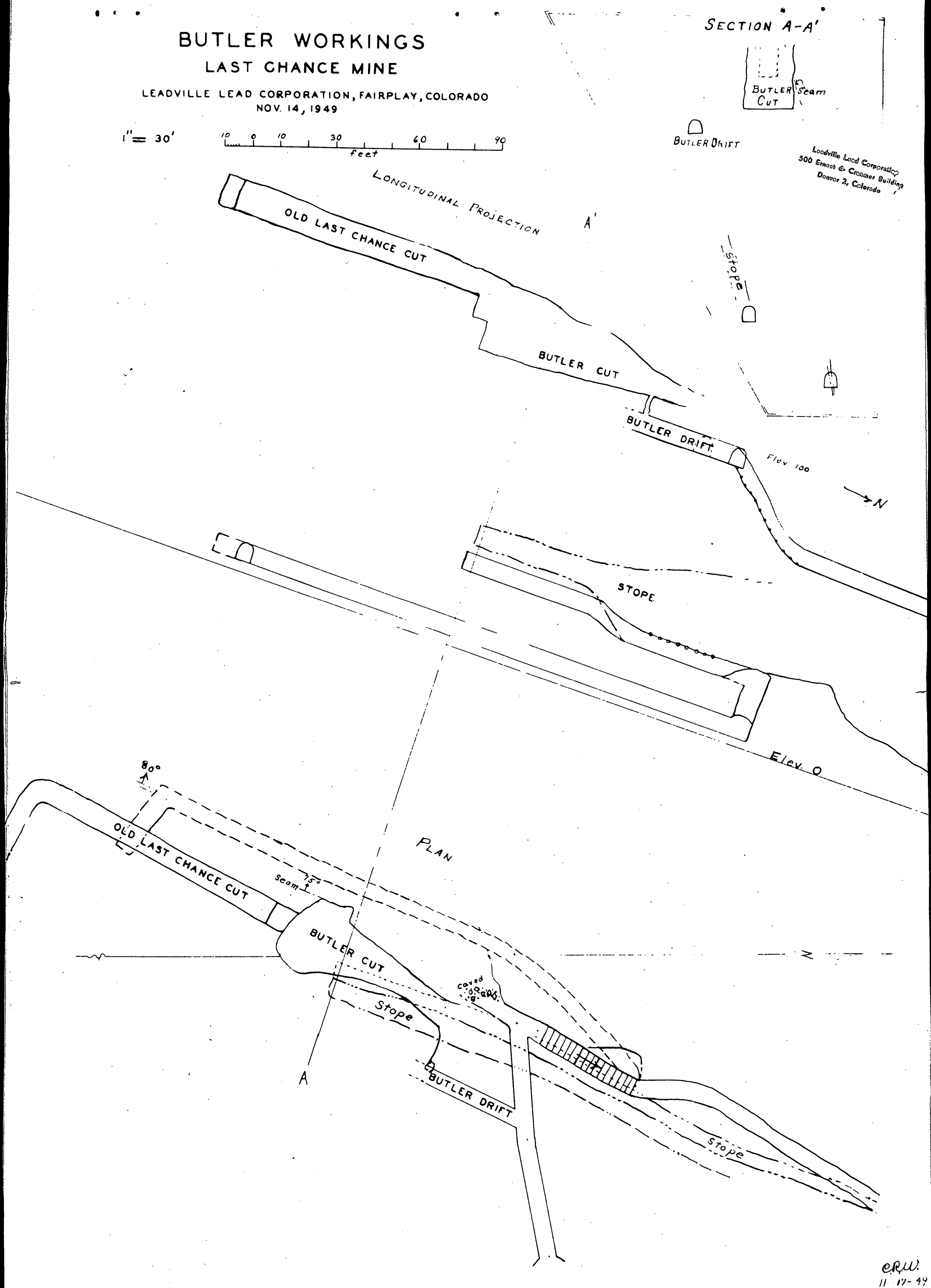
1...	First 300 feet of hole, per foot	$3.00
	Second 300 " " "	3.50
	Third 300 " " "	4.00
	Fourth 300 " " "	4.50
2...	For casing, additional per foot	0.50
3...	For time cementing, drilling and blasting if requested, and all labor outside of drilling and casing and lost time not the fault of the contractor, per hour	$2.50
4...	Company to furnish compressed air and water at working place.	
	Company to furnish cement if required.	
	Company to furnish transportation from bunk house to mine.	
5...	Minimum footage guaranteed by company	1,500 feet
6...	Company to furnish core boxes if required and labor carrying same from working place to storage.	

Copy - E.R. Wilkey

BUTLER WORKINGS

LAST CHANCE MINE

LEADVILLE LEAD CORPORATION, FAIRPLAY, COLORADO
NOV. 14, 1949



C.R.W.
11-17-49

PROPOSED EXPLORATION PROGRAM
ON SOME OF THE HOLDINGS OF
THE LEADVILLE LEAD CORPORATION

HILDA, LAST CHANCE, AND HILLTOP MINES
HORSESHOE MINING DISTRICT
PARK COUNTY
COLORADO

By H. W. C. Prommel

May, 1951

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Exhibit 1.
Form MF-100

H. W. C. PROMMEL
CONSULTING GEOLOGIST AND MINING ENGINEER
731 SOUTH DOWNING STREET
DENVER 9, COLORADO

Leadville Lead Corporation
500 Ernest & Cranmer Bldg.
Denver 2, Colorado

PROPOSED EXPLORATION PROGRAM ON SOME OF THE HOLDINGS OF THE LEADVILLE LEAD CORPORATION HILDA, LAST CHANCE AND HILLTOP MINES HORSESHOE MINING DISTRICT PARK COUNTY COLORADO.

1. LOCATION

The holdings of the Leadville Lead Corporation are situated in the Horseshoe District of Park County and the California District of Lake County, Colorado. The principal mine workings, such as the Last Chance, Hilltop, Lind, Stewart, Fulton, Hilda, and Dauntless Tunnel are situated on the east slope of the Mosquito Range between Mount Sheridan and Mount Sherman, at elevations ranging from approximately 12,000 to 13,000 feet.

2. OBJECT OF THIS REPORT

The object of this report is to outline the most advantageous exploration program to cover the expenditure of funds amounting to approximately $51,000 from the Leadville Lead Corporation and a $51,000 matching exploration loan to be applied for from the Defense Minerals Administration, Washington, D. C., on Forms MF-100 and MF-103. This report is to be used to answer some of the questions on above forms and to serve as Exhibit No. 1 to be submitted with said forms.

3. OTHER EXHIBITS TO ACCOMPANY FORMS MF-100 AND MF-103

Inasmuch as a recent prospectus of the Leadville Lead Corporation dated April 25, 1951, containing detailed information regarding location, history, production, owner-

ship, geology, access to markets, etc. is to be filed with Forms MF-100 and MF-103 as Exhibit No. 1, this report will solely concern itself with details of an exploration program and existing geological features on which the program is based. Additional and substantiating detailed data on the holdings of the Leadville Lead Corporation pertaining to past history and production etc. and containing copies of reports on the Hilltop-Last Chance mines by nationally known engineers are contained in a Brochure, entitled "Leadville Lead Corporation and the Hilltop Consolidation" assembled and prepared by James N. Redman of Denver, Colorado, dated April 30, 1947, which is to be submitted with Forms MF-100 and MF-103 as Exhibit No. 3.

4. U. S. GEOLOGICAL SURVEY AND U. S. BUREAU OF MINES PUBLISHED AND UNPUBLISHED DATA AND INFORMATION ON GENERAL REGION

The locality of the holdings of Leadville Lead Corporation as well as the surrounding general region, which includes Colorado's largest mining district, the Leadville district, as well as many other well known mines, such as Climax, mines on North Star mountain, mineralized regions and mines on Mt. Lincoln, Mt. Bross, Loveland Mountain, Buckskin Gulch, Mosquito Gulch, London Mountain, Sacramento gulches to the north, to mines in the Weston Pass District 5 miles due south of the Hilltop mine, are well known to geologists of the United States Geological Survey and engineers of the United States Bureau of Mines. Of especial and immediate interest are the following published reports accompanied by maps:

Behre, C. H. Jr., Revision of structure and stratigraphy in the Mosquito Range and the Leadville district, Colorado: Colorado Sci. Soc. Proc., vol. 12, pp. 37-57, 1929.

Singewald, Q. D., and Butler, B. S., Preliminary geologic map of the Alma district, Colorado: Colorado Sci. Soc. Prov., vol 12, No. 9, pp. 295-308, 1930.

Behre, Chas. H., Jr., The Weston Pass Mining District, Lake and Park Counties, Colorado: Colorado Sci. Soc. Proc., vol. 13, No. 3, pp. 55-75, 1932.

Behre, C. H., Jr., Preliminary Geological Report on the West Slope of the Mosquito Range in the Vicinity of Leadville, Colorado: Colorado Sci. Soc. Proc., vol. 14, No. 2, pp. 49-79. Prepared, in cooperation with the State of Colorado, Colorado Metal Mining Fund, Colorado Mining Association, and Geological Survey Board of Colorado, as an explanation of a geologic map issued in 1939 by the Geological Survey, U. S. Department of the Interior.

Since the publication of the geological map mentioned under the last report above, additional field work including mapping, has been done by Messrs. Behre and Singewald on the east slope of the Mosquito Range including the locality of the Hilda, Last Chance, Hilltop and Dauntless Tunnel workings. While a report on this region is under preparation for publication, it has not as yet been made available to the public and there is no certainty as to when this report might be published.

The interest of the United States Bureau of Mines to carry on some type of exploratory work at and near the Last Chance-Hilltop workings dates back to the fall of 1942 when Mr. Scot Hazen, project engineer of the Bureau of Mines

obtained from H. W. C. Prommel, at that time project engineer for the U. S. Bureau of Mines of dump sampling operations in the Leadville District and in charge of equipment and supplies stored in Leadville, certain camp equipment and cooking utensils to be used for the establishment of a camp at the Last Chance-Hilltop workings preparatory to projected diamond drilling or other exploratory work in that vicinity. The diamond drilling contemplated by the Bureau at that time has not materialized to date.

A preliminary study of the region had been made by C. R. Wilfley, Mining Engineer, and R. W. Handley, Consulting Metallurgist, U. S. Bureau of Mines, and the region is mentioned in War Minerals Report 194, dated Washington 1943.

During 1948 or 1949 a plane table survey of the region between the east portal of the Dauntless Tunnel and the Hilda-Last Chance workings was made by engineers of the United States Bureau of Mines and surface geological features were studied, showing the continued interest of the Bureau in exploratory work in the region.

5. PREPARATORY STUDIES TO OUTLINE CONTEMPLATED EXPLORATORY WORK

Due to adverse weather conditions at the high altitude at which the properties are located and deep snow covering surface exposures a preliminary study of the ground could not be made during the winter of 1950-1951. A large number of maps and other descriptive matter and reports besides the Redman brochure, above mentioned, and attached to

Form MF-100 as Exhibit No. 3, were available for study at the Company's office and in the files of Mr. Redman. From this data a composite map of the Hilda-Last Chance-Hilltop mine workings was built up on a scale of 1:480 (1 inch equals 40 feet) by H. W. C. Prommel, James N. Redman and Tom E. McKay. This map is based principally on former maps by W. F. Berger, 1910; Fred McNair, 1916; M. F. Crossette, 1919; Geo. T. McDonald, 1921; Sam Doran, 1922; Gerald Galloway, 1949; and C. R. Wilfley, 1949. The final composite map contains all data as well as descriptive notes found on all the above maps, is 40 inches by 70 inches in size and while available upon request, it is not attached to this report. However, a reduction of this map to a scale of 1:1200 (1 inch equals 100 feet) is embodied on Plate 1 which accompanies and is a part of this report.

6. PLATE 1 Inasmuch as this exploration program concerns itself with advancing the Dauntless Tunnel as well as diamond drilling from the surface and from underground workings, it was deemed essential to build up a composite map taking in the region of known underground workings as well as the areas adjacent to and including the contemplated course of the Dauntless Tunnel from its present east portal to the projected west portal. This map, entitled "Composite Map of the Last Chance-Hilltop-Dauntless Region, Horseshoe Mining District, Park and Lake Counties, Colorado," is attached to this report as "Plate 1" and will be referred

to hereafter as such. Plate 1, drawn to a scale of 1:1200 (1 inch equals 100 feet), shows the principal features of the underground workings as obtained from the 1:480 scale map above mentioned, including the location of the Rob Roy Shaft and other nearby discovery and prospect workings. The western part of the surface geology was obtained from Behre's geological map of the western slope of the Mosquito Range. The eastern part of the surface geology was obtained from a plane table reconnaisance map of the U. S. Bureau of Mines, while claim locations and boundaries were obtained from patent plats of the U. S. Bureau of Land Management. In order to make quick orientation on the map possible, a 500 ft. square coordinate net, numbered from south to north and from east to west, was superimposed on the map.

7. THE GEOLOGIC SECTION

Rocks which occur at the surface and underlie the region range from the Silver Plume granite to the Weber grits, overlain by white porphyry and intruded by white and gray porphyries. The section and the thicknesses of individual members, obtained in part from measurements given in former reports by Lindberg and Larsh (see reports in Redman brochure, Exhibit No. 3 to Form MF-100), as they will be used hereafter in this report, are given on the following table. For the sake of brevity individual members in the section will be referred to by their local names.

Exhibit No. 1.
Form MF-100

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Denver 2, Colorado

Local Name of Formation	Thickness in feet	Type of Rock	Revised Name of Formation	Age
White Porphyry	300 plus	Porphyry	White porphyry	Tertiary
Weber Grits	?	Shales, sandstones, congl.	Weber form	Pennsylvanian
Blue Lime	200-220	Limestones mostly	Leadville Limestone. Dyer Dolomite	Mississippian Devonian
Parting Quartzite	30	Quartzite	Parting Quartz	"
White Lime	115	Dolomitic Limestone	Manitou Limest.	Ordovician
Peerless Shale or Transitionary Shale	30	Shales and Quartzites	Peerless Shale	Ordovician Cambrian
Sawatch or Cambrian Quartzite		Quartzite	Sawatch Quartzite	Cambrian
with porphyry sills	105 plus	Porphyry		Tertiary ?
Granite		Granite	Granite	Pre-Cambrian

8. OBJECT OF RECOMMENDED EXPLORATION WORK AND POSSIBLE ORE HORIZONS

The entire production so far obtained from the Hilda-Last Chance-Hilltop-Fulton-Lind-Stewart workings amounting to some 5 millions of dollars originated from fissures and replacement ore bodies in the Blue lime. The object of the recommended exploration work is to explore for possible extensions of already known ore bodies in the Blue lime as well as to look for ore bodies at lower horizons which have produced lead and zinc ores in commercial quantities in other mining districts of Colorado under equal or similar geological conditions.

Sulphide lead and zinc ores have been produced from

ore bodies in the White Lime in the Leadville and other districts. While the White lime is stressed in the recent prospectus of the Leadville Lead Corporation mentioned above, the Peerless shale which forms a transition horizon of shales and quartzites between the White lime and the Sawatch quartzite and which is producing ore in many places, is not mentioned. Behre, in his report on the Weston Pass mining district situated some 5 miles due south of the Last Chance-Hilltop workings, discussing a division of the Sawatch quartzite into two members, writes as follows:

> "The upper member of this formation ("transition shale" of earlier reports) consists of sandy and shaly dolomitic beds and calcareous, shaley beds, with prominent fucoid markings. At Weston Pass the thickness is 50 feet. This and the underlying quartzite are already well recognized as separable lithologic units. The writer therefore proposes their separation as individual members and suggests that the lower 90 to 135 feet of quartzitic rock, including at the top the dark-red ("purple") quartzite bed recognized by Singewald and Butler, which is a constant feature in the Leadville and Alma districts, be regarded as the lower member. As the term "transition shale" is descriptive, it is recommended that the upper 30 to 50 ft. of the Cambrian, ending above at the top of the well known "red cast beds", be designated the PEERLESS SHALE MEMBER of the Sawatch quartzite, from the typical occurrence of these beds on the northwest slope of Peerless Mountain, 6 miles east southeast of Leadville."

It is to be noted that the type locality of the Peerless shale member is less than a mile south of the Hilltop Shaft; that ore is mined from it in Buckskin Gulch west of Alma; that it is present and has been productive, together with the underlying Sawatch quartzite from which it is

separated by a porphyry sill, on North Star Mountain at Hoosier Pass; and that in April, 1951, ore was encountered in a vein in Peerless shale in the Leadville Drainage Tunnel at a distance of 8573 feet from its portal. Several samples assayed from 90 to 200 ounces of silver and more than 50% of lead to the ton. Small values of copper, zinc and gold were also present. Being definitely present to the north, south and to the west of the Last Chance-Hilltop region, its presence underneath the White lime in that region is to say the least, not very problematical.

A porphyry sill may, or may not be present between the Peerless shale and the Sawatch quartzite underneath the Last Chance-Hilltop region. As shown in the northwest corner of Plate 1, porphyry sills are present near the contemplated west portal of the Dauntless Tunnel and have been traced over considerable distances both to the north and south. It remains to be seen whether or not they retain their prominence to the east underneath the Last Chance-Hilltop region. No doubt some porphyry sills will be found, but their thickness and lateral extent cannot be foretold at this time.

The Sawatch quartzite which has produced gold and other minerals in various parts of Colorado and in which a good grade of silver-lead ore was encountered in the Leadville drainage tunnel in January, 1951, is the lowest horizon suggested for exploratory work in the proposed exploration program.

In summary, the horizons which can be and should be tested for silver-lead-zinc ore occurrences by diamond drill-

ing and driving of the Dauntless tunnel in the Last Chance-Hilltop region are, from the top downward:

Blue Lime
White Lime
Peerless Shale
Sawatch Quartzite.

Underneath the Hilda-Last Chance-Hilltop ore body, (see Plate 1), all of the above horizons lie above the plane of the Dauntless tunnel. Underneath the southerly possible continuation of the Lind and Stewart ore bodies in the Blue lime, the plane of the Dauntless tunnel crosses the White lime, and the Peerless shale and Sawatch quartzite lie a short distance below it.

9. BOUNDARY LINES OF SEDIMENTARY SERIES ON PLANE OF DAUNTLESS TUNNEL.

As none of the accessible workings have penetrated the base of the Blue lime, it is somewhat difficult to determine the boundary lines of the sedimentary series on the plane of the Dauntless Tunnel. An attempt to do this was nevertheless made by using all available data from the different maps and reports. Six strike and dip measurements, data from one diamond drill hole drilled from the present face of the Dauntless Tunnel and some data contained in the report by W. S. Larsh[1] were used for the purpose.

On page 6 of his report, under paragraph marked (4)

1. Larsh, W. S., Report on the Hilltop Mining Company, Park County, Colorado, October 1921. Report bound in brochure by James N. Redman which accompanies Forms MF-100 and MF-103 as Exhibit No. 3.

Leadville Lead Corporation
500 Ernest & Cranmer Bldg.
Denver 2, Colorado

near the bottom of the page, Larsh states:

> "That the plane of the Dauntless tunnel will intersect the bottom of the White lime vertically below the main ore shoot (Last Chance-Hilltop) at a point about 150 ft. north of the Hilltop south end line-------"

Some notes made by Ogden Tweto, geologist of the United States Geological Survey, on drill cores from a 30 degrees down hole at the breast of the Dauntless tunnel read as follows:

> "In parting to 12' then fault with gougy breccia, at least 2'. Then alternate porphyry (light gray, fine grained, with few small feldspar phenocrysts) to 32'. Then into fine grained, alternate White porphyry (conclude that it is White porphyry after considerable deliberation, but it looks like White lime too. Too uniform for White lime, and no reaction with acid)."

Strike and dip measurements are shown on Plate 1 at the following locations:

Coord. 2330N - 1455W: in triangle between Last Chance-Hilltop and Lind-Stewart workings. From old maps.
Strike N-14-W, dip 20 degr. East.

Coord. 595N - 543W: near East Portal of Dauntless tunnel. From U. S. Bureau of Mines map.
Strike N-15-E, dip 15 degr. East.

Coord. 1480N - 1565W: over projected course of Dauntless tunnel. From U. S. Bureau of Mines map.
Strike N-10-W, dip 16 degr. East.

Coord. 1400N - 1750W: east of road to Last Chance open cut. From U. S. Bureau of Mines map.
Strike N-10-W, dip 16 degr. East.

Coord. 610N - 565W: near East portal of Dauntless tunnel. From C. R. Wilfley Report, December 20, 1948.
Strike N-20-25-E, dip 20 degr. East.

Coord. 950N - 2212W: in southernmost end of Hilda tunnel. From C. R. Wilfley report, December 20, 1948.
Strike N-36-E, dip 23 degr. East.

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From these strikes and dips it appears that the strike of the sedimentaries changes from a northwesterly direction in the northeastern part of Plate 1 to a northeasterly direction in the south central part of Plate 1. Dips are steeper to the northeast and southwest than they are to the southeast near the portal of the Dauntless tunnel, pointing to the possibility of a slight northwestward trending open fold, or a nosing in the sedimentaries.

With the control points of the bottom of the White lime on the plane of the Dauntless tunnel to the north, the Parting quartzite in the same plane near the present face of the Dauntless tunnel to the southeast, and assuming a gradual change of strike from northwest to southeast, the boundary lines of the sedimentary series on the plane of the Dauntless Tunnel, were plotted as shown on Plate 2, attached to and forming a part of this report. Assuming an average easterly dip of 15½ degrees near the major axis of the arch above described, a general cross section was then constructed which, if used in conjunction with the boundary lines of the sedimentaries on the plane of the Dauntless Tunnel should give an approximate yet fairly accurate cross section of the sedimentary series below any point near the course of the Dauntless Tunnel and the Hilda-Last Chance-Hilltop workings. Five such cross sections are shown on Plate 2; their locations with respect to the co-ordinate net on Plate 1 are also shown in plan on Plate 2. By superimposing Plate 2 over Plate 1

and making coordinate lines and numbers on both maps coincide, the locations of the sections with respect to mining claims and surface geological features are apparent.

10. GENERAL OUTLINE AND APPROXIMATE COSTS OF EXPLORATION WORK.

A general outline of exploratory work to be undertaken under the present program is as follows:

1). Plane table mapping and geological field work in conjunction with driving of Dauntless tunnel and diamond drilling, including geological mapping in Dauntless tunnel and correlation with surface exposures.n Determination of elevations for cross sections and guidance of diamond drilling program	$ 4,000.00
2). Advance Dauntless tunnel approximately 1,200 feet from its present face to intersect the Lind-Stewart and the Hilda-Last Chance-Hilltop ore zone on their downward projections and thus open this region along the tunnel for further exploratory work, at approximate total cost of $40.00 per foot	48,000.00
3). Approximately 6720 feet of diamond drilling @ $7.00 per foot, at locations shown on plan and cross sections on Plate 2, plus approximately $2,960 of incidental costs	50,000.00
TOTAL APPROXIMATE COST OF EXPLORATION PROGRAM	$102,000.00

11. MINING CLAIMS ON WHICH EXPLORATORY WORK IS TO BE DONE

The mining claims on which the exploratory work is to be done are shown on Plate 1. It embraces the following claims:

Name of Claim	Survey Number	Title
Badger Boy	1336	Fee ownership
Rat	5444	Lease
California	5517 AM	Fee ownership
Addie	5413	Lease and option
Hilda	5413	" " "
Last Chance	3195	" " "
Cato	3196	" " "

The terms of lease and option are described in greater detail on Forms MF-100 and MF-103 with which this report is submitted as Exhibit No. 1.

12. DETAILS OF EXPLORATORY WORK AND EQUIPMENT ON HAND.

Apart from work done by the Leadville Lead Corporation during 1948 and lessees and sub-lessees in 1949 and 1950, as described on pages 6 and 8 of the prospectus which accompanies Forms MF-100 and MF-103 as Exhibit No. 2, the properties have been shut down. Nor could they be visited to advantage during the winter of 1950-1951 in order to invoice the equipment and supplies now on hand at the property. Data on equipment and supplies, labor, water supply and road conditions mentioned in this report were therefore obtained from the files of the Leadville Lead Corporation and from information obtained from Mr. James N. Redman who in 1948 was managing the property and who is familiar with conditions existing on the property.

13. MAPPING AND GEOLOGICAL FIELD WORK

As the maps accompanying this report are composite maps constructed from a number of old maps which do not always check with each other, it is imperative that some plane table mapping be done at the surface and a number of elevations obtained in order to correlate and study surface and subsurface data and direct the drilling program. Some underground survey work may also suggest itself as the work progresses and underground geological study and sampling in accessible places should not be neglected. This work should be started as early as possible

and can be carried on in conjunction with advancing the Dauntless Tunnel and diamond drilling. Outside of the engineering equipment furnished by the geologist and the occasional use of a car, no other major equipment is needed for this work. Drafting and office work connected with the geological work can be done in one of the buildings available on the property and mentioned below under Dauntless Tunnel.

14.
DAUNTLESS TUNNEL EXPLORATORY WORK AVAILABLE EQUIPMENT, ADDITIONAL NEEDED EQUIPMENT AND APPROXIMATE COSTS

An advance of 1200 feet from its present face will put the face of the tunnel at its intersection with the Last Chance-Hilltop fissure immediately below the base of the Peerless shale, into Sawatch quartzite, or into a sill of porphyry if it is present here between the Peerless shale and the Sawatch Quartzite. It is recommended that this work be done at the utmost speed possible, on a contract basis, the company furnishing the major equipment and the contractor furnishing labor and the necessary supplies. The overall price of $40 per foot was arrived at from cost data submitted by Frank Vannatter for driving the Dauntless Tunnel a distance of 403 feet during 1949, and other data. Vannetter's cost items are as follows:

Exhibit No. 1.
Form MF-100

Leadville Lead Corporation
500 Ernest & Cranmer Bldg.
Denver 2, Colorado

Mine labor	$ 4,494.97
Commissary	616.00
Diesel fuel	499.00
Tramming expense (engine)	600.00
Gasoline fuel	198.00
Supplies	20.10
Coal and welding gas	103.00
Powder and caps	1,399.87
Compensation insurance	323.00
Groceries	1,529.00
Old age pension	154.00
Withholding tax	697.00
Equipment and supplies*	2,550.00
Miscellaneous	15.00
Total	$13,198.94

*Includes such items as picks, shovels, carbide, batteries, lamps, shooting wire, drill steel, water connections, boots, anti-freeze, pipe fittings, wire, air valves, nails, fish plates, repairs, etc.

This would amount to a cost of $32.75 per foot for above items, to which must be added increased costs since 1949, local supervision, some additional equipment as quoted below, which with careful planning may bring the total cost for tunnel driving to about $40.00 per foot.

During December, 1939, the writer made a rather detailed cost estimate for the driving of a 8' x 8' crosscut tunnel on a mining property in Cunningham Gulch, San Juan County, Colorado. The cost arrived at per foot of tunnel to be driven amounted to $18.51 per foot, plus a bonus of $4.00 per foot over a certain amount of tunnel driven per month. The work was to be done on a day's pay basis. Since 1939 all prices of equipment and supplies, labor, insurance, etc. have increased very materially. The cost of course also depends on equipment already available at the mine and as there is some doubt, without invoicing on the property, as to what equipment is actually available and in good repair, a detailed cost

estimate cannot be made at present. It is believed, however, that $40 should cover the total cost per foot of driving the tunnel.

Counting on 22 working days per month, 3 eight hour shifts per day and a minimum advance of 15 ft. per day, with possible contingencies arising occasionally, the work should be completed within 5 months after actual work in the tunnel face is started and all equipment is in place and ready to operate.

According to Leadville Lead Corporation records, the following equipment will be available on the property:

14a - Buildings

1 40' x 40' x 20' two floor Quonset Hut at mouth of Dauntless Tunnel, housing the principal mining machinery, shop. Bottom floor unsurfaced; second floor of rough pine; first and second floors interconnected by stairway. Upper floor to serve as change room, lavatory and storage space for small tools, parts and fittings.

1 snowshed, of timber, slab lagging and building paper, connects portal Quonset Hut with bunkhouse.

1 20' x 80' frame and building paper structure equipped as a boarding house and bunkhouse to house 24 workmen.

1 20' x 60' Quonset Hut with wood floor and partitions equipped as a bunkhouse, 160 ft. westerly from the north end of the portal house. This building can house 28 workmen when additional fixtures are installed.

1 small old frame shed on Last Chance claim near open cut workings housing a gasoline driven 210 cu. ft. air compressor (listed below).

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14b - Equipment

1 Cummins Diesel engine driven 445 cu. ft. Gardner-Denver air compressor unit mounted with batteries and air receivers.

1 Cummins Diesel engine driven 25 K. W. electric generating set.

1 small gasoline driven electric light plant.

1 15 HP oil fired boiler used as central heating plant.

1 gasoline engine driven, trailer mounted electric arc-welding machine.

2 27 cu. ft. mine cars.
1 mine car transfer device (Cherry Picker)
1 2-machine drill "Jumbo"
1 Gardner Denver 14 mucking machine
2 CF 79 Gardner Denver automatic drifter machine drills.
2 (or 3)(?) 1000 gallon oil storage tanks at the north end of the portal Quonset Hut.
1 gasoline driven 210 cu. ft. air compressor.

14c - Mobile Equipment

1 D-7 "Caterpillar" Angledozer (built about 1939).
1 D-2 T-2 "Caterpillar" Traxcavator (built in 1948).
1 1949 "Dodge" Power Wagon, stored in Fairplay.

14d - Machine Parts, Rails, etc.

Approximately $5,000.00 worth of machine parts, mine rails, compressed air pipe, mine timbers, and miscellaneous supplies.

14e - Additional Equipment Needed.

If there are sufficient rails, compressed air pipe, ties, ventilation pipe and a blower in the $5,000 worth of parts, etc., listed above, the main items of additional equipment needed for driving the Dauntless tunnel 1200 ft. are:

1 Compressed air locomotive and trailer (extra air tank). The present (May, 1951) cost is $2,500.00 cash, or a $150 per month rental basis with $100 applying on the purchase price.

The ~~four~~ two mine cars at the Dauntless tunnel are

said not to be in very good condition. At least 8 good mine cars should be available. Such cars, manufactured by Card Iron Works in Denver, would come to about $500 each, or a total of $4,000.

14f - Tunnel Ventilation

The present face of the Dauntless tunnel is about 750 ft. northwest of the adit (Coord. 690N-710W) connecting the tunnel with the Dauntless Shaft. 1560 ft. from the east portal, or 531 feet ahead of the present tunnel face, at Coord. 1430N-1510W, the course of the projected tunnel passes underneath a 6 ft, x 8 ft. shaft 110 ft. deep, as shown on the U. S. Bureau of Mines plane table map. The surface elevation of this shaft is about 12,585 ft., leaving a vertical distance of about 170 ft. between the bottom of this shaft and the floor of the Dauntless Tunnel. If the mineralized fissure on which this shaft evidently was sunk is encountered in the tunnel, a 170 ft. exploratory raise connecting with the bottom of this shaft would also serve as an air passage and thus be of great assistance in driving the remaining 669 ft. of the tunnel to its intersection with the Last Chance-Hilltop fissure. While the driving of this raise is not included in the exploration program, it is nevertheless mentioned here because certain changes which may suggest themselves as the drilling to be undertaken under the diamond drilling program proceeds, might make funds available for the driving of this raise. If ore should be encountered in this raise, an exploratory drift started from this raise about 120 feet above the floor of the

tunnel in a northeasterly direction along the course of mineralization for a distance of approximately 400 to 450 feet may connext with the Doran drift (Plate 1, Coord. 1830N-1350W) of the Last Chance-Hilltop workings, thus establishing ventilation through these workings and making them accessible for exploratory work.

15. DETAILS OF DIAMOND DRILLING PROGRAM.

The locations of sections A-A' to E-E' and data leading to their construction have already been discussed. The holes to be drilled on each section, their depths, accumulative depths, cost per hole and accumulative costs are shown on the following table:

Diamond Drill Hole Program for Exploration Loan

Secs.	Holes	Depth	Accum. Depth	Cost $7 p.ft.	Accum. Cost $7 p.ft.	Accum. feet
A-A'	A-1	400	400	2800	2800	
	A-2	400	800	2800	5600	
	A-3	400	1200	2800	8400	1200
B-B'	B-1	250	250	1750	1750	1450
C-C'	C-1	250	250	1750	1750	
	C-2	370	620	2590	4340	
	C-3	550	1170	3850	8190	2620
D-D'	D-1	140	140	980	980	
	D-2	270	410	1890	2870	
	D-3	420	830	2940	5810	
	D-4	270	1100	1890	7700	
	D-5	300	1400	2100	9800	
	D-6	400	1800	2800	12600	
	D-7	470	2270	3290	15890	4,890
E-E'	E-1	170	170	1190	1190	
	E-2	290	460	2030	3220	
	E-3	430	890	3010	6230	
	E-4	50	940	350	6580	
	E-5	120	1060	840	7420	
	E-6	320	1380	2240	9660	
	E-7	450	1830	3150	12810	
					$47040.	6720 ft.
		6,720 ft. @ $7 p. ft.			$47,040.00	
		Incidental costs			2,960.00	
		Total			$50,000.00	

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The price per foot of hole is based on the usual contract price of $3.50 to $5.00 per foot, plus additional work required which is not covered by the contract price, such as furnishing water, power, core boxes, sampling and storing of cores, etc. etc. U. S. Bureau of Mines cost for diamond drilling in high territory in Ross Basin, in the San Juan region of southwestern Colorado, varies from $6 to $9 per foot. Taking into consideration that the Last Chance-Hilltop region is somewhat more accessible, an estimated average cost of $7 per foot does not seem out of place. A discussion of the drill holes on each section is as follows:

15a - Section A-A'

Inasmuch as surface conditions over the boundary line of the Parting quartzite with the plane of the Dauntless tunnel are very similar along its strike, only one section is shown on Plate 2 for the three holes to be drilled in this vicinity. These holes, A1, A2, and A3, will test ore possibilities in the Blue lime only, to both sides of a porphyry dike outcropping in this vicinity and a short distance south of which high grade ore was shipped from the Badger Boy open cut along a fissure of the same name. (Coord. 900N-1020W Plate 1.) Due to the possible presence of several fissures in the vicinity of this dike which may represent a continuation of the dike separating the Lind and Stewart ore bodies to the north but which may also represent a continuation of the dike encountered in the face of the Felt Crosscut (Plate 1, Coord. 2200N-1100W), the holes are flat and are continued a considerable distance to the east of

the dike. If commercial ore is encountered in this vicinity by these holes in the Blue lime, downward diamond drilling to test the ore possibilities in the White lime, Peerless Shale and Sawatch quartzite can be done at a later date from the Dauntless Tunnel.

15b - Section B-B'

In studying the southerly strike of the Lind ore body on Plate 1 it appears to bear away to the west from the dike which separates it from the Stewart ore body, or the dike itself assumes a more southeasterly direction. It is therefore quite possible that the mineralized stringers in the vicinity of Section B-B' represent a southwesterly continuation of the Lind ore body. As shown on section B-B' on Plate 2, a relatively short hole should intersect these stringers at the approximate ore horizon in the Blue lime. Testing of the lower sedimentary series here at a later date from the Dauntless tunnel is even more evident than it is in the locality of section A-A'. In fact, some ore might even be encountered here along the course of the Dauntless tunnel itself in the White lime and in the Peerless shale.

15c - Section C-C'

It may be suggested that the three holes shown on section C-C' on Plate 2 should be drilled from the hanging wall side of the Hilda-Last Chance-Hilltop fissure. However, that area is covered with porphyry slide rock and may have some porphyry in place underneath it, both of which will be difficult to drill through. For this reason the holes have been

spotted in the footwall of the fissure where Blue limestone lies at the surface. Holes on this section may throw some light on the possible southeasterly continuation of the South Dyer fault shown on Plate 1 at Coord. 3060N - 3670W. They should also determine the continuity of an ore body encountered by Redman and partially mined by Butler and Vannatter in the Last Chance open cut as well as underground near the Vannatter shaft, and also followed downward for 55 ft. in a 60 to 70 degree inclined hole drilled by Vannatter during 1949 near the southern end of the Last Chance open cut, some 140 ft. to the northeast of section C-C'. If ore is encountered in hole 1 of section C-C' it will help to prove an ore body which may be continuous from the Vannatter shaft to ore which is said to exist on the winze level of the Hilda tunnel. Exploration of the White lime, the Peerless shale and the Sawatch quartzite by holes 2 and 3 on section C-C' would naturally follow.

15d - Section D-D'

In the underground workings on the Hilda-Last Chance-Hilltop ore body there are two crosscuts to the west which can be made accessible and from which diamond drilling can be done advantageously to test possible continuations of already known ore bodies, ore bodies underlying them in lower formations as well as possible and already partly indicated ore bodies to the west which may roughly parallel the Hilda-Last Chance-Hilltop ore occurrence. One of these is the Hilda Crosscut shown on Plate 1 at Coord. 1140N - 2370W.

In a raise at the very west end of the Lower Cato

Crosscut, at Coord. 1690N - 2240W, Plates 1 and 2, ore is said to have been encountered at the top of the raise. Ore is also said to have been found in the Upper Cato Crosscut, at Coord. 1600N - 2310W, Plates 1 and 2, and probably in a discovery tunnel at Coord. 1510N - 2380W, Plates 1 and 2. The possibilities of a parallel ore body can be explored by holes 4, 5, 6, and 7 as shown on section D-D' on Plate 2. If ore is found in holes 4 and 5, the drilling of holes 6 and 7 would be justified to explore ore possibilities in the White lime, Peerless shale and Sawatch quartzite. It should be borne in mind, however, that a porphyry sill may be found between the Peerless shale and the Sawatch quartzite; if this is found to be the case, the drilling of another, steeper hole might then be advisable to test ore possibilities beneath such a sill in the Sawatch quartzite.

Prior to the drilling of holes 4, 5, 6, and 7, holes 1, 2, and 3 should be drilled to test the downward continuity of ore said to have been encountered on the winze level of the Hilda Tunnel and to test the possibility of ore bodies in the White lime, Peerless shale and Sawatch quartzite. If ore is found in the Peerless shale in hole 3, underlain by porphyry, a fourth hole may have to be drilled to test the Sawatch quartzite underneath the porphyry.

15e - Section E-E'

Inasmuch as less footage is required on section E-E' to test the same horizons as on section D-D', it is advisable to test the parallel ore horizon on section E-E' prior to doing

so on section D-D'. The locations of holes 1 to 7 are shown on section E-E' as well as on the plane map on Plate 2.

15f - Number of Drills

As little organized drilling has so far been done in this vicinity, it is hard to predict the time required for completion of the program above outlined. At least two drills should be working at the same time. Drill No. 1 should drill holes at and near Sections A-A' and B-B', while Drill No. 2 drills holes 1, 2, and 3 on section C-C'. In the meantime, the Hilda and Lower Cato Crosscuts should be readied for the drills so that drillers and equipment would be protected from inclement weather conditions should the drilling program extend into late fall and early winter months.

15g - Water

Water for drilling purposes is believed to be available from a lake, at Coord. 1370N - 900W, as well as from the headwaters of Four Mile Creek and springs and water courses in the vicinity of the Last Chance open cut.

Water sufficient for core drilling also flows from the Dauntless Tunnel from June to November or December. There is also surface flow during much of this time sufficient for core drilling in many places. During the rest of the year there is much snow and ice on the surface. Drinking water is generally brought to the mine from sources known to be safe.

16.
ROADS

Roads and road conditions to the East portal of the Dauntless Tunnel and onward to diamond

drilling sites are shown and described in Exhibits No. 3 (Redman brochure) and No. 2 (Prospectus of April, 1951). Roads from the east portal of the Dauntless Tunnel to the Last Chance open cut and Cato Crosscut are also shown on Plate 1 attached to this report.

A little secondary road work for which the necessary equipment is on the property, may have to be done to reach the locations of holes A-1, A-2, and B-1 at Coord. 1110N - 1130W, 1370N - 1155W, and 1360N - 1580W, respectively. With exception of cleaning out the Hilda and Lower Cato Crosscuts, all other diamond drill hole locations are now accessible.

17. NUMBER OF MEN REQUIRED

Dauntless Tunnel, 3 shifts. While the number of men required to advance the Dauntless Tunnel would be left to the contractor who undertakes the work, the approximate number of men on a three shifts per day basis is set forth below:

6 machine men (drillers)
3 helpers
3 mucking machine and air locomotive operators
3 surface men looking after compressor, etc.

Total 15 men

Diamond drilling, 1 shift basis. To operate 2 drills on a one shift per day basis would require.

2 drillers
2 helpers
2 roustabouts

Total 6 men

Company Employees

Besides the tunnel and diamond drilling crews, the

company will probably have to have a few employees on the ground for odd jobs, such as road upkeep, collecting core boxes, sampling, work around buildings, pipe lines for water to drills, etc. The company crew should consist of:

1 general foreman to supervise all activities
2 roustabouts
1 cook
1 cook's helper and roustabout

Total 5 men

This would mean a total crew of 26 men who can be housed and taken care of with the facilities now existing at the East Portal of the Dauntless Tunnel.

18. AVAILABILITY OF LABOR

While there has been a shortage of labor in the mining camps of Colorado, there are a number of steady residents in the nearby towns of Fairplay, Alma, Como, Dillon, Leadville, Breckenridge, Buena Vista, and Salida, which no doubt could furnish the necessary mining labor required for the work.

Experienced diamond drillers may be an exception to the above. However, contractors usually furnish their own drilling crews and there are a number of contractors who will be contacted for the work.

19. CONCLUSIONS RECOMMENDATIONS

While preparing the data set forth on Plates 1 and 2 which are attached to and form a part of this report to be submitted as Exhibit No. 1 with Forms MF-100 and MG-103, I have made a detailed study of all available information on the holdings of Leadville Lead Corporation in the Horseshoe Mining District of Park County and the California Mining District of Lake County, Colo-

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rado, most of which is also set forth in Exhibits No. 2 and No. 3, as well as in government publications cited in this report.

In view of general geological conditions comparing favorably with those of producing districts, past production records, production from ore having recently been mined from new discoveries near the south end of the Last Chance open cut, I believe that the carrying out of the exploration program as outlined in this report is fully justified in order to open up additional ore reserves needed in the present national emergency.

My report is herewith respectfully submitted,

Harald W. C. Prommel

Harald W. C. Prommel
Consulting Geologist and Mining Engineer
Denver, Colorado.

Denver, Colorado.
May 15, 1951

operator's Maps

Final Report

7½x10½

LEADVILLE LEAD CORPORATION

DENVER, COLORADO

Leadville Lead Corporation
500 Finest & Cranmer Building
Denver 2, Colorado

EXHIBIT NO. 4

TO ACCOMPANY FORM MF-100 OF DEFENSE MINERALS ADMINISTRATION.

REPORT BY C. R. WILFLEY, DATED DECEMBER 20, 1948.

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THE ORIGINAL OF THIS REPORT IS ON FILE IN THE OFFICES OF LEADVILLE LEAD CORPORATION, AND IT OR A PHOTOSTAT COPY CAN BE FURNISHED ON REQUEST.

DENVER, COLORADO
DECEMBER 20, 1948

REPORT ON THE HILLTOP CONSOLIDATION OF THE LEADVILLE LEAD CORPORATION NEAR FAIRPLAY, COLORADO

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

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SUMMARY

THE PROPERTY WAS EXAMINED NOV. 2-4, 7-9, AND 14-17, 1948. INCLEMENT WEATHER PREVENTED DETAILED EXAMINATION, AND THIS REPORT IS THEREFORE TO BE CONSIDERED PRELIMINARY.

THE WORKINGS EXAMINED WERE; MAIN WORKINGS FROM SOUTH END TO HILL TOP SHAFT, 1,500 FEET; CHANCE OPENCUT; HILDA TUNNEL; BADGER BOY OPENCUT; DAUNTLESS SHAFT DUMP; DAUNTLESS TUNNEL.

GEOLOGICAL STRUCTURE AND MODES OF ORE OCCURRENCE ARE CONSIDERED THE SAME AS IN THE HIGHLY PRODUCTIVE LEADVILLE DISTRICT, OF WHICH THE HILL TOP AREA IS THE SOUTHEASTERN PART. IN THE LEADVILLE DISTRICT A RICH PRODUCTION WAS MADE FROM THE TOP SEDIMENTARY BED, KNOWN AS THE BLUE LIME, AND A VERY LARGE OUTPUT CAME ALSO FROM THE UNDERLYING PARTING QUARTZITE, WHITE LIME, AND CAMBRIAN QUARTZITE BEDS. IN THE HILL TOP AREA LARGE BODIES OF RICH SILVER-LEAD ORE WERE FOUND IN THE BLUE LIME, BUT AT NO PLACE HAVE THE UNDERLYING BEDS BEEN EXPLORED. IT IS LOGICAL TO EXPECT ORE IN THESE BEDS AT THE HILL TOP, AND THE DAUNTLESS TUNNEL IS BEING DRIVEN FOR THIS PURPOSE.

LEADVILLE LEAD CORPORATION HAS ACQUIRED AND IS IN PROCESS OF ACQUIRING A LARGE TERRITORY SURROUNDING THE MINE, AND PROPOSES TO DRIVE THE DAUNTLESS TUNNEL AHEAD FROM ITS PRESENT FACE TO THE HILL TOP VEINS AND EXPLORE BOTH THE UNDERLYING BEDS AND THE OLD MINE WORKINGS. WHEN CONDITIONS WARRANT THE TUNNEL CAN BE DRIVEN AHEAD FROM THE HILL TOP TO A PORTAL IN IOWA GULCH NEAR THE MARKET FOR THE ORE AT THE LEADVILLE SMELTER; THIS WILL GREATLY SHORTEN THE HAUL AND PROVIDE A MORE FAVORABLE OPERATING BASE.

THE PROJECT IS EXPLORATORY AND OF SPECULATIVE NATURE. IT IS CONCLUDED THAT THE OLD WORKINGS PROBABLY CONTAIN A SUBSTANTIAL AMOUNT OF ORE THAT WILL BE FOUND PROFITABLE UNDER PRESENT HIGH METAL PRICES, AND THAT THE MINE DUMPS WITH SUITABLE SORTING ARRANGEMENTS SHOULD LIKEWISE YIELD PROFITABLE ORE. EXTENSIVE SAMPLING AND MEASUREMENT ARE RECOMMENDED, TO DETERMINE THIS.

IT IS FURTHER CONCLUDED THAT THE NORTH AND SOUTH EXTENSIONS OF THE MAIN VEIN SYSTEMS SHOULD YIELD ADDITIONAL ORE; AND THAT THE SURROUNDING AREA, WHERE THE SEDIMENTARY BEDS ARE MASKED BY A COVERING OF PORPHYRY, MAY CONTAIN IMPORTANT ORE DEPOSITS WHICH CAN BE EXPLORED BY THE DAUNTLESS TUNNEL. THE MOST IMPORTANT PROBABILITY AND THE ONE MOST LIKELY TO PRODUCE ORE IS THE SERIES OF UNDERLYING SEDIMENTARY BEDS. THESE WILL BE PENETRATED IN THE SHORTEST TIME AND AT LEAST EXPENSE BY THE DAUNTLESS TUNNEL.

INTRODUCTION

Leadville Lead Corporation
C/O Fairplay Dredger Building
Denver, Colorado

THE FOLLOWING IS A REPORT OF PRELIMINARY EXAMINATION OF THE HILL TOP MINE NEAR FAIRPLAY, COLORADO, OPERATED BY THE LEADVILLE LEAD CORPORATION OF DENVER, COLORADO.

THE MINE WAS EXAMINED NOV. 2-4, 7-9, AND 14-17, 1948. IN ADDITION A PRELIMINARY STUDY HAD BEEN MADE IN 1942 AND REPORTED IN A U. S. GOVERNMENT WAR MINERALS REPORT. 1/.

LEADVILLE LEAD CORPORATION, HEADED BY JAMES N. REDMAN, A WELL-KNOWN MINE OPERATOR OF DENVER, IS REOPENING THE HILL TOP MINE FOR THE PURPOSE OF EXAMINATION AND FOR RECOVERY OF SUCH ORE AS REMAINS IN THE WORKINGS, WHILE CARRYING OUT AN EXTENSIVE PLAN OF EXPLORATION AND DEVELOPMENT.

THE PRINCIPAL OPERATION IS TO BE THE DRIVING OF A TUNNEL KNOWN AS THE DAUNTLESS TUNNEL, TO REACH THE SEVERAL VEINS ON THE PROPERTY AND EXPLORE THESE VEINS IN THE FAVORABLE ROCK FORMATIONS WHICH LIE BENEATH THE OLD MINE WORKINGS. IT IS PLANNED TO EVENTUALLY CONTINUE THE TUNNEL AHEAD, THROUGH THE MOSQUITO RANGE, TO A PORTAL IN IOWA GULCH ON THE LEADVILLE SIDE OF THE RANGE. THIS WILL GREATLY SHORTEN THE HAUL TO THE ORE MARKET AT THE SMELTER IN LEADVILLE.

DURING THE EXAMINATION A LIGHT MANTLE OF SNOW AND SEVERELY COLD BLUSTERY WEATHER PREVENTED EXAMINATION OF THE SURFACE. FURTHER, THE OLD WORKINGS HAD BARELY BEEN REOPENED AND WERE HEAVILY COATED WITH ICE CRYSTALS, SO THAT DETAILED EXAMINATION WAS NOT FEASIBLE. AS REOPENING AND ICE REMOVAL PROGRESS MANY DETAILS CAN BE EXAMINED.

THE WORKINGS WERE: THE LAST CHANCE-HILL TOP MAIN STOPES FROM THE EXTREME SOUTH END TO THE HILL TOP SHAFT, WHERE PROGRESS WAS STOPPED; THE LAST CHANCE OPENCUT; THE HILDA TUNNEL; THE BADGER BOY OPENCUT; AND THE DAUNTLESS TUNNEL.

OWING TO THE CONDITIONS MENTIONED, THIS REPORT IS OF A PRELIMINARY NATURE.

LOCATION AND ACCESSIBILITY

THE PROPERTY IS LOCATED IN SEC. 1, T. 10 S., R. 79 W. AND ADJOINING SECTIONS, PARK AND LAKE COUNTIES, COLORADO, 13 MILES BY ROAD FROM THE STATE HIGHWAY AT FAIRPLAY, COUNTY SEAT OF PARK COUNTY. A ROAD MAINTAINED BY PARK COUNTY FOLLOWS THE ABANDONED RIGHT-OF-WAY OF THE NARROW GAGE C&S RAILROAD TO THE DESERTED TOWN OF LEAVICK. FROM THIS POINT LEADVILLE LEAD CORPORATION HAS CONSTRUCTED A NEW ROAD, IN PART REHABILITATION OF AN OLD ROAD, THE REMAINING 2 MILES TO THE DAUNTLESS TUNNEL, FOLLOWING THE COURSE OF FOUR-MILE CREEK. ALTHOUGH SEVERE WINTER CONDITIONS WILL CAUSE SOME DIFFICULTY, THE NEW ROAD IS ADVANTAGEOUSLY SITUATED FOR SNOW REMOVAL, AND WITH BULLDOZER MAINTENANCE SHOULD PROVIDE YEAR 'ROUND ACCESS TO THE MINE.

A STEEP BUT SERVICEABLE ROAD REBUILT BY THE CORPORATION CONNECTS THE DAUNTLESS TUNNEL BASE WITH THE UPPER WORKINGS.

1/ C. R. WILFLEY, MINING ENGINEER, AND R. W. HANDLEY, CONSULTING METALLURGIST, U. S. BUREAU OF MINES, WAR MINERALS REPORT 194, WASHINGTON, 1943.

PHYSICAL FEATURES AND CLIMATE

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MOST OF THE PROPERTY IS ABOVE TIMBERLINE. THE MAIN BASE OF OPERATIONS, THE DAUNTLESS TUNNEL, IS AT AN ALTITUDE OF 12,296 FEET ABOVE SEALEVEL; LAST CHANCE SHAFT, 12,769 FEET; HILL TOP SHAFT 12,956 FEET; SUMMIT OF MOSQUITO RANGE ALONG LINE OF PROPOSED TUNNEL, 13,200 FEET. THE MINES NOW BEING WORKED ARE ON THE EAST SLOPE OF MOSQUITO RANGE IN PARK COUNTY.

THE TERRAIN ON THE EAST SLOPE IS NOT EXCEPTIONALLY ROUGH AND IS CHARACTERIZED BY ROLLING SLOPES COVERED WITH THE DISINTEGRATION DEBRIS OF PPORPHYRY SHEETS AND FLOWS, AND IS PRACTICALLY DEVOID OF VEGETATION. THE WEST SLOPE IS MORE PRECIPITOUS AT HIGH ALTITUDES, BUT AFTER A SHORT DESCENT THE GRADES OF IOWA GULCH ARE MODERATE.

WATER AT THE MINES IS SCARCE, BUT SMALL STREAMS AND SPRINGS ARE BEING DEVELOPED WHICH SHOULD PROVIDE SUFFICIENT WATER FOR DOMESTIC AND ORDINARY MINING PURPOSES. IT IS POSSIBLE THAT AN ADDITIONAL SUPPLY WILL BE DEVELOPED AS THE DAUNTLESS TUNNEL IS DRIVEN AHEAD. TIMBER FOR MINING PURPOSES IS ABUNDANT AT THE LOWER ALTITUDES, NOT FAR BELOW THE MINES.

POWER FOR THE PRESENT PROGRAM WILL BE FURNISHED BY DIESEL AND GASOLINE ENGINES. ELECTRIC POWER FROM THE LINES OF THE PUBLIC SERVICE COMPANY OF COLORADO CAN BE BROUGHT OVER THE RANGE FROM THE IOWA GULCH SIDE, BUT IT IS BELIEVED ADVISABLE TO DEFER CONSIDERATION OF THIS UNTIL THE DEVELOPMENT PROGRAM HAS REACHED ITS FIRST OBJECTIVES.

THE SMELTING PLANT OF THE AMERICAN SMELTING & REFINING COMPANY AT LEADVILLE, NOW 80 MILES DISTANT BY TRUCK, PROVIDES THE PRINCIPAL MARKET FOR THE ORE. MIXED SULFIDE ORES REQUIRING SEPARATION BY MILLING CAN BE MARKETED AT CUSTOM MILLS IN THE LEADVILLE DISTRICT; OR, IF SUFFICIENT TONNAGE IS DEVELOPED, THE CORPORATION CAN CONSTRUCT ITS OWN MILL. OXIDIZED ZINC ORES IF OF SUFFICIENTLY HIGH GRADE MUST BE SOLD TO DISTANT ZINC BUYERS.

EXPERIENCED MINING LABOR IS FAIRLY PLENTIFUL, AT WAGES RANGING FROM A GENERAL MINERS' PAY OF $1.25 PER HOUR TO $1.60 PER HOUR FOR SPECIALISTS. THESE RATES COMPARE FAVORABLY WITH THE OTHER MINING DISTRICTS OF COLORADO, ESPECIALLY IN CONSIDERATION OF THE HIGH ALTITUDE AND SEVERE WINTERS.

THE CLIMATE IS CHARACTERIZED BY CONSIDERABLE SNOWFALL, ESPECIALLY AT THE HIGHER ALTITUDES, WHERE DRIFTING DUE TO WIND IS A FEATURE. TEMPERATURES SELDOM REACH ABNORMAL LOW LIMITS.

HISTORY

THE FIRST RECORDED DISCOVERY WAS MADE IN 1873, ON THE OUTCROP OF THE LAST CHANCE NEAR THE PRESENT OPENCUT. SINCE THEN VARIOUS MINING OPERATIONS ON DIFFERENT PROPERTIES WERE CARRIED OUT, TOO NUMEROUS TO RECORD HERE. THE HILL TOP MINE, LOCATED IN 1886, BECAME SUCH AN IMPORTANT PRODUCER OF ORE THAT AN AERIAL TRAMWAY WAS BUILT DOWN TO THE TOWN OF LEAVICK, A CONCENTRATING MILL WAS BUILT THERE, AND THE COLORADO & SOUTHERN RAILROAD BUILT A NARROW-GAGE LINE FROM FAIRPLAY TO LEAVICK.

THE CONCENTRATING MILL WAS NOT SUCCESSFUL--POSSIBLY BECAUSE THE SIMPLE GRAVITY CONCENTRATING METHODS THEN AVAILABLE WOULD GIVE VERY LOW RECOVERIES ON THE HIGHLY OXIDIZED HILL TOP ORES. WITH THE DEMONETIZATION OF SILVER IN 1893 AND CONSEQUENT DROP IN THE PRICE OF THE METAL, MINING CEASED AND THE RAILROAD WAS

EVENTUALLY ABANDONED.

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SINCE 1893 HOWEVER, THERE WERE SEVERAL OPERATIONS OF CONSIDERABLE EXTENT, AND A SUBSTANTIAL PRODUCTION. THE LAST OPERATION SHOWN BY AVAILABLE RECORDS WAS BY ONE DORAN, AT THE EXTREME NORTH END OF THE MINE, WHERE HE REPORTS THAT HE WAS DEVELOPING NEW ORE AT THE TIME HE CEASED OPERATIONS.

DUE TO THE ENERGETIC EFFORTS OF MR. REDMAN, THE LEADVILLE LEAD CORPORATION HAS FOR THE PAST SEVERAL YEARS BEEN ACQUIRING EXTENSIVE TERRITORY WITH THE OBJECT OF CARRYING OUT A LONG-RANGE EXPLORATORY PROGRAM.

PROPERTY

A LARGE AREA IS BEING ACQUIRED UNDER VARIOUS METHODS, SUCH AS OUTRIGHT PURCHASE, PURCHASE UNDER LEASE AND OPTION, TAX TITLES, LONG-TERM LEASES, AND THE LOCATION OF NEW CLAIMS ON OPEN GROUND. ON THE ACCOMPANYING CLAIM MAP, FURNISHED BY THE COMPANY, THE TERRITORY THUS BEING ACQUIRED IS OUTLINED. IT IS HARDLY FEASIBLE TO DISTINGUISH EACH CLASS OF TITLE OR METHOD OF HOLDING, AS CONDITIONS CHANGE AS NEGOTIATIONS PROCEED.

THE CLAIM MAP SHOWS ALSO THE APPROXIMATE POSITIONS OF THE CONTINENTAL CHIEF MINE TO THE NORTH AND THE PEERLESS MINE TO THE SOUTH. BOTH OF THESE WERE PRODUCTIVE IN THE PAST, AND NEW WORK WAS BEGUN RECENTLY AT THE PEERLESS MINE. LEADVILLE LEAD CORPORATION HAS ACQUIRED OR HOLDS INTERESTS IN PRACTICALLY ALL THE GROUND BETWEEN THESE TWO MINES, COVERING ABOUT TWO MILES IN A NORTH-SOUTH DIRECTION.

DURING THE EXAMINATION IT WAS NOTED THAT THE CORPORATION IS WELL EQUIPPED WITH SUPPLIES AND MACHINERY. IMPORTANT ITEMS WERE: D-7 CATERPILLAR ANGLEDOZER; T-2 TRAXCAVATOR WITH TRAILER; 3-TON TRUCK; DODGE POWERWAGON; DODGE AMBULANCE; DODGE WEAPON CARRIER; 2 AUTOMOBILES; 445-CUFT., 210-CUFT. AND 105-CUFT. AIR COMPRESSORS; G-D MUCKING MACHINE; 2-DRILL "JUMBO" DRILL CARRIAGE AND "CHERRY PICKER"; 2 DRIFTING AND 2 SINKING DRILLS; 8 MINE CARS, 27 CUFT.; 1-1/2-TON ATLAS STORAGE BATTERY MINE LOCOMOTIVE; MINE RAILS, TIES, AIR PIPE AND THE LIKE.

STRUCTURES NOW IN USE AND BEING BUILT WILL BE ADEQUATE TO HOUSE MEN AND MACHINERY FOR SATISFACTORY AND CONTINUOUS OPERATION. THE PRINCIPAL ITEMS ARE THE PRESENT FRAME 1-STORY BOARDING HOUSE ABOUT 40 BY 80 FEET; A 20 BY 60 FOOT QUONSET HUT NOW BEING BUILT FOR A BUNK HOUSE; A 40 BY 40 FOOT QUONSET HUT NEARLY COMPLETED HOUSING THE TUNNEL PORTAL AND MINE MACHINERY; AND SEVERAL SMALL STRUCTURES.

UNDER A FAVORABLE ARRANGEMENT THE COMPANY HAS POSSESSION AND USE OF THE BUILDINGS AT THE BARCOE TUNNEL. THESE ARE SITUATED NOT FAR BELOW LEADVICK ON THE VALLEY FLOOR OF FOUR MILE CREEK, MAKING AN ADVANTAGEOUS WAY-STATION WITH OFFICE AND LIVING QUARTERS AND EASY ACCESS TO FAIRPLAY.

GEOLOGY

THE MINE IS SITUATED AT THE SOUTHEAST MARGIN OF THE HIGHLY PRODUCTIVE LEADVILLE DISTRICT, WITH THE SAME TYPE OF GEOLOGY AND ORE DEPOSITS.

THE ROCKS CONSIST OF SEDIMENTARIES, OR WATER-LAID BEDS

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WHICH WERE INTRUDED BY MOLTEN PORPHYRY THAT SOLIDIFIED IN THE FORM OF DIKES FILLING FISSURES, AND GREAT MASSES OR SHEETS BETWEEN OR CUTTING ACROSS THE SEDIMENTARY BEDS.

ON THE SHEET WHICH FOLLOWS (PAGE 6) IS SHOWN THE GEOLOGIC COLUMNAR SECTION, FROM THE SURFACE DOWNWARD. THE ACCOMPANYINT FIGURE (PAGE 7) SHOWS THIS COLUMN GRAPHICALLY AND ILLUSTRATES THE RELATIONS OF THE ROCK FORMATIONS AND THE COMPLICATED PORPHYRY INTRUSIONS AND MODES OF ORE OCCURRENCE.

IN THIS REPORT THE LOCAL OR MINERS' NAMES FOR THE FORMATIONS ARE USED, AS EXISTING REPORTS AND REFERENCES ARE COUCHED IN THE TERMS. THE REVISED AND MORE UP-TO-DATE GEOLOGIC SECTION IS SHOWN ON PAGE 6 ALONG WITH THE LOCAL NAMES.

THE SEDIMENTARY BEDS HAVE BEEN TILTED BY OROGENIC FORCES AND IN THE PROCESS HAVE BEEN FRACTURED BY NUMEROUS FAULTS. IT IS BELIEVED THAT THE MAJOR FAULTS WERE CHANNELS THROUGH WHICH THE ORE-BEARING HOT SOLUTIONS AND GASES ASCENDED, DEPOSITING THEIR MINERALS IN FAVORABLE PLACES IN THE SEDIMENTARY BEDS OR FILLING THE FISSURES OF OTHER FAULTS. IN SOME CASES LATER FAULTS HAVE CUT ACROSS ORE BODIES, DISPLACING ONE SEGMENT FROM THE OTHER; IN OTHER CASES, FAULTS EXISTING BEFORE THE MINERALIZATION PROVED TO BE BARRIERS AGAINST WHICH MINERALIZATION STOPPED.

THE ACCOMPANYING MAP TITLED "FAULT SYSTEM NEAR HILL TOP MINE" SHOWS THE REMARKABLE AMOUNT OF FAULTING IN THIS VICINITY, TYPICAL OF THE LEADVILLE DISTRICT. THIS MAP WAS COPIED FROM A U. S. GEOLOGICAL SURVEY MAP ON WHICH NOTHING WAS MAPPED EAST OF THE CREST OF MOSQUITO RANGE. IT IS PROBABLE THAT THE INTENSIVE FAULTING, POSSIBLY WITH DIMINISHING INTENSITY, CONTINUED THROUGH THE HILL TOP AREA. SINCE FAULTING IS INTIMATELY CONNECTED WITH MINERALIZATION IT IS IMPORTANT TO WORK OUT THE FAULTING IN THE HILL TOP AREA.

THIS MAP SHOWS AN ALINEMENT OF THE HILL TOP FAULT WITH THAT OF THE CONTINENTAL CHIEF MINE, ROUGHLY A MILE NORTH. THERE IS ALSO THE SUGGESTION THAT BOTH MINES ARE LOCATED AT OR NEAR THE CROSSING OF TWO FAULT SYSTEMS, ONE NORTH-SOUTH, THE OTHER NORTHEAST-SOUTHWEST.

THE "BLUE LIME" HAS BEEN THE MOST PRODUCTIVE FORMATION, THE "WHITE LIME" NEXT, AND THE CAMBRIAN QUARTZITE NEXT. ON THE FAIRPLAY SIDE THE PEERLESS SHALE OF THE WHITE LIME AND THE CAMBRIAN QUARTZITE FORMATIONS HAS BEEN QUITE PRODUCTIVE. IN THE GRANITE, WHICH IS THE FOUNDATION ROCK OF UNKNOWN DEPTH, UNDERLYING THE WHOLE DISTRICT, THE VEINS ARE AS A RULE SMALL AND UNCOMMERCIAL. THERE IS NO CRITERION FOR DETERMINING WHETHER THE WHITE LIME OR THE CAMBRIAN QUARTZITE FORMATIONS WILL BE PRODUCTIVE, EVEN DIRECTLY BENEATH RICH PRODUCTION IN THE BLUE LIME ABOVE. THE ORE THAT IS FOUND IN THE WHITE LIME FORMATION IS USUALLY AS HEAVY MIXED SULFIDE ORE OF LEAD, COPPER AND ZINC, AS WELL AS IRON.

IN THE BLUE LIME FORMATION THE MOST PRODUCTIVE BODIES AS A RULE ARE REPLACEMENT BODIES, IN WHICH THE MINERALIZING SOLUTIONS HAVE ATTACKED AND DISSOLVED THE LIMESTONE, REPLACING IT WITH METALLIC MINERALS, SOMETIMES IN LARGE MASSES EXTENDING LATERALLY, OR IN LONG CIGAR-LIKE BODIES SUCH AS THE HILL TOP ORE BODY.

OF SPECIAL INTEREST, AS SHOWN ON THE FAULT SYSTEM MAP, THE SOUTH DYER, ONE OF THE MAJOR FAULTS, WOULD IF PROJECTED PASS BETWEEN THE SOUTH END OF THE LAST CHANCE AND THE HILDA TUNNEL. SOME OBSERVERS BELIEVE THAT THIS IS THE CASE.

GEOLOGIC SECTION

LEADVILLE DISTRICT

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FORMATION LOCAL NAME	THICKNESS, FEET	ROCKS	FORMATION REVISED NAME		AGE
BLUE LIME	40 TO 246	MOSTLY LIMESTONES	LEADVILLE LIMESTONE		MISSIPPIAN
			DYER DOLOMITE	CHAFFEE FORMATION	DEVONIAN
PARTING QUARTZITE	0 TO 55	MOSTLY QUARTZITES	PARTING QUARTZITE		
WHITE LIME	27 TO 187	MOSTLY DOLOMITIC LIMESTONES	MANITOU LIMESTONE		ORDOVICIAN
			PEERLESS SHALE	SAWATCH QUARTZITE	CAMBRIAN
CAMBRIAN QUARTZITE	94 TO 192	MOSTLY QUARTZITES			
GRANITE		GRANITE AND SCHIST AND GNEISS			PRE-CAMBRIAN

As the surface in this vicinity is covered by porphyry there are no outcrops of the sedimentary beds from which the stratigraphy can be worked out. As the Last Chance and South Dyer fissures are both reverse faults with the upthrow on the west side, it is likely that any continuation of Last Chance ore beyond the Dyer fault will be relatively downthrown and lie deeper in the Hilda workings.

MINE WORKINGS

The accompanying maps, Plan and Longitudinal Projection, show the general extent and relationships of the mine workings. Owing to certain conflicts in the old maps and reports, and lack of exploration, the positions of the sedimentary beds are not known with exactitude. The maps are therefore to be regarded as idealized sections and not exact as to details.

The workings examined were the Last Chance-Hill Top workings from the south end to the Hill Top shaft, a distance of about 1,500 feet; The Last Chance opencut; The Hilda Tunnel; The Bagsser Boy opencut; and the Dauntless Tunnel.

In the Last Chance-Hill Top an ore body was followed, striking N. 28° E. and dipping 15° N. It lies in the Blue Lime beds, which strike N. 15° W. and dip 20° E. As far as examined the workings consist of one large stope varying from something like 10 to 40 feet in width and 10 to 60 or 70 feet in height; it continues on beyond the Hill Top shaft, and, as shown by reports and maps, ends at the Hill Top fault. Beyond this point a porphyry dike running northerly and paralleling the fault was encountered, with two ore bodies, one on each side of the dike, known as the Lind and Stewart bodies. According to reports, ore was being opened up in the lower end of the workings, north from the Lind and Stewart stopes, at the time of the last work done.

Ice crystals cover most of the walls of the stope and have accumulated loosely on the floor, making detailed examination difficult. The stope is of very irregular shape, with a very uneven floor.

From such observations as could be made, it appeared possible that considerable ore might have been left in the stope, some of it uncommercial in grade at the time of mining, some of it overlooked or hidden in seams which have since broken loose and caved into the stope. A boulder about 8 by 10 by 10 feet in size, which could weigh approximately 70 tons was noted in passing, among numerous others. A sample 6.7 feet high across one face of this boulder assayed 0.10 oz. gold and 21.3 oz. silver per ton, 15.2 percent lead, 0.8 percent copper, and 5.0 percent zinc, gross assay value at smelter net prices, $99 per ton. It is improbable that ore of this grade (about $99 per ton at 1927 metal quotations) would have been left by the miners. It must have caved down since that time.

As there are many other boulders besides a considerable amount of fine materials in this stope, an extensive sampling program is warranted. A substantial amount of good ore may thus be found.

The workings were entered through the short tunnel shown on the map, near the Last Chance opencut, known as the Boarding House tunnel. The Hill Top and Last Chance shafts, vertical, and the Hill Top incline, are closed by ice. A small opening was cored through the ice of one of the shafts and this apparently furnishes fair natural ventilation, as a distinct draft was noted in the stope during the examination.

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THE LAST CHANCE OPENCUT EXPOSES THE SOUTH END OF THE ORE BODY, SO FAR AS EXPLORATION GOES. IT FORMERLY CONNECTED WITH THE STOPE BELOW, WHICH HAD HOLED THROUGH; THE OPENING IS NOW CLOSED.

FROM THE OPENCUT LEADVILLE LEAD CORPORATION HAS MINED AND SHIPPED BY TRUCK 137 TONS OF ORE OF GOOD GRADE (DESCRIBED UNDER "CHARACTER OF ORE"). ORE IS EXPOSED IN THE EAST SIDE OF THE OPENCUT, SOMEWHAT SHATTERED, AND HIGHLY IXIDIZED, UNDER 5 OR 6 FEET OF SURFACE DEBRIS. THE TOP OF THIS ORE EXPOSURE IS ROUNDED, NORTH TO SOUTH, SUGGESTING POSSIBLY A DOWN-DRAG ON THE SOUTH DUE TO FAULTING. THE ORE HAS PASSED UNDER THE FLOOR OF THE CUT AT THE SOUTH END.

IN THE HILDA TUNNEL THE WORKINGS ARE ALMOST COMPLETELY COATED WITH ICE, MAKING EXAMINATION DIFFICULT. NO ORE WAS OBSERVED IN THE WORKINGS ON THE TUNNEL LEVEL, BUT A SMALL AMOUNT OF ORE IS REPORTED TO BE EXPOSED IN THE WINZE WORKINGS ABOUT FIFTY FEET DEEPER.

AT THE EXTREME EAST END OF THE HILDA TUNNEL IS A STRIKING HORIZON MARKER CONSISTING OF A SOFT BLACK CLAY BED WHICH STRIKES N. 36° E. AND DIPS 23° E. IT IS INTERBEDDED IN THE BLUE LIME FORMATION AND SHOWS THE ATTITUDE OF THE STRATA AT THIS POINT. IF IT IS FOUND CONTINUOUS ELSEWHERE IT SHOULD PROVE TO BE A GOOD HORIZON MARKER IN DETERMINING THE ELEVATIONS OF THE BEDS AND POSSIBLE FAULTING.

AT THE BADGER BOY OPENCUT, ALONG THE LINE OF THE DAUNTLESS TUNNEL, A LARGE IRREGULAR CUT HAS BEEN MADE, EXPOSING FRACTURES AND CONSIDERABLE DISTURBANCE OF THE STRATA BUT NO ORE. CORRELATION OF THIS WITH NEARBY SURFACE WORKINGS MAY INDICATE FAULTING.

THE DAUNTLESS TUNNEL, WHICH HAS BEEN DRIVEN 576 FEET ON A COURSE N. 42° W. APPROXIMATELY, IS IN BLUE LIME WHICH STRIKES N. 20° - 25° E. AND DIPS 20° E. THE TUNNEL CROSSES FOUR FRACTURES OR VEINS, THE FIRST THREE OF WHICH ARE FILLED WITH GOOD QUARTZ AND ALTERATION MATERIAL BUT LITTLE VISIBLE METALLIC MINERALS. THESE THREE STRIKE N. 5° TO 15° E. AND DIP FROM VERTICAL TO 59° W. THE FIRST TWO SHOULD INTERSECT SOUTH OF THE TUNNEL AND THE SECOND TWO NORTH OF THE TUNNEL. SUCH INTERSECTIONS SHOULD BE FAVORABLE SITES FOR ORE DEPOSITION.

THE FOURTH FRACTURE, WHICH APPEARS TO BE THE DAUNTLESS VEIN, STRIKES N. 33° E. AND DIPS 74° W. ON THE TUNNEL LEVEL. IT HAS BEEN EXPLORED BY A RAISE REPORTED TO BE 90 FEET HIGH, WITH A DRIFT AT THE TOP 60 FEET LONG CONNECTING WITH THE SHAFT. ORE OF FAIR GRADE IS REPORTED TO BE EXPOSED IN THE DRIFT.

THE TUNNEL, DRIVEN STRAIGHT, IS AT AN ELEVATION WHICH WILL PLACE IT BENEATH THE BLUE LIME AND WHITE LIME FORMATIONS WHERE IT CUTS THE LAST CHANCE-HILL TOP VEIN, ACCORDING TO THE DATA AVAILABLE. IN THE ZONE ABOUT 200 TO 600 FEET AHEAD OF THE PRESENT FACE IT SHOULD ENCOUNTER THE LIND-STEWART VEIN SYSTEM PROJECTED SOUTH. ALLOWING FOR A 75° WEST DIP TO THE LAST CHANCE-HILL TOP VEIN, THE TUNNEL SHOULD REACH THIS VEIN IN ABOUT 1,650 FEET OF NEW WORK.

MINE DUMPS AT THE HILDA TUNNEL, LAST CHANCE OPENCUT, AND DAUNTLESS SHAFT WERE OBSERVED, BUT THE EXTREMELY INCLEMENT WEATHER AND LACK OF TIME PREVENTED SAMPLING. SOME GOOD ORE WAS OBSERVED, PARTICULARLY AT THE DAUNTLESS SHAFT.

NO LARGE WASTE DUMPS WERE OBSERVED, INDICATING THAT MOST OF THE EXCAVATION WAS IN ORE. THIS IS OF PARTICULAR INTEREST IN

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REGARD TO THE LAST CHANCE AND HILL TOP SHAFTS, AS THE SIZE OF THE BIG STOPE ACCOUNTS FOR A LARGE VOLUME OF EXCAVATION.

CHARACTER OF ORE

IN THE BLUE LIME DEPOSITS SILVER AND LEAD ARE THE PRINCIPAL VALUES, ALTHOUGH IN SOME CASES AN OUTER CASING OF ZINC CARBONATE ORE OF COMMERCIAL VALUE IS FOUND. THE SILVER-LEAD ORE IS VERY MUCH OXIDIZED; SCATTERED KERNELS AND BUNCHES OF THE SULFIDES OF LEAD AND ZINC (GALENA AND SPHALERITE) ARE ALWAYS PRESENT AND SOMETIMES IN MASSES UP TO ABOUT 100-LB. SIZE, BUT ANALYSES SHOW NEARLY ALL THE SULFUR HAS BEEN REMOVED BY OXIDATION. THE NUMERICAL AVERAGE ASSAY OF 112 SHIPMENTS--6,051 TONS-- MADE IN 1910 IS 15.69 OZ. SILVER PER TON AND 15.72 PERCENT LEAD, OR 1 OUNCE OF SILVER FOR EACH 1 PERCENT OF LEAD.

FOUR SHIPMENTS AMOUNTING TO 137 TONS MINED FROM THE LAST CHANCE CUT BY LEADVILLE LEAD CORPORATION AND TRUCKED TO THE AMERICAN SMELTING & REFINING COMPANY SMELTER AT LEADVILLE HAD A WEIGHTED AVERAGE ASSAY OF GOLD, 0.015 OZ. AND SILVER 4.71 OZ., PER TON, 11.33 PERCENT LEAD, 0.16 PERCENT COPPER, 3.01 PERCENT ZINC, 5.69 PERCENT IRON, AND 0.26 PERCENT SULFUR. THIS LOW SULFUR CONTENT SHOWS THE ALMOST COMPLETE OXIDATION OF THE ORE.

THE DEPOSITS IN THE WHITE LIME OF THE LEADVILLE DISTRICT ARE USUALLY HEAVY MIXED-SULFIDES OF LEAD, ZINC, COPPER, AND IRON, CARRYING GOLD AND SILVER.

IN THE CAMBRIAN QUARTZITE THE DEPOSITS ARE GENERALLY SILICEOUS GOLD ORE.

OXIDIZED ZINC ORES (SILICATE AND CARBONATE) HAVE BEEN MINED IN LARGE QUANTITIES IN THE LEADVILLE DISTRICT AND AT TIMES HAVE BEEN QUITE PROFITABLE. RECORDS FURNISHED BY MR. REDMAN SHOW THAT IN 1910 ZINC ORE AMOUNTING TO 479 TONS AVERAGING 33.25 PERCENT ZINC WERE SHIPPED (PRESUMABLY OXIDIZED ORE.)

FREQUENT REFERENCES SPEAK OF THE LEADVILLE OXIDIZED ZINC ORE AS A CASING OR SHELL AROUND THE SILVER-LEAD ORE DEPOSITS. HENDERSON 2/ SPEAKS OF THE OXIDIZED ZINC ORES OF LEADVILLE "FOUND.....ALONG THE SIDES OR FLOORS OF LEAD CARBONATE STOPES." THIS SUGGESTS THAT IT WOULD BE WELL TO EXAMINE THE FLOORS OF THE HILL TOP STOPES, AS WELL AS THE WALLS, IN A SEARCH FOR ZINC ORE. THE OXIDIZED ZINC ORES OF LEADVILLE ALSO OCCURRED IN MASSIVE DEPOSITS.

HENDERSON 3/ MENTIONS THE HILL TOP ORE AS FOLLOWS: " MR.J. B. MCDONALD STATES THAT IN THE SPRING OF 1906 HE FOUND THE FIRST CARBONATE AND SILICATE OF ZINC EVER FOUND IN COMMERCIAL QUANTITIES IN THE LEADVILLE REGION. THIS WAS AT THE HILLTOP MINE, IN THE HORSESHOE DISTRICT, WHICH ADJOINS THE LEADVILLE DISTRICT ON THE DIVIDE BETWEEN LAKE AND PARK COUNTIES".

THE MARKET FOR OXIDIZED ZINC ORES IS SUBJECT TO VARIATIONS IN REQUIREMENTS AND MARKETING CONDITIONS. THIS MARKET SHOULD BE INVESTIGATED IF AND WHEN SUCH ORE IS ENCOUNTERED.

2/ HENDERSON, C.W., IN GEOLOGY AND ORE DEPOSITS OF THE LEADVILLE MINING DISTRICT, COLORADO, PROFESSIONAL PAPER 148, WASHINGTON 1927.

3/ HENDERSON, C.W., WORK CITED.

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THE TUNNEL PROJECT

THERE ARE TWO PARTS TO THE DAUNTLESS TUNNEL PROJECT. THE FIRST IS THE CONTINUATION OF THE PRESENT TUNNEL TO THE LAST CHANCE-HILL TOP WORKINGS AND THE SECOND IS CONTINUATION THROUGH MOSQUITO RANGE TO A PORTAL IN IOWA GULCH ON THE LEADVILLE SIDE OF THE RANGE.

THE OBJECT OF THE FIRST SECTION IS TO GIVE ACCESS FOR ECONOMICAL EXPLORATION OF THE LOWER FORMATIONS BENEATH THE OLD WORKINGS, FURNISH ECONOMICAL MEANS FOR MINING IN THE OLD WORKINGS, PROSPECT THE SOUTH EXTENSION OF THE LIND-STEWART AND LAST CHANCE-HILL TOP SYSTEMS.

THE FACE OF THE TUNNEL IS NOW 576 FEET IN FROM THE PORTAL. THE DRIVE TO THE LAST CHANCE VEIN WOULD BE APPROXIMATELY 1,650 FEET. THE LIND-STEWART ZONE SHOULD BE CUT AT SOMEWHERE 200 TO 600 FEET AHEAD OF THE PRESENT FACE.

THIS FIRST SECTION WILL PROVIDE A MUCH BETTER BASE OF OPERATIONS AND FAR MORE ECONOMICAL METHODS OF MINING, THAN WOULD ATTEMPTS TO REHABILITATE EITHER OF THE OLD SHAFTS AND OPERATE THROUGH IT.

THE SECOND SECTION WOULD, FOR PRACTICAL REASONS, BE DRIVEN FROM A NEW PORTAL IN IOWA GULCH, TO A CONNECTION WITH THE FIRST SECTION AT THE LAST CHANCE WORKINGS.

THE OBJECT OF THE SECOND SECTION IS PRINCIPALLY TO PROVIDE MUCH CHEAPER TRANSPORTATION TO MARKET AT THE LEADVILLE SMELTER. AT PRESENT THE ORE MUST BE TRUCKED 80 MILES AT A COST OF ABOUT $6.50 PER TON BESIDES THE COST OF MAINTAINING 13 MILES OF ROAD TO THE HIGHWAY NEAR FAIRPLAY. OTHER ADVANTAGES ARE A BETTER BASE OF OPERATIONS, AS THE EQUIPMENT WOULD BE TRANSFERRED TO THE NEW PORTAL, 4 MILES FROM RAILHEAD AND 6 MILES BY TRUCK FROM THE SMELTER, AND PROSPECTING OF THE GROUND BETWEEN THE LAST CHANCE WORKINGS AND IOWA GULCH. THE DISTANCE TO BE DRIVEN WOULD BE APPROXIMATELY 3,500 FEET.

CONCLUSIONS

POSSIBILITIES FOR ORE

IN THE OLD WORKINGS IT WAS NOT FEASIBLE TO CARRY OUT THE LONG PROGRAM NECESSARY TO FIND, SAMPLE, AND ESTIMATE THE ORE LEFT IN THE OLD WORKINGS. AS STATED BEFORE, IT IS BELIEVED POSSIBLE THAT A SUBSTANTIAL AMOUNT OF ORE MAY BE FOUND ON DETAILED EXAMINATION.

IN THE SOUTH EXTENSIONS OF THE VEIN SYSTEMS THE OBSERVABLE FACTS WERE INSUFFICIENT TO LEAD TO DEFINITE CONCLUSIONS. IN THE SOUTH END OF THE LAST CHANCE WORKINGS THE ORE BODY APPEARS TO HAVE BENT DOWNWARD RELATIVE TO ITS GENERAL UPWARD INCLINATION IN THE MAIN WORKINGS. IN THE HILDA TUNNEL THERE IS NO ORE, YET MINERALIZATION IS REPORTED TO BE APPEARING 50 OR 60 FEET BELOW, IN THE WINZES. THESE TWO FACTS GIVE SOME REASON TO SUSPECT A CROSS FAULT, WITH THE EAST SIDE THROWN DOWN. A MODERATE AMOUNT OF DIAMOND DRILLING SHOULD DETERMINE WHAT CONDITIONS ARE, AND BE A GUIDE TO EXPLORATION OF ORE.

THE NORTH EXTENSION OF THE VEIN SYSTEM, ALTHOUGH IT COULD NOT BE EXAMINED, APPEARS TO BE PROMISING. THE DORAN REPORTS, WHICH ARE BELIEVED TO BE RELIABLE, STATE THAT THE LAST WORKINGS IN THE NORTH END, WERE STILL IN ORE. GOING NORTH, ANY CONTINUATION OF THE VEIN SYSTEM WILL BE APPROACHING NEARER TO THE CENTERS OF MINERALIZATION, SUCH AS THE CONTINENTAL CHIEF MINE DUE NORTH, AND THE LONDON AND OTHER MINES ON THE LONDON FAULT TO THE NORTH-EAST.

IN THE TRIANGULAR AREA BETWEEN THE TWO VEIN SYSTEMS IT IS POSSIBLE THAT ORE WILL BE FOUND ASSOCIATED WITH FRACTURES SYMPATHETIC TO THE MAIN FRACTURE SYSTEMS. SUCH FRACTURES ARE LIKELY TO BE

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OF LESS EXTENT AND AMOUNT OF MINERALIZATION THAN THE MAIN FRACTURES.

THE GENERAL AREA SURROUNDING THE MINE IS LARGELY UNPROSPECTED BECAUSE OF THE COVERING OF PORPHYRY WHICH HIDES ROCK OR VEIN OUTCROPS. AUTHORITIES ARE IN GENERAL AGREEMENT AS TO THE POSSIBILITIES THAT ORE DEPOSITS EXIST IN THIS AREA.

SINGEWALD, 4/ DESCRIBING THE HILL TOP AREA, SAYS "THE HILLTOP MINE....SUPPLIED 1 TO 1-1/2 MILLION DOLLARS' WORTH OF SILVER-LEAD ORE, BUT ALL OTHER MINES IN THAT MINERALIZED AREA WERE VERY MUCH SMALLER. UNPROSPECTED GROUND WITHIN THE UPPER PART OF THE LEADVILLE DOLOMITE (BLUE LIME) WHERE IT IS CONCEALED BENEATH YOUNGER ROCKS, BETWEEN THE HILLTOP AND CONTINENTAL CHIEF MINES AND EAST OF THE PEERLESS MAUD MINE...MAY CONTAIN DEPOSITS VALUED AT A MILLION DOLLARS OR LESS".

LOUGHLIN AND BEHRE 5/ WRITING IN THE SAME PUBLICATION AS SINGEWALD, STATE: "FAR TO THE EAST OF THE MAIN DISTRICT (LEADVILLE DISTRICT) AND CLOSE TO THE CREST OF THE MOSQUITO RANGE, THREE MINES OF IMPRESSIVE SIZE, THE CONTINENTAL CHIEF, HILLTOP AND PEERLESS, HAVE BEEN VERY PRODUCTIVE IN TIMES PAST, AND A FEW OTHERS, LIKE THE LIDDIA, ARE CREDITED WITH APPRECIABLE OUTPUTS. THEIR ORE BODIES HAVE ALL BEEN IN THE UPPER PART OF THE LEADVILLE DOLOMITE. STRUCTURAL CONDITIONS APPEAR FAVORABLE FOR THE OCCURRENCE OF SIMILAR ORE BODIES, PARTICULARLY BENEATH THE CREST OF THE RANGE WHERE THE LEADVILLE DOLOMITE IS CUT BY NUMEROUS MINERALIZED FISSURES AND IS OVERLAIN BY A THICK SILL OF EARLY WHITE PORPHYRY.

THE CONCLUSION OF THIS REPORT IS THAT THE GENERAL AREA SURROUNDING THE MINE IS QUITE PROMISING; BUT THAT INTENSIVE PROSPECTING, AIDED BY GEOPHYSICAL SURVEYS AND SOME DIAMOND DRILLING, WOULD BE NECESSARY BEFORE PREDICTIONS COULD BE MADE.

THE LOWER FORMATIONS BENEATH THE HILL TOP MINE ARE THE MOST DEFINITE POSSIBILITIES OF ALL. IT IS NOTEWORTHY THAT THE PRESENT EXAMINATION, ALL OTHER REPORTS, AND THE AUTHORITIES QUOTED, ALL FIND THAT ONLY THE BLUE LIME HAS BEEN WORKED. THE UNDERLYING PARTING QUARTZITE, WHITE LIME, PEERLESS SHALE, CAMBRIAN QUARTZITE, AND EVEN THE ANCIENT GRANITE IN PLACES, HAVE ALL BEEN PRODUCTIVE IN THE LEADVILLE DISTRICT.

THERE IS NO RECORD THAT ANYTHING HAS EVER BEEN DONE TO PROSPECT OR IN ANY WAY EXPLORE THESE FORMATIONS BELOW THE OLD MINE WORKINGS. IT IS SOUND REASONING TO ARGUE THAT THERE ARE STRONG POSSIBILITIES FOR ORE IN THESE FORMATIONS. WHILE IT IS TRUE THAT THESE FORMATIONS ARE SOMETIMES FOUND BARREN BELOW GOOD DEPOSITS OF ORE IN THE BLUE LIME, THERE IS NO CRITERION, AND PROSPECTING IN SOME FORM IS THE ONLY METHOD OF FINDING OUT.

THE MINE DUMPS ARE POSSIBLE SOURCES OF ORE. THEY WERE NOT EXAMINED, BUT ORE WAS NOTED AT THE DUMPS OF THE LAST CHANCE OPENCUT, THE HILDA TUNNEL, AND THE DAUNTLESS SHAFT. FROM THE REPORTS FURNISHED, IT APPEARS THAT THERE IS A SUBSTANTIAL TONNAGE OF MINE DUMPS; AT PRESENT HIGH METAL PRICES IT IS POSSIBLE THAT A SUITABLE SORTING PLANT MIGHT PRODUCE A QUANTITY OF PROFITABLE ORE.

4/ SINGEWALD, Q.D., IN MINERAL RESOURCES OF COLORADO, BY VANDERWILT ET AL, DENVER, 1947.

5/ LOUGHLIN, G.F. AND BEHRE, C.H., IN MINERAL RESOURCES OF COLORADO, BY VANDERWILT ET AL, DENVER, 1947.

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THE TUNNEL PROJECT

SINCE THE DAUNTLESS TUNNEL HAS ALREADY CONNECTED WITH ONE POSSIBLE SOURCE OF ORE-- THE DAUNTLESS VEIN--, THE LIND-STEWART VEINS PROJECTED CAN BE REACHED IN A RELATIVELY SHORT DRIVE AHEAD, AND THE MAIN VEIN CAN BE CUT AT THE DEEPEST FORMATION, THE DRIVING OF THIS TUNNEL TO THE LAST CHANCE VEIN IS CONSIDERED WELL JUSTIFIED.

GEOPHYSICAL SURVEYS

IN CONSIDERING THE USE OF GEOPHYSICAL PROSPECTING, THE DEPTH OF THE PORPHYRY OR WEBER FORMATION OVERLYING THE ORE-BEARING BEDS IS IMPORTANT. IF MORE THAN A FEW HUNDRED FEET, WEAK AND INDETERMINATE RESULTS MIGHT BE OBTAINED.

THE MOST EFFECTIVE METHODS WOULD BE THE OLDEST AND SIMPLEST. THESE ARE SPONTANEOUS POLARIZATION, IN WHICH THE NATURAL ELECTRICAL CURRENTS GIVEN OFF BY SULFIDE BODIES ARE LOCATED AND MEASURED BY SURFACE OBSERVATIONS; AND THE EARTH RESISTIVITY METHOD, IN WHICH AN ARTIFICIAL ELECTRICAL CURRENT IS SENT THROUGH THE GROUND AND THE SPECIFIC RESISTIVITY OF THE STRATA IS MEASURED.

THE SPONTANEOUS POLARIZATION METHOD WOULD BE QUITE EFFECTIVE IN LOCATING VEINS OR MASSIVE BODIES OF SULFIDES. IT IS DOUBTFUL THAT THE HIGHLY OXIDIZED BLUE LIME ORE BODIES WOULD GIVE A POSITIVE ENOUGH REACTION; MASSIVE SULFIDES IN THE WHITE LIME, HOWEVER, SHOULD RESPOND. THE RESISTIVITY METHOD, HOWEVER, SHOULD BE EFFECTIVE IN LOCATING AND TRACING FAULTS, ESPECIALLY THOSE OF MUCH VERTICAL DISPLACEMENT, AND IN TRACING WET FISSURES WITH OR WITHOUT VERTICAL DISPLACEMENT. IT WOULD NOT INDICATE THE PRESENCE OF ORE EXCEPT IN THE CASE OF A LARGE MASS OR DEEP FISSURE FILLING OF HEAVY SULFIDES; IN SUCH A CASE THE INDICATIONS SHOULD BE CHECKED BY SPONTANEOUS POLARIZATION TO AVOID MISTAKING A CONDUCTIVE WET FISSURE FOR A SULFIDE BODY.

PRELIMINARY TESTS WOULD BE NECESSARY BEFORE CONCLUDING AS TO THE USEFULNESS OF THESE METHODS . IT IS POSSIBLE THAT THE HEAVY LEAD SULFIDES RESIDUAL IN THE BLUE LIME BODIES, TOGETHER WITH THE VERY ACTIVE OXIDATION POSSIBLY STILL GOING ON, WOULD GIVE A GOOD REACTION WITH SPONTANEOUS POLARIZATION, ESPECIALLY UNDER SHALLOW COVER.

THE SEISMOGRAPH MIGHT BE EFFECTIVE, BUT ONLY IN COVERING WIDE AREAS; FOR THE MORE CLOSELY DETAILED WORK REQUIRED BY THIS CASE THE ELECTRICAL METHODS WOULD BE MORE SUCCESSFUL. THE ONLY USE FOR THE SEISMOGRAPH WOULD BE IN DETERMINING THE DEPTH TO STRATA, WHICH WOULD HELP IN TRACING FAULTS; IT WOULD BE INEFFECTIVE IN INDICATING THE PRESENCE OR ABSENCE OF ORE.

THE CONCLUSION IS THAT THE SIMPLER METHODS OF ELECTRICAL GEOPHYSICS MIGHT BE SUCCESSFUL, ESPECIALLY UNDER SHALLOW COVER, AS IN THE CASE OF THE SOUTH END AND SOUTH EXTENSION OF THE LAST CHANCE ORE SHOOT. PRELIMINARY TESTS WOULD BE NECESSARY BEFORE FULL RECOMMENDATIONS COULD BE GIVEN.

RECOMMENDATIONS

THE FOLLOWING PROCEDURE IS RECOMMENDED, TO CARRY THE PROJECT THROUGH TO PRINCIPAL OBJECTIVES; THE PROGRAM FROM THERE ON SHOULD BE GUIDED BY THE RESULTS ACHIEVED.

1...THE DAUNTLESS TUNNEL SHOULD BE DRIVEN AHEAD TO CUT THE LAST CHANCE VEIN, AND CONNECTION MADE WITH THE OLD MINE WORKINGS. EXPLORATION OF THE GROUND PASSED THROUGH BY THE TUNNEL, AND OF

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THE OLD WORKINGS, SHOULD BE GUIDED BY WHAT IS FOUND.

2...EXPLORATION AND REHABILITATION OF THE OLD MINE WORKINGS SHOULD BE DEFERRED UNTIL THE DAUNTLESS TUNNEL CONNECTION HAS BEEN MADE. SUCH WORK CAN THEN BE DONE MORE ECONOMICALLY AND EFFECTIVELY.

3...EXTENSION OF THE DAUNTLESS TUNNEL FROM THE LAST CHANCE TO THE IOWA GULCH SIDE SHOULD BE DEFERRED UNTIL THE RESULTS OF EXPLORATION PROJECTS 1 AND 2, ABOVE, ARE KNOWN, AND ORE RESERVES ESTABLISHED. A GEOLOGICAL STUDY, POSSIBLY AIDED BY GEOPHYSICAL EXPLORATION, SHOULD BE MADE NEXT SPRING ALONG THE ROUTE OF THE PROPOSED TUNNEL EXTENSION; THIS MIGHT DEVELOP INTERESTING ORE POSSIBILITIES AND FURNISH ADDITIONAL JUSTIFICATION FOR DRIVING THE EXTENSION.

4...THE CATO CROSSCUT SHOULD BE REOPENED AND MADE ACCESSIBLE TO EXAMINATION, ESPECIALLY OF THE REPORTED OCCURENCE OF PORPHYRY.

5...DIAMOND DRILLING SHOULD BE DONE IN THE NEAR FUTURE IN THE SOUTH AREA, CONSISTING OF:

HOLE 1.... A DOWN HOLE PERPENDICULAR TO THE DIP OF THE STRATA, IN THE SOUTH END OF LAST CHANCE WORKINGS, TO DETERMINE THE POSITIONS OF THE BEDS.

HOLE 2.... A DOWN HOLE IN THE BOTTOM OF THE HILDA WORKINGS, SIMILAR TO HOLE 1, DRIVEN FOR THE SAME PURPOSE.

HOLE 3.... A SHORT FLAT HOLE DRIVEN EAST FROM THE SOUTH END OF LAST CHANCE WORKINGS, TO EXPLORE FOR POSSIBLE OTHER FRACTURES OF THE VEIN SYSTEM.

HOLES... SHORT HOLES POINTED AT SUITABLE ANGLES TO EXPLORE THE REPORTED PORPHYRY AND DETERMINE ITS EXTENT AND NATURE.

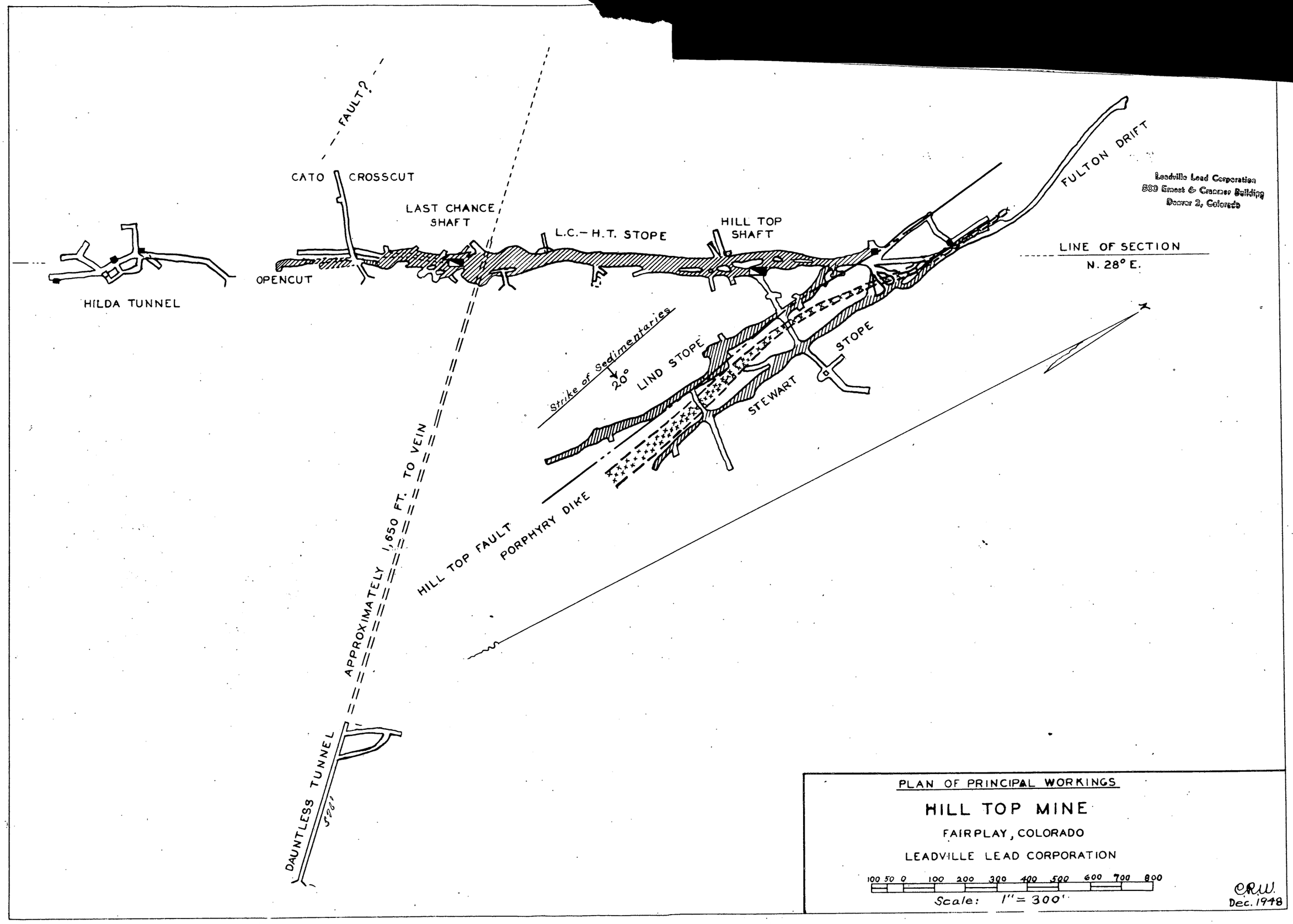
HOLE 5.... A FLAT HOLE 200 TO 3000 FEET LONG, DRIVEN WEST FROM THE WEST END OF THE CATO CROSSCUT, FOR EXPLORATION PURPOSES.

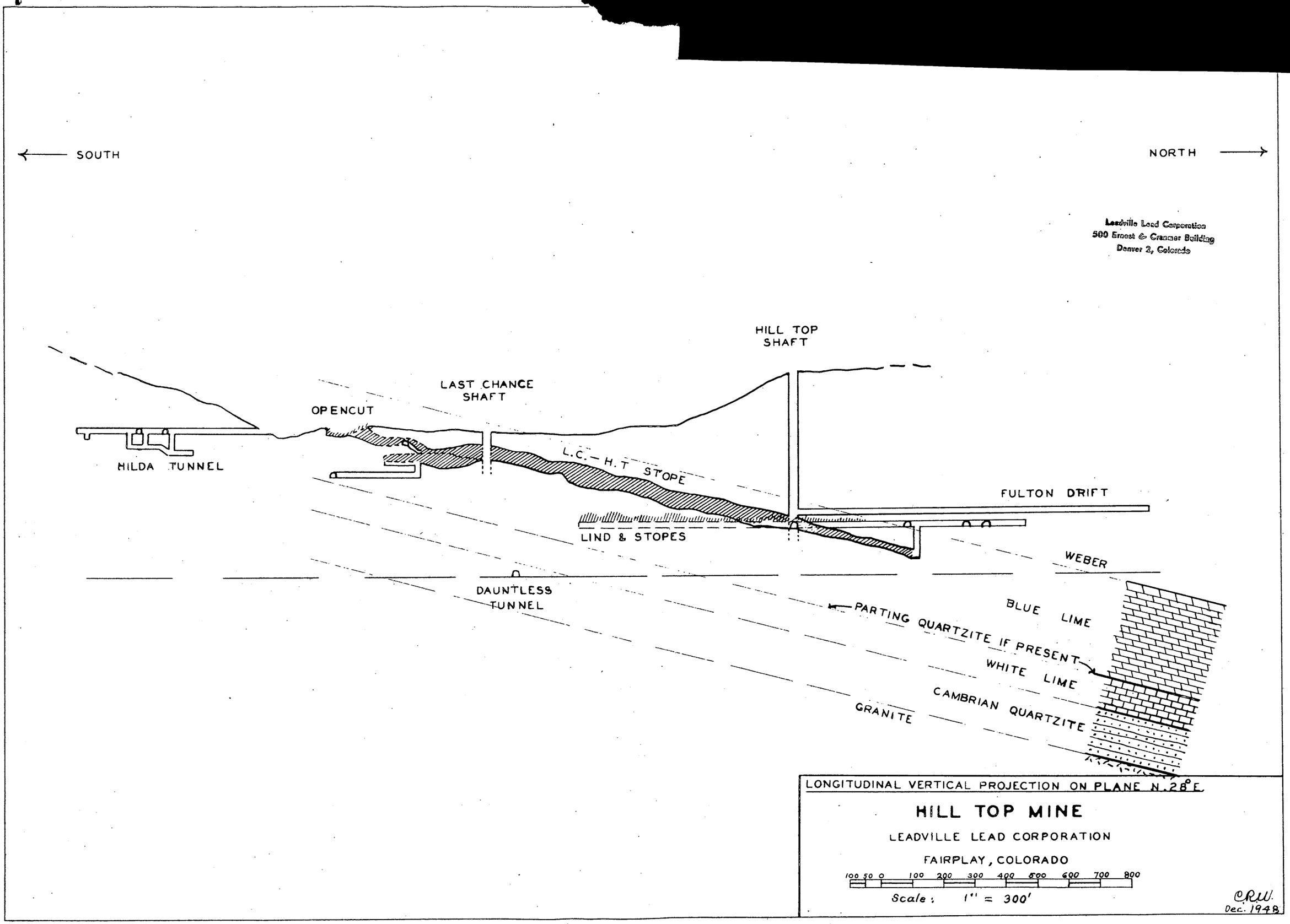
FURTHER DRILLING IN THE SOUTH AREA WOULD BE BEST DONE FROM THE SURFACE AND PROBABLY MUST BE LEFT UNTIL THE SNOW HAS GONE. IF IT IS FOUND THAT GEOPHYSICAL TESTS ARE SUCCESSFUL, THE SOUTH AREA SHOULD BE FIRST STUDIED IN THIS WAY; THEN THE PLACING AND POINTING OF DIAMOND DRILL HOLES CAN BE EFFECTIVELY GUIDED.

6.... PRELIMINARY GEOPHYSICAL TESTS SHOULD BE RUN IN THE SOUTH AREA AS SOON AS FEASIBLE NEXT SPRING. IF THEY ARE FOUND TO BE SUCCESSFUL, DRILLING FROM THE SURFACE IN THIS AREA WILL BE EFFECTIVELY DIRECTED, AND FURTHER GEOPHYSICAL EXPLORATION ELSEWHERE CAN BE PLANNED.

C. R. WILFLEY
MINING ENGINEER

DENVER, COLORADO DEC. 20, 1948


FAULT?
CATO CROSSCUT
LAST CHANCE SHAFT
L.C.-H.T. STOPE
HILL TOP SHAFT
FULTON DRIFT
Leadville Lead Corporation
800 Ernest & Cranmer Building
Denver 2, Colorado
LINE OF SECTION
N. 28° E.
HILDA TUNNEL
OPENCUT
Strike of Sedimentaries
20°
LIND STOPE
STOPE
STEWART
HILL TOP FAULT
PORPHYRY DIKE
APPROXIMATELY 1,650 FT. TO VEIN
DAUNTLESS TUNNEL
PLAN OF PRINCIPAL WORKINGS
HILL TOP MINE
FAIRPLAY, COLORADO
LEADVILLE LEAD CORPORATION
100 50 0 100 200 300 400 500 600 700 800
Scale: 1" = 300'
CRW
Dec. 1948


SOUTH
NORTH
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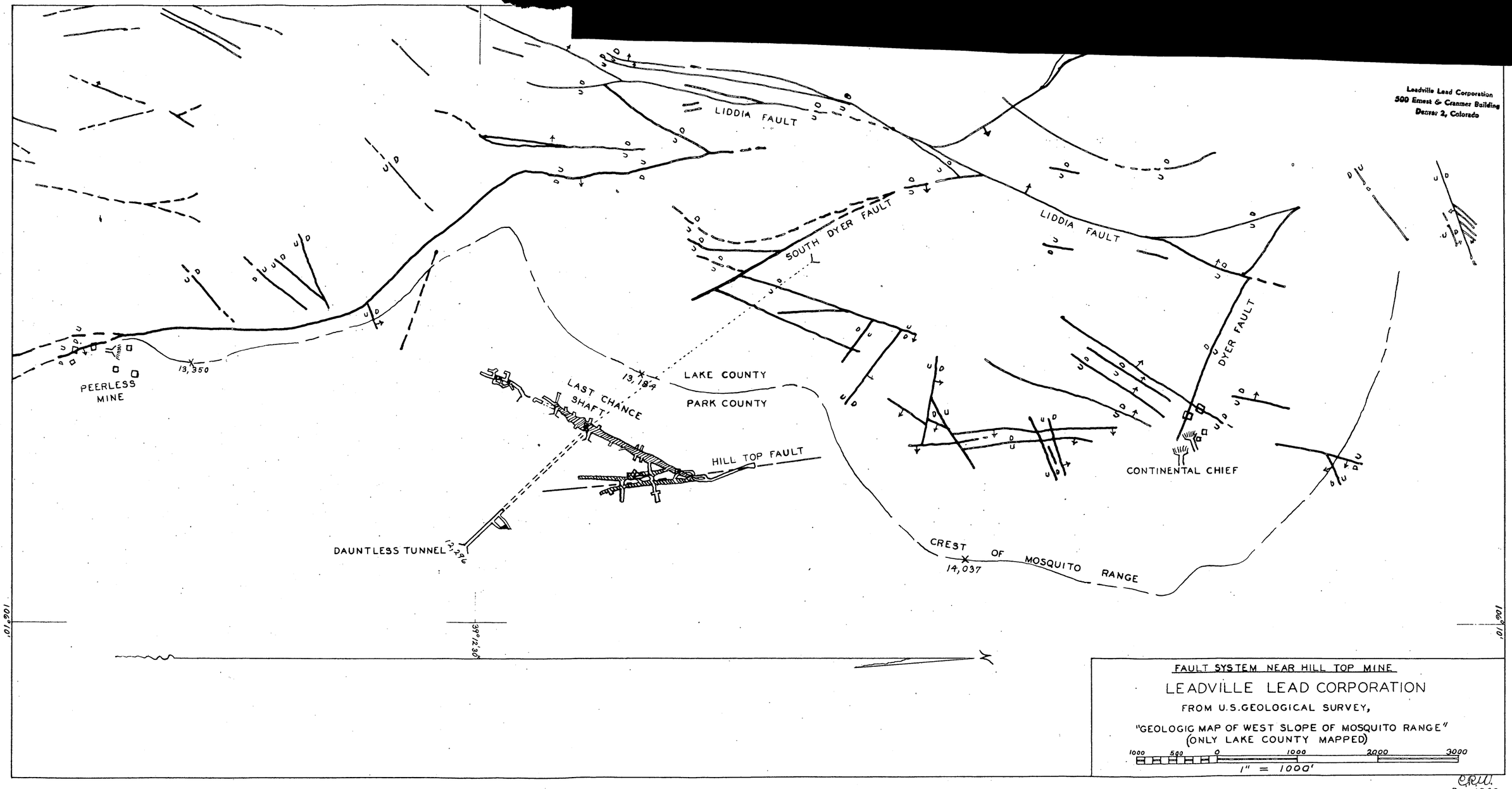
HILL TOP SHAFT
LAST CHANCE SHAFT
OPENCUT
HILDA TUNNEL
L.C.-H.T STOPE
FULTON DRIFT
LIND & STOPES
WEBER
DAUNTLESS TUNNEL
BLUE LIME
PARTING QUARTZITE IF PRESENT
WHITE LIME
CAMBRIAN QUARTZITE
GRANITE
LONGITUDINAL VERTICAL PROJECTION ON PLANE N.28° E.
HILL TOP MINE
LEADVILLE LEAD CORPORATION
FAIRPLAY, COLORADO
100 50 0 100 200 300 400 500 600 700 800
Scale: 1" = 300'
CRW
Dec. 1948


Leadville Lead Corporation
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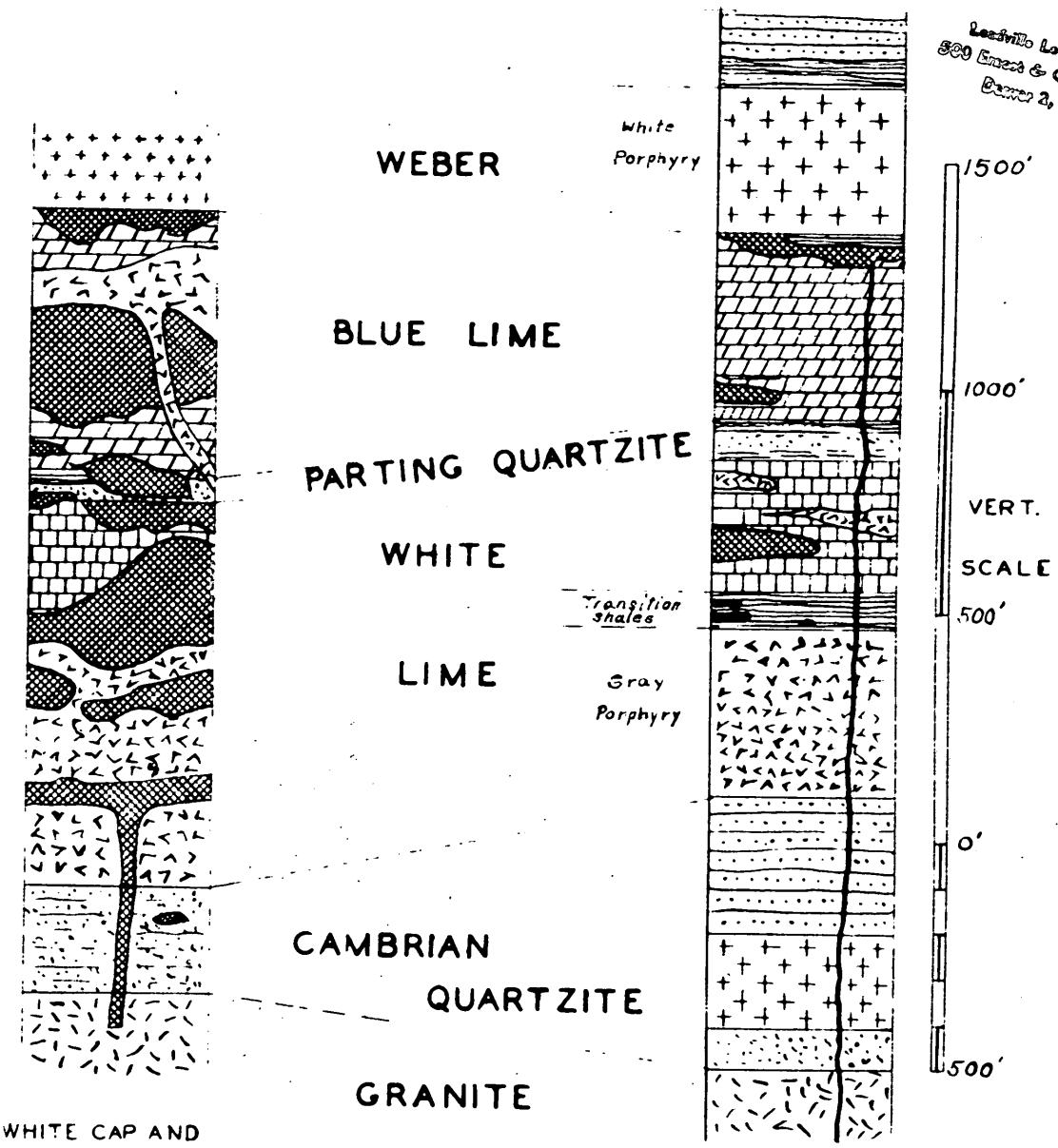
Denver 2, Colorado
LIDDIA FAULT
SOUTH DYER FAULT
LIDDIA FAULT
DYER FAULT
PEERLESS MINE
13,350
13,184
LAST CHANCE SHAFT
LAKE COUNTY
PARK COUNTY
HILL TOP FAULT
CONTINENTAL CHIEF
DAUNTLESS TUNNEL
12,296
CREST OF MOSQUITO RANGE
14,037
106°10'
39°12'30"
FAULT SYSTEM NEAR HILL TOP MINE
LEADVILLE LEAD CORPORATION
FROM U.S. GEOLOGICAL SURVEY,
"GEOLOGIC MAP OF WEST SLOPE OF MOSQUITO RANGE"
(ONLY LAKE COUNTY MAPPED)
1000 500 0 1000 2000 3000
1" = 1000'
C.R.U.
Dec. 1948

GEOLOGIC SECTIONS

ORE-BEARING BEDS & MODES OF ORE OCCURRENCE, LEADVILLE



WHITE CAP AND CORD WINZES AND VICINITY

RESURRECTION, SEDALIA, FORTUNE, LITTLE ELLEN, NEW YEARS, DIAMOND, DOLLY B., AND FAMOUS MINES

ORE BODIES THUS:

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From

U.S. GEOLOGICAL SURVEY BULLETIN 779

CRW
Dec. 1948

MF - 100

Exhibit 4

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LEADVILLE LEAD CORPORATION

DENVER, COLORADO

EXHIBIT No. 6

TO ACCOMPANY FORM MF-100 OF DEFENSE MINERALS ADMINISTRATION.

LETTER AND REPORT BY W. F. B. BERGER, DATED DECEMBER 6, 1948.

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THE ORIGINAL OF THIS REPORT IS ON FILE IN THE OFFICES OF LEADVILLE LEAD CORPORATION, AND IT OR A PHOTOSTAT COPY CAN BE FURNISHED ON REQUEST.

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Y

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

W. F. B. BERGER
MINING ENGINEER

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

QUEENSWOOD DRIVE,
R.R.4, VICTORIA, B.C.
DECEMBER 6, 1948

MR. JAMES N. REDMAN
305 CALIFORNIA BUILDING
DENVER, COLORADO, U.S.A.

DEAR MR. REDMAN:

REFERRING TO OUR PHONE CONVERSATION OF DAY BEFORE YESTERDAY EVENING, THERE ARE ONE OR TWO POINTS I WISH TO TRY AND CLEAR UP. YOU SAID YOU WERE ANXIOUS TO KNOW JUST WHAT THE ORE FROM THAT PART OF THE BIG STOPE THAT CAME FROM THE LAST CHANCE GROUND, BROUGHT IN THE WAY OF RETURNS. I BEG TO QUOTE FROM MY FULL REPORT THAT WILL BE SENT TO YOU LATER.

"THE FIGURE OF $4,000,000.00 HAS BEEN QUOTED AS THE VALUE OF THE ORE TAKEN FROM THE BIG STOPE. AS THE READER KNOWS, SUCH FIGURES ARE GENERALLY UNRELIABLE AND WHEN ONE HEARS THAT SUCH AND SUCH A MINE HAS PRODUCED MILLIONS OF DOLLARS, ONE IMMEDIATELY DISCOUNTS THE SAME. IN THIS CASE, HOWEVER, IT IS NOT HEARSAY, IMAGINATION NOR GUESS WORK, AS IN 1910 I WAS ABLE TO GET AUTHENTIC FIGURES. ALL OF THE DUPLICATE GLOBE SMELTER SETTLEMENT SHEETS WERE STORED IN THE VAULTS OF THE COLORADO NATIONAL BANK. THESE WERE MADE AVAILABLE TO ME AND I SORTED OUT THE SETTLEMENT SHEETS PERTAINING TO THE HILLTOP AND LAST CHANCE ORE. I PERSONALLY ADDED ON A BURROUGH'S ADDING MACHINE THE FIGURES ON THE SETTLEMENT SHEETS AND THEY TOTALLED A LITTLE OVER $4,000,000.00. AS THESE FIGURES WERE NET SMELTER RETURNS, AND ALLOWING FOR TREATMENT CHARGES, ROYALTY, ETC., THE GROSS ASSAY VALUE OF THE TONNAGE WOULD BE OVER $5,000,000.00.

AS A MATTER OF FACT, EXCEPT AS A POINT OF INTEREST, AS LONG AS YOU HAVE THE TOTAL FIGURE OF ALL THAT CAME OUT OF THE BIG STOPE, AND THE FACT THAT ALL THIS ORE WENT TO THE GLOBE SMELTER, IT DOES NOT MATTER JUST WHAT CAME FROM THE LAST CHANCE AND WHAT CAME FROM THE HILLTOP. IT IS NOW ONE PROPERTY SO WHAT IS THE DIFFERENCE? IF IT WERE OF ABSOLUTE NECESSITY, SOME EFFORT MIGHT BE MADE TO RECOVER THE OLD GLOBE SMELTER SETTLEMENT SHEETS FROM THE COLORADO NATIONAL BANK.

AS I TOLD YOU OVER THE PHONE, WHEN I HAD ACCESS TO THESE RECORDS, THEY WERE STORED IN THE VAULTS OF THE OLD COLORADO NATIONAL BANK BUILDING AT 17TH AND LARIMER STREETS. I FEEL PRETTY SURE THAT

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MINING ENGINEER

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MR. JAMES N. REDMAN

DECEMBER 6, 1948

WHEN THE BANK MOVED TO THE PRESENT LOCATION THAT A GENERAL HOUSE-CLEANING WAS HAD AND THE RECORDS, SUCH AS THE GLOBE SMELTER, IN WHICH THEY HAD NO FURTHER INTEREST, WERE PROBABLY DISPOSED OF. I MAY BE MISTAKEN, AND YOU MIGHT TAKE A CHANCE AND ASK MR. KOUNTZE ABOUT IT. AS I REMEMBER IT, THE GLOBE SMELTER RECORDS WERE PACKED IN WOODEN BOXES AND LABELLED "GLOBE SMELTER".

I REALLY DON'T BELIEVE THAT AS FAR AS THE FUTURE OF YOUR COMPANY IS CONCERNED THAT ANYTHING CAN BE GAINED BY GOING TO ALL THE TROUBLE AND NUISANCE IT WOULD CAUSE THE BANK.

NOW AS TO THE BLANK IN THE HISTORY OF THE EARLY DAYS OF LAST CHANCE DEVELOPMENT. I HAVE ONE LEAD WHICH IT MIGHT PAY YOU TO FOLLOW UP. I WROTE YOU THAT ABOUT 1901, ONE SCHLESSINGER SOUGHT THE EXTENSION OF THE MAIN ORE CHUTE TO THE SOUTH. THE SCHLESSINGER REFERRED TO WAS BERT SCHLESSINGER WHO WAS THE SON OF T. S. SCHLESSINGER WHO WAS MANAGER OF ALL THE KOUNTZE AND SHEEDY OPERATIONS IN THE LEADVILLE DISTRICT. THE ELDER SCHLESSINGER PROBABLY HAD CHARGE OF THE OPERATIONS OF THE HILDA MINING COMPANY WHICH HAD TAKEN OVER SIMPSON'S ONLY CHANCE MINING COMPANY. IT WAS NATURAL FOR THE ELDER SCHLESSINGER TO SEND HIS SON BERT, WHO WAS THEN ABOUT 25 YEARS OLD, OVER TO THE LAST CHANCE AND MAKE HIM SUPERINTENDENT OF THE HILDA MINING COMPANY.

IN 1900 I WAS DOING THE SURVEYING IN THE DOWN TOWN MINES OF THE KOUNTZE AND SHEEDY INTERESTS AND WAS SENT OVER TO MAKE A SURVEY OF THE HILDA TUNNEL. I HAVE JUST SEARCHED THROUGH MY OLD FILES TO SEE IF I COULD FIND THE OLD SURVEY NOTE BOOK THAT I USED IN MAKING SURVEYS ON THE K. & S. OUTSIDE MINES. UNFORTUNATELY, I CANNOT FIND IT, THOUGH I CAN REMEMBER SEEING IT TWO OR THREE YEARS AGO. I REMEMBER I SPENT THREE OR FOUR DAYS WITH BERT SCHLESSINGER AND OF COURSE DURING THAT TIME I MUST HAVE HEARD AND SEEN A LOT THAT I WOULD GIVE ANYTHING NOW TO REMEMBER, BUT I MUST CONFESS THE PICTURE HAS FADED OUT COMPLETELY. HOWEVER IT JUST MIGHT BE THAT BERT SCHLESSINGER IS STILL ALIVE, AND IF SO AND YOU CAN CONTACT HIM, YOU WOULD SECURE A LOT OF VALUABLE FIRST HAND INFORMATION, ABOUT WHAT HAPPENED IN THE 70'S AND 80'S WHICH WE SEEM TO HAVE DIFFICULTY IN GETTING ANY REAL INFORMATION ABOUT. I SUGGEST THE WAY TO LEARN ABOUT BERT SCHLESSINGER. EVERY TWO OR THREE YEARS THE COLORADO NATIONAL BANK HAS TO MAKE AN ASSESSMENT ON THE SHAREHOLDERS OF THE BIG CHIEF MINING COMPANY TO PROVIDE MONEY FOR TAXES. THE QUESTION ALWAYS AROSE WHETHER THE PROPERTY SHOULD BE LET GO FOR TAXES, HOWEVER, IN EVERY CASE THE ASSESSMENT WAS ASKED FOR AND PROBABLY IF UNCOLLECTED WAS ABSORBED BY THE

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MINING ENGINEER

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MR. JAMES N. REDMAN

DECEMBER 6, 1948

KOUNTZE AND BERGER INTERESTS. IT WAS A MATTER OF GETTING MONEY FROM THE VARIOUS ESTATES, AMONG WHICH WAS THE SCHLESSINGER. I AM INCLINED TO THINK BERT SCHLESSINGER MUST BE DECEASED, BECAUSE IF LIVING, HE WOULD HAVE BEEN APPROACHED DIRECT, AND I WOULD HAVE KNOWN ABOUT IT. I AM SURE MR. ROBERTS CAN ADVISE YOU JUST WHOM THE BANK DEALS WITH IN ITS DEALINGS WITH THE SCHLESSINGER ESTATE.

YOU REFERRED OVER THE PHONE TO THE MAP YOU HAD SEEN IN CASEY'S OFFICE THAT SHOWED THE WORKINGS AT THE SOUTHERN END OF THE LAST CHANCE. I AM SORRY TO SAY I HAVE NO RECOLLECTIONS OF SUCH A MAP, UNLESS IT IS PART OF THE MAP OF THE OLD WORKINGS WHICH I RECENTLY SENT YOU. I WILL SAY THIS, HOWEVER, THAT I ALWAYS CONSIDERED THE UPPER END OF THE LAST CHANCE GULCH A VERY INTERESTING PIECE OF GROUND. I THINK IT WAS IN 1911 OR 1912 THAT I CLEANED OUT A TUNNEL THAT WAS DRIVEN WEST, STARTING IN THE GULCH A FEW FEET SOUTH OF THE OLD BOARDINGHOUSE TUNNEL. AS I REMEMBER IT, MY INTENTION WAS TO EXTEND THIS TUNNEL WESTWARD CLEAR IN UNDER SHERIDAN PASS. THIS TUNNEL WAS KNOWN AS EITHER THE CATO TUNNEL OR THE ROBERT J. INGERSOL TUNNEL. HOWEVER, AFTER CLEANING IT OUT, I ABANDONED THE IDEA BECAUSE I FELT IT WAS AT TOO HIGH AN ELEVATION TO BE WORTH THE EXPENSE AND EFFORT. AS THE PROPOSED BIG TUNNEL WILL GO THROUGH THE SAME GROUND, AND AT A PROPER DEPTH, I WOULD NOT GIVE THE "CATO" TUNNEL ANY FURTHER THOUGHT.

IN CLOSING I WISH TO SAY THAT I WAS MUCH GRATIFIED TO HEAR YOU SAY YOU WOULD LIKE ME TO CONTINUE WRITING LETTERS AND GIVING YOU INFORMATION FROM TIME TO TIME INSTEAD OF CUTTING SHORT OUR BUSINESS BY GETTING OUT THE FULL REPORT AND SENDING YOU ALL DATA I HAVE ON HAND. NEEDLESS TO SAY I AM AWFULLY INTERESTED IN WHAT YOU ARE DOING. I WILL VENTURE TO SAY, LIVING CONDITIONS ARE VERY UNCOMFORTABLE COMPARED WITH WHAT I EXPERIENCED FROM 1907 TO 1913. THE OLD TRAMWAY CERTAINLY WAS A GOD-SEND. THAT ENABLED US TO BRING UP ABOUT 75 TONS OF COAL EVERY SEPTEMBER WHICH MEANT WARM BUILDINGS, AND THE USE OF A BIG RANGE IN THE COOK HOUSE.

I AM ANXIOUSLY AWAITING THE QUESTIONAIRE YOU MENTIONED YOU ARE SENDING. I ASSURE YOU THIS WILL RECEIVE MY PROMPT ATTENTION.

WITH KINDEST REGARDS, I AM,

FAITHFULLY YOURS,

W. F. B. BERGER

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

REPORT

on

PROPERTY

of

LEADVILLE LEAD CORPORATION

by

W.F.B. BERGER

PREFACE

From a mining engineer's standpoint,this report has to be made in a most unusual manner. The usual procedure is for an engineer to spend several days or weeks on the particular property to be examined. During which time he personally inspects all the available workings,taking samples and collecting all data available. It is then a simple matter to return to his home base and work up his field notes and data while the matter is fresh in his mind. In this case, the mental picture is over forty years old. I have no immediate field notes, the data collected is mostly hearsay or obsolete. I trust you will take this into consideration in reading this report. Ordinarily I would follow the customary plan adopted by most mining engineers and would arrange the detail of the report under headings such as:

NAME OF PROPERTY
DESCRIPTION OF PROPERTY
OWNERSHIP
LOCATION OF PROPERTY
HISTORY
GEOLOGY
DEVELOPMENT
IMPROVEMENT AND EQUIPMENT
PAST ORE PRODUCTION
KNOWN ORE RESERVES
POTENTIALITIES
RECOMMENDATIONS

I will follow ,more or less, the plan of these headings and make references in each particular case, to data you already have in hand. If you do not have such data, I will then fill out the headings from information I have. Herewith follows the report.

NAME OF PROPERTY:

Leadville Lead Corporation,Hilltop Tunnel Project.

DESCRIPTION OF PROPERTY:

List of claims,leases, options,etc. listed in prospectus of the Leadville Lead Corporation.

OWNERSHIP:

Leadville Lead Corporation.

Leadville Lead Corporation
999 Ernest & Cranmer Building
Denver 2, Colorado

LOCATION OF PROPERTY:

Property is located in the Horseshoe mining district on the southern and eastern slopes of Mt. Sherman and Mt. Sheridan in Park County, Colorado. There is also some of the property located on the northern and western slopes of Mt. Sherman and Mt. Sheridan.

HISTORY:

Commencing with the first known mining operations on the Last Chance claim, I regard it just as well to set forth in Chronological order, historical events that occurred in connection with the properties now owned or controlled by the Leadville Lead Corporation.

1873 to 1887 In 1873 the Last Chance mine was opened and was operated by a man named McMillan, the original discoverer, until 1887. In Coal mining parlance, his operation would be classed as a "wagon mine". It probably was more or less of the quarry operation conducted in the outcrop at the southern end of the Big ore shoot. During these years the Last Chance mine constantly increased in size and by 1887 had become a shipping mine of recognized importance. The first ore shift was transported by pack train across the divide to one of the several smelters then operating in Leadville. It was in 1885 that the Last Chance shaft was sunk to a depth of 400 feet. It is assumed McMillan was still at the head of the operating company, but hearsay has it that the sinking of the Last Chance shaft was done by a man named Wenze. However, I assume that Wenze was acting as a shaft contractor and had probably nothing to do with the mining operation. In 1886 a mine cook, discharged by Last Chance operators, located with a grubstake provided by a Leadville partner, three claims called HILLTOP, PTARMIGAN and LESLIE DE, just north of the Last Chance end line, representing the beginning of the Hilltop mine. I do not know the name of the aforementioned cook but it could be ascertained from the original patent papers which are no doubt in the possession of the Trumbull Estate. The successor of George Barnard will probably know where these are. In the same year, while the Last Chance production was at its peak, the cook and his partner sunk the Hilltop Incline Shaft through the Last Chance ore shoot, to a depth of 122 feet, resulting in a highly profitable production. Later 6 claims: TOP HILL, RUSH, ENTERPRISE, VANDERBILT, ASTOR and HUMBOLDT were staked, presumably by the aforementioned cook and his partner, at the north of the original locations and added to the Hilltop group. It may be assumed that a dwal was consummated between McMillan and the cook and his partner. I say this because McMillan appears to have controlled the operations until 1887.

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1887 to 1890 In 1887 a promoter named Simpson of Denver organized the Only Chance Mining Company. It is only conjecture, but I assume that with the proceeds from sale of stock he bought out McMillan, and the Only Chance Mining Company became the owners of the Last Chance claim. At the same time it is presumed, he acquired a lease on the mine claims of the Hilltop group, which were patented. Simpson was evidently able to raise considerable money by the sale of stock and also by bank loans. The proceeds of which were used in mine development, the extension of the railroad from Fairplay to Leavick and the erection of a large mill at Leavick. Also he built a good wagon road from the Last Chance to Leavick. I am not sure whether Simpson built the tramway from the Hilltop shaft to Leavick or whether he hauled the Last Chance ore on ore wagons to a loading platform on the newly built railroad spur at Leavick. I should imagine however, that he shipped a considerable tonnage, but not sufficient to pay off his bank loans and his company failed in 1890 and was taken over by the controlling interests of the Colorado National Bank who were also the owners of the Globe Smelter.

1890 It was in 1890 when the interests that took over the holdings of Simpson, organized a new company called the Cato Mining Company, and from 1890 to 1893 the Cato Mining Company operated the Last Chance and Hilltop mines under the direct supervision of engineers supplied by the Globe Smelter. In other words, it might be said from 1890 to 1893 the Globe Smelter operated the Last Chance and Hilltop mines. Unless the Globe Smelter had a lease on the Hilltop claims at the time, I am at a loss to understand why the tramway should not have been built with the upper terminal at the Last Chance. If the Globe smelter people, then known as the Cato Mining Company, had a lease on the Hilltop claims and sank the shaft to the main ore shoot, it is probable they constructed the tramway and this tramway transported practically all the ore taken from the main ore stope.

1892 From another source it is reported that one Felix Leavick and associates acquired control of the property, built a narrow gauge railway spur from the Colorado and southern station of Fairplay, to the newly established company town of Leavick. They also constructed a three mile aerial tramway from Leavick to the main Hilltop shaft, and a concentration mill at the lower tram terminal. I will admit that this last statement conflicts with all other sources of information. The only way I can explain this contradiction, is that perhaps Felix Leavick was really an engineer employed by the Globe Smelter Company and ~~was~~ superintended the construction work just mentioned. I say this because I feel sure the Cato Mining Company under the direction of the Globe smelter people, was the actual operator.

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This is further confirmed by the fact that in 1896 the Cato Company reorganized and became the Hilda Mining Company, at which time the stock in the Cato Mining Company was exchanged for stock in the new Hilda Mining Company. I feel sure that if Leavick had had any direct interest in the properties a considerable block of Cato Mining stock would have been issued to him. This however was not so.

1893 In 1893 the Cato Mining Company (Globe Smelter) shut down. I do not know the reason given at the time, although hearsay has it that owing to the 1893 drop in the price of silver, the Cato company merely followed the example set by most of the silver mines in Leadville which shut down at the time. There may have been other reasons, one of which is, the Globe smelter might have found it more profitable to buy fluxing ore in Leadville at the low price of silver, than to assume the cost of mining and smelting their own ore from the Last Chance. Just how long this shutdown lasted I am unable to say with any degree of accuracy,however, it probably was only a matter of a few months duration,because in 1893 or early in 1894 the Trumbull interests took over and operated under the name of "The Hilltop Mining Company". The Trumbull interests under the name of the Hilltop Mining Company operated the mine until the fall of 1906 when the Hilltop claims were leased to J.B. McDonald of Leadville. McDonald held this lease for about two years, during which time he removed the ice from the Hilltop shaft which was frozen solid to a depth of 500 feet. He also put in good order, the tramway and the hoisting equipment at the Hilltop shaft, and cleaned out and laid track in the 500 ft level to the south up to the boundary line of the Last Chance. It was J.B. McDonald who recognized the value of Smithsonite (Zinc carbonate) ore and in his cleaning up operations exposed a considerable tonnage of this class of ore. As far as can be ascertained McDonald never shipped ore of any kind. If he had, I feel sure it would be reported by Walter Larsh in his 1910 report.

1908 to 1913 In the spring of 1908 E.H. Platt,my partner at the time, and I spent several days at the mine making an examination. As a result of this examination we took over McDonald's lease, combining this lease with the lease which I had acquired on the Last Chance claim and organized the Chance-Hilltop Mining Company. Which company successfully operated until 1913, at which time the leases on the Hilltop and Last Chance were given up. As the tramway was in good operating order, we were able to get up supplies and fuel for the winter and started mining the zinc ore. As I remember it,in a couple of months we had cleaned up all of the exposed zinc sheathing. I was in New York at the time and was rather surprised to get a letter from Mr. Platt saying that instead of a zinc mine we had a lead mine. It happened that during the last few days of the zinc clean up Platt had put some men on one of the stringers leading from the main stope. This stringer eventually led into the Lind Stope and Stewart Stope, and with other lead exposures put us on a producing basis which lasted until 1913 when the Chance-Hilltop Company closed down.

I mention this bit of history to show that no matter how hopeless the situation of making a producing mine out of the Hilltop looks on the face of it, it has been demonstrated two or three times that all that is required to start up this mine is a small amount of capital and perseverance in searching for the continuation of old ore bodies or new ore bodies. This Platt demonstrated in 1908. In 1913 when I shut down, I had, so to speak thoroughly scraped the bottom of the bucket, and as a trip east resulted in not obtaining capital to carry out a prospecting campaign, I closed down expecting to reopen the following summer. As it happened, I never returned, but it was a few years later, I think about 1917, when the Sun and Moon Company reopened the mine. I cannot make out from Crossette's report on the Sun and Moon Company whether they actually had a shipping record. This information probably could be obtained from the Trumbull interests who would have records of royalty paid them. As a matter of fact, I think that the Sun and Moon Company, when they took over were exactly in the same position that Platt was in when he had exhausted the zinc ore in 1908. Unless I am mistaken, between the time I closed down and the Sun and Moon activity, another outfit opened the Hilltop. This was in 1916 when the price of lead and zinc were sky high. The work was done under the direction of an engineer named McDaniel of Denver. It may be that McDaniel's crowd was one and the same as the Sun and Moon Company.

While I have no actual figures, the Chance-Hilltop Company's five year operation was not profitable. Which can be accounted for as follows: the price of lead, zinc and silver were at an all time low, besides this the company spent about $25,000.00 in trying to successfully mill the ore. Also a large amount of money was spent in needless development, which bore only negative results. Whereas I would not swear to it, my impression is that the net smelter returns from the sale of ore was in the neighborhood of $300,000.00. When one considers the high cost of handling this ore and the low price of metals coupled with the needless expenditures afore mentioned, it can be readily understood why the operation of the Chance-Hilltop was not profitable.

1913 to 1917 The Hilltop mine was idle during this period. In 1917 the Hilltop Silver Mining Company was organized. It was organized by a small syndicate of Denver men headed by George C. Manley and George L. Felt, who employed an engineer named McDaniel of Denver. The Hilltop Silver Mining Company secured a lease on the Hilltop group claims on September 1st, 1918. At this time the Hilltop Silver Mining Company was reorganized and became the Sun and Moon Company. There seems to be some conflict as to whether the Sun and Moon grew out of the Hilltop Silver Mining Company or vice versa. In 1919 mining engineer Crossette reported to the Sun and Moon Company, but Walter S. Larsh in his 1921 report says that the Sun and Moon Company, through Manly, obtained the lease on the Hilltop property, but at the time of his report the lessee was the Hilltop Silver Mining Company.

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As far as the Leadville Lead Corporation is concerned, it makes no difference as to whether the operation was conducted under the name of the Sun and Moon Company or the Hilltop Silver Mining Company. The only record of production by these companies is a statement in the 1921 report of Walter Larsh, in which he says that royalties paid during the first three years of the lease (Sept.1st,1918 to September 1921) was $4000.00, which would mean a production value net smelter returns of about $16,000.00. The Sun and Moon Company did considerable development work following Crossette's recommendations in his 1919 report. In the report of H.C. Enos of June 30,1919 he mentions the work done in carrying out Crossette's recommendations. In 1920 to 1921 Sam Doran used to write me personal letters, just as a matter of interest, telling me what was going on at the Hilltop. My memory of the contents of those letters is very vague but I do remember that he said that the Doran drift finally came into a nice ore body which was being shipped.

From 1921 to the present date, I beg to refer to the Prospectus of the Leadville Lead Corporation,page 11. Going back to the organization of the Hilda Mining Company in 1896, which was successor to the Cato Mining Company. Subsequently in 1913 the Hilda Mining Company was reorganized under the name of the New Chance Mining Company and almost immediately reorganized again under the name of the Big Chief Mining Company, which is the present owner of the Last Chance group of claims.

GEOLOGY:

The area with which this memorandum is concerned is that area of mining claims which has been assembled by lease or ownership by the Leadville Lead Corporation. To all purposes this area as far as the geology is concerned, might be located in the Leadville district proper. The structure of the formations is identical, and considering the fact that the greater part of the area in question is virgin ground, much can be gained by a careful study of the geology in the proven rich areas in the Leadville district. Such a study will have a great bearing in the actual development of the area in question. It has been found in mining geology that there is a certain parallelism in ore occurrences. I have found this to be true in all the localities with which I am familiar. Much can be learned from the procedure practiced in prospecting as practiced in the oil industry. In other words, in the oil game one looks for an oil dome or other oil bearing structure before one drills. The same rule should apply inmining. If this rule had been strictly adhered to, much money and needless effort would have been saved. In this particular case, where it is contemplated the development of a new area, it is essential to take into consideration everything that can be learned from the developed mines of Leadville.

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In general, the average Leadville structure is as follows: Starting from the surface and going down, the first hundred feet is really made up of over burden consisting of talus or drift material. The thickness of this stratum depends on how much erosion has taken place, or whether the area is situated in a spot favorable to the collection of such debris material, whether it be of moraine nature or simply local wash, or it might be that this stratum is entirely absent because it was entirely scored away by erosion. Allowing for one hundred feet of over burden, we encounter next, a stratum of carboniferous limestone. This is known as the Leadville blue lime, and it was the blue lime in the early days of Leadville which produced the rich ores that made Leadville famous. This stratum is from two hundred to two hundred and fifty feet thick. The ore carrying a high content of silver in the form of silver chlorides or bromides. In certain mines that were developed in Leadville, the values were spectacular,this was particularly so in the Tabor mines located on Fryer Hill.

The United States Geological Survey engineers have proven beyond a doubt that the source of the lead carbonate came from the effect of intrusive porphyry in the form of dikes or sills. In no place in the whole Leadville district has the blue lime produced ore where porphyry is absent. This is hard to understand because the porphyry per se has practically no valuable mineral content. An explanation is, that the lime strata contained subteranian water seams, and when the hot porphyry intrusions struck the sulphide ore bodies in the lower limestone,highly sulphuric acid solutions were produced. These solutions followed minor fault planes (which are prevalent in the Leadville district). When this acid solution encountered carboniferous limestone, a chemical reaction took place which ate away the limestone, neutralized the ascending acid solutions. The Mammoth Cave in Kentucky and the Carlsbad Caverns in New Mexico are e xamples of the effect of corrosion in beds of limestone. There is a difference however between the resultant opening in the Leadville district limestone. The difference being that in the Leadville limestone a strong acid solution performed the corrosive action, whereas in the other caverns hot water was the disolvent. In the first case, a neutral mineral solution was left behind, and in the other a saturated solution of calcium carbonate, which by evaporation or due to seepage, lined these caverns with stalactites and stalagmites. Let us imagine in the case of the Hilltop blue lime water courses (afterwards huge stopes) filled with the neutral hot solution which we will classify as a saturated solution of lead carbonate,zinc carbonate and iron carbonate. As time went on these solutions were cooled by meteoric waters from above and from the cooling effect of the country rock. The lead carbonate assumed a crystalline form and was precipitated as leadsand resembling sugar, or in sediment that assumed amorphous crystalline rock formation. Lead sand, which I have mentioned is a common occurrence in the Leadville district. It does look like coarse sugar and occurs in large pockets and is highly prized on account of being easily mined. Another comparison is the formation of common salt in salt mines, where saline saturated solutions by evaporation and condensation,when cooled, started a period of crystallization, which deposited the salt in layers or beds. I do not know how to account for it, but is is evidentthat the zinc carbonate solution for some reason was precipitated at a different time than the lead carbonate. Whether a new re-agent was introduced or the solution became re-heated and suddenly cooled is pure conjecture on my part, but it is a fact,however, that the hard zinc carbonate,mineralogically classified as Smithsonite, occurs separately from the lead carbonate. This is evidenced by the fact that in the main stope the lead carbonate ore was incased in a shell of zinc carbonate.

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I noted one exception, and that was in the Ice Palace stope, where there was a combined ore which looked like the ore of the main shoot, but which analyzed 20% zinc and about 20% lead. As a matter of fact I had a hard time disposing of this ore as the lead smelters did not want it on account of the high zinc content, and the zinc smelters felt the same way on account of the lead content interfering in their volitilization process.

The foregoing explanation as to how lead carbonate and zinc carbonate ores were deposited in the Hilltop mines is set forth only as a probable or possible mode of deposition. It may be inaccurate because there are other theories which might govern in this particular case. My theory is based on the assumption that the sulphide ore bodies were the source of supply of the lead and zinc minerals in the blue limestone. I have assumed that these minerals were leached out of the sulphides and carried in solution into the blue lime. I have searched through the Emmon's reports and so far have not found any occurrence of sulphides in the blue limestone, but it is possible to imagine that primary sulphides did occur inthe blue limestone as well as in the white and it may be that if such sulphide ore bodies did exist, they may have been metamorphosed in place by oxidation. While Iwas at the Hilltop I found many evidences that would corroborate such a theory. All through the ore that was contained in the Big stope were found little boulders which when cracked open showed a solid core of Galena about the size of a baseball. Surrounding this was about an inch or two of anglesite (lead sulphate), the outer coating perhaps two inches thick of cerusite (lead carbonate). Other boulders had a core of sphalerite (zinc sulphide) surrounded by Smithsonite (zinc carbonate) to the limits of the boulder. In the case of the zinc there is no intermediate sulphate such as anglesite in the lead ore. In proving this theory there are several loose strings to tie up. For instance one might ask how did the bunches of carbonate ore acquire the roundish character, or how did this ore get the form of sheathing,lining the big ore shoot? The only way I can figure this is by the action of meteoric or surface waters acting as an oxidizor over a long period of time. In other words, if these sulphide ore bodies now in the zone of oxidation, are not disturbed by faulting or intrusions, would in about a million years be completely oxidized and assume the character of carbonate ores. I naturally do not advise waiting a million years for this to happen.

Below the stratum of blue lime,lies a sedimentary bed of a hard flinty quartzite known locally as the parting quartzite. Larsh in his report says the parting quartzite is absent in the Hilltop area. I personally never saw parting quartzite in connection with the old workings, but I did investigate a story that a man named Wentz when sinking the Last Chance shaft, struck parting quartzite in the bottom of the shaft. I can remember accompanying Walter Larsh and searching the Last Chance dump for pieces of quartzite, and on finding some, we were not sure it was the true parting quartzite or a pieceof Cambrian quartzite thrown up by one of the major faults and afterwards transported by glacial action. I will venture to say,however that the blue limestone and the white limestone being so well established, there is the usual layer of parting quartzite as in Leadville. Below this bed of quartzite, there occurs a stratum of limestone known as the Leadville white limestone. This averages between two hundred and three hundred feet in thickness. The ore bodies occurring in this stratum being below the zone of oxidation, are composed of the various sulphides. The zinc mineral is in the form of sphalerite (zinc sulphide). The lead mineral is Galena, iron occurs mostly in the form of pyrite.

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I will not attempt in this memorandum to discuss the genesis of these ore deposits. As far as the development of the properties of Leadville Lead Corporation is concerned, it does not make much difference as to how these ore bodies were formed. If one is interested in the genesis of ore, I would recommend a visit to any scientific library where may be found very good books on this subject. For our purposes we can assume the following facts:

1. The ore bodies in the blue limestone are oxydized ore, mostly lead and zinc carbonates.

2. The ore bodies occurring in the white lime are sulphide in nature. Theparting quartzite has no mineralization.

To continue the description of stratification: Below the white lime occurs the cambrian quartzite. This stratum varies in thickness in the different localities of the Leadville district, but it is safe to say the average thickness is about four hundred feet. The cambrian quartzite which is the bottom of the sedimentary system lies on archaeian granite. The cambrian quartzite per se is devoid of mineral value, but it is worthy of note that in fissures which extend down into the granite, there are cases where said fissures have the vein structure with the usual hanging and foot walls with the very rich pay streak. The New Monarch mine in South Evans Gulch is a good example of this condition. The fissures in this mine are about four or five feet wide with a one foot pay streak. The pay ore in the case of the New Monarch was sphalerite, assaying high in gold value, sometimes as high as fifteen oz. gold per ton. It is hard to understand where these values came from. In my own experience while operating the Silent Friend mine in South Evans Gulch, I have this to report: The Yak Tunnel crossed a four foot fissure in the granite, directly under the mine workings. I drove a lateral north along the fissure which was filled with sulphide ore, mostly pyrite, but without value, and no pay streak. After following the fissure several hundred feet, I put up an upraise two hundred feet in height. I don't know how far I was below the white lime, or whether the fissure persisted through the white lime, but I do know that I still had walls of cambrian quartzite. Suddenly assays begun to show values in the gangue material and I took out of a stope about twenty feet long and twenty feet high, quite a bunch of seven oz. gold ore. As I understand it, such occurrences were frequent in the New Monarch properties. I mention this because in driving in the Redman tunnel, while going through the cambrian quartzite, a careful watch should be kept for cross fissures, and if encountered, should be prospected, as I did in the case of the Silent Friend. Just what caused the deposition of values in the cambrian quartzite is a mystery. The solutions evidently came up through the granite but while passing through the granite, left no values behind, but when entering the cambrian quartzite, a condition was met which precipitated these values. You will note on the cross section map entitled "Cross Section Along Tunnel" , that I have indicated the possibility of finding a fissure such as I have mentioned.

It might be in order at this point to give some explanation as to why the presence of porphyry is essential. I shall avoid a technical discussion on the subject, but the following memorandum in simple language may serve to explain why the presence of porphyry is important.

It is an almost universal law in all mining districts, that

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wherever there are ore bodies of commercial value, due to the presence of gold and silver, that these ore bodies are always found in contact with porphyry in the form of dikes or sills. I will not attempt to go into a highly technical explanation of just what function porphyry intrusions perform in creating ore deposition, the main thing is that porphyry seems to be essential; witness in Cripple Creek. The veins are in granite, but unless they are in contact with phonolite dikes and sills, the vein matter is devoid of value. Phonolite is one of the porphyries. Whereas I have no actual data before me, I can remember many instances from Cripple Creek. During the 40 years I was active professionally as a mining engineer, most of my work was reconnaissance. I was always impressed with the idea unless porphyry was in evidence that there was no chance of developing a mine. In 1908 when I re-opened the Hilltop, I was guided in prospecting by first establishing the location of porphyry instrusions. For instance the old timers missed entirely the significance of the porphyry dike which runs along the eastern side of the property, however without knowing why it was, ore bodies were discovered following the trend of the porphyry dike. In my case, I appreciated what the presence of porphyry meant and it resulted in my opening up the chain of ore bodies to the east of the main stope. These ore bodies were connected with the main stope and at first I thought they were overflows from the main stope, but finally reached the conclusion that they were water courses that fed the main stope. Unfortunately I have already sent to Mr. Redman the map of the old workings so I do not have the names attached to these ore bodies in their sequence. The largest was the Lind stope which produced a fairly large tonnage of commercial ore. About 200 feet south of the Lind stope occurred the Stewart stope. This was not quite as big as the Lind stope, but had the same characteristics. It was connected with the main stope by a water course filled with ore of the same character as the main stope. I believe there were one or two more ore bodies that led off the main stope, which I mined out in 1910 to 1912. Larsh in his report mentions these. It is noteworthy that they all were connected with the main stope and as they reached the porphyry dike, the channels went up or down along the dike. In other words the intrusive dike occurred before ore deposition and in no sense did the dike cut off the ore bodies. It is true that these ore bodies seemed to be cut off by the dike, but what really happened was that the intrusion caused a displacement or minor fault, which gave the same effect as if the ore bodies terminated at the dike. Larsh in his report on page 12 quotes S.F. Emmons, U.S.G S. as saying that "the ore deposits were formed before the folding and faulting of the strata". This would seem to be a contradiction that the ascending solutions followed followed the porphyry dike in forming the ore bodies. I held to that assumption and the displacement of the ore bodies after they were formed might have been caused by a subsequent intrusion at a point distant from the main porphyry dike.

It was in 1912 or 1913 when I decided to discontinue the search for more of these off shoots of the main stope, and I started following a showing north of the Lind Stope which I called the Last Hope. As I remember it, it was promising at first, but never amounted to anything worth while and was finally cut off by the porphyry dike.

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Continuing the stratigraphy of the Leadville district; I have stated that the cambrian quartzite rested on the archaean granite. This granite extends down indefinitely, being part of the earth's crust. Whereas I more or less used an ideal section to describe the Leadville stratigraphy, I did not mention the fact that in several cases there are many instances of lava (porphyry) horizontal flows, which are several hundred feet in thickness, which can hardly be classed as porphyry sills. Sometimes this lava flowed out on the surface and is particularly evidenced on the Hilltop property where it forms a large, in extent, thick capping. These lava flows, which are really intrusions of gray porphyry, usually followed the bedding planes of the limestone. Whether this particular lava flow (intrusions of gray poprhyry) had any influence on ore deposition, I do not know, but I hardly think so.

The various engineers who have made reports on the Hilltop project, have submitted some very good ideas under the heading of "GEOLOGY" in these reports. I refer especially to the report of Fred J. McNair which he made in 1933. His remarks regarding possibilities of ore coccurrences in the territory from the Hilltop north east to and beyond the London mine is particularly noteworthy. His description of the various faults which pass through the territory of the Leadville Lead Corporation, and the surrounding territory adjacent thereto, should be studied with great care. As these faults have had a great influence on ore deposition. In this connection I might mention that in the late thirties McNair prepared a map showing the trend of these faults. Unfortunately I have lost the white print that he sent me at the time but I feel sure he can supply you with one now. I also beg to call attention to the remarks on "geology" in the report of H.C. Enos, dated June 30th, 1919. Also Crossette's remarks in his report of 1919 are worthy of note.

Of course the most valuable treatise on the district in question is the original Emmon's report published by the United States Geological Survey in 1886. This with the accompanying Atlas would be invaluable to your company. As the report has been out of print for many years, nothing can be gained by sending to Washington. Your only chance of getting this report would be to search the second hand book stores in Denver and Leadville. I secured the Emmons report in that way in the late thirties. But unfortunately my copy and atlas were lost when moving from Colorado to Victoria.

You might however be able to secure the revision of the Emmons report made by J.T. Irving and G.F. Loughlin published in 1927 and known as "Professional Papers 148". Published by the United States Printing Office, Washington, D.C. in 1927.

In concluding these notes on geology, let me state that whereas it may be interesting to speculate on the whys and wherefores of ore occurrences, the development of the mine depends on the fact that such ore occurrences are there, and not how they came to be there.

DEVELOPMENT:

The combined Hilltop and Last Chance mines can be considered well developed properties. The various operations in the past, all contributed valuable development work. Counting drifts, cross-cuts, stopes, tunnels, shafts and inclines, there is probably over a mile of workings. With the exception of the shafts which are full of ice, nearly all of these workings are accessable. Considering the length of time these mines have been opened it is a most unusual situation.

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In most old mines, old workings are badly caved,however, in the case of the mines in question, there is a remarkable state of preservation. I attribute this to the fact that down to the depth of 500 feet the ground seems to be permanently frozen. I noticed this when doing diamond drilling in the summer of 1911. Although some of the holes were in over 100 feet, the bits would strike solid ice,which would deflect the course of the hole,so that one was never sure exactly where the drill went and this of course discounted the value of any data as to the logs of the holes. In making this statement I am not trying to discourage the use of diamond drills on the property, as I know the difficulty can be overcome by proper equipment. I merely made the statement to prove my contention that ice conditions exist down to an average depth from four to five hundred feet below the surface, which accounts for the state of preservation of the old workings. From 1909 to 1912 I had on the payroll a surveyor who did nothing else but survey any new work and map out all the old workings that were available. It can be said that by 1912 the mines were pretty well mapped. The present map of the old workings was the result of the intermittent work of surveyor Schram. Since that time there has been very little surveying done. I note in Crossette's report on page 5, he mentions that a map accompanied his report. (Such a map is absent from the Crossette report I have in hand). However, he must have done considerable survey to have produced such a map,as I do not think Schram's survey took in the part of the mine he describes. I Hope in the copy of the Crossette report you got from Mrs. Doran, the map was included. In the report of C.O. Lindberg made to the Hilltop Silver Mining Company on the date of August 16,1920, he mentions on page one a list of maps. I think he used the Schram survey map in preparing the maps that are a part of his report. As I do not see any indication that he made a new survey.

As I have mentioned before, the mines in question are in a good state of development and outside of the completion of the proposed big tunnel from the Leadville side, there is no need to wait for a lot of dead development work to be completed before an actual mining operation can be started.

IMPROVEMENTS AND EQUIPMENT:

I beg to refer to the 1902 report of Walter Larsh which contains a very good inventory of what was on hand at the Hilltop mine at the time of his report. All the equipment that he mentions is still on the property, but is for the most part, unusable. Since 1910 various leasers have no doubt added small equipment and I would say that today the mine has a stock of mine cars, picks and shovels and other small tools in sufficient quantity to allow a start being made without buying a lot of new equipment.

PAST ORE PRODUCTION:

It is regrettable that there seems to have been no definite records kept by the various operators who had charge of the properties from the beginning of mine operations in 1873 up to the present time. The possible exceptions to this is from figures gathered from old records of the Globe Smelter which were made available to me in 1910. At which time I added the figures on all of the settlement sheets which pertained to ore shipped from the Last Chance and Hilltop mines and the total arrived at was a little over $4,000,000.00,say $4,200,000.00.

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As these figures were net smelter returns, we should add another million to take care of treatment charges, moisture, royalty, freight charges, etc. making a total of $5,200,000.00. Another exception is the fact that accurate figures were kept by the Chance-Hilltop mining company. These are quoted in Larsh's report and cover the years from 1909 to 1910. From then on I am compelled to trust from memory. I hereby submit a summary of estimated production from the different stopes and workings in the Last Chance and Hilltop mines.

1. Production of lead ore from what is known as the Big Stope	$5,200,000.
2. Zinc ore from Big Stope	40,000.
3. Lead ore shipped from Lind Stope and Stewart Stope plus salvaged lead ore from Big stope	250,000.
The estimated past production of these mines can therefore be set at	5,490,000.

It must be understood however, that I do not make any claim to the accuracy of these figures.

KNOWN ORE RESERVES:

Strictly speaking there are no known ore reserves on the properties of the Leadville Lead Corporation. I mean by that that there is no shipping ore blocked out, or what is usually classed as ore, in sight. In other words there is no place in the mines where miners could go to work and mine out ore of a grade that could be shipped directly to the smelters. However, we can regard as known ore reserves the low grade ore that can be recovered by salvage operation in the old workings, together with low grade ore in place to be mined out of the floors and walls of the stopes now existing in the big ore shoot, and this material, mined and trammed out through the Dauntless tunnel and dumped by itself, thus creating what is known as a low grade dump.

At this point an explanation is in order as to where the material that will constitute the low grade dump will be found. As a general rule, in the Leadville district, the ore bodies in the blue limestone were deposited in what is called blanket beds. These blanket formations were laid down in conformity with the bedding planes of the blue limestone or in fault fissures where the faulting occurred before ore deposition. In other words the mineral bearing solutions followed planes of least resistance, and the consequent water course openings in the limestone filled afterwards with ore. In the case of the Hilltop and Last Chance mines, the water course instead of following the limestone bedding planes, followed probably what was at first a small crack that went obliquely through the limestone, and as the dissolvent action of the mineral bearing acid solution ate away the limestone, a water course was opened, which kept increasing in size and finally resulted in an opening that can be bestdescribed as a huge "pipe". This "pipe" was tilted at an angle of about five degrees from the horizontal. I use the word "pipe" for want of a better word. It certainly is not a pipe in the sense of having a smooth lining and a smooth outside covering. In fact it is both irregular and bumpy in both respects. This means that the bottom of the pipe is not like the smooth floor of the bedding planes of the blanket ore bodies in the Leadville District. The "bumps" are sometimes good ore, but mostly are blocks of blue limestone that never was attacked by the ascending acid solutions. In fact it is a common occurrence to find large "horses" of unattacked blue limestone.

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These "horses" are usually lengthwise with the strike of the ore shoot. The filling of this particular pipe was mostly lead carbonate oreof commercial value, and it was this core that was shipped direct to the Globe smelter. The mining-out of which accounts for the big stopes inthe main ore shoot. It can be readily seen,however,that in mining this ore the "pipe" was not thoroughly cleaned and that there was left behind not only bunches of good ore,but stretches of low grade ore in place, which was not taken because if taken out would have interfered with maintaining track levels necessary to bring the ore to the Hilltop shaft. These stretches are of considerable length and in some cases there may be floors of ore four or five feet thick under where the tracks were laid. If we consider a thorough cleaning of this "pipe" throughout the length, from a point north of the Lind stope,where the fault terminates the main ore shoot to a point where the Last Chance ore outcrop occurred, that is somewhere in the south of the Boardinghouse tunnel,we would produce a very considerable tonnage for the proposed low grade dump. It is proposed to build up this low grade dump during the winter and spring months, and in the summer and fall months to conduct a systematic sorting operation of the material which composes the low grade dump. I think it is permissable to classify this material as known ore reserves,because it is customary in mines where a very low grade ore is put through a mill, ore reserves are measured in tonnage of blocked-out low grade ore in place usually called mill dirt. It is almost impossible to measure this ore reserve. The only way possible to arrive at an accurate figure of tonnage, would be to finish building the sorting dump and measuring said dump, and as a matter of fact,in the end nothing would be gained by such a procedure unless it was contemplated selling the property and using the tonnage of the low grade dump as an asset. Here again we are up against another problem,to-wit: In well established mining and milling operations, the ratio of recovery is known factor,whereas the ratio of recovery in a sorting operation,is a decidedly variable factor.Just as a rough guess I would say it would take about forty tons of low grade dump to make one ton of desirable ore for the smelter. As I have just said this is a rough guess and actual sorting may prove this ratio entirely wrong. This ratio,of course, depends a great deal on what is put on the low grade dump. As mentioned before, there is no need of putting on this dump, pieces that are straight limestone. All such material should bypass the low grade dump and be trammed directly to the waste dump. In some of the big mines,ore reserves of mill dirt are not measured in tonnage, but the time estimated to be consumed in the extraction thereof. In your case I would say it would take about four winters to thoroughly clean the "pipe". As work goes on, this estimated period of time will no doubt be increased but for the sake of argument, let us say that the Leadville Lead Corporation has ahead of it a five year life as a going mining operation.

POTENTIALITIES:

The usual way of treating "potentialities" is to make three classes of potential ore. (1) ore in sight. (2) Probable ore. (3) Possible ore, Earlier in this report I have stated that there is no ore in sight in the true sense of the word, but I think it is allowable to put the known ore reserves in the "ore in sight" class. It must be borne in mind, however, that if we assume a forty to one ratio of recovery, that the potential value in dollars and cents will not be large,considering the resultant tonnage after sorting. In other words, if the cost of handling forty tons of ore is more than the net smelter returns on the one ton of ore produced by sorting, it is obvious that there would be no use of conducting a sorting operation. This can only be determined by actual practice.

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However I am just enough of an optimist to believe that sorting will pay, and that if we assume that the low grade dump will receive 50 tons per day for eight months, winter and spring operation, we could be sorting 12,000 tons each year, and at the ratio of forty to one, we would have a resultant production of 300 tons of a net smelter value of $40.00 per ton, or a gross potential value of $12,000.00 per year. It may be that the cost of handling will be less than $1.00 per ton, and also that the grade of smelting ore produced may be better than $40.00 per ton. If both of these conjectures are true, then the yearly operations will show a profit instead of just breaking even. All of this remains to be seen, a and as I have said before, only actual practice will tell. I would suggest that you make a pilot test this year. It would be a comparatively simple matter to build a trestle and start the low grade dump, to place a tally board at the beginning of the dump, and peg each mine car as it is dumped. I have forgotten the capacity of the mine cars used in the Dauntless, but of course that can easily be calculated. I would suggest that the trestle be built long enough so that 1000 tons can be dumped separately, allowing room for future dumping while sorting is going on. In a letter that will follow this report later, I shall go into detail as to the handling of this test on 1000 tons. The main thing now is to get the dump started.

2. Probable Ore: In this class I shall place the principal potentiality of the Hilltop Tunnel project. I refer of course to the sulphide ore bodies which we can assume exist in the stratum of white limestone. As a matter of fact, in the big mines of Leadville, such as the Ibex, the Wolftone, Silver Cord, Carbutt and Moyer, the yield from the sulphide zone has greatly exceeded the yield of the oxidized zone. Acting on this assumption and knowing that the blue limestone in the Hilltop and Last Chance produced over $5,000,000.00, I think we are warranted in settling up a potential of $5,000,000.00 for the sulphide ore bodies in the white limestone. The realization of the potentiality of the sulphide ore bodies depends on the fact that the bulk of these sulphides will have to be milled. However there will be considerable sulphide ore shipped to the smelter. In the case of the Ibex mine, the rich high grade strikes, such as the Hahniwald brothers made in 1903, were in pockets of sulphide ore shipped direct to the smelter. It is quite possible that pockets of high grade ore may be encountered in the sulphides of the white lime on your property. With the present improvements in milling practice over those of thirty years ago, makes for a very attractive outlook for your mines, both as to the life of the mines and the very high rate of recovery of values. Ultimately the Leadville Lead Corporation will have a mill of its own, but meanwhile I have no doubt that arrangements can be made with one of the custom mills in the Leadville district.

Another source of probable ore can be obtained by finding new ore bodies in connection with prospecting along the main porphyry dike. By following the recommendations of Crossette and Enos in their reports, I think ore bodies will be found that can go into the probable class. It is too early to make an estimate in figures of tonnage or value of these probable ore bodies. The conditions existing now are not very different from those that existed when E.H. Platt and I started work in 1908. As I have mentioned under the heading "History", we took into consideration the presence of the porphyry dike and used it as a guide with the result, we uncovered the Lind and Stewart stopes which yielded $200,000.00. I think therefore, I am safe in saying that the chances are very good of duplicating this figure by systematically following up the chances of finding ore in connection with the porphyry dike as suggested by Crossette and Enos. I think I would be justified in classing what follows as "probable ore", but to be on the safe side, I will classify what follows as "Possible ore".

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I think diamond drilling will reveal other "pipes". These may occur in Lime King ground which is west of the Hilltop and Last Chance groups. These "pipes" if found, will be parallel to the Hilltop-Last Chance "pipe",and it is quite possible that other parallel "pipes" may be found still further west.

Another source of possible ore is finding the extension (if it exists) of the main ore shoot to the south of the Last Chance mine. Naturally as these are only possibilities,I make no attempt to set these up as to potential value. While on the subject of possible ore occurrences; the territory between the Last Chance and the Peerless mine should not be overlooked. The prospecting of this ground should wait until the big Hilltop tunnel is in sufficiently to warrant a lateral to the south,from which a diamond drilling operation can be conducted.

To sum up "potentialities", I will guess at the following figures:

1.	Ore in sight?	$ 250,000.00
2.	Probable ore?	5,300,000.00
3.	Possible Ore?	Cannot be estimated.

RECOMMENDATIONS:

As a matter of fact from the standpoint of an engineer's report on a mining property, "recommendations" are not yet in order in this particular case. In this case where we are starting from scratch, no set programme can be set forth. All thatcan be done is to state the main objectives of the project, leaving details as to performance towards such an objective up to the management on the ground. In the course of preparing this report, I have set forth certain situations as if they were accomplished facts. For example a low grade dump. I have also taken upon myself in the last few months,in letters to Mr. Redman, the president, to suggest certain courses of action that I think should be carried out. These really are "recommendation",but I see no necessity for repeating these suggestions in this report. I will,however, be glad to continue to give advice to the best of my ability as long as it is desired. I shall now set forth what I understand to be the main objective of the Hilltop tunnel project of the Leadville Lead Corporation, and to suggest a procedure to be followed in arriving at such an objective, leaving all details of performance up to the local management. Herewith follows an outline,as much in sequence as possible, of work leading up to this objective,

The main objective of the Hilltop tunnel project is to drive a tunnel eastward from the head of Iowa Gulch under Sheridan Pass,to connect with the present Dauntless tunnel. This tunnel to have laterals, branching off from it at various points to reach prospective ore oocurrences that will require transportation facilities.

The main Hilltop tunnel (I think it should be named right now the "Redman Tunnel"), when it reaches Last Chance ground,should be curved in a northerly direction and driven on a straight line to a point just west of the London mine properties. The Redman tunnel should be of the same dimensions as those of the Yak tunnel.

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Details as to the establishment of the correct level and course of the tunnel has been described in letters to Mr. Redman, You are confronted by a situation that was not present when the Yak tunnel was started. In other words nothing had to be done by the Yak management as to the question of housing or feeding labour. This was solved by the fact that the miners commuted daily from Leadville where they had their own homes. In your case it might be well before starting the Redman tunnel operations, to select a piece of ground as nearly flat or gently sloping as it is possible to be found as near the proposed portal of the proposed tunnel as possible. A wagon road should then be built to connect with the present wagon road up Iowa Gulch. On this piece of ground, buildings consisting of a boardinghouse, bunk house, and a small office building which can be utilized for sleeping quarters for local officials and visitors, should be built. In other words, a layout such as was installed at the Hilltop. The boardinghouse and bunkh ouse should be built to accomodate thirty men. A crew of this size will be sufficient to accomplish all work necessary to get the tunnel started. The wagon road I have suggested is the first work to be undertaken. Over it can be trucked lumber and building materials. A water supply for this camp can be obtained by pumping a small stream which flows the year round, which is fed by a spring on the flank of Mt. Sheridan, not far north of the proposed portal. The pipe carrying this water should be laid on rather a steep grade and run wide open all the time. A three inch pipe should be installed. When it reaches the camp, a well covered control valve should be installed which will force water through smaller well insulated pipes into the camp. Concurrently with the establishment of this camp, the location of the new heading should be surveyed and established as to level. Three or four men should be put to work on a short open cut on the correct level, wheeling the material out and starting a dump. This open cut should be made at least 15 feet wide and carried forward until the face has reached 10 feet high at least. I think this open cut will be mostly in slide rock and will require no blasting. In order to take care of the miners engaged in this work, I would suggest your making arrangements with a Leadville livery stable or taxi outfit to bring them out mornings and take them back in the late afternoons. As I remember it, I used to be driven from Leadville up Iowa Gulch to a point not far from the proposed portal. It would be out of the question to ask the men to make the long climb from your present Dauntless camp. The material taken out by wheelbarrow ought to produce a dump of sufficient size to hold a Denver-Gardner Compressor. It being understood that the compressor will be hauled from Leadville over the proposed wagon road to the camp. To get the compressor from the camp up to the new dump, it will probably be necessary to buy a ratchet hand winch, and with the help of said winch to skid the compressor on planks up to the desired location.

As I understand it, you have at present a camp at the Dauntless tunnel, I would recommend your putting the available man power lodged there to work on the project of securing ventilation through the old Boardinghouse tunnel.

I plainly see that it will be practically impossible to carry out my intention of describing future operations without going into detail as I go along, therefore, I will terminate at this point remarks under the heading "RECOMMENDATIONS". I will endeavor, however, to set forth in letters to Mr. Redman, the various courses of action to be undertaken in the future. These letters can then be compiled in a subsequent report.

Respectfully submitted,

Victoria, B.C.
December 1, 1948.

W.F.B. Berger.

MF - 100

Exhibit 6.

LEADVILLE LEAD CORPORATION
500 E & C Bldg.
EXHIBIT A
FORM MF-103

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

EXHIBIT A

TO ACCOMPANY FORM MF-103 OF DEFENSE
MINERALS ADMINISTRATION

MINING LEASE FROM THE BIG CHIEF MINING CO. DATED AUGUST 5, 1945.

MINE OPTION FROM THE BIG CHIEF MINING CO. DATED AUGUST 5, 1945.

AMENDMENT TO MINING LEASE DATED OCTOBER 7, 1946.

CONSENT TO ASSIGN LEASE DATED FEBRUARY 10, 1947.

ASSIGNMENT OF LEASE DATED FEBRUARY 11, 1947.

AMENDMENT TO MINING LEASE DATED JULY 21, 1948.

AMENDMENT TO MINING LEASE DATED NOVEMBER 10, 1949.

ESCROW AGREEMENT DATED MAY 7, 1949.

AMENDMENT OF MINING LEASE FEBRUARY 28, 1951.

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Denver 2, Colorado

THE ORIGINAL OF THIS LEASE, OPTION, VARIOUS AMENDMENTS THERETO, ASSIGNMENTS, AND ESCROW AGREEMENT ARE IN THE OFFICES OF LEADVILLE LEAD CORPORATION AND THE ORIGINALS OR PHOTOSTATIC COPY THEREOF CAN BE FURNISHED UPON REQUEST.

Corporation
Cranmer Building
Denver 2, Colorado

MINING LEASE

THIS LEASE, made and entered into this 5th day of August, 1945, by and between THE BIG CHIEF MINING COMPANY, a Colorado Corporation, Party of the First Part, hereinafter called Lessor, and JAMES N. REDMAN of Park County, Colorado, Party of the Second Part, hereinafter called Lessee.

W I T N E S S E T H:

That, the said Big Chief Mining Company for and in consideration of the payment by Lessee of the sum of $195.00, representing all presently unpaid State and County taxes assessed against the premises hereinafter described and of the royalties hereinafter reserved and the premises and covenants hereinafter expressed, to be kept and performed by Lessee, his heirs, executors, administrators and assigns, as conditions hereof, has leased, let and demised, and by these presents does hereby lease, let and demise unto the said Lessee, his heirs, executors, administrators and assigns, the following described mining property, situate in the Horseshoe Mining District, in Park County, State of Colorado, to-wit:

LAST CHANCE Lode	Mining Claim,	U.S. Survey No. 3195
CATO	do	U.S. Survey No. 3196
HILDA & ADDIE	do	U. S. Survey No. 5413
E PLURIBUS UNUM	do	)
COLUMBIA	do	)
UNCLE SAM	do	)
ANITA	do	)
IRON CHIEF	do	)
BIG CHIEF	do	) All in
GALENITE	do	) U.S. Survey No. 12176
WASHOE	do	)
ANGLESITE	do	)
CERUSSITE	do	)

LAST CHANCE PLACER, located in Sec. 8, T. 10 S., R. 78 W. 6th principal Meridian

together with all the right, title and interest of the said The Big Chief Mining Company, in and to the lodes, veins and ore deposits within the boundary lines of each and all of the said

properties, and all dumps on or appertaining to said properties, and the shafts, tunnels, workings, rights, privileges, hereditaments and appurtenances thereunto belonging or in any wise appertaining, and all of the interest which said Lessor has in and to the improvements thereon or in connection therewith.

TO HAVE AND TO HOLD unto Lessee for the purpose of mining, removing and selling ore therefrom for the term of five years from date hereof, expiring at noon on the first day of September, 1950, unless sooner forfeited or terminated, in accordance with the terms hereof.

AND IN CONSIDERATION of such demise, Lessee hereby covenants and agrees with Lessor and its successors and assigns, as follows, to-wit:

1. To enter upon and take possession of herein demised premised on or before August 25, 1945, for the purpose of exploring and developing the same, and of mining ore therefrom. Lessee shall perform on said demised premises six hundred (600) 8-hour shifts of one man each for each of the first two years of the life of this lease and twelve hundred (1200) 8-hour shifts of one man each for the remaining years of the life of the lease.

It is understood and agreed that each expenditure by Lessee of the sum of Five ($5.00) Dollars in labor, improvements or core drilling actually performed or made upon herein demised premises, shall be considered the equivalent of one shift of labor upon said premises as hereinabove defined, and shall accordingly apply upon the labor requirements of this lease hereinabove recited.

It is also understood and agreed that because of the present inaccessibility of the underground workings, the lack

of adequate equipment and operating facilities on the premises, and because of severe winter weather conditions at this location, Lessee shall, if he so elects, be allowed to discontinue all operations from the 15th day of November until the 15th day of June of each year of the life of this lease.

2. Although time is of the essence of this paragraph, nevertheless if Lessee fails to perform the required number of shifts of labor in any period because of strike, extraordinary mine casualty, or because of any other circumstances manifestly beyond his control, such failure shall not then be deemed to be a breach of this covenant sufficient to justify the termination of this lease and reentry by the Lessor for condition broken.

3. To carry proper and sufficient Workmen's Compensation Insurance at all times during the life of this lease, so as to insure Lessee and his employes hereunder against liability for industrial accidents and to save Lessor from liability therefor, and to keep such notices respecting such insurance as may be required by law properly posted on said premises.

4. To allow said Lessor or its agents, upon request, to enter upon and into any and every part of the said premises for the purpose of inspection, sampling and surveying.

5. To occupy and hold all lodes, spurs and mineral deposits, cross or parallel, of any kind or nature, which may be discovered by said Lessee or any person in privity with him, in any manner, by working within or from the demised ground, as the property of said Lessor, with the privilege to said Lessee to work and mine the same as part of the aforesaid demised premises.

6. To timber well and sufficiently in accordance with good mining practice and to keep in good repair, drained and clear of loose rock and rubbish, where and as necessary for the proper

working of this mine, unless prevented by extraordinary mining casualty, all the drifts, shafts, tunnels and other workings which may at any time, during the term of this lease, be used, driven or made by Lessee; PROVIDED, HOWEVER, that Lessee shall have the privilege of filling old stopes with waste, according to the best modern mining practice. Lessee promises and covenants that promptly after the first day of January and July of each year during the life of this lease, he will cause to be made an accurate map prepared by competent mining surveyors showing all stopes that have been filled with waste, as above mentioned, and showing all new workings and developments and the true condition of all workings which may be accessible corrected to date, and Lessee will furnish such map to Lessor, not less than thirty (30) days after such date. Lessee agrees that in the event of his failure to comply with the foregoing provision, Lessor may cause such a map to be prepared at the expense of Lessee, and Lessee agrees and covenants to promptly pay all expense thus incurred at the time of their accrual.

7. To make all shafts at least 8 feet by 4 feet in the clear, and all drifts at least 6-1/2 feet high by 4-1/2 feet wide in the clear.

8. To furnish to Lessor by the 15th day of each and every calendar month during which demised premises are actually worked by Lessee, a complete statement for the previous calendar month, showing all shipments of ore, if any, and all labor shifts performed and money expended by Lessee upon said premises during the previous calendar month.

9. To pay, or cause to be paid to Lessor promptly, as royalty, the following percentages of the net smelter or mill value of ores extracted and removed from the demised premises during the life of this lease:

On ore of a net smelter or mill value of $25.00 or less per ton, 10% of such net smelter or mill value.

On ore of a net smelter or mill value of more than $25.00 and not exceeding $50.00 per ton, 15% of such net smelter or mill value.

On ore of a net smelter or mill value of more than $50.00, and not exceeding $75.00 per ton, 20% of such net smelter or mill value.

On ore of a net smelter or mill value of more than $75.00 per ton, 25% of such net smelter or mill value.

On all ores removed from dumps on the surface of the demised premises, regardless of the net smelter or mill value of the same per ton, 5% of the net smelter or mill value.

By the net smelter or mill value of ore is meant the value of the ore after deducting the following charges; the actual cost of transporting said ore from the mine to the ore buyer at smelter or custom mill; all smelter and custom mill charges for the treatment and handling of said ore; such additional charges or deductions as are usually made by such smelter or custom mills; provided, however, if the said Lessee concentrates ores from the demised premises in a mill operated or controlled by him, whether in the vicinity of Alma, Colorado, or in the vicinity of demised premises, or elsewhere, then and in that event the concentrates from such mill shall be sold directly to a smelter, and the milling charges to be deducted in determining the net smelter value of the ore shall include only the actual milling costs of Lessee per crude dry ton of such ore, excluding from such costs executive salaries and office expense, but including, together with other operating expenses, the cost of labor and supervision at the mill. In the event that ores from the demised premises are treated at a mill owned or controlled by Lessee, then Lessee shall certify to the smelter which purchases the concentrates therefrom, the crude ore tonnages represented by the concentrates shipped from Lessee's mill.

Detailed duplicate statements on all sales of ore from the demised premises to smelter or custom mill shall be furnished by the buyer to Lessor, it being the intention of the parties that all ores extracted from the demised premises shall be sold to smelter or custom mill for the best net returns available. All royalty payments shall be made to Lessor, in care of The Colorado National Bank, Denver, Colorado. The royalties upon any ore may, at the option of Lessor, be held by smelting company or other buyers subject to the order of Lessor.

10. To deliver to said Lessor, without demand or further notice, at noon on the 1st day of September, 1950, or at any time upon demand upon the termination of this lease prior to the said first day of September, 1950, all of the premises hereinabove described, together with the appurtenances and improvements now on the premises or hereafter to be erected or constructed thereon by Lessee, and all repairs and replacements that shall have been made by Lessee during his possession of the said premises, in as good order and condition, ordinary wear and tear expected, as the premises are in at the beginning of the term hereof, and the mine ready for work, acts of God, unavoidable actions of the elements, and accidents not arising from negligence excepted.

11. To pay all State and County property taxes assessed by the County of Park upon Lessor's interest in the demised premises or improvements thereon, beginning with taxes assessed for the year 1945, and the same shall be paid in entirety by Lessee not later than the first day of August of each year of the life of this lease, beginning with the first day of August subsequent to the rendering of statement of taxes due for the year 1945 by the said County of Park to said Lessor. In the event there should be developed upon said mining property a

13. Lessee shall not have the right to assign this lease or any interest thereunder, or sublet all or any part of said premises, without first having obtained the written consent of Lessor. Lessee shall permit no persons whatsoever not in privity with the parties hereto to take or hold possession of the said premises, or any part thereof, under any pretext whatsoever.

14. Lessee shall have the right, at his election, to make application to the Reconstruction Finance Corporation for a Development Mining Loan, or for an appropriation by the United States Bureau of Mines, all for the purpose of reopening or developing herein demised premises, provided the title of demised premises is not thereby encumbered.

15. Every covenant and agreement of this lease to be kept and performed by Lessee is hereby declared to be a condition of the lease, for the breach of which Lessor shall have the power to terminate this lease and the right to re-enter upon the premises demised personally or by its agents or attorneys without prejudice to any and all claims for damages which said Lessor might have by reason of the violation of any covenant hereof by Lessee. By the reentry of Lessor upon a breach of condition, Lessee shall be dispossessed of all his possessory rights and estate hereunder and Lessor shall be thereby seized of and returned to its former estate, free and clear of any rights, liens or claims by reason of this instrument. In event of breach of any covenant or condition of this lease by Lessee to be kept and performed, Lessor may, at its option, consider the Lessee and all persons found in occupation of the premises herein demised as guilty of unlawful detainer, and proceed against them accordingly. Provided, however, no delay or delays caused by unavoidable accident, strike, fires, snow slides, acts of God or other matters beyond the reasonable

Control of Lessee shall be considered or taken to be a breach of the covenants and conditions of this lease. Time is of the essence of the covenants of this lease.

The Lessor expressly reserves to itself the property and rights of property in all minerals to be extracted from said premises during the term of this lease.

16. The Lessee during the term of this lease may work and develop through the premises of Lessor, hereinabove described, any and all other property or mining claims which the Lessee, his heirs, executors, administrators or assigns, may lawfully acquire, provided that a royalty of five (5) cents per ton on any ore extracted from other property, removed through the workings, or hoisted through the shaft shall be paid by Lessee to Lessor for the use of its property and workings.

17. Lessee shall have the right, at his election, to surrender this mining lease and all of his rights thereunder unto Lessor, at any time during the life of said lease. Prior to any such surrender, however, Lessee shall give to Lessor thirty (30) days' written notice of Lessee's intention to terminate said contract and surrender up said leased premises. Any such surrender or termination of said lease shall not operate to release or discharge Lessee of liability for default on his part, occurring prior to the time of such surrender or termination, but shall only relieve Lessee from the obligation of further development of the demised premises. Lessee shall have the right following the surrender of the demised premises, whether at the end of the term hereof, or upon prior termination of this lease, for any cause, or upon forfeiture or surrender thereof, to remove from said premises as his property all supplies, tools, rail and pipe, mining machinery and equipment placed on said premises by and at the expense of Lessee, within thirty (30) days after such surrender; provided, however, should such surrender of the premises occur during the winter season,

then and in that event Lessee shall have six (6) months from the date of such surrender to exercise his right of removal herein granted. Lessee's failure to remove his said property from the demised premises within the period allowed shall forfeit his right to remove same, whereupon said property shall revert to and without further consideration become the property of Lessor.

18. It is agreed that Lessor shall have, during all reasonable business hours, and without previous notice to Lessee, the right to inspect, examine and copy all books of account and records of mine and milling operations in accordance with the standards of good accountancy.

19. Lessee is hereby granted the right to remove any or all dump ores now on the surface of demised premises and to pay Lessor as total compensation therefor, in lieu of royalty as hereinabove required, the sum of twenty-five (25¢) cents per wet ton of two thousand (2000) pounds, and to remove said dump ores to any custom mill, or buyer or smelter, with the distinct understanding that Lessee shall cause the transportation agency hauling such ore to keep in triplicate a correct record of the weights thereof, and Lessee shall make monthly settlement to Lessor at said price of 25¢ per ton for all dump ores removed by Lessee from Lessor's premises; said settlement shall be made in cash by Lessee not later than the 10th day of the following month, and such payment shall be accompanied by said transportation agency's record of ore so removed, certified both by Lessee and said transportation agency.

20. Each and every clause, covenant and agreement of this lease shall be held and deemed to extend to the heirs, executors,

"producing mine" within the meaning of the laws of the State of Colorado, thereby rendering the mineral output subject to taxation under the revenue laws of said State, then, and in that event, it is hereby agreed that such special tax on the minerals so produced shall be borne and paid by the parties hereto, respectively, in the propertion in which they shall receive the "net mill or smelter value" of the ores produced from said premises during each tax year; the terms "net mill or smelter value" being here used as defined in Paragraph No. 9 hereof.

12. To pay promptly for all labor, materials and supplies to be performed or furnished to Lessee or anyone under or in privity with him upon the said premises, and at all times to save and keep harmless the Lessor and the said premises and every part thereof from any and all claims, demands and liens on account of any such labor, materials and supplies, and during the entire life of this lease to post and keep conspicuously posted on said premises, and at the entrance to the workings, notices in the following form, to-wit:

N O T I C E
August 15 1945

> Notice is hereby given to all persons performing labor or service of any character or furnishing machinery or other materials or supplies, at any time to, on or in connection with the so-called Last Chance Group of mining claims or to any mine or mines therein located, or upon any of the property, real or personal, used in connection therewith, that the undersigned owners of the said Last Chance Group of Claims and the improvements thereon and connected therewith, will not be responsible for any such labor, service, machinery, materials or supplies, nor shall the interests of any of the said owners be subject to any liens therefor. The said premises have been leased to James N. Redman.

THE BIG CHIEF MINING COMPANY
O W N E R.

IT IS MUTUALLY PROMISED, COVENANTED AND AGREED by and between the said Lessor and the Lessee as follows, to-wit:

13. Lessee shall not have the right to assign this lease or any interest thereunder, or sublet all or any part of said premises, without first having obtained the written consent of Lessor. Lessee shall permit no persons whatsoever not in privity with the parties hereto to take or hold possession of the said premises, or any part thereof, under any pretext whatsoever.

14. Lessee shall have the right, at his election, to make application to the Reconstruction Finance Corporation for a Development Mining Loan, or for an appropriation by the United States Bureau of Mines, all for the purpose of reopening or developing herein demised premises, provided the title of demised premises is not thereby encumbered.

15. Every covenant and agreement of this lease to be kept and performed by Lessee is hereby declared to be a condition of the lease, for the breach of which Lessor shall have the power to terminate this lease and the right to re-enter upon the premises demised personally or by its agents or attorneys without prejudice to any and all claims for damages which said Lessor might have by reason of the violation of any covenant hereof by Lessee. By the reentry of Lessor upon a breach of condition, Lessee shall be dispossessed of all his possessory rights and estate hereunder and Lessor shall be thereby seized of and returned to its former estate, free and clear of any rights, liens or claims by reason of this instrument. In event of breach of any covenant or condition of this lease by Lessee to be kept and performed, Lessor may, at its option, consider the Lessee and all persons found in occupation of the premises herein demised as guilty of unlawful detainer, and proceed against them accordingly. Provided, however, no delay or delays caused by unavoidable accident, strike, fires, snow slides, acts of God or other matters beyond the reasonable

Control of Lessee shall be considered or taken to be a breach of the covenants and conditions of this lease. Time is of the essence of the covenants of this lease.

The Lessor expressly reserves to itself the property and rights of property in all minerals to be extracted from said premises during the term of this lease.

16. The Lessee during the term of this lease may work and develop through the premises of Lessor, hereinabove described, any and all other property or mining claims which the Lessee, his heirs, executors, administrators or assigns, may lawfully acquire, provided that a royalty of five (5) cents per ton on any ore extracted from other property, removed through the workings, or hoisted through the shaft shall be paid by Lessee to Lessor for the use of its property and workings.

17. Lessee shall have the right, at his election, to surrender this mining lease and all of his rights thereunder unto Lessor, at any time during the life of said lease. Prior to any such surrender, however, Lessee shall give to Lessor thirty (30) days' written notice of Lessee's intention to terminate said contract and surrender up said leased premises. Any such surrender or termination of said lease shall not operate to release or discharge Lessee of liability for default on his part, occurring prior to the time of such surrender or termination, but shall only relieve Lessee from the obligation of further development of the demised premises. Lessee shall have the right following the surrender of the demised premises, whether at the end of the term hereof, or upon prior termination of this lease, for any cause, or upon forfeiture or surrender thereof, to remove from said premises as his property all supplies, tools, rail and pipe, mining machinery and equipment placed on said premises by and at the expense of Lessee, within thirty (30) days after such surrender; provided, however, should such surrender of the premises occur during the winter season,

then and in that event Lessee shall have six (6) months from the date of such surrender to exercise his right of removal herein granted. Lessee's failure to remove his said property from the demised premises within the period allowed shall forfeit his right to remove same, whereupon said property shall revert to and without further consideration become the property of Lessor.

18. It is agreed that Lessor shall have, during all reasonable business hours, and without previous notice to Lessee, the right to inspect, examine and copy all books of account and records of mine and milling operations in accordance with the standards of good accountancy.

19. Lessee is hereby granted the right to remove any or all dump ores now on the surface of demised premises and to pay Lessor as total compensation therefor, in lieu of royalty as hereinabove required, the sum of twenty-five (25¢) cents per wet ton of two thousand (2000) pounds, and to remove said dump ores to any custom mill, or buyer or smelter, with the distinct understanding that Lessee shall cause the transportation agency hauling such ore to keep in triplicate a correct record of the weights thereof, and Lessee shall make monthly settlement to Lessor at said price of 25¢ per ton for all dump ores removed by Lessee from Lessor's premises; said settlement shall be made in cash by Lessee not later than the 10th day of the following month, and such payment shall be accompanied by said transportation agency's record of ore so removed, certified both by Lessee and said transportation agency.

20. Each and every clause, covenant and agreement of this lease shall be held and deemed to extend to the heirs, executors,

Sullo Lead Corporation
500 Linnet & Cranmer Building
Denver 2, Colorado

administrators and assigns of each of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have affixed their signatures hereto. This contract is executed in duplicate.

THE BIG CHIEF MINING COMPANY

BY Arthur H. Laws, Pres.

L e s s o r

(SEAL)

James N. Redman

James N. Redman

L e s s e e

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

M I N E O P T I O N

THIS AGREEMENT entered into this 5th day of August, 1945, by and between THE BIG CHIEF MINING COMPANY, a Colorado corporation, hereinafter called Lessor, and JAMES N. REDMAN of Park County, Colorado, hereinafter called Lessee, Witnesseth, That:

WHEREAS, by a mining lease of even date herewith said Lessor has leased certain mining properties to said Lessee, which said properties are hereinafter described as the optioned premises, and;

WHEREAS, in connection with said mining lease, Lessor desires to grant an option to purchase the leased mining properties to the said James N. Redman, Lessee;

NOW, THEREFORE, In consideration of the premises, the undertakings of the Lessee, under the said lease of even date herewith, and the sum of $195.00 Dollars received by said Lessor from said Lessee, as recited on the first page of said lease; the said Lessor has agreed and does hereby agree to sell to said Lessee, James N. Redman, all of its right, title and interest in and to the property hereinafter described (being the same property included in the said lease hereinbefore described, executed this date by the parties hereto, to which said lease reference is expressly made) as follows, to-wit:

LAST CHANCE Lode Mining Claim		U.S. Survey No. 3195
CATO	do	U.S. Survey No. 3196
HILDA AND ADDIE	do	U.S. Survey No. 5413

and

LAST CHANCE PLACER, located in Sec. 8, T. 10 S. R. 78 W. 6th Principal Meridian

E PLURIBUS UNUM Lode Mining Claim		)
COLUMBIA	do	)
UNCLE SAM	do	)

ANITA	do	)	
		)	
IRON CHIEF	do	)	
CERUSSITE	do	)	All in U.S. Survey
BIG CHIEF	do	)	No. 12176
ANGLESITE	do	)	
GALENITE	do	)	
WASHOE	do		

together with all the right, title and interest of the Lessor in and to the lodes, veins and ore deposits within the boundary lines of each and all of the said properties, and the shafts, tunnels, workings, rights, privileges, hereditaments and appurtences thereunto belonging or in any wise appertaining, and all of the interest which said Lessor has in and to the improvements thereon or in connection therewith, for the sum of Thirty five Thousand ($35,000.00) Dollars, to be paid by the said James N. Redman to the said Lessor or its successors at or prior to the termination of said lease by forfeiture or otherwise, but in no event later than the first day of September, 1950, less any and all royalty which may theretofore have been paid to the said Lessor or its successor by said James N. Redman or his assigns or successors under the provisions of paragraph No. 9 of said hereinabove mentioned lease.

If the said James N. Redman shall well and truly pay to the said Lessor the sums indicated at or prior to the termination of said lease, but in no event not later than September 1, 1950, said Lessor will forthwith convey to the said James N. Redman, all of its right, title and interest in and to the said properties by good and sufficient mining deeds, and will also furnish an abstract of title to the said mining claims, certified by a competent abstractor showing the said mining claims to be free and clear from all liens and encumbrances resulting from any acts or omissions on its part.

PROVIDED, HOWEVER, if the option hereinabove granted to said Redman is exercised on or before August 5, 1946, it is

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Denver 2, Colorado

mutually agreed that the purchase price shall be discounted 25% so as to make the total purchase price to be paid on the exercise of said option Twenty Six Thousand Five Hundred ($26,500.00) Dollars; and provided further that if the option afore said is exercised on or before August 5, 1947, then and in that event it is mutually agreed that the purchase price to be paid shall be discounted 17½%, so as to make the total purchase price to be paid on the exercise of said option Twenty Eight Thousand, Eight Hundred Seventy-five ($28,875.00) Dollars. Upon the exercise of the option at any time, all royalty which may theretofore have been paid by said Redman, or bv his legal assigns or successors to said Lessor, shall be credited against the purchase prices payable under this option to said Lessor.

If the option herein granted is not exercised by Lessee, by the payment of the respective purchase prices to the said Lessor while the said lease is in full force and effect, on or prior to September 1, 1947, then this agreement will be null and void and of no effect and all of the parties hereto shall be released from all obligations thereunder.

It is mutually understood and agreed that the said Redman shall not sell, assign or transfer his rights under this option, or any portion of his rights herein, without having first obtained the written consent of Lessor.

THE BIG CHIEF MINING COMPANY
By

(SEAL)

Arthur H. Laws
President
L e s s o r

ACCEPTED THIS 5 day
of August, 1945.

James N. Redman
James N. Redman
L e s s e e

Leadville Lead Corporation
889 Ernest & Cranmor Building
Denver 2, Colorado

AMENDMENT TO MINING LEASE

THIS AGREEMENT, Made and entered into this 7th day of October, 1946, by and between THE BIG CHIEF MINING COMPANY, a Colorado corporation, party of the first part, hereinafter called Lessor, and JAMES N. REDMAN, of Park County, Colorado, hereinafter called Lessee.

W I T N E S S E T H:

That, whereas on August 5, 1945, Lessor executed a mining lease demising unto Lessee the following described mining property situate in the Horseshoe District, Park County, Colorado, to-wit:

LAST CHANCE	Lode Mining Claim,	U.S. Survey No.	3195
CATO	do	do	3196
HILDA & ADDIE	do	do	5413
E PLURIBUS UNUM	do	)	
COLUMBIA	do	)	
UNCLE SAM	do	)	
ANITA	do	)	
IRON CHIEF	do	)	
BIG CHIEF	do	)	All in
GALENITE	do	)	U.S. Survey No. 12176
WASHOE	do	)	
ANGLESITE	do	)	
CERUSSITE	do	)	

LAST CHANCE PLACER, located in Sec. 8, T. 10 S., R. 78 W. 6th Principal Meridian

together with all the right, title and interest of the said The Big Chief Mining Company, in and to the lodes, veins and ore deposits within the boundary lines of each and all of the said properties, and all dumps on or appertaining to said properties, and the shafts, tunnels, workings, rights, privileges, hereditaments and appurtenances thereunto belonging or in any wise appertaining, and all of the interest which said Lessor has in and to the improvements thereon, or in connection therewith.

Together with an option to purchase above described demised premises on or before September 1, 1950, for the sum of

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800 Ernest & Cranmer Building
Denver 2, Colorado

$35,000.00, less any and all royalty paid prior to last recited date by Lessee to Lessor, and together with agreement that said purchase price shall be discounted 25% if option should be exercised on or before August 5, 1946, and discounted 17½%, if option should be exercised on or before August 5, 1947, and

WHEREAS, Lessee has represented to Lessor that he is endeavoring to induce an adequately financed mining company to undertake certain exploration and development work on said demised premises,

NOW, THEREFORE, For and in consideration of the sum of Two Dollars ($2.00) this day in hand paid Lessor by Lessee, receipt whereof is hereby acknowledged, and of the herein covenants by Lessee, to be kept and performed, Lessor hereby agrees with Lessee as follows, to-wit:

1. The term of said Mining Lease dated August 5, 1945, is hereby extended to and until the first day of September, 1956, unless sooner forfeited or terminated in accordance with the terms thereof.

2. Lessor hereby extends the terms of said option to purchase said demised premises, for the sum of Thirty-five Thousand ($35,000.00) Dollars, to and until September 5, 1956, less any and all royalty paid prior to last-recited date by Lessee to Lessor, and likewise extends the term wherein said purchase price shall be discounted 25% to and until August 5, 1947, and the term wherein said purchase price shall be discounted 17½% to and until August 5, 1948.

Lessee hereby covenants with Lessor as follows, to-wit:

3. To commence the exploration of said demised premises by core-drilling, on or before July 15, 1947 and to drive the DAUNTLESS TUNNEL, an adit located on premises of other ownership, toward the boundary line of said demised premises, for the purposes

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Denver 2, Colorado

of exploration and development of lower horizons of demised premises, with the understanding that the work and expenditure of the advance of said Dauntless Tunnel shall be credited by Lessor to Lessee upon the labor requirements of said lease.

4. All of the terms and conditions of said lease of August 5, 1945, not specifically modified by this amendment, shall remain unchanged and in full force and effect.

Each and every clause, covenant and agreement of this amendment to lease shall be held and deemed to extend to the heirs, executors, administrators and assigns of each of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have affixed their signatures hereto. This contract is executed in duplicate.

THE BIG CHIEF MINING COMPANY
By

(SEAL)

Attest.

C. E. Buchenau
President

G. H. Roberts
Secretary

L e s s o r

James N. Redman
James N. Redman

L e s s e e

Leadville Lead Corporation
839 Brown & Cramer Building
Denver 2, Colorado

Denver, Colorado
February 10, 1947.

The undersigned corporation hereby consents to the sale, assignment and transfer to LEADVILLE LEAD CORPORATION, a Colorado corporation, by James N. Redman, of all of his rights under Mining Lease and Option executed to him by undersigned on August 5, 1945, and Amendment to Mining Lease executed to him by undersigned on October 7, 1946.

THE BIG CHIEF MINING COMPANY
By

C. E. Buchenau
President

Attest: (SEAL)

G. H. Roberts
Secretary

Leadville Lead Corporation
800 Ernest & Cranmer Building
Denver 2, Colorado

ASSIGNMENT

FOR AND IN CONSIDERATION of the sum of Two Dollars ($2.00) and other good and valuable considerations, the receipt whereof is hereby acknowledged, the undersigned, JAMES N. REDMAN, hereby sells and conveys and sets over unto LEADVILLE LEAD CORPORATION, a Colorado Corporation, a certain Mining Lease and Option, executed to him on August 5, 1945, by The Big Chief Mining Company, a Colorado corporation, demising the following described Mining property, situated in the Horseshoe Mining District, Park County, Colorado, to-wit:

LAST CHANCE Lode, Survey No. 3195,
CATO Lode, Survey No. 3196
HILDA & ADDIE Lodes Survey No. 5413
E PLURIBUS UNUM, COLUMBIA, UNCLE SAM,
ANITA, IRON CHIEF, BIG CHIEF, GALENITE,
WASHOE, ANGLESITE & CERUSSITE Lodes,
Survey No. 12176, and
LAST CHANCE PLACER.

EXECUTED at Denver, Colorado, this 11th day of February, 1947.

James N. Redman

Leadville Lead Corporation
800 Ernest & Cranmer Building
Denver 2, Colorado

AMENDMENT TO MINING LEASE

THIS AGREEMENT, made and entered into this 21st day of July, 1948, by and between The Big Chief Mining Company, a Colorado corporation, first party, hereinafter called Lessor, and LEADVILLE LEAD CORPORATION, a Colorado Corporation, second party, hereinafter called Lessee,

W I T N E S S E T H

That, whereas on August 5, 1945, Lessor granted a mining lease to James N. Redman, subsequently assigned to lessee herein, with lessor's written consent, demising the following described mining property situate in the Horseshoe Mining District, Park County, Colorado, to-wit:

Last Chance Lode Mining Claim,		U.S. Survey No. 3195
Cato	do	U.S. Survey No. 3196
Hilda & Addie	do	U.S. Survey No. 5413
E Pluribus Unum	do	)
Columbia	do	)
Uncle Sam	do	)
Anita	do	) All in
Iron Chief	do	) U.S. Survey No. 12176
Big Chief	do	)
Galenite	do	)
Washoe	do	)
Anglesite	do	)
Cerussite	do	)

Last Chance Placer, located in Section 8, Township 10 S., Range 78 W. 6th Principal Meridian

WHEREAS, on October 7, 1946, Lessor and said Redman executed an amendment to said lease,

NOW THEREFORE, for and in consideration of the sum of Two Dollars ($2.00) this day in hand paid Lessor by Lessee, receipt whereof is hereby acknowledged, and of other good and valuable considerations recited herein and of the herein covenants by Lessee to be kept and performed, Lessor and Lessee hereby agree, each with the other, as follows, to-wit:

1. Lessee declares that it has purchased, in the name of James N. Redman, from Lake County, Colorado, by its Board of

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Denver 2, Colorado

Commissioners, Lake County Tax Sale Certificate No. 12987, sold October 24, 1908, being for all of that part of U. S. Survey No. 12176, located in Lake County, Colorado, containing Three (3) acres of land, more or less, which said land was formerly the property of Lessor as a parcel of said Survey No. 12176, the remainder of which said survey is now demised to Lessee, but that the said Lake County portion of said survey was never demised to Lessee. Lessee further declares that treasurer's deed will be issued to said Redman on September 27, 1948, unless the same has been redeemed, and that said Redman has agreed with Lessee, in last recited event, to convey said parcel of land to Lessee or its nominee by quit claim deed. Lessee agrees with Lessor that if and when said treasurer's deed shall issue to said Redman, it will forthwith cause to be conveyed to Lessor, without further consideration, by quit-claim deed, the said above described Lake County portion of said certificate No. 12176, provided, however, that Lessor will then and in that event, include said Lake County portion of said Survey No. 12176 in said lease and option of August 5, 1945, without further consideration.

2. Whereas paragraph 9 of said lease provided, among other things, that Lessee shall pay Lessor as royalty "on all ore removed from dumps on the surface of demised premises, regardless of net smelter or mill value of the same per ton, 5% of the net smelter or mill value", Lessor hereby grants to Lessee the election of paying said dump royalties as above recited, or of paying Lessor a flat royalty of 25¢ for each wet ton of two thousand pounds of dump ore removed by Lessee from said premises. The weight or ore so removed shall be estimated by the transportation agency removing same from said premises and such agency shall keep duplicate records of all truck loads so removed, and shall, at the end of each month wherein dump ores are so hauled, attest the

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600 Ernest & Cranmer Building
Denver 2, Colorado

AMENDMENT TO MINING LEASE

THIS AGREEMENT, Made and entered into this 10th day of November, 1949, by and between THE BIG CHIEF MINING COMPANY, a Colorado corporation, First party, hereinafter called Lessor, and LEADVILLE LEAD CORPORATION, a Colorado corporation, Second party, hereinafter called Lessee,

W I T N E S S E T H:

That, Whereas on August 5, 1945, Lessor granted a Mining Lease to James N. Redman, subsequently assigned to Lessee herein, with Lessor's written consent, demising the following described mining property situate in the Horseshoe Mining District, Park County, Colorado, to-wit:

LAST CHANCE Lode Mining Claim,		U.S. Survey No. 3195
CATO	do	U.S. Survey No. 3196
HILDA AND ADDIE	do	U. S. Survey No. 5413
E PLURIBUS UNUM		)
COLUMBIA		)
UNCLE SAM		)
ANITA		)
IRON CHIEF	do	) All in U.S. Survey
BIG CHIEF		) No. 12176
GALENITE		)
WASHOE		)
ANGLESITE		)
CERUSSITE		)

LAST CHANCE PLACER, located in Section 8, Township 10 S., Range 78 W. 6th Principal Meridian

And, Whereas, on October 7, 1946, on March 18, 1949 and on May 6, 1949 several amendments to said lease were executed,

NOW THEREFORE, for and in consideration of the sum of Two Dollars ($2.00) this day in hand paid Lessor by Lessee, receipt whereof is hereby acknowledged, and of other good and valuable considerations recited herein, and of the herein covenants by Lessee to be kept and performed, Lessor and Lessee hereby agree each with the other, as follows, to-wit:

1. Paragraph 9 of said lease of August 5, 1945, as subsequently amended, is hereby cancelled, deleted and set a t

naught, and the paragraph recited herebelow is hereby substituted for the said original paragraph 9 as heretofore amended;

> To pay or cause to be paid to Lessor promptly, as royalty, 10% of the net smelter or mill value of all ores extracted or removed from the demised premises during the life of this lease.
>
> By the net smelter or mill value of the ore is meant the value of the ore after deducting the following charges: The actual cost of transporting said ore from the mine to the ore buyer at smelter or custom mill; all smelter and custom mill charges for the treatment and handling of said ore; such additional charges or deductions as are usually made by such smelter or custom mills; provided, however, if the said Lessee concentrates ores from the demised premises in a mill operated or controlled by it, whether in the vicinity of Alma, Colorado, or in the vicinity of demised premises, or elsewhere, then and in that event the concentrates from such mill shall be sold directly to a smelter, and the milling charges to be deducted in determining the net smelter value of the ore shall include only the actual milling costs of lessee per crude dry ton of such ore, excluding from such costs executive salaries and office expense, but including, together with other operating expenses, the cost of labor and supervision at the mill. In the event that ores from the demised premises are treated at a mill owned or controlled by Lessee, then Lessee shall certify to the smelter which purchased the concentrates therefrom, the crude ore tonnages represented by the concentrates shipped from Lessee's mill.
>
> Detailed duplicate statements on all sales of ore from the demised premises to smelter or custom mill shall be furnished by the buyer to Lessor, it being the intention of the parties that all ores extracted from the demised premises shall be sold to smelter or custom mill for the best net returns available. All royalty payments shall be made to Lessor, in care of the Colorado National Bank, Denver, Colorado. The royalties upon any ore may, at the option of Lessor, be held by smelting company, or other buyers, subject to the order of Lessor.

2. All of the terms and conditions of said lease of August 5, 1945, not specifically modified by this amendment, shall remain unchanged and in full force and effect.

Leadville Lead Corporation
800 [illegible] Hamer Building
Denver 2, Colorado

AMENDMENT TO MINING LEASE

THIS AGREEMENT, Made and entered into this 28th day of February, 1951, by and between THE BIG CHIEF MINING COMPANY, a Colorado corporation, First Party, hereinafter called Lessor, and LEADVILLE LEAD CORPORATION, a Colorado corporation, Second Party, hereinafter called Lessee.

W I T N E S S E T H

That, Whereas, on August 5, 1945, Lessor granted a Mining Lease and Option to James N. Redman, (which said Mining Lease and Option was, on February 11, 1947, assigned to Lessee herein, with Lessor's written consent), demising the following described property situate in the Horseshoe Mining District, Park County, Colorado, to-wit:

Last Chance Lode	Mining Claim		U. S. Survey No. 3195
Cato	do		do 3196
Hilda & Addie	do		do 5413
E Pluribus Unum	do	(	
Columbia	do	(	
Uncle Sam	do	(	
Anita	do	(	
Iron Chief	do	(	All in U.S. Survey
Big Chief	do	(	No. 12176
Galenite	do	(	
Washoe	do	(	
Anglesite	do	(	
Cerussite	do	(	

Last Chance Placer, located in Section 8, Township 10 S., Range 78 W. 6th Principal Meridian

And, Whereas said Mining Lease was subsequently modified by amendments in writing, and

Whereas, by written amendment of May 6, 1949, it was provided that the term wherein the purchase price of the said demised premises should be discounted Seventeen and one-half percent (17½%) should be extended to and until August 5, 1951,

NOW THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00) this day in hand paid Lessor by Lessee, receipt whereof is hereby acknowledged and of other good and valuable considerations, Lessor hereby agrees with Lessee as follows,

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500 Cranmer Building
Denver 2, Colorado

to-wit:

1. That the term wherein purchase price of said demised premises shall be discounted Seventeen and one-half percent (17½%) shall be extended to and until August 5, 1952.

2. That all of the terms and conditions of said lease of August 5, 1945 and all of the written amendments thereto, not modified by herein amendment, shall remain unchanged and in full force and effect.

Each and every clause, covenant and agreement of this amendment shall be held to extend to the successors and assigns of each of the parties hereto.

IN WITNESS WHEREOF, THE parties hereto have affixed their signatures and seals hereto on the day and date first above written. This contract is executed in duplicate.

THE BIG CHIEF MINING COMPANY
By C. E. Buchenau President

Lessor

ATTEST: (SEAL)

G. H. Roberts
Secretary.

LEADVILLE LEAD CORPORATION
By
Robert G. Risk President

Lessee

ATTEST: (SEAL)

Ben L. Wright, Jr.
Secretary.

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

LEADVILLE LEAD CORPORATION
500 E & C Bldg.
EXHIBIT B
FORM MF-103

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

EXHIBIT B

TO ACCOMPANY FORM MF-103 OF DEFENSE
MINERALS ADMINISTRATION

MINING LEASE FROM ALFRED S. LEWERENZ, as Trustee for the heirs of Robert J. Allison, Deceased, DATED JUNE 15, 1948.

AMENDMENT TO MINING LEASE DATED JUNE 21, 1949.

AMENDMENT TO MINING LEASE DATED NOVEMBER 6, 1950.

LETTER DATED NOVEMBER 6, 1950.

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

THE ORIGINAL OF THIS LEASE, AMENDMENTS AND LETTER ARE IN THE OFFICE OF LEADVILLE LEAD CORPORATION AND THE ORIGINALS OR PHOTOSTATIC COPY THEREOF CAN BE FURNISHED UPON REQUEST.

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

MINING LEASE

THIS LEASE, Made and entered into this fifteenth day of June, 1948, by and between ALFRED S. LEWERENZ, of the City of Los Angeles, County of Los Angeles, State of California, as Trustee for the heirs of ROBERT J. ALLISON, DECEASED, First Party, hereinafter called Lessor, and LEADVILLE LEAD CORPORATION, a Colorado corporation, Second Party, hereinafter called Lessee.

WITNESSETH, That, for and in consideration of the sum of Two Hundred Fifty Dollars ($250.00) this day paid by Lessee to Lessor, as advance royalty, and of the royalties hereinafter reserved and the covenants hereinafter expressed, to be kept and performed by Lessee, Lessor has leased, let and demised, and by these presents does hereby lease, let and demise unto Lessee, its successors and assigns, all of the following described property, situate in the Horseshoe Mining District, Park County, Colorado, to-wit:

RAT Lode Mining Claim, U.S. Survey No. 5444
THURMAN Lode Mining Claim, U.S. Survey No. 5444

together with all lodes, veins and ore deposits within the boundary lines of said premises, and all rights, privileges, hereditaments and appurtenances thereunto belonging or in any wise appertaining.

TO HAVE AND TO HOLD unto Lessee for the purpose of mining, removing and selling ore therefrom, for a term beginning on the date hereof, and expiring at noon on the 15th day of June, 1963, unless sooner forfeited or terminated in accordance with the terms hereof, with full power to assign this lease or to sublet all or any portion of herein demised premises, with the understanding that Lessee shall be responsible to Lessor for the compliance by assignees and sublessees with the covenants of this lease, and with the further understanding that Lessee shall promptly notify Lessor in writing at Room 730, First National Bank Building, Denver, Colorado of each assignment or subletting, together with the names of assignees or sub-lessees.

AND IN CONSIDERATION of such demise, Lessee hereby covenants and agrees with Lessor as follows, to-wit:

1. On or before July 15, 1948, to enter upon demised premises and/or into an adit, locally and commonly known as the Dauntless Tunnel, which said adit has been extended underground to a point on the Dauntless Claim, U.S. Survey, No. 4914, and then to begin the necessary work preliminary to continuing the advance of said Dauntless Tunnel toward demised premises, and, on or before August 1, 1948, to begin said advance and thereafter to advance said tunnel so that the same shall have been extended to the easternmost side line of demised premises on or before June 30, 1949, and thereafter to continue to advance said tunnel so that the same shall have been extended to the westernmost side line of demised premises on or before June 30, 1950. It is understood that the said Dauntless Tunnel, if advanced into demised premises, will provide an opening through which demised premises can be drained and through which ore therefrom can be transported economically to the surface so that the work of advancing said Dauntless Tunnel will benefit demised premises and will facilitate the exploration thereof and the mining of ore therefrom.

2. To advance said Dauntless Tunnel toward demised premises with due diligence, it being understood that work performed in the advance of said adit between its present terminus on said Dauntless claim and the westernmost side line of herein demisedpremises shall constitute full performance of labor required by this lease to and until the 30th day of June, 1950.

3. For the remaining life of this lease, subsequent to June 30, 1950, to perform directly on demised premises, not less than 600 8-hour shifts of labor of one man each, for each remaining year of the life of this lease. It is understood that each expenditure by Lessee of Five Dollars ($5.00) in bulldozer trenching, core drilling and in payment to contractors for drifting, raising or sinking in said demised premises shall be considered the equivalent of the performance by Lessee of one 8-hour, one man shift of labor.

4. To allow Lessor access to all parts of demised premises at all reasonable times; to do all work in miner-like fashion so as to

protect the premises as a workable mine, including timbering of underground workings wherever necessary; to make written reports to Lessor at least four times a year while lease is in force, showing all labor performed and all ore shipped, and to furnish Lessor, at Lessor's request, copies of any core-drilling and sampling records and copies of any maps of underground workings of demised premises which may be made by Lessee during the life of this lease.

5. To pay, or cause to be paid Lessor promptly, as royalty, the following percentages of the net smelter or mill value of ores extracted and removed from demised premises, during the life of this lease:

On ore of a net smelter or mill value of $25.00 or less per ton, 10% of such smelter or mill value;

On ore of a net smelter or mill value of more than $25.00 and not exceeding $50.00 per ton, 15% of such net smelter or mill value;

On ore of a net smelter or mill value of more than $50.00 and not exceeding $75.00 per ton, 20% of such net smelter or mill value;

On ore of a net smelter or mill value of more than $75.00 per ton, 25% of such net smelter or mill value.

By the net smelter or mill value of the ore is meant the value of the ore after deducting the following charges; the actual cost of transporting said ore from the mine to the smelter or custom mill; all smelter and custom mill charges for the treatment and handling of said ore, and such additional charges or deductions as are usually made by such smelter or custom mill; provided, however, if Lessee concentrates ores from the demised premises in a mill operated or controlled by it, then and in that event the concentrates from such mill shall be sold directly to a smelter and the milling charges to be deducted in determining the net smelter value of the ore, shall include only the actual milling costs of Lessee per crude ton of such ore, excluding from such costs executive salaries and office expenses, but including, together with other proper operating expenses, the cost of labor and supervision at the mill. In the event that ores from the demised premises are treated at a mill owned or controlled by Lessee, then Lessee shall certify to the smelter which purchases the concentrates therefrom the

crude ore tonnages represented by the concentrates shipped from Lessee's mill.

Detailed duplicate statements on all sales of ore from the demised premises to smelter or custom mill shall be furnished by the buyer to Lessor. All royalty payments shall be made to Lessor or to his successors, as Lessor may designate. The royalties upon any ore may, at the option of Lessor, be held by smelting company or other buyer, subject to the order of Lessor.

6. Whereas Lessee expects to advance said Dauntless Tunnel through demised premises into other mining claims now owned or controlled by it and to transport through said tunnel ore which may be mined on such other claims owned or controlled by Lessee, as well as ore mined from herein demised premises, Lessee hereby agrees, as an additional consideration to Lessor for this demise, to pay Lessor the sum of 1-1/2¢ per ton for each ton of ore transported by Lessee and its sub-leasees, through that portion of said Dauntless Tunnel which may be driven in herein demised premises, provided said ore shall not have been mined from herein demised premises, it being understood that the said amount of 1-1/2¢ per ton shall not apply to ores derived from Lessor's premises. It is further understood that said 1-1/2¢ per ton shall be paid only on ores which may be actually transported through Lessor's premises.

7. To deliver to said Lessor, without demand or further notice, at noon on the fifteenth day of June, 1963, or at any time upon demand upon termination of this lease, prior to the fifteenth day of June, 1963, all of the premises hereinabove described, together with the appurtenances and improvements, except said Dauntless Tunnel, in as good order and condition, ordinary wear and tear excepted, as the premises were in at the beginning of the term hereof, and the mine ready for work, acts of God, unavoidable actions of the elements and actions not arising from negligence excepted, except that in the event that Lessee shall operate properties of other ownerships through extension of said Dauntless Tunnel, and shall transport ore through said portion of said Tunnel in demised premises, it shall pay Lessor the above recited sum of 1-1/2¢ per ton for all ores so transported through demised premises in order to preserve

and maintain its right-of-way through demised premises.

8. Lessee shall pay all general property taxes assessed as a non-producing mine against Lessor's ownership in the demised premises during the term of this lease, beginning with taxes for the year 1948; but Lessor shall be charged with Lessor's proportion, based on the royalties hereinabove reserved, of taxes bases on assessment as a producing mine and of any production, severance or similar or other excise taxes, and Lessee shall advance such taxes and be reimbursed therefor out of royalties.

9. Every covenant and agreement of this lease to be kept and performed by Lessee is hereby declared to be a condition of this lease, for the breach of which Lessor shall have the power to terminate this lease and the right to re-enter the demised premises without prejudice to any and all claims for damages which Lessor may have by reason of the violation of any covenant hereof by Lessee. By the reentry of Lessor upon a breach of condition, Lessee shall be dispossessed of all of its possessory rights and estate hereunder, and Lessor shall be thereby seized of and returned to his former estates, free and clear of any rights, liens or claims, by reason of this instrument. In the event of the breach of any covenant or condition of this lease by Lessee to be kept and performed, Lessor shall, in order to enforce forfeiture of said lease, notify Lessee in writing of Lessor's intention to enforce forfeiture because of Lessee's default, such default to be specified in said notice, and if Lessee, within thirty days after mailing or delivery of said written notice, shall not have remedied the default so specified, Lessor may then forthwith declare forfeiture and may then consider Lessee and all persons found in occupation of the premises herein demised as guilty of unlawful detainer, and proceed against them accordingly, provided, however, no dalay or delays caused by unavoidable accident, strike, fires, snowslides, acts of God or other matters (not financial) beyond the reasonable control of the Lessee shall be considered or taken to be a breach of the covenants and conditions of this lease. Time is of the essence of this lease.

Leadville Lead Corporation
000 Ernest & Cranmer Building
Denver 2, Colorado

Lessor hereby expressly reserves to himself the property and rights of property in all minerals to be extracted from said premises during the term of this lease.

10. Lessee shall have the right, at its election, to surrender this mining lease and all of its rights thereunder, independent of said Dauntless Tunnel right-of-way, unto Lessor at any time during the life of this lease. Prior to any such surrender, however, Lessee shall give to Lessor thirty (30) days written notice of its intention to terminate said contract and surrender up said leased premises. Any such surrender or termination of said lease shall not operate to release or discharge Lessee of liability for default on its part occurring prior to the time of such surrender or termination, but shall only relieve Lessee from the obligation of further development of the demised premises.

11. Notices to either party shall be given by registered United States mail to the following respective addresses:

(a) To Lessor - 730 First National Bank Building
Denver, Colorado;

(b) To Lessee - 305 California Building, Denver, Colorado.

12. Lessee shall have the right, following the surrender of demised premises, whether at the end of the term hereof, or upon prior termination of this lease for any cause, or upon forfeiture or surrender thereof to remove from said premises, as its property, and within ninety (90) days after such surrender, termination or forfeiture, all supplies, tools and mining equipment placed on said premises by it, provided, however, should such surrender, termination or forfeiture of the premises occur during the winter season, then and in that event Lessee shall have six (6) months from the date of such surrender, termination or forfeiture to exercise the right of removal herein granted. Lessee's failure to remove its said property from the demised premises within the periods hereinabove allowed, shall forfeit its right to remove same, whereupon said property shall revert to, and without further consideration become the property of

Lead Corporation
Grammer Building
Colorado

Lessor, except for such mine rail, compressed air pipe and ventilation pipe which may be placed by Lessee in that portion of said Dauntless Tunnel driven through herein demised premises, it being understood that the said mine rail and pipe shall remain the property of Lessee.

13. In consideration of the foregoing covenants expressed in paragraph 6, on page 4 hereof of this instrument, requiring Lessee to pay Lessor the sum of 1-1/2¢ per ton for each ton of ore not originating from herein demised premises, but transported through that portion of said Dauntless Tunnel driven in herein demised premises, Lessor hereby grants to Lessee the right-of-way and use of said Dauntless Tunnel through herein demised premises, for so long a time as Lessee or its successors shall be engaged in using said Dauntless Tunnel as a transportation tunnel to serve any of the claims leased, operated, owned, or controlled by it provided that Lessee shall pay Lessor, as aforesaid, the said sum of 1-1/2¢ per ton of ore as recited in paragraph 6 hereof.

14. Lessor and Lessee agree, each with the other, in consideration of the covenants herein expressed, that upon the surrender, expiration, forfeiture, or termination of this lease, Lessor, his successors or assigns, shall have the right to use said Dauntless Tunnel in connection with Lessor's mining operations on the demised premises and shall also have the right to use such tunnel for transportation of ore, on the following conditions, to-wit:

(a) If Lessee shall continue to use said Dauntless Tunnel as a transportation tunnel as herein provided to serve the claims, leased, operated, owned or controlled by it, Lessee shall haul ore through said tunnel and Lessor shall pay for such hauling such sum as Lessor and Lessee shall agree. In the event of disagreement, Lessor and Lessee shall each appoint an arbitrator who shall fix the hauling charge, and if the two arbitrators cannot agree, the arbitrators shall select a third arbitrator and the haulage charge fixed by any two of the three arbitrators shall be binding upon the parties.

(b) If Lessee shall for any reason cease or suspend hauling operations through said tunnel for a period of sixty (60) consecutive days (the delays provided for in paragraph 7 hereof have no application), Lessor shall have the right to use said tunnel for the transportation

of Lessor's ore in common with other permitted users thereof. If Lessee's equipment and materials shall then remain in the tunnel, Lessor and other persons having the right to use such tunnel, shall have the right to use such equipment. The charge by Lessee for the use of the tunnel, without use of Lessee's equipment and materials by Lessor and other permitted users thereof shall be at the rate of 1/1/2¢ per ton for every 300 feet through which such ore shall be transported and an additional charge for the use of Lessee's equipment shall be made to be agreed upon by Lessor and Lessee herein, or fixed by a board of arbitrators, approved by them in the manner provided in paragraph (a) above. Such arbitrators shall also have the right to adopt reasonable rules and regulations to govern the use of such tunnel by all users thereof. The charge and cost of the arbitrators shall be borne equally by the parties hereto, but the full amount shall be paid by Lessee and Lessee shall be reimbursed for Lessor's one-half share from subsequently accruing royalties.

(c) Upon resumption of transportation use of the tunnel by Lessee, it shall resume haulage of Lessor's ore as provided in paragraph (a) above.

(d) Nothing herein shall be construed to prevent Lessee from having the right at all times to remove its equipment and materials from said tunnel.

(e) Suspension of hauling operations by the Lessee shall not be construed as an abandonment of its right to use such tunnel unless such suspension shall continue for a period of two years.

15. Lessee shall comply with the Workmen's Compensation Laws of Colorado and with Social Security, Unemployment Insurance and all other state and federal laws relating to Lessee's operations and shall carry liability insurance to protect Lessor against claims of any and all persons who may be injured or whose property may be damaged on demised premises whether or not as a result of Lessee's operations, and to save Lessor harmless from any claim for damages or liability by reason thereof, and, before commencing work, Lessee shall deliver all insurance policies herein recited to Lessor for inspection and Lessee

Loodville Lead Corporation
[illegible] & Cranmor Building
[illegible] Colorado

shall keep all such policies renewed from time to time, and shall advise Lessor in writing of such renewals.

16. Lessee shall keep herein demised premises free and clear of all labor and material liens and encumbrances and shall keep posted in a conspicuous place on demised premises a written or printed notice that the premises are leased and operated by Lessee and that the interest of Lessor shall not be subject to liens by reason of Lessee's operations.

17. Lessor hereby agrees with Lessee to deliver to Lessee any abstracts of title to herein demised premises now in Lessor's possession, and further that if Lessee shall elect either to obtain, at its expense, a new abstract of title to said premises, or to procure the continuation of a presently existing abstract of title, also at Lessee's expense, then and in that event Lessee shall have the right to deduct the expense of such abstracts, or abstract continuation from royalty due Lessor under this agreement, not exceeding, however, the sum of $250.00.

18. It is understood and agreed that Lessor herein is not acting individually or personally, but solely as Trustee or Successor Trustee of and for the heirs of Robert J. Allison, deceased, pursuant to his appointment and powers by decree of the District Court of the City and County of Denver, Colorado, dated on or about June 30, 1936, in those certain proceedings entitled: "Robert Y. Speir, plaintiff, v. The International Trust Company, a Colorado corporation, et al., defendants" being case A-14825 in said Court; and that in executing this lease or by any of the acts of Lessor hereunder, or otherwise in connection with said trust estate, said Trustee charges only the trust estate and not himself personally, and Lessee agrees to look only to the assets of the estate.

19. Each and every clause, covenant and agreement of this lease shall be held and deemed to extend to and be binding upon the heirs, personal representatives, successors and assigns of each of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have affixed their signatures hereto the day and year first above written. This contract is

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

executed in duplicate.

(sig.) Alfred S. Lewerenz
Alfred S. Lewerenz, Trustee for
the heirs of Robert J. Allison, Deceased
L e s s o r

LEADVILLE LEAD CORPORATION
By
(sig.) James N. Redman President
L e s s e e

ATTEST:

(sig.) Tom E. McKay
Secretary

Leadville Lead Corporation
900 Lincoln & Cranmor Building
Denver 2, Colorado

AMENDMENT TO LEASE

FOR GOOD AND VALUABLE CONSIDERATION, it is agreed by and between ALFRED S. LEWERENZ as trustee for the heirs of Robert J. Allison, deceased, lessor, and LEADVILLE LEAD CORPORATION, a corporation, lessee in that certain Mining Lease dated June 15, 1948, on the Thurman and Rat Lode Mining Claims, U. S. Survey No. 5444, in the Horse Shoe Mining District, Park County, Colorado, that said lease is hereby amended as follows:

1 . Said lease shall expire at noon on June 15, 1973.

2. Said lease shall cover any and all interest in said mining claims now or hereafter held by said lessor; said interest appearing from an examination of the abstract of title thereto furnished by the lessee is an undivided 23/48 interest therein or possibly an undiv. 25/48 interest therein.

3. For the duration of this contract, or so long as the lessor shall own any interest in said claims, the lessee shall pay the lessor a portion of the royalties, rentals and other consideration as provided in the lease based upon the proportionate interest so held by the lessor; provided, however, the entire sum of $250.00 heretofore paid by the lessee to the lessor as advance royalty shall so be applied and shall be retained by the lessor.

4. If, as and when the lessor shall acquire title to the remaining any or all outstanding interest or interests in said claims, such additional interest or interests shall automatically be subject to the terms of said lease and this amendment thereto and in particular to paragraph 3 above.

Rocky Mountain Corporation
888 Patent & Trademark Building
Denver 2, Colorado

5. Lessor shall pay the 1948 and subsequent general taxes on the outstanding interest or interests in said claims and in particular the interest of John J. Devereux which appears from the examination of the abstract of title thereto referred to to be an undivided 23/48 or 25/48 interest therein, until lessor shall acquire title to the Devereux interest or redemption shall be made as provided by Ch. 40, Sec. 145, C.S.A. Thereafter, the lessee and lessor shall respectively pay taxes as provided in paragraph 8 of said lease and the lessee shall also pay to the lessor an amount equal to the taxes paid by lessor until the Devereux interest is acquired or redeemed.

6. Except as herein otherwise provided, the lessee agrees that it will not directly or indirectly seek to acquire title to any of said Devereux interest, provided, however, that in the event any of such Devereux interest shall be redeemed under Chap. 40, Sec. 145 C.S.A., the lessor shall have the first right to acquire all or any part of such interest so redeemed, and will exert diligent effort to endeavor to acquire the same and should the the lessor fail to acquire all or any part of such Devereux interest within nine (9) months from the time of such redemption, then the lessee shall thereafter have the right to acquire such redeemed interest or any part thereof. Should the lessor acquire all or any part of such redeemed Devereux interest, the same shall be subject to paragraph 4 of this amendment, but should the lessee acquire the same as herein provided, such interest so acquired by the lessee shall be thereafter automatically excluded from the operation of said lease.

If, however, prior to the time of any redemption of such Devereux interest referred to above, any Devereux heir or heirs having an interest in said claims shall appear, then the lessor shall have the first right to acquire all or any part of such Devereux interest or interests within nine (9) months from the time the lessor shall receive a notice from the lessee addressed to the lessor at 730 First National Bank Building, Denver, Colorado, and a like notice addressed to the lessor at 4107 Holly Knoll Drive, Hollywood 27, California, by registered mail, with return receipt, such notices giving the name or names of such Devereux heir or heirs and their addresses, and should the lessor fail to acquire all or any part of such Devereux interest within such nine (9) months' period, then the lessee shall thereafter have the right to acquire the same. Should the lessor acquire all or any part of such Devereux interest, the same shall be subject to paragraph 4 of this amendment, but should the lessee acquire the same as provided herein, such interest so acquired by the lessee shall be thereafter automatically excluded from the operation of said lease.

7. Unless and until the lessor shall obtain title to the Devereux interest, lessee may mine and claims herein referred to, exercising allthe rights, benefits and remedies and being subject to all duties and obligations of a working tenant provided in and under C.S.A. 3, Chapter 92, Sections 8 to 16 both inclusive, subject to said lease.

Leadville Lead Corporation
Old Lincoln & Common Building
Denver 2, Colorado

8. In lieu of paragraph 1 on page 2 of said lease, the following paragraph shall be substituted:

> To enter upon demised premises and/or into an adit, locally and commonly known as the Dauntless Tunnel, which said adit has been extended underground to a point on the Dauntless Claim, U.S. Survey, No. 4914, and then to begin the necessary work preliminary to continuing the advance of said Dauntless Tunnel toward demised premises, and to advance said tunnel so that the same shall have been extended to the westermost side line of demised premises on or before September 1, 1950. It is understood that the said Dauntless Tunnel, if advanced into demised premises, will provide an opening through which demised premises can be drained and through which ore therefrom can be transported economically to the surface so that the work of advancing said Dauntless Tunnel will benefit demised premises and will facilitate the exploration thereof and the mining of ore therefrom.

9. In lieu of paragraph 14 (a) on page 8 of said lease the following shall be substituted:

> If Lessee shall continue to use said Dauntless Tunnel as a transportation tunnel as herein provided to serve the claims, leases, operated, owned or controlled by it, Lessee shall haul Lessor's ore through said tunnel and Lessor shall pay for such hauling such sum as Lessor and Lessee shall agree. In the event of disagreement, Lessor and Lessee shall each appoint an arbitrator who shall fix the charge for hauling Lessor's ore, and if the two arbitrators cannot agree, the arbitrators shall select a third arbitrator and the haulage charge fixed by any two of the three arbitrators shall be binding upon the parties.

10. As herein modified, said lease shall remain in full force and effect.

IN WITNESS WHEREOF the parties have hereunto affixed their signatures this 21st day of June, 1949.

(sig.) Alfred S. Lewerenz
Alfred S. Lewerenz as trustee for the heirs of Robert J. Allison, deceased.
Lessor

LEADVILLE LEAD CORPORATION

Attest:

by Robert E. Harvey (sig.)
President Lessee

(sig.) Clio L. Kem
Secretary

STATE OF CALIFORNIA)
) SS.
CITY AND COUNTY OF LOS ANGELES)

The foregoing instrument was acknowledged before me this 28th day of June, 1949, by Alfred S. Lawerenz as trustee for the heirs of Robert J. Allison, deceased, lessor.

My commission expires: Jan. 14, 1952.
Witness my hand and official seal.

SEAL

(signed) Warren E. Spain
Notary Public

STATE OF COLORADO)
) SS.
CITY AND COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 21st day of June, 1949, by Robert E. Harvey, as President, and by Clio L. Kem, as Secretary of Leadville Lead Corporation, a corporation, lessee.

My commission expires: Dec. 23, 1951.
Witness my hand and official seal.

SEAL

(signed) Irene Smythe
Notary Public

Leadville Lead Corporation
[illegible] & Cranmer Building
Denver 2, Colorado

AMENDMENT TO LEASE

FOR GOOD AND VALUABLE CONSIDERATION, it is agreed by and between ALFRED S. LEWERENZ as trustee for the heirs of Robert J. Allison, deceased, lessor, and LEADVILLE LEAD CORPORATION, a corporation, lessee in that certain Mining Lease dated June 15, 1948, and amended June 22, 1949, on the Thurman and Rat Lode Mining Claims, U.S. Survey No. 5444, in the Horse Shoe Mining District, Park County, Colorado, that said lease is hereby amended as follows:

1. Paragraph one on p. 2 of said lease of June 15, 1948, as subsequently amended, is hereby cancelled, deleted and set at naught, and the paragraph recited hereinbelow is hereby substituted for the said original paragraph one as heretofore amended:

> To enter upon demised premises and/or into an adit, locally and commonly known as the Dauntless Tunnel, which said adit has been extended under ground to a point on the Dauntless Claim, U.S. Survey, No. 4914, and then to begin the necessary work preliminary to continuing the advance of said Dauntless Tunnel toward demised premises, and to advance said tunnel so that the same shall have been extended to the westermost side line of demised premises on or before June 1, 1952. It is understood that the said Dauntless Tunnel, if advanced into demised premises, will provide an opening through which demised premises can be drained and through which ore therefrom can be transported economically to the surface so that the work of advancing said Dauntless Tunnel will benefit demised premises and will facilitate the exploration thereof and the mining of ore therefrom.

2. Paragraph 5 on p.3 of said lease of June 15, 1948 is hereby cancelled, deleted and set at naught, and the paragraph recited herebelow is hereby substituted for the said original paragraph 5.

> To pay or cause to be paid to lessor promptly, as royalty, 10% of the net smelter or mill value of all ores extracted or removed from the demised premises during the life of this lease.

By the net smelter or mill value of the ore is

meant the value of the ore after deducting the following charges: the actual cost of transporting said ore from the mine to the ore buyer at smelter or custom mill; all smelter and custom mill charges for the treatment and handling of said ore; such additional charges or deductions as are usually made by such smelter or custom mills; provided, however, if the said Lessee concentrates ores from the demised premises in a mill operated or controlled by it, whether in the vicinity of Alma, Colorado, or in the vicinity of demised premises, or elsewhere, then and in that event the concentrates from such mill shall be sold directly to a smelter, and the milling charges to be deducted in determining the net smelter value of the ore shall include only the actual milling costs of Lessee per crude dry ton of such ore, excluding from such costs executive salaries and office expense, but including, together with other operating expenses, the cost of labor and supervision at the mill. In the event that the ores from the demised premises are treated at a mill owned or controlled by Lessee, then Lessee shall certify to the smelter which purchased the concentrates therefrom, the crude ore tonnages represented by the concentrates shipped from Lessee's mill.

Detailed duplicate statements on all sales of ore from the demised premises to smelter or custom mill shall be furnished by the buyer to Lessor. All royalty payments shall be made to Lessor or to his successor, as Lessor may designate. The royalties upon any ore may, at the option of Lessor, be held by smelting company, or other buyers, subject to the order of Lessor.

3. As herein modified, said lease and amendment shall remain in full force and effect.

IN WITNESS WHEREOF the parties have hereunto affixed their signatures this 6th day of November, 1950.

(signed) Alfred S. Lewerenz
Alfred S. Lewerenz as trustee for the heirs of Robert J. Allison, deceased.
Lessor

LEADVILLE LEAD CORPORATION

ATTEST:

BY Francis X. Wieck (signed)
Vice-President
Lessee

(signed) Ben L. Wright, Jr.
Secretary

STATE OF CALIFORNIA)
) SS.
CITY AND COUNTY OF LOS ANGELES)

The foregoing instrument was acknowledged before me this 21st day of November, 1950, by Alfred S. Lewerenz as trustee for the heirs of Robert J. Allison, deceased, lessor.

My commission expires: Nov. 27, 1952
SEAL Witness my hand and official seal. (sig.) Thomas D. McAnulty
Notary Public

Leadville Lead Corporation
900 Ernest & Cranmer Building
Denver 2, Colorado

STATE OF COLORADO)
) SS.
CITY AND COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this 29th day of November, 1950, by Francis X. Wieck as Vice-President and by Ben L. Wright, Jr., as Secretary of Leadville Lead Corporation, a corporation, lessee.

My commission expires: Dec. 23, 1951.
Witnes my hand and official seal.
SEAL

(signed) Irene Smythe
Notary Public

C O P Y

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

November 6, 1950

Leadville Lead Corporation
500 E & C Building
Denver, Colorado

In re: Rat and Thurman Lease.

Gentlemen:

The lease dated June 15, 1948 and amendments thereto granting you a lease on the Rat and Thurman Lode Mining Claim being U.S. Survey No. 5444 is now in good standing and in full force and effect.

We hereby excuse any default on your part as lessee under said lease and amendments which may have occured prior to the date hereof.

Yours very truly,

(signed) Alfred S. Lewerenz

Alfred S. Lewerena, as trustee for
the heirs of Robert J. Allison, Lessor.

amc/

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

Leadville Lead Corporation
900 Ernest & Cranmer Building
Denver 2, Colorado

LEADVILLE LEAD CORPORATIO
500 E & C Bldg.
EXHIBIT C
FORM MF-103

EXHIBIT C

TO ACCOMPANY FORM MF-103 OF DEFENSE
MINERALS ADMINISTRATION

MINING LEASE TO FRANK VANNATTER OF LAST CHANCE CLAIM
DATED JULY 26, 1950.

AMENDMENT TO LEASE DATED NOVEMBER 6, 1950.

LETTER DATED AUGUST 31, 1950.

LETTER DATED FEBRUARY 3, 1951.

Leadville Lead Corporation
900 Ernest & Cranmer Building
Denver 2, Colorado

THE ORIGINAL OF THIS LEASE, AMENDMENT, AND LETTERS ARE IN THE OFFICE OF LEADVILLE LEAD CORPORATION AND THE ORIGINALS OR PHOTOSTATIC COPY THEREOF CAN BE FURNISHED UPON REQUEST.

M I N I N G - L E A S E

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

THIS LEASE, made and entered into this 26th day of July, 1950, by and between LEADVILLE LEAD CORPORATION, a Colorado Corporation, hereinafter called Lessor and F. Vannatter, Denver, Colorado hereinafter called Lessee,

WITNESSETH:

THAT WHEREAS, Lessor now holds the Last Chance Lode Mining Claim, U. S. Survey No. 3195, and other claims under lease and option executed August 5, 1946 by the Big Chief Mining Company, which lease is of record in Book 140 at Page 179 of the records of Park County, Colorado.

AND WHEREAS, The Big Chief Mining Company has consented to the execution by Lessor of herein lease to F. Vannatter,

NOW, THEREFORE, FOR AND IN CONSIDERATION of the sum of Ten Dollars ($10.00) paid Lessor by Lessee, receipt whereof is hereby acknowledged, and of other good and valuable considerations and of the covenants by lessee to be kept and performed, Lessor has leased, let and demised, and by these presents does hereby lease, let and demise to Lessee, all of the Last Chance Claim.

TO HAVE AND TO HOLD unto Lessee for the purpose of mining, removing and selling ore therefrom for a term beginning at noon on the day of the date hereof, and expiring at noon on the 1st day of September 1953, unless sooner forfeited or terminated, in accordance with the terms hereof. In consideration of such demise and of the covenants mutually to be performed, Lessor and Lessee hereby covenant and agree each with the other as follows, to-wit:

1. Lessee agrees to enter upon and take possession of herein demised premises on or before August 1, 1950, and to perform thereon not less than 1200 8-hour shifts per year, of one man each, for the continuence of this lease.

- Although time is of the essence of this paragraph, nevertheless, if the Lessee fails to perform the required number of shifts of labor in any period because of strike, extra-ordinary mine casualty, or because of any other circumstances manifestly beyond his control, such failure shall not then be deemed to be a breach of this covenant suffic-

ient to justify the termination of this lease and re-entry by the Lessors for conditions broken.

2. Leasee shall carry sufficient and proper Workman's Compensation Insurance at all times during the life of this lease, so as to insure Lessee and his employees hereunder against liability for industrial accidents and save Lessor liability therefor, and to keep such notices respecting such insurance as may be required by law properly posted in said premises, and at all times to save and keep harmless the Lessor and the said premises and every part thereof from any and all claims, demands and liens on account of any such labor, materials and supplies, and during the entire life of this lease to post and keep continuously posted on said premises, and at the entrance to the workings, notices in the following form, to-wit:

NOTICE

NOTICE IS HEREBY GIVEN by the undersigned, LEADVILLE LEAD CORPORATION, Lessee of the Big Chief Mining Company, owner, that it has given a lease to F. Vannatter of the Last Chance Lode Mining Claim, U.S. Survey No. 3195, situated in the Horseshoe Mining District in the County of Park and State of Colorado.

AND NOTICE IS ALSO HEREBY GIVEN that the undersigned Lessee, Leadville Lead Corporation, or the owner, the Big Chief Mining Company, will not be responsible or held liable for any claim or claims for performing labor or furnishing skill, materials, supplies, machinery or other fixtures or for prospecting or development of said property, or on account of the erection, construction, alteration, removal, addition or repair of any structure of other improvements on said property by or for the said Lessee, or by or for any other person or persons and that the said property or the interest of said owner in said property will not be subject to any lien or claim of lien therefor.

DATED _____ LEADVILLE LEAD CORPORATION

BY _____ PRESIDENT
Lessee of the Big Chief Mining Co.

And other notice or notices furnished by Lessor to Lessee shall also be kept posted as directed by Lessor.

3. Lessee shall allow Lessor or its agents, as well as agents or representatives of the Big Chief Mining Company, owner of herein demised premises, at all resonable times to enter upon and into any and every part of said premises for the purpose of inspection, sampling and surveying.

4. Lessee shall allow Lessor the right to core drill in workings operation by Lessee provided such core drilling shall be done at such time and in such manner as shall not unduly interfere with Lessee's operations. Lessor shall be furnished duplicates of all maps, engineers reports, core loggings, assays and including assays of cores and core sludge and may examine all cores and loggings on demand.

Lessee shall furnish to Lessor on the 15th day of each and every calendar month during which demised premises are worked by Lessee, a complete statement for the previous calendar month showing all labor shifts performed and money expended by Lessee upon the premises on the previous calendar month.

5. To deliver to Lessor, without demand or further notice, on September 1, 1953, subject to conditions outlined in paragraph numbered 16, or at any prior time, upon demand upon the termination of this lease, all of the premises hereinabove described, together with the appurtenances and improvements now on the premises or have been hereinafter constructed or installed thereon by Lessee during his possession of said premises, and costs of said appurtenances and improvements have been paid for by Lessor, cost of labor of construction and installation excepted, in as good order and condition, ordinary wear and tear excepted, as the premises were in at the beginning of the terms hereof and the mine ready for continual work, acts of God, unavoidable actions of the elements and accidents not arising from negligence excepted.

6. In order to properly gauge the number of shifts performed by Lessee it is agreed that all money paid in wages or contract, either labor or diamond drilling, be prorated as shifts worked in the proportion of each $5.00 so expended to equal one-eight hour man shift, this to include wages paid to one shifter for each shift worked in every twenty-four hour period but not to include any office or executive expense. All labor shifts performed on any property owned or controlled by Leadville Lead Corporation can be

applied on any lease held by Lessee or his assigns, distribution of labor shifts to be made at discretion of Lessee or his assigns.

7. Lessee shall pay, or cause to be paid Lessor promptly as royalty 15% of the net smelter or mill value of all ores extracted and removed from property owned or leased by Lessor.

By the net smelter or mill value of the ore is meant the value of the ore after deducting the following charges; actual cost of transporting said ore from the mine to the smelter or custom mill; all smelter and custom mill charges for the treatment and handling of said ore, actual cost of transporting concentrates from custom mill to smelter, and such additional charges or deductions as are usually made by such smelter or custom mill; provided, however, if Lessee concentrates ores from the demised premises in a mill operated or controlled by him, or his assigns, then and in that event the concentrates from such mill shall be sold directly to a smelter and the milling charges to be deducted in determining the net smelter value of the ore, shall include only the actual milling costs of Lessee per ton of such crude ore, excluding from such costs executive salaries and office expenses, but including, together with other proper operating expenses, the cost of labor and supervision at the mill. In the event that ores from the demised premises are treated at a mill owned or controlled by Lessee, then Lessee shall certify to the smelter which purchases the concentrates therefrom the crude ore tonnages represented by the concentrates shipped from Lessee's mill. Detailed duplicate statements on all sales of ore from the demised premises to smelter or custom mill shall be furnished by the buyer to Lessor, or to Lessor and its Lessors, if any.

8. Lessee agrees to do all work in miner-like fashion and in conformity with the mining laws of the State of Colorado, so as to protect the premises as a workable mine; to allow a monthly audit from the books of Lessee or his assigns showing all labor performed and all ore shipped. The Lessee further agrees to furnish Lessor

duplicates of any maps made of underground workings of demised premises made by Lessee during continuance of this lease.

9. Lessee agrees that in the event there should be developed upon said mining property a "producing mine" within the meaning of the laws of the State of Colorado, thereby rendering the mineral output subject to taxation under the revenue laws of the State, then and in that event, it is hereby agreed that such special tax on the minerals so produced shall be borne by the parties hereto, respectively, in the proportions in which they shall receive the "net mill or smelter value", of the ores produced from said premises during each tax year; the terms "net smelter or mill value" being here used as defined heretofore.

10. It is agreed that should the Lessee desire to surrender this mining lease and all of his rights hereunder unto the Lessor at any time during the life of this lease, prior to any such surrender the Lessee shall give the Lessor (30) days written notice of Lessee's intention to terminate said contract and surrender up said leased premises, any such surrender or termination of said lease shall not operate to release or discharge the Lessee of liability for default upon its part occurring prior to the time of such surrender or termination, but shall only relieve Lessee from the obligation of further development of the demised premises. Lessee shall have the right, following surrender of the demised premises, whether at the end of the term hereof or upon prior termination of this lease for any cause or upon forfeiture or surrender thereof to remove from said premises as its property all supplies, tools, mining machinery and equipment placed on said premises by and at the expense of Lessee within (30) days after such surrender; provided, however, should such surrender of the premises occur during the winter season, then and in that event the Lessee shall have six (6) months from the date of such surrender to exercise its right of removal herein granted. Lessee's failure to remove its said property from the demised premises within the period allowed shall forfeit its right to remove same, whereupon said property shall revert to, and without further

consideration become the property of Lessor.

11. Lessor hereby agrees to allow Lessee use of such equipment and machinery that is in Lessor's possession at or in the vicinity of the demised premises, provided such use is inferior to the use of Lessor. Lessee shall pay for the labor and fuel required for such operation and shall at this expense maintain said equipment in good condition and running order so long as used by Lessee, and Lessee agrees to return said machinery upon demand in as good condition as when taken into his possession, ordinary wear and tear excepted. Lessor shall have the right to terminate such use at any time it deems it advisable.

12. Lessor hereby agrees to furnish Lessee, free of charge, a site or sites, to be selected by Lessor near the demised property for the erection by Lessee, at his expense, other buildings for housing Lessee's equipment and crew, ore bins and dumps.

13. Lessor hereby grants Lessee free use of living quarters for Lessee and his crew in buildings already constructed near the Dauntless Tunnel Portal, but Lessor reserves the right to determine what portion of said existing buildings may be occupied by Lessee as aforesaid. Such free use shall be inferior to that of Lessor and may be terminated when and if facilities are not adequate to house employees of both the Lessor and Lessee.

14. Lessee shall have the right to construct laterals, drifts, cross-cuts, upraises and shafts on the demised premises and may core-drill from the Dauntless Tunnel or from the surface or any underground workings which lie upon property owned or controlled by Lessor until termination of this lease. All shafts and upraises shall be at least 8 feet by 6 feet in the clear and all laterals, drifts, and cross-cuts at least 7 feet high and 5 feet wide in the clear unless otherwise mutually agreed. Lessor shall have the right to run the Dauntless Tunnel into, or through the leased premises. Lessor shall also at all times have the right of ingress and egress to and through the lower cato crosscut and passage connected thereto as a means of egress and ingress to the mine workings and terri-

tory made accessible thereby. Lessee shall have the right of ingress and egress over existing roads upon property owned or controlled by Lessor.

15. It is mutually agreed that Lessee shall have the right to mine all that portion of any vein,lode, or ledge, the top or apexes of which lie inside the surface boundary line of said leased premises throughout their entire depth extended downward vertically, although such veins, lodes or ledges in their downward course may so far depart from a perpendicular as to extend outside the vertical side line of said premises, provided that the right of possession to such outside parts of said veins, lodes and ledges shall be confined to such portions thereof as lie between vertical planes drawn downward through the end lines of said premises so continued in their own direction that such planes will intersect such exterior parts of said veins, lodes or ledges.

16. Lessor agrees that upon written request from the Lessee for the three (3) year extension of the lease on the Last Chance Lode Mining Claim that such request shall automatically be granted under the terms of this lease, save as to dates and renewals, if such request be made during the month of August, 1953, provided this lease then be in good standing and all the terms thereof have been performed by Lessee.

17. Lessor grants full power to Lessee to assign interests in this lease, in portions and percentages to be determined at the discretion of Lessee to the Fairplay-Leadville Leasing Company, a Colorado Corporation. However, that Lessee shall be responsible to Lessor for the compliance by said assignees with the covenants of this lease and with full power to assign interests in this lease to persons or corporations not named herein, in percentages to be determined at Lessee's discretion, with the further understanding that Lessee shall promptly notify Lessor in writing at the office maintained by Lessor in Denver, Colorado.

18. Every covenant and agreement of this lease to be

kept and performed by Lessee is hereby declared to be a condition of this lease, for the breach of which Lessor shall have the power to terminate this lease and the right to re-enter the demised premises without prejudice to any and all claims for damages which Lessor may have by reason of the violation of any covenant hereof by Lessee. By the re-entry of Lessor upon a breach of condition, Lessee shall be dispossessed of all of its possessory rights and estate hereunder, and Lessor shall be thereby seized of and returned to his former estates, free and clear of all rights, liens or claims, by reason of this instrument. In the event of the breach of any covenant or condition of this lease by Lessee to be kept and performed, Lessor shall, in order to enforce forfeiture of said lease, notify Lessee in writing of Lessor's intention to enforce forfeiture because of Lessee's default, such default to be specified in said notice, and if Lessee, within thirty days after mailing or delivery of said written notice, shall not have remedied the default so specified, Lessor may then forthwith declare forfeiture and may then consider Lessee and all persons found in occupation of the premises herein demised as guilty of unlawful detainer, and preceed against them accordingly, provided, however, no delay or delays caused by unavoidable accident, strike, fires, snowslides, acts of God or other matters (not financial) beyond the reasonable control of the Lessee shall be considered or taken to be a breach of the covenants and conditions of this lease. Time is of the essence of this lease. Lessor hereby expressly reserves to himself the property and rights of property in all minerals to be extracted from said premises during the term of this lease.

19. Each and every clause and covenant of this lease shall be held and deemed to extend to be and be binding upon the heirs, personal representatives, successors and assigns of each of the parties hereto.

20. In the event that the Leadville Lead Corporation has an opportunity of disposing by either sale or lease of all their

mining property in Park County, Colorado and the consummation of the transaction would be hindered by any lease or leases to F. Vannatter, it is mutually agreed that F. Vannatter, or his assigns, will relinquish all rights and title to any and all leases he holds on any property either owned or controlled by the Leadville Lead Corporation at a price to be figured as follows:

> An amount as disclosed by an audit of the books of F. Vannatter, the Fairplay-Leadville Leasing Company and the Harry L. (Hardrock) Sinclair Company of all moneys expended in any manner whatsoever on any lease or leases held by F. Vannatter or for the costs of any construction performed by F. Vannatter or his assigns on property owned or controlled by Leadville Lead Corporation.
>
> The total cost as disclosed by this audit plus an amount equal to one hundred percent will be the sale price at which F. Vannatter or his assigns will relinquish all right and title to any lease or leases held at the time this agreement is written.

IN WITNESS WHEREOF, the parties hereto have affixed their signatures hereto, the day and year first above written.

This contract is made in duplicate.

ATTEST:

(signed) Ben L. Wright, Jr.
SECRETARY

LEADVILLE LEAD CORPORATION

BY (signed) Francis X. Wieck
VICE*PRESIDENT

LESSOR

(signed) Frank Vannatter
Frank Vannatter

LESSEE.

Leadville Lead Corporation
[illegible] & Cranmer Building
Denver 2, Colorado

AMENDMENT TO LEASE

WHEREAS, The attached lease in the first paragraph of paragraph No. 7 reads:

> "Lessee shall pay, or cause to be paid Lessor promptly as royalty, 15% of the net smelter or mill value of all ores extracted and removed from property owned or leased by Lessor", and

WHEREAS, this paragraph as previously agreed upon read:

> "Lessee shall pay, or cause to be paid Lessor promptly as royalty 10% of the net smelter or mill value of all ores extracted and removed from property owned or leased by Lessor; and to pay to Lessor as additional royalties 5% of the net smelter or mill value of ores extracted and removed from property held under lease by Lessor", and

WHEREAS, the new first Paragraph of paragraph No. 7 does not accurately reflect the understanding of the parties, and

WHEREAS, the Board of Directors of Leadville Lead Corporation did in its meeting of November 5, 1950, by resolution duly made, seconded and passed resolved that said paragraph should be amended to read as follows:

> "Lessee shall pay, or cause to be paid Lessor promptly as royalty 15% of the net smelter or mill value of all ores extracted and removed from property leased by Lessor; however as, if and when Leadville Lead Corporation shall become fee owner of the herein demised property Lessee shall promptly pay as royalty 10% of the net smelter or mill value in lieu of the 15% otherwise provided for.

As herein modified said lease shall remain in full force and effect.

IN WITNESS WHEREOF the parties have hereunto affixed their signatures this 6th day of November, 1950.

(signed) Frank Vannatter
Frank Vannatter

LEADVILLE LEAD CORPORATION

ATTEST:

BY (signed) Francis X. Weick
Francis X. Wieck, Vice-President

Ben L. Wright, Jr. (signed)
Secretary

Leadville Lead Corporation
200 Ernest & Cranmer Building
Denver 2, Colorado

Denver, Colorado

August 31, 1950

Leadville Lead Corporation,
804 Boston Bldg.,
Denver 2, Colorado. ATTENTION: Mr. Clio Kem, President

Gentlemen:

This will confirm a verbal agreement made between F. Vannatter and Mr. Clio Kem, acting as President of the Leadville Lead Corporation.

In the event that the Leadville Lead Corporation has an opportunity of disposing by either sale or lease of all their mining property in Park County, Colorado and the consumation of the transaction would be hindered by any lease or leases to F. Vannatter, it is mutually agreed that F. Vannatter or his assigns will relinquish all rights and title to any and all leases he holds on any property either owned or controlled by the Leadville Lead Corporation at a price to be figured as follows:

An amount as disclosed by an audit of the books of F. Vannatter, the Fairplay-Leadville Leasing Company and the Harry L. (Hardrock) Sinclair Company of all moneys expended in any manner whatsoever on any lease or leases held by F. Vannatter or for the costs of any construction performed by F. Vannatter or his assigns on property owned or controlled by Leadville Lead Corporation.

The total cost as disclosed by this audit plus an amount equal to one hundred percent will be the sale price at which F. Vannatter or his assigns will relinquish all right and title to any lease or leases held at the time this agreement is written.

Yours very truly,

(Sig.), F. Vannatter
F. Vannatter

FV/rf

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

February 3, 1951

Leadville Lead Corporation
500 E & C Building
Denver, Colorado

Gentlemen:

On the 26th day of July, 1950, you leased to me the Last Chance Lode Mining Claim, U.S. Survey No. 3195. This lease was subsequently modified.

I and my associates have heretofore expended $38,845.64 on this lease and other leases from yourself.

At the present time I have a split check arrangement with Harold Nelson, Ed Knizeley and certain other miners whereby I agree to furnish them necessary machinery, powder, and fuel oil, and I receive 1/2 of lessee's share of all net smelter returns from all ore shipped under the agreement.

In consideration of $5.00, receipt of which is hereby acknowledged, and for other good and valuable considerations I do hereby agree that I will release, assign, or will surrender or otherwise convey any and all right, title, and interest I and my associates, who have put up part of the $38,845.64, have in and to the lease mentioned above as, if, and when the net smelter returns paid to me as my share of the mining operations of the property total $38,845,64 plus costs under the split check basis as set forth above.

I also agree upon payment to me of $38,845.64 and other costs incurred after this date under split check arrangement with Harold Nelson, et al, that I will release, or will assign, or will otherwise transfer all my right, title and interest in and to said lease upon assumption by yourself of any duties imposed upon me because of the split check agreement, as above set out.

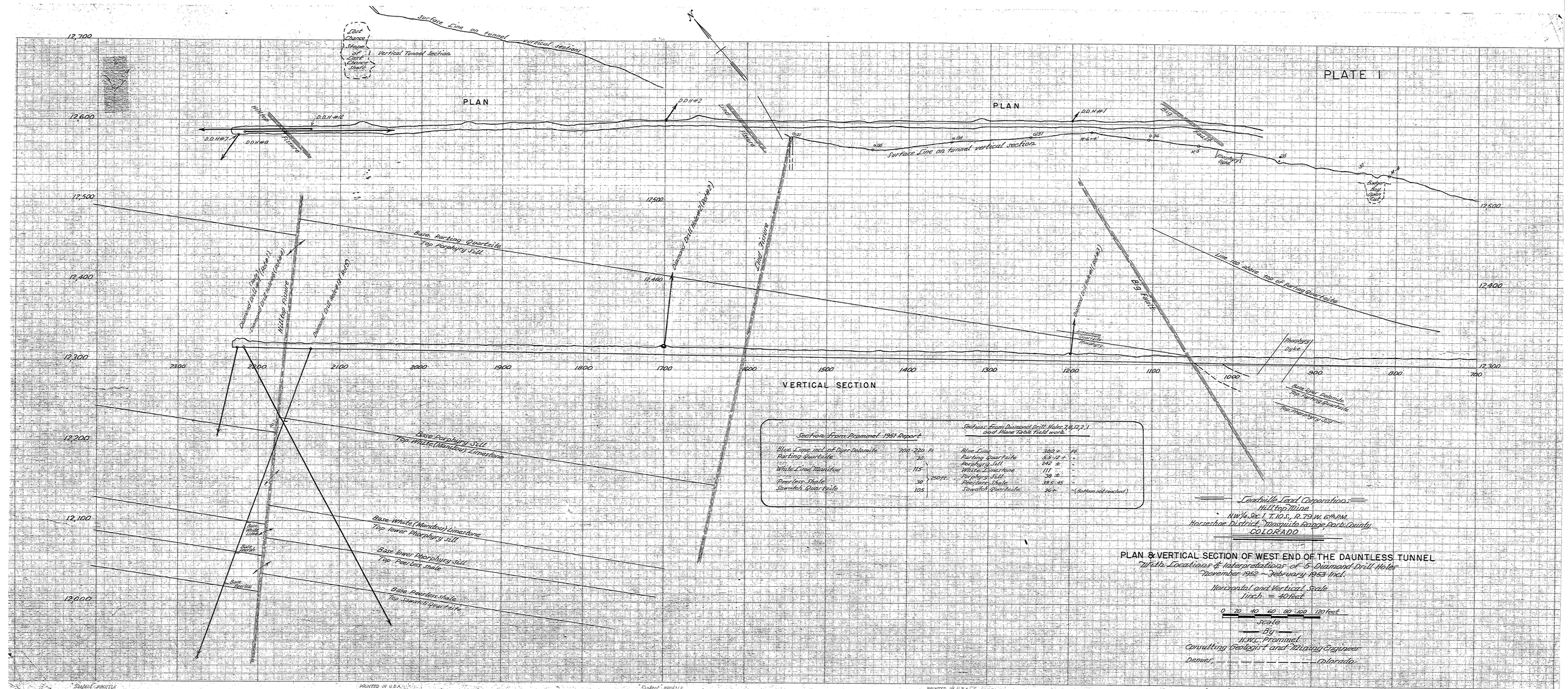
Yours very truly,

(signed) F. Vannatter

F. Vannatter

FV:
amc.

PLATE I



Section from Prommel 1951 Report			Section from Diamond Drill Holes 7 & 12, 2, 1 and Plane Table Field work		
Blue Lime incl. of Dyer Dolomite	200-220 ft.		Blue Lime	300+	ft.
Parting Quartzite	30		Parting Quartzite	5.5-12 +	"
Porphyry Sill			Porphyry Sill	141 ±	"
White Lime Manitou	115		White Limestone	111	"
		280 ft.	Porphyry Sill	38 ±	"
Peerless Shale	30		Peerless Shale	39.5-45	"
Sawatch Quartzite	105		Sawatch Quartzite	96+	" (Bottom not reached)

Leadville Lead Corporation
Hilltop Mine
NW¼ Sec. 1 T. 10 S., R. 79 W. 6th P.M.
Horseshoe District Mosquito Range Park County
COLORADO

PLAN & VERTICAL SECTION OF WEST END OF THE DAUNTLESS TUNNEL

With Locations & Interpretations of 5 Diamond Drill Holes
November 1952 – February 1953 Incl.

Horizontal and Vertical Scale
1 inch = 40 feet

0 20 40 60 80 100 120 feet
Scale

By
H.W.C. Prommel
Consulting Geologist and Mining Engineer
Denver, Colorado

"Safeset" PROFILE PLATE 1 EUGENE DIETZGEN Co.
PRINTED IN U.S.A. ON 100% RAG PAPER MADE IN U.S.A.
"Safeset" PROFILE PLATE 1 EUGENE DIETZGEN Co.
PRINTED IN U.S.A. ON 100% RAG PAPER MADE IN U.S.A.
"Safeset" PROFILE PLATE 1 EUGENE DIETZGEN Co.
PRINTED IN U.S.A. ON 100% RAG PAPER MADE IN U.S.A.

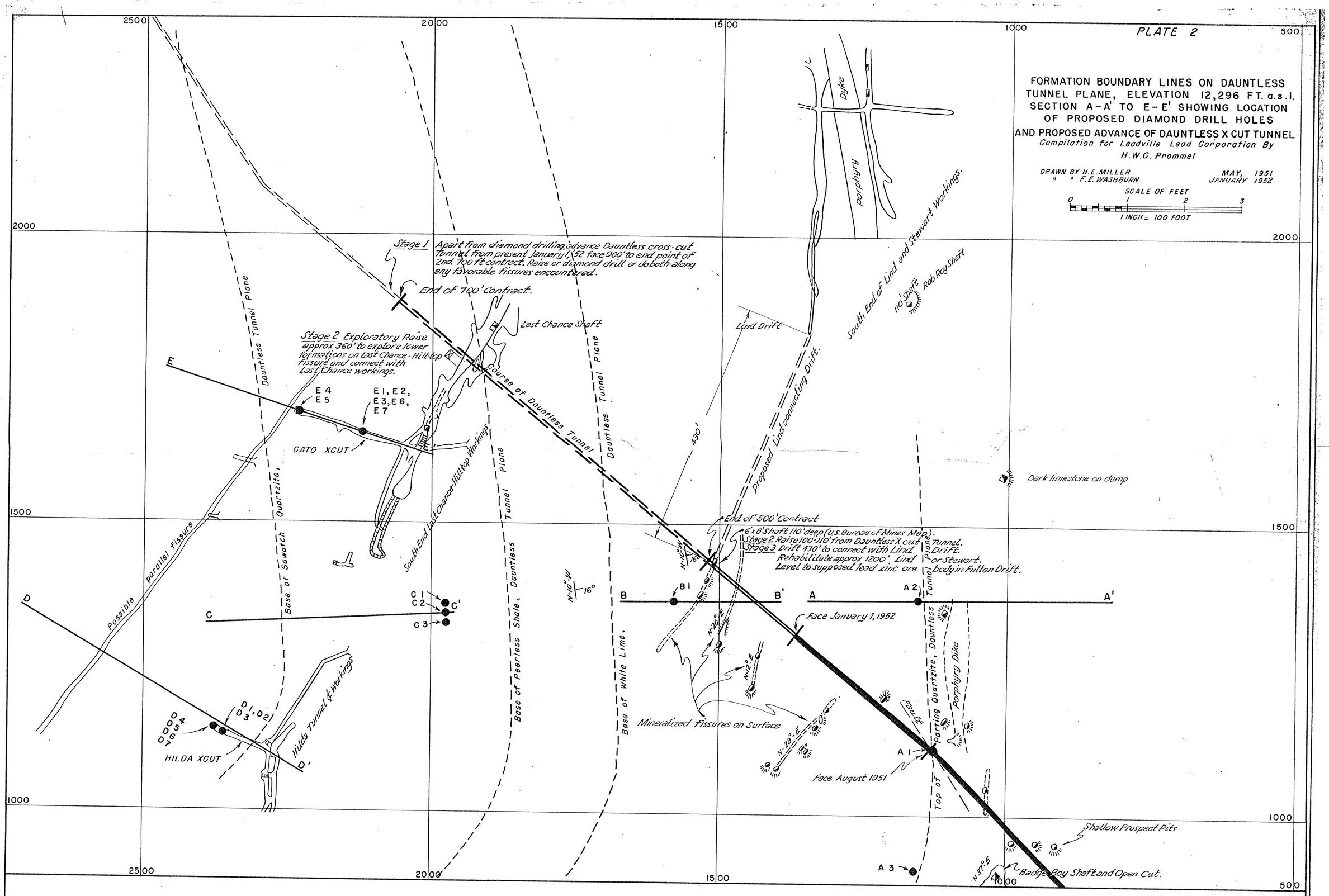
PLATE 2

FORMATION BOUNDARY LINES ON DAUNTLESS TUNNEL PLANE, ELEVATION 12,296 FT. a.s.l. SECTION A-A' TO E-E' SHOWING LOCATION OF PROPOSED DIAMOND DRILL HOLES AND PROPOSED ADVANCE OF DAUNTLESS X CUT TUNNEL

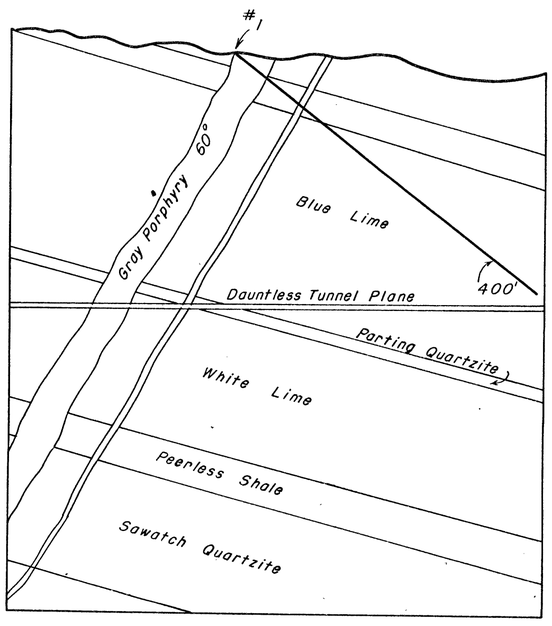
Compilation for Leadville Lead Corporation By H.W.C. Prommel

DRAWN BY H.E. MILLER — MAY, 1951
" " F.E. WASHBURN — JANUARY 1952

SCALE OF FEET: 0, 1, 2, 3 — 1 INCH = 100 FOOT

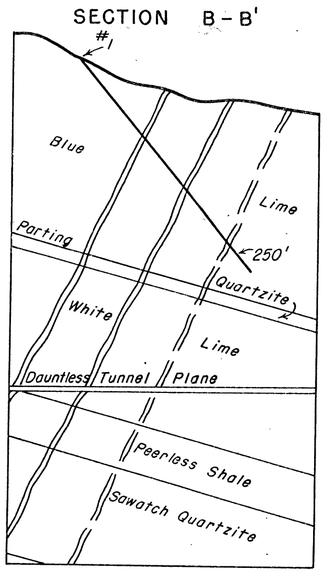


SECTION A-A'

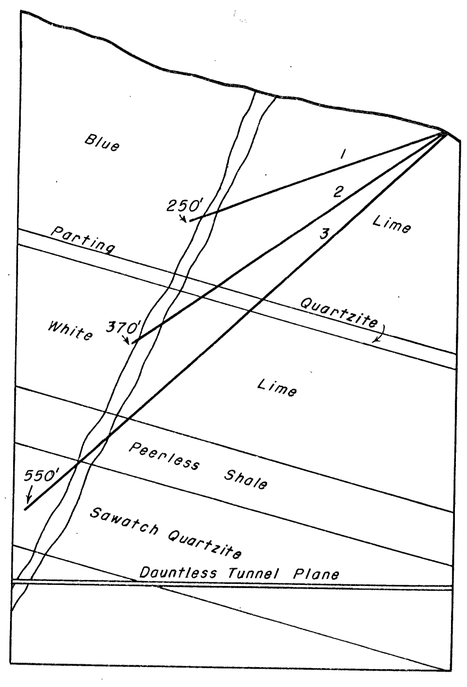


SCALE OF FEET: 0, 1, 2, 3, 4
HORIZONTAL & VERTICAL SCALE 1 INCH = 100 FOOT

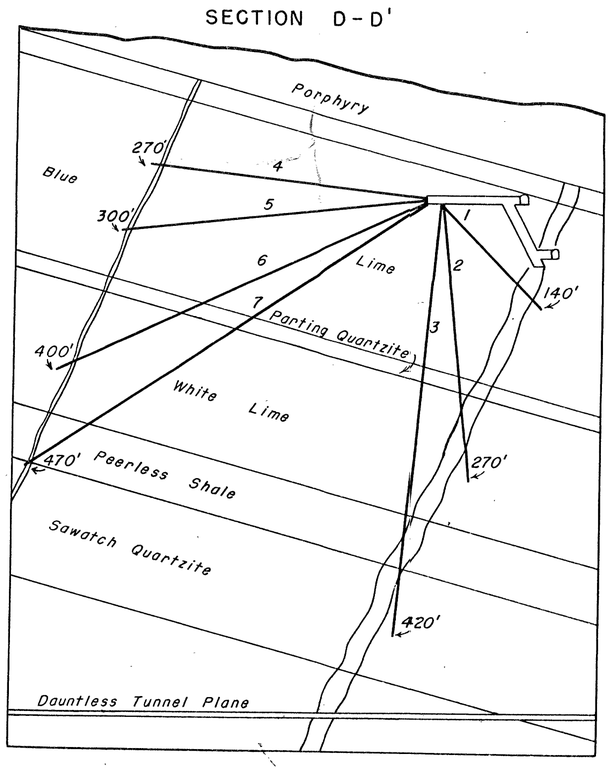
SECTION B-B'



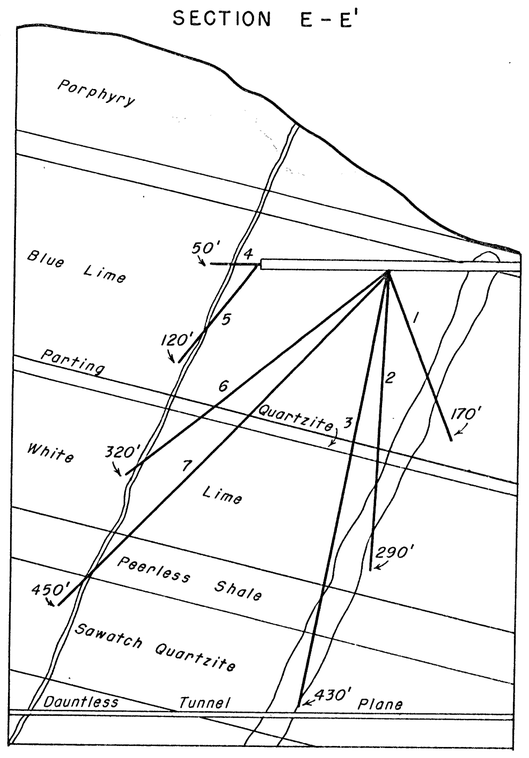
SECTION C-C'



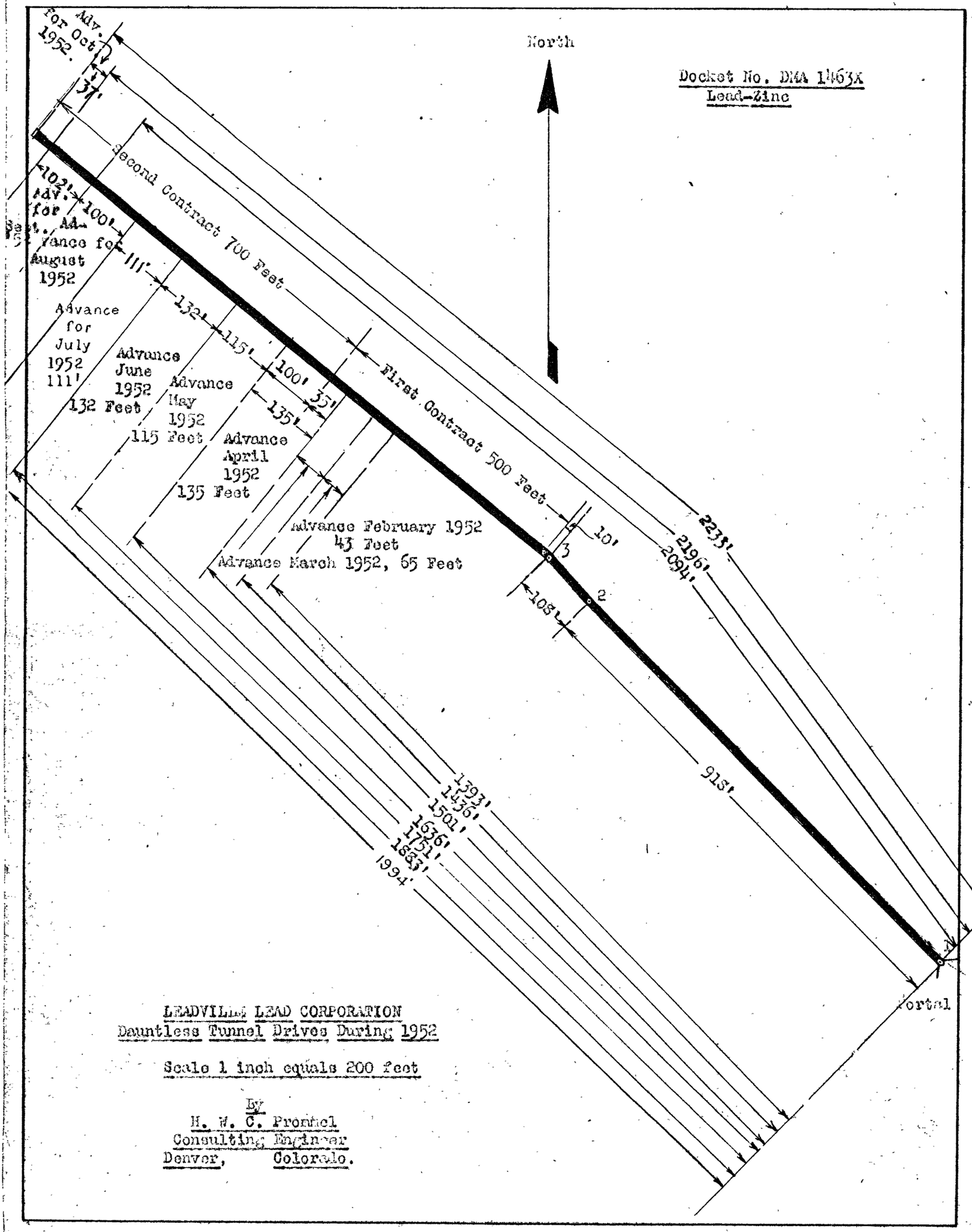
SECTION D-D'



SECTION E-E'



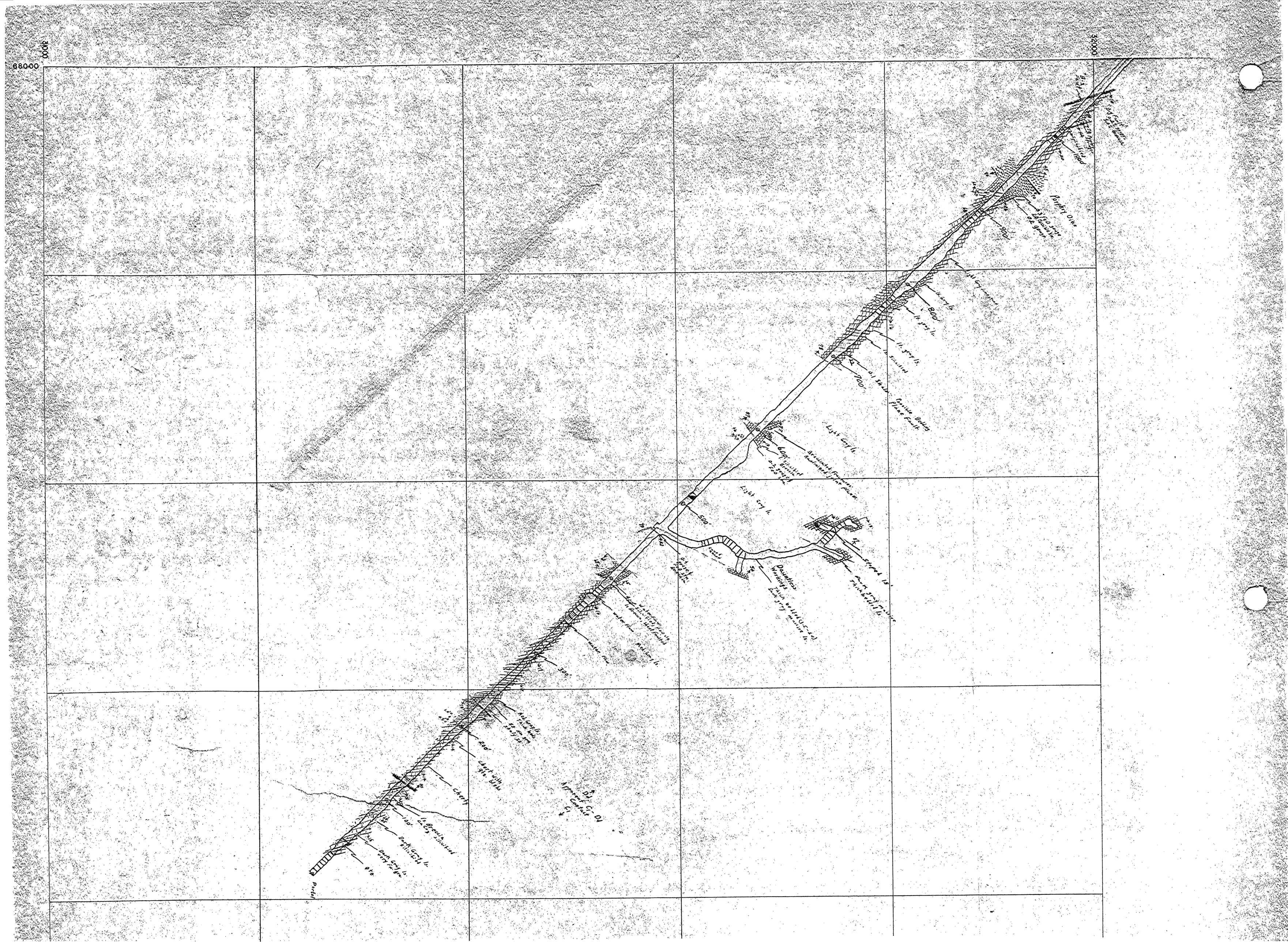
HILLTOP INCLINE SHAFT
LAST CHANCE SHAFT
LAST CHANCE DUMP
ROB ROY SHAFT
Section 6
Section 5
Section 3
Section 4B
Section 4A
Section 1
Section 2
LOWER CATO CROSSCUT
UPPER CATO CROSS CUT
VANHATTER SHAFT
LOWER CATO DUMP
LAST CHANCE OPEN CUT
MILLER SHAFT
HILDA TUNNEL
Covered ground
SUGAR LOAF PIT
UPPER DRUNKLESS SHAFT
DRUNKLESS SHAFT
1500N
1000N
500N
Leadville Lead Corporation
Hilltop - Drunkless Group
Lake Co Colo
Plane Table Map No 1
Aug - Sept 52
Scale 1" = 100'
Instr. H.W.C. Promvel
Rod P. Hopkins



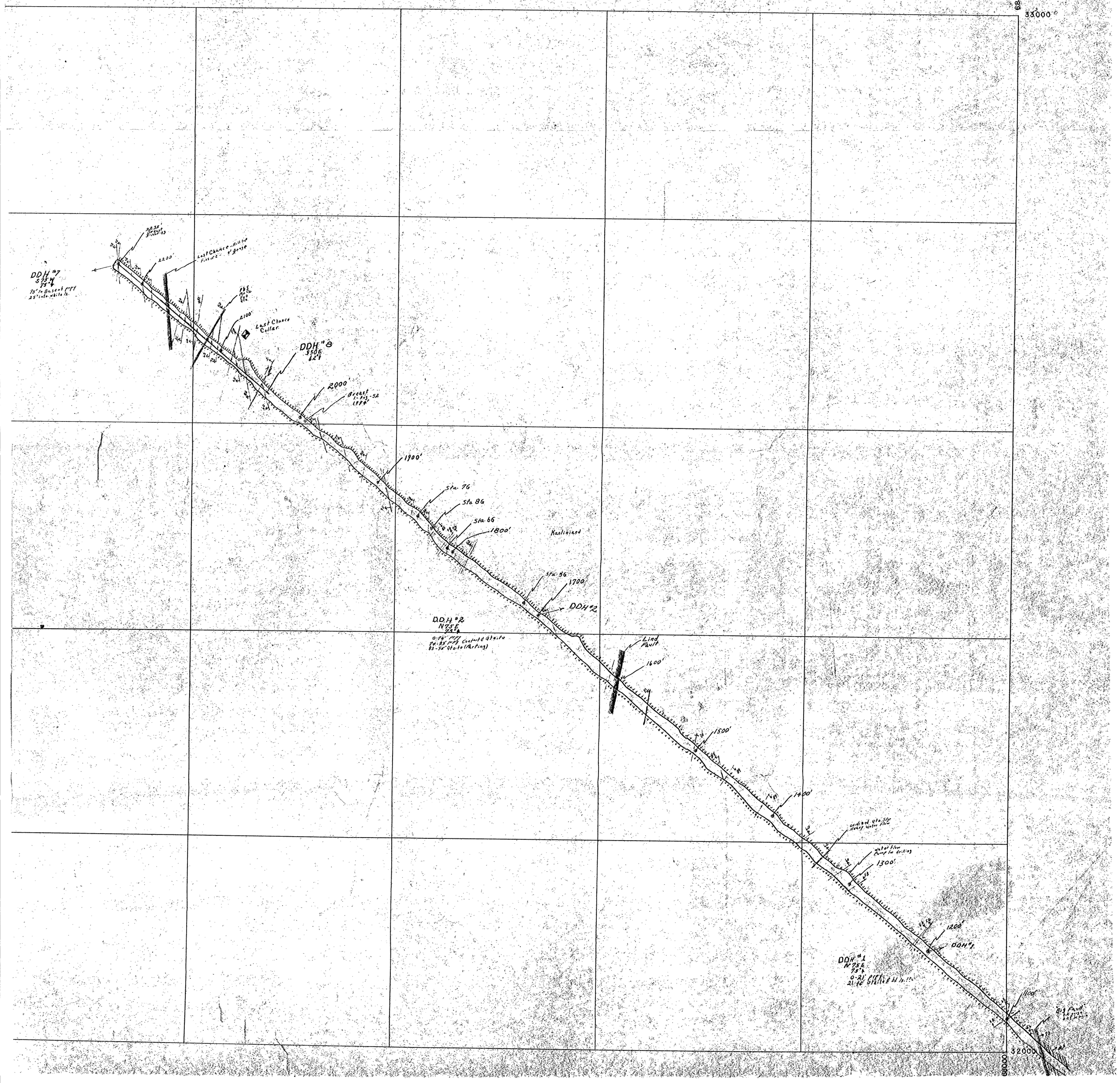
LEADVILLE LEAD CORPORATION
Dauntless Tunnel Drives During 1952

Scale 1 inch equals 200 feet

By
H. W. C. Prontel
Consulting Engineer
Denver, Colorado.


68000
9000
32000
Porphyry Dike
Fed into Manville
Ice gauge
800'
Light Grey Limestone
Light Grey Sh.
Light Grey Sh.
Sheared
Oil Shale
Positive Rolling Plane Fault
700'
Light Grey Sh.
600' Sheared Shale
Brecciated Fragments
Indicated fault plane
Light Grey Sh.
500'
Dissolved Wooden Trash & Sand (Grey)
Dark Grey Sh.
Fault Grey Shale
Fault Grey Sh.
Sheared Sh.
Light Grey Sh.
Light Grey Sh.
Water flow
Water flow
300'
Alternate Thin Layers
200'
Chert with Qtz. Veins
Chert
Argillaceous Cap
Dark Grey Sh.
Light Grey Sh.
Dark Grey Sh.
Dark Grey Sh.
100'
Dark Grey Sh.
Dark Grey Sh.
0'

DAUNTLESS TUNNEL
ELEV. 12300' (APPROX.)
SCALE: 1" = 50'



PROPOSED WEST PORTAL DAUNTLESS TUNNEL
R. 80 W.
R. 79 W.
6459 GALBOLINSKY
9739 HARD LUCK
9739 FOUNDLING
6454 EQUATOR
6920 DIAMOND FIELD
6590 SUMMIT
6765 SKY POCKET
KLONDYKE
12264
6490 FOURTH OF JULY
6765 HILDEGARDE
7998 BERTHA
673 TOWN TALK
South Dyer Fault
7998 MARY C.
T. 9 S.
T. 10 S.
7998 SILVER CHIEF
ELIAS DYER
5548 DIVIDE
5548 CLIMAX
GEORGIA
14465 LUCY NO. 2
14465 LUCY NO. 1
6190 SATELLITE
LAKE COUNTY
PARK COUNTY
MARY
3732 CARRIE F.
16106
R.G. INGERSOLL
3149 HOPKINS
5595 AM.
3196 CATO
7581 FAIR PLAY
3743 LITTLE ANGIE
CHARLES RICHARDSON
12176 GALENITE
12176
CERUSSITE
ANGLESITE
1781 BIG CHICAGO
12176 WASHO
3195
LEGEND
Silver Plume granite
Later gray porphyry
White porphyry (in part slide rock)
Weber grits
Leadville limestone
Mineralized fissure
Faults
Contact
Contact inferred
Contour Interval 20 feet
Dyer dolomite
Parting quartzite
Vertical shaft
Circular shaft
Adit
Trench or pit
Dump
Strike & dip of beds
Road
Manitou (white) limestone
Sawatch quartzite

PLATE I

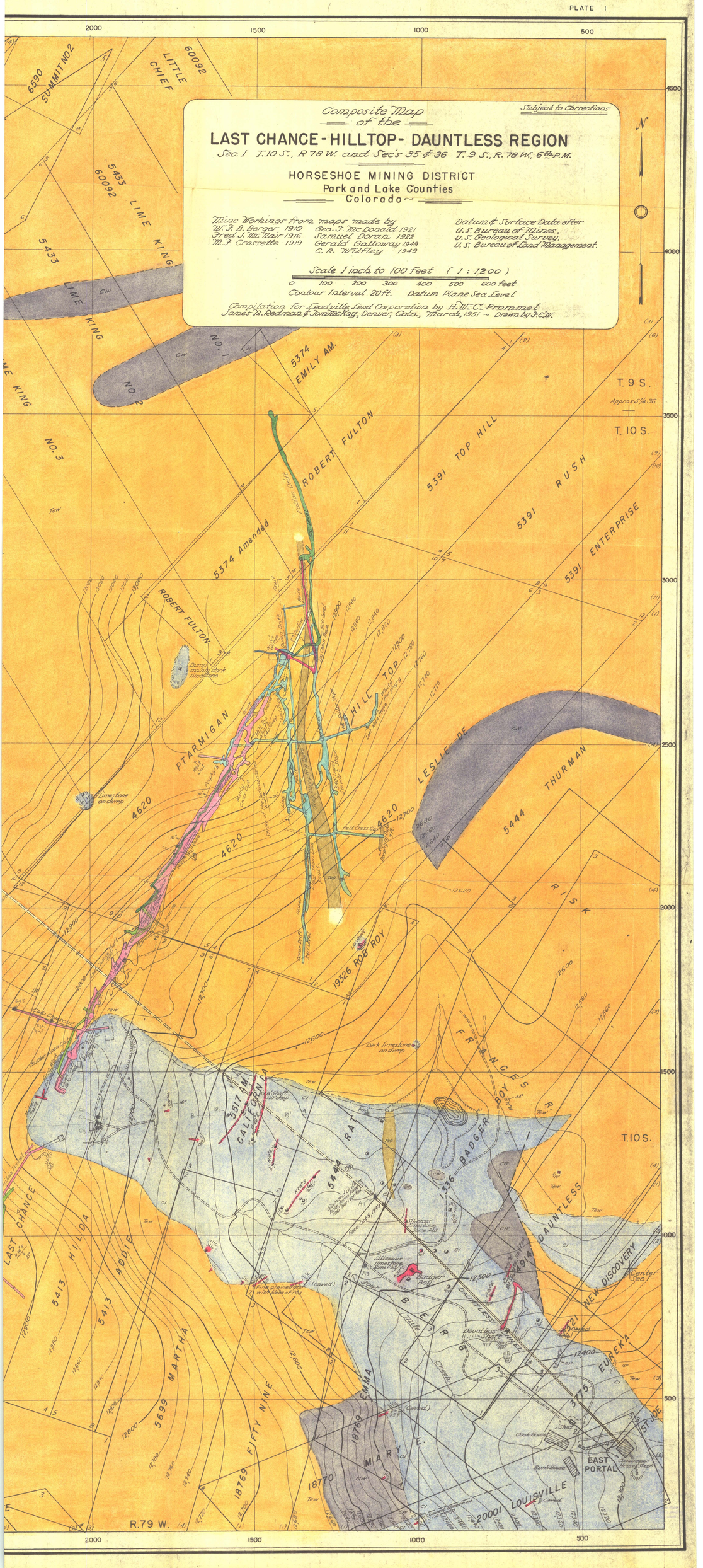

Composite Map
of the
LAST CHANCE - HILLTOP - DAUNTLESS REGION
Sec. 1 T. 10 S., R. 79 W. and Sec's 35 & 36 T. 9 S., R. 79 W., 6th P.M.
HORSESHOE MINING DISTRICT
Park and Lake Counties
Colorado
Subject to Corrections
Mine Workings from maps made by
W. J. B. Berger 1910
Fred J. McNair 1916
M. J. Crossette 1919
Geo. J. McDonald 1921
Samuel Doran 1922
Gerald Galloway 1949
C. R. Wilfley 1949
Datum & Surface Data after
U.S. Bureau of Mines,
U.S. Geological Survey,
U.S. Bureau of Land Management.
Scale 1 inch to 100 feet (1 : 1200)
0 100 200 300 400 500 600 feet
Contour Interval 20 ft. Datum Plane Sea Level
Compilation for Leadville Lead Corporation by H. W. C. Pronamel
James R. Redman & Jon McKay, Denver, Colo., March, 1951 ~ Drawn by J. C. W.
N
T. 9 S.
Approx. S 1/4 36
T. 10 S.
R. 79 W.
SUMMIT NO. 2
LITTLE CHIEF
LIME KING
NO. 1
NO. 2
NO. 3
EMILY AM.
ROBERT FULTON
TOP HILL
RUSH
ENTERPRISE
PTARMIGAN
HILL TOP
LESLIE DE
THURMAN
RISK
FRANCES
CALIFORNIA
RAT
BADGER BOY
DAUNTLESS
NEW DISCOVERY
EUREKA
LAST CHANCE
HILDA
ADDIE
MARTHA
FIFTY NINE
EMMA
MARY
LOUISVILLE
EAST PORTAL
ROB ROY
Dump mainly dark limestone
Limestone on dump
Dark limestone on dump
Cook House
Bunk House
Center Sec. 1

PLATE 2

FORMATION BOUNDARY LINES ON DAUNTLESS TUNNEL PLANE, ELEVATION 12,296 FT. a.s.l. SECTION A-A' TO E-E' SHOWING LOCATION OF PROPOSED DIAMOND DRILL HOLES

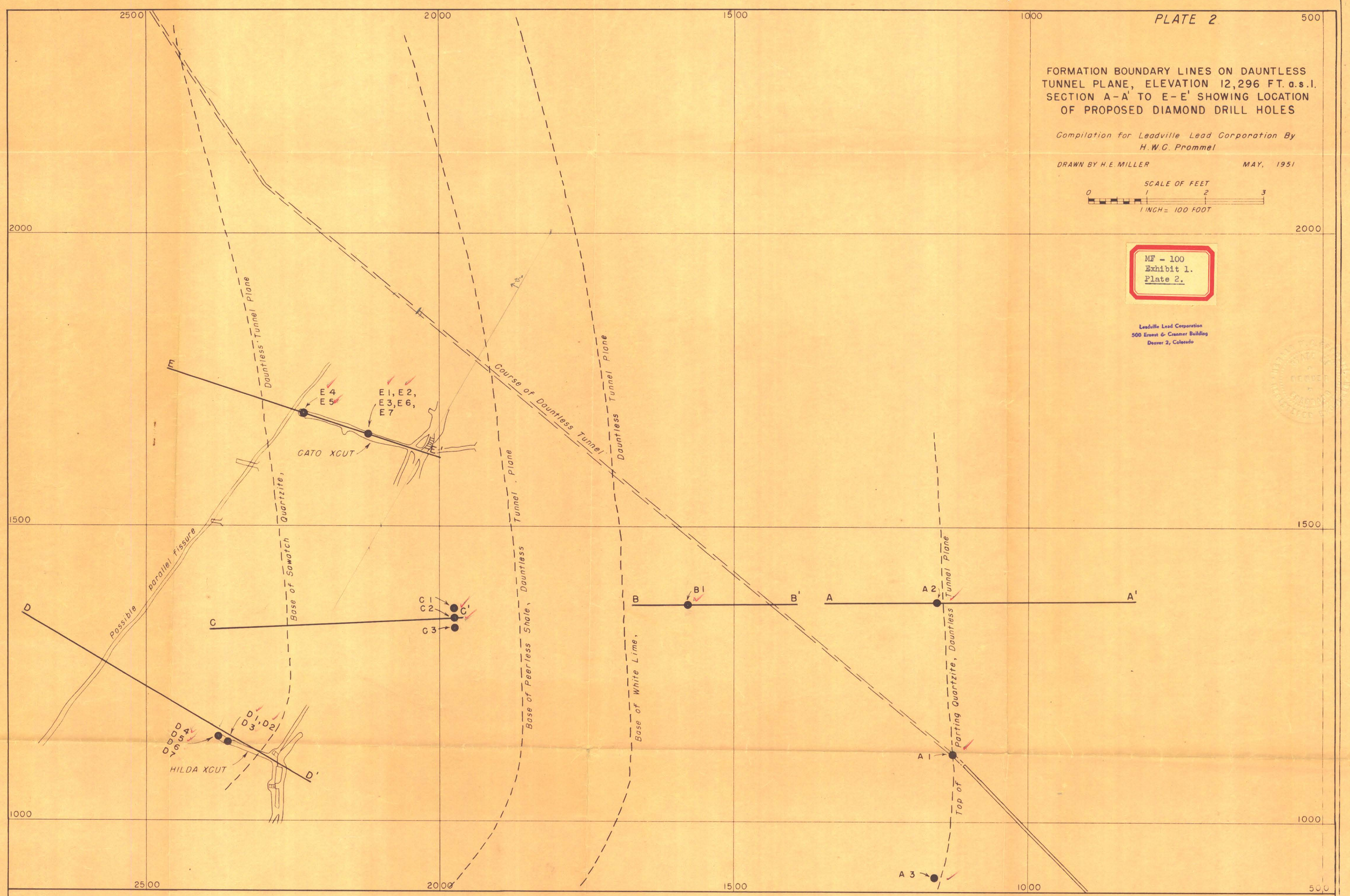
Compilation for Leadville Lead Corporation By H.W.C. Prommel

DRAWN BY H.E. MILLER — MAY, 1951

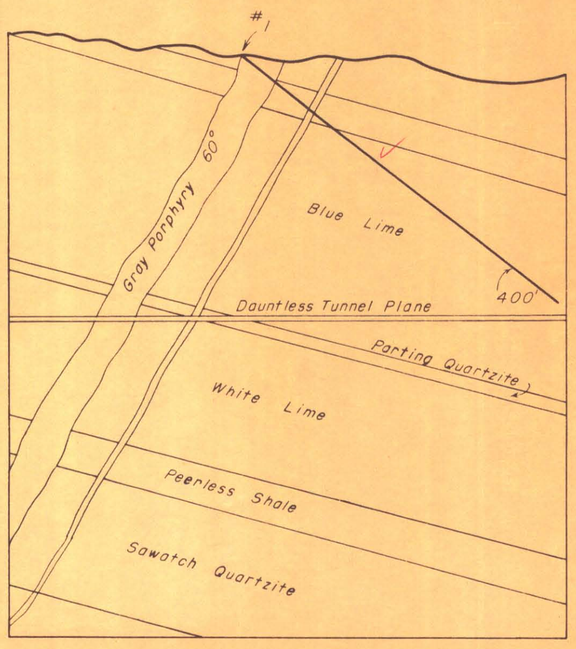
SCALE OF FEET
0 1 2 3
1 INCH = 100 FOOT

MF - 100
Exhibit 1.
Plate 2.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

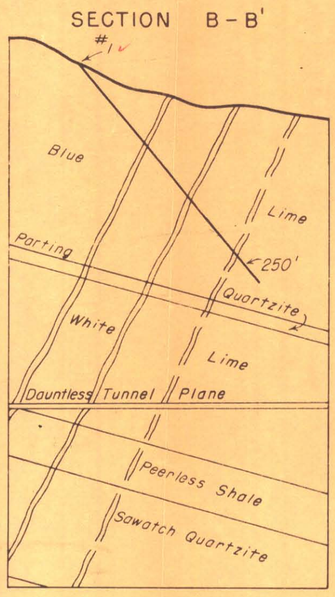


SECTION A-A'

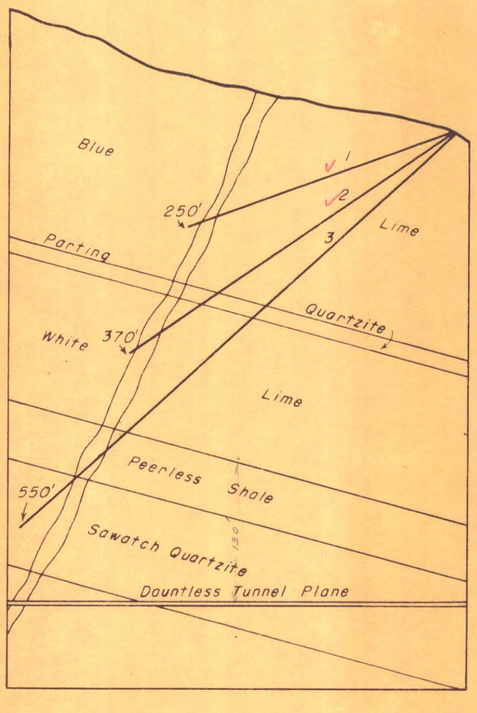


SCALE OF FEET
0 1 2 3 4
HORIZONTAL & VERTICAL SCALE 1 INCH = 100 FOOT

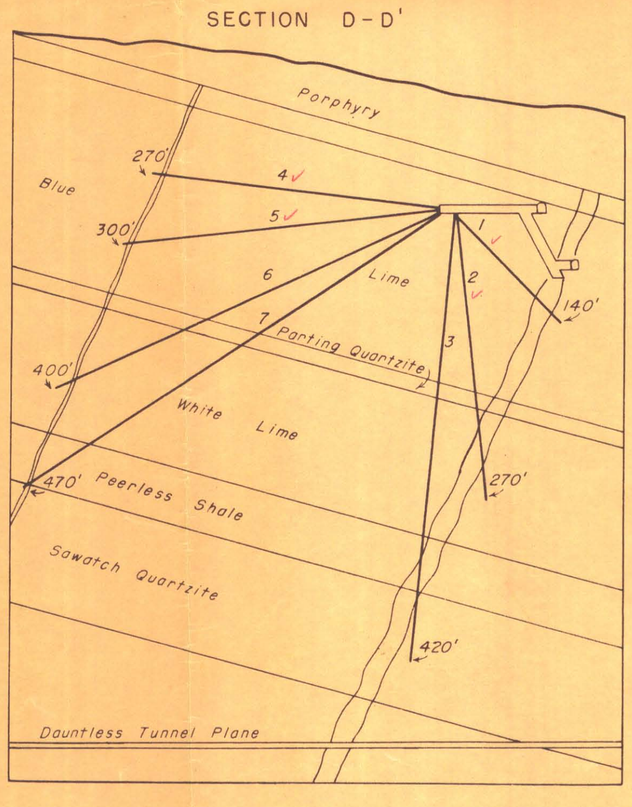
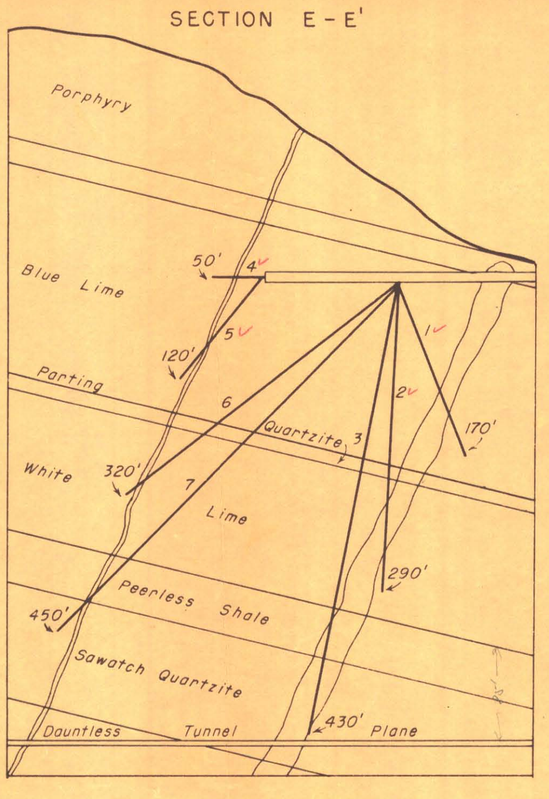
SECTION B-B'



SECTION C-C'



SECTION D-D'



SECTION E-E'