Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE APPLICANT

ITEM 1.

The applicant is a corporation incorporated in 1937 in the Province of Nova Scotia, Dominion of Canada. The principal office is 25 King Street West, Toronto, Ontario and the place of business is Eureka, Eureka County, Nevada.

The company is qualified to do business in the State of Nevada and the State of New York.

ITEM 2.

The applicant is not a partnership.

ITEM 3.

The following are the names and addresses of all officers and directors:-

NAME	ADDRESS	
T. Lindsley	230 Park Ave., N. Y.	Director & President
G. W. Mitchell	Eureka, Nevada	Director, Gen'l. Mgr. & Vice President
J. M. Kesson	217 Bay St. Toronto	Director
W. B. Malone	25 King St. W. Toronto	Director
Maurice R. Jennings	25 King St. W. Toronto	Director & Secty.
Paul W. Zeckhausen	230 Park Ave., N. Y.	Treasurer

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE APPLICANT (continued)

ITEM 3. (continued)

The following are the names and addresses of the five largest stockholders in Eureka Corporation Limited:

NAME	ADRESS	NO. OF SHARES
Gee & Co.	25 King St. W. Toronto, Ontario, Canada	1,664,589
C. A. England & Co.	25 King St. W. Toronto, Ontario, Canada	455,206
Dow & Co.	25 King St. W. Toronto, Ontario, Canada	164,865
Northfield Canada, Ltd.	25 King St. W. Toronto, Ontario, Canada	120,000
Dominick	25 King St. W. Toronto, Ontario, Canada	91,696

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE APPLICANT (continued)

ITEM 4.

a) Eureka Corporation, Ltd. has been operating the Richmond-Eureka Mine at Eureka, Nevada for the past 14 years. Associated Companies and officers of the Corporation have been operating mining and metallurgical works in Canada, United States, Nicaragua and other countries for the past 30 years. Some of the associated companies are:

Falconbridge Nickel Mines, Ltd. (Nickel)	Falconbridge, Ontario
New Calumet Mines, Ltd. (Lead, Zinc)	Southern, Ontario
La Luz Mines, Ltd. (Gold)	Nicaragua, Central America
Ventures, Ltd.	Various locations in Canada

b) The Vice President and General Manager of Eureka Corporation is:-

George W. Mitchell,

Engineer of Mines degree Colorado School of Mines 1923. Age 52 years

Mining experience:-

United Verde Copper Company - Jerome Arizona	- 6 years
Lake Shore Mines, Ltd. - Kirkland Lake, Ontario	- 1½ years
International Nickel Co., Frood Mine-Sudbury, Ontario	- 3½ "
Falconbridge Nickel Mines, Ltd. - Falconbridge, Ontario	- 1½ "
Matachewan Cons. Mines, Ltd. -Matachewan, Ontario	- 6 "
Panminas, Inc. Adamson Mine - Bishop, California	- 1½ "
Eureka Corporation, Ltd. - Eureka, Nevada	- 7 years

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE APPLICANT (continued)

ITEM 4 b) (continued)

The General Superintendent of the Richmond Eureka Mine is:-

W. Spencer Hutchinson, Jr.

BS Degree in Mining Engineering, Massachusetts Institute of Technology, in 1929, Age 45 years.

Mining Experience:-

Anaconda Copper Mining Co., Butte, Montana. Assistant Engineer, Sept. 1929 - Dec. 1930	1 yr., 3 mos.
North American Mines, Inc. Boston, Massachusetts. Engineer at copper property, Baja California, Mex. Jan. 1931 - Aug. 1931	8 mos.
Philadelphia & Reading Coal & Iron Co. Pottsville, Penn. Special Engineer, Sept. 1931-Mar. 1934	2 yrs., 7 mos.
North American Mines, Inc., Boston, Massachusetts. Field Engineer in Charge of Explorations in western United States, Apr. 1934 - Feb. 1938	3 yrs., 11 mos.
Fremont Gover Co., Amador City, California Engineer and Engineer in Charge - Feb. 1938-May 1940	2 yrs., 4 mos.
Curley Luck Gold Corporation, Winnemucca, Nevada Superintendent of Ashdown Mine,-June 1940-Oct. 1940	5 mos.
Cherokee Mine, Greenville, California Manager and Superintendent,-Feb. 1941-July 1942	1 yr., 6 mos.
Metals Reserve Co., U.S. Government, Washington, D. C. Principal Engineer, Aug. 1942-Jan. 1944	1 yr., 6 mos.
U. S. Navy, Feb. 1944-Jan. 1946, Senior Lieutenant	2 yrs.
Brush Creek Mine, Goodyears Bar, California Manager & Superintendent, Mar. 1946-Aug. 1949	3 yrs., 6 mos.
Colorado Raw Materials Office, Atomic Energy Commission, Grand Junction, Colorado, Ass't. Manager - Oct. 1949-Feb. 1951	1 yr., 5 mos.
Eureka Corporation, Ltd. Eureka, Nevada General Superintendent, March 1951 - present	3 mos.

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE APPLICANT (continued)

ITEM 5.

Eureka Corporation Limited is Lessee of the property and Richmond-Eureka Mining Company is the owner.

ITEM 6.

Not applicable.

ITEM 7.

The mining property under control of Eureka Corporation Limited was acquired by lease from the owners, Richmond-Eureka Mining Co., in 1937. The lease is for 25 years and may be extended an additional 15 years to 1977. Attached are copies of the lease agreements marked Exhibit A.

(Note: Exhibit A is to include the following:

Main Lease Agreement, Richmond-Eureka Mining Co. Ground dated dated June 30, 1937, between Richmond-Eureka Mining Co. and W. F. James.

Indenture, dated July 17, 1937, between Richmond-Eureka Mining Company, Wm. F. James, and Eureka Corporation, Limited.

Supplemental Lease, Agreement between Richmond-Eureka Mining Co. and Eureka Corporation Limited, dated June 22, 1949

Negotiations are now in progress with Richmond-Eureka Mining Co., Lessor, to obtain the "Landlord's Subordination Agreement", whereby the Lessor would subordinate all its right, title and interest under the provisions of said lease, to the right, title and interest of the United States of America under the provisions of said Exploration Project Contract. These negotiations have not been completed but will be submitted as soon as possible.

ITEM 8.

Attached (Exhibit C) is a copy of Eureka Corporation, Limited's financial statement as of April 30, 1951.

THE APPLICANT (continued)

ITEM 9.

Eureka Corporation, Limited is prepared to invest $1,630,000 in the proposed project. This is sufficient to pay our part of the cost of the project.

THE PROPERTY

ITEM 10.

a) The Richmond-Eureka Mine property is situated in the Eureka Mining District, Eureka County, Nevada. Properties are located in Sections 3, 4, 9, 10, 11, 14, 15, 16, 21, 22, 23, 26, 27, 28, in T.19 N., R. 53 E and in Sections 33 and 34 in T.20 N., R. 53 E of M.D.B. and M., Nevada. Eureka lots are in Sections 13 and 14 of T. 19 N., R. 53 E.

Attached (Exhibit D) is a list of all mining claims and plots of ground included in the Richmond-Eureka Mine property.

b) The area upon which exploration is to be conducted is described more particularly as follows:

> Beginning at Point No. 1, thence the Section Corner common to Sections 14, 15, 22 and 23 of T19N, R53 E of M.D.B. & M. bears N 1°30'W - 1,240 feet; thence S 20°30' W - 2,730 feet to Point No. 2; thence N 48°00' W - 1,600 feet to Point No. 3; thence N 23°30' E - 1,635 feet to Point No. 4; thence N 90°00' E - 1,430 feet to Point No. 1, the place of beginning. (See attachment, Map No. 1)

The above described area includes in part and whole the following patented and unpatented claims:

PATENTED CLAIMS

Champion Millsite, Portion of	Buckeye Millsite, Portion of
Fad Claim, Portion of	Brown Millsite
Porter Millsite	Carson Millsite
T. R. Claim, Portion of	Peach Claim, Portion of
La Veta Claim, Portion of	Brown Claim, Portion of
Porter Claim, Portion of	Calloway Claim, Portion of
Surplus Millsite, Portion of	Ravine Claim, Portion of

THE PROPERTY (continued)

ITEM 10. (continued)

PATENTED CLAIMS

Skylark Hillsite, Portion of
Honeymoon Amended Claim, Portion of
Lucky Man Claim, Portion of
Monarch No. 3 Claim, Portion of
Cliff Mine Claim, Portion of
Skylark Claim, Portion of
Ruby Hill No. 2 Claim, Portion of

UNPATENTED CLAIMS

B - B Claim, Portion of
Ann Fraction Claim, Portion of
R. E. No. 4 Claim, Portion of
R. E. No. 9 Claim, Portion of
R. E. No. 8 Claim, Portion of
R. E. No. 3 Claim, Portion of

ITEM 11.

The property is presently known as the Richmond-Eureka Mine which is a consolidation of the Richmond Mining Company's property and the Eureka Consolidated Company's property. The consolidation of the properties of these two companies was made in the year 1905. Since that time and in the past few years several other parcels of adjoining claims have been included in the Richmond-Eureka Mine properties. For further detail see the attached (Exhibit E) copy of Technical Publication No. 2196, Class 1, Mining Technology, September 1947 of the American Institute of Mining and Metallurgical Engineers, entitled "The Story of Eureka", by William Sharp.

ITEM 12.

The main works of the Richmond-Eureka Mine are 2½ miles southwest of the town of Eureka, Eureka County, Nevada and is connected to the town by a two-lane surfaced highway maintained by the State of Nevada. The town of Eureka is on the main transcontinental highway, U.S. 50, and is 78 miles west of Ely, Nevada and 246 miles east of Reno, Nevada.

THE PROPERTY (continued)

ITEM 12. (continued)

The nearest rail connections are at Palisade, Nevada which is on the mainlines of the Western Pacific R. R. and the Southern Pacific R. R. Palisade is 90 miles north of Eureka and the two towns are connected by Nevada State Highway, Route #20, which heads north from a junction with U. S. Highway 50, 5 miles west of Eureka. State Highway 20 is surfaced for the first 30 miles and the balance of the road is graveled and maintained by the State. An additional section of this road is to be surfaced this year, 1951, and it is contemplated that the total distance will be surfaced in a few years. This would then be the most direct and feasible route for shipment of large quantities of freight and supplies.

At the present time, freight and supplies for the Eureka District are brought in by truck freight lines from Salt Lake City and Ely to the East and Reno to the west.

ITEM 13.

Water is available from the mine workings for operations at all seasons. The quantity is in excess of 1000 gallons per minute and could be adequate for any contemplated operation. Water from the mine is solely owned by Eureka Corporation Limited and water rights are recorded in Eureka County Courthouse, Eureka, Nevada.

Power is generated in the Company's diesel electric power plant on the property. The present maximum capacity of this plant is 6,350 K.W. The following is a record of the cost of operating the power plant in 1948, during a period when power production could be comparable to the proposed power operation.

THE PROPERTY (continued)

ITEM 13. (continued)

MONTH 1948	COST	K.W.H. CONSUMPTION	COST PER K.W.H.
July	$ 43,412.08	2,465,860	$ 0.0176
August	40,827.13	2,648,050	0.0154
September	63,879.91	3,346,300	0.0191
October	57,857.28	3,578,100	0.0162
November	74,053.62	4,241,093	0.0175
December	40,181.17	2,235,320	0.0180
Six months ending 12/31/48	$ 320,211.19	18,514,723	$ 0.0173

The following is a record of other sources of power which are not considered available at this time.

The nearest hydro-electric power lines are at Pioche, Nevada, approximately 150 miles from Eureka and at Winnemucca, Nevada, which is also approximately 150 miles from Eureka. Neither of these sources have sufficient line capacity at the present time to make available at those locations the amount of power required.

Kennecott Copper Company supplies the Ely, Nevada district with steam generated power but no power is available from this source.

The cost of power at Pioche is approximately $ 0.006 per K.W.H. and in the Ely district is approximately $0.01 per K.W.H.

The estimated cost to rebuild and extend the existing power line from Pioche is in excess of $2,000,000.00. At the present time the power line from the Hoover Dam to Pioche does not have sufficient capacity to carry the additional load without increasing the voltage, necessitating installation of new insulators and new distribution equipment.

THE PROPERTY (continued)

ITEM 13. (continued)

The proposed exploration program will require the installation of two additional 1,000 K.W. diesel generators. Foundations are in and ready for installation. This will increase the rated capacity of the plant to 8,350 K.W.

When pumping 9,000 gal. per minute from an average depth of 1,500 feet below the shaft collar, approximately 144,000 kilowatt hours of power per day will be generated, equal to 4,320,000 kilowatt hours per month. All other power demands, such as the 600 H.P. hoist, are included in the above.

SUMMARY OF POWER USE:

First six months	21,600,000 K.W.H.
Second six months	28,800,000 K.W.H.
Third six months	28,800,000 K.W.H.
TOTAL (nearest million)	80,000,000 K.W.H.

ITEM 14.

BUILDINGS & STRUCTURES

Fire House Building	$ 403.05
Hoist House Building	12,793.27
Head Frame and Bin	15,826.81
Machine Shop Building	23,175.07
Power House Building	199,021.54
Power House Building Additional (Quonset)	20,480.68
Small Diesel Building and Addition	13,359.69
Warehouse Building	12,807.33
Oil House	2,544.87
Powder Magazine	1,608.35

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE PROPERTY (continued)

ITEM 14. (continued)

BUILDINGS & STRUCTURES

Miscel. Sheds	$ 2,695.01	
Water Treatment Building	1,725.33	
Power Plant Water Treatment Bldg.	2,841.41	
Landing Room and Tunnel	2,345.61	
Steel Storage Construction	3,097.23	
Hospital Building	2,694.24	
Dry Room	10,019.68	
Engineering Building	2,400.75	
Trailer Houses	3,825.50	
TOTAL BUILDINGS & STRUCTURES		$ 333,665.42

MINING EQUIPMENT

1	Ledgerwood Double Drum Electric Hoist complete w/2 - 300 H.P. Motors, Grids, Controls and accessories. Installed.	$ 53,494.15
1	J. Geo. Leyner Engineering Works Single Drum Chippy Hoist powered by 50 H.P. Motor and with controls, Grids and Accessories.	1,698.99
1	American Hoist and Derrick Co. Single Drum Hoist powered by D-13000 Caterpillar Tractor Diesel Engine.	5,571.00
7	Utility Air Hoists	3,045.87
2	Safety Cross Heads	741.62
3	Muck Skips complete w/safety & dumping devices	4,993.58
1	10"x6"x7" Sullivan Air Compressor powered by 75 H.P. G.E.Motor. Complete	4,865.31
1	15 12x8x10 C.P. Compressor w/75 H.P. Motor and Accessories. Complete	6,283.90
1	17x10 - 677 cuft. I.R. w/100 H.P. Motor and accessories. Complete	4,486.62

THE PROPERTY (continued)

ITEM 14 (continued)

MINING EQUIPMENT

1	210 cu.ft. I.R. Portable Air Compressor direct connected to Waukesha Gasoline Engine	$ 3,295.38
1	Imperial Type 10XB I.R. Compressor V Belt connected to 200 H.P. Electric Motor and complete w/Accessories, etc.	6,205.60
7	2" M.R.V. I.R. Motor Pumps less Motor	2,050.00
8	Pomona Sinking Pumps rated 725 GPM at 508' Lift less Motors	6,453.76
4	Byron Jackson #5KM-6 Stage Submersible Pumps rated 2000 GPM at 565' Lift less Motors	19,581.79
4	Pomona Low Lift Pumps rated 875 GPM at 40' Lift less Motors	1,297.57
4	Byron Jackson #5KM Single Stage Low Lift Pumps rated at 2000 GPM at 45' Lift less motors.	3,588.00
1	Pomona 5 stage Deep Well Pump rated at 950 GPM at 171' Lift less Motor	2,203.33
23	Ingersoll Rand 4GT-2 Station Pumps rated 1000GPM at 1000 ft. Head less Motors	32,389.22
2	Aldrich Type 4B4ST - 4 Stage Station Pumps rated 750 GPM at 575' Head less Motors	450.00
3	15 H.P. Vertical Shaft Motors 1800 R.P.M.	987.00
2	20 H.P. Vertical Shaft Motors 1160 R.P.M.	1,024.00
3	25 H.P. Horizontal Splash Proof Motors 3450 R.P.M.	692.24
3	25 H.P. Vertical Shaft Motors	1,440.00
2	40 H.P. Horizontal Splash Proof Motors 3450 R.P.M.	861.80
2	50 H.P. Horizontal Splash Proof Motors 3450 R.P.M.	807.30
5	100 H.P. Vertical Shaft Motors 1800 R.P.M.	6,932.80

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE PROPERTY (continued)

ITEM 14 (continued)

MINING EQUIPMENT

1	125 H.P. Vertical Shaft Motors 1800 R.P.M.	$ 1,315.29
2	125 H.P. Horizontal Induction Motors 1750 R.P.M.	2,000.00
1	150 H.P. " " " " "	1,553.83
1	200 H.P. " " " " "	2,247.26
4	250 H.P. " " " " "	11,325.52
10	350 H.P. " " " " "	31,519.44
4	350 H.P. Submersible Motors 1750 R.P.M.	29,668.00
8	450 H.P. Horizontal Induction Motors 3600 R.P.M.	36,158.88
6	100 H.P. Starters	4,816.30
2	125 H.P. "	300.00
2	150 H.P. "	971.70
3	250 H.P. "	5,817.00
1	200 H.P. "	570.17
17	350 H.P. Starters	29,813.69
2	370 H.P. "	3,826.80
2	450 H.P. "	2,860.20
19	400 Amp. Disconnecting Switches	8,768.00
6	Automatic Pump Control Panels	6,905.70
1	Joy D.D.T. Dual Jumbo Drill	4,183.27
1	Eimco 12B Mucking Machine	1,472.90
1	Eimco Model 21-55 Rocker-shovel	4,149.73
1	Joy Model H.L. 20 Mine Car Loader	2,620.80
2	Shaft Mucking Machines	8,027.61
1	15 H.P. Sullivan Type AAF-212 Slusher w/Pacific Slushing Scraper #H-12-H-8	1,243.53

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE PROPERTY (continued)

ITEM 14 (continued)

MINING EQUIPMENT

1	10 H.P. Sullivan Type PF-211 Slusher w/Pacific Slushing Scraper #H-36-H8	$ 1,249.12	
1	50 H.P. 3 Drum Universal Scraper Hauler w/1 1/2 yd. R.D. Scuerman Scraper	5,341.27	
1	30 H.P. 2 Drum Sullivan Type D-212 Scraper Hauler w/48" Model "C" Pacific Scraper	2,913.63	
1	Stephen Adamson 1/2 ton Battery Locomotive	1,949.97	
2	Mancha Type "B" Little Trammer Locomotives	9,820.48	
7	"Card" 47 cuft. Rocker Dump Cars	4,142.97	
8	Mine Timber Cars w/Card Timken Brg. Trucks	739.50	
2	Small Air Blowers	517.80	
3	Coppus Fans	2,018.67	
80	Wheat Electric Mine Lamps	1,283.06	
	Impact Wrenches, Track Benders, Etc.	2,077.65	
	TOTAL MINING EQUIPMENT		$41,430.67

FACILITY EQUIPMENT

	Office Equipment	$ 3,907.92	
	Engineering Equipment	1,926.77	
	Shop Equipment	38,300.38	
	Construction Equipment	5,683.06	
	Power Lines & Apparatus	71,003.56	
1	McIntosh-Seymour Diesel Engine	38,279.47	
3	1000 KW Worthington Diesel Generator	404,818.69	
	Foundations, etc. for 4th and 5th Worthington Installations	11,315.75	
4	800-1000 KW General Motor Diesel Generators	238,712.23	

THE PROPERTY (continued)

ITEM 14 (continued)

FACILITY EQUIPMENT

3	UD-18 International 50 KW Diesel Electric Units	$ 15,819.65	
	Small Light Plants	1,375.00	
	Electric Analyzers, etc.	947.92	
	Tractors, Trucks and Cars	19,087.98	
	Heating System	9,391.97	
	Diesel Storage Tanks (168,000 gals.)	14,010.63	
	Fire Hydrants, Water Lines & Fire Fighting Equip.	22,632.84	
	Hospital Equipment	697.63	
	Water Treatment Equipment	6,884.89	
	Water Tanks	12,098.18	
	Miscellaneous	2,049.68	
	TOTAL FACILITY EQUIPMENT		$918,944.20
	Milling Equipment - Miscellaneous	19,051.17	19,051.17
	TOTAL EQUIPMENT		$1,349,486.04

ITEM 15.

Early production could be treated in the Mt. Hope mill of the Callahan Zinc-Lead Company under lease arrangements. This mill could have a capacity of 250 tons per day and is located 25 miles from the Richmond-Eureka Mine and good all weather roads connect the two properties.

Concentrates of Lead would probably be shipped by rail from Palisade, Nevada to a Smelter in the Salt Lake City, Utah area Zinc Concentrates would

THE PROPERTY (continued)

ITEM 15. (continued)

be shipped by rail to smelters near Amarillo, Texas.

It would be proposed to construct a 500 T.P.D. mill at the company's property near Eureka and to increase this later to 1,000 T.P.D. pending favorable developments.

ITEM 16.

HISTORY

a) Silver-lead ore was first discovered in the Eureka District in September 1864 by a group of prospectors from Austin who made the discovery in an outcrop in New York Canyon, about two miles south of the present townsite of Eureka. Production from the district was delayed until 1870 due to early difficulties in successfully smelting the ore. In 1870 San Francisco interest formed the Eureka Consolidated Mining Co., which controlled the ground on the northeast side of Ruby Hill and in 1871 an English Company, the Richmond Mining Co., bought the adjoining claims to the west. Both of these two companies commenced mining and built smelters in the town of Eureka. By 1872 mining and smelting operations had reached a maximum of about 150 tons per day. Ore from the Companies properties and custom ore was treated in these two smelters until 1891, when the smelters were shut down. Mining continued, however, until 1905 under a leasing or "tributing" system and the ore was shipped to either Selby or Salt Lake City smelters for treatment.

In 1905 the Richmond-Eureka Mining Co., a subsidiary of the United States Smelting, Refining and Mining Co., acquired the combined holdings of the two companies and, after a short period of rehabilitation work, mining under a leasing system was resumed. Approximately 200 tons of ore per day

THE PROPERTY (continued)

ITEM 16. (continued)

were mined and shipped to the smelter in the Salt Lake City area until 1910 when the Eureka-Pallisade R.R. was washed out and mining in the district ceased with the exception of mine small-scale leasing.

During the productive period of 1870 to 1910 approximately 1,250,000 tons of ore were mined having a gross value, variously estimated at from $60,000,000 to $90,000,000. This production was from ore bodies in the footwall of the Ruby Hill Fault and for the most part from above the Richmond 700' Level. These ore bodies were above the water table in the district and were almost completely oxidized. The ore values were for the most part in gold and silver with high lead values. It is estimated that the two properties produced approximately 200,000 tons of lead which accounted for nearly one-third the value of the ore.

In 1937 the Eureka Corporation Limited obtained a lease on the holdings of the Richmond-Eureka Company with the major objective that of exploring the hangingwall of the Ruby Hill Fault on the geologic theory that ore would be discovered in the Eldorado dolomite at a deeper horizon. During the period 1937 to 1941 the Company drilled three diamond drill holes in the hangingwall side of the Ruby Hill Fault. Drill hole A was located in the block northwest of the Bowman Fault and was drilled from the surface to a depth of 3240 ft. cutting through 2,012 feet of Eldorado dolomite at a depth of from 1,190 to 3,202 feet. No important ore showings were indicated by this hole. Drill hole B was started from the 900 ft. level of the Lucan Shaft to explore the block of ground southeast of the Bowman Fault and lying in the hangingwall of the Ruby Hill Fault. Drill Hole B encountered lead-zinc ore at a depth of from 1,409 to 1,449 feet below the Lucan 900 ft. Level. Drill Hole C was also drilled from the

THE PROPERTY (continued)

ITEM 16. (continued)

900 ft. level of the Logan Shaft approximately 210 feet northeast of the location of the color of Hole B. This hole encountered 40 feet of lead-zinc ore at a depth of from 1,350 to 1,390 feet.

On a basis of these favorable indications the Eureka Corporation Limited started sinking the Fad Shaft, located 1430 feet northeast of the Logan Shaft, in February of 1942. Due to the difficulty of obtaining suitable pumping and other equipment during the war, sinking was slow and the shaft was stopped at a depth of 540 feet. In early 1943 the company submitted a proposal to the U. S. War Production Board for developing the mine, milling 500 tons of ore per day in an attempt to obtain the necessary equipment, materials and supplies. This Agency concluded that further exploration was necessary and requested that the U.S. Bureau of Mines make a study and propose a suitable program. The Bureau of Mines recommended that further drilling be done and a diamond drilling program was started in October of 1943 under the direction of the U. S. Bureau of Mines.

The Bureau of Mines drilled three diamond drill holes from the 900 ft. level of the Logan Shaft in the area of the discoveries made by the Eureka Corporation, Ltd. and spaced approximately 200 feet from the holes previously drilled. These three holes encountered lead-zinc ore as follows:

Drill Hole D-Across 27½ ft. at a depth of from 1,469 to 1,496.5 ft.

Drill Hole E-Across 59½ ft. at a depth of from 1,502.5 to 1,562 ft.

Drill Hole F-Across 27.4 ft. at a depth of from 1,375.6 to 1,403 ft.

THE PROPERTY (continued)

ITEM 16. (continued)

In 1945 when materials and equipment were again available, the Company prepared to continue sinking of the Fad Shaft and sinking was started that year. The Fad Shaft was sunk to a depth of 2,415 feet, connection was made to the Leon 900 foot level and stations cut at 1,234, 1,684, 2,034 and 2,250 feet. A crosscut was started on the 2250 Level. At a point approximately 175 feet from the shaft, on March 25, 1948, a heavy flow of water which was greater than pumping capacity was encountered and the shaft was flooded. An attempt was made to recover the shaft by increasing pumping capacity during the period May 16, 1948 to December 16, 1948 but the velocity of the water eroded the 2250 Level water course, depositing rock material in the bottom of the shaft to a depth of some 80 feet. Pumping was stopped again December 16, 1948, in order to prevent further difficulty.

Ira B. Joralemon and W. E. Romig made examinations of the property in the later part of 1949 and it was recommended that exploration be conducted in the fault block northwest of the Bowman Fault in an attempt to discover ore at a higher horizon. In August of 1950 an extensive drilling program was commenced to explore the ore possibilities in this upper fault block. A total of 6,929 feet of rotary drill hole was drilled cutting four sections in the Eldorado dolomite in the block. One diamond drill hole, collared underground on the Leon 900 foot level, was drilled to cut the upper section of the lower fault block and intersect

THE PROPERTY (continued)

ITEM 16. (continued)

the Ruby Hill Fault. Another diamond drill hole, collared underground on the Richmond 800 foot level, was drilled to explore the downward extensions of the ore zone in the footwall of the Ruby Hill Fault.

Drilling in the upper fault block on the hangingwall side of Ruby Hill Fault was not encouraging, with the exception of some oxidized ore indications in one of the rotary rig drill holes. A diamond drill hole is now being drilled from the Richmond 800 foot level to check this favorable indication. The possibilities of the area cannot be said to be exhausted because of the small number of holes drilled.

Eureka Corporation Limited
Richmond Eureka Mine
Eureka, Nevada

THE PROPERTY (continued)

ITEM 16. (continued)

b) The following is a partial record of the production from adjoining and neighboring properties, some of which are now included in the properties under the control of Eureka Corporation Limited:

MF-103 16(b) Property	Produc. Tons	Value	Metal	Present Status	Remarks
Dunderberg	51,268	$1,882,933	Au,Ag & Pb	Inactive	Greatest production was in 1870's & 80's.
Connolly	4,657	166,794	Au, Ag & Pb	"	Greatest production was in 1870's & 80's.
Eureka Croesus Mining Co.	8,300	332,000	Au, Ag & Pb	"	Consolidation of Dunderberg & Connolly, prod. in 1917 and 1931, recent prod. not known.
Silver Connor Mine	4,626	158,900	Au, Ag & As	"	Greatest production in 1880's, recent Prod. of leasers not known.
Geddes & Bertrand Mine	32,081	1,000,000	Ag,Au	"	Greatest prod. during 1870's & 80's.
Diamond Mine	32,705 30,000	1,060,875 650,000	Pb,Ag,Au & Ag	"	Greatest prod. dur. 1873-1896. Prod. dur. 1935-38 period (estimated).
Eureka Tunnel	4,275	192,476	Ag,Au & Pb	"	Greatest prod. during 1880's.
Windfall Mine	40,000	200,000	Au	"	Greatest prod. 1909-1912.
Jackson	24,245	834,230	Pb, Au Ag	"	Within Eureka Corp. claim boundaries.
Phoenix	4,630	134,078	Pb, Au, Ag	"	Within Eureka Corp. claim boundaries. Greatest production in 1870's.
Silver Lick	4,875	219,349	Au, Ag	"	Within Eureka Corp. claim boundaries.
Albion Consol Mining Co.	7,127	245,305	Pb, Au, Ag	"	Within Eureka Corp. claim boundaries. Greatest prod. in 1880's.
Bullwacker	4,118	116,069	Pb, Ag	"	Within Eureka Corp. claim boundaries.
Holly	25,000	400,000	Pb, Ag	"	Includes prod. from Bullwhacker, Silver West & Holly dur. 1920's. Within Eureka Corp. claim boundaries.

THE PROPERTY (continued)

ITEM 16 (continued)

c) The following is a record of some of the recent, available reports which furnish information pertinent to exploration of the Richmond-Eureka Mine:

Published Reports:

American Institute of Mining and Metallurgical Engineers, Technical Publication No. 2196, "The Story of Eureka" by William Sharp, Chicago Meeting, February 1946; Published in Mining Technology, Class I, September 1946. (Exhibit E)

United States Department of Interior, Bureau of Mines, Report of Investigation, R.I. 3949, December 1946, "EXPLORATION OF THE EUREKA CORPORATION GOLD, SILVER, LEAD, AND ZINC PROPERTIES, EUREKA COUNTY, NEVADA", by E. O. Binyon. (Exhibit F) (History, exploration and metallurgical testing).

Private Reports:

Synopsis of a Report on An Investigation of the Properties of Eureka Corporation Limited in Nevada by Ira B. Jeralemon, September 1949. (Exhibit G), (Exploration and recommendations).

Report on Eureka Property by Nepheline Products Limited, Lakefield, Ontario, work accomplished during the first six months of 1945. (Exhibit H), (Ore dressing and metallurgical testing).

ITEM 17.

Production

a) The mine is not in production.

ITEM 18.

Ore or Mineral Reserves

a) The ore bodies occur as the typical replacement deposit in the Elderado dolomite, a member of the Paleozoic sediments that are found widespread through the Great Basin area. Practically no inclusions of unreplaced dolomite are found in the ore bodies and replacement of the dolomite is essentially complete. The outlines of the ore bodies are definite and there

THE PROPERTY (continued)

ITEM 16. a) (continued)

is a sharp line of demarcation between the ore and barren dolomite. A complete description of the ore deposits will be found in the attached Report of Investigations, R.I. 3949, United States Department of the Interior, Bureau of Mines, December 1946, by E. O. Binyon (Exhibit F).

b) Pertinent maps are attached and included in Exhibits E and F.

c) No positive ore is blocked out in the Richmond-Eureka Mine. Five diamond drill holes, in an area 300 feet long and 200 feet wide, intersected zinc-lead ore ranging in thickness of from 27.4 feet to 59.5 feet at a little more than 2000 feet below the surface. The U. S. Bureau of Mines made no estimates of tonnage but in their ore dressing experiments calculated the weighted average content of the ore to be as follows:

Lead	-	4.46 %
Zinc	-	9.84 %
Gold	-	0.241 ounces per ton
Silver	-	7.28 ounces per ton

Ira B. Joralemon in his investigation states that the drilling indicates a possible 800,000 tons of heavy sulphide ore that averages 3.74% lead, 9% zinc, 0.192 ounces of gold and 5.92 ounces of silver. He also states that this indicated ore occupies less than a tenth of the promising area northeast of the Ruby Hill Fault. The U. S. Bureau of Mines reported the best hole to average 6.9% lead, 10.93% zinc, 0.388 ounces gold and 11.52 ounces silver over a thickness of 65 feet.

Based on the indicated tonnage and grade of ore as estimated by Ira B. Joralemon, the metal content and the gross and per ton value of the ore at present market prices would be as follows:

THE PROPERTY (Continued)

ITEM 18 c) (continued)

GRADE & METAL CONTENT

	TONS OF ORE	GRADE	METAL CONTENT
Lead	800,000	3.74%	29,920 tons
Zinc	800,000	9.00%	72,000 "
Gold	800,000	0.192 oz/ton	153,600 ozs.
Silver	800,000	5.92 oz/ton	4,736,000 "

GROSS & PER TON VALUE

Lead	-	29,920 x 2,000 x $0.17	-	$ 10,170,000
Zinc	-	72,000 x 2,000 x $0.175	-	25,200,000
Gold	-	153,600 x $35.00	-	5,400,000
Silver	-	4,736,000 x $0.9016	-	4,260,000
		GROSS VALUE OF INDICATED ORE		$ 45,000,000
		GROSS PER TON VALUE OF ORE		

Details of the diamond drilling results are contained in the above referenced Report of Investigations by the U. S. Bureau of Mines which is attached (Exhibit F).

THE EXPLORATION

ITEM 20.

The exploration will be conducted for lead-zinc ore of the replacement type which may make available an estimated one to five million tons of ore. This ore is likely to contain 3.74% lead, 9% zinc, 0.192 ounces gold and 5.92 ounces silver.

THE EXPLORATION (Continued)

ITEM 21.

It is proposed to unwater the Fad Shaft and advance an underground opening into the indicated ore on the 2250' level (6th Level) or on the 2000' level (5th level) in approximately eighteen to twenty-four months. We believe that such a program can be accomplished for a total cost of $3,200,000.

A detailed time schedule and itemized listing of the work to be done is set forth under Item 24 of this application.

ITEM 22.

The main orebodies of the Richmond-Eureka Mine, which produced an estimated 1,250,000 tons of ore worth some $40,000,000 to $90,000,000, occurred in the favorable Eldorado dolomite formation on the footwall of the Ruby Hill Fault, a northwest southeast trending normal fault. Diamond drilling by the company and the United States Bureau of Mines has located the favorable Eldorado dolomite in a down faulted block on the hangingwall or northeast side of the Ruby Hill Fault.

Indications are that the ore body in this locality will be sufficient in size to support at least a production of 500 tons of ore per day and may very well be large enough to warrant a production of 1,000 tons of ore per day. It is estimated that on a basis of 500 tons of ore per day, the production of lead and zinc would be as follows:

Zinc	1,080 tons per month
Lead	580 " " "

THE EXPLORATION (continued)

ITEM 22. (continued)

On a basis of 1000 tons of ore per day, the production of lead and zinc would be:

Zinc	2,160 tons per month
Lead	1,160 " " "

Further detail on the geology, geologic maps, assay results on the diamond drilling and other pertinent data are contained in the following reports which are attached:

American Institute of Mining and Metallurgical Engineers, Technical Publication No. 2196, "The Story of Eureka", by William Sharp, Sept. 1947.

United States Department of Interior, Bureau of Mines, Report of Investigations, R.E. 3949, December 1946, "Exploration of the Eureka Corporation Gold, Silver, Lead and Zinc Properties", Eureka County, Nevada, by E. O. Binyon. (Exhibit F)

Synopsis of a Report on An Investigation of the Properties of Eureka Corporation Limited in Nevada by Ira B. Joralemon, September 1949. (Exhibit G)

Maps of the proposed openings are attached and are itemized as follows:

Map No. 1 - Eureka Corporation Limited, Surface Claim Map and area to be included in exploration contract.

Map No. 2 - Fad Shaft, 800 Level showing location of proposed rotary drill holed, crosscut connection, station enlargement and location of hoisting facilities for deep well pump.

Map No. 3 - Fad Shaft, 1200 Level showing station enlargement.

Map No. 4 - Fad Shaft, 1700 Level showing location of proposed crosscut on this level which is to be driven to tap another source of water in the ore block at a higher elevation.

THE EXPLORATION (Continued)

ITEM 22. (continued)

Map No. 5 - Fad Shaft, 2000 Level showing location of proposed crosscut into the ore block which is an alternative to the crosscut proposed on the 2250 level.

Map No. 6 - Fad Shaft, 2250 Level showing the proposed crosscut to explore the ore at this horizon.

Chart No. 1-Chart Record of Pumping from Fad Shaft and pertinent Water Data.

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE EXPLORATION (Continued)

ITEM 23. REQUIREMENTS AND COSTS

Labor - By numbers and classes w/wages

Item (a)	Total Months	Hourly Rate	Total Wages	Payroll Taxes	
6 Pumpmen	18	155 ½	$ 46,575.36	$ 6,893.15	$ 53,468.51
3 "	12	"	15,525.12	2,297.72	17,822.84
4 Electricians	18	176	35,143.68	5,201.26	40,344.94
3 Hoistmen	18	188 ½	28,229.76	4,178.00	32,407.76
2 "	12	"	12,546.56	1,856.89	14,403.45
1 Skip tender	18	155 ½	7,762.56	1,148.86	8,911.42
5 Skip tenders	12	"	25,875.20	3,829.53	29,704.73
3 Top landers	18	145 ½	21,790.08	3,224.93	25,015.01
3 Working Shift Bosses	18	188 ½	28,229.76	4,178.00	32,407.76
* 2 Miners	18	165 ½	16,523.52	2,445.48	18,969.00
* 4 "	12	"	22,031.36	3,260.64	25,292.00
* 6 "	4	"	11,013.54	1,630.00	12,643.54
* 2 Muckers	18	155 ½	15,525.12	2,297.72	17,822.84
* 4 "	12	"	20,700.16	3,063.62	23,763.78
1 Motorman	18	"	7,762.56	1,148.86	8,911.42
2 Motormen	12	"	10,350.08	1,531.81	11,881.89
3 Switchmen	12	"	15,525.12	2,297.72	17,822.84
5 Mechanics	18	176	43,929.60	6,501.58	50,431.18
4 "	4	"	7,808.20	1,155.61	8,963.81
2 Watchmen	18	143	14,277.12	799.52	15,076.64
2 Carpenters Framers	18	176	17,571.84	1,194.89	18,766.73
2 Carpenter Helpers	18	145 ½	14,526.72	987.82	15,514.54

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

THE EXPLORATION (continued)

ITEM 23 a) (continued)

Item (a)	Total Months	Hourly Rate	Total Wages	Payroll Taxes	
1 Surface Laborer	18	145 ½	$ 7,263.36	$ 406.75	$ 7,670.11
1 Truck Driver	18	155 ½	7,762.56	605.48	8,368.04
1 Cat Skinner	18	180 ½	9,010.56	702.82	9,713.38
2 Warehousemen	18	176	17,571.84	1,019.67	18,591.51
1 Bookkeeper	18	"	8,785.92	386.58	9,172.50
2 Typists	18	155 ½	15,525.12	683.11	16,208.23
6 Diesel Oper.	18	176	52,715.52	3,848.23	56,563.75
* Bonus Payments for Drifting Contracts			20,000.00	2,960.00	22,960.00
			$577,857.90	$71,736.25	$649,594.15

Item b) Supervision by numbers and positions w/salary.

1 Manager	18	2/3 Time	$15,000/yr	$22,500	$3,330.00	$ 25,830.00
1 Gen'l. Sup't.	18	Full T.	12,000/yr	18,000	2,664.00	20,664.00
1 Mine Sup't.	18	" "	600/mo	10,800	1,598.40	12,398.40
1 Mine Foreman	18	" "	500/mo	9,000	1,332.00	10,332.00
1 Engineer	18	" "	425/mo	7,650	1,132.20	8,782.20
1 Master Mechanic	18	" "	500/mo	9,000	1,332.00	10,332.00
1 Surface Fore.	18	" "	450/mo	8,100	1,198.80	9,298.80
1 Accountant	18	" "	525/mo	9,450	1,398.60	10,848.60
				$94,500	$13,986.00	$108,486.00

Item c) Cost of Necessary Repairs

Recondition Station Pump Motors (6 Motors)	$ 15,000.00
" " " Starters (8 Starters)	8,000.00

THE EXPLORATION (continued)

ITEM 23 c) (continued)

Recondition Station Pump Disconnecting Switches ($)	$ 2,000.00
Recondition Mine Machinery & Electrical Equipment at present on 2250 Level	25,000.00
	$ 50,000.00
d) Re-habilitate Trailer Camp	$ 10,000.00
e) Cost of Items of Equipment	
2 1000 KW Diesel Electric Generator Sets	$ 300,000.00
3 Byron Jackson 5 KW 6 Stage Submersible Pumps Complete w/cable, etc.	75,000.00
6 Byron Jackson 6 x 8 x 12 Station Pumps	21,000.00
1 Single Drum Hoist	15,000.00
1 Mancha Little Trammer	3,500.00
1 Mancha Little Trammer Batteries w/Boxes	2,500.00
1 3 KW Battery Charger	1,000.00
4 Starters Hib OR 7051 - 350 HP	12,800.00
10 400 Amp Disconnecting Switches #LCB1305472	7,000.00
5 Coppus MTG - 25 HP Fans	4,000.00
3 150 KVA Underground Transformers	4,500.00
8 47 cuft. Card Rocker Dump Mine Cars	6,000.00
4 7 1/2 KVA Lighting Transformers	1,000.00
1 Byron Jackson 5 KW Low Lift Pump	2,000.00
1 Byron Jackson Spare Motor for Submersible Pump	10,000.00
4 450 HP Station Pump Motors	21,000.00
4 Radiators for G.M.C. Diesel Engines	16,000.00
3 Water Doors	10,500.00
	$ 512,800.00
f) Rotary Drill Rig	$ 120,000.00

THE EXPLORATION (continued)

ITEM 23 (continued)

G) Intention of company is to put up their existing equipment as shown under Item 14.

h) Cost of Materials & Supplies

3000 Ft. 18" Ventilation Pipe	$ 12,000.00
2000 Ft. 18" Well Caping	20,000.00
600 Ft. 12" Std. Pipe	4,800.00
4200 Ft. 10" Std. Pipe	27,300.00
2000 Ft. 6" Std. Pipe	7,000.00
2000 Ft. 4" Std. Pipe	5,000.00
Pipe Couplings and Fittings	20,000.00
380,000 Lbs. Structural Steel	38,000.00
46,000 Lbs. 35# Mine Rail	3,500.00
Track Bolt, Spikes, and Ties	2,500.00
Cement, Sand, Gravel and Reinforcing Steel	5,000.00
200,000 Bdft. Mine Timber	24,000.00
650 Boxes Blasting Powder	6,500.00
Necessary Electric Caps, Etc.	2,500.00
Rotary Rig Supplies- Propane, Bits, Fluids, Etc.	25,000.00
7,000,000 Gals. Fuel Oil	840,000.00
12,000 Gals. Lub. Oil	8,400.00
Diesel Replacement Parts	90,000.00
Gasoline, Greases and Automotive Supplies	6,000.00
2,000' 3/3/0 Armored Cable Deep Well	9,000.00
5,000 3/3/0 Armored Cable Station Pump	22,500.00
2,000 3/0/3 Cond. 600 V R.C. Cable	5,000.00

THE EXPLORATION (continued)

ITEM 23 h) (continued)

Miscellaneous Electric Supplies	$ 36,000.00
Hardware - Nails, Small Tools	7,200.00
Air, Water and Suction Hose	4,500.00
Drill Steel and Drill Parts	10,000.00
Shop Supplies Welding and Metals	6,000.00
Hoisting Cable, Wire Rope, Etc.	4,000.00
Pump Replacement Parts	27,000.00
	$1,278,700.00

i) Cost of Other Items Not Included Above

Fire Insurance	$ 18,000.00
Property Taxes	15,000.00
	$ 33,000.00

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

EXPLORATION (continued)

ITEM 24

First 6 months

Rehabilitate power plant

Rehabilitate trailer camp.

Rehabilitate and install shaft pump.

Install motors and starters on 800 level pump station, sufficient to pump approx. 7000 G.P.M.

Drive 50' drift on 1200 level for sump space.

Install 3 6x8x12 Byron Jackson station pumps on 1200 level (capacity 2400 G.P.M., 500' head), motors, cables, starters and miscellaneous electrical equipment.

Finish 800 pump station for 2 additional 4-GT pumps and install (125 cu. yds. excavation). Drill 24" rotary hole, install casing. Drive 250' drift to rotary hole. Cut pump station at rotary hole (400 cu. yds.) Install hoist and pumps, 10" discharge line to Fad 800 pump station and necessary electrical equipment.

Finish construction on power house to accomodate 2 1000 K.W. Generating Units.

Volume of water expected to be pumped during this period - 1,800,000,000 gals. (This amount of pumping expected to unwater shaft below 1700 level).

MONEY TO ACCOMPLISH THIS WORK

Labor	$ 162,415.00
Supervision	36,162.00
Rehabilitate Trailer Camp	10,000.00
New Equipment	212,800.00
Rotary Rig Rental	120,000.00
Down Payment on 2 1000 KW Gen. Units	150,000.00
Supplies	439,178.33
Other Items	11,000.00
	$1,141,555.33

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

EXPLORATION (continued)

ITEM 24 (continued)

Second 6 months.

Rehabilitate 1700 level.

Remove and repair electrical equipment from 1700 level.

Install 3 6x8x12 Byron Jackson station pumps, motors, starters, cables and miscellaneous electrical equipment.

Install ventilating fans.

Drive 700' drift on 1700 level to help drain upper section. Put in water door.

Install 3 motors, starters, etc. on installed 4GT pumps on 1700 level.

Install 2 1000 KW generating units.

Start pumping from rotary hole.

Rehabilitate 2000 level.

Install ventilation lines between 1700 and 2000 levels.

Volume of water expected to be pumped during this period- 2,073,600,000 gals. Total for first 12 months - 3,873,600,000 gals.

MONEY TO ACCOMPLISH THIS WORK

Labor	$ 237,267.81
Supervision	36,162.00
Recondition motors, etc. 1700 level.	25,000.00
Final payment & installation of 2 1000 KW Generators	150,000.00
Supplies	517,178.33
Other Items	11,000.00
TOTAL	$ 976,608.14

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

EXPLORATION (continued)

ITEM 24 (continued)

Third 6 months.

Pump down to 2250 level.

Rehabilitate 2250 level.

Cut station for permanent Byron Jackson submersible pumps and install (220 cu. yds.).

Finish excavation for 2250 sump. Build settling ponds and dams.

Excavate sump for low lift pumps.

Clean out shaft below 2250 level and install pump.

Clean and repair mining machinery & electrical equipment from 2250 level.

Drive 1000' drift for exploration.

Put in water doors.

Install discharge lines and ventilation lines.

Volume of water expected to be pumped during this period - 2,332,8000,000 gals. Total for 18 month period - 6,206,400,000 gals.

MONEY TO ACCOMPLISH THIS WORK

Labor	$ 249,911.34
Supervision	36,162.00
Recondition Equipment on 2250 level.	25,000.00
Supplies	322,343.34
Other Items	11,000.00
TOTAL	$ 644,416.68

EXPLORATION (continued)

ITEM 2A (continued)

SUMMARY - TIME SCHEDULE

First 6 months	-	$ 1,141,555.33
Second 6 months		976,608.14
Third 6 months	-	644,416.68
SUB-TOTAL		$ 2,762,580.15
Contingencies for Overall program approximately 15 per cent		437,419.85
GRAND TOTAL COST		$ 3,200,000.00

EXHIBIT A

Eureka Corpor tion Limited
Eureka, Nevada

MAIN LEASE AGREEMENT

RICHMOND-EUREKA MINING CO. GROUND

SCHEDULE A

Eureka Corper tion Limited
Richmond-Eureka Mine
Eureka, Nevada

THIS INDENTURE OF LEASE, MADE THIS 30th day of June 1937, by and between RICHMOND-EUREKA MINING COMPANY, a corpor tion organized and existing under the laws of the State of Maine, Lessor, nd N. F. James, of Toronto, in the Province of Ontario and Dominion of Canada, Lessee,

WITNESSETH:

THAT for and in consideration of the rental and royalties hereinafter mentioned, and the mutual and reciprocal covenants and undertakings of the parties hereto, the Lessor demises and lets to the Lessee, and the Lessee leases and takes from the Lessor, upon the terms and conditi ns hereinafter set forth, all the right, title, and interest of the Lessor in and to the mining properties, claims and rights more particularly set forth and described in Schedule A hereto annexed, which is hereby made part of the le se; together with all and singular the rights and appurtenances thereunto belonging.

TO HAVE AND TO HOLD for the period or term of twenty-five (25) years from the date hereof, expiring at noon on the 30th day of June 1962, unless sooner terminated in the manner and upon the conditions hereinafter set forth.

YIELDING AND PAYING therefor, as rental and royalty, a sum equal to fifteen percent (15%) of the net mill, smelter or reduction plant returns before deduction of freight and/or transportation charges from the mine to the mill, smelter or reduction plant; and in the event the Lessee should construct or acquire a mill, smelter or reduction plant and treat therein ores mined under this le se, the net mill, smelter or reduction plant returns as specified herein shall be

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

equal to the best price obtainable if such ores were shipped to mills, smelters or reduction plants in the Salt Lake Valley, Utah; and the Lessee agrees that in case of all shipments of ore, concentrates and mill products, the Lessee will advise the mill, smelter or reduction plant in writing that fifteen(15%) of the net payment therefor before deduction of freight and/or transportation charges is to be paid direct by said mill, smelter or reduction plant, to the Lessor, at Room 1012, Newhouse Building, Salt Lake City, Utah: such payment to be accompanied by smelter, mill or reduction plant settlement sheets covering the shipments; a copy of the Lessee's letter directing the smelter, mill or reduction plant to make settlement as aforesaid, to be promptly furnished to the Lessor; also a copy of the contract or contracts, and schedule or schedules under which treatment or reduction of the ore concentrates or mill products are shipped to be furnished to the Lessor. Books and records shall be properly kept by the Lessee, open at all reasonable times to the inspection of the Lessor, its officers and appointees.

In addition to the rental and royalty aforesaid, a primary consideration and object of this lease is to provide for and to secure the performance of certain exploration and development work calculated to discover, locate, develop and make possible the mining of a faulted segment of ore which it is believed may exist at considerable depth; consequently the continuance of this lease is made dependent upon the continuous prosecution of the work calculated to attain this object; and while the Lessee takes over, under lease, the entire property, with the right to work and mine any part thereof, it is expressly understood that work done in the old mines or upper workings, or elsewhere on the property, for the purpose of

finding and mining ore therefrom, shall not in any degree relieve the Lessee from his obligation to do continuous work and make continuous progress, in the manner and to the extent herein set forth, in the search for the above-mentioned faulted segment of ore, which is as aforesaid, a primary object of this lease.

With this understanding of the objects of the lease, the Lessee covenants and agrees as follows:

1. To enter into possession of the demised premises forthwith, and within sixty (60) days from the date hereof to begin the actual work of prospecting the demised premises by diamond, rotary or churn drilling, such work to be continuous and to amount to at least fifty (50) daily drill shifts of eight hours each in each calendar month, beginning with the month next following the date of starting such drilling, and to continue until June 1, 1938, except as hereinafter provided. This drilling may be carried on either on the demised premises or on other property owned or controlled by Lessee and within one-half (½) mile of the demised premises, if in the opinion of the Lessee drill prospecting of the demised premises can best be carried on by drilling from points outside of but adjacent to the demised premises.

The Lessee may at any time notify the Lessor in writing that he has completed the amount of drilling he desires to do prior to starting the shaft work hereinafter provided for, in which event he shall be released from the obligation of doing any further drilling. The Lessee may nevertheless, if he so desires, do additional drilling.

2. On or before June 1, 1938, or within thirty (30) days after Lessee has given written notice to the Lessor that he has completed the amount of drilling he desires to do before starting shaft work as herein provided, whichever of those dates shall be the earlier, the Lessee shall begin the actual work of sinking a deep shaft upon the leased property at such place as he may select, which shaft shall have three (3) compartments of the following dimensions, to wit:

Two (2) hoisting compartments, each not less than 4 ft. x 5 ft. inside dimensions in the clear;

Also One (1) pump and man-way compartment not less than 5 ft. x 5 ft. inside dimensions in the clear;

And the Lessee agrees to prosecute and carry on the actual physical work of sinking said shaft continuously by causing to be done or performed therein or thereon, and for the purpose of accomplishing the actual sinking thereof, a minimum of six hundred and thirty (630) 8-hour shifts of mining labor per month; a shift of mining labor for the purpose hereof being defined as the labor of one (1) employee within and for the benefit of said shaft for the period of eight (8) hours of each twenty-four (24) hours.

3. It is further agreed that during the period of this lease, the shaft and workings herein provided for shall be solely for the use and benefit of the property leased, included within the exterior boundaries of the leased premises or controlled by any extralateral rights pertaining thereto, and that during the period of this lease, except with the consent in writing of the Lessor first had and obtained, no ore, waste, or other material shall be hoisted through this shaft, or transported through workings connected therewith, except such as may have originated within the boundaries of the leased property or be controlled by the aforesaid extralateral rights.

4. The Lessee further agrees, this lease continuing in force, that the work of sinking and constructing the shaft above-described shall be carried on continuously until a depth of at least twenty-five hundred (2500) feet certically below the collar of said shaft shall have been attained, or until the faulted segment of ore for which search is being made shall have been located and made available for mining before the shaft has reached the depth of twenty-five hundred (2500) feet above-mentioned; and the Lessee agrees that upon reaching the depth of twenty-five hundred (2500) feet above-mentioned, or upon locating the ore sought for at a lessor depth, he will continue to use at least the number of shifts of mining labor above-mentioned for the

continuous prosectuion of development work according to such plans as he may in good faith adopt and until commercial ore is developed and ready for shipment which both the Lessor and the Lessee agree is the ore sought for, to wit: the faulted segment of the Richmond-Eureka ore body; and thereafter the development, mining and shipment of products shall be carried on with regularity and in the continuous and reasonable course of business.

Failure or interruption in the continuous performance of drilling, shaft sinking and development, mining and shipment of products as hereinbefore provided, unless excused by force majeure reasons hereinafter stated, shall give the lessor the right to cancel and terminate this lease. In such case the Lessor shall give to the Lessee written notice of cancellation to take effect within thirty (30) days from the date of said notice; and if within the thirty (30) days the Lessee shall not resume the work called for under the lease, and continue the same in good faith as herein provided, the lease shall, upon expiration of the thirty (30) days' notice, be terminated, and the leased property shall be thereupon surrendered to the Lessor.

In case of any other violation or breach of the terms of this lease, the Lessor may give the Lessee written notice of such violation or breach, and if the violation or breach is not cured or corrected within thirty (30) days after giving said notice, the Lessor may declare the lease terminated, and the lease shall thereupon be terminated and the property surrendered to the Lessor. Any failure to give notice in case of violation or breach shall not be considered a waiver of any such violation or breach, or of any violation or breach of like character. It is also agreed that the Lessee may at any time, upon thirty (30) days written notice, surrender

the lease and thereupon the lease shall become terminated.

5. If the Lessee shall be delayed, interrupted or prevented from carrying on the work continuously, as herein provided, by acts of God, strikes, fire, breakage of machinery, interruption of, or delays in, transportation, injunction, governmental demands, regulations or requirements, destruction by the elements, or other matters or things beyond his reasonable control, then the Lessee for the time being shall be excused for failure of continuous performance during the time he was so prevented and delayed, and this lease shall be extended for a period equal to the period or periods of delay above-mentioned; and if after commercial ore is developed and ready for shipment, regular shipments and sale of products in the continuous and reasonable course of business shall be interfered with, interrupted or prevented by any of the above-mentioned causes, or if by reason of financial crises, or market conditions, regular shipments in the continuous and reasonable course of business and sale of products cannot be made without financial loss or serious hardship, then likewise the Lessee shall for the time being be excused for failure to make regular shipments as aforesaid for the period of prevention and delay, and the Lease shall be extended for a like period; PROVIDED, HOWEVER, that if there shall be, in any of the cases hereinbefore stated, interruption of continuous performance of work or of shipments and sale at any time for a period of six (6) months, then the Lessor may at its option by written notice to the Lessee, terminate the Lease, anything herein to the contrary notwithstanding.

6. The Lessee agrees that in the event of the cancellation of this lease through violation of any of its provisions, or upon voluntary surrender of the same by the Lessee, the Lessee will for thirty (30) days thereafter, at his sole expense, continue pumping waters flowing into said

shaft or workings therefrom, to the extent that said shaft and working therefrom shall be kept free from all water, except under conditions beyond Lessee's reasonable control.

7. The Lessee covenants and agrees that all work of exploration, development and mining, shall be carried on in a high-class, systematic and minerlike manner, consistent in all respects with good mining; that all shafts, levels, drifts, raises and other openings used by the Lessee within the demised premises, shall be maintained in at least as good condition as they are at present, and that the new shaft hereinbefore provided for, and all drifts, crosscuts, raises, and all workings connected therewith, or having to do with the new development work at depth, shall be constructed and done in a minerlike manner, in accordance with the usual requirements of good and permanent mining development, and shall be left, at the termination of the lease, in such shape that they are accessible and available for further work.

8. The Lessee agrees, upon taking possession, to post, and to keep so posted thereafter as long as he may be in possession, in conspicuous places on the demised premises, such notices as may be necessary and adequate under the laws of Nevada to quickly notify all persons who may come within or upon the demised premises, that said mining property is held by the Lessee under lease from the Lessor, and that the Lessee, and not the Lessor, is liable for all labor performed and supplies and materials of any and all character used by the Lessee in and upon the demised premises, and that the Lessee is, and will be, solely responsible for all debts and expenses incurred in the mining operations within or upon said demised premises.

9. The Lessee agrees that he will hold the Lessor harmless

and fully indemnified against all claims and demands of any kind or nature which may be made upon the Lessor or against the demised premises for or on account of any debts or expenses contracted or incurred by the Lessee, or for personal injury or property damage, or for on on account of any acts or omissions by the Lessee, his agents and servants; and he will assume and discharge all liability, claims, demands, causes of action, cost and expenses of whatsoever nature arising out of the use or operation of said demised premises by himself, his servants or agents, or other persons having business with them or any of them, and that he will comply in all respects with the laws of the State of Nevada with reference to the Workmen's Compensation Insurance or Employer's Liability, and all other laws or statutes of any Governmental authority, whether Federal, State or County, affecting his operations of said demised premises.

10. The Lessee shall, during the continuance of this lease, do all assessment work upon said property necessary to maintain the title thereto, and shall carry such insurance against fire and other risks as is customary under similar circumstances; the insurance to be payable, in case of loss, to the Lessor and/or the Lessee, as their interests may appear.

11. The Lessee agrees that he will pay any and all general taxes that may be assessed and levied upon said leased premises and upon any personal property thereon or therein, and upon any personal property that the Lessee may later place thereon or therein incidental to his operations, for each year or fraction thereof that this lease remains in effect. The Lessee also agrees to pay all social security, unemployment insurance or other pay-roll taxes, imposts and charges levied by the Federal, State or other taxing authority, and all income, net proceeds and profit taxes that may be assessed against the Lessee's operation or

shipments resulting therefrom by the United States, the State of Nevada, or other taxing authority; and if this lease should be terminated by forfeiture, surrender, cancellation or otherwise during any taxable period, then the Lessee will pay such proportion of the taxes that may be levied covering such period as may be equal to the proportionate period during which the Lessee holds and occupies the leased premises.

12. The Lessee shall at all times keep accurate maps, records and plans of all drilling, exploration, development and mining work, and full and complete records of assays, recoveries, returns, and other matters pertaining to the operation of the property, all of which maps, plans and records shall be open at all reasonable times to the inspection of the Lessor, its officers and appointees; and at the expiration or earlier termination of the lease, all such maps, plans, records, etc., or full, true and complete copies thereof, shall be delivered to the Lessor, and shall be the property of the Lessor.

13. The Lessee agrees that the Lessor, its representatives or agents, may have access at any time and all times that will not seriously interfere with the work of the Lessee, to the premises, to all exploration or mine workings existent therein, and to all workings that may be prosecuted by the Lessee during his occupancy of the leased premises.

The Lessor further expressly reserves unto itself the right and privelege at any time to enter any of the workings of the Lessee, and at any point therein or thereon prosecute such development, drive such drifts, raises, corsscuts, winzes, sub-levels, shafts and other workings which the Lessor may deem necessary or advisable to prove ownership in and to any veins, ores, ore-bodies, fault veins, and mineralized areas that may originate within the property at any time included under this lease; any work prosecuted by the

Lessor as aforesaid to be performed in such manner as to offer the least possible inconvenience to the Lessee; but the Lessee agrees to afford the Lessor every reasonable use of workings and equipment to aid the Lessor in the accomplishment of the aforesaid work; and it is agreed by the parties hereto that the Lessor, as well as the Lessee, shall have the right to assert, prosecute and defend any and all extralateral rights to dips, spurs, angles and any ore-bodies, veins or broad lodes that may apex within the property at any time included in the leased property under this lease.

14. The Lessor is putting under this lease all of its claims, patented and unpatented, some of them not connected with the main body of the property. It is also including under the lease town lots, mill sites, and all other property and equipment. It is expressly understood, however, that the Lessor makes no warranty of title to said property.

15. The Lessee agrees at the termination of this lease, whether through expiration of the term thereof, cancellation, forfeiture or surrender, that he will deliver up to Lessor the leased premises, with all appurtenances, shafts, tunnels, levels and other workings, and all improvements thereon, and therein, in good order and condition, and also will deliver up and surrender as part of the leased property, all works, structures and material attached to the realty which constitute part of said mines and mining property, including pipes, rails, conduits and their fastenings, together with all shaft appurtenances and equipment, including head frames complete, and like structures, and all ore developed and in place, or broken ore in or upon the property. For a period of ninety (90) days after the termination date of the lease the Lessor shall have the privelege of purchasing from the Lessee, at a price to be mutually agreed upon, any personal property owned by the Lessee in the nature of equipment, machinery, tools

and appliances that have been placed upon the premises by the Lessee during the period of the lease and not attached so as to be part of the realty. If the Lessor fails to purchase the equipment and personal property abovementioned within the ninety (90) days specified, then the Lessee shall have an additional period of six (6) months from the date of notification that the Lessor will not purchase, to remove such personal property and equipment as the Lessee may be entitled to remove, as hereinbefore provided, and in the event the Lessee fails to remove said personal property from said leased premises within the period of six (6) months aforesaid, title thereto shall be vested in the Lessor.

16. If this lease shall continue in effect throughout the term thereof, as hereinbefore stated, and shall be in effect up to the date fixed for termination thereof, then the Lessee, upon giving notice in writing to the Lessor at least six (6) months before the date hereinbefore fixed for termination of the lease, shall be entitled to an extension of the lease for a further period of fifteen (15) years, upon the same terms and conditions as are herein contained.

17. The Lessee agrees that he will not assign this lease or any part thereof, or sublet the leased premises or any part thereof, without first obtaining the written consent of the Lessor.

18. All notices called for to be given under this agreement shall be in writing, and until otherwise designated by the respective parties, notice to Richmond-Eureka Mining Company shall be delivered to that company care of C. A. Hight, President, No. 75 Federal Street, Boston, Massachusetts, and notice to James shall be delivered addressed to him at the office of Ventures Limited, Bank of Commerce Building, King Street, City of Toronto, Province of Ontario, Canada.

IN WITNESS WHEREOF, RICHMOND-EUREKA MINING COMPANY has hereunto

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

set its corporate name and seal by its President thereunto duly authorized, and said James has hereunto set his name and seal on the day and year first herein-above written.

Attest:
"George Mixten", (Signed)
Secretary

SEAL-Richmond-Eureka
Mining Company

RICHMOND-EUREKA MINING COMPANY,

By "C. A. Hight" (Signed)
President

"W. F. James" (Signed) SEAL

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

Commonwealth of Massachusetts, County of Suffolk - ss.

On this 30th day of June, A. D. 1937, personally appeared before me, Philip E. Coyle, a notary public in and for said Commonwealth of Massachusetts, C. A. HIGHT, known to me to be the president of the RICHMOND-EUREKA MINING COMPANY, the corporation that executed the foregoing instrument, and upon oath did depose that he is the officer of said corporation as above designated; that he is acquainted with the seal of said corporation and that the seal affixed to said instrument is the corporate seal of said corporation; that the signatures to said instrument were made by officers of said corporation as indicated after said signatures; and that the said corporation executed the said instrument freely and voluntarily and for the uses and purposes therein mentioned.

In witness whereof, I have hereunto set my hand and affixed my official seal at my office in the county of Suffolk, the day and year in this certificate first above written.

"Philip E. Coyle" (Signed)

Notary Public in and for the
Commonwealth of Massachusetts

SEAL

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

SCHEDULE "A"A

RICHMOND-EUREKA PROPERTY

EUREKA MINING DISTRICT, EUREKA COUNTY, NEVADA

PATENTED CLAIMS

NAME OF CLAIMS	Survey or Lot No.
At Last	47
Atlantic	2854
Ant Arctic	2855
Arctic	2857
Albion No. 1	2860
Albion No. 2	2861
Albion No. 3	2862
Albion Consolidated	2863
Apex	2865
Acouchment	2866
Buckeye	37
Brown	87
Buckeye Millsite	113
Brown Millsite	139
Big T. R.	2871
Champion	38
Calloway	57
Carson	68
Champion Millsite	114
Carson Mill Site	137
Cliff Mine	2856
Diagonal	200
Davies	230
Davies No. 2	231
Fries	308
Frank	309
Fad	3223
Great Eastern	165
Grand Central	174
Gulch	2872
Honeymoon Am'd.	2868
Hoosac	60
Lookout	43
Lupita	49A
Lucky Man	2852
La Veta	2873
Momoth	41
Marcelina East	119
Main Shaft	2864

Eureka Corpor tion Limited
Richmond-Eureka Mine
Eureka, Nevada

Marriage Am'd	2867
Nuget	46
Porter	86
Porter Mill Site	138
Price	228
Price No. 2	229
Peach	2869
Richmond	64
Richmond Rancho	211
Rearguard	225A
Rearguard M. S.	225B
Ravine	2858
Remnants	3252
Sentinel	40
Savage	42
Skylark	56
St. George	66
Surplus	85
Surplus Mill Site	141
Silver Region	160
Skylark Mill Site	214
Sea King	240
St. Patrick	241A
St. Patrick Mill Site	241B
St. Andrew	242A
St. Andrew Mill Site	242B
St. David	2859
Tip Top	65
T. R.	2870
Victoria	161
Williamsburg	117

UNPATENTED CLAIMS

Richmond Eureka Number 2
Richmond Eureka Number 3 Amended
Richmond Eureka Number 4
Richmond Eureka Numbers 6 to 25 both inclusive.

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

In Eureka Town Site

Lot 90	Block 108
" 91	" 109
" 92	" 110
" 93	" 111
" 96	" 112
" 48B	" 114
" 49B	" 116
All of City Block	115
Lot 5	" 9
" 6	" 9
" 7	" 9
" 8	" 9
" 9	" 9
" 11	" 17
" 12	" 17
" 42	" 7
" 43	" 7
All of	" 8
Lot 6	" 29
" 9	" 28

COLE - WITTENBERG GROUND

TRANSFER OF TITLE TO

RICHMOND-EUREKA MINING CO.

C O P Y

AGREEMENT made this 30th day of June, 1937, between RICHMOND-EUREKA MINING COMPANY, a corporation of the State of Maine, Party of the first part, and WILLIAM F. JAMES, of the city of Toronto, Province of Ontario, Dominion of Canada, party of the second part, WITNESSETH:

THAT WHEREAS under date of June 30th 1937, the Richmond-Eureka Mining Company leased to James certain property situated in the Eureka Mining District, Eureka County, State of Nevada, the said properties and the terms, conditions and purposes of said lease and the rentals thereunder being all set forth and described in said lease, to which reference is hereby made; and

WHEREAS to insure against any dispute as to ownership of ore which may be discovered within or beyond the limits of the leased property, also by way of addition to and extension of the property to be operated under the terms of the lease, James, the Lessee, has secured an option from Charles F. Wittenberg and M. W. Burdick, of Tonopah, Nevada, and Thomas F. Cole, of Reno, Nevada, on various patented and unpatented mining claims and other property situated in the Eureka Mining District, Eureka, Nevada, adjoining, on the northerly side thereof, the properties included under said lease; for description of said optioned property reference being hereby made to said option agreement; and

WHEREAS in accordance with the provisions of said option and in support thereof, a deed dated April 12, 1937, has been executed by the optioners above-mentioned, conveying said properties to James, Lessee under said lease, and said deed has been placed in escrow with the First National Bank at Reno at Tonopah, Nevada, to be delivered upon full payment of the purchase price of the property, as provided in said option agreement;

NOW THEREFORE it is agreed by and between the parties hereto as follows:

1. That the option granted by Wittenberg and others to James, hereintofore referred to, shall be held and used, as hereinafter provided, for the benefit and protention of the lease from Richmond-Eureka Mining Company to James, abovementioned, and the property covered by said lease.

2. James agrees that at least thirty (30) days before the due date of each and every purchase price payment under said option, he will notify Richmond-Eureka Mining Company in writing as to whether or not he will make such option payment; and if he makes all payments, thereby completing the purchase of the property, so as to entitle him to delivery of the escrow deed, he will forthwith upon acquiring title to said property convey the same to Richmond-Eureka Mining Company, and Richmond-Eureka Mining Company will place under its lease to James the property so acquired, subject to the terms and conditions thereof, and all rentals payable thereunder, the same to become part of the property leased thereunder; and in such case, the lease to James still continuing in full force and effect, James shall be entitled to reimbursement of the actual payments made by him on account of the purchase of said optioned property; such reimbursement to be made out of the first net proceeds of ore mined from any of the properties included under said lease; no royalties or rentals to be paid nor any other division of net proceeds to be made until reimbursement is fully accomplished as aforesaid.

3. Richmond-Eureka Mining Company does not in any way by this agreement bind itself or agree to make any payments or advances under said option, or assume any obligation or liability thereunder; but it is agreed by and between the parties hereto that if, the lease to James still continuing in force, James elects not to make any payment coming due under the option,

Richmond-Eureka Mining Company may furnish the funds required, if it so elects, and James will cause the payment to be made with funds so furnished; and if the option payments are completed so that delivery of the deed to the optioned property is obtained, the property shall be conveyed to Richmond-Eureka Mining Company and be put under the lease from Richmond-Eureka Mining Company to James, and the parties, to the extent that they have severally made payments on account of the purchase price under said option, shall be reimbursed out of the first net proceeds from ore mined from any of the property under the lease, as hereinbefore provided.

4. If, the lease above-mentioned still continuing in force, neither James nor Richmond-Eureka Mining Company elects to make further payments under said option, then the option shall be surrendered and cancelled, and there shall be no reimbursement to either party out of the net proceeds of the ore for any payments theretofore made by either of them.

5. If James withdraws from and/or surrenders the lease from Richmond-Eureka Mining Company, or if said lease shall be cancelled or terminated for any reason whatsoever, then the Richmond-Eureka Mining Company shall have the right to take over the option and to continue the payments, but James shall not be entitled to any reimbursement for payments theretofore made by him under the option.

6. The option provides, in Paragraph Seventh thereof, that it shall not be assignable without the written consent of the optioners. James assures Richmond-Eureka Mining Company that he has obtained such written consent and hereby agrees and undertakes to procure from the optioners such further written consent as may be necessary to enable him to carry out this agreement and make it in all respects valid and binding.

7. Richmond-Eureka Mining Company has included under its lease to James all its right, title and interest in and to any claims in said Mining District, some of them not connected with the main body of the property. The property leased includes also town lots and mill sites. It may also be desirable to option or acquire other property for the protection of the Richmond-Eureka ore bodies, or for addition to, or extension of, the properties. In this connection the parties agree to take a circle having a radius of two (2) miles or a diameter of four (4) miles, with the centre at the Richmond-shaft, and it is agreed that if either party, before or during the life of said lease, shall have optioned or acquired, or shall option or acquire, any property within this circle, the other party shall forthwith be notified, and within sixty (60) days after notice shall elect whether the option or property is to be held for the benefit of, or included under said lease; and if it is agreed that the option or property shall be held for the benefit of, or included under the said lease, all necessary steps shall be taken by assignment, conveyance or lease, to the end that the option shall be held for the benefit of, or the property placed under said lease, and the party acquiring and paying for the property shall be reimbursed out of the net proceeds of any ore mined from any of the properties included under said lease; no royalties to be paid, and no other division of net proceeds to be made, until reimbursement is made as aforesaid. If upon being notified of an option or purchase by one of the parties, the other party elects against its being included under said lease, then the party acquiring the property or holding the option may acquire or hold it independently for his own account.

8. All notices called for to be given under this agreement shall be in writing, and until otherwise designated by the respective parties, notice to Richmond-Eureka Mining Company shall be delivered to that company care

of C. A. Hight, President, No. 75 Federal Street, Boston, Massachusetts, and notice to James shall be delivered addressed to him at the office of Ventures, Ltd., Bank of Commerce Building, King Street, City of Toronto, Province of Ontario, Canada.

WITNESS the signatures of the parties hereto on the day and year first herein-above written.

ATTEST:

(Signed) George Mixton,
Secretary

RICHMOND-EUREKA MINING COMPANY,

By (Signed) C. A. Hight, Pres.

(Signed) William F. James.

AGREEMENT

This agreement made this 22nd day of June 1949, by and between Richmond-Eureka Mining Company, a corporation organized and existing under the laws of the State of Maine, party of the first part and hereinafter called "Richmond Eureka" and Eureka Corporation Limited, a corporation organized and existing under the laws of the Province of Nova Scotia, Dominion of Canada, party of the second part, and hereinafter called "Eureka Corporation";

WITNESSETH:

That under date of June 30, 1937, Richmond Eureka leased to W. F. James of Toronto, Canada certain mines and mining properties more particularly described or referred to in an Indenture of Lease bearing the last named date; that thereafter with the consent of Richmond Eureka, W. F. James assigned such lease to Eureka Corporation and Eureka Corporation agreed among other things to perform each and every covenant and stipulation in said lease contained to be performed on the part of said W. F. James, and

WHEREAS

Eureka Corporation entered into possession of the leased premises and has performed extensive development work therein but has encountered a flow of water retarding its operations and by reason thereof has not been and is not doing 630 man shifts per month of work, and Eureka Corporation is now obligated to resume such work prior to July 1, 1949, and

WHEREAS

Eureka Corporation has requested of Richmond Eureka that it be granted additional time to complete plans for resumption of work in the leased premises and for the financing thereof and Richmond Eureka is willing

to grant such request upon the terms and subject to the conditions hereinafer set forth;

Now, therefore, by reason of the promises and of the sum of ten dollars to it paid, receipt whereof is hereby acknowledged and of the covents and greements hereinafter contained to be well kept and performed by Eureka Corporation, Richmond-Eureka agrees that during the period of time beginning July 1, 1949 and ending December 31, 1949 it will not exercise any right it may have to cancel or terminate such Indenture of Lease upon any default of Eureka Corporation in the performance of the man shifts of work required to be performed by Eureka Corporation pursuant to the terms of such lease.

And in consideration of the sum of ten dollars to it paid, receipt whereof is hereby acknowledged, and of the promises and agreements of Richmond-Eureka hereinabove contained, Eureka Corporation promises and agrees:

1. That it will proceed diligently with the completion of its plans for the resumption of work in the leased premises including its plans for the financing of such work.

2. That notwithstanding any provision to the contrary in said lease of June 30, 1937 or in any amendment thereto it is expressly agreed that all buildings, structures, improvements, additions, machinery, equipment (including appurtenances, attachments or auxiliary equipment thereto) articles or materials now or hereafter physically annexed or attached to the leased premises or otherwise installed thereon or therein are and shall be part of the realty and title thereto is and shall be vested in Richmond-Eureka and without limiting the generality of the foregoing it is expressly agreed that

the water treatment plant and water storage tanks and water supply system, the lubrication storage building and all fuel storage tanks, the hospital building, the machine shop with all machinery and equipment therein exclusive of small tools, the hoist house with the two hoists and all other machinery and equipment therein, the compressors and compressor plants and air distribution system, the power house with all machinery and equipment therein, including three Worthington Diesel engines with generators, and all switch panels, starting and auxiliary equipment, the substation with transformers and cutouts and attachments, all power lines, change house and equipment therein, the steel sharpening shop building with machinery and equipment therein, the garage, the yard storage platforms and facilities, all tracks, plant heating system, and plant fire protection system, shafts and shaft machinery and equipment including headframes, and idling structures, sheaves, skips and cages, safety doors, chutes, hoisting ropes, air lines, water columns, power cables, and signal systems, blowers, ventilating pipe, station pumps and motors with auxiliary control switches, starters and panels, and all other station machinery and equipment, level sump pumps and main sump pumps

now or hereafter physically annexed or attached to or otherwise installed on or in the leased premises are and shall be the property of Richmond Eureka and shall not be removed from the leased premises during the term of the lease or at any other time except as follows:

a) If Eureka Corporation desires to substitute, in the normal course of operations, new machinery or equipment for similar machinery or equipment previously installed, Eureka Corporation may remove and sell for a fair market price the machinery or equipment so to be replaced, provided that before any such sale, the machinery and equipment to be substituted has been acquired by Eureka Corporation and is either on the leased premises or available for shipment thereto and provided further that Eureka Corporation shall have paid, on the purchase price of the machinery and equipment to be

substituted, an amount at least equal to the amount to be realized from the sale of the machinery and equipment to be removed.

b) With the consent of Richmond-Eureka in writing first had and obtained Eureka Corporation may dispose of other such machinery and equipment for each or other consideration approved in writing by Richmond-Eureka, provided such cash or other consideration is applied to the use and benefit of the leased premises in a manner approved in writing by Richmond-Eureka, but Richmond-Eureka shall be under no obligation to give such consent or approval but shall not arbitrarily withhold the same.

The words "annexed" and "attached" as used herein include, (without limiting the generality of the same) bolting, nailing, screwing, grouting, concreting, or other fastening to the land, buildings, structures, or any portion thereof.

The buildings, structures, improvements, machinery and equipment hereinabove referred to and presently located on or in the leased premises and such substitutions or additions as may be made thereto are and shall be a unit and an integral part of the leased premises and Eureka-Corporation acknowledges that title to all such property is and shall be in Richmond Eureka and such property shall be kept intact as one unit with the leased premises.

IN WITNESS WHEREOF

EXHIBIT "D"

EUREKA CORPORATION LIMITED
Eureka, Nevada

August 11, 1951

Re: Eureka Corporation Limited
Eureka, Nevada
Docket No. DMA-74X

Mr. J. L. Hofflund
General Counsel
Defense Minerals Administration
Washington 25, D. C.

Dear Mr. Hofflund:

Attached please find executed guaranty as suggested in your letter of July 31, 1951 to serve in lieu of Landlord's Subordination Agreement in our application of May 29, 1951 for exploration loan.

Sincerely yours,

EUREKA CORPORATION LIMITED

George W. Mitchell
Vice President & General Manager

GWM/
cc: Dr. Boyd
Thayer Lindsley - Toronto, New York
Paul Zeckhausen
W. S. Hutchinson

G U A R A N T Y

In consideration of the waiver by the United States of America of the requirement of a landlord's subordination agreement as set forth in paragraph 2(b) of the attached Exploration Project Contract between the undersigned and the United States of America, the undersigned hereby guarantees the payment to the United States of America of royalties, as specified in paragraph 15 of said Contract, upon any and all ore discovered or developed as a result of said Contract, which is mined within 10 years from the date of said Contract, whether or not the undersigned has any interest in the property covered by the said Contract or any part in the mining operations at the time said ore is mined. If for any reason the net smelter returns from operations that would be subject under said contract to such payments to the United States of America are not available as a means of measuring the amount of such payment, then the undersigned agrees and undertakes to make such payment according to the best estimates of the amount that can reasonably be made, and in the event of dispute as to such estimate, the undersigned agrees that the determination thereof by either the Administrator of Defense Minerals Administration or by the Director of the United States Bureau of Mines shall be final and binding upon the undersigned; provided, however, that should undersigned, prior to the accrual of any obligation to pay under this guarantee, furnish to the United States the subordination agreement required by paragraph 2(b) of

said contract this covenant shall thereupon become fully satisfied and of no further force or effect.

Dated this 11th day of August 1951

EUREKA CORPORATION LIMITED

_____

Thayer Lindsley
President

EXHIBIT C

EXHIBIT "C"

Eureka Corporation Limited
Eureka, Nevada

F I N A N C I A L S T A T E M E N T

AS OF

APRIL 30, 1951

EUREKA CORPORATION LIMITED

BALANCE SHEET

April 30, 1951

A S S E T S

CURRENT ASSETS:			
On deposit - Canadian banks:	$	$	$
Canadian funds	2,932.30		
U. S. dollar account	312.50	3,244.80	
On deposit and on hand in U.S.		19,782.65	23,027.45
Accounts Receivable		$ 7,742.58	
Accounts Receivable - associated companies		63,457.44	
Loan receivable		9,000.00	80,200.02
Total current assets			$ 103,227.47
INVENTORY - supplies at cost			200,620.23
INVESTMENT AND DEPOSIT:			
Richmond-Eureka Mining Co. stock - 1875 shares at cost		$ 14,155.43	
Deposit - with Nevada Industrial Commission		1,224.99	15,380.42
FIXED ASSETS - (Schedule A-1)			
Mining claims in Nevada - owned outright at cost	$10,000.00		
Less: portion represented by royalty payments charged to deferred development expenses	7,340.29	$ 2,659.71	
Cost of mining claims in Nevada assigned or to be assigned to Richmond-Eureka Mining Company		272,036.60	
Payments on options to purchase mining claims in Nevada		40,700.00	
		$ 315,396.31	
Payments to U.S. Government for option lease on oil, and gas rights in Nye County, Nevada, 2560 acres		1,280.00	
Buildings		333,665.42	
Machinery and equipment		1,349,486.04	
Total fixed assets			1,999,827.77
CAPITALIZED EXPENSES AND DEFERRED CHARGES:			
Deferred development expenses - (schedule A-2)		$4,068,456.58	
Deferred administrative and general expense	$538,653.15		
Less: forgiveness of interest	177,251.30	361,401.85	
Expenditures and advances for outside exploration		11,818.36	
Expenditures for exploring gas and oil rights		1,304.85	
Prepaid insurance and interest		12,847.69	4,455,829.33
Total assets			$ 6,774,885.22

EUREKA CORPORATION LIMITED

LIABILITIES AND CAPITAL

April 30, 1951

CURRENT LIABILITIES:		
Notes payable	$53,947.73	$
Accounts payable - material, supplies expenses at Mine	4,510.10	
Accrued payroll	2,470.90	
Accrued taxes	7,623.23	68,551.96
Payable to associated companies and individuals		107,822.58
Total current liabilities		$ 176,374.54
CAPITAL:		
Capital shares - par value $1.00 Canadian		
Authorized 5,000,000 shares		
Unissued 148,545 shares		
Issued and Outstanding 4,851,455 shares	$4,593,780.91	
Paid-in surplus	2,085,150.69	
Deficit	80,420.92*	6,598,510.68
Total liabilities and capital		$6,774,885.22

EUREKA CORPORATION LIMITED

ANALYSIS OF FIXED ASSETS

April 30, 1951

	Balance Sept. 30, 1950	Additions	Dispositions	Balance Apr. 30, 1951
Mining Claims				
Nevada claims in Nevada owned outright at cost $10,000.00 less portion represented by royalty, $7,340.29, charged to development expense.	$ 2,659.71			$ 2,659.71
Mining claims in Nevada subject to assignment to Richmond Eureka Mining Co. at cost	268,526.41	$ 3,510.19		272,036.60
Payments made on options to purchase mining claims in Nevada.	37,375.00	3,325.00		40,700.00
Total mining claims and options on claims	308,561.12	6,835.19		315,396.31
Land in Eureka, Nevada (non-mining).	3,618.85		$ 3,618.85	
Other Mining Interest	14,200.47		14,200.47	
Non-mining Option Leases		1,280.00		1,280.00
Buildings.	333,321.50	343.92		333,665.42
Equipment - Mining	435,152.12		23,661.46	411,490.67
Facility	934,763.84		15,819.64	918,944.20
Milling	32,011.82		12,960.65	19,051.17
	$2,061,629.73	$ 8,459.11	$ 70,261.07	$1,999,827.77

EUREKA CORPORATION LIMITED

DEFERRED DEVELOPMENT EXPENSE

April 30, 1951

	Balance September 30, 1950	Additions at Cost	Balance April 30, 1951
Mine Development			
Fad Shaft			
Sinking	$ 1,313,985.08	$	$ 1,313,985.08
Station Cutting	772,623.22		772,623.22
Drifting	114,040.45		114,040.45
Raising	8,484.92		8,484.92
Mine Maintenance & Repair	237,126.06	47,344.18	284,470.24
Mine Unwatering	476,685.65		476,685.65
Locan Drift			
Drifting	23,594.24		23,594.24
Other Developments Prior to 1943	119,403.73		119,403.73
Mining Expense Prior to 1942	42,403.17		42,403.17
	$ 3,108,346.52	$ 47,344.18	$ 3,155,690.70
Milling		1,060.42	1,060.42
Diamond & Rotary Drilling	108,332.85	138,040.84	246,373.69
Office & Supervision at Prop.	331,576.19	11,740.85	343,317.04
General Expense at Property	409,546.46	29,263.17	438,809.63
	$ 3,957,802.02	$ 227,449.46	$ 4,185,251.48
Net Return from Ore Prior to 1943 (deduct).	116,794.90		116,794.90
	$ 3,841,007.12	$ 227,449.46	$ 4,068,456.58

EUREKA CORPORATION LIMITED

Loans and Accounts Payable

April 30, 1951

DUE CHEMICAL BANK & TRUST COMPANY	$	$ 50,000.00
DUE ASSOCIATED AND AFFILIATED COMPANIES:		
Frobisher Limited	60,045.46	
Ventures Limited	40,088.22	
Panominas Inc.	3,785.58	
Falconbridge Nickel Mines Limited	2,291.54	
Hoyle Mining Company	1,548.48	
Quebec Lead Smelters Syndicate	63.30	107,822.58
MINE OFFICE:		
Notes Payable	3,947.73	
Accrued Wages	2,470.90	
Accrued Taxes	7,623.23	
Accounts Payable	4,510.10	18,551.96
Total		$ 176,374.54

EUREKA CORPORATION LIMITED

TRIAL BALANCE

April 30, 1951

Cash - First National Bank of Nevada		$ 16,684.93	
Cash - Special Account - Chemical Bank and Trust Co.		300.00	
Petty Cash Fund		189.94	
Accounts Receivable		71,290.02	
Loans Receivable		9,000.00	
Inventory Supplies		200,620.23	
Cash Deposits - Nev. Ind. etc.		1,224.99	
Mining Claims Owned Outright		2,659.71	
Mining Claims Under R. E. Lease		272,036.60	
Payments Made On Mining Claim Options		40,700.00	
Non-Mining Option Leases		1,280.00	
Buildings & Equipment Previous Years		1,735,249.29	
Buildings	$ 333,321.50		
Equipment	1,401,927.79		
Deferred Development		3,841,007.12	
Diamond & Rotary Drilling	108,332.85		
Mine Development	3,108,346.52		
Gen. Exp. at Property	409,546.46		
Office & Supervision at Prop.	331,576.19		
Less-Net Return from Ore	116,794.90 *		
Deferred Administrative & Gen. Exp.		345,258.79	
Expenditures & Advances for Outside Exploration		11,818.36	
Expenditures for Exploring Oil and Gas Rights		1,304.85	
Prepaid Insurance		12,706.00	
Prepaid Interest		141.69	
Buildings - Current		343.92	
Mining Equipment - Current			$ 23,661.46
Facility " "			15,319.64
Milling " "			12,980.85
Mine Development - Current		47,344.18	
Diamond & Rotary Drilling - Current		138,040.84	
Milling - Current		1,060.42	
Office & Supervision - Current		11,740.85	
General Expense at Prop. - Current		29,263.17	
Deferred Administrative & General - Current		7,356.01	
New York Office Control			6,807,959.12
Deficit		80,420.92	
Accounts Payable			4,510.10
Notes Payable			3,947.73
Payroll Payable			2,470.90
Accrued Taxes			7,623.23
		$ 6,878,952.83	$ 6,878,952.83

EXHIBIT D

EXHIBIT "D"

EUREKA CORPORATION LIMITED
EUREKA, NEVADA

PROPERTY

ALL CLAIMS UNDER CONTROL OF

EUREKA CORPORATION LIMITED

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

EXHIBIT D

6. (b) **PATENTED CLAIMS**

NAME OF CLAIM	LOT OR SURVEY NO.
Acouchment	2866
Apex	2865
At Last	47
Albion No. 1	2860
Albion No. 2	2861
Albion No. 3	2862
Albion Consolidated	2863
Antarctic, (Ant Arctic)	2855
Atlantic	2854
Arctic	2857
Big T. R.	2871
Brown	87
Buckeye	37
Carson	68
Callaway	57
Champion	38
Cliff Mine	2856
Davies	230
Davies No. 2	231
Diagonal	200
Fad	3223
Frank	309
Fries	308
Grand Central	174
Great Eastern	165
Gulch	2872
Honeymoon Amended	2868
La Veta	2873
Look Out	43
Lucky Man	2852
Lupita	49-A
Mammonth	41
Main Shaft	2864
Marriage Amended	2867
Marcelina East	119
Nuget	46
Peach	2869
Porter	86
Price	228
Price No. 2	229
Ravine	2858
Rear Guard	225-A
Remnants	3252
Richmond	64
Richmond Rancho	211

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

EXHIBIT D

6. (b) (Continued) PATENTED CLAIMS

NAME OF CLAIM	LOT OR SURVEY NO.
Alabama	106
Badger	218
Bowman	175
Richmond Ex. No. 4	4686
Connell	190
Central Consolidated	268
Cyanide	4686
Europa Consolidated	176
Fredrika	269
General Lee	120
Little Giant	192
Lone Pine	4686
Macon City	250
Members No. 2	281
Margaretta	1946
Morning Star	249
Monarch No. 2	4686
Monarch No. 3	4686
Oriental and Belmont Consol.	196
Racine	89
Richmond Extension	4686
" Ex. No. 1	4686
" " " 2	4686
" " " 3	4686
" Fraction	4686
Ruby Hill Fraction	4686
Ruby Hill No. 1	4686
" " " 2	4686
Wide West	105
Democrat	310
Green Seal	167-A
Herculean	317
Minerva	292
Silver Lick and Bobbie Burns Consol.	75
Vera Cruz and California Con.	76
Protection	300
Horizontal	316
Silver Bill and Diagonal	255
Western and Winchester	216
Jack and Scanland	217
Isandula	213

Eureka Corporation Limited
Richmond-Eureka Mine
Eureka, Nevada

EXHIBIT D

6. (b) (Continued) PATENTED CLAIMS

NAME OF CLAIM	LOT OR SURVEY NO.
Charter	297
Central Hill	273
Hope Consolidated	206
Maud C	307
Pride of the West	267
Harlem & Eureka Belle Consol.	262
Patroon and Grand Delivery Consol.	261
Belle of the West #2	271
Bullwhacker	51
Holly	122
Silver West	131
Adams & Ferren	116
Jackson	98
Tinnie	195
Wilson	97
Silver Region	160
Savage	42
Sentinel	40
Skylark	56
St. Andrew	242-A
St. David	2859
St. George	66
St. Patrick	241-A
Surplus	85
Tip Top	65
T. R.	2870
Victoria	161
Williamsburg	117
*Hoosac	60
*Sea King	240

MILL SITES

Brown	139
Buckeye	113
Carson	137
Champion	114
Porter	138
Skylark	214
Surplus	141
St. Andrew	242-B
St. Patrick	241-B
Rear Guard	245-B
Lupita	225-B
Triangle	49-B
Block-115	48-B

Eureka Corporation Limited
Eureka, Nevada

6. (b) (Continued) EXHIBIT D

MILL SITES

Block - 112	96
Block - 109	91
Block - 108	90
Block - 110	92
Block - 117	93
Block - 8	
Block - 29	6
Block - 28	9
Block - 9	5
Block - 7	42
Block - 17	11, 12

* Are not on map. These patents are south of property shown on map.

6. (c) UNPATENTED CLAIMS

NAME OF CLAIM	LOCATED DATE	RECORDED DATE	RECORDED BOOK PAGE	AMENDED LOCATION RECORDED DATE	AMENDED LOCATION RECORDED BOOK PAGE
Adams Hill Extension	12/17/25	1/20/26	J 490	8/21/45	K 337
" " Ext. #1	12/25/25	"	J 490	"	K 331
" " Ext. #2	12/17/25	"	J 491	"	K 342
" " Ext. #3	12/17/25	"	J 491	"	K 331
" " Ext. #4	12/16/25	1/14/26	J 482	(1/25/26	J 505)
				(8 3/45	K 326)
				(1/25/26	J 506)
" " Ext. #5	12/17/25	"	J 482	(8/3/45	K 327)
				(1/25/26	J 507)
" " Ext. #6	"	"	J 482	(8/3/45	K 327)
				(1/25/26	J 507)
" " Ext. #7	"	"	J 483	(8/3/45	K 328)
				(1/25/26	J 508)
" " Ext. #8	"	"	J 483	(8/2/45	K 324)
" " Ext. #9	"	1/28/26	J 492	8/2/45	K 325
" " Ext. #10	3/31/26	6/14/26	K 4	8/21/45	K 330
				(6/14/26	J 546)
Adams Hill Fraction	11/25/25	1/28/26	J 515	(6/30/27	K 64)
				(8/24/45	K 324)
		(11/11/25	J 468		
Adams Hill Apex	10/30/25	1/22/26	J 493	6/14/26	J 546
Alpha Extension	7/1/36	8/4/36	K 255	11/21/45	K 393

Eureka Corporation Limited
Eureka, Nevada

6. (c) (Continued)

EXHIBIT D

UNPATENTED CLAIMS

NAME OF CLAIM	LOCATED DATE	RECORDED DATE	RECORDED BOOK PAGE	AMENDED LOCATION RECORDED DATE	AMENDED LOCATION RECORDED BOOK PAGE
Alpha Extension #2	7/1/36	8/4/36	K 256	11/21/45	K 393
" " #3	"	"	K 256	"	K 394
" " #4	"	"	K 257	"	K 394
" " #5	"	"	K 257	"	K 395
" " #6	"	"	K 258	"	K 395
" " #7	"	"	K 258	"	K 396
Altoona	11/12/1878	11/18/1878	K 263	11/21/1878	F 268
Ann Fraction	6/22/42	6/29/42	K 291		
Auro Fraction	12/8/25	6/4/26	J 533	8/21/45	K 336
B-B	6/22/26	6/22/26	K 7	(1/ 1/26	K 21)
				(8/10/26	K 24)
				(6/29/42	K 292)
Badger Extension	3/26/27	6/11/27	K 60	8/24/45	K 344
Cedar Tree	12/30/25	1/27/26	J 514	9/17/45	K 352
Cedar Fraction	4/12/25	6/14/26	K 6	9/17/45	K 352
		(7/1/29	K 153)		
Cub	7/1/29	(9/21/29	K 161)	8/21/45	K 338
		(7/1/29	K 153)		
Cub No. 1	7/1/29	(9/21/29	K 161	"	K 339
		(7/1/25	J 459	"	
Cyanide Extension	7/1/25	(7/25/25	J 461)	8/21/45	K 334
		(7/1/25	J 459	1/21/26	J 494)
" Ext. #1	7/1/25	(7/25/25	J 462	8/21/45	K 335)
	9/14/25	9/14/25	J 465	(1/21/26	J 495)
" " #3	8/29/25			(8/21/45	K 333)
				(1/22/26	K 495
" " #4	10/13/25	11/11/25	J 468	8/21/45	
				(1/22/26	J 496)
" " #5	10/30/25	11/11/25	J 469	(8/21/45	K 332)
" " #6	12/11/25	1/25/26	J 500	8/21/45	K 341
" " #7	12/16/25	1/25/26	J 500	8/1/45	K 318
" " #8	"	1/28/26	J 515	8/1/45	K 319
" " #13	"	1/20/26	J 487	8/2/45	K 319
" " #14	"	"	J 489	"	K 320
" " #16	"	"	J 488	"	K 320
" " #17	"	"	J 485	"	K 321
" " #24	"	1/14/26	J 479	(1/25/26	J 503)
				(8/2/45	K 322)
" " #25	12/16/25	6/14/26	J 547	8/2/45	K 322
				(1/25/26	J 504)
" " #26	"	1/14/26	J 480	(8/2/45	K 323)

Eureka Corporation Limited
Eureka, Nevada

6. (c) (Continued)

EXHIBIT D

UNPATENTED CLAIMS

NAME OF CLAIM	LOCATED DATE	RECORDED DATE	RECORDED BOOK	PAGE	AMENDED LOCATION RECORDED DATE	AMENDED LOCATION RECORDED BOOK	PAGE
Cyanide Ext. #27	12/16/25	1/25/26	J	499	8/2/45	K	324
		(11/11/25	J	489	(1/26/26	J	496)
Cyanide Fraction	10/30/25	(12/7/25	J	470	(8/21/45	K	334)
					(8/14/26	K	31)
December No. 2	12/12/25	1/27/26	J	509	(9/6/45	K	347)
					(3/19/27	K	51)
" " 3	12/18/25	1/25/26	J	498	(9/17/45	K	353)
					(3/19/27	K	52)
" " 4	"	"	J	499	(9/17/45	K	354)
					(3/19/27	K	52)
" " 5	"	1/28/26	J	516	(9/17/45	K	354)
					(3/19/27	K	53)
" " 6	"	"	J	516	(9/17/45	K	355)
					(6/30/27	K	64)
December Fraction	4/10/26	6/1/26	J	530	(10/15/45	K	364)
Democrat Fraction	5/10/26	6/14/26	K	2	9/8/45	K	348
Dodge Fraction	11/30/26	1/22/27	K	37	8/24/45	K	344
		1/1/16	I	185			
East Cyanide	1/1/16	2/3/16	I	188	8/21/45	K	335
Elsie	5/-/25	1/5/26	J	473	9/17/45	K	356
Fox	7/2/36	8/6/36	K	259	11/21/45	K	391
" No. 1	"	"	K	259	"	K	392
" " 2	"	"	K	260	"	K	392
(Recorded Hellon)							
Helen, Hellen	6/4/1891	6/14/1891	G	499			
January	1/10/26	2/15/26	J	519	8/21/45	K	338
		(7/1/29	K	151)			
July	7/1/29	(7/30/29	K	156)	8/21/45	K	339
		(7/1/29	K	152			
July #1	"	(7/30/29	K	157	"	K	340
		(7/1/29	K	152			
July #2	"	(7/30/29	K	157	"	K	341
Little Addie	5/28/26	6/14/26	J	543	6/30/27	K	63
					(7/2/35	K	224
Little Addie Fraction	5/18/26	6/14/26	K	1	(8/24/45	K	345
Lucky Dick	11/5/19	11/17/19	J	57	9/6/45	K	348
					8/14/26	K	30
Lucky Dick Fraction	4/8/20	4/26/20	J	324	(6/29/42	K	293)
Last Fraction	5/7/26	8/10/26	K	26	9/16/45	K	350
May Fraction	5/7/26	5/26/26	J	525	9/6/45	K	350
March Fraction	3/19/26	6/1/26	J	529	8/21/45	K	337
					(8/14/26	K	30
Monarch Fraction	1/15/26	1/27/26	J	509	(9/6/45	K	349)

Eureka Corporation Limited
Eureka, Nevada

6. (c) (Continued)

EXHIBIT A

UNPATENTED CLAIMS

NAME OF CLAIM	LOCATED DATE	RECORDED DATE	RECORDED BOOK	PAGE	AMENDED LOCATION RECORDED DATE	AMENDED LOCATION RECORDED BOOK	PAGE
Mohawk	5/4/14	8/1/14	I	166	6/14/26	J	545
Fraser and Mileono	3/15/1881	3/19/1881	F	471			
		(1/1/16	I	186)			
New Years	1/1/16	(2/3/16	I	189)			
Pine Fraction	2/8/26	5/29/26	J	528			
					(6/30/27	K	64
Red Seal	6/3/26	6/14/26	J	544	(8/24/45	K	343
Sagebrush	12/28/25	1/27/26	J	512	8/3/45	K	325
" #1	"	"	J	512	"	K	326
Stormy Fraction	2/25/26	5/29/26	J	528			
Sunday "	3/7/26	6/12/26	J	539	8/20/45	K	330
Windy "	3/27/26	6/1/26	J	530			
Boom	2/17/45	5/1/45	K	297	10/15/45	K	359
Boom #1	"	"	K	297	"	K	360
Boom #2	"	"	K	298	"	K	361
Boom #3	"	"	K	299	"	K	361
Bullwhacker No. 2	7/1/35	7/2/35	K	223	10/15/45	K	362
" " 3	"	"	K	223	"	K	363
Nelly No. 2	"	"	K	222	"	K	364
" " 3	"	"	K	222	"	K	365
Silver West No. 2	"	"	K	223	"	K	366
Bourbon	9/1/39	9/1/39	K	283	10/15/45	K	362
Rye	9/1/39	"	K	283	"	K	365
Wonder	6/15/45	(6/20/45	K	(310			
		(11/30/45	K	(396	12/8/45	K	398
		(6/20/45	K	311			
Wonder No. 1	"	(11/30/45	K	397)	"	K	399
Jumbo	7/17/22	11/27/22	J	398	12/8/45	K	397
Jumbo No. 3	"	"	J	399	"	K	398
Polly	7/1/28	9/6/28	K	120	5/23/46	K	414
Polly No. 1	"	"	K	121	"	K	415
" " 2	"	"	K	121	"	K	416
Silver Fraction	3/29/45	6/25/45	K	313			
Spring	5/15/45	6/25/45	K	312			
Wave Fraction	5/26/45	8/1/45	K	317			
Wac Fraction	"	"	K	318			
Spar "	6/1/45	8/21/45	K	329			
Zeke "	4/25/46	5/3/46	K	411			
March	3/14/45	6/11/45	K	300			
" No. 1	"	"	K	300			
" " 2	"	"	K	301			
" " 3	3/14/45	6/11/45	K	301			
" " 4	"	"	K	302			
" " 5	"	"	K	302			
" " 6	"	"	K	303			
" " 7	"	"	K	303			
" " 8	3/16/45	"	K	304			
" " 9	"	"	K	304			
" " 10	"	"	K	305			
" " 11	"	"	K	305			

Eureka Corporation Limited
Eureka, Nevada

6. (c) (Continued)

EXHIBIT A

UNPATENTED CLAIMS

NAME OF CLAIM	LOCATED DATE	RECORDED DATE	RECORDED BOOK PAGE	AMENDED LOCATION RECORDED DATE	AMENDED LOCATION RECORDED BOOK PAGE
March Extension	4/28/45	6/11/45	K 306		
" " No. 1	4/28/45	6/11/45	K 306		
Snow	3/28/45	"	K 307		
" No. 1	"	"	K 307		
" No. 2	"	"	K 308		
" No. 3	"	"	K 308		
" No. 4	"	"	K 309		
" No. 5	"	"	K 309		
R-E. No. 2		6/18/36	K 243		
	4/5/36	4/8/36	K 227		
		4/8/36	K 228		
R-E No. 3	4/5/36	6/18/36	K 243	5/15/36	K 239
		4/8/36	K 228		
R-E No. 4	4/5/36	6/18/36	K 244		
		4/8/46	K 229		
R-E No. 6	4/6/36	6/18/36	K 244		
		4/8/36	K 229		
R-E No. 7	4/5/36	6/18/36	K 245		
		4/8/36	K 230		
R-E No. 8	4/5/36	6/18/36	K 245		
		4/18/36	K 230		
R-E No. 9	4/3/36	6/18/36	K 246		
		4/8/36	K 231		
R-E No. 10	4/3/36	6/18/36	K 246		
		4/8/36	K 231		
R-E No. 11	4/6/36	6/18/36	K 247		
		4/8/36	K 232		
R-E No. 12	4/5/36	6/18/36	K 247		
		4/8/36	K 232		
R-E No. 13	4/5/36	6/18/36	K 248		
		4/8/36	K 233		
R-E No. 14	4/3/36	6/18/36	K 248		
		4/8/36	K 233		
R-E No. 15	"	6/18/36	K 249		
		4/8/36	K 234		
R-E No. 16	4/6/36	6/18/36	K 249		
		4/8/36	K 234		
R-E No. 17	4/5/36	6/18/36	K 250		
		4/8/36	K 235		
R-E No. 18	"	6/18/36	K 250		
		4/8/36	K 235		
R-E No. 19	4/3/36	6/18/36	K 251		
		4/8/36	K 236		
R-E No. 20	"	6/18/36	K 251		
		4/8/36	K 236		
R-E No. 21	4/6/36	6/18/36	K 252		
		4/8/36	K 238		
R-E No. 22	4/5/36	6/18/36	K 252		
		4/8/36	K 238		

Eureka Corporation Limited
Eureka, Nevada

6. (c) (Continued)

EXHIBIT A

UNPATENTED CLAIMS

NAME OF CLAIM	LOCATED DATE	RECORDED DATE	RECORDED BOOK PAGE	AMENDED LOCATION RECORDED DATE	AMENDED LOCATION RECORDED BOOK PAGE
R-E No. 23	4/5/36	6/18/36	K 253		
		4/8/36	K 237		
R-E No. 24	4/4/36	6/18/36	K 253		
		4/8/36	K 237		
R-E No. 25	"	6/18/36	K 254		

EXHIBIT F

EXHIBIT "E"

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS
Technical Publication No. 2196
Class I, Mining Technology, September 1947

DISCUSSION OF THIS PAPER IS INVITED. Discussion in writing (2 copies) may be sent to the Secretary, American Institute of Mining and Metallurgical Engineers, 29 West 39th Street, New York 18, N. Y. Unless special arrangement is made, discussion of this paper will close Nov. 15, 1947. Any discussion offered thereafter should preferably be in the form of a new paper.

The Story of Eureka

By William Sharp, Member AIME

(Chicago Meeting, February 1946)

EXHIBIT E

Discovery of new ore in the Eureka district, Nevada, as a result of bold and persistent exploration based on a geologic interpretation of structure has recently aroused wide comment in mining circles. It may therefore be of interest to the profession to have a summary of the historical background and an account of the recent program of development.

The mines of Eureka, discovered in the late 1860's, were the first important silver-lead mines in the United States. They have a production record of more than fifty-one million dollars.[1]

After the ore bodies were apparently bottomed in the 1880's, repeated attempts to find new ore were unsuccessful until 1940, when a diamond-drill hole cut a 40-ft width of sulphide ore 1409 ft below the 841-ft level of the Locan shaft. The next hole cut 30 ft, of ore and three additional holes drilled in 1943 and 1944 showed the ore body to be continuous, Shaft sinking to reach and open up the ore body has been in progress since 1945.

Geology

Stratigraphy

The ore in the Eureka district occurs in a series of Cambrian sediments which is exposed through a thickness of over 6000 ft. The stratigraphic column is as follows:[2]

	Thickness, Ft
Ordovician:	
Pogonip limestone (upper part). Thin bedded limestone with some chert.	
Upper Cambrian:	
Pogonip limestone (lower part). Thin-bedded limestone (with shaly limestone and chert)	425+
Dunderberg shale. Shale (clay and calcareous shale) and thin-bedded limestone	340+
Hamburg dolomite. Dolomite and limestone	900+
Middle Cambrian:	
Secret Canyon shale. Shale and thin-bedded limestone	1,035
Geddes limestone. Carbonaceous, flaggy limestone with some shale partings	335
Middle (?) and Lower Cambrian:	
Eldorado dolomite. Dolomite and limestone	2,000
Lower Cambrian:	
Prospect Mountain quartzite. Quartzite with occasional intercalated conglomerate and shale	1,660+
The Prospect Mountain quartzite has been subdivided into two formations: Upper part, Pioche shale. Shale, quartzite with some intercalated limestone (Lower Cambrian fossils)-200 ft. Lower part, Prospect Mountain quartzite proper-	1,460+ft.
Total thickness	6,695+

Much the most productive of these formations has been the Eldorado dolomite, which yielded more than $42,000,000 at Ruby Hill and an additional amount

Manuscript received at the office of the Institute Sept. 6, 1946.

* Geologist, Eureka, Nevada.

[1] B. F. Couch and J. A. Carpenter: Nevada's Metal and Mineral Production. Nevada *Bulletin* (1943) 37.

[2] H. E. Wheeler and D. M. Lemmon: Univ. Nevada *Bulletin* (May 1, 1939) 33.

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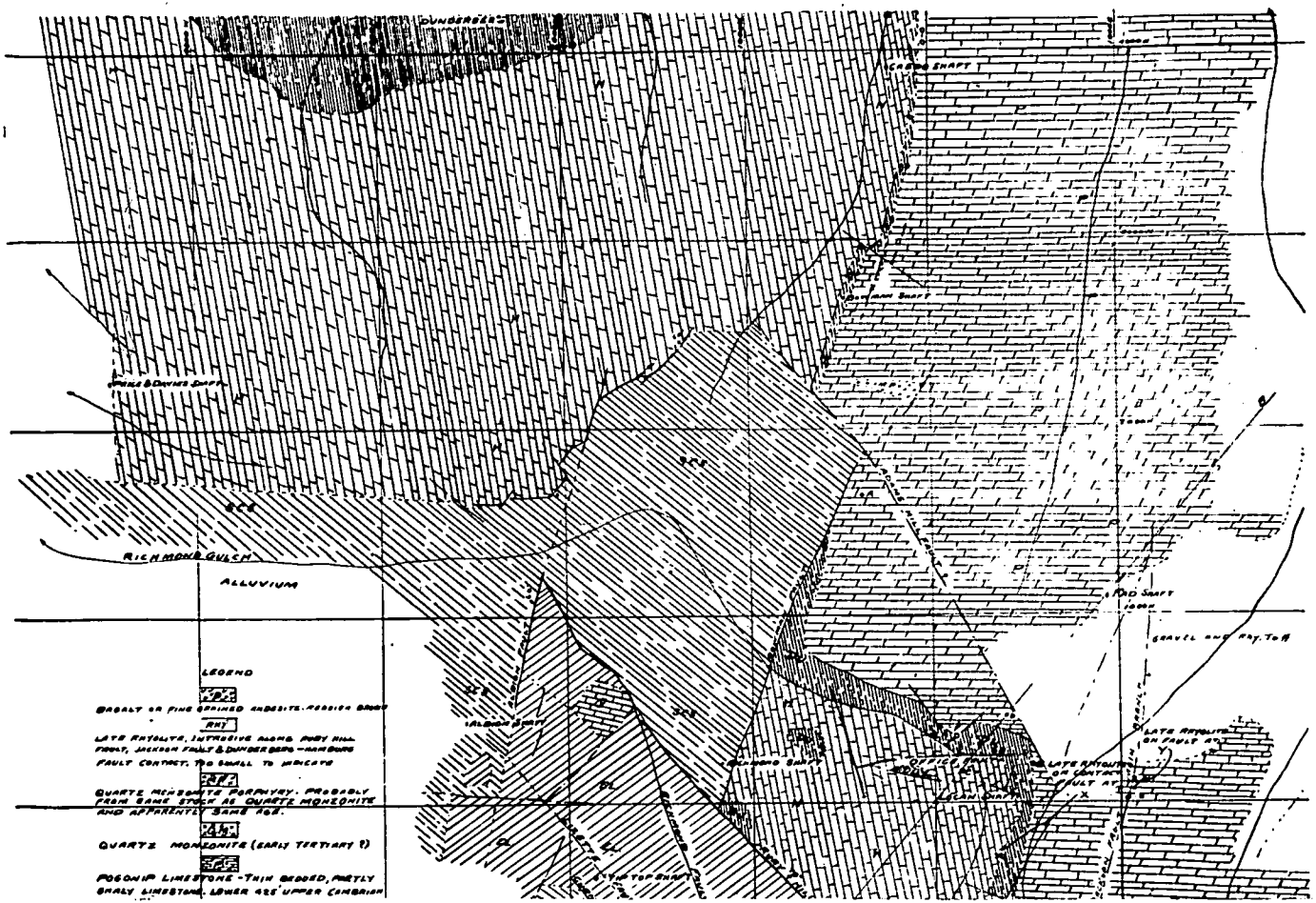

DUNDERBERG
CARBO SHAFT
MIKE & DAVID SHAFT
RICHMOND GULCH
ALLUVIUM
GRAVEL AND FRY. TOFF
LEGEND
BASALT OR FINE GRAINED ANDESITE. POSSIBLE DIKE
LATE RHYOLITE, INTRUSIVE ALONG PUDY HILL FAULT, JACKSON FAULT & DUNDERBERG-HAMBURG FAULT CONTACT. TOO SMALL TO INDICATE
QUARTZ MONZONITE PORPHYRY. PROBABLY FROM SAME STOCK AS QUARTZ MONZONITE AND APPARENTLY SAME AGE.
QUARTZ MONZONITE (EARLY TERTIARY ?)
PROGRESS LIMESTONE - THIN BEDDED, PARTLY SHALY LIMESTONE, LOWER ORD UPPER CAMBRIAN

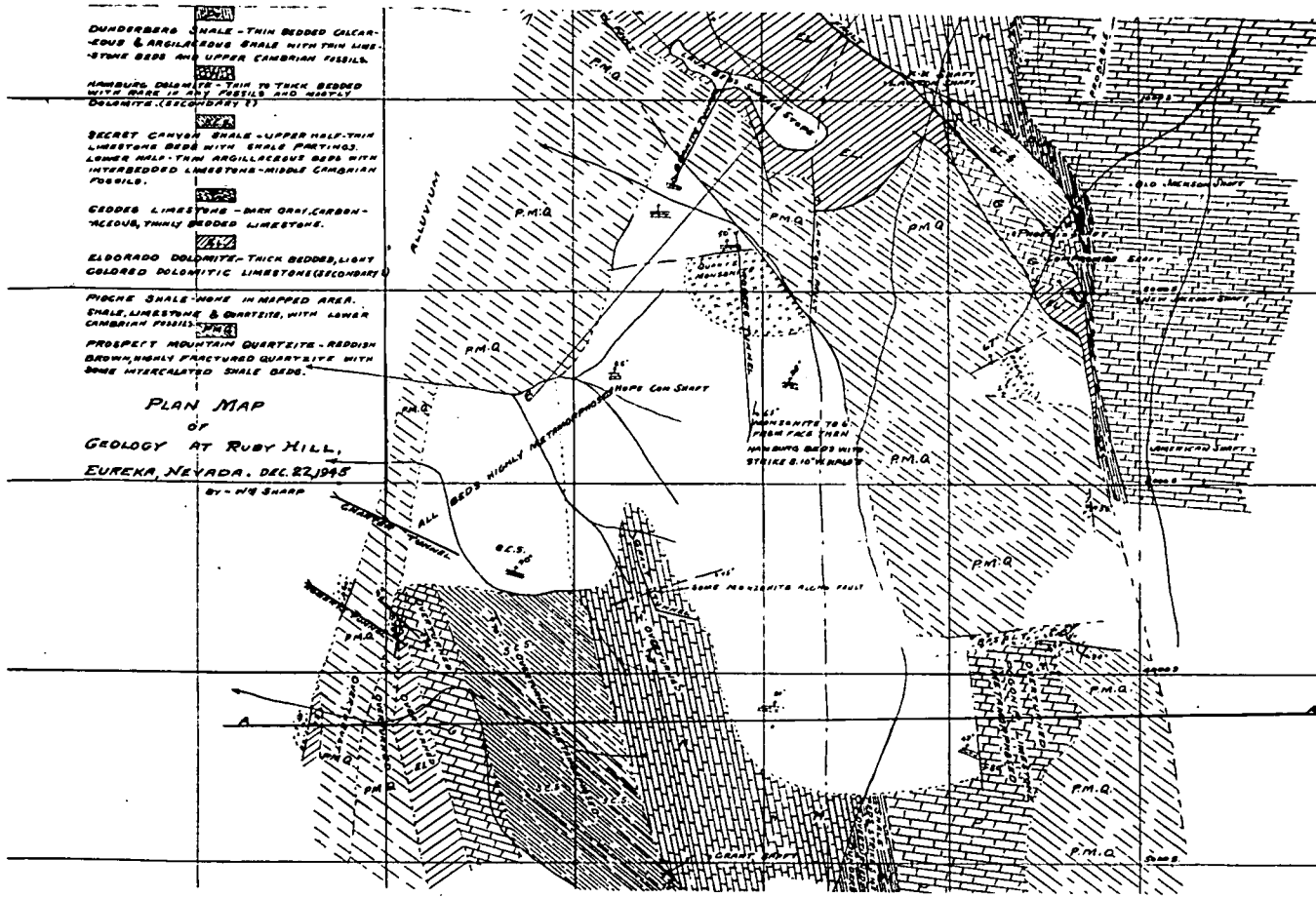
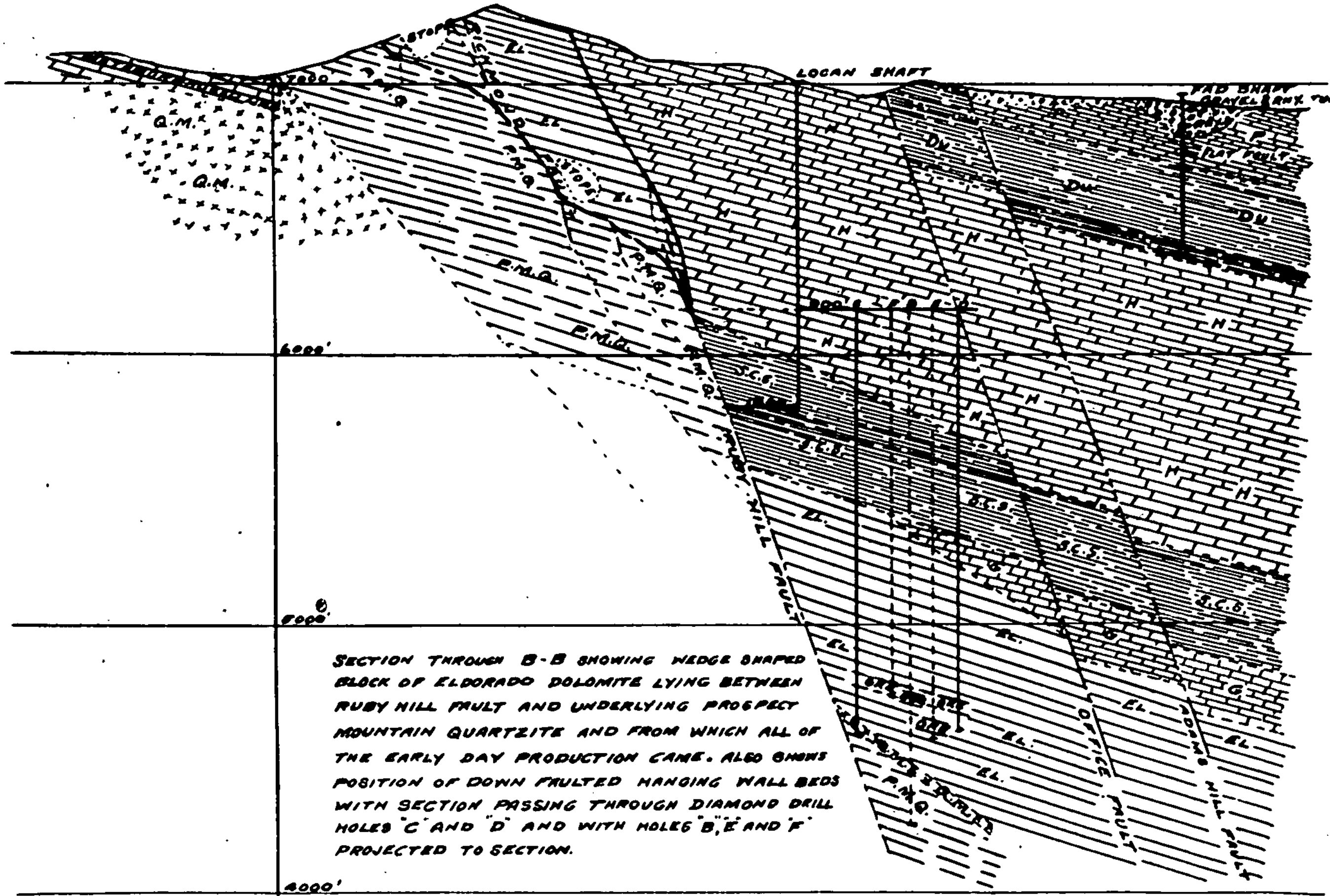


FIG 1—GEOLOGIC STRUCTURE OF EUREKA DISTRICT.



SECTION THROUGH B-B SHOWING WEDGE SHAPED BLOCK OF ELDORADO DOLOMITE LYING BETWEEN RUBY HILL FAULT AND UNDERLYING PROSPECT MOUNTAIN QUARTZITE AND FROM WHICH ALL OF THE EARLY DAY PRODUCTION CAME. ALSO SHOWS POSITION OF DOWN FAULTED HANGING WALL BEDS WITH SECTION PASSING THROUGH DIAMOND DRILL HOLES "C" AND "D" AND WITH HOLES "B", "E" AND "F" PROJECTED TO SECTION.

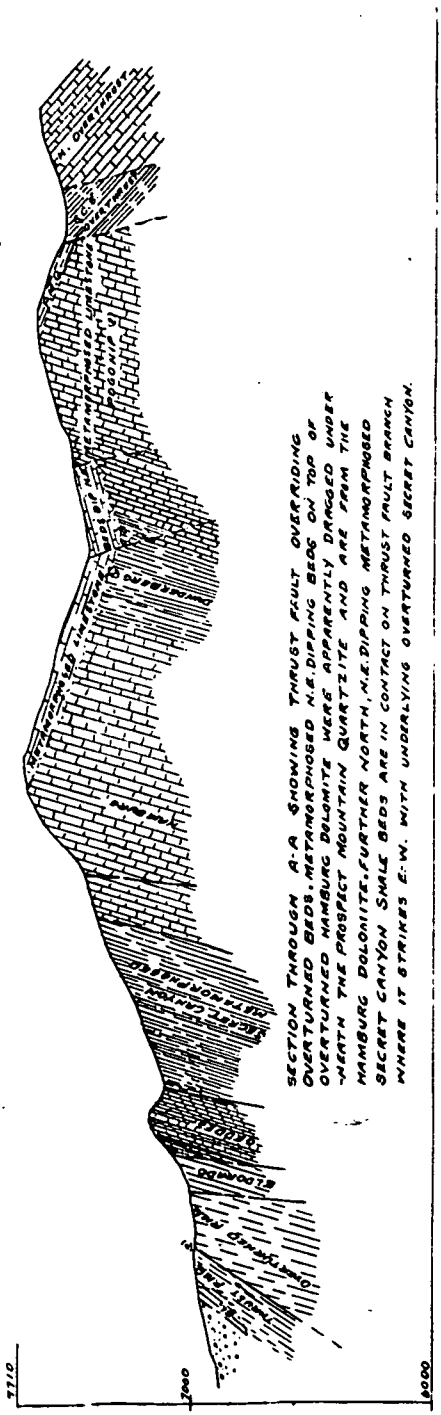


FIG 2—GEOLOGIC PLAN, EUREKA DISTRICT.

from south of Ruby Hill, where, together with other formations (the Secret Canyon, Hamburg and Dunderberg) it produced nearly $7,000,000. The production from immediately north of Ruby Hill, in the Hamburg, Dunderberg and Pogonip formations, amounted to slightly more than $2,000,000.

Structure

The present complex structure of Ruby Hill represents an anticline which was broken by thrust-faulting and later by normal faults.

Folding and Thrusting—The original fold was a northerly trending anticline with isoclinal limbs. Thrusting, apparently from the west, cut through the anticline, overturned the east limb and overrode it. The sedimentary beds in the overthrust block were in certain places materially thinned by slipping along approximately parallel planes, which can be seen within the formations. As a result, the Secret Canyon shale and the Eldorado dolomite were found to be less than half their normal thickness where penetrated by diamond drilling from the 841-ft level of the Locan shaft, and the Geddes limestone was completely missing in hole *C* as shown in section *A–A′* of Fig 1.

Normal Faulting—After the overthrusting, normal displacements occurred along faults of three sets, with strikes respectively west of north, east of north and nearly east-west. The effect of the east-west faults was to elevate the blocks to the south of them. This permitted erosion to remove the greater part of the overthrust beds on Prospect Mountain, where only remnants and down-dropped segments now remain, and to expose the overturned east limb of the anticline. At Ruby Hill and to the north on Adams Hill, however, all of the overthrust Cambrian sediments remain, and it is in these beds that the ore in this part of the district occurs.

Ore Bodies

The ore bodies at Ruby Hill were all within a block of Eldorado dolomite, which narrows downward in the form of a wedge. It is bounded on the northeast by the Ruby Hill fault (one of the northwesterly striking normal set) and on the southwest by Prospect Mountain quartzite (which underlies the Eldorado). The quartzite dips eastward toward the fault, thus forming the bottom of the productive block.

The block, elongated in a northwesterly direction, has a length of 4400 ft on the surface. In width it measures 120 ft near its southeast end on the Jackson property and 1200 ft at its northwest end on the Richmond property. Downward, it came to a wedge end between the quartzite and the fault at a depth of 600 ft in the Jackson mine and at 1300 ft in the Richmond mine.

This remarkably productive wedge of dolomite has been crushed and recemented and into it the ore has been introduced. All the ore in this block was oxidized with the exception of occasional residual bunches in the cores of ore bodies. Although much of the lead was in the form of plumbojarosite, oxidation had not reached its extreme stage, since small amounts of anglesite and galena were present and most of the iron was carbonate.

An example of the richness of the ores mined by the companies in the early period can be gained from a published report of the Richmond Mining Co. for the year 1878. In that year, the average value of the ore smelted at its furnaces was given as follows: lead 33.12 pct, iron 24.07 pct, zinc 1.89 pct, arsenic 4.13 pct, sulphur 1.67 pct, together with a silver content of 27.55 oz per ton and a gold content of 1.59 oz per ton.

In mining this grade of ore, the companies had, of necessity, left casings of iron carbonate ore around the walls of all the stopes. Sometimes these casings were many feet thick. All the iron carbonate contained small quantities of lead, gold and silver but within the casings there were also streaks and bunches of the high-grade ores. It was from these casings that production by lessees came when company operations ceased.

Most of the important ore bodies had no outcrops, although discovery of the mines was made on the Eureka Consolidated property where a large ore body outcropped in the dolomite near its contact with the underlying quartzite. Smaller surface lenses also made in the Jackson and Phoenix mines near this same contact but the only outcrop of ore in the Richmond mine was a narrow 40-ft lens that made along the Lizette fault. It was here that the Richmond company started its first shaft, the Tip Top incline. The ore in this shaft led to a large flat ore body a short distance below the surface, which made along a thrust-fault plane in the dolomite. A number of additional ore bodies along faulted segments of thrust planes were discovered in depth. Other types of ore bodies included:

1. Ore lenses along the Richmond fault, particularly where the fault separated the dolomite and quartzite.

2. Small ore bodies in and adjoining the Lawton cross fault.

3. Ore bodies along steeply dipping faults parallel to the Ruby Hill. On one of these a large ore body, known as the Potts Chamber, reached the bottom of the dolomite wedge at its junction with the Ruby Hill fault. Here the ore ended at a depth of 60 ft below the 800-ft level of the Richmond mine. Further to the northwest some stopes in this mine reached a depth of 900 ft but no ore of any consequence was found below that level.

The normal displacement on the Ruby Hill fault had dropped younger sediments on the northeast or hanging-wall side against the productive Eldorado dolomite. Clearly the most promising place to look for new ore was at a deeper stratigraphic

horizon on the hanging-wall side below these younger sediments. Workings to test this horizon succeeded in reaching the dolomite but did not explore it very extensively. Geologists in the eighties disagreed as to whether the Ruby Hill fault was premineral or postmineral, and the mining companies, hoping that it was postmineral but fearing that it was premineral, made only half-hearted attempts to meet the huge costs of this deeper exploration.

Undoubtedly the fault is premineral, and acted as a channel for the ore-bearing solutions to reach the wedge of Eldorado dolomite, but the early operators feared that if it were premineral no ore could be expected in the hanging-wall formations.

This was the situation when active operations ceased.

Early Productive Period

In the early 1870's, Eureka boasted of two large smelters with a daily capacity of 200 tons or more each, and there were at one time three other smaller furnaces in operation. Pictures show lead bullion stacked up in the yards of the larger smelters like cordwood awaiting a favorable lead market.

The two large smelters, whose slag dumps still greet all travelers as they enter Eureka along highway 50, were those of the Richmond Mining Co. at the south end of town and the Eureka Consolidated Mining Co. at the north end. Their mines were adjoining properties 2 miles to the west, on Ruby Hill.

Most of the production occurred in the period 1871–1888, and the Richmond mine and smelter were closed in 1890. The Eureka Consolidated Mining Co. had by this time ceased mining operations on company account but had let out small blocks of ground around the old ore bodies to lessees, or "tributors," as they were called in those days. The Eureka company continued to operate its smelter for several years on the production from lessees but as the production decreased it became unprofitable to continue and the smelter was dismantled.

Of the more than forty-two million dollars produced from the wedge-shaped block of dolomite, over forty million was produced by the Richmond and the Eureka Consolidated Mining companies.

Originally, six companies owned the claims covering the surface exposure of Eldorado dolomite on Ruby Hill but the Richmond absorbed the Albion Consolidated to the west of it and the Eureka Consolidated acquired the K K Consolidated lying to the east, and the four companies then remaining were, from northwest to southeast: Richmond Mining Co., Eureka Consolidated Mining Co., Phoenix Silver Mining Co., Jackson Mining Co.

Development Operations

Richmond Mining Co.—After the Richmond Mining Company's first shaft, the Tip Top incline, reached the large, flat thrust-plane ore body, the company started a vertical shaft, the Richmond, at a point on the north side of Ruby Hill, 900 ft to the northeast. This shaft, starting at an elevation more than 150 ft lower than the Tip Top incline, is 1200 ft deep, and the company established levels 100 ft apart until the 900-ft level was reached; below that the levels are 150 ft apart. The shaft started in Secret Canyon shale a short distance to the north of the Ruby Hill fault and on the west side of the Bowman fault; passed through the shale and the Ruby Hill fault between the 2nd and 3rd levels, where it entered the Eldorado dolomite and passed into Prospect Mountain quartzite at 700 ft and bottomed in that formation.

The flat thrust-plane ore body trended downward to the northeast to the 200 ft level of the Richmond mine. There ore was found along the dolomite-quartzite contact and along the Richmond fault as well as on

the thrust plane. Below this level, the thrust-plane ore split up, one part trending downward to the northwest while the other part continued downward to the northeast. Through a series of ore stringers and connecting lenses the second part joined with ore along the Richmond fault, passed through the fault into the hanging wall and continued until it reached the top of the Potts Chamber ore body.

It was the latter ore body that caused extended litigation between the Richmond and the Eureka Consolidated companies in the late seventies. The Richmond company contended that it had the right through apex of its ore body at surface to follow that ore body regardless of the fact that in strike the Potts Chamber crossed into the Eureka Consolidated property, and regardless of the fact that the two companies had previously established a boundary line along the end lines of their respective claims. The court held in favor of the Eureka Consolidated, making the compromise boundary line permanent.

Exploration Beyond the Ruby Hill Fault—The Richmond company began to probe into the hanging wall of the Ruby Hill fault at its 600-ft level, but as these crosscuts entered formations stratigraphically higher than the Eldorado the work was of very limited extent. However, a crosscut through the fault on the 1050-ft level, at a point west of the Bowman fault, entered a downthrown segment of Eldorado. Several hundred feet of drifting and crosscutting was done in this block but no ore was found. The company then put down five diamond-drill holes from different parts of this development work to prospect the formation at a little greater depth, but all without success. On the 1200-ft level, the company merely crosscut 140 ft into the Eldorado to the northeast of the fault and quit.

Eureka Consolidated—The Eureka Consolidated Company's main vertical shaft, the Lawton, was 730 ft deep. It started in Eldorado dolomite and bottomed in Prospect Mountain quartzite. Then at a point 600 ft to the northwest of this shaft, on the 730-ft (9th) level, starting in Eldorado dolomite, the company sank an incline shaft to the 14th level. This shaft also bottomed in the quartzite not far below the Ruby Hill fault. This level was beneath the dolomite wedge and hence found no ore.

The ore bodies in the Eureka Consolidated property also made along thrust planes in the dolomite, on or near the underlying quartzite. Ore also formed lenses in the dolomite along the contact where the formations were separated by the Richmond fault. Other lenses followed into the dolomite along the Lawton cross fault and eventually connected with the Potts Chamber, as did those of the Richmond farther to the west.

Exploration in the Hanging Wall of the Fault—The Eureka Consolidated also ran short crosscuts through the fault into the upper formations. However, with the intention of really exploring beyond the fault for what the company hoped would be the downthrown portions of the surface ore bodies, it sank the vertical Locan shaft to a depth of 1200 ft. It started in Hamburg dolomite 850 ft to the northeast of the Ruby Hill fault and bottomed in Secret Canyon shale.

On the 1200-ft level, the fault separated Secret Canyon shale and Prospect Mountain quartzite. At the point where the crosscut on this level cut the fault, pyrite was present in the fault filling but so much water was encountered that the pumps were drowned and the development ceased.

Closing Years of Operation—After the Eureka Consolidated closed its smelter, lessees continued to mine, or "chloride" as they called it, the better streaks and bunches of ore in the iron carbonate casings, which they shipped to the Salt Lake Valley smelters. Sometimes the

pay was pretty lean but a good car now and then helped to keep the wolf from the door and a small yearly production was maintained until 1905. In that year the Richmond and the Eureka Consolidated properties were consolidated into the Richmond-Eureka Mining Co. and in this new company the United States Smelting, Refining and Mining Co. held the controlling interest.

In the years between 1905 and 1910, the Richmond-Eureka Mining Co. rehabilitated the Eureka Consolidated and Richmond mines and shipped the stope casings and many of the old stope fills that had formerly been too low in grade. This ore had an average grade of 3 pct lead, 30 pct excess iron over insoluble, with some lime and a gold-silver content of $6.00 per ton. At that time the bulk of the custom ores reaching the Salt Lake Valley smelters were highly siliceous and the basic ores from Eureka supplied a much needed flux.

However, early in 1910, floods washed out the Eureka and Palisade railroad in so many places that several years passed before it was repaired. In the meantime the mine had closed, and when the railroad was again in operation the railroad company had so boosted its rates that the Richmond-Eureka Mining Co. decided it could not operate at a profit on this low-grade product, and the mines remained closed. Lessees continued to chloride a little ore and were able to make a small production after the railroad was operating.

Renewal of Search

The resumption of exploration for deeper ore bodies dates from 1919, when the Ruby Hill Development Co., financed in Canada, took a lease on the property of the Richmond-Eureka Mining Co. and started to unwater the Locan shaft, with the intention of sinking it further.

At that time, the water stood in the Locan shaft at a depth of about 1000 ft. The company found that it was necessary to retimber the shaft below, 600 ft, and it encountered so many difficulties in the pumping operations that when the top of the station was reached at the 1200-ft level its money had given out, and the project was abandoned.

In 1923, the Richmond-Eureka Mining Co. unwatered the Locan shaft to the 1200-ft level. Finding the original crosscut in the Secret Canyon shale very badly caved, it drove a parallel crosscut southwest to the Ruby Hill fault and the adjoining quartzite. It then connected to the old working a short distance to the southeast and also drove a drift to the northwest, partly in the quartzite, until it reached the Geddes limestone (which underlies the Secret Canyon shale). Water stored in the interstices of this thin-bedded limestone drowned the pumps, and this work was stopped. Along the fault, however, mineralized material was found over widths of from 6 in. to 2 ft, and some of it carried valuable deposits of lead and silver with a small amount of gold.

The company then went back to the 841-ft level, above the water; drove a crosscut 200 ft to the northeast of the shaft and there started a vertical diamond-drill hole. This hole started in Hamburg dolomite, passed into Secret Canyon shale at a depth of about 350 ft and entered the Eldorado dolomite somewhere between 700 and 740 ft. However, much caving of the hole had occurred in the bottom part of the Secret Canyon shale and the upper part of the dolomite was badly crushed, so that even after solid dolomite was entered, at 740 ft, the hole caved above the drill. In consequence, when a depth of 760 ft has been reached, the hole was abandoned.

About the year 1926, the Richmond-Eureka Mining Co. sent its geologists, R. N. Hunt and R. T. Walker, to the property to make a detailed geologic

study. They made an excellent geological map of the area immediately surrounding the property and recommended that deeper exploration be attempted, but this work never was started.

Discovery of Ore

In 1935, Thayer Lindsley, in looking over Nevada mining districts, went over the Eureka district hurriedly. He liked the possibilities and later sent geologists to give the area a more thorough study. They, too, liked the chances and in 1937 Dr. W. F. James obtained a long-time lease on the Richmond-Eureka Mining Company's property and an option to purchase the adjoining property on the north, owned by the Cole-Wittenberg interests. This lease and option were then turned over to the Eureka Corporation Limited, which, in the fall of that year, started a vertical diamond-drill hole to explore in advance of sinking.

This drill hole, known as *A* hole, was located far enough in the hanging wall of the Ruby Hill fault to enable it to reach the Prospect Mountain quartzite before penetrating the fault. The geologic plan in Fig 2 shows a cross fault, the Lawton, striking slightly east of north (one of the normal faults), dipping about 70° to the east and ending in the footwall of the Ruby Hill fault. Another fault, the Bowman, with a similar strike and dip, ends at the hanging wall of the Ruby Hill. It was thought that perhaps the Lawton and the Bowman were faulted portions of the same fault, with a horizontal displacement along the Ruby Hill of about 800 ft. Drill hole *A* was so located that if the ore bodies had been shifted that 800 ft (considering the Ruby Hill post-mineral) the drill hole would still have a good chance of penetrating an ore lens.

Diamond-drill hole *A* started in Pogonip limestone 60 ft to the east of the Bowman fault; passed through the fault and into Secret Canyon shale at 200 ft, into Geddes limestone at 832 ft, into Eldorado dolomite at 1190 ft, through the Eldorado into quartz monzonite porphyry at 3202 ft and bottomed still in the porphyry, at 3240 ft. It is thought that the porphyry has been intruded along the contact between the dolomite and the quartzite, but caving of the hole caused abandonment before the quartzite was reached.

It took the E. J. Longyear Co. 14 months to drill this hole, but much experience was gained that was helpful in drilling later holes. No ore was found in the hole but small amounts of lead and zinc occurred in the monzonite porphyry.

Most men would have become discouraged after such a poor showing but Mr. Lindsley, after pausing some months for breath, opened the Locan shaft to the 841-ft level and began to drill again from there.

Diamond-drill hole *B* was started from the 841-ft level of the Locan shaft, at a point 430 ft to the northeast. It was thought at the time that it would be farther from this level to the top of the Eldorado dolomite than it had been from the surface to the top of the formation in *A* hole, because in *B* the hole was starting in Hamburg dolomite while in *A* hole Secret Canyon shale, which was cut at 200 ft, extended to the surface on the west side of the Bowman fault. Furthermore, erosion had removed the top of it opposite *A* hole. However, in drilling *B* hole it was found that all the formations, at least those below the Hamburg, had been considerably thinned by the thrusting. The Secret Canyon and Eldorado were found to be less than half their normal thickness and the Geddes limestone was thinned to a thickness of only 10 ft at this point. This hole penetrated the Prospect Mountain quartzite at 1690 ft after passing through about 14 ft of quartz monzonite porphyry, and continued in the quartzite to a depth of 1900 ft.

B hole passed through a 15-ft section

of mostly oxidized iron-zinc ore beginning at 1152 ft, and at 1409 ft it entered a 40-ft width of solid sulphides of iron, zinc and lead. Below that, in the dolomite, it passed through several apparently vertical streaks of sulphide ore before reaching the porphyry.

After *B* hole had been finished, the drill hole abandoned by the Richmond-Eureka Mining Co. in 1924 was reopened and drilled from 760 ft to a depth of 1562 ft. It is called *C* hole, and passed from Eldorado dolomite into monzonite porphyry at 1522 and into quartzite at 1554 ft. This hole encountered sulphides in the dolomite at a depth of 1340 ft, with occasional streaks of sulphide ½ in. thick, and at 1360 ft it entered solid sulphide ore, similar to that in *B* hole, which continued for 30 ft.

In November 1941, preparations were begun for sinking a new shaft, the Fad. Sinking was started in February of the following year. It is 1430 ft to the northeast of the Locan shaft and at an elevation 50 ft lower. Sinking of the shaft went forward until water was encountered at 235 ft in the Pogonip limestone, then, although the flow never was more than 60 gal per minute, war had made it impossible to obtain proper pumps and by the time the shaft had reached a depth of 540 ft its progress had slowed to almost nothing.

Ore Body Confirmed

In the fall of 1943, the Bureau of Mines undertook to drill additional holes from the 841-ft level of the Locan shaft, to prove whether or not the ore found in drill holes *B* and *C* was a real ore-body or whether the holes had accidentally cut two isolated spots of ore. Holes *D*, *E* and *F* were drilled, respectively 200 ft north, 200 ft east and 200 ft west of *B* hole. Hole *F* is also 200 ft north of *C* hole and the pattern of the five holes is that of a diamond. All these holes penetrated what is apparently the same sulphide ore body as that found in drill holes *B* and *C*, and together they proved almost conclusively that a real ore body had been discovered.

The results of assays from sludges from the five drill holes show average assay values as follows:

Drill Hole B—Across 40 ft from 1409 to 1449 ft, assayed gold 0.164 oz, silver 3.56 oz, lead 2.46 pct, zinc 14.44 pct. Another zone in this hole, of 15 ft from 1404 to 1509 ft, assayed gold 0.123 oz, silver 2.35 oz, lead 2.00 pct and zinc 4.74 pct.

Drill Hole C—Across 40 ft from 1350 to 1390 ft, assayed gold 0.139 oz, silver 6.75 oz, lead 4.51 pct and zinc 10.05 pct. Another zone in this hole of 18 ft (from 1425 to 1443 ft) assayed gold 0.104 oz, silver 6.29 oz, lead 3.14 pct and zinc 3.82 pct.

Drill Hole D—Across 27½ ft from 1469 to 1496.5 ft, assayed gold 0.11 oz, silver 3.29 oz, lead 2.33 pct and zinc 8.33 pct. Contiguous to this 27½ ft is a width of 25½ ft of lower grade ore.

Drill Hole E—Across 59½ ft from 1502½ to 1562 ft, assayed gold 0.42 oz, silver 12.12 oz, lead 8.23 pct and zinc 11.85 pct.

Drill Hole F—Across 27.4 ft from 1375.6 to 1403 ft, assayed gold 0.153 oz, silver 3.49 oz, lead 2.22 pct and zinc 6.35 pct.

Present Operations

In none of the drill holes was it possible to obtain core samples of the ore except specimens attached to cement, but the amount of sludge obtained was nearly the amount of a calculated hole.

Pyrite, some arsenopyrite, and some dolomite were the gangue minerals, and lead, zinc and pyrite concentrates will be made by selective flotation. The pyrite, which contains most of the gold, will then be roasted and cyanided.

During the year 1945, a surface plant with equipment capable of sinking the Fad shaft to the depth of the sulphide ore body was installed and unwatering of the shaft was started.

Originally, the Fad was timbered with 8 by 8 wooden sets. The three south compartments were 5 by 5½ ft in the clear and the north or manway compartment was 4½ by 5½ ft in the clear. This made the overall dimensions of the shaft, including the 2-in. lagging, 23 ft 2 in. long by 7 ft 2 in. wide.

When work was resumed in 1945, it was found that the wooden sets below the water level, which at that time was about 300 ft below the surface, had settled out of line; so, starting just above the water, the wooden sets were removed and most of the section below that point was concreted. At that time it was nearly impossible to obtain timber for sets, so it was decided to use steel sets; although the cost is greater, the probable life is also greater. These sets, starting just above 300 ft, are made from 6-in. I-beams placed at 6-ft centers. In order to conform with the 8 by 8 wooden sets above, the three south compartments are 5 ft 2 in. by 5½ ft in the clear and the manway is 4 ft 8 in. by 5½ ft in the clear. The overall dimensions are 22 ft 8 in. by 6½ ft, and, since the lagging is wedged inside the 6-in. I-beams, no extra shaft space is required.

The shaft passed from Pogonip limestone into Dunderberg shale at 800 ft (because of shale within the Pogonip, I had placed this contact at a higher elevation). It passed from Dunderberg shale into Hamburg dolomite at 1080 ft and is still in the Hamburg at the present depth of 1585 ft.

The water in the shaft increased gradually from 60 gal per min. at 500 ft to 600 gal at 1200 ft and to nearly 1000 gal at 1585 ft. However, measurements in the diamond-drill holes show that the area has drained at a rapid rate.

At 790 ft a connection was made to the 841-ft level of the Locan shaft and a main pumping station was constructed at this level. At 1233 ft a temporary pump station was cut and at 1680 ft another main pump station will be cut. At 2250 ft a main pump station will be cut and a crosscut will be driven to the ore.

ACKNOWLEDGMENTS

During the summer of 1932, Dr. T. B. Nolan, of the U.S. Geological Survey, started a survey of the Eureka district. Lack of funds held up the work until 1938, when Dr. Nolan returned. He then spent the summers of 1938, 1939, 1940, 1941 and 1946 in the district and has now completed his field work. Assisting him on palentology were Dr. Josiah Bridge, Dr. C. W. Merriam, Dr. Fisher, Dr. Cooper and Dr. Cloud at various times, and to Dr. Nolan and all of the others the author is indebted for great help.

He is indebted also to Dr. H. E. Wheeler, Dr. Dwight M. Lemmon, Mr. R. N. Hunt, Mr. R. T. Walker, Mr. E. O. Binyon, the Bureau of Mines, and many others.

His thanks for permission to publish this report are given to Mr. George W. Tower, president of Eureka Corporation Limited, and to Mr. George W. Mitchell, general manager of the company.

EXHIBIT F

EUREKA CORPORATION LIMITED
EUREKA NEVADA

EXHIBIT F

R. I. 3949,
December 1946.

REPORT OF INVESTIGATIONS

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

EXPLORATION OF THE EUREKA CORPORATION GOLD, SILVER, LEAD, AND ZINC PROPERTIES, EUREKA COUNTY, NEVADA[1]

By E. O. Binyon[2]

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INTRODUCTION

In 1937 the Eureka Corporation, Ltd., of Canada obtained a lease on the mining property of the Richmond-Eureka Mining Co. in the Eureka mining district, Eureka County, Nevada. In 1910 the Richmond-Eureka Co. suspended all operations except small-scale leasing, but company and other geologists contended that the El Dorado dolomite would also carry ore in its continuation in a fault block north and northeast of the productive old workings. The company began to explore the fault block in 1923 by diamond drilling from the 900 level of the Locan shaft, but for various reasons the hole was drilled to a depth of only 725 feet and was then abandoned.

The Eureka Corporation, Ltd., planned an extensive diamond-drilling program, which included four deep diamond-drill holes, one (designated "A", fig. 1) to be drilled from the surface, and three (designated "B", "C", and "D", figs. 1 and 2) to be drilled from the 900 level of the Locan shaft. Of these, only B and C were completed by the company. Hole C was a continuation of the hole started by the Richmond-Eureka Co.

1/ The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from Bureau of Mines Report of Investigations 3949."

2/ Mining engineer, Reno Division, Mining Branch.

The site for hole D (figs. 1 and 2) was prepared, but the hole was not drilled. Both B anc C holes penetrated sulfide ore carrying good percentages of zinc, lead, gold, and silver. The ore bodies were 40 feet thick and were found approximately 1,400 feet below the 900 level of Locan shaft.

On the basis of the very favorable results obtained from the drilling program, the Eureka Corporation planned extensive development of the property and in 1942 commenced sinking the Fad shaft (figs. 1 and 2). The shortage of equipment and materials brought on by the war and difficulties with water in the shaft greatly hindered progress. However, early in 1943 the Eureka Corporation, Ltd., of Canada submitted to the War Production Board a proposal for developing the mine and milling 500 tons of zinc-lead ore a day. The proposal involved an expenditure of $2,890,750.

Before acting on the corporation's proposal, the War Production Board concluded that further exploration was necessary and requested the Bureau of Mines to examine the property and recommend a plan to explore the ore bodies more fully. R. A. Elgin, an engineer of the Bureau examined the property in April 1943 and recommended that four vertical diamond-drill holes, to total approximately 6,800 feet, be drilled from the 900 level of the Locan shaft. These holes, spaced about 200 feet from one or the other of those drilled by the company, formed an irregular, five-sided polygon, which enclosed an area approximately 350 to 300 feet, as shown on figure 2. Also recommended were two flat holes for draining the Fad shaft, but these were to be drilled only if the results of the vertical holes warranted and if sufficient funds were available. Work was to begin at the earliest possible date.

On September 20, 1943, the author arrived in Eureka to start the work preparatory to drilling.

Actual project work did not begin until October 13, 1943. The Eureka Corporation assisted the Bureau by lending, moving, and setting up equipment with which they had been sinking the Fad shaft; they also made some minor repairs to the equipment and to the Locan shaft. The interval between September 20 and October 13, 1943, was taken up by this work.

ACKNOWLEDGMENTS

In its program of exploration of mineral deposits, the Bureau of Mines has as its primary objective the more effective utilization of our mineral resources to the end that they make the greatest possible contribution to national security and economy. It is the policy of the Bureau to publish the facts developed by each exploratory project as soon as practicable after its conclusion. The Mining Branch, Lowell B. Moon, chief, conducts preliminary examinations, performs the actual exploratory work, and prepares the final report. The Metallurgical Branch, R. G. Knickerbocker, chief, analyses samples and performs beneficiation tests. Both these branches are under the supervision of Dr. R. S. Dean, assistant director.

Special acknowledgment is made to William Sharp, superintendent of the Eureka Corporation at Eureka, for his cooperation and valuable assistance; to S. R. Zimmerley, regional engineer, Bureau of Mines, Salt Lake City, and the Metallurgical staff for analyzing the samples and performing beneficiation tests; and, to Glenn L. Allen, district engineer, Bureau of Mines, Reno, Nev.

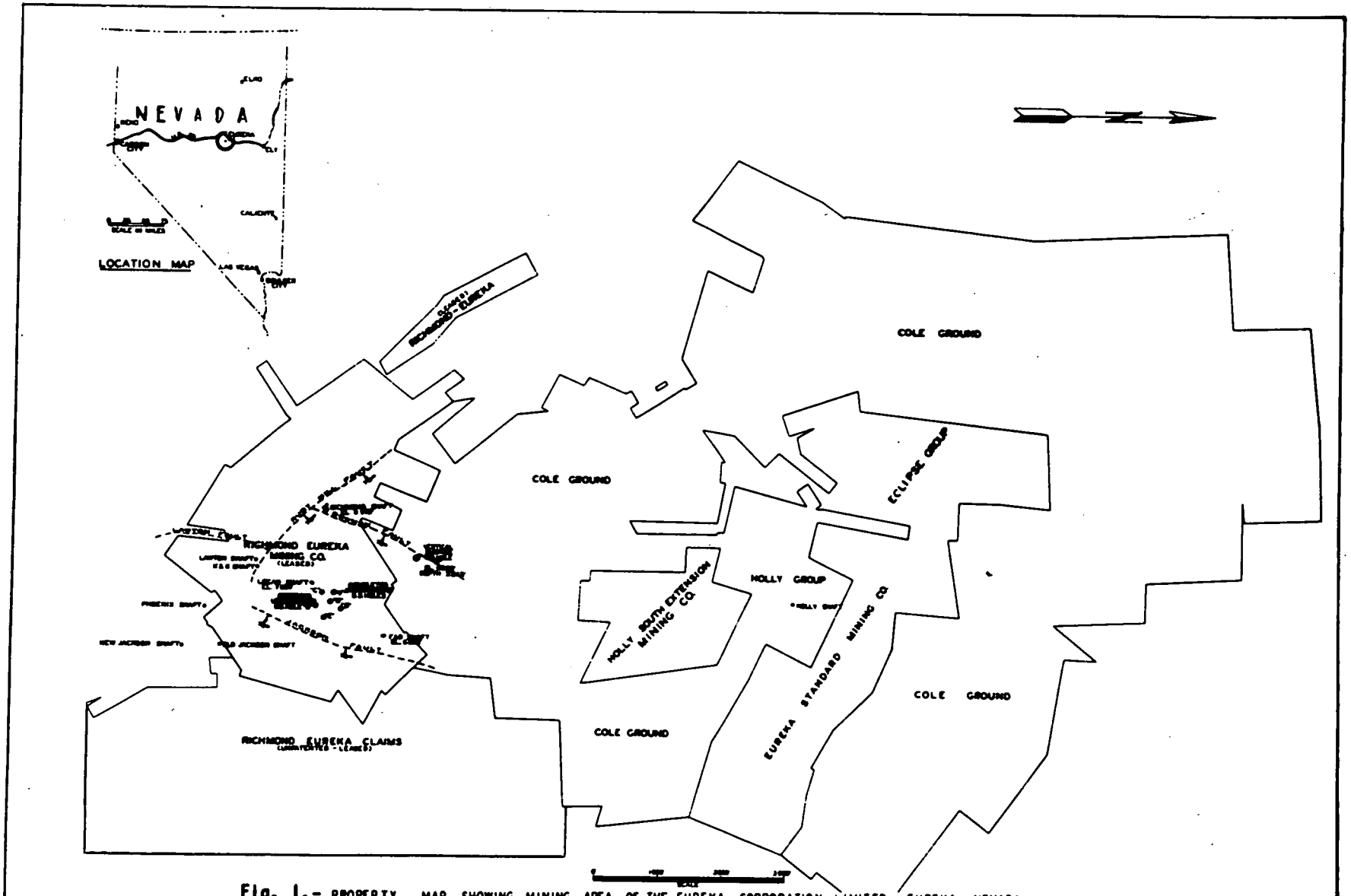


Fig. 1.- PROPERTY MAP SHOWING MINING AREA OF THE EUREKA CORPORATION LIMITED, EUREKA, NEVADA

OWNERSHIP

In 1905, the properties of the Richmond Mining Co. and the Eureka Consolidated Mining Co., including the famous Richmond and Eureka mines, were combined under the control of the Richmond-Eureka Mining Co.

The United States Smelting, Refining, & Mining Co., of 75 Federal Street, Boston, Mass., owns a controlling interest in the Richmond-Eureka Mining Co. These properties (fig. 1) were leased by the Richmond-Eureka Mining Co. to the Eureka Corp., Ltd.

The Eureka Corp., Ltd., is incorporated under the laws of Nova Scotia, Canada. George W. Tower is president of the corporation, W. B. Malone is secretary, and Thayer Lindsley is director. The main office of Eureka Corp., Ltd., is at 25 King Street, West Toronto, Ontario, Canada. George W. Mitchell is the resident manager for the corporation at Eureka, Nev.

The lease agreement includes 70 patented and 4 unpatented claims and 18 city lots and 2 city blocks in the Eureka townsite. Under a purchase agreement with the owners of the Cole-Wittenberg group (fig. 1), the corporation has also acquired 28 patented and 84 unpatented claims. The Holly group (fig. 1), consisting of three patented and five unpatented claims, likewise has been obtained under purchase agreement with the owner. All lease and purchase agreements are of record in the County Recorder's office in Eureka, Nev.

HISTORY AND PRODUCTION

Ore was first discovered in the district in September 1864. A group of prospectors from Austin found an outcrop of silver-lead ore in New York Canyon near the "76" claim, about 2 miles south of the present townsite. The following year the Champion and Buckeye claims were taken up on the southwest side of what is now known as Ruby Hill. Only a small amount of ore was mined, and operations virtually ceased after a small smelter, erected in 1866, failed to treat the ores effectively, and little was done thereafter until 1869. Since their discovery in 1864, these mines are reported to have produced 1,250,000 tons of oxide ore containing gold, silver, and lead, valued at approximately $90,000,000. Both companies smelted the ores locally until depletion of ore reserves forced them into leasing remnants of the larger ore bodies for small-scale production. Ore mined by lessees was shipped to the Selby smelter in California and to various smelters in the Salt Lake City area.

In 1869 ore from the Champion and Buckeye claims was successfully smelted, which encouraged mining activity in the district. San Francisco interests organized the Eureka Consolidated Mining Co., which controlled the ground on the northeast side of Ruby Hill; in 1871 an English company, the Richmond Mining Co., bought the adjoining claims to the west. Both companies immediately started to build smelters, and in 1872 mining and smelting operations had reached a high of about 160 tons per day. These two companies, the largest in the district, continued to treat ores from their mines, as well as custom ores, until 1891, when the smelters were shut down. Mining continued, however, under a leasing or "tributing" system until 1905, the ore being shipped to either Selby or Salt Lake City smelters for treatment.

In 1905 the Richmond-Eureka Mining Co., a subsidiary of the United States Smelting, Refining & Mining Co., acquired the combined holdings of the two companies, and, after a year or two of rehabilitory work, mining operations under a leasing system were resumed.

Lessees shipped approximately 200 tons per day to the smelter in the Salt Lake City area until the Eureka-Palisade Railroad was washed out in 1910. From that year until 1937, only small-scale leasing was done. The company, however, did some exploratory work in 1923 and started to drill hole C in the area to the north and on the hanging-wall side of the Ruby Hill fault; but for various reasons the hole was abandoned after reaching a depth of 725 feet, and drilling stopped.

In 1937, the Eureka Corp., Ltd., obtained a lease on the Richmond-Eureka holdings, and although 29,000 tons of ore was shipped between 1937 and 1940, the major objective of the corporation was exploration of the area north of the Ruby Hill fault. The diamond-drill program of Eureka Corp., Ltd., was started in September 1937 with diamond drill hole A (fig. 1) and was completed in 1941 with diamond-drill hole B. Total production from the Richmond-Eureka property to date is approximately 1,250,000 tons of ore with a gross value of approximately $90,000,000, the greater part of which represented gold and silver. Lead produced amounted to approximately 200,000 tons, or about one-third the value of the ore.

LOCATION AND COMMUNICATIONS

The properties of the Eureka Corporation, Ltd., in the Eureka Mining district are 2-1/2 miles west of Eureka, which is the business center of the district and the county seat of Eureka County, Nevada. The lands are in secs. 10, 11, 14, 15, 22, and 23, T. 19 N., R. 53 E. The Public Land Survey has not been completed over the entire district, but the sections mentioned will include virtually all of the claims held by the corporation.

Eureka is in the southeastern corner of Eureka County, on the Lincoln Highway (U. S. Highway 50), 77 miles west of Ely and 248 miles east of Reno. The nearest rail connection is at East Ely, Nev., which is the southern terminus of the Nevada Northern Railway. Ely is the main distribution point for White Pine and Eureka Counties. The Nevada Northern Railway connects with the Western Pacific Railroad at Shafter and with the Southern Pacific Railroad at Cobre. Palisade, 90 miles north of Eureka, is on the main lines of the Southern Pacific and Western Pacific Railroads. The road to Palisade, although graveled for about 60 miles, is not serviceable the year around, and little freight is brought in from this rail point. This road is now being improved by the Federal Government, and application has been made to convert it into a hard-surfaced highway. At present, the greater part of supplies and freight destined for the Eureka district is hauled from Ely and Reno by Hickey Stages, and rates from these two points are high. If the road between Eureka and Palisade should be hard-surfaced, this would be the most direct and feasible route for shipment of large quantities of freight or express.

The road from Eureka to the properties of the Eureka Corporation is a graded dirt road that needs considerable improvement. Although the grades are

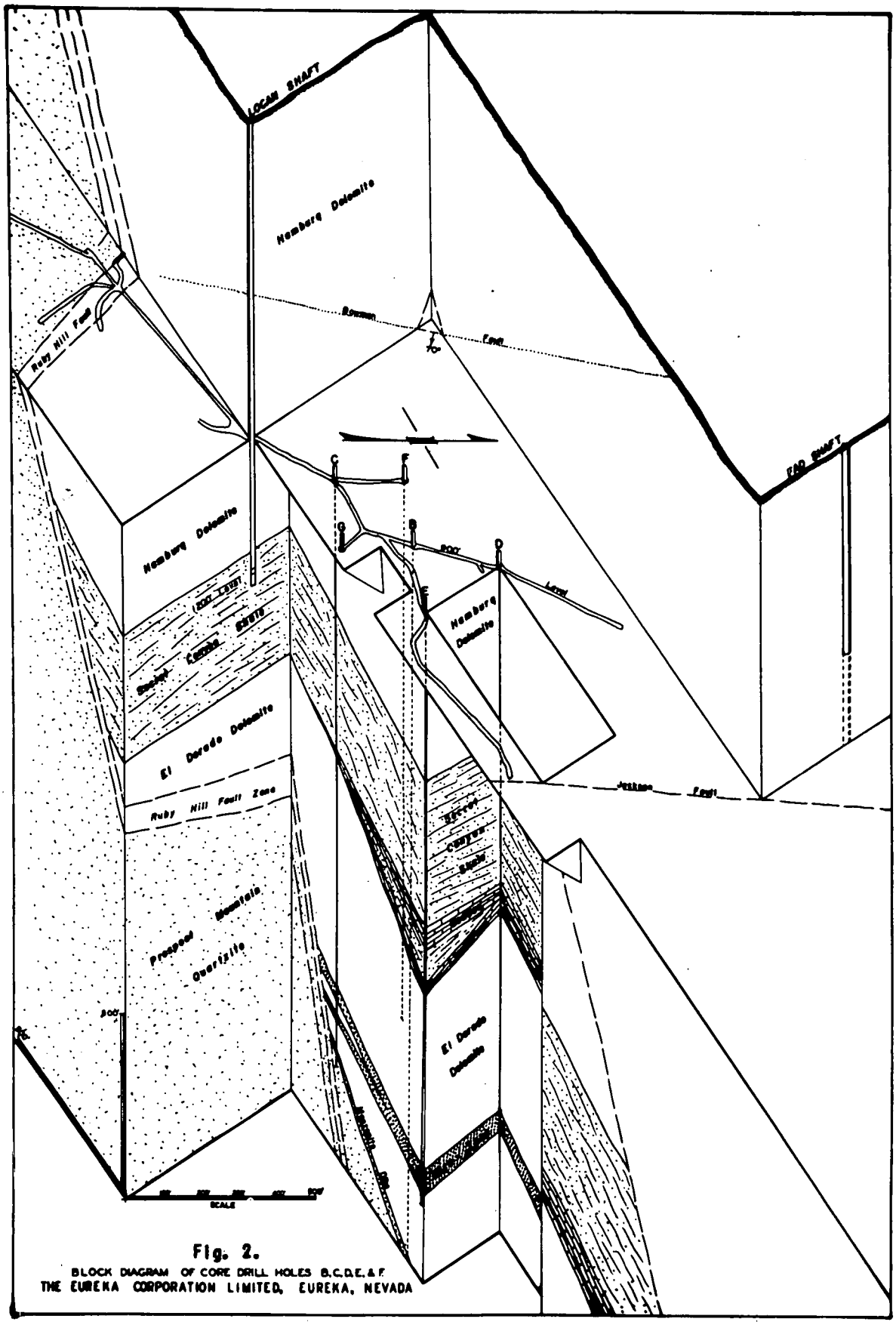


Fig. 2.

BLOCK DIAGRAM OF CORE DRILL HOLES B, C, D, E, & F.
THE EUREKA CORPORATION LIMITED, EUREKA, NEVADA

not excessive and the road is maintained in fair condition during summer and fall, it will not stand up under heavy traffic in winter and spring. Applications have been made to the Government for an oiled, hard-surfaced road.

A branch telephne line connects Eureka and small outlying communities with Ely, where connections are available with the main lines of the Bell system. Indirect telegraph connections are maintained by the Bell Telephone Company. Messages are transmitted over the party-line telephone connecting with Ely, and from there are sent out over the main lines of the company's telegraph system.

PHYSICAL FEATURES

The most prominent surface feature in the district is Prospect Mountain, a north-south trending spur from the west slope of the Diamond Range. The ridgelike Prospect Mountain is some 7 miles long and 1 to 1-1/2 miles wide. From Prospect Peak, the highest point of the ridge, which has an altitude of 9,600 feet, the south and west sides slope steeply into Fish Creek and Spring Valley, respectively. The east slope is rough, being broken into numerous ridges and canyons, which trend northeast and join the main canyon in which Eureka townsite is situated.

To the north the slope is fairly regular but steep to Mineral Hill, the altitude of which is 7,740 feet. From this hill northward the mountain ridge is broken into three unimposing hills, on which the greater part of the corporation's claims are located. Ruby Hill, the most southern and the highest of the three hills, with an altitude of 7,300 feet, is separated from Adams Hill by a narrow gulch, which joins Spring Valley on the west. On Ruby Hill are located the "lava beds" and the underground workings of the Richmond-Eureka mines.

Adams Hill, altitude 6,950 feet, is a long, flat-topped elevation with gentle slopes into Austin Canyon on the east and into Spring Valley on the west. To the north it slopes gradually into Mineral Point, which is really a part of Adams Hill. Mineral Point merges into Diamond Valley and is the northernmost part of Prospect Mountain Ridge. The altitude of Diamond Valley here is 6,350 feet, or about 600 feet below the collar of the Fad shaft, which is on the east rim of Adams Hill at altitude of 6,950 feet. The location and altitude of all shafts are shown on figures 1 and 2.

The climate permits year-around operation. Throughout the winter months, however, long periods of subzero weather are not unusual, making the protection of all water pipe lines imperative and insulation of buildings and houses advisable. Snow, although on the ground from 4 to 5 months, does not seriously interfere with highway traffic but does occasionally block the roads to the property and the outlying communities.

All fuel for domestic purposes is hauled in on order by a local merchant and trucking firm. Wood for fuel is brought in from a distance of about 40 miles, and coal is hauled from Ely. The Shell Oil Co. and the Standard Oil Co. of California have wholesale plants in Eureka for bulk sales of gasoline, Diesel fuel, stove oil, and all types of lubricants. No fuel or lumber company is in Eureka. Lumber and timber for mining purposes are obtained from Ely, Reno, or Fallon.

Water for mine and domestic use at the property is purchased from the Ruby Hill Water Works. A. C. Florio, the owner, also owns the Eureka Water Works, which supplies the Eureka townsite. These companies hold the water rights on several springs in the mountains about 5 miles southeast of the Richmond-Eureka mine. These springs are the only developed water within a reasonable distance of the property. The supply from them, is ample for present needs.

Little is known of the volume of water that flows or is pumped from the wells in Spring and Diamond Valleys. These wells, which are 75 to 110 feet deep, were sunk by stockmen, and no attempt was made to obtain a greater flow than was needed. It is reasonable to expect that a good volume of water can be obtained from deeper wells, as artesian water is found farther north in Diamond Valley.

There is little doubt that the mine will make enough water for all mining and milling uses, at least for a time. The water level in the Locan shaft is 206 feet below the 900 level, or at elevation of 6,157 feet. In diamond-drill holes D, E, and F water stood 64 feet below the collars, or at elevation of 6,350 feet. The Fad shaft makes about 50 gallons per minute, and this water was struck 252 feet below collar, or at an elevation of 6,698 feet. The Fad shaft will be sunk at least 3,000 feet to an elevation of 3,950 feet. This indicates an unlimited supply, as the Fad shaft and the workings from the shaft will open a large area of virgin ground some 2,500 feet thick in which water-bearing formations are known to be present. Whether or not continuous pumping will exhaust the supply is not known, but it is entirely probable that with some control of the flow into the mine, sufficient volume for mining and milling can be pumped throughout the life of the property. It would seem advisable, however, to obtain more definite data on the water in the valleys, as it is possible that water from this source might be required.

LABOR AND CAMP ACCOMMODATIONS

At present there is an acute shortage of all classes of labor in the district, and no immediate relief is in sight. In fact, the shortage will become more acute as mining operations increase. The 25 or 30 men now employed by the corporation represent virtually the entire supply of local labor. The requirements for skilled and unskilled labor, in addition to that now available, are expected to rise to a peak of approximately 300, and arrangements must be made to import that number of men in order to maintain development and production.

No living accommodations are available at the mine. All employees live in Eureka, and at present the town does not have housing facilities for even a few more workers. For the employees necessary for installation of equipment and in the preliminary stages of development, trailer houses can be used until permanent housing is available.

The county hospital in Eureka is not equipped to care for more than 15 patients, nor can it care for major surgical cases. With the growth of the community, hospital facilities will have to be increased and the local doctor will need assistance.

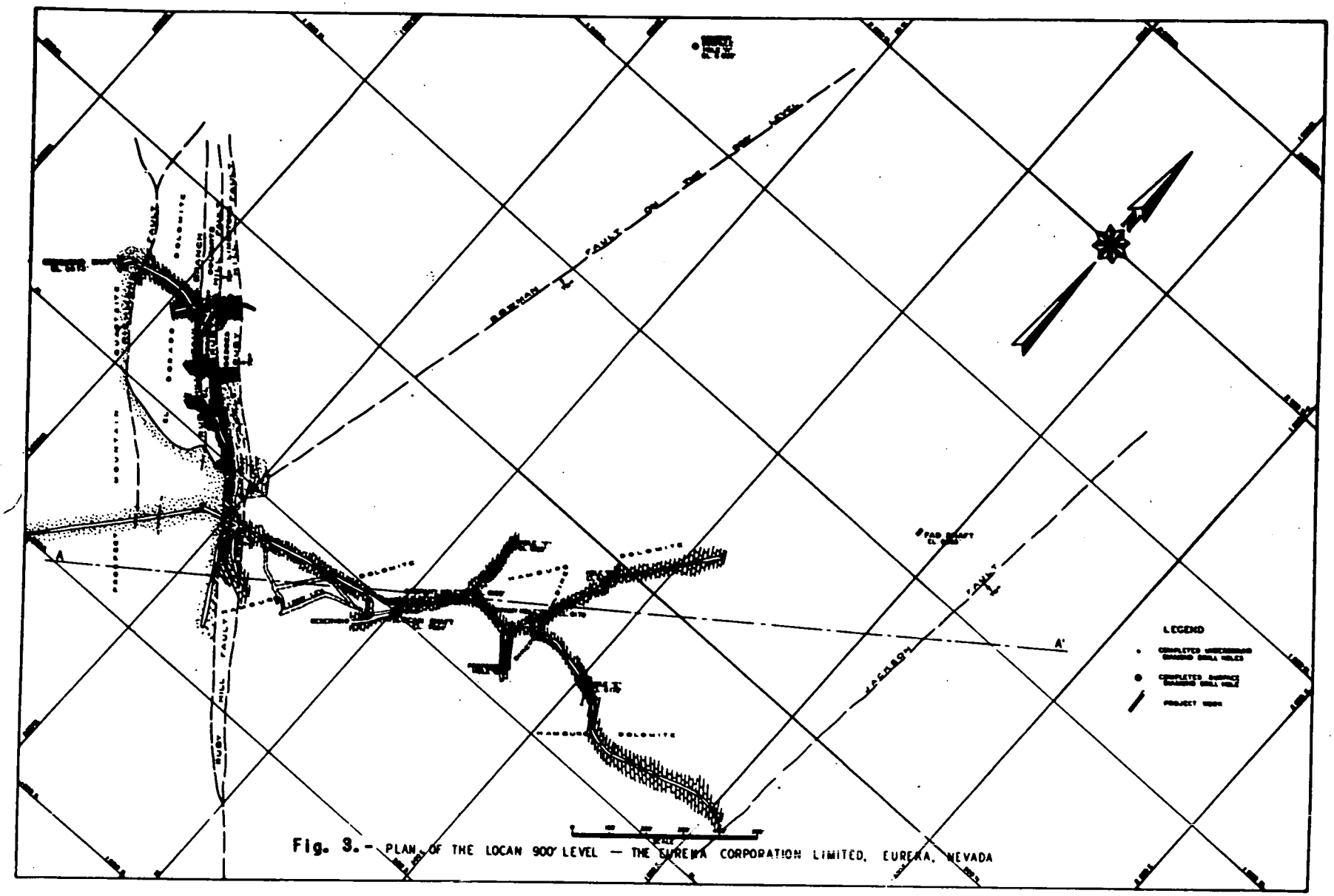
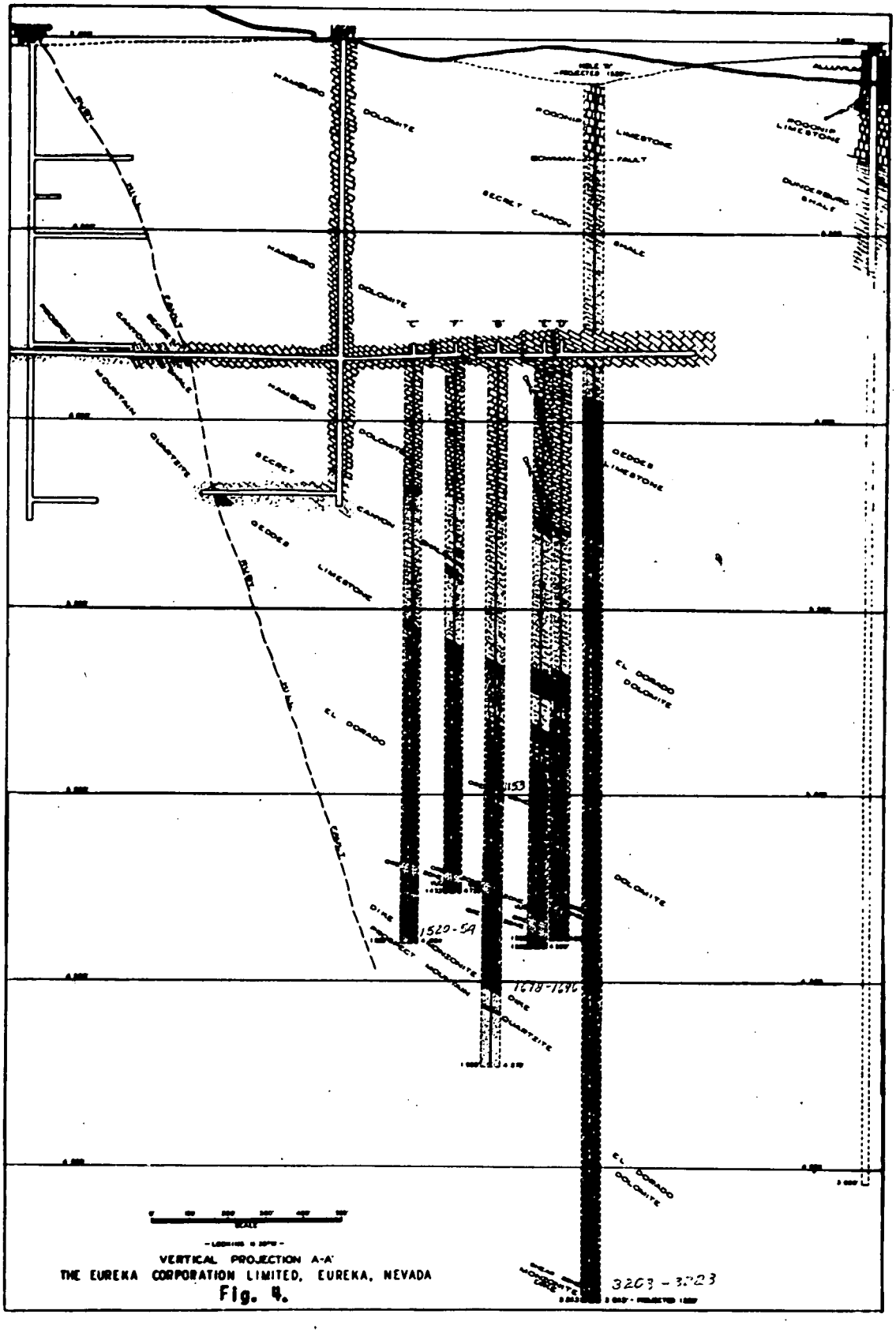


Fig. 3. - PLAN OF THE LOCAN 900' LEVEL — THE EUREKA CORPORATION LIMITED, EUREKA, NEVADA



VERTICAL PROJECTION A-A'
THE EUREKA CORPORATION LIMITED, EUREKA, NEVADA
Fig. 4.

PLAN OF THE PROJECT

For further exploration of the property, the Bureau proposed a diamond-drilling program, which included four vertical holes totaling 6,800 feet of drilling and two flat drainage holes totaling 2,000 feet, a total of 8,800 feet. The two flat holes, which were to drain the Fad shaft to approximately the 900 level, were to be drilled only if the results from the vertical holes warranted sinking the Fad shaft and funds were available.

Before drilling could begin, a certain amount of preparatory work was necessary; equipment such as hoist, compressors, and other accessory equipment had to be moved from the Fad shaft to the Locan shaft. Locan shaft required minor repairs, and all track and pipe had to be replaced on the 900-level before beginning raises and stations for holes E, F, and G.

The vertical holes, designated D, E F, and G, were to be collared from the 900 level of the Locan shaft and with holes B and C, which had been put down by the corporation, were to form a pattern enclosing an area approximately 350 by 300 feet, as shown on figure 2. Holes D and E were located to take advantage of all work done by the Eureka Corporation in preparation for its drilling program. The drifts and crosscut to holes D and E had been driven, and at D hole the raise and station had been completed, whereas at hole E only the riase and station were to be completed to make it ready for the drill. The locations of holes F and C were such that crosscuts had to be driven and raises and drill stations had to be cut. Total footage of crosscuts, as planned, amounted to 280 feet. Also, the three raises would require 135 feet of rock work with timbering and installation of sheave supports. The stations were to be 10 by 15 by 8 feet, or for the three holes, E, F, and G, a total of 133 cubic yards was to be excavated.

ORE DEPOSITS

The geology of the Eureka district has been fully described by Hague[3/] and Curtis.[4/] Walcott[5/] and Resser[6/] wrote several reports covering the fauna found in the Cambrian formation, in which virtually all of the ore deposits occur. Through the work of Wheeler and Lemmon,[7/] a stratigraphic sequence with

3/ Hague, Arnold, Abstract of the Report on the Geology of the Eureka District, Nev.: In 3d. Am. Rept., U. S. Geol. Surv., 1881-82, 1883, pp. 237-290. Also, Geology of the Eureka District, [Nev.]: Geol. Surv. Mono. 20, 1892, 419 pp.

4/ Curtis, J. S., Silver-lead deposits of Eureka, Nev.: Geol. Surv. Mono. 7, 1884, 200 pp.

5/ Walcott, C. D., Paleontology of Eureka District Nev. : Geol. Surv. Mono. 8, 1884, 298 pp.

6/ Resser, C. E., Nomenclature of Some Cambrian Trilobites: Smithsonian Misc. Coll., vol. 93, No. 5, 1935, 46 pp.
Second Contribution to Nomenclature of Some Cambrian Trilobites: Smithsonian Misc. Coll., vol. 95, No. 4, 1936, pp. 1-29.
Third Contribution to Nomenclature of Some Cambrian Trilobites: Smithsonian Misc. Coll., vol. 95, No. 22, 1937, pp. 1-29.

7/ Wheeler, Harry E., and Lemmon, Dwight M., Cambrian Formations of the Eureka and Pioche Districts, Nev.: Geol. and Min. Surv. No. 31, vol. 33, No. 3, 1939, pp. 13-32.

accurately measured strata was made. The name "Geddes" was proposed for the bed of flaggey limestone which lay conformably on top of the El Dorado dolomite, of which it was formerly considered a part. It was designated as a separate formation. Faunas were reallocated, which, according to Wheeler and Lemmon, would aid in distinguishing and properly placing the formations in their true sequence and would also lead a better understanding of certain structural fractures that had been either misinterpreted or entirely overlooked.

The oxide and sulfide ore bodies containing gold, silver, and lead, and gold, silver, lead, zinc, and cadmium, respectively, occur as typical replacement deposits in the El Dorado dolomite, a member of the Paleozoic sediments that are widespread through the Great Basin area. The age of the El Dorado has been designated as of the Lower and Middle Cambrian period of the Paleozoic era.

Some relatively small oxide-ore bodies have been found in the upper beds of dolomite and limestone (the Hamburg and Pogonip). The more important deposits, however, are confined almost entirely to the El Dorado dolomite. This stratum, 2,000 feet in thickness, is composed of a secondary dolomitic limestone in which dolomite predominates. The color ranges from light gray to black. Bedding has been virtually obliterated by faulting; apparently the entire bed has been crushed and recemented with calcite.

The stratigraphic sequence of Cambrian formation in the district, as determined by Wheeler and Lemmon, is:

"Pogonip" limestone	425	Lower portion	Upper Cambrian
Dunderburg shale	340		
Hamburg dolomite	900		
Secret Canyon shale	1,035		Middle Cambrian
Geddes limestone	335		
El Dorado dolomite	2,000		Middle and Lower Cambrian
	5,035		
Prospect Mountain quartzite	1,600		Lower Cambrian
	6,635		

Although the total thickness of strata is 6,635, this does not represent the thickness which it will be necessary to penetrate to reach the sulfide deposits, as they were found 500 feet from the top of the El Dorado dolomite.

The deposits of oxidized ore on Ruby Hill were confined to a segment of the El Dorado dolomite, which apparently is an upthrust fault block on the footwall of the Ruby Hill fault. This fault, with the parallel branches or secondary fissures, is thought to be the main channel for the mineralizing solutions that result from igneous intrusions. Although it is generally accepted that the mineralizing action was of igneous origin and that either the granite, monzonite, or rhyolite found in the area might have been the source of the solution, a definite genesis has not been determined.

As stated, the deposits are of the replacement type, and, judging from the analyses of the ores from the upper segment, the ascending mineralizing solution completely replaced the El Dorado dolomite. Few, if any, inclusions of unreplaced dolomite were found in the ore deposits. The ore bodies of Ruby

Hill seem to have no definite pattern either as to position or size and shape. The physical condition of the dolomite and the main structural features, the Ruby Hill and other faults, are certainly the most important factors in the formation and distribution of the ore bodies. The chemical composition of the rock (that is, whether dolomite or limestone) apparently had little if any bearing on the formation of the ore bodies, as they occurred neither in any particular horizon nor with any definite pattern. No criteria have been found from which either the size or shape, dip or strike, or position of occurrence of ore bodies can be predicted. Dip and strike varied with the individual ore bodies; some were flat and seemed to follow the direction of the thrust faults; others conformed to the strike and dip of the normal faults; still others occurred as isolated bodies with unrelated strike or dip.

Some of the ore bodies were connected by stringers of iron oxide of varying size, and although some relation apparently existed between ore bodies, there was no definite criterion that could be used for locating them. All the upper ore bodies were almost completely oxidized, the oxide zone extending from surface to 1,200 feet, or slightly below water level.

Results of the diamond-drilling programs of the corporation and of the Bureau were exceptionally favorable. All of the underground holes drilled encountered good thicknesses of sulfide ore and proved beyond doubt that the El Dorado dolomite in the area on the hanging wall of the Ruby Hill fault lying between Jackson fault on the east and the Bowman on the west is in its normal position in the stratigraphic sequence, that it is mineralized, and that the manner of occurrence of these sulfide ore bodies is somewhat similar to that of the upper oxide deposits.

Data obtained from core-drill samples through the deposit in the El Dorado dolomite in the hanging wall of the Ruby Hill fault indicate that in this segment of the dolomite, replacement action of the solutions was also very complete. The analysis shows an extremely low percentage of insoluble and other gangue material.

Although little is known concerning the lateral extent or the shape of these sulfide deposits, results from the diamond-drill holes seem to point to greater uniformity in the dip and strike and a more definite horizon than was found in the oxidized areas, with perhaps less erratic spacing of the ore bodies. The source of mineralization is the same for both the sulfide and oxide ore bodies. The lower ore bodies are mainly sulfides, with only an oxidized shell. An increase in zinc and decrease in lead contents of the sulfide ore indicate a zonal distribution of these metals.

It has been reported that the outlines of the oxide ore bodies were well-defined - that there was a definite line of demarcation between the ore and barren dolomite. This is true also of the sulfide ore bodies. In all the holes drilled by the Bureau and the corporation there was a sharp break between the ore and waste on both the hanging wall and footwall. With the line of demarcation so easily distinguishable, no difficulty whatever will be experienced in determining the limits to which ore can be mined.

Diamond-drill holes A, B, and C (figs. 5 and 6) encountered a monzonite porphyry sill between the El Dorado dolomite and the Prospect Mountain quartzite, considerably below the ore.

Also, in hole E the same rock was encountered at three different depths in the Hamburg dolomite, well above the ore. Although it has not been definitely determined that the monzonite is a source of the mineralizing solutions, it is very probably that it has some bearing on the formation of the deposits.

THE ORE

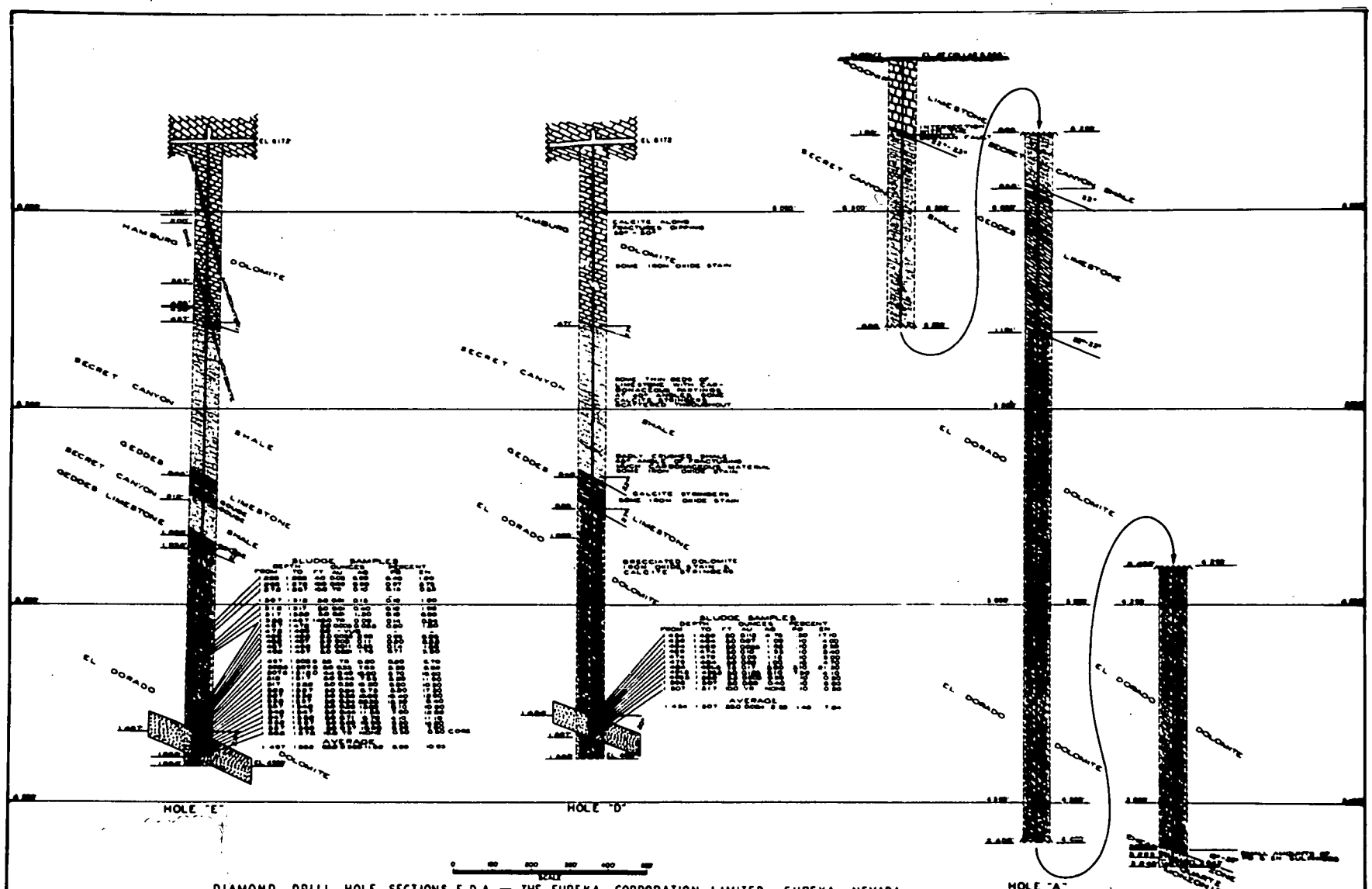
The sulfide ores originally deposited by ascending solution were later completely oxidized and leached to form the typical Ruby hill ores mined in early days south of Ruby Hill fault.

The following analysis (by Fred Claudet of London) of a composite sample of the ores mined in 1878 by the Richmond-Eureka Co. is representative of virtually all the ore mined in Ruby Hill:

	Percent		
Lead oxide	35.65		
Bismuth	(c)		
Copper oxide	0.15	(Lead	33.12
Iron sesquioxide	34.39	Copper	0.12
Manganese oxide	0.13	Iron	24.07
Arsenic acid	6.34	Zinc	1.89
Sulfuric acid	4.18	Arsenic	4.15
Antimony	0.25	Sulfur	1.67
Chlorine	-	Antimony	0.25)
Silica	2.95		
Alumina	0.64		
Lime	1.14		
Magnesia	0.41		
Water and carbonic acid	10.90		
	99.50		
Au-Ag	0.10		
Ag, oz. per short ton	27.55		
Au, oz. per short ton	1.59		

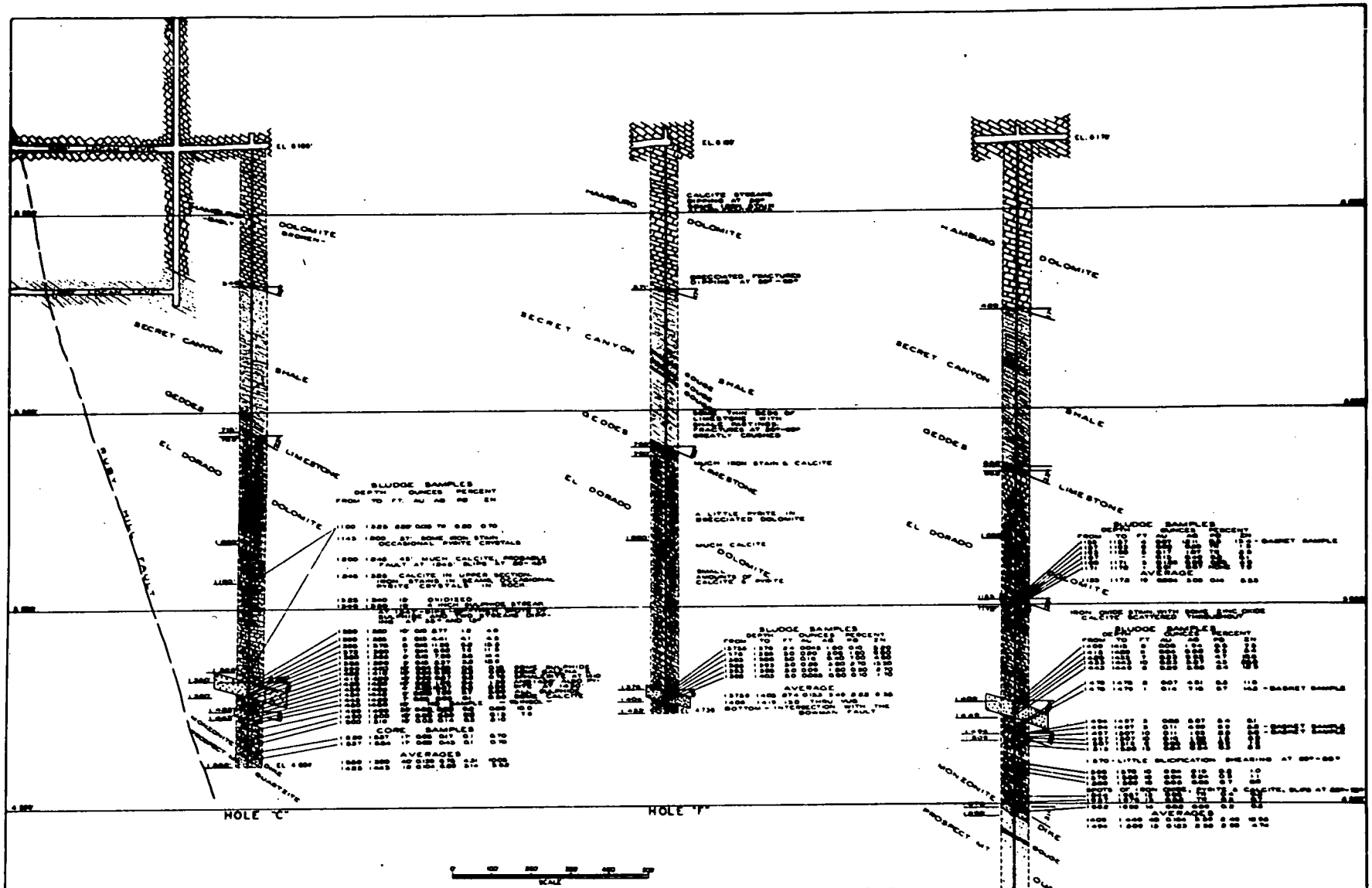
The value of the ores diminished somewhat in later years, but little change occurred in their chemical composition.

Average ore was composed almost entirely of carbonates and oxides of lead and iron. Predominant lead minerals were cerussite, anglesite, and small amounts of lead occurring as galena in nodules which oxidizing action had not reached. Oxidation was quite complete, and only a very small amount of lead or iron sulfides was found. Extensive oxidation and subsequent leaching produced a very loosely consolidated ore, particularly in the upper portion of the ore bodies. Caves, which occurred in connection with virtually all of the ore bodies, were very probably formed by the shrinkage caused by oxidation and subsequent leaching. Oxidation extended to almost 1,200 feet.



DIAMOND DRILL HOLE SECTIONS E, D, A. — THE EUREKA CORPORATION LIMITED, EUREKA, NEVADA

Fig. 6.



DIAMOND DRILL HOLE SECTIONS C.F.B. — THE EUREKA CORPORATION LIMITED, EUREKA, NEVADA

Fig. 5.

Minerals found in ores from the old workings on Ruby Hill include cerrusite, anglesite, mimetite, galena, pyrite, wulfenite, sphalerite, calamine, smithsonite, arsenopyrite, malachite, azurite, manganese, limonite, siderite, calcite, aragonite, quartz, pyromorphite, leadhillite, molybdenite, and wad. Silver was found as chloride and less often as sulfide and was associated almost entirely with the lead minerals. Gold was associated with the limonite and with silica, and some of the more siliceous ore carried a high gold content.

Because of the small quantity of samples recovered, no composite sample was made of ore from diamond-drill holes B, C, D, E, and F. A composite was made at the project, for check purposes, of the samples from hole E, 1,506 to 1,565 feet. Assays are given below. Analyses made by the Bureau of head samples from the ore body cut in hole E also are shown below:

Analyses of hole E composites

	Salt Lake composite, No-18.2	Project composite
	Percent	Percent
S	38.0	
Insol.	.4	
SiO_2	.1	
Fe	29.35	
CaO	2.1	
Al_2O_3	.35	
Pb(oxide)	.1	
Cu(oxide)	.02	
Zn(oxide)	.1	
Pb	8.0	8.1
Cu	.15	
Zn	10.7	11.6
Cd	.12	
Mn	.1	
As	5.7	
Sb	.16	
Co	.02	
Sn	.08	
Au	0.45 oz./ton	0.445 oz./ton
Ag	14.20 oz./ton	13.65 oz./ton
Specific gravity	4.9	

Though having a higher Au-Ag-Pb-Zn content than the average of the ores from holes B, C, D, or F, this analysis is fairly typical of the ore found in these holes. Sludge samples from D and F holes varied little in physical or chemical character from the E hole composite. Analyses of all samples are shown on figures 5 and 6.

The ore minerals observed in the sulfide ores are sphalerite (variety marmatite), galena, pyrite, arsenopyrite, tetrahedrite, chalcopyrite, and minor quantities of alteration minerals. The concentrates from the sulfide

ores contained valuable amounts (0.5 to 0.6 percent) of cadmium as well as small amounts of cobalt, tin, and antimony. The gangue minerals are calcite and altered feldspars

In holes D, E, and F at the top of the ore bodies some oxide minerals were noted, principally limonite, but only in very small amounts.

The oxide minerals apparently have been formed as lining of the caves or vugs, which occurred at the top of D, E, and F hole ore bodies, or as a casing surrounding the ore bodies.

The outstanding physical characteristic of the ore is its softness and friability. The ore could be observed only as sludge samples. No core was recovered from the ore bodies, and as the ore caved readily during drilling (particularly in E hole) it is believed that it is too soft and loosely consolidated to stand without support over comparatively small openings. The ore is heavy; the specific gravity of the composite sample from E hole is 4.9. This figure, however, is too high for the average of ore from all drill holes, as the ore from E hole was all sulfide with no layers or inclusions of dolomite, and a more nearly accurate average specific gravity for the ore would be 3.8.

MINE WORKINGS AND EQUIPMENT

Development of the ore bodies in Richmond and Eureka mines in the upper segment of the El Dorado dolomite, south of and in the footwall of the Ruby Hill fault, was almost entirely through shafts. The "lava beds" or surface outcrop, containing a few relatively minor ore bodies, was worked through adits and tunnels. Two of the main shafts, the Lawton and Richmond, are inaccessible at present. Access to only a part of the old workings is gained through the Locan shaft. This and the Richmond are the deepest shafts on Ruby Hill, and both are approximately 1,250 feet in depth. The Richmond shaft is caved above the 900 Locan level. The Locan shaft has no ladders below the 900.

Ground subsidence and caving make entrance to most of the old workings either unsafe or impossible. A very clear idea of the old workings can be obtained from the many horizontal and vertical sections made by Curtis.8/ Of the four main vertical shafts, the K-K, Lawton, Richmond, and Locan, only the last is now open. Lawton shaft is in bad condition, and the 1,230-foot Richmond shaft, although affording access to some of the workings of the 600-level, is unsafe and is caved between this point and the 900 Locan level, which connects the Richmond with the Locan shaft. The latter shaft, also sunk to 1,230 feet, has but three levels - the 600 (a pump station), 900, and 1,200 levels. The 1,200 level is under water, and at present only the 900 level is used. In mining the sulfide ore bodies, the Eureka Corporation, Ltd., plans to utilize the Locan, a three-compartment shaft (two hoisting and one manway pipe), as an auxiliary and for ventilating purposes. At present the 900 level of the Locan shaft is being extended to connect with the Fad shaft when it reaches this level.

8/ Work cited in footnote 4.

Development of the ore bodies found by the Corporation and the Bureau in the El Dorado dolomite on the hanging wall of the Ruby Hill fault is to be through the Fad shaft. This new shaft, 1,450 feet northeast of the Locan, has four compartments - three 5-1/2 by 5 feet and one 4-1/2 by 5 feet. It has been sunk 542 feet below the collar and is to be continued, in the first stage of the development, to a depth of 3,000 feet, which will extend it between 600 and 900 feet below the ore bodies in the drill holes. Its location in relation to the more important shafts, is shown on figures 1 and 2.

The topography of Ruby Hill offered poor opportunity for access to the ore by tunnels or adits. Most of the ore bodies on the hill were opened by shafts, from which drifts were driven to or toward the Ruby Hill fault or to known ore bodies. Ground conditions in the dolomite were good. The quartzite stood fairly well, but some timbering was necessary, especially where water was encountered. The shales required timbering wherever they were opened.

Drifts and shafts through the Hamburg dolomite required little or no timber, and the El Dorado dolomite stood well except in those zones that were badly crushed and fractured. All ground required timbering in and adjacent to the ore bodies or along the quartzite contact.

Virtually all stoping was done by the square-set method. Some fill was used, but only where filling was readily available or ground conditions forced additional support for the timbers. A horizontal cut-and-fill system was tried out for a short time but apparently was either too costly or not suitable, as it was soon discontinued.

Leasing operations used square sets wherever the size of ore bodies required it or the grade of ore would justify the cost. Smaller ore bodies were mined by underhand or overhand open stope, with stull support for heavy ground.

WORK OF THE PROJECT

Core Drilling

Of the four vertical holes (D, E, F, and G) planned, only three (D, E, and F) were completed. Neither of the drainage holes was drilled.

Very poor progress was made on holes D and E owing to the inexperience of crews, poor equipment, and caving ground (particularly in the Secret Canyon shale). Therefore, a third drill, which was set up on hole F, was used solely as a standby to take up some of the slack caused by waiting for cement to set in holes D and E, as well as delays in delivery of supplies and equipment. Excessive cementing, unusual difficulties in the use of cement for catching up caving ground and stopping water loss contributed toward a low footage per drill shift.

Holes E, D, and F were completed on October 30, 1944, December 7, 1944, and January 29, 1945, respectively. A total of 4,577 feet was drilled. Hole E went to a depth of 1,582 feet; hold D to 1,562 feet; and hole F to 1,433 feet below the 900 level. Ore was encountered in all holes. Sections of the individual holes are shown on figures 5 and 6.

A total of 58 sludge samples and 13 core samples were taken from the three holes. No core samples were obtained from the main ore bodies; those taken were either from above or below the ore. Approximately 335 pounds of the sludge samples were shipped for analysis and ore-dressing tests to experimental stations of the Bureau in Salt Lake City, Utah, and Reno, Nev.

The work of the project resulted in further proof that mineralization of the El Dorado dolomite continued into the segment that lay on the hanging wall of the Ruby Hill fault between the Jackson and Bowman faults; also, that the ore bodies found by the corporation in holes B and C were not limited to the immediate vicinity of these holes, but were either continuous or relatively closely spaced in the area blocked by the holes.

Ore Dressing

The experimental stations of the Bureau in Salt Lake City and Reno have completed beneficiation tests on four separate composites of sludge samples from core-drilled by the Eureka Corp., Ltd., and the Bureau. Detailed reports of the results of the test work have been made and are recorded at these stations. However, a brief summary of the reports follows.

The following tabulation of analyses (gold, silver, lead, and zinc only) permits comparison of the individual physical composites as well as between the physical composites and the calculated weighted average Au-Ag-Pb-Zn content of the ore.

	Oz./ton		Percent	
	Au	Ag	Pb	Zn
1. Composite of B and C hole rejects sent in by R. A. Elgin	-	-	3.3	9.6
2. Composite of B and C hole rejects, Ne-18.1, sent in by William Sharp	0.16	5.3	3.6	9.2
3. E hole composite, Bureau sample) Ne-18.2	.45	14.20	8.0	10.7
) Ne-18.3	.45	14.55	8.8	11.5
4. D, E, and F hole composite, Bureau sample	.235	6.5	4.5	9.2
5. Calculated weighted average content of ore reserves	.241	7.28	4.46	9.84

The first composite sample, sent in by R. A. Elgin, was made up of rejects of sludge samples from holes B and C. The size of the sample, however, limited test work to checking for the grade of concentrate that might be obtained by selective flotation, and no attempt was made to obtain maximum recovery. The results of the tests are shown below.

Product	Assay, percent				Distribution, percent	
	Pb	Zn	Cd	Fe	Pb	Zn
Lead concentrate	66.0	6.5	-	3.65	46.2	1.3
Zinc concentrate No. 1	2.2	53.8	0.64	7.4	5.1	36.0
Zinc concentrate No. 2	5.1	50.4	.61	8.5	8.6	24.5
Head sample	3.3	9.6	-	26.4		

The second composite, sent in by William Sharp, of Eureka Corp., Ltd., was made up of 13 assay-sample rejects from holes B and C. Owing to the size of the sample, no test work was done to determine the method of treatment required for recovering the gold in the auriferous pyritic tailings. The zinc cleaner and rougher tailings are composed almost entirely of pyrite containing over 90 percent gold. Complete test data on selective flotation of lead and zinc on this composite follow.

Test No.: Z-18187 Date: 6-29-43

Ore: Eureka Corporation, Ne-18.1 Class: Lead-zinc

Treatment: Selective flotation of lead and zinc

Product	Assay No.	Weight	Percent weight	Assay, percent					
				Pb	Zn	Fe	Insol.	CaO	Cd
Pb cl. conct.	13811	22.6	4.5	63.2	2.7	6.35	0.4	-	-
Pb cl. tail.		11.0	2.2	14.0	7.0	17.5	.4	-	-
Zn recl. conct.	13998	58.9	11.8	.6	52.0	8.5	.2	-	0.60
Zn recl. tail.	13999	18.7	3.8	1.3	36.7	17.0	.2	-	-
Zn cl. tail.		226.2	45.4	.4	2.7	38.0	2.2	-	-
Ro tail.	13815	161.0	32.3	.05	.4	19.6	.8	19.6	-
Head sample		498.4	100.0	3.47	9.16	25.9	1.1	8.6	-
Calc. Zn cl. conct. .			15.6	.9	45.2	10.9	1.2	-	0.45

	Assay No.	Oz/ton		Distribution, percent			
		Ag	Au	Pb	Zn	Ag	Au
Pb cl. conct.	13811	60.9	0.06	82.0	1.3	56.6	2.1
Pb cl. tail.		17.6	.12	8.9	1.7	8.0	2.1
Zn recl. conct.	13998	4.0	.01	2.0	67.0	9.7	.9
Zn recl. tail.	13999	2.0	.04	1.4	15.2	1.6	1.2
Zn cl. tail.		2.15	.22	5.2	13.4	20.1	78.5
Ro tail.	13815	.6	.06	.5	1.4	4.0	15.2
Head sample		4.85	.127	100.0	100.0	-	-
Calc. Zn cl. conct. .		3.7	.02	3.4	82.2	11.3	2.1

Reagents, pounds per ton

Pebble mill grind, 65-mesh	Pb float	Zn float	Zn cleaning
CaO-2.0	Z-3-0.09	$CuSO_4$ -1.8	Zn Ro. conct. ground in pebble mill with 4.0 lb./ton CaO
$ZnSO_4.H_2O$-6.0	B-23-0.06	Z-3-0.20	
NaCN -0.5		Z-6-0.15 B-23-0.06	

The third series of tests was made on a composite (Ne-18.2) of the sludge samples from hole E, analysis of which follows:

Ne-18.2:	Percent
S	38.0
Insol.	.4
SiO_2	.1
Fe	29.35
CaO	2.1
Al_2O_3	.35
Pb (oxide)	<.1
Cu (oxide)	<.02
Zn (oxide)	<.1
Pb	8.0

Ne-18.2:	Percent
Cu	.15
Zn	10.7
Cd	.12
Mn	.1
As	5.7
Sb	.16
Co	.02
Sn	.08
	Oz./ton
Au	0.45
Ag	14.20

Treatment procedures, as quoted from the report by the Bureau's Salt Lake City experimental station, were:

1. Selective flotation
2. Cyanidation of pyritic rougher tail
3. Cyanidation of roaster rougher tail

The Bureau's Reno experimental station also made many tests to determine the best method of treatment of the pyrite, which makes up the bulk of the tailings. These tailings contained 93.8 percent of the gold. As stated, the results of these tests have been reported by the Metallurgical Branch and no attempt will be made to give the complete reports. Excerpts from the reports are quoted and tables are given, however, in order to compare the results with those on the above tests and one other made on a low-grade composite from D, E, and F holes.

The following excerpts are from a preliminary report by the Salt Lake City experimental station.

> Only fair recoveries of marketable lead and zinc products were obtained by selective flotation. The physical nature of diamond-drill sludge samples was a handicap to good flotation, as an intense tarnish was present on all galena and sphalerite particles. Whether this tarnish is peculiar to the natural deposit or is due to drying of core sludge samples could not be determined with certainty. The gold content of ore is contained in pyrite, and as the bulk of ore is pyrite, the flotation tailing will be a gold concentrate. This gold product was only partly amenable to cyanidation following an oxidizing roast and probably would require smelting for optimum recovery. The cadmium content followed the zinc closely; however, no marked concentration of cobalt, tin, antimony, or arsenic was obtained.

Product	Assay, percent						
	Pb	Zn	Fe	As	Sb	Cd	Co
Pb conct.	61.4	1.8	11.1	5.3	0.61	-	-
Zn conct.	1.0	53.6	9.1	.6	.06	0.53	0.02
Cl. tail.	5.6	10.9	32.7	-	-	-	-
Ro. tail.	.9	1.8	40.8	6.8	-	-	-

Product	Oz/ton		Recovery, percent			
	Au	Ag	Pb	Zn	Au	Ag
Pb conct.	0.22	77.5	74.5	1.4	4.7	60.1
Zn conct.	.04	4.7	2.1	70.6	1.5	6.4
Cl. tail.	.53	11.5	16.1	19.5	27.3	21.0
Ro. tail	.48	2.6	7.3	8.5	66.5	12.5

The tailings are included in above table, as they are largely auriferous pyrite containing 93.8 percent of the gold and 33.5 percent of silver. Direct cyanidation of the pyrite tailing for recovery of gold was unsuccessful, as less than 1 percent of gold was soluble even with minus 200-mesh grinding. Following an oxidizing roast, reginding, and cyanidation, 70 percent of the gold and 31 percent of the silver was extracted. These recoveries are still too low, and the recommended treatment procedure would be direct smelting of pyrite for precious-metal recovery.

The fourth and last series of tests was made on a composite made up of proportionate parts of the composites from D, E, and F holes. Although last reported as incomplete, the tests had proceeded far enough to show that the results compared favorably to those obtained on the higher-grade ore.

The following is quoted from a report by the Salt Lake laboratory on this work.

> Test work on this sample, which assayed 4.5 percent Pb, 9.2 percent Zn, 24.4 percent Fe, 0.5 percent insol., 0.235 oz. Au, 6.5 oz. Ag, 0.2 percent oxidized lead, and 0.5 percent oxidized zinc, has been underway for some time.
>
> The results obtained thus far are roughly comparable to those obtained in tests on higher-grade ore. The gold content of the ore is so completely locked in pyrite that it cannot be liberated and therefore remains in the pyrite tailings. The selective flotation of the lead and zinc is further complicated by the highly tarnished condition of the surfaces of the lead and zinc sulfide minerals in the sludge samples as submitted. It is possible that this tarnished condition of these minerals has prevented obtaining optimum metallurgical results.
>
> Approximately 73 percent of the lead was recovered in a concentrate assaying 46.3 percent Pb, 4.8 percent Zn, 0.28 oz. Au, and 48.9 oz. Ag. Only 8.3 percent of the gold and 54.5 percent of the silver were recovered in this concentrate. The zinc concentrate

assayed 55.6 percent Zn, 0.8 percent Pb, 7.8 percent Fe, 0.02 oz. Au, and 4.3 oz. Ag, with a recovery of 69.7 percent of the total zinc. Work is being continued on the small amount of composite which remains. However, the quantity of the composite sample will not permit large-scale investigation of the possibility of roasting and the cyaniding the pyrite tailings for the recovery of gold.

The uniform results obtained from the tests indicate that no difficulty will be experienced in making fair recoveries of lead and zinc by standard methods of selective flotation of the ore. The tarnished condition of the samples probably contributed somewhat to the fact that only fair recoveries were made. The ore no doubt will be tarnished less than the samples used for testing, and in actual practice recoveries probably will be higher than the tests indicate.

Some difficulty was experienced in working out an economical method of treatment for recovering gold from the pyritic tailings. The tests made by the Bureau's Reno and Salt Lake experimental stations for determining a method of treatment to recover the gold from these tailings are in a degree inconclusive. The results obtained by both stations indicate than an economical method is yet to be worked out, and it is possible that the tailings may have to be treated by pyrometallurgical methods in order to recover the gold from this product.

EXHIBIT G

SYNOPSIS

of a

REPORT ON AN INVESTIGATION

of the

PROPERTIES OF EUREKA CORPORATION LIMITED IN NEVADA

by

Ira B. Joralemon

September, 1949

EUREKA CORPORATION LIMITED

2810—25 KING STREET WEST
TORONTO, ONTARIO

September 7th, 1949.

To the Shareholders,
Eureka Corporation Limited.

Mr. Ira B. Joralemon has submitted the following Summary of a Report which he has prepared as a result of his recent investigation of the Eureka mining properties in Nevada. Pertinent maps are enclosed herewith.

The complete report is too voluminous to permit of its publication but the essential points are covered in the Summary. The complete report is available at the Toronto Office, at the address shown above, or in New York City at Suite 1841, 230 Park Avenue.

The Report of Mr. W. E. Romig, who has also been making an investigation on behalf of the Company, should be received during October.

G. S. JEWETT,
Secretary, Eureka Corporation Limited.

August 23rd, 1949.

Eureka Corporation Limited,
230 Park Avenue,
New York (17), N.Y.

Gentlemen:

Following is a Summary of my Report on Eureka Corporation Limited. This Summary is repeated in my detailed report on the Eureka problem. Maps and sections are enclosed with the report.

From 1869 to 1882 the high grade oxidized orebodies under Ruby Hill, near Eureka, Nevada, produced more than $40,000,000. in silver, lead, and gold. About 1,300,000 tons of ore are said to have been mined. Later production has been comparatively small, and chiefly from low grade ore. Eureka Corporation Limited now owns or holds under lease all of the portion of the Eureka District in or near Ruby Hill.

The Ruby Hill ore occurred in irregular bodies, the horizontal projection of which occupied about a quarter of an area 2,200 feet long from northwest to southeast by 1,200 feet wide. On the southwest the ore-bearing dolomite came to the surface. On the northeast it was cut off at about the 900 Level by the large Ruby Hill Fault. The ore-bearing rocks northeast of this fault were

dropped in two large fault blocks. Block 1-B, northwest of the Bowman cross fault, was dropped about 700 feet. Save for one barren drill hole far to the north, no development has been done in the ore-bearing horizon in this block. Block 1-A, southeast of the Bowman Fault, was dropped 1,300 feet. Five diamond drill holes in an area 400 feet long by 300 feet wide in this block indicated a possible 800,000 tons of heavy sulphide ore that averages 0.192 ounces gold, 5.92 ounces silver, 3.74% lead, and 9% zinc for 51.7 feet in thickness. The best hole averaged 0.388 ounces gold, 11.52 ounces silver, 6.9% lead, and 10.93% zinc for 65 feet in thickness. This indicated ore occupies less than a tenth of the promising area northeast of the Ruby Hill Fault.

Preliminary metallurgical tests on samples from the drill holes indicate that the net payment at the mill from shipment of concentrates, with lead at 15 cents per pound and zinc at 10 cents, would be $14.75 per ton of ore of the average grade, and double this amount per ton of ore of the grade cut by the best drill hole.

Eureka Corporation Limited sunk the 2,415 foot Fad Shaft to make this deep ore available. About 700 feet from the ore a crosscut on the 2,250 Level encountered a great flow of water that flooded the shaft. Pumping up to 9,000 gallons per minute failed to recover the 2,250 Level. The principal reasons for the failure were:

1. The 2,250 Level was 1,250 feet below the original water table. The resultant rapid flow under great head enlarged the water courses, bringing in mud and grit that made it impracticable to keep pumps running.

2. No drill holes were kept open, to permit measuring the drop in water table.

3. A water door on the 2,250 Level was not strong enough to stand the great pressure.

4. No drill hole was run ahead of the face, to permit gradual draining of large open fissures.

5. It is possible that part of the water pumped to the surface ran down crevices and was recirculated.

From the pumping record and from experience in other mines, it seems likely that the 2,250 Level ore can be made accessible by unwatering the mine a few hundred feet at a time, pumping a total of four to six billion gallons of water at the rate of 5,000 gallons per minute.

There are three excellent chances of finding large orebodies at much higher levels. This would permit bringing the mine to production at a far lower cost than that required to unwater the 2,250 Level. The three promising places are:

1. In Block 1-B, northwest of the Bowman Fault, above the 1,700 Level.

2. In higher beds 400 to 600 feet above the ore developed by drilling in Block 1-A.

3. In a fault block of dolomite under the quartzite that underlies the old Ruby Hill orebodies, from the 1,200 to the 1,700 Level.

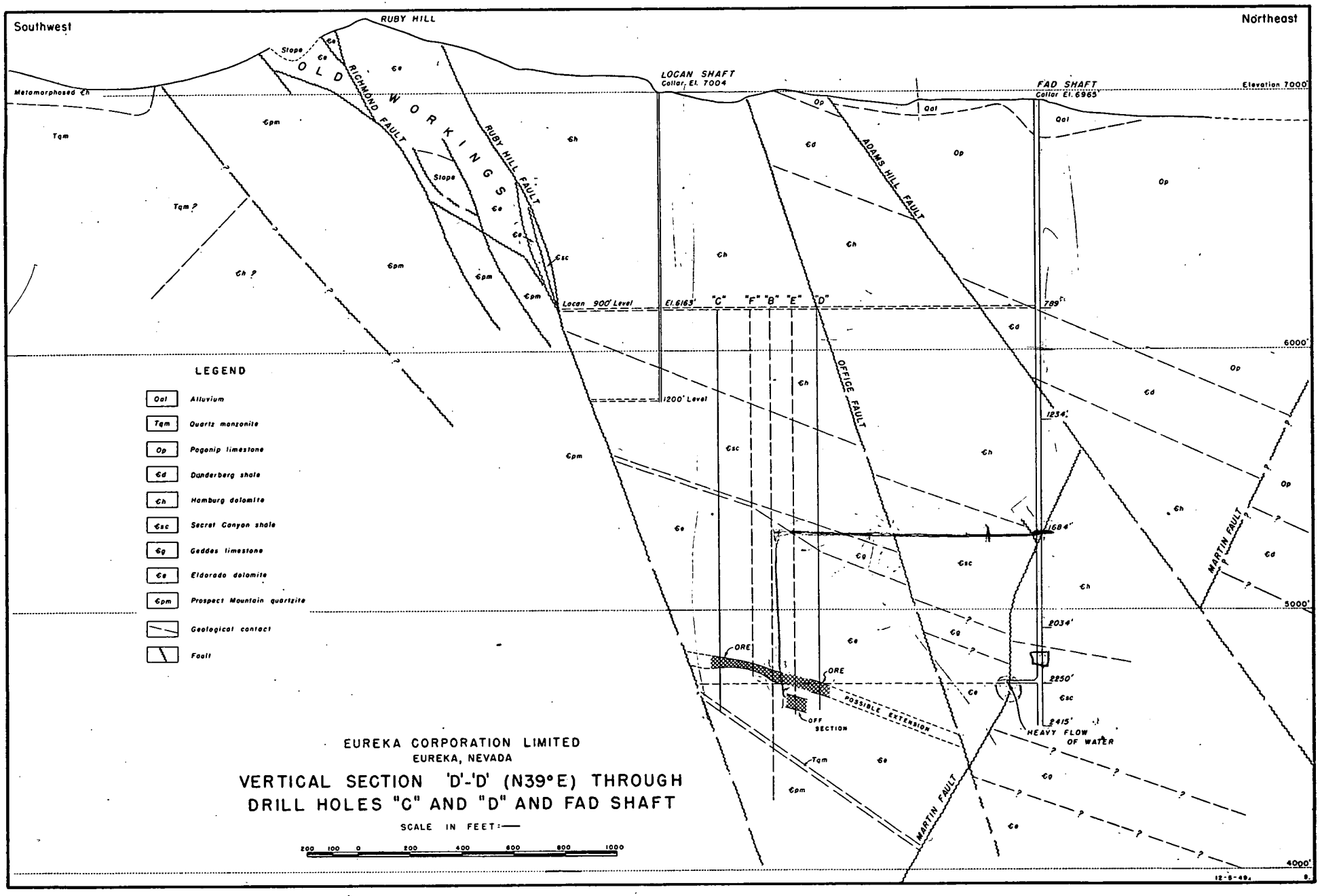
These three possibilities can be tested by churn and diamond drill holes at comparatively small expense.

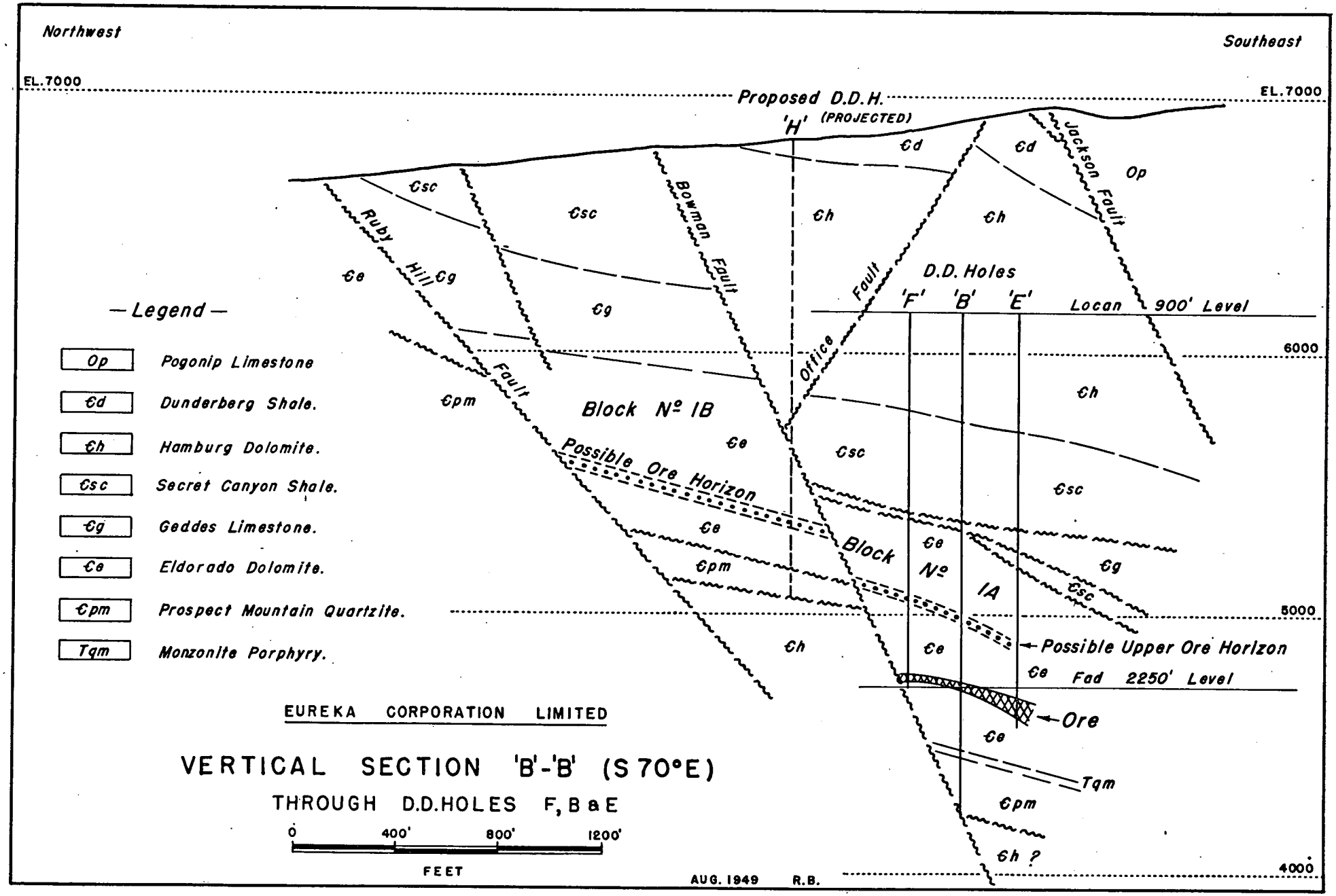
MAP

BELONGS

HERE

2


Southwest
Northeast
RUBY HILL
Metamorphosed Ch
Stope
OLD WORKINGS
RICHMOND FAULT
RUBY HILL FAULT
LOCAN SHAFT
Collar El. 7004
FAD SHAFT
Collar El. 6965'
Elevation 7000'
ADAMS HILL FAULT
OFFICE FAULT
MARTIN FAULT
Locan 900' Level
1200' Level
El. 6163'
"C"
"F"
"B"
"E"
"D"
789'
1234'
1684'
2034'
2250'
2415'
HEAVY FLOW OF WATER
ORE
OFF SECTION
POSSIBLE EXTENSION
6000'
5000'
4000'
LEGEND
Qal Alluvium
Tqm Quartz monzonite
Op Pogonip limestone
Ꞓd Dunderberg shale
Ꞓh Hamburg dolomite
Ꞓsc Secret Canyon shale
Ꞓg Geddes limestone
Ꞓe Eldorado dolomite
Ꞓpm Prospect Mountain quartzite
Geological contact
Fault
EUREKA CORPORATION LIMITED
EUREKA, NEVADA
VERTICAL SECTION 'D'-'D' (N39°E) THROUGH
DRILL HOLES "C" AND "D" AND FAD SHAFT
SCALE IN FEET:—
200 100 0 200 400 600 800 1000
12-6-49


Northwest
Southeast
EL.7000
EL.7000
Proposed D.D.H.
'H' (PROJECTED)
Ꞓd
Ꞓd
Jackson Fault
Op
Ꞓsc
Ꞓsc
Bowman Fault
Ꞓh
Ꞓh
Ruby Hill Fault
Ꞓe
Ꞓg
Ꞓg
Office Fault
D.D. Holes
'F' 'B' 'E'
Locan 900' Level
6000
Ꞓh
Ꞓpm
Block Nº 1B
Ꞓe
Ꞓsc
Possible Ore Horizon
Ꞓsc
Ꞓe
Ꞓe
Block Nº 1A
Ꞓpm
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Ꞓsc
5000
Ꞓh
Ꞓe
Possible Upper Ore Horizon
Ꞓe
Fad 2250' Level
Ore
Ꞓe
Tqm
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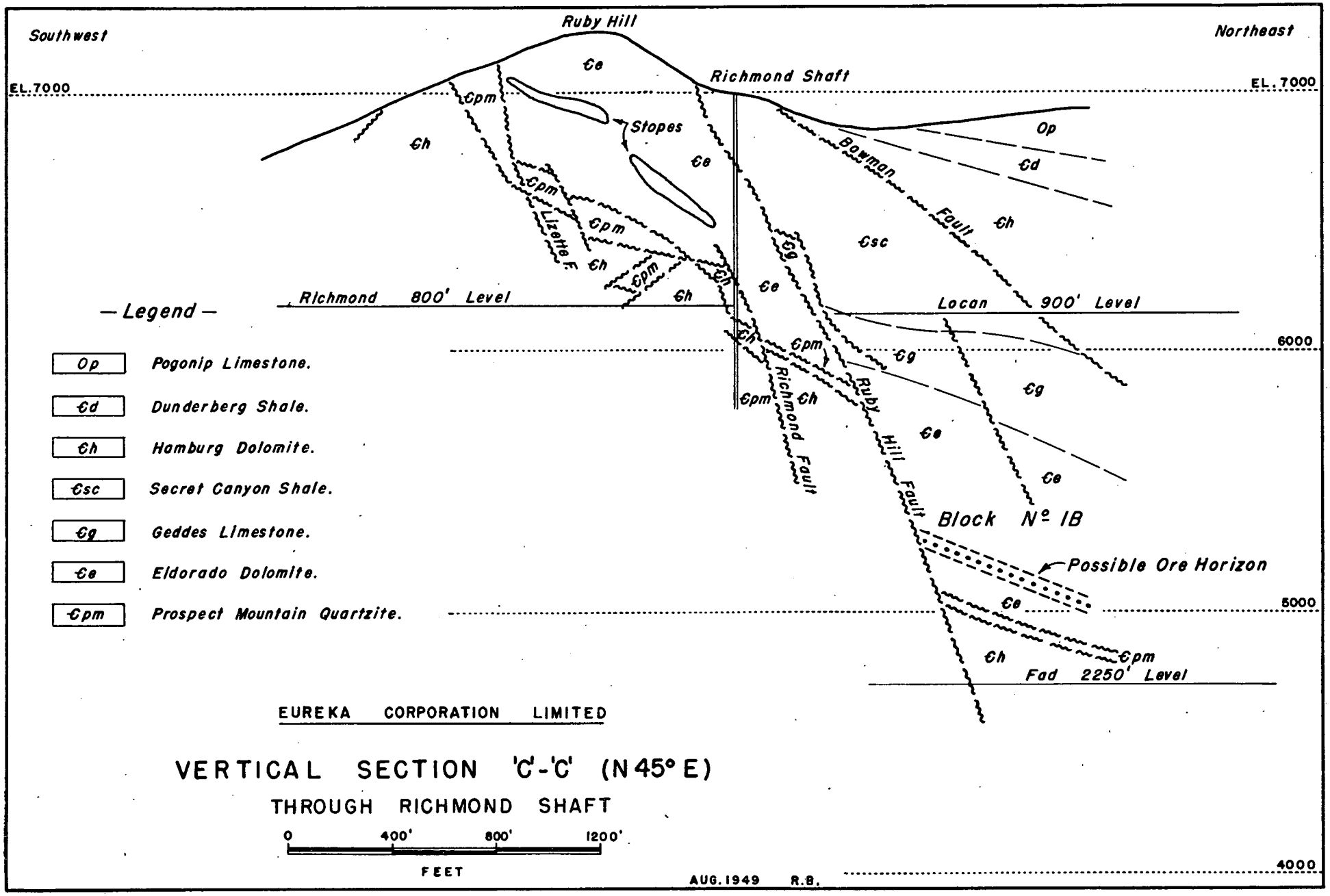
Ꞓh ?
4000
— Legend —
Op Pogonip Limestone
Ꞓd Dunderberg Shale.
Ꞓh Hamburg Dolomite.
Ꞓsc Secret Canyon Shale.
Ꞓg Geddes Limestone.
Ꞓe Eldorado Dolomite.
Ꞓpm Prospect Mountain Quartzite.
Tqm Monzonite Porphyry.
EUREKA CORPORATION LIMITED
VERTICAL SECTION 'B'-'B' (S 70°E)
THROUGH D.D.HOLES F, B & E
0 400' 800' 1200'
FEET
AUG. 1949 R.B.



EUREKA CORPORATION LIMITED

VERTICAL SECTION 'C'-'C' (N 45° E)

THROUGH RICHMOND SHAFT

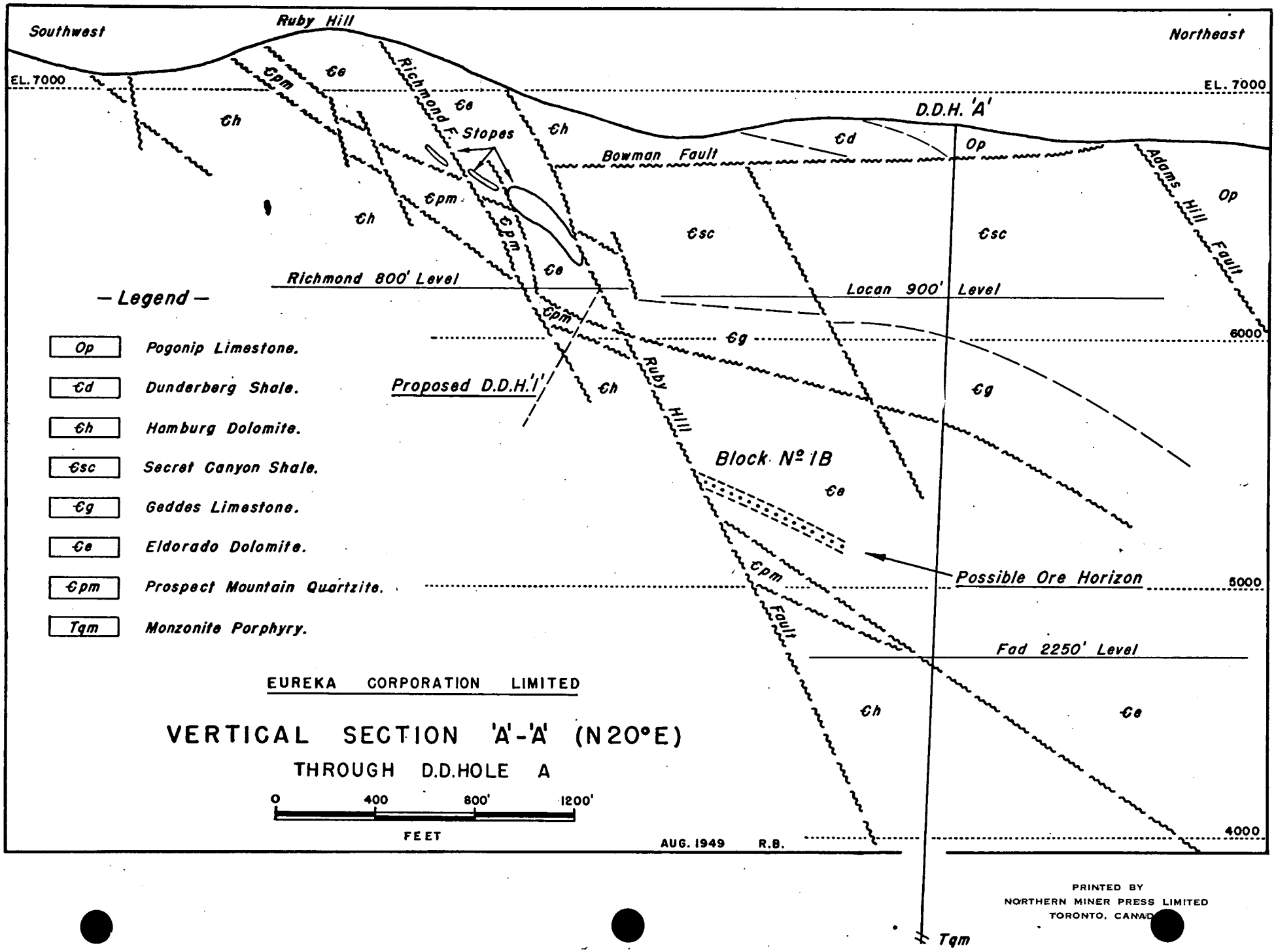


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EXHIBIT K

EXHIBIT H

Eureka Corporation Limited
Eureka, Nevada

ORE AMENABILITY

and

METALLURGICAL TESTING

EUREKA CORPORATION, LTD.
Eureka, Nevada

NEPHELINE PRODUCTS LIMITED
Lakefield, Ontario

REPORT ON
EUREKA PROPERTY

On November 25, 1944, ten samples of diamond drill sludge from Hole "E" on the Richmond-Eureka property, Nevada, were received from Mr. Geo. W. Mitchell, marked as in Table I below. Gold and silver assays on the individual samples, as reported by the U. S. Bureau of Mines and by our own laboratory, are shown:

TABLE I

Sample No.	Mark	N. P. L. Au.O/Ton	N. P. L. Ag. O/Ton	U. S. B. Au.O/Ton	U. S. B. A.O/Ton	Wt. Grams
1	1122' to 1127'	0.25	8.87	0.24	8.75	1165
2	1510' to 1517'	0.44	7.84	0.44	7.55	1360
3	1517' to 1522'	0.40	17.00	0.38	16.20	2219
4	1527' to 1532'	0.38	16.02	0.38	16.00	2648
5	1532' to 1537'	0.37	28.71	0.34	29.35	1273
6	1537' to 1542'	0.42	13.52	0.38	13.60	2500
7	1542' to 1547'	0.46	11.88	0.44	11.55	2560
8	1547' to 1552'	0.72	6.90	0.71	6.70	2405
9	1552' to 1557'	0.63	11.65	0.60	10.90	2225
10	1558' to 1559'	0.40	10.48			1247

Some of the individual sample bags were broken and the spillings were gathered up and called "sample No. 11", weighing 2355 grams. After combining and thoroughly mixing the eleven samples a "heads sample" was cut out for analysis with the following results:

Analysis of Heads Sample:

Gold	0.45	ozs./ton
Silver	13.90	" "
Lead	8.34	per cent
Zinc	12.14	" "
Iron	31.13	" "
Sulphur	38.81	" "
Arsenic	6.12	" "
Copper	0.10	" "
Antimony	0.18	" "
Insols	1.56	" "

The specific gravity of the heads sample was determined as 4.40.

The material was placed in glass jars under distilled water to prevent atmospheric oxidation. Test work was commenced on January 17, 1945.

A microscopic examination by Mr. La Mar Evans of the U. S. Bureau of Mines showed the chief ore minerals to be galena and sphalerite, probably of marmitic variety, with smaller amounts of chalcopyrite, cerussite, smithsonite and traces of calamine. The sphalerite and galena range in size from minus 100 mesh to plus 400 mesh (theoretical) and have a brown tarnish which appears to be iron oxide. The gangue minerals in order of their abundance are pyrite, arsenopyrite, marcasite, calcite and altered feldspars, according to Mr. Evans' report.

Observations during later test work indicated the presence of marmatite was unlikely.

The following test work was undertaken in our laboratories to June 1, 1945.

TEST NO. I

A primary lead concentrate was floated while depressing zinc with cyanide and zinc sulphate. This was followed by a Zn-Fe-As Bulk float after reactivating with copper sulphate, attempting to make a clean primary tailing. The Zn-Fe-As concentrate was reground and the zinc was floated from it while depressing the pyrite and arsenopyrite with excess lime and cyanide.

Test Details:

A 2000 gram sample of ore, which was 75% minus 200 mesh size, was ground for five minutes in the laboratory ball mill with 1200 ml. of water and the following reagents -

Soda ash	2.0 lbs./ton
Sodium cyanide	0.02 "
Zinc sulphate	1.5 "
Sodium ethyl xanthate	0.01 "

The mill was discharged into a 2000 gram Denver Sub-A flotation cell and the pulp was conditioned for five minutes with the following -

Aerofloat 31	0.025 lbs./ton
Cresylic acid	0.032 "

A primary lead concentrate was removed for 15 minutes with the addition of 0.048 lbs./ton of cresylic acid.

The lead tailing was conditioned for 10 minutes with the following:-

Copper sulphate	1.5 lbs./ton

and an additional 3 minutes with the following -

Sodium ethyl xanthate	0.20 lbs./ton
Pine oil	0.068 "

A Zn-Fe-As bulk concentrate was then removed for 20 minutes. An addition of 0.10 lbs. ton of Aerofloat 25 was made to improve the froth.

The Zn-Fe-As concentrate was reground for 5 minutes without washing and with the following reagents -

Lime	4.0 lbs./ton
Sodium cyanide	0.10 "

The pulp was conditioned for 5 minutes with the following -

Sodium ethyl xanthate	0.10 lbs./ton
Pine Oil	0.05 "

A zinc rougher concentrate was floated for 10 minutes without additional reagents and an Fe-As tailing remained.

Product	Wt. %	Assays - ozs./tn. Au	Ag	Pb	Analyses - per cent Zn	Fe	S	As	Insols
Heads (calcd)	100.0	0.45	13.58	7.49	13.01	31.59	38.32	5.89	0.70
Pb rougher conc.	9.7	0.26	74.02	53.80	2.66	10.26	20.31	4.51	0.41
Zn rougher conc.	23.5	0.14	11.40	3.80	47.59	11.41	32.96	1.35	1.08
Fe-As tailing	62.1	0.61	5.14	1.90	2.41	42.78	44.93	7.82	0.44
Primary tails	4.7	0.34	11.24	4.30	1.70	28.48	14.78	5.90	2.97

Product	Wt. %	Distribution of Metals - per cent						
Heads (calcd.)	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Pb rougher conc.	9.7	5.57	52.89	69.65	1.98	3.15	5.14	7.43
Zn Rougher conc.	23.5	7.25	19.71	11.91	85.89	8.48	20.19	5.38
Fe-As Tailing	62.1	83.67	23.53	15.76	11.52	84.15	72.87	82.50
Primary tails	4.7	3.51	3.87	2.68	0.61	4.22	1.80	4.69

Conclusions:

The lead recovery of 69.65% was not satisfactory. The loss of gold in the primary tailing was too high to be acceptable. The test showed that the gold values were largely associated with the Fe-As product. However, the procedure used was not suitable for this ore and was varied in Test No. 2.

TEST NO. 2

This test was conducted along standard methods of selective flotation, depressing zinc with cyanide and zinc sulphate while floating a lead rougher concentrate, reactivating the zinc with copper sulphate and removing a zinc rougher concentrate while depressing the pyrite and arsenopyrite with lime and cyanide. The rougher concentrates were suitably cleaned to grade.

Test Details:

A 2000 gram sample of ore was ground for 8 minutes in dilute pulp with the following reagents -

Soda Ash	3.0 lbs./ton
Zinc Sulphate	1.5 "
Sodium cyanide	0.02 "

The mill was discharged into a 2000 gram Denver Sub-A flotation cell and the pulp conditioned for 5 minutes with the following:

Aerofloat 31	0.025 lbs./ton
Sodium ethyl xanthate	0.02 "
Cresylic acid	0.048 "

A lead rougher concentrate was removed for 15 minutes and this was cleaned once in a 500 gram cell to make a lead cleaner concentrate and a lead cleaner tailing.

The lead tailing was conditioned for 5 minutes with the following reagents -

Lime	0.5 lbs./ton
Sodium cyanide	0.15 "

and an additional 5 minutes with the following -

Copper sulphate	1.5 lbs./ton
Sodium ethyl xanthate	0.10 "
Pine Oil	0.05 "

A zinc rougher concentrate was removed for 18 minutes, skimming to a white froth. This rougher concentrate was cleaned threee times with 1.0 lb./ton of lime and 0.07 lbs./ton of cyanide to make a zinc cleaner concentrate and a zinc cleaner tailing.

The zinc rougher tailing was filtered and the volume of solution noted. Dissolved gold was found to amount to 0.0005 oz./ton of solution. The solids were reserved for further test work on gold recovery.

Results:

Product	Wt. %	Assays Ozs./ton Au	Ag	Analyses, per cent Pb	Zn	Fe	S	As	Indols.
Heads (Calcd.)	100.0	0.50	14.39	8.52	12.75	30.85	38.43	5.80	2.90
Pb cleaner conc.	11.6	0.28	70.48	56.75	2.54	12.57	22.16	4.85	0.20
Pb cleaner tails	1.7	0.54	47.96	16.52	10.26	24.33	29.04	6.62	3.44
Zn Cleaner conc.	20.3	0.04	7.42	0.90	53.44	7.95	34.75	0.75	—
Zn Cleaner tails	17.4	0.63	11.62	3.90	6.42	37.24	41.26	8.71	0.42
Zn Rougher tails	49.0	0.58	3.81	1.60	0.63	42.66	43.14	7.07	0.28

Product	Wt. %	Distribution of Metals - per cent Au	Ag	Pb	Zn	Fe	S	As
Heads (cald.)	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Pb cleaner conc.	11.6	6.31	57.03	77.55	2.32	4.74	6.72	9.73
Pb cleaner tails	1.7	1.72	5.48	3.19	1.32	1.30	1.24	1.88
Zn cleaner conc.	20.3	15.74	10.48	2.15	85.18	5.24	18.38	2.63
Zn Cleaner tails	17.4	21.23	14.05	7.92	8.76	21.01	18.69	26.12
Zn rougher tails	49.0	55.00	12.96	9.19	2.42	67.71	54.97	59.64

Conclusions:

The results indicate that the ore will be amenable to standard practice in zinc-lead flotation. The lead recovery is still low however.

TEST NO. 3

This test was along the lines of Test No. 2; The PH for the lead float was increased by the use of more soda ash in the ball mill. Slightly more xanthate and Aerofloat 31 were used in the lead float and the machine was pulled to a dead float. The lime and cyanide to the zinc conditioner were increased and an attempt was made to produce a low zinc tailing. The zinc rougher concentrate was ten reground with lime and cyanide and floated to produce a first cleaner tailing as low as possible which was combined with zinc rougher tailing. The cleaner concentrate was given three additional cleanings to make a final zinc cleaner concentrate and a zinc cleaner tailing.

An attempt was made to float the pyrite from the arsenopyrite in the zinc rougher tailing.

Test Details:

A 2000 gram sample of ore was ground for 8 minutes in the ball mill with 1000 ml. of water and with the following reagents -

Soda ash	5.0 lbs./ton
Zinc sulphate	1.5 "
Sodium cyanide	0.02 "

The ball mill was discharged into the Denver Sub-A cell and a rougher lead concentrate removed for 15 minutes with 0.02 lbs./ton of sodium ethyl xanthate and 0.06 lbs./ton of Aerofloat 31; the pH of the lead rougher float was 9.7.

The lead tailing was conditioned for 5 minutes with the following reagents -

Lime	5.0 lbs./ton
Sodium cyanide	0.20 "

and an additional 5 minutes with the following:

Copper sulphate	1.5 lbs./ton
Sodium ethyl xanthate	0.10 "
Pine Oil	0.034 "

A zinc froth was removed with 0.05 lbs./ton of pine oil until the froth was practically barren. The pH of the zinc rougher float was 10.4.

The zinc rougher concentrate was filtered; washed and reground for 15 minutes in the pebble mill with the following:

Lime	0.25 lbs./ton
Sodium cyanide	0.20 "

The pulp was conditioned in the floatation cell with the following reagents -

Sodium ethyl xanthate	0.015 lbs./ton	
Pine oil	0.034 "	was added

and the machine pulled to a white froth.

The zinc cleaner concentrate was given three additional cleanings without reagents, making a zinc cleaner concentrate and a combined zinc cleaner tailing. The first zinc cleaner tailing was combined with the zinc rougher tailing.

The zinc rougher tailing was washed and reground for 15 minutes in the pebble mill with the following reagents -

Lime	0.25 lbs./ton
Sodium ethyl xanthate	0.10 "

The pulp was transferred to the flotation cell and 0.034 lbs./ton of pine oil used to remove a pyrite concentrate while depressing the arsenopyrite.

Results:

		Assays Ozs./ton		Analyses - per cent					
Product	Wt. %	Au	Ag	Pb	Zn	Fe	S	As	Insols.
Heads (calcd.)	100.0	0.458	14.28	8.64	12.26	30.98	38.30	5.85	0.34
Pb rougher conc.	16.5	0.40	68.41	46.00	3.50	16.86	25.34	6.28	0.28
Zn cleaner conc.	15.1	0.05	5.09	0.86	56.03	7.82	33.25	0.33	0.10
Zn cleaner tails	8.7	0.35	9.00	1.73	36.45	17.72	34.18	4.25	0.54
Pyrite conc.	30.2	0.48	3.13	1.24	0.15	45.98	49.99	3.08	0.12
Arsenopyrite conc.	29.5	0.71	2.59	1.42	0.14	39.13	37.29	11.66	0.70

	Wt.	Distribution of Metals - per cent						
Product	%	Au	Ag	Pb	Zn	Fe	S	As
Heads (calcd.)	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Pb rougher conc.	16.5	14.37	78.91	87.65	4.70	8.96	10.90	17.69
Zn cleaner con.	15.1	1.64	5.37	1.50	68.64	3.80	13.07	0.85
Zn cleaner tails	8.7	6.57	3.76	1.73	25.75	4.95	7.73	6.29
Pyrite conc.	30.2	31.65	6.62	4.33	0.37	44.82	39.42	15.90
Arsenopyrite conc	29.5	45.77	5.34	4.79	0.34	37.47	28.88	59.27

Following are the screen analyses of the various products:

	SCREENS				
Product	-/65	/100	/200	/365	-365
Pb rougher conc.			4.70	25.48	69.82
Zn cleaner conc.			0.56	15.60	83.84
Zn cleaner tails			3.50	14.00	82.50
Pyrite conc.			3.09	26.00	70.91
Arsenopyrite conc.		0.38	8.32	37.60	53.70

Conclusions:

Lead recovery was improved somewhat in this test but was still not satisfactory. The lead in the zinc tailing should not exceed 0.10% lest it give trouble in cyanidation after roasting for gold and silver recovery. The zinc concentrate is high in arsenic, about 0.2% as being an acceptable figure.

It may be possible to make a good separation of the pyrite and arsenopyrite. A considerable amount of the gold is associated with the latter.

TEST NO. 4

The grinding time was increased in this test and the reagents were varied as shown below. Care was taken to pull the lead rougher until no more lead was floating and a white froth appeared. High soda ash was added and the addition of thiocarbanilide was made with the purpose of floating the lead more completely and thus lowering the lead in the zinc tailing. The rougher zinc float was the same as in Test No. 3. The rougher zinc concentrate was filtered, washed and reground with lime and cyanide and an attempt was made to clean without xanthate, using only a minimum of pine oil with the object of reducing the arsenic content of the zinc concentrate. This was not successful. As the ore supply was limited the products were combined, reagents removed by washing and the cleaning operation repeated without cyanide and with a little xanthate. This was also not successful. Copper sulphate was apparently necessary to activate the zinc. A third attempt was made using copper sulphate and xanthate which was more successful.

Test Details:

A 2000 gram sample of ore was ground for 12 minutes in the ball mill with 1000 ml. of water and with the following reagents -

Soda ash	7.0 lbs./ton
Zinc sulphate	1.5 "
Sodium Cyanide	0.02 "
Thiocarbanilide	0.10 "

The ball mill was discharged into a 2000 gram Denver Sub-A flotation cell and a rougher lead concentrate floated with the following reagents -

Sodium ethyl xanthate	0.02 lbs./ton
Aerofloat 31	0.025 "
Cresylic acid	0.096 "

The pH of the lead rougher float was 9.7

The lead tailing was conditioned for 5 minutes with the following:

Lime	5.0 lbs./ton
Sodium cyanide	0.20 "
Copper Sulphate	1.5 "
Sodium ethyl xanthate	0.10 "
Pine Oil	0.05 "

A zinc rougher concentrate was skimmed to a white froth using 0.017 lbs./ton of pine oil. The pH of the zinc rougher circuit was 11.5

The zinc rougher concentrate was filtered, washed and reground for 20 minutes in the pebble mill with the following reagents -

Lime	1.0 lbs./ton
Sodium cyanide	0.05 "

Pine oil only was added to the flotation cell. The float was not successful.

The products were combined, washed and the following reagents tried:

Lime	0.5 lbs./ton
Sodium ethyl xanthate	0.01 "
Pine Oil	0.034 "

This float was also unsuccessful. The products were combined again, washed and a third attempt made to float a zinc cleaner concentrate with the following:

Copper Sulphate	0.01 lbs./ton
Sodium ethyl Xanthate	0.02 "
Pine Oil	0.034 "

The concentrate was recleaned three times without further addition of reagents making a zinc cleaner concentrate and a combined zinc cleaner tailing.

The zinc rougher tailing was filtered, washed and reground for 15 minutes in the pebble mill with 0.25 lbs./ton of lime. A pyrite concentrate was then removed using the following reagents:

Sodium ethyl xanthate	0.10 lbs./ton
Pine Oil	0.068 "

Results:

Product	Wt. %	Assay Au	Ag	Analyses - per cent Pb	Zn	Fe	S	As	Insols.
Heads (calcd.)	100.0	0.425	14.06	8.33	12.06	31.33	39.03	6.09	0.20
Pb rougher conc.	13.4	0.32	77.91	54.90	2.91	12.99	23.39	6.02	0.20
Zn cleaner conc.	14.8	0.01	5.15	0.83	54.99	8.16	33.67	0.45	0.08
Zn cleaner tails	2.6	0.20	15.43	3.70	34.74	15.81	30.01	2.70	1.06
Pyrite conc.	22.1	0.46	3.74	1.10	8.25	40.19	47.70	3.12	0.08
Arsenopyrite conc.	47.1	0.58	3.46	1.10	1.70	40.54	41.61	9.47	0.24

Product	Wt. %	Distribution of Metal - per cent Au	Ag	Pb	Zn	Fe	S	As
Heads (calcd.)	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Pb rougher conc.	13.4	10.18	74.23	88.23	3.23	5.55	8.03	13.23
Zn cleaner conc.	14.8	0.35	5.42	1.47	67.48	3.86	12.77	1.09
Zn cleaner tails	2.6	1.24	2.89	1.17	7.58	1.33	2.02	1.17
Pyrite conc.	22.1	23.87	5.86	2.91	15.07	28.27	26.93	11.28
Arsenopyrite conc.	47.1	64.36	11.60	6.22	6.64	60.99	50.25	73.23

Following are the screen analyses of the various products:

Product	SCREENS +65	+100	+200	+365	-365
Pb rougher conc.			2.67	19.00	78.83
Zn cleaner conc.				3.20	96.80
Zn cleaner tails					
Pyrite conc.			1.60	17.00	81.40
Arsenopyrite conc.		0.20	5.18	35.60	59.02

Conclusions:

The grade of the lead concentrate both with respect to lead and silver is satisfactory but the recovery is still low. A fairly good separation of the pyrite and arsenopyrite was made and it is shown that a large proportion of the gold is associated with arsenopyrite.

TEST NO. 5

The lead float was similar to Test No. 4 but the soda ash was further increased. The lead tailing was filtered, washed and treated by cyanidation. After the agitation period was finished the solids were filtered and washed thoroughly. The washed solids were then agitated with fresh water and the zinc reactivated with copper sulphate. A zinc concentrate was floated and this was reground and cleaned as in previous tests.

Test Details:

A 2000 gram sample was ground for 12 minutes in the ball mill with 1000 ml. of water and with the following reagents -

Soda ash	8.0 lbs./ton
Sodium cyanide	0.02 "
Zinc Sulphate	1.5 "
Thiocarbanilide	0.10 "

The ball mill was discharged into the flotation cell and a lead rougher concentrate floated by the addition of the following-

Sodium ethyl xanthate	0.02 lbs./ton
Aerofloat 31	0.025 "
Cresylic Acid	0.096 "

The lead tailing was filtered, washed and reground in the pebble mill for 20 minutes in a cyanide solution of 1.50 lbs./ton NaCN and 0.4 lbs./ton CaO, followed by 24 hours agitation. After 24 hours, agitation was continued with a fresh solution of 1.50 lbs./ton NaCN and 0.15 lbs./ton CaO, for an additional 24 hours. The solids were filtered, washed and repulped three times.

The cyanided lead tailing was conditioned with fresh water in the flotation cell with the addition of the following reagents-

Lime	2.0 lbs./ton
Copper Sulphate	1.5 "
Sodium ethyl Xanthate	0.10 "
Pine Oil	0.034 "

A zinc rougher concentrate was removed for 12 minutes. A considerable amount of pyrite floated.

The zinc rougher concentrate was ground for 30 minutes in the pebble mill with the following-

Lime	1.0 lbs./ton
Sodium cyanide	0.07 "

The pulp was discharged into the flotation cell and a froth removed with 0.051 lbs./ton of pine oil. There appeared to be no selectivity so the products were combined, filtered and washed well. A second attempt at cleaning the zinc rougher concentrate was made by conditioning 10 minutes with the following-

Lime	3.0 lbs./ton
Sodium ethyl xanthate	0.05 "

A zinc cleaner concentrate was then removed for 10 minutes and this concentrate was recleaned three times to make a final zinc cleaner concentrate and a zinc cleaner tailing.

The first zinc cleaner tailing was combined with the zinc rougher tailing and, after filtering and washing, was ground for 15 minutes in the pebble mill with 0.25 lbs./ton of lime. The pulp was transferred to the flotation machine and floated with the following reagents for 15 minutes-

Sodium ethyl xanthate	0.15 lbs./ton
Pine Oil	0.05 "

Results:

Product	Wt. %	Analyses - per cent							
		Au	Ag	Pb	Zn	Fe	S	As	Insols.
Heads (calcd.)	100.0	0.45	15.16	9.23	12.10	30.89	38.07	5.99	1.22
Pb rougher conc.	13.5	0.32	76.49	57.10	2.81	12.94	23.18	5.67	0.26
Zn cleaner conc.	18.5	0.01	3.30	0.83	55.39	8.10	33.48	0.37	0.12
Zn cleaner tails	2.9	0.29	9.25	3.45	29.96	19.38	32.98	3.68	0.92
Pyrite conc.	40.5	0.54	3.80	1.80	0.86	45.48	49.09	4.32	0.08
Arsenopyrite conc.	24.6	0.70	3.07	2.14	0.96	35.25	32.14	13.42	1.22
1st Solution	272	0.0010	0.32						
2nd "	302	0.0005	0.0645						
Wash	278	0.0005	0.021						

Product	Wt. %	Distribution of Metals - per cent						
		Au	Ag	Pb	Zn	Fe	S	As
Heads (calcd.)	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Pb rougher conc.	13.5	9.62	68.18	83.66	3.14	5.66	8.23	12.81
Zn cleaner conc.	18.5	0.41	4.04	1.67	84.90	4.86	16.31	1.14
Zn cleaner tails	2.9	1.87	1.76	1.08	7.13	1.81	2.50	1.77
Pyrite conc.	40.5	48.65	10.15	7.90	2.88	59.65	52.24	29.24
Arsenopyrite conc.	24.6	38.21	4.97	5.69	1.95	28.02	20.73	55.04
1st Solution	272	0.61	5.77					
2nd "	302	0.33	1.28					
Wash	278	0.30	3.85					

Following are the screen analyses of the various products:

Product	SCREENS				
	+ 65	+ 100	+ 200	+ 365	- 365
Pb rougher conc.			2.28	17.60	80.12
Zn Cleaner conc.			0.10	7.00	92.90
Pyrite Conc.			0.50	18.00	81.50
Arsenopyrite conc.	0.20	0.10	3.56	27.40	68.74

Conclusions:

The lead float was not as successful as in the previous test although the reagents were similar. The optimum pH may have been exceeded in this test. Very little extraction of gold was obtained by cyaniding the lead tailing. In the zinc rougher float a moderate lime alkalinity should be maintained. The cleaning operation should be carried out at a high pH with a minimum of copper sulphate and xanthate.

Roasting and Cyaniding Arsenopyrite Concentrates.

TEST NO. 6A

A 300 gram sample of combined arsenopyrite concentrate from Test No. 3 and Test No. 4 was roasted as per Lakefield low temperature procedure. The initial temperature was 750°F and this temperature was maintained for 1 hour, 45 minutes, during which time the bulk of the arsenic fume was eliminated. During this period there was minimum access of air. At the end of this period the temperature was slowly brought up to 1200 F with liberal air supply. Total roasting time was 3 hours.

The calcine was quenched, allowed to stand for 24 hours, filtered and washed thoroughly. The cake was ground in the pebble mill to 95,9% minus 325 mesh and subsequently divided into two parts, A and B, which were treated as follows:

Part A-Agitated for 24 hours in a cyanide solution containing 2.0 lbs. of NaCN and 0.20 lbs. of CaO per ton of solution. After 24 hours the solids were filtered and washed and agitated for an additional 24 hour period with a cyanide solution containing 6.0 lbs. of NaCN and 0.20 lbs. of CaO per ton of solution.

Part B-Agitated for a period of 12 hours with an acid brine solution (NaCL 27.0% and H_2SO_4 2.0%), filtered and washed thoroughly and cyanided as in Part A.

Roasting results:

Product	% Wt. Reduction	Assays Ozs./ton Au	Ag	Analyses - per cent Pb	Zn	Fe	S	As
Feed		0.60	3.25	0.69	1.33	40.61	39.44	10.08
Calcine	32.17	0.88	4.79	-	-	59.87	1.34	1.20

Cyanidation results:

	Part A Au	Part A Ag	Part B Au	Part B Ag
Assay of calcine, ozs./ton	0.88	4.79	0.88	4.79
Assay of cyanide tailing, ozs./ton	0.44	3.16	0.46	2.16
Recovery by Cyanidation, per cent	50.00	34.03	47.73	54.91

TEST NO. 6B

A 300 gram sample of the same feed as was used in Test No. 6A was roasted as per Lakefield high temperature procedure. The initial temperature was 1200°F. This temperature was maintained, with minimum access of air, until arsenic fumes ceased to be evolved, which required 1 hour 35 minutes. The temperature of the charge was then allowed to drop slowly to 900°F at which temperature it was held with liberal air supply, for 1 hour. Total raosting time 4 hours 10 minutes.

The calcine after regrinding to 95.9% minus 325 mesh size was divided into Part A and Part B and these treated as in Test 6A.

Roasting Results:

Product	% Wt. Reduction	Assays Ozs./ton Au	Ag	Analyses - per cent Pb	Zn	Fe	S	As
Feed		0.60	3.25	0.69	1.33	40.61	39.44	10.08
Calcine	31.90	0.88	4.77	-	-	59.63	1.84	0.90

Cyanidation Results:	Part A Au	Part A Ag	Part B Au	Part B Ag
Assay of calcine, ozs./ton	0.88	4.77	0.88	4.77
Assay of cyanide, tailing, ozs./ton	0.30	2.54	0.22	1.43
Recovery by cyanidation, per cent.	65.91	46.75	75.00	70.02

Roasting and Cyanidation of Pyrite Concentrates

TEST NO. 7A

A 300 gram sample of combined pyrite concentrates from Test No. 3 and Test No. 4 was roasted as per Lakefield low temperature procedure described in Test No. 6A.

The calcine was treated as in the two previous tests, after regrinding to 97.5% minus 325 mesh.

Roasting Results:

Product	% Wt. Reduction	Assays Ozs./ton Au	Ag	Analyses - per cent Pb	Zn	Fe	S	As
Feed		0.39	3.60	0.80	3.94	43.88	48.12	3.19
Calcine	32.13	0.575	5.30	-	-	64.65	0.39	0.49

Cyanidation Results:	Part A Au	Part A Ag	Part B Au	Part B Ag
Assay of calcine, ozs./ton	0.575	5.30	0.575	5.30
Assay of cyanide tailing, ozs./ton	0.21	2.35	0.18	1.96
Recovery by cyanidation, per cent.	63.48	55.66	68.70	63.02

TEST NO. 7B

A 300 gram sample of the same feed as was used in Test No. 7A was raosted

as per Lakefield high temperature procedure described in Test No. 6B.

The calcine was treated as in the three previous tests, after regrinding to 97.5% minus 325 mesh.

Roasting results:

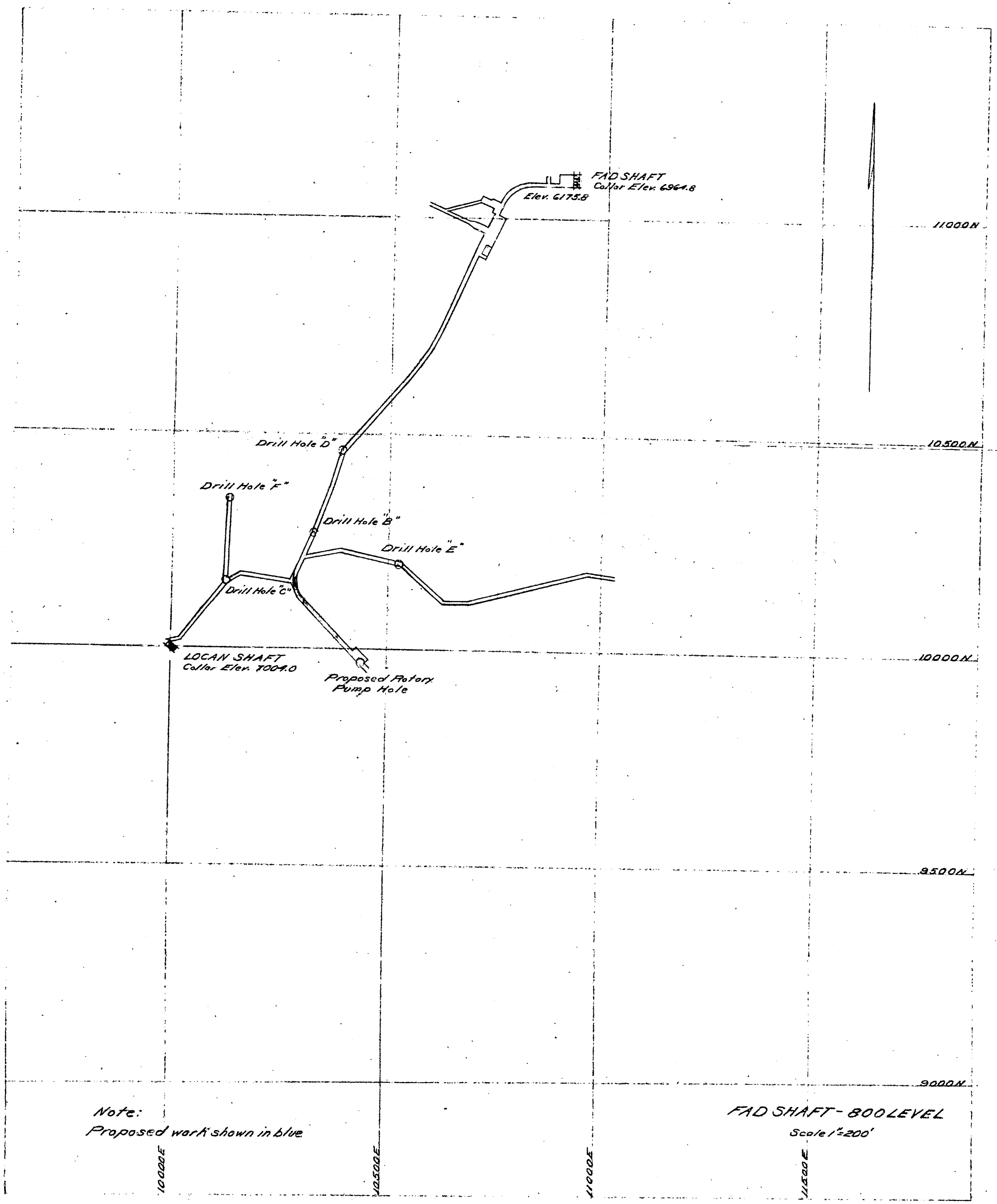
	% Wt.	Assays Ozs./ton		Analyses per cent				
Product	Reduction	Au	Ag	Pb	Zn	Fe	S	As
Feed		0.39	3.60	0.80	3.94	43.88	48.12	3.19
Calcine	32.62	0.58	5.34	-	-	65.12	2.86	0.30

Cyanidation Results:

	Part A		Part B	
	Au	Ag	Au	Ag
Assay of calcine, ozs./ton	0.58	5.34	0.58	5.34
Assay of cyanide tailing, ozs./ton	0.235	2.63	0.22	2.65
Recovery by cyanidation, per cent.	59.48	50.75	62.07	50.37

Conclusions:

These four tests indicate a recovery of around 70% of the gold and silver in the pyrite and arsenopyrite by roasting and cyaniding.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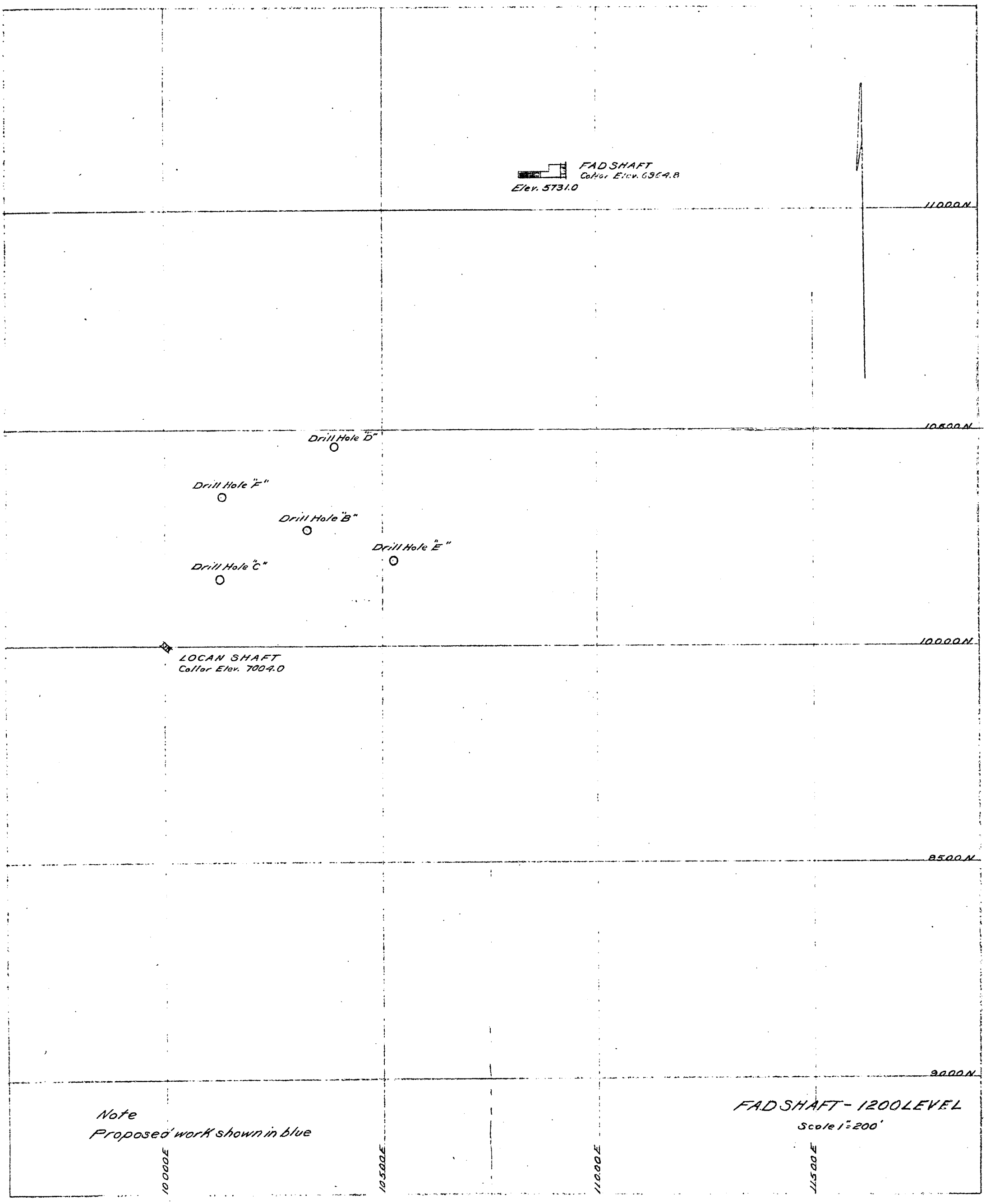
Elev. 6175.8
11000N
10500N
10000N
9500N
9000N
Drill Hole "D"
Drill Hole "F"
Drill Hole "B"
Drill Hole "E"
Drill Hole "C"
LOCAN SHAFT
Collar Elev. 7004.0
Proposed Rotary
Pump Hole
Note:
Proposed work shown in blue
FAD SHAFT - 800 LEVEL
Scale 1"=200'
10000E
10500E
11000E
11500E

MAP No. 2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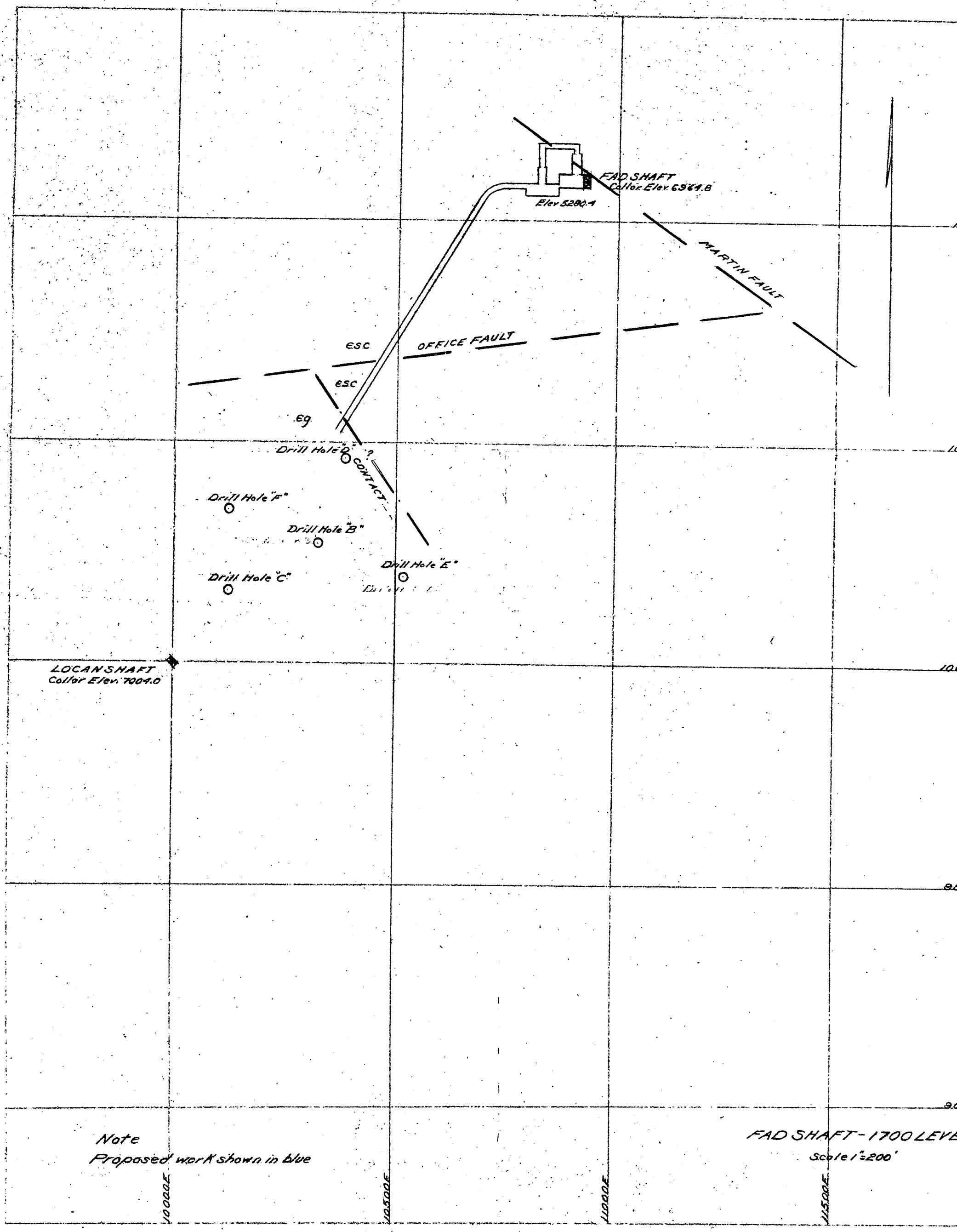
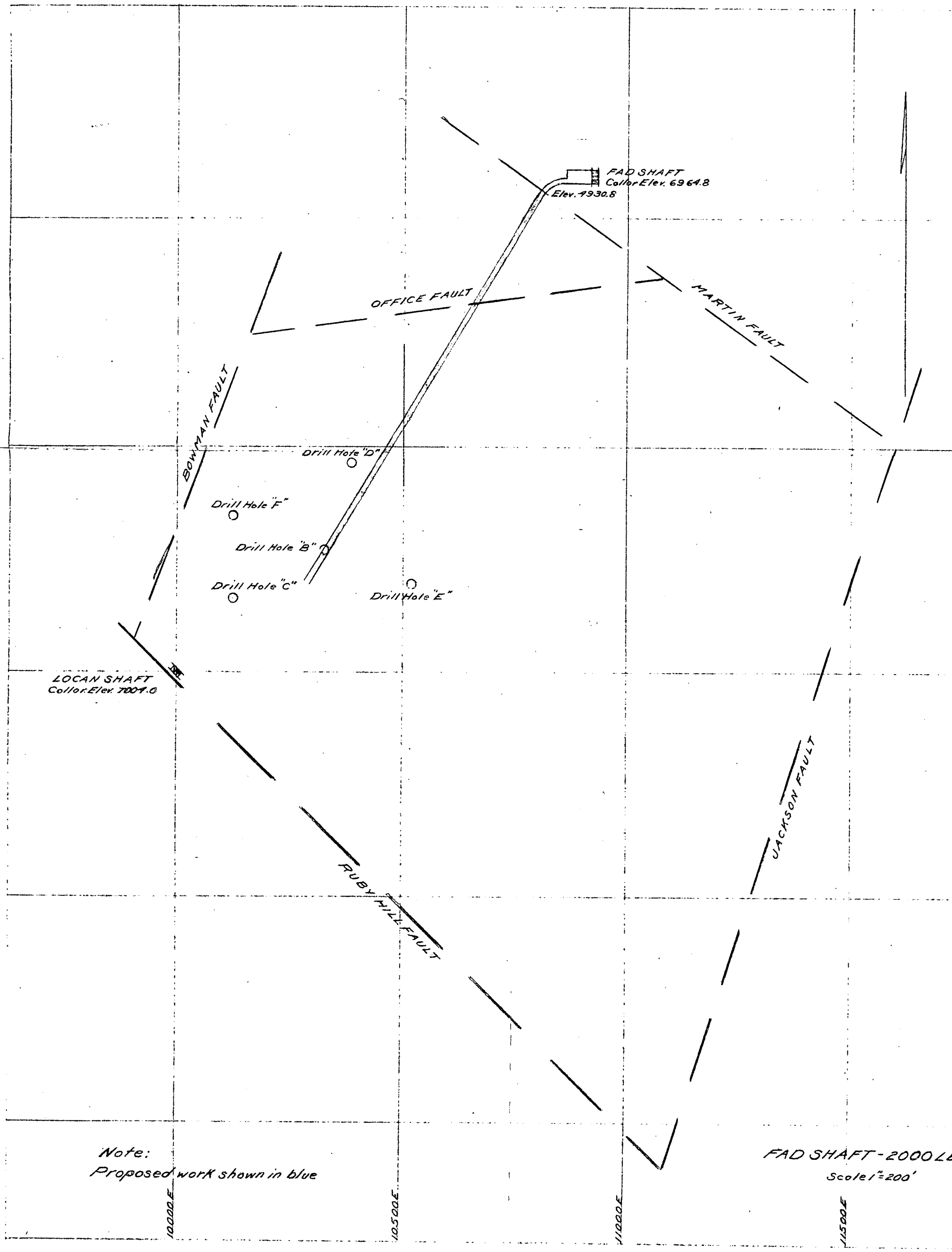
Collar Elev. 6964.8
Elev. 5731.0
11000N
10500N
Drill Hole "D"
Drill Hole "F"
Drill Hole "B"
Drill Hole "E"
Drill Hole "C"
10000N
LOCAN SHAFT
Collar Elev. 7004.0
9500N
9000N
Note
Proposed work shown in blue
FAD SHAFT - 1200 LEVEL
Scale 1" = 200'
10000E
10500E
11000E
11500E

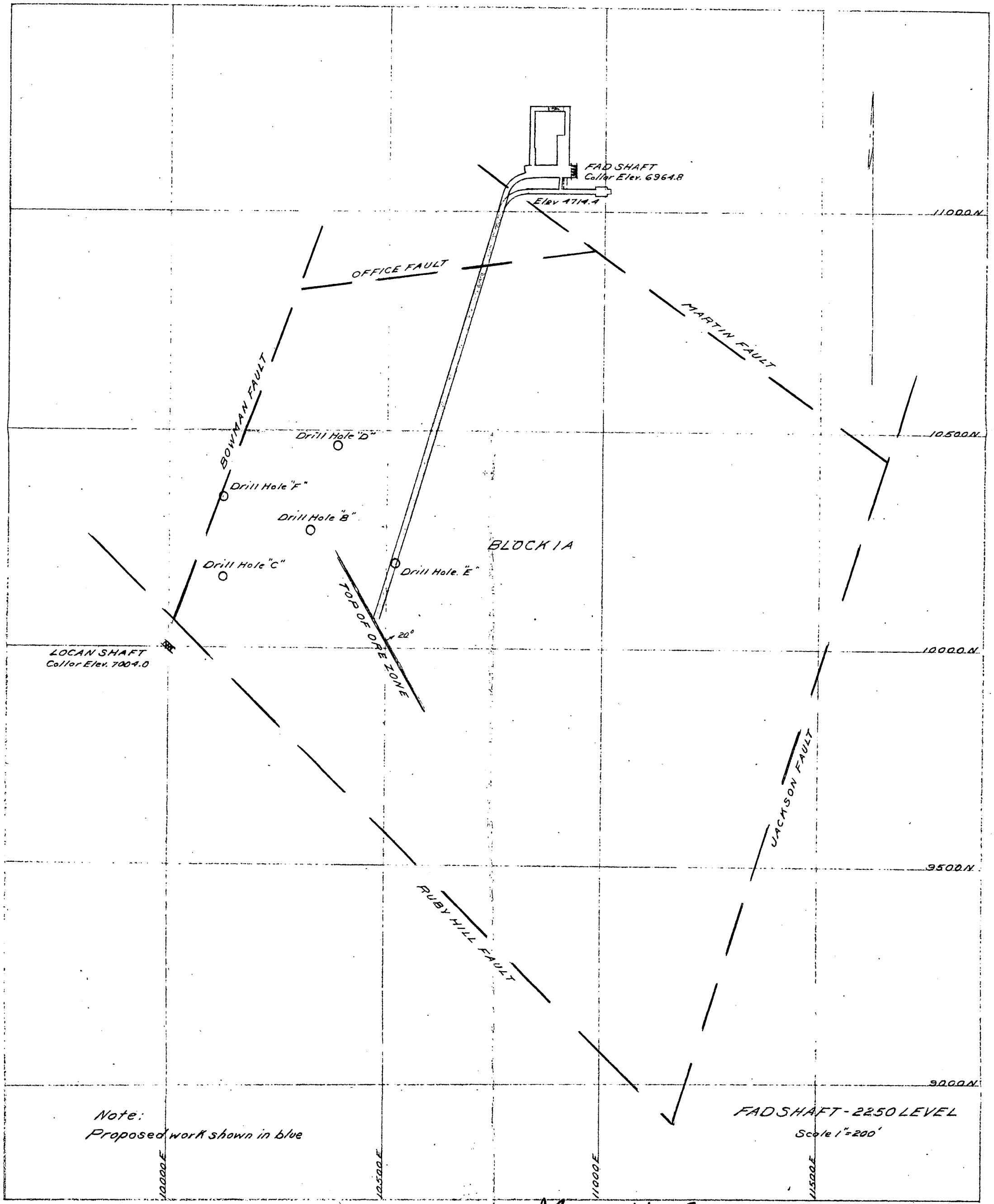
MAP No. 3


FAD SHAFT
Collar Elev. 6964.8
Elev 5280.4
MARTIN FAULT
OFFICE FAULT
ESC
ESC
eg
Drill Hole "D"
?
CONTACT
Drill Hole "F"
Drill Hole "B"
Drill Hole "E"
Drill Hole "C"
LOCAN SHAFT
Collar Elev. 7004.0
Note
Proposed work shown in blue
FAD SHAFT - 1700 LEVE
Scale 1"=200'
10000E
10500E
11000E
11500E

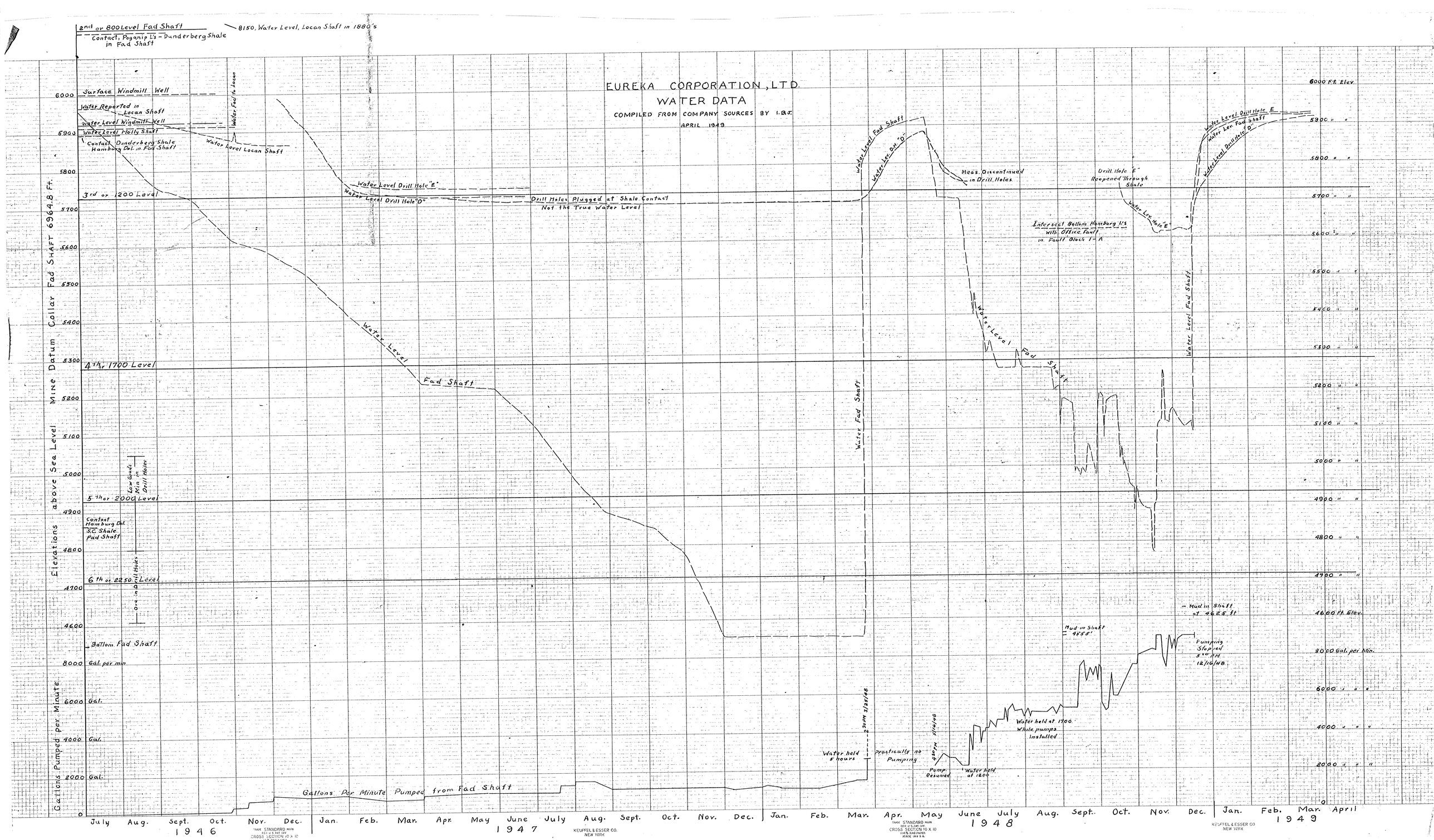
MAP No. 4

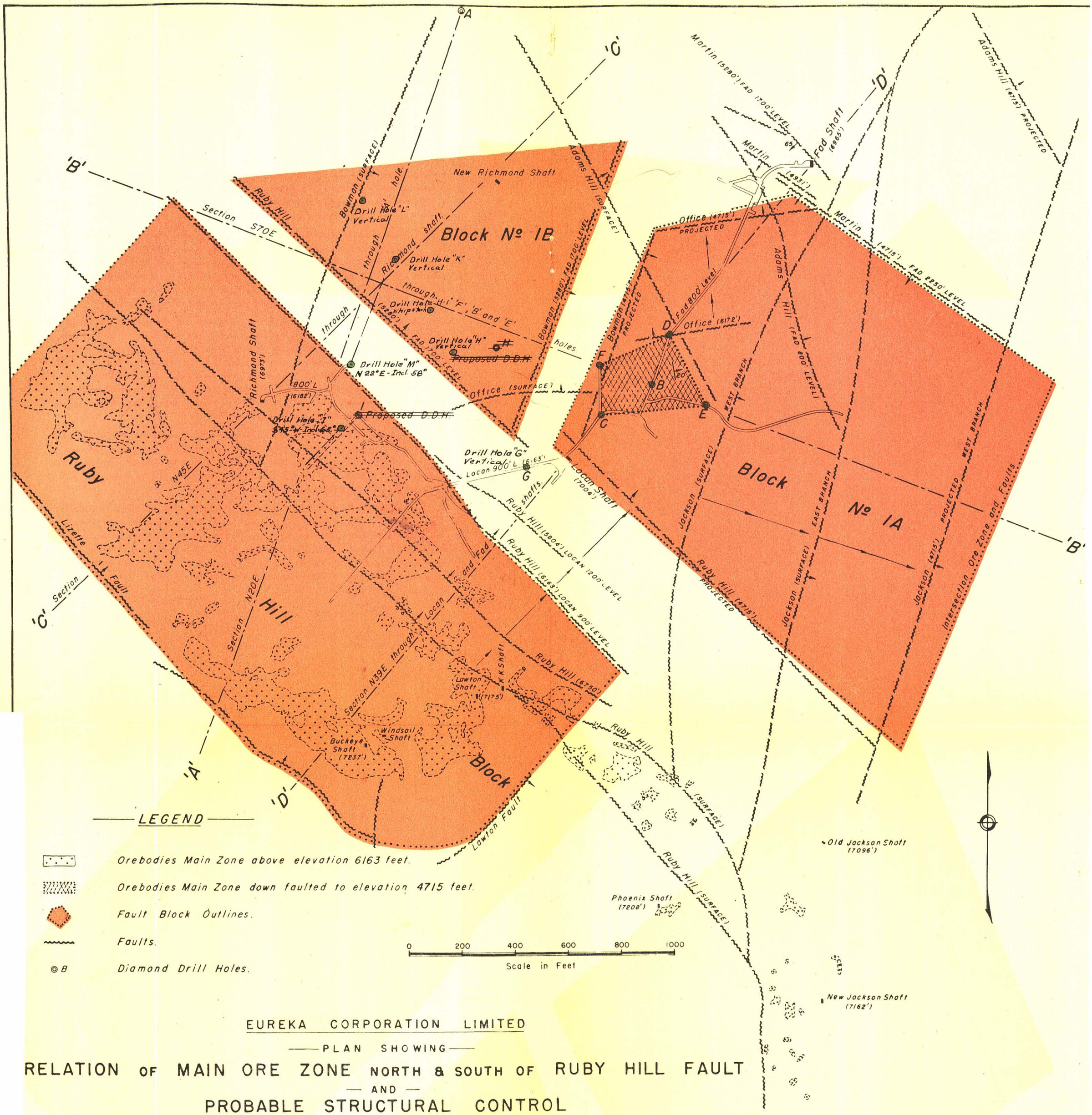

FAD SHAFT
Collar Elev. 6964.8
Elev. 4930.8
OFFICE FAULT
MARTIN FAULT
BOWMAN FAULT
Drill Hole "D"
Drill Hole "F"
Drill Hole "B"
Drill Hole "C"
Drill Hole "E"
LOCAN SHAFT
Collar Elev. 7004.0
JACKSON FAULT
RUBY HILL FAULT
Note:
Proposed work shown in blue
FAD SHAFT - 2000 L
Scale 1" = 200'
10000 E
10500 E
11000 E
11500 E

MAP No 5


FAD SHAFT
Collar Elev. 6964.8
Elev 4714.4
11000N
OFFICE FAULT
MARTIN FAULT
BOWMAN FAULT
10500N
Drill Hole "D"
Drill Hole "F"
Drill Hole "B"
BLOCK IA
Drill Hole "C"
Drill Hole "E"
TOP OF ORE ZONE
20°
LOCAN SHAFT
Collar Elev. 7004.0
10000N
JACKSON FAULT
9500N
RUBY HILL FAULT
9000N
Note:
Proposed work shown in blue
FAD SHAFT - 2250 LEVEL
Scale 1" = 200'
10000E
10500E
11000E
11500E

MAP No. 6


EUREKA CORPORATION, LTD.
WATER DATA
COMPILED FROM COMPANY SOURCES BY I.B.J.
APRIL 1949
2nd or 800 Level Fad Shaft
Contact, Paganip Ls - Dunderberg Shale in Fad Shaft
8150, Water Level, Locan Shaft in 1880's
Surface Windmill Well
Water Reported in Locan Shaft
Water Level Windmill Well
Water Level Holly Shaft
Contact Dunderberg Shale Hamburg Dol. in Fad Shaft
Water Fad'n Locan
Water Level Locan Shaft
3rd or 1200 Level
Water Level Drill Hole "E"
Water Level Drill Hole "D"
Drill Holes Plugged at Shale Contact
Not the True Water Level
Water Level Fad Shaft
4th or 1700 Level
5th or 2000 Level
Low Grade Min in Drill Holes
Contact Hamburg Dol. S.C. Shale Fad Shaft
6th or 2250 Level
Ore in Drill Holes
Bottom Fad Shaft
Water Fad Shaft
Water Level Dit "D"
Meas. Discontinued in Drill Holes
Drill Hole "E" Reopened Through Shale
Intersect Bottom Hamburg Ls with Office Fault in Fault Block 1-A
Water Level Drill Hole "E"
Water Level Fad Shaft
Elevations above Sea Level Mine Datum Collar Fad SHAFT 6964.8 Ft.
6000 Ft. Elev.
4600 Ft. Elev.
Gallons Pumped per Minute
8000 Gal. per min
6000 Gal.
4000 Gal.
2000 Gal.
Gallons Per Minute Pumped from Fad Shaft
Water held 8 hours
Practically no Pumping
Pump Resumed
Water held at 1200
Water held at 1700 while pumps installed
Mud in Shaft 4855'
Mud in Shaft at 4625 ft
Pumping Stopped 5:00 P.M. 12/16/48
8000 Gal. per Min.
July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. April
1946
1947
1948
1949
KEUFFEL & ESSER CO. NEW YORK



EUREKA CORPORATION LIMITED

PLAN SHOWING

RELATION OF MAIN ORE ZONE NORTH & SOUTH OF RUBY HILL FAULT

AND

PROBABLE STRUCTURAL CONTROL

TORONTO — Sept. 1949 R.B.

The following programme is recommended, with details of later stages modified to suit results of earlier stages:

1. Do 1,800 to 3,500 feet of churn drilling from surface and 1,000 to 1,800 feet of diamond drilling from the 800 Level, Fad Shaft, to test the three possibilities for finding ore on or above the 1,700 Level. Time required, eight months to one year. Estimated cost $40,000 to $80,000.

2. Unwater the mine to the 1,700 Level and crosscut to the ore-bearing formations. Time required, not to exceed 18 months. Estimated maximum cost, including pumping, $870,000. If there was recirculation of water in the earlier pumping, the cost will be much lower. If, as seems likely, large orebodies are found above the 1,700 Level, about $500,000. additional must be spent to provide a second exit and to prepare the mine for production.

3. Unwater the mine to the 2,250 Level and crosscut to the orebody already developed by drilling. Time required, about one year. Estimated maximum cost $720,000. As in the second stage, the cost will be much less if there was recirculation of water pumped in 1948. If ore is found on or above the 1,700 Level, Stage 3 can be carried out gradually, out of part of profits. If no ore is found above the 1,700 Level, about $1,000,000. additional must be spent for second exit, auxiliary levels, etc., before large scale production can start from the 2,250 Level.

4. As soon as possible, ship high grade ore to a custom mill and smelter. The estimated net return at the mine from ore of the grade of the 65 feet cut by Drill hole E, with lead at 15 cents and zinc at 10 cents per pound, would be $17 per ton. This would more than cover the cost of mining, pumping, and overhead while a treatment plant is being designed and built. The size, character, and position of orebodies must be known before such a plant is planned. After it is in operation, with production at the rate of 500 tons per day, all costs at Eureka should total $10 to $12 per ton. This will permit a fair profit on probable average grade ore. It is possible that the cost of power, and so the total cost, may be greatly reduced.

It is essential to secure a more reasonable lease from Richmond Eureka Mining Company before starting the programme outlined above. When this is done, the preliminary development will be an exceedingly good speculation. If, as expected, it finds large orebodies on or above the 1,700 Level, a total expenditure of less than $1,450,000. plus the cost of a treatment plant, seems likely to result in one of the greatest mining districts in the country.

If no ore is found above the 1,700 Level, the venture will be less attractive. Extensions of the deep ore already indicated by drilling may total several million tons. However, there is a remote chance that the flow of water may be so great that the cost of mining and development will be prohibitive. It is far more likely that large-scale production from the deep orebodies can be started at a total cost of $2,650,000., plus the cost of a treatment plant. A possible profit of many times this amount fully justifies an attempt to unwater the 2,250 Level even if no higher ore is found.

Yours very truly,

IRA B. JORALEMON.

MAP No. 1

CLAIM MAP

EUREKA CORPORATION LIMITED

EUREKA MINING DISTRICT

EUREKA COUNTY, NEVADA

SCALE 400 FT = 1 IN.

200' 400' 800' 1200'

MARCH 7, 1946

N

W E

S

Drawing No. CE-22