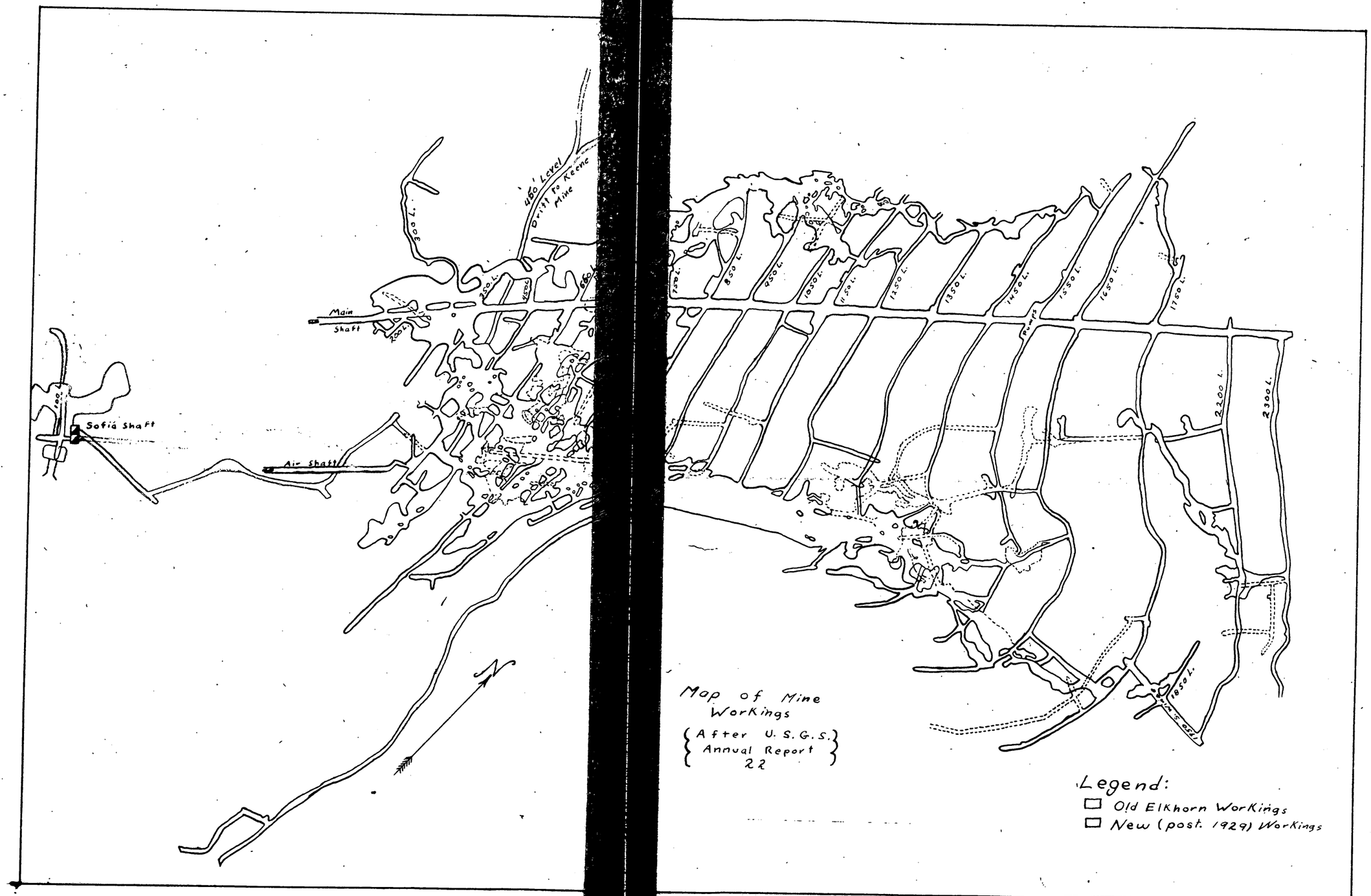


Map of Mine Workings
(After U.S.G.S. Annual Report 22)

PROPERTY Elkhorn (Relief) Mentor Exploration

HOLE NUMBER BS 1

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. .....
DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING N 73° E
DIP - 21°

STARTED May 25, 1955

COMPLETED June 23, 1955

ULTIMATE DEPTH 122.0'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE			
0.0-30.0	Casing					
30.0-49.0	White dolomite. Soft & num. small Vug holes. Several secs. are loose and sandy.					
49.0-54.0	Yellow dolomite. Soft, sugary, & num. small Vug holes.					
54.0-63.0	White dolomite.					
63.0-74.0	Yellow dolomite.					
74.0-79.0	White dolomite.					
79.0-89.0	Blue dolomite, soft & sugary.					
89.0-122.0	White dolomite.					
	115.5 Black specks, poss. lead min'l.					
	NOTE: Hole stopped due to caving & stuck rods & stuck casing.					
	END					

OFFICIAL COPY
C. ...
REC...
DEC 27 1996
...

PROPERTY Elkhorn (Sophie) [illegible]

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5915.00
DEP. E 4535.00

ELEVATION OF COLLAR 6521.25

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED December 20th, 1934

COMPLETED January 7th, 1935

ULTIMATE DEPTH 94.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0- 1.6	Casing.								
1.6- 29.0	White dolomite, generally speckled appearance. Many narrow (1/8" to 1/4") quartz stringers.								
	7.0-7.2 Brecciated quartz stringer, grey silver min'l.	383	0.2'	0.03	27.00	0.10	0.10		
29.0- 34.0	Dolomite, bluish, no quartz.								
34.0- 48.0	White dolomite.								
48.0- 55.0	Dolomite and quartz mixture. Some quartz as stringers but mostly a siliceous replacement of the dolomite. Slight silver mineralization.	384	7.0'	0.01	2.20	Tr.	Tr.		
55.0- 59.0	As above. First 2.0' is mostly quartz and remainder mostly dolomite.	385	4.0'	Tr.	0.30	Tr.	Tr.		
59.0- 64.0	Almost entirely quartz. Blue-grey silver mineralization. Quartz is vuggy and some vugs lined with yellow. Last of section is brecciated quartz and dolomite with brown specks.	386	5.0'	0.04	13.00	0.50	1.00		
64.0- 94.0	White dolomite.								
	END								

PROPERTY Elkhorn (Sophie) Mines Exploration

HOLE NUMBER [illegible]

SHEET NUMBER [illegible]

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5035.43
DEP. E 5076.76

ELEVATION OF COLLAR 6423.21

DATUM

DIRECTION AT START: BEARING S 46° W
DIP -53°

STARTED [illegible], 1953

COMPLETED [illegible], 1953

ULTIMATE DEPTH 169.9

LOGGED BY N.E.P.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn	
0.0- 10.0	White dolomite, slightly silicified.							
10.0- 20.0	Pale yellow dolomite, slightly speckled (Mn ferns)							
20.0- 27.0	Pale yellow and grey mottled dolomite.							
27.0- 40.0	Pale yellow speckled dolomite.							
40.0- 46.0	Yellow and blue-grey mottled dolomite, fairly hard and slightly silicified.							
46.0- 55.0	Yellow dolomite, speckled, and containing fine hairline stringers.							
55.0- 71.0	Blue dolomite, siliceous in spots.							
	61.0-61.5 Character sample of siliceous section with hairline orange-colored fractures.	427	0.5'	Tr.	0.20	Tr.	Tr.	
71.0- 73.0	Yellow dolomite.							
73.0- 84.0	Blue dolomite.							
84.0- 92.0	Yellow dolomite.							
92.0- 94.0	Blue dolomite.							
94.0-105.5	Yellow dolomite.							
105.5-107.3	Brown siliceous brecciated material containing quartz, calcite, and brown altered dolomite.	409	1.8'	0.03	0.60	0.10	0.40	
107.3-132.0	Blue dolomite. Some sections dark blue-grey, some mottled, and some speckled.							
132.0-135.0	White dolomite.							

HOLE NUMBER L 3

SHEET NUMBER (2)

SECTION FROM ..... TO .....

PROPERTY .....

DIAMOND DRILL RECORD

LOCATION: LAT. .....
DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING .....
DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE				
135.0-137.0	Dark blue-grey siliceous dolomite.						
137.0-141.0	Pale yellow dolomite.						
141.0-169.0	Alternating layers of blue and yellow dolomite. Most of section is a mixture of the two, and has a mottled appearance. Small speck of galena at 154.0'.						
	END						

HOLE NUMBER DH 9

SHEET NUMBER (1)

SECTION FROM ..... TO .....

PROPERTY Elkhorn & Dev. Co. Hunter Exploration

DIAMOND DRILL RECORD

LOCATION: LAT. N 5447.94 DEP. E 5405.79

ELEVATION OF COLLAR 6327.14

DATUM

DIRECTION AT START: BEARING N 60° E DIP +5°

STARTED January 25, 1955

COMPLETED February 17, 1955

ULTIMATE DEPTH 522.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0-6.5	Casing. Hornstone. Dol. str. at 5.0'	408	Char. Sands	tr.	0.20	0.60	2.00
6.5-8.0	Hard brown hornstone of the rock strata known as the Elkhorn Shale. Indications of distortion and some brecciation.	442	1.5	0.07	19.10		
8.0-48.0	Hard generally light colored hornstone. Sharp contact with brown hornstone. Some sections grey to blue grey, but mostly light grey to flesh colored. Banded appearance due to visibility of bedding.						
	8.0 - 8.7 Highly mineralized with disseminated pyrite. Some locations show black fernlike min'l. (manganese) Entire section—numerous narrow str. pyrite in fractures cutting the bedding, and narrow bands of dissem. pyrite along bedding. Talcose shearing plane at 44.0'	435	0.7'	0.06	17.60	0.20	1.40
	8.7 - 9.5 Light grey hornstone, sl. pyrite.	443	0.8'	0.01	0.60		
	12.5 - 13.0 Light grey hornstone with two 1/4" str. of pyrite.	444	0.5'	0.01	0.60		
48.0-70.0	Dark brown to black hornstone. Rare, real black-board slate in spots. Occas. pyrite str.						

PROPERTY

HOLE NUMBER Dn 13-3

SHEET NUMBER (2)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING ..... DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
70.0-75.0	Varied color hornstone, contorted with wavy lines. Milky appearance. Mixed with limestone & other soft minerals.								
75.0-87.0	Blue limestone, very impure, occas. pyrite.								
	79.0 - 80.0 Soft white altered limestone cont. pyrite xls crystals.								
	85.0 - 85.3 Blue limestone with abund. fine dissem. pyrite.	436	0.3'	Tr.	0.20				
87.0-100.0	Altered limestone, multi-colored and wavy.								
	99.0 - 99.3 Char sample, cont. some qtz. with pyrite.	410	0.3'	0.01	0.05	Tr.	0.15		
100.0-163.5	Blue limestone, slaty in spots. Sprinkling of fine pyrite throughout. Wavy bands of various shades of blue or gray.								
	147.0 - 148.5 Bleached to light brown.								
163.5-166.5	Altered limestone, gray to brown marble								
166.5-246.0	Gray to blue gray limestone.								
	190.0 - 191.0 Slaty looking								
	193.0 - 200.0 Bleached, prob. dolomite.								
	206.0 - 207.0 Distributed & recrystallized.								
	209.0 - 210.0 Brecciated & thinly banded containing fine dissem. pyrite. (Char Sample)	437	1.0'	Tr.	0.20				

PROPERTY

HOLE NUMBER Fa 9

SHEET NUMBER (6)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
	211.0 Fracture plane with small mg. Coated with blue						
	grey powdery min'l.						
	227.0-228.0 Broken up, rusty fxng. surfaces.						
	230.0 - 235.0 Light colored silic. limestone.						
246.0-249.0	Dark blue speckled limestone. Oolitic app.						
	248.7 - 249.3 Much pyrite.	438	0.6'	0.01	0.40		
249.3-267.0	Light gray limestone, sl. pyrite.						
267.0-302.0	Mostly blue limestone, but some ness. gray or brown.						
	General wavy app.						
	281.0 - 283.5 Altered limestone, multi-colored,						
	Sl. min'l. Marble-ized.						
	283.5 - 289.0 Light brown color.						
302.0-305.0	White to light brown limestone. Talcy & core broken.						
	Shearing.						
305.0-307.0	Blue limestone.						
307.0-321.0	White to pale yellow or light brown limestone. Some						
	ness. soft & porous.						
321.0-331.0	Generally blue speckled limestone, some pyrite.						
	Some sections light gray or light brown.						
	321.0 - 329.0 Bleached almost white.						
331.0-342.0	Generally white limestone, some ness. gray.						

PROPERTY

HOLE NUMBER [illegible]

SHEET NUMBER (4)

SECTION FROM ..... TO

DIAMOND DRILL RECORD

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING ..... DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
342.5-351.0	Blue limestone, very homogenous.						
351.0-407.0	White limestone.						
	367.0 - 368.0 Rusty shear zone with soft talcose material, gouge, & sl. min'l.						
	394.0 Vug hole.						
	395.0 - 396.0 Min'l. limestone, fine specklas of lead and/or pyrite.	581	1.0'	Tr.	Tr.	Tr.	Tr.
407.0-430.8	Pale yellow dolomite, some parts white. Some narrow bands test with acid as limestone, but generally tests as dolomite.						
430.8-431.8	Band of brown dolomite, sl. min'l. and relatively hard. Quite silic. & resembles low grade qtz. ore of Elkhorn oreshoots.	582	1.0'				
431.8-459.9	White to yellow limestone or dolomite. Acid test suggests it is limestone.						
	451.0 - 452.2 Sl. min'l. hard.						
459.8-465.0	Shear zone or fault, very oxidized.						
	459.8 - 462.4 Altered dolomite & rusty gouge. Some hard black silic. rock.	439	2.6'	0.005	0.60	Tr.	Tr.
	462.4 - 463.3 Soft rusty dolomite & hard silic. dolomite, abundant pyrite.	440	0.9'	Tr.	0.20	0.20	0.10

PROPERTY

HOLE NUMBER Dm 3

SHEET NUMBER (5)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
	463.3 - 465.0 White siliceous dolomite, but sl. Mineralized.	441	1.7'	Tr.	Tr.		
465.0-522.0	White dolomite, rare gray stringers.						
	480.0 - 482.5 Soft & chalky with small vug holes.						
	Lost of sand in place of core.						
	519.8 - 520.7 Soft sugary blue-gray dolomite.						
	Core from shear zone above appears at start of many						
	of the runs.						
	END						

PROPERTY Elkhorn (Sophia) Mentor Exploration

HOLE NUMBER E14

SHEET NUMBER (1)

SECTION FROM ..... TO ..

DIAMOND DRILL RECORD

LOCATION: LAT. N 5106.54
DEP. E 5112.51

ELEVATION OF COLLAR 6423.71

DATUM

DIRECTION AT START: BEARING N 63°E. (?)
DIP -57°

STARTED January 25th, 1955

COMPLETED February 9th, 1955

ULTIMATE DEPTH 200.0

LOGGED BY H.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0- 32.0	Pale yellow to white dolomite, mostly clear but some sections speckled. Quite siliceous and in a few spots could be quartz. Narrow (1") stringer at 4.0' which is dark in color and possibly mineralized. Small fault or shear or fissure at 27.0-27.5 with gouge and fragments of quartz.						
32.0- 36.0	Pale blue-grey mottled dolomite.						
36.0- 41.0	Yellow dolomite.						
41.0- 65.0	Blue-grey mottled dolomite. Loose dolomite sand at 60.0						
65.0- 67.0	Yellow dolomite.						
67.0- 75.0	Pale blue and yellow dolomite, very siliceous.						
75.0- 78.4	Siliceous dolomite, generally well mineralized. Lead, zinc, and silver minerals and some copper stain.	411	3.4' 1.90 71.80 5 72.58	0.06	58.80	4.20	0.84
	76.6-77.3 Porous and vuggy with blue copper stain and grey and yellow powdery mineralization.						
	77.8-78.1 Porous rock with some quartz breccia. Grey and yellow mineralization. Estimate high silver content.						
78.4- 82.6	Siliceous dolomite with speckled mineralization. Highly mineralized stringer (1") at 81.3	412	4.2'	0.01	1.40	1.10	0.90
82.6- 87.6	Highly siliceous dolomite, almost quartz in places. Slight mineralization.	413	5.0'	0.01	0.60	0.10	0.20

PROPERTY

HOLE NUMBER EU4

SHEET NUMBER (2)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
87.6- 93.0	Yellow speckled dolomite, slightly mineralized.	414	5.4'	Tr.	0.60	0.40	0.15		
93.0- 99.0	Siliceous dolomite, mineralized and containing a few vugs.	415	6.0'	Tr.	0.30	0.10	0.20		
99.0-102.5	Siliceous dolomite, well mineralized. One or two spots show porous yellow powdery mineralization.	416	3.5'	Tr.	0.20	0.15	1.00		
102.5-134.0	White to pale yellow dolomite, all harder than normal and therefore slightly mineralized and silicified. Has hairline lines and speckles of manganese.								
134.0-137.0	Brown siliceous material with some quartz and abundant fine galena.	417	3.0'	0.02	6.60	3.80	1.70		
137.0-138.0	Speckled dolomite with brown siliceous material and some quartz as stringers.	418	1.0'	Tr.	0.90	0.20	4.40		
138.0-139.0	Brown speckled dolomite. Rusty looking. One location of massive galena (½") Grains of calcite or barite.	419	1.0'	0.04	33.60	5.90	21.60		
139.0-140.0	Some speckled mineralized dolomite. Remainder is hard silceous brown material mixed with white crystalline medium hard mineral which is calamine (or smithsonite).	420	1.0'	0.05	17.60	0.70	14.30		
					12.5	3.0	7½		
140.0-142.0	Reddish brown siliceous material mixed with white crystalline calamine. Latter mostly lining vugs but comprising 50% of whole. Brown and white mottled appearance. Porous and vuggy (or lacy).	421	2.0'	0.02	7.40	0.60	18.40		

PROPERTY

HOLE NUMBER

SHEET NUMBER (3)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
142.0-144.0	First half is speckled dolomite and last half is same as 140.0-142.0	422	2.0'	0.01	3.60	0.30	23.20
144.0-145.0	Speckled dolomite, some silicification.	423	1.0'	0.005	0.70	0.30	3.60
145.0-148.5	Brown siliceous material and dolomite. Some quartz. A few vugs contain calcite.	424	3.5'	0.01	1.60	0.40	4.20
148.5-153.0	Ditto above but 1.0' of core is brown vuggy quartz. Last 1.0' is siliceous dolomite.	425	4.5'	0.01	3.50	0.30	3.90
153.0-155.0	Siliceous dolomite.	426	2.0'	Tr.	0.40	0.10	0.40
155.0-166.5	White to pale yellow slightly siliceous dolomite.						
166.5-167.5	Dark colored siliceous dolomite. Probably contains a zinc mineral.	433	1.0'	0.01	2.60	5.50	0.90
167.5-200.0	White to pale yellow dolomite.						

END

PROPERTY Elkhorn (Sophia) Hunter Exploration

HOLE NUMBER E13

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5103.54
DEP. E 5116.01

ELEVATION OF COLLAR 6423.61

DATUM

DIRECTION AT START: BEARING N 53°W
DIP -65°

STARTED February 10th, 1955

COMPLETED February 17th, 1955

ULTIMATE DEPTH 226.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0- 1.5	Pale grey dolomite.								
1.5- 5.0	White dolomite.								
5.0- 7.7	First half of section is 80% quartz with disseminated galena. Last half is siliceous dolomite with dark mineralized stringers. One tiny vug is lined with yellow powder.	434	2.7'	0.02	4.20	0.10	0.15		
7.7- 17.0	Yellow speckled dolomite.								
17.0- 37.0	Pale grey and yellow dolomite. Narrow qtz. str. at 23.0'								
37.0- 42.0	Blue dolomite.								
42.0- 44.0	Yellow dolomite.								
44.0- 47.0	Blue dolomite.								
47.0- 51.0	Yellow dolomite.								
51.0-106.0	Blue and blue mottled dolomite. 60.0-62.0 Yellow. 104.0-104.3 Rusty yellow seam.								
106.0-112.5	Yellow dolomite.								
112.5-124.0	Blue dolomite.								
124.0-126.0	Yellow dolomite, hard and speckled, slightly silicified.								
126.0-133.0	Blue dolomite. Open fissure (¼") at 132.0 is filled with brick red chert.								
133.0-134.0	Yellow dolomite.								

PROPERTY

HOLE NUMBER E15

SHEET NUMBER (2)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
134.0-136.0	Siliceous dolomite containing some quartz. Dark color due to mineralized stringers.	445	2.0'	Tr.	0.60	Tr.	0.15		
136.0-139.0	Yellow dolomite.								
139.0-148.5	Blue siliceous dolomite.								
148.5-152.0	Yellow siliceous dolomite, dark stringers longitudinal to core.	446	3.5'	Tr.	0.30	0.10	0.20		
152.0-188.0	Yellow slightly silceous dolomite, generally speckled.								
	157.0 Brown stringer.								
	181.8 (1") Brown stringer containing dolomite breccia.								
188.0-189.5	Siliceous dolomite with mineralized stringer.								
189.5-194.1	Dark siliceous dolomite with numerous narrow quartz stringers.	448	4.6'	0.01	1.40	Tr.	0.20		
	193.5-194.1 Brown and white, vuggy. White mineral is calamine.								
194.1-197.5	Blue dolomite and blue quartz, some narrow qtz. str.	449	3.4'	Tr.	0.10	Tr.	0.05		
197.5-202.3	Dark dolomite with mineralized stringer and narrow quartz stringers.	450	4.8'	0.02	8.00	0.60	1.00		
	200.9-201.0 Massive galena, none in core but panned from sludge.								
202.3-203.3	Blue and yellow dolomite, sl. siliceous and sl. min'l.	451	1.0'	0.07	2.90	0.40	0.90		
203.3-211.8	Blue dolomite.								

PROPERTY

HOLE NUMBER E15

SHEET NUMBER (3)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn	
211.8-212.0	Mineralized quartz with yellow and grey mineralization.	460	0.2'	0.06	29.60	4.00	13.60	
212.0-213.0	Dark yellow dolomite with some blue quartz. Orange powdery mineralization and trace of azurite blue.	489	1.0'	0.02	4.20	1.50	3.90	
213.0-215.0	Yellow dolomite.							
215.0-216.5	Blue dolomite.							
216.5-226.0	Yellow dolomite.							
	218.0-219.0 A few narrow quartz stringers and slight mineralization.							
	END							

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER Eu 6

SHEET NUMBER (1)

SECTION FROM ..... TO ..

DIAMOND DRILL RECORD

LOCATION: LAT. N 5438.28
DEP. E 5390.79

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED February 17, 1955

COMPLETED February 21, 1955

ULTIMATE DEPTH 118.0'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0-10.5	Dolomite, very siliceous & almost qtz. in spots. Color light grey to brown. Sl. min'l. This is FW portion of Elkhorn South oreshoot.	462	10.5'	Tr.	0.05	Tr.	Tr.
10.5-12.0	Dark mineralized dolomite. Some bluish quartz. Red seam at 11.8' may indicate FW of Elkhorn oreshoot.	463	1.5'	0.02	3.40	0.20	0.80
12.0-25.0	Light brown siliceous dolomite.						
25.0-44.0	Yellow dolomite.						
44.0-45.7	Bluish siliceous dolomite. Sl. min'l., but some yellow oxide.	476	1.7'	0.01	1.60	0.15	0.20
45.7-51.7	Blue & yellow & white dolomite, all sl. silic. & sl. min'l. A few min'l str.						
51.7-53.0	Yellow silic. dolomite with dark str. NOTE: 44.0 - 53.0 possibly 80' contact oreshoot.	477	1.3'	Tr.	0.50	0.10	0.15
53.0-85.0	White speckled dolomite & pale yellow dolomite.						
85.0-118.0	Pale yellow dolomite. Some secs. white & cont. min'l. str. 112.0 - 113.0 Min'l zone with some quartz.						

END

PROPERTY Elkhorn (Sophia) Mentor Exploration

HOLE NUMBER EU7

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5110.54
DEP. E 5113.01

ELEVATION OF COLLAR 6423.91

DATUM N 53°W

DIRECTION AT START: BEARING -50°
DIP

STARTED February 18th, 1955.

COMPLETED February 26th, 1955.

ULTIMATE DEPTH 226.5

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0- 20.0	Yellow dolomite, slightly speckled and some hairline stringers.						
	8.4-8.5 Mineralized quartz stringer with some pyrite.						
20.0- 24.0	Blue dolomite.						
24.0- 49.0	Yellow dolomite.						
49.0- 60.0	Blue dolomite, some blue and yellow mottled.						
60.0- 64.0	Dark yellow crumbly dolomite. Most of core is sand.						
64.0- 77.0	Blue and yellow mottled dolomite.						
77.0- 89.0	Yellow unconsolidated dolomite. Core recovered only 3.0'						
	86.0-86.3 Looks like fault gouge.						
89.0- 93.0	Slightly mineralized dolomite.						
93.0- 94.5	Yellow dolomite, mineralized stringers and specks.	456	1.5'	0.01	0.80	0.40	2.60
94.5- 96.7	Mostly yellow dolomite. Some included quartz. Some yellow spots suggesting silver. A little calamine.	457	2.2'	0.03	6.00	1.90	5.40
96.7- 98.4	Speckled dolomite, some quartz and calamine.	458	1.7'	0.10	2.80	0.30	1.70
98.4-102.3	Yellow speckled dolomite. A few narrow bands of cherty red material.	459	3.9'	0.01	2.40	0.20	1.60
102.3-104.5	Blue siliceous dolomite.						
104.5-117.0	Pale yellow dolomite.						
	109.0 Stringer (1") of brecciated dolomite.						
117.0-119.0	Blue siliceous dolomite.						

PROPERTY

HOLE NUMBER 107

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
119.0-131.0	Pale yellow to white dolomite.						
131.0-133.0	Blue siliceous dolomite, slightly brecciated and resembling quartz in spots.						
133.0-156.0	Yellow dolomite.						
	149.8-150.4 Dark brown mineralized stringer.	490	0.6'	0.01	1.20	0.40	0.20
156.0-168.7	Mostly blue dolomite.						
168.7-171.5	Brecciated blue and white dolomite recemented with blue dolomite. Dark mineralized stringers.	466	2.8'	Tr.	0.40	0.20	0.15
171.5-173.1	Blue dolomite.	467	1.6'	Tr.	0.30	T	Tr.
173.1-175.4	Yellow powdery dolomite and a few inches of dark quartz.	468	2.3'	Tr.	0.40	Tr.	Tr.
175.4-186.0	Pale blue dolomite.						
186.0-198.0	Pale yellow dolomite.						
198.0-202.2	Mostly quartz and siliceous dolomite. Bluish mineralization in quartz and some yellow indication of lead or silver. Slight pyrite (fine). A few pieces look like Sophia high grade.	469	4.2'	0.03	6.00	0.30	0.20
202.2-226.5	Yellow dolomite, some sections nearly white and others darker yellow and speckled.						
	END						

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5354.28
DEP. E 5397.54

ELEVATION OF COLLAR 6324.52

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED February 23rd, 1955.

COMPLETED February 23rd, 1955.

ULTIMATE DEPTH 9.5'

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0 - 9.5	Brownish quartz or silicified dolomite. Slight mineralization. Broke into old stope.	465	9.5'	0.01	1.40	0.05	0.10		
	END								

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER EU9

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5349.78
DEP. E 5398.04

ELEVATION OF COLLAR 6325.02

DATUM

DIRECTION AT START: BEARING S 75° W
DIP -55°

STARTED February 23rd, 1955.

COMPLETED February 24th, 1955.

ULTIMATE DEPTH 60.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0 - 3.0	Brownish quartz. Some vugs and mineralized stringers.	471	3.0'	0.01	1.80	0.20	1.10
3.0 - 3.2	Typical Elkhorn quartz ore. Blue quartz with yellow specks.	472	0.2'	0.16	53.60	1.60	3.40
3.2 - 6.0	Brown siliceous dolomite, some mineralized stringers.	473	2.8'	Tr.	0.80	0.10	0.40
6.0 - 40.0	White to yellow dolomite, some parts siliceous.						
	10.6-11.1 Dark & mineralized, no doubt cont. values.						
	36.0-36.4 Fractured dolomite, some dark mineralization.						
	37.5-38.5 Yellow dolomite, dark stringers (80 ft. contact oreshoot??)	479	1.0'	Tr.	Tr.	Tr.	Tr.
40.0-56.0	Generally clear white dolomite.						
56.0-60.0	Dolomite with bluish tinge.						

END

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER Eu 10

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5320.73 DEP. E 5417.42

ELEVATION OF COLLAR 6325.51

DATUM

DIRECTION AT START: BEARING N 88° E DIP -40°

STARTED February 25, 1955

COMPLETED February 27, 1955

ULTIMATE DEPTH 78.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0-7.0	Brownish silic. dolomite. Sl. min'l.	470	7.0'	0.01	0.40	0.10	0.90
7.0-23.0	White and yellow dolomite, generally silicified. Very quartzose in spots. Silver mineralization in stringers at 8.5, 10.0, & 17.5. Sl. min'l. throughout.						
23.0-38.0	Blue dolomite with occasional bands or stringers of white dolomite. Slight pyrite min'l. throughout.						
38.0-57.0	Generally blue dolomite. Section is in highly altered zone or near a fault. In any case is close to hornstone contact.						
	38.0 - 38.5 Bleached carbonate with ½" str. of translucent yellow brown mineral, which is soft & greasy to the feel.						
	39.0 - 39.6 Ditto above.						
	40.5 - 41.5 Bleached & cont. light yellow chalky carbonate.						
	41.5 - 42.0 Soft brown sandstone rock, but effervesces with acid.						
	42.0 - 44.0 Soft, white, bleached & brecciated carbonate.						
	47.0 47.5 Blue dolomite with abundant fine pyrit	505	0.5'	0.03	0.60		

PROPERTY

HOLE NUMBER Eu 10

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE				
57.0-78.0	Generally blue dolomite & same as section above.						
	58.0 - 62.0 Bleached almost white, very soft, cont. hairline blue stringers.						
	62.0 73.0 Marble appearance. Thin wavy bands of varied colored dolomite.						
	66.0 - 66.6 Min'l. band with yellow translucent min'l. pyrite including one 1/8" stringer.						
	67.5 - 68.5 Cont. much of the mustard yellow translucent mineral.						
	73.0 - 78.0 Pale blue dolomite.						
	END						

PROPERTY Elkhorn (Sophia) Hunter Exploration

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5339.84
DEP. E 5204.26

ELEVATION OF COLLAR 6426.55

DATUM

DIRECTION AT START: BEARING S 46°W
DIP -55°

STARTED February 26th, 1955

COMPLETED March 11th, 1955

ULTIMATE DEPTH 297.0 Deepened to 3[illegible].0

LOGGED BY H.E.F

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0- 49.0	Pale yellow to white dolomite, slightly speckled.								
	Numerous hairline seams.								
	5.0 Dark mineralized stringer (1")								
	14.0-15.0 Slight brecciation.								
	33.5 Narrow open seam with dark crystalline layer.								
	36.2 Narrow (1/4") mineralized quartz stringer.								
49.0- 49.5	Darker dolomite, slightly mineralized and containing a little quartz and crumbly gouge material.								
49.5- 55.0	Yellow to brownish dolomite.								
55.0- 59.5	Blue dolomite.								
59.5- 69.0	Clear yellow dolomite.								
69.0- 78.0	Pale yellow dolomite.								
78.0-80.0	Pale bluish dolomite.								
80.0-110.0	Pale yellow dolomite, white in spots.								
	92.0 Narrow seam (1/8") of brightly colored gouge.								
	95.0-96.0 Dark blue dolomite, very hard, and must be silicified.								
110.0-112.0	Yellow dolomite.								
112.0-115.0	Mottled blue and yellow dolomite.								
115.0-133.0	Yellow dolomite.								
	118.0-119.5 Snow white dolomite.								

PROPERTY

HOLE NUMBER FD1

SHEET NUMBER (2)

DIAMOND DRILL RECORD

SECTION FROM ..... TO .....

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING ..... DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
133.0-135.5	White speckled dolomite.								
	133.0-133.5 Narrow (¼") stringer of reddish siliceous material. Slight bresciation beside the stringer. Some blebs of quartz and trace of lead mineralization.								
	134.5-135.5 Dark grey dolomite, slight mineralization and suggestion of brecciation.								
135.5-153.0	Pale yellow dolomite.								
153.0-156.0	Blue dolomite, slightly siliceous with a bare suggestion of silver mineralization.								
156.0-178.5	Blue dolomite, in a few sections blue and yellow mottled.								
	158.0 Seam (¼") of siliceous brick red material.								
	171.0 Seam (¼") open and lined with quartz crystals.								
178.5-187.7	Pale yellow dolomite.								
187.7-189.2	Siliceous dolomite, fairly dark color due to mineralized stringers giving it a brecciated appearance. The stringers are probably manganese.	487	1.5'	0.01	0.40	0.05	0.15		
189.2-235.0	Pale yellow to white dolomite. Fairly hard and good drilling.								

PROPERTY

HOLE NUMBER EDU

SHEET NUMBER (3)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING ..... DIP .....

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
	206.7-206.9 Mineralized seam containing blue quartz and a trace of lead mineralization.	488	0.2'	Tr.	0.10	Tr.	Tr.		
	222.0-222.5 Dark stringers.								
	225.0-228.0 Speckled and containing mineralized str.								
235.0-257.0	Yellow dolomite.								
	239.0-239.2 Dark mineralized seam.								
	252.1-253.3 Brecciated dolomite. Trace of blue quartz and yellow silver mineralization.								
	252.1-252.4 Character sample.	493	0.3'	Tr.	0.20	Tr.	Tr.		
257.0-260.0	Crumbly yellow dolomite. No core but 2.0' of sand.								
260.0-279.0	Yellow dolomite.								
279.0-280.0	Dark mineralized dolomite. Trace of quartz and trace of galena.	494	1.0'	Tr.	0.10	0.20	Tr.		
280.0-290.0	Dark yellow dolomite.								
290.0-297.0	Pale yellow dolomite. Last 3.0' is speckled yellow and grey.								
	290.5 Quartz stringer (1") looks like silver ore.								
	END								

PROPERTY Elkhorn (Sophia) Mentor Exploration

(Deepening) HOLE NUMBER Eu 11

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5339.84
DEP. E 5204.26

ELEVATION OF COLLAR 6426.55

DATUM

DIRECTION AT START: BEARING S 46° W
DIP -S 5°

STARTED April 9, 1955

COMPLETED April 12, 1955

ULTIMATE DEPTH 340.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
297.0-303.0	Yellow dolomite, speckled & sl. siliceous.						
303.0-304.0	Silic. dolomite, sl. brecciation, sl. min'l.	523	1.0'	Tr.	Tr.	Tr.	Tr.
304.0-313.5	Pale yellow speckled dolomite, sl mang.						
313.5-314.2	Silic. dolomite, manganese ferns.	524	0.7'	Tr.	0.40	0.10	0.25
314.2-321.4	Pale yellow speckled dolomite.						
321.4-325.5	Blue & yellow dolomite, speckled, sl. min'l.	525	4.1'	Tr.	0.30	Tr.	0.20
	Suggestion of galena.						
325.5-326.1	Dark brown to black dolomite. Fine galena. High	526	0.6'	0.01	3.40	1.00	2.10
	in quartz.						
326.1-332.0	Yellow speckled dolomite.						
	327.0 Str. (1") of porous silver bearing rock.						
	(High Grade?)						
	329.0 Mud seam (6") Lost return water.						
	329.5 - 331.0 Vug hole or cavity (18")						
	331.0 - 332.0 Two vug holes each 3".						
332.0-332.5	Grey silic. dolomite	527	0.5'	Tr.	0.05	Tr.	Tr.
332.5-340.0	Yellow dolomite						
340.0-343.5	Open fissure, bottom not found at 343.5.						
	END						

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER Eh 12

SHEET NUMBER (2)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5285.23 DEP. E 5400.42

ELEVATION OF COLLAR 6326.81

DATUM

DIRECTION AT START: BEARING S 88° W DIP -55°

STARTED February 28, 1955

COMPLETED March 11, 1955

ULTIMATE DEPTH 253.0'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0-13.0	Brownish siliceous dolomite, very sl. min'l. Core from 12.0 - 13.0 is badly broken. FW argillaceous seam believed to be at 13.0'.						
13.0-20.0	Light colored dolomite, brownish tinge.						
20.0-57.1	White to pale yellow dolomite.						
57.1-65.8	Yellow siliceous dolomite with dark min'l. str. Some of section resembles low grade ore of Elkhorn S. oreshoot (80' contact?)	480	8.7'	Tr.	Tr.	Tr.	0.20
65.3-71.5	Pale yellow dolomite.						
71.5-75.3	Yellow dol. with dark str. Some dark red blebs and stringers.	481	3.8'	Tr.	0.10	Tr.	Tr.
75.3-105.0	Pale yellow dolomite.						
	79.0 - 79.5 Frac. dol. with dark str.	482	0.5'	0.01	0.80	0.20	Tr.
	90.5 - 92.5 Frac. zone with dark str.						
105.0-114.0	Light grey siliceous dolomite. Very sl. min'l., but could represent possible ore horizon.						
114.0-124.5	Yellow speckled dolomite with some mineralization.						
124.5-125.2	Mineralized dolomite and 0.3' str. of brecc. dol. with min'l. quartz.	484	0.7'	Tr.	0.20	Tr.	Tr.
125.2-127.7	Speckled dol. sl. min'l.	485	2.5'	0.01	0.30	0.10	0.10

PROPERTY

HOLE NUMBER Eu 12

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE				
127.7-146.0	Pale yellow to white dolomite.						
146.0-201.0	White dolomite. Occasional hairline str. of min'l. or of quartz.						
	172.0 - 172.3 Brecciated dolomite in qtz. matrix.						
	183.0 Narrow min'l. x'lline str. (¼") Qtz. Core very broken over entire section.						
201.0-219.0	Pale yellow to yellow dolomite. A few rusty seams & parting planes.						
219.0-253.0	Light grey to blue to yellow dolomite, in alternating bands & some sections mottled. Generally harder than usual & poss. sl. silicified.						
	END						

PROPERTY Elkhorn - Hunter Exploration

HOLE NUMBER En 13

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5242.73
DEP. E 5397.92

ELEVATION OF COLLAR 6326.8

DATUM

DIRECTION AT START: BEARING S 65° W
DIP -10°

STARTED March 11, 1955

COMPLETED March 16, 1955

ULTIMATE DEPTH 213.0'

LOGGED BY L. A. P.

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE			
0.0-6.0	Yellow siliceous dolomite, prob. low grade, quartzose ore of Elkhorn S. oreshoot.					
6.0-40.0	White to light grey dolomite, sl. harder than ave.					
	8.0 - 8.5 Soft mineralized stringer.					
	16.0- 17.0 Min'l. stringers.					
	33.0 - 34.0 Yellow dolomite.					
	34.0 - 40.0 Core very broken.					
	35.0 ½" brink red brecciated stringer.					
40.0-52.0	Pale yellow to white speckled dolomite.					
	43.0 ½" brick red brecciated stringer.					
52.0-54.0	Dark silic. dolomite with min'l. str. & prob. mang.					
54.0-66.0	White dolomite. A few rusty parting planes.					
66.0-100.0	Pale yellow sl. speckled dolomite.					
100.0-112.0	White speckled dolomite, a few min'l. str. One or two soft sandy bands.					
112.0-132.0	White to pale yellow dolomite. Solid rock giving good core.					
132.0-142.9	Ditto above, but core badly broken					

PROPERTY

HOLE NUMBER Ex 19

SHEET NUMBER (2)

DIAMOND DRILL RECORD

SECTION FROM ..... TO .....

LOCATION: LAT. .....
DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING .....
DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
142.0-145.6	Quartz dolomite breccia. Sl. min'l.	497	2.7'	0.01	1.80	0.05	Tr.		
145.6-146.6	Dolomite breccia. Large percentage is brownish qtz.	498	1.0'	0.03	21.70	.40	0.20		
	Trace of silver min'l. Some fine pyrite.								
146.6-147.4	White speckled dolomite	499	0.8'	Tr.	0.40	0.10	Tr.		
147.4-152.0	White dolomite.								
152.0-158.2	Yellow dolomite.								
158.2-161.3	Dolomite breccia. 50% of section is white quartz.	500	3.1'	0.07	25.50	1.00	2.00		
	High grade silver stringer from 160.2 - 160.6.								
	Tetrahedrite x'ls. at 161.3.								
161.3-170.0	White & yellow dolomite, a few min'l str.								
170.0-171.8	Yellow dolomite with min'l. str.	512	1.8'	0.01	1.20	0.05	0.30		
171.8-213.0	Mostly yellow dolomite with a few min'l str.								

END

PROPERTY [illegible] (Sopka) Mutter Exploration

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM _____ TO _____

DIAMOND DRILL RECORD

LOCATION: LAT. H 5[illegible]

DEP. E 5[illegible].75

ELEVATION OF COLLAR 6[illegible].55

DATUM

DIRECTION AT START: BEARING S 7[illegible]0W

DIP -55°

STARTED March [illegible], 1973

COMPLETED March [illegible], 1973

ULTIMATE DEPTH 57.0

LOGGED BY V.B.J.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	A	A3	B	B3	
0.0- 17.0	Yellow dolomite. Dark mineralized stringer (lens like core) at 1.0' and 5.0' in core.							
17.0- 38.0	Pale yellow and white dolomite.							
	32.0 Narrow (1/4") mineralized stringer.							
38.0- 39.1	Yellow crumbly dolomite. Last half of section is brecciated.							
39.1- 46.0	Pale yellow speckled dolomite.							
46.0- 57.0	Blue dolomite.							
57.0- 65.0	Yellow dolomite.							
	62.0 Mineralized seam (1/8")							
	64.0 Slight brecciation.							
65.0- 78.0	Pale yellow and blue dolomite in alternating layers.							
78.0-105.0	Yellow dolomite.							
105.0-128.5	Blue dolomite.							
128.5-131.0	Yellow dolomite.							
	128.5-128.6 Lens like stringer of ore.							
131.0-161.0	Blue dolomite.							
	147.0-148.0 Yellow.							
	149.0-153.0 Yellow.							
161.0-175.0	White dolomite.							
	170.0 Quartz stringer (1") cont. dolomite breccia.							

PROPERTY

HOLE NUMBER FDU

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
175.0-183.0	Yellow dolomite.								
183.0-203.0	Mostly white dolomite.								
	190.5-193.0 Sugary yellow crumbly dolomite. At 192.5 resembles fault gouge.								
208.0-225.0	Yellow and blue and yellow mottled dolomite.								
	217.0-219.0 Core contains longitudinal stringer of brown siliceous material.								
225.0-227.0	Yellow dolomite with brown mineralized inclusions, and white dolomite with dark hairline stringers.	506	2.0'	Tr.	0.20	Tr.	Tr.		
227.0-233.0	Yellow dolomite.								
233.0-235.5	Sugary yellow dolomite with mineralized stringers and suggestion of lead.	507	2.5'	Tr.	0.10	Tr.	Tr.		
235.5-246.2	Yellow dolomite with hairline stringers and numerous narrow fissures mostly longitudinal to core. Suggestion of brecciation.								
	242.0 Hairline fissure lined with dark crystalline coating. (Zinc?)								
246.2-248.5	Yellow dolomite, well mineralized. Contains some quartz in narrow veinlets. Part is brecciated. Some brown or dark inclusions. Mineral present resembles light brown calcite or a feldspar. Possibly axinite. Two locations show vugs with lining of calamine.	508	2.3'	Tr.	0.60	0.10	0.30		

PROPERTY

HOLE NUMBER [illegible]

SHEET NUMBER (3)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
248.5-250.5	Yellow and brown mineralized dolomite. Considerable quartz as blebs and stringers. Some calamine. Also a mineral resembling galena.	509	2.0'	0.01	0.90	0.30	4.00		
250.5-253.2	Ditto above but fairly dark brown.	510	2.7'	0.01	1.60	0.40	3.10		
253.2-255.4	Ditto but last 1.0' of section is yellow speckled dolomite.	511	2.2'	0.015	2.40	0.20	1.30		
255.4-262.0	White speckled dolomite.								
262.0-267.0	Blue and yellow dolomite.								
267.0-273.0	Yellow dolomite.								
	END								

DIAMOND DRILL RECORD

PROPERTY Kitchener Mining Exploration HOLE NO. Eu 15

SHEET NUMBER (1) SECTION FROM ____ TO ____ STARTED March 16, 1955

LATITUDE N 5280.73 DATUM ____ COMPLETED March 21, 1955

DEPARTURE E 5396.92 BEARING S 48° W ULTIMATE DEPTH 207.0'

ELEVATION 6326.8 DIP -25° ~~PROPOSED DEPTH~~ Logged by W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	GOLD $	SLUDGE GOLD $		
0.0-1.0	Casing						
1.0-3.0	Good grade silver ore. Silic. dolomite & quartz with minerals of lead, zinc, & silver.						
3.0-16.0	Silic. dolomite, light grey to brownish color. Very sl. min'l.						
16.0-25.0	Pale yellow to grey dolomite.						
25.0-52.0	White dolomite, core very broken.						
52.0-60.5	White dolomite, sl. silic. & sl. min'l. Contact on both sides quite clear at 40° - 45° to core. Possibly rep. 80' contact horizon.						
60.5-65.0	White & pale yellow dolomite.						
65.0-85.0	Yellow & white dolomite in alternating layers. Numerous min'l. str.						
85.0-123.0	White dolomite. Relatively solid rock & good core. 103.0 Red hematitic str. (1/8"). 115.0 Yellow oxide str.						
123.0-130.0	Pale yellow speckled dolomite. 124.5 Narrow ½" str. cont. dolomite breccia. 125.5 Ditto, some qtz. & poss. zinc min'l. 127.0 - 128.0 Yellow sl. min'l. dolomite.						

N.M.P. TORONTO-STOCK FORM NO. 5M1 REV. 12/51

DIAMOND DRILL RECORD

PROPERTY _____ HOLE NO. Eu 15

SHEET NUMBER (2) SECTION FROM _____ TO _____ STARTED

LATITUDE _____ DATUM _____ COMPLETED

DEPARTURE _____ BEARING _____ ULTIMATE DEPTH

ELEVATION _____ DIP _____ PROPOSED DEPTH

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au GOLD $	Ag	Pb SLUDGE GOLD $	Zn
130.0-145.0	White dolomite. Core very broken.						
145.0-161.6	Yellow speckled dolomite, sl. min'l. in places. Core very broken.						
161.6-163.0	White speckled dolomite.	501	1.4'	.005	0.40	Tr.	0.20
163.0-164.6	Some yellow dolomite but mostly brown min'l. qtz. Silver & copper minerals. Yellow oxides or chlorides.	502	1.6'	0.01	1.20	0.10	0.30
164.6-165.5	White speckled dolomite.	503	0.9'	0.01	0.80	0.05	0.15
165.5-168.0	Yellow dolomite.						
168.0-169.0	Yellow dolomite, dark str. tr. of qtz.	504	1.0'	.005	0.70	Tr.	Tr.
169.0-185.0	Mostly pale yellow dolomite, but some bands of white.						
185.0-207.0	White dolomite.						

END

N.W.P. TORONTO-STORE FORM No. 301 REV. 1243

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER Eu 16

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5526.20
DEP. E 5389.22

ELEVATION OF COLLAR 6324.63

DATUM

DIRECTION AT START: BEARING S 60° W
DIP -10°

STARTED March 22, 1955

COMPLETED March 26, 1955

ULTIMATE DEPTH 249.5'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE				
0.0-8.0	Yellow siliceous dolomite, fairly well min'l. Part of						
	FW portion of Elkhorn S. oreshoot.						
	3.0 - 3.3 High grade silver ore stringer.						
	7.0 1" min'l qtz. str.						
8.0-17.0	Pale yellow dolomite, some secs. min'l.						
17.0-28.0	White dolomite.						
	18.0 - 18.5 Soft min'l. band showing some lead.						
	Possibly rep. FW of Elkhorn ore.						
28.0-50.0	Pale grey hard silic. dolomite.						
	46.0 - 47.0 Speckled.						
50.0-88.0	White dolomite.						
	84.0 - 85.5 Yellow & sugary.						
88.0-110.0	Pale yellow dolomite, broken core.						
110.0-144.0	White dolomite.						
	125.0 - 126.0 Min'l. prob. manganese.						
	136.0 - 137.0 Min'l. stringers, sl. brecciation.						
	139.0 - 140.0 White min'l. str. zone.						
144.0-148.0	Yellow dolomite.						
148.0-155.0	White dolomite.						
155.0-176.0	Yellow dolomite.						
176.0-182.0	Blue dolomite.						

PROPERTY

HOLE NUMBER Eu 16

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE			
182.0-192.0	Yellow dolomite.					
192.0-203.0	Pale yellow dolomite, speckled app. in plades.					
	Rusty parting planes. Core very broken					
203.0-210.0	White dolomite, broken.					
210.0-215.0	Yellow dolomite.					
215.0-217.0	White dolomite.					
217.0-218.0	Yellow (dark) sugary dolomite.					
218.0-225.0	Yellow & blue mottled dolomite, very friable.					
	Core broken.					
225.0-232.0	White solid dolomite.					
232.0-249.5	Dark blue dolomite.					
	241.0 - 243.0 Yellow.					
	248.5 - 249.5 Yellow.					
	END					

PROPERTY Elkhorn (Sophia) Mentor Exploration

HOLE NUMBER Eu 17

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5212.28
DEP. E 5218.96

ELEVATION OF COLLAR 6424.03

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED March 23, 1955

COMPLETED March 27, 1955

ULTIMATE DEPTH 138.0'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn	
0.0-30.0	White dolomite.							
30.0-50.0	White dolomite, some sections speckled. Numerous hairline str. & some manganese ferns. Generally harder than average & poss. sl. silicified.							
50.0-55.0	Pale yellow to brownish dolomite, & few vug holes.							
55.0-63.0	White, yellow & blue dolomite with an overall mottled appearance.							
63.0-78.0	White dolomite.							
78.0-80.0	White siliceous speckled dolomite.							
80.0-84.0	White dolomite.							
84.0-91.0	Blue dolomite.							
91.0-112.5	Pale yellow to brownish dolomite, some min'l. str. Generally soft & some sections sugary.							
112.5-113.4	White silic. dolomite, sl. min'l.	514	0.9'	Tr.	0.20	0.10	0.10	
113.4-113.7	Quartz stringer in dolomite. Some silver min'l. & specks of galena.	515	0.3'	0.02	13.40	1.60	3.10	
113.7-115.3	Silic. dolomite, trace of galena.	516	1.6'	Tr.	0.60	0.20	1.05	
115.3-131.0	Pale yellow dolomite							
131.0-135.0	Yellow dolomite, parting plane longitudinal to core.							
135.0-137.0	Pale yellow dolomite.							
137.0-138.0	White dolomite.							

END

HOLE NUMBER [illegible]-20

PROPERTY Elkhorn - Dorlar Exploration

SHEET NUMBER (1)

DIAMOND DRILL RECORD

SECTION FROM ..... TO .....

LOCATION: LAT. N 5525.70
DEP. L 5393.72

ELEVATION OF COLLAR 6321.81

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED March 26, 1955

COMPLETED March 26, 1955

ULTIMATE DEPTH 12.0

LOGGED BY W. L. P.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0-5.0	Very siliceous dolomite with fair mill. Quartzose ore of Elkhorn S. oreshoot.								
5.0-12.0	Same as above but more brecciated appearance & well mineralized.	585	4.0'	0.01	1.60	0.50	0.60		
	12.0 Broke into old stope.								
	Hole was to probe for 40 ft. contact oreshoot at about 50' but abandoned when old stope was encountered.								
	Adl.								

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER Eu 19

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5568.61
DEP. E 5386.76

ELEVATION OF COLLAR 6322.19

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED March 28, 1955

COMPLETED March 29, 1955

ULTIMATE DEPTH 21.0'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE			
0.0-21.0	Yellow siliceous dolomite, fairly well mineralized. Almost quartz in spots. FW material of Elkhorn oreshoot. A few vugs lined with qtz. and/or zinc mineral. Some is brecciated dolomite in qtz. matrix. Probably low grade estimated to contain 2 ozs. silver per ton.					
	21.0 Broke into old stope.					
	END					

PROPERTY Elkhorn (Sophia) Mentor Exploration

HOLE NUMBER EU20

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5211.78
DEP. E 5216.46

ELEVATION OF COLLAR 6428.63

DATUM

DIRECTION AT START: BEARING S 71°W
DIP -55°

STARTED April 20th, 1955

COMPLETED May 7th, 1955

ULTIMATE DEPTH Deepened June 13th-20th, 1955
296.0

LOGGED BY H.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn	
0.0- 34.0	Pale yellow speckled dolomite, some Mn.							
	22.5-23.0 Hairline fissure longitudinal to core and lined with dark crystalline layer (Zn?)							
	35.0 Lost return water.							
34.0- 42.0	Siliceous speckled dolomite, slightly mineralized.							
42.0- 52.0	Blue mottled dolomite.							
	48.0-48.5 Sugary with min'l. stringer.							
	49.5-50.0 Sugary yellow with min'l. stringer.							
52.0- 96.0	Yellow dolomite.							
	57.5-60.0 Soft and sugary.							
	61.5 Narrow (½") rusty stringer, prob. min'l.							
	84.0-88.0 Slightly min'l. with suggestion of brecciation.							
96.0-115.0	Blue dolomite.							
115.0-117.0	White dolomite, last 0.3' sugary.							
117.0-147.0	Mostly blue dolomite but mottled with yellow.							
	131.0-133.0 Sugary blue.							
	134.0-134.7 Open fissure.							
	134.7-138.0 Yellow, sl. min'l. Qtz. str.(¼") at 135.0							
	141.0-141.5 Open fissure.							
	143.0-143.7 Open fissure.							
	145.5-146.5 Siliceous and sl. min'l.							

PROPERTY

HOLE NUMBER HU20

SHEET NUMBER (2)

SECTION FROM ..... TO ...

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
147.0-179.0	Yellow dolomite.						
	151.5-155.5 Open fissure 4' wide, seemed fairly clean with smooth walls.						
	161.0-161.5 Open fissure.						
	161.5-161.7 Stringer of fine grained soft brown material.						
	165.0-166.0 Open fissure.						
	166.0-167.0 Sugary.						
	171.0-172.0 Sugary with min'l. stringer.						
	177.5-179.0 Open fissure.						
179.0-180.0	Siliceous speckled dolomite, slightly mineralized. Mostly white but some blue.						
	179.0 Stringer (1½") of porous mineralized dolomite and quartz. Dark brown color and estimated to contain silver values.						
	179.0-180.0 Mud seam. This seam along with the fissure above it caused trouble in removing rods and resulted in the hole being stopped at 255.0						
	182.0 At front of section in core there is a 1" length of brown granular limestone typical of material lining cavities (stalactitic).						

PROPERTY

HOLE NUMBER N20

SHEET NUMBER (3)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
188.0-220.0	Blue dolomite.						
	201.0 Soft sandy spot.						
	205.0 Siliceous.						
220.0-241.0	Blue and yellow dolomite in alternate layers and mottled in some sections.						
	220.0-221.0 White and slightly mineralized.						
	226.0-228.0 Yellow and mineralized.						
241.0-246.0	Dark blue to brownish dolomite, silceous and sl. min'l. with some hairline quartz stringers.						
246.0-248.3	Dark siliceous mineralized dolomite, sl. brecciated app.						
248.3-252.0	Dark siliceous mineralized dolomite with narrow quartz stringers. Suggestion of zinc. Almost black in spots.	518	3.7'	0.01	1.60	0.10	0.20
252.0-255.0	Siliceous blue dolomite.	519	3.0'	Tr.	0.60	Tr.	Tr.
	Hole reamed to 184.0 and EX casing put in.						
255.0-259.2	Siliceous blue dolomite.						
259.2-261.0	Mineralized dolomite, trace of galena.	577	1.8'	Tr.	0.10	Tr.	Tr.
261.0-262.0	Blue dolomite, sl. silic. & sl. min'l.	578	1.0'	0.015	2.80	0.30	0.40
262.0-265.0	Mixture of blue min'l. dolomite, blue to white quartz cont. fine pyrite, and porous brown dolomite honeycombed by qtz. str. & cont. blebs of galena. Two spots show grey and yellow silver mineralization.	579	3.0'	0.01	2.60	0.40	0.40

PROPERTY

HOLE NUMBER EU20

SHEET NUMBER (4)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn	
265.0-272.0	Part of section is yellow dolomite containing large blebs of galena and part is blue to white quartz with fine pyrite and galena. Considerable brown mineralized dolomite containing narrow quartz stringers. Some core is dolomite and quartz or siliceous dolomite partly replaced by quartz.	580	7.0'	0.01	2.20	0.50	0.80	
272.0-273.8	Brown siliceous dolomite with about 50% of blue quartz with pyrite, galena, and silver minerals.	583	1.8'	Tr.	0.40	Tr.	Tr.	
273.8-277.0	Blue and yellow hard siliceous dolomite.	584	3.2'	Tr.	0.10	Tr.	Tr.	
277.0-296.0	Yellow dolomite.							

END

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER Eu 21

DIAMOND DRILL RECORD

SHEET NUMBER (1)

SECTION FROM

LOCATION: LAT. N 5648.61
DEP. E 5377.26

ELEVATION OF COLLAR 6322.19

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED March 30, 1955

COMPLETED March 31, 1955

ULTIMATE DEPTH 74.0'

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE			
0.0-15.0	Siliceous yellow dolomite, sl. min'l. FW portion of Elkhorn oreshoot. Probably contains 1.5 ozs. Ag per ton.					
15.0-35.0	Yellow dolomite, sl. silic., but almost no min'l. 20.5 - 21.0 Soft argillaceous seam which may represent FW contact of the Elkhorn ore.					
35.0-53.0	Pale yellow to white speckled dolomite. Num. hairline min'l. str. & a few narr. seams, showing brecciation.					
53.0-61.0	Pale yellow dolomite.					
61.0-74.0	White dolomite, mostly speckled & some dark str.					
	END					

PROPERTY Elkhorn- Hunter Exploration

HOLE NUMBER [illegible]

SHEET NUMBER (1)

DIAMOND DRILL RECORD

SECTION FROM ..... TO .....

LOCATION: LAT. N 5726.84
DEP. E 2352.65

ELEVATION OF COLLAR 6323.94

DATUM

DIRECTION AT START: BEARING S 60°W
DIP -10°

STARTED April 1st, 1955

COMPLETED April 14th, 1955

ULTIMATE DEPTH 66.5

LOGGED BY N.B.P.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0- 14.0	Yellow dolomite, siliceous and slightly mineralized.								
14.0- 19.3	Dark mineralized dolomite with considerable quartz as blebs and stringers. Last few inches of section is soft fine grained material with bluish tinge, mottled with green. Offshoot from Elkhorn ore.	517	5.3'	0.02	7.0	0.20	1.10		
19.3- 21.5	Dolomite, slightly mineralized and slightly brecciated. First 3" is same as last of section above.								
21.5- 39.0	Pale yellow and white dolomite, slightly mottled appearance.								
39.0- 41.0	Blue dolomite, a few dark mineralized bands.								
41.0- 44.0	White dolomite, mottled with blue.								
44.0- 76.0	Pale yellow speckled dolomite.								
	66.0-67.0 Soft sugary dolomite seam.								
	70.5-71.0 Mineralized quartz stringer (2") and soft multi-colored mineralized gouge. The quartz might assay.								
	73.0 Quartz stringer (1/8")								
	70.0-73.0 Hairline quartz stringers.								
	75.0-76.0 Sugary and slightly mineralized.								

PROPERTY

HOLE NUMBER [illegible]

SHEET NUMBER (2)

DIAMOND DRILL RECORD

SECTION FROM ..... TO .....

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING ..... DIP .....

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
6.0- 96.0	Relatively dark dolomite, probably due to impurities as mineralization is slight. Several narrow sections show slight mineralization or brecciation and contain hairline quartz stringers.								
	77.5 Stringer (1/8") containing serpentine.								
	93.0-96.0 Core broken and recovery only 50%. Contains a few narrow black quartz stringers.								
96.0-110.0	Mostly yellow dolomite but a few bands of blue. Sugary in spots. Slight brecciation in one or two places.								
110.0-132.0	White dolomite, relatively solid.								
	122.0 Blue quartz stringer (½") with associated black minerals and possibly hematite. Dolomite is brecciated near quartz. The stringer is at 20° to core and therefore takes up 0.5' of core length.								
	127.0 Mineralized quartz stringer (½") at 30° to core.								
	130.0-131.5 Core broken up.								
132.0-138.0	Pale blue dolomite.								
138.0-150.3	Pale yellow dolomite, slightly mineralized.	522	12.3'	Tr.	0.20	Tr.	Tr.		

PROPERTY

HOLE NUMBER

SHEET NUMBER (9)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING ..... DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
1.0-151.0	Brecciated dolomite with considerable quartz. Galena showing in one spot.	520	0.7'	Tr.	0.10	Tr.	Tr.		
151.0-168.0	Mostly white and pale yellow dolomite, generally darkened by impure stringers. Some narrow (1/8") quartz stringers.								
168.0-169.2	Mixture of quartz and hematite. Crystals (cubic) up to 1/4". Dark maroon to black in color but scratches red.	521	1.2'	Tr.	0.60	Tr.	0.15		
169.2-170.7	Dark siliceous dolomite with a few stringers (1/4") of quartz-hematite material.								
170.7-208.5	Pale yellow dolomite, slightly speckled and most of core broken up.								
208.5-230.0	Blue dolomite. Occasional band of white and latter contains rusty seams and is badly broken. The blue is generally quite solid.								
230.0-240.0	Yellow dolomite.								
240.0-257.0	Pale blue to blue dolomite, a few yellow bands.								
257.0-278.0	Mixed yellow and blue dolomite. Core very broken.								
278.0-308.0	Generally dark blue dolomite, slightly mottled with yellow and some yellow bands.								
308.0-311.0	White dolomite.								
311.0-314.0	Blue dolomite.								

PROPERTY

HOLE NUMBER

SHEET NUMBER (5)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
[illegible]4.0-316.0	Shear or fault zone. Some quartz, talcose material,								
	and serpentine. Probably as stringer in white								
	dolomite. Multi-colored gouge.								
316.0-369.0	Dark blue dolomite.								
	323.0-323.5 Sugary.								
	327.0-330.0 White.								
	342.0-344.0 Pale yellow.								
369.0-379.0	White dolomite.								
379.0-391.0	White and pale blue dolomite. Core very broken. A								
	few sugary or sandy sections.								
	388.5-390.0 Open fissure (1.5')								
[illegible]1.0-393.0	Yellow dolomite.								
393.0-406.5	Generally dark blue dolomite.								
	END								

PROPERTY Elkhorn (Keene) Mentor Exploration

HOLE NUMBER Eu 23

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 6183.18
DEP. E 5136.48

ELEVATION OF COLLAR 6383.65

DATUM

DIRECTION AT START: BEARING N 59° E
DIP ∓5°

STARTED April 12, 1955

COMPLETED April 15, 1955

ULTIMATE DEPTH 100.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0-1.0	Pink mottled dolomite.								
1.0-20.0	White dolomite. Wavy grey stringers.								
20.0-22.0	White to pink dolomite. Brecciated & recemented. Cons. fine pyrite. Contact zone with Elkhorn Shale.	535	2.0'	0.01	0.40	0.20	0.80		
22.0-44.0	Hornstone. Brownish to flesh colored. Some narrow sections almost black. Considerable pyrite throughout.								
44.0-50.0	Slaty blue limestone.								
50.0-65.0	Black slate or hornstone. Thinly bedded. Some pyrite.								
65.0-72.0	Brown to grey slaty limestone.								
72.0-77.0	Blue limestone.								
77.0-100.0	Blue limestone & black slaty looking limestone in alternate layers. Some sections light brown.								

END

PROPERTY Elkhorn (Keno) Mentor Exploration

HOLE NUMBER Dr 24

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 6185.18
DEP. E 5136.48

ELEVATION OF COLLAR 6383.65

DATUM

DIRECTION AT START: BEARING N 40° E
DIP + 5°

STARTED April 16, 1955

COMPLETED April 17, 1955

ULTIMATE DEPTH 49.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0-31.0	White dolomite. A few pink brecciated sections. Some vug holes. Many grey stringers which are higher in calcium than the dolomite itself.								
31.0-40.2	Pale yellow dolomite. Broken up core. Rusty specks.								
40.2-41.5	Hornstone, oxidized - Orange brown in color. Sl. min'l.								
	41.0 - 41.2	533	0.2'	Tr.	0.05	Tr.	Tr.		
41.5-49.0	Brown hornstone, bluish tinge in spots. Cons. pyrite. Bedding longitudinal to core. Some pyrite layers on parting planes.								
	41.5 - 41.7	534	0.2'	0.01	0.30	0.10	0.50		
	END								

PROPERTY Ellsworth (Keeno) Hunter Exploration

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 6192.68
DEP. E 5136.48

ELEVATION OF COLLAR 6383.65

DATUM

DIRECTION AT START: BEARING N 23° E
DIP + 5°

STARTED April 17th, 1955

COMPLETED April 28th, 1955

ULTIMATE DEPTH 350.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE				
.0- 53.0	White dolomite with grey stringers.						
	18.0-20.0 Pink, brecciated.						
	34.5 1½" of yellow sand.						
	37.0-39.0 Brecciated and slightly mineralized.						
	51.0-51.7 Oxidized seam with white powdery gouge.						
53.0- 62.0	Pinkish dolomite with slightly silicified look.						
	58.0-58.5 White soft seam at 30° to core, crystalline structure and vuggy.						
62.0-124.0	Mostly white dolomite but some sections various colors and brecciated.						
	98.0-98.3 Conglomeritic appearance with stringers of red hematite color.						
	110.5-114.5 Vuggy with slight mineralization.						
124.0-130.0	Pale yellow dolomite.						
130.0-165.0	White dolomite, a few rusty seams longitudinal to core.						
	134.5 2" open fissure.						
	161.0 1" rusty mineralized stringer.						
165.0-170.0	Pale yellow dolomite.						
170.0-190.0	White dolomite.						
190.0-194.0	Pinkish dolomite.						
194.0-213.0	White dolomite.						

PROPERTY

HOLE NUMBER [illegible]5

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE				
3.0-215.0	Pale yellow dolomite.						
215.0-273.0	White dolomite, slightly pinkish in spots, no min'l.						
	244.5 Porous grey seam (½")						
273.0-284.0	White siliceous dolomite containing wavy seams of						
	rusty material. Some sugary seams, and no min'l.						
	275.0-280.0 Parting planes coated with black min'l.						
	Some Mn ferns.						
284.0-286.0	Multi-colored dolomite.						
286.0-292.0	White dolomite.						
292.0-309.0	Badly broken white dolomite, heavily shattered. Some						
	sections sugary. A few 1/8" quarts stringers. General						
	orange or rusty appearance, especially along cracks.						
	Some parting planes coated with black.						
	294.0-296.0 Brecciated but no mineralization.						
309.0-350.0	White dolomite.						
	END						

PROPERTY Elkhorn (Keene) Mentor Exploration

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 6178.18
DEP. E 5128.48

ELEVATION OF COLLAR 6383.65

DATUM

DIRECTION AT START: BEARING S 59° W
DIP + 5°

STARTED April 29th, 1955

COMPLETED May 7th, 1955

ULTIMATE DEPTH 344.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0- 12.0	White to pink dolomite.								
12.0- 19.0	White dolomite, generally brecciated and mixed with grey and brown dolomite. Marble appearance, some Mn.								
19.0- 82.5	White dolomite, some sections mottled.								
	23.0 Rusty stringer.								
	25.0-26.0 Rusty stringer with manganese.								
	33.0-59.0 Core very broken.								
	56.0 Narrow (½") mineralized stringer estimated to contain silver values.								
	67.0-67.5 Conglomeritic appearance.								
	70.0-71.0 Vuggy and vugs lined with crystals.								
82.5- 85.0	Brown brecciated dolomite with brecciated appearance and conglomeritic appearance for first half of section, and the remainder is white latered dolomite with talcose material and slight mineralization.	562	2.5'	Tr.	0.30				
85.0- 95.0	White dolomite with grey stringers. Lost return water at 93.5'.								
95.0-135.0	White dolomite.								
135.0-142.0	Pale blue dolomite.								
142.0-183.0	White dolomite with some parts pale blue or grey.								
183.0-185.0	White dolomite.								

PROPERTY

HOLE NUMBER EU26

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE			
185.0-203.0	Blue to pale translucent blue dolomite.					
204.0-237.0	Mostly white dolomite, some sections with small rusty specks.					
	234.0-235.0 Shearing, fine grained alteration products & slight mineralization.					
	235.0-237.0 Dolomite contorted and mixed with talcose material.					
237.0-274.0	Blue to light brown dolomite.					
	242.5-243.0 Seam of white powdery material resembling kaolinite.					
	261.0-262.0 Talc seam.					
274.0-288.0	Blue dolomite.					
288.0-297.0	White dolomite.					
297.0-311.5	Pale blue dolomite.					
311.5-313.0	Vuggy white to sugary yellow dolomite.					
313.0-321.0	Mostly pale blue dolomite.					
	317.0-318.0 White and sugary.					
321.0-344.0	Alternate sections of blue & brown dolomite, many rusty fractures. Some stringers of powdery min'l.					
	322.0-323.0 Altered to dark brown with some Mn.					
	338.0-340.0 Brown dolomite.					

HOLE NUMBER [illegible]

SHEET NUMBER (1)

SECTION FROM ..... TO .....

PROPERTY Elkhorn - Mentor Exploration

DIAMOND DRILL RECORD

LOCATION: LAT. N 5735.34
DEP. E 5259.85

ELEVATION OF COLLAR 6319.94

DATUM

DIRECTION AT START: BEARING
DIP Vertical

STARTED April 15th, 1955.

COMPLETED April 18th, 1955.

ULTIMATE DEPTH 90.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0 - 22.0	Yellow dolomite.								
22.0 - 24.0	Seam of fine grained sediments, in part hard and siliceous, remainder soft. Mn ferns on parting planes. Generally light grey color but tinged blue and green in spots. Elkhorn FW? 22.0-22.2 Mineralized stringer.								
24.0 - 54.5	Pale yellow to white dolomite. Generally speckled & a few min'l. str. A few narrow quartz stringers. 54.0-54.5 Soft and sandy.								
54.5 - 56.3	Siliceous dolomite. Sl. min'l. First 0.4' is 25% quartz as stringer.	528	1.8'	Tr.	0.15	Tr.	Tr.		
56.3 - 61.0	Speckled dolomite, slight silicification.	529	4.7'	Tr.	Tr.	Tr.	Tr.		
61.0 - 66.5	Dark mineralized dolomite, hard & siliceous. First 1.0' is black & cherty. Considerable quartz as narrow stringers. Some core very cherty. A few vug holes lined with brown crystalline material. (zinc?)	530	5.5'	Tr.	0.05	0.40	0.20		
66.5 - 69.1	Black siliceous material with bluish quartz stringers and quartz as breccia cement.	531	2.6'	0.01	0.45	0.30	0.60		
69.1 - 71.9	Dark siliceous dolomite.	532	2.8'	Tr.	0.10	Tr.	Tr.		
71.9 - 76.0	Yellow and white dolomite, but color darkened by impurities. Possibly sl. min'l.								

PROPERTY

HOLE NUMBER [illegible]

SHEET NUMBER (2)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. ..... DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING ..... DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE				
.0 - 90.0	Pale yellow to white dolomite, mostly speckled.						
	84.0-86.0 Contains a few vugs lined with quartz, also quartz str. and open seams.						
	87.0 Quartz stringer (½") with hematitic color.						
	END						

HOLE NUMBER Eu 28

SHEET NUMBER (1)

SECTION FROM ..... TO .....

PROPERTY Elkhorn - Mentor Exploration

DIAMOND DRILL RECORD

LOCATION: LAT. N 5737.84
DEP. E 5358.85

ELEVATION OF COLLAR 6319.94

DATUM

DIRECTION AT START: BEARING N 25° W
DIP -65°

STARTED April 18, 1955

COMPLETED April 20, 1955

ULTIMATE DEPTH 107.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE				
0.0-20.5	Yellow dolomite.						
20.5-21.5	Argillaceous seam, same as that cut in Eu 27. Elkhorn FW?						
21.5-52.7	Pale yellow to white dolomite. Mostly speckled. Sl. min'l.						
52.7-59.0	Min'l silic. dolomite. First 1.0' is brecciated & cont. some quartz. See corr. to Eu 27, samples 528 to 532.						
59.0-72.0	Pale yellow to white dolomite. Core very broken.						
72.0-88.0	White dolomite. 75.0 - 75.4 Silic. min'l. str.						
88.0-102.0	White speckled dolomite. Small vug at 98.0.						
102.0-107.0	Pale blue dolomite.						
	END						

PROPERTY Elkhorn - Mentor Exploration

HOLE NUMBER EU29

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5754.34
DEP. E 5367.85

ELEVATION OF COLLAR 6323.94

DATUM

DIRECTION AT START: BEARING N 20° E
DIP +5°

STARTED April 21st, 1955.

COMPLETED May 6th, 1955.

ULTIMATE DEPTH 404.0

LOGGED BY W.E.P.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
0.0 - 47.0	Hornstone, light brown to dark brown to flesh colored. Considerable pyrite through section both disseminated and as stringers up to 1/8" wide. In some parts rock is homogeneous and in other parts is thinly bedded with wavy contacts.								
	46.0 Narrow seam of gouge.								
	45.0-47.0 Hairline fractures in slate filled with carbonate.								
47.0 - 56.0	Dark blue limestone.								
	48.5-48.7 Gouge.								
	54.0-55.0 Brown.								
56.0 - 70.0	Hornstone. Contact with limestone is fairly sharp but some limestone included in slate and appears partially digested. Slate generally brown but some parts are bleached.								
70.0 - 105.0	Black slate or hornstone with some disseminated pyrite.								
	71.0-72.5 Altered to brick red color, as are other narrow sections.								
	In whole section the slate is broken. Most of parting planes are at 60° to core. Many bands & str. showing alteration & bleaching. Many light hairline str. at all angles to core.								

PROPERTY

HOLE NUMBER E-29

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
105.0-130.0	Blue limestone with considerable pyrite. Sharp contact with slate at 40° to core. Limestone varies from coarse blue to fine grained brown. Generally wavy bedding lines.								
130.0-160.0	Limestone, fine grained and mostly medium brown in color. Narrow seams of gouge at 144.0, 146.0 & 148.0								
160.0-182.5	Blue limestone.								
182.5-185.5	Siliceous limestone, light brown to shite in color. Part of section is white quartz but core too broken to determine width of quartz. No mineralization. Could be possible ore horizon at some other location.								
185.5-214.5	Blue limestone. 200.0-202.0 Siliceous & bleached.								
214.5-216.0	White quartz, no mineralization.								
216.0-218.0	White siliceous limestone.								
218.0-227.0	Blue limestone.								
227.0-241.0	Light brown siliceous limestone, a few small vug holes. No Min'l. Almost quartz in spots.								
241.0-302.0	Blue limestone. Occasional stringers with pyrite. Some places light blue in color, and others light grey and very fine grained.								

PROPERTY

HOLE NUMBER EU29

SHEET NUMBER (3)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
	268.0-268.4 Altered stringer with talcose material.								
	268.0-270.0 Altered zone, core broken.								
	275.0 Seam of gouge (½") cont. small pieces of limestone.								
	293.0-295.0 Light brown & siliceous, some qtz. sl. min'l.								
302.0-340.0	Blue limestone, several vug holes. Good solid core.								
340.0-342.0	White silceous limestone.								
342.0-345.0	Pale blue to white limestone, very broken. Parting plane longitudinal to core and cont. white powdery material. Possibly some calcite.								
345.0-349.0	Blue and brown limestone, sl. silic. Some black specks of min'l. Last 1.0' is highly altered.								
349.0-351.0	Blue limestone.								
351.0-382.0	White to light grey limestone, soft and core broken.								
	363.0-364.0 Brownish & silicecus.								
	367.0-370.0 As above with slight mineralization.								
382.0-404.0	White limestone, soft and porous looking.								
	398.0-399.0 Soft crumbly shear zone with gouge & slickensided surfaces. Conglomeritic appearance & some grey min'l. present. Dirty brown color.								
	403.0-404.0 Light brown seam of clay-like material, powdery when dry.								

PROPERTY Elkhorn (Keene) Mentor Exploration

HOLE NUMBER DD 20

SHEET NUMBER 1.

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 6189.68
DEP. E 5136.48

ELEVATION OF COLLAR 6383.65

DATUM

DIRECTION AT START: BEARING N 31° E
DIP -5°

STARTED May 7th, 1955

COMPLETED May 15th, 1955

ULTIMATE DEPTH 300.5

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0 - 41.0	White dolomite, fairly hard. A few small vugs. Rusty fracture planes. Numerous grey str. but these not mineralized.						
41.0 - 50.0	White dolomite. Core all broken due to rusty fracture or shearing planes.						
50.0 - 69.7	White dolomite, wavy shear planes. Some Mn ferns. 66.0-66.5 Brecciation.						
69.7 - 71.5	Brownish siliceous dolomite.	536	1.8'	Tr.	0.10	0.05	Tr.
71.5 - 73.9	Brown & grey siliceous dolomite with brecciated appearance. Black sludge water and panned galena from sludge.	537	2.4'	Tr.	0.20	0.70	0.15
73.9 - 76.5	Yellow siliceous dolomite, sugary appearance. Last 1.0' is blue dolomite with cons. pyrite.	538	2.6'	Tr.	0.10	0.60	0.10
76.5 - 78.4	Brown mineralized dolomite, brecciated.	539	1.9'	Tr.	0.30	0.30	0.05
78.4 - 80.4	Mostly talc or serpentine with fine mineralization, possibly galena.	540	2.0'	Tr.	0.40	0.10	0.60
80.4 - 83.0	Talc or serpentine, 20° to core.						
83.0 - 86.0	Altered dolomite, reddish cast & sl. brecciated appear.						
86.0 - 98.0	White dolomite, sl. manganese min'l. Several soft "talcy" sections.						
98.0-103.5	Light brown to reddish altered dolomite. Sl. min'l. Sl. brecciation. Joins white dolomite almost longitudinal to core.						

PROPERTY

HOLE NUMBER DH 30

SHEET NUMBER 2a

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
103.5-104.0	Brecciated dolomite, quartz, & gouge.	545	0.5'	Tr.	0.10	0.10	0.60
104.0-106.0	Dolomite, brecciated & mixed with altered products.						
	Affected by being close to a contact.						
106.0-110.0	White dolomite. Brecciated and interstices mostly grey						
	dolomite. Considerable red hematite color, mostly on						
	fractures.						
110.0-116.0	White dolomite. A few surfaces coated with grey dolomite						
	crystals.						
116.0-119.0	Hard pink dolomite.						
119.0-121.0	Brecciated or sheared dolomite. Matrix is soft earthy						
	hematitic material.						
121.0-131.0	White to pink dolomite, faintly brecciated appearance.						
	Grey stringers. Some manganese specks.						
131.0-156.0	White dolomite.						
156.0-160.0	Yellow dolomite, a few vug holes.						
160.0-163.0	White to blue-grey dolomite, some pyrite min'l.						
	161.5-161.7 Dark stringer containing much pyrite.						
163.0-168.0	Yellow dolomite, many rusty stringers. Some grey str.						
	166.5-167.5 Talcy str.						
168.0-170.0	Yellow dolomite. Soft yellow stringers longitudinal to						
	core & cont. some mineral resembling mica.						

PROPERTY

HOLE NUMBER EU 30

SHEET NUMBER 3.

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
170.0-176.0	Various colored dolomite, altered and impure. At 10° to core.								
176.0-181.0	Mostly blue dolomite.								
181.0-185.1	Yellow impure dolomite.								
185.1-186.2	Mineralized dolomite. Last 0.3' is cherty and contains much pyrite.	552	1.1'	Tr.	0.40	0.15	0.20		
186.2-193.0	Pale yellow dolomite.								
193.0-202.0	Yellow to brownish dolomite.								
202.0-205.0	Blue dolomite.								
205.0-208.0	Soft greenish rock possibly chloritic. Contains cons. fine pyrite.								
208.0-215.0	Pale yellow dolomite.								
215.0-215.8	Altered dolomite & some quartz. Rusty oxidized appearance. Some fine pyrite.	549	0.8'	0.02	1.20	Tr.	0.30		
215.8-217.0	Yellow dolomite.								
217.0-219.5	Rusty oxidized dolomite, fine pyrite. Shear zone suggested by slickensiding.	550	2.5'	0.01	0.70	0.10	0.20		
219.5-264.0	White dolomite.								
	230.0-230.5 Brecciation with grey dolomite & talc.								
	232.5-233.0 Soft brown talcose material.								
	251.0-252.0 Brown siliceous dolomite.								

HOLE NUMBER DH 20

SHEET NUMBER A

SECTION FROM ..... TO .....

PROPERTY .....

DIAMOND DRILL RECORD

LOCATION: LAT. .....
DEP. .....

ELEVATION OF COLLAR .....

DATUM .....

DIRECTION AT START: BEARING .....
DIP .....

STARTED .....

COMPLETED .....

ULTIMATE DEPTH .....

LOGGED BY .....

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
264.0-268.6	Blue dolomite & soft greensih sediments. Considerable pyrite contained in this section.						
268.6-270.8	Soft speckled fine-grained rock. Mostly brown & rusty. Shear zone or zone of oxidation.	561	2.2'	Tr.	0.20	0.10	0.15
270.8-277.0	White dolomite. Fractures, etc. longitudinal to core indicates that the drilling is along the bedding.						
277.0-278.5	Soft greenish rock resembling chlorite. Mixed with dolomite in a wavy pattern.						
278.5-300.5	White to pale yellow dolomite. 282.5-283.5 Blue dolomite mixture.						
	END						

HOLE NUMBER Eu 31

SHEET NUMBER (1)

SECTION FROM ..... TO .....

PROPERTY Elkhorn (Keene) Hunter Exploration

DIAMOND DRILL RECORD

LOCATION: LAT. 6187.68 DEP. E 5136.48

ELEVATION OF COLLAR 6383.65

DATUM

DIRECTION AT START: BEARING N 35° 30' E DIP + 5°

STARTED May 15, 1955

COMPLETED May 16, 1955

ULTIMATE DEPTH 47.5'

LOGGED BY H. E. F.

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE				
0.0-40.8	White dolomite. Numerous narrow grey stringers.						
40.8-47.5	Brownish hornstone with fine pyrite.						
	END						

PROPERTY Elkhorn (Sophia) Mentor Exploration

HOLE NUMBER Em 32

SHEET NUMBER (1)

SECTION FROM ..... TO .....

DIAMOND DRILL RECORD

LOCATION: LAT. N 5085.43
DEP. E 5096.76

ELEVATION OF COLLAR 6427.21

DATUM

DIRECTION AT START: BEARING S 66° W
DIP -45°

STARTED May 21, 1955

COMPLETED June 1, 1955

ULTIMATE DEPTH 277.0

LOGGED BY W. E. F.

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE				
0.0-5.0	Yellow speckled dolomite.						
5.0-7.0	Blue dolomite.						
7.0-25.0	Mostly yellow speckled dolomite, but some narrow bands						
	of white.						
	12.0 1" min'l. str.						
	23.0 - 24.0 Sugary						
25.0-35.0	Blue & yellow dolomite, latter sugary.						
35.0-39.0	Blue dolomite & yellow dolomite sand. Core rec. 15%						
39.0-48.0	Blue dolomite, some secs. sugary.						
48.0-74.0	Yellow dolomite.						
	48.0 - 48.5 Soft rusty white talc seam.						
	50.0 - 50.3 Ditto						
	51.0 - 56.0 approx. Shear zone in the dolomite.						
	Soft talcose material and definite serpentine.						
	60.0 - 64.0 Sandy. Core recovery 15%.						
	64.0 - 68.0 Sandy. Core recovery 45%.						
74.0-96.0	Blue dolomite						
	78.0 Lost return water.						
	88.0 - 90.0 White with min'l. str.						
96.0-101.0	White speckled dolomite, some min'l.						

PROPERTY

HOLE NUMBER Zn 32

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
101.0-102.2	Min'l. dolomite with cons. quartz and numerous specks of galena.	573	1.2'	0.03	6.20	1.40	2.50		
102.2-106.2	Min'l. dolomite, some qtz. as narrow str., a few specks of galena.	574	4.0'	0.01	2.80	0.50	0.70		
106.2-116.0	Pale yellow dolomite.								
	106.2 - 109.5 Siliceous & sl. min'l.								
	113.0 - 116.0 White & talcy, sl. min'l.								
	115.0 Mud seam								
116.0-132.0	White & pale blue dolomite, some secs. silic. Some mg. ferns. Numerous narrow qtz. str. Sl. min'l.								
	131.0 Narrow (1") str. of dark dolomite and qtz. heavily mineralized. Sl. galena. Porous, yellow oxides. Est. to be high grade silver ore.								
132.0-173.0	White dolomite, sl. silic. harder than average.								
	140.0 Lost return water.								
173.0-174.0	Brownish silic. dolomite, sl. min'l.								
174.0-233.0	White to pale yellow or pale grey dolomite. Some secs. sl. min'l.								
	176.0 - 177.0 Open fissure (1')								
	177.0 Caving								

PROPERTY

HOLE NUMBER Dm 32

SHEET NUMBER (3)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn		
	185.0 Sand seam.								
	200.0 - 200.3 Open fissure. (0.3')								
	206.0 - 207.5 Open fissure. (1.5')								
	209.5 - 211.5 Open fissure. (2.0')								
	226.0 - 226.3 Open fissure. (0.3')								
	226.5 - 228.0 Open fissure. (1.5')								
	200.0 - 220.0 Core very broken.								
233.0-238.0	Blue dolomite. Core rec. 2.0'								
238.0-246.0	White dolomite, sandy & talcy. Core rec. 0.8' (10%).								
246.0-254.0	White dolomite. Core rec. 0.3' (4%).								
	246.0 - 249.5 Very broken								
	249.5 - 253.7 Open fissure (4.2')								
	253.7 - 254.0 Fractured dol. & quartz, sl. min'l.								
254.0-266.0	White dolomite.								
	254.0 - 254.5 Frac. dol. & qtz.								
	260.0 - 261.0 (Approx.) Brecciated dolomite.								
	Core rec. 3.0' (25%)								
266.0-277.0	White dolomite & dol. sand. Very broken.								
	1.0' of section (location not known) is frac. dol.	575	1.0'	Tr.	0.20	Tr.	Tr.		
	& qtz. & sl. min'l.								

PROPERTY

HOLE NUMBER Ba 32

SHEET NUMBER (4)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT.
DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING
DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
	Core rec. 2.0' (20%)						
	Char. sample 253.7 - 254.5	576	0.8'	Tr.	0.30	Tr.	Tr.
	Rods sticking — Hole abandoned.						
	END						

PROPERTY Elkhorn (Sophia) Mentor Exploration

HOLE NUMBER EU33

SHEET NUMBER (1)

SECTION FROM ..... TO ..

DIAMOND DRILL RECORD

LOCATION: LAT. N 5016.00
DEP. E 4977.00

ELEVATION OF COLLAR 6422.25

DATUM

DIRECTION AT START: BEARING S 77° W
DIP -20°

STARTED August 14th, 1955

COMPLETED August 30th, 1955

ULTIMATE DEPTH 301.0

LOGGED BY W.E.F.

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	Au	Ag	Pb	Zn
0.0- 18.0	Dolomite, slightly mineralized and containing numerous narrow quartz stringers and a few up to 1" wide.						
18.0- 35.0	Open stope.						
35.0- 36.0	Dolomite and quartz, mineralized. Estimated to be ore grade for silver. No doubt similar to material mined from stope.						
36.0-48.0	White dolomite, slightly mineralized in spots. 48.0 Lost return water.						
48.0- 71.0	Mostly blue dolomite, but first few feet is sugary and brownish. Numerous narrow mud seams. 50.0 4" fissure.						
71.0-104.0	White dolomite, very broken. Core recovery poor (40%)						
104.0-110.0	White to brown dolomite, slight mineralization. Core recovery good but no water return.						
110.0-138.0	White dolomite. 139.0 Narrow stringer of blue dolomite. 130.0-131.0 Core contains fragments of soft brown fissure filling material.						
138.0-140.0	Light yellow dolomite sand with some brown fissure-filling material. Core recovery only 30%.						

N

E

PROPERTY

HOLE NUMBER

SHEET NUMBER (2)

SECTION FROM TO

DIAMOND DRILL RECORD

LOCATION: LAT. DEP.

ELEVATION OF COLLAR

DATUM

DIRECTION AT START: BEARING DIP

STARTED

COMPLETED

ULTIMATE DEPTH

LOGGED BY

DEPTH FEET	FORMATION	SAMPLE No.	WIDTH OF SAMPLE				
140.0-240.0	White, pale yellow, and pale blue dolomite in alternate bands. Some mottled.						
	145.0 Sandy seam.						
	200.0-204.0 White sand.						
	215.0-216.0 Sand.						
	217.0-218.0 Yellow sand.						
	227.0-228.0 Muddy sand.						
	142.0 8" fissure.						
	151.0-158.5 Open fissure.						
	208.0-213.0 Open fissure.						
240.0-301.0	Pale blue and white dolomite.						
	Sandy seams at 255.0, 257.0, 265.0						
	287.0 Sandy oxidized seam.						
	268.0 Lost water return.						
	Core recovery poor.						
	EX casing installed to footage 172.						
	END						

REPORT

ON THE

ELKHORN MINING PROPERTY

JEFFERSON COUNTY, MONTANA

BY

W. H. SWAYNE

MAY 1945

Contents

	Page
Introduction	1
Summary & Conclusions	2
Location & Holdings	5
Development	7
History	9
Past Production	14
Geology	
General	16
Sedimentary rocks	17
Structure	19
Intrusives	19
Economic Geology	20
Hanging Wall Orebodies	21
Footwall Replacement Deposits	23
Conclusions	24
Future Ore Possibilities	27
Footwall Area	27
Hanging Wall Area	29
J.R. Keene Claim	30
Operating Conditions	32
Recommendations	35
Cost Data	39
Bibliography	44
Assays & Smelter Returns	46
Cross Section and Geologic Map	

INTRODUCTION

This report is made at the request of Anker B. Henningsen. Its purpose is to bring together available data pertaining to the old Elkhorn Mining property in an effort to determine its prospective ore possibilities.

Owing to the conditions of the mine workings now under water below the 65 foot level of the Sophia Shaft and the 300 foot level of the old Elkhorn shaft, very little examination of the underground workings has been possible. A composite geological map was made during the summer of 1944. The surface mapping was done on a scale 1 inch = 100 feet. All prospect pits and accessible workings were mapped in detail. Much of the information concerning the history, ore production, and conditions of the old mine workings has been accumulated from literature and reports in the Bibliography appended hereto. The future possibilities of the mining property, as indicated by available data, are reported herein. However, where these data are based upon the observations of others, the possibilities cited must be confirmed by current sampling and mapping when and if the underground workings in question are made accessible.

Respectfully submitted,

W. H. Swayne

W. H. Swayne

Summary and Conclusions

Summary

The Elkhorn mining property is located 19 miles east of Boulder, Jefferson County, Montana on the eastern edge of the Boulder batholith granite area. The property consists of 5 patented lode mining claims, 3 patented mill sites, 2 patented placer claims and 3 lots in the old Elkhorn townsite. Total holdings amount to 110.5 acres. Title is equally divided among three owners.

The mine was actively worked from 1881 to 1912 with the exception of short periods of idleness. Since 1912 very little underground mining has been done. Latest production has come from reworking and shipment of old dumps and tailings. The mine's past production is about $12,700,000. The metals produced include predominant silver and some gold, lead, zinc, and copper.

Production has come from two major ore zones. These occur along a sugary dolomite-shale contact having a variable dip between 35° and 55°. Small arches in this contact have localized the mineralization into two oreshoots beneath the hanging wall shale. One occurs north of and the other south of the shaft. They have been stoped from the surface to the 1750 level. In addition, large irregularly shaped dolomite replacement orebodies have been mined in the footwall of the old stopes at distances of 40', 80', 230', and 360 feet.

Prospects for future ore include:

1. Silver, lead, zinc ore from the footwall area between the Sophia shaft and the old Elkhorn mine workings, from the surface to the 1050 level. The footwall area above the 450 level presents the most promising prospect for relatively

quick ore. There would be about 100 feet of backs above this which could be put into operation with a minimum of expense and time. Development of the footwall area between the 450 level and the 1050 level would require considerable unwatering and preparation. This is considered the next logical step after prospects above the 450 level have been proven.

2. The Keene workings present a good prospect for gold ore. They have yielded ore averaging 1.09 oz. per ton from a structure similar to that of the old Elkhorn. After some preparation this prospect could be operated on a small scale to determine its possible downward extension. Then, if warranted by initial prospecting its development could be continued from the upper levels of the old Elkhorn workings.

3. Deep level prospects in the footwall and hanging wall of the old Elkhorn stopes are interesting because of their possible zinc ore content in addition to ores of silver and lead. Investigation and development of these would require considerable time and expense.

In order to investigate any of the ore possibilities a program of unwatering and repair must initiated. Since the property ownership includes no equipment, hoisting machinery, pumps, a compressor, and miscellaneous mining tools would be required. Present war conditions have restricted the availability of this type of equipment.

Conclusion

The mine in its present condition, does not represent a proven mining venture, but a prospect, the value of which must be determined. Establishment of ore reserves upon which determination of an economic capital investment and estimated

profits could be based can be arrived at only through a program of careful prospecting and development work, the cost of which must be considered a gamble. Unless considerable risk capital is available the idea of leasing to responsible operators with the necessary equipment should be considered. Study of the orebodies mined during a controlled leasing period would provide a better knowledge of the footwall orebodies upon which determination of warranted capital risk for deeper level prospecting could be based.

If leasing does not appeal to the ownership, an alternative program of government loans should be considered.

Location and Holdings

The Elkhorn mining district is located in the center of Jefferson County, Montana in sections 11, 14, 15, and 22 of Township 6 North, Range 3 West of the Montana meridian. The town of Boulder, the Jefferson County seat, is 19 miles westward via an unimproved county road. Boulder is located on U. S. highway 10, 36 miles north of Butte and 30 miles south of Helena, the Montana state capitol.

The district is situated in an area of considerable relief. The old town of Elkhorn and the Elkhorn shaft are at approximately 6500 feet elevation. The ridges and mountains to the north of town reach 9300 feet. The region receives abundant rain and snow and is the locus of midsummer thunder storms. The small creek flowing in the Elkhorn canyon almost disappears in the late summer and fall. However, inhabitants of the old town of Elkhorn get their water from shallow wells penetrating the valley wash and moraine during the dry season.

Title to the Elkhorn Mining Property rests with Anker B. Henningsen of San Mateo, California, and his brothers, 1/3; Morrill D. Stackpole of Mexico, 1/3; and D. C. Walker of Anaconds, Montana, 1/3.

Holdings under this ownership include 5 patented quartz lode mining claims known as the:

	Survey Numbers
A. M. Holter	1374
Hardin	2523
Silver Star	2689
James R. Keene	1890
Sophia	3882

	Survey Numbers
3 Patented mill sites:	
Hardin	2523A-B
Silver Star	2689A
Elkhorn	2516
2 patented placer claims:	
Elkhorn	1348
Bowden	6091

and three lots in the Elkhorn townsite. The total holdings amount to 110.7 acres. All the above mentioned claims are recorded in the Government General Land Office.

Nineteen miles of fair mountain road connect the property with the nearest rail shipping point, Boulder, Montana. The property is serviced with electricity by the Montana Power Company.

Development

Development on the property includes 3 shafts, 20 mining levels totaling approximately 14,500 feet of drifts and crosscuts, and two main areas of almost continuous stoping from the surface to the 1750 level.

The main Elkhorn shaft is an incline, the pitch of which varies from 35° to 55° following the mineralized dolomite-shale hanging wall contact for 2300 feet on the dip. The bottom of this shaft is 1439 feet below the surface. An inclined air shaft extends down along the shale hanging wall to the 450 level where it joins the eastern stope area. The Sophia is a two compartment vertical shaft 115 feet deep. This shaft is 450 feet south of the Old Elkhorn shaft and is in the footwall of the main Elkhorn workings. (See map and cross section.) The Sophia shaft is merely a prospect having approximately 255 feet of drifting and crosscutting on the 65 foot level and 405 feet on the 110 foot level together with minor "gopher hole" stoping.

In addition to the above, prospect tunneling on the J. R. Keene claim amounts to 450 feet together with some stoping and raising.

Surface improvements are few. The Old Elkhorn shaft collar, head frame, and hoist house are in very poor condition, and would require considerable reconstruction and renovation for renewed operation. The Sophia head frame and hoist house are in good condition and ready for use. The shaft also is reported to be in good condition. At present there are on the property a small electric hoist, a compressor,

a 300 gallon centrifugal pump, some drilling equipment, and miscellaneous tools none of which belong to the present owners.

Several old buildings on the premises which could be utilized after some repair, include a small assay office, office building, tool house, and bunkhouse. A small ore bin in good condition is located near the Sophia headframe.

History of Property

The Elkhorn district was prospected prior to 1870 but did not attract attention until a productive orebody was found on the A. M. Holter lode. This property later known as the Elkhorn mine, has been the principal producer in the district.

The Elkhorn property was sold by its original locators to A. M. Holter for whom the claim was named. Mr. Holter organized the Elkhorn Mining company. In 1881 the mine was developed to a depth of 300 feet. At this depth the free milling ores became refractory with consequent treatment losses as high as 50% of the silver values. The property was idle during most of 1882. In 1883, with newly enlisted capital, new hoisting facilities were installed and a 10 stamp chloridizing mill was erected with a capacity of about 11 tons per day. Recoveries were increased to 90% of the values which were mainly silver and a little gold. Copper was the chief impurity. The property was worked to the 800 level where the ore became lean; then in 1888 the Montana corporation sold out to a new company organized in London.

The English company remodeled the mill and undertook vigorous development of the mine. They confined their mining to the mineralized contact zone between the hanging wall "hornstone" or shale, and the underlying dolomite. Footwall chamber deposits were mined however, penetrating the footwall to a distance of 35-50 feet from the main hanging wall shale. The mine was opened to the 2300 foot level. In 1899 the mining and pumping costs had reached $15.60 per ton and milling costs were$9.50 per ton. At that

time the pumping was done with Cornish type steam pumps of low efficiency. These costs coupled with the small extent of low grade ore in sight resulted in closing the mine and its sale in 1901 to the Longmaid interests of Helena.

Josia Bowden, of Helena, was in charge for the Longmaids. It is reported that the Longmaid interests spent $80,000 pumping out the water and putting the mine in operating condition. Mr. Bowden indicated a total original investment of approximately $350,000 before actual mining was resumed. The property was idle from 1902-1906 owing to the 50 cent silver price. In 1906 the mill was remodeled to treat low grade ore. Mill feed averaged about 10 oz. silver per ton. A 60% recovery was accomplished in making a concentrate which contained 1000 oz. silver per ton and 5% to 6% lead. The concentrates were shipped to the smelter.

The Longmaid's operations from 1906 to 1912 included cleaning up concentrates left under tanks and launders in the old mill, reworking dumps and tailings, and cleaning up ore left in the old stoped areas. The underground development consisted of exploration of the footwall zone below the 1050 foot level. According to Mr. Bowden, this area was prospected and mined to a distance of 80 to 160 feet beneath the hanging wall shale. He reports the average grade of ore mined from this area between 1910 and 1912 to have been 19.5 oz. silver, 0.25 oz. gold, and 2-3% lead per ton. There is no available record of the zinc content. Mr. Bowden also stated that some mining was done in the J. R. Keene workings. The ore recovered is reported to have averaged 1.09 oz. gold and 6.0 oz. silver per ton and a small amount of lead.

Summarizing the Longmaid's operation of the property, their expenditures were:

$80,000 pumping out the old mine.

$100,000 installation of furnace roasters.

$50,000 installation of tailings leaching plant.

They paid $300,000 to $400,000 dividends, and good salaries to men in charge. Rowland King estimates the Longmaid's mining and milling costs at $4.78 per ton.

In 1912 the present owners headed by Morrill D. Stackpole and his associate D. C. Walker purchased the property from the Longmaids for $250,000 according to Mr. Bowden. The property was idle from 1912 to 1929 except for some leasing. During this period tailings and dump concentrates were shipped to the East Helena smelter by D. C. Walker, Ed Erickson, H. E. Walker, Fred Bell, and Western Metallurgical Co. These shipmenst amounted to approximately 569 tons which averaged .091 oz. gold, 79.73 oz. silver, 2.5% lead and 5.2% zinc.

In 1929 an operator named Goodman organized a company to explore the footwall area and sank the Sophia shaft to a depth of 115 feet. He did some work on the 65 foot and the 110 foot levels. In the fall of 1929 the work was stopped with the financial crash.

In 1932 Peets' interests operated a pilot mill for determining metal recoveries possible from the tailings. During 1935 some dumps were reworked and concentrates amounting to 134 tons were shipped to the smelter. These shipments averaged approximately 0.29 oz. gold, 140 oz. silver, 5.5% lead, 0.3% copper, and 8.0% zinc.

In 1936 disagreements among parties concerned, culminated in court proceedings. The outcome resulted in A. F. McClaine of Washington organizing the Elkhorn Metals Inc. for the treatment of tailings. He is reported to have spent $35,000. Shipments of concentrates resulting from tailings treatment amounted to 2386 tons during 1936-1938, according to East Helena Smelter records. Average assays of these concentrates were 0.18 oz. gold, 61.56 oz. silver, 8.15% lead, 0.21% copper, and 8.2% zinc. In 1938 the venture was considered a failure and abandoned. At this time Rowland King wrote a report on the Elkhorn property and McClaine organized the ~~Elkhorn~~ Sophia Syndicate for the purpose of working the mine. Satisfactory agreements could not be reached, and no mining was done.

From 1938 until 1942 the property remained idle. In June of 1942 Stuart McKee of Nachez, Washington leased the property for the purpose of mining the footwall ores through the Sophia shaft. He equipped the Sophia with its present hoisting and pumping equipment and did some prospecting on the 65 foot and 110 foot levels according to reports. East Helena Smelter records show McKee shipped a total of 66 tons of crude ore, presumably from the small stopes in the Sophia workings. This ore averaged .02 oz. gold, 8.63 oz. silver, 0.97% lead, 0.05% copper, and 3.3% zinc. It is reported that McKee struck high grade silver lead ore on the 110 foot level and specimens of this ore were displayed. However, none of this ore was shipped to the smelter and McKee ceased mining

operations. Since December 1942 Mastin Taylor, who supposedly has sub-leased from McKee, has been shipping tailings to the A. S. & R. Company's Smelter at East Helena, Montana. At the time of this writing practically all the old tailings of value have been shipped from the property.

Past Production

Past production records are varied and scattered, but are summarized below using the best available data. Pardee in U. S. G. S. Bulletin 842, 1933, gives Elkhorn production records as follows:

1875-1899	$ 9,317,000	in silver gold, and lead
1900-1904	436,000	allowance made.
1905-1928 (Except 1908& 1925)	3,682,000	
1908 & 1925	565,000	estimate
	$14,000,000	total

Gold	$ 1,500,000	
Silver	14,000,000	--ounces
Lead	11,000,000	--pounds
Copper	1,000,000	--pounds

Following is a recent compilation from smelter records indicating total production up to May 1, 1945.

PAST PRODUCTIONS

Period	Dry Tons	Oz. Silver	Ounces Gold	Lbs. Lead	Lbs. Zinc	Lbs. Copper	Approximate Gross Value
1882-1900	Not Available	9,159,438	6,669.5	3,952,784	NOT REPORTED		$ 9,317,000
1901-1906	Property idle						
1906-1912 Smelting Ore	96,533	3,668,254	------NOTREPORTED----------				2,164,376
Mill Concentrates	9,620	866,519	------NOTREPORTED----------				508,696
1913-1929 Tailings Mill Concentrates	569	45,366	51.8	28,000	56,900	--	34,000
1929-1934	No record						
1935-1936 Dump Concentrates Tailings	134	18,786	28.0	14,740	20,440	804	14,714
1936-1938 Tailings Concentrates	2,386	146,882	429.5	390,000	386,532	9,066	130,702
1938-1942	Property idle						
1942-1945(May) Tailings	44,858	286,306	1,097.8	1,607,218	3,021,740	35,866	598,468
Total	?	14,191,551	8,276.6	5,992,742	3,485,612+	45,736+	$12,767,956

Geology

General

The geology of the Elkhorn Mining district has been described by W. H. Weed and Joseph Barrell in the Geological Survey annual report published in 1901. (See Bibliography.) The property under consideration is located in the heart of the area covered by the government report. The geology is complex and interesting in that stratigraphic, structural and igneous intrusive problems are represented in this district which is on the eastern edge of the Boulder batholith granite area.

The sedimentary rocks are dolomitic limestones and shales of Cambrian and Devonian age which have been folded and intruded by later igneous rocks. Strong faulting has not been recognized in the area under discussion. The chief igneous rocks are intrusive diorites and gabbros in the vicinity of the Elkhorn mine workings, but to the north and northwest of the Elkhorn property granite or quartz monzonite is exposed. A few hundred feet south and west of the East Butte property, shown on the map, quartz diorite porphyry intrudes the limestone.

It is difficult to ascertain which of the igneous rock types represents the source of the mineralization. Weed thought the basic igneous rocks of the district and particularly the gabbro was responsible. It may be significant that in the area covered by the accompanying map basic igneous rocks were present as small dikes or masses in the vicinity of ore bearing zones. The small deposits in closest association with the basic intrusives have gold as their main valuable metal with subordinate amounts of silver and lead, whereas

in the Elkhorn ore zones which do not appear immediately related in space to basic intrusives, gold is subordinate to silver, lead, and zinc. That deeper seated igneous masses underlying the limestone, possibly of granitic composition, are responsible for the mineralization in the Elkhorn ore zones, is a postulate that must be considered. Metamorphic effects are negligible adjacent to the small dikes which cut the limestones at random, but bordering the larger diorite masses shown on the map garnet zones are present, and in the vicinity of the Klondike property a wollastonite-epidote zone is seen. Weed noted that only the smaller ore deposits of the district were associated with contact metamorphic rocks.

Sedimentary rocks.

The sedimentary rocks exposed in the area include the following formations.

The Starmount limestone is of Cambrian age and has been correlated with the Meagher formation by W. H. Weed and E. S. Perry. This is the oldest formation exposed in the immediate vicinity of the Elkhorn property. It is approximately 600 feet thick, consisting of thin argillaceous beds near the base and grading upward into more resistant limestones of grey or white color. These rocks are exposed near the glory hole of the East Butte property.

The Hobo Gulch formation (Cambrian) which has been correlated with the Park shale by E. S. Perry, overlies the Starmount limestone. It is about 150 feet thick and includes 18 feet of shales near the base. These are overlain by some 100+ feet of dark limestones and small cherty lenses which stand out on weathered surfaces.

The Cemetary Limestone (Cambrian) is correlated with the Pilgrim formation by E. S. Perry and overlies the Hobo Gulch formation. It is approximately 650 feet thick. Weed has included in the base of this formation a peculiar black blocky limestone bed which weathers into small angular blocks resembling basic flow rocks. This black blocky limestone is exposed on the hill south west of the old Elkhorn mill. Overlying this bed the limestones are blue or grey and quite resistant. The upper 100 feet of the formation includes thick and thin bedded white or grey limestones which have a decidedly crystalline granular texture. These beds grade upward into the yellowish colored sugary dolomite which forms the footwall of the Elkhorn mine. The dolomite contains 44% $MgCO_3$ and 0.4% silica and iron. It is exposed just south of the Sophia shaft and in the railroad cut just east of the Old Elkhorn headframe.

The Elkhorn Hornstone (Cambrian) is correlated with the Dry Creek formation by E. S. Perry. It is seldom seen in surface exposures, but its location is determined by small prospect pits. According to Weed a hanging wall crosscut in the Elkhorn mine penetrates this formation for 120 feet, where it consists of a series of thin strata varying in composition from extremely dense fine grained quartzites to calcareous and agrillaceous shales. This shale is well exposed in the railroad cut just east of the old Elkhorn headframe. Here it is about 40 feet thick and indurated to the point that it resembles a thin bedded chert. Upon weathering it breaks into small angular fragments with conchoidal fracture.

The Keene Limestone (Devonian) which has been

correlated with the Jefferson limestone formation, is a series of bluish to white sugary dolomitic limestones overlying the Elkhorn shale. It is very similar in appearance to the upper 100 feet of the Cemetary limestone. The railroad cut north east of the Elkhorn shaft, the Keene tunnel, and the railroad cut north of the air shaft present the best exposures. This limestone series is overlain by the Union shale which is not exposed in the area studied.

General Structure

The formations described have been tilted to the east and now have an average dip of 45° - 55° in that direction and strike approximately north and south. Within the area of the Holter and Keene claims the prevailing attitude is disturbed by local folding of the Elkhorn shale and the limestones immediately above and below it. Minor faulting and fracturing of the limestones occurs in the vicinity of this folding and is believed to have resulted from it, at least in part. The breccia zones and minor slipping planes described in the Elkhorn workings and those visible on the 65 foot level of the Sophia probably have resulted from minor adjustments to the folding.

Intrusives

A dioritic intrusive mass intrudes the limestones in the vicinity of the old water tank east of Elkhorn workings, and is reported to have been encountered on the 650 foot level of the mine. A little to the north and east of this intrusive just off the eastern edge of the map a small granitic tongue was observed on the ridge. Just where this granite may be expected underground with respect to the lower

levels of the old mine workings is conjectural. A large basic diorite or gabbro intrusive mass is exposed immediately north and west of the Keene workings where it may mask a suspected fault zone. This intrusive extends northward to the Klondike workings.

Economic Geology

From an economic point of view the most important members of the sedimentary series have been the Elkhorn Shale and the underlying dolomite. It is under the variable dipping contact plane between these formations that the big orebodies of the old Elkhorn mine occurred. The two principal ore zones are localized along the underside of small folds or arches which follow down the dip of the hanging wall shale. Weed stated that although there has been some movement along the contact plane there is no evidence of mineralization along the contact except in the arches under which the orebodies are found. The orebodies replacing the dolomite immediately below and adjacent to the shale are referred to as the hanging wall orebodies.

In addition to these, isolated irregularly shaped replacement chamber deposits have been mined in the footwall of the hangingwall orebodies in a position directly beneath them and arches which localized them.

The mineralogy of the ores was reported by Weed to consist primarily of argentiferous galena, together with some argentiferous tetrahedrite, sphalerite and pyrite. The oxidation products include native silver, cerrusite (lead carbonate), calamine (hydrated zinc silicate), malachite (copper carbonate), cerargyrite (horn silver or silver chloride), and limonite. Minor rare minerals are listed in

Weed's report but are curiosities rather than of economic importance. They include:

Linarite - hydrated sulfate of lead and copper.

Pyrolusite - manganese dioxide.

Azurite - copper carbonate

Bournonite - antimony sulfide containing copper and lead.

Descloizite - vanadate of lead and zinc.

Aurichalcite - basic carbonate of zinc and copper.

Hanging Wall Orebodies

It is apparent from the map of the old Elkhorn workings that there have been two main channels of ore deposition which follow the afore mentioned arches. The stoped area south of the shaft is stronger than the northern one and is responsible for two thirds of the mine production. According to Weed's observations the dolomite hanging wall shale contact which is very smooth and sharp away from ore zones is frequently brecciated and shows evidence of movement immediately above them.

The hanging wall ore shoots in general are quartzose ore. Oxidation is reported to reach greater depths in the hanging wall orebodies than in the footwall replacement bodies. The principal ore minerals in the hanging wall ore zones were argentiferous galena, pyrite and sphalerite and their oxidized products. The zinc content of the ores is reported to increase with depth particularly below the 1350 level according to Weed and Bowden. Quartz in the unoxidized portion of the deposit varies from dense greyish clear or glassy medium grained material to fine cryptocrystalline silica.

The northern oreshoot splits at the 950 level and both branches appear to narrow on their downward extension. Weed notes that the southern branch narrows to a small pipe of lowgrade ore, while the northern branch swells out into a chamber of lead ore above the 1450 level. Below the 1650 level this branch turns abruptly eastward and crosses the shaft 80 feet below the 1750 level where it narrows. Weed considers the small shoot of parallel direction on the 2200 level southeast of the shaft, to be a continuation of the same ore pipe. At 25 feet below the 2200 level this ore is described as a small mass of quartz three feet wide carrying only a peppering of sulfides. The sudden change in direction of the ore pipes may be due to faulting. The suspected fault zone in the vicinity of the Keene workings is offered as a possible cause. Certainly there is strong indication that this north ore zone is pinching out in depth.

The south stope is more uniform in cross section and continues to greater depth than the northern one. Weed notes that this orebody below the 1450 level becomes variable in character and smaller. Widths in the upper levels are reported to average 8 feet of quartzy ore and reach a maximum average width of 40 feet in the 1350 stope. The ore is thickest beneath undulations in dip particularly where slight flattenning occurs. Below the 1850 level the ore is reported cut off against a small fault in the hanging wall shale. At this point Weed states there is a branch of the ore too zincy to work, which grades off into almost barren quartz. From the outline of the old stopes it is apparent that the south orebody also is pinching out with depth. Mr. Bowden's experience confirms this.

Footwall Replacement Deposits.

These orebodies occur in the footwall of the hanging wall stopes and are located directly beneath them. Both Weed and Bowden refer to the common occurence of veins and "leads" connecting the footwall bodies with the hanging wall ore zone. The footwall bodies have been found at distances of 40, 80, and 230 feet from the hanging wall shale. The small ore zone exposed in the Sophia shaft is 340 feet from the hanging wall. Thin shale or clay seams parallel to the limestone bedding appear to locallize the ore, it is reported. In addition zones of crushing and brecciation of the dolomite are characteristic.

The orebodies are very irregular in shape and often have fingers extending away from the main body. The upper parts of the bodies are characterized by breccia zones of dolomite fragments, the interspaces being filled with bluish quartz and carrying up to 100 oz. silver per ton. The main masses of these bodies are predominently argentiferous lead ore. In general they contain more base metal than the hanging wall ores. According to both Weed and Bowden the deepest of these footwall bodies are very rich in zinc. Oxidation of the footwall replacements has been slight even in the near surface occurences. Alteration of the limestones due to ore deposition is lacking except for small silica seams.

Mr. Bowden, the last operator of the deep level workings, noted that many of the footwall deposits mined in the levels below the 1050 level were pipe-like or tabular with their long axes at right angles to the bedding and the hanging wall. Some of these deep footwall oreshoots, none

of which have ever been mapped, were often vertical so that the deeper they extended the farther they were from the hanging wall shale. One such oreshoot on the 1550 level is reported to be horizontal and extends several hundred feet into the footwall of the shale dolomite contact. The average grade of ore mined from the footwall between 1910 and 1912, was 19.5 oz. silver, 0.25 oz. gold, and 2.3% lead. Zinc content was not reported. The largest footwall stopes were at 1550 level and extended horizontally into the footwall for 300 feet directly beneath the old hanging wall stopes. They are reported to have averaged 100 ounces silver per ton. Bowden reports that there was no ore along the hanging wall shale contact in the levels, but that the footwall zone was productive as far as several hundred feet in the footwall of the shale. The footwall zone under the north hanging wall stope was not very productive according to Bowden.

Geological Conclusions

Described ore occurrences indicate that the mineralizing solutions ascended from some area below the present mine workings. These solutions permeated zones of weakness in the dolomite caused by minor folding and fracturing and were localized beneath shallow arches formed in the impervious hanging wall shale bed. Local flattening of this bed caused additional localization possibly by the retardation or damming of the solutions. Minor clay seams occurring in the footwall dolomite exercised similar localization control over the solutions resulting in ore zones paralleling the bedding at least in the upper levels. The pinching out of hanging wall

orebodies in depth may be interpreted in several ways. One explanation is that the lower levels represent a bottom of the ore zone close to its origin. A second is that the solutions rather than following the bedding during their entire ascent may have risen vertically across the dolomite bedding through pervious channelways until they reached the small clay seams and hanging wall shale under which they were concentrated. This postulate is favored by Bowden's experience in deep level footwall mining. It is interesting in this connection, that the suspected fault zone in the vicinity of the Keene workings projects to the position in the Elkhorn workings where Bowden found the steeply dipping orebodies which cut across the bedding planes. At the same location underground, Weed noted faulting which offset the hanging wall shales and the abrupt turning of the north stope downward continuation. It is conjectured that this zone may represent the main feeder channelway, although this needs confirmation by underground study. Evidence for the existence of this fault zone as seen on the surface above the Keene workings include a sharp bending of the formations at the edge of the diorite intrusive which occupies the suspected fault zone and offsetting of the sedimentary beds on either side of this intrusive mass. A strong fault zone was noted in the Dalcoath workings paralleling the southern edge of the basic intrusive and corresponding in attitude to the suspected faulting. If the solutions originated in the footwall of the shale-dolomite contact, which is reported to be devoid of mineralization in the deepest levels, then the possibility of yet undiscovered footwall orebodies above the 2300 level is strengthened.

Since the basic intrusive encountered on the 600 level of the old mine lies east of the main ore zones and in large part above them, a deeper seated, possible granitic source, is considered feasible. No evidence of mineralization was noted in this basic intrusive by Weed.

Little mention has been made of the Jefferson or Lodgepole? dolomite overlying the Elkhorn shale. Several prospects have been dug in this formation resulting in some silver ore production. On the dump of the caved Relief shaft oxidized quartzy ore assaying 155 ounces silver and 0.03 ounces gold per ton was noted. The ore was of the same general type as that observed in the Elkhorn vein outcrop at the old shaft collar. A small open stope just visible through a hole in the cave showed an attitude indicated on the map. Its downward projection would intersect the Elkhorn workings in the zone of indicated faulting in the deeper levels. This should encourage hanging wall prospecting if operation of the Elkhorn workings presents the opportunity, particularly since the hanging wall area has never been explored.

Future Prospects and Ore Possibilities

The Elkhorn property presents several prospects for future ore. The possibilities cited must be confirmed by sampling and study of the underground workings, particularly the deep footwall stoped areas which have never been mapped.* The metals to be considered include silver, lead, and zinc in the Elkhorn mine, and gold in the Keene ore bearing structure.

I <u>The footwall area</u>

A. <u>Shallow levels</u> - One of the most promising areas for immediate ore possibilities is the footwall area from the Sophia shaft to the old hanging wall stopes particularly between the surface and the 1050 level of the old mine. The Longmaids who last operated the mine in active fashion, prospected some of the footwall possibilities between the 1050 and the 2300 levels. According to their manager, Mr. Bowden, ore in this footwall zone was of good grade and accounted for much of Longmaid's production. Mr. Bowden stated that little or no footwall prospecting has been done above the 1050 level. That similar footwall ore zones may exist at shallower depths is evidenced by the reported ore occurence in the Sophia workings, particularly that on the 110 foot level. According to King's sampling, this ore averages 4 feet in width and contains values amounting to $6.49 per ton. A high grade sample reported to have come from this ore zone assayed 106.8 ounces silver, 0.02 ounces gold, and was very high in lead and zinc. The footwall stope on the 450 level of the old Elkhorn workings also testifies to shallow footwall ore possibilities.

* These workings are now under water and therefore inaccessible.

King's sampling of the periphyry of this stope indicates ore averaging 5.75 feet in width and containing 12.3 ounces silver, 0.026 ounces gold, and 0.84% lead.

It is felt that the breccia zones and clay seams together with minor fractures striking at right angles to the bedding, which were observed in the Sophia workings, may be orebearing. Certainly, indications show the footwall area was subjected to some mineralizing activity. The amount of ore deposited is a matter of conjecture, which can be determined only by prospecting. The best available map of the lower Sophia workings shows the ore discovered to be on the east flank of the most productive zone developed in the old Elkhorn structure. This prospect should be extended to the west until it is directly beneath the main Elkhorn ore zone where, theoretically, it should reach the best ore possibilities.

B. Deep Level - According to Mr. Bowden the deep level footwall possibilities have never been systematically prospected even though mining was done in this area. The most interesting possibilities in the deeper level footwall zone are those of zinc and lead. At the time most of the deep level mining was done, zinc was penalized and therefore avoided in the mining wherever possible. Mr. Bowden indicates that the deep footwall orebodies contained considerable zinc. This needs confirmation by sampling.

Bowden's descriptions of irregular ore pipes and vertical ore zones in the footwall zone suggests the possible existence of similar ore zones at greater distances from the hanging wall than those heretofore mined.

Development work is necessary to determine the relative strength and concentration of the possible orebodies

and zones at considerable distances from the old hanging wall ore zone. Bowden has indicated that they may be scattered and therefore difficult to find. The greatest ore concentration appears to have been within the 80 foot zone immediately beneath the hanging wall shale. However, this observation might only be apparent because of the lack of footwall development.

II Hanging Wall Area

A. Beneath the Elkhorn Shale Hanging Wall - Indications are that the old hanging wall orebodies have been pretty well mined out. However, if in their mining, any attempt was made to avoid the zinc, then there is the possibility that some zinc could be recovered by the cleaning up and extension of these old stopes. The economy of such a prospect must be determined by sampling and tonnage estimates. Both Weed and Bowden have indicated a high zinc content in the deeper stopes. The following quotations from Weed's report confirm this.

"Samples of very zincy ore from the 1750 footwall orebody vary considerable in silver contents. A specimen containing large amounts of resinous blende and of the dark colored blende, or 'black jack' gave 45% zinc, 3% lead, and 15 to 20 ounces of silver. The smelter returns show that the ore shipped averaged over 20% zinc, and as the penalty is 50 cents for each percent over 12% in sulfide ore, it will be seen that the cost of treatment was materially increased."

"Carload lots shipped in 1894 gave assays as follows: Sulfide ore: zinc 32.6%; Silver 180.6 oz.; gold 0.13 oz.;

lead 14%. Oxidized ore: zinc, 17.3%; silver 223.3 oz.; gold 0.17 oz.; lead 12.8%."

Under such conditions selective mining and sorting probably would have been employed in order to avoid as much zinc as possible.

Possibilities of downward extensions of ore below the hanging wall stoped areas are poor. Any hope of their downward extension is discouraged by the pinching out with depth observed by both Weed and Bowden and the stope outlines on the map.

B. Area Above the Hanging Wall Shale

According to the best information available, the limestone above the hanging wall shale has never been prospected by work from the old Elkhorn mine. Several surface prospects exist in this limestone indicating that at least some mineralization effects exist above the Elkhorn shale. Mention has been made of the old Relief shaft and dump. Although the Elkhorn shale has acted as a blanket under which mineralization was localized, there is the possibility that faulting and breaking of this shale may have allowed some mineralizing solutions to escape into the overlying limestones. The possibility of orebodies existing above the hanging wall shale could be investigated if the mine were again in operation.

III J. R. Keene Claim

The small workings on the J. R. Keene claim have produced gold ore averaging 1.09 oz. a ton according to Bowden. The stopes underlie an arched hanging wall shale thought to be the Elkhorn shale. The structure is complicated by local bedding slips and numerous cross fractures which dip steeply

eastward and strike almost at right angles to the bedding. The main orebody is a replacement along the bedding with pipelike fingers extending out from the main ore mass along fracture planes. There appear to be several overlapping ore horizons, some of which are connected by the above mentioned pipes. The orebodies appear to be locallized under the arching structure within the zone of cross fracturing. The stopes average about 4 feet in width. The ore seen in pillars is an iron stained quartz containing small specks of galena and copper stains. No free gold was visible but could be seen upon panning the crushed vein material. The possible downward extension of this structure is considered a likely prospect. It could be prospected from the old Elkhorn workings to determine its resemblance to the Elkhorn structure and its productivity.

Operating Conditions

Most of the information on past operating conditions has come from Weed's report and Mr. Bowden. It is interesting to note that no machine drilling was done in the old mine. Mr. Bowden insisted on hand drilling to keep down the possibility of over break in the irregular footwall orebodies.

The flow of water into the mine was reported at about 300 gallons per minute, most of which enters above the 1750 level. The lower levels were almost dry according to Mr. Bowden. Some fluctuation of flow corresponding to the dry season is indicated. Longmaids used 1000 gallons per minute pumping capacity. In November 1938, an attempt to unwater the mine with a pumping capacity of 200 gallons per minute was unsuccessful.

According to Weed's report the early mining and pumping costs reached $16.60 a ton in 1899, and milling costs reached $9.50 per ton. King estimates Longmaid's mining and milling costs to have been about $4.78 per ton from 1906 to 1912.

Prior to 1906 ore finding was comparatively simple since mining was confined to the main ore zones and the large stoped areas. Large open stopes, sometimes 60 feet across, were timbered with huge stulls. There is some indication that this type of timbering was inadequate, particularly in the area of the big 1350 stope which is reported caved. Apparently the stopes were left open. Now they would be filled with great volumes of water.

Bowden indicated that ore finding in the footwall area was more difficult. Where orebodies were not exposed,

small clay seams, some of which showed slight mineralization, were followed until they opened into an ore-shoot of minable proportions. Gopher hole stoping was necessary to extract the ores from fingers and channels leading away from the main ore masses. Stull timbering was adequate in these stopes, which were left open, since enough silicification accompanied the ore to indurate the sugary dolomite in the vicinity of the oreshoots. The small stopes examined on the 65 foot level of the Sophia tend to corroborate Bowden's statements concerning ore finding and stope conditions of the footwall ore zone.

In a report written in 1938, Rowland King estimated mining and milling costs of footwall ores would be $5.50 per ton, on a 100 ton per day basis, and that 75% - 80% of the values would be recoverable by flotation. This estimate is considered to be quite optomistic.

Future operations probably would be predominently in the footwall zone where ore finding would involve following small clay seams through unbroken dolomite to a point where crushing of the dolomite and ore deposition had taken place. Perhaps some pattern of the clay seams and crushed zones could be worked out by careful underground mapping which would lessen the amount of prospecting necessary to find new orebodies. Orebodies anticipated would be of irregular shape and at almost any attitude. Some gopher hole mining might be necessary of the finger-like ore pipes described. Stull timbering probably would be adequate except under conditions of unusually heavy ground.

Accurate calculation of mining costs can be made only

after the frequency and condition of the orebodies have been determined together with the amount of development necessary to find new orebodies.

Recommendations

The following program for investigation and development of the prospective ore possibilities of this property is recommended.

I. The mine should be unwatered to the 450 level of the old Elkhorn workings in order to begin accurate samplings and investigation. This would allow examination and sampling of the upper level stopes, particularly those in the footwall of the 450 level. This stoped area was mapped and sampled by Rowland King in 1938. His sampling indicates an average width of 5.75 feet of siliceous ore containing 12.3 oz. silver, 0.026 oz. gold, and 0.84% lead. This ore was exposed in the periphery of the old stope and presumably would be available for confirmatory sampling. Immediately after King's sampling the mine was allowed to flood. The only mining since that time was that done by Stuart McKee of Washington who leased the property in 1942. His main activity was in the Sophia shaft. Total tonnage of ore mined during his lease according to East Helena Smelter records was 66 dry tons of ore averaging .02 oz gold, 10.3 oz. silver, 1.0% lead, .05% copper, and 3.28% zinc. Presumably most of this ore came from the Sophia workings.

With some cleaning out, the lower Sophia level could be mapped and sampled. This level was sampled by King in 1938. Results of his sampling indicate 4.0 feet of $6.49 ore. Since that time McKee prospected this level and is reported to have exposed some high grade silver-lead-zinc ore. A specimen of this ore assayed 106.8 oz. silver and 0.02 oz. gold and was a solid chunk of galena and sphalerite. Since McKee's reported discovery no mining has been done in the

Sophia as it was allowed to fill with water.

Dewatering to the 450 level would permit examination of the caved condition in the upper part of the old inclined shaft. The cave is reported to be about 100 feet in length. Estimates should be made for its repair in anticipation of deeper level unwatering, which could best be done through this shaft.

This first step of dewatering to the 450 level would require:

Purchase or rent of a suitable pump and motor.

Employment of 3 - 6 men.

Extension of power line 200 feet to the air shaft collar.

Installation of skidway and tackle for lowering. the pump in the air shaft.

Power expense for pump operation.

Miscellaneous timbering and repair.

Miscellaneous tools and equipment such as pipe, etc.

Any development work or prospecting would require in addition a compressor and hoisting equipment, drilling machines, steel rails, hoses, pipe, powder, etc.

When dewatering and study of the area above the 450 level has been accomplished, there are two alternatives for further prospecting.

IIA. To repair the old Elkhorn shaft and head frame and equip it with a hoist and pumping equipment for unwatering the old mine to the 2300 level. This would allow investigation of all the prospective ore possibilities cited, but would involve the risk of considerable capital, the amount of which would depend on conditions encountered and the extent of necessary repairs.

II B. A more economical plan would be as follows: If the results of step I warrant further work, an 80 foot crosscut could be driven to connect the Sophia 110 foot level with the 450 level footwall stope of the old mine. This would facilitate prospecting and mining of the shallow footwall area between the Sophia and the old Elkhorn stopes. These ores might best be mined through the Sophia shaft with underground waste disposal in the old Elkhorn stopes. There would be about 100 feet of backs above orebodies in this area.

III As this work progressed preparations for further unwatering and deeper level exploration of the footwall ore possibilities could be carried on as warranted. Work below the 450 level could most economically be carried on through the old Elkhorn shaft after the necessary repairs have been made. After this shaft is equipped with adequate hoisting and pumping equipment, dewatering and prospecting of the footwall could be carried out through crosscuts driven from the old stopes into the footwall ore zone. Adequate underground waste disposal is anticipated. This work could be carried on in progressive stages while upper level mining was in progress.

IV The J. R. Keene structure indicates a gold ore possibility which should be investigated. With some cleaning up and timbering of the old tunnel and stope, the Keene structure could be prospected to determine its downward extension. Possibly some ore could be recovered by underhand stoping. Then, if indications are favorable a more extensive development of the deeper portions of this structure could be carried on from the northern most workings off the old Elkhorn shaft.

This progressive program of prospecting and development would keep initial speculative capital required at a minimum, and would be advantageous, particularly, if at any stage it were found advisable to cease operation. In such a program, however, capital necessary to carry on each succeeding step should be available to avoid losses brought about by delay and reflooding of dewatered areas.

Diamond drilling must be considered as a possible means of prospecting indicated ore possibilities. Owing to the existence of open water courses and soft sugary zones in the dolomite, and soft brecciated zones in the orebodies, the efficiency and accuracy of diamond drilling is doubtful. Core recovery in critical zones might be poor and the possibility of sludge losses is great. However, after examination of underground conditions above the 450 level, the effectiveness of a diamond drilling program for prospecting can be determined. If diamond drilling is feasible it would materially reduce prospecting costs.

Cost Data

Owing to the lack of recent accurate information concerning inflow of water and underground conditions of the old mine, cost data must necessarily represent estimates. Actual costs may be higher or lower than the estimated amounts depending on variation of conditions encountered and fluctuation in prices of power, equipment, labor, and supplies. An effort was made to keep all cost estimates high enough to insure completion of each project considered.

$5000 should be sufficient to dewater the old mine to the 450 level for sampling and investigation according to recommendation I. Volume of workings to be unwatered are estimated at 1,000,000 cubic feet. This represents approximately 7,500,000 gallons of water in addition to the reported 300 gallons per minute made by the mine. Based on a pumping rate of 600 gal. per min., 200 foot maximum head, dewatering gains would approximate 300 gallons per minute, or 18,000 gal. per hour. Pumping at this rate 18 days would be required to dewater to the 450 level.

Cost of adequate pump	$525	minimum
Power cost, assuming 40HP motor required on two cent KWH power rate would be 75 cents KWH, or $18. per day for 18 days. -----	$325	
Wages for 6 men for 18 days (Men to watch pump and make necessary repairs, timbering, etc.)	$850	
	$1700.	pump operation cost
Plus cost of preparing air shaft for pumping and establishing pump.	$300	
Estimated dewatering cost to 450 level.	$2000.	

Timbering, cleaning up caves, and repairs necessary for safe accessibility.	$1500 ±
	$3500
Margin for assurance of completion of project, miscellaneous expenses and materials such as pipe etc.	$1500
Cost of step I of recommended program.	$5000.

Continuation of the dewatering program to the 1050 level would require pumping out an estimated volume of 10,000,000 cu. feet or 75,000,000 gallons of water in addition to the reported 300 gallon per minute inflow. At 600 gallons per minute pumping rate against a maximum head of 600 feet, the time required would be about 180 days since 300 gallon per minute dewatering progress would be made.

Cost of additional pump required....	$2500±
150 Horsepower at two cents KWH power rate indicates daily power cost of $36.00	$6480.
Wages for 6 men for 180 days	$7200.
	$16,180
Plus estimated repair costs and mine expenses.	3,820
Plus necessary hoist	5,000
Estimated cost for dewatering------ (from 450 to 1050 level)	$25,000
This means a total estimated cost for dewatering from the surface to the 1050 level----------	$30,000

Continuation of the dewatering program from the 1050 level to the bottom of the mine involves pumping out an additional 10,000,000 cubic feet of workings or 75,000,000 gallons of water against a maximum head of 1400 feet. The time required with a 600 gallon pumping capacity would be

about 180 days. The estimated cost is $25,000.

Increase in pumping capacities would lessen the time and the costs. As dewatering progressed, more accurate total cost estimates could be made based upon actual existing conditions.

Development work and prospecting would require hoisting and compressor equipment, mining machines and accessories together with much miscellaneous material such as pipe, hose, timber, powder, etc. $5000 - $10,000 would furnish enough of this equipment for prospecting. Until operation has proven differently the cost of drifting and prospect tunneling is estimated at about $10. per foot. Compressor and hoist costs would depend upon type of installation warranted by results of underground examination.

Above cost figures are estimates and should be construed only as an approximation of expected costs. They may be too high or too low depending upon conditions encountered. If mining is in progress at the same time the lower levels are being dewatered, then a lessening of actual pumping costs would be expected.

As the mine is under water, and with no mining equipment thereon belonging to the owners, reopening of the same appears speculative. Although the past production record is significant of the strength of mineralization and there are indications that still undeveloped mineralization exists, prospective ore possibilities all need confirmation by sampling and development to determine both tenor and tonnages available for mining.

Therefore it is suggested that from the owners point of view a good method for determination of the prospective ore possibilities would be to place the property under lease to someone who already has the necessary mining equipment and who would be interested in prospecting the ore possibilities in the footwall of the old workings above the 450 level. Under a good lease agreement where the owners retain control of the property after a reasonable period of time, these shallow ores could be developed and mined to the benefit of both the owners and the leasee. At the same time careful study of areas dewatered and mined during this operation would give some idea as to the amount of deeper level prospecting warranted and more accurate data on the anticipated costs than are now possible. This would be at no capital risk to the owners.

If the owners are not in accord with leasing, an alternative program of government loans may be feasible. A $ 5,000 loan to unwater and map and sample any remaining ore in old workings would be a preliminary . However, no prospecting or development could be done on this type of loan. If prospects warrant, with an additional government loan or privately enlisted capital the program for prospecting ore possibilities could be continued.

It is estimated that about $ 50,000 would be required for investigation and development of the ore possibilities from the surface to the 1050 level in the footwall of the old workings.

$	5,000	dewatering to the 450 level
	20,000	dewatering to the 1050 level
	10,000	for necessary mining and hoisting equipment
	10,000	for 1000 feet development work at $ 10 per ft.
	5,000	for misc. expenses and supplies
$	50,000	

Again this figure represents only an approximate cost of re-opening the mine . Until definite data are available on actual conditions accurate cost determinations are impossible .

Bibliography

on

The Elkhorn Mining District

1. Geology and Ore Deposits of the Elkhorn Mining District --by W. H. Weed and Joseph Barrell.

United States Geological Survey 22 Annual Report Vol. 29, pages 407-549, 1902. The most complete report on the Elkhorn Mining District as a whole and the Elkhorn mine in particular.

2. More recent Geological Survey Bulletins contain brief reports on the district.

a) R. W. Stone--Geologic Relation of Ore Deposits in the Elkhorn Mountains, Montana.

United States Geological Survey Bulletin 470, pp.75-98, 1911.

b) A. Knopf--Ore Deposits of the Greater Helena Mining Region. United States Geological Survey Bulletin 527, pp. , 1913.

c) J. T. Pardee--Ore Deposits of the Greater Helena Mining Region. United States Geological Survey Bulletin 842, 1933.

3. A general district reconnaissance by A. D. Falck and Blair Stewart made for the Basin Tunnel Mining Company in 1937.

4. A Report on the Elkhorn Mine by Rowland King made for the Elkhorn Syndicate in 1938.

5. Smelter records available from the East Helena Smelter, American Smelting and Refining Co., E. McL. Tittman, mgr.

6. Personal interviews with Mr. Josia Bowden of Helena, who was manager of the property during the Longmaids' operation from 1902-1912.

ROWLAND KING'S SAMPLES & ASSAYS

No.	Location	Width	($31.81) Gold	(61½) Oz's. Silver	(3.4¢) % Lead	Value Per Ton
1	65' level	4.5'	0.02	13.0	1.6	$ 9.72
2	65' "	23.0'	0.02	9.1	1.6	7.32
3	65' "	3.0'	0.01	5.6	0.1	3.84
4	110' "	6.0'	0.01	3.2	trace	2.29
5	110' "	9.5'	trace	0.15	trace	.10
6	110' "	11.5'	0.02	10.3	trace	6.66
7	110' "	19.5'	0.005	3.5	trace	2.31
8	Surface	6.0'	0.005	3.4	trace	2.25
9	Air Shaft	4.75'	0.04	8.0	0.2	6.33
10	" "	5.0'	0.10	63.2	2.65	43.78
11	" "	9.0'	0.035	7.8	0.25	6.08
12	450' level	4.5'	0.06	23.8	1.0	17.20
13	80' contact	5.0'	trace	2.0	0.1	1.30
14	" "	4.5'	"	0.3	trace	.18
	450' Level Footwall Stope Samples					
15	Sta. 27	4.5'	0.04	29.7	1.1	20.27
16	Sta. 29	9.0'	0.005	1.7	0.2	1.34
17	Sta. 31	7.0'	0.005	3.2	0.25	2.30
18	Sta. 31	3.0'	trace	0.55	0.1	.41
19	Stope Sta. 21	2.5'	"	1.0	0.25	.78
20	" " 21	2.0'	0.04	75.6	9.1	53.95
21	" " 21	2.5'	trace	1.0	trace	.61
22	" " 43	6.0'	0.005	3.0	0.1	2.07
23	" " 45	2.7'	0.01	28.5	0.5	18.16
24	" " 47	3.2'	trace	1.5	0.2	1.06
25	" " 47	1.3'	0.19	34.6	11.1	34.87
26	" " 49	6.0'	0.10	29.1	2.9	23.05
27	" " 51	4.5'	0.05	18.4	2.7	14.73
28	" " 52	2.5'	0.01	14.4	0.2	9.31
29	" " 55	1.5'	0.05	21.2	0.8	15.18
30	" 300 level	1.0'	0.20	1.4	0.3	7.44
35	110' level Sta. 105	2.5'	0.015	13.3	0.25	8.83
36	Air Shaft	3.0'	0.02	20.1	0.3	13.21
37	Sta. 105-110'	4.0'	0.01	11.1	0.3	7.36
40	" " "	2.5'	0.02	19.5	0.3	12.85
41	Surface	4.0'	0.025	10.8	0.2	7.57

Dates	Dry Tons	Smelting Ore Net Proceeds	Average Frt.&Trt.	Gross Value	Avr. Price Silver	Relative Silver Content Ounces	Months Covered
9/01-11/02	10,673	$ 86,044	$9.10/ton	$ 183,178	53.4¢	32.0/ton	14
9/06-1/08	14,669	223,302	8.50	352,988	67.7	35.5/ton	16
1/08-9/08	9,510	183,937	8.74	267,054	53.8	52.0/ton	8
9/08-2/09	6,177	101,031	7.65	148,283	50.6	47.4/ton	5½
2/09-9/09	8,233	149,986	6.68	204,982	51.5	35.3/ton	6½
9/09-1/10	5,486	88,718	6.59	124,870	51.5	31.4/ton	4½
1/10-6/10	6,008	100,603	6.31	133,513	52.8	31.7/ton	4
	60,756	938,621		$1,419,868	56.1	37.9/ton	58.5

The following table represents new ore mined in the footwall at the lower levels.

Dates	Dry Tons	Net Proceeds	Average Frt.&Trt.	Gross Value	Avrg. Price Silver	Rel. Silver Cont.Oz.	Months Covered
6/10-10/10	6,270	$ 101,946	$7.00/ton	$ 145,836	53.4¢	43.4/ton	4½
10/10-3/11	9,307	141,077	7.05	206,751	54.0	41.1/ton	5½
3/11-8/11	7,913	98,279	6.70	151,296	53.0	36.1/ton	5
8/11-1/12	6,240	77,311	6.44	117,496	53.7	35.0/ton	4-1/4
1/12-9/12	6,047	86,243	6.10	123,129	58.6	34.9/ton	7-3/4
	35,777	$ 504,856		$ 744,508	54.5	38.3	27.0

Totals for Smelting ore for the above period is as follows:

Dates	Dry Tons	Net Proceeds	Gross Value	Months Covered
9/01-9/12	96,533	$1,443,477	$2,164,376	85½

CONCENTRATE

Except for the time from September 1901 to November 1902 the Longmaid's operated their gravity concentration mill throughout the period. The following tabulation covers the shipments of concentrate and was taken from the same records as those for the smelting ore.

Dates	Dry Tons	Net Proceeds	Average Fgt.&Trt.	Gross Value	Avrg. Price Silver	Rel.Silver Content Ounces	Mo. Covered
9/06-1/08	1,497	$ 50,884	$ 8.40/ton	$ 63,459	57.7¢	65.0/ton	16
1/08-9/08	1,555	41,840	11.00	58,945	53.8	71.4/ton	8
9/08-2/09	1,181	49,950	12.25	64,417	50.6	107.0/ton	5½
2/09-9/09	1,115	60,648	10.88	72,779	51.5	105.0/ton	6½
9/09-1/10	576	26,574	11.79	33,366	51.5	89.7/ton	4½
1/10-6/10	575	29,321	11.10	35,703	52.8	96.4/ton	4
	6,499	$259,217		$328,669	54.6	84.3/ton	44.5

Dates	Dry Tons	Net Proceeds	Average Fgt.&Trt.	Gross Value	Avrg. Price Silver	Rel.Sil. Content Ounces	Mos. Covered
6/10-10/10	642	$ 32,680	$ 9.50	$ 38,779	53.4	95.4/ton	4½
10/10-3/11	777	37,385	10.20	45,310	54.0	107.2/ton	5½
3/11-8/11	662	29,673	11.28	37,151	53.0	105.7/ton	5
8/11-1/12	468	20,194	11.40	25,529	53.7	101.1/ton	4-1/4
1/12-9/12	572	27,195	12.35	34,258	58.6	102.0/ton	7-3/4
	3,121	$147,127		$181,027	54.5	102.1/ton	27

FROM. KINGS REPORT.

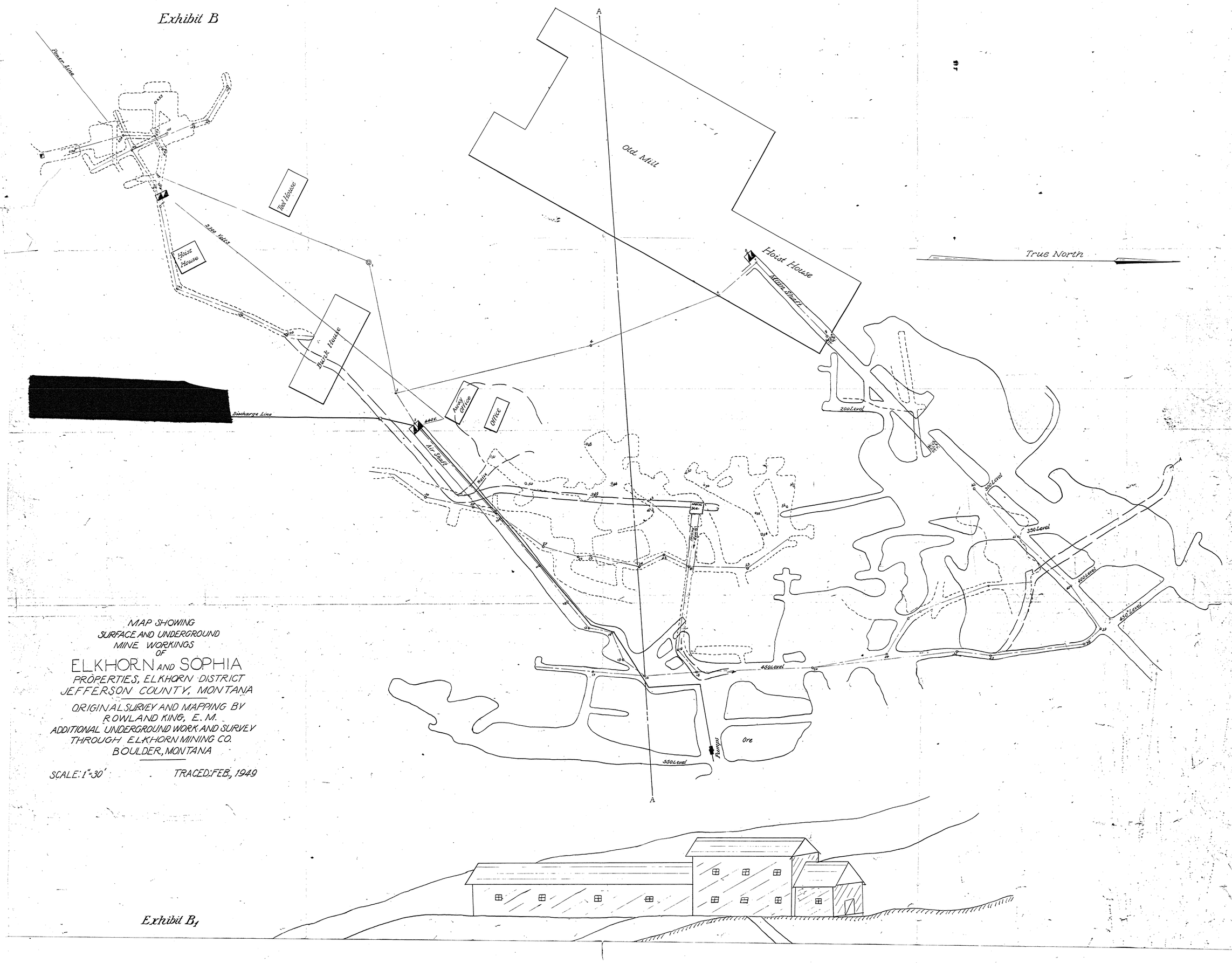
STATEMENT OF SHIPMENTS FROM ELKHORN MINE - ELKHORN, JEFFERSON COUNTY, MONTANA

East Helena, Montana
June 19, 1944

Date	Shipper	Class	Dry Tons	Gold	Silver	Lead	Copper	Insol	Fe	Mn	CaO	Zn	S.
9/24/1917	D.C. Walker	Tailings	38	0.04	11.1	1.0	Tr.	39.1	4.6	0.4	14.3	6.6	1.8
10/1/	D.C. Walker	"	49	0.04	11.5	2.5						5.5	
10/2/	D.C. Walker	"	41	0.04	9.3	1.4						4.8	
10/29/	" "		2	0.06	60.9	4.9	0.4	68.6	2.8	Tr.	3.8	5.3	1.2
11/13/	Ed Erickson		12	0.10	44.9	4.4						2.5	
11/13/	" "		4	0.19	5.8			23.5	42.2			1.0	
12.20/1919	H. E. Walker		18	0.29	123.3	7.0		70.2	1.6			5.2	0.5
8/10/1921	Fred Bell		12	0.05	23.8	0		68.7	4.3	0	2.3	6.9	1.3
10/31/	Western Metallurgical Co.		17	0.05	91.1	3.0		18.6	2.3	0.7		7.0	2.7
11/19/	" " "		12	0.04	60.3	2.0						5.5	
1/18/1922	D. C. Walker (Old Elkhorn)		12	0.07	37.9	0		82.5	2.5	0	1.4	3.5	
6/23/	Western Met. Co.		22	0.08	124.2	3.3						6.7	
7/14/	" " "		30	0.11	158.9							7.4	
7/25	" " "		14	0.115	124.3	2.9						7.0	
8/16	" " "		26	0.135	157.3	3.4						7.3	
8/26/	" " "		18	0.10	124.6	2.6						6.6	
9/9	" " "		23	0.08	101.5	2.3						6.3	
9/26/	" " "		24	0.085	90.6	1.9						6.2	
10/10	" " "		21	0.09	107.9	2.4						6.2	
10/18	" " "		13	0.075	106.0	3.2						7.4	
11/3	" " "		17	0.09	111.0	2.9						7.3	
12/2	" " "		18	0.08	99.5	2.7						6.8	
2/27/1923	" " "	Dump	22	0.13	112.3	3.3							
3/22/	" " "		13	0.05	69.8								
3/22	" " "		8	0.22	52.2	5.1							
4/13/	" " "		20	0.045	73.8	2.7						5.2	
4/25	" " "		20	0.04	69.5	2.3						5.6	
5/9/	" " "		22	0.05	81.3	1.7						5.3	
6/1	" " "		18	0.09	103.2	2.9						5.7	
11/22/1926	D.C. Walker		2	0.05	44.2	2.2	0.3	100.2	4.6	0.2		5.5	
1/7/1935	Thos. Woodward	Cts.	6	0.11	71.2	2.2	0.10					6.4	
6/25	R. E. Perey	"	4	0.22	138.7	4.2	0.25					9.4	
7/9	" " (Dump)	"	4	0.26	155.6	4.6	0.60					7.6	
7/17	" " "	"	4	0.24	144.6	4.3	0.35					6.6	
7/23	" " "	"	5	0.26	154.2	5.9	0.55					7.4	
7/29/	" " "	"	5	0.23	136.4	6.5	0.35					8.1	
8/1	" " "	"	5	0.25	164.4	7.5	0.50					8.8	
8.9/	" " "	"	5	0.205	138.4	6.4	0.40					8.1	

Date	Shipper			Class	Dry Tons	G	Silver	Lead	Copper	Insol	Fe	Mn	Zn	S
8/14/	R. E. Perey		(Dump)	Cts.	10	0.18	133.5	6.1	0.30				7.9	
8/23	"	"	"	"	4	0.20	138.6	6.3	0.70				7.6	
9/9/	"	"	"	"	9	0.19	138.4	6.3	0.30				8.2	
9/14	"	"	"	"	6	0.18	142.6	6.3	0.15				8.9	
9/24/	"	"	"	"	6	0.21	149.7	6.0	0.20				9.2	
9/28/	"	"	"	"	11	0.19	145.5	5.9	0.15				8.6	
10/1	"	"	"	"	11	0.205	155.7	5.9	0.15				9.3	
10/12/	"	"	"	"	10	0.18	139.1	5.8	0.08				8.3	
10/18/	"	"	"	"	10	0.23	148.4	6.1	0.08				8.0	
10/30/	"	"	"	"	11	0.225	148.4	5.1	0.04				7.4	
11/19/	"	"	"	"	8	0.19	121.6	3.2	0.20				7.6	
Sept. 1936	Elkhorn Metals, Inc.			"	9	0.16	110.35	4.21	0.01				4.3	
Oct. 1936	"	"	"	"	52	0.19	109.52	5.10	0.16				5.6	
Nov. 1936	"	"	"	"	98	0.16	65.80	6.78	0.11				6.5	
Dec. 1936	"	"	"	"	175	0.15	49.16	5.77	0.36				9.1	
Jan. 1937	"	"	"	"	35	0.19	63.60	5.10	0.45				10.7	
Mar. 1937	"	"	"	"	206	0.17	63.80	4.58	0.26				10.5	
Apr. 1937	"	"	"	"	169	0.13	36.02	8.34	0.07				7.7	
May 1937	"	"	"	"	226	0.14	44.76	4.56	0.07				9.4	
June 1937	"	"	"	"	218	0.15	37.29	6.39	0.04				7.9	
July 1937	"	"	"	"	194	0.17	40.09	6.59	0.03				8.4	
Aug. 1937	"	"	"	"	182	0.17	37.66	6.75	0.07				9.1	
Sept. 1937	"	"	"	"	162	0.27	52.02	11.96	0.21				9.5	
Oct. 1937	"	"	"	"	154	0.22	52.46	14.86	0.26				7.6	
Nov. 1937	"	"	"	"	145	0.20	41.78	14.21	0.49				9.3	
Dec. 1937	"	"	"	"	180	0.22	46.01	16.04	0.23				6.6	
Jan. 1938	"	"	"	"	181	0.14	32.80	9.12	0.24				7.8	
Apr. 1941	Leslie Harris			"	5	0.135	31.20	6.1	0.30				6.3	
Oct. 1942	Stuart McKee			Tlgs.	133	0.021	7.64	2.04	0.03				3.2	
Nov. 1942	"	"		"	709	0.025	6.54	1.64	0.04				3.0	
Dec. 1942	"	"& Mastin Taylor		"	847	0.025	7.02	2.12	0.04				3.3	
Dec. 1942	"	"		Crude	53	0.020	10.74	0.95	0.05				2.9	
Jan. 1943	Mastin Taylor			Tlgs.	1816	0.024	6.34	1.75	0.02				3.2	
Feb. 1943	"	"		"	1934	0.023	6.37	2.01	0.03				3.3	
Mar. 1943	"	"		"	2375	0.024	6.28	1.55	0.02				3.1	
Apr. 1943	"	"		"	1292	0.024	6.10	1.63	0.03				2.5	
May 1943	"	"		"	3259	0.026	6.54	2.49	0.03				2.4	
June 1943	"	"		"	1165	0.030	8.83	3.92	0.09				2.8	
July 1943	"	"		"	4009	0.024	5.28	2.32	0.06				2.3	
Aug. 1943	"	"		"	3648	0.023	5.86	1.84	0.09				2.3	
Sept. 1943	"	"		"	947	0.029	6.66	1.80	0.08				4.0	
July 1943	Stuart McKee			Crude	9	0.020	8.25	1.00	0.05				5.9	
Aug. 1943	"	"		"	4	0.015	9.40	1.50	0.05				3.9	
Oct. 1943	Mastin Taylor			Tlgs.	770	0.025	6.77	2.10	0.06				4.4	
Nov. 1943	"	"		"	720	0.025	6.56	2.10	0.02				4.7	
Dec. 1943	"	"		"	756	0.027	6.50	1.86	0.02				4.6	
Jan. 1944	"	"		"	152	0.030	6.04	1.61	0.02				3.5	
May 1944	"	"		"	1152	0.022	6.25	1.57	0.05				3.3	

Exhibit B

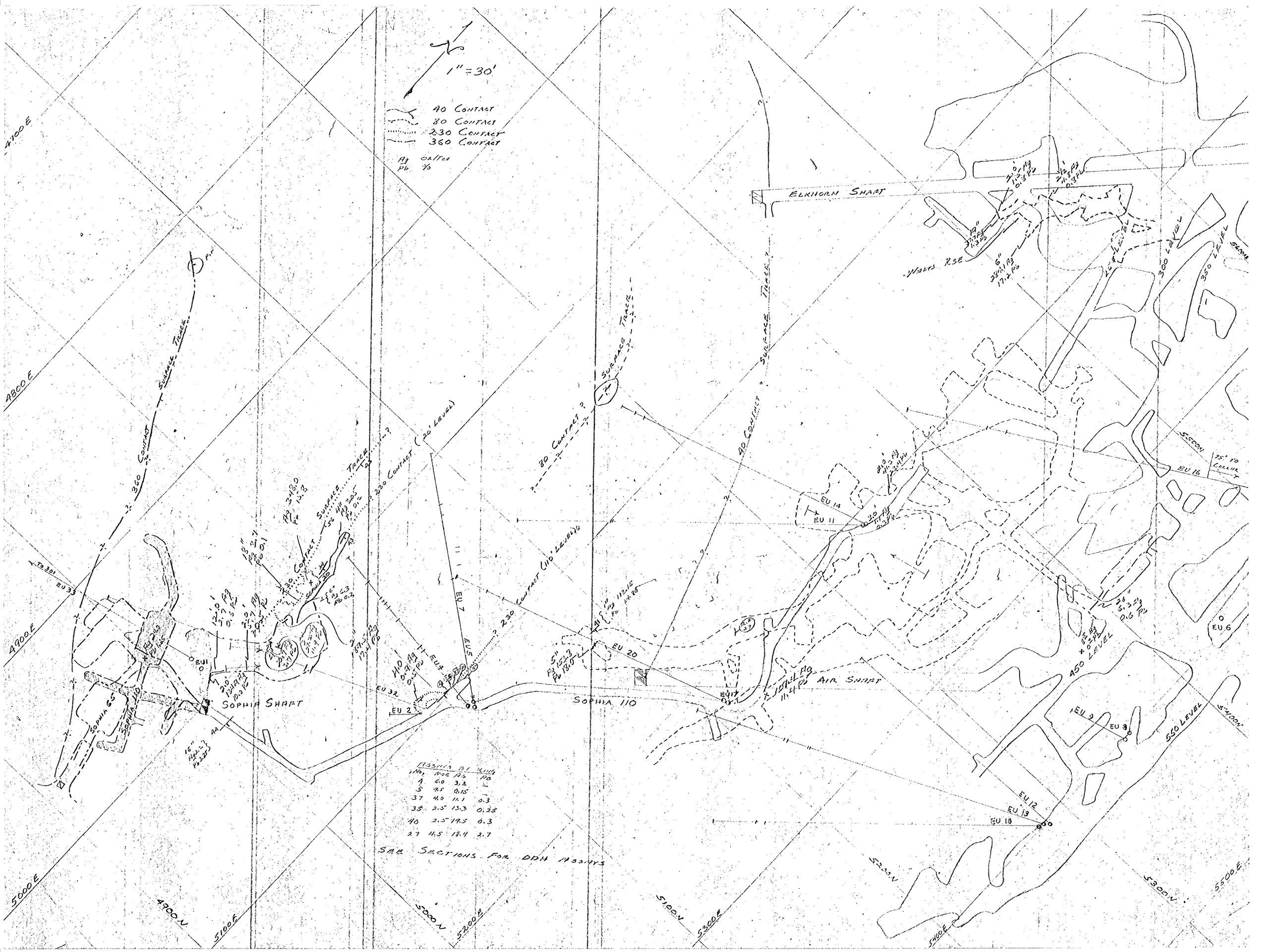


MAP SHOWING
SURFACE AND UNDERGROUND
MINE WORKINGS
OF
ELKHORN AND SOPHIA
PROPERTIES, ELKHORN DISTRICT
JEFFERSON COUNTY, MONTANA

ORIGINAL SURVEY AND MAPPING BY
ROWLAND KING, E. M.
ADDITIONAL UNDERGROUND WORK AND SURVEY
THROUGH ELKHORN MINING CO.
BOULDER, MONTANA

SCALE: 1" = 30' TRACED: FEB., 1949

Exhibit B_1


1" = 30'
40 Contact
80 Contact
230 Contact
360 Contact
Ag oz/ton
Pb %
4700 E
4800 E
4900 E
5000 E
5100 E
5200 E
5300 E
5400 E
5500 E
4900 N
5000 N
5100 N
5200 N
5300 N
Elkhorn Shaft
Sophia Shaft
Sophia 110
Sophia 65
Sophia 110
Surface Trench
Contact Shaft
Pit
Contact (20' Level)
Contact (110' Level)
Walls RSE
Air Shaft
300 Level
350 Level
450 Level
550 Level
Sscon
75' to Collar
EU 1
EU 2
EU 4
EU 5
EU 6
EU 7
EU 9
EU 11
EU 12
EU 13
EU 14
EU 16
EU 17
EU 18
EU 20
EU 32
EU 33
Ts 301
Assays by Kinds
No. Wide Ag Pb
1 6.0 3.2
5 9.5 0.15
37 4.0 11.1 0.3
38 2.5 13.3 0.25
40 2.5 19.5 0.3
27 11.5 12.4 2.7
See Sections for DDH Assays

SEC. 10
SEC. 11
SEC. 15
SEC. 14
T. 6 N. R. 4 W.
T. 6 N. R. 3 W.
UNION 2669
SIDE ISSUE 2622
LOUISE
C & D 7220
GOLDEN MOSS 2671
DEWEY 7175
PET 7221
GOLDEN CURRY N
COLUMBUS 7171
JAPAN
GOLDEN CURRY MILL SITE
GOLDEN CURRY No 2 7219
GOLDEN CURRY No 1 7218
GOLDEN DREAM 7176
WILLIAM D
GOLD HILL 1069
BIRDS EYE 1069
MONTANA 1069
PARK 1069
HEAGAN 1069
E. GOLDEN CURRY (unpatented)
ERICKMAN (unpatented)
SOUTH GOLDEN CURRY
SO. GOLDEN CURRY No 2
C. & P. (unpatented)
C. H. & H. B
EDNA MAUD 8977
DEWEY 1069
WOLFTONE 4012
KLONDIKE No 3
KLONDIKE 1042
KLONDIKE No 2
DUNSTONE 2359
JAMES R KEENE 1890
ST. PATRICK
RELIEF 23
ELKHORN No 5
ORE CONTROL
ELKHORN No 4
ELKHORN No 5
ELKHORN No 2
SOPHIA 3882
A.M. HOLTER 1324
MAIN SHAFT
HARDIN MS 2523A
HARDIN MS 2523B
SILVER STAR MS 268
PLACER 1091
ANACONDA 8979
NELLIE 8896
FISSURE FRAC 9804
PEACOCK 7968
MOREAU MS 2725B
MOREAU 2725A
TURKEY 7969
ELKHORN TOWNSITE 6091
SO. EXTENSION OF THE A.M. HOLTER 2524A
SILVER STAR 2689A
SO. EXTENSION M.S. 2524B
JOHN H. SHOBER 1531
LUXANBURGH 1524
C.F. HOFMANN 8896
FISSURE FRAC MILL SITE
C.F. HOFMANN MILL SITE
PLACER 6091
C & D PLACER
PLACER 1348
PLACER 6094
QUEEN GULCH
PLACER 1378
LEGEND
Owned by Elkhorn Mining Co
30 year lease from Laura I. Walker
Being purchased by Elkhorn Mining Co
30 year lease from Mont Projects Inc
N
ELKHORN MINING DISTRICT
(NEAR BOULDER)
JEFFERSON COUNTY
MONTANA
SCALE 1 IN = 300 FT.

MENTOR EXPLORATION & DEVELOPMENT CO. LTD.
ELKHORN LEASE
JEFFERSON COUNTY, MONTANA
PLAN
OF
DIAMOND DRILL HOLES
SCALE 1" = 30'
SEPT. 1955
6000 N
5000 E
5500 N
4500 E
5000 N
5000 E
5500 E
5500 N
To 350'
To 300'
To 304'
To 301'
To 322'
EU 26
EU 25
EU 30
EU 31
EU 24
EU 23
FACE
Elkhorn Shaft
Air Shaft
Sophia Shaft
300 Level
350 Level
400 Level
450 Level
500 Level
EU 28
EU 29
EU 22
EU 27
EU 21
EU 19
EU 16
EU 18
EU 14
EU 11
EU 7
EU 20
EU 4
EU 9
EU 32
EU 2
EU 17
EU 33
EU 1
EU 6
EU 3
EU 5
EU 8
EU 12
EU 13
EU 15
EU 10
Coordinates (0)' 5000 N
(assumed) 5000 E

Ag (Pb-Zn)