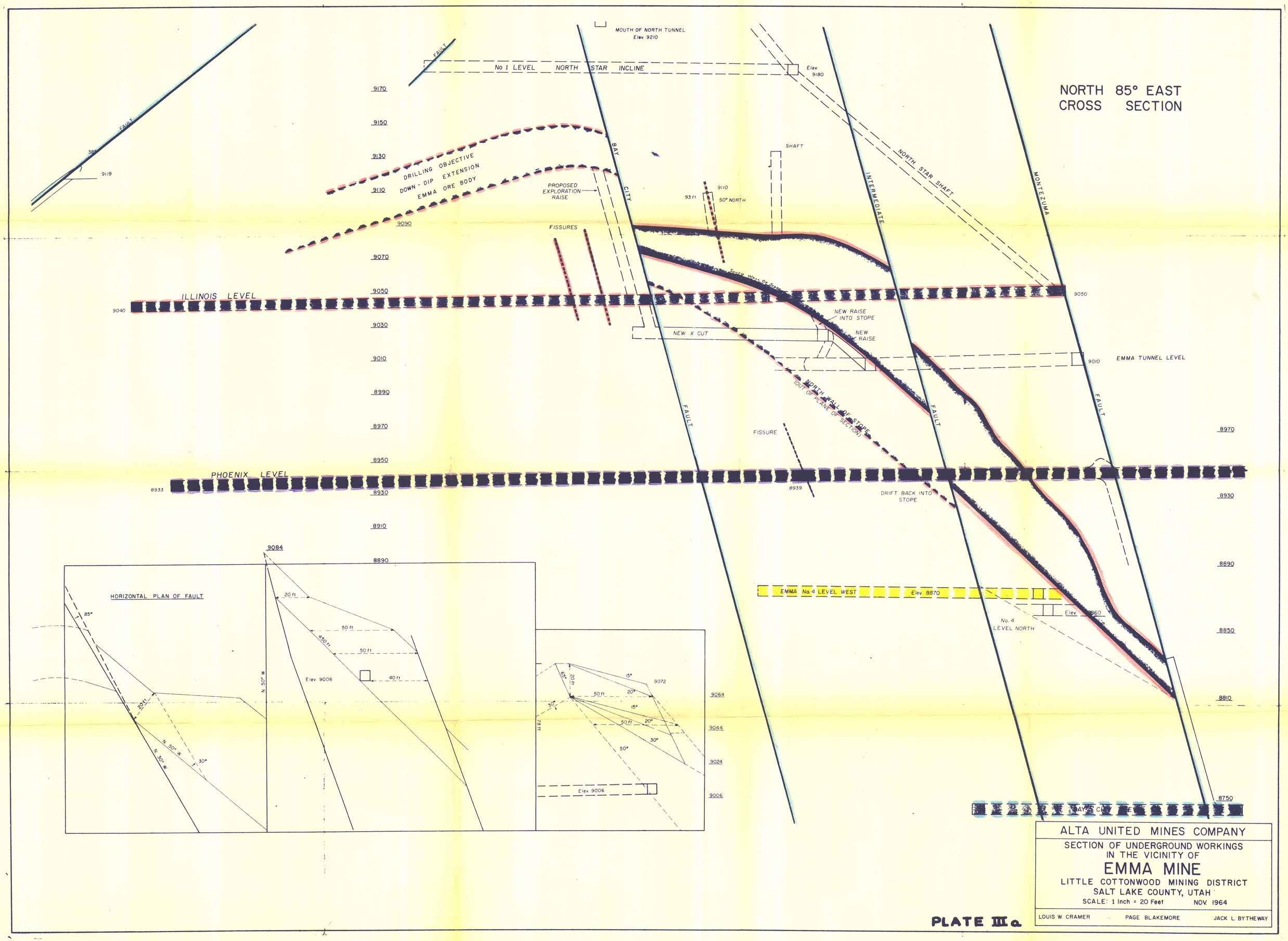
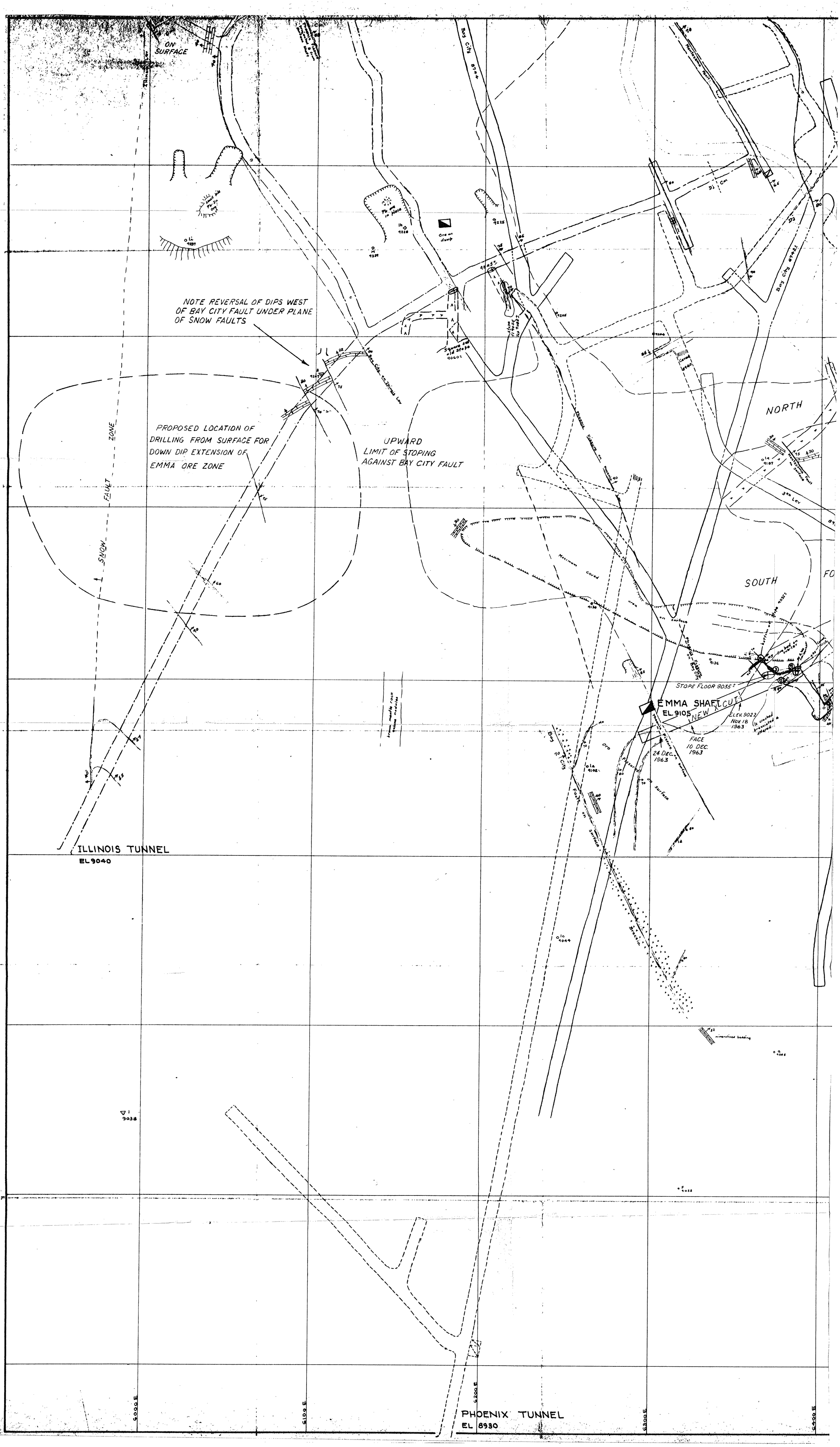

NORTH 85° EAST
CROSS SECTION
MOUTH OF NORTH TUNNEL
Elev. 9210
No. 1 LEVEL NORTH STAR INCLINE
Elev 9180
FAULT
38°
9119
9170
9150
9130
9110
9090
9070
9050
9030
9010
8990
8970
8950
8930
8910
8890
8870
8850
8810
8750
DRILLING OBJECTIVE
DOWN-DIP EXTENSION
EMMA ORE BODY
PROPOSED EXPLORATION RAISE
FISSURES
BAY CITY
SHAFT
93 ft.
9110
50° NORTH
INTERMEDIATE
NORTH STAR SHAFT
MONTEZUMA
SEVEN WALL OF STOPE
ILLINOIS LEVEL
9040
9050
NEW RAISE INTO STOPE
NEW X CUT
NEW RAISE
9010
EMMA TUNNEL LEVEL
NORTH WALL OF STOPE
(OUT OF PLANE OF SECTION)
FAULT
FISSURE
8970
PHOENIX LEVEL
8933
8939
DRIFT BACK INTO STOPE
8930
EMMA No. 4 LEVEL WEST
Elev. 8870
Elev. 8860
No. 4 LEVEL NORTH
BAY CITY
HORIZONTAL PLAN OF FAULT
85°
20 ft.
N 50° W
N 30° W
30°
9084
8890
20 ft.
50 ft.
450 ft.
50 ft.
40 ft.
Elev 9006
65°
20 ft.
15°
9072
50 ft.
20°
15°
30°
78 ft.
50 ft.
20°
30°
50°
9064
9044
9024
9006
Elev 9006
ALTA UNITED MINES COMPANY
SECTION OF UNDERGROUND WORKINGS
IN THE VICINITY OF
EMMA MINE
LITTLE COTTONWOOD MINING DISTRICT
SALT LAKE COUNTY, UTAH
SCALE: 1 Inch = 20 Feet
NOV. 1964
LOUIS W. CRAMER
PAGE BLAKEMORE
JACK L. BYTHEWAY

PLATE IIIa


ON SURFACE
Bay City 87 A.A.
Montezuma Fault
Bay City 87 A.A.
NOTE REVERSAL OF DIPS WEST OF BAY CITY FAULT UNDER PLANE OF SNOW FAULTS
PROPOSED LOCATION OF DRILLING FROM SURFACE FOR DOWN DIP EXTENSION OF EMMA ORE ZONE
UPWARD LIMIT OF STOPING AGAINST BAY CITY FAULT
SNOW FAULT ZONE
NORTH
SOUTH
Maximum caved
STOPE FLOOR 9035±
EMMA SHAFT
EL. 9105
NEW X CUT
ELEV. 9022 NOV 18 1963
FACE 10 DEC. 1963
24 DEC. 1963
Bay City Fault on Surface
Breccia
mineralized bedding
ILLINOIS TUNNEL
EL 9040
PHOENIX TUNNEL
EL 8930
6000 E
6100 E
6200 E
6300 E
6400 E

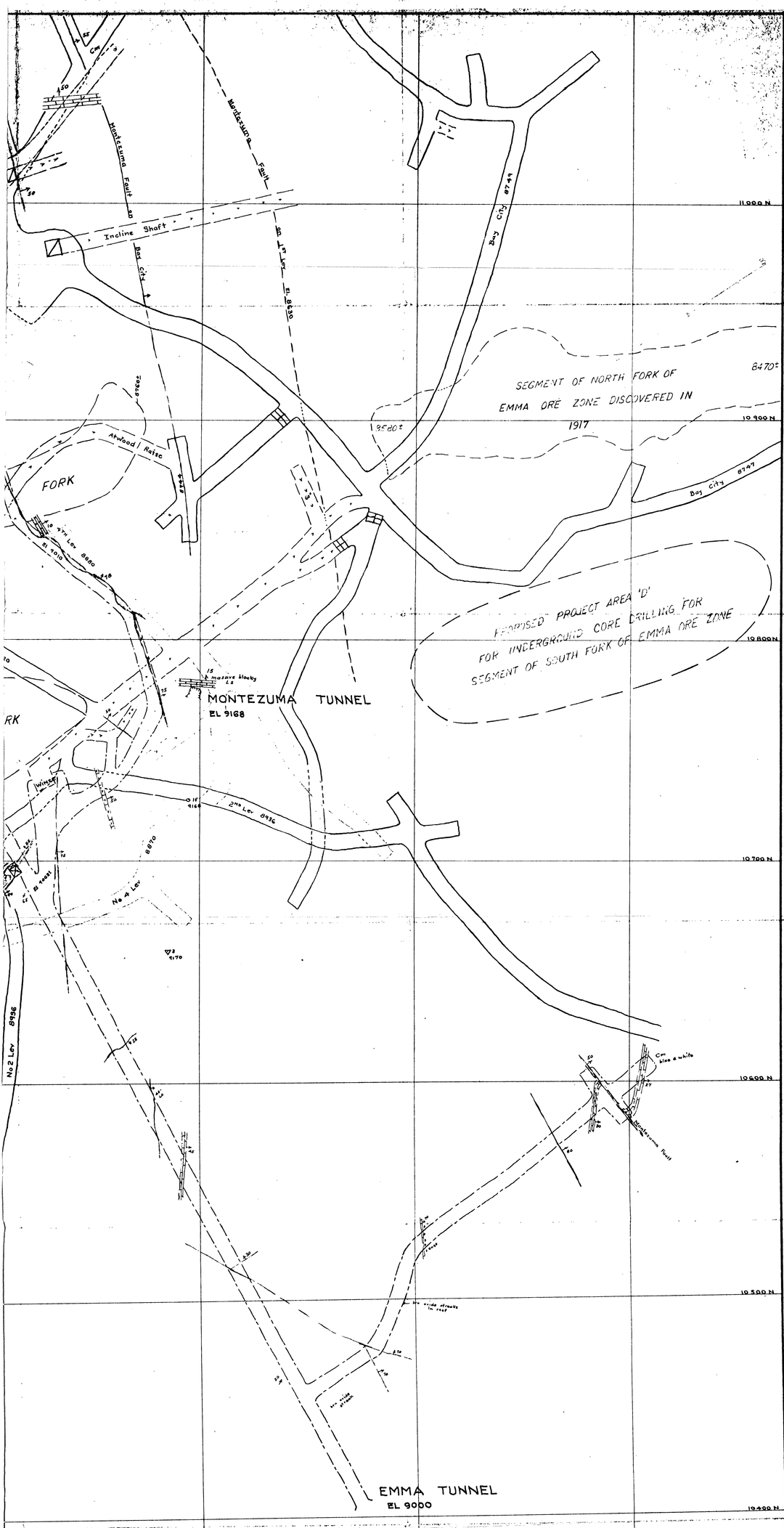


PLATE II

ALTA UNITED MINES COMPANY

EMMA PROJECT

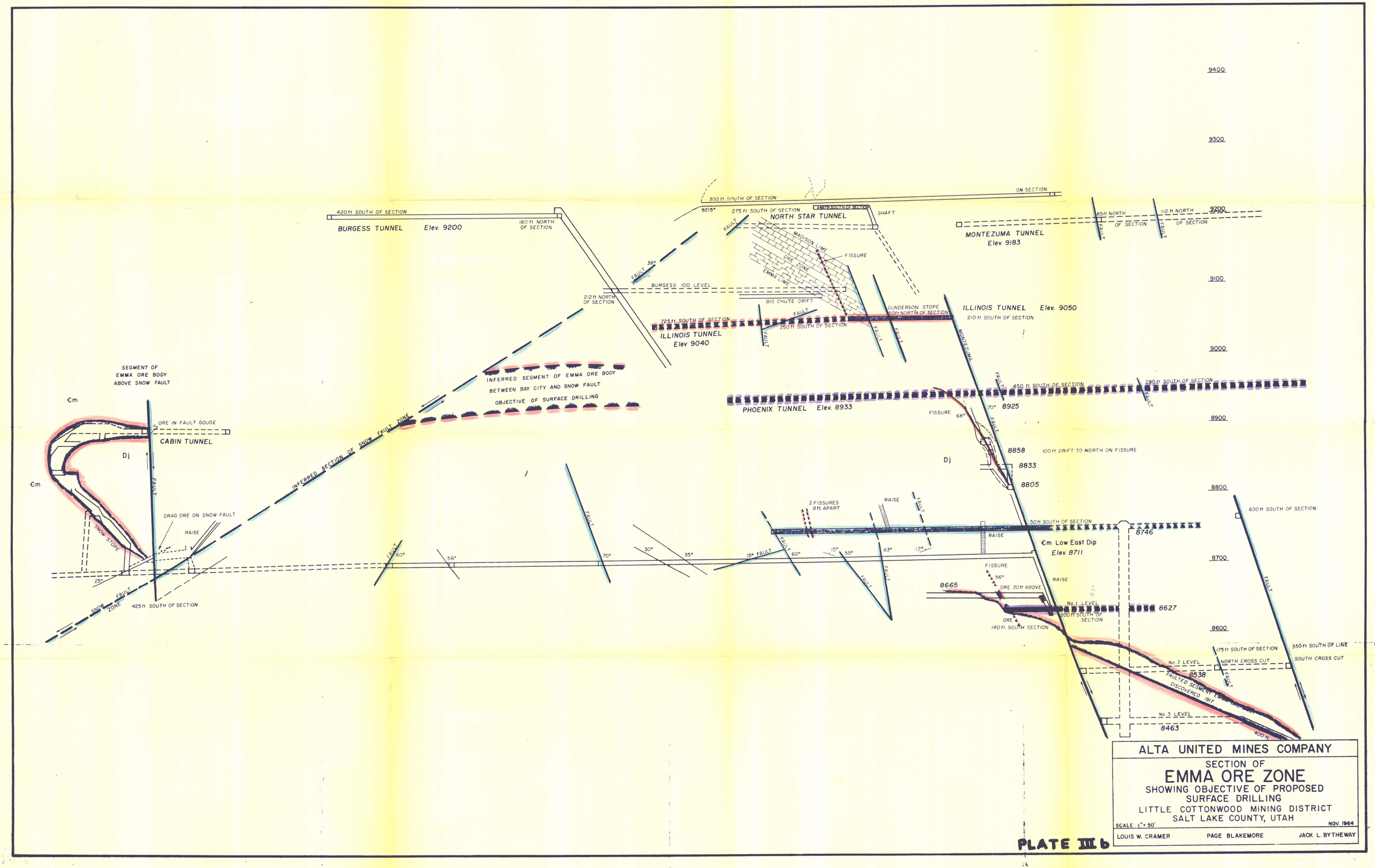
LITTLE COTTONWOOD MINING DISTRICT

SALT LAKE CO. UTAH

1" = 20'

Sample Locations ③

L.W.C.


9400
9300
9200
9100
9000
8900
8800
8700
8600
420 ft. SOUTH OF SECTION
BURGESS TUNNEL Elev. 9200
160 ft. NORTH OF SECTION
300 ft SOUTH OF SECTION
ON SECTION
9215*
275 ft SOUTH OF SECTION
NORTH STAR TUNNEL
SHAFT
FAULT
MADISON LIME
FISSURE
ORE ZONE
EMMA LIME
85 ft NORTH OF SECTION
112 ft NORTH OF SECTION
MONTEZUMA TUNNEL
Elev. 9183
FAULT 38°
BURGESS 100 LEVEL
212 ft NORTH OF SECTION
BIG CHUTE DRIFT
725 ft SOUTH OF SECTION
ILLINOIS TUNNEL
Elev 9040
250 ft SOUTH OF SECTION
GUNDERSON STOPE
60 ft NORTH OF SECTION
ILLINOIS TUNNEL Elev. 9050
210 ft SOUTH OF SECTION
MONTEZUMA
INFERRED SEGMENT OF EMMA ORE BODY
BETWEEN BAY CITY AND SNOW FAULT
OBJECTIVE OF SURFACE DRILLING
SEGMENT OF
EMMA ORE BODY
ABOVE SNOW FAULT
Ꞓm
ORE IN FAULT GOUGE
CABIN TUNNEL
Dj
FAULT
INFERRED SECTION OF SNOW FAULT ZONE
DRAG ORE ON SNOW FAULT
RAISE
SNOW STOPE
25°
SNOW FAULT ZONE
425 ft. SOUTH OF SECTION
450 ft SOUTH OF SECTION
290 ft SOUTH OF SECTION
PHOENIX TUNNEL Elev. 8933
70°
8925
FISSURE
68°
8858
100 ft DRIFT TO NORTH ON FISSURE
8833
8805
600 ft SOUTH OF SECTION
2 FISSURES
8 ft. APART
RAISE
50 ft SOUTH OF SECTION
8746
Ꞓm Low East Dip
Elev. 8711
60°
56°
70°
30°
35°
15° FAULT
60°
15°
55°
83°
17°
FISSURE
56°
ORE 30 ft ABOVE
8665
No. 1 LEVEL
200 ft SOUTH OF SECTION
8627
ORE
140 ft SOUTH SECTION
175 ft SOUTH OF SECTION
350 ft SOUTH OF LINE
No. 2 LEVEL
NORTH CROSS CUT
SOUTH CROSS CUT
8538
FAULTED SEGMENT EMMA ORE BODY
DISCOVERED 1917
No. 3 LEVEL
8463
100 ft
ALTA UNITED MINES COMPANY
SECTION OF
EMMA ORE ZONE
SHOWING OBJECTIVE OF PROPOSED
SURFACE DRILLING
LITTLE COTTONWOOD MINING DISTRICT
SALT LAKE COUNTY, UTAH
SCALE 1" = 50'
NOV. 1964
LOUIS W. CRAMER
PAGE BLAKEMORE
JACK L. BYTHEWAY
PLATE III b

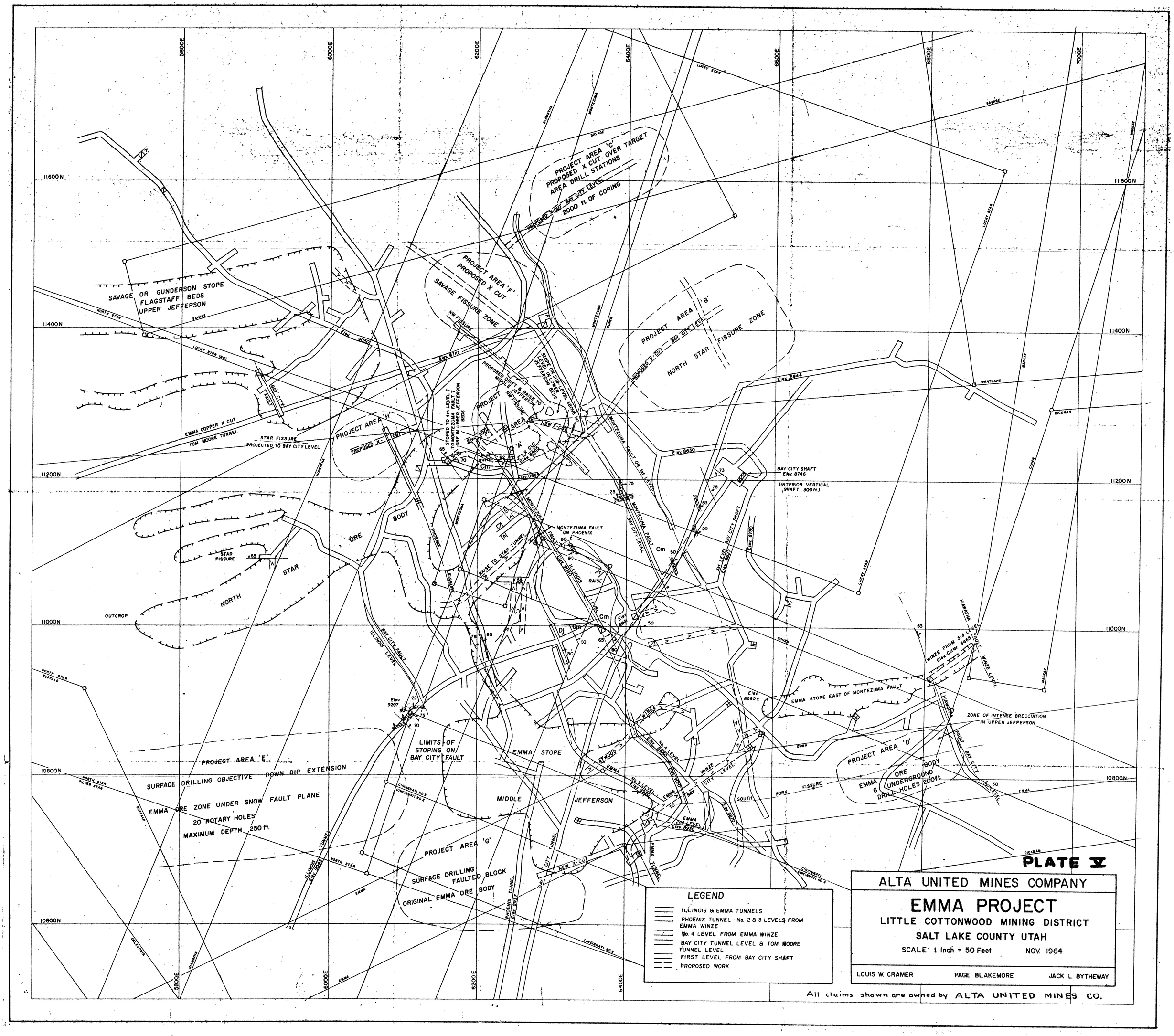
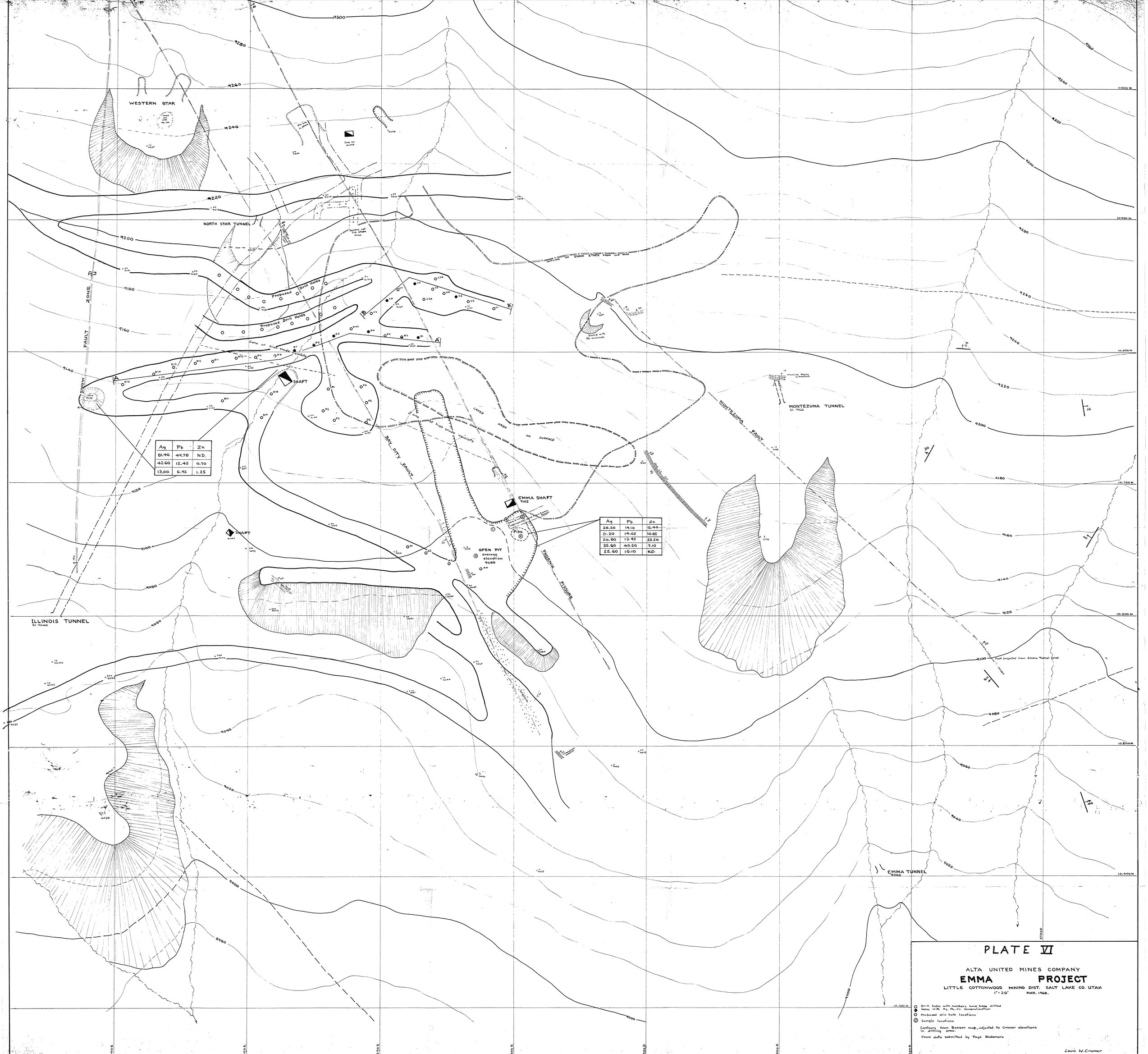


PLATE V
ALTA UNITED MINES COMPANY
EMMA PROJECT
LITTLE COTTONWOOD MINING DISTRICT
SALT LAKE COUNTY UTAH
SCALE: 1 Inch = 50 Feet
NOV. 1964
LOUIS W. CRAMER
PAGE BLAKEMORE
JACK L. BYTHEWAY
All claims shown are owned by ALTA UNITED MINES CO.
LEGEND
ILLINOIS & EMMA TUNNELS
PHOENIX TUNNEL - No. 2 & 3 LEVELS FROM EMMA WINZE
No. 4 LEVEL FROM EMMA WINZE
BAY CITY TUNNEL LEVEL & TOM MOORE TUNNEL LEVEL
FIRST LEVEL FROM BAY CITY SHAFT
PROPOSED WORK
PROJECT AREA 'C'
PROPOSED X CUT OVER TARGET AREA DRILL STATIONS
2000 ft OF CORING
PROJECT AREA 'F'
PROPOSED X CUT
SAVAGE FISSURE ZONE
PROJECT AREA 'B'
NORTH STAR FISSURE ZONE
SAVAGE OR GUNDERSON STOPE
FLAGSTAFF BEDS
UPPER JEFFERSON
PROJECT AREA 'H'
PROPOSED X-CUT
EMMA COPPER X CUT
TOM MOORE TUNNEL
STAR FISSURE
PROJECTED TO BAY CITY LEVEL
STOPED TO 4th LEVEL ? TO MONTEZUMA FAULT ? ORE IN UPPER JEFFERSON BEDS
PROPOSED DRIFT & RAISE TO MIDDLE JEFFERSON
STOPE ON SUB LEVEL ABOVE 'H' LEVEL IN LOWER JEFFERSON BEDS
PROJECT AREA 'A'
NEW X CUT
MONTEZUMA FAULT ON 8th LEVEL
BAY CITY SHAFT Elev. 8746
(INTERIOR VERTICAL SHAFT 300 ft.)
BAY CITY LEVEL
MONTEZUMA FAULT ON PHOENIX
RAISE TO STAR TUNNEL
ILLINOIS LEVEL
BAY CITY FAULT
STAR FISSURE
NORTH STAR ORE BODY
OUTCROP
LIMITS OF STOPING ON BAY CITY FAULT
EMMA STOPE
MIDDLE JEFFERSON
EMMA STOPE EAST OF MONTEZUMA FAULT
ZONE OF INTENSE BRECCIATION IN UPPER JEFFERSON
WINZE FROM 3rd LEVEL Elev. Colar 8465
WINZE LEVEL
PROJECT AREA 'D'
EMMA ORE BODY
6 UNDERGROUND DRILL HOLES 200 ft
PROJECT AREA 'E'
SURFACE DRILLING OBJECTIVE
DOWN DIP EXTENSION
EMMA ORE ZONE UNDER SNOW FAULT PLANE
20 ROTARY HOLES
MAXIMUM DEPTH 250 ft.
PROJECT AREA 'G'
SURFACE DRILLING
FAULTED BLOCK
ORIGINAL EMMA ORE BODY
EMMA TUNNEL
PHOENIX TUNNEL
BAY CITY TUNNEL
ILLINOIS TUNNEL
SOUTH FORK FISSURE
No. 4 LEVEL
No. 3 LEVEL
EMMA 2nd LEVEL
EMMA 1st LEVEL
Elev. 8580 ±
Elev. 9050
Elev. 8710
Elev. 8944
Elev. 8830
Elev. 8865
Elev. 8750
Elev. 9207
Elev. 8937
Elev. 8580
Elev. 8930
Elev. 8935
11600N
11400N
11200N
11000N
10800N
10600N
5800E
6000E
6200E
6400E
6600E
6800E
7000E



Ag	Pb	Zn
81.40	49.78	N.D.
42.60	12.45	0.70
13.00	6.95	1.25

Ag	Pb	Zn
28.20	19.10	12.40
21.20	14.05	10.85
26.80	13.95	22.50
35.60	40.20	7.10
22.60	10.10	N.D.

PLATE VI

ALTA UNITED MINES COMPANY

EMMA PROJECT

LITTLE COTTONWOOD MINING DIST. SALT LAKE CO. UTAH

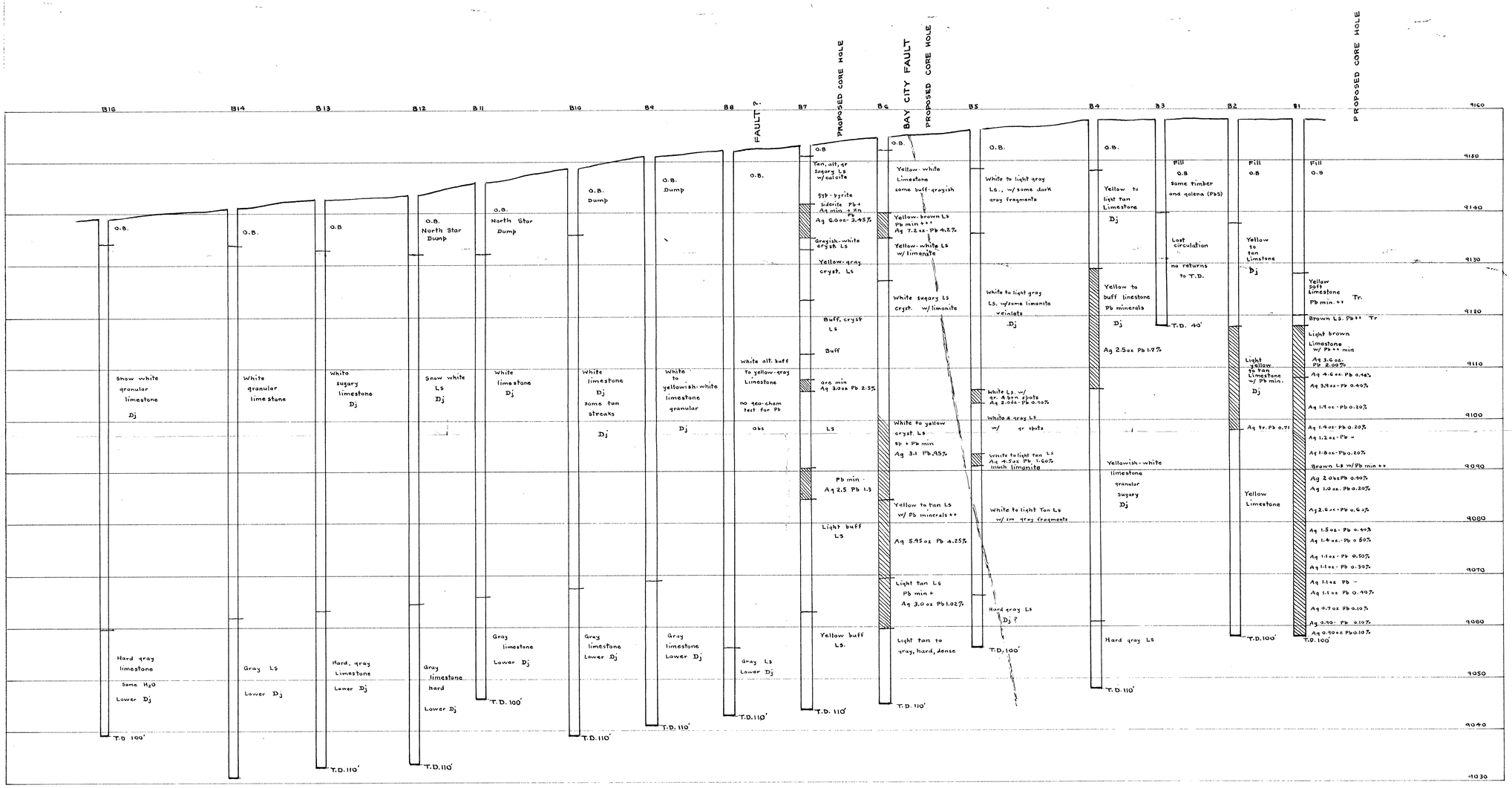
1" = 20' MAR. 1968.

- Drill holes with numbers have been drilled
- Holes with Ag, Pb, Zn mineralization
- Proposed drill hole locations
- Sample locations

Contours from Beeson map, adjusted to Cramer elevations in drilling area.

From data submitted by Page Blakemore

Louis W. Cramer



Silver - Lead mineralization

O.B overburden

Dj Jefferson Formation (Devonian)

PLATE VII

EMMA PROJECT

CROSS SECTION OF DRILL HOLES ALONG LINE A-A'

VERTICAL SCALE 1" = 10'

Logged by Page B. Blakemore

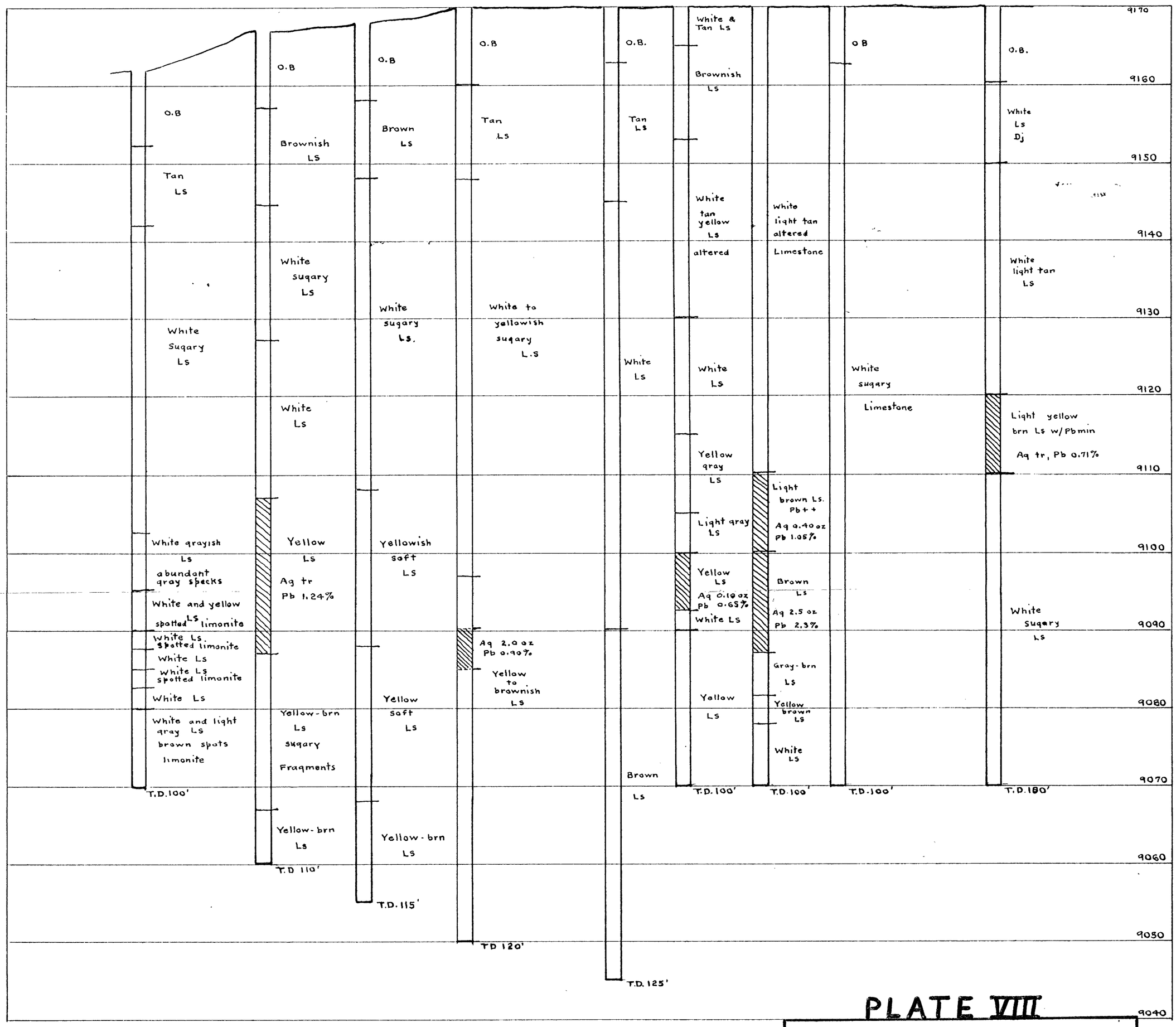


PLATE VIII

Silver - Lead mineralization

O.B Overburden

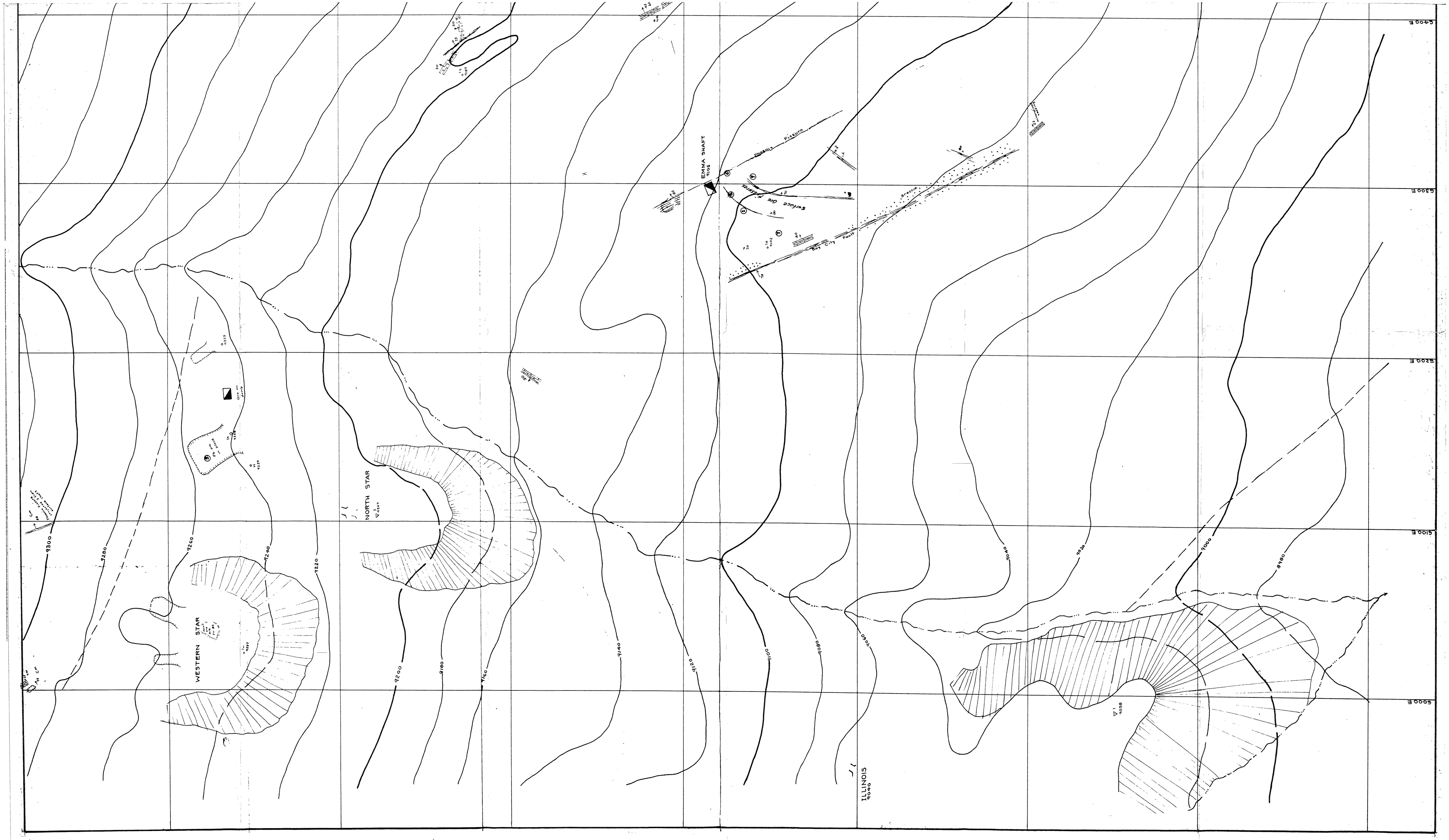
Holes in Jefferson Ls. (Devonian)

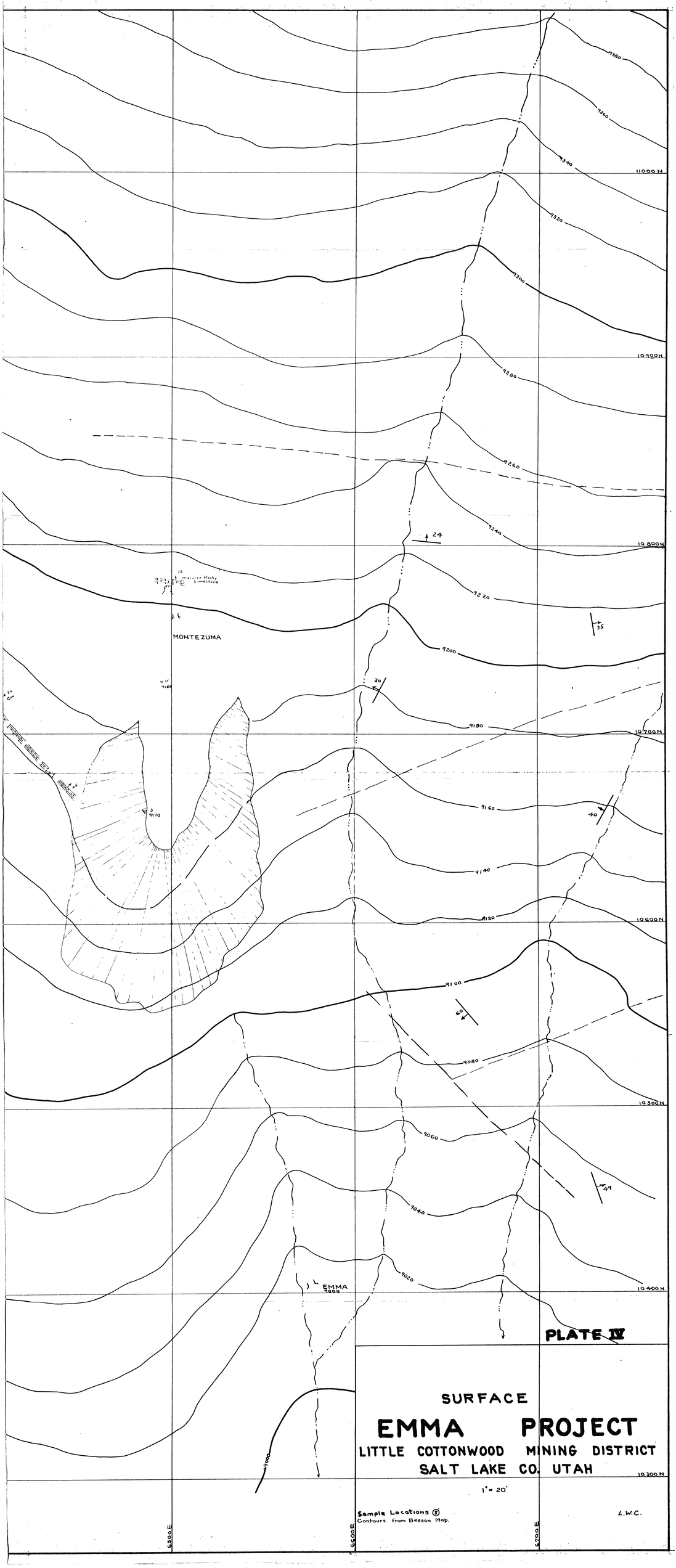
EMMA PROJECT

CROSS SECTION OF DRILL HOLES ALONG LINE B-B'

VERTICAL SCALE 1" = 10'

Logged by Page B. Blakemore


WESTERN STAR
NORTH STAR
ILLINOIS
EMMA SHAFT
Surface Out Crops
Rosebud Pitsburg
Breccia
Bull City Fault
9300
9280
9260
9240
9220
9200
9180
9160
9140
9120
9100
9080
9060
9040
9020
9000
8980
6000 E
6100 E
6200 E
6300 E
6400 E


9380
9360
9340
9320
9300
9280
9260
9240
9220
9200
9180
9160
9140
9120
9100
9080
9060
9040
9020
9000
11000 N
10900 N
10800 N
10700 N
10600 N
10500 N
10400 N
10300 N
6500 E
6600 E
6700 E
24
35
30
40
60
49
MONTEZUMA
massive blocky Limestone
9170
EMMA
PLATE IV
SURFACE
EMMA PROJECT
LITTLE COTTONWOOD MINING DISTRICT
SALT LAKE CO. UTAH
1" = 20'
Sample Locations
Contours from Beeson Map.
L.W.C.

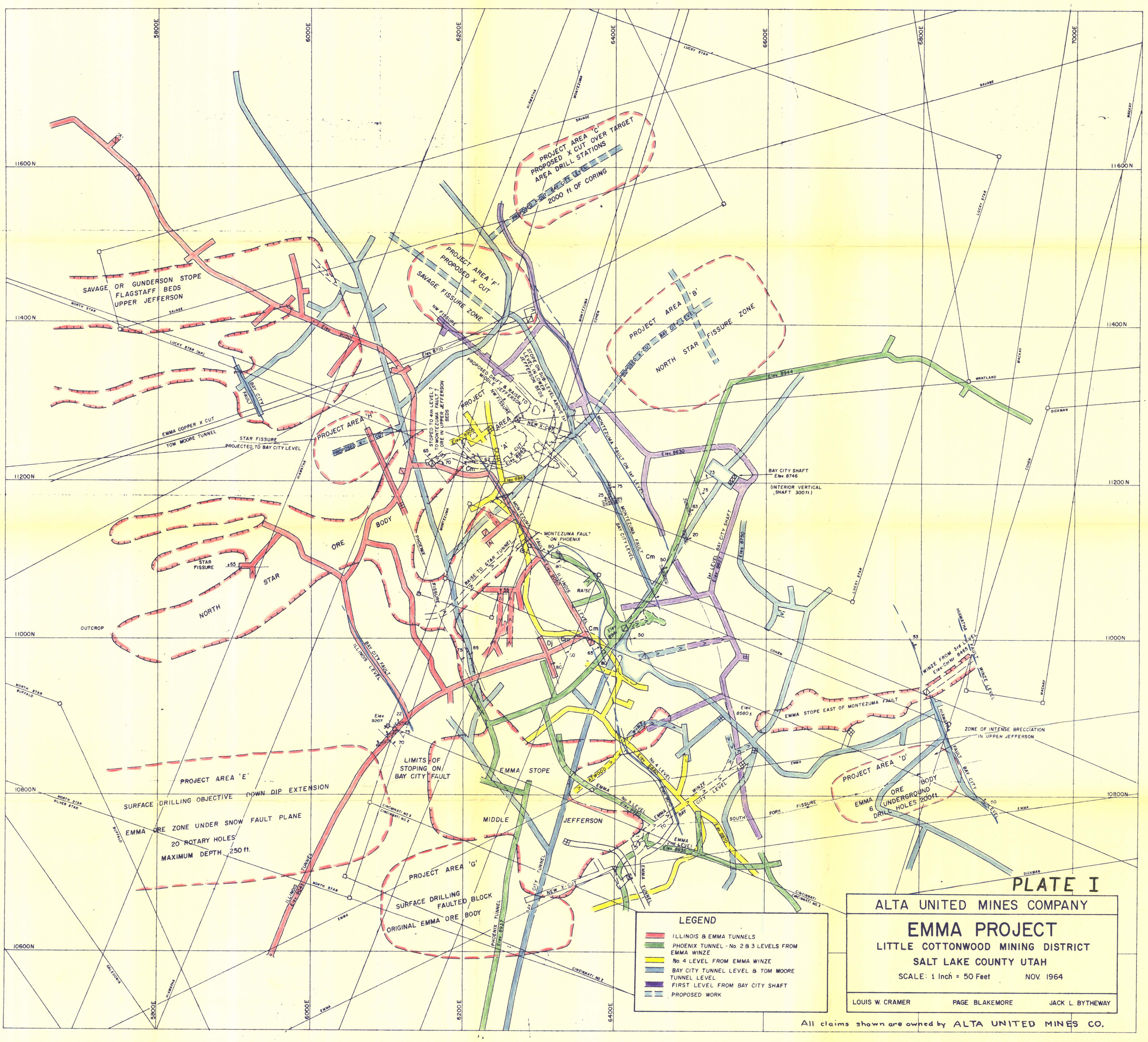


PLATE I
ALTA UNITED MINES COMPANY
EMMA PROJECT
LITTLE COTTONWOOD MINING DISTRICT
SALT LAKE COUNTY UTAH
SCALE: 1 Inch = 50 Feet
NOV. 1964
LOUIS W. CRAMER
PAGE BLAKEMORE
JACK L. BYTHEWAY
All claims shown are owned by ALTA UNITED MINES CO.
LEGEND
ILLINOIS & EMMA TUNNELS
PHOENIX TUNNEL - No. 2 & 3 LEVELS FROM EMMA WINZE
No. 4 LEVEL FROM EMMA WINZE
BAY CITY TUNNEL LEVEL & TOM MOORE TUNNEL LEVEL
FIRST LEVEL FROM BAY CITY SHAFT
PROPOSED WORK
PROJECT AREA 'C'
PROPOSED X CUT OVER TARGET AREA DRILL STATIONS
2000 ft. OF CORING
PROJECT AREA 'F'
PROPOSED X CUT
SAVAGE FISSURE ZONE
PROJECT AREA 'B'
NORTH STAR FISSURE ZONE
SAVAGE OR GUNDERSON STOPE
FLAGSTAFF BEDS
UPPER JEFFERSON
PROJECT AREA 'H'
PROPOSED X-CUT
STAR FISSURE
PROJECTED TO BAY CITY LEVEL
EMMA COPPER X CUT
TOM MOORE TUNNEL
NORTH STAR ORE BODY
STAR FISSURE
OUTCROP
PROJECT AREA 'A'
NEW X-CUT
PROPOSED DRIFT & RAISE TO MIDDLE JEFFERSON
NW FISSURE
STOPE ON SUB-LEVEL ABOVE 1st LEVEL IN LOWER JEFFERSON BEDS
STOPED TO 4th LEVEL TO MONTEZUMA FAULT (ORE IN LOWER JEFFERSON BEDS)
MONTEZUMA FAULT ON 1st LEVEL
MONTEZUMA FAULT ON PHOENIX
RAISE TO STAR TUNNEL
BAY CITY SHAFT
Elev. 8746
(INTERIOR VERTICAL SHAFT 300 ft.)
BAY CITY LEVEL
1st LEVEL BAY CITY SHAFT
ILLINOIS LEVEL
BAY CITY FAULT
LIMITS OF STOPING ON BAY CITY FAULT
EMMA STOPE
MIDDLE JEFFERSON
EMMA STOPE EAST OF MONTEZUMA FAULT
ZONE OF INTENSE BRECCIATION IN UPPER JEFFERSON
WINZE FROM 3rd LEVEL
WINZE LEVEL
PROJECT AREA 'D'
EMMA ORE BODY UNDERGROUND
6 DRILL HOLES 200 ft.
PROJECT AREA 'E'
SURFACE DRILLING OBJECTIVE DOWN DIP EXTENSION
EMMA ORE ZONE UNDER SNOW FAULT PLANE
20 ROTARY HOLES
MAXIMUM DEPTH 250 ft.
PROJECT AREA 'G'
SURFACE DRILLING FAULTED BLOCK
ORIGINAL EMMA ORE BODY
NEW X-CUT
PHOENIX TUNNEL
BAY CITY TUNNEL
EMMA TUNNEL
ILLINOIS TUNNEL
SOUTH FORK FISSURE
WANTLAND
DICKMAN
5800E
6000E
6200E
6400E
6600E
6800E
7000E
11600N
11400N
11200N
11000N
10800N
10600N