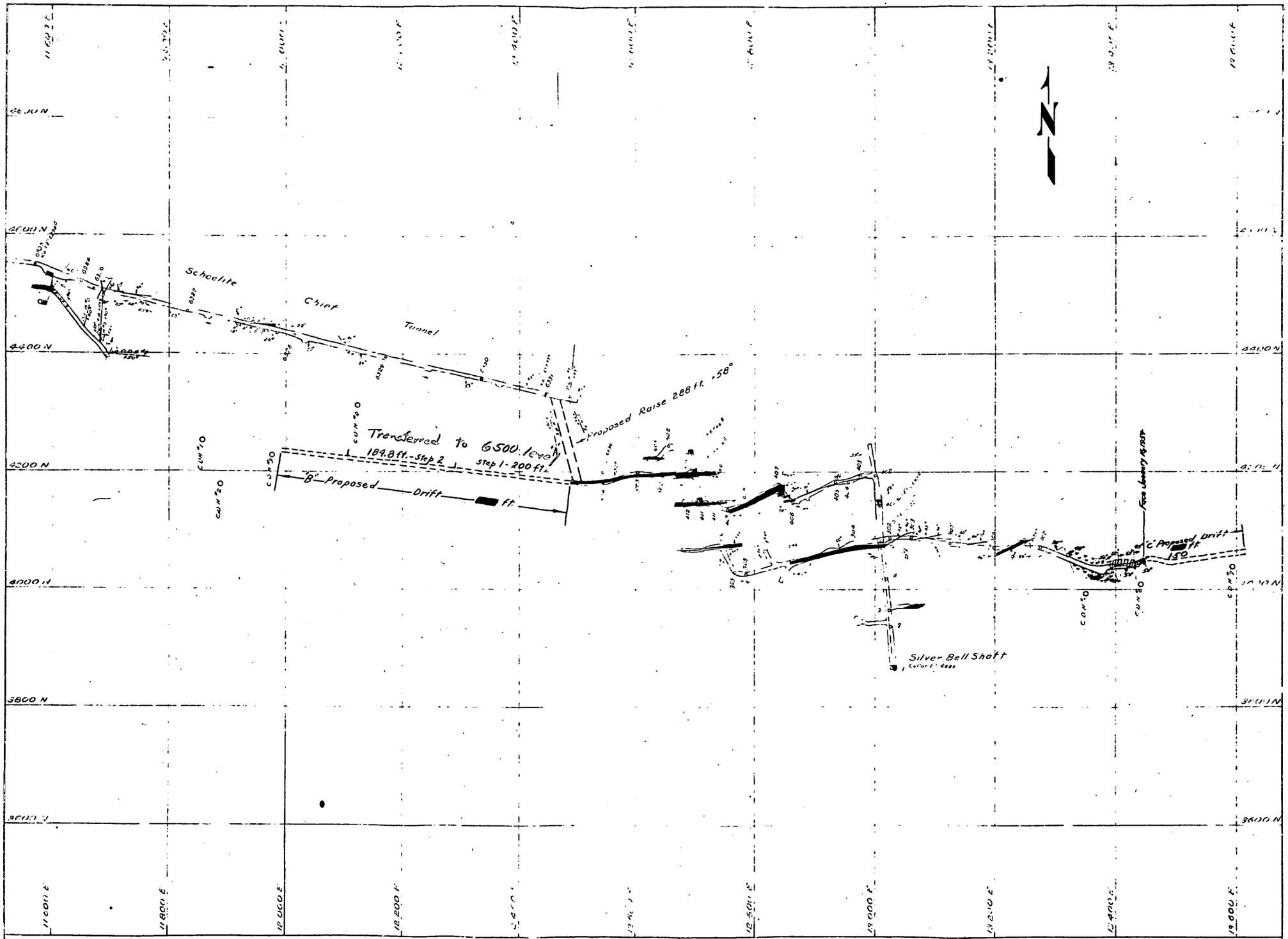
REFERENCES		WORK				
Base Maps D.M. Lemmon U.S.G.S. C-1107		DRAWN Schrader	8-1-54	COMBINED METALS REDUCTION CO. Pioche, Nevada	MINERVA TUNGSTEN PROPERTY EXPLORATION PROPOSALS Scheelite Chief and Silver Bell Mine Areas	SCALE 1" = 100'
		TRACED				B-877
		CHECKED R.G. Lee	8-2-54			
		APPROVED				



E. H. O. E. Schroder 1-14-54
R. H. Godka 1-14-54

COMBINED METALS REDUCTION CO.
MINERVA TUNSTEN PROP
M.I.A. MINES
WHITE PINE CO. NEV.

COMPOSITE SILVER BELL AND EAST END SCHEELITE CHIEF MINE

SCALE 1" = 100'

C-1112

Printed on Imperial Cloth-Salt Lake Blue

APPLICATION FOR PERMIT Serial No. 15381

TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF NEVADA

Date of first receipt and filing in State Engineer's office Nov. 9, 1953
Returned to applicant for correction
Corrected application filed

The undersigned M.I.A. Company (not incorporated)
Name of applicant

of Pioche, County of Lincoln,

State of Nevada, hereby make application for permission to appropriate the public waters of the State of Nevada, as hereinafter stated. (If applicant is a corporation, give date and place of incorporation.)

1. The source of the proposed appropriation is underground source
Name of stream, lake, or other source
(in White Pine County)

2. The amount of water applied for is 0.7 second-feet.
One second-foot equals 40 miners' inches

3. The water to be used for Mining and Domestic use
Irrigation, power, mining, manufacturing, domestic, or other use

4. The water is to be diverted from its source at the following point:
S. 81° 04' W. 580.2 ft. from NE corner of NE¼NW¼ Sec. 29, T. 11 N.,
Describe as being within a 40-acre subdivision of public survey, or by course and distance to a section corner. If on unsurveyed land, it should be so stated.
R. 68 E., M.D.M., White Pine County, Nevada.

IF THE WATER IS TO BE USED FOR IRRIGATION, SUPPLY THE FOLLOWING INFORMATION:

(a) Number of acres to be irrigated is

(b) Description of land to be irrigated
Describe by legal subdivision, or if on unsurveyed land it should be so stated and a description provided in accordance with special instruction from the State Engineer when application is returned for correction.

(c) Use will begin about _____ and end about _____, of each year.
Month Month

IF WATER IS TO BE USED FOR POWER, MINING, STOCK WATERING, OR OTHER USE, SUPPLY THE FOLLOWING INFORMATION

(d) Power to be developed is _____ horsepower.

(e) Place of use SW¼SW¼ Sec. 21, T. 11 N., R. 68 E., M.D.M.
Give location of place of use by legal subdivision

(f) Point of return of water to stream not to be returned.
Describe in same manner as point of diversion

(g) State number and kinds of animals to be watered

(h) Use will begin about Jany. and end about Dec., of each year.
Month Month

(i) Remarks

No._____

Application for Permit to Appropriate Water

STATE OF NEVADA
ENGINEER'S OFFICE

Filed.....

Applicant.....

.....

P. O. Address.....

.....

Form 1b 2M—9-53

469

INSTRUCTIONS TO APPLICANTS

Application should be made out in detail on the form prescribed by the State Engineer.

Applications should be typewritten or filled out with ink.

An application is not a permit to appropriate water until after its approval by the State Engineer. Under a permit, the consent of the State is given, in a manner provided by law, to acquire a water right and gives the permitee an inchoate right which will ripen into a legal and complete appropriation, only upon completion of the works of diversion and the placing of the water to beneficial use, and the filing of proofs thereto, together with such maps as may be required. Upon approval (or rejection) of any application, a copy of the original application with such approval, or rejection, endorsed thereon, will be returned to the applicant. The terms of the permit will show on the endorsement, and be a guide for the applicant.

The following rules should be complied with in making application:

Under Question No. 1—Where the source of the water desired is from more than one stream, lake, spring, underground, or other body of water, separate applications must be made out for each source; *provided, however*, that when the numerous sources have their confluence above the point of diversion one application will serve to appropriate the water, by giving the name of the main stream at the point of diversion. The application should state the name of the stream, including its tributaries.

Under Question No. 2—The amount of water applied for should be limited to the amount that can be put to beneficial use. The statute provides that the State Engineer in determining the amount of water to be granted in any permit shall take into consideration the irrigation requirements in the section of the State in which the appropriation is to be made. Therefore, the applicant in answer to this question should base the amount on what he believes will be necessary, and if possible in addition to the continuous flow required in cubic feet per second, give the duty of water in acre-feet per acre per irrigation season.

Under Question No. 3—Ordinarily only one use of water can be named in each application. If domestic purposes is included, however, two uses can be named. For instance, if the application stated "For Irrigation and Domestic Purposes" it shall be allowed; but if "Power and Irrigation" are named in one application, it shall not be allowed, but the application will be returned for correction.

Under Question No. 4—The point of diversion is one of vital importance in the application, as upon the location of the point of diversion depends the question of interferences with prior rights. The point of diversion must be described as being within a forty-acre legal subdivision, or if on unsurveyed lands, a course and distance should be given to the nearest legal subdivision corner and also the approximate forty-acre legal subdivision the point would lie within if public lands surveys were projected on the unsurveyed area. The actual location of the point of diversion can later be shown on an amended application following a survey. In all cases a map of a survey made by a licensed State Water Right Surveyor must be filed in support of said application, prior to its publication, and must show a tie by course and distance to a legal subdivision corner, or in the event a corner cannot be located within a distance of six miles, the tie must be to a definite and well-known fixed monument or object approved by the State Engineer.

Except under special conditions, there shall be accepted only one point of diversion in each application, for the reason that an entire stream could be covered by one application if more than one point of diversion were permitted to be named in each filing. In cases where the diversions, if there be more than one, are on the same forty-acre tract, and are required to economically handle the water, the application for more than one point of diversion will be considered.

Under Question No. 4(a)—The total number of acres of land should be stated with reasonable accuracy. The quantity of water allowed in the permit, endorsed thereon by the State Engineer, is determined by the number of acres to be irrigated, the duty of water, as well as the amount of unappropriated water in the stream.

Under Question No. 4(b)—There should be given a description of the land to be irrigated by legal subdivisions. In the event that the land proposed to be irrigated is unsurveyed, then give the approximate location of such land, together with the township and range wherein such land is situated.

Under Question No. 4(c)—Give the time when the use of water for irrigation purposes will begin, and also when it will end.

Under Question No. 4(d)—If the application is for power purposes, give the theoretical horsepower to be developed, and the vertical head under which the power is to be developed.

Under Question No. 4(e)—If application for power or stock watering purposes, give a description of the location of the proposed place of use, by legal subdivisions, or tie by course and distance to a section corner, as required in answer to Question 4 above.

Under Question No. 4(f)—Where water applied for is to be returned to the stream, give a description of the proposed point of return, as described in answer to Question 4 above.

Under Question No. 4(g)—State number and kinds of animals to be watered at place of use.

Under Question No. 4(h)—Give time when use of water for stock watering purposes will begin and when it will end.

Under Description of Proposed Works—Under description of proposed works, state by what means the water is to be diverted from the stream, whether by dams, ditches, pipe lines or other conduit. Give the size of such ditches, pipe lines, etc., and the proposed grade that each will have from the point of diversion, to enable this office to determine the capacity of each. The size of the ditch should be consistent with the amount of water applied for under Question No. 2.

If the water is to be stored in a reservoir, give its location with reference to the legal subdivision or subdivisions. If the reservoir, or ditch, is to be located on unsurveyed lands, the rules and regulations of the Department of the Interior should be followed precisely. Such rules and regulations are embodied in a pamphlet furnished by the Department of the Interior, called "Regulations Concerning Right of Way Over Public Lands and Reservations for Canals, Ditches, and Reservoirs," approved by the Secretary of the Interior, June 6, 1908. The maps and field notes of such reservoir should conform strictly with these regulations and a copy filed with the office of the State Engineer.

The application shall bear the signature of the applicant, his agent or attorney.

FEES

The following fees shall be collected by the State Engineer in advance, and shall be accounted for and paid by him into the General Fund of the State Treasury once each month; *provided*, that ten dollars ($10) shall be the minimum fee for issuing and recording any permit;

(a) For examining and filing an application for permit to appropriate water, twenty-five dollars ($25), which shall include the cost of publication, which publication fee is hereby fixed at fifteen dollars ($15).

(b) For examining and filing an application for permit to change the point of diversion, manner of use, or place of use, thirty dollars ($30), which shall include the cost of permit should the same issue thereunder, and the cost of publication of such application.

(c) For issuing and recording a permit to appropriate water for irrigation purposes, ten cents per acre for each acre to be irrigated, up to and including one hundred acres; and five cents for each acre in excess of one hundred acres, up to and including one thousand acres; and three cents for each acre in excess of one thousand acres.

(d) For issuing and recording permit for power purposes, five cents for each theoretical horsepower to be developed; and for issuing final certificate under permit for power purposes, twenty-five cents for each theoretical horsepower to be developed up to and including one hundred horsepower; and twenty cents for each horsepower in excess of one hundred horsepower up to and including one thousand horsepower; and fifteen cents for each horsepower in excess of one thousand.

(e) For issuing and recording permit to store water, twenty-five dollars ($25), and for issuing final certificate under permit to store water, five cents for each acre-foot of water stored up to and including one thousand acre-feet; and three cents for each acre-foot in excess of one thousand.

(f) For issuing and recording permit to appropriate water for any other purpose, $10 for each second foot of water applied for, or fraction thereof.

(g) For filing secondary permit under reservoir permit, $5; for approving and recording permit under reservoir permit, $5.

(h) For filing proof of commencement of work, $1.

(i) For filing proof of completion of work, under any permit, $1.

(j) For filing any protest, $10; for filing application for extension of time for filing proofs, $5; for filing any assignment of water right deed, $1 for each water right assigned; and for filing any other instrument, $1.

DESCRIPTION OF PROPOSED WORKS

Well drilled and cased to depth of about 365 ft., pump and motor

State manner in which water is to be diverted, whether by dam or other works, whether through pipes, ditches, flumes, or other conduits. If water

to be installed, and water piped about 3800 ft. to 7,000 gal.

is to be stored in reservoirs, it should be so stated and the location of the reservoir should be given with reference to the legal subdivisions.

galvanized iron storage tank.

5. Estimated cost of works $6,500.00

6. Estimated time required to construct works 6 months

7. Remarks

For use of applicant

M.I.A. Company, Applicant.

By s/A. L. Scott Attorney
Tioche, Nevada

Compared

This sheet inspected

, Engineer.

OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, and not to exceed cubic feet per second.

Actual construction work shall begin on or before

Proof of commencement of work shall be filed before

Work must be prosecuted with reasonable diligence and be completed on or before

Proof of completion of work shall be filed before

Application of water to beneficial use shall be made on or before . Proof of the application of water to beneficial use must be filed with State Engineer on or before

WITNESS MY HAND AND SEAL this day of ,

State Engineer.

STATE OF NEVADA—STATE ENGINEER'S OFFICE

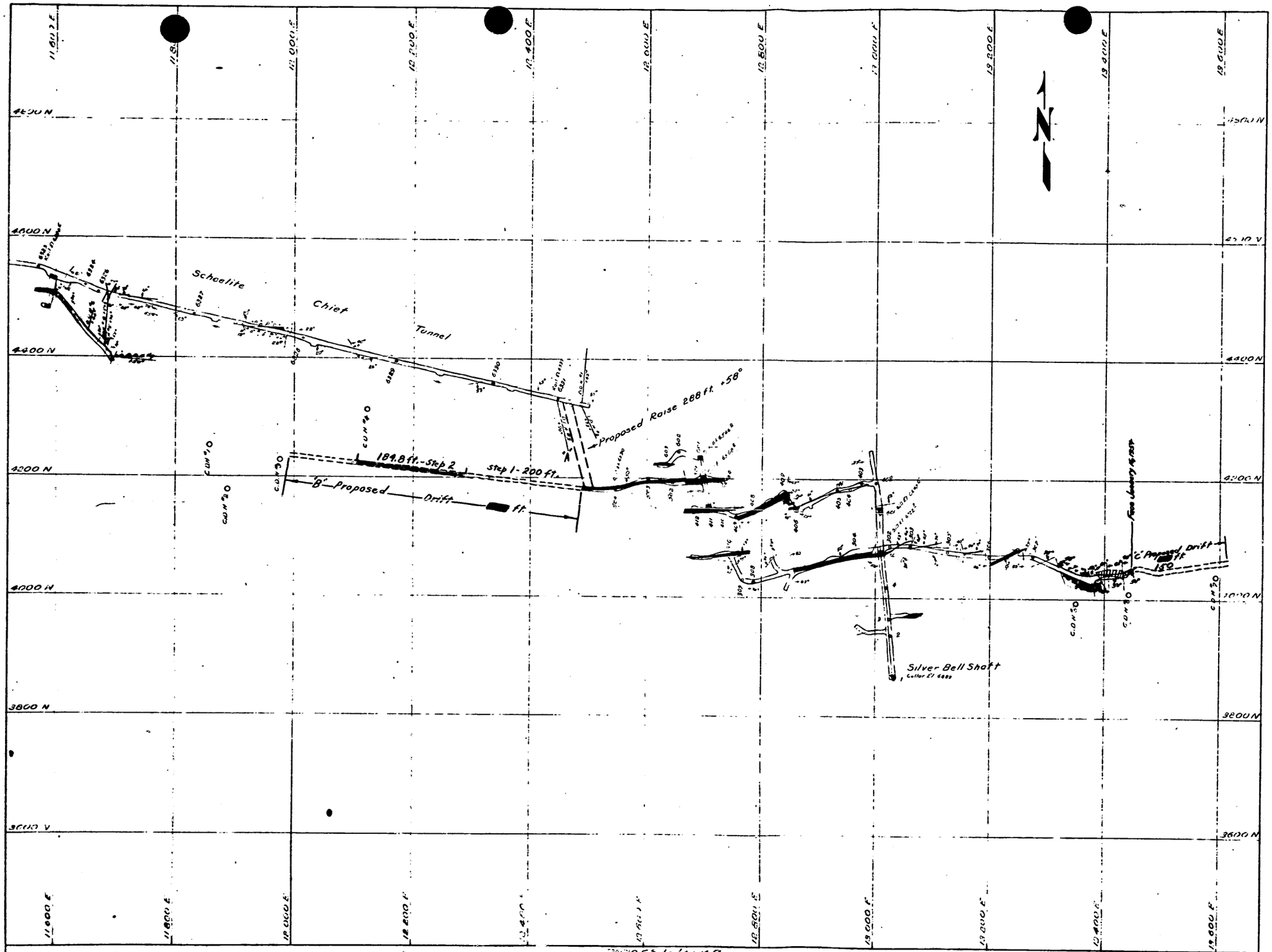
I, F. N. DONDERO, Deputy, State Engineer of the State of Nevada, duly appointed and qualified, having charge of the records and files of the office of the State Engineer, do hereby certify that the foregoing is a full, complete and true copy of an Application No. 15381 to appropriate water from an underground source in the name of M.I.A. Company

, filed in said office on the 9th day of November, A. D. 1953, as appears by the records and files of the office of the State Engineer of Nevada, and nothing more or less.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at the City of Carson, State of Nevada, this 29th day of March, A. D. 1954.

F N Dondero

406



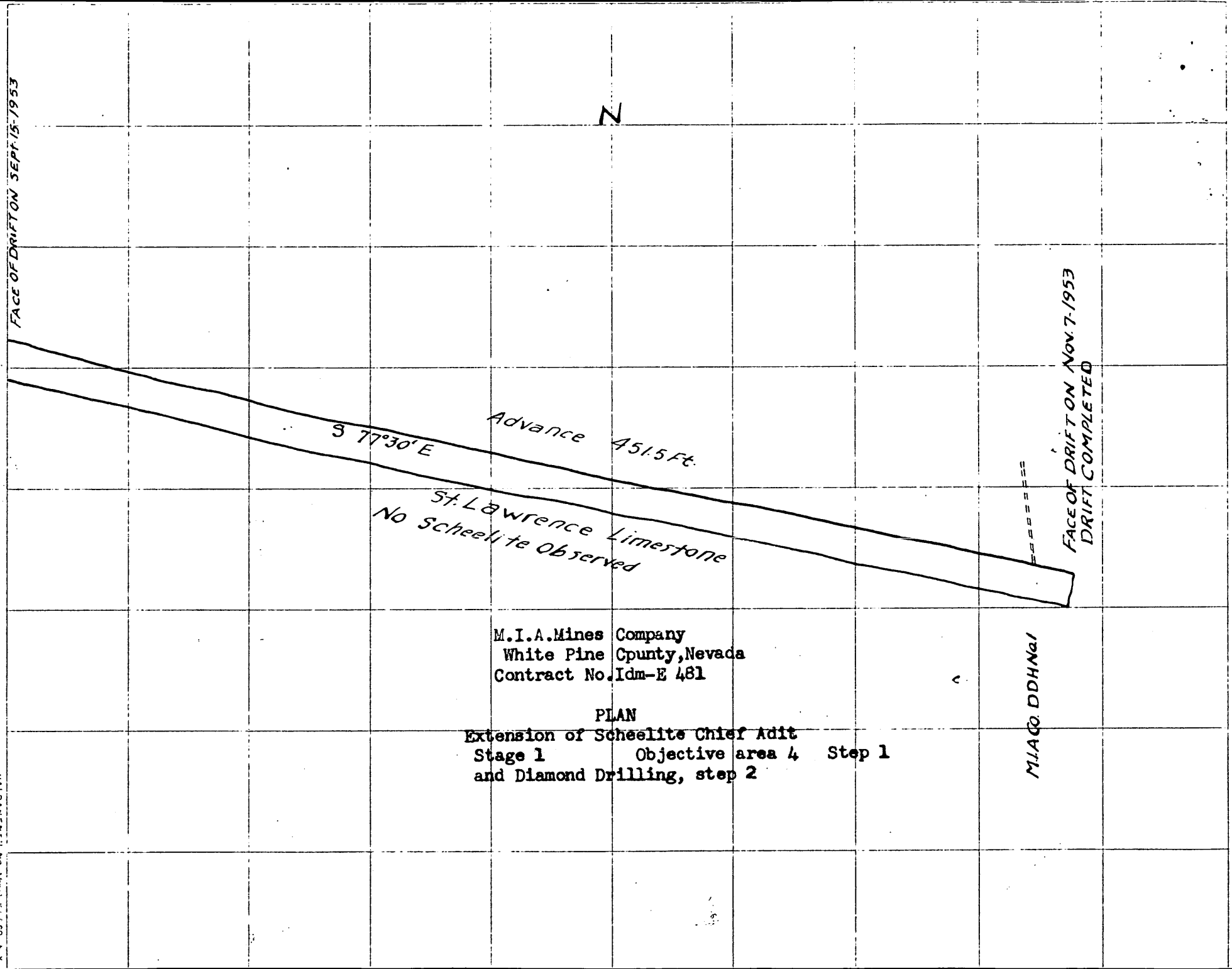
COMBINED METALS REDUCTION CO.
MINERVA TUNSTEN PROP
M.I.A. MINES
WHITE PINE CO. NEV.

COMPOSITE SILVER BELL AND EAST END SCHEELITE CHIEF MINE

SCALE 1" = 200'

C-1112

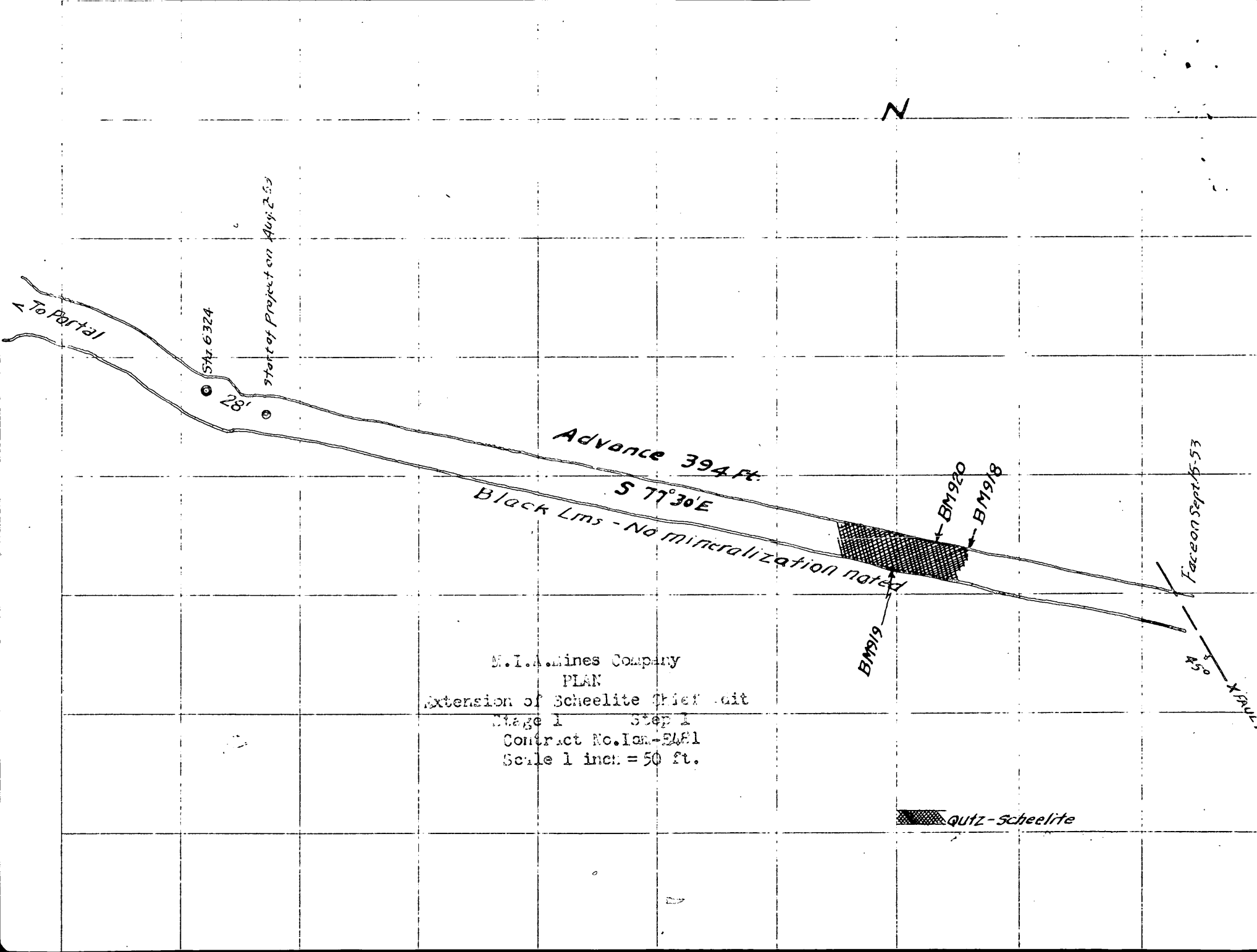
E Schrader 1-14-54
R H Godbe 1-14-54



M.I.A.Mines Company
White Pine Cpunty,Nevada
Contract No.Idm-E 481

PLAN
Extension of Scheelite Chief Adit
Stage 1 Objective area 4 Step 1
and Diamond Drilling, step 2

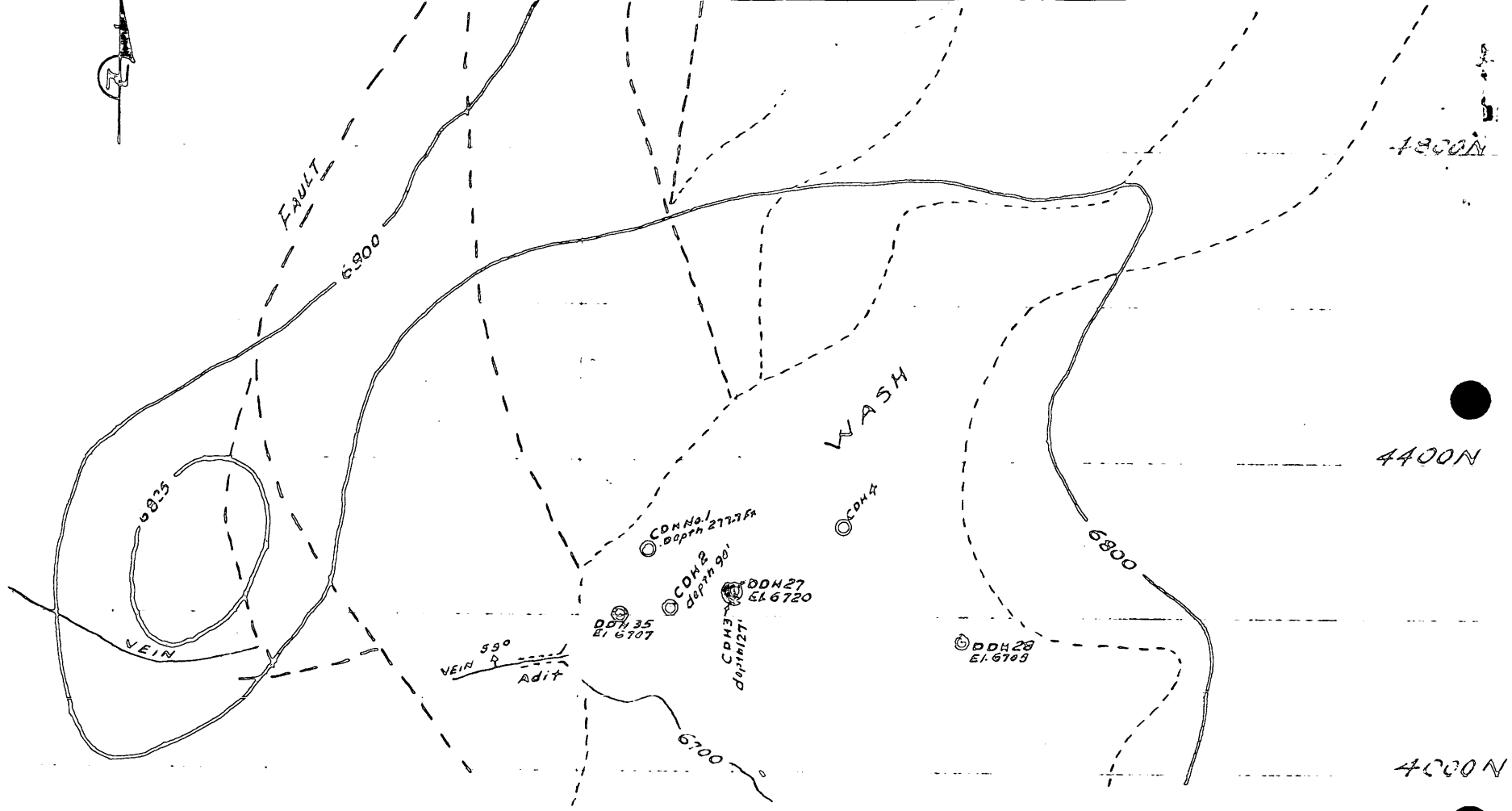
"ALBANENE" NO. 1904 K&E CO., N.Y.
REG. U.S. PAT. OFF.



M.I.A. Mines Company
PLAN
Extension of Scheelite Thief Adit
Stage 1 Step 1
Contract No. Ian-5481
Scale 1 inch = 50 ft.

N
Sta 6324
56'
Face on Sept. 15-53
Start of Project
Intermediate Road
Chu
to Smokeway
Route
to Portal

To Portal
Sta. 6324
Start of Project on Aug. 2, 53
Advance 394 ft.
S 77°30'E
Black Lms - No mineralization noted
Face on Sept. 5, 53
N



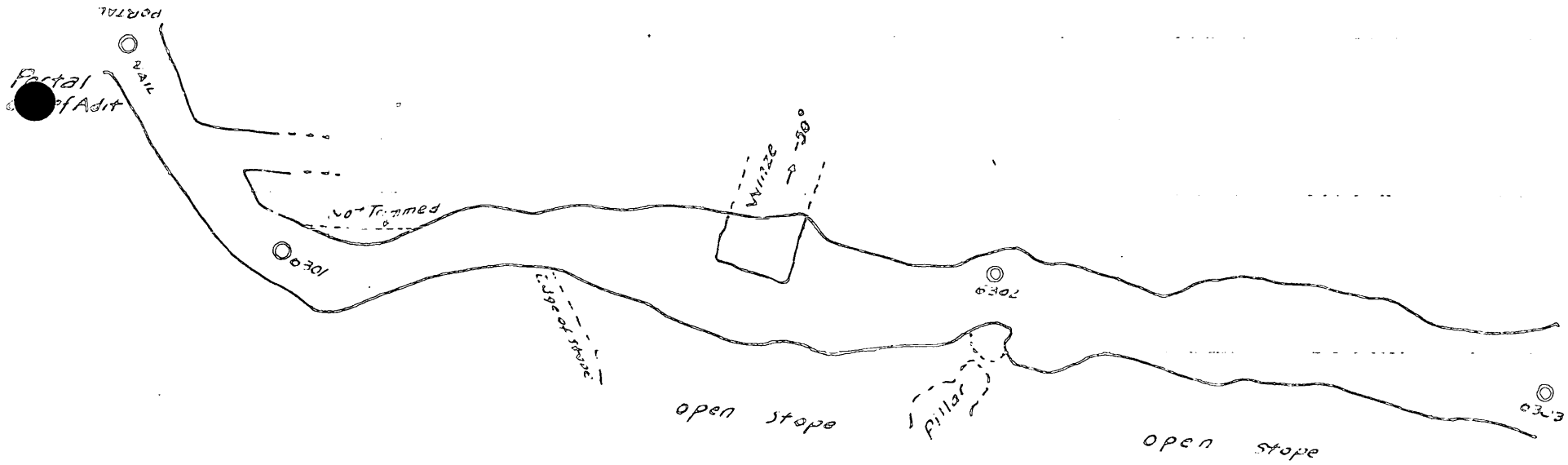
M.I.A. MINES CO.

MINERVA TUNGSTEN MINE

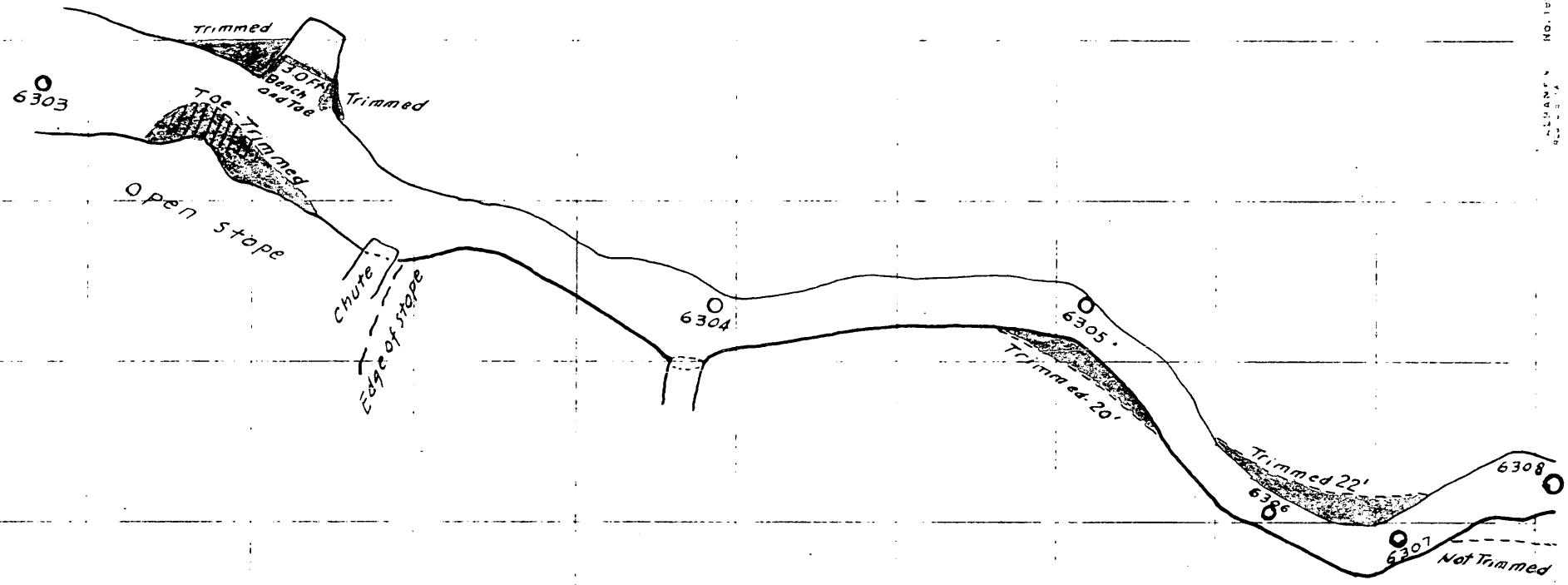
WHITE PINE COUNTY, NEVADA

PLAN: LOCATION OF CHURN DRILL HOLES

Scale: 1" = 200'



MIA MINES Co.
PLAN - SCHEELITE CHIEF ADIT
CONTRACT IDM-E481
RED = ADIT TRIM - PAGES 1 TO 8, INCL.
Scale 1" = 20'



Trimming Completed

Photographed & Transcribed

M.I.A.
2688

Bureau of Mines
Report of Investigations 4648

INVESTIGATION OF TUNGSTEN METALS CORP. DEPOSITS (MINERVA MINING DISTRICT) WHITE PINE COUNTY, NEV.

BY E. W. NEWMAN, ROBERT W. GEEHAN, AND RUSSELL R. TRENGOVE

United States Department of the Interior ——— March 1950

INVESTIGATION OF TUNGSTEN METALS CORP. DEPOSITS (MINERVA MINING DISTRICT) WHITE PINE COUNTY, NEV.

BY E. W. NEWMAN, ROBERT W. GEEHAN, AND RUSSELL R. TRENGOVE

* * * * * * * * * **Report of Investigations 4648**

UNITED STATES DEPARTMENT OF THE INTERIOR
Oscar L. Chapman, Secretary
BUREAU OF MINES
James Boyd, Director

The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Report of Investigations 4648."

March 1950

INVESTIGATION OF TUNGSTEN METALS CORP. DEPOSITS, (MINERVA MINING DISTRICT), WHITE PINE COUNTY, NEV.

by

E. W. Newman,[1] Robert W. Geehan,[1]
and Russell R. Trengove[1]

CONTENTS

	Page
Introduction and summary	2
Acknowledgments	2
Location and physical features	3
Property and ownership	3
History and production	3
Labor and living conditions	4
Geologic summary	5
Work performed by Bureau of Mines in 1940 and 1941	7
Mining methods	11
Milling methods	12

ILLUSTRATIONS

Fig.		Follows page
1.	Location map	2
2.	Base map	2
3.	Sample map of outcrops	6
4.	Drill-hole sections showing geology and sample analyses, East Everit mine (holes 3-7, 22, 23, and 30)	6
5.	Drill-hole sections showing geology and sample analyses, East and West Everit mines (holes 1, 2, 8, 9, and 36)	6
6.	Drill-hole sections showing geology and sample analyses, Scheelite Chief mine (holes 10, 11, 25, 26, 29, 30, and 31)	6
7.	Drill-hole sections showing geology and sample analyses, Scheelite Chief mine (holes 12, 13, 14, 14-A, 15, 15-A, and 37)	6
8.	Drill-hole sections showing geology and sample analyses, Scheelite Chief mine (holes 17-A, 18, 19, 20, 27, 28, and 35)	6
9.	Drill-hole sections showing geology, East Everit vein (holes 39, 41, 41-A, 45, and 47)	6
10.	Drill-hole sections showing geology and sample analyses, Silver Bell mine (holes 17-A, 49, 51, and 53)	6
11.	Mill flow sheet	12

1/ Mining engineers, Reno Branch, Mining Division.

Report of Investigations 4648

INTRODUCTION AND SUMMARY

The Bureau of Mines, in cooperation with the U. S. Geological Survey, developed the property of the Tungsten Metals Corp. by surface trenching and diamond drilling from November 1940 to June 1941 and from August 1943 to December 1943. The purpose of the work was to determine possible reserves of tungsten in the downward extension and lateral eastern extension of three major tungsten-bearing quartz veins.

The property is 50 miles south of Ely, White Pine County, Nev., in the Minerva Mining District. Tungsten ore was discovered in the district in 1915, and mining started in 1916. The tungsten ore bodies occur as shoots in quartz veins that occur along faults in limestone. With the exception of a small-scale leasing operation in 1932, the property was idle from 1919 until 1936, when Tungsten Metals Corp. was organized to acquire the mines. Production ceased in May 1945, and the mines were idle until leased in 1947.

Development by the Bureau of Mines during 1940 and 1941 consisted of surface trenching, sampling, and diamond drilling 37 holes for a total of 6,959 feet. Subsequent drilling of eight holes, totaling 3,067 feet, in 1943 disclosed additional reserves.

This report sets forth in considerable detail the exploration work completed by the Bureau and briefly describes the mining and milling methods employed. Diamond-drill hole logs and sample analyses are shown graphically in the illustrations that accompany the report.

ACKNOWLEDGMENTS

The first section of the development work was started and completed under the direction of the late Charles F. Jackson, then chief of the Mining Division, and E. D. Gardner, formerly supervising engineer for the Western States. Analytical work was done under the direction of the late E. S. Leaver, of the Metallurgical Division of the Bureau of Mines.

Acknowledgment is also due Dwight M. Lemmon, of the U. S. Geological Survey, for cooperation in planning the drilling program and advising on all geological problems. As the area is complexly faulted, this assistance was particularly helpful.

Acknowledgment is also made to Paul Sirkegian and Al O'Connell, of the Tungsten Metals Corp., for cooperation in arranging to supply board and room for the project employees and drill crews and other valued services that did so much to expedite the Bureau's work.

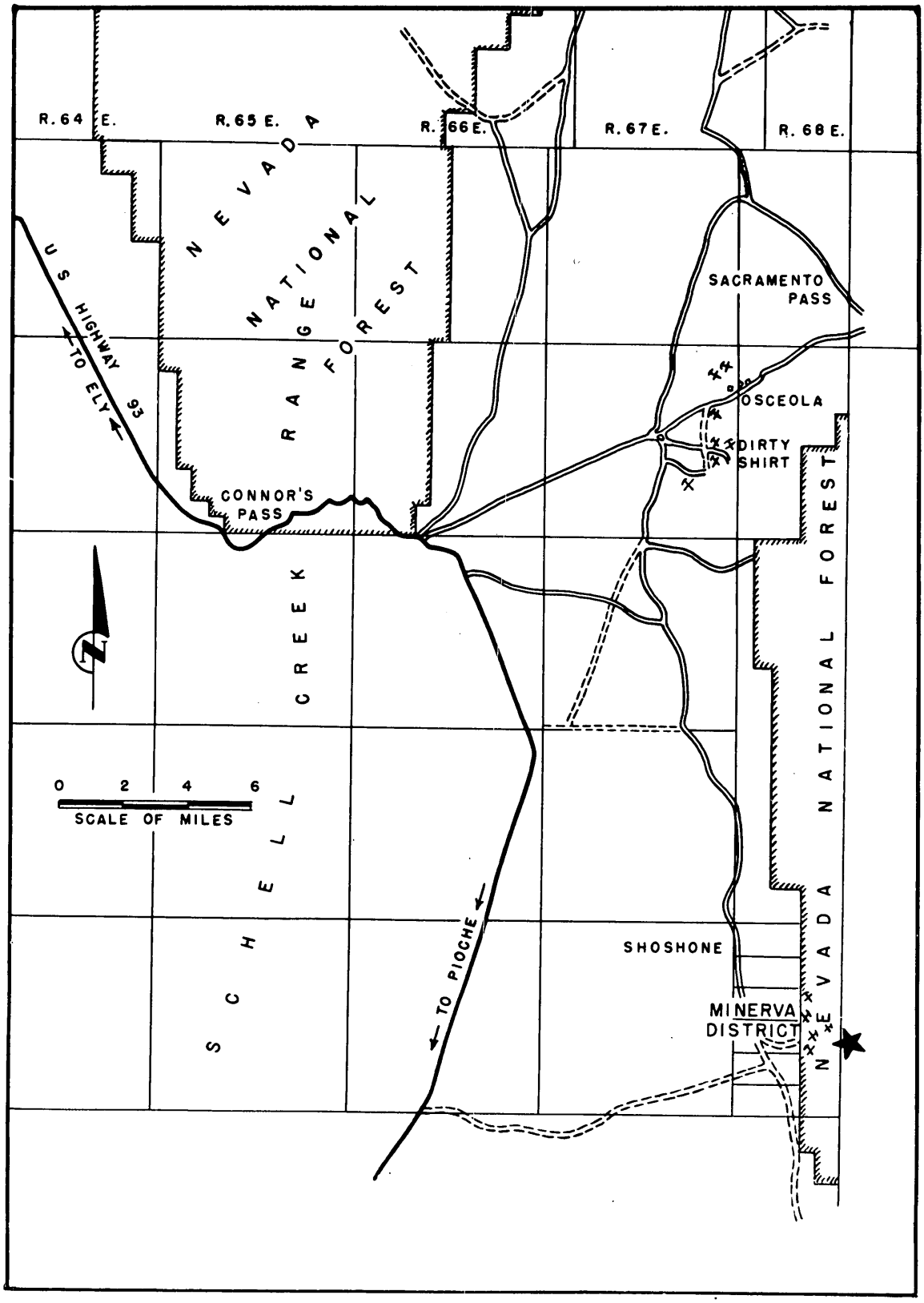
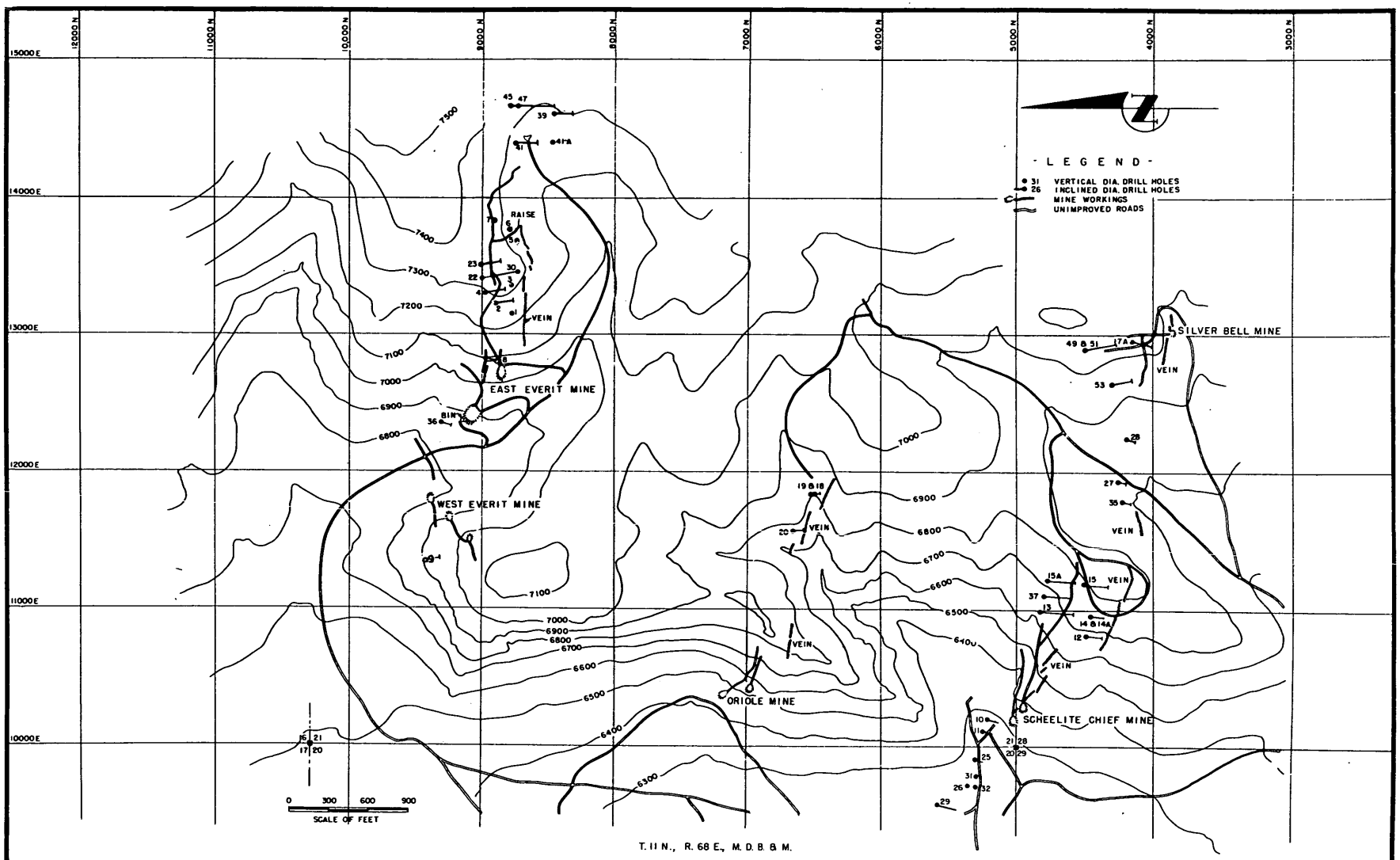


Figure 1. - Location map.



Topography by Dwight M. Lemmon and Donald Wyant, U. S. Geological Survey

Figure 2. - Base map.

This report was prepared under the supervision of A. C. Johnson, chief, Reno Branch, Mining Division.

LOCATION AND PHYSICAL FEATURES

Figure 1 shows the location of the Tungsten Metals Corp. property. The claims of the corporation that were investigated are in the Minerva Mining District in secs. 16, 20, 21, and 28, T. 11 N., R. 68 E., Mount Diablo base line and meridian, in the southeastern portion of White Pine County, Nev. The Minerva mill and camp are 1 mile south of Shoshone post office; the mines are 4 to 6 miles southeast of the mill. Ely, Nev., the nearest source of supplies, is served by the Nevada Northern Railroad, several truck lines, and three bus lines. To reach Minerva from Ely, drive south on U. S. Highway 93 for 35 miles, turn to the left on a gravel road, and proceed 15 miles to the camp.

The Minerva mill and camp are in Spring Valley, a typical Nevada sagebrush flat. The mines are in a very rugged area, with high cliffs cut by deep creek valleys, in the western foothills of the Snake range. Altitudes of the mine workings range from 6,260 to 7,200 feet. The camp and mill are at an altitude of 6,000 feet.

An ample supply of water for use in camp, mine, and mill is obtained from a spring near the mill. This water is piped to the camp and mill and is hauled to the mines by tank truck.

The climate is moderate. Summers are hot and dry, with only an occasional rain shower; winters are severe, with occasional heavy snow and subzero days. No timber suitable for mine use is found in the district. Near the mines, a good stand of pinon pine and juniper breaks the monotony of the sagebrush, so prevalent in the flats around the camp.

PROPERTY AND OWNERSHIP

In 1943 the Tungsten Metals Corp. had five mines in the district (see fig. 2) - the East Everit, West Everit, Oriole, Silver Bell, and Scheelite Chief.

HISTORY AND PRODUCTION

The following paragraph on the early history of the district is quoted from "Mining Districts and Mineral Resources of Nevada."2/

> In 1869, an Indian showed the Indian silver mine to white miners, and the Shoshone District was organized. Some rich chloride ore was found, but the mines did not prove profitable, and the district was abandoned about 1876. The St. Lawrence mine produced in 1911. Tungsten ore was discovered in the

2/ Lincoln, Francis Church, Mining Districts and Mineral Resources of Nevada: Nevada State Bureau of Mines, 1923.

district in 1915 and was mined in 1916. In 1918, the Minerva Tungsten Corp. was incorporated and equipped with a 150-ton concentrating mill.

The more recent history is covered by the following quotation from an unpublished report of the U. S. Geological Survey:[3]

> A 150-ton mill was completed in 1918 shortly before the price of tungsten fell below production cost. Production for this period is thought to have been about $100,000 worth of concentrate valued at the high price then prevailing. With the exception of a small-scale leasing operation in 1932, the property was idle until 1936, when Tungsten Metals Corp. was organized to take over the mines. A 75-ton mill was built in 1938, and four mines have since been developed - the Scheelite Chief, Oriole, West Everit, and East Everit. Production (through January 1943) from these mines has been 70,020 units of WO_3, which sold for about $1,250,000. Elsewhere in the district, the Hilltop, Tony, Canary Yellow, and Zigzag mines have yielded about 2,000 units of WO_3, making a total district production of about 72,000 units valued at $1,300,000.

Mining operations ceased in May 1945 and remained idle until Robert Stopper started operations on the property in the spring of 1947. No production records for 1947 are available.

Production from the mines of Tungsten Metals Corp. from 1936 to 1945, inclusive, is over 110,000 tons of ore, or 83,000 units WO_3.[4]

LABOR AND LIVING CONDITIONS

Fair living quarters were provided for about 45 company employees at the Minerva camp in 1943. One large bunkhouse and several small houses were available for single men. Other small houses were rented for a nominal sum to married men. A large company mess hall was operated by a contractor, who supplied board to the men at $1.50 per day. The employees had the use of a bathhouse with showers, toilets, and laundry tubs, and a reading room also was available. The camp was equipped with power and water. No change room was provided at the mine.

Miners and mill operators were paid $7.51 per day; muckers and mill helpers received $6.97 per day. These rates include overtime, which was paid each day instead of at the end of a work week. All employees worked a 7-day week. Miners, muckers, and mill men were hired in Ely.

3/ Lemmon, Dwight M., Tungsten Mines in the Minerva District, White Pine County, Nev.: U. S. Geol. Survey unpublished report Mar. 1, 1943.

4/ Compiled from unpublished yearly production records in the office of the Nevada State Bureau of Mines, Reno, Nev.

GEOLOGIC SUMMARY5/

The tungsten ore bodies in the Minerva district occur as shoots in quartz veins that occupy faults in limestone of Cambrian age. The ore shoots rake gently westward, roughly parallel to the bedding in the adjoining limestone, and were originally remarkably continuous, although subsequent faulting has disrupted this continuity.

The Cambrian sedimentary rocks adjoining the veins fall into four mapable units, of which the youngest is a shale. The following columnar section pertains to the map area:

Shale:	300 feet plus; thin, platy limestone and shale.
Upper black limestone:	300 feet; thin-bedded to flaggy, dark-gray limestone.
Upper white limestone:	75 to 300 feet; massive, light-gray limestone with a pinkish cast.
Lower black limestone:	300 feet plus; light- to dark-gray limestone, variable, mottled. Bedding indistinct to good.

Below this section, northward in the range, limestone is exposed for a thickness of at least 1,500 feet down to the underlying Pioche shale and Prospect Mountain quartzite, both of which crop out in Pole and Huebnerite Canyons, 6 miles north of Minerva.

The ore bodies do not extend through the upper shale, which is faulted along the east border of the map area against cherty limestone, referred to the Ordovician Pogonip formation. The faults have disrupted stratigraphic sequence and eliminated several thousand feet of strata above the shale. The overlying Eureka quartzite, also Ordovician, crops out 2,000 feet southeast of the Silver Bell mine.

Several post-ore rhyolite dikes and sills, probably of Tertiary age, extend in a northwesterly direction across the district. No other igneous rocks are exposed in the area, although granitic rocks are found 8 miles north in the range.

The quartz veins, which strike easterly and dip 45° to 70° north, vary in width from a few inches to 30 feet or more and are known to extend at least 3,000 to 4,000 feet laterally. The quartz changes in thickness in a short distance along strike or dip and may be distributed in a series of closely spaced, parallel fractures with horses of limestone.

The outcrops of the veins are limited laterally by alluvium to the west and by the shale and alluvium to the east. Although the veins may continue eastward beneath the shale and under the main range, no major veins have been found on the surface at higher stratigraphic horizons. The Chief vein has

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5/ Lemmon, Dwight M., Unpublished report of the Geol. Survey, January 1944. See, also, Lemmon, Dwight M., Tungsten Deposits in the Minerva District, White Pine County, Nev., February 1944: On open file at U. S. Geol. Survey, Washington, D. C., and Salt Lake City, Utah, and Nevada State Bureau of Mines, Reno, Nev., released Aug. 20, 1945.

been traced westward by drill holes for 600 feet from the portal of the main adit, but no attempt has been made to trace any of the others beneath the alluvium. Frontal faults that define the range probably lie only a short distance west of the foothills, so the possibility of discovering large segments of veins buried beneath the alluvium seems remote * * *.

The minerals in the veins consist mainly of quartz and calcite with some scheelite and, in spots, traces of tetrahedrite, galena, silver haloids, powellite, and cuprodescloizite * * *.

The Everit and Chief veins each contain a single main ore shoot, which has been mined for pitch lengths of 600 to 900 feet, respectively. The Everit shoot is known to continue 240 to 400 feet west and may extend 500 feet east, making a total length of 1,500 feet * * *. In the Everit vein, ore bodies have been found adjoining higher beds on the crest of the West Everit hill and just above the Everit fault in the East Everit mine. Although drilling beneath the Silver Bell mine has shown that a substantial thickness of quartz is present in the vein, the amount of work done has been insufficient to prove or disprove a lower ore shoot * * *.

The Minerva area is broken by faults that follow at least five systems. Nearly all these faults, even the low-angle ones, are normal faults; * * *. In general, premineral faults that may have influenced localization of ore shoots have had only small displacements, the larger displacements being post-mineral.

Most of the faults are excellently exposed at the surface and frequently have topographic expression, for they repeat beds of massive, cliff-forming limestone * * *.

The following fault types, listed from oldest to youngest, have been recognized:

1. Faults now occupied by quartz veins that strike N. 70° W. to N. 70° E. and dip 40° to 70° N. The hanging wall appears to have moved downward 30 to 75 feet, but the true displacement cannot be determined, and the apparent displacement cannot always be differentiated from post-mineral movement along the veins.

2. Faults that strike northerly, dip vertically to 75° E. or W. and have displacements up to 20 feet.

3. Faults that strike N. 15° W. to N. 30° E., dip 13° to 60° E., and have displacements up to 400 feet.

4. Faults that strike easterly, dip 45° to 60° N. and frequently follow vein segments. Displacements are up to 50 feet.

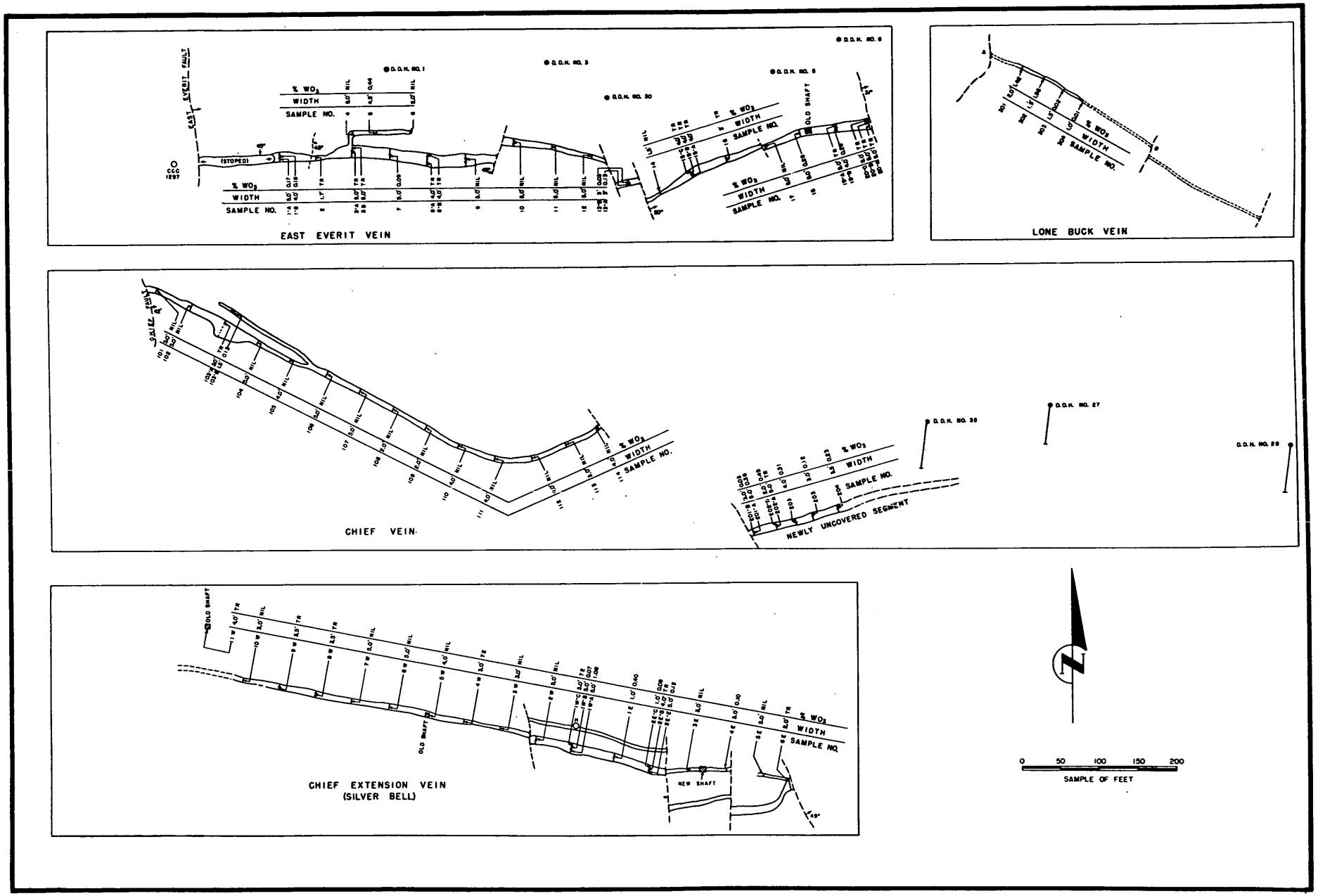


Figure 3. - Sample map of outcrops.

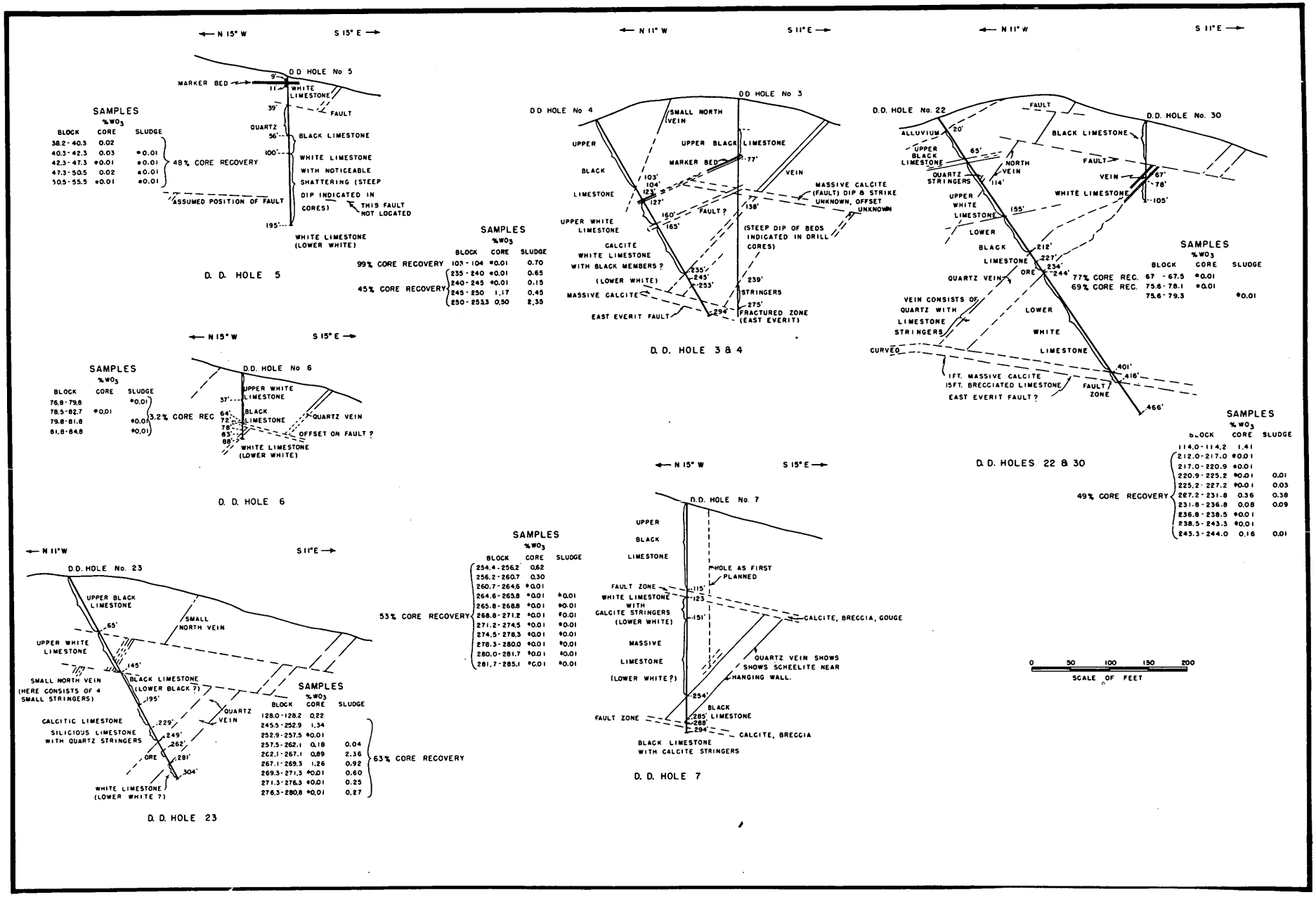


Figure 4. - Drill hole sections showing geology and sample analyses, East Everit mine (holes 3 to 7, 22, 23, and 30).

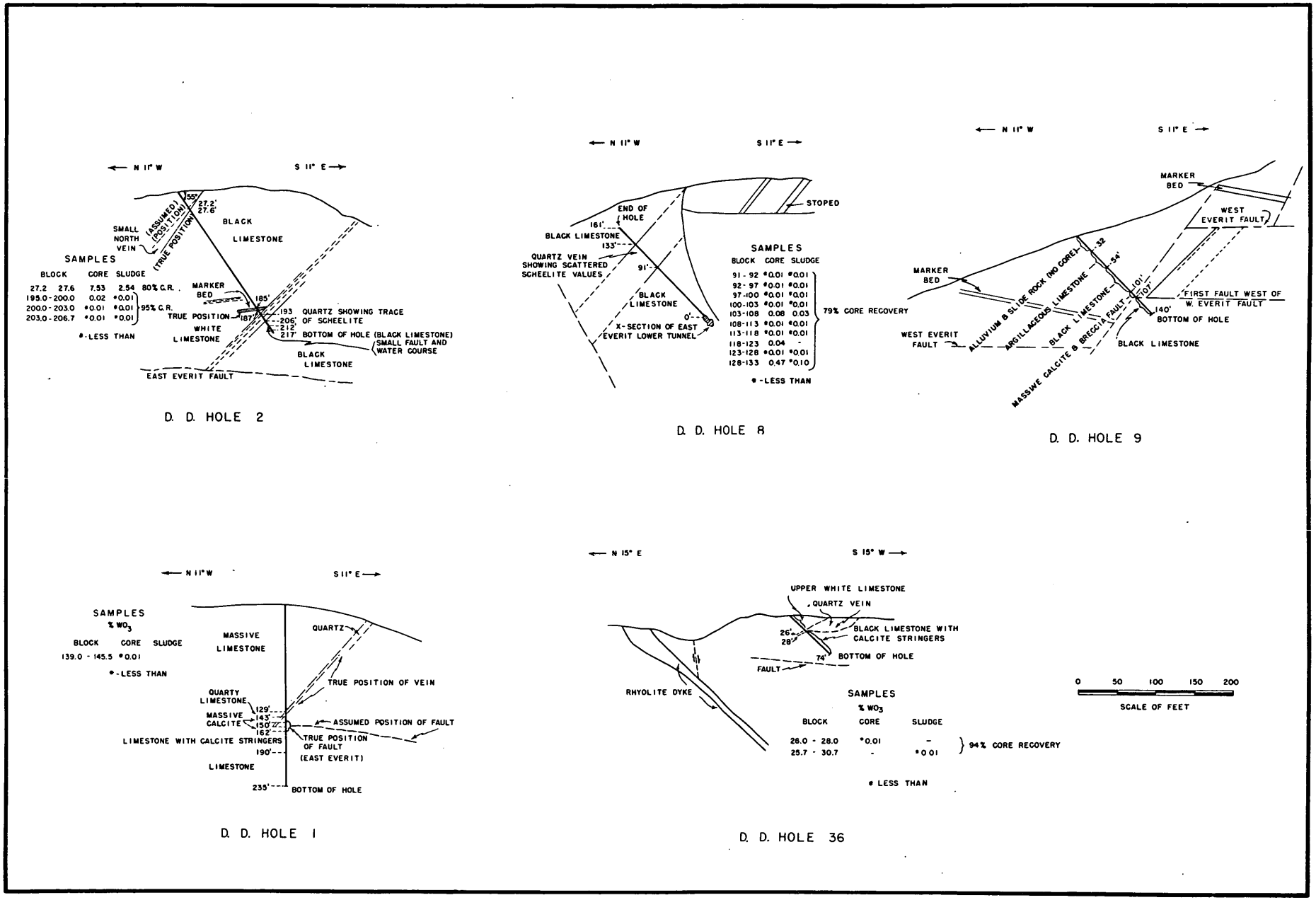


Figure 5. - Drill hole sections showing geology and sample analyses, East and West Everit mines (holes 1, 2, 8, 9, and 36).

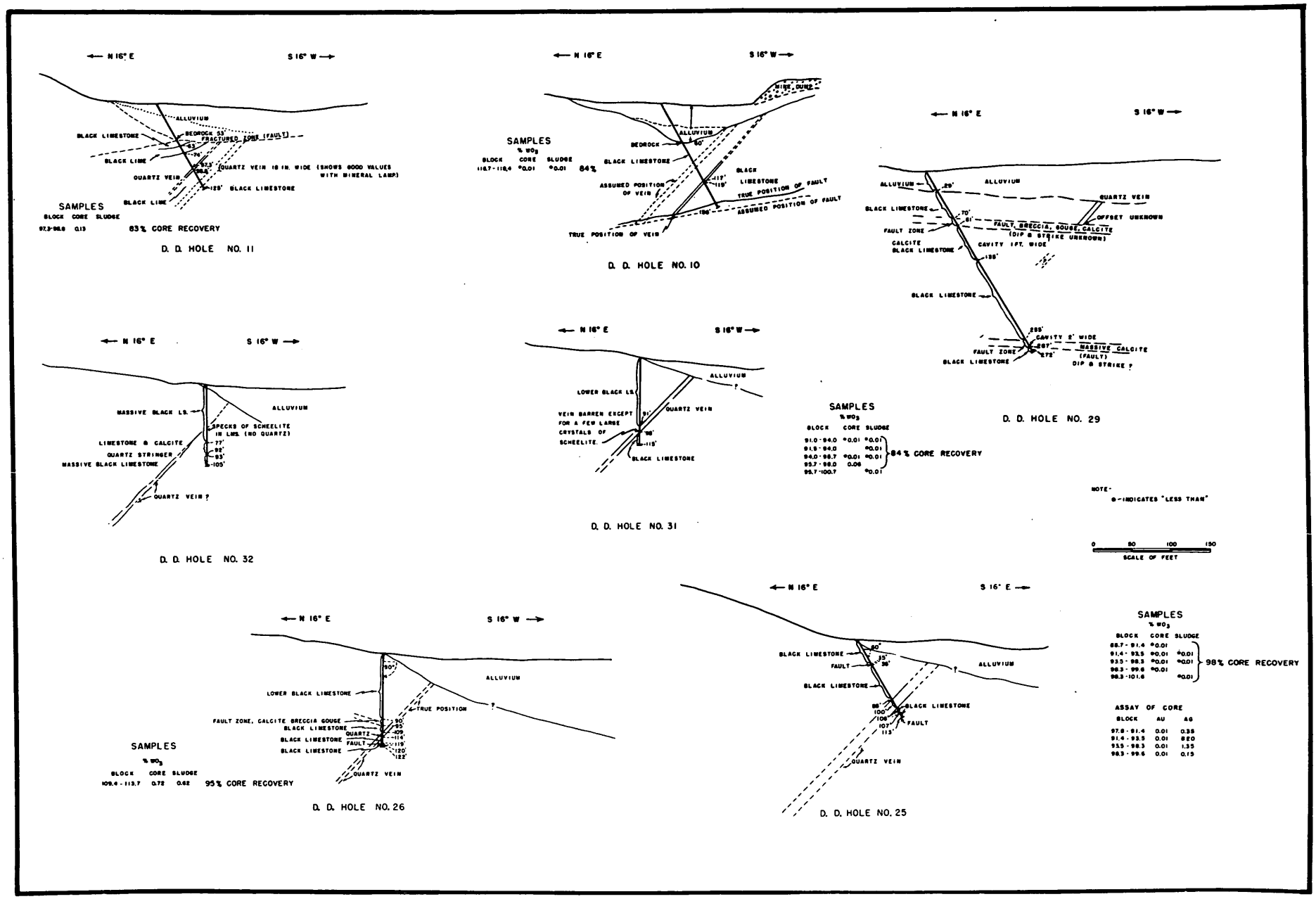


Figure 6. - Drill hole sections showing geology and sample analyses, Scheelite Chief mine (holes 10, 11, 25, 26, 29, 30, and 31).

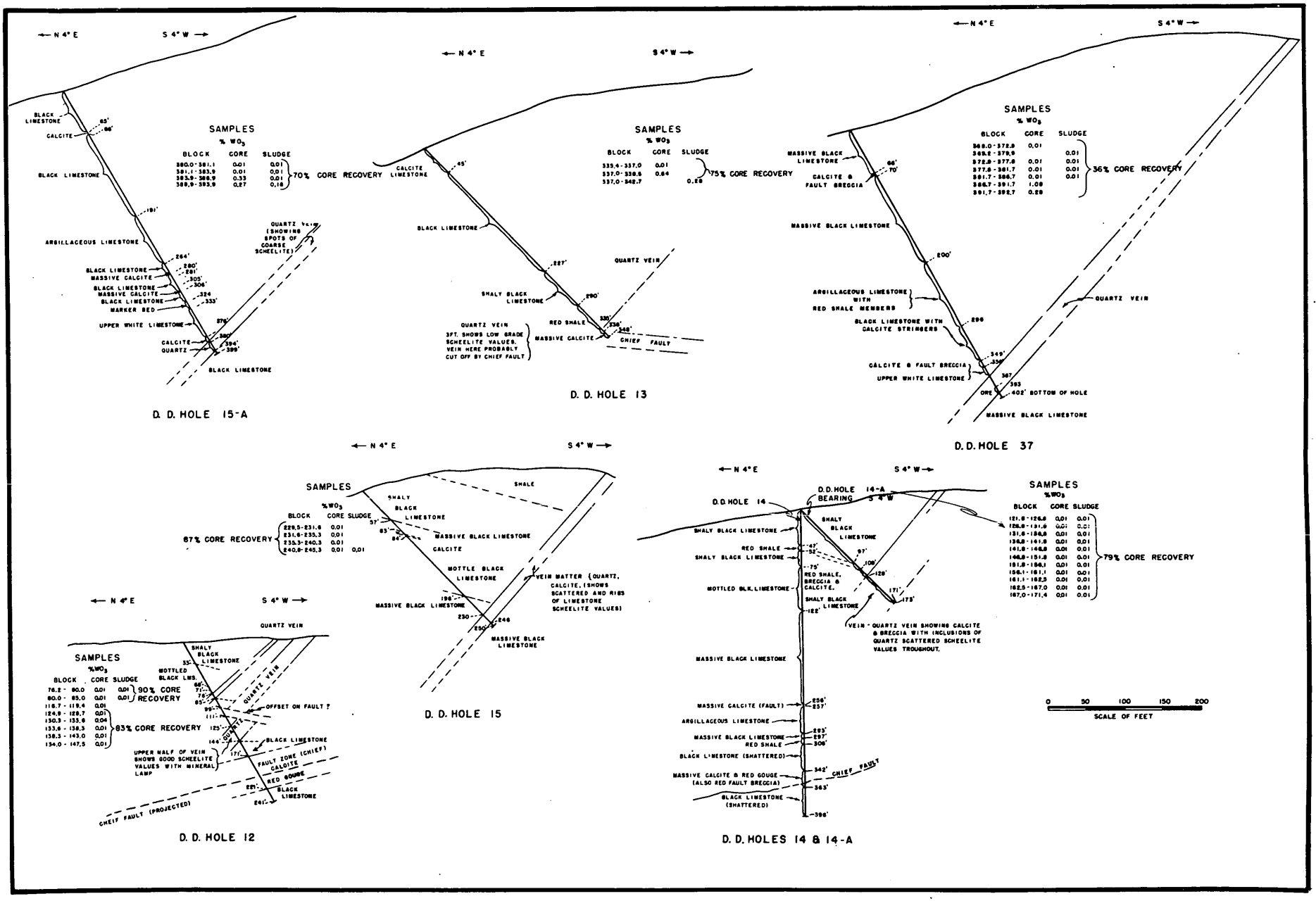


Figure 7. - Drill hole sections showing geology and sample analyses, Scheelite Chief mine (holes 12, 13, 14, 14-A, 15, 15-A, and 37).

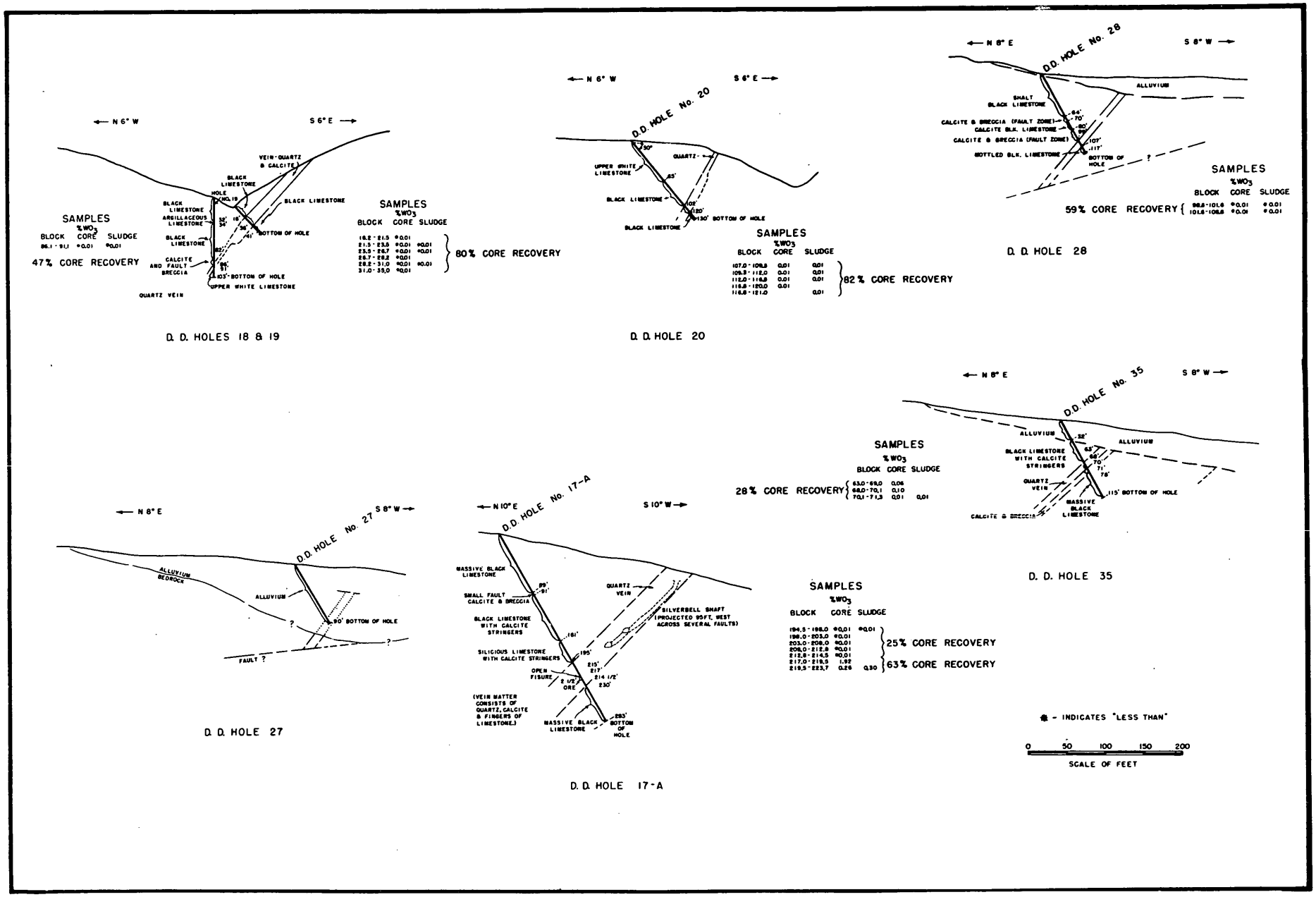


Figure 8. - Drill hole sections showing geology and sample analyses, Scheelite Chief mine (holes 17-A, 18, 19, 20, 27, 28, and 35).

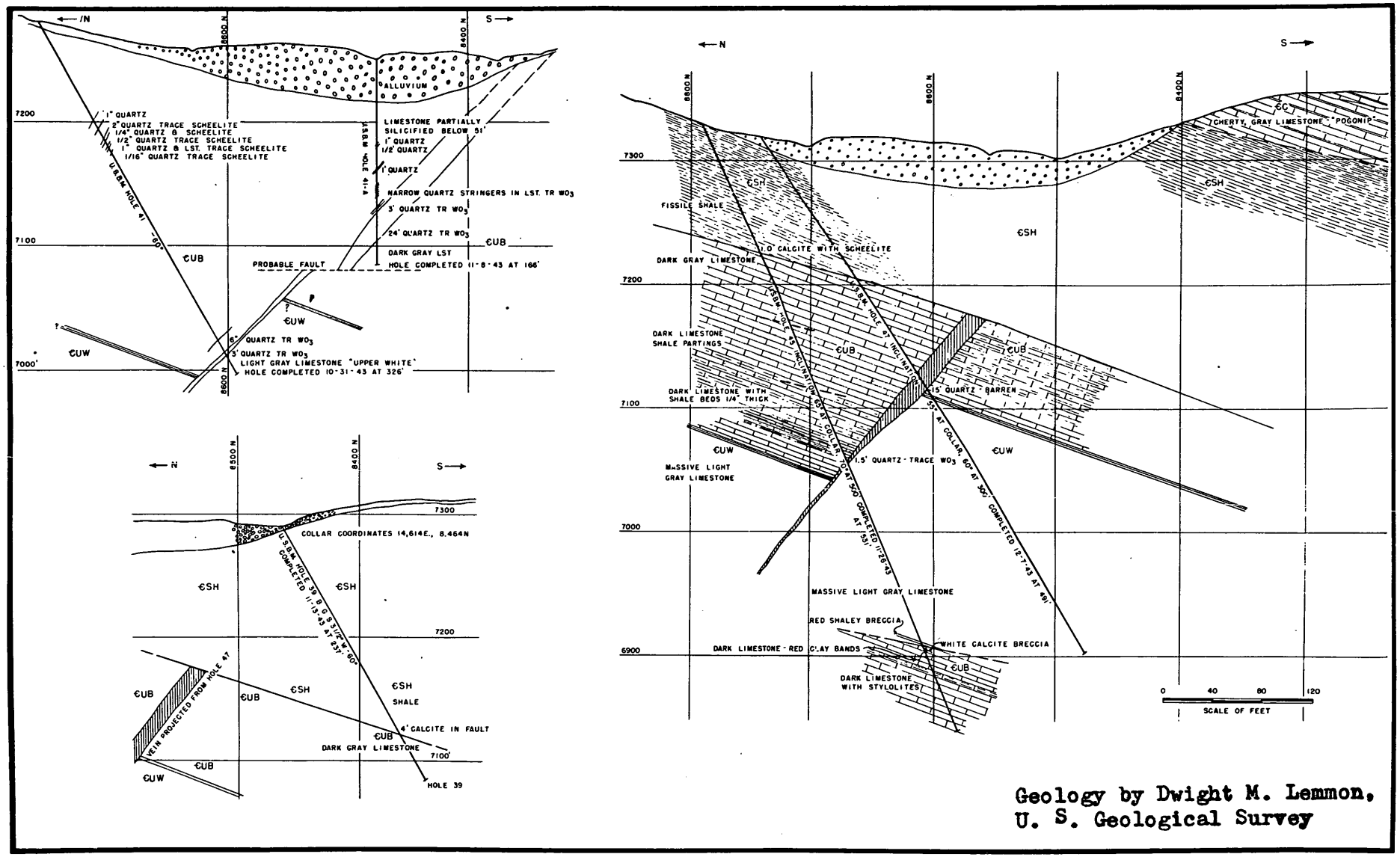


Figure 9. - Drill hole sections showing geology, East Everit vein (holes 39, 41, 41-A, 45, and 47).

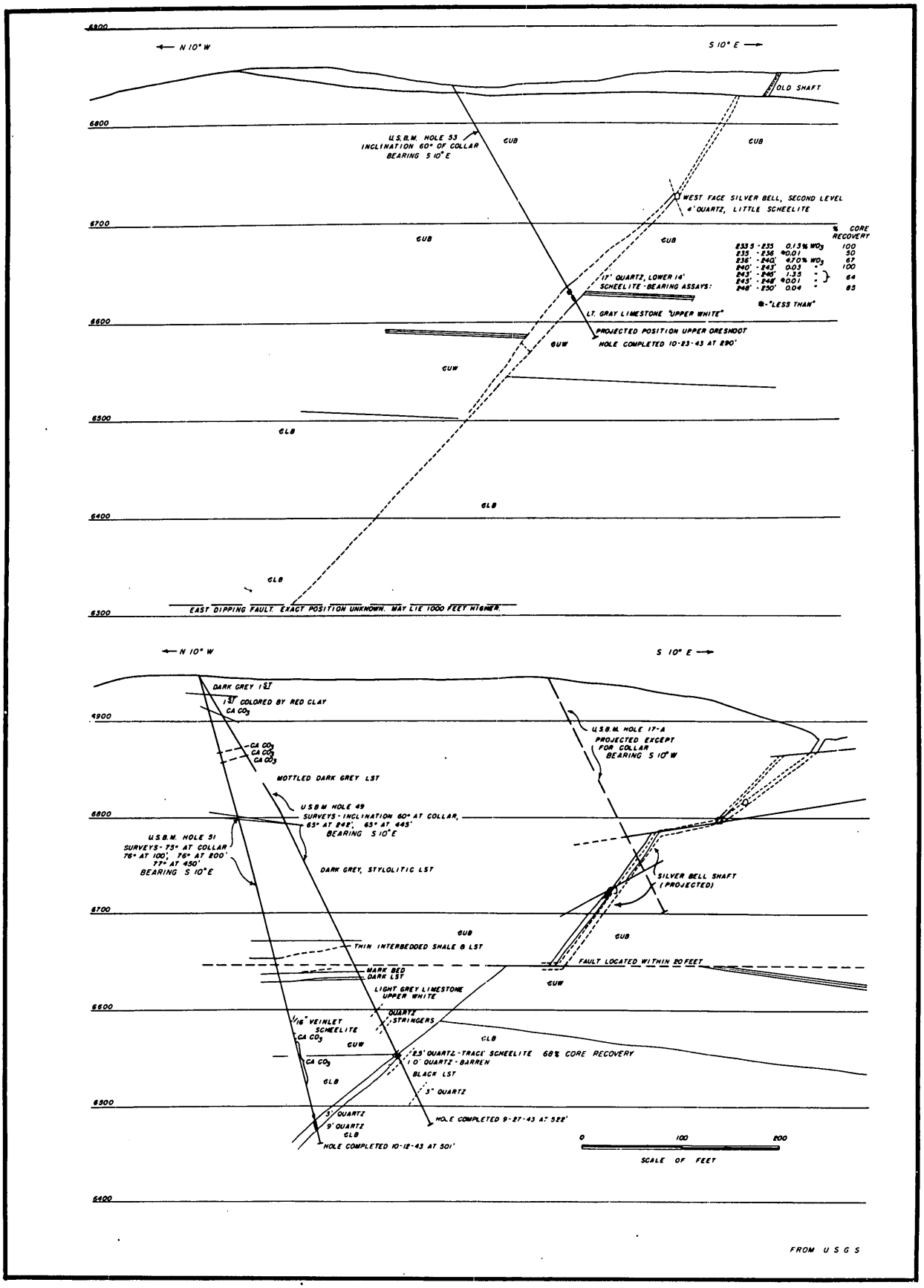


Figure 10. - Drill hole sections showing geology and sample analyses, Silver Bell mine (holes 17-A, 49, 51, and 53).

5. Faults that strike northerly and dip 45° to 70° W. Most abundant on the west side of West Everit Hill; displacements up to 200 feet.

WORK PERFORMED BY BUREAU OF MINES IN 1940 AND 1941

Some of the veins outcropped on ridges, where they could be sampled directly; but in many places the veins were covered with overburden, and trenching was necessary to uncover them before a sample could be obtained. In general, the overburden proved to be comparatively shallow.

Most of the trenching (fig. 3) was confined to the eastern extension of the Scheelite Chief vein in the neighborhood of the Silver Bell mine, but some was necessary to uncover parts of the East Everit vein also. One vein of new ore was uncovered by trenching. All trenches were spaced approximately 50 feet apart along the strike of the veins, so that surface samples could be taken at regular intervals.

Altogether, 880 feet of trenches were dug, and 181 cubic yards of alluvium was excavated. This work was done in December 1940 and January and February 1941 and was completed before diamond drilling began.

Surface exposures of the East Everit and Chief veins were sampled at regular 50-foot intervals along the strike, either on outcrops or in the bottom of trenches dug to bedrock. Large channels, 12 inches wide and 6 inches deep were cut across the quartz vein at each interval. A cut of this size provided a sample weighing approximately 80 pounds per foot of sample width.

Surface trenching and sampling disclosed three areas wherein some ore was indicated. Altogether, 68 surface samples weighing about 6 tons were sent to Reno for assaying. On the East Everit vein (fig. 3) 21 samples were taken. On the Chief vein (fig. 3) 43 samples were taken.

After staking out the diamond-drill holes, considerable trail building was found to be necessary before the drills could be brought in. This work was done in January along with the trenching and sampling. The longest single trail was built in the direction of the East Oriole vein (fig. 2). This trail was three-quarters of a mile long and was cut through a heavy growth of pinon pine and juniper. Altogether, 5,000 feet of trails were built. A tabulated summary of holes drilled is shown by table 1.

Two drills were used and operated two shifts, 7 days per week. In order to have early information on more than one area, one drill was set up on the East Everit Hill (figs. 2, 3, 4, and 5) and the other was started drilling in the Scheelite Chief area (see figs. 2, 6, 7, and 8). All of the holes except hole 8, which was drilled from an underground station, were drilled from the surface. On May 23 one drill was taken away for use elsewhere, and the program was finished with the remaining drill. The last hole was completed on June 5, 1941. Later drilling of eight holes was completed in 1943 (figs. 9 and 10).

TABLE 1. - Summary of holes drilled

Hole	Coordinates North	Coordinates East	Elevation, ft.	Inclination, degrees	Bearing	Percent core recovery	Total footage
1	8780	13150	7,245	-90	-	87	235
2	8900	13225	7,279	-55	S. 11° E.	90	217
3	8781	13358	7,313	-90	-	82	282
4	8980	13303	7,292	-60	S. 11° E.	62	294
5	8740	13680	7,282	-90	-	80	195
6	8800	13767	7,291	-90	-	45	88
7	8912	13832	7,332	-90	-	44	300
8*	8880	12807	6,912	+45	N. 11° W.	87	161
9	9432	11343	6,900	-45	S. 11° E.	36	140
10	5220	10200	6,294	-60	S. 16° W.	84	156
11	5250	10112	6,290	-60	S. 16° W.	72	125
12	4493	10815	6,685	-60	S. 4° W.	80	241
13	4825	10990	6,600	-45	S. 4° W.	37	348
14	4458	10960	6,745	-90	-	71	398
14A	4458	10960	6,745	-45	S. 4° W.	78	173
15	4505	11195	6,793	-45	S. 4° W.	75	250
15A	4772	11220	6,689	-60	S. 4° W.	73	399
17A	4150	12965	6,943	-60	S. 10° W.	46	283
18	6490	11845	6,797	-45	S. 6° E.	62	41
19	6518	11845	6,810	-90	-	47	103
20	6651	11572	6,779	-50	S. 6° E.	43	130
22	9000	13410	7,316	-55	S. 11° E.	63	466
23	9010	13510	7,340	-60	S. 11° E.	75	304
25	5305	9910	6,269	-60	S. 16° W.	72	113
26	5365	9715	6,251	-90	-	66	122
27	4252	11950	6,720	-60	S. 8° W.	0	90
28	4190	12246	6,755	-60	S. 8° W.	52	117
29	5590	9575	6,220	-60	S. 16° W.	62	272
30	8736	13455	7,313	-90	-	69	105
31	5300	9785	6,264	-90	-	85	115
32	5305	9710	6,248	-90	-	37	105
35	4222	11802	6,707	-60	S. 8° W.	36	115
36	9308	12358	6,873	-45	S. 15° W.	69	74
37	4800	11105	6,665	-60	S. 4° W.	63	402
39	8464	14614	7,289	-60	South	57	237
41	8758	14405	7,280	-60	South	76	329
41A	8473	14408	7,250	-90	-	53	166
45	8792	14674	7,329	-65	South	67	531
47	8742	14674	7,319	-55	South	50	491
49	4495	12901	6,944	-60	S. 10° E.	69	522
51	4496	12901	6,944	-75	S. 10° E.	62	501
53	4292	12649	6,838	-60	S. 10° E.	82	290
							10,026

* Drilled from underground station.

During the diamond drilling every effort was made to get good samples. Early in the program it was found that, without exception, the scheelite ore occurred in the quartz veins. Therefore, special care was always taken whenever a drill hole was suspected of nearing a quartz vein. By constant panning of the sludge, Bureau of Mines samplers were able to tell when the drill passed from limestone into quartz. Usually, the driller also could tell when this happened, by the action of the drill. Each time quartz was hit, the drill rods were pulled; and if the water return was poor, the hole was either cemented or cased, in order to get a good sludge return. Often, however, fractures were encountered every few inches through the vein and the sludge return was poor, but in general core recovery was good.

The diamond drilling was spread over six main areas (fig. 2) of the Tungsten Metals property in order to pickup possible ore bodies. These areas are listed below:

East Everit (above East Everit fault)
East Everit (below East Everit fault)
West Everit
West extension of Chief
East extension of Chief
East Oriole

These areas will be mentioned briefly in the following paragraphs. Sections of the diamond-drill holes showing position of the veins, sample analyses, and other pertinent data are included in this report. (See figs. 4 to 10, which serve as graphic logs.)

East Everit Area (Above East Everit Fault)

In the east Everit area, above the East Evert fault, 10 holes were drilled for a total footage of 2,486 feet. These were Nos. 1 to 7, 22, 23, and 30 (figs. 4 and 5). Of this group, holes 1, 2, 5, and 6 hit the main quartz vein as projected.

Drilling in the East Everit area picked up the faulted portion of the Everit ore body.

The Tungsten Metals Corp. started a long crosscut in June 1941 to develop this segment.

East Everit Area (Below East Everit Fault)

Two holes were drilled in the East Everit area below the East Everit fault (8 and 36, fig. 5). The object of hole 8 was to find the position of the vein below the East Everit fault. This hole was drilled from an underground station in the East Everit lower tunnel. The quartz vein was encountered near its plotted position and proved to be over 40 feet wide. After finding the vein, a crosscut 150 feet long was run by the corporation to reach it at tunnel level.

A large vein of scheelite-bearing quartz outcrops on the surface below the portal of the East Everit lower tunnel, and hole 36 was planned to develop this showing at some depth. The hole showed that the quartz outcrop pinches to a thin wedge below the surface.

West Everit Area

During mining operations in the West Everit tunnel, a small but high-grade lens of ore was followed until it was cut off by a fault. Diamond-drill hole 9 (fig. 5) was projected to intersect the ore body on the other side of that fault. The hole was drilled to a depth of 140 feet but failed to intersect the vein.

Chief Area (West Extension)

One of the largest ore bodies in the district occurred in the Chief vein; an effort was made during the program to find the continuation of this ore body both east and west of the company's workings. Small faults limited the ore lens to the west, and holes 10, 11, 25, 26, 29, 31, and 32 were drilled on the west side of the workings to first find the position of the vein and then to locate an ore shoot. Although seven holes were drilled in the area west of the company workings, they were relatively shallow, representing a total footage of only 1,008 feet (fig. 2).

In hole 29, two large faults were encountered that offset the vein, so no effort was made to drill farther west. Instead, holes 31 and 32 in the vicinity of hole 26 were drilled.

Chief Area (East of Chief Workings)

A large fault limits the Chief vein on the east side of the Chief workings, giving the vein a horizontal displacement of about 300 feet and a large vertical displacement. This fault was mapped thoroughly by D. M. Lemmon, of the U. S. Geological Survey, and holes were diamond-drilled to try to find the faulted segment of the ore body on the east side of the Chief fault. In the immediate vicinity of the fault, seven holes were drilled, representing a footage of 2,211 feet. These holes were 12, 13, 14, 14A, 15, 15A, and 37 (figs. 2 and 7).

Farther east, four holes (35, 27, 28, and 17A, figs. 2 and 8) were drilled to trace and sample the eastern extension of the Chief vein. These holes represent 605 feet of drilling. In the vicinity of the fault, the shallower holes were drilled to determine accurately the true dip of the vein before trying to find the vein at greater depth.

Oriole Area

Although considerable mining was done by the company at various times on the western part of the Oriole vein, the eastern segments of the Oriole have remained undeveloped, and three diamond-drill holes (18, 19, and 20, figs. 2 and 8) were planned to develop this area. Owing to the ruggedness of the terrain in the vicinity of those segments, trails had to be built from the

Chief Extension in order to move the drills into the area. The total footage represented by the three holes was 274 feet.

Silver Bell Drilling on Chief Vein

The Silver Bell shaft was sunk on the eastern extension of the Chief vein as a result of the work done by the Bureau of Mines. A small stope was mined in 1942, and the shaft was deepened in 1943. Owing to insufficient labor, all work in this mine was suspended in June 1943. Hole 17A and the stope on the third level of the mine found ore at a stratigraphic horizon much higher than the ore shoot in the Chief mine to the west. Holes 49 and 51 (fig. 10) were designed to test the vein at the same stratigraphic horizon as the "Chief Shoot," so as to locate its extension or disprove continuance at its normal horizon.

East Everit Drilling

The East Everit (fig. 9) mine is worked through two adits, one at 6,900 feet altitude and the main adit at 7,050 feet altitude. A large ore shoot was found and mined as a result of the Bureau's work. The vein was lost to the east of the area, and no surface outcrops were found to guide the corporation in its search for the eastern segment. A crosscut was started to prospect for this segment, but work was suspended in June 1942 because of lack of labor. Geological studies of the area were made by Dwight Lemmon, of the U. S. Geological Survey, and the probable location of the faulted vein was determined. A drilling program was designed to locate first the vein and then the ore shoot. A 2,000-foot truck road was built from the end of the East Everit road to the area to be drilled. Five diamond-drill holes (39, 41, 41A, 45, and 47, figs. 2 and 9) were drilled to develop this area.

No unusual problems were encountered while drilling was in progress. The average rate of progress per drill shift in limestone was 20 feet, and in quartz it was considerably less. No sludge or water were recovered from the veins in the deep holes, because there are large open cracks and fissures on the hanging-wall side of the vein. The inclination of deep holes was verified by surveying with a hydrofluoric acid etch on glass tubes.

MINING METHODS

With the exception of the Silver Bell, which is developed by an inclined shaft, all mines are entered through adits. Ore produced in open stopes was trammed to the surface bins by mule train and trucked to the mill.

The ore is in quartz veins with limestone hanging and foot walls. In general, workings require little or no timber. The mines were developed by drifts run on the adit levels and by crosscuts run in limestone to find faulted segments. In workings driven prior to 1943, the cross section of drifts was about 4.5 by 7 feet. In 1943, a mucking machine was purchased, and it has been found necessary to widen the drifts to 5 feet or more in order to use this equipment. No timber was used in drifts or crosscuts. As a result of the large amount of crosscutting necessary to locate and develop faulted segments of the ore body, the cost of both tramming and development was high.

Where ore shoots were cut by drifts, stopes were started up from the drift with only small pillars left to protect the haulageway. Shoots found above drift level were stoped from sublevels run near the bottom of the ore body. A few underhand stopes were mined on small bodies of ore found below the drifts. Open stopes were used throughout all mines, with a few small pillars left to support the strong hanging wall. Miners worked on staging carried on stulls. Stopes were allowed to stand open after being completed, and no appreciable caving has occurred after a period of several years. No effort was made to sort broken ore, but some lean zones were left as pillars. In stopes worked from sublevels, slushers were used to move the ore to chutes extending to the haulageway. In stopes started on or near the drift level, the ore runs to chutes by gravity. Small tugger hoists were used to lift supplies into the stopes.

Underground haulage equipment consists of several mule-drawn, 14-cubic-foot, end-dump cars. Up to 1943, all ore was trammed to the surface by hand. As the working faces of the East Everit and Chief mines were over 1,000 feet from the portals, the cost of tramming was high.

MILLING METHODS

A mill with a capacity of 75 tons per day is situated in Spring Valley at the Minerva camp. A flow sheet of this mill follows (fig. 11). Power was supplied by two 180-horsepower Diesel engines direct-connected to 440-volt, 100-kv., alternating-current generators. An ample supply of water was pumped from a spring. Mill recovery was estimated to be 80 percent on normal mill head containing 1 percent WO_3, and concentrates contained 64 to 70 percent WO_3. The company was penalized on some shipments for a small copper content in the concentrate, but the charge was not high enough to justify changing milling methods. Owing to the small production of ore from the mine, the mill was idle about 10 days per month.

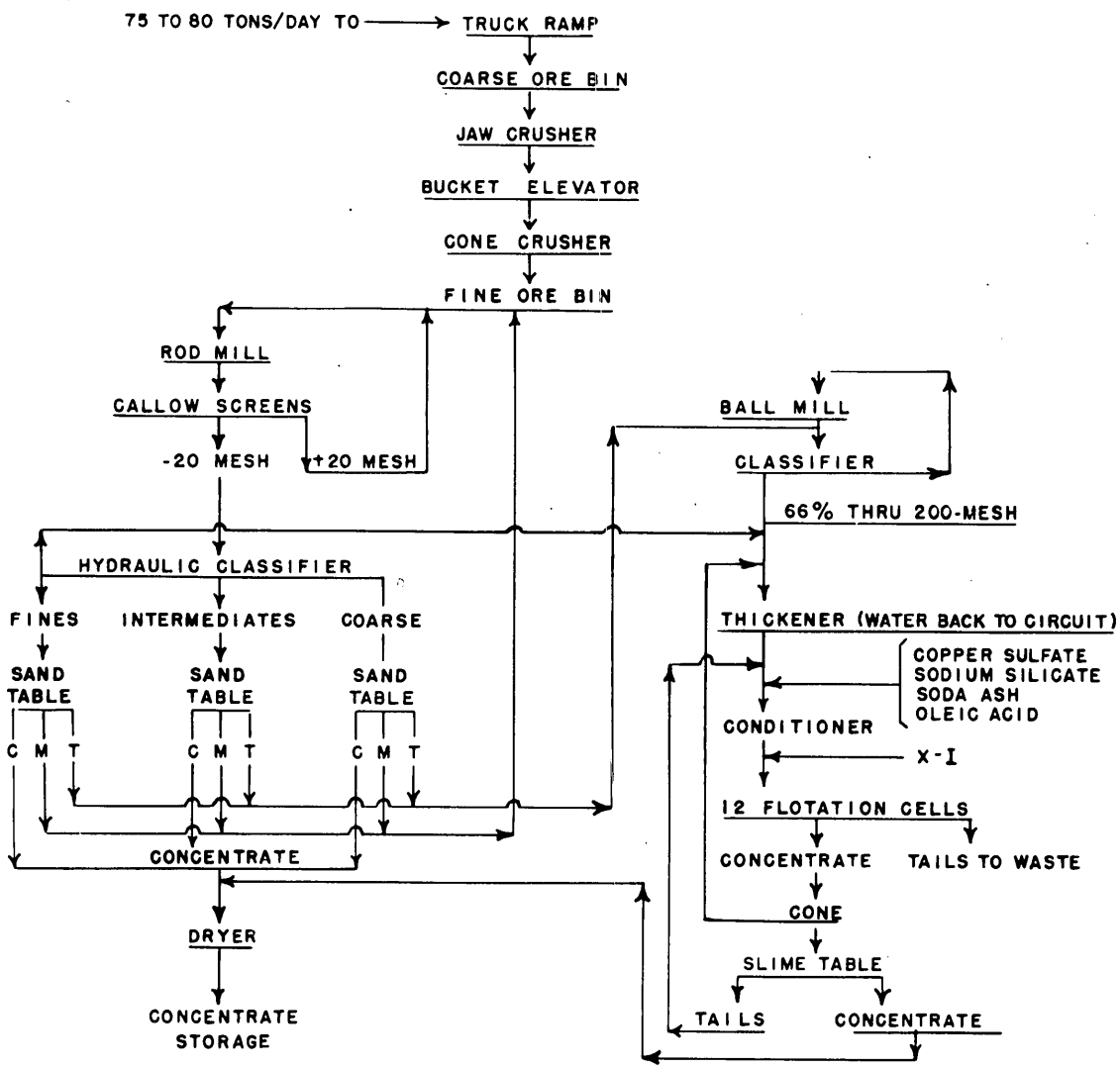
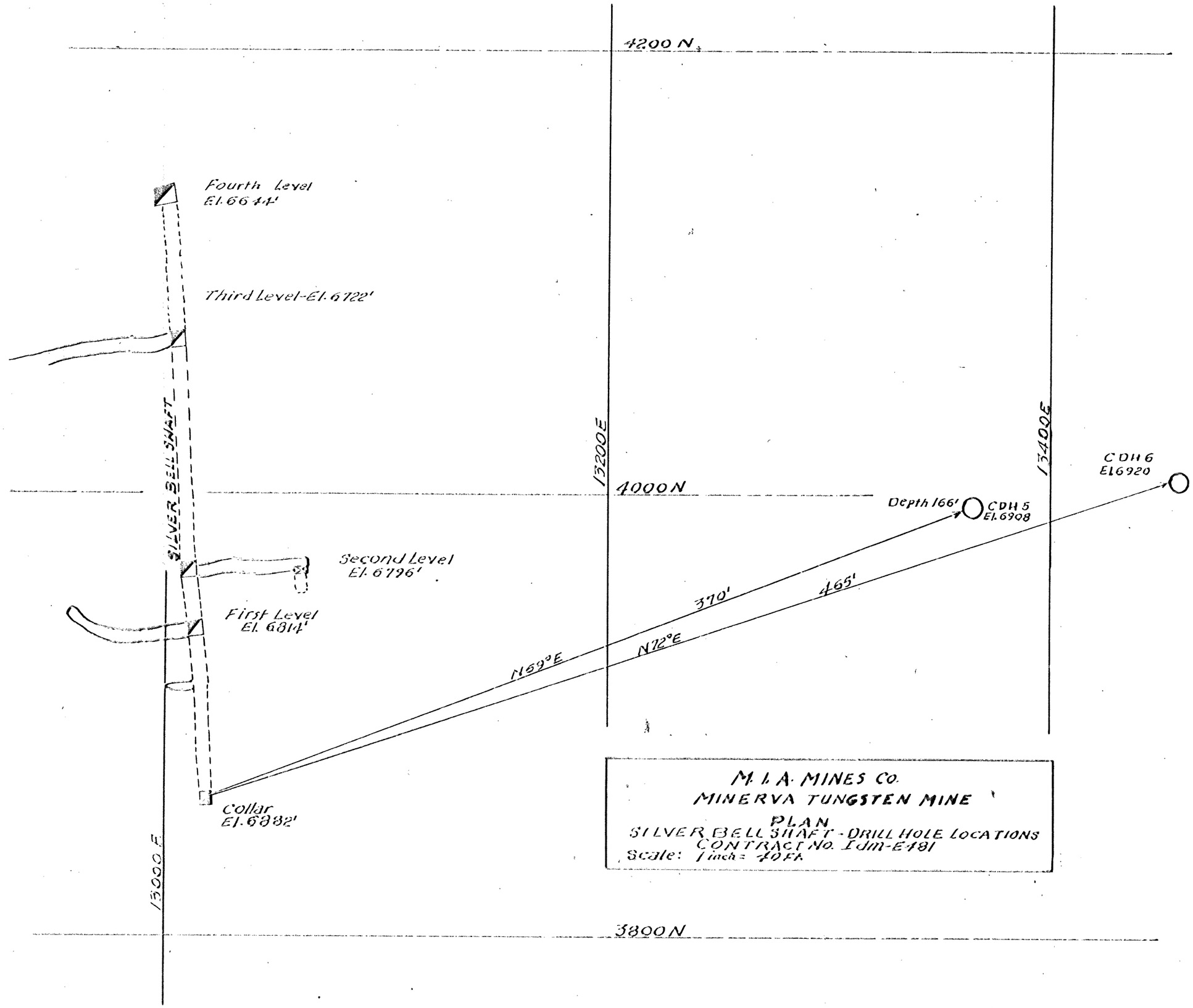
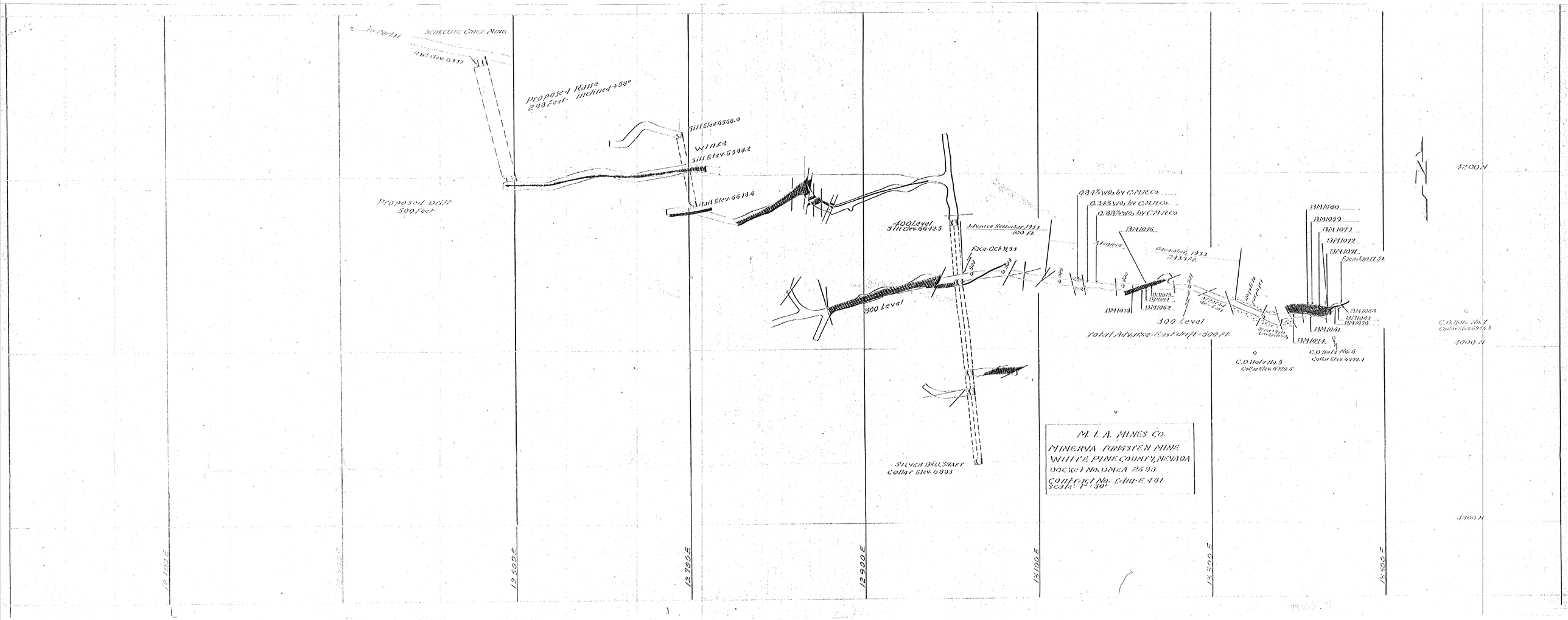
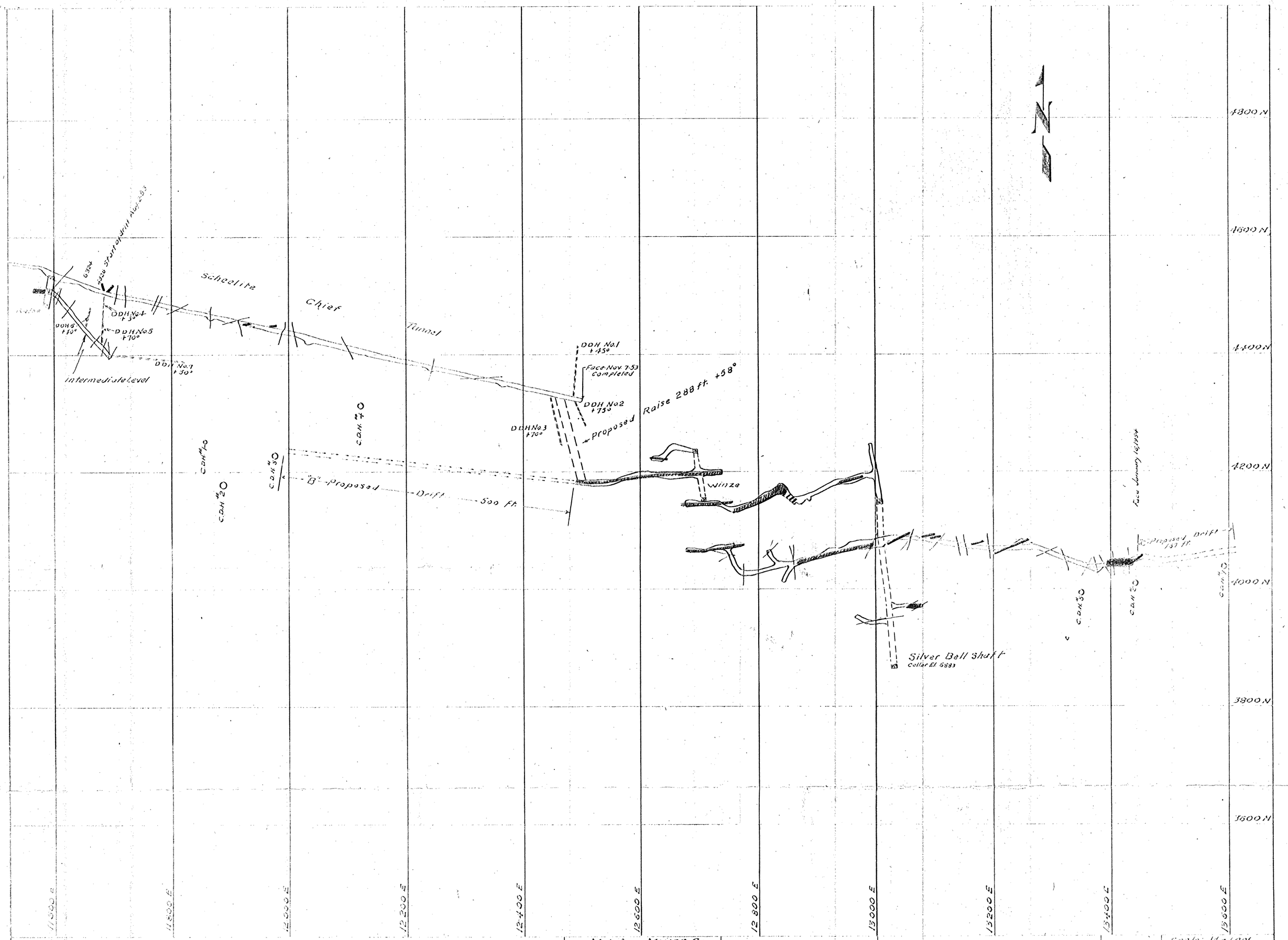


Figure 11. - Mill flow sheet.

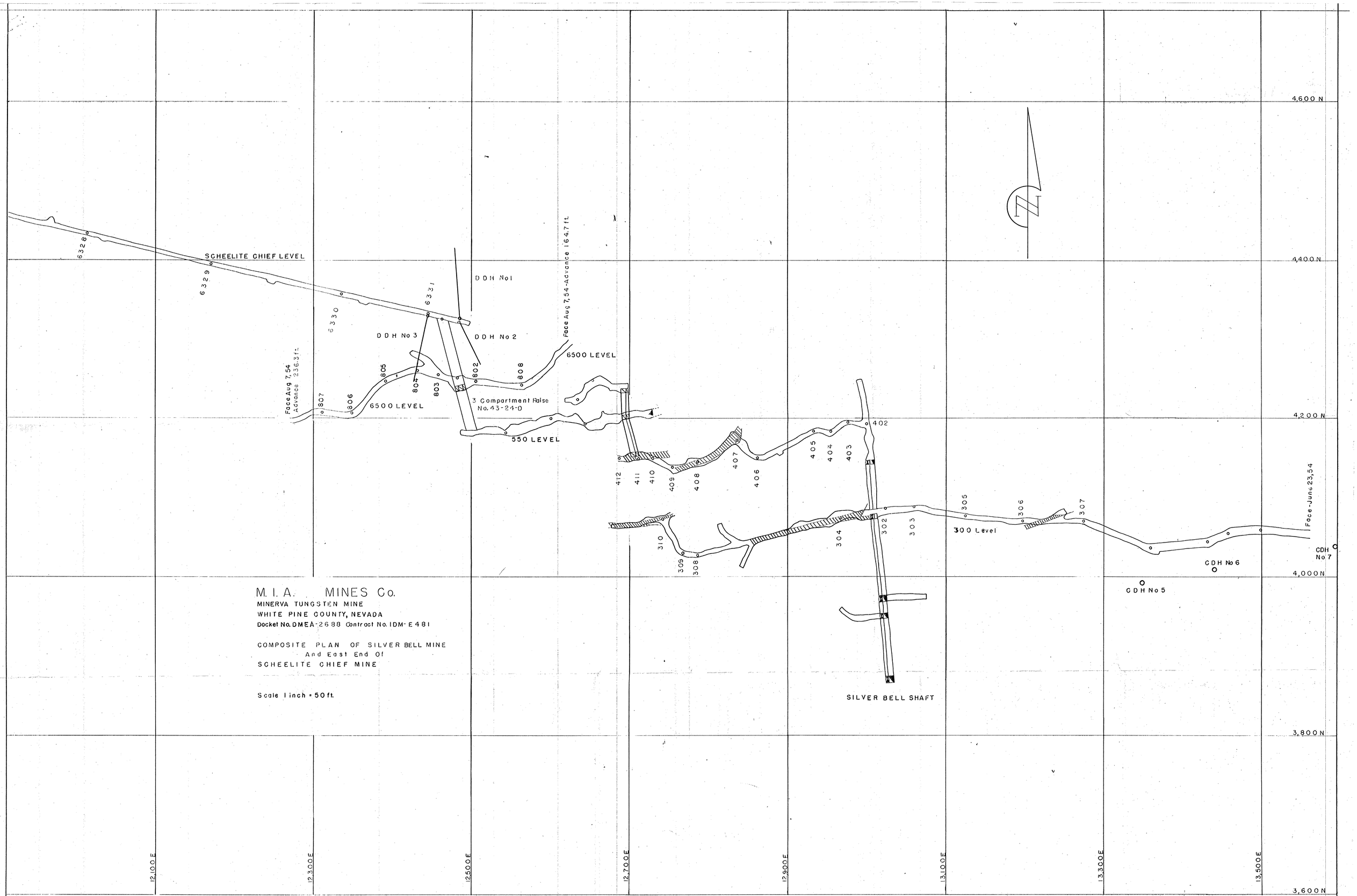

4200 N
Fourth Level
El. 6644'
Third Level-El. 6722'
SILVER BELL SHAFT
13200E
13400E
4000N
CDH 6
El 6920
Depth 166'
CDH 5
El. 6908
Second Level
El. 6796'
First Level
El. 6814'
370'
465'
N69°E
N72°E
Collar
El. 6882'
13000E
3800N
M. I. A. MINES CO.
MINERVA TUNGSTEN MINE
PLAN
SILVER BELL SHAFT - DRILL HOLE LOCATIONS
CONTRACT No. IJM-E-481
Scale: 1 inch = 40 FT.


To Portal
SCHEELITE CHIEF MINE
Rail Elev. 6337
Proposed Raise
288 Feet Inclined +58°
Sill Elev. 6366.0
Winze
Sill Elev. 6399.2
Rail Elev. 6618.6
Proposed Drift
500 Feet
400 Level
Sill Elev. 6642.5
Advance November 1953
100 Ft
Face-Oct 31 53
300 Level
0.84% WO3 by C.M.R.Co.
0.34% WO3 by C.M.R.Co.
0.88% WO3 by C.M.R.Co.
BM1016
Advance
December 1953
213.5 Ft
BM1015
BM1017
BM1042
BM1013
300 Level
Total Advance-East drift-500 Ft
BM1060
BM1059
BM1073
BM1072
BM1071
Face Jan 11-54
BM1068
BM1069
BM1070
BM1061
BM1014
C.D. Hole No. 5
Collar Elev. 6920.6
C.D. Hole No. 6
Collar Elev. 6992.1
C.D. Hole No. 7
Collar Elev. 6995.5
SILVER BELL SHAFT
Collar Elev. 6893
M. I. A. MINES CO.
MINERVA TUNGSTEN MINE
WHITE PINE COUNTY, NEVADA
DOCKET No. DMEA 2598
CONTRACT No. Edm-E 481
Scale: 1" = 50'
4200 N
4000 N
3900 N
12,100 E
12,200 E
12,300 E
12,400 E
12,500 E
12,600 E



M. I. A. MINES Co.
Minerva Tungsten Mine
White Pine County, Nev.
Contract No: Cdm-E 481

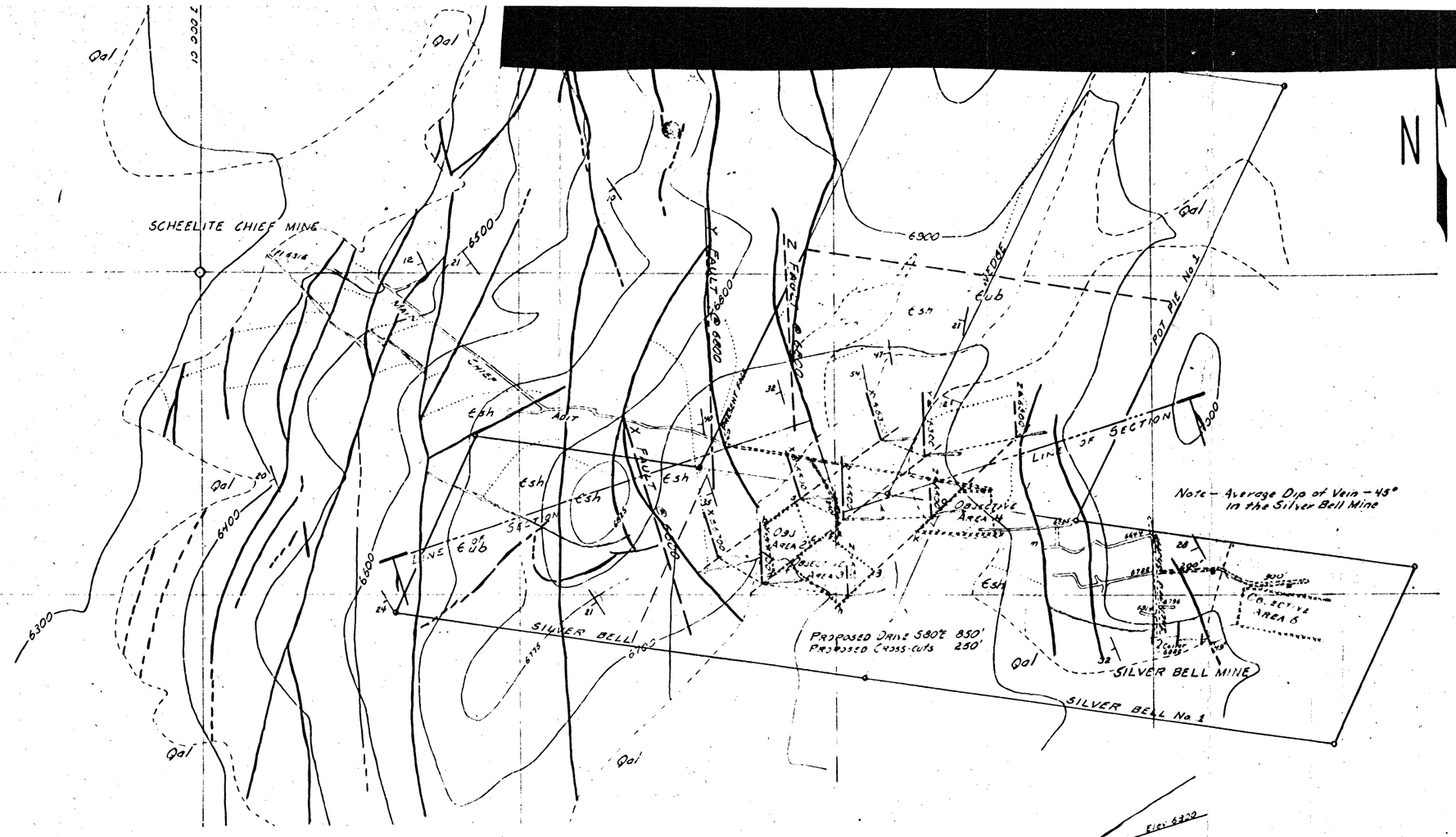
Composite Plan of Silver Bell
And East End
Scheelite Chief Mine



M. I. A. MINES Co.
MINERVA TUNGSTEN MINE
WHITE PINE COUNTY, NEVADA
Docket No. DMEA-2688 Contract No. IDM-E481

COMPOSITE PLAN OF SILVER BELL MINE
And East End Of
SCHEELITE CHIEF MINE

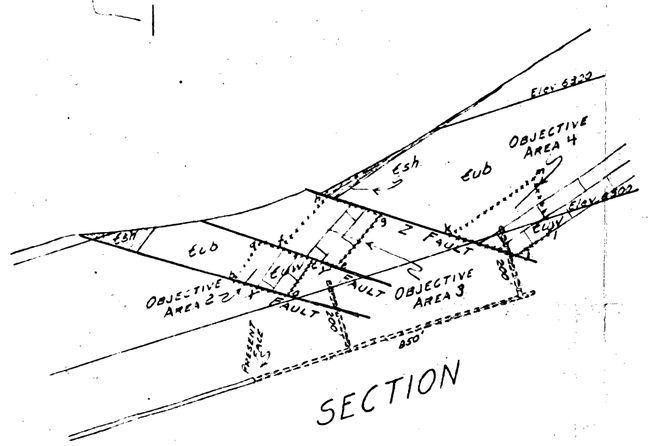
Scale 1 inch = 50 ft.



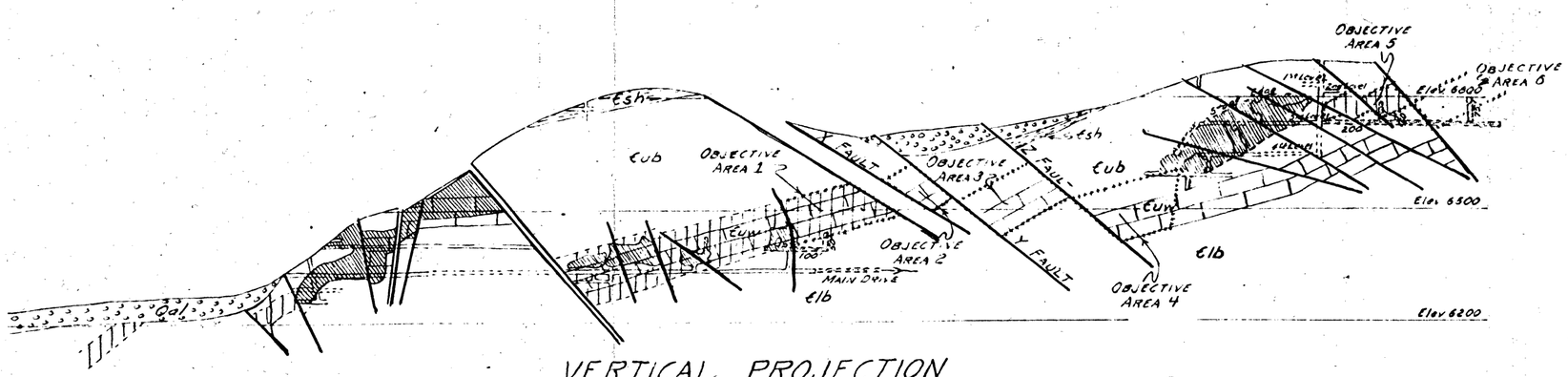
PLAN

LEGEND

Qal	Quaternary Alluvium
Esh	Shale
Eub	Upper Black Limestone
Euw	Upper White Limestone
Elb	Lower Black Limestone
Trh	Rhyolite
	Vein
	Fault
21	Strike and Dip of Beds
	Intersection X Fault and Vein at Elev. 6500'
	Proposed Exploration Work
	Exploration Project Boundaries



SECTION

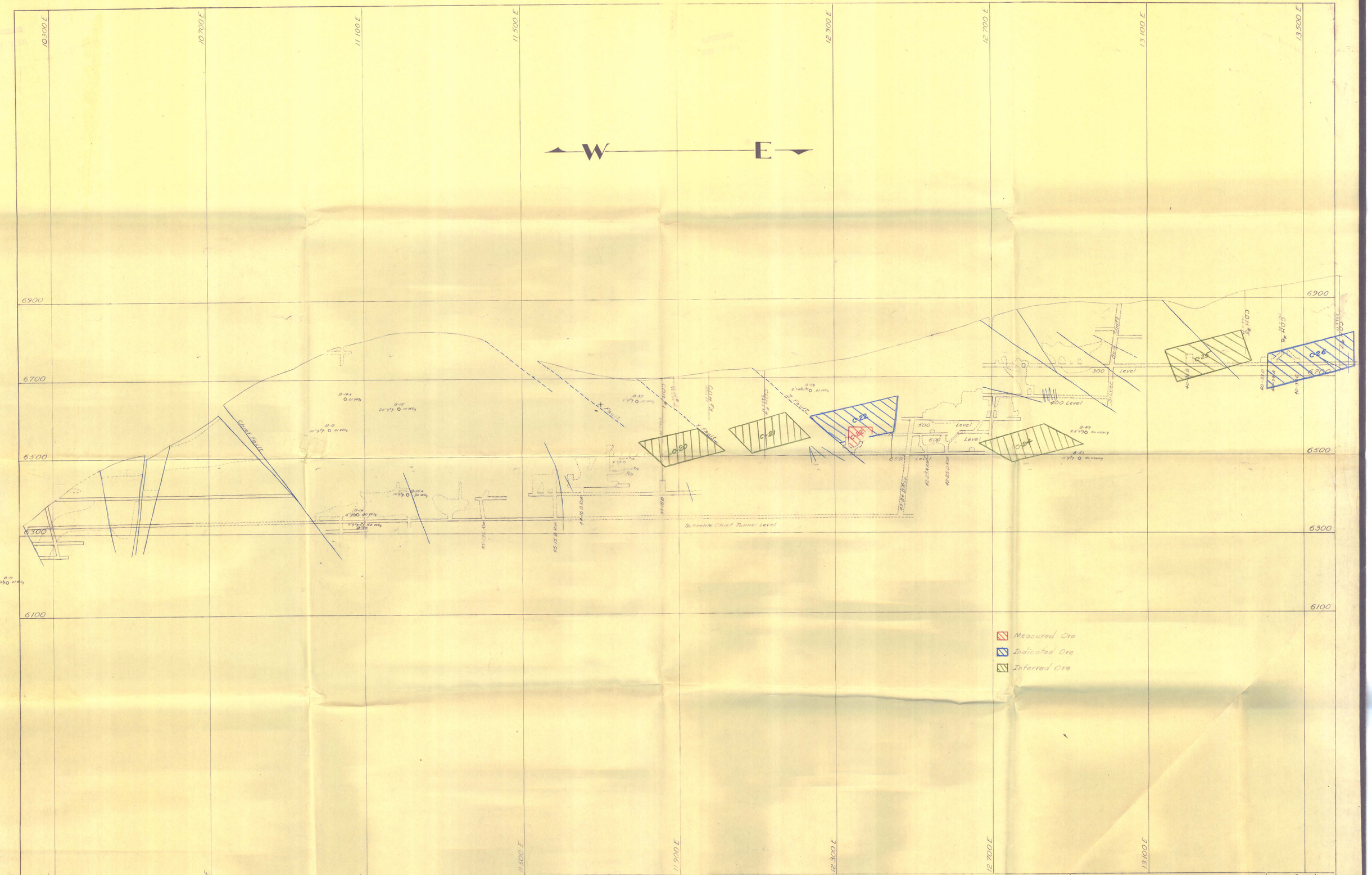


VERTICAL PROJECTION

REVISIONS	REFERENCES: BASE MAPS – DM LEMMON U.S.G.S.	WORK: DRAWN R.H. GODBE 8-1-52; TRACED; CHECKED P. GEMMILL 8-5-52; APPROVED	COMBINED METALS REDUCTION CO. PIOCHE, NEVADA	MINERVA TUNGSTEN PROPERTY ~EXPLORATION PROPOSALS~ SCHEELITE CHIEF AND SILVER BELL MINE AREAS

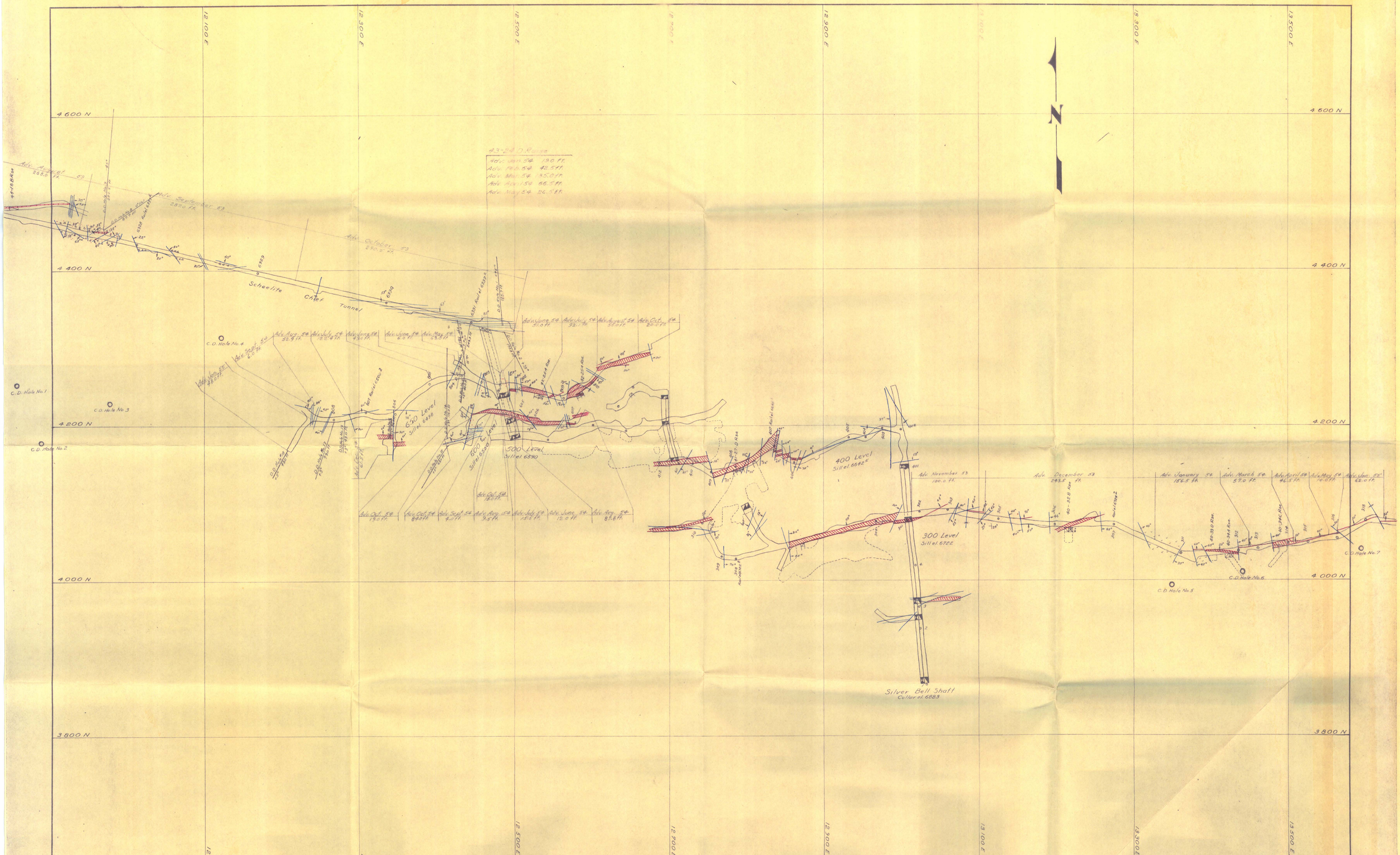
SCALE 1" = 300'

C-1107



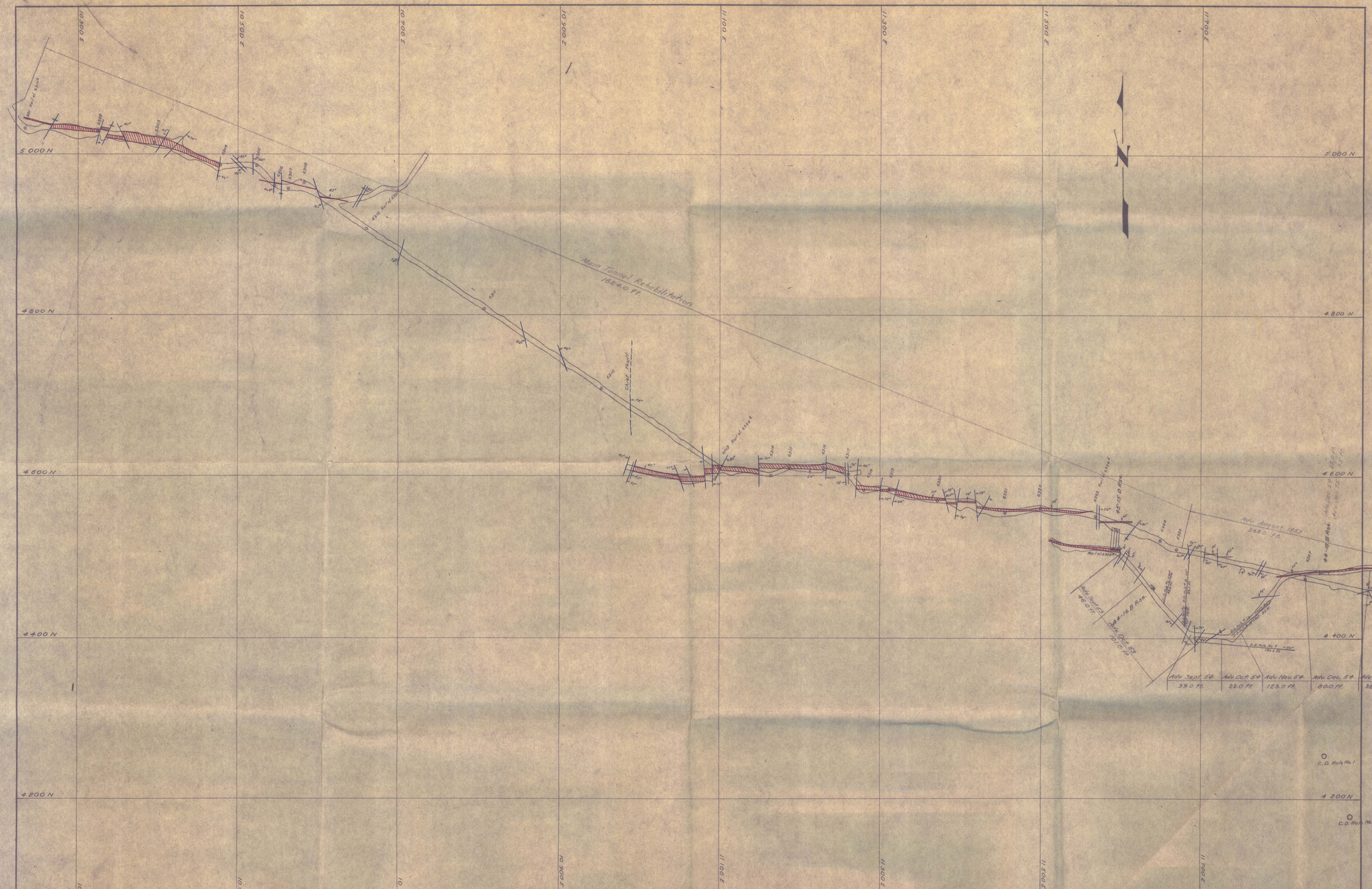
REVISIONS		DRAWN KEA 10-6-54	COMBINED METALS REDUCTION CO. PIOCHE NEVADA
REFERENCES		TRACED	VERTICAL PROJECTION SCHEELITE CHIEF FISSURE
		CHECKED	SCALE 1" = 100'
		APPROVED	D-1222

SALT LAKE BLUE



REVISIONS		D-1219	DRAWN Schroder 3-30-55	COMBINED METALS REDUCTION CO.	SILVER BELL MINE and East End SCHEELITE CHIEF
REVISIONS		Docket No. DMEA 2668 Contract No. IDM-E 481	TRACED	Pioche, Nevada	SCALE 1" = 50'
			CHECKED		D-1228
			APPROVED		

CEBCO 1000-H



REVISIONS		REVISIONS		REFERENCES	D-1225 Dec Ret No. DM-EA 2688 Contract No. DM-E 461

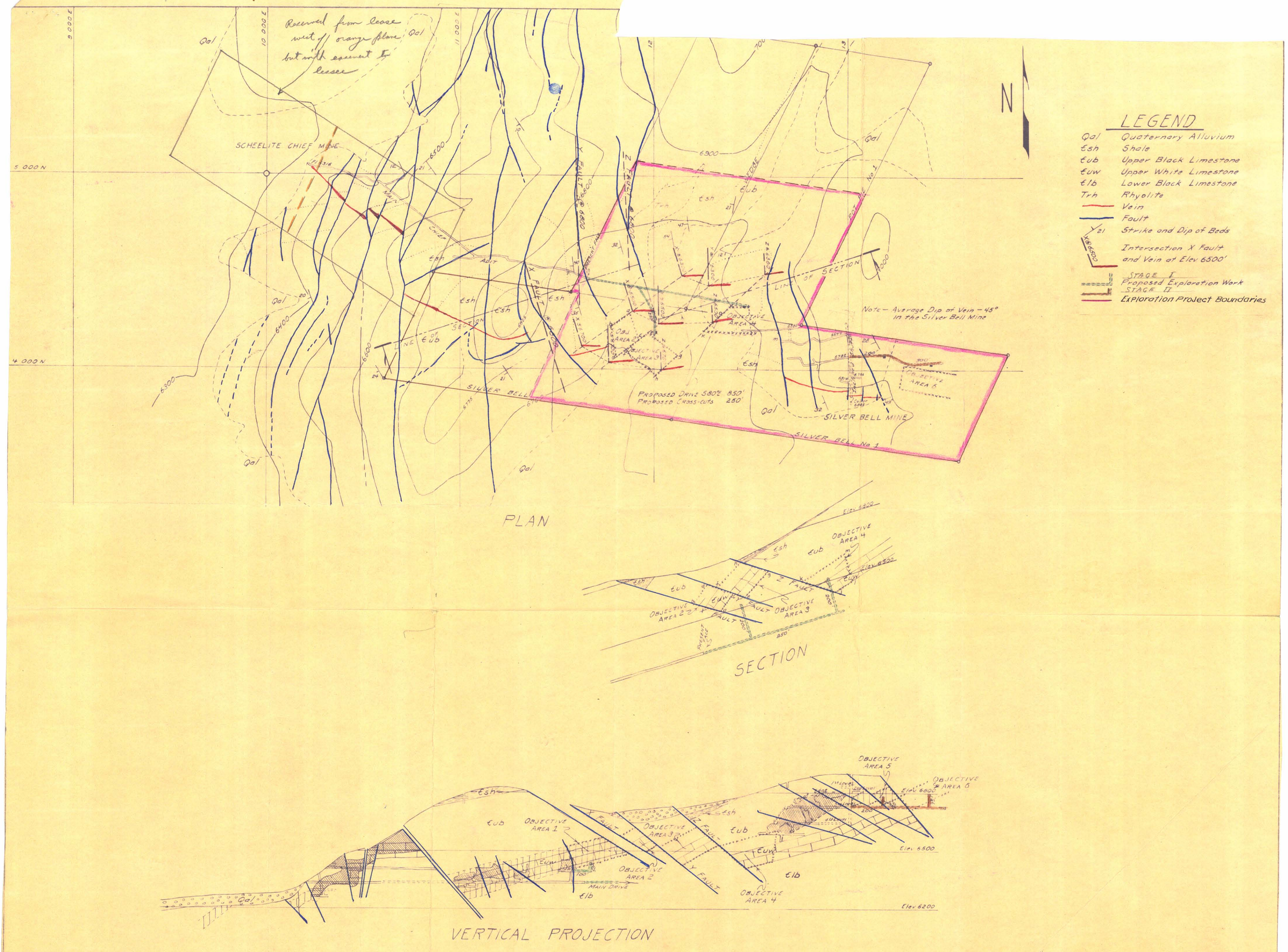
DRAWN	Schrader	3-30-59
TRACED		
CHECKED		
APPROVED		

COMBINED METALS REDUCTION CO.
Pioche, Nevada

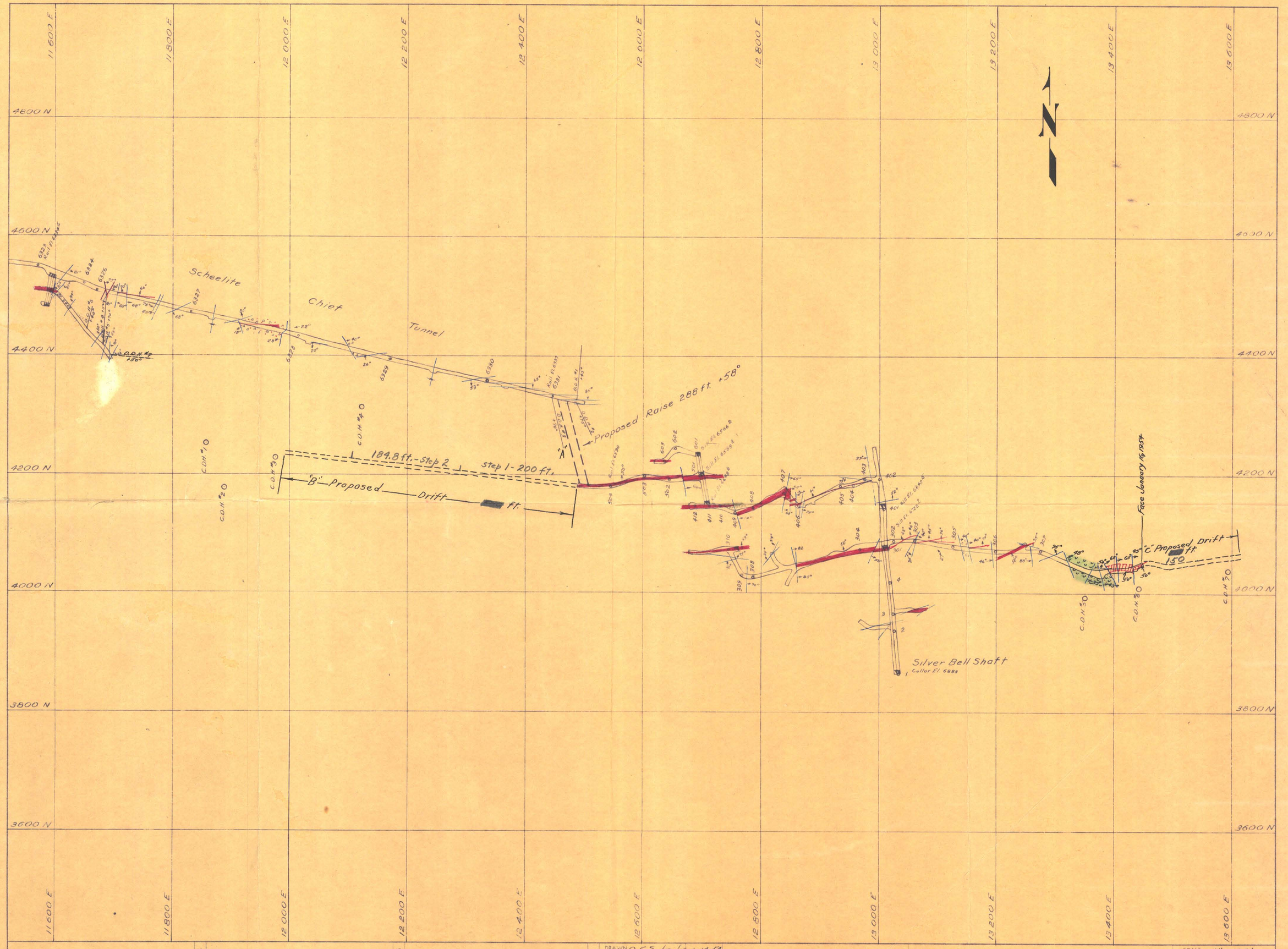
Portal and West End
SCHEELITE CHIEF TUNNEL

SCALE 1" = 50'
D-1229

CEBCO 1000-H



REVISIONS	REFERENCES: BASE MAPS – D.M. LEMMON U.S.G.S.	WORK: DRAWN R.H. GODBE 8-1-52; TRACED; CHECKED P. GEMMILL 8-5-52; APPROVED	COMBINED METALS REDUCTION CO. PIOCHE, NEVADA	MINERVA TUNGSTEN PROPERTY ~EXPLORATION PROPOSALS~ SCHEELITE CHIEF AND SILVER BELL MINE AREAS	SCALE 1" = 300' C-1107



REVISIONS		REFERENCES	
WORK	DRAWN O.E. Schrader 1-14-54		
	TRACED		
	CHECKED R.H. Godbe 1-14-54		
	APPROVED		

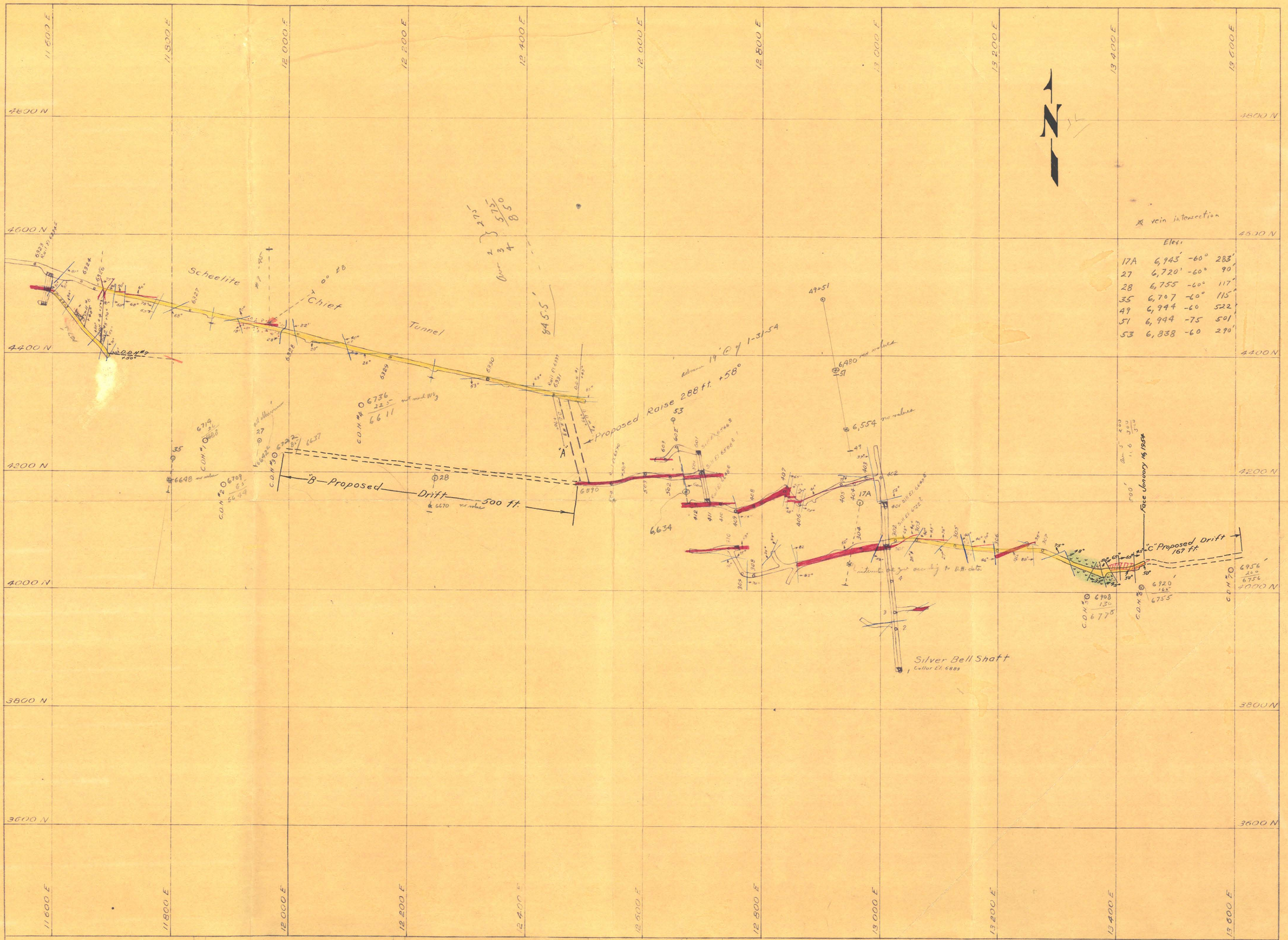
COMBINED METALS REDUCTION CO.
MINERVA TUNSTEN PROP
M.I.A. MINES
WHITE PINE CO. NEV.

COMPOSITE SILVER BELL AND EAST END SCHEELITE CHIEF MINE

SCALE 1" = 100'

C-1112

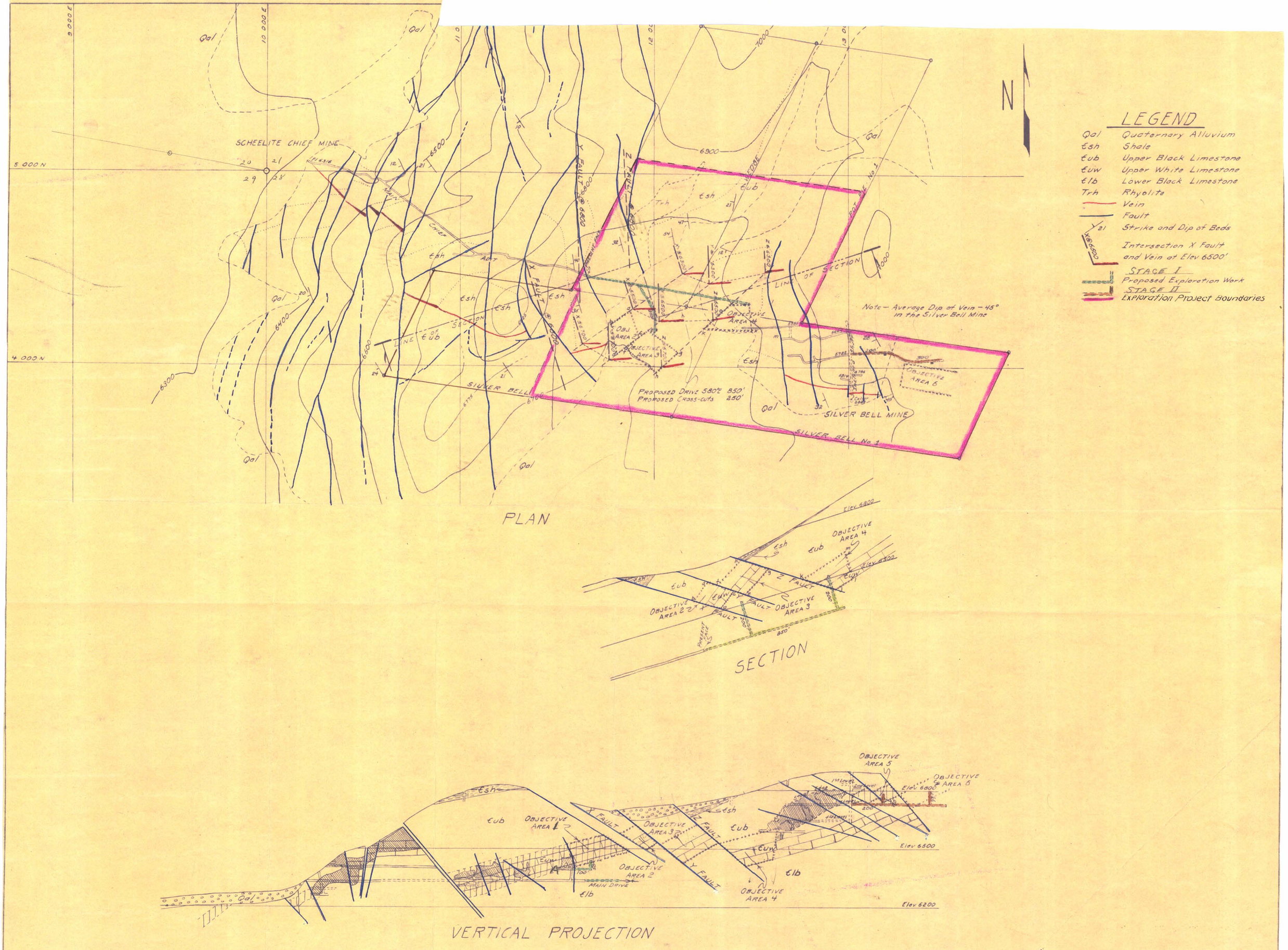
Printed on Imperial Cloth–Salt Lake Blue



REVISIONS	REFERENCES	WORK		
		DRAWN O.E. Schroder	1-14-54	COMBINED METALS REDUCTION CO. MINERVA TUNSTEN PROP M.I.A. MINES WHITE PINE CO. NEV.
		TRACED		COMPOSITE SILVER BELL AND EAST END SCHEELITE CHIEF MINE
		CHECKED R.H. Godbe	1-14-54	SCALE 1" = 100'
		APPROVED		C-1112

(1-21-54)

Printed on Imperial Cloth—Salt Lake Blue



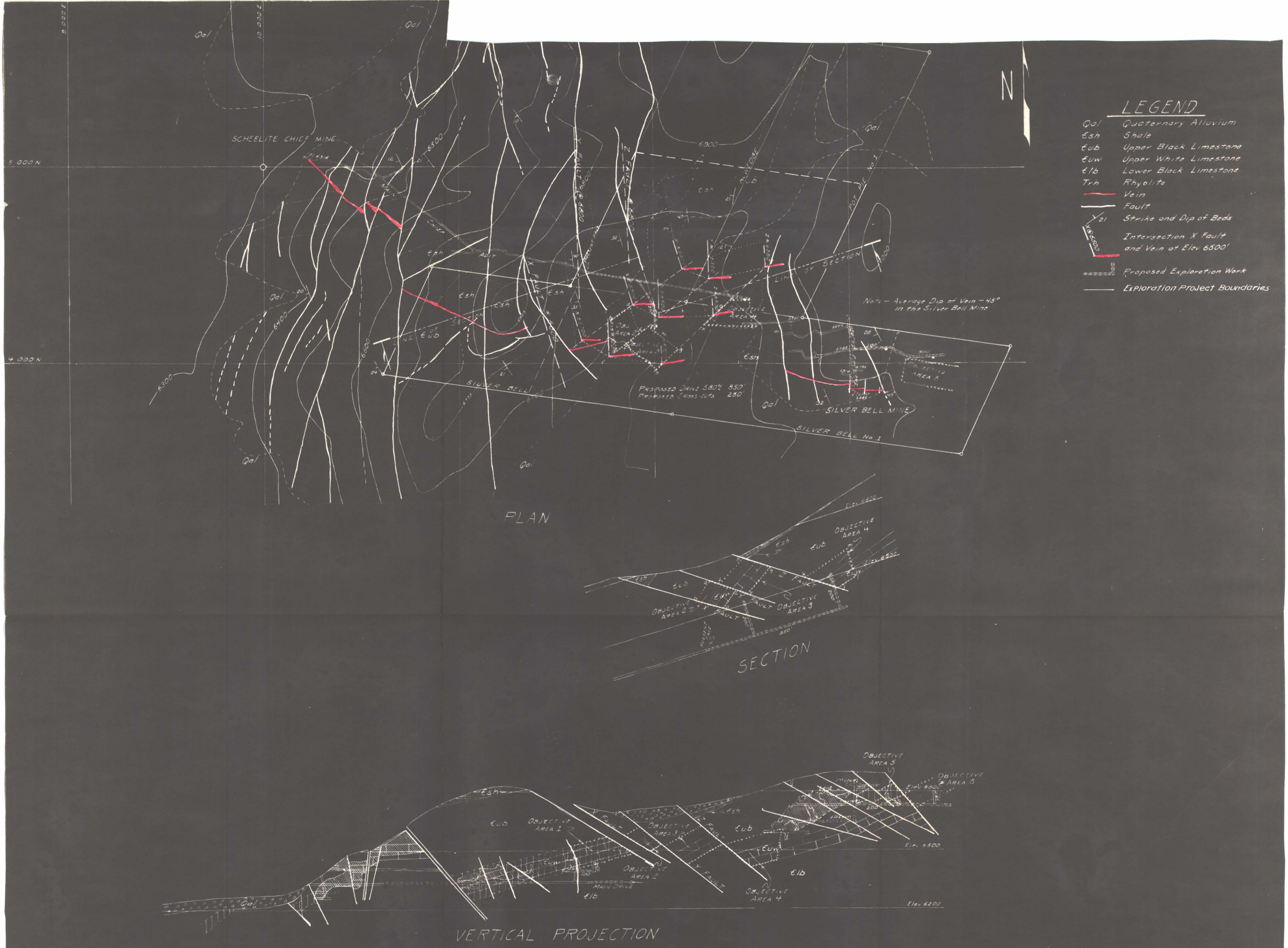
REVISIONS		REFERENCES	BASE MAPS – D.M. LEMMON U.S.G.S.	WORK	DRAWN R.H. GODBE 8-1-52	COMBINED METALS REDUCTION CO. PIOCHE, NEVADA
					TRACED	
					CHECKED P. GEMMILL 8-5-52	
					APPROVED	

MINERVA TUNGSTEN PROPERTY
~EXPLORATION PROPOSALS~
SCHEELITE CHIEF AND SILVER BELL MINE AREAS

SCALE 1" = 300'

C-1107

Salt Lake Blue



BASE MAPS – D.M. LEMMON U.S.G.S.

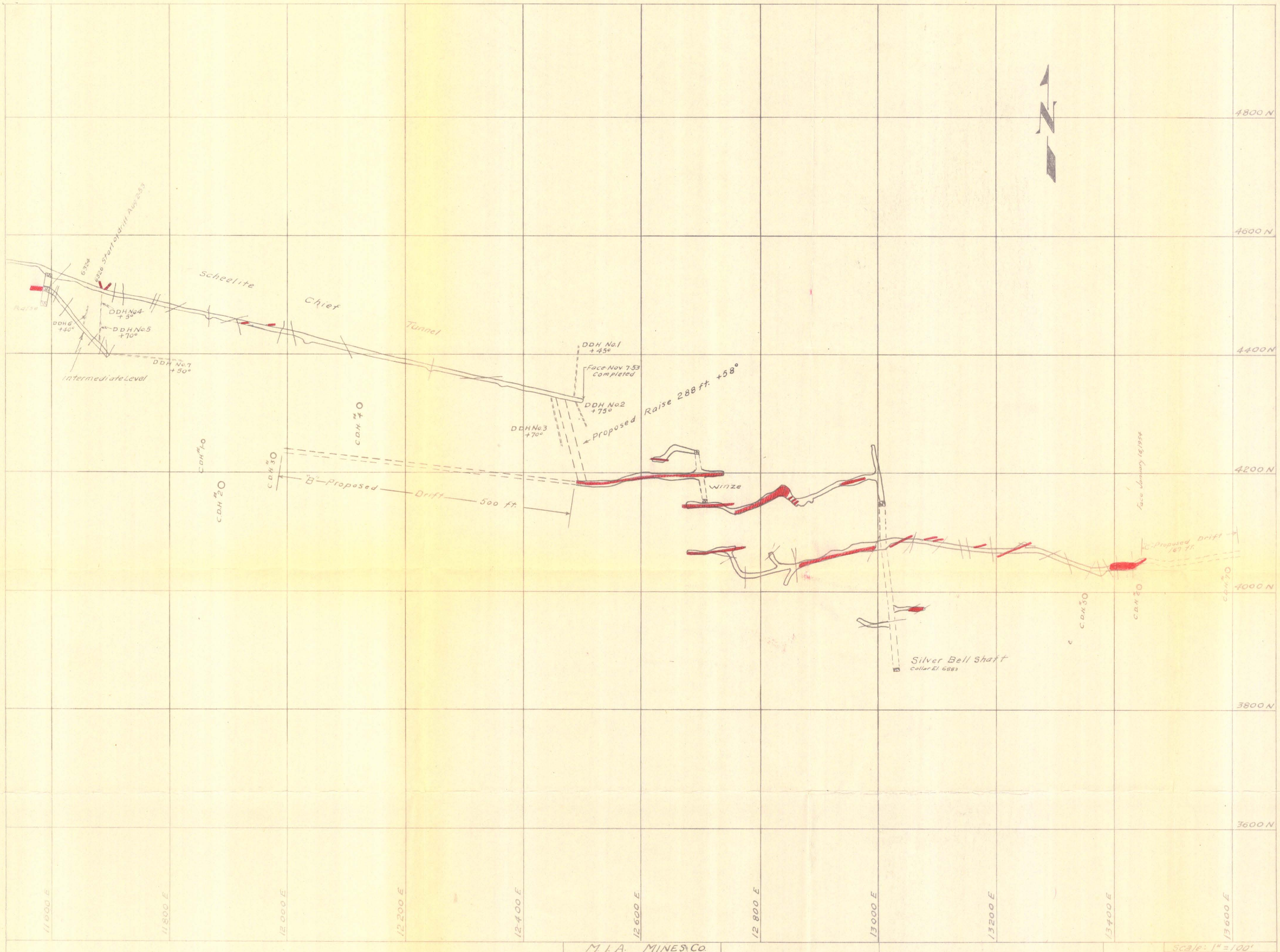
DRAWN R.H. GODBE 8-1-52
TRACED
CHECKED P. GEMMILL 8-5-52
APPROVED

COMBINED METALS REDUCTION CO
PIOCHE, NEVADA

MINERVA TUNGSTEN PROPERTY
~EXPLORATION PROPOSALS~
SCHEELITE CHIEF AND SILVER BELL MINE AREAS

SCALE 1" = 300'

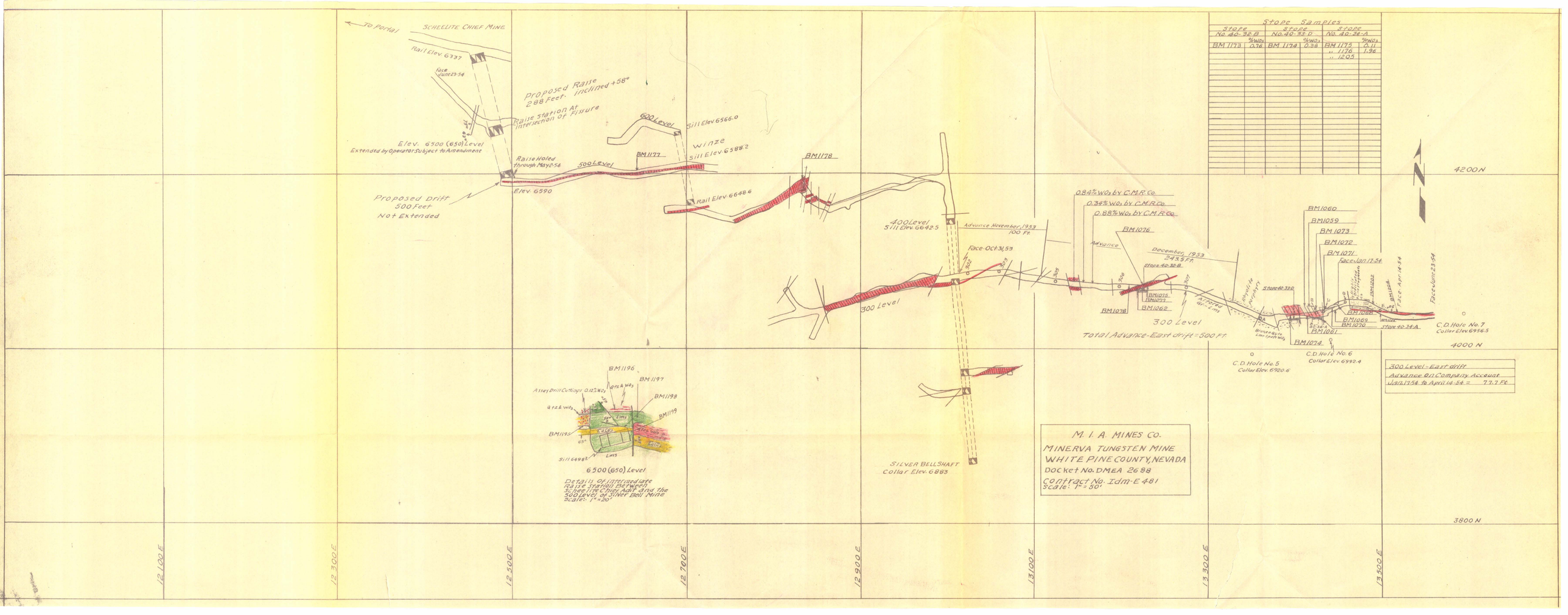
C-1107



M. I. A. MINES Co.
Minerva Tungsten Mine
White Pine County, Nev.
Contract No: Idm-E 481

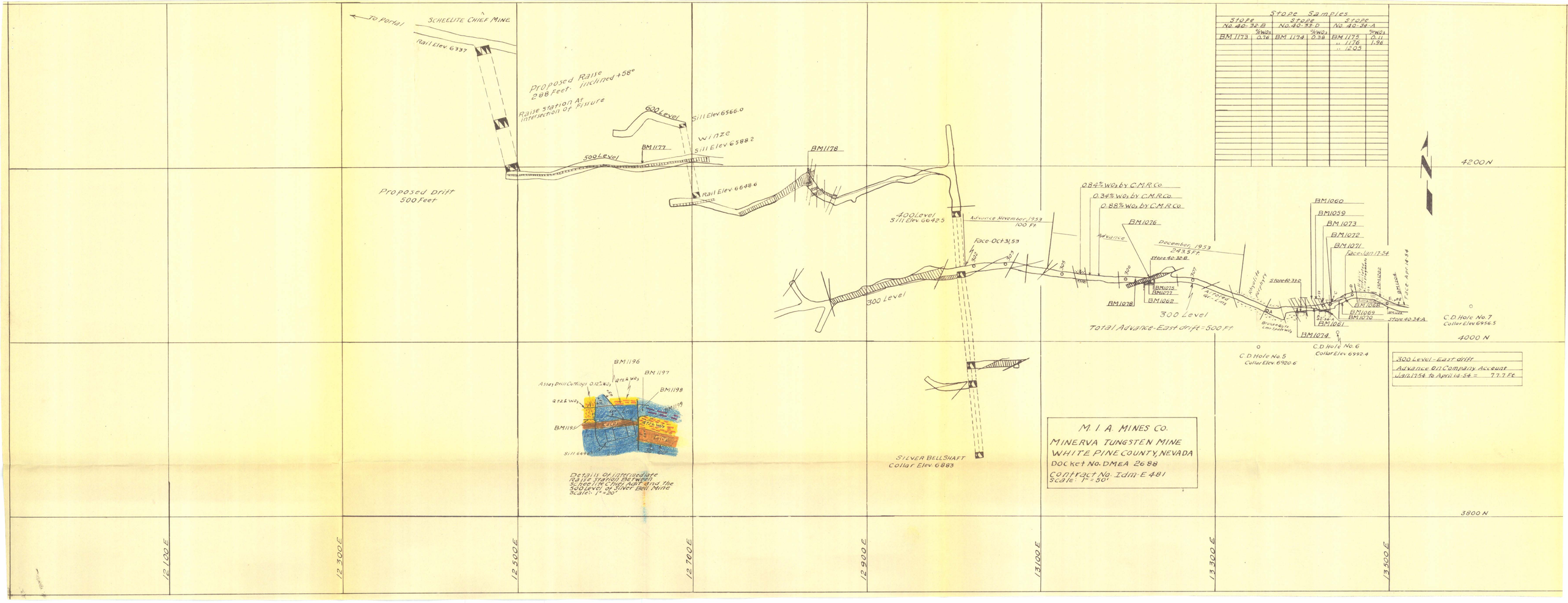
Composite Plan of Silver Bell
And East End
Scheelite Chief Mine

Scale: 1" = 100'



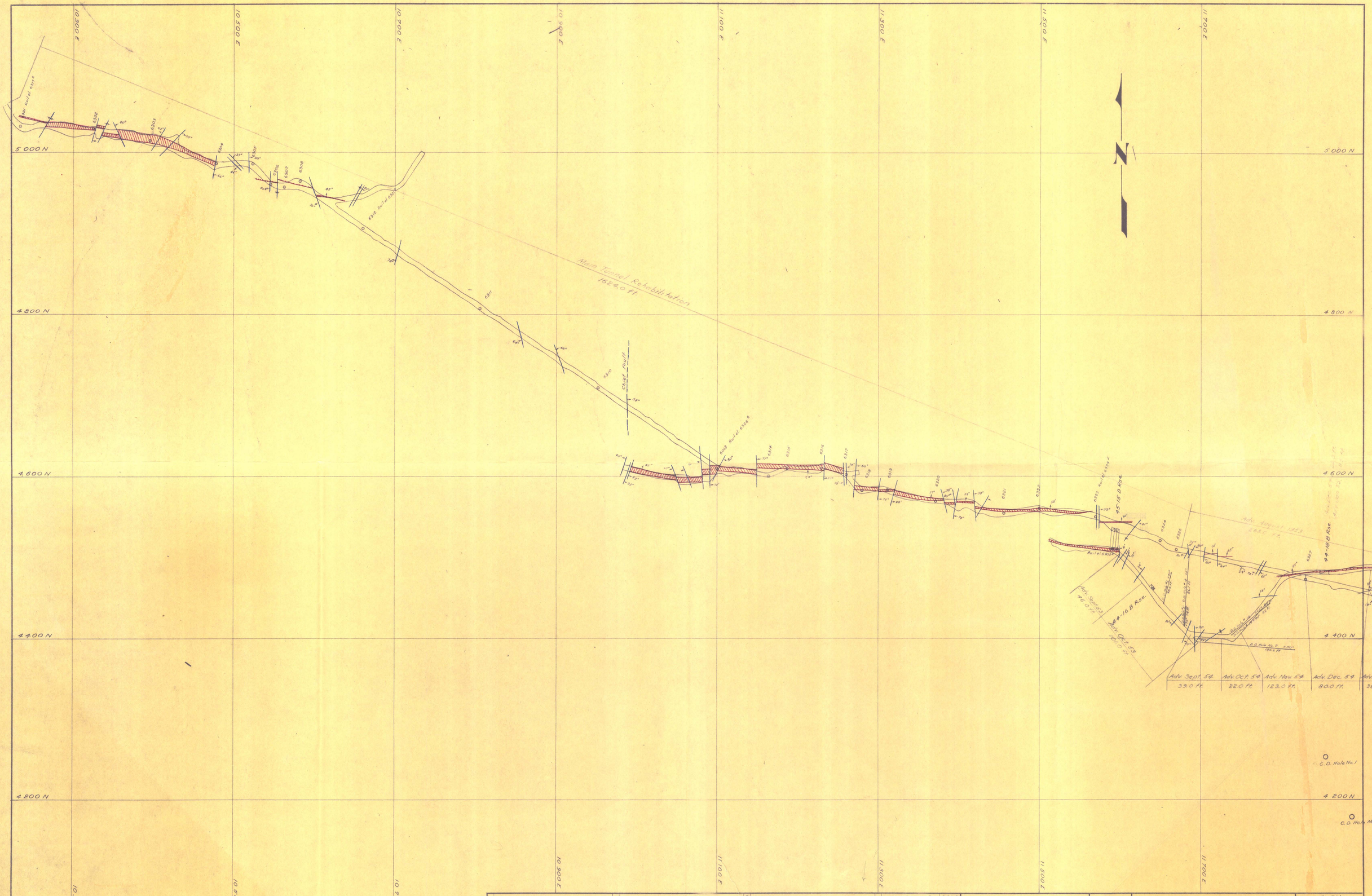
Stope Samples

Stope No. 40-32-B	% WO3	Stope No. 40-32-D	% WO3	Stope No. 40-34-A	% WO3
BM 1173	0.76	BM 1174	0.38	BM 1175	0.11
				" 1176	1.96
				" 1205	



Stope Samples

Stope No. 40-32-B	%WO3	Stope No. 40-33-D	%WO3	Stope No. 40-34-A	%WO3
BM 1173	0.76	BM 1174	0.38	BM 1175	0.21
				" 1176	1.96
				" 1205	



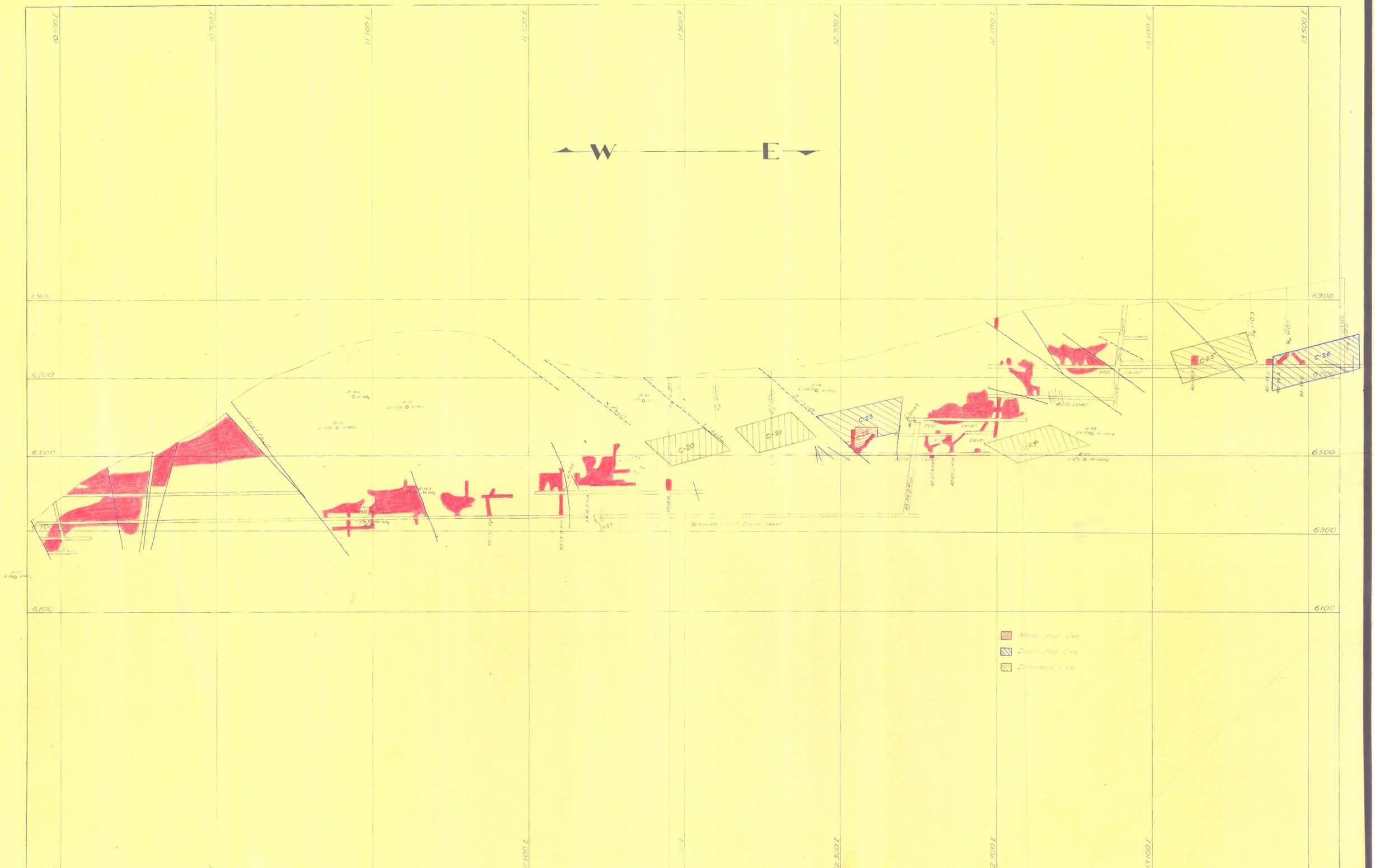
REVISIONS	REFERENCES	D-1225 Docket No. DMEA 2608 Contract No. DMEA 901	WORK	DRAWN Schrader 3-30-55 TRACED CHECKED APPROVED	COMBINED METALS REDUCTION CO. Pioche, Nevada

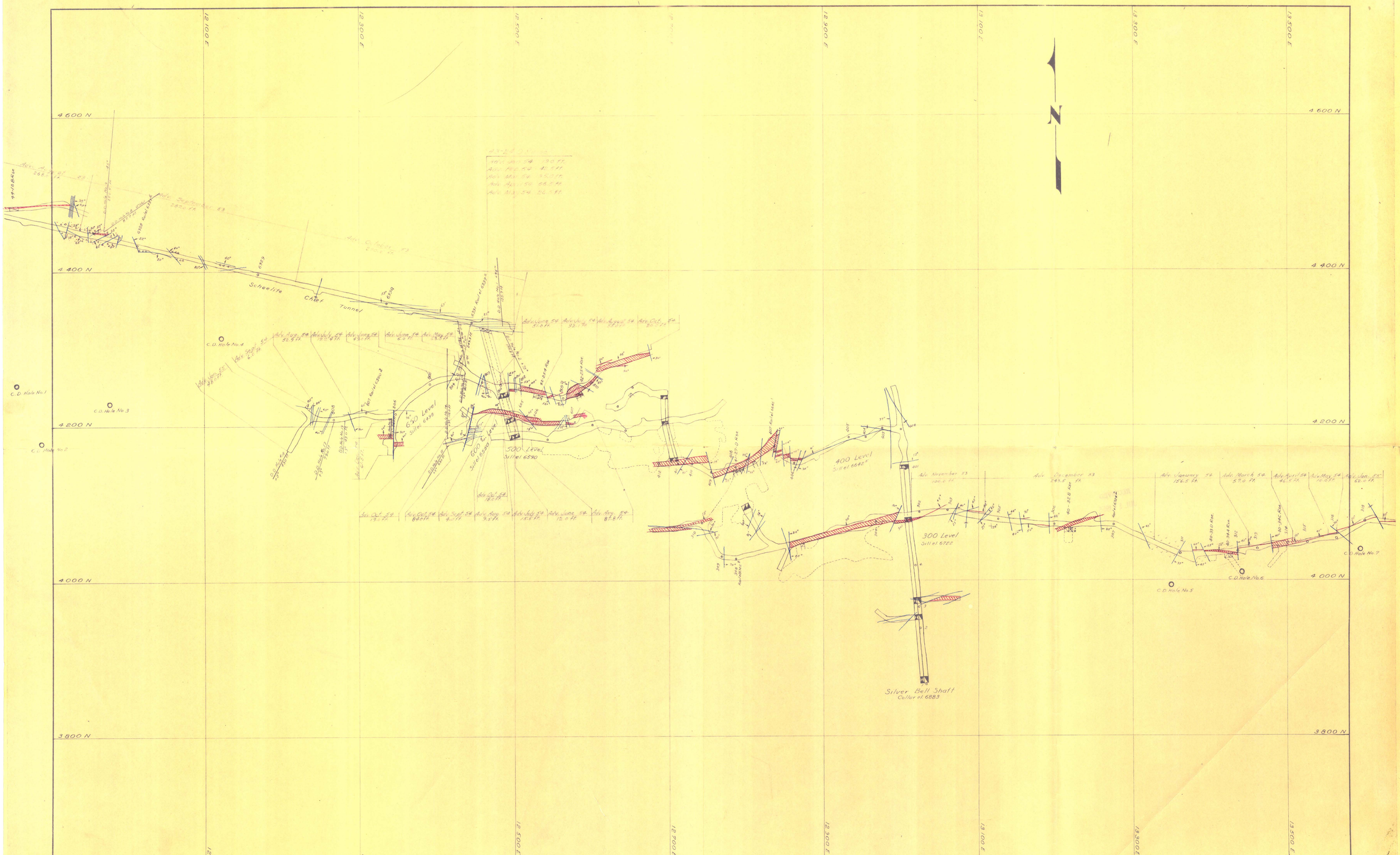
Portal and West End
SCHEELITE CHIEF TUNNEL

SCALE 1" = 50'

D-1229

CESCO 1000-H


W
E
10,300 E
10,700 E
11,100 E
11,500 E
11,900 E
12,300 E
12,700 E
13,100 E
13,500 E
6900
6700
6500
6300
6100
X Fault
Chief Level
Scheelite Chief Tunnel Level
C-23
C-24
C-25
C-26
C-29
C-21
500 Level
400 Level
300 Level
Measured Ore
Indicated Ore
Inferred Ore
DRAWN KEA 10-4-54
TRACED
CHECKED
APPROVED
REVISIONS
REFERENCE
COMBINED METALS REDUCTION CO.
PIOCHE NEVADA
VERTICAL PROJECTION
SCHEELITE CHIEF FISSURE
SCALE 1" = 100'
D-1222
SALT LAKE BLUE



REVISIONS	REVISIONS	REFERENCES: D-1219 Docket No. DMEA 2688 Contract No. 10ME 181	DRAWN Schroder 3-30-55	COMBINED METALS REDUCTION CO. Pioche, Nevada	SILVER BELL MINE and East End SCHEELITE CHIEF	SCALE 1" = 50' D-1228
			TRACED			
			CHECKED			
			APPROVED			

CERCO 1000-H