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James Doyle Sell Mining Collection

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AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

November 20, 1968

J.H.C.
NOV 26 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
EL TIRO PIT AND PORTLAND RIDGE AREAS

During October, 1968, two drills were operated two shifts per day, six days per week. A truck mounted drill completed D-312 in El Tiro Pit and was replaced by a skid mounted drill which began drilling on Portland Ridge, completing F-161 and starting F-163.

The footage drilled and the average direct drilling costs for October, 1968, are:

Drill	Footage Drilled	Advance Per Shift	Average Direct Cost Per Foot
Diamond - Truck	163.9	16.4	$ 9.19
Diamond - Skid	818.3	20.5	11.72
Total	982.2		
		Combined Average	$ 11.19

The attached table summarizes the drilling results.

EL TIRO PIT

Drill hole D-312 was completed in October to a depth of 1,549.6 feet. However, the hole was completely described in last months report. In summary the primary grade in El Tiro was higher than that found in Oxide but decreased rapidly below 1,200 feet. No additional deep drilling in the intrusive rocks is planned at this time.

PORTLAND RIDGE

At the end of October one hole had been completed and two holes were in progress on Portland Ridge. The completed hole, F-161, is marginal while the adjacent hole to the east, F-163 (completed in November), encountered 183 feet of ore assaying 1.10/0.02, beginning at a depth of 125.7 feet. The remaining hole encountered a thick but sub-marginal chalcocite zone. Four angle holes are planned at this time in an effort to establish continuity of the ore under areas which may be too precipitous to drill vertically. The footages drilled in October are described below.

F-161

This hole was drilled from 81.2 feet to a final depth of 471.3 feet in October. The hole is entirely in a strongly altered fine grained rock which most closely resembles syenodiorite. Leached capping containing abundant jarosite and live limonite graded into sulfides at about 120 feet. The chalcocite ore occurred in two zones where it was locallized by faulting and brecciation and massive pyrite veins. Within the ore zones the pyrite content varied from an estimated 2 to 15 percent while surrounding rock containing about 1 percent disseminated pyrite was leach and waste in grade. A broad fault zone from 188.6 to 207.0 feet contained two high grade assays. The primary grade at the bottom of the hole averaged only 0.04 percent copper.

F-162

This hole is located between two angle holes, F-77 and F-84, which were drilled due south from the north slope several years ago. The plan view of the ore intercepts in these holes is shown on the accompanying map. However, no additional ore was found in hole F-162 down to a depth of 330.7 feet in October.

The hole was collared in strongly altered syenodiorite (?) containing live limonite and very strong sericite. Partially oxidized sulfides with abundant limonite were penetrated from 41.7 feet to 195.1 feet. This was followed by sub-marginal grade chalcocite values. The existance of sulfides undergoing oxidation near the surface while oxidation had penetrated to about 200 feet indicates recent uplift and destruction of the ore zone.

A breccia zone beginning at 277.1 feet and continuing to 324.0 feet contains angular fragments in a dark matrix of sulfides and quartz. This zone, unlike most zones of this type, yields low assays indicating the dark color of the matrix is not due to chalcocite. A quartz vein was penetrated at 324.0 feet and continued to 330.7 feet at the end of the month.

F-163

After F-161 encountered a marginal ore zone it was decided to drill at least one additional hole to the east. Like many holes in this area stranded sulfide zones were found near the surface. These occurred in the intervals 45.9 to 59.2 and 77.6 to 95.3 feet, both intervals contain chalcocite ore. The intervening rock is strongly oxidized and contains only a trace of sulfide. The hole was at 103.4 feet in completely leached syenodiorite at the end of October. (A 183.0 foot thick ore zone averaging 1.10/0.02, beginning at 125.7 feet was penetrated in November).

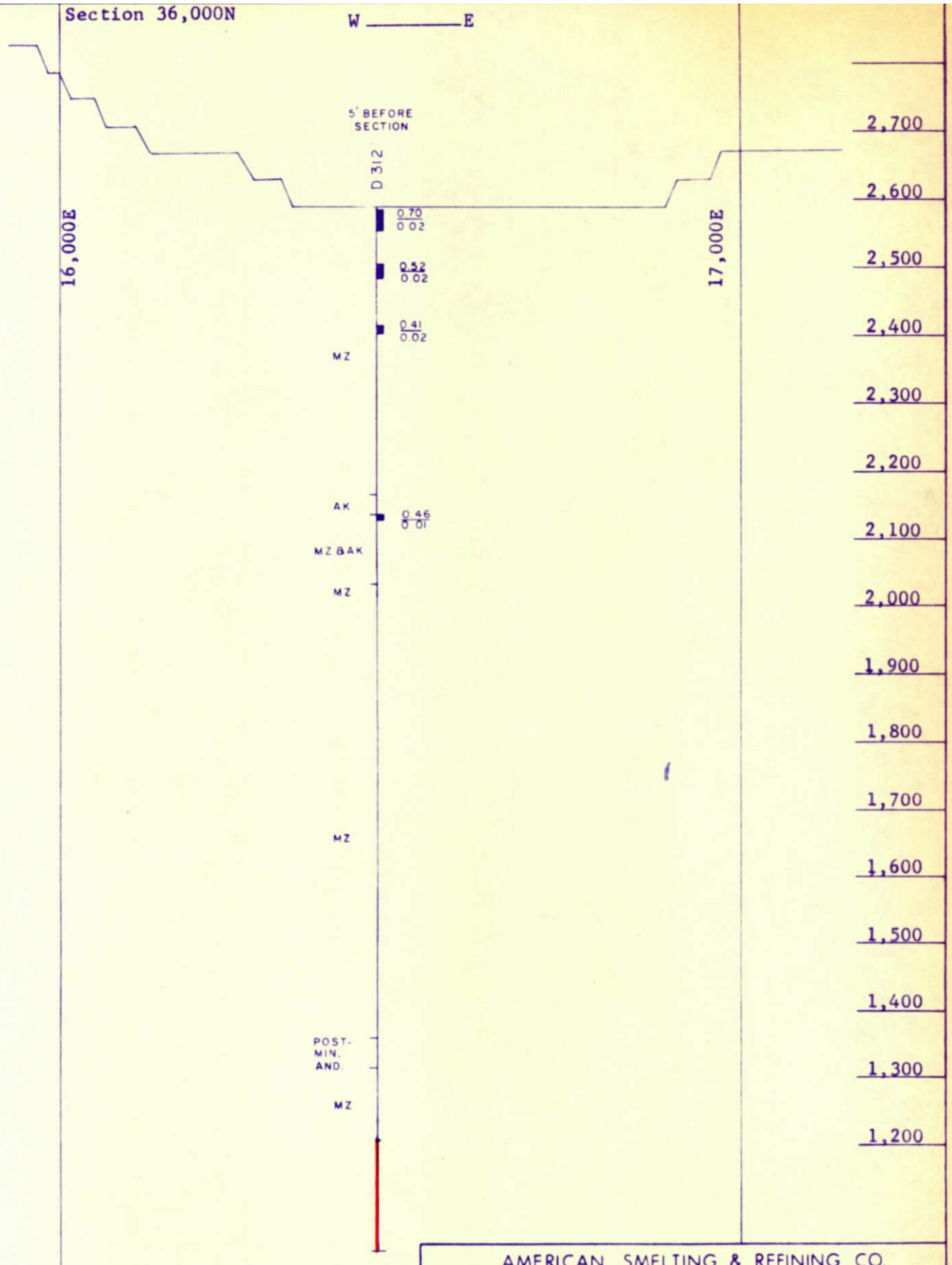
R. C. Edmiston

R. C. Edmiston
Resident Geologist

RCE:jca

DIAMOND DRILLING PROGRESS REPORT - OCTOBER, 1968

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-312	2588.26	35,994.55	16,464.31	No +0.40% intervals				163.9	1,549.6	1,549.6
F-161	3065.22	28,329.22	27,759.78	176.7	56.7	0.56	0.02	384.2	471.3	471.3
				316.0	19.1	1.24	0.03			
F-162	3153.14	28,532.15	28,571.02	No +0.40% intervals				330.7	330.7	-
F-163	3113.26	28,388.59	27,996.32	50.5	8.7	0.48	0.01	103.4	103.4	-
				77.6	17.7	0.54	0.04			
						TOTAL		982.2		



+ 0.4% Total Copper

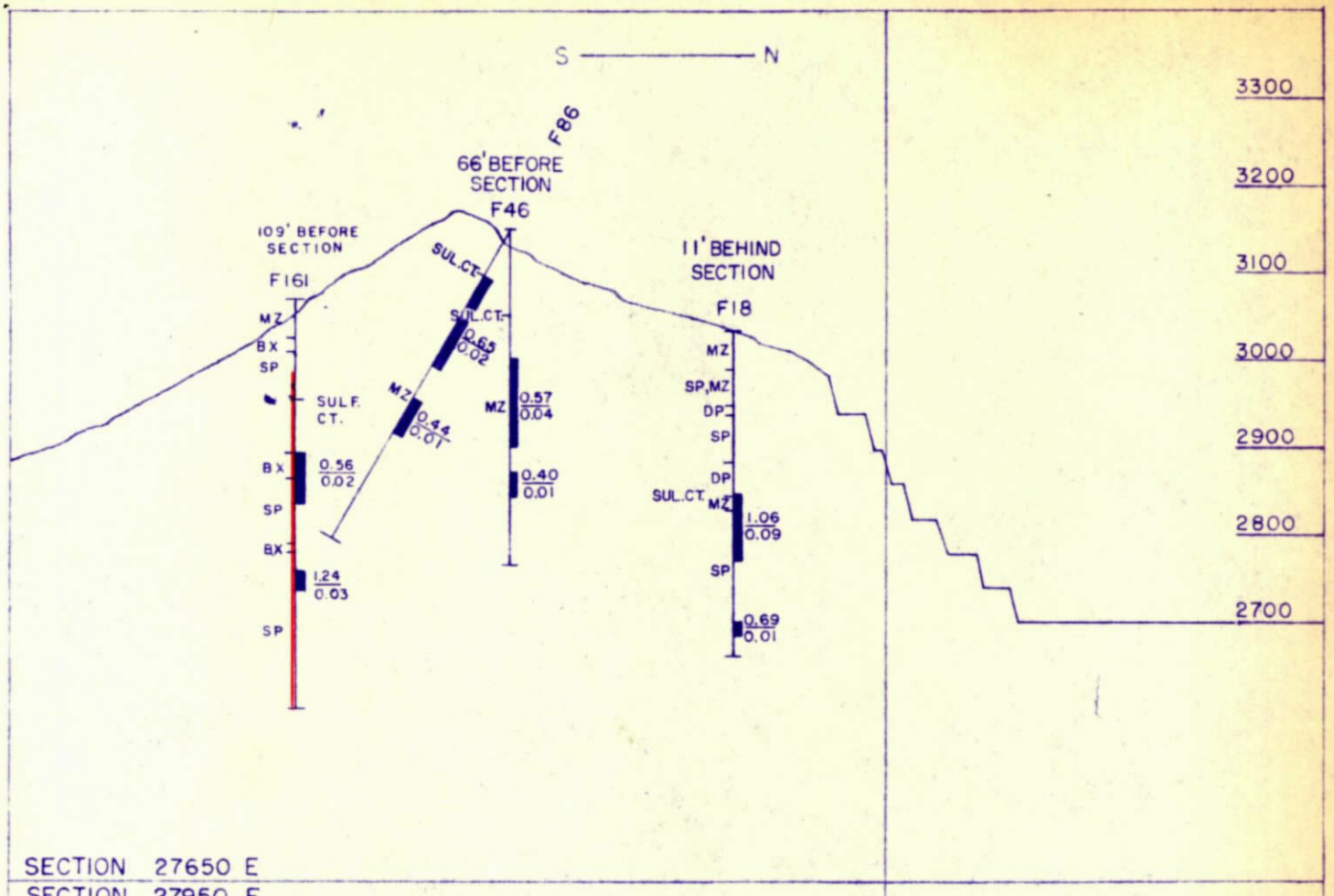
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

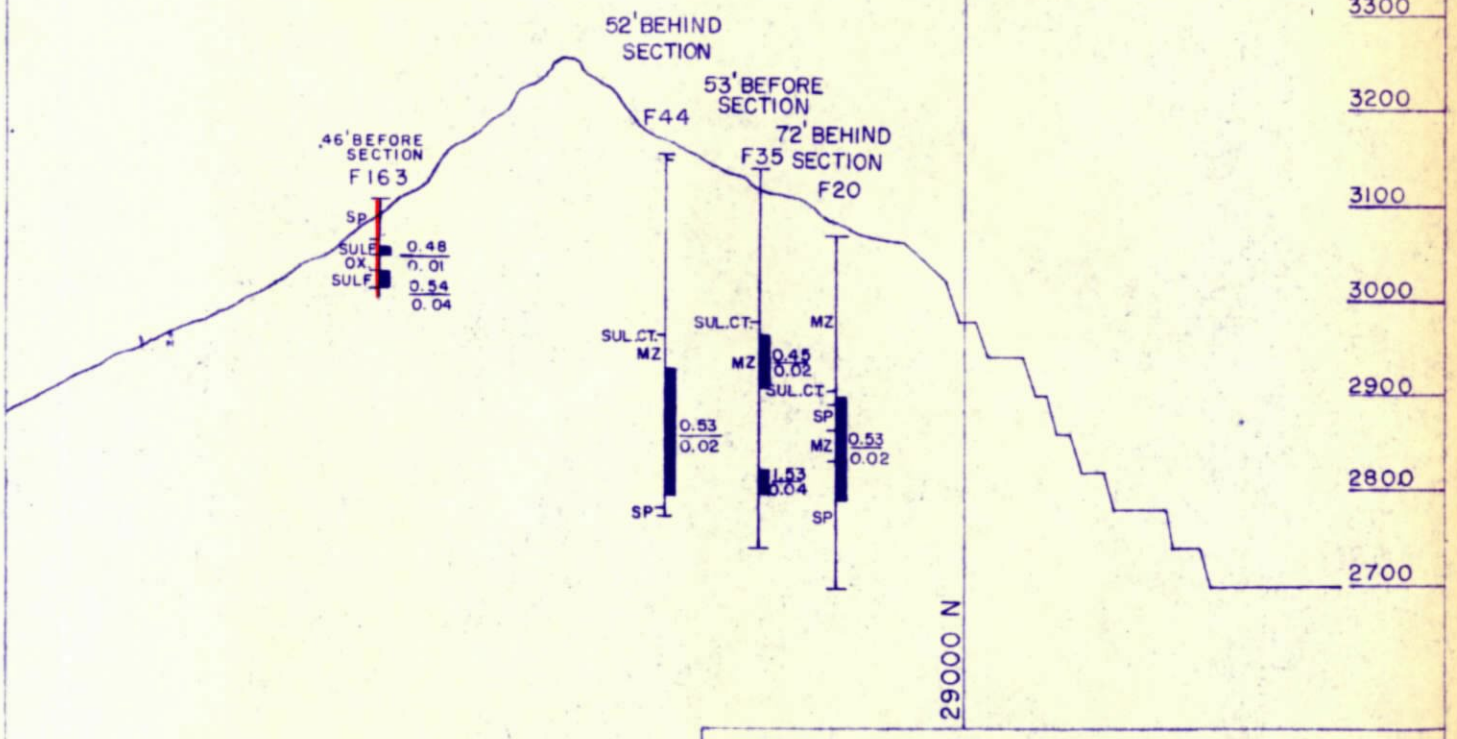
EL TIRO PIT
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	NOV 1 1968	S 121 A



SECTION 27650 E

SECTION 27950 E



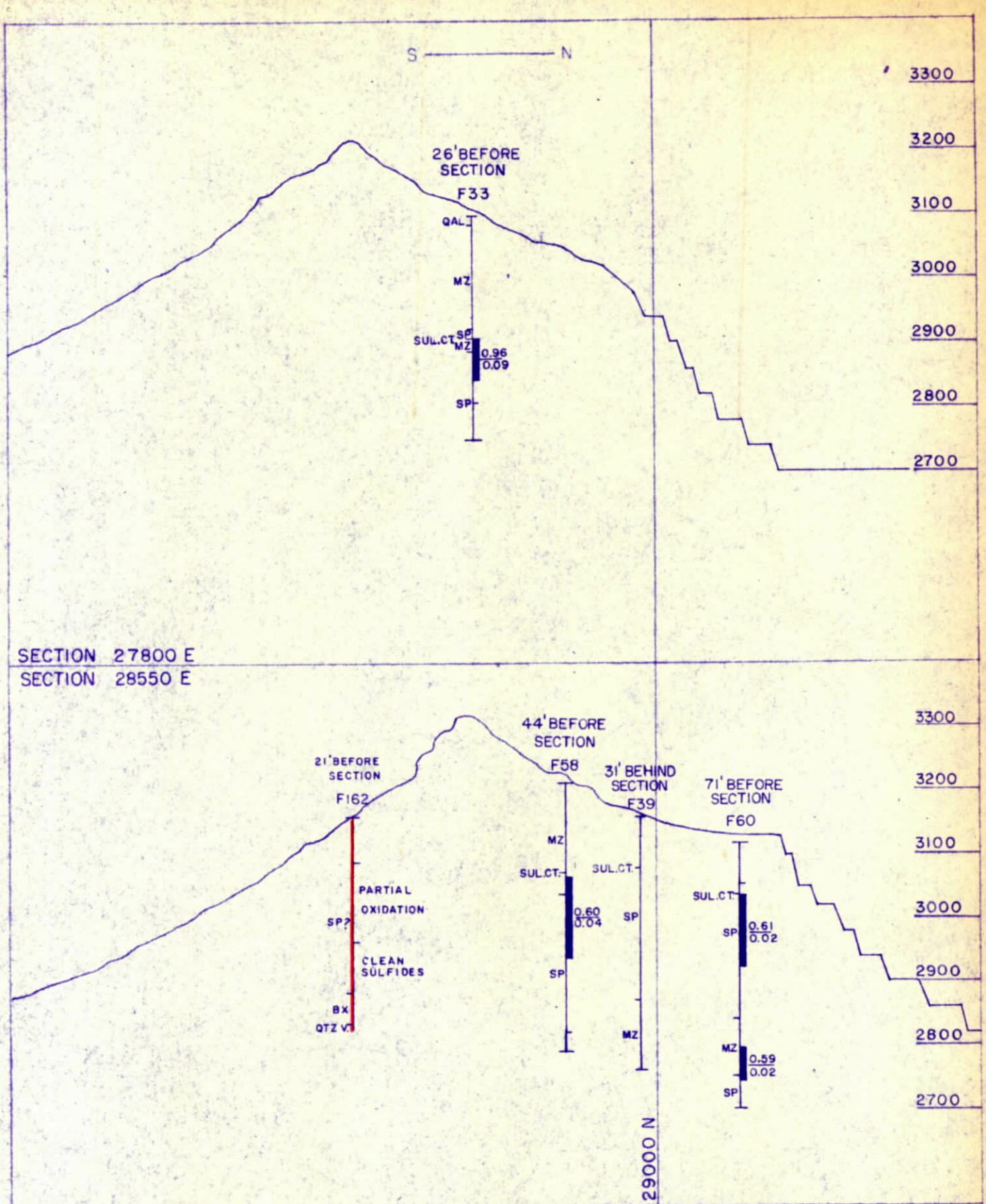
▮ +0.4 % Total Copper Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu / Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

OXIDE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	CWH	NOV 1 1968	S-121- A



+0.4 % Total Copper

Advance for month

Note: Rock Types Generalized

Cu Assay is Total Cu / Non Sul. Cu

AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

OXIDE AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	CWH	NOV 1 1968	S-121- A

MOD.—ST. LEACHED OUTCROPS.
AREA OF OVERALL STRONGEST MINERALIZATION AND ALTERATION.
1-100; OXIDE COPPER CO. CHURN DRILL HOLES
101-188; ASARCO CHURN DRILL HOLES
F-1; OXIDE AREA DIAMOND DRILL HOLES
P-1; PROPOSED DRILL HOLES
HOLES DRILLED OR DRILLING DURING MONTH
WILL CARRY OVERBURDEN[1]
WILL NOT, BUT HAS AT LEAST ONE BENCH OF ORE
WILL NOT, AND HAS LESS THAN ONE BENCH OF ORE
.4 NUMBER OF ORE BENCHES
[1] BASED ON 38¢ COPPER AND 19¢ STRIPPING COST
26000 E
27000 E
28000 E
29000 E
30000 E
29000 N
28000 N
3300
3250
3200
3150
3100
3050
3000
2950
2900
2850
2800
MILL AREA
MODIFIED BY RCE, 9/9/68
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
OXIDE PIT AREA
SCALE: 1" = 200'
DRAWN BY: C W H
DATE: 5/7/63
NOV 1 1968
FILE: S-121-211D

Mr. J. H. Courtright

S-1.1

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

J. H. C.
NOV 6 1968

November 5, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: SILVER BELL UNIT DRILLING PROGRESS REPORT
EL TIRO PIT AND PORTLAND RIDGE AREAS

During October, 1968, two drills were operated two shifts per day, six days per week. A truck mounted drill completed D-312 in El Tiro Pit and was replaced by a skid mount which began drilling on Portland Ridge. Another skid mounted drill drilled throughout the month on Portland Ridge, completing F-161 and starting F-163.

The footage drilled and the average direct drilling costs for October, 1968, are:

Drill	Footage Drilled	Advance Per Shift	Average Direct Cost Per Foot
Diamond - Truck	163.9	16.4	$ 9.19
Diamond - Skid	818.3	20.5	11.72
TOTAL	982.2		
		Combined Average	$ 11.19

The attached table summarizes the drilling results.

R C Edmiston
R. C. Edmiston
Resident Geologist

RCE:jca
cc: TASnedden
CPPollock A/M
RBMeen
JHCourtright (2)
DRJameson (2)
File

DIAMOND DRILLING PROGRESS REPORT - OCTOBER, 1968

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-312	2588.26	35,994.55	16,464.31	No +0.40% intervals				163.9	1,549.6	1,549.6
F-161	3065.22	28,329.22	27,759.78	176.7	56.7	0.56	0.02	384.2	471.3	471.3
				316.0	19.1	1.24	0.03			
F-162	3150	28,550	28,600	No +0.40% intervals				330.7	330.7	-
F-163	3090	28,400	27,950	50.5	8.7	0.48	0.01	103.4	103.4	-
				77.6	17.7	0.54	0.04			
							TOTAL	982.2		

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

November 5, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: SILVER BELL UNIT DRILLING PROGRESS REPORT
EL TIRO PIT AND PORTLAND RIDGE AREAS

During October, 1968, two drills were operated two shifts per day, six days per week. A truck mounted drill completed D-312 in El Tiro Pit and was replaced by a skid mount which began drilling on Portland Ridge. Another skid mounted drill drilled throughout the month on Portland Ridge, completing F-161 and starting F-163.

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Diamond - Truck	163.9	16.4	$ 9.19
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The attached table summarizes the drilling results.

R C Edmiston
R. C. Edmiston
Resident Geologist

RCE:jca
cc: TASnedden
CPPollock A/M
RBMeen
JHCourtright (2)
DRJameson (2)
File

DIAMOND DRILLING PROGRESS REPORT - OCTOBER, 1968

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-312	2588.26	35,994.55	16,464.31	No +0.40% intervals				163.9	1,549.6	1,549.6
F-161	3065.22	28,329.22	27,759.78	176.7	56.7	0.56	0.02	384.2	471.3	471.3
				316.0	19.1	1.24	0.03			
F-162	3150	28,550	28,600	No +0.40% intervals				330.7	330.7	-
F-163	3090	28,400	27,950	50.5	8.7	0.48	0.01	103.4	103.4	-
				77.6	17.7	0.54	0.04			
							TOTAL	982.2		

J.H.C.
NOV 1 1968

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

October 24, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
EL TIRO PIT, OXIDE PIT AND PORTLAND RIDGE AREAS.

During September, 1968, two drills were operated two shifts per day, six days per week. A truck mounted diamond drill drilled throughout the month on hole D-312 in El Tiro Pit. Another truck mounted drill completed F-160 in Oxide Pit and was replaced by a skid mounted drill which began F-161 on Portland Ridge.

The footage drilled and the average direct drilling costs for September, 1968 are:

Drill	Footage Drilled	Advance Per Shift	Average Direct Cost Per Foot
Diamond - Truck	1,166.4	16.7	$ 8.47
Diamond - Skid	81.2	13.5	22.42*
Total	1,247.6		
		Combined Avg.	$ 9.35

* High cost per foot due to dividing total moving cost by small footage drilled during month.

Portland Ridge

F-161 Drill hole F-161 was drilled to a depth of 81.2 feet on the west end of the south slope of Portland Ridge in September. The rock units consisted of monzonite to 43.0 feet followed by a strong breccia zone to 60.0 feet. Syenodiorite (?) occupied the remaining interval. In both monzonite and syenodiorite alteration is strong with a hematite stained groundmass cut by veinlets alternately filled with jarosite and live limonite.

Oxide Pit

F-160 Drill hole F-160 was completed to a final depth of 1500.0 feet from the 2660 level in Oxide Pit during the month of September. A general decline in mineralization occurred from 1,000 feet to 1,500 feet, as shown below. The general intensity of alteration remained about the same with varying amounts of secondary potash being noted throughout. The composite assay for the entire hole is 0.145% total copper. The assays as compiled into 100 foot intervals are:

Depth	Average Assay	Depth	Average Assay
12.0 - 100.0	0.28	800.0 - 900.0	0.19
100.0 - 200.0	0.12	900.0 - 1000.0	0.20
200.0 - 300.0	0.19	1000.0 - 1100.0	0.10
300.0 - 400.0	0.18	1100.0 - 1200.0	0.11
400.0 - 500.0	0.14	1200.0 - 1300.0	0.08
500.0 - 600.0	0.11	1300.0 - 1400.0	0.06
600.0 - 700.0	0.13	1400.0 - 1500.0	0.05
700.0 - 800.0	0.23		

- - - -

EL TIRO PIT

D-132 Drill hole D-312 was deepened from 565.6 feet to 1385.7 feet during September. The advance was in monzonite except for a post-mineral andesite dike from 1232.0 to 1274.3. There is a general increase in primary mineralization from 600.0 feet to 1200.0 feet.followed by a decline from 1200.0 to 1549.6 feet where the hole was stopped in October. The composite assays for the entire hole, including the footage drilled in October are given below.

Depth	Average Assay	Depth	Average Assay
5.0 - 100.0	0.44	900.0 - 1000.0	0.21
100.0 - 200.0	0.29	1000.0 - 1100.0	0.21
200.0 - 300.0	0.22	1100.0 - 1200.0	0.23
300.0 - 400.0	0.26	1200.0 - 1300.0	0.21
400.0 - 500.0	0.26	1300.0 - 1400.0	0.15
500.0 - 600.0	0.22	1400.0 - 1500.0	0.14
600.0 - 700.0	0.16	1500.0 - 1549.6	0.06
700.0 - 800.0	0.18		
800.0 - 900.0	0.20		

The overall average grade of primary mineralization is 0.205% total copper.

Increases and decreases in chalcopyrite are generally accompanied by corresponding fluctuations in silicification rather than potassic alteration. Secondary orthoclase become strongest in bands along fractures near the bottom of the hole, where the mineralization is weakest.

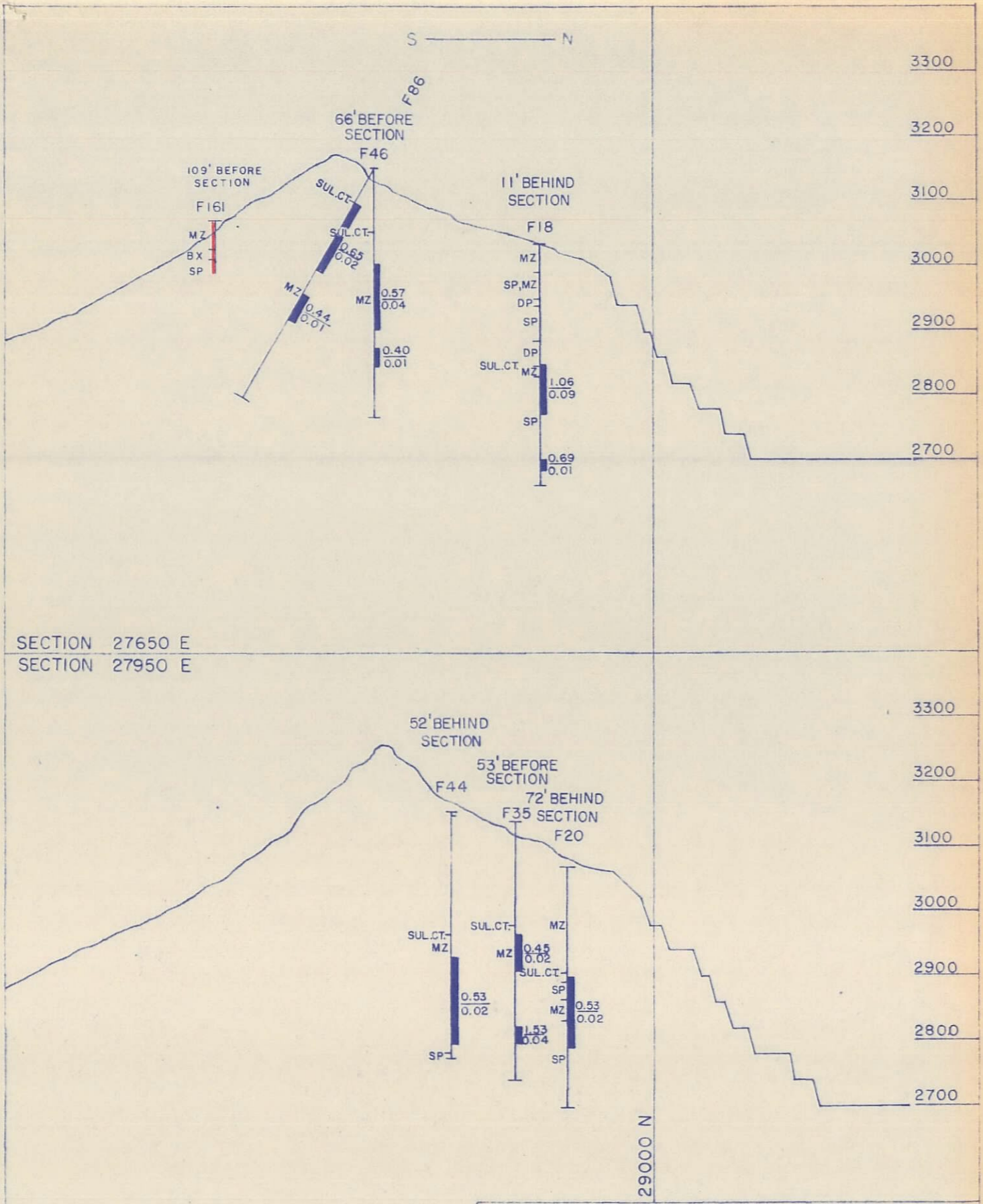
R. C. Edmiston

R. C. Edmiston
Resident Geologist

RCE:jca

DIAMOND DRILLING PROGRESS REPORT - September 1968

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo	Depth End Mo	Final Depth
D-312	2588.26	35,994.55	16,464.31	No +0.40% intervals				820.1	1385.7	-
F-160	2664.30	29,646.85	27,731.34	"	"	"		346.3	1500.0	1500.0
F-161	3065.22	28,329.22	27,759.78	"	"	"		81.2	81.2	-
							TOTAL	1,247.6		



+0.4 % Total Copper

Advance for month

Note : Rock Types Generalized

Cu Assay is Total Cu / Non Sul. Cu

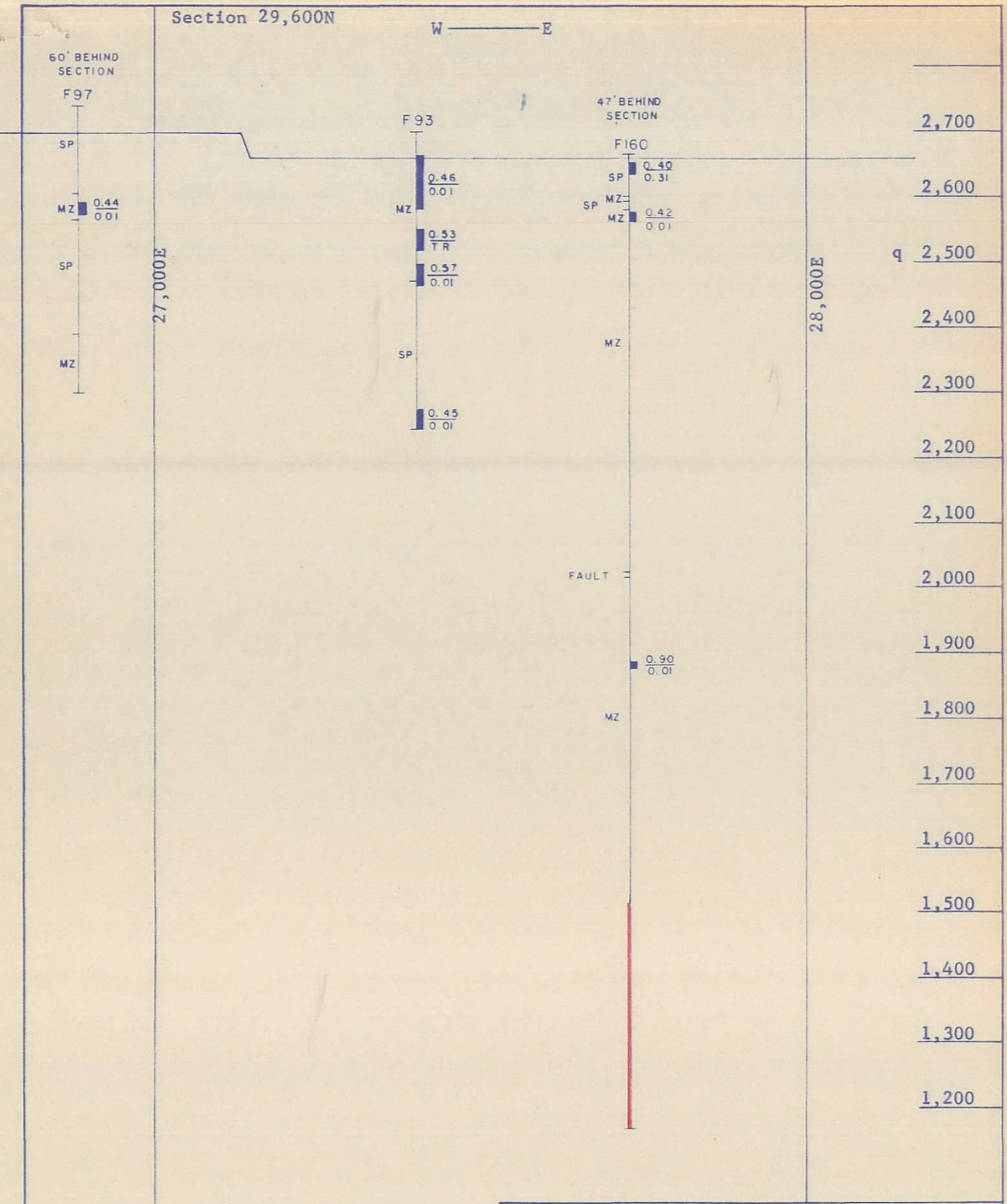
AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

OXIDE AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	CWH	OCT 1 1968	S-121- A



+0.4% Total Copper

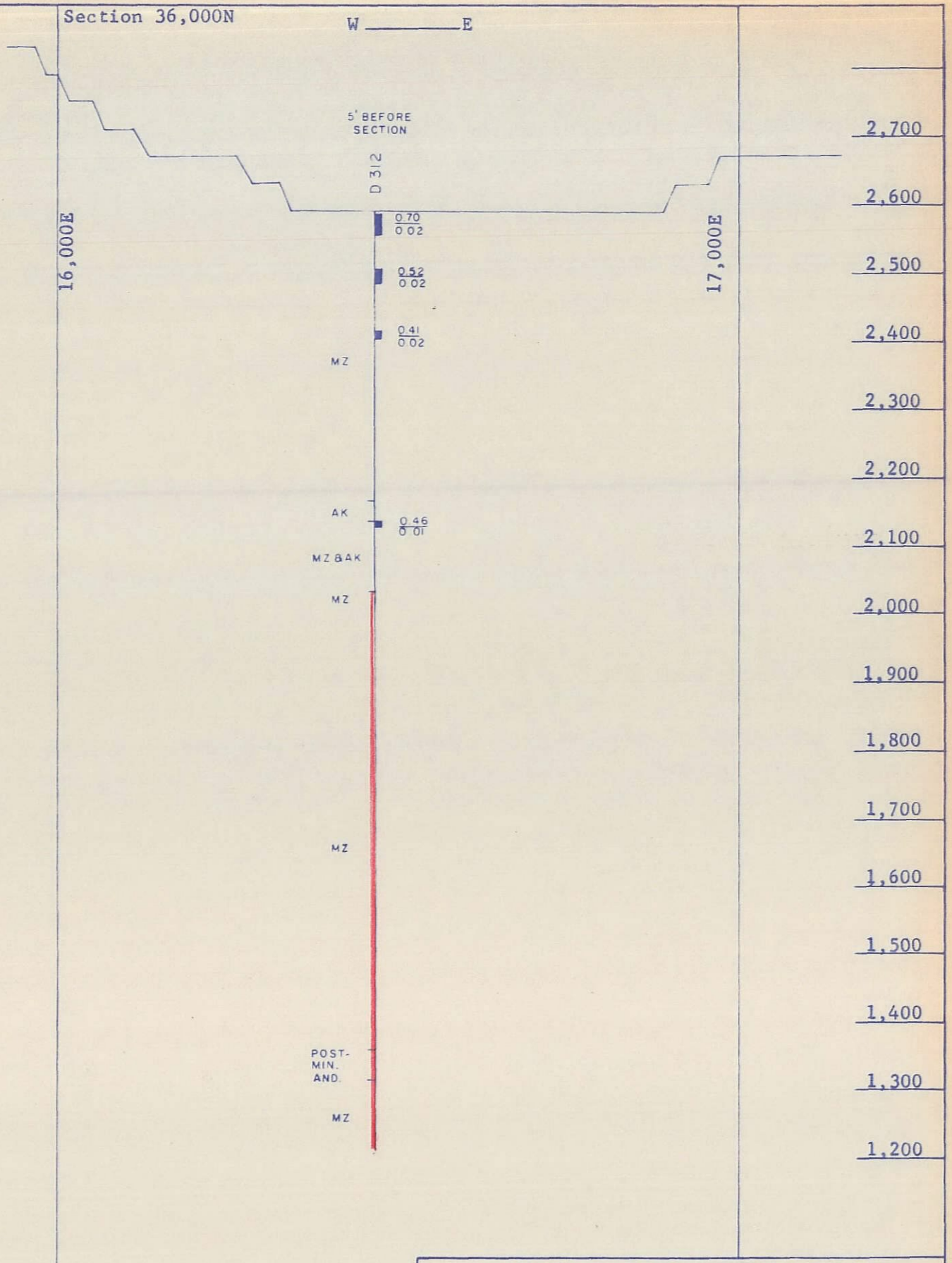
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

OXIDE PIT
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	OCT 1 1968	S 121 A



+0.4% Total Copper

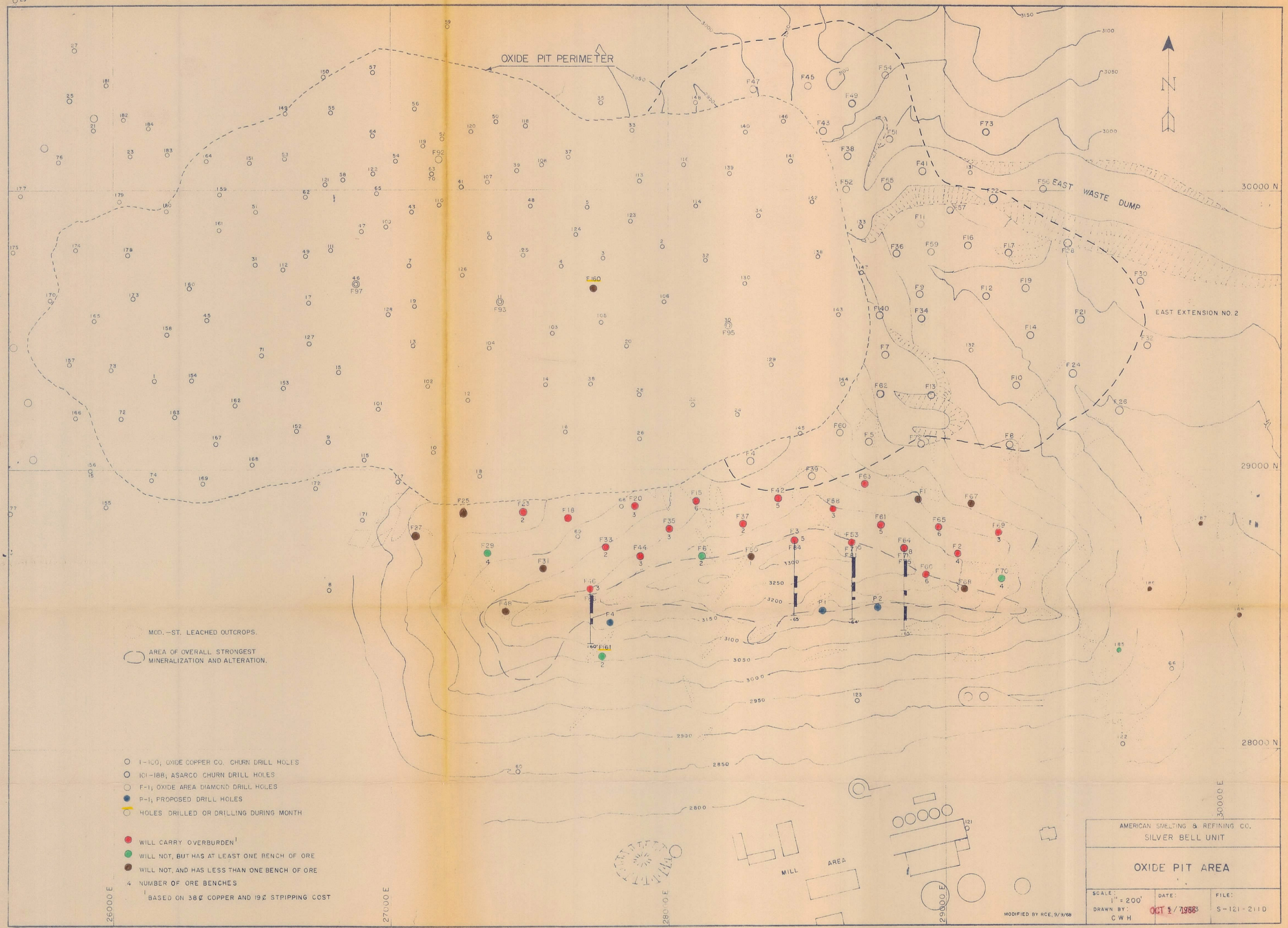
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

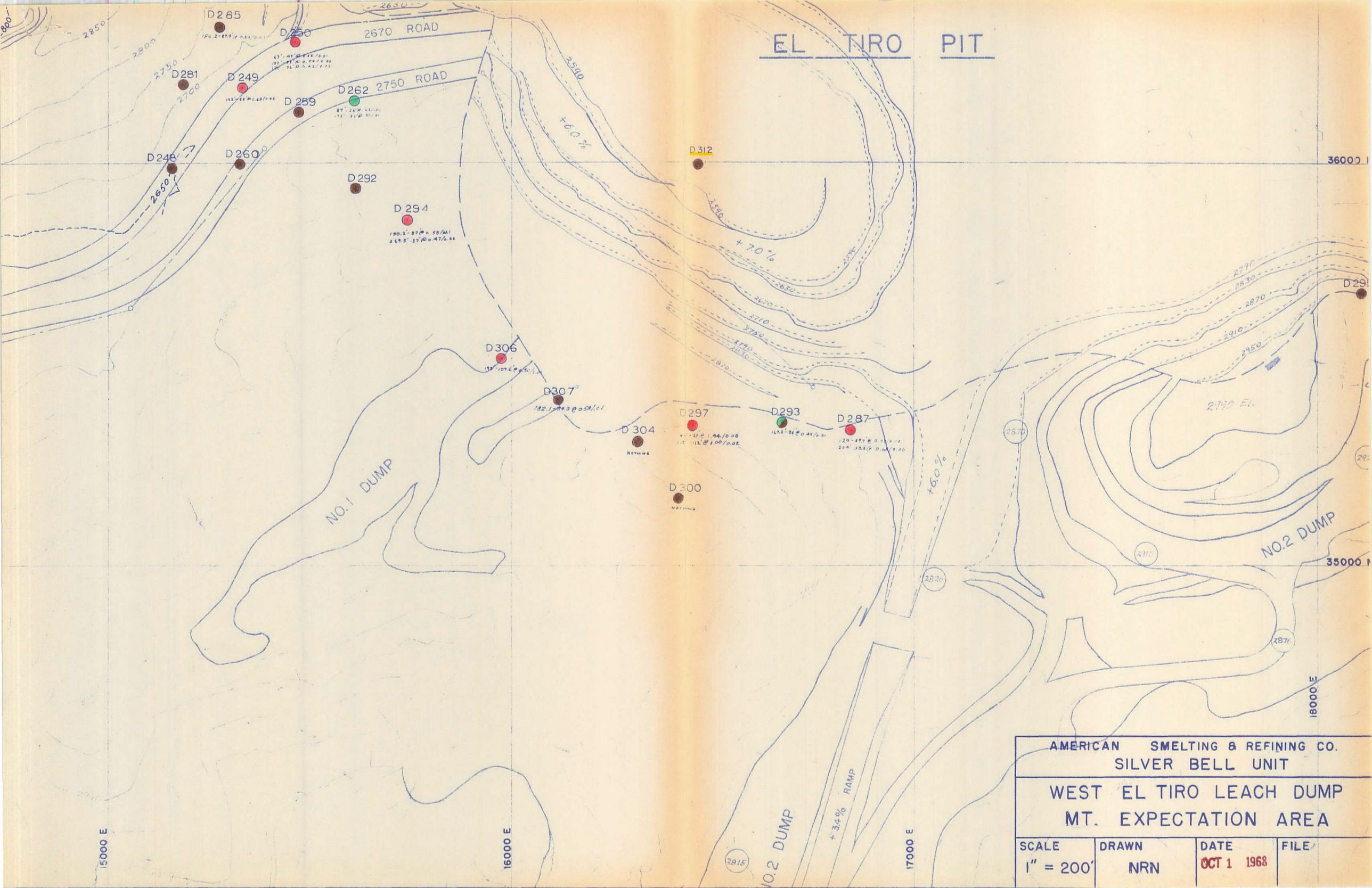
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

EL TIRO PIT
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	OCT 1 1968	S 121 A


OXIDE PIT PERIMETER
EAST WASTE DUMP
EAST EXTENSION NO. 2
MILL AREA
N
30000 N
29000 N
28000 N
26000 E
27000 E
28000 E
29000 E
30000 E
MOD.-ST. LEACHED OUTCROPS.
AREA OF OVERALL STRONGEST MINERALIZATION AND ALTERATION.
1-100; OXIDE COPPER CO. CHURN DRILL HOLES
101-188; ASARCO CHURN DRILL HOLES
F-1; OXIDE AREA DIAMOND DRILL HOLES
P-1; PROPOSED DRILL HOLES
HOLES DRILLED OR DRILLING DURING MONTH
WILL CARRY OVERBURDEN[1]
WILL NOT, BUT HAS AT LEAST ONE BENCH OF ORE
WILL NOT, AND HAS LESS THAN ONE BENCH OF ORE
4 NUMBER OF ORE BENCHES
[1] BASED ON 38¢ COPPER AND 19¢ STRIPPING COST
MODIFIED BY RCE, 9/9/68
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
OXIDE PIT AREA
SCALE: 1" = 200'
DRAWN BY: C.W.H.
DATE: OCT 2 / 1968
FILE: S-121-211D

EL TIRO PIT



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP
MT. EXPECTATION AREA

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	OCT 1 1968	

Mr. J. H. Courtright

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

October 24, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: QUARTERLY GEOLOGIC REPORT

OXIDE PIT

Mining during the third quarter advanced the 2660 level west and northwest mostly in syenodiorite. Grade was mostly above 0.4% Cu with several small pods of plus 0.2% oxide copper. The amount of oxide Cu is less than in the same location on the 2700 level. New areas of leach rock were mined on the north and northwest face which were not present on the 2700 level. Further expansion in this direction should encounter increased amounts of leach grade rock.

EL TIRO PIT

During the past quarter mining was carried out on the 2670 and 2630 levels and on Page Hill. Mapping of the pit faces on Page Hill was carried out where possible.

2670 Level

Eastward extension of the 2670 level encountered acid reactive hornfels further west than in the 2710 level. The hornfels extend north northeast from the El Tiro Fault zone to 36450N and 17900E. The hornfels are generally roofed along near-horizontal contacts by dacite. Grade in the block ranges from plus 0.4% Cu in the fault zone to leach with plus 0.2% oxide to the northeast. Continued eastward expansion of this level should encounter greater amounts of leach and ore grade hornfels than on the 2710 level. The remainder of the mining was similar in rock type and mineralization to the same location on the 2710 level.

2630 Level

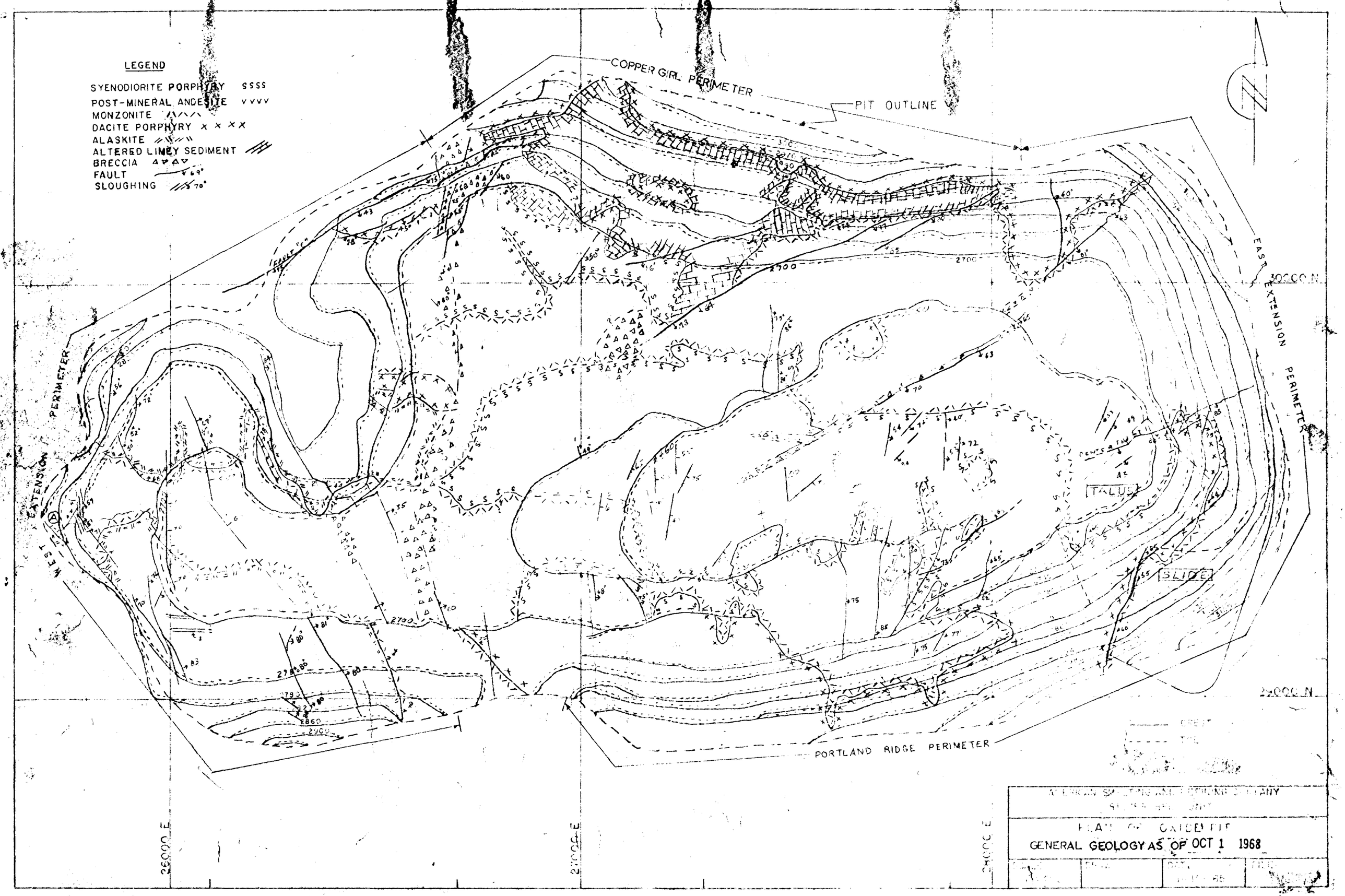
Mining on the 2630 level was mostly in ore grade alaskite with the exception of a small block of acid reactive hornfels in the northeast face. Further expansion to the northeast should encounter acid reactive hornfels in the El Tiro Fault zone.

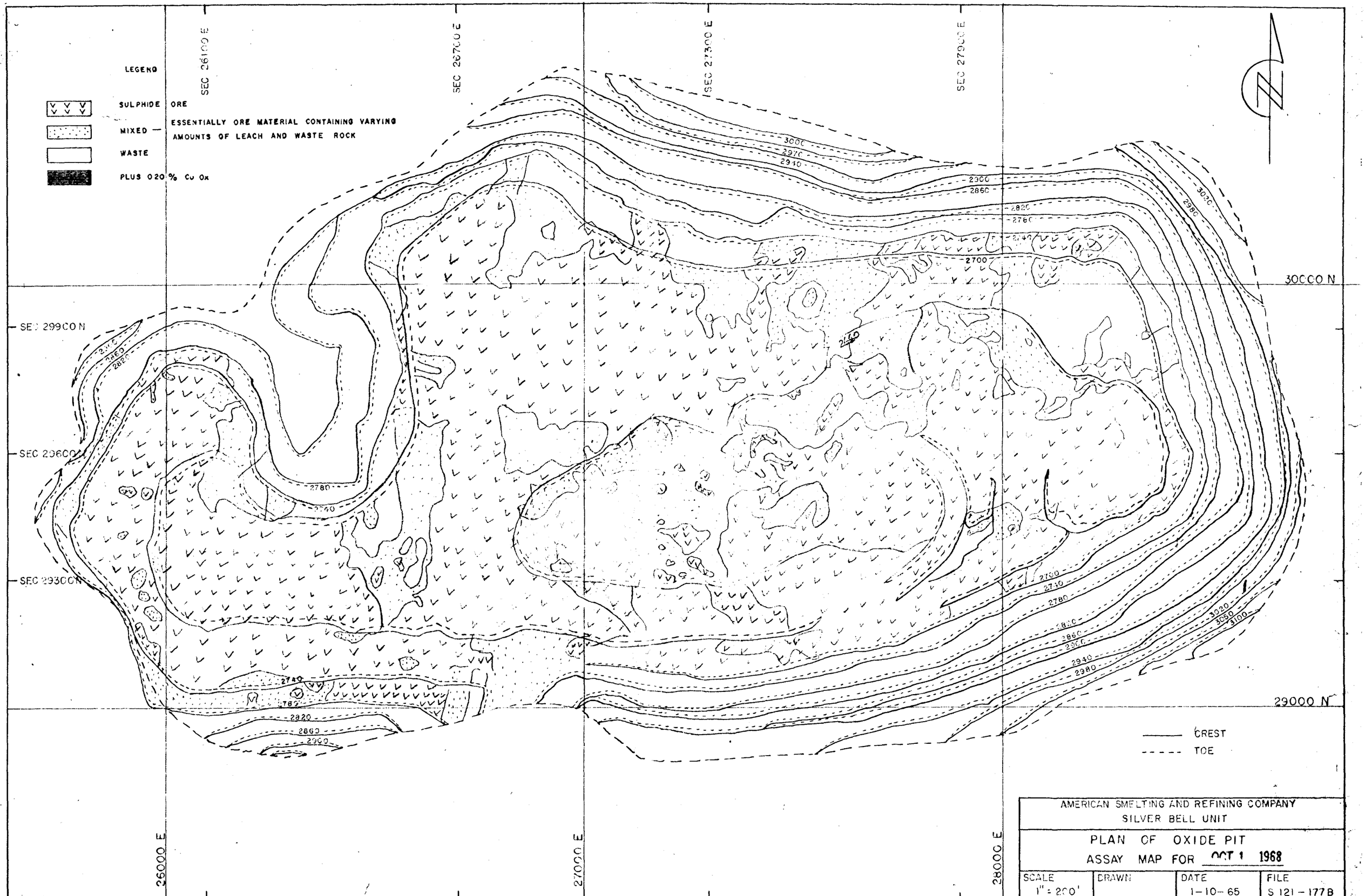
Page Hill

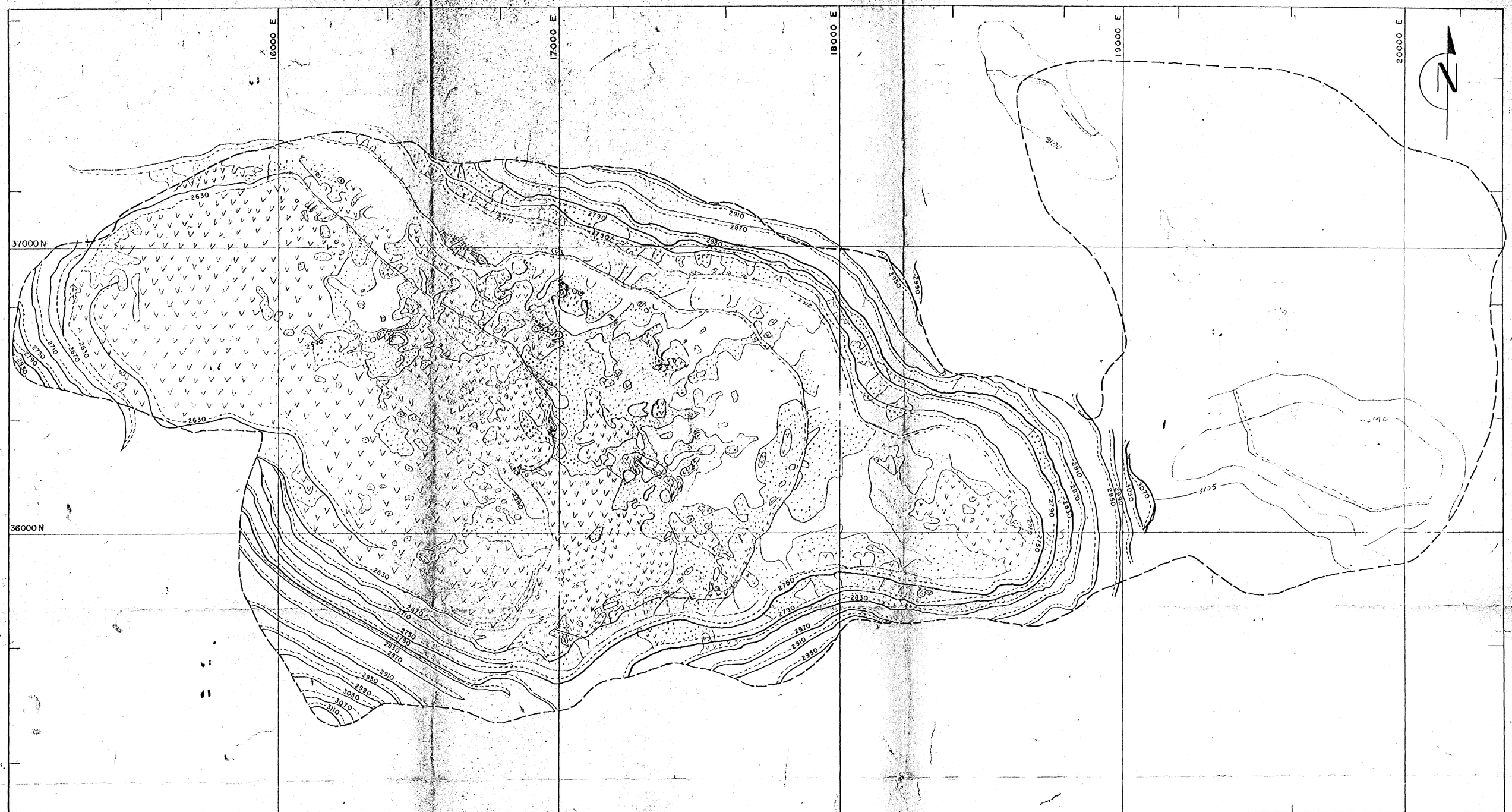
Mining in oxidized sediments continued on Page Hill during the past quarter. Strong faulting was noted wherever it was possible to map. There were numerous changes in composition among the tactite and hornfels with most contacts being fault contacts. Most of the visible copper was in the form of "copper pitch" and malachite with some unoxidized chalcopyrite. Unoxidized veins of sphalerite and galena were also found.

L. J. Jansen
Geologist

LJJ:jca


LEGEND
SYENODIORITE PORPHYRY SSSS
POST-MINERAL ANDESITE VVVV
MONZONITE
DACITE PORPHYRY X X X X
ALASKITE
ALTERED LIMEY SEDIMENT
BRECCIA
FAULT
SLOUGHING
COPPER GIRL PERIMETER
PIT OUTLINE
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
TALUS
SLIDE
FAULT "C"
2700
2800
2900
30000 N
29000 N
28000 E
27000 E
26000 E
PLAN OF CAPER PIT
GENERAL GEOLOGY AS OF OCT 1 1968

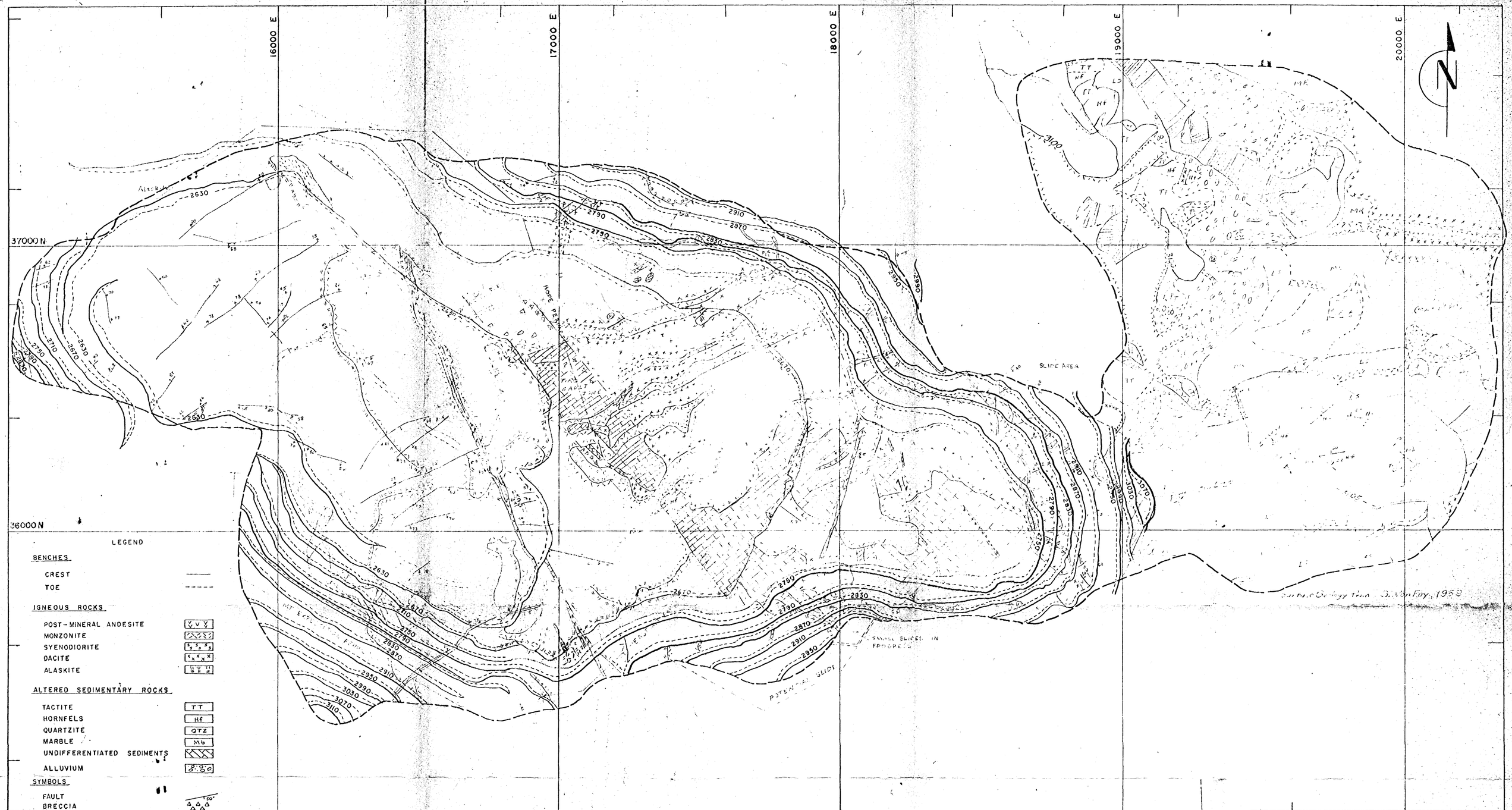

LEGEND
SULPHIDE ORE
MIXED — ESSENTIALLY ORE MATERIAL CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK
WASTE
PLUS 0.20 % Cu Ox
SEC 26100 E
SEC 26700 E
SEC 27300 E
SEC 27900 E
30000 N
29900 N
29600 N
29300 N
29000 N
26000 E
27000 E
28000 E
CREST
TOE
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT
ASSAY MAP FOR OCT 1 1968
SCALE 1" = 200'
DRAWN
DATE 1-10-65
FILE S 121-177B



AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT

PLAN OF EL TIRO PIT
CROSS SECTION FOR

SCALE	DRAWN	DATE	FILE
1" = 200'	HHR	1-24-68	S-121-2060



AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT

PLAN OF EL TIRO PIT
GEOLOGY FOR OCT 1 1968

SCALE	DRAWN	DATE	FILE
1" = 200'	HHR	1-24-68	S-121-2060

J. H. C.

OCT 1 1968

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

September 19, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM NORTHWEST SILVER BELL, EL TIRO PIT AND OXIDE PIT AREAS, August, 1968

During the month of August, 1968, two truck mounted drills were operated two shifts per day, six days per week. The first proposed deep hole was begun in El Tiro Pit after the completion of the third in a series of holes testing magnetic anomallies in the Northwest Silver Bell area. Work continued on the first deep hole in Oxide Pit throughout the month.

The footage drilled, average advance per shift and average direct cost per foot for the month of August, 1968 are:

Total Footage: 2,287.7 feet.
Average advance per shift: 21.2 feet.
Average direct cost per foot: $7.52

The attached table summarizes the drilling results.

NORTHWEST SILVER BELL

The third hole to test magnetic anomallies northwest of El Tiro Pit was completed in August. This is hole D-311 located on anomally number 4 on the attached map. In summary, not enough ore has been found in any of the holes to carry the overburden. It appears that there is a potential for high grade vein deposits in this area but not for disseminated, open pit type ore. No additional drilling is planned or recommended in this area at the present time. Hole D-311 is described below.

D-311

This hole was completed to a depth of 658.4 feet through a complex series of short intercepts of hornfels, alaskite, monzonite and post-mineral andesite. Alaskite was drilled to 112.2 feet followed by hornfels cut by monzonite to 247.4 feet, where alaskite was again encountered. This was the thickest sequence of hornfels encountered. From 247.4 feet to 537.4 feet there are numerous short intervals of all the above rocks. From 537.4 to 605.1 feet there is an unusual monzonite (?) containing 26.4 feet of primary mineralization averaging 0.52/.01. The rock is strongly altered to clay, chlorite and serpentine. Pyrite, chalcopyrite, molybdenite and sphalerite occur in thin veinlets, while pyrite and chlorite were found

together in aggregate clumps. In addition, in the strongly mineralized zone there are elongate plagioclase laths in a diabasic texture. A fine grained white quartzite followed to 640.5 feet where a rock similar to that described above was found. The hole was stopped at 658.4 feet.

OXIDE PIT

During August, hole F-160 on the 2660 level of Oxide Pit was deepened from 90.0 to 1,153.7 feet, entirely in monzonite. Moderate to strong clay alteration was noted over the interval drilled. Traces of potash alteration in the form of a pinkish alteration of the groundmass were noted intermittently to 191.9 feet where this alteration became stronger and more persistent. Below 191.9 feet the groundmass is generally of a light to moderate salmon pink color. The assays have been compiled into hundred foot intervals to better show any general increases or decreases in copper mineralization. For the first 1200 feet these assays are:

Depth	Average Assay	Depth	Average Assay
0 - 100.0	0.28	600.0 - 700.0	0.13
100.0 - 200.0	0.12	700.0 - 800.0	0.23
200.0 - 300.0	0.19	800.0 - 900.0	0.19
300.0 - 400.0	0.18	900.0 - 1000.0	0.20
400.0 - 500.0	0.14	1000.0 - 1100.0	0.10
500.0 - 600.0	0.11	1100.0 - 1200.0	0.11

EL TIRO PIT

Drill hole D-312 was collared on the 2590 level in El Tiro Pit, as shown on the accompanying map, and drilled to a depth of 565.6 feet in August. Proposed depth is 1500 feet. The hole penetrated monzonite to 417.0 feet followed by alaskite cut by numerous monzonite dikes to 559.0 feet. Monzonite occupied the remaining interval to 565.6.

The alteration in this hole is considerably different than that found in F-160 in Oxide Pit. The monzonite in D-312 is very strongly silicified with weaker clay and secondary potash alteration. Secondary orthoclase is limited to bands along fractures and bordering veins. The clay alteration varies inversely with the silicification.

Two supergene ore intervals were found near the collar. The base of enrichment is about 110 feet below the collar. The assays compiled into hundred foot intervals are:

Depth	Average Assay	Depth	Average Assay
0 - 100.0	0.44	300.0 - 400.0	0.26
100.0 - 200.0	0.29	400.0 - 500.0	0.26
200.0 - 300.0	0.22	500.0 - 600.0	0.22

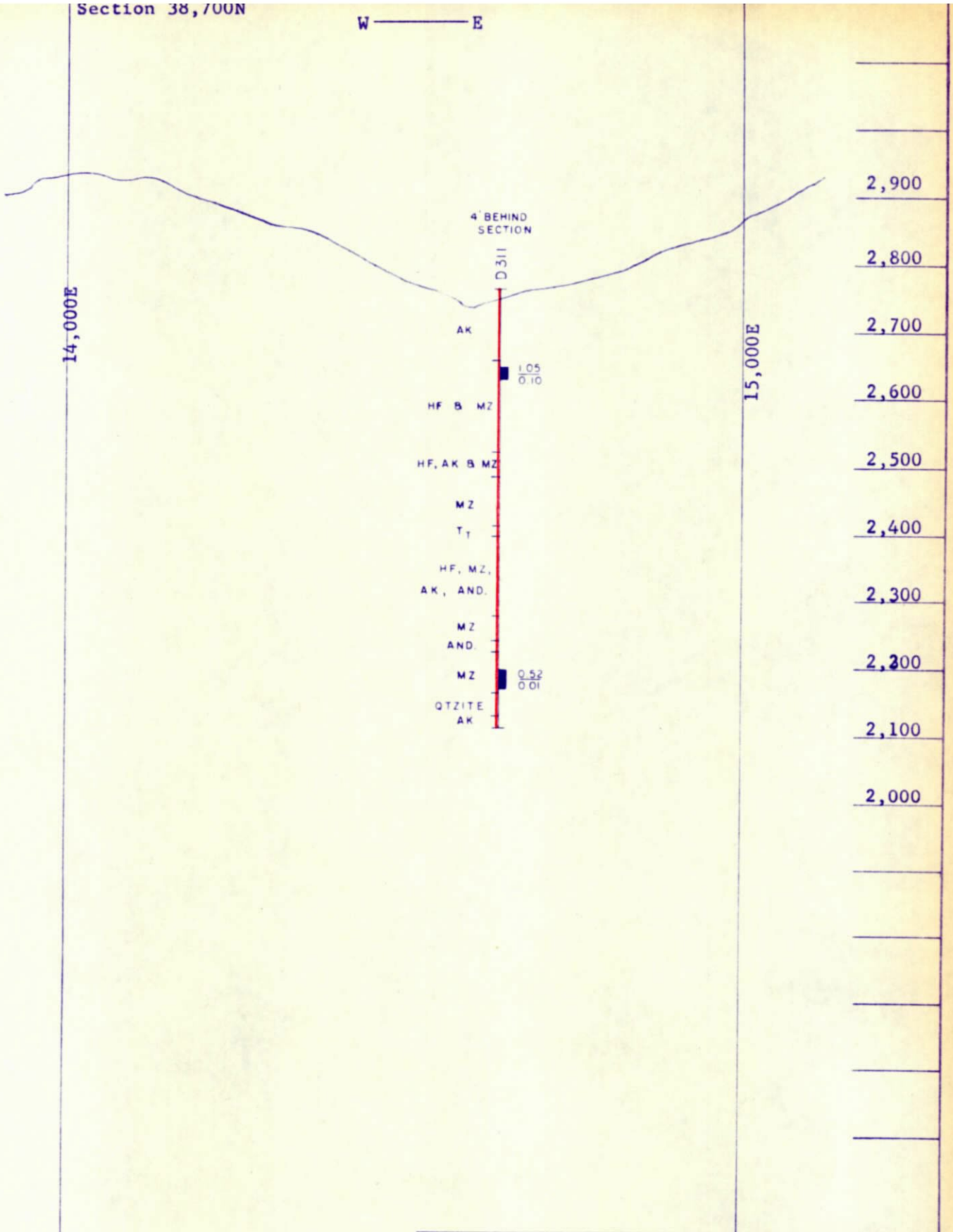
R C Edmiston

R. C. Edmiston
Resident Geologist

RCE:jca

DIAMOND DRILLING PROGRESS REPORT - August 1968

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-311	2765.43	38,704.28	14,678.73	119.0	16.4	1.05	0.10	658.4	658.4	658.4
				572.5	26.4	0.52	0.01			
D-312	2588.26	35,994.55	16,464.31	5.0	31.5	0.70	0.02	565.6	565.6	
				83.0	21.4	0.52	0.02			
				175.9	10.7	0.41	0.02			
				458.9	8.4	0.46	0.01			
F-160	2664.30	29,646.85	27,731.34	90.0	9.0	0.42	0.01	1,063.7	1,153.7	
				782.0	9.4	0.90	0.01			



+ 0.4% Total Copper

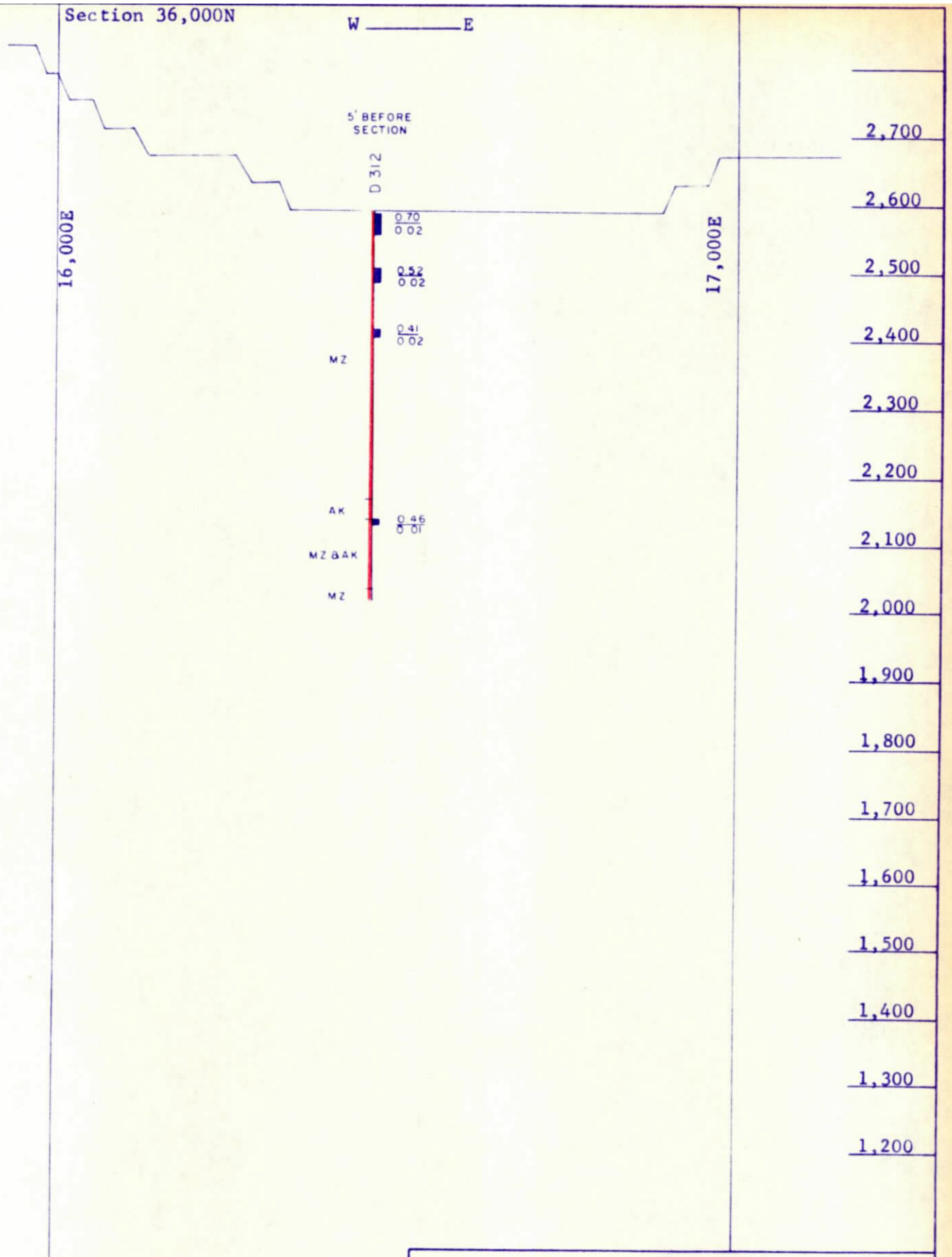
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

NORTHWEST SILVER BELL
DRILL HOLE PROJECTION

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	SEP 1 1968	S 121 A



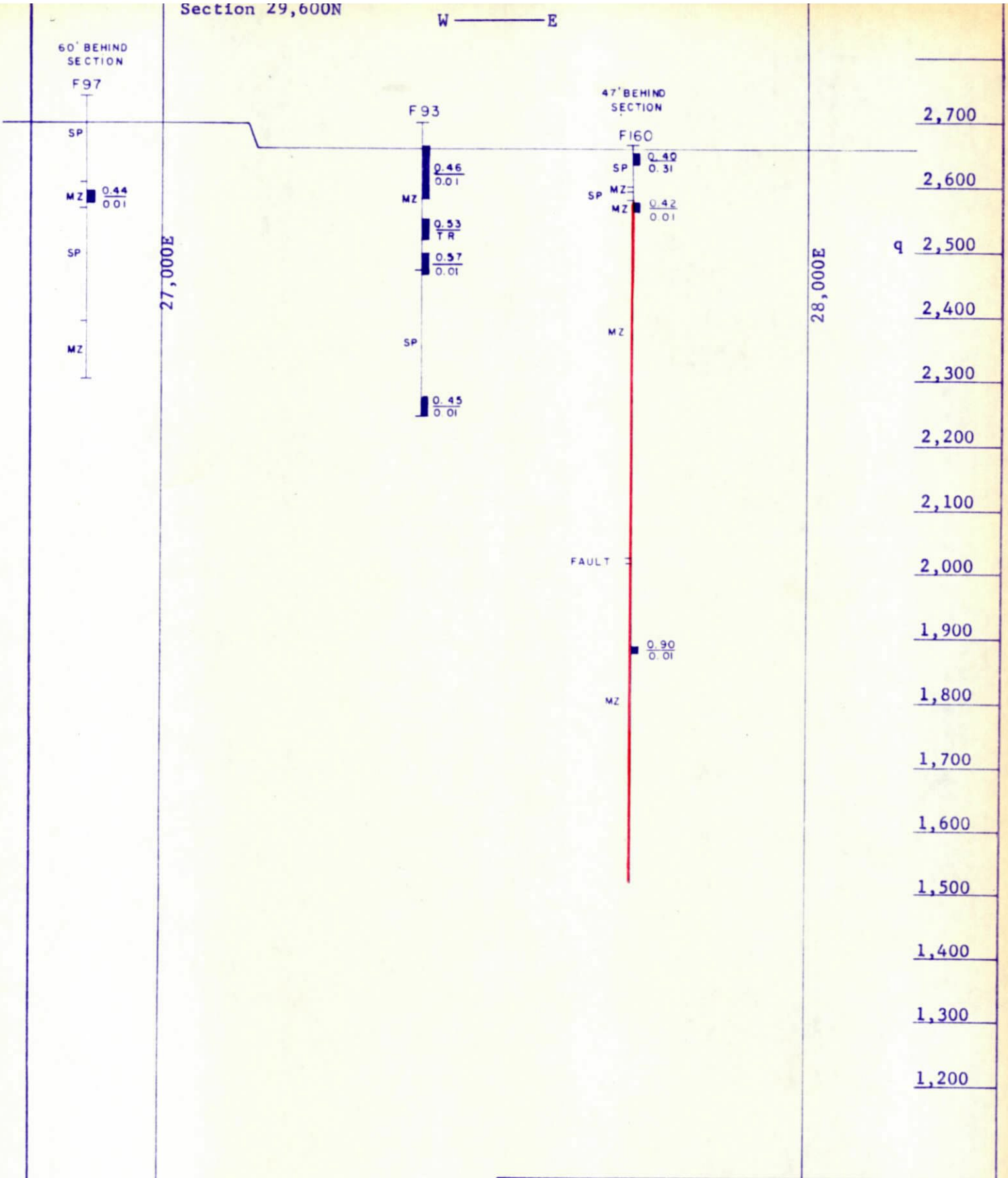
+ 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

EL TIRO PIT
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	SEP 1 1968	S 121 A



■ + 0.4% Total Copper

/ Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

OXIDE PIT
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
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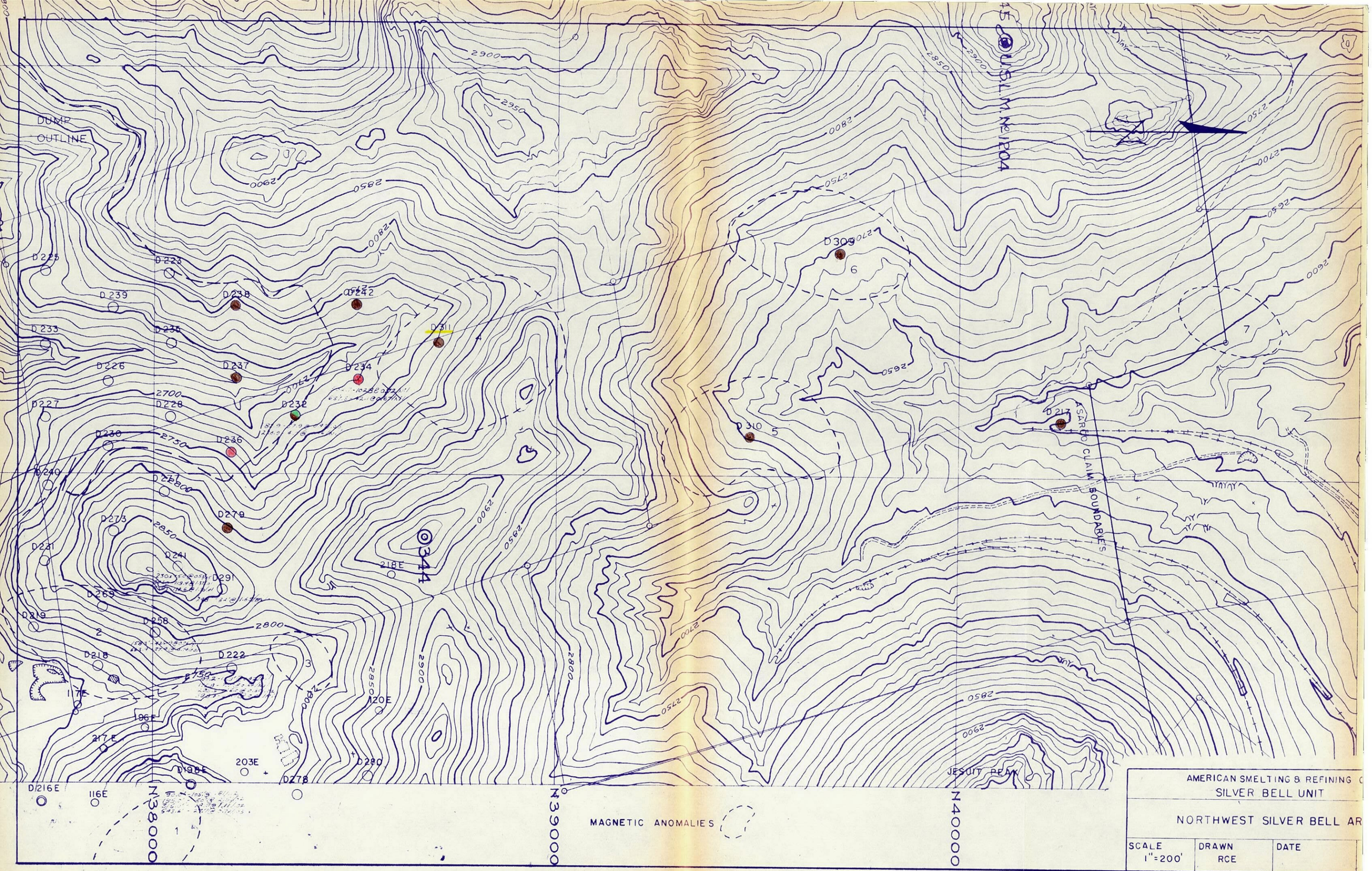
DUMP OUTLINE
D225
D223
D239
D238
D242
D233
D235
D311
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D237
D234
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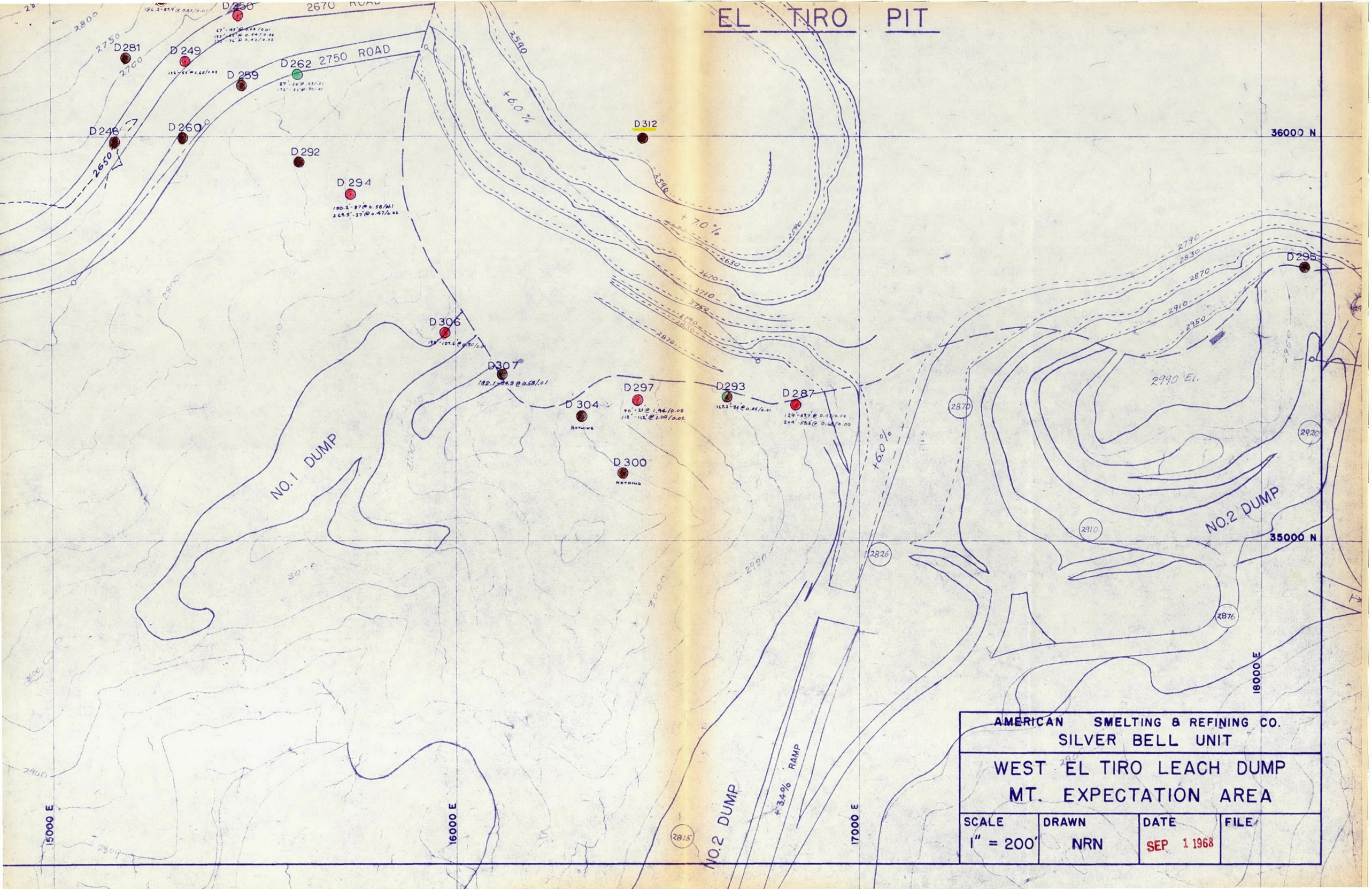
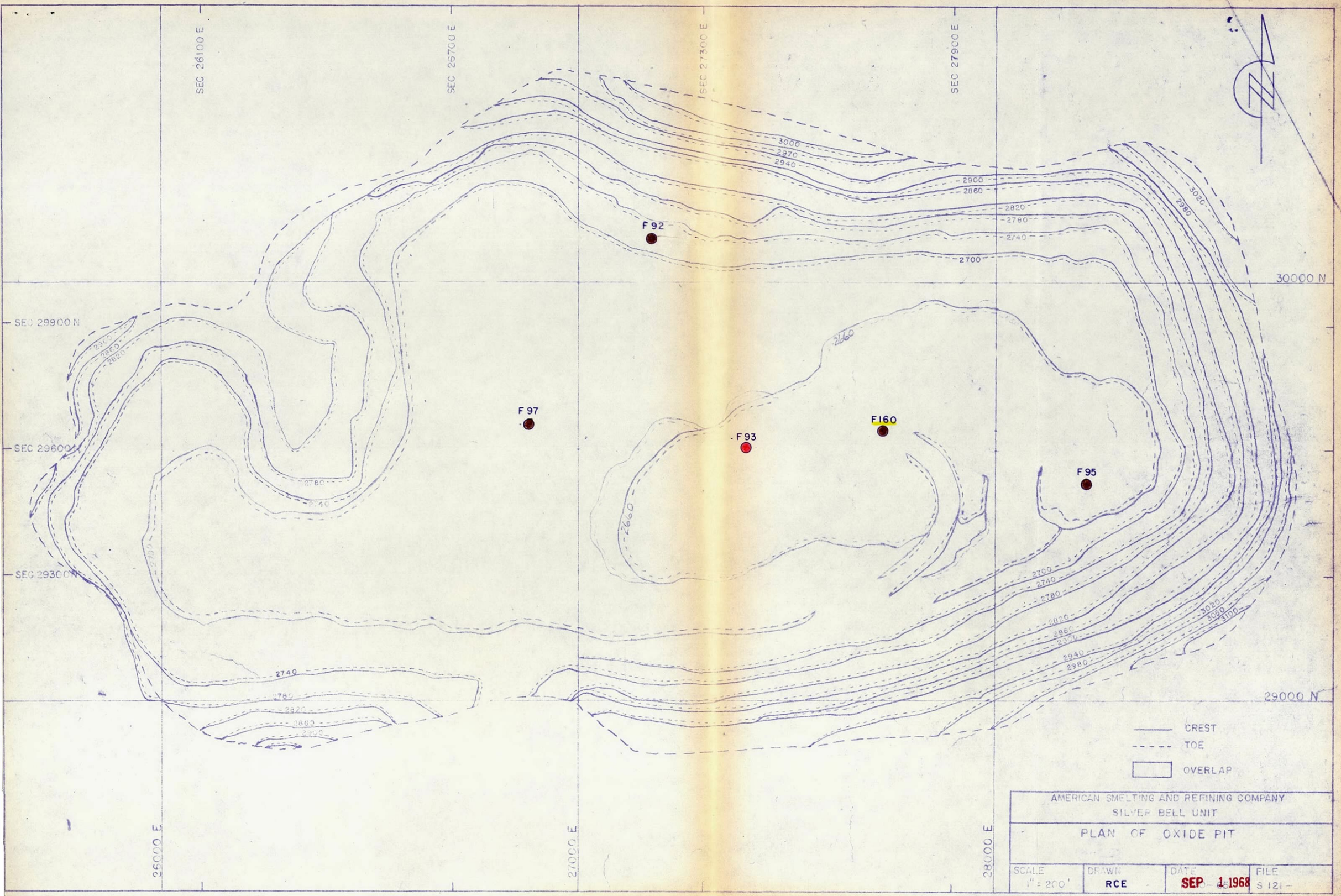
D236
D240
D271
D279
D273
D241
D291
D269
D219
D258
D218
D222
D309
6
D310
5
D217
CLAIM BOUNDARIES
344
218E
120E
117E
196E
217E
203E
D198E
D216E
116E
D278
D280
JESUIT PEAK
MAGNETIC ANOMALIES
N38000
N39000
N40000
2900
2950
2850
2800
2750
2700
2650
2600
AMERICAN SMELTING & REFINING C
SILVER BELL UNIT
NORTHWEST SILVER BELL AR
SCALE 1"=200'
DRAWN RCE
DATE


EL TIRO PIT
2670 ROAD
2750 ROAD
D250
D281
D249
D262
D259
D248
D260
D292
D294
D312
D306
D307
D297
D304
D293
D287
D300
D295
NOTHING
NOTHING
+60%
+70%
+60%
+3.4% RAMP
NO.1 DUMP
NO.2 DUMP
NO.2 DUMP
2990 El.
36000 N
35000 N
15000 E
16000 E
17000 E
18000 E
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
WEST EL TIRO LEACH DUMP
MT. EXPECTATION AREA
SCALE
1" = 200'
DRAWN
NRN
DATE
SEP 1 1968
FILE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SEC 27900 E
SEC 29900 N
SEC 29600 N
SEC 29300 N
30000 N
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26000 E
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28000 E
F 92
F 97
F 93
F160
F 95
3000
2970
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2900
2860
2820
2780
2740
2700
3020
2980
2660
3060
3100
CREST
TOE
OVERLAP
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT
SCALE
1" = 200'
DRAWN
RCE
DATE
SEP 1 1968
FILE
S 121

Mr. J. H. Courtright

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

July 17, 1968

W.E.S.

AUG 8 1968

J. H. C.

AUG 19 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: QUARTERLY GEOLOGIC REPORT

OXIDE PIT

During the past quarter the 2660 level was advanced to the west, mostly in syenodiorite. Most of the rock removed assayed between 0.20% and 0.40% sulfides due to a general decrease in chalcocite from the levels above.

EAST EXTENSION STRIPPING AND SLOPE STABILITY

The existence of the slide zone in the southeast corner of Oxide Pit will create several problems when stripping begins in that area for the East Extension to Oxide Pit. The first problem, the removal of loose and unstable rock debris, will be difficult if not insurmountable. It should be kept in mind that in recent months several new cracks have formed within previously "solid" rock so that moving heavy equipment around the periphery of the zone involves some risk.

The second problem will involve the stability of the newly formed pit faces. This is an area of known slope problems and the risk of sudden small failures injuring men or damaging equipment will be greater than for the mine as a whole. The following procedures are recommended to minimize the danger of personal injury or equipment damage.

1. An analysis of the potential slope problems using the best available techniques for designing pit slopes should be made. (Particular attention should be paid to the northeast trending shears which seem to have played an important role in the large failure of December 1, 1967.)

2. Survey pins should be installed along the new pit perimeter and checked periodically for movement. An access road should be maintained to the pit perimeter to facilitate inspections and surveying.

3. The possibility of developing an automatic alarm system with 0.05 feet sensitivity should be investigated.

EL TIRO PIT

During the past quarter mining took place on the 2710, 2670 and 2630 levels and on Page Hill. No mapping of pit faces on Page Hill or Union Ridge has been carried out to date, mainly because only a few faces have been formed during the stripping. However, to establish some continuity. Mr. Steve Von Fay's surface geology (1959) has transferred to the El Tiro Pit Geology Map, and mine mapping will begin as soon as possible.

2710 Level

The 2710 level was completed in the East Extension Number One during the past quarter. The distribution of ore in the sediments is shown on the attached maps. In general the sedimentary ore occupied a larger area than on the benches above but was more irregular and generally lower grade. Because of the importance of lithology in dealing with sediments and also the vertical extent of mineralization the possibility of constructing a plexiglass mine model of the sediments to be mined in El Tiro Pit is being considered.

2670 Level

Ore grade chalcopyrite in hornfels should be found in the southeast corner of the 2670 level in the coming quarter, at about 36,000N; 17,500E. The hornfels in this area should continue to be acid reactive. No important changes in rock type or mineralization have been noted and the 2670 level during the past quarter.

2630 Level

Mining on this level was in ore grade monzonite during the past quarter. Acid reactive hornfels should be encountered in the coming quarter when the El Tiro Fault zone is entered at about 36,500N; 16,900E.

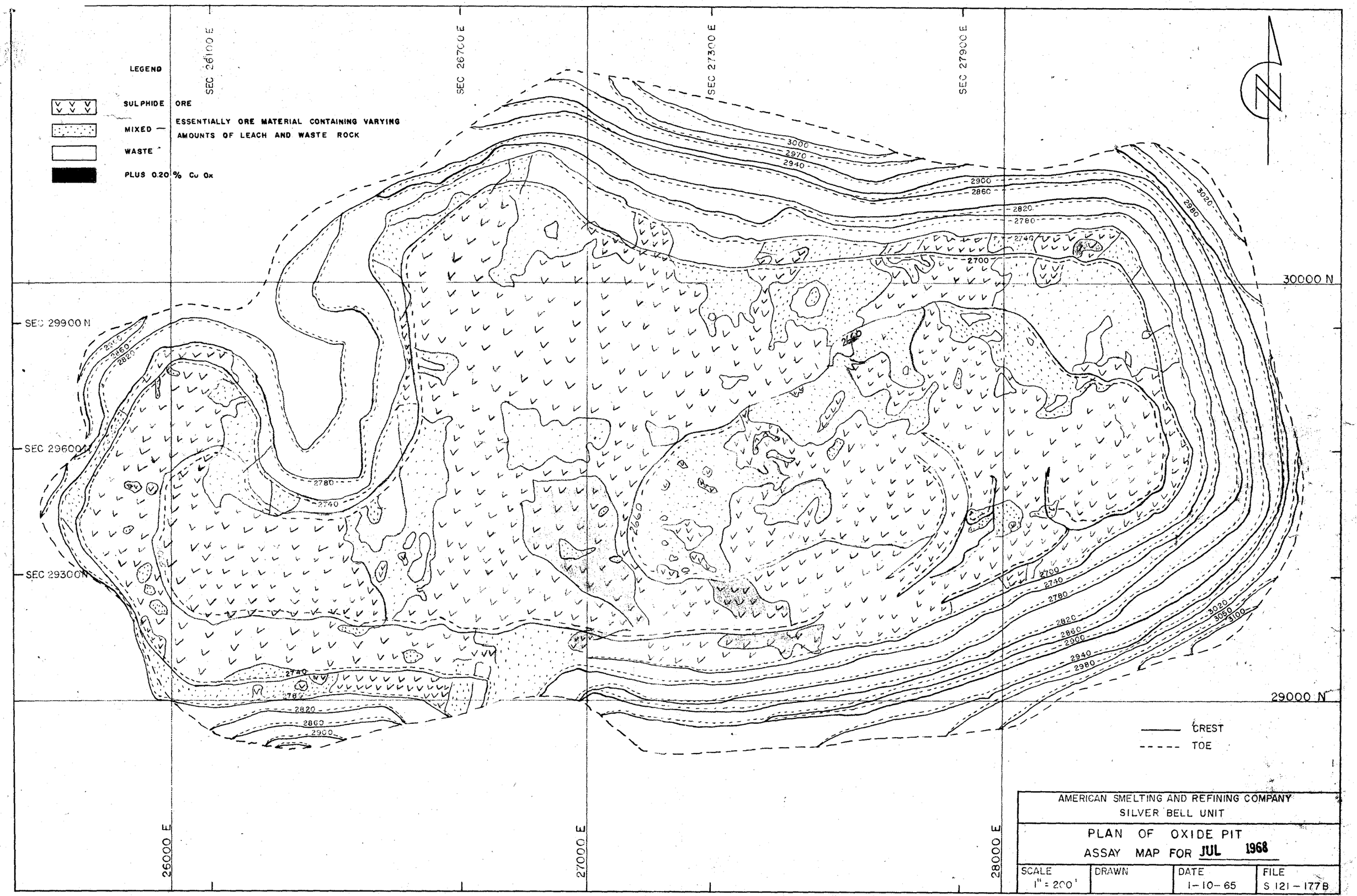
SOUTH PERIMETER SLUMPING

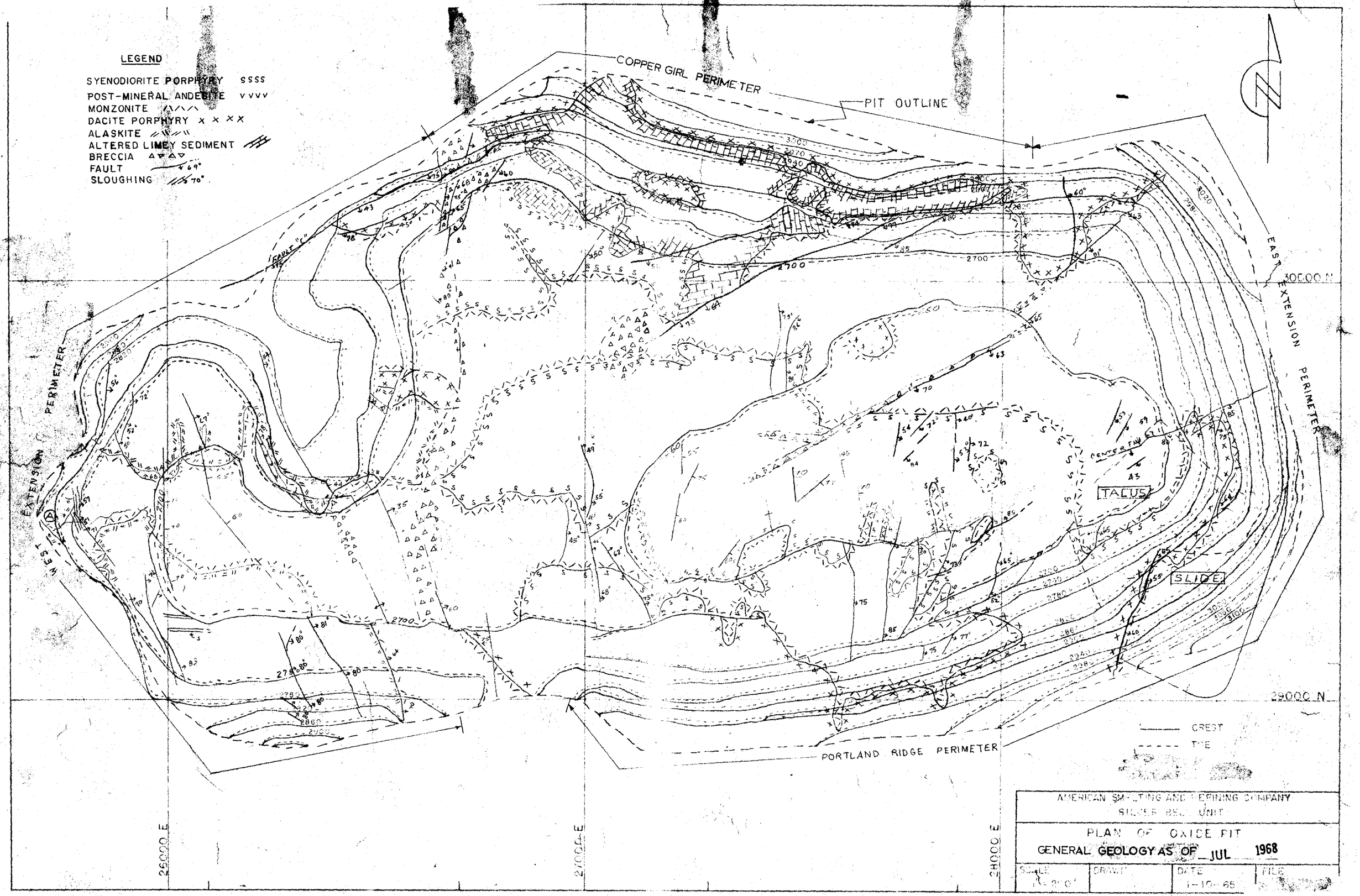
Survey control points were installed in the area marked "Potential Slide" on the El Tiro Pit Geology map during the past quarter. A small amount of slumping and expansion (average slump about 0.1 feet) was recorded. This area should be closely watched as the 2670 level is pushed to completion below this zone.

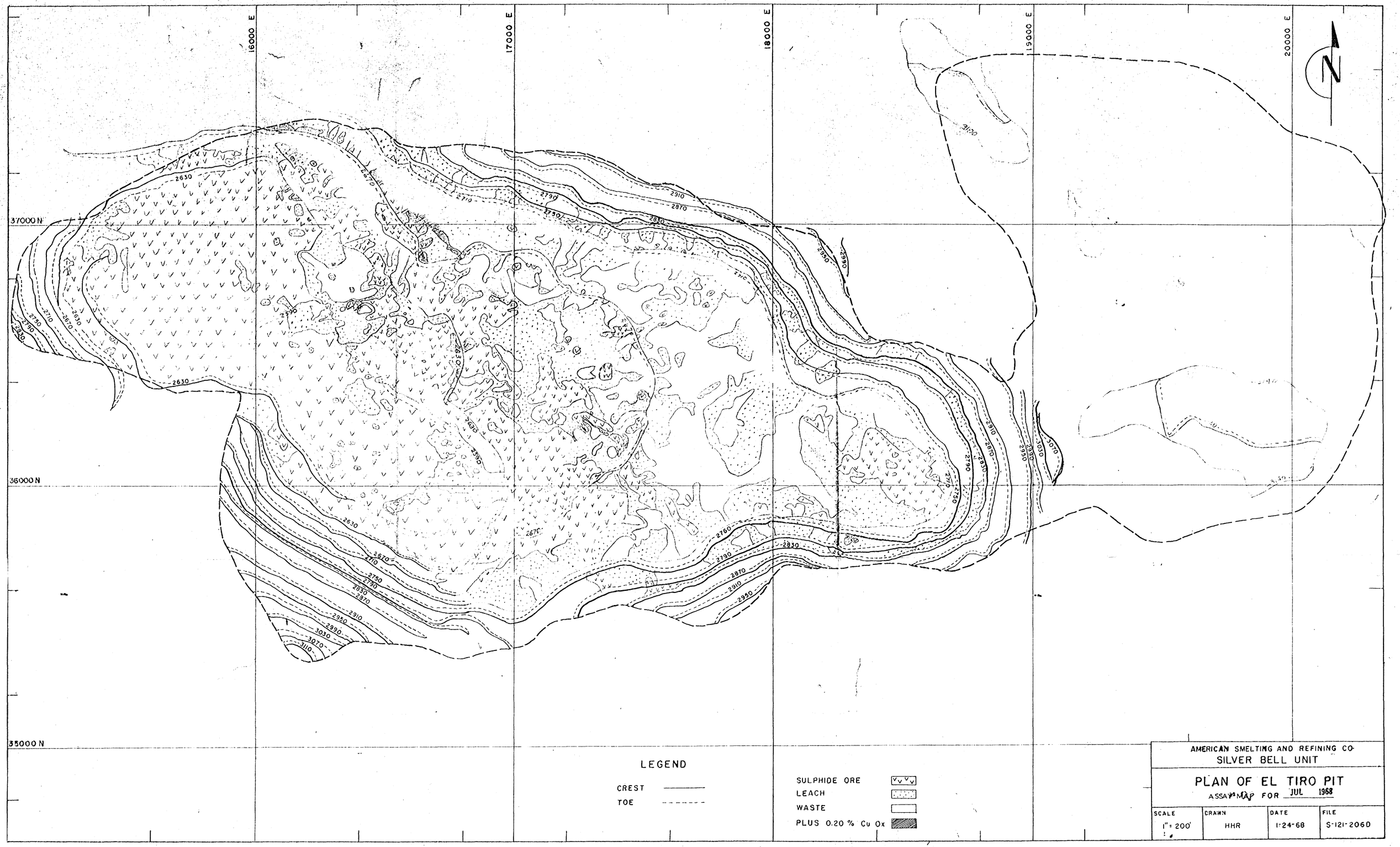
R C Edmiston

R. C. Edmiston
Resident Geologist

RCE:jca


LEGEND
SULPHIDE ORE
MIXED — ESSENTIALLY ORE MATERIAL CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK
WASTE
PLUS 0.20 % Cu Ox
SEC 26100 E
SEC 26700 E
SEC 27300 E
SEC 27900 E
30000 N
29000 N
SEC 29900 N
SEC 29600 N
SEC 29300 N
26000 E
27000 E
28000 E
CREST
TOE
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT
ASSAY MAP FOR JUL 1968
SCALE 1" = 200'
DRAWN
DATE 1-10-65
FILE S 121-177B


LEGEND
SYENODIORITE PORPHYRY SSSS
POST-MINERAL ANDESITE VVVV
MONZONITE
DACITE PORPHYRY
ALASKITE
ALTERED LIMEY SEDIMENT
BRECCIA
FAULT
SLOUGHING
COPPER GIRL PERIMETER
PIT OUTLINE
FAULT "C"
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
TALUS
SLIDE
CENTER LINE
30000 N
29000 N
26000 E
27000 E
28000 E
CREST
TOE
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT
GENERAL GEOLOGY AS OF JUL 1968
SCALE
DRAWN
DATE
1-10-65
FILE


16000 E
17000 E
18000 E
19000 E
20000 E
37000 N
36000 N
35000 N
N
LEGEND
CREST
TOE
SULPHIDE ORE
LEACH
WASTE
PLUS 0.20 % Cu Ox
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
ASSAY MAP FOR JUL 1968
SCALE
1" = 200'
DRAWN
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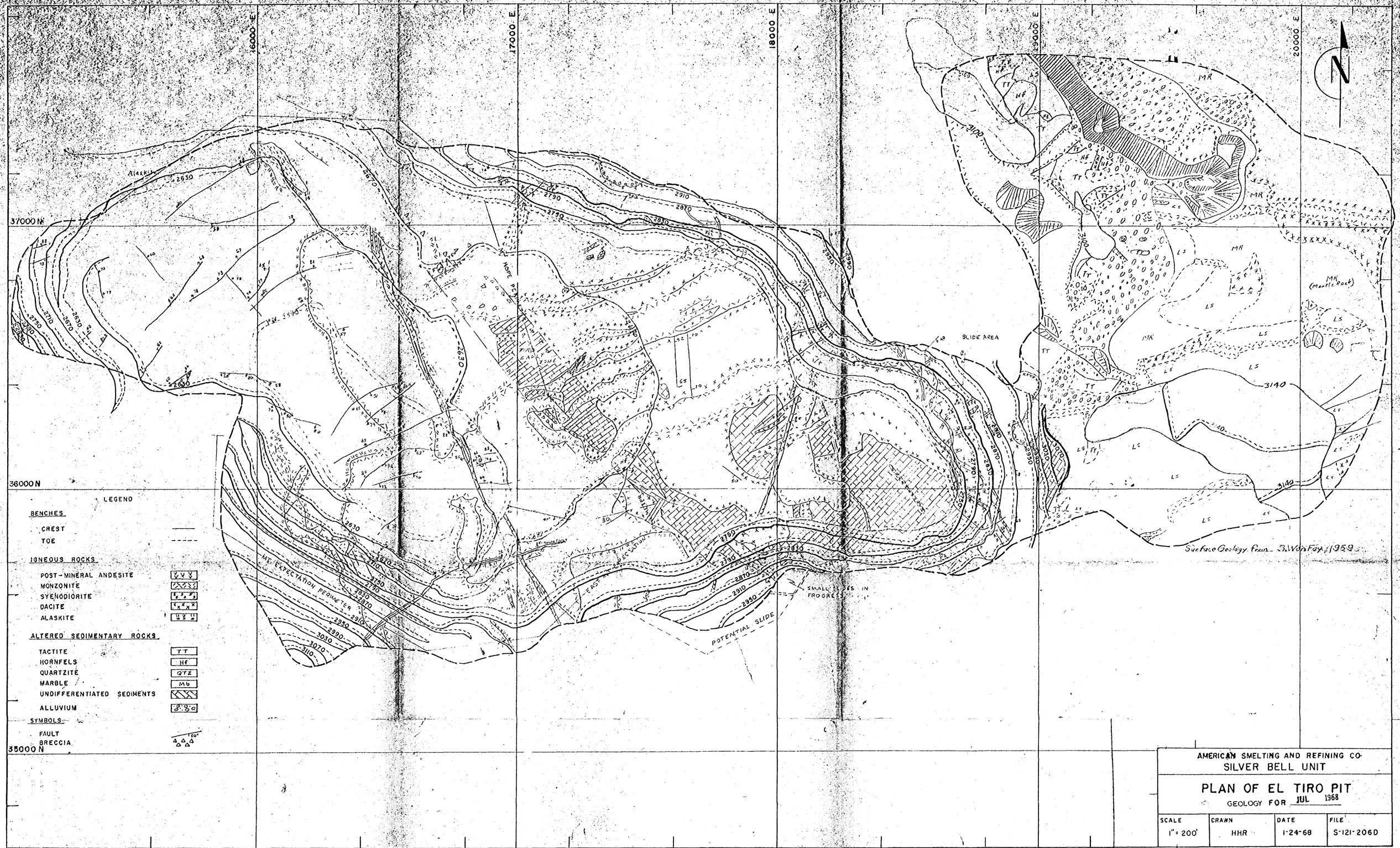
DATE
1-24-68
FILE
S-121-2060


16000 E
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36000 N
35000 N
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Alaskite
2630
2670
2710
2750
2790
2830
2870
2910
2950
2990
3030
3070
3110
3140
Hope Pit
Fault Zone
Fault
East Expectation
Mt. Expectation Perimeter
Slide Area
Small Slides in Progress
Potential Slide
MR
(Mountain Rock)
TT
HF
LS
QTZ
MB
Surface Geology from S. Von Fox, 1959
LEGEND
BENCHES
CREST
TOE
IGNEOUS ROCKS
POST-MINERAL ANDESITE
MONZONITE
SYENODIORITE
DACITE
ALASKITE
ALTERED SEDIMENTARY ROCKS
TACTITE
HORNFELS
QUARTZITE
MARBLE
UNDIFFERENTIATED SEDIMENTS
ALLUVIUM
SYMBOLS
FAULT
BRECCIA
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
GEOLOGY FOR JUL 1968
SCALE 1" = 200'
DRAWN HHR
DATE 1-24-68
FILE S-121-206D

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

July 18, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: Monthly Report - SILVER BELL UNIT DRILLING PROGRAM, Danube, North El Tiro Hill and Northwest Silver Bell areas, June, 1968.

During the month of June 1968, two drills were operated, two shifts per day, six days per week. A skid mounted angle hole drill completed hole F-154 and was then replaced by a truck mounted drill which drilled two vertical holes, F-156 and F-157 in the Danube area. This drill has now been moved to the North El Tiro area to drill Magnetic Anomallies. An attempt was made to deepen churn drill hole 200E, but this failed due to bad hole conditions and the drill was then moved to the west end of El Tiro Pit, 2710 level, to drill an additional deep hole.

The footage drilled and the average direct drilling costs for the month of June, 1968 are:

Drill	Footage Drilled	Average Advance per Shift	Average Direct Cost/Ft.
Diamond - Truck	1,724.6	19.7'	$ 7.36
Diamond - Skid, Angle	27.3	27.3'	11.79
Total	1,751.9	Combined avg.	$ 7.43

The attached table summarizes the drilling results.

DANUBE AREA

Holes F-156 and F-157 were drilled west and north of hole F-152 to check for continuity of the 241 feet of ore grade mineralization encountered in that hole. Neither hole was successful although some ore was found in F-157 where hornfels were cut by monzonite dikes. Both holes contained banded hornfels in which the banding probably represents compositional differences in the original limestone beds. This would indicate a much lower grade of metamorphism or metasomatism than that found associated with sedimentary ores in El Tiro Pit where alteration and/or replacement has been intense enough to erase any indications of bedding.

In summary, the recent drilling of the two angle holes and three vertical holes in the Danube Area show that ore grade mineralization is restricted to a thin zone within the overall zone of alteration and mineralization and otherwise exists only where monzonite dikes cut favorable beds of hornfels. No further holes are recommended on Danubel Hill at this time. Two additional holes have been recommended for North Butte by Mr. Courtright and these should be started in July.

F-156

Drill hole F-156 was collared in 30 feet of alluvium. The hole entered hornfels at 30.0 feet and then encountered a Post Mineral Andesite dike which extended from 41.6 to 89.5 feet. The andesite was broken and gougey with a 70° fault at 52.0 feet. The hole remained in hornfels down to 451.5, except for monzonite dikes encountered in the following intervals: 267.0-276.1; 281.3-319.4; 444.4-444.7. The hornfels were composed mainly of various colored, fine grained silicate minerals with garnet contents of up to 45%. Alternating bands of light and dark minerals, probably representing bedding, were found from 134.6 to 240.0 feet. The bands dipped from 50° to 80°.

F-157

This hole also encountered hornfels cut by monzonite dikes, after drilling through 12.4 feet of alluvium. The monzonite occupied the following intervals: 12.4-77.6; 137.6-172.0; 307.9-347.9. Alternating thin parallel bands of contrasting light and dark minerals, probably representing bedding, were found in the hornfels throughout the hole. These dipped from 65° to 75°. Ore grade mineralization was found in the hornfels adjacent to the monzonite dikes. However, the mineralization was not pervasive enough to warrent the drilling of futher holes in this area.

NORTH EL TIRO HILL AREA

Deep drilling for sediments in the North El Tiro Hill Area continued with the attempted deepening of churn drill hole 200E and the drilling of a new hole, D-308.

D-200E

Churn drill hole 200E could not be deepened because of bad hole conditions. The hole had been cleaned out and cased by a rotary drill, but the casing was cemented in cave material 10 feet short of the bottom of the hole. (Further attempts to cement failed as the cement ran out of the hole before setting up.) BX casing was reamed down to 538.7, through a zone of strong brecciation and poor core recovery. The breccia appeared to be composed of dacite to 473.3 feet, followed by alaskite to the bottom of the hole at 538.7 feet.

D-308

The distribution of rock types and ore grade mineralization for D-308 is shown on the attached section. Generally the hole is in hornfels which have been cut by alaskite, monzonite and post-mineral andesite dikes. The hornfels having been strongly broken or shattered but not gougey. Weak to moderate disseminated chalcopyrite has produced several intercepts of low grade ore. Drilling on this hole continued at the end of the month.

NORTHWEST SILVER BELL AREA

D-309

Drilling on three magnetic anomollies in this area commenced with hole D-309, located on the anomally numbered six on the attached map. This hole was drilled to a depth of 73.8 feet in June and completed to a depth of 510.0 feet in July.

The hole was collared in alaskite, which persisted to a depth of 71.6 feet where aplite was encountered. The alaskite was very weakly altered and leached. Pyrite was noted at a depth of 14.6 feet and continued in amounts varying from a trace to 0.5 percent.

Magnetite existed in disseminated grains which appeared partially altered to hematite. In addition the alaskite contained about 2 percent chlorite altered from biotite. The plagioclose was altered to a green clay mineral while the orthoclose appeared unaltered. (Note: the biotite-chlorite and magnetite content increased with depth but no sediments or mineralization greater than 0.10% was found.)

R C Edmiston

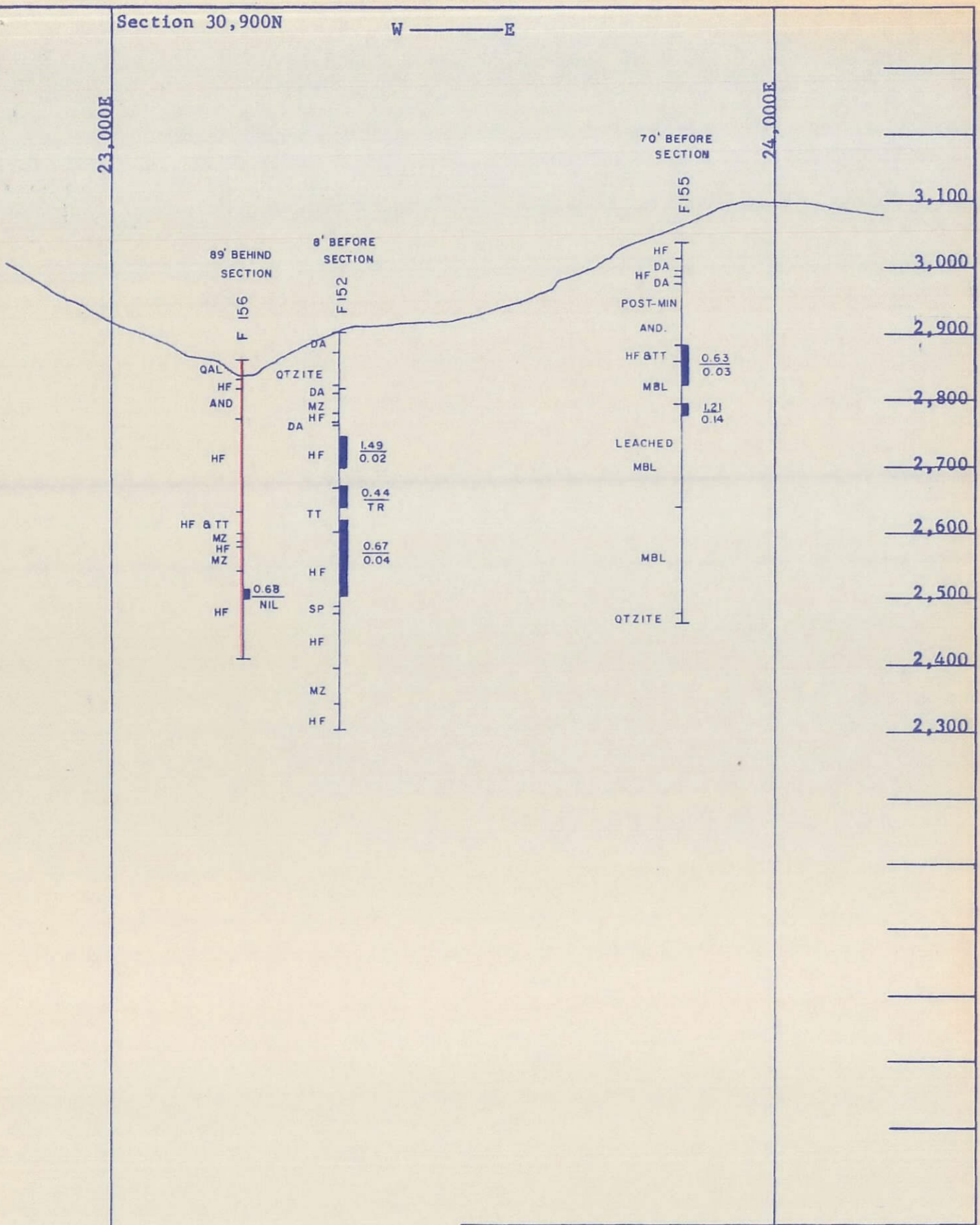
R. C. Edmiston
Resident Geologist

RCE:jca

DIAMOND DRILLING PROGRESS REPORT - June 1968

Hole No.	Approx. Elevation	Coordinates North	Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N. S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
*F-154	2880.75	30,638.04	23,372.93	No plus 0.40% Cu this interval				27.3	678.8	678.8
F-156	2859.25	30,989.07	23,197.37	350.1	9.9	0.68	Nil	451.5	451.5	451.5
F-157	2880.47	31,078.97	23,340.79	77.6	9.8	0.50	0.01	456.1	456.1	456.1
				114.3	23.3	0.45	0.02			
				300.1	19.7	0.91	0.02			
				347.9	19.6	0.48	Nil			
D-308	2712.51	37,463.49	15,951.56	77.8	17.2	0.99	0.07	651.5	651.5	
				141.3	20.2	0.43	0.02			
				283.5	9.2	0.43	0.02			
				370.9	9.3	0.86	0.02			
				431.1	45.7	0.52	0.01			
				552.0	38.0	0.49	Nil			
D-309	2694.46	39,701.14	14,456.14	No plus 0.40% Cu this interval				73.8	73.8	
D-200E	2887.68	37,955.39	15,937.31	No plus 0.40% Cu this interval				91.7	538.7	538.7
						TOTAL		1,751.9		

* Angle hole - 52% plunge; N30°E



■ + 0.4% Total Copper

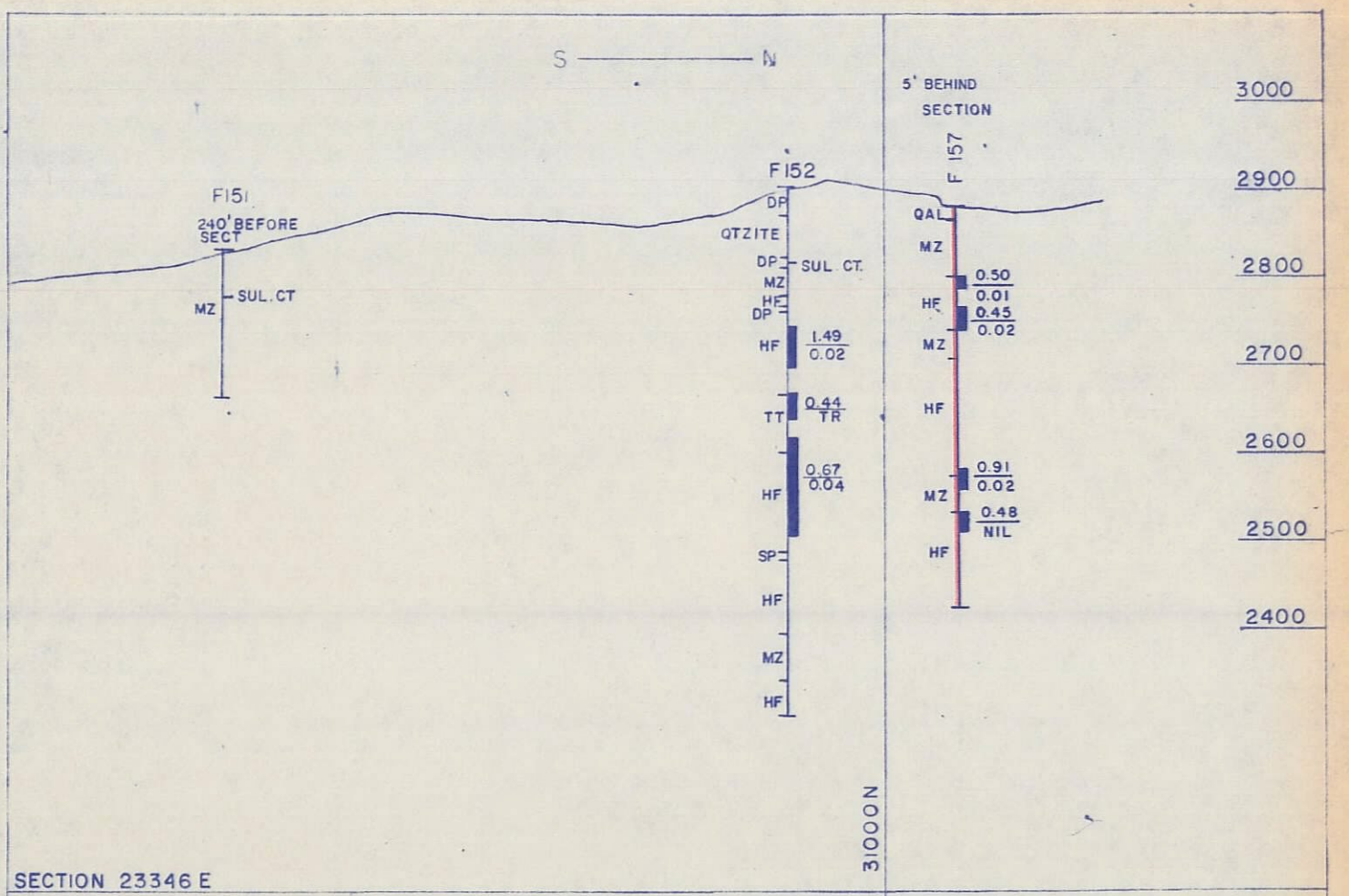
| Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DANUBE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	JUL 1968	S 121 A



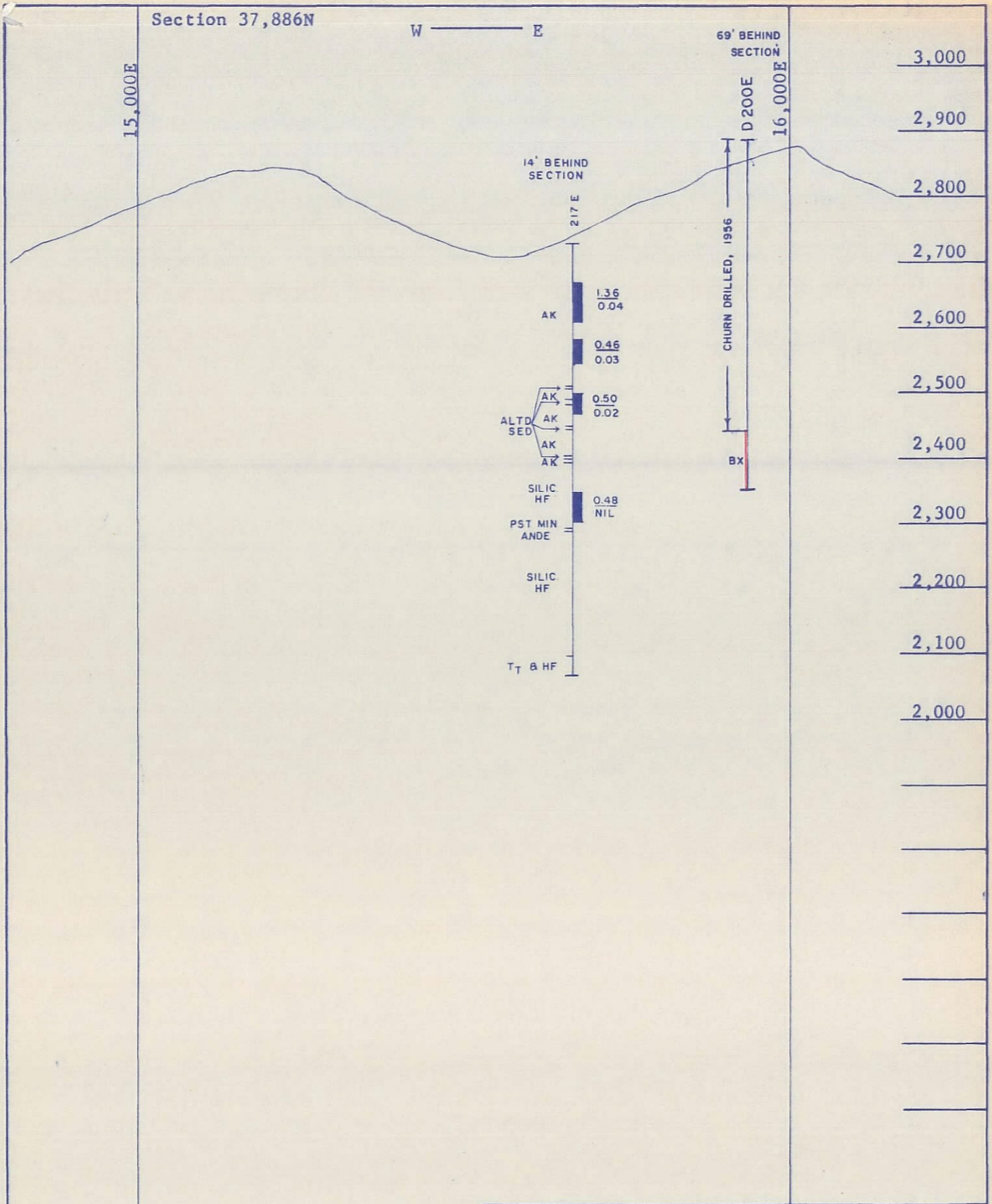
▮ +0.4 % Total Copper
| Advance for month

Note : Rock Types Generalized
Cu Assay is Total Cu / Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

OXIDE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	JUL 1968	S-121- A



+ 0.4% Total Copper

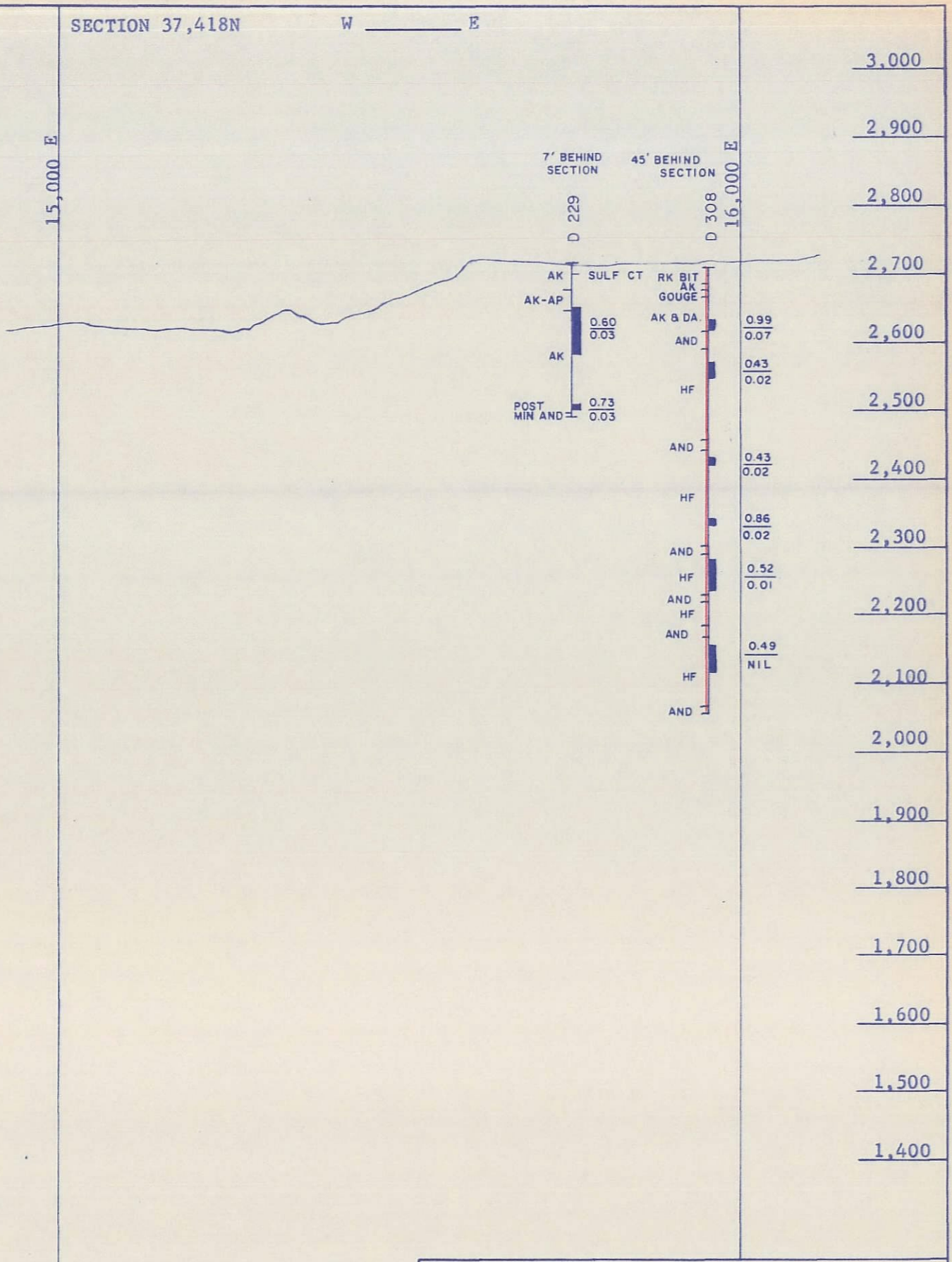
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	JUL 1968	S 121 A



+ 0.4% Total Copper

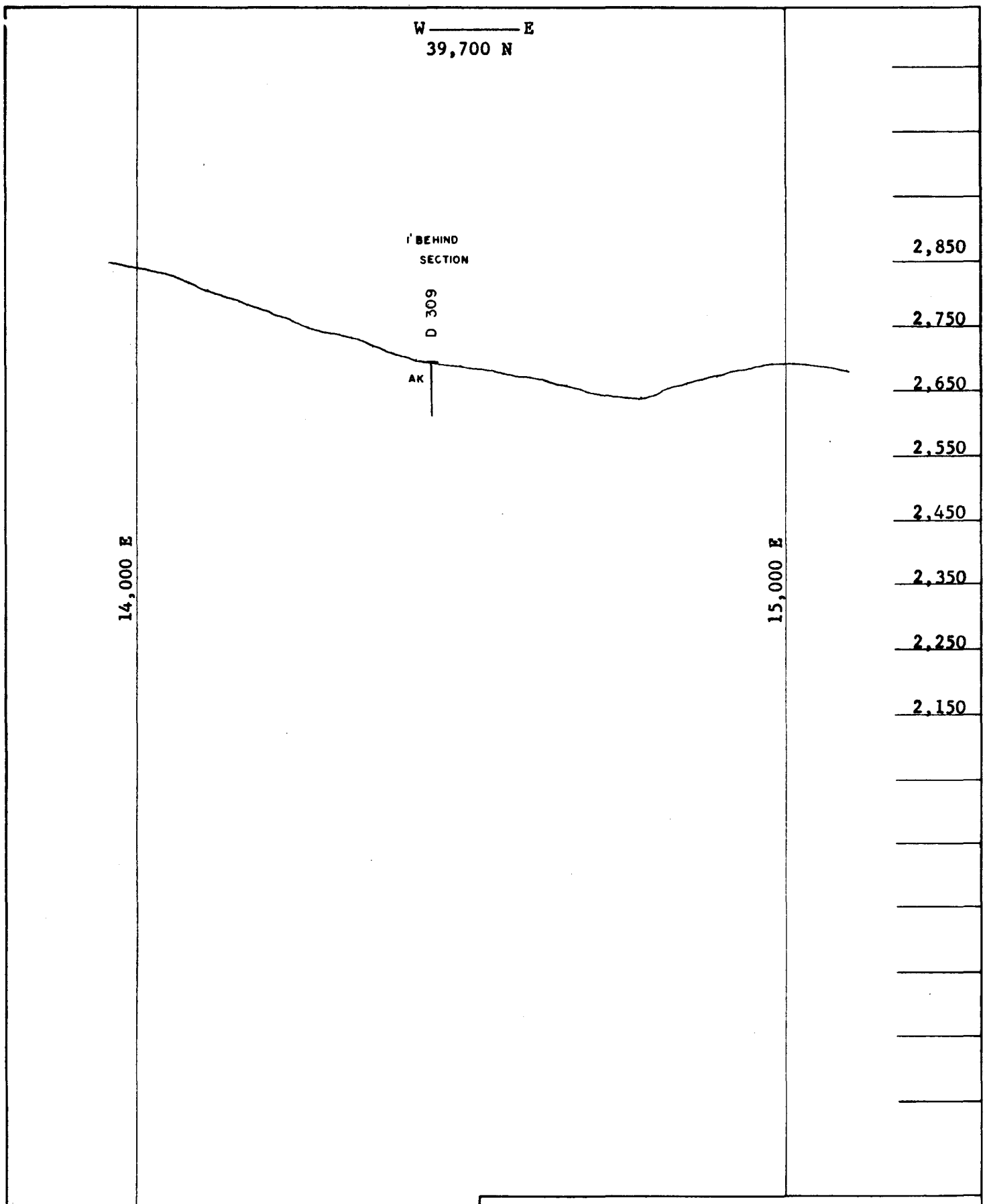
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		JUL 1968	S 121 A



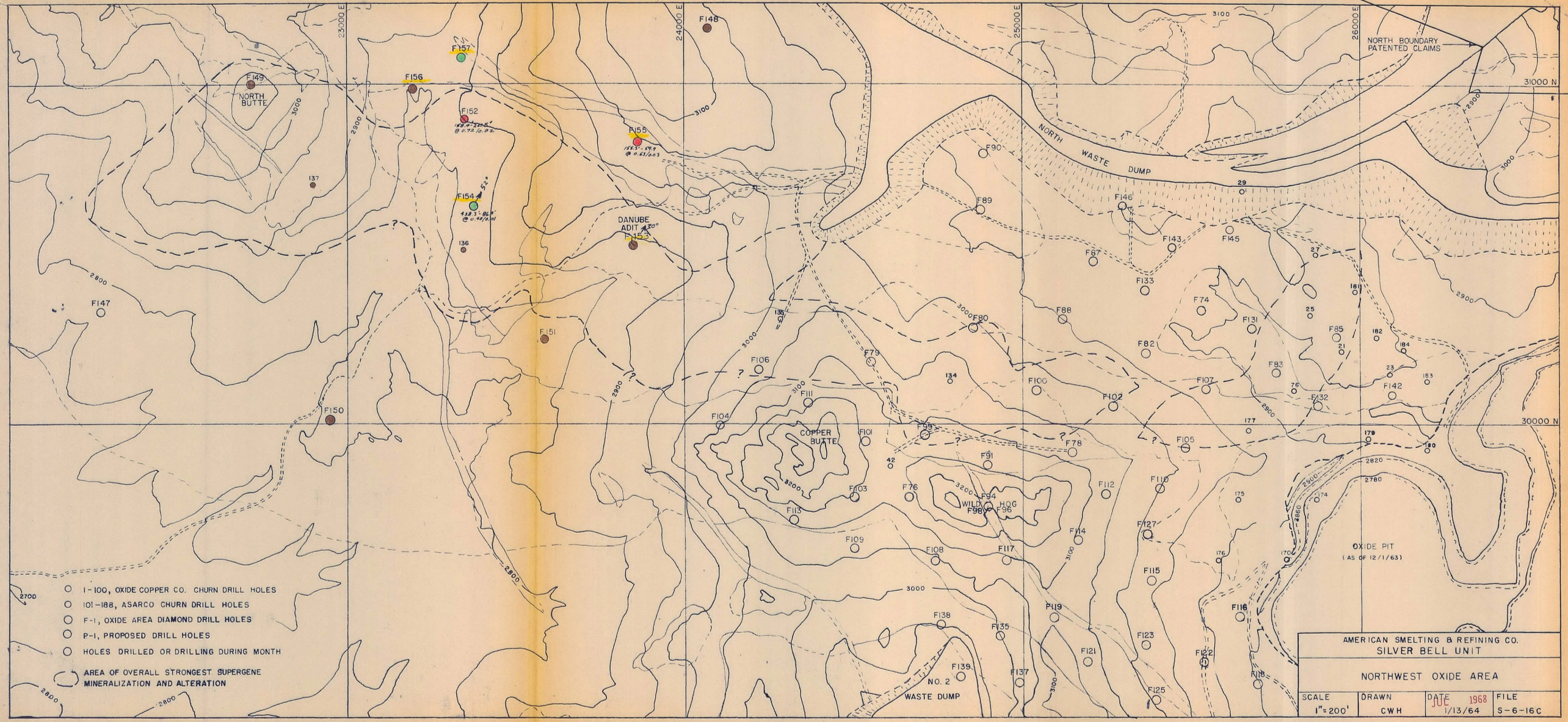
▮ + 0.4% Total Copper
Advance for month

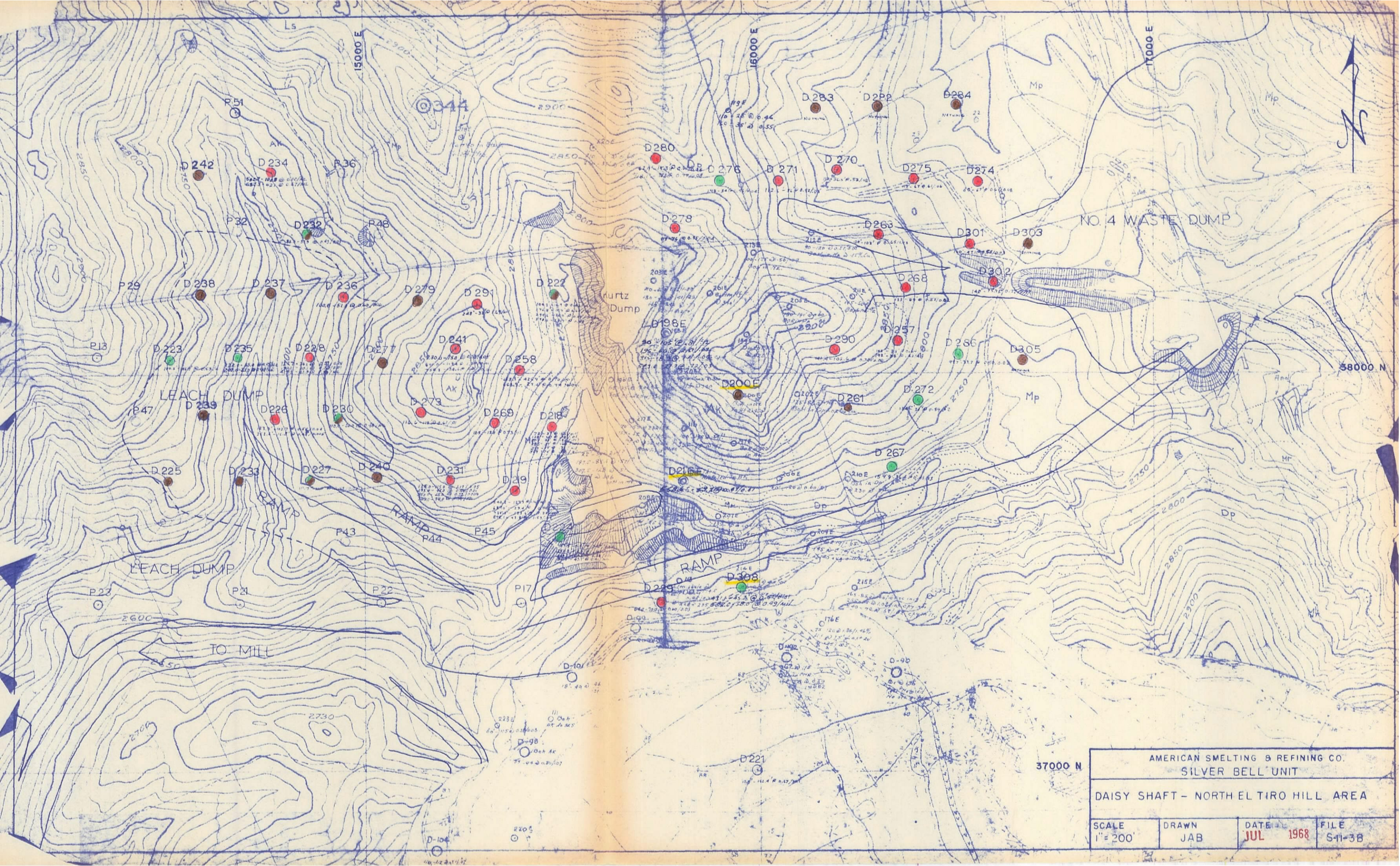
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

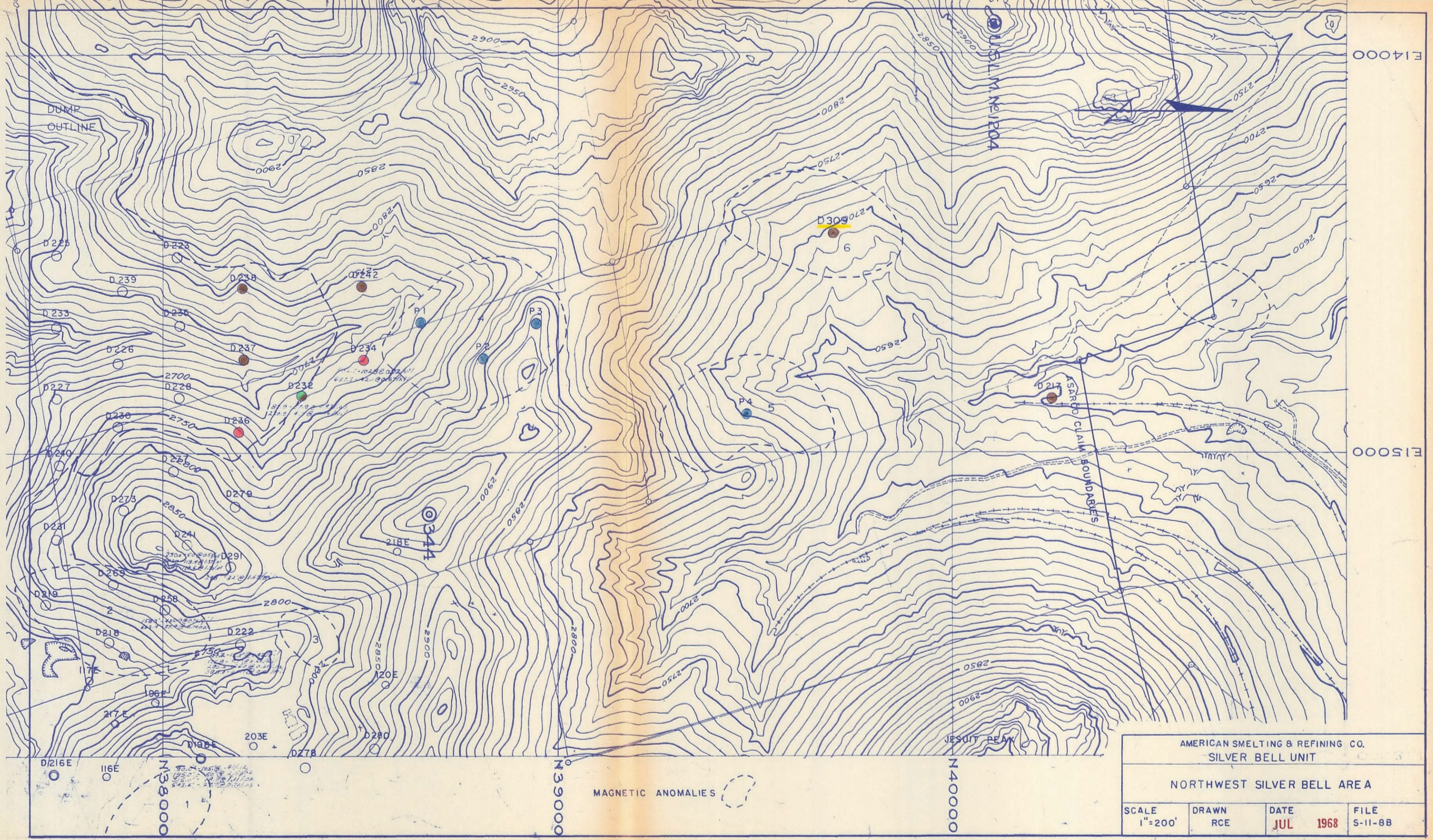
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

NORTH WEST SILVER BELL AREA
PROJECTED DRILL HOLE

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE		S 121 A


23000 E
24000 E
25000 E
26000 E
31000 N
30000 N
NORTH BOUNDARY PATENTED CLAIMS
NORTH WASTE DUMP
NORTH BUTTE
DANUBE ADIT
COPPER BUTTE
WILD HOG
NO. 2 WASTE DUMP
OXIDE PIT
(AS OF 12/1/63)
F147
F148
F149
F150
F151
F152
F153
F154
F155
F156
F157
F76
F78
F79
F80
F82
F83
F85
F87
F88
F89
F90
F91
F94
F96
F98
F99
F100
F101
F102
F103
F104
F105
F106
F107
F108
F109
F111
F112
F113
F114
F115
F116
F117
F118
F119
F121
F122
F123
F125
F127
F131
F132
F133
F135
F137
F138
F139
F142
F143
F145
F146
F74
3100
3000
2900
2800
2820
2780
2860
3200
2700
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
NORTHWEST OXIDE AREA
SCALE 1"=200'
DRAWN CWH
DATE JUL 1968 1/13/64
FILE S-6-16C
1-100, OXIDE COPPER CO. CHURN DRILL HOLES
101-188, ASARCO CHURN DRILL HOLES
F-1, OXIDE AREA DIAMOND DRILL HOLES
P-1, PROPOSED DRILL HOLES
HOLES DRILLED OR DRILLING DURING MONTH
AREA OF OVERALL STRONGEST SUPERGENE MINERALIZATION AND ALTERATION


15000 E
16000 E
17000 E
58000 N
37000 N
NO. 4 WASTE DUMP
LEACH DUMP
LEACH DUMP
Kurtz Dump
RAMP
RAMP
RAMP
TO MILL
D242
D234
P36
P51
P32
D232
P48
P29
D238
D237
D236
D279
D291
D222
D198E
D241
D258
D200E
D216E
D308
D229
D223
D235
D228
D277
P13
D239
D226
D230
D273
D269
D218
D225
D233
D227
D240
D231
D249
P47
P43
P44
P45
P23
P21
P22
P17
D280
D276
D271
D278
D283
D282
D284
D270
D275
D274
D263
D301
D303
D302
D268
D257
D290
D286
D305
D261
D272
D267
D221
D-101
D-98
D-104
D-96
D-99
Mp
Dp
Ls
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE JUL 1968
FILE S-11-3B



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

NORTHWEST SILVER BELL AREA

SCALE	DRAWN	DATE	FILE
1"=200'	RCE	JUL 1968	S-11-88

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

May 17, 1968

J. H. C.

MAY 31 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
MT. EXPECTATION, NORTH EL TIRO HILL AND DANUBE AREAS,
April, 1968

During the month of April four types of drills were operated at Silver Bell. A truck mounted diamond drill operated throughout the month deepening churn drill hole 198E in the North El Tiro Hill area. A skid rig worked from the 1st to the 15th on Mt. Expectation. An angle hole skid rig was brought in the 15th to drill an angle hole near the Danube Adit. A Failing Rotary drill was used to clean out two churn drill holes for deepening with a diamond drill in the North El Tiro Hill area.

The footage for each drill and the average direct drilling costs for April, 1968 are:

Drill	Footage Drilled	Average Advance Per Shift	Average Direct Cost per Foot
Diamond - Truck	593.8	10.2'	$ 7.33
Diamond - Skid	400.0	15.4'	8.94
Diamond - Skid, Angle	221.0	8.5'	11.46
TOTAL	1,214.8'	Combined average:	$ 8.61

The two churn drill holes were cleaned and cased by the Failing Rotary Drill at a cost of $2.36 per foot.

Hole No.	Elevation	Coordinates North	Coordinates East	+0.40% Cu Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Month	Depth End of Month	Final Depth
D198E	2820.59	38,102.17	15,751.91	315.0	18.9	1.11	.02	593.8	908.8	908.8
				543.6	27.7	0.72	.03			
D-307	3111.64	35,411.17	16,127.05	182.1	34.9	0.58	.01	400.0	400.0	400.0
F-153	2897.26	30,528.85	23,849.04	No significant thickness				211.0	221.0	
						TOTAL		1,214.8'		

Mt. Expectation

The drilling on Mt. Expectation has been terminated following the completion of D-307. A total of twelve holes have been drilled on Mt. Expectation along the El Tiro Pit perimeter. Only four of these have penetrated an economic thickness of ore grade mineralization. The location of all holes are shown on an accompanying map. The thickness of the chalcocite blanket appears to diminish abruptly southwest of the El Tiro Pit and no further drill holes are planned or recommended in this area at this time. A summary of hole D-307 is given below:

D-307

Drilled entirely in alaskite with the exception of several aplite dikes in the first 90 feet and two subsequent aplite dikes from 241.0 to 292.0 and 380.5-385.9. Sulfides were intersected at about 104.4' and ore grade mineralization existed from 182.1 to 217.0 and from 243.4 to 253.0. The ore was accompanied by quartz veins, gouge and strong clay-sericite alteration. Strong clay-sericite alteration persisted throughout the hole to 400.0 feet, where the hole was bottomed in alaskite. Primary mineralization averaged only about 0.15%.

North El Tiro Hill

Four churn drill holes in the vicinity of North El Tiro Hill have been selected for deepening to check for possible deep seated chalcopyrite ore in the sediments. The first of these, D198E, was completed in April and a summary of the geology is given below:

D198E

This hole started at 315.0 feet in the bottom of churn hole 198E. The hole immediately entered ore grade hornfels cut by monzonite dikes. Ore grade mineralization ended at about 352 feet. The hole continued in hornfels, with monzonite dikes frequently intruding the hornfels as shown in the accompanying section. At 787.7 feet monzonite was again encountered and persisted to the bottom of the hole at 908.8'.

The hornfels were generally fine grained, dense, siliceous and black to dark green in color. In general chalcopyrite mineralization increased adjacent to the monzonite dikes. This was most noticeable from 498 feet to 571 feet where a monzonite dike was bordered by ore grade mineralization in a strong altered and sheared hornfels. Magnetite was visible only when there was strong chalcopyrite present.

Danube Area

Drilling was resumed in the Danube area following completion of the Mt. Expectation project. The first hole, F-153, is an angle hole being drilled N30°E from the Danube Adit at an angle of 30° from the horizontal.

Briefly, the hill on which the Danube Adit is located exhibits several of the geologic features associated with sedimentary ore in the East Extension of El Tiro Pit. (This hill will be referred to as the Danube Hill for convenience.) In addition, there is a broad geochemical anomaly and several strong magnetic anomalies. Mineralization appears best on the west side of Danube Hill where hole F-152 encountered 241.5 feet of ore, beginning at 158.4 feet, which contained 0.72% total copper and 0.02% non-sulfide copper. Available information shows that any economic mineralization will probably be limited to the vicinity of the igneous-sediment contact, which is steeply dipping to the southwest. Therefore, angle holes are being used to drill across this contact to check the width, or least dimension, of a possibly tabular, inclined ore body.

Hole F-153 was started by Mr. Nuttycombe to penetrate through the tactite on the east side of the hill. A summary of the footage drilled in April is given below:

F-153

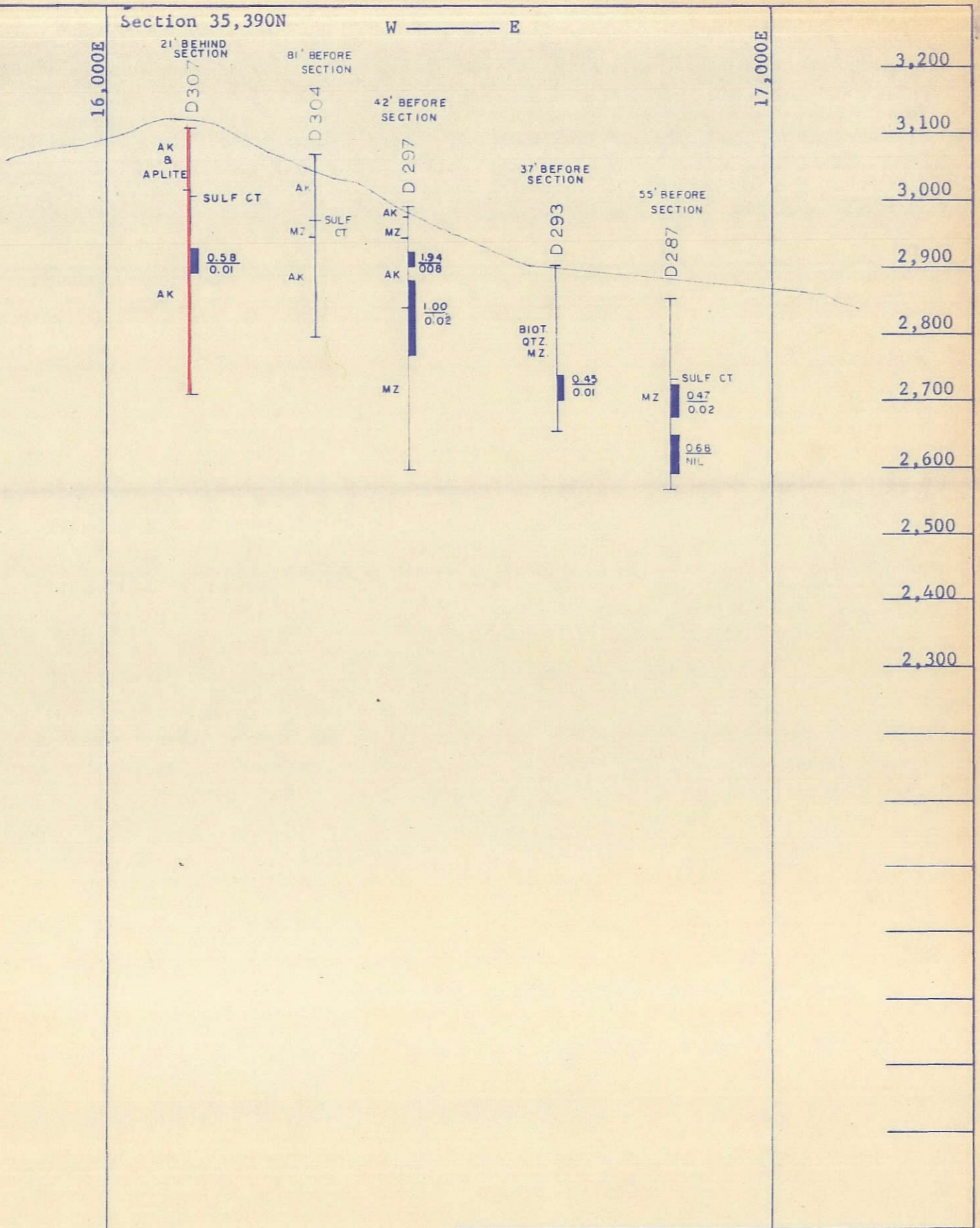
This hole was collared at an angle of 30° from horizontal in a N30°E direction. (Because of the angle it was impossible to measure the true dip of veins and structures encountered in the hole). A complex series of intrusives were encountered to a distance of 147.2 feet down the hole where the sediment contact was penetrated. The

sequence of igneous units was: 0.25.4, monzonite; 25.4-28.9, syenodiorite or dacite; 28.9-32.9, post-mineral andesite; 32.9-98.0, dacite: 98.0-108.5, an unusual porphyritic rock consisting of 25% large laths of plagioclase set in a light green aphanitic groundmass with accessory epidote and chlorite; 108.5-117.5, monzonite or syenodiorite; 117.5 to 132.5, dacite; 132.5 to 137.2, quartzite; 137.2-147.2, syenodiorite. The sediments consisted of dense hornfels and marble with strong oxidation still being encountered at 221.0 feet at the end of the month. (Note: This hole was stopped in May at a depth of 507.4 feet; no significant ore-grade mineralization was encountered).

R C Edmiston

R. C. Edmiston
Resident Geologist

RCE:jca



+0.4% Total Copper

Advance for month

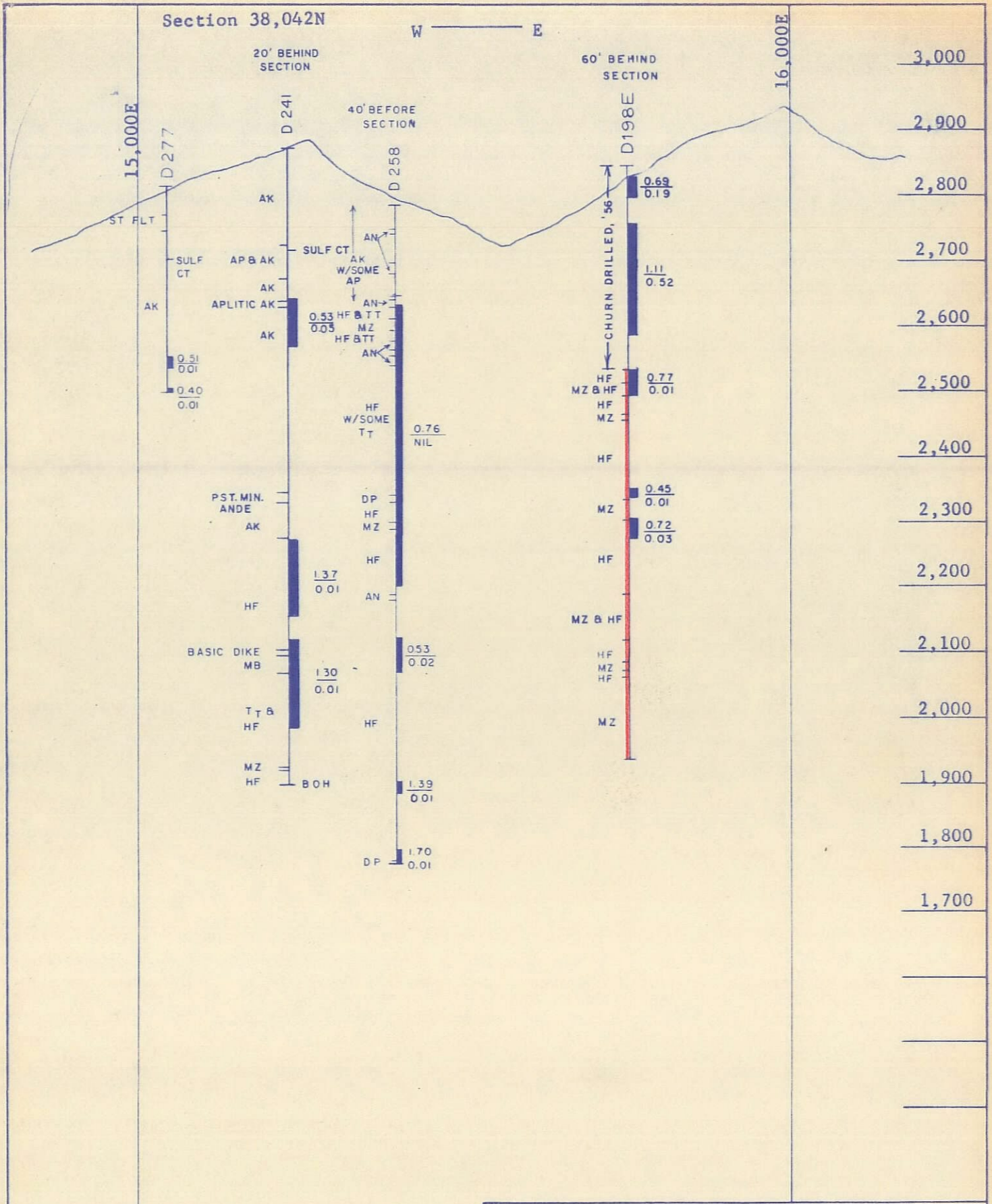
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

MT. EXPECTATION

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE NRN	APR 1968	S 121 A



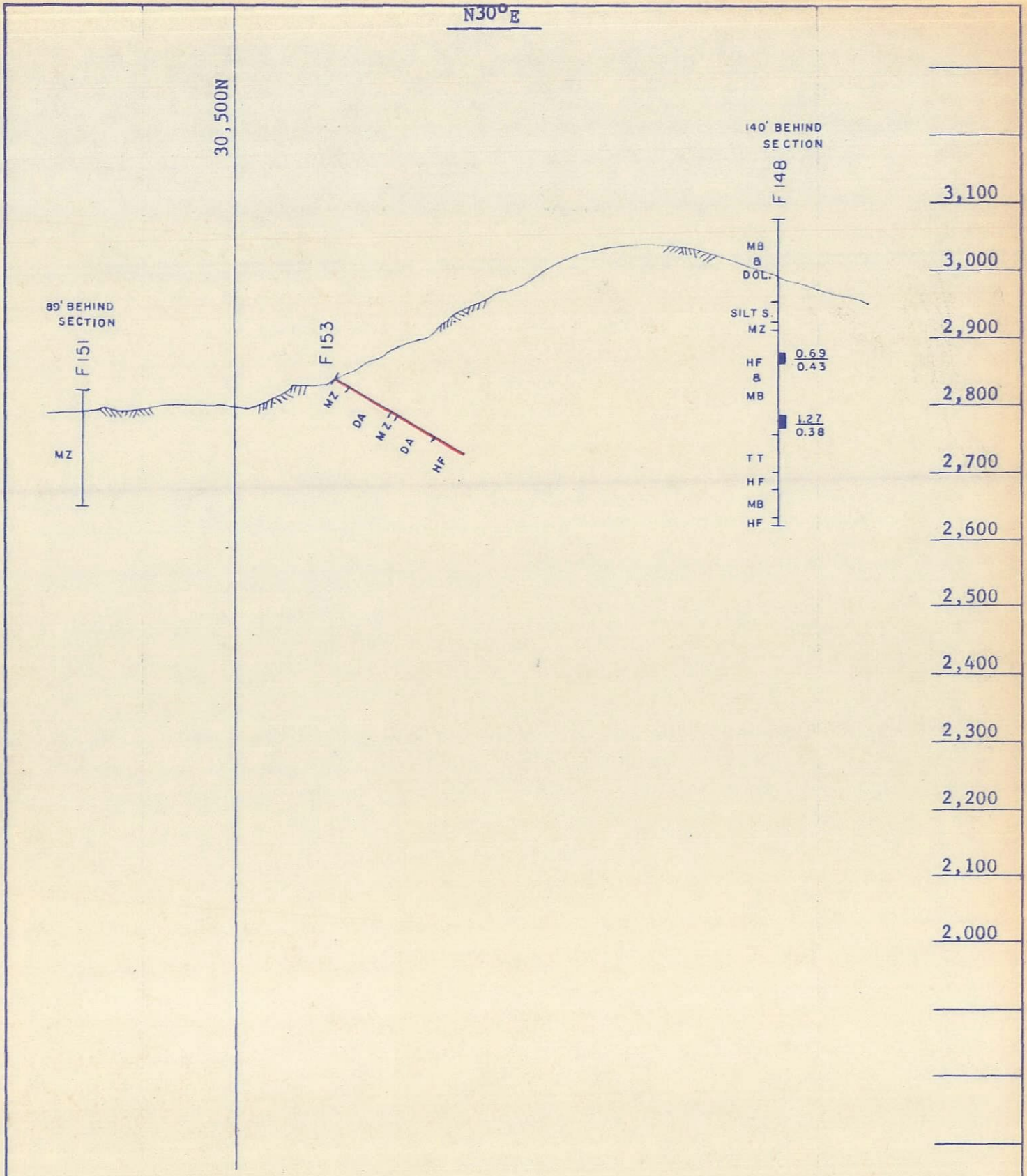
▮ + 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	RCE NRN	APR 1968	S 121 A



+0.4% Total Copper

Advance for month

Note: Rock Types Generalized

Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

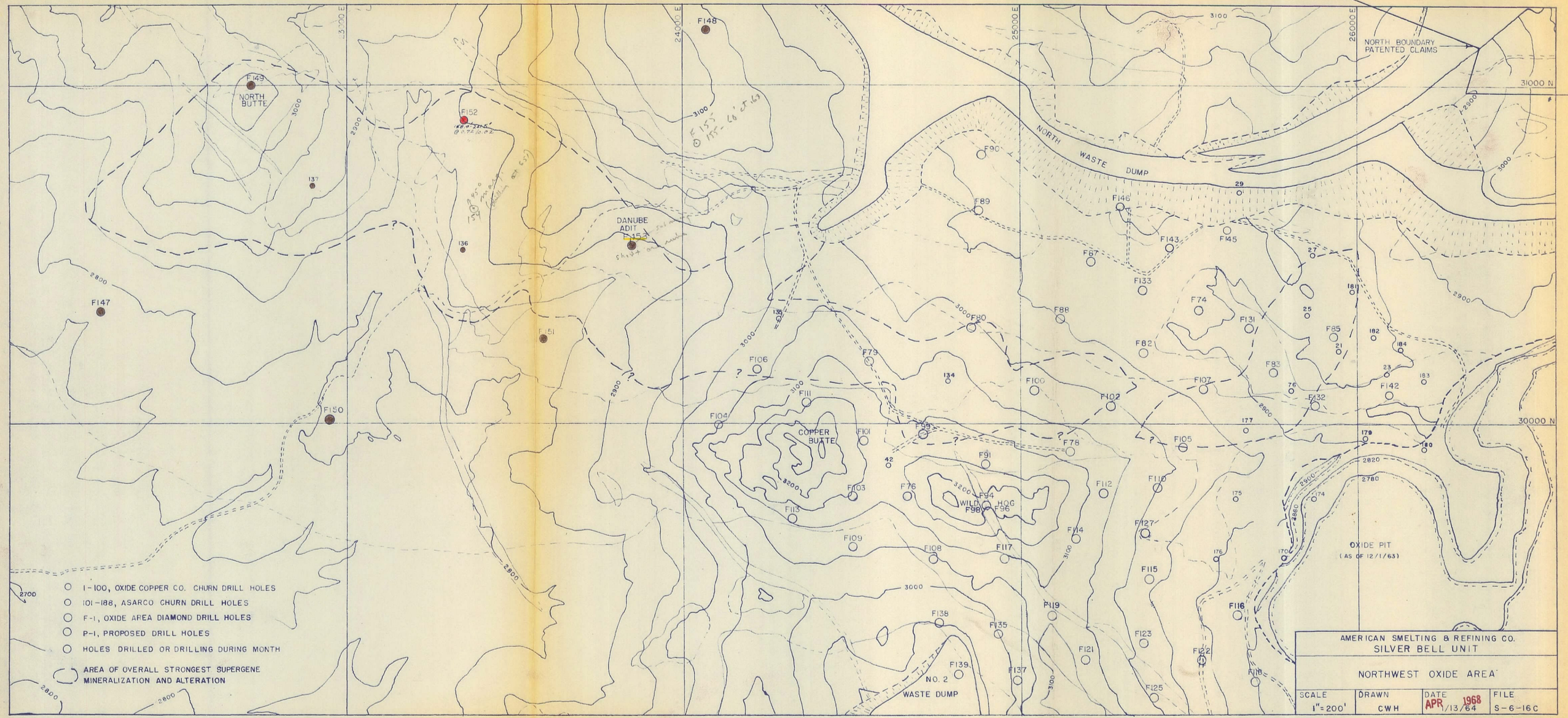
DANUBE HILL
DRILL HOLE PROJECTIONS

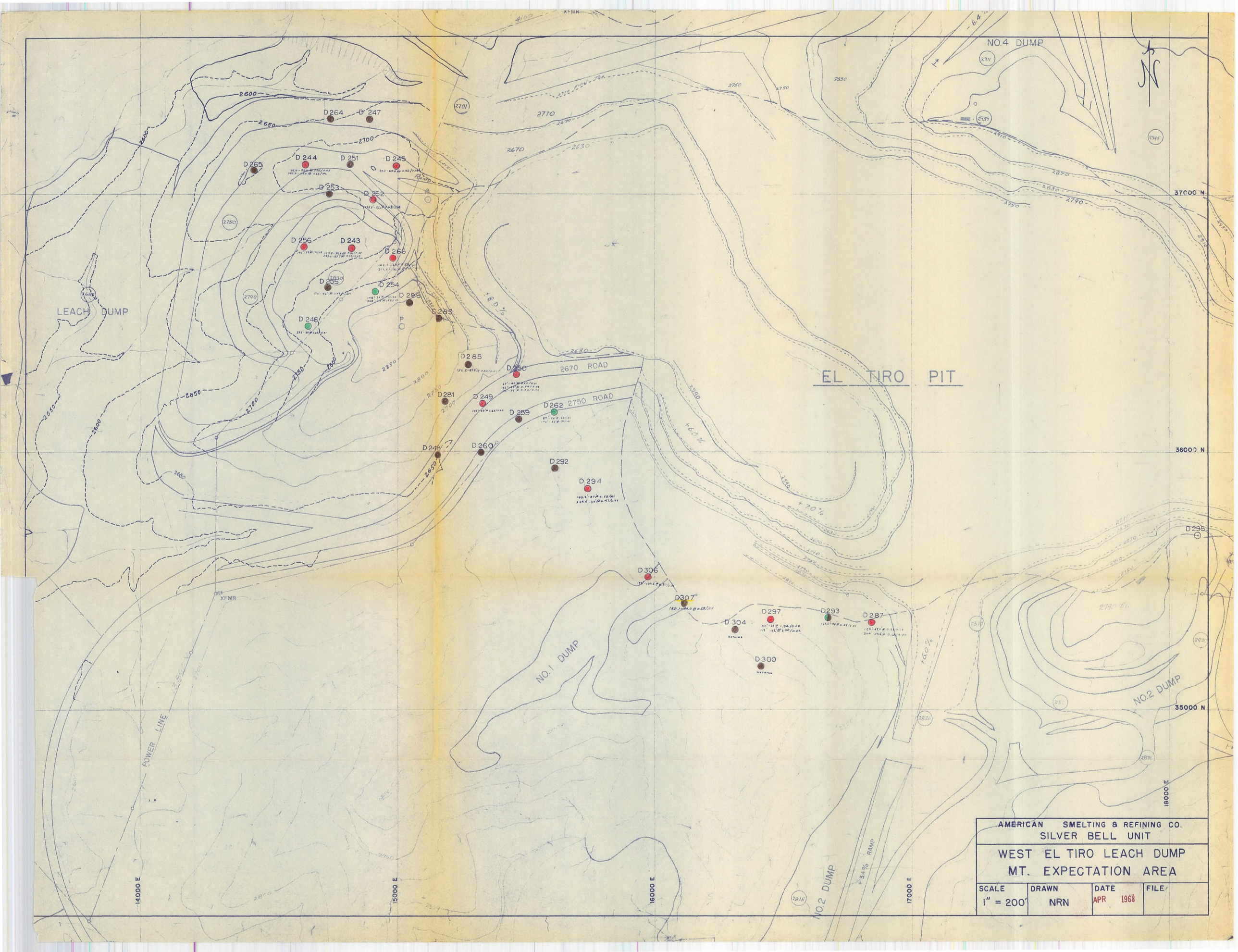
SCALE	DRAWN	DATE	FILE
1" = 200'	RCE	APR 1968	S 121 A

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT – NORTH EL TIRO HILL AREA

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	APR 1968	S-11-38


NORTH BUTTE
DANUBE ADIT
COPPER BUTTE
WILD HOG
NO. 2 WASTE DUMP
NORTH WASTE DUMP
NORTH BOUNDARY PATENTED CLAIMS
OXIDE PIT
(AS OF 12/1/63)
24000 E
25000 E
26000 E
31000 N
30000 N
1-100, OXIDE COPPER CO. CHURN DRILL HOLES
101-188, ASARCO CHURN DRILL HOLES
F-1, OXIDE AREA DIAMOND DRILL HOLES
P-1, PROPOSED DRILL HOLES
HOLES DRILLED OR DRILLING DURING MONTH
AREA OF OVERALL STRONGEST SUPERGENE MINERALIZATION AND ALTERATION
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
NORTHWEST OXIDE AREA
SCALE 1"=200'
DRAWN CWH
DATE APR 1/13/64 1968
FILE S-6-16C


NO.4 DUMP
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
POWER LINE
XFMR
RAMP
37000 N
36000 N
35000 N
14000 E
15000 E
16000 E
17000 E
18000 E
D264
D247
D265
D244
D251
D245
D253
D252
D256
D243
D266
D255
D254
D286
D289
D246
D285
D250
D281
D249
D259
D262
D248
D260
D292
D294
D306
D307
D304
D297
D293
D287
D300
D295
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
WEST EL TIRO LEACH DUMP
MT. EXPECTATION AREA
SCALE
1" = 200'
DRAWN
NRN
DATE
APR 1968
FILE

Mr. J. H. Courtright

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

J. H. C.

April 16, 1968

APR 29 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
MT. EXPECTATION AND NORTH EL TIRO HILL AREAS March, 1968

The following briefly summarizes the drilling done during the month of March, 1968.

A total of 1,466.2' of diamond core drilling was done; 782.7' with the truck mounted rig and 683.5' with the skid rig. Without taking any delays into account the average advance per shift was 26.9' for the truck rig and 14.9' for the skid rig. One 315' churn hole was cleaned out and cased with the Failing rig.

The average direct drilling cost for the month was $8.25 per foot with the skid rig costing $9.79 per foot and the truck rig $7.23 per foot. The cost of cleaning the old churn drill hole was $1.49 per foot.

Hole No.	Approx. Elevation	North	East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-301	2,845.54	38,326.64	16,532.07	159.6	47.1	0.55	0.03	229.9	304.9	304.9
D-302	2,849.56	38,231.67	16,593.79	140.2	75.9	0.72	0.07	175.8	265.8	265.8
D-303	2,843.28	38,322.58	16,684.54	No significant thickness				186.2	276.2	276.2
D-304	3,065.48	35,309.76	16,313.72	"	"	"		275.6	275.6	275.6
D-305	2,745.43	38,031.76	16,669.21	"	"	"		195.0	195.0	195.0
D-306	3,037.52	35,515.94	15,975.75	193.2	107.6	0.50	0.01	428.7	428.7	428.7
							TOTAL	1,466.2'		

D-301 This hole collared in dump material and encountered quartz-monzonite at 75' and remained in it throughout the extent drilled. The monzonite was moderate to strongly stained by brown limonite. Intimately associated with the limonite in the oxidized zone was the copper oxide mineral tenorite.

Sulfide mineralization was encountered at 159.6' and the main chalcocite enrichment was present from there to 247'. This zone contained "ore-grade" copper values.

The hole was bottomed at 304.9' in essentially primary mineralization carry around 0.3% copper in the form of chalcopyrite.

D-302 This hole collared in dump material and encountered monzonite at 90'. The rock was strongly stained by brown limonite to the sulfide contact at 140'. There was an approximate 0.1% copper value in the leached capping which, for the most part, was in the form of tenorite.

Chalcocite enrichment was substantial resulting in "ore-grade" material in the interval 140.2'-216.1'. The chalcopyrite primary mineralization appears to contain approximately 0.3% copper.

The hole was bottomed at 265.8'.

D-303 This hole collared in dump material and hit monzonite bedrock at 90'. Brown limonite with associated tenorite was present to 188' where the sulfide zone was encountered.

There was no significant secondary enrichment in this hole and no "ore-grade" intercepts were encountered.

The hole bottomed in seemingly sparsely altered monzonite at 276.2'.

D-304 This hole collared in alaskite and with the exception of monzonite encountered in the interval 100.6'-124.3' remained in it.

The alaskite in the oxide zone was strongly hematite and limonite stained. Differing from the monzonite in the above described holes this alaskite had no visible tenorite present associated with the limonite.

Sulfides were encountered at approximately 86', but chalcocite enrichment was very limited in extent and no significant thickness of "ore-grade" material formed. The primary mineralization apparently contained approximately 0.1% copper.

The hole was bottomed in alaskite at 275.6'.

D-305 This hole collared in monzonite and encountered sulfides at 75'. The leached capping was moderately limonite stained and contained up to 0.15% Cu in the form of tenorite.

Chalcocite enrichment was limited in extent (vertical) and no significant thickness of "ore-grade" material was formed. The primary mineralization in this vicinity appears to have been approximately 0.1% copper.

The hole bottomed at 195.0'.

D-306 This hole collared in alaskite and remained in it to 420.6'. Monzonite was then present to 428.7' where the hole was bottomed.

The leached caprock was sparsely limonite stained and moderate to strongly hematite stained. No visible copper minerals were seen in the leached rock and the total copper value ranged between 0.01 and 0.02%.

Sulfides were encountered at 103.9', but chalcocite enrichment did not make the rock "ore-grade" until 193.2'. The hole penetrated "ore-grade" material from there to 200.8'.

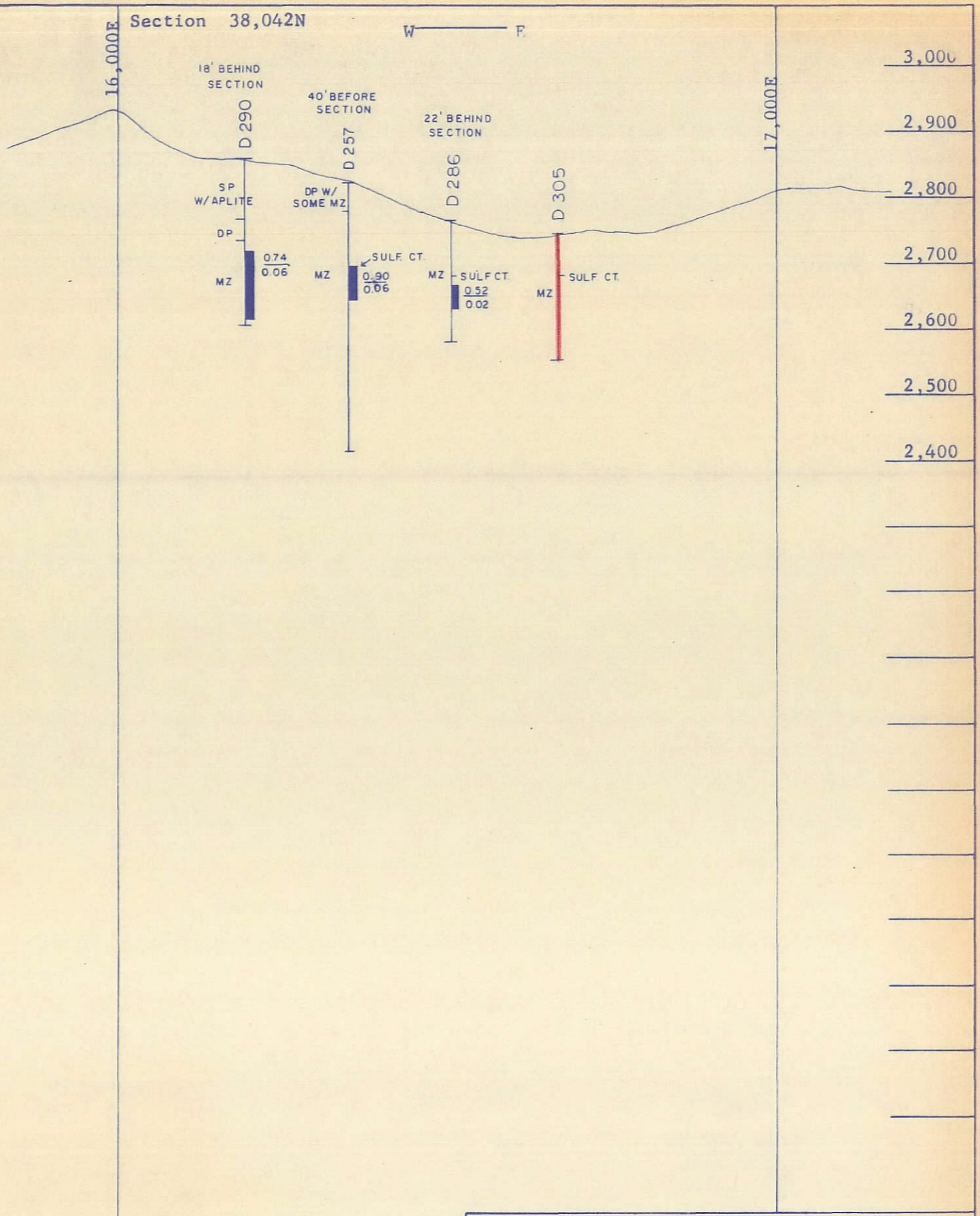
The primary mineralization grade was apparently around 0.1% in this vicinity.

The hole was bottomed at 428.7' in monzonite.

N. R. Nuttycombe

N. R. Nuttycombe

NRN:jca



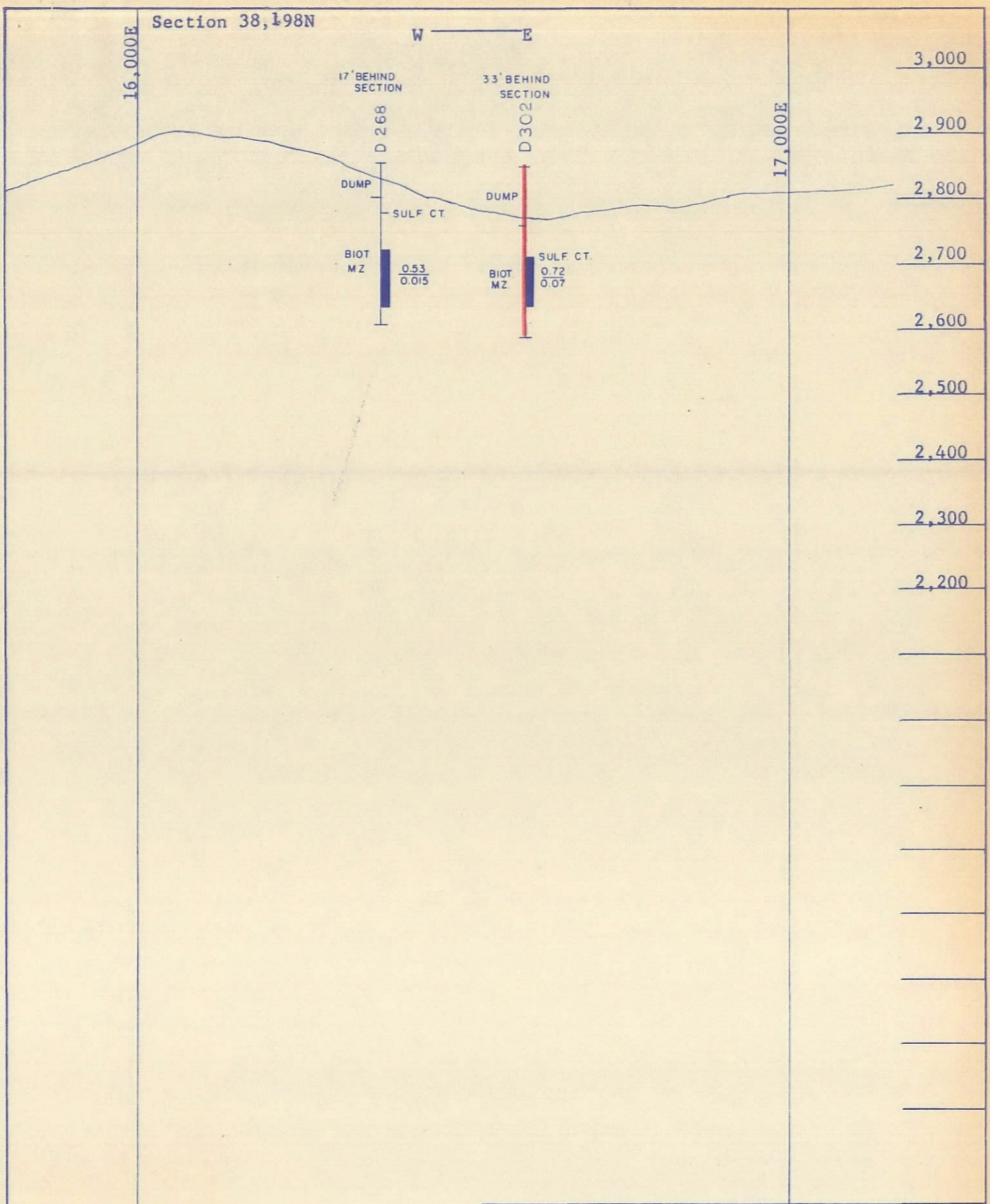
+ 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	APR 1968	S 121 A



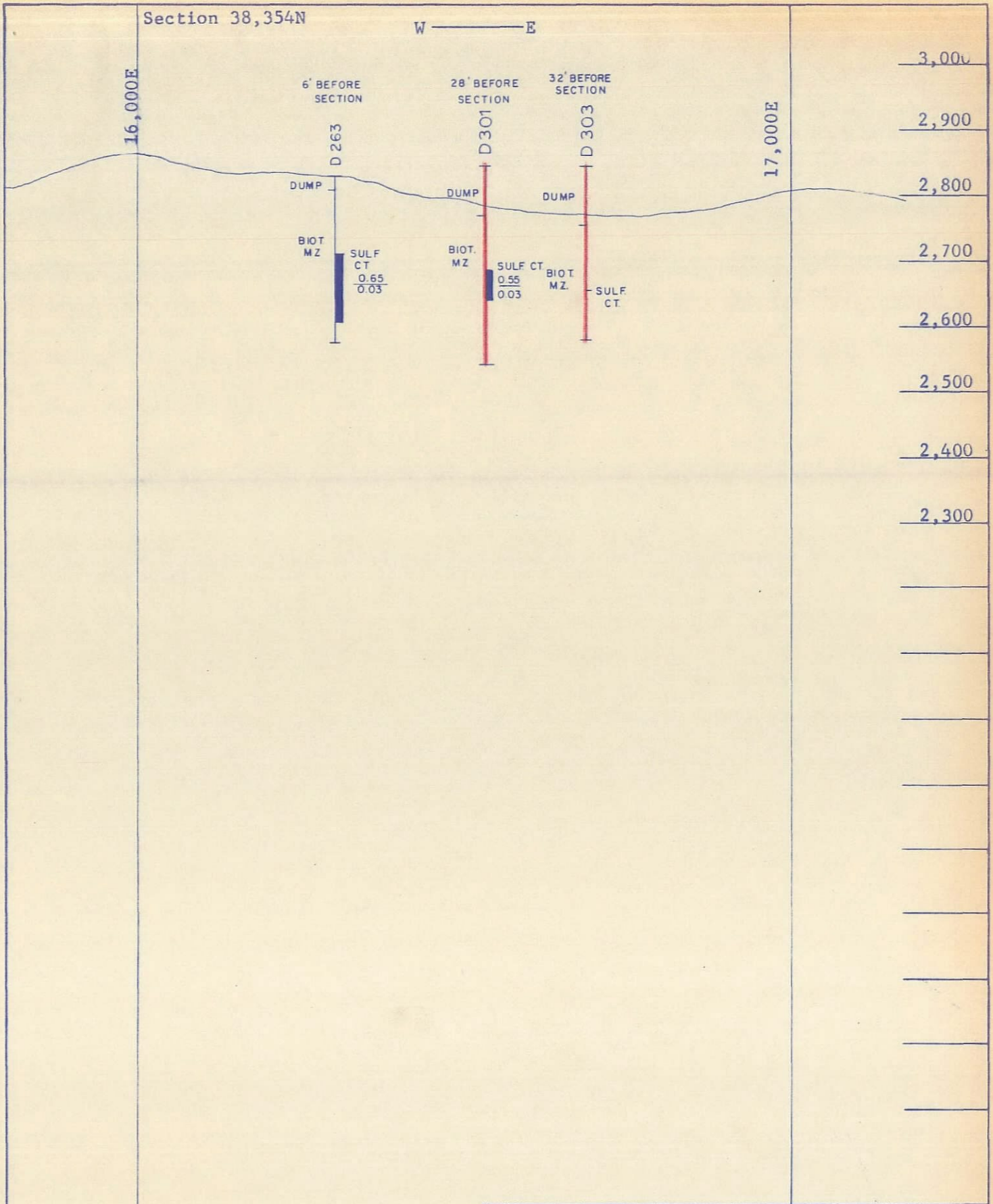
+ 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

Daisy Shaft - North El Tiro Hill Area
Drill Hole Projections

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	APR 1968	S 121 A



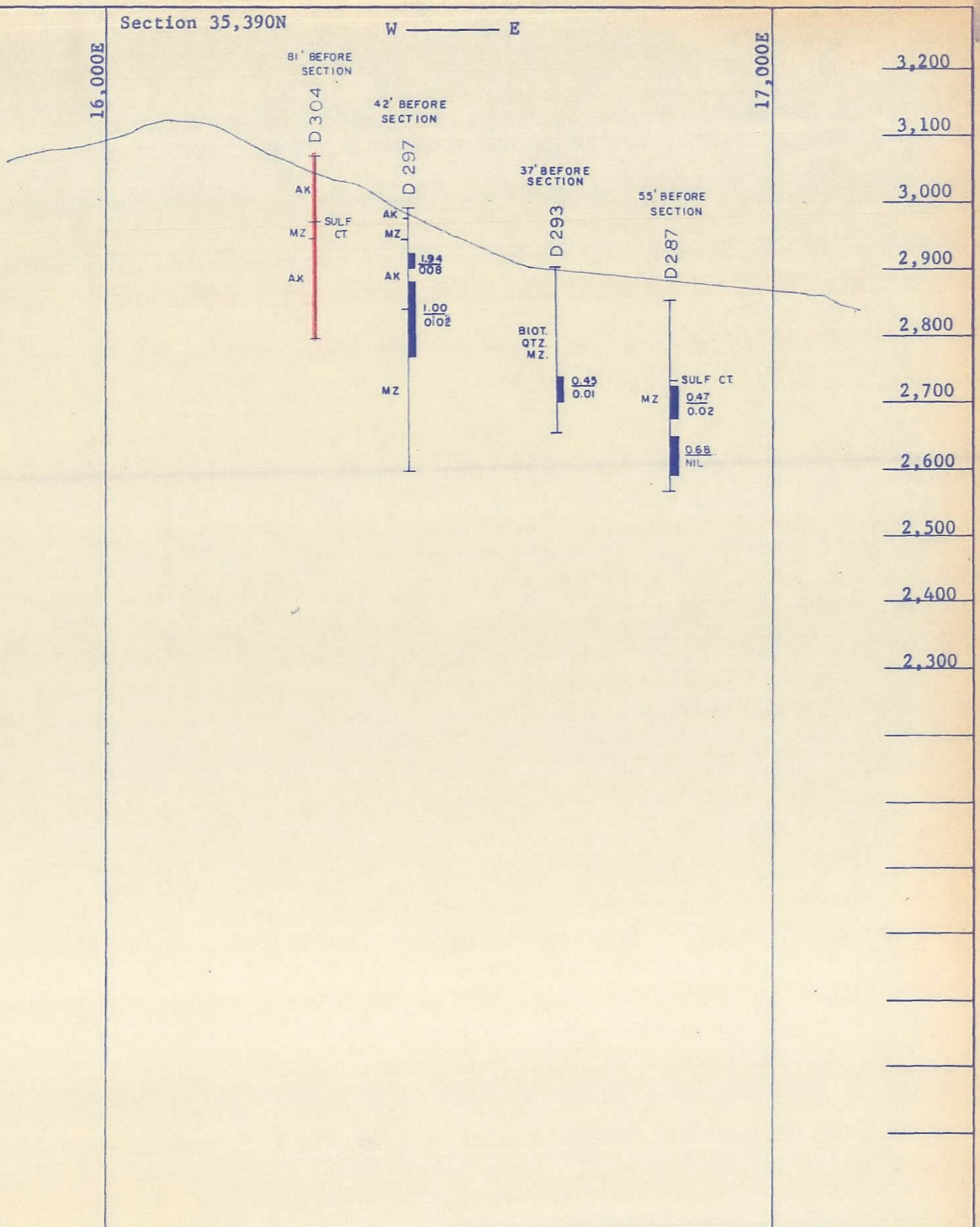
+ 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	APR 1968	S 121 A



+0.4% Total Copper

Advance for month

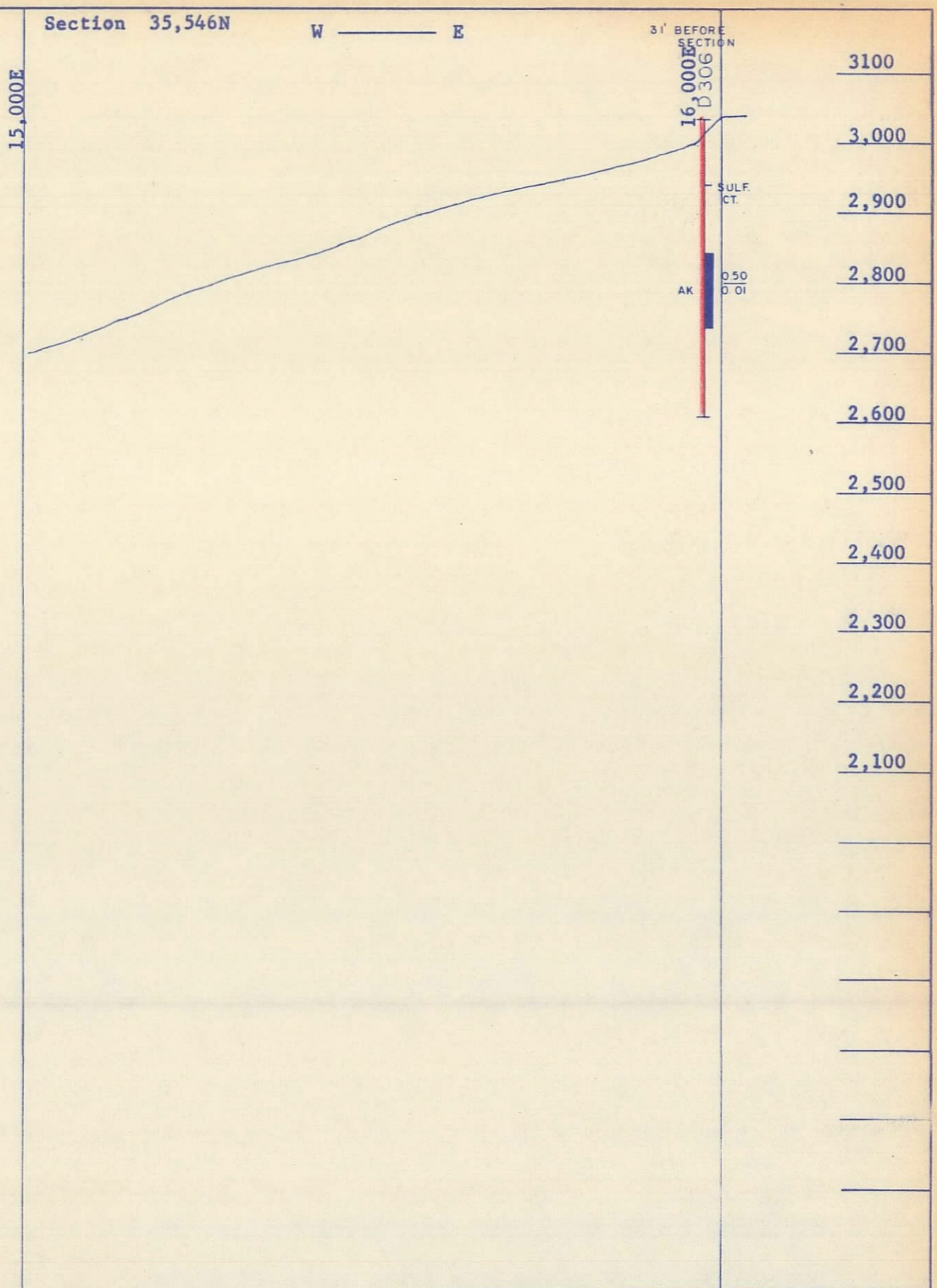
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

MT. EXPECTATION

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	APR 1968	S 121 A



+ 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

MT. EXPECTATION
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	APR 1968	S 121 A

EXPLANATION FOR PLAN MAPS

D-2??

○ Holes drilled during month

P-??

● Proposed holes. Those holes colored are those of the original grid pattern that will probably be drilled.

D-Series Recent drilling program started with hole number D-218.

E-Series Churn drill holes drilled starting around 1956.

COPPER CONTENT

D-231

● 125'-115.0' @ 1.17/0/05 Hole contains sufficient thickness of +0.4% material to carry overburden.

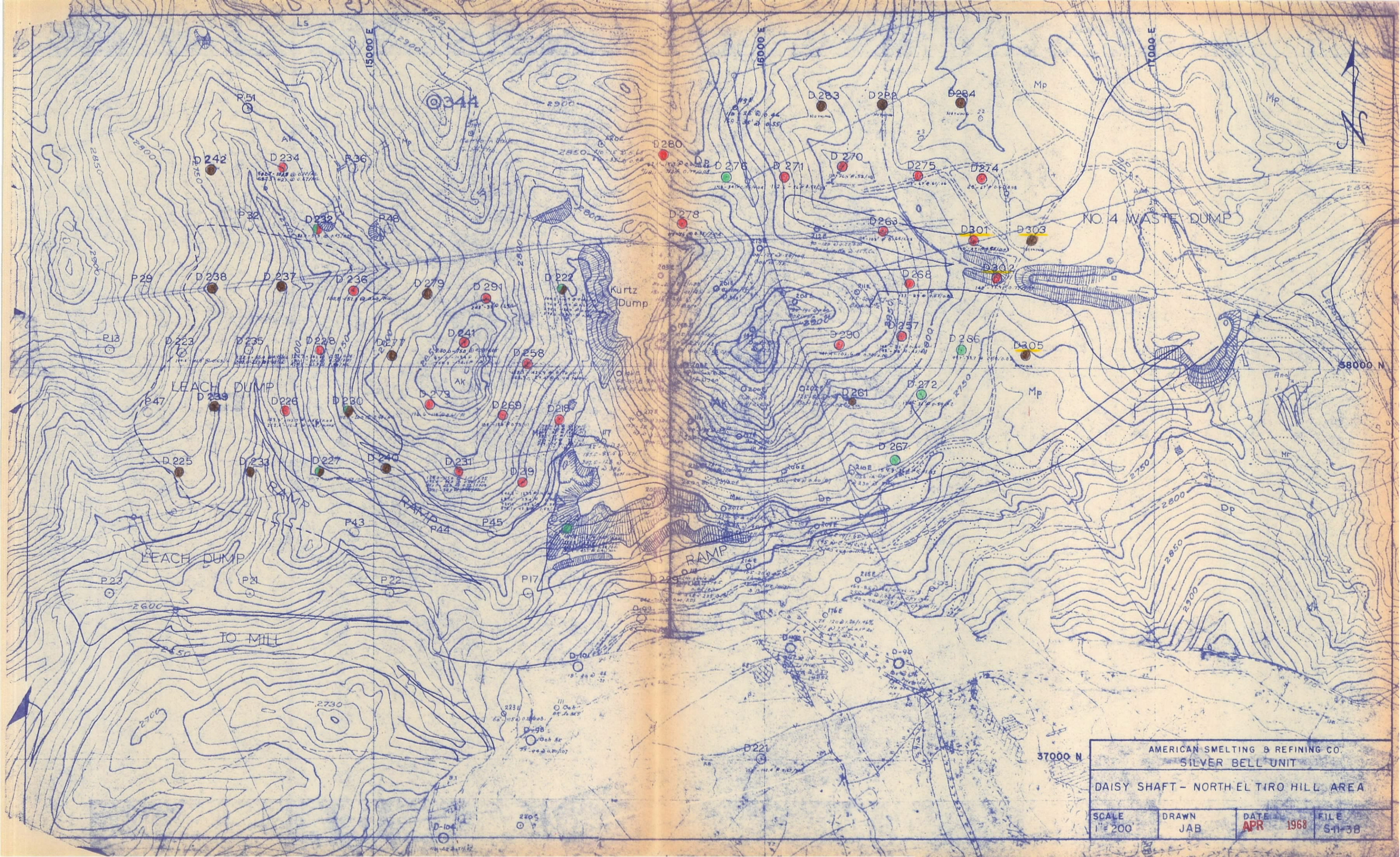
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

D-2??

● Marginal hole. Insufficient thickness and/or grade of material to carry stripping.

D-2??

● None to thin +0.4% copper intervals.


15000 E
16000 E
17000 E
58000 N
37000 N
N
NO. 4 WASTE DUMP
Kurtz Dump
LEACH DUMP
LEACH DUMP
RAMP
RAMP
RAMP
TO MILL
D 242
D 234
D 232
D 238
D 237
D 236
D 279
D 291
D 222
D 241
D 258
D 223
D 235
D 228
D 277
D 239
D 226
D 230
D 273
D 269
D 218
D 225
D 233
D 227
D 240
D 231
D 229
D 280
D 276
D 271
D 270
D 275
D 274
D 283
D 282
D 284
D 278
D 263
D 301
D 303
D 268
D 290
D 257
D 286
D 305
D 261
D 272
D 267
D 221
P 51
P 36
P 32
P 48
P 29
P 13
P 47
P 43
P 44
P 45
P 23
P 21
P 22
P 17
Mp
DP
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE APR 1968
FILE S-11-38

NO.4 DUMP
N
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
NO.2 DUMP
POWER LINE
XFMR
RAMP
37000 N
36000 N
35000 N
14000 E
15000 E
16000 E
17000 E
18000 E
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
WEST EL TIRO LEACH DUMP
MT. EXPECTATION AREA
SCALE 1" = 200'
DRAWN NRN
DATE APR 1968
FILE

Mr. J. H. Courtright

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona

April 12, 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: QUARTERLY GEOLOGIC REPORT

GENERAL:

The expansion of mining into the sediments has created numerous problems for all the technical groups at Silver Bell. One of the geologic problems is differentiating the sediments on a basis which is easily recognizable from one level to another and from one geologist to another. Compositionally, the most distinct units are hornfels, quartzite and marble. It is often difficult to draw a line between what has been called tactite and hornfels within the pit, the difference being mainly the relative percentage of garnet in each rock. Therefore in future pit mapping an attempt will be made to map and trace contacts only between hornfels (all types), quartzites and marbles.

During the last quarter leach grade acid reactive rock was stockpiled. Separate ore reserves are being kept for this rock, under the heading of "Ammonia Leach". The question then arises as to whether this new category should be shown on the geologist's assay maps. I believe it is best on these maps to show only the grade of mineralization as found rather than taking into account the manner of copper recovery from the rock. The main use of the geologist's assay maps seems to be as an overlay for the geology maps, showing ore controls, etc.; rather than as a tool for production planning.

OXIDE PIT

2700 Level

Mining took place on the 2700 level until the end of the quarter when the shovel was moved down to the 2660 level. Mining was in mostly ore grade monzonite and alaskite. Well developed NNW trending faults and shears were revealed by the mining.

2660 Level

At the beginning of January approximately two feet of water stood in the 2660 level as a result of unusually heavy rains. This water was pumped to the precipitation plant because of the large quantity of copper carried in solution. This level is approaching the base of supergene enrichment and mining to date has shown that some areas which are leach grade on 2660 were ore grade on the 2700 level.

Minor raveling ocurred from the slide zone in the southeast corner of the Oxide Pit during the past quarter. However, new cracks have formed behind and parallel to the old ones and have developed to a point where a renewal of moderate scale sliding should take place shortly.

EL TIRO PIT

During the past quarter mining in El Tiro Pit took place mainly on the 2710 and 2670 levels. Mining commenced on the 2630 level at the end of the quarter and stripping operations on Union Ridge and Page Hill were carried out intermittently.

Union Ridge - Page Hill

The stripping operations on Union Ridge and Page Hill, which have been designated the El Tiro Pit - East Extension No. 2, have not taken place in such a manner that geologic mapping can be conducted between shots. However, an examination of the muck after blasting has shown large quantities of copper "pitch" and malachite along with incompletely oxidized veins of chalcopyrite. The first bench drilled on Union Ridge, the 3130 level, showed an average assay of 0.71% total copper and 0.61% non-sulfide copper. Similarly the first holes drilled on Page Hill, for the 3150 level, showed an average of 0.80% total copper, including 0.63% non-sulfide copper.

2710 Level

The 2710 level was nearly completed in the East Extension No. 1 during the past quarter. It was found that the main ore zone which had been plunging to the northwest, entirely in sediments, was cut off to the northwest on this level by a dacite embayment into the tactite and hornfels. Figure one shows the location of sedimentary ore on the 2830 through 2710 levels in the East Extension No. 1. (Since this map, as well as the large assay maps of the entire pits, are based on blast hole assays, the true elevation of the ore-waste contours is twenty feet above the elevation shown). Figure 1 shows that the ore body has widened with depth and plunged to the northwest, down to the 2710 level where the dacite embayment was encountered.

The large ore zone which is shown on the diamond drill hole ore reserve maps between 18,020E and 18,380E, was discounted on the basis of geologic information in the last quarterly report. That interpretation proved to be correct and only a few percent of the ore inferred from the diamond drilling was found at this location. Clearly, there is a need for further refinements in the calculation of ore reserves in the sediments.

2670 Level

The 2670 level was expanded south and east along the El Tiro Fault Zone. The El Tiro Fault Zone contained several large blocks of hornfels and quartzite as shown on the El Tiro Pit Geology Map. This 200 foot wide zone of faulting and brecciation continues to separate ore grade monzonite and alaskite, to the southwest, from leach and waste grade monzonite dikes and dacite, to the northeast. The original pit perimeter coincided with the El Tiro Fault Zone as no igneous ore was found northeast of this dominant structure. However, strong mineralization is found in small blocks of hornfels surrounded by leach and waste grade igneous rock northeast of this zone. The El Tiro Fault Zone exhibits several of the characteristics attributed previously to a hypothetical major structure of deep seated weakness and continual movement.

South Perimeter Slumping

Approximately six months ago small cracks were observed to be forming on the hill east of Mt. Expectation. During the last quarter a general detioration of the pit wall was noted over the area shown as "potential slide" on the accom-

panying map. The size and distribution of cracks in this area was mapped at a scale of 1" = 50', mostly by plane table. The location of old workings beneath this hill were also plotted on the map.

It appears that a general slump due to pit geometry and rock conditions is taking place along 700 feet of the pit perimeter, as shown. The worst area at present is on the east side of the slump where sloughing is now taking place. This area coincides with the intersection of the El Tiro Fault Zone with the pit wall and lays over an old stope and numerous smaller underground openings.

The hazard does not seem great enough to hinder the completion of the 2670 level at this time. However, the safety of the operating crews would be enhanced if the shift foreman were appraised of the hazard and made frequent inspections of the area themselves.

RC Edmiston

R. C. Edmiston
Geological Engineer

RCE:jca

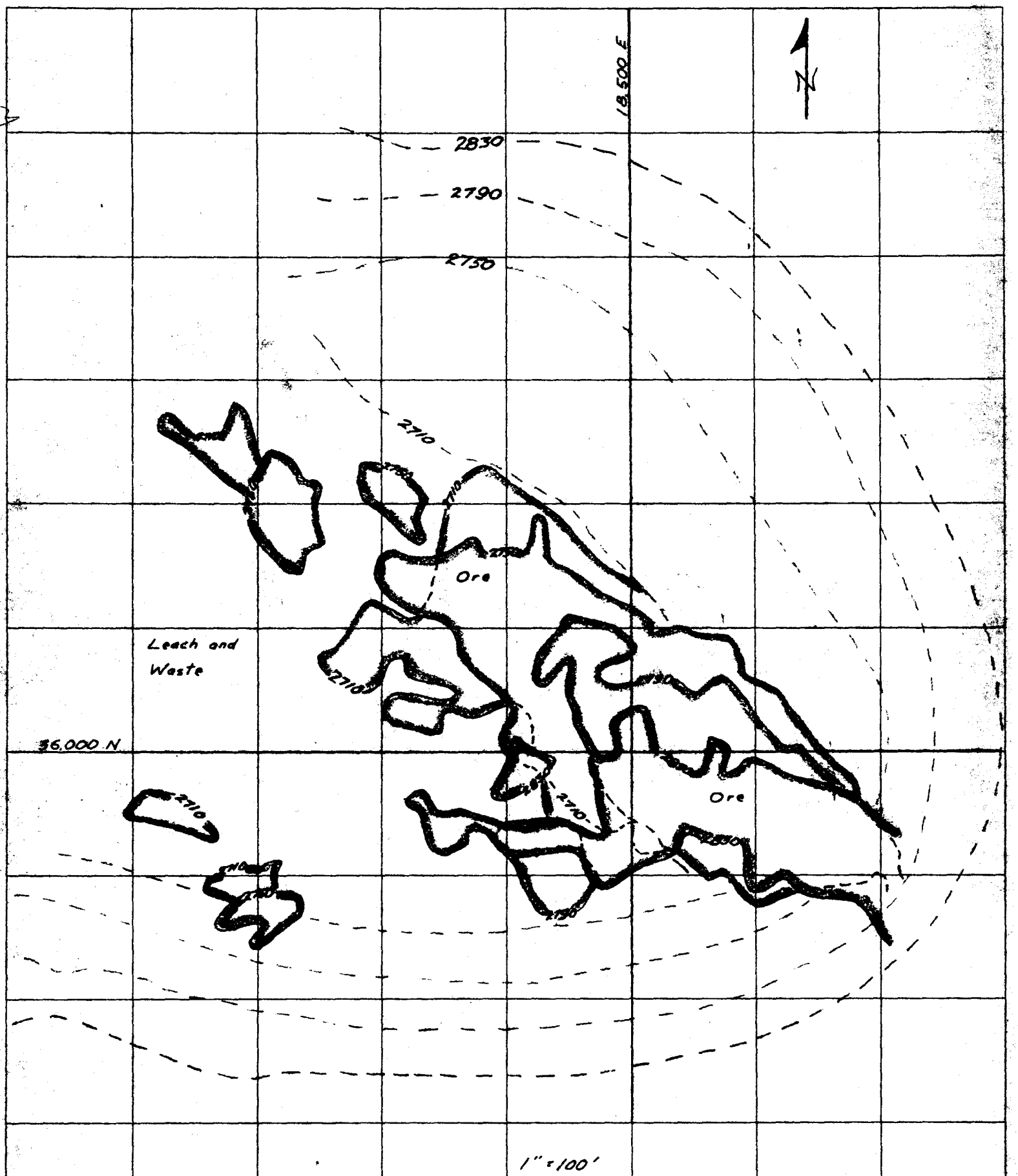


FIGURE ONE SEDIMENTARY ORE IN EL TIRO PIT, EAST EXTENSION #1

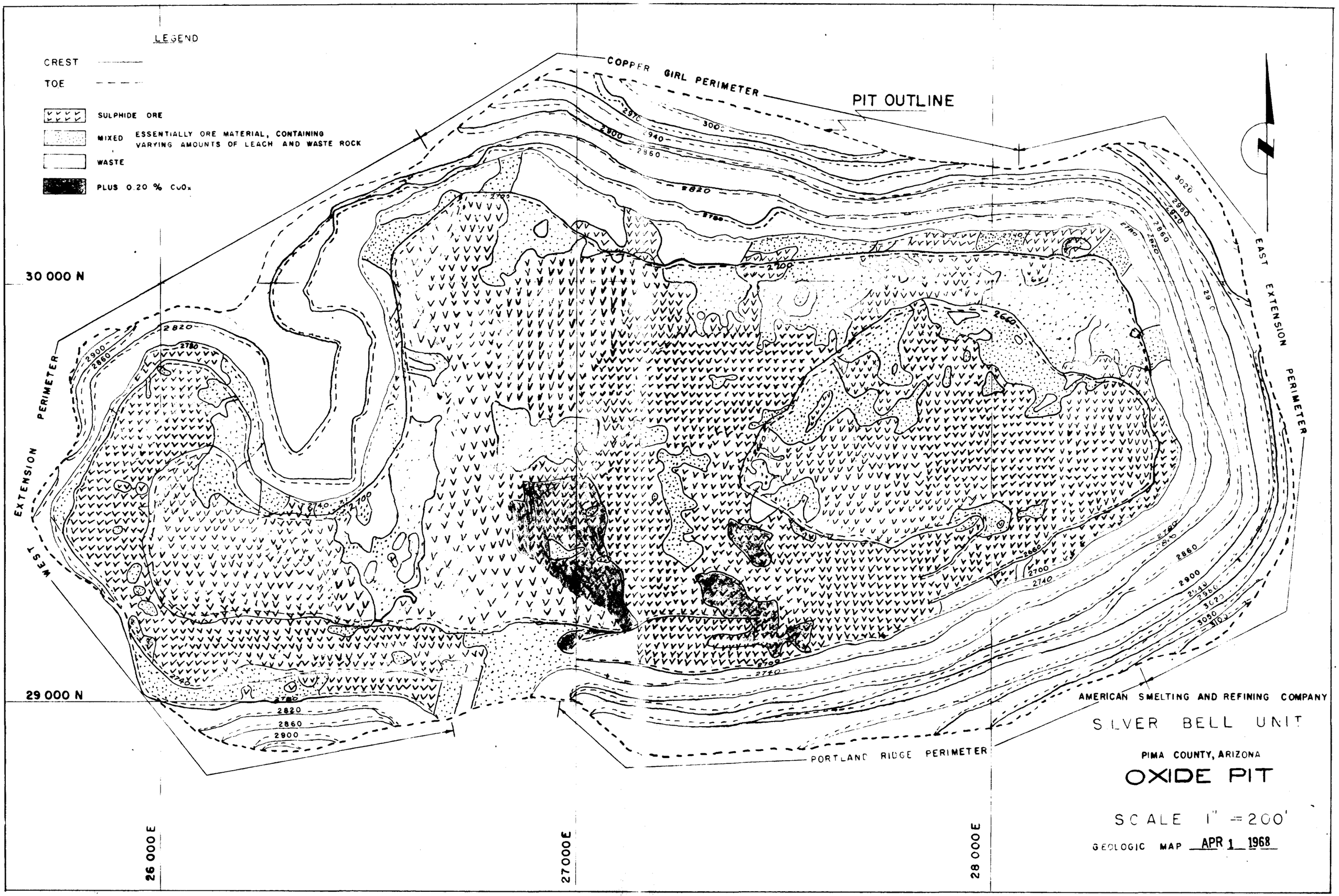
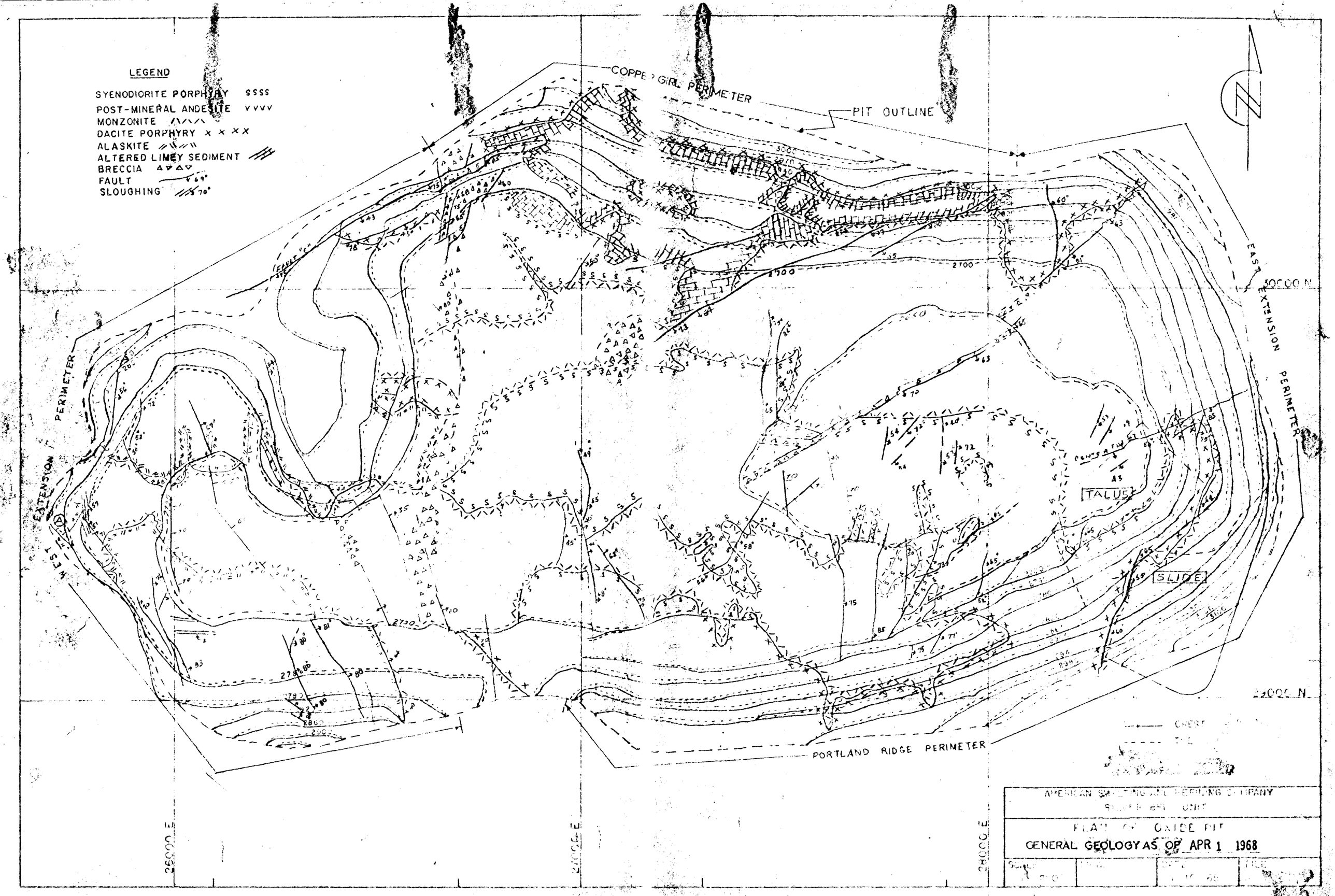
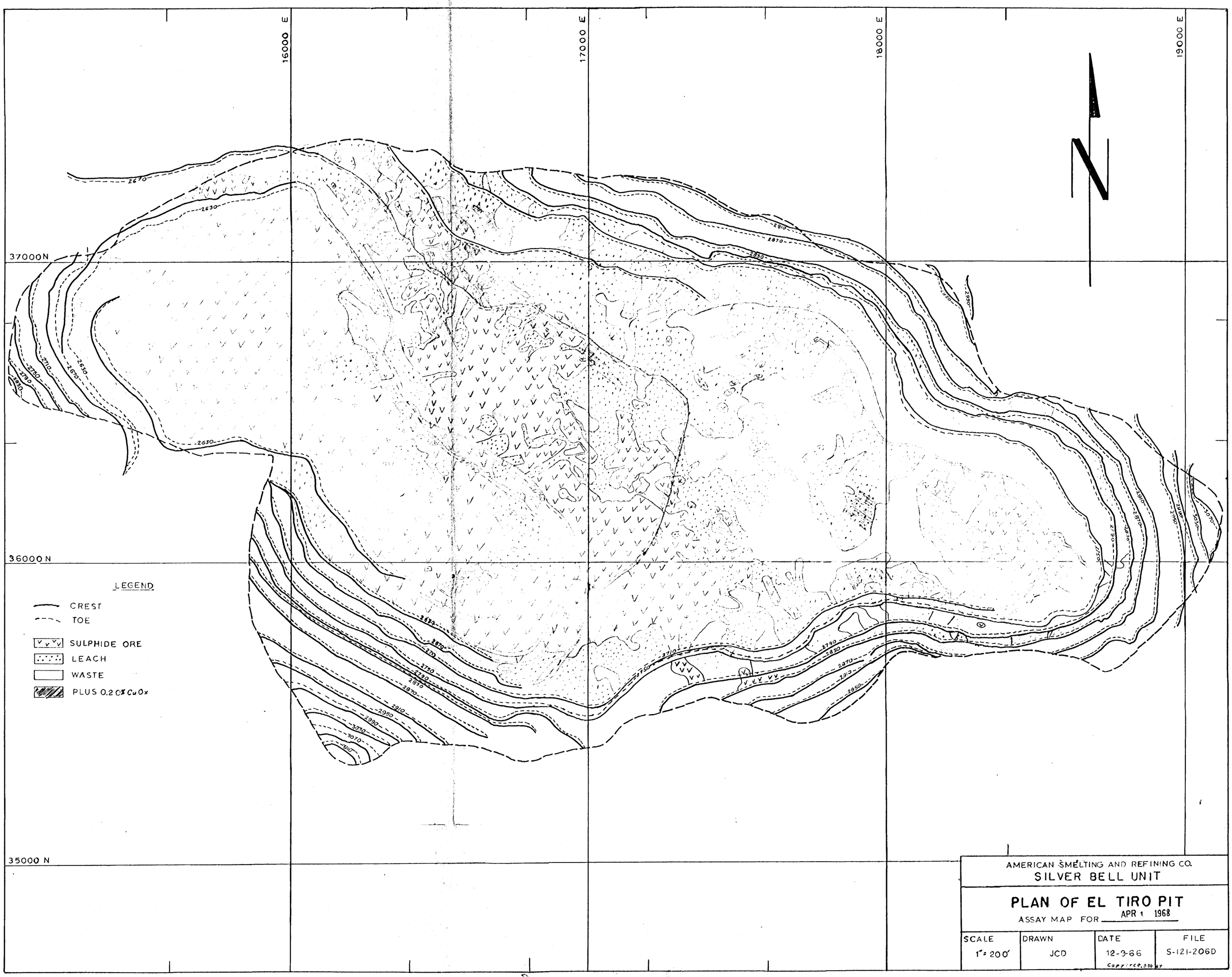
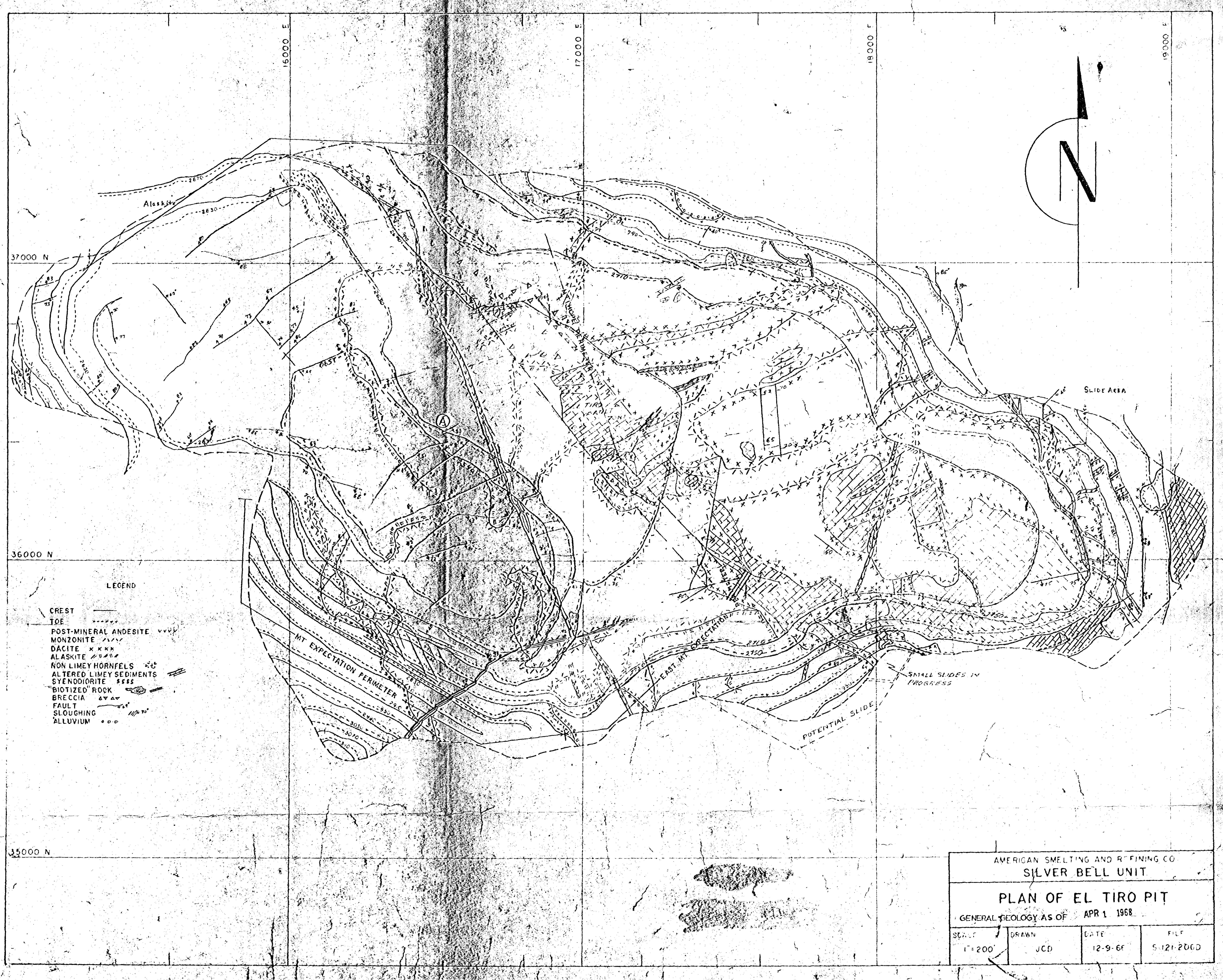

LEGEND
CREST
TOE
SULPHIDE ORE
MIXED ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK
WASTE
PLUS 0.20 % CuOx
COPPER GIRL PERIMETER
PIT OUTLINE
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
30 000 N
29 000 N
26 000 E
27 000 E
28 000 E
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PIMA COUNTY, ARIZONA
OXIDE PIT
SCALE 1" = 200'
GEOLOGIC MAP APR 1 1968

Plate 1


LEGEND
SYENODIORITE PORPHYRY SSSS
POST-MINERAL ANDESITE VVVV
MONZONITE
DACITE PORPHYRY X X X X
ALASKITE
ALTERED LIMEY SEDIMENT
BRECCIA
FAULT
SLOUGHING
COPPER GIRL PERIMETER
PIT OUTLINE
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
TALUS
SLIDE
FAULT "C"
2700
2730
2800
2900
50000 N
25000 N
26000 E
27000 E
28000 E
AMERICAN SMELTING AND REFINING COMPANY
PLAN OF OXIDE PIT
GENERAL GEOLOGY AS OF APR 1 1968


16000 E
17000 E
18000 E
19000 E
37000N
36000 N
35000 N
N
LEGEND
CREST
TOE
SULPHIDE ORE
LEACH
WASTE
PLUS 0.20% CuOx
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
ASSAY MAP FOR APR 1 1968
SCALE
1" = 200'
DRAWN
JCD
DATE
12-9-66
FILE
S-121-206D


16000 E
17000 E
18000 E
19000 E
37000 N
36000 N
35000 N
Alaskite
Slide Area
MT EXPECTATION PERIMETER
EAST MT EXPECTATION
SMALL SLIDES IN PROGRESS
POTENTIAL SLIDE
LEGEND
CREST
TOE
POST-MINERAL ANDESITE
MONZONITE
DACITE
ALASKITE
NON LIMEY HORNFELS
ALTERED LIMEY SEDIMENTS
SYENODIORITE
"BIOTIZED" ROCK
BRECCIA
FAULT
SLOUGHING
ALLUVIUM
AMERICAN SMELTING AND REFINING CO
SILVER BELL UNIT
PLAN OF EL TIRO PIT
GENERAL GEOLOGY AS OF APR 1 1968
SCALE 1"=200'
DRAWN JCD
DATE 12-9-66
FILE S-121-2060

Mr. Courtright

AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
Silver Bell, Arizona
March 12, 1968

J. H. C.

MAR 29 1968

MEMORANDUM TO: Mr. D. R. Jameson, Superintendent

Subject: Monthly Report - Silver Bell Unit Drilling Program
Mt. Expectation, North El Tiro Hill and East Quartzite
Peak Areas - February, 1968

The following briefly summarizes the drilling done during the month of February, 1968.

A total of 1,447.9' of diamond core drilling was done; 701.4' with a truck mounted rig and 746.5' with a skid mounted rig. Without taking any delays into account the average advance per shift was 20.0' for the truck rig and 16.4' for the skid rig.

The averaged direct drilling cost for the month was $8.25 per foot, with the skid rig costing $9.05 per foot and the truck rig $7.43 per foot.

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	Avg. % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-297	2,990.33	35,348.55	16,451.74	69.7	20.8	1.94	0.08			
				112.0	111.8	0.998	.02	392.9	392.9	392.9
D-299	2,900.35	39,333.93	18,818.47	No significant thickness.				701.4	911.4	911.4
D-300	3,064.73	35,165.00	16,416.91	"	"	"		353.6	353.6	353.6
							TOTAL	1,447.9		

D-297 This hole collared in alaskite, but entered monzonite at 17.5'. The monzonite present to 47.1', was strongly broken, highly altered and moderately limonite stained.

Alaskite was again encountered at 47.1' and continued to around 15.2'. This alaskite was quite unusual in its state of alteration and mineralization. Throughout the feldspars had been intensely altered so that now the large original quartz grains are set in a very fine grained homogeneous white ground mass of a hard clay. Very strong pyrite and specularite with lesser chalcocite occured through the interval 70'-88'. The specularite disappeared at 89', but the pyrite and chalcocite continued. The pyrite occurs replacing the original quartz grains of the alaskite, quite frequently resulting in a total sulfide content of up to 40% of the rocks volume. Chalcocite subsequently has replaced the pyrite to different degrees.

A very strong fault zone occures in the interval 149'-173' with strong gouge developed in the intervals 153-158', 166-169' and 172-174'. The lower contact of the alaskite with underlying monzonite occured in this zone somewhere around 152'.

Biotite quartz monzonite underlies the alaskite at 152' and persists to the bottom of the hole at 392.9'. This rock was typical, being moderately altered and strongly veined by quartz and sulfides. This material contained plus 0.4% copper to 223.8'.

D-299 This hole has been described to the depth of 704.6' in the January report. The following covers the remaining 206.8'.

From 554.5' on down the rocks texture was not definitive indicating whether the rock was dacite porphyry or a monzonite porphyry. What apparently is secondary biotite is variably present. Where its content is high the rock generally takes on a pseudo breccia texture and looks more like dacite than monzonite. Where the biotite content is low the texture of the rock shows euhedral crystal development distinct from the characteristic shard like nature of the grains in the dacite.

The sulfide content and total copper content remained quite low throughout.

This hole was stopped at 911.4' without encountering sediments, but until thin section work is done to determine whether the last several hundred feet of rock was dacite or quartz monzonite the existance of sediments underlying the dacite sill cannot be ruled out.

D-300 This hole was drilled through alaskite throughout its extent except for the interval 101.4'-111.1' which penetrated monzonite.

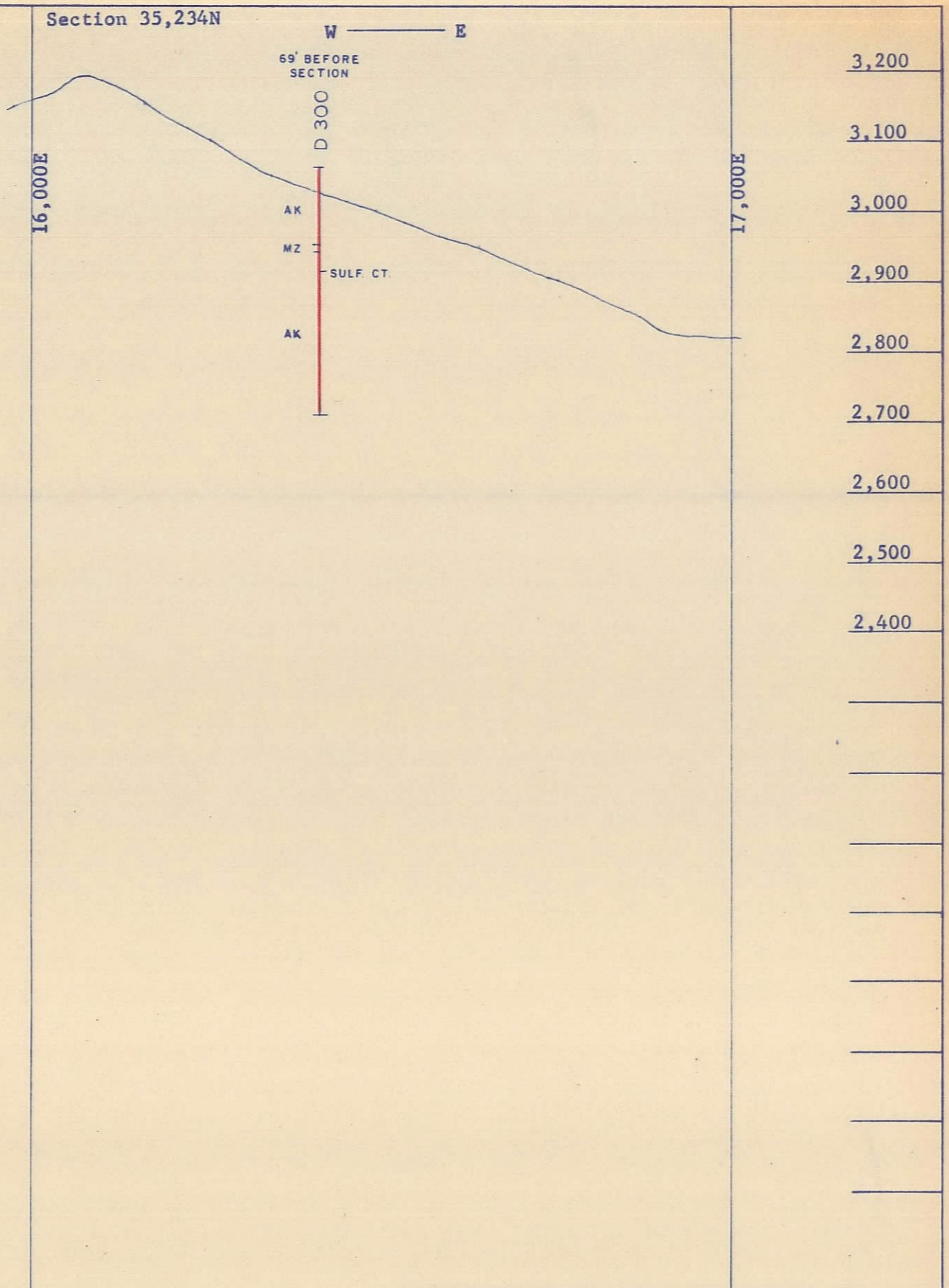
Sulfides were first encountered at 147', but leaching continued to differing degrees all the way to the bottom of the hole at 353.6'. Chalcocite was present from 147'-245.1', but was nowhere significantly developed.

The hole was stopped at 353.6'.

N. R. Nuttycombe

N. R. Nuttycombe

NRN:jca



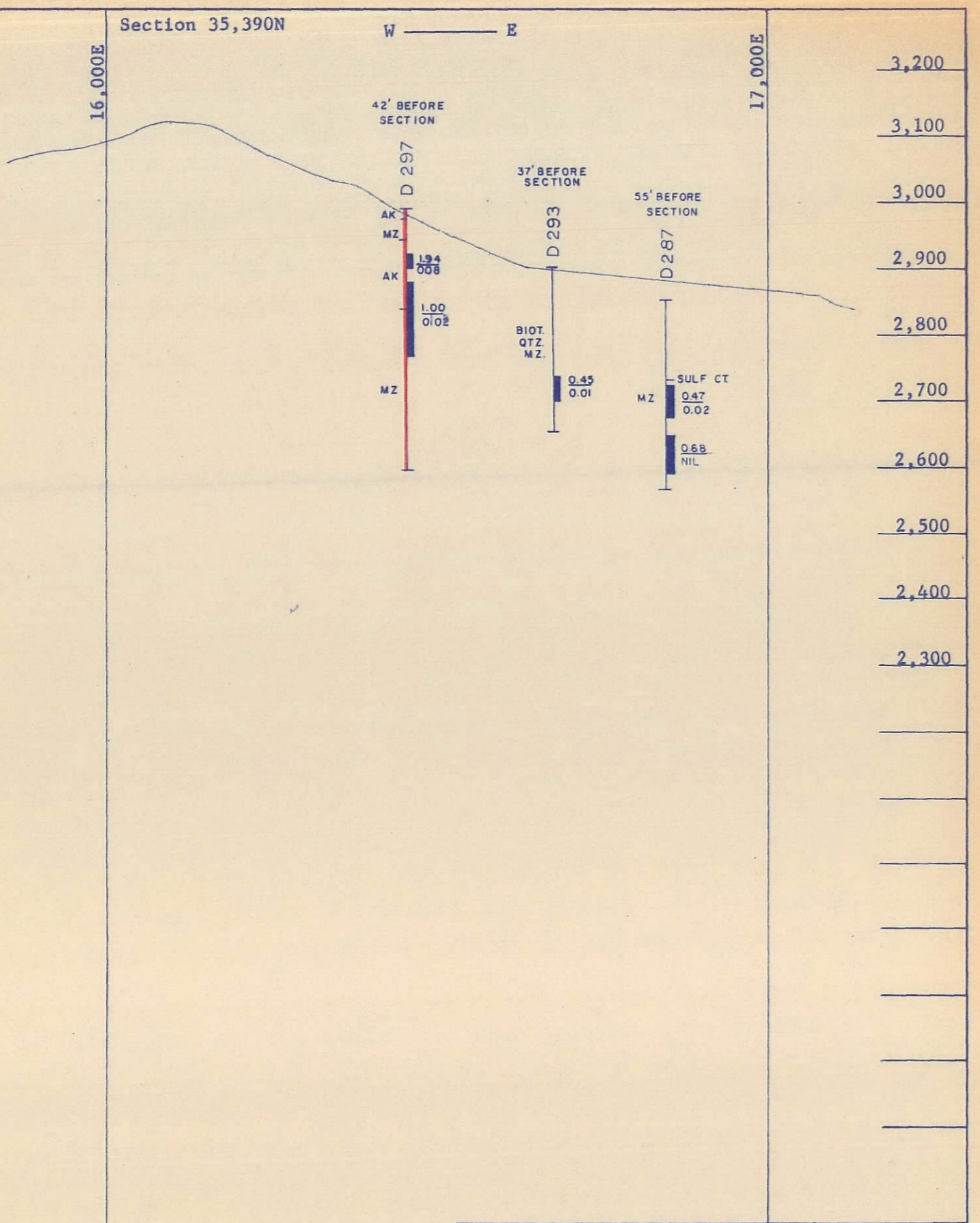
+ 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

Mt. Expectation
Drill Hole Projections

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	FEB 1968	S 121 A



+ 0.4% Total Copper

Advance for month

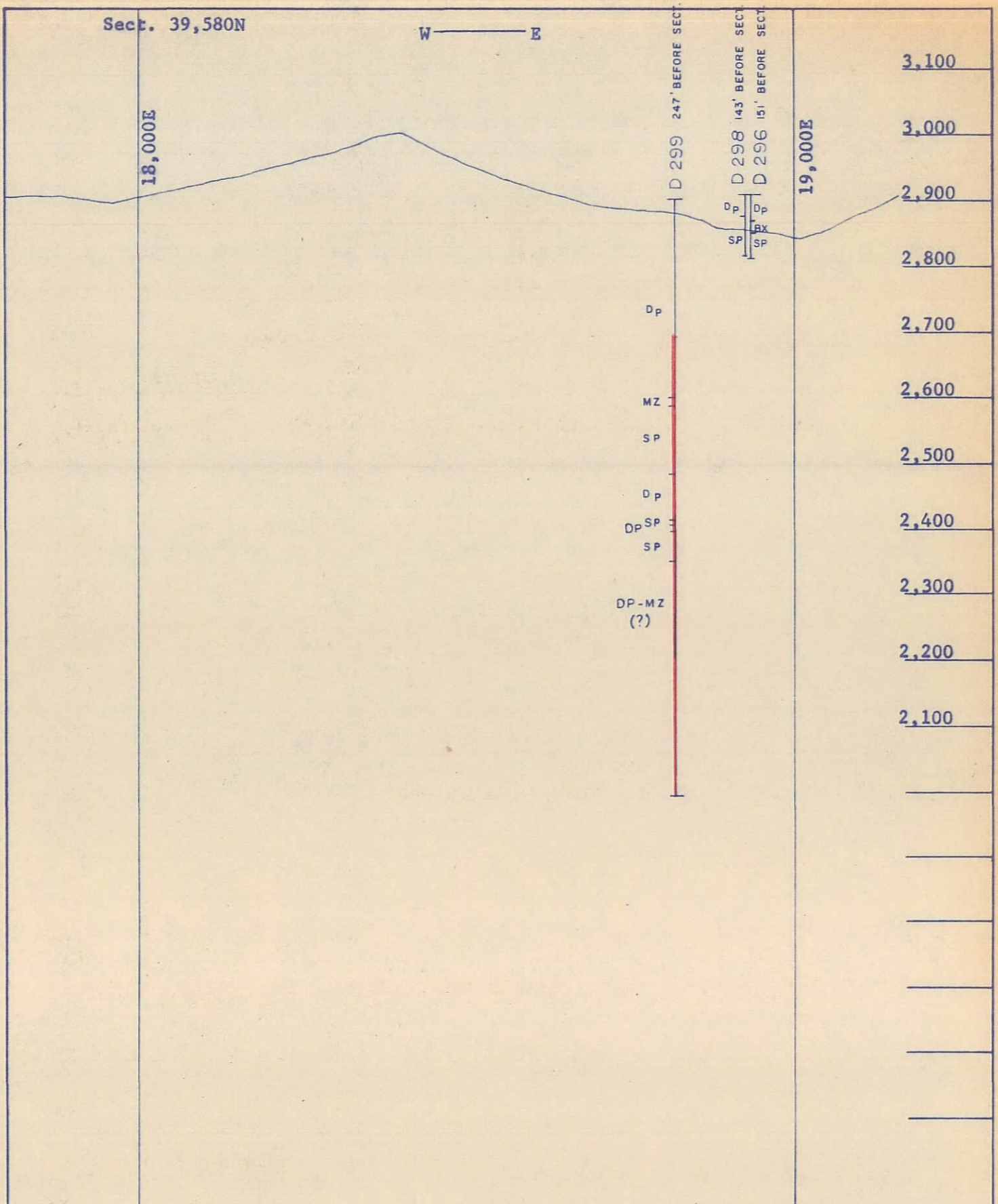
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

MT. EXPECTATION

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	FEB 1968	S 121 A



+0.4% Total Copper

Advance for month

Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

EAST QUARTZITE PEAK
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	FEB 1968	S 121 A

EXPLANATION FOR PLAN MAPS

D-2??

○ Holes drilled during month

P-??

● Proposed holes. Those holes colored are those of the original grid pattern that will probably be drilled.

D-Series Recent drilling program started with hole number D-218.

E-Series Churn drill holes drilled starting around 1956.

COPPER CONTENT

D-231

● 125'-115.0' @ 1.17/0/05 Hole contains sufficient thickness of +0.4% material to carry overburden.

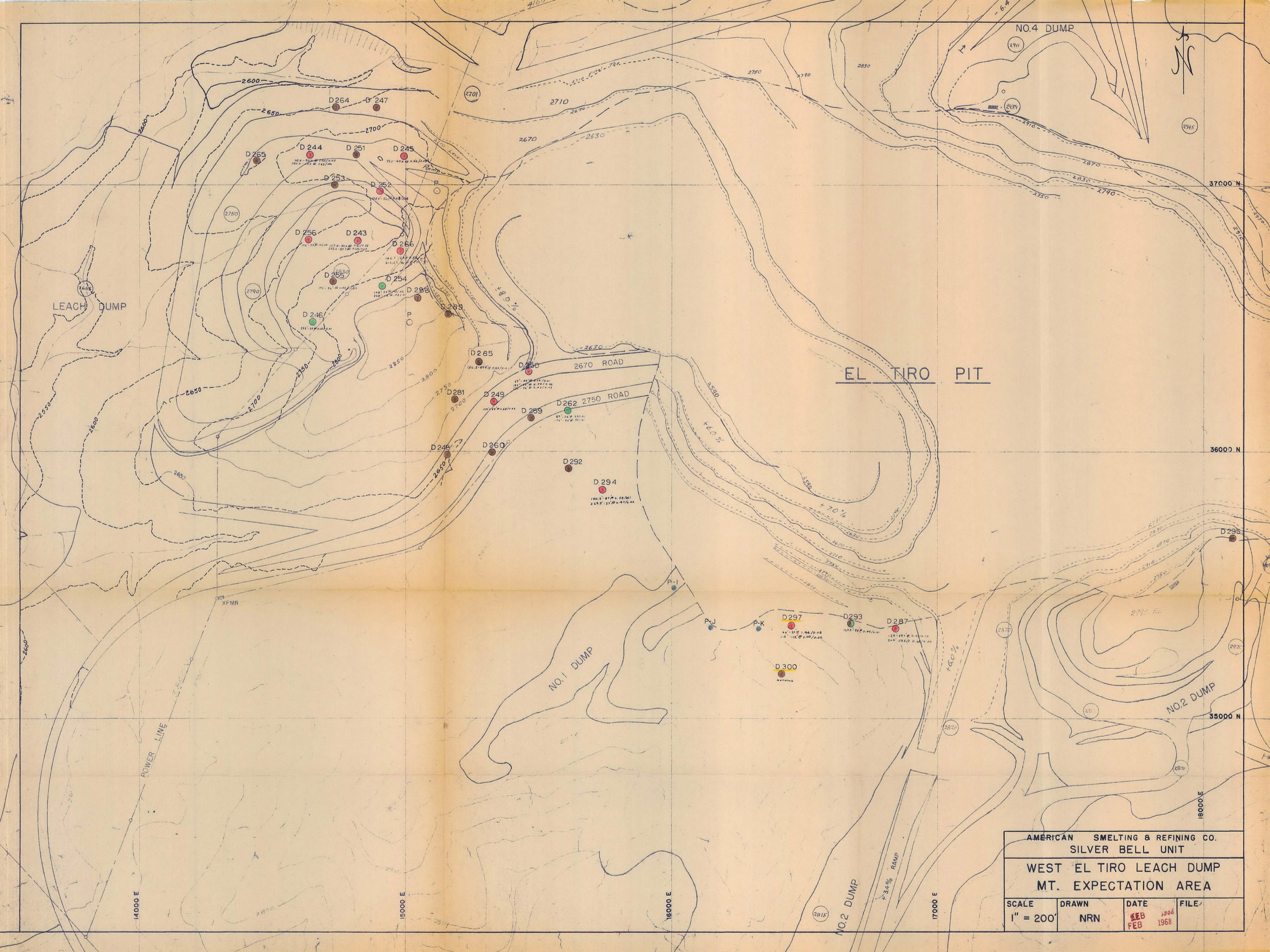
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

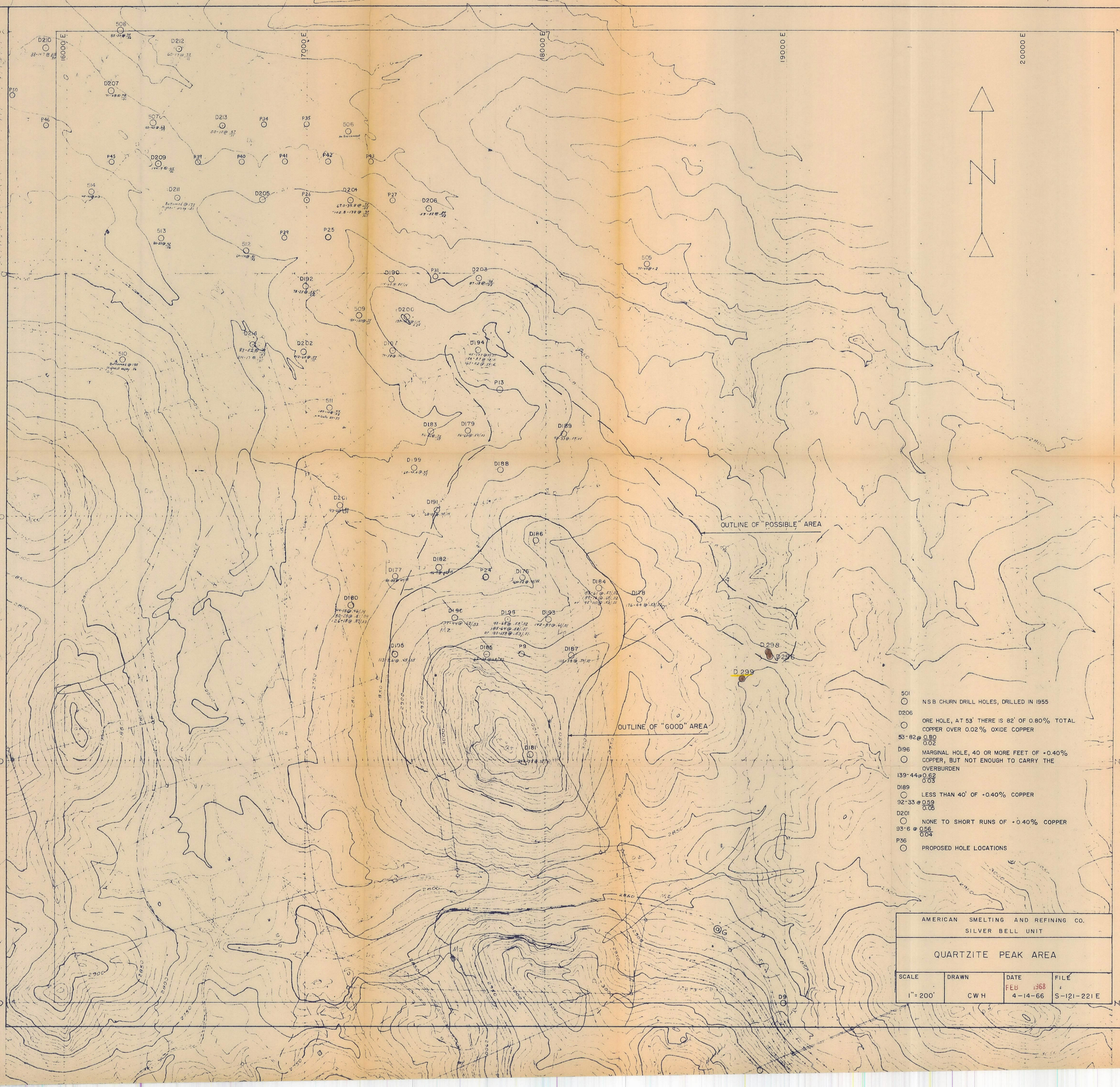
D-2??

● Marginal hole. Insufficient thickness and/or grade of material to carry stripping.

D-2??

● None to thin +0.4% copper intervals.


NO.4 DUMP
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
NO.2 DUMP
POWER LINE
XFMR
+34% RAMP
+70%
+60%
+60%
+80%
D264
D247
D265
D244
D251
D245
D253
D252
D256
D243
D266
D255
D254
D288
D289
D246
D285
D250
D281
D249
D259
D262
D248
D260
D292
D294
P-I
P-J
P-K
D297
D293
D287
D300
D295
37000 N
36000 N
35000 N
14000 E
15000 E
16000 E
17000 E
18000 E
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
WEST EL TIRO LEACH DUMP
MT. EXPECTATION AREA
SCALE
1" = 200'
DRAWN
NRN
DATE
FEB 1968
FILE


16000 E
17000 E
18000 E
19000 E
20000 E
N 42000
N 41000
N 40000
N 39000
N 38000
N
OUTLINE OF "POSSIBLE" AREA
OUTLINE OF "GOOD" AREA
D208
D210
D212
D207
D213
D209
D211
D205
D204
D206
D192
D190
D203
D200
D197
D194
D214
D202
D183
D179
D189
D199
D188
D201
D191
D186
D182
D177
D176
D184
D178
D180
D196
D198
D193
D195
D185
D187
D181
D298
D296
D299
D9
P50
P46
P45
P39
P40
P41
P42
P43
P34
P35
P26
P27
P29
P25
P31
P13
P24
P9
501
NSB CHURN DRILL HOLES, DRILLED IN 1955
D206
ORE HOLE, AT 53' THERE IS 82' OF 0.80% TOTAL COPPER OVER 0.02% OXIDE COPPER
53-82 @ 0.80 / 0.02
D196
MARGINAL HOLE, 40 OR MORE FEET OF +0.40% COPPER, BUT NOT ENOUGH TO CARRY THE OVERBURDEN
139-44 @ 0.62 / 0.03
D189
LESS THAN 40' OF +0.40% COPPER
92-33 @ 0.59 / 0.05
D201
NONE TO SHORT RUNS OF +0.40% COPPER
93-6 @ 0.56 / 0.04
P36
PROPOSED HOLE LOCATIONS
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
QUARTZITE PEAK AREA
SCALE 1" = 200'
DRAWN CWH
DATE FEB 1968 4-14-66
FILE S-121-221 E