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Mr. Courtright

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

January 18, 1968

J.H.C
JAN 30 1968

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

Subject: QUARTERLY GEOLOGIC REPORT AND ORE RESERVE MAPS.

OXIDE PIT

Geology

2700 Level Most of activity in Oxide Pit in the last quarter of 1967 was on the west face of the 2700 level. To the north the final crest was reached after moving through the north trending breccia zone. To the south the west extension was entered after passing through the same zone of brecciation and strong alteration. The latter face is now well into ore grade monzonite. The leach and waste zones encountered were in the same location as those encountered on the 2740 level.

2660 Level A small quantity of mixed ore and leach grade monzonite and syenodiorite were removed. A larger amount of leach is being exposed on this level than was found in the same location on the 2700 level. This is to be expected as the base of the ore zone is approached.

Oxide Pit Soughing

On November 30 and December 1, 1967, following several years of observation and measurement, a large slope failure occurred in the southeast corner of Oxide Pit. The area of the slide and the resulting debris is approximately outlined on the accompanying geologic map. The mass of rock at the bottom of the slide is in excess of 100,000 tons. The failure was not complete and at least the same amount remains at the top in an apparently broken but stable mass. A crude sketch of what occurred during the failure is shown in Figure I. Three modes of failure occurred, with most of the volume of rock coming from the upper levels. As shown in the Figure they are:

1. Sliding on fracture planes dipping into the pit.

2. Rotation (clockwise in the Figure) of sections which had been separated by a large crack such that they leaned out over the pit, forming overhangs and eventually falling.

3. Small scale slides popping out along the lower limits of activity.

The east boundary of the slide zone is a northeast trending fault plane, one of a strongly developed set of shears striking N20E and being near vertical in dip. It forms a relatively smooth plane for a length of 400 feet. The western limit of the slide apparently has followed fractures striking northwest and dipping northeast. The west side of the zone does not form a continuous plane as does the east.

For several months prior to the slide, movement was measured at several points along the headwall cracks. The graph in Figure II correlates the movement at two points with the rainfall during this period. Station 1 was located on the northeast trending fault near its intersection with the face. Station 9 was located across the furthest fracture from the pit. Both show an increased rate of movement following heavy rains in early October. In early November the movement was up to 0.025 feet per day and steadily increasing. A warning of possible failure was made in mid-November. On November 25th the first large block fell. During the following week cracks opened several inches as acceleration increased. On November 30th a general failure along the breadth of the slide began. By December 3rd the mass of rock which had not fallen into the pit had apparently become stable.

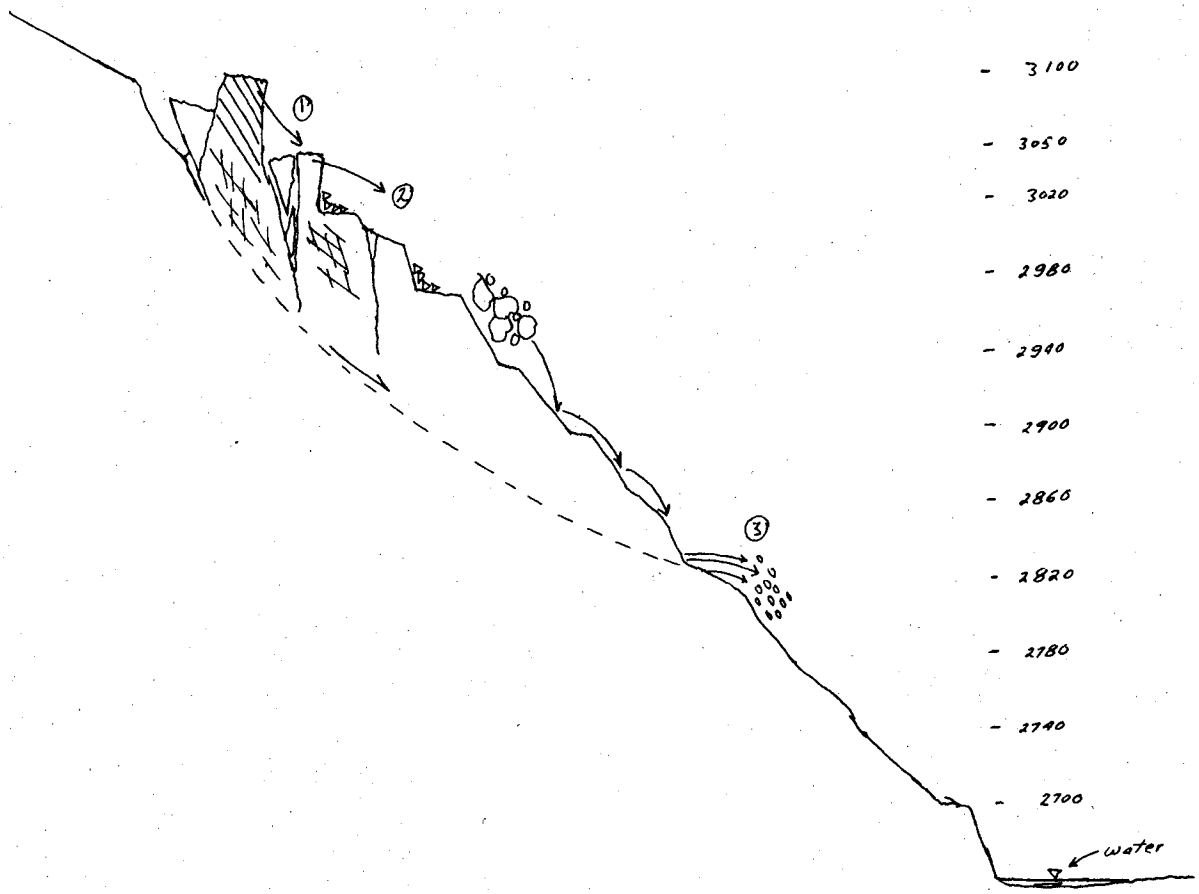


FIGURE 1---- Sketch of Slope Failure of December, 1967, southeast corner of Oxide Pit.

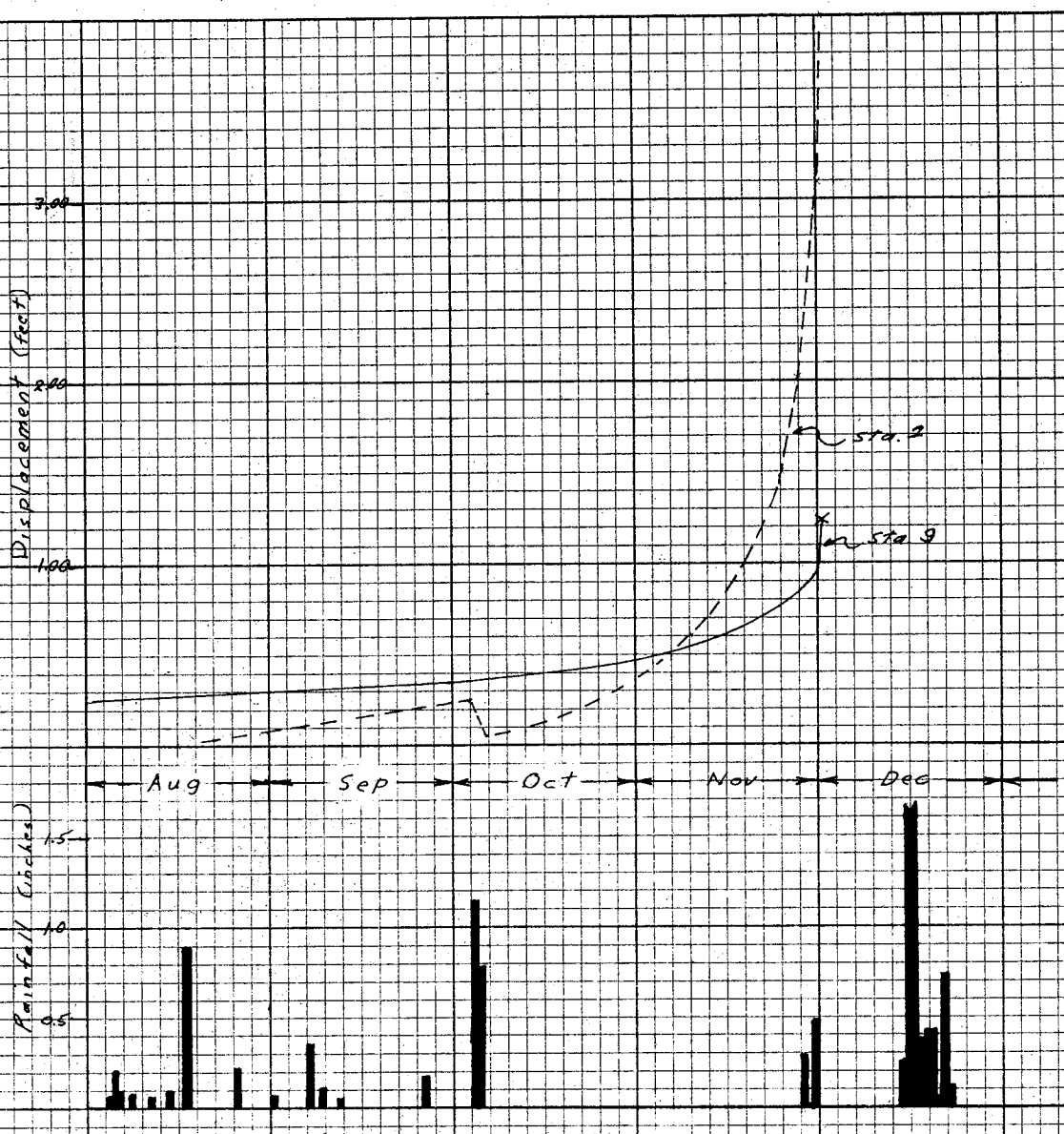


FIGURE 2 --- Slope Movement and Rainfall Prior to Failure.

10 X 10 TO THE INCH 46 0702
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

EL TIRO PIT

Geology

2750 Level The 2750 level was pushed to completion in the East Extension I about January 5, 1968. A study was made on the geometries of the ore zone and the sedimentary blocks in which most of the ore lies. The following conclusions were reached:

1. Nearly all of the ore has been found in one continuous zone, entirely in hornfels and tactite. (Shown in red on the accompanying map).

2. This zone is roughly elliptical in plan, the long axis trending N35W. The ore zone is bounded on the northeast by the tactite-dacite contact. To the southwest the ore grade mineralization ends in quartzites and hornfels. The ore zone plunges 20° to the northwest under the dacite.

3. The size of the ore zone has increased with depth. It was also noticed that the shape and size of the ore zone as shown on the ore reserve maps for all levels above the 2710 is completely unlike what was actually mined. This condition is mostly due to drill holes straddling the elongated ore zone.

2710 Level The 2710 level was pushed eastward mostly in leach and waste during the last quarter. Most of ore encountered was in the monzonite between 17,000E and 17,500E. Most of the waste was in dacite. Along the El Tiro Fault Zone a belt of hornfels about 300 feet long, 150 feet wide and trending N45W was removed. The 2710 level at this time is about 200 feet due west of the main ore body in the East Extension I.

The ore reserves for the 2710 level show a large block of ore extending from 18,020E to 18,380E and from 36,000N south to final toe, which varies from 35,850N to 35,920N. As only small quantities of ore have been found within this area on upper levels an examination of this area was made. This inferred ore zone is based on a 32.3 ft intersept of ore in DDH No. D-28. The mineralization was entirely in hornfels. No ore was penetrated by any adjacent holes. Considering all available information it is unlikely that this zone will contain more than a few percent of the approximately 100,000 tons shown on the ore reserves.

2670 Level The 2670 level was pushed to the southwest in ore grade monzonite and alaskite. The mining was mostly southwest of the El Tiro Fault Zone until the end of the quarter when expansion was to the northeast across this zone. Unexpected blocks of hornfels were found in the fault zone causing some otherwise leachable high oxide material to be acid reactive and unleachable.

There was no important sloughing in El Tiro Pit during the last quarter. However, some small cracks were discovered on the south headwall which are being observed at this time.

Robert C. Edmiston

Robert C. Edmiston

RCE:jca

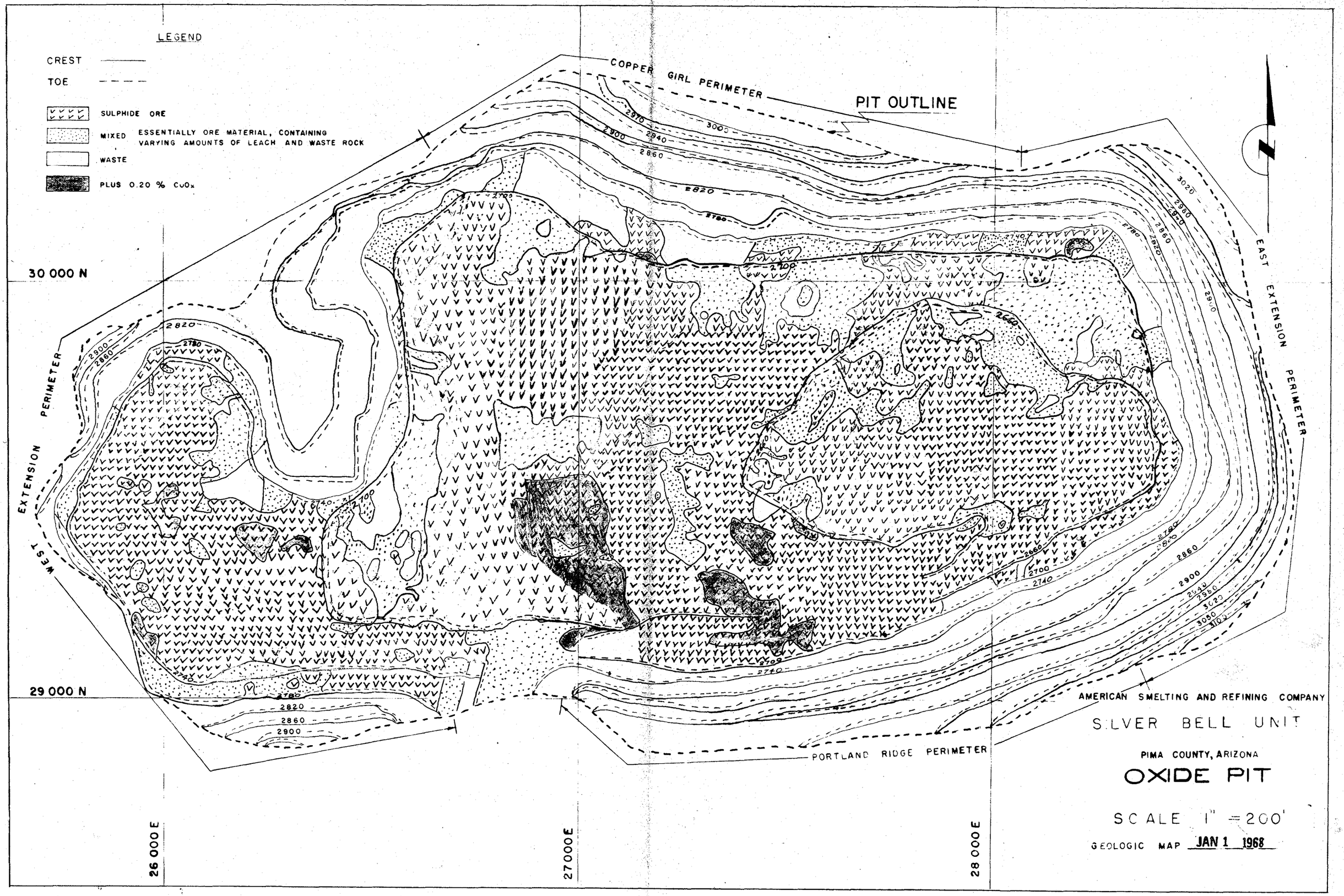
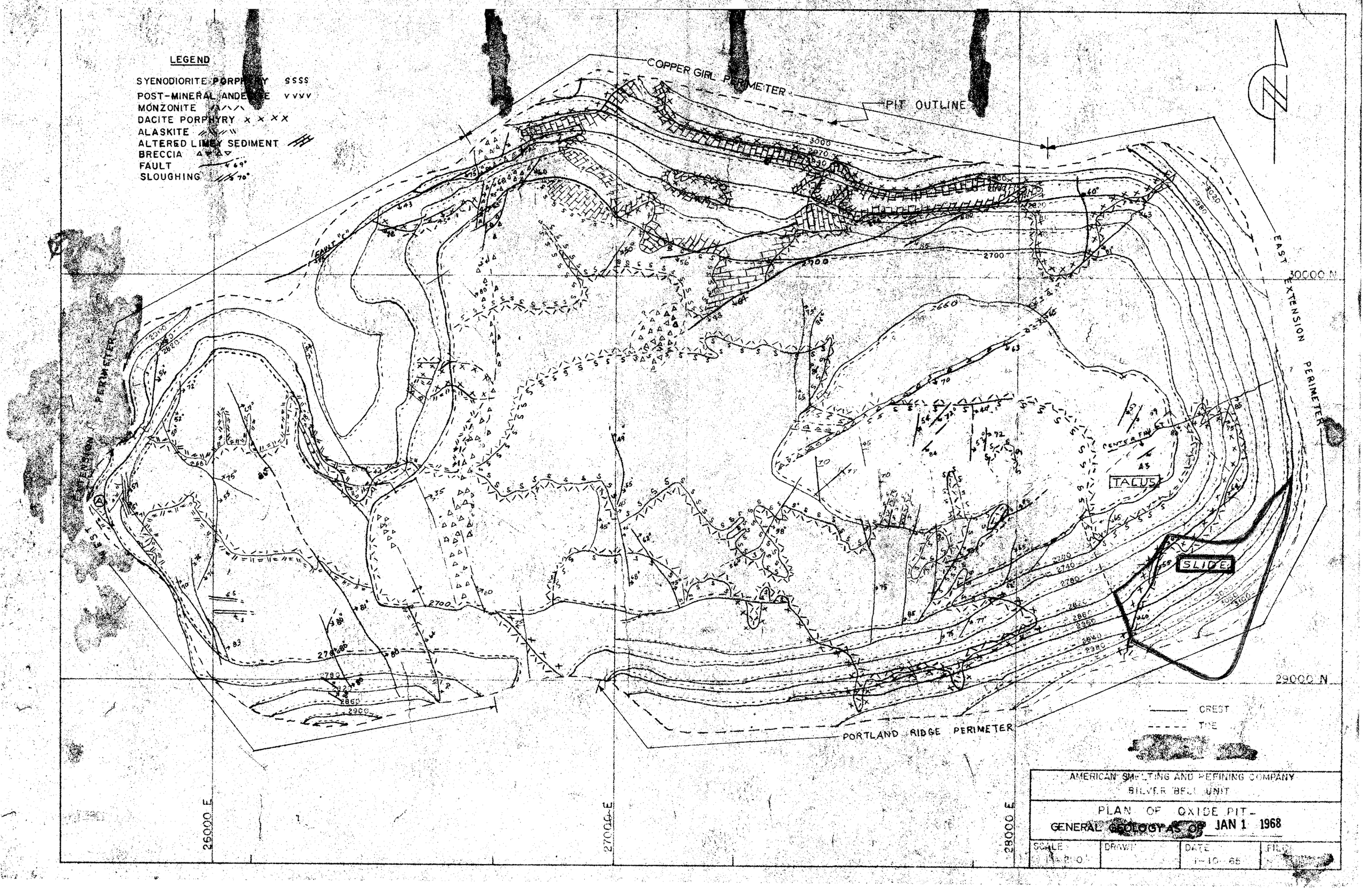
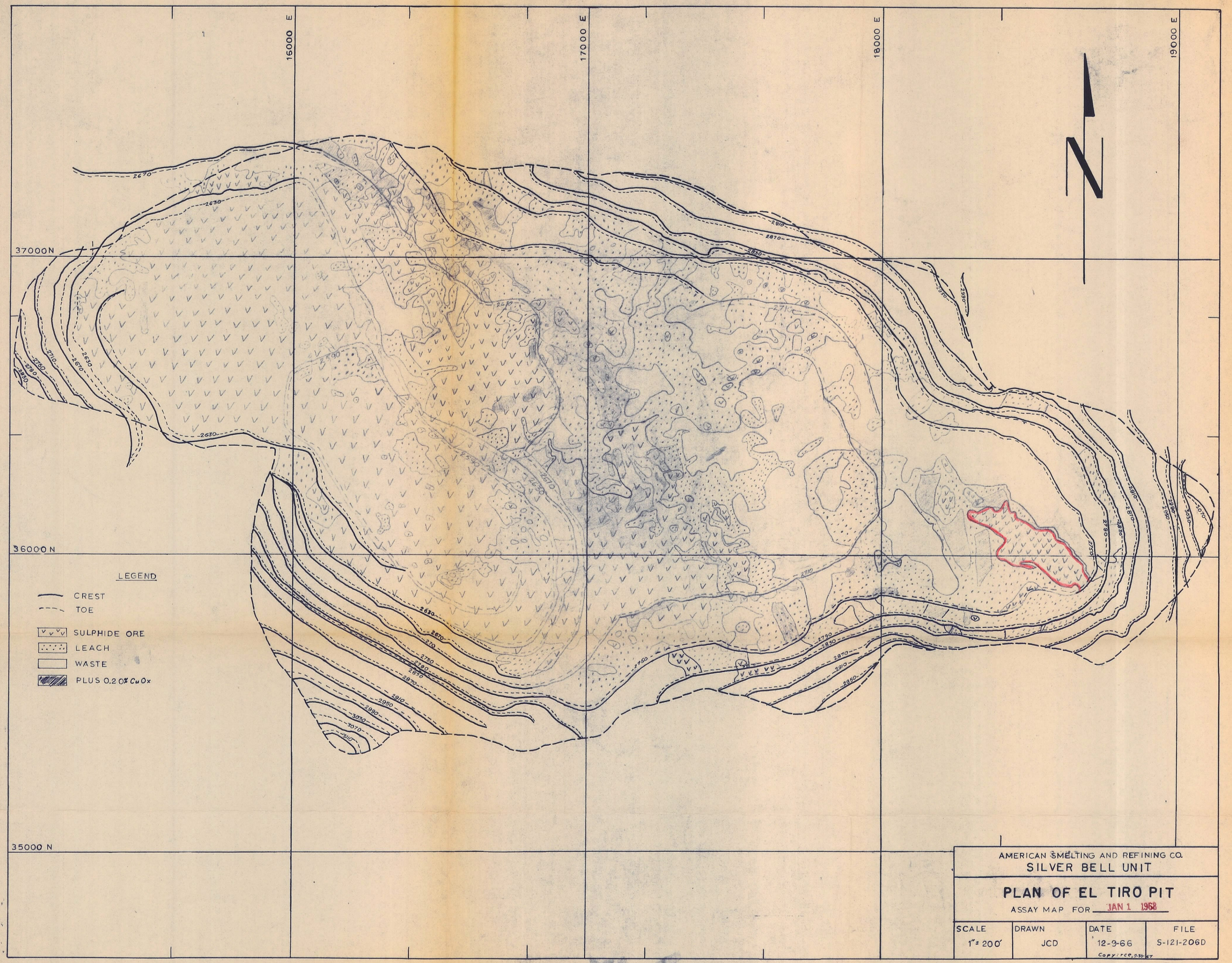
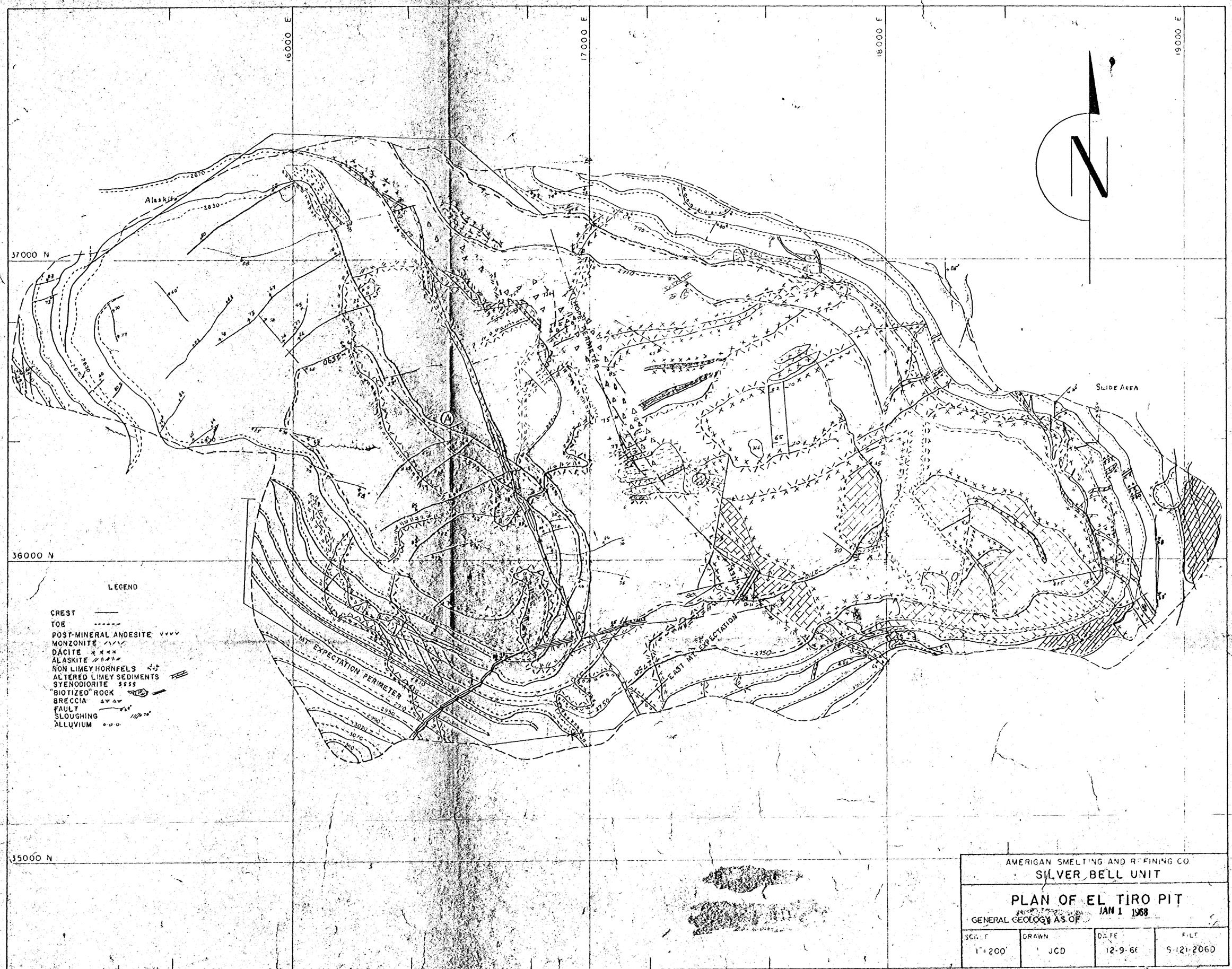

LEGEND
CREST
TOE
SULPHIDE ORE
MIXED ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK
WASTE
PLUS 0.20 % CuOx
COPPER GIRL PERIMETER
PIT OUTLINE
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
30 000 N
29 000 N
26 000 E
27 000 E
28 000 E
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PIMA COUNTY, ARIZONA
OXIDE PIT
SCALE 1" = 200'
GEOLOGIC MAP JAN 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
FAULT "C"
CENTER FAULT
TALUS
SLIDE
30000 N
29000 N
25000 E
27000 E
28000 E
CREST
TOE
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT-
GENERAL GEOLOGY AS OF JAN 1 1968
SCALE
DRAWN
DATE
FILE


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 JAN 1 1968
SCALE
1" = 200'
DRAWN
JCD
DATE
12-9-66
Copy: rce, 9-30-67
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
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 JAN 1 1968
SCALE 1" = 200'
DRAWN JCD
DATE 12-9-66
FILE S-121-206D

Mr. Courtright

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

January 18, 1968

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM NORTH EL TIRO HILL-DAISY SHAFT AREA AND WEST EL TIRO LEACH DUMP AREA, December, 1967

The following briefly summarizes the drilling done during the month of December, 1967. We had one truck mounted and one skid mounted rig, both worked two shifts per day, six days a week.

A total of 2,225.0' of core drilling was done; 843.9' with the skid rig and 1,381.1' with the truck rig. Without taking any delays into account the average advance per shift was 16.9' for the skid rig and 27.6' for the truck rig.

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-281	2,710.41	36,194.66	15,187.15	203.9	35.8	0.43	Nil	214.7	252.1	252.1
D-283	2,809.82	38,666.28	16,142.27	180.7	24.4	0.51	0.21	87.6	268.3	268.3
D-284	2,749.44	38,677.40	16,505.15	No significant thickness				167.6	167.6	167.6
D-285	2,743.13	36,337.08	15,274.85	186.2	27.9	0.52	0.01	397.9	397.9	397.9
D-286	2,764.78	38,046.18	16,504.81	99.7	33.7	0.50	0.02	183.6	183.6	183.6
D-287	2,851.15	35,335.31	16,846.64	129.1	49.8	0.47	0.02			
				204.2	58.3	0.68	0.00	287.3	287.3	287.3
D-288	2,861.90	36,575.04	15,046.99	No significant thickness				398.5	398.5	398.5
D-289	2,372.00	36,516.19	15,161.35	No significant thickness				231.3	231.3	231.3
D-290	2,862.85	38,060.21	16,191.64	141.4	102.6	0.74	0.06	256.5	256.5	256.5
							TOTAL	2,225.0		

D-281 This hole collared in and remained in alaskite throughout its extent. The alteration of this rock was quite variable, being somewhat controlled by degree of structural deformation.

Sulfides were encountered at 54' at which depth sparse limonite was still present. The limonite disappeared near 64', but reappeared at about 90' and was present in sparse amounts to 230'. The total sulfide content did not much exceed 3% and there was chalcocite enriched ore grade mineralization only in the interval 203.9 to 230.5' through which the grade averaged 0.47%/0.01%.

The hole was bottomed at 252.1'.

D-283 This hole collared in monzonite, but entered dacite at 19.2' and remained in it, with minor exceptions, to the bottom of the hole at 268.3'. The minor exceptions were monzonite dikes encountered at 147'-149' and 160.0'-164.3'.

The rock was weakly altered and sparsely mineralized, but did contain 50.5' of 0.47%/0.13% mineralization in the interval 154.6'-205.1'. Traces of sulfides were first encountered at 28', but had limonite and hematite intermixed to the depth of 137'.

D-284 This hole was collared in and remained in quartz monzonite. The rock was strongly altered to 63' and then the intensity dropped to and remained weak. The rock was strongly limonite stained to 68' at which point it disappeared and sulfides appeared. The total sulfide content remained less than 3% and there was no significant thickness of ore grade material. The hole was bottomed at 167.6'.

D-285 This hole collared in alaskite and bottomed in it, but was cut in the intervals 32.1'-35.4' and 165'-167' by a hornblend monzonite and a aplite dike respectively.

Intensity of fracturing, degree of alteration and degree of mineralization were variable, but always interrelated. The total sulfide content generally ranged around 3%, but locally was greater than 4%. The copper content was also sporadic with only 27.9' of 0.52%/0.01% in the interval 186.2'-214.1'. The hole was stopped at the depth of 397.9'.

D-286 This hole collared in and remained in monzonite to the bottom at 183.6'. The rock was sparsely altered and had a low total sulfide content. Sulfides were encountered at 86' and 0.50%/0.02% material was drilled from 99.7 to 133.4'.

D-287 This hole collared in and remained in quartz monzonite. The rock was moderately altered and cut by numerous quartz-sericite-sulfide veinlets. The total sulfide content remained close to 3%, but had a fair copper content. The interval 129.1'-178.9' averaged 0.47%/0.02% copper and the interval 204.2'-262.5' averaged 0.68%/nil copper. The hole was bottomed at 287.3'.

D-288 This hole collared in and bottomed in alaskite, but was cut in the intervals 26.0'-26.3', 32.6'-35.8', 52.7'-54.0' and 226.3'-227.3' by dikes of aplite.

The rock was once again varibly faulted, fractured, altered and mineralized. There were a couple of strong shear zones which were strogly altered and had total sulfide contents of greater than 5%. Despite the local "high" total sulfide contents, the total copper content remained low with no significant thickness of ore grade material being encountered. The hole was bottomed at 398.5'.

D-289 This hole collared in and bottomed in alaskite and was cut only by one aplite dike in the interval 181.7'-183.3'.

Sulfides were encountered at 56.7', but the total content remained less than 2% throughout the extent drilled. There were no significant thickness of ore grade material encountered.

The hole was bottomed at 231.3'.

D-290 This hole collared in a rock which appears to be a syenodiorite porphyry. The rock has small elongate felspars set in a dark ground mass which has a high percentage of very fine grained biotite. This syenodiorite (?) was present to 93.4', but some aplite was present near 10', 40' and 67'. At 93.4' dacite was intersected and at 126.1' it was cut by a quartz monzonite. The monzonite was present from there on.

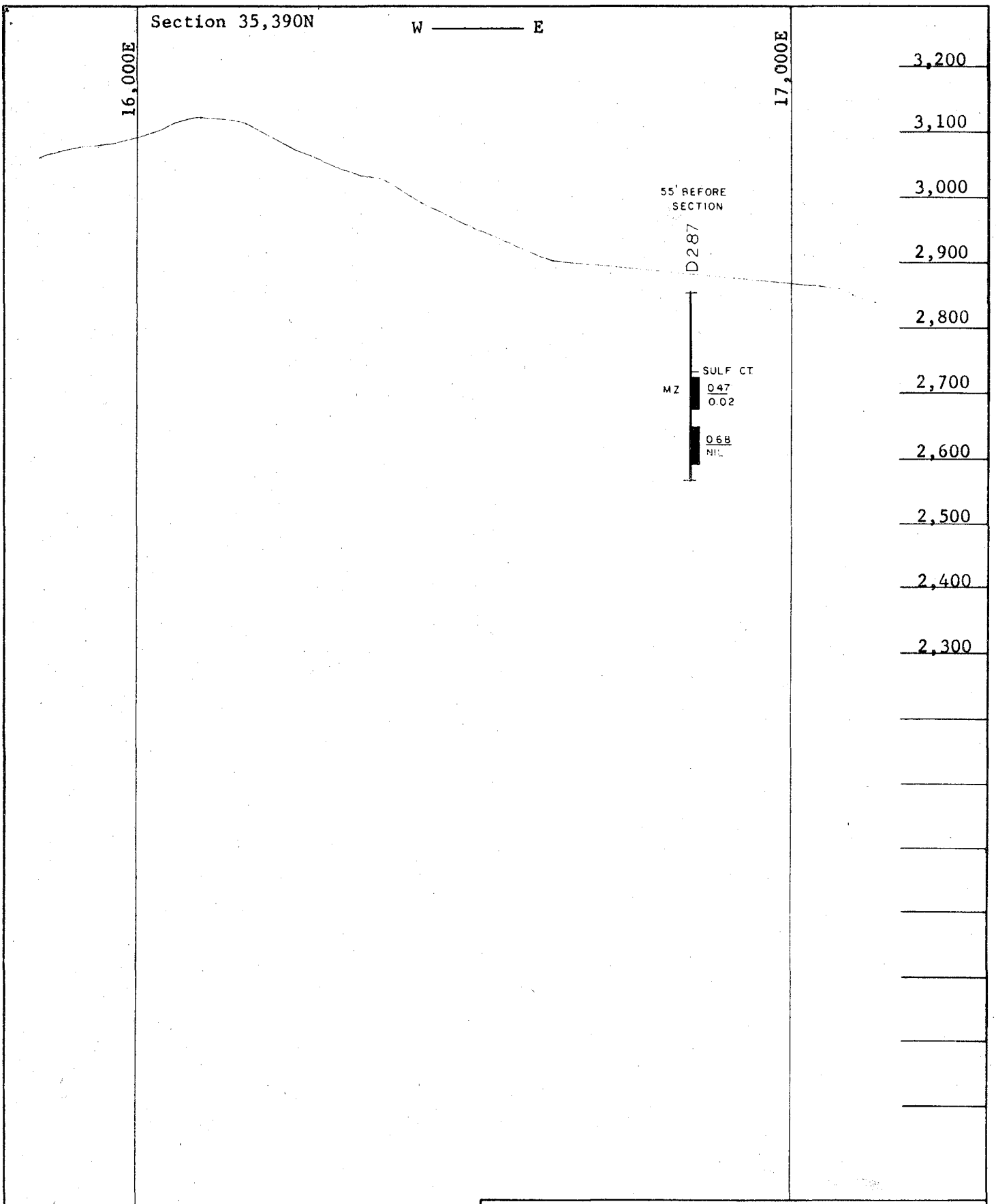
The sulfide contact was at 141', but some limonites persisted to 207.2'. The total sulfide content was quite low, but copper minerals predominated. The interval 141.4'-244.0' averaged 0.74%/0.06% copper.

The hole was stopped, perhaps prematurely, at 256.7'.

N. R. Nuttycombe

N. R. Nuttycombe
Geologist

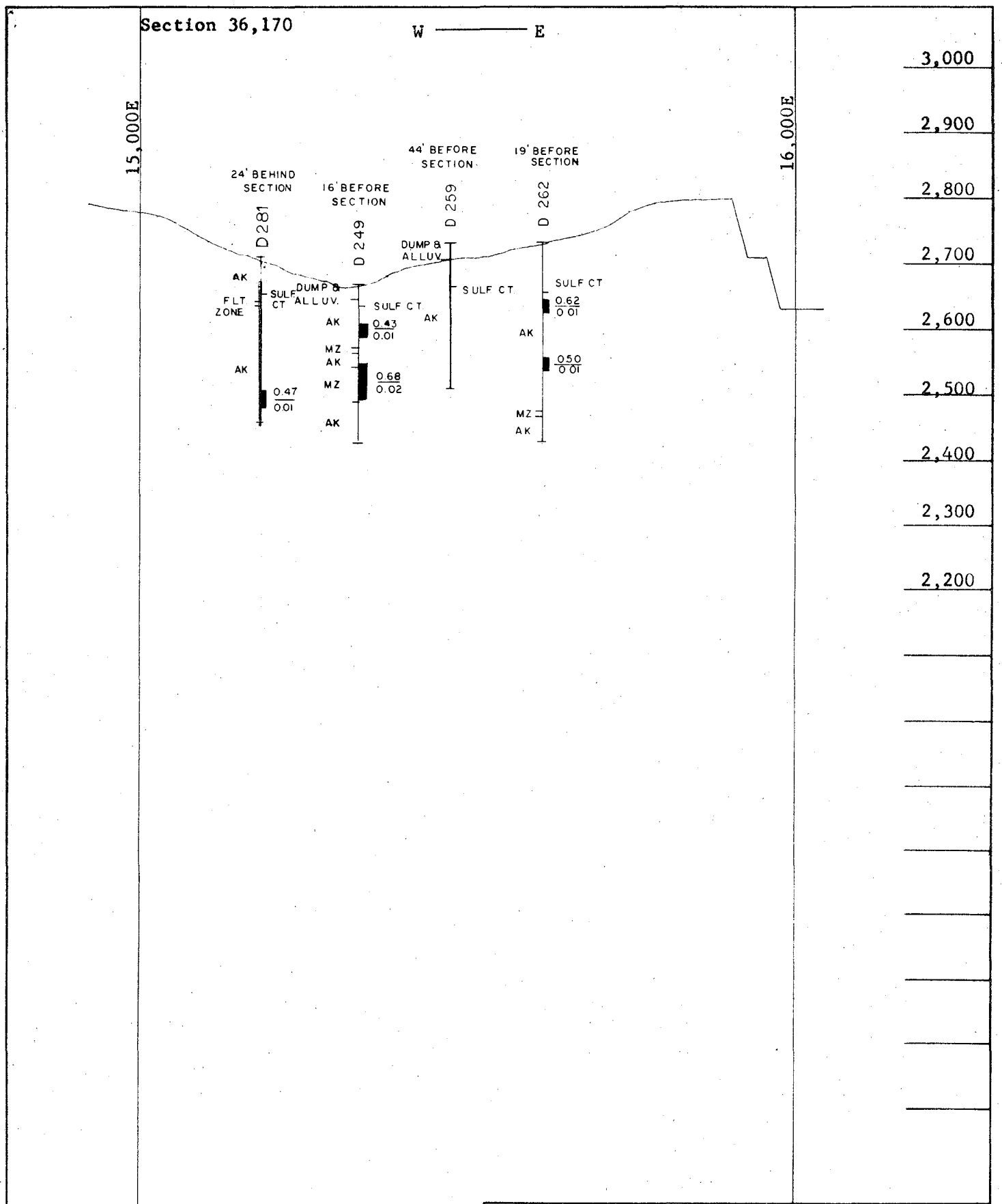
NRN:jca



+ 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 1" = 200'	DRAWN NRN	DATE 1967 DEC	FILE S 121 A



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
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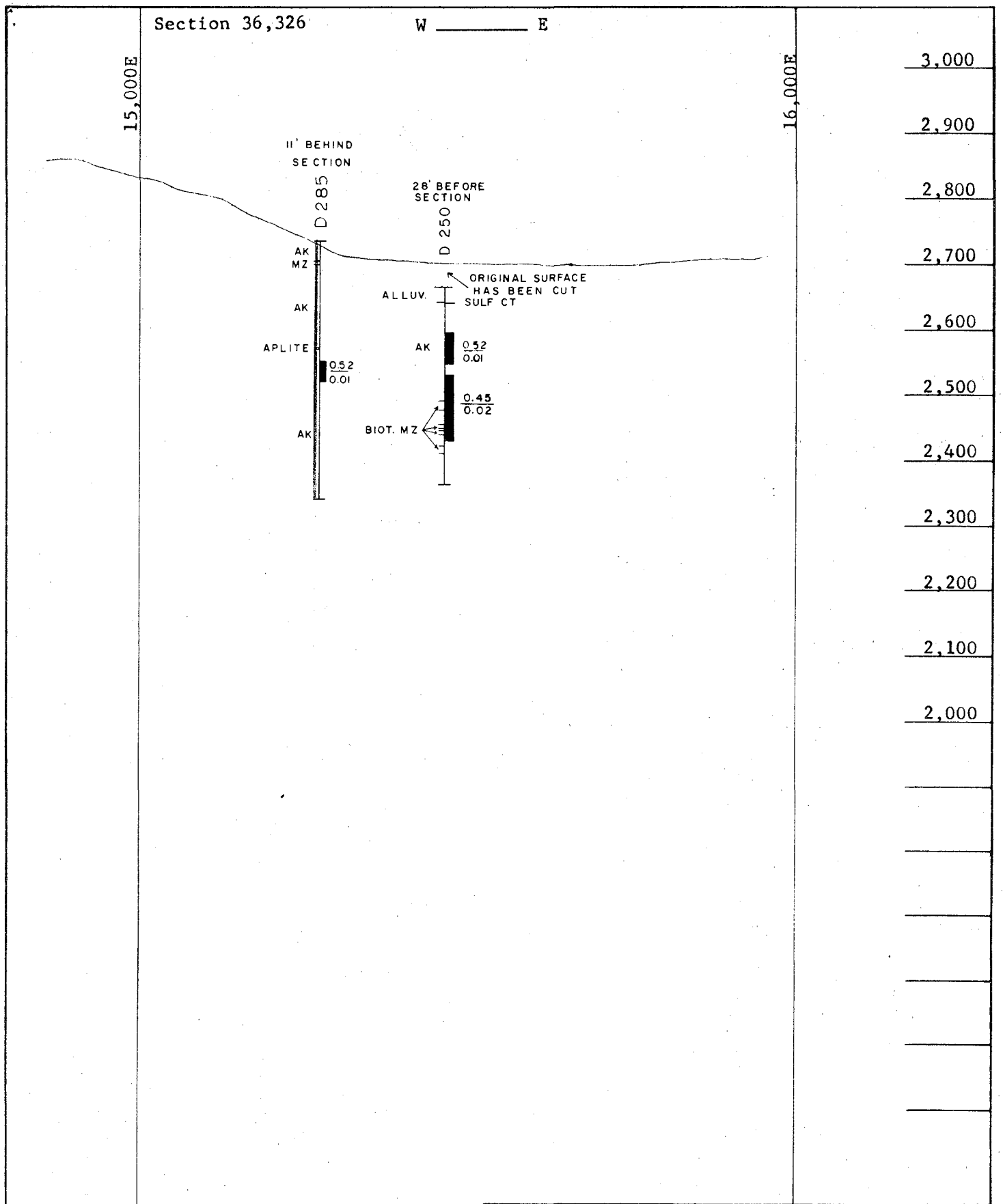


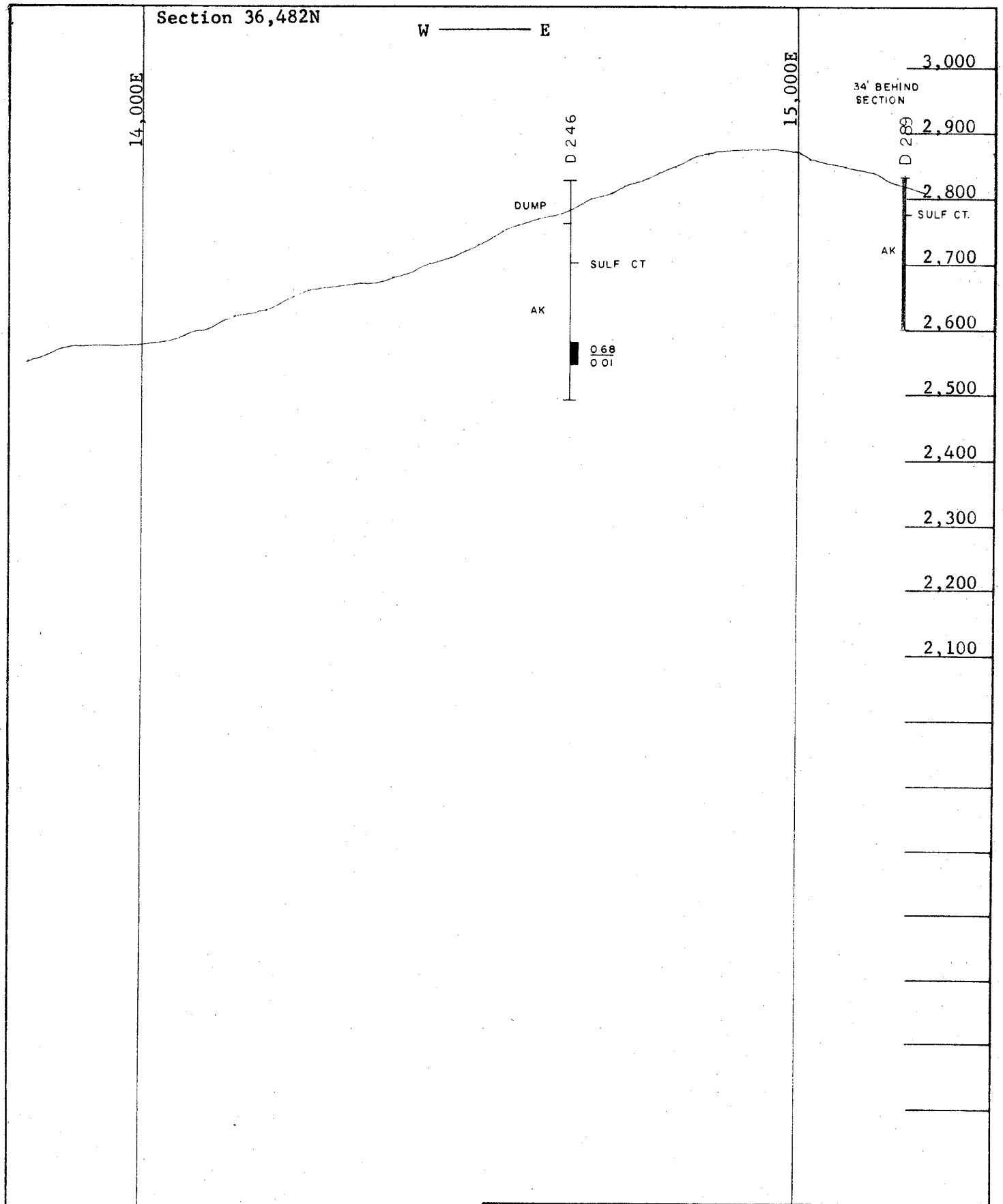
+ 0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	DEC 1967	S 121 A



+ 0.4% Total Copper
Advance for month

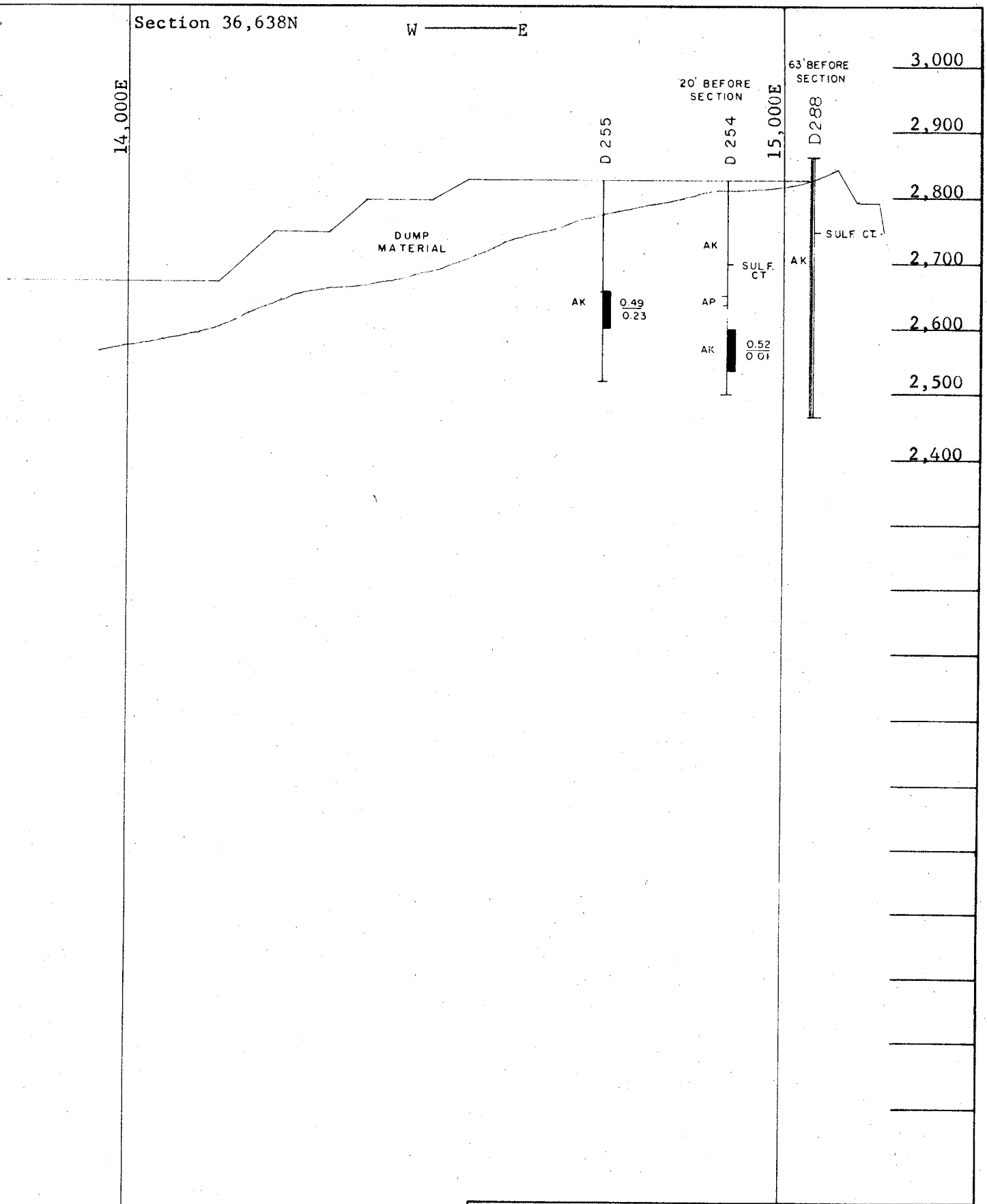
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP -MT. EXPECTATION AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	DEC 1967	S 121 A



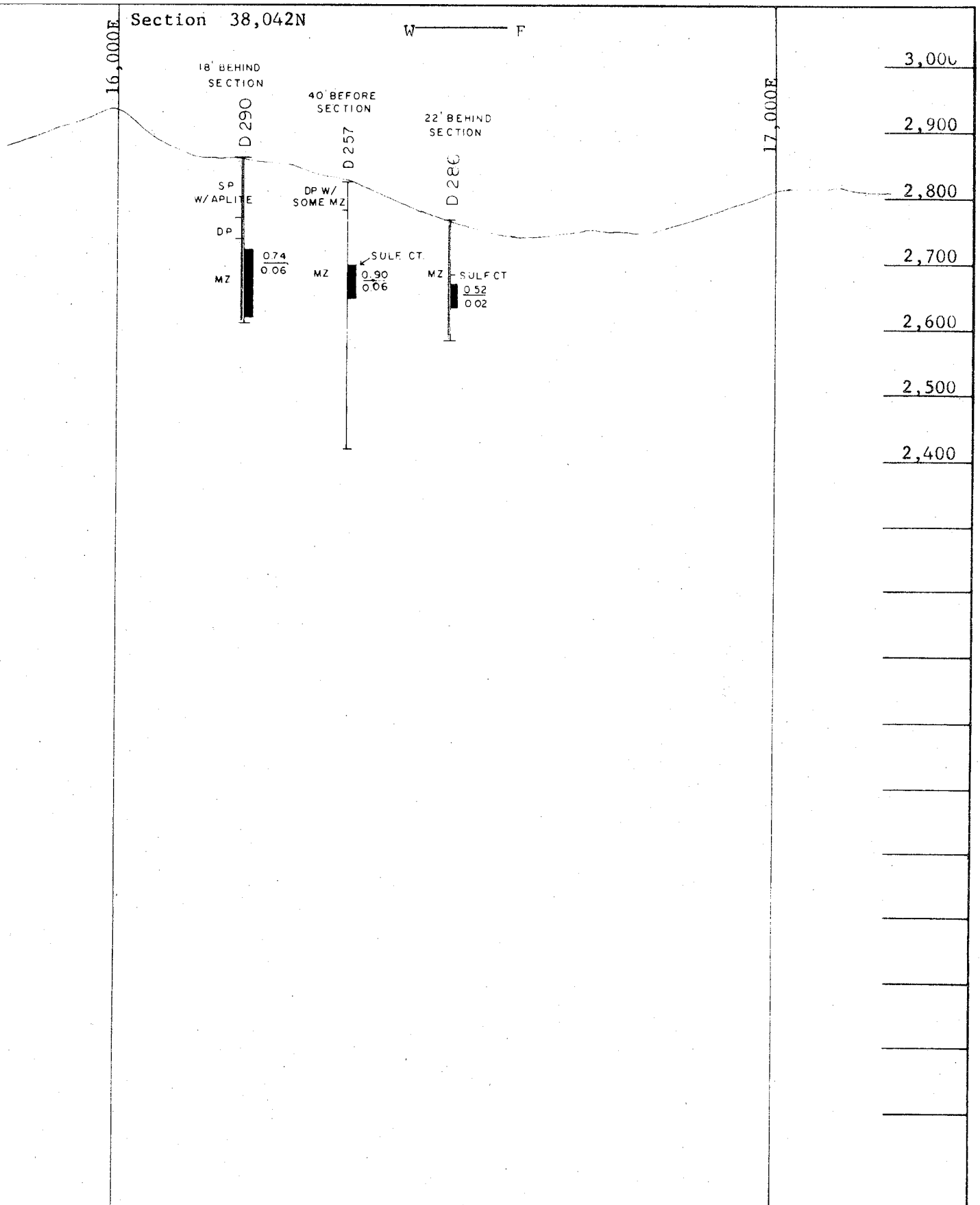
+ 0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	DEC 1967	S 121 A



■ + 0.4% Total Copper

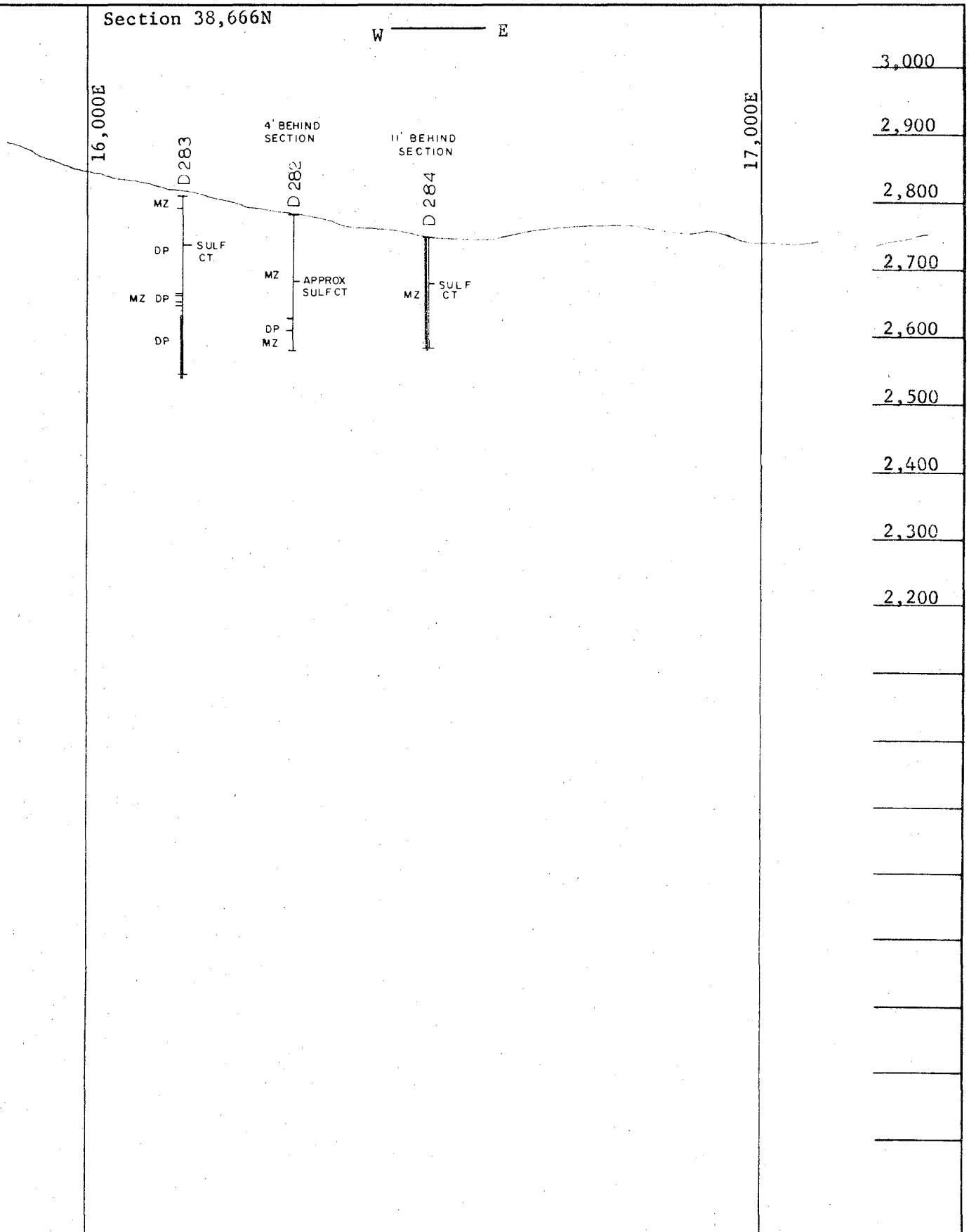
| Advance for month

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	DEC 1967	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 1" = 200'	DRAWN NRN	DATE DEC 1967	FILE 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.

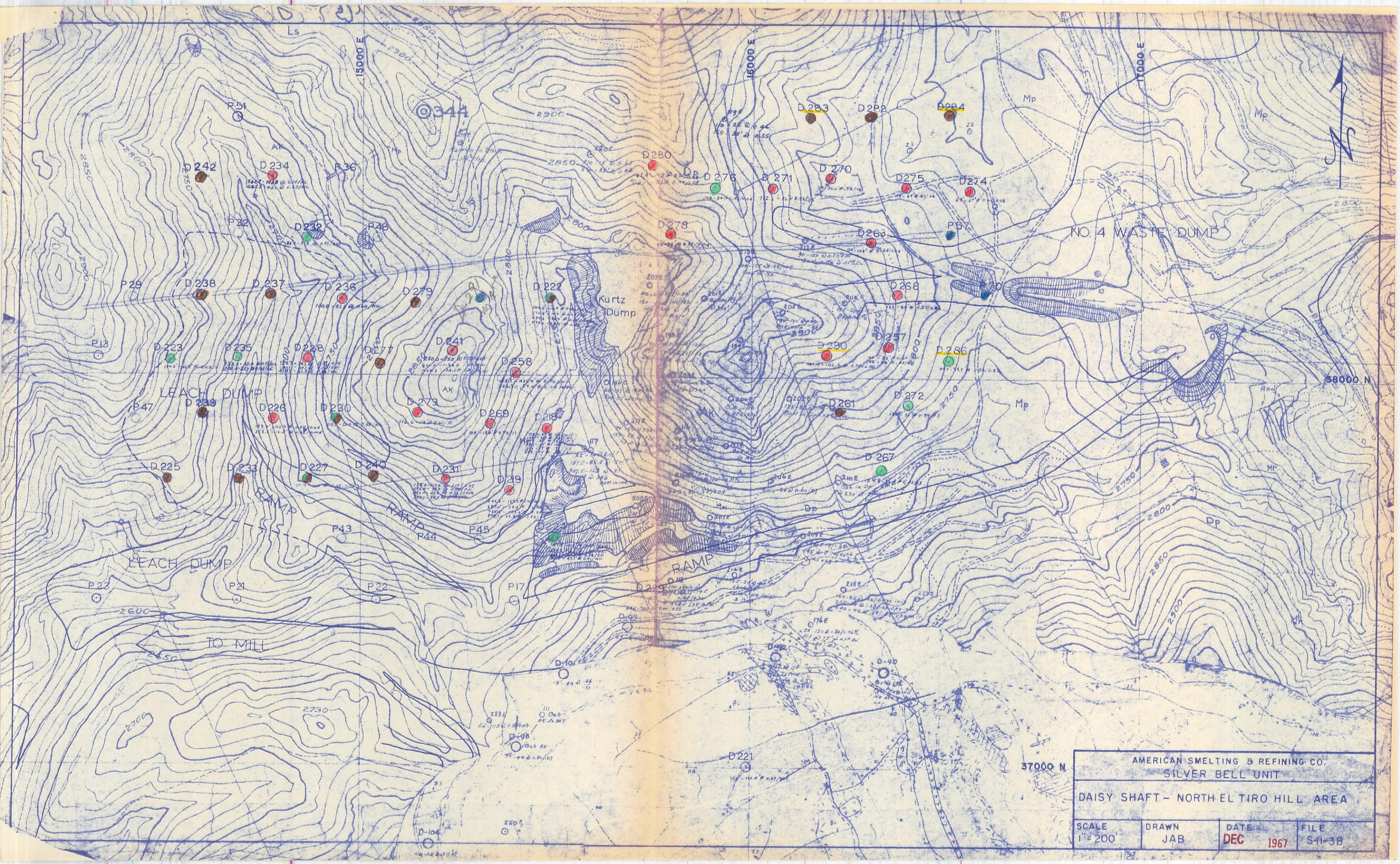
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

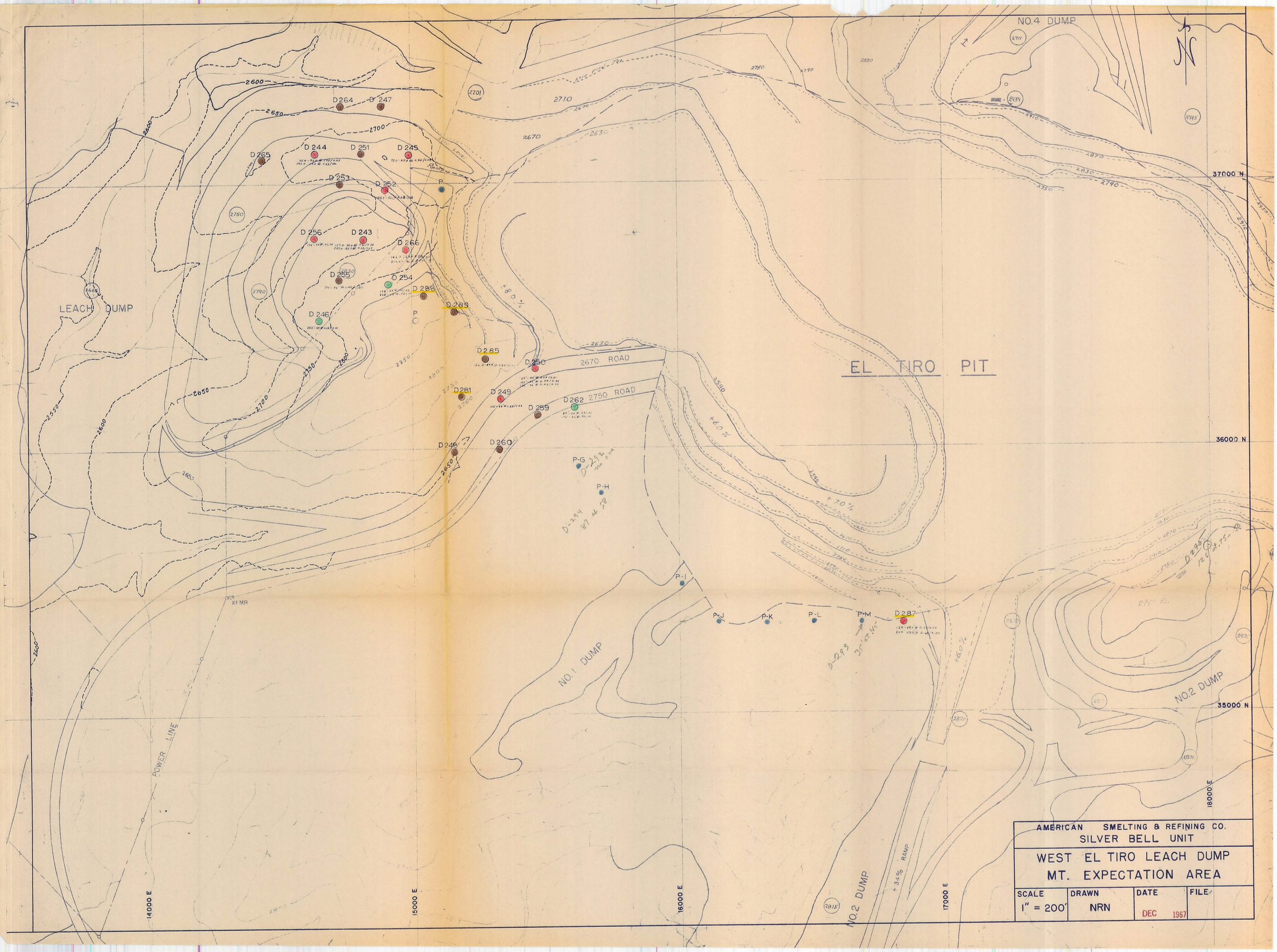
D-2??

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

D-2??

None to thin +0.4% intervals.


AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE DEC 1967
FILE S-11-38
NO. 4 WASTE DUMP
LEACH DUMP
LEACH DUMP
Kurtz Dump
RAMP
RAMP
RAMP
TO MILL
15000 E
16000 E
17000 E
38000 N
37000 N
D 242
D 234
P 36
P 32
D 232
P 48
P 29
D 238
D 237
D 236
D 279
D 222
D 223
D 235
D 228
D 277
D 241
D 258
D 239
D 226
D 230
D 273
D 269
D 218
D 225
D 233
D 227
D 240
D 231
D 229
P 43
P 44
P 45
P 22
P 21
P 17
D 229
D 221
D 104
D 280
D 276
D 271
D 278
D 283
D 282
D 284
D 270
D 275
D 274
D 263
P 57
D 268
D 290
D 257
D 286
D 261
D 272
D 267
P 51
P 47
P 13
P 23
2900
2850
2800
2750
2700
2650
2600
2730


NO.4 DUMP
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
POWER LINE
XFMR
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 DEC 1967
FILE

Mr. J. H. Courtright

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

J. H. C.

MAR 1 1968

February 20, 1968

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
NORTH EL TIRO HILL, MT. EXPECTION AND EAST QUARTZITE
PEAK AREAS.

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

A total of 2,068.6' of core drilling was done; 1,471.3' with the trunk mounted rig and 597.3' with the skid rig. Without taking any delays into account the average advance per shift was 11.9' for the skid rig and 28.3' for the truck rig.

The averaged direct drilling cost for the month was $8.01/ft., with the skid rig costing $10.72 per foot and the truck rig $6.91 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-291	2,847	38,200	15,300	247.9'	31.6	1.69	Nil	379.0	379.0	379.0
D-292	2,810	35,930	15,625	No significant thickness				231.0	231.0	231.0
D-293	2,900	35,340	16,685	162.2'	34.1	0.45	0.01	249.5	249.5	249.5
D-294	2,840	35,830	15,710	150.2 269.5	87.3 37.2	0.58 0.47	Nil 0.02	366.3	366.3	366.3
D-295	2,970	35,620	18,010	50.0	126.4	0.75	0.50	450.0	450.0	450.0
D-296	2,905	39,405	18,945	No significant thickness				92.7	92.7	92.7
D-297	Drilling not started.									
D-298	2,905	39,415	18,930	No significant thickness				90.1	90.1	90.1
D-299	2,895	39,350	18,885	"	"	"		210.0	210.0	-
							TOTAL	2,068.6'		

D-291 This hole collared in alaskite and remained in it to 190.0'. The alaskite was weekly altered and poorly mineralized. There was a gradual increase in intensity of structural deformation downward towards its lower contact.

Sediments were encountered at 190.6' and persisted to the bottom of the hole at 379.0'. The sediments were of variable composition starting with high garnet tactites then chloritic and soft diopside hornfels and ended in the very fine grained, hard light green diopside hornfels.

From 247.9' thru 279.5' a strong sulfide-calcite-chlorite zone was penetrated which contained up to 5.3% Pb, 7.9% Zn, 1.11 oz/ton Ag and 1.89% Cu. This zone probably represents a steep dipping vein following a N-S fault seen in outcrop 200' north.

D-292 This hole collared in and was bottomed in alaskite, being cut only by monzonite in the interval 110.8'-120.0'.

The rock was weak to moderately altered and had a low total copper content.

The hole was stopped at 231.0'.

D-293 This hole collared in and remained in a biotite quartz monzonite. The alteration on the average was weak, but the rock became somewhat fresher appearing at depth.

Sulfides were encountered at 57', but the total volume remained quite low. The copper content ran +0.4% only in the interval 167.2'-202.3'.

D-294 This hole collared in and bottomed in alaskite. The rock was weakly altered, but moderately veined. Sulfides were encountered at 119' and the chalcocite enriched material ran ore grade in the intervals 150.2'-237.5' and 269.5'-306.7'.

The hole was stopped at 366.3'.

D-295 This hole was drilled on a small scale, but high magnitude magnetic anomaly which appears to be a continuation of the anomaly over ore bearing sediments in El Tiro Pit. Hole D-220 was earlier drilled on this anomaly and intersected massive pyrite and magnetite.

The hole was collared in dacite, but passed into sediments at 55'. The sediments first encountered were garnet tactite and these graded downward into wallastonite-diopside hornfels. At 164' the sediments became dense and siliceous, but broken. Strongly broken and altered fault material was encountered at 173' and continued to around 380'. This faulting is believed to be related to the El Tiro Fault zone.

High total, but low sulfide copper Values occured above the fault zone in the sediments, but the fault zone material was essentially unmineralized.

At 399.6' the sediments gave way to dacite once again. Dacite and monzonite were intermixed to 446' where sediments were again encountered.

The hole was bottomed in barren hornfels at 450.'.

D-296 & D-298 These holes were started with the intention of going deep to test for possible sediments beneath the dacite. The presence of sediments was indicated on the assay log for the 1910 churndrill hole No. 38 located very close by. When D-296 entered a syenodiorite dike at 39' and remained in it to 92.7' it was decided to move the hole rather than take the chance of remaining in it. D-298 was the new site chosen, but it too encountered a syenodiorite dike. As it turned out, there was a swarm of syenodiorite dikes passing through the area only some of which surfaced.

The drill rig was again moved, this time approximately 100' to the south west and this new site - D-299 is still being drilled.

D-297 Drilling had not commenced at this location by the end of January.

D-299 This hole is being drilled to test for sediments beneath the dacite of the area.

The hole collared in sparse to weakly altered dacite and continued in it to 303.4' where biotite monzonite was encountered. At 317.3' syenodiorite porphyry was intersected and

it persisted to 420'. Dacite was then entered again, but was cut in the intervals 490.7'-499.0' and 508.5'-554.5' by more of the syenodiorite. From 554.5' to 704.6' dacite was again encountered. This dacite took on an atypical texture somewhat similar to monzonite. The lower dacite was secondarily biotized to various degrees which locally resulted in a breccia texture.

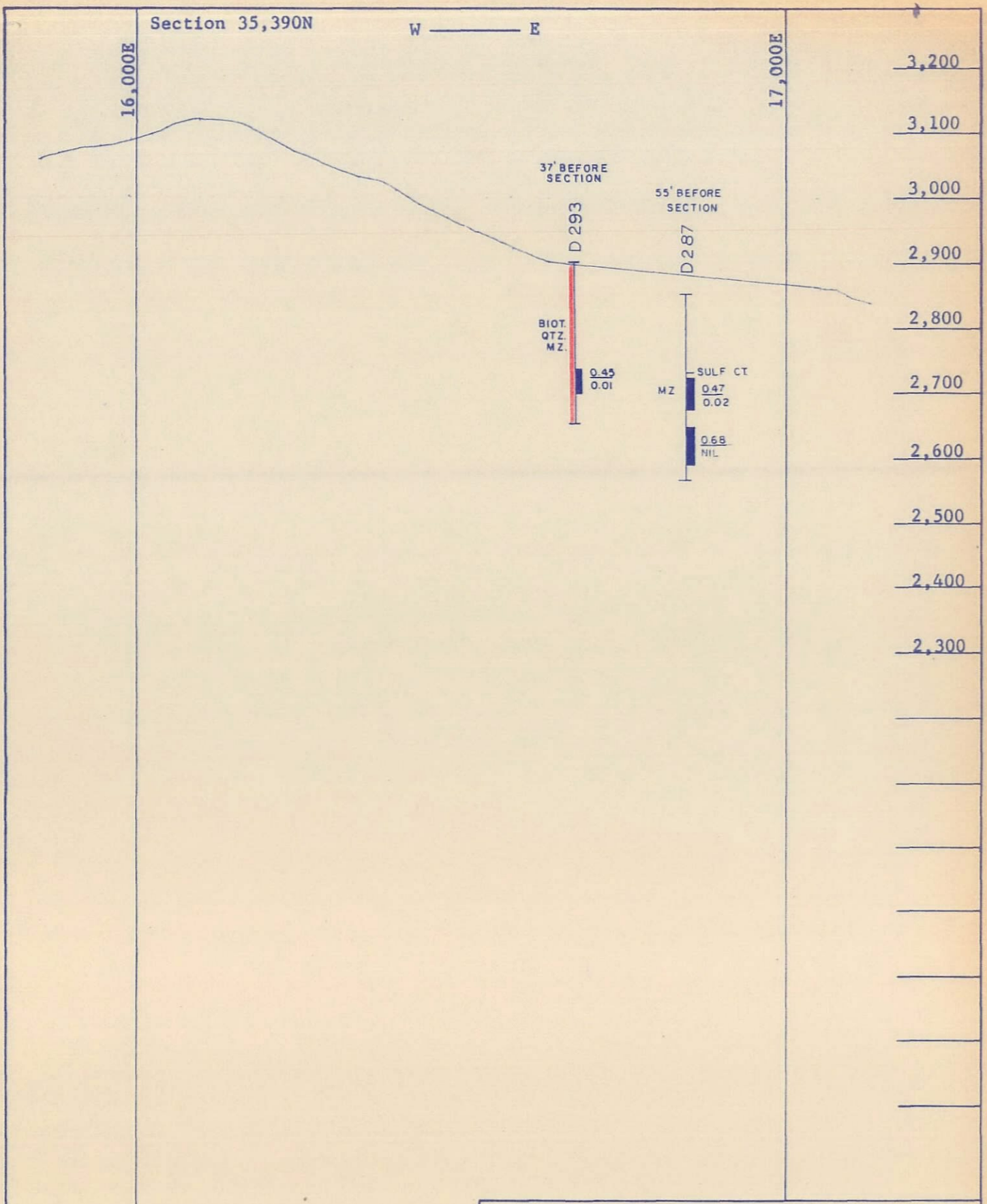
The total sulfide showed a slight increase downward and averaged about 2-1/2% by volume. The copper content was quite low throughout averaging about 0.04%.

Calcite began to appear on fractures at around 300' and continues. Locally chalcopyrite crystals have been found growing in this calcite which seems to indicate that limey sediments do exist at depth.

N. R. Nuttycombe

N. R. Nuttycombe

NRN:jca



+ 0.4% Total Copper
Advance for month

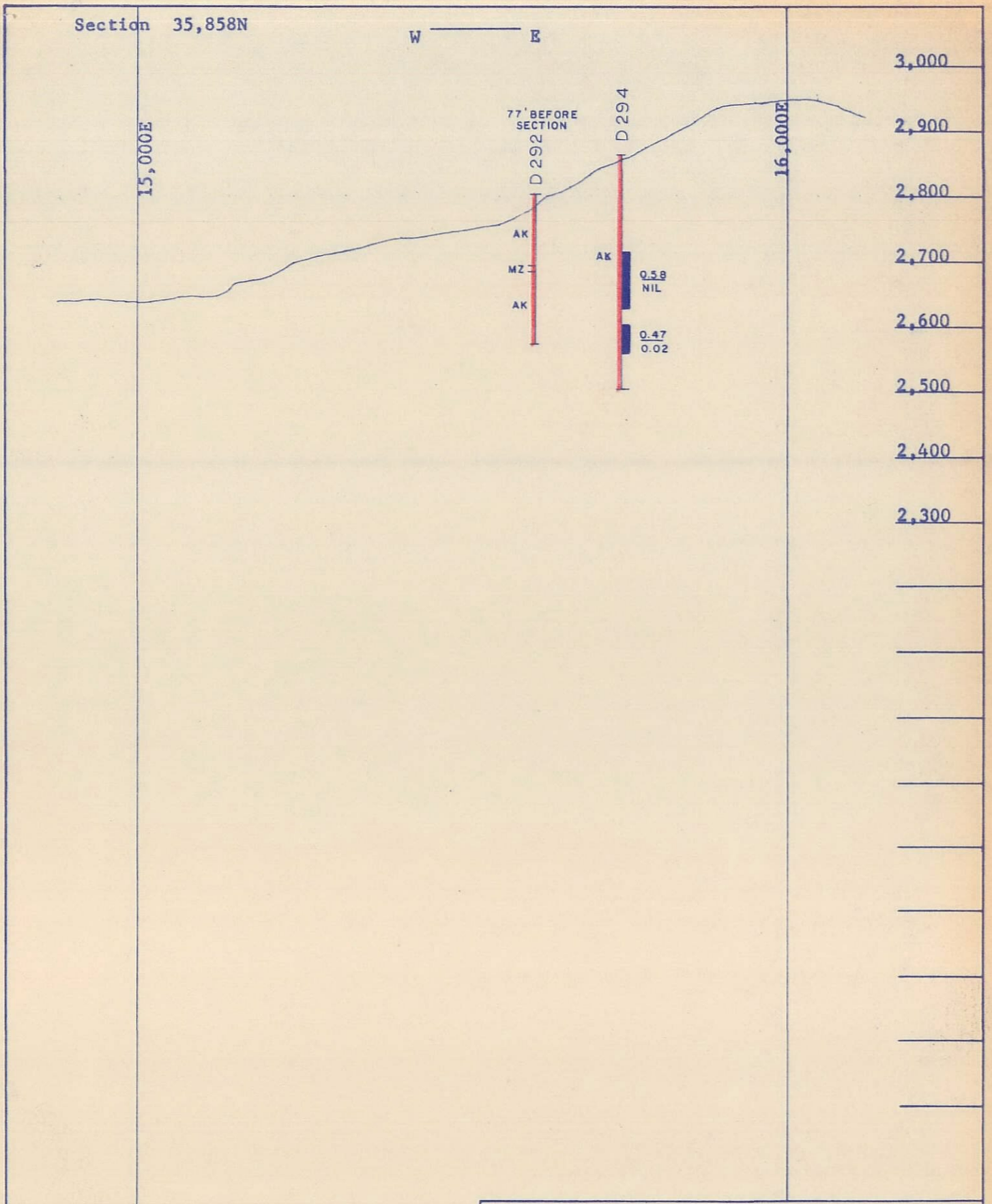
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

MT. EXPECTATION

DRILL HOLE PROJECTIONS

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



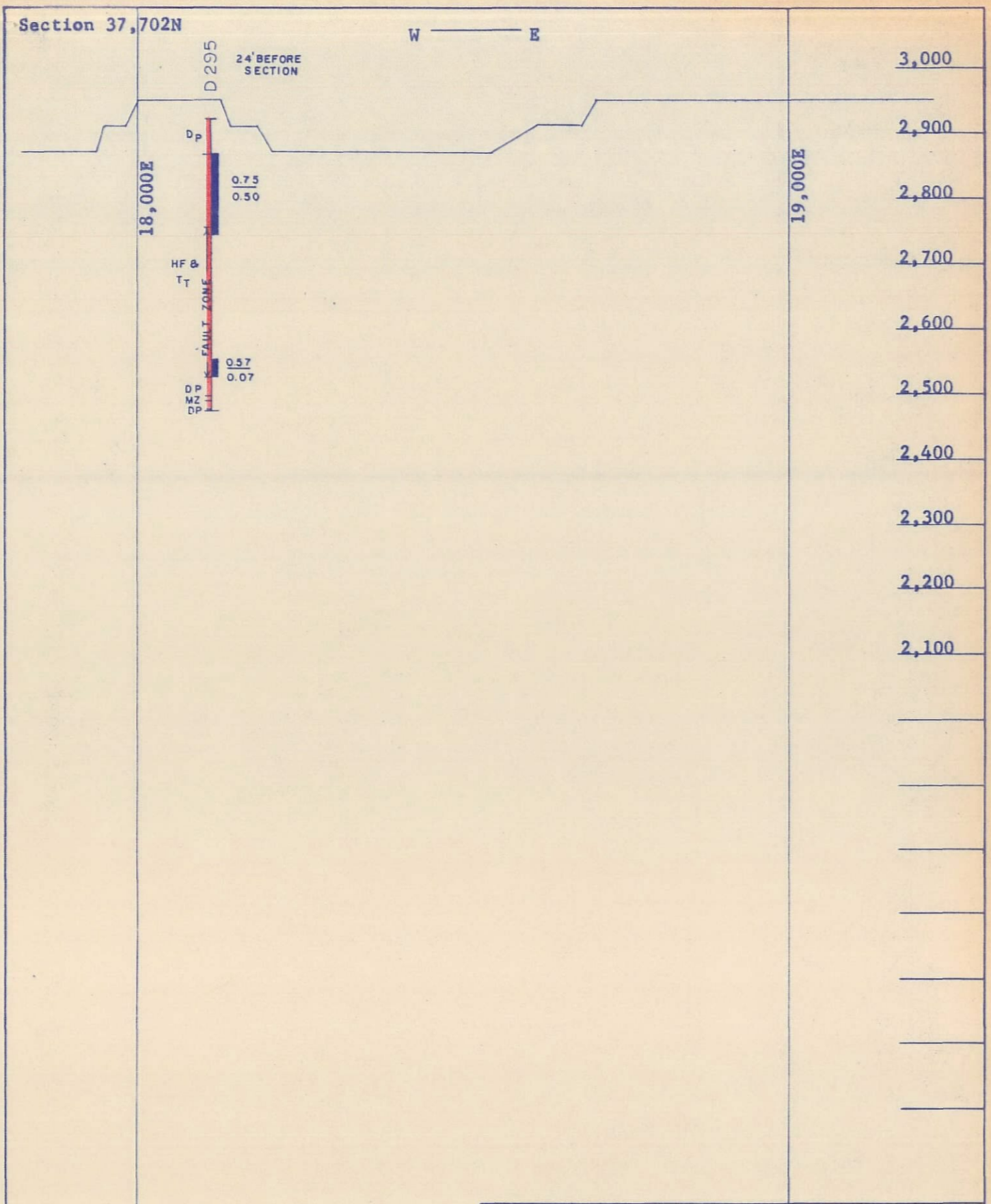
+0.4% Total Copper
Advance for month

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	JAN 1968	S 121 A



+ 0.4% Total Copper

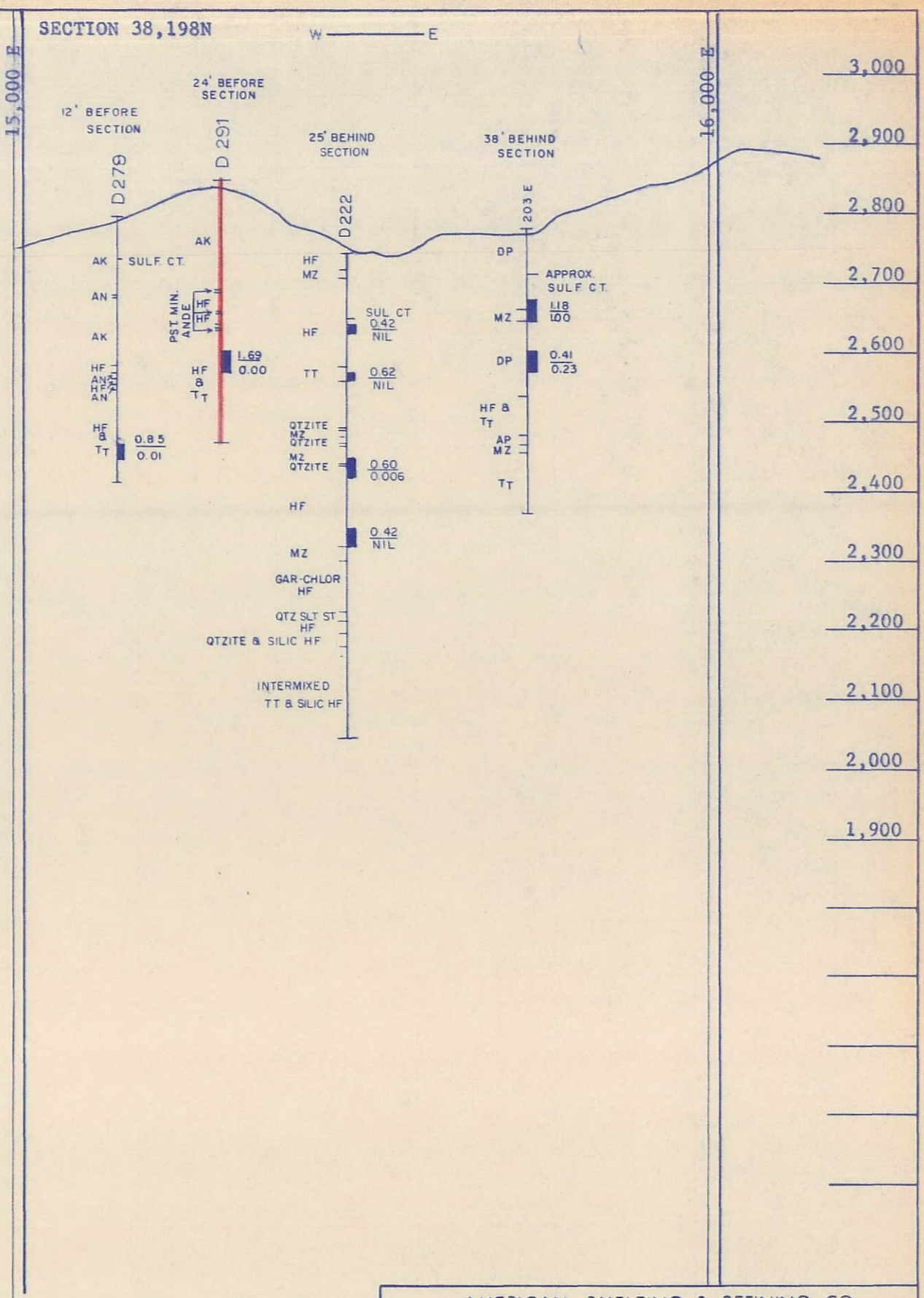
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

SOUTH EL TIRO PIT
DRILL HOLE PROJECTIONS

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



+ 0.4% Total Copper

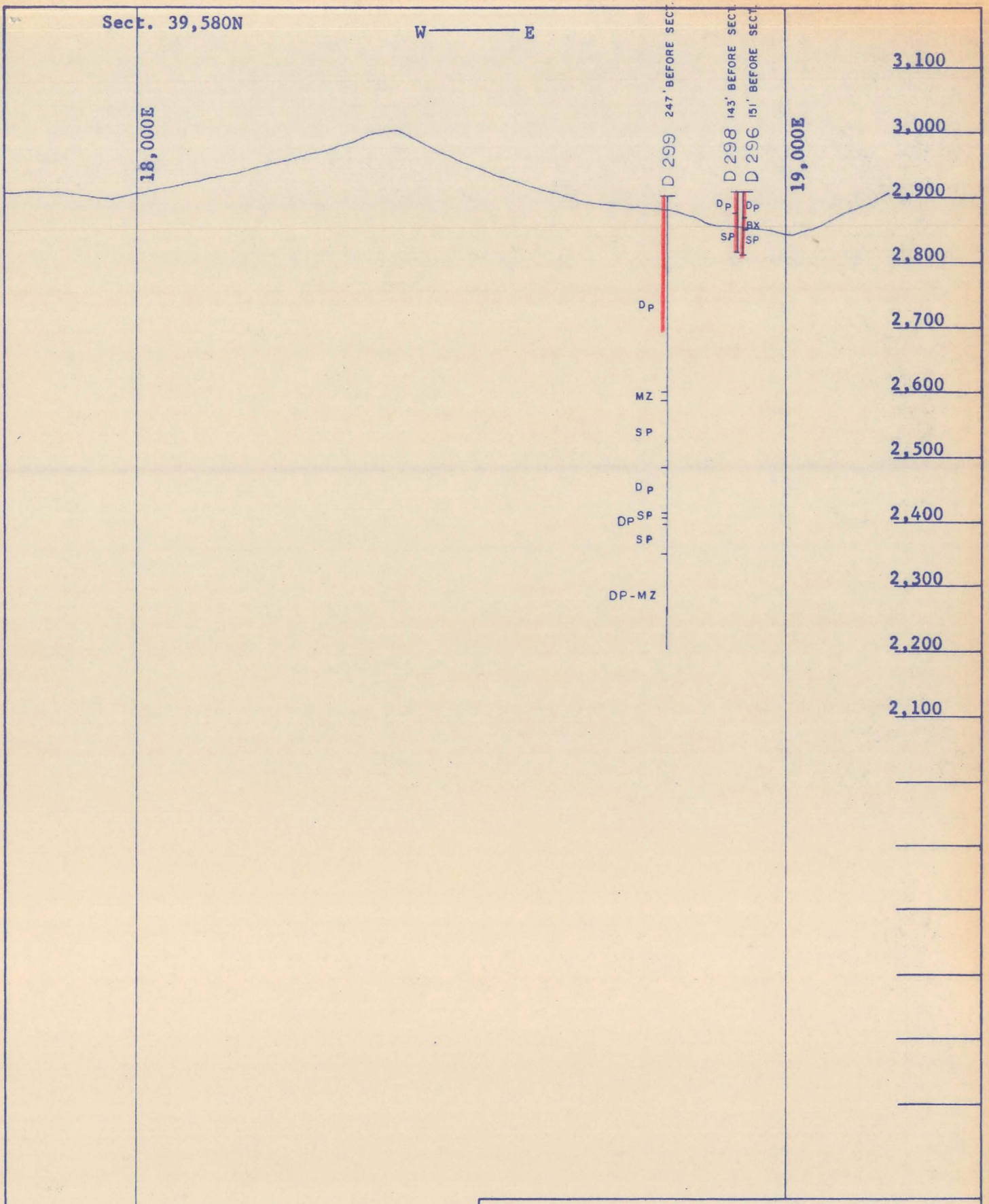
Advance for month

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	JAN 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	JAN 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.

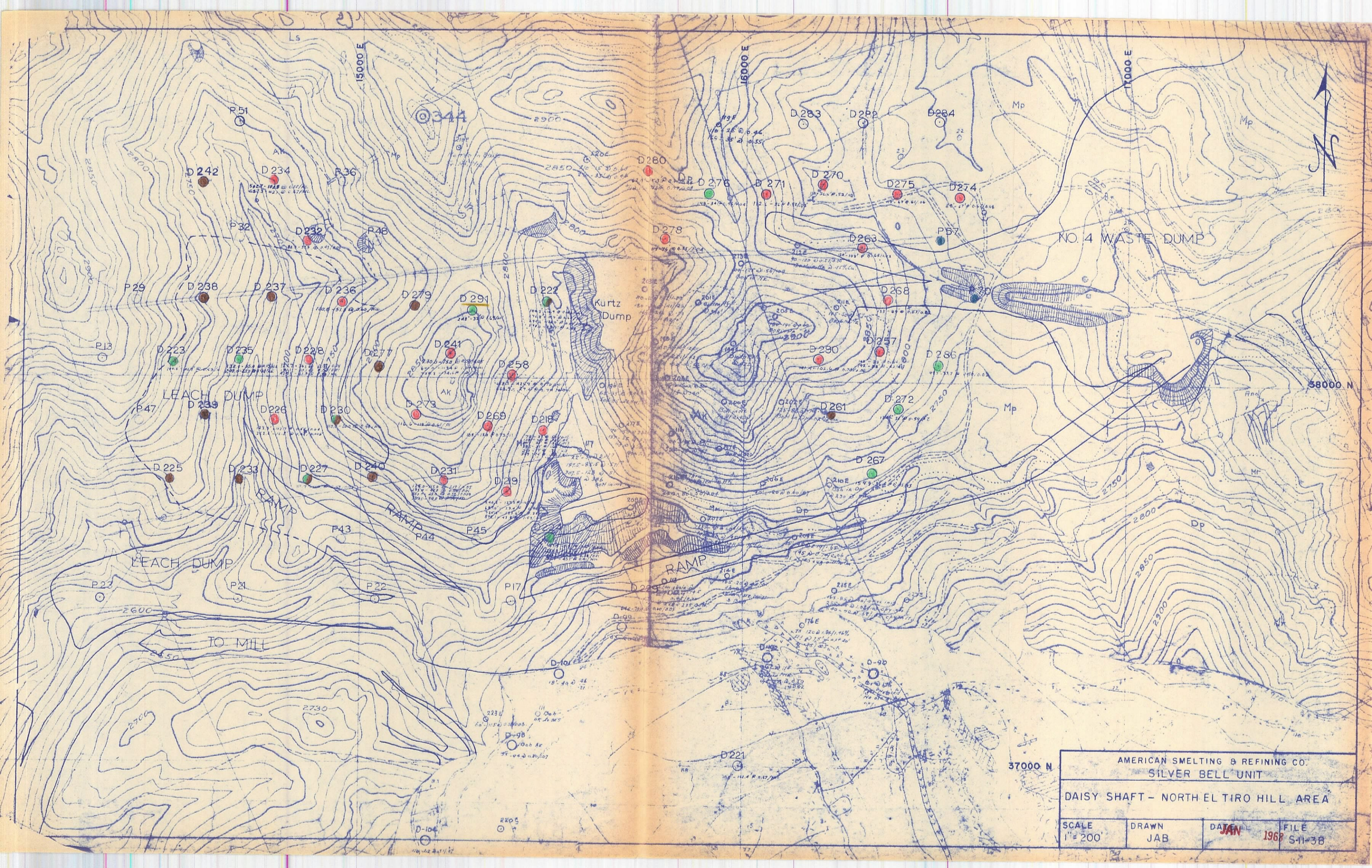
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

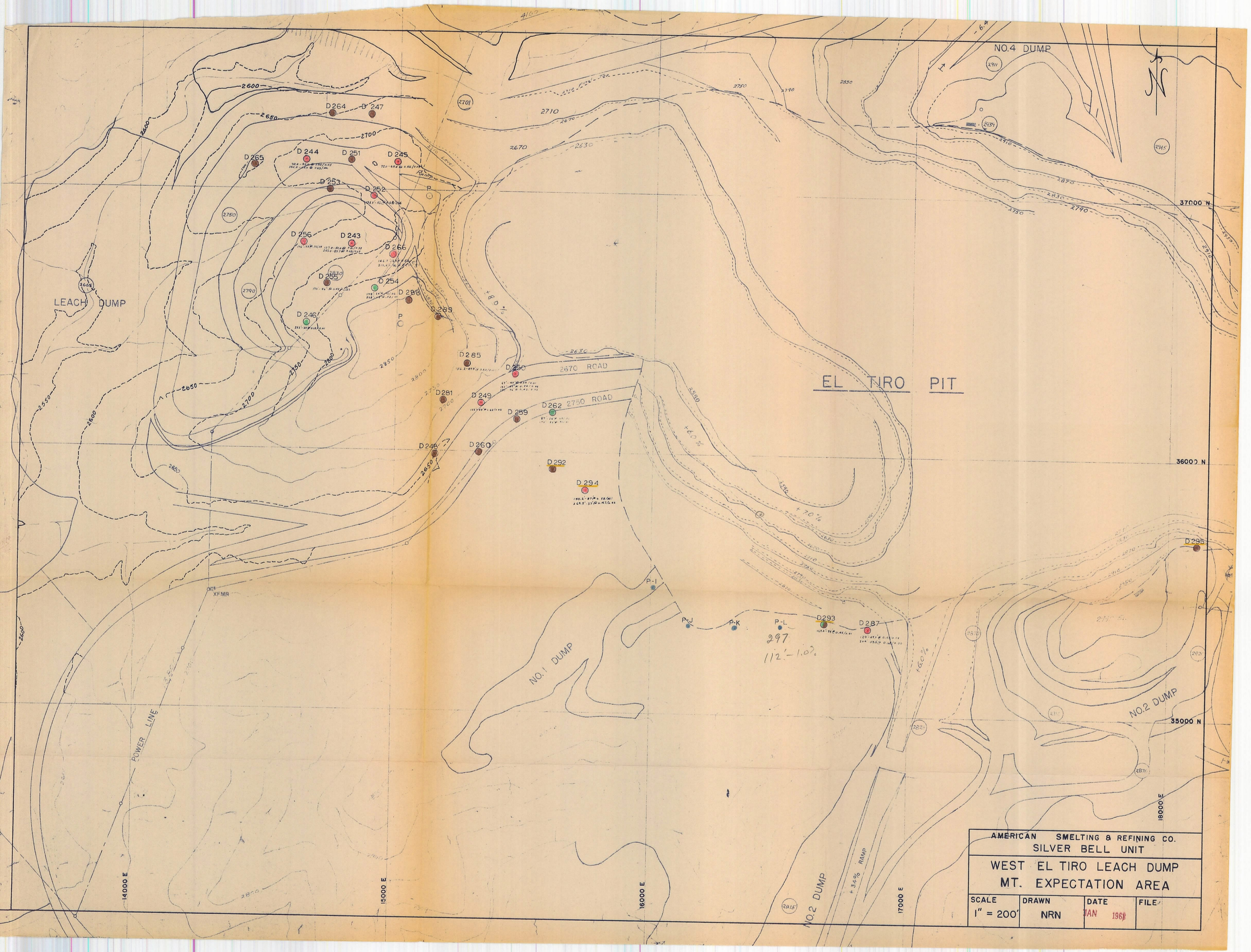
D-2??

● 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
38000 N
37000 N
NO. 4 WASTE DUMP
LEACH DUMP
LEACH DUMP
Kurtz Dump
RAMP
RAMP
RAMP
TO MILL
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE JAN 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
+34% RAMP
+60%
+70%
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
D288
D289
D246
D285
D250
D281
D249
D262
D259
D248
D260
D292
D294
D295
D293
D287
P-I
P-J
P-K
P-L
297
112'-1.0%
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
WEST EL TIRO LEACH DUMP
MT. EXPECTATION AREA
SCALE
1" = 200'
DRAWN
NRN
DATE
JAN 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
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 JAN 1968 4-14-66
FILE S-121-221 E

MR. J. H. COURTRIGHT

J.H.C.
JAN 2- 1967

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

December 22, 1967

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM, NORTH EL TIRO HILL-DAISY SHAFT AREA AND WEST EL TIRO LEACH DUMP AREA, NOVEMBER, 1967.

The following briefly summarizes the drilling done during the month of November, 1967. We had one truck mounted and one skid mounted diamond drill rig drilling in the North El Tiro Hill-Daisy Shaft and West El Tiro Leach Dump areas. Both rigs worked two shifts per day, six days per week.

A total of 2,506.6' was core drilled: 844.2' with the skid rig and 1,662.4' with the truck rig. Without taking any delays into account the average advance per shift was 16.9' for the skid rig and 33.2' for the truck rig.

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-273	2,842.42	37,904.93	15,142.85	116.6	118.7	0.61	0.01	107.1	323.7	323.7
D-274	2,767.30	38,481.07	16,559.40	No significant thickness				19.7	172.2	172.2
D-275	2,780.56	38,488.15	16,393.14	114.7	67.3	0.61	0.06	205.7	205.7	205.7
D-276	2,872.07	38,482.71	15,903.45	198.2	34.4	0.56	0.04	254.9	254.9	254.9
D-277	2,814.43	38,029.46	15,043.20	No significant thickness				317.9	317.9	317.9
D-278	2,810.06	38,364.91	15,788.63	117.4	75.6	0.55	0.04	383.0	383.0	383.0
D-279	2,799.42	38,185.92	15,136.05	No significant thickness				381.8	381.8	381.8
D-280	2,871.19	38,538.46	15,750.47	62.9	15.3	0.61	0.08			
				118.1	78.8	0.77	0.08	415.8	415.8	415.8
D-281	2,710.41	36,194.66	15,187.15	No significant thickness				37.4	37.4	
D-282	2,781.22	38,670.23	16,306.01	No significant thickness				202.6	202.6	202.6
D-283	2,809.82	38,666.28	16,142.27	154.6	50.5	0.47	0.13	180.7	180.7	268.3
							TOTAL	2,506.6		

D-273

This hole collared in and bottomed in alaskite, but was cut by numerous aplite dikes and one monzonite dike.

The rock was strongly altered throughout and was cut by numerous quartz-sericite-sulfide veins. Sulfides were encountered at 96.4' and the chalcocite enriched zone ran ore grade throughout the interval 116.6'-235.3'. The total sulfide content increased notably at around 235', but there was a gradual decrease in grade. Covelite was present in amounts equal to the chalcocite through this zone.

The hole was bottomed in alaskite at 323.7'.

D-274

This hole collared in and was bottomed in biotite-quartz monzonite. In general the rock was only weakly altered, but was locally moderate to strongly altered. The biotites were altered to chlorite of all stages, but there was essentially no hydromica formed.

Sulfides were encountered at 79', but a medium to dark brown limonite persisted on fractures to 152'. The sulfides were pretty well disseminated and found replacing biotite in general. Sulfides were also present on fractures, but these fractures showed less than normal sericite-quartz halo development.

In the enriched zone the total sulfide content averaged approximately 3-1/2%. The pyrite content averaged 2% throughout the sulfide zone. Chalcocite enrichment was present from 76' to 153' and ran ore grade in interval 85.3' to 127.5'.

D-275

This hole collared in and bottomed in biotite-quartz monzonite. The rock was moderate to strongly altered from the surface to a depth of approximately 40'. The intensity of this alteration was due to the existance of a strong fault zone between 22' and 45' combined with surface weathering effects. Below 40' the rock was weakly altered except for the interval 107' - 131' which was a structurally sheared zone that was moderately altered.

Sulfides were encountered at 94', but the total sulfide content remained, on the average, less than 2% throughout the extent drilled. The primary pyrite to chalcopyrite ratio was approximately one with each accounting for approximately 0.6% of the volume of the rock. The main zone of chalcocite enrichment was from 82' to 182'. The mineralization was ore grade from 114' to 182'.

The hole was bottomed in the monzonite at 205.7'

D-276

This hole was collared in dacite and remained in it to the bottom with the exception of some irregular monzonite dikes cutting the dacite throughout the interval 118' - 140'.

The dacite showed only weak alteration of the clay-sericite type and was weakly mineralized. The volume of primary sulfides was approximately 2-1/2% with pyrite comprising close to 2%. The monzonite dikes themselves were no better mineralized than the dacite, but did show moderate to strong alteration.

There was strong hematite-limonite development above 45' where sulfides first appeared and it continued to be present in weak amounts throughout the hole intermixed with the sulfides. Chalcocite enrichment was present from 45' to the bottom of the hole at 254.9', but the main zone was from 137' thru 233'. The mineralization ran ore grade from 198.2' - 232.6'.

D-277

This hole collared in alaskite and remained in it with the exception of occassional minor aplite dikes intersected.

There was a great deal of fault gouge and sheared material penetrated, most of which was strongly altered to sericite and clay.

The bottom of the leached zone was at 114'. The volume of the primary sulfides was somewhat variable and ranged from 37 to 12%. The primary sulfides were both disseminated in the strongly altered fault material and associated with fairly numerous sericite-quartz haloed veinlets.

D-278

This hole was collared in dacite and entered sediments at 220'. The sediments continued to 351' being cut by monzonite in the intervals 310.6' - 317.3', 331.0' - 347.7' and 351.4' - 367'. Dacite was encountered again at 267' and persisted to the bottom of the hole at 383.0'.

The dacite was moderately to strongly altered to the depth of 109' and then became weakly altered. This alteration was primarily sericite and lesser clay. The sediment occupying the interval 220' - 256' was a siltstone and is now a quartzitic siltstone or shale. The remainder of the sediments were originally limy and are now altered to calcium silicate hornfels and occassional tactites.

Sulfides were encountered @ 84', but by volume represented only around 2% of the dacite. Despite the low total sulfide content in the material 117.4' - 184.0', much of the chalcocite precipitstrf on the walls of fractures apparently without the aid of chalcopyrite or pyrite.

In the sediments the total sulfide content approached 3%, but the copper content was generally lower than 3%.

D-279

This hole was collared in weakly altered alaskite and remained in it to the depth of 216.8' where altered sediments were encountered. The alteration in the alaskite was manifested by the development of sericite along numerous high angle fractures and weak "clay" type alteration of the plagioclase felds.

The sediments, which were originally limy, are altered to garnet and calcium silicates. Most of these altered sediments would be garnet-diopside hornfels with 5% to 20% remnant calcite.

Sulfides were first encountered in the alaskite at approximately 61'. The total sulfide content remained around 2-1/2% in the igneous rock and was no where ore grade. Within the altered sediments the total sulfides were even lower averaging approximately 1%. The copper content was quite low in the sediments except for the interval 329.7' to 350.9' which averaged 0.85% copper ocuring as chalcopyrite.

This hole was bottomed at 381.8' in altered sediments.

D-280

This hole collared in dacite and then passed through an aplitic zone from 18.6' to 34.6'. Where a zone of completely intermixed dacite and syenodiorite was encountered. At 50.6' the syenodiorite took over and was present to 100.7'. Between 100.7' and 125.2' syenodiorite was intermixed with dacite. Dacite was encountered at 125.2' and was the dominate rock type on to the bottom of the hole at 415.8' The dacite was cut in the intervals 275' - 279' and 297' - 299' by diopside-chlorite sediments and in the intervals 381' - 397' and 399' - 404' by syenodiorite.

There was a rather high intensity of faulting from the surface down to 177' and through this zone the alteration was generally strong. Below 177' the alteration intensity was sparse.

Sulfides were encountered at 63', but had limonite intermixed with them to a depth of 215'. The pyrite content was low throughout with less than half the intervals having greater than 1% pyrite. Despite the low total sulfide content ore-grade material occupied the intervals 62.9' - 78.2' and 118.1' - 196.9'. Besides these ore zones which were mainly in dacite, the small sediment xenoliths carried chalcopyrite with copper equivalents greater than 1%.

The hole was bottomed at 415.8' in dacite, but calcite on fractures probably indicate the proximity of calcareous sediments below. If sediments do exist below there is a very good chance that they would be well mineralized.

D-281

This hole was collared in and remained in alaskite to the bottom. Fault zones were fairly numerous throughout and the alteration was generally moderate as a result.

Sulfides were encountered at 54' and sparse chalcocite was present from there to the bottom. The total sulfide content was low averaging only about 2-1/2%. Plus 0.4% copper was penetrated only in the interval 203.9' - 230.5'.

The hole was bottomed in alaskite at 252.1'.

D-282

This was collared in and bottomed in a biotite quartz monzonite, but did penetrate dacite in the interval 157.0' - 174.2'.

The intensity of alteration and mineralization was sparse. The base of the oxidation zone was at 112', but some sulfides including chalcocite was present starting at 48.4'. No ore grade material was encountered.

The hole was bottomed in monzonite at 202.6'.

D-283

This hole collared in monzonite, but entered dacite at 19.2'. The dacite was then present to the bottom of the hole except in the intervals 147' - 149' and 160.0' to 164.3' where monzonite was again encountered.

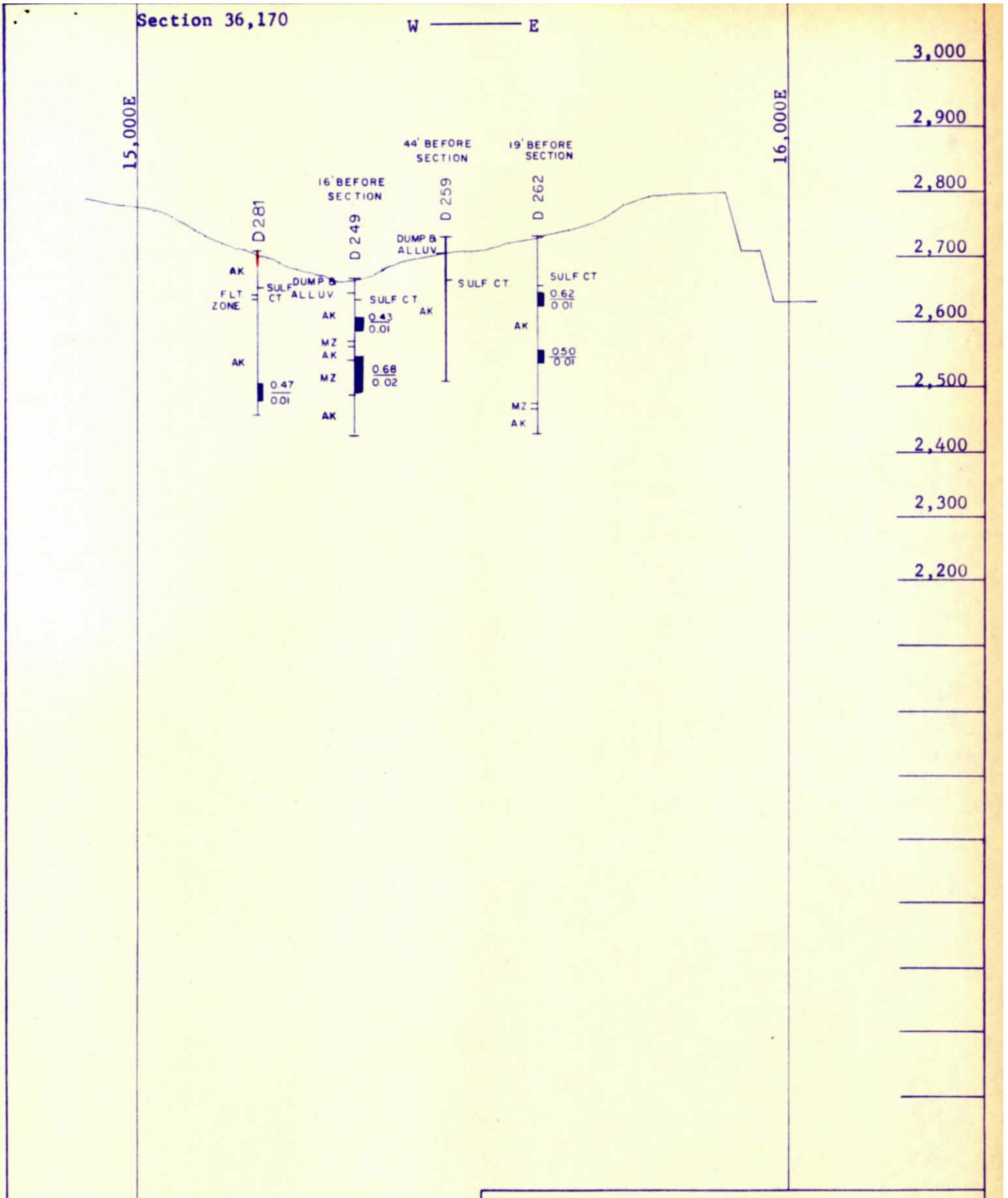
The degree of alteration was weak to about 140'. Below that depth the alteration was very weak. The total sulfide content remained low throughout the sulfide zone. Plus 0.4% copper material was encountered in the zone 145.6' - 205.1', but had relatively high non-sulfide associated.

The hole was bottomed in dacite at 268.3'.

N. R. Nuttycombe

N. R. Nuttycombe

NRN:jca
cc: TASnedden
CPPollock A/M
RBMeen
JHCourtright (2)
DRJameson (2)
File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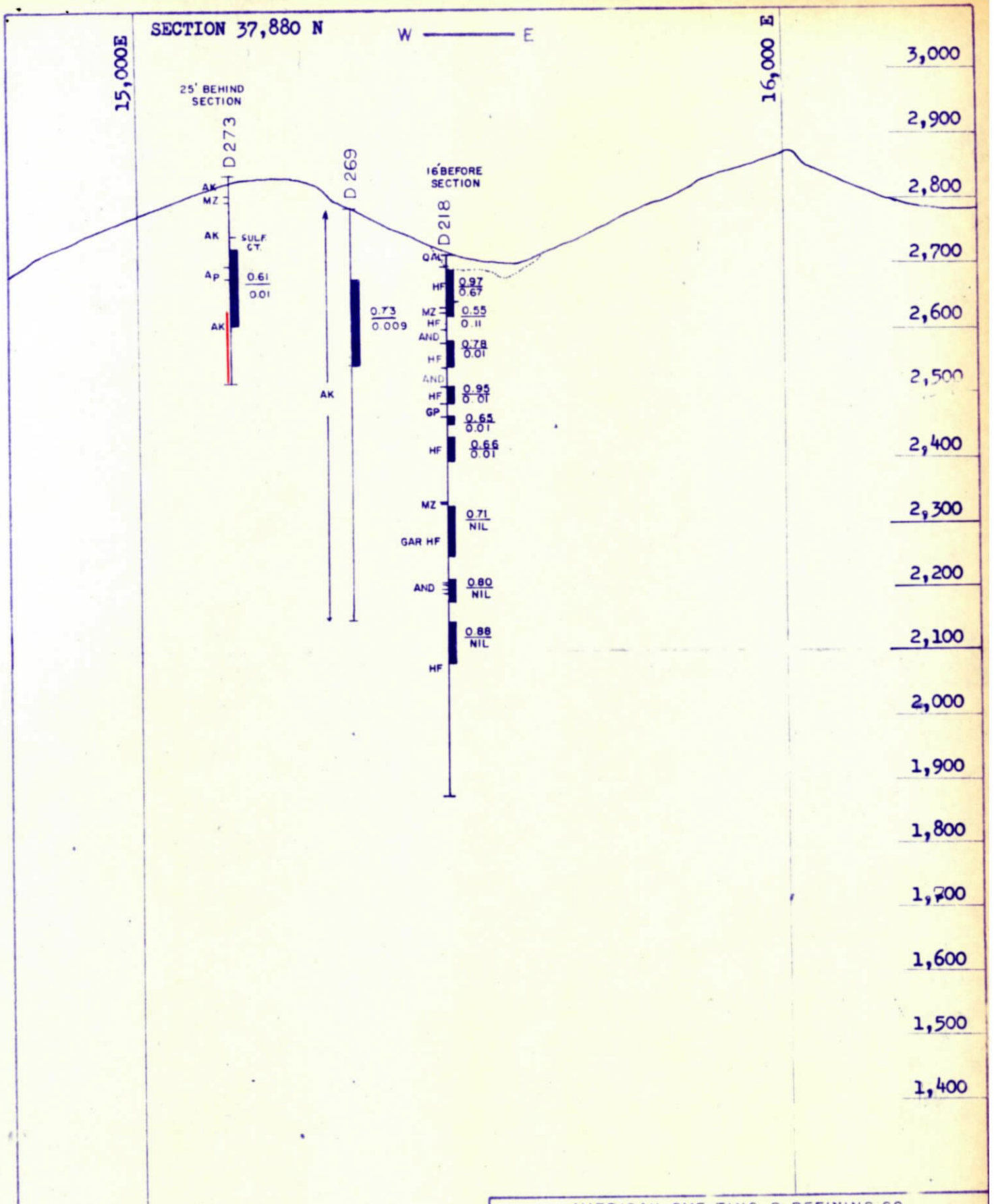
W
E
15,000E
16,000E
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
44' BEFORE SECTION
19' BEFORE SECTION
16' BEFORE SECTION
D 281
D 249
D 259
D 262
DUMP & ALLUV.
SULF CT
FLT ZONE
AK
MZ
0.47
0.01
0.43
0.01
0.68
0.02
0.62
0.01
0.50
0.01
+ 0.4% Total Copper
Advance for month
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS
SCALE 1" = 200'
DRAWN NRN
DATE NOV 1967
FILE S 121 A



+0.4 % Total Copper

Advance for month

Note: Rock Types Generalized

Cu Assay is Total Cu/Non Sul. Cu

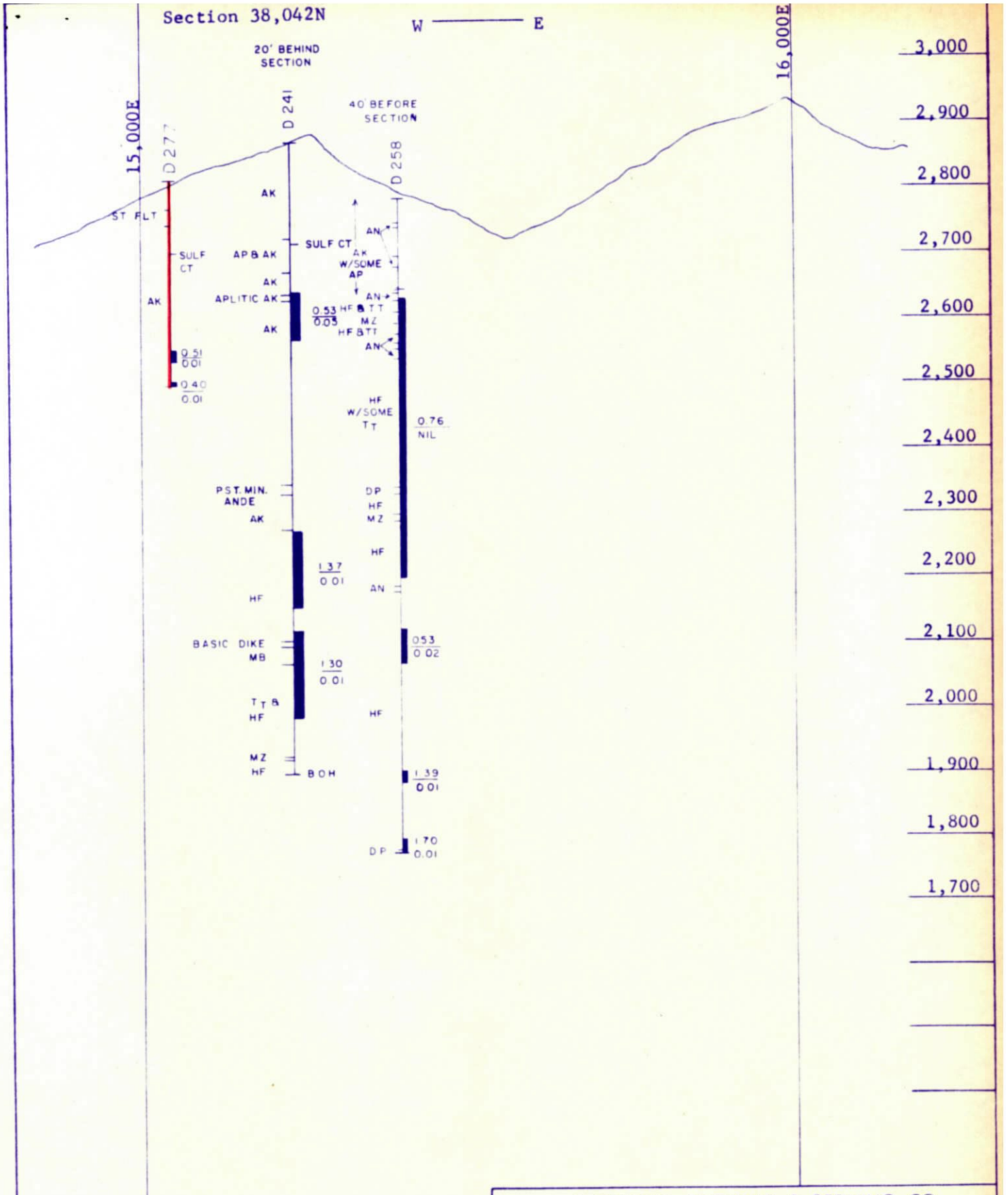
AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		NOV 1967	S-121- A



+ 0.4% Total Copper

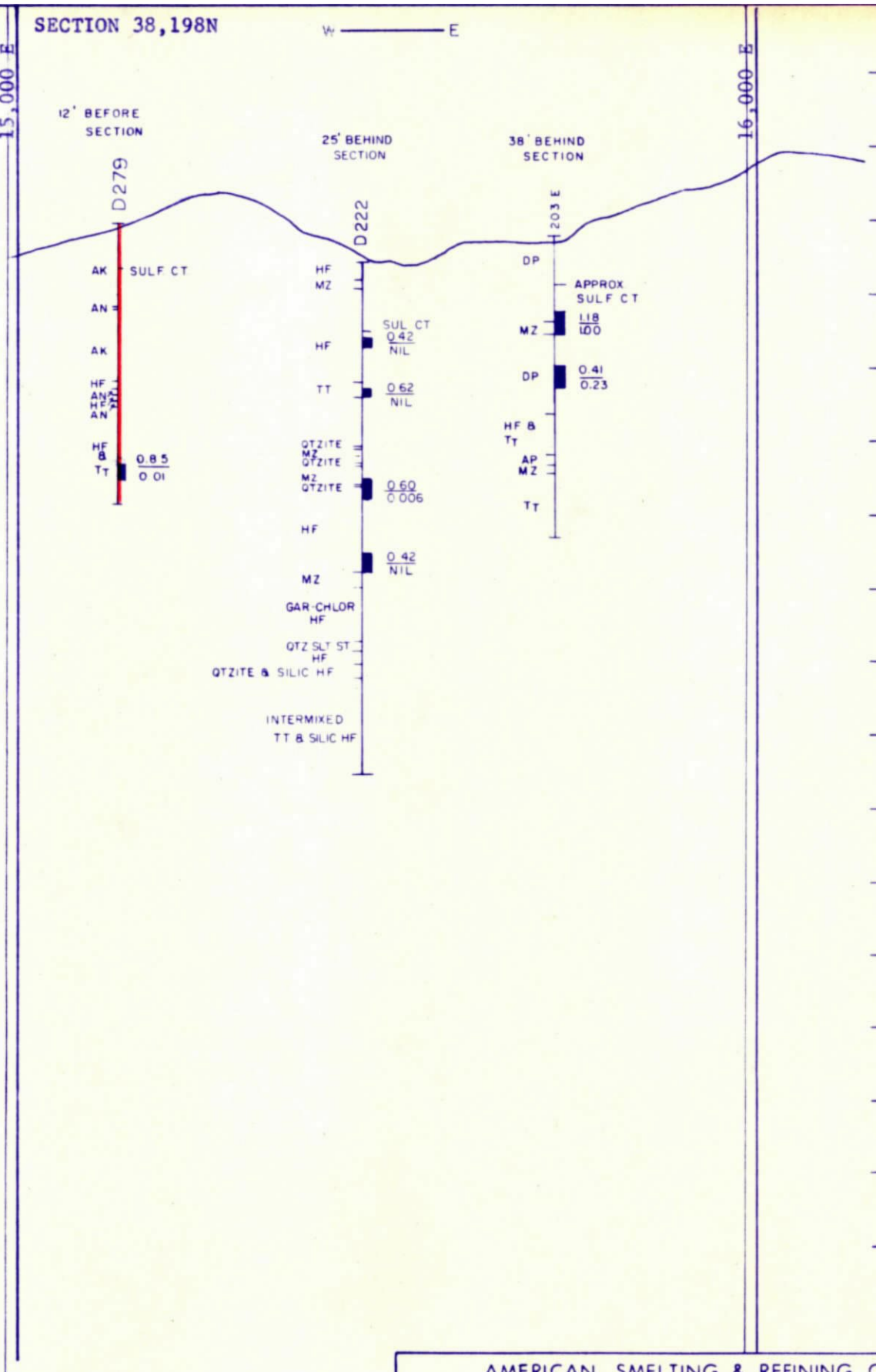
Advance for month

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	NOV 1967	S 121 A



■ + 0.4% Total Copper

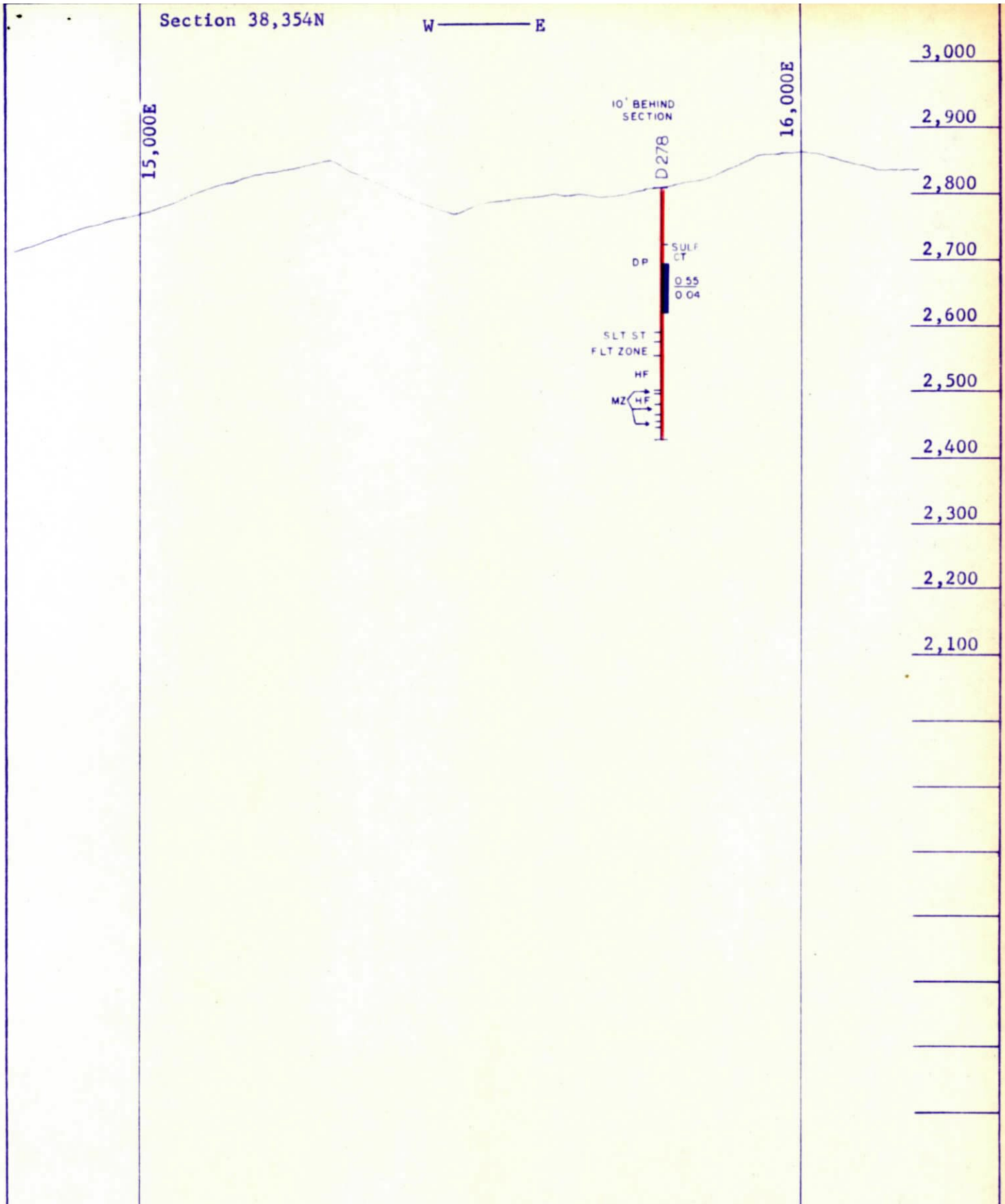
| Advance for month

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	NOV 1967	S 121 A



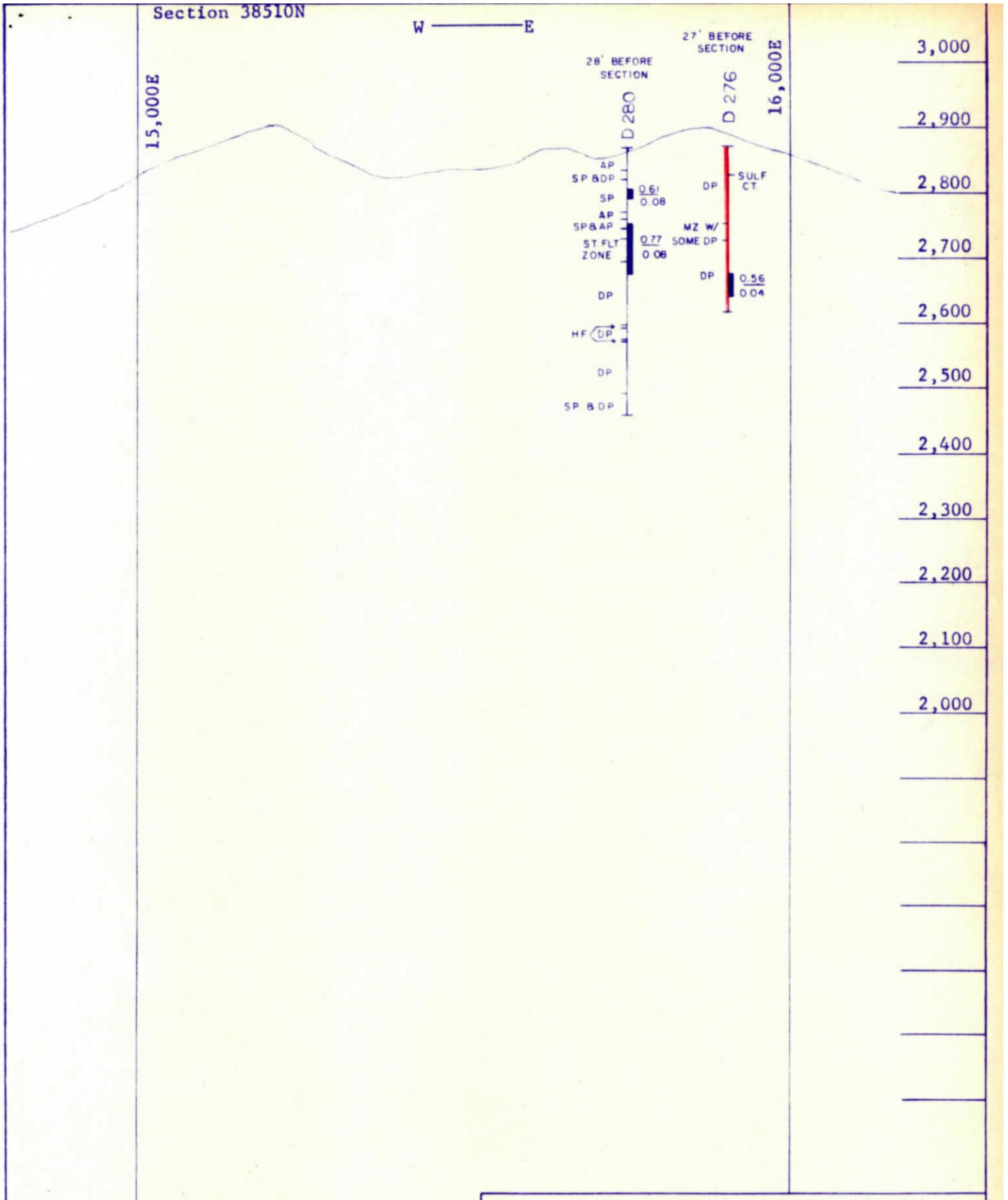
+0.4% Total Copper
Advance for month

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	NOV 1967	S 121 A



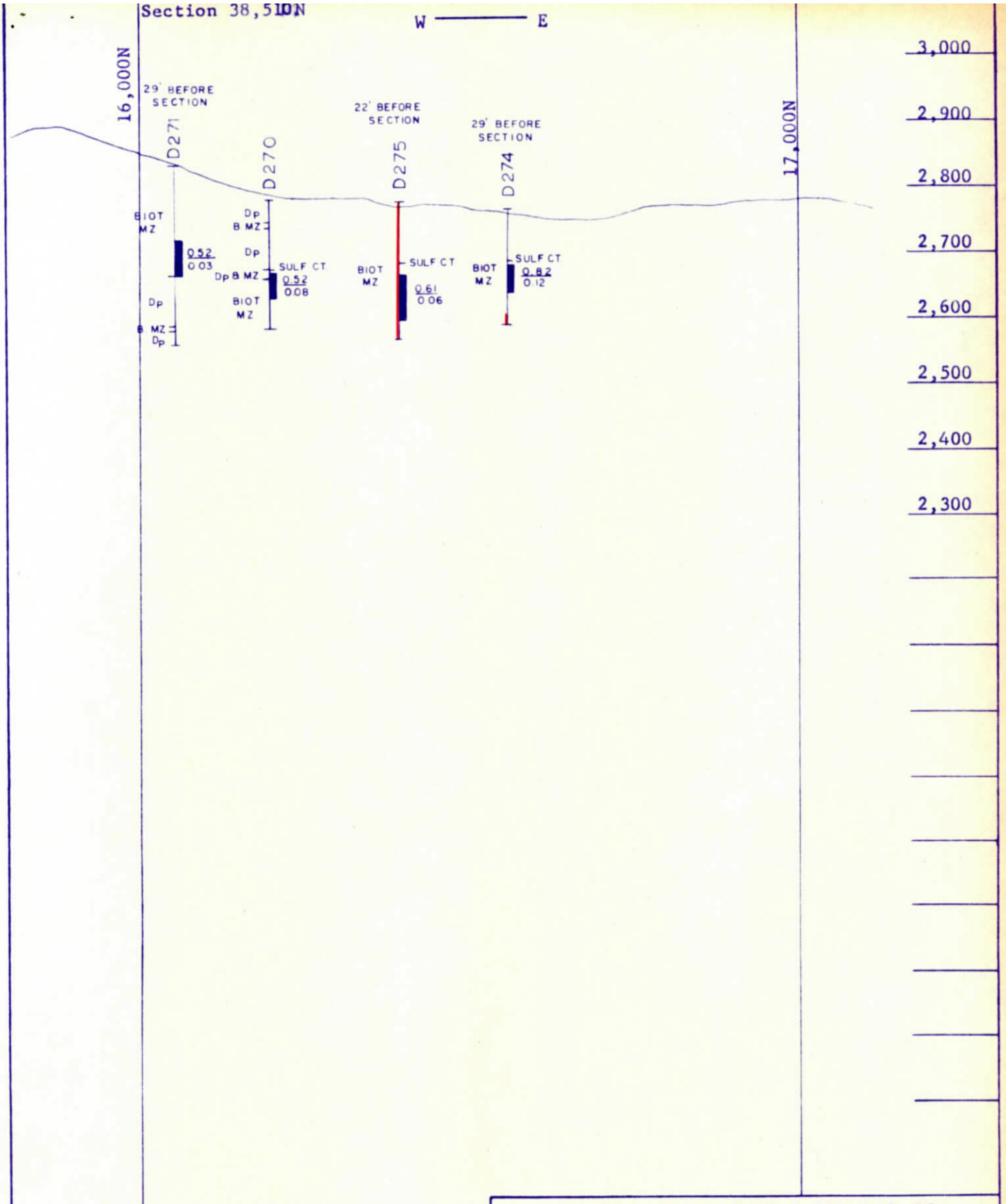
+ 0.4% Total Copper
Advance for month

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

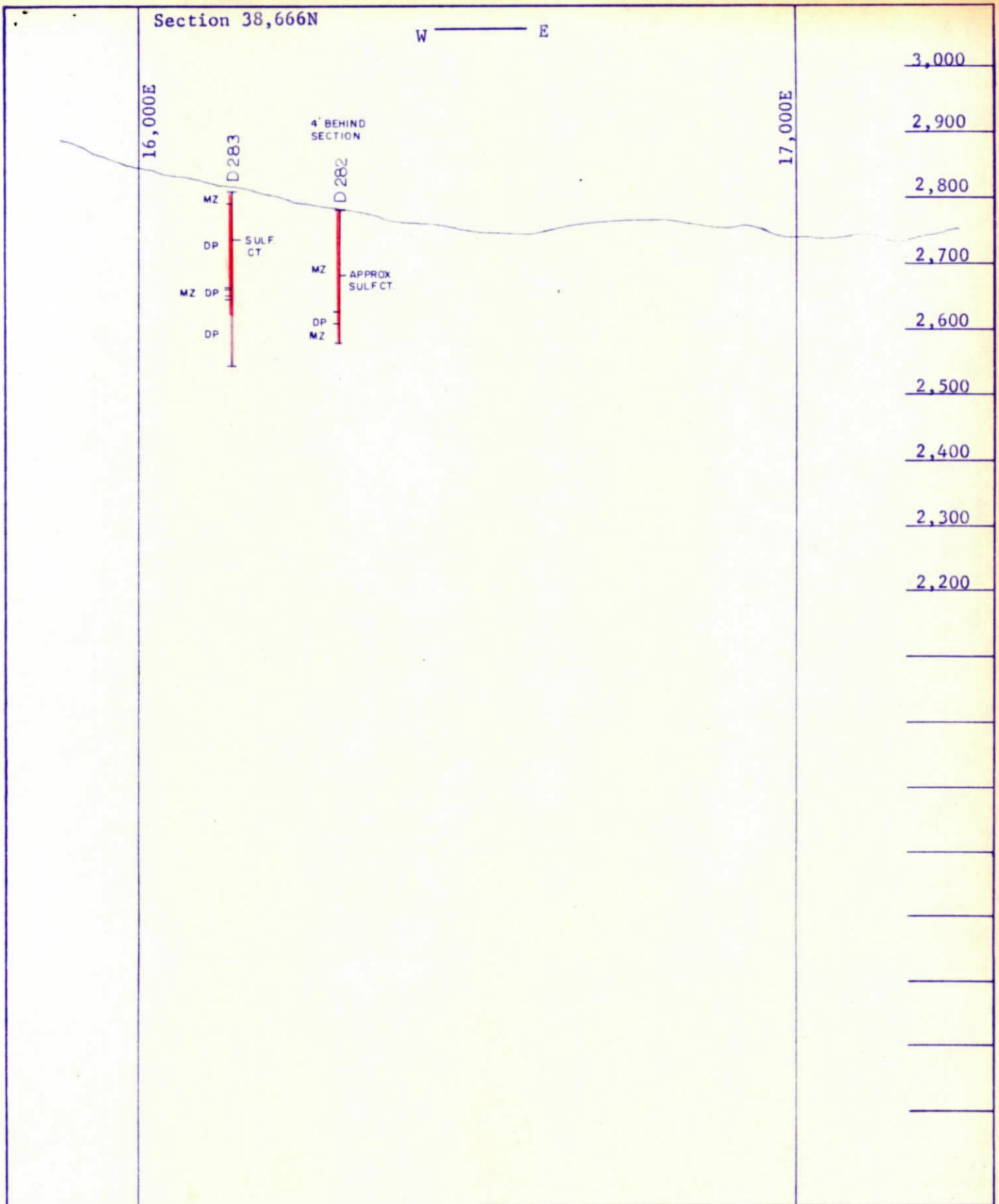
SCALE	DRAWN	DATE	FILE
1" = 200'	NRN		S 121 A



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	NOV 1967	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	NOV 1967	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.

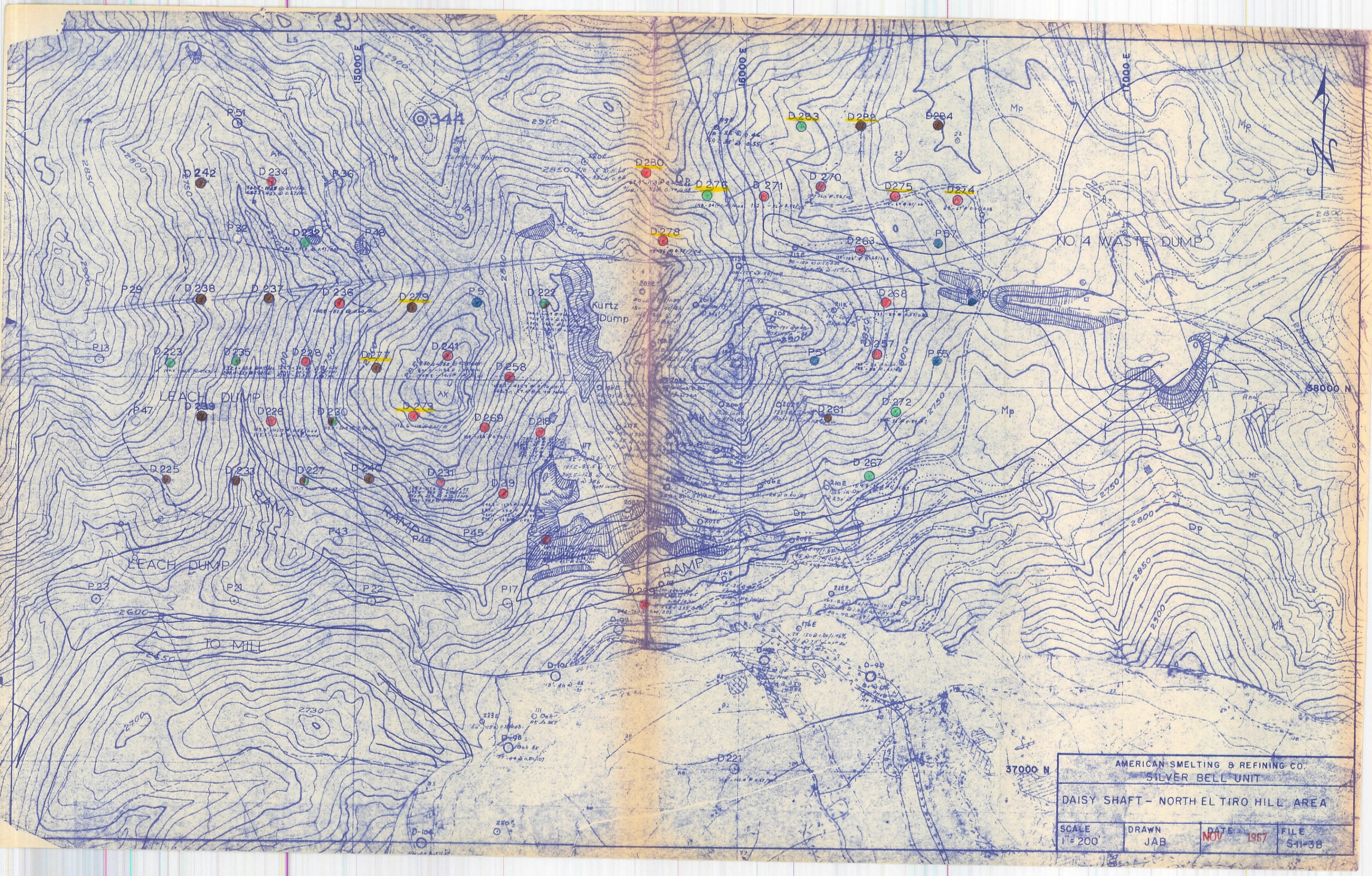
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

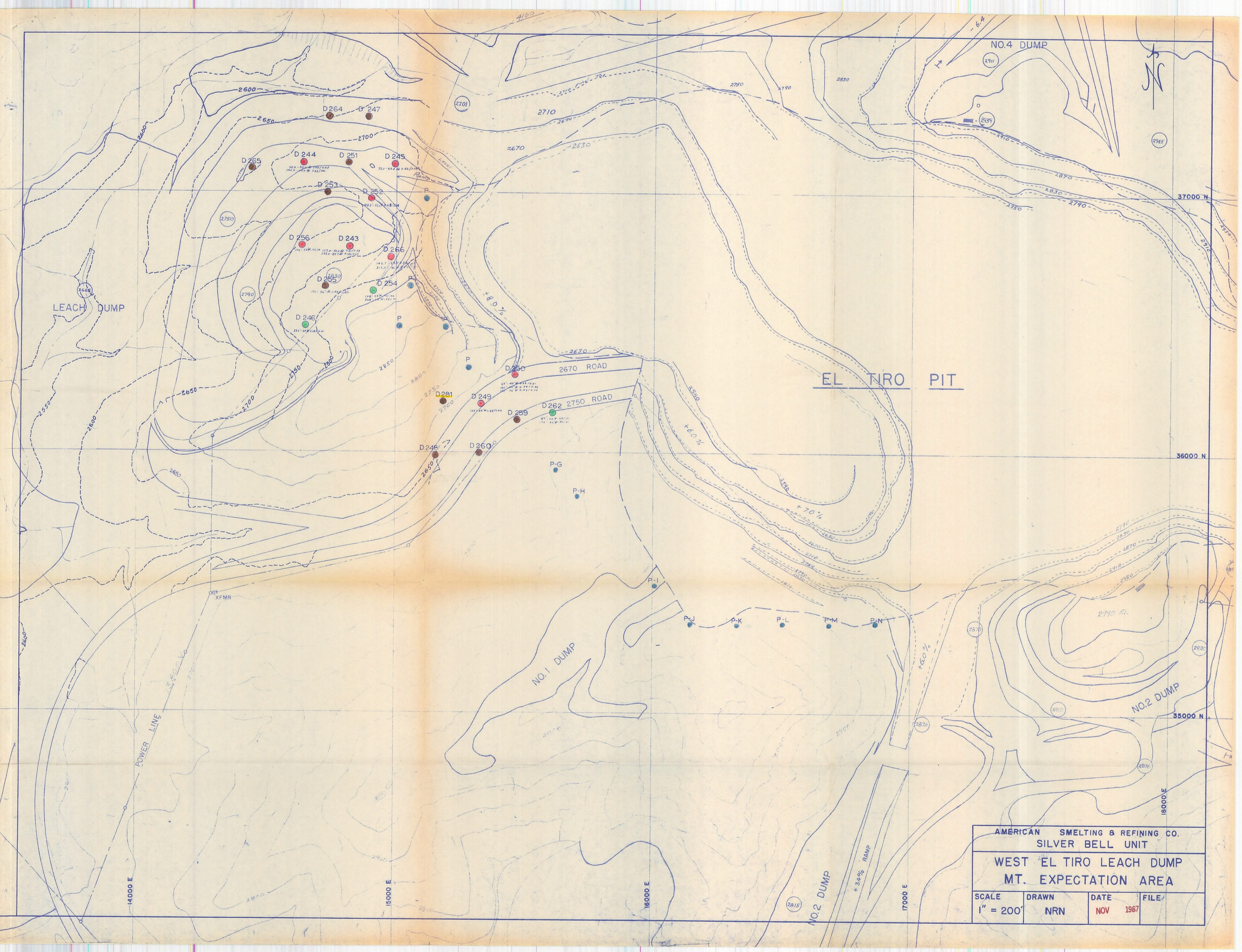
D-2??

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

D-2??

● None to thin +0.4% intervals.


15000 E
16000 E
17000 E
38000 N
37000 N
NO. 4 WASTE DUMP
LEACH DUMP
LEACH DUMP
Kurtz Dump
RAMP
RAMP
RAMP
TO MILL
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE NOV 1967
FILE S-11-3B


NO.4 DUMP
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
2790 El.
POWER LINE
XFMR
+34% 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 NOV 1967
FILE

Mr. J. H. Courtright

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

November 16, 1967

J.H.C.
NOV 28 1967

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM, NORTH EL TIRO HILL - DAISY SHAFT AREA AND WEST EL TIRO LEACH DUMP AREA, October, 1967

The following briefly summarizes the drilling done during the month of October, 1967. We had one truck mounted and one skid mounted diamond core drill working in the North El Tiro Hill-Daisy Shaft area and the West El Tiro Leach Dump area. Both rigs ran two shifts per day, 6 days per week.

A total of 2,943.7' was core drilled; 757.5' with the skid rig and the remainder with the truck rig. Without taking any delays into account the average advance per shift was 14.6' for the skid and 42.0' for the truck rig.

The average direct drilling cost was $6.96 per foot for the truck rig and $8.06 per foot for the skid rig.

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-249	2,667.69	36,186.32	15,332.41	No significant thickness				63.0	242.3	242.3
D-251	2,750.09	37,111.89	14,816.65	"	"	"		121.0	164.0	164.0
D-252	2,798.03	36,972.00	14,906.47	138.8	55.7	0.63	0.04	139.1	229.7	229.7
D-253	2,798.75	36,999.43	14,733.19	No significant thickness				91.4	196.5	196.5
D-255	2,826.77	36,635.83	14,726.15	170.2	55.8	0.49	0.23	246.0	309.0	309.0
D-258	2,786.20	38,007.77	15,394.33	886.0	18.1	1.39	0.01			
				992.8	19.1	1.70	0.01	197.1	1011.8	1011.8
D-262	2,733.73	36,151.92	15,613.98	No significant thickness				111.0	305.5	305.5
D-266	2,829.78	36,757.80	14,991.44	146.7	62.5	0.56	Nil			
				213.6	36.0	0.71	Nil	227.1	311.0	311.0
D-267	2,780.16	37,763.00	16,334.39	159.9	36.6	0.48	0.13	188.4	254.6	254.6
D-269	2,793.70	37,878.89	15,329.60	105.4	138.2	0.73	0.009	640.9	640.9	640.9
D-270	2,785.12	38,512.33	16,197.00	112.5	36.5	0.52	0.08	199.0	199.0	199.0
D-271	2,834.96	38,486.83	16,050.19	112.6	56.2	0.52	0.03	272.6	272.6	272.6
D-272	2,769.21	37,934.71	16,401.58	124.3	34.4	0.59	0.02	167.0	178.0	323.7
D-273	2,842.42	37,904.93	15,142.85	116.6	118.7	0.61	0.01	116.6	116.6	116.6
D-274	2,767.30	38,481.07	16,559.40	85.3	67.2	0.67	0.08	152.5	152.5	172.2
							TOTAL	2,943.7'		

D-249

This was a hammer drill hole which had been stopped at the water table, but still in ore grade chalcocite enriched mineralization.

The hole had been collared in alluvial fill material and hit bedrock at 22'. The bedrock was alaskite and this rock type was present from 22.0' to 97.0' and was again encountered in the intervals 109'-125' and 162'-242.3'. The remaining intervals were occupied by monzonite dike material.

The new portion of the hole starting at 179.3' was entirely in alaskite which was moderately altered. Chalcocite enrichment was present, but gradually decreased downward and nowhere ran ore grade.

D-251 This hole collared in dump material and hit bedrock at 43.0'. Weakly altered alaskite was drilled fxm there to 164.0'.

Sulfides were encountered at 88.7' and sparse chalcocite enrichment was present from 98' on to the bottom of the hole at 164.0'. No significant ore grade materail was encountered.

D-252

This hole was collared in dump material and hit alaskite bedrock at 90.6'. The alaskite was sheared and faulted to approximately 155' and this material was strongly altered - primarily to clay minerals. The alteration became weak at around 186' and remained that way to the end of the hole at 229.7'.

Sulfides were encountered at 130.7' and the chalcocite enriched mineralization ran ore grade from 138.8' to 194.5'.

D-253

This hole collared in dump material and hit alaskite bedrock at 105.1'. The rock was sparsely altered with occassional traces of sericite and trace to sparse amount of clay minerals. Biotite was altered to chlorite near the surface, but became fresher with depth.

Sulfides were encountered at 138', but represented less than 1% of the total rock volume. Sparse to weak orange limonite was present on fracture above the sulfide contact.

This hole bottomed in alaskite at 196'.

D-255

This hole collared in dump material and hit alaskite bedrock at 63.0'. The bedrock was strongly limonite stained and moderately altered to the sulfide contact at 195'. The alteration varied from moderate to strong from there on down. The main alteration was of the plagioclase felspars to a green to yellow waxey material. Trace to sparse amounts of limonite were associated with the sulfides.

Sulfides were encountered at 195', but the total sulfide content was low, averaging about 1.5%. The sulfide copper content at its highest was around 0.3% and gradually decreased downward.

The hole penetrated aplite from 275.0 to 277.5' and then went back into alaskite and was bottomed in it at 309.0'.

D-258

This hole was at 814.7' at the beginning of the month and in a dense light-green diopside hornfels which had a very low total sulfide content.

The drilling donw this month continued down through silicate hornfels. Locally there were changes to wollastonite-garnet and wallastonite-tremolite-garnet hornfels. These varieties were fine to medium grained and somewhat more porous than the diopside hornfels. Whether due to the porosity or the chemical favorability of these varieties, there was a substantial increase in sulfide mineralization. In the intervals 877.9-904.1' and 992.8 -1011.8' the copper content approached 2% and occurred as well dissiminated fine to medium bornite.

The hole entered dacite at 1009.5 and was stopped still in it at 1011.8'.

D-262

This hole had been drilled to the depth of 197.0' with the hammer drill. During this month the hole was re-entered with the diamond drill and taken to 305.5'. Except for monzonite penetrated in the interval 258.7-267.6' the entire hole was in alaskite.

The rock as a whole was moderately altered to sericite and lesser clay. The silicification was controlled by high angle fracture systems and had pyrite and chalcopyrite associated.

The total sulfide content averaged approximately 3% with pyrite the predominate mineral. There was only slight chalcocite enrichment and this became insignificant. Only one 8.7' interval assayed greater than 0.4% copper.

The hole was bottomed in alaskite at 305.5'.

D-266

This hole collared in dump material and hit alaskite bedrock at 83.9'.

The alaskite was moderately altered throughout, locally sheared and faulted and fairly uniformly veined. The alteration and mineralization was associated with the fractures and faults. Sulfides were usually well disseminated in the silicified and sericitized zones bounding fractures.

Sulfides were encountered at 139.0' (56' below the bedrock surface). Chalcocite enrichment varied in intensity from 146' to 272' with occassional "high-grade" zones where shearing or faulting were strong. The pyrite content was variable with intervals ranging from 1 to 8% pyrite.

The hole was bottomed at 311.0' still in alaskite.

D-267

This hole was collared in dump material and hit bedrock at 66.2'. The entire hole was drilled through a complex zone of biotite monzonite interfingering in dacite. The material was moderate to strongly limonite stained to 159' making changes in rock type difficult to pin down.

The alteration was weak with "bleaching" the most notable effect. The biotites showed alteration of all degrees. At 213.5' a uniform, quite fresh monzonite was encountered which persisted to the bottom. This monzonite showed approximately 80% of the biotite altering to chlorite.

Sulfides were encountered at around 138', but the total sulfide content remained around 3%. Other than in the interval 149.5-174.9' the chalcopyrite copper values were greater than the chalcocite. Covellite was also associated with the chalcopyrite and chalcocite from 174.9' to 237.6'. The copper content was greater than 0.4% only in two widely separated intervals.

The hole was bottomed at 254.6' in monzonite.

D-269

This hole was collared in and bottomed in alaskite which was cut only by a few minor aplite and poikilitic quartz monzonite dikes.

The rock was strongly altered throughout, having been moderately sheared and faulted prior to introduction of the hydrothermal solutions. Quartz-sericite alteration predominates, occurring as bands surrounding the numerous fractures.

The total sulfide content was high in the interval 131'-244' where the pyrite volume itself averaged more than 5%. The pyrite content decreased considerably and ranged from less than 1% to occassionally 5%, but averaged about 2%. The chalcocite content dropped off abruptly at 232' and disappeared altogether around 396.6'.

Trace to sparse amounts of calcite were present in the core from 294' on down and probably results from the lateral proximity of calcareous sediments.

D-270

This hole was collared in dacite and continued in it to around 106' with the exception of the interval 35.1'-42.3' where biotite monzonite was cut. At around 106' a zone of intermixed dacite and biotite monzonite was cut and this extended to approximately 122' where uniform biotite monzonite was entered. The hole was bottomed still in this monzonite at 199.0'.

The rock is shattered and broken throughout, but only weakly altered. Sulfides were encountered at 106' and except for in the interval 106'-140' comprised less than two percent of the rock. Chalcocite enrichment ran ore grade only in the interval 112.5'-149.0'.

D-271

This hole collared in biotite monzonite and continued in it to 168.8' where dacite was hit. The dacite continued to the bottom, but was cut in the interval 238'-252' by a dike of the biotite monzonite.

The monzonite was strongly altered from the surface to about 150' where the degree became weak. The strong alteration was somewhat aided by structural breaking in the interval 64'-91'.

Sulfides were encountered at 112.6' and the chalcocite enriched zone ran ore grade from there to 168.8'.

The hole was bottomed in dacite at 272.6'

D-272

This hole was collared in and drilled entirely in biotite monzonite. The rock as a whole was weakly altered and was weak to moderately limonite stained down to the sulfide contact at 82.5'. The chalcocite enriched zone ran ore grade only in the interval 124.3-158.7'

This hole was bottomed in dacite at 178.0'.

D-273

This hole collared in and bottomed in alaskite, but was cut by numerous aplite dikes and one monzonite dike.

The rock was strongly altered throughout and was cut by numerous quartz-sericite-sulfide veins.

Sulfides were encountered at 96.4' and the chalcocite enriched zone ran ore grade through the interval 116.6'-235.3'. The total sulfide content increased notably at around 235', but there was a gradual decrease in grade. Covellite was present in amounts about equal to the chalcocite through this zone.

The hole was bottomed in alaskite at 323.7'.

D-274

This hole collared in and stayed in biotite quartz monzonite. The rock was weakly altered with only trace to sparse amounts of sericite and sparse to weak amounts of clay minerals.

Sulfides were hit at 79' and ran ore grade from there to 152.5'. The hole was bottomed in monzonite at 172.2'.

N. R. Nuttycombe

N. R. Nuttycombe
Geologist

NRN:jca

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.

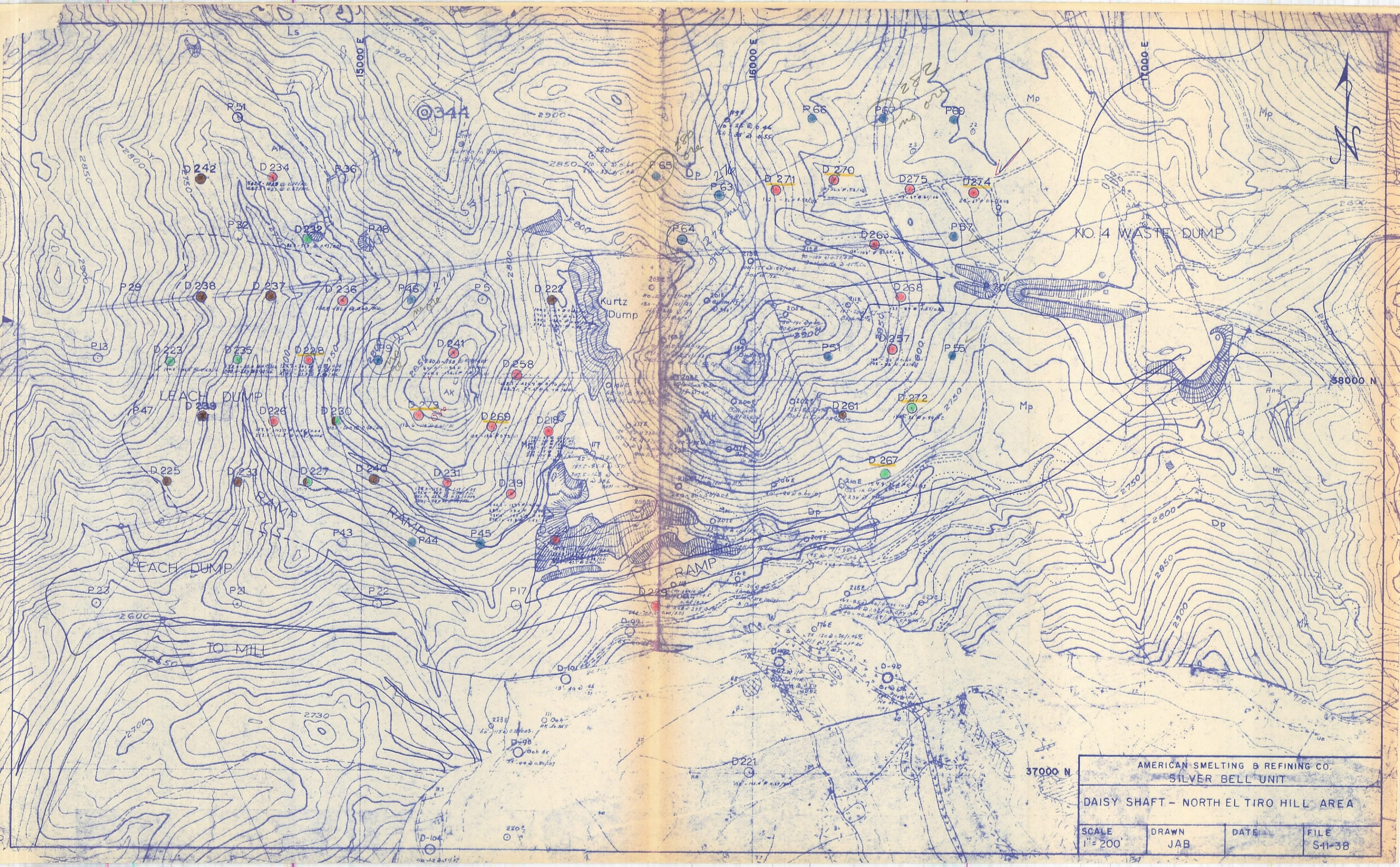
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

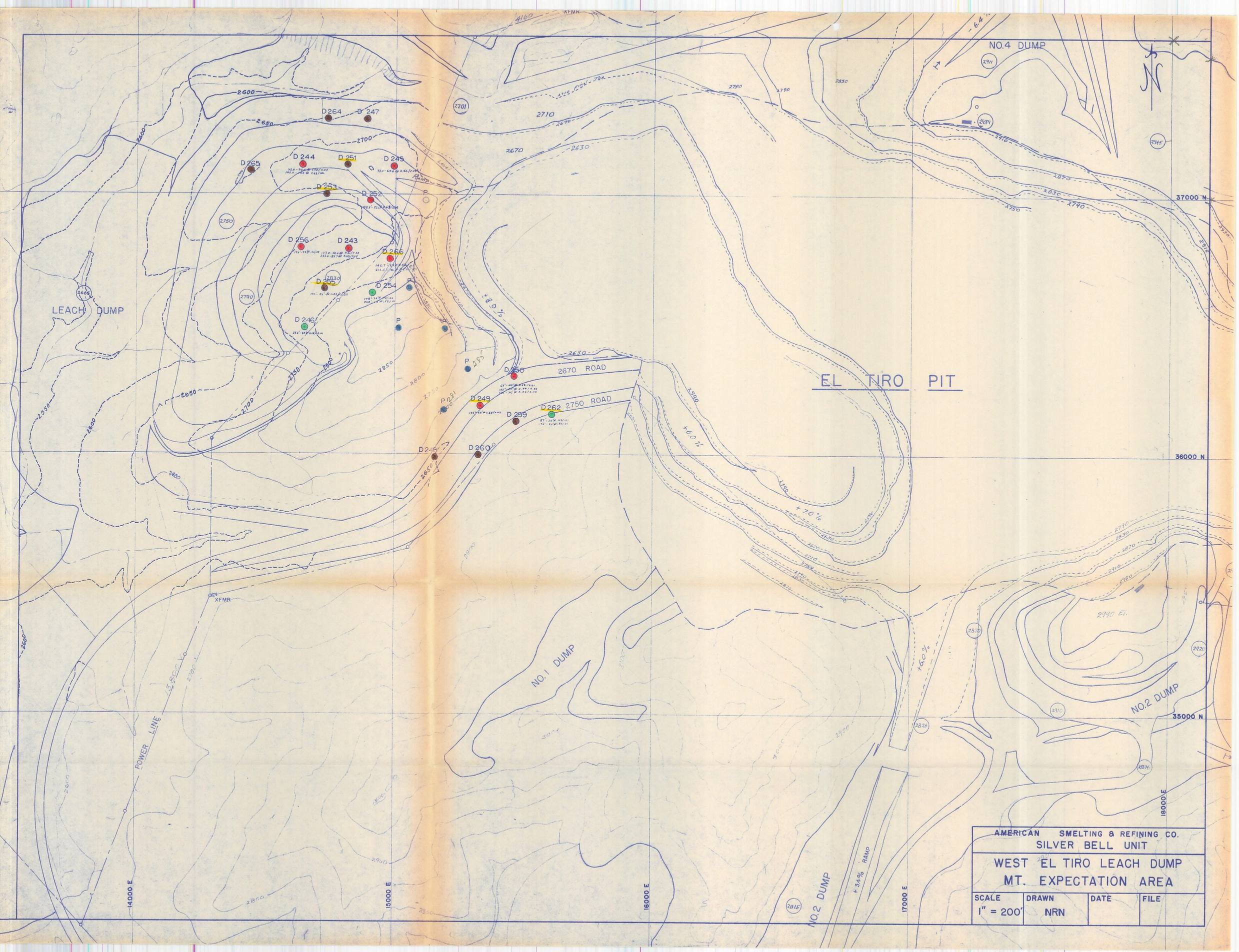
D-2??

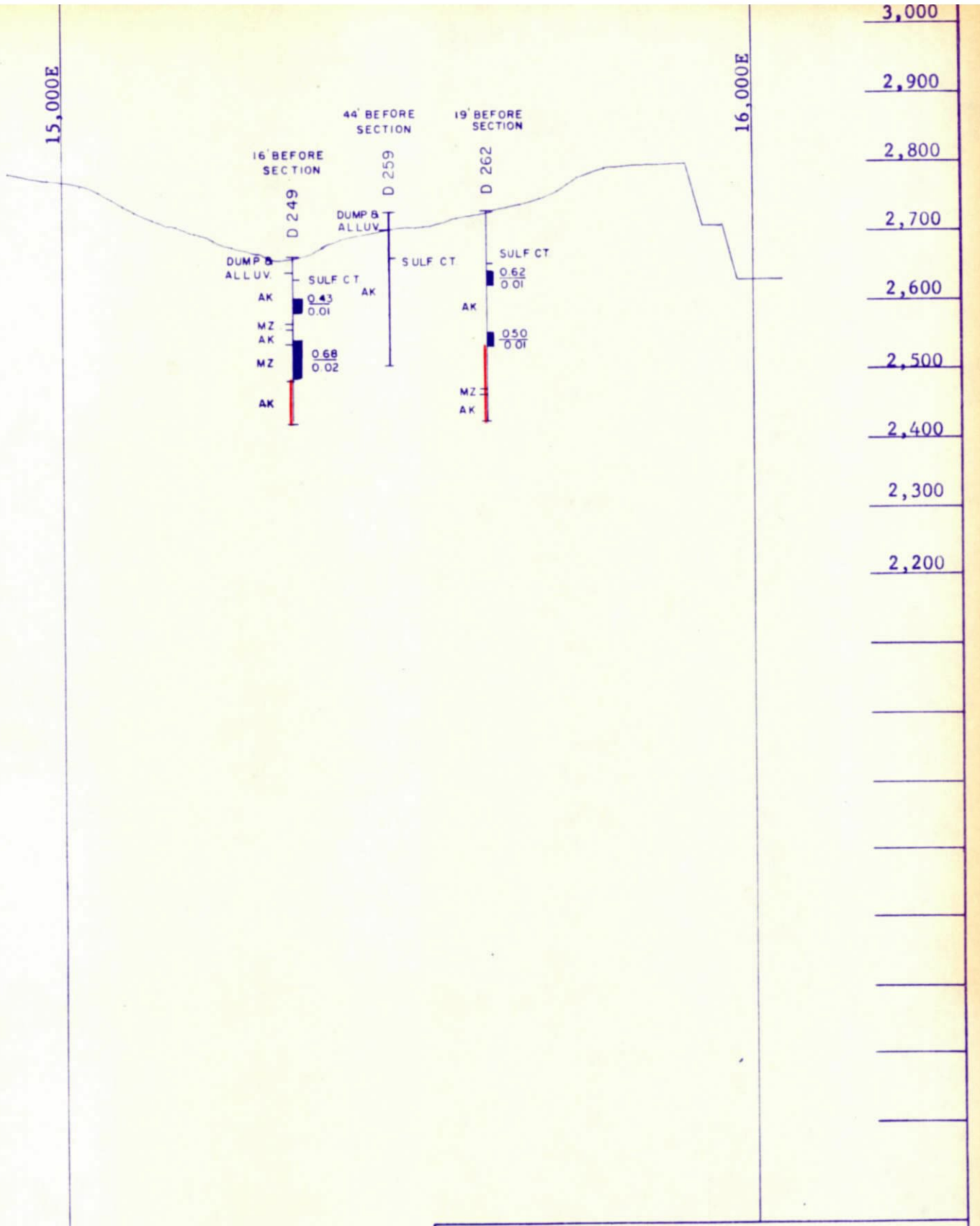
● Marginal hole. Insufficient thickness and/or grade of material to carry stripping.

D-2??

● None to thin +0.4% intervals.


15000 E
16000 E
17000 E
38000 N
37000 N
NO. 4 WASTE DUMP
Kurtz Dump
LEACH DUMP
LEACH DUMP
RAMP
RAMP
RAMP
TO MILL
Mp
Dp
Ls
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE
FILE S-11-38


NO.4 DUMP
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
NO.2 DUMP
POWER LINE
13,900 V.
XFMR
XFMR
+34% RAMP
+60%
+70%
+80%
2790 El.
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
FILE



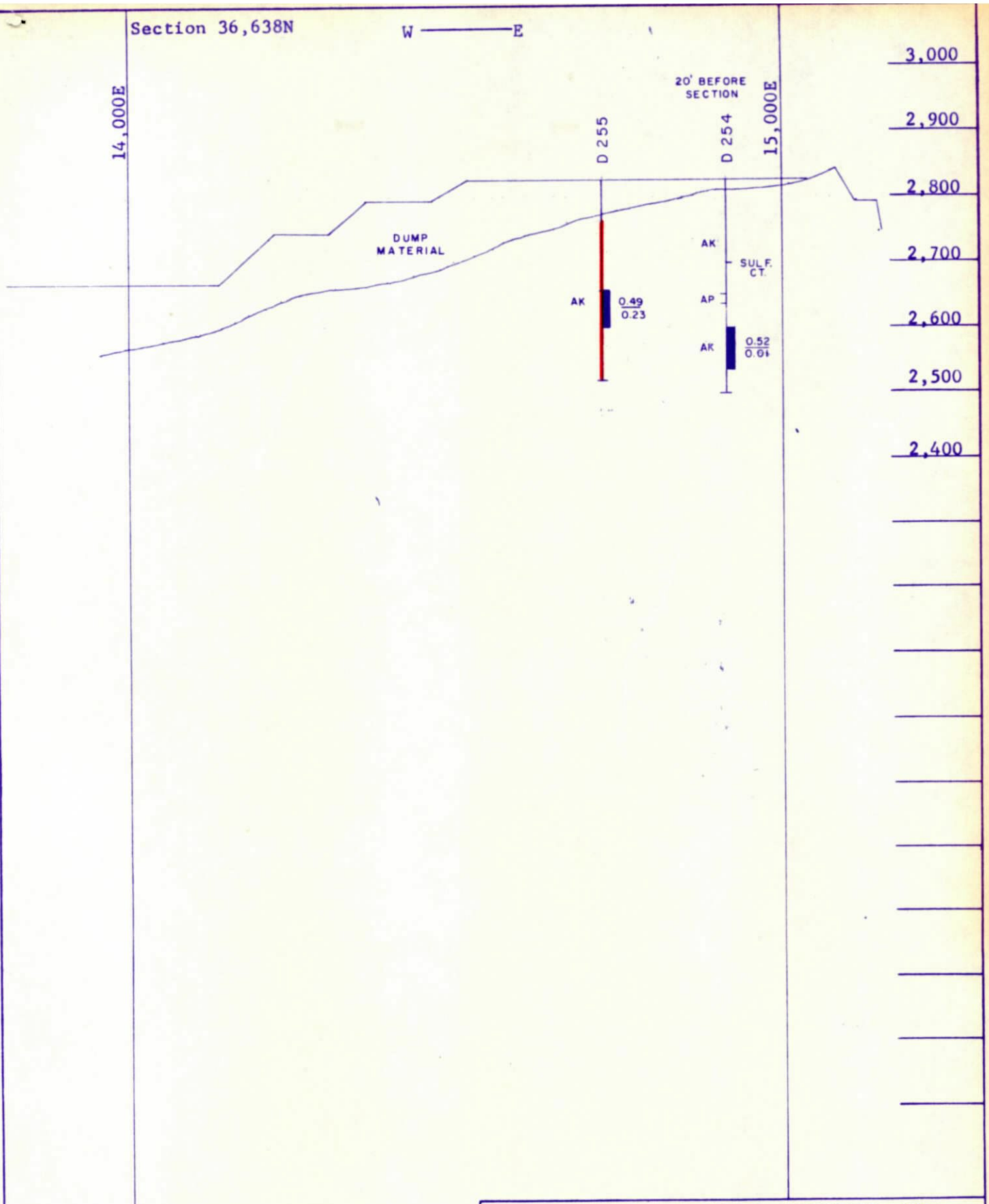
+ 0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

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



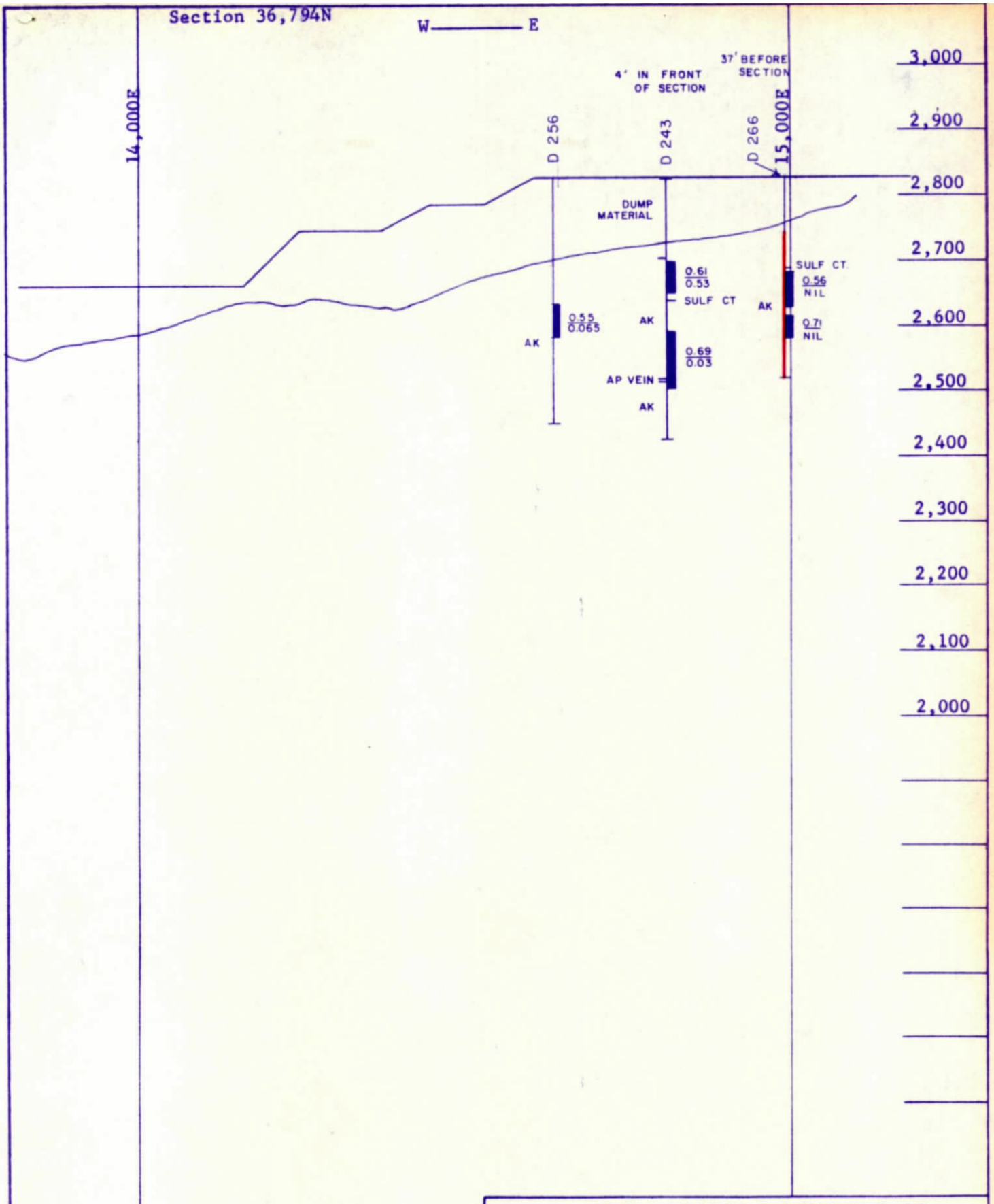
+ 0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

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



+ 0.4% Total Copper

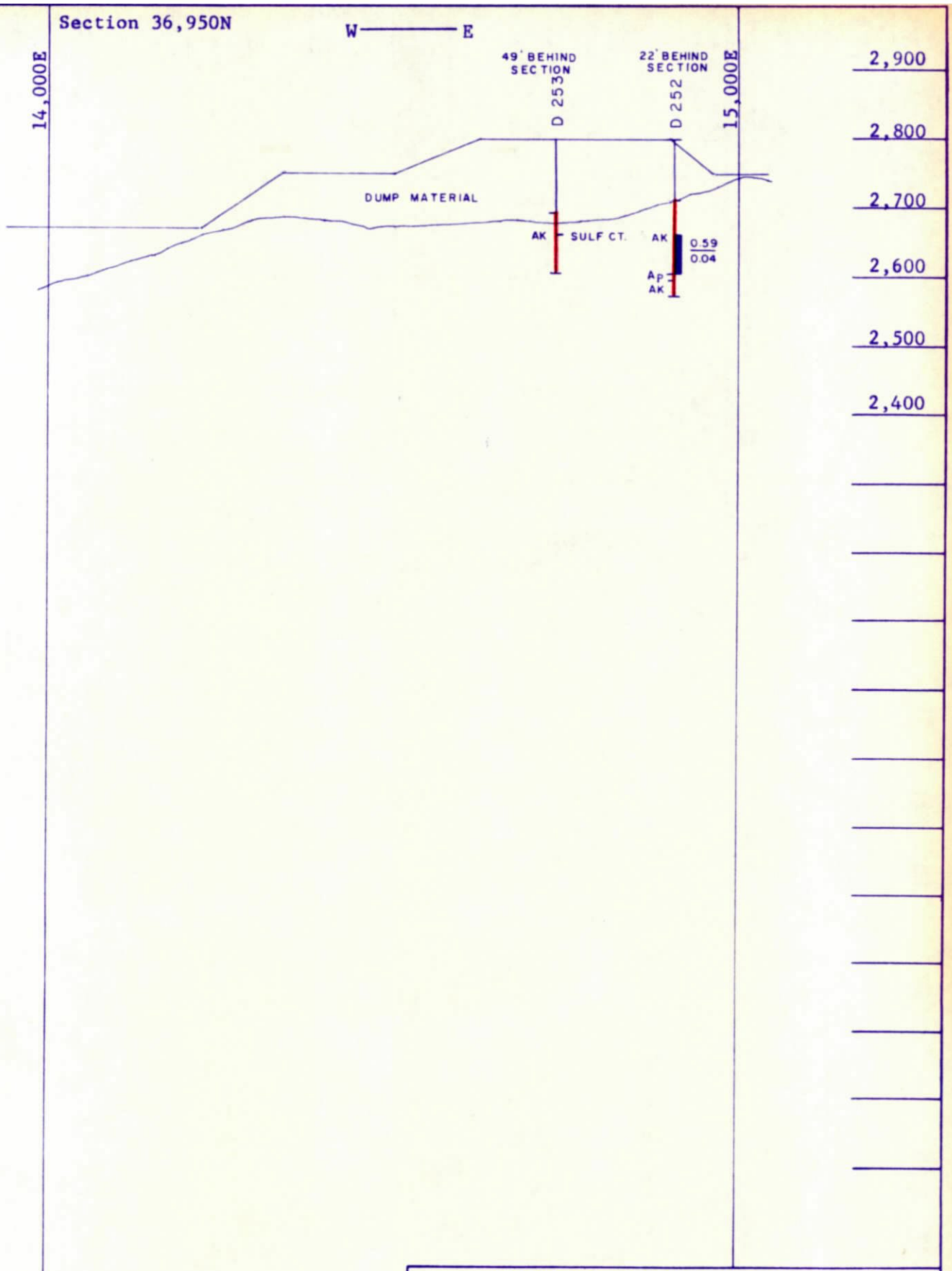
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

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



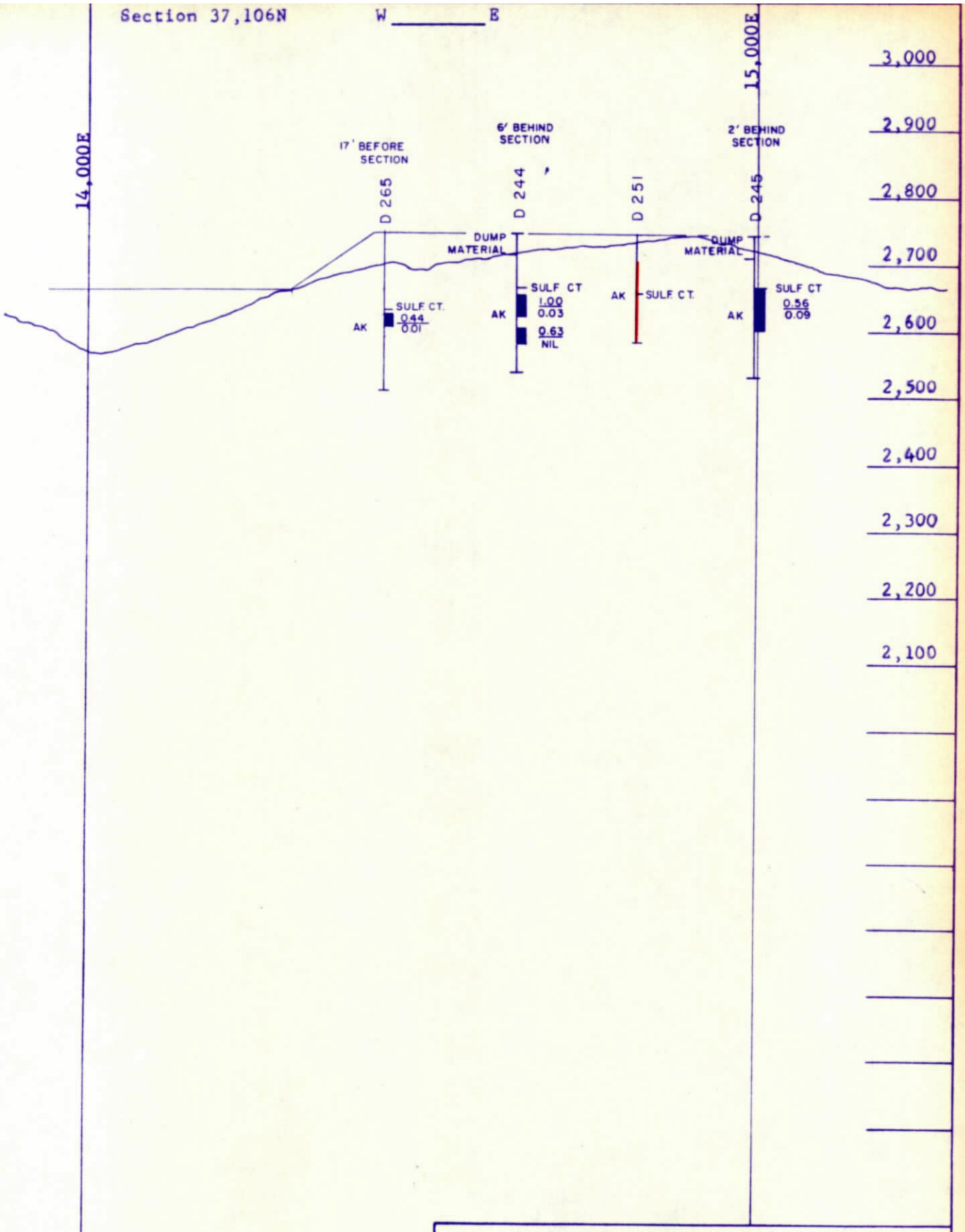
+ 0.4% Total Copper
Advance for month

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		S 121 A



+ 0.4% Total Copper

Advance for month

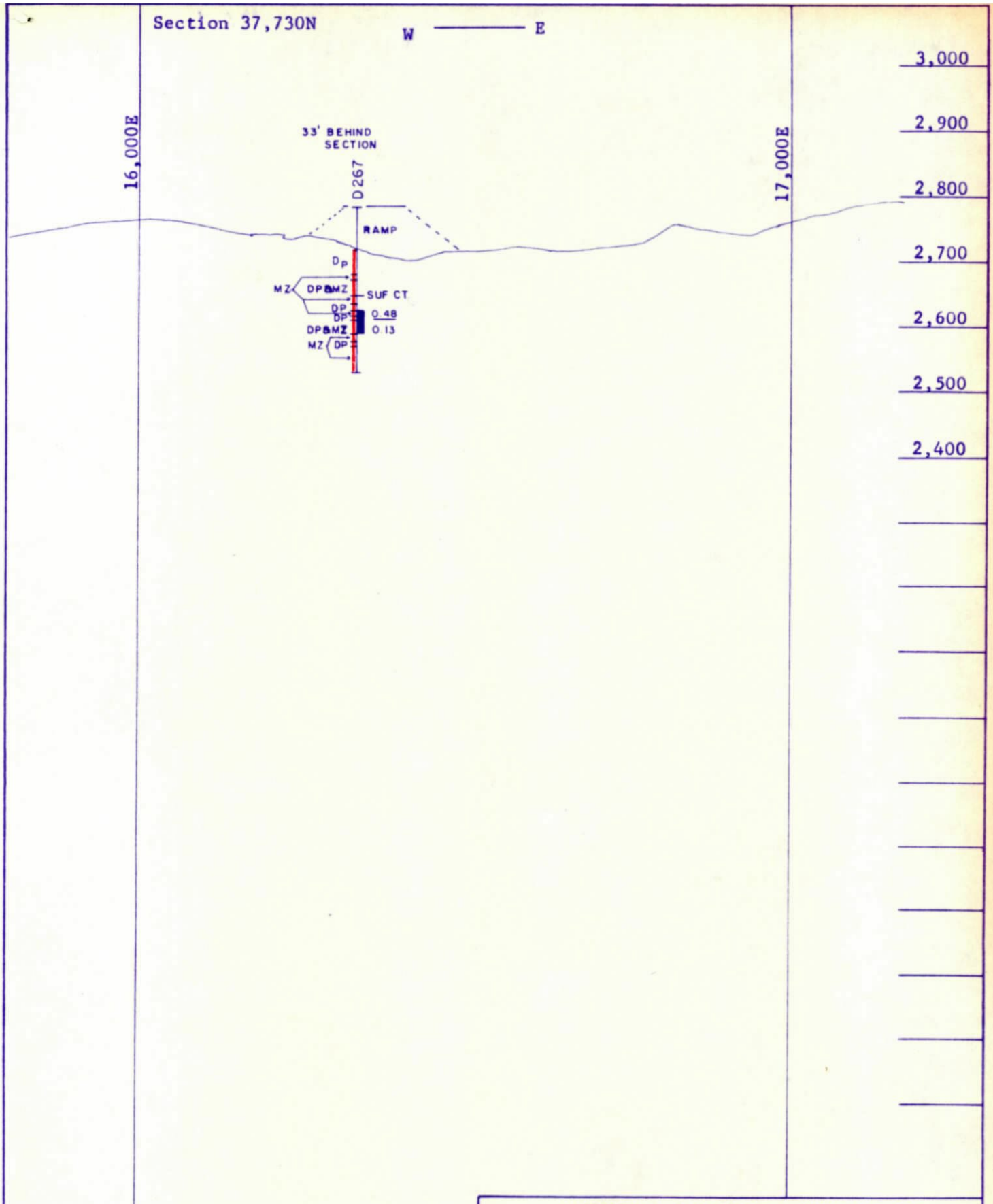
Note: Rock Types Generalized

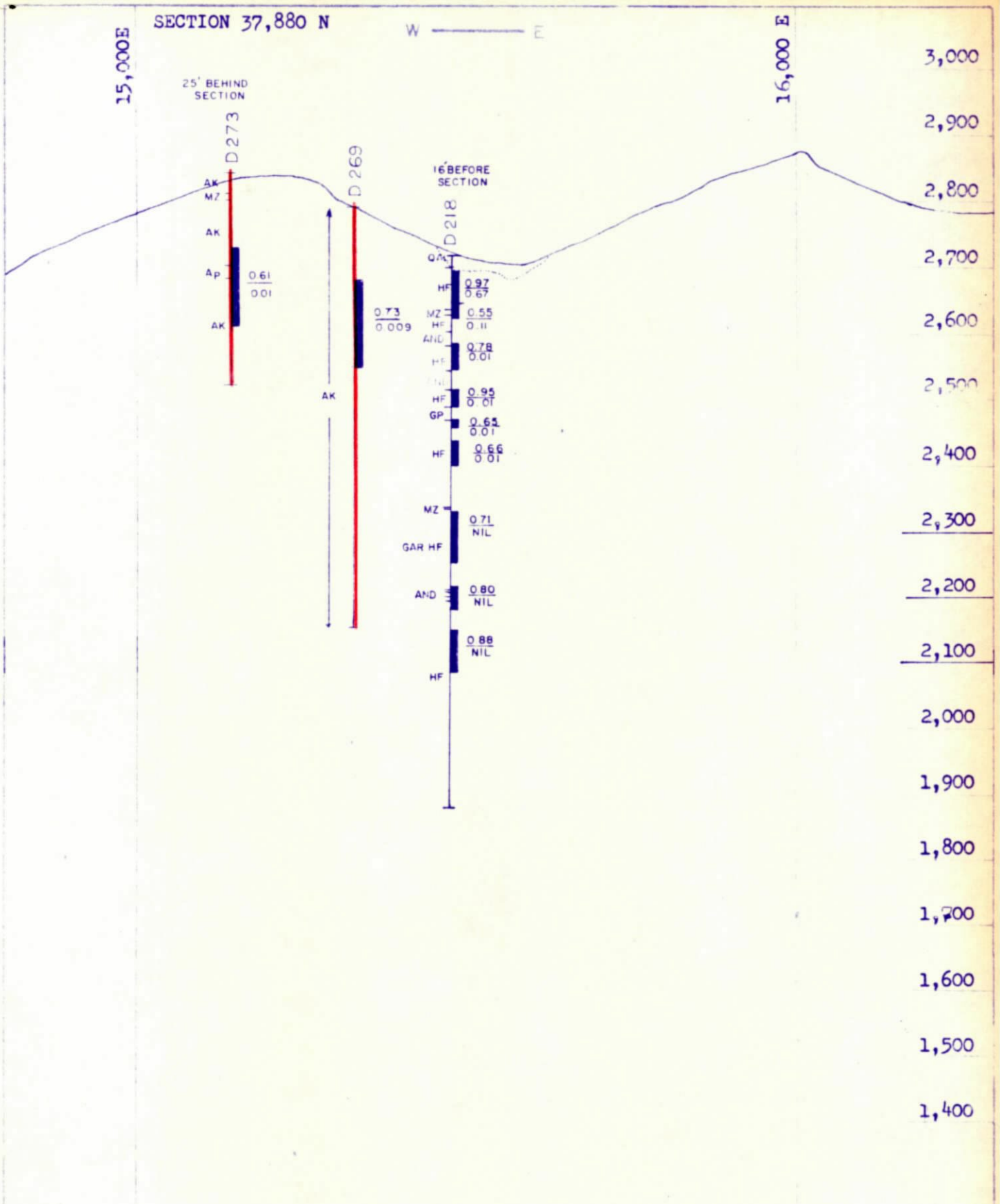
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

West El Tiro Leach Dump - Mt. Expectation Area
Drill Hole Projections

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


Section 37,730N
W
E
16,000E
17,000E
3,000
2,900
2,800
2,700
2,600
2,500
2,400
33' BEHIND SECTION
D267
RAMP
Dp
MZ
DP&MZ
SUF CT
DP
DP
0.48
0.13
DP&MZ
MZ
DP
+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
1" = 200'
DRAWN
NRN
DATE
FILE
S 121 A



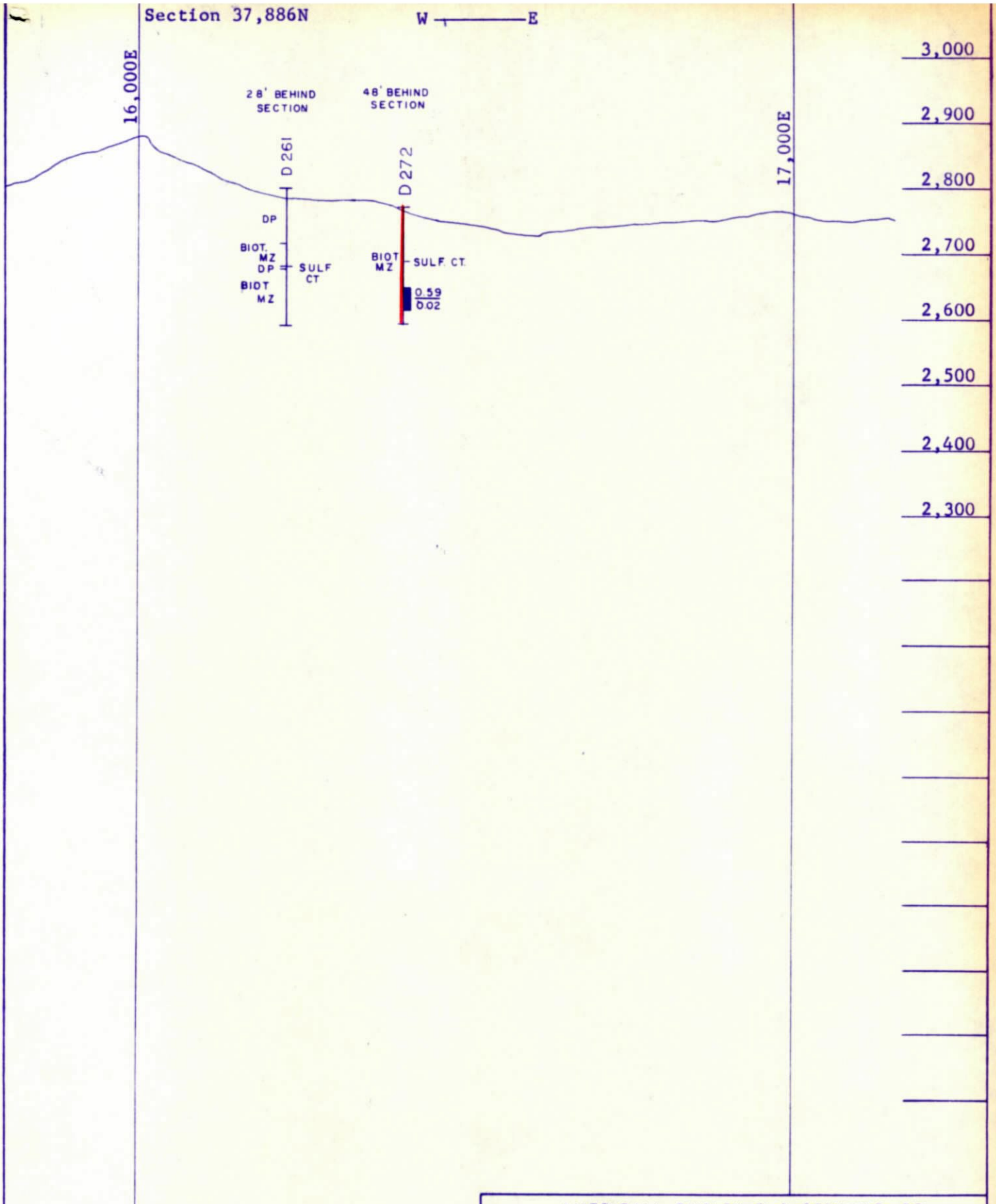
+ 0.4 % Total Copper
Advance for month

Note: Rock Types Generalized
Cu Assays 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'			9-/21- A



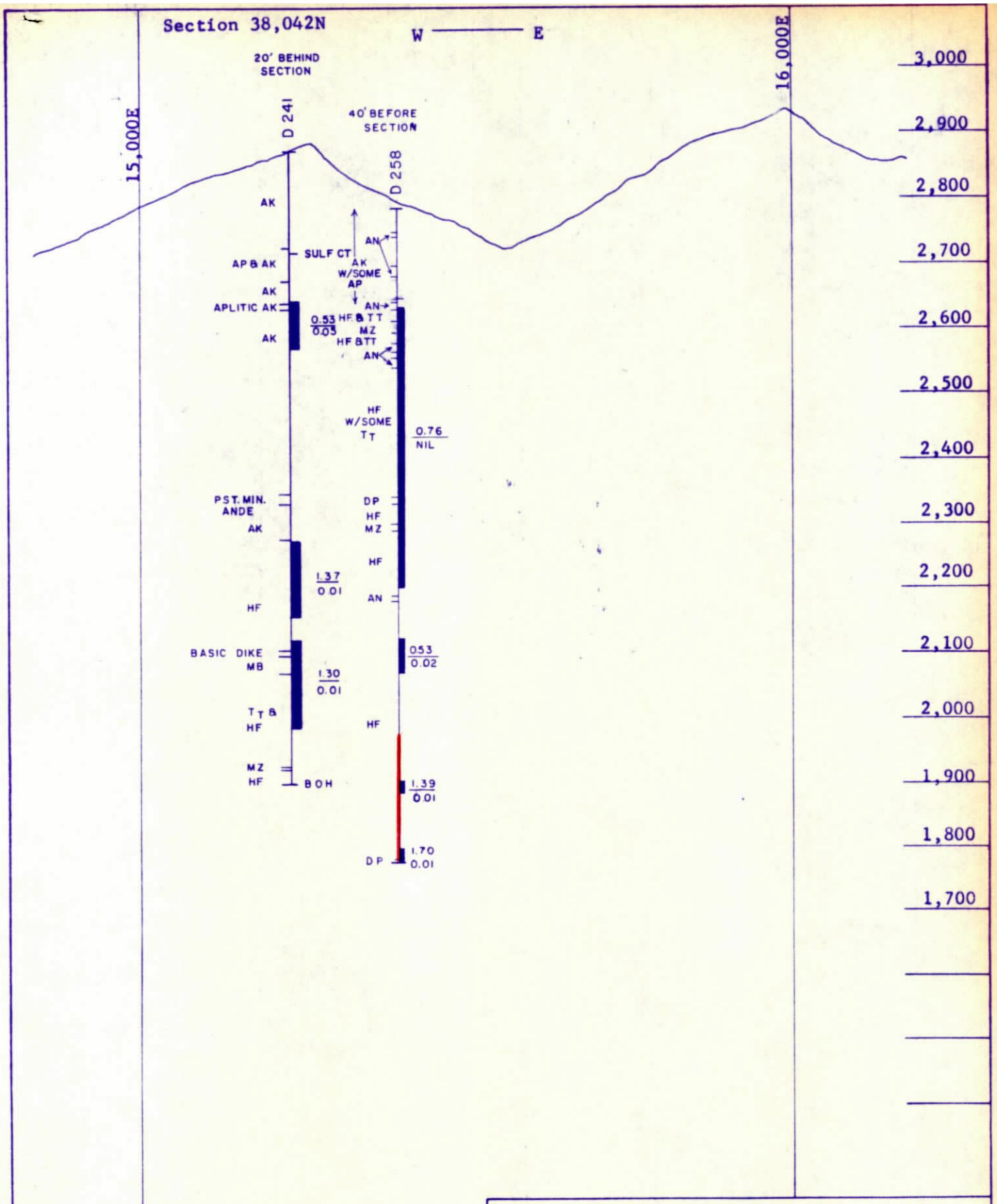
+ 0.4% Total Copper
Advance for month

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		S 121 A



■ + 0.4% Total Copper

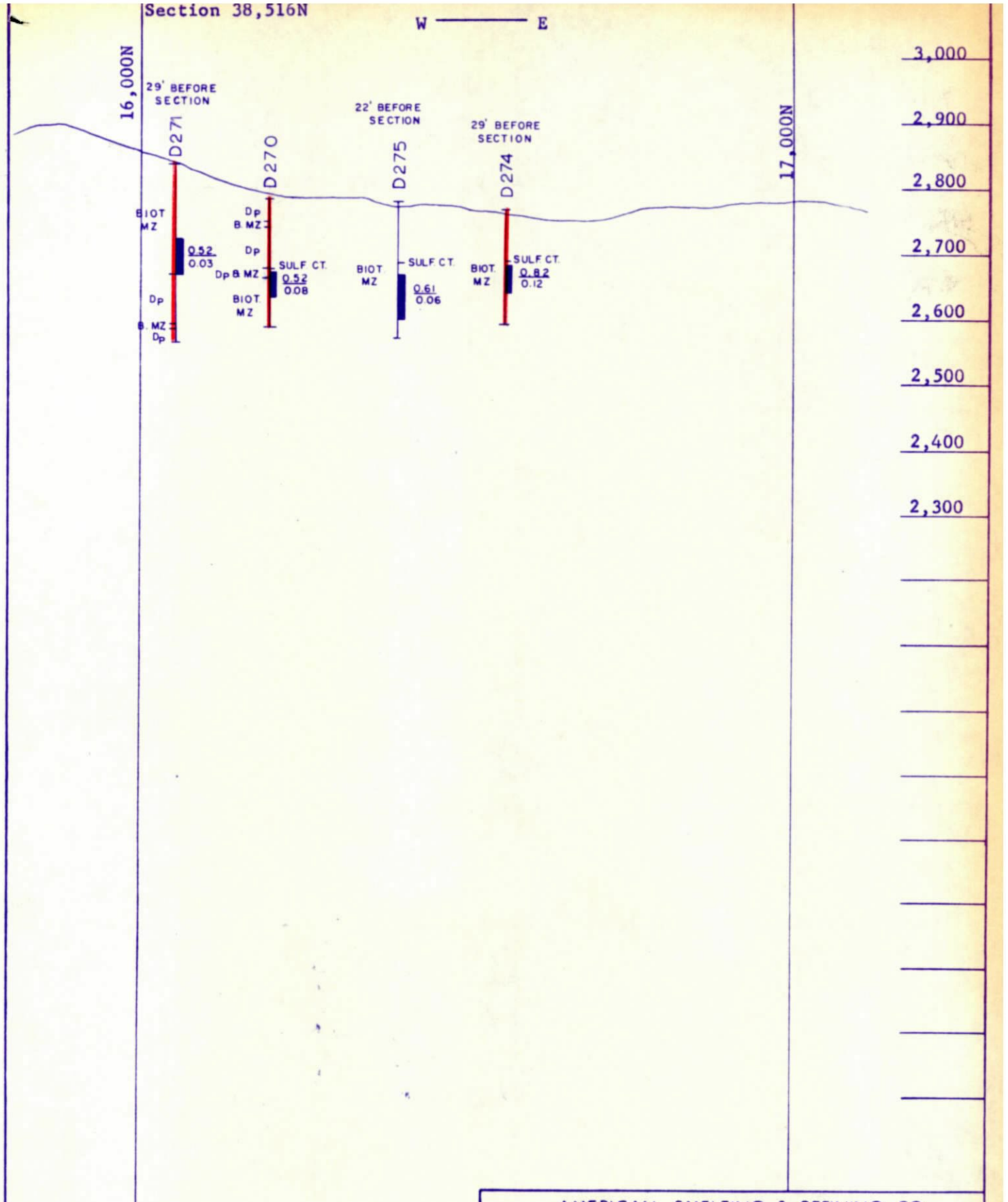
| Advance for month

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	8/28/57	S 121 A



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

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

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

October 16, 1967

J. H. C.
JUN 26 1968

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

Subject: QUARTERLY GEOLOGIC REPORT AND ORE RESERVE MAPS.

OXIDE PIT

Mining in Oxide Pit for the third quarter was limited to the westward expansion of the 2660 level. To the north mining was in monzonite; half ore and half leach with small pods of waste. The monzonite contained abundant pyrite and weak chalcopyrite with weak to moderate chalcocite coatings. The south half of the face was advanced in more strongly mineralized syenodiorite which was nearly all ore. The syenodiorite contained a large amount of chalcopyrite with moderate to strong coatings of chalcocite. (Plates 1 and 2).

The slide area in the southeast corner of Oxide Pit became highly active near the end of the rainy season. There were numerous small rockfalls and a slide of about 100 tons the third week in September. Most of the debris was caught by the bench immediately below. This bench is now covered and will not retain much more slide material. Most of the benches below the slide area have become rounded and offer little resistance to falling rock. It appears that there will be more small slides in the near future rather than a single failure of the entire fractured mass.

EL TIRO PIT

In El Tiro mining was directed toward the eastern expansion of the 2750, 2710 and 2670 level. Mining was temperarily halted on the 2590 level in late July.

On the 2750 ore grade mineralization was limited to the hornfels at the east end. The hornfels contained chalcopyrite, usually in thin veins but occasionally massive, and a small zone of strong molybdenite in quartz veins.

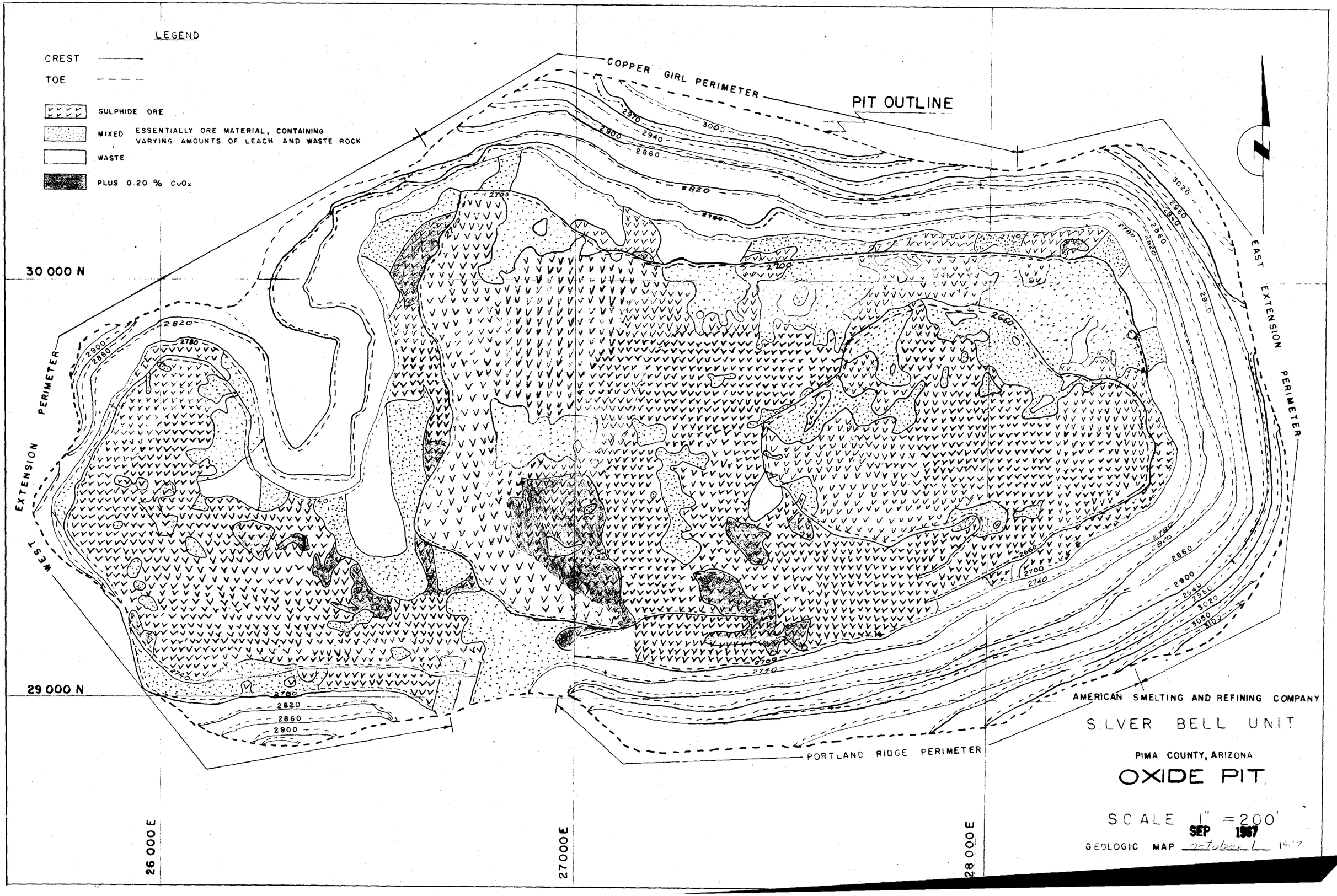
On the 2710 level blocks of hornfels were encountered in the southeast corner (17,250E, 36,250N) along the El Tiro Fault Zone. The sediments and monzonite to the south were ore grade while the dacite porphyry and monzonite to the north were leach and waste with small pods of ore.

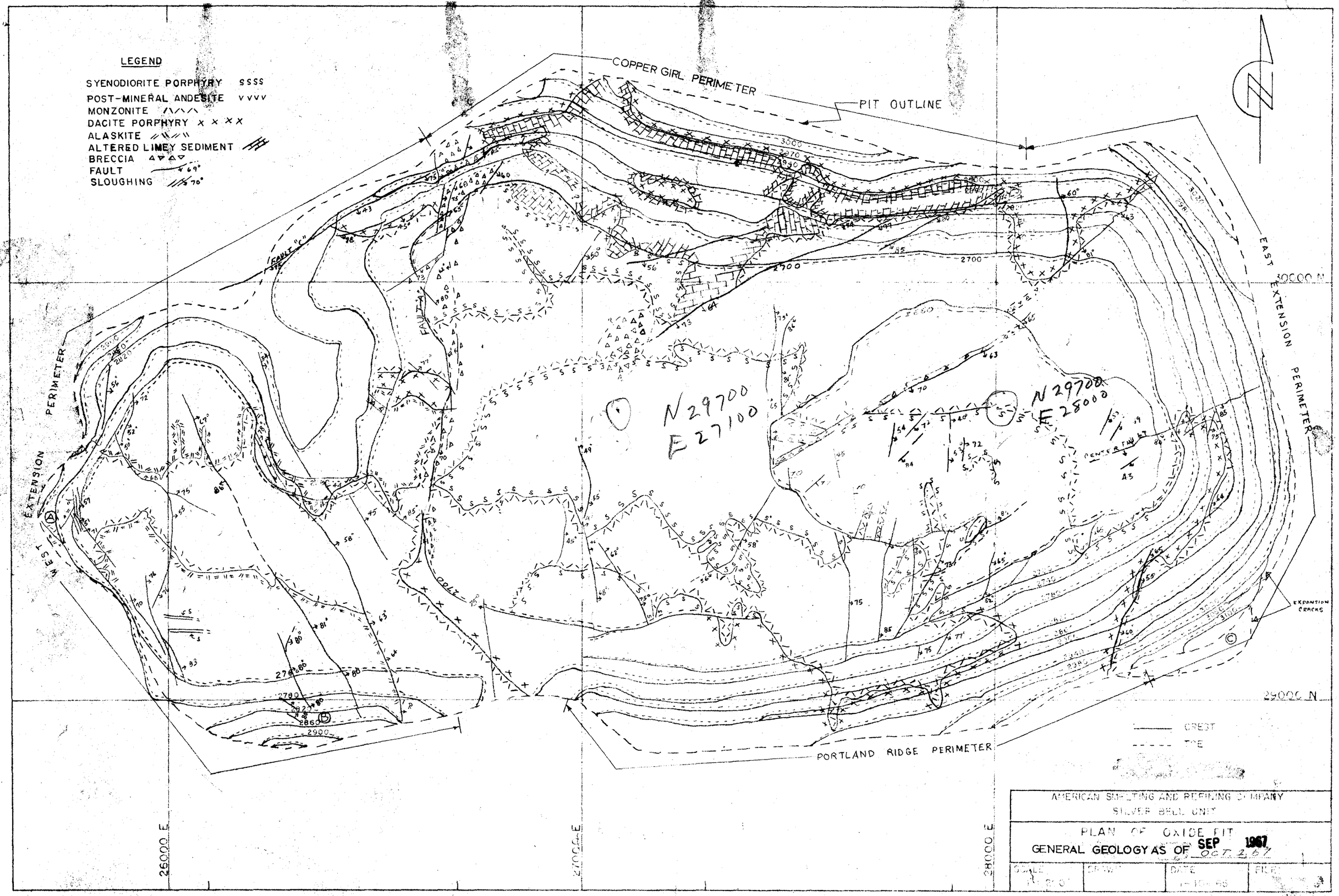
The 2670 level was expanded to the southeast along the west side of the El Tiro Fault Zone. There should be several hundred thousand tons of ore grade monzonite to the southeast.

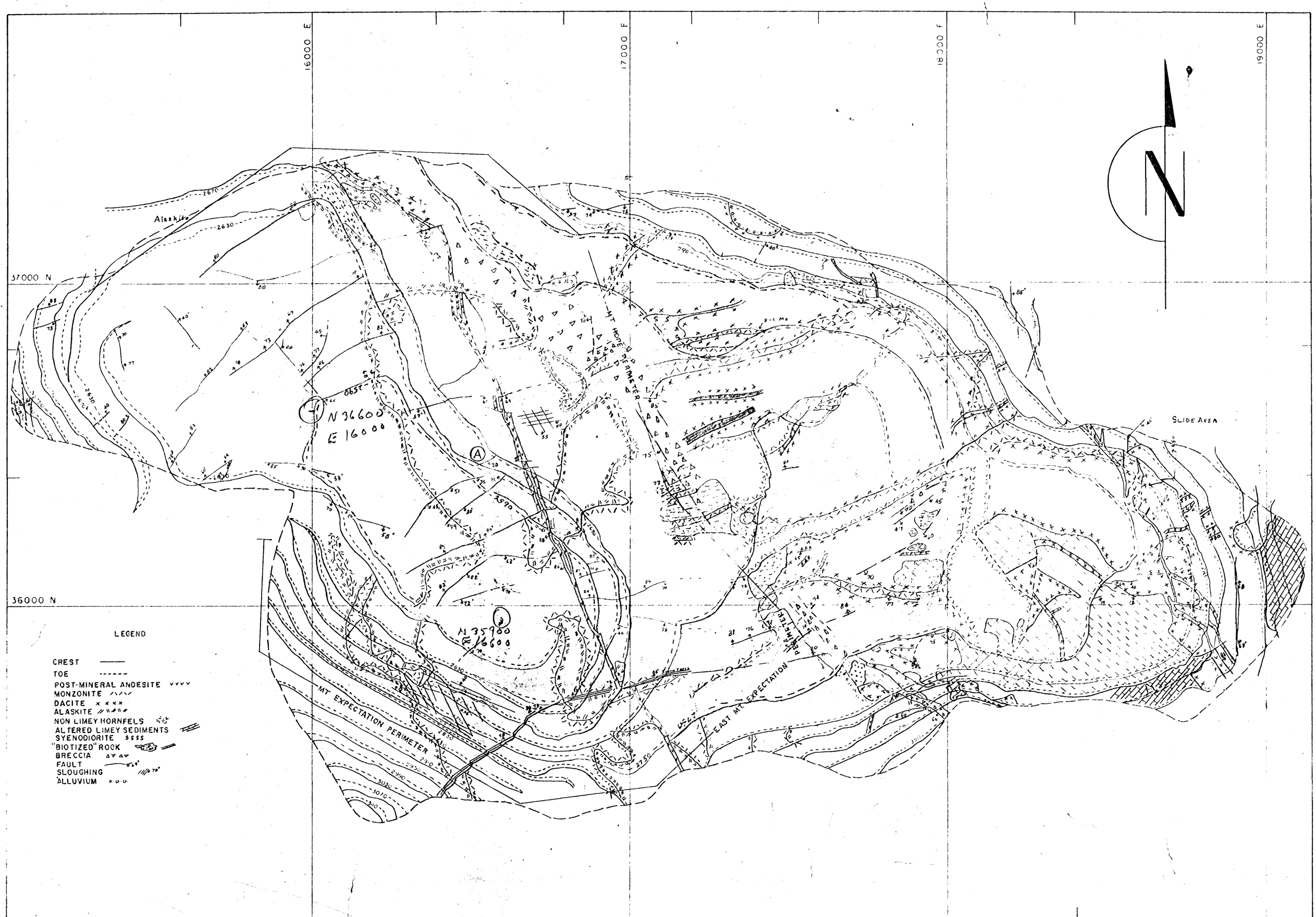
A small slide reached the 2750 bench on September 2, at 18,350E, 36,400N. This followed several hours of scraping by a shovel which moved the crest beyond its designed limits. There are several hundred tons of rock currently sliding down the pit wall at this location. A step out of 75 to 100 feet may be necessary as a safety measure when the 2710 level is advanced in this area.

Robert C. Edmiston
Robert C. Edmiston

RCE:jca


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 October 1 1967
SEP 1967


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"
FAULT "A"
WEST EXTENSION PERIMETER
EAST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
CENTER LINE
EXPANSION CRACKS
N 29700
E 27100
N 29700
E 28000
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 SEP 1967
SCALE
DRAWN
DATE
FILE



AMERICAN SMELTING AND REFINING CO

SILVER BELL UNIT

PLAN OF EL TIRO PIT

GENERAL GEOLOGY AS OF THIRD QUARTER 67

SCALE	DRAWN	DATE	FILE
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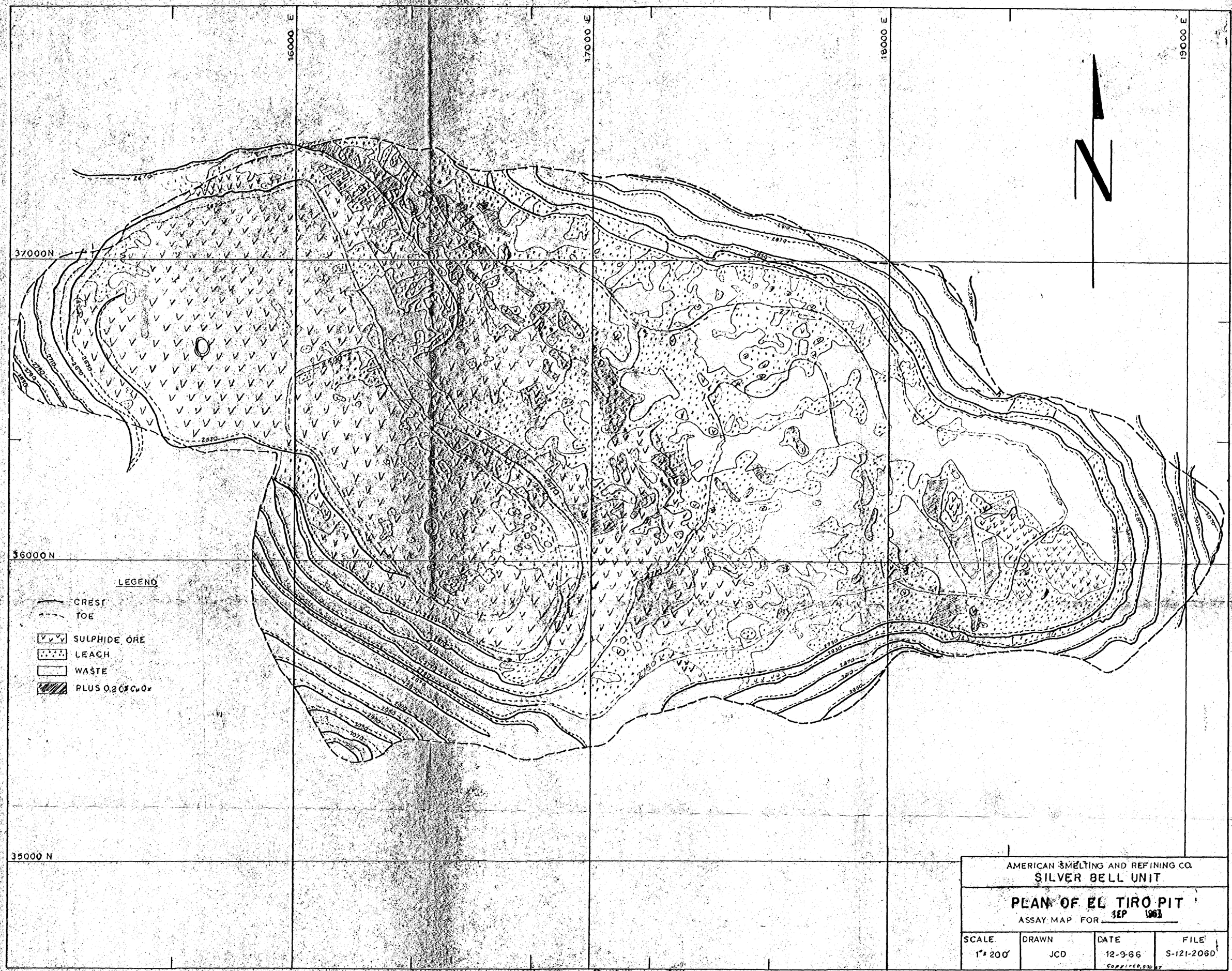

16000 E
17000 E
18000 E
19000 E
37000N
36000N
35000 N
LEGEND
CREST
TOE
SULPHIDE ORE
LEACH
WASTE
PLUS 0.20% CuOx
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
ASSAY MAP FOR SEP 1967
SCALE
1" = 200'
DRAWN
JCD
DATE
12-9-66
FILE
S-121-206D

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

October 18, 1967

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM, NORTH EL TIRO HILL - DAISY SHAFT AREA AND WEST EL TIRO LEACH DUMP AREA, August, 1967.

The following briefly summarizes the drilling done during the month of September. During the month, we had one truck-mounted and one skid-mounted diamond drill rig and one failing rotary-hammer rig drilling. The diamond drills worked two shifts per day and the failing rig worked one shift.

A total of 321.0' of dump material was rotary drilled and 787.0' of bed rock hammer drilled during the month with the Failing rig. The combined footage for the diamond drills was 2,289.2'.

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-250	2,668.24	36,298.28	15,465.10	170.0	75.8	0.42	0.02	144.2	305.2	305.2
D-254	2,832.19	36,618.61	14,913.14	178.9	23.8	0.70	0.02	378.2	406.2	406.2
				228.5	63.3	0.52	0.01			
D-256	2,821.34	36,791.55	14,636.90	175.5	72.3	0.52	0.08	240.3	380.2	380.2
D-257	2,825.45	38,082.61	16,352.27	142.2	33.2	0.84	0.04	268.5	410.2	410.2
				191.8	38.4	0.42	Nil.			
D-258	2,786.20	38,007.77	15,394.33	158.3	426.9	0.76	Nil	814.7	814.7	
				663.9	53.3	0.53	0.02			
D-259	2,728.81	36,126.04	15,472.21	No significant thickness				222.0	222.0	222.0
D-260	2,716.73	35,998.42	15,325.58	No significant thickness				147.0	147.0	147.0
D-261	2,796.77	37,914.32	16,225.81	No significant thickness				209.0	209.0	209.0
D-262	2,733.73	36,151.92	15,613.98	87.0	25.0	0.62	0.01	197.0	197.0	305.5
				172.0	25.0	0.50	0.01			
D-263	2,831.95	38,347.71	16,301.61	120.2	103.1	0.65	0.03	255.3	255.3	255.3
D-264	2,688.97	37,291.30	14,739.56	No significant thickness				157.0	157.0	157.0
D-265	2,749.02	37,089.46	14,439.55	No significant thickness				237.0	237.0	237.0
D-266	2,829.78	36,757.80	14,991.44	Dump material only				84.0		
D-267	2,780.16	37,763.00	16,334.39	Dump material only				67.0		
D-268	2,856.65	38,215.53	16,372.00	133.0	88.8	0.53	0.15	247.2	247.2	247.2
							TOTAL	3,397.2		

D-250 (Hammer to 162' - Diamond to 305.2)

This hole was collared in alluvial fill material and encountered alaskite bedrock at 22.0'. The alaskite was moderately altered to sericite-clay and had a primary sulfide content which averaged approximately 3%. A series of biotite monzonite dikes cut the alaskite in the intervals 174.6-187.5, 211.2-217.0, 220.4-227.3 and 244.5-257.2.

The calcocite enriched sulfide zone ran ore grade in the intervals 72.0-117.0 and 137.0-236.8.

The hole was bottomed in alaskite at 305.2.

D-254

This hole collared in dump material and hit alaskite bedrock at 28.0' Except for aplite in the interval 178.9-191.7 the alaskite was present throughout the hole.

The alteration was variable, but generally weak to moderate in intensity. Sericitization and silicification became moderate to strong in the interval 220-355'.

Sulfides were encountered at 129.2', but averaged only 1% until 220' where the total content approached 2-1/2 to 3%. Chalcocite enriched pyrite and chalcopyrite ran ore grade in the interval 228.5-291.8.

The hole was bottomed in alaskite at 406.2'.

D-256

Dump material was drilled to 139.9' where alaskite bedrock was encountered. The rock was weakly altered with the main alteration being that of plagioclase felspar going to light green montmorillonite (?). There was very minor sericite developed.

Sulfides were encountered at 175.5' and some chalcocite was present from there to 320'. Ore-grade mineralization was present in the interval 194.0-247.8.

A noticable amount of green copper stain was present in the altered plagioclase feldspars from the bedrock surface to 230.3'. This is probably derived from leach solutions from the above dump.

The hole was bottomed in alaskite at 380.2'.

D-257

This hole collared in dacite porphyry and encountered biotite monzonite at 41.2'. The biotite monzonite contained approximately 4% biotite occuring in medium sized books and as very fine flakes in the ground mass. The biotite is variably altered to chlorite and some hydromica. The alteration is in general weak, but variable overall.

Sulfides were encountered at 130.0'. The chalcopyrite content remained at around 2% from there to the bottom and chalcocite was present from there to 291'. Secondary orthoclase was associated with and seemingly proportional to the chalcopyrite.

The hole was bottomed in biotite monzonite at 410.7'.

D-258

This hole collared in alaskite which was moderate to strongly altered. The alaskite continued to 145' with minor occurrences of aplite and was cut in the intervals 37.5-42.3, 88.4-103.6, and 145.4-158.3 by post mineral (?) andesite. The andesite dike(s) was steep dipping and the various intercepts are probably of the same dike. The andesite contained azurite and malachite and assayed as much as 0.23% sulfide copper. The same, or related andesite dikes were cut at depths in the interval 209.8-222.8', 232.7'-248.0', 451.4-452.3' and 498.4-503.9'.

At 158.3' altered paleozoic sediments were encountered which then persisted throughout the extent of the hole. The altered sediments showed only small variations which were random and repetitive. The changes which are seen probably represent changes in intensity of alteration more than changes in original rock type.

The original rocks were probably somewhat dirty dolomitic siliceous siltstones intermixed with occasional thin beds of relatively clean limestones. These have now been altered to diopside, tremolite and wollastonite hornfels. The rocks contain varying amounts of garnet and locally contain enough to be called tactites.

The diopside and tremolite hornfels are silified to different degrees which affects their favorability as host. The more siliceous hornfels are less permeable and generally of lower grade. This is seen in the interval 717.2-997.8 through which the copper content seldom was greater than 0.01%.

Throughout most of the sediments the only copper mineral indentified was chalcopyrite, but in some of the deep wollastonite garnet hornfels the principal copper mineral was bornite. The sulfides were usually well disseminated in the less siliceous fine to medium grained zones. In the fine grained siliceous and non porous hornfels the mineralization is associated with quartz veins.

As previously mentioned the sediment sequence was occasionally cut by dikes of igneous rocks. Other than the post mineral andesite already mentioned poikilitic quartz monzonite porphyry dikes occurred at 173.3-181.1 and 488.6-498.8, and dacite porphyry was intersected at 447.0-457.8 and in the bottom of the hole at 100.5-1011.8'. These rocks had quite low total sulfide contents.

D-259

This hole collared in alluvial material and hit alaskite berdock at 27.0'. The rock was weakly altered or poorly mineralized. Sulfides were encountered at 67.0', but at no place was the copper content greater than 0.3%.

The hole was bottomed still in alaskite at 222.0'.

D-260

Once again the hole was collared in dump material, moderately altered alaskite was hit at 22.0' and persisted to 147.0' where the hole was bottomed.

Sulfides were encountered at 68' and chalcocite enrichment occurred from there to the bottom of the hole. The total sulfide content was slightly less than 3% and the chalcocite content indicated an upgrading of less than 2 times of the original copper. There was only 10' of plus 0.4% copper encountered.

D-261

This hole collared in talus material and hit dacite porphyry at 13.0'. The dacite was moderately altered and carried trace amounts of unleached pyrite. At 85' a biotite monzonite was intersected which was then present to the bottom of the hole with the exception of the interval 120.0-133.8' where dacite was again penetrated. The biotite monzonite was weakly altered and mineralized.

The base of oxidation and leaching was at 133' and minor chalcocite, chalcopyrite and pyrite was present from there to the bottom at 209'. The sulfides were in high angle stringers and replacing biotite. Only very minor amounts of plus 0.4% copper was encountered.

D-262

This hole collared in alluvial material and hit alaskite bedrock at 12.0'. The alaskite was present to the bottom of the hole at 305.5 being cut only by monzonite in the interval 258.7-267.6'.

The rock was moderately altered, sericite being the predominent product with [illegible] clay. Sulfides were encountered at 77' and chalcocite enriched ore grade material was penetrated in the interval 87.0-107.0 and 177.0-197.0'.

D-263

This hole was collared in dump material and hit biotite monzonite at 21.0'. This biotite monzonite is quite similar in appearance to the granodiorite mapped by Watson to the north. The rock is strongly altered to around 125' then becomes moderately altered.

Sulfides were encountered at 40' and some chalcocite enrichment was present from there to the bottom. The zone ran ore grade in the interval 120.7-223.3'. The sulfides are well disseminated and associated with the biotite.

D-264

The hole was collared in dump material and hit alaskite at 63.0'. The rock was weakly altered and very sparsely mineralized.

Sulfides were encountered at 82.0' and some chalcocite enrichment was present from there to the bottom of the hole at 157.0'. At no place did the total copper content get above 0.3%.

D-265

This hole collared in dump material and hit alaskite bedrock at 59.0'. The rock was moderately altered and sparsely mineralized.

Sulfides were encountered at 117.0' and some chalcocite was present from there to the bottom of the hole at 237.0'. The chalcocite enriched sulfide zone ran plus 0.4% from the interval 122.0-142.0'.

D-268

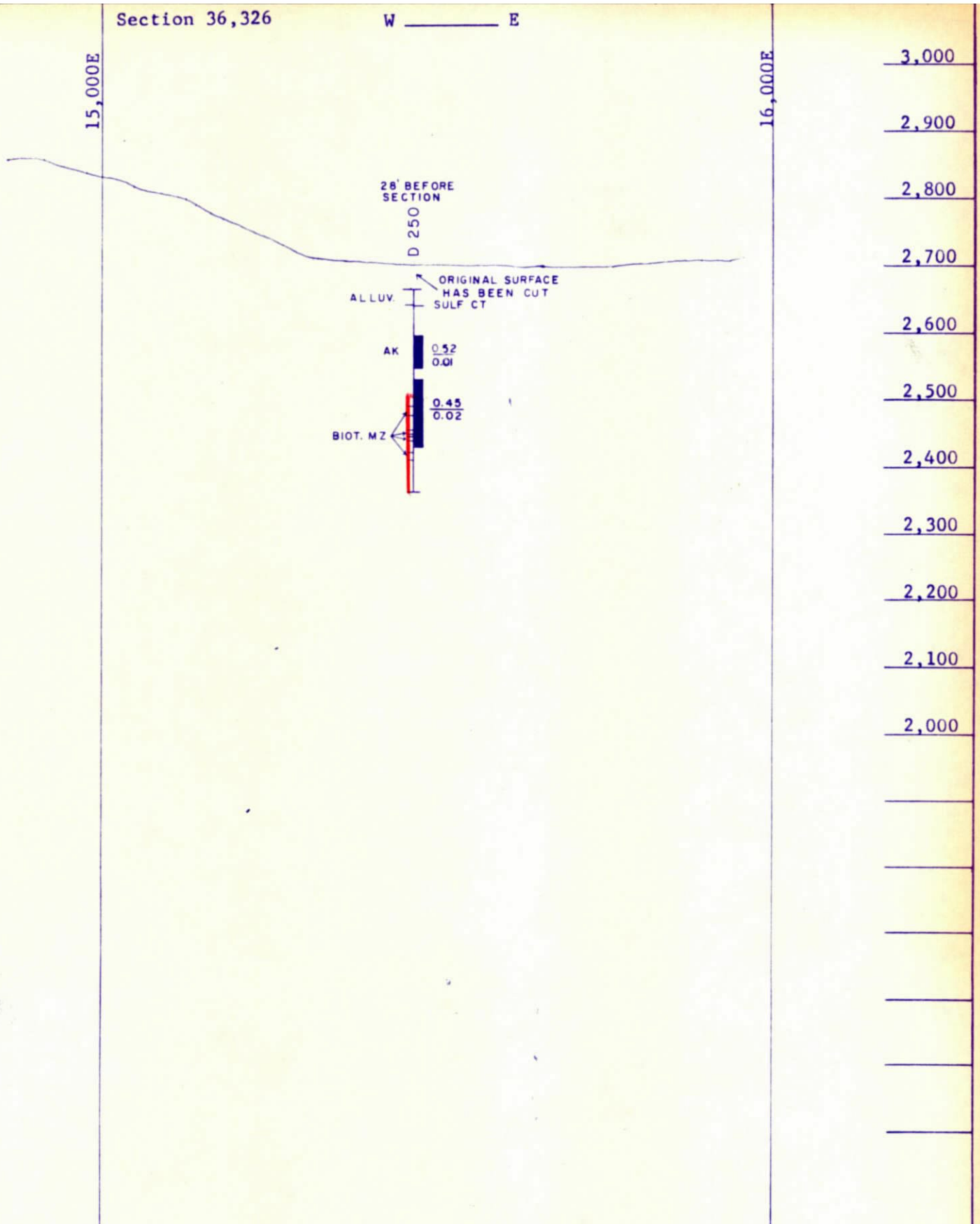
This hole penetrated 53' of dump material and hit biotite monzonite bedrock. This rock is the same as encountered in D-263 and is somewhat similar to the granodiorite.

The biotite monzonite is moderate to strongly altered. Sulfides were encountered at 74.0', but were intermixed with some, but decreasing amounts of limonite throughout the hole. The sulfides were both fracture controlled, and disseminated associated with biotite. The chalcocite enriched zone ran ore grade in the interval 124.3-221.8'.

N. R. Nuttycombe

N. R. Nuttycombe
Geologist

NRN:jca



+ 0.4% Total Copper

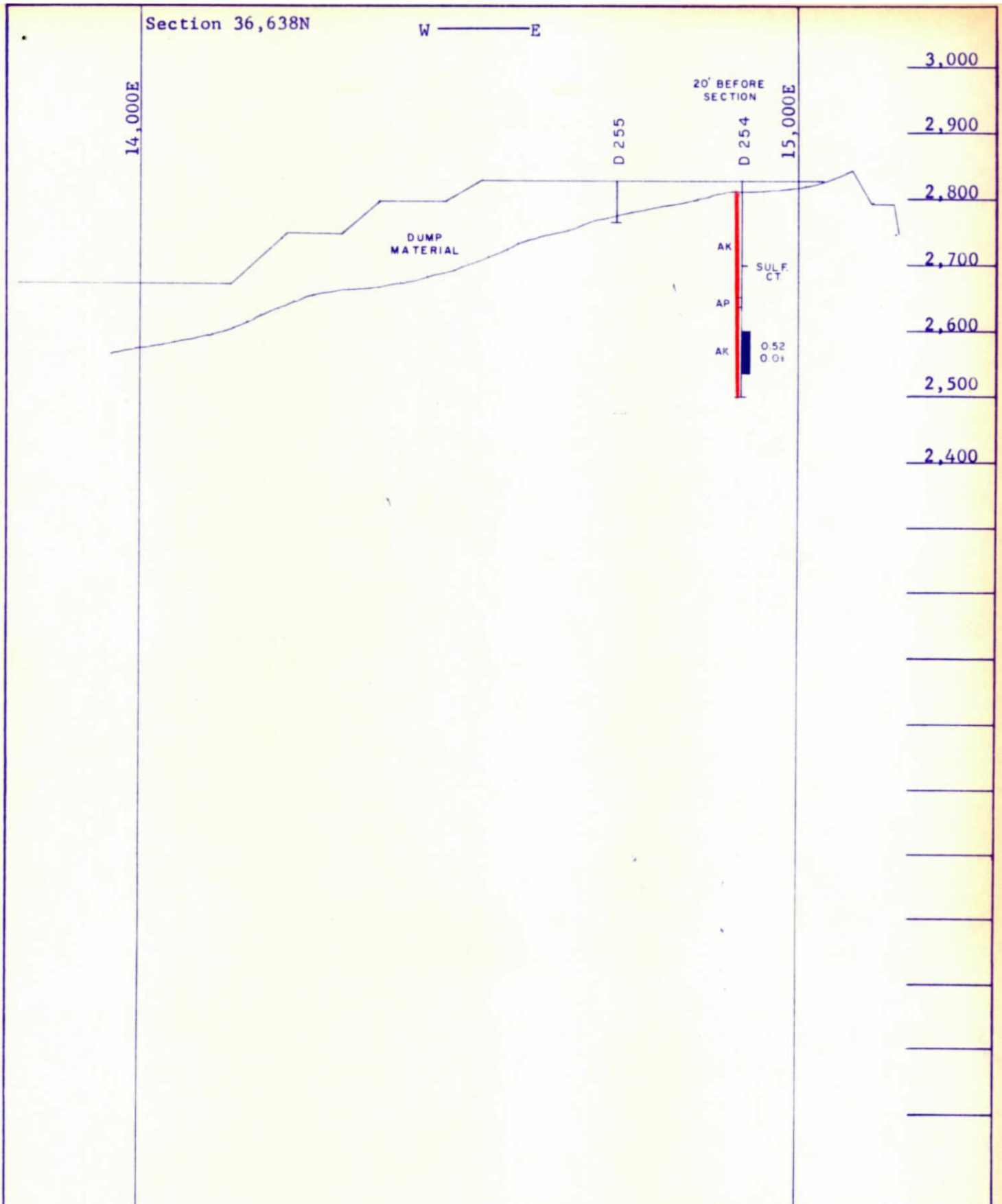
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	S 121 A



+ 0.4% Total Copper

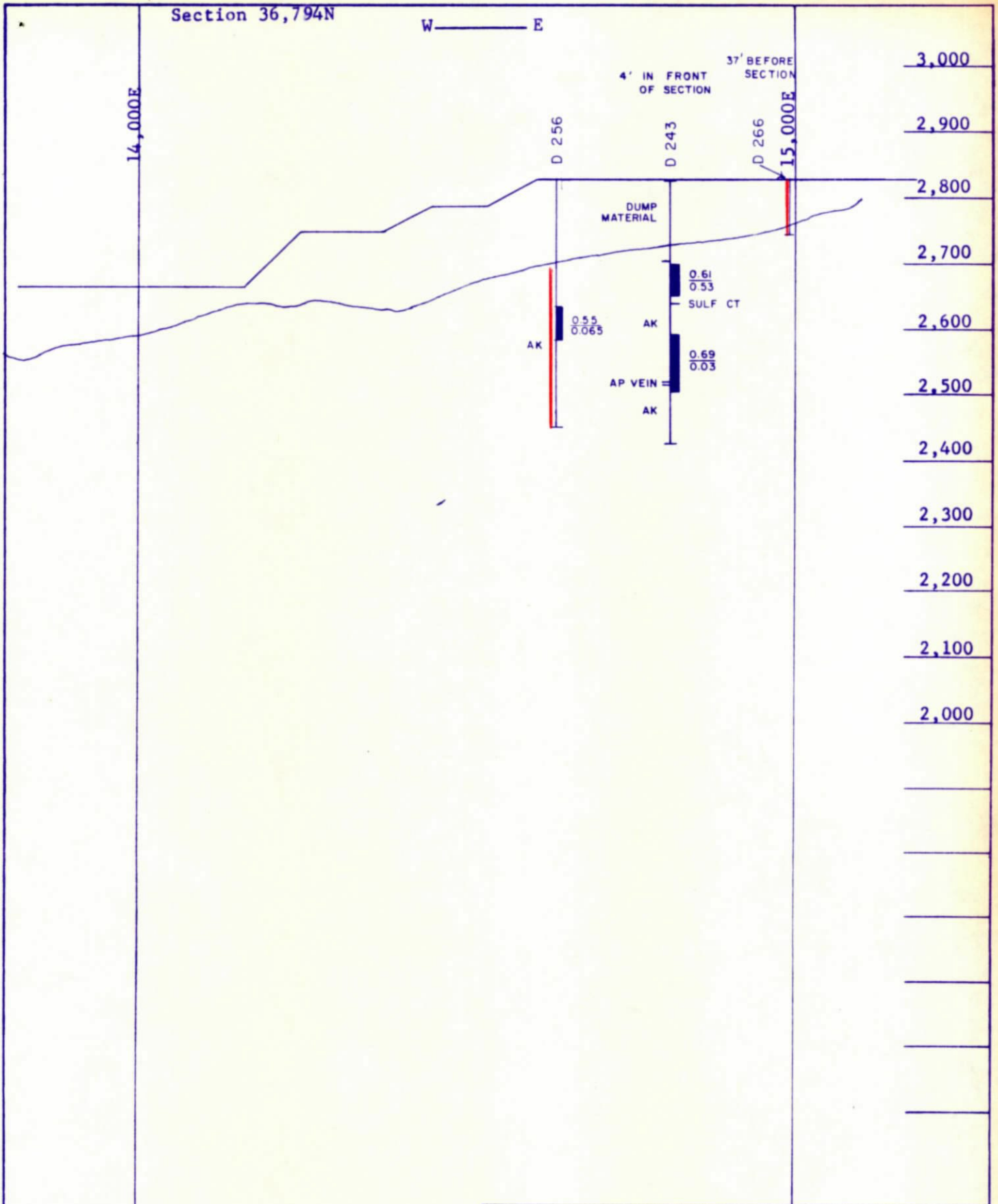
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	S 121 A



+ 0.4% Total Copper

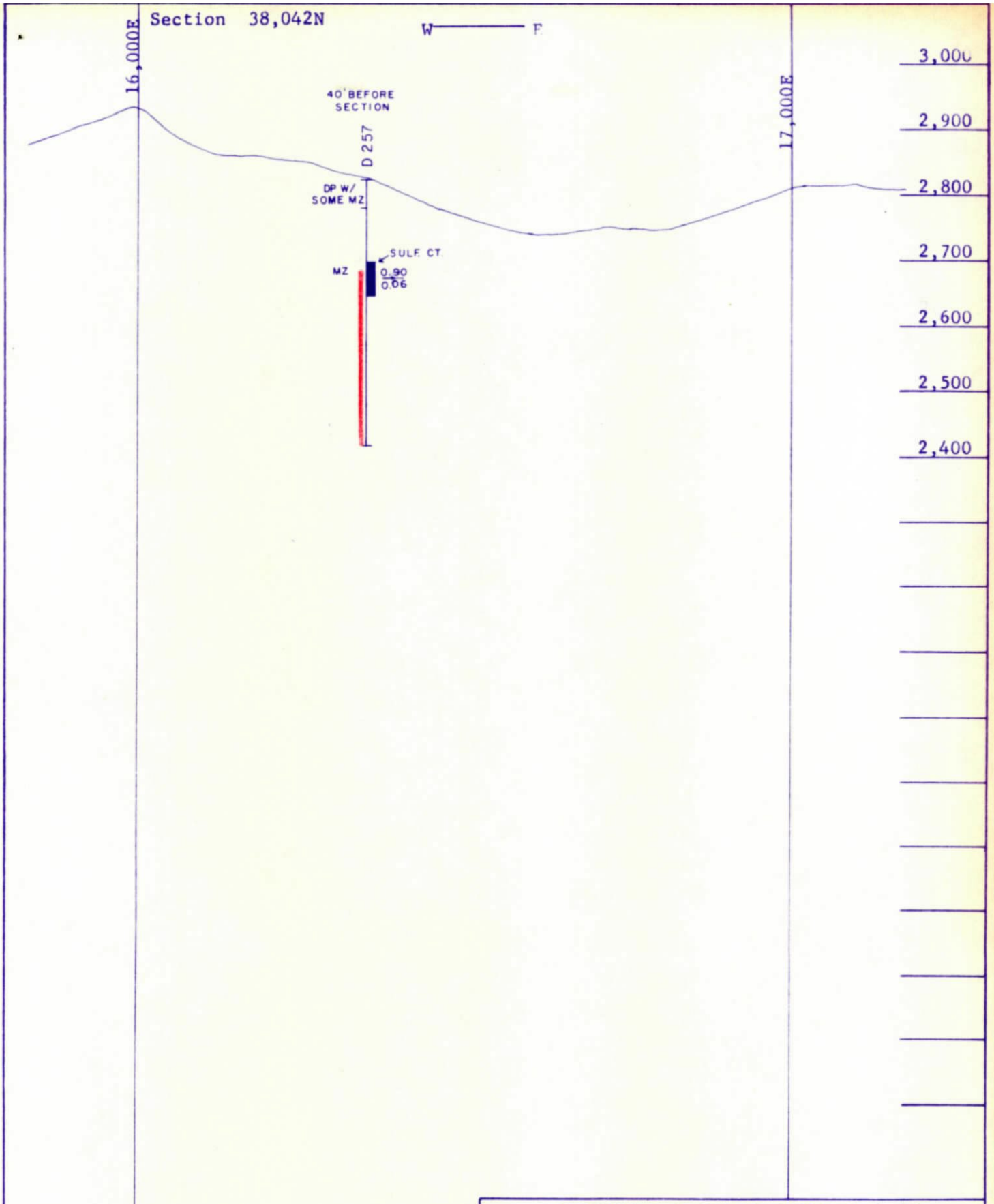
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	S 121 A



▮ + 0.4% Total Copper

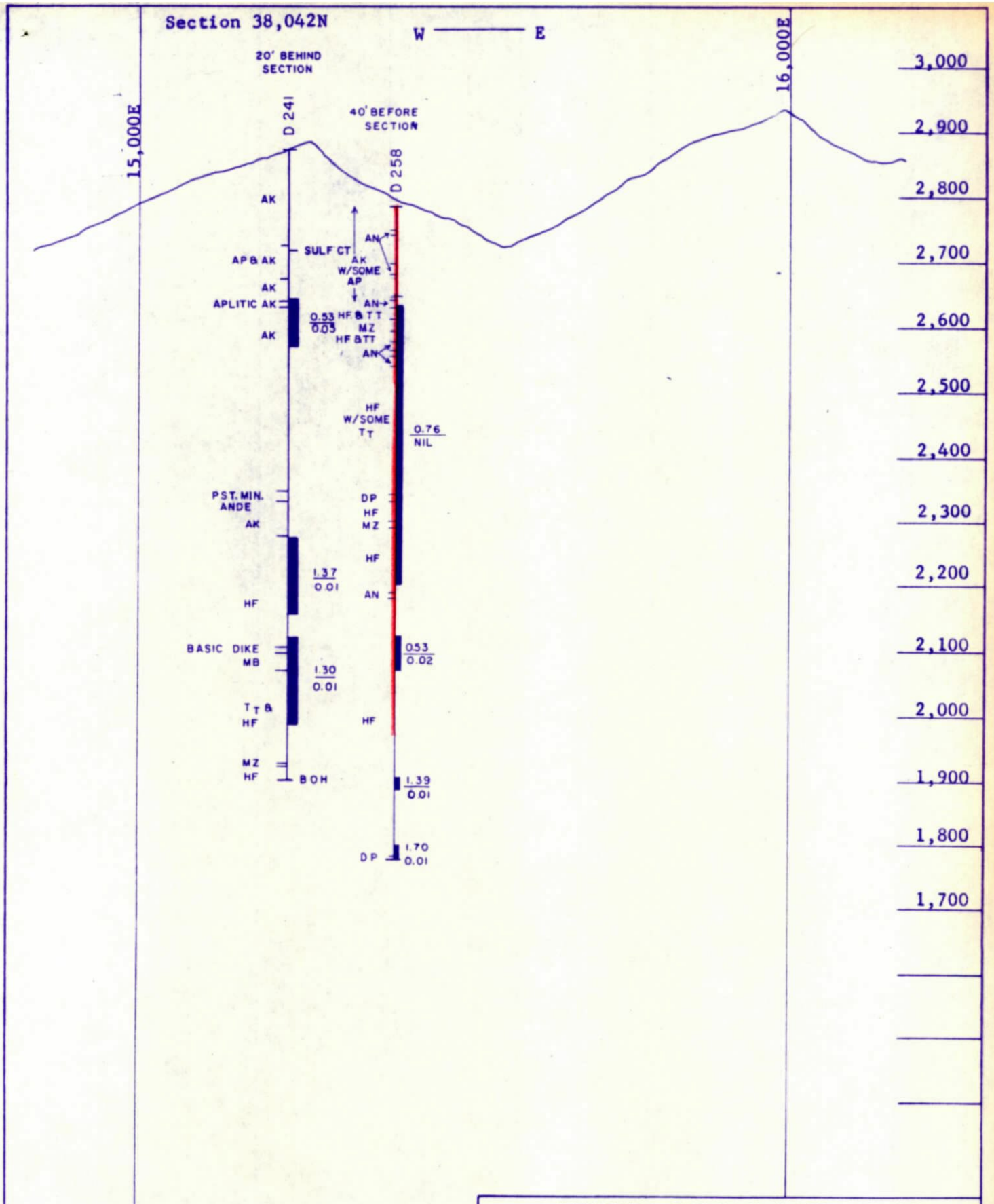
| Advance for month

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	SEP 1967	S 121 A



+0.4% Total Copper

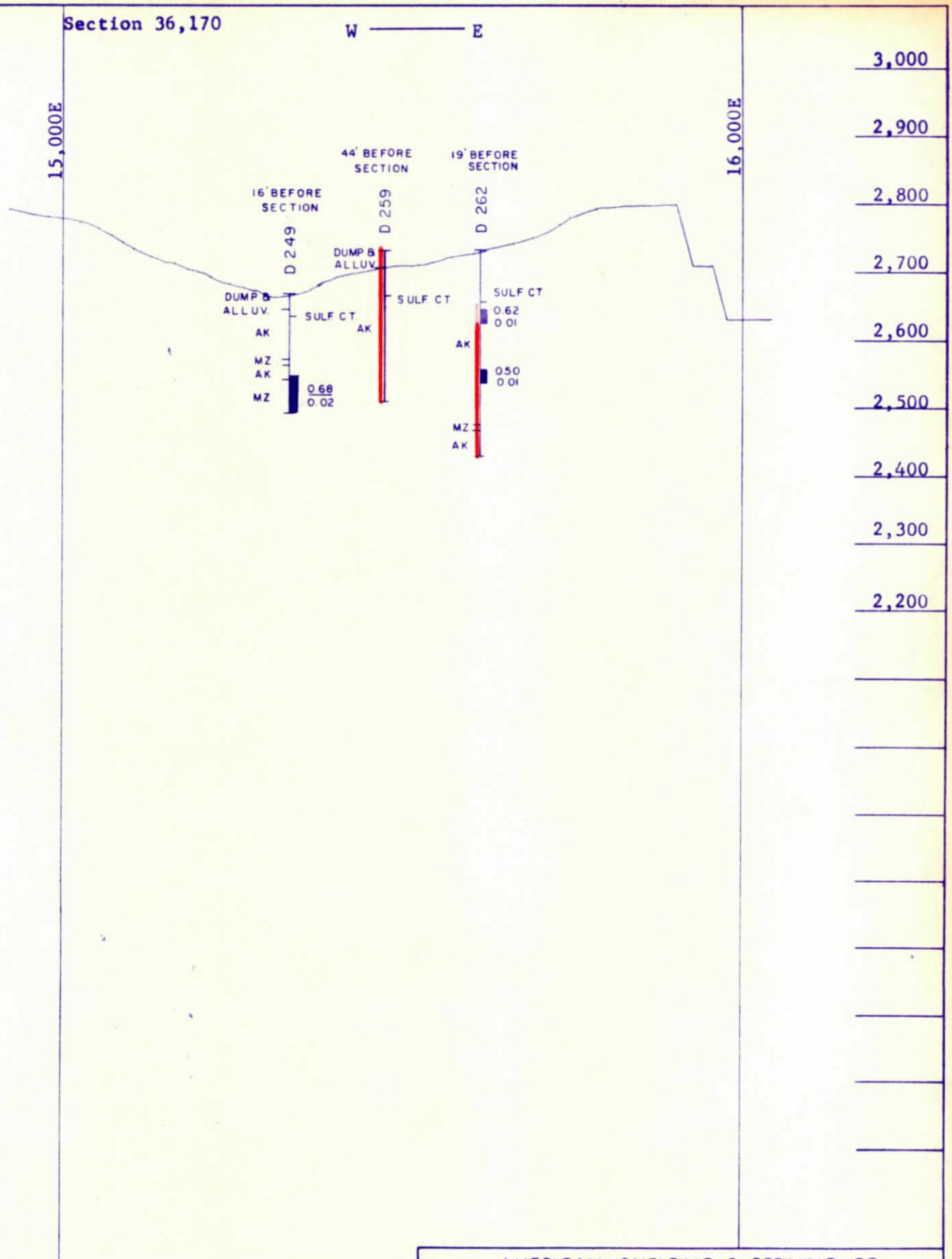
Advance for month

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	SEP 1967	S 121 A



■ + 0.4% Total Copper

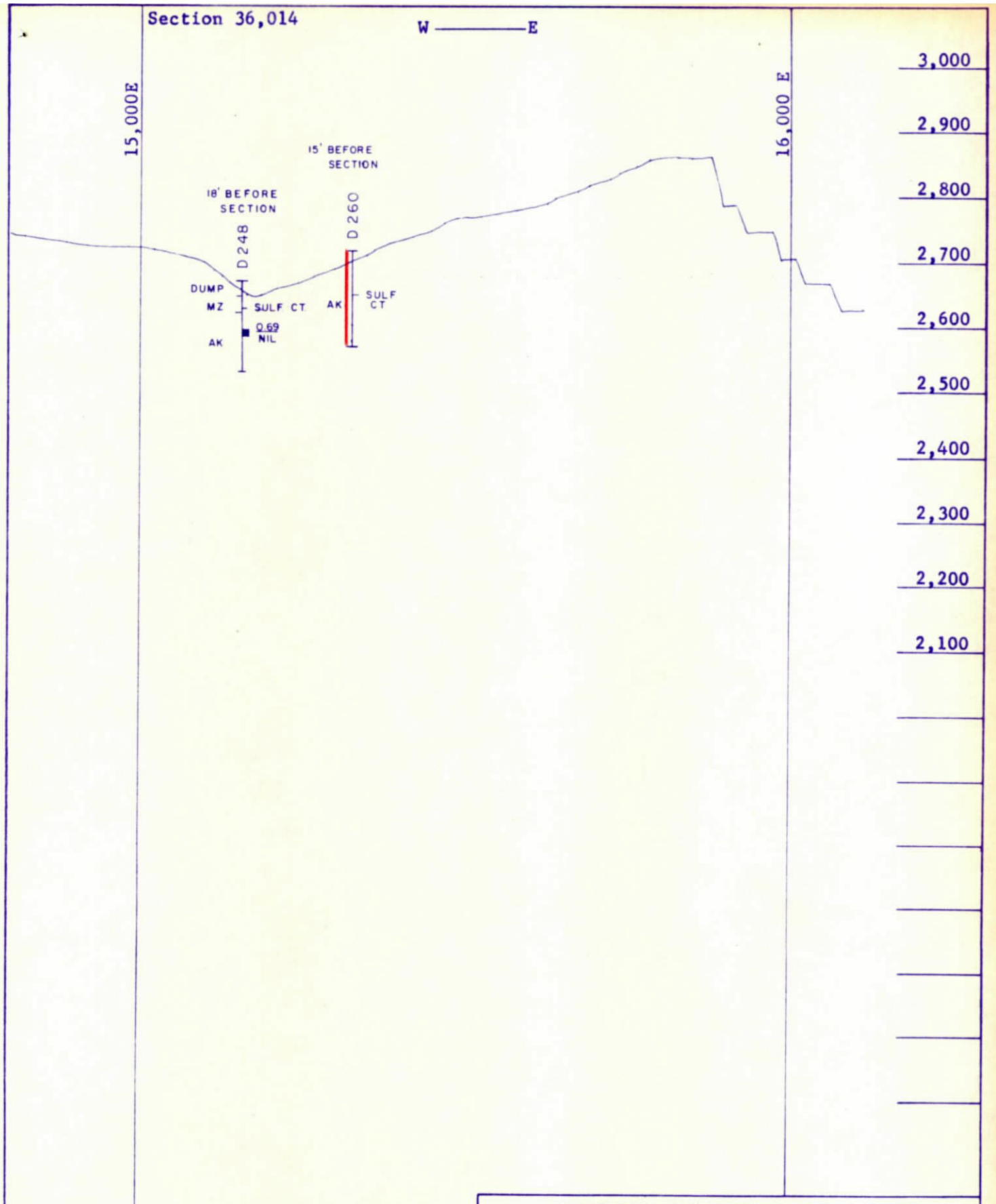
/ Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

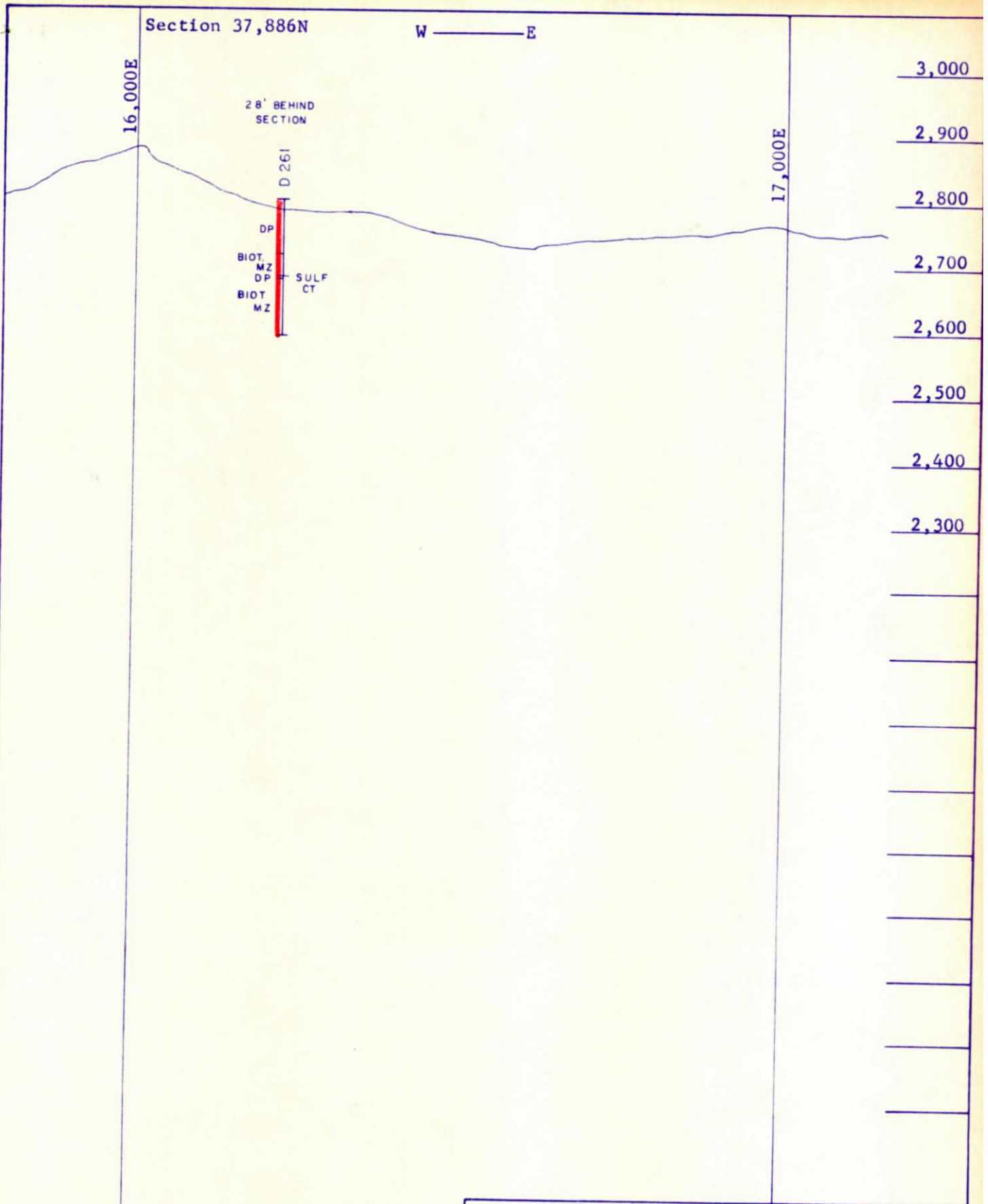
SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	S 121 A



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	S 121 A



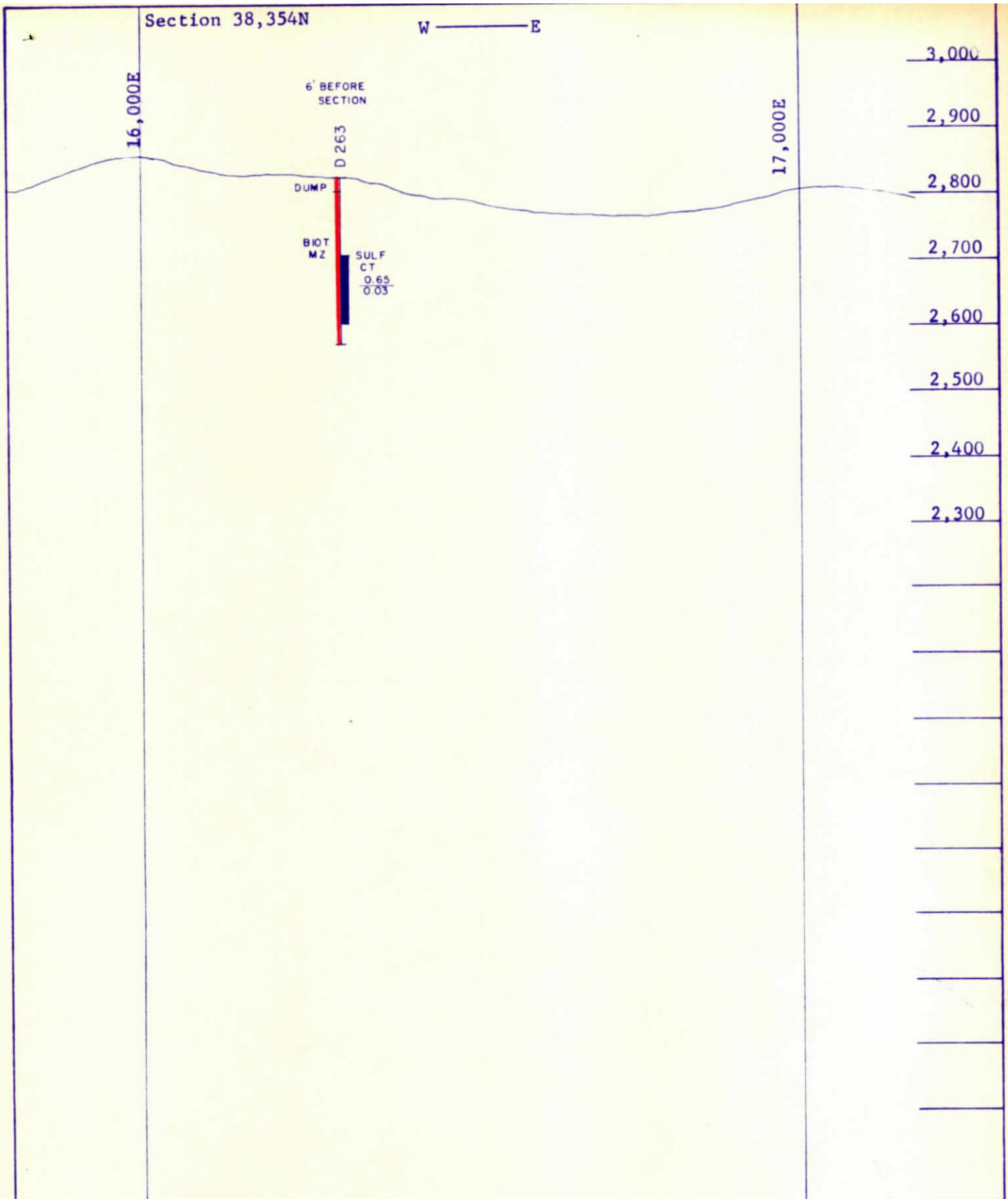
+0.4% Total Copper
Advance for month

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	SEP 1967	S 121 A



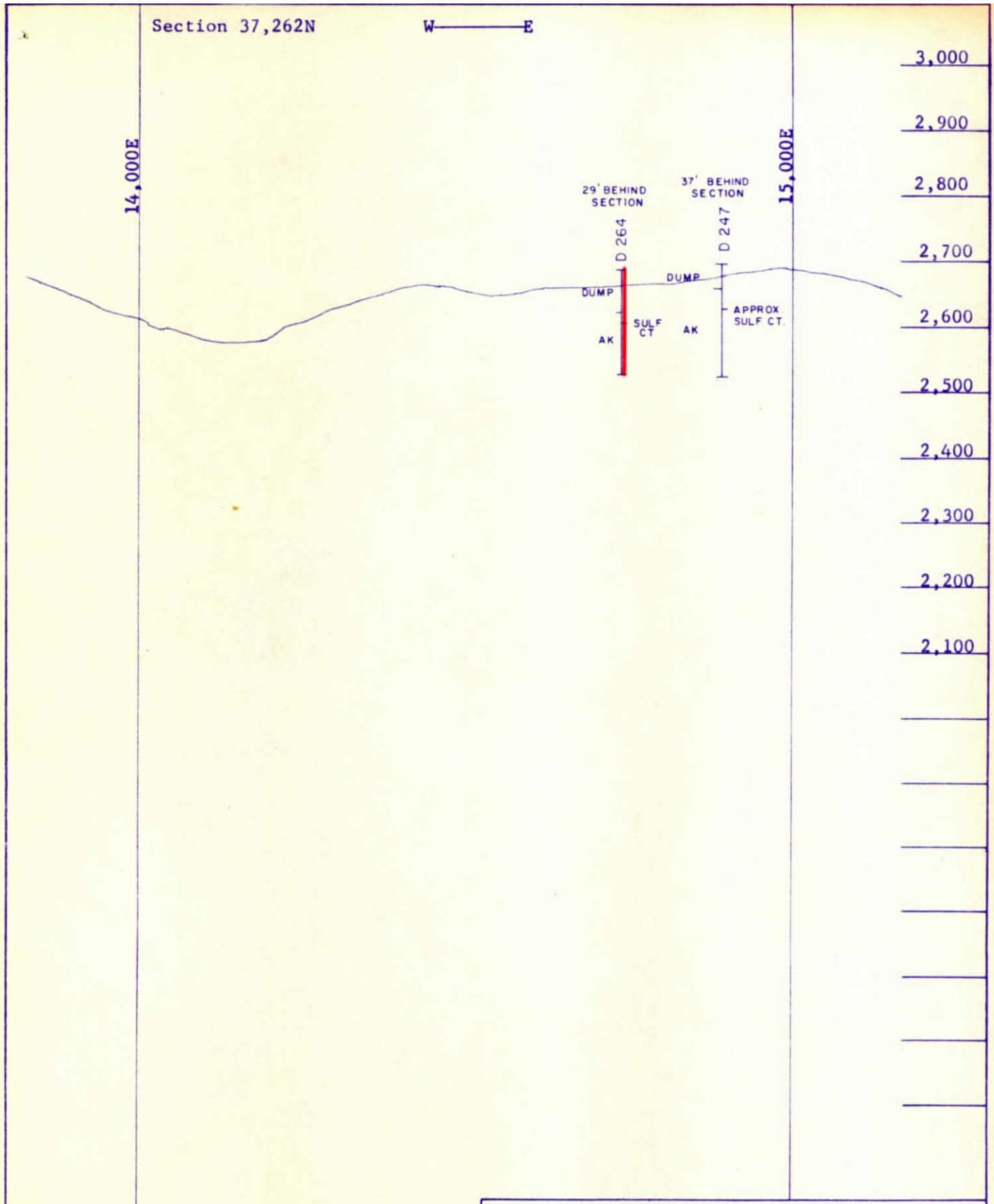
+ 0.4% Total Copper
Advance for month

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	SEP 1967	S 121 A



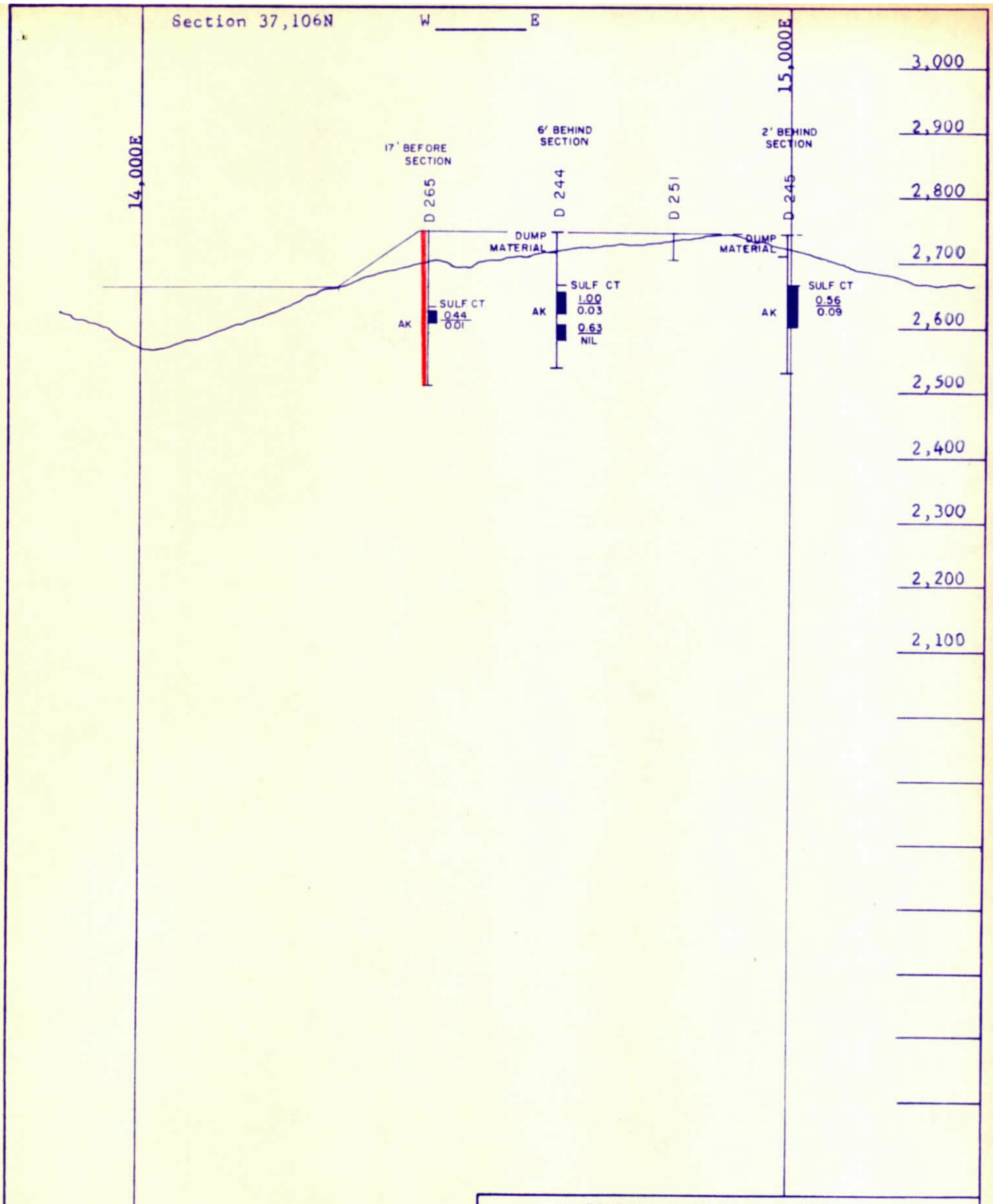
+ 0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1987	S 121 A



+ 0.4% Total Copper

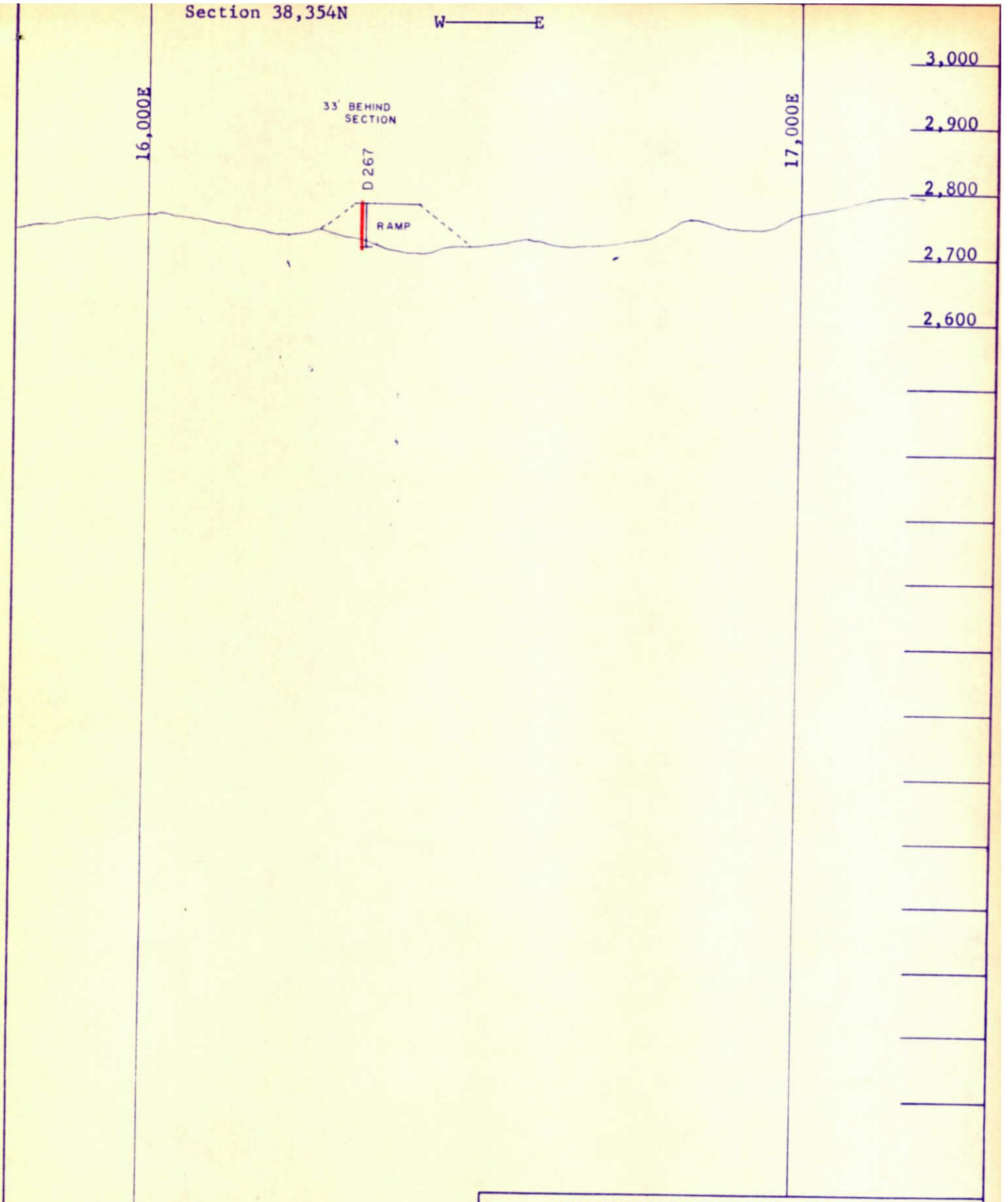
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

West El Tiro Leach Dump - Mt. Expectation Area
Drill Hole Projections

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	S 121 A

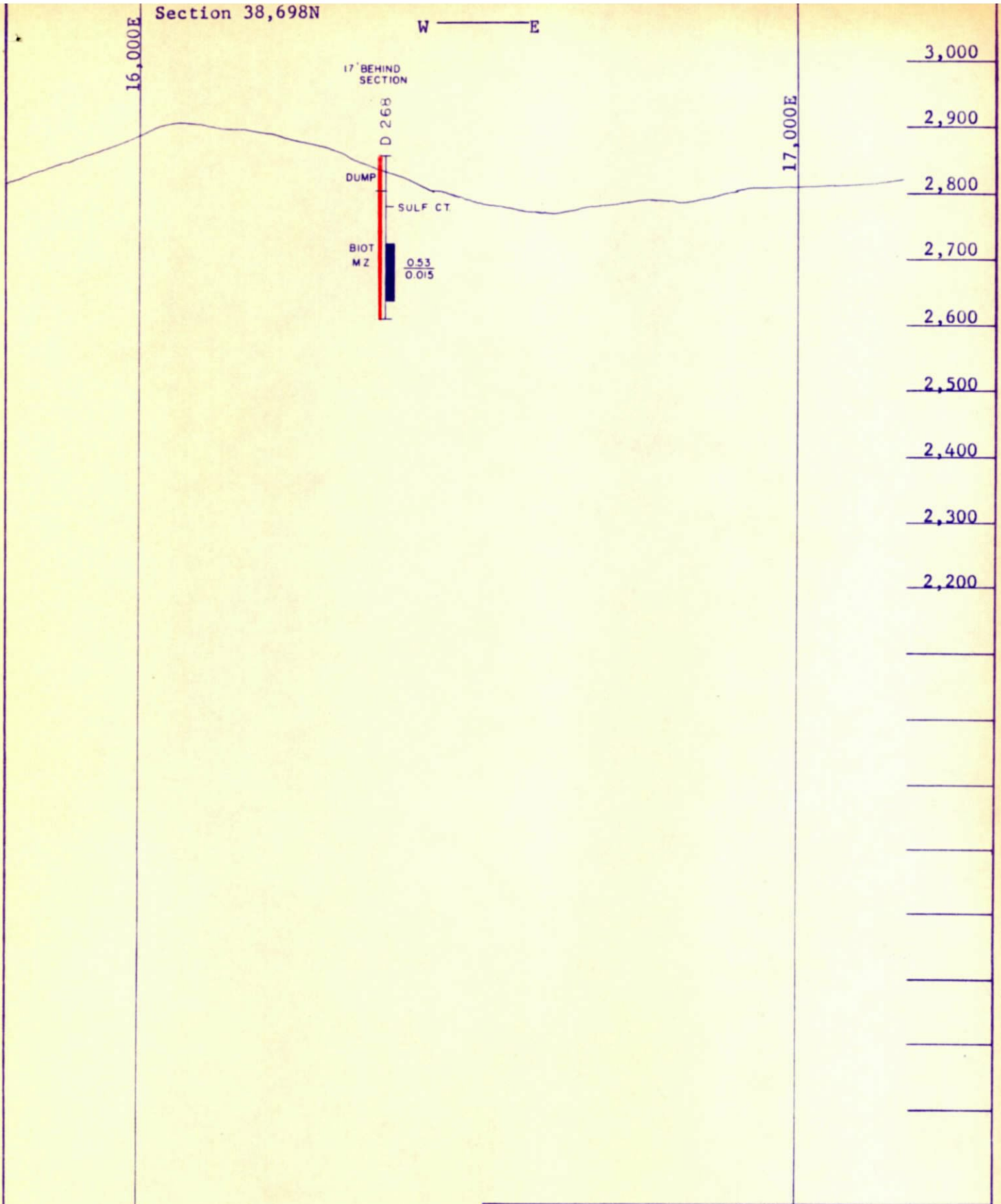


+ 0.4% Total Copper
Advance for month
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	SEP 1967	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	SEP 1967	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% intervals.

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

J. H. C.
SEP 29 1967

September 18, 1967

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM, NORTH EL TIRO HILL - DAISY SHAFT AREA AND WEST EL TIRO LEACH DUMP AREA, AUG. 1967

The following briefly summarizes the drilling done during the month of August. During the month of August two truck mounted diamond core drilling rigs and one Failing rotary-hammer rig worked both the El Tiro-Daisy Shaft area and the West El Tiro leach dump area. The diamond rigs worked two shifts per day and the rotary-hammer rig one.

A total of 626.0' of dump material was rotary drilled and 854.0' of bedrock was hammer drilled with the Failing rig. The two truck mounted core rigs drilled 1,892.9' during the month.

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-236	2,770.25	38,193.75	14,952.41	No significant thickness				149.8	363.8	363.8
D-237	2,774.18	38,206.01	14,767.25	"	"	"		225.0	314.0	314.0
D-238	2,775.60	38,201.70	14,588.70	"	"	"		175.7	212.7	212.7
D-241	2,870.51	38,062.12	15,230.22	601.0	119.4	1.37	0.01	637.0	975.0	975.0
				755.3	134.6	1.30	0.01			
D-242	2,733.60	38,504.73	14,584.86	No significant thickness				176.2	722.9	722.9
D-246	2,825.54	36,484.93	14,651.37	252.0	35.0	0.68	0.01	337.0	337.0	337.0
D-247	2,695.28	37,289.44	14,891.96	No significant thickness				172.0	172.0	172.0
D-248	2,665.52	35,986.98	15,158.90	"	"	"		144.0	144.0	144.0
D-249	2,667.69	36,186.32	15,332.41	122.0	55.0	0.68	0.02	177.0	177.0	-
D-250	2,668.24	36,298.28	15,465.10	67.0	45.0	0.52	0.01	162.0	162.0	-
				132.0	25.0	0.54	0.02			
D-251	2,750.09	37,111.89	14,816.65	Dump Material only				43.0	43.0	-
D-252	2,798.03	36,972.00	14,906.47	"	"	"		89.0	89.0	-
D-253	2,797.42	36,999.38	14,733.09	"	"	"		106.0	106.0	-
D-254	2,832	36,618.61	14,913.14	"	"	"		27.0	27.0	-
D-255	2,826.77	36,635.83	14,726.15	"	"	"		63.0	63.0	-
D-256	2,821.34	36,791.55	14,636.90	"	"	"		138.0	138.0	-

Continued next page -

Hole No.	Approx. Elevation	Approx. Coordinates North	East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-257	2,825.45	38,082.62	16,352.24	127.2	48.2	0.90	0.06	142.2	142.2	-
D-259	2,728.81	36,126.04	15,472.21	Assays not received yet				22.0	22.0	-
217-E	2,728.71	37,872.96	15,669.16	384.0	43.2	0.48	Nil	276.0	660.0	660.0
203-E	2,785.77	38,236.67	15,725.76	No significant thickness				111.0	410.1	410.1
						TOTAL		3,372.9		

GENERAL PROGRAM

Drilling in the El Tiro-Daisy Shaft area consisted of interspaced drilling in the vicinity of the leach dump with a chalcocite blanket being the objective. In addition to this diamond drill holes D-242, D-241 and old Churn drill holes 203-E and 217-E were deepened to probe the sediments.

Peripheral drilling on the east and north side of North El Tiro hill was begun and will be continued in an effort to more exactly determine the extent of economic chalcocite blanket.

The deep drilling throughout the El Tiro-Daisy Shaft area will be curtailed for the present upon the request of Mr. Jameson. Drilling will hopefully be continued in the near future once a rigorous program has been outlined and approved.

Drilling in the West El Tiro Leach dump area has consisted of rotary drilling through the leach dump material, in preparation for future diamond drilling, and hammer drilling in haul roads. The drilling in the haul roads was done at this time because they are not in use, and in the case of D-247 and D-264 to evaluate the area of that roadway before it is covered by more dump material.

DESCRIPTION OF INDIVIDUAL HOLES

D-236 This hole was described in entirety in last months report.

D-237 This hole collared in dump material and hit bedrock around 115'. Approximately 13' of bed rock was rotary drilled with no sample being recovered.

Bedrock was alaskite and this rock type persisted throughout the extent of the hole. The rock was weak to moderately altered and only sparsely mineralized. Sulfides were encountered at 13'. Chalcocite was very sparce, occuring to any significant amount only through the interval 128' - 146'.

The hole was bottomed at 314'.

D-238 This hole collared in dump and hit alaskite bedrock at 37'. The rock was strongly broken and gougy and moderate to strongly altered from 165' to 182'. Sulfides were encountered at 89' and consisted almost wholly of pyrite and chalcopyrite. Chalcocite contributed to the copper assay values

only in the interval 167' - 212', and there averaged only 0.01%.

The hole was bottomed at 212.7'.

D-241 This hole had been drilled to the water table at 338' with the hammer drill and now has been drilled to 975.0' with a diamond rig.

A description of this hole to the depth of 338' can be found in last month's report. The hole was collared in alaskite and continues in it starting at this depth of 338'. The alaskite continues to the depth of 601' being cut only by post-mineral andesite in the intervals, 531.6 - 533.0 and 535.8 - 546.0. The alaskite is weakly altered and cut by fairly numerous quartz-sericite-sulfide veins and seams. Trace to sparce amounts of calcite began to be detected around 484' and continued to 601'.

Altered sediments were encountered at 601' and persisted with minor exception to 975.1' where the hole was bottomed. The sediments were primarily tremolite-chlorite hornfels which were generally of a fine grained nature. Garnet tactites occured in the intervals 625.5' - 641.1', 824.1' - 844.9' and 854.9'-889.9'. Generally speaking these tactite zones were higher grade than the hornfels. A fine to medium grained impure marble which ran low ore-grade, was penetrated in the interval 780.7'-818.0'.

Magnetite occured in varying amounts up to approximately 15% and was generally associated with the higher chalcopyrite concentrations.

From 889.9' on the hole penetrated predominately garnet-diopside hornfels which did not run ore-grade.

This sequence of sediments just described was cut from place to place by various igneous rocks. A mixture of aplite and alaskite existed in the interval 730'-755', a highly basic dike cut the sequence at 772'-774', and a fresh monzonite dike occupied the interval 951.3'-953.7'.

The only suggestions of bedding recorded indicated a possible dip of 50°.

D-242 This hole was described in its entirety in last months report.

D-246 (Hammer) This hole was collared in the leach dump material and hit alaskite bedrock at 67'. The sulfide contact was at 127', but the total sulfide content was quite low to 172' where it began to pick up.

The only significant ore interval was 247.0'-282.0' which ran 0.68/0.01. The total primary sulfide content was somewhat higher in this interval than all but one other interval (172.0'-187.0'), but that interval had only an +0.4% Cu assay. The ore interval had an average total sulfide content of around 4%.

The hole was bottomed at the water table at 337.0'.

D-247 (Hammer) This hole was collared in dump material and hit alaskite bedrock at 37'. The alaskite was weakly altered and sparse to weakly mineralized. The total copper content averaged less than 0.20%.

The hole was bottomed still in alaskite at 172'.

D-248 (Hammer) This hole penetrated 22.0' of alluvium and then hit alaskite (?). At 42.0' a distinct monzonite was intercepted and it continued to 47.0' where alaskite was again cut. From 52.0' to the end of the hole at 142.0' the rock appeared to be a mixture of alaskite and monzonite.

The rock was weakly altered throughout and was also weakly mineralized. The only plus 0.4% Cu intervals were where the pyrite content was quite high. The total copper content averaged between 0.25% and 0.3%. Some sulfides were present from the bedrock surface on down.

D-249 (Hammer) This hole was collared in alluvial fill material and hit bedrock at 22'. The bedrock was alaskite and this rock type was present from 22.0' to 97.0' and again in the interval 109'-125'. The alaskite was cut in the intervals 97.0'-109' and 125' to the bottom of the hole at 177' by quartz monzonite.

Both the alaskite and monzonite were moderate to strongly altered. Sulfides were present from the bedrock surface down and chalcocite first appeared around 32'. The chalcocite ran ore grade in the intervals 62'-82' and 122'-177'. The lower interval was in the monzonite and was associated with a slightly higher than average pyrite content for the hole.

This hole was bottomed at the water table at 177', but will be deepened with the diamond drill later.

D-250 (Hammer) This hole was collared in alluvial fill material and encountered bedrock at 22.0'. The bedrock was alaskite which persisted to the bottom of the hole.

The rock was moderately altered to clay and sericite and had a primary sulfide content which averaged around 3%. The primary sulfide content increased somewhat with depth. Chalcocite was present throughout, and ran ore grade in the intervals 72'-117' and 137'-162'.

The hole was still in ore when stopped at the water table at 162.0'. This hole will also be deepened with a diamond rig.

D-251 thru D-256 These holes were all rotary drilled through the dump material. The bedrock will be diamond drilled in the near future.

D-257 This hole was the first of a series of holes which will be drilled peripheral to the known North El Tiro hill chalcocite ore body.

The hole was collared in dacite and began to get interfingering of quartz monzonite at around 18'. At 41.2' the rock became entirely a quartz monzonite.

The rock was moderately altered and weak to moderately silicified. The sulfide zone was encountered at 127.2' and chalcocite was present from there to 291.7', but ran ore-grade only in the interval 127.2'-175.4'. The chalcopyrite content was unusually high even in the chalcocite zone. The overall chalcopyrite content averaged over 0.2%. Secondary orthoclase was associated with the chalcopyrite from 291' to the end of the hole.

Starting at 350, there was an appearance of calcite on fractures which quite probably indicates the presence of nearby sediments. The proximity may be either vertical or lateral.

The hole was bottomed at 410.7'.

D-259 (Hammer) This hole collared in alluvial material and intercepted bedrock at 27'. Bedrock was alaskite and it persisted throughout the extent of of the hole.

The alteration was weak through and the total sulfide content was low, averaging less than 2%.

The hole was bottomed at 222.0'.

217-E (Re-entry) This is an old Churn drill hole which was re-entered with a diamond rig to evaulate the deep lying altered sediments. The hole cannot be considered to have fully accomplished this objective. It was stopped at the depth of 660.0' on the advice of Mr. Jameson.

The fact that this hole intercepted only a few ore-grade zones doesnot rule out the possibility of good grade ore a little deeper. The rock drilled with the diamond rig was quite dense and somewhat siliceous. It was not a favorable host.

All possible bedding indications hint at a 45° to 60° bedding dip, the latter of which closely corresponds to what has been noted to the west across the drainage channel. If ore is bedding controlled, as it appears, the favorable beds encountered in D-241, D-218, D-219 and now the more recently drilled D-258 one would not expect to encounter the favorable horizons until around 600'. A change in rock type to tactite and less dense hornfels was hit at 631' and the last 2' of the hole had a 0.5% Cu assay.

The hornfels drilled from re-entry at 384.0' to 631.0' were very fine grained, a very pale green and tan in color and siliceous. The original rock was probably a limey siliceous siltstone. This rock is now unreactive and most contained mineralization as very thin veins and fracture fillings.

At 631' a sequence of garnet-wollastonite-tremolite tactite, limey-chloritic hornfels and tremolite-wollastonite hornfels was encountered and persisted until the hole was stopped at 660.0'. The last few feet showed very thin bedding which is similar to Abrigo which was d pping at 70°.

203-E (Re-entry) This hole was re-entered with the same purpose as 217-E. This hole was stopped prematurely due to drilling problems.

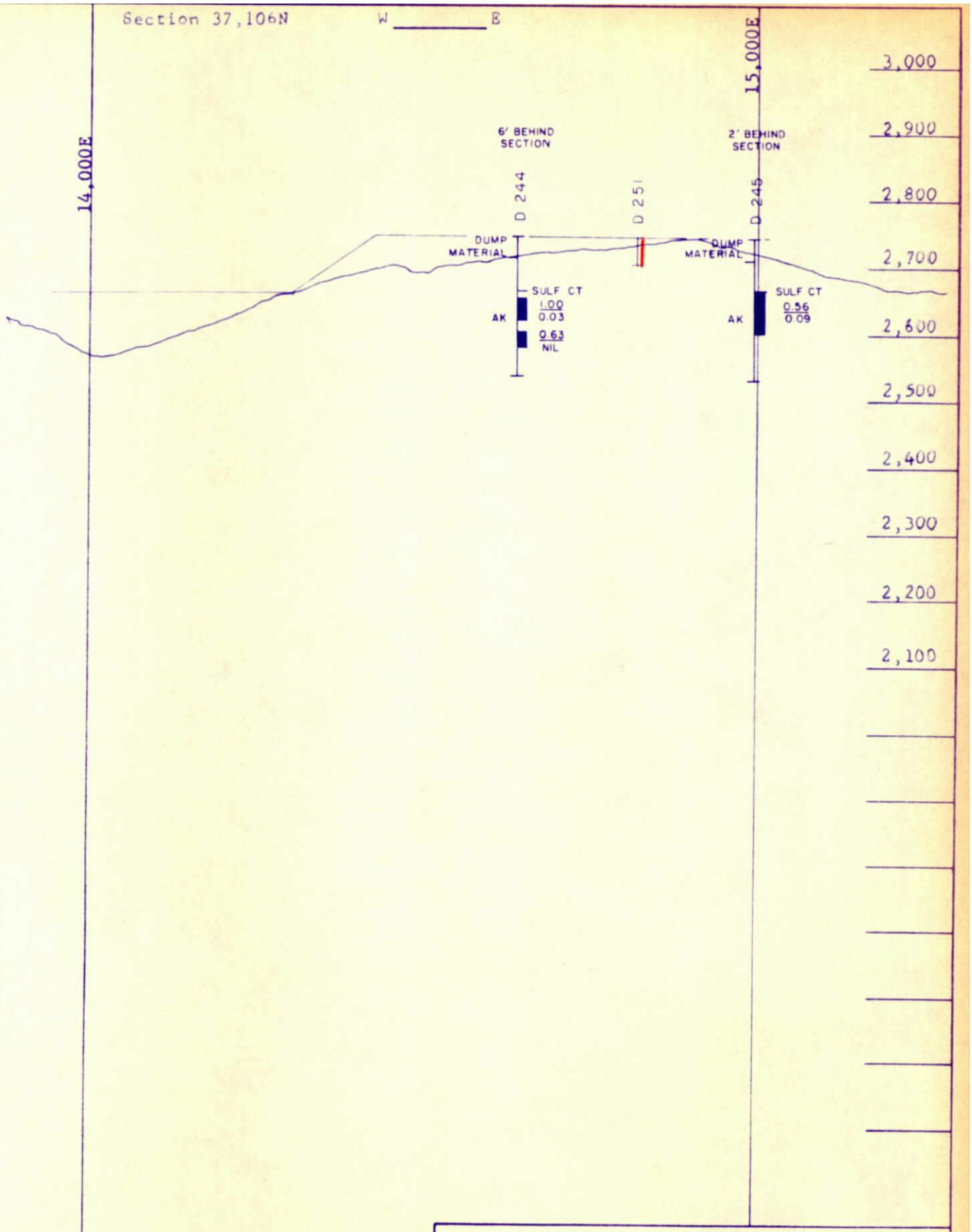
Aplite was first encountered upon re-entry and continued to 310.3' where monzonite was encountered. At 326.5' a dark green to black fine grained slightly acid reactive hornfels (??) was encountered. This was cut by a few thin dikes of alaskite and dacite. At 364.8' a fine to medium grained porphyritic rock was encountered. The rock appeared to be pre-mineral and possibly related to the monzonites. The rock was weakly mineralized.

At 388.4' a soft gougy, strongly broken sediment (?) was encountered. There was very little core recovery in this area and much caving of the hole. The hole was bottomed in this material at 410.7'.

N. R. Nuttycombe

N. R. Nuttycombe
Geologist

NRN:jca



■ + 0.4% Total Copper

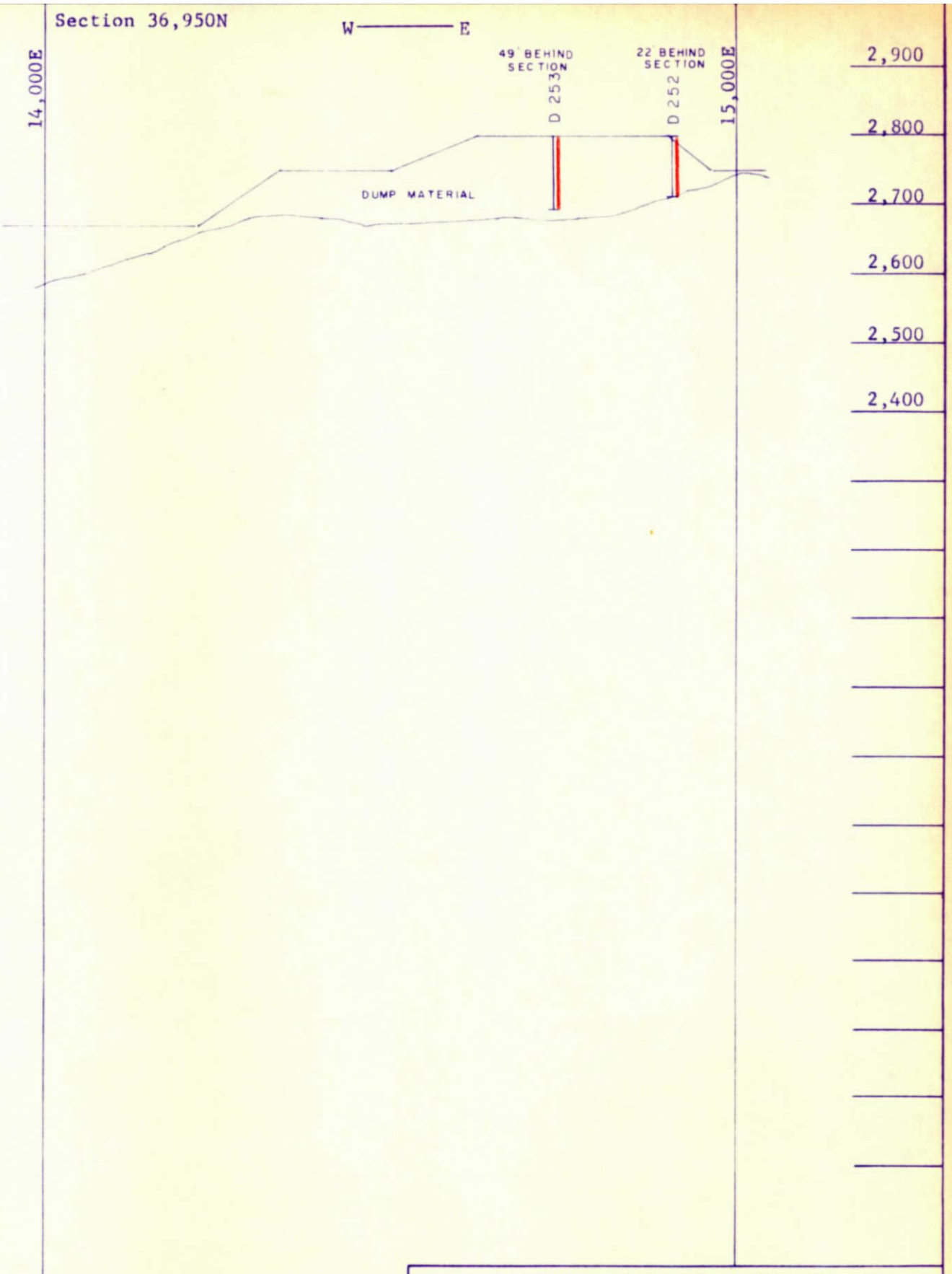
| Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

West El Tiro Leach Dump - Mt. Expectation Area
Drill Hole Projections

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	AUG 1967	S 121 A



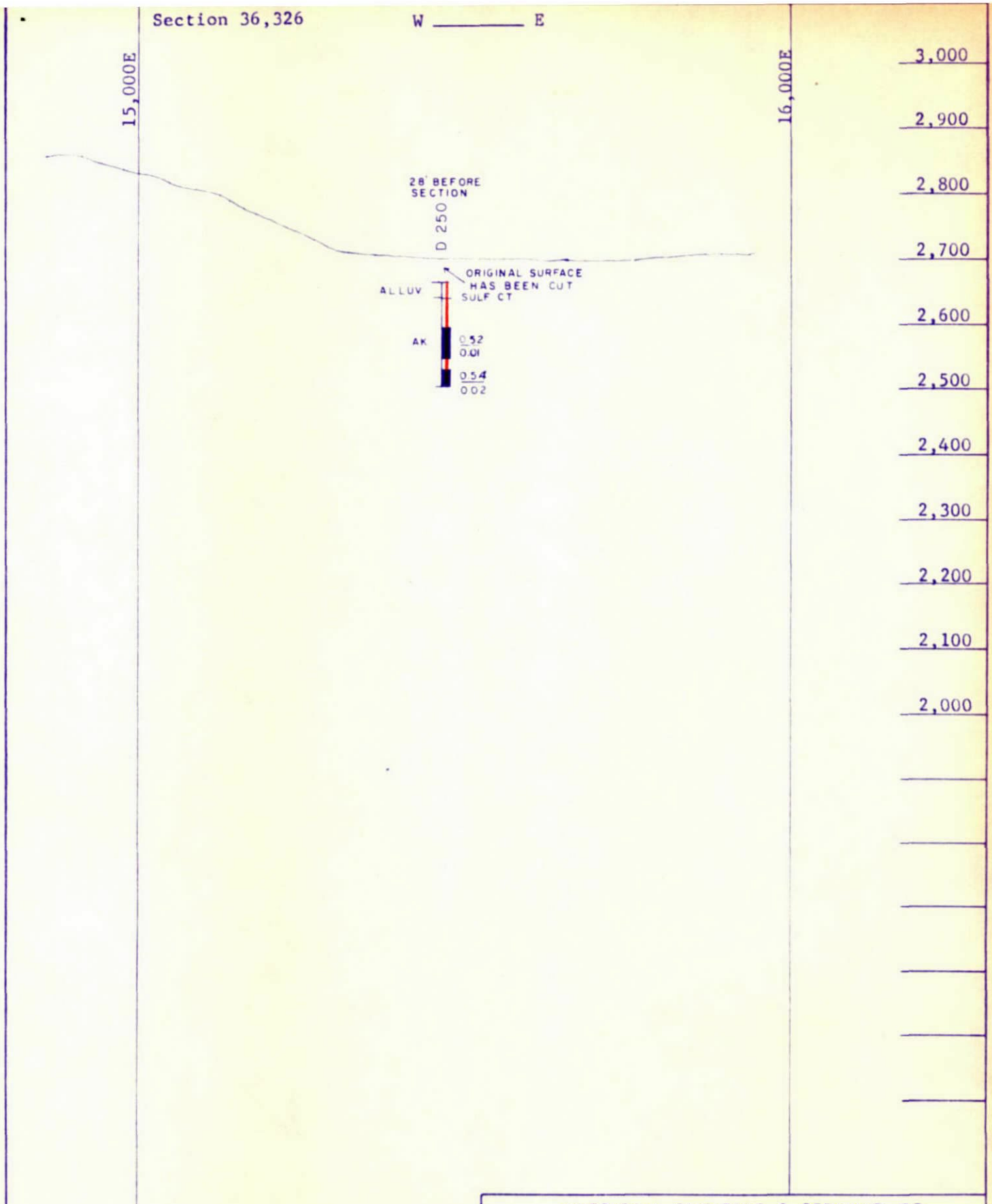
+ 0.4% Total Copper
Advance for month

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	AUG 1967	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.
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WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
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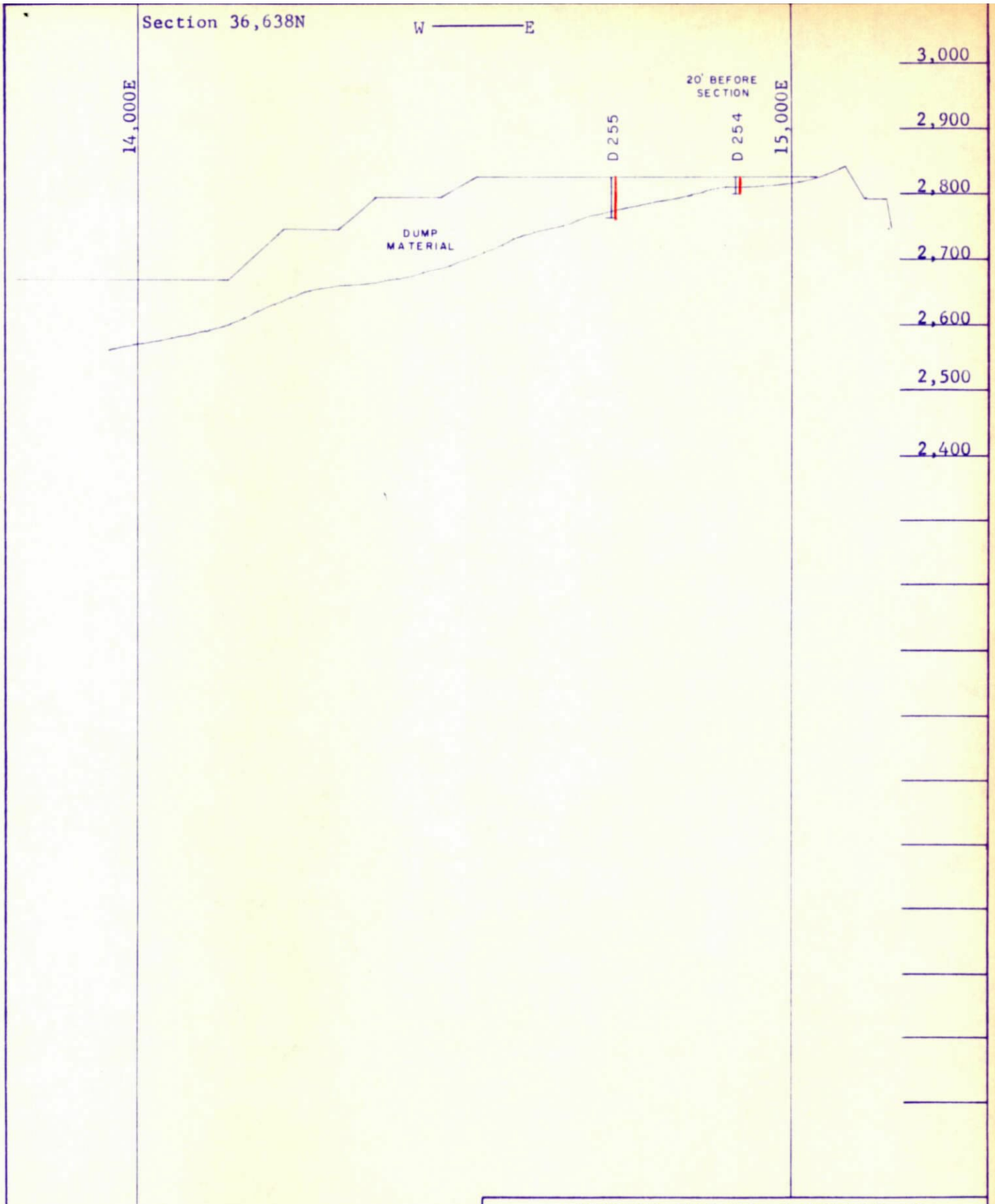

+ 0.4% Total Copper

Advance for month

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

AMERICAN SMELTING & REFINING CO.
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WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
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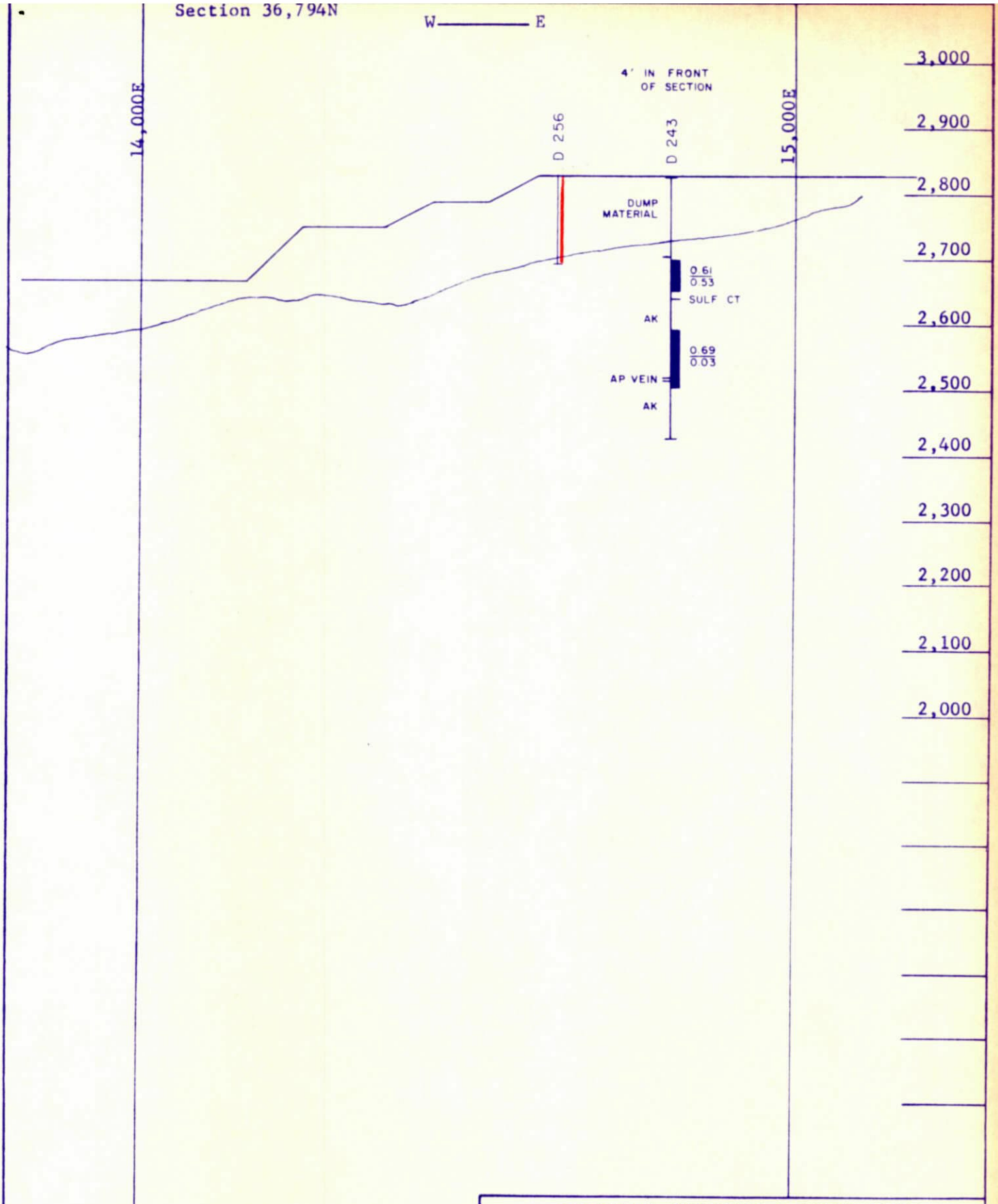

+ 0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

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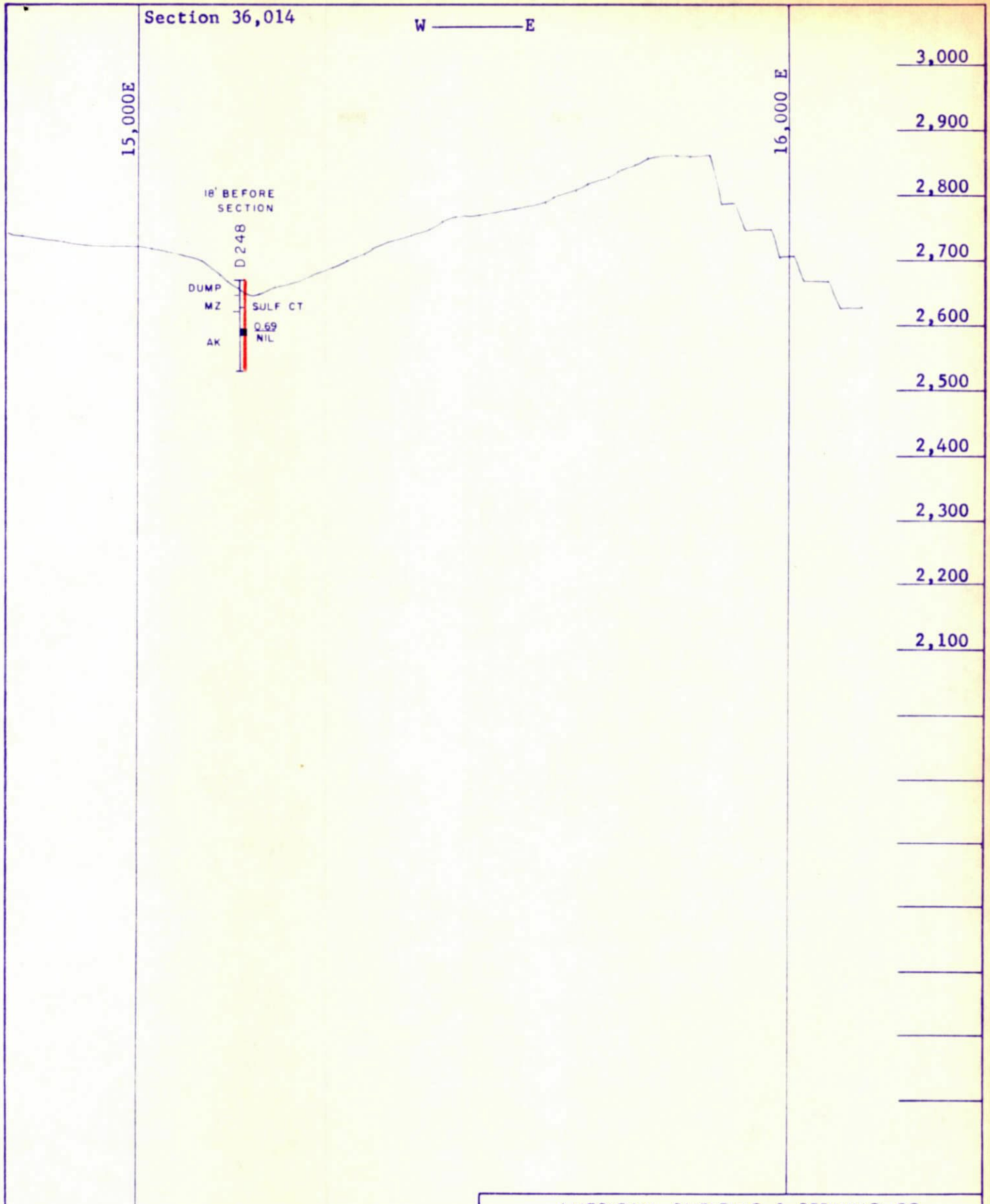

+ 0.4% Total Copper
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AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
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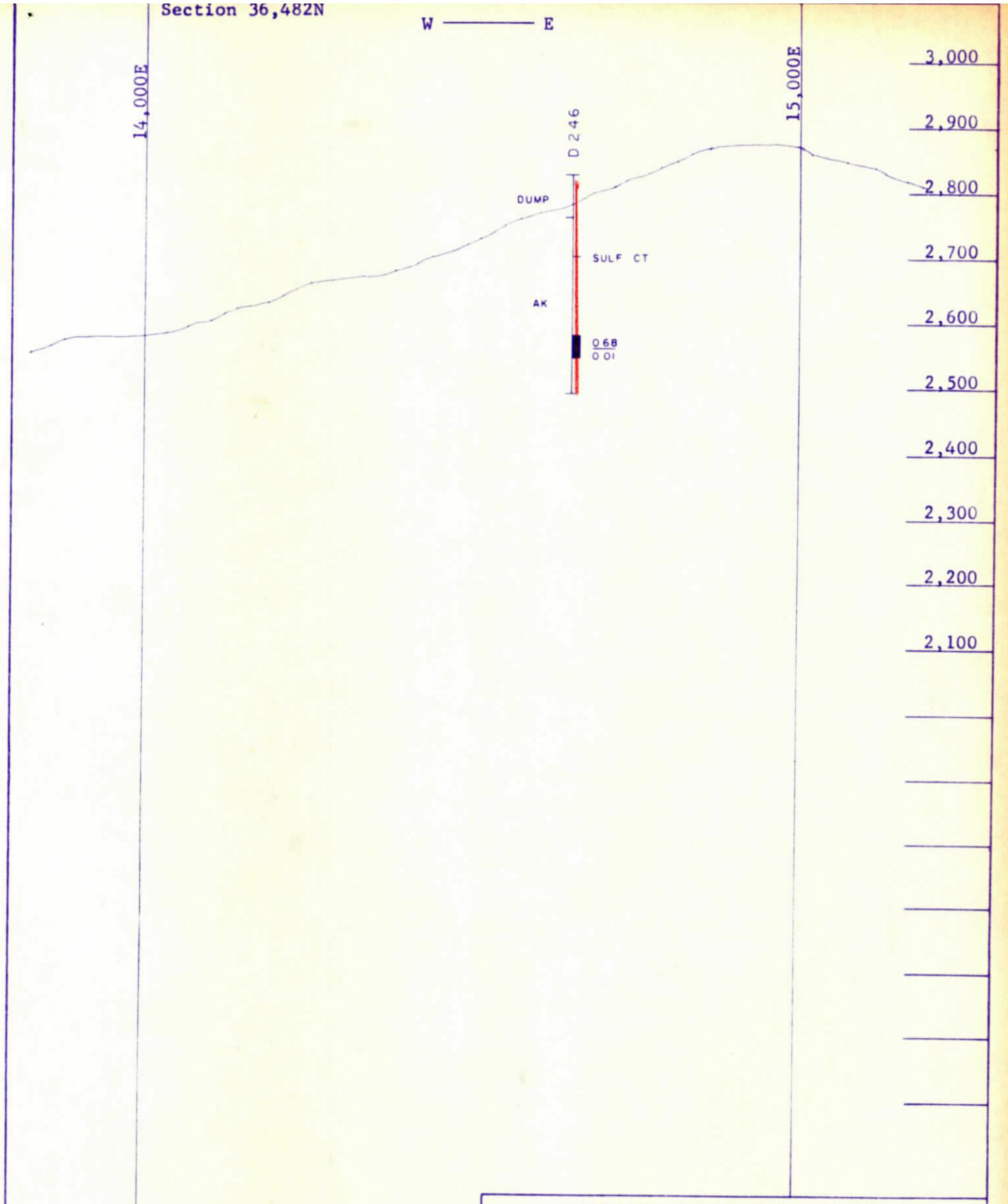


+ 0.4% Total Copper

Advance for month

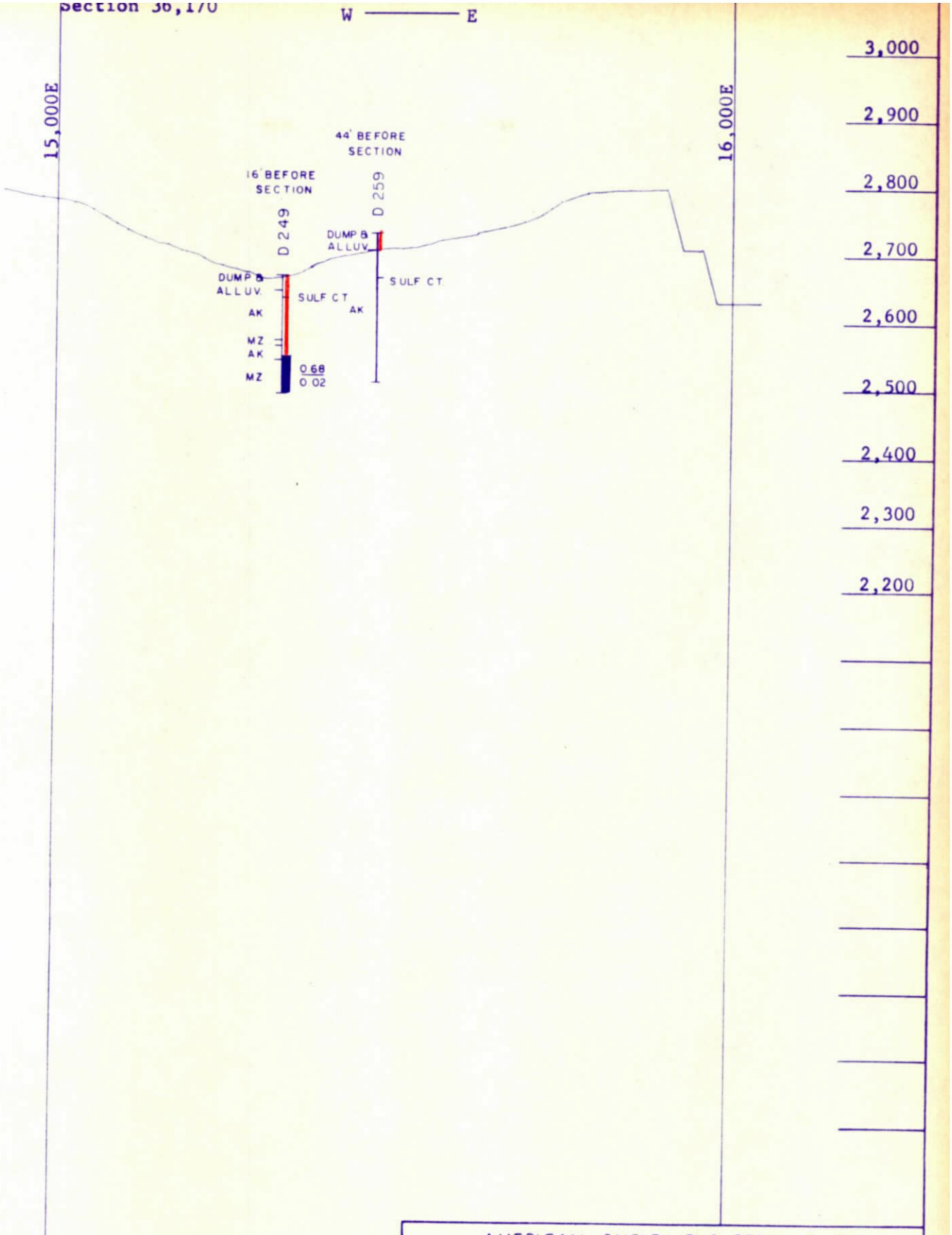
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP -MT. EXPECTATION AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	AUG 1961	S 121 A



+ 0.4% Total Copper

Advance for month

Note: Rock Types Generalized
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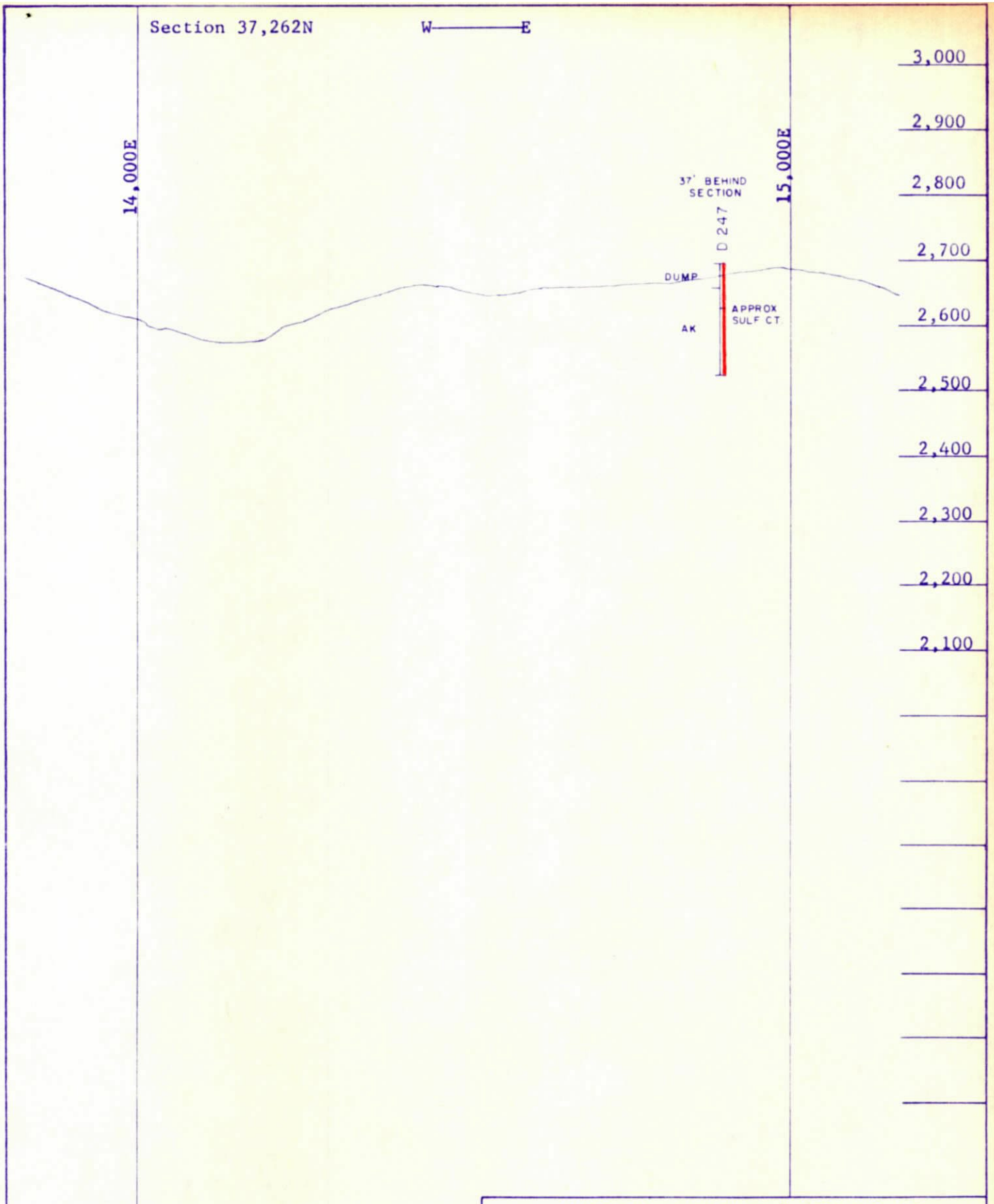
AMERICAN SMELTING & REFINING CO. SILVER BELL UNIT			
WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA DRILL HOLE PROJECTIONS			
SCALE 1" = 200'	DRAWN NRN	DATE AUG 1967	FILE S 121 A



+ 0.4% Total Copper

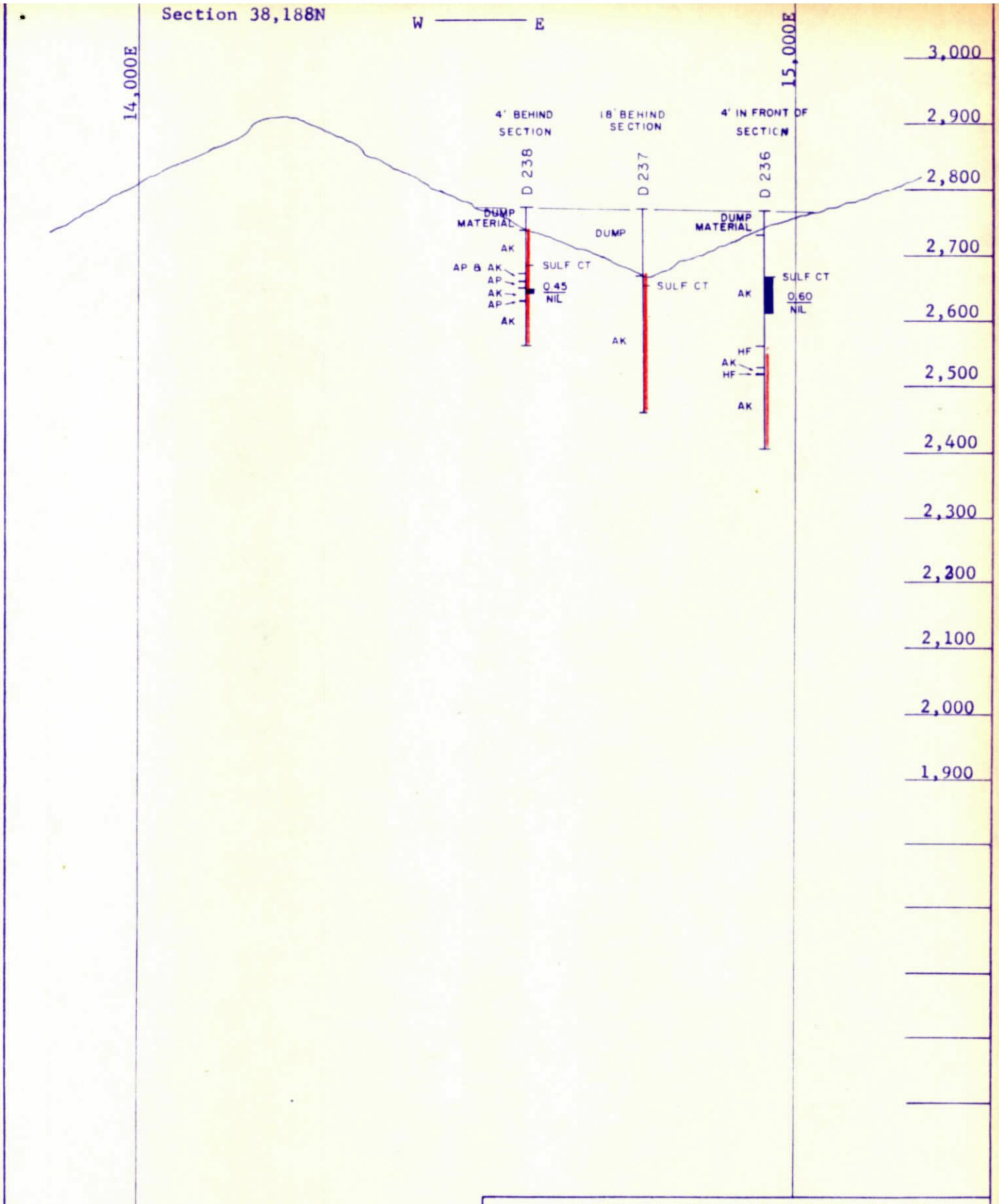
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	AUG 1967	S 121 A



+ 0.4% Total Copper

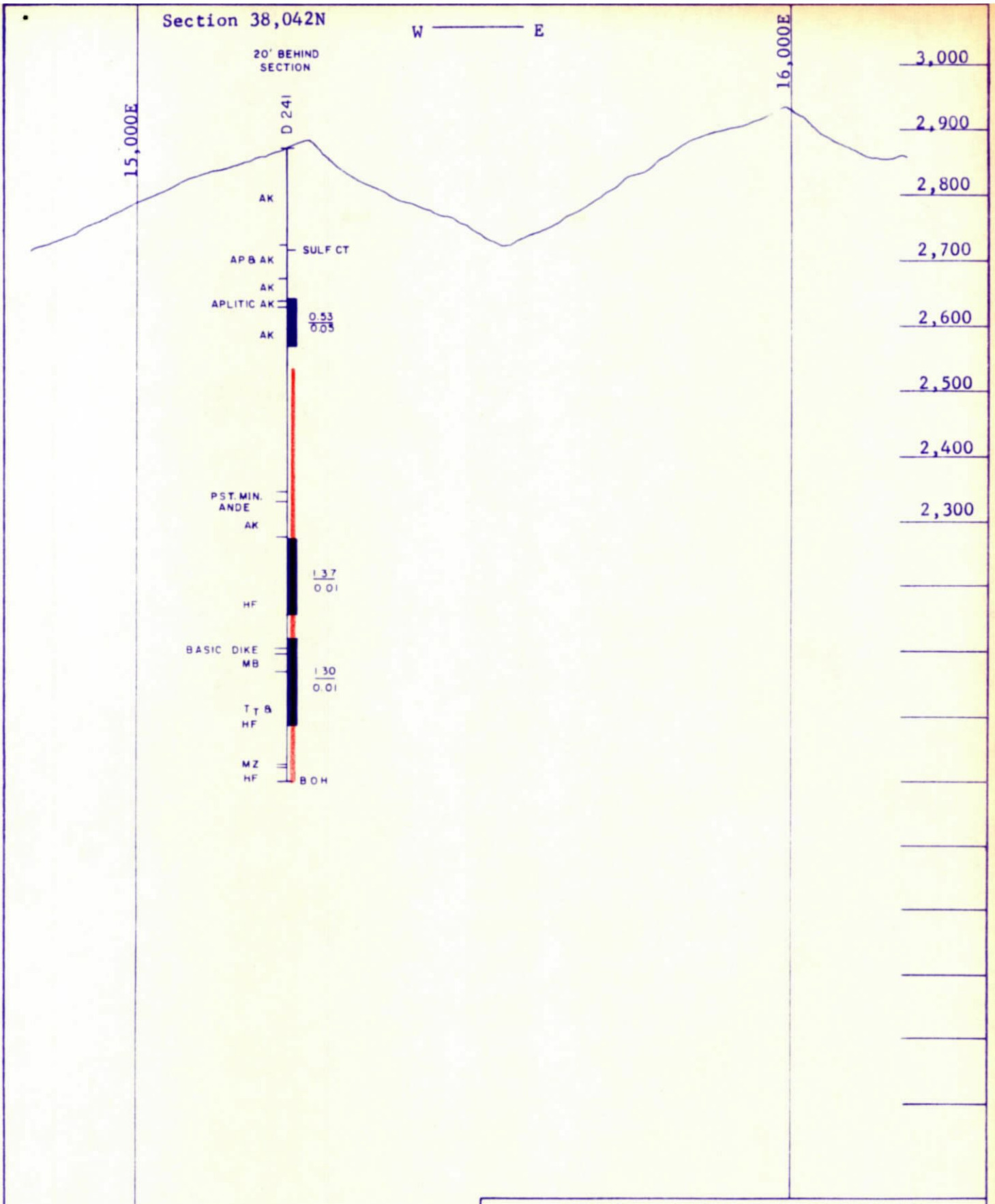
Advance for month

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	AUG 1967	S 121 A



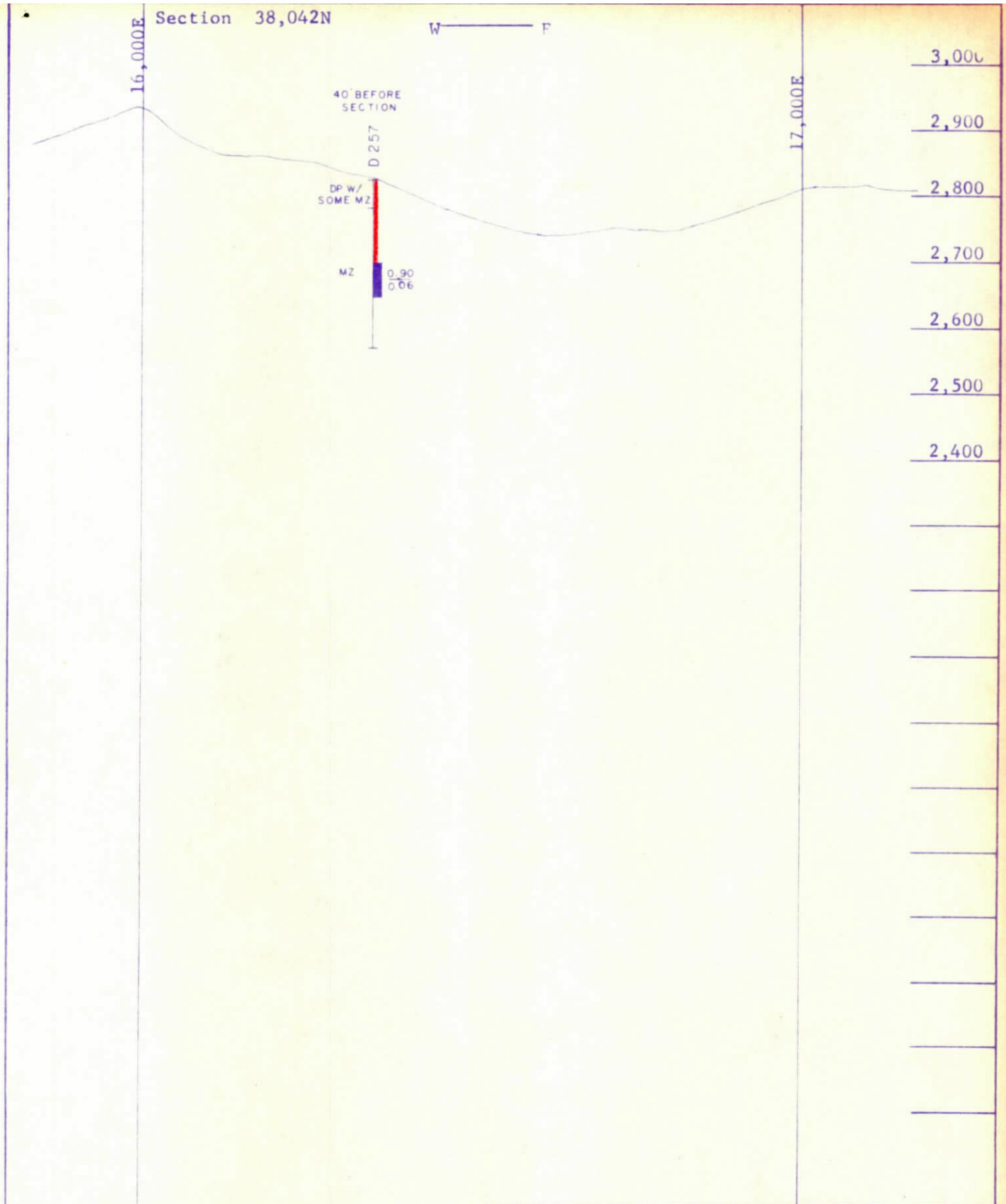
+ 0.4% Total Copper
Advance for month

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	8/18/67 AUG 1967	S 121 A

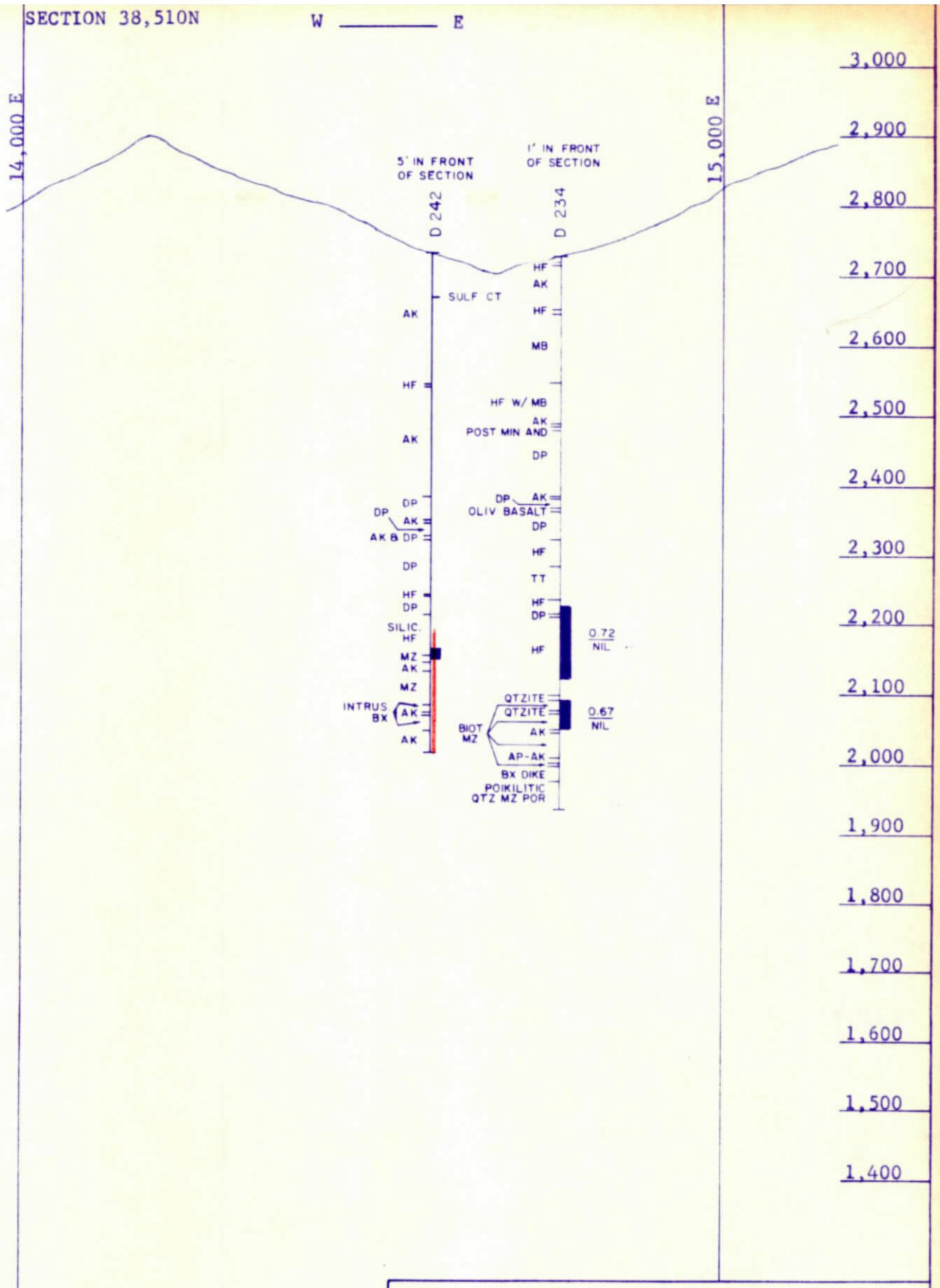


+ 0.4% Total Copper

Advance for month

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

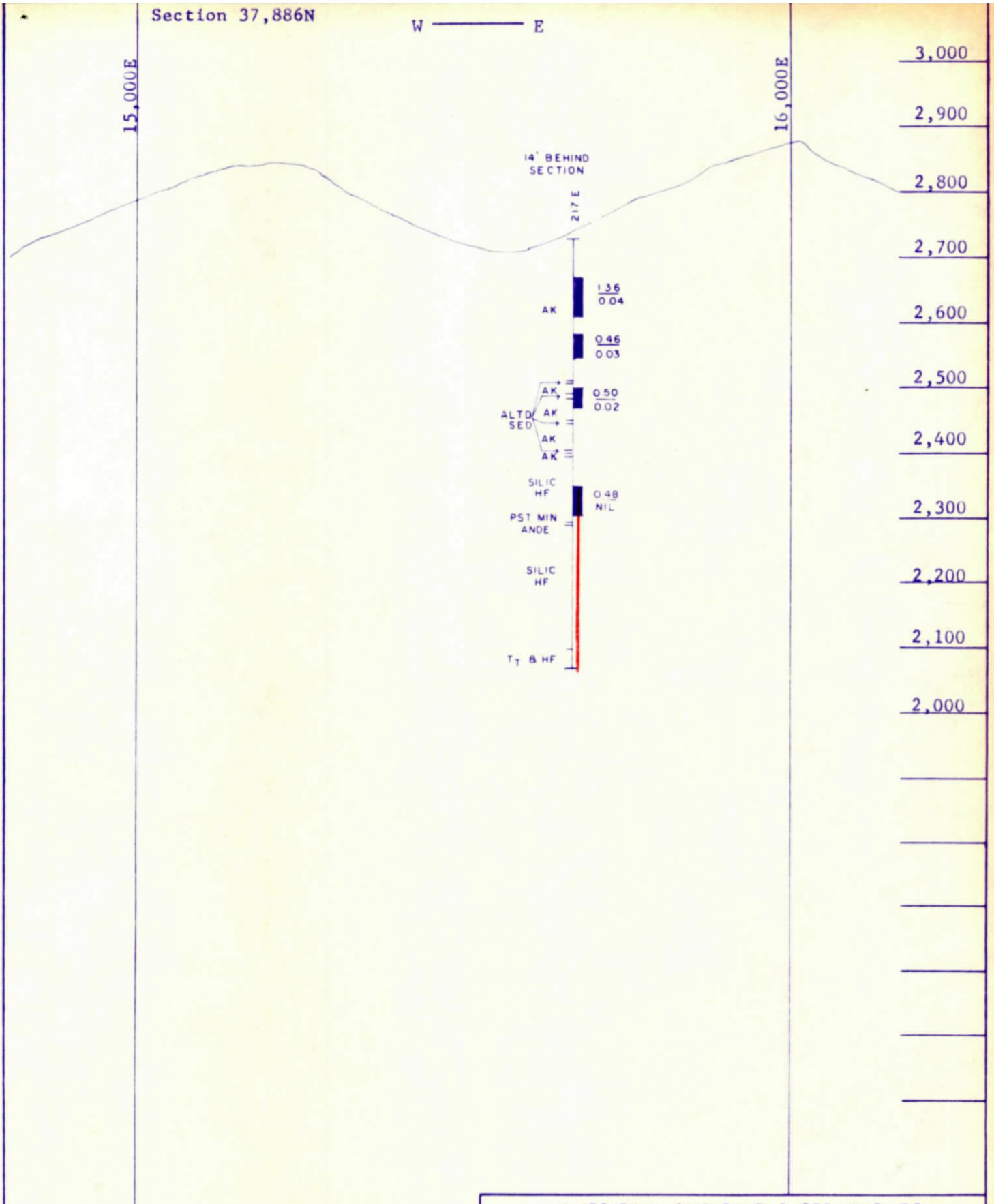
AMERICAN SMELTING & REFINING CO. SILVER BELL UNIT			
DAISY SHAFT - NORTH EL TIRO HILL AREA DRILL HOLE PROJECTIONS			
SCALE 1" = 200'	DRAWN NRN	DATE AUG 1967	FILE S 121 A



+ 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 1" = 200'	DRAWN	DATE AUG 1967	FILE S 121 A



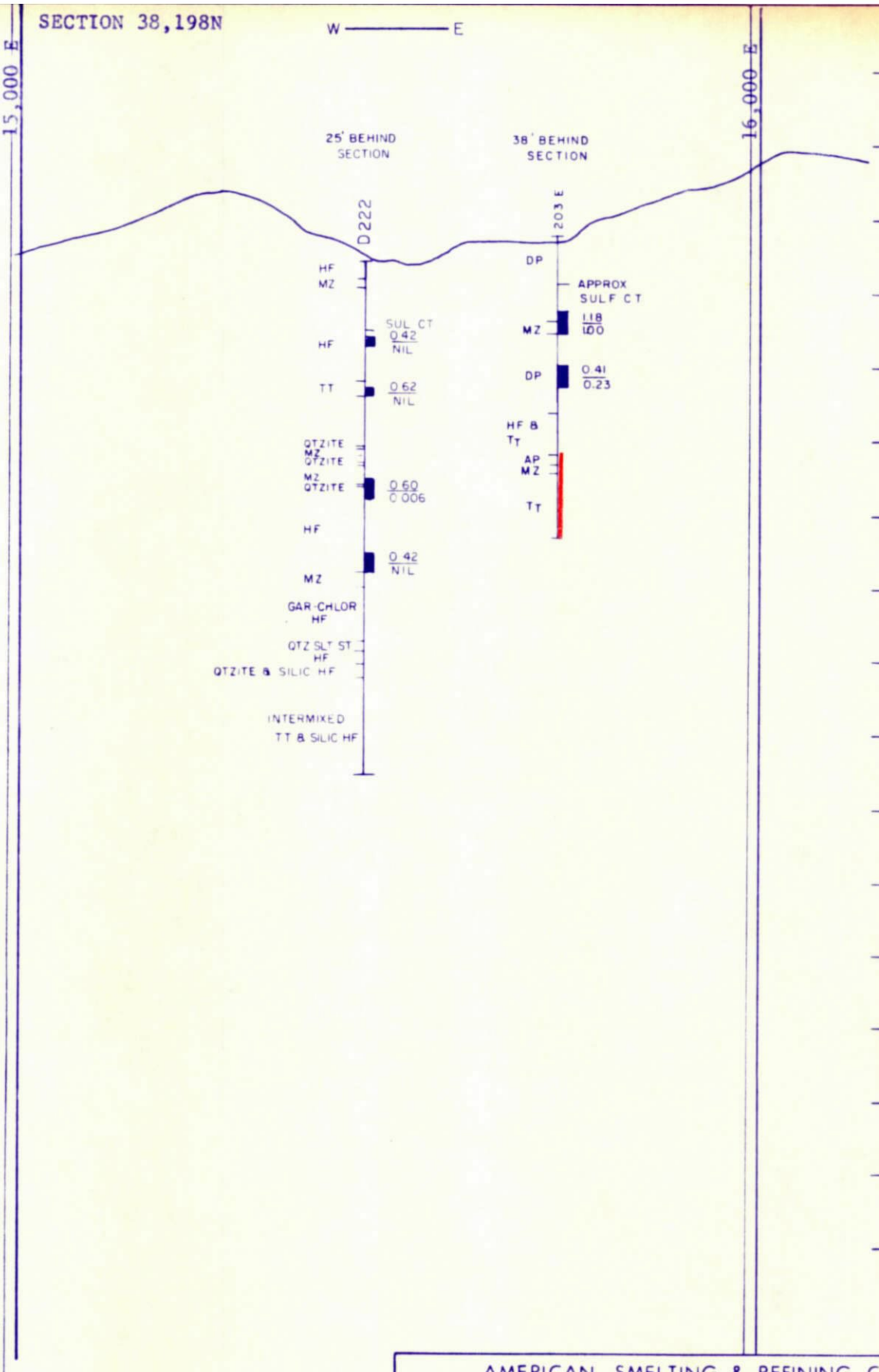
+ 0.4% Total Copper
Advance for month

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	AUG 1967	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	AUG 1967	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.

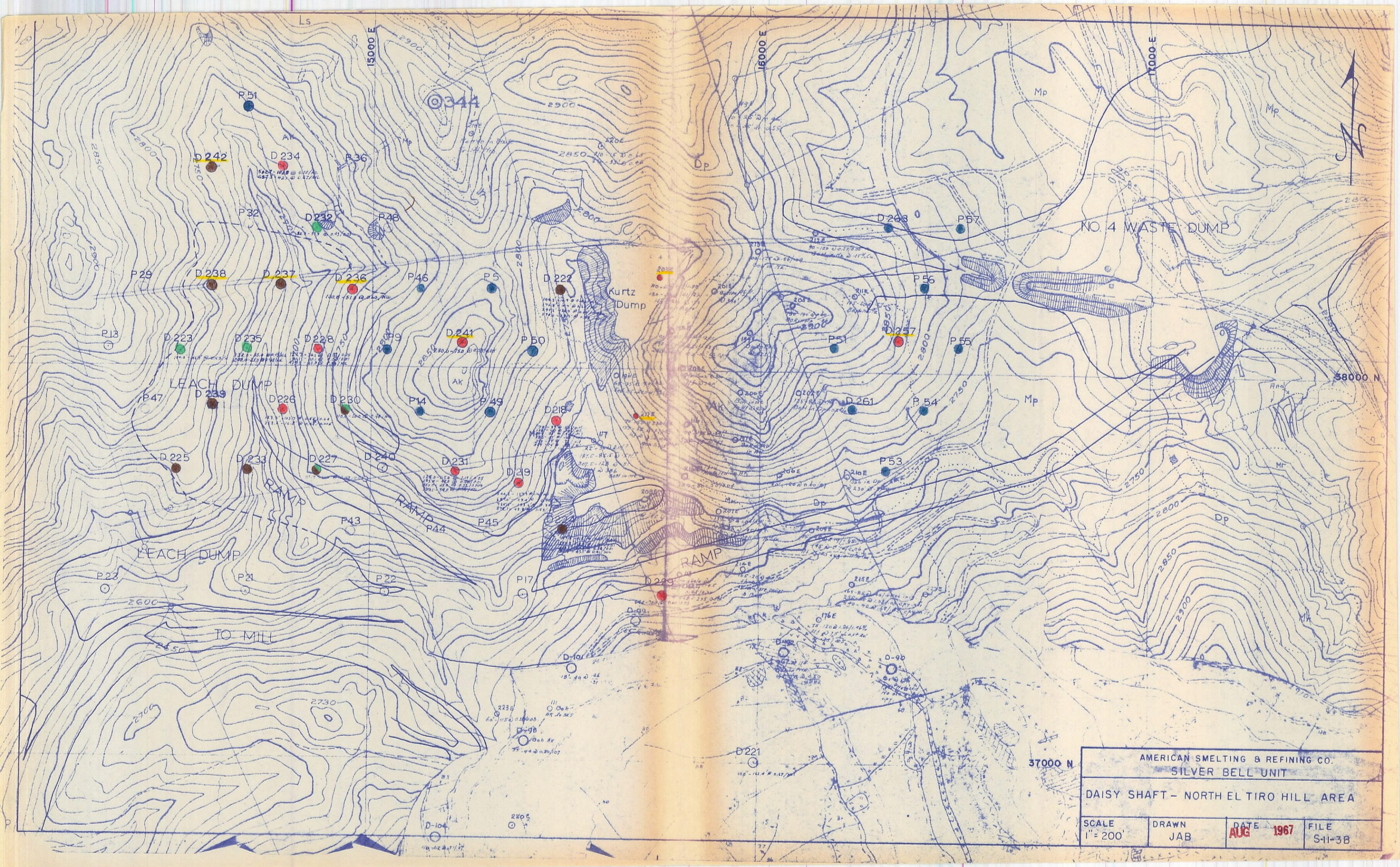
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

D-2??

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

D-2??

● None to thin +0.4% intervals.


15000 E
16000 E
17000 E
38000 N
37000 N
N
NO. 4 WASTE DUMP
Kurtz Dump
LEACH DUMP
LEACH DUMP
RAMP
RAMP
RAMP
TO MILL
P51
D 242
D 234
P36
P32
D 232
P48
P29
D 238
D 237
D 236
P46
P5
D 222
P13
D 223
D 235
D 228
P9
D 241
P50
P47
D 239
D 226
D 230
P14
P49
D 218
D 225
D 233
D 227
D 240
D 231
D 219
P43
P44
P45
P23
P21
P22
P17
D 220
D 221
D 104
D 263
P57
P56
P51
D 257
P55
D 261
P54
P53
D-101
D-98
D-96
2900
2850
2800
2750
2700
2650
2600
2730
Mp
Dp
Ls
Ak
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT – NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE AUG 1967
FILE S-11-38

NO.4 DUMP
LEACH DUMP
EL TIRO PIT
2670 ROAD
2750 ROAD
NO.1 DUMP
NO.2 DUMP
NO.2 DUMP
POWER LINE
13,800 V.
XFMR
2990 El.
+34% RAMP
+60%
+70%
+60%
+60%
D 247
D 244
D 251
D 245
D 253
D 252
D 256
D 243
D 255
D 254
D 246
D 250
D 249
D 289
D 262
D 248
D 260
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 AUG 1967
FILE

Mr. J. H. Courtright

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

J. H. C.

AUG 25 1967

August 16, 1967

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
EL TIRO - DAISY SHAFT AREA AND WEST EL TIRO LEACH DUMP AREA
July, 1967.

The following briefly summarizes the drilling done during the month of July.

During the month we had two diamond core drilling rigs and one Failing rotary-hammer rig working in the El Tiro-Daisy Shaft area and in the West El Tiro leach dump area. The diamond rigs worked two shifts per day and the Failing rig only one.

A total of 396.0' of dump material was rotary drilled and 1,226.0' of bedrock was hammer drilled with the Failing rig. The diamond core rigs drilled a total of 2,214.4' of bedrock during the same period.

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-231	2,791.54	37,751.74	15,247.39	799.0	34.0	0.54	Nil	243.8	1,000.2	1,000.2
D-232	2,734.20	38,354.93	14,868.60	No significant thickness				256.4	617.4	617.4
D-234	2,728.04	38,510.99	14,769.14	502.7	102.8	0.72	Nil	324.5	796.0	796.0
				637.3	42.1	0.67	Nil			
D-235	2,771.68	38,040.56	14,676.77	132.0	55.0	0.45	Nil	223.0	320.0	320.0
				202.0	25.0	0.44	Nil			
D-236	2,770.25	38,193.75	14,952.41	100.8	57.3	0.60	Nil	214.0	214.0	
D-237	2,774.18	38,206.01	14,767.25	All dump material				89.0	89.0	
D-238	2,775.60	38,201.70	14,588.70	All dump material				39.0	39.0	
D-239	2,772.73	37,901.83	14,594.12	No significant thickness				252.0	252.0	252.0
D-240	2,755.37	37,740.77	15,053.83	No significant thickness				485.0	520.0	520.0
D-241	2,870.51	38,062.12	15,230.22	230.0	75.0	0.53	0.05	338.0	338.0	
D-242	2,733.60	38,504.73	14,584.86	No significant thickness				546.7	546.7	
D-243	2,826.38	36,789.88	14,819.53	127.0	50.0	0.61	0.53	403.0	403.0	403.0
				235.0	87.7	0.69	0.03			
D-244	2,750.00	37,112.46	14,639.69	92.0	35.0	1.00	0.03	210.0	210.0	
				142.0	25.0	0.63	Nil			
D-245	2,746.32	37,107.75	14,994.48	77.0	65.0	0.56	0.09	212.0	212.0	

- - - - -

GENERAL PROGRAM

The drilling program for the month of July saw continuation of the drilling in the El Tiro-Daisy Shaft area and the initiation of drilling in the West El Tiro leach dump area.

Drilling was continued in the area to the west of Daisy Shaft with a dual purpose still in mind. An effort was made to try to show continuity of what appears to be a thin low-grade chalcocite blanket and to make further probe of plaeozoic sediments below the alaskite to the north of the dump.

Although more drilling needs to be done to complete the drill pattern between the dump area and the Kurtz-Daisy Shaft area there appears to be a continuous, but not uniform, chalcocite blanket extending and narrowing towards D-223. What might be, or have been an economic, although thin and low-grade, chalcocite enriched zone is hurt by being buried as much as 100' beneath leach dump material.

The holes which were drilled to investigate the chalcocite zone were: D-231, D-235, D-236, D-239, D-240 and D-241. Holes D-237 and D-238 will also be drilled to test the chalcocite, but by the end of the month had only been rotary drilled and cased through the dump.

The drilling being done to the north of the dump area in the vicinity of 38,400N, 14800E/18 along a magnetic anomaly which is centered slightly east of the bottom of the drainage and extends from the dump to the head of the drainage. Holes D-232 and D-234 were drilled along the axis of this anomaly and D-242 on the west boundary.

Drilling was initiated in the west El Tiro leach dump area at this time to take advantage of the availability of the Failing rotary-hammer rig.

The drilling is being done as a preliminary test to check the chalcocite zone in the area, and to determine whether or not it will be feasable to drill and case some holes through the dump at this time. The holes drilled are D-243, D-244, and D-245.

Formal drilling of the area will not be carried out until the completion of the drilling in the El Tiro-Daisy Shaft and North El Tiro Hill area.

INDIVIDUAL DRILL HOLE DESCRIPTION

D-231 Although not completed until this month this hole was described in completion in last months report.

D-232 This hole was drilled to 361.0' last month and stopped in poorly mineralized dacite porphyry. The drill was then moved to D-234 and at that location, as was described in last months report, the dacite was again intercepted and this time penetrated. As is indicated on the drilling tabulations on the first page of this report significant thicknesses of approximately 0.7% ore was encountered beneath the dacite in D-234. In light of this new information it was decided to re-enter D-232 and penetrate the dacite in hopes of intercepting a similar sequence.

The base of the dacite was quickly reached upon resumption of drilling at D-232. At 366.2' the dacite was cut by an apalite dike which itself was underlain by a younger post-mineral andesite which occupied the interval 317.7-373.3'. Beneath the dacite was a thick sequence of intermixed thin-bedded (?) tremolite-actinolite, diopside and garnet hornfels, tactites and siliceous hornfelsic siltstones. This sequence was cut by dacite in the interval 456'-508', but continued to the bottom of the hole at 617.4'. The units were generally quite fine grained and dense and contained only sparse amounts of sulfides. For the most part sulfides were fracture controlled and chalcopyrite predominated over pyrite.

It appears that the sediments encountered in this hole were the same as those which contained ore in D-234. If this is so, then there exists more local controls on ore localization than bedding favorability.

D-234 This hole was described in completion in last months report.

D-235(Hammer) This hole was collared in dump material and hit alaskite bed rock at 97'. The alaskite was of normal texture and was weak to moderately altered throughout. The hole was bottomed still in alaskite at 321.0'.

The approximate sulfide contact was at 125' and the material ran ore grade from there to 187.0'. Chalcocite enrichment started at the sulfide contact and occured as a variably enriched blanket to 217' at which point its volume abruptly diminished. At the bottom of the hole chclcocite accounted for 0.02% copper.

The water table was intersected at 292.0'.

D-236 This hole collared in dump material and intersected strongly broken and highly altered alaskite at 37.0". The hole is located directly adjacent to the strong fault zone indicated on the map and the effects of the fault are readily seen in the core.

At 207' the strongly broken and altered alaskite gave way to hornfelsic sediments. The sediments were light green tremalite-chlorite hornfels with variable amounts of garnet associated. Alaskite was again insected at 251.4' and continued to the bottom of the hole at 363.5'.

Sulfides were encountered at approximately 100' and ran ore grade from there to 158.1'. Nearly all of the copper in the interval occured as chalcocite. The main chalcocite zone was thin and abrupt extending from 100' to 168'.

Mineralization in the sediments was chalcopyrite controled by fractures and generally associated with garnet. Chalcopyrite values exceeded 0.4% in some intervals, but they were too short to be of any consequence.

D-237 This hole was only rotary drilled through the dump material during the month.

D-238 As above.

D-239(Hammer) This hole was collared in dump material and intercepted alaskite bedrock at 87.0'. The alaskite was of uniform character and persisted throughout the extent of the hole.

Sulfides were encountered almost immediately in bedrock, but the total sulfide content was lower than normal averaging approximately 2%. Chalcocite occured

only as a very weak blanket with only one ten foot interval reaching 0.4%. The chalcocite became non existant below 197.0'.

This hole was bottomed at 252.0'.

D-240 This hole collared in dump material and hit bedrock at 35.0'. The bedrock was bleached and weak to moderately altered alaskite. At 77.1' a poikilitic quartz monzonite porphyry similiar to that seen in the bottom of D-234 was encountered. A strong fault-breccia of younger age than either rock type extended from 54.5 to 87.0'. The altitude of this structure was not determined.

The poikilitic quartz monzonite continued to 132.6' where a brecciated contact with alaskite was encountered. The alaskite then continued on to the bottom of the hole being cut again at 295.5-303.5 by the monzonite and in the intervals 353.1-356.9, 360.4-365.4, 420.9-433.9, 437.8-442.5, and 491.3-493.4, by thick white quartz veins which carried large grains of disseminated molybdenite, pyrite and chalcopyrite. Various attitudes ranging from 50° to 85° were measured for these veins, with the higher angles more common. The 5 separate intercepts quite probably are of the same vein which is snaking its way upward.

The sulfide contact was at 92' and the chalcocite enriched zone extended from there to 154'. The chclcocite zone was quite thin and low grade with only one interval assaying greater than 0.4%. The pyrite content of the hole was usually low except within the same zone as the higher grade chalcocite where it averaged approximately 4%. Chalcopyrite values increased somewhat with depth and individual assays reached 0.7%, but such zones were of insufficient thickness to make ore. Within the quartz veins mentioned above the molybdenum content, where assayed, averaged 0.081% or a copper equivalent of 0.34%.

This hole had a <u>surprisingly</u> low copper content for being so close to D-231 which had 115' of plus 1% chalcocite enriched ore.

D-241 (Hammer) D-241 was collared in alaskite and has persisted throughout the extent so far drilled. There is, however, a zone from 145.0' to 200.0' where the rock appears to be a mixture of apalite and alaskite.

Trace to sparse amounts of sulfides were first encountered at 35.0' and continued to 80.0'. This zone contained trace amounts of pyrite with chalcocite coatings. The main sulfide mass was not encountered until 130'. Chalcocite was present from there on thru 338', but was ore-grade only on the interval 230'-305'. The sulfides were intermixed with sparse to weak amounts of limonite.

The water table was encountered at 338.0' which indicates that the chalcocite blanket is stranded and explains the presence of limonites intermixed with the sulfides. Hammer drilling was stopped when the water table was encountered and a diamond drill has since been moved on to continue the hole. The hole will be taken to depth in an effort to intercept paleozoic sediments.

D-242 This hole was drilled on the west flank of a magnetic anomaly which extends from the north edge of the leach dump to the head of the drainage. This hole was drilled to give further information on the altitides of the alaskite-sediment contact, and to determine the extent of alteration and mineralization of the sediments if found.

The hole was collared in alaskite which was sparsely altered and limonite stained. Sulfides were encountered at 54.0' with the pyrite content averaging 3% down to the depth of 175.6' where it was reduced to approximately 1%. The pyrite content reamined quite low throughout the rest of the hole with a few local exceptions. The chalcocite zone was very low-grade and extended from 54' to 217'.

A two foot pod of chlorotized limey sediment was encountered in the alaskite at 190.8' and the alaskite was then cut by dacite at 351.6'. The dacite extended to 521' with a few small zones of alaskite and sediments included. This dacite is a continuation of the sill encountered in D-232 and D-234.

A continueous block of siliceous hornfels and siltstone occured in the interval 521'-580'. These sediments were somewhat similar to those seen directly beneath the dacite in D-234 and may indicate that the sediments are of a continuous somewhat thick sequence. Individual assays indicate 0.6% Cu from chalcopyrite in some limey units.

The monzonite encountered at 580' is the same poikilitic monzonite as was encountered in D-232 and D-234, and shows little increase in copper over the dacite. The pyrite content, however, is higher than in either the dacite or sediment and may be, at least partially, primary.

The breccia occuring between 652' and 689' is an intrusive breccia and contains fragments of alaskite, dacite, monzonite and paleozoic sediments. The breccia was variably mineralized with some more favorable sediment pebbles and blocks carring interesting amounts of chalcopyrite.

The breccia was underlain at 689.6' by sparse to weakly altered alaskite which contained less than 1% total sulfides. The hole was bottomed in this alaskite at 722.9'.

D-243 (Hammer & Diamond) The hole was drilled through the leach dump at the west end of El Tiro pit. This dump has been subjected to leach solutions intermittently for several years and the effects of these leach solutions are pronounced in the underlying bedrock.

The hole was started in and penetrated 122' of dump material. The dump is underlain by alaskite bedrock which persist to the bottom of the hole at 403.0'. The alaskite is cut by only an occasional thin apalite dike.

The effects of the leach solutions has been; (1) the development of a strong limonite-hematite stain and coating through and the rock, (2) the precipation of a moderate amount of malachite in altered plagioclase feldspars (3) slight, noticable increase in alteration intensity.

It is evident that a significant amount of copper leached from the dump above has been carried down into bedrock and precipitated out as non-sulfides in the interval 127'-177' which has an average non sulfide copper content of 0.53%.

Chalcocite occured in some proportions throughout the hole, but was sigiificantly concentrated to be ore-grade only in the interval 235.0'-322.7'. The water table began at 222.0'.

D-244 (Hammer) This hole was collared in the west El Tiro leach dump and intersected alaskite bedrock at 32'. The alaskite was sparse to weakly hematite-limonite stained to the depth of 97' and showed only sparse-weak clay-sericite development to 67'. The degree of alteration increased to weak-moderate in the interval 67'-177' and then became sparse.

The degree of mineralization corresponded closely to the alteration - the pyrite content averaged approximately 3% through the interval 92'-177' and dropped to approximately 1% above and below this zone. The chalcocite zone extended from 62' to 182' with strong enrichment occuring in the interval 92'-127' where individual assays indicated 2.33% copper as chalcocite. In the interval 142'-167' there was an unusual appearance of bornite-covellite on pyrite and chalcocpyrite giving ore-grade enrichment.

This hole was bottomed at 210' at which point the water table was intercepted.

D-245 (Hammer) This hole collared in dump material and hit alaskite bedrock at 32'. The alaskite was moderately limonite-hematite stained from 32' to 82' and only sparsely altered throughout the extent of the hole.

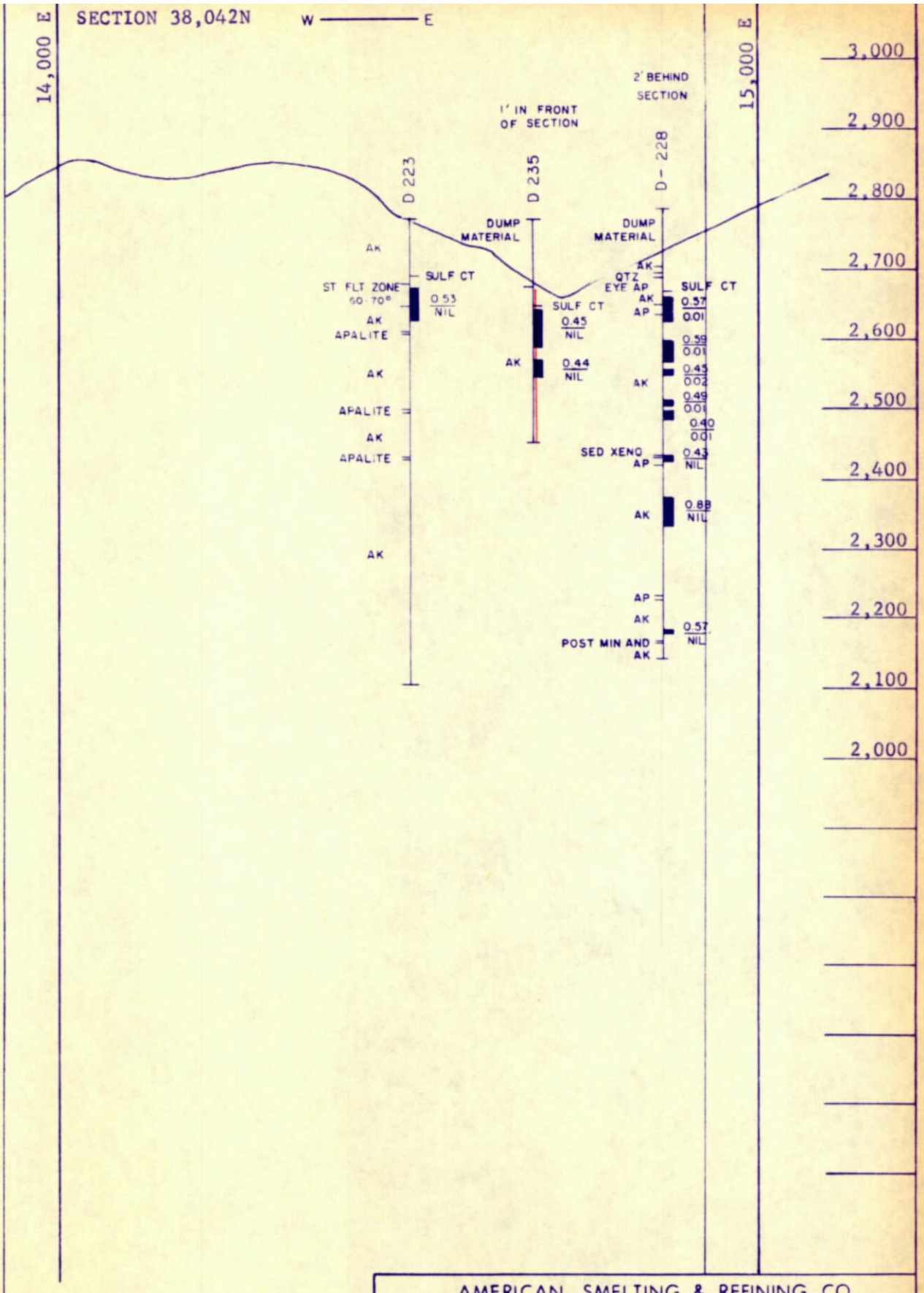
Sulfides were encountered at 82' and varying amounts of chalcocite was present from there to the bottom of the hole of 212'. COvellite-bornite also occured intermixed with the chalcocite in the interval 87'-137'. Ore grade enrichment existed through the interval 77'-142'.

The hole was stopped at the water level at 212'.

N. R. Nuttycombe

N. R. Nuttycombe

NRN:jca



+ 0.4% Total Copper

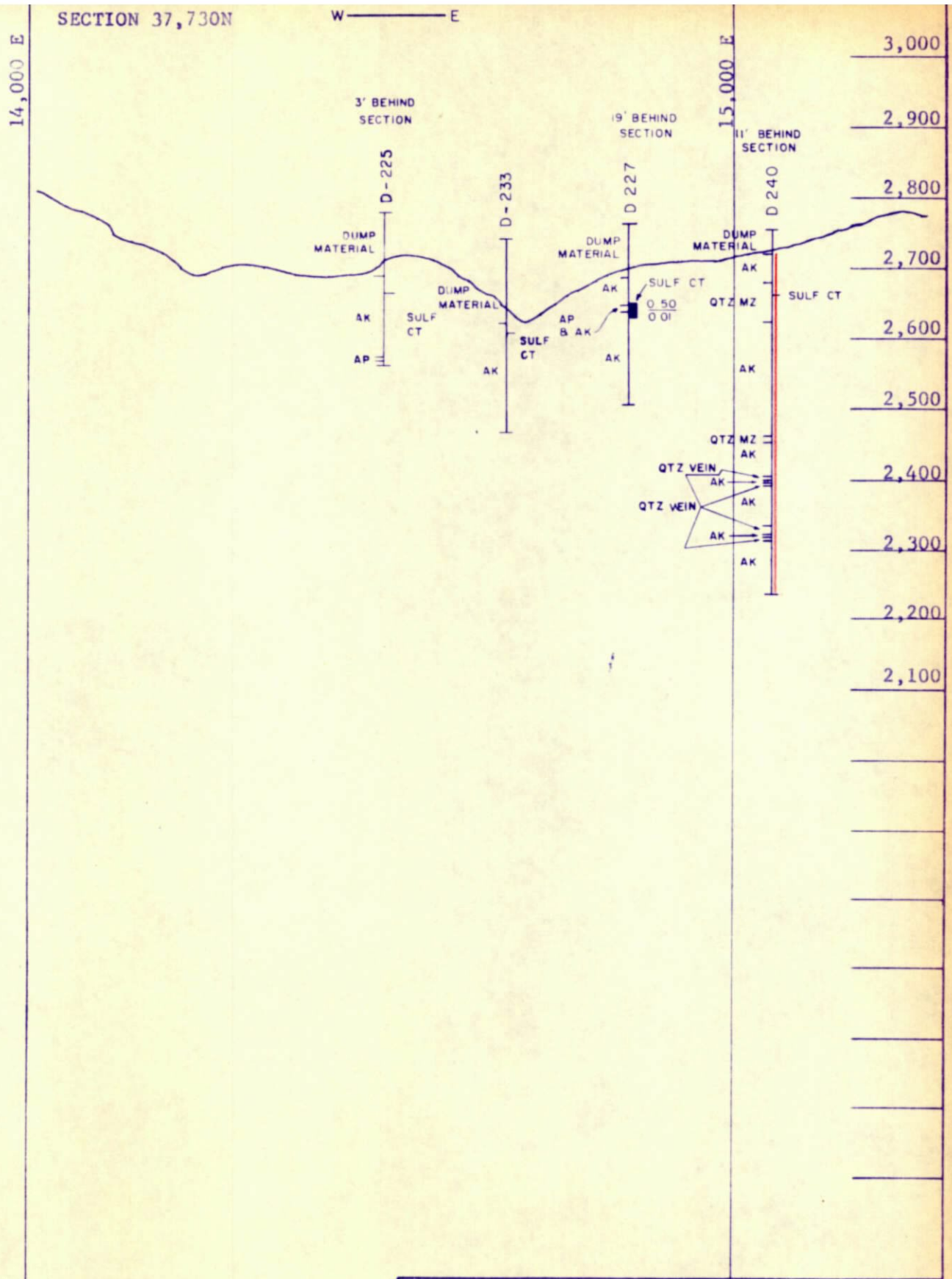
Advance for month

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	8/18/67	S 121 A



■ + 0.4% Total Copper

| Advance for month

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AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

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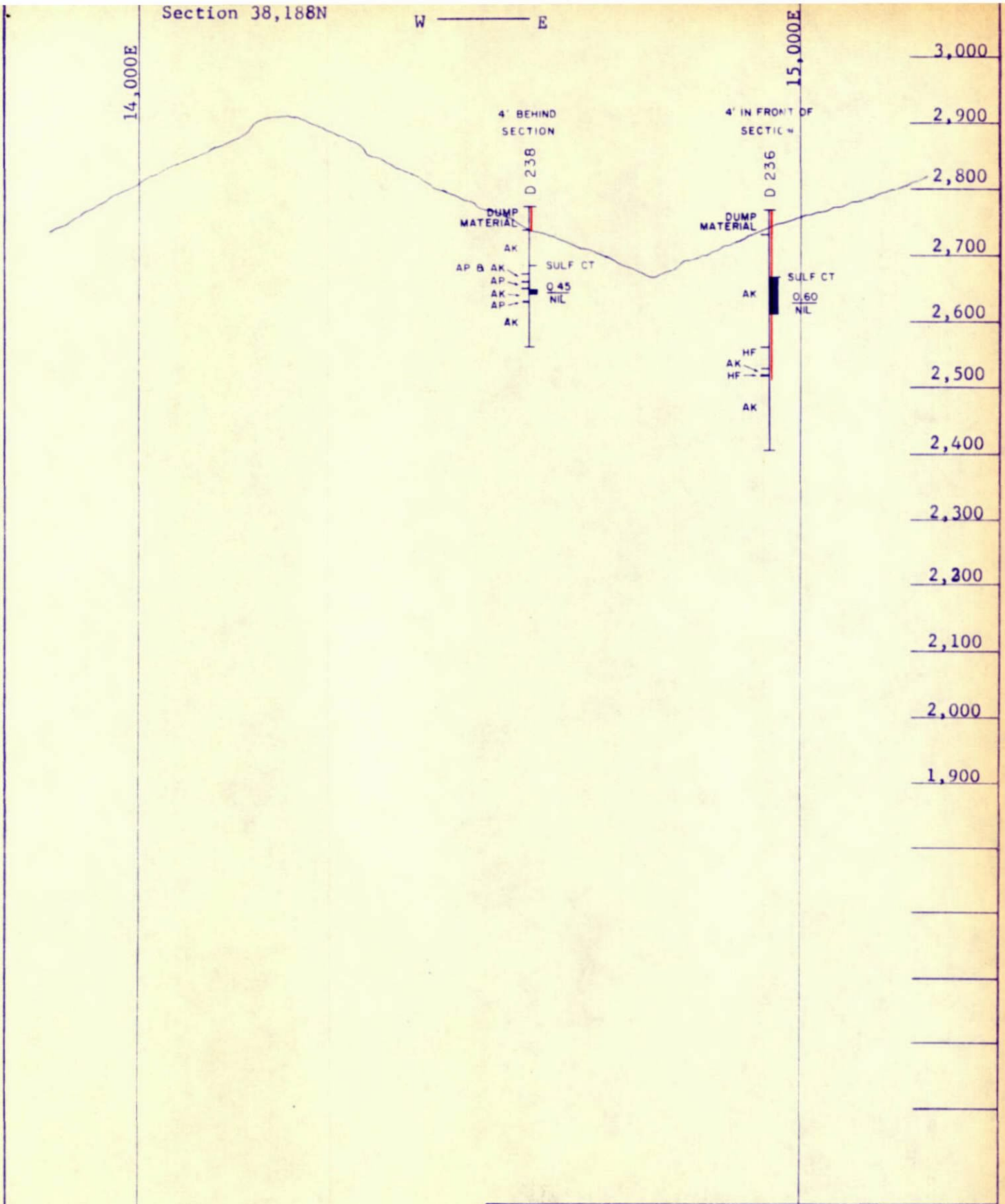

■ + 0.4% Total Copper

| 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

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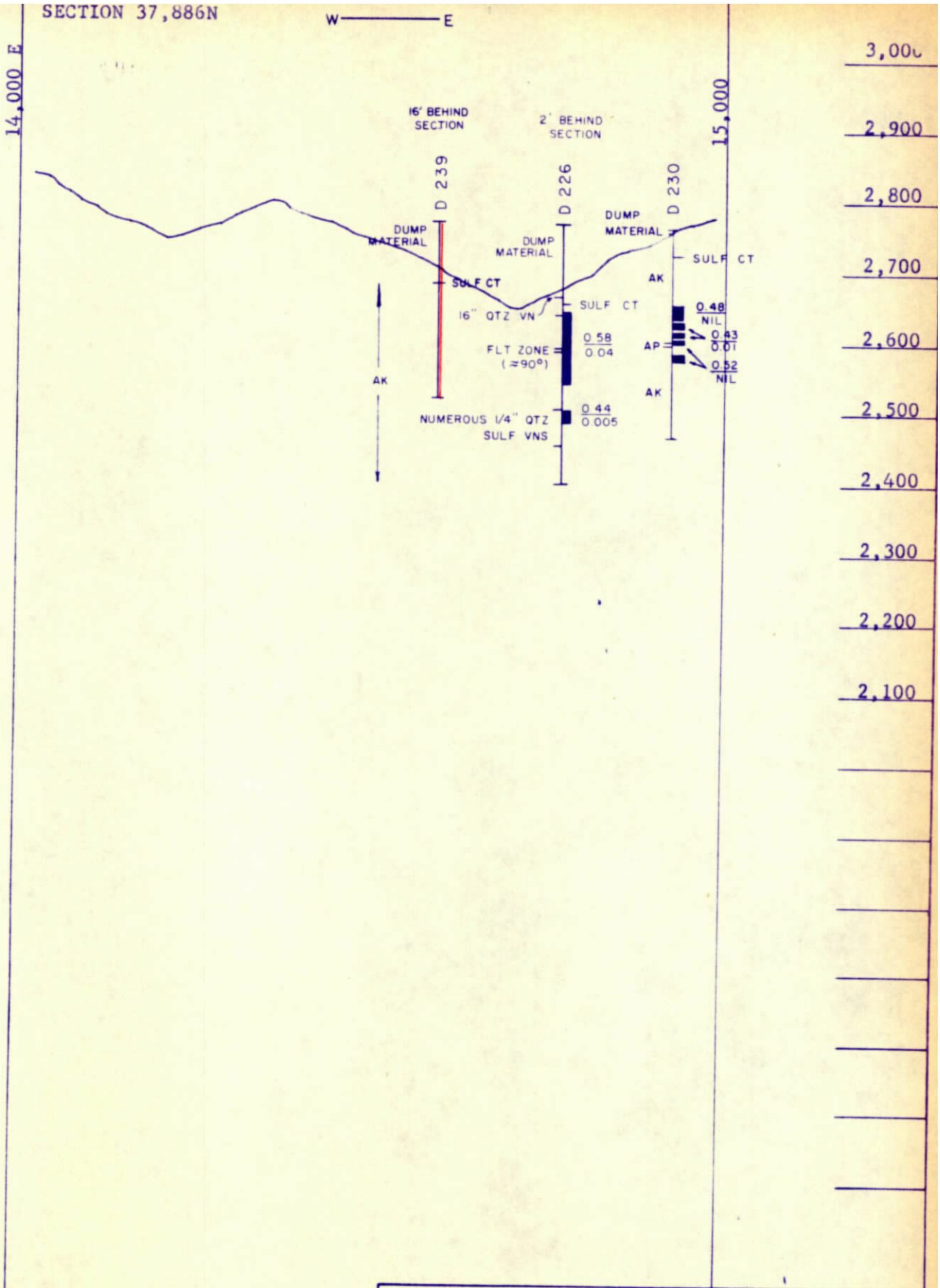
1" = 200'	NRN	8/18/67	S 121 A



■ + 0.4% Total Copper

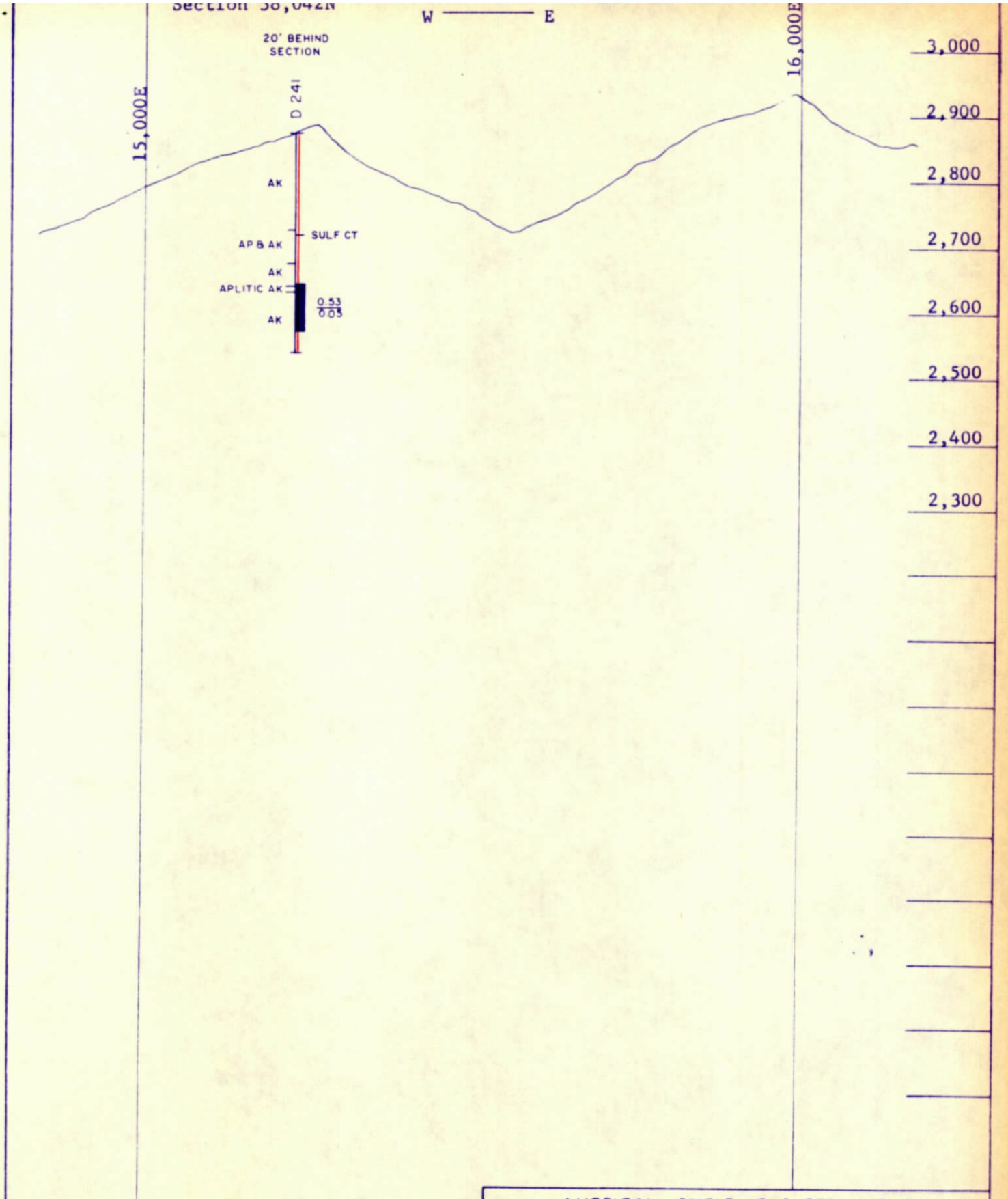
| Advance for month

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	8/18/67	S 121 A



+ 0.4% Total Copper

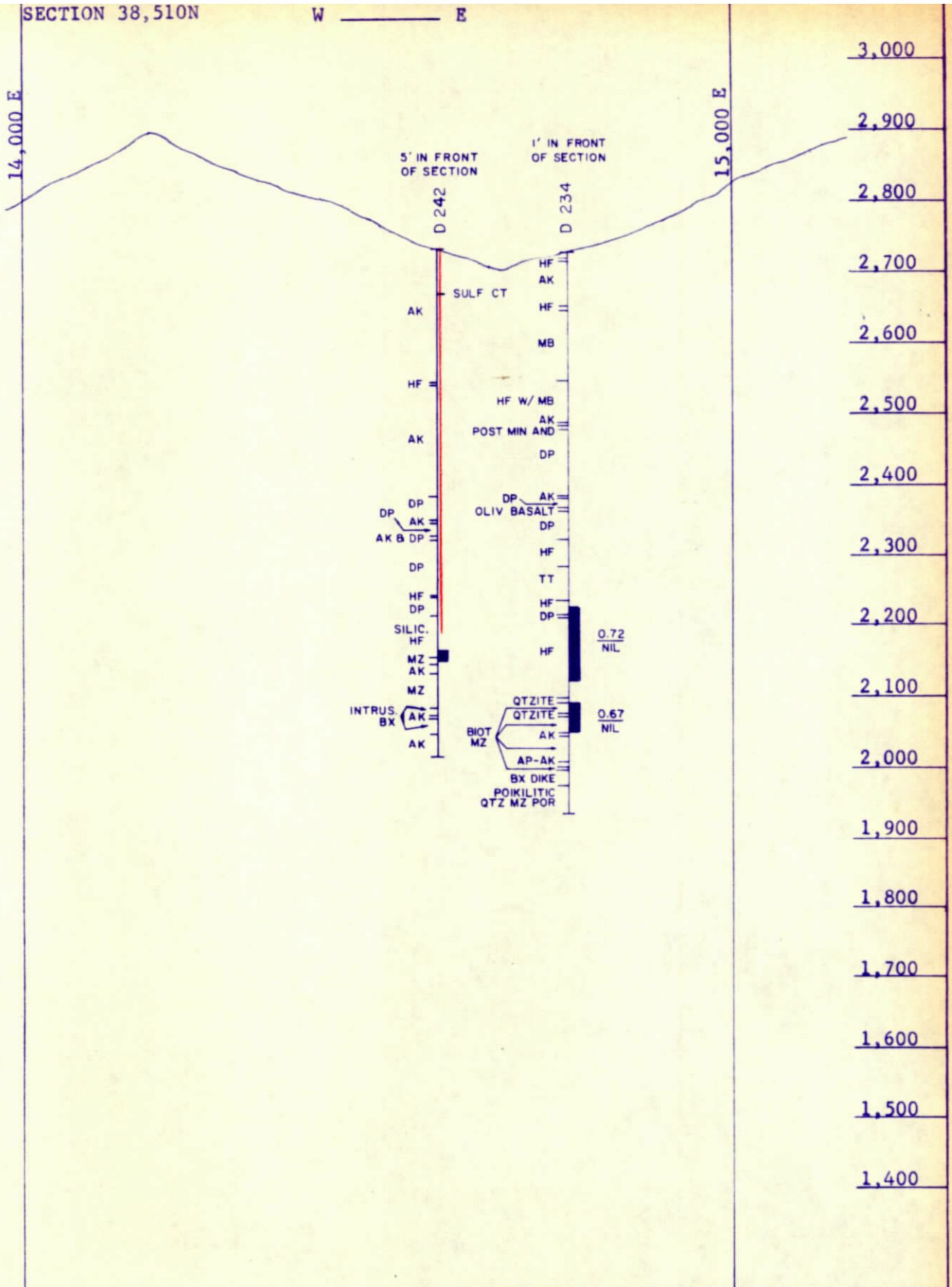
Advance for month

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	8/18/67	S 121 A



+0.4% Total Copper

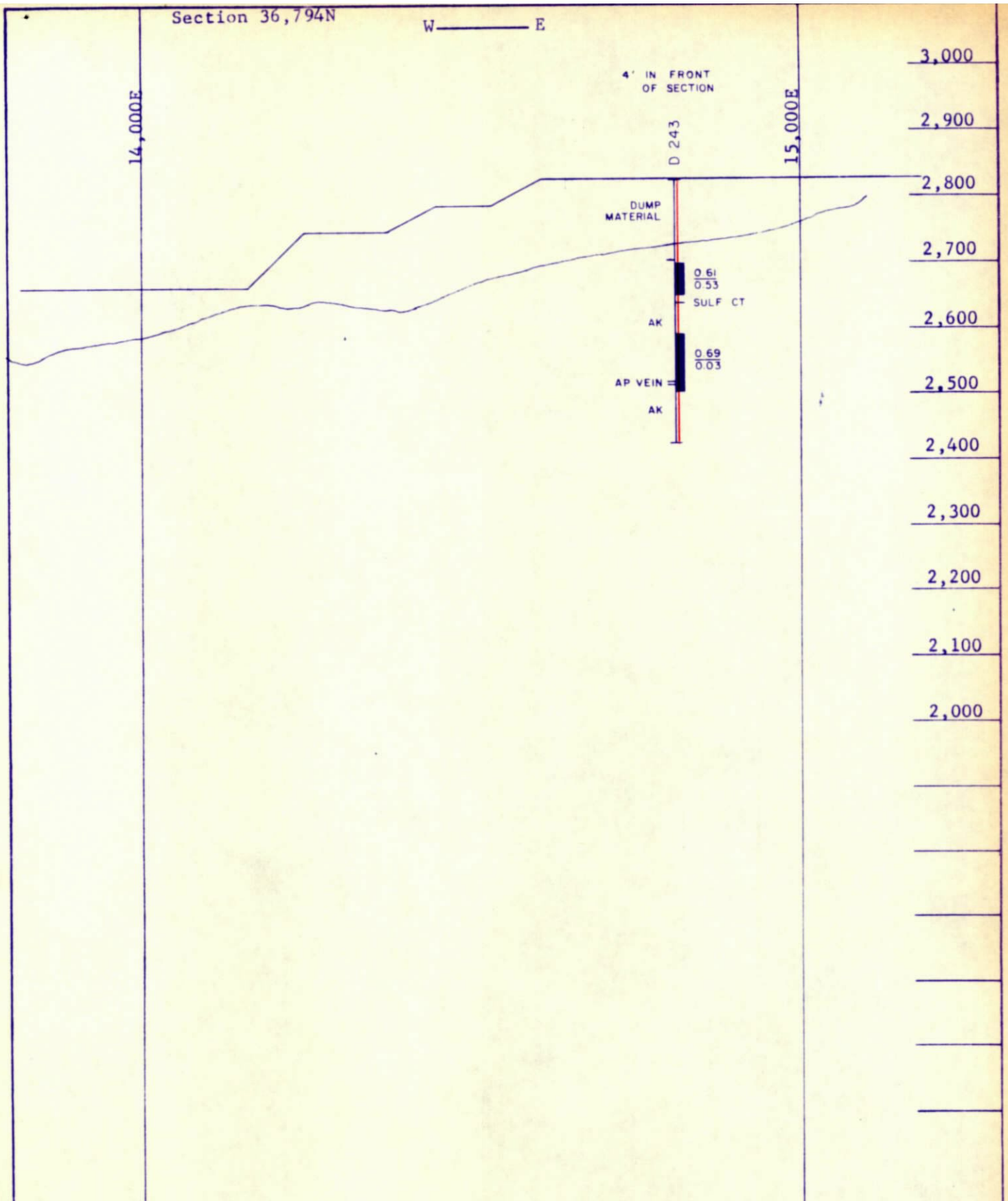
Advance for month

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'			S 121 A



▮ + 0.4% Total Copper

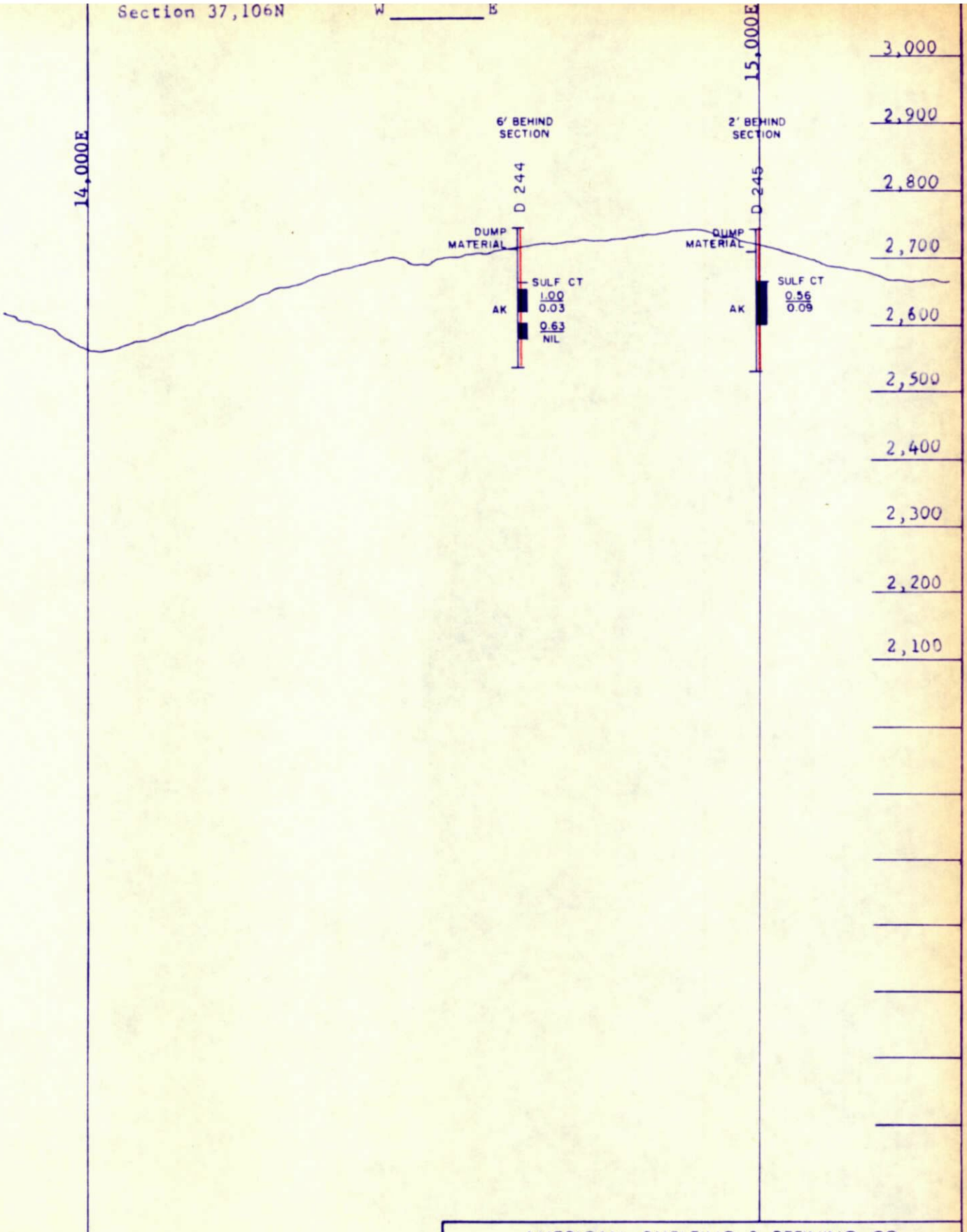
| Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

WEST EL TIRO LEACH DUMP - MT. EXPECTATION AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN		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

West El Tiro Leach Dump - Mt. Expectation Area
Drill Hole Projections

SCALE	DRAWN	DATE	FILE
1" = 200'	NRN	8/18/67	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.

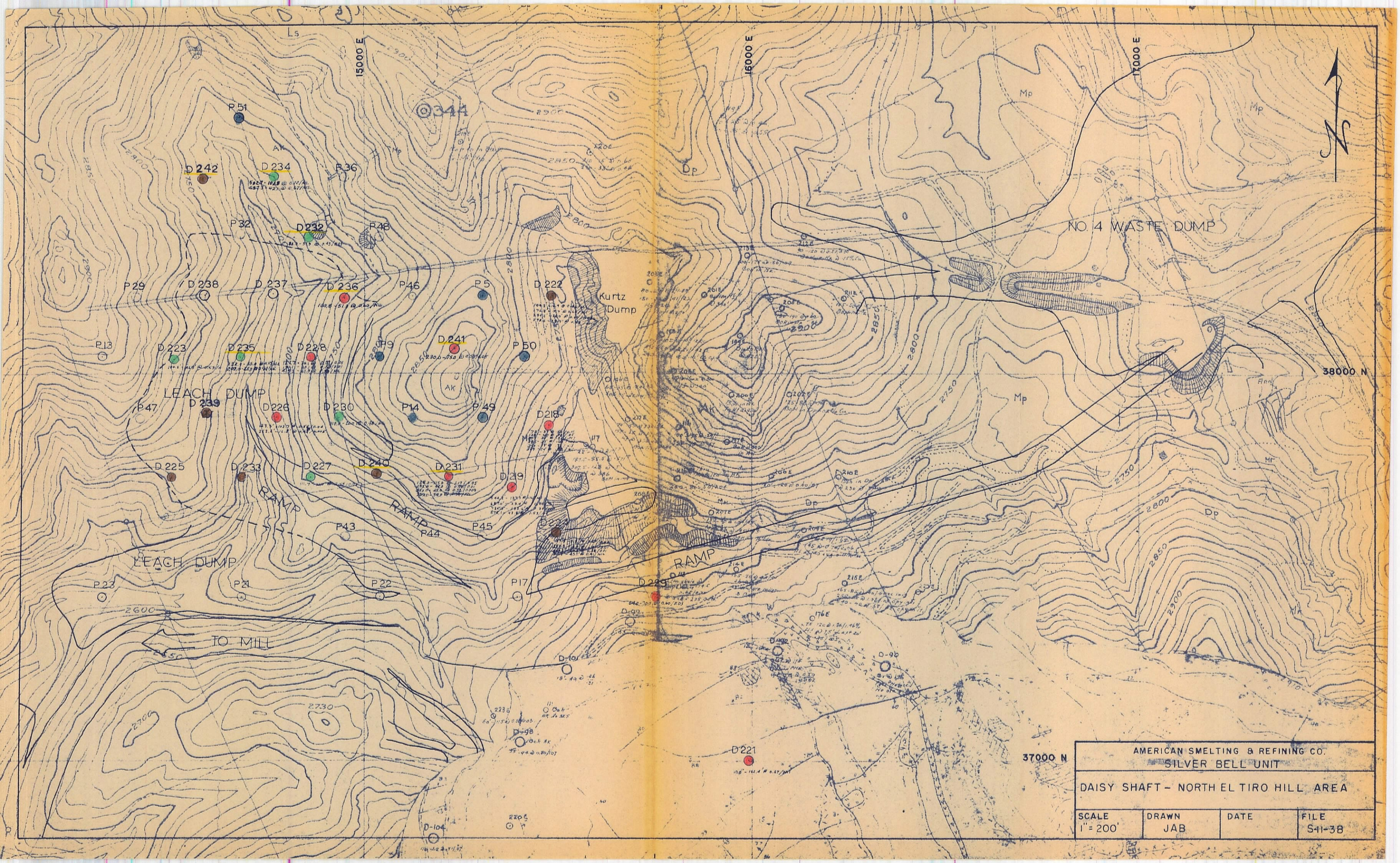
To be read - Starting at 125' there is 115.0' of material which assays 1.17% total copper and 0.05% non-sulfide copper.

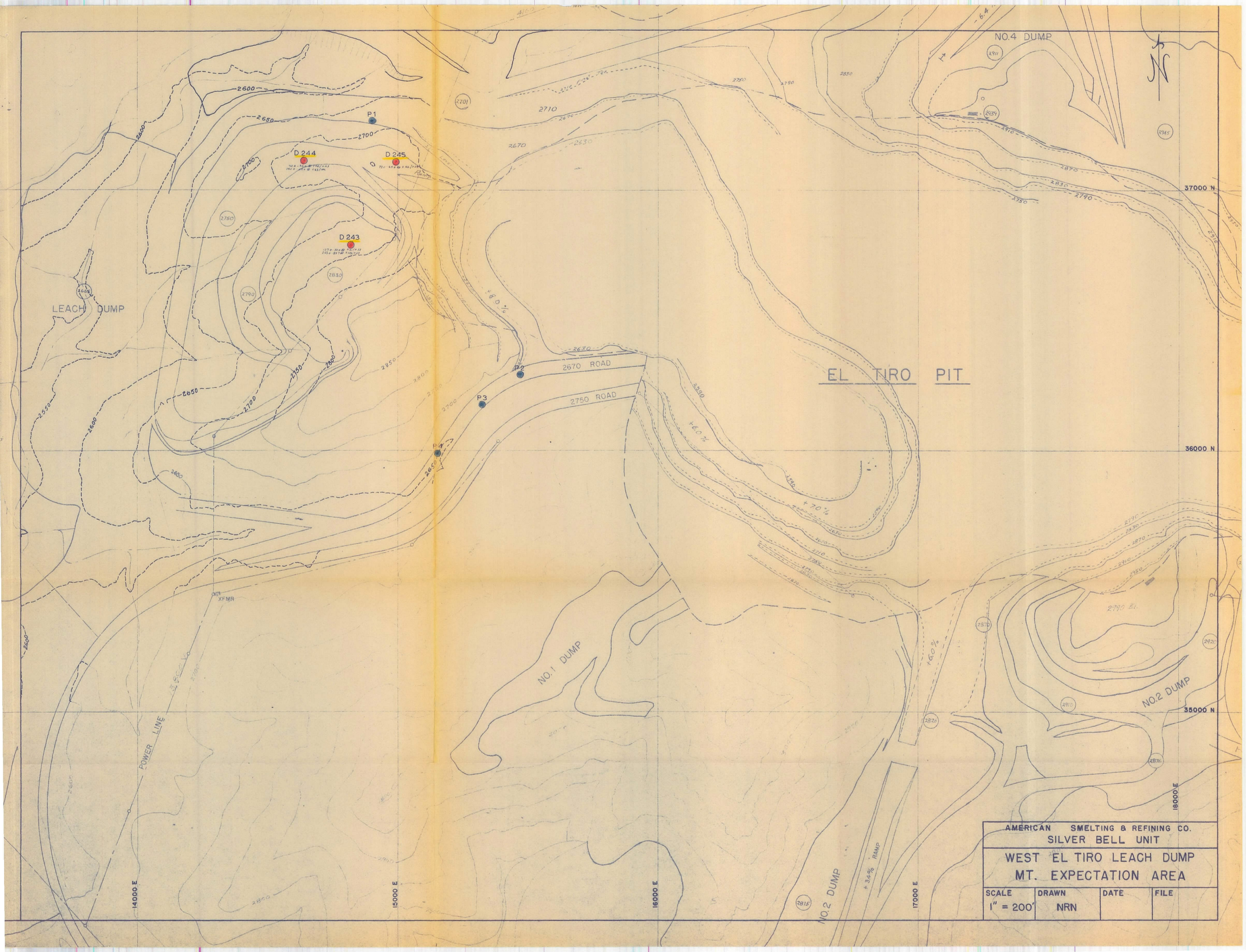
D-2??

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

D-2??

● None to thin +0.4% intervals.


15000 E
16000 E
17000 E
38000 N
37000 N
NO. 4 WASTE DUMP
Kurtz Dump
LEACH DUMP
LEACH DUMP
RAMP
RAMP
RAMP
TO MILL
P51
D242
D234
P36
P32
D232
P48
P29
D238
D237
D236
P46
P5
D222
P13
D223
D235
D228
P9
D241
P50
P47
D239
D226
D230
P14
P49
D218
D225
D233
D227
D240
D231
D29
P43
P44
P45
D229
P23
P21
P22
P17
D221
D-101
D-96
D-98
D-104
2730
2600
2750
2850
2900
Mp
Dp
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE
FILE S41-3B


NO.4 DUMP
N
P1
D 244
D 245
D 243
LEACH DUMP
2670 ROAD
2750 ROAD
P2
P3
P4
EL TIRO PIT
37000 N
36000 N
35000 N
XFMR
POWER LINE
NO.1 DUMP
NO.2 DUMP
NO.2 DUMP
+34% RAMP
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
FILE

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

July 31, 1967

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

Subject: QUARTERLY GEOLOGIC REPORT AND ORE RESERVE MAPS

OXIDE PIT

Mining during the second quarter of 1967 was confined entirely to the 2660' level. This mining was through approximately equal amounts of syenodiorite porphyry and monzonite porphyry. Essentially all of the syenodiorite was ore-grade and in one small area, individual blast hole assays ran as high as 4.9%. The monzonite averaged somewhat lower grade with approximately 1/3 of the mass being leach-grade.

The syenodiorite was strongly mineralized both in a disseminated manner and veined. The pyrite and chalcopyrite was quite fine grained and strongly coated with chalcocite. The mineralization in the monzonite was less disseminated and more closely associated with quartz veins.

The whole area mined was strongly faulted, jointed and quartz veined. The quartz veining is locally strong enough and random enough to be considered a stockwork.

There was a significant amount of movement of the blocks in the upper southeast corner of Oxide pit. The existing fissures expanded as much as 5 inches and there was an overall northward shift of the blocks.

The renewed activity of the blocks is the result of a combination of factors. The blocks themselves have been building up internal energy during the months of apparent stability and with the renewal of blasting in the east end of the pit have been jarred back into motion. The summer rains, although not yet heavy, have helped to lubricate the blocks.

Although these blocks could slide off at any time, they present essentially no danger to men or equipment. All present and future mining on this level will be clear of the potential slide area.

EL TIRO PIT

During the second quarter of 1967 mining took place on the 2750', 2710', and the 2590' levels.

Mining on the 2750' level was through approximately equal amounts of leach and waste-grade material and a minor amount of low grade ore. The ore occured along a structurally broken zone in dacite and monzonite. The zone was high in pyrite, but had only sparse chalcopyrite and weak chalcocite.

Mining on the 2710' bench was through monzonite porphyry and alaskite and passed into a large amount of El Tiro fault material. This material was strongly broken, ground up and altered and only occasionally was any particular rock type identifiable.

Medium grade ore occurred in the monzonite and alaskite where there was strong quartz-sulfide veining. Within the fault zone material there was generally strong oxidation which resulted in the development of substantial amounts of +0.2% non-sulfide leach ore. Only locally did the sulfides sufficiantly withstand oxidation to be classed as ore. These sulfides were moderate chalcopyrite and pyrite associated with strong fine-grained chlorite-biotite.

Mining on the 2590' level was through moderate to strongly altered and quartz veined alaskite and monzonite. The monzonite, on the whole, was less altered than the alaskite, but contained approximately the same total volume of sulfides. The sulfides in the monzonite were primarily pyrite while the alaskite contained substantial proportions of chalcopyrite and chalcocite. Only a small amount of the material mined did not make ore grade and this was monzonite.

Although the area as a whole was strongly faulted and broken the alaskite from the western end of the level did not break well on blasting and required a substantial amount of secondary blasting.

The slump blocks in the north east part of the pit appear to have been relatively stable, but a step out on the 2750' bench is being made to assure no future activity of the blocks.

N. R. Nuttycombe

N. R. Nuttycombe
Resident Geologist

NRN:jca

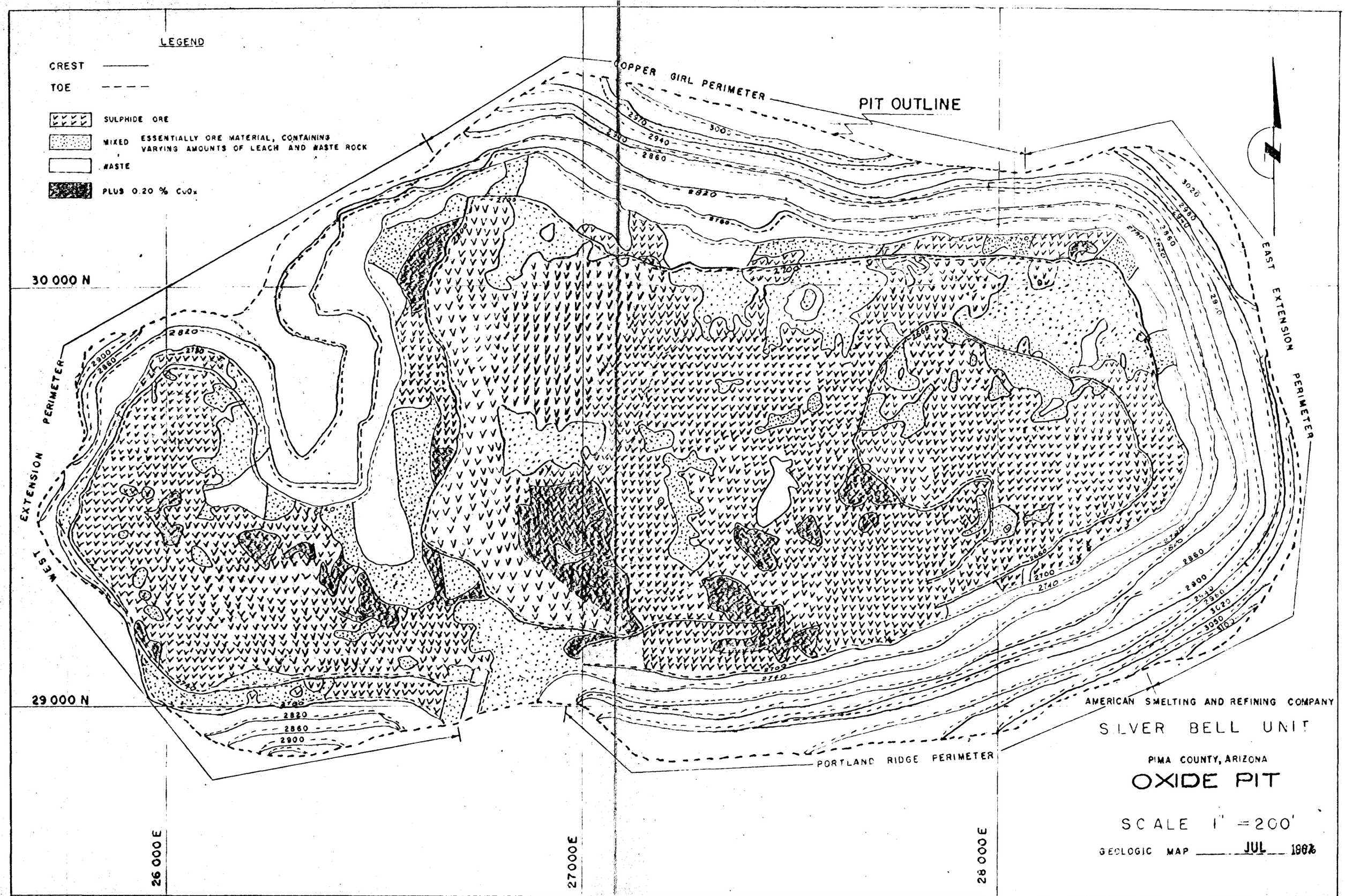
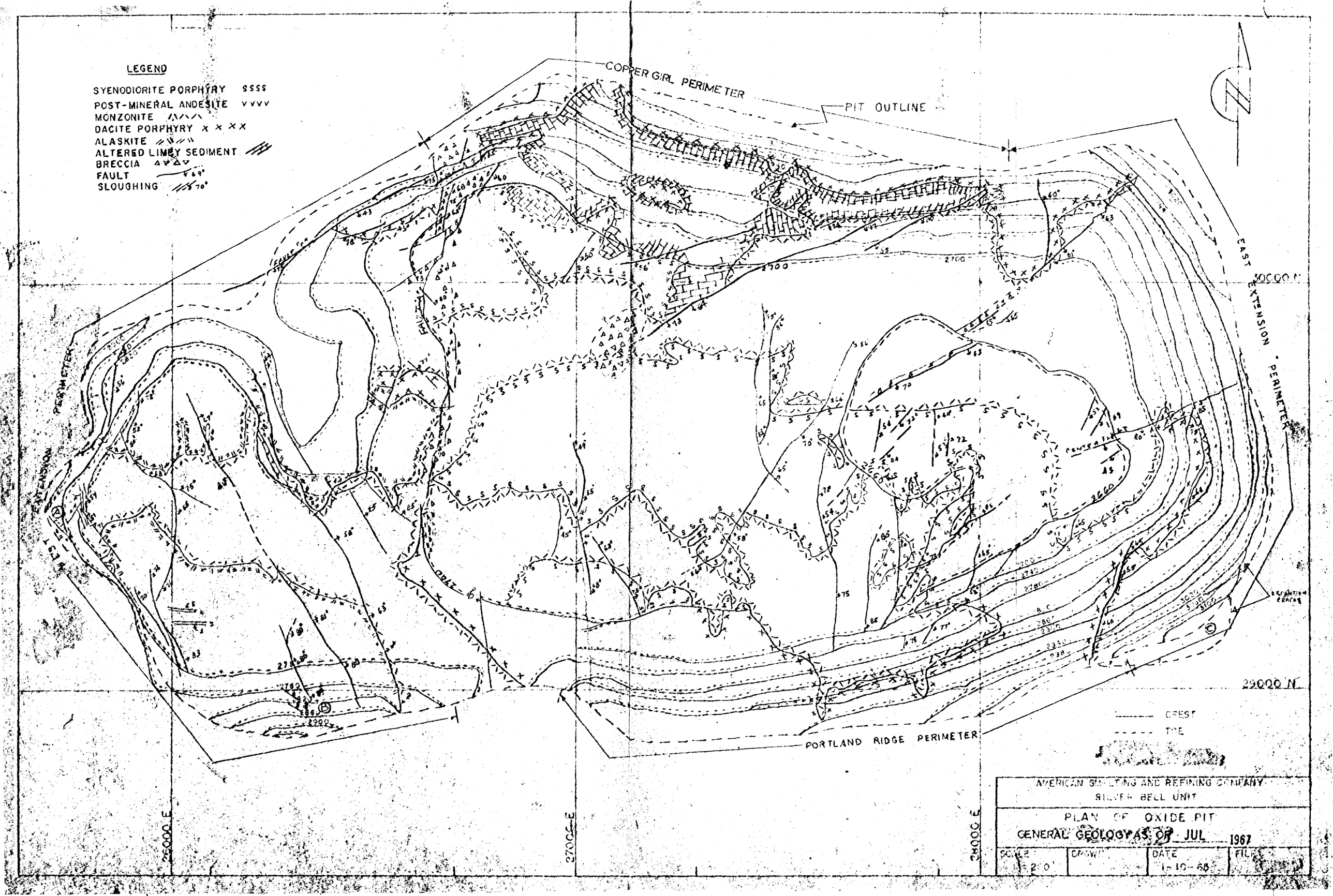
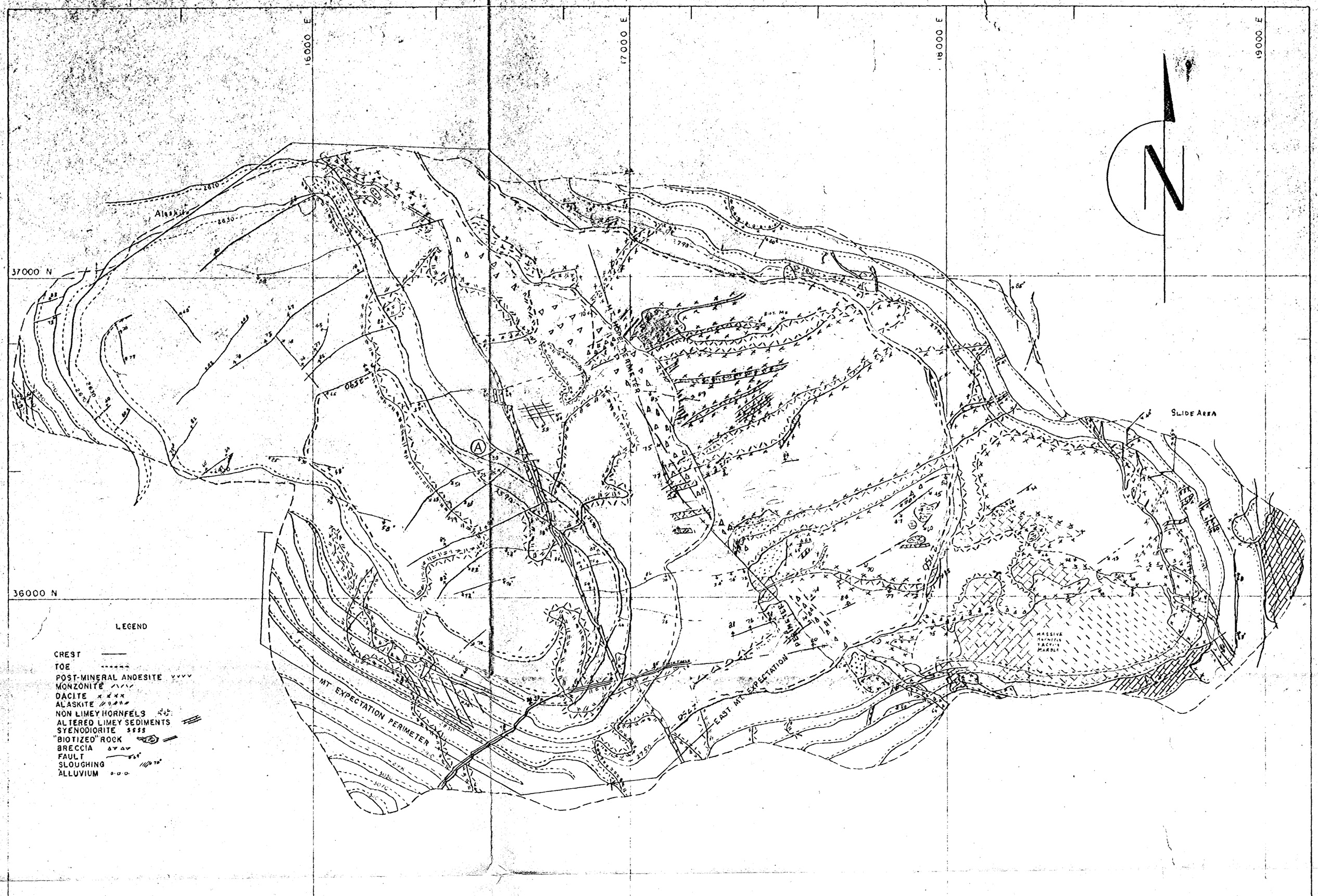

LEGEND
CREST
TOE
SULPHIDE ORE
MIXED ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK
WASTE
PLUS 0.20 % CuOx
COPPER GIRL PERIMETER
PIT OUTLINE
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
30 000 N
29 000 N
26 000 E
27 000 E
28 000 E
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PIMA COUNTY, ARIZONA
OXIDE PIT
SCALE 1" = 200'
GEOLOGIC MAP JUL 1967

Plate 1


LEGEND
SYENODIORITE PORPHYRY
POST-MINERAL ANDESITE
MONZONITE
DACITE PORPHYRY
ALASKITE
ALTERED LIMEY SEDIMENT
BRECCIA
FAULT
SLOUGHING
COPPER GIRL PERIMETER
PIT OUTLINE
EAST EXTENSION PERIMETER
PERIMETER
EXTENSION
PORTLAND RIDGE PERIMETER
FAULT
CREST
TOE
25000 E
27000 E
29000 E
29000 N
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT
GENERAL GEOLOGY AS OF JUL 1967
SCALE
DRAWN
DATE
FILE



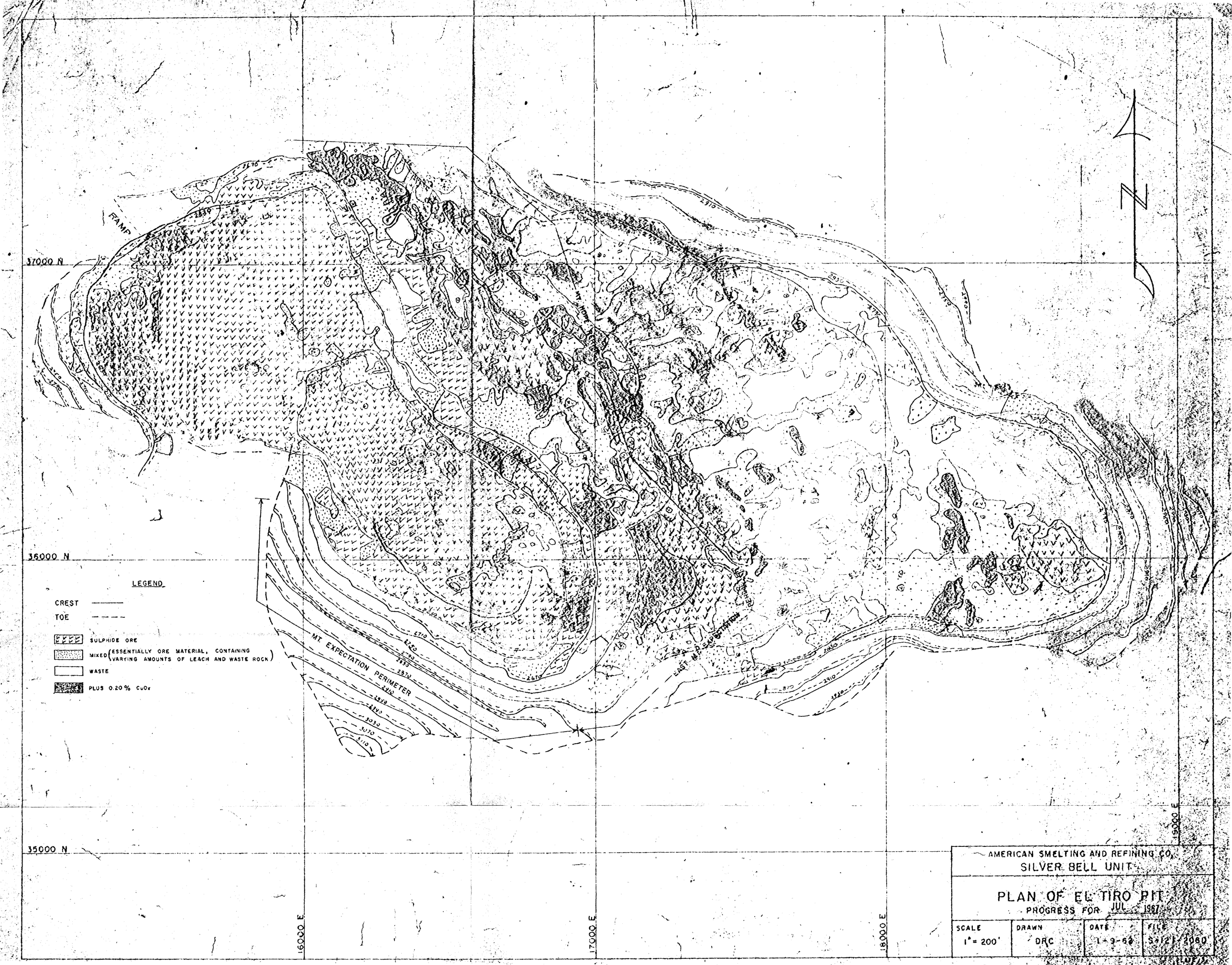
AMERICAN SMELTING AND REFINING CO.

SILVER BELL UNIT

PLAN OF EL TIRO PIT

GENERAL GEOLOGY AS OF JUNE 9, 1967

SCALE	DRAWN	DATE	FILE
1" = 200'	JCD	12-9-66	S-121 206D


N
37000 N
36000 N
35000 N
16000 E
17000 E
18000 E
19000 E
FAMP
MT. HOPE
EAST MT. EXPECTATION
MT. EXPECTATION PERIMETER
LEGEND
CREST
TOE
SULPHIDE ORE
MIXED (ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK)
WASTE
PLUS 0.20% CuOx
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
PROGRESS FOR JUL 1967
SCALE
1" = 200'
DRAWN
DRC
DATE
1-9-68
FILE
S-121 2060'

Mr. J. H. Courtright
S-1.1

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

J. H. C.

JUL 27 1967

July 19, 1967

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

Subject: MONTHLY REPORT - SILVER BELL UNIT DRILLING PROGRAM
EL TIRO - DAISY SHAFT AREA - June, 1967.

The following briefly summarizes the drilling done during the month of June.

A total of 2,359.9' of diamond core drilling was done by two truck mounted rigs working in the El Tiro - Daisy Shaft area on a two shift per day basis.

In addition to the core drills we had one Failing hammer drill rig working in the same area. This rig worked one shift per day doing both hammer drilling of alaskite bed rock and rotary drilling through dump material. This rig drilled a total of 1,268.0' of which 420.0' was dump material. The holes drilled with this rig were D-229, D-230, D-235 and hole D-231 down to the depth of 371.0' at which point core drilling began.

Hole No.	Approx. Elevation	Approx. Coordinates North	East	+0.40% Copper Lenses Depth to Top	Thickness	Avg. % Cu Total	N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-224	2,717.48	37,589.89	15,491.90	449.2	110.2	0.58	0.01	578.5	972.1	972.1
				911.7	45.7	0.41	Nil.			
D-228	2,767.54	38,043.63	14,863.68	127.7	36.1	0.57	0.01	563.5	646.5	646.5
				191.1	30.1	0.59	0.01			
				415.3	42.9	0.88	Nil.			
D-229	2,718.34	37,425.10	15,751.25	64.0	70.0	0.60	0.03	224.0	224.0	224.0
D-230	2,762.89	37,885.95	14,928.58	110.0	20.0	0.48	Nil.	297.0	297.0	297.0
D-231	2,791.54	37,751.74	15,247.39	125.0	115.0	1.17	0.05	756.4	756.4	
				295.0	45.0	0.46	0.01			
				350.0	25.0	0.52	0.009			
D-232				82.9	57.9	0.43	0.03	361.0	361.0	361.0
D-233	2,762.81	37,729.61	14,671.52	No +0.4% Cu this interval				279.0	279.0	279.0
D-234	2,730	38,509	14,769	" " " " "				464.5	464.5	
D-235	2,771.68	38,040.56	14,676.78	Dump Material (not sampled)				97.0	97.0	
217-E	2,728.71	37,872.96	15,669.16	Cleaned and cased to depth 384'						

D-224 Drilling was continued from 393.6 to a depth of 972.1 feet during the month. A description of the hole down to 740 feet was given in last months report.

The hole continued in moderately altered alaskite from 740 feet to 883 feet at which point the alaskite took on a monzonitic appearance. This pseudo monzonite or monzonite continued to 908 feet. An intermixed sequence of tactite, calcium silicate hornfels and monzonite extended to 957 at which point a biotite monzonite was encountered. The hole was still in this monzonite when bottomed.

The only plus 0.4% copper encountered in this newly described portion of the hole was a 45.7 foot zone of chalcopyrite in the sediments and monzonite at 911' which averaged 0.41%.

D-228 This hole collared in dump material and intersected alaskite bedrock at 83 feet. The hole continued (with minor exceptions) in and was bottomed in alaskite at 646.5 feet. The minor exceptions were a few zones of apalite encountered and a 2-1/2 foot thick post mineral andesite dike at 621 feet.

The alaskite was moderately altered and quartz veined and had moderate to strong sericite associated with the sulfide mineralization. Sulfides were encountered at 91' and the chalcocite blanket extended f rom there to 458', but other than in the interval 127.7 - 163.8' was weak. Chalcopyrite was the primary ore mineral in all of the +0.4% copper intervals other than 127.7'- 163.8'.

D-229 (Hammer Drill) This hole penetrated alaskite from the bed rock contact at 17' to the bottom at 224.0'. There were occasional zones of apalite and a post-mineral andesite dike at 219' - 221'.

Sulfides were encountered at 40' and chalcopyrite was present to some extent throughout the sulfide zone penetrated.

The only significant +0.4% copper interval was from 64.0' to 134.0'.

D-230 (Hammer Drill) This hole collared in alaskite and continued in it to the bottom with only occasional intercepts of apalite.

The rock was weak to moderately altered and had an average total sulfide content which approached 3%. Sulfides were encountered at 40' and the chalcocite zone extended from that depth to 237'. There were six +0.4% copper intervals, but all but one were ten feet or less in thickness. The exception was a 20.0' interval starting at 110.0'.

D-231 (Hammer Drill) Alaskite was drilled from the collar to 800' at which point siliceous hornfels were encountered. At 821' fine grained quartzite with intermixed hornfels was intercepted and the sequence continued to 850.5' where alaskite was again cut. The hole was bottomed still in alaskite at 1000.2'

Sulfides were encountered at 125' and calcocite was present from there to 371'. Mineralization and sericite was strongly associated with fracturing and quartz veining. A significant amount of MoS_2 occured throughout the interval 250'-661'. Where assays for molybdenum were run they averaged 0.052%.

This hole was taken to 1000' in an attempt to intersect a similar sequence of mineralized sediments as was encountered 160' to the east in D-219. The sediment - alaskite contact obviously became quite steep between these holes. The short interval of sediments intersected in this hole was probably a nose sticking out from the other nearby mass. A moderate amount of gypsum veining starting where

the sediments were encountered and continuing to the bottom of the hole probably indicates that the sediment-alaskite contact is quite close to D-231.

D-232 This hole was started in dump material and hit alaskite bedrock at 10.2'. Chloritic hornfels underlay the alaskite at 84.8' and continued to 82.9'. A sequence of relatively clean recrystallized limestones were penetrated from 82.9' to 226.3' and were followed by garnet-diopside hornfels extending to 231.6'. A dacite porphyry was then drilled from 231.6' to 256.4'. A post-mineral andesite cut this dacite at 243.6' - 247.6'. Garnet-tremolite hornfels was drilled from 256.4' to 301.6' where the dacite was once again encountered and this time continued to 361.0' at which point the hole was stopped.

Sulfides were first encountered at 79.3' where chalcopyrite and pyrite were associated with strong magnetite in hornfels and the recrystallized limestone. The over all sulfide content of this hole was quite low, but locally high concentrations would be associated with garnet-tremolite hornfels. The only significant thickness of +0.4% copper occured between 82.9' and 140.8'.

This hole was drilled to check a magnetic anomoly in the area.

D-233 (Hammer Drill) This hole was started in dump material and intersected alaskite bedrock at 122.0'. The alaskite continued throughout the hole and was only weakly altered and mineralized. The hole was bottomed at 279.0'.

The sulfide contact was at 132' and a weak chalcocite blanket was developed from there to 257.0'. No +0.4% copper intervals were encountered in this hole.

D-234 This hole was started in mantle rock and intersected bedrock at 7.4'. The bedrock was hornfelsic sediments which extended to 11.4' where alaskite was encountered. The alaskite continued to 71.2' where a tremolite-diopside-garnet hornfels mass was hit. A sequence of marble extended from 81.5' to 181.0' and was followed by another sequence of hornfelsic meta-sediments which persisted to the depth of 239'. A thin dike of alaskite was intruded at 239' and was terminated by a latter post-mineral andesite at 246.6'.

A dacite porphyry mass was intersected at 249.4' which had a graduational contact with alaskite occuring in the interval 343.0' - 345.5'. The dacite continued to the depth of 405.4' with only a short interval of olivine basalt at 361.1' - 364.5'. The dacite passed into underlying meta-sediments through a porphyritic monzonite-appearing transition zone from 405.4' to 407.8'. The meta-sediments were a randomly changing and complexly intermixed sequence of calcium silicates hornfels, tactites, siliceous and limy hornfels and a minor amount of quartzite. Starting at 633.0' this sequence was cut by a series of interleafing biotite monzonite dikes. The last sediments were in the interval 652.0' - 655.4' and the biotite monzonite continued on. At 681.3' - 683.9', 689.6' - 690.5' and 720.3 ' - 728.2' the biotite monzonite was cut by alaskite and opalite which appears to be younger than the monzonite.

The biotite monzonite ends at 732.0' where it is cut by an intrusive breccia which is composed of fragments of alaskite, monzonite, biotite monzonite and various types of altered sediments. The lower contact of the breccia is at 756.0' where it cut through a quartz monzonite porphyry which is characterized by a strong secondary texture. The secondary texture referred to is large regrown orthoclase with poikilitic intergrowths and large rounded quartz eyes with the same structure. The hole was bottomed in this rock at 796.0'.

Plus 0.4% copper mineralization was found in the intervals 502.7' - 605.5' and 645.7' - 679.4'. The upper interval was in hornfels and tactites, while the lower was in the zone of interleafed biotite monzonite and sediments. The principle copper minerals in both cases was chalcopyrite.

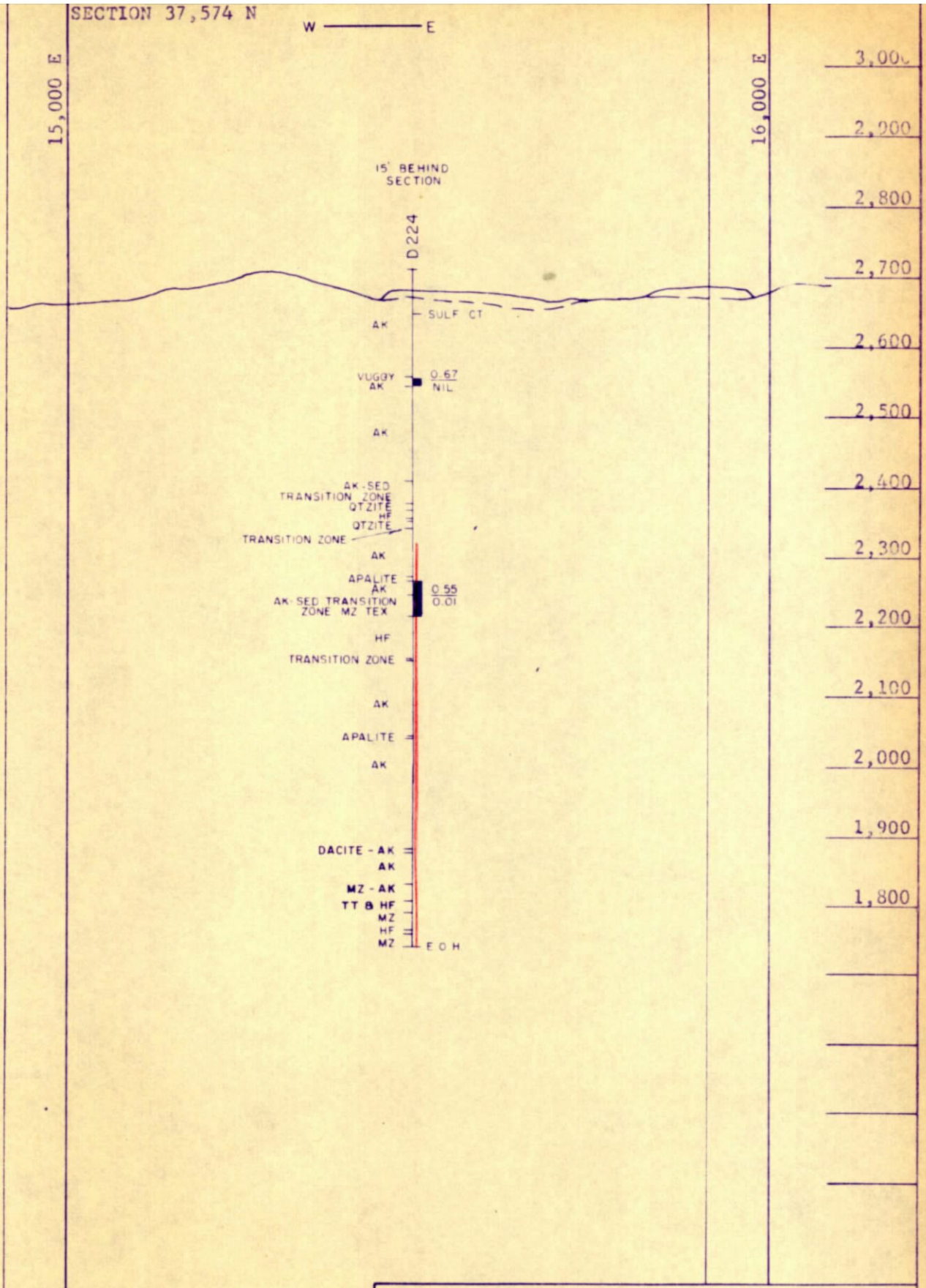
D-235 This hole was only rotary drilled through the dump material during the month. The dump material was 97.0' thick.

217-E Cleaning and casing of this old churn drill hole continued during the early part of the month. The hole will be deepened with a diamond drill later.

Nicholas R Nuttycombe

Nicholas R. Nuttycombe

NRN:jca



+ 0.4% Total Copper

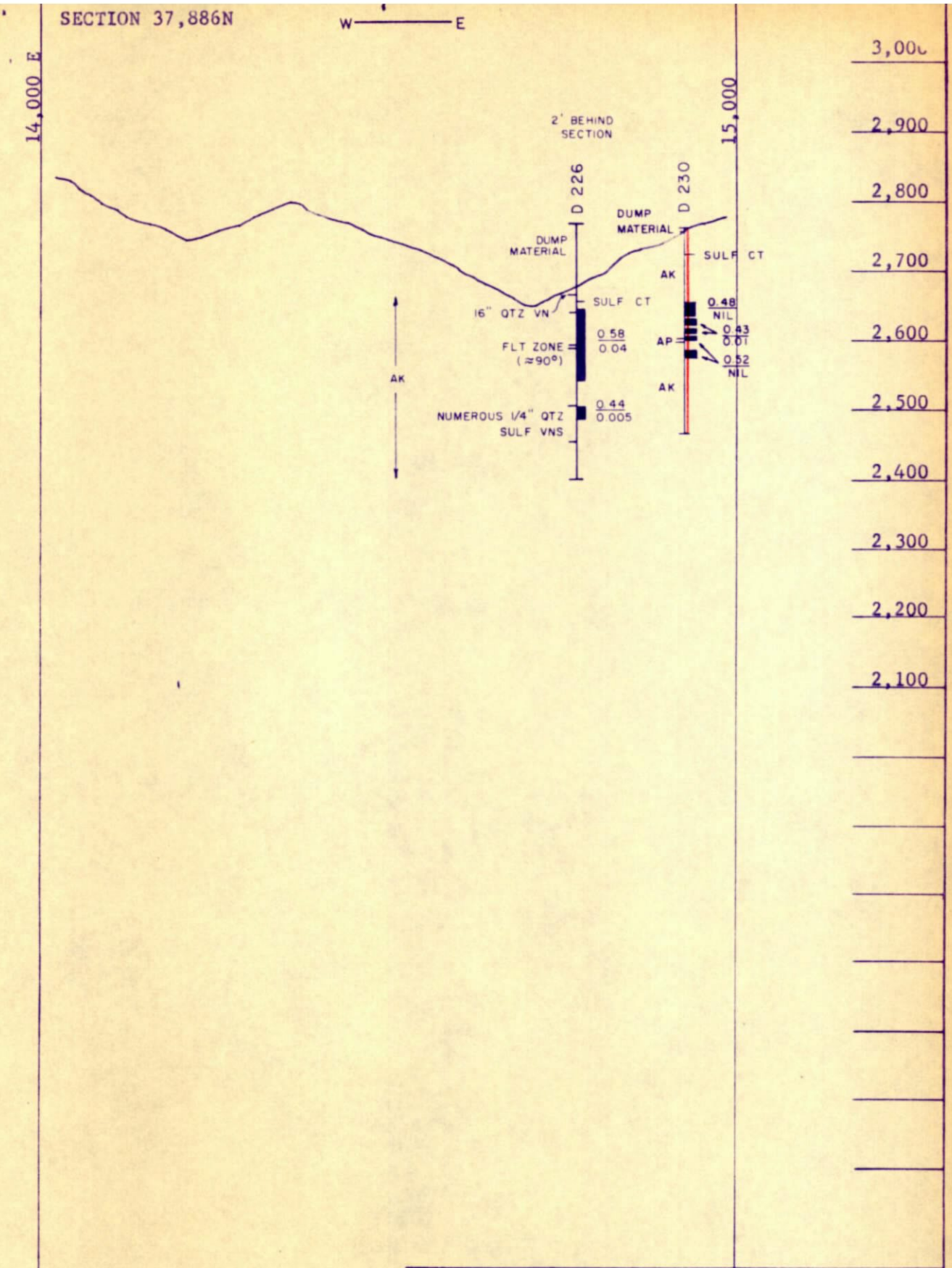
Advance for month

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'		JUN 1967	S 121 A



■ + 0.4% Total Copper

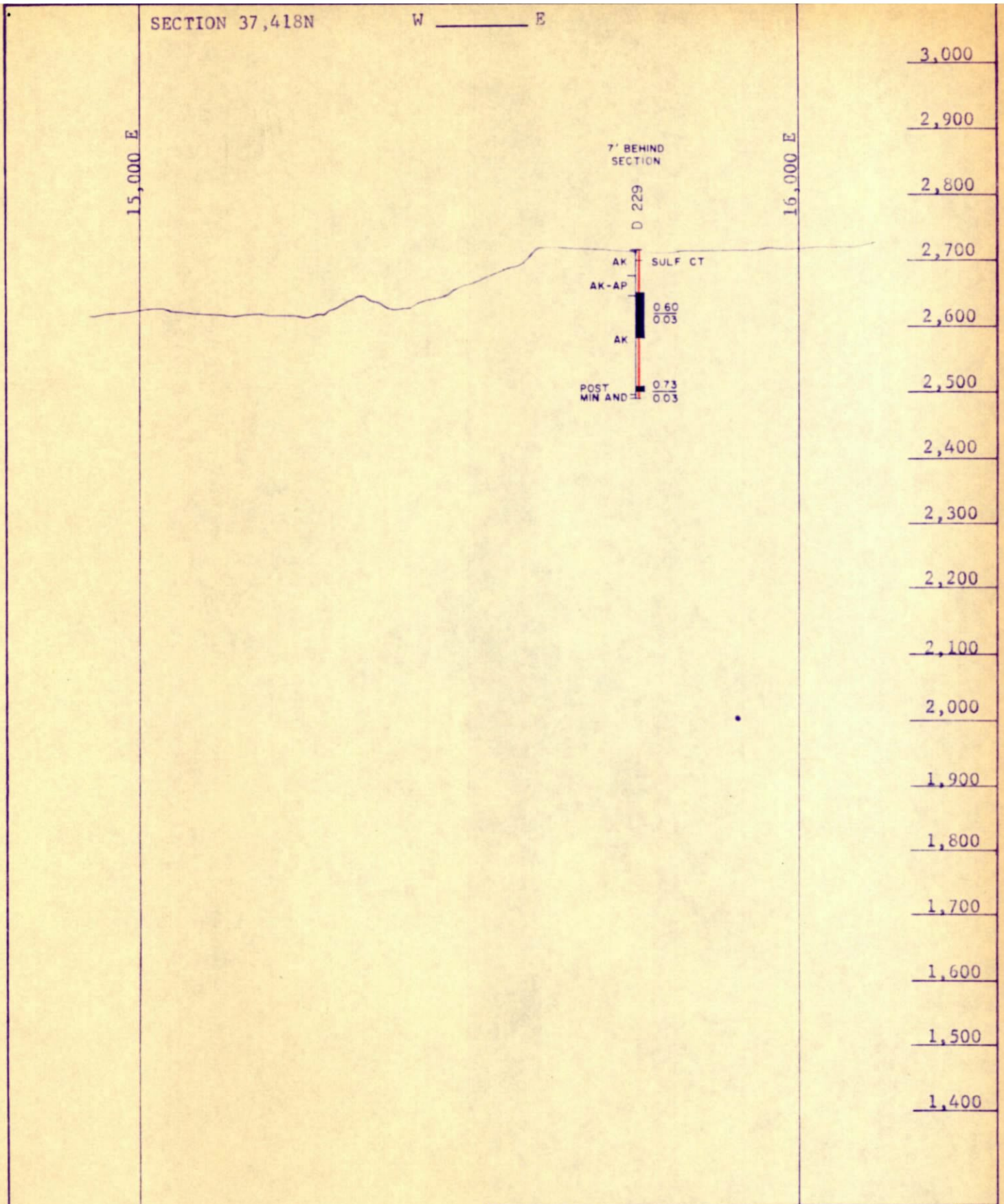
| Advance for month

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'		JUN 1967	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
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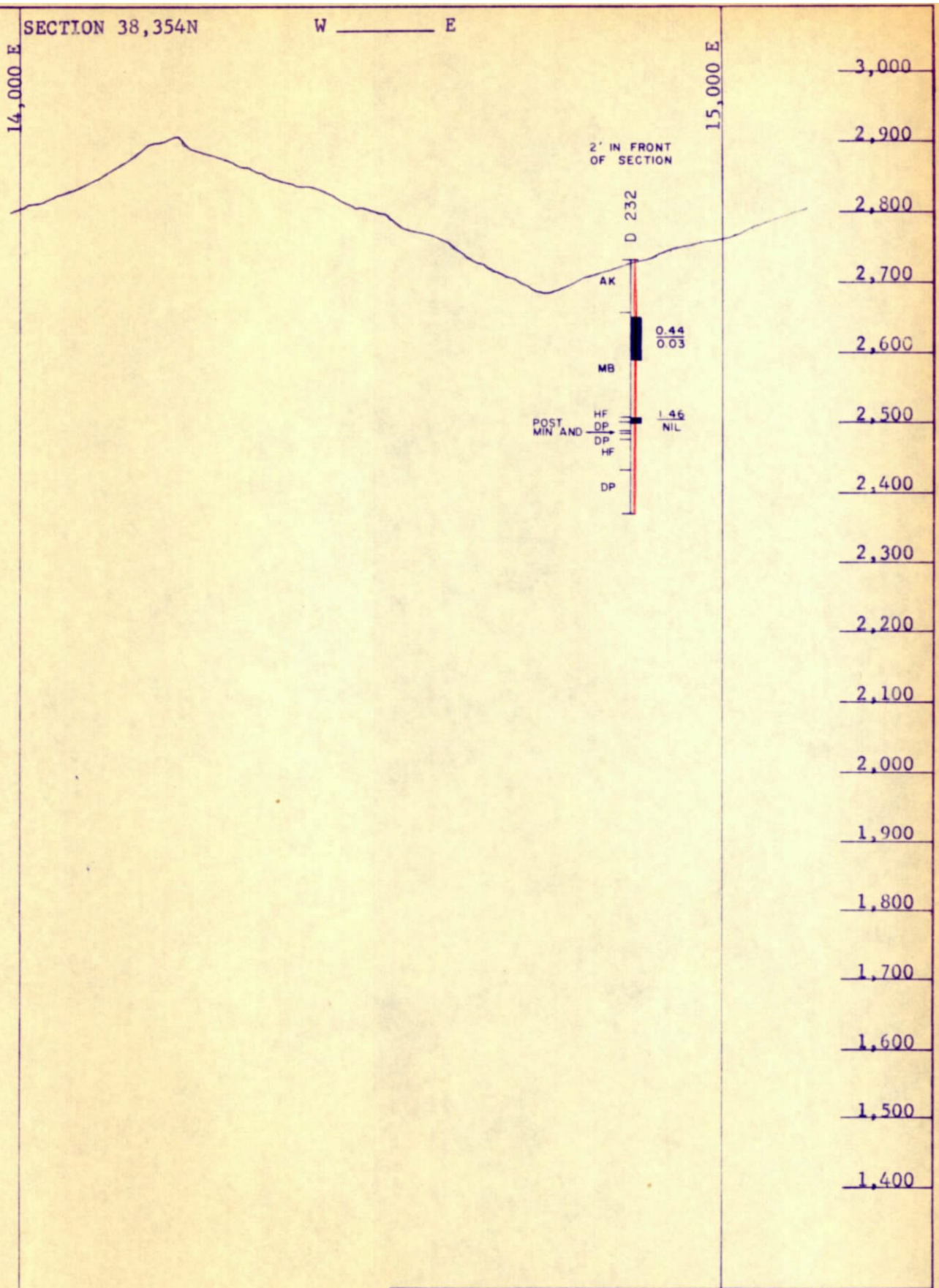


+ 0.4% Total Copper

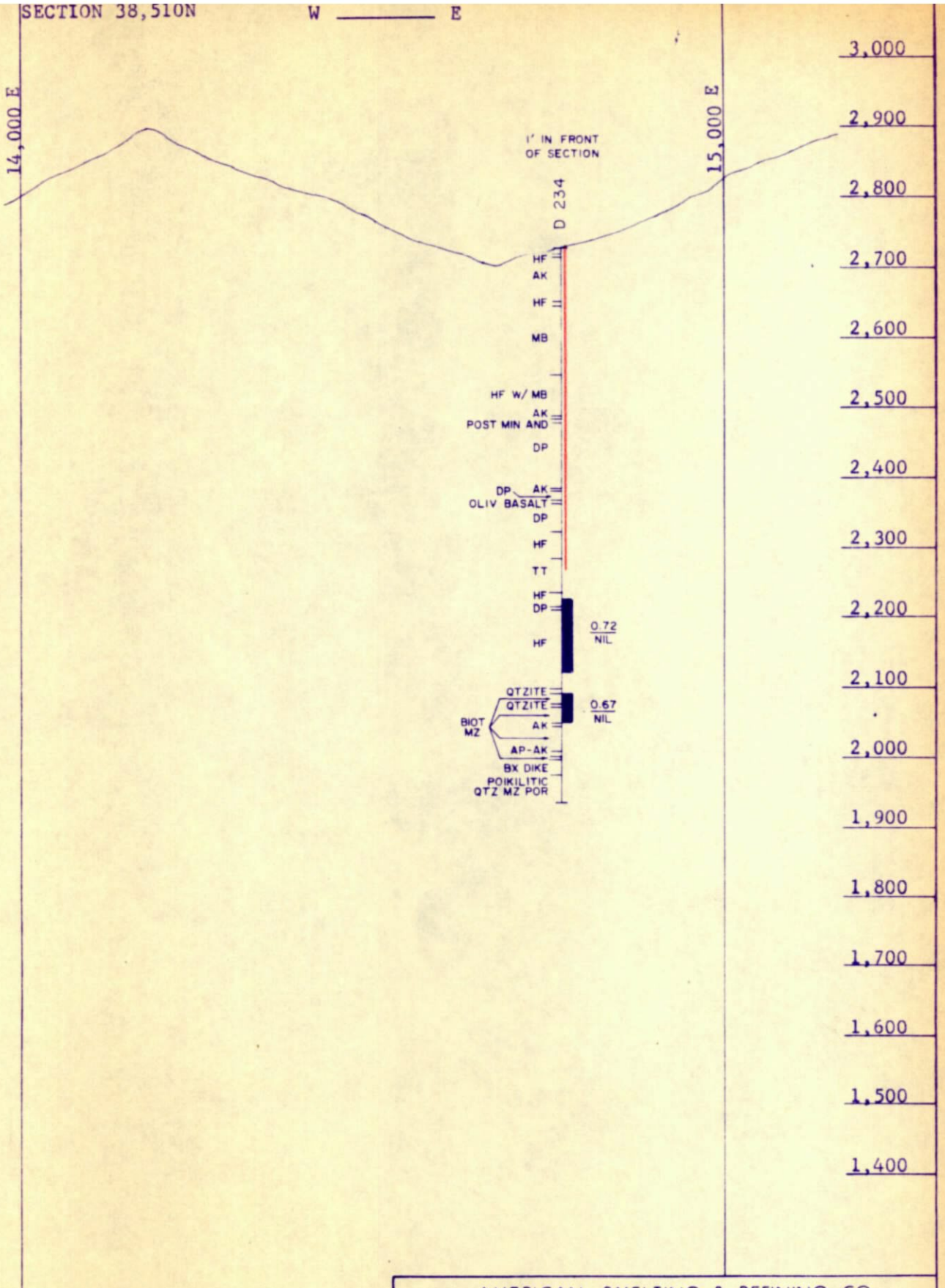
Advance for month

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'		JUN 1967	S 121 A

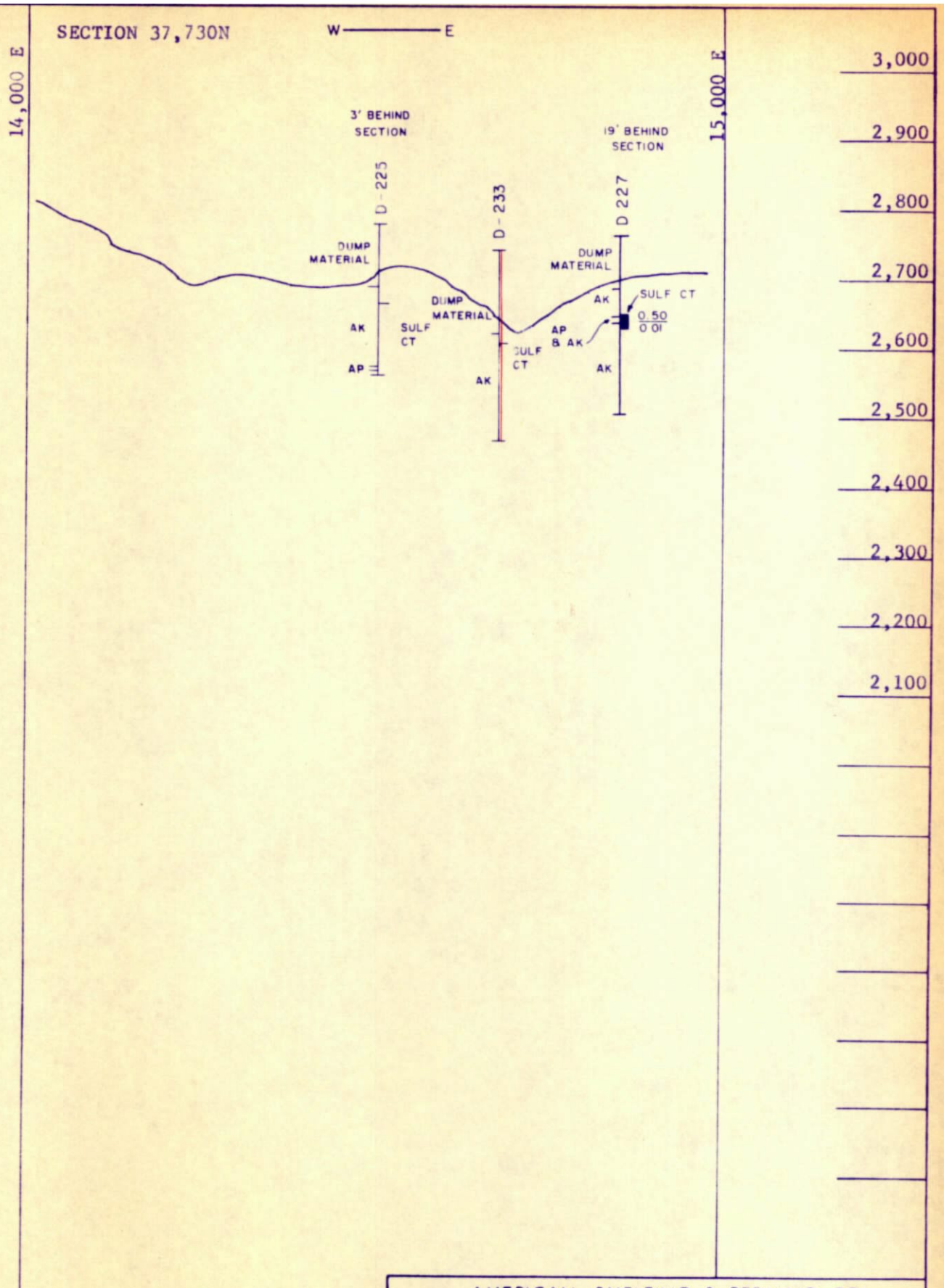


+0.4% Total Copper

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 1" = 200'	DRAWN	DATE JUN 1967	FILE S 121 A



+ 0.4% Total Copper

Advance for month

Note: Rock Types Generalized
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AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

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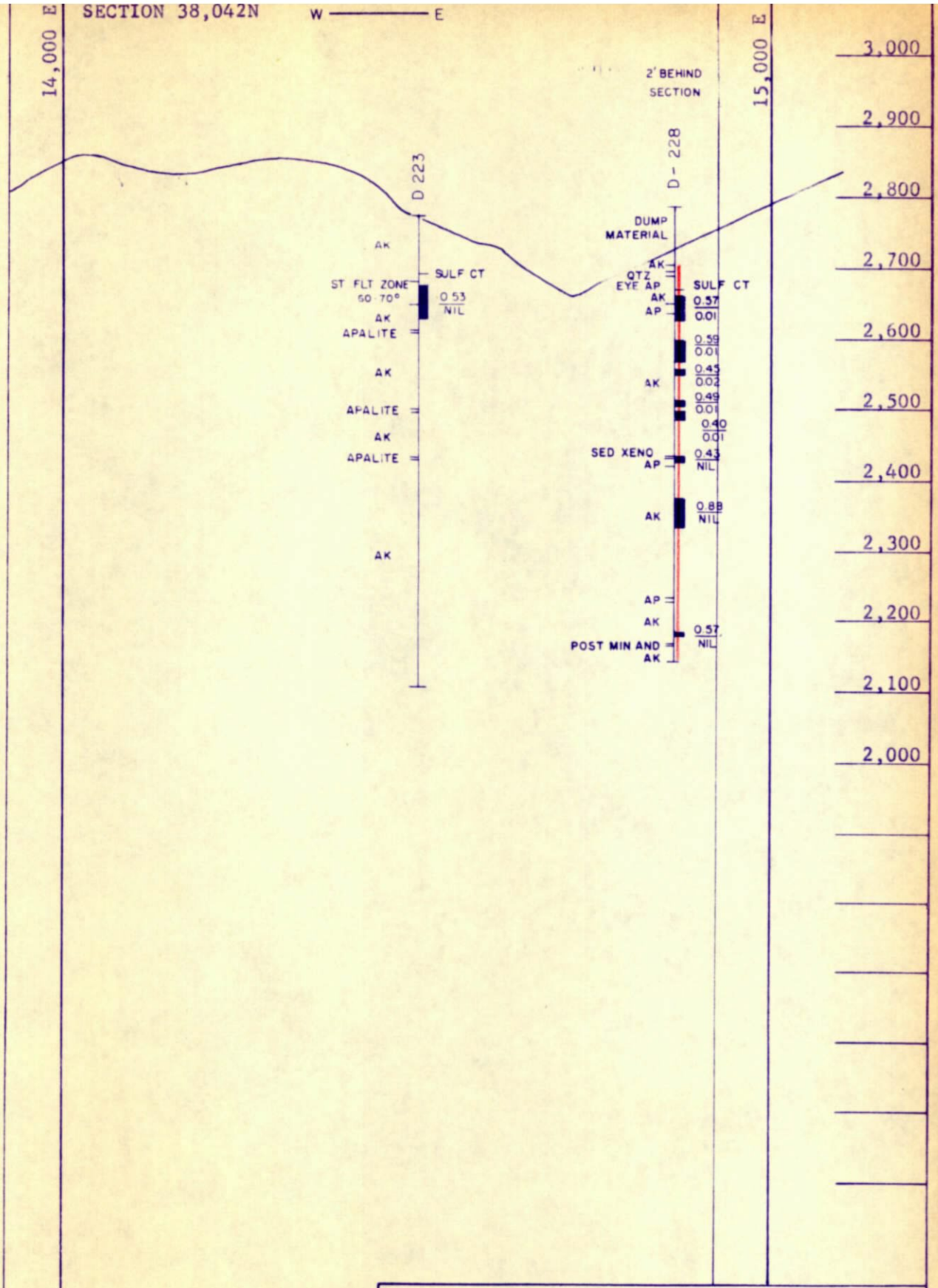
1" = 200'		JUN 1967	S 121 A



■ + 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

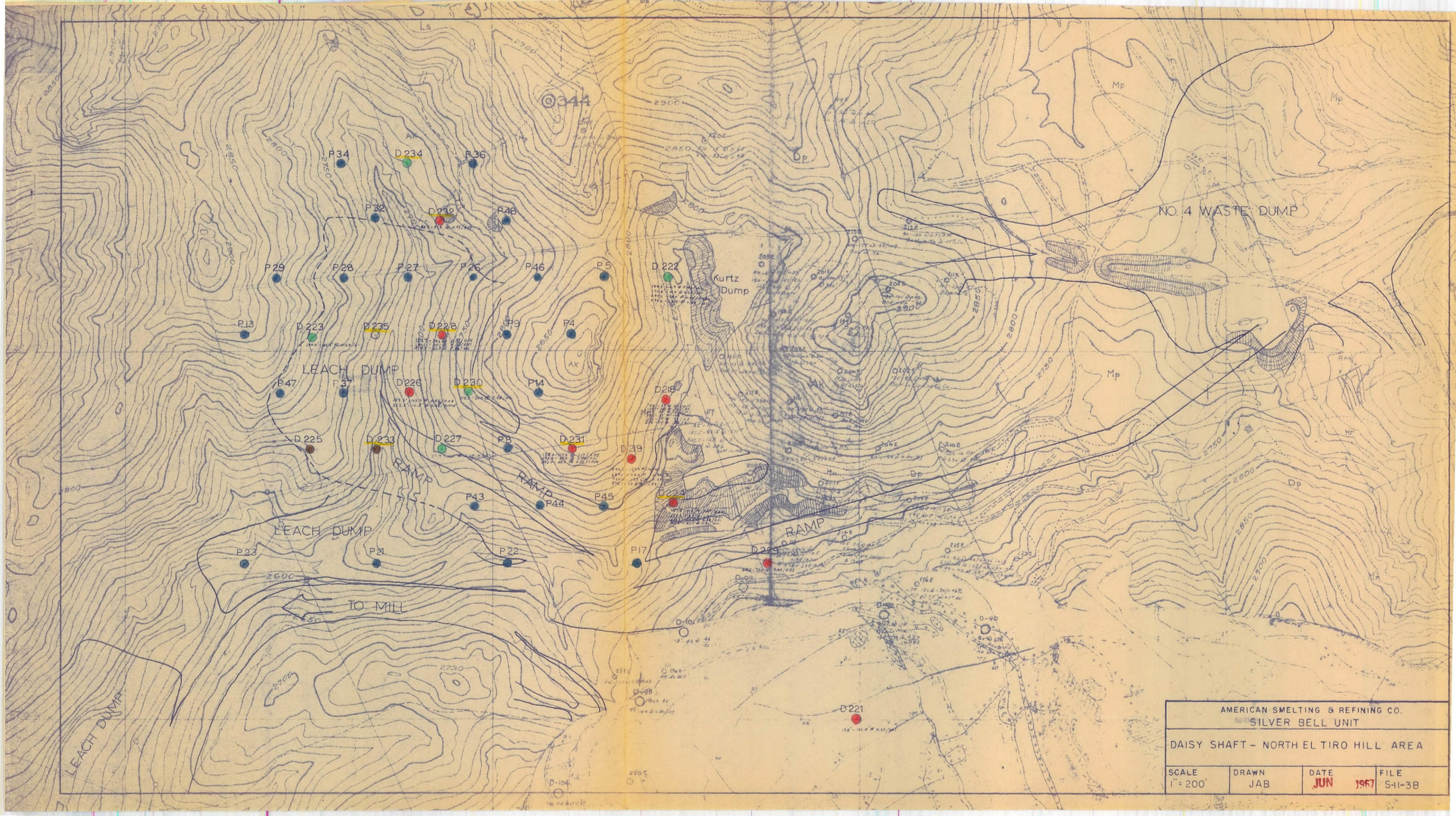
SCALE	DRAWN	DATE	FILE
1" = 200'		JUN 1967	S 121 A

EXPLANATION FOR PLAN MAP

D-Series	Recent drilling starts with D-218
P-Series	Proposed holes. Not all of P holes will necessarily be drilled. Holes already drilled will guide further drilling.

COPPER CONTENT

D-231 125' - 115.0' @ 1.17/0.05	Hole contains sufficient thickness of +0.4% material to be considered ore.
D-223	Marginal hole. Insufficient thickness and/or grade of material to carry stripping.
D-225	None to thin +0.4% intervals.


NO. 4 WASTE DUMP
Kurtz Dump
LEACH DUMP
LEACH DUMP
LEACH DUMP
RAMP
RAMP
RAMP
TO MILL
P34
D234
P36
P32
D232
P48
P29
P28
P27
P26
P46
P5
D222
P13
D223
D235
D228
P9
P4
P47
P37
D226
D230
P14
D218
D225
D233
D227
P8
D231
D219
P43
P44
P45
D224
P23
P21
P22
P17
D229
D221
D-101
D-98
D-104
D-96
2900
2850
2800
2750
2730
2700
2600
Mp
Dp
Ls
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE JUN 1967
FILE S-11-3B

Mr. Courtright

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

June 19, 1967

J. H. C.

JUN 28 1967

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

Subject: MONTHLY REPORT ON THE EL TIRO-DAISY SHAFT AREA
DIAMOND DRILLING

The following briefly summarizes the results of diamond drilling in the El Tiro-Daisy Shaft area during the month of May, 1967.

A total of 3,071.5 feet of diamond core drilling was done by two truck mounted rigs working in the El Tiro-Daisy Shaft area on a two shift per day basis.

Hole No.	Approx. Elevation	Approx. Coordinates North	East	+0.40% Copper Lenses Depth to Top	Thick-ness	Avg. % Cu Total	N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
D-19	2,736.56	37,704.65	15,382.87	875.1	43.8	1.53	0.02	190.9	1,065.0	1,065.0
D-220	2,791.83	35,818.68	18,256.46	-	-	-	-	215.3	215.3	215.3
D-221	2,626.03	37,004.57	15,994.48	10.0	162.4	0.67	Nil.	385.6	385.6	385.6
D-222	2,762	38,198	15,486	104.2	10.9	0.42	Nil.	700.8	700.8	700.8
				176.8	7.7	0.62	Nil.			
				295.6	26.0	0.60	0.006			
				398.0	22.7	0.42	Nil.			
D-223	2,775	38,038	14,500	100.2	46.8	0.53	Nil	671.3	671.3	671.3
D-224	2,685	37,578	15,488	159.5	9.8	0.67	0.01	348.6	393.6	-
				357.3	8.7	0.41	0.01			
D-225	2,775	37,731	14,501	-	-	-	-	128.1	219.1	219.1
D-226	2,772	37,887	14,771	123.3	102.7	0.58	0.04	260.7	365.7	365.7
				262.6	16.8	0.44	0.005			
D-227	2,750	37,731	14,862	111.7	21.0	0.50	0.01	170.2	246.2	246.2
						Total		3,071.5		

Hole D-220 was drilled in the southeast corner of the 2790' level of El Tiro pit to complete the pattern of the original drilling program. It appeared that there was a possibility to show continuity between a body of ore intercepted outside the present pit perimeter with ore adjacent in the pit.

This hole collared in a medium grained clean quartzite and continued in it for 10' then a 56' randomly changing sequence of recrystallized limes, light tan to cream hornfels, garnetites and tactites was penetrated. Occasional vague hints of bedding indicated an approximate 50° dip.

At 75' a massive body of pyrite and magnetite with small amounts of garnet, chlorite, serpentine and tremalite intermixed was encountered. The relative proportions magnetite and pyrite would very and the total metallic mineral content rnaged from 50 to 100 colume percent. Unfortunately only a few hundreths of a percent copper was associated.

The magnetite-pyrite body was 102 feet thick and ended abruptly at 177.6 feet where monzonite was encountered. The monzonite was moderately to strongly altered, but contained only sparse sulfided and a few hundreths of a percent copper.

Although this hole failed to show continuity between the two ore masses, it opens up another possibility - that of a high grade chalcopyrite ore body haloed by the massive pyrite-magnetite zone.

A 50 foot grid magnetic survey will be conducted as soon as an operative magnetometer becomes available. Hopefully this survey will outline the body and guide further drilling.

D-221 was drilled from the 2630' level of El Tiro pit with the object of trying to intercept sediments at depth under the alaskite.

The hole collared in an alaskite which was strongly shattered, altered and silicified throughout its extent. A chalcocite enriched ore zone extended from the collar to a depth of 172.4' with an average sulfide copper content of 0.67%.

After passing through a 250' thickness of alaskite interfingering monzonite was encountered. A post-monzonite pebble breccia was then penetrated from 256' through 265' and this was followed by monzonite which continued to the bottom of the hole at 385.6 feet. The monzonite was moderately altered and contained a much higher pyrite content than the alaskite, but only averaged 0.13% copper.

D-222 was collared in sediments and penetrated a randomly alternating thin-bedded sequence to a depth of 700.8 feet. Five thin monzonite dikes was intercepted at widely separated points in the hole.

The most common rock type encountered was a light green hornfels which was variably siliceous and limey. Other rock types encountered were tactite, garnetites, fine grained quartzite and varieties of hornfels which were chloritic, tremolitic, and garnetitic. Hints of bedding throughout the sequence indicated an approximate 65° dip.

Ore grade chalcopyrite mineralization was encountered at four widely separated points. Each of the ore-grade intervals was short and there was no consistent favorable rock type associated. The light green hornfels which was prevalent in this hole is similar to the thick sequence encountered in hole D-87 and is considered to be generally an unfavorable host.

D-223 collared and remained in alaskite until bottomed at 671.3 feet. Short zones of interfingering apalite were encountered sporatically.

The alaskite was variably altered ranging from moderately fresh to strongly altered. The intensity of alteration was dependent upon proximity to premineral faults and the density of fracturing and veining.

A chalcocite enriched ore zone was encountered at 100.2' and continued to 147.0' and had an average sulfide copper content of 0.54%.

As much as 4% calcite occuring as veins and lining on fractures is felt to indicate the proximity of limy sediments.

D-224 was collared in dump material and then entered a weakly altered alaskite at 45 feet. The majority of the rock penetrated in this hole has been alaskite, but two bodies of sediments enveloped by alaskite were penetrated. The sediment blocks extended from 331' to 358' and from 498' to approximately 555 feet. Bounding both sediment blocks was what appeared to be a porphyritic monzonitic rock. It is felt that this rock represents a transition zone between alaskite and sediment and is the result of assimilation of sediments by alaskite.

The sediments penetrated have been largely chloritic and limy hornfels which were probably originally limy arkosic siltstones.

A 101 foot thick ore zone which averaged 0.54 percent sulfide copper occured between 440.7' and 552.6'. This chalcopyrite ore was associated with the larger sediment block and its transition zone.

D-225 was collared in dump material and hit alaskite bed rock at 91'. The degree of alteration and mineralization was variable with the pyrite content approaching 20% through one ten foot interval. The copper content was quite low with the highest value in the enriched zone being only 0.22%.

This hole was bottomed in alaskite at 219.1'.

D-226 collared in dump material and did not hit bedrock until 105'. Bedrock was alaskite which persisted throughout the extent of the hole.

Sulfides were encountered at 123.3' a mere 18' below the bedrock surface. A chalcocite enriched ore zone averaging 0.54% sulfide copper extented from 123.3' to 226.0'.

The rock as a whole was moderate to strongly altered to clay-sericite and locally contained secondary orthoclase.

This hole was stopped at 365.7' in protore which averaged 0.12% copper.

D-227 was also collared in dump material and went into an alaskite bedrock at 76'. The alaskite was cut by many thin gouge zones and was moderate to strongly altered averaging approximately 10% sericite.

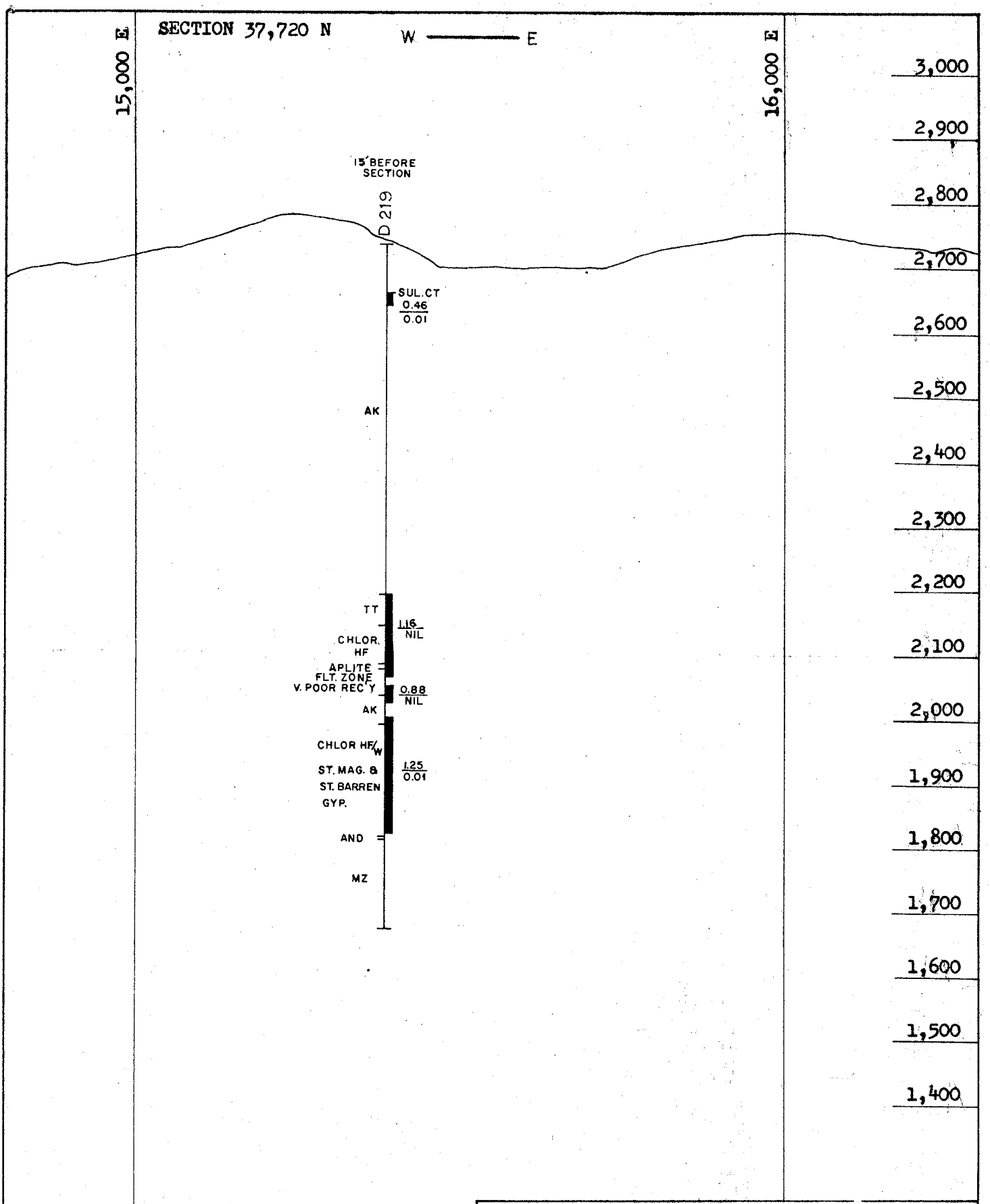
Ore grade material averaging 0.50% sulfide copper occured in a 21' zone between 111.7' and 132'. This was in the zone of chalcocite enrichment.

The hole was bottomed in alaskite at 242.6'.

Nicholas R. Nuttycombe

Nicholas R. Nuttycombe

NRN:jca



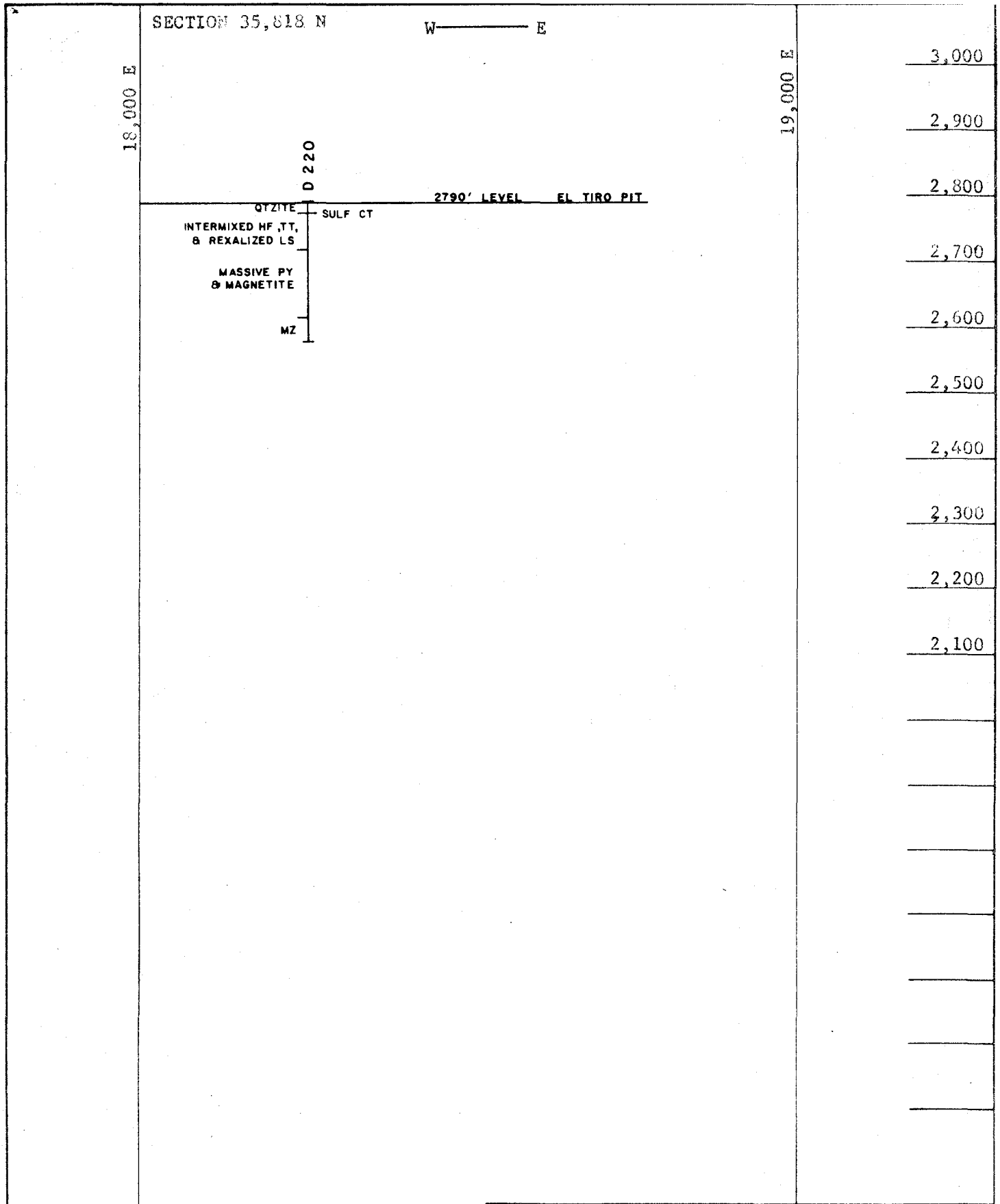
▮ + 0.4% Total Copper Advance for month

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'	JAB		S 121 A



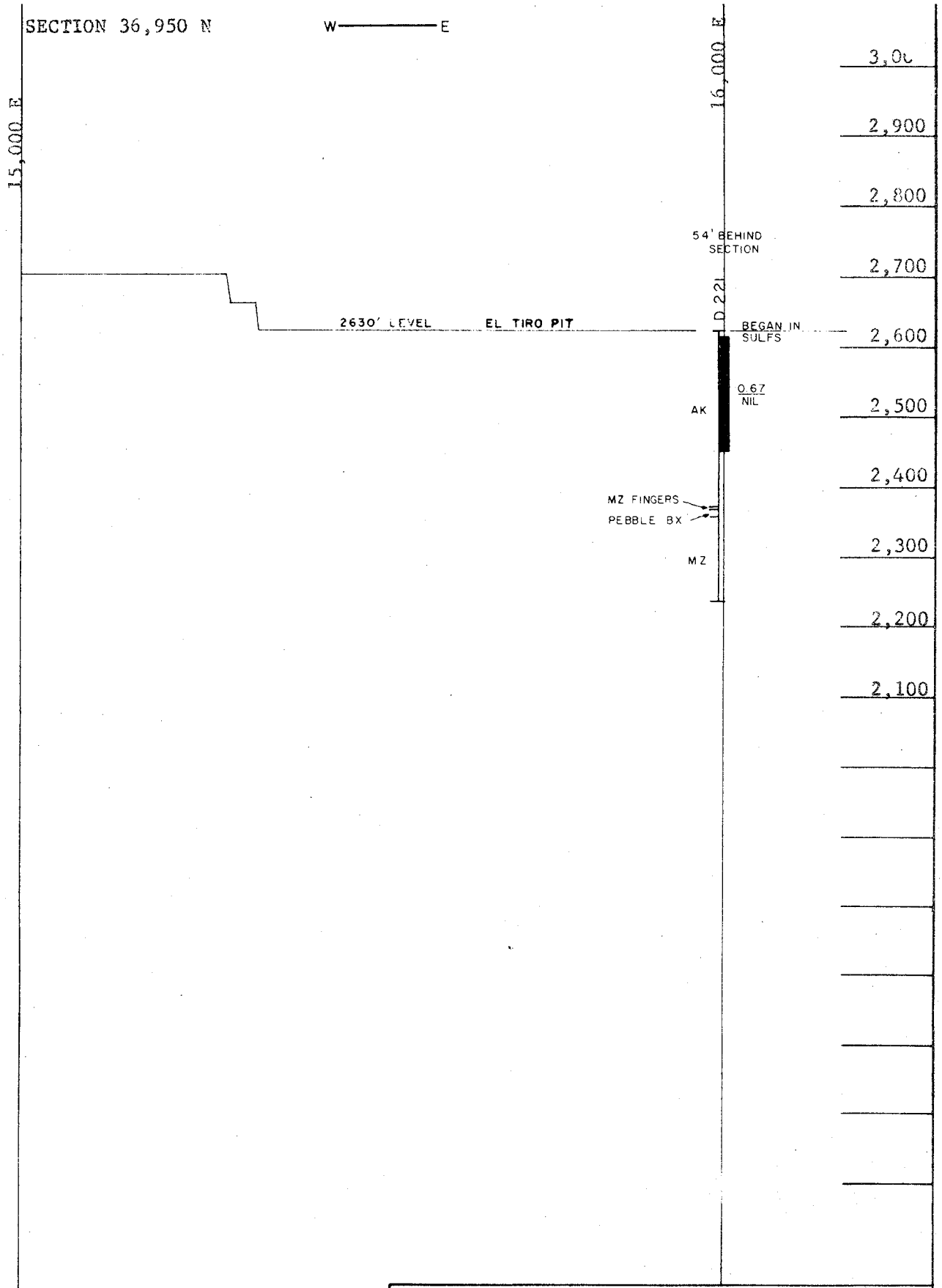
+ 0.4% Total Copper Advance for month

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'			S 121 A



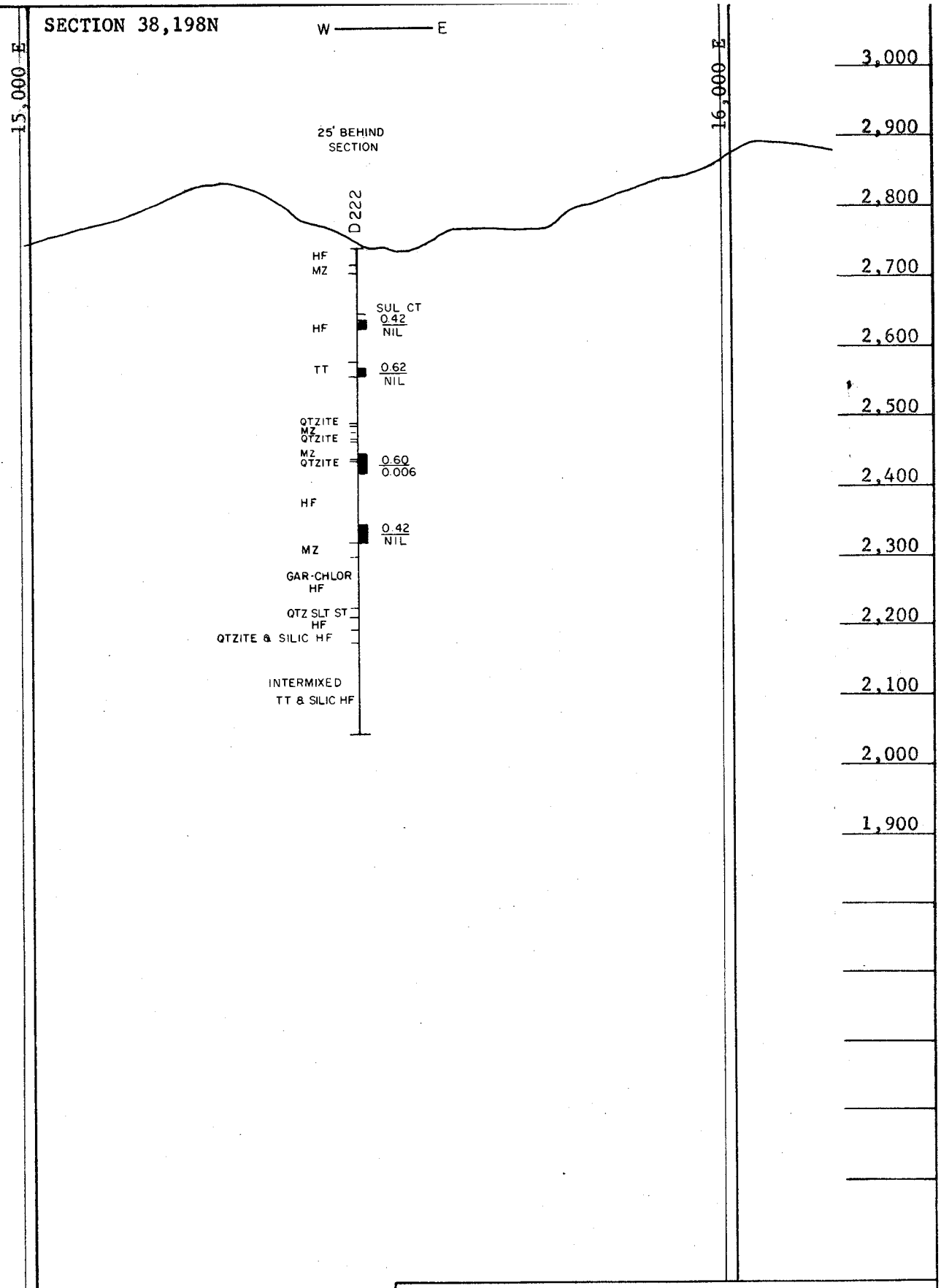
+0.4% Total Copper
Advance for month

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'			S 121 A



▮ + 0.4% Total Copper Advance for month

Note: Rock Types Generalized
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AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

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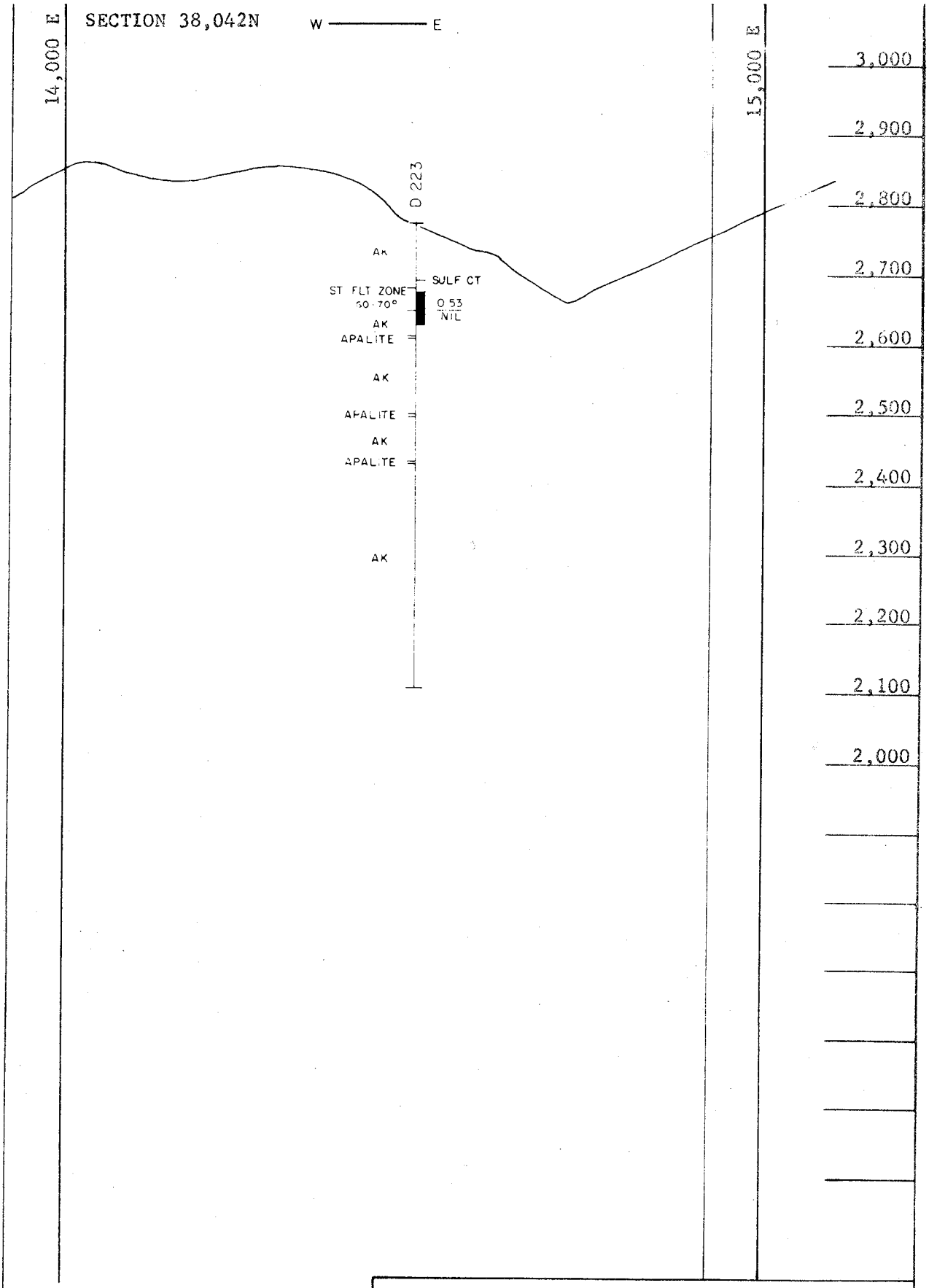
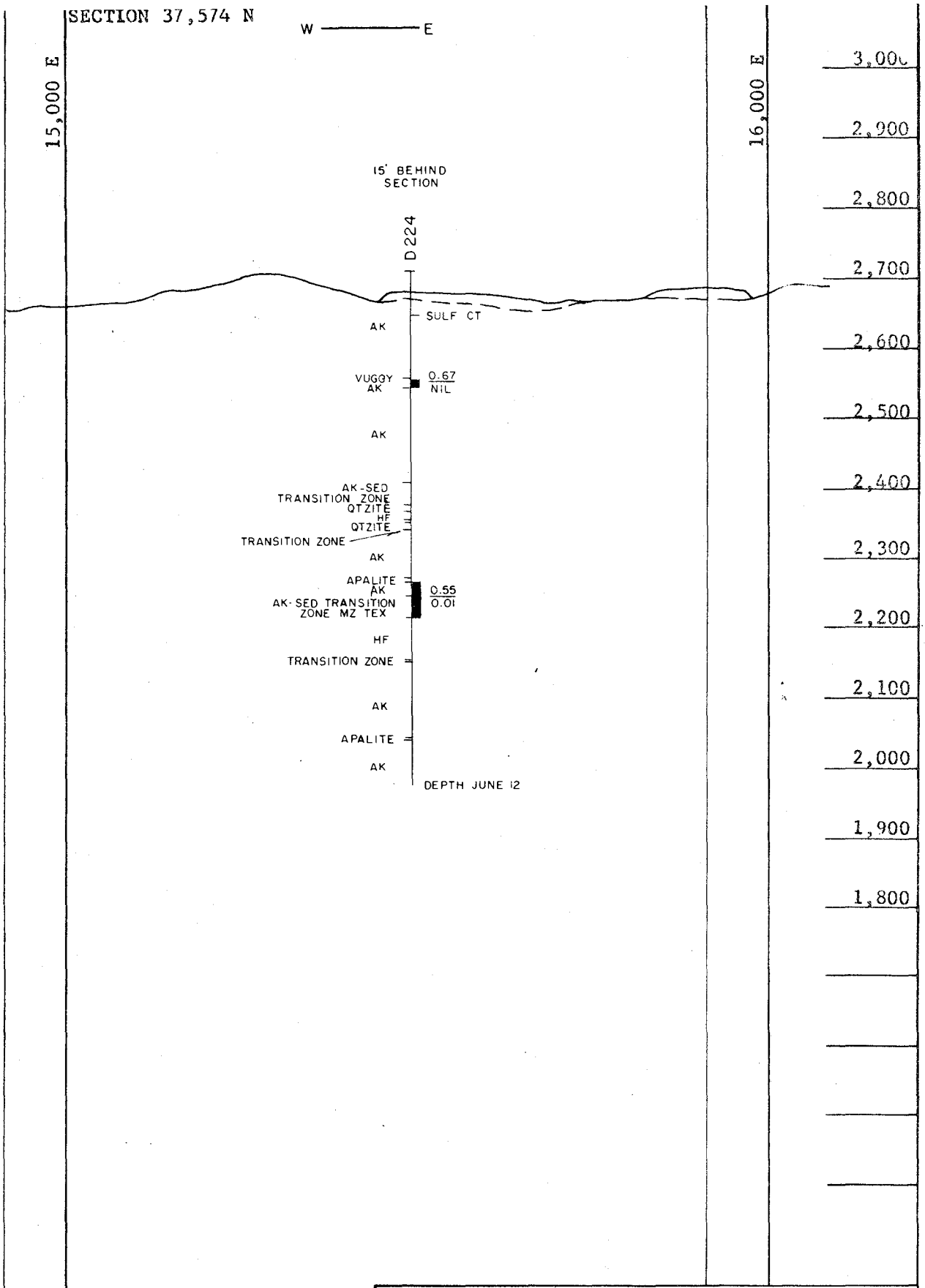
1" = 200'			S 121 A



■ + 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 1" = 200'	DRAWN	DATE	FILE S 121 A



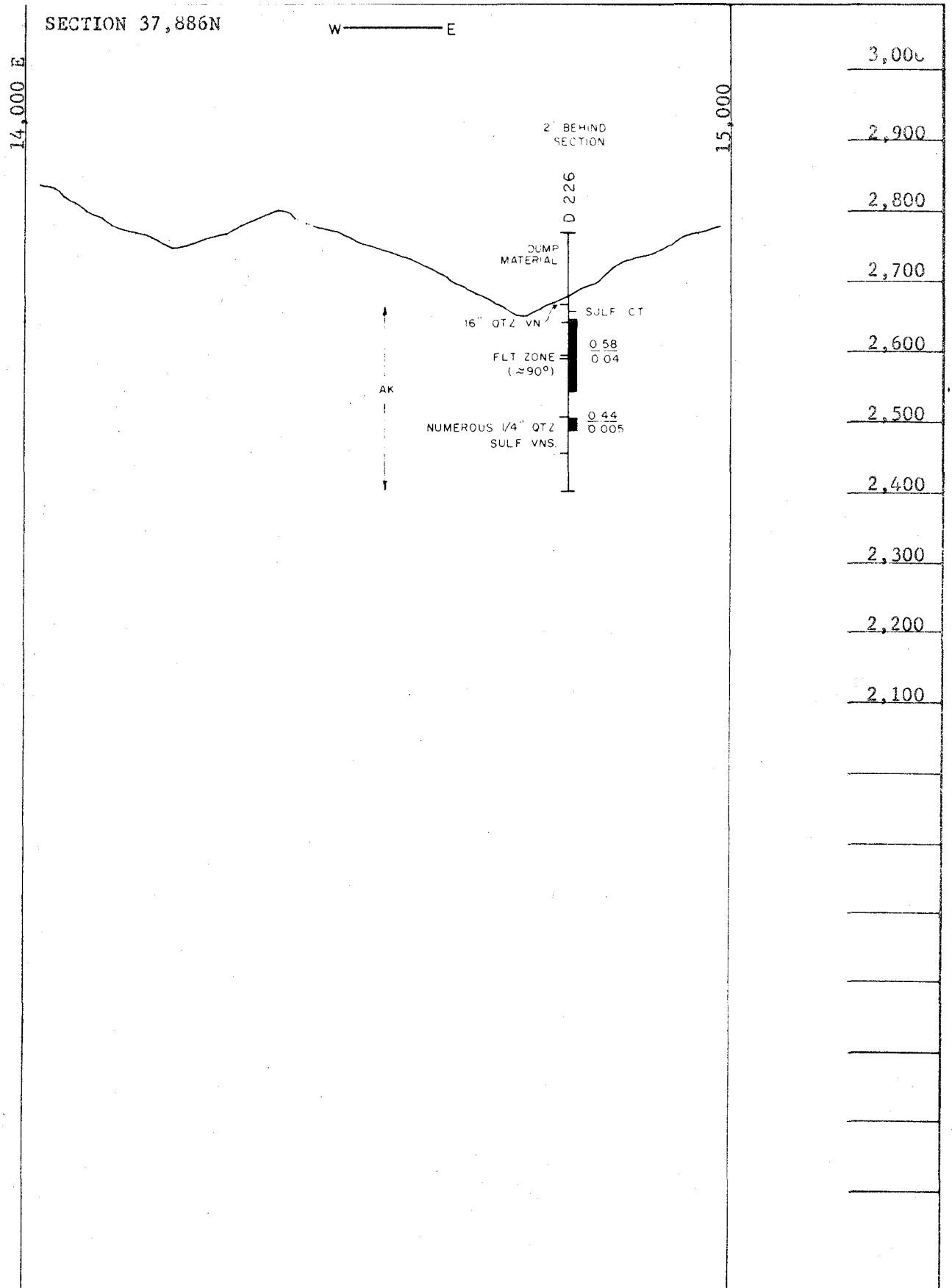
■ + 0.4% Total Copper Advance for month

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

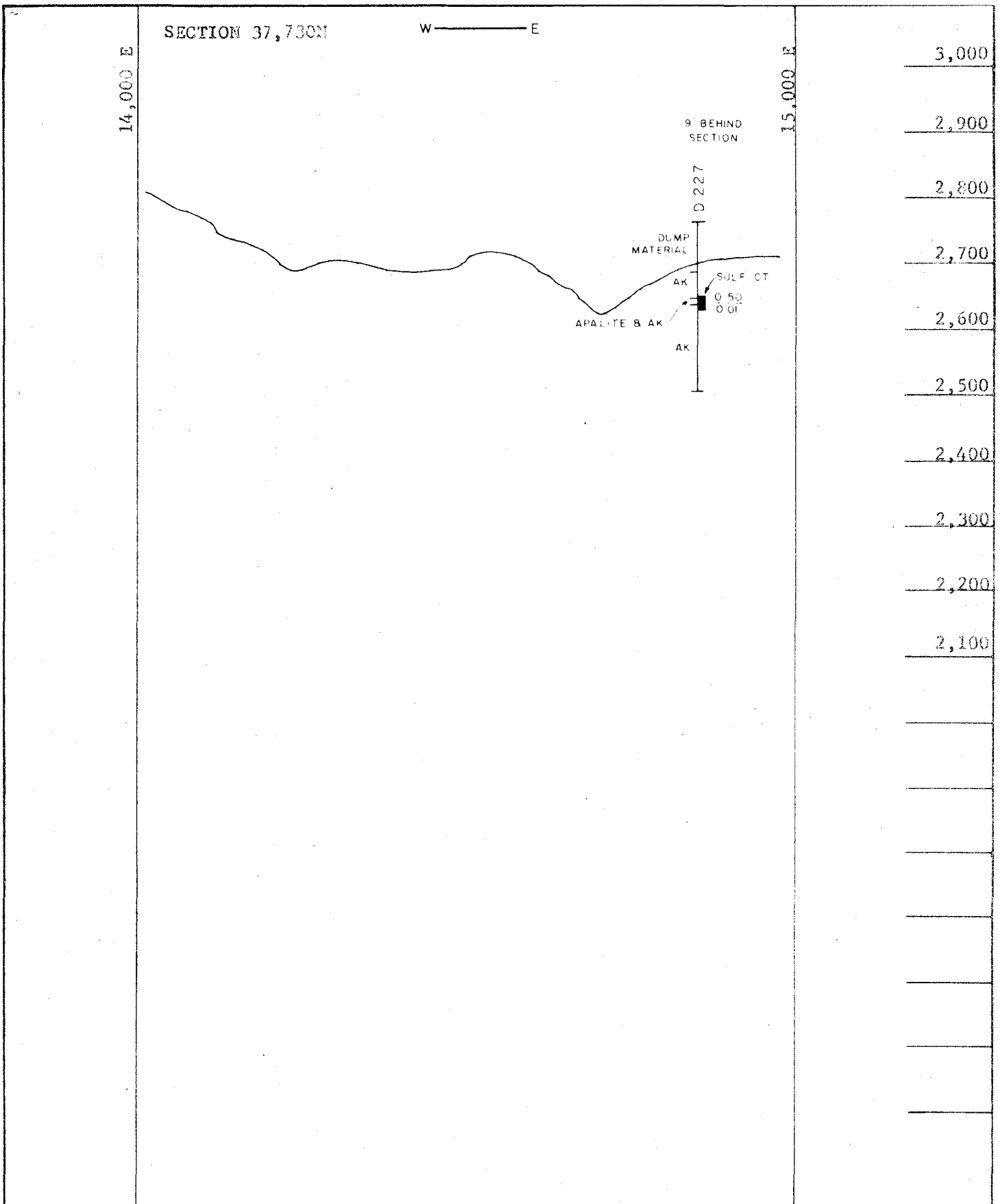
SCALE	DRAWN	DATE	FILE
1" = 200'			S 121 A



+ 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 1" = 200'	DRAWN	DATE	FILE S 121 A



■ + 0.4% Total Copper
Advance for month

Note: Rock Types Generalized
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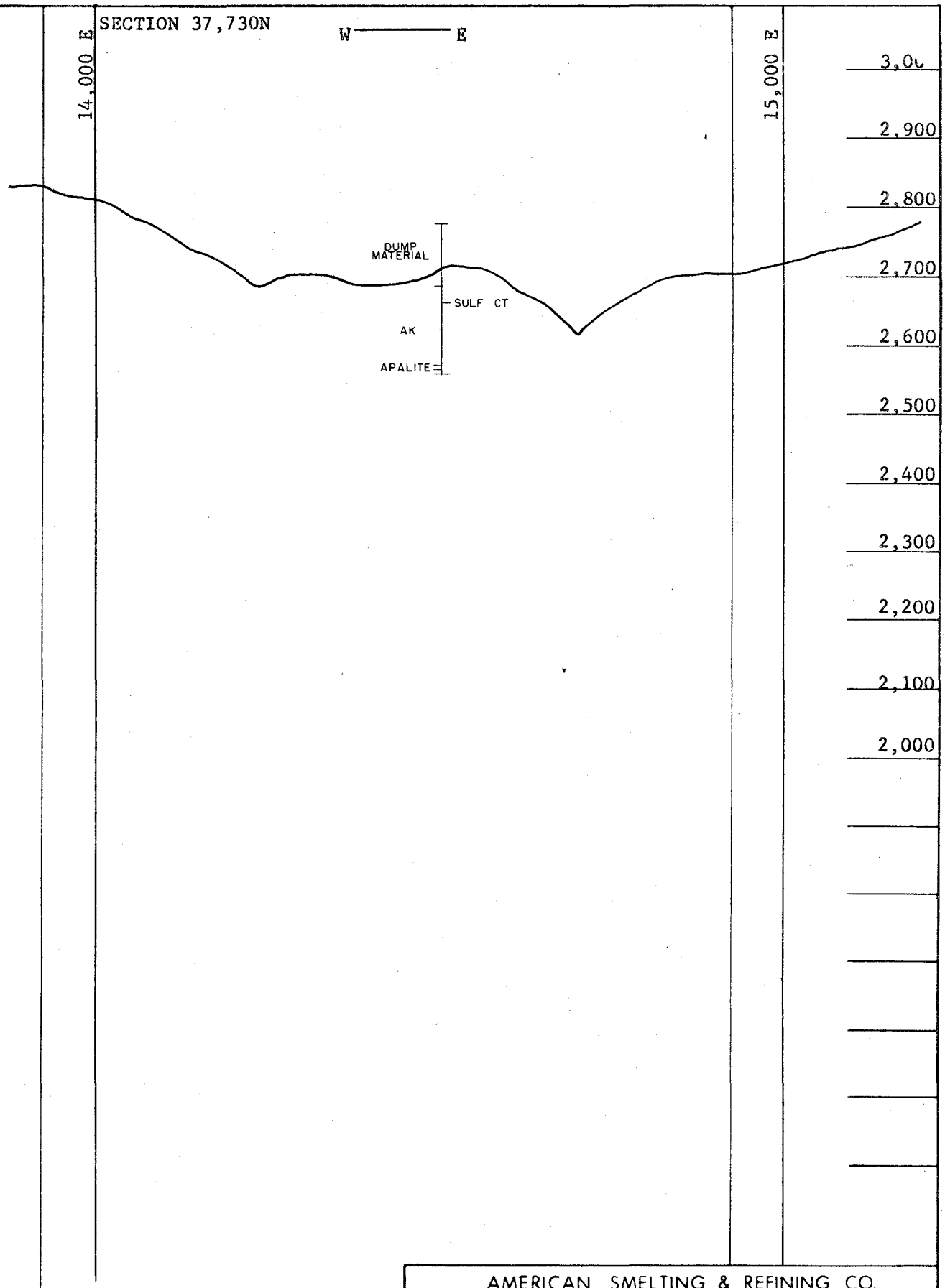
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'			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 AREA DRILL HOLE PROJECTIONS			
SCALE 1" = 200'	DRAWN	DATE	FILE S 121 A

AMERICAN SMELTING AND REFINING COMPANY
Sahuarita Arizona
June 8, 1967

J. H. C.
JUN 12 1967

MEMORANDUM TO MR. P. A. LEWIS

Re: Monthly Report on Diamond Drilling

SUMMARY - DISCUSSION

The total footage drilled during May amounted to 1,690.7 feet. Two (2) holes, M-140 and M-141, were completed. Drilling commenced on hole M-142.

The desired negative mineral results continue to be encountered on Sec. 33 T16S, R13E. The drilling program on Sec. 33 as outlined by the consultant geologist for the state of Arizona Bureau of Land Management will be completed by the end of June.

M-140, situated 1,550 feet south and 990 feet east of the northwest corner of Sec. 33, did not encounter any visible copper mineralization. The total copper assays ranged from nil to 0.02 percent.

M-141, located 1,320 feet north and 1,320 feet west of the southeast corner of Sec. 33, did not penetrate any visible copper mineralization. The assays ranged from 0.01 to 0.05 percent total copper.

M-142, positioned 1,320 feet east and 100 feet north of the southwest corner of Sec. 33, had not reached bedrock by the end of May.

GEOLOGIC LOG OF HOLES

M-140 encountered unsorted fanglomerate at bedrock, 309.8 feet below the surface. The fanglomerate was composed of fragments of biotite rhyolite in a fine grained hematitic matrix. At 439.6 feet below an old erosional surface (referred to as the San Xavier Surface in Company literature) unaltered and unmineralized, interbedded, fine grained, gray arkose and black carboniferous siltstone and shale of the Cretaceous Amole formation were encountered. The hole bottomed in the Amole arkose and black shale at 1,000.0 feet.

M-141 penetrated interbedded hematite rich siltstone and fine grained conglomerate at bedrock 390.0 feet below the surface and the hole continued in this material to a depth of 500.0 feet where it bottomed. Numerous fragments of the Amole arkose and black shale and a few fragments of biotite rhyolite were seen in the conglomeritic zones. This interbedded siltstone and fine grained conglomerate correlates with the sediments of the Helmet fanglomerate immediately below the basalt porphyry flow as seen in hole M-139 on Sec. 33 and is therefore post mineral rock.

M-142 continued to rock bit in recent alluvium at the end of May and stood at a depth of 190.7 feet at that time.

Sections illustrating progress for May, a list of abbreviations utilized on cross sections, a tabulation of ore intercepts for the month, and a plan map with hole locations and proposed drill holes are attached.

D. K. HALL
Resident Geologist

DKH:mt

Enclosures

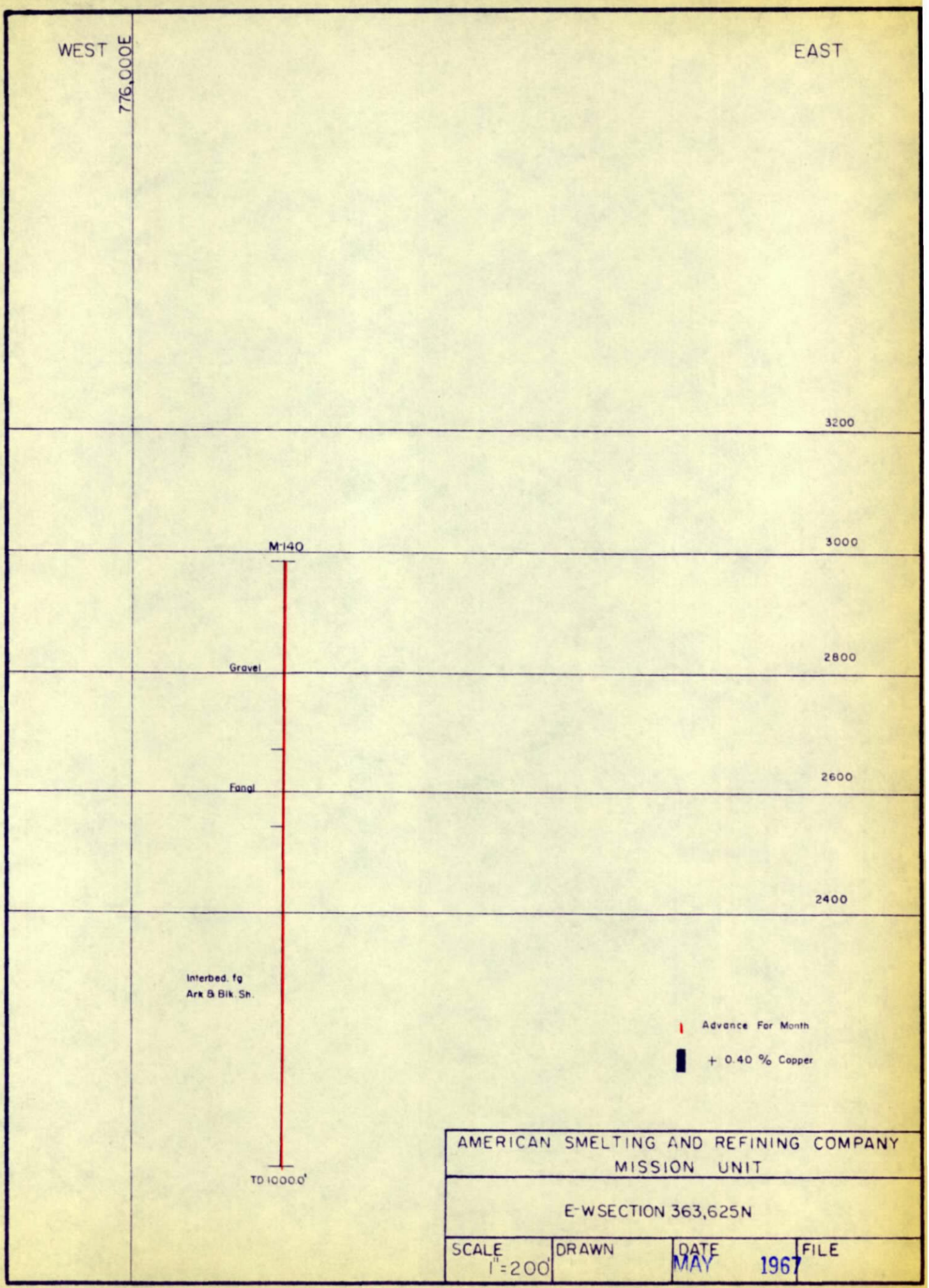
DIAMOND DRILLING - MISSION UNIT

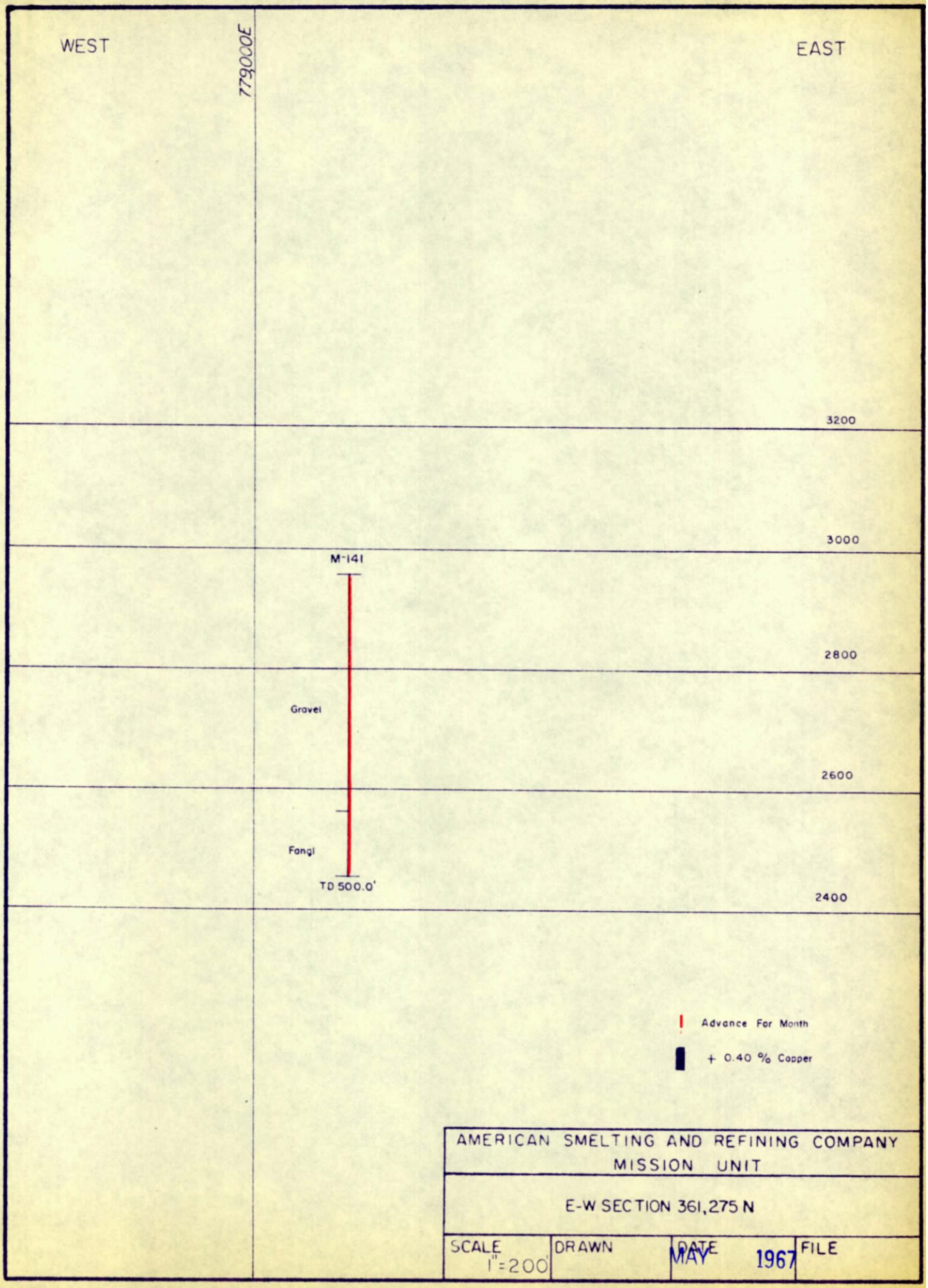
May, 1967

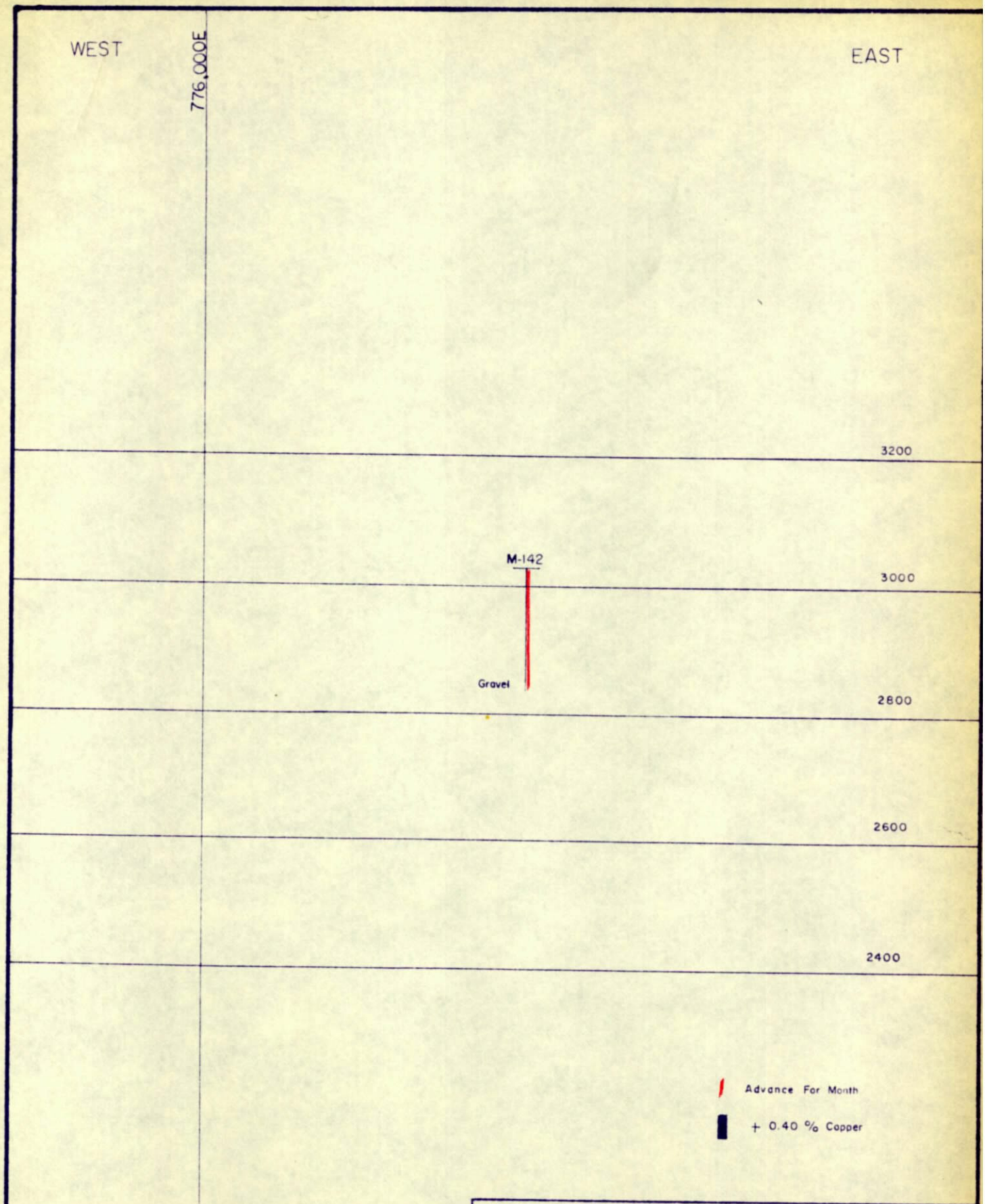
Hole Nos.	Ground Elevations	Coordinates North	Coordinates East	+ 0.40% Cu. Depth	Intersections Interval	Average Total	% Cu. N.S.	Feet Drilled During Month	Depth End of Month	Final Depth
M-140	2982.71	363,638.63	776,244.02	-	Assays range from nil to 0.02% Cu		-	1000.0	1000.0	1000.0
M-141	2955.57	361,275.00	779,153.58	-	Assays range from 0.01 to 0.05% Cu		-	500.0	500.0	500.0
M-142	3027.33	360,038.99	776,496.09	-	All drilling rotary		-	190.7	190.7	
								1,690.7		

EXPLANATION OF ABBREVIATIONS ON SECTIONS

Cal. Cgl.	-	Caliche Conglomerate (Overburden)
Arg.	-	Argillite
Cgl.	-	Conglomerate
Tt.	-	Tactite
Hf.	-	Hornfels
Mb.	-	Marble
C. Arg.	-	Calcareous Argillite
N.S.	-	Non Sulfide
T.D.	-	Total Depth
And.	-	Andesite
Bx.	-	Breccia
Mp.	-	Metaporphyry
Gyp.	-	Gypsum
Gr.	-	Granite


WEST
776,000E
EAST
3200
3000
M-140
2800
Gravel
2600
Fangl
2400
Interbed. fg
Ark & Blk. Sh.
Advance For Month
+ 0.40 % Copper
TD 10000'
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
E-W SECTION 363,625N
SCALE
1" = 200'
DRAWN
DATE
MAY 1967
FILE


WEST
779000E
EAST
3200
3000
M-141
2800
Gravel
2600
Fangl
TD 500.0'
2400
Advance For Month
+ 0.40 % Copper
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
E-W SECTION 361,275 N
SCALE
1"=200'
DRAWN
DATE
MAY 1967
FILE



AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT

E-W SECTION 360,000N

SCALE	DRAWN	DATE	FILE
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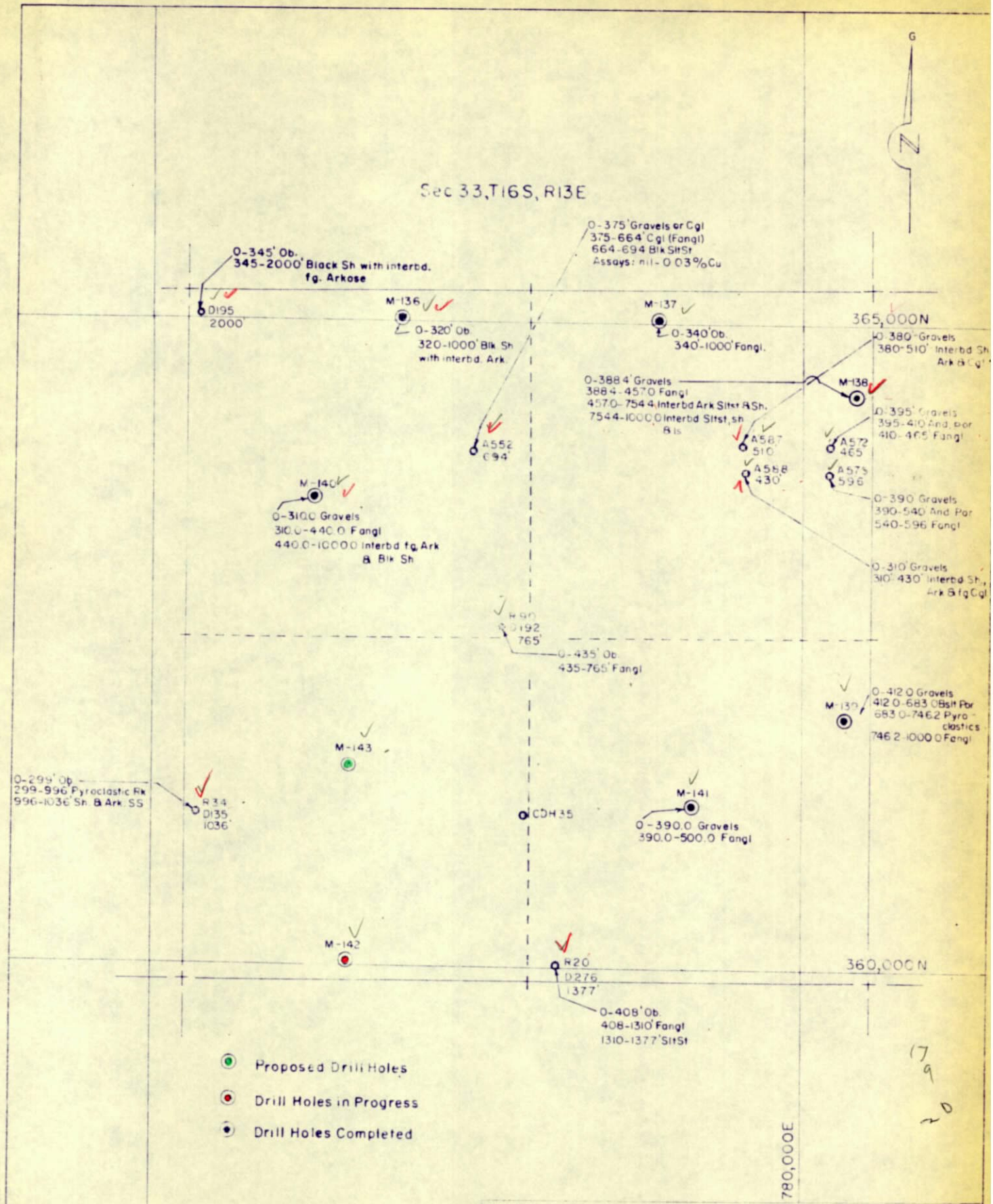


AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT

DIAMOND DRILLING PROGRESS MAP

SCALE	DRAWN	DATE	FILE
1" = 1000'		MAY 1967	

Mr. J. H. Courtright

WES
~~BAW~~

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

J. H. C.
MAY 24 1967

May 23, 1967

W.E.S.
MAY 26 1967

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

Subject: MONTHLY REPORT ON EL TIRO AND BATTERY INCLINE AREA DIAMOND DRILLING.

The following breifly summarizes the results of diamond drilling in the El Tiro and Battery Incline areas during the month of April, 1967.

A total of 2,050.7 feet of diamond core drilling was done by one truck mounted rig working in the El Tiro area and one truck mounted rig working in the Battery Incline area, each operating two shifts per day.

The following results are available:

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-219	2,735.4	37,704.7	15,382.9	544.2	127.3	1.16	Nil.			
				687.0	23.4	0.88	Nil.			
				735.3	183.6	1.25	Nil.	468.7	874.1	1065.0
G-24	2,708.2	28,433.7	33,033.6	No +0.4% Cu Lenses				87.4	170.4	170.4
G-25	2,716.6	28,432.0	32,323.3	No +0.4% Cu Lenses				93.1	176.1	176.1
G-26	2,358.5	25,462.2	42,738.5	No +0.4% Cu Lenses				515.7	515.7	515.7
G-27	2,338.6	25,508.6	43,808.6	No +0.4% Cu Lenses				501.5	501.5	501.5
G-28	2,573.2	28,154.2	36,309.7	No +0.4% Cu Lenses				191.5	191.5	191.5
G-29	2,552.1	26,568.5	35,909.9	No +0.4% Cu Lenses				192.8	192.8	192.8
							TOTAL	2,050.7		

EL TIRO AREA:

Drilling continued on D-219. From 660 feet to about 700 feet a fault zone with very poor ground conditions was encountered. The drill was stuck in this zone for the greater part of the month, and core recovery through the zone was very poor. A few feet above the fault, aplite was cored, and in the zone, a small amount of strongly altered alaskite and hornfelsic sediments were recovered.

Beyond the zone some 45 feet of alaskite was cored before the hole re-entered meta-sediments. The contact of the alaskite and meta-sediments was obscured because of shearing. The alaskite probably formed a dike through the sediments, however, it is possible that it is merely a block brought in along the very strong fault zone.

At 745 feet (directly below the alaskite) strongly altered hornfelic sediments were encountered. The sediments were limy and strongly altered to chlorite with strong magnetite. Post mineral movement has caused brecciation of the hornfels with subsequent cementing by gypsum. The addition of gypsum was quite strong, the core being composed of from 10 to 50 percent of the mineral.

Chalcopyrite occurrs as veins and disseminations through the rock. The disseminated chalcopyrite was closely associated with finely disseminated magnetite.

Monzonite was encountered at 926.0 feet. Mineralization in the monzonite consisted of weak pyrite and chalcopyrite assaying at about 0.15% copper. The hole was bottomed in monzonite at 1065.0 feet.

BATTERY INCLINE AREA:

G-26 collared in redish gypsiferous sediments (?) and entered strongly altered igenous (?) breccia at 17 feet. At 30 feet the breccia gave way to a strongly altered unidentified igneous rock that may be ignimbrite. Arkose was cut at 51 feet, claystone (?) at 58.8 and arkose again at 65 feet. These rocks carried finely disseminated pyrite.

At 72.8 feet red basalt probably a post mineral sill, was encountered. Arkose was again encountered at 161.8 feet, and the hole remained in that rock to the bottom at 515.1, except for a monzonite dike at 443 to 470 feet.

The arkose was strongly pyritized but copper values were only about 0.01%.

G-27 collared in a pre-mineral air (?) lain tuff. This tuff is thin bedded, the beds consisting of very fine grained glassy, to coarse shards of volcanic material. It appears to be welded in places. The beds dip an average of -30° and are weakly altered and pyritized. The hole bottomed at 501.5 feet in the tuff. Copper values averaged less than 0.01% copper and no enrichment was noted.

This tuff may be co-relative to material logged as "arkose" in more highly altered areas.

G-28 collared in a biotite monzonite and remained in that rock to the bottom at 191.5 feet. The rock contained up to 35% biotite, which was strongly chloritized. Moderate pyrite was noted but primary copper mineralization averaged only about 0.01%.

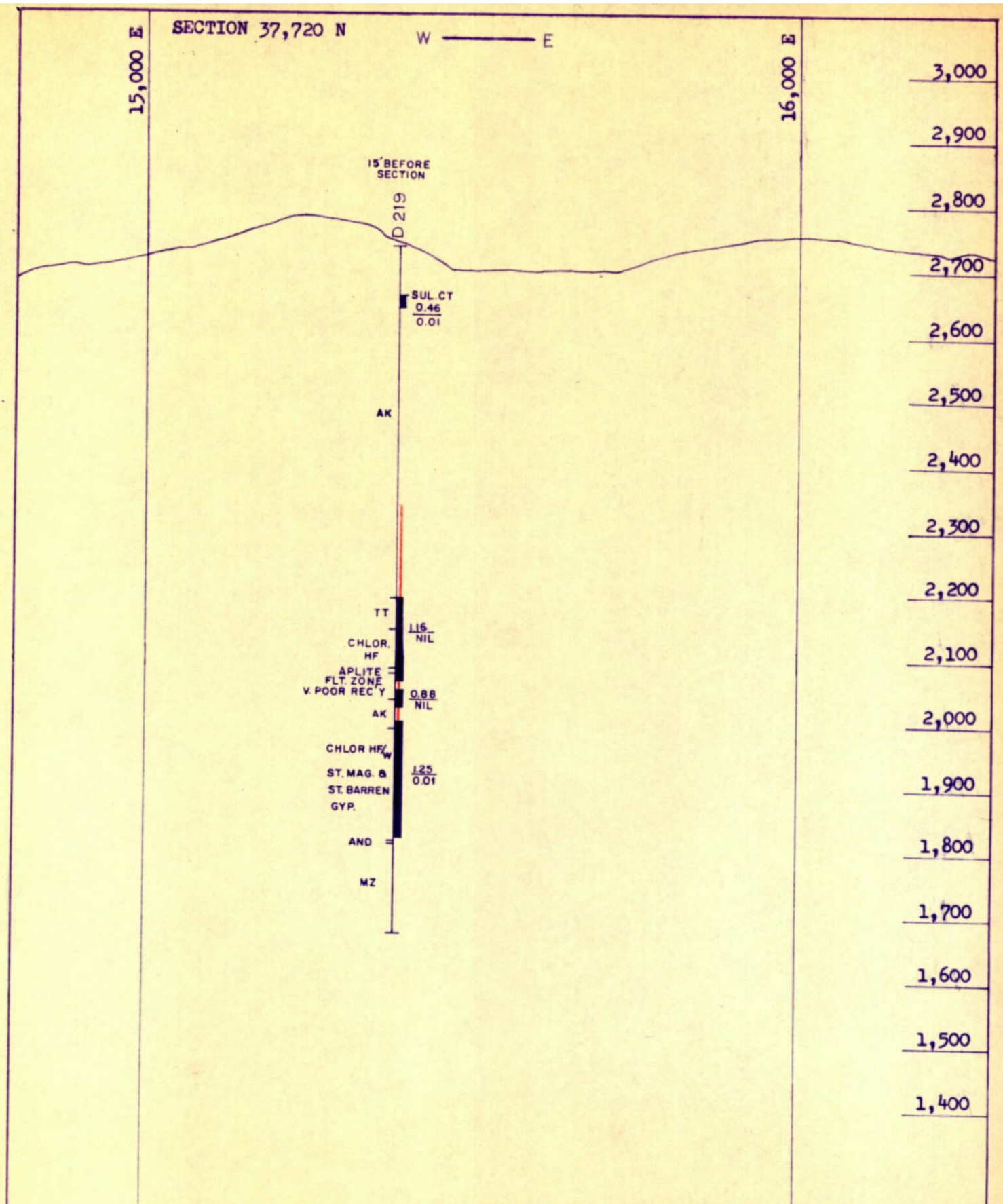
G-29 collared in strongly altered Silver Bell andesite and remained in that rock to the bottom at 192.8 feet, except for a post mineral andesite dike between 24 and 63.6 feet. Three to four percent pyrite was present but primary copper mineralization averaged only 0.02 to 0.05% copper.

Hole G-29 terminated the drilling in the Battery Incline area for the present. Results were generally disappointing, however, a few more holes may be justified after completion of more geochemical sampling.

James A. Briscoe

JAB:jca

James A. Briscoe



+0.4% Total Copper

Advance for month

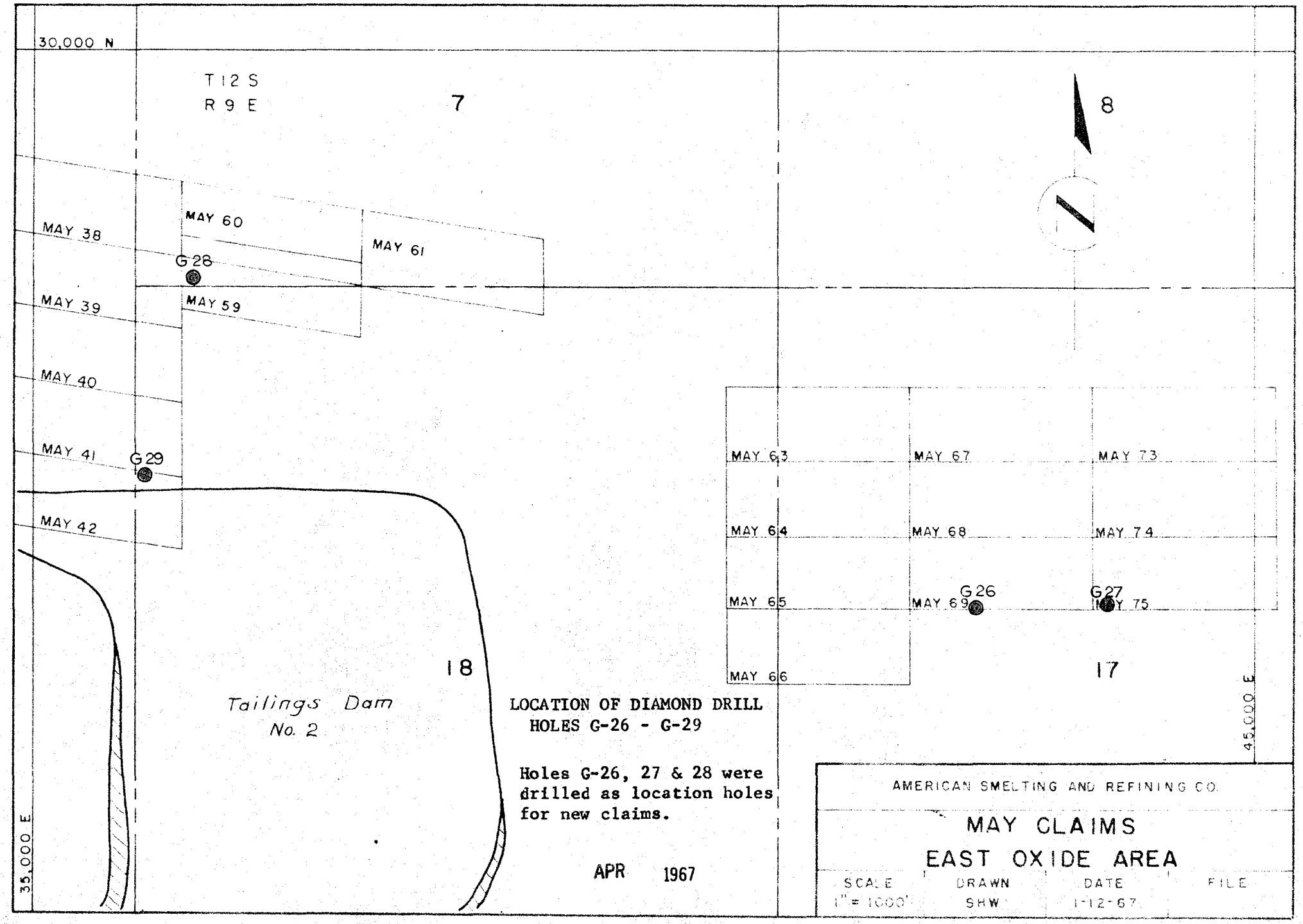
Note: Rock Types Generalized

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

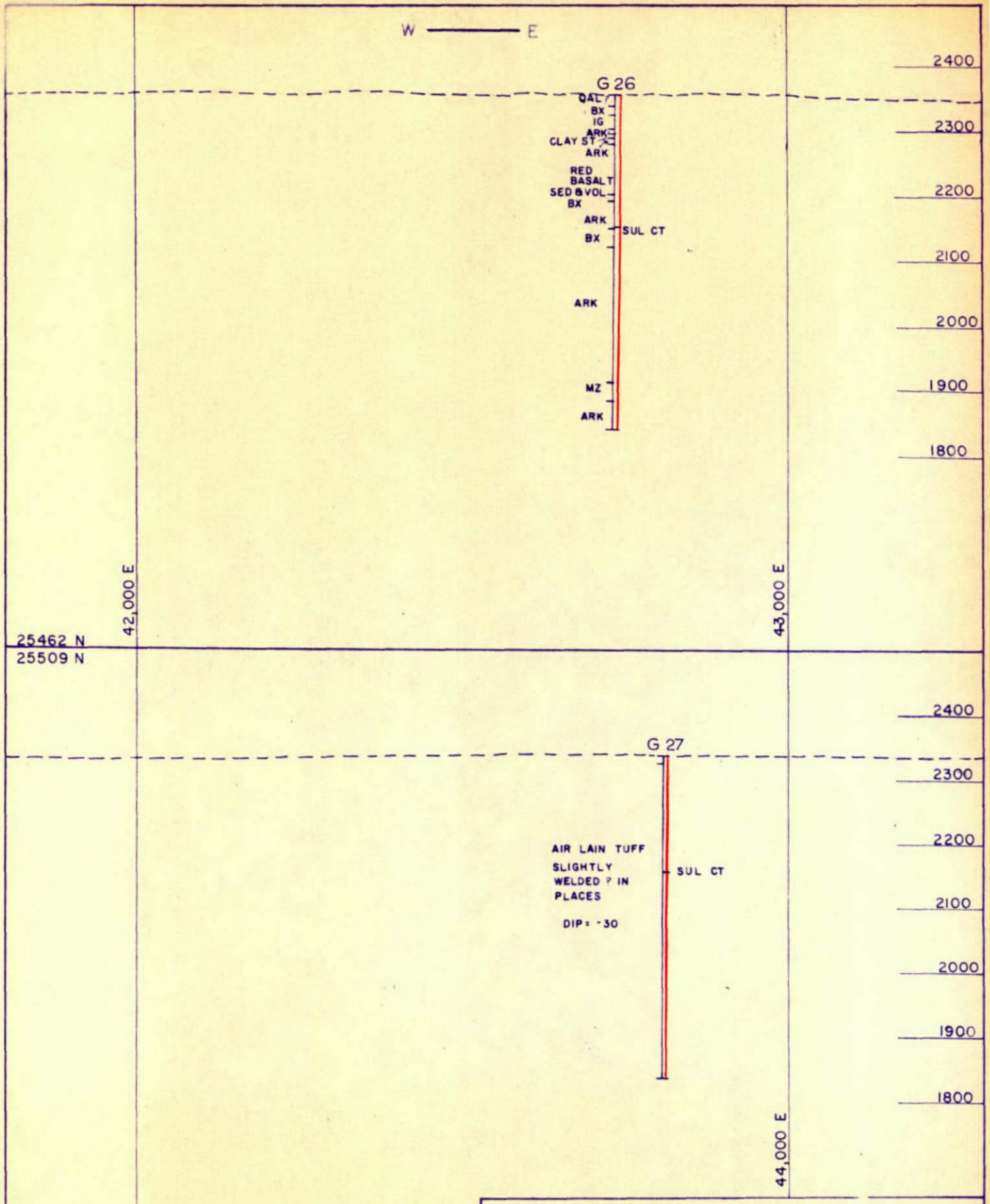
SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	APR 1967	S 121 A

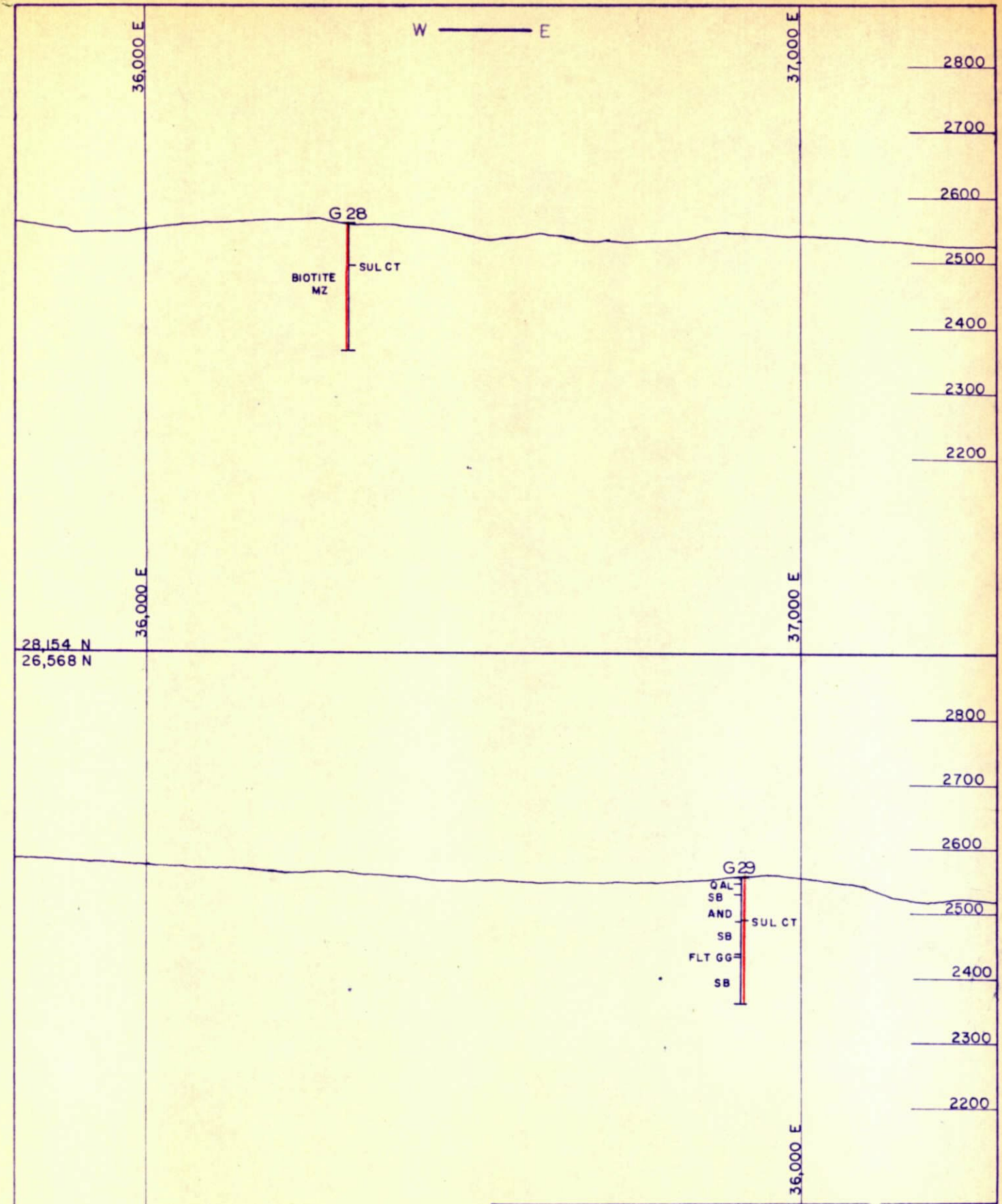


LOCATION OF DIAMOND DRILL HOLES G-26 - G-29

Holes G-26, 27 & 28 were drilled as location holes for new claims.

APR 1967

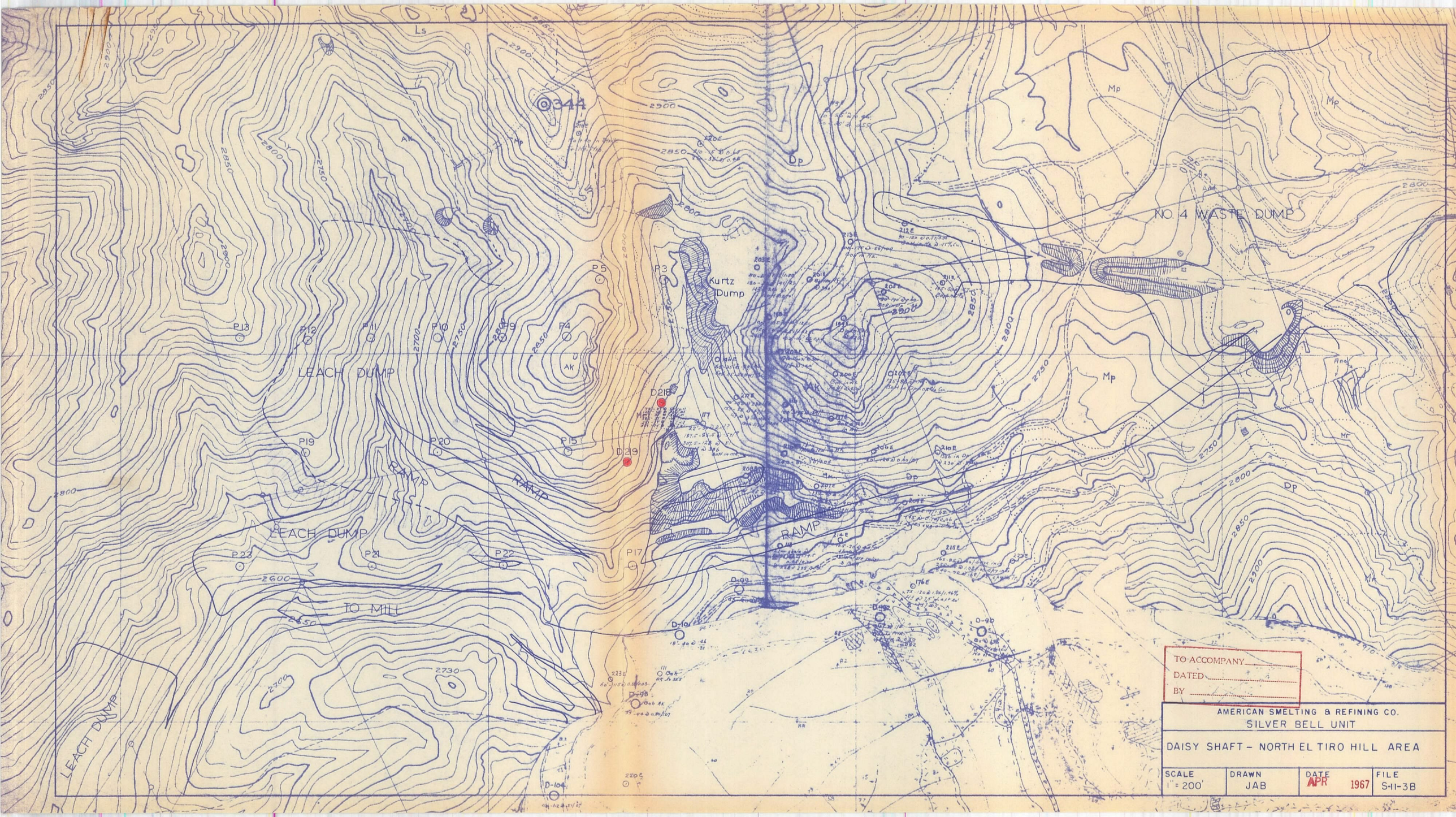

W — E
G 26
QAL
BX
IG
ARK
CLAY ST
ARK
RED BASALT
SED & VOL
BX
ARK
SUL CT
BX
ARK
MZ
ARK
2400
2300
2200
2100
2000
1900
1800
42,000 E
43,000 E
25462 N
25509 N
G 27
AIR LAIN TUFF
SLIGHTLY WELDED ? IN PLACES
DIP = -30
SUL CT
44,000 E
43,000 E
+0.4% Total Copper
Advance for month
Note Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS
SCALE 1" = 200'
DRAWN JAB
DATE APR 1967
FILE S 121 A



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	APR 1967	S 121 A


NO. 4 WASTE DUMP
Kurtz Dump
LEACH DUMP
LEACH DUMP
LEACH DUMP
RAMP
RAMP
RAMP
TO MILL
TO ACCOMPANY
DATED
BY
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE APR 1967
FILE S-11-3B

MIS-1.1
J HC

J. H. C.
JUL 7 1967

AMERICAN SMELTING AND REFINING COMPANY
Sahuarita Arizona
July 6, 1967

MEMORANDUM TO MR. P. A. LEWIS

Re: Monthly Report on Diamond Drilling

SUMMARY - DISCUSSION

The total footage drilled during June was 809.3 feet. Two (2) holes, M-142 and M-143, were completed.

The desired negative mineral results were encountered on Sec. 33, T16S, R13E. The drilling program on Sec. 33, as outlined by the consultant geologist for the Arizona Bureau of Land Management, was completed on the 20th of June.

M-142, located 1,320 feet east and 100 feet north of the southwest corner of Sec. 33 did not encounter any visible copper mineralization. The total copper assays ranged from nil to 0.05 percent.

M-143, situated 1,310 feet east and 1,670 feet north of the southwest corner of Sec. 33 did not encounter any visible copper mineralization. Total copper assays range from nil to 0.01 percent.

GEOLOGIC LOG OF HOLES

M-142 encountered unsorted Helmet fanglomerate at bedrock, 310.0 feet below surface. The unaltered, unmineralized fanglomerate is composed of sharp angular fragments of black carbonaceous shale, siltstone, and fine grained gray arkose (possibly of the Cretaceous Amole formation) in an occasionally chlorite and hematite rich silty matrix. The hole bottomed in the Helmet fanglomerate at 500.0 feet.

M-143 encountered caliche cemented conglomerate at 290.0 feet below surface and Helmet fanglomerate bedrock at 317.7 feet. The unaltered unmineralized fanglomerate is composed of sharp angular carbonaceous black shale, siltstone, and fine grained gray arkose in an occasionally chlorite and hematite rich moderately well indurated, silty matrix. The hole bottomed in the Helmet fanglomerate at 500.0 feet.

Sections illustrating progress for June, a list of abbreviations utilized on cross sections, a tabulation of ore intercepts for the month, and a plan map with hole locations are attached.

D. K. HALL
Resident Geologist

DKH:tt

Enclosures

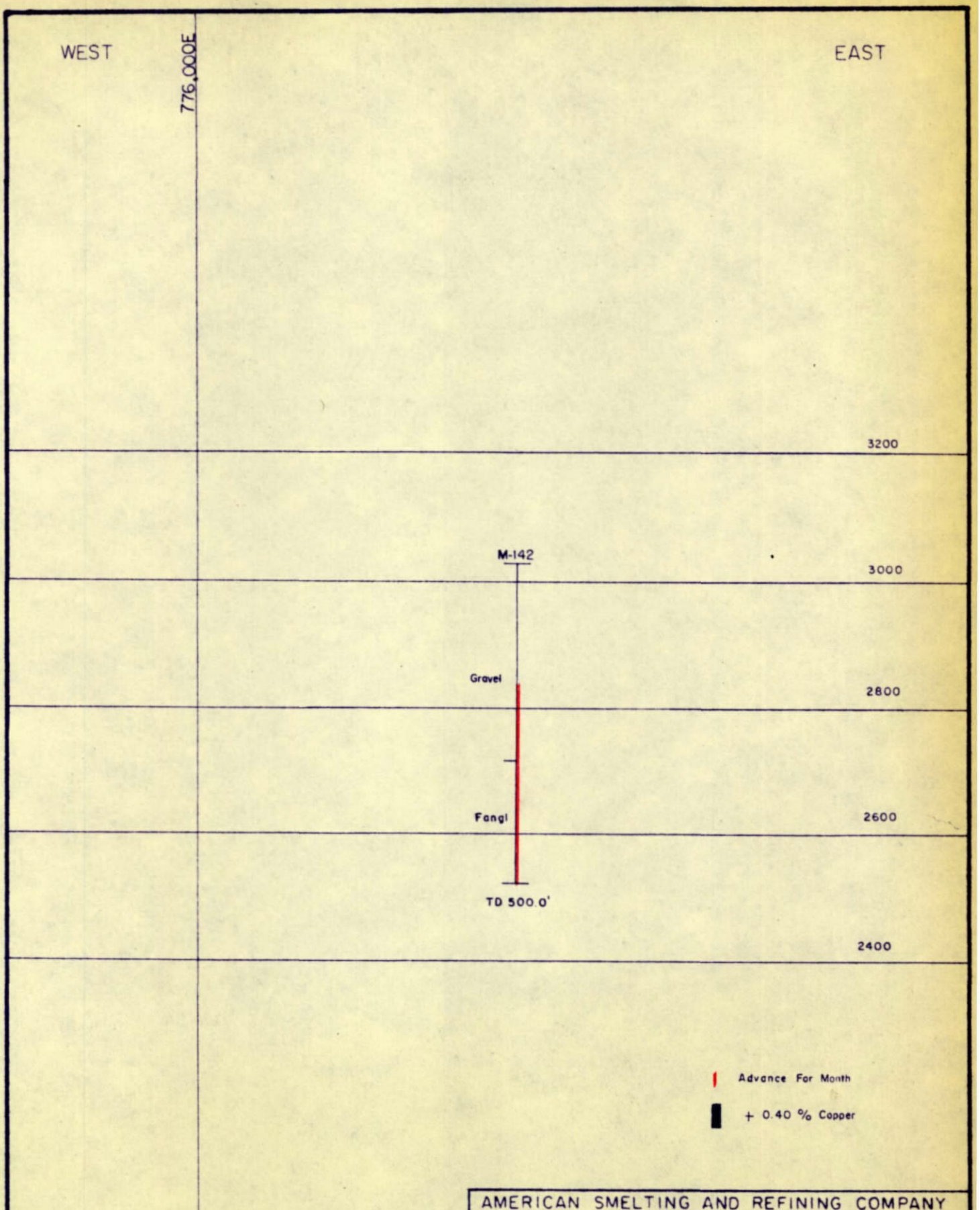
DIAMOND DRILLING - MISSION UNIT

June, 1967

Hole Nos.	Ground Elevations	Coordinates North	Coordinates East	+ 0.40% Cu Depth	Intersections Interval	Average Total	% Cu N. S.	Feet Drilled During Month	Depth End of Month	Final Depth
M-142	3027.33	360,038.99	776,496.09	-	Assays range from nil to 0.05% Cu		-	309.3	500.0	500.0
M-143	3008.57	361,566.86	776,562.06	-	Assays range from nil to 0.01% Cu		-	500.0	500.0	500.0
								809.3		

EXPLANATION OF ABBREVIATIONS ON SECTIONS

Cal. Cgl.	-	Caliche Conglomerate (Overburden)
Arg.	-	Argillite
Cgl.	-	Conglomerate
Tt.	-	Tactite
Hf.	-	Hornfels
Mb.	-	Marble
C. Arg.	-	Calcareous Argillite
N.S.	-	Non Sulfide
T.D.	-	Total Depth
And.	-	Andesite
Bx.	-	Breccia
Mp.	-	Metaporphyry
Gyp.	-	Gypsum
Gr.	-	Granite



AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT

E-W SECTION 360,000N

SCALE	DRAWN	DATE	FILE
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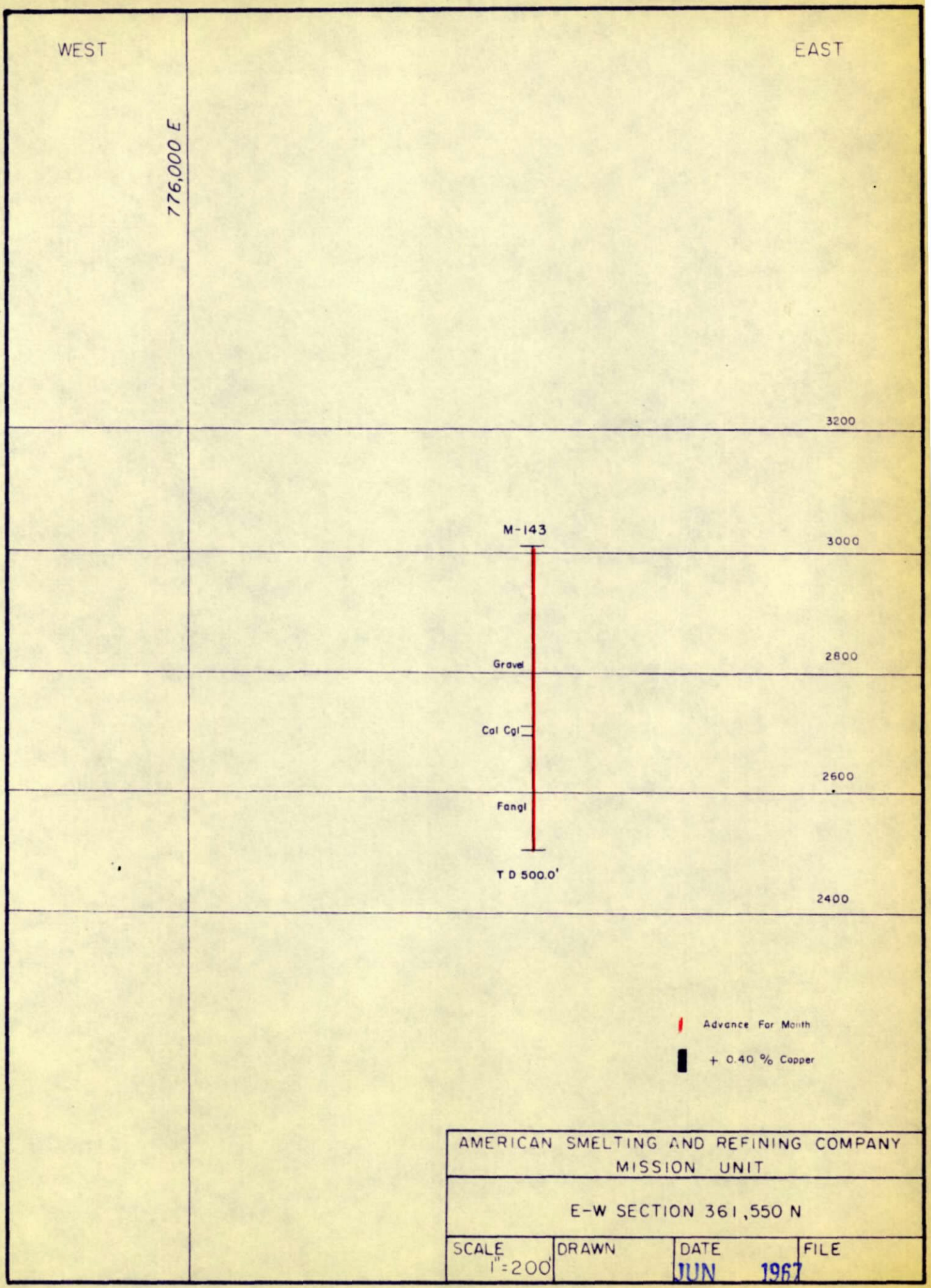
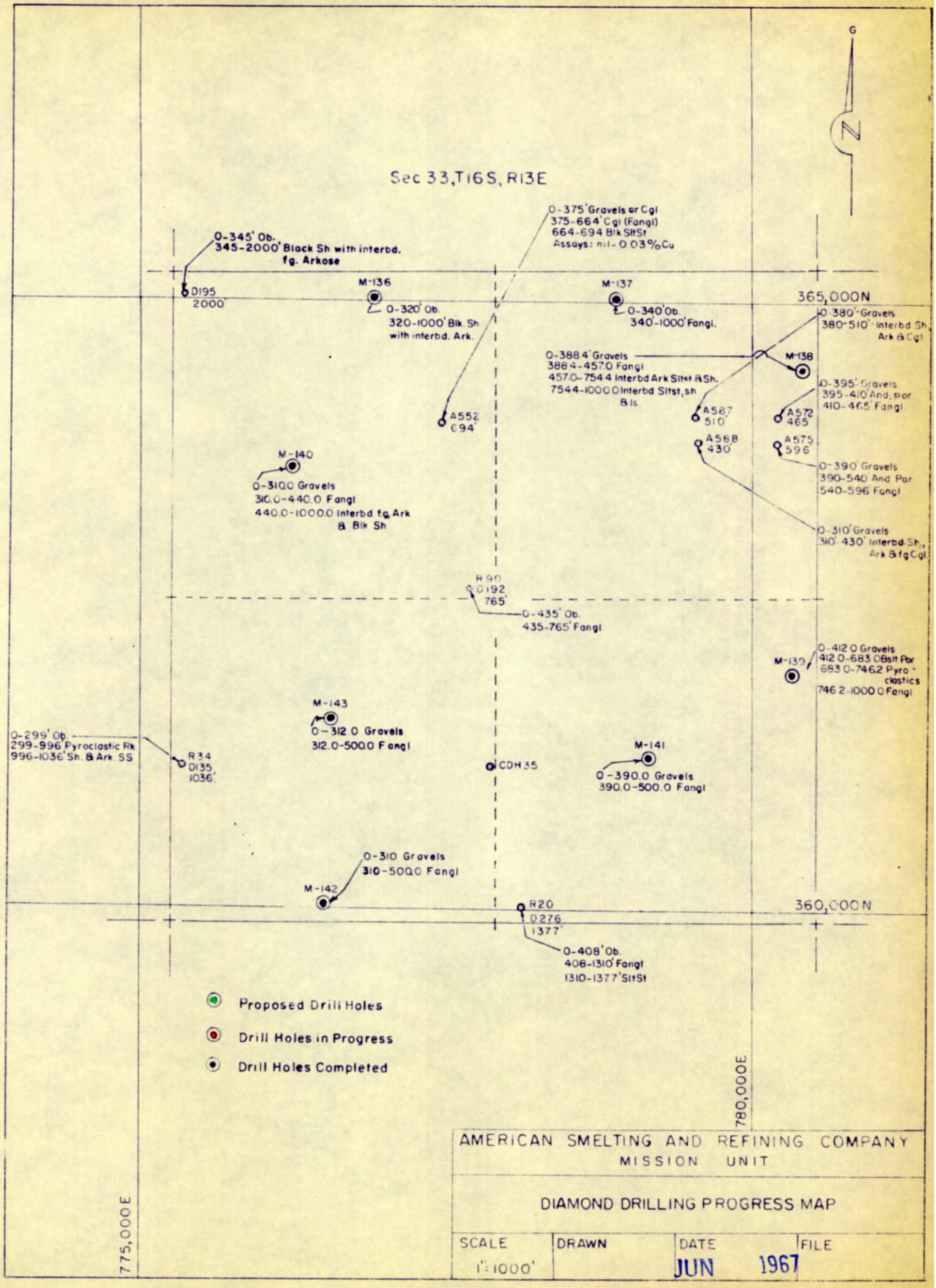

WEST
EAST
776,000 E
3200
M-143
3000
Gravel
2800
Cal Cgl
2600
Fangl
T D 500.0'
2400
Advance For Month
+ 0.40 % Copper
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
E-W SECTION 361,550 N
SCALE
1"=200'
DRAWN
DATE
JUN 1967
FILE



AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT

DIAMOND DRILLING PROGRESS MAP

SCALE	DRAWN	DATE	FILE
1"=1000'		JUN 1967	

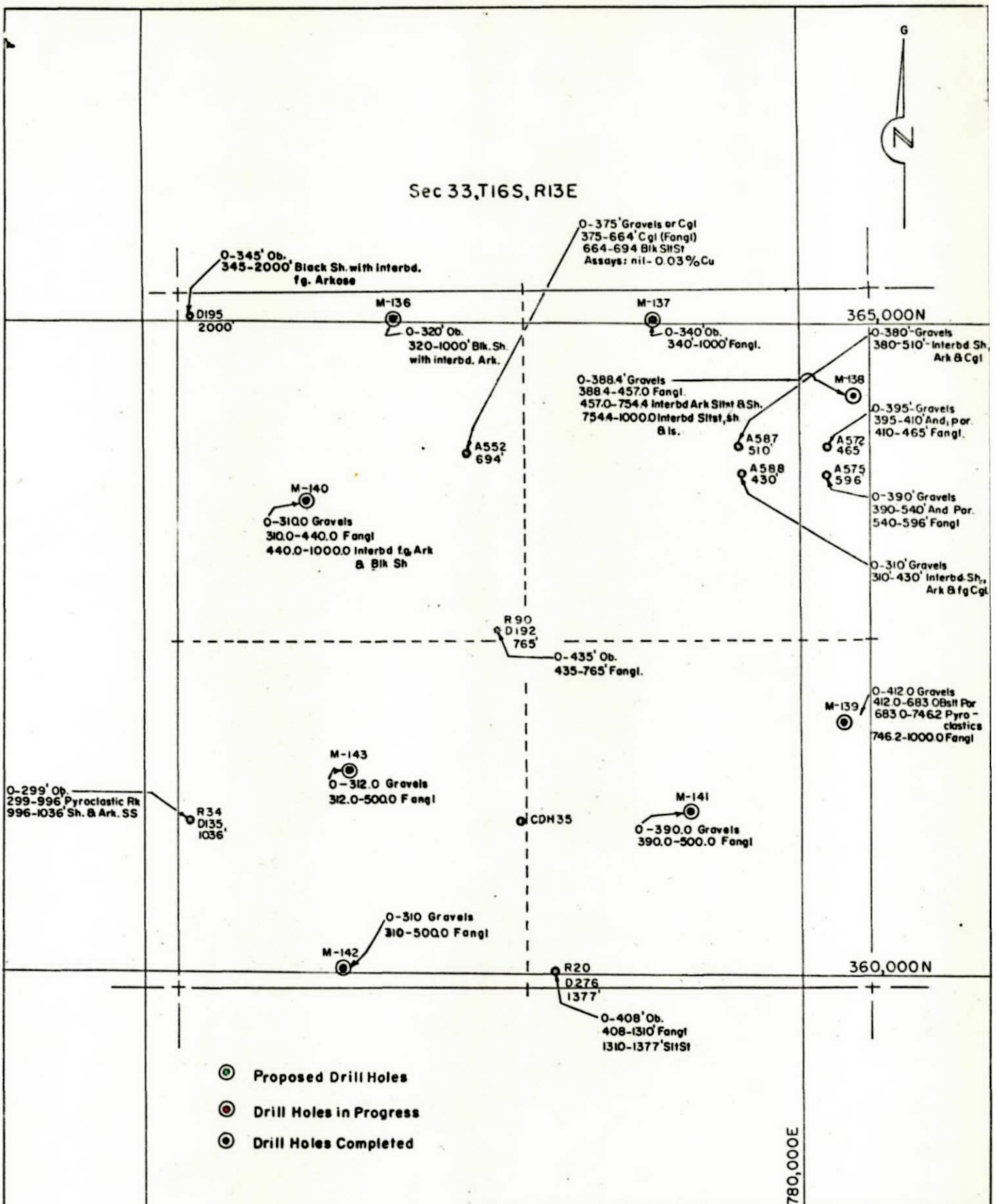
J. H. C.

JUL 3 1967

DIAMOND DRILLING - MISSION UNIT

June, 1967

Hole Nos.	Ground Elevations	Coordinates North	Coordinates East	+ 0.40% Cu Depth	Intersections Interval	Average Total	% Cu N. S.	Feet Drilled During Month	Depth End of Month	Final Depth
M-142	3027.33	360,038.99	776,496.09	-	Assays range from nil to 0.05% Cu		-	309.3	500.0	500.0
M-143	3008.57	361,566.86	776,562.06	-	Assays range from nil to 0.01% Cu		-	500.0	500.0	500.0
								809.3		



AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT

DIAMOND DRILLING PROGRESS MAP

SCALE	DRAWN	DATE	FILE
1" = 1000'		JUN 1967	

AMERICAN SMELTING AND REFINING COMPANY
Sahuarita Arizona

May 10, 1967

MR. J. E. K.
READ AND RETURN
PREPARE ANSWERS ___ HANDLE ___
FILE ✓ INITIALS

MEMORANDUM TO MR. P. A. LEWIS

Re: Monthly Report on Diamond Drilling

J. E. K. MAY 16 1967

J. H. C. MAY 12 1967

SUMMARY - DISCUSSION

The total footage drilled during April amounted to 1,764.5 feet. Two (2) holes, M-138 and M-139, were completed. Drilling will commence on hole M-140 in the first part of May.

The desired negative mineral results continue to be encountered on Sec. 33, T16S, R13E. Drilling should be completed on Sec. 33 by the end of June.

M-138, situated 800 feet south and 125 feet west of the northeast corner of Sec. 33, T16S, R13E, did not encounter any visible copper mineralization. The total copper assays ranged from nil to 0.09 percent.

M-139, located 2,060 feet north and 200 feet west of the southeast corner of Sec. 33, T16S, R13E, did not penetrate any visible copper mineralization. The total copper assays ranged from nil to 0.02 percent.

GEOLOGIC LOG OF HOLES

M-138 encountered unsorted fanglomerate at bedrock 388.4 feet below the surface. The fanglomerate was composed entirely of fragments of Cretaceous siltstone and arkose. At approximately 460.0 feet, unaltered and unmineralized brown to black interbedded arkose, siltstone and shale of the Cretaceous Amole formation were penetrated. Below a depth of 750.0 feet, occasional short interbedded limestone facies were encountered in the Amole sediments. The hole bottomed in the Amole sediments at a depth of 1,000.0 feet.

M-139 penetrated post mineral mid-Tertiary basalt porphyry at bedrock 412.0 feet below the surface. The basalt is an interformational flow in the Helmet fanglomerate. At 683.0 feet, below a broken contact with the basalt porphyry, a 60.0-foot zone of tuffaceous pyroclastics was encountered below which moderate grading to poorly sorted fanglomerate, composed almost entirely of fragments of the Amole sediments, was penetrated. Bedding of occasional silt zones in the fanglomerate was approximately 30 degrees. The hole bottomed in poorly sorted fanglomerate at 1,000.0 feet.

Sections illustrating progress for April, a list of abbreviations utilized on cross sections, a tabulation of ore intercepts for the month, and a plan map with hole locations and proposed drill holes are attached.

D. K. HALL
Resident Geologist

DKH:vnm
attachs

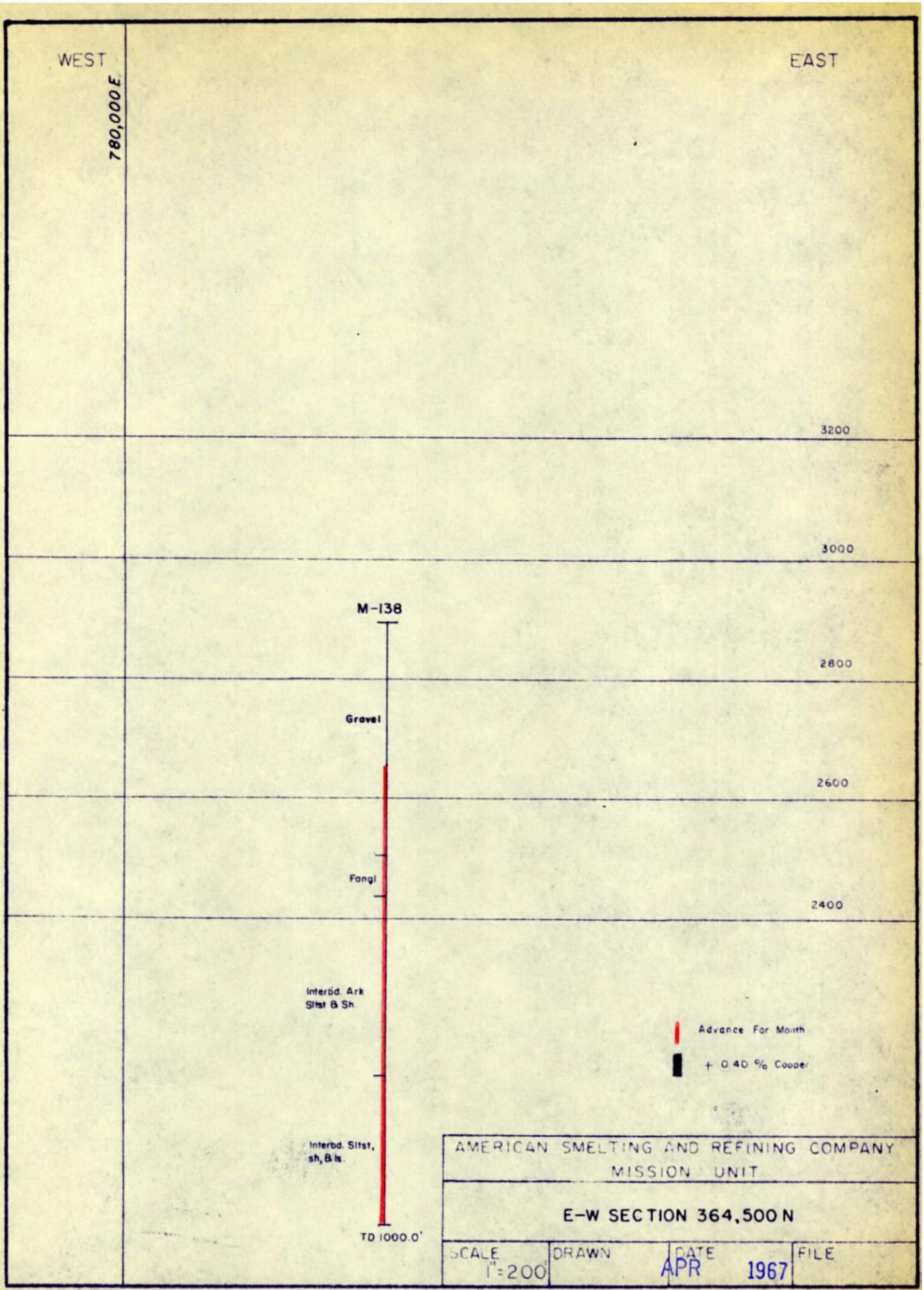
DIAMOND DRILLING - MISSION UNIT

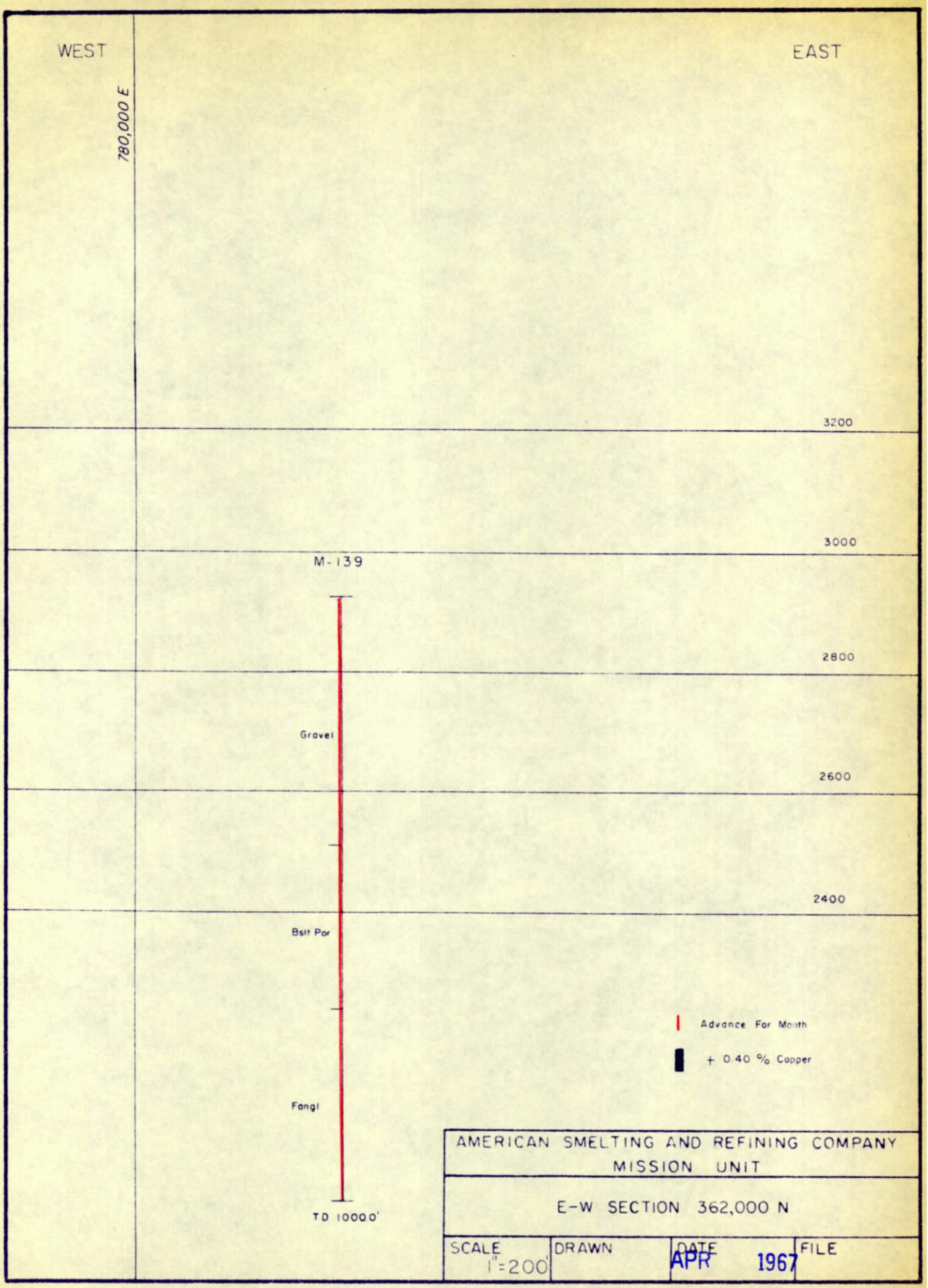
April, 1967

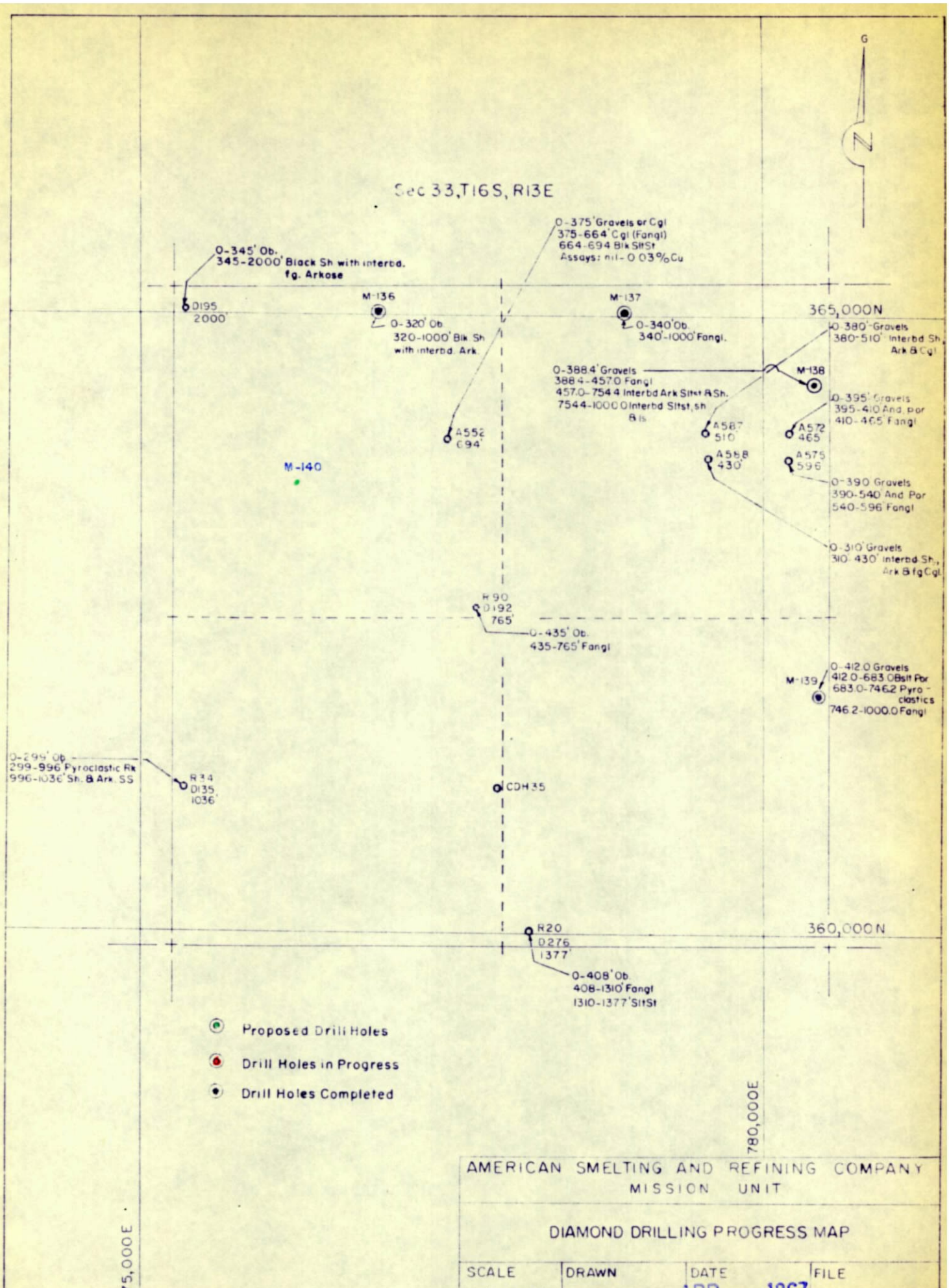
Hole Nos.	Ground Elevations	Coordinates North	Coordinates East	+0.40% Cu Depth	Intersections Interval	Average Total	% Cu N. S.	Feet Drilled During Month	Depth End of Month	Final Depth
M-138	2,898.4	364,376	780,430	Assays range from nil to 0.09% Cu				764.5	1,000.0	1,000.0
M-139	2,925.4	361,972	780,337	Assays range from nil to 0.02% Cu				1,000.0	1,000.0	1,000.0
								1,764.5		

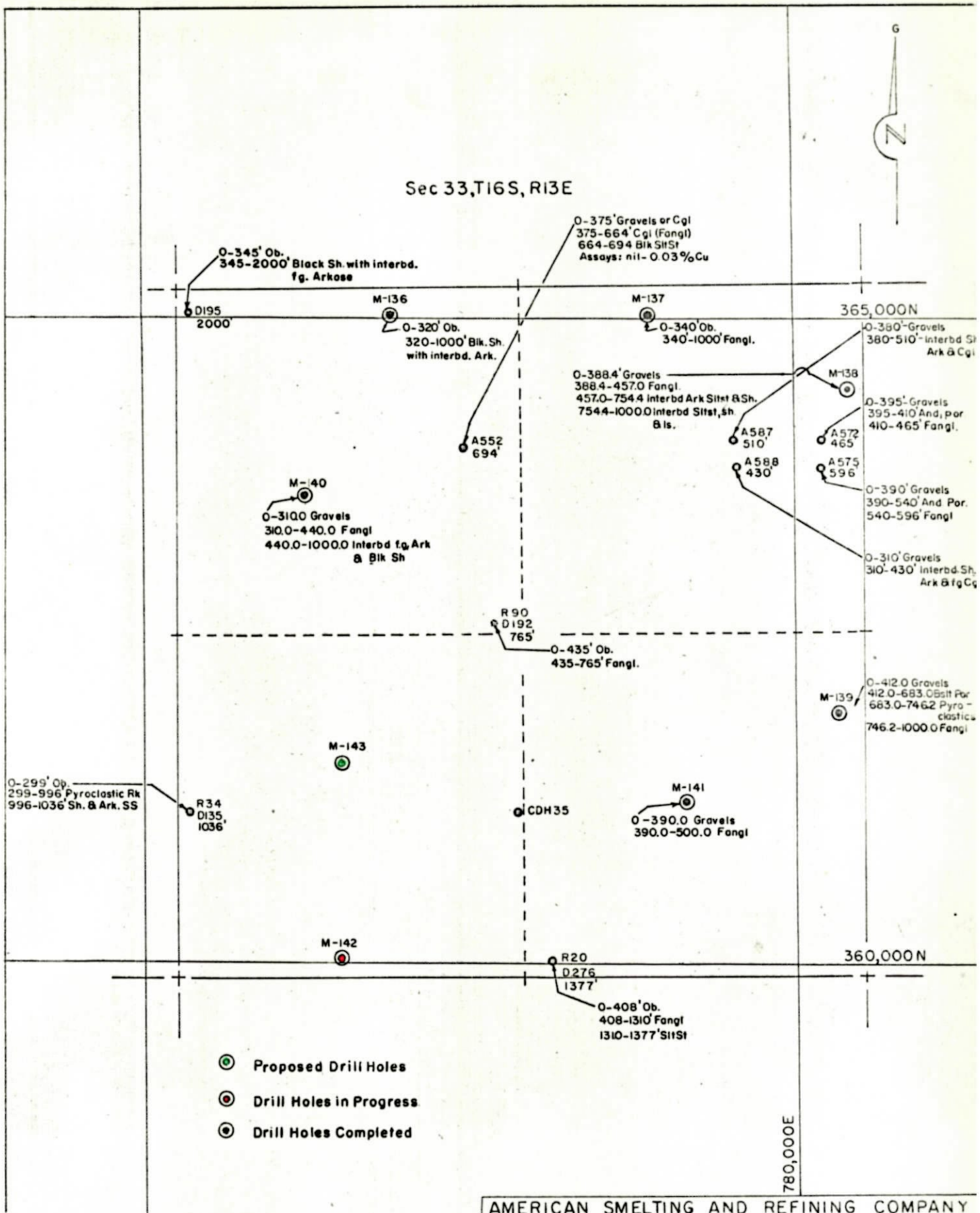
EXPLANATION OF ABBREVIATIONS ON SECTIONS

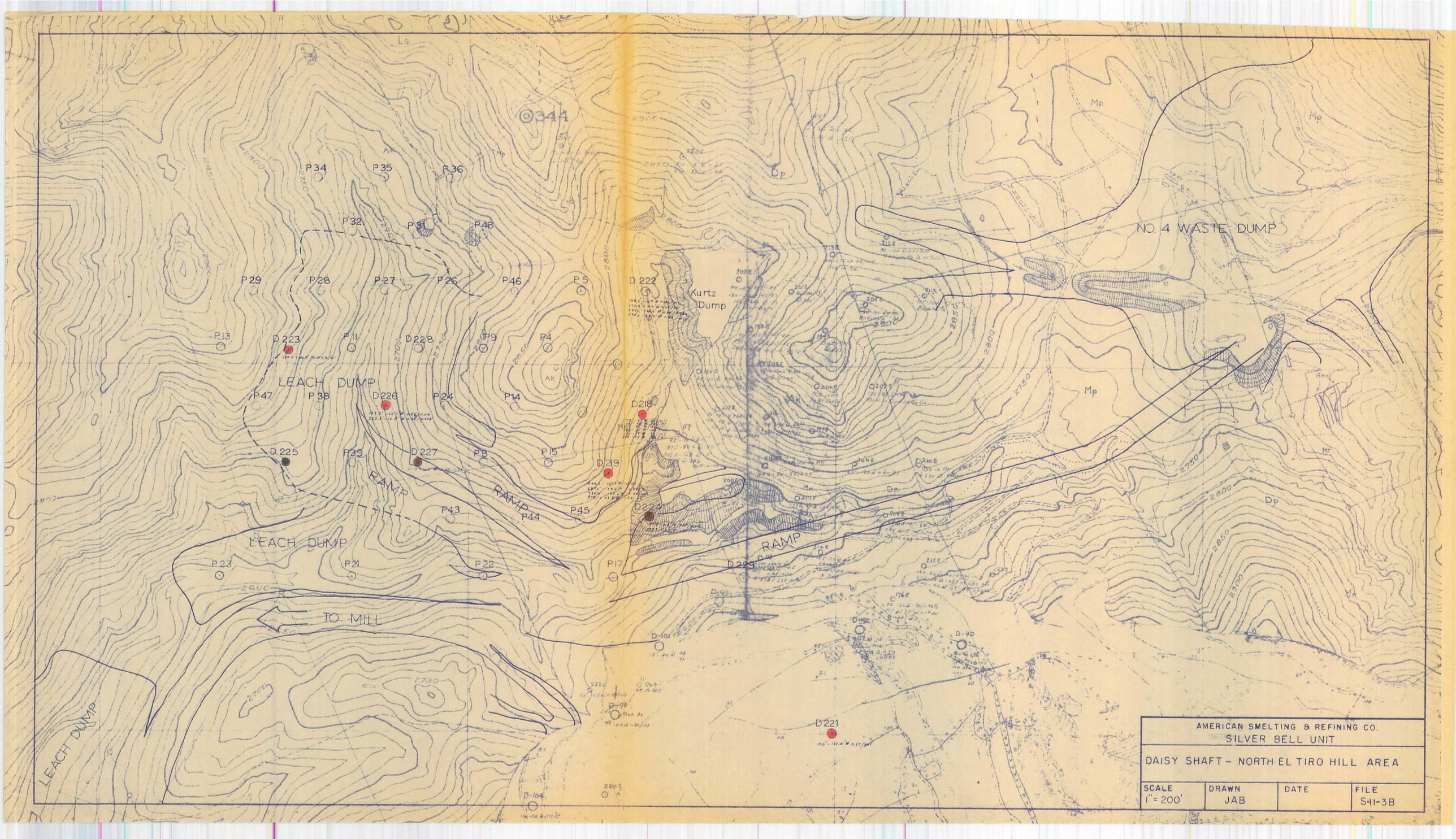
Cal. Cgl.	- Caliche Conglomerate (Overburden)
Arg.	- Argillite
Cgl.	- Conglomerate
Tt.	- Tactite
Hf.	- Hornfels
Mb.	- Marble
C. Arg.	- Calcareous Argillite
N.S.	- Non Sulfide
T.D.	- Total Depth
And.	- Andesite
Bx.	- Breccia
Mp.	- Metaporphyry
Gyp.	- Gypsum
Gr.	- Granite


WEST
EAST
780,000 E
3200
3000
M-138
2800
Gravel
2600
Fangl
2400
Interbd. Ark
Sltst & Sh.
Advance For Month
+ 0.40 % Copper
Interbd. Sltst,
sh, & ls.
TD 1000.0'
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
E-W SECTION 364,500 N
SCALE
1"=200'
DRAWN
DATE
APR 1967
FILE


WEST
EAST
780,000 E
3200
3000
M-139
2800
Gravel
2600
2400
Bslt Por
Advance For Month
+ 0.40 % Copper
Fangl
TD 10000'
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
E-W SECTION 362,000 N
SCALE
1"=200'
DRAWN
DATE
APR 1967
FILE


Sec 33, T16S, R13E
N
0-375' Gravels or Cgl
375-664' Cgl (Fangl)
664-694 Blk SltSt
Assays: nil-0.03% Cu
0-345' Ob.
345-2000' Black Sh with interbd. fg. Arkose
D195
2000'
M-136
0-320' Ob.
320-1000' Blk Sh with interbd. Ark.
M-137
0-340' Ob.
340-1000' Fangl.
365,000N
0-380' Gravels
380-510' Interbd Sh, Ark & Cgl
0-388.4' Gravels
388.4-457.0 Fangl
457.0-754.4 Interbd Ark Sltst & Sh.
754.4-1000.0 Interbd Sltst, sh & ls
M-138
0-395' Gravels
395-410 And. por
410-465' Fangl
A552
694'
A587
510'
A572
465'
A588
430'
A575
596'
M-140
0-390 Gravels
390-540' And Por
540-596' Fangl
0-310' Gravels
310-430' Interbd Sh., Ark & fg Cgl
R90
D192
765'
0-435' Ob.
435-765' Fangl
M-139
0-412.0 Gravels
412.0-683.0 Bslt Por
683.0-746.2 Pyro-clastics
746.2-1000.0 Fangl
0-299' Ob.
299-996' Pyroclastic Rk
996-1036' Sh. & Ark. SS
R34
D135
1036'
CDH35
R20
D276
1377'
360,000N
0-408' Ob.
408-1310' Fangl
1310-1377' SltSt
Proposed Drill Holes
Drill Holes in Progress
Drill Holes Completed
780,000E
775,000E
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
DIAMOND DRILLING PROGRESS MAP
SCALE
1"=1000'
DRAWN
DATE
APR 1967
FILE


Sec 33, T16S, R13E
0-375' Gravels or Cgl
375-664' Cgl (Fangl)
664-694 Blk SltSt
Assays: nil-0.03% Cu
0-345' Ob.
345-2000' Black Sh. with interbd. fg. Arkose
D195
2000'
M-136
0-320' Ob.
320-1000' Blk. Sh. with interbd. Ark.
M-137
0-340' Ob.
340'-1000' Fangl.
365,000N
0-380' Gravels
380-510' Interbd Sl
Ark & Cgl
M-138
0-388.4' Gravels
388.4-457.0 Fangl.
457.0-754.4 Interbd Ark Siltst & Sh.
754.4-1000.0 Interbd Siltst, Sh & ls.
0-395' Gravels
395-410' And, por
410-465' Fangl.
A587
510'
A572
465'
A552
694'
A588
430'
A575
596'
M-140
0-310.0 Gravels
310.0-440.0 Fangl
440.0-1000.0 Interbd f.g. Ark & Blk Sh
0-390' Gravels
390-540' And Por.
540-596' Fangl
0-310' Gravels
310'-430' Interbd Sh, Ark & fg Cg
R90
D192
765'
0-435' Ob.
435-765' Fangl.
0-412.0 Gravels
412.0-683.0 Sltst Por
683.0-746.2 Pyro-clastics
746.2-1000.0 Fangl
M-139
M-143
0-299' Ob.
299-996' Pyroclastic Rk
996-1036' Sh. & Ark. SS
R34
D135
1036'
CDH35
M-141
0-390.0 Gravels
390.0-500.0 Fangl
M-142
R20
D276
1377'
360,000N
0-408' Ob.
408-1310' Fangl
1310-1377' SltSt
Proposed Drill Holes
Drill Holes in Progress
Drill Holes Completed
780,000E
775,000E
AMERICAN SMELTING AND REFINING COMPANY
MISSION UNIT
DIAMOND DRILLING PROGRESS MAP
SCALE
1" = 1000'
DRAWN
DATE
MAY 1967
FILE



AMERICAN SMELTING & REFINING CO. SILVER BELL UNIT			
DAISY SHAFT – NORTH EL TIRO HILL AREA			
SCALE 1" = 200'	DRAWN JAB	DATE	FILE S-11-3B

~~WES, BWO~~

S-10.10

J. H. C.
MAY 4 1967

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

April 26, 1967

W.E.S.
MAY 22 1967

Mr. J. H. Courtright, Chief Geologist
Southwestern Mining Department
American Smelting and Refining Company
P. O. Box 5795
Tucson, Arizona 85703

SILVER BELL UNIT
DAISY SHAFT -
NORTH EL TIRO AREA

Dear Sir:

I am enclosing copies of my preliminary 200 scale cross sections of the Daisy Shaft - North El Tiro Area. These cross sections are subject to checking and revision, however, they illustrate the presence of altered sediments below both the alaskite and the dacite.

At present my plans call for a hole from the bottom of El Tiro pit, probably on the east side somewhere along the 36,000~~E~~ N coordinate line. Rotary drill holes, cut with the blast hole rig, will first be put down to a depth of 80 feet. Diamond drilling from the bottom of one of the rotary holes can be done depending on which, if any, of the holes cut sediments.

In addition to the hole proposed above, holes will be put down on the geochemical anomoly to test for a chalcocite blanket in the alaskite.

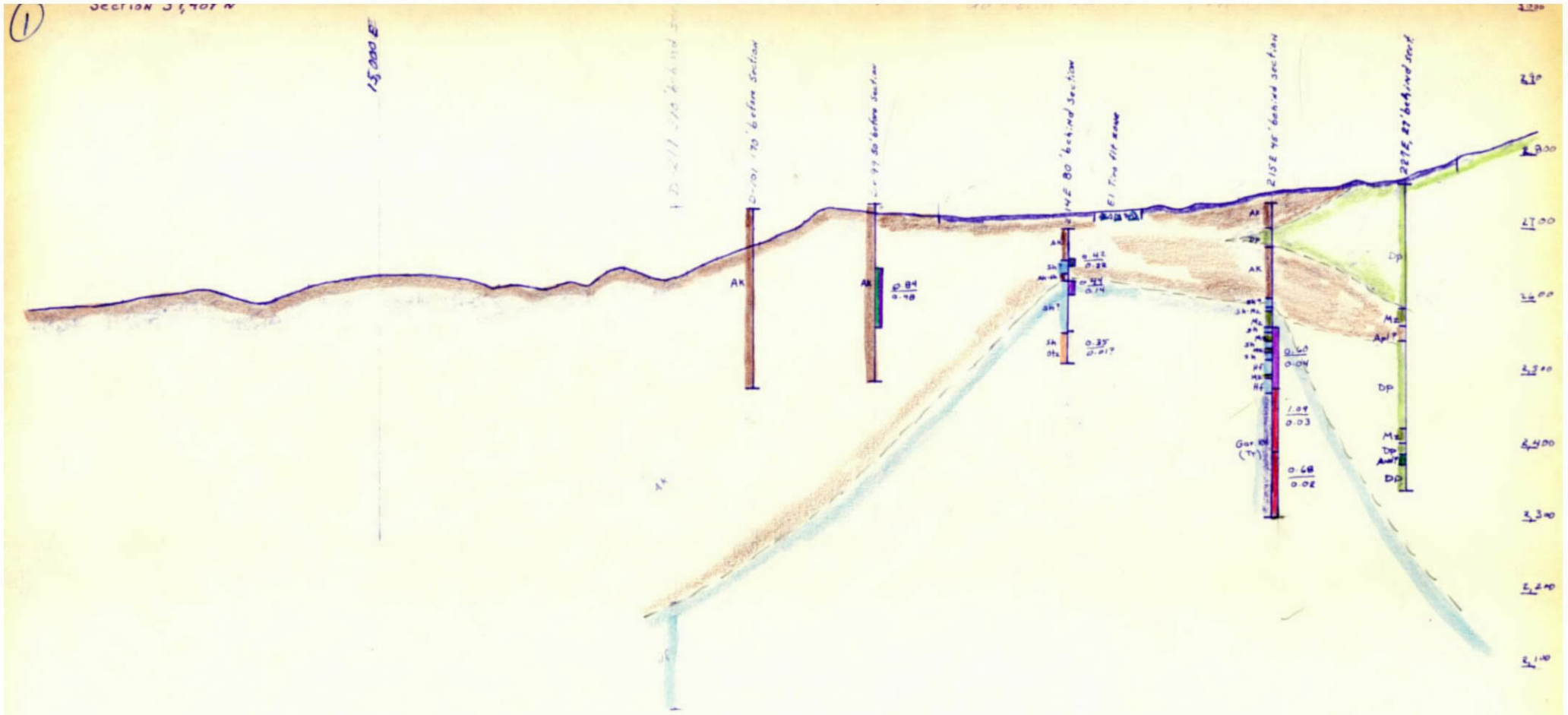
Very truly yours,

James A. Briscoe

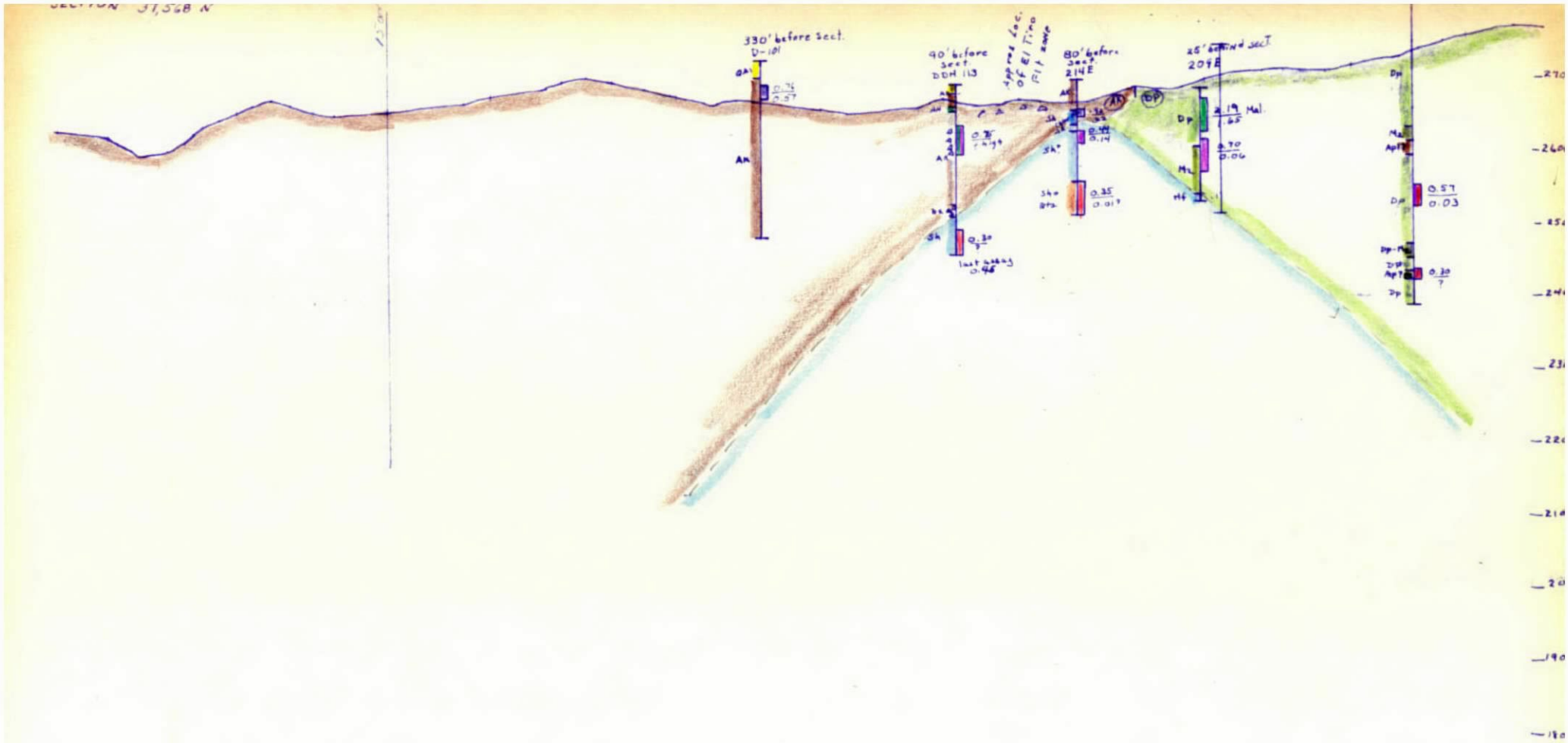
James A. Briscoe
Geologist

JAB:jca

Encls.

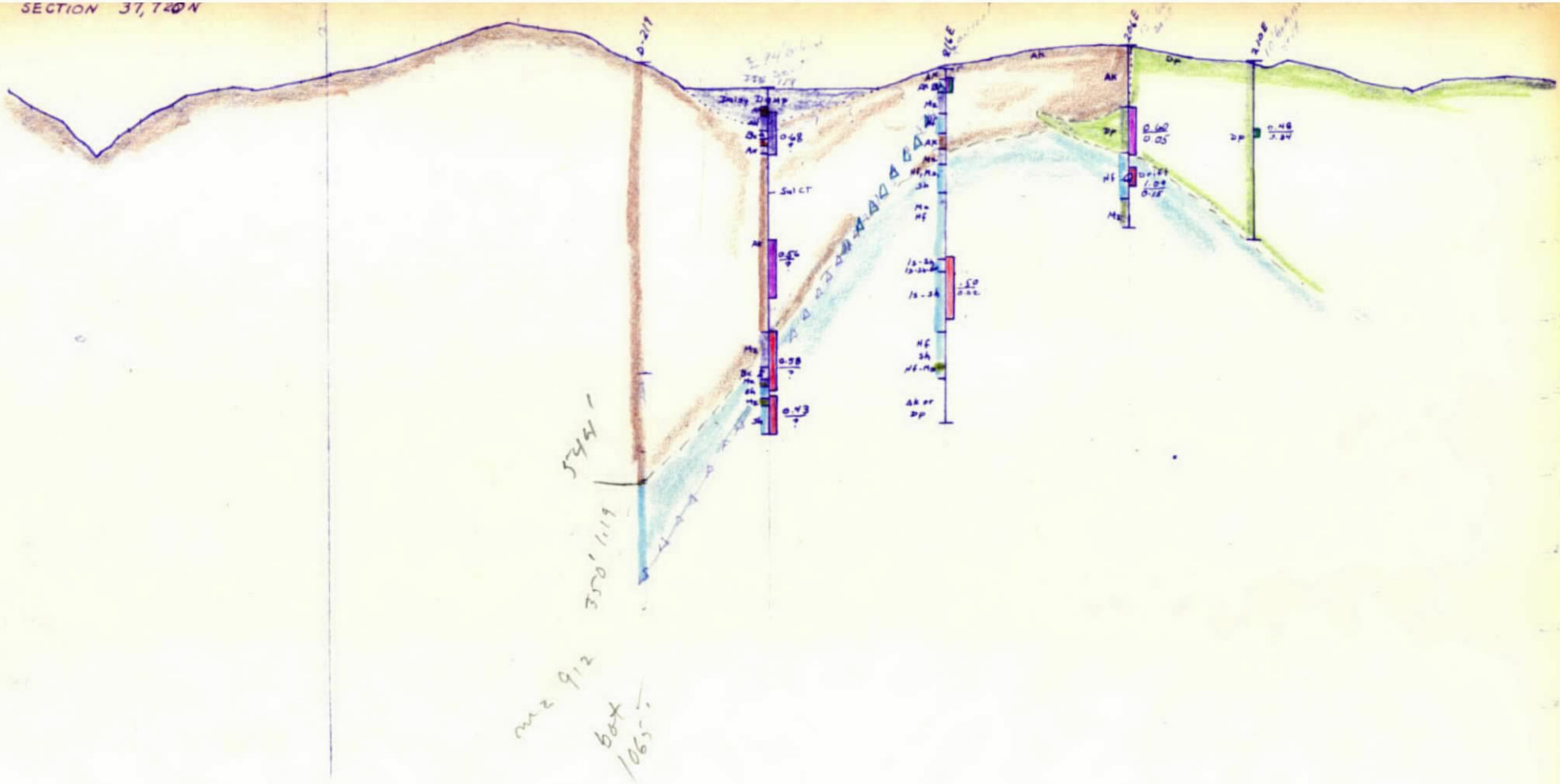


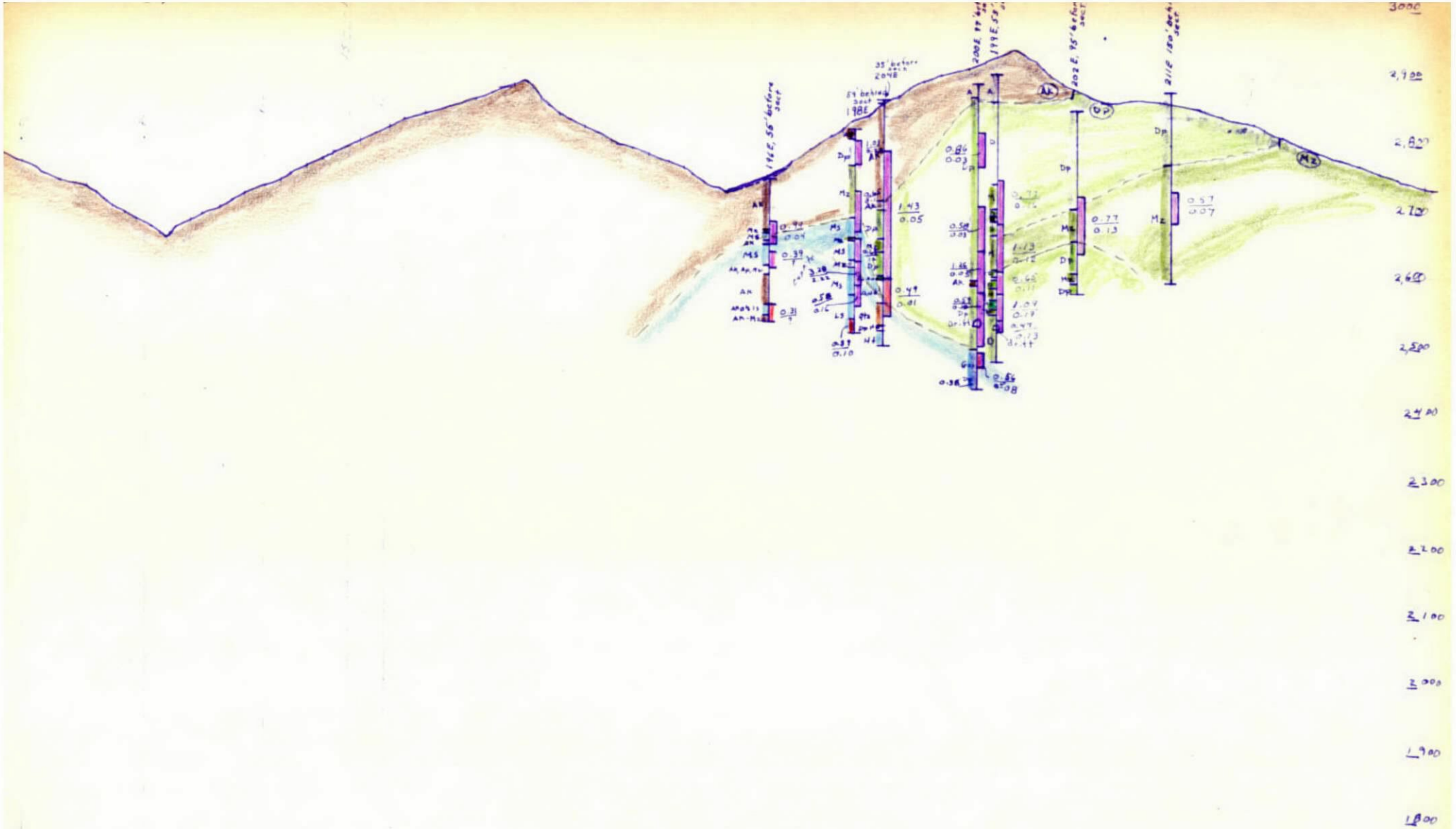
Ak	alaskite
Dp	dacite
Mz	monzonite
Hf	hornfels
Tr	tactite
Qtz	quartzite
And	post-mineral andesite
	oxide ore (+0.4)
	chalcocite ore
	chalcopyrite ore


SECTION 37,568 N
330' before Sect.
D-101
40' before Sect.
DDH 113
Approx Loc. of El Tiro Pit ramp
80' before Sect.
214E
25' beyond sect
209E
Mal.
Dp
Ap
Sh
Am
270
260
250
240
230
220
210
200
190
180

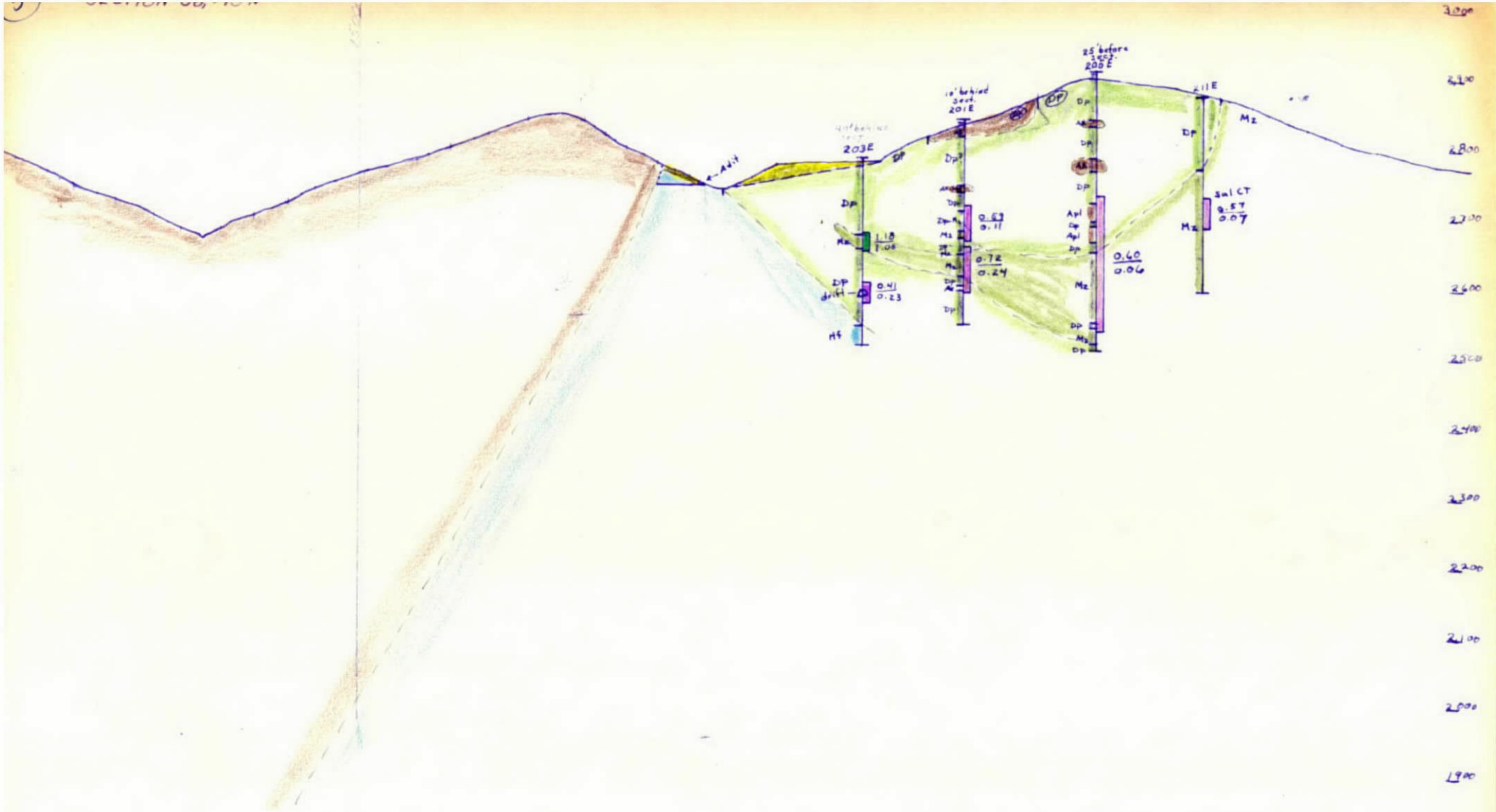
2)

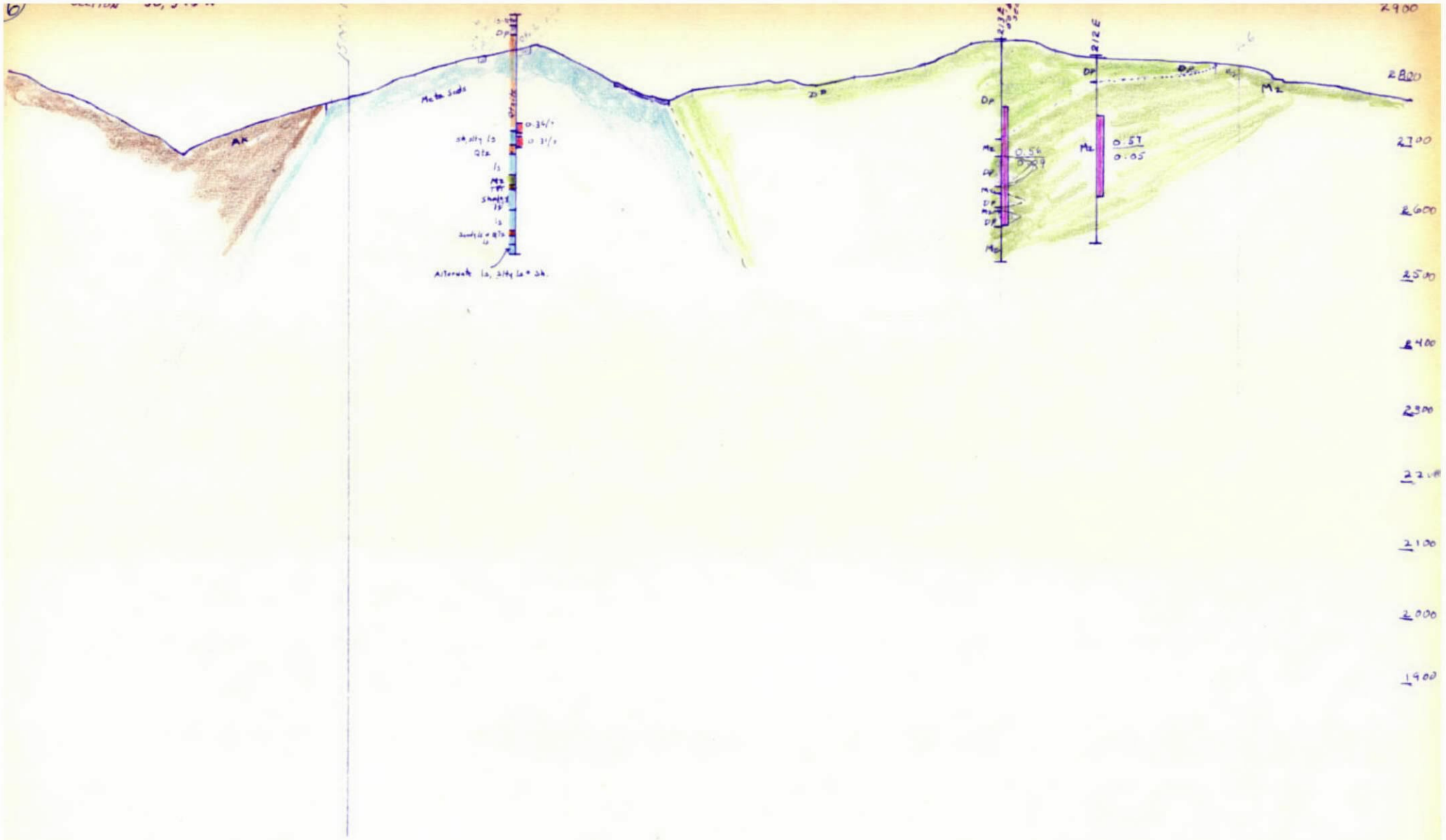
SECTION 37, 720 N



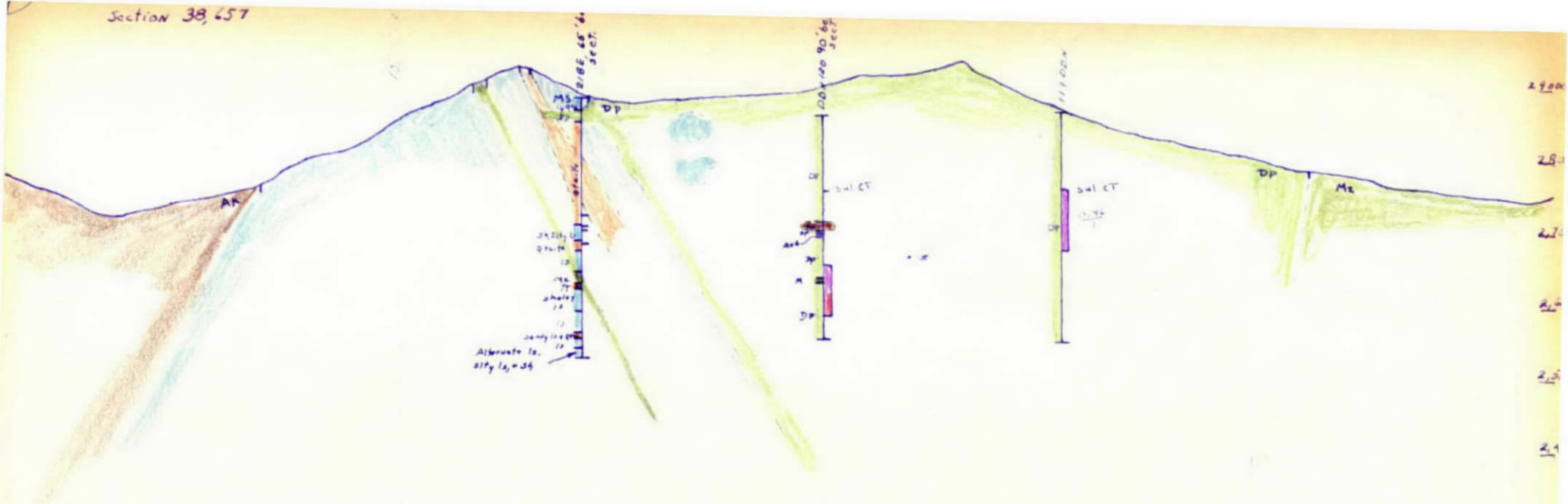

3000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800

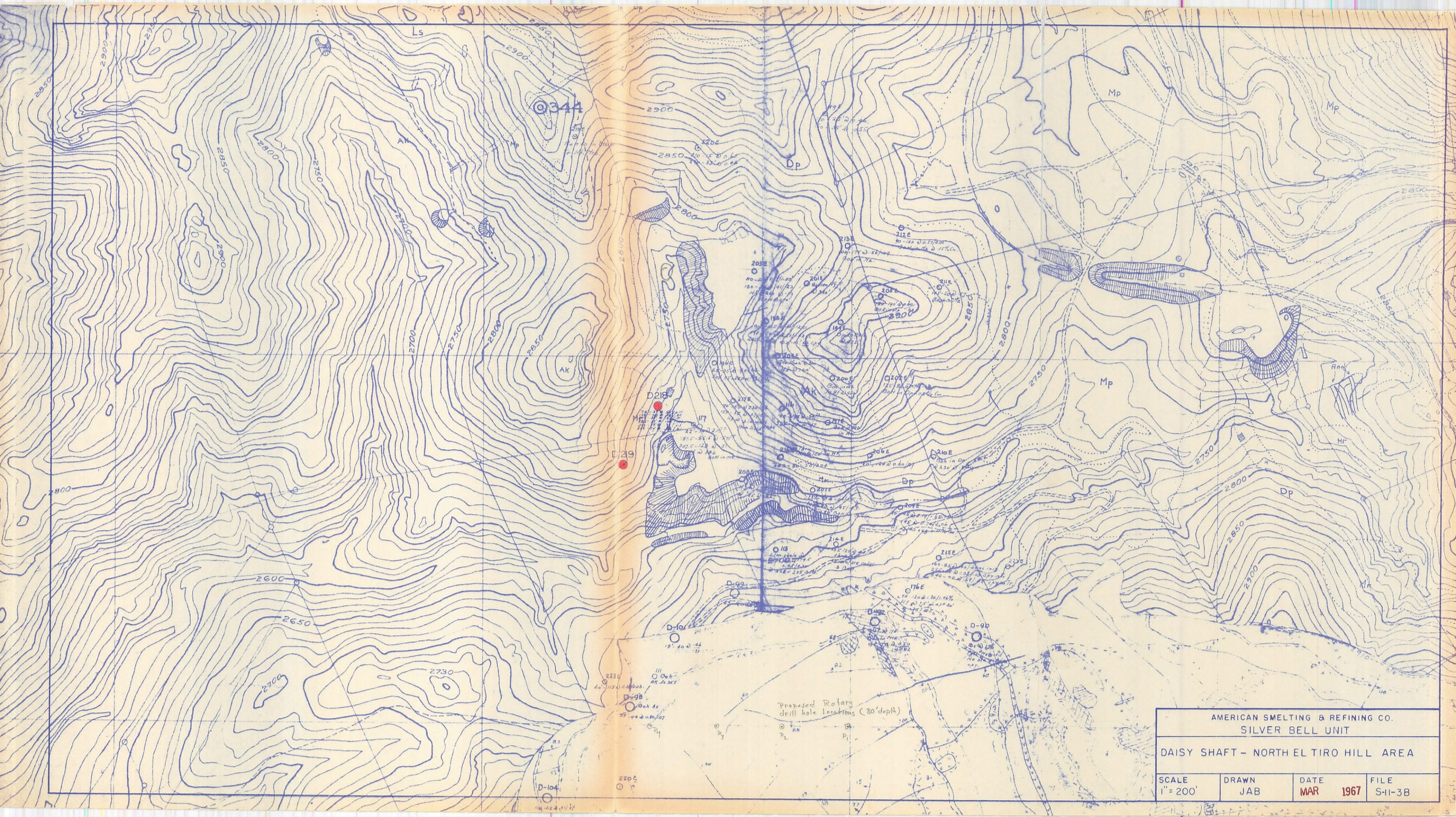
D-218
D-117
E-175
116
202E
Silty dense
Silty-sh
Warkings?
300 level
Valley
Gar
Dp
Aplite
Leached to depth
Drift
0.97
0.26
0.18
1.38
0.04
0.59
0.54
0.53
0.86
0.03
0.58
0.03
1.86
0.05
0.59
0.10
0.38
0.78
0.01
0.95
0.01
0.63
0.01
0.65
0.01
0.21
0.01
0.88
0.01
0.88
0.01
0.55
0.63

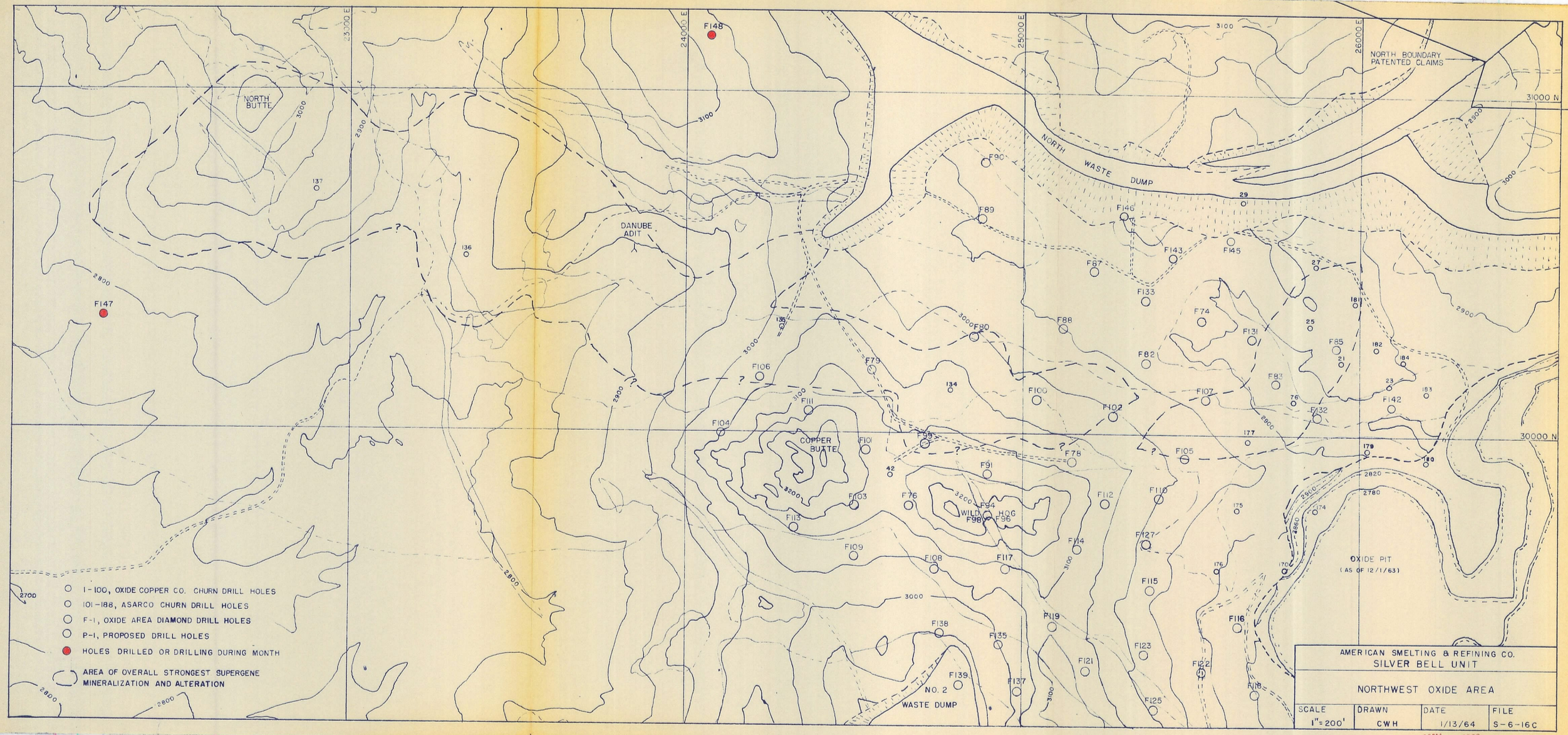

203E
201E
205E
211E
25' before sect. 205E
10' behind sect. 201E
DP
Mz
Apl
Ap
1.18
1.08
0.41
0.23
0.83
0.11
0.72
0.24
0.60
0.06
0.57
0.07
3ml CT
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700


2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
AK
Mesozoic
DP
Mz
0.34/1
0.31/1
0.56
0.57
0.05
212E
Alternate: ls, silty ls + sh.

Section 38,657




AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
DAISY SHAFT - NORTH EL TIRO HILL AREA
SCALE 1" = 200'
DRAWN JAB
DATE MAR 1967
FILE S-11-3B
Proposed Rotary drill hole Locations (80' depth)
D218
D29
D-99
D-101
D-98
D-104
D-90
Mp
Dp
Ls
Ak
2900
2850
2800
2750
2700
2650
2600
2730


NORTH BUTTE
DANUBE ADIT
COPPER BUTTE
WILD HOG
NORTH WASTE DUMP
NO. 2 WASTE DUMP
OXIDE PIT
(AS OF 12/1/63)
NORTH BOUNDARY PATENTED CLAIMS
23000 E
24000 E
25000 E
26000 E
31000 N
30000 N
F147
F148
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 1/13/64
FILE S-6-16C

MAY 1966

~~BALLO~~

Mr. J. H. Courtright

J. H. C.
APR 27 1967

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

April 24, 1967

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

Subject: MONTHLY REPORT ON EL TIRO AND BATTERY INCLINE AREA DIAMOND DRILLING.

The following briefly summarizes the result of diamond drilling in the El Tiro and Battery Incline areas during the month of March, 1967.

A total of 2,567.3 feet of diamond core drilling was done by one truck mounted rig working in the El Tiro area and either a skid or truck mounted rig working in the Battery Incline area, each operating two shifts per day. The following results are available:

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-87	3,080.9	36,799.6	19,398.5	2445.4	16.0	0.95	0.01	122.9	2564.4	2564.4
D-218	2,718.7	37,863.7	15,475.7	29.0	43.6	0.97	0.67			
				72.6	27.1	0.55	0.11			
				138.1	40.1	0.78	0.01			
				206.7	33.0	0.95	0.01			
				253.4	14.6	0.65	0.01			
				285.0	73.9	0.88	Nil.	842.0	842.0	842.0
D-219	2,735.4	37,704.7	15,382.9	77.6	19.3	0.46	0.01	405.4	405.4	
G-18	2,547.7	27,050.3	35,119.0	No +0.40% Cu Lenses				139.5	139.5	139.5
G-19	2,536.7	26,882.6	35,374.4	" " " "				139.6	159.6	159.6
G-20	2,526.0	26,888.7	36,460.3	" " " "				265.8	265.8	265.8
G-21	2,501.9	26,572.0	36,447.9	47.0	28.1	.75	0.08	180.0	180.0	180.0
G-22	2,668.0	27,814.0	34,493.1	No. +0.40% Cu lenses				200.6	200.6	200.6
G-23	2,689.0	28,119.5	32,851.15	" " " "				168.5	168.5	168.5
G-24	2,708.2	28,433.7	33,033.6	" " " "				83.0	83.0	170.4
						Total		2,567.3		

EL TIRO PIT

Hole D-218 collared in leached non-reactive hornfels. Sulfides and sparse lime were encountered at 71 feet. The hole continued in metasediments, hornfels for the most part, except for short intercepts pf post-mineral andesite and monzonite, to the bottom at 842.0 feet. Ore grade material was cut at intercepts as noted above, in "results" column. (Also see cross section). It should be noted that post mineral andesite breaks the first three ore runs up. Since the andesite occurs as narrow steeply dipping dikes, these three runs should be considered continuous, because the lateral extent of the andesite is negligeable.

The mineralization is mainly chalcopyrite, with weak pyrite, and sparse MoS_2 occuring along steeply dipping veins, and disseminations out from the veins. A small amount of argentiferous galena was noted.

This hole demonstrates that a potentially large and well mineralized body of sediments underlies alaskite and dacite in the Daisy Shaft-North El Tiro Hill area. Further drilling in this area will be done to explore for similar un-exposed sediments and also to test for a chalcocite blanket in the alaskite to the west of Daisy shaft.

D-219 collared in weakly altered alaskite. Sulfides were encountered at 76.0 feet, and about 20 feet of ore grade chalcocite directly below the contact was noted. The hole continued in alaskite to a depth of 544 feet where tactite was encountered. The hole has penetrated ore grade sediments to about 660 feet and drilling is still in progress.

Mineralization in the metasediments consists mainly of chalcopyrite, sparse pyrite, and trace MoS_2 along and disseminated out from steeply dipping veins. The hole cut two quartz vein intercepts 3 and 4 feet thick. These thickness may be somewhat exaggerated due to the possibly steep altitude of the quartz veins, however, they are much larger than any veining previously encountered. The veins carried up to 3% copper and about 0.2% Mo.

BATTERY INCLINE AREA

G-18 collared in intensely altered monzonite and continued in that rock to the bottom at 139.5 feet. Sulfides were encountered at 40.8 feet, but no economic copper enrichment was seen. Primary mineralization averaged 0.16% copper as chalcopyrite.

G-19 collared in monzonite and at nine feet entered intensely altered rock, that may be Mt. Lord ignimbrite or syenodiorite. The hole continued in this rock to the bottom at 159.6 feet except for three post mineral andesite dikes (see cross section). No economic copper enrichment was seen. Primary mineralization averaged 0.04% copper as chalcopyrite.

G-20 collared in strong to intensely altered monzonite, and remained in that rock, except for two post mineral andesite dikes, to the bottom at 265.8. No economic copper enrichment was noted. Primary mineralization averaged 0.01% copper.

This hole was intended to test a geophysical anomoly which indicated a sharp increase in total sulfide content at about 300 to 400 feet. Intense alteration of the monzonite below 160 feet caused the hole to cave so badly that no progress could be made beyond 265 feet. Similar alteration and mineralization was encountered in hole G-17 which also tested a similar anomoly without encouraging results. For this reason it is felt that another hole is unnecessary.

G-21 collared in quartz monzonite and encountered sulfides at 47 feet. The hole remained in monzonite to the bottom at 180.0 feet. The rock was moderate to strongly altered and in places secondary biotite was seen. Ore grade chalcocite was cut as 47.0 feet to 75.1 feet, and averaged 0.75/0.08% copper. Primary mineralization averaged 0.2% copper as chalcopyrite.

G-22 collared in strong to intensely altered rock, tentatively identified as syenodiorite. Post mineral andesite was drilled from 109.8 feet to 134.7 feet where monzonite and sulfides were encountered. The hole bottomed in monzonite at 200.6 feet. No chalcocite enrichment was encountered, primary mineralization averaging about 0.02% copper as chalcopyrite.

G-23 collared in strongly altered syenodiorite, encountered sulfides at 44.5 feet, cut monzonite at 80 feet and remained in that rock to the bottom at 168.5 feet. About 10 feet of ore grade chalcocite was encountered. Primary mineralization probably averages about 0.07% copper

G-24 collared in strongly altered monzonite, cut syenodiorite at 105 feet and cut monzonite at 159 feet, and bottomed at 170.4 feet. Sulfides were cut at 60.1 feet but no economic chalcocite enrichment was encountered. Primary mineralization contained about 0.03% copper as chalcopyrite.

James A. Briscoe
Geologist

JAB:jca

EXPLANATION FOR THE PLAN MAP OF THE BATTERY INCLINE AREA

6-13
○ Old Churn drill holes drilled by the S. W. Mudd interests in 1909. Assays by KCN.

G-Series
○ Recent diamond drill holes.

COPPER CONTENT OF DRILL HOLES

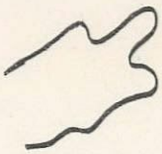
G-
100'-75'
@1.00%
0.05%
40 or more feet, of +0.40% copper material, of grade that will carry stripping. Total Copper/Oxide Copper - i.e. Starting at 100 feet there is 75 feet of 1.00/0.05% copper material.

40 feet of +0.40% copper material, that won't carry stripping.

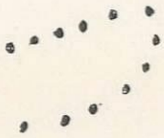
Holes with significant copper but less than ore grade.

Holes with no significant copper.

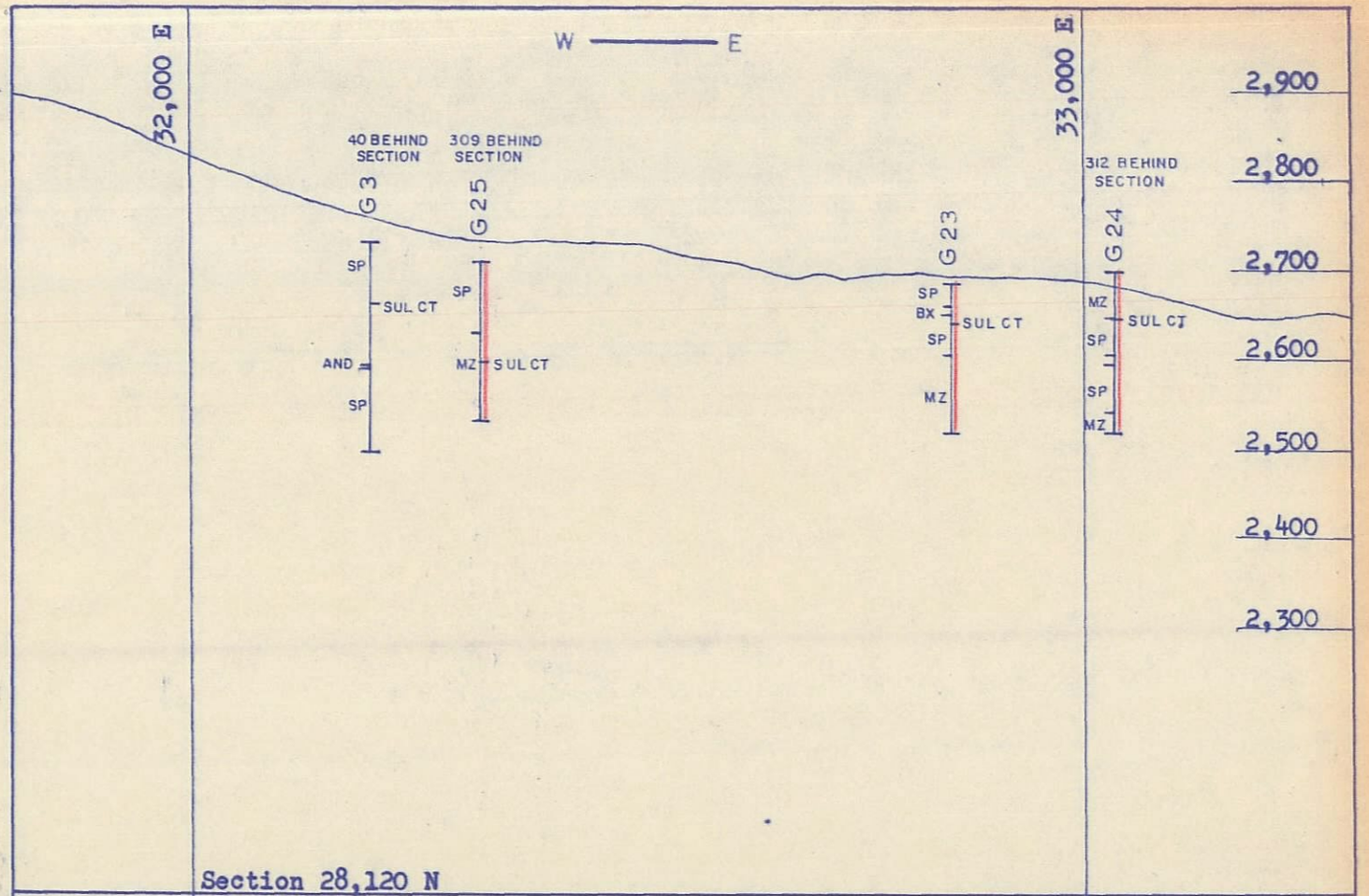
P-10
○ Proposed diamond drill holes.



Outline of capping thought to overlie moderate to strong copper mineralization after J. C. Playter, 1949.



Outline of the plus 20 parts per million molybdenum geochemical anomoly, Fall, 1966.



Section 28,120 N

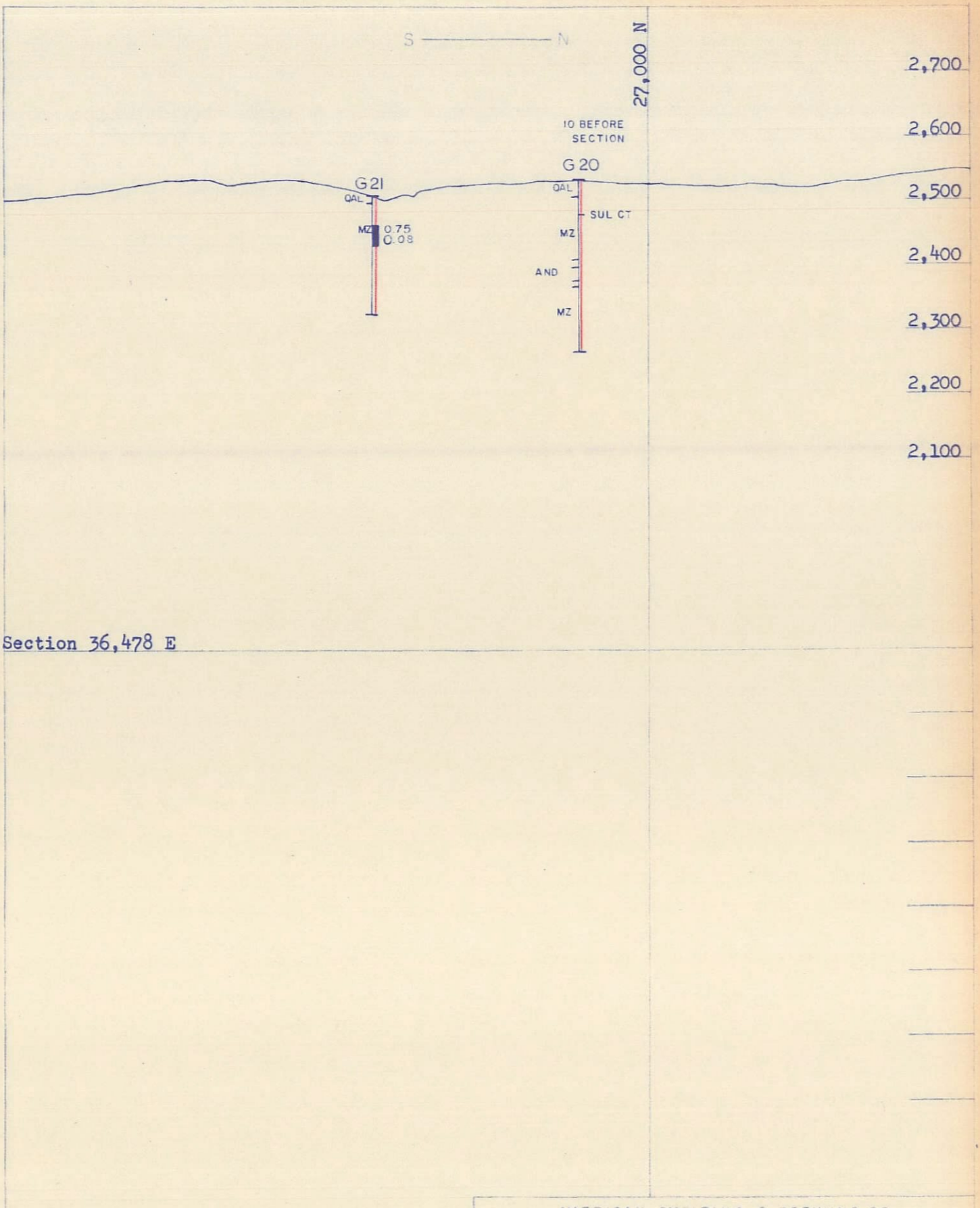
+0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1"= 200'	JAB	MAR 1967	S 121 A



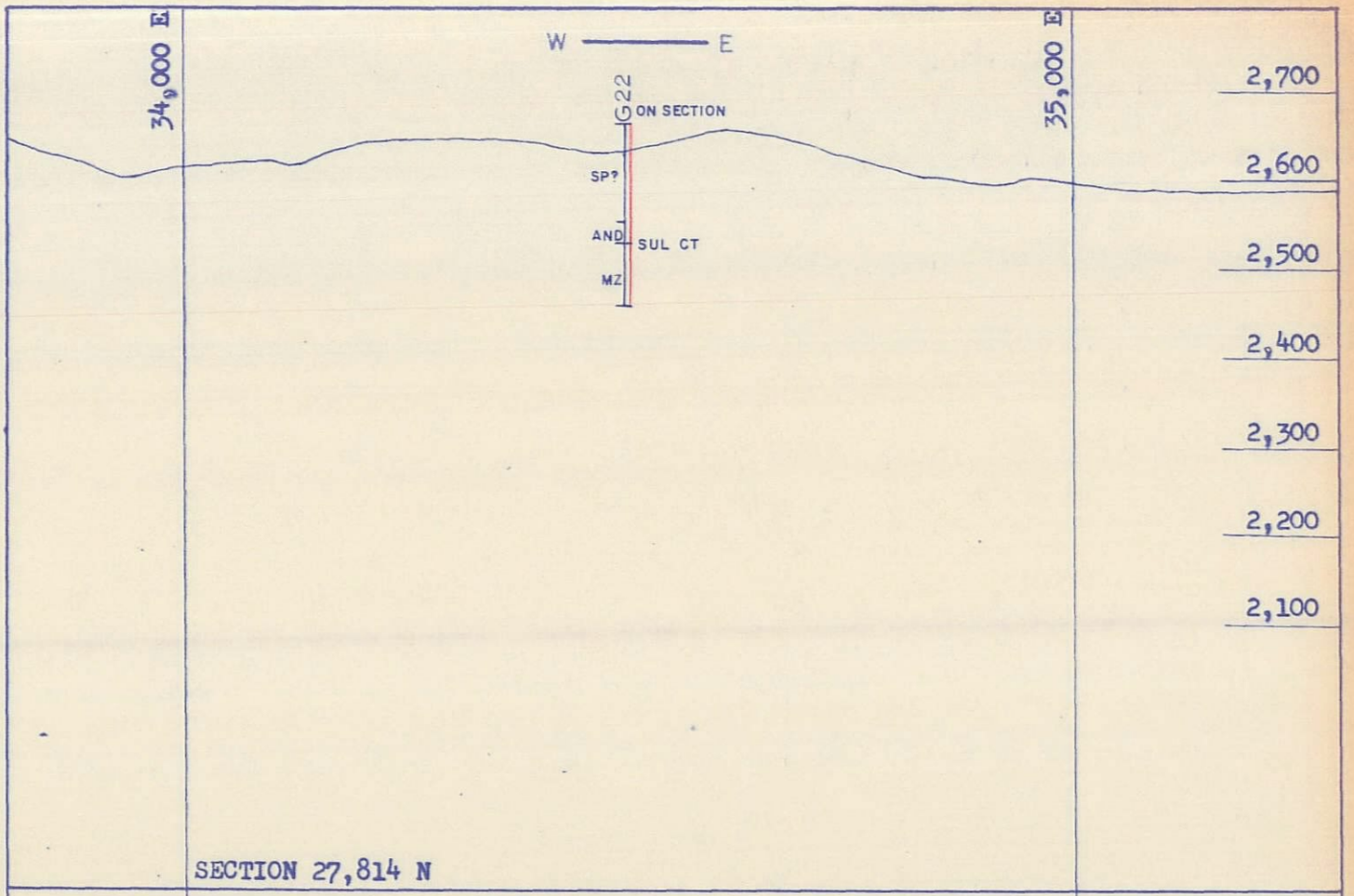
+0.4 % Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	MAR 1967	S-121- A



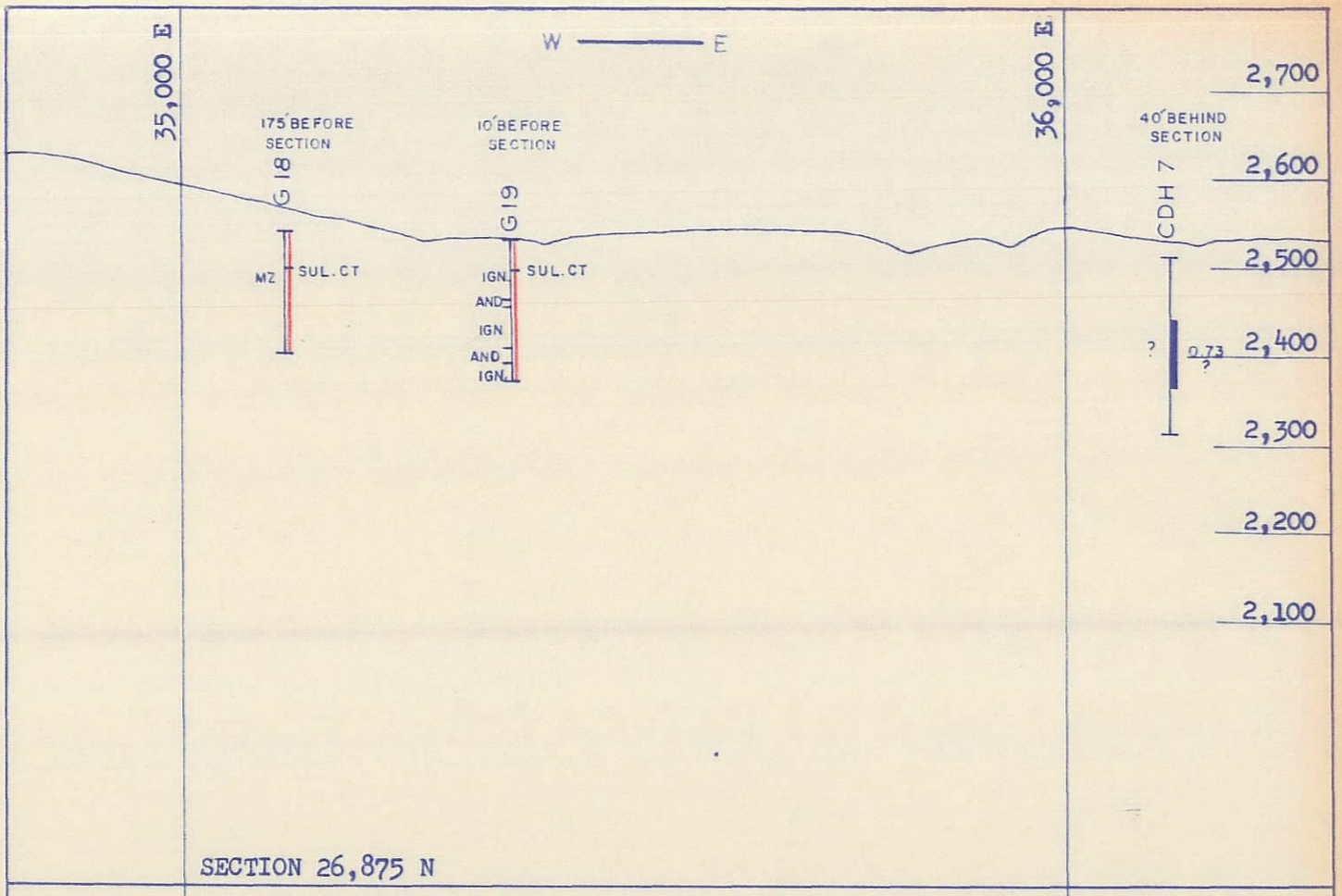
+0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	MAR 1967	S 121 A



SECTION 26,875 N

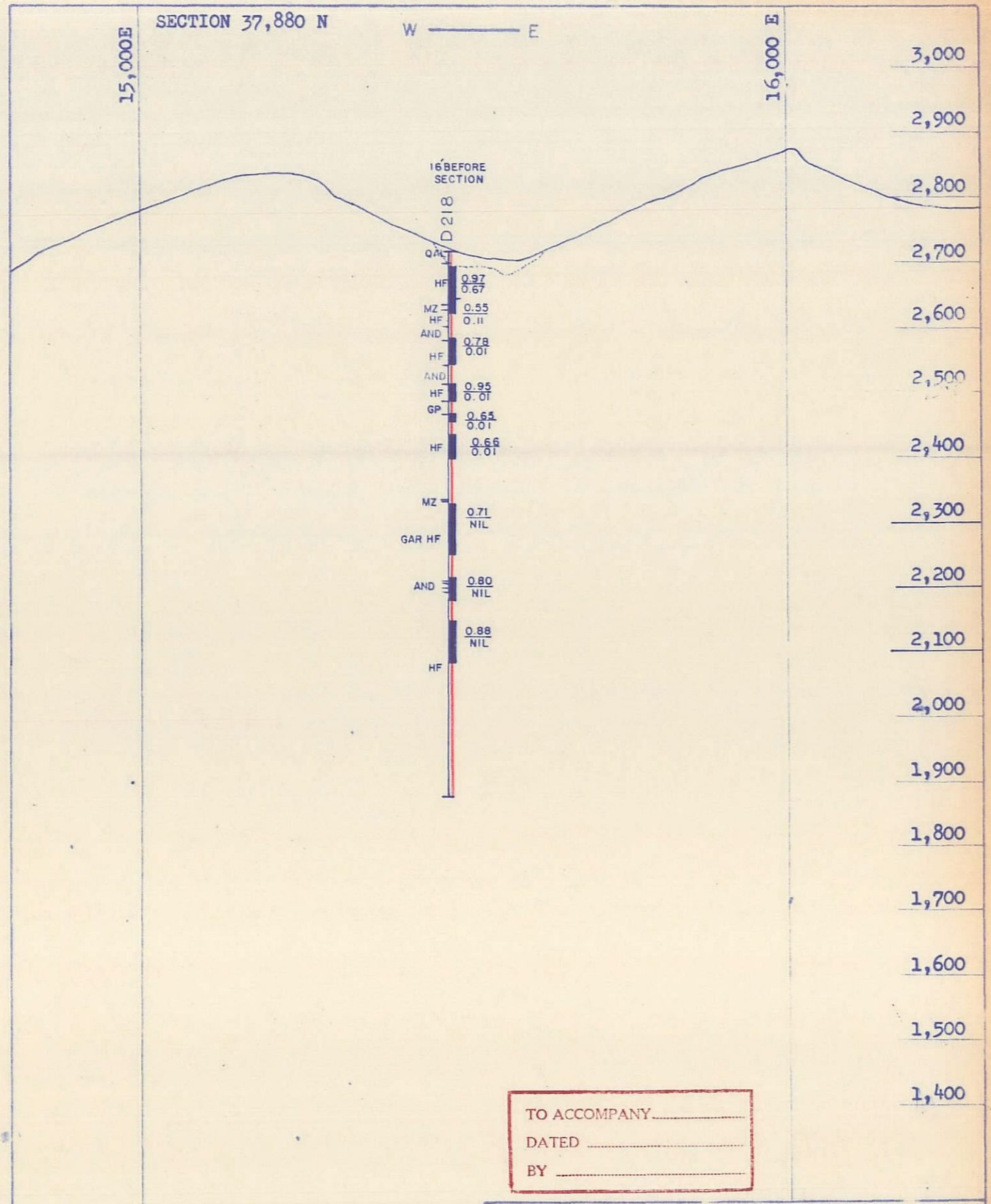
+0.4% Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	MAR 1967	S 121 A



TO ACCOMPANY.....
DATED .....
BY .....

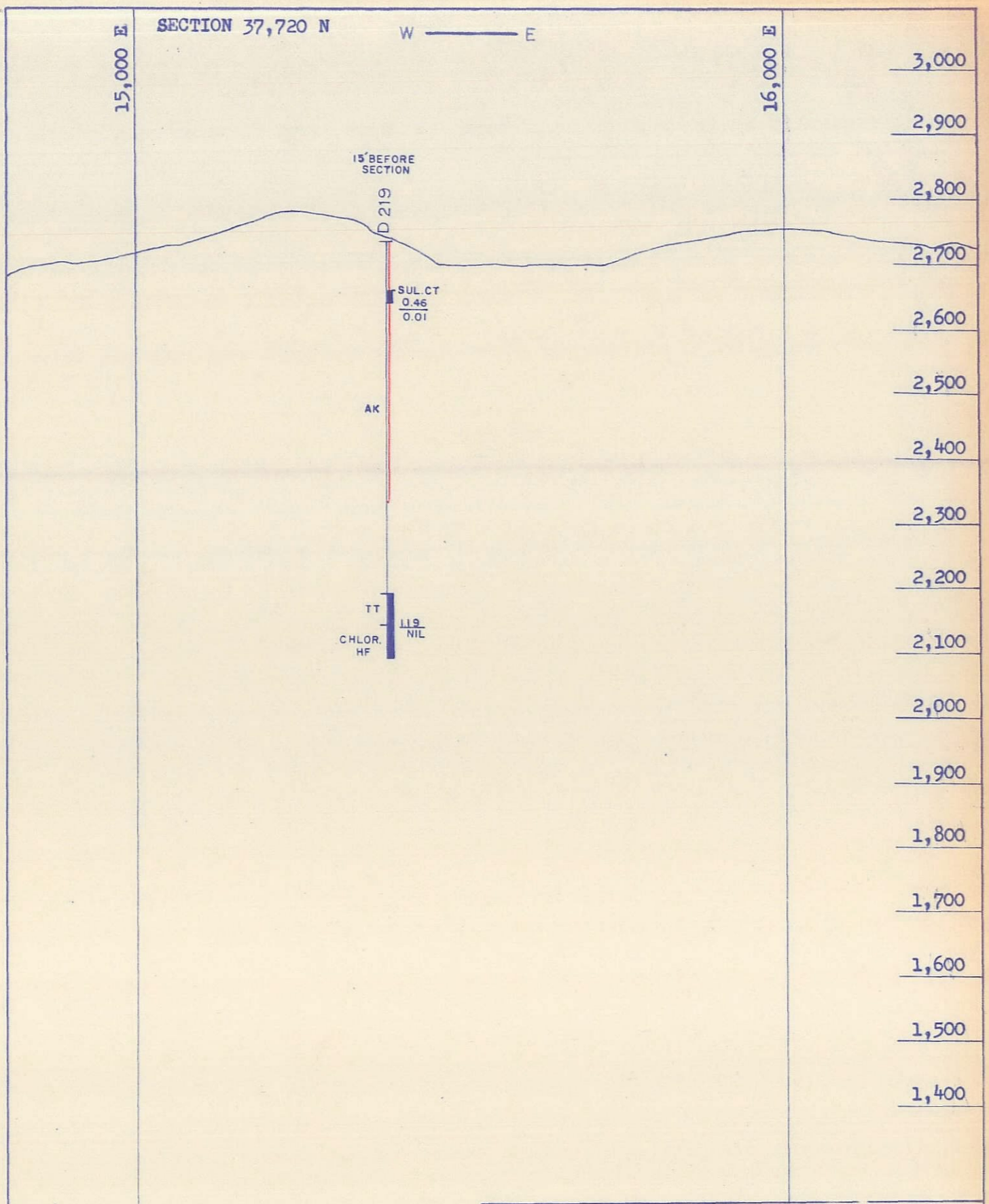
+0.4 % Total Copper
Advance for month

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'		MAR 1967	S-121- A



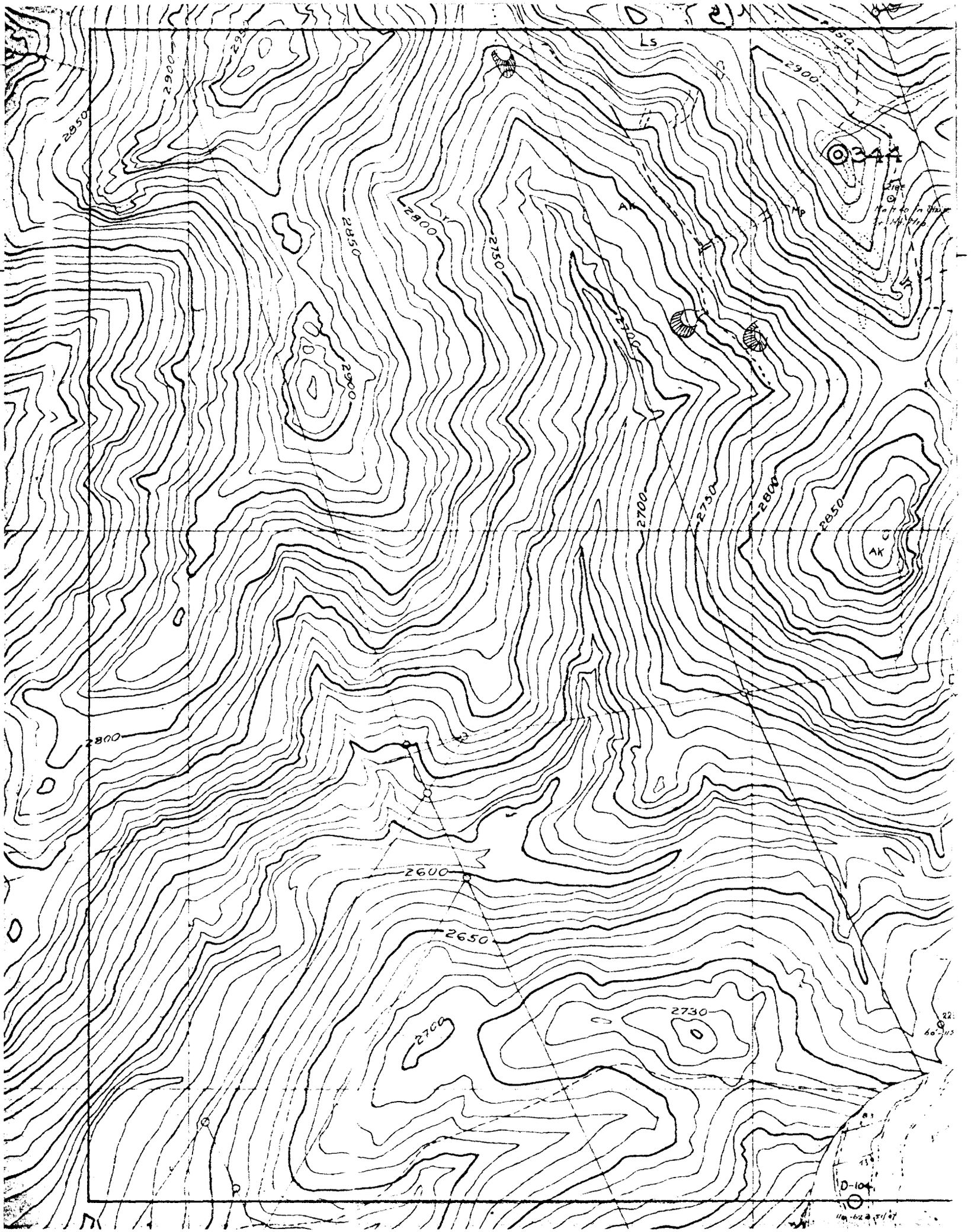
+0.4% Total Copper
Advance for month

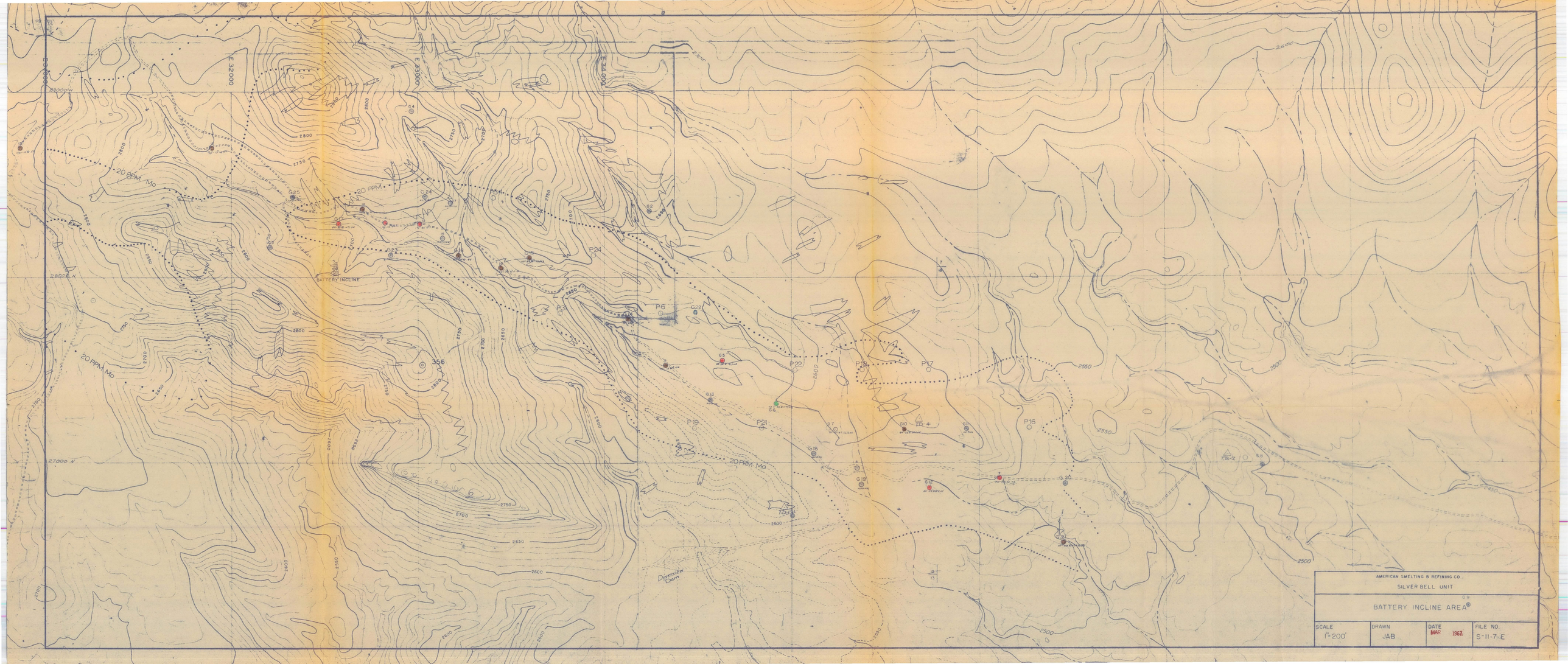
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

DAISY SHAFT - NORTH EL TIRO HILL AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	MAR 1967	S 121 A


2950
2900
2850
2800
2750
2700
2600
2650
2730
Ls
AK
Mp
344
D-104


AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
BATTERY INCLINE AREA
SCALE 1" = 200'
DRAWN JAB
DATE MAR 1967
FILE NO. S-11-7-E
20 PPM Mo
BATTERY INCLINE
Drainage Basin
P5
P16
P17
P18
P19
P21
P22
P24
G4
G5
G6
G7
G8
G9
G10
G11
G12
G13
G15
G16
G18
G19
G20
G22
G23
G24
G25
356
E 32000
E 33000
E 34000
27000 N
28000 N
28000 W
2800
2750
2700
2650
2600
2550
2500

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

April 20, 1967

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

Subject: QUARTERLY GEOLOGIC REPORT AND ORE RESERVE MAP

OXIDE PIT

During the first quarter of 1967 mining in Oxide pit took place on the 2700' level and the 2660' level. The 2700' level was mined up the the first part of February when the drop-cut for the 2660' level was begun. All subsequent mining took place developing this level.

The mining on the 2700' level was along its west perimeter and was of material from the "A" fault zone. This strong fault and breccia zone passes through both monzonite and syenodiorite porphyry. This material is strongly altered, the alteration being faciliated by the extreem mechanical disruption of the rock. The main alteration is clay-sericite, but there has also been either remobilization of original potash felspar or much hydrothermally carried potash brought into the sheared rock of the southwest corner. Most of the material mined had medium to "high"-grade sulfide values, with local high non-sulfide copper values occuring in the porous breccia areas.

Mining on the 2660' level was through strongly altered syenodiorite and monzonite. The alteration in the syenodiorite was clay-sericite while the monzonite was also moderately silicified. Ore-grade values were derived from well developed chalcocite on disseminated pyrite and chalcopyrite and occasional chalcocite veins of up to a couple of inches thick.

The shaded areas on the Oxide Assay Map indicate that a moderate amount on non-silfide bearing material will be mined during the next quarter. For the most part this material will contain less than 0.4 non-sulfide copper.

Movement of less than 0.1" was measured on the expansion cracks in the southeast corner of Oxide Pit. It appears that the blasting for the 2660' bench has had essentially no effect on blocks that had prior movement.

EL TIRO PIT

During the first quarter of 1967 mining was carried out on the 2750', 2710' and 2590' levels with cleaning up to final toe taking place on the 2790' level. The 2750' level was most actively mined with two shovels working throughout most of the quarter.

Mining on the 2750' level was through dacite, monzonite, non-limey sediments, a minor amount of limey sediments and alaskite. The majority of the dacite mined was leach and waste-grade with only a small amount of medium-grade ore material being encountered. The mineralization was chalcocite on pryite and chalcopyrite in thin quartz sulfide veins. The non-limey sediments mined were strongly altered and structurally broken siltstones, arkoses and quartzite which averaged low ore-grade. The original sulfide ore content was somewhat higher, but this has been subjected to leaching and oxidation and a good part of the copper recombined as oxides, carbonates and silicates in place. The one pod of limey sediments mined contained medium to "high" grade chal-

copyrite. The monzonite was moderate to strongly altered, but was generally of leach grade.

Closely associated with the non-limey sediments and the El Tiro fault was the occurrance of large amounts of biotite. This biotite is apparently hydrothermally introduced and occurs both as large aggregate masses of variably sized flakes and as an invading alteration of surrounding rocks. Moderate amounts of sulfide mineals are locally associated with the biotite. Various consumers are being consulted to determine if this biotite is of a commercial quality.

Mining on the 2710' level was of about equal amounts of alaskite and monzonite plus a small amount of non-limey sediments. All the rocks were strongly altered to clay and sericite and more than half of the material ran ore-grade. High copper vaules were derived from well developed chalcocite on pyrite and chalcopyrite as disseminated grains and in quartz veins. Substantial amounts of non-sulfide copper was associated with higher grade sulfide ore.

On the 2590' level monzonite and a lesser amount of alaskite was mined. The monzonite seemed to be of two different phases differing in biotite content, clay-sericite development and copper content. That in the northwest corner of the level was weakly altered, moderately siliceous and was cut by numerous copper - poor quartz-pyrite veins and had a normal biotite content. The remainder of the monzonite was moderately altered, had a abnormally high biotite content, was non-siliceous, but strongly veined by copper bearing quartz-sulfide veins. The alaskite encountered was moderate to strongly altered and was generally of medium grade.

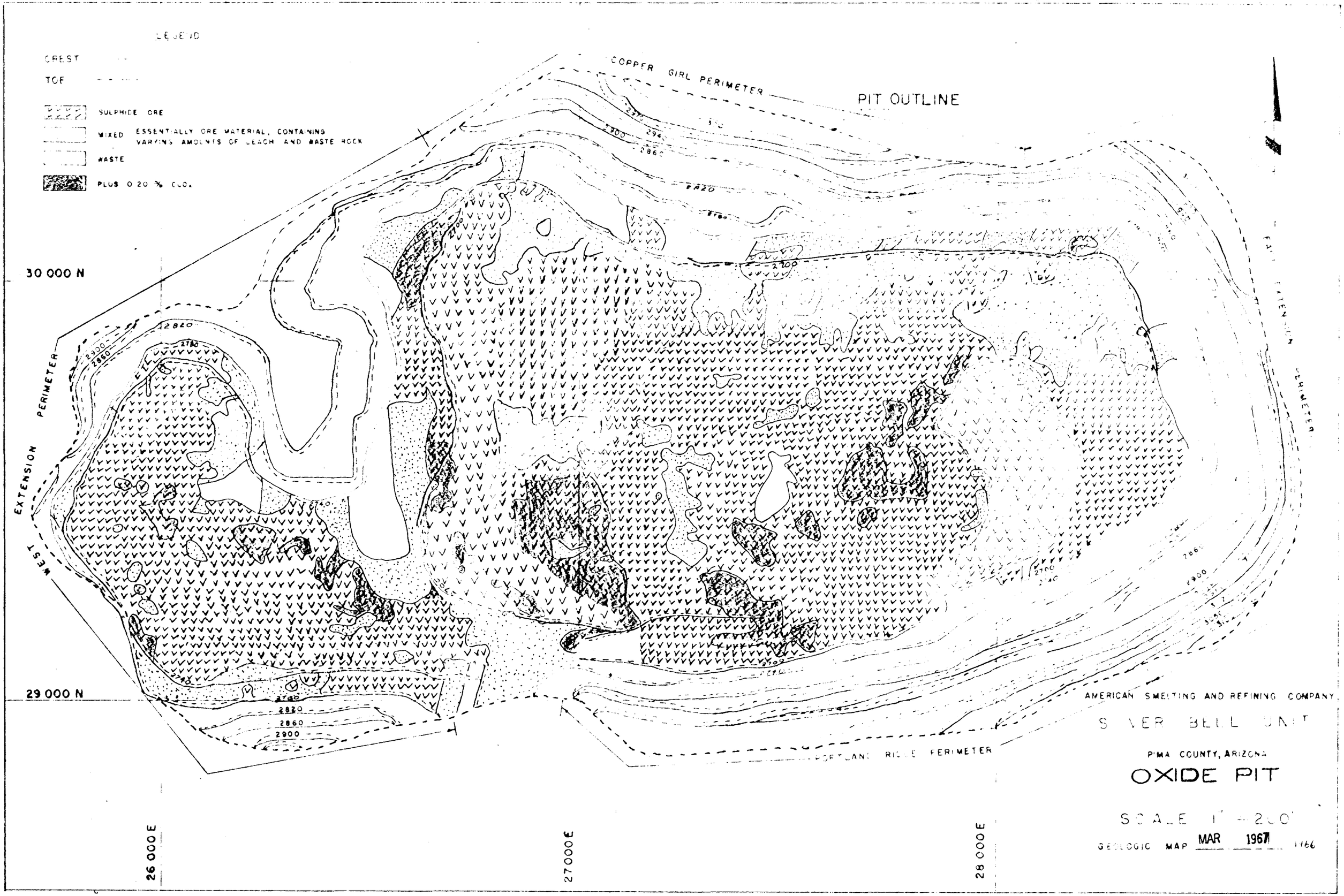
Mining during the second quarter will encounter large quantities of high non-sulfide ore on the 2710' level as mining progresses across the El Tiro fault zone.

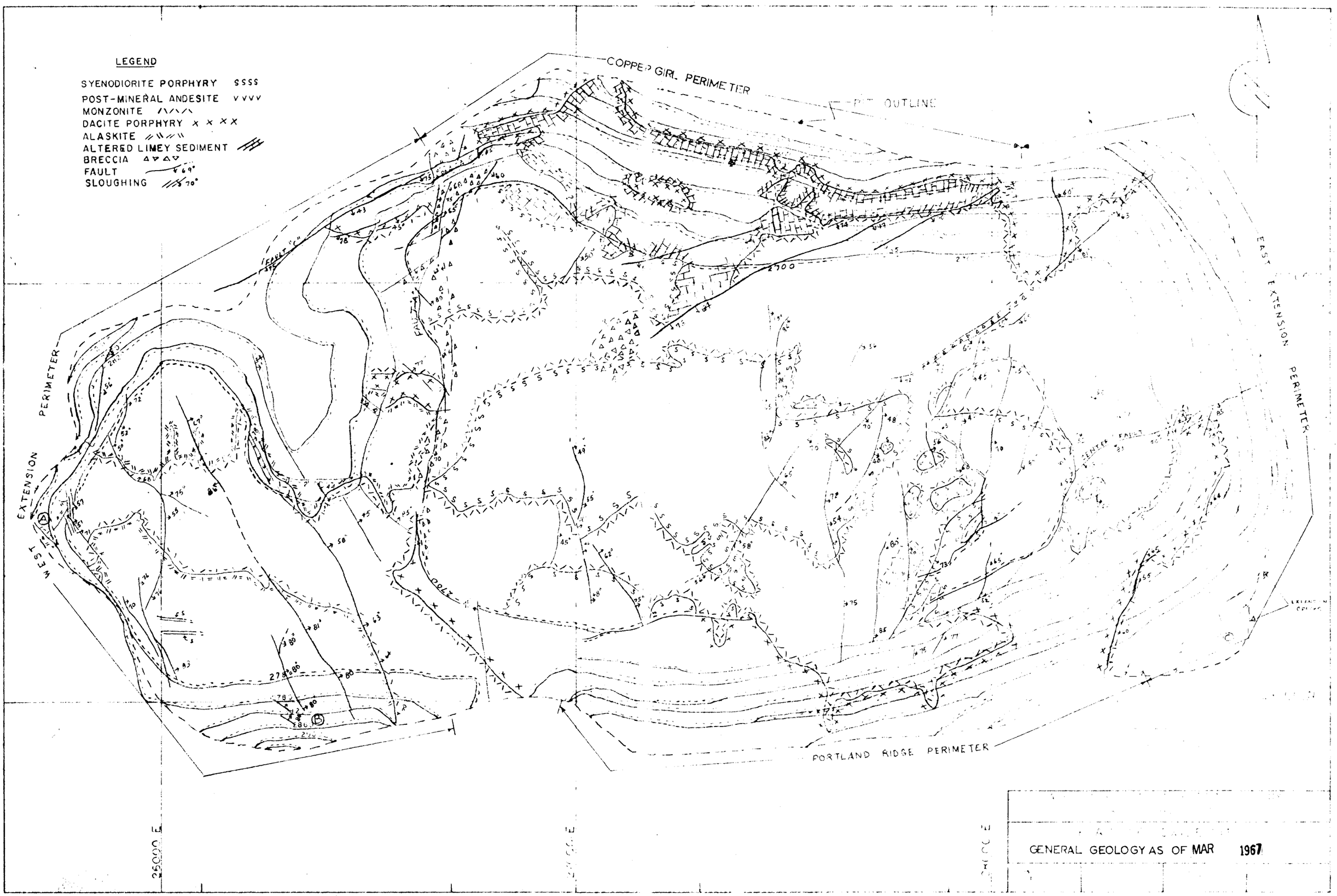
During final toe cleanup on the 2790' level pit-wall movement began in the vicinity of 18,600E and 36,400N. The movement took place along two major joint-fault systems which intersect in such a manner to form trough-like shoots. These shoots plunge at 38° along a S 27° W direction into the pit and the troughs widen towards the pit. Any compressional stress transverse to the intersection of the planes is most easily released by sliding the internal blocks down and outward into the pit. When mining passed over the intersection there was a release in confining pressure which allowed up to ten feet of downward and outward movement of some of the blocks. Mining on lower benches will be carried out so as to leave a large mass on the toe of the blocks to prevent further movement. A detailed report on this slide area is nearing completion at this time and will be available for further information. No other significant pit wall movement was noted during the quarter in El Tiro Pit.

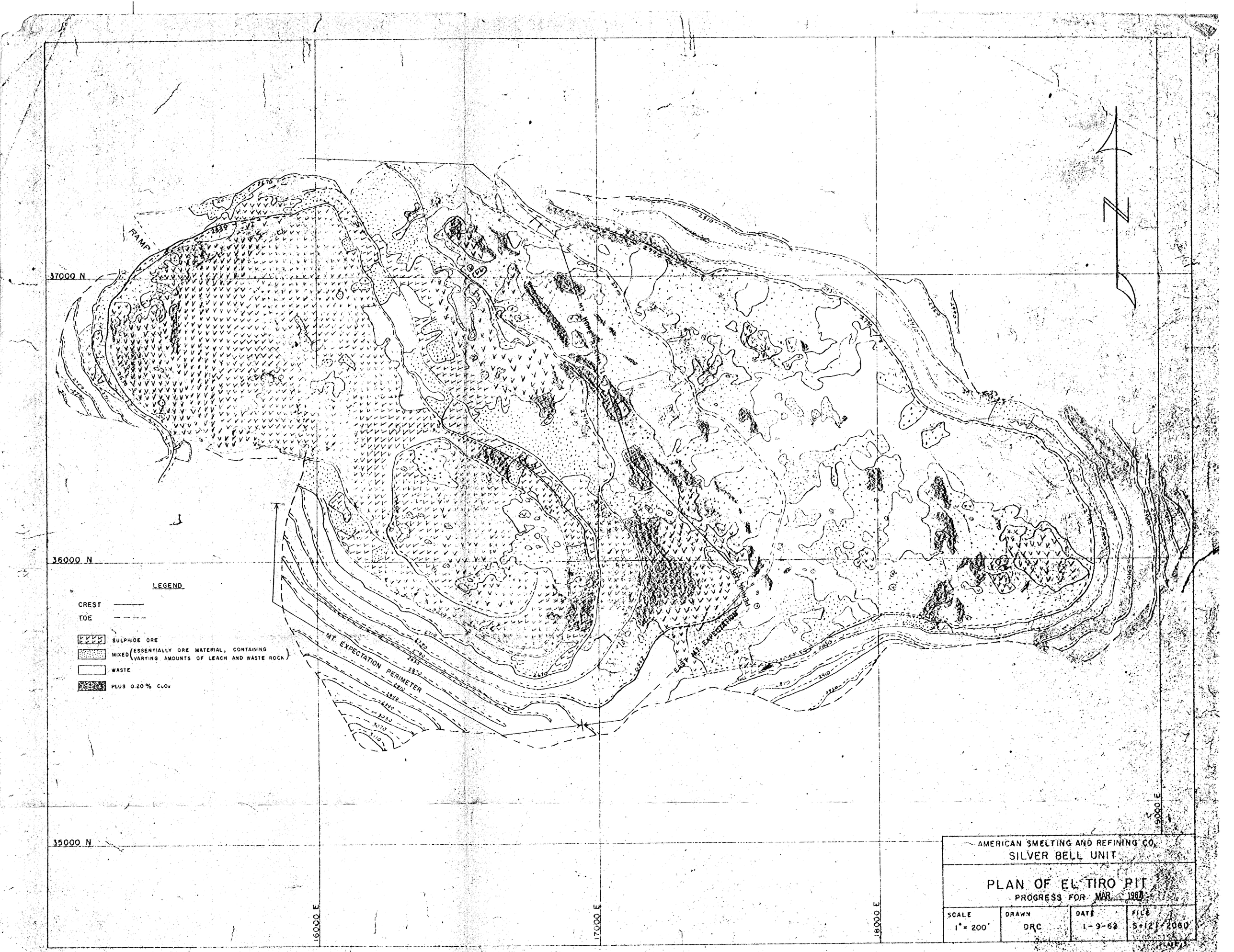
N. R. Nuttycombe

N. R. Nuttycombe
Resident Geologist

NRN:jca


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
30 000 N
29 000 N
WEST EXTENSION PERIMETER
EAST EXTENSION PERIMETER
2820
2860
2900
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 MAR 1967


LEGEND
SYENODIORITE PORPHYRY
POST-MINERAL ANDESITE
MONZONITE
DACITE PORPHYRY
ALASKITE
ALTERED LIMEY SEDIMENT
BRECCIA
FAULT
SLOUGHING
COPPER GIRL PERIMETER
PIT OUTLINE
WEST EXTENSION PERIMETER
EAST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
FAULT "C"
FAULT "A"
FAULT "B"
CENTER FAULT
2700
2750
2800
2850
GENERAL GEOLOGY AS OF MAR 1967


RAMP
37000 N
36000 N
35000 N
16000 E
17000 E
18000 E
19000 E
LEGEND
CREST
TOE
SULPHIDE ORE
MIXED (ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK)
WASTE
PLUS 0.20% CuOx
MT. EXPECTATION PERIMETER
EAST MT. EXPECTATION
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
PROGRESS FOR MAR. 1961
SCALE 1" = 200'
DRAWN DRC
DATE 1-9-62
FILE S-121-2060

Mr. J. H. Courtright

WES, ~~Baby~~

J.H.C.
MAR 23 1967

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

W.E.S.
MAR 23 1967

March 17, 1967

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

Subject: MONTHY REPORT ON EL TIRO AND BATTERY INCLINE AREA DIAMOND DRILLING.

The following briefly summarizes the results of diamond drilling in the El Tiro and Battery Incline areas during the month of February, 1967.

A total of 1,611.5 feet of diamond core drilling was done by one truck mounted rig working in the El Tiro area, and a skid or truck mounted rig working in the Battery Incline area. On February 22, 1967 the skid rig on hole G-17 was replaced by a Joy 22, truck mounted rig. This rig will be used, where possible, for future drilling in the Battery Incline area. Each of the rigs work on a two shift per day basis. The following results are available:

Hole No.	Approx. Elevation	Approx. Coordinates North	Approx. Coordinates East	+0.40% Cu Lenses Depth to Top	Thickness	Avg % Cu Total	Avg % Cu N.S.	Ft. Drill. During Mo.	Depth End Mo.	Final Depth
G-15	2,689.5	28,104.4	33,596.1	110.1	24.4	.40	.03	215.7	215.7	215.7
G-16	2,644.9	28,128.9	33,216.9	84.4	9.5	.95	.02	191.0	191.0	191.0
G-17	2,688.2	28,290.3	32,572.5	54.4	37.2	.67	.04	654.3	654.3	654.3
D-87	3,080.9	36,799.6	19,398.5	1916.1	2.8	1.33	-			
				1961.0	4.1	.55	-			
				2300.0	9.9	1.05	.01			
				2340.3	13.6	.88	.01			
				2379.3	9.5	.47	-	550.5	2441.5	
						TOTAL		1611.5		

EL TIRO AREA

Drilling was continued on D-87, the hole being deepened from 1891.0 feet to 2441.5 feet at the end of the month. The hole was stopped on March 4, 1967 at a depth of 2,564.4 feet.

During the month the hole cut alternate beds of hornfels, tactite, and marble - the alteration being comparable to that seen near ore zones in the east extension of El Tiro pit.

From a depth of about 2,150 feet to the bottom of the hole, the formations were brecciated to varying degrees. The brecciation appeared to be, for the most part, pre-mineralization but in places there was evidence of pre-breccia mineralization. The mineralization was therefore probably, penecontemporaneous with the brecciation, but with the main phase occurring after brecciation. The sediments

were cut by narrow dikes or sills of dacite which were also strongly brecciated. The dacite may have intruded fault zones which were later re-activated, as all of the dacite show signs of brecciation.

No definite marker beds were cut and the sediments were therefore not absolutely identified. However, a detailed graphic geologic log at a scale of 1 inch equals 20 feet, was kept, and intercepts plotted on this log appear similar to the Pennsylvanian Naco limestone found in the nearby Waterman mountains.

The beds dipped 30 to 40 degrees and the true thickness penetrated was about 659 feet.

Short intercepts of high grade copper were cut but generally the rock was barren. Monzonite intercepted between 2,385 amd 2,440 feet showed strong secondary felspar alteration and contained blebs of chalcopyrite up to 1/8 inch long, with an average grade of about 0.40% copper.

D-87 was one of five holes testing for sediments beneath the dacite porphyry. The other four holes were D-214, D-216, D-217 and D-17. All but D-214 cut sediments. Although none of the holes cut extensive ore grade material, they demonstrate that there is a considerable amount of sedimentary rocks that may be favorable for replacement type mineralization, concealed by dacite porphyry.

BATTERY INCLINE AREA

G-15 collared in intensely altered monzonite, and cut intensely altered syenodeorite circa 74 feet. The hole bottomed at 215.7 feet in that rock. Both rocks were so strongly altered that identification was difficult. Alteration consisted of moderate pyritization accompanied by strong silicification, clay and sericite.

Sulfides were cut at 89.4 feet. Plus 0.4% copper material was encountered from 110.1 feet to 134.5 feet at a grade of 0.40/0.03%. Primary mineralization averaged about 0.07% copper as chalcopyrite.

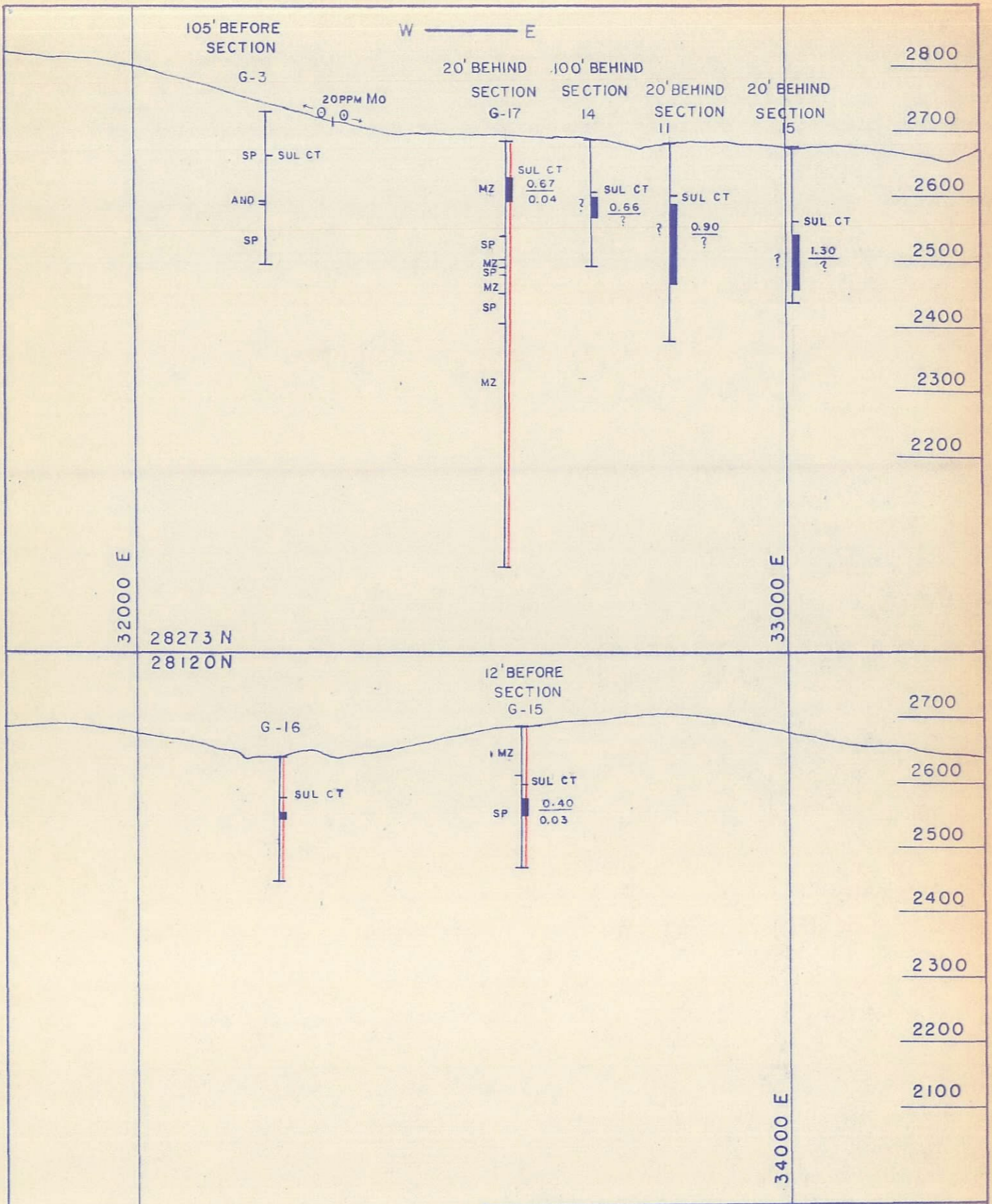
G-16 collared in moderately altered monzonite and remained in that rock, except for a four foot intercept of syenodiorite at 126 feet, to the bottom at 191.0 feet. Clean sulfides were encountered at 84.4 feet. Only two widely separated ten foot runs of ore grade material were encountered. Primary mineralization averaged about 0.10% copper.

G-17 collared in strongly altered monzonite, cut alternating bands of syenodiorite and monzonite at 150 feet, cut monzonite at 180 feet and remained in that rock to the bottom at 654.7 feet. Sulfides were encountered at 54.4 feet. Plus 0.4% copper material was drilled from 54.4 to 91.6 feet at an average grade of 0.67/0.04%.

An induced polorization geophysical survey indicated an increase to 7% total sulfide content at about 300 foot depth in this area. G-17 was drilled beyond the chalcocite zone to test for the possibility of ore grade primary mineralization. An increase of pyrite was noted, but there was no increase in the copper grade.

James A. Briscoe
Geologist

JAB:jca


W — E
105' BEFORE SECTION
G-3
20PPM Mo
SP
SUL CT
AND
SP
20' BEHIND SECTION G-17
SUL CT
0.67
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MZ
SP
MZ
SP
MZ
SP
MZ
100' BEHIND SECTION 14
SUL CT
0.66
?
20' BEHIND SECTION 11
SUL CT
0.90
?
20' BEHIND SECTION 15
SUL CT
1.30
?
2800
2700
2600
2500
2400
2300
2200
32000 E
33000 E
28273 N
28120 N
12' BEFORE SECTION G-15
G-16
SUL CT
MZ
SUL CT
SP
0.40
0.03
2700
2600
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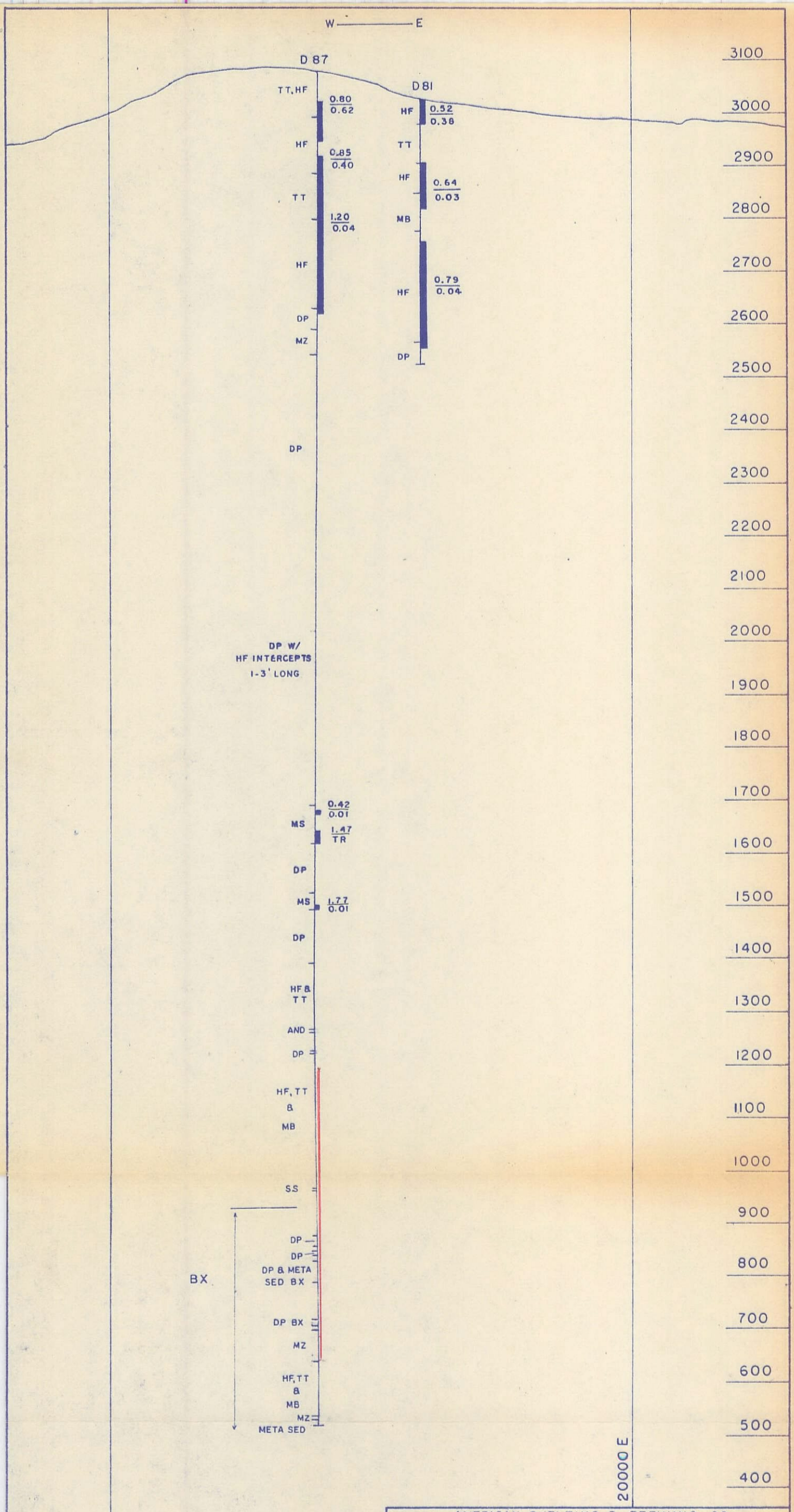
2400
2300
2200
2100
34000 E
33000 E
+0.4 % Total Copper
Advance for month
Note: Rock Types Generalized
Cu Assay is Total Cu/Non Sul. Cu
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS
SCALE 1" = 200'
DRAWN JAB
DATE FEB 1967
FILE 5-121- A


W
E
D 87
D 81
TT, HF
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0.62
HF
0.85
0.40
TT
1.20
0.04
HF
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MZ
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DP W/
HF INTERCEPTS
1-3' LONG
0.42
0.01
MS
1.47
TR
DP
MS
1.77
0.01
DP
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TT
AND
DP
HF, TT
&
MB
SS
DP
DP
DP & META
SED BX
BX
DP BX
MZ
HF, TT
&
MB
MZ
META SED
HF
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0.38
TT
HF
0.64
0.03
MB
HF
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DP
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3000
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2600
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2400
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2100
2000
1900
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1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
20000 E
19000 E
36800 N
+0.4 % Total Copper
Advance for month
Note: Rock Type Generalised
Cu Assay is Total Cu/Non Sul. Cu
AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
EL TIRO AREA
DRILL HOLE PROJECTIONS
SCALE
1" = 200'
DRAWN
JAB
DATE
FEB 1967
FILE
S-121- A

EXPLANATION FOR THE PLAN MAP OF THE BATTERY INCLINE AREA

6-13 ○ Old Churn drill holes drilled by the S. W. Mudd interests in 1909. Assays by KCN.

G-Series ○ Recent diamond drill holes.

COPPER CONTENT OF DRILL HOLES

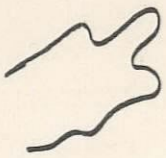
G- ● 100'-75' @1.00% / 0.05% — 40 or more feet, of +0.40% copper material, of grade that will carry stripping. Total Copper/Oxide Copper - i.e. Starting at 100 feet there is 75 feet of 1.00/0.05% copper material.

● 40 feet of +0.40% copper material, that won't carry stripping.

● Holes with significant copper but less than ore grade.

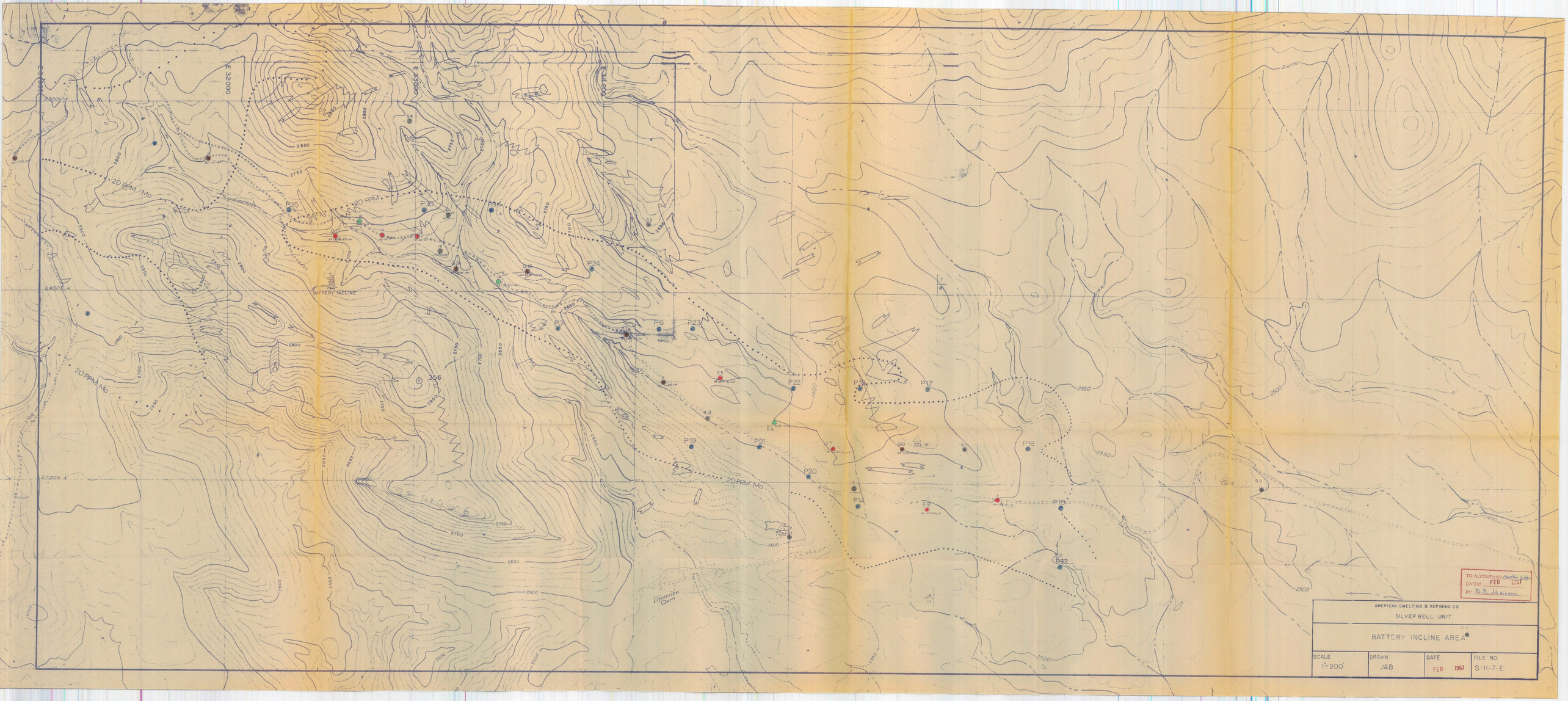
● Holes with no significant copper.

P-10 ● Proposed diamond drill holes.



Outline of capping thought to overlie moderate to strong copper mineralization after J. C. Playter, 1949.

Outline of the plus 20 parts per million molybdenum geochemical anomoly, Fall, 1966.



TO ACCOMPANY Monthly Report
DATED FEB 1967
BY D. R. Jackson

AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

BATTERY INCLINE AREA

SCALE	DRAWN	DATE	FILE NO.
1" = 200'	JAB	FEB 1967	S-11-7-E

S-

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

J. H. C.
MAR 6 - 1967

March 3, 1967

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

Subject: SILVER BELL UNIT - El Tiro and Battery Incline Area
Drilling Progress Report - February, 1967.

A total of 1611.5 feet of diamond core drilling was done by one truck mounted rig working in the El Tiro area and one skid mounted rig working in the Battery Incline area, each operating two shifts per day. The following results are available.

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
G-15	2,708	28,125	33,580	110.1	24.4	.40	.03	215.7	215.7	215.7
G-16	2,648	28,125	33,225	84.4	9.5	.94	.02			
				142.3	8.2	.54	.01	191.0	191.0	191.0
G-17	2,697	28,270	32,595	54.4	37.2	.67	.04			
				123.3	9.2	.53	.01			
				144.2	7.8	.42	.01			
				177.6	7.7	.44	.01			
				193.8	7.7	.40	.01			
				596.6	9.9	.49	-	654.3	654.3	654.3
				615.7	9.0	.42	-			
D-87	3,080.9	36,799.6	19,398.5	1916.1	2.8	1.33	-			
				1961.0	4.1	.55	-	550.5	2441.5	
				2300.0	9.9	1.05	.01			
				2340.3	13.6	.88	.01			
				2379.3	9.5	.47	-			
						TOTAL		1611.5		

Nicholas R. Nuttycombe
Nicholas R. Nuttycombe
Resident Geologist

NRN:jca

cc: TASnedden
CPPollock A/M
REMeen
JHCourtright (2)
DRJameson (2)
File

Mr. J. H. Courtright

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

February 17, 1967

J. H. C.
FEB 28 1967

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

Subject: MONTHLY REPORT ON EL TIRO AND BATTERY INCLINE AREA DIAMOND DRILLING

The following briefly summarizes the results of the diamond drilling in the El Tiro and Battery Incline areas during the month of January, 1967.

A total of 1,629.2 feet of diamond core drilling was done by one truck mounted rig working in the El Tiro area and one skid mounted rig working in the Battery Incline area, each operating two shifts per day. The following results are available:

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 E.O.M.	Final Depth
G-10	2,609.5	27,182.3	35,606.3	No 0.40% Cu Lenses				147.0	180.3	180.3
G-11	2,603.8	27,185.2	35,940.8	No 0.40% Cu Lenses				223.5	223.5	223.5
G-12	2,540.4	26,869.4	35,735.7	51.5'	51.9'	.84	.03	210.4	210.4	210.4
G-13	2,560.9	27,343.6	34,569.2	No 0.40% Cu Lenses				222.2	222.2	222.2
G-14	2,615.4	27,769.0	34,126.7	90.6'	7.6'	.53	.01	202.7	202.7	202.7
D-87	3,080.9	36,799.6	19,398.5	1401.3'	11.7'	.42	.01	623.4	1891.0	
				1442.4	21.0	1.47	Tr.			
				1580.2	10.0'	1.77	.01			
						Total		1,629.2		

El Tiro Area

Drilling has continued on hole D-87. Sediments were penetrated at 1,693.0 feet, and consist of alternating beds of siliceous non-limy hornfels, chloritic limy hornfels, clean marble, quartzitic marble, thin beds of quartzite, and tactite. At the first of the month about 192 feet of these sediments had been penetrated. The beds are dipping at about 30° so this represents a true thickness of about 167 feet. The sediments are rather weakly mineralized, only a few short runs of +0.40% copper material having been encountered, however, the alteration is comparable to that of non-mineralized sediments in El Tiro pit.

An effort is being made to correlate these sediments to rocks of known age in the Waterman Mountains. So-far the sequence appears to resemble the Upper Pennsylvanian Naco limestone (as described by Ruff, 1951), however, no definitive marker beds have been encountered. If the rock penetrated so far actually is the Naco limestone a possible target for mineralization would be the Devonian Martin limestone, which is considered a favorable host rock at Bisbee, and Superior as well as Silver Bell (Merz, 1967).

Battery Incline Area

G-10 collared in strongly altered syenodiorite, cut monzonite at 41 feet, possible Silver Bell andesite at 89 feet and on to the bottom of the hole at 180.3 feet. Sulfides were cut at about 87 feet, and a thin chalcocite blanket encountered, however, the blanket contained no ore grade material. Primary mineralization averaged about 0.10% copper.

G-11 collared in intensely altered syenodiorite or Silver Bell andesite, cut monzonite at 113.0 feet, Silver Bell andesite at 145.0 and continued in that rock to the bottom at 223.5 feet. Sulfides were encountered at 97 feet but no enriched blanket or ore grade copper was seen. Primary mineralization averaged 0.01% copper.

G-12 collared in monzonite, cut syenodiorite about 34 feet, went into monzonite at 58 feet and remained in that rock to the bottom at 210.4 feet. Sulfides were encountered at 51.5 feet and ore grade from that point to 103.4 feet was cut. This 52 feet lens averaged 0.84/0.05 percent copper. Primary mineralization averaged about 0.12% copper.

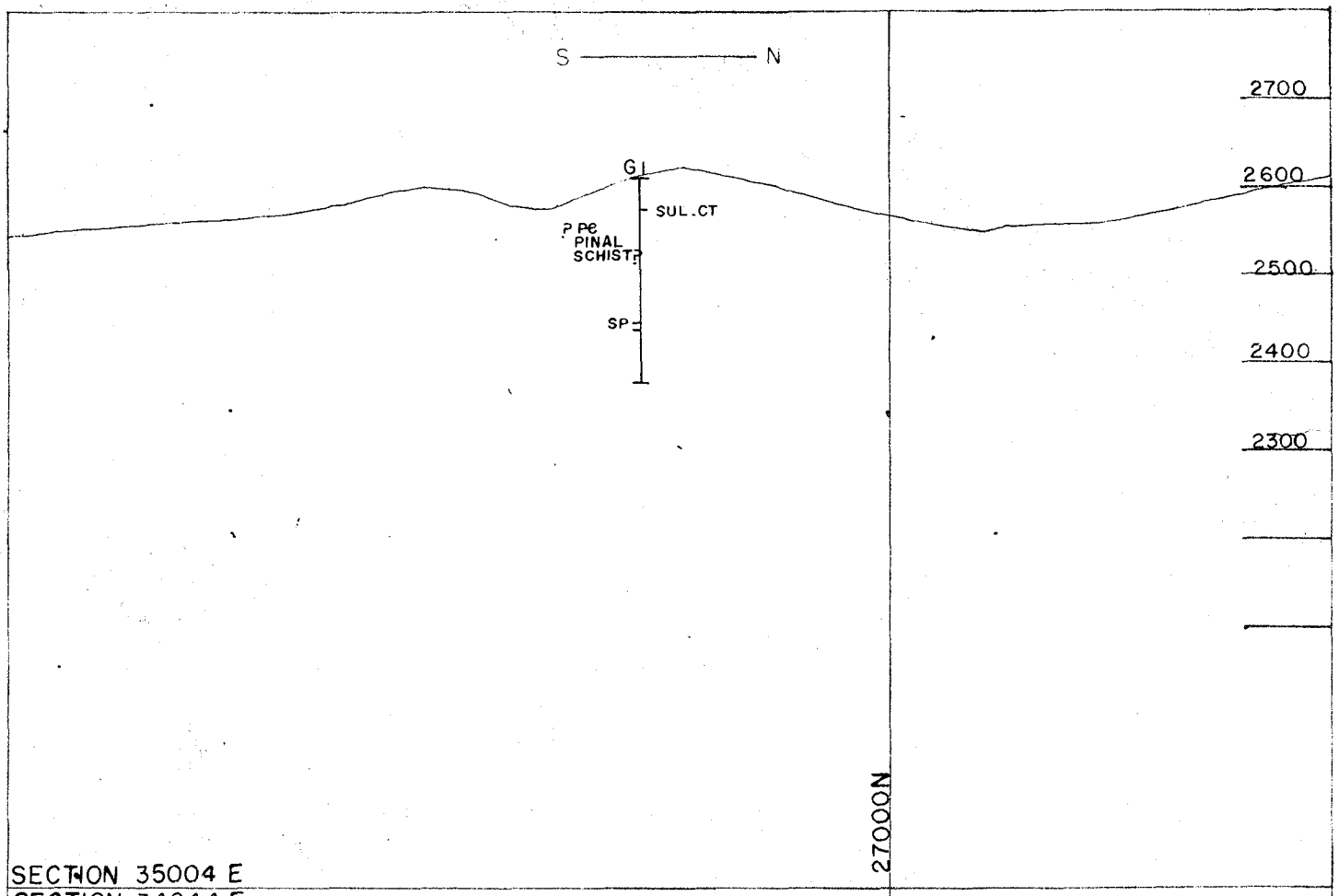
G-13 collared in strongly altered syenodiorite porphyry, encountered two monzonite dikes between 69.5 to 73.4 feet and 150.9 to 151.3 feet, entered monzonite at 157.8 feet and remained in that rock to the bottom at 222.2 feet. Sulfides were cut at 38 feet however no +0.40% copper material was found in the hole. Primary mineralization averaged approximately 0.22% copper as chalcopyrite.

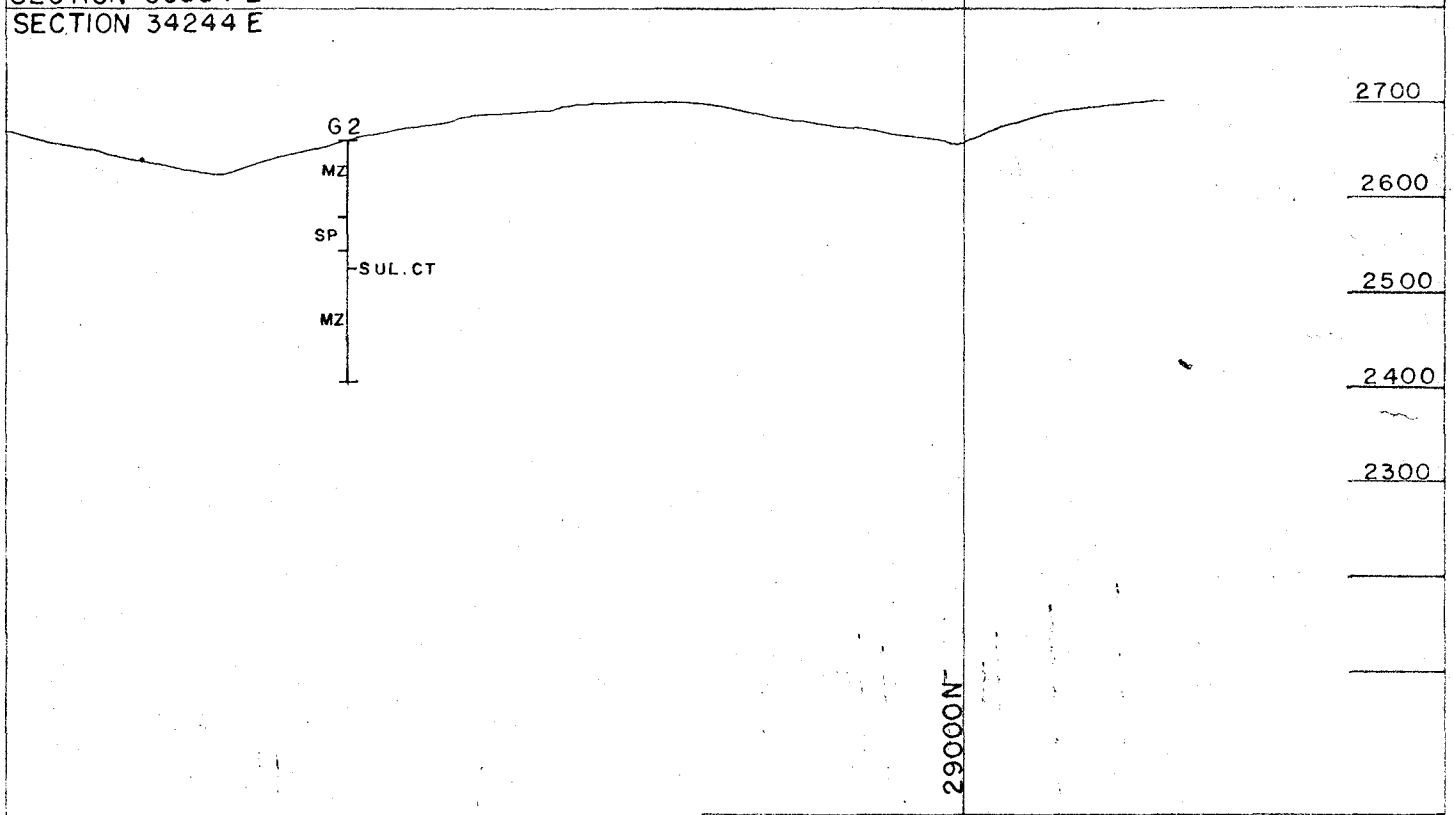
G-14 collared in strongly altered syenodiorite and remained in that rock to the bottom at 202.7. Sulfides, broken by leached areas, were encountered at 48.9 feet, with clean sulfides being cut at 66.7 feet. A thin chalcocite blanket containing one seven foot run of 0.57% copper was encountered. Primary mineralization averaged about 0.15% copper as chalcopyrite.

J. A. Briscoe

J. A. Briscoe
Geologist

JAB:jca





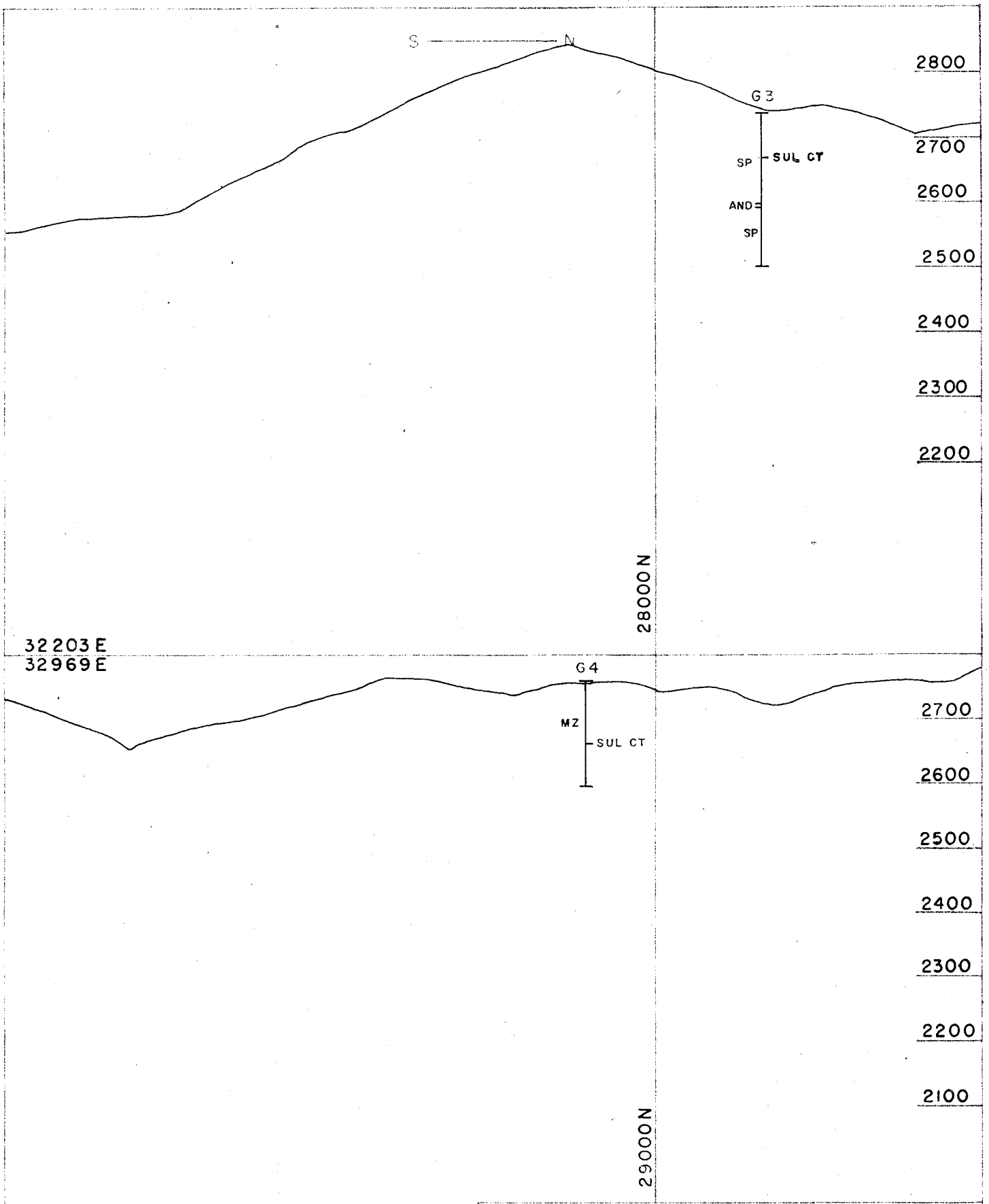
▮ +0.4 % Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		JAN 1967	S-121- A



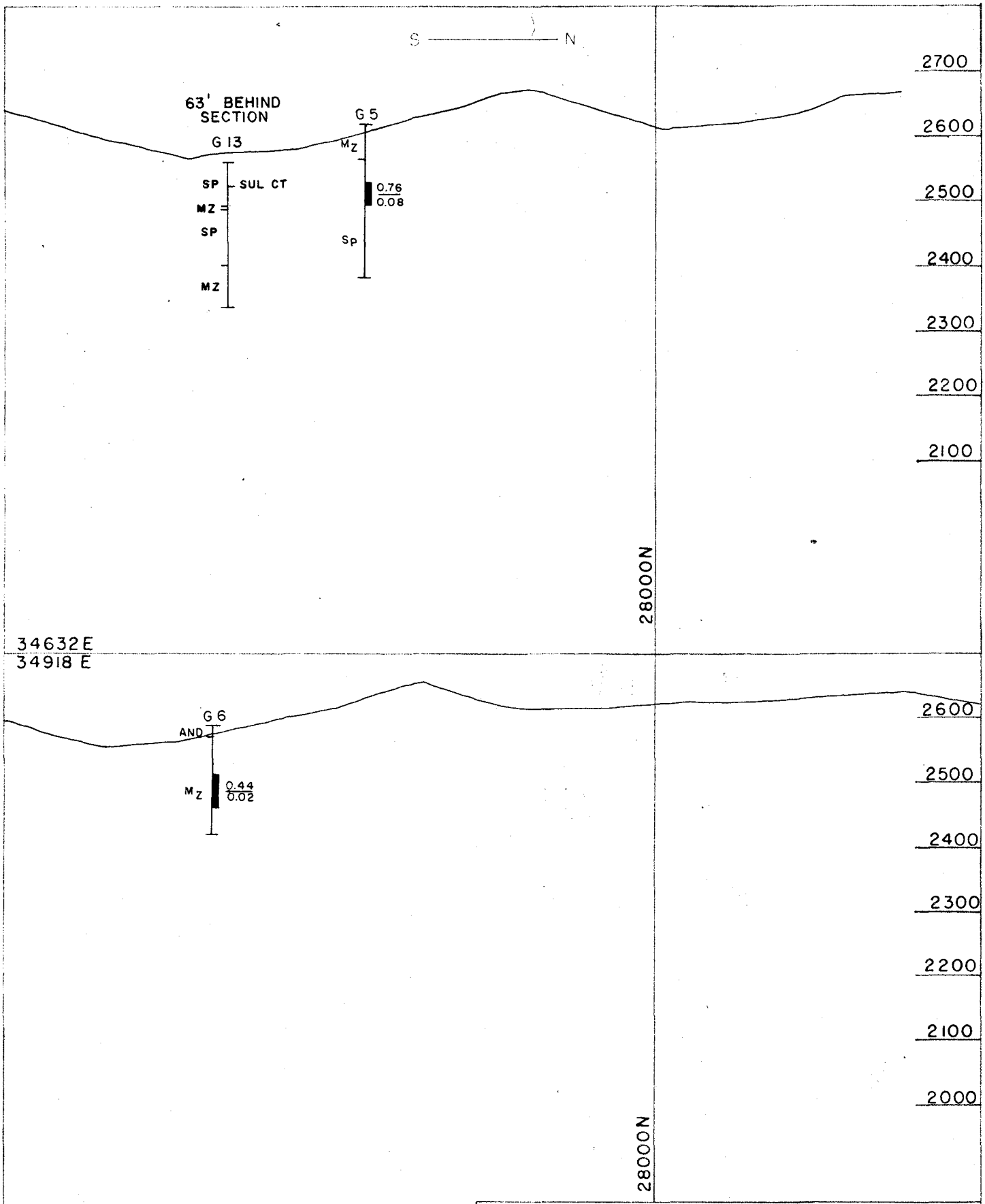
+0.4 % Total Copper
Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

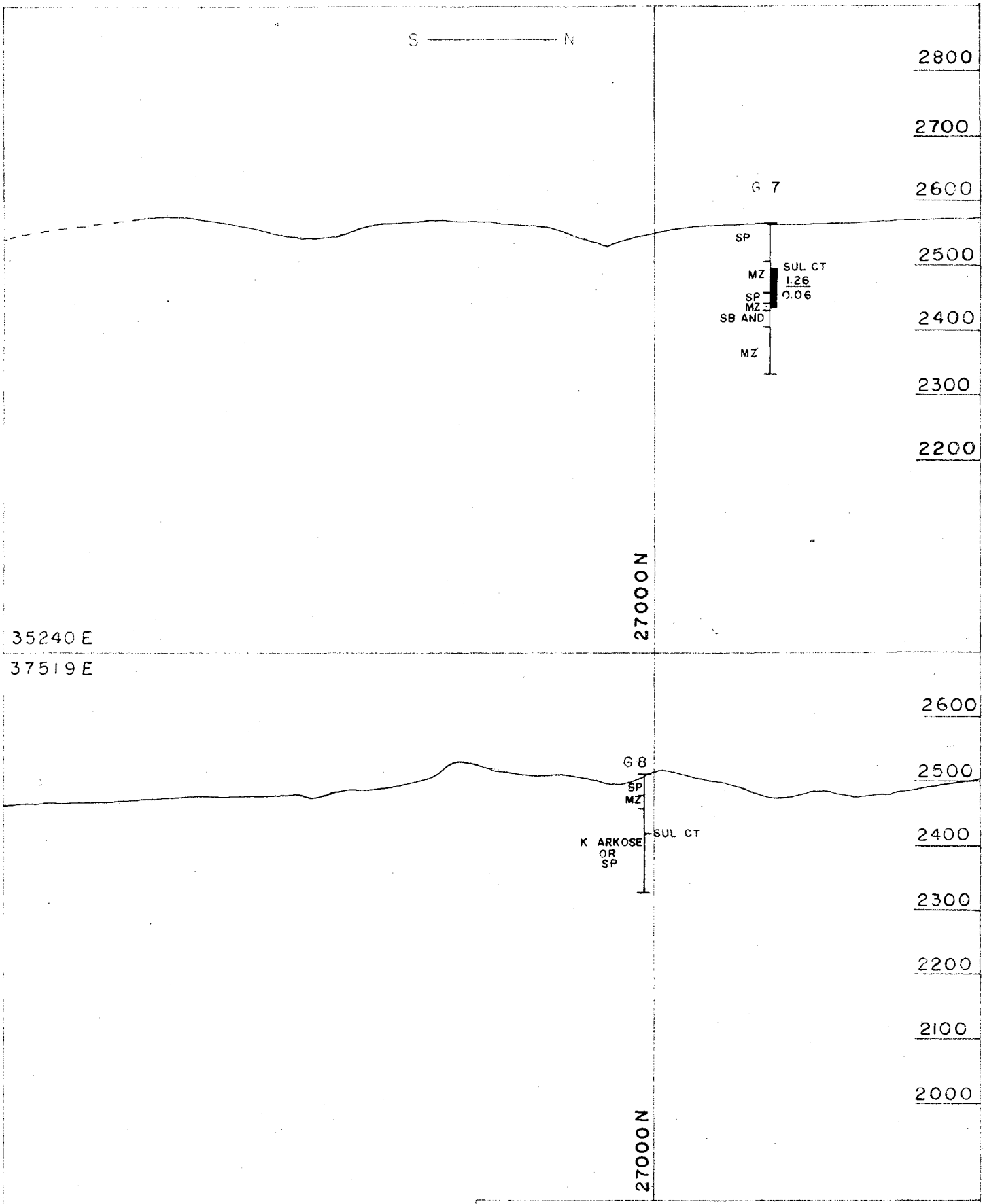
SCALE	DRAWN	DATE	FILE
1"=200'		JAN 1967	S-121- A



▮ +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			
BATTERY INCLINE AREA DRILL HOLE PROJECTIONS			
SCALE 1" = 200'	DRAWN	DATE JAN 1967	FILE S-121- A



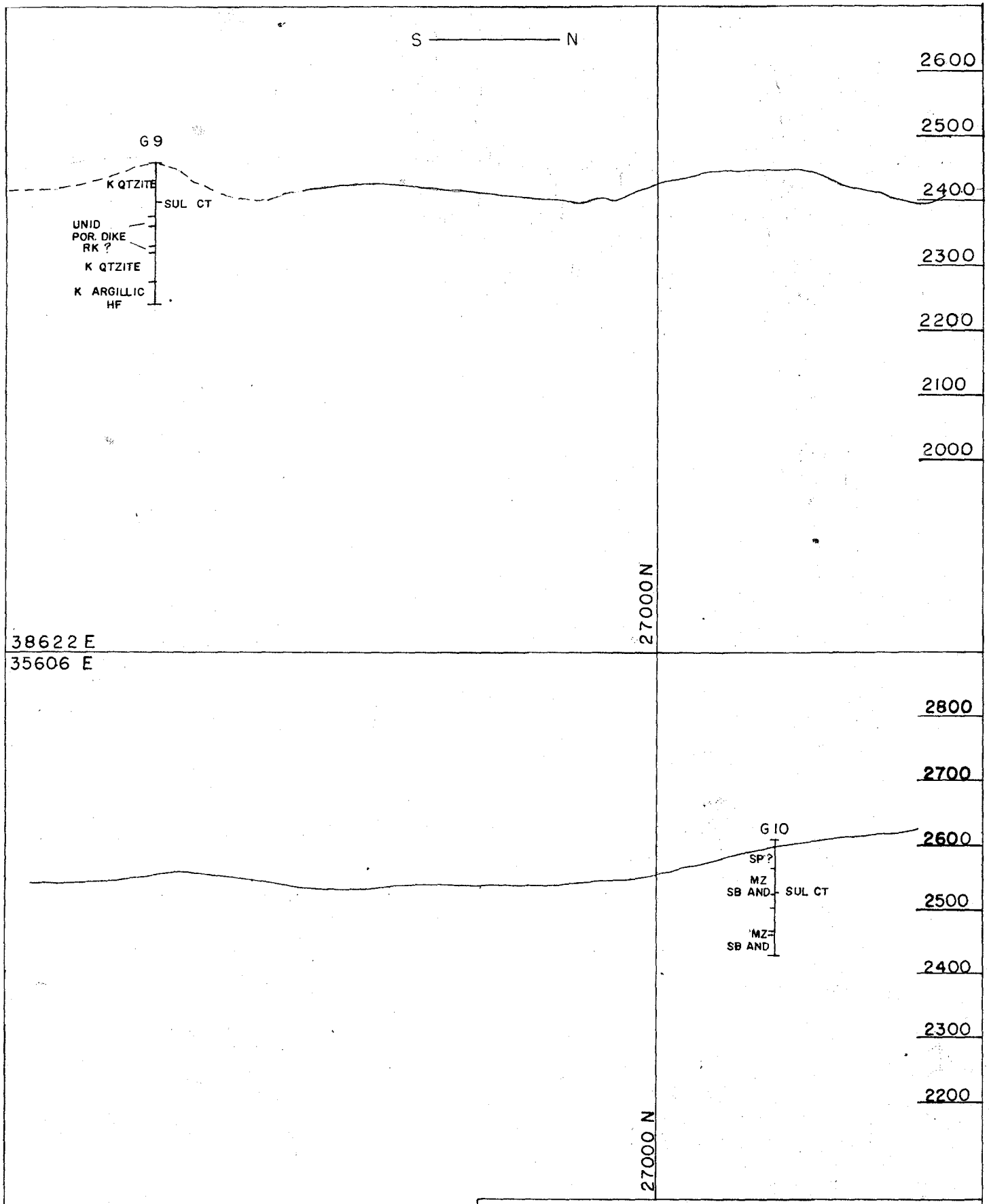
▮ +0.4 % Total Copper Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

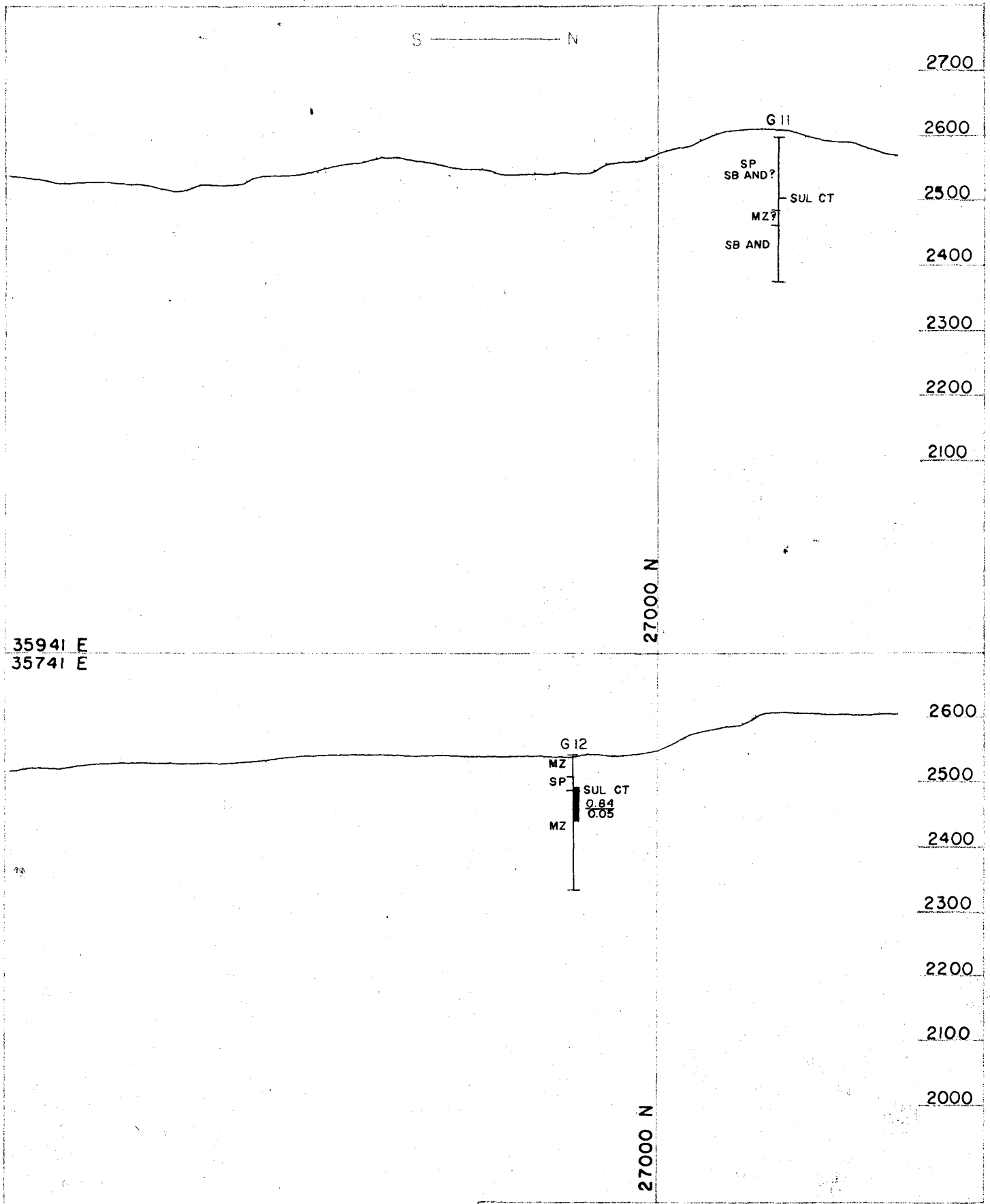
SCALE	DRAWN	DATE	FILE
1" = 200'		JAN 1967	S-121- A



▮ +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			
BATTERY INCLINE AREA DRILL HOLE PROJECTIONS			
SCALE 1"=200'	DRAWN	DATE JAN 1967	FILE S-121- A



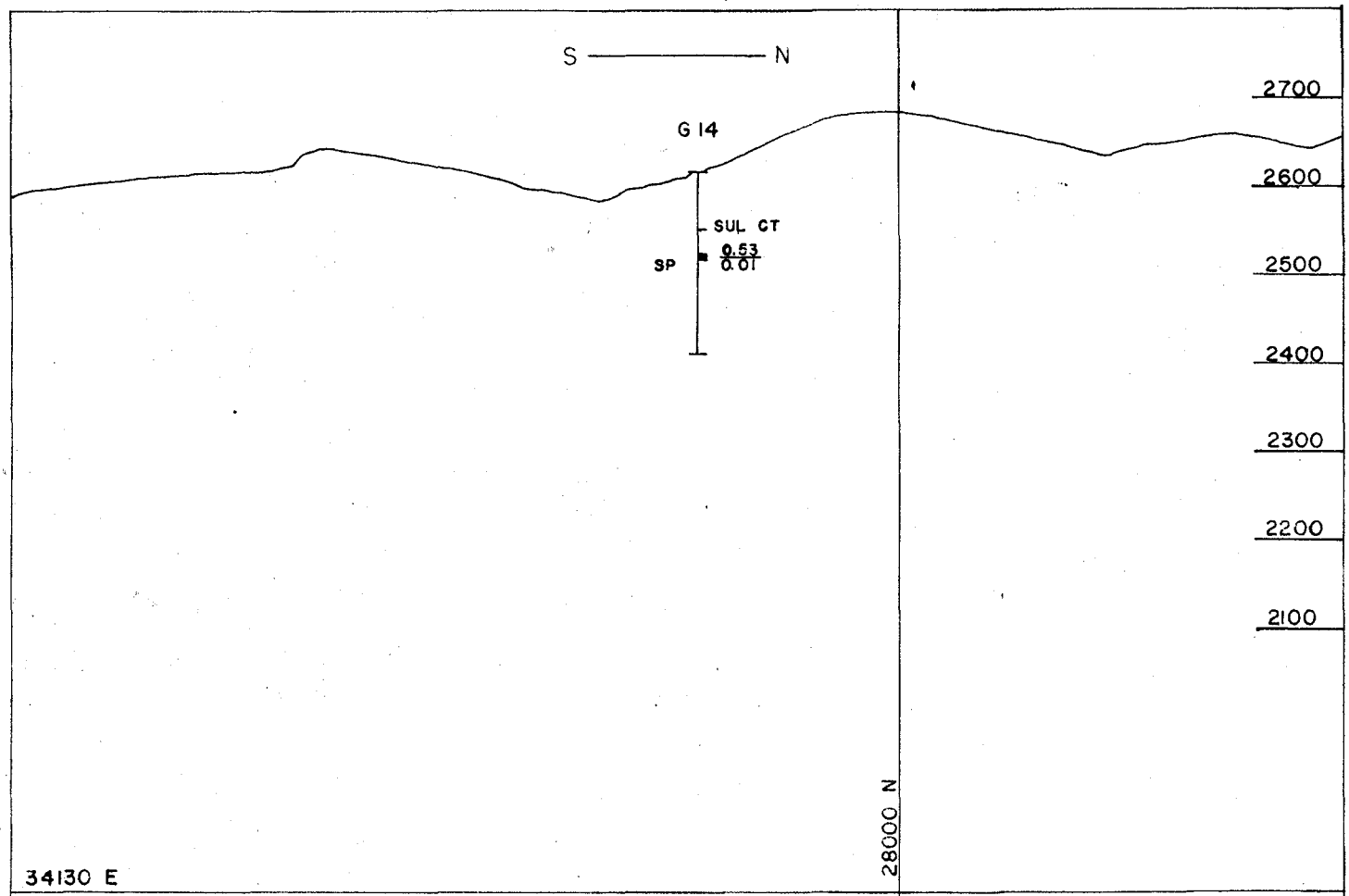
▮ +0.4 % Total Copper Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		JAN 1967	S-121- A



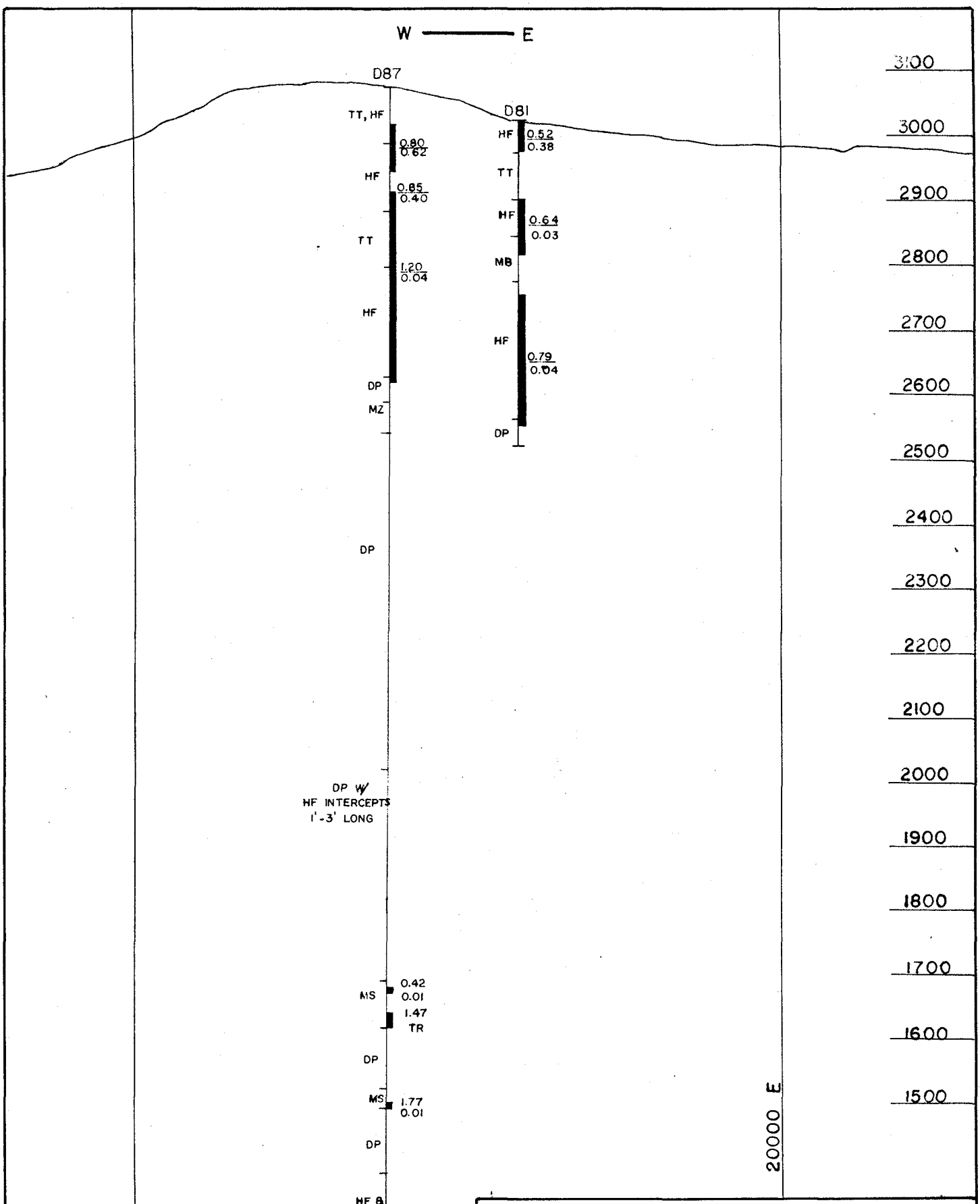
▮ +0.4 % Total Copper Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	2-15-67	S-121- A



AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

EL TIRO AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	JAB	JAN 1967	S-121- A

EXPLANATION FOR THE PLAN MAP OF THE BATTERY INCLINE AREA

6-13

Old Churn drill holes drilled by the S. W. Mudd interests in 1909. Assays by KCN.

G-Series

Recent diamond drill holes.

COPPER CONTENT OF DRILL HOLES

G-

100'-75'
@1.00%
0.05%

40 or more feet, of +0.40% copper material, of grade that will carry stripping. Total Copper/Oxide Copper - i.e. Starting at 100 feet there is 75 feet of 1.00/0.05% copper material.

40 feet of +0.40% copper material, that won't carry stripping.

Holes with significant copper but less than ore grade.

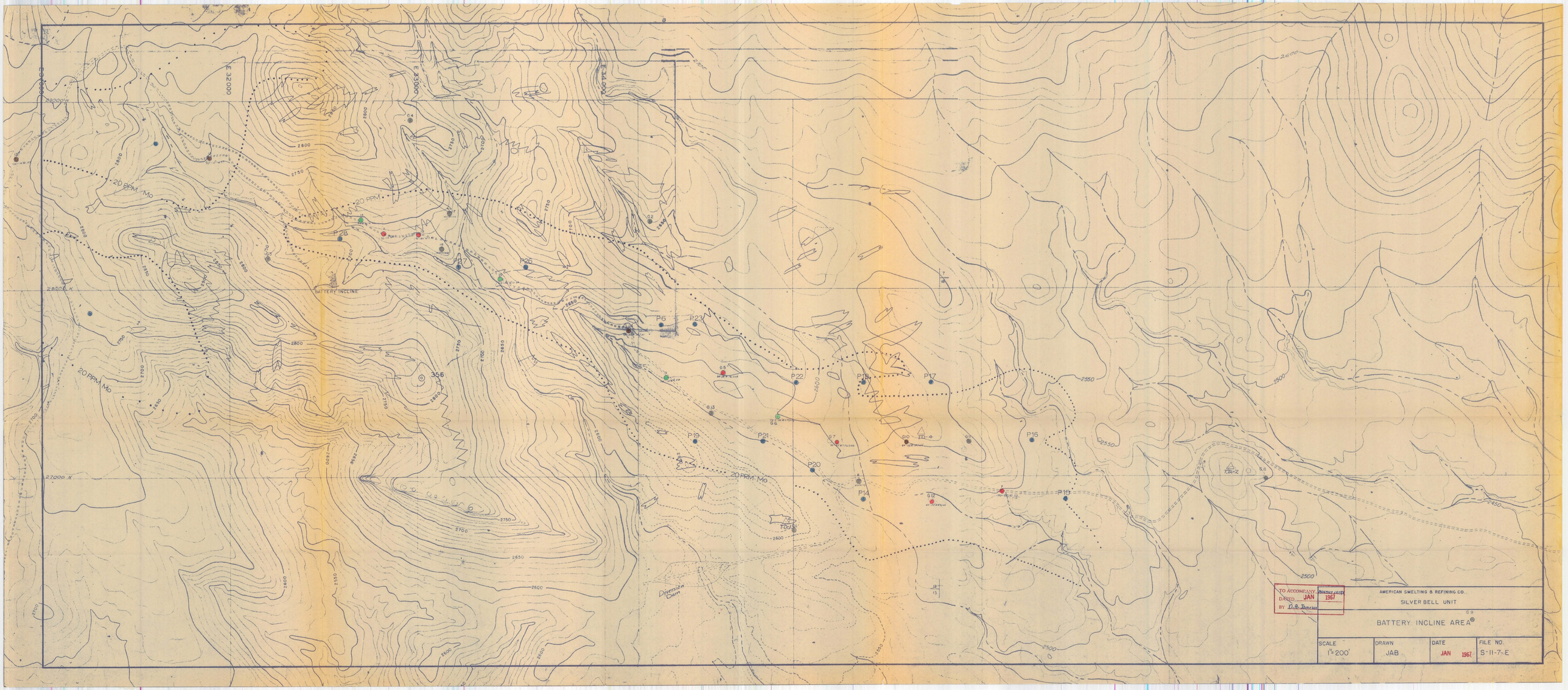
Holes with no significant copper.

P-10

Proposed diamond drill holes.

Outline of capping thought to overlie moderate to strong copper mineralization after J. C. Playter, 1949.

Outline of the plus 20 parts per million molybdenum geochemical anomoly, Fall, 1966.



TO ACCOMPANY MINING LEASE
DATED JAN 1967
BY D.A. Jameson

AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

BATTERY INCLINE AREA

SCALE	DRAWN	DATE	FILE NO.
1" = 200'	JAB	JAN 1967	S-11-7-E

Mr. McNaughton

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

J. H. C.

January 20, 1967

JAN 30 1967

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

Subject: QUARTERLY GEOLOGIC REPORT AND ORE RESERVE MAPS.

OXIDE PIT:

During the last quarter of 1966 virtually all of the mining was carried out on the west end of the 2700' level. There was a minor amount of cleaning up to final toe along the north face of the same level.

The advance was through approximately equal amounts of ore-grade strongly altered monzonite and moderate to strong altered syenodiorite porphyry. A small amount of strongly pyritized hornfels was also mined in the northwest corner of the level. As mining progressed west the "A" fault zone was encountered. This zone of several parallel faults is strongly brecciated and altered.

There was no sloughing in Oxide Pit during this quarter and an average of only 0.2 inches expansion of the cracks in the 3050' and 3100' levels of the southeast corner of the pit.

EL TIRO PIT:

Mining during the fourth quarter of 1966 in El Tiro pit was heaviest on the 2790' level with less extensive mining on the 2750' level. On the 2630' level only minor cleaning up took place.

Mining along the northeast face of the 2790' bench was of about equal amounts of dacite and monzonite. In general the dacite was weakly altered and contained only sparse sulfides. On the whole this material was waste-grade. The monzonite dikes would locally contain moderate amounts of sulfides and be ore-grade. Along this face secondary orthoclase was associated with sulfide mineralization whether in dacite or monzonite.

As the altered sediments of the Imperial extension were approached from the north the dacite became moderately to strongly silicified and within a hundred feet of the contact became moderately stained by manganese oxide. Closely associated with the dacite-sediment contact is a moderately strong fault which is nearly horizontal to the north and dips from 40° to 60° southward in the vicinity of the contact. This fault may have exerted an influence on the localization of mineralization in the vicinity.

The sediments (originally limey) have been altered to various degrees and to different products. Near the dacite contact strongly chalcopyrite was associated with chlorite-tremolite hornfels and lessor amounts of garnetite-tactite. Farther to the south sparsely mineralized medium-grained marble was encountered.

Ore-grade mineralization occured as veinlets, bedding (?) replacements and massive replacements. Chlorite was quite frequently found directly associated with the chalcopyrite while tremolite and occasionally garnet would be found as a more pervasive alteration of the ore-grade rock.

Mining on the 2750' level was of altered sediments, monzonite, alaskite, and dacite. The altered sediments were non-limey hornfelic siltstone and quartzites. They occured along the general trend of the El Tiro fault zone and were cut by numerous transverse faults. A high oxide copper content is a result of this faulting. The monzonite and alaskite mined was for the most part ore-grade while the dacite was leach-grade.

Massive pyrite lesser, but significant amounts of chalcopyrite and chalcocite in a sericite ground mass was mined near 36,000N, 17,200E. This is the location of intersection of an east-west trending fault and a strong breccia portion of the El Tiro zone. To the east along the east west fault zone a moderately developed breccia was cemented by sphalerite, covellite, chalcocite, chalcopyrite and pyrite. Farther to the south galena-covellite veinlets were found in the moderate to strongly altered alaskite.

The small amount of mining which took place on the 2630' level was in ore and leach-grade moderate to strongly altered alaskite.

There was no sloughing noted in El Tiro Pit during the quarter.

Nicholas R. Nuttycombe

Nicholas R. Nuttycombe
Resident Geologist

NRN:jca

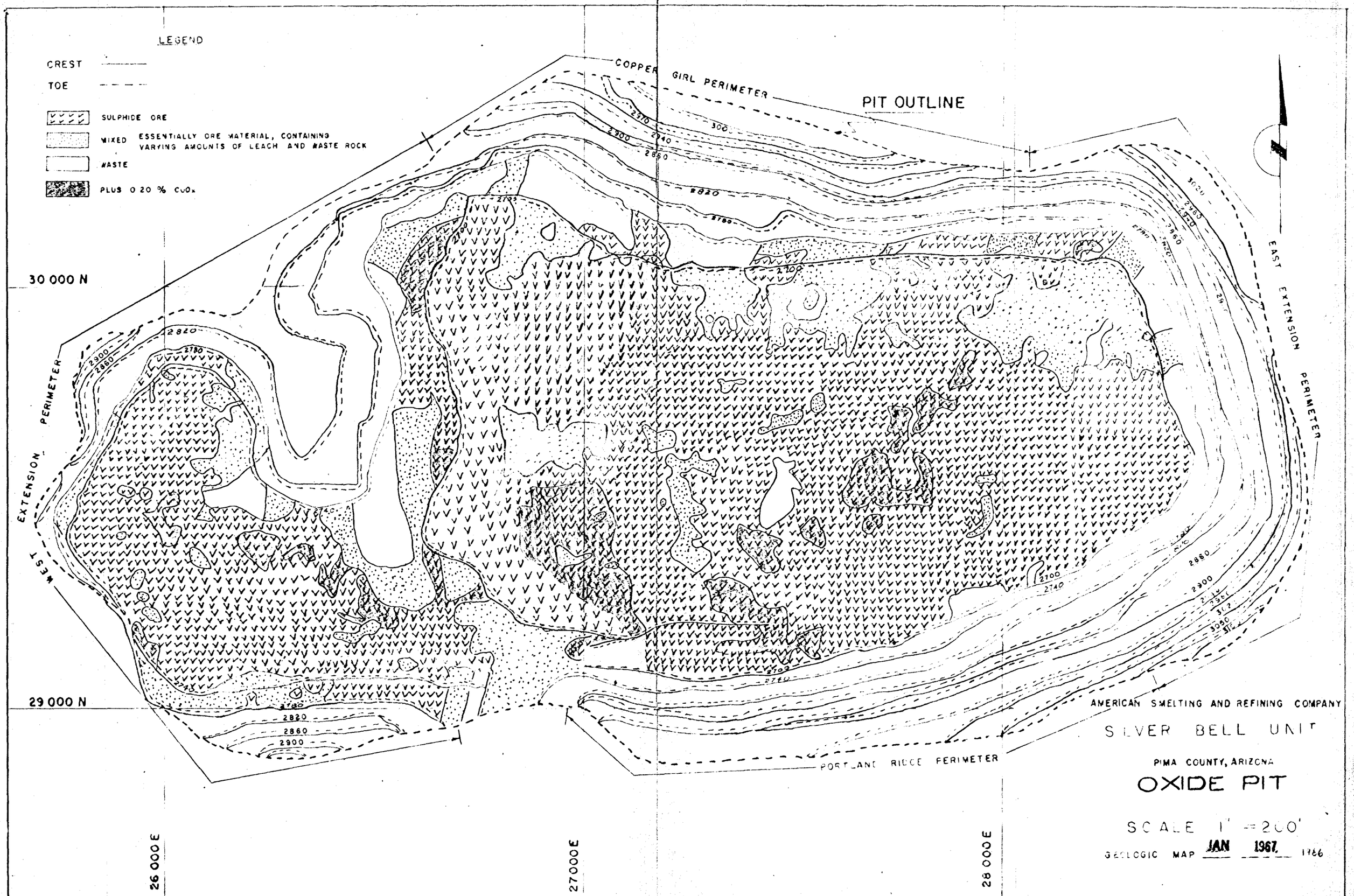

LEGEND
CREST
TOE
SULPHIDE ORE
MIXED ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK
WASTE
PLUS 0 20 % CuOx
PIT OUTLINE
COPPER GIRL PERIMETER
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
30 000 N
29 000 N
26 000 E
27000E
28 000E
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PIMA COUNTY, ARIZONA
OXIDE PIT
SCALE 1" = 200'
GEOLOGIC MAP JAN 1967 1966

Plate 1

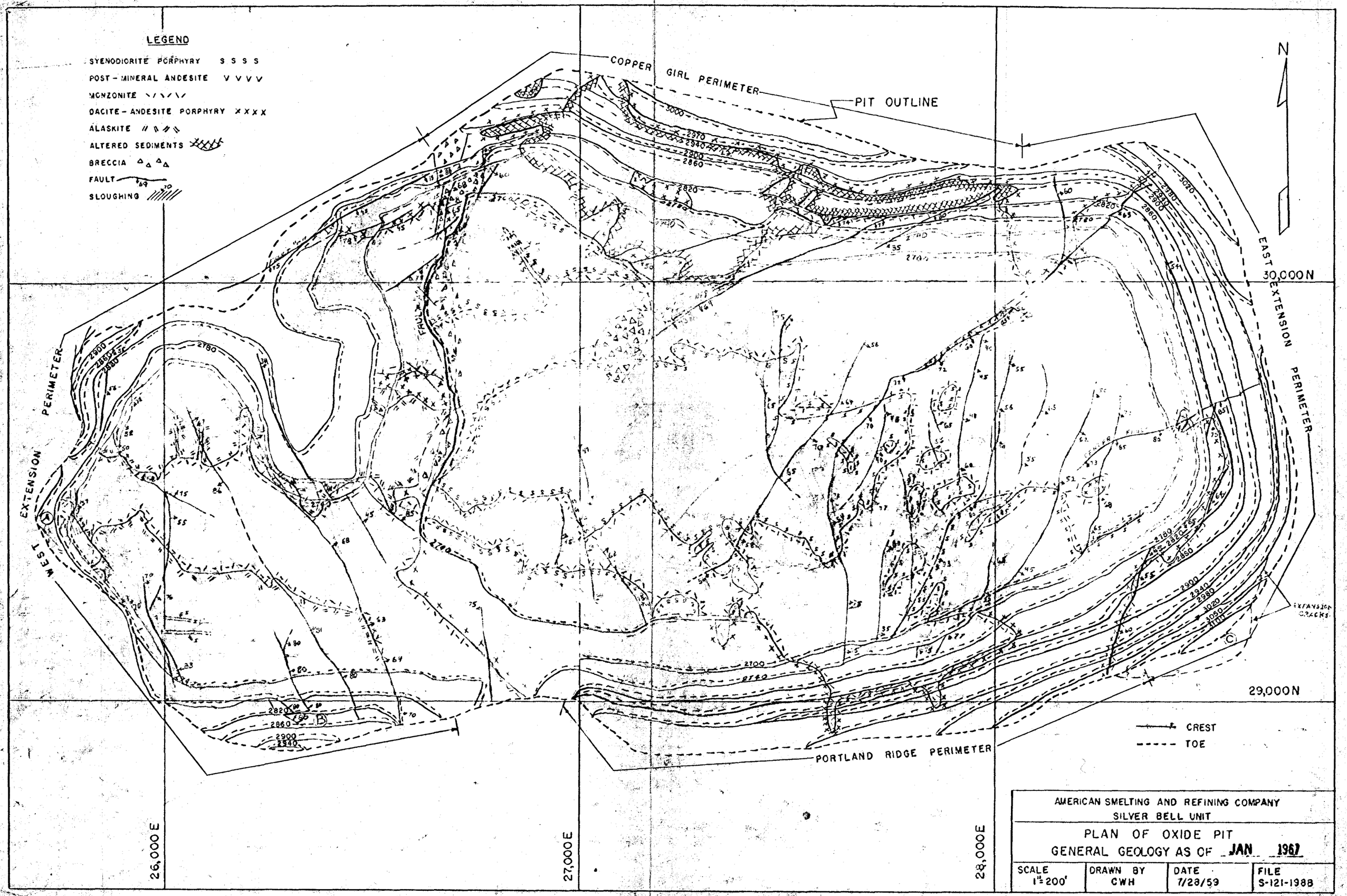
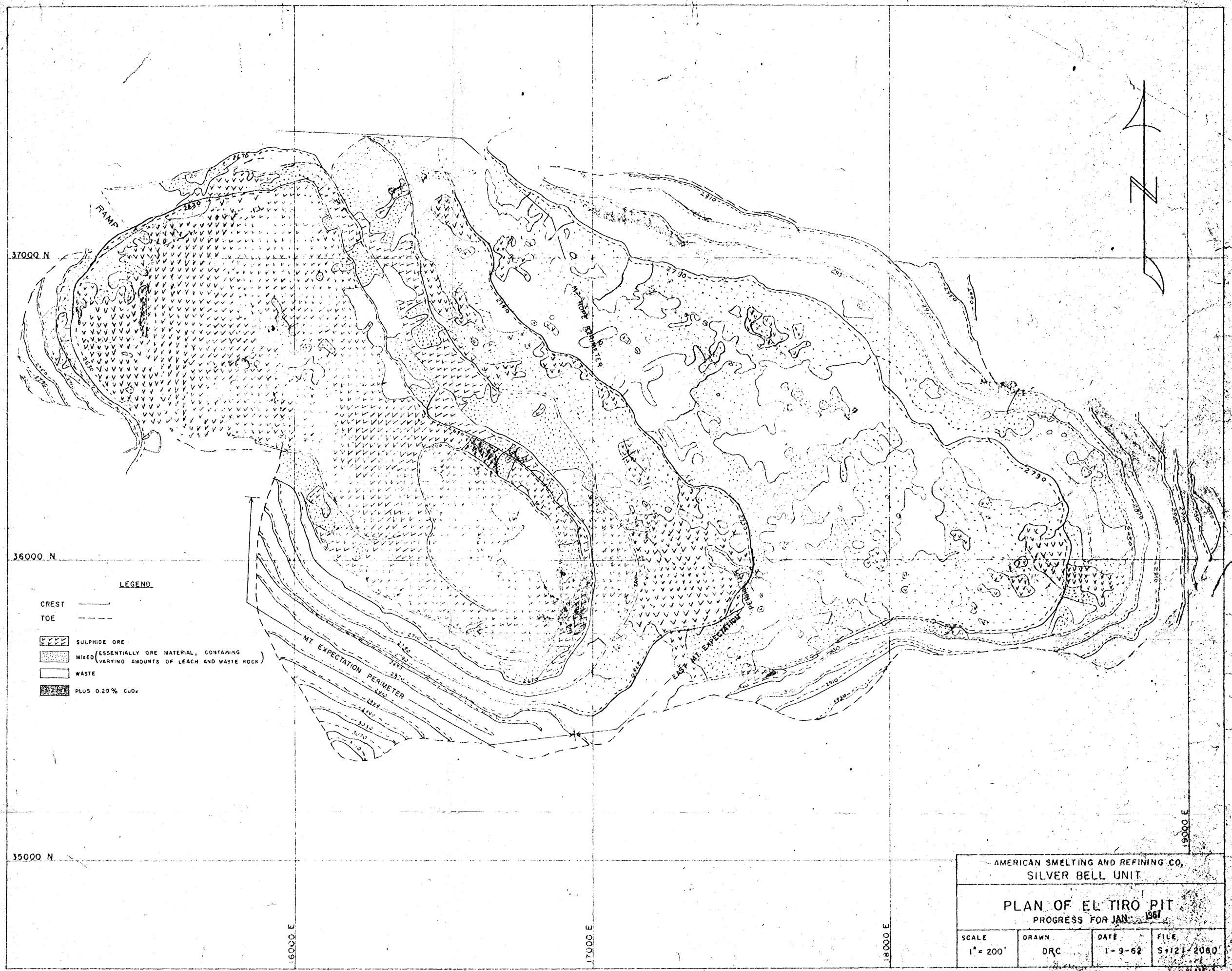
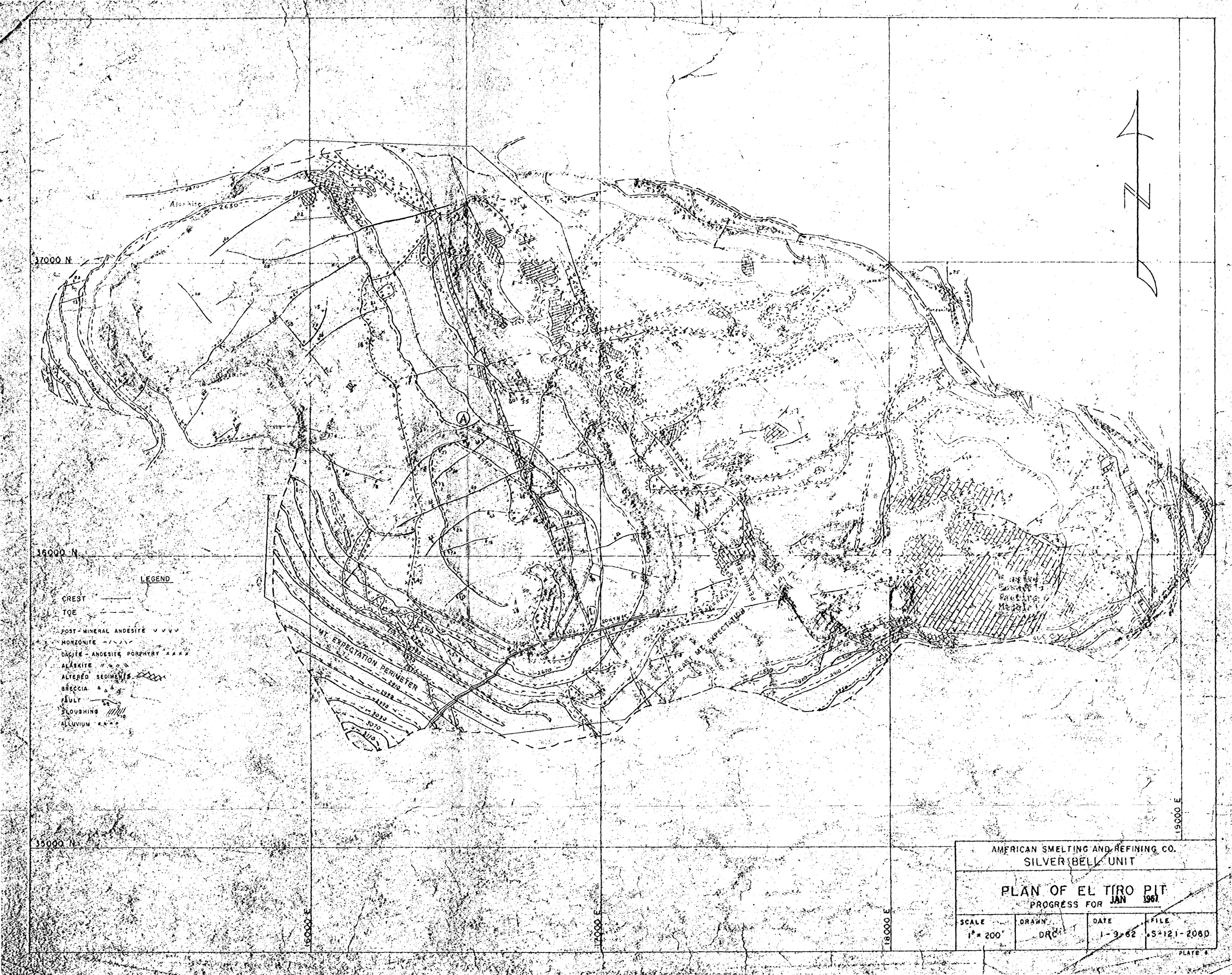

LEGEND
SYENODIORITE PORPHYRY S S S S
POST-MINERAL ANDESITE V V V V
MONZONITE
DACITE-ANDESITE PORPHYRY X X X X
ALASKITE
ALTERED SEDIMENTS
BRECCIA
FAULT
SLOUGHING
COPPER GIRL PERIMETER
PIT OUTLINE
N
EAST EXTENSION PERIMETER
WEST EXTENSION PERIMETER
PORTLAND RIDGE PERIMETER
EXPANSION CRACKS
30,000N
29,000N
26,000E
27,000E
28,000E
CREST
TOE
AMERICAN SMELTING AND REFINING COMPANY
SILVER BELL UNIT
PLAN OF OXIDE PIT
GENERAL GEOLOGY AS OF JAN 1967
SCALE 1" = 200'
DRAWN BY CWH
DATE 7/28/59
FILE S-121-1988

PLATE 2


N
37000 N
36000 N
35000 N
16000 E
17000 E
18000 E
19000 E
RAMP
MT. HOPE PERIMETER
EAST MT. EXPECTATION
MT. EXPECTATION PERIMETER
2910
2790
2670
LEGEND
CREST
TOE
SULPHIDE ORE
MIXED (ESSENTIALLY ORE MATERIAL, CONTAINING VARYING AMOUNTS OF LEACH AND WASTE ROCK)
WASTE
PLUS 0.20% CuOx
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
PROGRESS FOR JAN. 1967
SCALE
1" = 200'
DRAWN
DRC
DATE
1-9-62
FILE
S-121-2060


N
37000 N
36000 N
35000 N
16000 E
17000 E
18000 E
19000 E
Alaskite
2630
LEGEND
CREST
TOE
POST-MINERAL ANDESITE
MONZONITE
DACITE - ANDESITE PORPHYRY
ALASKITE
ALTERED SEDIMENTS
BRECCIA
FAULT
SLOUGHING
ALLUVIUM
MT. EXPECTATION PERIMETER
EAST MT. EXPECTATION PERIMETER
SOUTHEAST FAULT
2710
2670
2630
2590
2550
2510
2470
2430
2390
2350
3030
3070
3110
A
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
PLAN OF EL TIRO PIT
PROGRESS FOR JAN 1967
SCALE 1" = 200'
DRAWN DRC
DATE 1-9-62
FILE S-121-2060
PLATE 4

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

January 13, 1967

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

Subject: MONTHLY REPORT ON EL TIRO AND BATTERY INCLINE AREA DIAMOND DRILLING

The following briefly summarizes the results of the diamond drilling in the El Tiro and Battery Incline areas during the month of December, 1966.

A total of 1,580.1 feet of diamond core drilling was done by one truck-mounted rig working in the El Tiro area and one skid-mounted rig working in the Battery Incline area, each operating two shifts per day. The following results are available:

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
G-6	2580.4	27321.6	34917.5	75.2	52.4	0.44	0.02	168.7	168.7	168.7
G-7	2564.8	27181.3	35239.7	69.6	59.6	1.26	0.06	223.1	223.1	223.1
G-8	2507.7	26986.7	37519.1	No +0.40% Cu in hole				184.3	184.3	184.3
G-9	2457.3	26237.6	38622.2	No +0.40% Cu in hole				216.4	216.4	216.4
G-10	2590	27189	35556	Assays not available				33.3	33.3	
D-87	3080.9	36799.6	19398.5	No +0.40% Cu lenses this interval.				754.3	1,267.6	
							Total	1,580.1		

EL TIRO AREA

Diamond drill hole D-87 was re-entered with the purpose of making a second penetration of the thick dacite sill, which underlies Union Ridge, in an area favorable for the interception of ore grade material.

In May of 1962 the hole cut high grade ore from 180 feet to 460 feet where it entered the dacite sill. For this reason it is felt that sediments underlying the sill may also be well mineralized.

During the month of December 754.3 feet of rock, dacite - except for short intercepts of monzonite and sedimentary xenolith s, was drilled. The drilling started from the bottom of the old hole at 513.3 feet and finished the month at a depth of 1,267.6 feet.

BATTERY INCLINE AREA

G-7 was located on the same moly geochemical anomoly which was used to locate G-6, and is located 360 feet east of that hole. The hole collared in Silver Bell andesite (or possibly syenodiorite), encountered monzonite at 60 feet, andesite at 109.5 feet, monzonite at 123.8 feet, andesite at 137.3 feet and monzonite at 158.5 feet bottoming in that rock at 223.1 feet.

Sulfides were encountered at 68 feet. Starting at 69.6 feet, 59.6 feet of 1.26/0.06 percent copper material was encountered. Un-enriched copper mineralization averaged a grade of 0.31 percent.

G-8 was drilled as a location hole for the claims MAY 43, 44, 45, 54, 55, and 56.

The hole collared in strongly altered syenodiorite (?) breccia. Monzonite was encountered between 33 feet and 54 feet. From 54 feet to the bottom of the hole at 184.3 feet strongly altered and silcified syenodiorite (?) breccia was encountered.

Sulfides consisting entirely of pyrite were encountered at 92.1 feet. No ore grade copper was found in the hole. Only traces of chalcocite and chalcopyrite were noticed. Unenriched material averaged 0.01 percent copper.

G-9 was drilled as a location hole for the claims MAY 52, 53, 57 and 58.

It was located on an outcrop that was thought to be quartzite, with the objective of determining whether the rock actually was quartzite. The hole collared in quartzite (as determined by thin section and heavy mineral analysis), and remained in that rock to 184 feet except for possible volcanic rock from 84 t0 100 feet, un-identified porphyritic dike rock from 130 feet to 138 feet and small monzonite dikelets at 159 to 162 feet. At 184 feet to the bottom at 216.4 feet an argillic hornfels was encountered. The sulfide contact was at 60 feet. No ore grade copper and only traces of copper minerals were encountered in the hole.

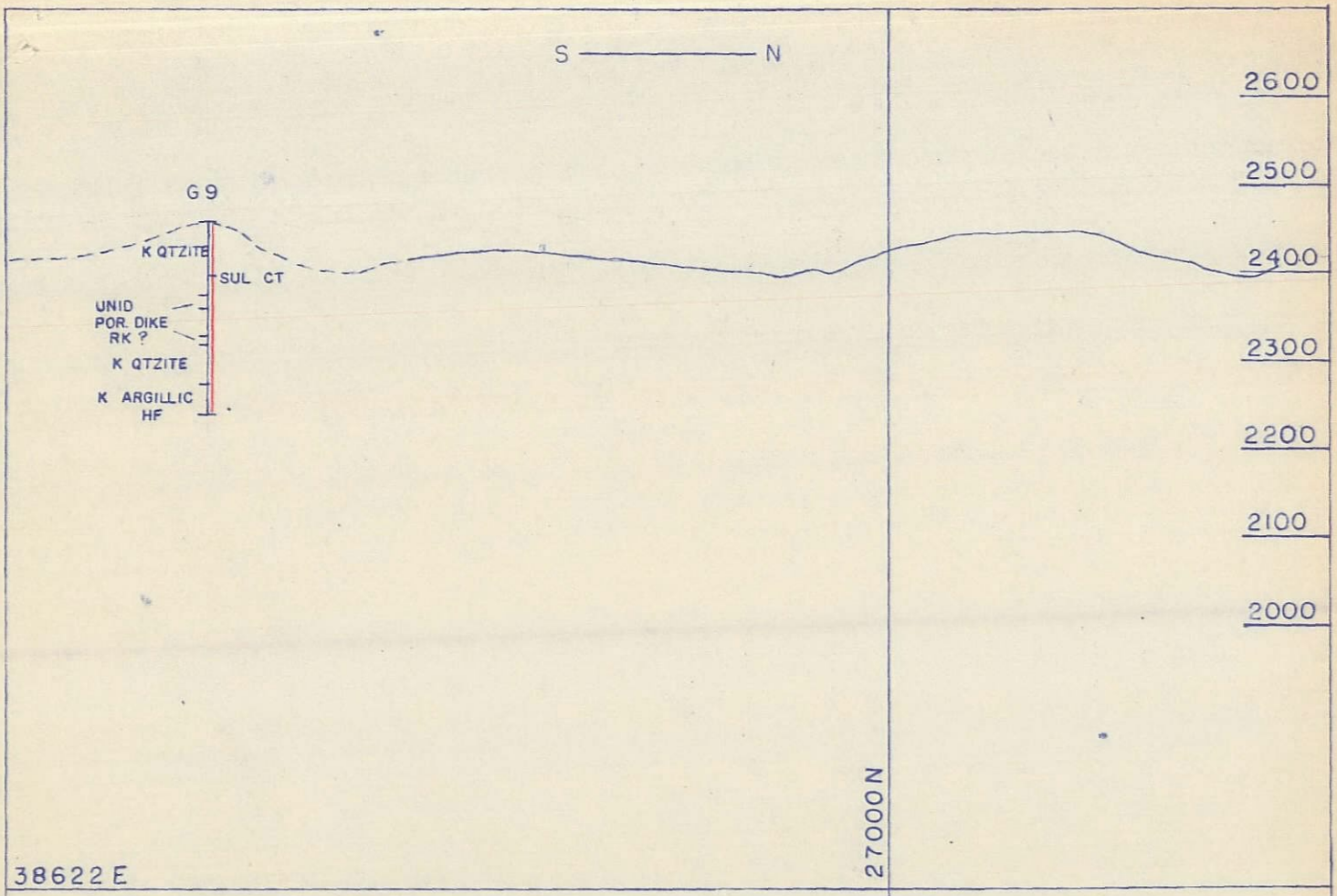
The un-enriched mineralization averaged 0.03 percent copper.

The altered sediments described above have been tentatively correlated to Cretaceous arkose exposed further to the east. Since the Cretaceous beds are known to be underlain by the older Paleozoic rocks which carry high grade primary ore in the El Tiro area, there is a possibility of replacement type mineralization at depth.

A ground magnetometer survey is being run over the area to determine whether there is a magnetic anomoly which is characteristic of repalcement type deposits.

James A. Briscoe
James A. Briscoe
Geologist

JAB:jca



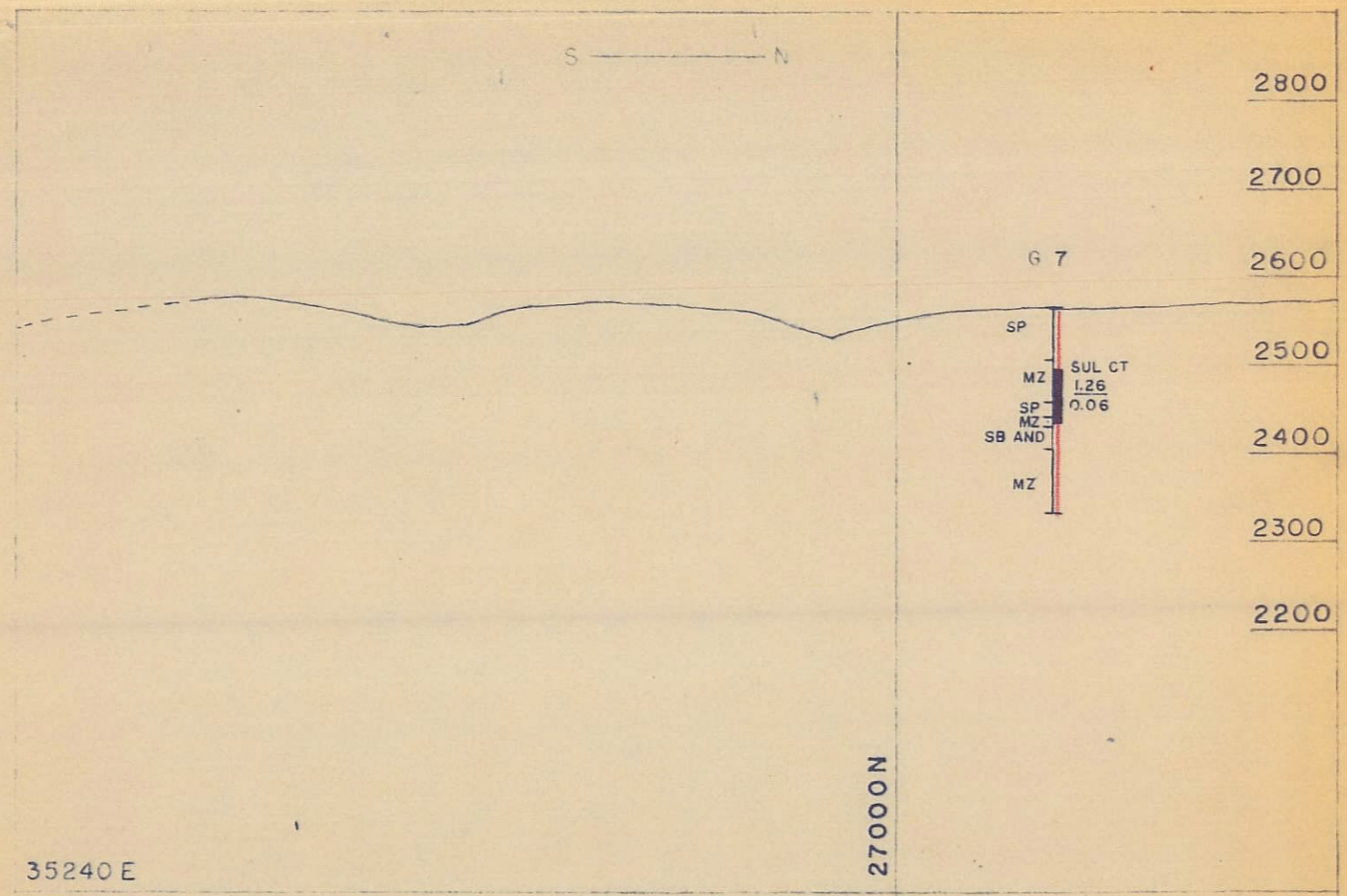
▮ +0.4 % Total Copper
| Advance for month

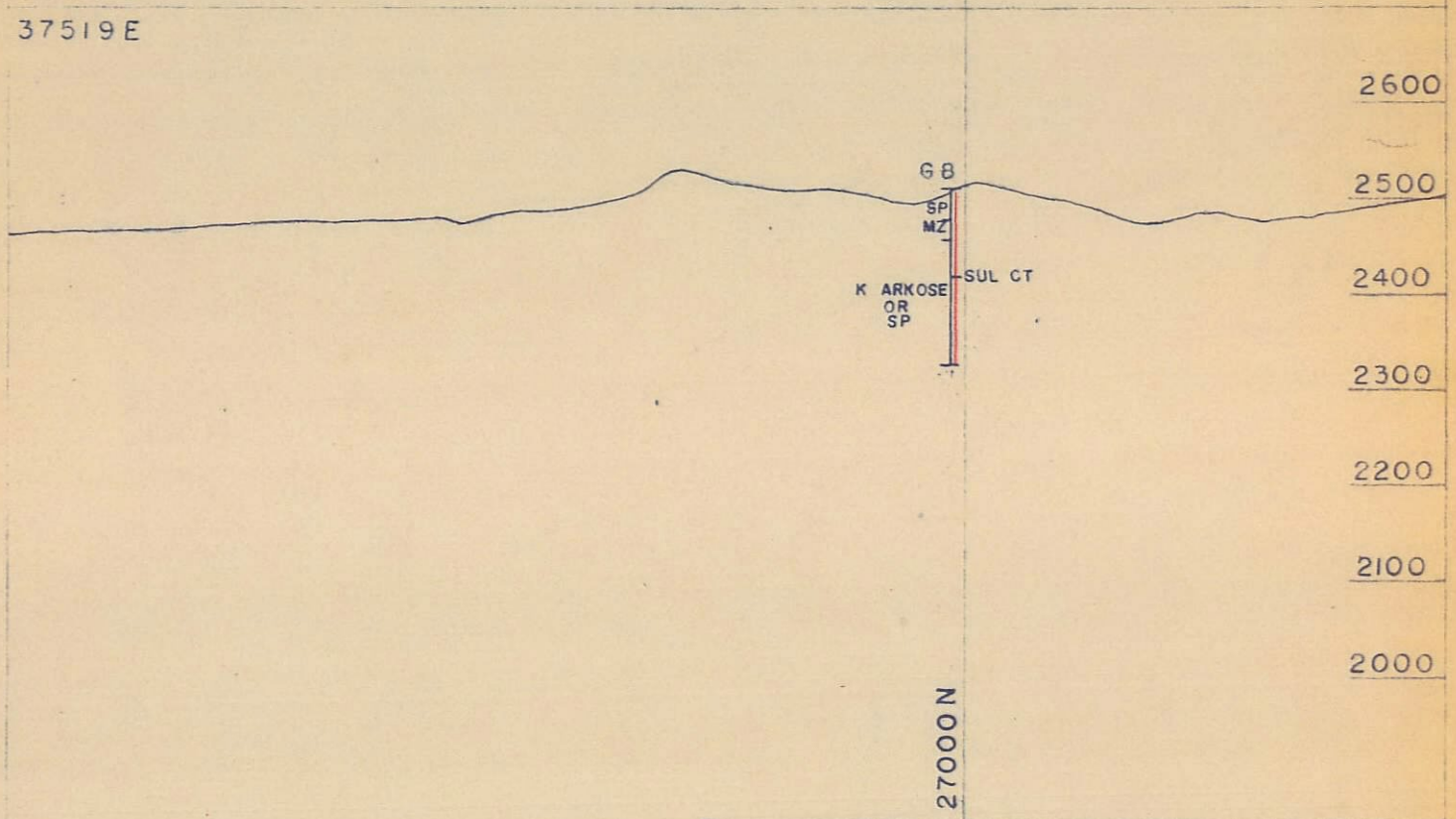
Note : Rock Types Generalized
Cu Assay is Total Cu / Non Sul. Cu

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		DEC. 1966	S-121- A





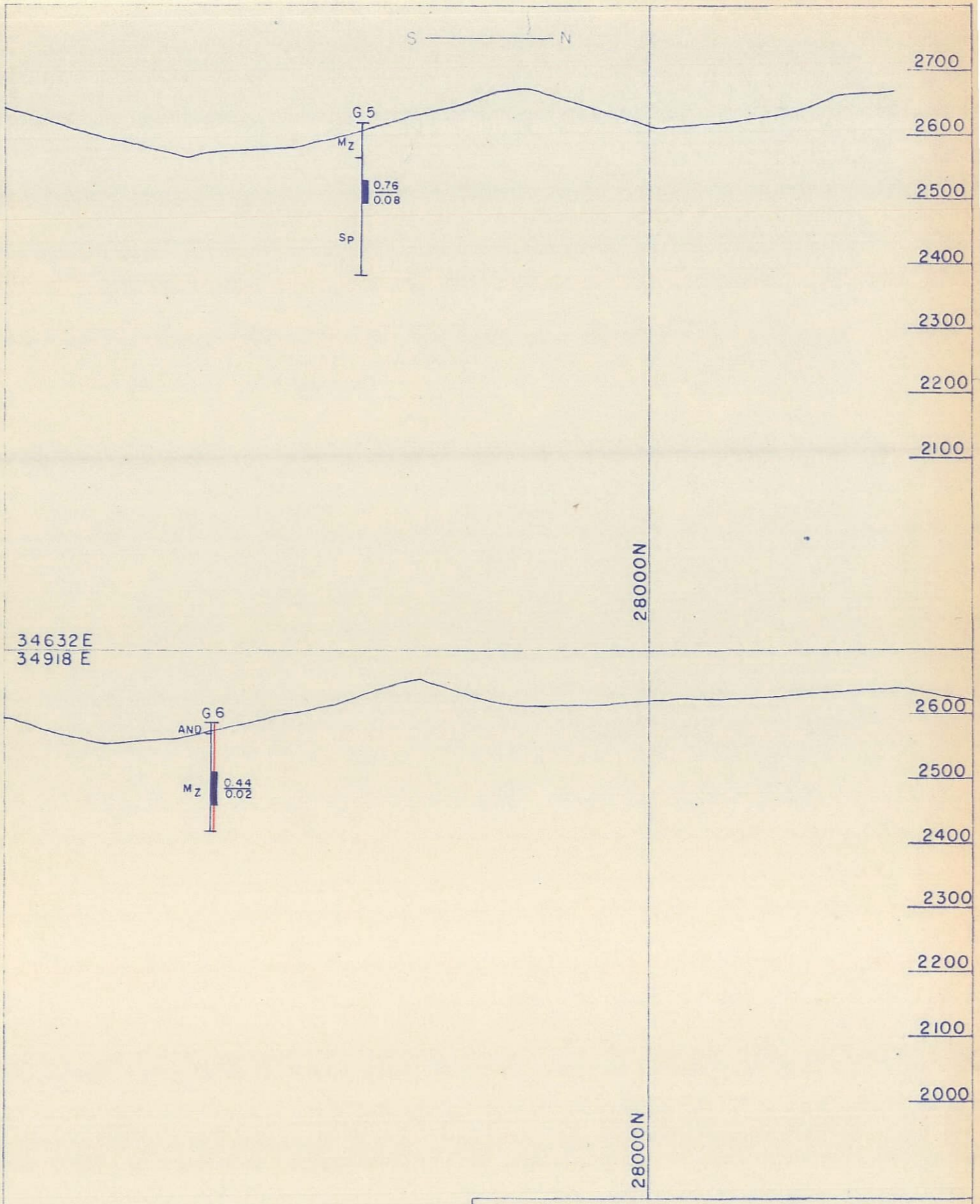
▮ +0.4 % Total Copper
| Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		DEC 1967	S-121- A



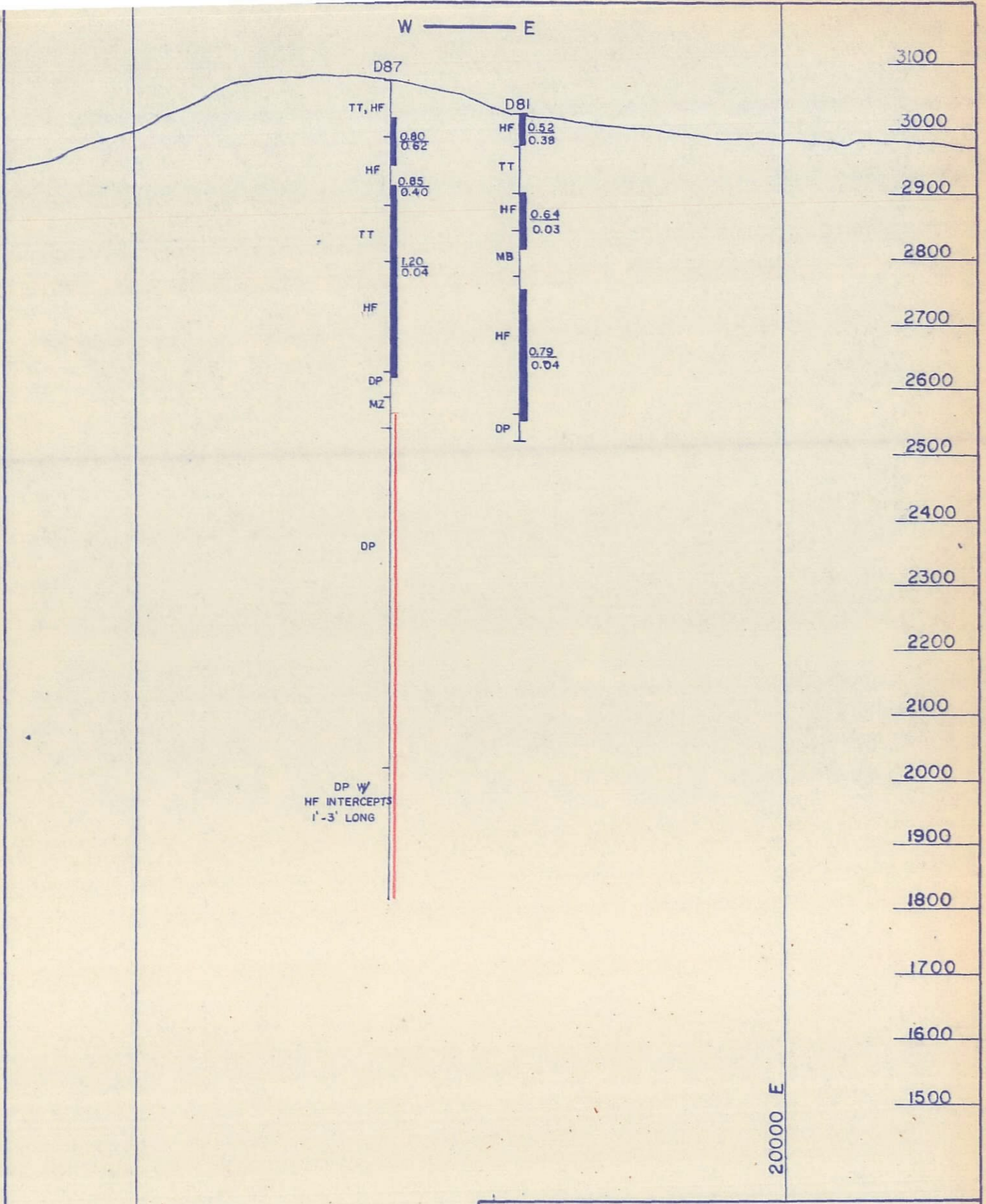
▮ +0.4 % Total Copper
| Advance for month

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

AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT

BATTERY INCLINE AREA
DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		DEC _ 1967	S-121- A



19000 E

36800 N

+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 AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'		DEC - 1966	S-121- A

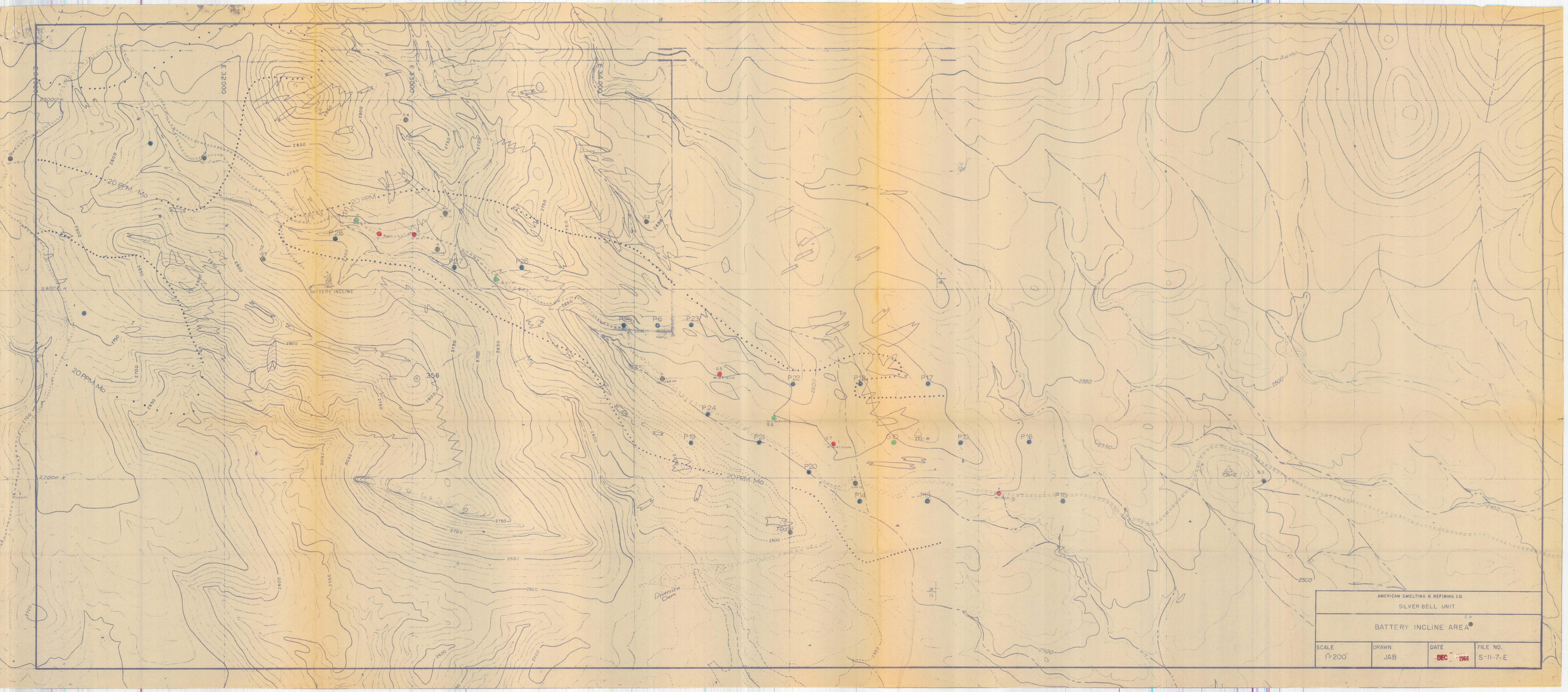
EXPLANATION FOR THE PLAN MAP OF THE BATTERY INCLINE AREA

○ 8-13	Old Churn drill holes drilled by the S. W. Mudd interests in 1909. Assays by KCN.
○ G Series	Recent diamond drill holes.

COPPER CONTENT OF DRILL HOLES

G-10 ● 100'-75' @1.00%	40 or more feet, of 0.40% copper material. Starting at 100 feet there is 75 feet of 1.00% copper material.
●	Less than 40 feet of +0.40% copper material.
●	None to short runs of +0.40% copper material.
P-10 ●	Proposed diamond drill holes.

Outline of capping thought to overlie moderate to strong copper mineralization after J. C. Playter, 1949.


AMERICAN SMELTING & REFINING CO.
SILVER BELL UNIT
BATTERY INCLINE AREA
SCALE
1" = 200'
DRAWN
JAB
DATE
DEC 1966
FILE NO.
S-11-7-E
E 32000
E 33000
E 34000
28000 N
27000 N
20 RPM Mo
BATTERY INCLINE
Diversion Dam
P28
P26
P6
P23
P22
P24
P19
P21
P20
P14
P13
P15
P16
P17
P18
P10
P9
P8
C4
356
2800
2750
2700
2650
2600
2550
2500
2450

J. H. C.

AUG 3 1966

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

July 25, 1966

PERSONAL/CONFIDENTIAL
Mr. K. E. Richard, Chief Geologist
American Smelting and Refining Company
120 Broadway
New York, N. Y. 10005

DEEP DRILLING
NORTH EL TIRO
SILVER BELL UNIT

Dear Sir:

I am enclosing a copy of Mr. Briscoe's memorandum of July 11 together with comments from Messrs. Kinnison, Von Fay, and Watson.

Deep drilling to penetrate the dacite is admittedly a long-shot exploration gamble. Even if mineralized calcareous sediments exist beneath the dacite sill, the depth may preclude profitable exploitation.

The outcrops of calcareous sediments on the flanks of Quartzite Peak, clearly underlie the quartzite which caps the peak. In at least one area, hornfels can be seen in contact with the quartzite. It appears to me that these small outcrops of hornfels are scabs at the base of the quartzite and above the plane dilated by the dacite rather than xenoliths within the dacite.

I belive 2 or 3 deep test holes are justified even in view of the long odds, and the possibility of drilling into the dacite vent.

Very truly yours,

W. E. SANGART

WES/pjc
Enclosures
cc: JHCourtright, with all enclosures
BNWatson, w/ JKK, SVF, & BNW comments only

J. H. C.

AUG 3 1966

W.E.S.

JUL 25 1966

July 22, 1966

Comments

After many years of diamond drilling at Silver Bell, it is becoming increasingly difficult to find good new exploration targets. Mr. Briscoe is "reaching" somewhat, but his thesis is interesting, and certainly exploration would be in poor shape if it were not for "idea" men.

My thoughts on the proposed deep drilling are as follows:

A. If the Quartzite and Jesuit Peak quartzites are truly Cambrian and hopes rest with finding Apache Mescal at depth, I would call the drilling a very poor risk. There is no proof that the Mescal even exists in the Silver Bell area. These quartzites, however, could be Permian and the Paleozoic limestone sequence could underlie the dacite as it apparently does in the Oxide area. This target might be worth shooting for, even in some depth. The well-metamorphosed character of the quartzites defie absolute age identification.

B. My impression of the dacite is that of a sill thinning northeastward and with vents in the "principal structure" zone. Diamond drilling has never penetrated the main body of dacite--even a short distance east of the Union Ridge metasediments--and this lends support to the vent concept, or at least an appreciable thickening of the dacite toward the ore zone. Mr. Briscoe's two proposed holes could well be in a vent area. As the dacite has always shown flow structure in hand specimen and/or thin section, some flow structure analysis might be worthwhile in the area of the two proposed holes.

I would like to see these two deep holes drilled just as and where proposed. A third hole of, say, a 750-foot maximum depth might also be drilled just west of Jesuit Peak close to the Paleozoic sediments to test the theory of east-dipping limestones sliding under the dacite. Possibly this hole should be drilled first.

All holes could be started as regular depth exploration holes and deepened if conditions are found favorable. It should be remembered, however, that the geology of the zone of alteration is very complex and that the odds of finding economic tactite ore minable by underground methods are admittedly long.

Barry N. Watson

BARRY N. WATSON

J. H. C. July 21, 1966

AUG 3 1966

W.E.S.
JUL 25 1966

Comments

With reference to Mr. Briscoe's memo to Mr. Jameson, proposing two deep drill holes at Silver Bell, I have the following comments:

A. Although a great deal of thought has been applied to reach the thesis proposed by Mr. Briscoe, and to put this into a 3-dimensional view with specific possible dimensions, he seems to push conclusions beyond the point of the evidence available. No matter how much more detail might ever be gathered, I think that the basic premise would remain about the same--that there may be mescal deep under the dacite in the subject area. I see little hope for geophysics to alter this interpretation.

B. If the Mescal is deep, it will not be ore, unless mineralized far beyond any expectable Cu grades. I believe these northern claims-- -- if any are to be drilled would be better explored by four or five holes not deeper than 600 feet. Two holes, even to the suggested depths, might not answer the question proposed by Briscoe.

C. The Apache group and Mescal limestone in particular may be thin, and may not be present. Our knowlege of distribution and thickness of Apache members, and of pre-Troy erosion, indicates that the Apache group thins rapidly southeast, both from the Slate Mountains and Catalina Mountains. It is absent in the northern Tucson Mountains. Although a small section is present at Ragged Top, no Mescal is there seen. The Mescal not only thins southward, but being high in the Apache it was in many places eroded in pre-Troy time.

John E. Kinnison

JOHN E. KINNISON

W.E.S.

JUL 25 1966

July 18, 1966

H. C.

AUG 3 1966

Comments

Mr. Briscoe has written a very interesting memorandum and has ovbiously put in a good deal of thought, work, and imagination. He deserves to be commended.

He presents a very interesting thesis. In support of the suggestion that the dacite may be sill-like is the "water" hole that Kalaf put down in the dacite outcrop in the arroyo north of the Atlas Camp and the old railroad grade. This hole, according to Kalaf, penetrated 400 feet of dacite, and then entered sediments. (Shallower than Briscoe's section?) I have seen mineralized sedimentary fragments at the collar of the hole. (±.6 cu, according to Kalaf)

On the other hand, so far, our experience with the dacite indicates it thickens rapidly, dips steeply easterly, or becomes stock-like easterly from the main alaskite-dacite contact.

It is my impression that two claims covering Jesuit hill are foreign claims and I am uncertain about current conflicts and portions of BS&K claims.

The odds against success in this undertaking are high. The dacite "sill" must be thin enough to be penetrated in economic depth. Rocks under it must then bear economic grades of copper, once the sill is penetrated. Any tool whatsoever that would aid in isolating such a blind target would be of use.

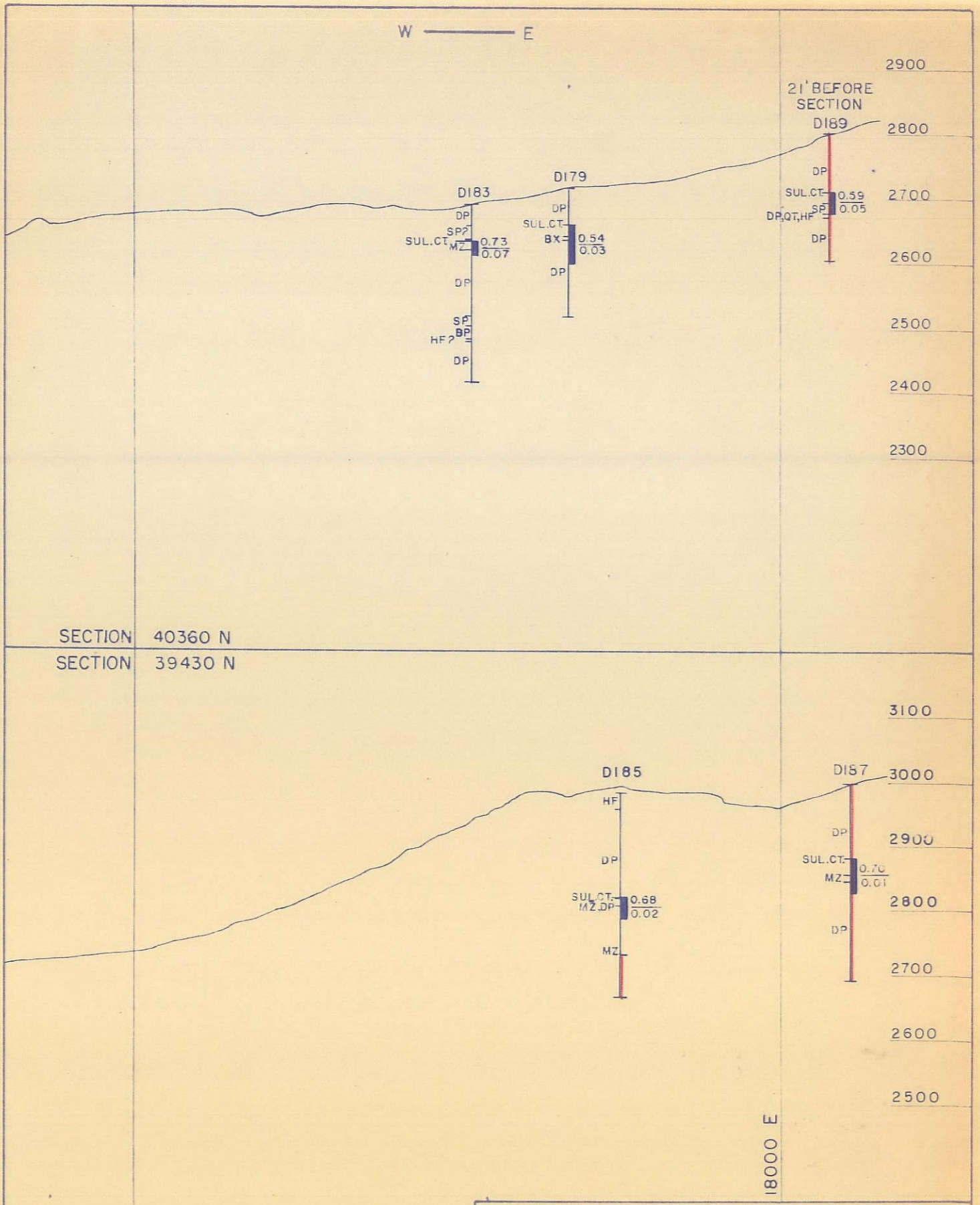
I would personally like to see the geophysicists comment on the utility of magnetics, I. P., gravity, and a geochemical grid on about a 500' spacing as aids to isolating such an exploration target at the depths under consideration.

STEPHEN VON FAY

SVF/pjc

J. E. K.

JUL 20 1966



+0.4 % Total Copper

Advance for month

Note: Rock Types Generalized

Cu Assay is Total Cu/Non Sul. Cu

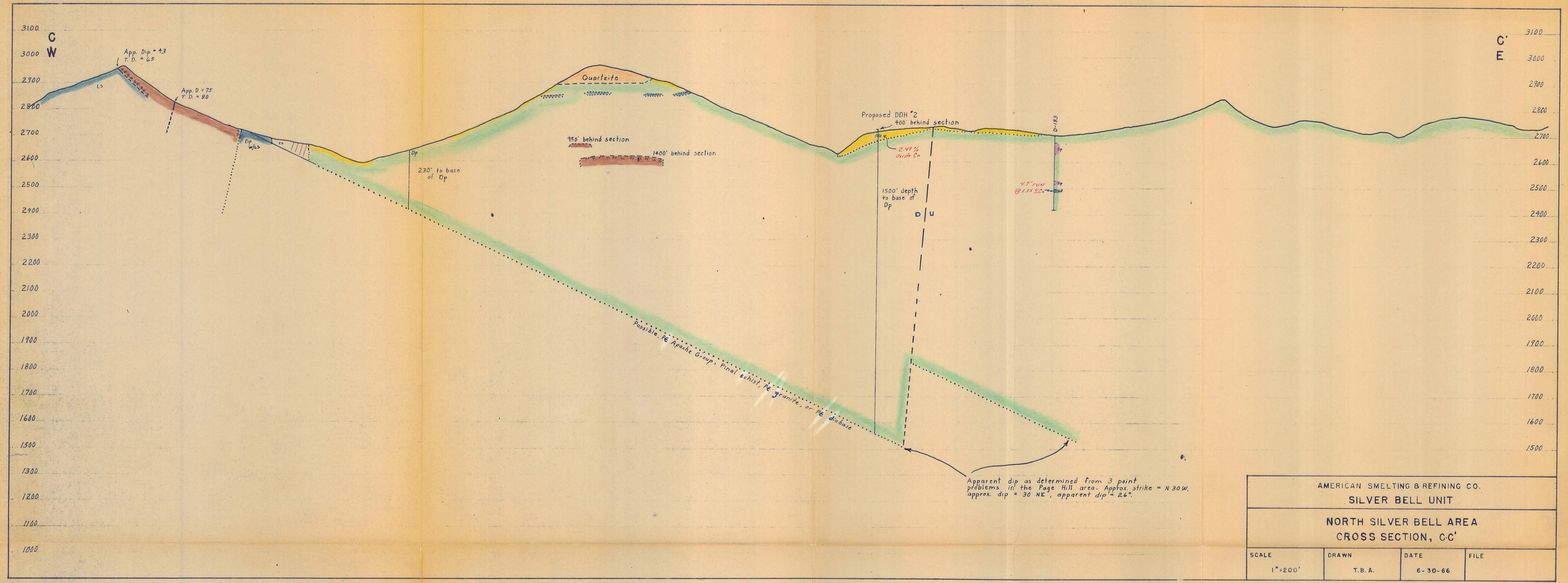
AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

EL TIRO AREA

DRILL HOLE PROJECTIONS

SCALE	DRAWN	DATE	FILE
1" = 200'	CWH	MAY 1966	S-121- A



AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT

NORTH SILVER BELL AREA

CROSS SECTION, C-C'

SCALE	DRAWN	DATE	FILE
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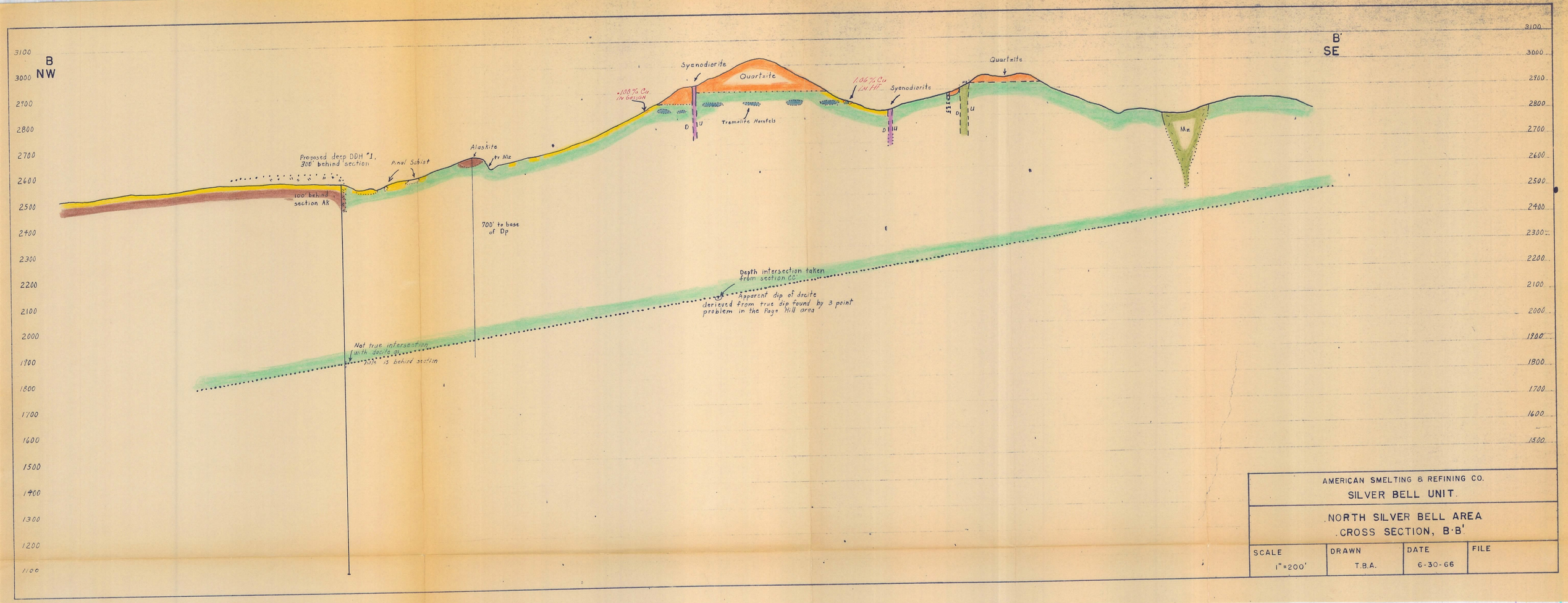

AMERICAN SMELTING & REFINING CO.

SILVER BELL UNIT.

NORTH SILVER BELL AREA

CROSS SECTION, B-B'

SCALE	DRAWN	DATE	FILE
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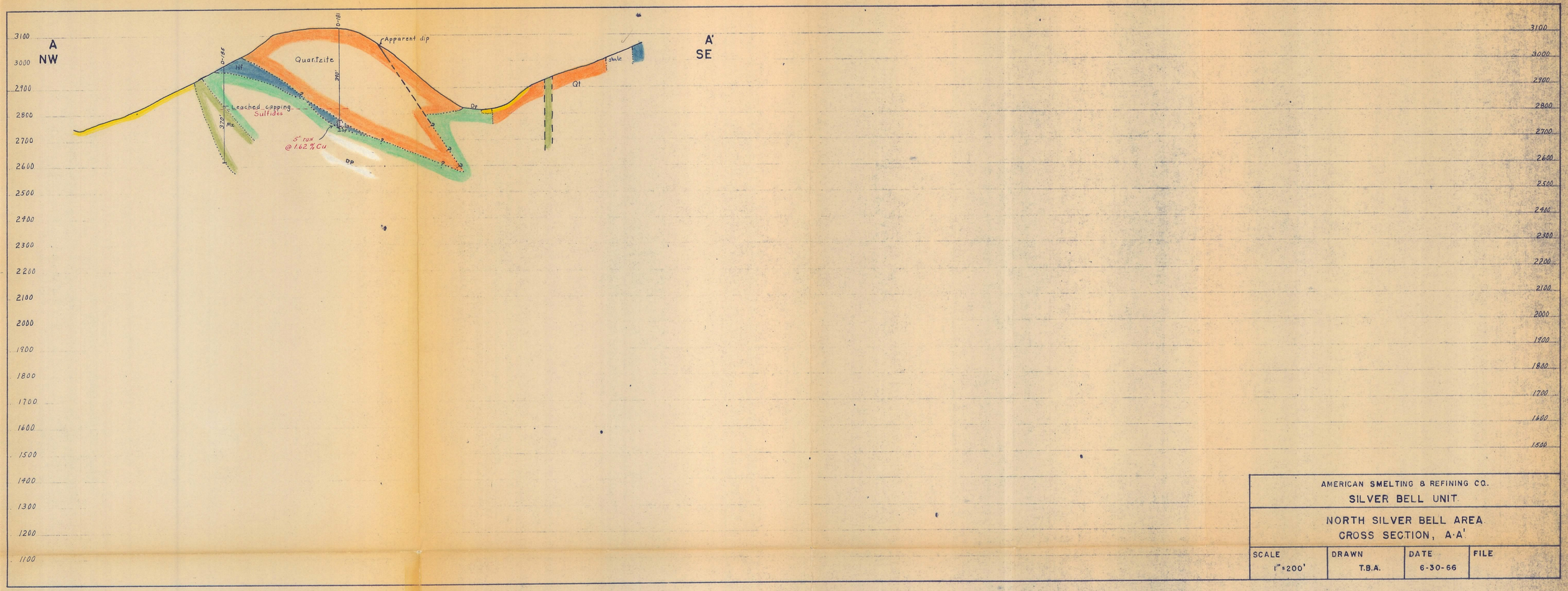

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SILVER BELL UNIT

NORTH SILVER BELL AREA

CROSS SECTION, A-A'

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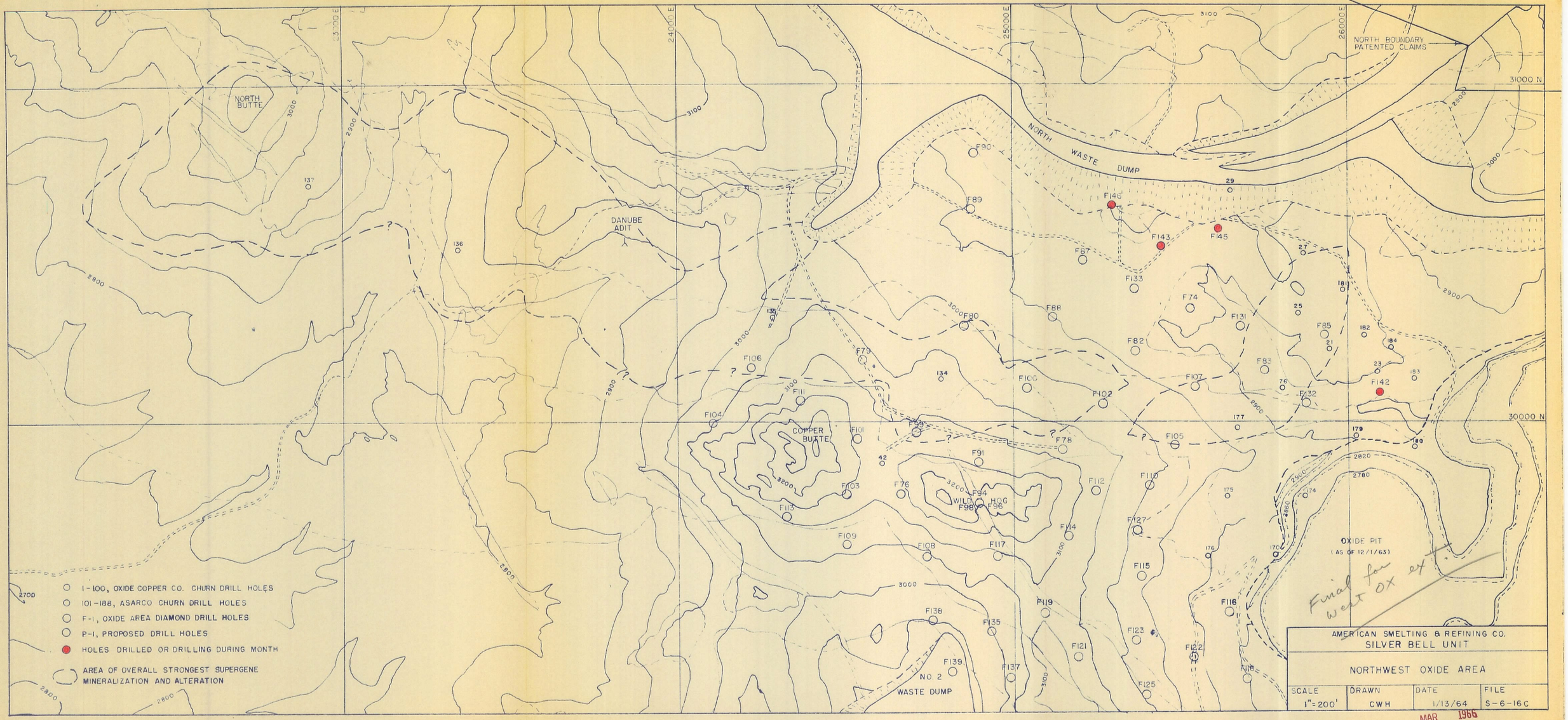
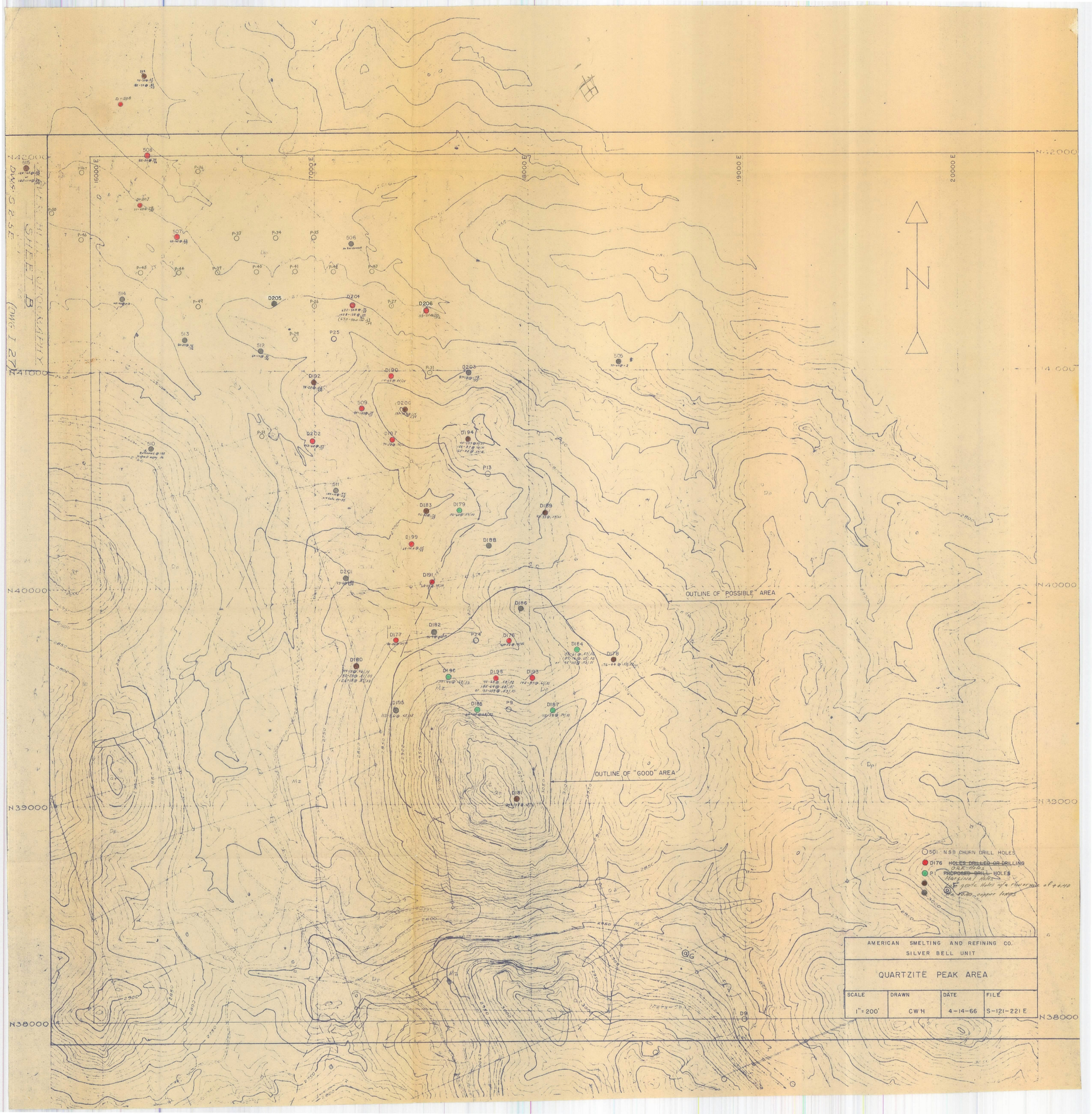

NORTH BUTTE
DANUBE ADIT
COPPER BUTTE
WILD HOG
NO. 2 WASTE DUMP
NORTH WASTE DUMP
NORTH BOUNDARY PATENTED CLAIMS
OXIDE PIT
(AS OF 12/1/63)
23100 E
24000 E
25000 E
26000 E
31000 N
30000 N
1-100, OXIDE COPPER CO. CHURN DRILL HOLES
101-188, ASARCO CHURN DRILL HOLES
F-1, OXIDE AREA DIAMOND DRILL HOLES
P-1, 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 1/13/64
FILE S-6-16C
Final for West OX ex
MAR 1966


SILVER BELL UPPER BELT TOPOGRAPHY
DWG. S 2-5E SHEET B
(DWG. I 27)
16000 E
17000 E
18000 E
19000 E
20000 E
N42000
N41000
N40000
N39000
N38000
OUTLINE OF "POSSIBLE" AREA
OUTLINE OF "GOOD" AREA
501 NSB CHURN DRILL HOLES
D176 ~~HOLES DRILLED OR DRILLING~~ ORE HOLES
P1 ~~PROPOSED DRILL~~ HOLES Marginal Holes
Low grade Holes w/a rev. or mix of +0.40
Ave +0.90 copper leases
AMERICAN SMELTING AND REFINING CO.
SILVER BELL UNIT
QUARTZITE PEAK AREA
SCALE 1" = 200'
DRAWN CWH
DATE 4-14-66
FILE S-121-221 E