THE HECLA MINING COMPANY OF CANADA LIMITED

SUMMARY REPORT ON THE MOSQUITO CREEK GOLD PROJECT

AT WELLS, BRITISH COLUMBIA

Period February 28 to August 29, 1986

Cariboo Mining District

NTS (93H/4)

Latitude: 53°06'North Longitude: 121°36'West

SUMMARY AND CONCLUSIONS

The Hecla Mining Company of Canada Ltd. optioned the Mosquito Creek Gold Property (Figure I.) from the Mosquito Creek Gold Mining Company Ltd. on February 17, 1986. During the period February 28 to August 29, Hecla carried out an underground exploration program, consisting of 321 meters of development and 2,263 meters of percussion drilling, at a total cost of approximately 810 thousand dollars Canadian.

The objective of the program was discovery of auriferous pyrite "replacement" ore, within the "Main band" limestone unit and outside the previously-developed mine area, at a rate of about 30 tonnes per meter of development. Rate of discovery of ore during the last 6 full years of operation of the Aurum Mine was 17 tonnes per meter of development and 0.6 tonnes per meter of drilling. Greater than 80 percent of ore milled at an average rate of 121 tonnes/day during this period was "replacement" ore with an average mill head grade of 20.2 grams gold/tonne.

About 80 percent of the work completed was carried out in the 2-182 and 4-201W drifts. The 4-201 W drift explored limestone, thought to be the "Main band", in the footwall of the "West Fault". The 2-182 drifts explored the "Main band" in the vicinity of the Mosquito Creek drainage.

A "replacement" ore body on the structural hanging wall side of the 2A stope was encountered in the 2-182 W drift.

Due to disappointing results for the project, Hecla terminated its option to purchase agreement for the Mosquito Creek Gold Property, without exercising its option, on August 19, 1986.

Principal conclusions of geological interest include:

°Zones of 1 ppm or more gold were encountered within a unit of green, chloritic and siliceous sandstone (or tuff). The extent, nature and economic significance of this new variety of mineralization is poorly understood but warrants further evaluation.

°On the basis of silver to gold ratios of "replacement" ore, both the "Rip" and "Kutney" zones are inferred to occur within the "Main band" limestone unit.

°Lode gold mineralization at Wells is part of an epigenetic hydrothermal system thought to be Late Jurassic-Early Cretaceous in age and related to the Willow Fault system.

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INTRODUCTION

The Mosquito Creek Gold Property (Figure I) is located on Island Mountain at Wells, 90 kilometres by paved road from the town of Quesnel, British Columbia, Canada. The property consists of the Mosquito Creek and Island Mountain claim groups, covering a total of 46 contiguous crown granted mineral claims and fractions, owned 100 percent by The Mosquito Creek Gold Mining Company Limited. Peregrine Petroleum Corporation owns 39 percent of the Mosquito Creek Gold Mining Co. Limited.

The property includes the Island Mountain Mine, which during the period 1933 to 1967 produced approximately 37 million grams of gold at an average recovered grade of 14 grams gold per tonne. The Mosquito Creek Gold Mine has produced 73,940 tonnes containing about 1,046,600 grams of gold, since 1980. Early placer production from drainages on the Mosquito Creek Gold Property apparently ranked among the richest in the Cariboo Gold Belt.

The Mosquito Creek Gold Mine is accessed by a 157 meter deep shaft and consists of a total of 5,683 meters of lateral development on four levels. The collar of the shaft is at an elevation of 1,393 meters and is located about 4 kilometres by dirt road from Wells.

The Hecla Mining Company of Canada Ltd. signed an option to purchase agreement with the Mosquito Creek Gold Mining Company Ltd. on February 17, 1986 and terminated the agreement, without exercising its option, August 19, 1986. This report outlines the format and presents results of the underground exploration program carried out by Hecla.

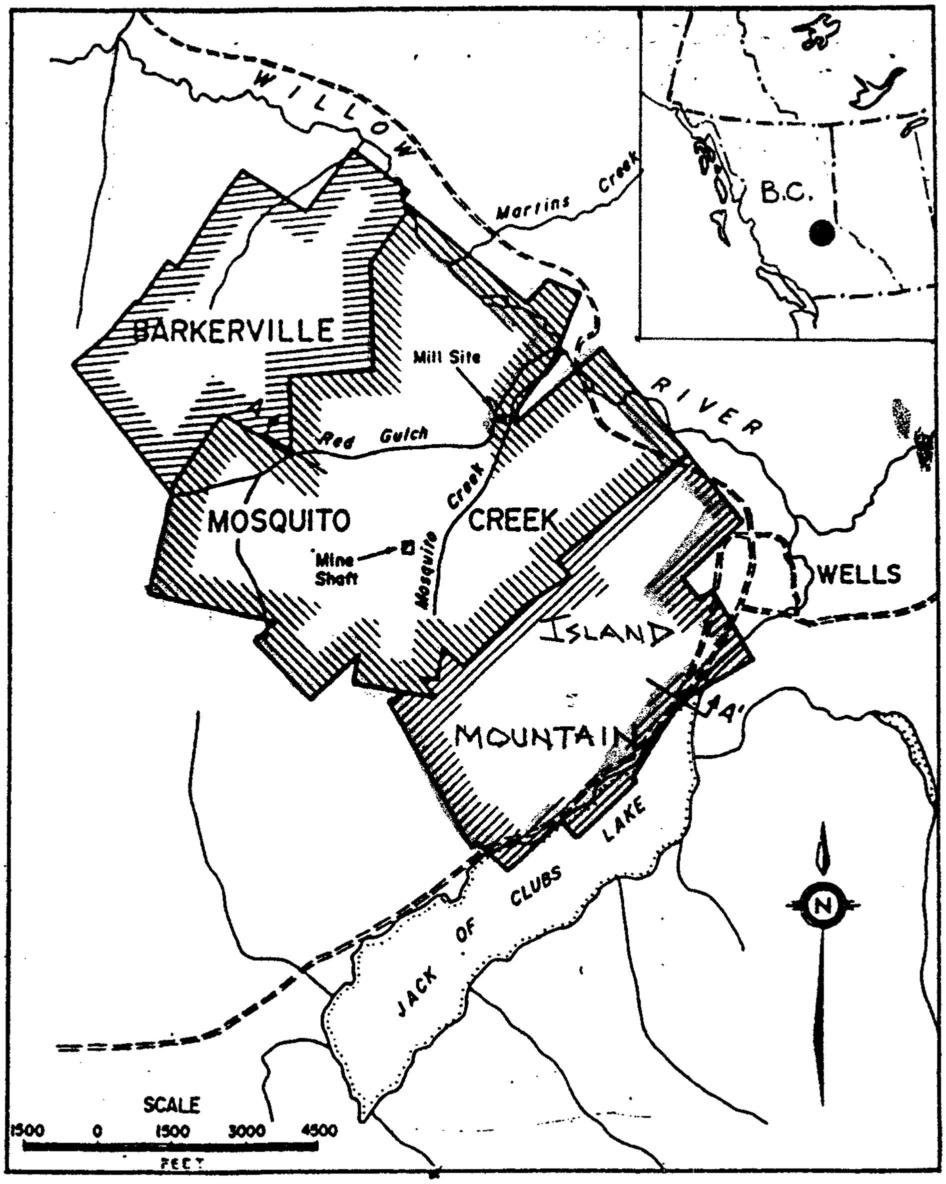


Figure 1. PROPERTY AND LOCATION MAP

OBJECTIVES OF PROGRAM

Discovery of auriferous pyrite "replacement" ore, within the "Main band" limestone unit and beyond existing workings, at a rate of approximately 30 tonnes per lineal meter of drifting and 3.9 tonnes per meter of drilling was the principal objective of the underground exploration program.

Supplementary objectives included:

1. Confirming and/or testing "replacement" ore targets, within the previously-developed mine area, by long-hole percussion drilling. Targets included ore-grade intercepts in drill holes, spontaneous potential geophysical anomalies in workings and down-plunge extensions of ore bodies with recorded production.

2. Finding the extension of the "Main band" limestone unit in the footwall of the "West Fault" structure. The "Main band" limestone unit and contained "replacement" ore at the west end of the mine are offset by movement along the "West Fault". The direction and magnitude of this displacement is unknown.

3. Defining the stratigraphy of the Mosquito Creek Gold Mine. Correlation between stratigraphy as previously mapped in the Island Mountain and Mosquito Creek Gold mines is poor. Position and nature of the "Baker-Rainbow" contact, historically important in locating "replacement" ore within the 339 limestone, is poorly understood.

OPERATING PROCEDURE

The normal procedure for exploring the "Main band" limestone unit included:

1. Drifting in the structural footwall of the limestone at a rate of one 1.7 meter round per day. In the absence of alternative headings, interference between drifting and drilling limited rate of development.

2. Monitoring the background gold content of the limestone by routine gold geochemical analyses of muck samples collected at a rate of 3 to 6 samples per round. One assay-ton samples were analysed, using the combined fire assay-atomic absorption technique, by TerraMin Research Labs Ltd. of Calgary, Alberta. A detection limit of 1 ppb gold is reported for this method.

3. Percussion drill testing the hanging wall of the limestone unit and adjacent strata. The 2-182 drifts were drill tested at intervals of 7.5 meters using Gardner-Denver FL83 jackleg drills. Gardner-Denver D93 percussion drills were used at stations with 15 meter separation in the 4-201 W drift. Several short cross cuts were required as drill stations in this drift to allow continuous drifting. Good penetration was achieved using button bits. Chip samples were routinely collected over intervals of four feet.

4. Logging and sampling of percussion drill holes. Chip samples were logged and samples containing abundant calcite and/or significant amounts of pyrite were submitted for gold analysis. However, a better understanding of extraneous mineralization may have been possible if all percussion samples had been run. Sample preparation was completed on site.

5. Spontaneous Potential Geophysical surveying. Long wire drift-scan surveying was carried out in new workings and all test holes were probed using the "uphole" method developed by W. Don Sutherland. Since the S.P. signature for "replacement" ore is unique, the S.P. method provided a good indication of proximity to the continuity of "replacement" ore.

6. Follow-up test holing and development.

WORK COMPLETED

MAIN BAND LIMESTONE UNIT

A total of 321 meters of development and 2263 meters of percussion drilling were completed during the underground exploration program (Table 1). About 80% of this was carried out in the 2-182 and 4-201 drifts driven east and west, respectively, in the footwall of the "Main band" limestone unit. Supplementary work, including most of the sampling for gold geochemistry and about 50% of spontaneous potential surveying, was conducted in these drift headings.

The 4-201 W drift explored a unit of limestone, thought to be the "Main band", in the footwall of the "West Fault" structure. The 2-182 drifts explored the "Main band" in the vicinity of the Mosquito Creek drainage. Drilling completed within the 4-201 and 2-182 drifts average 9.6 and 4.0 meters per lineal meter of drift, respectively.

SUPPLEMENTARY TARGETS

Supplementary targets (Table 2) within the previously developed mine area were pursued during the early part of the program. As a significant amount of time was lost due to delays in obtaining percussion drills in good working order, this component of the program accounted for only about 25 percent of percussion drilling completed.

Targets within 9.1 meters of workings were tested using Gardner-Denver FL83 jackleg drills. Adequate testing of targets within about 30 meters of workings was achieved in upholes using Gardner-Denver D93 percussion drills. A Gardner-Denver PR55 percussion drill, obtained near the end of the program, proved efficient in drilling down-holes.

Some of the better targets adjacent to the first level were not pursued due to absence of drills with downhole capacity and changing priorities during the course of the program.

GEOLOGICAL INVESTIGATIONS

A geological program initiated in November, 1985 was continued, as time permitted, throughout the period Hecla remained on the property. The principal objective of this program was to define the stratigraphy of the Mosquito Creek Gold Mine and correlate it with that in the Island Mountain Mine.

With exception of drifts driven in 1984 by the Hudson Bay Mining and Smelting Co. Limited, preliminary mapping of workings near the four levels has been completed at a scale of one to 240. About 115 diamond drill holes have been relogged to obtain additional stratigraphic information beyond limits of mine workings. Supplementary work included a limited (26 sample) multi-element geochemistry study of "replacement" ore and a contract petrographic study (Koehler, 1986) of 14 representative rock specimens. Much of this information is presented in the appendicies.

Table 1. Summary of Work Completed on The Mosquito Creek Gold Project, Period February 28, to August 19, 1986.

Item	Location		
	4-201 W	2-182	Other
Development (meters)	124	141	56
DRILLING(No. holes/meters)			
Jack Leg	7(59)	70(541)	7(52)
Percussion	54(1131)	-	23(480)
TOTALS	61(1190)	70(541)	30(532)
GOLD GEOCHEMISTRY (No. Samples)			
Muck	233	318	91
Jackleg drill	36	240	37
Percussion drill	495	-	260
Multielement	-	-	26
TOTAL	764	558	414
S.P. PROBING (meters)	1073	513	3137

Table 2. Supplementary Drill Targets Within the Previously-Developed Mine Area, The Mosquito Creek Gold Project, Period February 28, to August 19, 1986.

1. Diamond drill hole intercept of 38.4 grams gold/tonne over 6 cm. in U83-25 and sludge sample of 4.11 grams gold/tonne over 7.3 meters in U83-25. These are in proximity to the siltstone marker, between the 4-201 and 4-208 drifts, and may be Aurum-type targets.

2. Longhole intercept of 10.3 grams gold/tonne over 2.7 meters in T219, drilled from the 4-208 W drift in to the "Main band" adjacent to the "West Fault".

3. Downward continuation of 1E stopes.

4. Downward continuation of the 1-236 stope. Diamond drill hole intercepts in this area include 6.17 grams gold/tonne over 1.8 meters in U83-13 (at-18 degrees), 93 grams gold/tonne over 2.0 meters in U83-12 (at -39 degrees) and 22.3 grams gold/tonne over 3.0 meters of sludge in U83-21 (at - 14 degrees).

5. Diamond drill hole intercepts of 10.3 grams gold/tonne over 0.7 meters in U83-14 (at +44 degrees), 20.9 grams/tonne over 0.5 meters in U83-15 (at +68 degrees) and others above the 1-207 SW drift.

6. Replacement-type S.P. anomaly in the 313 degrees / +67 degrees longhole near station 44-51 and in proximity to narrow bands of "replacement" mineralisation exposed in the 1-207 NW drift.

DISCUSSION OF RESULTS

MAIN BAND

2-182 Drifts

Five thin (less than 15 cm.) bands of "replacement" ore (Table 3) were encountered in the 2-182 drifts. One of these in the 2-182 W drift was a lead to an ore lens, with drift dimensions, exposed in the 2-190 W crosscut (Figure 2). Results of follow-up longholing suggest the 2-190 ore lens contains indicated geological reserves (Appendix 1) of about 60 tonnes per meter, grading about 15.4 grams gold/tonne gold, over a minimum plunge length of 45 meters. Some visible gold in quartz-carbonate veinlets was observed in the 2-190 W crosscut.

Follow-up S.P. drift-scanning and drilling in the vicinity of another thin band of "replacement" ore in the 2-182 N drift led to discovery of a tabular lens exposed in the 2-182 decline. Geochemistry and assay results indicate material grading about 100 grams gold/tonne across 15 cm. The mineralization occurs over a minimum plunge length of 20 meters and appears to be stronger in the down plunge direction. This ore lens may be a folded and/or faulted segment of "replacement" ore exposed in the back of the 2-182 drift near the 2-180 stope.

Exploration failed to locate extensions of two thin bands of replacement mineralisation exposed in the 2-182 E drift.

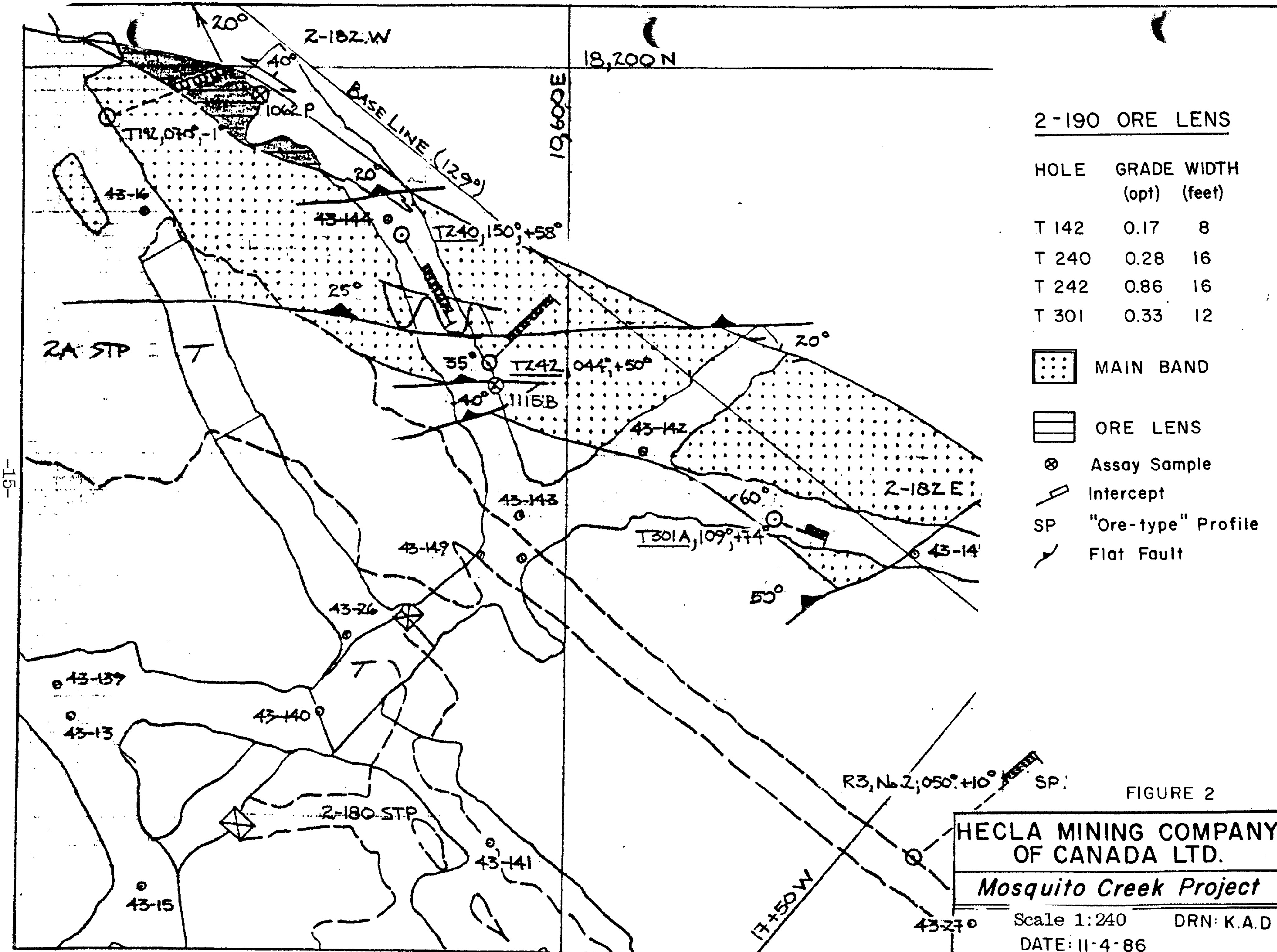

2-182 W
18,200 N
10,600 E
20°
40°
BASE LINE (129°)
1062 P
T192, 070°, -1
20°
43-16
43-144
T240, 150°, +58°
25°
2A STP
T
35°
T242, 044°, +50°
40°
1115 B
43-142
20°
2-182 E
60°
T301A, 109°, +74°
43-143
43-149
43-14
55°
43-26
T
43-139
43-13
43-140
2-180 STP
43-141
43-15
R3, No 2; 050°, +10°
SP
17+50 W
43-27
2-190 ORE LENS
HOLE
GRADE (opt)
WIDTH (feet)
T 142 0.17 8
T 240 0.28 16
T 242 0.86 16
T 301 0.33 12
MAIN BAND
ORE LENS
Assay Sample
Intercept
SP "Ore-type" Profile
Flat Fault
HECLA MINING COMPANY OF CANADA LTD.
Mosquito Creek Project
Scale 1:240
DRN: K.A.D
DATE: 11-4-86

FIGURE 2

Table 3. "Replacement" Bands in the 2-182 Drifts, The Mosquito Creek Gold Project, Period February 28, to August 19, 1986.

Location	Sample No.	Apparent Width (cm.)	Grade (gpt Au)
2-182N (43-140+23'N)	(lead to ore band in 2-182 decline)		
2-182 W (43-143+21'W)	1115 B	23	20.8
2-182 W (43-144)	(lead to 2-190 ore body)		
2-182 E (43-146+82.5'E)	1063 P	8	24.7
2-182 E (43-147+53.5'E)	1054 P	15	39.8
2-182 E 43-148+20'E)	(not sampled; probably strike continuation of above)		

4-208 W Drift

Exploration of the "Main band" close to the hanging wall of the "West Fault" confirmed mineralisation first encountered in test hole T218 and later exposed in the 4-241 raise. Several zones of heavily disseminated pyrite and associated thin, high-grade "replacement" bands were exposed in the raise.

A continuous chip sample across 1.2 meters in a 3 meter wide zone of mineralisation near the top of the raise returned values in the range 8.2 to 12.0 grams gold/tonne. This zone may be mineable. Additional mineralisation in the up-dip direction is indicated by S.P. profiles for longholes UP86-13 and 14.

4-201 W Drift

Results of exploration of limestone in the 4-201 W drift, driven in the footwall of the "West fault" were very disappointing. An average of 510 ppb gold over 6 meters in percussion hole up 86-51 and 421 ppb over 6 meters in hole UP86-76 were the best results obtained.

The "West Fault" zone is highly anomalous in gold (average of 24 muck samples was 1267 ppb gold) and contained some replacement-like mineralisation (sample 1114 B, 4.77 grams gold/tonne over 9 cm.) near the footwall. The dark grey and graphitic structural footwall of the limestone unit in the 4-201 W drift is a broad S.P. anomaly of extreme magnitude. The hanging wall side of the unit ranges in colour from dark grey to white.

ADDITIONAL MINERALIZATION

4-201 W Drift

Zones with anomalous gold in association with pyritic quartz-carbonate stringers occur within a unit of green, siliceous and chloritic sandstone (or tuff) in the structural hanging wall of the limestone unit. For example, average grades of 2.27 gpt over 6.1 meters and 2.23 gpt gold over 9.75 meters were obtained in percussion holes UP 86-6 and 52, respectively. Elsewhere in the unit, values of 1 gpt or more gold are found in association with several percent or less modal pyrite, but the association is not consistent.

The geometry and extent of this type of mineralisation is poorly understood and warrants further evaluation. As the "green unit" is widespread within the mine, potential for discovery of a new type of ore body is significant. A comprehensive assay study of the "green unit" would be most appropriate.

3-209 Crosscut

Drilling to locate the "Main band" limestone unit on the 3rd level encountered 3.1 grams gold per tonne over 26 meters, including 6.7 grams gold per tonne over 4.9 meters (12-17 meters), in percussion hole UP86-3. The higher grade intercept, subsequently exposed in the 3-209 crosscut, was related to irregular zones of massive coarse grained pyrite within a thick quartz-dolomite vein striking at an acute angle to the azimuth of the drill hole. The average grade of 15 muck samples, representing mineralisation exposed in the last 9.5 meters of the crosscut, was 0.48 grams gold/tonne. The best intercept obtained in the vicinity of 3-209 crosscut was 22.8 grams gold per tonne over 1.2 meters (interval 8.5-9.7 meters) in UP86-18.

The last 2.4 meters of UP86-3 returned 3.1 grams gold/tonne in limestone. Although subsequent drilling located a thin limestone unit about 3 meters in width, no additional mineralisation was found.

OTHER INTERCEPTS

Other interesting values encountered during the program were related to pyrite in quartz veins. Miscellaneous intercepts of note are presented in Table 4.

Table 4. Miscellaneous Intercepts, The Mosquito Creek Gold Project, Period February 28 to August 19,1986

Hole	Interval (meters)	Grade (gpt Au)	Location
UP86-1	30.5-32.9	4.08	3-193 NW drift (42-59+3 E)
UP86-11	23.1-29.3	1.92	4-201 W drift (41-68+2 N)
UP86-21	4.9-6.1	6.24	3-209 x-cut (42-129+49 N)
UP86-66	23.1-29.3	2.47	3-190 N x-cut (42-2+50 N)
T251	0-1.2	8.67	2-182 E drift (43-146+21 W)

GEOLOGICAL WORK

Results of geological investigations pertinent to this summary are presented below. Some of these are subject to interpretation and/or are preliminary in nature.

- The upper levels of the Mosquito Creek Gold Mine are located in the hinge zone of an overturned antiformal structure. A condensed stratigraphic section correlatable to that in the Island Mountain mine is exposed below a zone of flat faults subparallel in strike to the "Main band" limestone unit. The mine sequence mapped in the Island Mountain Mine is a folded stratigraphic section.

- The "West Fault" is probably a normal fault. Apparent right lateral displacement of 119 meters in plan view is indicated by offset of map units on the 3rd Level. On the basis of stratigraphic evidence, the limestone unit explored in the 4-201 drift is thought to be the "Main band" as repeated on the southwest limb of a second anticlinal fold structure.

- The silver: gold ratio of "replacement" mineralisation in the "Main band" is enhanced by a factor of 2 to 3 relative to that in the "Aurum"band. In the absence of good stratigraphic control, the silver: gold ratio of "replacement" ore may be good way of identifying the "Aurum band"/"339" limestone unit.

- Limestone in both the "Kutney zone" and Rip zone" are similiar in appearance to the "Main band" limestone unit. As no samples from the "Kutney zone" were run for silver, some resampling of core is warranted. Silver: gold ratios for three samples of rich "replacement" ore in the "Rip zone" fall in the range of 0.41 to 0.49 and are typical of those in the "Main band" limestone unit.

- Transition from core to periphery of an epigenetic hydrothermal systems is indicated by changes in grade, habit and host rocks of gold mineralisation at Wells. Auriferous quartz lodes in the "Rainbow Formation" give way to pyrite "replacement" bodies in limestone units of the "Baker Formation" and in turn to auriferous zones of pyrite-calcite-quartz stringers within unit of green, chloritic and siliceous sandstone (or tuff). Potassium/argon radiometric dating suggest a Late-Jurrasic - Early Cretaceous age for the mineralisation. A genetic relationship between gold mineralisation and the fault system initiated by right lateral strike-slip movement on the Willow Fault is inferred.

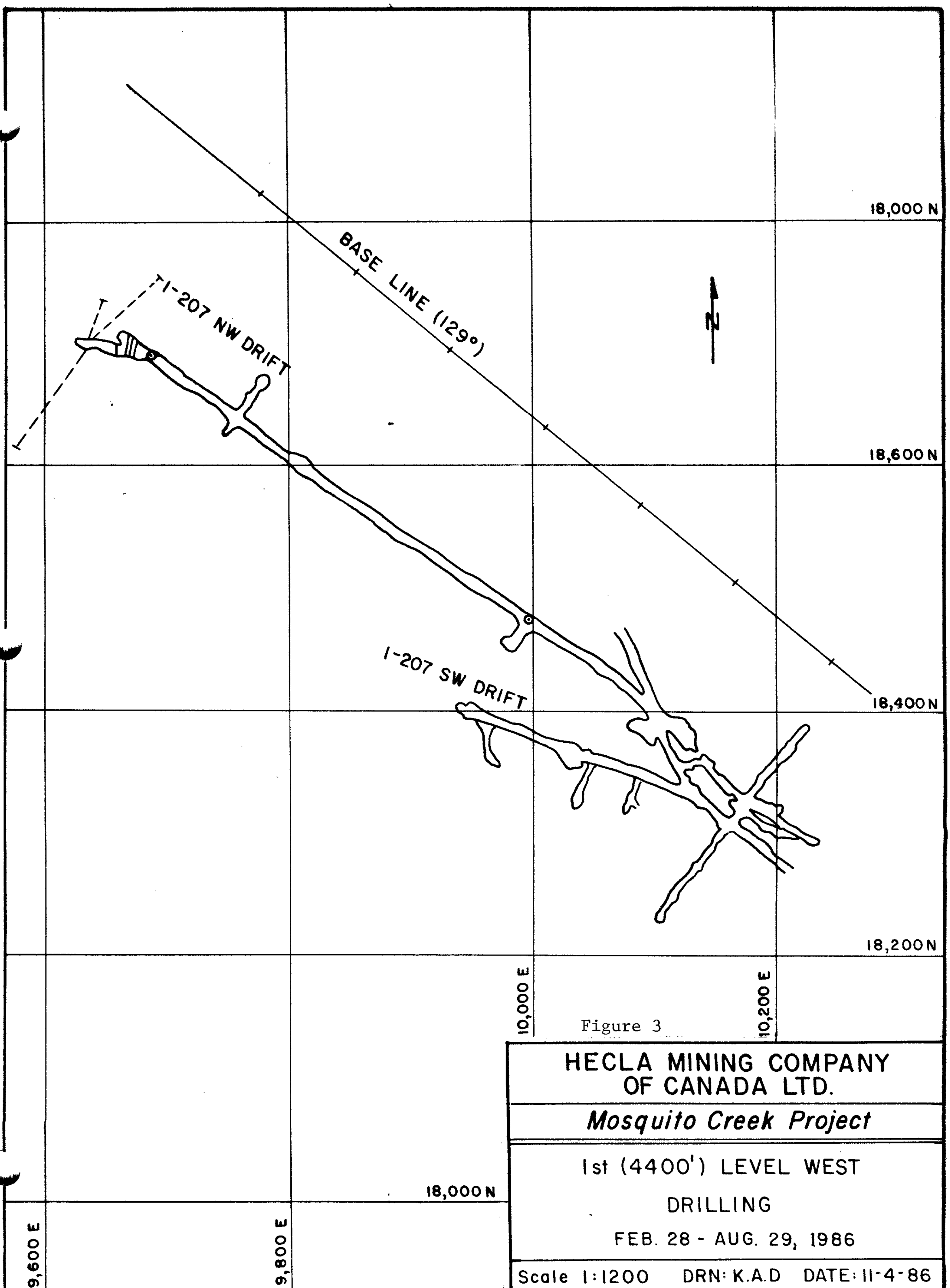

BASE LINE (129°)
1-207 NW DRIFT
1-207 SW DRIFT
N
18,000 N
18,600 N
18,400 N
18,200 N
18,000 N
9,600 E
9,800 E
10,000 E
10,200 E
HECLA MINING COMPANY
OF CANADA LTD.
Mosquito Creek Project
1st (4400') LEVEL WEST
DRILLING
FEB. 28 - AUG. 29, 1986
Scale 1:1200 DRN: K.A.D DATE: 11-4-86

Figure 3

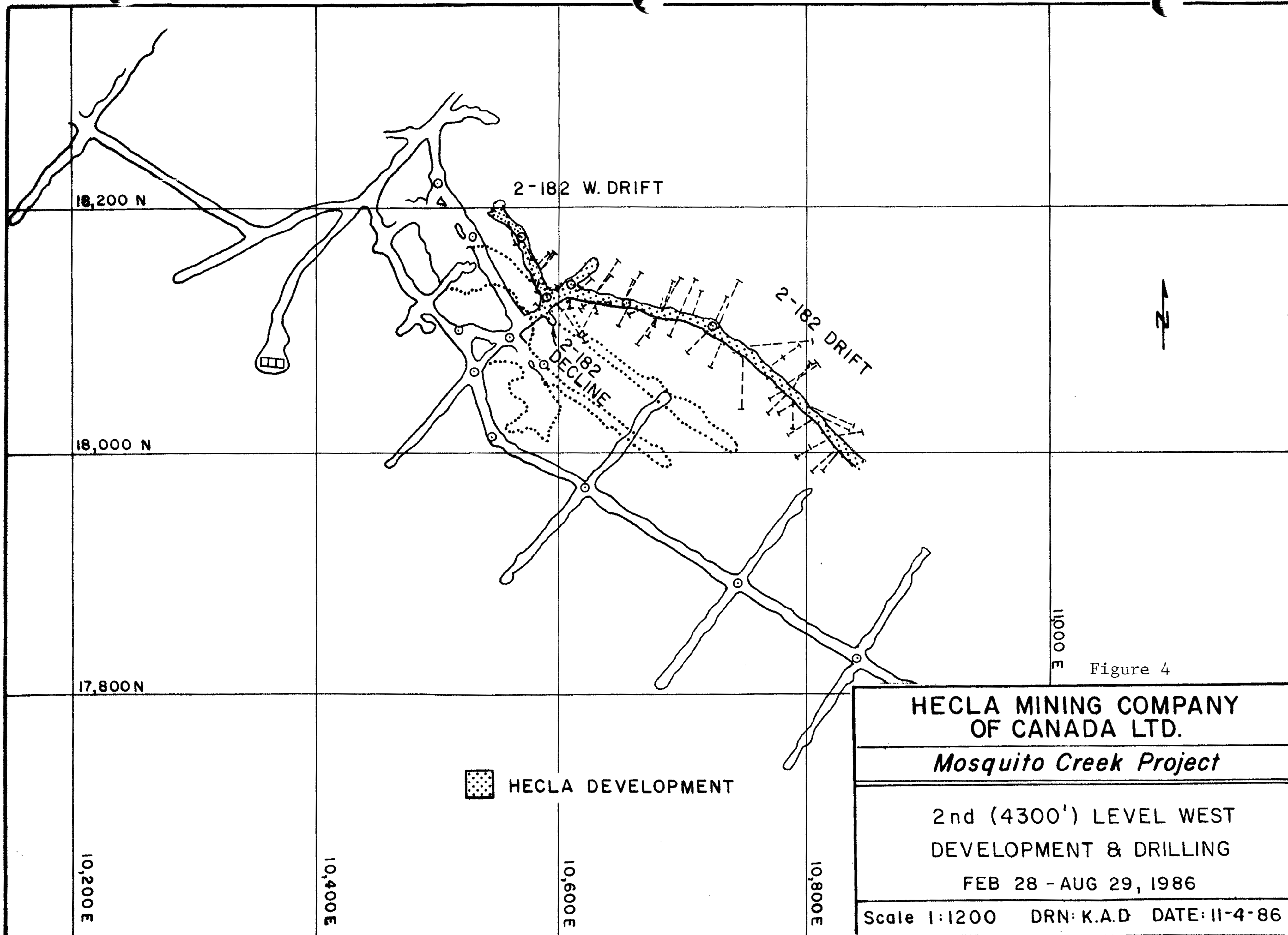


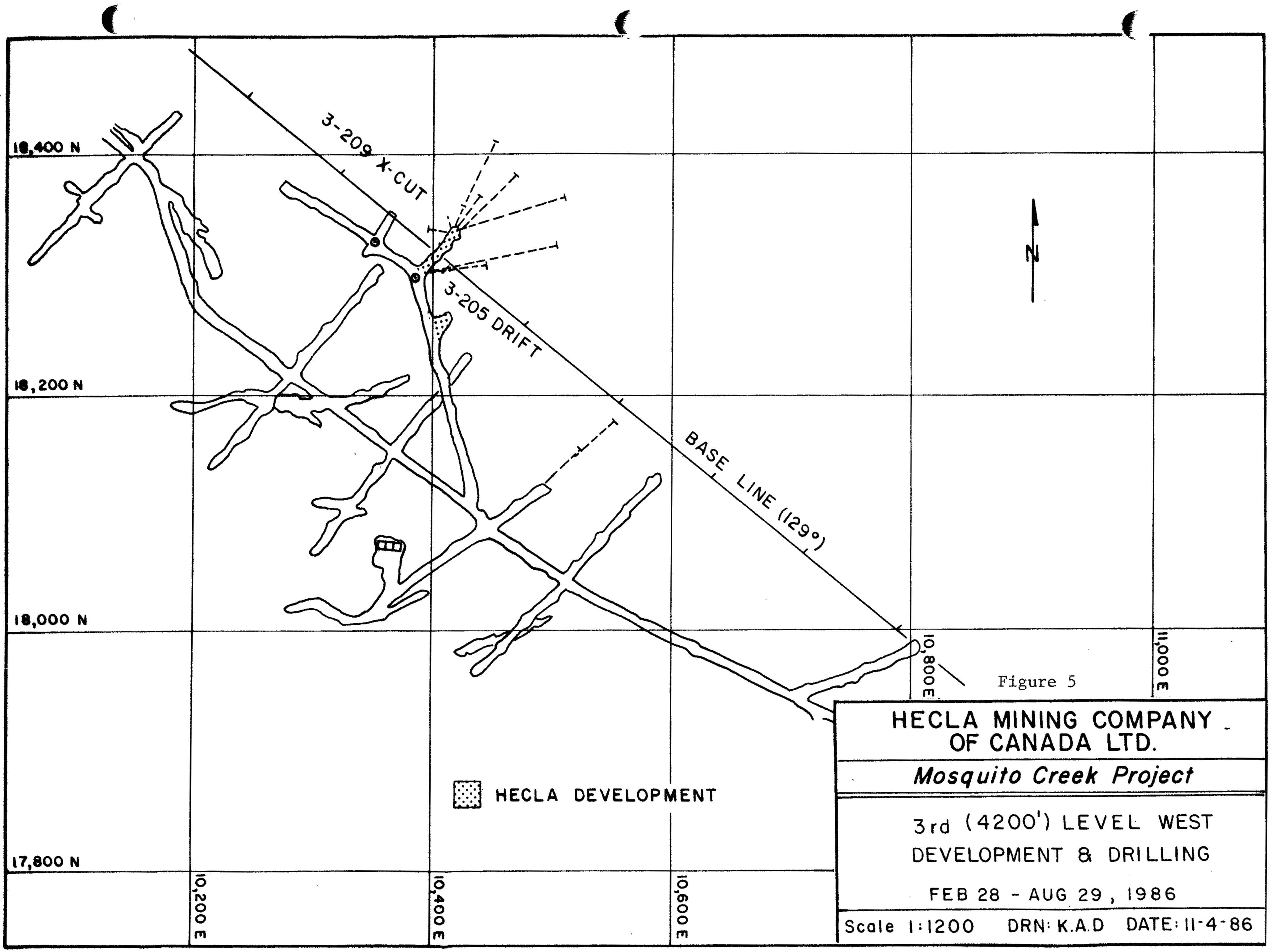
Figure 4

HECLA MINING COMPANY OF CANADA LTD.

Mosquito Creek Project

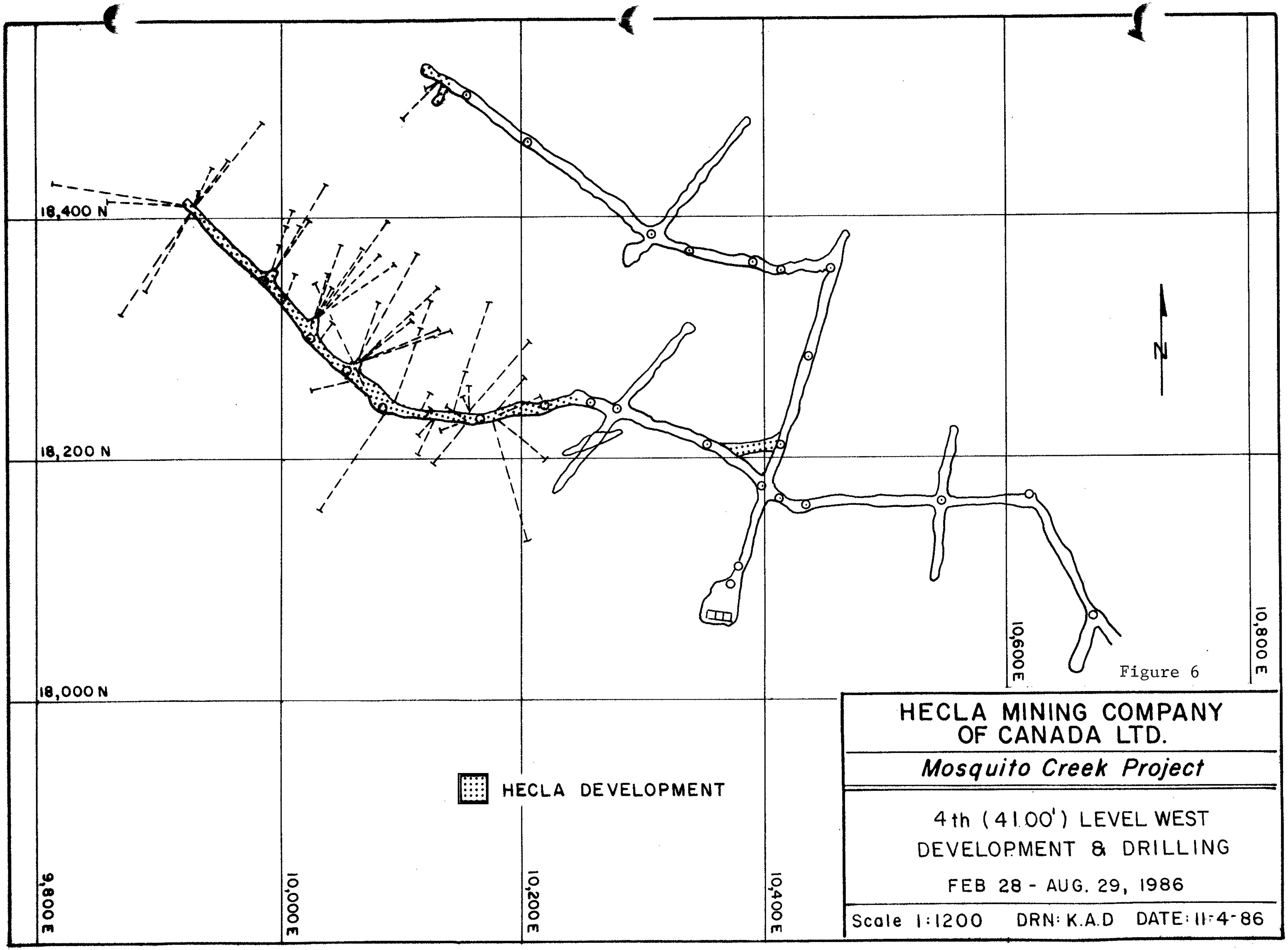
2nd (4300') LEVEL WEST
DEVELOPMENT & DRILLING
FEB 28 - AUG 29, 1986

Scale 1:1200 DRN: K.A.D DATE: 11-4-86



18,400 N
18,200 N
18,000 N
17,800 N
10,200 E
10,400 E
10,600 E
10,800 E
11,000 E
3-209 X-CUT
3-205 DRIFT
BASE LINE (129°)
N
HECLA DEVELOPMENT
HECLA MINING COMPANY OF CANADA LTD.
Mosquito Creek Project
3rd (4200') LEVEL WEST
DEVELOPMENT & DRILLING
FEB 28 - AUG 29, 1986
Scale 1:1200 DRN: K.A.D DATE: 11-4-86

Figure 5


18,400 N
18,200 N
18,000 N
9,800 E
10,000 E
10,200 E
10,400 E
10,600 E
10,800 E
N
HECLA DEVELOPMENT
HECLA MINING COMPANY
OF CANADA LTD.
Mosquito Creek Project
4th (4100') LEVEL WEST
DEVELOPMENT & DRILLING
FEB 28 - AUG. 29, 1986
Scale 1:1200
DRN: K.A.D
DATE: 11-4-86
Figure 6

<u>CERTIFICATION</u>

I, Richard D. Hall of 7 East 22nd Avenue Vancouver, British Columbia, declare as follows:

1. That I graduated with a BSc. in Geological Engineering from Queen's University in 1972.

2. That I graduated with a PhD. in Geology from The University of Western Ontario in 1980.

3. That I have practiced my profession on a seasonal basis and/or continuous basis since 1972 and 1980 respectively.

4. That I was employed as mine geologist by the Hecla Mining Company of Canada Limited at Wells during the period March 3 to September 19, 1986.

Dated at Wells, British Columbia, this 19th day of September, 1986.

Richard D. Hall
R.D. Hall

To accompany a report on
The Mosquito Creek Gold Project
at Wells, B.C.
dated September 19, 1986.

DRAFT

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APPENDIX I

INTERCEPTS AND ORE ZONES

Listing Drill Hole Intercepts, The Mosquito Creek Gold Project
Period February 28 to August 19, 1986

Test Hole	Interval (meters)	Grade (ppb Au)	Sample Numbers
T232	0-1.2	2,620	1274 B
T240	3.7-9.8	8,460	1688B-1692B
T241	0-7.3	9,728	1693B-1699B
T242	2.4-7.3	29,320	1701B-1705B
T251	0-1.2	8,680	1908B
T277	1.2-2.4	660	1255P
T290	6.1-12.2	2,755	1404P-1408P
T291	9.8-11.0	6,170/9,360	1415P
T293	0-4.9	1,145	1419P-1422P
T294	2.4-3.7	35,000	14215P
T301A	6.1-9.8	11,213	1613P,1619P,1620P
Percussion Hole			
UP86-1	17.1-35.4	1,989	1358B-1370B
UP86-3	7.3-35.4	2,852	1377B-1394B
UP86-6	22.0-28.0	2,780	1658B-1662B
UP86-9	24.4-25.6	1,210	1814B
UP86-10	17.1-22.0	981	1830B-1835B
UP86-11	23.2-29.3	1,911	1846B-1850B
UP86-13	6.1-8.5	5,370	1868B-1869B
	18.3-19.5	4,660	1878B
UP86-14	2.4-7.3	912	1883B-1884B

Test Hole	Interval (meters)	Grade (ppb Au)	Sample Numbers
UP86-18	2.4-11.0	6,728	1943B-1948B
UP86-19	1.2-2.4	2,960	1951B
UP86-34	3.7-6.1	3,764	1969B-1970B
UP86-34	25.6-29.3	763	1198P-1200P
UP86-35	22.0-23.2	1,740	1176P
UP86-45	8.5-9.8	1,100	1784P
UP86-47	6.1-7.3	1,128	1800P
UP86-49	8.5-9.8	1,756	1272P
UP86-51	7.3-15.9	469	1290P-1296P
UP86-52	8.5-18.3	2,253	1305P-1312P
UP86-55	6.1-8.5	465	1352P-1353P
UP86-66	9.8-11.0	2,460	1627P
UP86-71	12.2-14.6	767	1300,1301P
UP86-76	13.4-14.6	1,024	1452P
UP86-78	4.9-13.4	466	1560P-1564P
UP86-80	17.1-18.3	906	1612P

2-190 W ORE LENS

Drill Hole Intercepts

Test Hole	Interval (meters)	Apparent Width (meters)	Grade Au (gpt)
T192	3.7-6.1*	2.4	14.1,5.7
T240	3.7-8.5	4.9	9.6
including	(3.7-6.1)	(2.4)	(12.6)
T242	2.4-7.3*	4.9	29.3
T301A	6.1-9.8*	3.7	11.2
		Weighted Average	18.5
T241	0-7.3	7.3	1.61
including	(0-1.2)	(1.2)	(3.5)
43-24+87.5'E	6.4-8.2*	1.8	S.P. anomaly

Channel Sample	Width (meters)	Grade Au (gpt)
1062P	1.8	14.0

Muck Samples (2-190 W Crosscut round)

1468G		8.2
1469G		11.4
1470G		10.0
1475G		14.6
	Average muck	11.0

*hole ended in ore

RESERVE CALCULATION 2-190 W ORE LENS

Plunge Length		45*	meters
Diameter		4.9	meters
Volume (cylinder)		850	$meters^3$
Approximate total Specific Gravity	0.01[25(5.0)+75(2.9)]	3.43	
Tonnage Factor	1000/(1000x3.43)	.29	M^3/tonne
Approximate Grade		15	g/t
Indicated Geological Reserves		2900	tonnes

*Note: Plunge length is a minimum length constrained by intercepts and/or exposure of ore in workings. An "ore-type" S.P. anomaly in test hole No.2, Ring No.3 (station 43-24+87.5'E) suggests minimum plunge length of 61 meters.

2-182 Decline

Drill Hole Intercepts

Test Hole	Interval	Apparent Width (meters)	Grade Au (g/t)
T290	6.1-12.2	6.1	2.7
including	(8.5- 9.8)	(1.2)	(4.2)
T291	9.8-11.0*	1.2	9.4/6.2[1]
T293	1.2-3.7	2.4	1.6
T294	2.4-3.7	1.2	35.0/60.3[1]
T295	0-4.9	4.9	4.56
including	(1.2-2.4)	(1.2)	11.6/14.1[1]
DDH U82-70	24.38-24.57	0.18	124.8
Grab Samples			
1590P		.08	96.8/104.1[1]
1726P		.15	73.6/42.2[1]
Muck Samples			
5097G			2.23

*Test hole ended in ore

[1]Assayed by SGS Supervision Services Inc., General Testing Laboratories Division of Vancouver.

4-241 RAISE

Drill Hole Intercepts

Percussion Hole	Interval	Apparent Width (meters)	Grade Au (gpt)
UP86-13	6.1-8.5	2.4	5.4
including	(6.1-7.3)	(1.2)	(9.2)
	18.3-19.5	1.2	4.7
UP86-14	2.4-7.3	4.9	0.93
including	(3.7-4.9)	(1.2)	1.2

Chip Sample

1427P		4	8.1,11.9[1]

Grab Sample

1450P			68.0,83.7[1]

[1] Assayed by SGS Supervision Services Inc., General Testing Laboratories Division of Vancouver.

APPENDIX II

DRIFTING AND DRILLING

Development Completed on The Mosquito Creek Gold Project, Period February 28 to August 19, 1986.

Development	Drifting (meters)	Other (meters)
2-182 N Drift	26.7	
2-182 W Drift	28.0	
2-182 E Drift	81.7	
2-182 Decline		4.9
3-205 Drift	5.3	
3-209 Drift	17.6	
4-208 W Drift	8.8	
4-201 W Drift	123.8	
4-241 Raise		7.6
Other		16.5
TOTALS	291.9	29.0

Percussion Drilling Completed on The Mosquito Creek Gold Project

Period February 28 to August 19, 1986

Drilling	Level				TOTALS
No. Holes (meters)	1st	2nd	3rd	4th	
GD-FL83 Jackleg	2(16)	70(541)	5(36)	7(59)	84(652)
GD-D93 Percussion	7(142)	---	13(290)	46(910)	66(1342)
GD-D55 Percussion	---	---	---	11(270)	11(270)
TOTALS	9(158)	70(541)	18(326)	64(1239)	161(2264)

For Appendix II

Summary of Percussion Holes, Period February 28 to August 19, 1986

HOLE #	LEVEL	LOCATION	BEARING	DIP	METERS	SECTION
UP 86-1	3-193	42-59+3E	078°	+7°	35.4	20+00-22+00
UP 86-2	3-193	42-59+3E	080°	+41°	22.0	20+00-22+00
UP 86-3	3-193	42-59+2W	045°	+9°	35.4	20+00-22+00
UP 86-4	3-193	42-59+2W	044°	+45°	23.2	20+00-22+00
UP 86-5	3-193	42-59+0	215°	+74°	15.8	20+00-22+00
UP 86-6	4(201)	41-67+24½S	018°	+13°	30.5	22+00-24+00
UP 86-7	4(201)	41-67+24½S	018°	+33°	13.4	22+00-24+00
UP 86-8	4(201)	41-68+24½W	334°	+9°	30.5	22+00-24+00
UP 86-9	4(201)	41-68+8N	018°	+14°	28.0	22+00-24+00
UP 86-10	4-201	42-68+7½N	018°	+33°	24.1	22+00-24+00
UP 86-11	4(201)	41-68+2N	213°	+9°	30.5	22+00-24+00
UP 86-12	4(201)	41-67+45½S	017°	+76°	7.3	22+00-24+00
UP 86-13	4(208)	41-63+15W	224°	+53°	22.0	24+00-26+00
UP 86-14	4(208)	41-63+15W	226°	+73°	14.6	24+00-26+00
UP 86-15	4-208	41-63+17W	315°	+69°	12.2	24+00-26+00
UP 86-16	3-209xcut	42-129+35N	073°	+9°	28.7	20+00-22+00
UP 86-17	3-209xcut	42-129+56N	025°	+8°	24.4	20+00-22+00
UP 86-18	3-209xcut	42-129+51.5W	331°	+72°	14.6	20+00-22+00
UP 86-19	3-209xcut	42-129+53N	022°	+66°	17.1	20+00-22+00
UP 86-20	3-209xcut	42-129+55N	034°	+53°	18.3	20+00-22+00
UP 86-21	3-209xcut	42-129+49N	279°	+63°	15.9	20+00-22+00
UP 86-22	1-207 Drift	44-20+44W	034°	+45°	23.2	22+00-24+00
UP 86-23	1-207 Drift	44-20+44W	033°	+62°	23.2	22+00-24+00
UP 86-24	1-207 Drift	44-55+21½W	315°	+75	15.2	24+00-26+00
UP 86-25	1-207 Drift	44-55+20½W	315°	+85°	15.2	24+00-26+00
UP 86-26	1-207 Drift	44-57+50W	215°	+10°	31.7	28+00-30+00
UP 86-27	1-207 Drift	44-55+5	048°	+3°	23.2	28+00-30+00
UP 86-28	1-207 Drift	44-57+50W	020°	+5°	10.4	28+00-30+00
UP 86-29	4-233xcut	41-70+15N	070°	+12°	24.0	22+00-24+00
UP 86-30	4-233xcut	41-70+15N	068°	+28°	24.4	22+00-24+00

Cont.

HOLE#	LEVEL	LOCATION	BEARING	DIP	METERS	SECTION
UP 86-31	4-233xcut	41-70+15N	029°	+14°	30.5	22+00-24+00
UP 86-32	4-233xcut	41-70+15N	020°	+27°	17.1	22+00-24+00
UP 86-33	4-233xcut	41-70+15N	047°	+11°	17.1	22+00-24+00
UP 86-34	4-233xcut	41-70+15N	047°	+25°	29.3	22+00-24+00
UP 86-35	4-233xcut	41-70+14N	052°	+49°	24.4	22+00-24+00
UP 86-36	4-233xcut	41-70+13N	045°	+67°	18.3	22+00-24+00
UP 86-37	4-238xcut	41-69+20N	036°	+2°	29.3	22+00-24+00
UP 86-38	4-238xcut	41-69+20N	035°	+23°	22.0	22+00-24+00
UP 86-39	4-238xcut	41-69+20N	026°	+45°	12.2	22+00-24+00
UP 86-40	4-238xcut	41-69+20N	055°	+5°	23.2	22+00-24+00
UP 86-41	4-238xcut	41-69+20N	044°	+25°	24.4	22+00-24+00
UP 86-42	4-238xcut	41-69+20N	020°	+5°	19.5	22+00-24+00
UP 86-43	4-238xcut	41-69+20N	017°	+27°	12.2	22+00-24+00
UP 86-44	4-238xcut	41-69+20N	014°	+61°	12.2	22+00-24+00
UP 86-45	4-243xcut	41-71+13N	034°	+18°	15.9	24+00-26+00
UP 86-46	4-243xcut	41-71+13N	031°	+26°	28.0	24+00-26+00
UP 86-47	4-243xcut	41-71+13N	030°	+37°	15.9	24+00-26+00
UP 86-48	4-243xcut	41-71+13N	019°	+68°	15.9	24+00-26+00
UP 86-49	4-243xcut	41-71+13N	019°	+12°	15.9	24+00-26+00
UP 86-50	4-243xcut	41-71+13N	018°	+30°	14.6	24+00-26+00
UP 86-51	4-201 Drift	41-67+11S	252°	+62°	15.9	22+00-24+00
UP 86-52	4-201 Drift	41-67+11S	221°	+41°	18.3	22+00-24+00
UP 86-53	4-201 Drift	41-67+11S	296°	+69°	18.3	22+00-24+00
UP 86-54	4-201 Drift	41-67+12S	345°	-46°	2.1	22+00-24+00
UP 86-55	4-201 Drift	41-67+11S	359°	-33°	8.5	22+00-24+00
UP 86-56	4-201 Drift	41-67+39S	287°	+71°	12.2	22+00-24+00
UP 86-57	4-201 Drift	41-67+39S	206°	+50°	14.6	22+00-24+00
UP 86-58	4-201 Drift	41-67+39S	224°	+67°	15.9	22+00-24+00
UP 86-59	4-201 Drift	41-68+34W	300°	+63°	18.3	22+00-24+00
UP 86-60	4-201 Drift	41-68+33½W	257°	+58°	19.5	22+00-24+00
UP 86-61	4-201 Drift	41-71+88W	280°	+20°	36.6	24+00-26+00
UP 86-62	4-201 Drift	41-71+88W	274°	+48°	30.5	24+00-26+00

cont.

HOLE #	LEVEL	LOCATION	BEARING	DIP	METERS	SECTION
UP 86-63	4-201 Drift	41-71+22E	306°	+75°	18.3	24+00-26+00
UP 86-64	4-201 Drift	41-71+22E	022°	+68°	18.3	24+00-26+00
UP 86-65	3rd level	42-4+50N	047°	+11°	24.4	18+00-20+00
UP 86-66	3rd level	42-4+50N	044°	+30°	14.6	18+00-20+00
UP 86-70	4-201 Drift	41-71+83W	036°	+12°	14.6	24+00-26+00
UP 86-71	4-201 Drift	41-71+83W	038°	+29°	31.7	24+00-26+00
UP 86-72	4-201 Drift	41-71+83W	024°	+49°	15.9	24+00-26+00
UP 86-73	4-201 Drift	41-71+83W	019°	+70°	15.9	24+00-26+00
UP 86-74	4-201 Drift	41-71+83W	213°	+13°	31.7	24+00-26+00
UP 86-75	4-201 Drift	41-71+83W	210°	+44°	31.7	24+00-26+00
UP 86-76	4-201 Drift	41-67+11S	041°	-42°	32.3	22+00-24+00
UP 86-77	4-201 Drift	41-67+ N	164°	-38°	40.2	22+00-24+00
UP 86-78	4-201 Drift	41-67+17½N	041°	-38°	13.4	
UP 86-79	4-201 Drift	41-67+17½N	130°	-34°	24.4	
UP 86-80	4-201 Drift	41-67+17½N	066°	-50°	18.3	

Summary of Test Holes, Period February 28 to August 19, 1986

HOLE #	LEVEL	LOCATION	BEARING	DIP	METERS	SECTION
T-222	2-87	43-78+109 E	143°	+11°	8.2	8+00-10+00
T-223	2-87	43-78+4 E	005°	+2°	8.5	8+00-10+00
T-224	3-230xcut S	42-69A+14 S		+90°	4.3	22+00-24+00
T-225	3-230xcut S	42-69A+13 S	047°	+70°	4.9	22+00-24+00
T-226	3-194	42-126+54 W	033°	+10°	13.3	20+00-22+00
T-227	3-194	42-126+58 W	042°	+47°	7.0	20+00-22+00
T-228	3-194	42-126+60 W	040°	+70°	6.1	20+00-22+00
T-229	4-201	41-66+54.5S	214°	+4°	12.8	22+00-24+00
T-230	4-201	41-66+50.5S	027°	+15°	7.6	22+00-24+00
T-231	1-200	44-22+10 E	220°	+25°	8.5	18+00-20+00
T-232	1-200	44-22+5 E	281°	+68°	7.3	18+00-20+00
T-233	2nd	43-16+51½ E	249°	+70°	4.3	18+00-20+00
T-234	2nd	43-16+51½ E	241°	+49°	8.5	18+00-20+00
T-235	2-182 E	43-142+23 E	035°	+10°	9.8	16+00-18+00
T-236	2-182 E	43-142+23 E	037°	+36°	7.0	16+00-18+00
T-237	2-182 W	43-143+20 W	036°	+10°	6.4	18+00-20+00
T-237A					1.8	
T-238	2-182 W	43-143+20 W	033°	+26°	7.4	18+00-20+00
T-239	2-182 W	43-143+17 W	167°	+65°	7.3	18+00-20+00
T-240	2-182 W	43-143+50 W	150°	+58°	9.9	18+00-20+00
T-241	2-182 W	43-144+16 W	158°	+37°	7.4	18+00-20+00
T-242	2-182 W	43-144+25 W	044°	+50°	7.3	18+00-20+00
T-243	2-182 E	43-142+45 E	029°	+9°	6.1	16+00-18+00
T-244	2-182 E	43-142+45 E	033°	+17°	8.5	16+00-18+00
T-245	2-182 E	43-142+8 E	048°	+55°	6.1	16+00-18+00
T-246	4-201	41-67+50 S	023°	+18°	4.9	22+00-24+00
T-247	2-182 E	43-146+36½E	086°	+18°	15.9	16+00-18+00
T-248	2-182 E	43-146+35½E	183°	+12°	14.3	16+00-18+00
T-249	2-182 E	43-146+3 E	025°	+22°	9.8	16+00-18+00
T-250	2-182 E	43-146+1½ E	026°	+34°	8.5	16+00-18+00
T-251	2-182 E	43-146+21 W	024°	+31°	7.3	16+00-18+00
T-252	4-201	41-68+75 W	037°	+7°	6.4	22+00-24+00

cont

HOLE #	LEVEL	LOCATION	BEARING	DIP	METERS	SECTION
T-253	4-201	41-69+9 W	030°	+7°	4.9	22+00-24+00
T-254	2-182 E	43-146+31 W	203°	+16°	5.2	16+00-18+00
T-255	2-182 E	43-146+31 W	025°	+16°	9.1	16+00-18+00
T-256	2-182 E	43-147+66 E	115°	+10°	10.4	16+00-18+00
T-257	2-182 E	43-146+12.5E	200°	+18°	8.5	16+00-18+00
T-258	2-182 E	43-146+12.5E	202°	+26°	8.5	16+00-18+00
T-259	2-182 E	43-147+14 E	055°	+35°	9.8	16+00-18+00
T-260	2-182 E	43-147+14 E	055°	+25°	3.7	16+00-18+00
T-261	2-182 E	43-148+16¼E	098°	+23°	6.4	14+00-16+00
T-262	2-182 E	43-148+19 E	134°	+8°	9.8	14+00-16+00
T-263	2-182 E	43-147+35 E	058°	+12°	8.5	16+00-18+00
T-264	2-182 E	43-147+35 E	050°	+19°	8.5	16+00-18+00
T-265	4-201	41-72-27 W	216°	+7°	12.2	22+00-24+00
T-266	4-201	41-71+12½ N	047°	+5°	9.8	22+00-24+00
T-267	2-182 E	43-148+24 E			7.3	
T-268	2-182 E	43-148+26 W	237°	+46°	8.5	16+00-18+00
T-269	2-182 E	43-147+39 E	044°	+44°	7.3	16+00-18+00
T-270	2-182 E	43-147-39 E	035°	+19°	8.5	16+00-18+00
T-271	2-182 E	43-147+39 E	224°	+15°	7.9	16+00-18+00
T-272	2-182 E	43-142+25 E	212°	+13°	11.0	16+00-18+00
T-273	2-182 E	43-142+50½E	212°	+20°	8.5	16+00-18+00
T-274	2-182 E	43-146+43 W	212°	+16°	6.1	16+00-18+00
T-275	2-182 E	43-146+43 W	216°	+18°	9.8	16+00-18+00
T-276	2-182 E	43-146+0	221°	+14°	7.3	16+00-18+00
T-277	2-182 E	43-147+34 E	235°	+30°	5.5	16+00-18+00
T-278	2-182 E	43-147+39 E	169°	+61°	4.6	16+00-18+00
T-279	2-182 E	43-147+70 E	239°	+23°	7.3	14+00-16+00
T-280	2-182 E	43-147+70 E	238°	+28°	8.5	14+00-16+00
T-281	2-182 E	43-148+16 E	242°	+22°	11.0	14+00-16+00
T-282	2-182 E	43-148+16 E	146°	+46°	8.5	14+00-16+00
T-283	2-182 E	43-148+27½E	219°	+19°	7.9	14+00-16+00
T-284	2-182 E	43-148+26½E	228°	+23°	9.8	14+00-16+00

cont

HOLE	LEVEL	LOCATION	BEARING	DIP	METERS	SECTION
T-285	2-182 E	43-146+41 W	024°	+38	9.8	16+00-18+00
T-286	2-182 E	43-146+41 W	026°	+23°	9.8	16+00-18+00
T-287	2-182 E	43-142+24 E	245°	+62°	8.5	16+00-18+00
T-288	2-182 E	43-142+25 E	227°	+81°	5.2	16+00-18+00
T-289	2-182 E	43-145+15 E	251°	+53°	7.3	16+00-18+00
T-290	2-182 E	43-143+3 N	142°	-1°	12.2	18+00-20+00
T-291	2-182 Drift	43-143+13 N	152°	+2°	11.0	18+00-20+00
T-292	2-182 Drift	43-143+7½ N	019°	-70°	4.9	18+00-20+00
T-293	2-182 Drift	43-143+20½S	317°	-69°	4.9	18+00-20+00
T-294	2-182 Drift	43-143+10 S	312°	-59°	3.7	18+00-20+00
T-295	2-182 Drift	43-143+10 S	146°	-64°	4.9	18+00-20+00
T-296	2-182 Drift	43-143+5 N	148°	-64°	4.9	18+00-20+00
T-297	2-182 E	43-143+43 E	179°	+33°	9.8	16+00-18+00
T-298	2-182 E	43-142+4 E	175°	-59°	4.9	18+00-20+00
T-299	2-182 E	43-145+27 E	021°	-46°	3.7	16+00-18+00
T-300	2-182 E	43-145+27 E	199°	-58°	4.9	16+00-18+00
T-301	2-182 E	43-142+25 E	115°	+83°	7.3	16+00-18+00
T-302	2-182 E	43-142+25 E	196°	+74°		16+00-18+00
T-303	2-182 E	43-145+3 E	121°	+61°		16+00-18+00
T-301A	2-182 E	43-142+24 E	109°	+74°	9.8	16+00-18+00
T-302A	2-182 E	43-143+23½E	248°	+64°	9.8	16+00-18+00

APPENDIX III

SPONTANEOUS POTENTIAL SURVEYING

APPLICATION OF THE SPONTANEOUS POTENTIAL METHOD

(from a final project report by W. Don Sutherland - October 22, 1986)

Pilot geophysical tests in the Mosquito Creek Mine have shown that the spontaneous potential (S.P.) method is applicable to the detection of unexposed sulphide ore near underground openings and drill holes. The sulphide lenses produce a natural voltage potential when coupled with non-sulphide bearing rocks. The voltage difference is in the range of 100 to 300 millivolts, well above the normal background variation of 5 to 15 millivolts.

The S.P. method is directionally sensitive. Voltage potential increases in the direction of a sulphide lens and decreases in the opposite direction. By way of example:

1. If voltage potential on one drift wall is higher than on the opposite wall, the sulphide lens will be in the wall with the highest charge.

2. If voltage potential near the floor of a drift is higher than near the back, and if the charge varies lineally up and down the wall, the sulphide lens will be below the floor.

3. If three holes are drilled in section, and the S.P. profiles are compared, the sulphide lens will lie in the direction of increasing voltage.

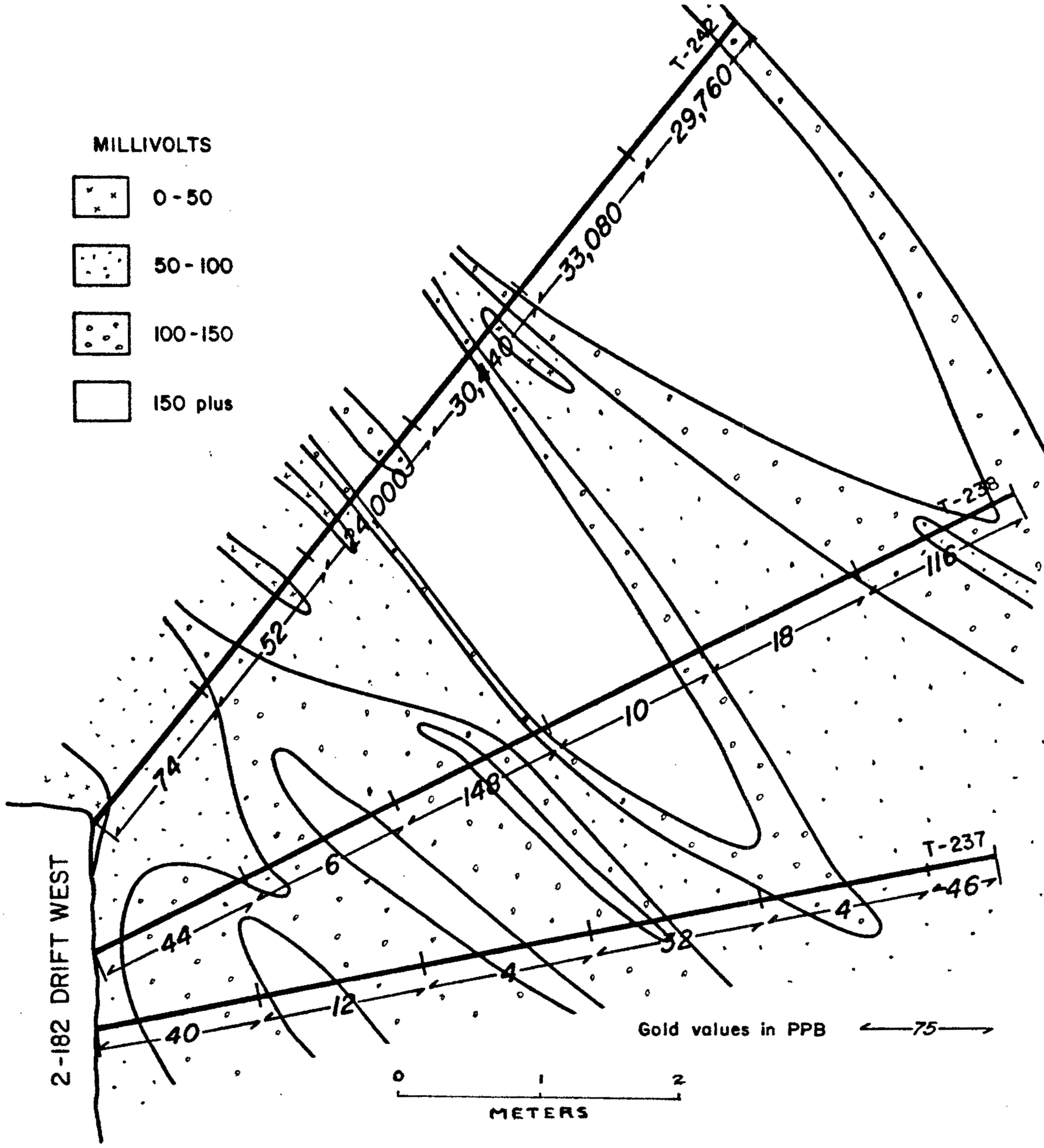
In practice, a base station is established in a location of low voltage potential, which is then coupled with the station at which the reading is taken. Drift readings are taken on both walls, at the top, middle and bottom, at five foot intervals along the drift, i.e. six readings for every five feet of drift. Intermediate readings may be taken to insure that voltage build-up is lineal rather than sporadic. Drift readings are then graphed and/or vectored and the graphs and vectors interpreted to determine the direction of a possible ore target. Drill holes are probed in a similar manner, with readings taken at one foot intervals. Probe readings are plotted on profiles and interpreted. Where drill logs and assay data are available, they are used to assist in the interpretation of the S.P. profiles.

The in-hole S.P. probes are a very useful aid in the re-study of old drill logs and core. Where core recovery was poor, and no sludge samples were taken (which was frequently the case at the Mosquito Creek Mine), the in-hole probe will show whether the missing section of core was sulphides or not, and what the actual width of sulphides was, regardless of core recovery. All of the old diamond drill holes and old test holes in the mine have now been probed to 100 ft. in the hole, which was the maximum length for the tooling used in the probing program. The exceptions are holes that were blocked by cave and float and flat or down holes that were water filled. Water in a hole short circuits the voltage potential and readings taken from a water filled hole are unreliable.

As with all electrical geophysical techniques, graphite interference is a severe handicap if present. When limestone is carbonaceous, and graphite slips develop, the usefulness of self potential surveys is greatly diminished. The graphite profiles usually are much more abrupt with higher spikes and dips than sulphide profiles. By careful interpretation, the two types may be distinguished, especially if geological information is available to assist in the interpretation. In instances where a drill hole intersects a graphite slip at a low angle, however, the voltage build up will tend to be gradational, and an incorrect sulphide interpretation may result.

In addition to limestone, other rock units in the mine may have graphite present. The dark quartzites in particular have multiple graphite slips which produce violently fibrillating S.P. profiles. In this instance the S.P. technique is useless for sulphide detection but is helpful in defining the limits of individual rock units.

An example of correlation between S.P. readings and gold assays is shown by results from test hole T-242, which intersected 4.9 meters of sulfide ore averaging 0.94 oz. Au per tonne. The accompanying figure shows the relationship between the geochemical assays and the S.P. contours for three test holes drilled in section in and below the T-242 ore lens. Surprisingly, an intersection of 27,220 ppb over 2.4 m. reports as 10 ppb only 2.4 m. away in the direction of dip. The S.P. readings, by contrast, show a significant halo in the plane of the ore lens, and an abrupt cut-out at right angles to it. The halo effect is detectable at least 4.6 m. away in the plane of the ore. The self potential contours shown on the figure also indicate the possibility that there is another ore lens en echelon and below the T-242 Discovery.



TEST HOLE CROSS SECTION
SHOWING SELF POTENTIAL CONTOURS
AND ASSAY VALUES

"Up-Hole" Spontaneous Potential Probing Completed on the Mosquito Creek Gold Project, Period February 28 to August 19, 1986, in meters.

Footage	Level				Totals
	1st	2nd	3rd	4th	
Old Test Holes	--	--	--	228	228
Old Diamond Drill Holes	--	906	630	895	2431
Hecla Test Holes	16	513	35	52	616
Hecla Percussion Holes	132	--	247	1069	1448
TOTALS	148	1,419	912	2,244	4,723

Appendix III - 1

Level I Assay Histograms
and Self Potential Profiles

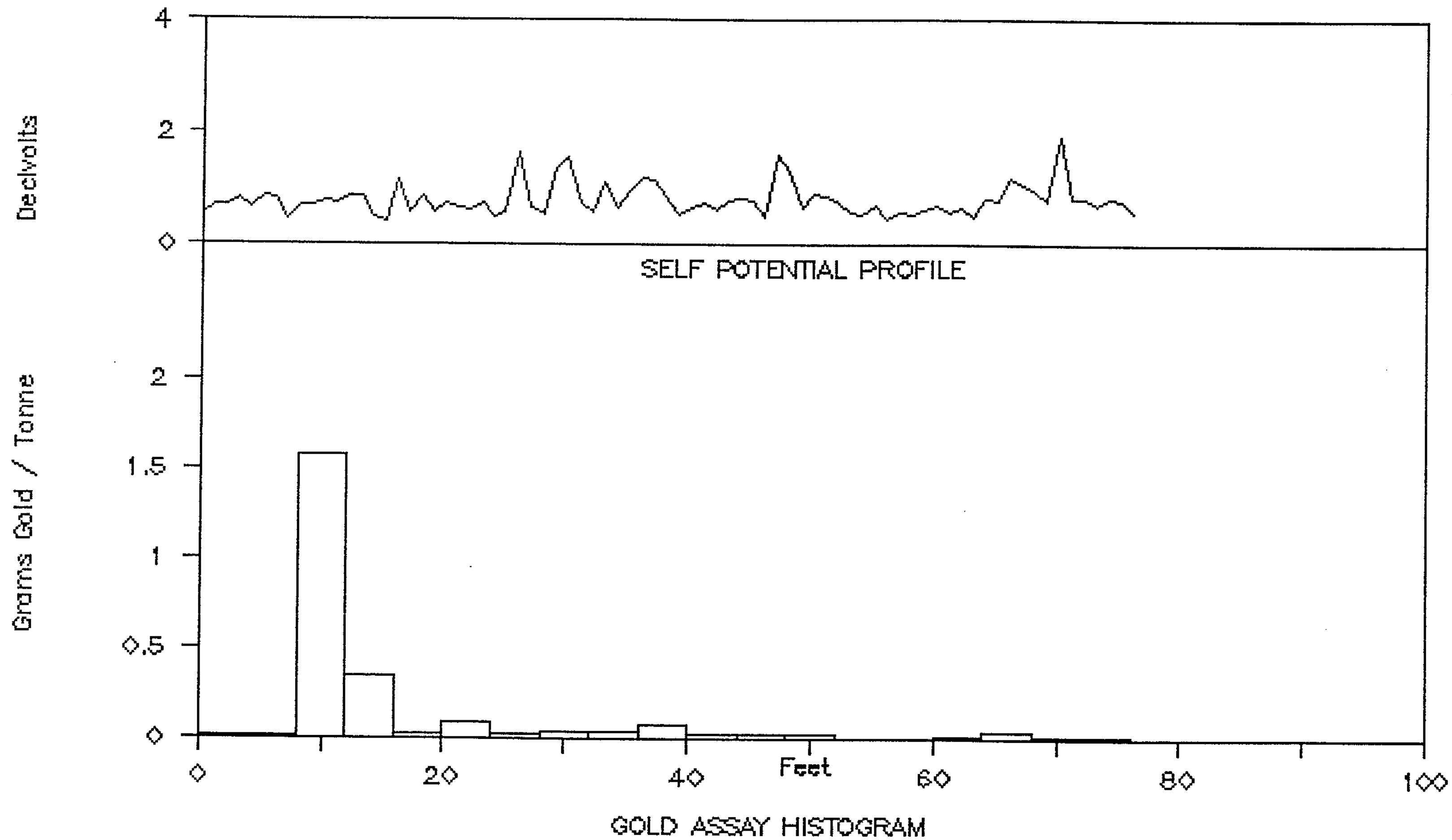
Percussion Holes
UP86-22 to UP86-28

Test Holes
T-231 to T-232

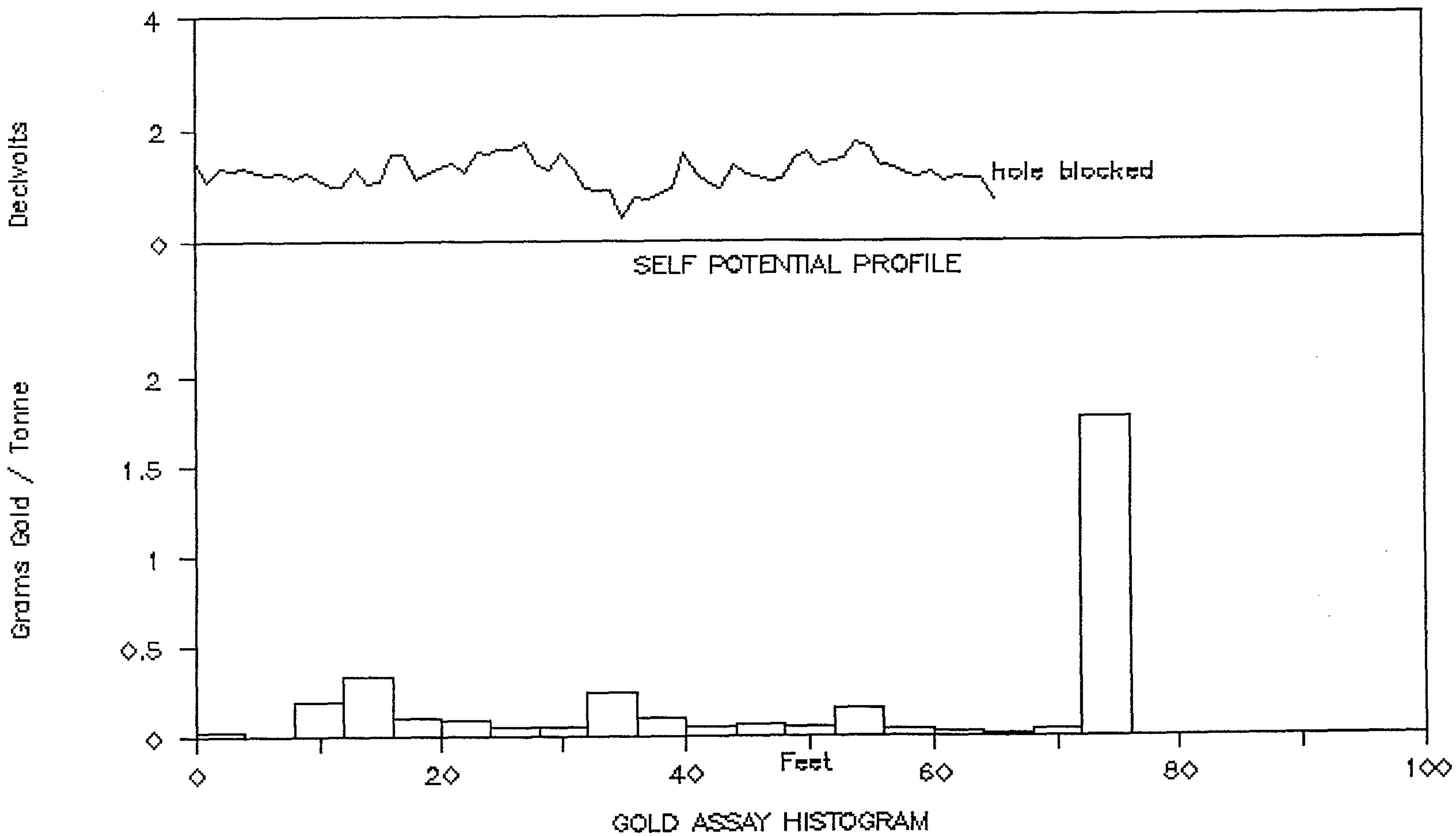
Level I

Hole	Latitude	Departure	Bearing	Inclination	Length
UP86-22	18,268N	10,223E	034°	+45°	76'
23	18,268N	10,223E	033°	+62°	76'
24	18,488N	9,978E	315°	+75°	50'
25	18,487N	9,979E	315°	+85°	50'
26	18,698N	9,628E	215°	+10°	104'
27	18,705N	9,639E	048°	+ 3°	76'
28	18,705N	9,637E	020°	+ 5°	34'
T-231	18,034N	10,435E	220°	+25°	28'
232	18,040N	10,432E	281°	+68°	24'

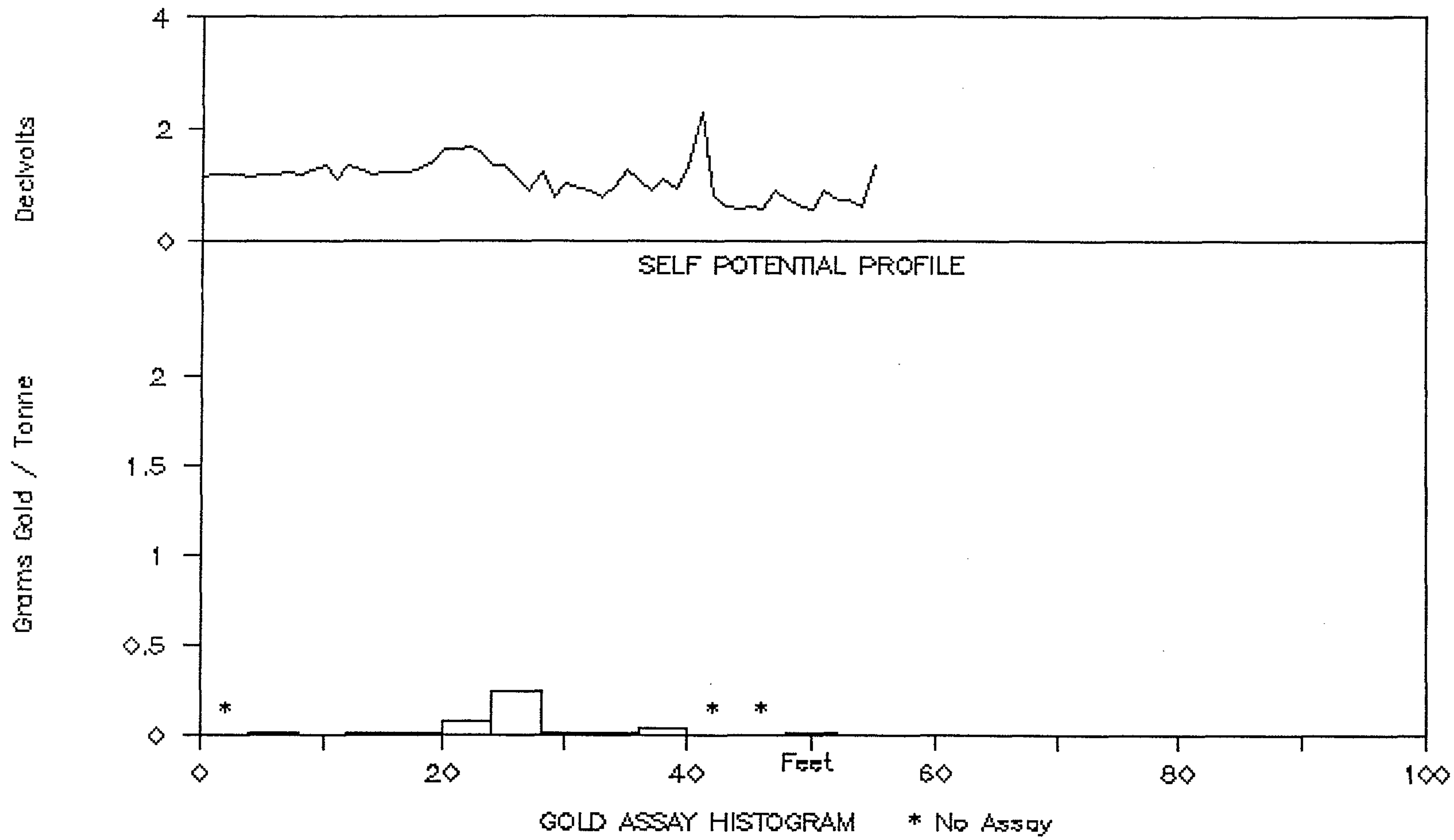
PERCUSSION HOLE UP86-22



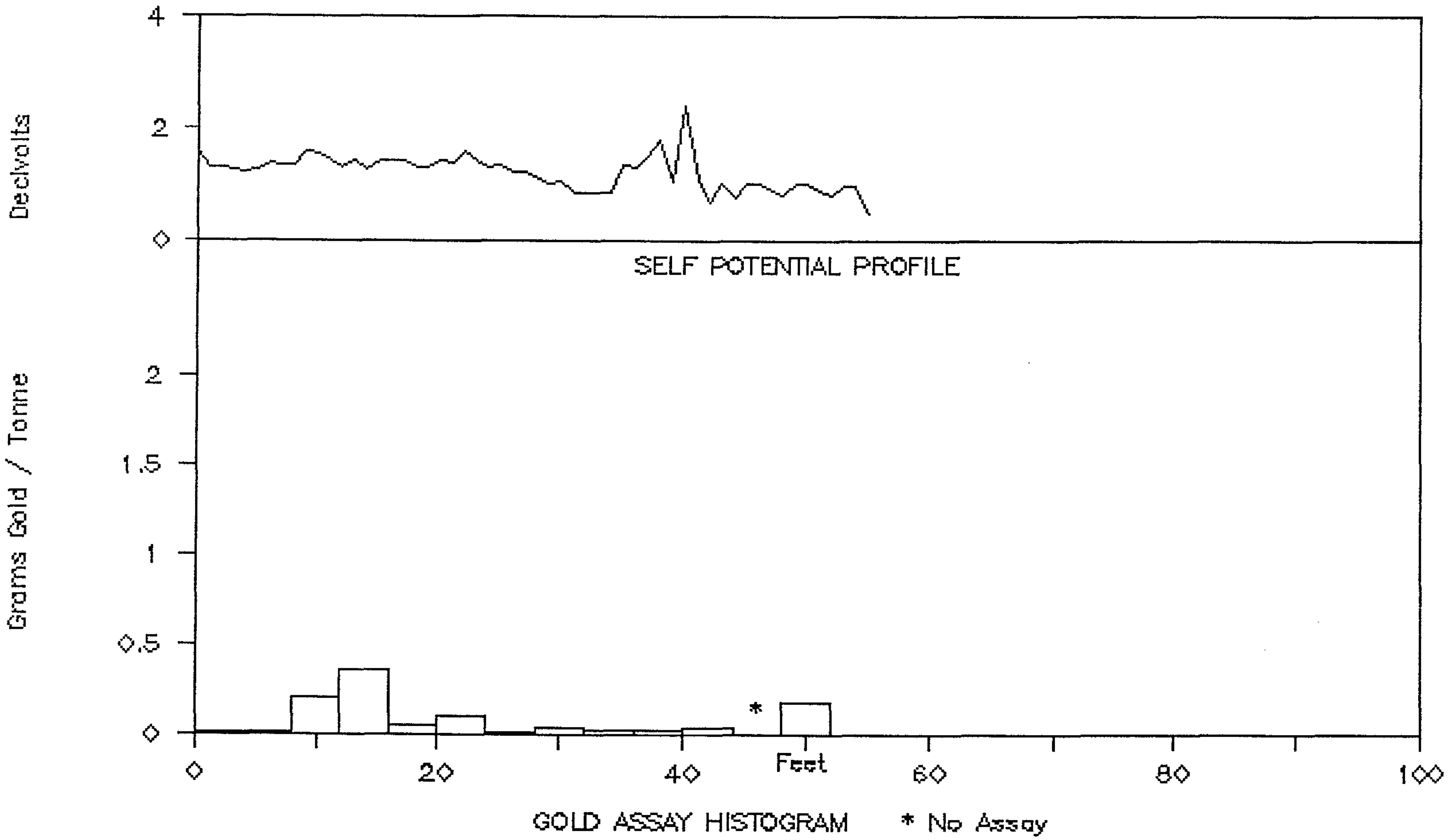
PERCUSSION HOLE UP86-23



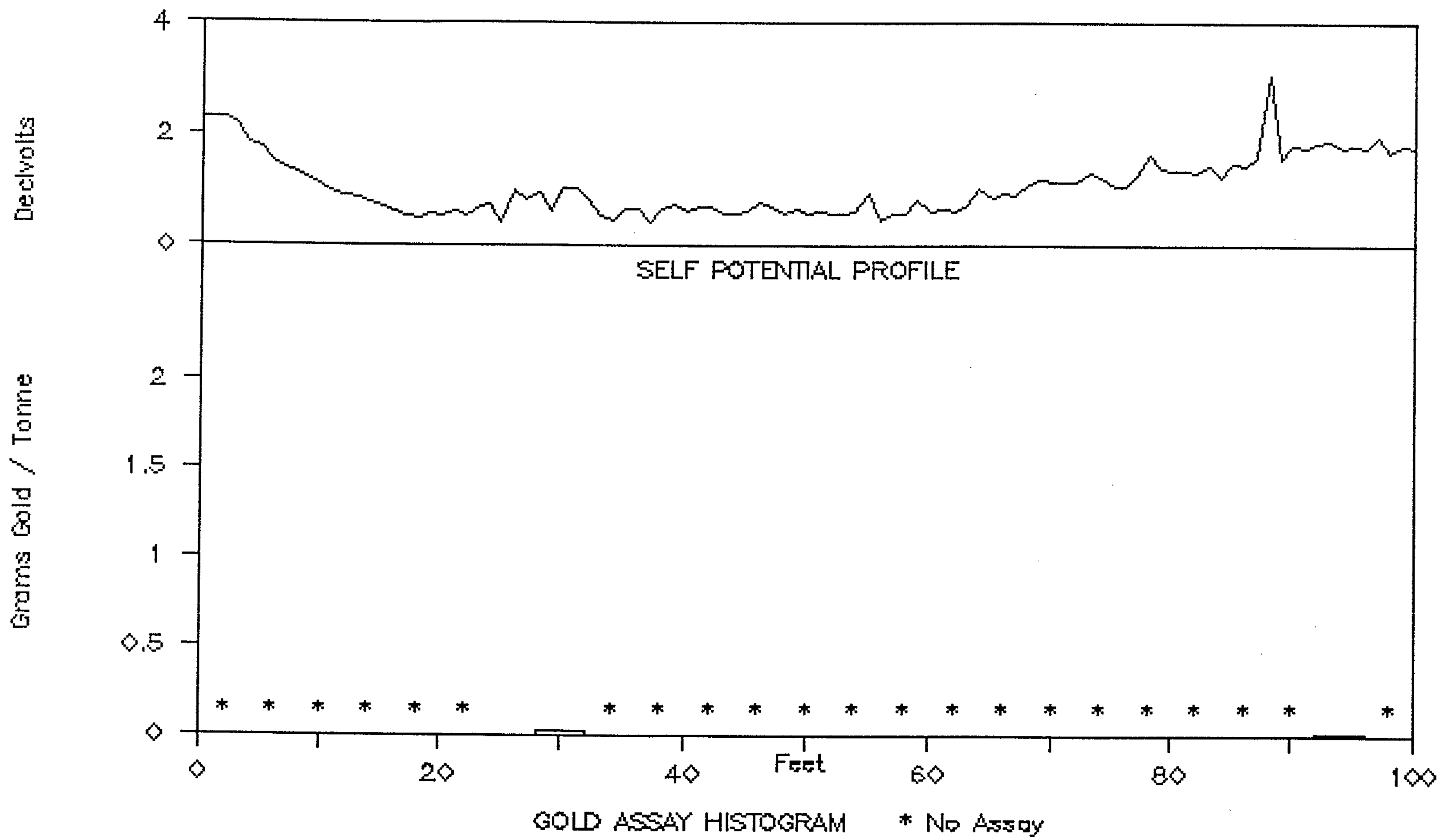
PERCUSSION HOLE UP86-24



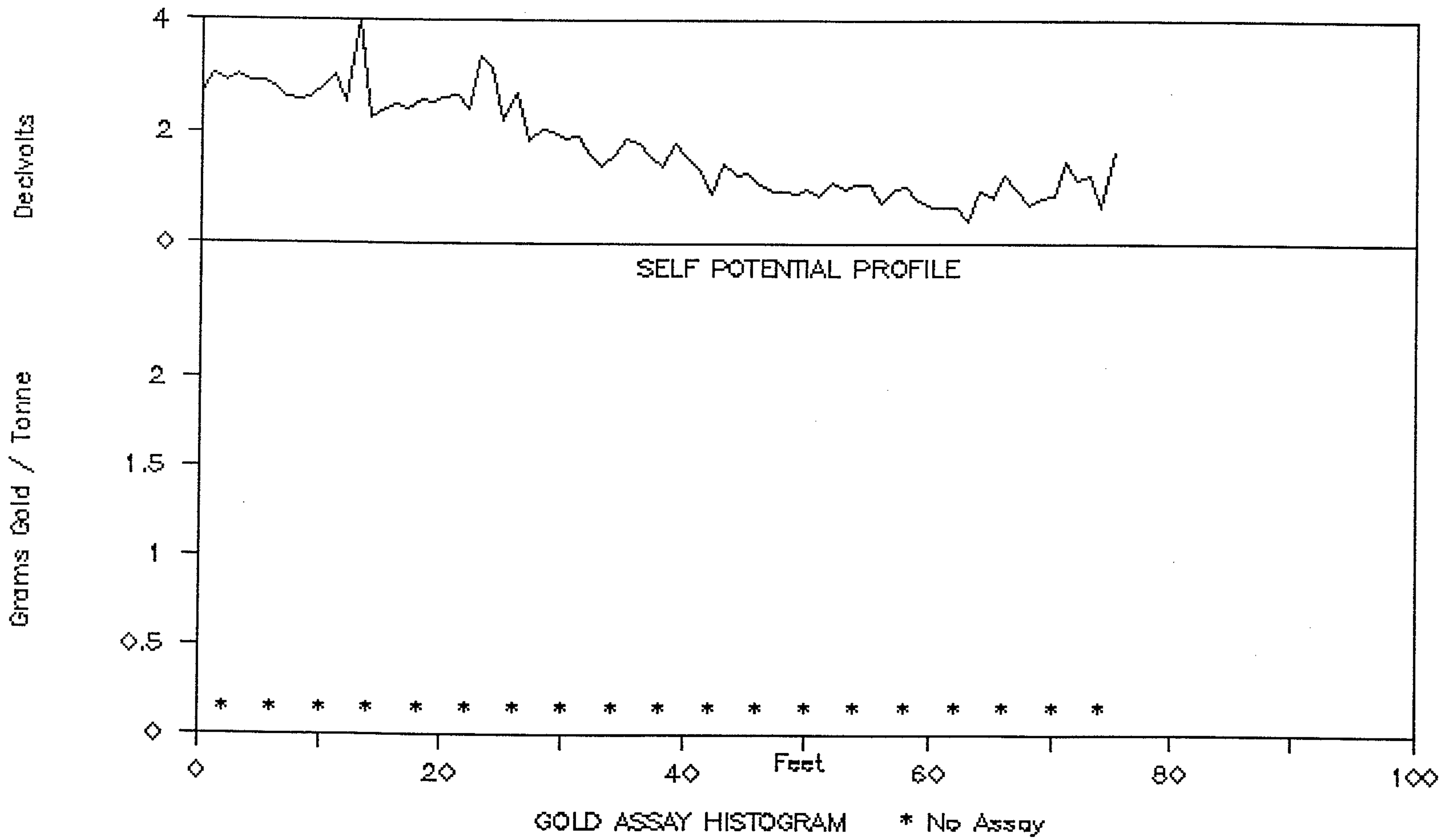
PERCUSSION HOLE UP86-25



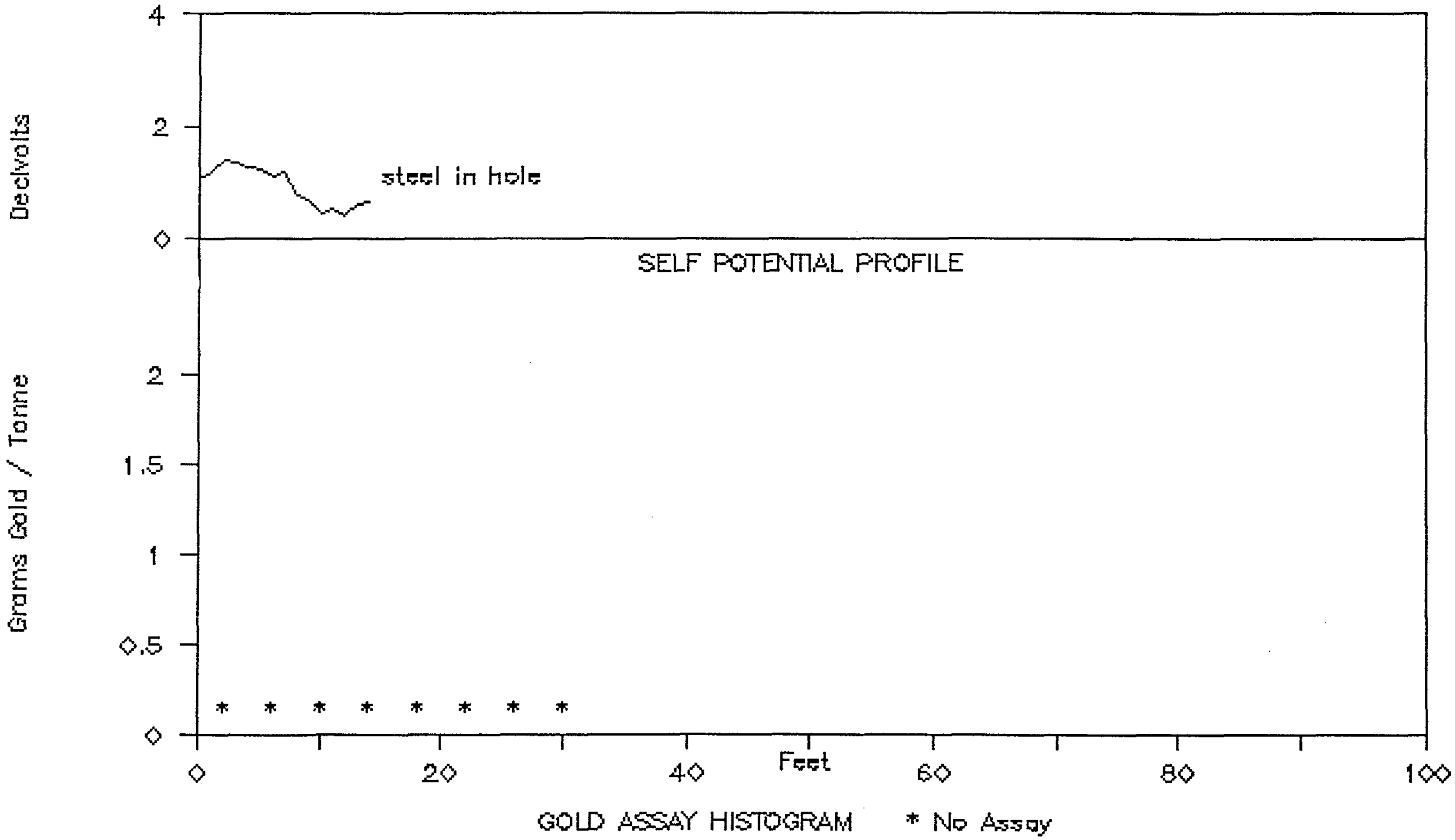
PERCUSSION HOLE UP86-26



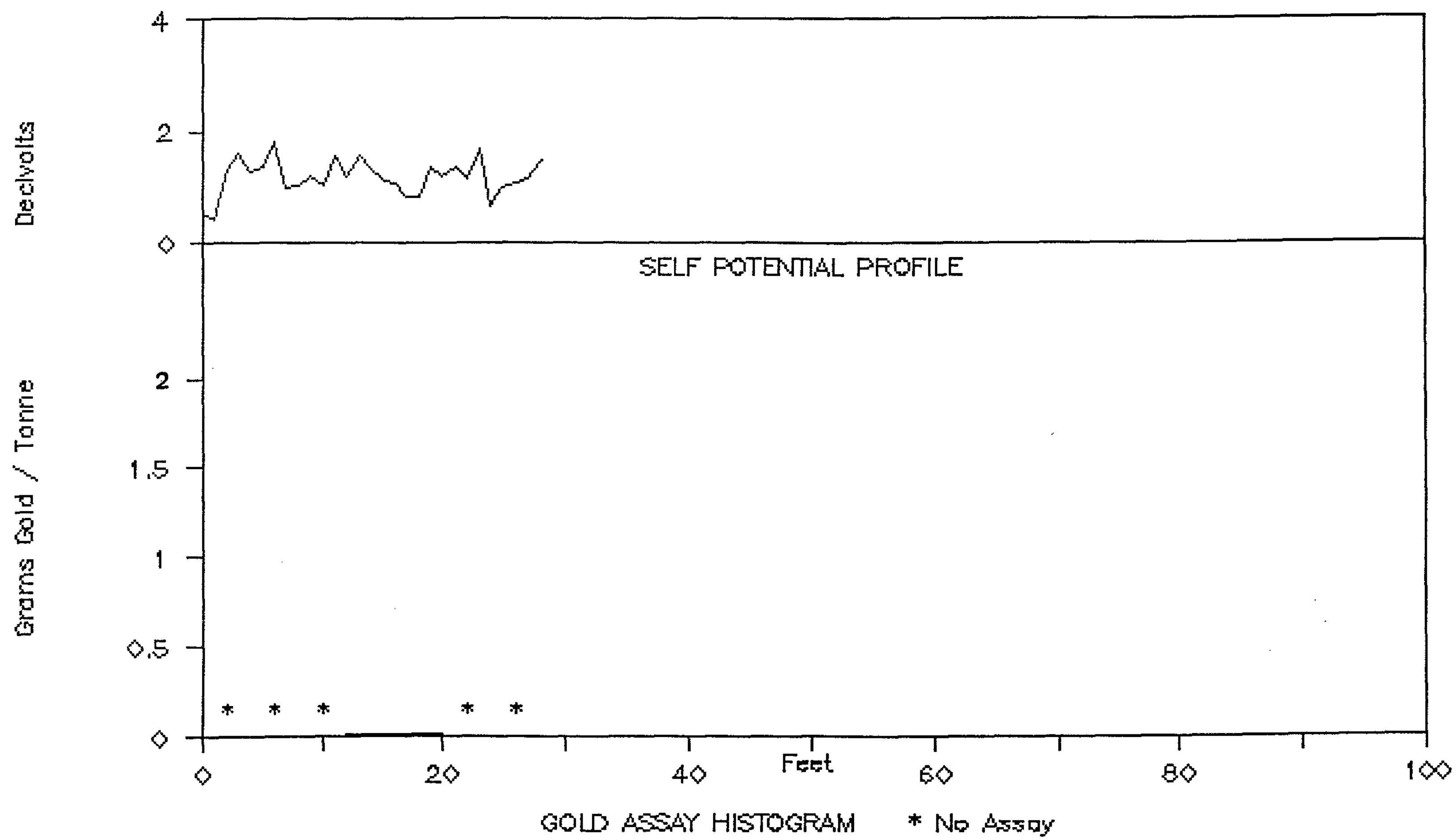
PERCUSSION HOLE UP86-27



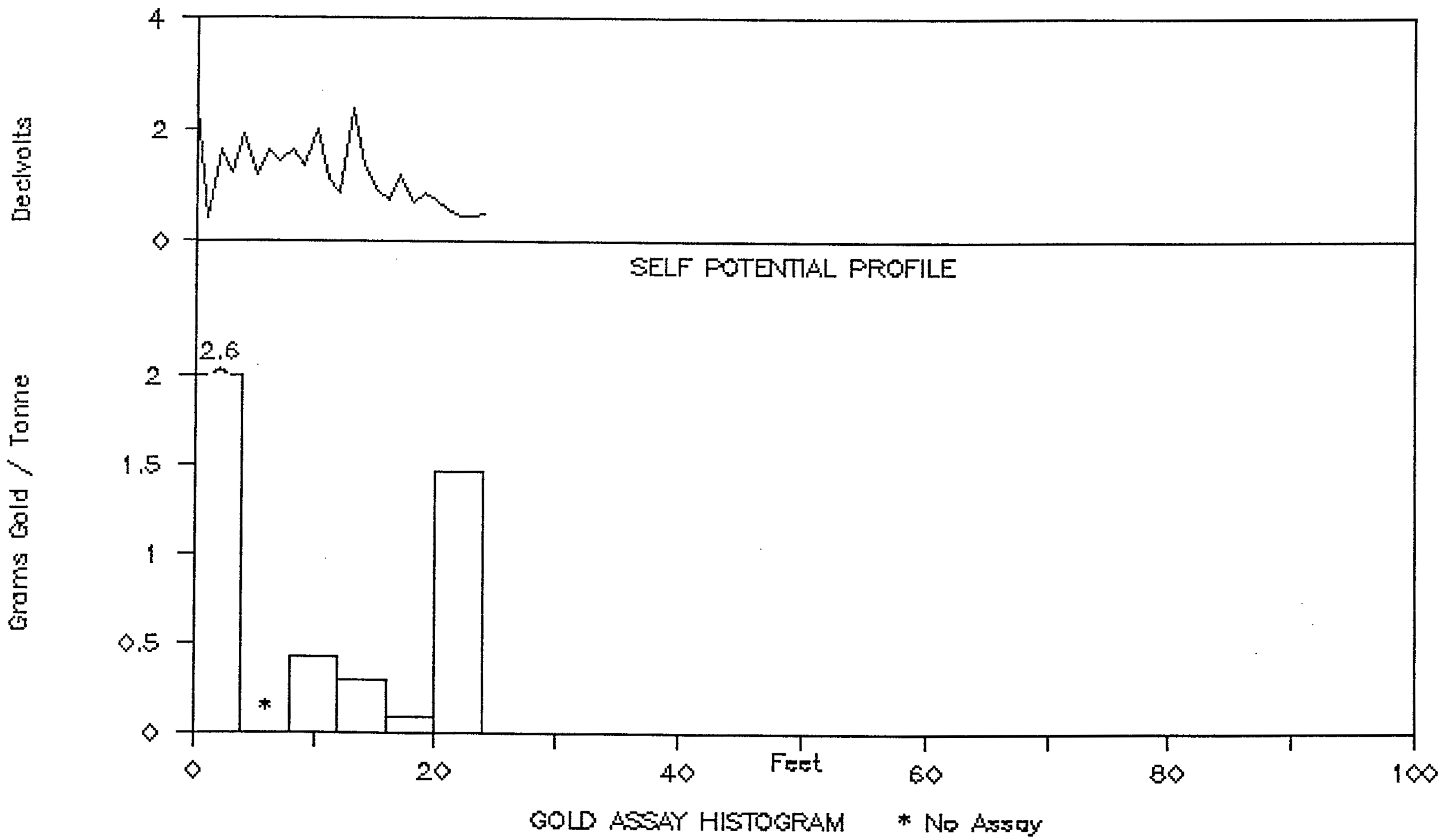
PERCUSSION HOLE UP86-28



TEST HOLE T-231



TEST HOLE T-232



Appendix III - 2

Level II Assay Histograms and Self Potential Profiles

Test Holes

T-222 to T-223

T-233 to T-245

T-247 to T-251

T-254 to T-264

T-267 to T-303

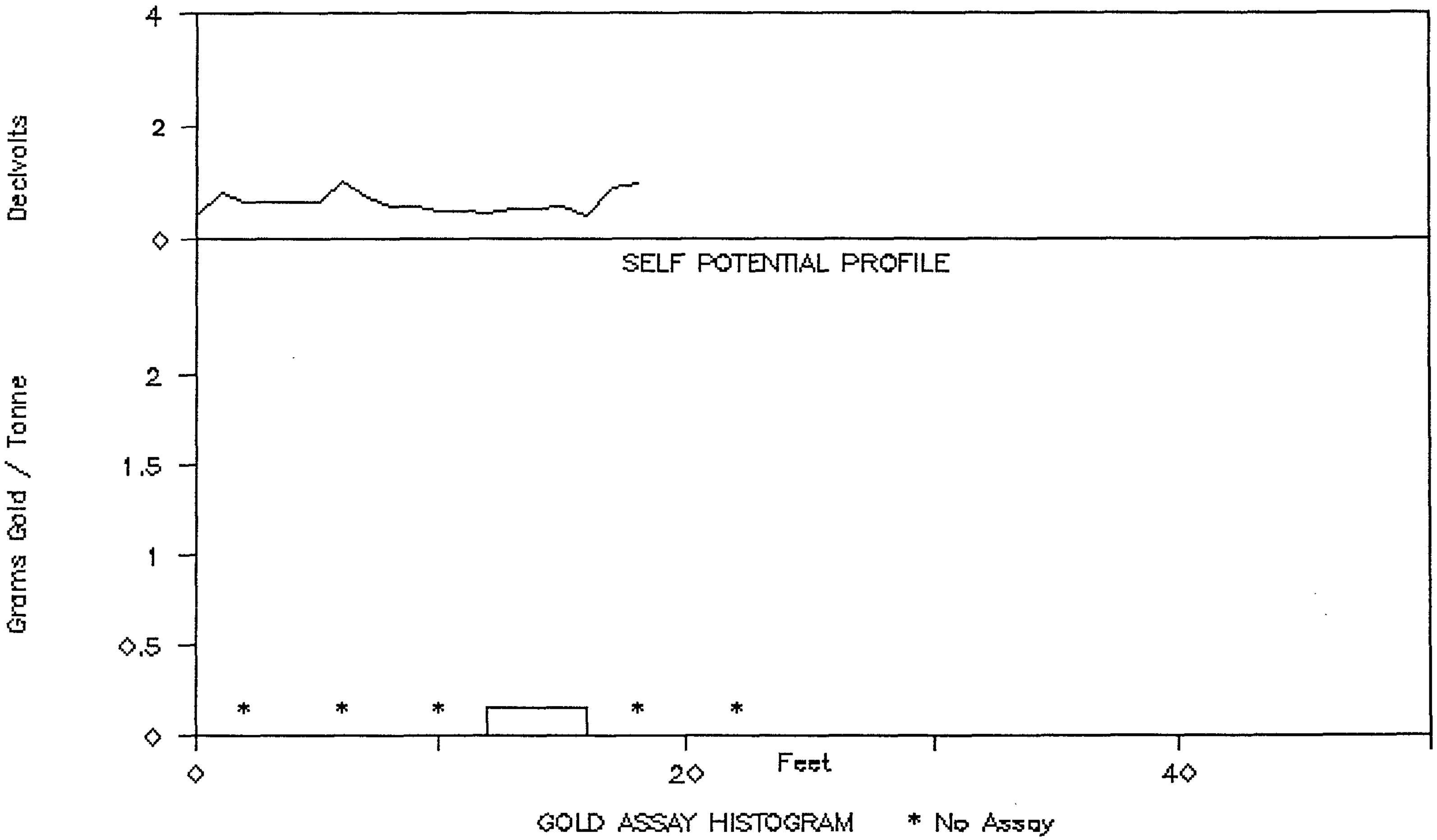
Level II

Hole	Latitude	Departure	Bearing	Inclination	Length
T-222	17,418N	11,378E	146°	+11°	27'
223	17,494N	11,303E	005°	+ 2°	28'
233	18,128N	10,551E	249°	+70°	14'
234	18,128N	10,551E	241°	+49°	28'
235	18,132N	10,634E	035°	+10°	32'
236	18,132N	10,634E	037°	+36°	23'
237	18,147N	10,589E	036°	+10°	21'
238	18,147N	10,589E	033°	+26°	24'
239	18,142N	10,585E	167°	+65°	24'
240	18,172N	10,572E	150°	+58°	32'
241	18,187N	10,559E	158°	+37°	24'
242	18,152N	10,587E	044°	+50°	24'
243	18,126N	10,655E	029°	+ 9°	20'
244	18,126N	10,655E	033°	+17°	28'
245	18,134N	10,620E	048°	+55°	20'
247	18,085N	10,757E	086°	+18°	52'
248	18,080N	10,752E	183°	+12°	47'
249	18,107N	10,731E	025°	+22°	32'
250	18,108N	10,728E	026°	+35°	28'
251	18,114N	10,706E	024°	+31°	24'
254	18,110N	10,696E	203°	+16°	17'
255	18,118N	10,697E	025°	+16°	30'
256	18,032N	10,806E	115°	+10°	34'
257	18,093N	10,733E	200°	+18°	28'
258	18,093N	10,733E	202°	+26°	28'
259	18,071N	10,771E	055°	+35°	32'
260	18,071N	10,771E	055°	+25°	12'
261	18,016N	10,827E	098°	+23°	21'
262	18,012N	10,827E	134°	+ 8°	32'
263	18,056N	10,786E	058°	+12°	28'
264	18,056N	10,786E	050°	+19°	28'
267	18,008N	10,830E	137°	+12°	24'
268	18,041N	10,893E	237°	+46°	28'
269	18,053N	10,789E	044°	+44°	24'
270	18,053N	10,789E	035°	+19°	28'

Level II

Hole	Latitude	Departure	Bearing	Inclination	Length
T-271	18,049N	10,785E	224°	+15°	26'
272	18,123N	10,634E	212°	+13°	36'
273	18,118N	10,659E	212°	+20°	28'
274	18,112N	10,680E	212°	+16°	20'
275	18,107N	10,703E	216°	+18°	32'
276	18,099N	10,723E	221°	+14°	24'
277	18,052N	10,781E	235°	+30°	18'
278	18,051N	10,787E	169°	+61°	15'
279	18,028N	10,807E	239°	+23°	24'
280	18,028N	10,807E	238°	+28°	28'
281	18,011N	10,822E	242°	+22°	36'
282	18,011N	10,822E	246°	+46°	28'
283	18,003N	10,830E	219°	+19°	26'
284	18,003N	10,829E	228°	+23°	32'
285	18,122N	10,682E	024°	+38°	32'
286	18,122N	10,682E	026°	+23°	32'
287	18,118N	10,671E	246°	+62°	28'
288	18,124N	10,634E	227°	+81°	17'
289	18,124N	10,633E	251°	+53°	24'
290	18,123N	10,599E	142°	- 1°	40'
291	18,125N	10,610E	152°	+ 2°	36'
292	18,132N	10,598E	019°	-70°	16'
293	18,114N	10,577E	317°	-69°	16'
294	18,121N	10,585E	312°	-59°	12'
295	18,116N	10,589E	146°	-64°	16'
296	18,125N	10,602E	148°	-64°	16'
297	18,047N	10,789E	179°	+33°	32'
298	18,127N	10,613E	175°	-59°	15'
299	18,122N	10,684E	021°	-46°	12'
300	18,113N	10,682E	199°	-58°	16'
301	18,127N	10,634E	109°	+74°	32'
302	18,126N	10,633E	248°	+64°	32'
303	18,121N	10,660E	121°	+61°	28'

TEST HOLE T-222



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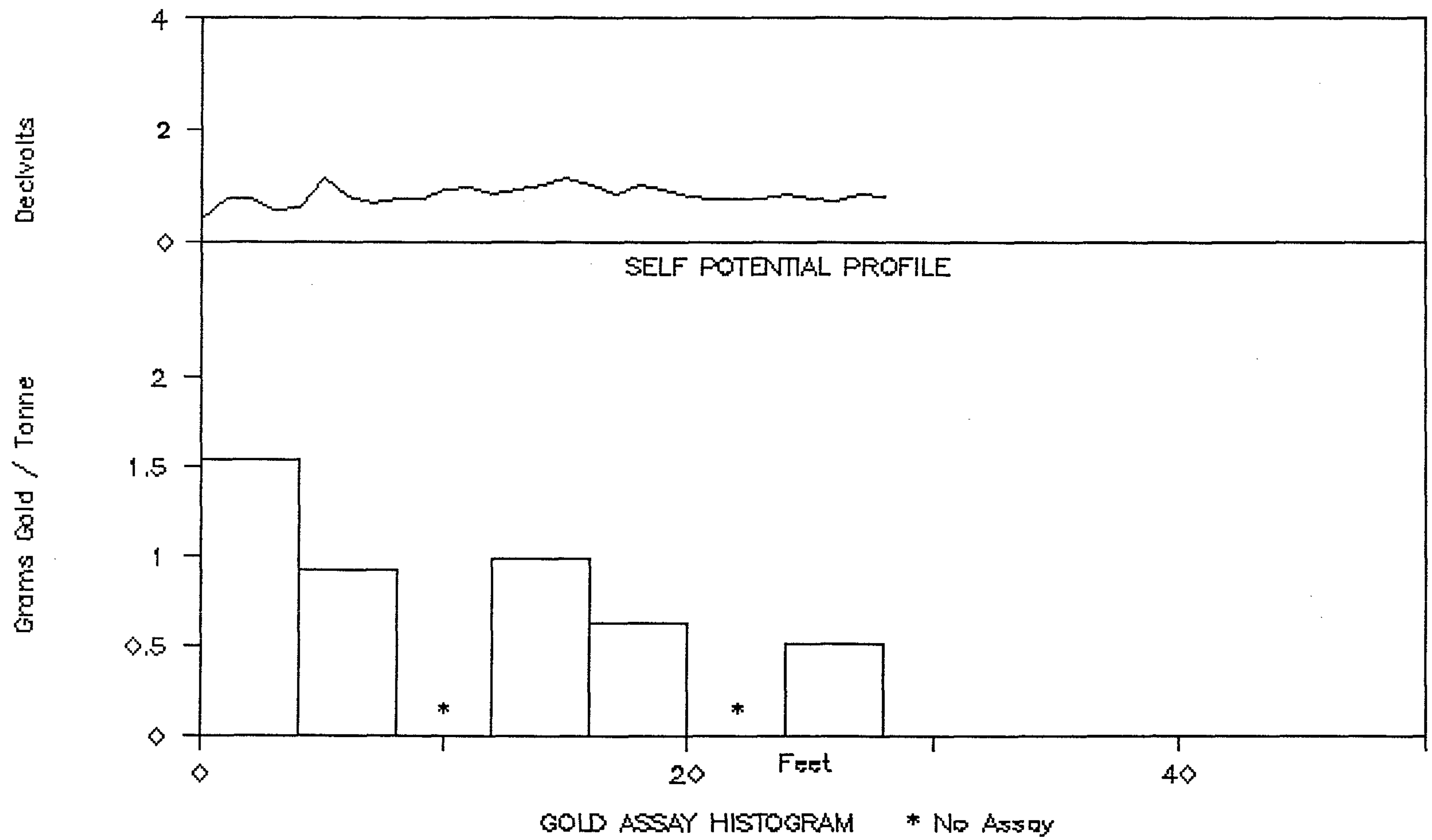

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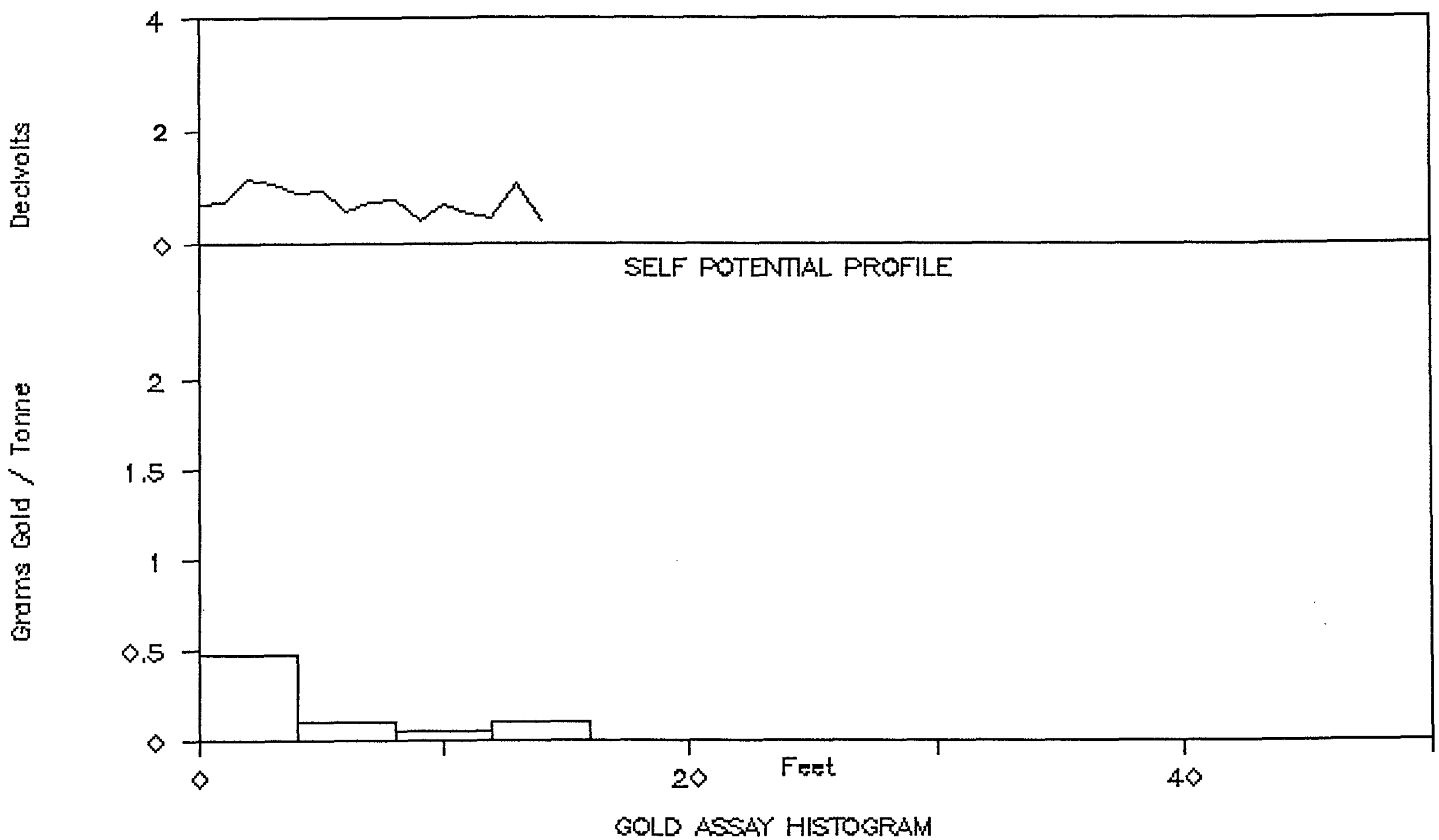

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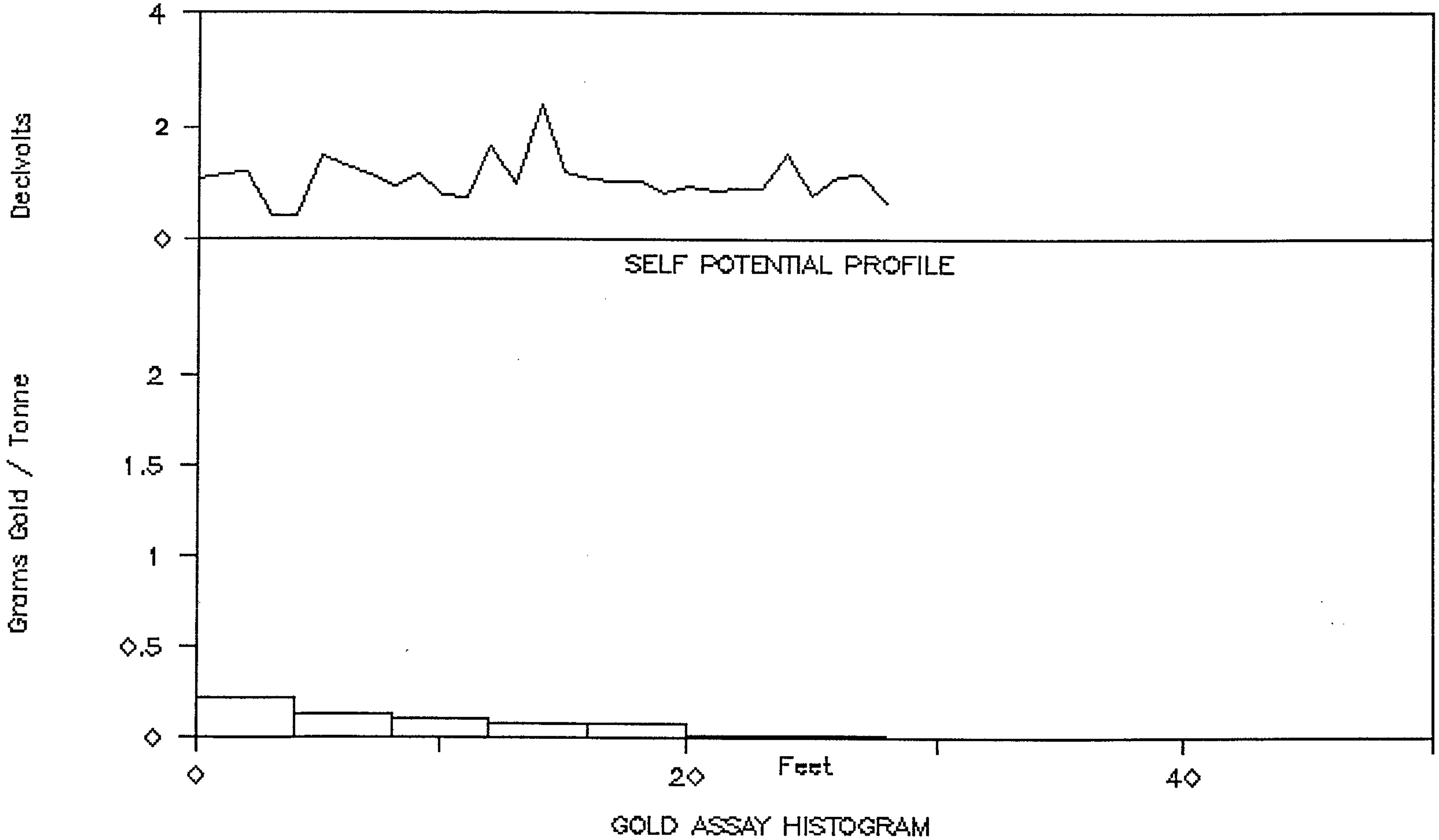

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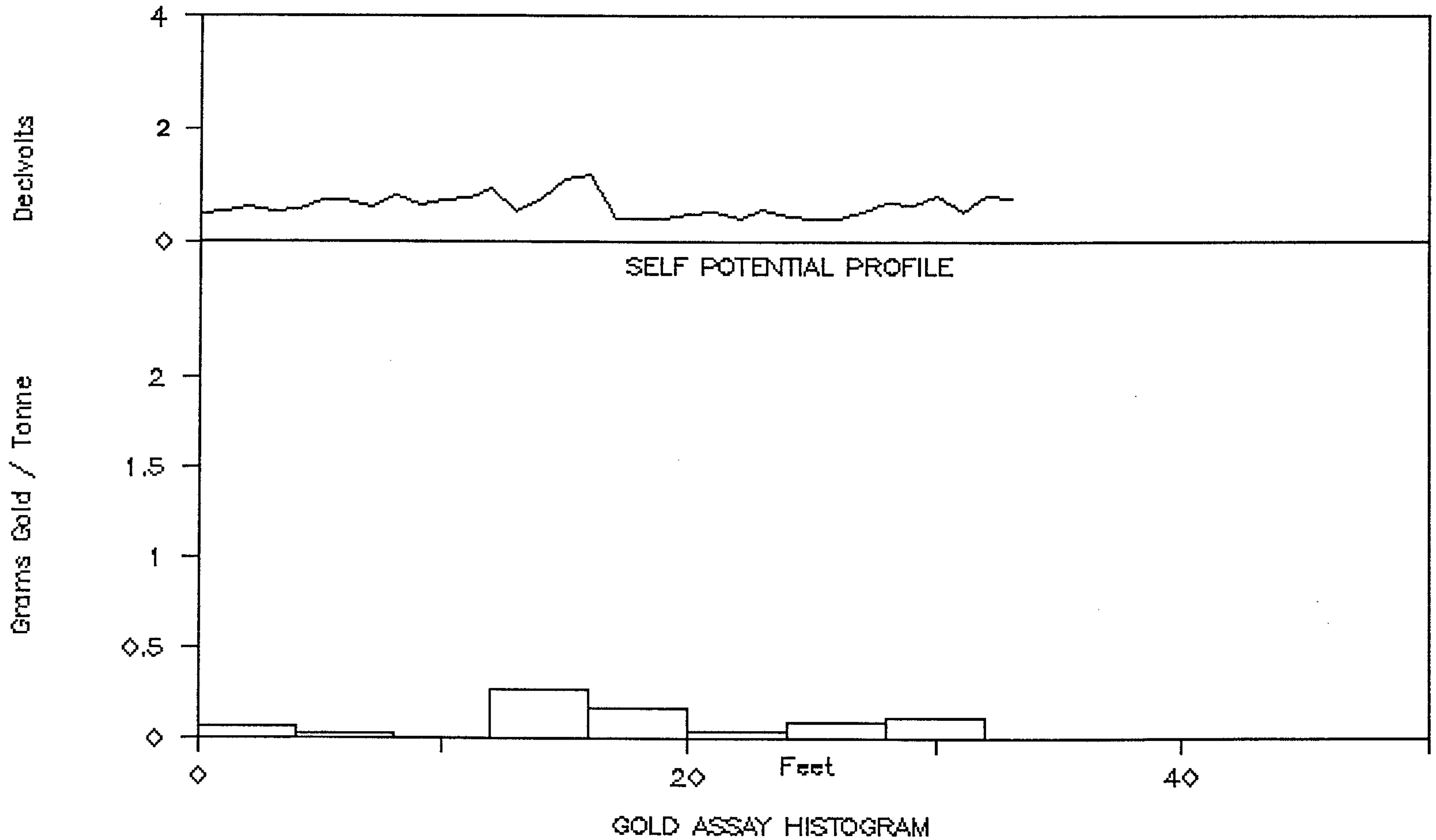

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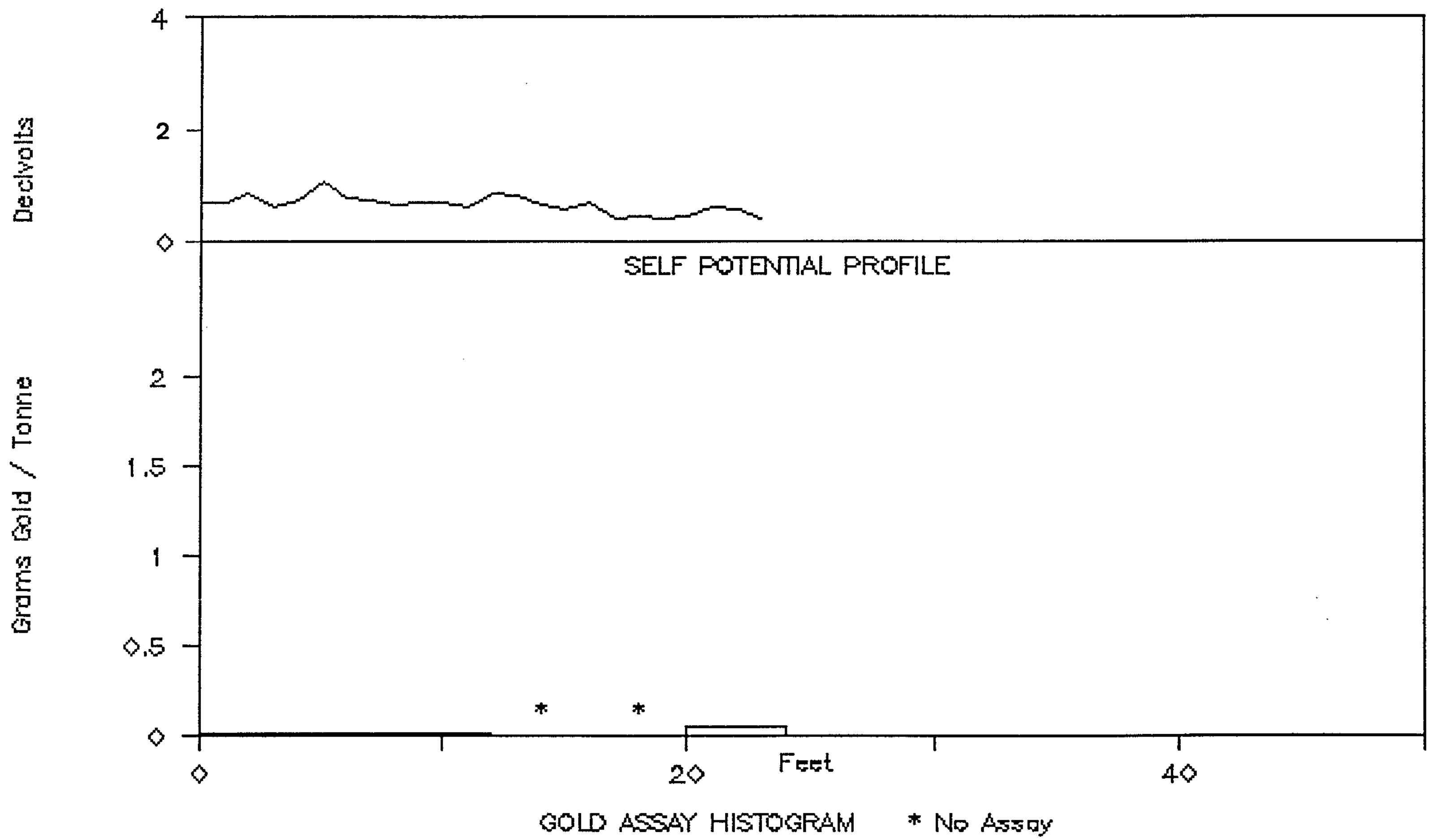

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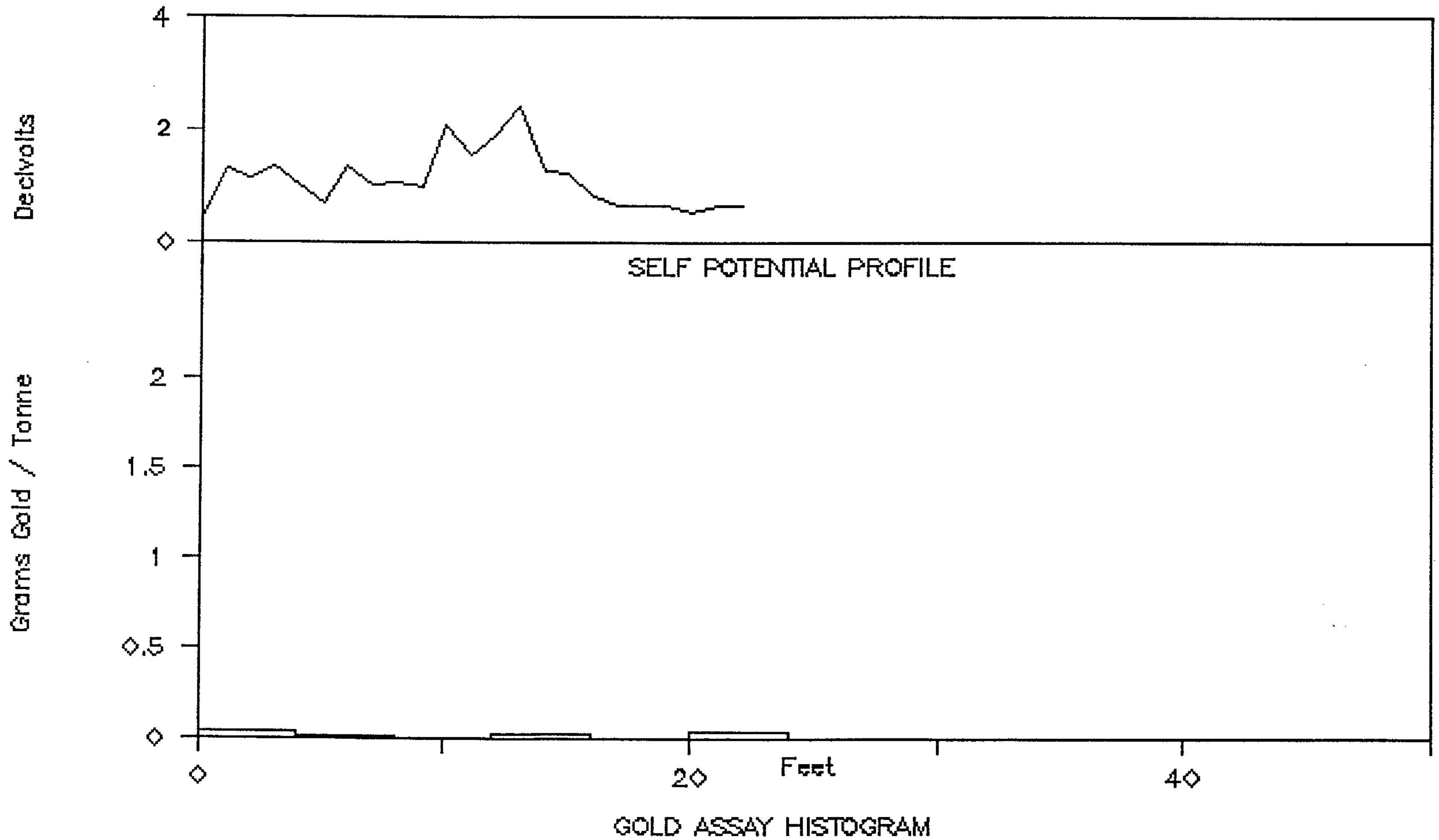

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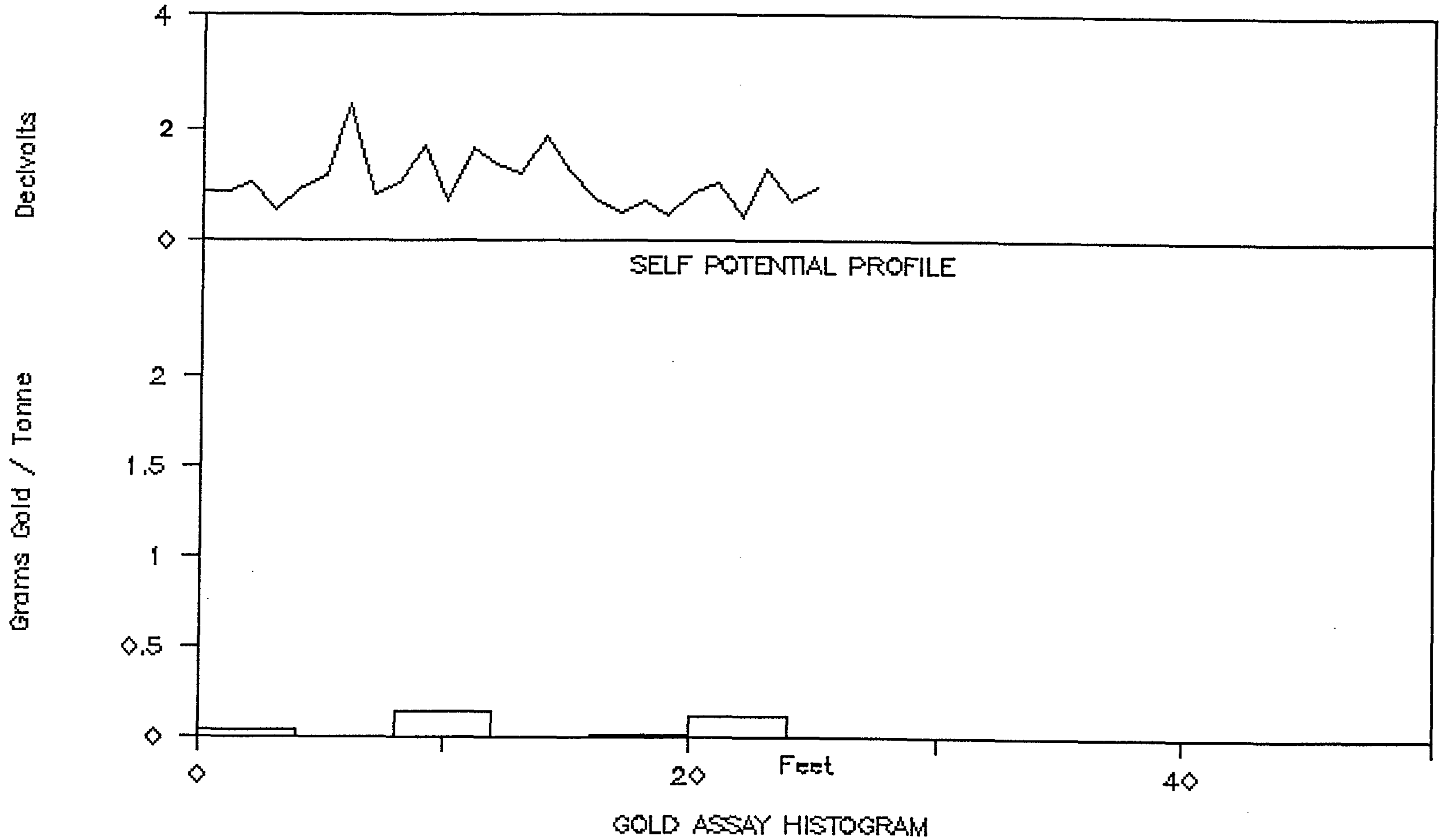

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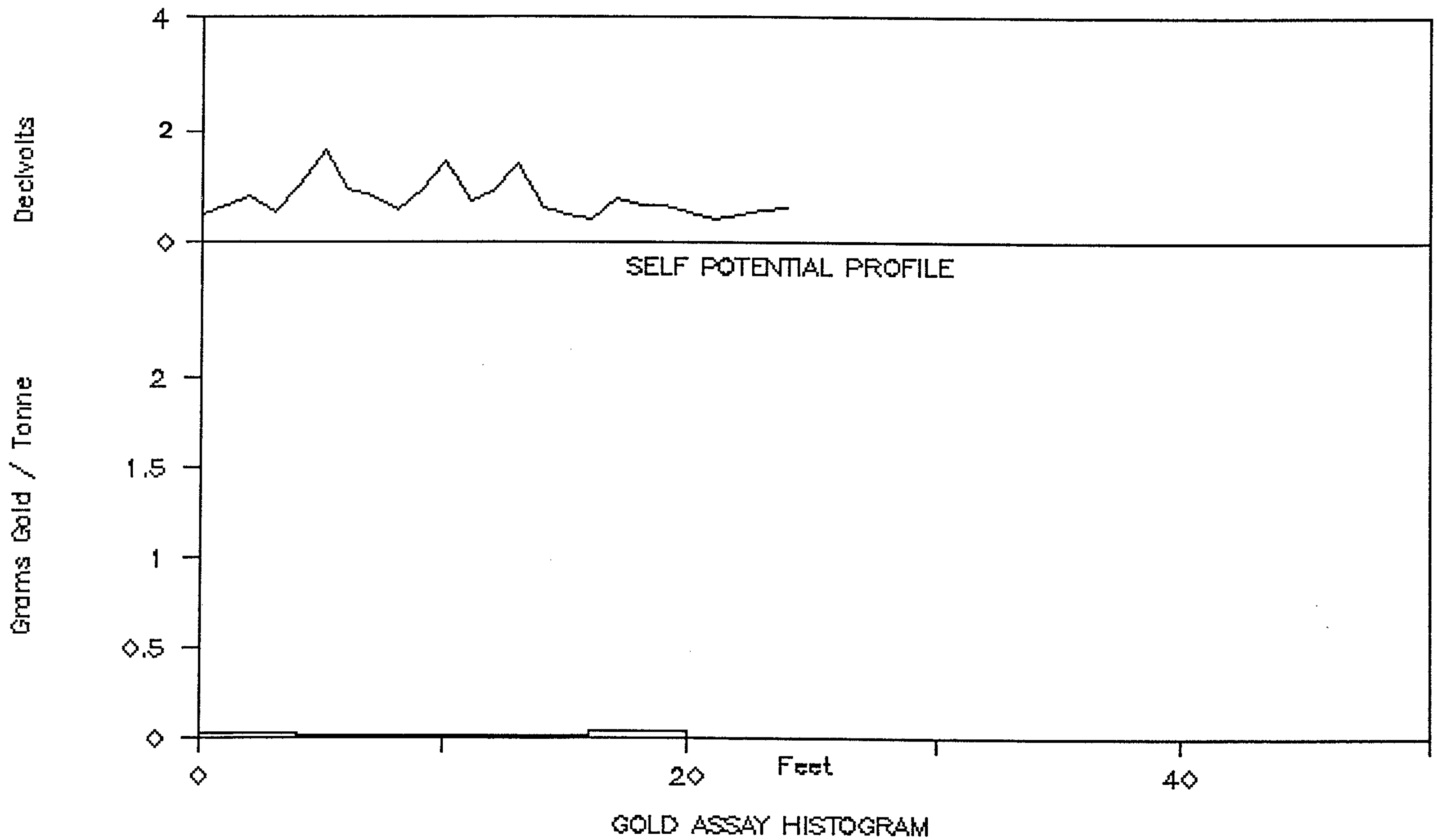

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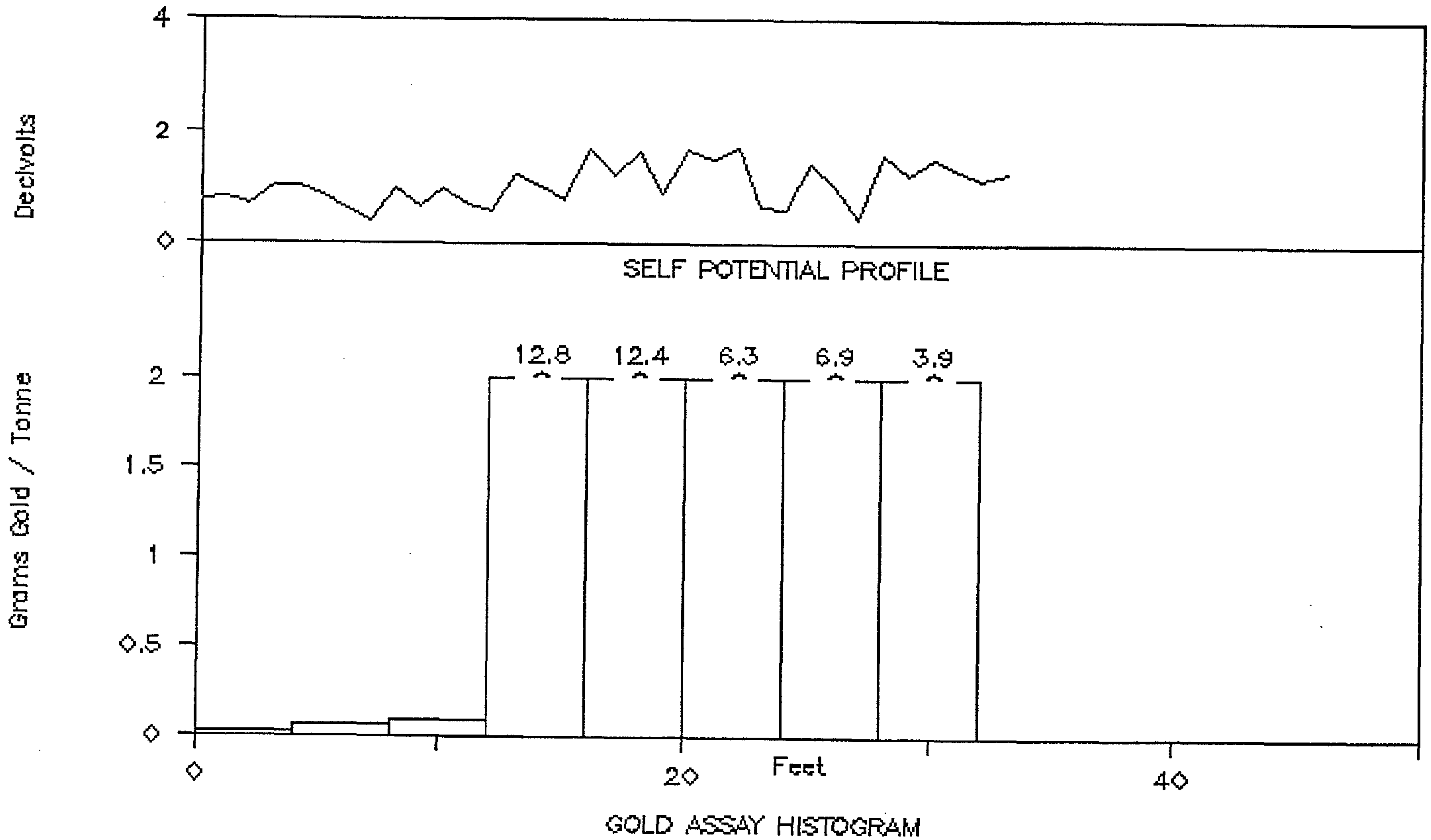
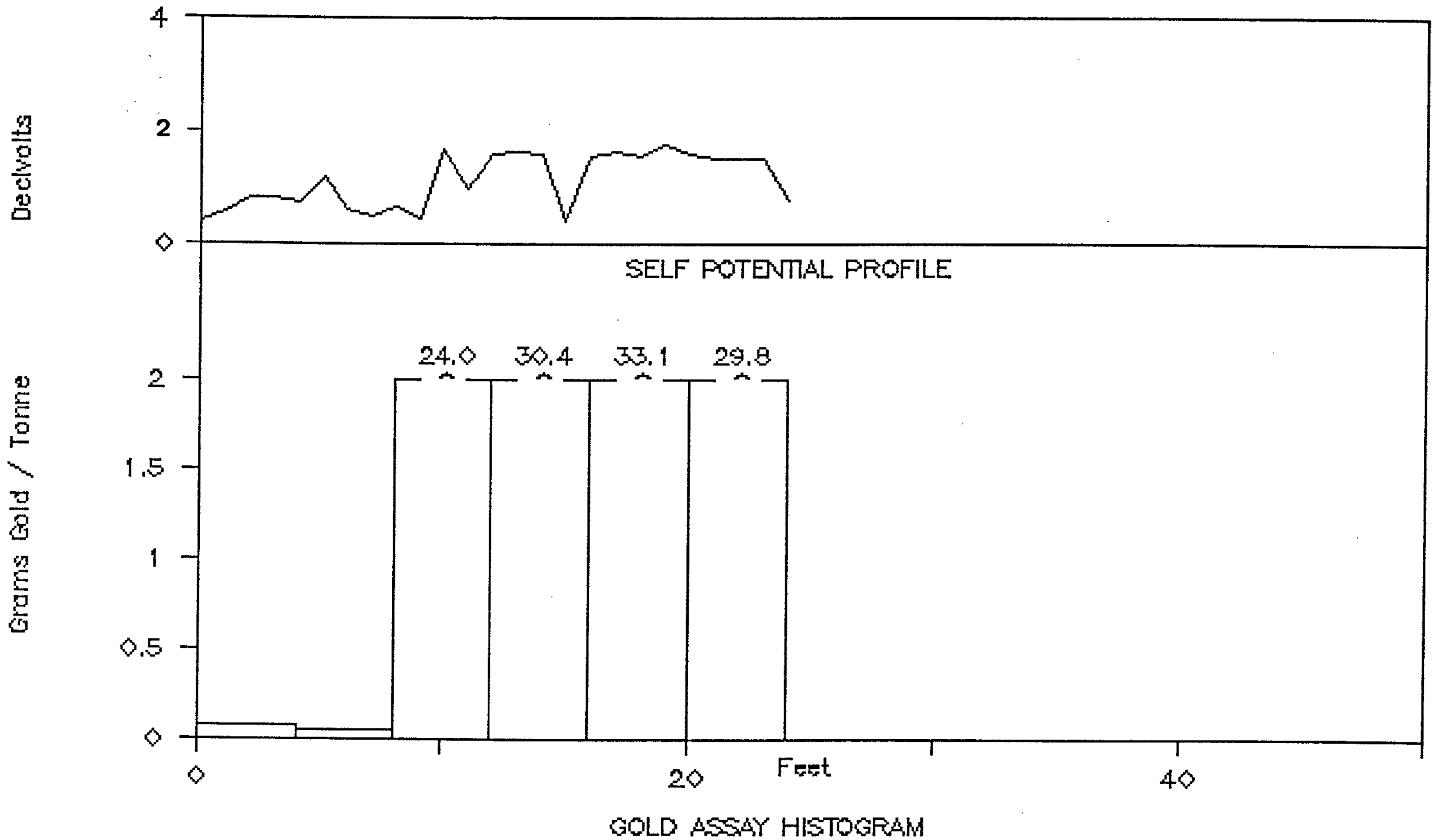


TEST HOLE T-241

TEST HOLE T-242



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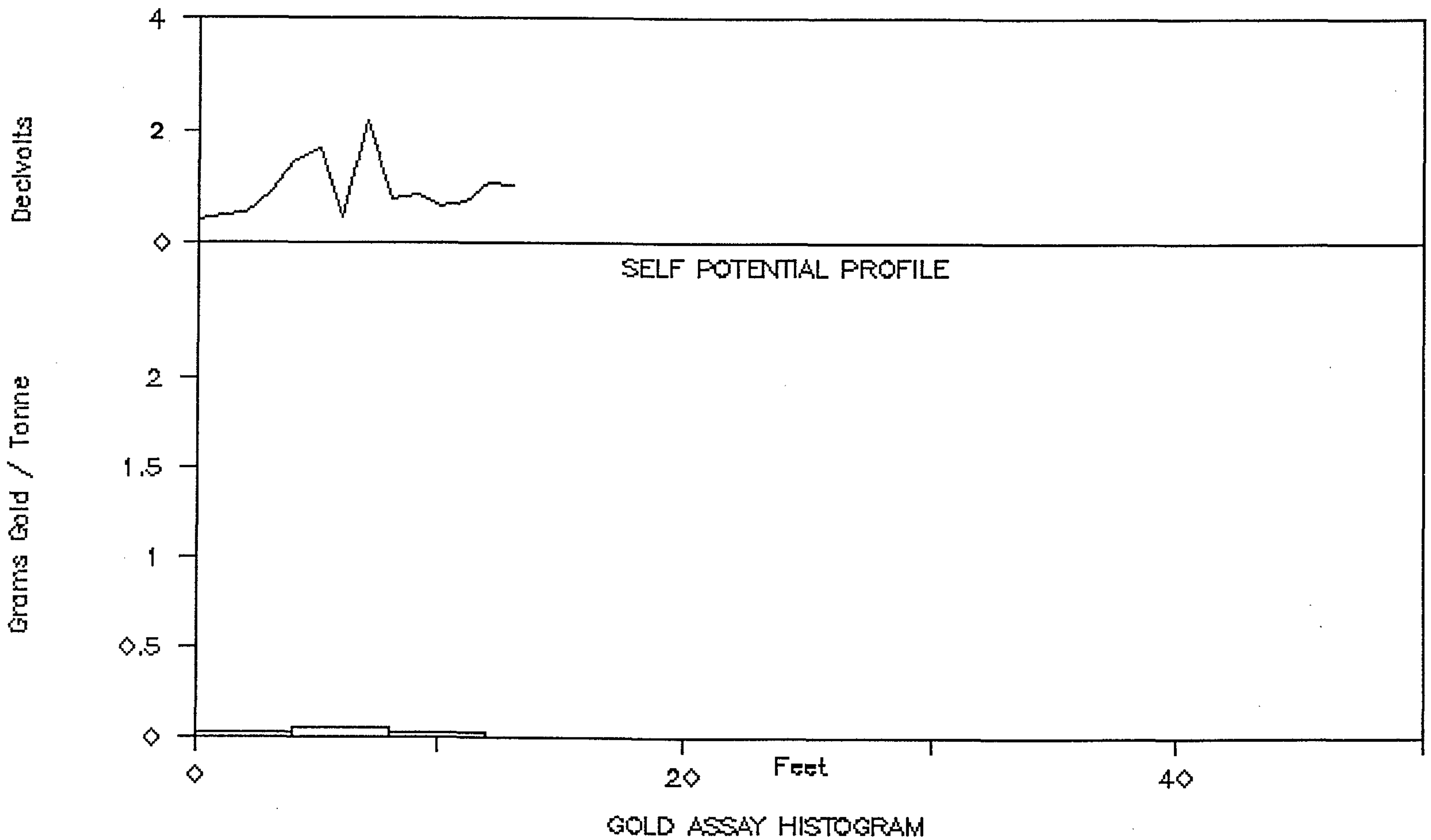

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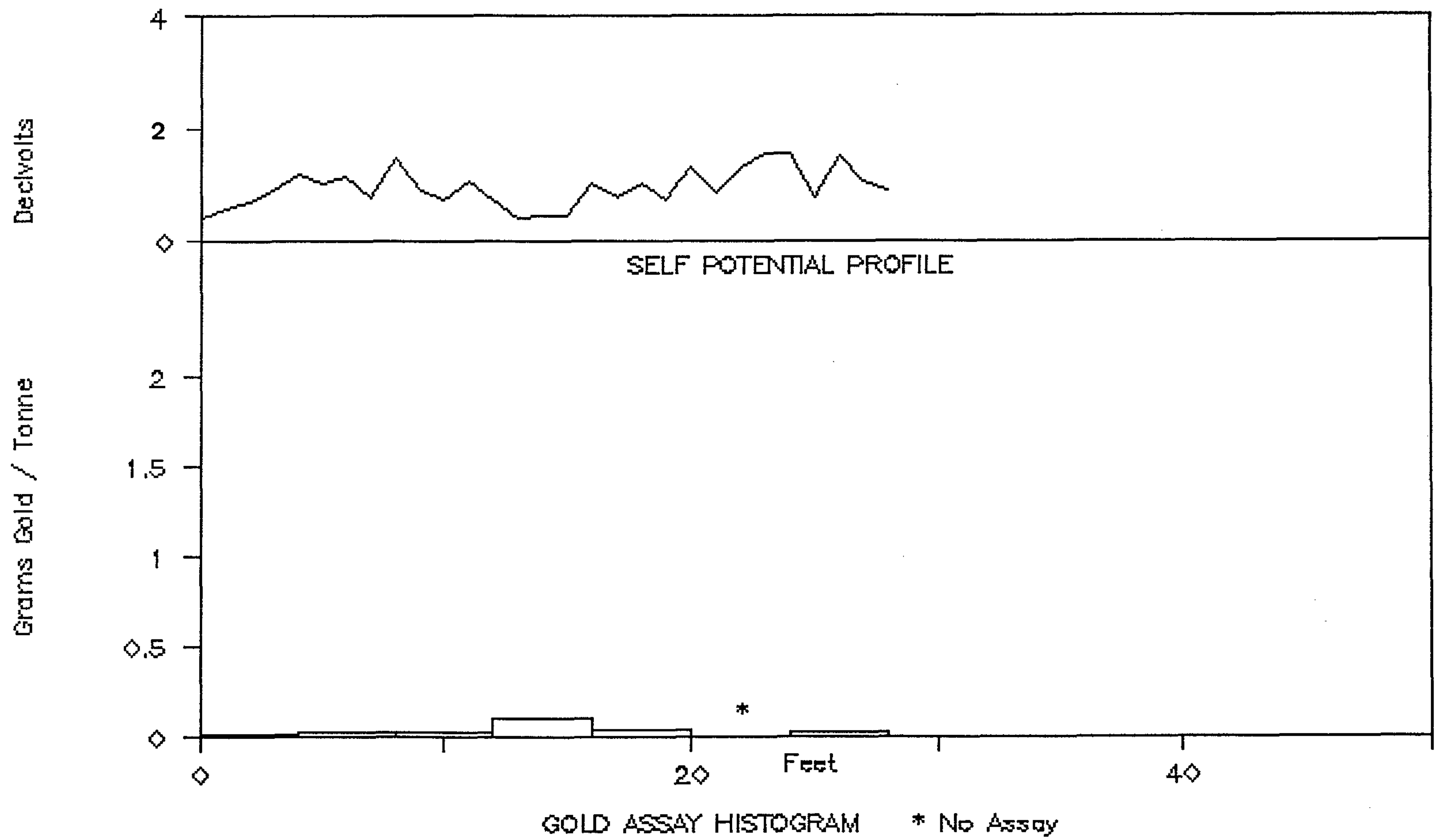

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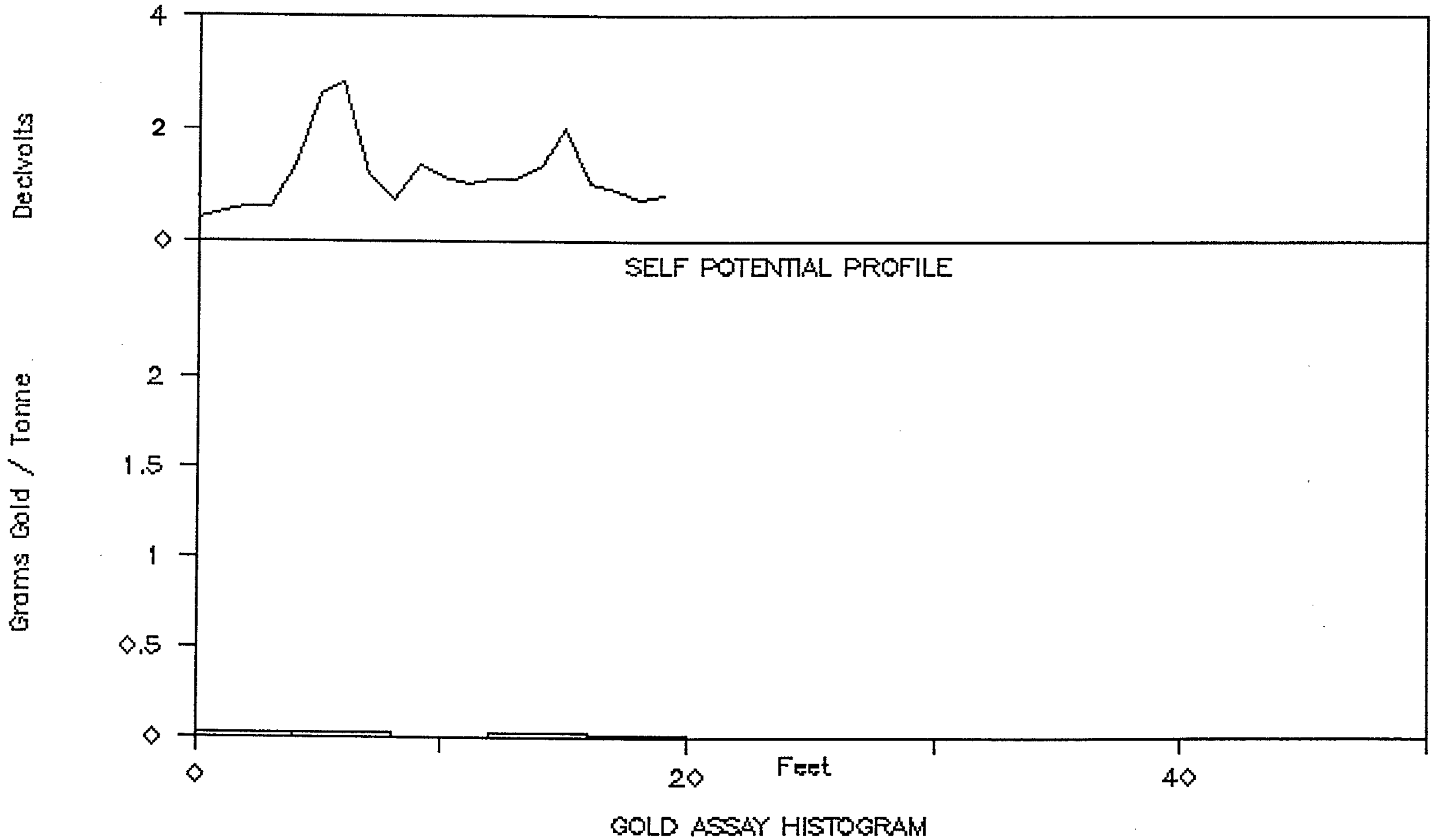
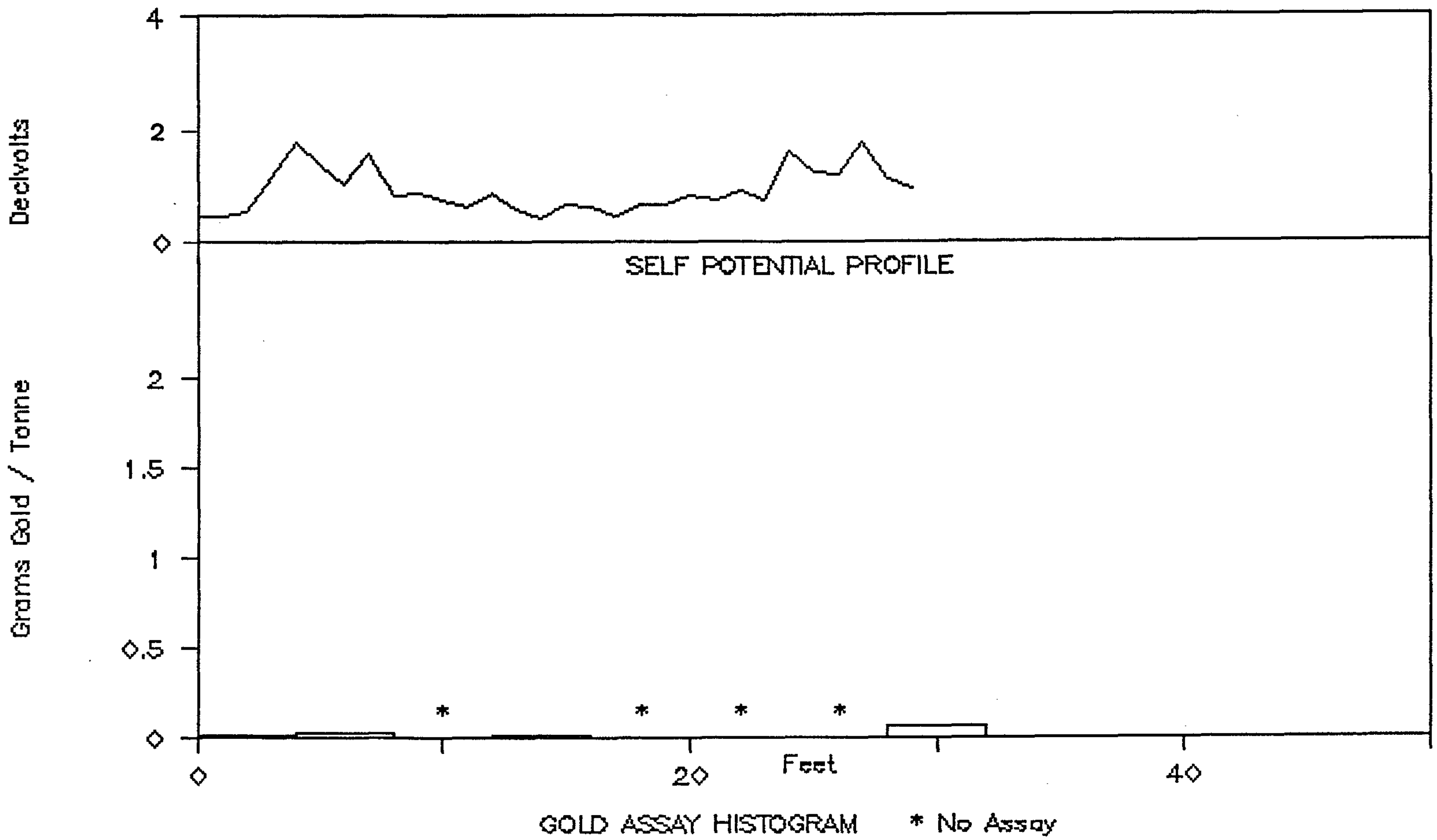
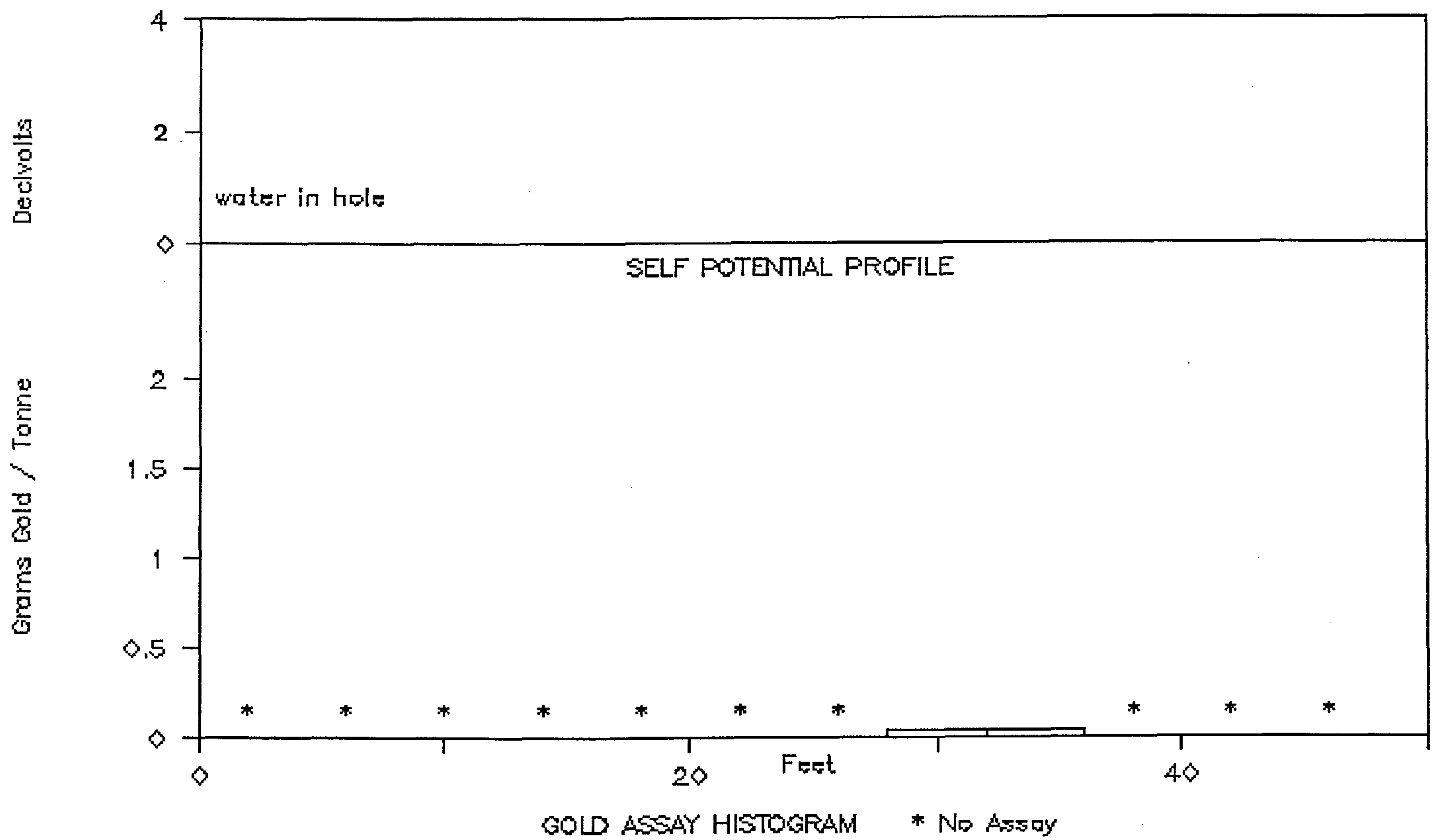


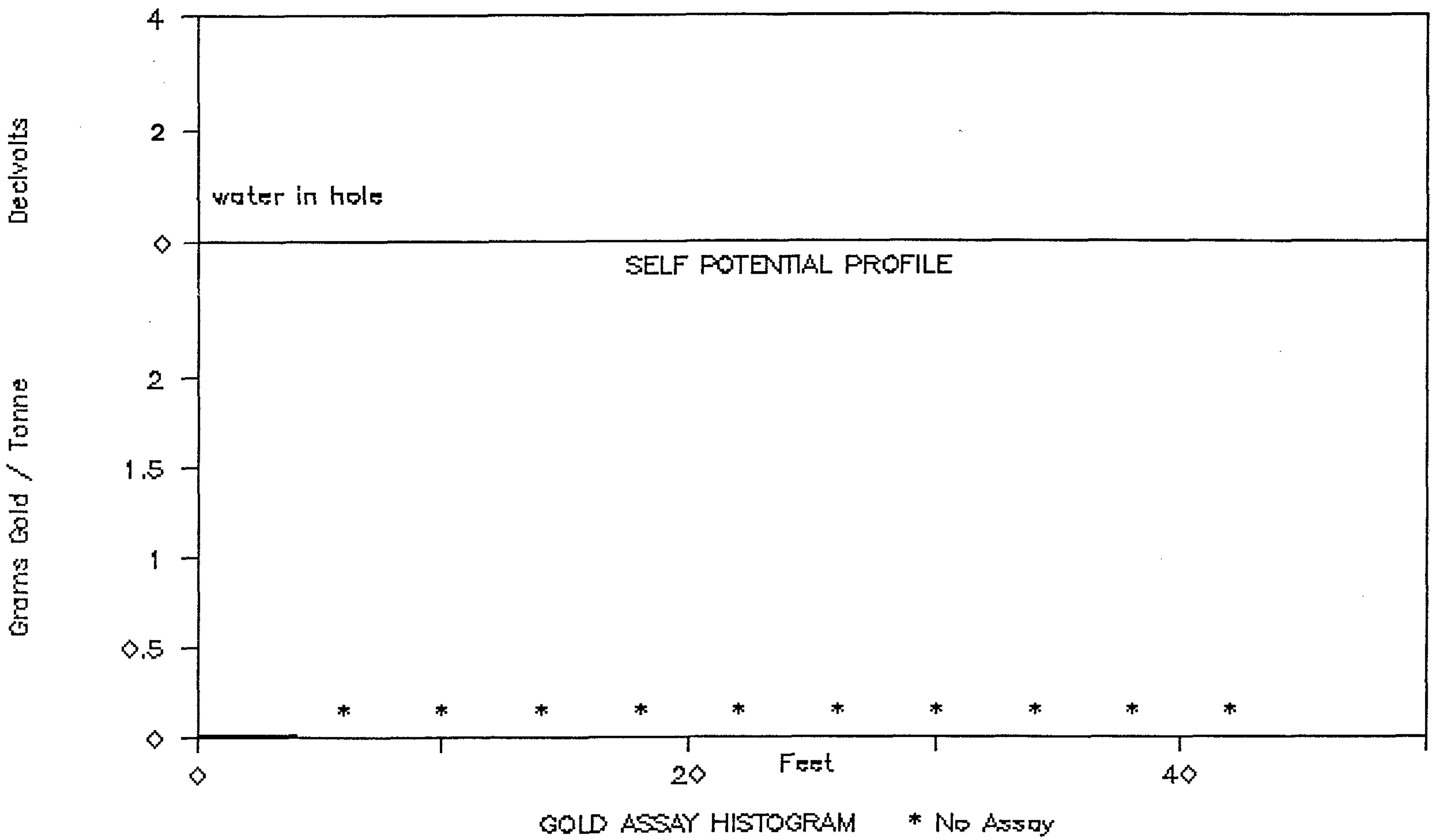
TEST HOLE T-255



TEST HOLE T-247

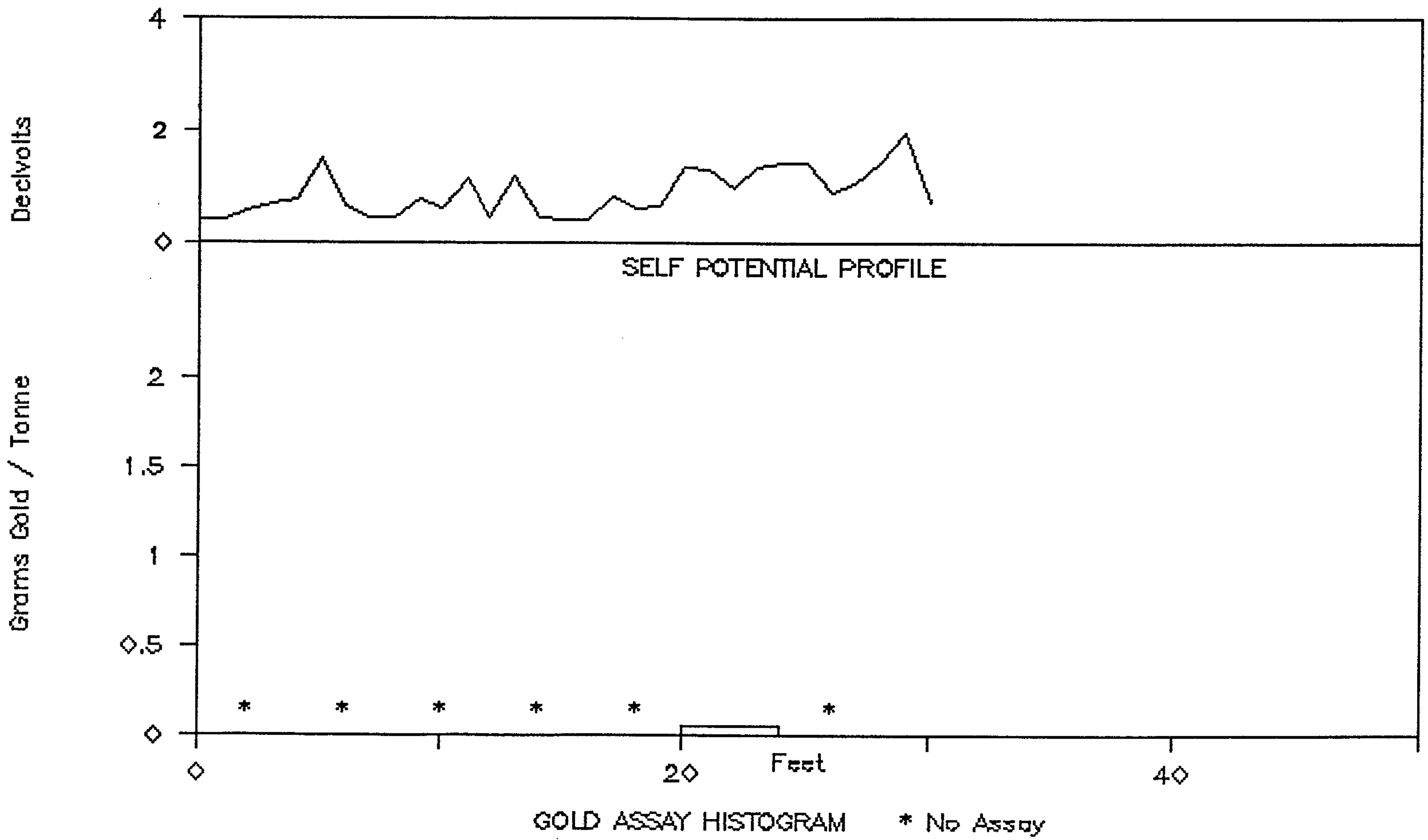


TEST HOLE T-248



TEST HOLE T-249

TEST HOLE T-250



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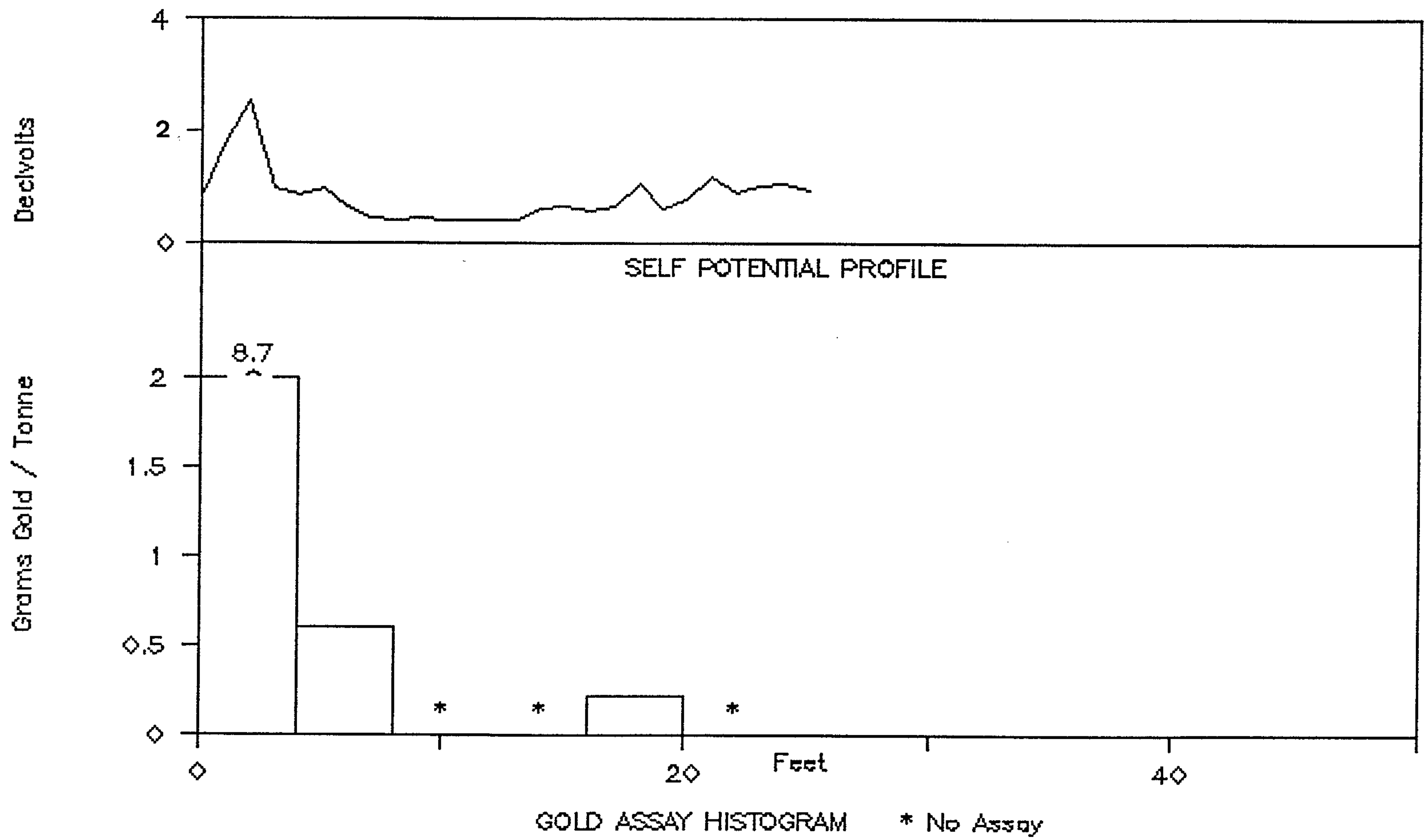

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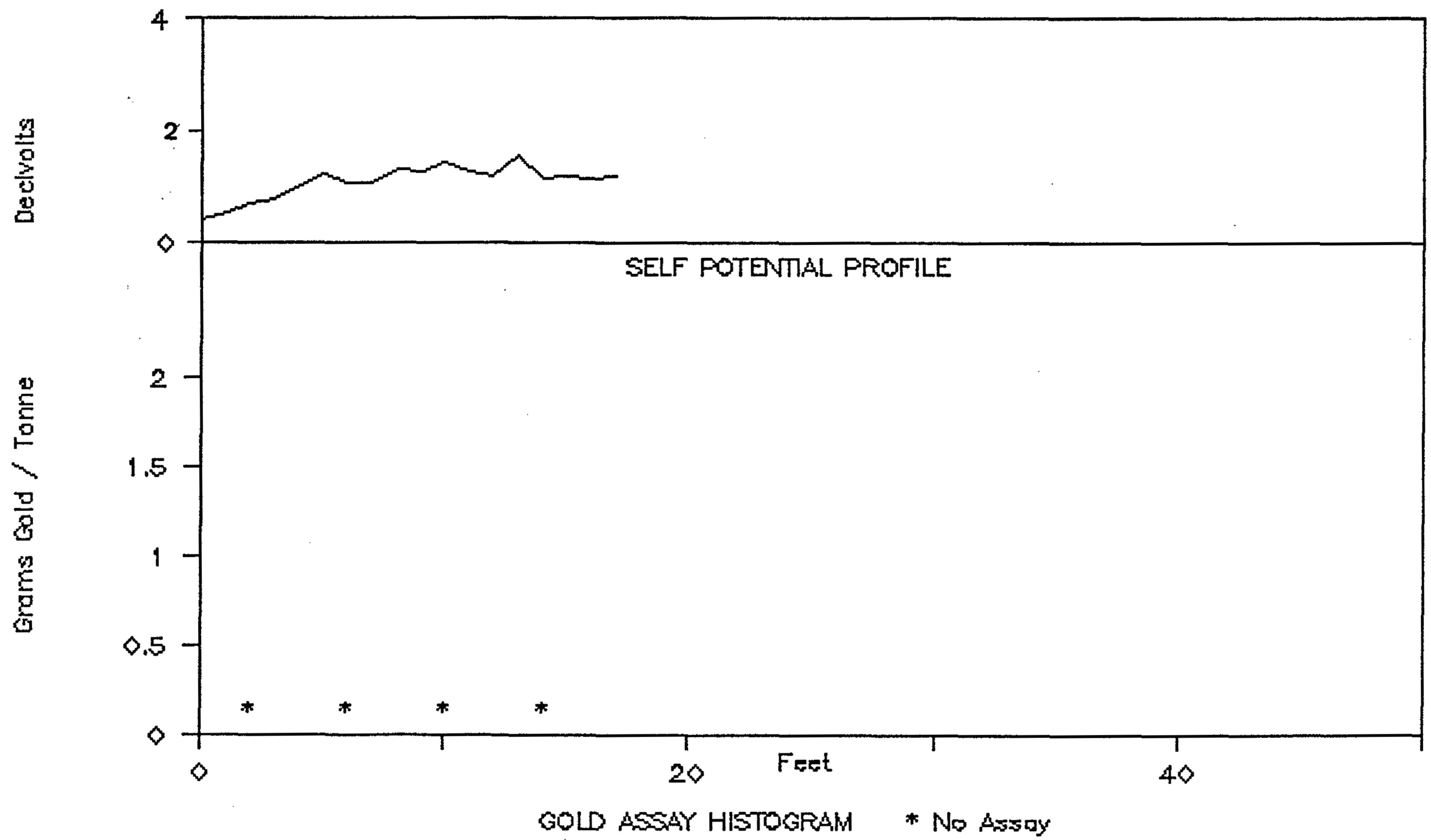

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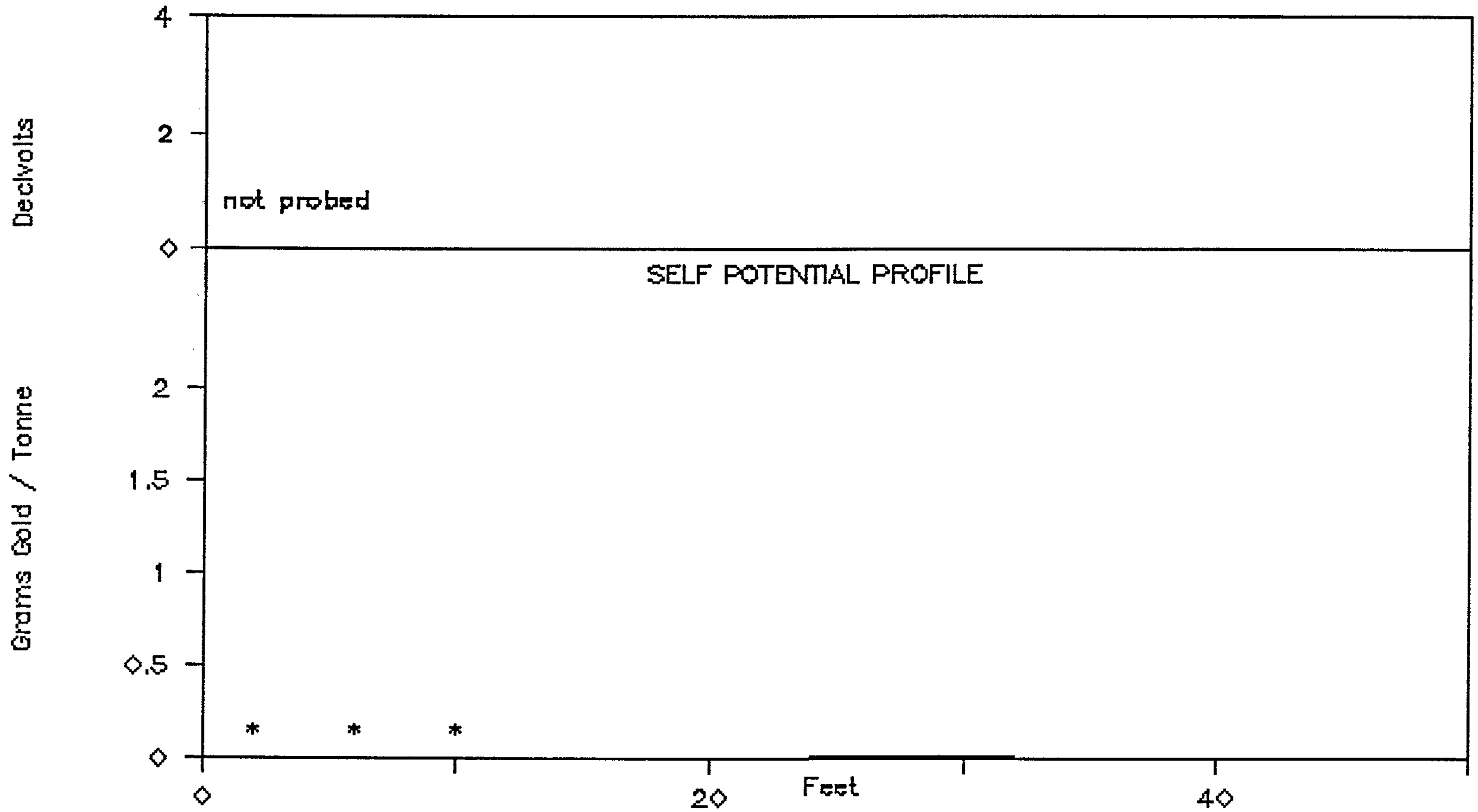
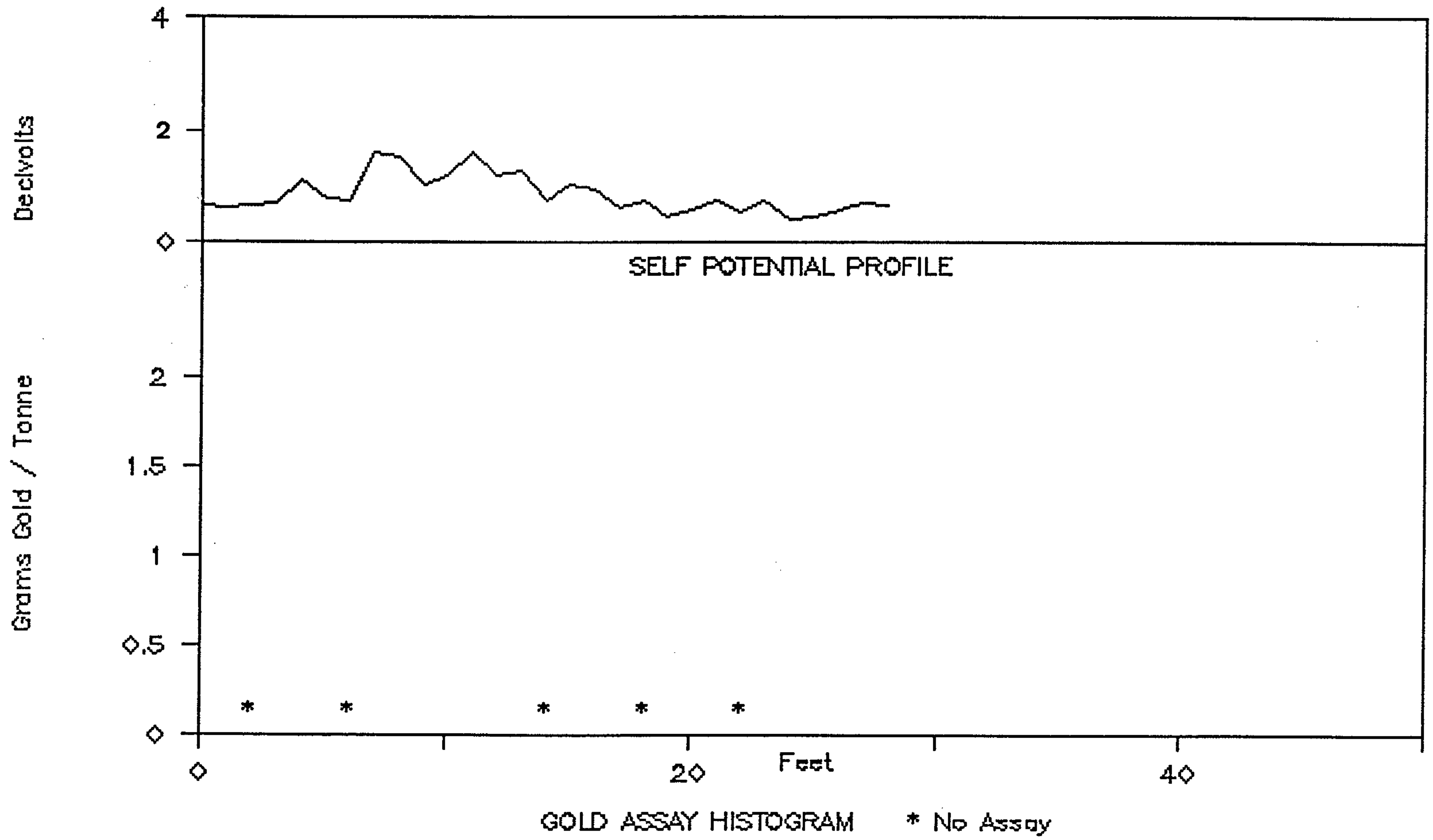
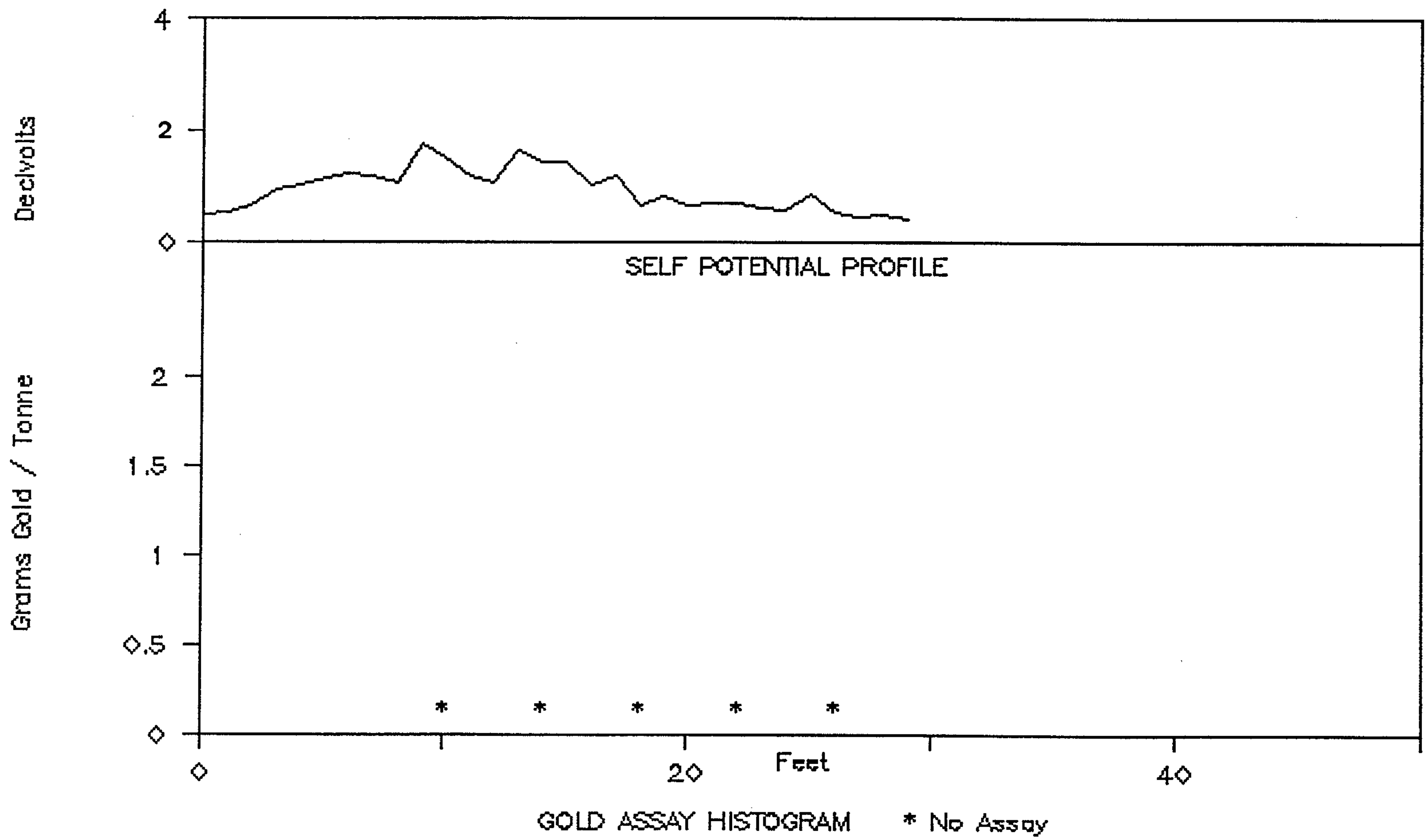


GOLD ASSAY HISTOGRAM * No Assay

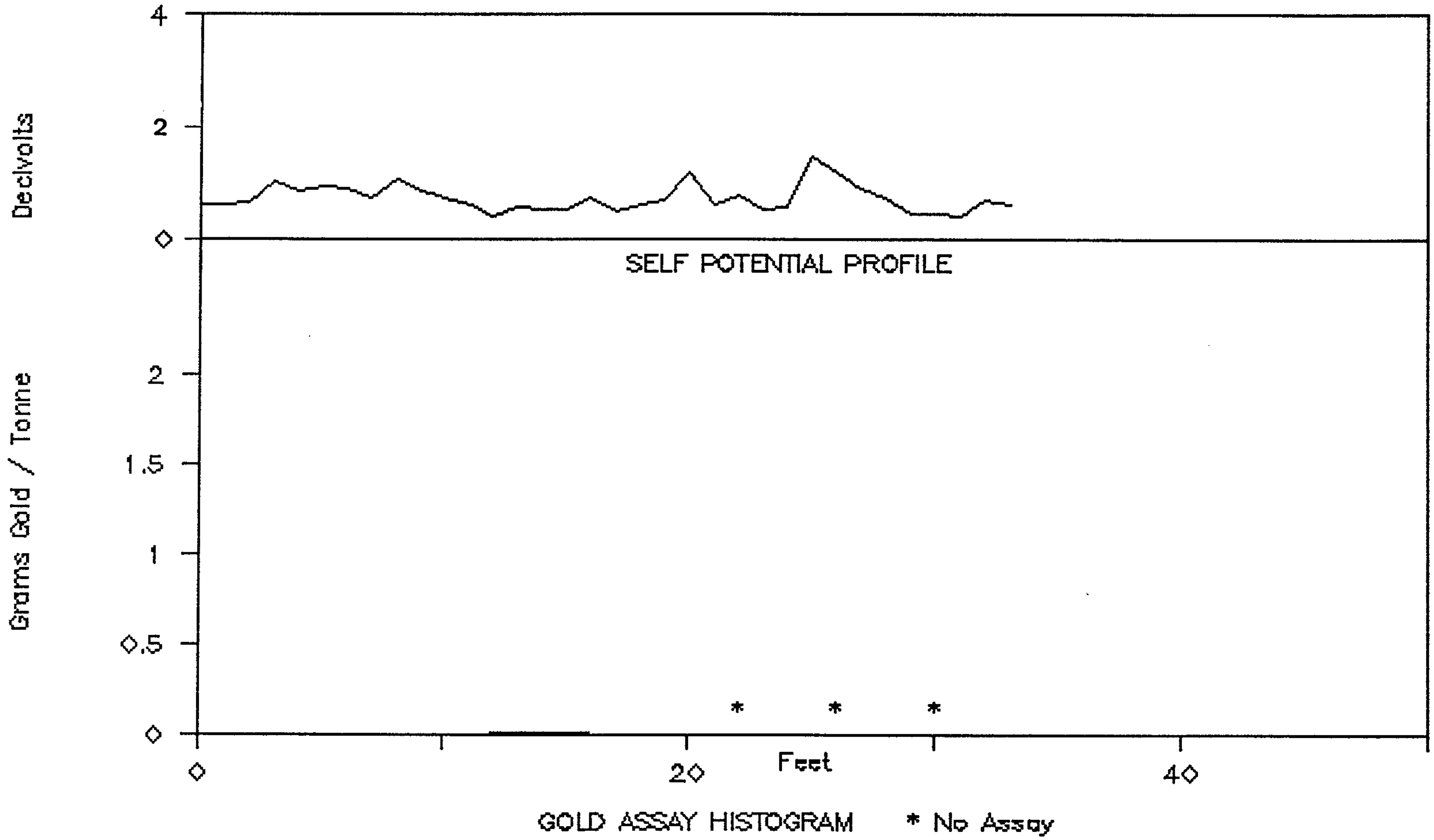
TEST HOLE T-257



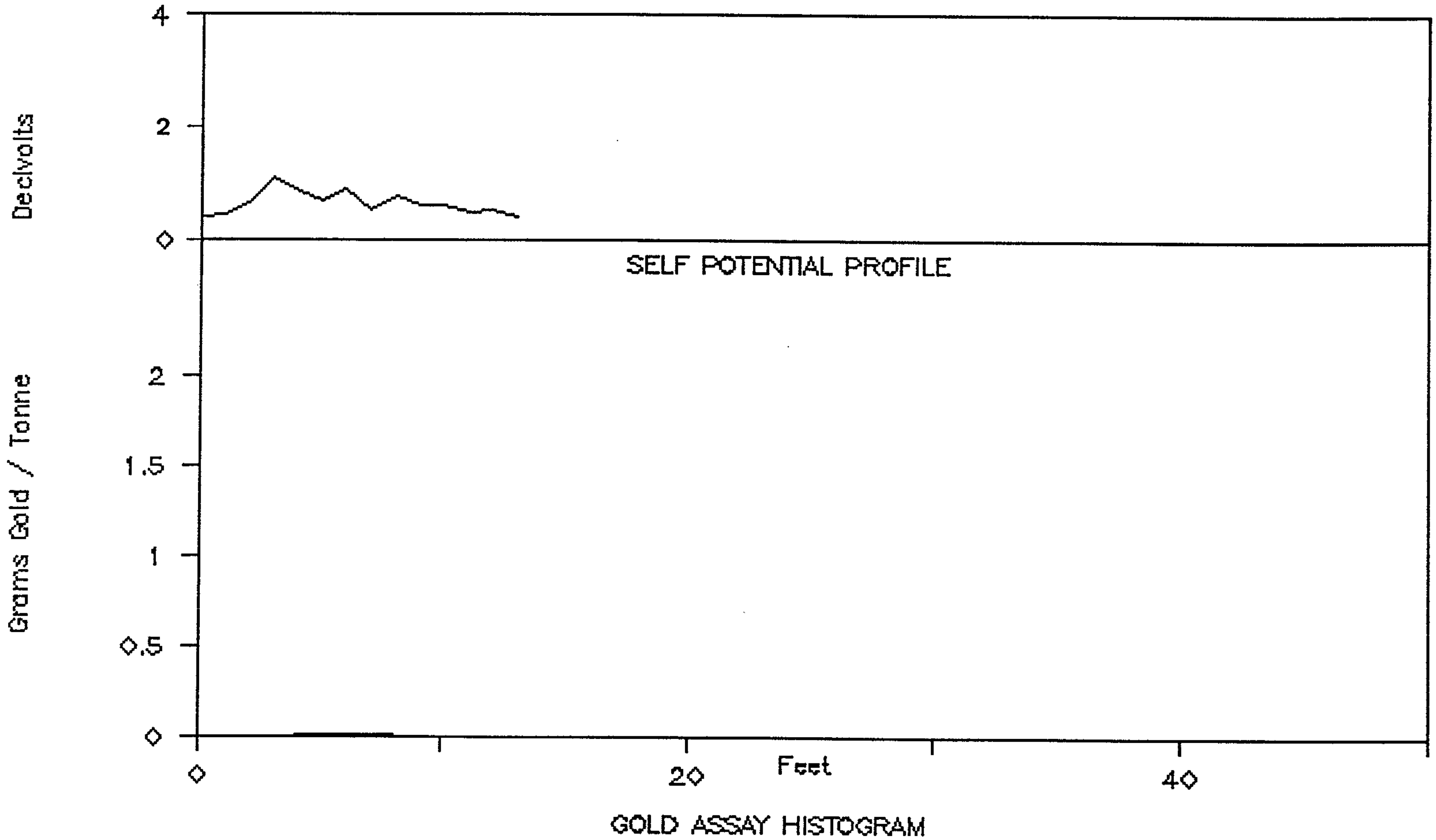
TEST HOLE T-258



TEST HOLE T-259

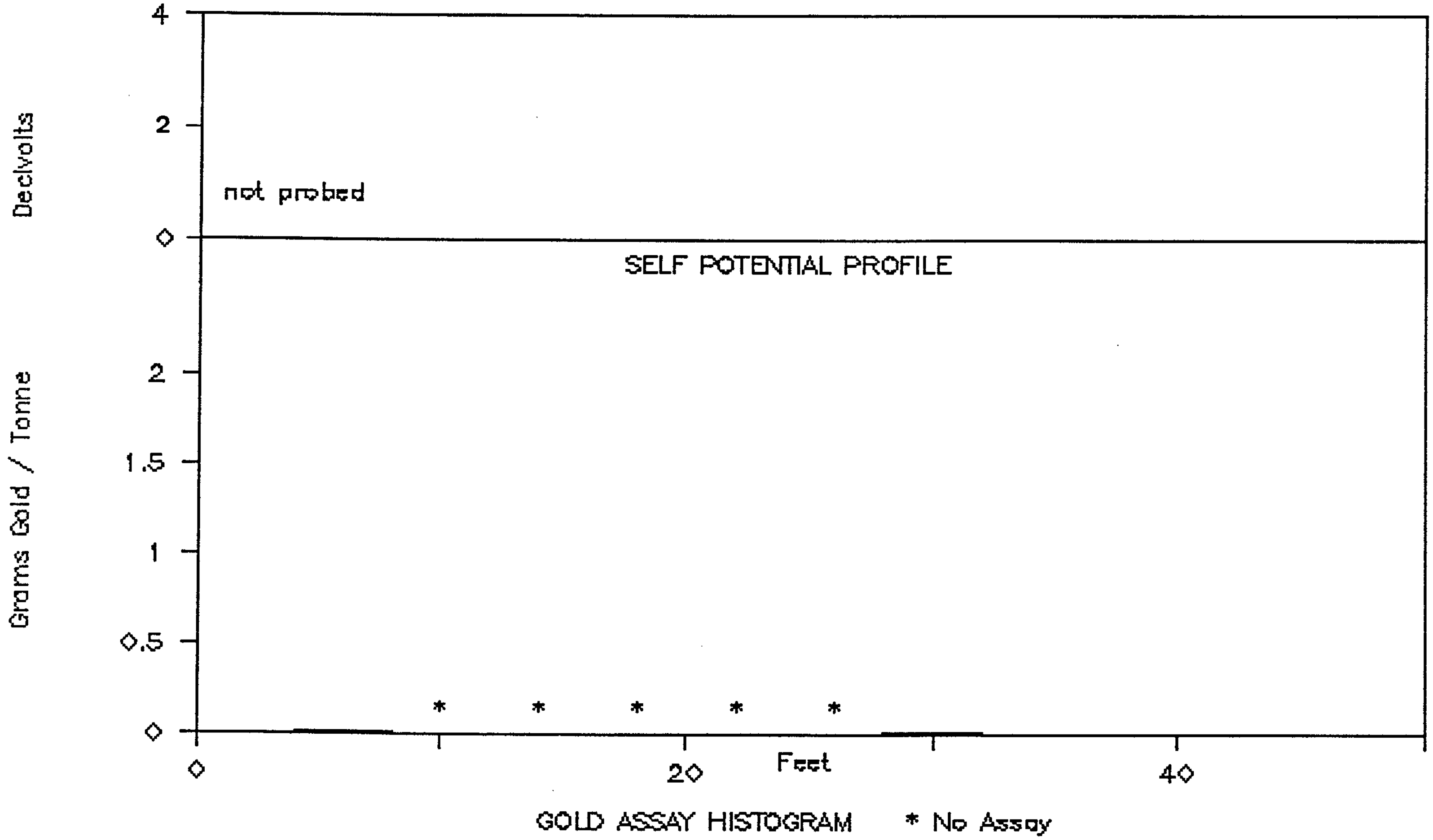


TEST HOLE T-260



TEST HOLE T-261

TEST HOLE T-262



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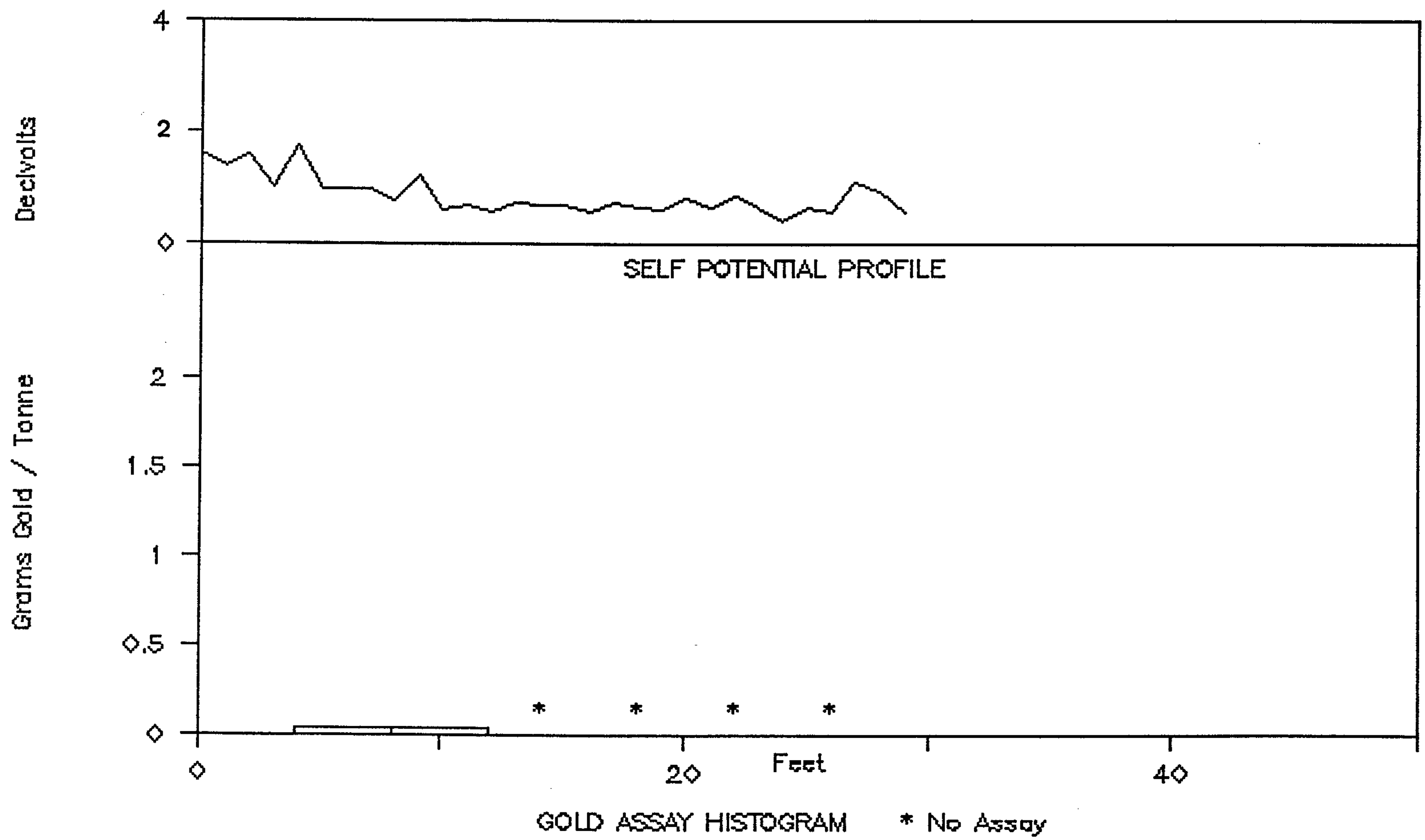
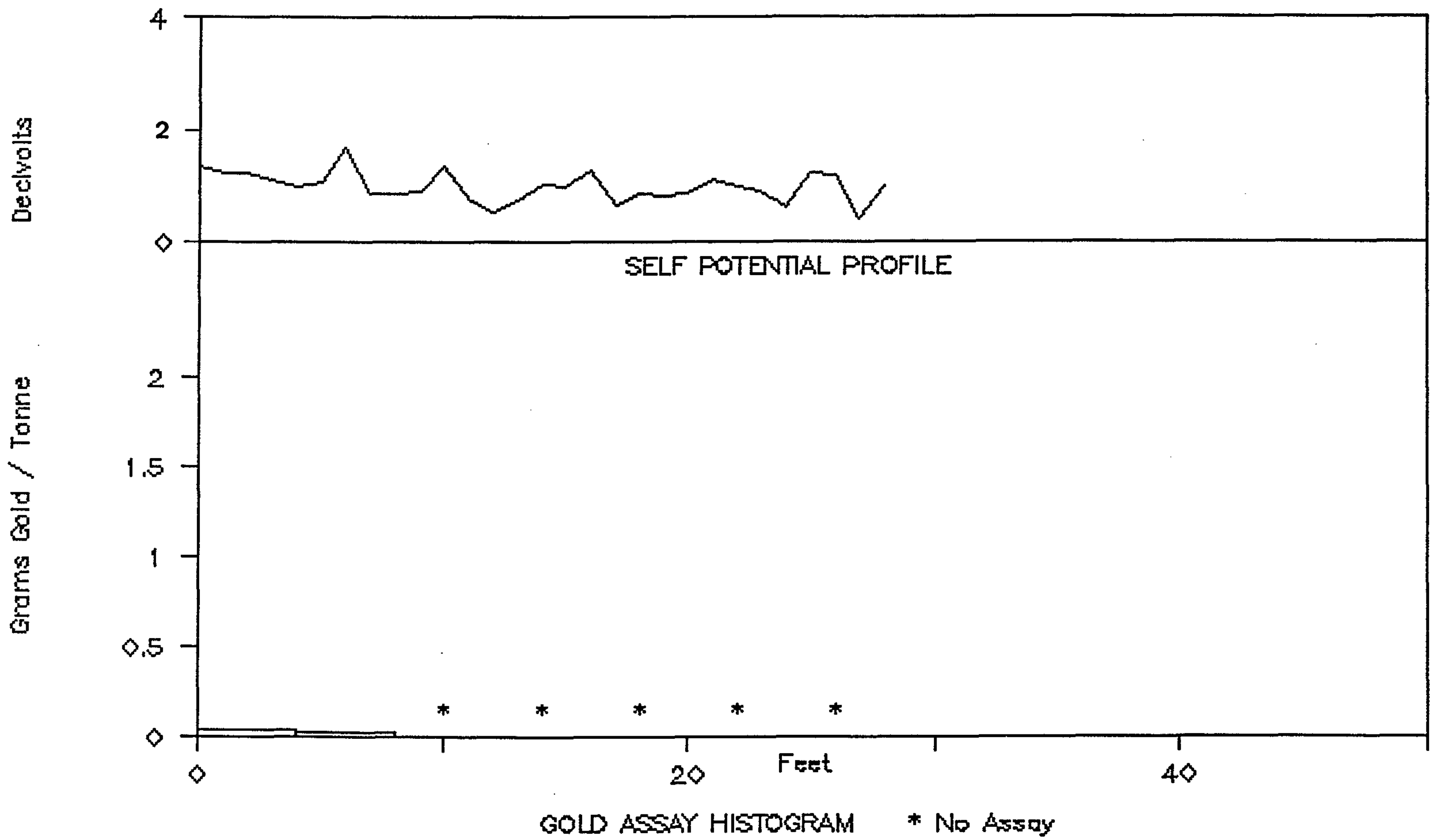
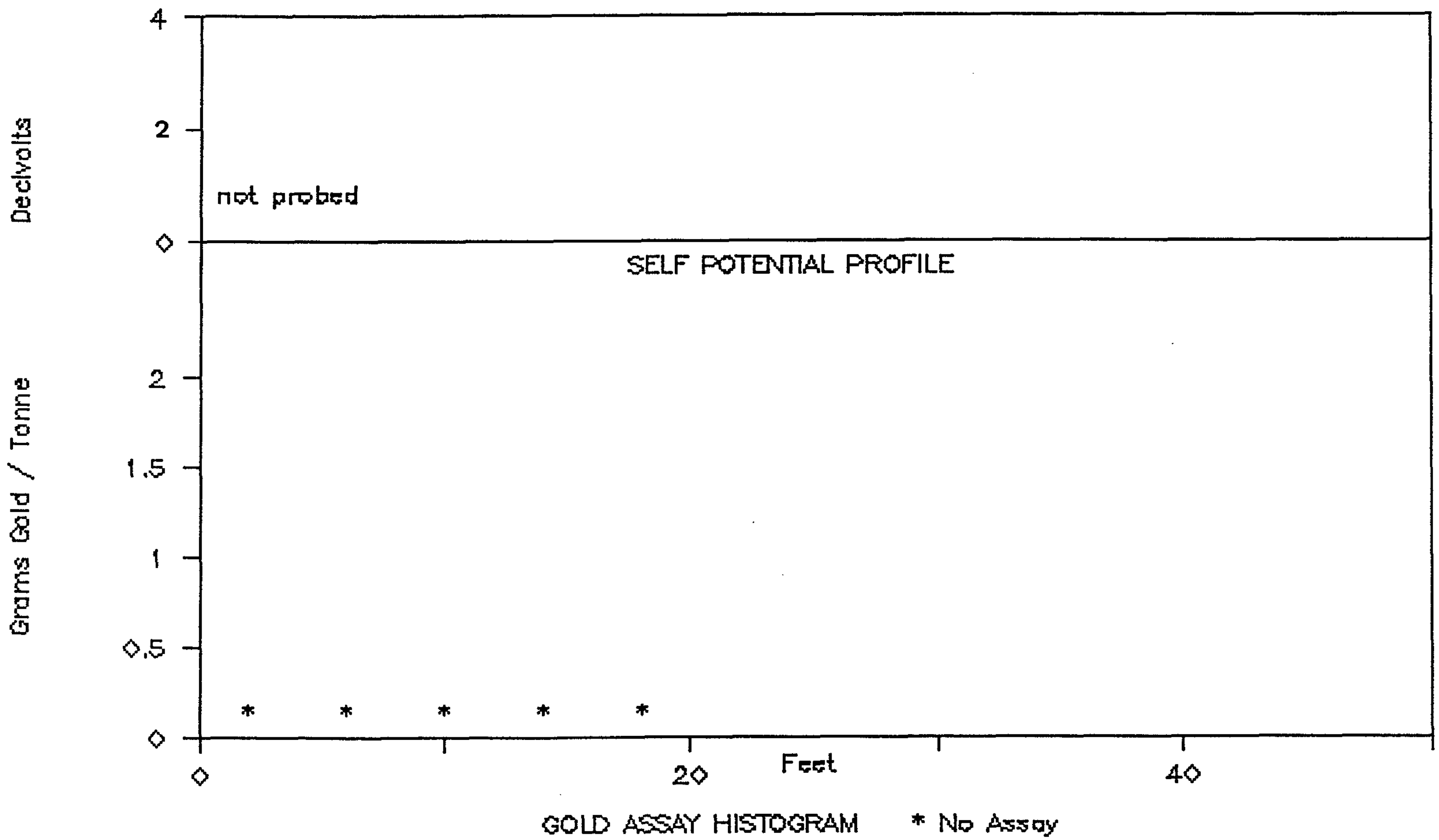


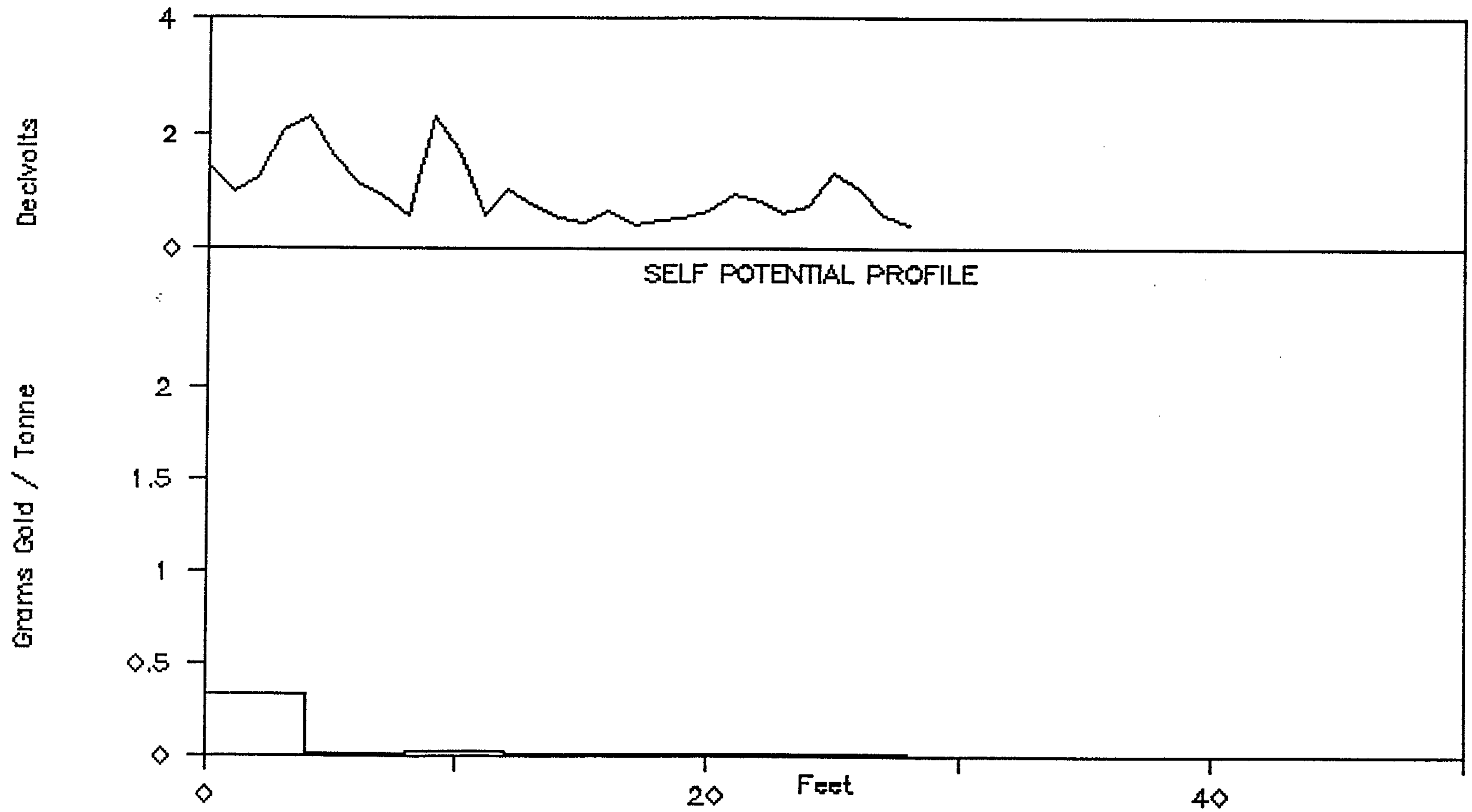
TEST HOLE T-264



TEST HOLE T-267

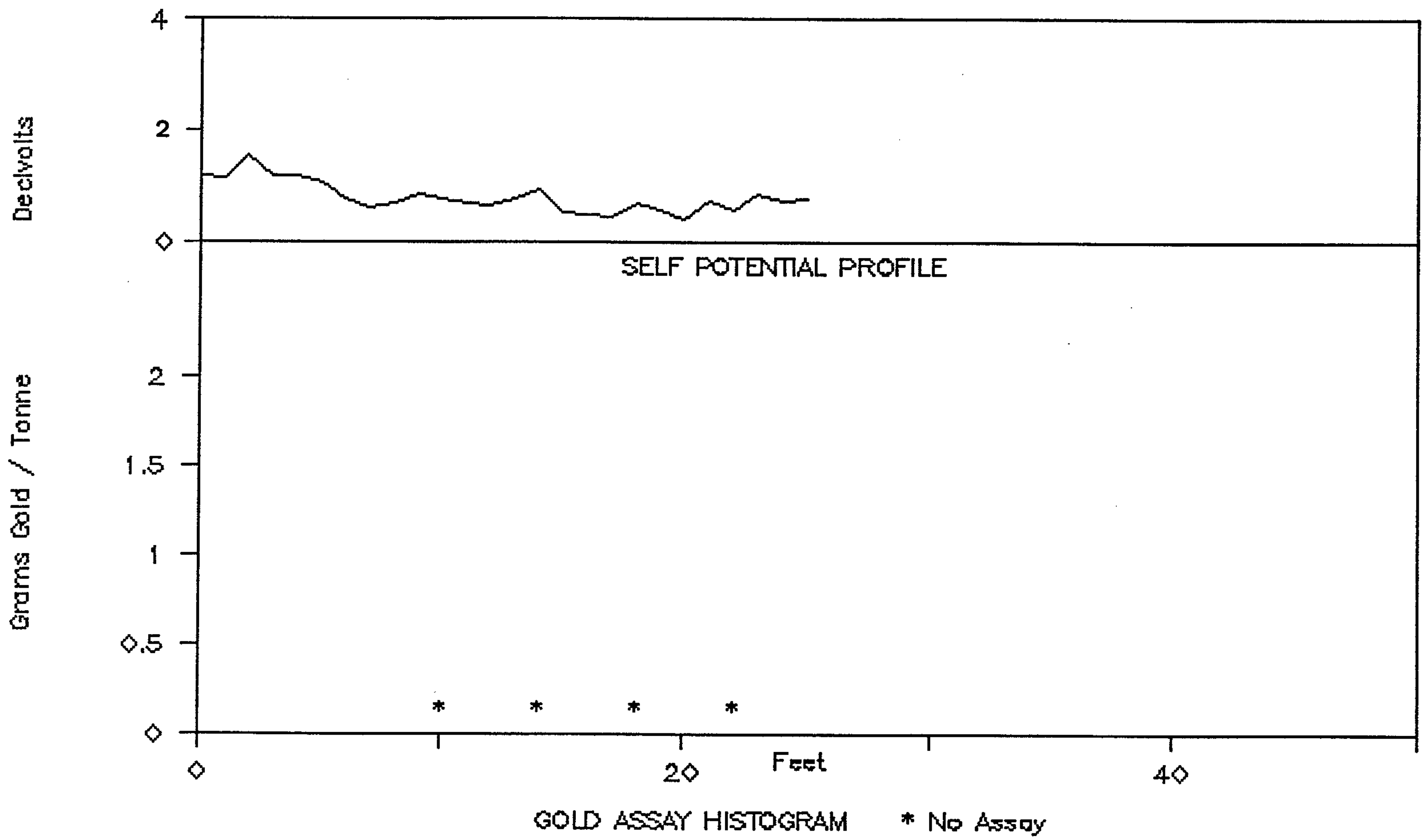


TEST HOLE T-268

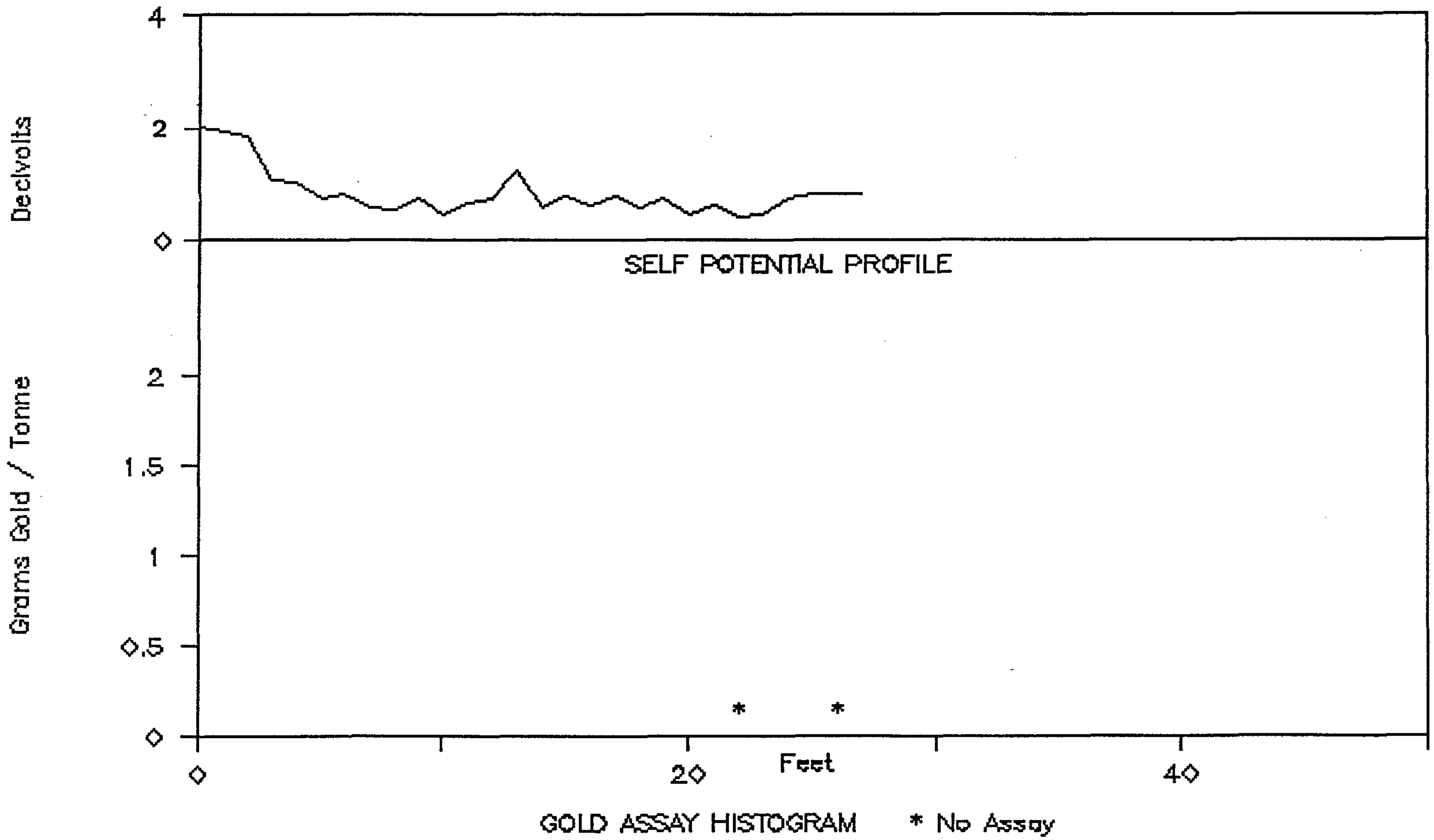


GOLD ASSAY HISTOGRAM

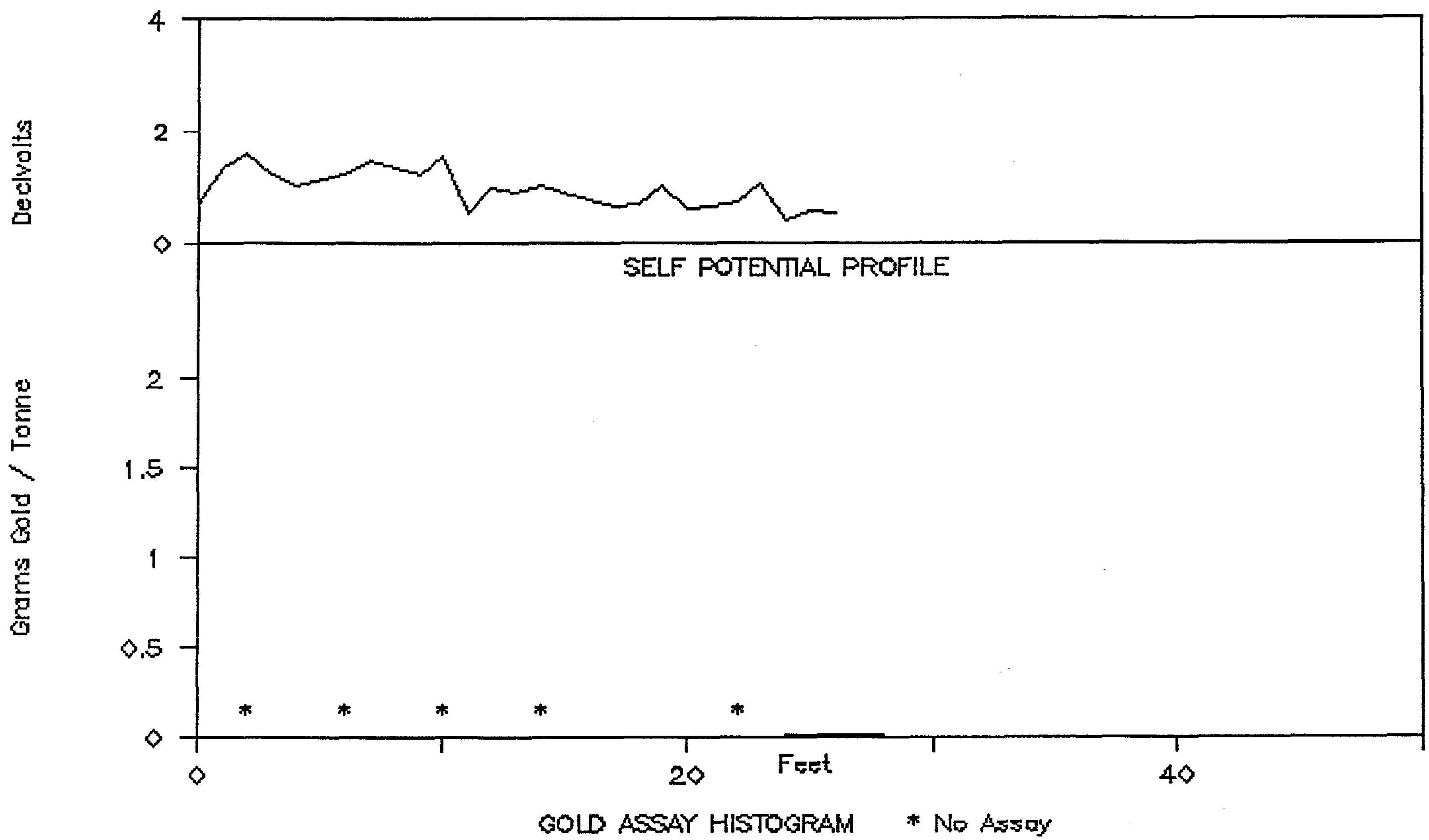
TEST HOLE T-269



TEST HOLE T-270

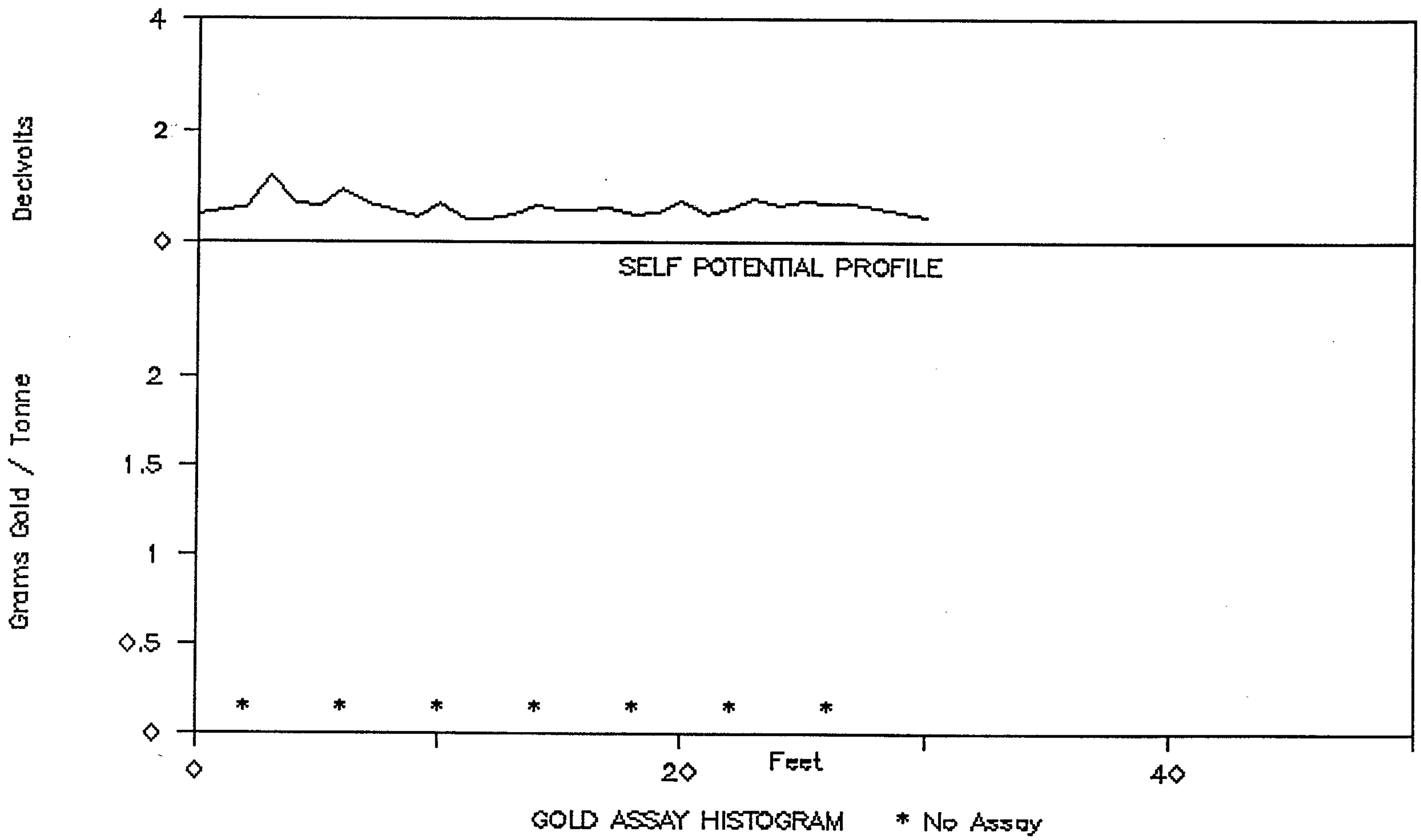


TEST HOLE T-271



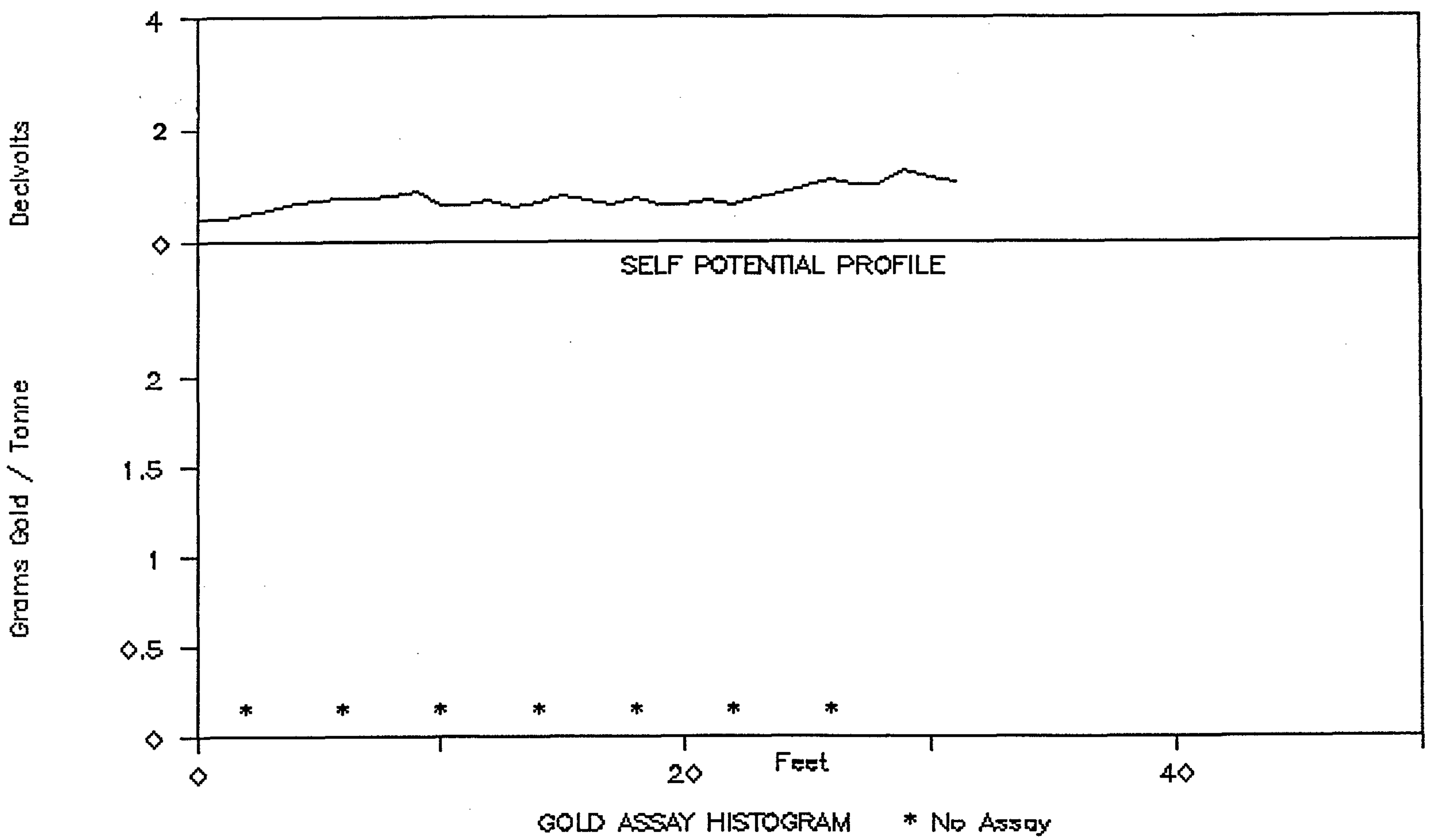
TEST HOLE T-272

TEST HOLE T-273

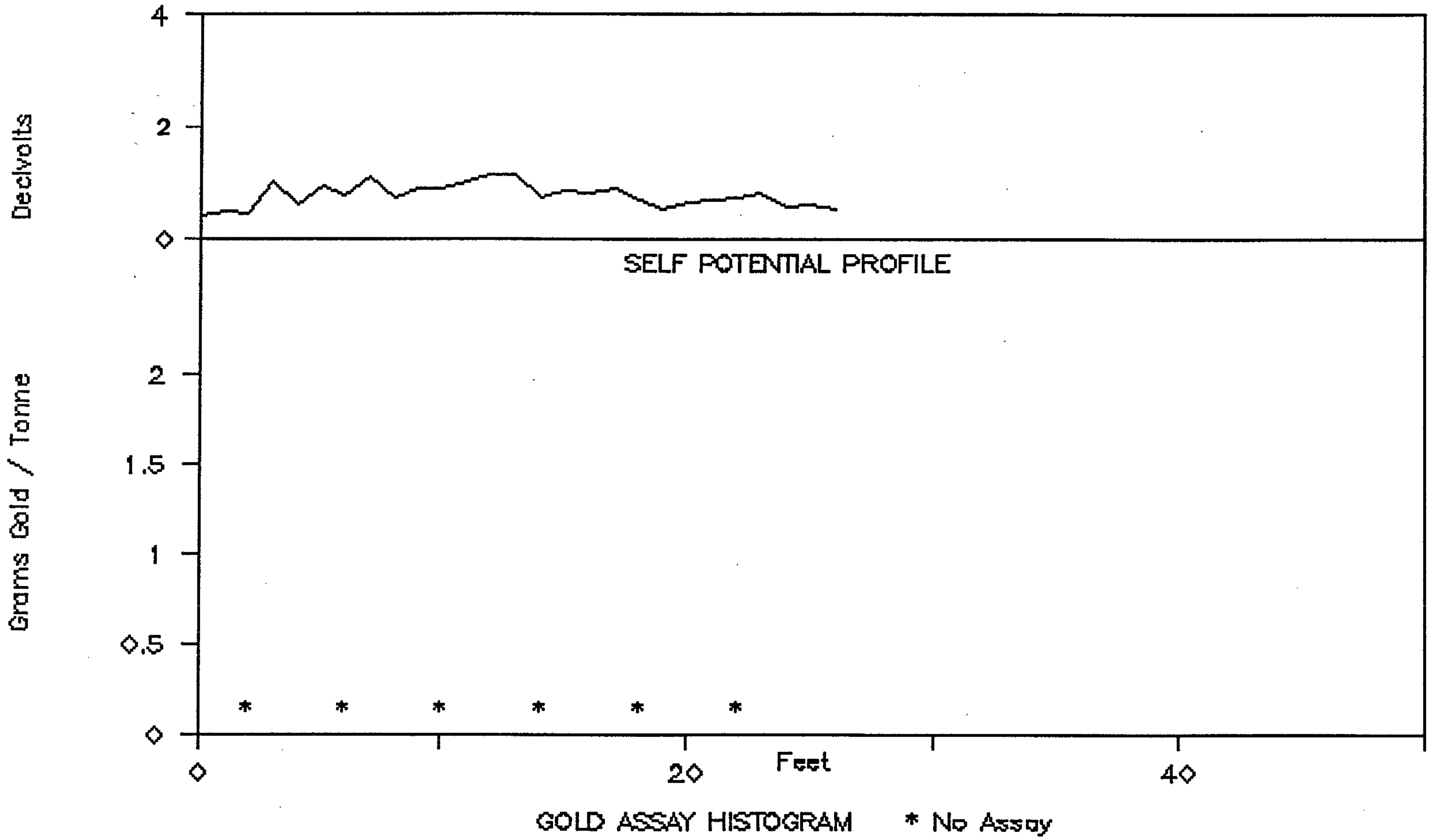


TEST HOLE T-274

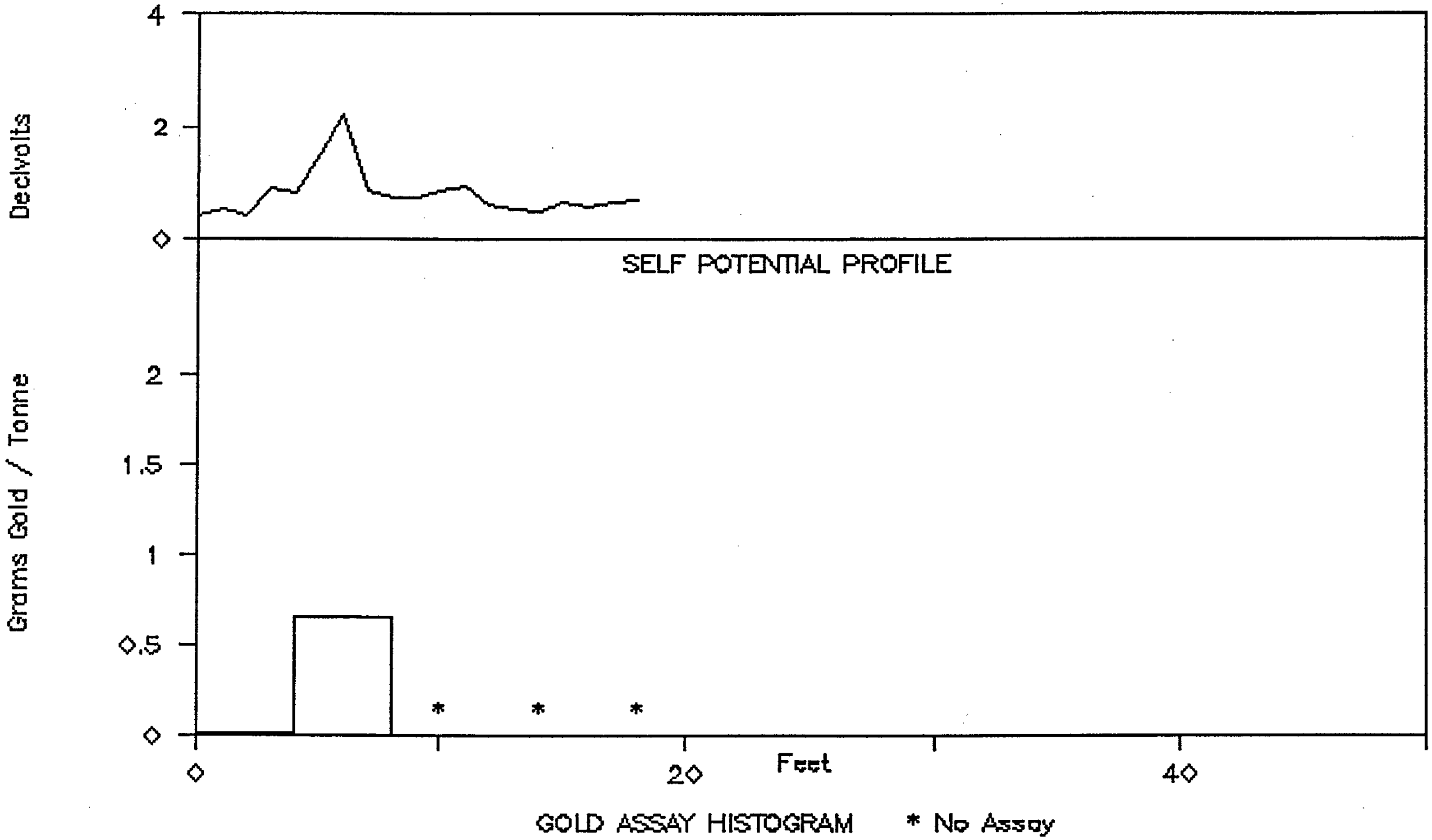
TEST HOLE T-275



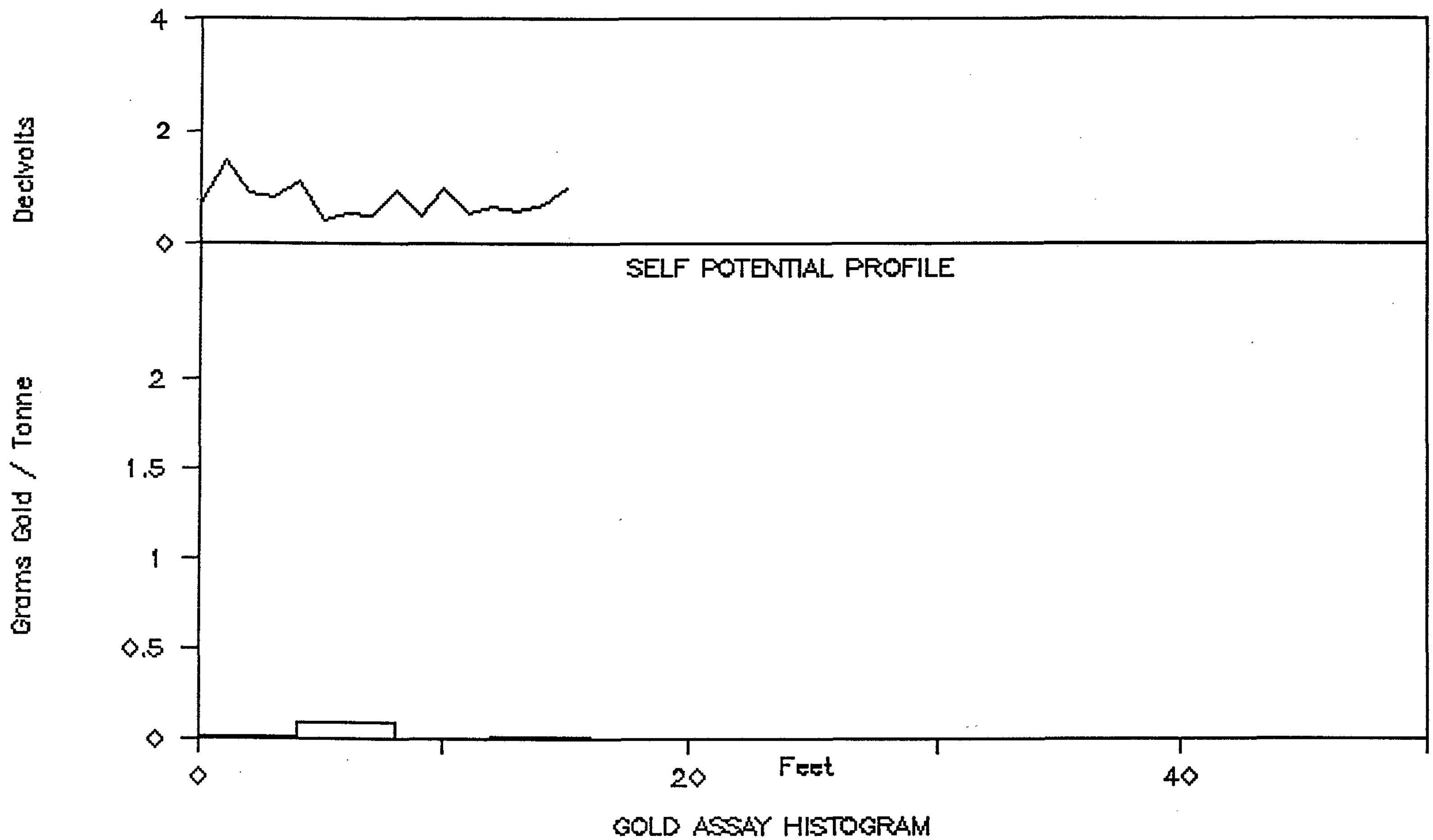
TEST HOLE T-276



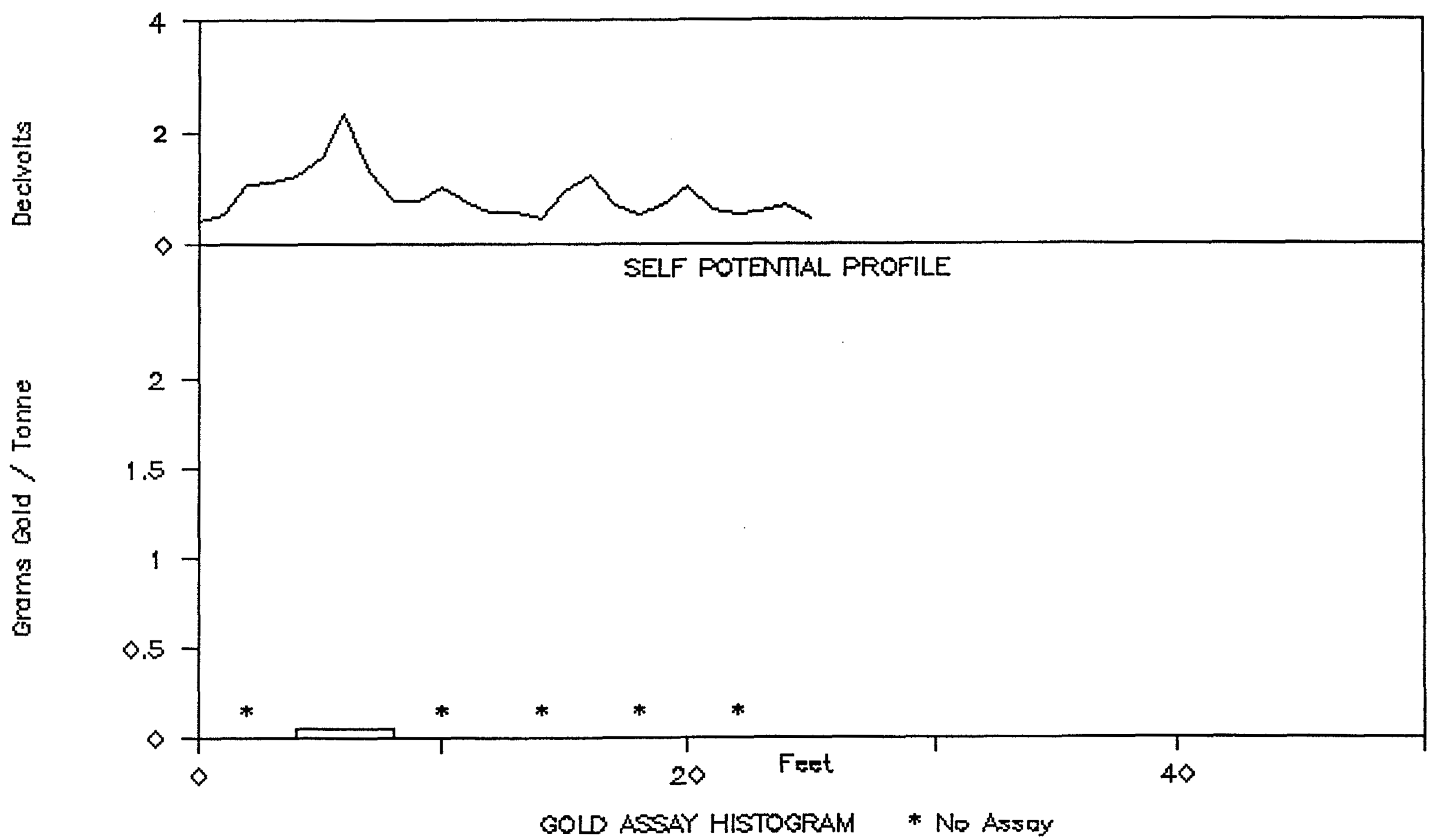
TEST HOLE T-277



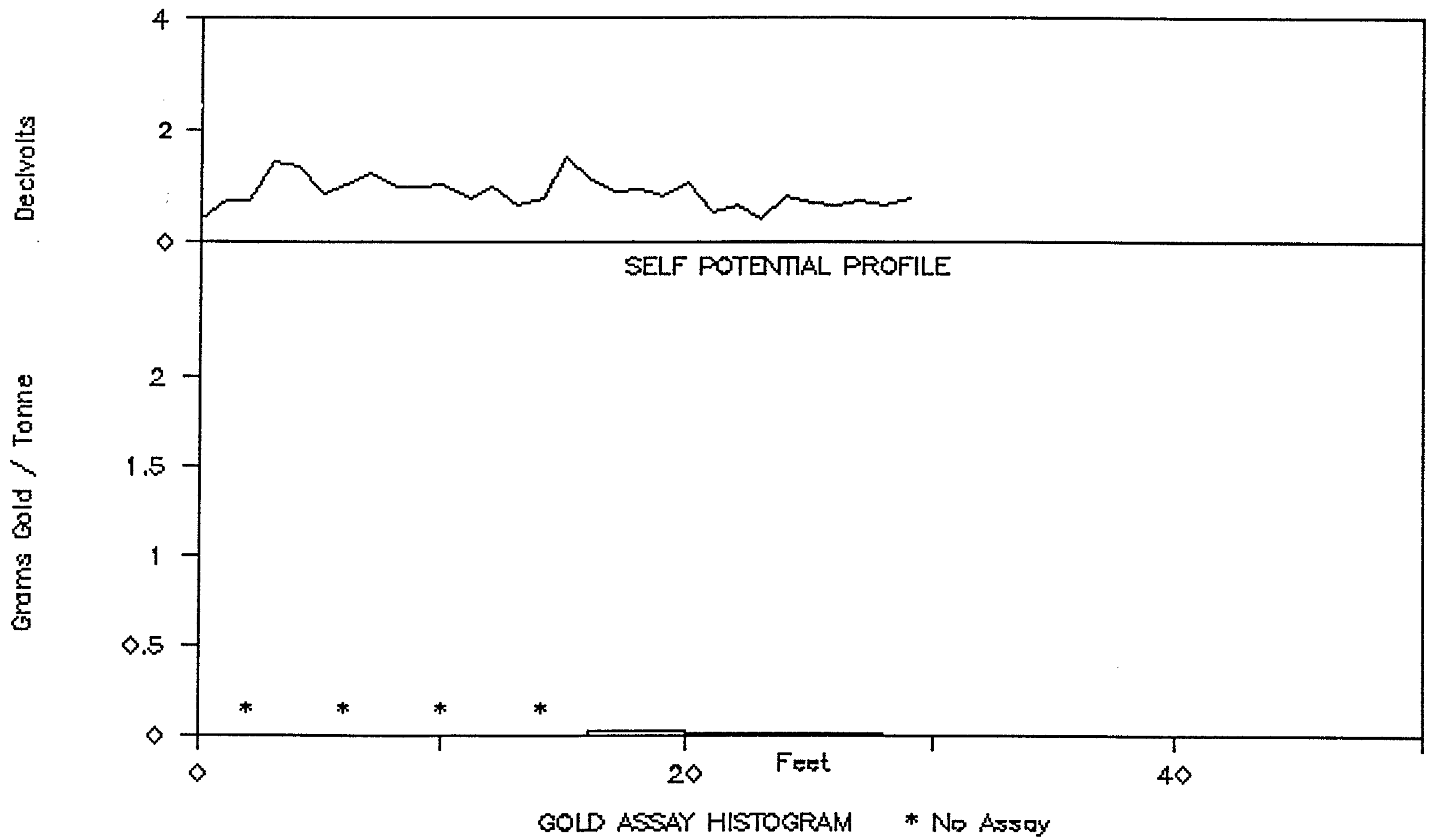
TEST HOLE T-278



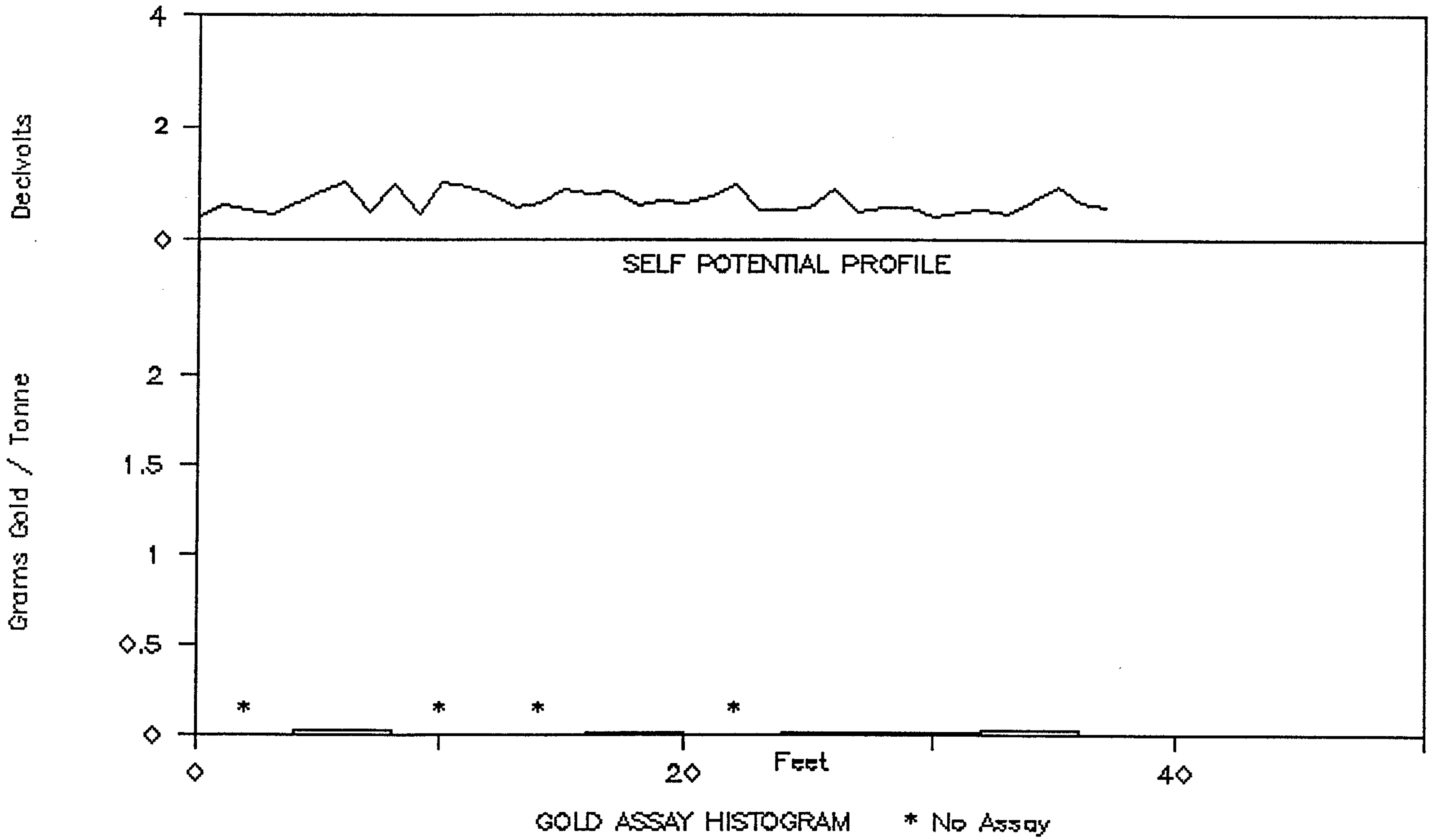
TEST HOLE T-279



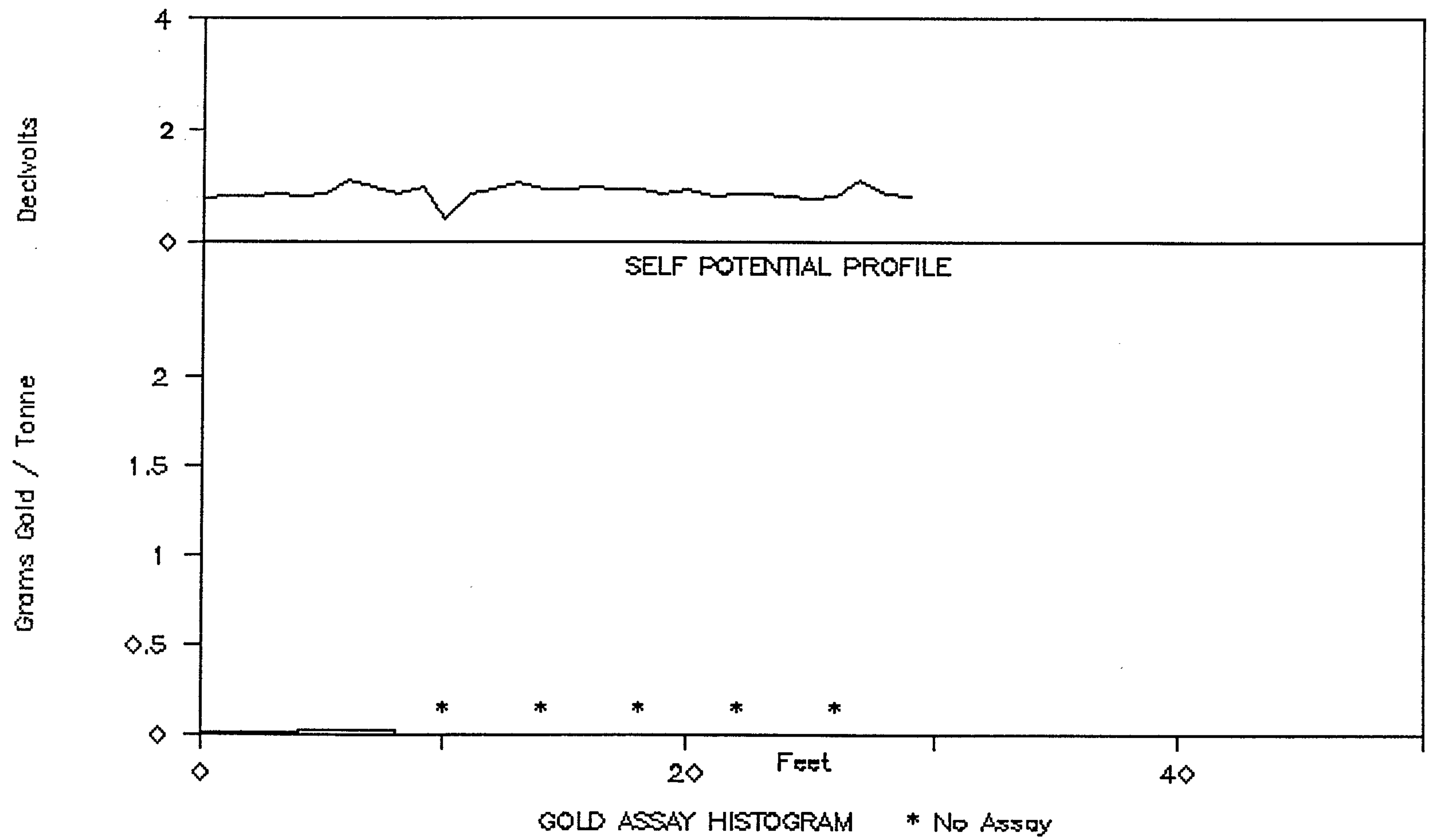
TEST HOLE T-280



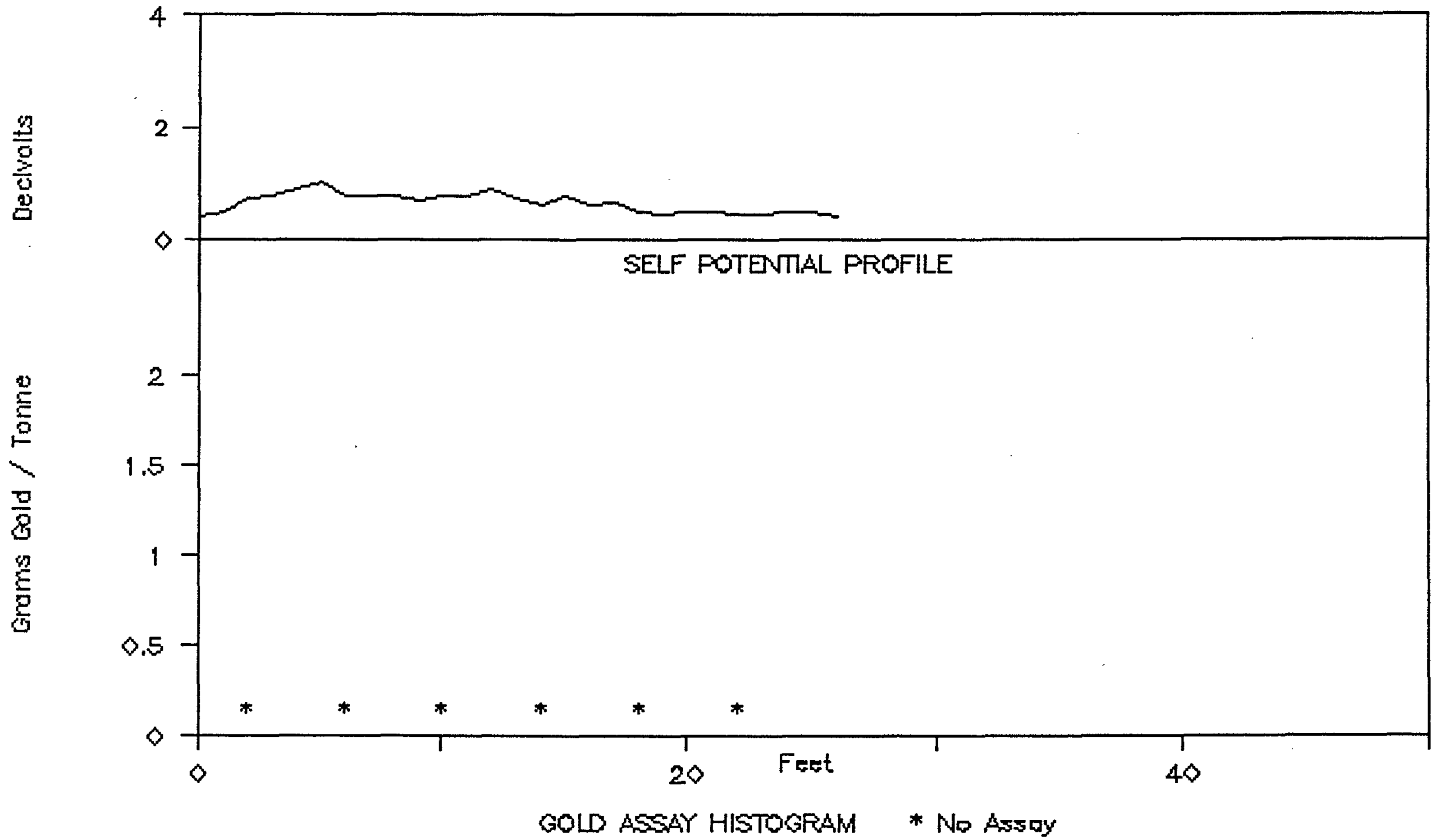
TEST HOLE T-281

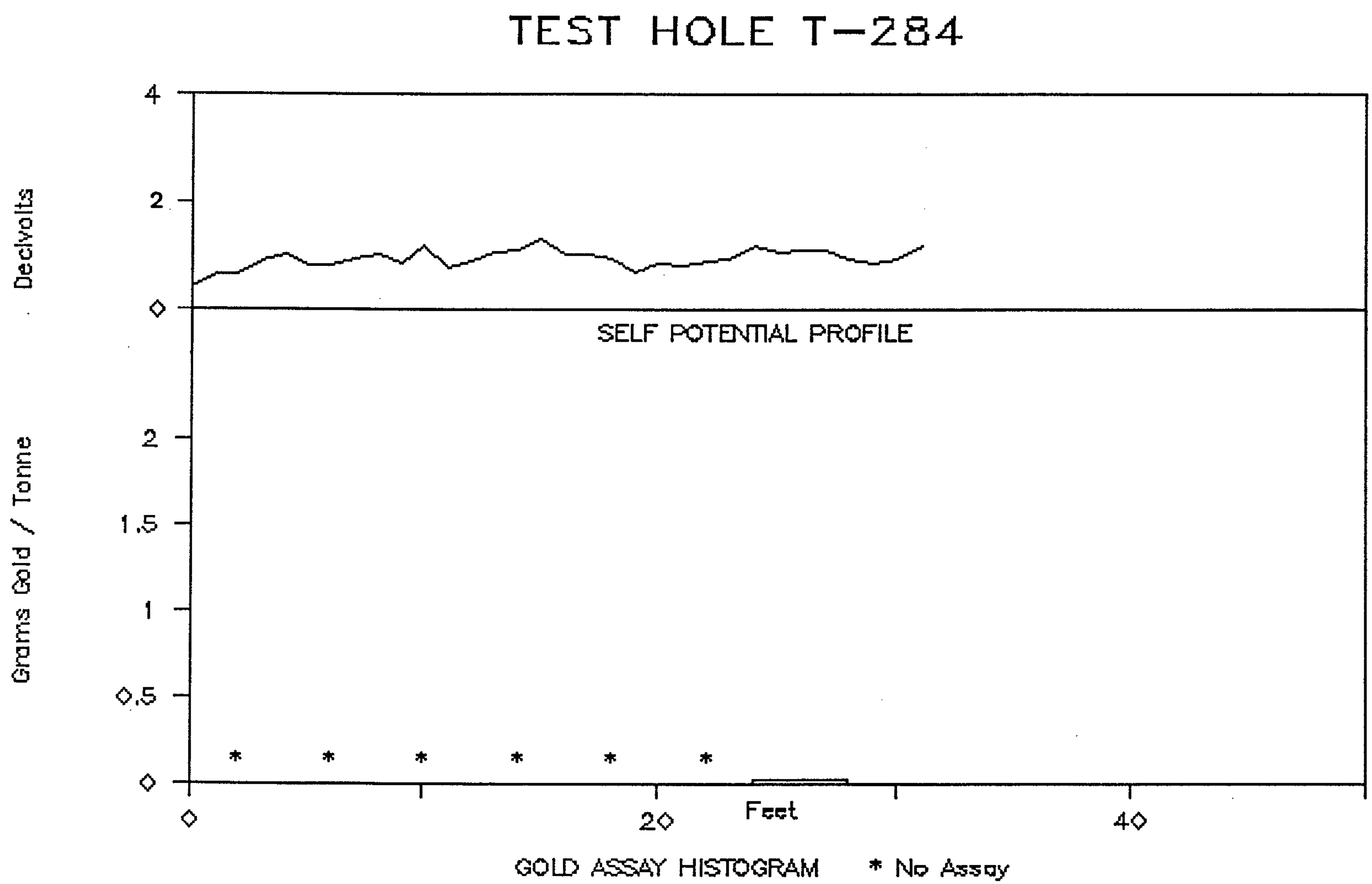


TEST HOLE T-282

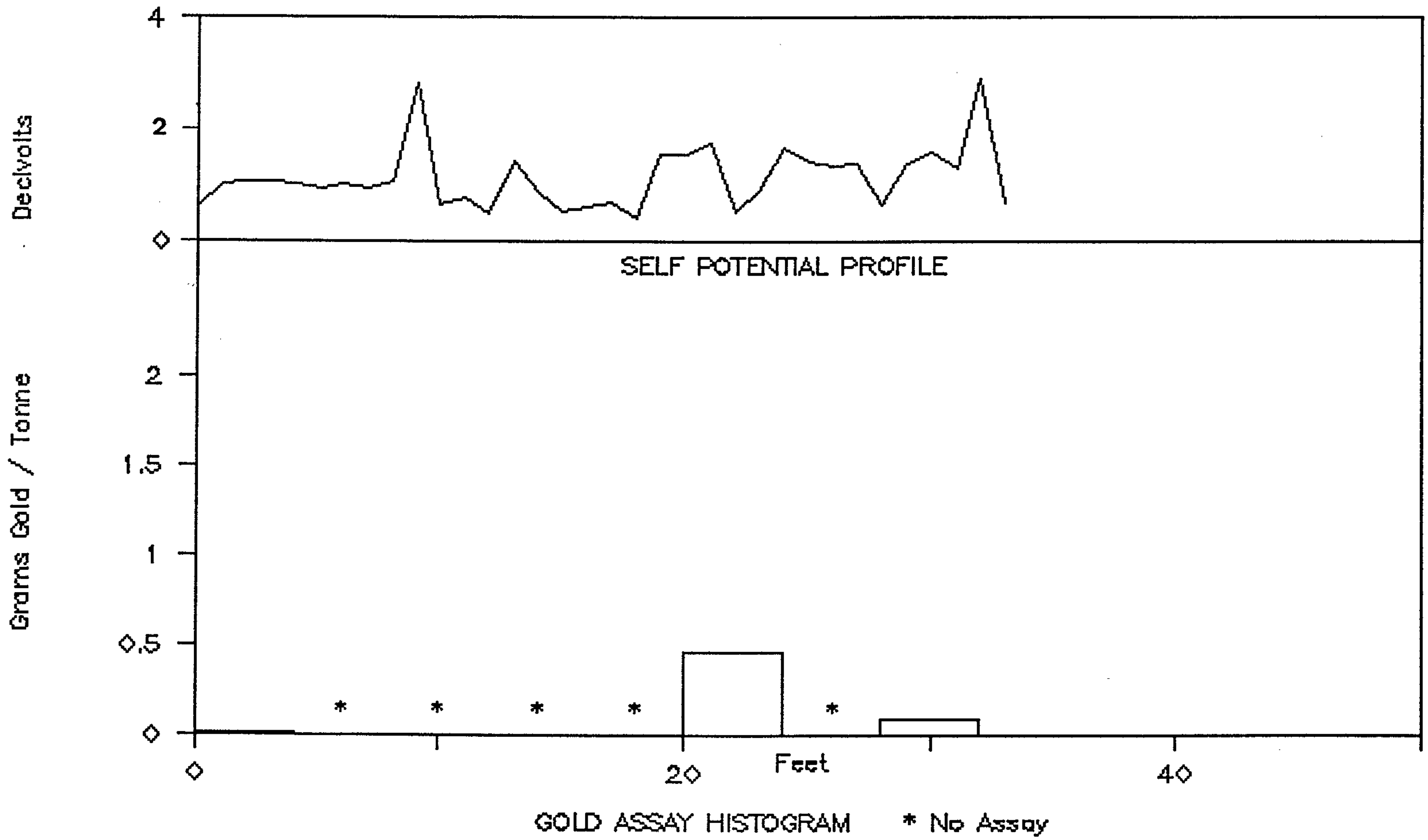


TEST HOLE T-283

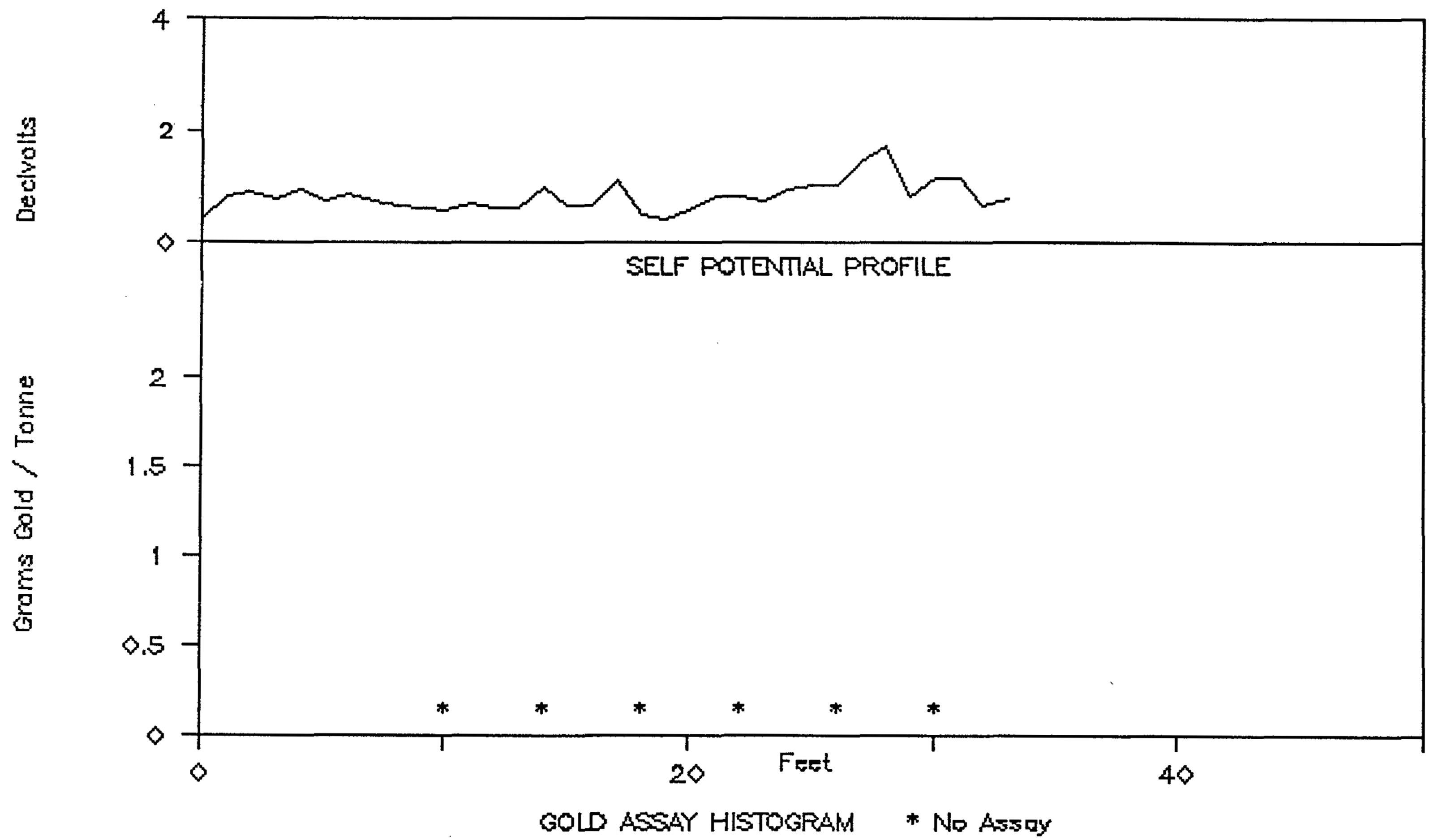



TEST HOLE T-284
Decivolts
4
2
0
SELF POTENTIAL PROFILE
Grams Gold / Tonne
2
1.5
1
0.5
0
* * * * * *
Feet
0
20
40
GOLD ASSAY HISTOGRAM
* No Assay

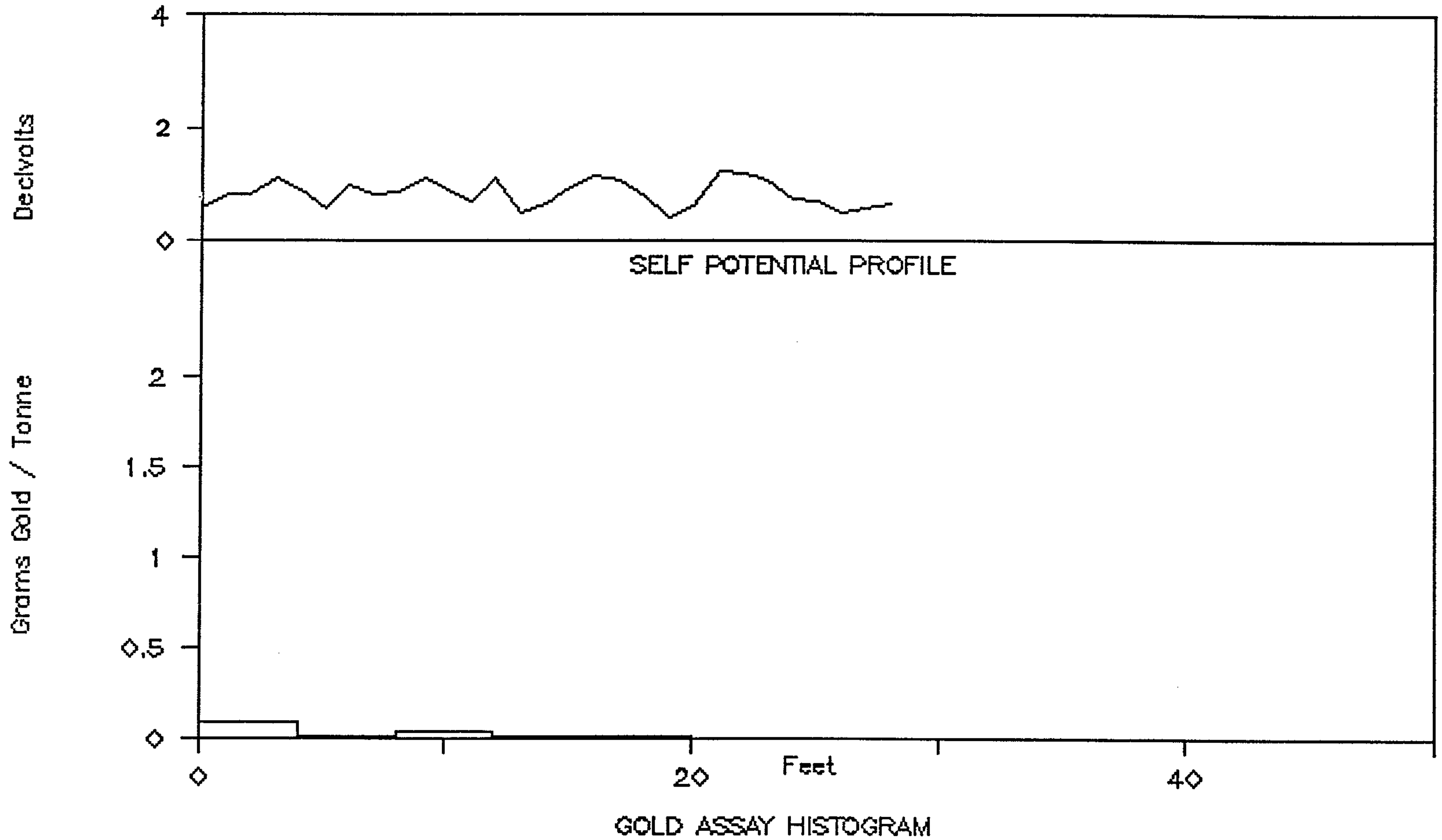
TEST HOLE T-285



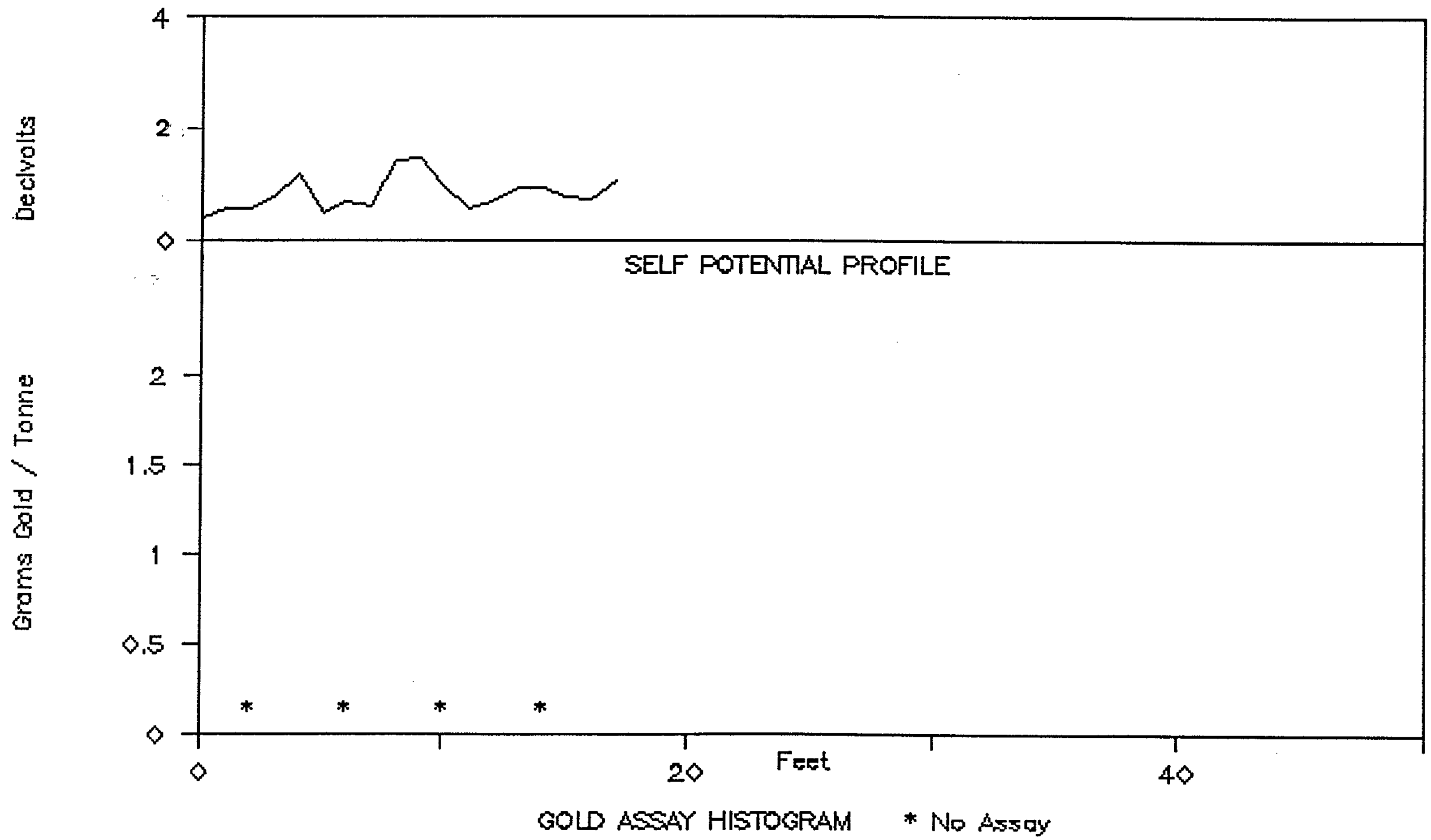
TEST HOLE T-286



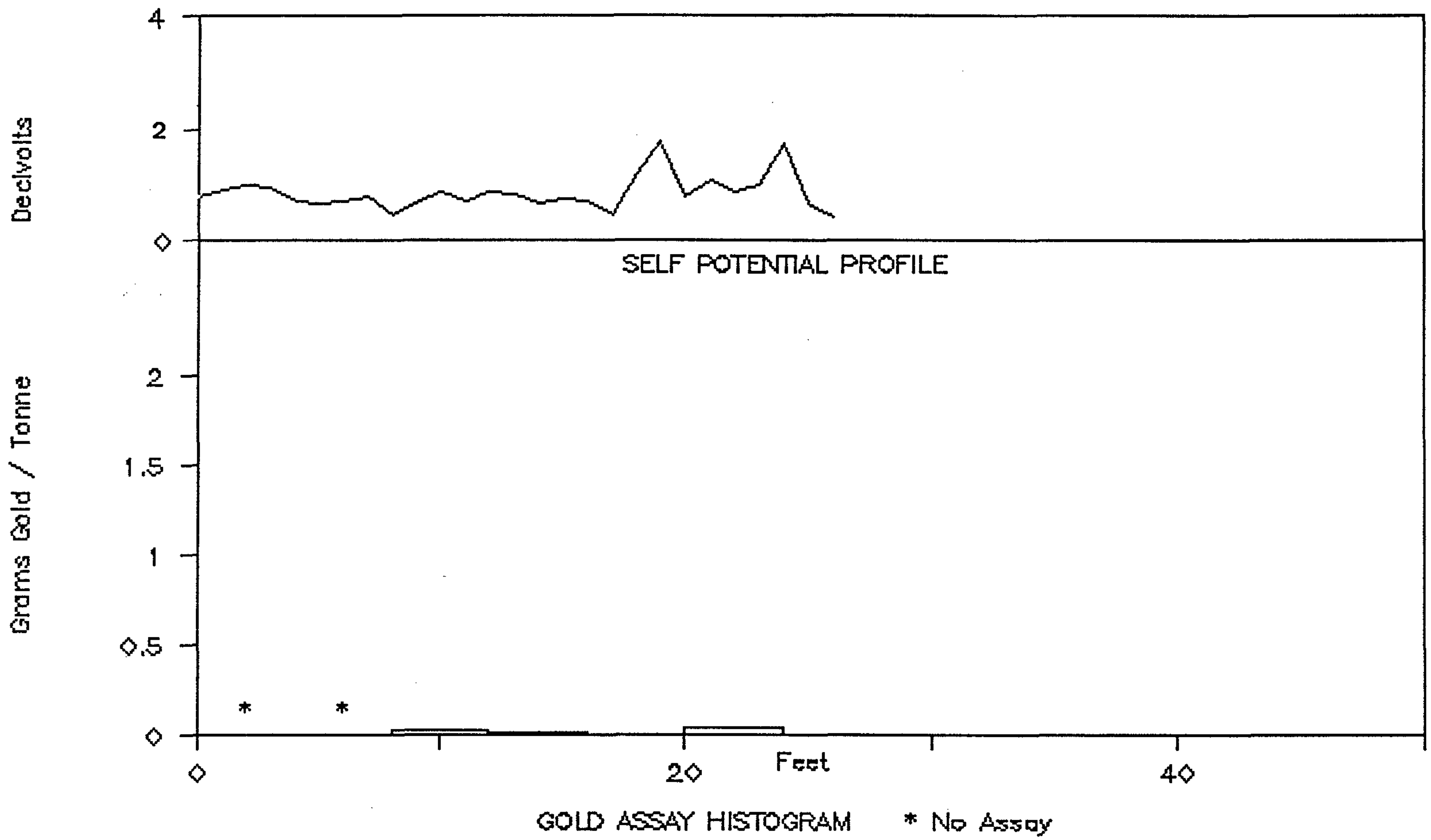
TEST HOLE T-287



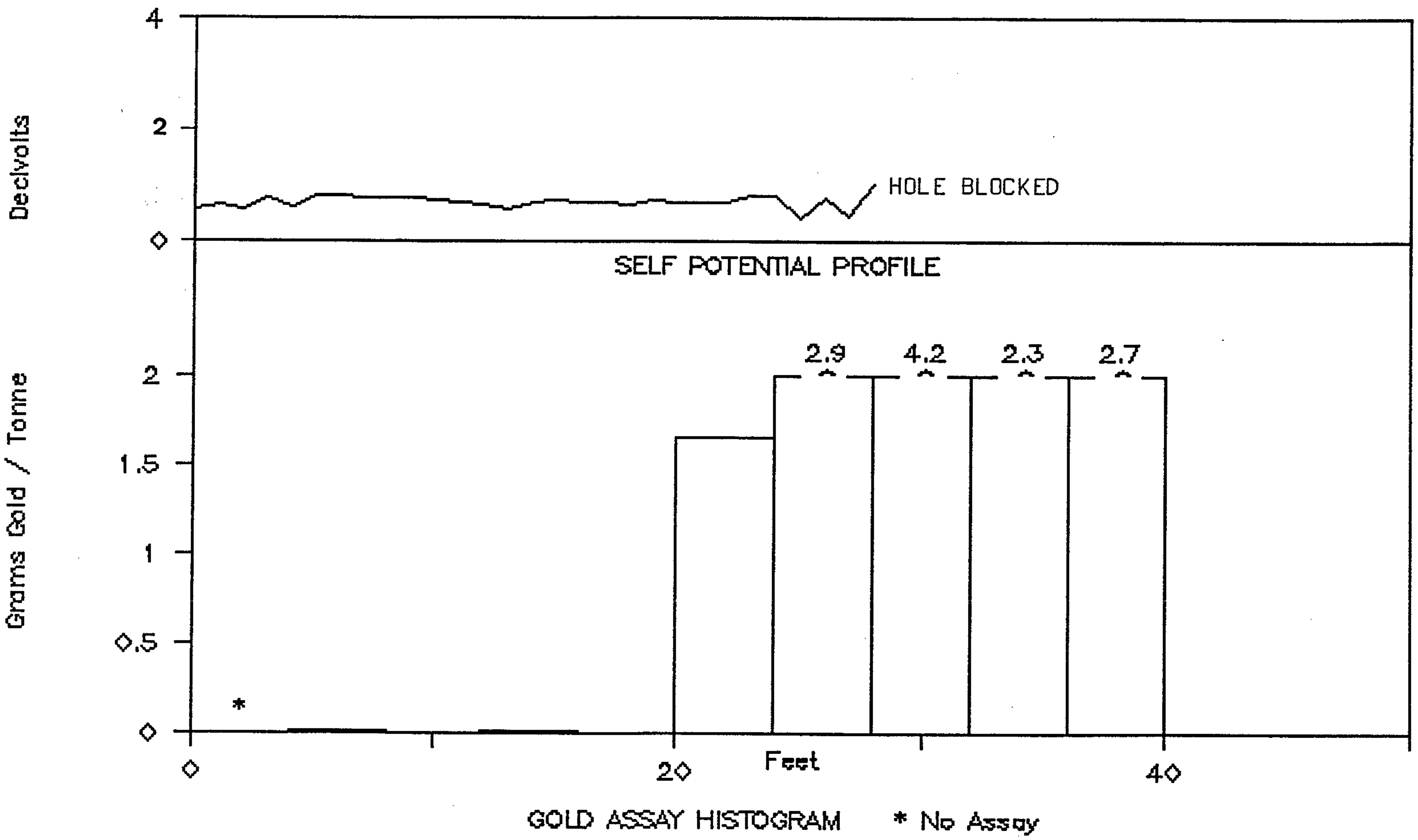
TEST HOLE T-288



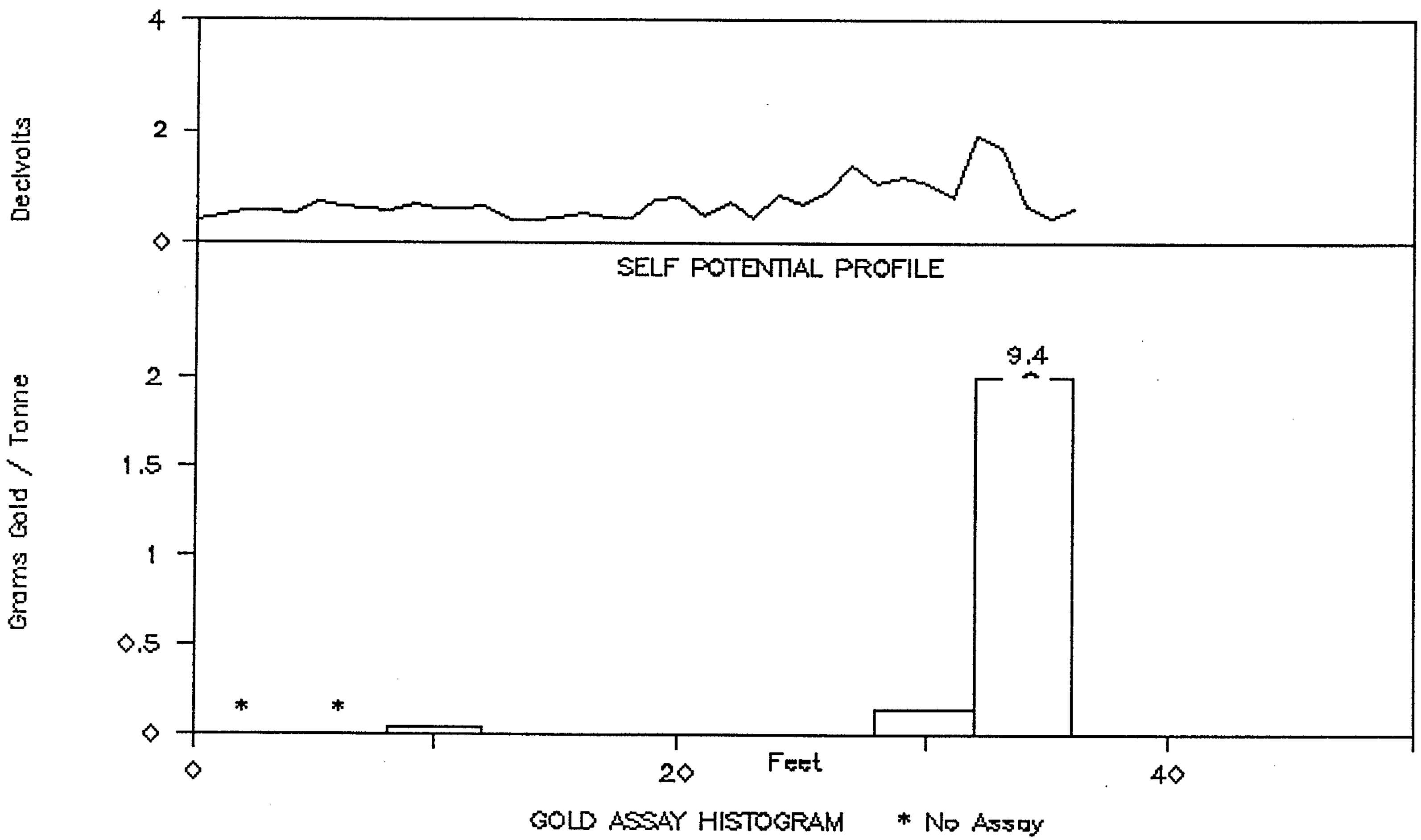
TEST HOLE T-289



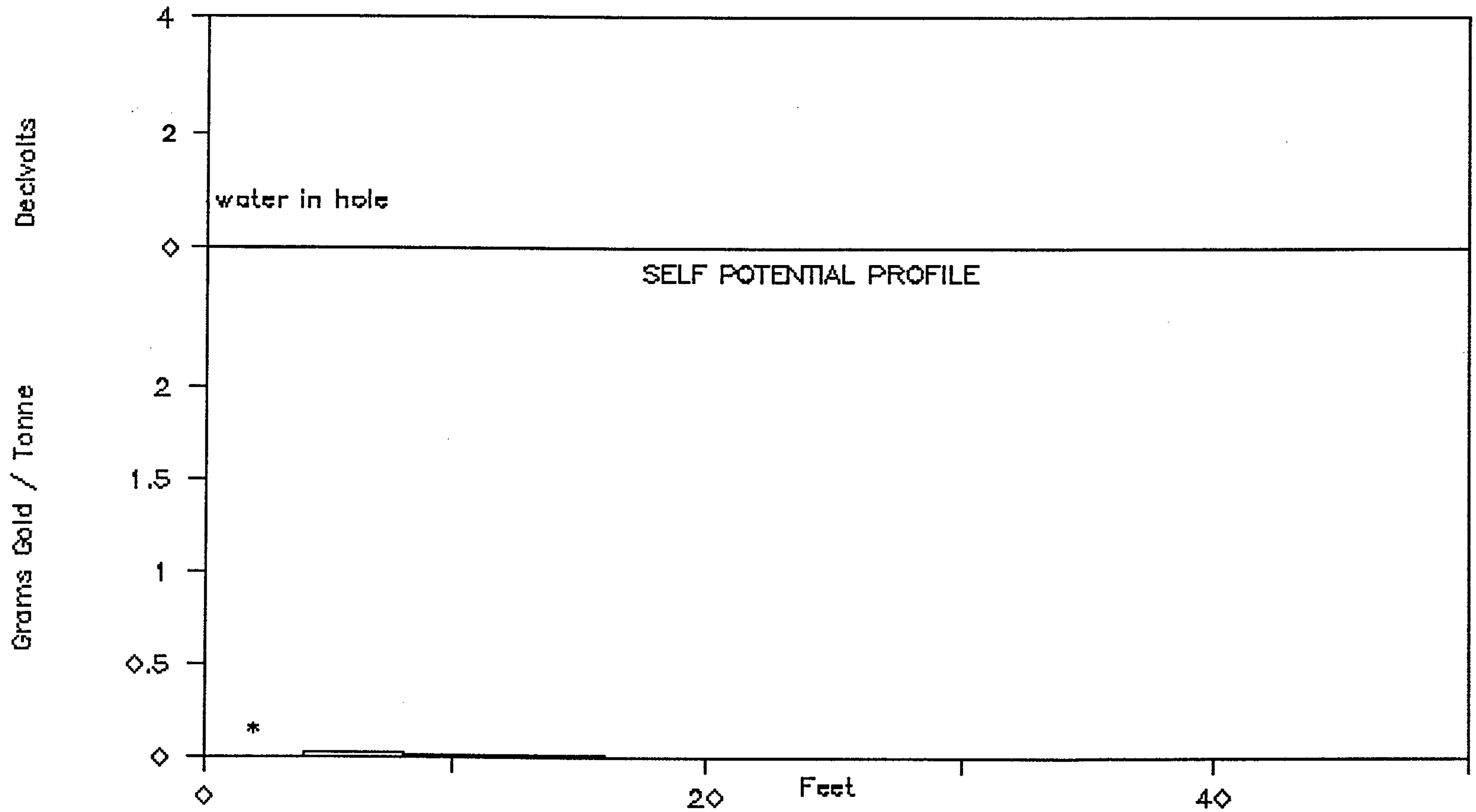
TEST HOLE T-290



TEST HOLE T-291



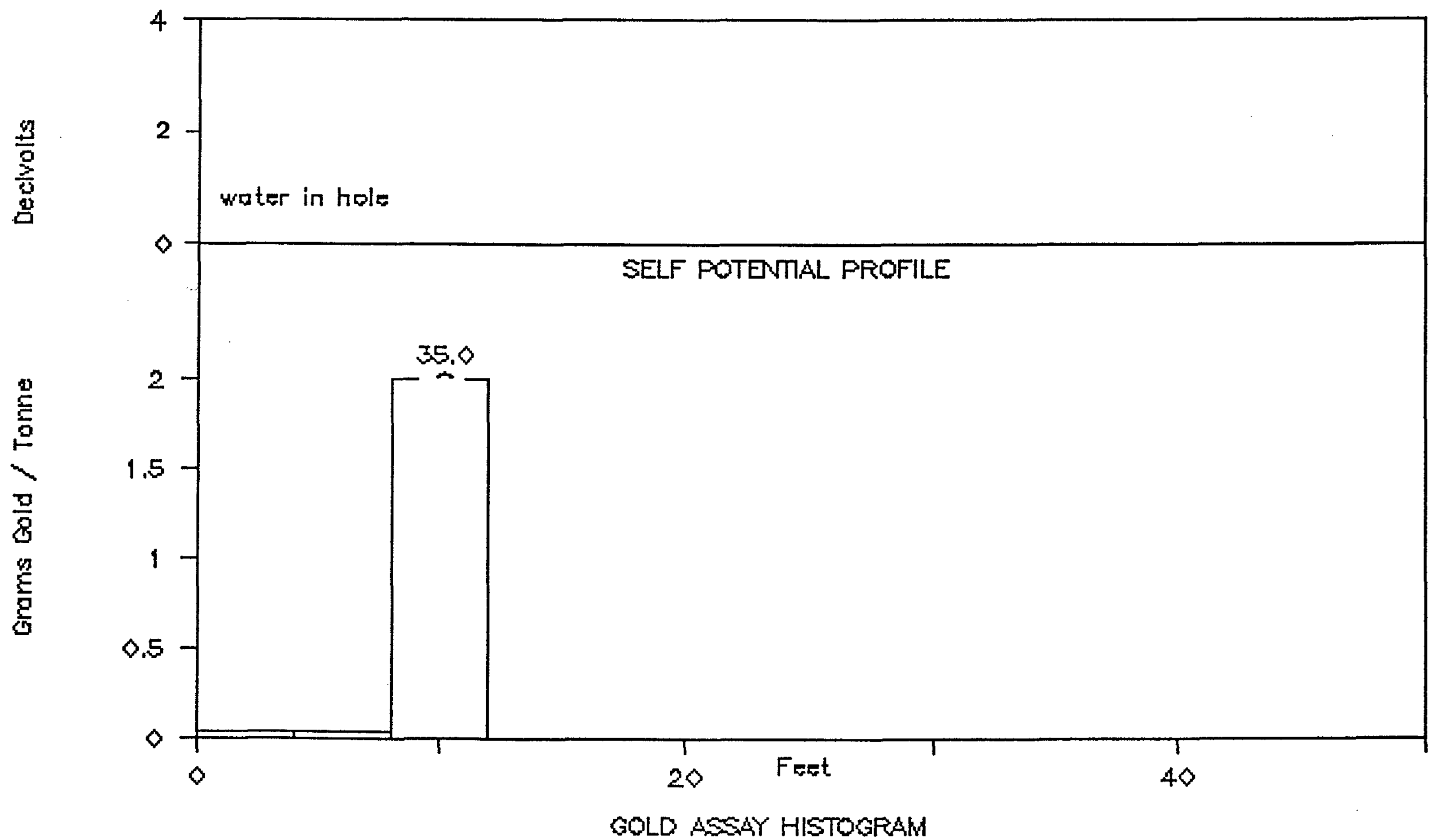
TEST HOLE T-292



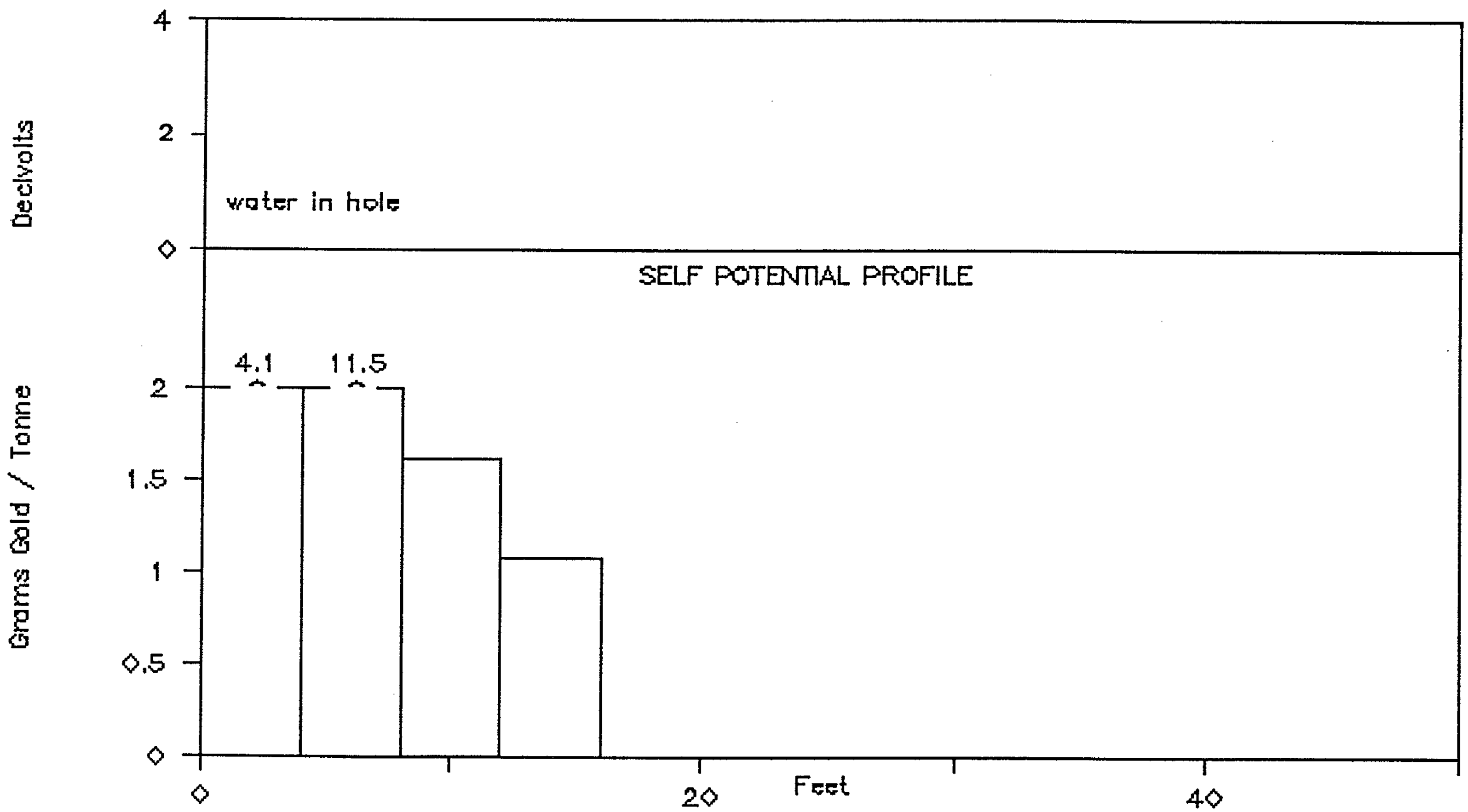
GOLD ASSAY HISTOGRAM * No Assay

TEST HOLE T-293

TEST HOLE T-294

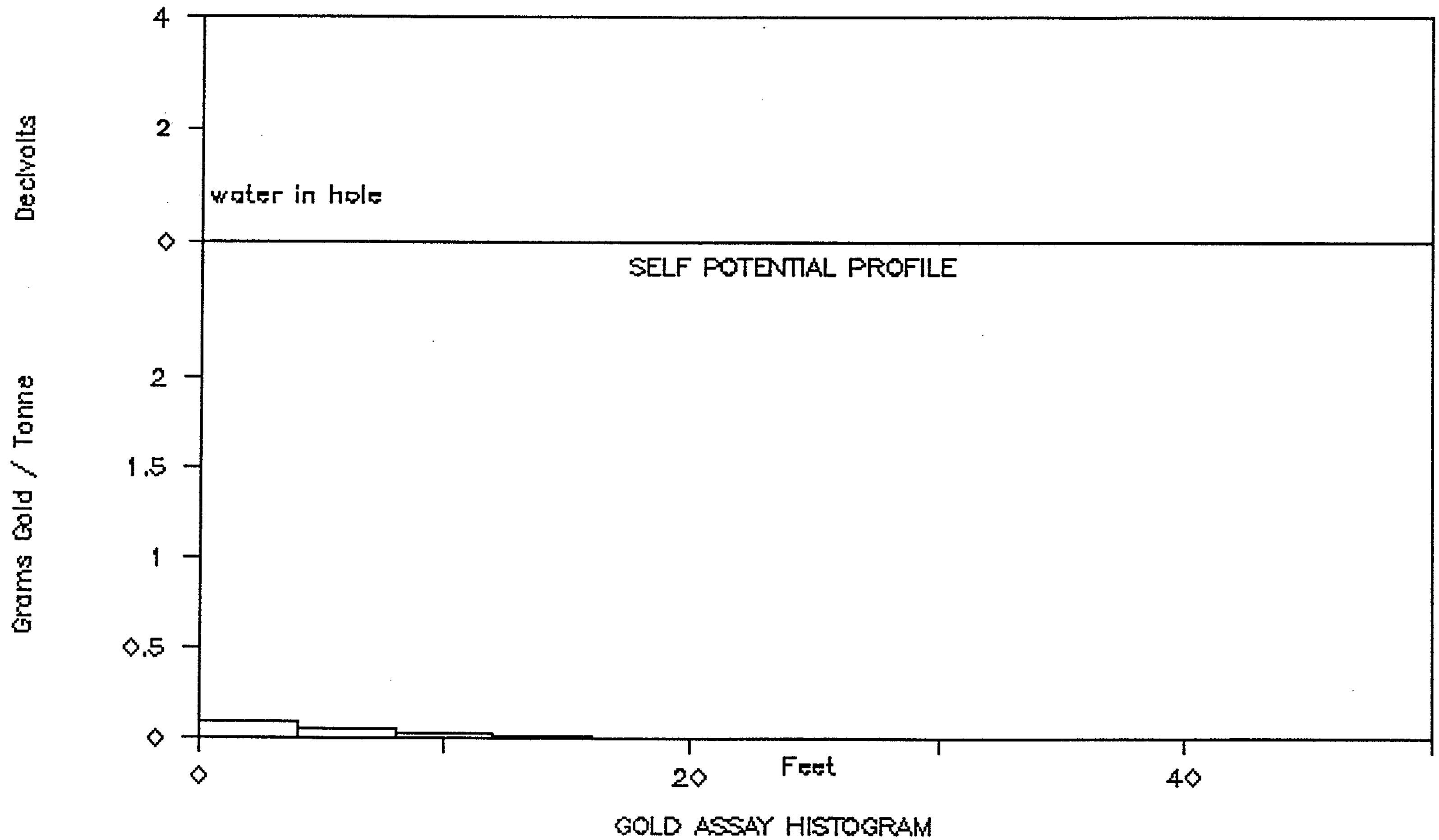


TEST HOLE T-295

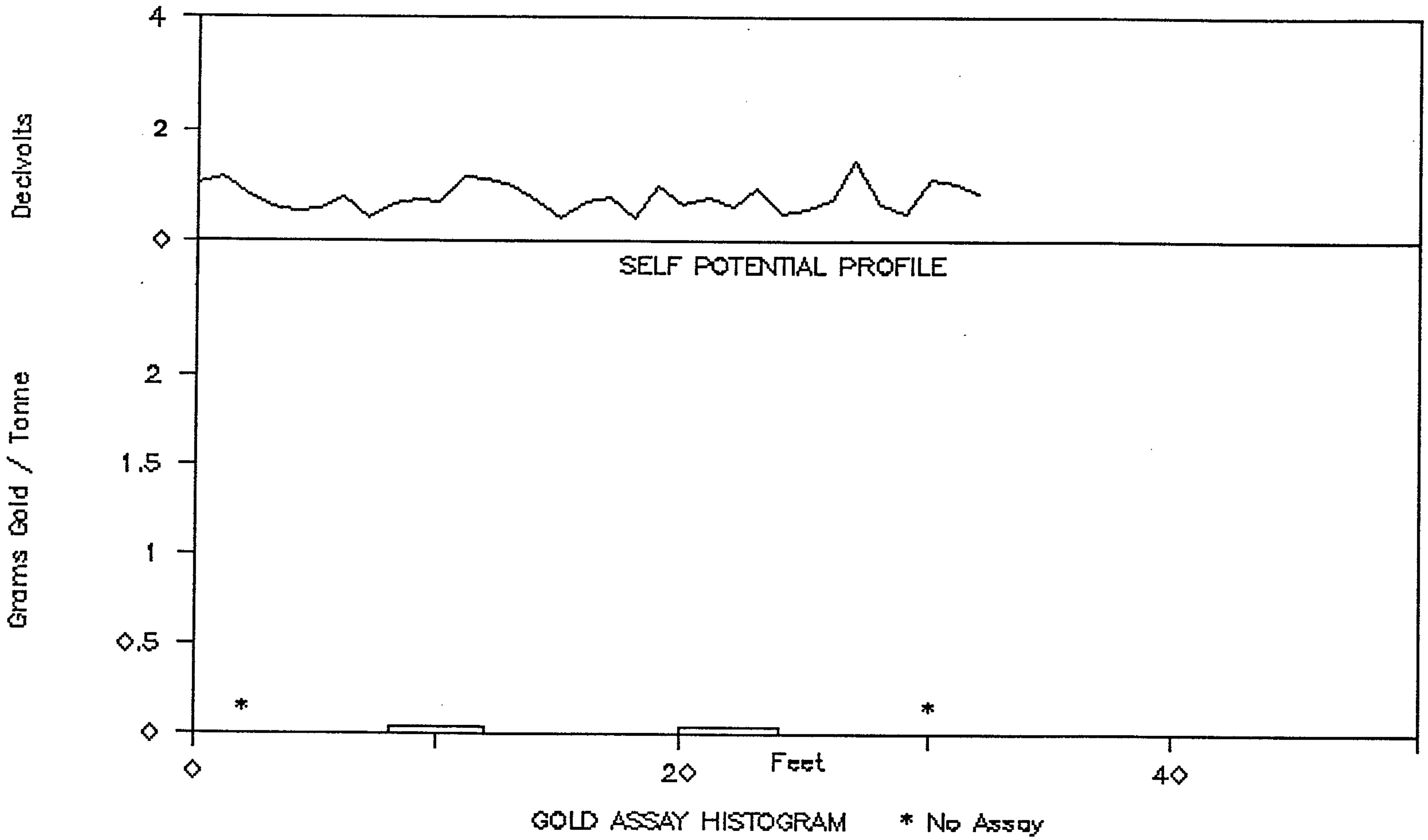


GOLD ASSAY HISTOGRAM

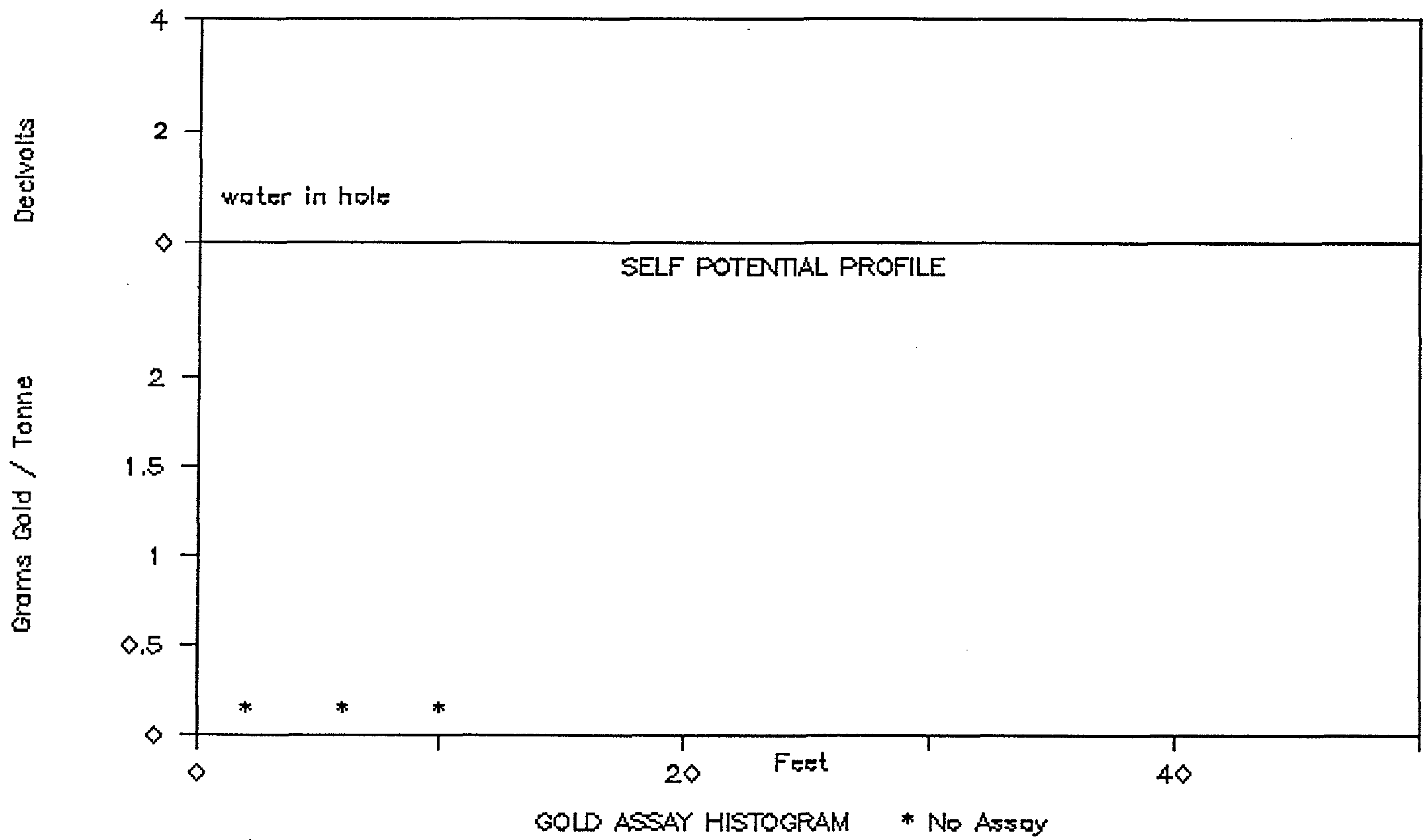
TEST HOLE T-296



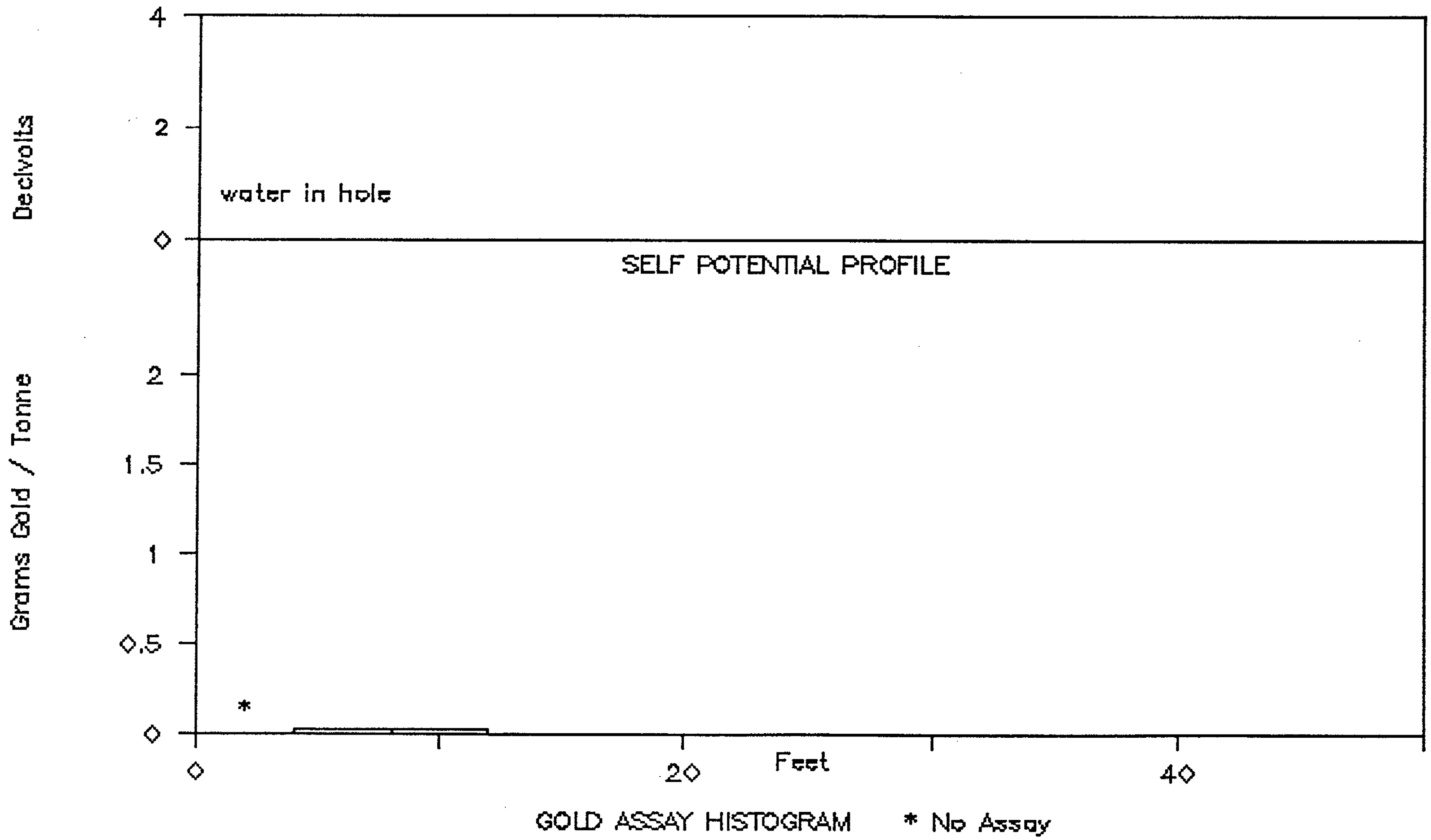
TEST HOLE T-297



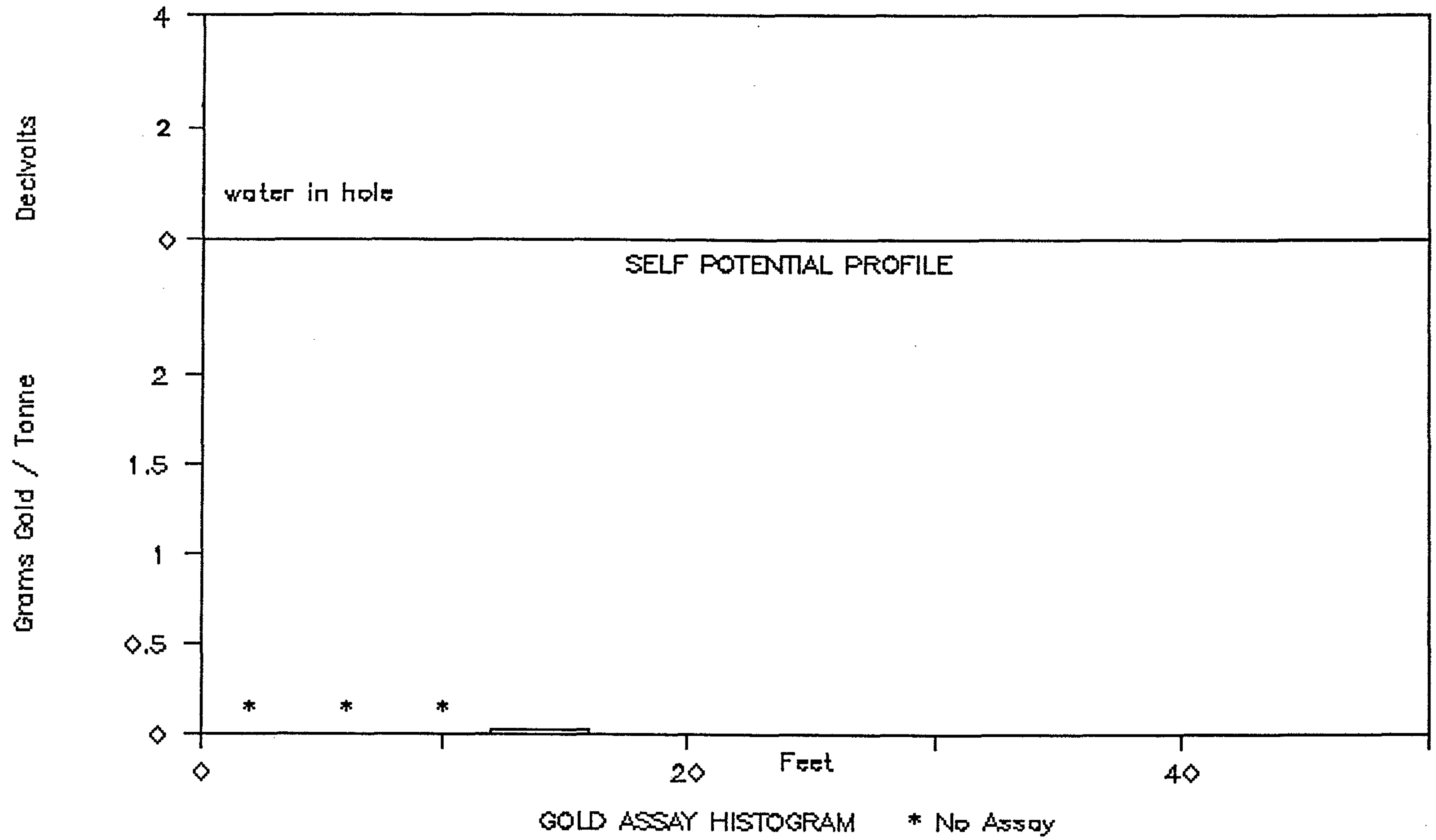
TEST HOLE T-298



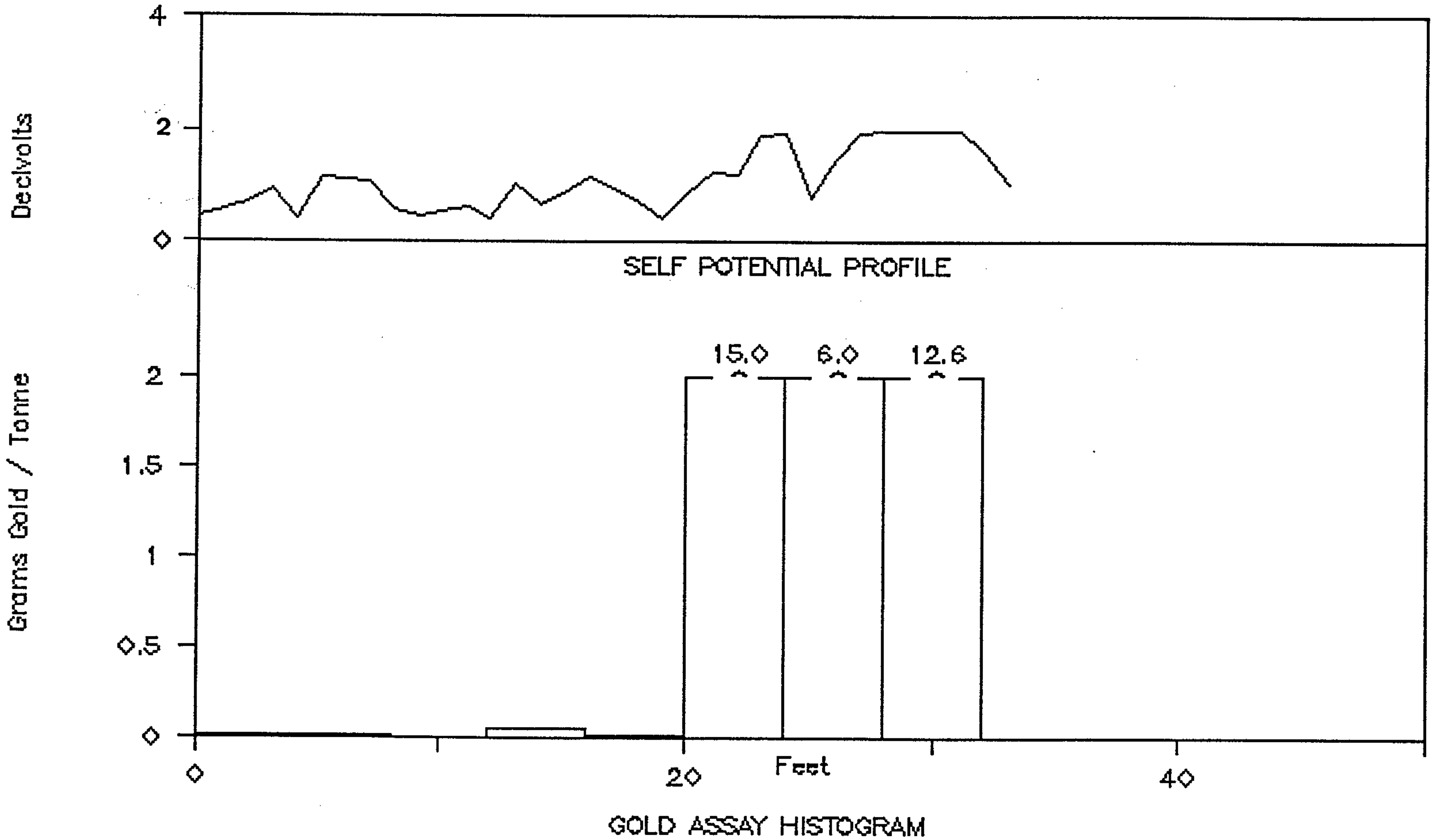
TEST HOLE T-299



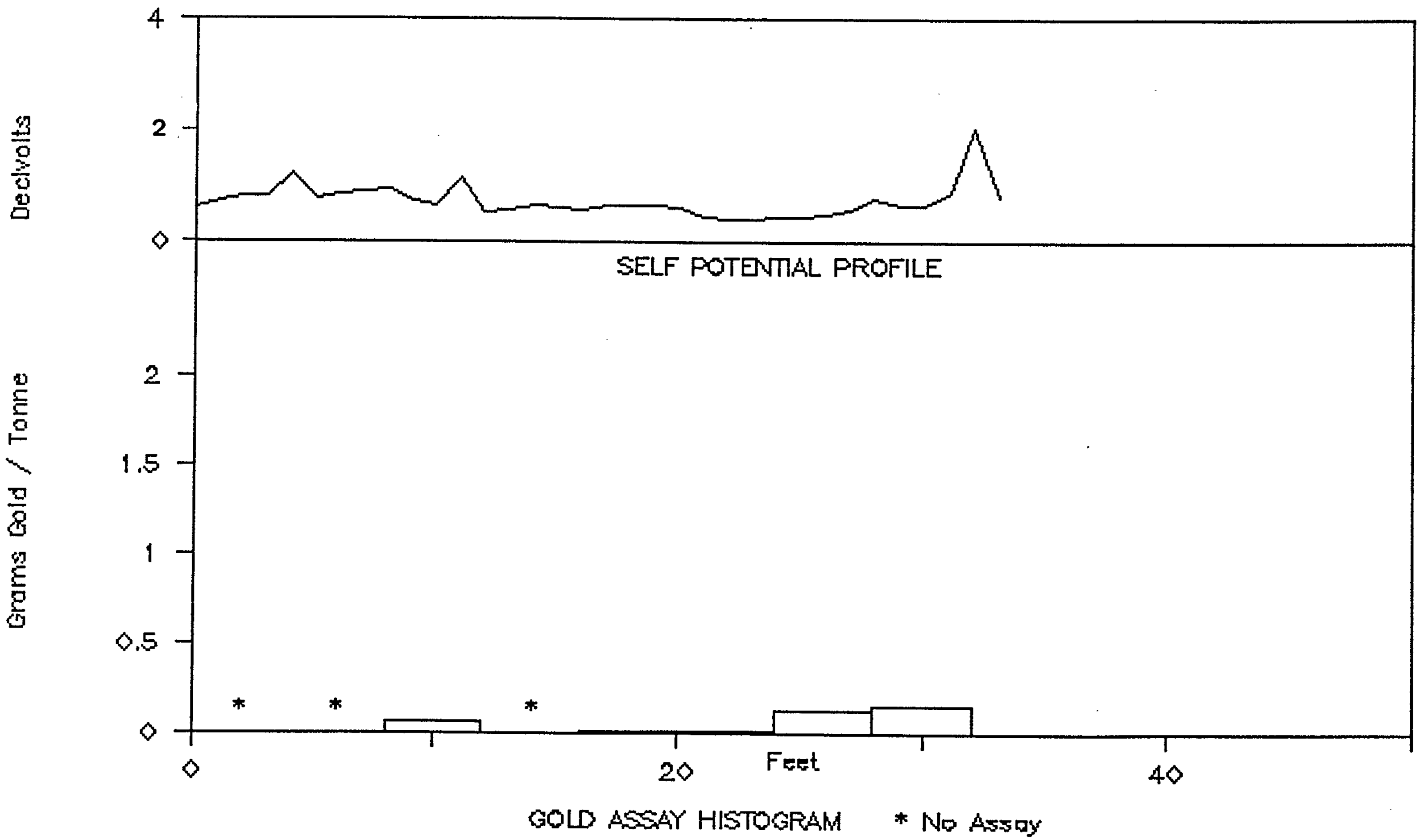
TEST HOLE T-300



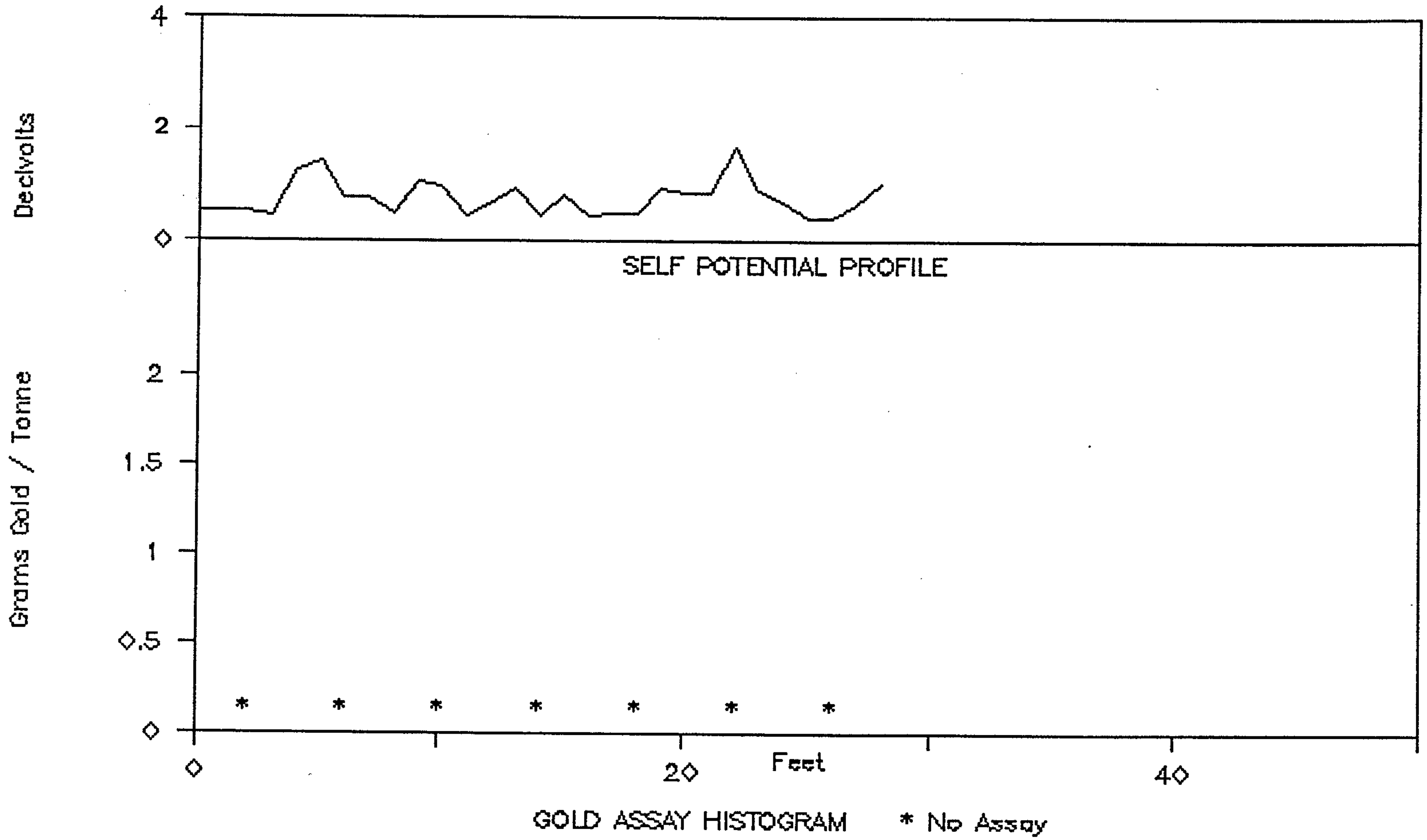
TEST HOLE T-301



TEST HOLE T-302



TEST HOLE T-303



Appendix III -3

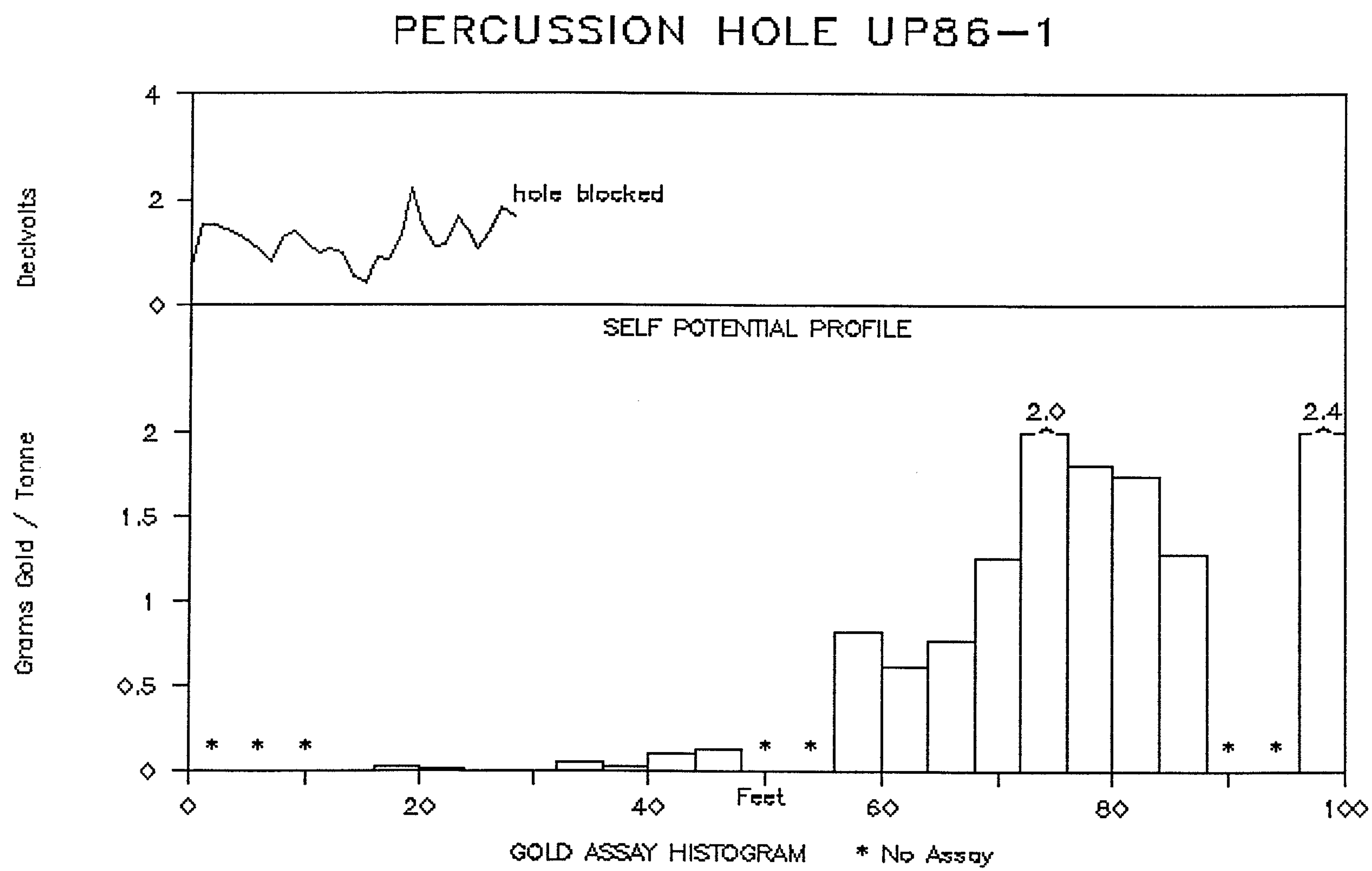
Level III Assey Histograms
and Self Potential Profiles

Percussion Holes
UP86-1 to UP86-5
UP86-16 to UP86-21
UP86-65 to UP86-66

Test Holes
T-224 to T-228

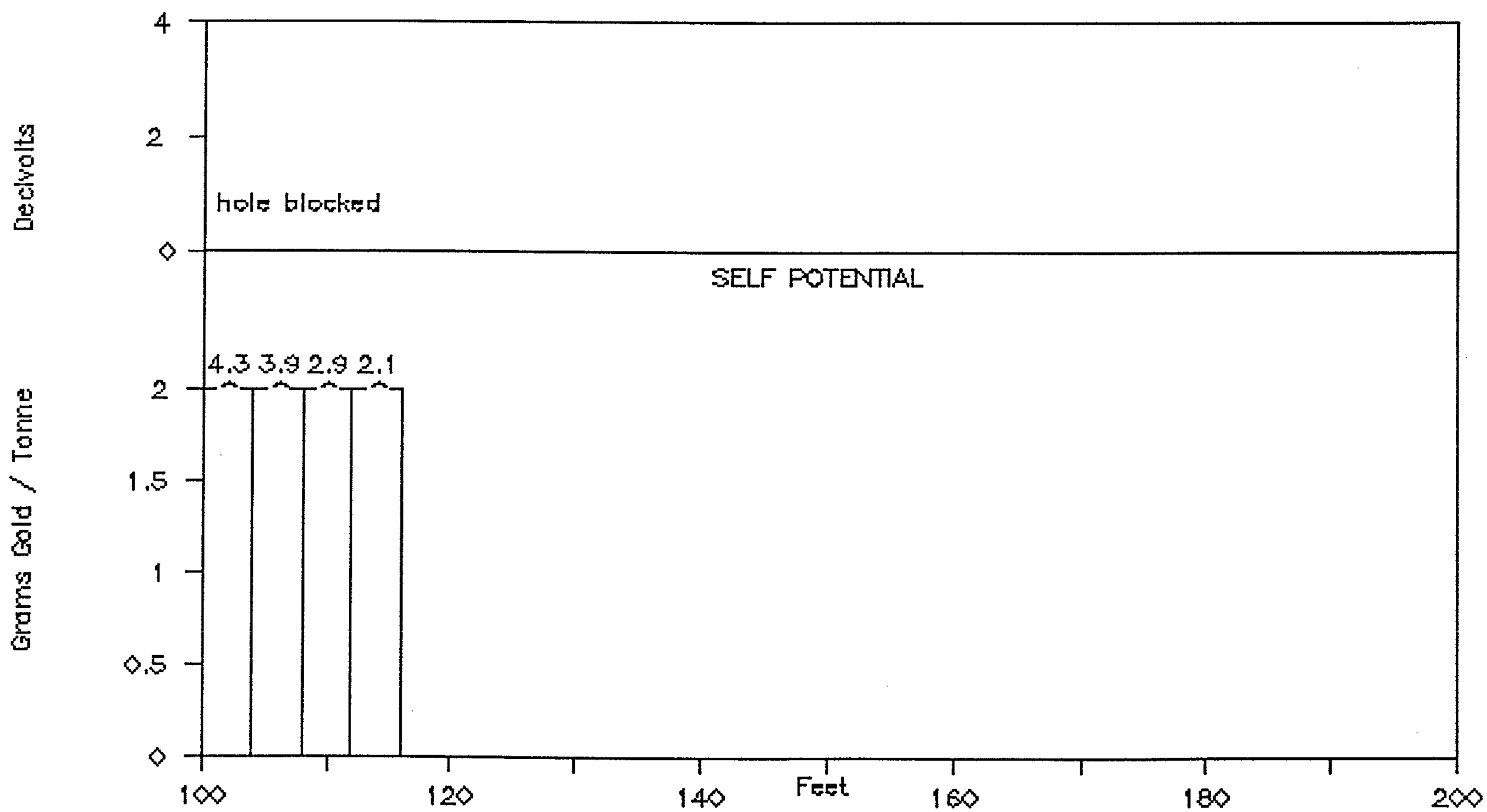
Level III

Hole	Latitude	Departure	Bearing	Inclination	Length
UP86-1	18,295N	10,390E	078°	+ 7°	116'
2	18,295N	10,390E	080°	+41°	72'
3	18,300N	10,387E	045°	+ 9°	116'
4	18,300N	10,387E	044°	+45°	76'
5	18,297N	10,384E	215°	+74°	52'
16	18,338N	10,423E	073°	+ 9°	94'
17	18,339N	10,421E	025°	+ 8°	80'
18	18,337N	10,418E	331°	+72	48'
19	18,338N	10,420E	022°	+66°	56'
20	18,339N	10,421E	034°	+53°	60'
21	18,336N	10,416E	279°	+63°	52'
65	10,126N	10,497E	047°	+11°	80'
66	10,126N	10,497E	044°	+30°	48'
T-224	18,383N	10,143E	-	+90°	14'
225	18,385N	10,144E	047°	+70°	16'
226	18,357N	10,308E	033°	+10°	44'
227	18,360N	10,304E	042°	+47°	23'
228	18,361N	10,302E	040°	+70°	20'



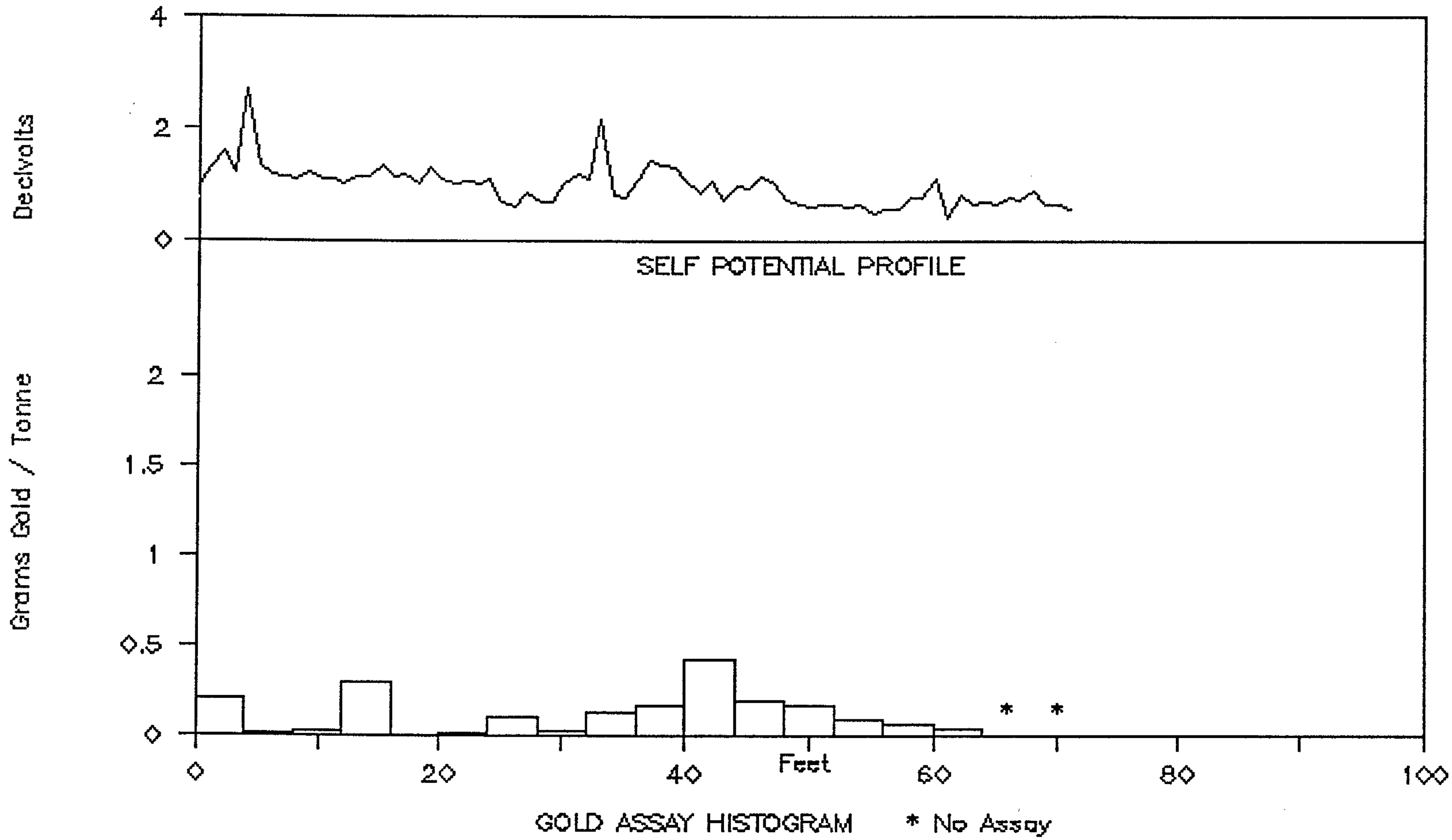
PERCUSSION HOLE UP86-1
Decivolts
4
2
0
hole blocked
SELF POTENTIAL PROFILE
Grams Gold / Tonne
2
1.5
1
0.5
0
2.0
2.4
*
0
20
40
Feet
60
80
100
GOLD ASSAY HISTOGRAM
* No Assay

PERCUSSION HOLE UP86-1

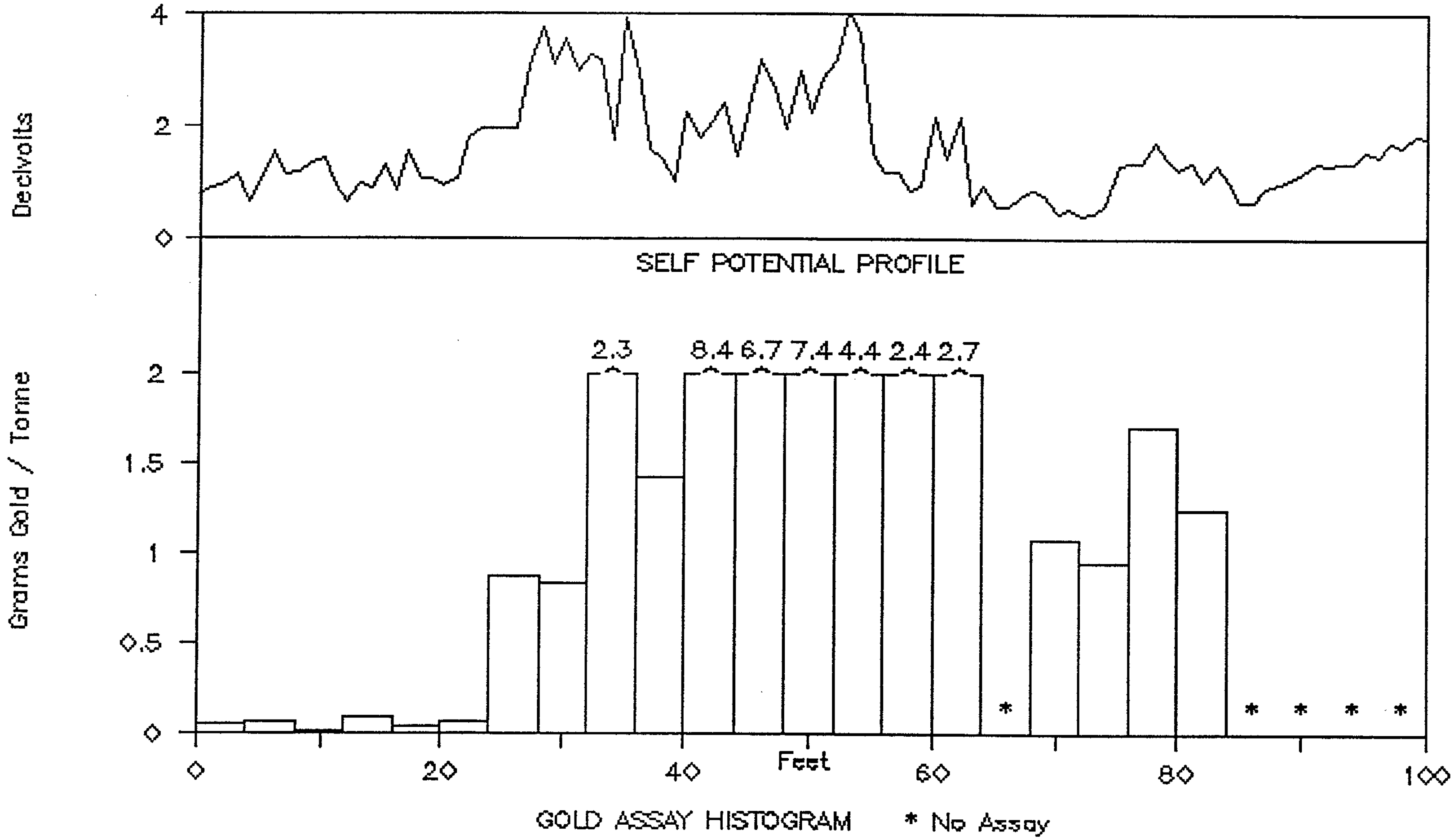


GOLD ASSAY HISTOGRAM

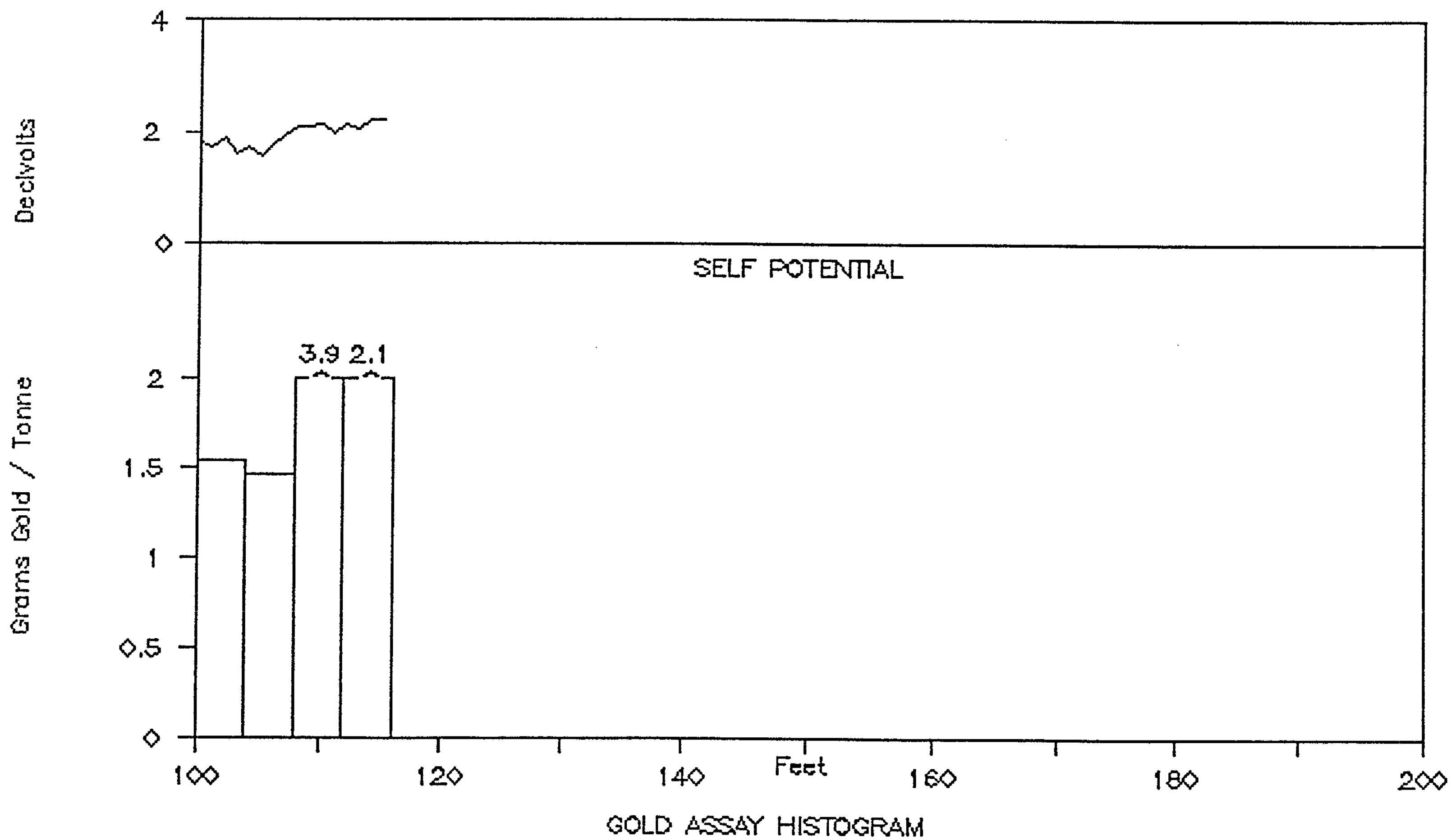
PERCUSSION HOLE UP86-2



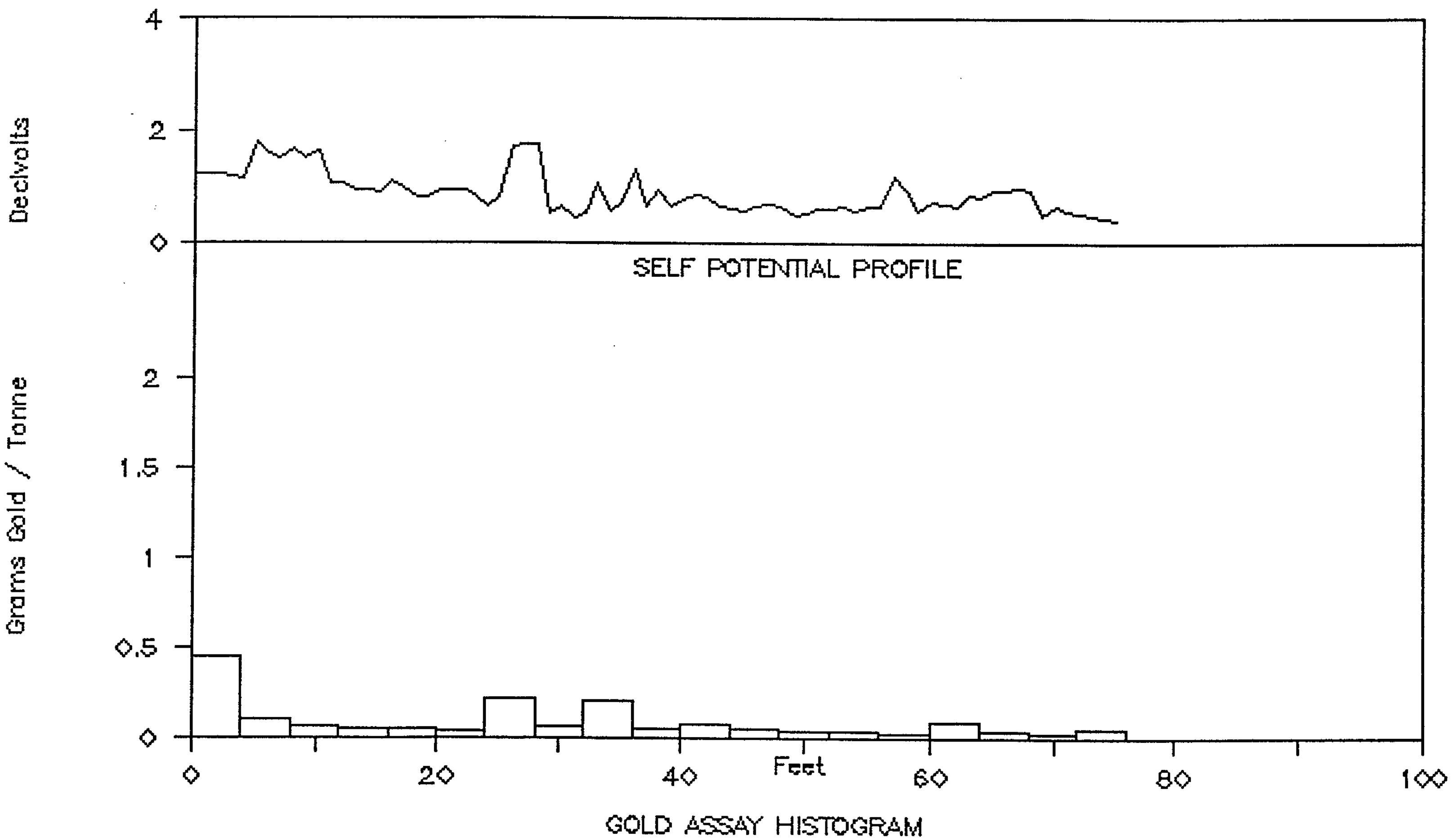
PERCUSSION HOLE UP86-3



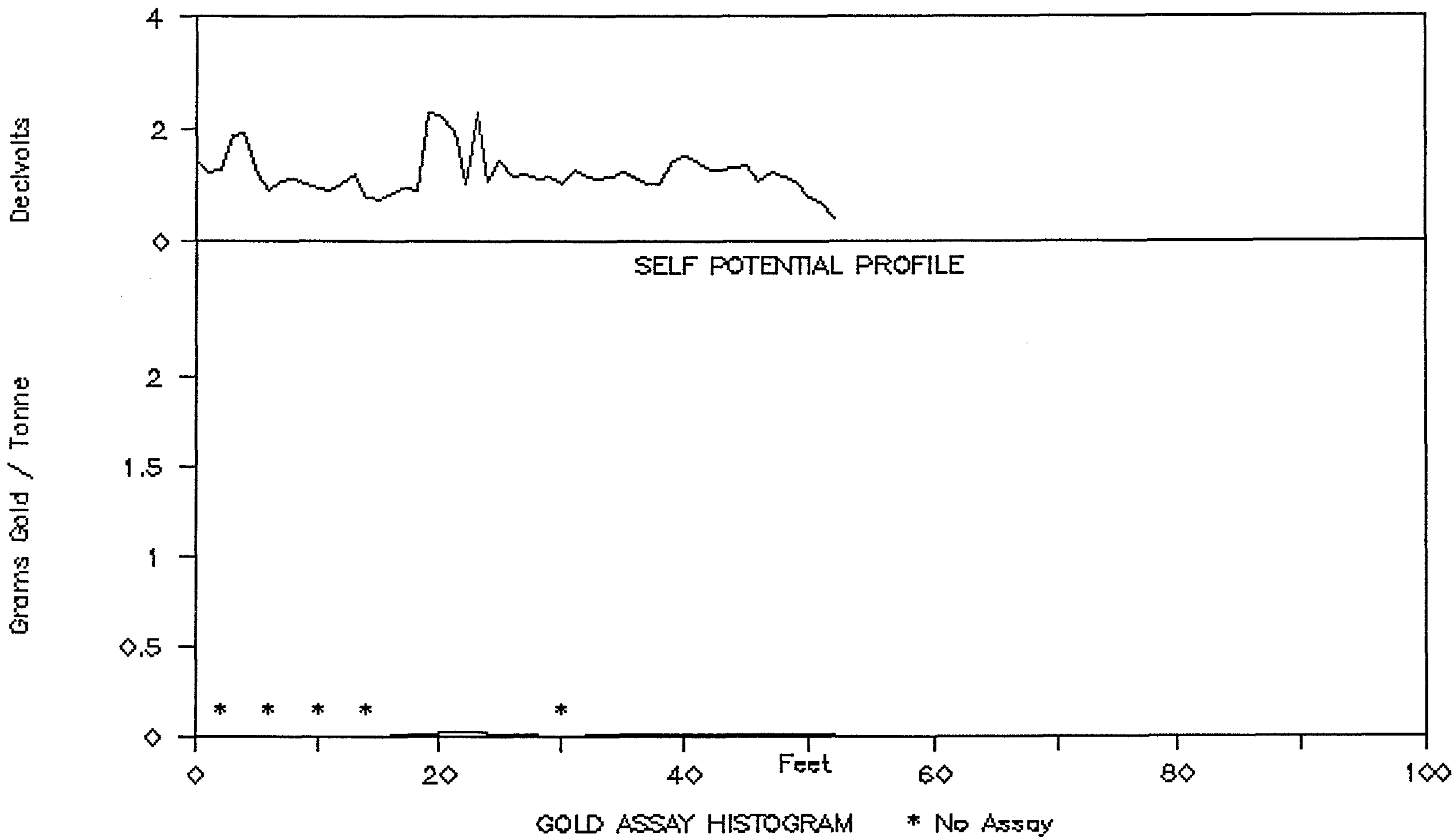
PERCUSSION HOLE UP86-3



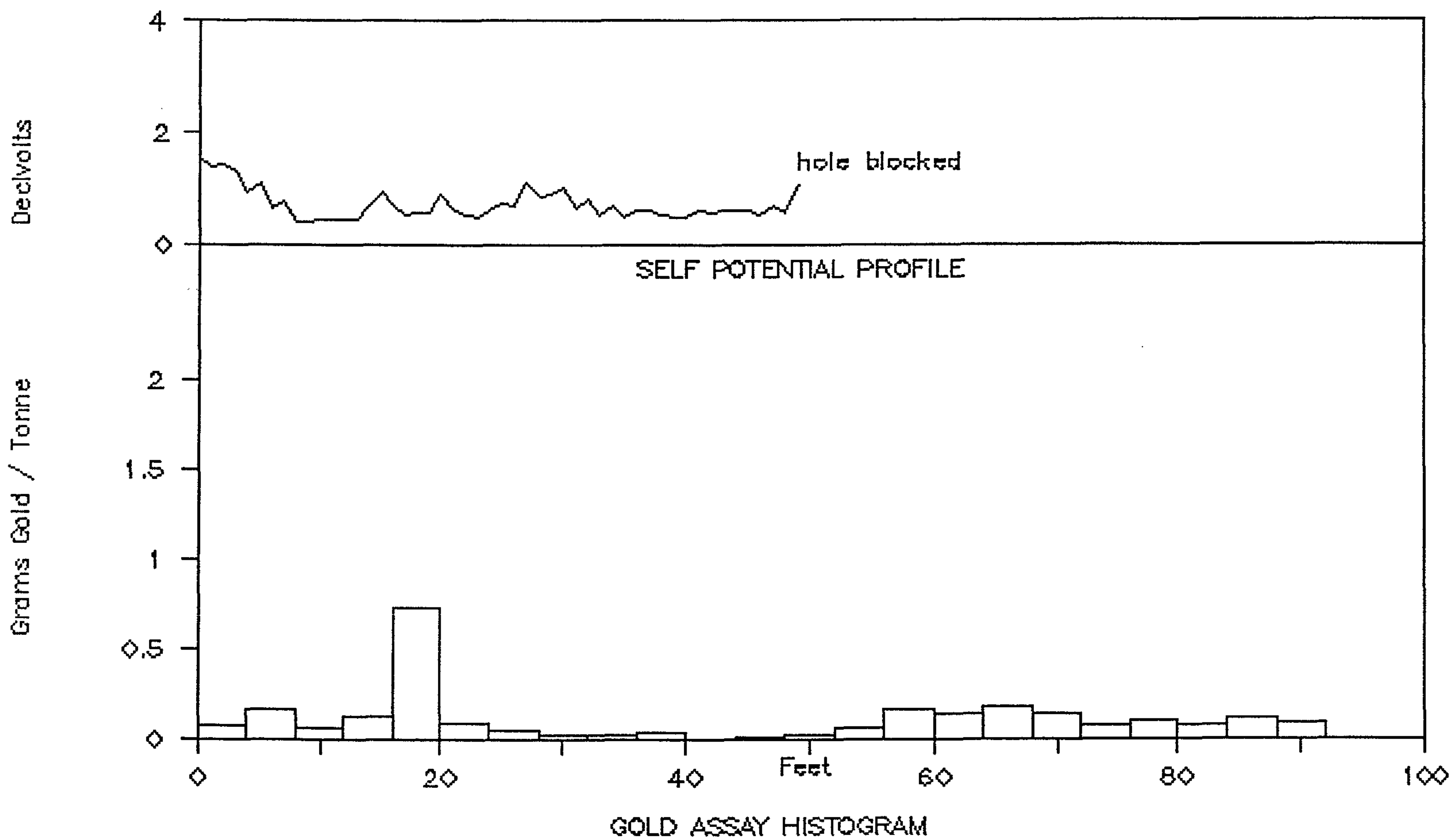
PERCUSSION HOLE UP86-4



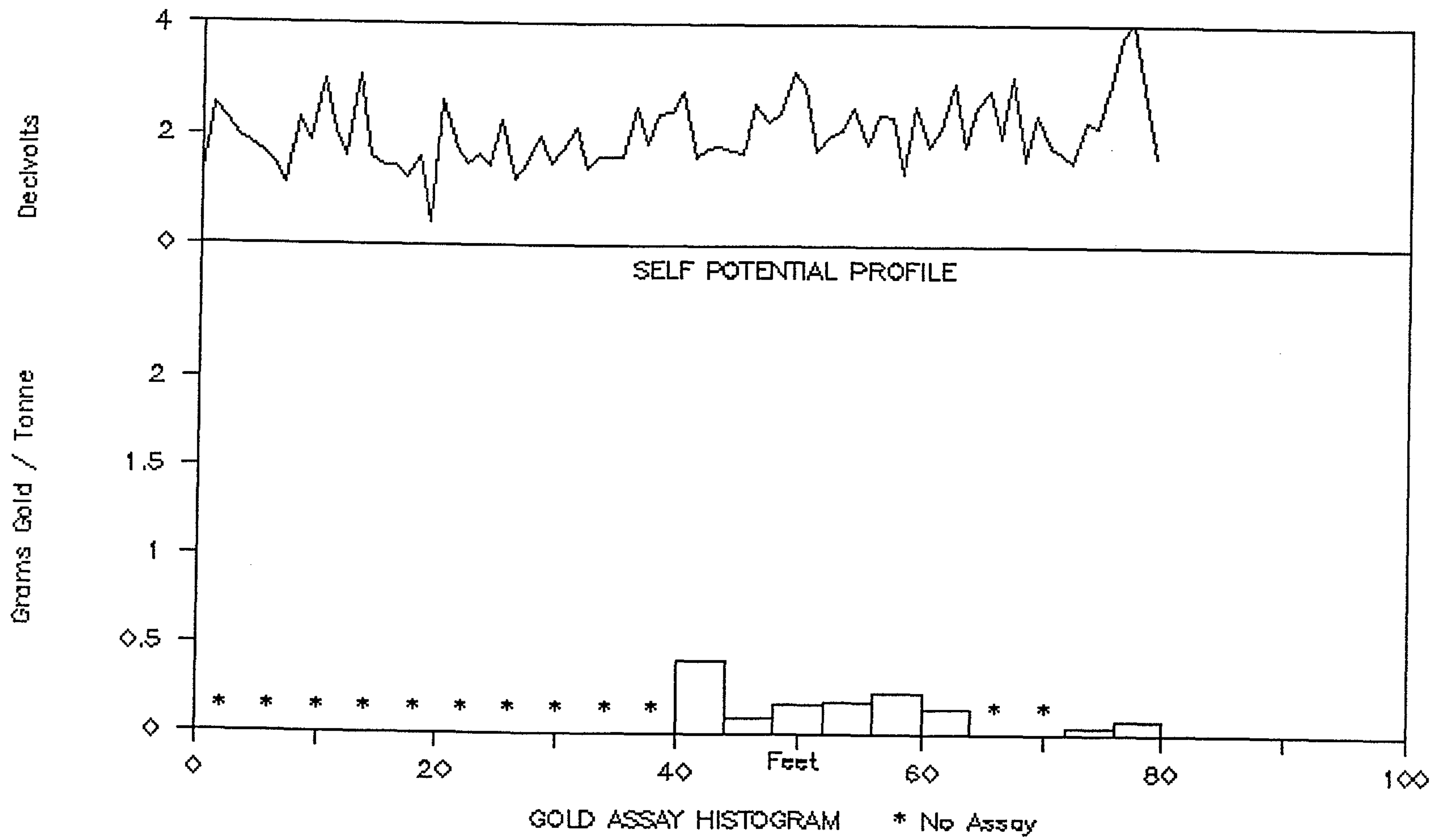
PERCUSSION HOLE UP86-5



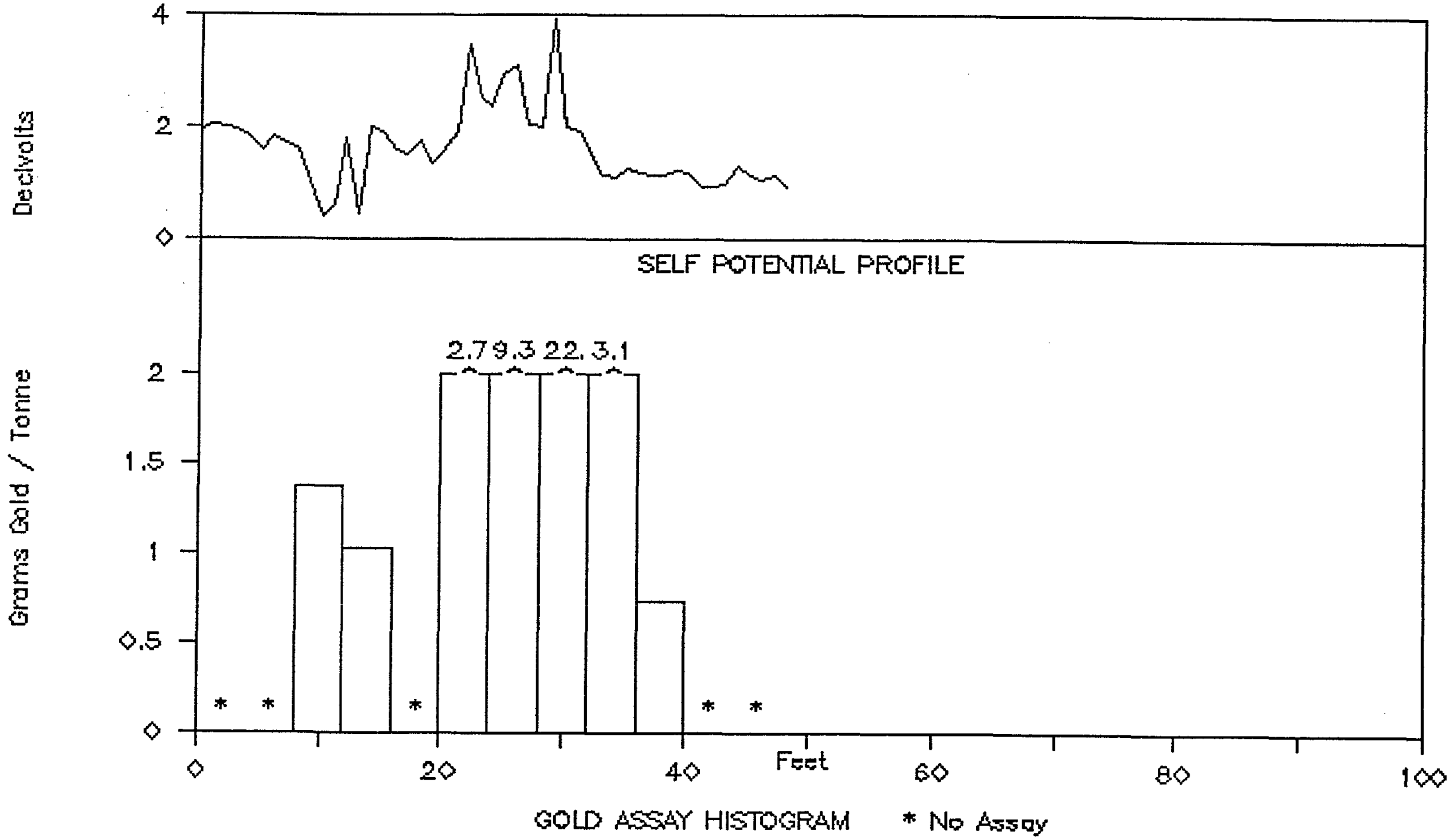
PERCUSSION HOLE UP86-16



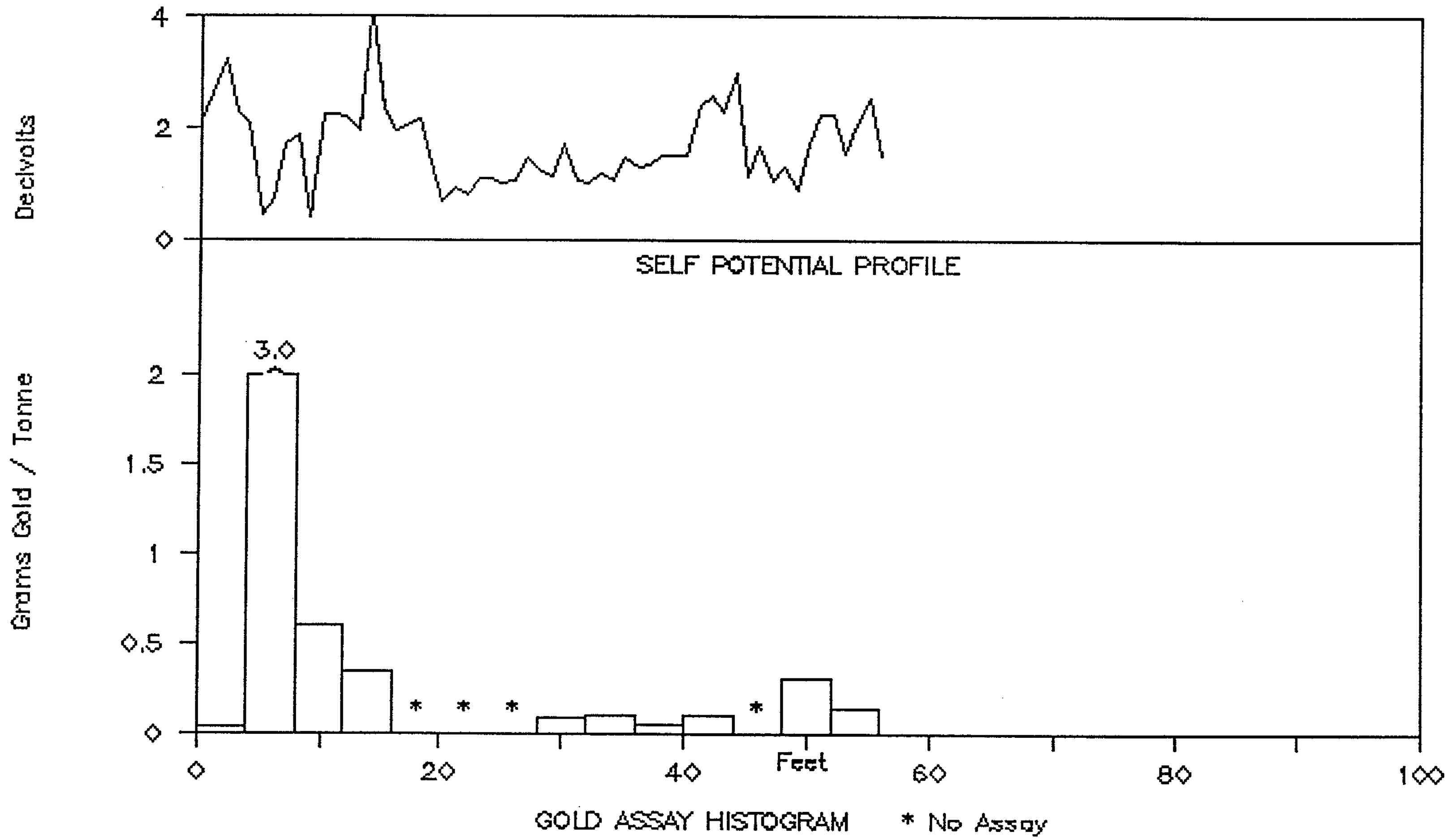
PERCUSSION HOLE UP86-17



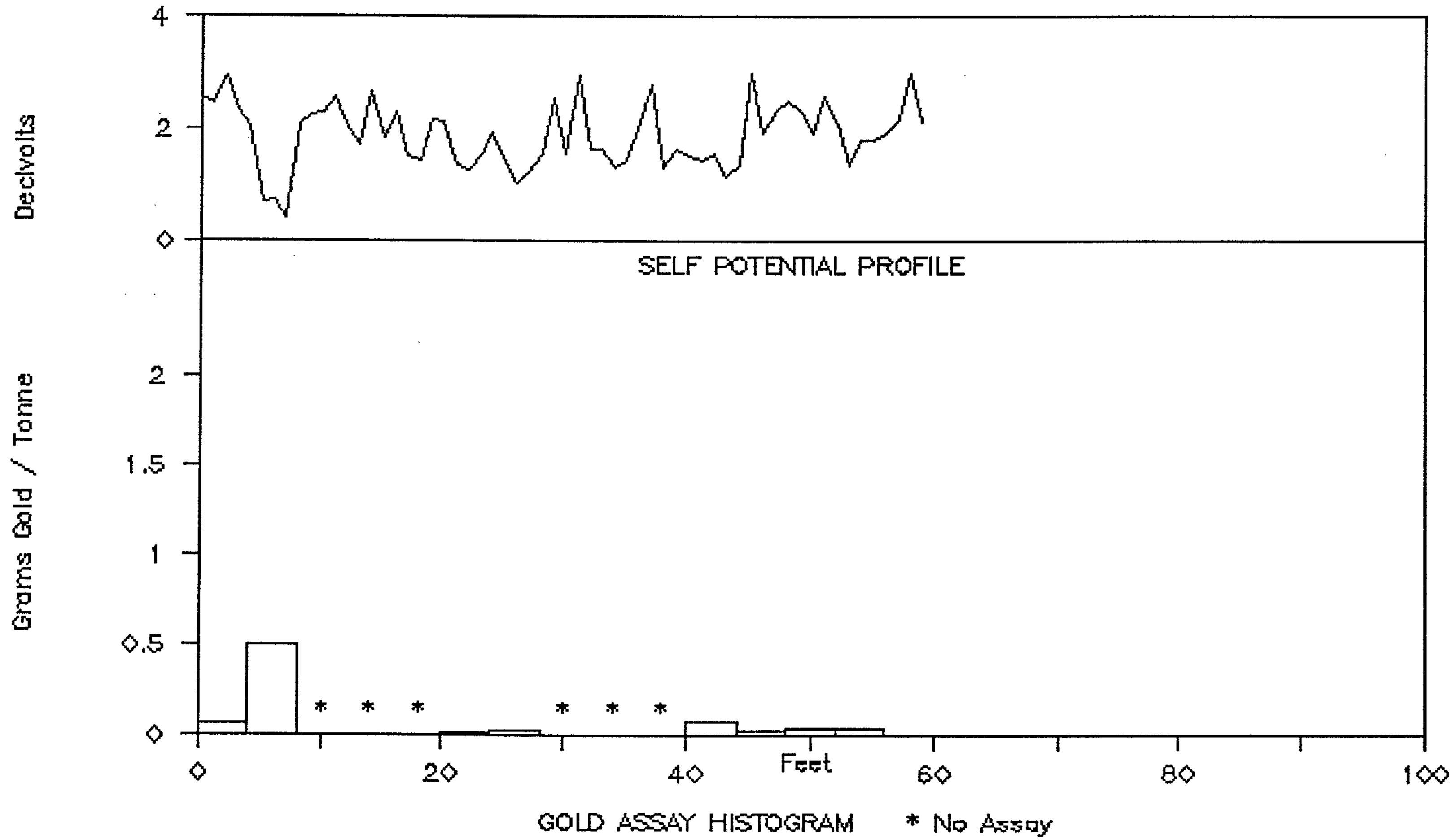
PERCUSSION HOLE UP86-18



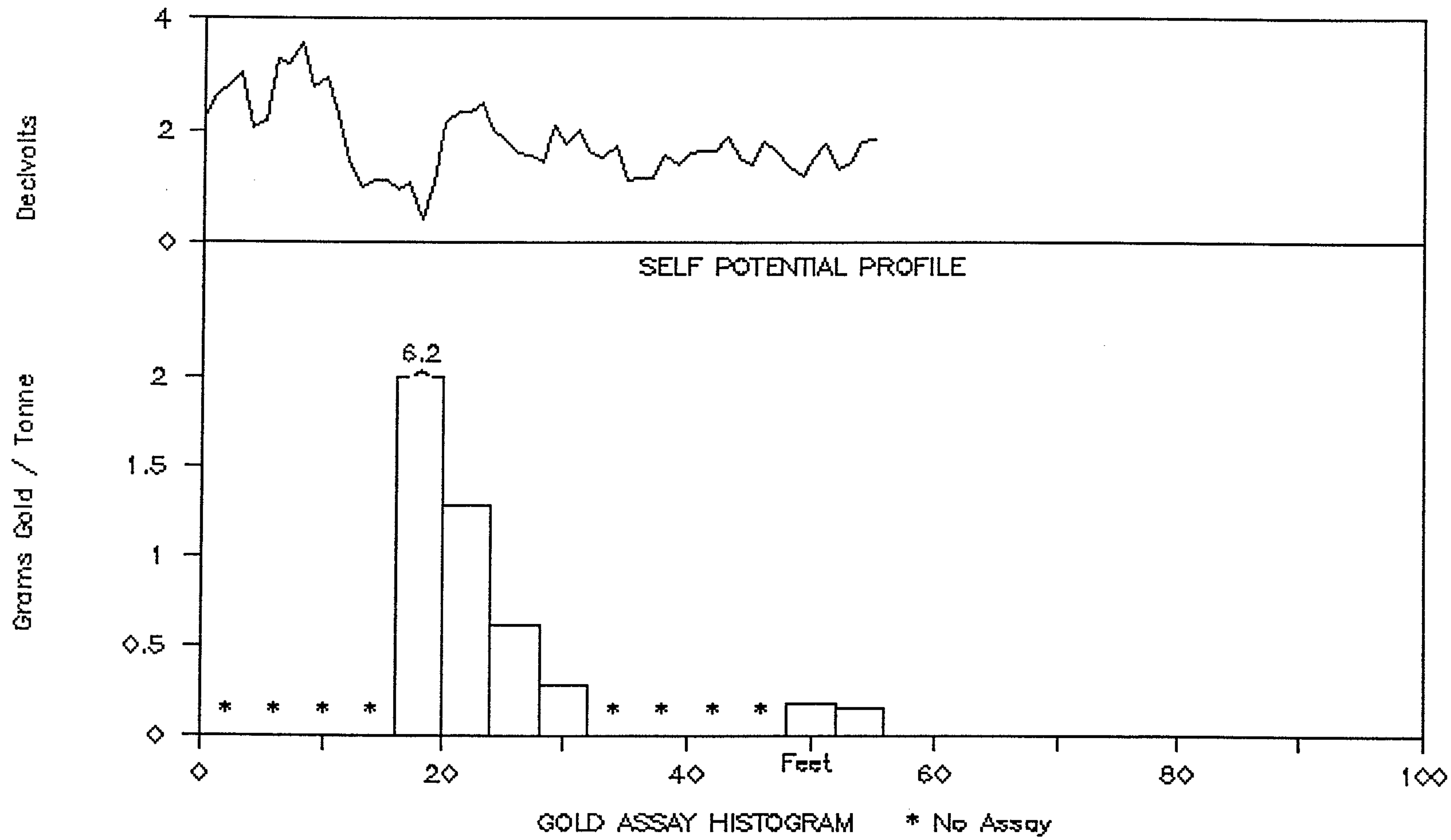
PERCUSSION HOLE UP86-19



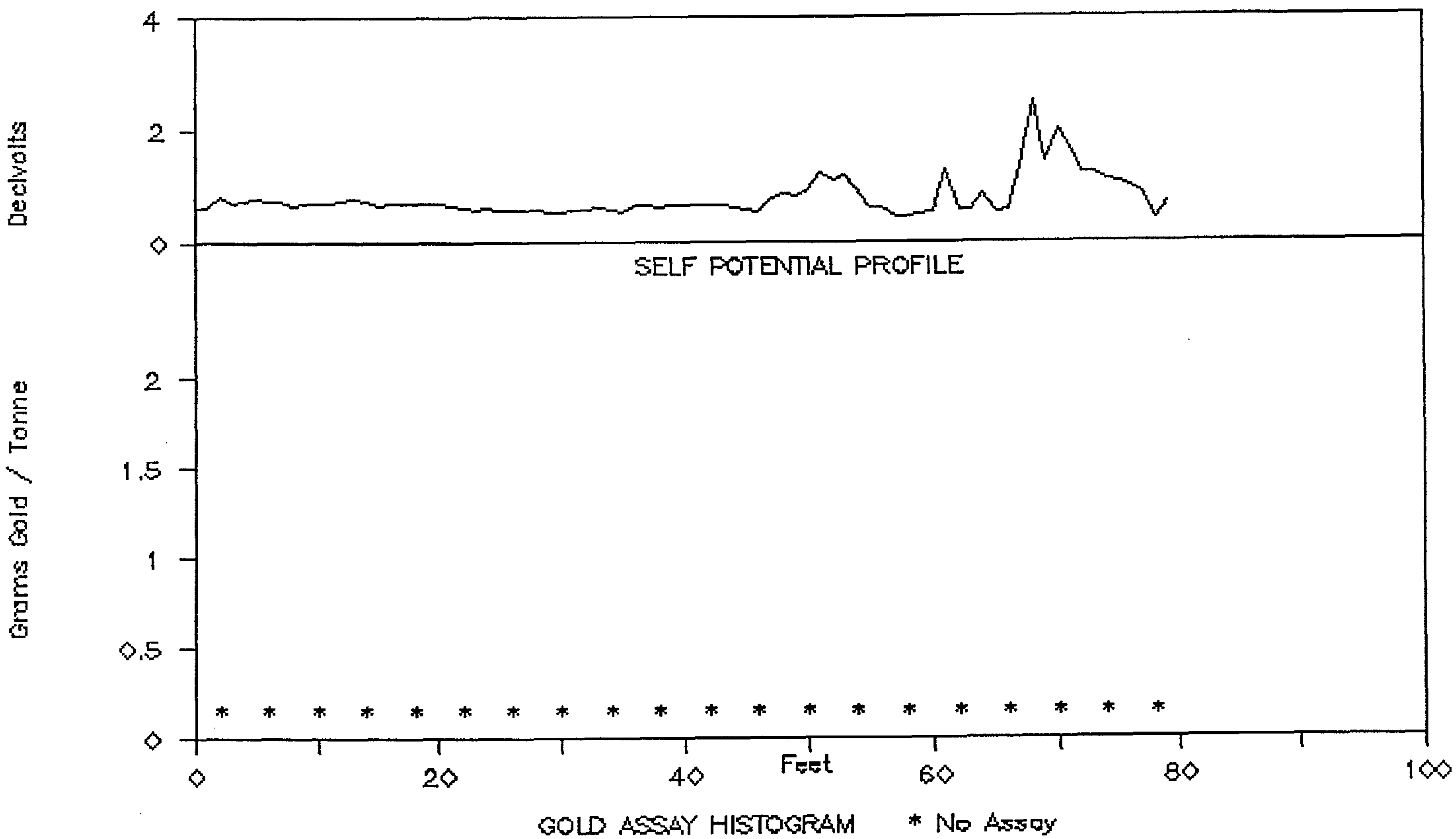
PERCUSSION HOLE UP86-20



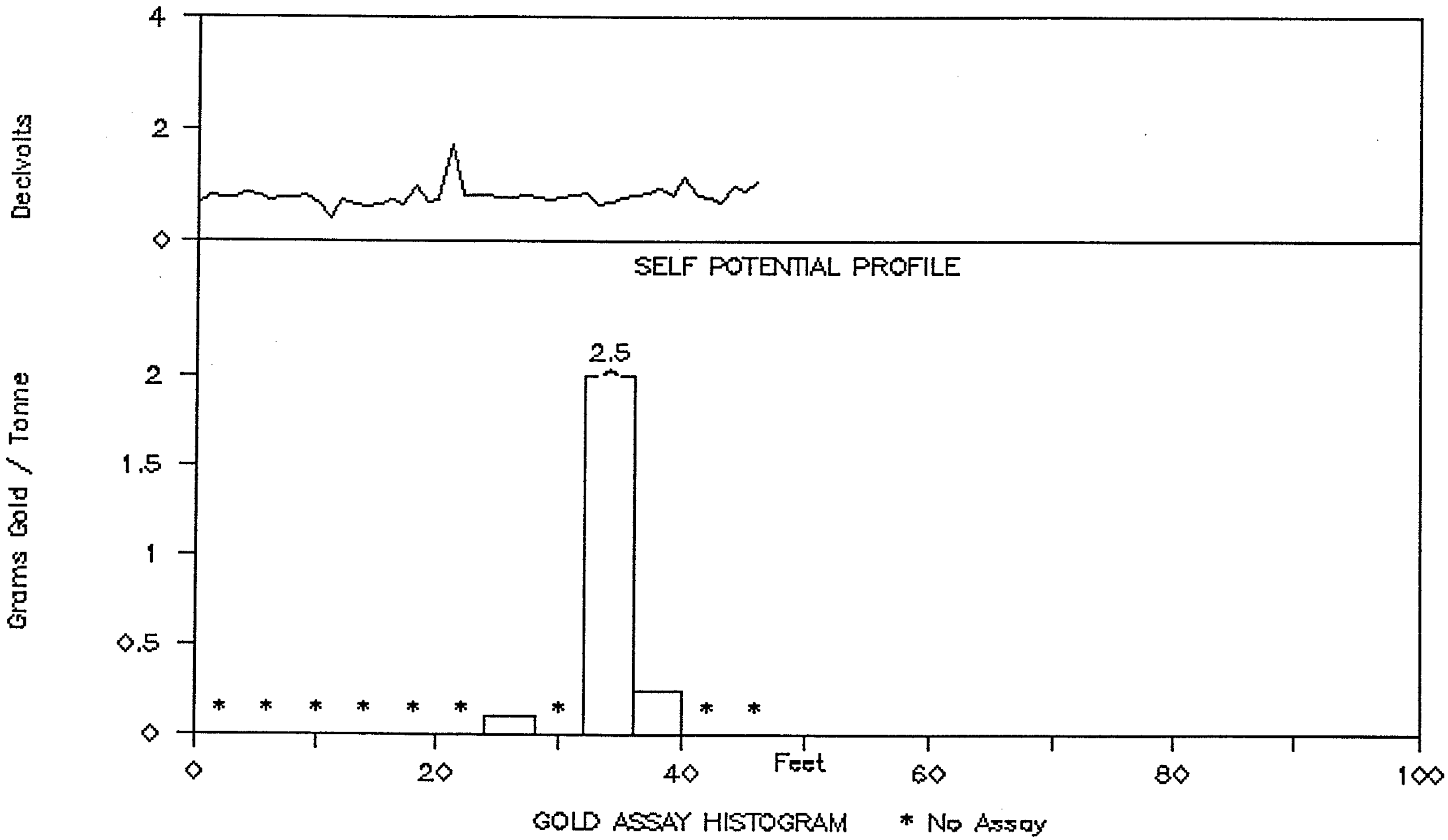
PERCUSSION HOLE UP86-21

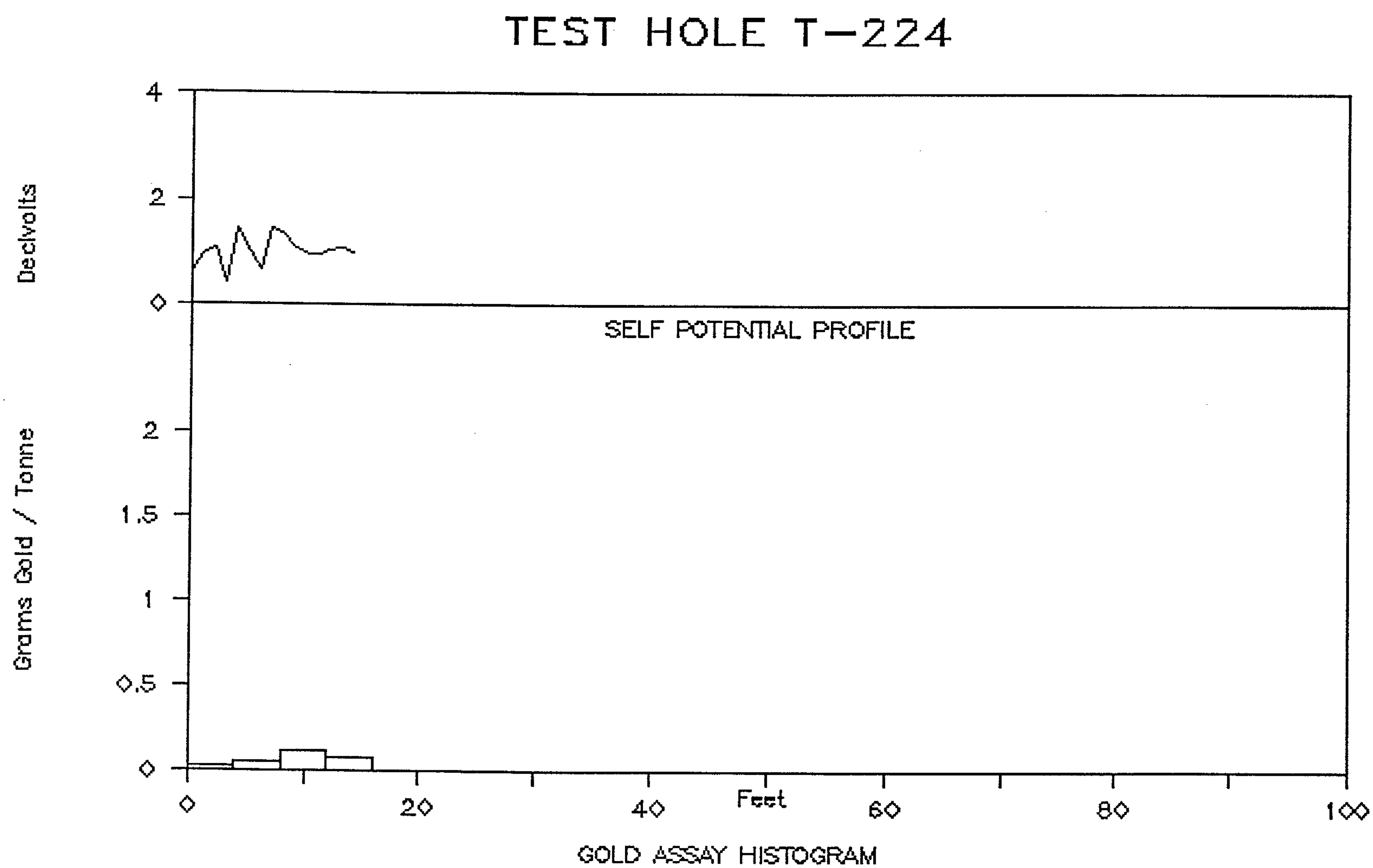


PERCUSSION HOLE UP86-65



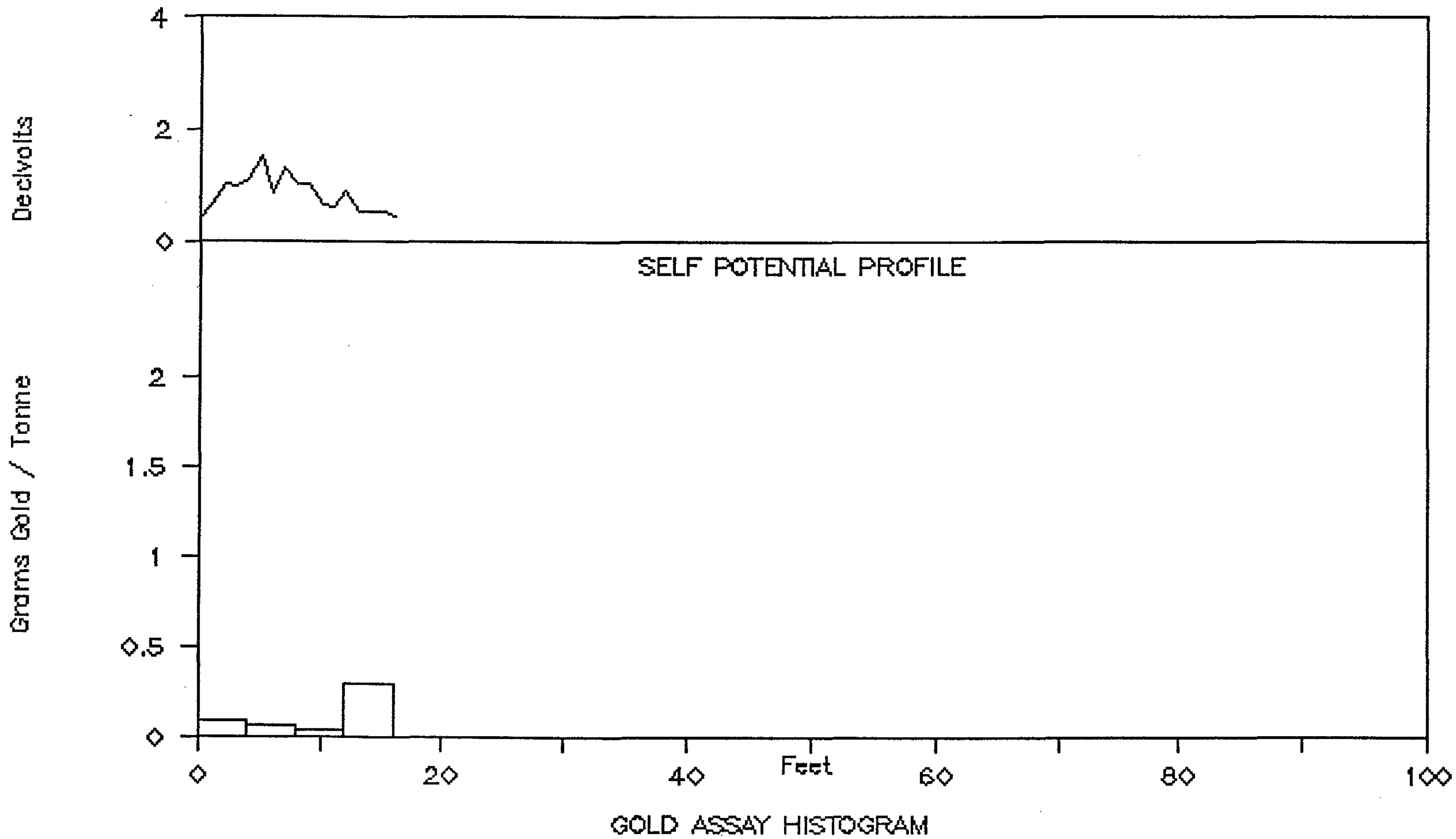
PERCUSSION HOLE UP86-66





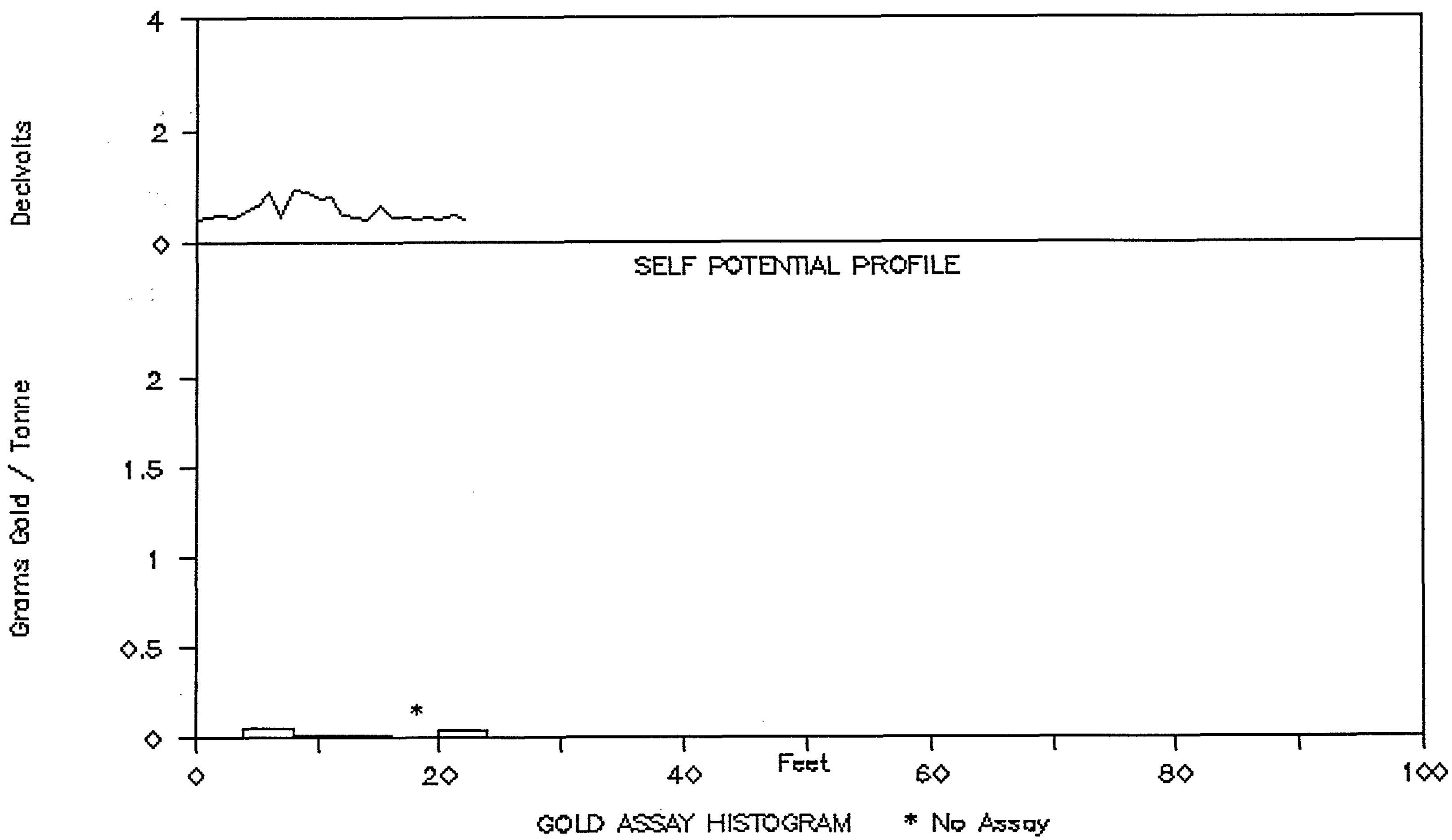
TEST HOLE T-224
Decivolts
4
2
0
SELF POTENTIAL PROFILE
Grams Gold / Tonne
2
1.5
1
0.5
0
0
20
40
Feet
60
80
100
GOLD ASSAY HISTOGRAM

TEST HOLE T-225

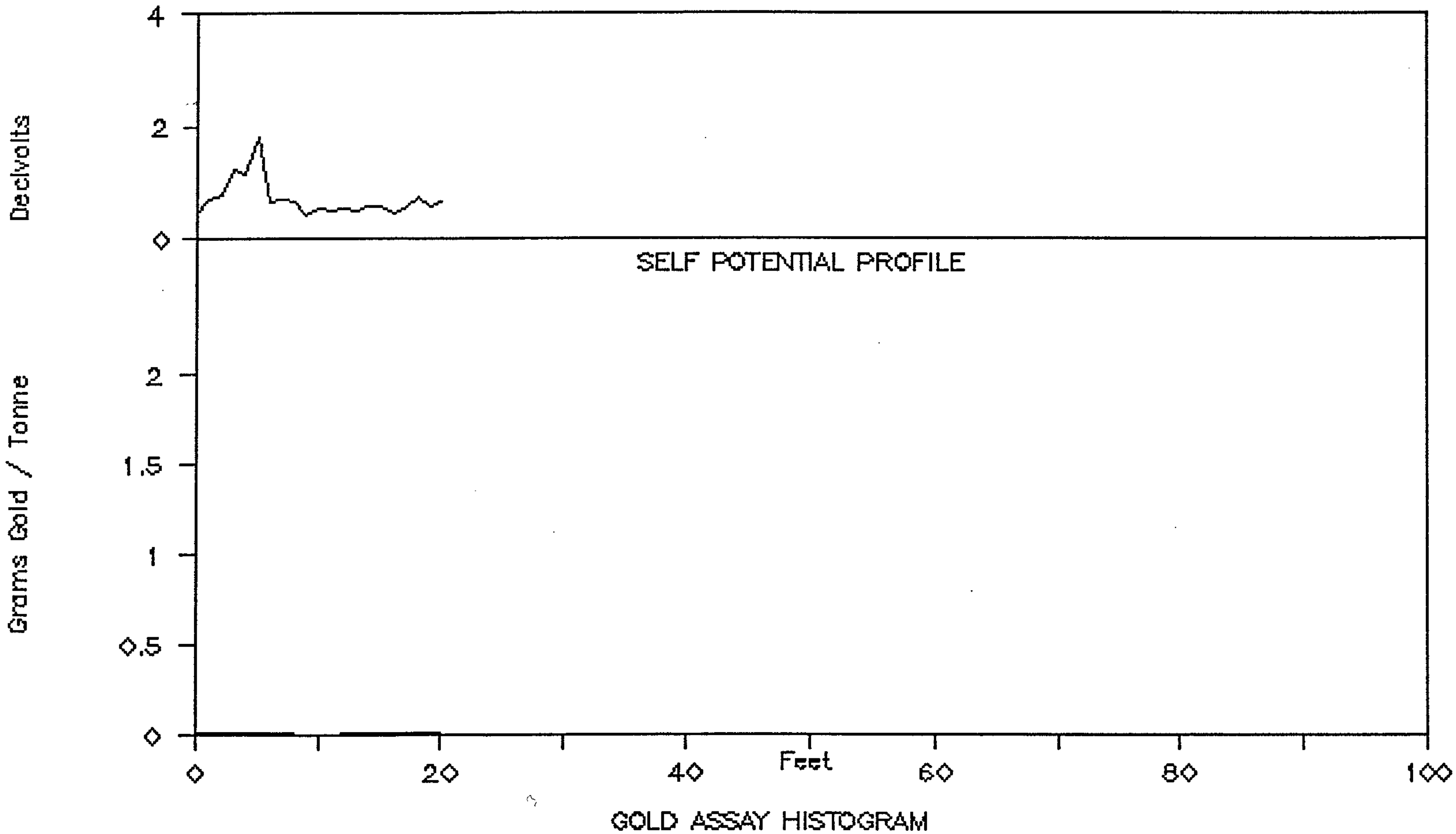


TEST HOLE T-226

TEST HOLE T-227



TEST HOLE T-228



Appendix III - 4

Level IV Assay Histograms and Self Potential Profiles

Percussion Holes

UP86-6 to UP86-15

UP86-29 to UP86-64

UP86-70 to UP86-80

Test Holes

T-229 to T-230

T-246

T-252 to T-253

T-265 to T-266

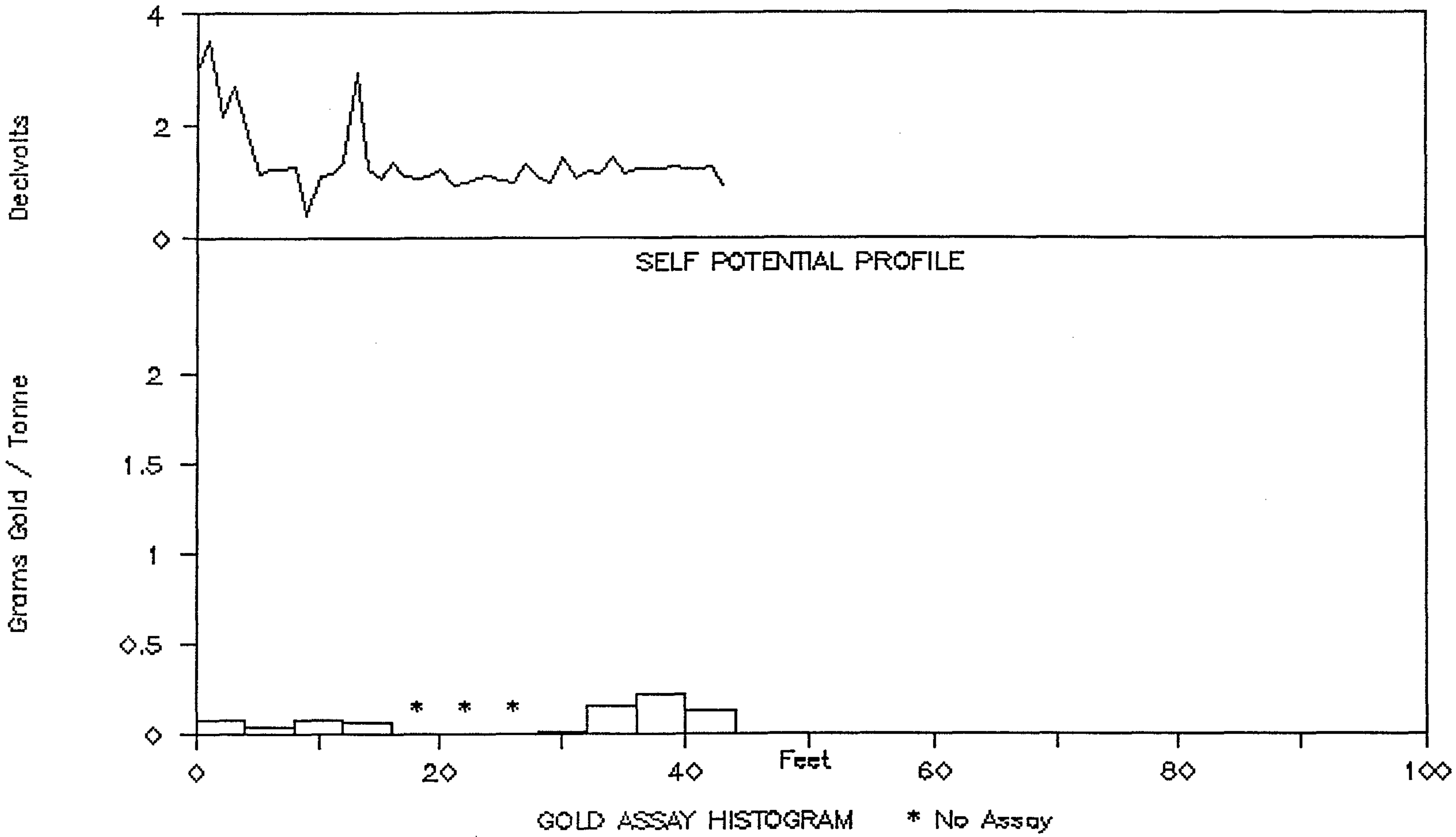
Level IV

Hole	Latitude	Departure	Bearing	Inclination	Length
UP86-6	18,237N	10,144E	018°	+13°	100'
7	18,237N	10,144E	018°	+32°	44'
8	18,259N	10,071E	334°	+ 9°	100'
9	18,245N	10,094E	018°	+14°	92'
10	18,245N	10,093E	018°	+33°	79'
11	18,239N	10,086E	213°	+ 9°	100'
12	18,237N	10,123E	017°	+76°	24'
13	18,505N	10,142E	224°	+53°	72'
14	18,507N	10,143E	226°	+73°	48'
15	18,509N	10,142E	315°	+69°	40'
29	18,281N	10,067E	070°	+12°	79'
30	18,281N	10,067E	068°	+28°	80'
31	18,283N	10,064E	029°	+14°	100'
32	18,283N	10,064E	020°	+27°	56'
33	18,282N	10,066E	047°	+11°	56'
34	18,282N	10,066E	047°	+25°	96'
35	18,282N	10,066E	052°	+49°	80'
36	18,282N	10,066E	045°	+67°	60'
37	18,316N	10,030E	036°	+ 2°	96'
38	18,316N	10,030E	035°	+23°	72'
39	18,316N	10,030E	026°	+45°	40'
40	18,315N	10,031E	055°	+ 5°	76'
41	18,315N	10,031E	044°	+25°	80'
42	18,317N	10,029E	020°	+ 5°	64'
43	18,317N	10,029E	017°	+27°	40'
44	18,313N	10,027E	014°	+61°	40'
45	18,355N	9,995E	034°	+18°	52'
46	18,355N	9,995E	031°	+26°	92'
47	18,355N	9,995E	030°	+37°	52'
48	18,353N	9,993E	019°	+68°	52'
49	18,357N	9,994E	016°	+12°	52'
50	18,357N	9,994E	018°	+30°	48'
51	18,229N	10,158E	252°	+62°	52'
52	18,228N	10,158E	221°	+41°	60'
53	18,231N	10,158E	296°	+69°	60'
54	18,236N	10,157E	345°	-46°	20'
55	18,236N	10,158E	359°	-33°	28'
56	18,234N	10,130E	287°	+71°	40'
57	18,231N	10,129E	206°	+50°	48'
58	18,133N	10,129E	224°	+67°	52'
59	18,265N	10,061E	300°	+63°	60'
60	18,263N	10,061E	025°	+58°	64'
61	18,405N	9,920E	280°	+20°	120'
62	18,404N	9,919E	274°	+48°	100'
63	18,331N	10,001E	306°	+75°	60'
64	18,332N	10,003E	022°	+68°	60'

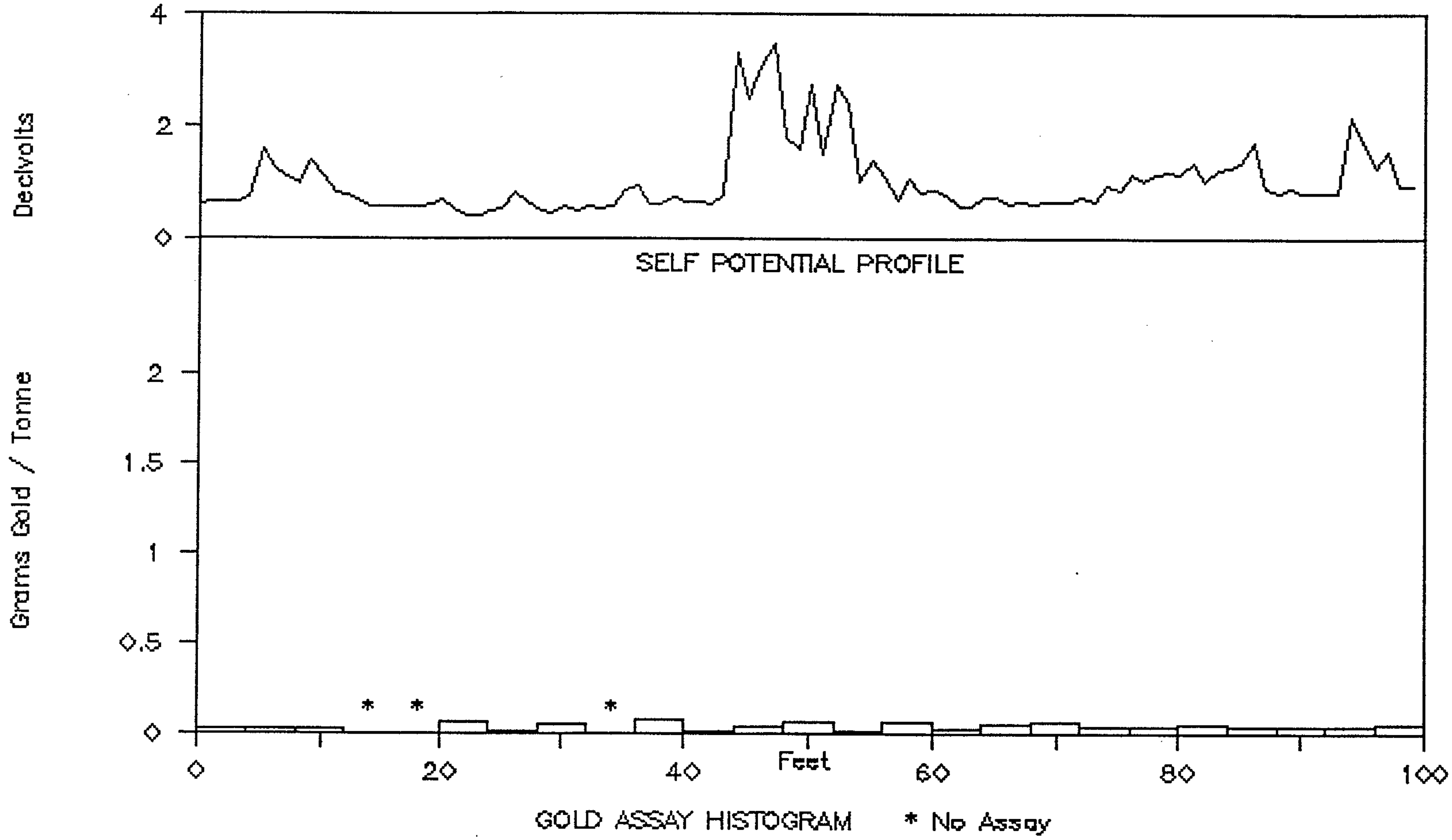
Level IV

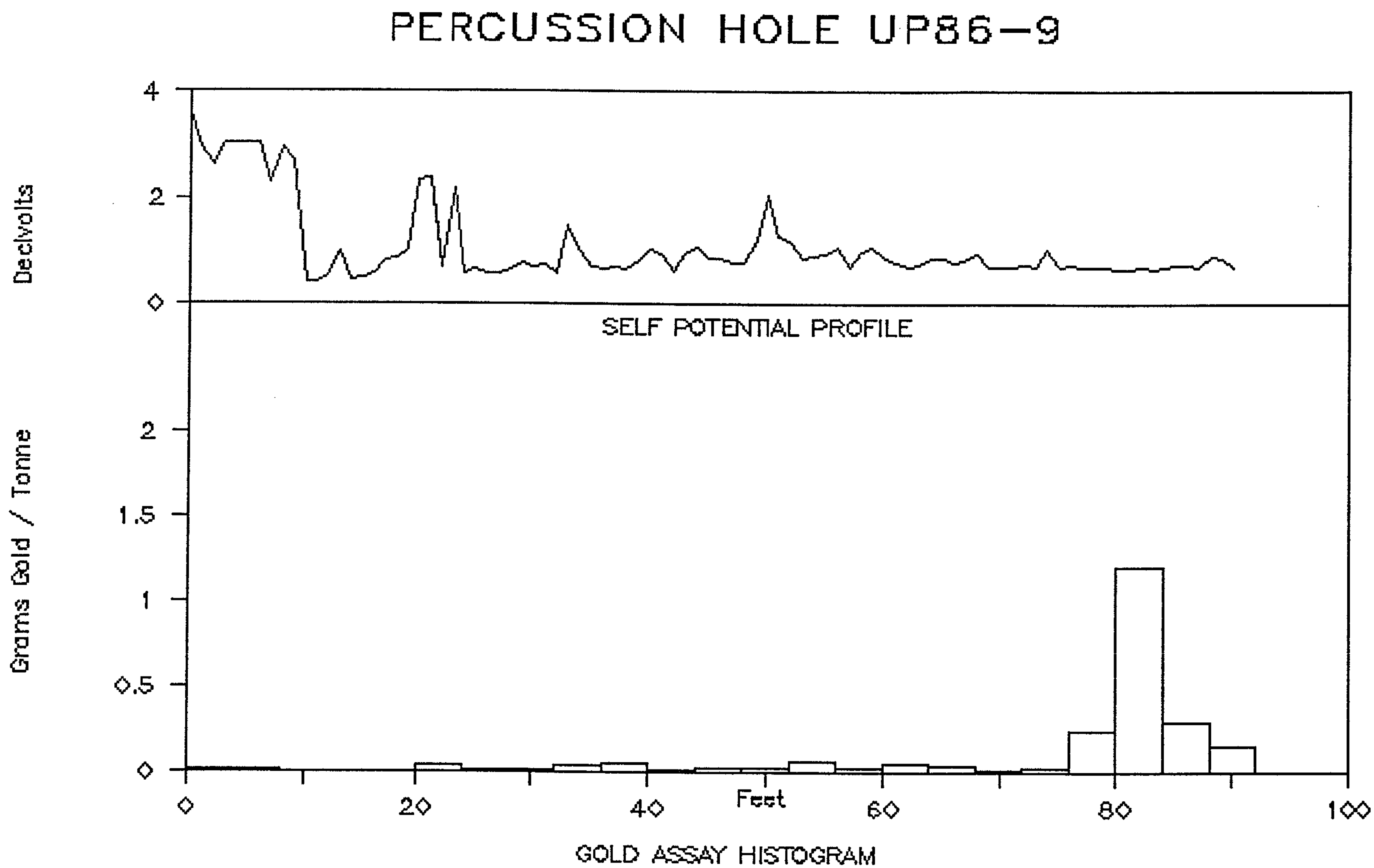
Hole	Latitude	Departure	Bearing	Inclination	Length
UP86-70	18,406N	9,928E	036°	+12°	48'
71	18,406N	9,928E	038°	+29°	104'
72	18,406N	9,928E	024°	+49°	52'
73	18,404N	9,927E	019°	+70°	52'
74	18,401N	9,923E	213°	+13°	104'
75	18,401N	9,923E	210°	+44°	104'
76	18,235N	10,160E	041°	-42°	106'
77	18,230N	10,180E	164°	-38°	132'
78	18,238N	10,185E	041°	-38°	44'
79	18,231N	10,186E	130°	-34°	80'
80	18,234N	10,186E	066°	-50°	60'
T-229	18,228N	10,172E	214°	+ 4°	42'
230	18,235N	10,174E	027°	+15°	25'
246	18,238N	10,129E	023°	+18°	16'
252	18,297N	10,033E	037°	+ 7°	21'
253	18,309N	10,025E	030°	+ 7°	16'
265	18,361N	9,963E	216°	+ 7°	40'
266	18,366N	9,995E	047°	+ 5°	32'

PERCUSSION HOLE UP86-7



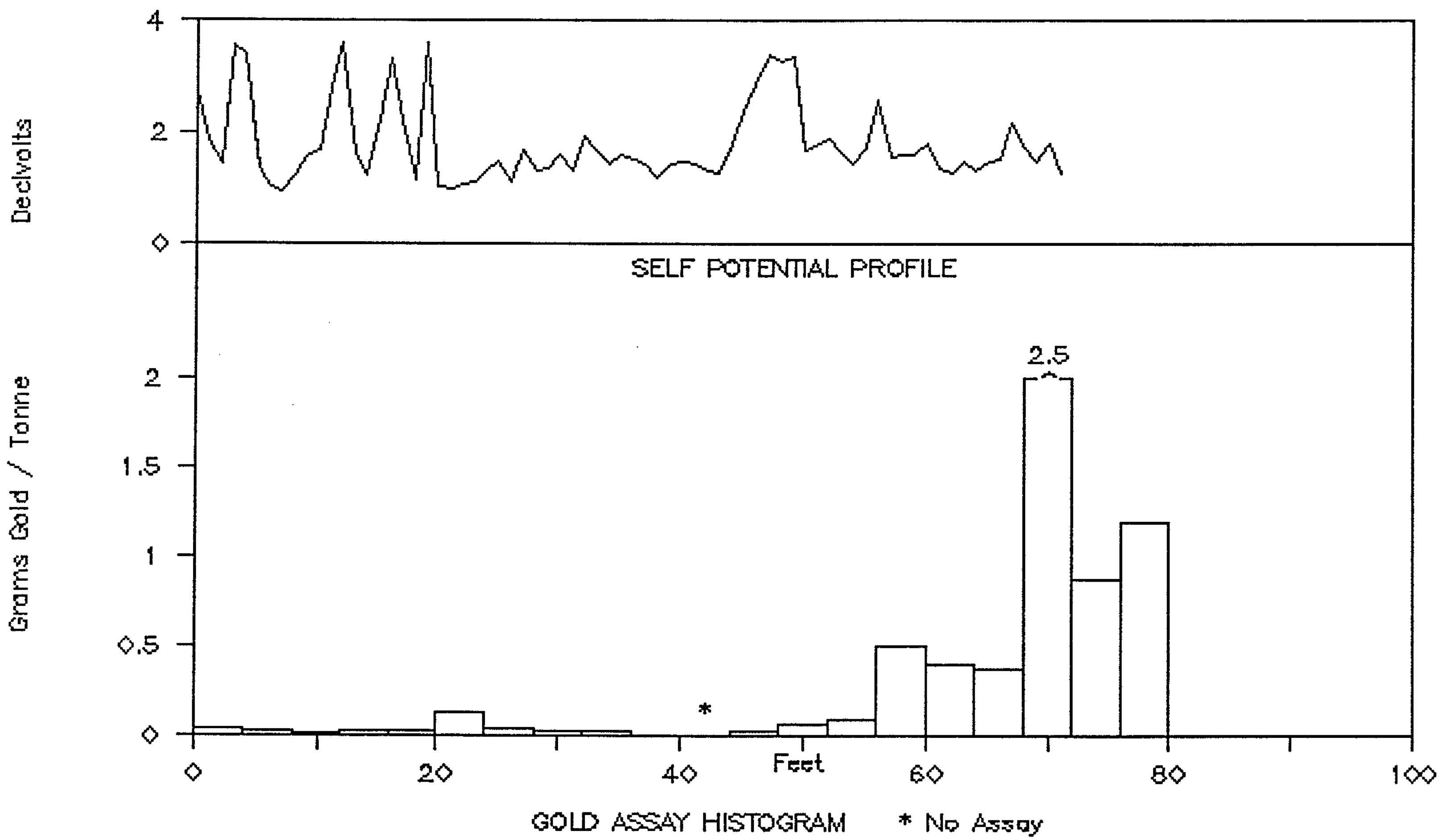
PERCUSSION HOLE UP86-8



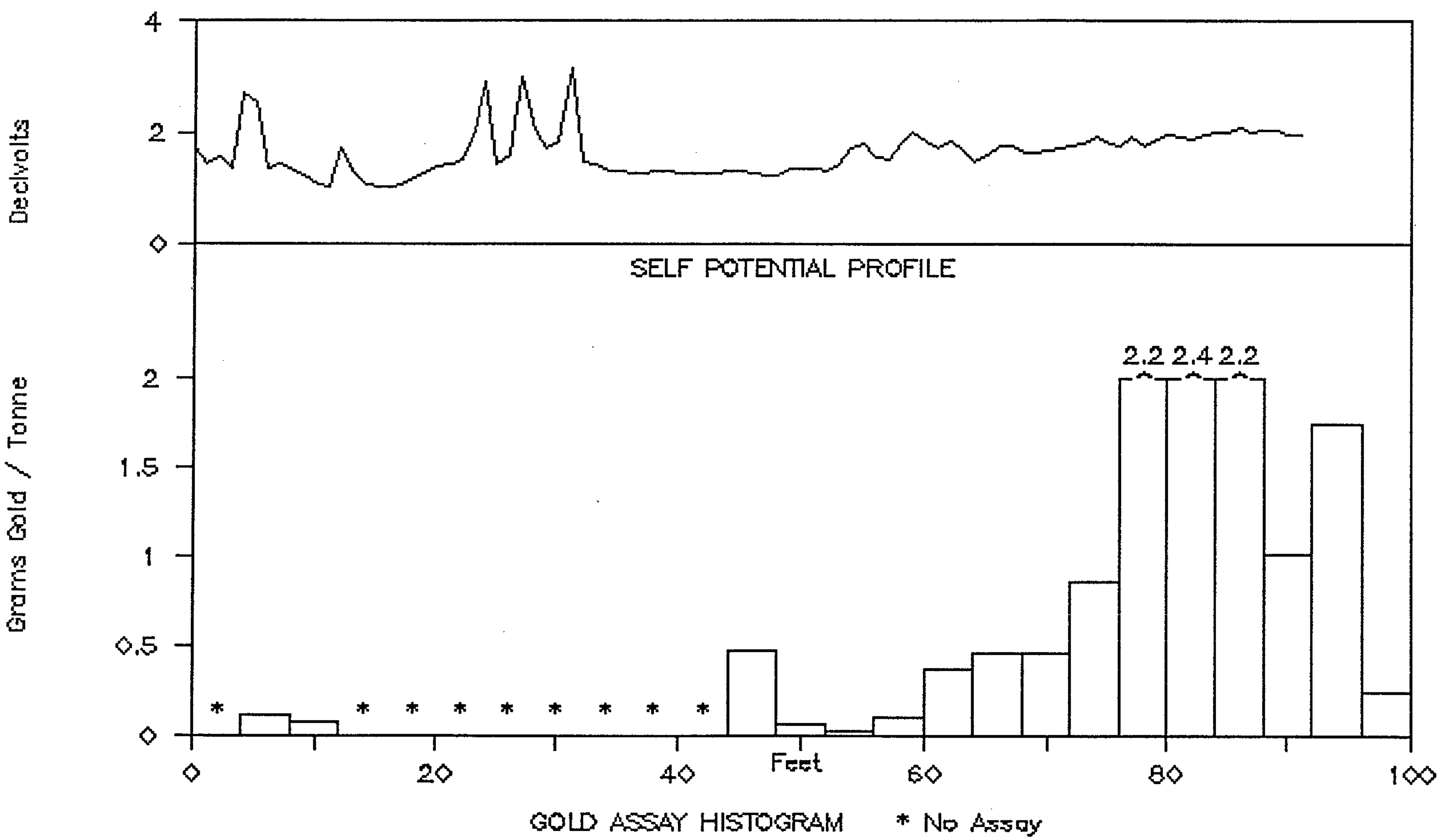


PERCUSSION HOLE UP86-9
Decivolts
4
2
0
SELF POTENTIAL PROFILE
Grams Gold / Tonne
2
1.5
1
0.5
0
Feet
0
20
40
60
80
100
GOLD ASSAY HISTOGRAM

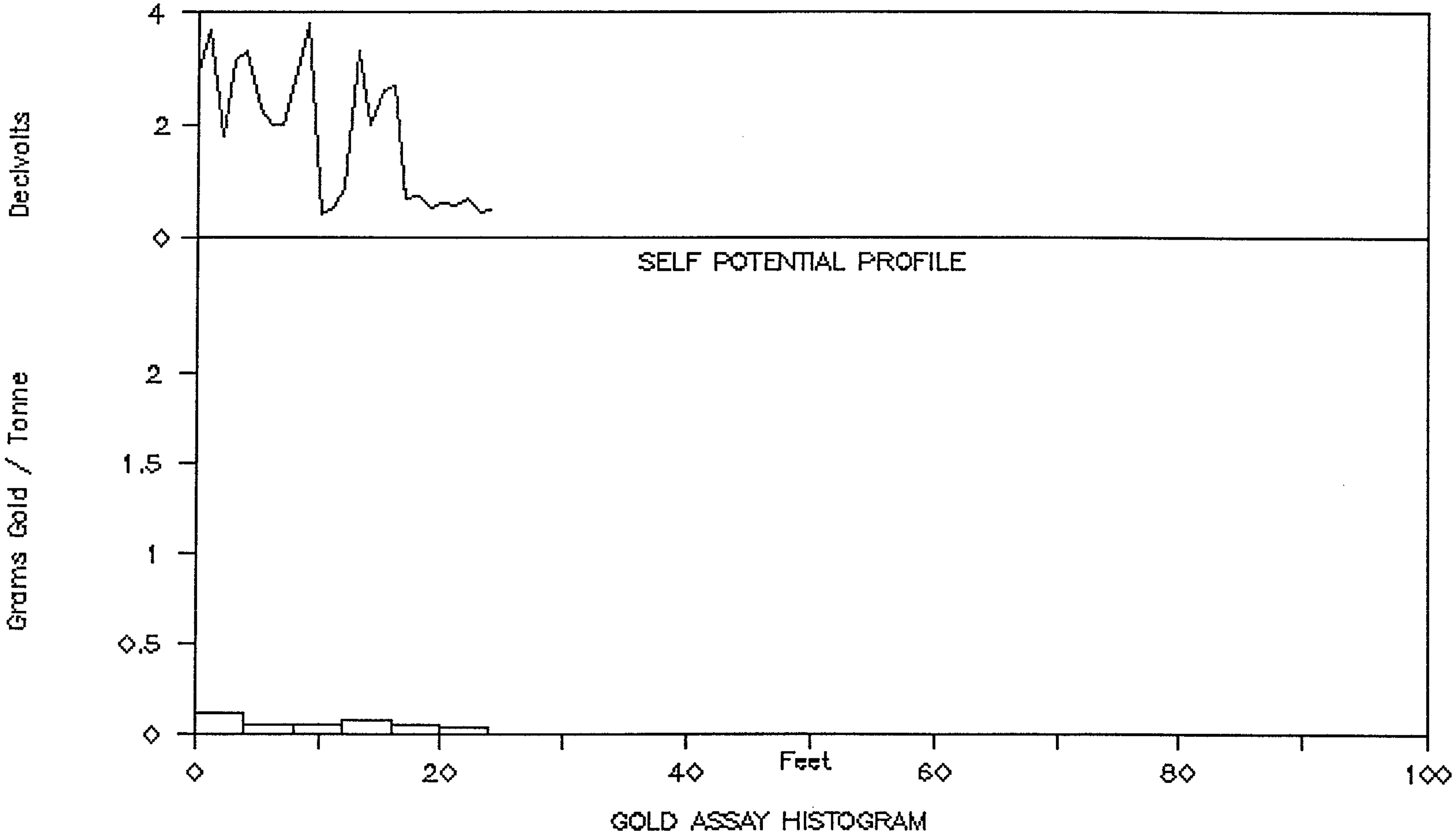
PERCUSSION HOLE UP86-10



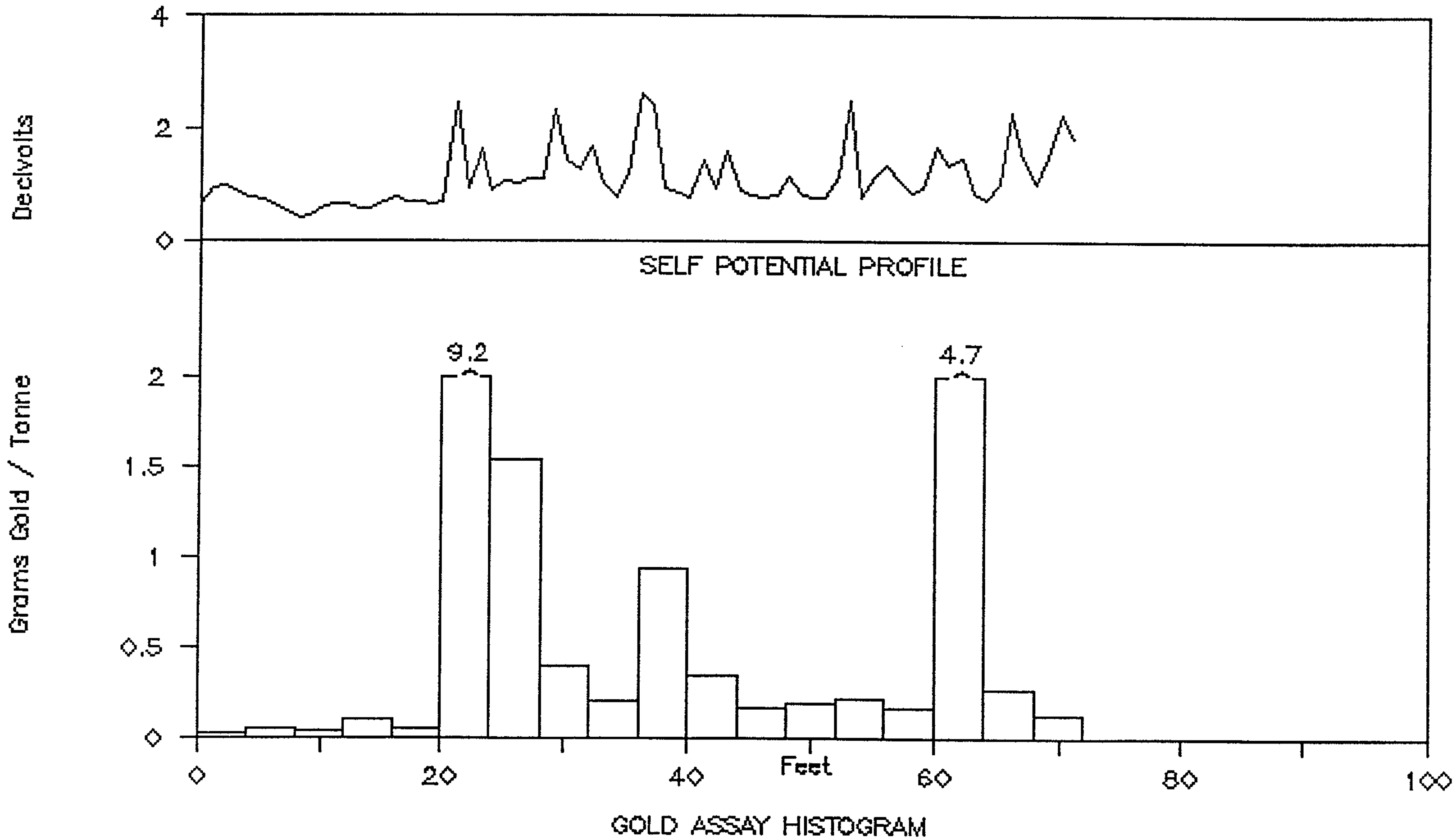
PERCUSSION HOLE UP86-11



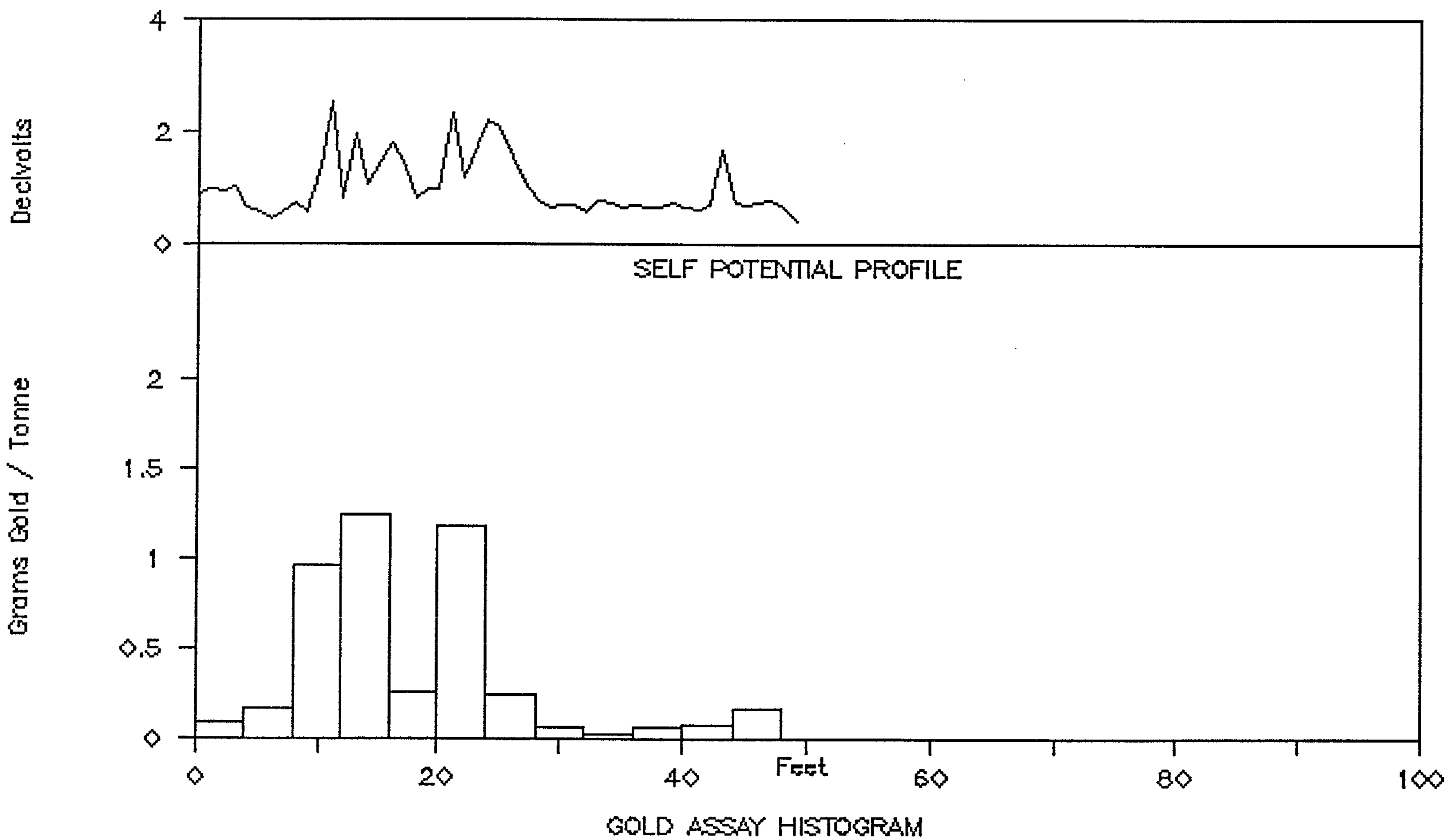
PERCUSSION HOLE UP86-12



PERCUSSION HOLE UP86-13



PERCUSSION HOLE UP86-14



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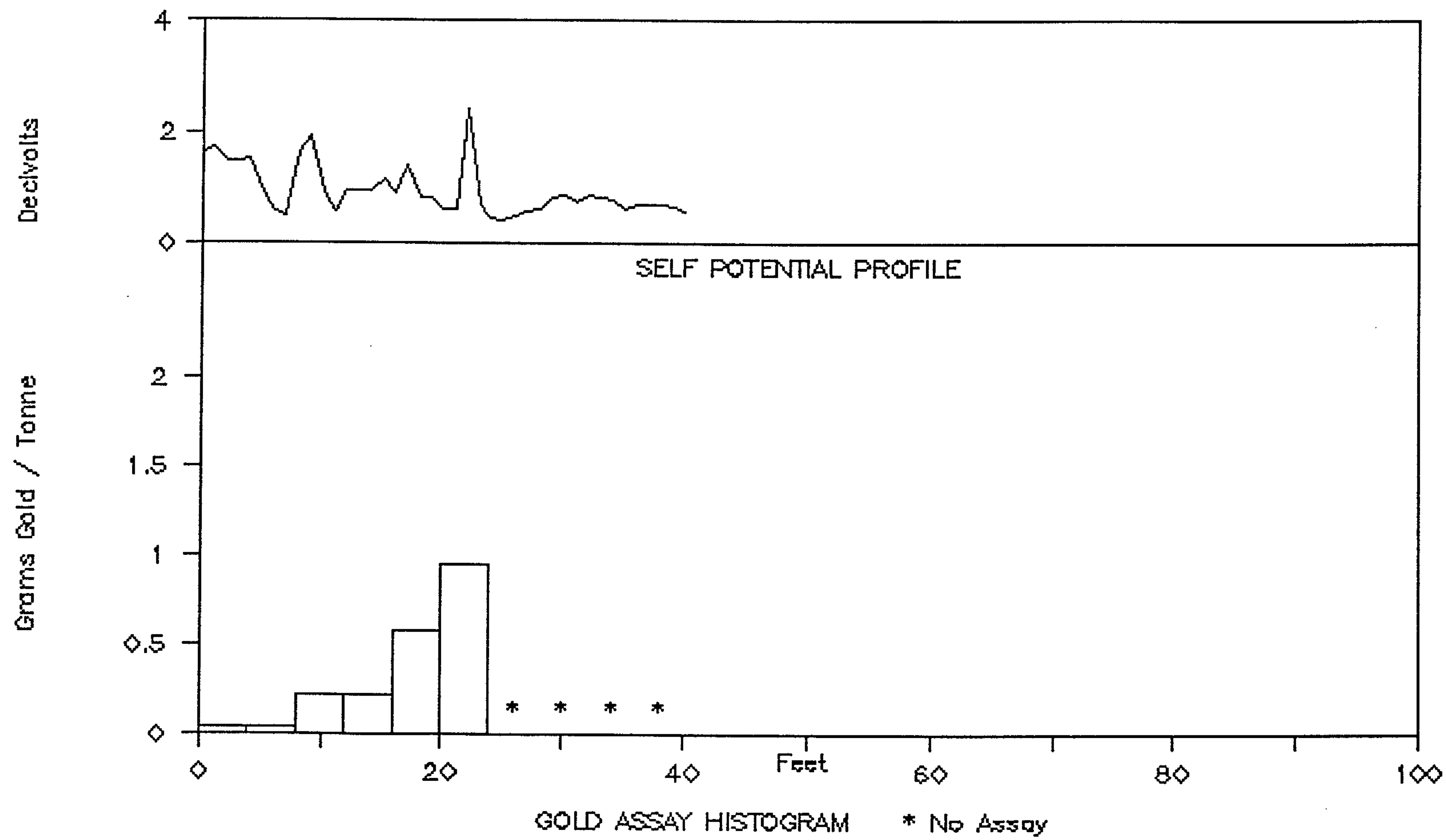
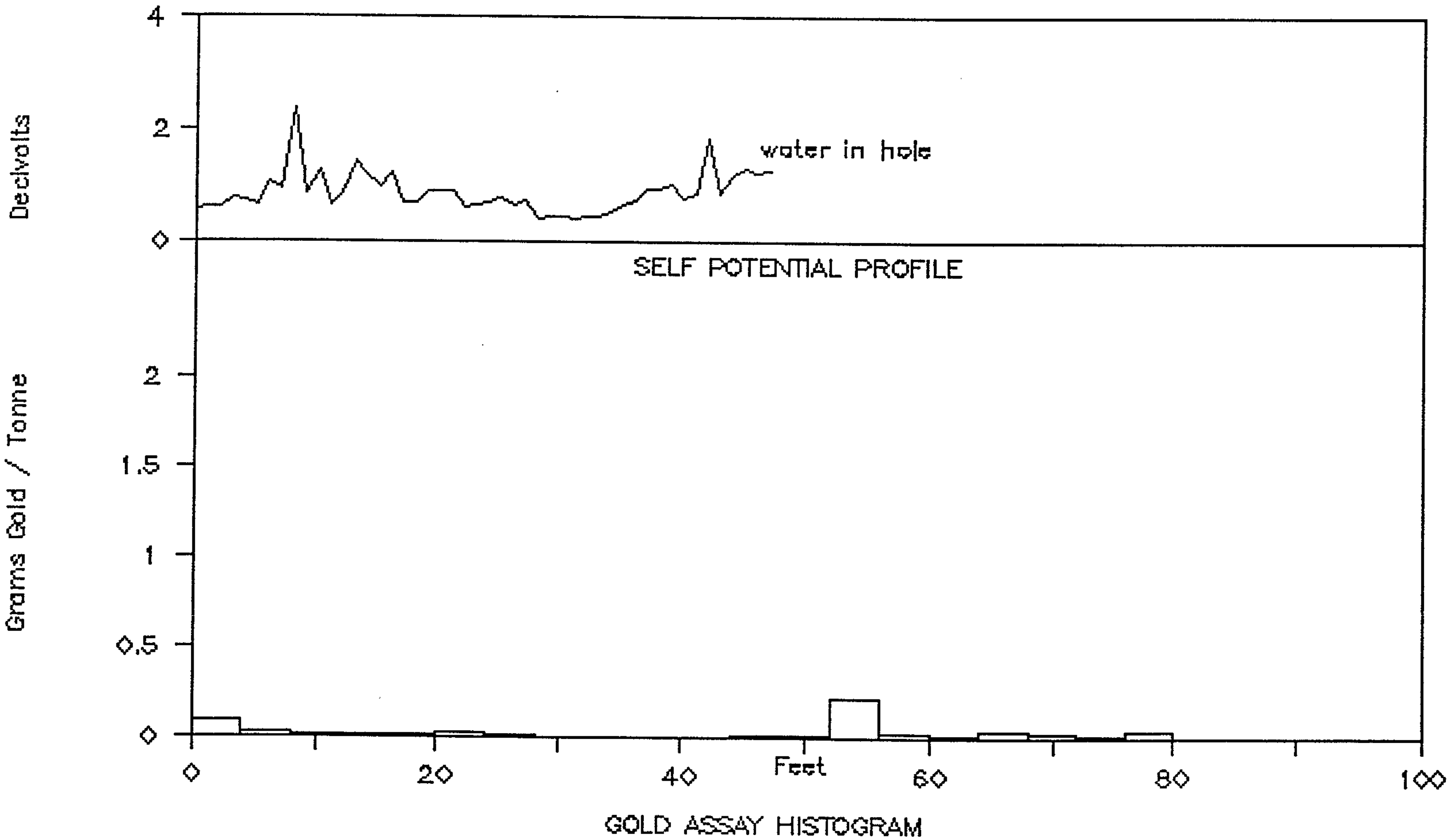


PERCUSSION HOLE UP86-29



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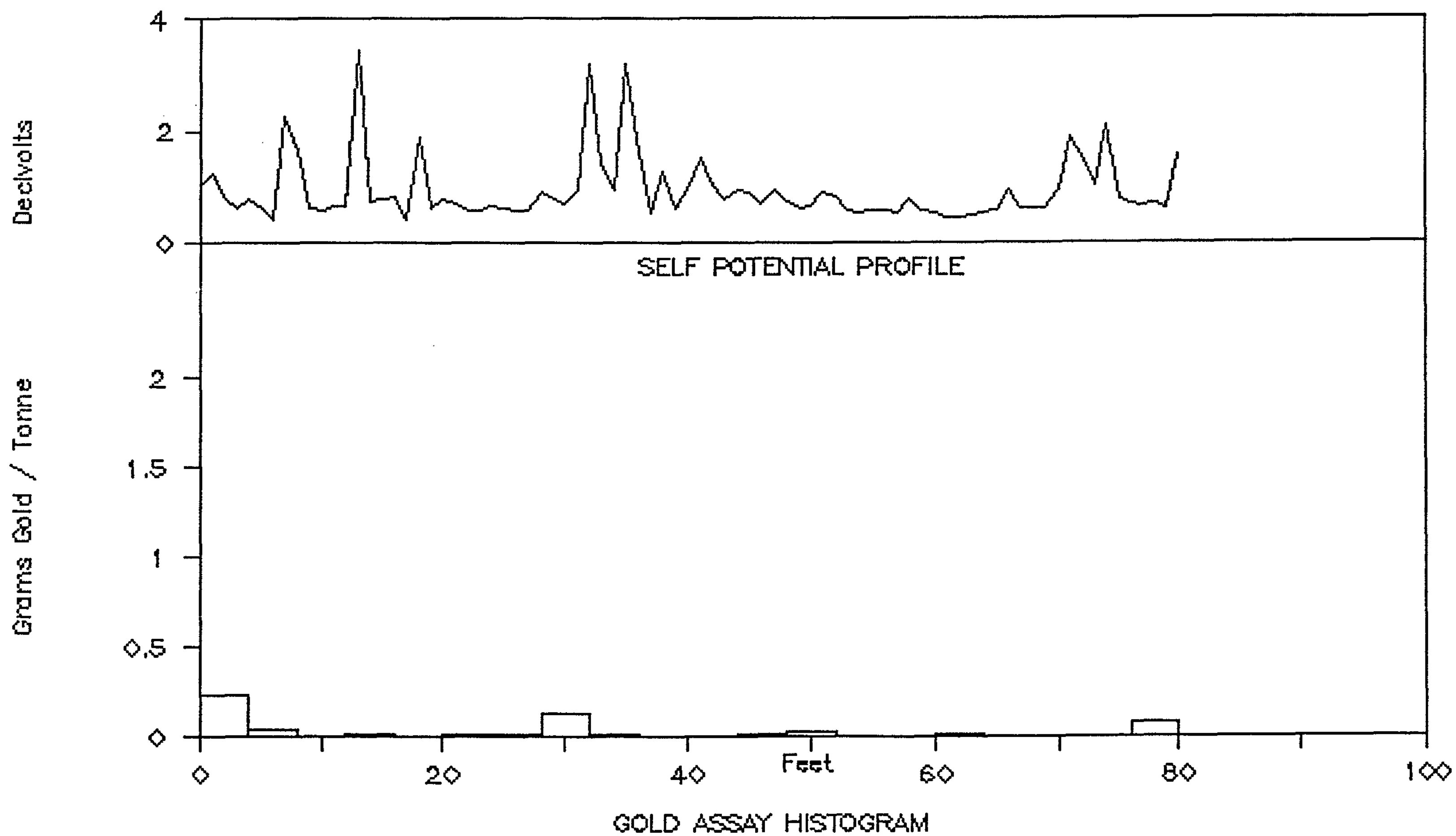
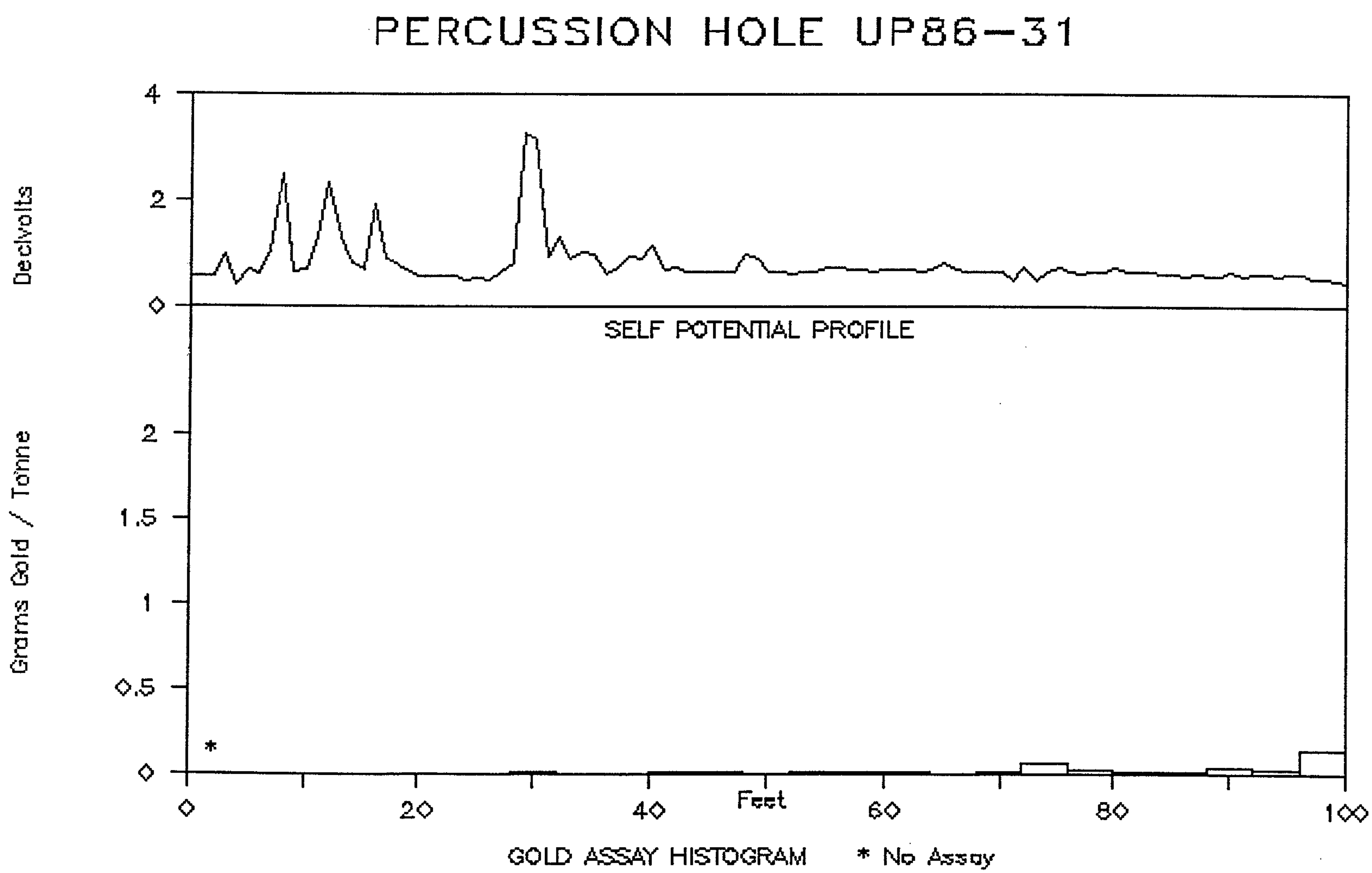
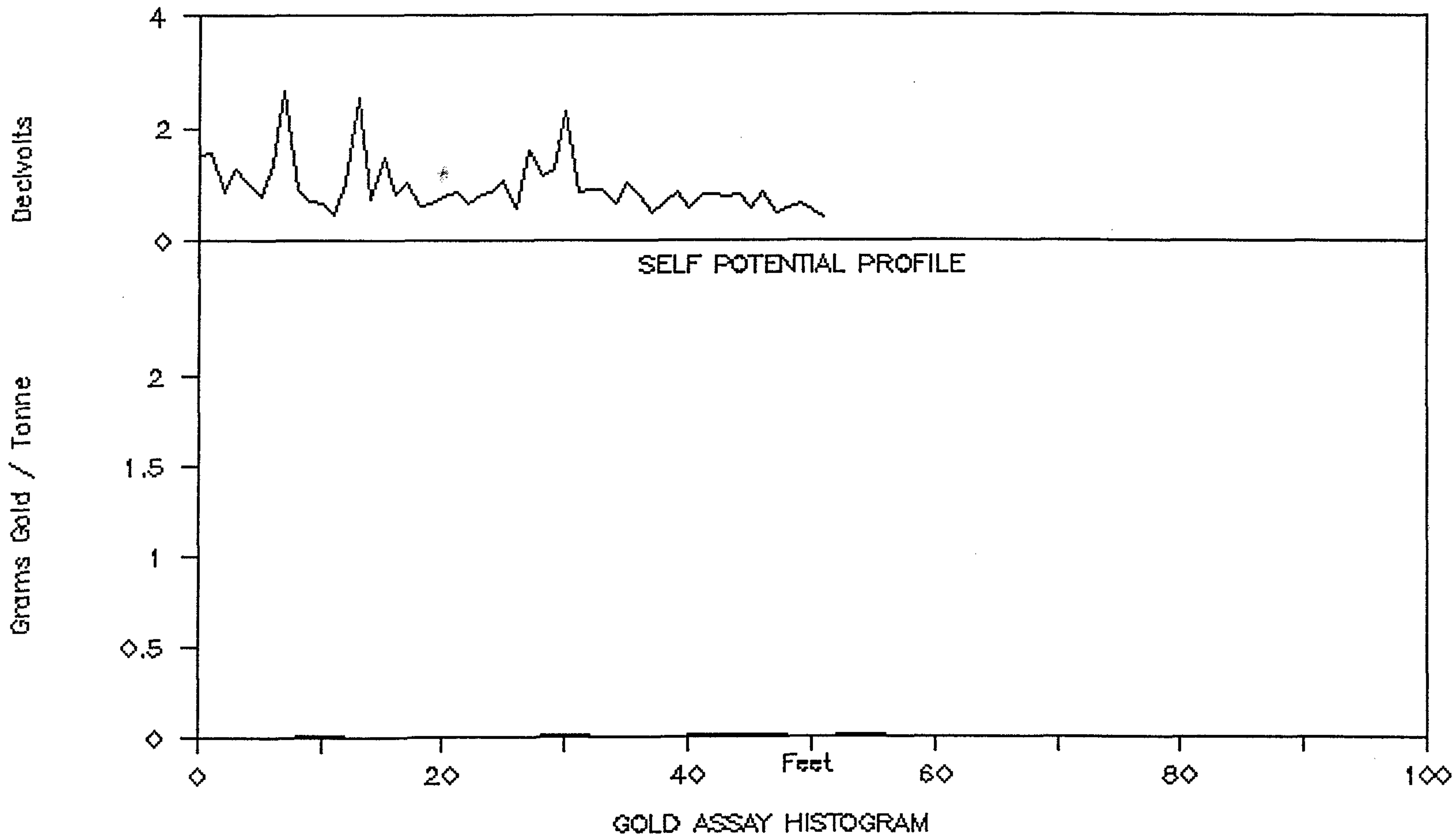




PERCUSSION HOLE UP86-31
Decivolts
4
2
0
SELF POTENTIAL PROFILE
Grams Gold / Tonne
2
1.5
1
0.5
0
*
0
20
40
Feet
60
80
100
GOLD ASSAY HISTOGRAM
* No Assay

PERCUSSION HOLE UP86-32



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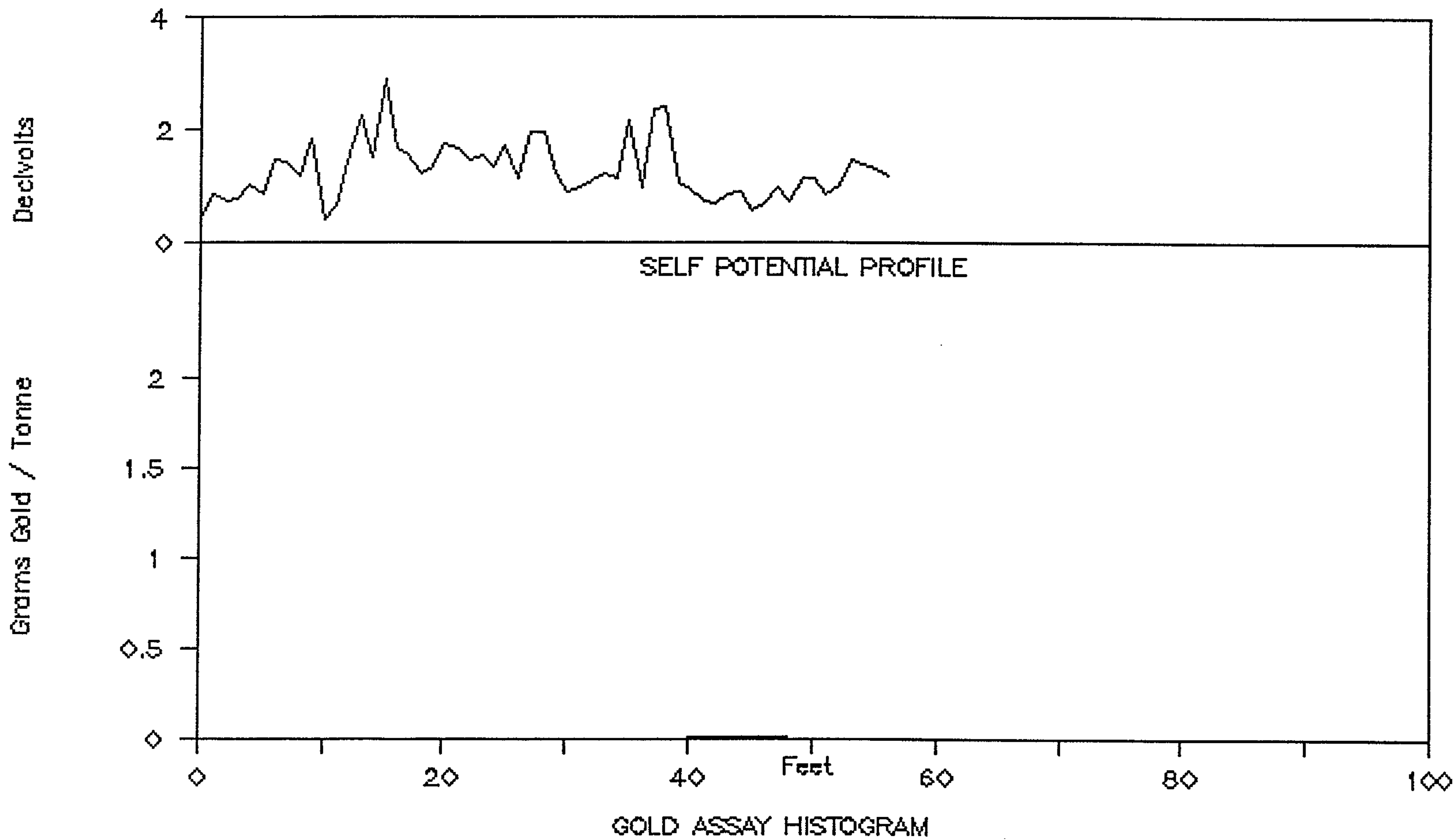

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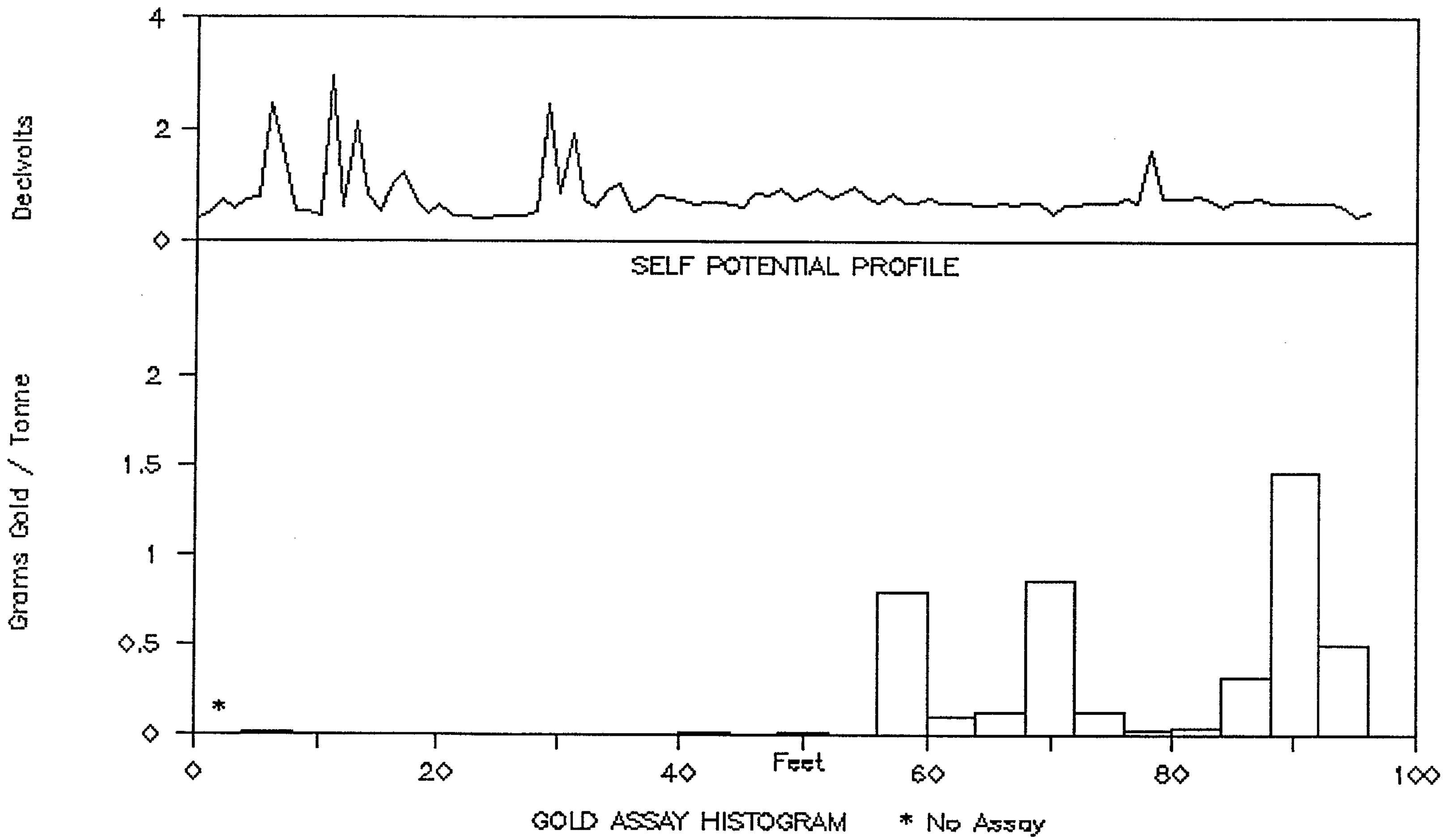

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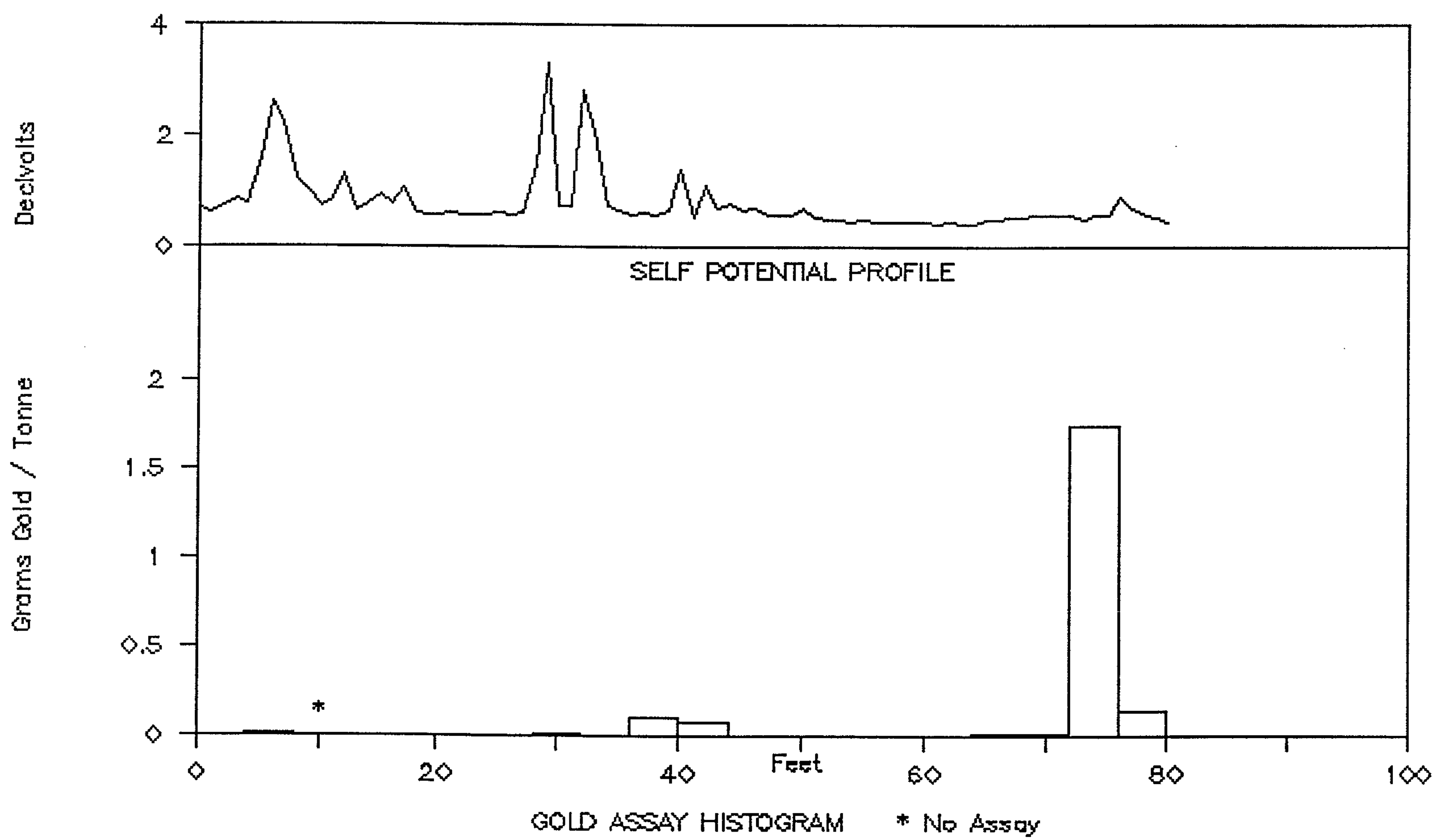

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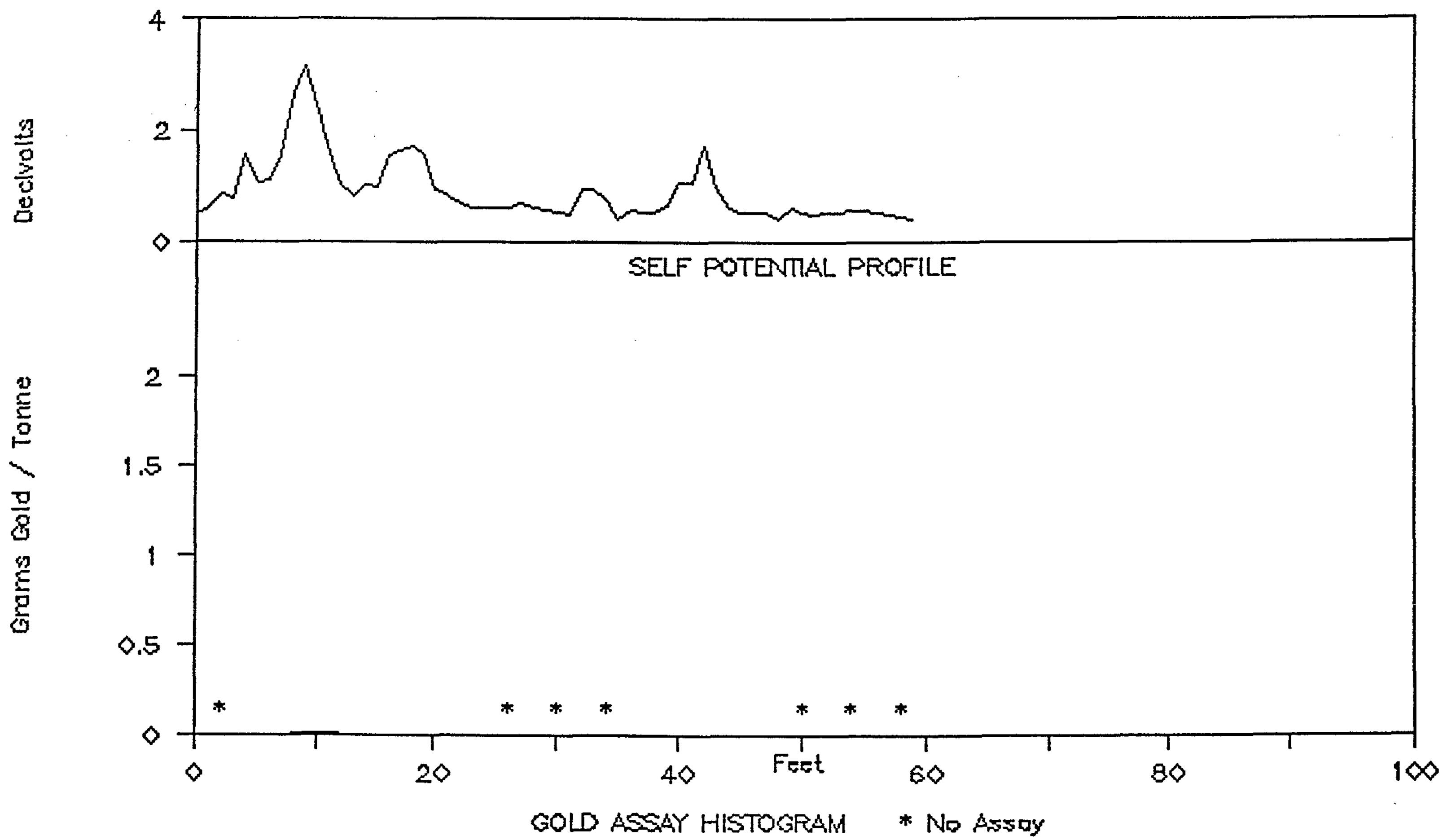

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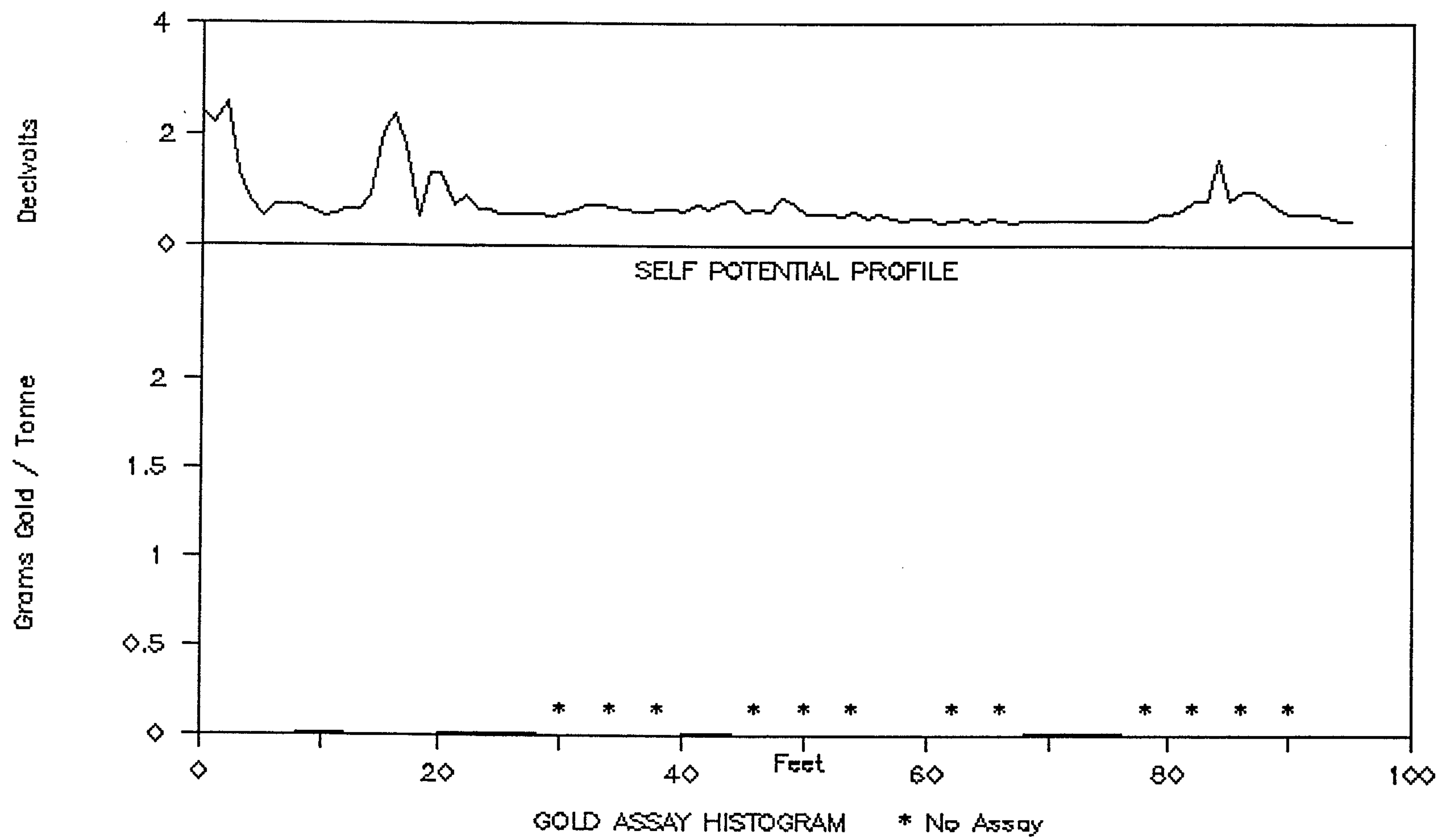

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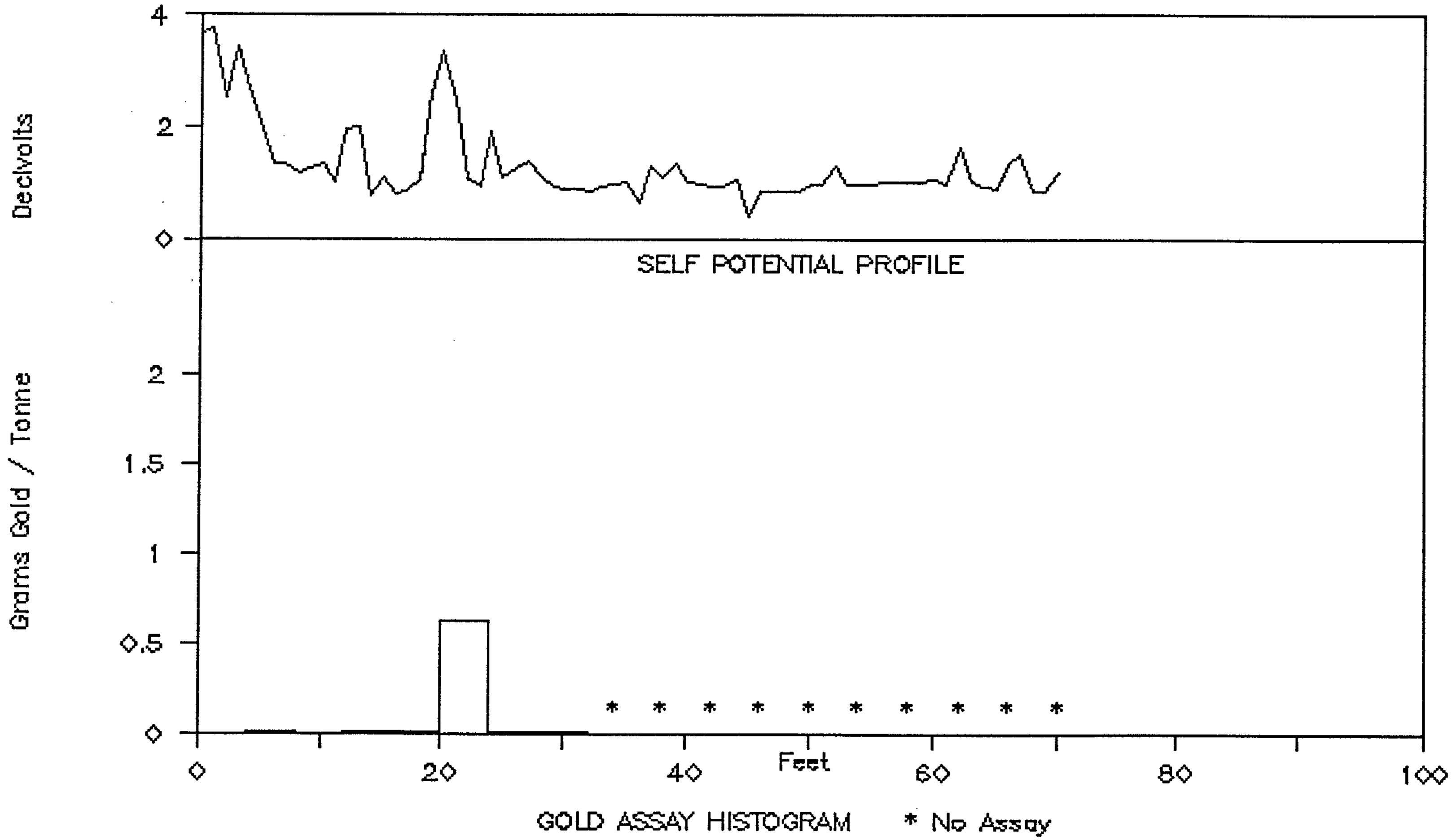
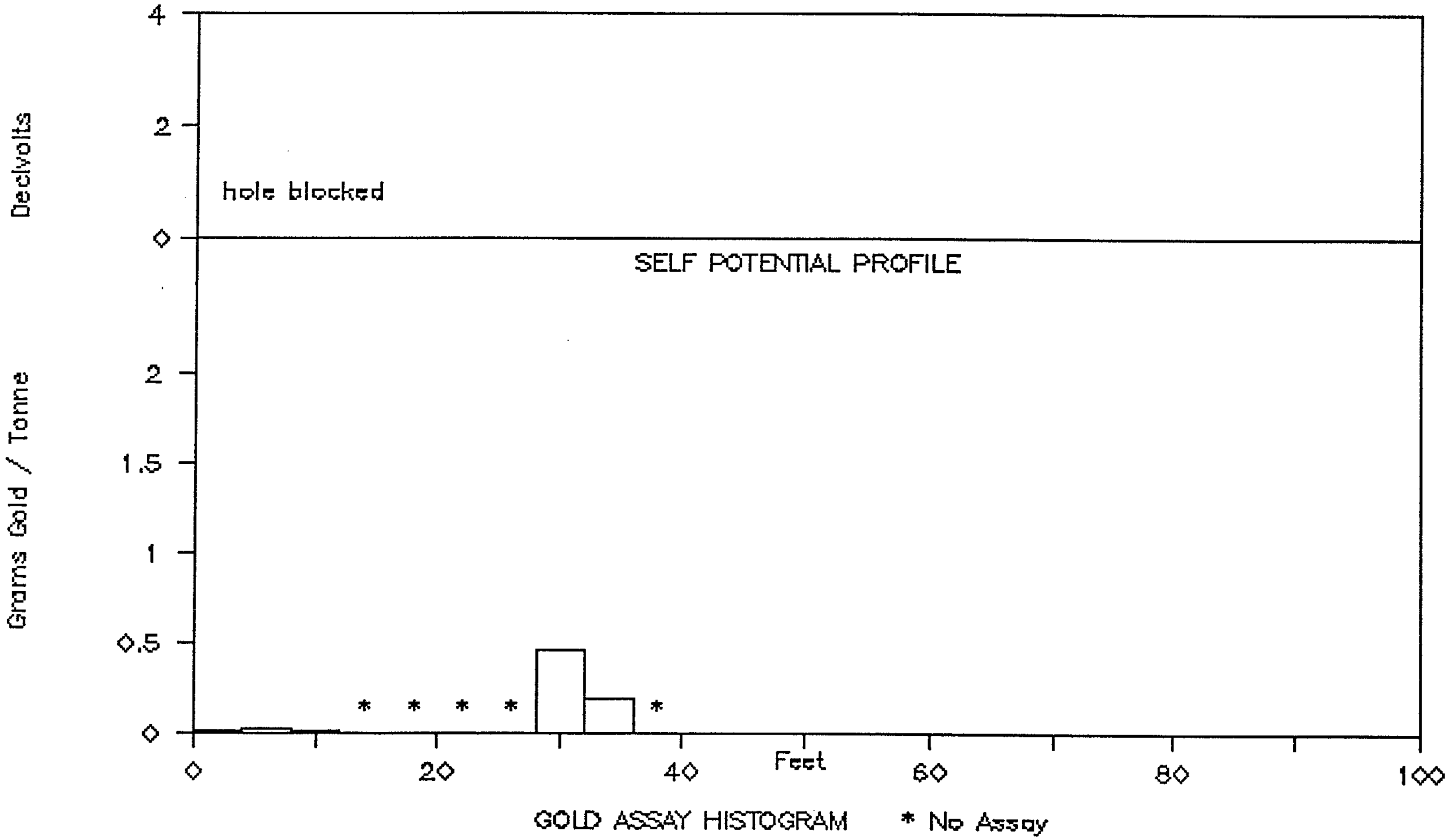
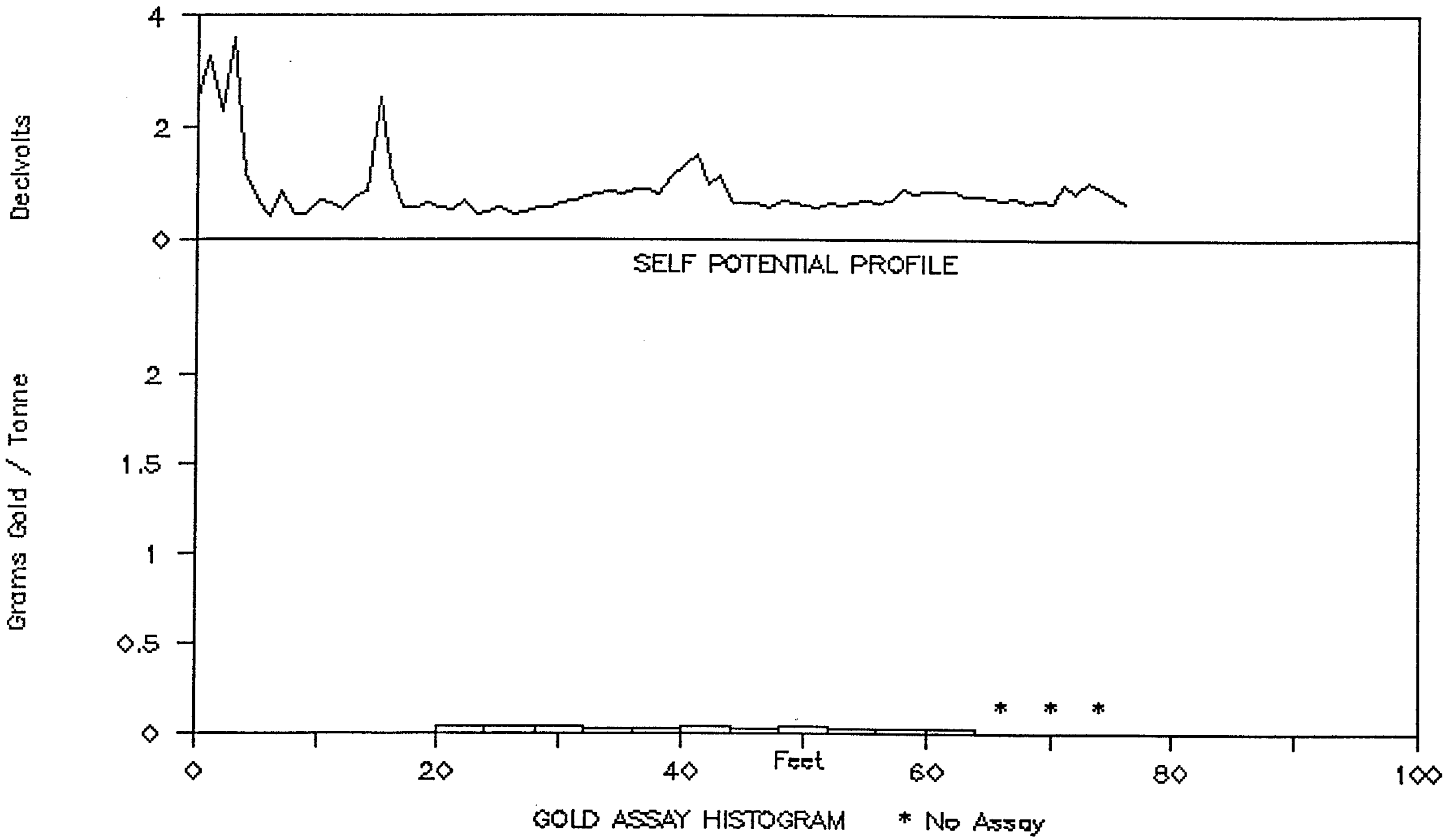


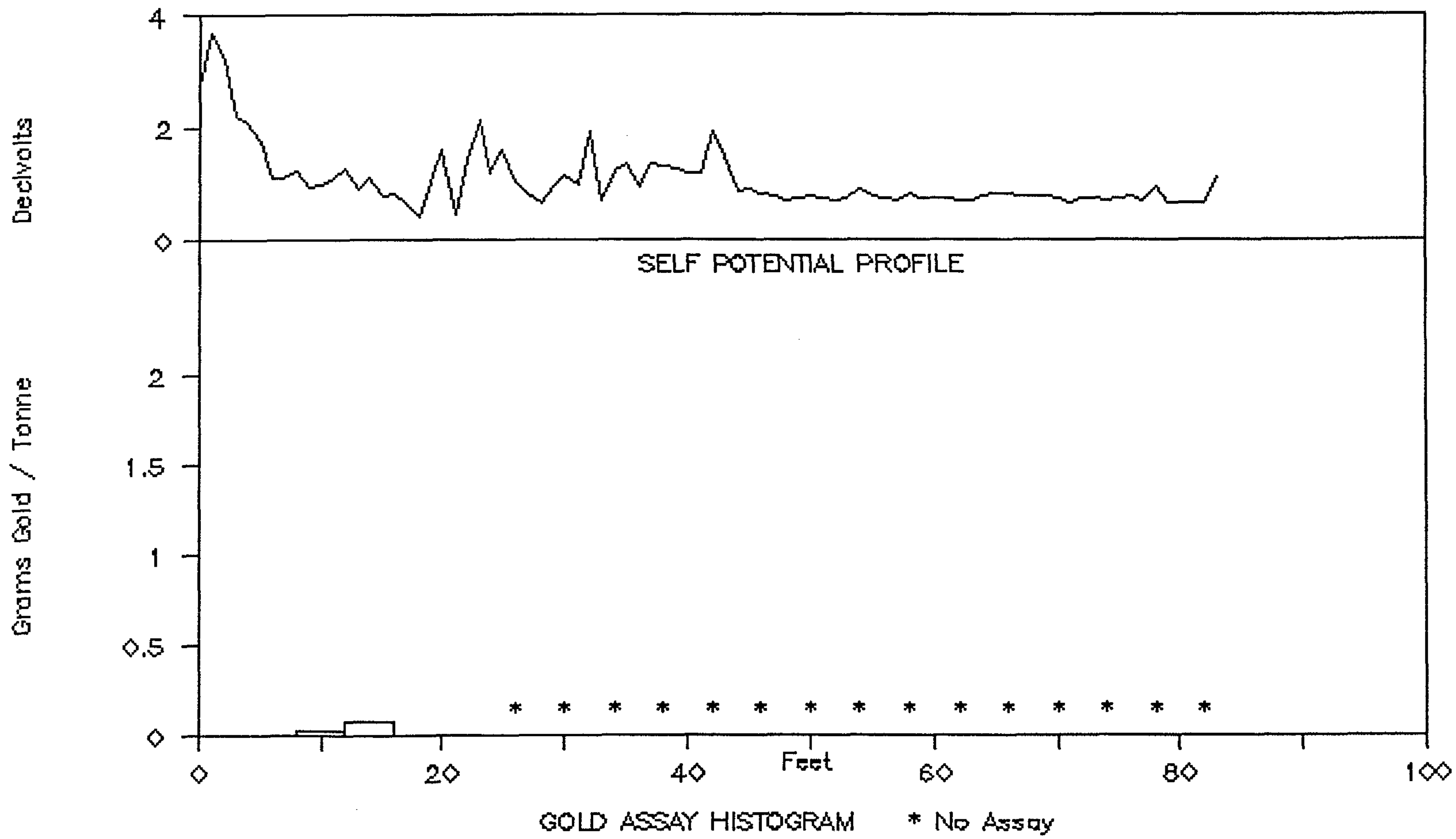
PERCUSSION HOLE UP86-39



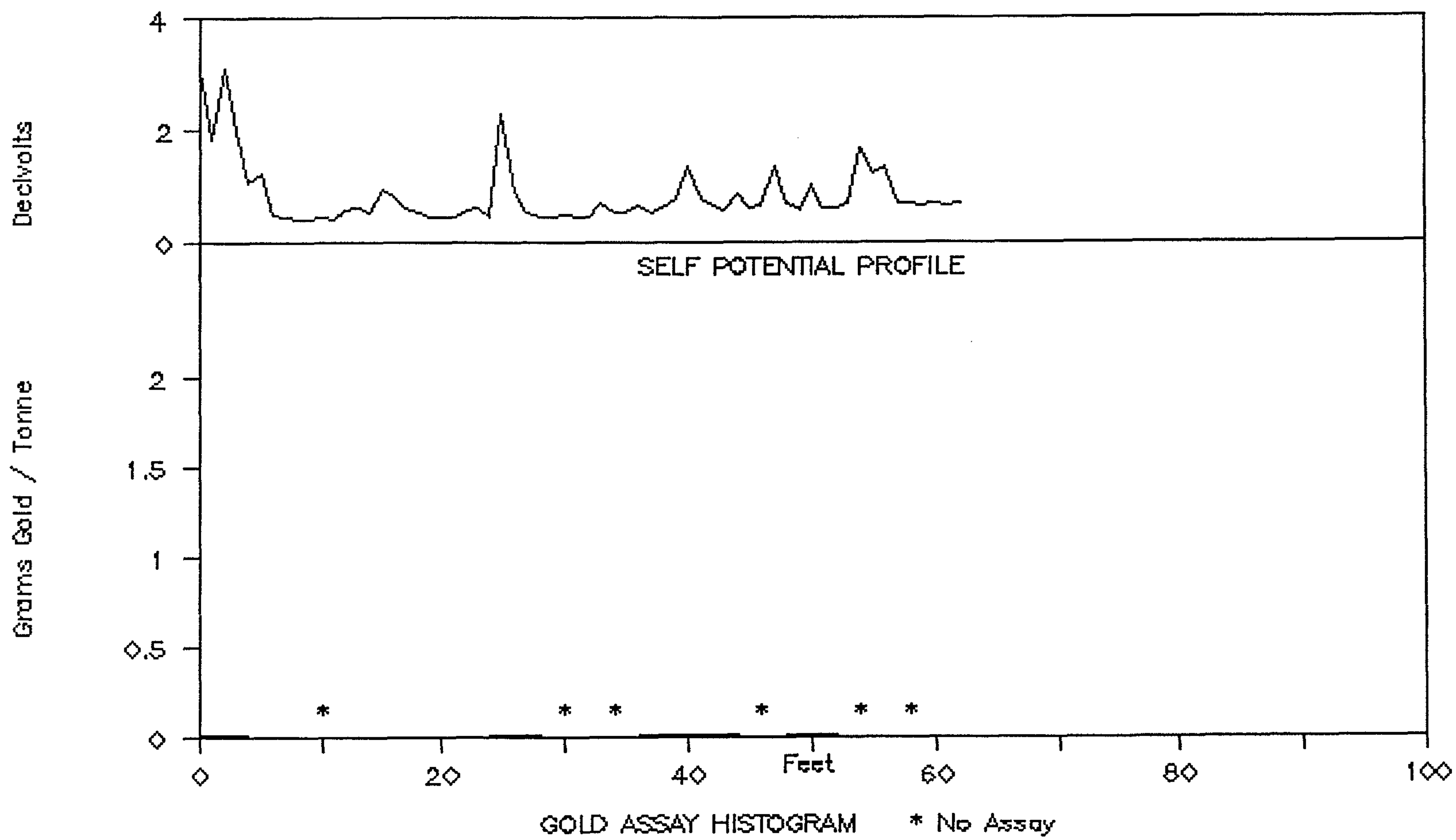
PERCUSSION HOLE UP86-40



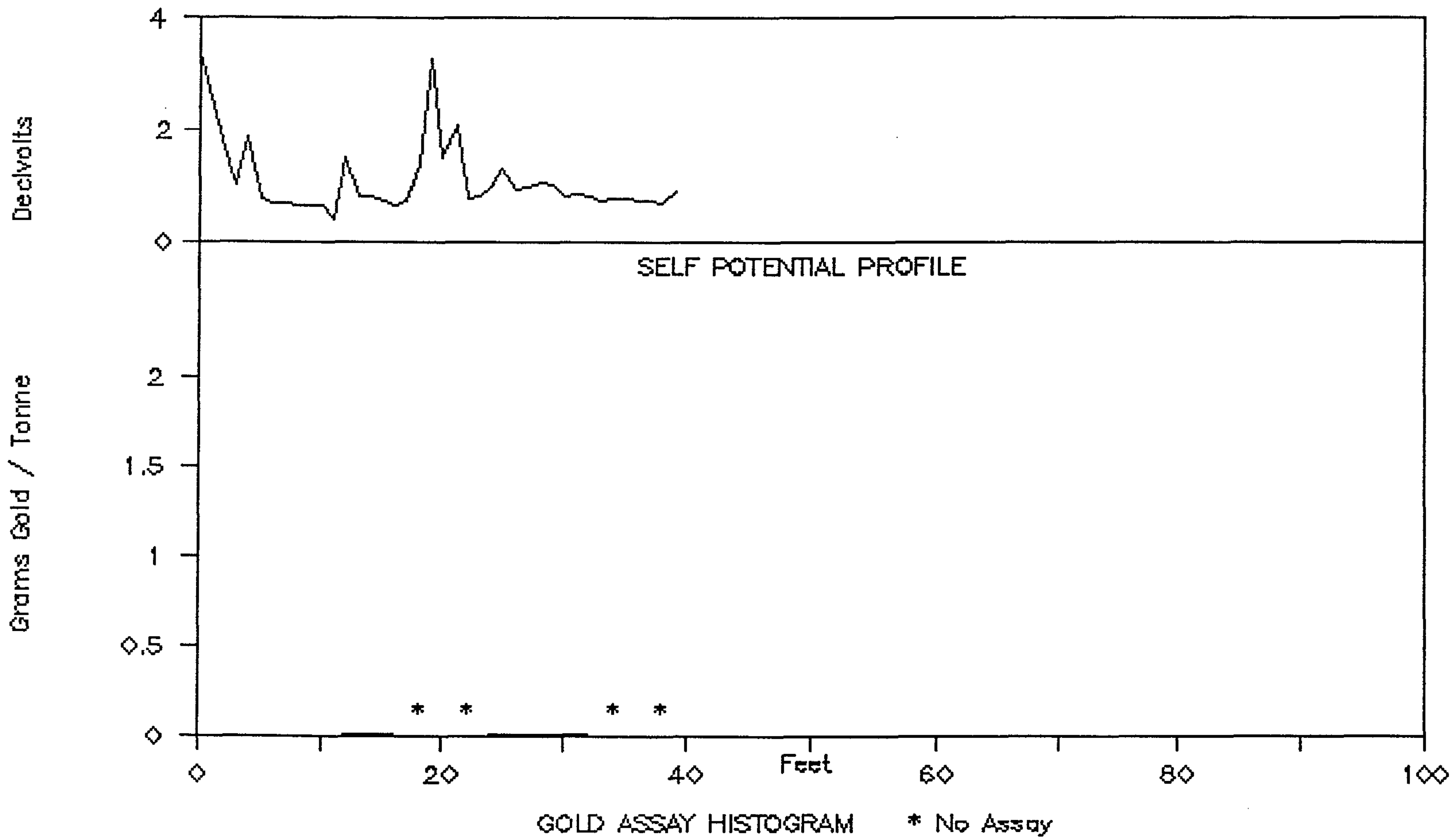
PERCUSSION HOLE UP86-41



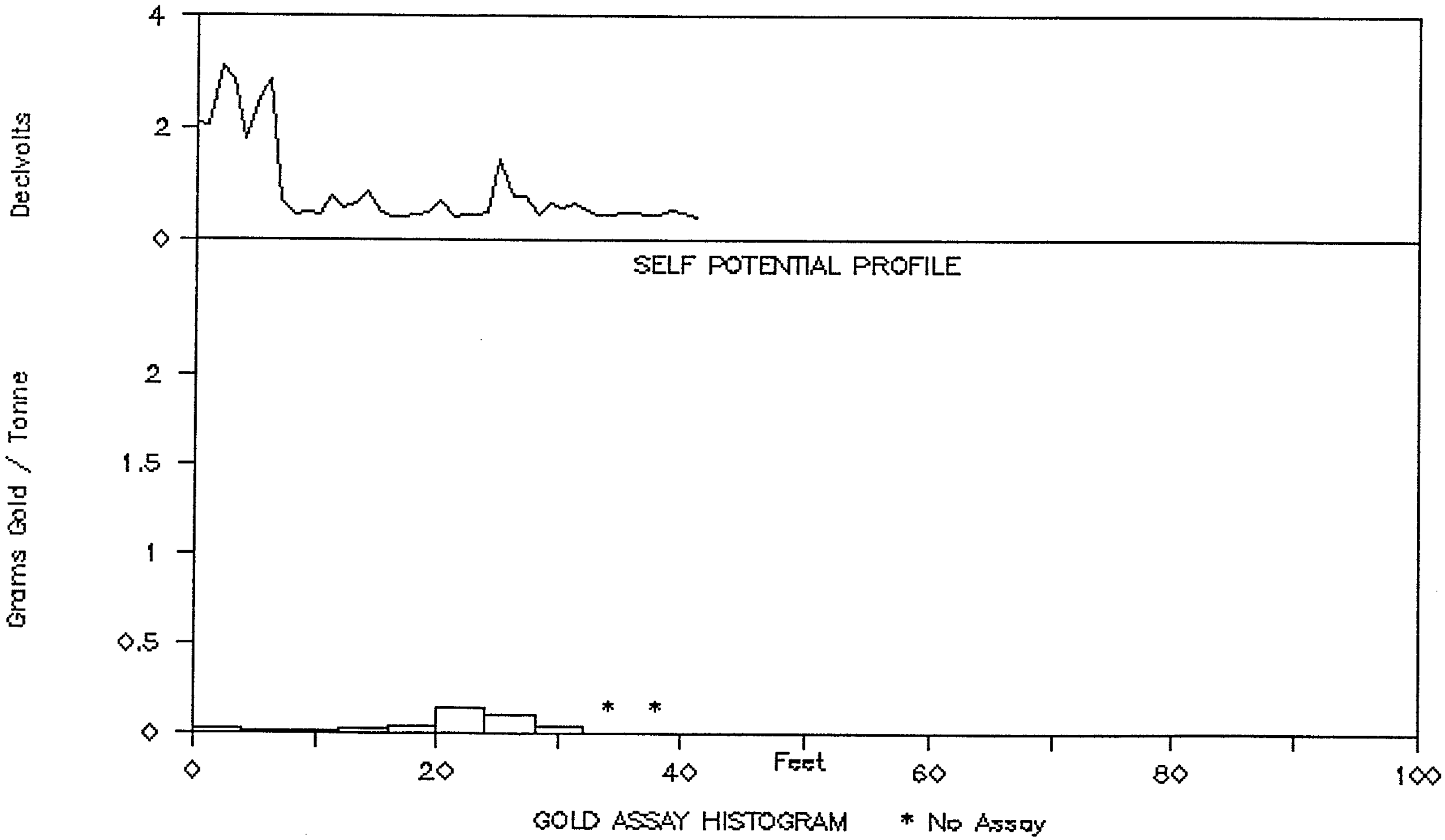
PERCUSSION HOLE UP86-42



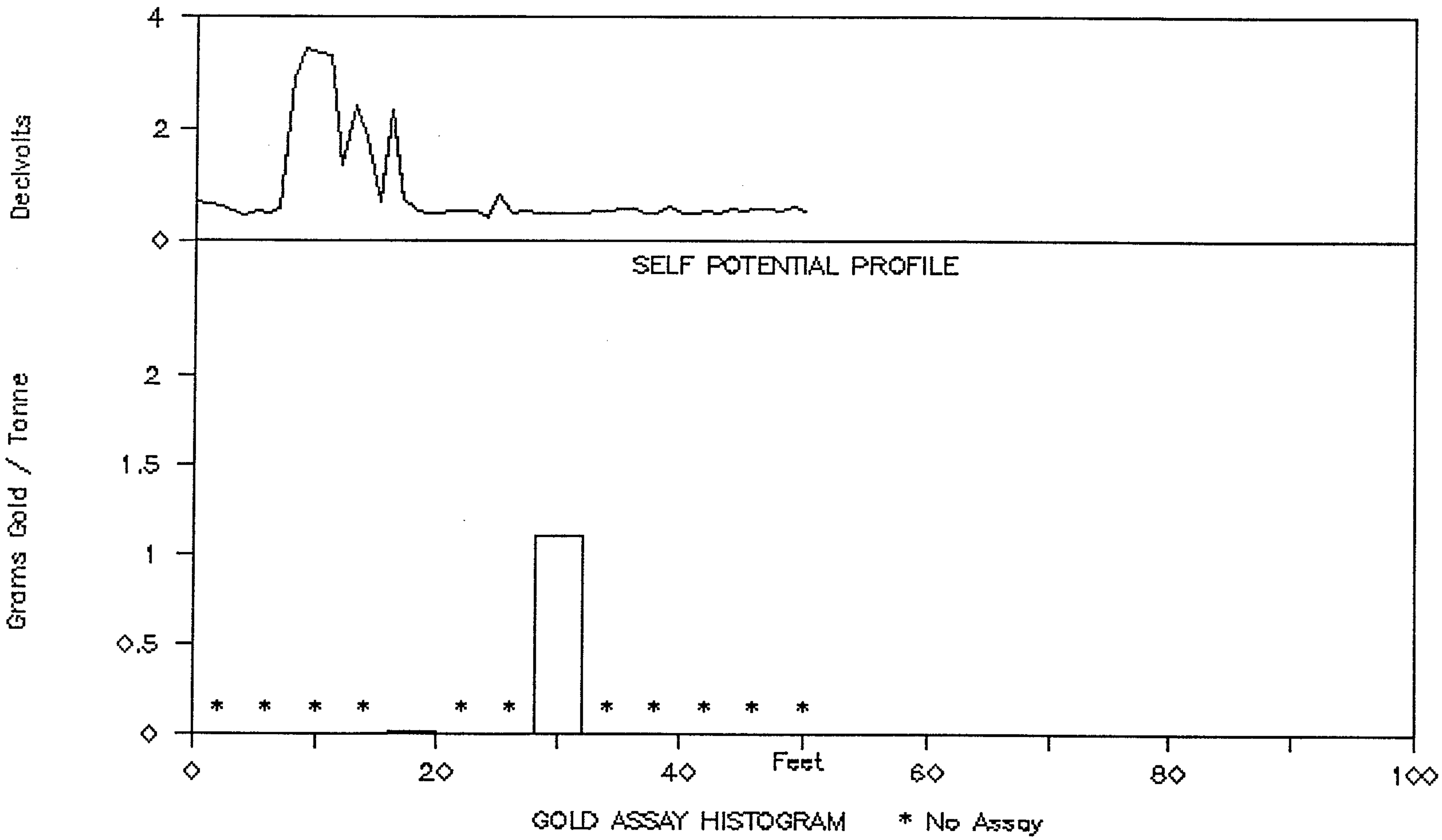
PERCUSSION HOLE UP86-43



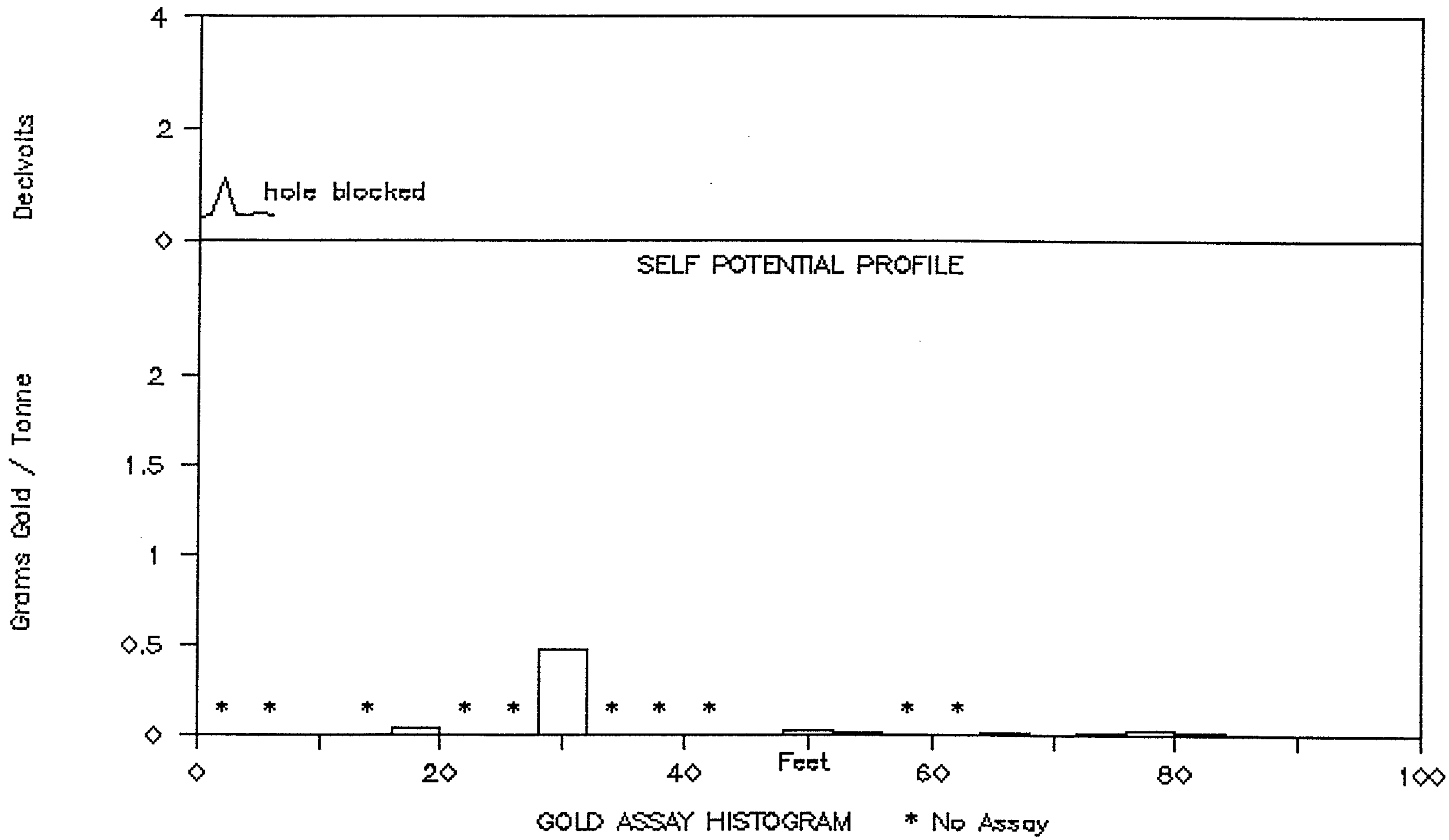
PERCUSSION HOLE UP86-44



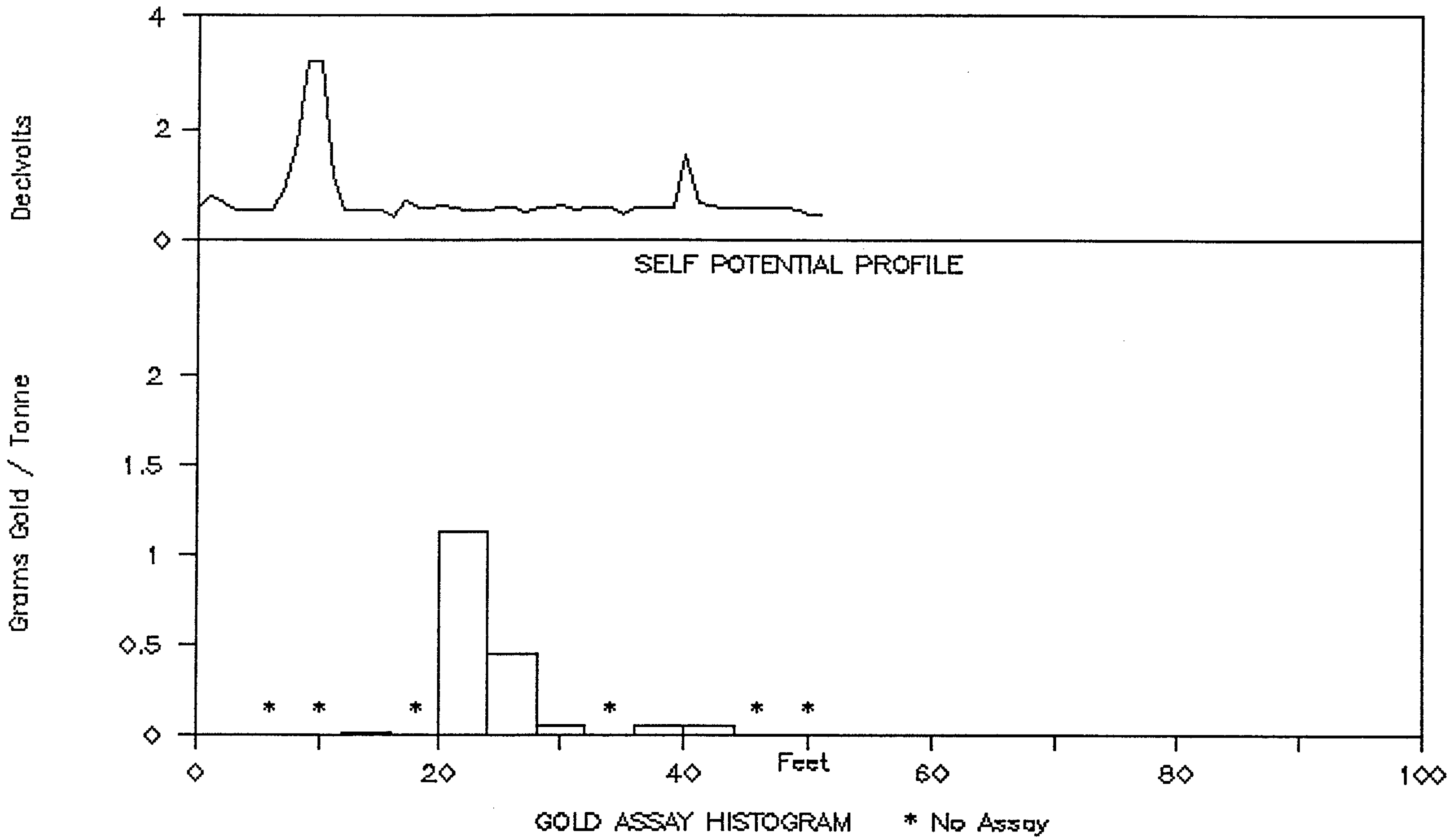
PERCUSSION HOLE UP86-45



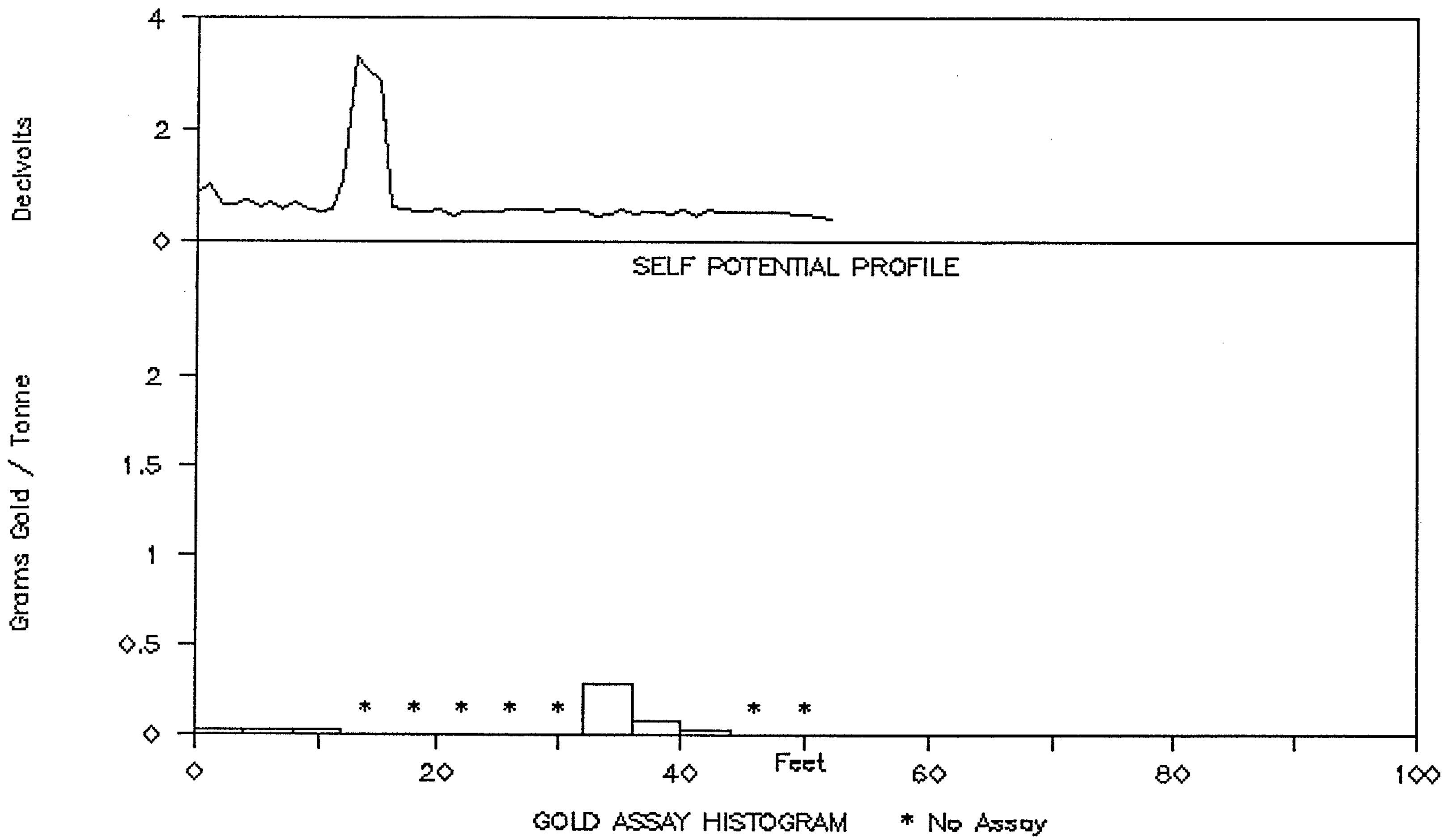
PERCUSSION HOLE UP86-46



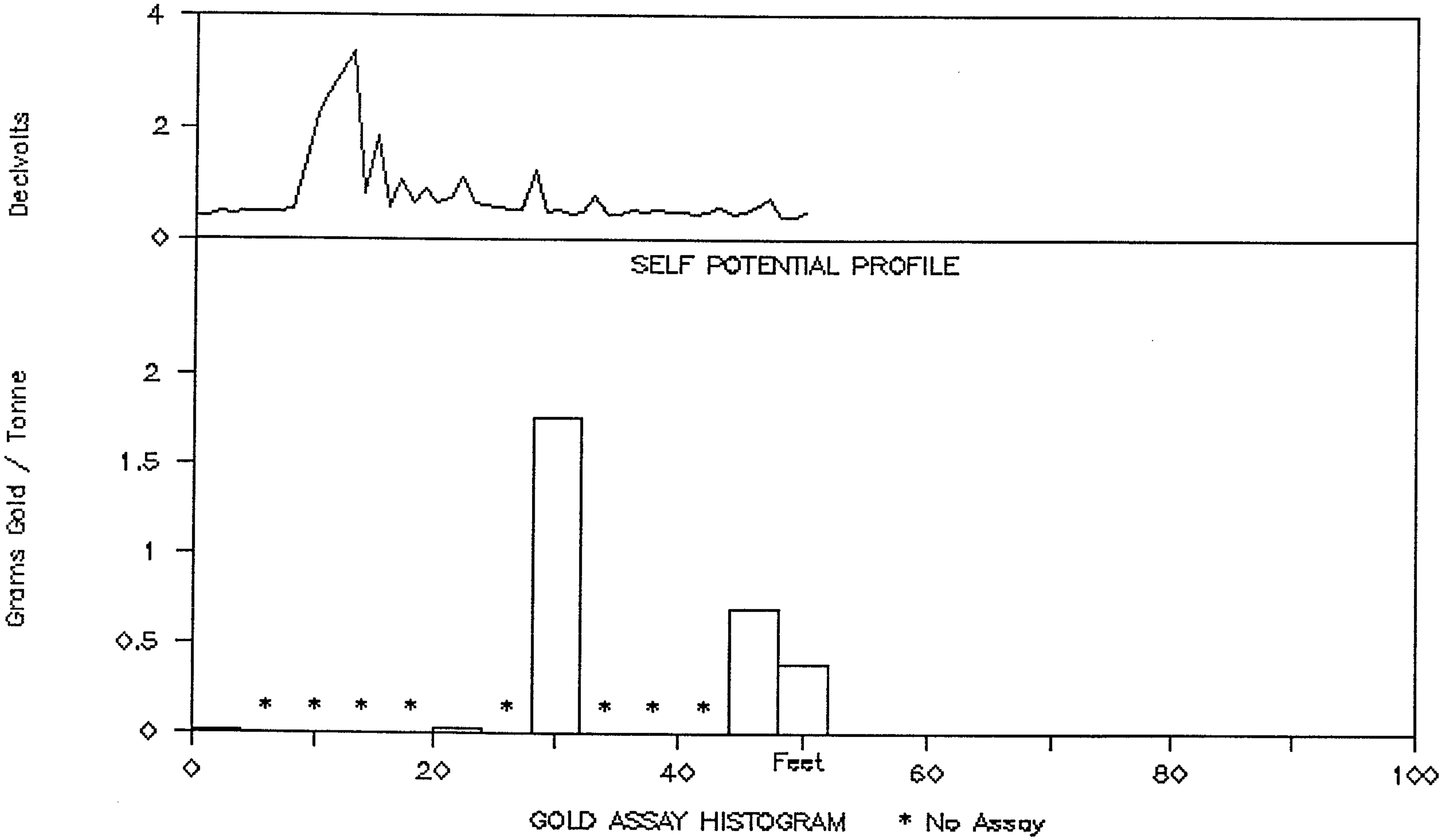
PERCUSSION HOLE UP86-47



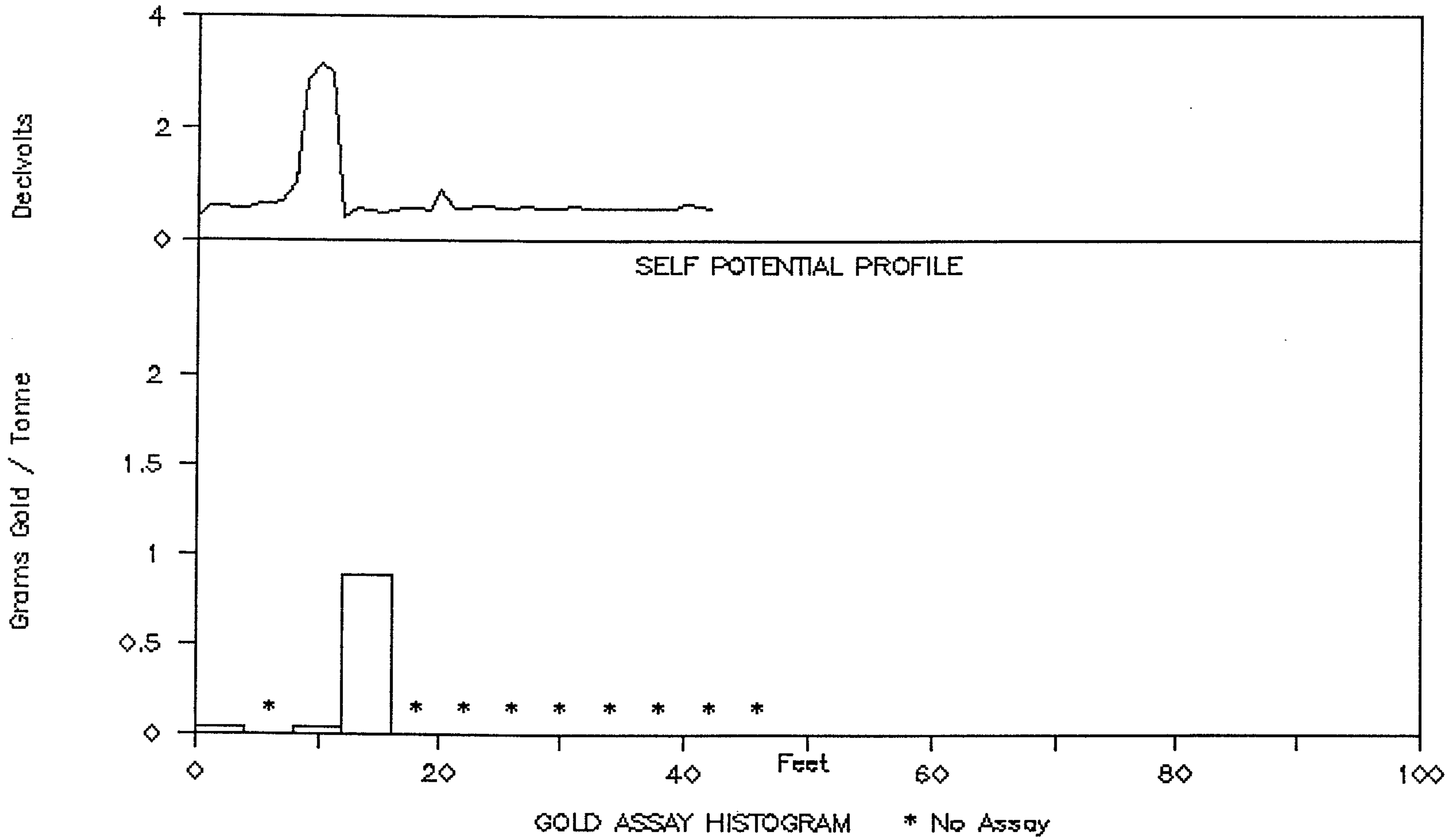
PERCUSSION HOLE UP86-48



PERCUSSION HOLE UP86-49



PERCUSSION HOLE UP86-50



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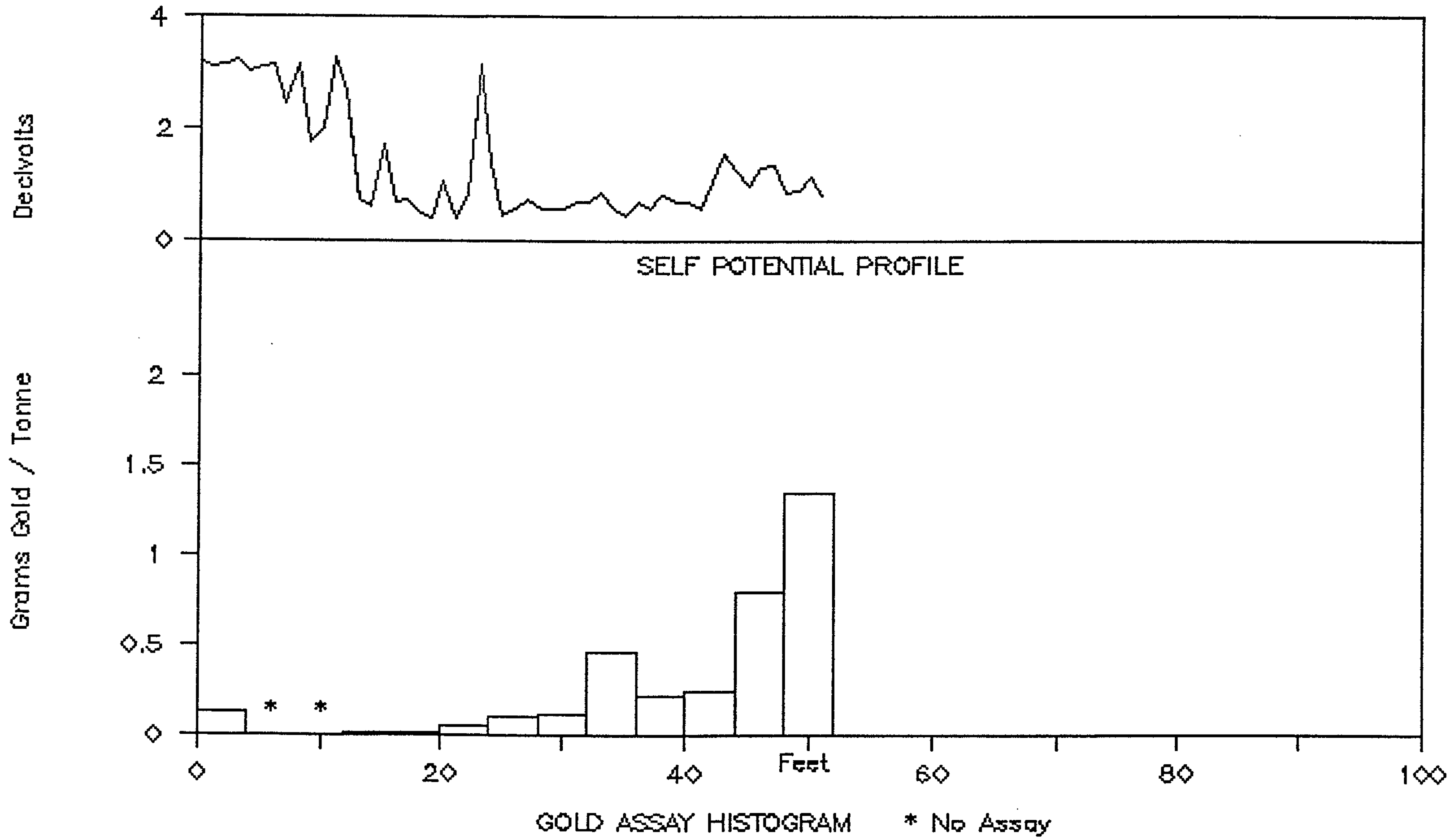

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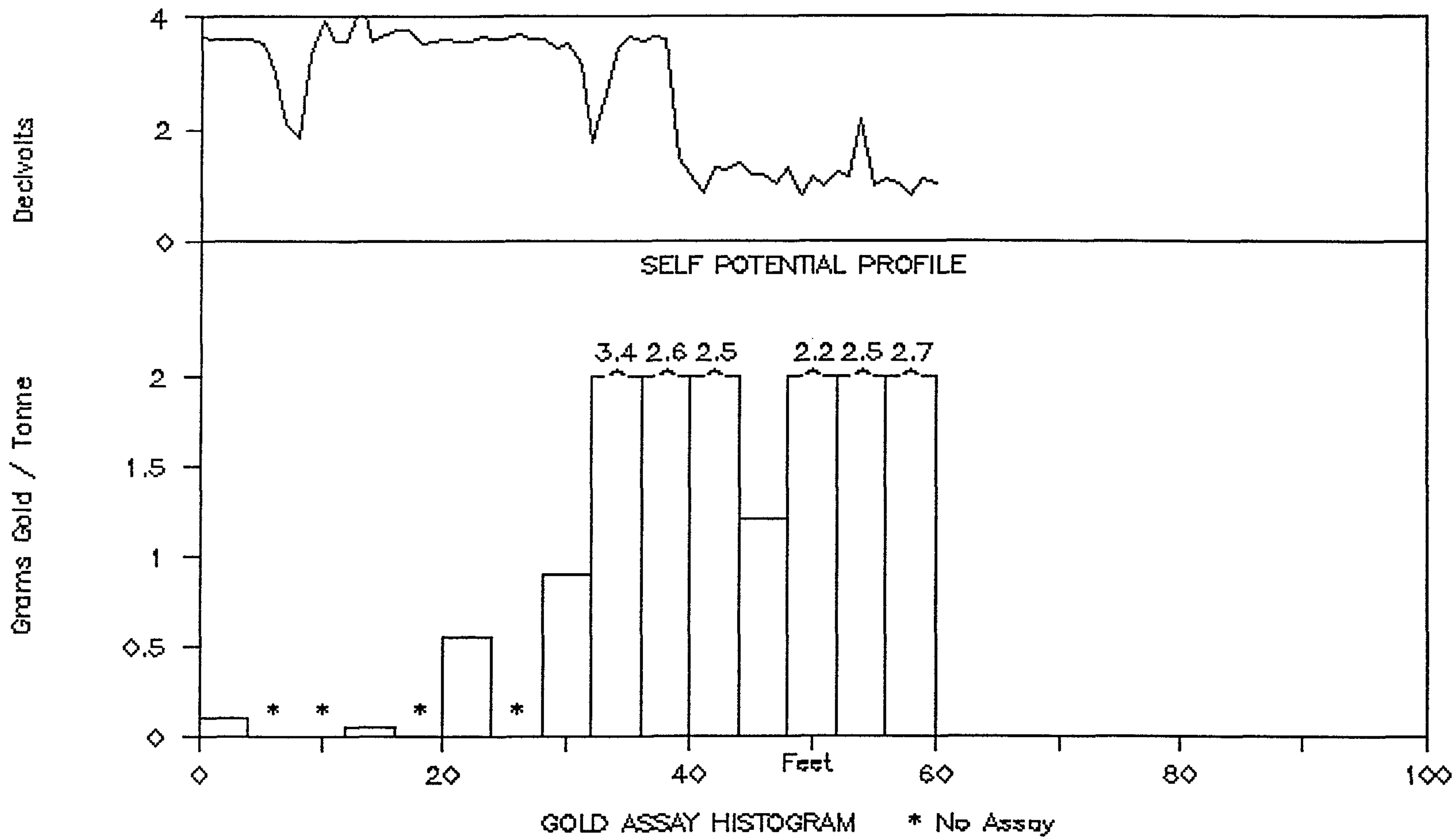

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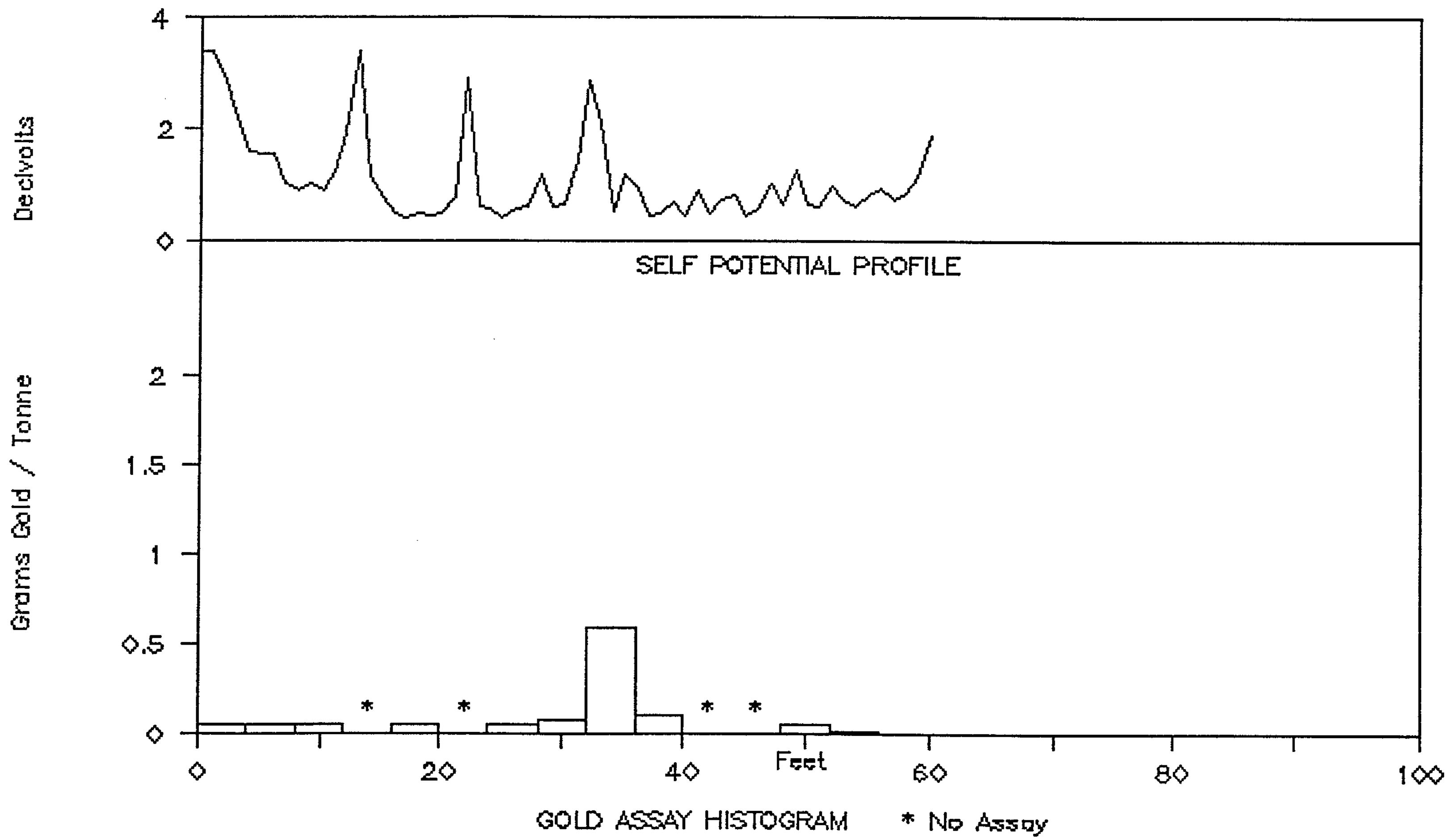
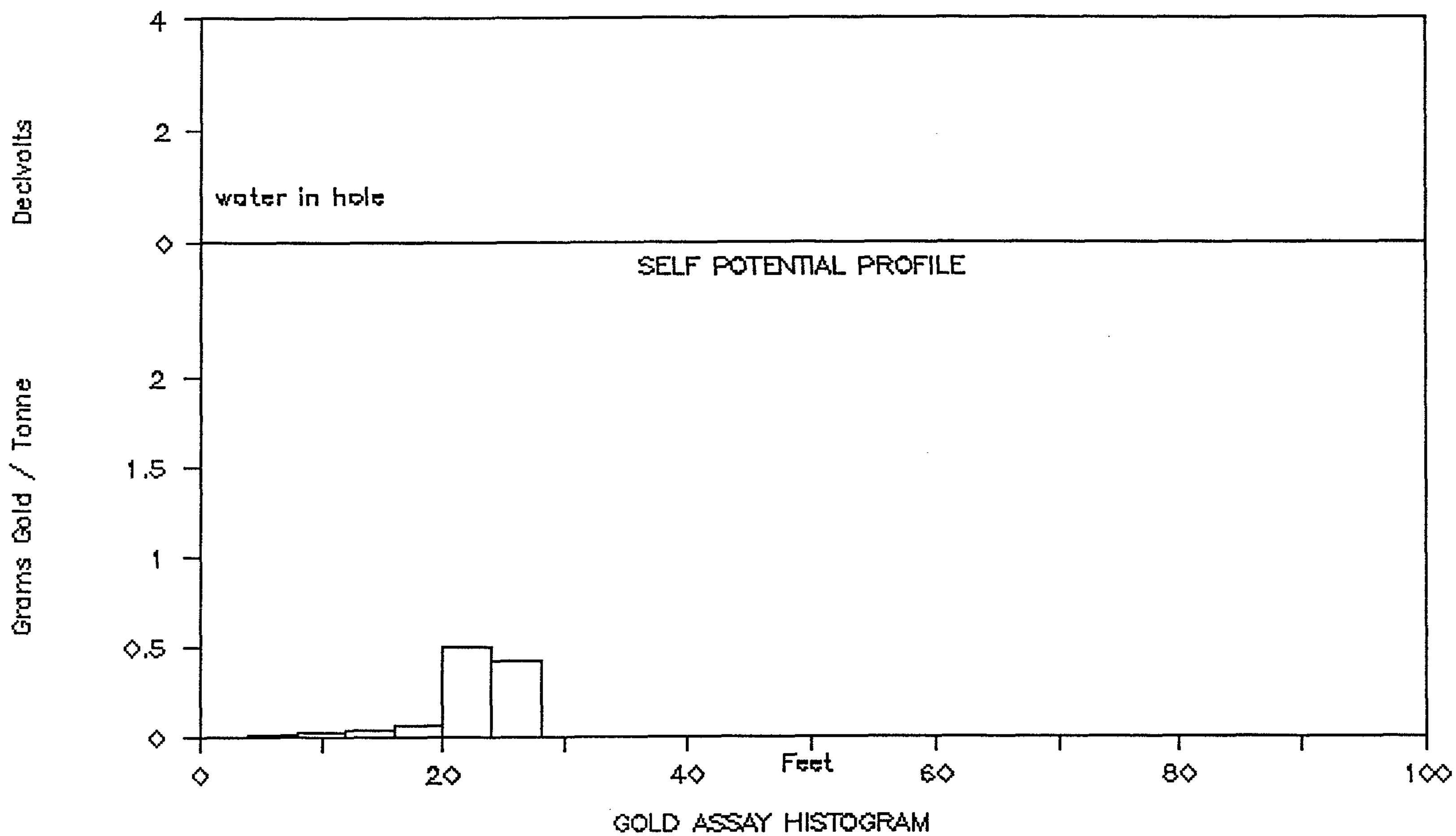


PERCUSSION HOLE UP86-54

PERCUSSION HOLE UP86-55



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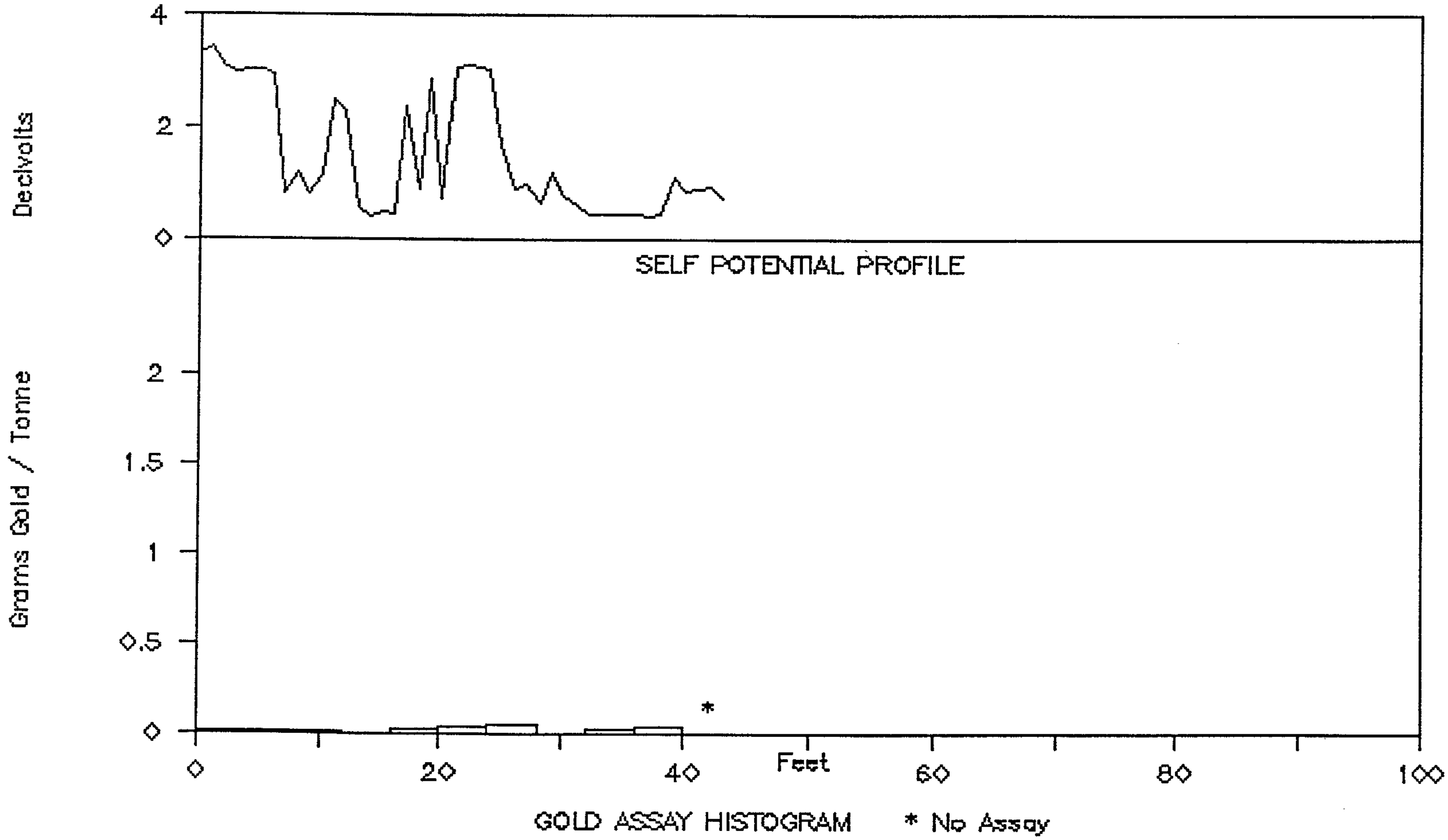

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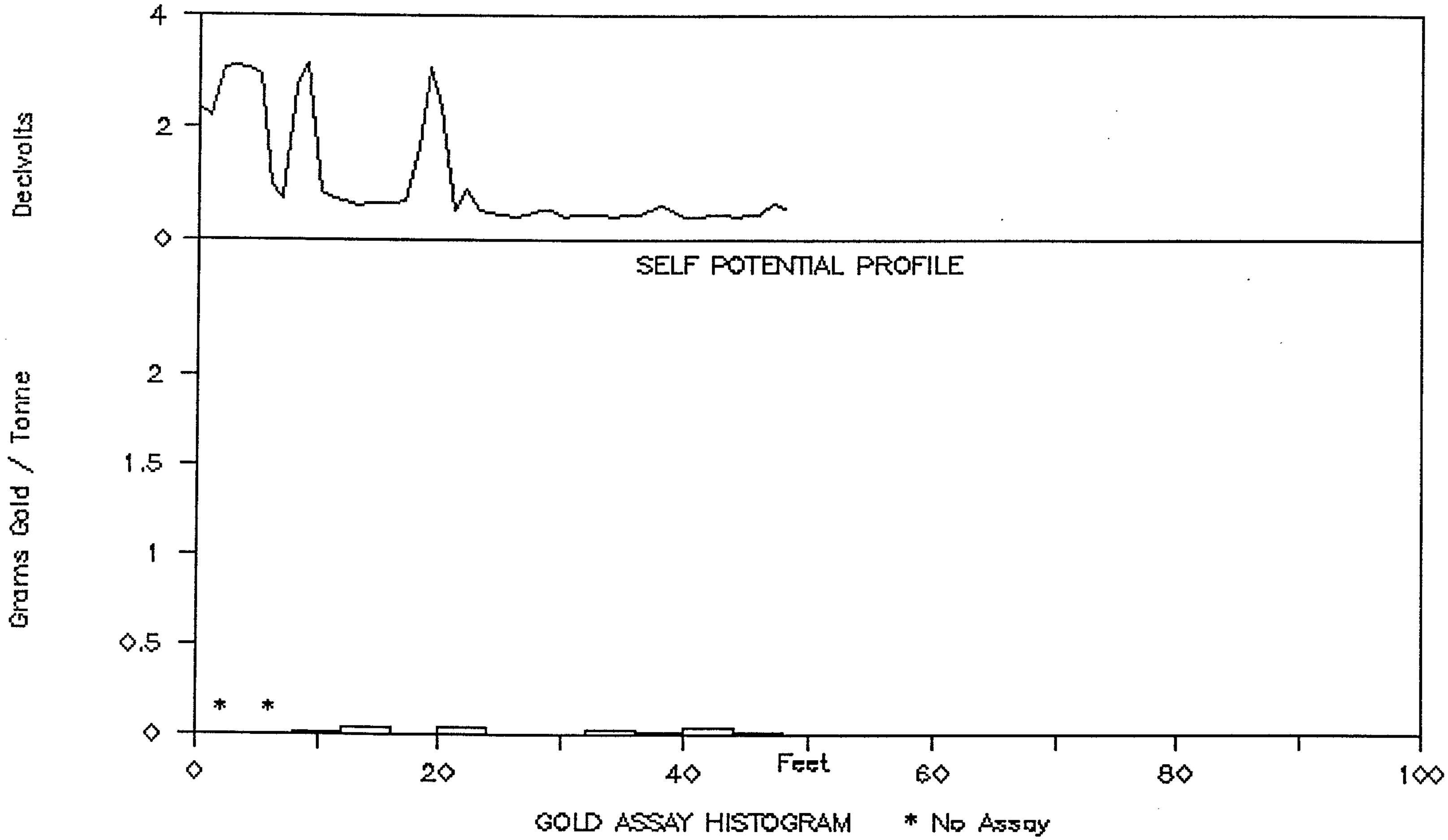
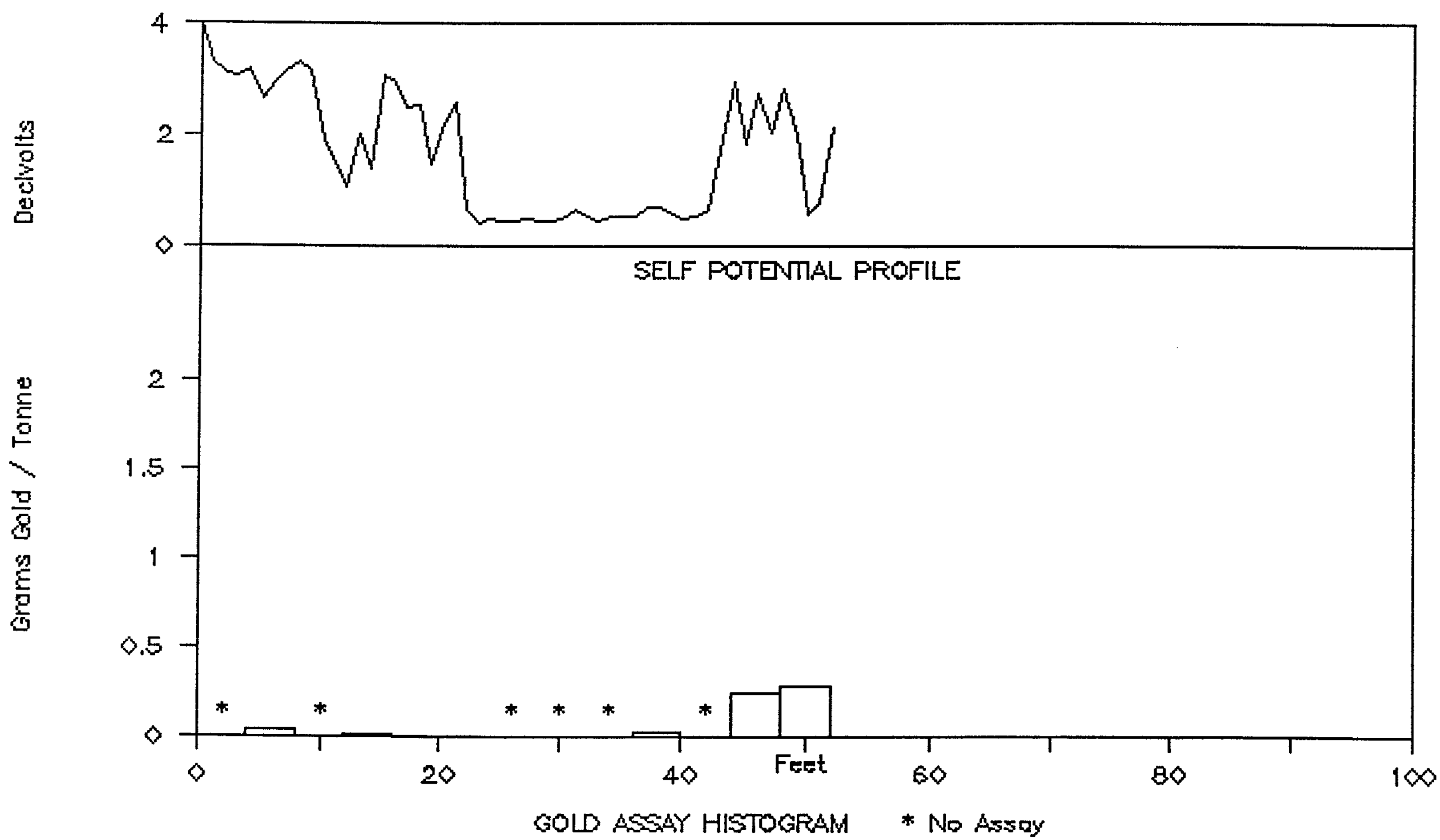


PERCUSSION HOLE UP86-58



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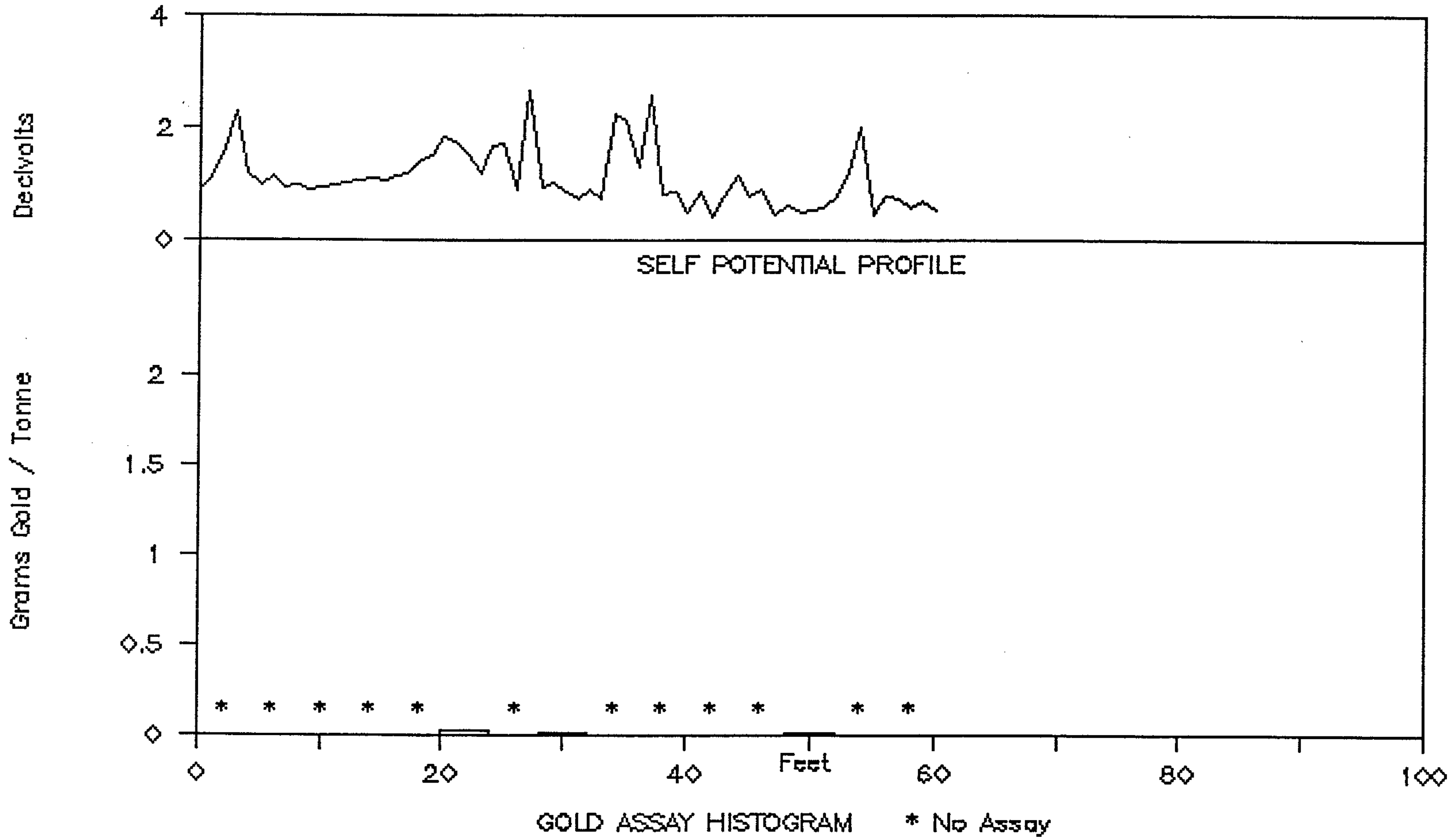
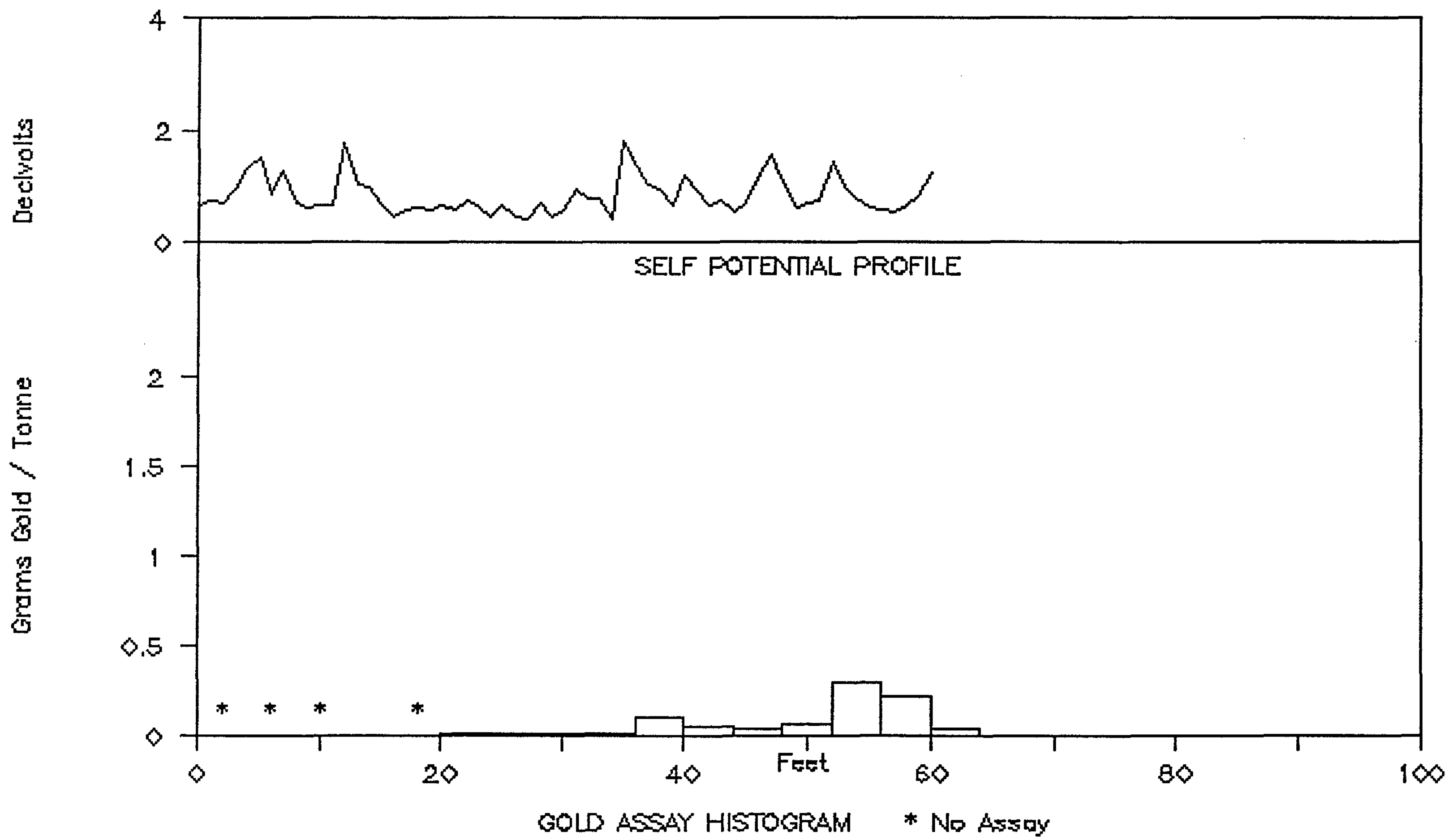


PERCUSSION HOLE UP86-60



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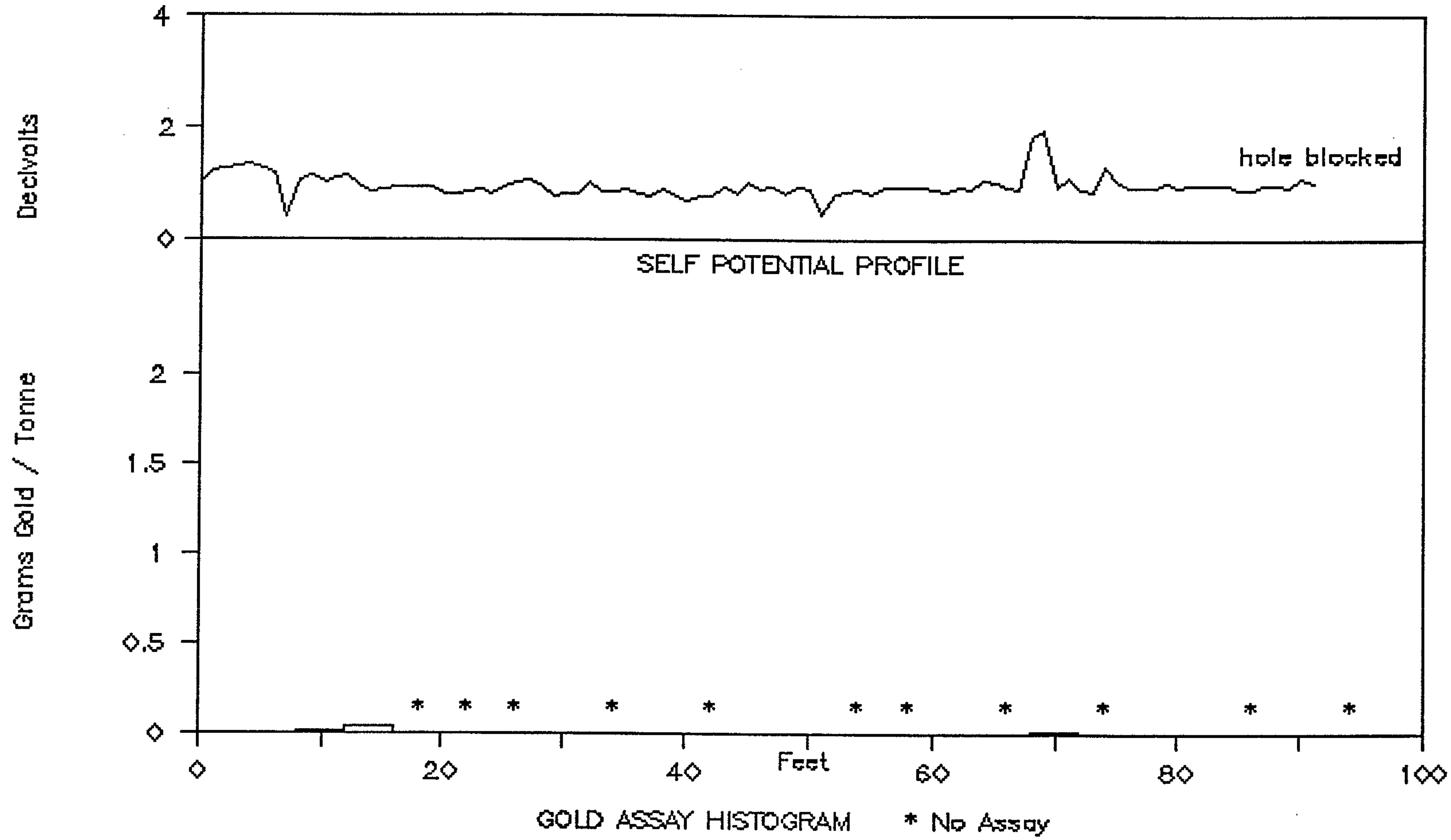

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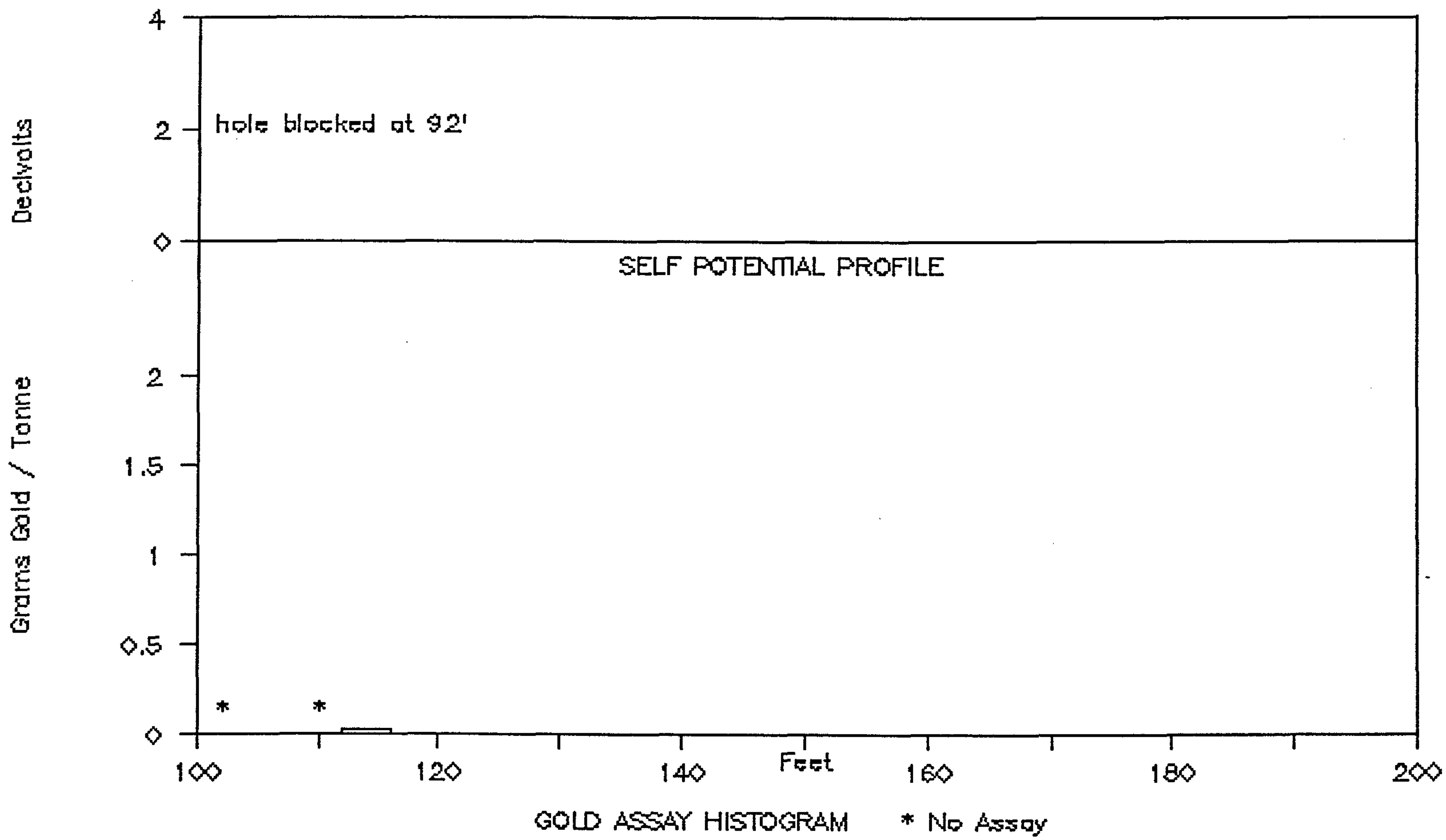

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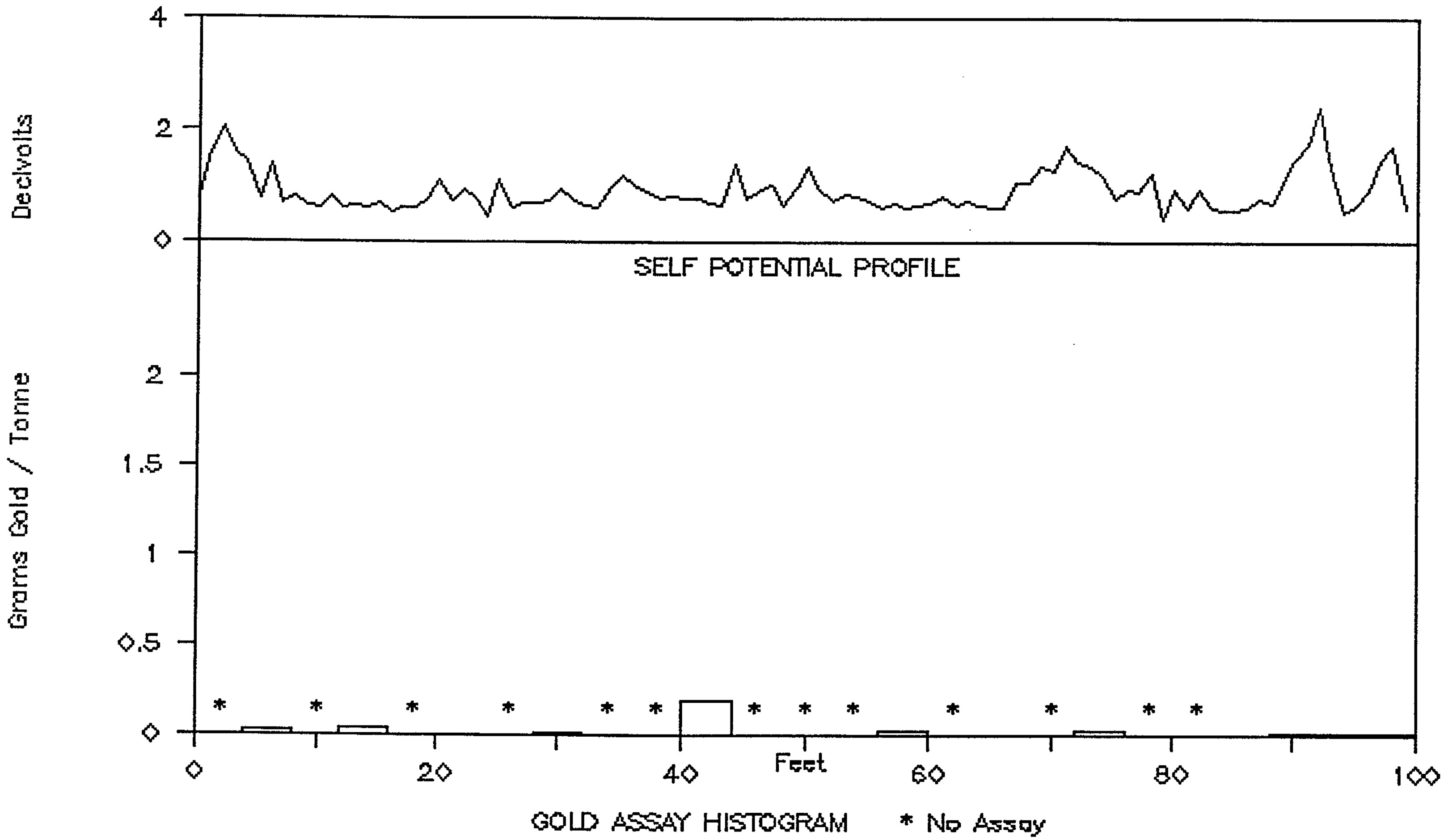

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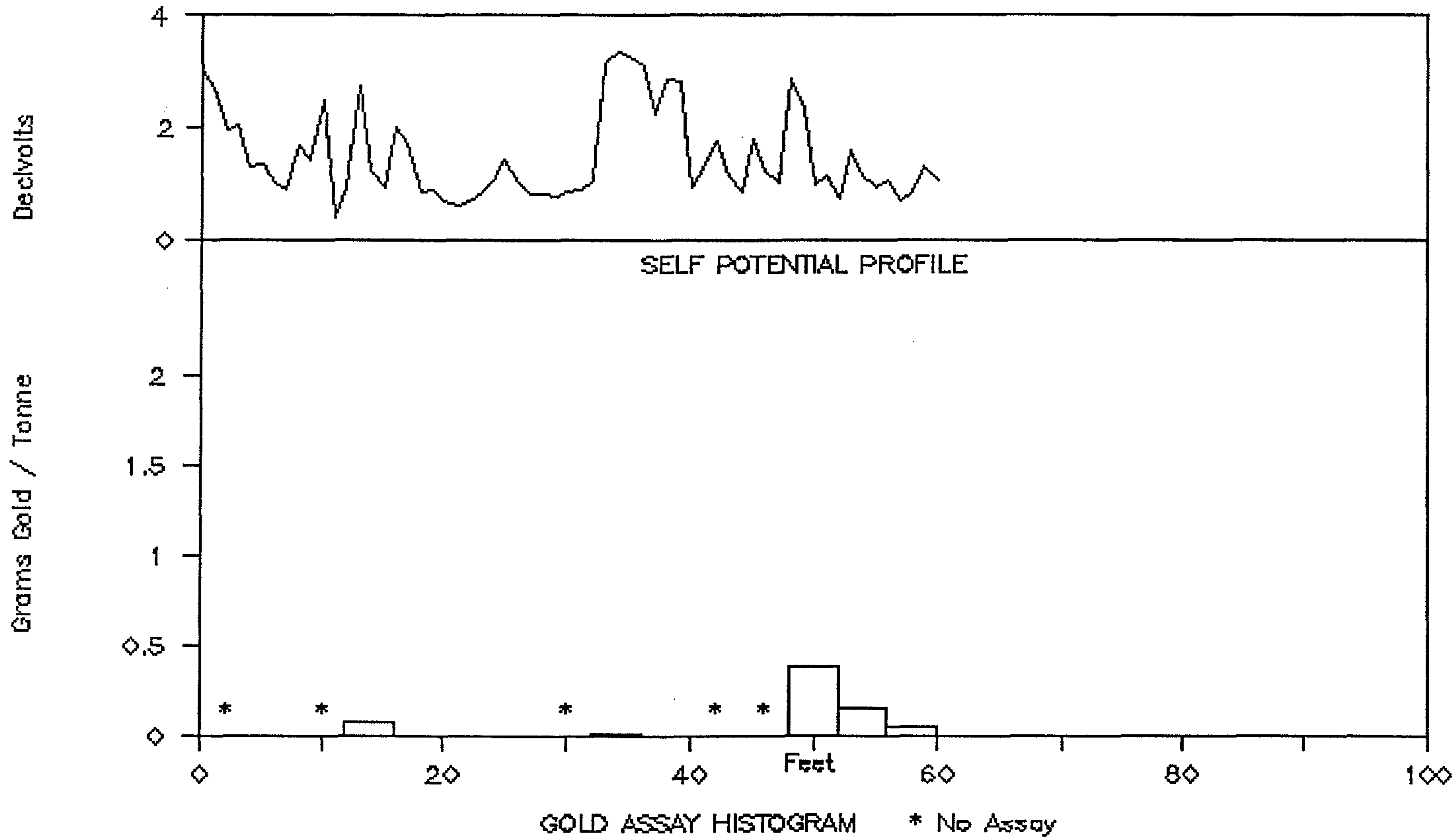

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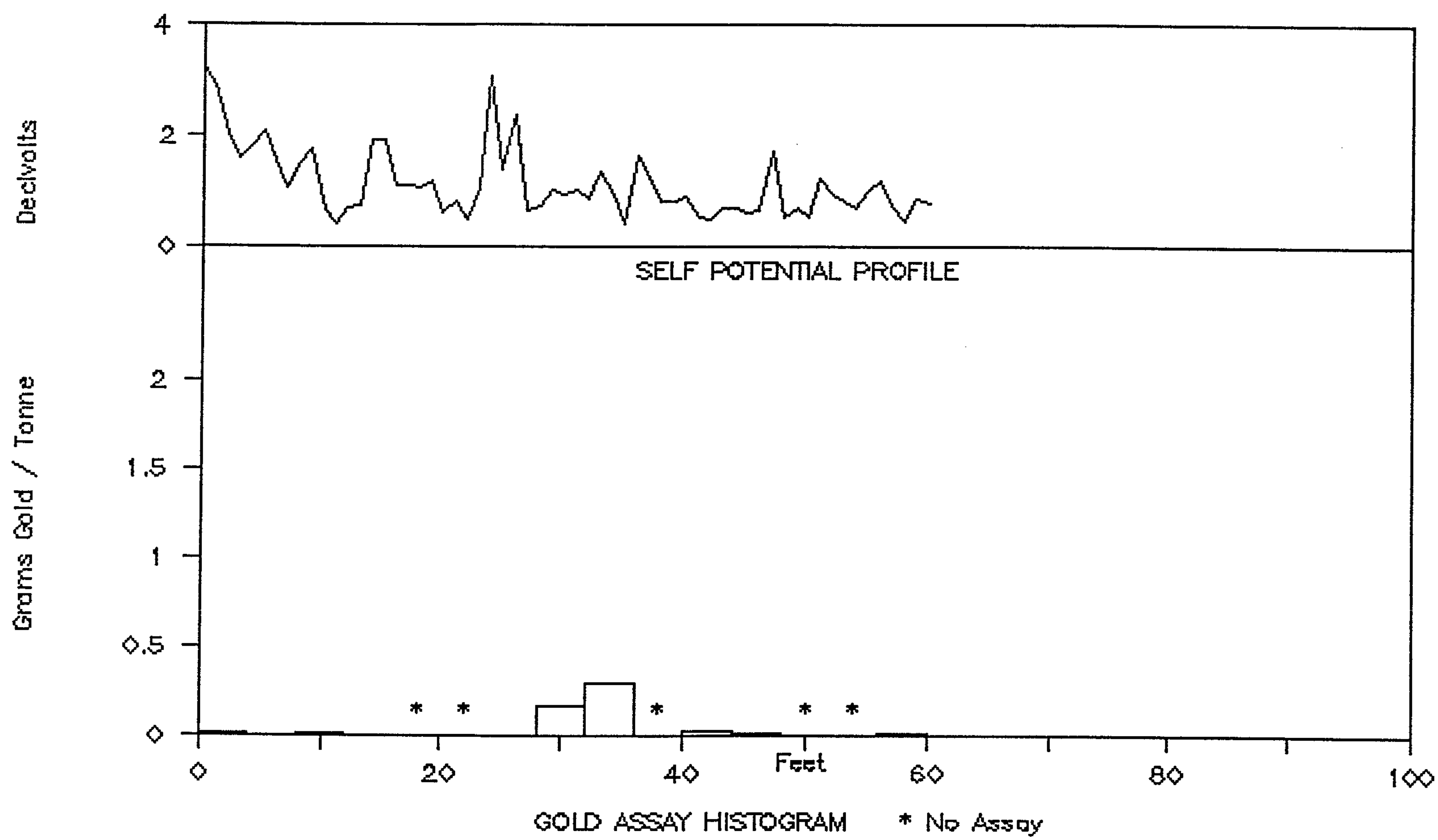

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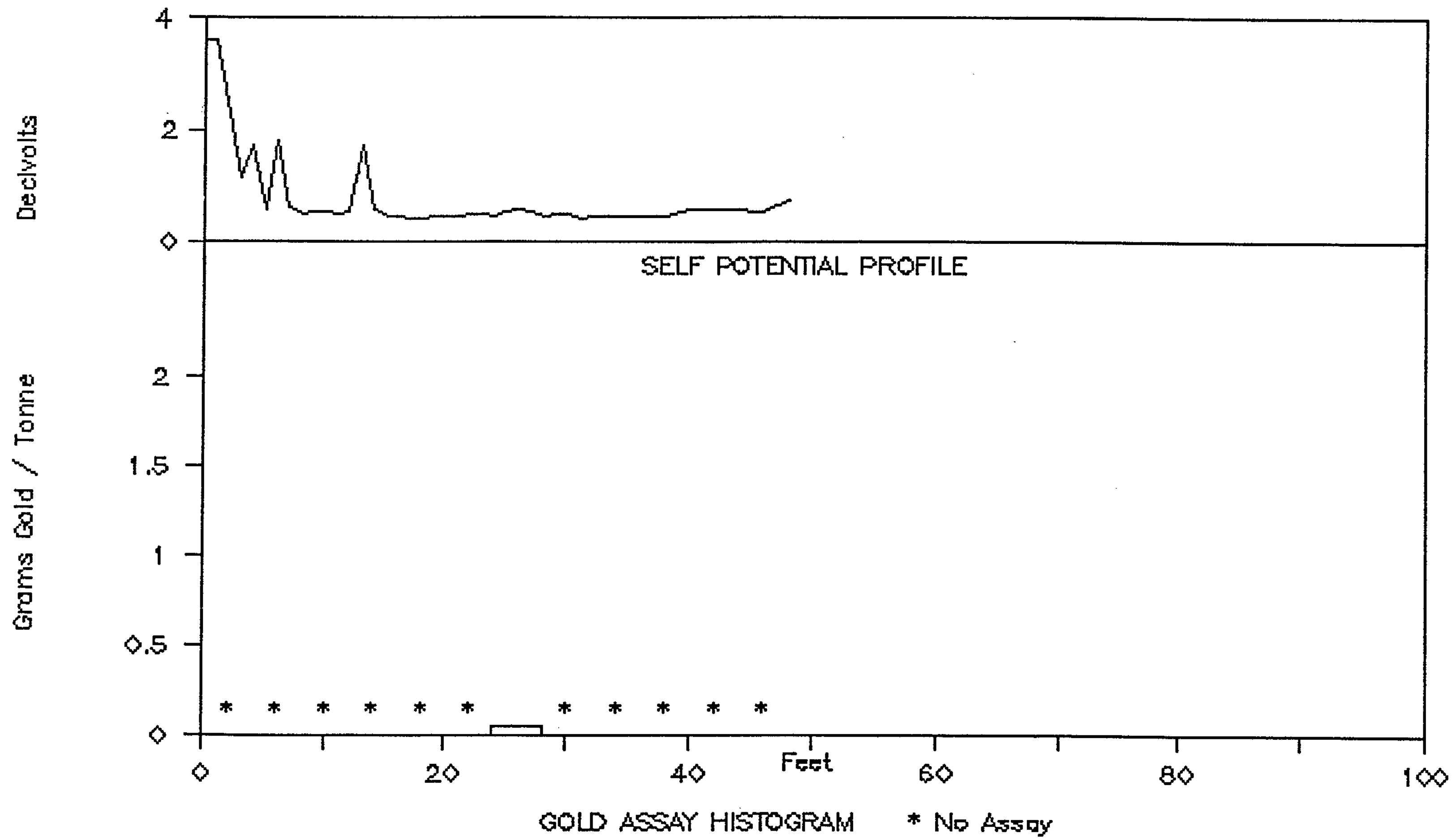

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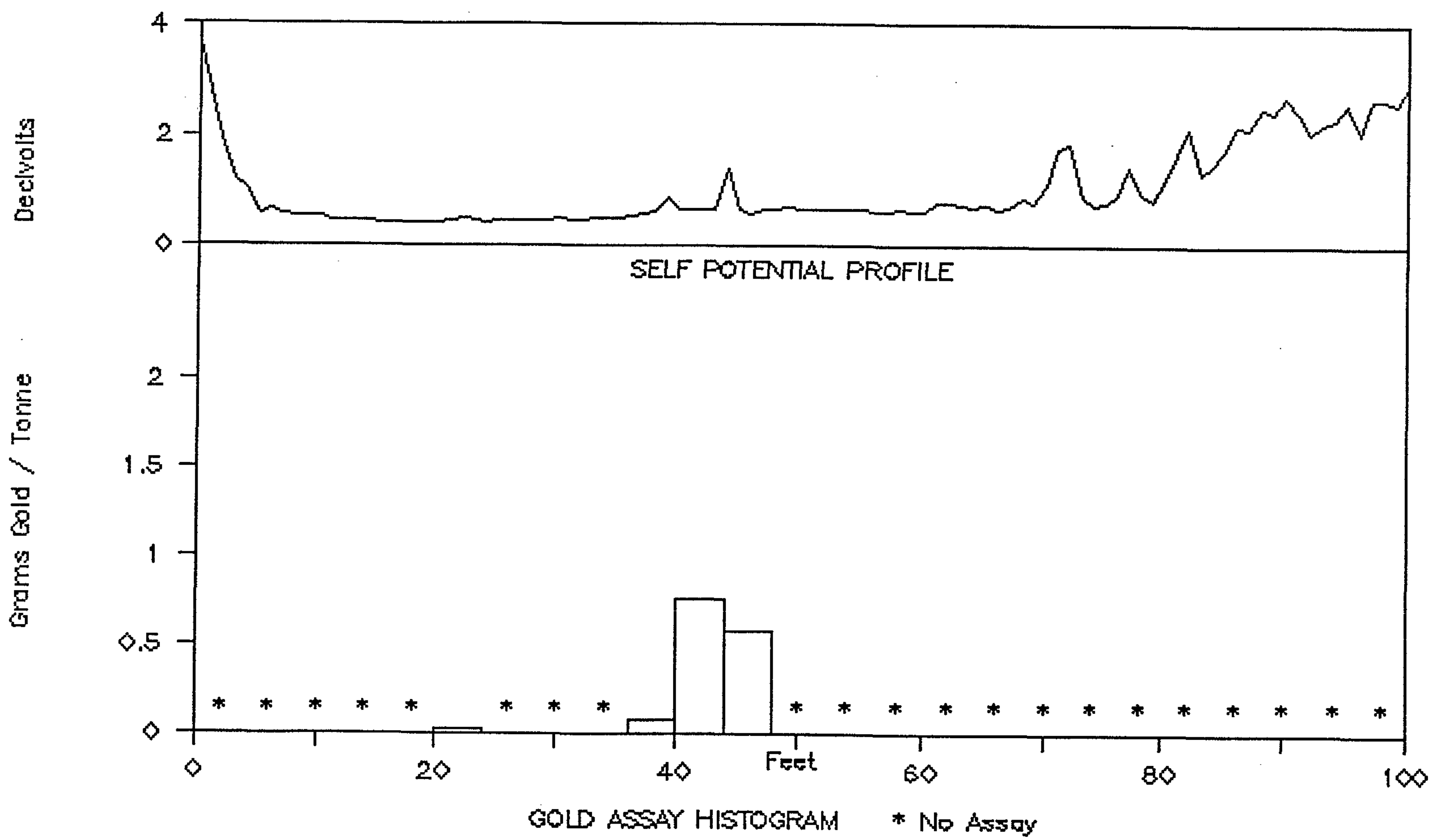

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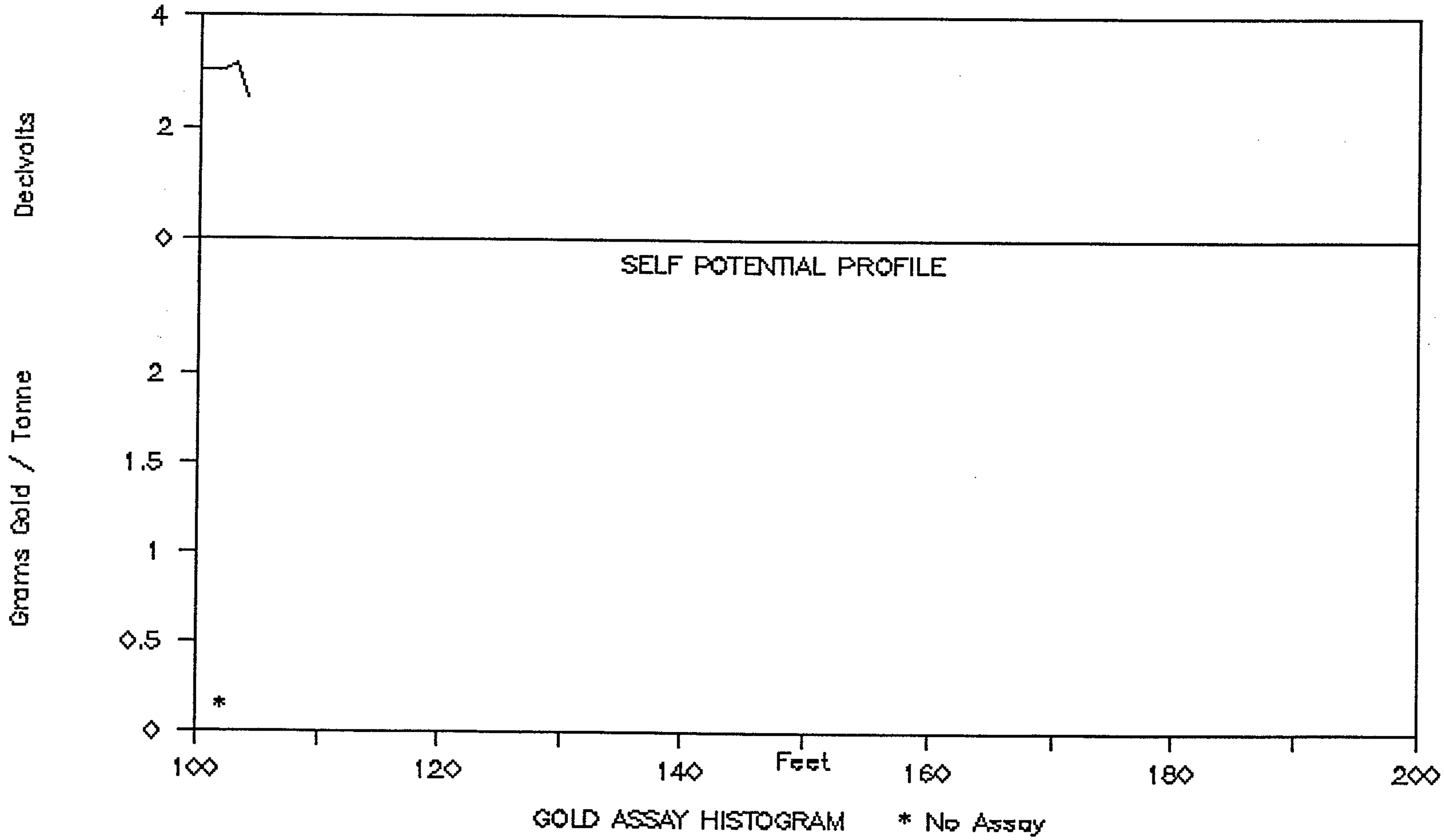
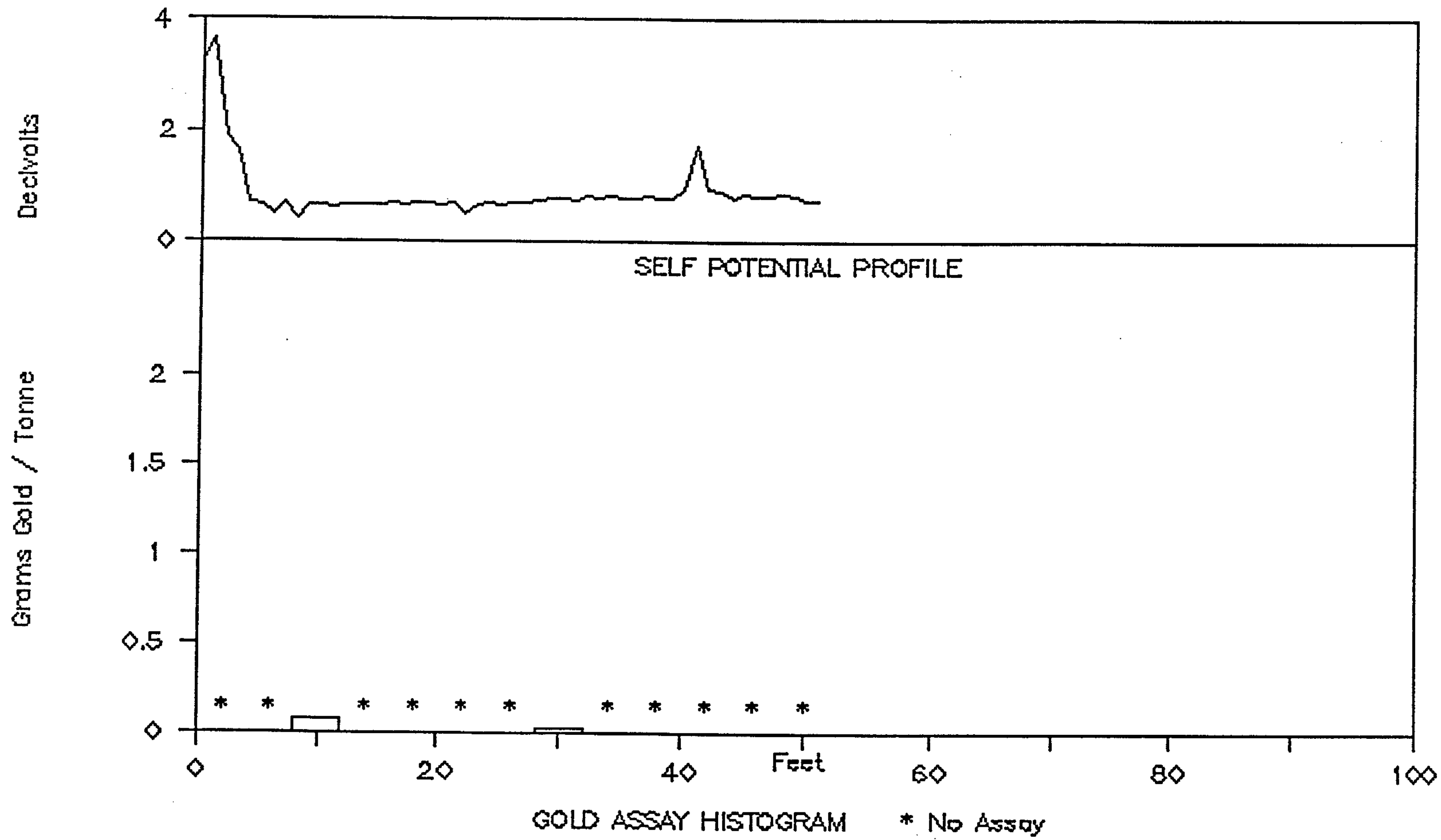


PERCUSSION HOLE UP86-72



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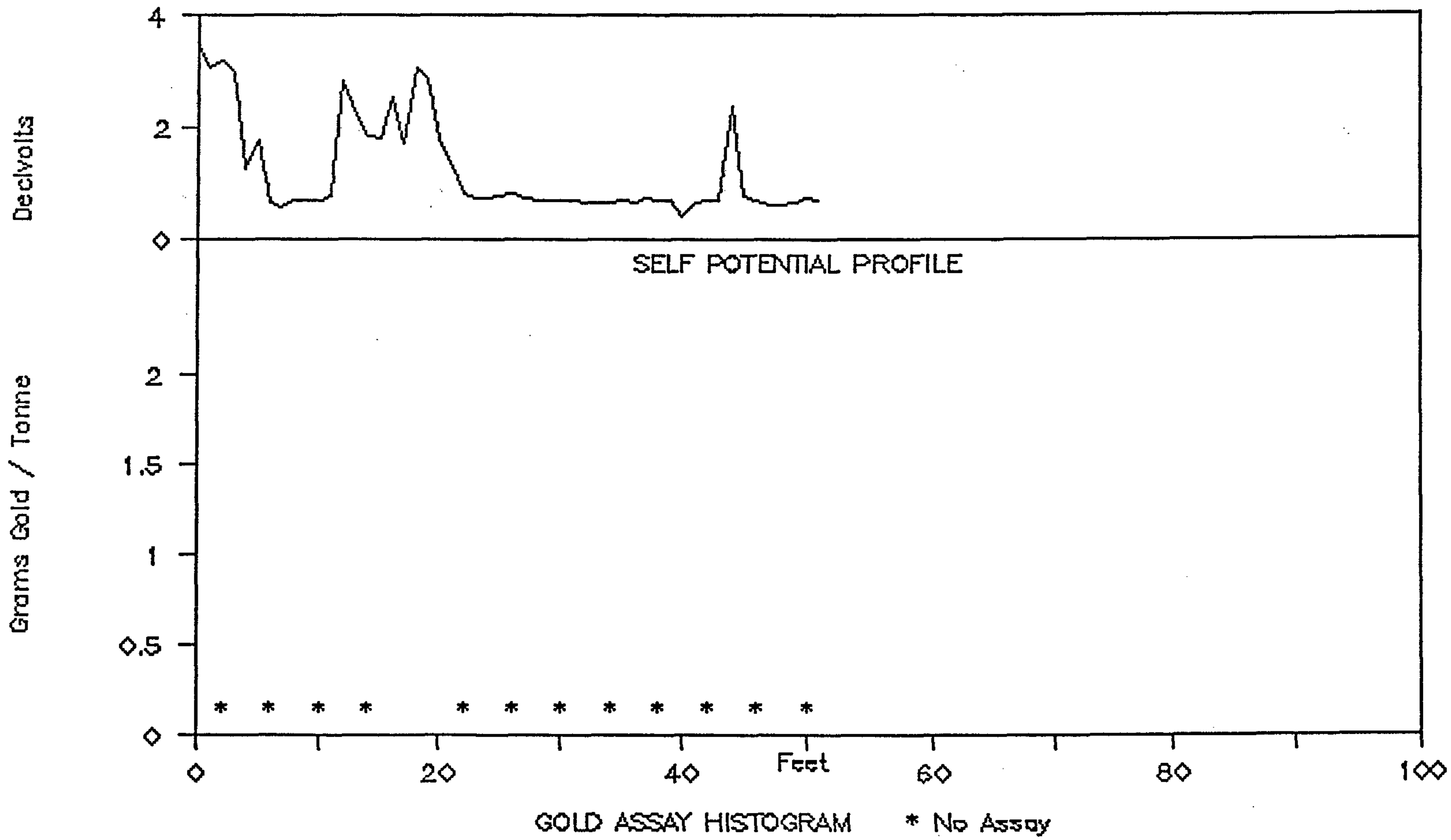
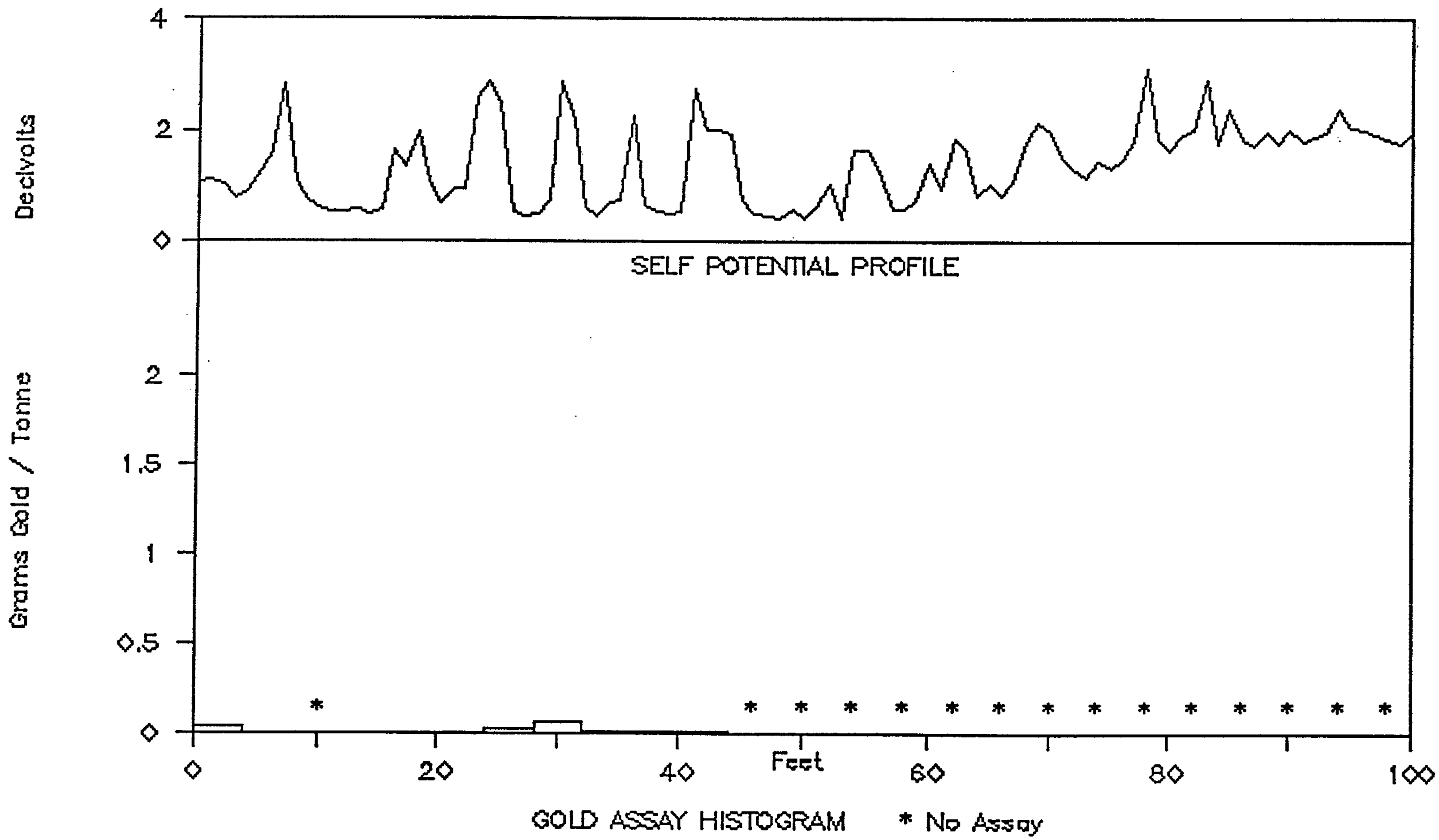


PERCUSSION HOLE UP86-74



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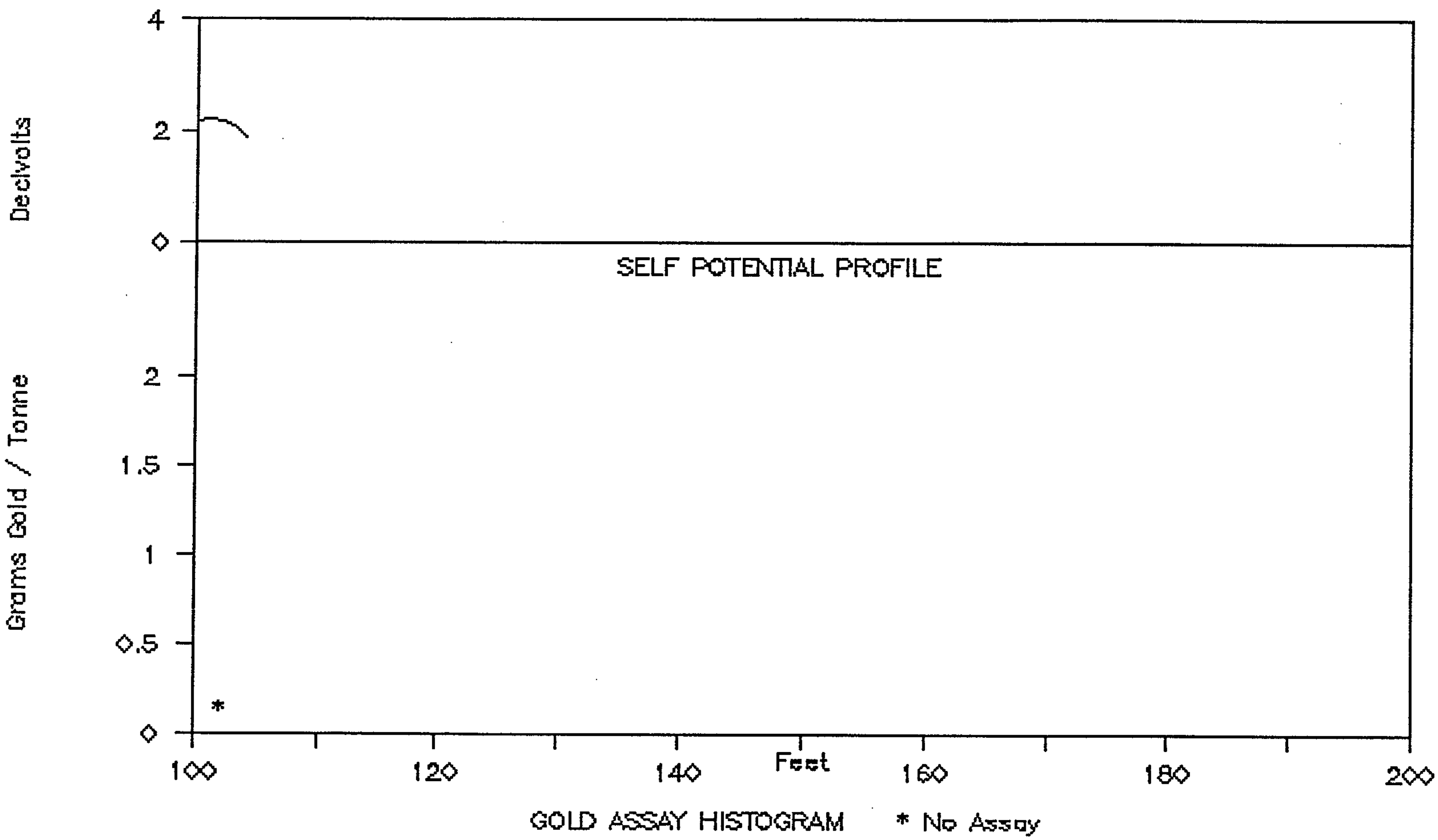
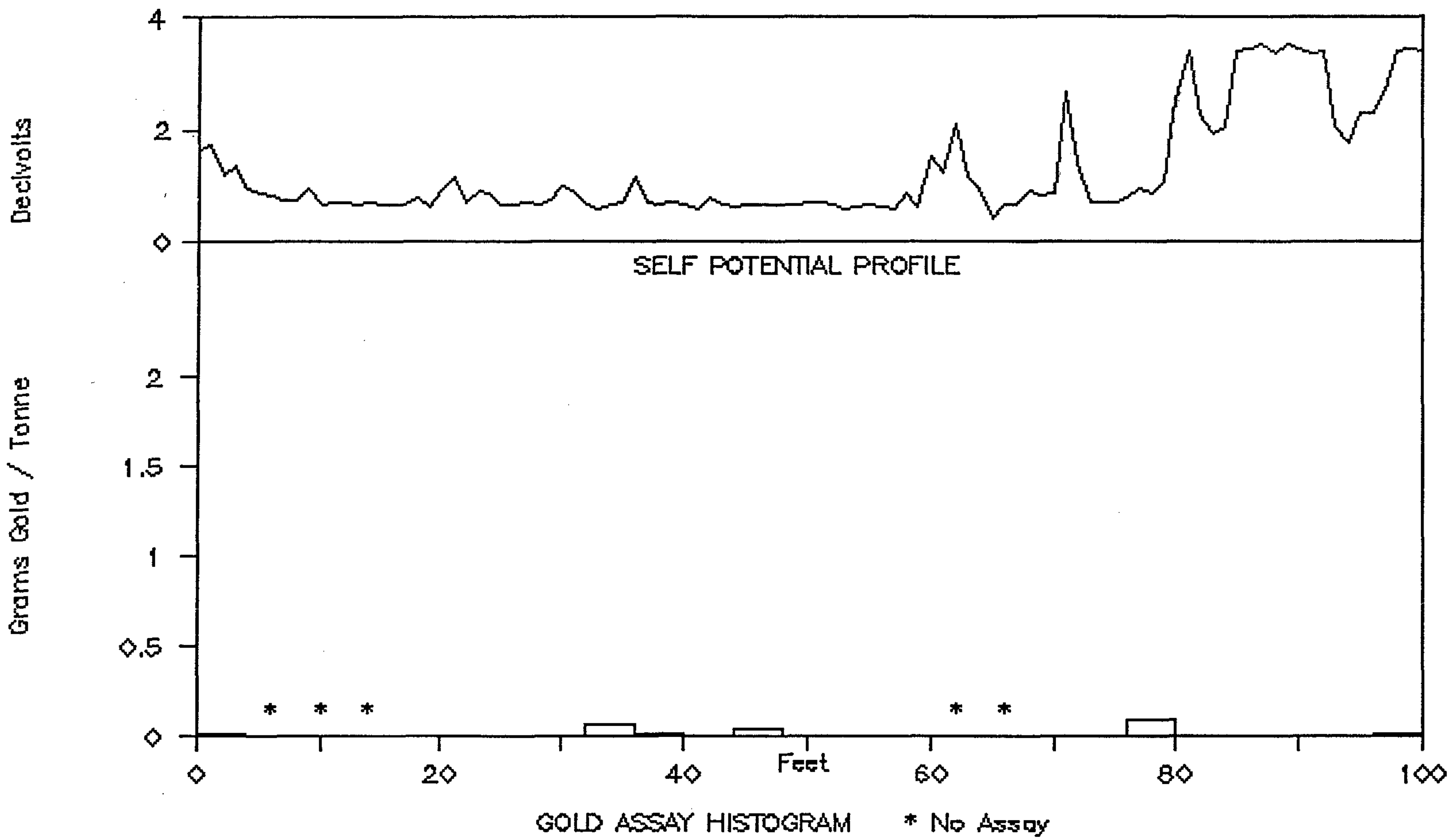


PERCUSSION HOLE UP86-75



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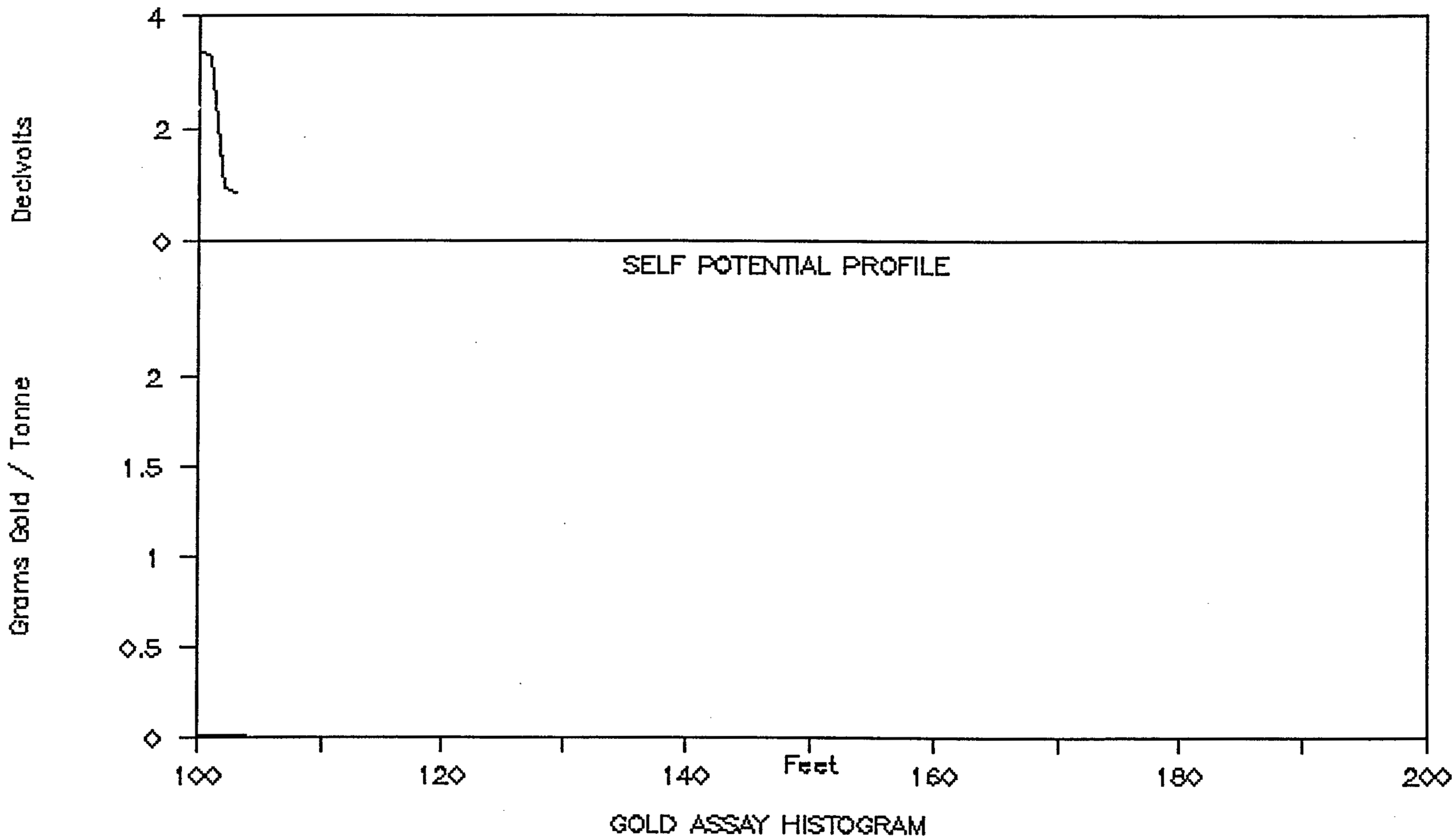

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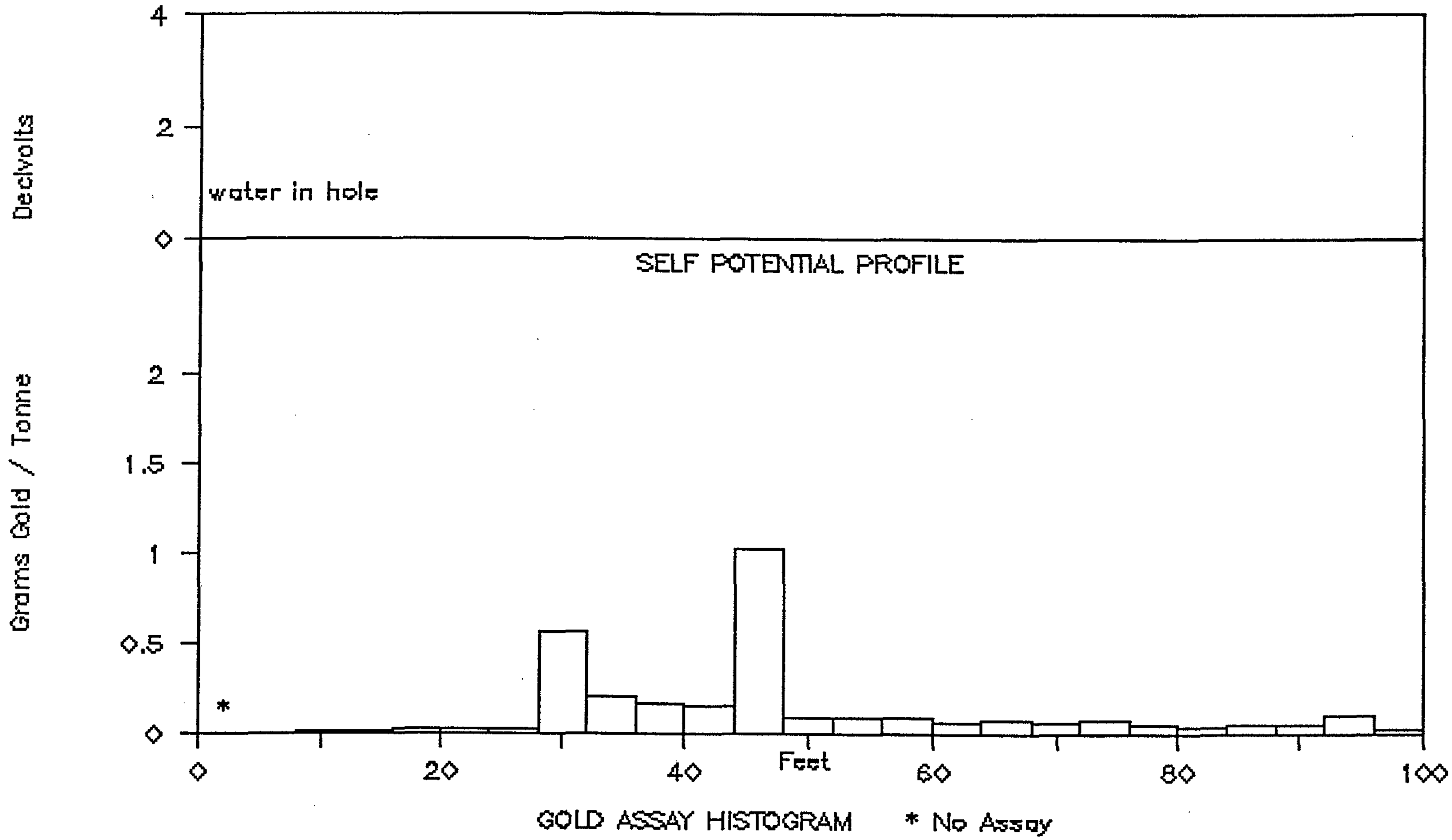

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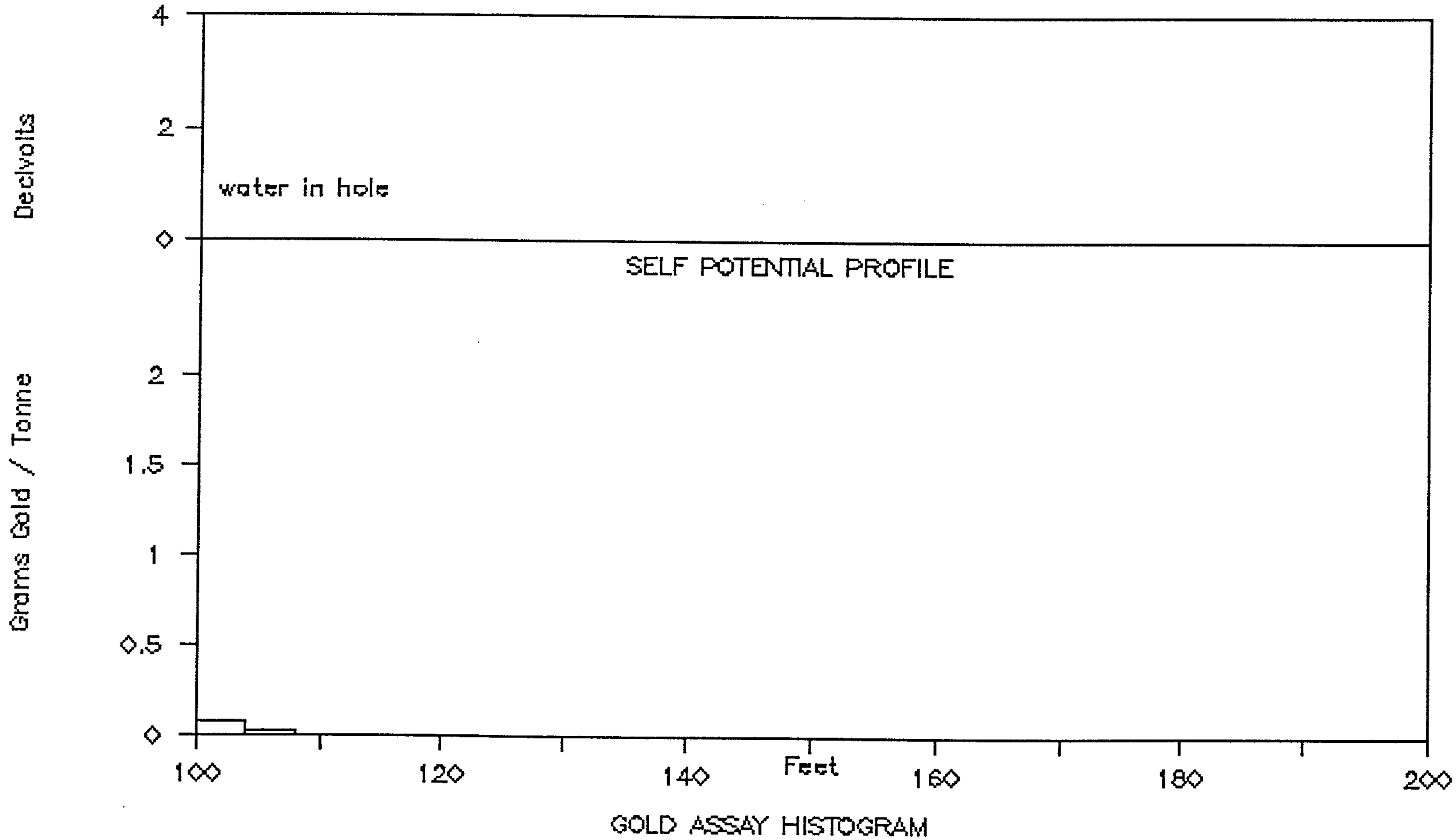
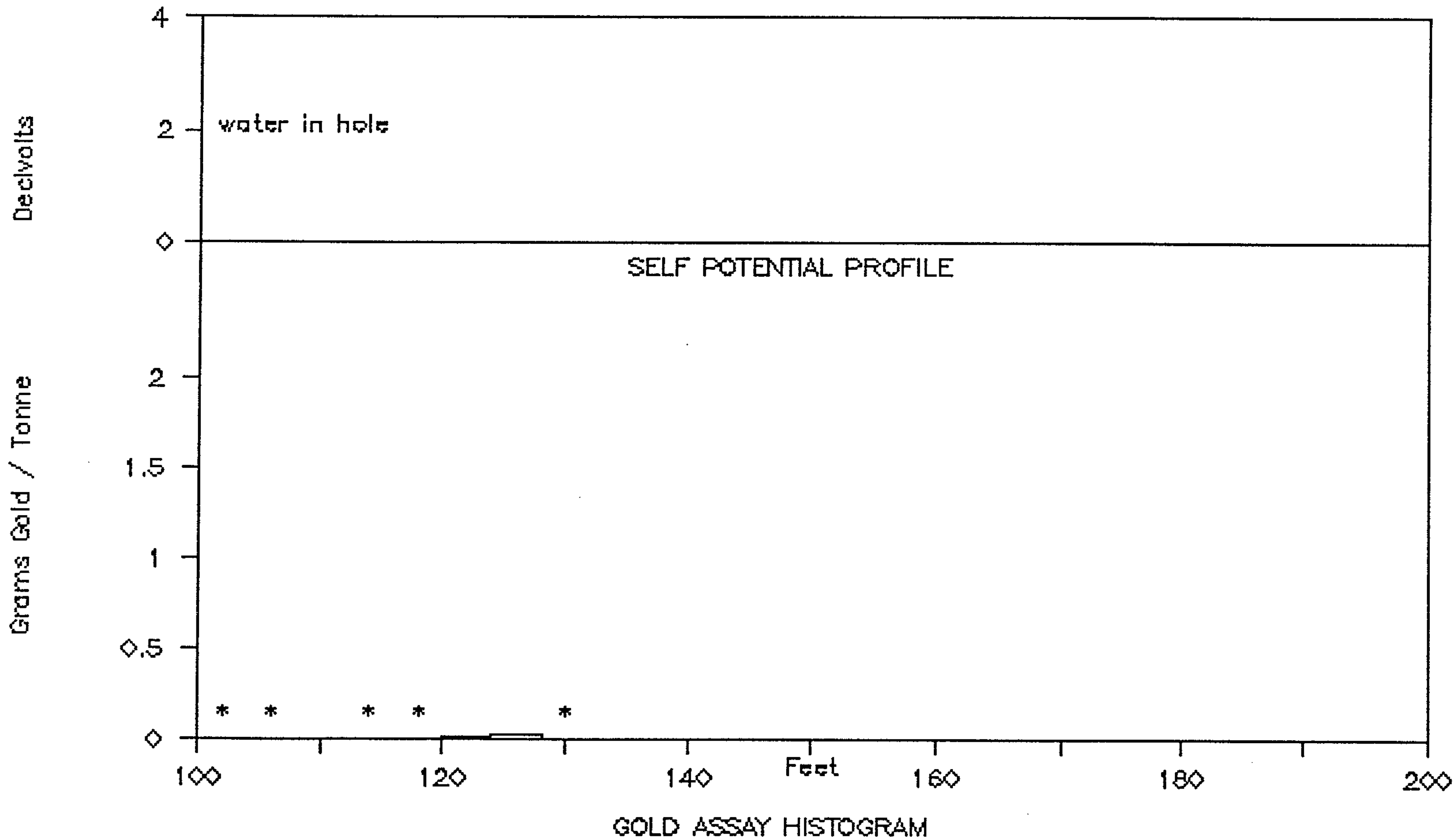


PERCUSSION HOLE UP86-77

PERCUSSION HOLE UP86-77



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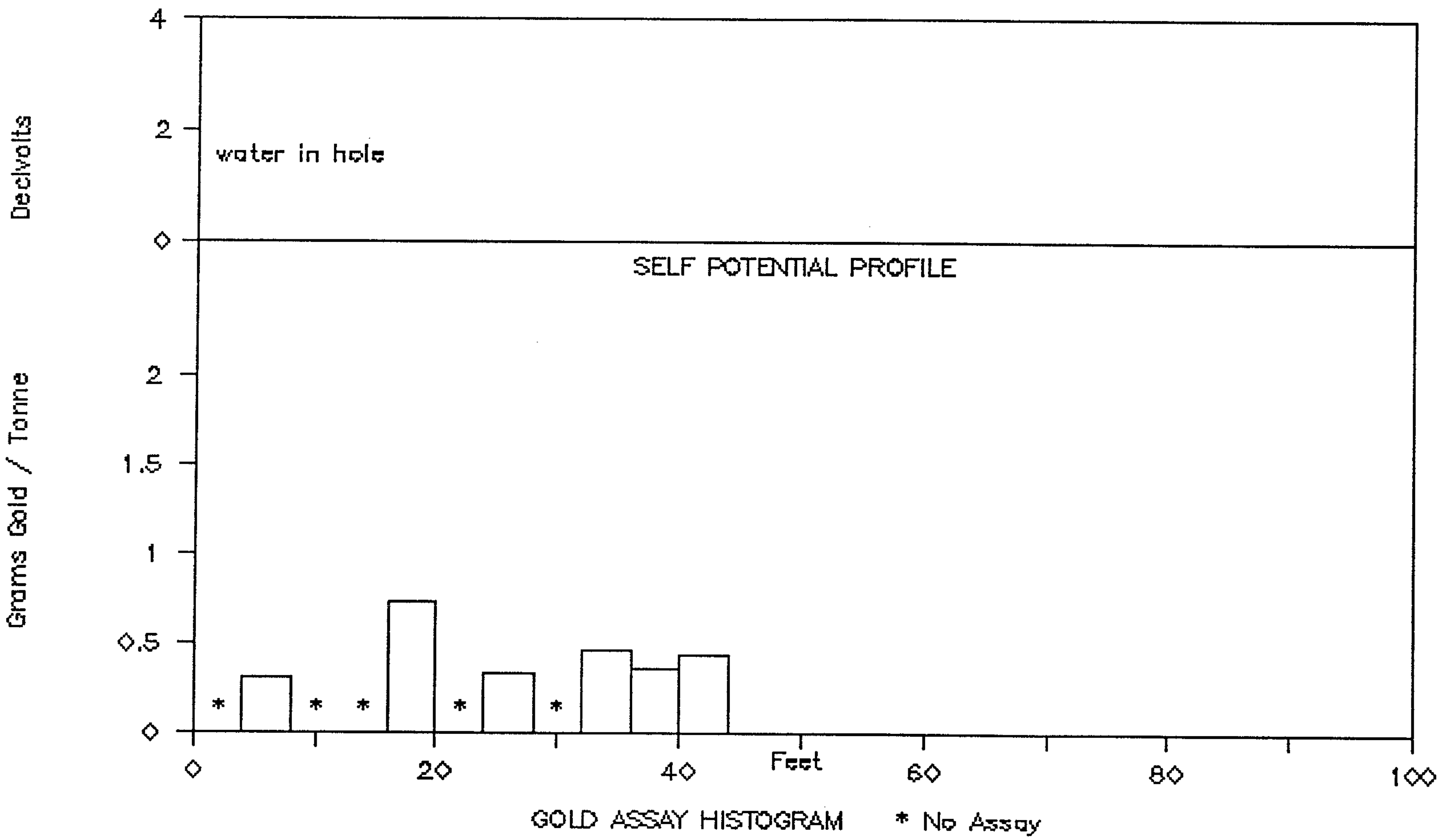

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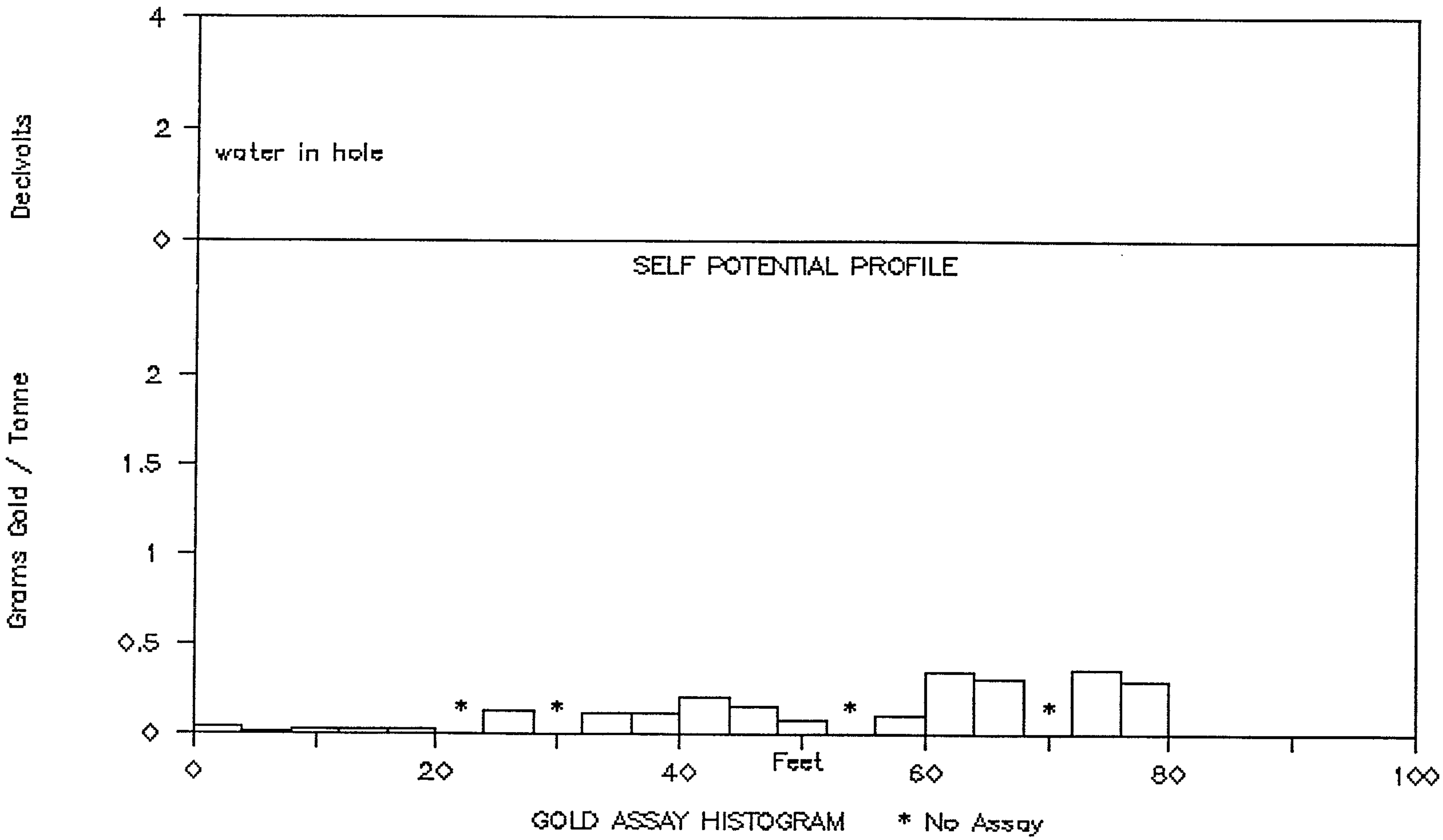
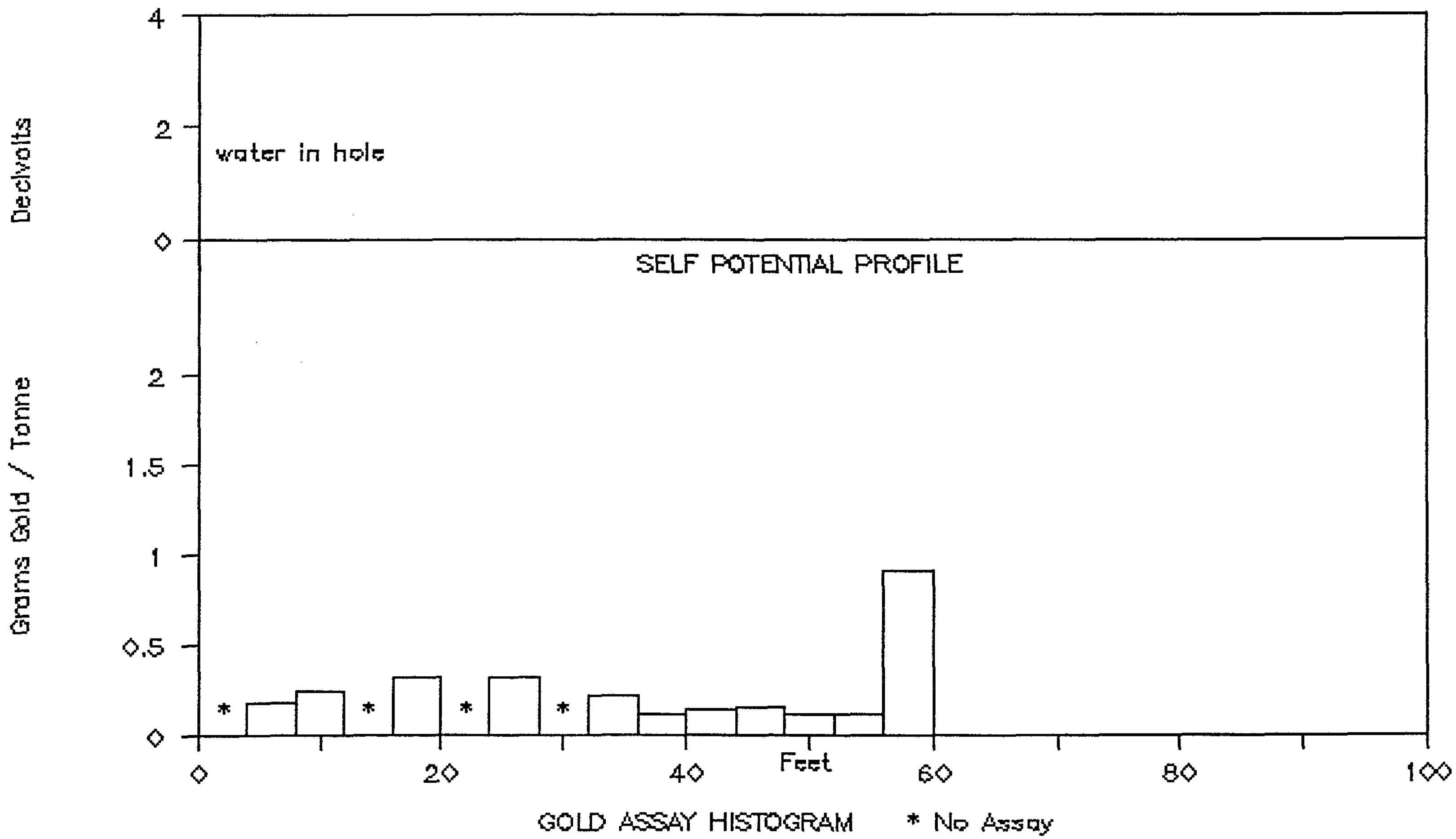
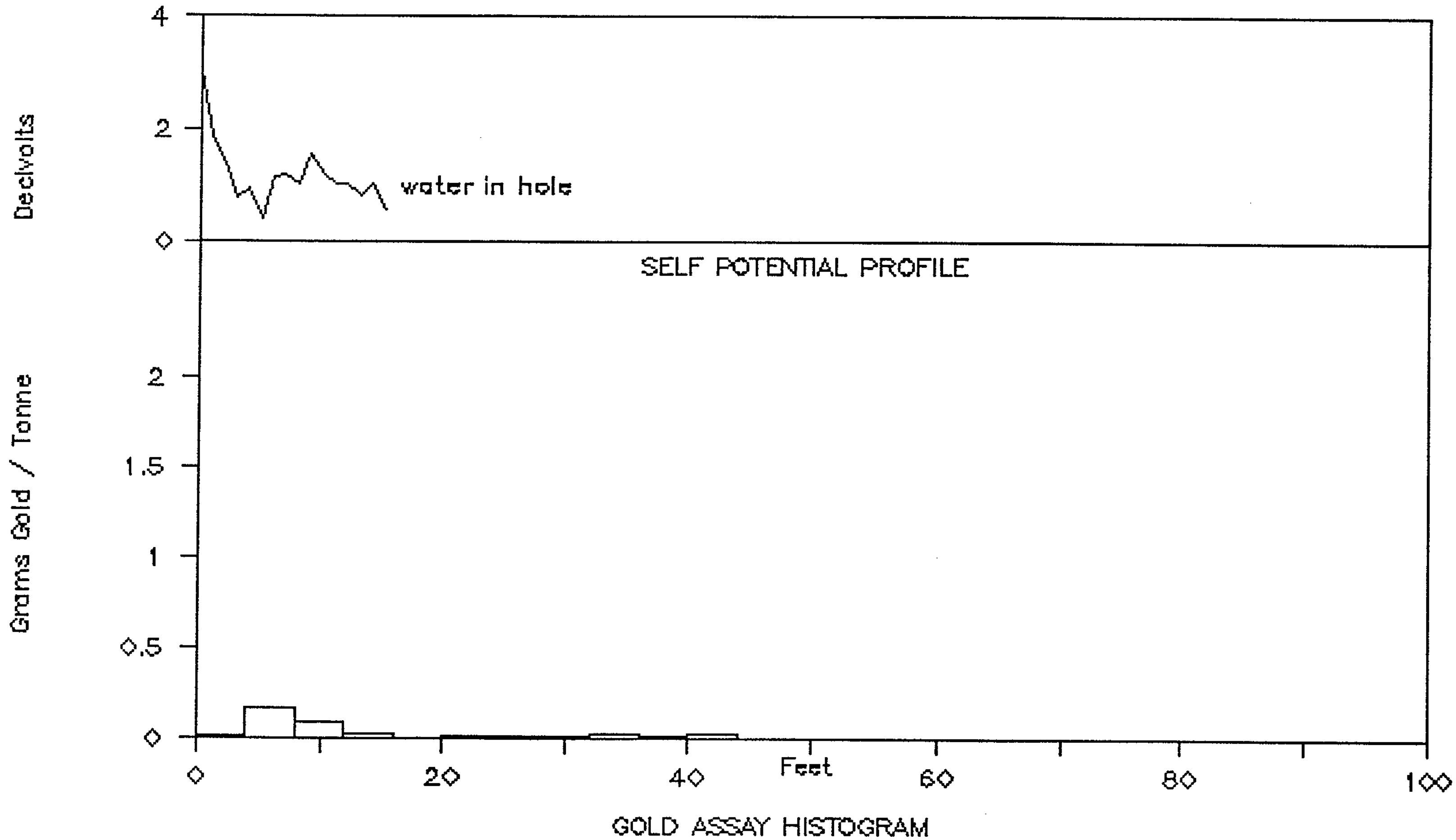


PERCUSSION HOLE UP86-80



TEST HOLE T-229



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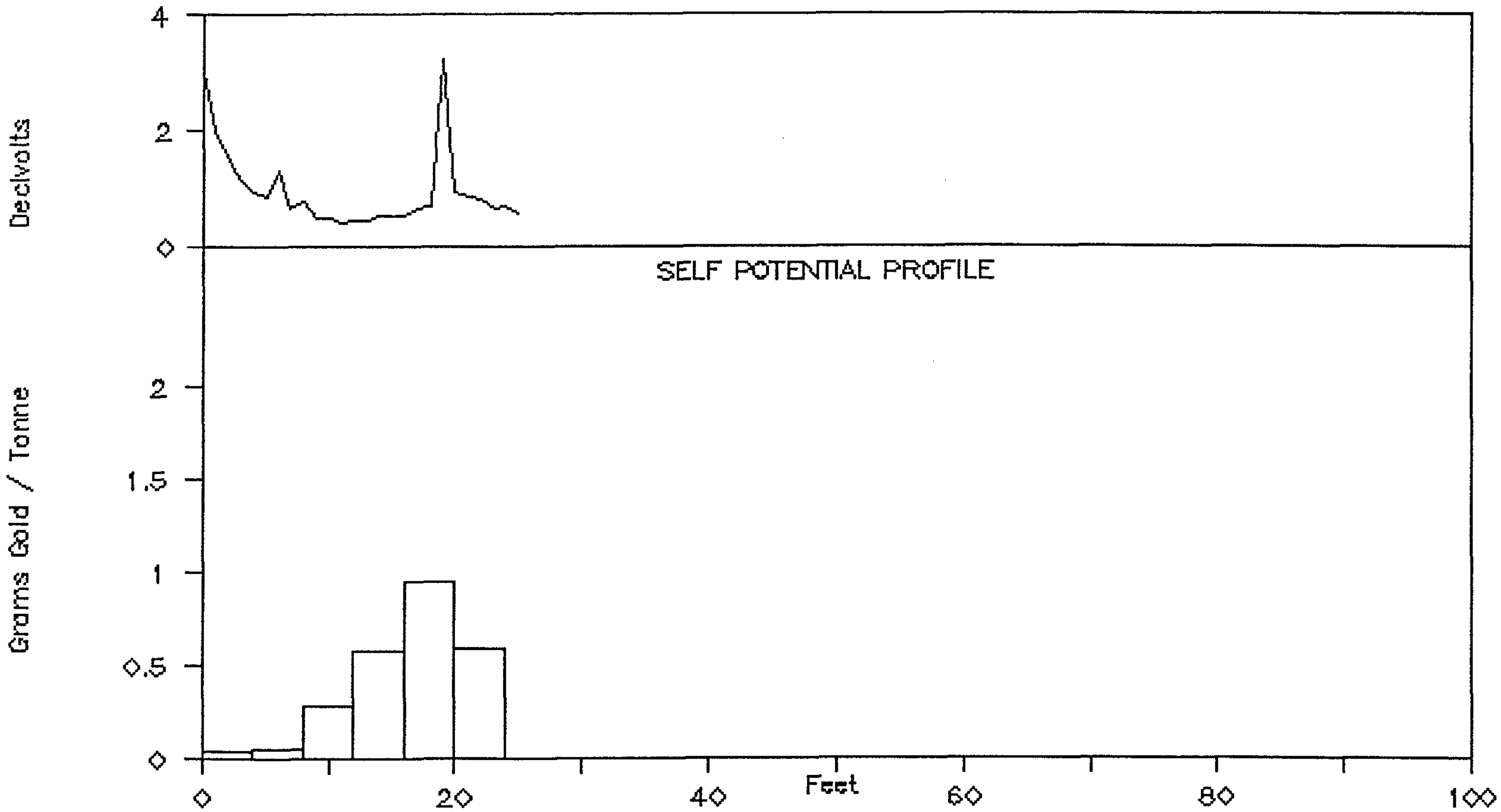
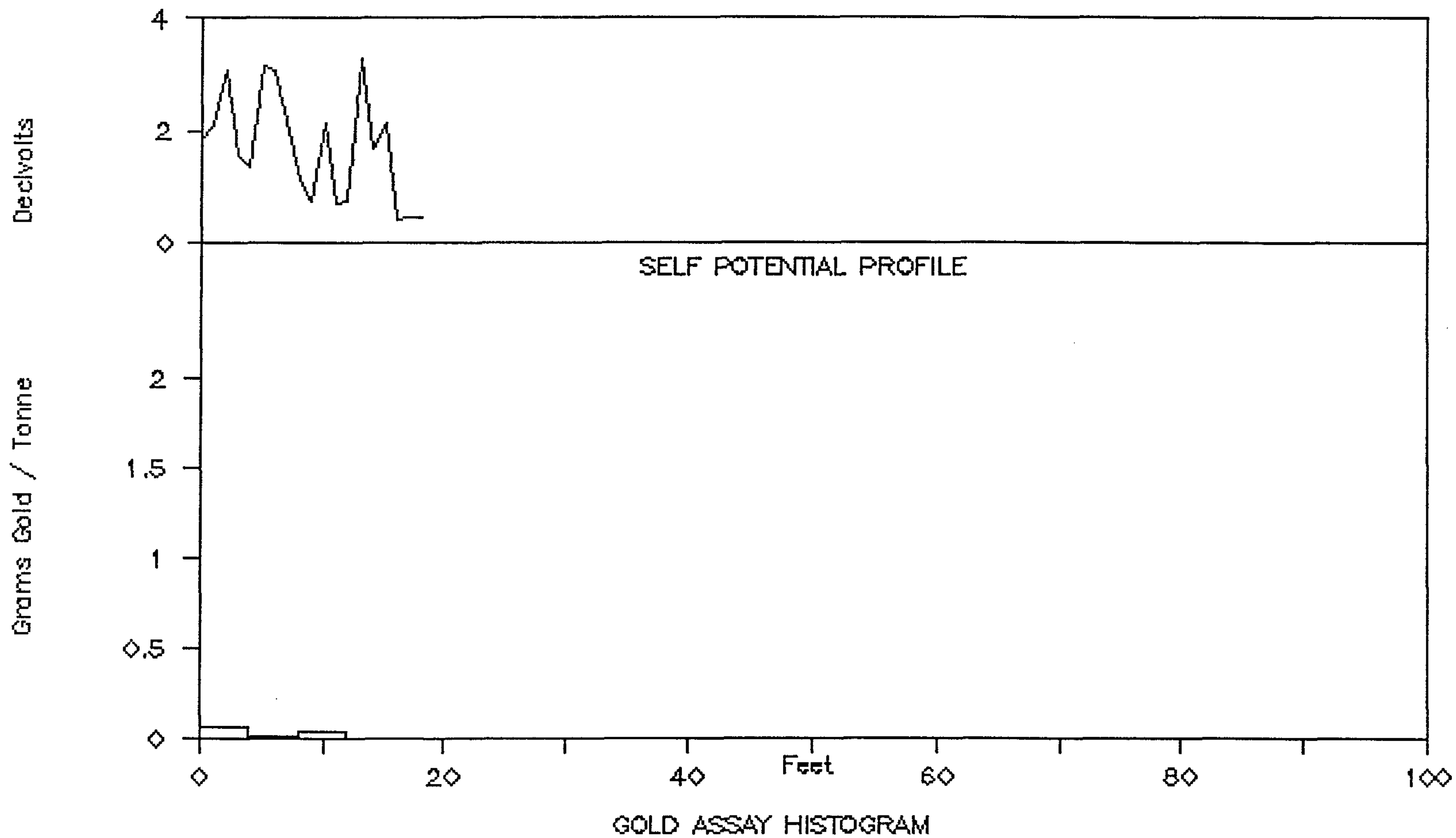


GOLD ASSAY HISTOGRAM

TEST HOLE T-246



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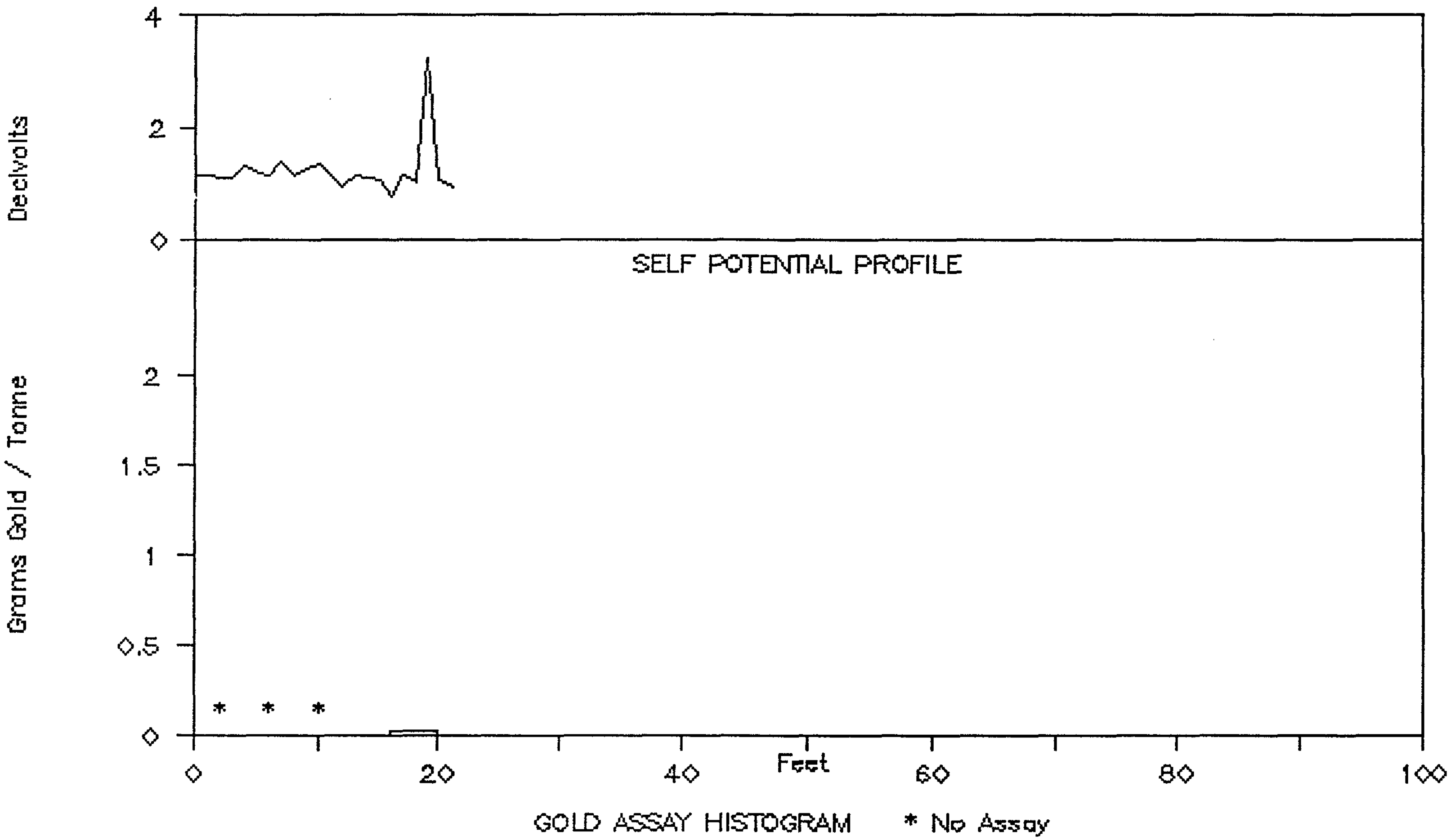

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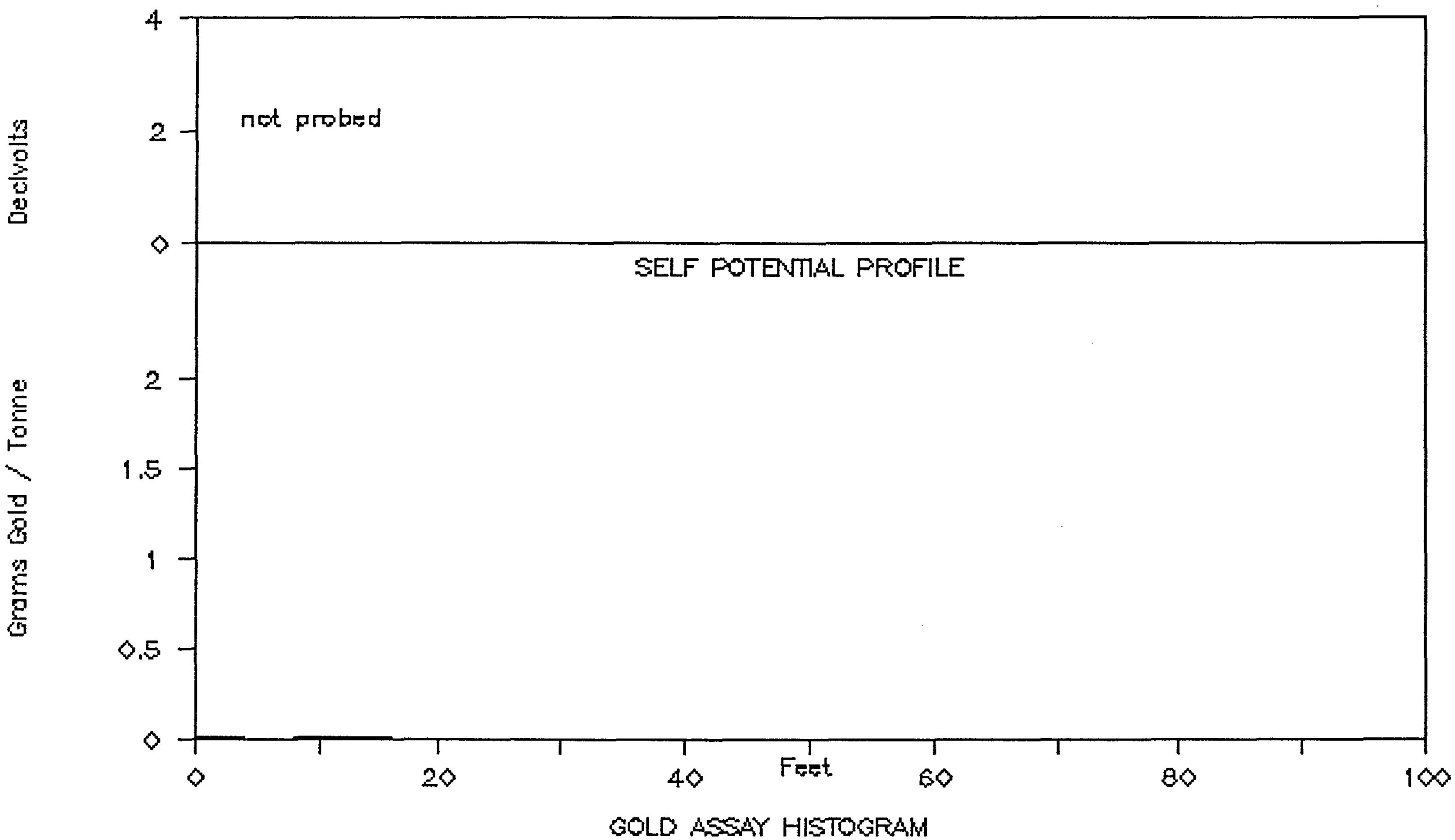

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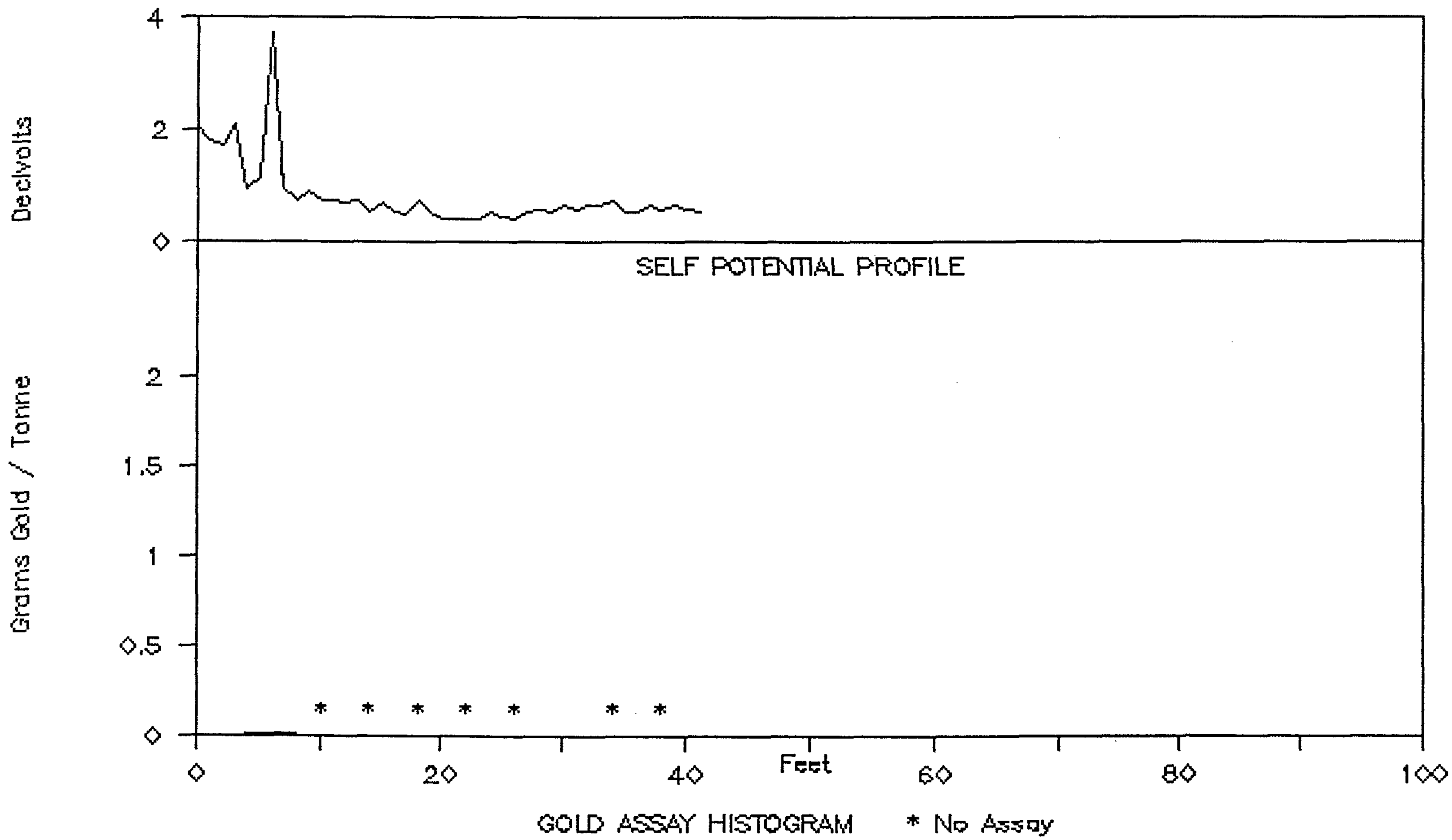

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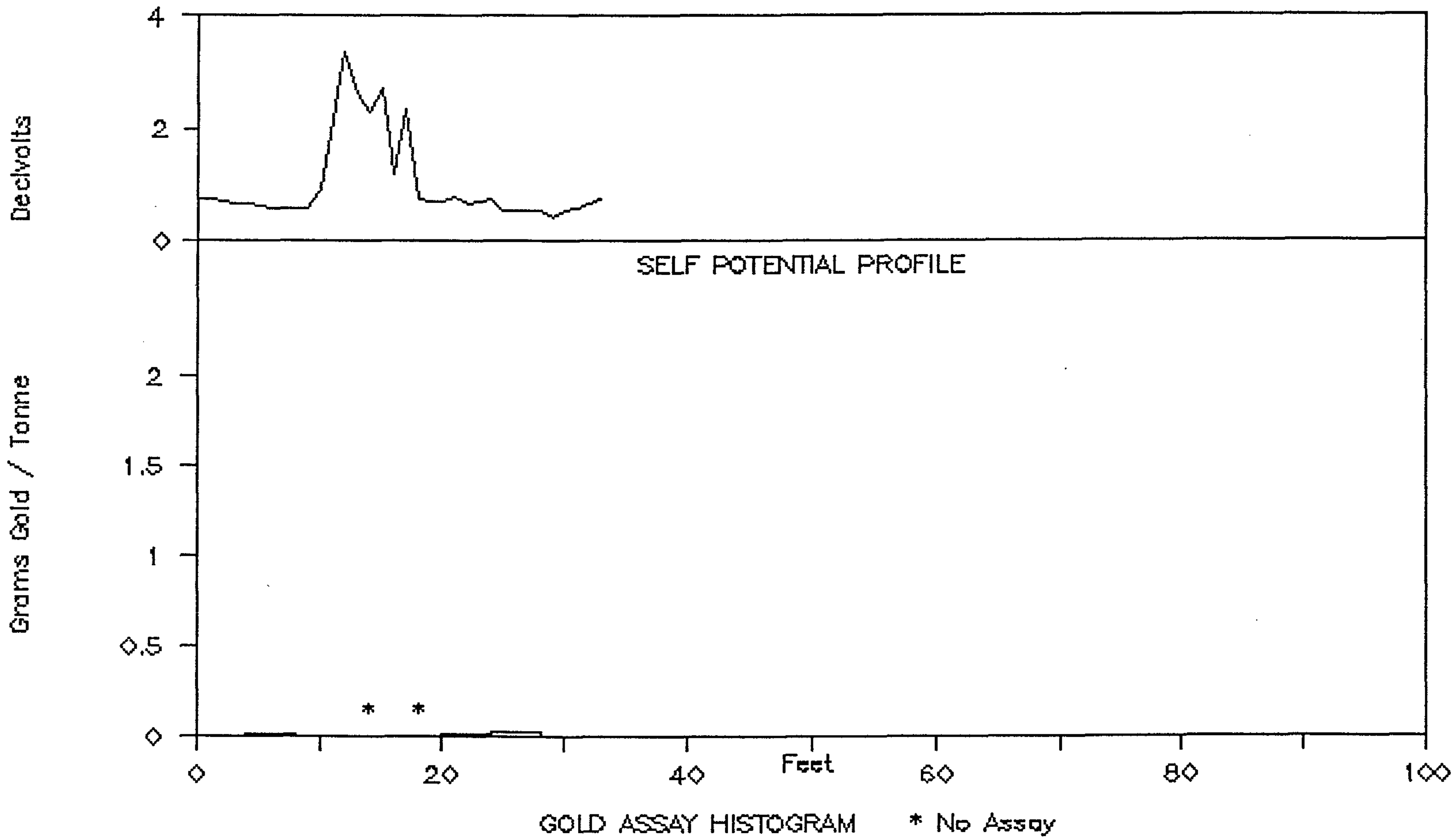
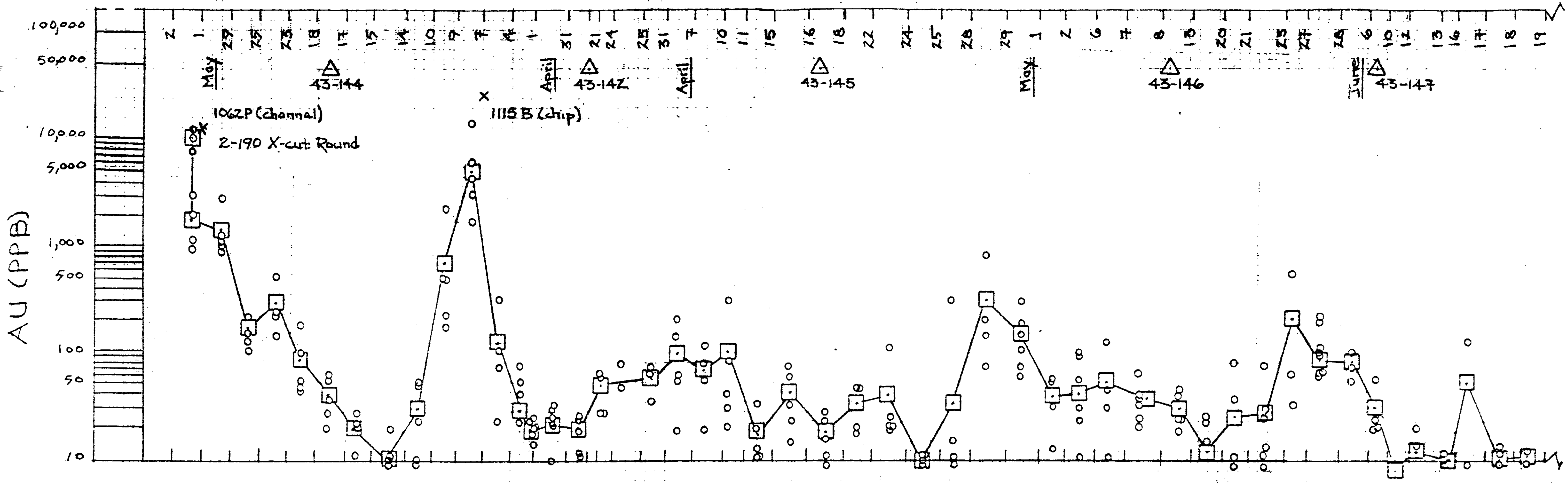


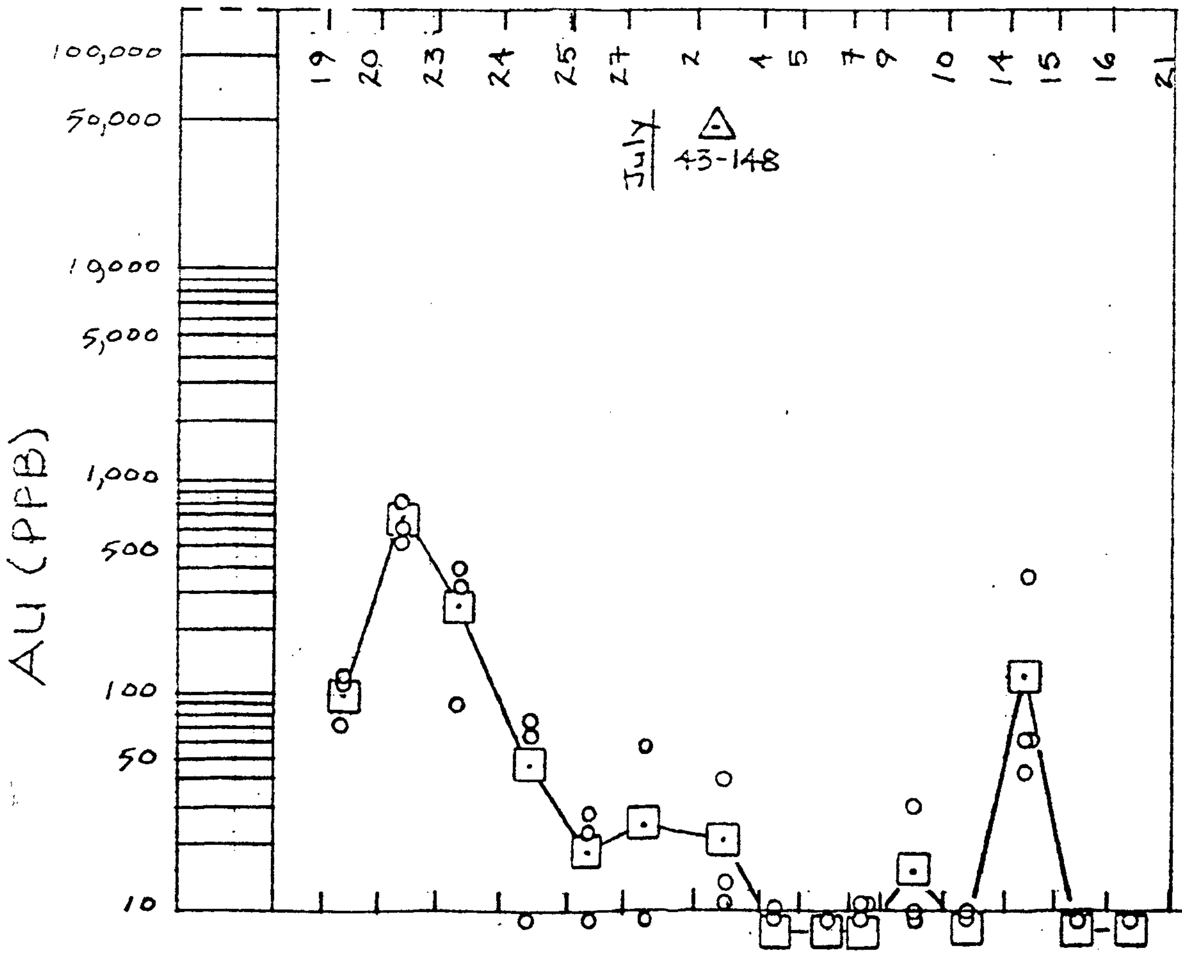
APPENDIX IV

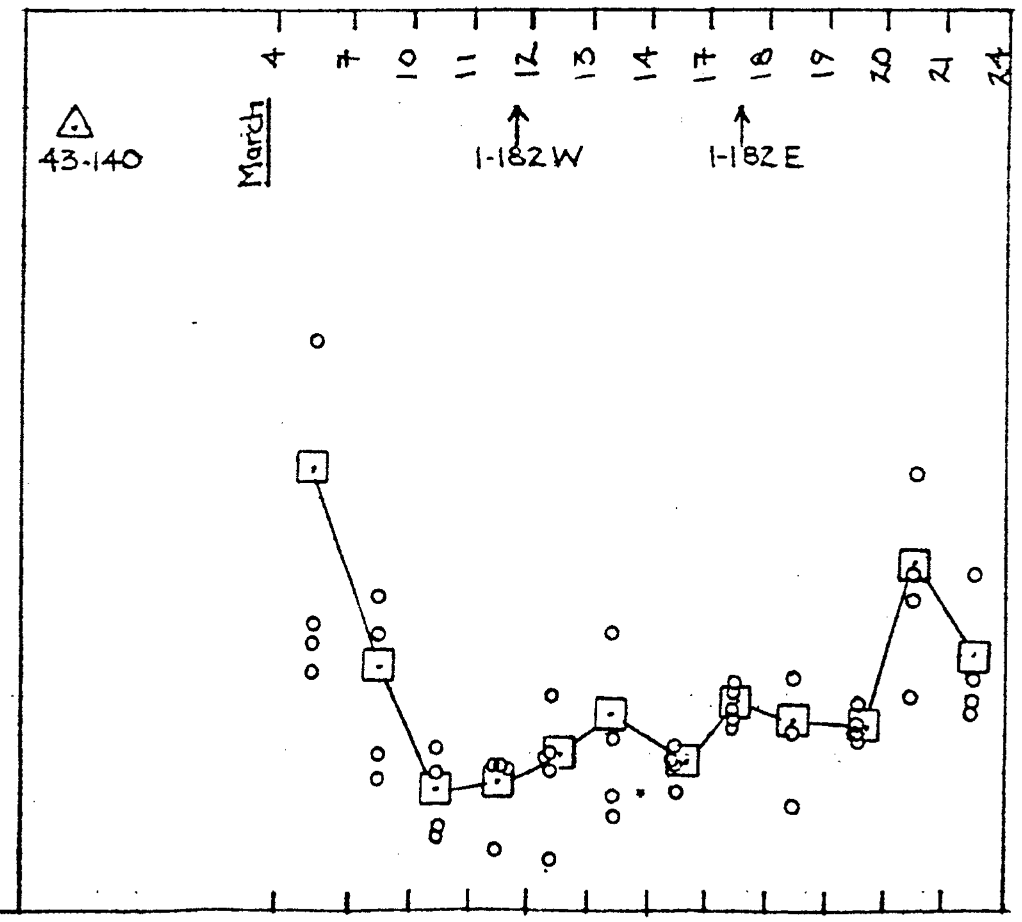
GOLD ASSAY AND GEOCHEMICAL RESULTS

Number of Geochemical Samples Analysed, The Mosquito Creek Gold Project, Period February 28 to August 19, 1986.

Sample Type	Level				Total
	1st	2nd	3rd	4th	
Muck	--	318	46	278	642
Test Hole	7	240	30	36	313
Percussion Hole	63	--	157	535	755
Multi-element	--	--	--	--	26
TOTAL					1736







LEGEND

○ INDIVIDUAL MUCK SAMPLE (3-6 PER ROUND)

⊡ AVERAGE FOR ROUND

NOTE: VALUES <10 ppb ARE NOT SHOWN

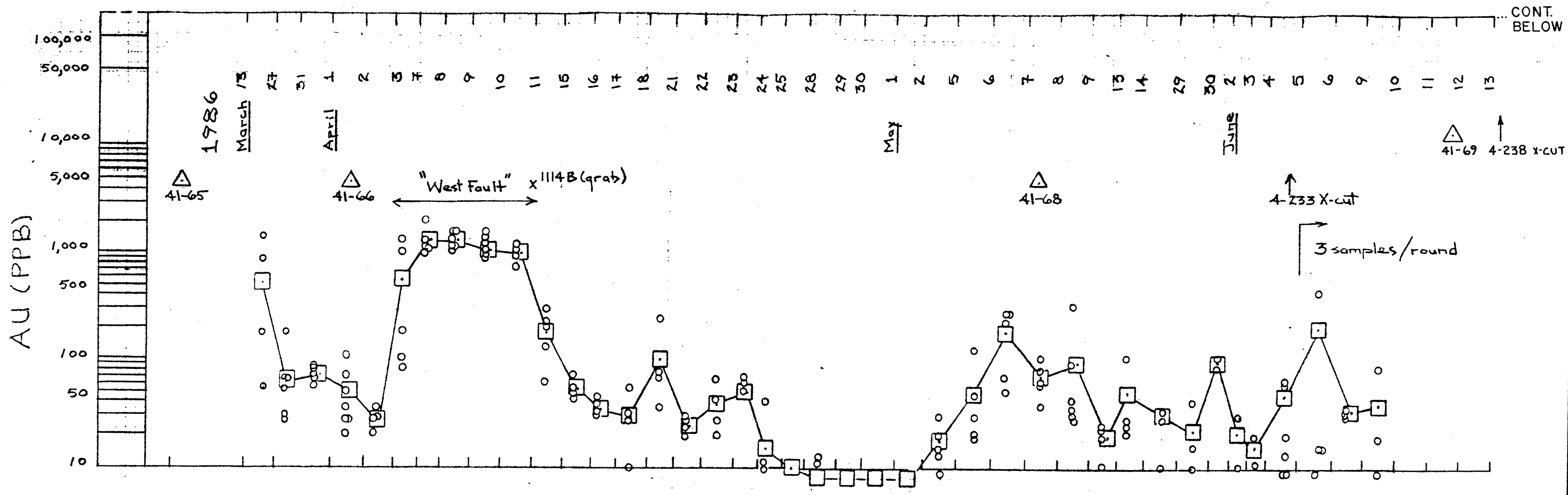
HECLA MINING COMPANY OF CANADA LTD.

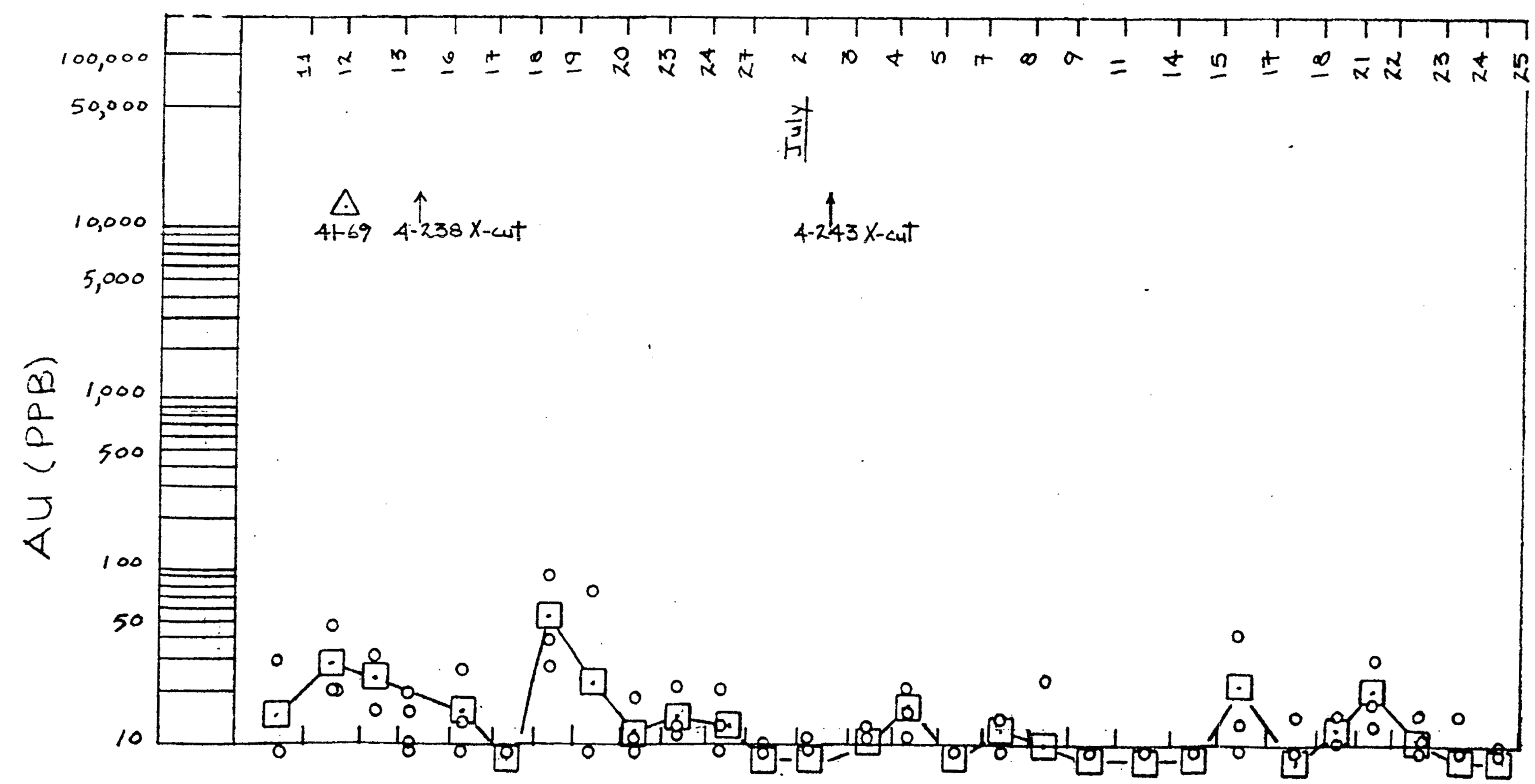
Mosquito Creek Project

GOLD IN MUCK SAMPLES

1-182 DRIFT

Scale 1: 240 DRN: J.I. DATE: 11-4-86





LEGEND

o INDIVIDUAL MUCK SAMPLES (3-6 PER ROUND)

⊡ AVERAGE FOR ROUND

NOTE: VALUES < 10 ppb ARE NOT SHOWN

HECLA MINING COMPANY OF CANADA LTD.

Mosquito Creek Project

GOLD IN MUCK SAMPLES

4-201 W. DRIFT

Scale 1 : 240 DRN: J.I. DATE: 11-4-86

TERRAMIN RESEARCH LABS LTD.

cc: Don Sutherland

ANALYTICAL REPORT

Job # 86-090-B

Hecla Mining

Date Mar.20, 1986

Client Project

Page 1/2

Sample No.		Au ppb
Pulp	1700 G	418
	1701	864
	1702	232
	1703	536
	1704	340
	1705	940
	1706	704
	1707	336
	1708	3720
	1709	124
	1710	232
	1711	534
	1800	184
	1801	146
	1802	228
	1803	4780
	1804	56
	1805	304
	1806	206
	1807	42
	1808	58
	1809	46
	1810	26
	1811	24
	1812	48

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TerraMin Research Labs Ltd.

ANALYTICAL REPORT

Job # 86-090-B

Date

Client Project

Page 2/2

Sample No.	Au ppb
1813	48
1814	18
1815	48

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-108 Hecla Mining Date Apr. 11, 1986

Client Project

Sample No.	Au ppb
1712	1420
1713	386
1714	412
1715	862
1716	900
1717	2300
1718	2220
1719	1320
1720	634
1721	1140
1722	1780
1723	2180
1724	1400
1725	348
1726	736
1727	332
1728	1000
1729	528
1730	990
1731	560
1732	1640
1733	1720
1734	1960
1735	3660
1736	1260

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-108 Date

Client Project Page 2/4

Sample No.	Au ppb
1737	1620
1738	58
1739	3700
1740	1400
1741	3320
1742	2240
1743	4000
1744	1140
1745	376
1746	98
1747	138
1748	84
1749	96
1750	132
1751	348
1752	38
1753	38
1754	62
1755	80
1756	48
1757	76
1758	68
1759	36
1760	1560
1761	912

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-108

Date

Client Project

Page 3/4

Sample No.	Au ppb
1762	184
1816	56
1817	18
1818	46
1819	54
1820	102
1821	28
1822	34
1823	202
1824	66
1825	52
1826	36
1827	48
1828	60
1829	86
1830	80
1831	108
1832	122
1833	74
1834	136
1835	32
1836	68
1837	72
1838	94
1839	64

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-108 Date

Client Project

Sample No.	Au ppb
1840	70
1841	66
NN1	54

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-117 Hecla Mining Date Apr.16, 1986

Client Project Page 1/5

Sample No.	Au ppb	Au oz/ton
1100 B	636	
1101	512	
1102	1580	.046
1103	6220	.182
1104	422	
1105	96	
1106	820	
1107	222	
1108	172	
1109	26	
1110	122	
1111	38	
1112	564	
1113	112	
1114	4760	.139
1115	20800	.607
1646 B	154	
1647	1540	.045
1648	928	
1649 B	982	
1763	188	
1764	32	
1765	54	
1766	68	
1767	26	

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-117 Date

Client Project Page 2/5

Sample No.	Au ppb	Au oz/ton
1768	28	
1769	68	
1770	66	
1771	88	
1772	82	
1773	84	
1774	74	
1775	66	
1776	26	
1777	34	
1778	42	
1779	54	
1780	72	
1781	118	
1782	50	
1783	22	
1784	28	
1785	28	
1786	36	
1787	76	
1788	24	
1789	192	
1790	86	
1791	122	
1792	1060	.031

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-117 Date

Client Project Page 3/5

Sample No.	Au ppb	Au oz/ton
1793	1400	.041
1794	76	
1795	24	
1796	1280	.037
1797	1040	.030
1798	1420	.041
1799	1280	.037
1842	12	
1843	34	
1844	12	
1845	26	
1846	24	
1847	18	
1848	24	
1849	8	
1850	6	
1851	32	
1852	24	
1853	20	
1854	18	
1855	24	
1856	26	
1857	24	
1858	16	
1859	120	

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-117 Date

Client Project Page 4/5

Sample No.	Au ppb	Au oz/ton
1860	338	
1861	18	
1862	64	
1863	218	
1864	20	
1865	84	
1866	58	
1867	136	
1868	2400	.070
1869	224	
1870	508	
1871	512	
1872	328	
1873	32	
1874	44	
1875	24	
1876	86	
1950	58	
1951	2140	.062
1952	1720	.050
1953	1500	.044
1954	10600	.310
1955	1160	.034
1956	1820	.053
1957	1280	.037

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-117

Date

Client Project

Sample No.	Au ppb	Au oz/ton
1958	1220	.036
1959	6840	.200
1960	1780	.052
1961	4880	.142
1962	3440	.100
1963	152	
1964	1440	.042
1965	1720	.050
1966	904	
1967	1560	.046
1968	986	
1969	182	
1970	1160	.034
1971	984	
1972	792	
1973	1020	.030

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ANALYTICAL REPORT

Job # 86-141 Hecla Mining Date May 7, 1986

Client Project Page 1/6

Sample No.	Au ppb
1116	26
1117	60
1118	124
1119	80
1120	88
1121	62
1122	42
1123	296
1124	12
1125	16
1126	18
1127	8
1128	86
1129	48
1130	10
1131	64
1132	48
1133	26
1134	48
1135 A	14
1135 B	10
1136	54
1137	16
1138	12
1140	36

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-141 Date

Client Project Page 2/6

Sample No.	Au ppb
1141	12
1142	18
1143	8
1144	12
1145	18
1146	18
1147	166
1148	88
1149 B	24
1251	8
1252	14
1253	12
1254	22
1255	24
1256	12
1257	24
1258	44
1259	56
1260	290
1261	584
1262	954
1263	592
1264	6
1265	32
1266	16

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-141

Date

Client Project

Page 3/6

Sample No.	Au ppb
1267	6
1268	10
1269	50
1270	32
1271 B	106
1400 G	28
1401	16
1402	24
1403	12
1404	20
1405	58
1406	28
1407	62
1408	8
1409	38
1410	18
1411	48
1412	48
1413	46
1414	56
1415	188
1416	100
1417	22
1418	26
1419	20

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-141 Date

Client Project Page 4/6

Sample No.	Au ppb
1420	128
1421 G	22
1877 B	24
1878	54
1879	52
1880	8
1881	10
1882	12
1883	14
1884	20
1885	12
1886	34
1887	20
1888	8
1889	12
1890	10
1891	24
1892	62
1893	16
1894	34
1895	78
1896	12
1897	22
1898	24
1899	28

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-141

Date

Client Project

Sample No.	Au ppb
1900	30
1901	22
1902	24
1903	44
1904	22
1905	28
1906	68
1907	70
1908	62
1909	50
1974	1380
1975	218
1976	310
1977	232
1978	676
1979	146
1980	64
1981	44
1982	56
1983	74
1984	48
1985	46
1986	34
1987	38
1988	32

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-141 Date

Client Project Page 6/6

Sample No.	Au ppb
1989	56
1990	28
1991	32
1992	10
1993	78
1994	36
1995	70
1996	252
1997	48
1998	2
1999	28

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ANALYTICAL REPORT

Job # 86-144 Hecla Mining Date May 8, 1986

Client Project

Sample No.	Au ppb
1060 P	612
1061 P	82
1062 P	14000
1272	12
1273	14
1274	2620
1275	420
1276	294
1277	88
1278	1460
1279 B	472
1280 B	104
1281	52
1282	104
1283 B	228
1284	136
1285	104
1286	74
1287	78
1288 B	20
1289	18
1422	258
1423	246
1424	152
1425	548

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-144 Date May 8, 1986

Client Project

Sample No.	Au ppb
1426	12
1427	10
1428	12
1429	6
1430	8
1431	16
1432	8
1433	6
1434	234
1435	124
1436	142
1437	240
1438	166
1439	12
1440	134
1441	156
1442	862
1443	76
1444	208
1445	124
1446	196
1447	324
1448	74
1449	62
1910 G	12

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-144 Date

Client Project Page 3/3

Sample No.	Au ppb
1911 G	4
1912 G	6
1913 G	42
1914 G	10
1915 G	4
1916 G	8
1917 G	10
1918 G	4
1919 G	6
1920 G	14
1921 G	12
1922 G	6
1923 G	2
1924 G	4
1925	6
1926 G	4
1927 G	6
1928 G	2
1929 G	8
1930 G	8

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-152 | Hecla Mining | Date May 16, 1986

Client Project

Page 1/5

Sample No.	Au ppb
1290 B	202
1291 B	20
1292 B	24
1293 B	292
1294 B	6
1295 B	14
1296 B	108
1297 B	28
1298 B	132
1299 B	164
1350 B	422
1351 B	198
1352 B	164
1353 B	92
1354 B	66
1355 B	48
1356 B	156
1357 B	104
1358 B	822
1359 B	616
1360 B	772
1361 B	1260
1362 B	2040
1363 B	1800
1364 B	1740

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-152

Date

Client Project

Sample No.	Au ppb
1365 B	1280
1366 B	2360
1367 B	4260
1368 B	3920
1369 B	2920
1370 B	2060
1371 B	60
1372 B	64
1373 B	22
1374 B	96
1375 B	36
1376 B	64
1377	868
1378 B	836
1379 B	2280
1380 B	1420
1381 B	8440
1382 B	6720
1383 B	7360
1384 B	4360
1385 B	2420
1386 B	2680
1387 B	1080
1388 B	952
1389 B	1700

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-152 Date

Client Project Page 3/5

Sample No.	Au ppb
1390 B	1240
1391 B	1540
1392 B	1460
1393 B	3860
1394 B	2120
1450 G	3060
1451 G	1240
1452 G	960
1453 G	1360
1454 G	1140
1455 G	56
1456 G	58
1457 G	32
1458 G	14
1459 G	1300
1460	3280
1461 G	2120
1462 G	966
1463 G	12
1464 G	30
1465 G	24
1466 G	56
1467 G	94
1468 G	8200
1469 G	11400

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-152 Date

Client Project Page 4/5

Sample No.	Au ppb
1470 G	10000
1471	46
1472	32
1473	140
1474	12
1475 C	12200
1475 G	14600
1476 G	30
1477 G	26
1478 G	42
1500 G	66
1501 G	120
1502 G	62
1503 G	84
1504 G	38
1931	86
1932	144
1933	8
1934	14
1935	8
1936	20
1937	14
1938	16
1939	30
1940	20

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-152

Date

Client Project

Page 5/5

Sample No.	Au ppb
1941	22
1942	48
1943	32
1944	140
1945	288
1946	70
1947	272
1948	244
1949	52
NN	1780

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-157 Hecla Mining Date May 22, 1986

Client Project Page 1/3

Sample No.	Au ppb
1395 B	68
1396 B	20
1397 B	4
1398 B	276
1399 B	172
1479 G	22
1480 G	32
1482 G	76
1483 G	42
1484 G	46
1485 G	26
1486 G	18
1487 G	26
1505 G	36
1506 G	96
1507 G	44
1508 G	332
1509 G	32
1510 G	30
1511 G	20
1512 G	24
1513 G	12
1514 G	26
1515 G	28
1516 G	116

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-157 Date

Client Project

Sample No.	Au ppb
1517 G	26
1518 G	22
1750 B	48
1751 B	92
1752 B	122
1753 B	452
1754 B	100
1755 B	64
1756 B	56
1757 B	58
1758 B	38
1759 B	218
1760 B	66
1761 B	212
1762 B	52
1763 B	84
1764 B	60
1765 B	44
1766 B	48
1767 B	28
1768 B	88
1769 B	36
1770 B	28
1771 B	50
1772 B	16

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-157 Date

Client Project Page 3/3

Sample No.	Au ppb
1773 B	16
1774 B	18
1775 B	14
1776 B	24
1777 B	20
1778 B	18
1779 B	20
1780 B	16
1781 B	16
1782 B	14

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TerraMin-Research Labs Ltd.

ANALYTICAL REPORT

Job # 86-168 | Hecla Mining | Date June 9, 1986

Client Project

Sample No.	Au ppb
1488	6
1489	4
1490	26
1491	24
1492	16
1493	4
1494 G	82
1495 G	12
1496 G	2
1497 G	2
1498 G	38
1519 G	302
1520 G	348
1521 G	246
1522	238
1523 G	404
1524	172
1525	302
1526 G	98
1527	44
1528 G	28
1529 G	2
1530	26
1531 G	8
1532	8

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168

Date

Client Project

Sample No.	Au ppb
1533 G	24
1534 G	18
1535 G	50
1536	42
1537 G	24
1538 G	30
1539 G	150
1540 G	6
1541 G	20
1543 G	16
1544 G	24
1545 G	8
1546 G	56
1547 G	18
1550 G	26
1551 G	12
1552 G	8
1553 G	14
1650	208
1651	220
1652	108
1653	302
1654	222
1655	212
1656 B	262

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168 Date

Client Project Page 3/8

Sample No.	Au ppb
1657	234
1658 B	3020
1659 B	4540
1661	2560
1662	1000
1663	508
1664	682
1665 B	44
1666 B	6
1667	148
1668 B	10
1669 B	18
1670 B	116
1671 B	82
1672 B	44
1673	78
1674	70
1675 B	14
1676 B	158
1677 B	224
1678 B	136
1679 B	28
1680 B	22
1681 B	16
1682 B	14

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168 Date

Client Project Page 4/8

Sample No.	Au ppb
1683 B	6
1684 B	8
1685 B	26
1686 B	68
1687 B	94
1688 B	12800
1689	12400
1690 B	6280
1691 B	6940
1692 B	3880
1693 B	3460
1694 B	1400
1695 B	1340
1696 B	188
1698	1600
1699 B	1740
1700 B	74
1701 B	52
1702 B	24000
1703 B	30400
1704	33080
1705 B	29760
1706	22
1707 B	32
1708 B	30

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168 Date

Client Project Page 5/8

Sample No.	Au ppb
1709 B	104
1710 B	48
1711 B	30
1712 B	54
1713 B	26
1714 B	32
1715 B	30
1716 B	28
1717 B	62
1718 B	16
1719 B	60
1720 B	76
1721 B	18
1721 B X	56
1722 B	40
1723 B	64
1725 B	14
1725 B	62
1726 B	38
1727 B	56
1728 B	64
1729 B	48
1730 B	44
1732 B	38
1733 B	44

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168 Date

Client Project

Sample No.	Au ppb
1734 B	40
1735 B	58
1737 B	8
1739 B	24
1740 B	62
1741 B	20
1742 B	42
1743 B	8
1744 B	12
1745 B	16
1746 B	2
1747 B	8
1748 B	6
1749 B	42
1783 B	50
1784	16
1785 B	8
1786 B	40
1787 B	12
1788 B	4
1789 B	32
1790 B	4
1791	46
1792 B	68
1793	126

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168 Date

Client Project Page 7/8

Sample No.	Au ppb
1794	208
1795	416
1796	172
1798	1320
1799	608
1800 B	16
1801 B	14
1802 B	42
1803 B	50
1804 B	18
1807 B	62
1808 B	28
1810 B	42
1811 B	12
1812 B	24
1967 B	870
S-101	12600
102	22
103	31400
104	14800
105	16
106	88
107	48
Burnt Yellow G	12
NN B1	4220

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-168

Date

Client Project

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Sample No.	Au ppb
NN B2	420
NN? 1736 ?	6

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ANALYTICAL REPORT

Job # 86-173 Hecla Mining Date June 10, 1986

Client Project Page 1/3

Sample No.	Au ppb
1499 G	78
1548 G	2840
1549 G	3020
1554 G	30
1555 G	34
1556 G	580
1557 G	66
1558 G	64
1559 G	96
1560 G	64
1561 G	104
1562 G	106
1563 G	120
1564 G	122
1600 G	2380
1601 G	5160
1602 G	8440
1603 G	8280
1604 G	1498
1605 G	1764
1606 G	2660
1607 G	4500
1805 B	28
1806 B	32
1809 B	60

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-173 Date

Client Project Page 2/3

Sample No.	Au ppb
1813 B	252
1814 B	1210
1815 B	304
1816 B	162
1817 B	48
1818 B	28
1819 B	22
1820 B	24
1821 B	32
1822 B	132
1823 B	48
1824 B	28
1825 B	28
1826 B	10
1827 B	32
1828 B	72
1829 B	94
1830 B	508
1831 B	400
1832 B	380
1833 B	2540
1834 B	872
1835 B	1188
1836 B	122
1837 B	78

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-173 Date

Client Project Page 3/3

Sample No.	Au ppb
1838 B	472
1839 B	72
1840 B	34
1841 B	102
1842 B	378
1843 B	490
1844 B	470
1845 B	860
1846 B	2220
1847 B	2400
1848 B	2180
1849 B	1012
1850 B	1744
1851 B	244
1852 B	118
1853 B	60
1854 B	50
1855 B	86
1856 B	60
1857 B	48

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-187 Hecla Mining Date June 19, 1986

Client Project Page 1/6

Sample No.	Au ppb
1565	55
1566 G	76
1608 G	28
1609 G	466
1610 G	34
1611 G	3340
1612 G	16
1613 G	2520
1614 G	10
1615 G	2540
1616 G	42
1617 G	2620
1618 G	5140
1619 G	86
1620 G	106
1621 G	1760
1622 G	30
1623 G	12
1624 G	20
1625 G	12
1626 G	14
1627 G	104
1628 G	62
1629 G	66
1630 G	16

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-187 Date

Client Project Page 2/6

Sample No.	Au ppb
1631 G	6
1632 G	16
1633 G	442
1800 B	6
1858 B	30
1859 B	12
1861 B	34
1862 B	14
1863 B	34
1864 B	54
1865 B	422
1866 B	110
1867 B	52
1868 B	9200
1869 B	1540
1870 B	404
1871 B	208
1872 B	934
1873 B	352
1874 B	176
1875 B	192
1876 B	226
1877 B	172
1878 B	4660
1879 B	270

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-187 Date

Client Project Page 3/6

Sample No.	Au ppb
1800 B	132
1881 B	94
1882 B	170
1883 B	968
1884 B	1240
1885 B	258
1886 B	1180
1887 B	240
1888 B	72
1889 B	32
1890 B	30
1891 B	76
1892 B	172
1893 B	46
1894 B	40
1895 B	42
1896 B	38
1897 B	220
1898 B	218
1899 B	578
1900 B	954
1901 B	70
1902 B	24
1903 B	56
1904 B	28

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-187

Date

Client Project

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Sample No.	Au ppb
1905 B	22
1906 B	46
1907 B	60
1908 B	8680
1909 B	604
1910 B	224
1911 B	86
1912 B	174
1913 B	68
1914 B	128
1915 B	736
1916 B	96
1917 B	54
1918 B	26
1919 B	24
1920 B	36
1921 B	8
1922 B	20
1923 B	30
1924 B	62
1925 B	166
1926 B	148
1927 B	184
1928 B	142
1929 B	86

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-187

Date

Client Project

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Sample No.	Au ppb
1930 B	102
1931 B	84
1932 B	118
1933 B	88
1935 B	408
1936 B	98
1937 B	166
1938 B	178
1939 B	234
1940 B	142
1941 B	38
1942 B	76
1943 B	1360
1944 B	1020
1045 B	2740
1946 B	9340
1947 B	22800
1948 B	3100
1949 B	734
1950 B	44
1951 B	2960
1952 B	610
1953 B	344
1954 B	92
1955 B	106

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-187 Date

Client Project Page 6/6

Sample No.	Au ppb
1956 B	54
1957 B	108
1958 B	308
1949 B	142
1960 B	66
1961 B	504
1962 B	18
1963 B	32
1964 B	76
1965 B	28
1966 B	44
1967 B	42
1968 B	8

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ANALYTICAL REPORT

Job # 86-199 Hecla Mining Date July 3, 1986

Client Project Page 1/6

Sample No.	Au ppb	Au oz/ton
1063 P	24600	.718
1064 P	39600	1.16
1150 B	110	
1151 B	92	
1152 B	58	
1153 B	56	
1154 B	246	
1155 B	102	
1156 B	58	
1158 B	72	
1158 B	54	
1159 B	158	
1160 B	36	
1161 B	26	
1162 B	18	
1163 B	36	
1164 B	1764	
1165 B	20	
1166 B	2	
1167 B	18	
1168 B	14	
1169 B	80	
1170 B	246	
1171 B	20	
1172 B	18	

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-199 Date

Client Project Page 2/6

Sample No.	Au ppb
1173 B	36
1174 B	16
1175 B	14
1176 B	10
1177 B	14
1178 B	12
1179 B	14
1180 B	14
1181 B	204
1182 B	354
1183 B	54
1184 B	100
1185 B	20
1186 B	40
1187 B	30
1188 B	28
1189 B	42
1190 B	180
1567 G	24
1568 G	20
1569 G	58
1570 G	24
1571 G	4
1572 G	6
1573 G	6

TERRAMIN RESEARCH LABS LTD.

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Job # 86-199

Date

Client Project

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Sample No.	Au ppb
1574 G	20
1575 G	14
1576 G	10
1577 G	8
1578 G	12
1579 G	8
1580 G	144
1581 G	6
1582 G	6
1583 G	14
1584 G	12
1585 G	12
1586 G	10
1587 G	10
1589 G	126
1590 G	132
1591 G	548
1592 G	624
1593 G	840
1634 G	36
1635 G	34
1636 G	32
1637 G	4
1638 G	88
1639 G	18

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-199 Date

Client Project Page 4/6

Sample No.	Au ppb
1640 G	6
1641 G	8
1642 G	30
1643 G	20
1644 G	48
1645 G	20
1646 G	32
1647 G	16
1648 G	2
1649 G	10
1650 G	6
1651 G	14
1652 G	28
1653 G	8
1654 G	6
1655 G	6
1656 G	28
1657 G	40
1658 G	96
1659 G	6
1660 G	78
1661 G	4
1662 G	8
1663 G	18
1664 G	12

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-199 Date

Client Project Page 5/6

Sample No.	Au ppb	Au oz/ton
1969 B	6240	.182
1970 B	1288	
1971 B	616	
1972 B	290	
1973 B	180	
1974 B	152	
1975 B	20	
1976 B	22	
1977 B	1570	
1978 B	346	
1979 B	30	
1980 B	98	
1981 B	34	
1982 B	44	
1983 B	48	
1984 B	78	
1985 B	24	
1986 B	28	
1987 B	28	
1988 B	10	
1989 B	6	
1990 B	12	
1991 B	36	
1992 B	20	
1993 B	22	

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ANALYTICAL REPORT

Job # 86-199

Date

Client Project

Sample No.	Au ppb
1994 B	2
1995 B	26
1996 B	28
1997 B	4
1998 B	192
1999 B	336

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ANALYTICAL REPORT

Job # 86-225 Hecla Mining Date July 21, 1986

Client Project Page 1/3

Sample No.	Au ppb
1191 B	10
1192 B	24
1193 B	22
1194 B	12
1195 B	28
1196 B	12
1197 B	66
1198 B	8
1199 B	10
1200 B	6
1201 B	12
1202 B	22
1203 B	10
1204 B	16
1205 B	46
1206 B	34
1207 B	12
1208 B	496
1209 B	32
1210 B	688
1211 B	284
1212 B	24
1588 G	78
1594 G	348
1595 G	422

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-225

Date

Client Project

Page 2/3

Sample No.	Au ppb
1596 G	94
1597 G	76
1598 G	68
1599 G	6
1665 G	22
1666 G	14
1667 G	12
1668 G	22
1669 G	16
1670 G	8
1671 G	8
1672 G	20
1673 G	6
1674 G	22
1675 G	14
1676 G	6
1677 G	10
1678 G	8
1679 G	8
1680 G	12
1681 G	8
1682 G	12
1683 G	14
1684 G	6
1685 G	12

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ANALYTICAL REPORT

Job # 86-225 Date

Client Project Page 3/3

Sample No.	Au ppb
1686 G	22
1687 G	16
1688 G	8
1689 G	8
5001 G	6
5002 G	28
5003 G	24
5004 G	2
5005 G	68
5006 G	6
5007 G	14
5008 G	12
5009 G	40
5010 G	8
5011 G	10
5012 G	8
5013 G	4
5014 G	4
Jard Chan	28
Jard GOS	772
NN Grey B	28
NN White B	38

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ANALYTICAL REPORT

Job # 86-236 Hecla Mining Date July 29, 1986

Client Project Page 1/6

Sample No.	Au ppb
1065 P	28
1066 P	10
1067 P	232
1068 P	36
1069 P	10
1070 P	12
1071 P	6
1072 P	12
1073 P	22
1074 P	128
1075 P	12
1076 P	10
1077 P	8
1078 P	12
1079 P	28
1080 P	4
1081 P	10
1082 P	12
1083 P	8
1084 P	4
1085 P	6
1086 P	74
1087 P	4
1088 P	10
1089 P	2

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ANALYTICAL REPORT

Job # 86-236 Date

Client Project Page 2/6

Sample No.	Au ppb
1090 P	4
1091 P	6
1092 P	8
1093 P	14
1094 P	10
1095 P	6
1096 P	24
1097 P	18
1098 P	36
1099 P	334
1100 P	12
1101 P	28
1102 P	18
1103 P	16
1104 P	18
1105 P	14
1106 P	20
1107 P	22
1108 P	10
1109 P	16
1110 P	18
1111 P	12
1112 P	10
1113 P	22
1114 P	68

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ANALYTICAL REPORT

Job # 86-236 Date

Client Project Page 3/6

Sample No.	Au ppb
1115 P	28
1116 P	14
1117 P	22
1118 P	38
1119 P	26
1120 P	142
1121 P	10
1122 P	6
1123 P	4
1124 P	12
1125 P	6
1126 P	4
1127 P	2
1128 P	4
1129 P	2
1130 P	2
1131 P	6
1132 P	4
1213 B	12
1214 B	4
1215 B	92
1216 B	34
1217 B	22
1218 B	12
1219 B	12

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ANALYTICAL REPORT

Job # 86-236

Date

Client Project

Sample No.	Au ppb
1220 B	24
1221 B	14
1222 B	6
1223 B	6
1224 B	2
1225 B	6
1226 B	12
1227 B	14
1228 B	224
1229 B	24
1230 B	18
1231 B	44
1232 B	62
1233 B	2
1234 B	4
1235 B	10
1236 B	20
1237 B	22
1238 B	4
1239 B	10
1240 B	8
1241 B	8
1242 B	6
1243 B	6
1244 B	14

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-236 Date

Client Project Page 5/6

Sample No.	Au ppb
1245 B	4
1246 B	4
1247 B	12
1248 B	4
1249 B	22
1690 G	4
1691 G	18
1692 G	16
1693 G	8
1694 G	10
1695 G	26
1696 G	4
1697 G	2
1698 G	32
1699 G	6
5015 G	5
5017 G	12
5018 G	64
5019 G 1/2	12
5019 G 2/2	382
5020 G	44
5021 G	64
5023 G	4
5024 G	6
5051 G	10

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ANALYTICAL REPORT

Job # 86-236 Date

Client Project Page 6/6

Sample No.	Au ppb
5052 G	8
5053 G	4
5054 G	6
5055 G	4
5056 G	2
5057 G	10
5058 G	8
5059 G	6
5060 G	10
5061 G	4

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ANALYTICAL REPORT

Job # 86-248 Hecla Mining Date Aug.9, 1986

Client Project Page 1/4

Sample No.	Au ppb
1133 P	2
1134	22
1135	6
1136	2
1137	14
1138	22
1139	8
1140	12
1144	2
1145	-2
1146	-2
1147	6
1148	6
1149	6
1150	-2
1151	2
1152	6
1153	6
1154	14
1155	12
1156	6
1157	-2
1158	8
1159	16
1161	10

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-248 Date

Client Project Page 2/4

Sample No.	Au ppb
1162 P	2
1163	6
1164	6
1165	16
1166	-2
1167	104
1168	74
1169	4
1170	10
1171	6
1172	6
1173	10
1174	12
1175	18
1176	1740
1177	142
1178	12
1179	10
1180	4
1181	2
1182	6
1183	4
1184	2
1185	4
1186	6

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-248 Date

Client Project Page 3/4

Sample No.	Au ppb
1187 P	18
1188	4
1189	22
1190	8
1191	790
1192	106
1193	128
1194	854
1195	126
1196	34
1197	38
1198	324
1199	1460
1200	504
1201	2
1202	16
1203	4
1204	6
1205	2
1206	4
1207	8
1208	10
1210	6
1211	14
1212	4

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-248 Date

Client Project Page 4/4

Sample No.	Au ppb
1213 P	-2
1214	12
1215	18
1216	20
1217	12
1218	12
5022 G	8
5062	6
5063	8
5064	14
5065	8
5066	20
5067	4
5068	44
5069	14
5070	10
5071	6
5072	4
5073	16
5074	4
5075	6
5076	2
5078	6
NN	6

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ANALYTICAL REPORT

Job # 86-266 Hecla Mining Date Aug.11, 1986

Client Project Page 1/4

Sample No.	Au ppb
1209 P	8
1219	8
1220	14
1221	6
1222	12
1223	20
1224	628
1225	12
1226	12
1227	14
1228	32
1229	16
1230	464
1231	192
1232	8
1233	14
1234	8
1235	10
1236	4
1237	2
1238	10
1239	36
1240	36
1241	40
1242	28

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-266 Date

Client Project Page 2/4

Sample No.	Au ppb
1243 P	26
1244	38
1245	32
1246	46
1247	30
1248	24
1249	28
1750 P	10
1751	4
1752	24
1753	94
1754	8
1755	8
1756	12
1757	6
1758	8
1759	4
1760	6
1761	22
1762	14
1763	12
1764	14
1765	12
1766	8
1767	28

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-266 Date

Client Project Page 3/4

Sample No.	Au ppb
1768 P	12
1769	22
1770	28
1771	38
1772	148
1773	102
1774	42
1775	10
1776	4
1777	6
1778	22
1779	12
1780	18
1781	2
1783	12
1784	1100
1785	4
1786	46
1787	480
1788	8
1789	24
1790	22
1791	12
1792	10
1793	14

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-266 Date

Client Project Page 4/4

Sample No.	Au ppb
1794 P	24
1795	22
1796	8
1797	6
5080 G	10
5081	16
5082	14
5083	32
5084	18
5085	12
5086	16
5087	8
5088	8
5089	16
5090	4
5091	10
5092	8
5093	8

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(403) 276-8668 Telex 03-821172 CGY

cc: Don Sutherland

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274 Hecla Mining Date Aug.18, 1986

Client Project Page 1/8

Sample No.	Au ppb
1250 P	456
1251	60
1252	52
1253	58
1254	16
1255	660
1256	18
1257	92
1258	16
1259	16
1260	60
1261	30
1262	30
1263	28
1264	284
1265	84
266	28
1267	24
1268	12
1269	18
1270	12
1271	34
1272	1756
1273	692
1274	390

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274 Date

Client Project Page 2/8

Sample No.	Au ppb
1275 P	44
1276	20
1277	14
1278	20
1279	32
1280	18
1281	32
1282	42
1283	44
1284	886
1285	126
1287	12
1288	12
1289	56
1290	106
1291	112
1292	464
1293	216
1294	242
1295	800
1296	1340
1297	56
1298	30
1299	76
1300	960

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274 Date

Client Project Page 3/8

Sample No.	Au ppb
1301 P	574
1302	102
1303	56
1304	558
1305	900
1306	3360
1307	2580
1308	2540
1309	1202
1310	2160
1311	2540
1312	2740
1313	28
1314	8
1315	12
1316	462
1317	96
1318	58
1319	60
1320	50
1322	60
1323	54
1324 1/2	80
1324 2/2	68
1325	596

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274 Date

Client Project Page 4/8

Sample No.	Au ppb
1326 P	106
1327	60
1328	20
1329	10
1330	78
1331	16
1332	18
1333	12
1334	44
1335	74
1336	28
1337	36
1338	88
1339	22
1340	36
1341	16
1342	12
1343	-2
1344	-2
1345	-2
1346	-2
1347	8
1348	20
1349	30
1350	42

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274

Date

Client Project

Sample No.	Au ppb
1351 P	72
1352	502
1353	428
1354	4
1355	46
1356	-2
1357	8
1358	-2
1359	2
1360	32
1361	-2
1362	16
1363	20
1364	18
1365	14
1366	4
1367	6
1368	4
1369	2
1370	-2
1371	14
1372	2
1373	40
1374	4
1375	2

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274 Date

Client Project Page 6/8

Sample No.	Au ppb
1376 P	6
1377	6
1378	4
1379	96
1380	10
1381	10
1382	6
1383	10
1384	14
1385	18
1386 1/2	14
1386 2/2	38
1387	16
1388	-2
1389	36
1390	22
1391	14
1392	18
1393	4
1394	30
1395	42
1396	50
1397	10
1398	30
1399	36

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274 Date

Client Project Page 7/8

Sample No.	Au ppb
1400 P	16
1401	2
1402	22
1403	8
1404	1656
1405	2860
1406	4220
1407	2340
1408	2700
1409	40
1410	6
1411	6
1412	4
1413	8
1414	142
1415	9360
1416	32
1417	18
1418	18
1419	716
1420	2000
1421	1124
1422	740
1782	6
1798	8

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-274

Date

Client Project

Page 8/8

Sample No.	Au ppb
1799 P	16
1800	1128
5094 G	370
5095	1632
5096	368

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cc: Don Sutherland

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-284 Hecla Mining Date Aug.19, 1986

Client Project Page 1/2

Sample No.	Au ppb
1424 P	46
1426	16
1428	4
1429	2
1430	36
1431	10
1432	10
1433	24
1434	14
1435	40
1436	20
1437	40
1438	20
1439	10
1440	6
1441	10
1442	16
1443	14
1444	32
1445	26
1446	32
1452	1024
1453	4060
1455	1612
1456	1072

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-284

Date

Client Project

Page 2/2

Sample No.	Au ppb
1457 P	88
1458	52
1459	26
1467	96
1468	92
1469	90
1470	64
1471	80
1472	68
1473	82
1474	56
1475	30
1476	250
1477	280
1480	28

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(403) 276-8668 Telex 03-821172 CGY

cc: Don sutherland

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-281 Hecla Mining Date Aug.19, 1986

Client Project Page 1/1

Sample No.	Au ppb
1423 P	40
1425	35000
1427	8080
1447	560
1448	202
1449	168
1450	68000
1451	152
1254	11540
1460	52
1461	48
1462	60
1463	108
1464	30
1465	82
1466	26

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-290 Hecla Mining Date Aug.24, 1986

Client Project Page 1/1

Sample No.	Au ppb	Au oz/ton
1465 P	76	
1481	16	
1482	20	
1483	8	
1484	36	
1485	4	
1486	8	
1487	42	
1488	4	
1489	8	
1490	24	
1491	32	
1492	44	
1493	88	
1494	8	
1495	44	
1496	48	
1497	26	
1498	28	
1499	34	
1500	14	
1501	34	
JARD A	15600	.456
JARD B	18800	.549

14, 2235 - 30th Avenue N.E., Calgary, Alberta T2E 7C7
(403) 276-8668 Telex 03-821172 CGY

cc: Don Sutherland

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-291 Hecla Mining Date Aug.31, 1986

Client Project Page 1/4

Sample No.	Au ppb
1502 P	18
1503	8
1504	10
1505	6
1506	20
1507	12
1508	42
1509	10
1510	8
1511	16
1512	24
1513	34
1514	22
1515	6
1516	20
1517	12
1518	16
1519	20
1520	100
1521	58
1522	42
1523	68
1524	292
1525	226
1526	38

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-291

Date

Client Project

Sample No.	Au ppb
1527 P	2
1528	4
1529	12
1530	48
1531	-2
1532	4
1533	6
1534	4
1535	2
1536	14
1537	2
1538	8
1539	4
1540	-2
1541	8
1542	32
1543	6
1544	24
1545	36
1546	10
1547	14
1548	192
1549	26
1550	8
1551	24

14, 2235 - 30th Avenue N.E., Calgary, Alberta T2E 7C7
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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-291

Date

Client Project

Sample No.	Au ppb
1552 P	8
1553	12
1554	16
1555	20
1556	-2
1557	2
1558	82
1559	308
1560	736
1561	334
1562	458
1563	364
1564	436
1565	-2
1566	2
1567	2
1568	22
1569	-2
1570	388
1571	150
1572	58
1573	14
1574	8
1575	18
1576	2

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(403) 276-8668 Telex 03-821172 CGY

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-291 Date

Client Project

Sample No.	Au ppb	Au oz/ton
1577 P	8	
1578	166	
1579	292	
1580	28	
1581	20	
1582	20	
1583	44	
1584	16	
1585	32	
1586	34	
1587	32	
1588	126	
1589	122	
1590	96800	2.83
1592	210	
1595	120	
1613	15000	.438
1726	73600	2.15

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(403) 276-8668 Telex 03-821172 CGY

cc: Don Sutherland

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-302 Hecla Mining Date Aug.31, 1986

Client Project Page 1/2

Sample No.	Au ppb
1141 P	10
1142	6
1143	8
1590	226
1591	122
1593	158
1594	82
1596	102
1597	344
1598	312
1600	360
1601	268
1602	182
1603	250
1604	322
1605	316
1606	224
1607	122
1608	140
1609	156
1610	116
1611	114
1612	906
1614	14
1615	14

14, 2235 - 30th Avenue N.E., Calgary, Alberta T2E 7C7
(403) 276-8668 Telex 03-821172 CGY

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 86-302 Date

Client Project Page 2/2

Sample No.	Au ppb	Au oz/ton
1616 P	8	
1617	54	
1618	12	
1619	6040	
1620	12600	.368
1621	64	
1622	14	
1623	20	
1624	132	
1625	152	
1626	104	
1627	2460	
1628	242	
5097 G	2240	

14, 2235 - 30th Avenue N.E., Calgary, Alberta T2E 7C7
(403) 276-8668 Telex 03-821172 CGY

CERTIFICATE OF ASSAY

Date: August 12, 1986
File: 8608-0852

SGS SUPERVISION SERVICES INC.
General Testing Laboratories Division
1001 East Pender Street,
Vancouver, B.C., Canada. V6A 1W2
Telephone: (604) 254-1647
Telex: 04-507514

TO: HECLA MINING
P.O. Box 160
Wells, B.C.
VOK 2RO

We hereby certify that the following are thé results of assays on: Ore

MARKED	GOLD oz/st	SILVER oz/st	xxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxx
P.O. No. 77370								
1415 P	0.180	0.12						

NOTE: REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS ON REQUEST PULPS AND AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

L. Wong
PROVINCIAL ASSAYER

CERTIFICATE OF ASSAY

Date: August 15, 1986

File: 8608-1252

SGS SUPERVISION SERVICES INC.
General Testing Laboratories Division
1001 East Pender Street,
Vancouver, B.C., Canada. V6A 1W2
Telephone: (604) 254-1647
Telex: 04-507514

TO: HECLA MINING
P.O. Box 160
Wells, B.C.
VOK 2RO

We hereby certify that the following are the results of assays on: pulps

MARKED	GOLD oz/st	XSILVERXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	XX
P.O. 77373								
1423	0.002							
1425	1.760							
1427	0.348							
1447	0.022							
1448	0.010							
1449	0.038							
1450	2.440							
1451	0.002							
1454	0.410							
1460	0.002							
1461	0.002							
1462	0.003							
1463	0.005							
1464	0.002							
1465	0.002							
1466	0.003							

NOTE: REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS ON REQUEST PULPS AND AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

L. Wong
PROVINCIAL ASSAYER

CERTIFICATE OF ASSAY

Date: August 15, 1986

File: 8608-1350

SGS SUPERVISION SERVICES INC.
General Testing Laboratories Division
1001 East Pender Street,
Vancouver, B.C., Canada. V6A 1W2
Telephone: (604) 254-1647
Telex: 04-507514

TO: HECLA MINING
P.O. Box 160
Wells, B.C.
VOK 2RO

We hereby certify that the following are the results of assays on: Pulps

MARKED	GOLD oz/st	~~SILVER~~ xxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxx
P.O. No. 77376								
1452	0.030							
1453	0.124							
1456	0.044							
1457	0.004							
1458	0.006							
1459	0.004							
1467	0.006							
1468	0.004							
1469	0.012							
1470	0.005							
1471	0.003							
1472	0.007							
1473	0.002							
1474	0.002							
1475	0.002							
1476	0.012							
1478	0.002							
1479	0.002							

NOTE: REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS ON REQUEST PULPS AND AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

L. Wong
PROVINCIAL ASSAYER

CERTIFICATE OF ASSAY

Date: August 25, 1986

File: 8608-2052

SGS SUPERVISION SERVICES INC.
General Testing Laboratories Division
1001 East Pender Street,
Vancouver, B.C., Canada. V6A 1W2
Telephone: (604) 254-1647
Telex: 04-507514

TO: HECLA MINING
P.O. Box 160
Wells, B.C.
VOK 2RO

We hereby certify that the following are the results of assays on: Pulps

MARKED	GOLD oz/st	~~SILVER~~	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxxxx
P.O. No. 77383								
1590	3.036							
1613	0.668							
1726	1.230							

NOTE: REJECTS RETAINED ONE MONTH. PULPS RETAINED THREE MONTHS ON REQUEST PULPS AND AND REJECTS WILL BE STORE FOR A MAXIMUM OF ONE YEAR.

L. Wong
PROVINCIAL ASSAYER

APPENDIX V

LIMITED MULTI-ELEMENT GEOCHEMICAL STUDY

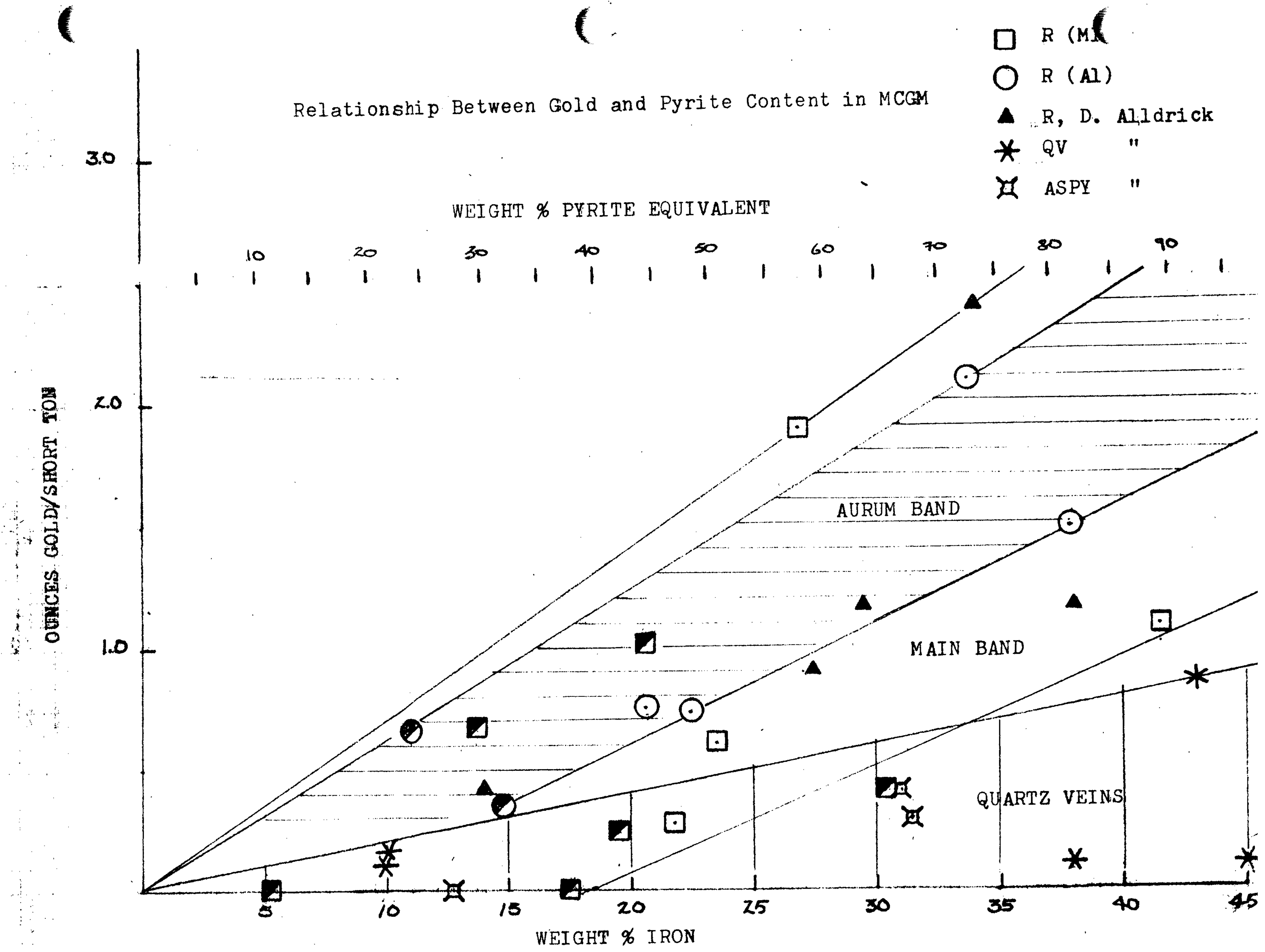
Listing of Samples for Multi-element Geochemical Study of "Replacement" Mineralisation.

	Massive	Stringer	Fringe
AURUM BAND			
	1716P	1722P	1715P
	1717P	1723P	1718P
	1721P		1719P
	1724P		1720P
			1725P
MAIN BAND			
	1702P	1700P	1701P
	1705P	1703P	1706P
	1710P	1704P	1712P
	1711P	1707P	1713P
		1708P	1714P
		1709P	

Massive: bands of fine to medium grained massive pyrite

Stringer: thin bands of coarse grained pyrite and spindly dolomite

Fringe: country rock with disseminated pyrite



Relationship Between Gold and Pyrite Content in MCGM
R (M
R (Al)
R, D. Alldrick
QV "
ASPY "
WEIGHT % PYRITE EQUIVALENT
10
20
30
40
50
60
70
80
90
OUNCES GOLD/SHORT TON
1.0
2.0
3.0
AURUM BAND
MAIN BAND
QUARTZ VEINS
5
10
15
20
25
30
35
40
45
WEIGHT % IRON

ACME ANALYTICAL LABORATORIES LTD. 852 E.HASTINGS ST.VANCOUVER B.C. V6A 1R6 PHONE 253-3158 DATA LINE 251-1011

GEOCHEMICAL ICP-MS ANALYSIS

.500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR LI.BE.GA.GE.IR.PT. AND AU.
- SAMPLE TYPE: PULP

DATE RECEIVED: APRIL 8 1986 DATE REPORT MAILED: Apr 10/86 ASSAYER. D. Toye. DEAN TOYE. CERTIFIED B.C. ASSAYER.

HECLA MINING FILE # 86-0442 PAGE 1

SAMPLE#	Li PPM	Be PPM	Ga PPM	Ge PPM	Rh PPM	Pd PPM	Ag PPM	Cd PPM	In PPM	Sn PPM	Sb PPM	Te PPM	I PPM	Ir PPM	Pt PPM	Au PPM	Hg PPM	Tl PPM	Th PPM	U PPM
1700P	2	.5	5	5	.3	.3	.1	.2	.3	.5	.7	1	1	.1	.1	5.7	.2	.1	.6	.6
1703P	2	.5	5	5	.3	.3	1.2	.2	.1	.5	11.6	12	1	.1	.1	5.6	.2	.1	.5	.3
1074P	2	.5	5	5	.3	.4	2.8	.5	.1	.5	10.8	1	1	.1	.1	15.0	.2	.1	.5	.6
1707P	2	.5	5	5	.3	.3	.1	.1	.1	.5	2.1	0	1	.1	.1	14.0	.2	.1	.8	.8
1708P	2	.5	5	5	.3	1.5	.1	.2	.4	.5	5.5	6	1	.1	.1	.2	.2	.1	2.9	.9
1709P	2	.5	5	5	.3	.3	.2	.1	.1	1.0	3.5	1	1	.1	.1	.2	.2	.1	.7	.4
1722P	2	.5	5	5	.3	.3	.1	.2	.1	.5	1.0	1	1	.1	.1	6.6	.2	.1	.9	.6
1723P	2	.5	5	5	.3	.3	.1	.1	.1	.5	.5	0	1	.1	.1	6.8	.2	.1	2.5	.8
DETECTION LIMIT	2	.5	5	5	.3	.3	.1	.1	.1	.5	.1	[illegible]	1	.1	.1	.1	.2	.1	.1	.1

ACME ANALYTICAL LABORATORIES LTD. 852 E.HASTINGS ST.VANCOUVER B.C. V6A 1R6 PHONE 253-3158 TELEX 04-53124

ASSAY CERTIFICATE

SAMPLE TYPE: PULP AU* 10 GRAM REGULAR ASSAY

DATE RECEIVED: APRIL 8 1986 DATE REPORT MAILED: Apr 10/86 ASSAYER. D. Toye. DEAN TOYE. CERTIFIED B.C. ASSAYER.

HECLA MINING FILE # 86-0442A PAGE 1

SAMPLE#	Mo %	Cu %	Pb %	Zn %	Ag OZ/T	Ni %	Co %	Mn %	Fe %	As %	U %	Th %	Cd %	Sb %	Bi %	Au OZ/T
1702P	.001	.01	.02	.01	.13	.01	.01	1.14	21.74	.36	.002	.01	.010	.010	.010	.282
1705P	.001	.01	.03	.01	.20	.01	.01	.98	23.52	.81	.002	.01	.010	.010	.010	.602
1710P	.001	.01	.17	.01	1.07	.01	.01	.17	41.51	.52	.002	.01	.010	.010	.010	1.080
1711P	.001	.01	.66	.01	1.12	.01	.01	.16	25.28	.37	.002	.01	.010	.010	.010	1.880
1716P	.001	.01	.03	.01	.18	.01	.01	.58	20.54	.35	.002	.01	.010	.010	.010	.725
1717P	.001	.01	.09	.01	.20	.01	.01	.90	22.44	.17	.002	.01	.010	.010	.010	.733
1721P	.001	.01	.02	.01	.62	.01	.01	.21	33.72	.42	.002	.01	.010	.010	.010	2.080
1724P	.001	.01	.02	.01	.30	.01	.01	.19	38.28	.55	.002	.01	.010	.010	.010	1.480
STD R-1	.092	.83	1.38	2.50	3.10	.03	.03	.07	6.85	.95	.003	.01	.040	.200	.030	-

ACME ANALYTICAL LABORATORIES LTD. 852 E.HASTINGS ST.VANCOUVER B.C. V6A 1R6 PHONE 253-3158 DATA LINE 251-1011

GEOCHEMICAL ICP ANALYSIS

.500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN.FE.CA.P.CR.MG.BA.TI.B.AL.NA.K.W.SI.ZR.CE.SN.Y.NB AND TA. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: PULP AU** ANALYSIS BY FA+AA FROM 10 GRAM SAMPLE.

DATE RECEIVED: APRIL 1986 DATE REPORT MAILED: Apr 24/86 ASSAYER. D. Toye. DEAN TOYE. CERTIFIED B.C. ASSAYER.

HECLA MINING FILE # 86-0442R PAGE 2

SAMPLE#	Mo PPM	Cu PPM	Pb PPM	Zn PPM	Ag PPM	Ni PPM	Co PPM	Mn PPM	Fe %	As PPM	U PPM	Au PPM	Th PPM	Sr PPM	Cd PPM	Sb PPM	Bi PPM	V PPM	Ca %	P %	La PPM	Cr PPM	Mg %	Ba PPM	Ti %	B PPM	Al %	Na %	K %	W PPM	Au** PPB
1701P	1	1	3	2	.1	3	1	448	.46	29	5	ND	1	1365	1	2	7	1	37.22	.01	2	1	.13	4	.01	5	.02	.01	.01	1	130
1706P	1	31	25	14	.4	6	2	412	1.11	35	5	ND	1	866	1	2	6	1	33.44	.03	3	1	.35	8	.01	7	.05	.01	.02	1	190
1712P	1	1	3	4	.1	5	1	363	.47	18	5	ND	1	947	1	2	7	1	38.61	.02	2	1	.13	13	.01	3	.02	.01	.01	1	26
1713P	1	3	13	11	.3	7	1	560	.92	116	5	ND	1	1098	1	2	6	1	35.67	.02	3	1	.22	8	.01	7	.04	.01	.02	1	230
1714P	1	1	7	13	.1	23	6	2393	2.13	35	5	ND	14	340	1	2	2	1	15.89	.03	10	4	.73	8	.01	2	.10	.01	.05	1	35
1715P	1	3	19	12	.1	8	1	950	1.12	15	5	ND	3	864	1	2	2	1	28.57	.02	4	2	.43	4	.01	2	.07	.01	.02	1	80
1718P	1	38	22	14	.3	7	5	657	1.81	495	5	ND	3	736	1	2	7	1	29.00	.03	3	2	.50	8	.01	4	.09	.01	.05	1	1100
1719P	1	50	9	39	.4	160	19	1406	4.66	284	5	ND	5	225	1	2	2	4	7.09	.09	8	22	1.75	25	.01	10	.25	.01	.13	1	150
1720P	1	24	37	30	.2	30	5	1112	2.26	39	5	ND	10	383	1	5	2	2	13.36	.03	8	6	.84	31	.01	7	.18	.01	.12	1	140
1725P	1	1	23	7	.1	4	1	1222	.77	3	5	ND	1	1163	1	2	4	1	33.33	.02	4	1	.30	7	.01	2	.02	.01	.01	1	28
STD C/FA-AU	21	60	42	134	7.1	71	27	1246	3.99	41	17	8	35	49	19	17	20	63	.50	.11	40	62	.89	178	.08	36	1.71	.07	.12	12	51

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DATE RECEIVED APRIL 1986
DATE REPORTS MAILED Apr 24/86

ASSAY CERTIFICATE

SAMPLE TYPE : PULP
AU** BY FIRE ASSAY

ASSAYER ..D Toye..DEAN TOYE. CERTIFIED B.C. ASSAYER.

HECLA MINING FILE# 96-0442 R

SAMPLE	Fe %	Au** oz/t
1700P	19.57	.232
1703P	30.35	.399
1704P	20.60	1.080
1707P	13.71	.670
1708P	5.27	.012
1709P	17.48	.040
1722P	14.68	.343
1723P	11.06	.355

APPENDIX VI

STRATIGRAPHY OF THE MOSQUITO CREEK GOLD MINE

MINE GEOLOGY MCGM

The "Mine sequence" at Wells consists of rhythmically bedded, dolomitic and siliceous clastic metasediments representing part of a submarine turbidite fan complex. Units of sandy and carbonaceous limestone within the turbidite sequence host conformable "replacement" lenses. Medium to dark grey units of graphitic "gritty" quartzite host crosscutting auriferous quartz lodes.

The mine sequence strikes northwest, dips moderately to steeply northeast and is cut by a flatter, but openly-folded, northeast-dipping cleavage. Strata are refolded and offset by northerly striking low angle faults. Orientation of these faults and quartz stopes in the Mosquito Creek Gold Mine appear to be consistent with models of fracturing associated with right lateral strike-slip movement on a major lineament. Map units are rarely continuous, without offset, for several tens of meters along strike and cannot be projected with confidence down dip between levels.

The Mosquito Creek Gold Mine (MCGM) is located in the upper hinge zone of the antiformal structure hosting mineralisation at the Cariboo Gold Quartz Mine (CGQM) and Island Mountain Mine (IMM). The hinge of this fold in the MCGM is cut by a north-dipping zone of flat faults, subparallel in strike to the "Main band" limestone unit. A tightly folded stratigraphic section, crudely correlatable to that in the IMM, is exposed as a window beneath the fault zone. The mine sequence mapped in the IMM appears to be a folded stratigraphic section.

The "Main band" limestone unit and contained "replacement" ore bodies are displaced at the west end of the MCGM by the "West Fault." This is a major north-striking and moderately east-dipping structure with an apparent right lateral component of displacement. The limestone unit explored in the footwall of the "West Fault" is thought to be the "Main band" as repeated on the southwest limb of a second anticlinal fold structure.

MINE STRATIGRAPHY MCGM

Mapping of stratigraphy in the MCGM is difficult due to tight folding and imbricate faulting. The present stratigraphic interpretation will be modified as structural problems are solved. Principal map units (see figure:Schematic Interpretation of Stratigraphy in the MCGM) are as follows:

Dss(2) "Green Rock"; Green, chloritic and siliceous snadstone (volcaniclastic or epiclastic rock ?) with finely disseminated ilmenite, pyrrhotite lamellae and finger nail-sized white calcite "nodules." The unit is massive and blocky in appearance but is probably very thinly bedded; distinctly deep orange weathering. Also consists of:

bs* Black, laminated siliceous and argillaceous siltstone with graphitic cleavage; minor component usually observed near margins of the unit.

tdss Tan coloured, laminated, dolomitic (porphyroblastic - talc-disseminated pyrite alternation of gdss; often associated with zones of very thin pyrite - quartz - calcite stringers.

Tu "Upper Turbidites"; Light to dark grey, medium to thickly bedded turbidites consisting of:

bs Black, laminated dolomitic (porphyroblastic) and argillaceous siltsone with graphitic cleavage and pyrite porphyroblasts.

q/g Gritty (quartz eyes) quartzites and/or quartz granule grits with either sericitic or graphitic cleavage.

Q(1) "Quartzite Unit"; Light to medium grey but orange weathering, very thinly bedded, fine to medium grained dolomitic (matrix and porphyroblasts) quartzite with a talcose parting and/or cleavage (dg). Contains some thin beds of medium grey, "sandy" limestone (l) and light grey, fine to medium grained, calcareous quartzite (cg).

M "Main Band Limestone Unit"; Generally medium to dark grey but lighter in colour in proximity to ore; consists of:

1 Mottled medium to light grey, very thinly bedded "sandy limestone" with stylolitic parting and graphitic cleavage.

c Zebra striped weathering, dark grey, laminated calcareous and argillaceous siltstone with graphitic cleavage and minor disseminated pyrite.

d Tiger striped weathering, dark grey, laminated dolomitic (matrix and porphyroblasts) and argillaceous siltstone units both talcose and graphitic cleavage, minor disseminated pyrite; appears to be an alteration of c.

dg Tan weathering, medium grey and massive - looking, dolomitic (matrix mainly) quartzite with talcose cleavage; may be an alteration of 1.

Dss(1) "Green Rock"; similar to Dss(2)

Tw "White Turbidites" ("Baker Formation"); Overall medium to light grey but orange weathering; medium to thickly bedded turbidites consisting of:

bs Black, laminated dolomitic (porphyroblastic) and argillaceous siltstone with graphitic cleavage and pyrite porphyroblasts; generally a minor component.

dg Light grey to orange weathering, dolomitic, granule (quartz, minor feldspar) grit.

ds Light grey to pale green, very thinly bedded to laminated, dolomitic (porphyroblastic) quartz siltstone with talcose parting and/or cleavage.

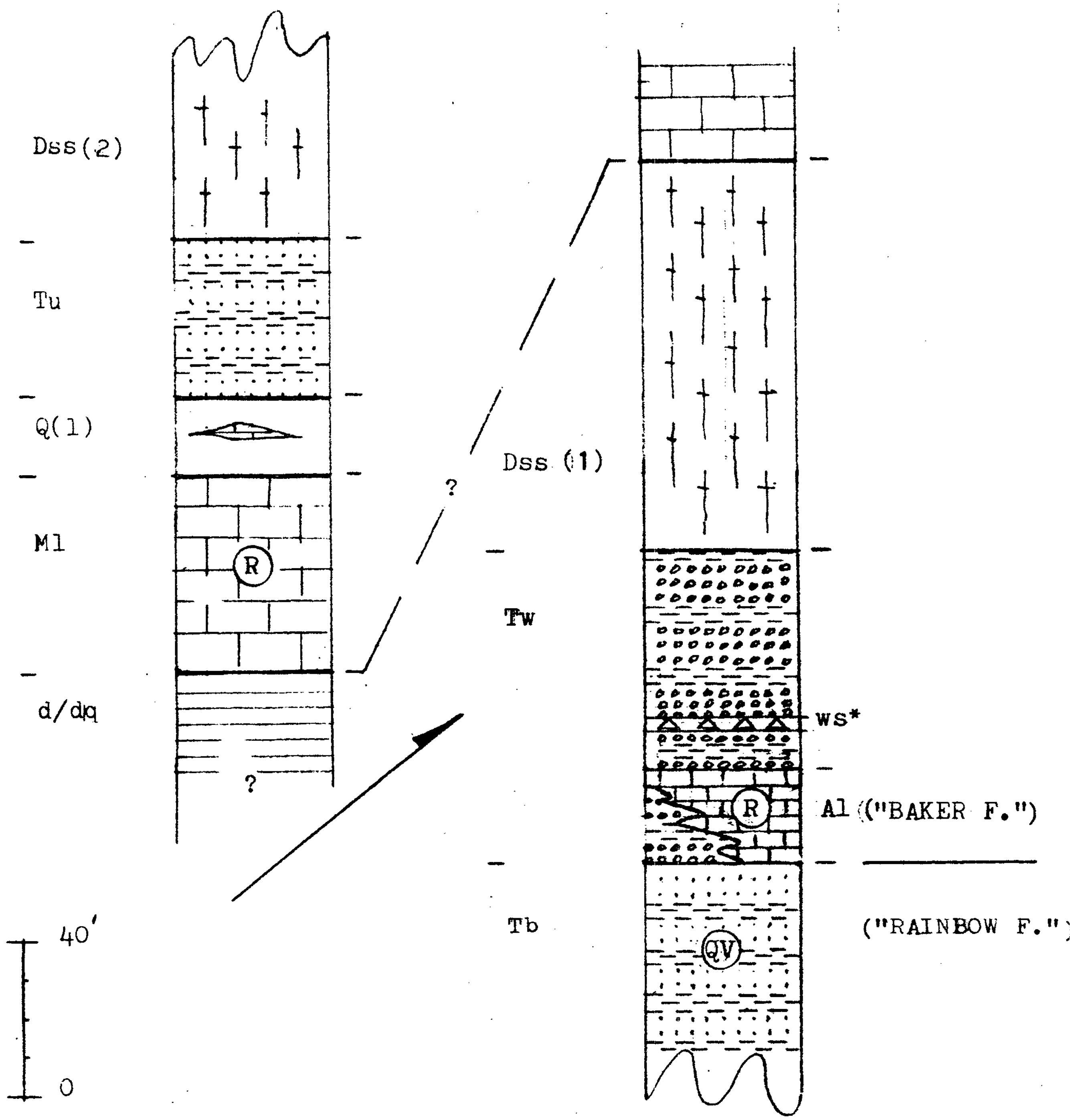
ws* White, laminated to very thinly banded, dolomitic (porphyroblastic) siltstone with talcose/graphitic parting and/or cleavage; distinctive marker unit.

Al "Aurum Band" Limestone Unit; A very thinly to thinly bedded unit consisting of light to medium grey, fine to medium grained calcareous quartzite and white "silty" limestone. Some medium grey colouration persists in the limestone. Locally the unit is orange weathering.

Tb "Black Turbidites" ("Rainbow Formation"); Uniformly dark grey, medium to thickly bedded turbidites consisting of:

bs Black, laminated dolomitic (porphyroblastic) and argillaceous siltstone with graphitic cleavage and pyrite porphyroblasts.

bq Dark grey, thinly bedded, gritty (blue quartz eyes) quartzite, lesser quartz granule grit, both with graphitic cleavage.



Schematic Interpretation of Stratigraphy in the MCGM

Location and Description of Type Specimens Submitted for Thin Sections.

Notes to accompany the petrographic report of Koehler (1986)

M1	(U81-12,12.8m)	Mottled light and dark grey, relatively pure sandy limestone with stylolitic parting. Generally is very thinly bedded.
Mc	(U82-37,16.3m)	Zebra striped, laminated, calcareous and argillaceous siltstone with graphitic cleavage; commonly contains accessory disseminated medium grained pyrite.
d	(U81-15,6.4m)	Tiger striped, laminated, dolomitic and argillaceous siltstone with graphitic and/or talcose cleavage; frequently appears to be an alteration product of Mc and can be weakly calcareous; frequently contains minor disseminated and/or fracture related pyrite.
Al	(U77-9,2.4m)	Very thinly bedded, white to tan weathering, relatively pure silty limestone.
ws*	(U83-27,2.1m)	Light grey, very thinly bedded to laminated, dolomitic (porphyroblastic) quartz siltstone. This is a very distinctive marker.
ws	(U82-73,11.1m)	Light and medium grey coloured very thinly bedded to laminated, dolomitic (porphyroblastic) quartz siltstone with talcose cleavage.
bs	(U83-21,42.7m)	Black, laminated, argillaceous and dolomitic (porphyrobalstic) siltstone with graphitic cleavage and minor coarse grained aggregates of pyrite.
bq	(U81-14,35.7m)	Dark grey, midium grained to gritty (quartz), weakly dolomitic)matrix and/or porphyroblasts) quartzite with graphitic cleavage. This is usually interbedded with bs on a thin to medium scale.

dq	(U80-48,14.3m)	Medium grey to mottled orange weathering, relatively homogenous looking, fine to medium grained dolomitic (matrix) quartz sandstone with talcose cleavage. This may be an alteration product of M1; tan to orange weathering underground.
dg	(U83-25,53.0m)	Light grey coloured, dolomitic (matrix and/or prophyroblasts) quartz granule grit with dark coloured replacements of dolomite porphyroblasts and talcose cleavage; tan to orange weathering underground.
cq	(U82-73,13.1m)	Light grey coloured, medium grained calcareous (matrix) quartzite with sericitic and chloritic cleavage.
qcv	(U81-15,2.4m)	Tan weathering stringer consisting of minor blue quartz, considerable spindly dolomite and several percent aggregates of fine grained pyrite.
IBSTP		Replacement mineralisation consisting of very thin bands of massive fine grained pyrite. These bands have very thin selvages of spindly dolomite and are hosted by M1
Dss	(U83-69,53.0m)	Dark green, homogeneous and massive-looking, fine to medium grained chloritic and siliceous sandstone (or tuff) with coarse white clacite Modules, finely disseminated ilmenite and lamallae of pyrrhotite; distinctly orange weathering underground.

PETROGRAPHIC ANALYSIS OF

14 FINE GRAINED METASEDIMENTARY ROCKS

Prepared For

HECLA MINING COMPANY

By:
Steven W. Koehler
P. O. Box 41 - 306 Junction Street
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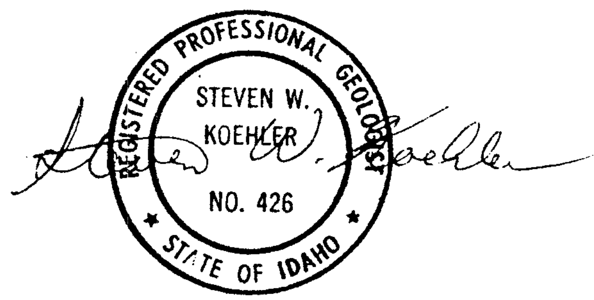
(208) 983-2734

27 May 1986



M8 rock

Carbonate Stain

A metalimestone consisting of 98% low ferroan calcite, 1% quartz, and 1% black organic matter. The rock is gray with white lenses and black streaks, and has a granoblastic elongate texture.

Calcite grains generally are .1 - .7 mm across, and are elongate with polygonal grain boundaries. Calcite has a strong reaction in cold dilute acid, however it took a light blue stain indicating the presence of iron. I arbitrarily named this low ferroan calcite to contrast it with high ferroan calcite in sample M1 which took a dark blue stain.

Quartz grains occur as equant and elongate grains .03 - .3 mm across. The quartz grains tend to be concentrated in layers roughly parallel to the elongate direction of the calcite grains. Quartz often contains inclusions of carbonate. Some edges of quartz grains are rounded, and others are jagged as if etched by calcite.

Black organic matter occurs as streaks and finely disseminated grains. The streaks appear black in the core sample, and where disseminated, the organic matter colors the rock gray. White lenses in the rock are relatively coarse calcite without organic matter.

The white calcite lenses in the core sample are in part, discordant fracture fillings. Calcite in a 1.5 mm wide fracture appears to be slightly more iron-rich (darker blue stain), than calcite along the adjacent walls; and the directional alignment of the grains is not distinctive as in the rest of the rock. In places, it is still possible to see where calcite crystals began growing as a crust along the walls of a fracture, with crystals pointing into what was an open space.

The original rock was a limestone deposited under reducing conditions, indicated by the presence of organic matter. Low grade metamorphism recrystallized the calcite into polygonal grains. The pressure involved during metamorphism was not equant, otherwise the calcite texture would be granoblastic polygonal as opposed to granoblastic elongate. The quartz grains are concentrated along what was probably original bedding. Based on the relation between the layers with quartz grains and the elongate directions of the calcite grains, the greatest metamorphic pressure must have been roughly perpendicular to bedding. Fractures, later filled with calcite, developed after metamorphism.

Mi   Carbonate Stain

A lightly metamorphosed argillaceous limestone consisting of 55% high ferroan calcite, 25% sericite, 15% quartz, 5% rutile + tourmaline + apatite + carbonaceous matter, and accessory pyrite. Calcite has a granoblastic elongate texture, sericite has a schistose texture, and quartz has a granoblastic polygonal texture. The grain size ranges from less than 1 micron to 2 mm with most grains being less than 1/4 mm across.

The minerals are intergrown with one another but any layer or lens may be calcite-rich, sericite-rich, or quartz-rich. Rutile, tourmaline, apatite, and carbonaceous matter occur as concentrations of thin, anastamosing, subparallel streaks that are black in the core sample. These streaks are continuous beyond the bounds of the core diameter. In addition to irregular continuous layers, calcite and quartz occur in distinct lenses up to 1.5 cm long.

High ferroan calcite grains commonly are 1/4 - 1 1/2 mm long, have a vigorous cold dilute acid reaction, and took a dark blue stain. This calcite contrasts with that in sample Mc which took a light blue stain. Individual calcite grains tend to be free of inclusions of quartz and sericite, however, these latter 2 minerals occur along calcite grain boundaries in calcite-rich lenses. Inclusion-free calcite may have developed when calcite recrystallized during metamorphism.

Quartz grains commonly are .02 - .5 mm across, have undulatory extinction, and contain inclusions of carbonate and sericite. The rims of a number of quartz grains are ragged as if corroded by calcite.

Rutile occurs as yellow-brown to dark brown needles and crystal fragments. Fine grained rutile is difficult to distinguish from the black dust I am calling carbonaceous matter. Tourmaline occurs as light green to brown crystal fragments.

Pyrite occurs as anhedral to subhedral cubic crystals 1/4 - 2 mm across. A peculiar texture occurs with all the pyrite grains in this thin section. On the same side of the pyrite crystals, there is a partial rim of high ferroan calcite on which is a rim of streaked or lenticular quartz. This ribbon texture in quartz is the kind of texture one sees in mylonitic quartzites. No such texture in quartz occurs anywhere else in this section, even though there are quartz grains all around, and even in contact with pyrite on the other 3 sides of the pyrite grains. I presume this is a pressure phenomenon that developed during metamorphism. It is interesting that this local anisotropy in the pressure appears to be consistent throughout the rock as a whole.

A1 Carbonate Stain

A lightly metamorphosed fine grained calcareous sandstone consisting of 75% quartz, 20% high ferroan calcite, 3% sericite, 2% plagioclase, and accessory brown tourmaline and dark golden brown rutile. Most grains are .05 - .2 mm across, but the range is .005 - .6 mm. Layering is not as distinctive as in samples Mc and Ml, but is defined by alternating, relatively high concentrations of quartz or calcite, or thin sericite-rich seams.

Quartz grains have polygonal grain boundaries and triple point juctions. Plagioclase has a refractive index distinctly less than quartz, thus is at least as sodic as sodic oligoclase, and possibly is albite. Plagioclase grains form as triple point junctions with quartz. Some quartz and plagioclase grains contain abundant inclusions of carbonate and sericite, and could be considered poikiloblastic; however, many quartz and plagioclase grains are relatively free of inclusions. In places, both quartz and plagioclase have ragged rims suggesting partial replacement by calcite.

Dss Carbonate Stain

A meta-argillite consisting of 50% quartz, 33% sericite, 7% chlorite, 7% carbonate, 2% plagioclase, 1% altered ilmenite, and minor pyrite. Most grains are .01 - .2 mm across with occasional grains as large as 1 mm. The layering is defined by the parallel alignment of the micaceous minerals and elongate carbonate grains. Quartz grains are equant to slightly elongate. Where quartz grains occur as aggregates, the grains occur as triple point juctions with straight, curved, and sutured grain boundaries.

Some carbonate occurs in lenses up to 6 mm long, the long direction of the lenses being parallel to the general layering. These carbonate lenses are polycrystalline aggregates and should not be confused with the single crystal porphyroblasts that occur in other samples such as bs and ws. Carbonate also fills some .07 mm wide fractures that are roughly perpendicular to layering. Most carbonate appears to be high ferroan calcite, and took a deep blue stain; however, some carbonate did not take a stain. Carbonate in one fracture took the stain. In another fracture carbonate did not stain, except along the fracture walls where it cuts through a high ferroan calcite lens.

Plagioclase grains usually are choked with inclusions of sericite, chlorite, and carbonate. Generally, the inclusions seem randomly oriented, however, the rims of some plagioclase grains contain micaceous inclusions parallel with the general layering. These textures suggest plagioclase grew before and during metamorphism.

continued

Dss cont.

Altered ilmenite grains are scattered throughout the rock. Most of these grains are completely altered, but there are some in which only the rims are altered. Alteration is recognized in thin section by the creamy white color in reflected light. A number of grains have dark, translucent, blocky crystals around their rims, and these authigenic overgrowths probably are rutile or anatase. Perhaps iron released from ilmenite during alteration ended up in chlorite, ferroan calcite, or pyrite.

IBSTP Carbonate Stain

A metamorphosed pyrite-dolomite ore consisting of 73% dolomite, 20% pyrite, 5% sericite, 2% quartz, and accessory rutile and ankerite(?).

The dolomite has a noticeably weaker cold dilute acid reaction than the calcite in samples Mc and Ml, and for the most part did not take any blue stain. However, there were some carbonate grains in which the rims took a dark blue stain, and the cores were unstained or took a pale blue stain. These rims were in contact with pyrite, and this relation suggests dolomite grading into ankerite. At the same time, many dolomite grains intergrown with pyrite did not take any stain. Dolomite grains range in size from .02 - 2 mm, and generally have a fan-shaped wavy extinction or a mottled extinction.

Pyrite occurs as subhedral to euhedral cubic crystals that are 3 microns to 1/2 mm across. In this section, most pyrite is concentrated in a 2 cm thick layer. There appears to be some tendency for the coarsest crystals to occur together, suggesting sedimentary grading, however, this relation is not clear enough to simply label it graded bedding. The pyrite-rich layer itself, and its concordant relation with the other layers in the rock clearly indicates a sedimentary origin for the sulfide.

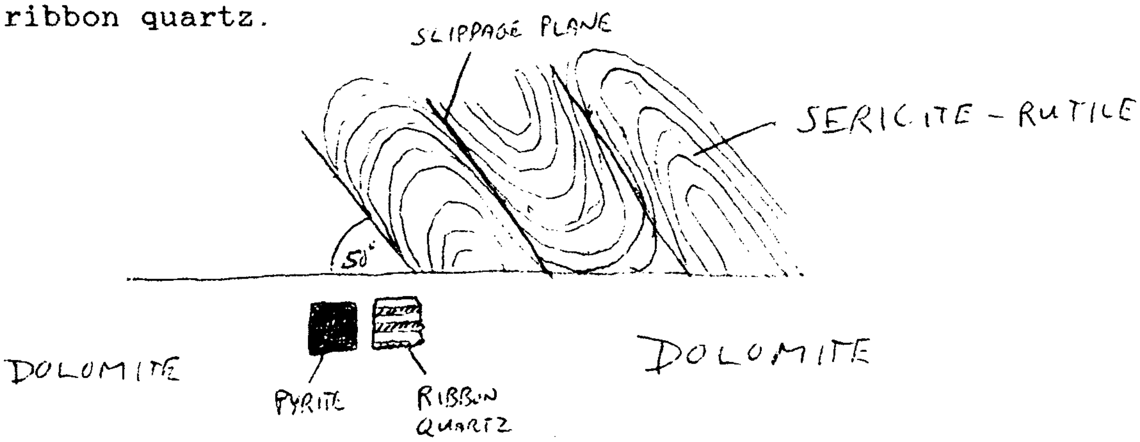
Quartz occurs mostly as .01 - .4 mm anhedral to euhdral grains that are concentrated in some layers. An unusually large grain is 2 mm across and perhaps formed as an open-space filling. Single subhedral to euhdrdal crystals "floating" in dolomite suggests some quartz precipitated out of solution and sank into the carbonate. A number of these crystals have jagged edges indicating corrosion by dolomite.

continued

IBSTP cont.

There is one occurrence of ribbon quartz (described in the report on M1) adjacent to pyrite in this section. There are a number of places in this section where one might have expected this texture to develop; however, it did not develop, and I suspect this is due to the abundance of carbonate in this sample. Carbonates behave plastically under deformation, and thus take up a lot of strain.

Sericite occurs in sericite-rich layers that are up to 3 mm thick. The sericite-rich layers have been deformed into a series of tight kink folds with axes at a 50 degree apparent angle to layering. Aligned granules of rutile emphasize the micro-fold structures and slippage planes between adjacent anticlines and synclines. The sketch below shows the geometry of the layering, folds, and a pyrite crystal with ribbon quartz.



bq — Carbonate Stain

A metamorphosed sericitic quartzite consisting of 85% quartz, 12% sericite, 3% carbonate, and accessory tourmaline, rutile, and pyrite. Quartz grains tend to be elongate with polygonal grain boundaries and triple point juctions. The rock splits along the sericite schistosity. Also, this very dark gray rock is porphyroblastic with gray spots of carbonate up to 3 mm across.

Quartz grains range in size from .01 - 1.25 mm but most are .05 - .5 mm.

Most sericite occurs as parallel flakes with rutile. Some sericite occurs as 1/4 - 1 mm diameter clots with a felted texture, suggesting these are a replacement of a former mineral.

continued

bq cont.

Carbonate occurs as grains .1 - 3 mm across with most being larger, single crystal, lens-shaped porphyroblasts. Most carbonate did not take the stain and has a slow acid reaction indicating dolomite. The cores of some grains took no stain or a pale blue stain, and the rims took a deep blue stain, suggesting transition from dolomite to ankerite. A number of smaller grains took a deep blue stain. Quartz inclusions in the larger porphyroblasts have deep embayments and jagged rims indicating replacement by dolomite.

Tourmaline occurs as .01 - .25 mm crystals and crystal fragments that may be colorless, grayish blue, brownish green, or brown. The larger grains occur as broken fragments and the smaller grains tend to be subhedral to euhedral crystals elongate parallel with the schistosity.

Pyrite occurs as occasional subhedral cubic grains elongate parallel to the schistosity, and in aggregates up to 1.5 mm long.

cq — Carbonate Stain

A calcareous quartzite consisting of 90% quartz, 8% high ferroan calcite, 2% plagioclase, and accessory sericite, rutile, and altered ilmenite. Most grains are .05 - .5 mm across with a few quartz grains up to .8 mm across. Quartz grains tend to be equant, have triple point grain junctions, and curved to straight grain boundaries.

Plagioclase has an oligoclase composition, and often contains numerous inclusions of carbonate and lesser amounts of sericite.

High ferroan calcite took a deep blue stain, and gives a vigorous cold dilute acid reaction. As usual, calcite has partially replaced the tectosilicates.

Grain size distribution of this former sandstone seems to have been bimodal. Most grains are less than .2 mm across, but a significant number of grains are .4 - .8 mm across.

qcv — Carbonate Stain

A carbonate-rich sedimentary ore similar to IBSTP. The layers range in thickness from .1 mm to 1 cm, and vary in composition from being predominantly carbonate, quartz, sericite, or pyrite.

continued

qcv cont.

Carbonate grains are up to 2 mm across and show fan-shaped wavy and mottled extinction. Carbonate took a very light to heavy stain, and gives a slow acid reaction; thus I presume the composition is something like siderite, dolomite, or ankerite.

Quartz grains generally are .05 - .5 mm across. In addition to being in sedimentary layers, quartz occurs as isolated subhedral to euhdral crystals (commonly 1/4 - 1/2 mm) with corroded rims in carbonate.

Sericite-rich layers contain numerous grains of rutile and tourmaline. A quartz-filled fracture distinctly cuts across a sericite-rich layer, becomes diffuse in the adjacent carbonate-rich layer, and then disappears into quartz-rich layer adjacent to the carbonate-rich layer. Perhaps this is a compaction phenomenon, like the sandstone dikes in the Badlands of South Dakota where unlithified underlying sediments squirted up into overlying sediments.

Pyrite occurs as subhedral to euhedral cubic crystals 3 microns to .7 mm across that are concentrated in layers .1 - 1.5 mm thick.

A few grains of barite(?) occur in a quartz-rich layer with sericite and rutile. The barite contains a few inclusions of sericite.

I interpret this rock as a mixture of chemical precipitates and sedimentary detritus, with carbonate, pyrite, some of the quartz, and barite being chemical precipitates. Most of the quartz and probably sericite (along with rutile and tourmaline) correspond to sand and clay detritus respectively. I am a little hesitant to consider all the sericite as being sedimentary detritus because I have studied similar rocks in which sericite is strongly associated with the sulfides.

d Carbonate Stain

A meta-argillite consisting of 70% sericite, 29% quartz-carbonate, 1% pyrite, and accessory rutile and tourmaline. Quartz and carbonate occur as intergrowths in discontinuous layers and lenses commonly 1 - 5 mm thick. Micro-kink folds occur throughout the sericite layers. These fold axes are variable but greater than 45 degree angles to the layering.

Carbonate took a dark blue stain and has a slow acid reaction, thus it is probably siderite or ankerite. Quartz grains are equant to slightly elongate with triple point junctions, and commonly are .03 - .2 mm across.

continued

d cont.

Numerous needles of rutile and some tourmaline occur in sericite, and are concentrated along shear planes in the limbs of the folds. As viewed in 2 dimensions, these shear planes appear roughly parallel to the axial planes of the folds.

Pyrite occurs as .1 - 1.2 mm subhedral to euhedral cubic crystals in sericite or on the boundary between layers of sericite and quartz-carbonate.

dq Carbonate Stain

A spotted meta-argillite consisting of 70% sericite, 20 percent carbonate, 9% quartz, 1% rutile, and pyrite. Quartz is scattered throughout sericite more than in the samples I have looked at so far, and without the distinct compositional layering the microfolds are not well developed.

Much carbonate occurs as porphyroblasts commonly .5 - 1.2 mm across, and these give the rock a spotted appearance in hand sample. The porphyroblasts took little or no stain but contain inclusions of carbonate grains (that took a dark blue stain), quartz, rutile, and sericite. Carbonate grains that took a dark blue stain are scattered throughout sercite. Again, the distinct carbonate-rich and sericite-rich compositional layers are not present as in many other samples. The slow acid reaction of the carbonates in combination with the variable staining indicates they are dolomite and ankerite or siderite.

Rutile occurs as blocky grains commonly 50 microns across. These grains contrast with those in sample d which occur as needles commonly less than 10 microns across.

Pyrite occurs as anhedral to euhedral grains about .2 mm across that are sparsely scattered throughout the rock.

As a whole, I think of these rocks as being the products of sedimentary detritus and chemical precipitation. A sample at any given location represents the balance of these 2 inputs. For example this sample would be dominantly sedimentary detritus. The sedimentary detritus input could be further subdivided into sandy (quartz-rich) or clayey (sericite-rich). The chemical precipitation input could be subdivided into iron-poor (low ferroan calcite as in sample Mc) or iron-rich (samples with siderite, ankerite, or high ferroan calcite). Alternatively, the chemical precipitation input could be split into calcium-rich (calcite bearing rocks) and calcium poor (dolomite, siderite, ankerite, and perhaps high ferroan calcite bearing rocks). Perhaps these methods of classifying these rocks might provide some general guides as where to look for ore.

dg Carbonate Stain

A lightly metamorphosed bimodal quartzite consisting of 90% quartz, 7% sericite, 1% carbonate, 1% green smectite, and 1% rutile + zircon + tourmaline.

Quartz occurs in 2 distinct size ranges; about 30% is .5 - 3 mm across, and the remainder is generally .03 - .2 mm across. The smaller grains are equant with polygonal grain boundaries, and are intergrown with sericite. The larger grains appear to have been fairly well rounded but are now partially recrystallized, and in a few cases contain inclusions of sericite and carbonate.

Carbonate also occurs in 2 modes: (1) as .04 mm rhombs that took a dark blue stain and (2) as 1/2 - 1 mm porphyroblasts that took a pale blue or no stain, and contain inclusions of quartz, sericite, and dark blue stained carbonate. Quartz inclusions in the porphyroblasts show partial replacement by carbonate. The carbonate percentage in the rock is too low to reliably evaluate the acid reaction.

Green smectite occurs as clots scattered throughout the rock. One occurrence is in the shape of a euhedral 2 mm long hornblende crystal. In places, smectite is intergrown with carbonate and sericite.

Zircon is unusually abundant in this rock compared to the other samples I have look at so far.

The bimodal nature of quartz in this sample is similar to sample cq. One could infer this sample is closer to the source of the grained quartz because the coarse quartz in this sample is significantly larger than in cq. Obviously, the relation is spoiled if there are multiple sources for quartz. Also, it may be significant that the finer grained bimodal quartzite, cq, contains more carbonate than this sample.

bs Carbonate Stain

A spotted meta-argillite consisting of 64% sericite, 17% quartz, 15% carbonate, and 4% rutile + tourmaline + yellow sulfides + carbonaceous matter(?).

Most quartz occurs as .03 - .3 mm grains in sericite. Some quartz is concentrated in .5 - 1.5 mm thick layers that cut across the schistosity as micro-ptygmatic folds, with each fold having the same vergence. Also present is some ribbon quartz adjacent to pyrite.

continued

bs cont.

Most carbonate occurs as 1.5 - 7 mm porphyroblasts of dolomite that are elongate parallel to the schistosity, and give the rock a spotted appearance. Except for 1/2 mm thick overgrowth rims on the ends (refering to the longest direction of the porphyroblasts), the porphyroblasts contain the layering of the rock as inclusions. The layering in the prophyroblasts is rotated relative to the layering outside the porphyroblasts, and this rotation is in the opposite sense of the ptygmatic fold noses. Smaller carbonate grains scattered throughout the rock took a dark blue stain, and these probably are siderite or ankerite.

Yellow sulfides present include both pyrite and pyrrhotite. There appears to be a tendency for the largest pyrrhotite grains to occur in dolomite porphyroblasts, but some pyrite occurs here also. Pyrite occurs as .1 - .5 mm subhedral cubic grains in aggregates up to 5 mm long.

The micro-structural relations indicate the porphyroblasts began growing after the rock had developed layering but before dynamic metamorphism had ceased. The overgrowth rims on the porphyroblasts must have developed late, and appear to have rejected and/or replaced the layering during their growth.

ws Carbonate Stain

An metamorphosed spotted argillaceous quartzite consisting of 65% quartz, 20% sericite, 15% carbonate, 1 % smectite + rutile + tourmline, and pyrite.

Quartz grains generally are .02 - .5 mm across.

Most carbonate occurs as .5 - 3.5 mm porphryoblasts that give a slow acid reaction and took little or no stain, which suggests they are dolomite. These porphyroblasts contain, as inclusions, the layering of the rock but do not show the obvious rotation as those in sample bs. The quartz grain inclusions show the usual jagged edges and delicate sharp tips that would not survive sedimentary transport, and must be the product of replacement by carbonate. A small amount of carbonate occurs as 1/2 mm and smaller grains that took a dark blue stain, and are scattered throughout the rock.

Smectite is turbid green and concentrated in areas up to .6 mm long, suggesting it is a replacement of another mineral.

Rutile and tourmaline are scattered throughout the rock.

Pyrite occurs as a 3 mm subhedral cubic crystal with a few inclusions of carbonate and sericite.

A metamorphosed argillaceous spotted quartzite consisting of 70% quartz, 20% sericite, 10% carbonate, and accessory rutile, tourmaline, and pyrite.

Quartz grains typically are .03 - .2 mm across.

Most carbonate occurs as 1 - 5 mm porphyroblasts that contain the quartz-sericite layering of the rock. These porphyroblasts give a slow acid reaction; but unlike samples bs and ws they took a blue stain, indicating they are siderite or ankerite. Like sample bs these porphyroblasts have overgrowth rims (1/4 mm thick) without inclusions, but unlike sample bs these porphyroblasts show only slight rotation of the layering. In places, the overgrowth rims appear to have pushed the layering out of the way.

Rutile and tourmaline are scattered throughout rock.

Pyrite occurs as occasional 1 - 3 mm subhedral grains.

Samples that have carbonate porphyroblasts possibly underwent a thermal metamorphism not experienced by samples of similar composition but without carbonate porphyroblasts. The fact some carbonate porphyroblasts are iron-rich and others are iron-poor is interesting and easy to detect, but I don't know if it has any practical application.