82-#742-10710 Kamloops

COMINCO LTD.

EXPLORATION WESTERN DISTRICT

NTS: 82M/15

GEOPHYSICAL REPORT

ON

BOREHOLE PULSE EM, UTEM, AND VLF

ELECTROMAGNETIC SURVEYS, AND MAGNETOMETER

SURVEY ON THE RUDDOCK CREEK PROPERTY

KAMLOOPS AND REVELSTOKE MINING DIVISIONS

CLAIMS: IT 1, 2, 3, 4, 5, 6, 16, 27, 29, 33, and 34

LATITUDE: 51°47'N

LONGITUDE: 118°51'W

CLAIM OWNER: FALCONBRIDGE NICKEL MINES LTD.

CLAIM OPERATOR: COMINCO LTD.

NOVEMBER 1982

JULES J. LAJOIE
Ph.D., P.Eng.

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INTRODUCTION

The Ruddock Creek Property is located about 65 miles north of Revelstoke, B.C., immediately west of Gordon Horne Peak as shown on the Location Map, Plate 235-82-1. Access from Revelstoke is by Route 23 to the mouth of Ruddock Creek, then west up Ruddock Creek by helicopter.

Plate 235-82-2 is a general geology and topographic plan of the area discussed in this report For location reference, Light Lake is shown in both Plate 235-82-2 and the Location Map, Plate 235-82-1.

This report describes geophysical work done in 1982 consisting of 4,526 feet of Downhole EM using five transmitter loops totalling 22,630 feet of Downhole surveying, 6.3 miles of grid preparation, 6.3 miles of UTEM electromagnetic surveying, and 5.7 miles each of VLF and magnetic surveying.

This work was performed on IT claims 1, 2, 3, 4, 5, 6, 16, 27, 29, 33 and 34.

GEOLOGY AND MINERALIZATION

The mineralization on the Ruddock Creek property is in metasedimentary rocks of the Shuswap metamorphic complex. The rock lithologies of the area are a varied succession of quartz biotite gneiss, calc-silicate gneiss, with intercalated layers of marble and quartzite.

The structure of the area is dominated by repetitive folding which took place during metamorphism, and was followed by faulting. The economic mineralization of interest consists of dark brown to black sphalerite with lesser galena in a calcareous quartzite gangue. Iron sulphide grades associated with the economic mineralization vary significantly but are usually in the range of 10% - 30%, and thereby geophysical responses may be expected.

The thickness of the sulphide layers is controlled largely by folding, the thickest section being in the hinge zones of some folds and the longest dimensions of these thickened zones being parallel to fold axes. The "E" showing is such a zone (Plate 235-82-2) plunging 27° towards 285°. The "E" zone fault west of the "E" showing (Plate 235-82-2) is interpreted to offset the hinge mineralization downdip.

The objective of past drilling west of the "E" zone fault was to locate the offset portion of the "E" zone mineralization. In particular, DDH C75-1 (Plate 235-82-2) drilled to a depth of 2,277 feet, intersected 18 feet of mineralization at about 2,050 feet. It is interpreted to have intersected the upper limb of the "E" zone fold in an area approaching the thickening of the main sulphide mass in the hinge of the fold. DDH C76-1 was drilled to a depth of 3,006 feet to intersect the postulated position of the main "E" zone but did not intersect it.

No further significant property work had been done since the 1976 drilling.

OBJECTIVE OF 1982 GEOPHYSICS

The objective of the 1982 Geophysics was twofold. Firstly, Downhole EM was to be done in the two deep holes C75-1 and C76-1 to test this technique and help in the location of the "E" zone mineralization thought to be located between the two holes. This work was contracted out to Crone Geophysics Ltd. of Toronto. Their report is included in Appendix A. Secondly, a surface time domain electromagnetic (UTEM), VLF electromagnetic, and magnetic survey were to be executed on the grid shown in Plate 234-82-2 to search for possible shallower undiscovered mineralized zones.

FIELD WORK

Between July 12 and 14, 1982, Frank Ferguson and Bruce Griffith of COMINCO Ltd. were on the property to probe the two deep holes C75-1 and C76-1, prior to the downhole geophysics work. Two camps were established by Frank Ferguson and Mike Davies of COMINCO Ltd. between July 22nd and 29th; the Upper camp prepared for the downhole geophysics crew and the Main camp prepared for the surface geophysics crew. Between July 27th and August 5th, Syd Visser of COMINCO Ltd., Dave Anderson of Crone Geophysics Ltd. and two linecutters from Martinson Lincutting and Staking Ltd. completed the downhole EM project. From August 6th to 14th, the two linecutters remained on the property to prepare the surface geophysics grid. The surface geophysics was completed by J.J. Lajoie, Austin O'Hara and Mike Davies of COMINCO Ltd. between August 11th and August 30th.

DESCRIPTION OF THE UTEM SYSTEM

UTEM is an acronym for "University of Toronto ElectroMagnetometer". The system was developed by Dr. Y. Lamontagne (1975) while he was a graduate student at that university.

The field procedure consists of first laying out a large loop of single strand insulated wire and energizing it with current from a transmitter which is powered by a 1.7 kw motor generator. Survey lines are generally oriented perpendicular to one side of the loop and surveying can be performed both inside and outside the loop. The field procedure is similar to Turam, a better known electromagnetic surveying method.

The transmitter loop is energized with a precise triangular current waveform at a carefully controlled frequency (30.9 Hz for most of this survey). The receiver system includes a sensor coil and backpack portable receiver module which has a digital recording facility on cassette magnetic tape. The time sychronization between transmitter and receiver is achieved through quartz crystal clocks in both units which must be accurate to about one second in 50 years.

The receiver sensor coil measures the vertical magnetic component of the electromagnetic field and response to its time derivative. Since the transmitter current waveform is triangular, the receiver coil will sense a perfect square wave in the absence of geologic conductors. Deviations from a perfect square wave are caused by electrical conductors which may be geologic or cultural in origin. The receiver stacks any preset number of cycles in order to increase the signal to noise ratio.

The UTEM receiver gathers and records 9 channels of data at each station. The later number channels (7-8-9) correspond to short time or high frequency while the lower number channels (1-2-3) correspond to long time or low frequency. Therefore, poor or weak conductors will respond on channels 9, 8, 7 and 6. Progressively better conductors will give responses on progressively lower number channels as well. For example, massive, highly conducting sulphides or graphite will produce a response on all nine channels.

It was mentioned above that the UTEM receiver records data digitally on a cassette. This tape is played back into a computer at the base camp. The computer processes the data and controls the plotting on an 11" x 15" graphics plotter. Data are portrayed on data sections (D.S.) as profiles of each of the nine channels, one section for each survey line.

DATA PRESENTATION

The results of the downhole EM survey are presented in the contractor's report in Appendix A. The results of the surface geophysics are presented in 6 maps and 21 UTEM data sections. The maps are listed as follows:-

Plate 235-82-1 (in text)	Location Map Scale 1:250,000
Plate 235-82-2 (in envelope)	Geophysical Grid Map on General Geology and Topography Scale 1" = 400'
Plate 235-82-3 (in envelope)	Total Field Magnetic Data Scale 1" = 200'
Plate 235-82-4 (in envelope)	VLF Field Strength and Tilt, Seattle, Washington Scale 1" = 200'
Plate 235-82-5 (in envelope)	VLF Field Strength and Tilt, Annapolis, Maryland Scale 1" = 200'
Plate 235-82-6 (in envelope)	UTEM Compilation Map Scale 1" = 200'

Legends for both the UTEM compilation maps and the data sections are also attached.

The data sections are arranged in order of loop number, then in order of line number.

The magnetic field amplitudes from both the transmitter loop (primary field) and from the electric currents induced in the ground (secondary field) vary by a few orders of magnitude from the beginning of a line near the transmitter loop to the end of the survey line far from the transmitter loop. To present such data, a normalized scheme must be used. In this survey, the primary field from the loop is used for normalizing and presenting the data according to the following scheme:-

a) For channel 1:

$$\% \text{ Ch. 1 anomaly} = \frac{\text{Ch.1} - P}{P} \times 100\%$$

where P is the primary field from the loop at the station and Ch.1 is the observed amplitude for channel 1

b) For the remaining channels (n = 2 to 9)

$$\% \text{ Ch.n anomaly} = \frac{(\text{Ch.n} - \text{Ch.2})}{\text{Ch.1}} \times 100\%$$

where Ch.n is the observed amplitude of Channel n (n = 2 to 9)

The above normalization procedures result in chaining errors displayed in Channel 1 only.

INTERPRETATION

The downhole EM work is interpreted in the report included in Appendix A.

For the UTEM survey, Loop 1 was installed as shown in Plate 235-82-2 with the front of the loop at 22100N. The "E" zone mineralization shows up clearly as a channel 3* UTEM anomaly at 23100N on Line 24800E (D.S. 9). On this line, it is interpreted to have a conductivity-thickness product (σt) of about 40 mhos, making it an intermediate to good conductor, and to be at a very shallow depth (<50'). Dip is steep and northerly. At 23100N on Line 25200E (D.S. 10), a channel 7 UTEM anomaly corresponds to the east end of the "E" zone mineralization, with a conductance in the 2 mho range. There are no significant UTEM anomalies from Lines 22400E to 24400E (D.S. 3 to D.S. 8). On Line 22000E (D.S. 2) a channel 7 anomaly occurs at 24300N. On Line 21600E, a subtle (deeper) channel 5 anomaly occurs at 24300N. Channel 5 indicates a reasonable conductor and, since Line 21600E was found to actually be about 800' away from Line 22000E, rather than the nominal 400', it was decided to insert three extra detail lines (21700E, 21800E and 21900E) and to move up the front of the loop to 23500N (Loop #2 in Plate 235-82-2). This data is shown in D.S.'s 11 to 15, at an extended scale. A subtle channel 5 anomaly occurs again at 24300N on Line 21600E (D.S. 11) with the new loop. The anomaly amplitude increased on Line 21770E (D.S. 12) with a channel 3 anomaly at 24300N.

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* channel 3 anomaly indicates that the anomaly is seen at the latest time on channel 3.

The anomaly appears best defined at 24300N on Line 21800E as a channel 3 anomaly with a conductance of about 50 mhos. The shape of the anomaly suggests a flat target at shallow depth (< 200') from about 24300N to 24400N. Computer modelling is recommended to berify this interpretation. On Line 21900E (D.S. 14), the conductance is reduced to about 5 mhos as evidenced by the channel 6 anomaly at 24300N. On Line 22000E (D.S. 15 and 15a), a channel 6 anomaly occurs at 24300N.

Surveying was done inside transmitter loop 1 south of 22100N as far as permitted by a cliff located at about 21400N. These data are shown in D.S. 16 to 21 and show no anomaly of interest.

The total field magnetic data are displayed in profile form in Plate 235-82-3. The data were corrected for drift and daily base shift in the normal manner. The area of the "E" zone mineralization at about 23000N on Lines 24800E and 25200E, exhibits strong activity as can be expected for outcropping pyrrhotite mineralization. A significant narrow anomaly occurs from 23830N on Line 22000E to 23910N on Line 21900E.

Plate 235-82-4 shows the VLF field strength and tilt data obtained using the Seattle station. The "E" zone mineralization stands out clearly as well as the weakly mineralized extension southwest of the main "E" zone in the limb of the fold. The next significant anomaly coincides with the eastern end of the UTEM anomaly discussed previously in the northwest corner of the grid. The source of the anomaly gets progressively deeper to the west. It is very weak on Line 21800E where the highest conductivity UTEM response is indicated.

Plate 235-82-5 shows VLF field strength and tilt data obtained using the Annapolis VLF station. The signal from this station is much weaker but the station direction is better for the strike of the two anomalies discussed previously. One line was surveyed over the "E" zone and it produces a very strong response. In the northwest corner of the grid, a strong anomaly was obtained at 24250N on Lines 22000E and 21900E, nearly coincident with the UTEM anomaly. The tilt anomaly is much weaker further west.

CONCLUSIONS

The downhole EM survey performed in DDH's C75-1 and C76-1 confirmed a flat conductive sheet corresponding with the 18' of mineralization intersected in C75-1. The postulated mineralization in the hinge of the fold could not be confirmed by the downhole EM survey because DDH C75-1 stopped 200 feet above the level of the suspected mineralization and DDH C76-1 was blocked about 400 feet above it.

UTEM, VLF and magnetic methods responded to the shallow "E" zone mineralization. A 50 mho UTEM anomaly was discovered and is centered at 24300N on Line 21800E. It deepens to the west and is shallower to the east where its conductance diminishes and gives a VLF response. It has no coincident magnetic anomaly.

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JJL/jel

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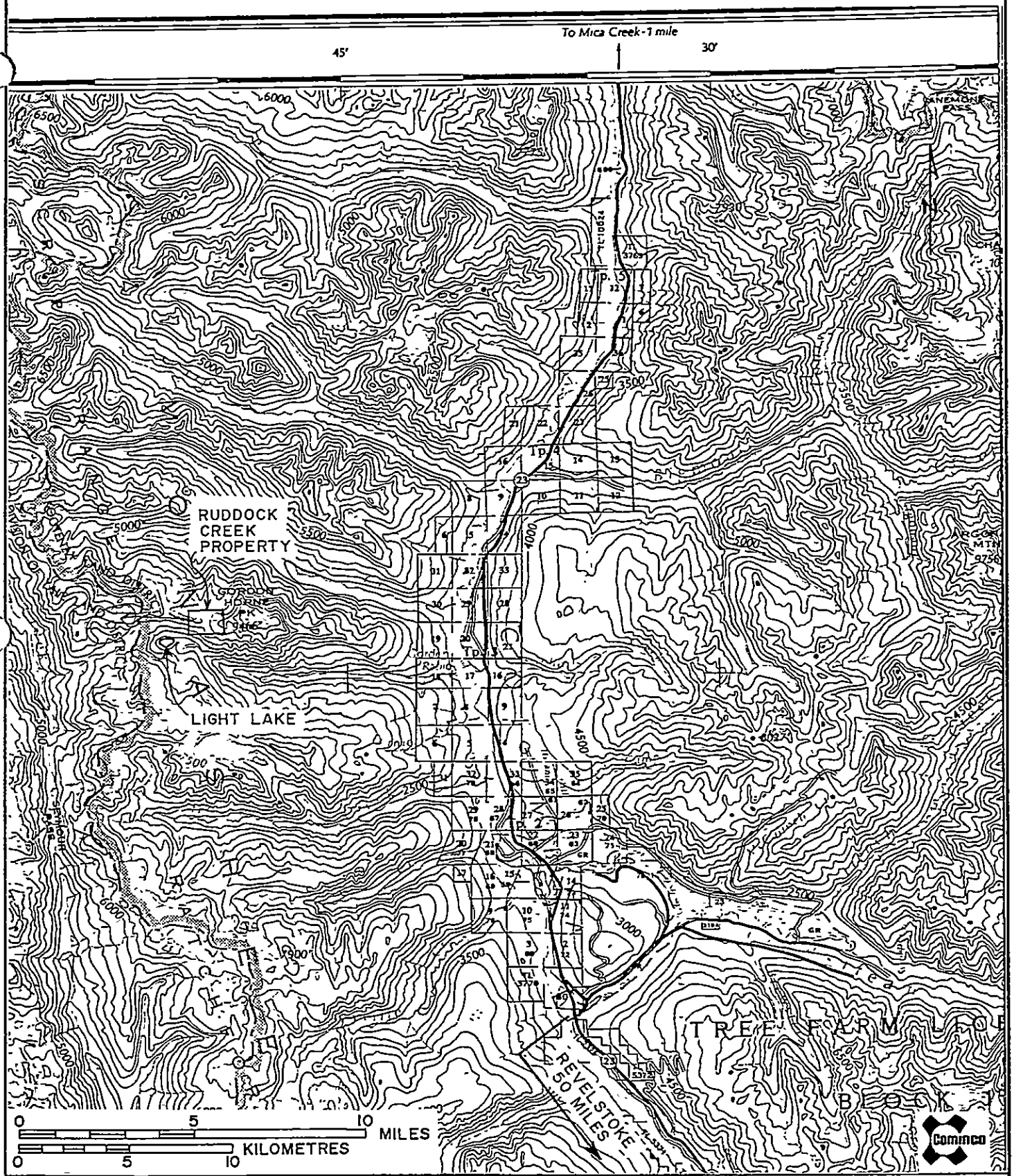
REFERENCES

Lamontagne, Y., 1975 Applications of Wideband Time Domain EM Measurements in Mineral Exploration: Doctoral Thesis, University of Toronto



Drawn by:		Traced by:	
Revised by	Date	Revised by	Date

NTS
82-M-15

RUDDOCK CREEK PROPERTY
LOCATION MAP
KAMLOOPS M.D., B.C.

Scale: 1 : 250,000 | Date: OCTOBER 1982 | Plate: 235 - 82 - 1

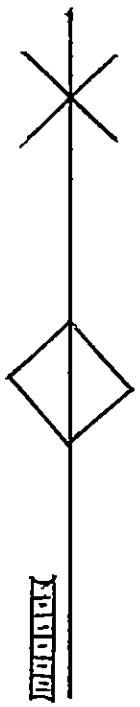
RCII-2187-C

210-0610

LEGEND

UTEM COMPILATION MAPS & DATA SECTIONS

SYMBOL	CHANNEL	MEAN DELAY TIME	
		15 Hz	30 Hz
	1	25.6 ms	12.8 ms
	2	12.8	6.4
	3	6.4	3.2
	4	3.2	1.6
	5	1.6	0.8
	6	0.8	0.4
	7	0.4	0.2
	8	0.2	0.1
	9	0.1	0.05
	10	0.05	

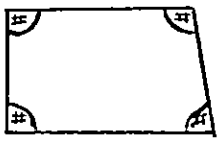


Axis of a cross-over anomaly. The number indicates the latest anomalous channel.

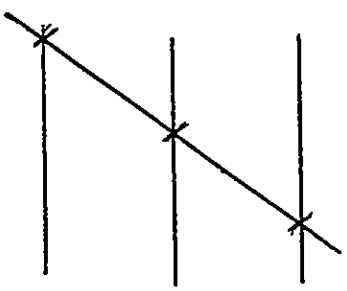
Depth indicated by: S - Shallow (< 30m)
M - Moderate (30-75m)
D - Deep (> 75m)

Axis of reversed cross-over anomaly produced when a small conductor dips at less than 70° towards the transmitter. In normal cross-over the positive response is towards the transmitter; reversed one, it is away from the transmitter.

Indicates a negative anomaly of width shown by the dash. The latest anomalous channel is shown. Can sometimes be confused with the negative part of a cross-over anomaly.



Outline of a transmitter loop.

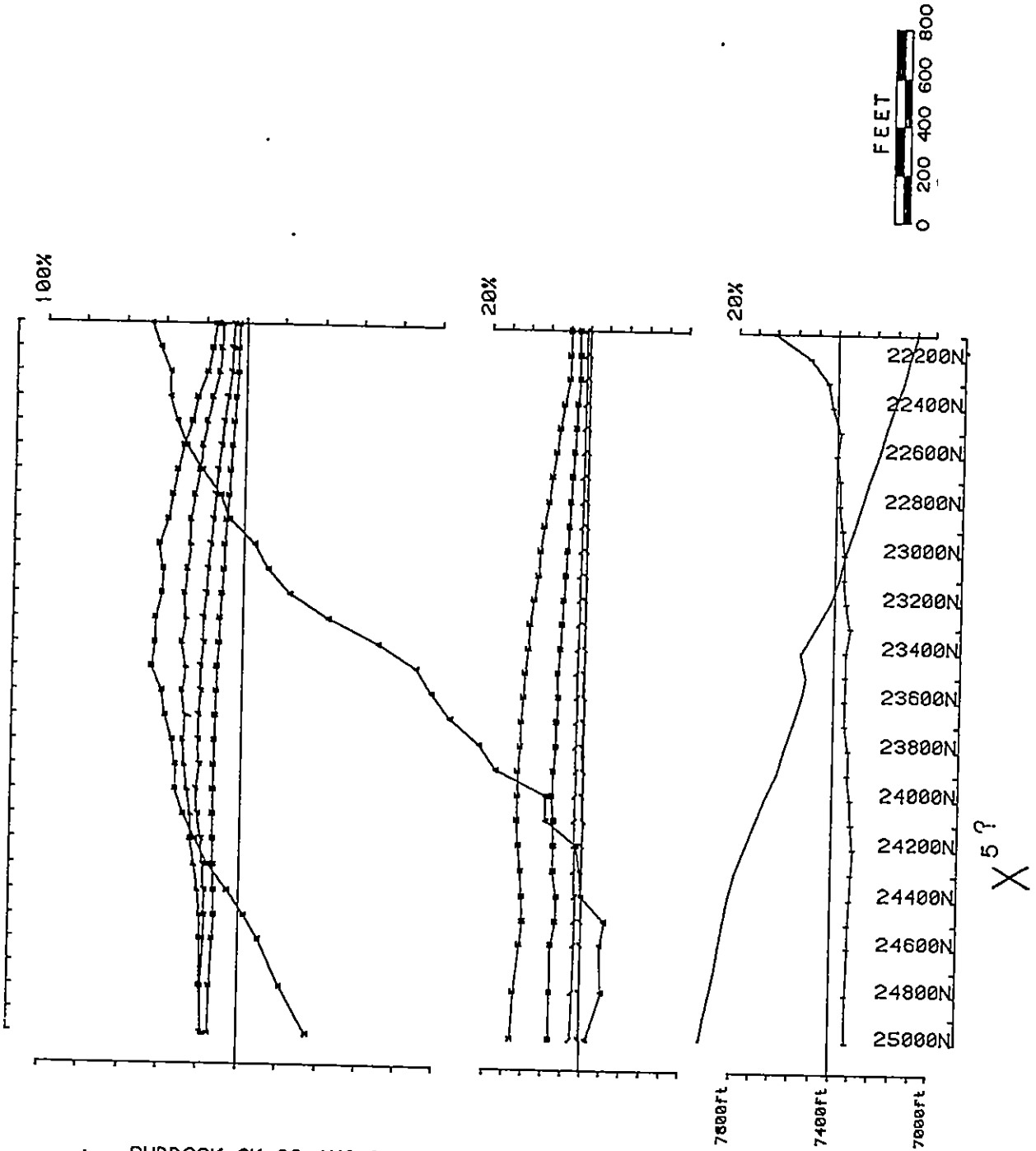


Conductor axis located by cross-over anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal cross-overs are indicated.

D A T A S E C T I O N S

D.S. 1 to D.S. 21



Area RUDDOCK CK 22-AUG-82 Cominco operator JJL&AOH freq(hz) 30.974
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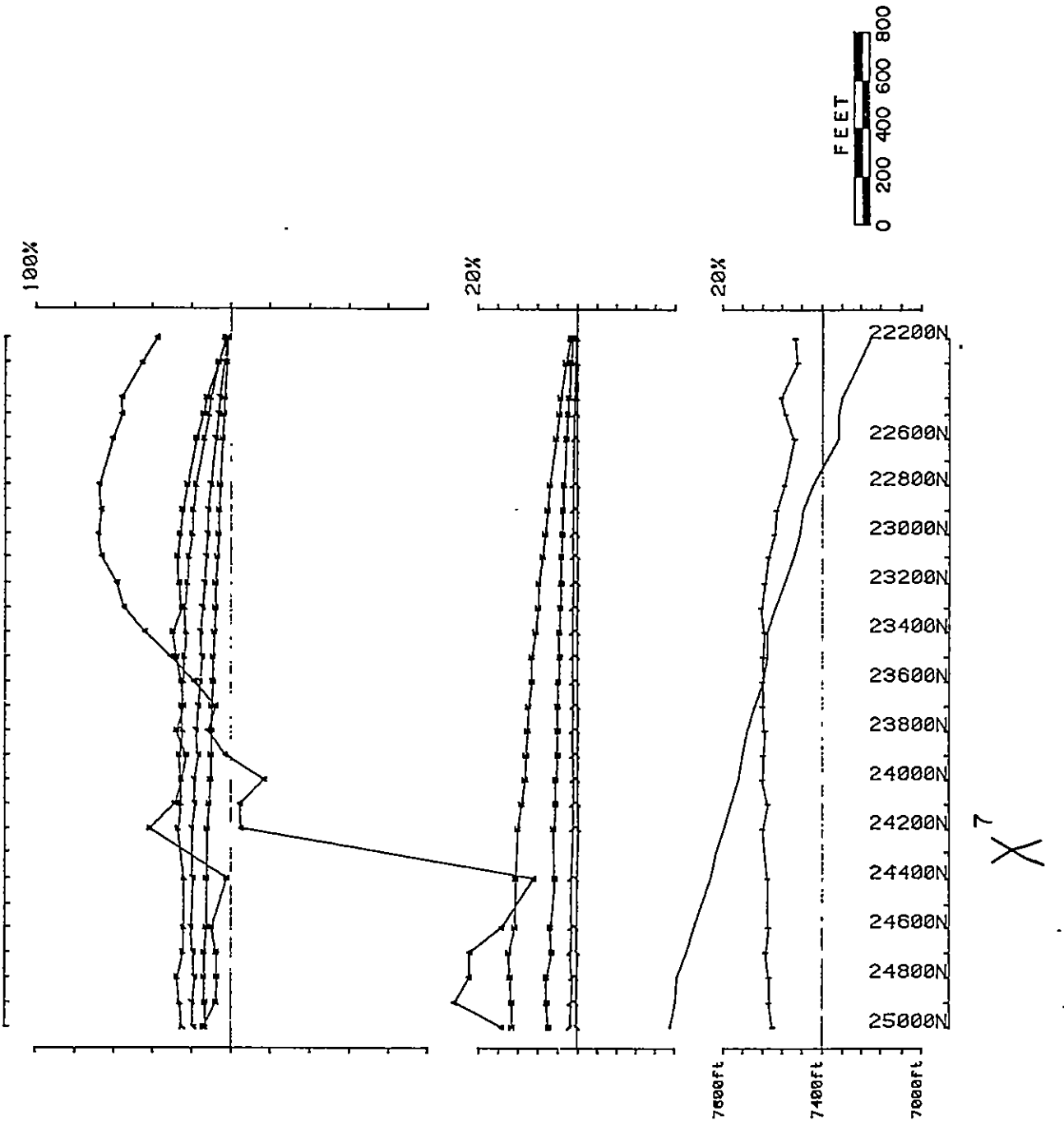
D.S.I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24800N
25000N
7600ft
7400ft
7000ft
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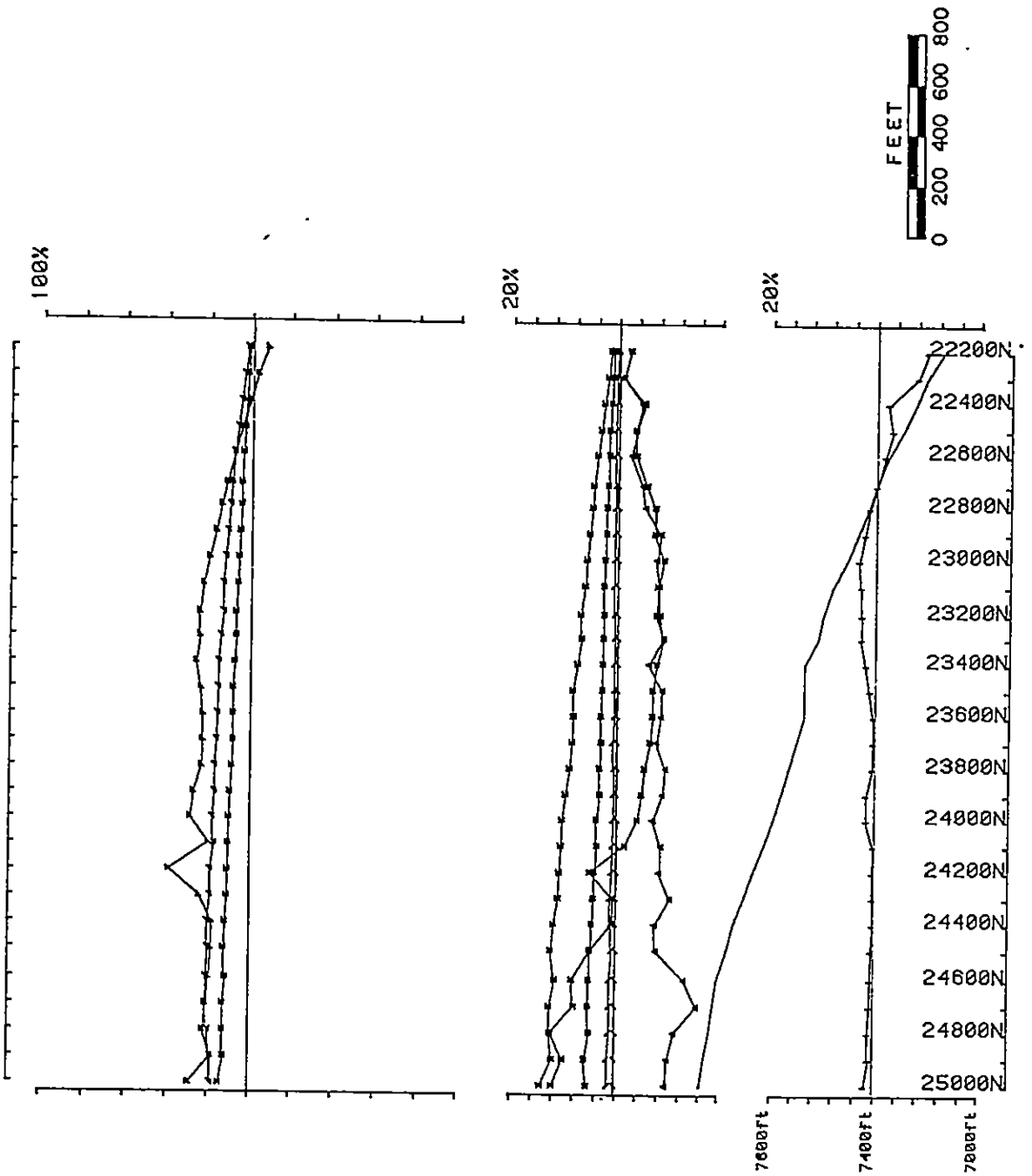
D.S. 2



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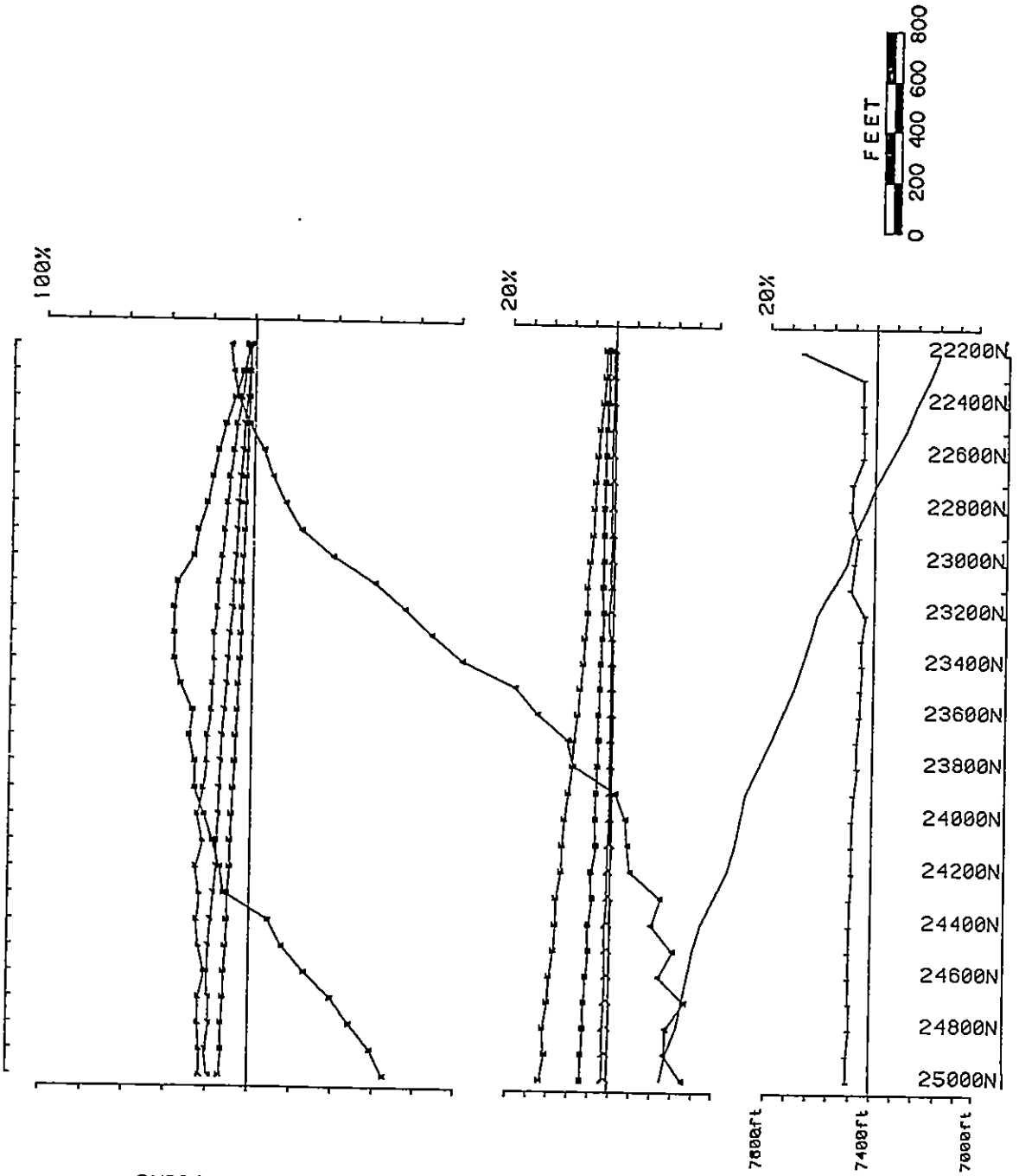

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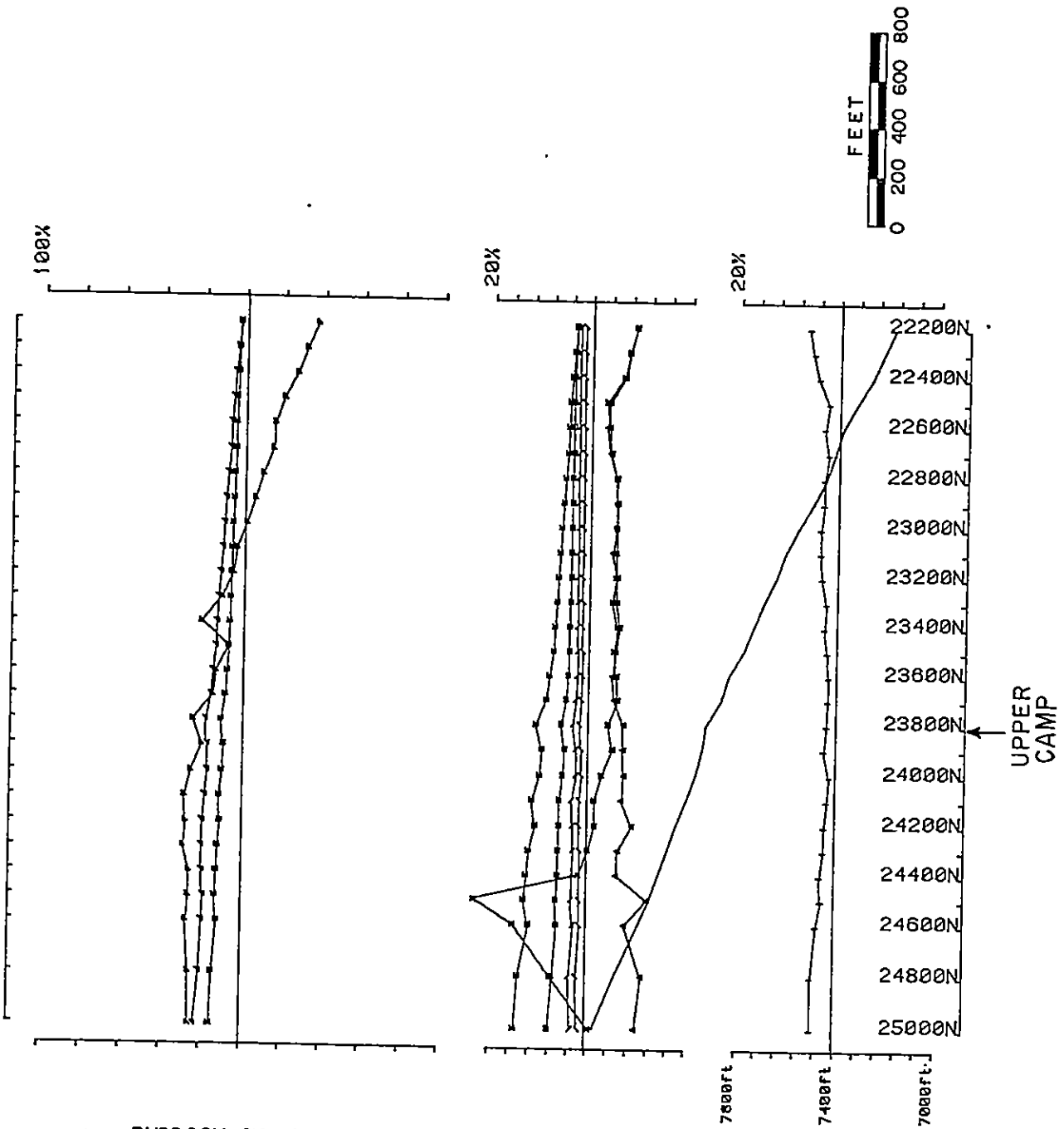
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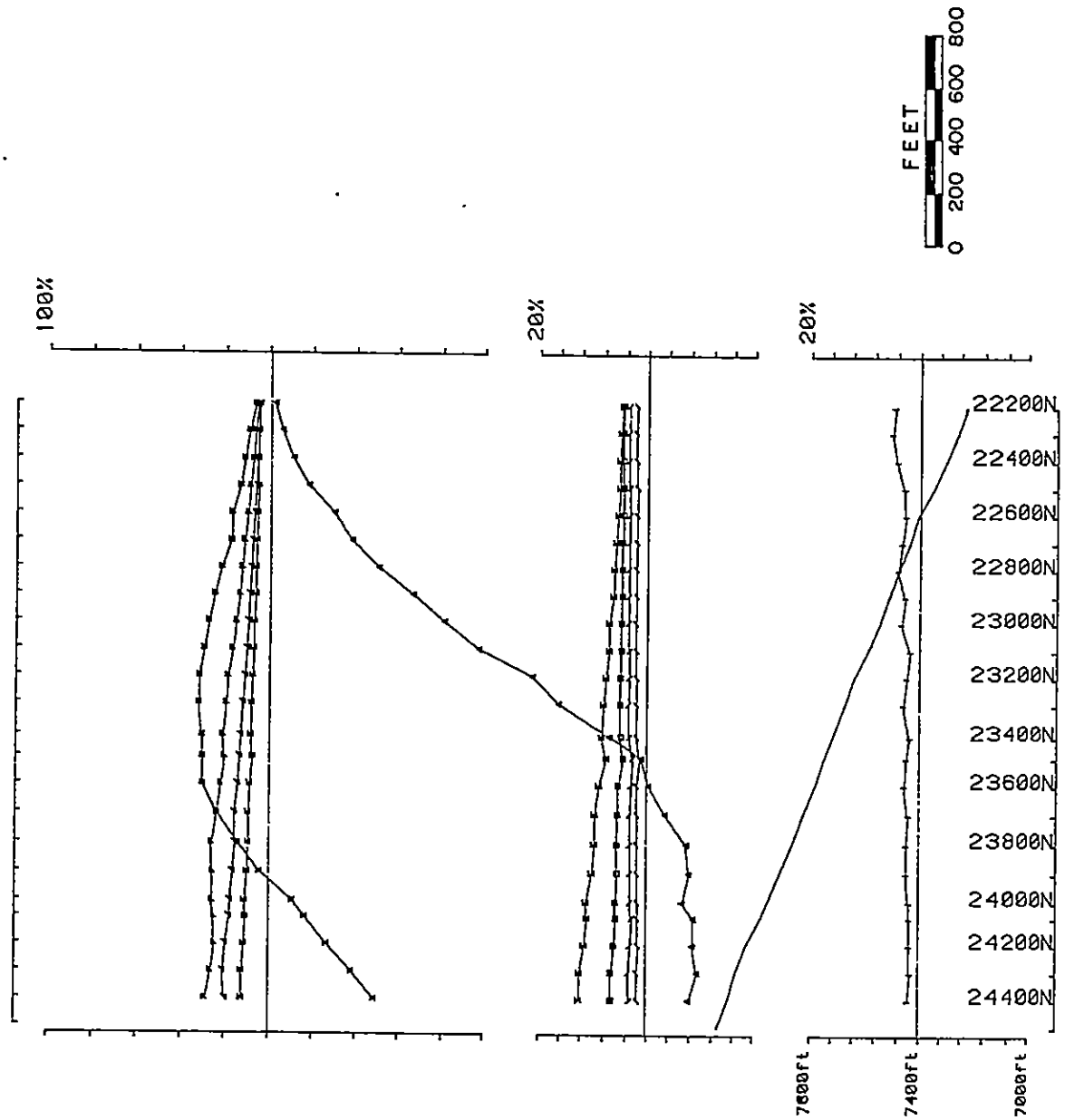

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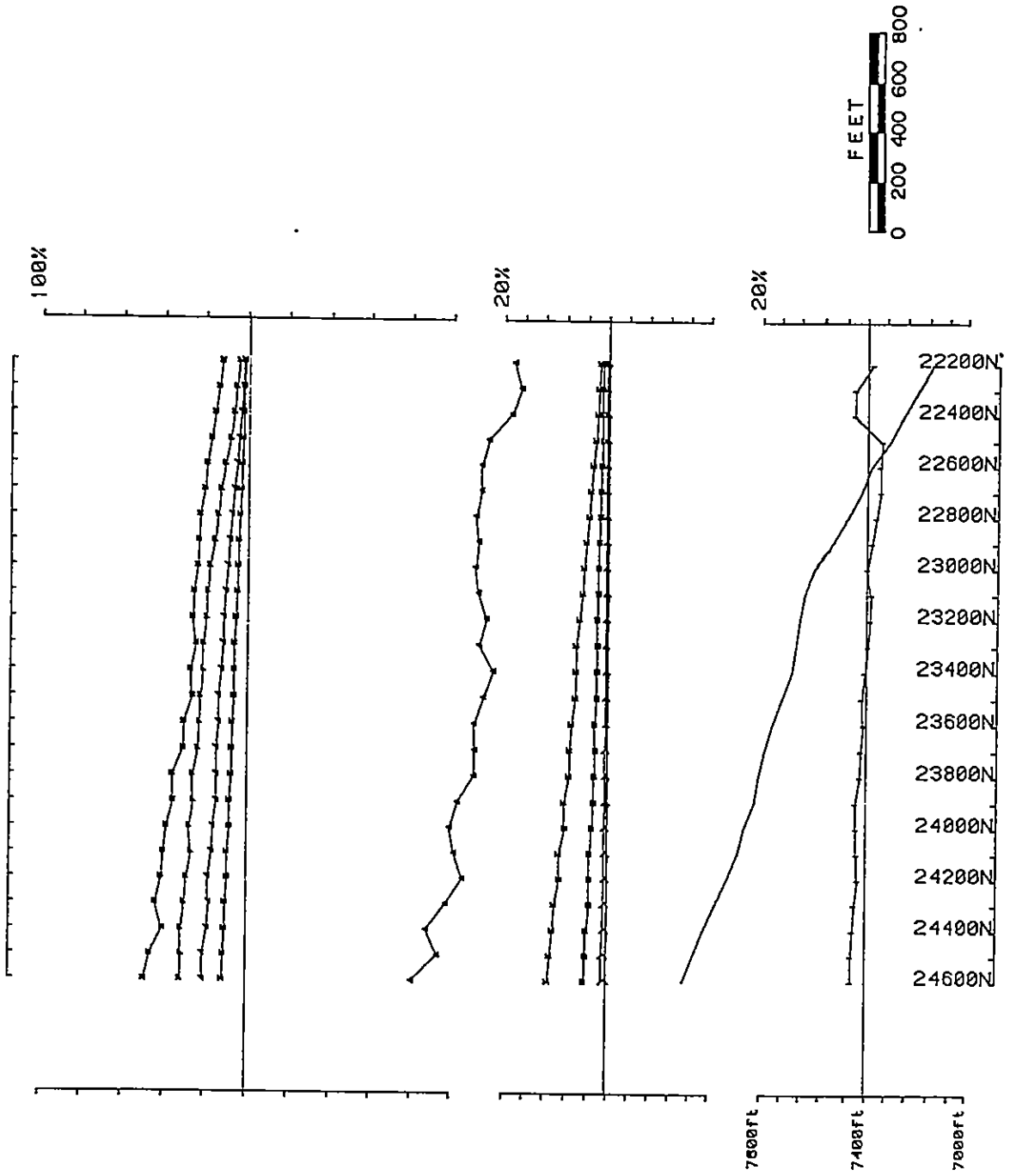

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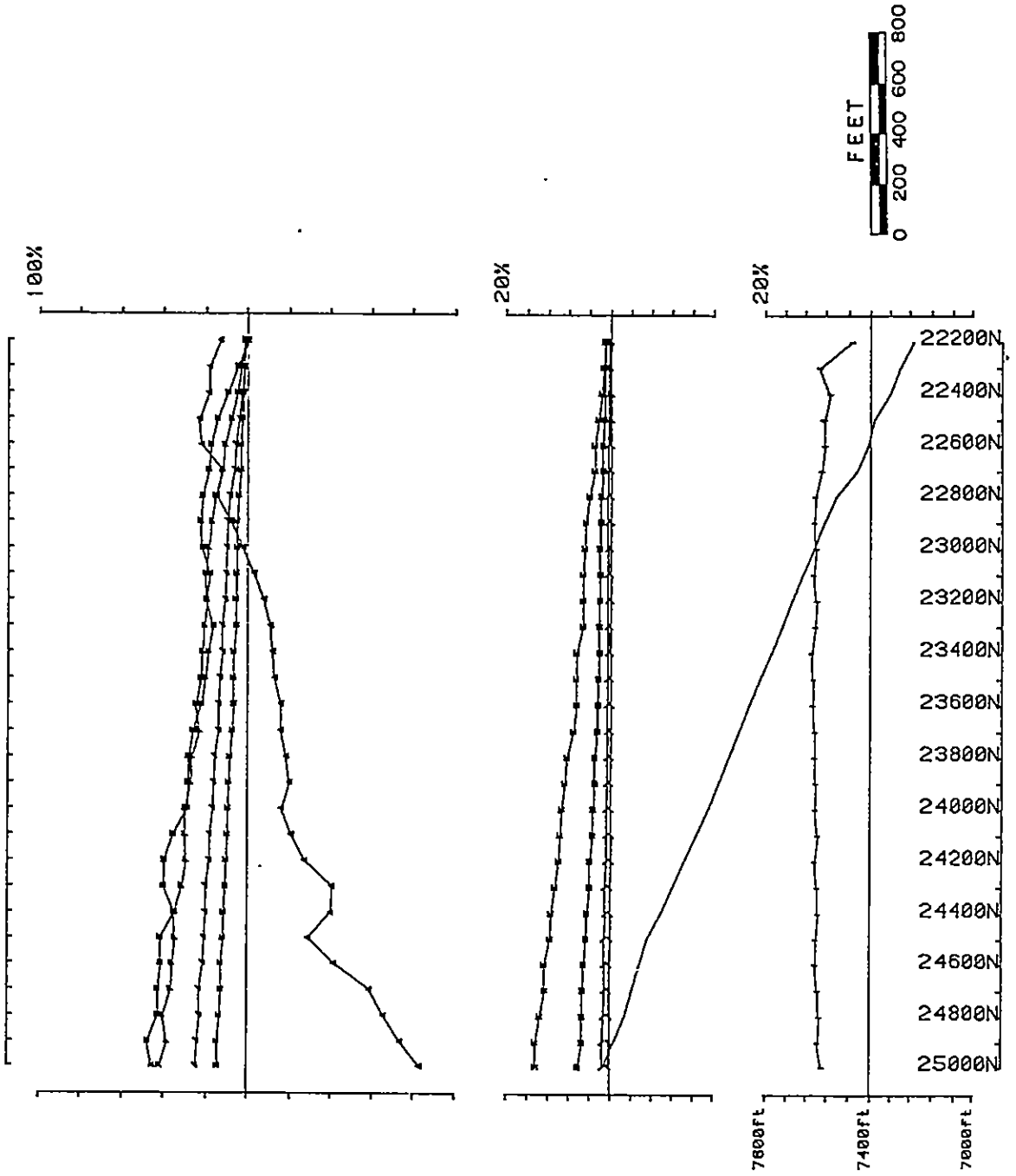

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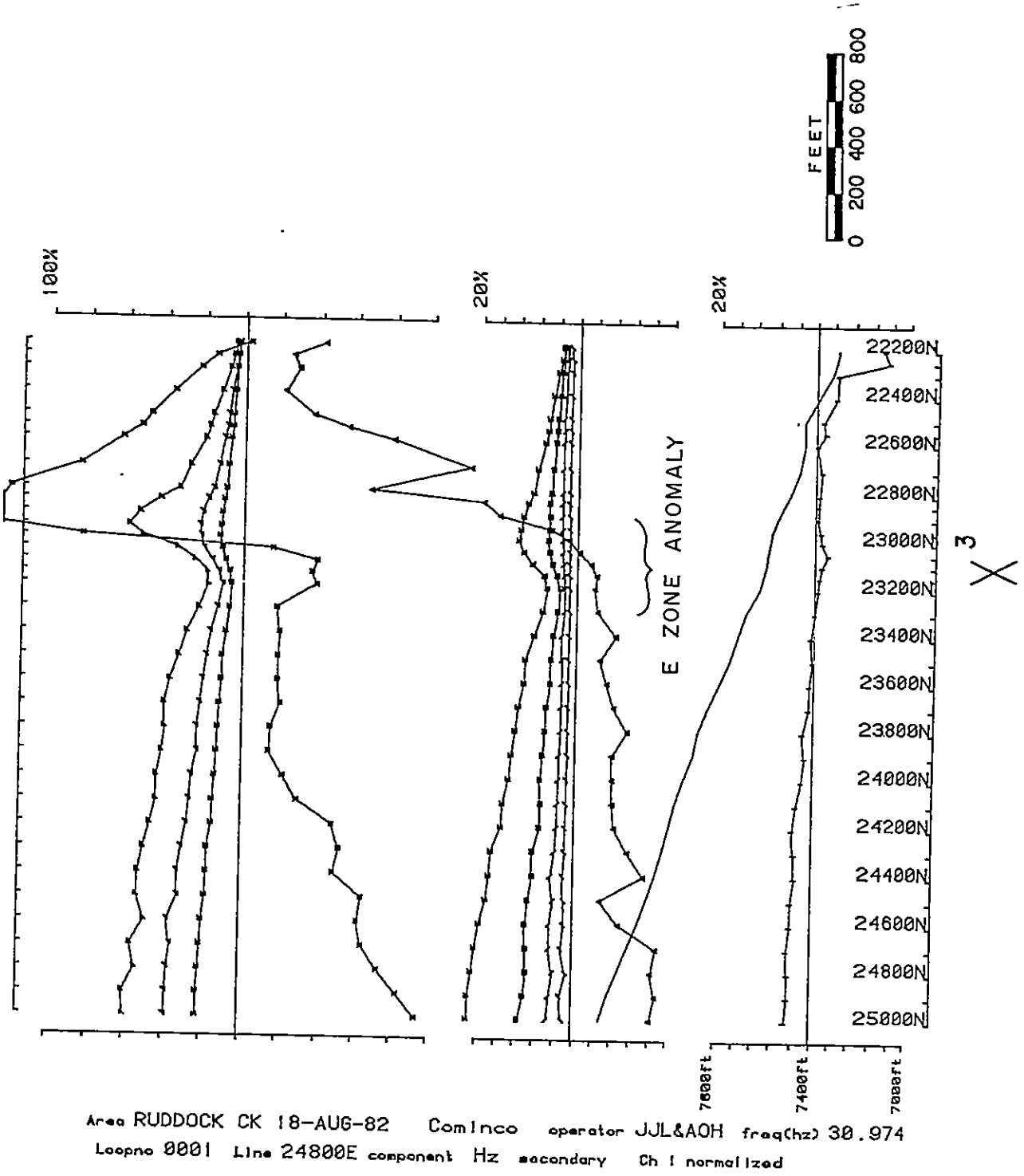

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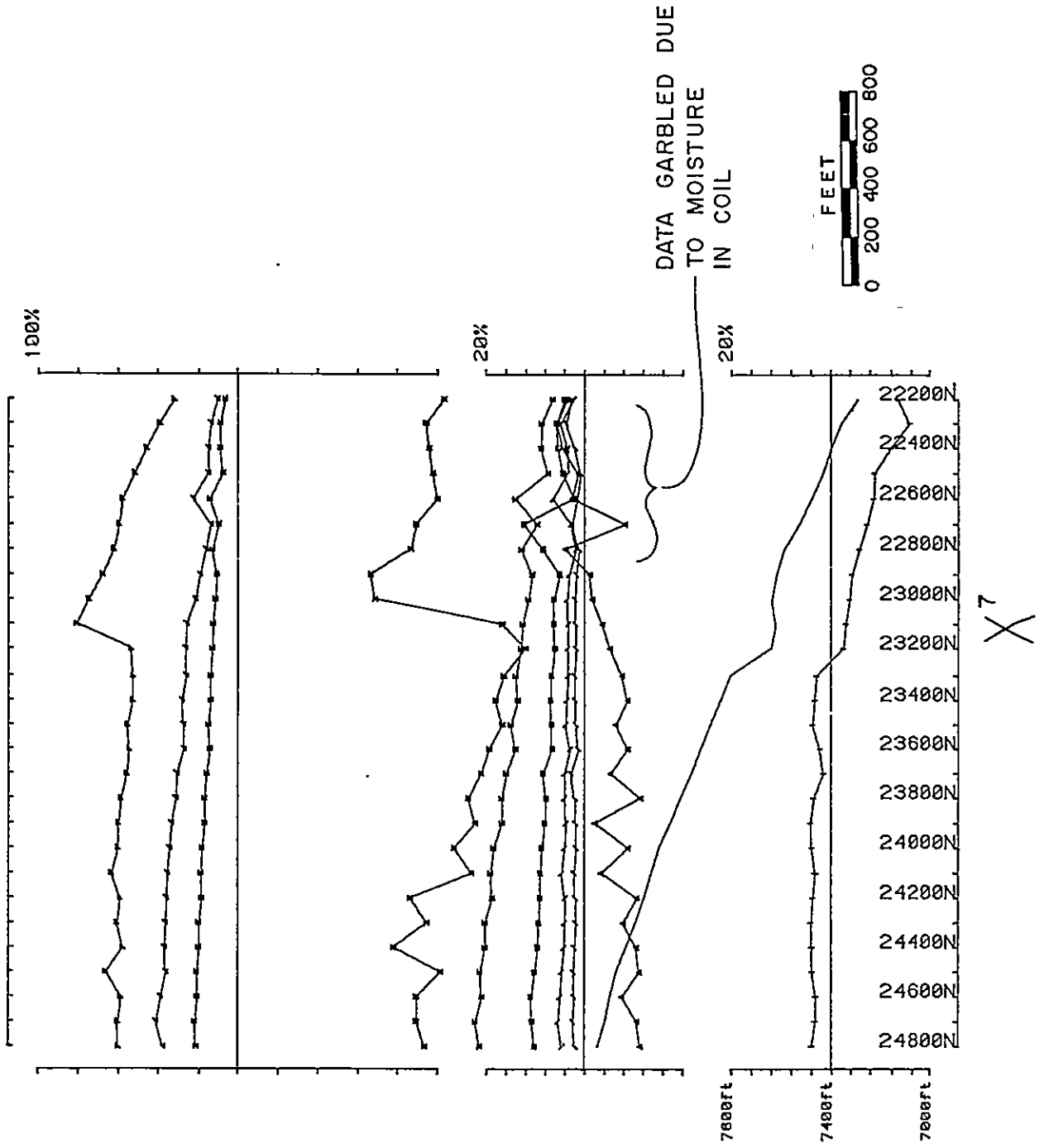
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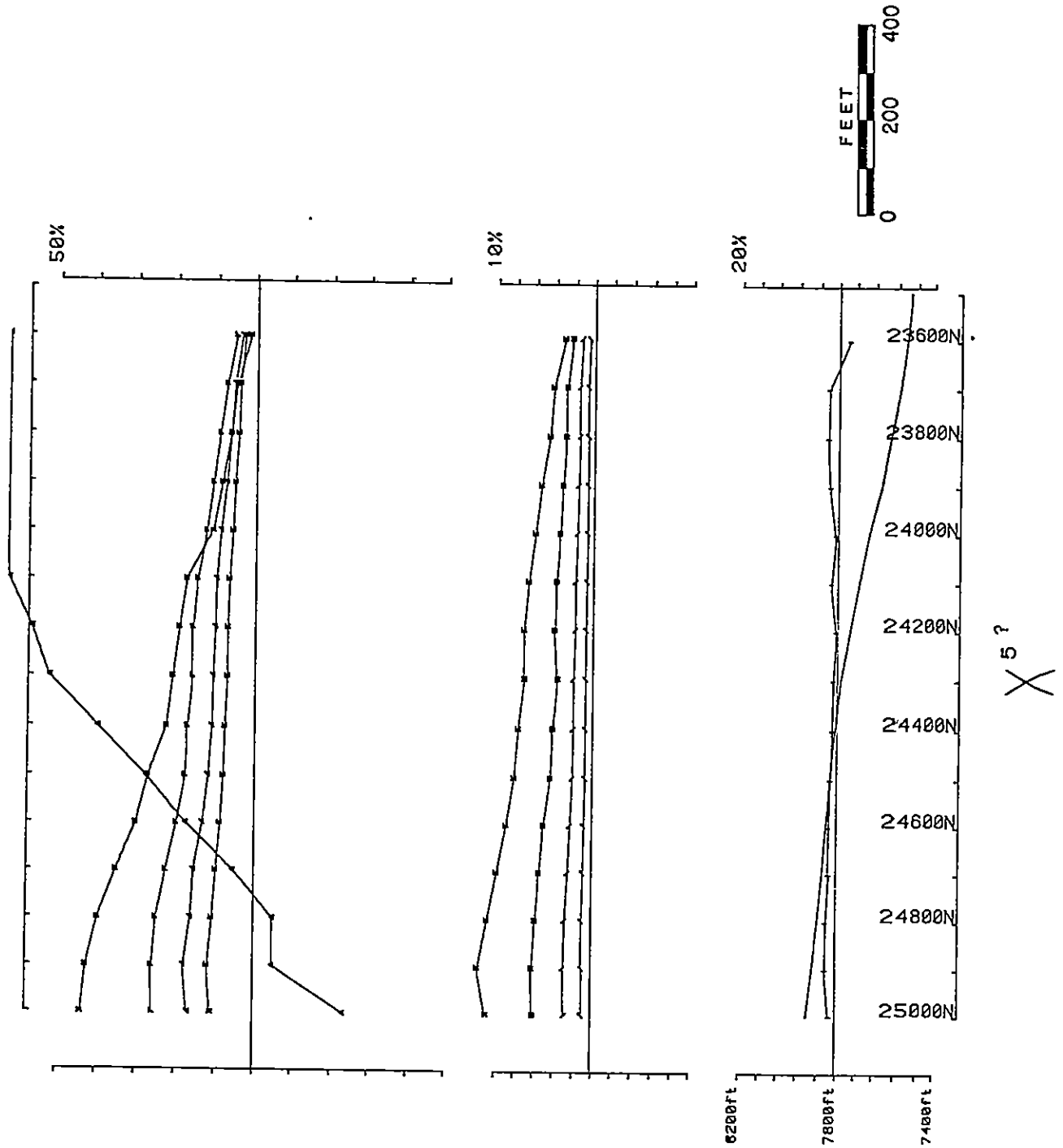

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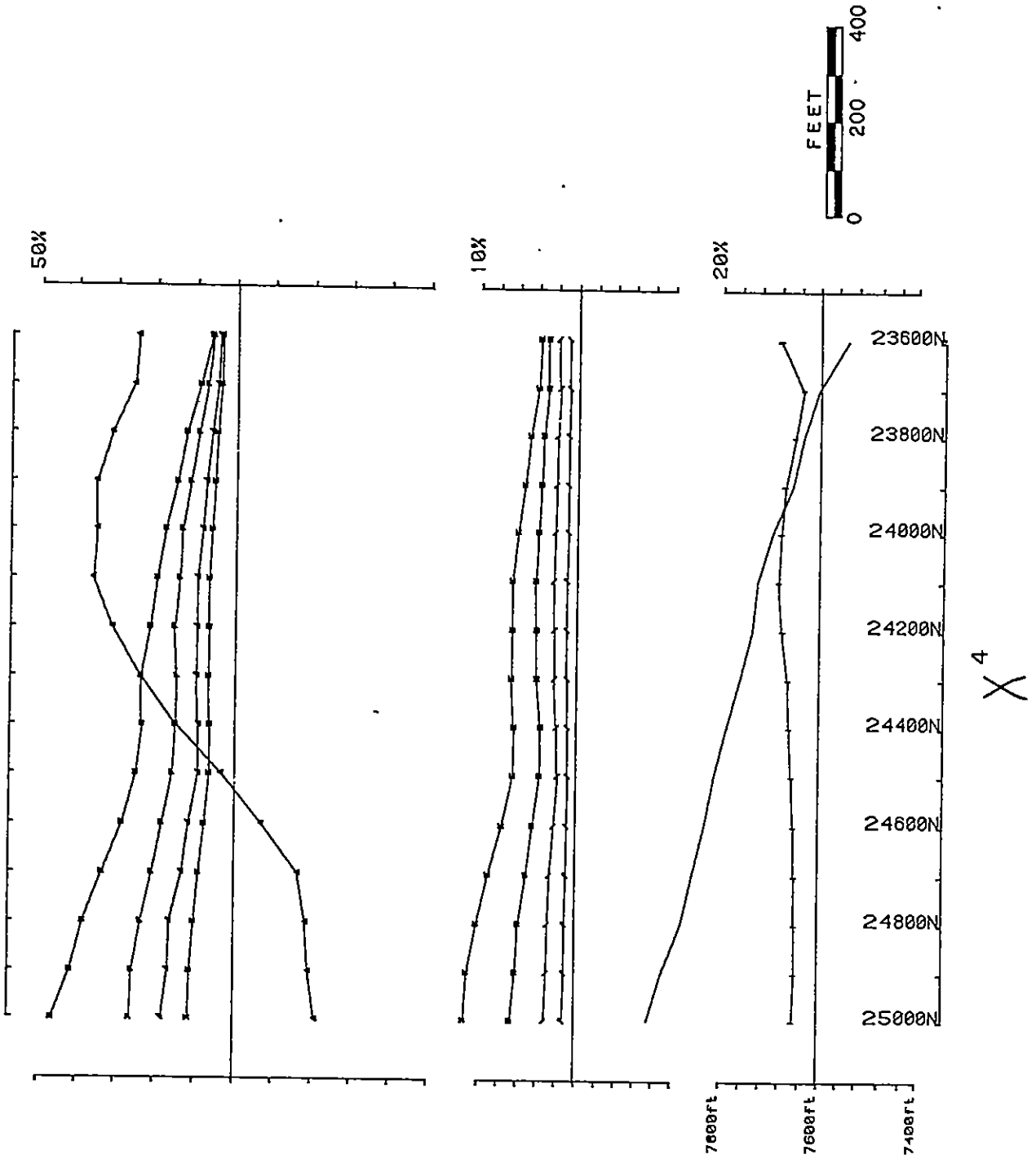

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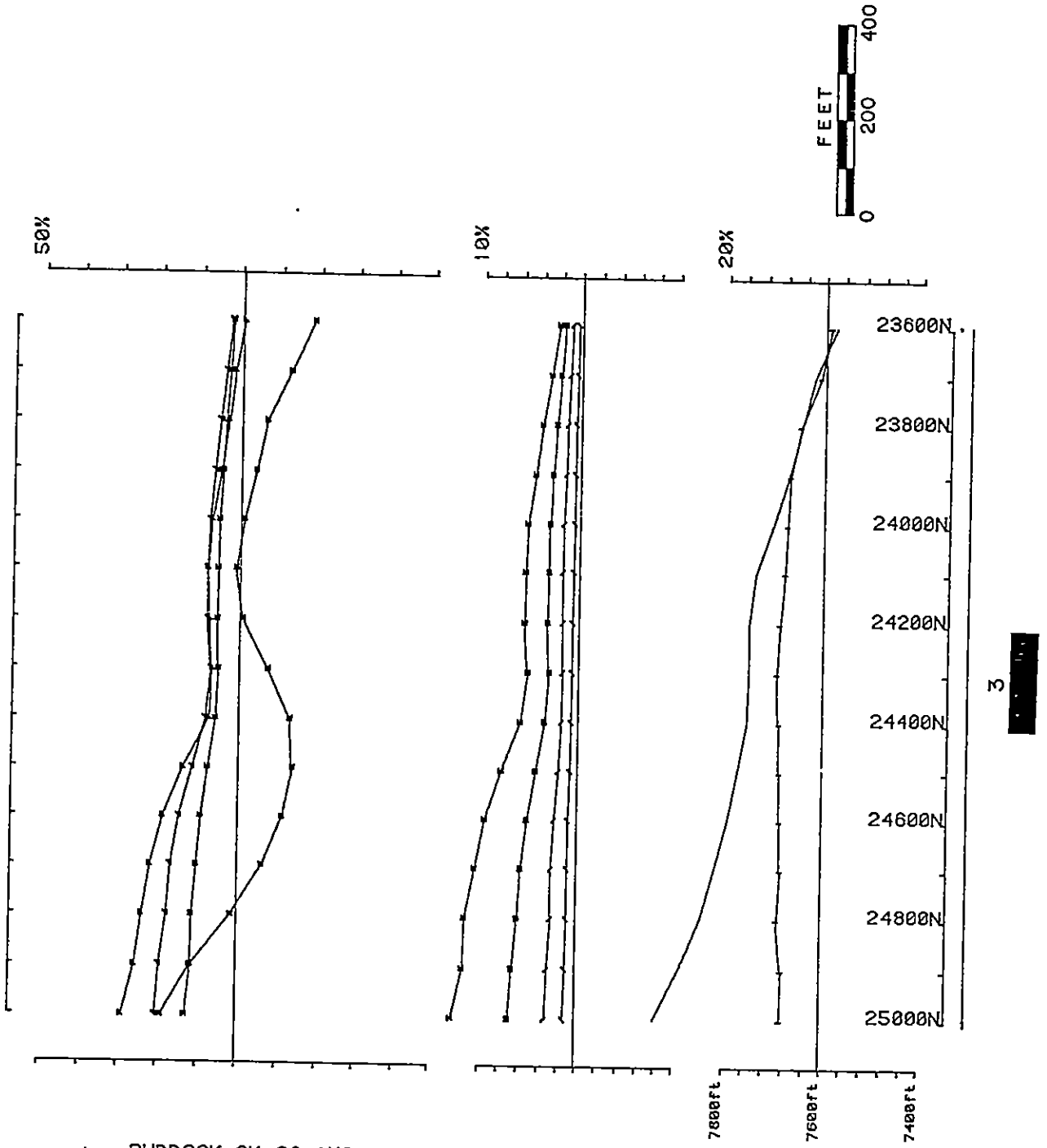

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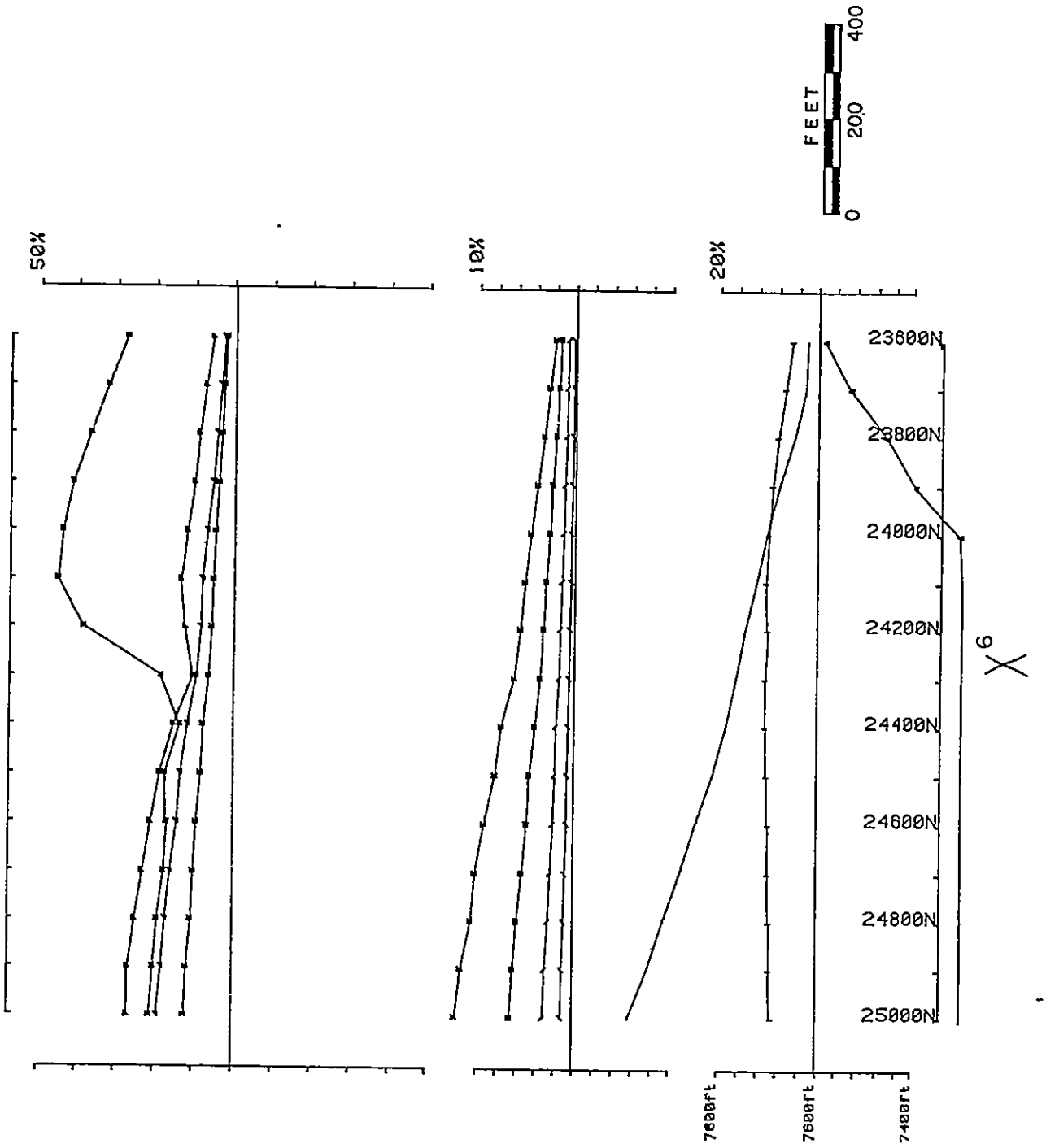

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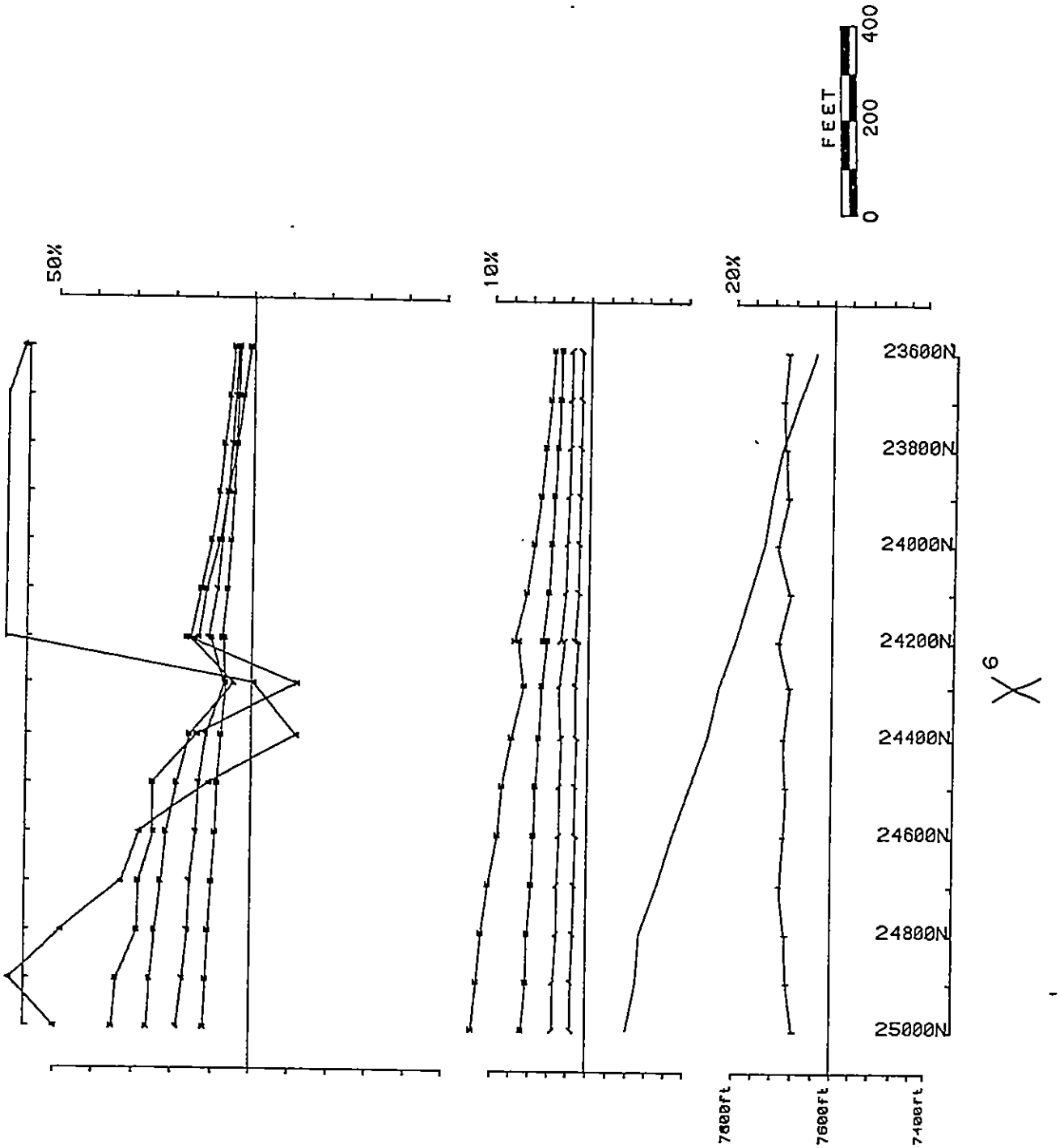

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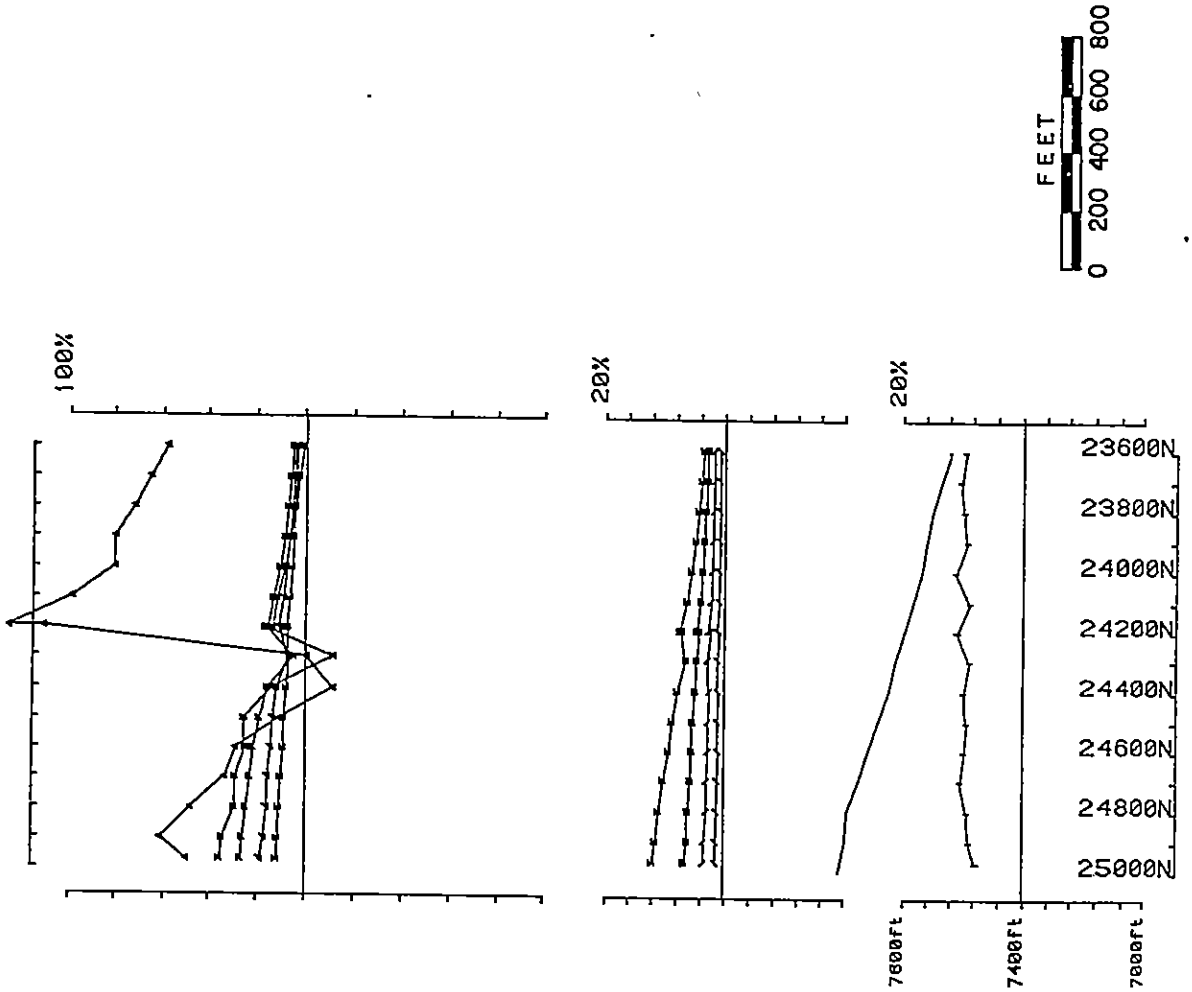

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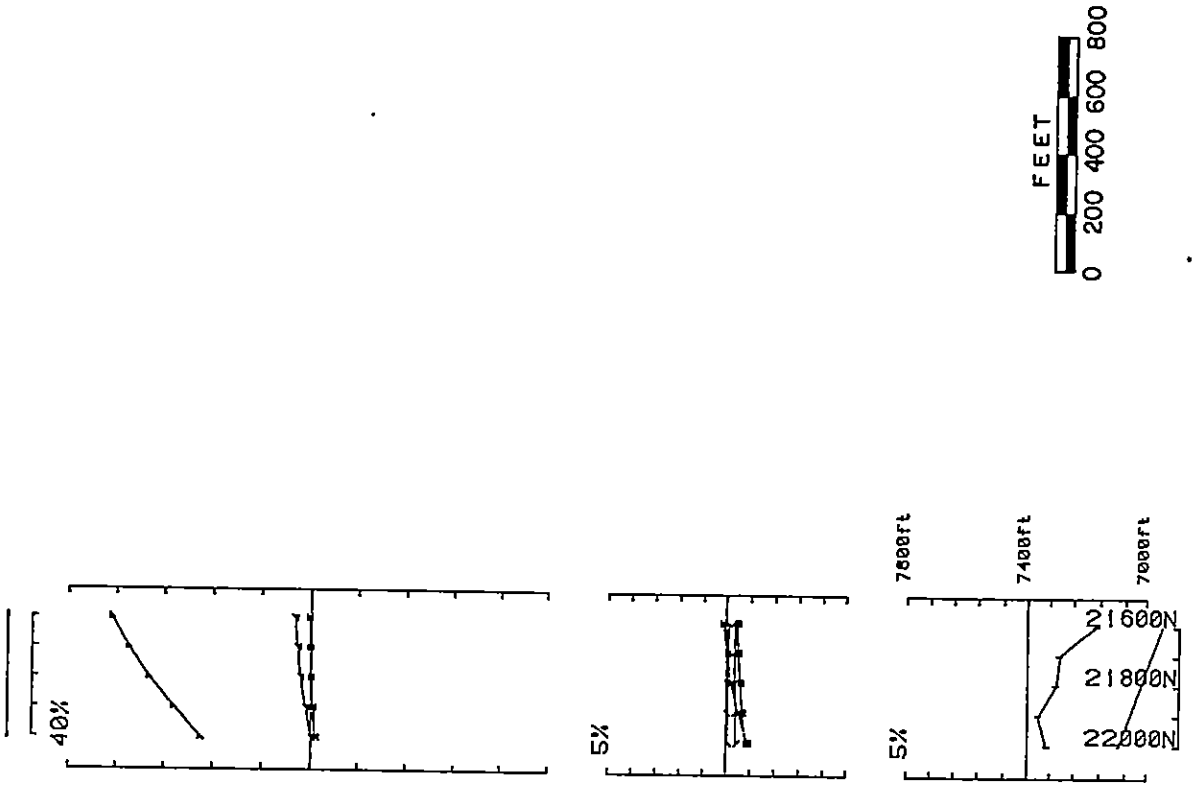

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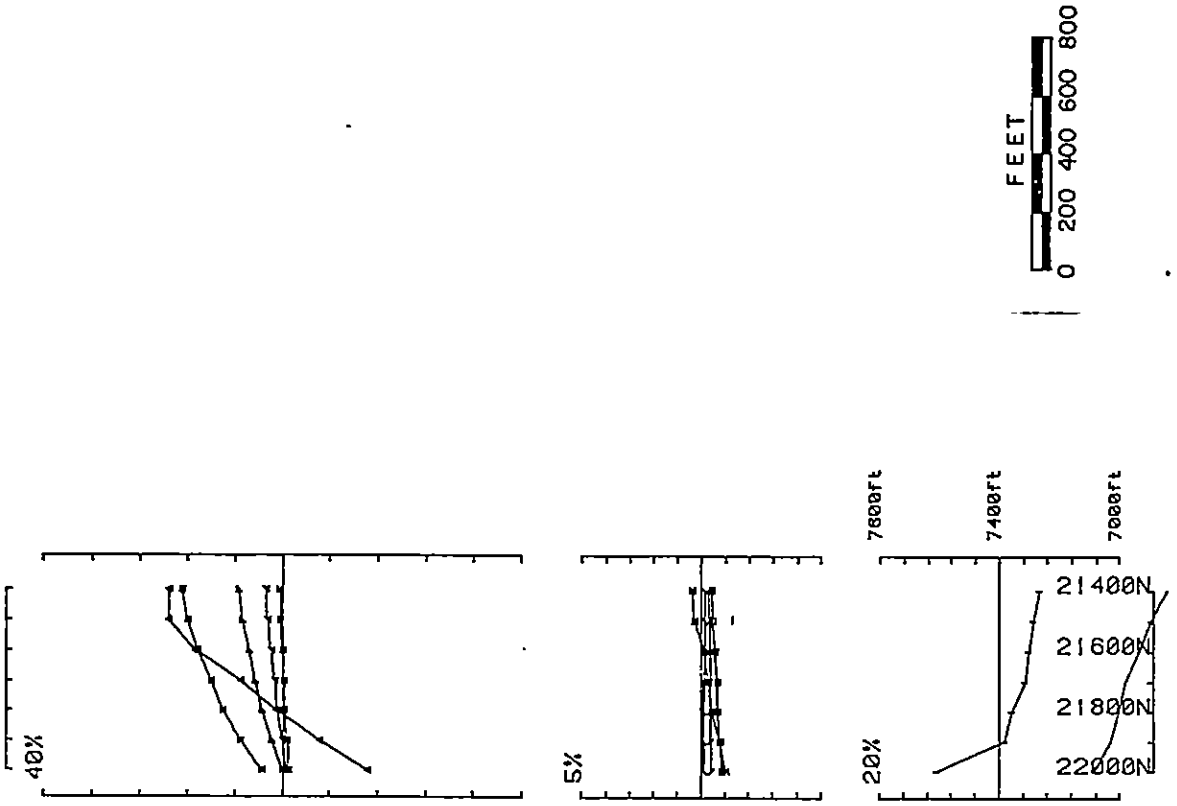
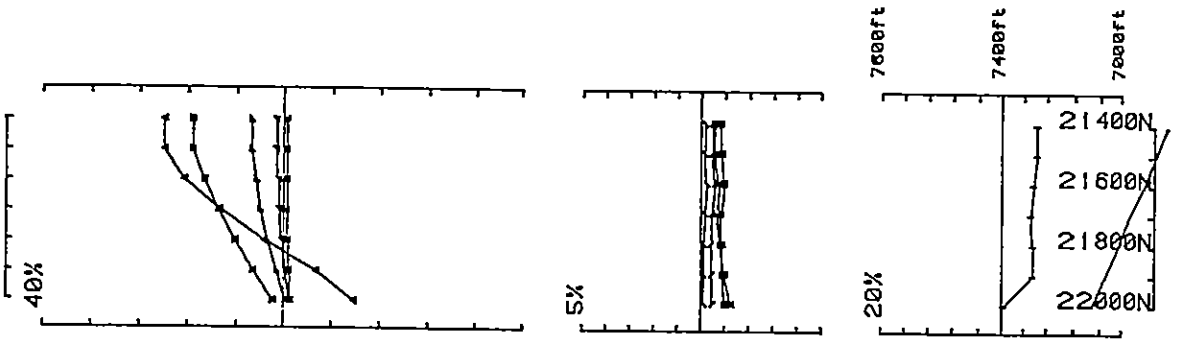
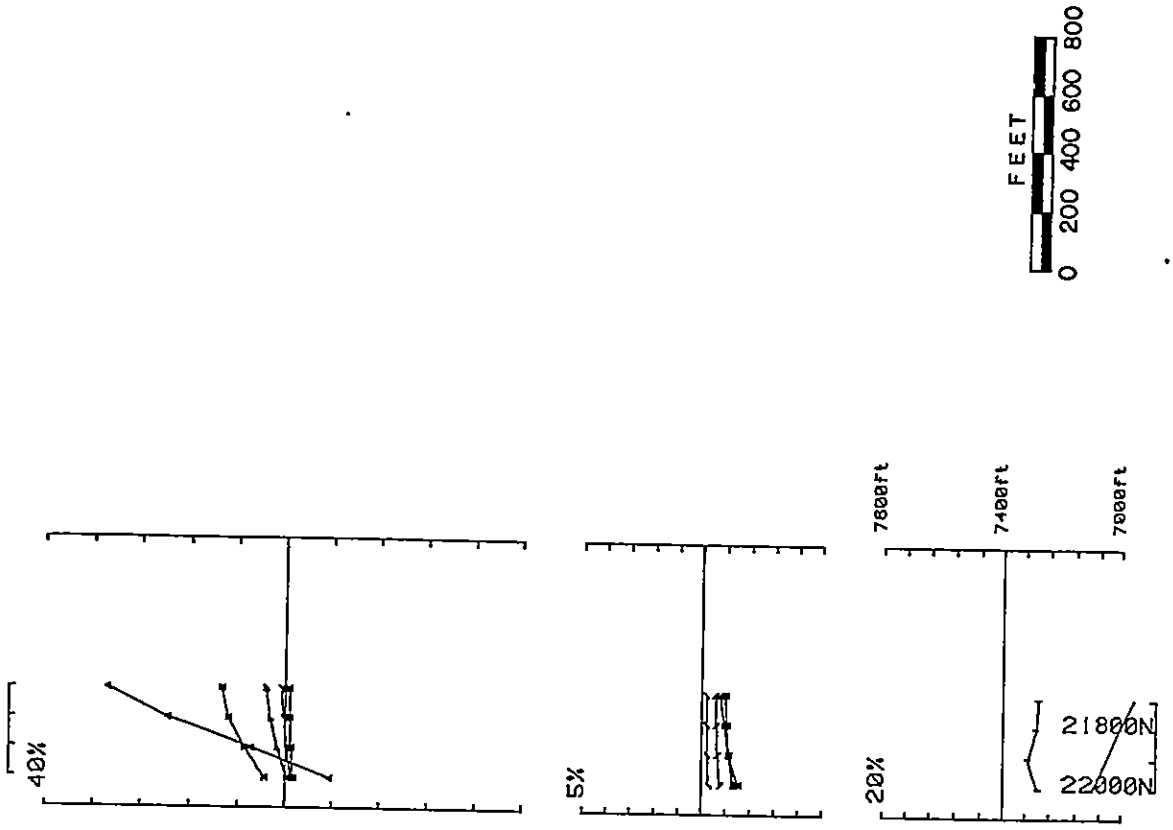


Area RUDDOCK CK 21-AUG-82 Cominco operator JJL&AOH freq(hz) 30.974
Loopno 0003 Line 22800E component Hz secondary Ch I normalized

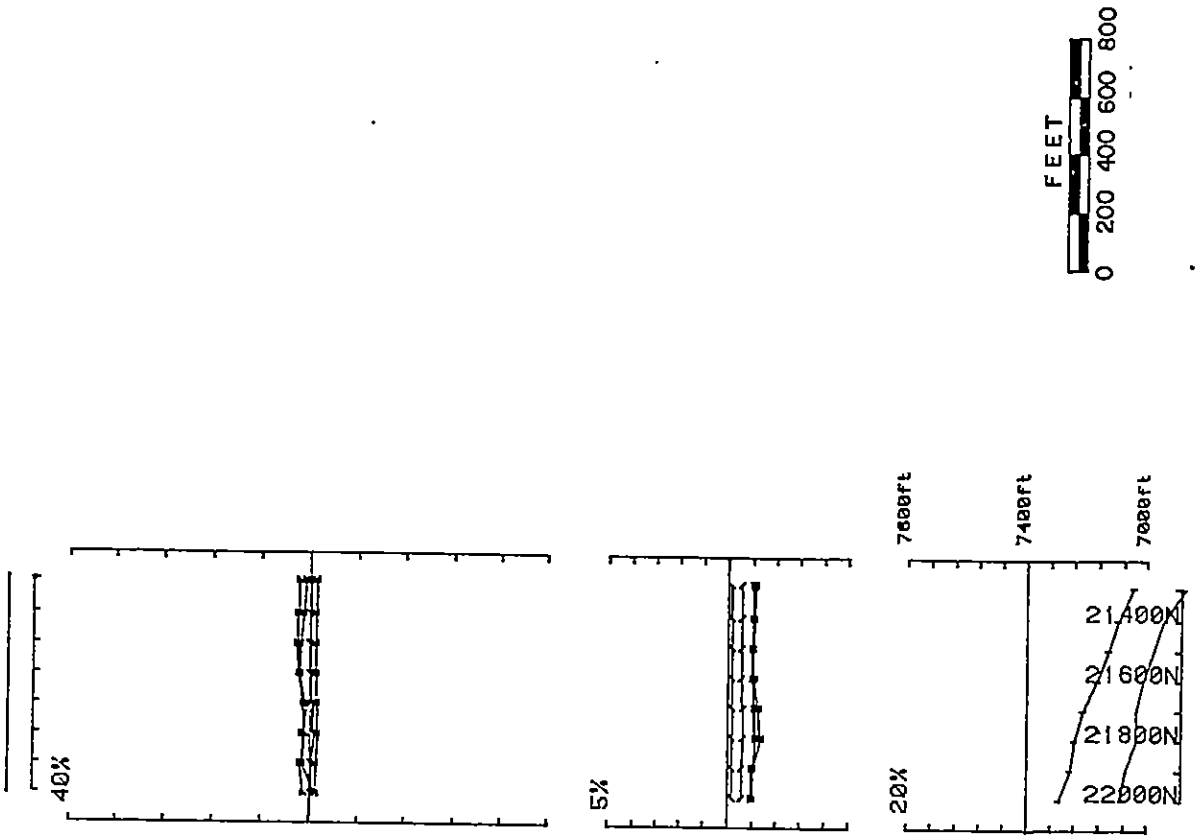


Area RUDDOCK CK 21-AUG-82 Cominco operator JJL&AOH freq(hz) 30.974
Loopno 0003 Line 23200E component Hz secondary Ch I normalized

D.S. 18

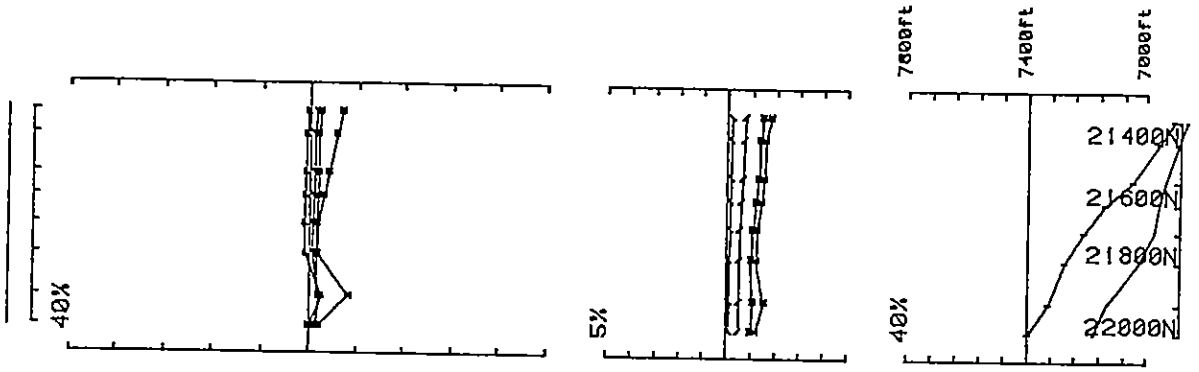


Area Ruddock CK 20-AUG-82 Cominco operator JJL&AOH freq(hz) 30.974
Loopno 0003 Line 23600E component Hz secondary Ch 1 normalized



Area Ruddock CK 20-AUG-82 Cominco operator JJL&AOH freq(hz) 30.974
Loopno 0003 Line 24000E component Hz secondary Ch 1 normalized

D.S. 20



Area Ruddock CK 20-AUG-82 Cominco operator JJL&AOH freq(hz) 30.974
Loopno 0003 Line 24400E component Hz secondary Ch 1 normalized

APPENDIX "A"

BOREHOLE PEM REPORT BY CRONE GEOPHYSICS LTD.

REPORT FOR: Cominco Limited

COVERING: Crone Borehole PEM

OVER THEIR: Ruddock Creek Property

SURVEY BY: Crone Geophysics Limited, Mississauga, Ontario

REPORT BY: David Anderson

DATED: September 1st, 1982

SUMMARY:

The PEM borehole logs from 75-1 and 76-1 delineated a horizontal conductor that is centrally intersected by 75-1 and remains off-hole, south of 76-1. The conductor shows some extension to the east, west and south of 75-1, but only limited extension to the north.

SURVEY DATA:

The Crone borehole PEM survey was run with a high power 2000 watt PEM transmitter. Transmit loops were 300 meters square. In all 5 loops were used, with 75-1 and 76-1 being logged from each loop location. For loop positions see the accompanying plan map.

BH 76-1 was clear to 720 meters, however microphonic noise problems were encountered at 670 meters. It is suspected that there is moving water in the borehole between 670 and 720 meters, causing the receiver probe to hit the walls of the hole and creating a strong noise signal. The survey data for the section of this hole, from 670 to 720 meters, is noise and cannot be used.

In all 6.8 km of logging was completed between July 29th to August 5th, 1982. The survey was run by D. Anderson of Crone Geophysics Limited.

INTERPRETATION:

For a detailed description of the individual borehole profiles consult the anomaly charts at the back of the report.

Multi transmit loops are employed in a PEM borehole survey to determine the attitude and direction of the conductor relative to the borehole. When a transmit loop is moved to the up dip or opposite side of a vertical conductor, the conductor is energized from below, causing the anomaly pattern to reverse.

Figures 1, 2 and 3 are scale models of the primary field generated by the in-loop, south and north transmit loops. Note that in the vicinity of the conductor, there is a 90° shift in the direction of the primary fields from the north and south loops (see figures 2 and 3). When 75-1 and 76-1 were logged from these loops, a reverse anomaly pattern was not detected. This eliminates the possibility of the observed response being generated by a vertical conductor between the holes. In fact, this would imply that the conductor is shallow dipping to near horizontal.

Figures 4, 5 and 6 show the expected response in 76-1, had a vertical conductor existed between the two holes. This assumes that 76-1 was open to the base of the hole.

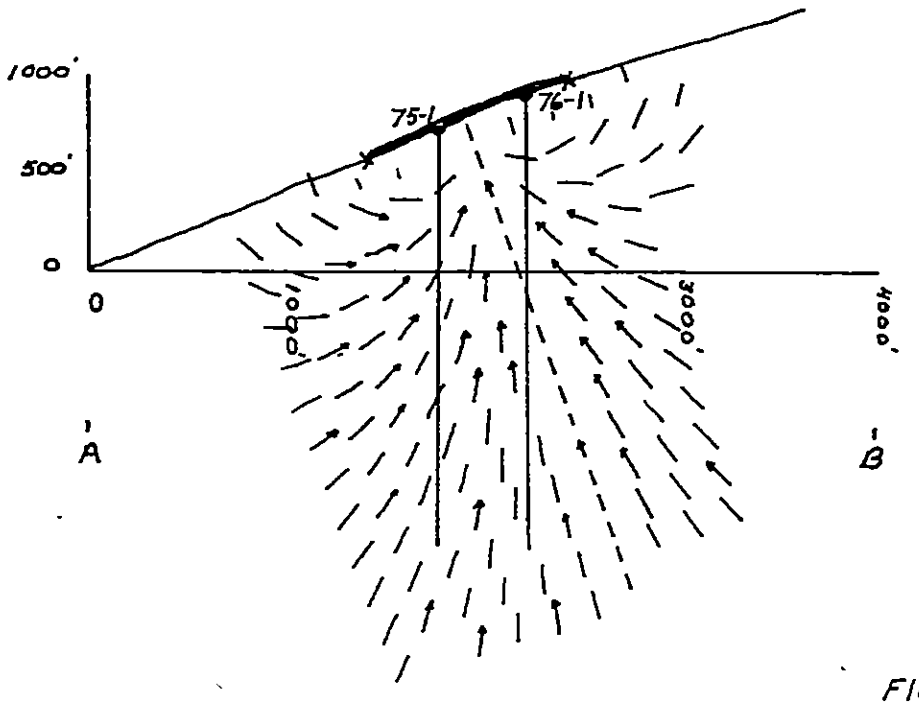
BH 75-1 has intersected the central region of a horizontal conductor at 610 meters (2001'). The conductor has an average conductivity-thickness of 115 mhos.

BH 76-1 passes to the north of the same conductor. The off-hole response in this hole, is still peaking at 670 meters where logging was stopped. This places the north edge of the conductor slightly below 670 meters and to the south of 76-1.

The borehole responses in 75-1 and 76-1 showed little change in character when surveyed from the different transmit loops. The regular nature of the response indicates a plate like conductor. There is some evidence of a shifting cross-over in the off-hole response of 76-1, (see anomaly charts). This suggests a limited thickening of the conductor.

Respectfully submitted,

David Anderson,
Geophysicist.



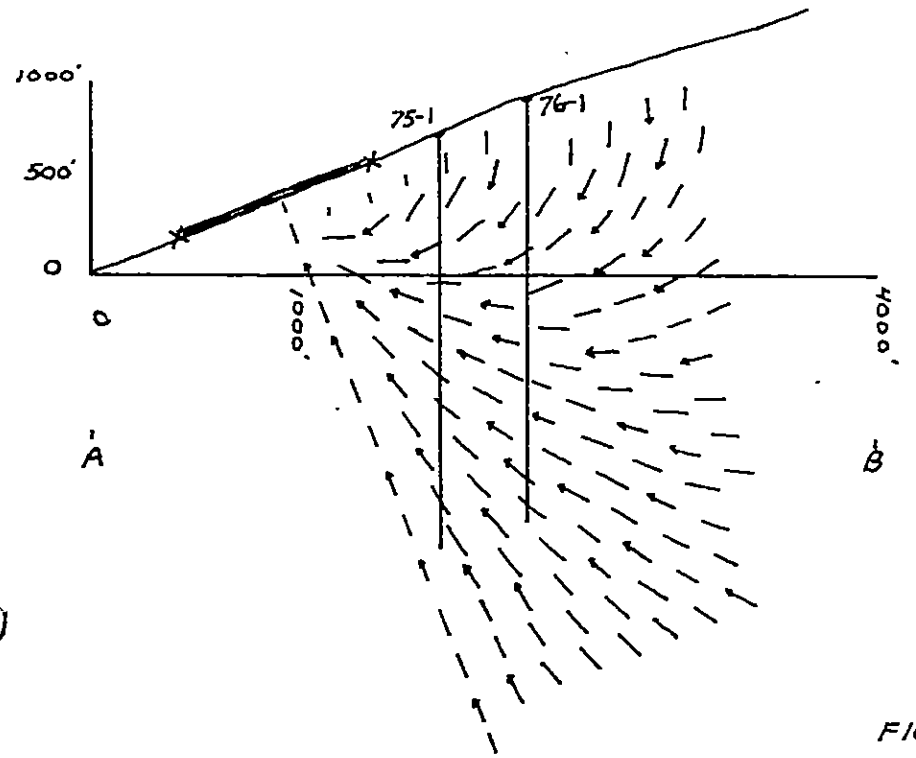
X- TRANSMIT LOOP

↑ - PRIMARY FIELD DIRECTION

SCALE 1"= 1000'

TRANSMIT LOOP SURROUNDING DRILL HOLES (IN-LOOP)

FIGURE 1



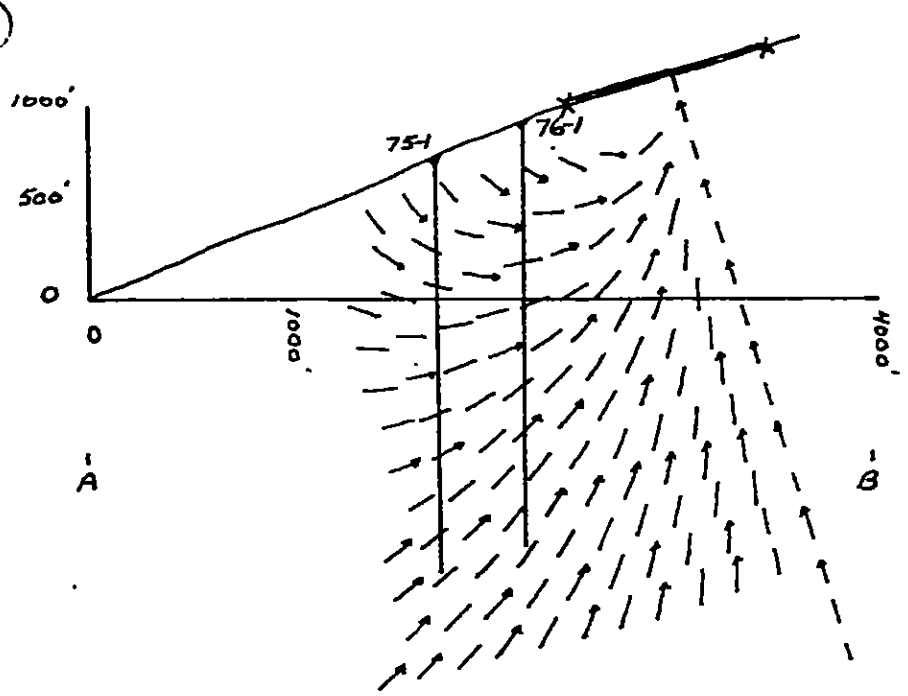
X- TRANSMIT LOOP

↑ - PRIMARY FIELD DIRECTION

SCALE 1"=1000'

TRANSMIT LOOP SOUTH OF THE BOREHOLES

FIGURE 2



X - TRANSMIT LOOP

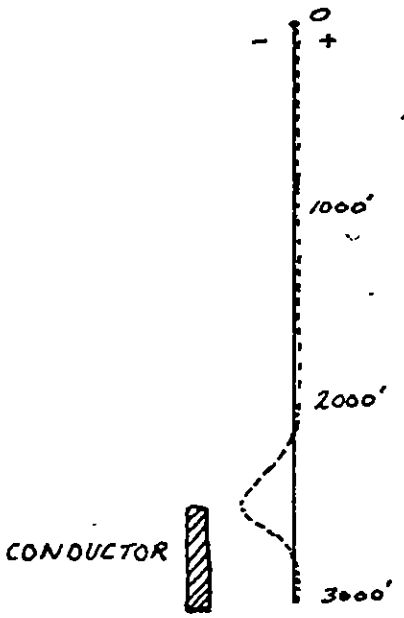
↑ - PRIMARY FIELD DIRECTION

SCALE 1" = 1000'

TRANSMIT LOOP NORTH OF THE BOREHOLES

FIGURE 3

BOREHOLE 76-1 TRANSMIT LOOP AROUND COLLAR



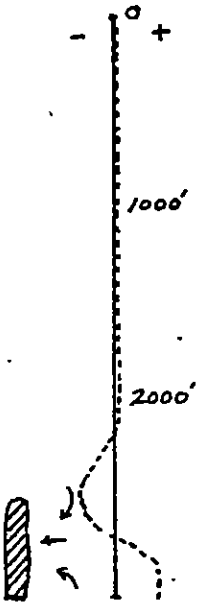
NEAR VERTICAL PRIMARY FIELD.

NEAR VERTICAL CONDUCTOR BEING ENERGIZED ON TOP ONLY.

STANDARD OFF HOLE RESPONSE.

FIGURE 4

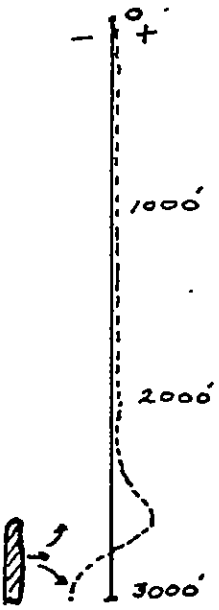
BOREHOLE 76-1 TRANSMIT LOOP TO THE SOUTH



CONDUCTOR IS ENERGIZED ON NORTH SIDE GIVING A SINUSOIDAL RESPONSE -VE TO +VE.

FIGURE 5

BOREHOLE 76-1 TRANSMIT LOOP TO THE NORTH



CONDUCTOR IS ENERGIZED ON SOUTH SIDE GIVING SINUSOIDAL RESPONSE +VE TO -VE.

FIGURE 6

INTERPRETATION

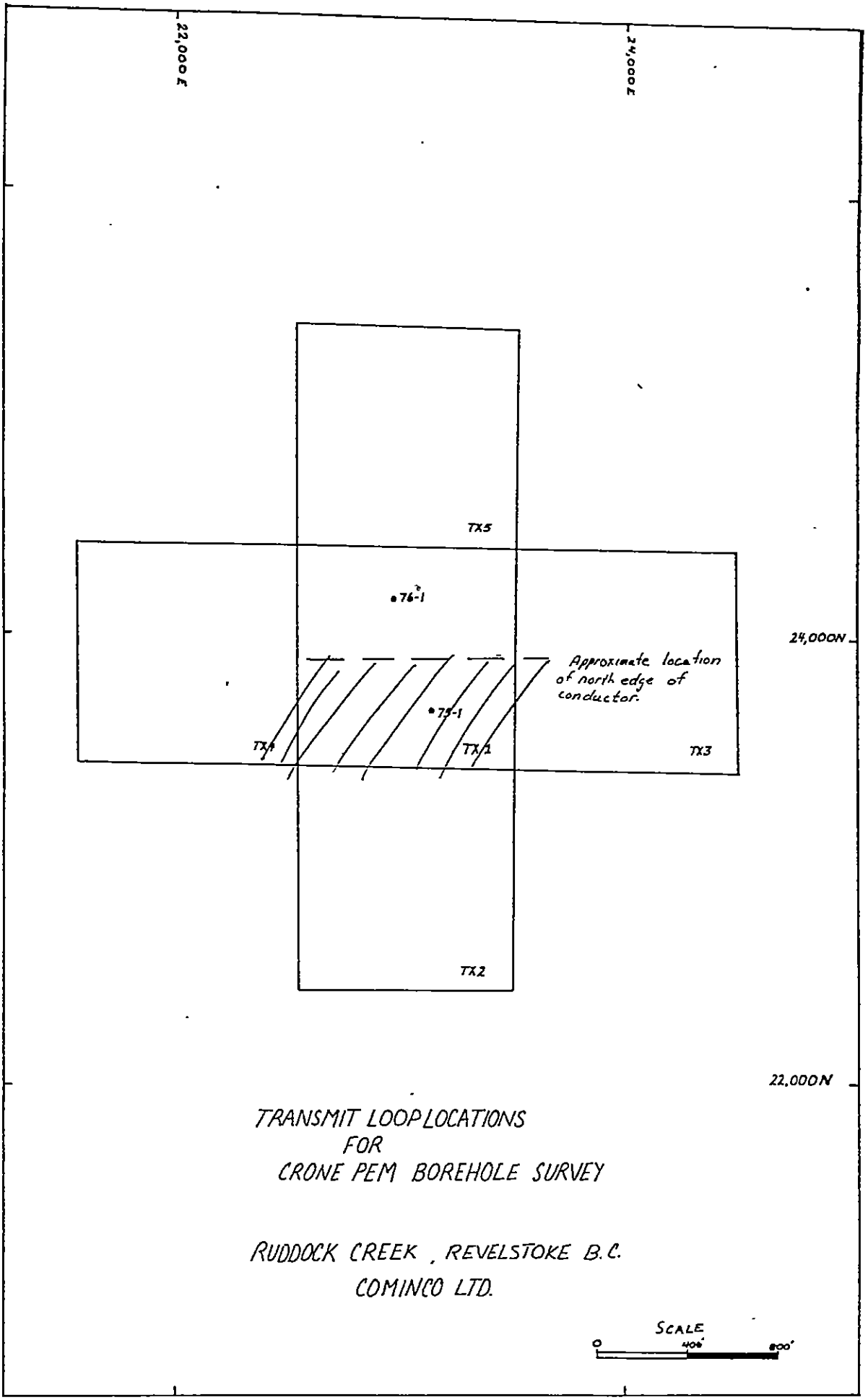
BOREHOLE PEM SURVEY

BOREHOLE NO	TX LOOP	METERS SURVEYED	ANOMALY DEPTH	TYPE	σt MHOS	REMARKS
75-1	1 In-Loop	660 (2165')	238m (780')	In-Hole		Minor sulphides.
			610m (2001')	In-Hole	111	Central intersection.
75-1	2 South	660 (2165')	238m (780')	In-Hole		Minor sulphides.
			610m (2001')	In-Hole	117	Increased magnitude.
75-1	3 East	660 (2165')	245m (804')	In-Hole		Minor sulphides.
			610m (2001')	In-Hole	120	
75-1	4 West	660 (2165')	610m (2001')	In-Hole		
75-1	5 North	660m (2165')	610m (2001')	In-Hole	96	

INTERPRETATION

BOREHOLE PEM SURVEY

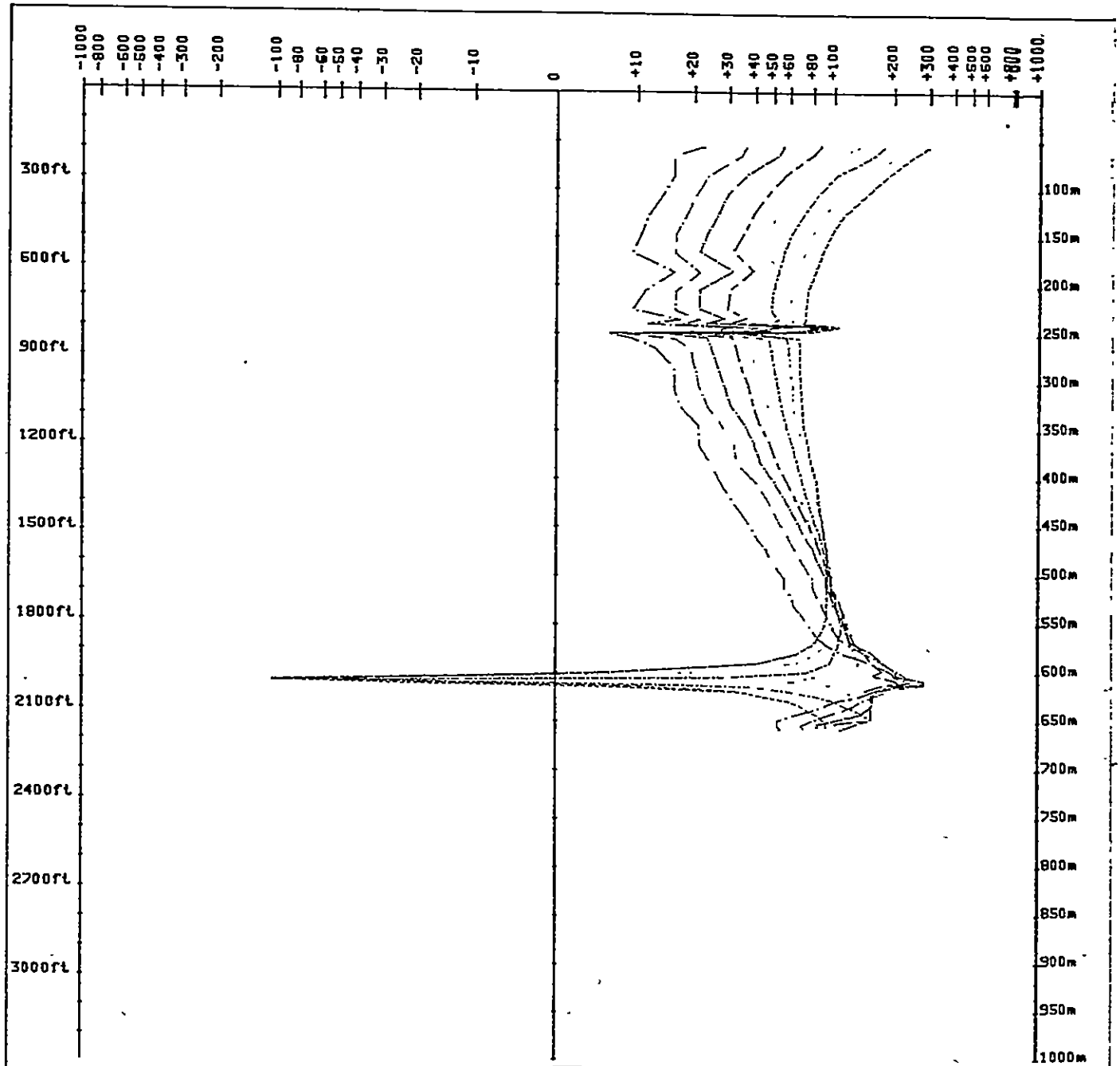
BOREHOLE NO	TX LOOP	METERS SURVEYED	ANOMALY DEPTH	TYPE	σt MHOS	REMARKS	CROSS-OVER SAMPLE #4
76-1	1 In-Loop	720m (2361')	Building Negative at base of hole.	Off-Hole	151	Profile incomplete - Minor kicks on profile attributed to minor sulphides or wedges.	630m (2066')
76-1	2 South	720m (2361')	Building Negative at base of hole.	Off-Hole	112	Suspect that noisy data from 670m to 720m caused by microphonics.	580m (1902')
76-1	3 East	720m (2361')	Building Negative at base of hole.	Off-Hole	138		640m (2099')
76-1	4 West	670m (2198')	Building Negative at base of hole.	Off-Hole	138		630m (2066')
76-1	5 North	670m (2198')	Building Negative	Off-Hole	106		670m (2198')



TRANSMIT LOOP LOCATIONS
FOR
CRONE PEM BOREHOLE SURVEY

RUDDOCK CREEK, REVELSTOKE B.C.
COMINCO LTD.

SCALE
0 400' 800'



Channel 1 =
Channel 2 =
Channel 3 =
Channel 4 =
Channel 5 =
Channel 6 =
Channel 7 =
Channel 8 =

DDH =
Tx Loop =
Scale = 1:4000

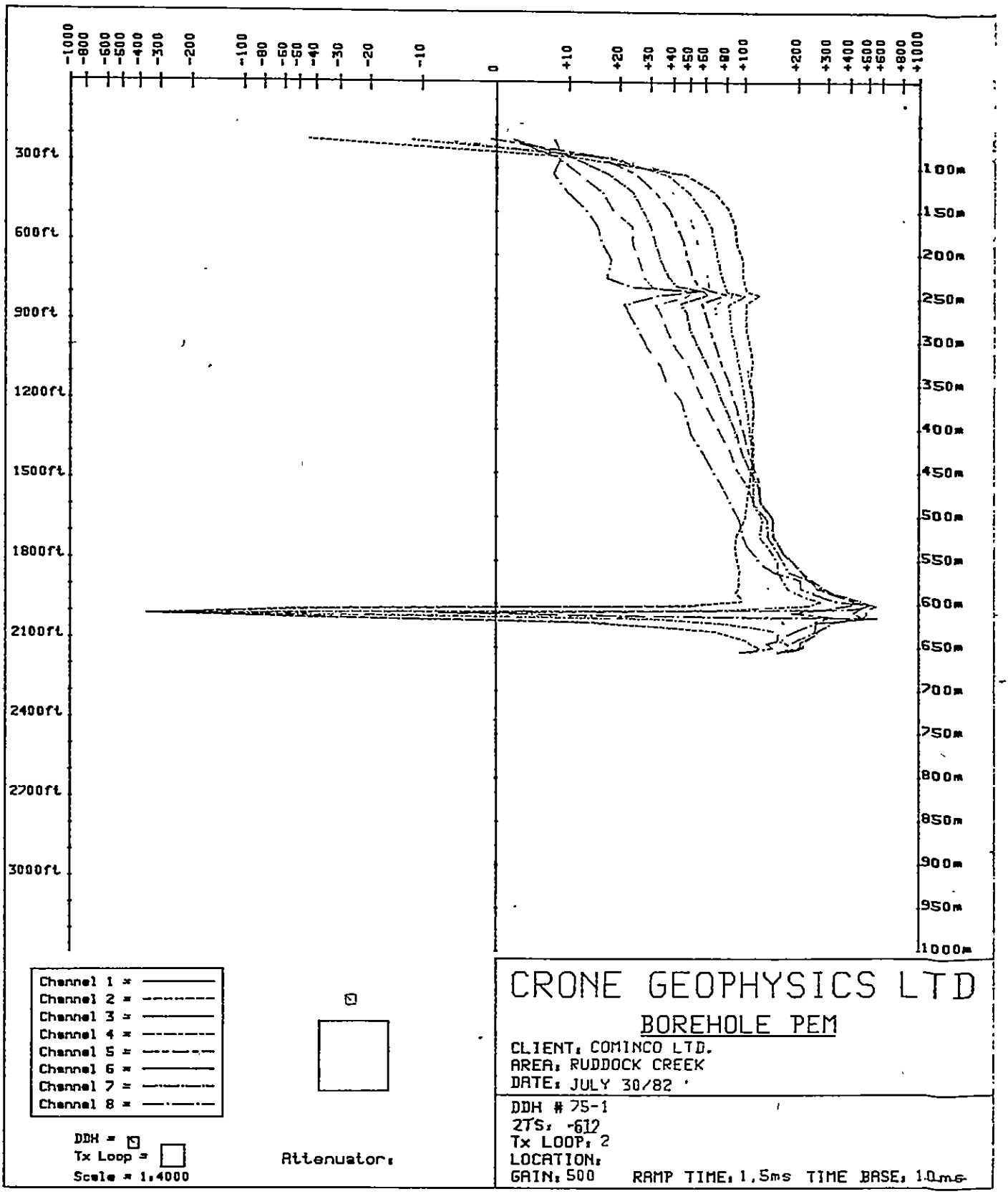
Attenuator:

CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: JULY 30/82

DDH # 75-1
ZTS: 612.
Tx LOOP: 1
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms

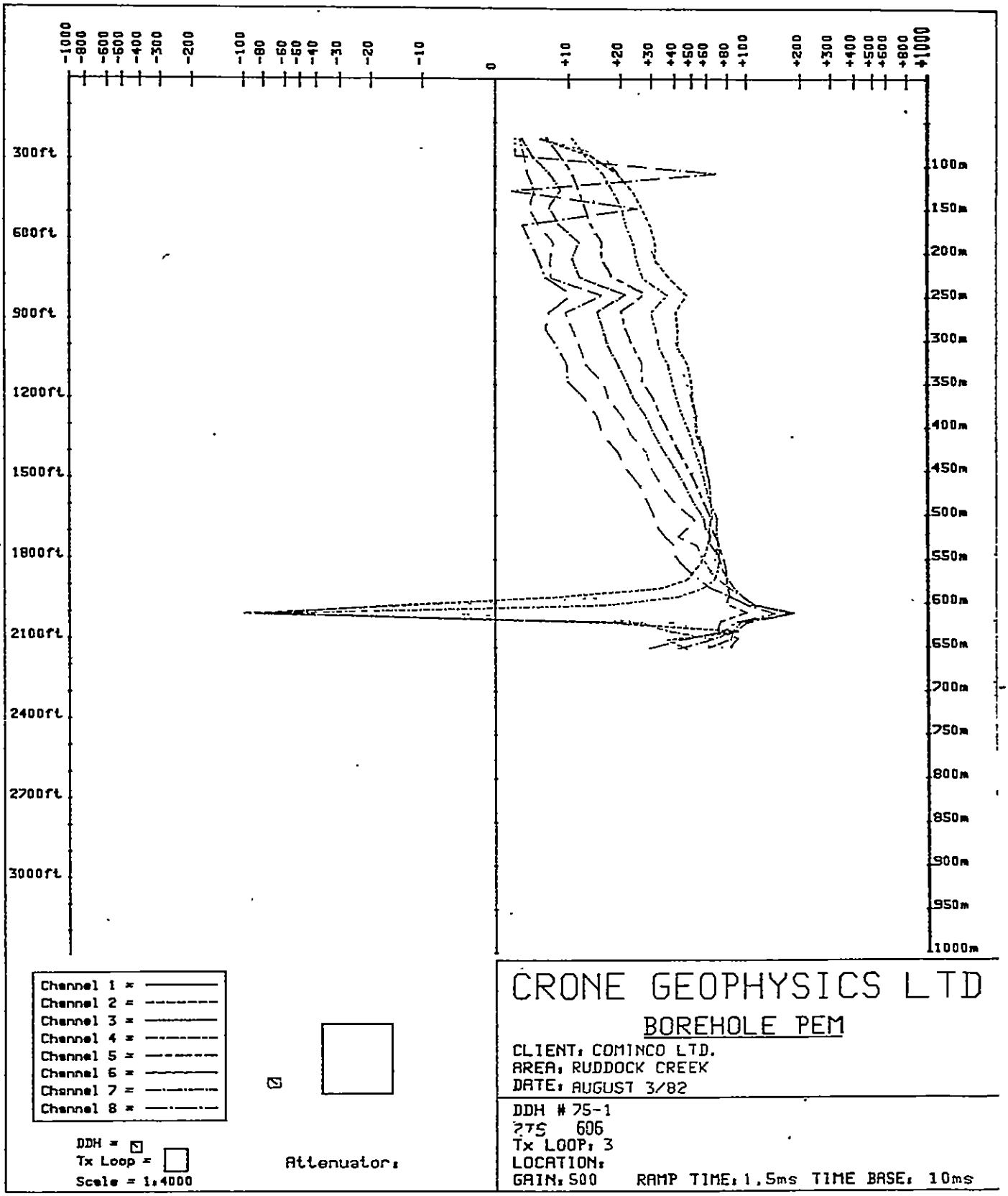


CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: JULY 30/82

DDH # 75-1
ZTS: -612
Tx LOOP: 2
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms

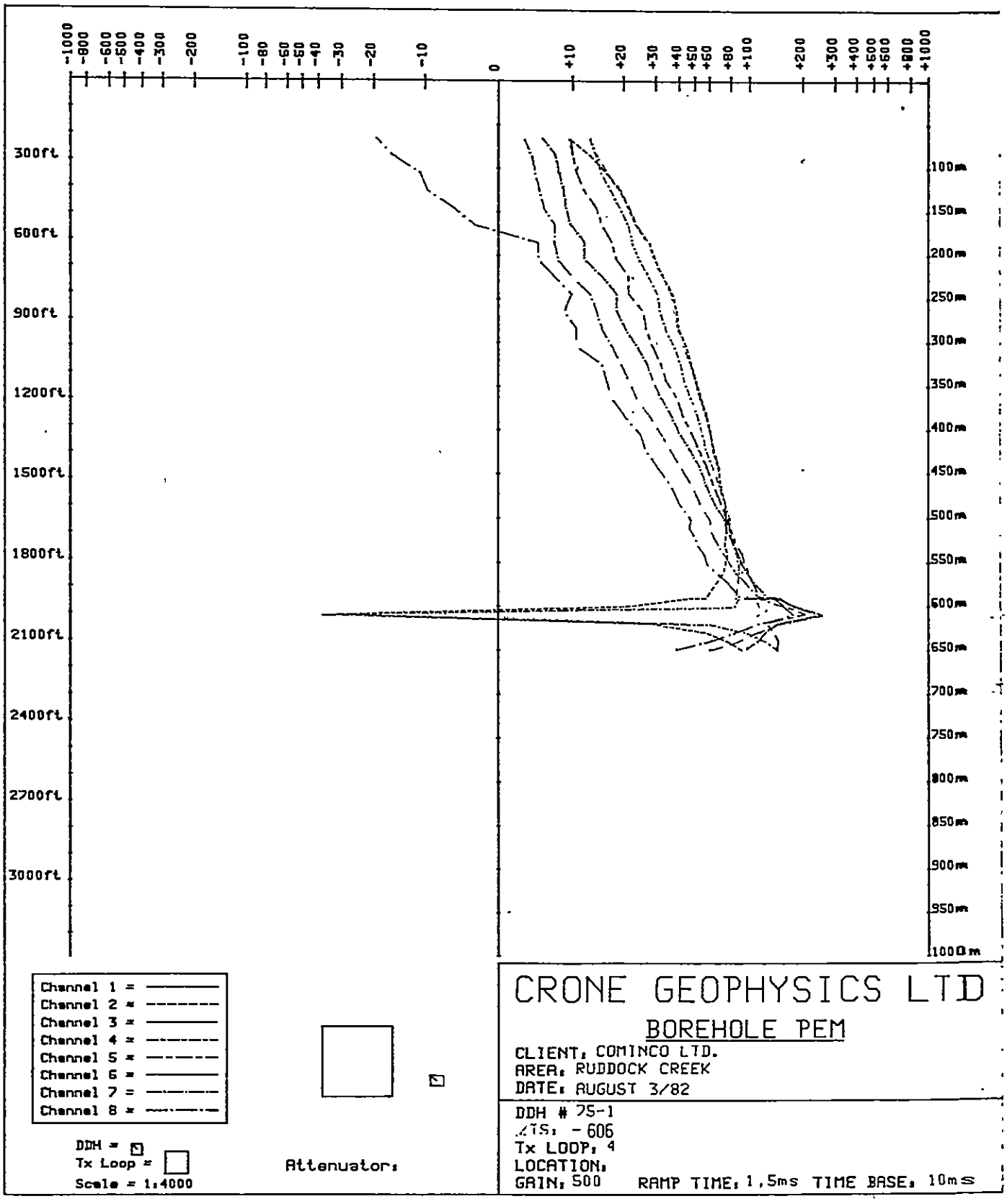


CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: AUGUST 3/82

DDH # 75-1
?7S 606
Tx LOOP: 3
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms

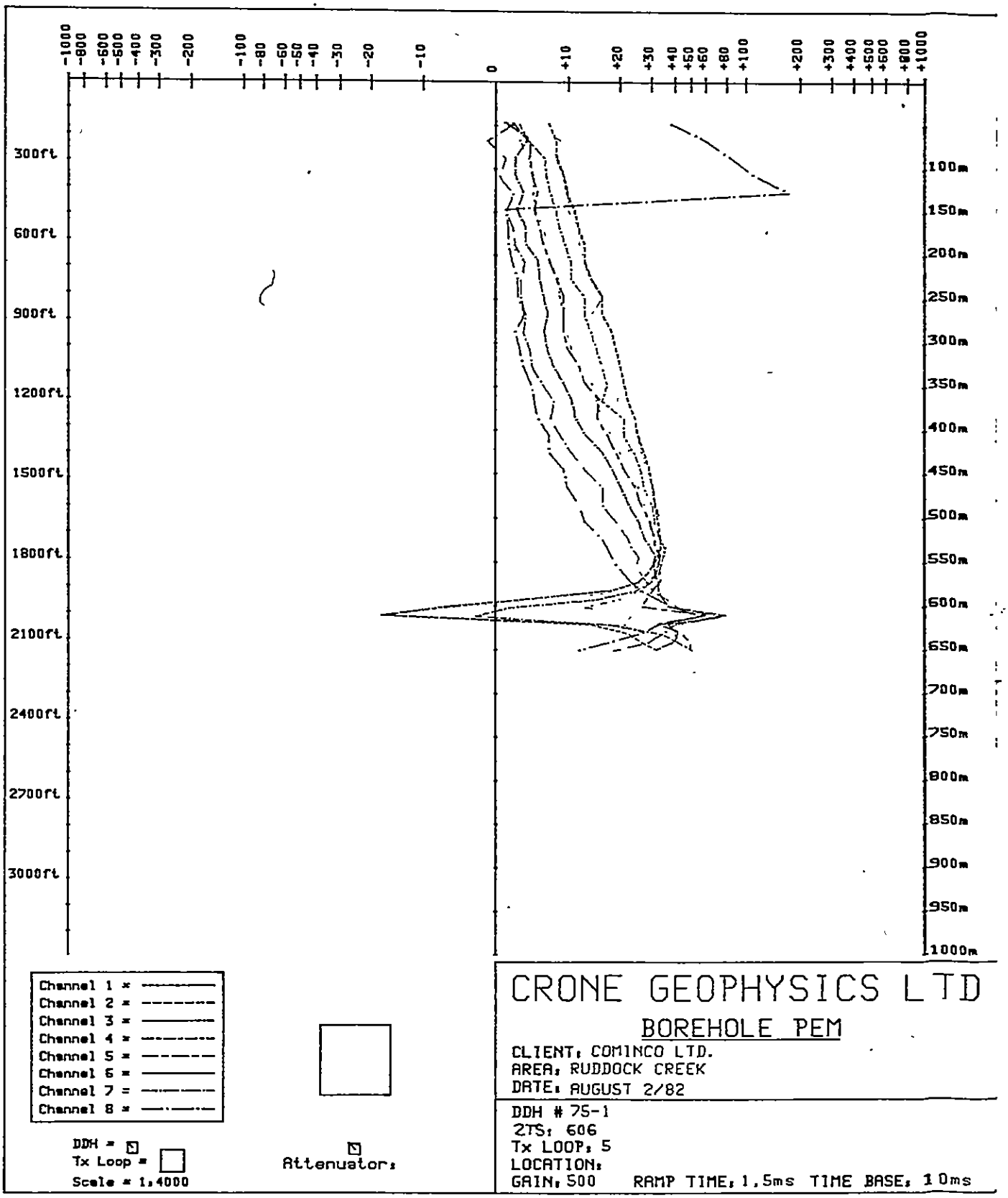


CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: AUGUST 3/82

DDH # 85-1
ATS: -606
Tx LOOP: 4
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms

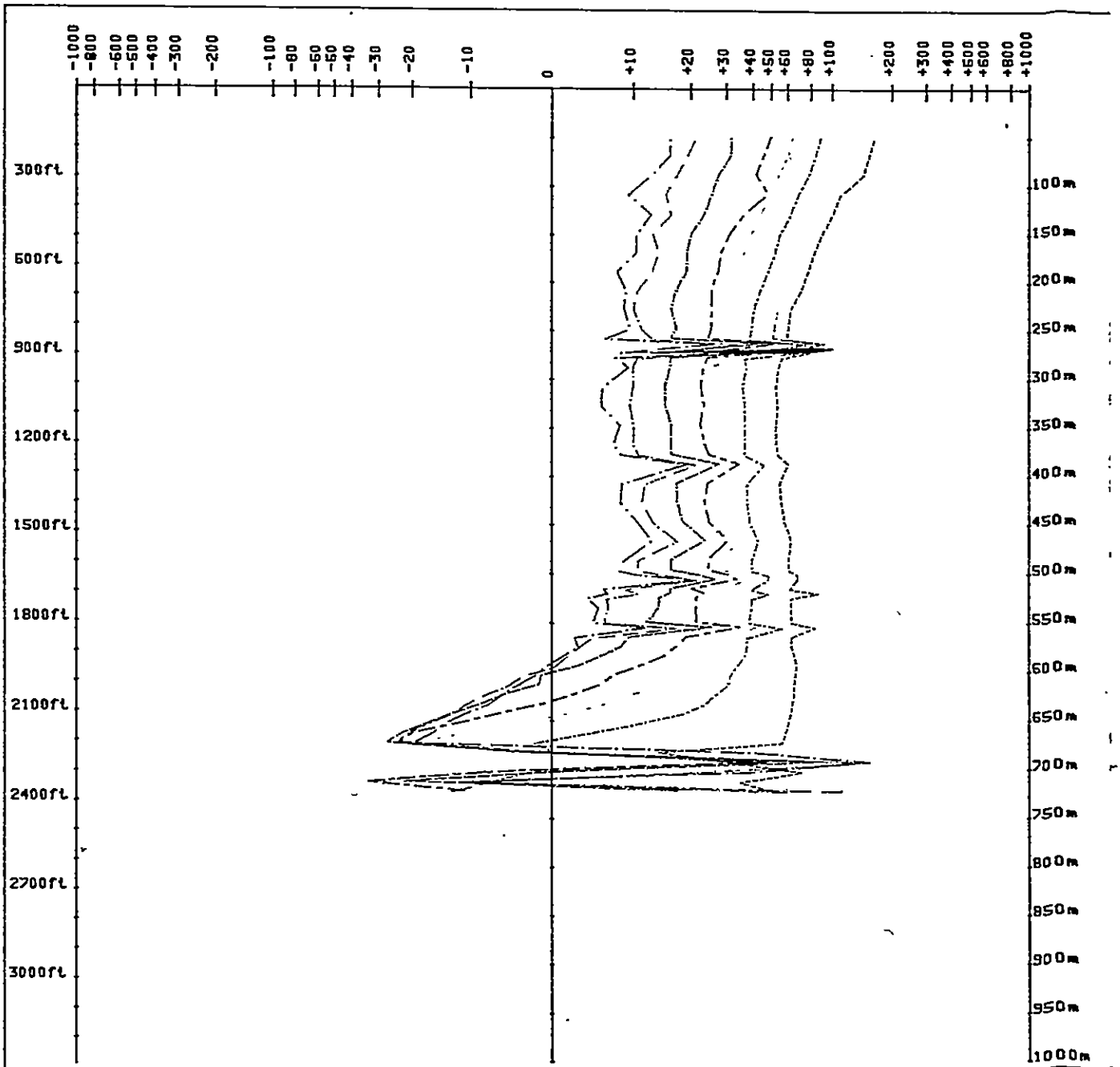


CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: AUGUST 2/82

DDH # 75-1
ZTS: 606
Tx LOOP: 5
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms



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Channel 3 =
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Channel 6 =
Channel 7 =
Channel 8 =

DDH =
Tx Loop =
Scale = 1:4000

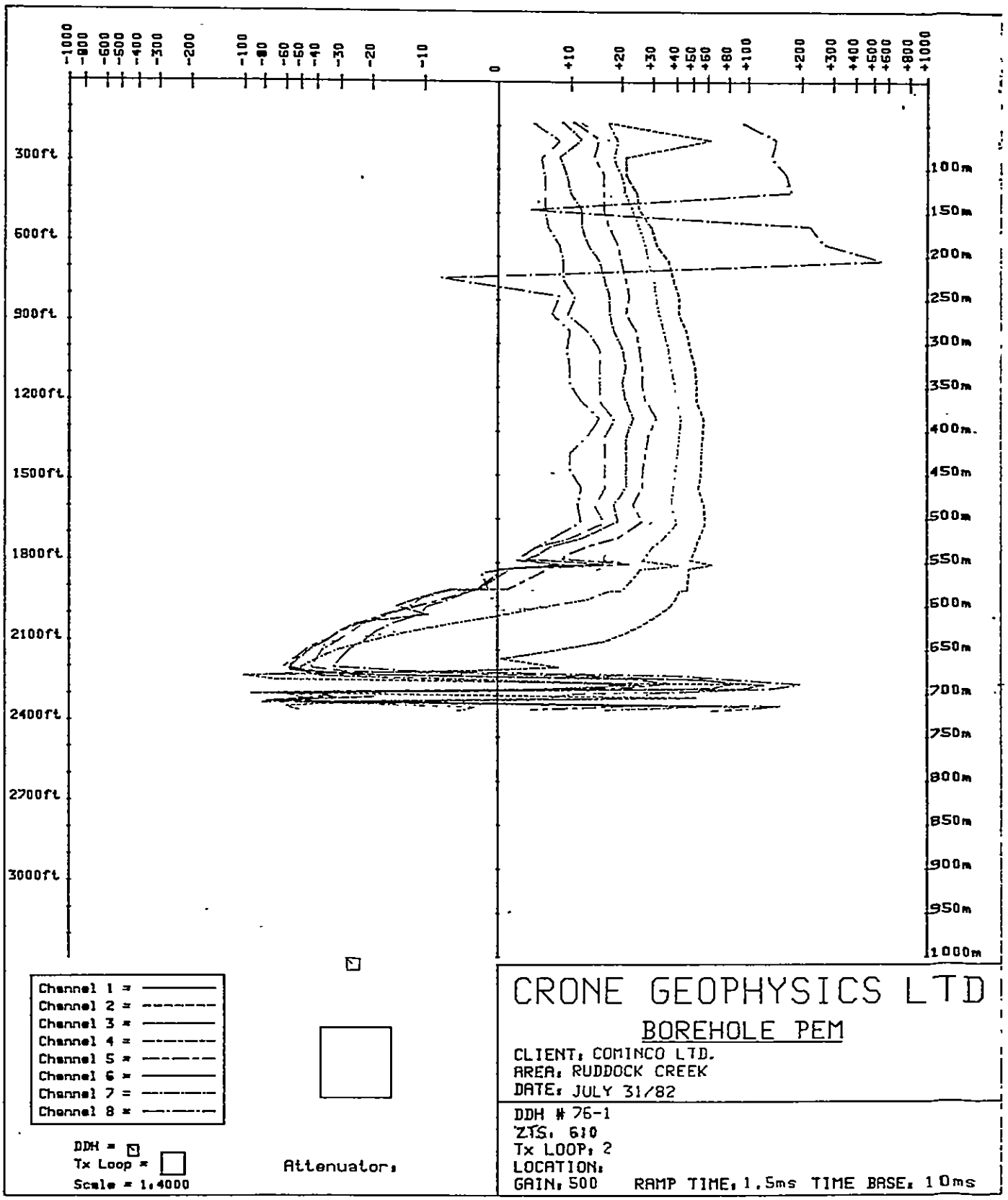
Attenuator:

CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: JULY 31/82

DDH # 76-1
ZTS, 612
Tx LOOP: 1
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms



CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: JULY 31/82

DDH # 76-1
Z/S: 6:0
Tx LOOP: 2
LOCATION:
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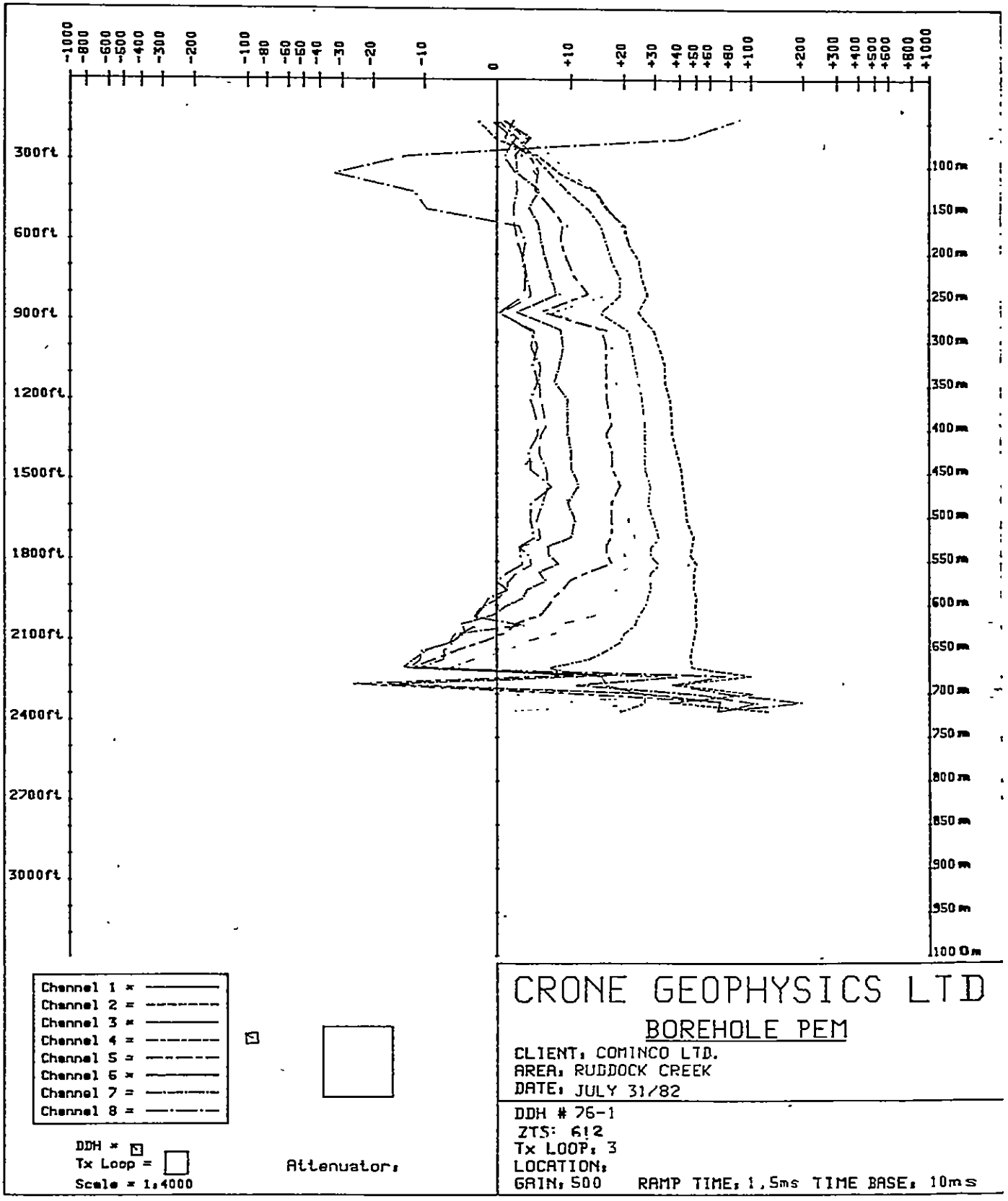
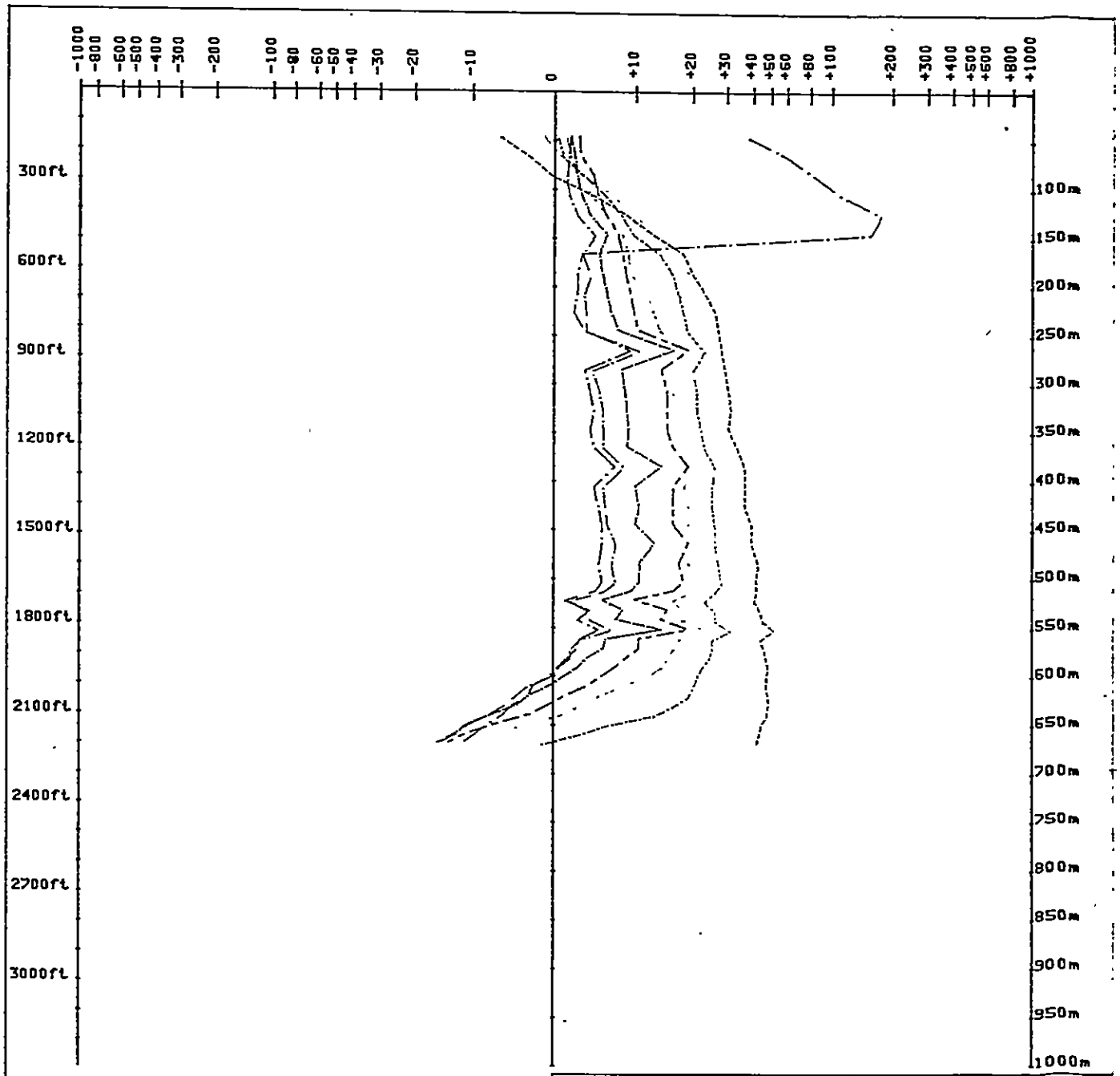


CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: JULY 31/82

DDH # 76-1
ZTS: 612
Tx LOOP: 3
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms



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Channel 2 =
Channel 3 =
Channel 4 =
Channel 5 =
Channel 6 =
Channel 7 =
Channel 8 =

DDH =
Tx Loop =
Scale = 1:4000

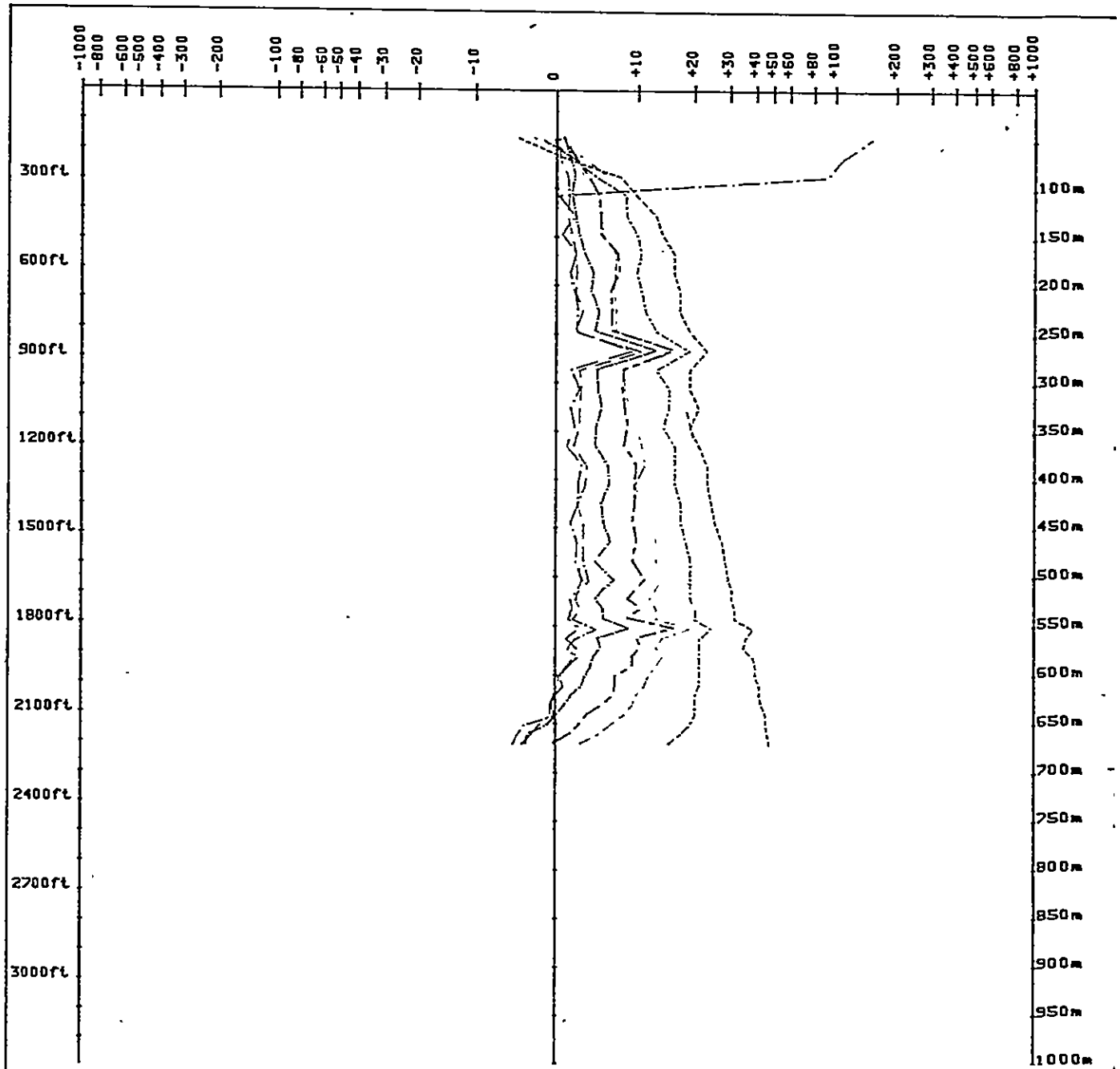
Attenuator:

CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: JULY 31/82

DDH # 76-1
ZTS: 602
Tx LOOP: 4
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 1K210m



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Channel 3 =
Channel 4 =
Channel 5 =
Channel 6 =
Channel 7 =
Channel 8 =

DDH =
Tx Loop =
Scale = 1:4000

Attenuator:

CRONE GEOPHYSICS LTD

BOREHOLE PEM

CLIENT: COMINCO LTD.
AREA: RUDDOCK CREEK
DATE: AUG 1/82

DDH # 76-1
ZTS: 612
Tx LOOP: 5
LOCATION:
GAIN: 500 RAMP TIME: 1.5ms TIME BASE: 10ms

IN THE MATTER OF THE B.C. MINERAL ACT

AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME

CARRIED OUT ON THE IT CLAIMS 1, 2, 3, 4, 5, 6, 16, 27, 29, 33 and 34

LOCATED 65 MILES N OF REVELSTOKE, B.C.

IN THE KAMLOOPS/REVELSTOKE MINING DIVISIONS OF THE

PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY

N.T.S. 82M/15

S T A T E M E N T

I, Jules J. Lajoie of the City of West Vancouver in the Province of British Columbia, make oath and say:

1. THAT I am employed as a geophysicist by Cominco Ltd. and, as such have a personal knowledge of the facts to which I hereinafter depose;

2. THAT annexed hereto and marked as "Exhibit A", to this statement is a true copy of expenditures incurred on geophysical survey on the IT mineral claims;

3. THAT the said expenditures were incurred between July 12th and August 30th, 1982, for the purpose of mineral exploration of the above-mentioned claims.

Jules J. Lajoie

Jules J. Lajoie, Ph.D., P.Eng.
Geophysicist, Cominco Ltd.

EXHIBIT "A"

STATEMENT OF EXPENDITURES (1982)

RUDDOCK CREEK PROPERTY

IT CLAIMS 1,2,3,4,5,6,16,27,29,33, and 34

1. SALARIES

a)	J.J. Lajoie, Senior Geophysicist, Cominco Ltd. 20 days @ $245/day	$ 4,900.00	
b)	S.J. Visser, Junior Geophysicist, Cominco Ltd. 9 days @ $175/day	1,575.00	
c)	A. O'Hara, Summer Geophysicist, Cominco Ltd. 20 days @ $135/day	2,700.00	
d)	F. Ferguson, Senior Technician, Cominco Ltd. 24 days @ $109.75/day	2,634.00	
e)	M.J. Davies, Junior Technician, Cominco Ltd. 32 days @ $ 67.625/day	2,164.00	
f)	D. Anderson, Crone Geophysics Ltd. 10 days @ $230/day	2,300.00	
g)	Linecutters (2), Martinson Linecutting Ltd. 2 men x 20 days x $165 (incl. expenses)	6,600.00	
			$ 22,873.00

2. CRONE GEOPHYSICS BOREHOLE PULSE EM

Contract Charges less salary above:

$10,090.87 - $2,300.00 = 7,790.87

includes mob-demob, expenses, rental, report, etc.

3. OKANAGAN HELICOPTERS 15,082.00

4. EXPENSE ACCOUNTS

a)	J.J. Lajoie	630.00	
b)	A. O'Hara	495.00	
c)	S.J. Visser	415.00	
d)	F. Ferguson	447.14	
e)	M.J. Davies	927.25	
f)	W.B. Griffith	597.00	
			3,511.39

Carried Forward 49,257.46

	CARRIED FORWARD	$ 49,257.46

5. EQUIPMENT RENTAL

a)	UTEM	$ 2,100.00	
b)	Borehole PEM (inc. in Crone invoice)		
c)	Borehole Probing Winch	847.61	
d)	VLF	300.00	
e)	Magnetometer	300.00	
			3,547.61

6. GEOPHYSICS

Data Compilation, Drafting, Reporting	3,000.00

7. MISCELLANEOUS

Fuel	$ 555.38	
Tent	465.63	
Building Supplies and Food Charges (Revelstoke Co-op)	2,117.24	
Survey Supplies	392.51	
Radio	261.50	
Truck Rental	912.49	
		4,704.75
TOTAL		$ 60,509.82

I certify this to be a true statement of expenditures for the UTEM geophysical survey on the IT 1,2,3,4,5,6,16,27,29,33, and 34 claims in 1982.

Jules J. Lajoie, Ph.D., P.Eng.
Geophysicist, Cominco Ltd.

CERTIFICATION

I, Jules J. Lajoie, of 5655 Keith Road, in the City of West Vancouver, in the Province of British Columbia, do hereby certify that:

1. I graduated from the University of Ottawa in 1968 with an Honours B.Sc. in Physics, from the University of British Columbia in 1970 with a M.Sc. in Geophysics, and from the University of Toronto in 1973 with a Ph.D. in Geophysics.

2. I am a registered member of the Association of Professional Engineers of the Province of British Columbia, the Society of Exploration Geophysicists, and the British Columbia Geophysical Society.

3. I have been practicing my profession for the past nine years.

Jules J. Lajoie

Jules J. Lajoie, Ph.D., P.Eng.
Geophysicist, Cominco Ltd.

RUDDOCK CREEK

VLF2 FS
VLF2 TILT

LEGEND

DIRECTION TO ANNAPOLIS, MARYLAND VLF STATION → EAST

INSTRUMENT : CRONE RADEM S.N. 193

TILT 1" = 40 %

-40% 0 +40%

FIELD STRENGTH 1"=40%

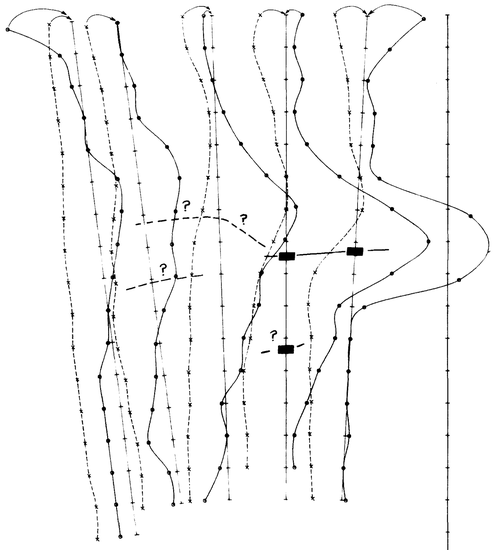
60% 100% 140%

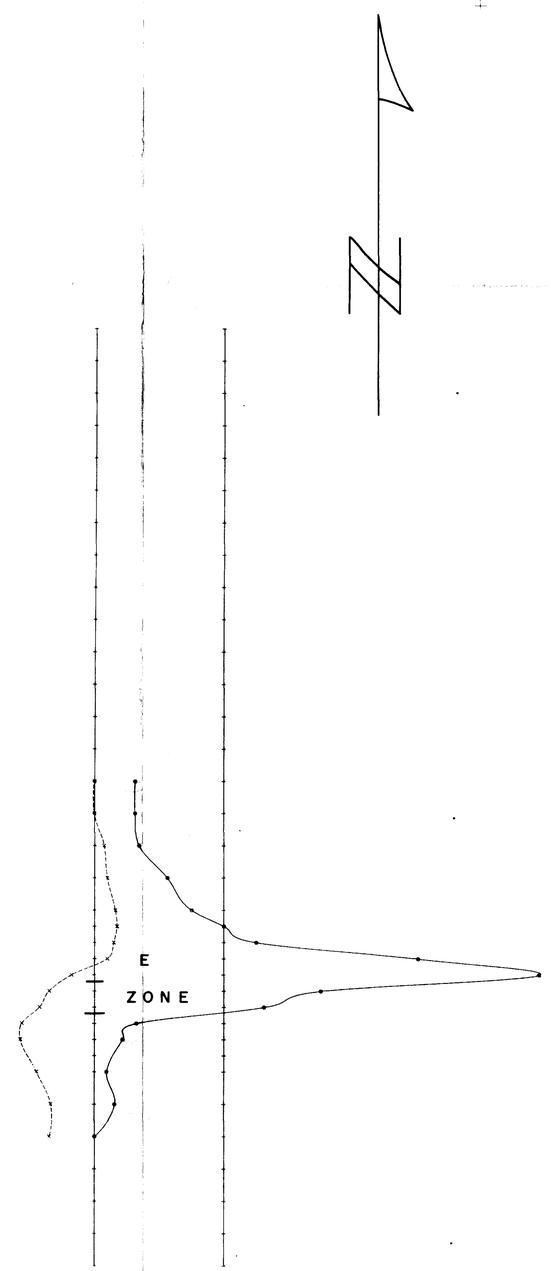
POSITIVE CROSSOVER

FIELD STRENGTH

TILT

SURVEY LINE





26000N
25500N
25000N
24500N
24000N
23500N
23000N
22500N
22000N

21600E
21700E
21800E
21900E
22000E
22400E
22800E
23200E
23600E
24000E
24400E
24800E
25200E

10,710

FEET
0 100 200 400 600

TO ACCOMPANY A REPORT BY J.J. LAJOIE Ph.D., P.Eng. Lubs Lajoie

RUDDOCK CREEK PROPERTY

NTS 82-M-15

Drawn by: | Traced by:

Revised by | Date | Revised by | Date

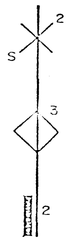
VLF FIELD STRENGTH and TILT
VLF STATION ANNAPOLIS, MARYLAND
KAMLOOPS M.D., B.C.

Scale: 1" = 200' | Date: OCTOBER 1982 | Plate: 235-82-5

FORM 210-0680

NCI-119-CL

LEGEND



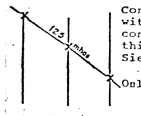
Axis of a cross-over anomaly. The number indicates the latent anomalous channel.

Depth indicated by: S - Shallow (< 30m)
M - Moderate (30-75m)
D - Deep (> 75m)

Axis of reversed cross-over anomaly produced when a small conductor dips at less than 70° towards the transmitter. In normal cross-over the positive response is towards the transmitter; reversed one, it is away from the transmitter.

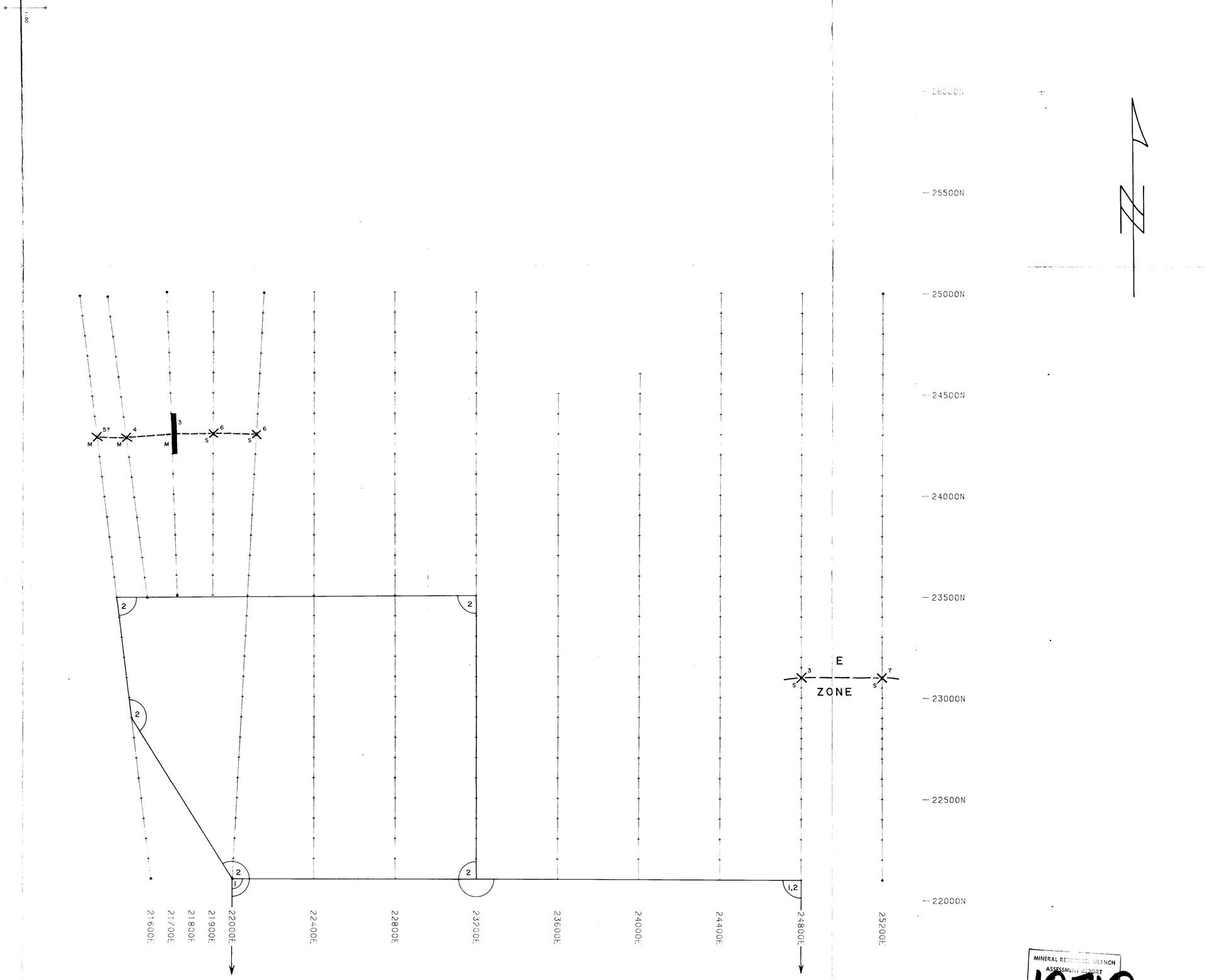
Indicates a negative anomaly of width shown by the dash. The latest anomalous channel is shown. Can sometimes be confused with the negative part of a cross-over anomaly.

Outline of a transmitter loop.



Conductor axis located by cross-over anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal cross-overs are indicated



FEET
0 100 200 400 600

TO ACCOMPANY A REPORT BY J.J. LAJOIE Ph.D., P.Eng.

RUDDOCK CREEK PROPERTY

NTS 82 - M - 15

Drawn by:	Traced by:	UTEM COMPILATION MAP
Revised by / Date	Revised by / Date	KAMLOOPS M.D., B.C.
		Scale: 1" = 200' Date: OCTOBER 1982 Plate: 235-82-6

NCI-119-C.L.

FORM 210-0680

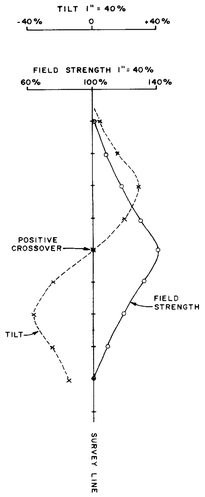
RUDDOCK CREEK

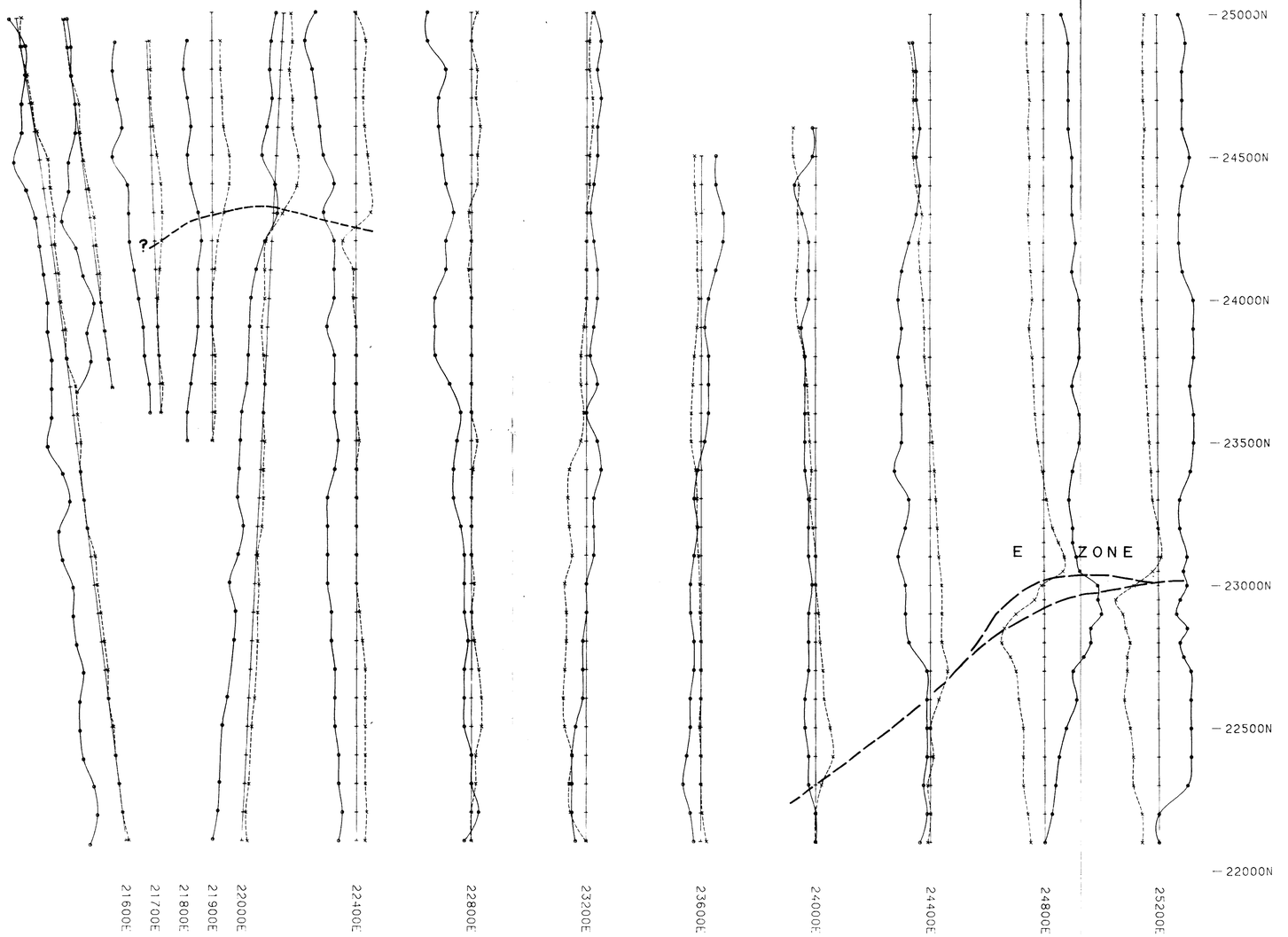
VLF1 FS
VLF1 TILT

LEGEND

DIRECTION TO SEATTLE, WASHINGTON VLF STATION

INSTRUMENT : CRONE RADEM S.N.193





10,710

FEET
0 100 200 400 600

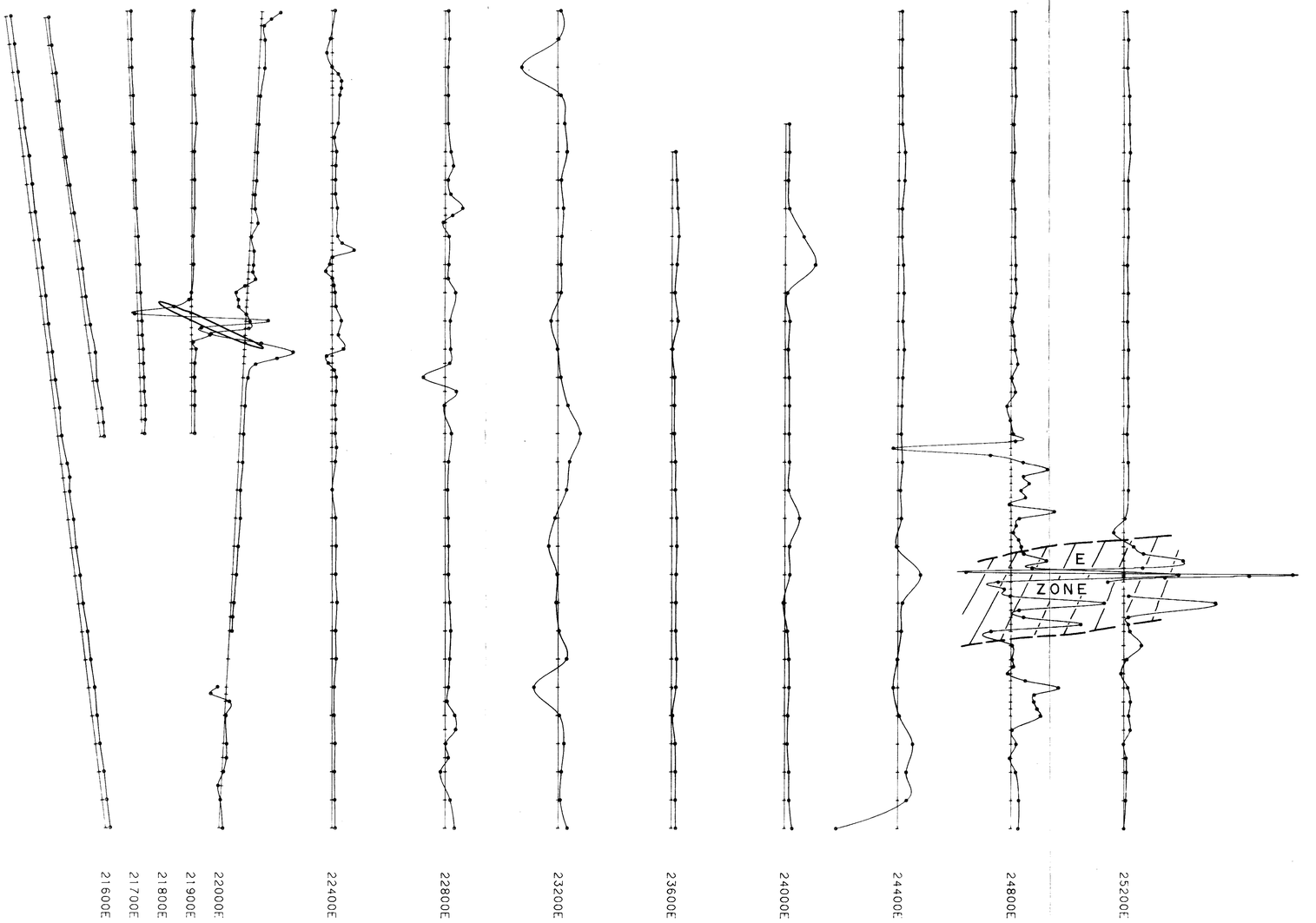
TO ACCOMPANY A REPORT BY J.J. LAJOIE Ph.D., P.Eng.

RUDDOCK CREEK PROPERTY	NTS 82-M-15
Drawn by:	Traced by:
Revised by: Date:	Revised by: Date:
VLF FIELD STRENGTH and TILT VLF STATION : SEATTLE, WASHINGTON KAMLOOPS M.D., B.C.	
Scale: 1" = 200'	Date: OCTOBER 1982
Plate: 235-82-4	

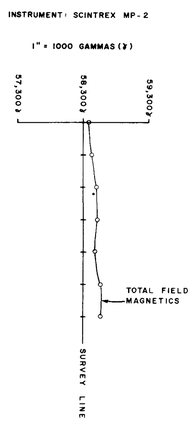
FORM 210 066C

RUDDOCK CREEK

MAG



LEGEND



FEET
0 100 200 400 600

10,710

TO ACCOMPANY A REPORT BY J.J. LAJOIE Ph.D., P.Eng.

RUDDOCK CREEK PROPERTY

NTS 82-M-15

Drawn by:	Traced by:	TOTAL FIELD MAGNETIC DATA GAMMAS LESS 58,300 KAMLOOPS M.D., B.C.
Revised by / Date	Revised by / Date	Scale: 1" = 200' Date: OCTOBER 1982 Plate: 235-82-3

FORM 210-0680

NCI-119-C.L.

RUDDOCK CREEK Pb.-Zn.
GEOLOGY (EAST HALF)
1" = 400' 1964

PASS AREA
(Location Main Camp)
PROPOSED PERMANENT
CAMP LOCATION

UTEM TRANSMITTER LOOP CORNER
AND LOOP OUTLINE

LEGEND

- LIMITS OF MAPPING
- SNOW (NÉVÉ) & GLACIER
- MORAINE & TALUS
- OUTCROP
- FAULT or SHEAR
- THRUST FAULT
- AIRPHOTO POINT
- SURVEY POINT (1965 TRIG)
- CLAIM POST
- " " SURVEYED
- PLUNGE OF DRAG FOLD AXIS
- β [70β] ULTRA-BASIC DYKES.
- γ [72γ] PEGMATITE, APLITE, GRANITE (QUARTZ-ORTHOCLASE-MUSCOVITE-BIOTITE).
- ZQ [7ZQ] MINERALIZED QUARTZITE (SPHALERITE, GALENA).
- L.LQ [7LQ] CRYSTALLINE LIMESTONE, GENERALLY QUARTZITIC.
- Q.QM [7QM] QUARTZITE AND QUARTZ-MICA SCHIST.
- MQ [7MQ] BIOTITE-QUARTZ SCHIST.
- H.AQ [7HQ] HORNBLENDE (GARNET, BIOTITE) SCHIST; QUARTZ-AMPHIBOLE SCHIST.
- FOLIATION (RELIC BEDDING) STRIKE AND DIP
- PERMITTIE SHEET STRIKE AND DIP

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
10,710

TO ACCOMPANY A REPORT BY J.J. LAJOIE Ph.D., P.Eng.

RUDDOCK CREEK
NTS 82-M-15

Drawn by	Traced by
Revised by Date	Revised by Date

GEOPHYSICAL GRID MAP ON
GENERAL GEOLOGY and TOPOGRAPHY
KAMLOOPS M.D., B.C.

Scale: 1" to 400' Date: OCTOBER 1982 Plate: 235-82-2

400 200 0 400 800 1200 1600 2000 2400 2800 3200 3600
SCALE: 1 INCH TO 400 FEET

COMPANY.. FALCONBRIDGE NICKEL MINES LTD.
PROPERTY.. **RUDDOCK CREEK** LEAD-ZINC
LOCATION.. 82-M-15, KAMLOOPS M.D.

WORKING PLACE.. EAST HALF
TYPE OF MAP.. **GENERAL GEOLOGY AND TOPOGRAPHY.**
BASED ON.. **MAPPING BY H.R. MORRIS.**
SURVEY CONTROL BY D.P HIGHE.

DATE.. MARCH, 1965
DRAWN BY.. MCELHANNEY AIR SURVEYS LTD.
DATE OF WORK.. **SUMMER 1961, 62, 63.**