Rio Canex

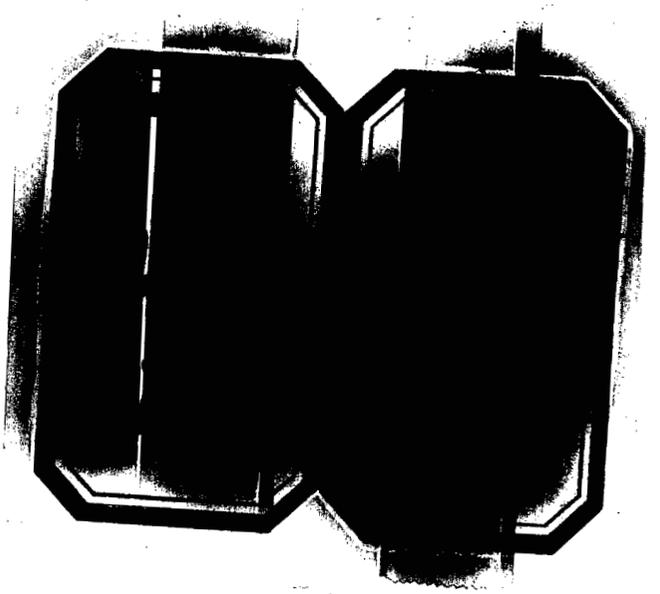
81-#543
-9586

Nifty Option Property

June 1981

Crone DEEPEM survey

93D/9W



Report For:	Rio Canex
Covering:	Crone Pulse Electromagnetic DEEPEM Survey
Over Their:	Nifty Option Property
Survey By:	Crone Geophysics Limited, Mississauga
Report By:	David Anderson, Geophysicist
Dated:	June 26th, 1981

SUMMARY:

The DEEPEM survey over the Nifty Option property detected no conductors.

SURVEY DATA:

The DEEPEM survey utilized a 300m x 600m transmit loop with power being supplied by a 2 kw. generator. For a description of the DEEPEM method, see appendix "A".

The survey was run by D. Anderson, a Crone Geophysics, Geophysicist, from June 10 to June 16, 1981. Additional field help (3 men) was supplied by Rio Canex. A total of 3.725 line kilometers were completed.

INTERPRETATION:

The Nifty Option property is located on the steep side of a mountain. The area of interest is located at approximately 0+50S and dips at -45° to the north. To maximize the coupling of the primary field with the zone of interest, the transmit loop was placed to the north on top of the mountain, and lines run to the south.

Due to the steep terrain, the horizontal component was measured with the coil being hand held. Consequently some late time readings are nosiy.

No conductors were detected in the survey.

Respectfully submitted

David Anderson, Geophysicist

part 2 of 2

LINE	METERS SURVEYED	TX LOOP	σ t	VERT X-OVER	HORIZ. PEAK	REMARKS
6W	300	1	--	--	--	--
450W	400	1	--	--	--	--
4W	650	1	--	--	--	--
350W	300	1	--	--	--	--
3W	550	1	--	--	--	--
2W	525	1	--	--	--	--
1W	500	1	--	--	--	--
0	500	1	--	--	--	--

DESCRIPTION OF THE DEEPEM PULSE EM METHOD

(1) This ground EM method is suited for deep penetration (50 to 200 meters) applications. In order to obtain deep penetration a strong primary field must be produced. This is achieved by using a larger area (usually 100M x 100M or greater) transmit loop consisting of a single turn of #10 AWG wire. The receiver coil takes both vertical and horizontal (directed along the survey line) measurements at stations 25 meters apart located on lines outside the Tx loop and perpendicular to it (as in a Turam survey). Unlike Turam, lines can be read beyond the edges of the Tx loop. The other horizontal component (perpendicular to the survey lines) should also be read in situations where the conductor is not a simple sheet like form, striking nearly perpendicular to the survey lines.

(2) Since the DEEPEM method measures only secondary fields it is not affected by rugged terrain unless the terrain itself is conductive. It has the disadvantage of any large loop system in that energizing the conductor is dependent on the primary field cutting the conductor at a good angle. If the conductor is not cut at a good angle it will not be energized and will not be detected. This blind spot can be eliminated by using two separate transmit loops on each side of the target area. In areas of very high surface conductivity ring currents occur outside the transmit loop and are concentrated in the area where survey measurements are made. In situations like this the DEEPEM method should not be used and the In-Loop Pulse EM method should be used instead.

(3) Interpretation of the DEEPEM results is by means of comparison with model study curves. The DEEPEM method is excellent in its ability to distinguish if a conductor is vertical, dipping or flat. With vertical conductors the vertical measurements produce a symmetrical cross-over anomaly and the horizontal component produces a positive peak at the cross-over point. For a flat con-

ductor the vertical component produces a positive anomaly and the horizontal component produces a cross-over. Dipping conductors produce patterns between the two extremes. Width of conductors is best determined by the use of two transmit loops on either side of the conductor. The method is very good at detecting deep small, lens-like conductors when the small conductor is not too far removed from the transmit loop (i.e. within 200 meters).

September 1979.

OPERATING INSTRUCTIONS:

Setting Up The Transmitter

(480 Watt, 24 Volt Output) For Surveys Outside The Tx Loop

1.1 The Tx loop is laid out as a single turn of #10 AWG copper wire in the form of a square 100 meters x 100 meters or 400' x 400'. Twist or clamp connectors are used at three corners. The loop should have a resistance of not less than 1 Ohm and not more than 1.5 Ohms. The loop ends are connected to the "High Voltage" clamps of the Tx control box.

1.2 Connect the motor generator (24 Volt output) wires - plus (red) and minus (black) to the battery clamps. Connect the Tx control input wires plus (red) and minus (black) to the same battery clamps. Check that the internal plug of the battery pack has been plugged in - (unplugged for shipping safety).

- Place Tx power switch in "Sync" position.
- Check that circuit breaker is "on.

1.3 Place the "Sync" switch at position required for 10ms or 20ms operation radio sync or cable sync. If cable sync is being used put blue wire on minus and yellow on plus. If radio sync is being used raise antenna to full height. Current ammeter should read 0.5 amp.

1.4 Open gasoline tank air valve and start engine.

1.5 Turn on loop Tx current by turning switch from "Sync" to "Pulse" (½ second delay). Current on ammeter should read between 6 and 8 amps (peak current is actually 20 amps).

DO NOT SWITCH FROM 10MS TO 20MS WITH PULSE ON.

1.6 If the booster antenna is required for the radio sync it should be set up and connected in place of the rod antenna.

Receiver

1.0 Plug in the receiver coil, turn preamplifier coil batteries ON. Switch receiver to the appropriate "SYNC" position (usually 10ms RADIO) - SYNC SIGNAL SHOULD BE GREATER THAN 900 on the meter. Green flasher should come on and remain solid.

1.1 Setting up the PP positive and the timing with the receive coil vertical at approximately 100 meters outside the loop, the transmit power on and the "sync green flasher on".

Function switch at "ADJ", sample switch at "PP", meter gain switch at "x 100" gain pot at "100". Turn the timing pot to the zero position then rotate clockwise until the meter needle starts to rise (set to positive side if negative using PP positive switch). Adjust timing pot (and gain pot) until the timing pot is set such that the needle is at the peak of the positive response and lock the pot in this position.[1] Set the gain pot at 500.[2] Do not move the "set PP positive", the timing or gain pots, for all readings with this transmit loop.

1.2 Take a vertical reading and then a horizontal reading (coil pointed along the survey line with the head towards the Tx loop). Leave gain pot at "500" (see noise) and do not worry if the needle goes off scale on ADJ when the receiver is close to the Tx loop.[3]

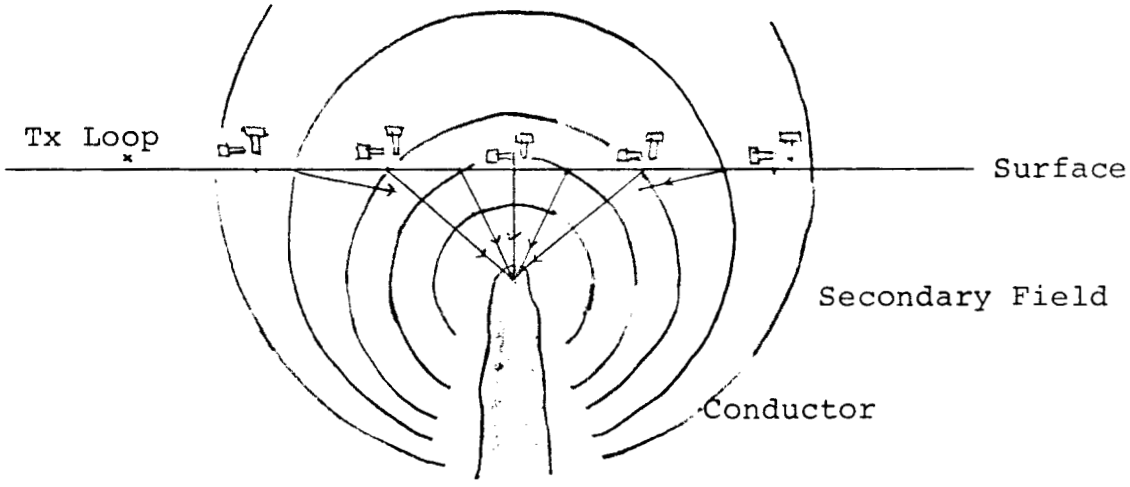
1.3 Record both vertical and horizontal readings for each station - if a conductor is detected then a perpendicular horizontal reading should be taken when directly over the conductor (for strike direction determination). When directly over a conductor peak, positive reading is obtained with a low vertical reading. The direction the receive coil head is pointed must be recorded.

(1) Instructions for setting Z.T.S. can be found in the PEM operating instructions.

(2) In areas of low noise,gain pot may be set in the 750 800 range.

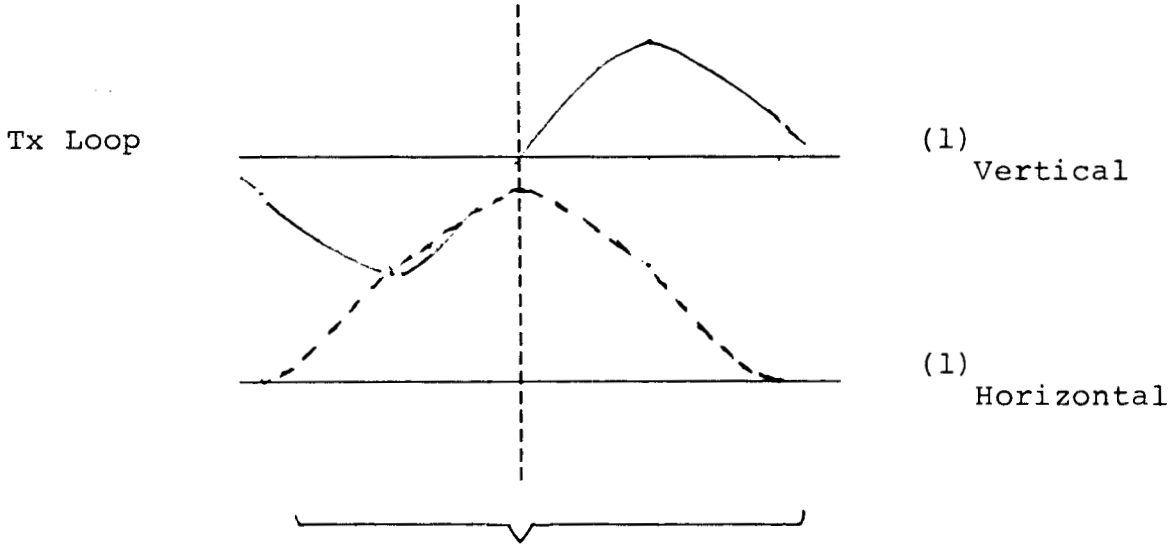
(3) At any station. It is important that maximum distance be maintained between the receiver and receiver coil, eg. when taking the horizontal measurement maximum distance is maintained when the receiver is between the receiver coil and the transmit loop.

DEEPEM SURVEY



Readings:

Vertical	-40	-120	0	+120	+40	Sample 1
Horizontal	0	+120	+200	+120	0	

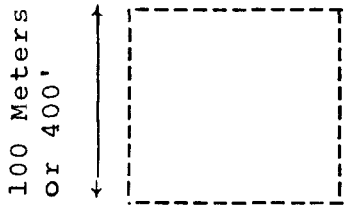


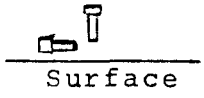
Vector Plotting Will Pinpoint Conductor's Depth Location and Possibly Dip. Plot Over This Range.

SURVEY PROCEDURE

Plan of the Field Survey

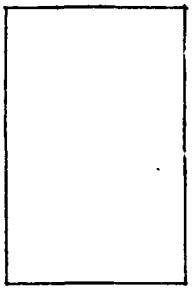
Readings every 100' or 25 meters.





Read vertical first
Horizontal second
(head points toward
Tx Loop)

Or



September 1979.

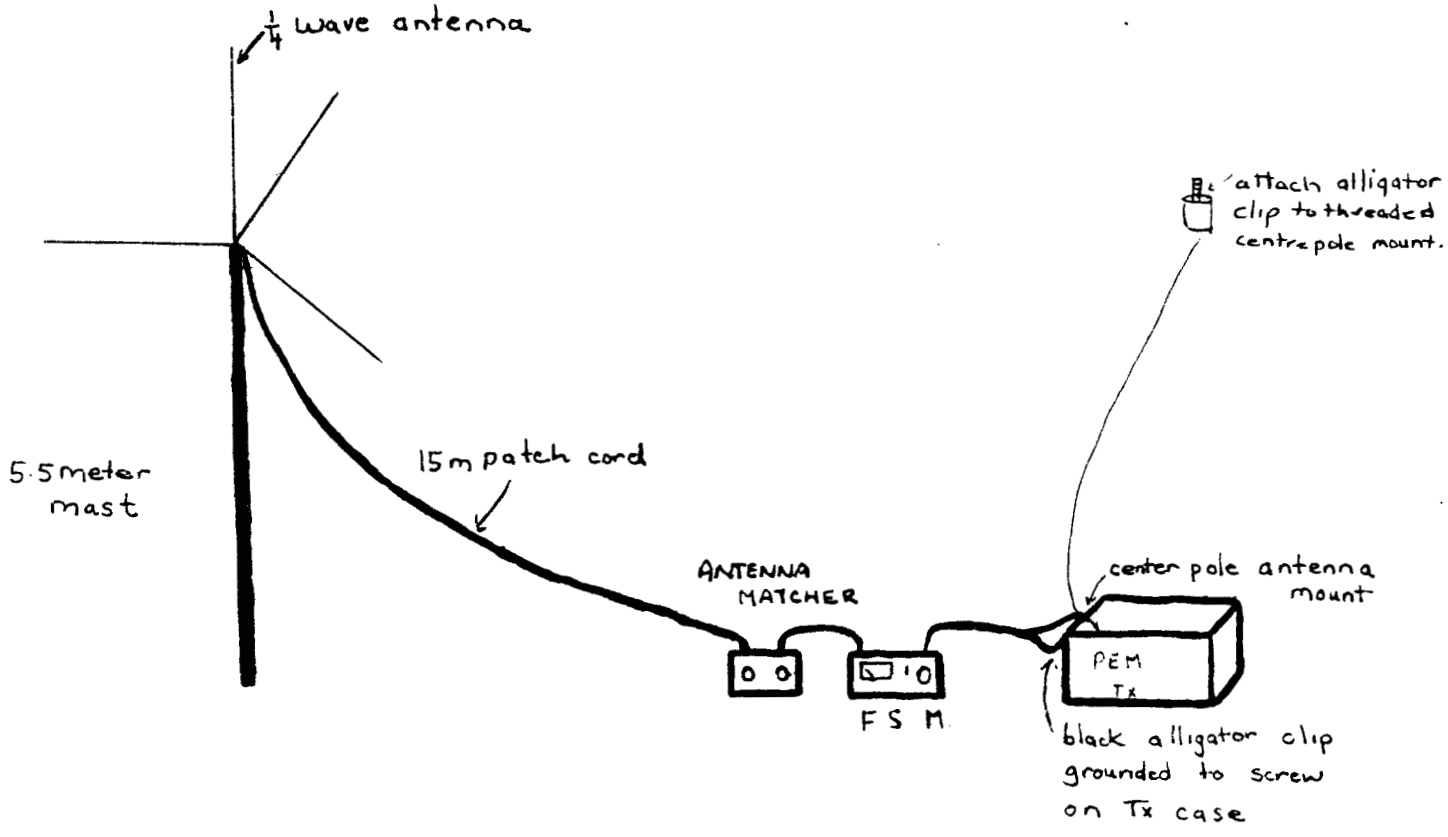
INSTRUCTIONS FOR OPERATION OF BOOSTER RADIO ANTENNA

The booster antenna consists of a 1/4 wave, omni-directional antenna. It is assembled as per instructions and mounted on a 5.5 meter (18') mast. A 15M (50') co-axial cable feeds from the base of the antenna into an antenna matcher. An additional .6M (2') patch cord feeds from the matcher into a field strength meter and from here to the transmitter.

To attach antenna to the transmitter, the original rod antenna supplied with the unit, must be removed. The co-axial cable feeding from the field strength meter has two alligator clips - one red, one black. The red clip is attached to the centre pole of the original mount and the black clip grounded on the transmitter case.

To tune the antenna, set the "FWD-REF" switch on the field strength meter to the "FWD" position. Adjust the "CAL" control for a full scale reading on the meter (to the "SET" mark) and then set "FWD-REF" switch to "REF". The reading on the SWR scale is the ratio of the impedance mismatch between the co-axial cable and the antenna. This should be adjusted to a minimum by altering the settings on the antenna matcher. The operator will have to experiment with the matcher to obtain the optimum minimum reading. The antenna is now ready for transmission.

Properly tuned, the antenna is capable of transmitting a signal to any point within a DEEPEM survey area (using $100M^2$ of 400 ft^2 transmit loop). When in rough terrain care should be taken to place the antenna on a high point maximizing the effectiveness of the transmitted signal.

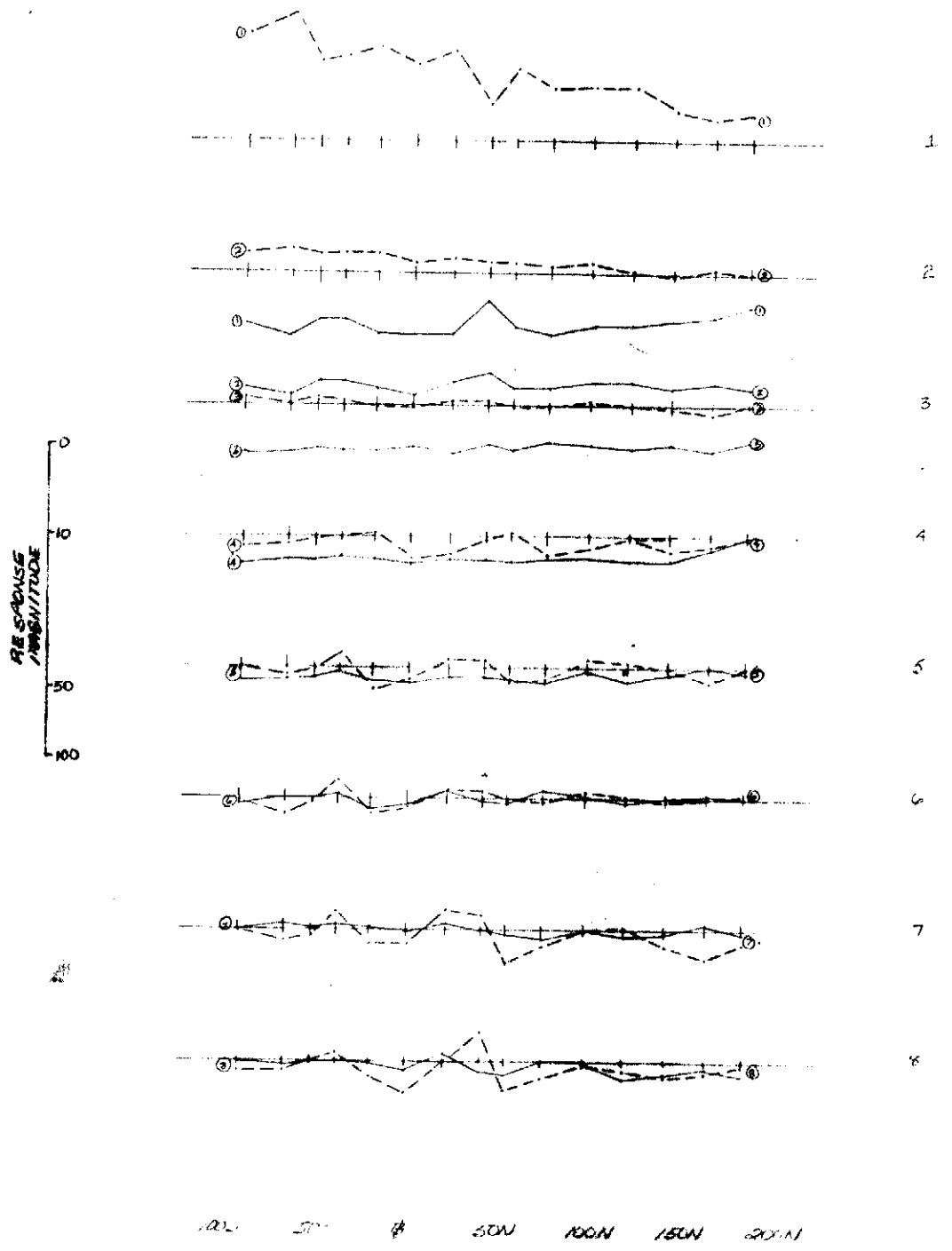


Replacement parts for booster antenna can be obtained at Radio Shack dealerships.

Part Description	Part Number
1/4 Wave Antenna	21-901
15M Patch Cord	278-971
Antenna Matcher	21-513
.6M Patch Cord	278-968
F.S. Meter	21-525

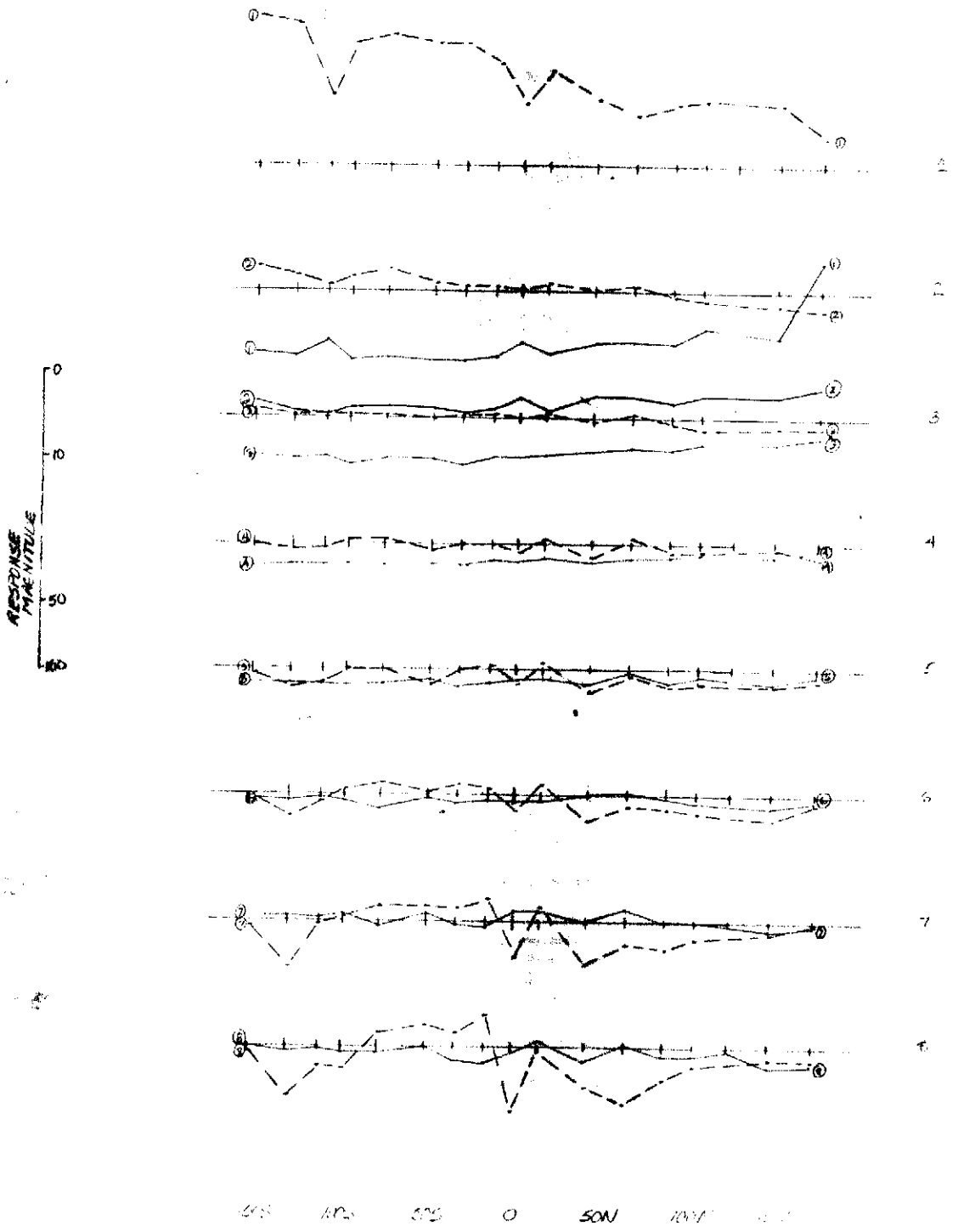
STATION INTERVAL.....25 METERS ALONG SLOPE:

PLOTTED POSITIONS CORRECTED FOR TOPOGRAPHY



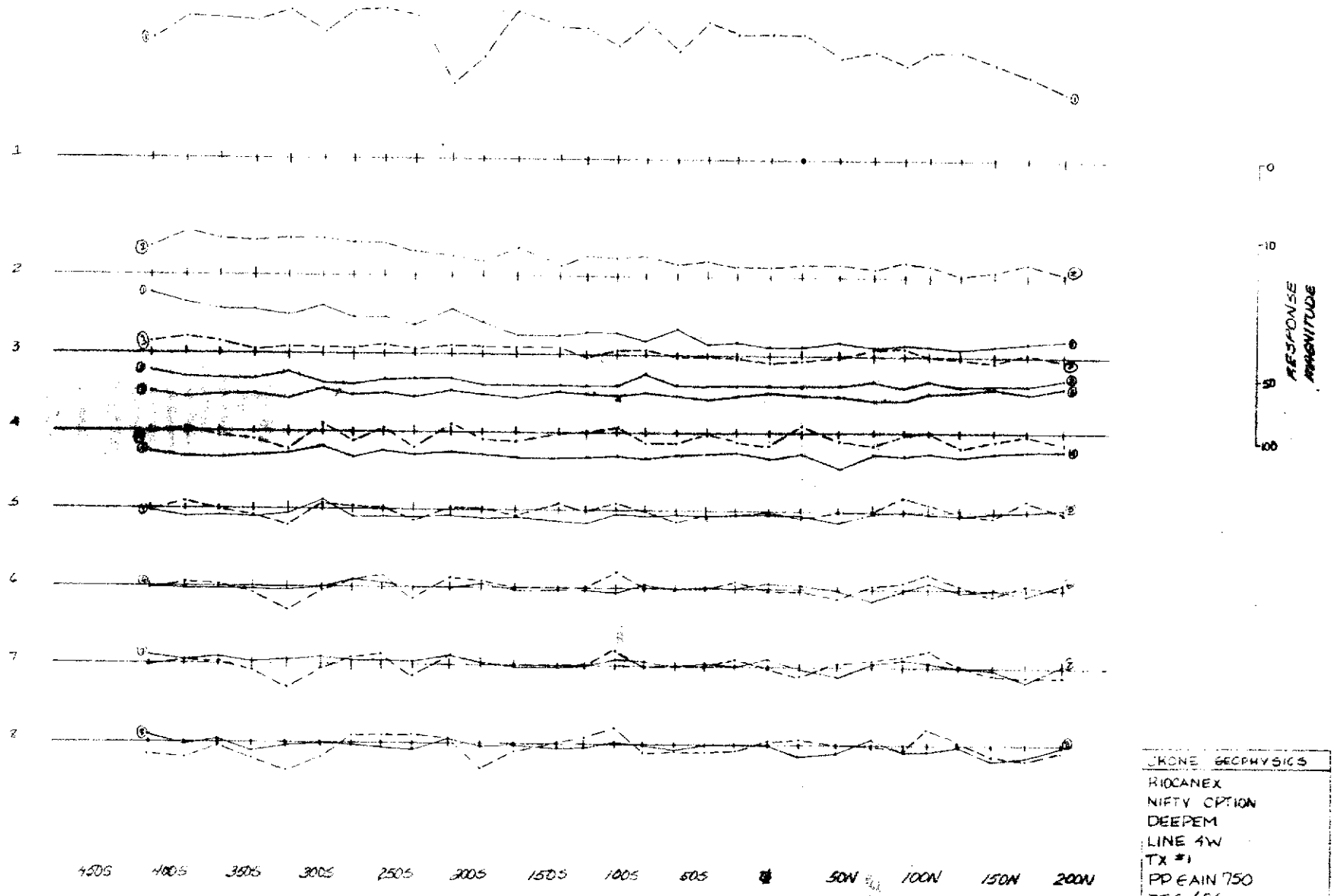
LEGEND VERTICAL (Z) COMPONENT
HORIZONTAL (X) COMPONENT

CRONE GEOPHYSICS
KIOCANEY
NIFTY CLAIMS
DEEP EM
LINE 6W
TX LOOP #1
PP GAIN 750
ZTS 600
SCALE VERT LOG HOR 12 TO 1 IN 25m
JUNE 23/81

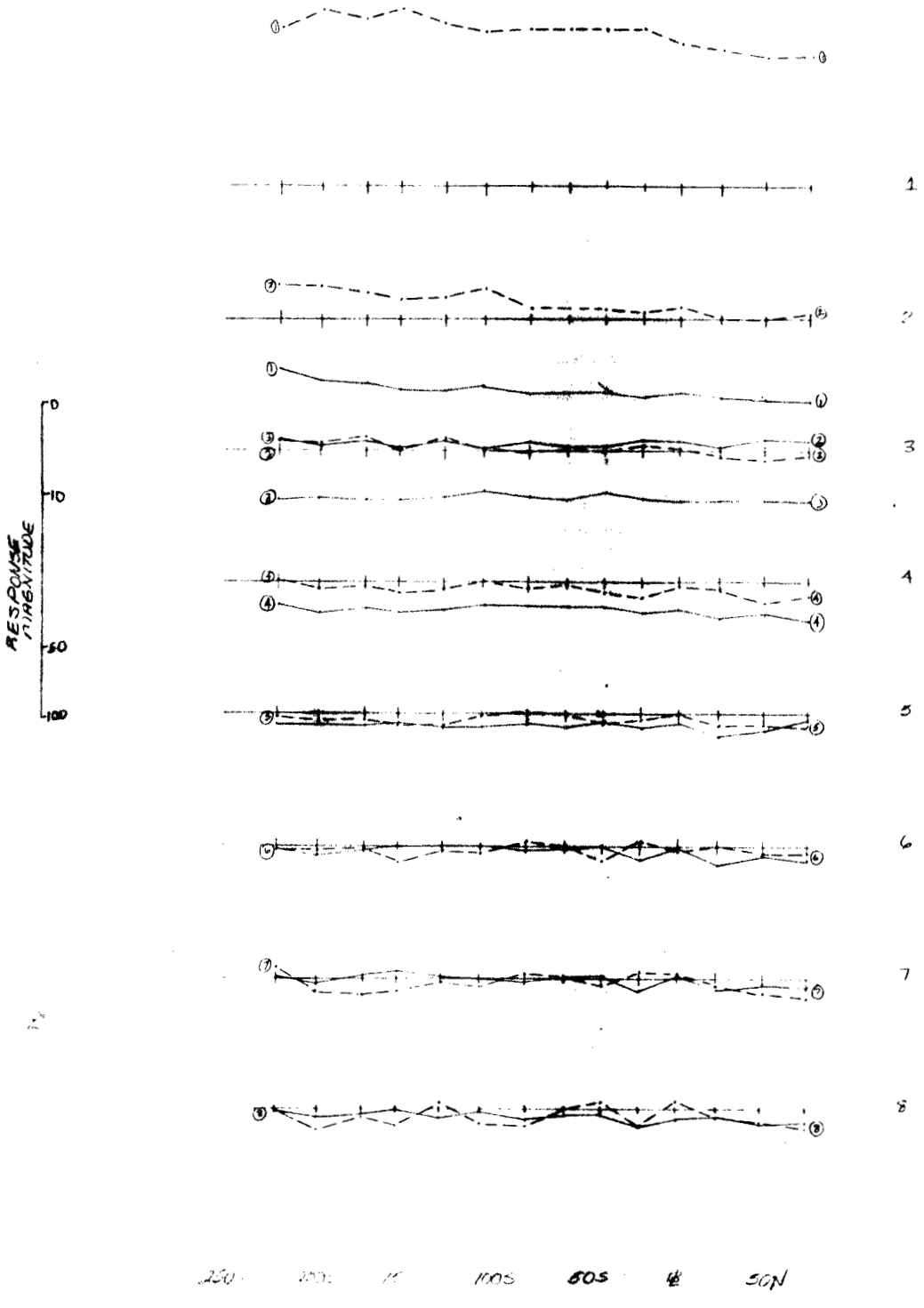


LEGEND VERTICAL (z) COMPONENT
HORIZONTAL (x) COMPONENT

CRONE GEOPHYSICS
BIOCANEX
NIETV OPTION
DEPTH M
LINE 450 N
TX
PP GAIN 750
ZTS 606
SCALE HORIZ 1cm = 25m
VERT LOG
JUNE 19/1981



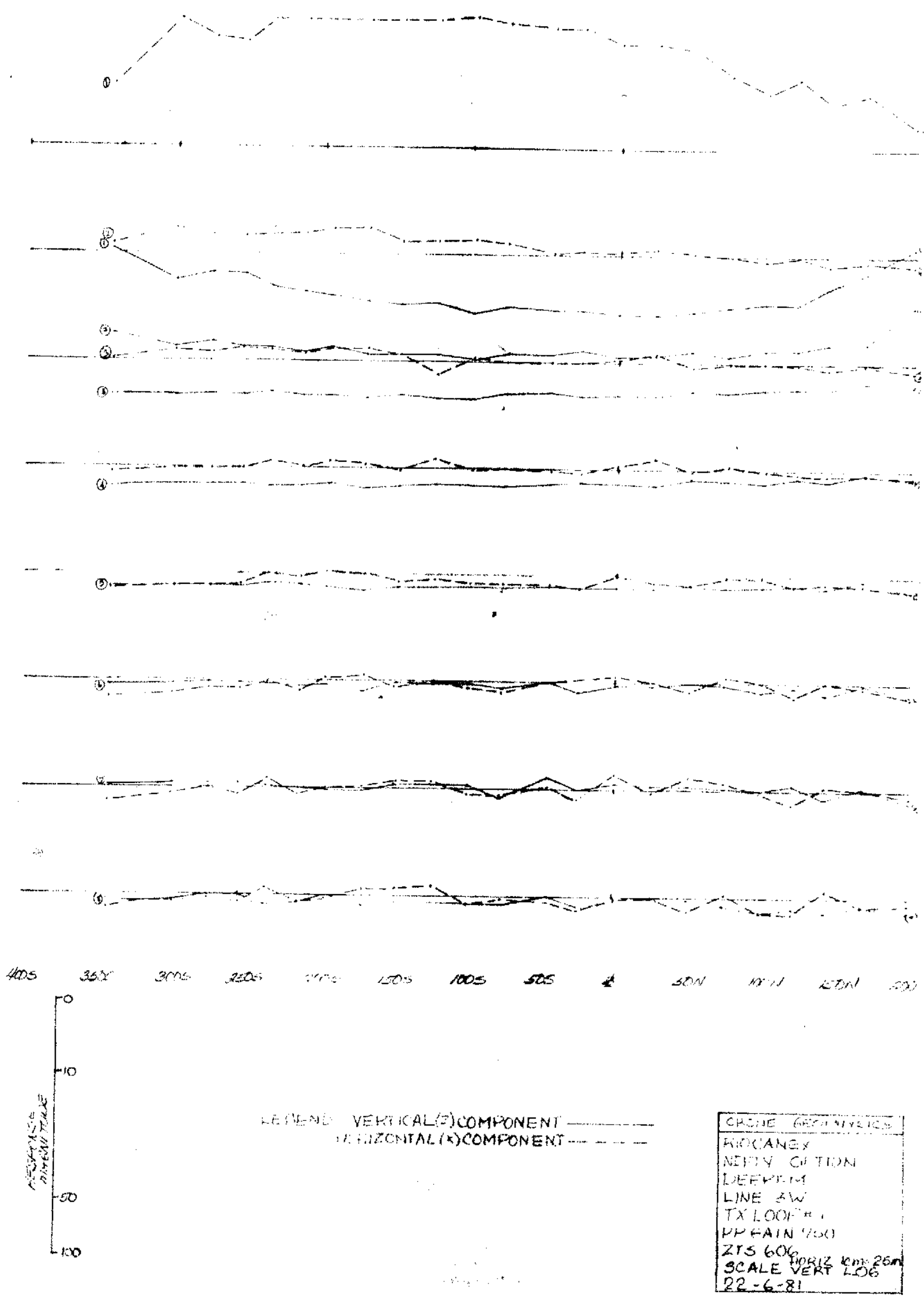
JKONE GEOPHYSICS
RIOCANEX
NIFTY OPTION
DEEPEM
LINE 4W
TX #1
PP EAIN 750
ZTS 606
SCALE HORIZ km:=25m
VERT LOG
23-6-81

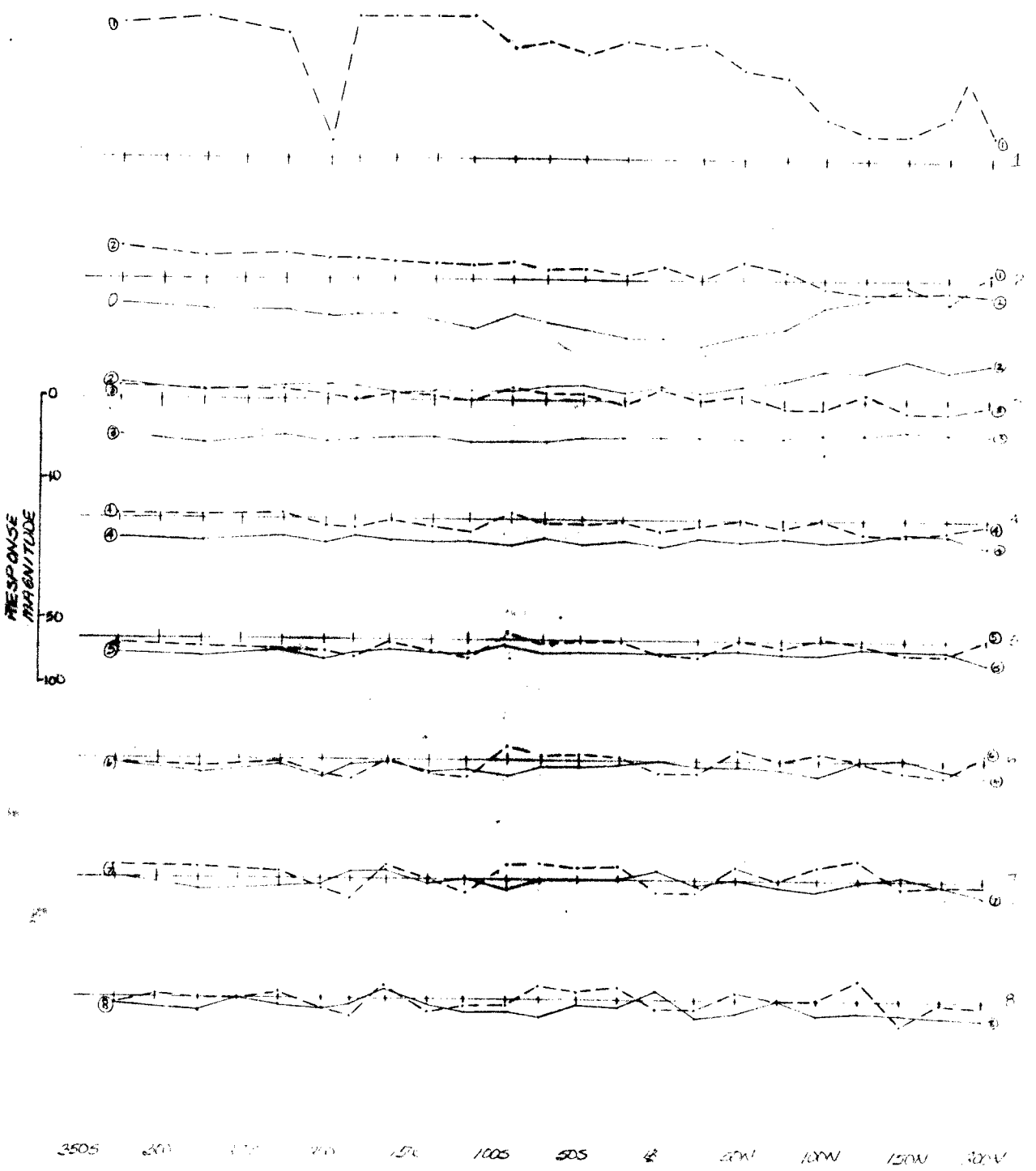


250 200 150 100S 50S 0 50N

VERTICAL (Z) COMPONENT
HORIZONTAL (X) COMPONENT

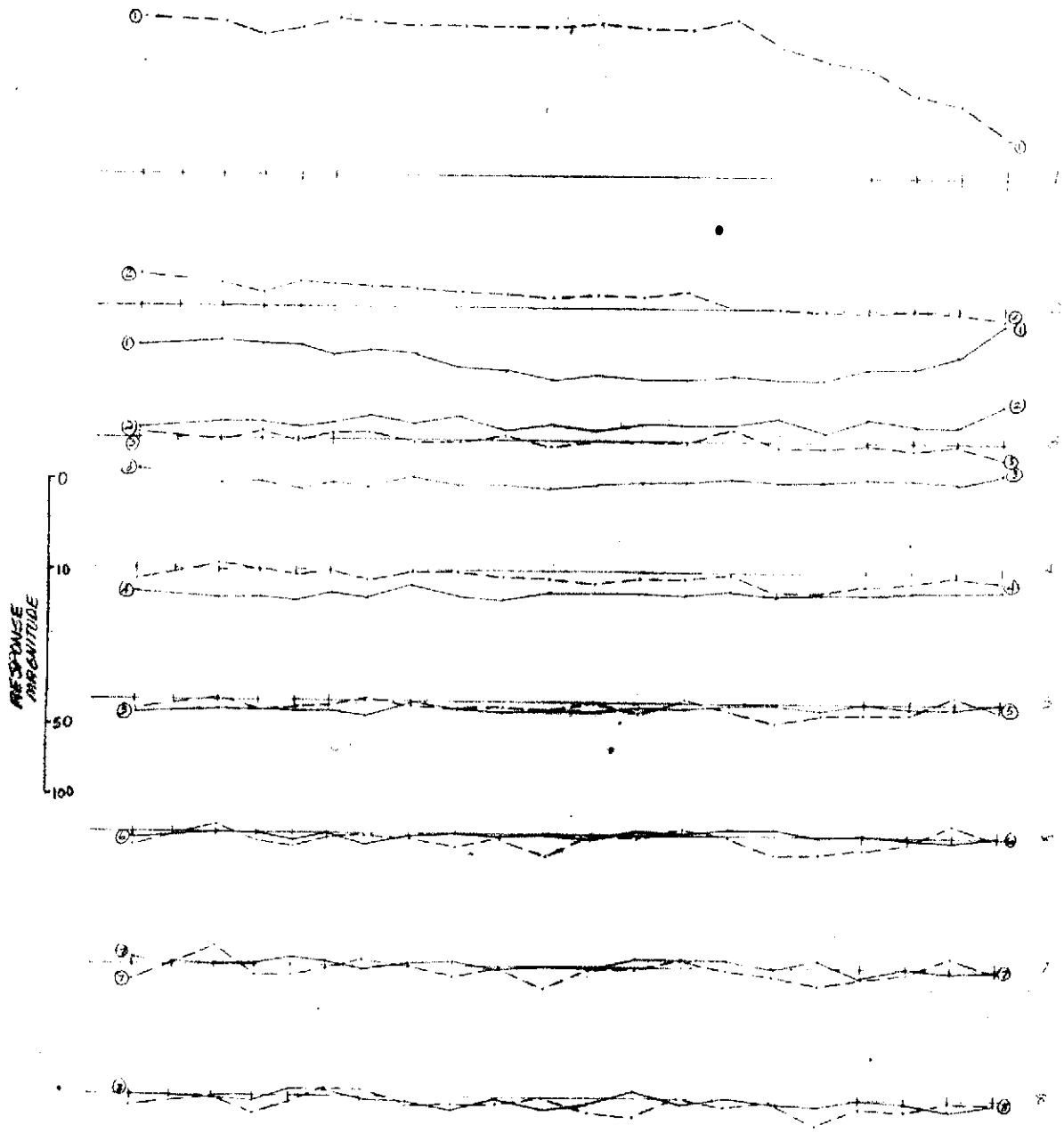
CRONE GEOPHYSICS
RIOCANEX
NIFTY OPTION
DEEPEM SURVEY
LINE 3500
TX LOOP
PP GAIN 75%
ZTS 606
SCALE VERT LOG HORIZ 1CM = 25m
22-6-81


400S
350S
300S
250S
150S
100S
50S
50N
0
10
50
100
RESPONSE AMPLITUDE
LEGEND VERTICAL(Z)COMPONENT
HORIZONTAL(X)COMPONENT
CRONE GEOPHYSICS
RIOCANEX
NIPPY OPTION
DEEPEM
LINE 4W
TX LOOP #1
PP GAIN 750
ZTS 606
SCALE HORIZ 1cm: 25m
VERT LOG
22-6-81



LEGEND VERTICAL(z) COMPONENT ————
HORIZONTAL(x) COMPONENT - - - -

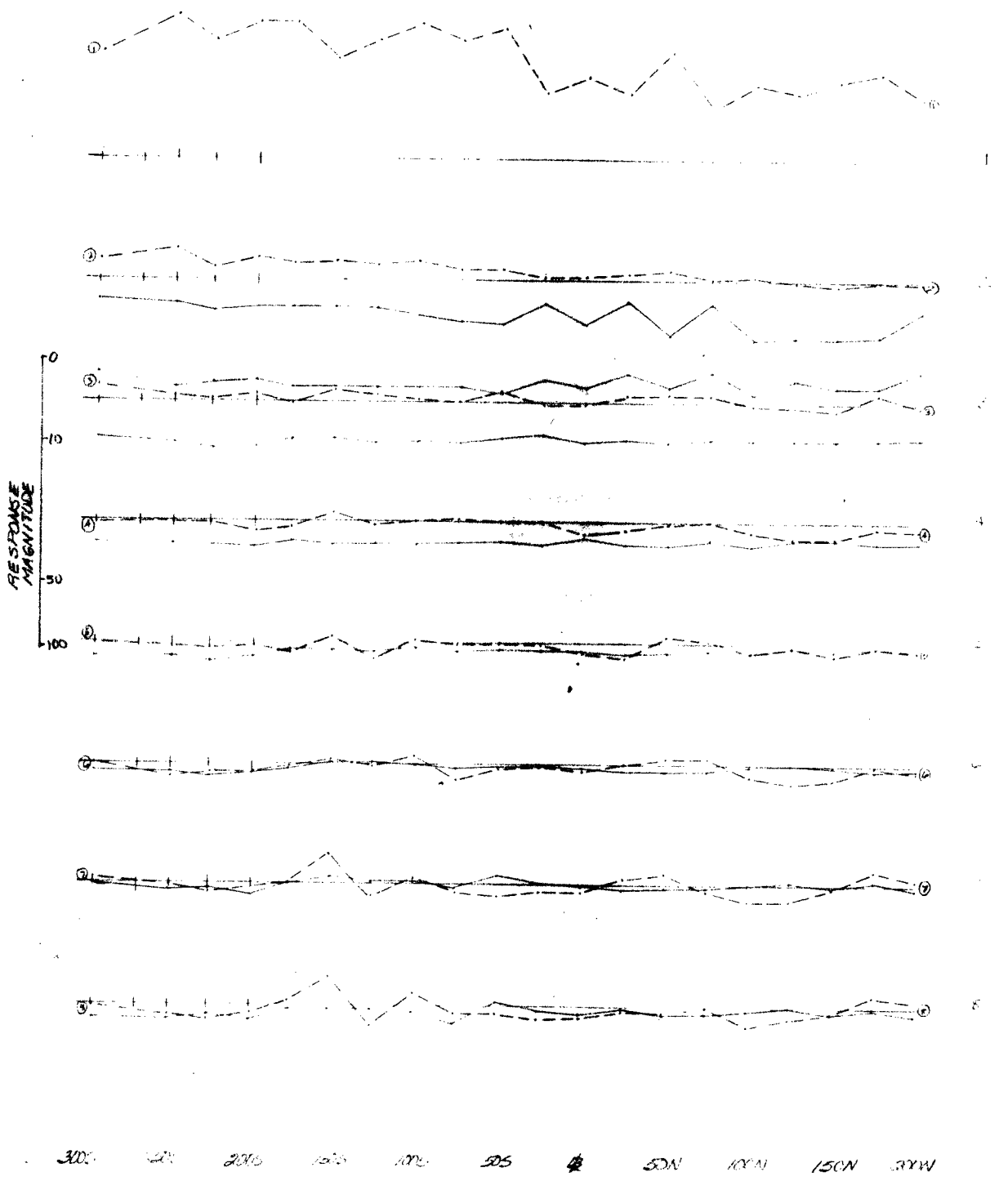
CRONE GEOPHYS.
RIOCANEX
NEFFY OPTIONS
DEEPEM
LINE 2W
TX LOOP #1
PP GAIN 750
ZTS 606
HORIZ 1cm=25m
SCALE VERT LOG
22-6-81



3000 2500 500 S 400N 450N 500N

LEGEND VERTICAL (z) COMPONENT
HORIZONTAL (x) COMPONENT

FIDDANES
NIFTY OPTION
DEEPEM SURVEY
LINE 1W
TX LOOP #
PP GAIN 1200
ZTS 600
SCALE HORIZ 1cm = 25m
VERT LOG
22-6-81



NORMAL VERTICAL (Z) COMPONENT
HORIZON

CRONE GEOPHYSICS
ROCANEX
NIETY OPTION
LINE 0
TX LOOP #1
FREQ 750
ZTS 666
SCALE VERT LOG 10M=25
22-6-81

TRANSMITTER LOOP

LINE 4+50 W
LINE 4+00 W
LINE 3+50 W
LINE 3+00 W
LINE 2+00W
LINE 1+00W
LINE 0+00
LINE 6+00 W

BASE LINE
BASE LINE

NORTHWEST ZONE
MAIN ZONE
TRENCH ZONE

CAMP

NIFTY 8
NIFTY 9
NIFTY 10
NIFTY 11

Station Interval..... 25 metres Along Slope
Plotted Positions Corrected for Topography

— LEGEND —

- Outcrop, assumed
- Geological Contact, assumed
- Fault, assumed
- Trail
- Trench
- •034 Sample location and number Preceeded by 8038

UNKNOWN AGE
5 Diorite
4 Quartz–feldspar porphyry (rhyolite) dykes
3 Andesite dykes
LOWER CRETACEOUS, GAMBIER GROUP
2 Andesite, dacite and minor rhyolite volcaniclastic ; 2a, andesite pebble to boulder volcaniclastic
1 Rhyolite tuff and lapilli tuff

N T S 93D 9W
SCALE 1:1000
20 10 0 20 40 60 80 Metres

RIO TINTO CANADIAN EXPLORATION LTD.
NIFTY OPTION
PULSE ELECTROMAGNETIC SURVEY

DATE	DRAWN BY	DWG.
JUNE 1981	CDC /dag	GP 8867