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MINNOVA INC.

GEOPHYSICAL REPORT OF A TRANSIENT (PULSE) EM SURVEY

HORN PROPERTY
KIMBERLEY, BRITISH COLUMBIA

LATITUDE: 49° 37'N
LONGITUDE: 116° 15'W

AUTHOR: Dennis V. Woods, Ph.D., P.Eng.
Consulting Geophysicist

DATE OF WORK: 12 - 25 May 1992
DATE OF REPORT: 11 July 1992

DENNIS V. WOODS, Ph.D., P.Eng.
Consulting Geophysicist

2539 - 140th Street. White Rock, B.C. V4A 4H9 (604) 538-1445

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PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA D. V. WOODS

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INTRODUCTION:

During the period 12 to 25 May 1992, a transient EM survey was carried out at the Horn property in south-eastern B.C. for Minnova Inc. Approximately 12 kilometres of cut line on the "DH" and Clair" grids were surveyed using a Crone 500 watt Pulse EM system.

The results of the survey are presented in this report along with a technical description of the Pulse EM method, survey procedures and data presentation. The survey data have also been analyzed and interpreted in terms of possible conductive horizons and other structures on the property. Follow-up drill holes are recommended.

SURVEY LOCATION AND ACCESS:

The survey area is located on the south side of the St. Mary River valley about 20 kilometres west of Kimberley, B.C. (Figure 1). The survey grid is easily accessible by highway from Kimberley along the north side of the river to St. Mary Lake, and then by a logging road which crosses the river west of the lake. Accommodation was obtained at off-season ski chalets near Kimberley.

CRONE PULSE ELECTROMAGNETIC SYSTEM:

The Crone Pulse electromagnetic system is a time domain EM system which can be used in the standard horizontal loop mode, fixed large-loop mode or in a downhole mode. The main advantage of the PEM

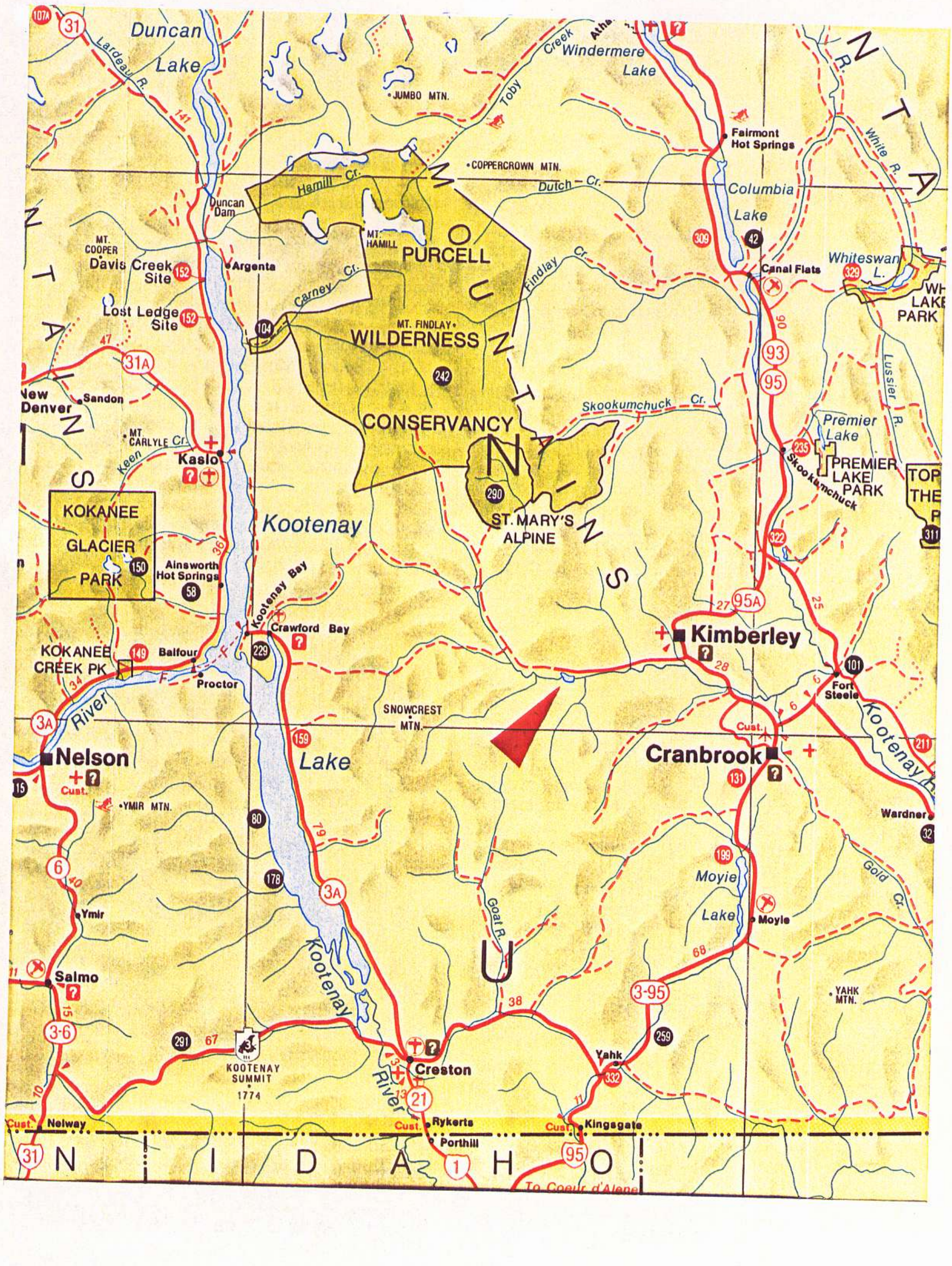

Figure 1.
Location Map
Horn Property - Minnova Inc.

system is that it is free of geometric and topographic restrictions and it has high inherent sensitivity because the secondary EM fields are measured during primary field off-time.

The primary field for the standard horizontal loop method is produced by a portable transmitter loop of 10 to 50 metres diameter. A depth of search of approximately 75% of separation is obtainable due to the high sensitivity of the receiver system. Interpretation is accomplished with the aid of Slingram horizontal loop curves (Bartel and Hohmann, 1985).

In the fixed source mode, the primary field is produced by a large rectangular transmitter loop some 400 to 1000 metres in length and powered by a 2000 watt transmitter, or by a smaller transmitter loop of 100 to 300 metres in size using a 500 watt transmitter. Fixed source PEM data is interpreted by utilizing the results of numerical computer modelling (Dyck, et al., 1980; West, et al., 1984; and Gallagher, et al., 1985). Precise interpretations are often quite difficult due to complex combinations of the background half-space response - i.e. the "smoke ring" effect (Nabighian, 1979) - and multiple conductor responses. In addition, an anomalous response from a large fixed transmitter loop is commonly due to a combination of electromagnetic induction and ohmic current channelling, with the latter possibly dominating.

The time derivative of the secondary EM field resulting from the presence of a conductor is sampled at eight windows on the decay curve, during primary field off-time. The eight channels range from 0.15 to 6.4 msec after primary field shut-off, and are equivalent to a spectrum of frequencies from approximately 6.7 kHz to 160 Hz, thus allowing conductor character and strength determination. In particular, the conductivity-thickness product (conductance) of a conductor can be determined from the rate of decay of the response, after correcting for the relative response gains on each channel (see "Instrument Specifications"). The size of the conductor and/or the size of the transmitter loop must also be factored into the conductance calculation (Woods, 1975; Woods et al., 1980; Lamontagne, et al., 1980; Gallagher, et al., 1985).

The vertical and horizontal components of the secondary field are measured at each station on the traverse, using the convention of vertical component positive downwards and horizontal component positive away from the transmitter loop. Time synchronization between transmitter and receiver is by radio or direct cable link. Additional detailed technical information on the Crone PEM system can be found in the "Instrument Specifications" at the end of this report.

SURVEY PROCEDURES:

The Pulse EM survey was carried out using four separate transmitter loops, two each on the DH and Clair grids, measuring approximately 250 by 200 metres and powered by a 500 watt Crone Pulse EM transmitter/generator. Three to four survey lines, spaced 250 metres apart, were surveyed to the west of each loop. This configuration provides maximum electromagnetic coupling and inductive response from the westward dipping stratigraphy in the area, while minimizing the time and effort required for set-up, given the steep topography and difficult bush conditions. Loop locations and survey traverses and are shown in Figure 2 and listed in Table 1.

Table 1 Pulse EM Survey

Grid	Tx Loop	Line	Stations	Length
DH	1	2+50 N	1+00 W to 8+00 W	700 m
		00 N	3+00 W to 14+00 W	1100 m
		2+50 S	2+50 W to 10+00 W	750 m
		4+00 S	0+50 W to 4+25 W	375 m
		(26+00 N)	(39+50 E to 35+75 E)	
		5+00 S	3+00 W to 9+00 W	600 m
	2	5+00 S	1+00 E to 2+00 W	300 m
		7+50 S	1+50 E to 7+25 W	875 m
		10+00 S	2+50 E to 5+50 W	800 m
Clair	3	2+50 N	22+50 W to 28+75 W	625 m
		00 N	21+00 W to 31+00 W	1000 m
		2+50 S	21+50 W to 31+00 W	950 m
		5+00 S	20+00 W to 30+00 W	1000 m
	4	7+50 S	20+50 W to 30+00 W	950 m
		10+00 S	19+75 W to 30+00 W	1025 m
		12+50 S	18+50 W to 27+25 W	875 m
			total	11.9 km

Both the vertical (Z) and horizontal (X) components were measured at 25 metre intervals along each survey line with the receiver set to the maximum constant gain. The primary field strength was also recorded which allows the data to be primary field normalized if required. Time synchronization between the transmitter and receiver was obtained using a remote radio connected to the transmitter by cable. The 500 watt transmitter delivered about 10 Amps of current to the transmitter loops.

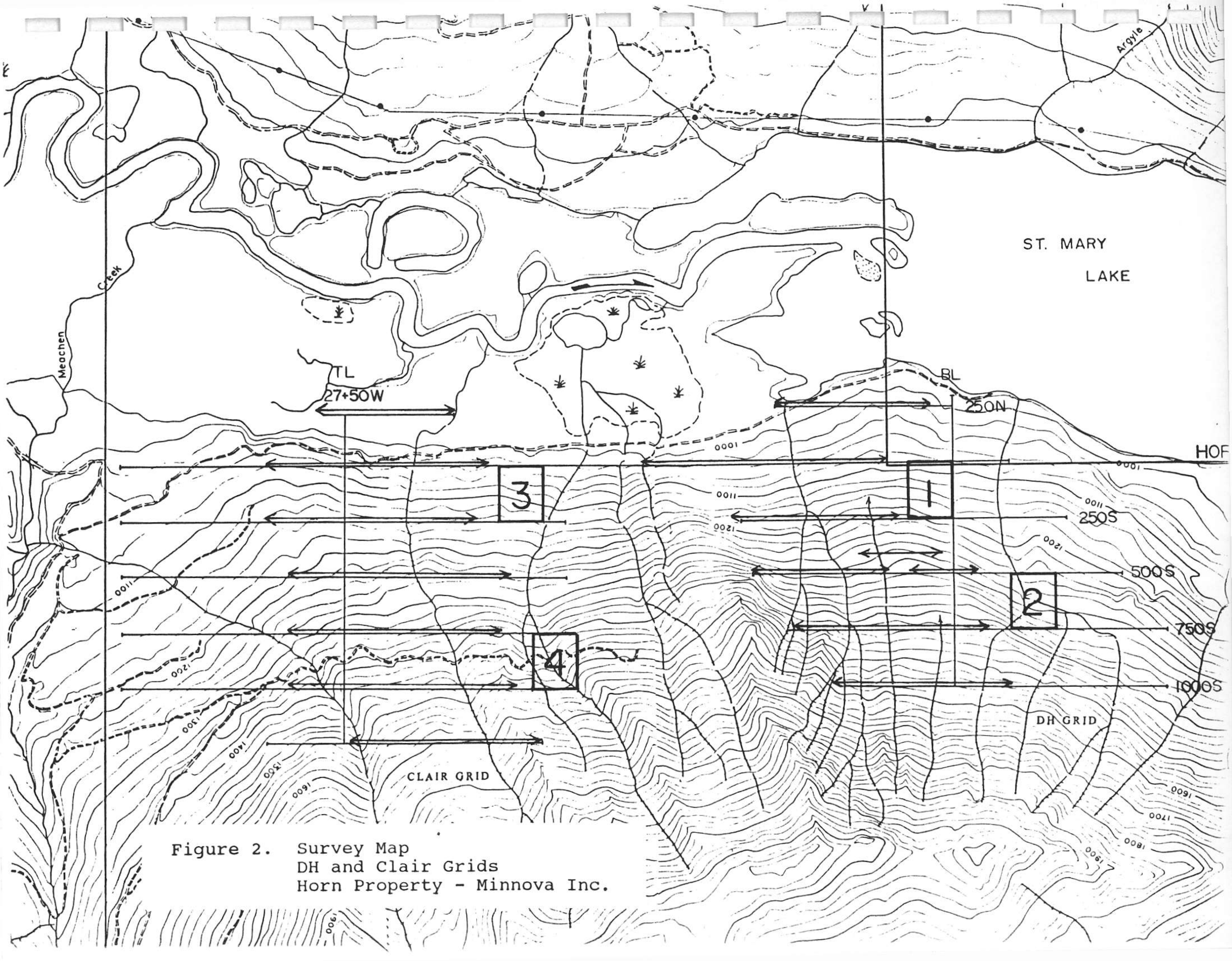

Figure 2. Survey Map
DH and Clair Grids
Horn Property - Minnova Inc.

DATA PRESENTATION:

The transient EM survey results are shown in Profiles 1 to 15. There is a separate plot for each survey line and for both the X and Z components. The plots are arranged with the primary field strength across the top, the first four channels of secondary response combined on one amplitude axis in the centre, and the last four channels combined on a separate and expanded amplitude axis along the bottom. The amplitude axes are arbitrarily set to expand the data to maximum size, to a limit of 4 units/cm. The data are plotted as recorded on constant 100% receiver gain.

INTERPRETATION PROCEDURES:

The survey results are organized according to grid area and survey line to facilitate discussion. The discussion of the results is primarily a qualitative analysis of the profile plots based largely on past experience. Quantitative interpretations, based on theoretical modelling (e.g. Gallagher, et al., 1985), are made where possible, and are transferred to the interpretation map shown in Figure 3.

The position and depth of the conductors are determined from the shape of the anomalous response after visual removal of the background half-space response and separation of multiple anomalous responses on the same line. The top of a conductor is located directly below the horizontal component amplitude maximum and the vertical component inflection maximum. The depth to the top of the conductor is calculated from the peak-to-peak separation of the vertical component side lobes, or the half-amplitude width of the horizontal component anomaly. The dip of the conductor is estimated from the asymmetry of the horizontal component profile and the relative sizes of the vertical component side lobes. The conductivity-thickness product (i.e. conductance) of the conductor is determined from the rate of decay of the anomalous response versus channel time, assuming a vertical plate model in free space.

Large background responses, closely spaced multiple conductors, and broad anomalies from deep conductors often make interpretations difficult and imprecise. Generally the deeper the conductive source, the lower will be its spatial resolution. Dip estimation is especially susceptible to error.

DISCUSSION OF RESULTS:

DH Grid

There are no significant anomalous responses observed in the data from the DH grid using transmitter loops 1 and 2 (Profiles 1 to 8). A positive response is observed in the horizontal components of the first six channels, which increases in amplitude away from the transmitter loop to broad maximums at 500-1000 m from the loop. This response appears to be independent of station location and depends only on the relative distance to the transmitter loop. It also appears to broaden and to be displaced further from the transmitter loop with later channels. The effect is observed more subtly in the vertical components as a broad positive inflection from large background negative amplitudes near the transmitter loop.

The broad response described above is due to EM induction in the surrounding country rock (i.e. the conducting half-space) rather than to any specific formation or conductor. The broadening and outward displacement of the response with later channels (i.e. time) is due to the "smoke-ring" effect of time-domain (transient) EM induction as described by Nabighian (1979).

A small, secondary peak in the first three channels of the horizontal component from line 00N at about 10+00W to 11+00W (Profile 2a), along with a corresponding inflection in the vertical components at the same location (Profile 2b), indicates the presence of a weak conductor as shown on the interpretation map in Figure 3. The anomaly is narrower than the broad background response and is approximately in the same location with each channel. In effect, the smoke-ring currents have concentrated and remained fixed in a conductive structure at about 10+50W. The conductor is about 60 m deep and dipping to the west. Its conductivity-thickness product is estimated to be about 7 mhos assuming a free-space plate model, however it is probably much less due to current channelling effects from the surrounding rock.

Clair Grid

The Pulse EM data from the Clair grid using transmitter loops 3 and 4 (Profiles 9 to 15) are similar to the DH grid data in that the

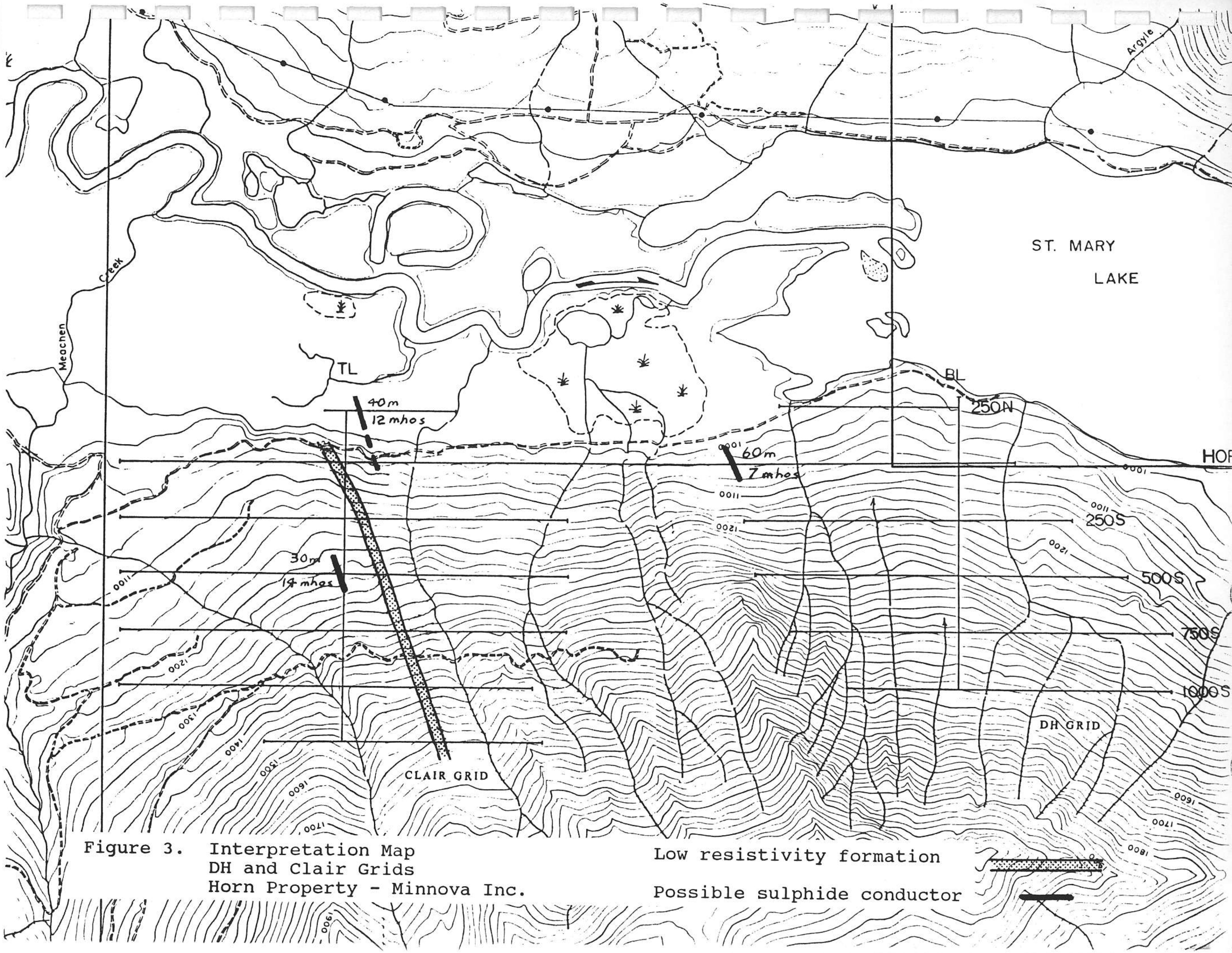

Figure 3. Interpretation Map
DH and Clair Grids
Horn Property - Minnova Inc.

profiles are dominated by a broad response which diffuses outward from the transmitter loops. However, on the Clair grid the maximum horizontal component amplitude and vertical component inflection are controlled by station location rather than distance from the transmitter loop. The induced smoke-ring currents are dominated by a moderately conductive formation which strikes across the entire grid from 23+00W on line 12+50S to 28+00W at line 00N as shown in Figure 3. This conductive formation has an overall conductivity-thickness product of about 5 mhos which may be due to a formation with resistivities of less than 10 ohm-m over a thickness of 50 m.

There are two specific locations on the Clair grid where narrower anomalies remain relatively fixed with later channel: at about 27+00W on line 2+50N (with a possible extension to line 00N), and at 27+75W on line 5+00S. These anomalies are due to separate, shallower conductors where the smoke-ring currents are concentrated. These conductors are about 30 to 40 m deep and dip to the west. The calculated conductivity-thickness product is 12 mhos at line 2+50N and 14 mhos at line 5+00S assuming a thin plate in free-space model.

CONCLUSION AND RECOMMENDATIONS:

The Pulse EM data from the survey of the DH and Clair grids on the Horn property are dominated by background responses from the surrounding rock formations. At the Clair grid, this background response appears to be controlled by a particular formation which angles across the survey lines in a north-northwesterly direction.

This formation is less resistive than the surrounding rocks, but it is unlikely to be due to a zone of economic sulphide mineralization. At the DH grid, the background response is not related to any particular formation, possibly because the stratigraphy is more flat-lying, or because its resistivity is more uniform.

There are three separate locations on the DH and Clair grids where the anomalous response is enhanced and remains fixed with later channel, indicating the presence of isolated conductive structures as shown on the interpretation map in Figure 3. These conductors are of limited size and relatively low conductivity-thickness product, suggesting weakly mineralized zones within the stratigraphic units. However, they may also be caused by surficial effects mimicking the response from bedrock conductors.

It is recommended that each of the three interpreted conductors shown in Figure 3 be tested by drilling. Holes should be spotted about 50 to 100 m west of the indicated locations of the conductors and drilled steeply to the east. Intersection depth depends on the dip of the formations, but should not exceed 100 m.

An anomalous increase in response amplitude at the end of line 00N on the DH grid suggests the possible existence of additional conductors between the two grids. For this reason, and also because the expected prospective formations were not detected on the DH grid, the Pulse EM survey should be extended to cover the region between the two grids. Also, it was not possible to survey in the St. Mary River valley bottom due to beaver dams and flooding, hence this area should be surveyed in the winter.

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STATEMENT OF QUALIFICATIONS:

NAME:	WOODS, Dennis V.
PROFESSION:	Geophysical Engineer
EDUCATION:	B.Sc. Applied Geology, Queen's University, 1973 M.Sc. Applied Geophysics, Queen's University, 1975 Ph.D. Geophysics, Australian National University, 1979
PROFESSIONAL ASSOCIATIONS:	Registered Professional Engineer, #15745 Province of British Columbia Active Member, Society of Exploration Geophysicist Canadian Society of Exploration Geophysicist Australian Society of Exploration Geophysicist
EXPERIENCE:	1971-79 - Field geologist with St. Joe Mineral Corp. and Selco Mining Corp. (summers) - Research graduate student and teaching assistant at Queen's University and the Australian National University 1979-86 - Assistant Professor of Applied Geophysics at Queen's University - Geophysical consultant with Paterson Grant & Watson Ltd., M.P.H. Consulting Ltd., James Neilson & Assoc. Ltd., and Foundex Geophysics Inc. - Visiting research scientist at Chervon Geosciences Ltd., Geological Survey of Canada, and the University of Washington 1986-90 - Project Geophysicist with Inverse Theory & Applications (ITA) Inc. - Chief Geophysicist at White Geophysical Inc. - Chief Geophysicist at Premier Geophysics Inc 1990- - President of Woods Geophysical Consulting

SPECIFICATIONS – CRONE PULSE EM EQUIPMENT

1. STANDARD RECEIVER

BATTERY SUPPLY:
±12 VDC, two internal, rechargeable, 12V gel type batteries

MEASURED QUANTITIES:
Primary shut-off voltage pulse (PP). Time derivative of the transient magnetic field by integrative sampling over eight, contiguous time gates (microseconds).

CH. NO.	WINDOW	WIDTH	MID PT.	REL. GAIN	WINDOW	WIDTH	MID PT.
PP	-100 to 0	100	-50	1.00	-200 to 0	200	-100
1	100 to 200	100	150	1.00	200 to 400	200	300
2	200 to 400	200	300	1.39	400 to 800	400	600
3	400 to 700	300	550	1.93	800 to 1400	600	1100
4	700 to 1100	400	900	2.68	1400 to 2200	800	1800
5	1100 to 1800	700	1450	3.73	2200 to 3600	1400	2900
6	1800 to 3000	1200	2400	5.18	3600 to 6000	2400	4800
7	3000 to 5000	2000	4000	7.20	6000 to 10K	4000	8000
8	5000 to 7800	2800	6400	10.00	10K to 15.6K	5600	12.8K
	10.8ms. Time Base				21.6ms. Time Base		

READOUT:
Readings are output on an analog meter (6V FSD), over three sensitivity ranges (X1, X10, X100). Data retrieval made by channel select switch.

TIMING:
A telemetry link ("sync") is maintained by radio signal, or a back-up cable, between the transmitter and the receiver, and is meter monitored.

SENSITIVITY:
Adjustable through a ten turn, calibrated gain pot.

SAMPLING MODES:
"S & H" (Sample & Hold)
The receiver averages 512 (10.8 ms), or 256 (21.6ms), readings for all channels, and stores the results for display.
"CONT" (Continuous)
A running average for all channels is stored, enabling the operator to reject thunderstorm spikes and power line noise by visual inspection.

OPERATING TEMPERATURE RANGE:
-40°C - 50°C (-40°F - 122°F)

DIMENSIONS: 28cm x 18cm x 27cm (11" x 7" x 10½")

SHIPPING DIMENSIONS: 37cm x 27cm x 35cm (14½" x 10½" x 14")

WEIGHT: 7kg (16lb)

SHIPPING WEIGHT: 14.5kg (32lb)

2. OPTIONAL DATALOGGER RECEIVER

- Uses above receiver in conjunction with Omnidata Polycorder®
- Data is A/D converted and stored in 32k memory.
- RS-232C serial interface allows for connection to modem.
- Continual monitoring of readings through LCD.
- Spheric and powerline rejection through software filter.
- Operating temp range from -40°C - 50°C (-40°F - 122°F)

WEIGHT: 14.5kg (32lb)

SHIPPING WEIGHT: 21.8kg (48lb)

DIMENSIONS: 22cm x 28cm x 46cm (8¾" x 11" x 18")

SHIPPING DIMENSIONS: 35cm x 30cm x 53cm (14" x 11¾" x 21")

SPECIFICATIONS – PULSE EM TRANSMITTER EQUIPMENT

MOTOR GENERATOR:
4-1/2 H.P. Wisconsin, 4 cycle engine with belt drive to D.C. alternator; maximum output 120V, 30 amps; external gas tank; frame unit weight: 33 kg, shipping: 47 kg.

REGULATOR:
Controls and filters the alternator output; continuously variable between 24V and 120V D.C.; 20 amp maximum current; weight: 10 kg, shipping: 24 kg.

PEM WAVEFORM TRANSMITTER:
Controls bipolar, on-off waveform and linear current shut-off ramp time. Radio and cable time synchronization with housing for optional crystal clock sync system; on-off times for 60 Hz areas 8.33ms, 16.66ms, 33.33ms; for 50 Hz areas 10.0ms, 20.0ms, 40ms; for analog PEM operation 10.9ms, 21.8ms; linear controlled current shut-off ramp times of 0.5, 1.0 and 1.5ms; monitors for shut-off ramp operation, instrument temperature, Tx loop continuity, and overload output current; automatic shut-down for open Tx loop. Weight: 12.5 kg, shipping: 22 kg.

REMOTE RADIO, ANTENNA AND MAST:
Used for radio timing synchronization on large survey grids; range up to 2 km; radio has 12V rechargeable gell cell battery supply; antenna is fiberglass mounted on a 4 section aluminum mast each 2m long. Radio weight: 2.7 kg, shipping: 6.0 kg; mast and antenna shipped as bundle: 6.4 kg.

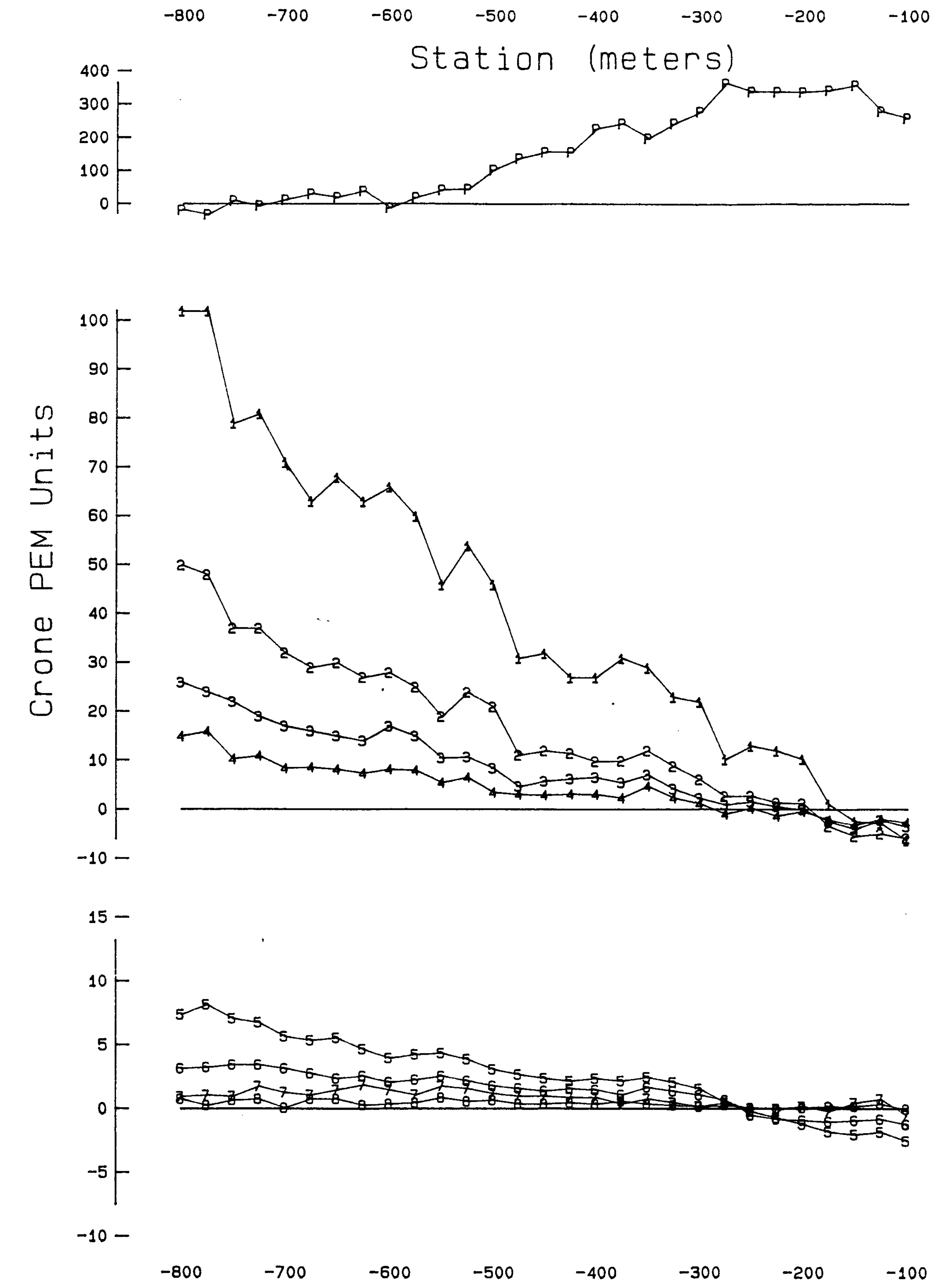
OPTIONAL CRYSTAL CLOCK TIMING LINK:
Installed in the Digital Rx and external box mounted to be plugged into PEM-Tx. Gel rechargeable power supply. Weight: 10 kg, shipping: 15 kg.

WIRE, SPOOLS AND WINDERS:
Transmitter wire is usually No. 10 or No. 12 AWG copper in 310m or 410m lengths, 1 length per spool; 2 spools in a shipping box; winder is mounted on a magnesium packframe.

MULTI-TURN MOVING COIL:
7 turn, 13.7 meter diameter Tx loop with plugs to break into 2 sections. Aluminum or copper wire and various coverings depending on area being used.

BATTERY POWER SUPPLY:
24V, 20 amp hour; rechargeable battery supply for use with PEM-Tx as power source rather than motor-generator-regulator. In aluminum case, with clamp connectors. Weight: 20.5 kg, shipping: 29 kg.

- Battery chargers supplied for all rechargeable battery units.
- All instruments and equipment operational from -40°C to +50°C.
- Shipping boxes are reusable plywood construction with closed cell foam shock protection.



MINNOVA INC.

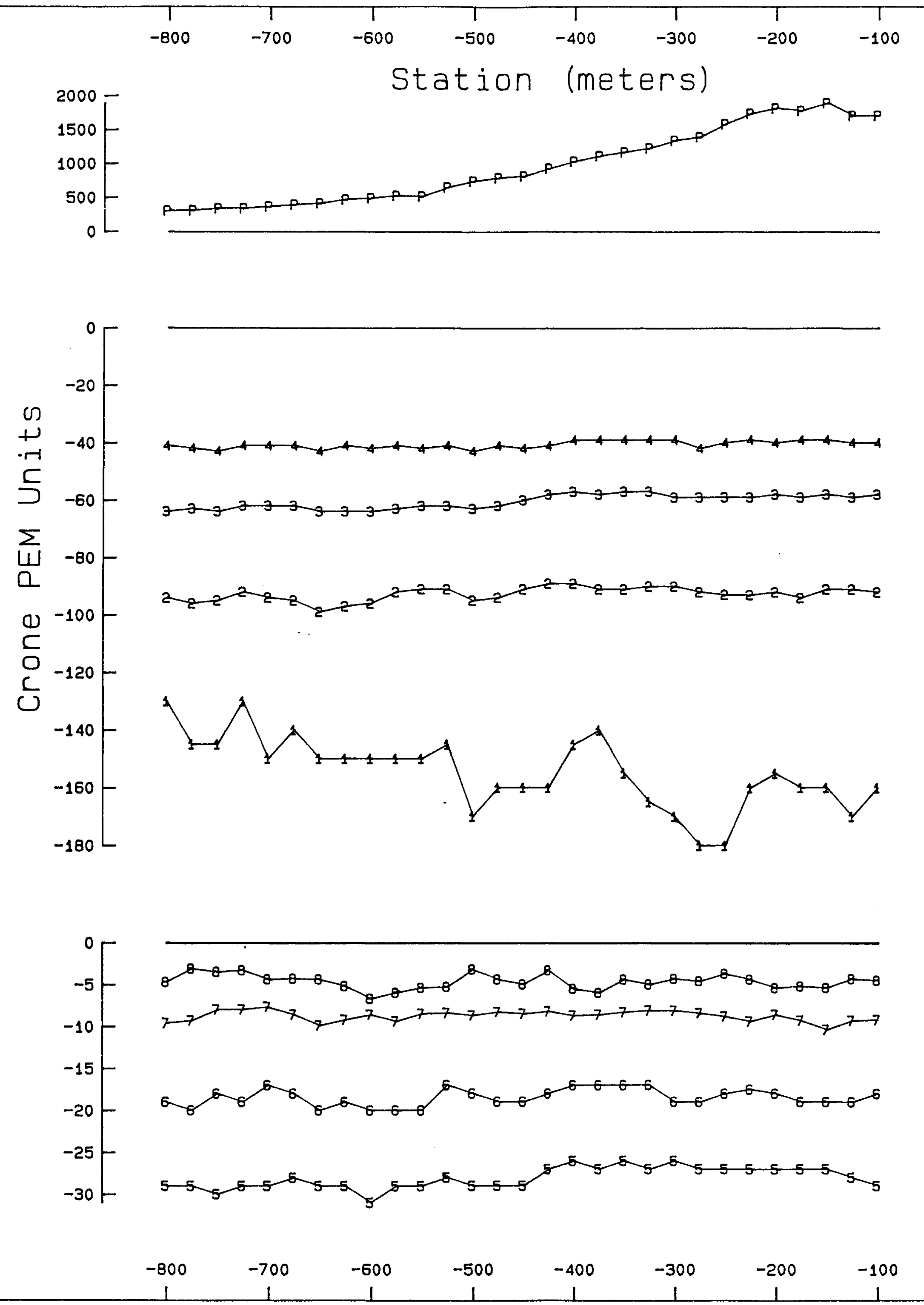
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 250N X LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 1a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

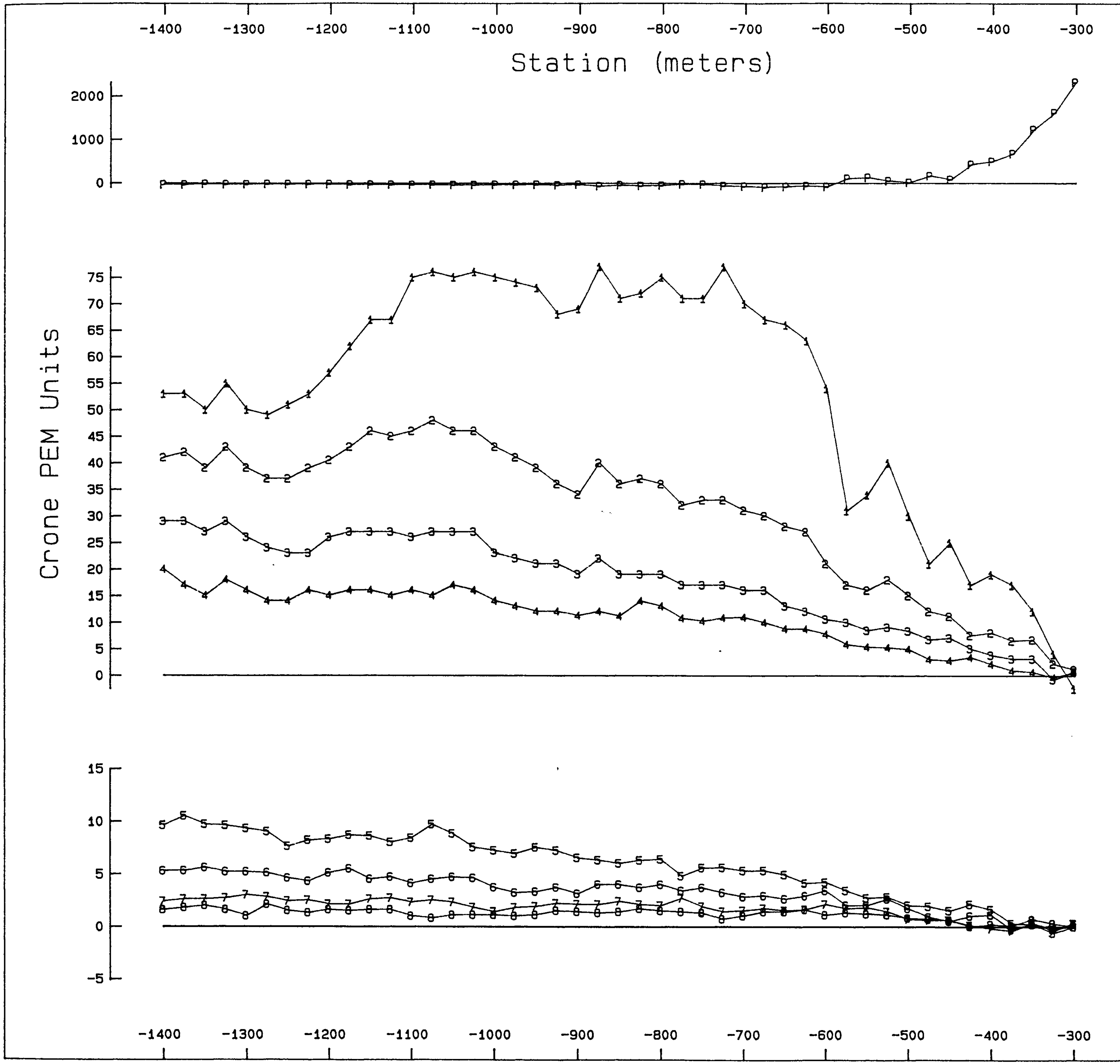
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 250N Z LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 1b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

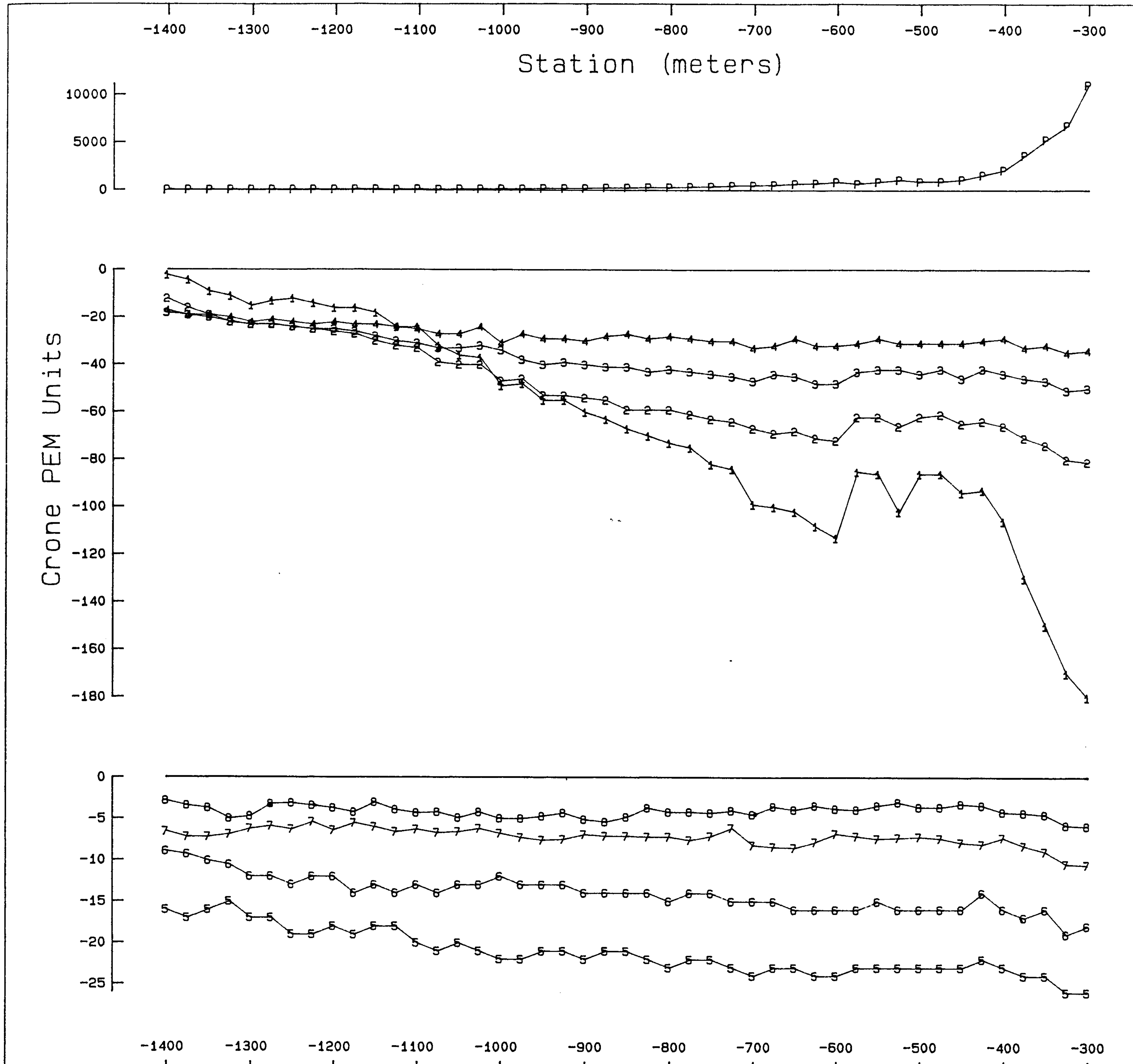
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 00N X LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 2a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 00N Z LOOP 1

Scale 1: 5000.0

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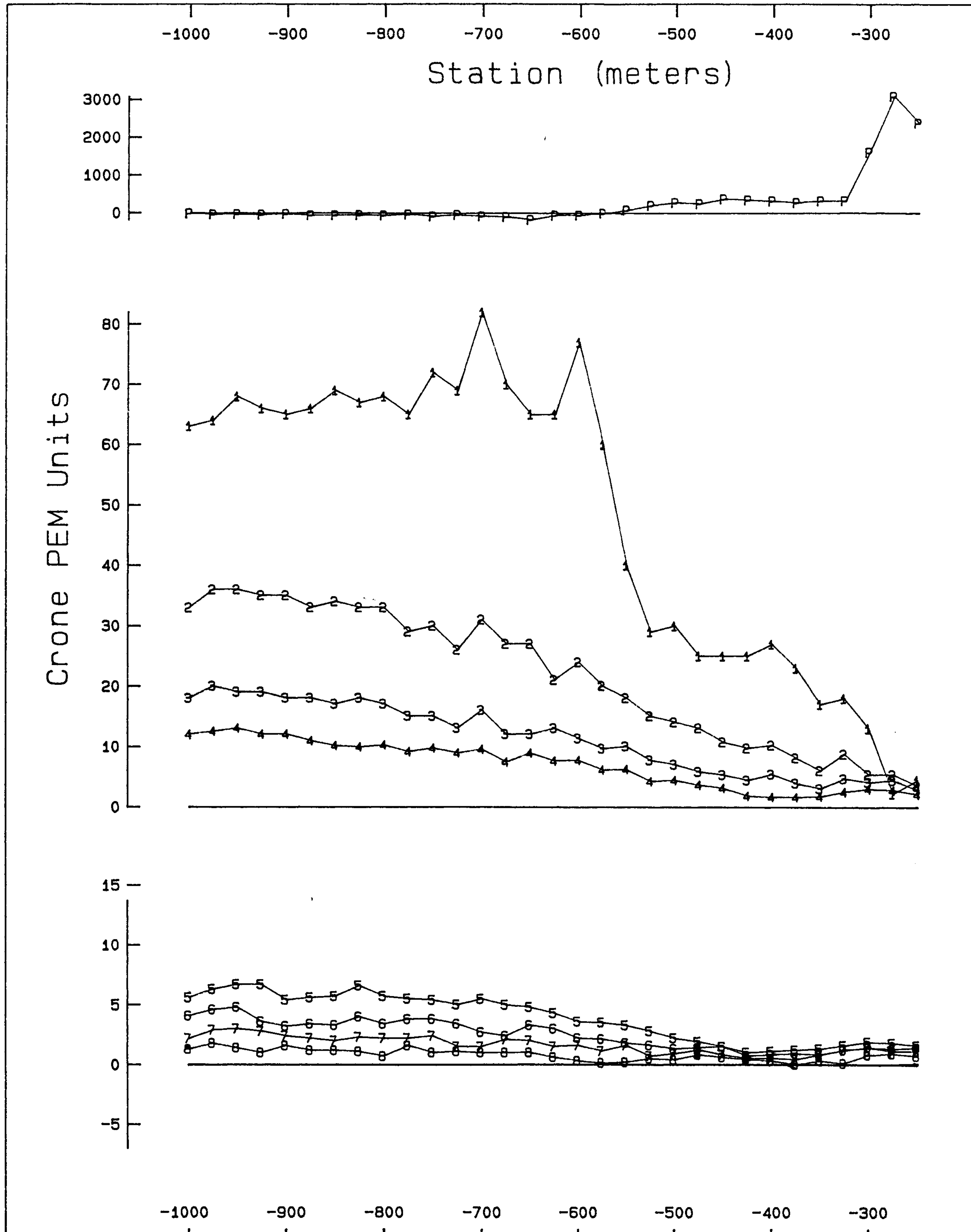
Date: June 1992	Survey: May 1992	Profile: 2b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

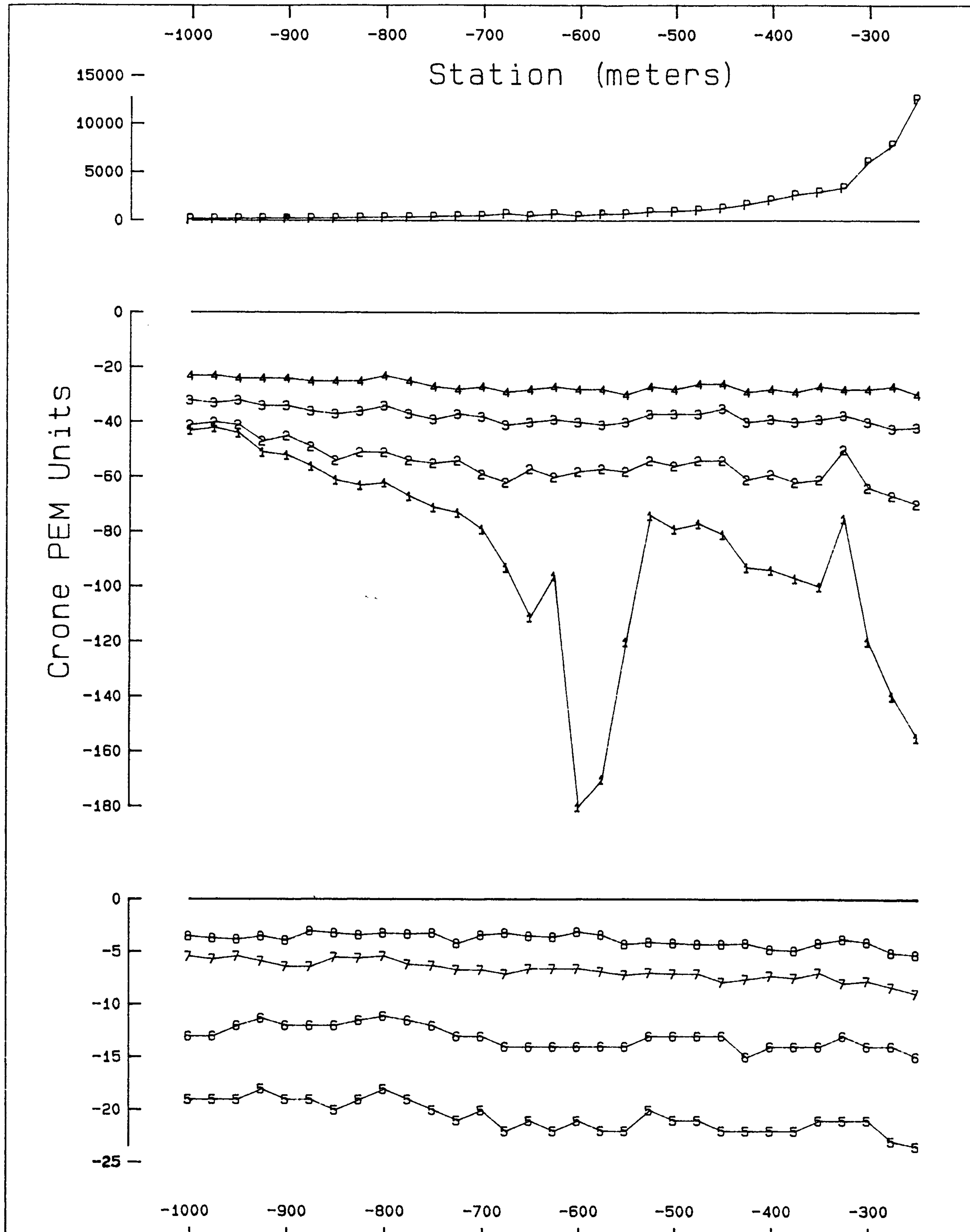
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 250S X LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 3a

WOODS GEOPHYSICAL CONSULTING



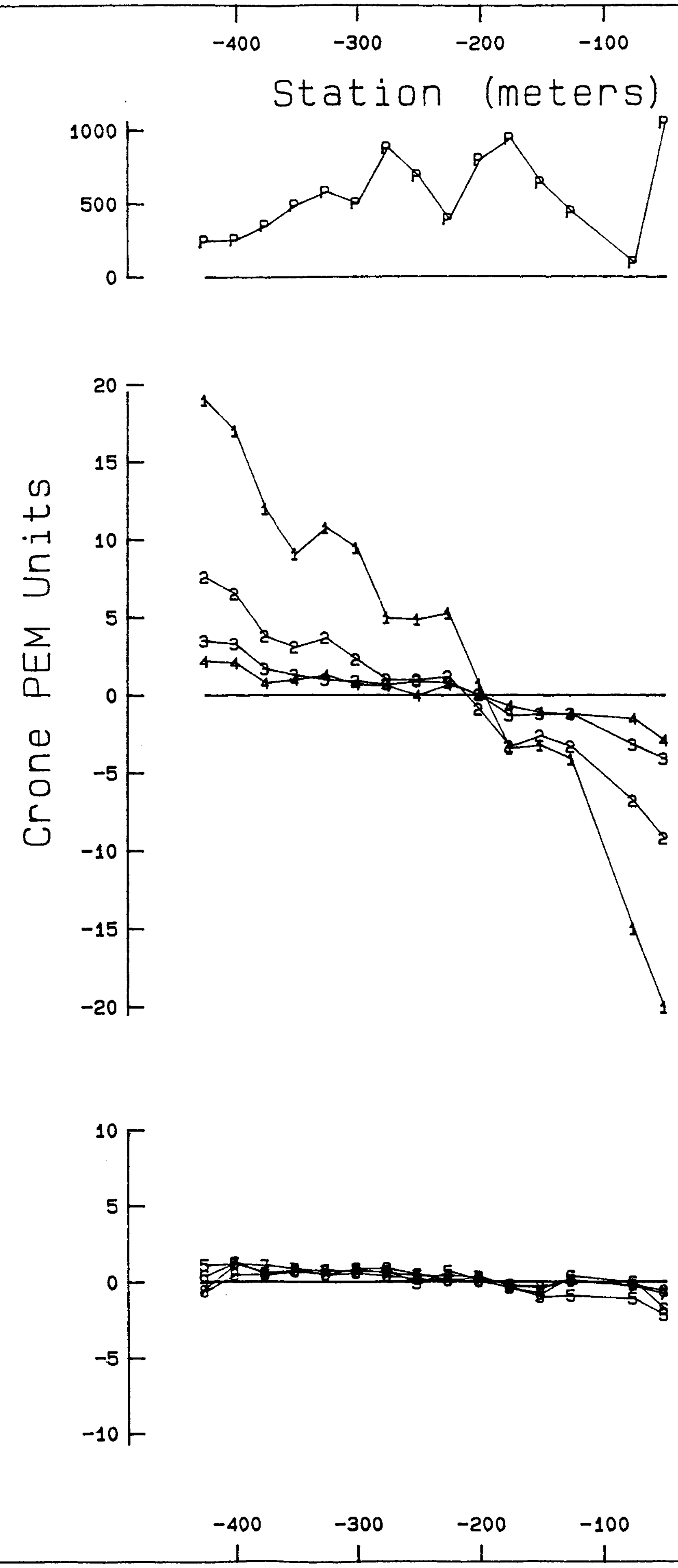
MINNOVA INC.

HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 250S Z LOOP 1

Scale 1: 5000.0

Date: June 1992	Survey: May 1992	Profile: 3b

WOODS GEOPHYSICAL CONSULTING



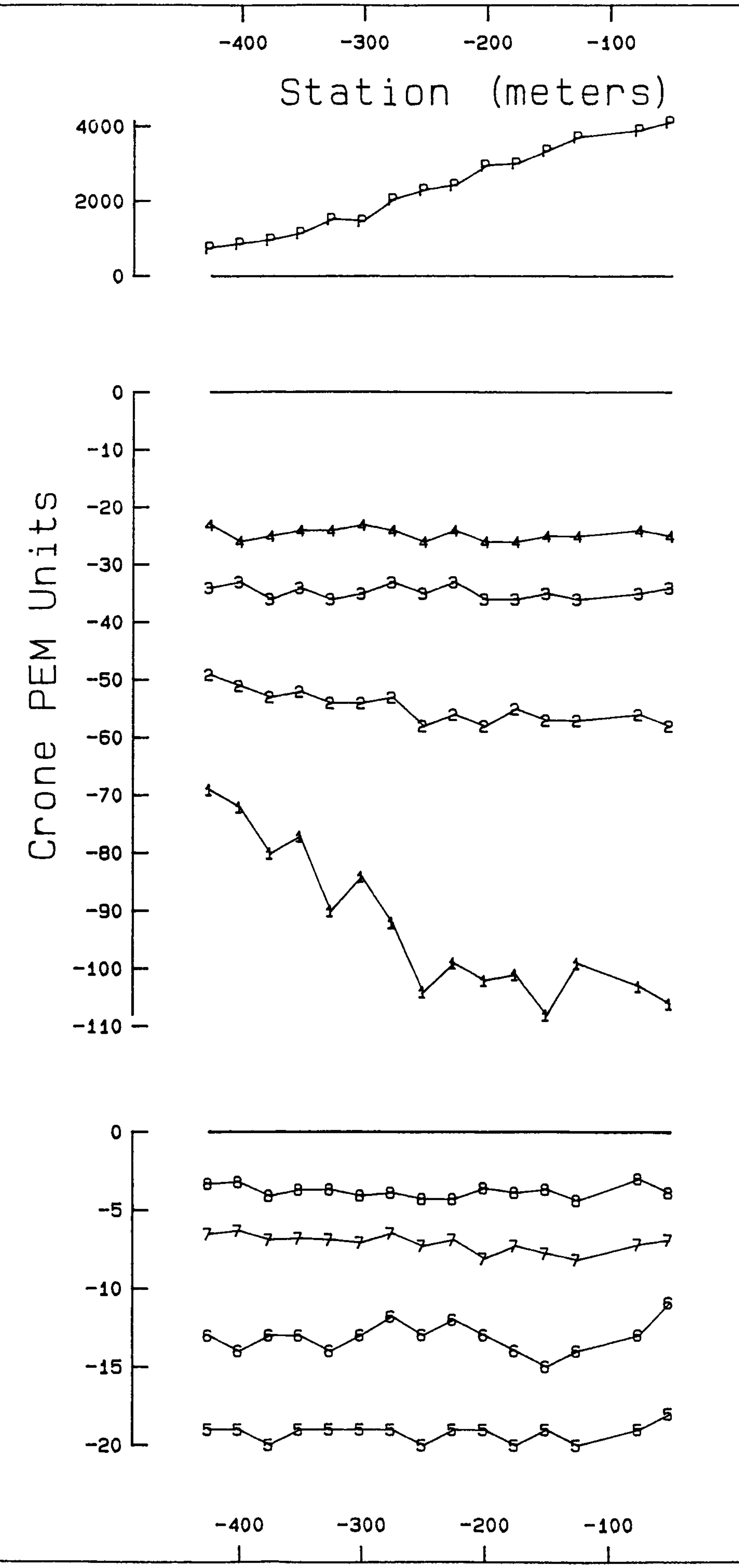
MINNOVA INC.

HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 400S X LOOP 1

Scale 1: 5000.0

Date: June 1992	Survey: May 1992	Profile: 4a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 400S Z LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 4b

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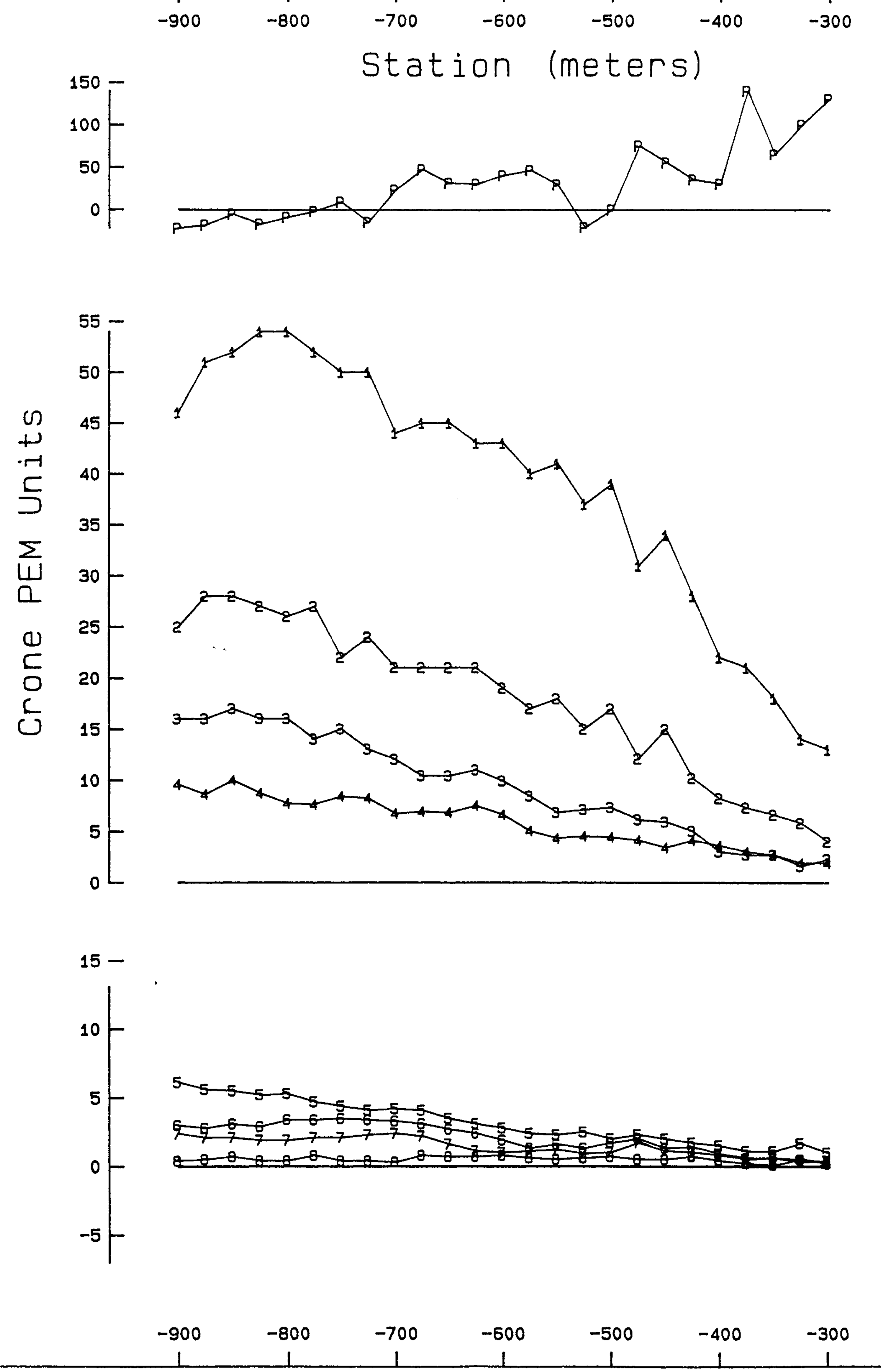


MINNOVA INC.

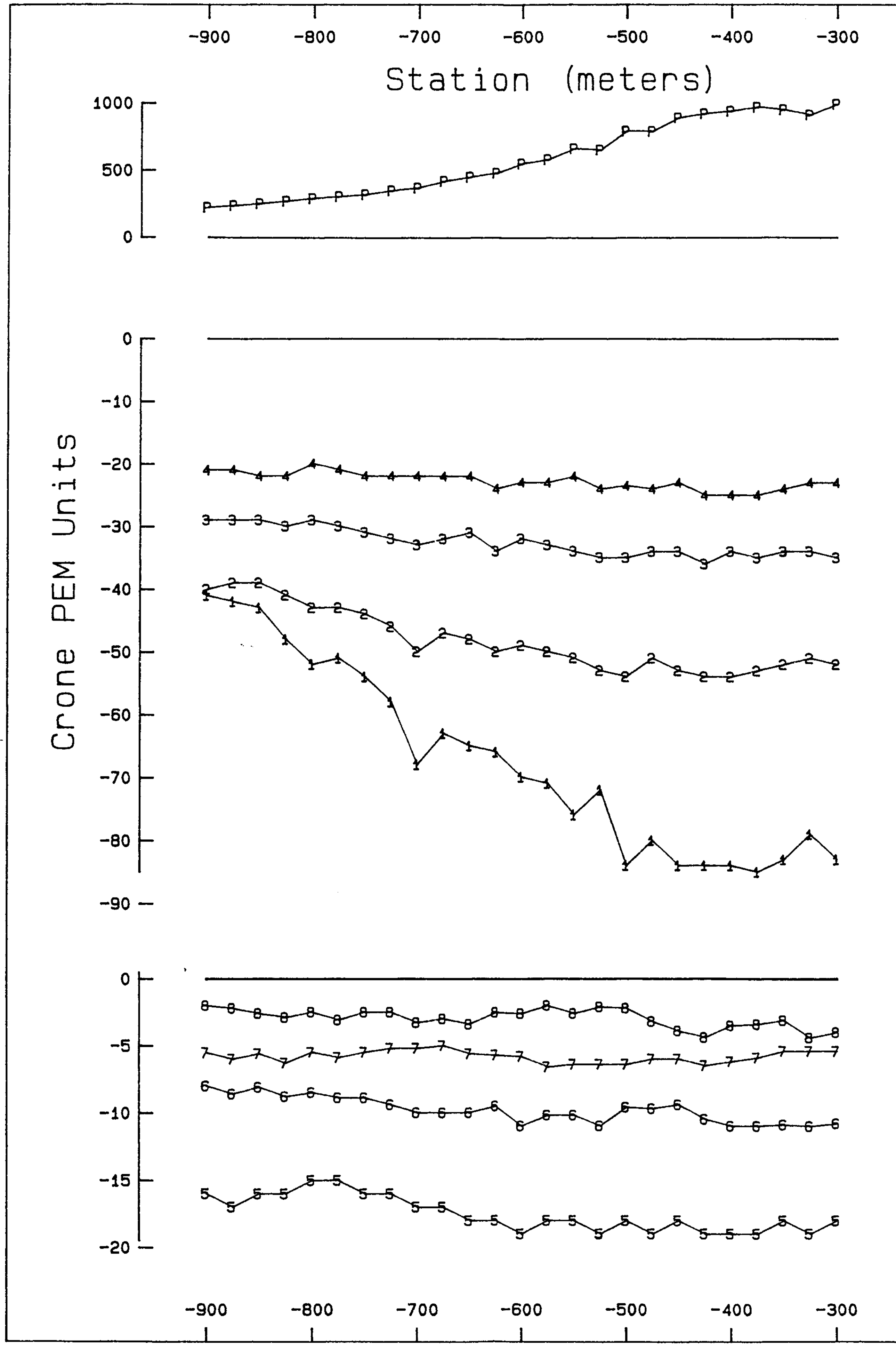
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 500S X LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 5a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

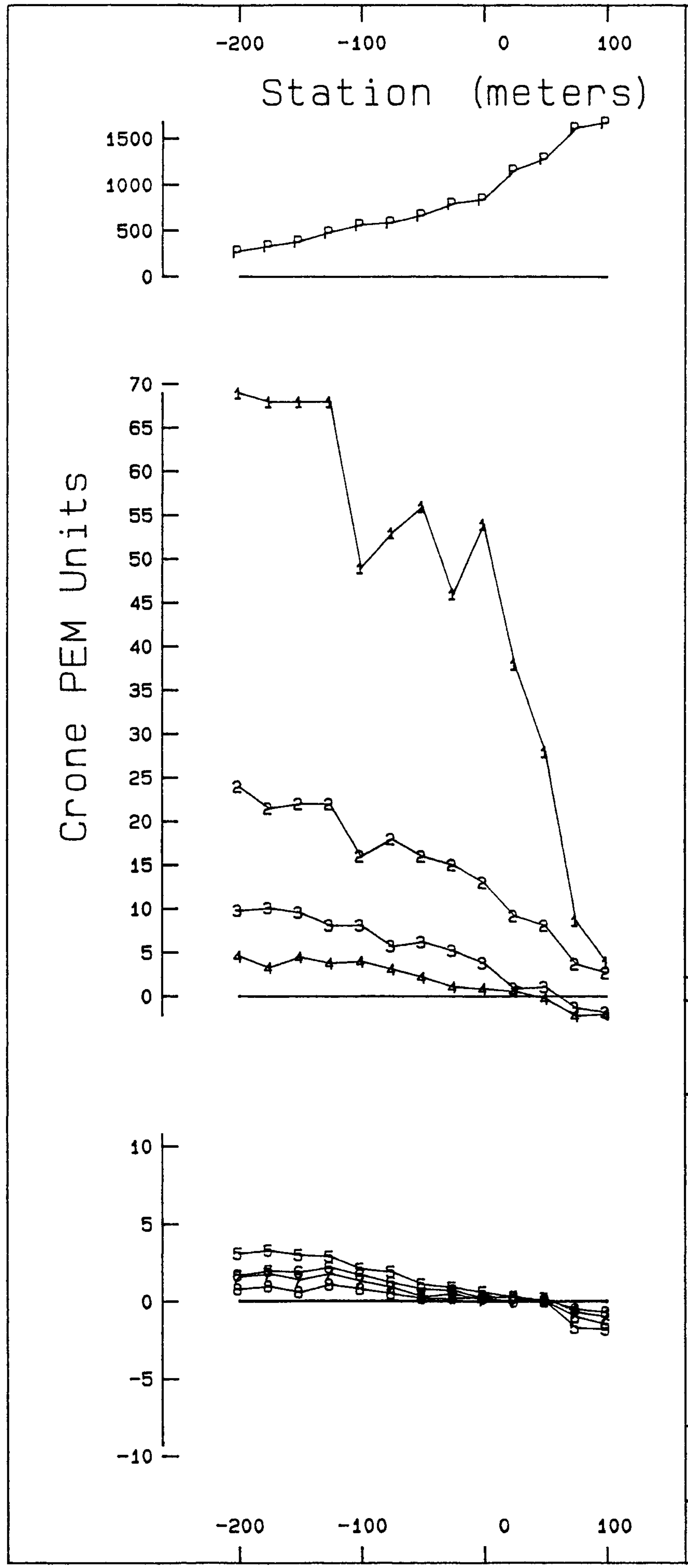
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 500S Z LOOP 1

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 5b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

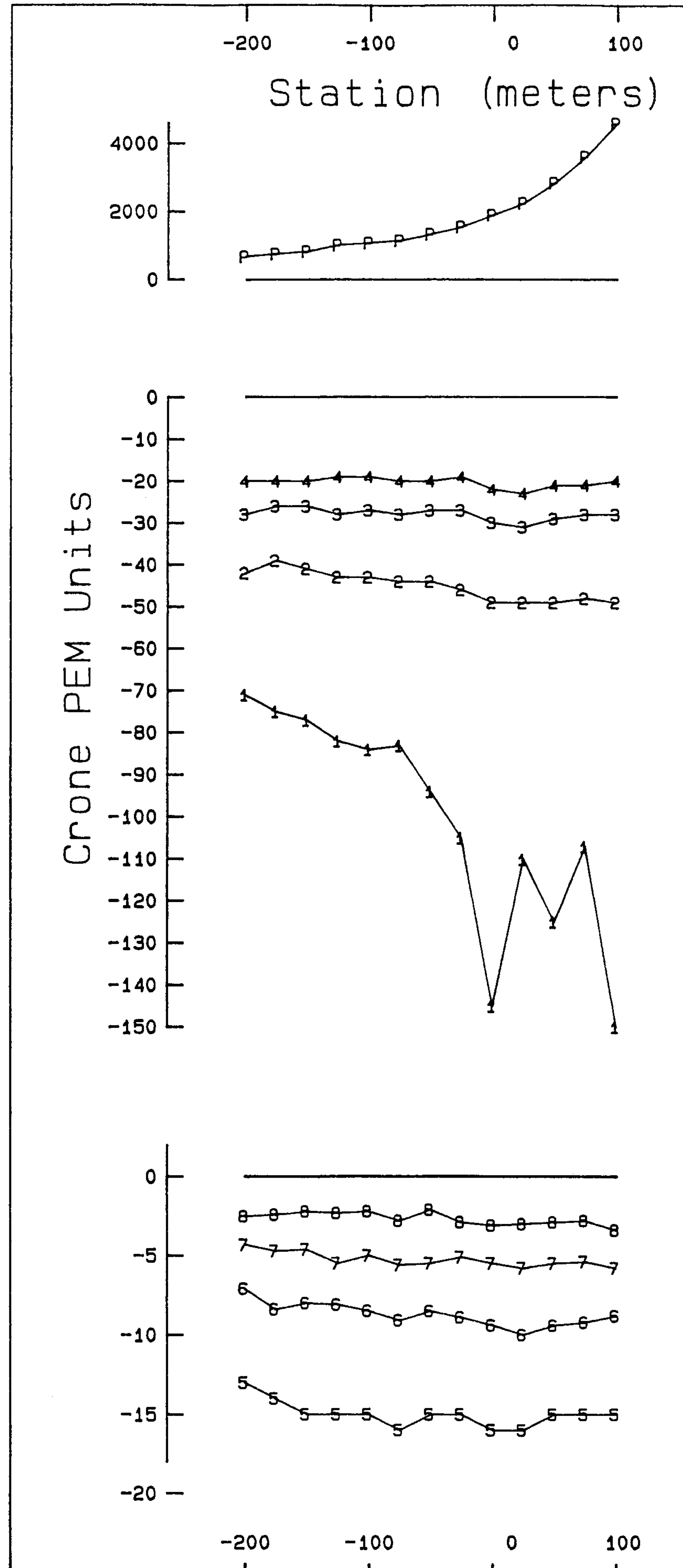
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 500S X LOOP 2

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 6a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

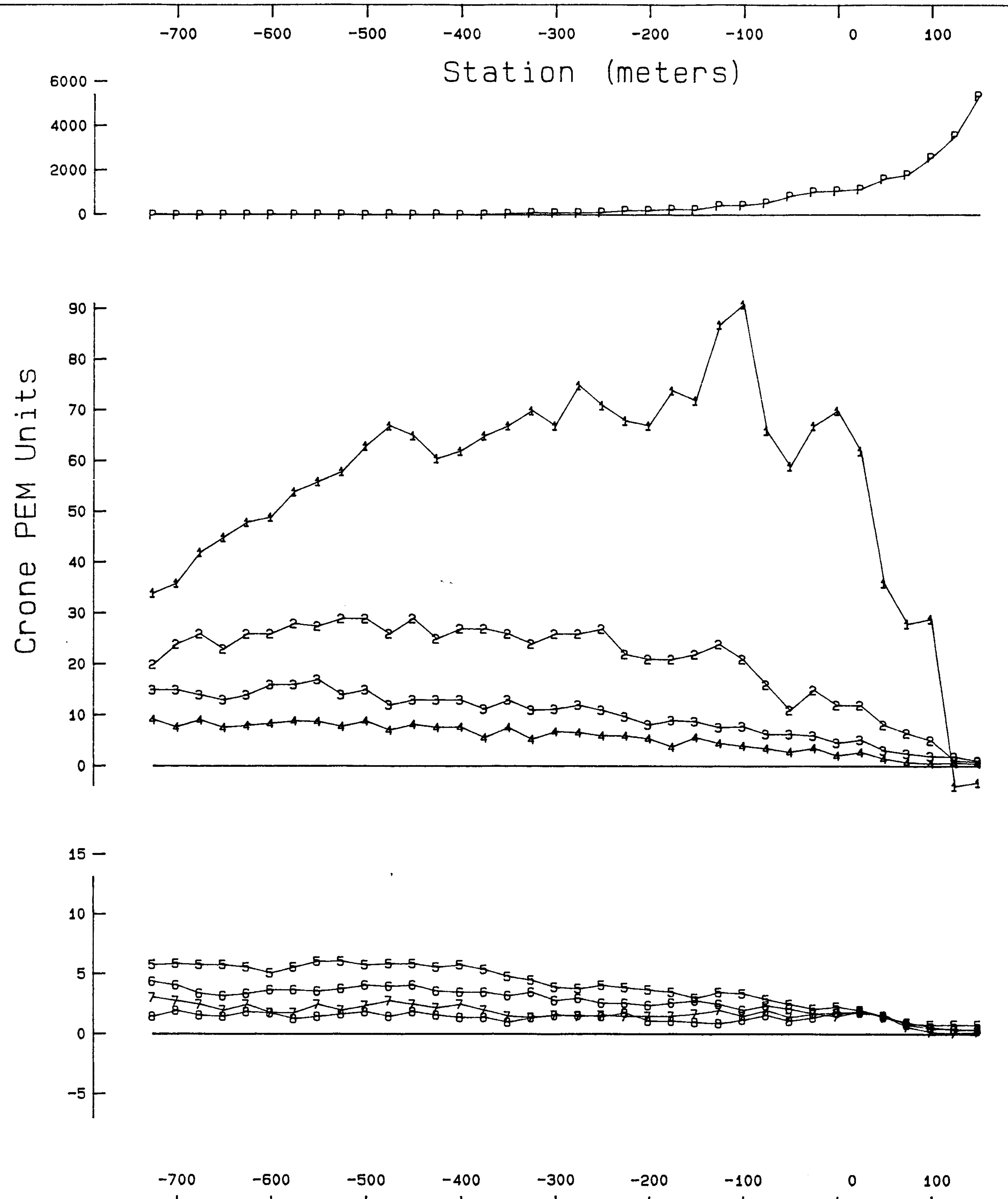
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 500S Z LOOP 2

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 6b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

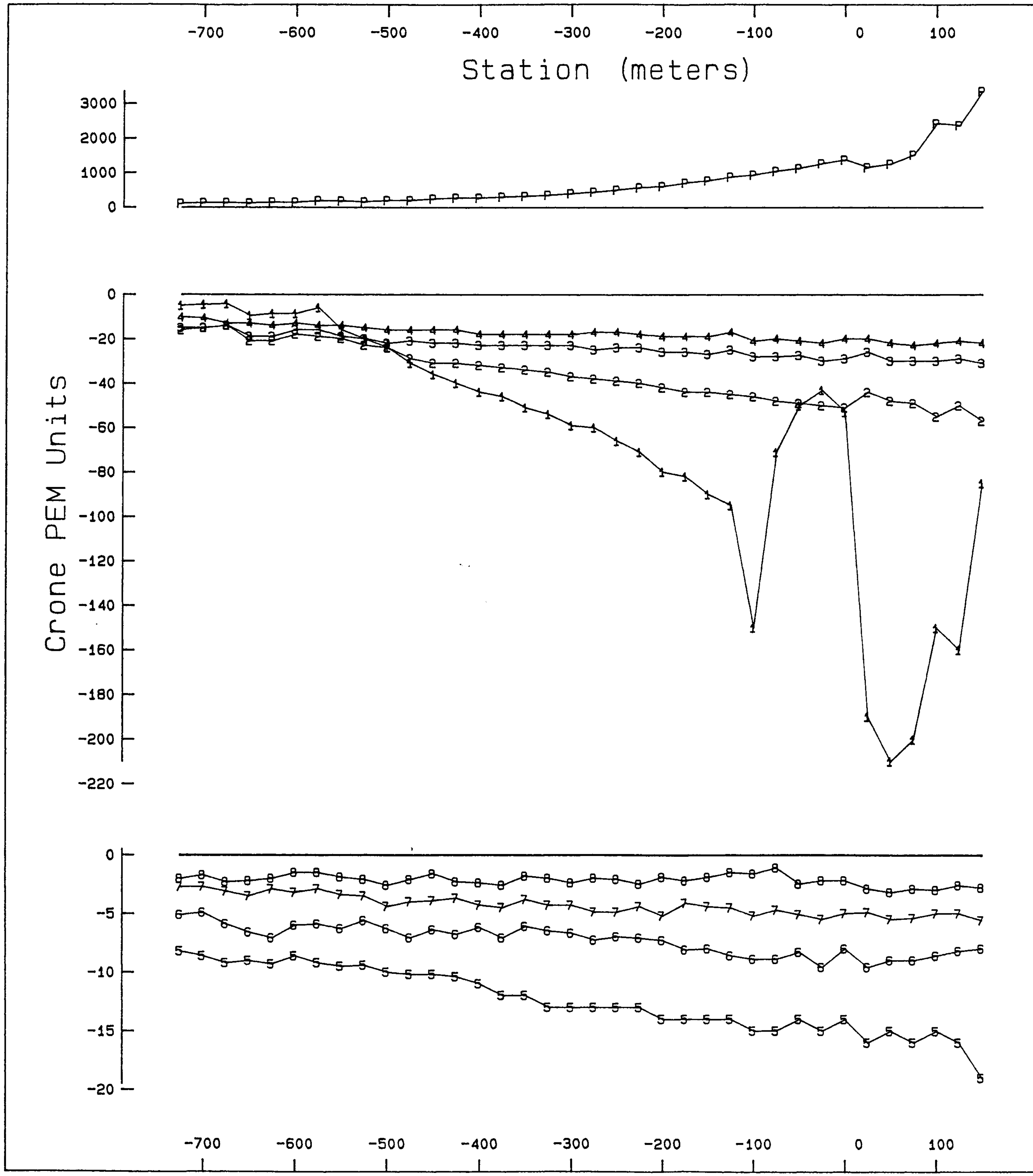
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 750S X LOOP 2

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 7a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

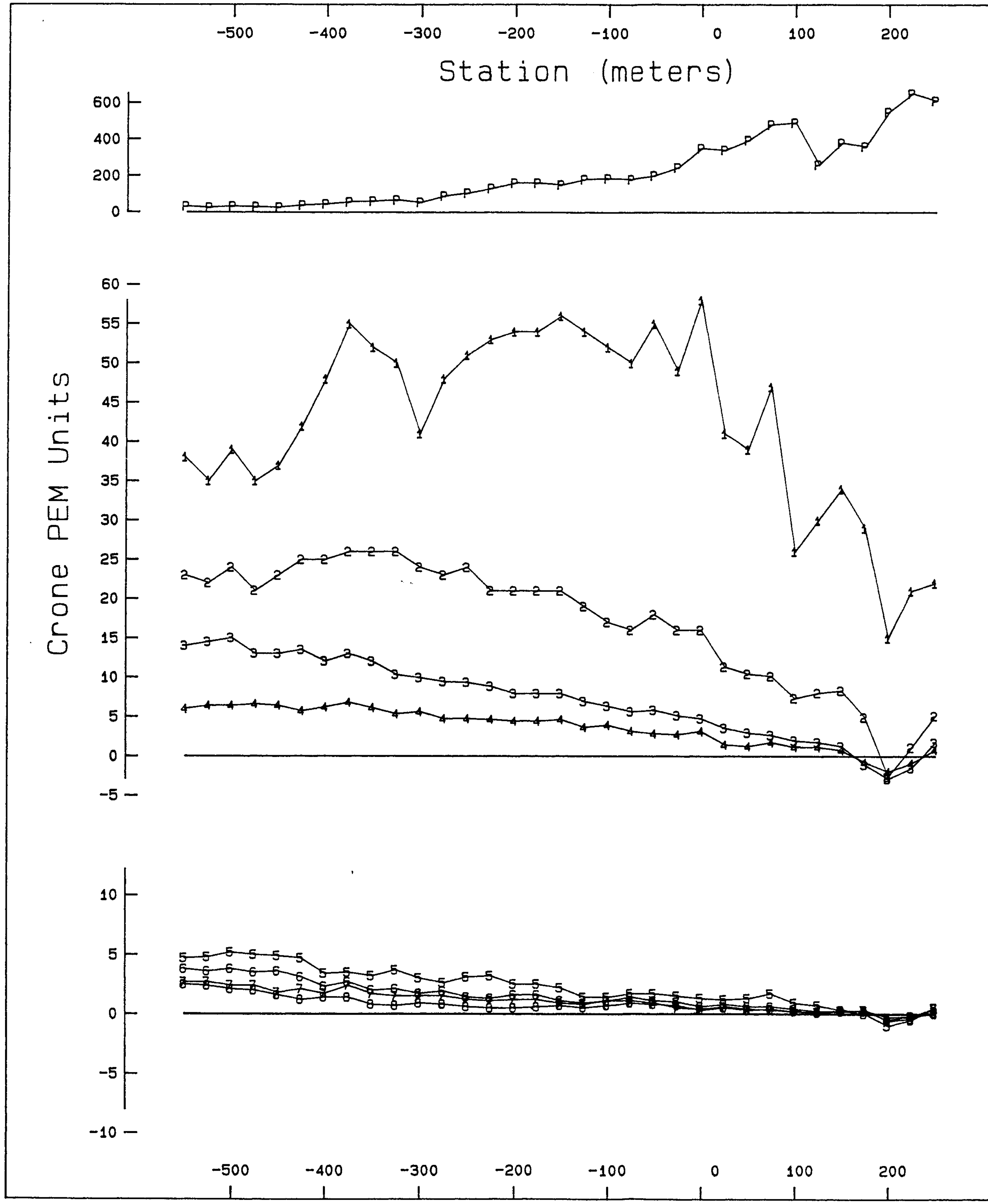
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 750S Z LOOP 2

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 7b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

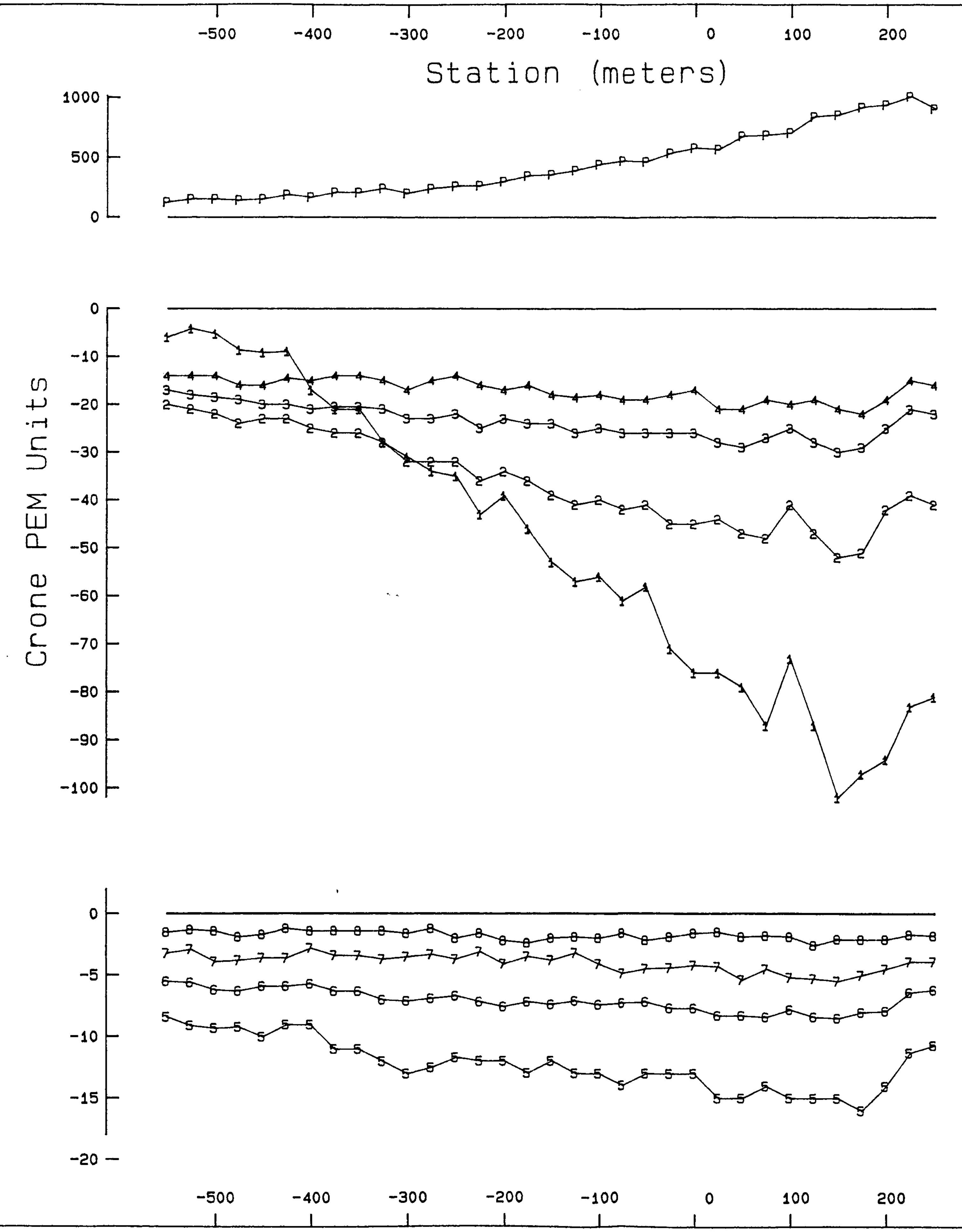
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 1000S X LOOP 2

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 8a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

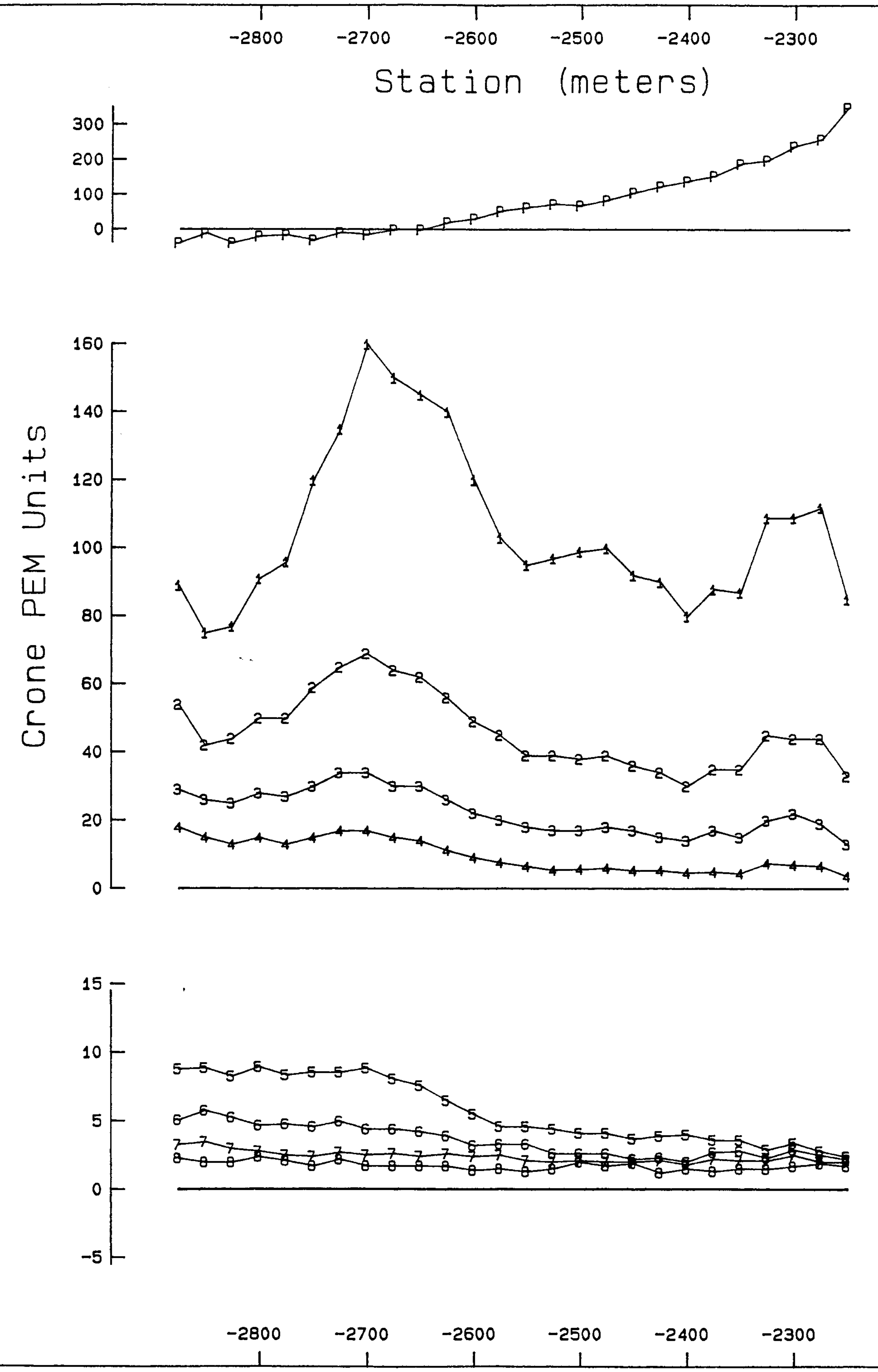
HORN PROPERTY - DH GRID
SURFACE PULSE EM SURVEY
LINE 1000S Z LOOP 2

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 8b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

HORN PROPERTY - CLAIR GRID

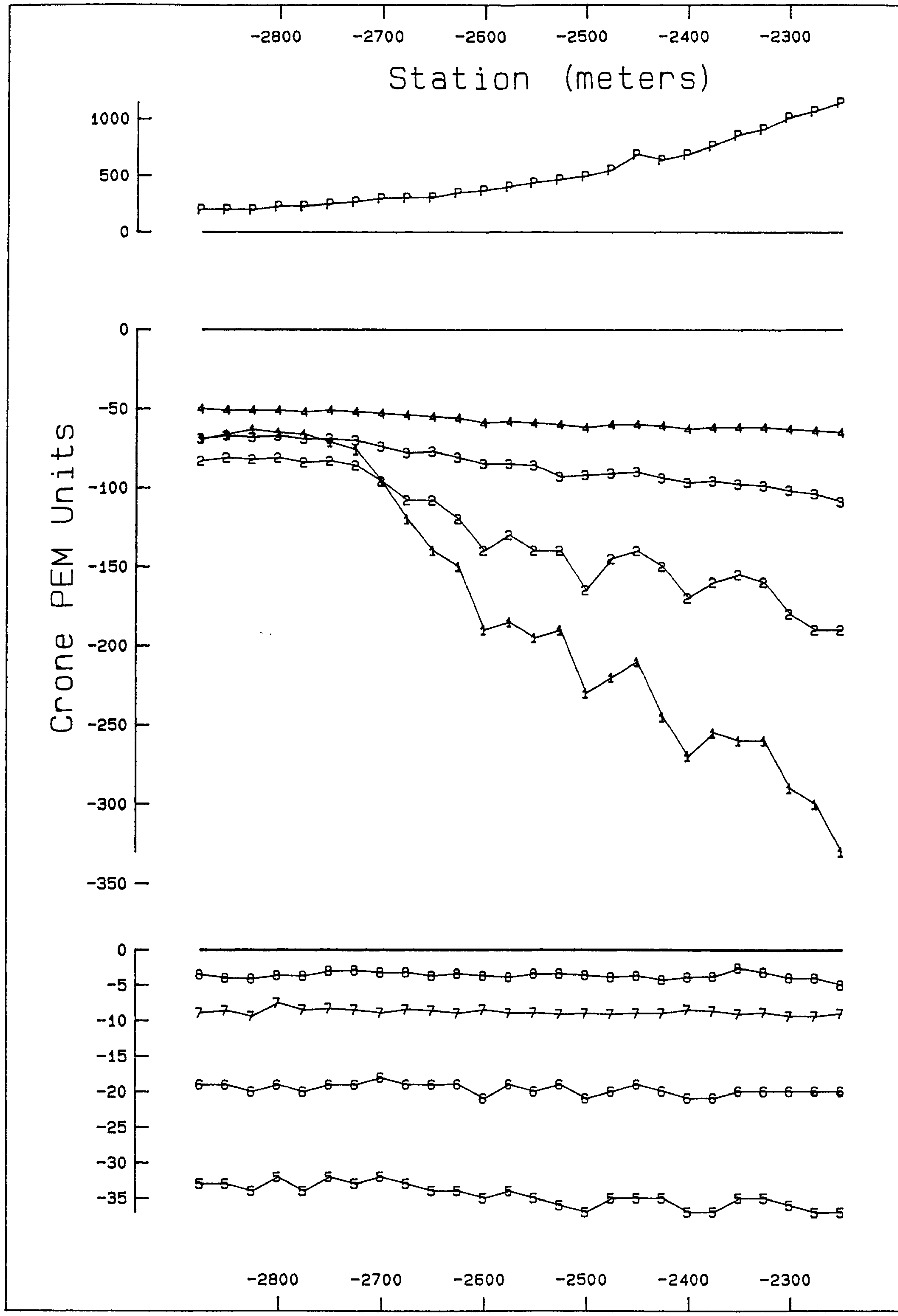
SURFACE PULSE EM SURVEY

LINE 250N X LOOP 3

Scale 1: 5000.0

Date: June 1992	Survey: May 1992	Profile: 9a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

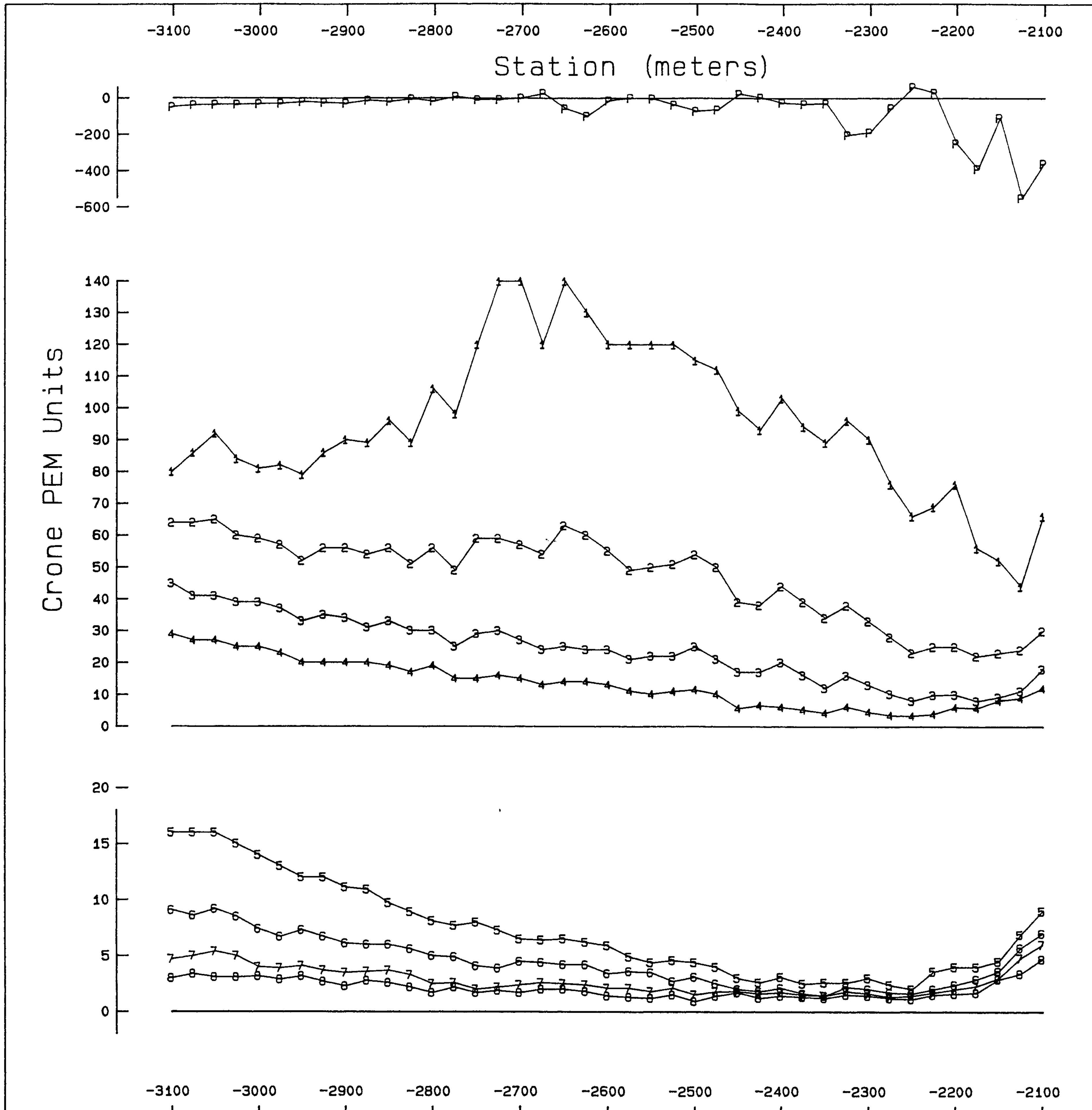
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 250N Z LOOP 3

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 9b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

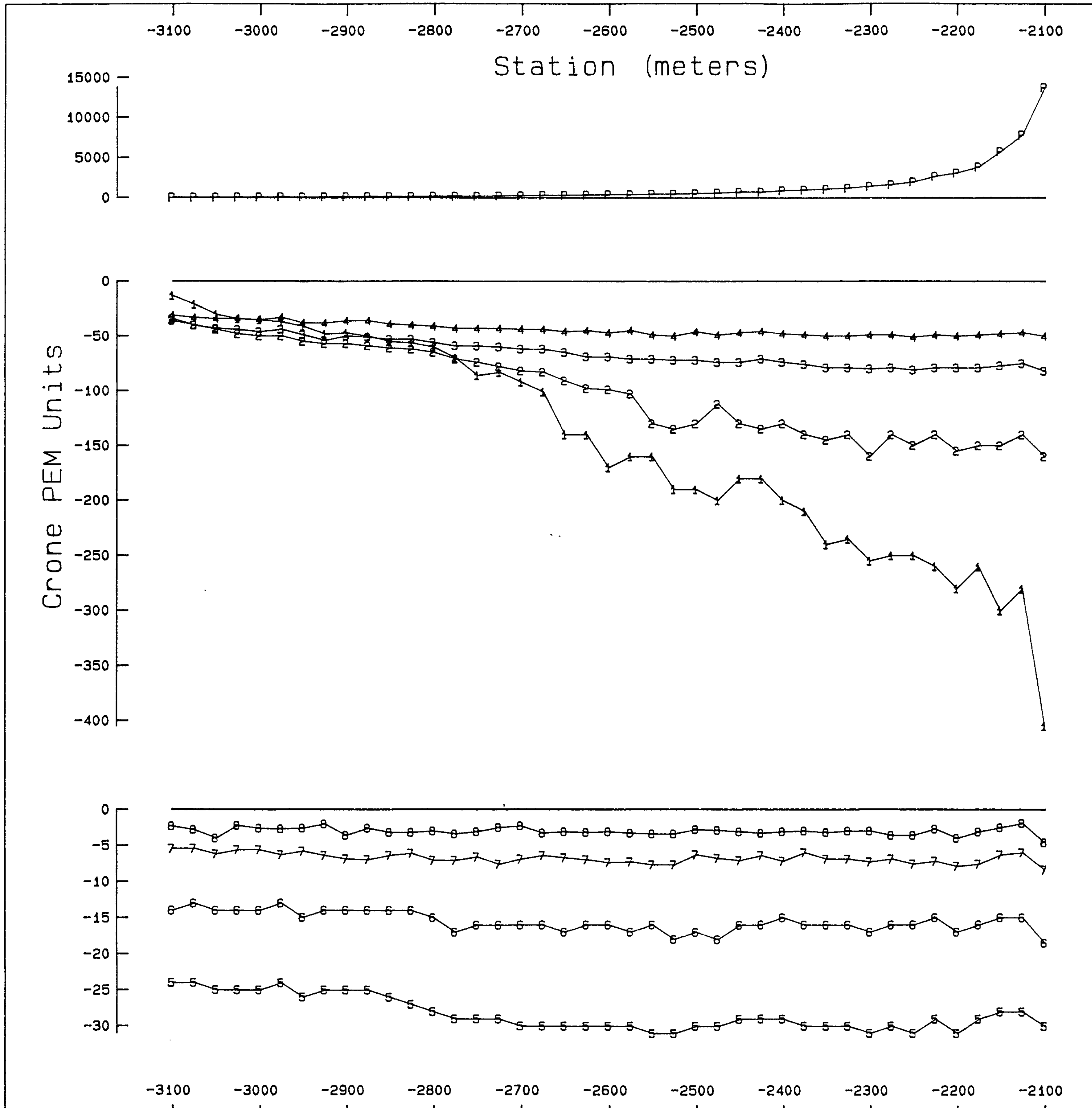
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 00N X LOOP 3

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 10a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

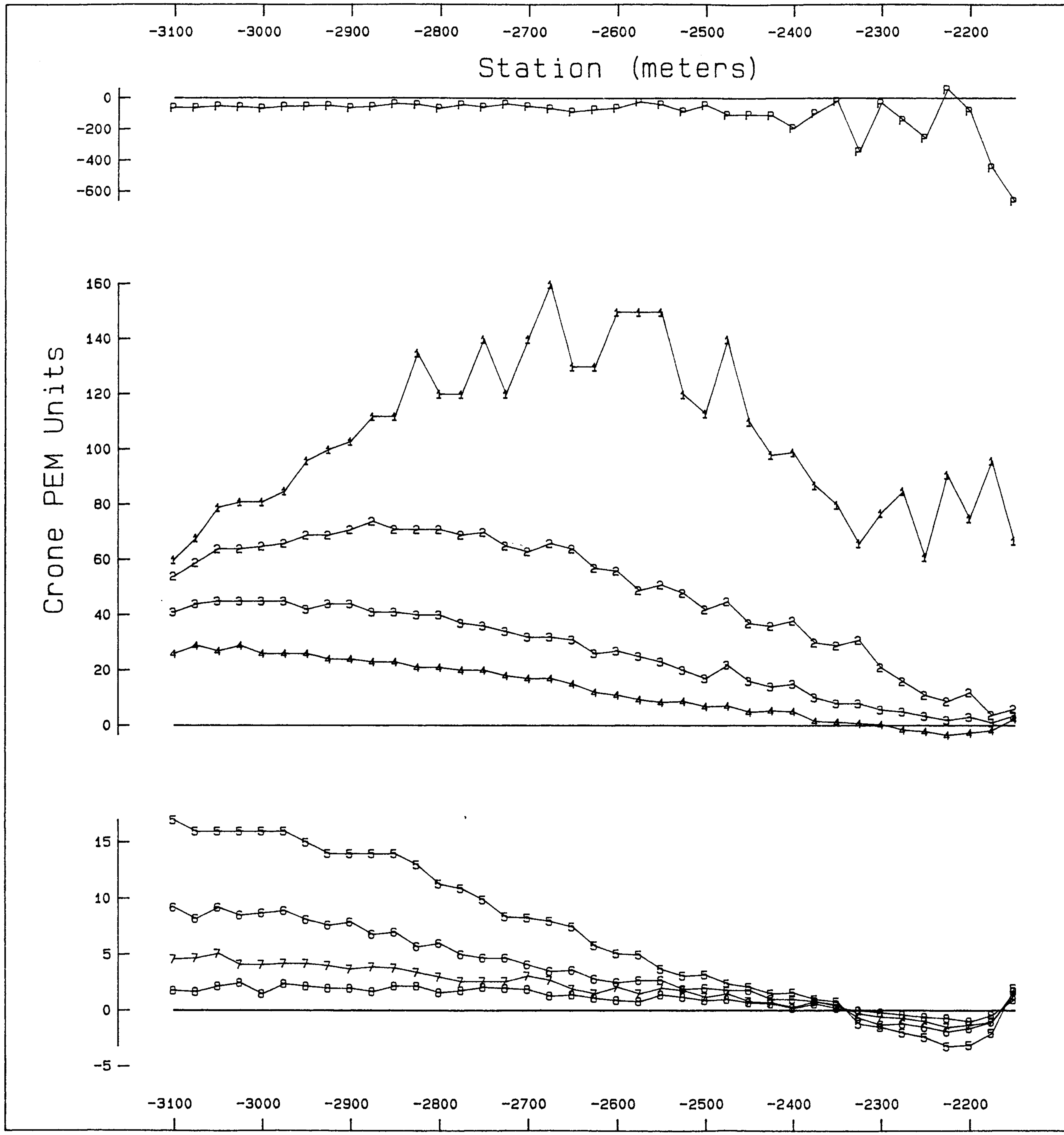
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 00N Z LOOP 3

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 10b

WOODS GEOPHYSICAL CONSULTING



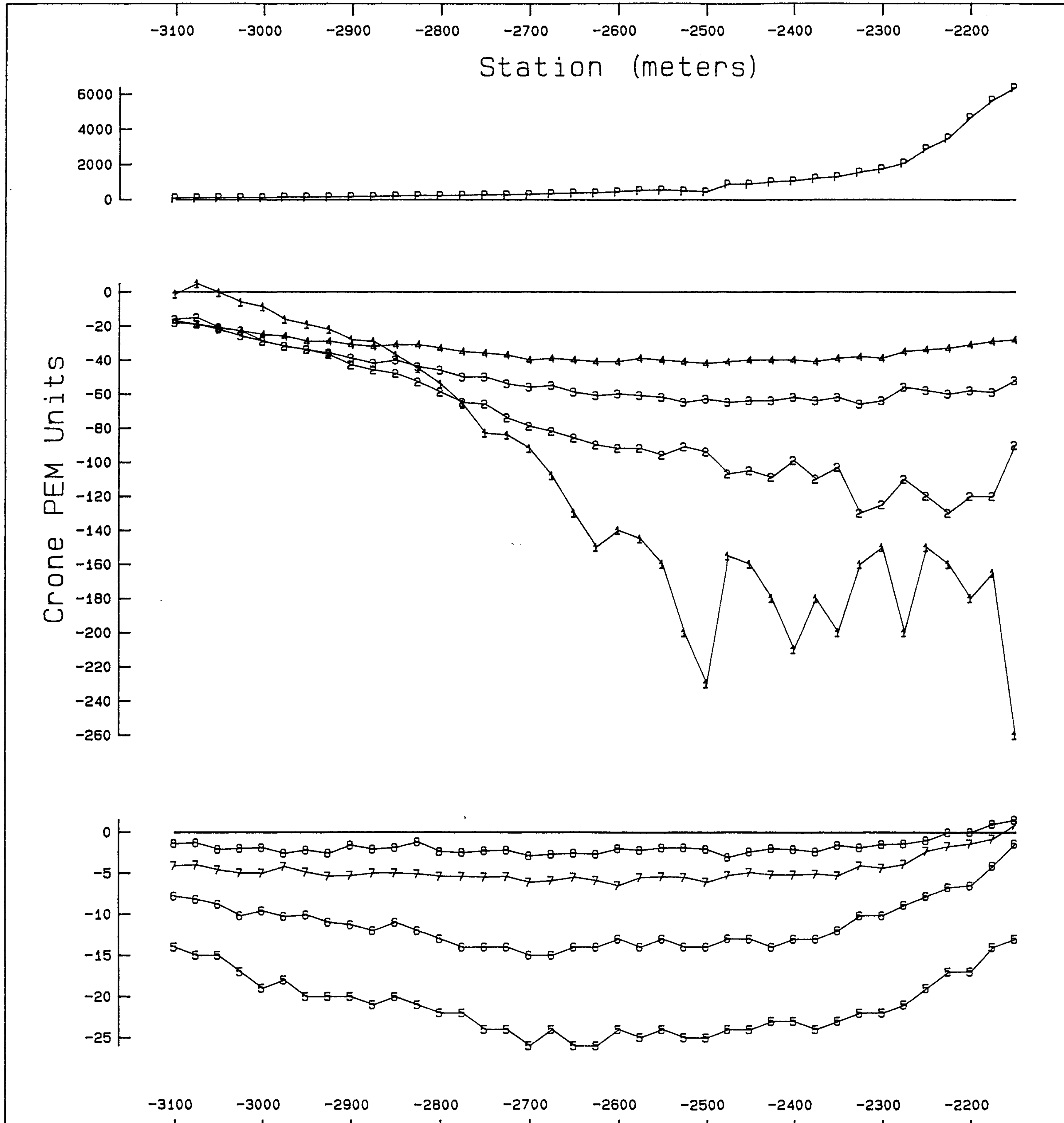
MINNOVA INC.

HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 250S X LOOP 3

Scale 1: 5000.0

Date: June 1992	Survey: May 1992	Profile: 11a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

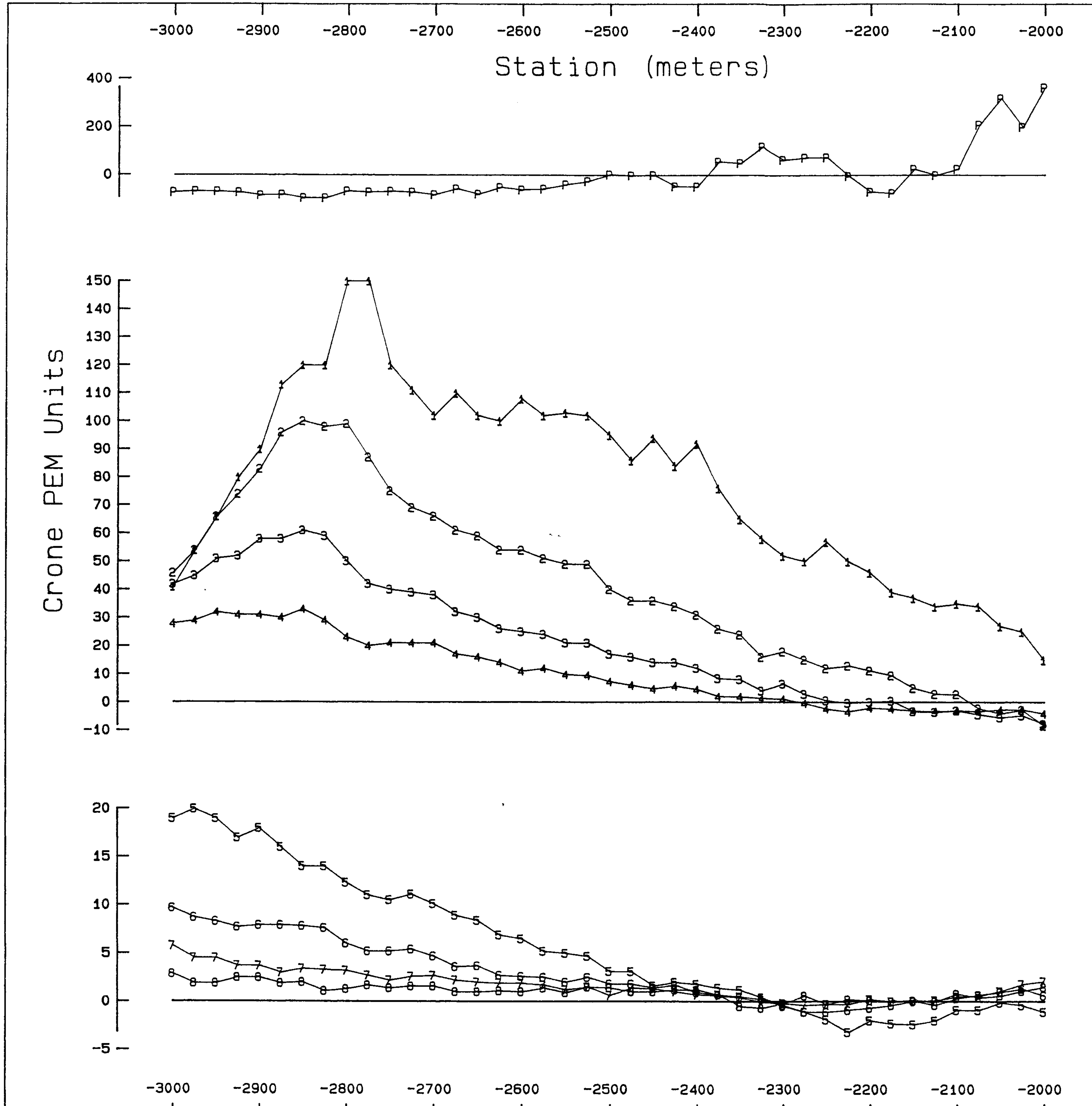
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 250S Z LOOP 3

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 11b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

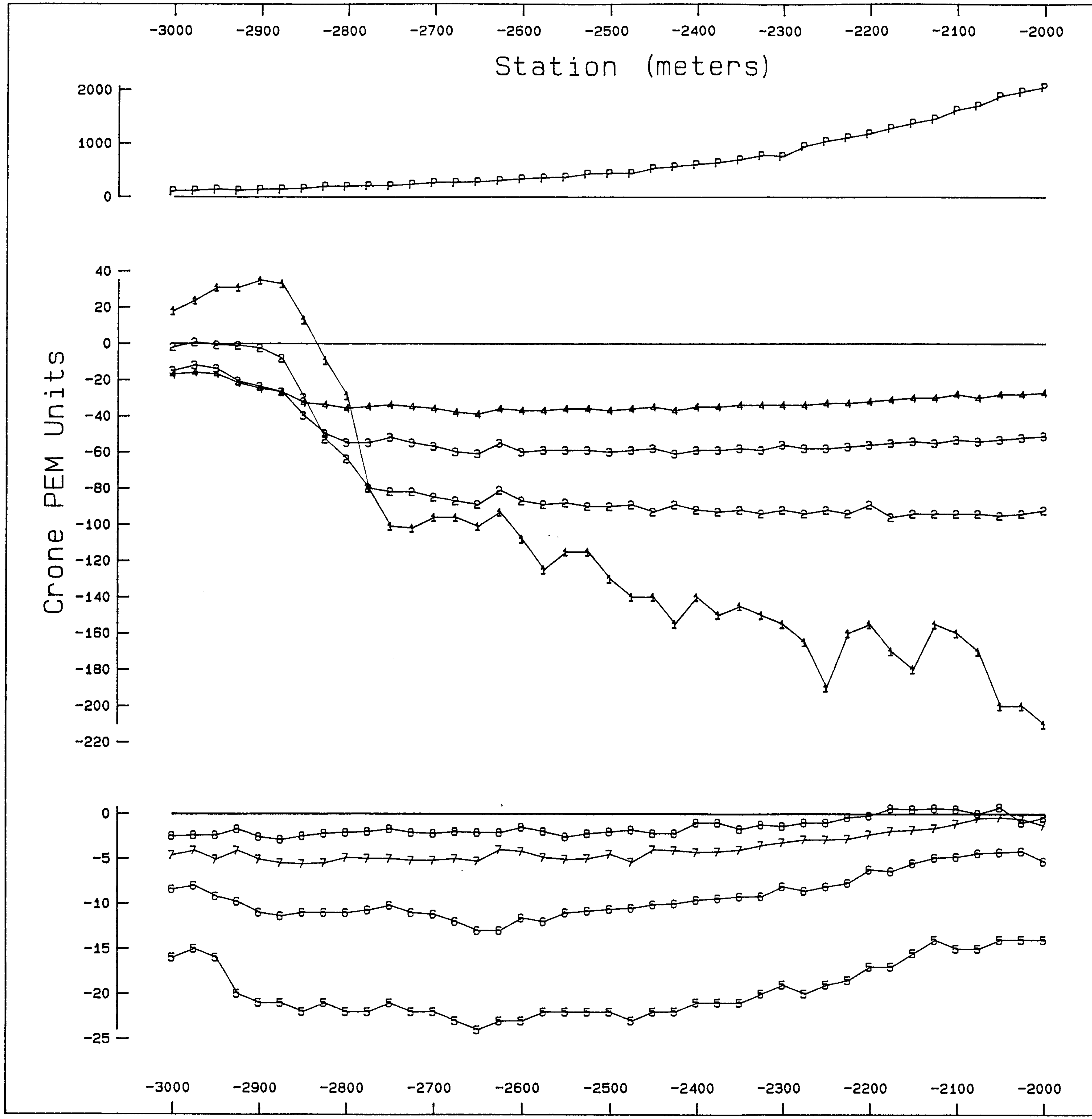
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 500S X LOOP 3

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 12a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

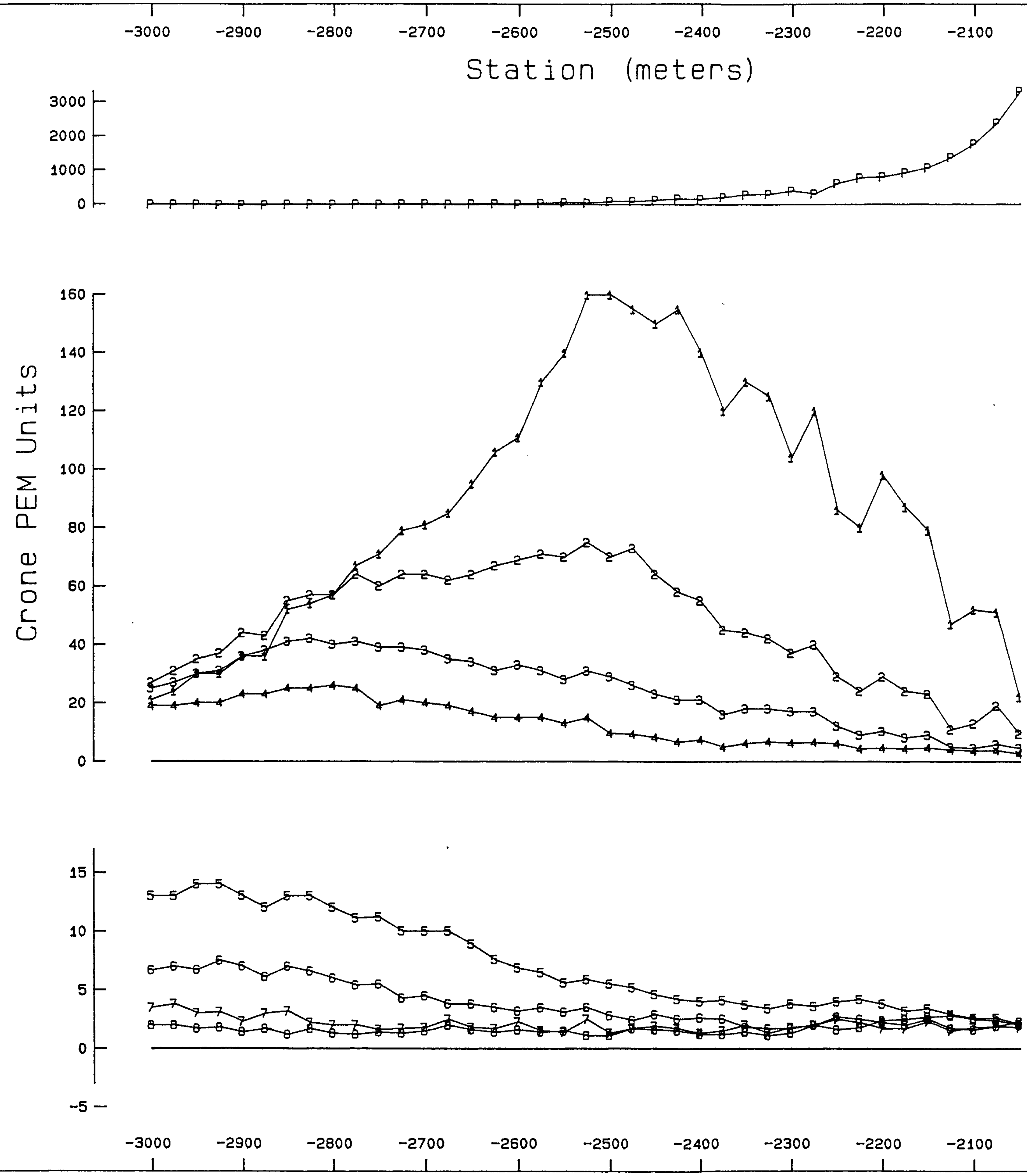
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 500S Z LOOP 3

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 12b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

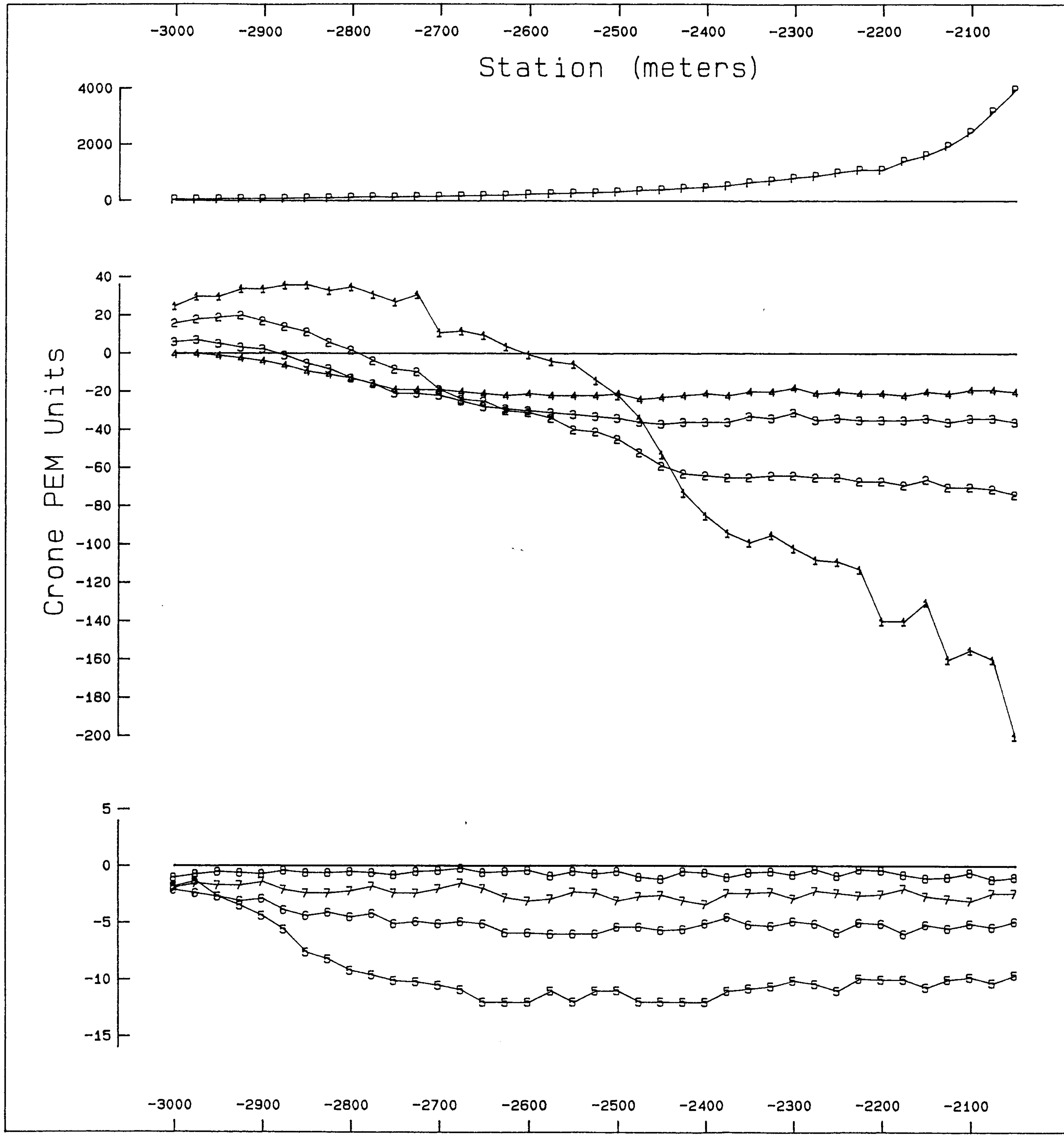
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 750S X LOOP 4

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 13a

WOODS GEOPHYSICAL CONSULTING



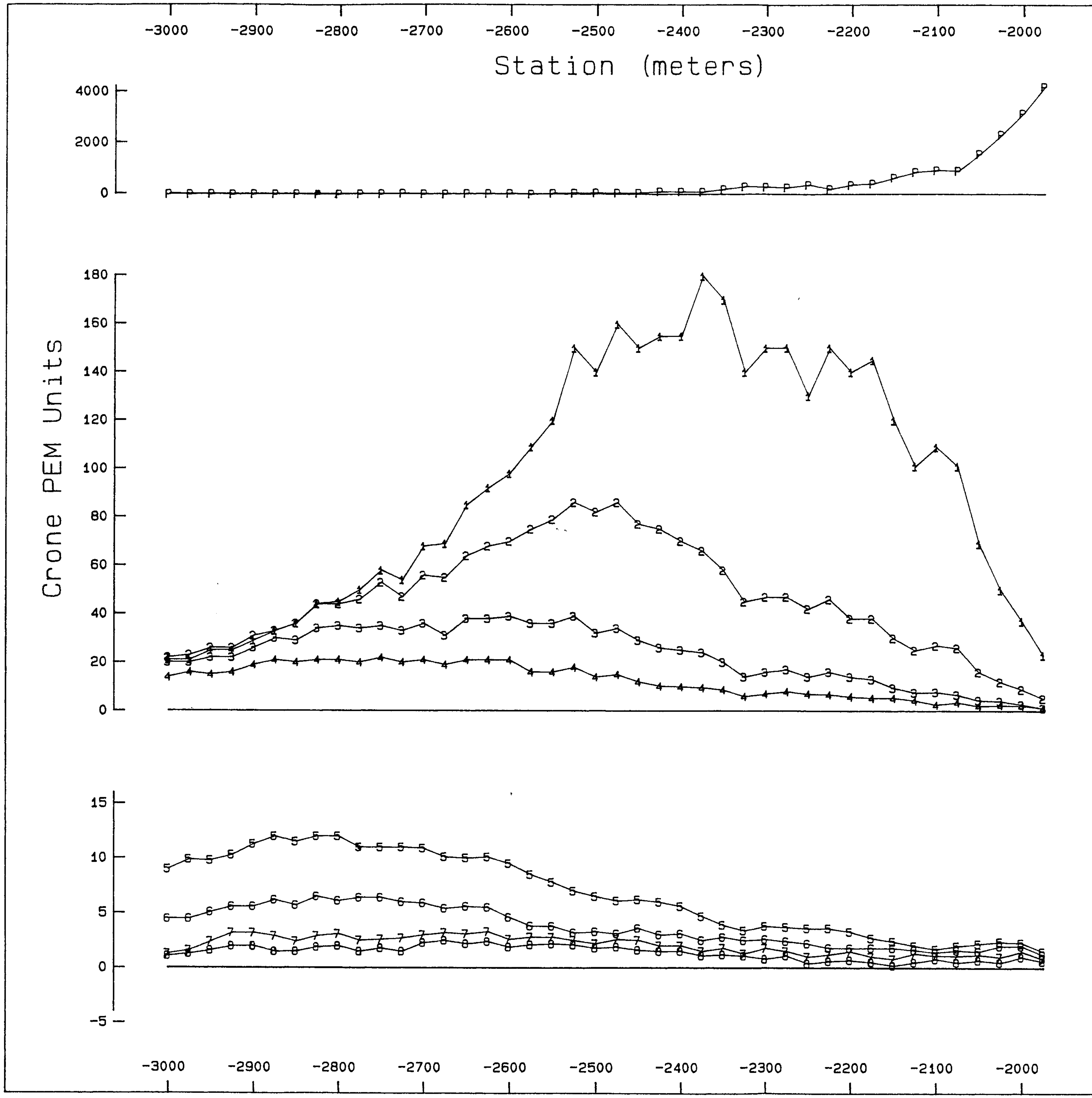
MINNOVA INC.

HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 750S Z LOOP 4

Scale 1: 5000.0

Date: June 1992	Survey: May 1992	Profile: 13b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

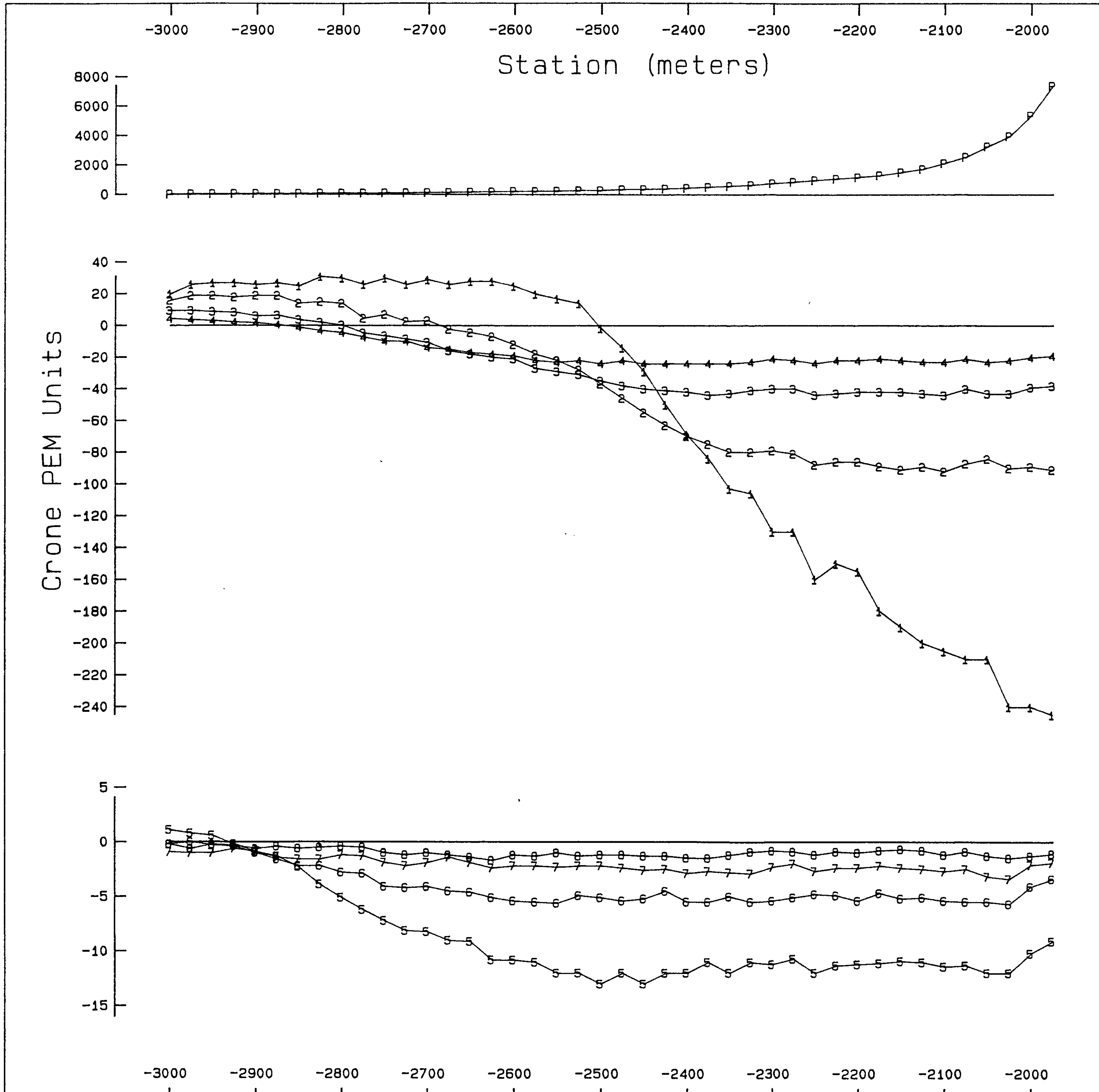
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 1000S X LOOP 4

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 14a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

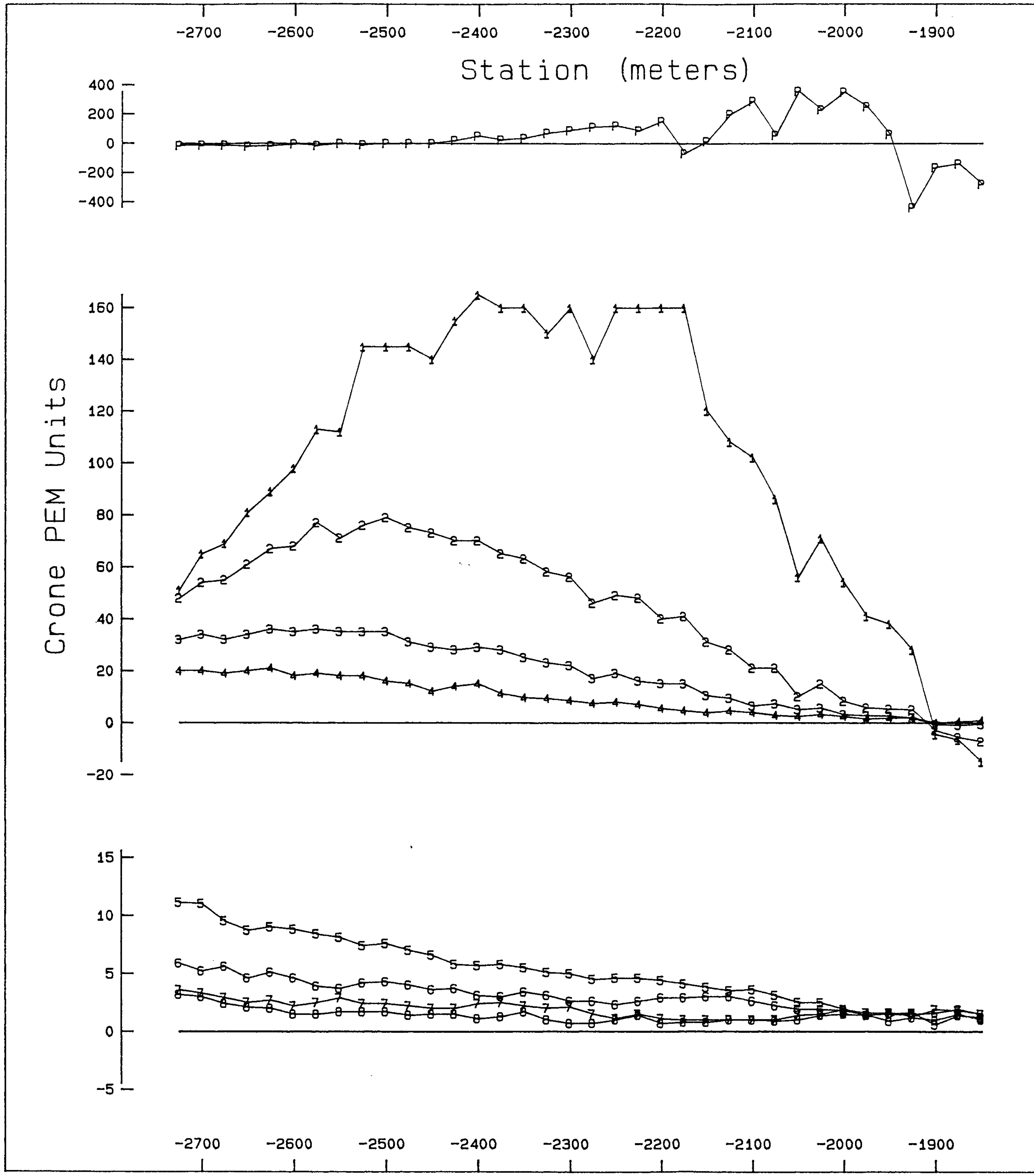
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 1000S Z LOOP 4

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 14b

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

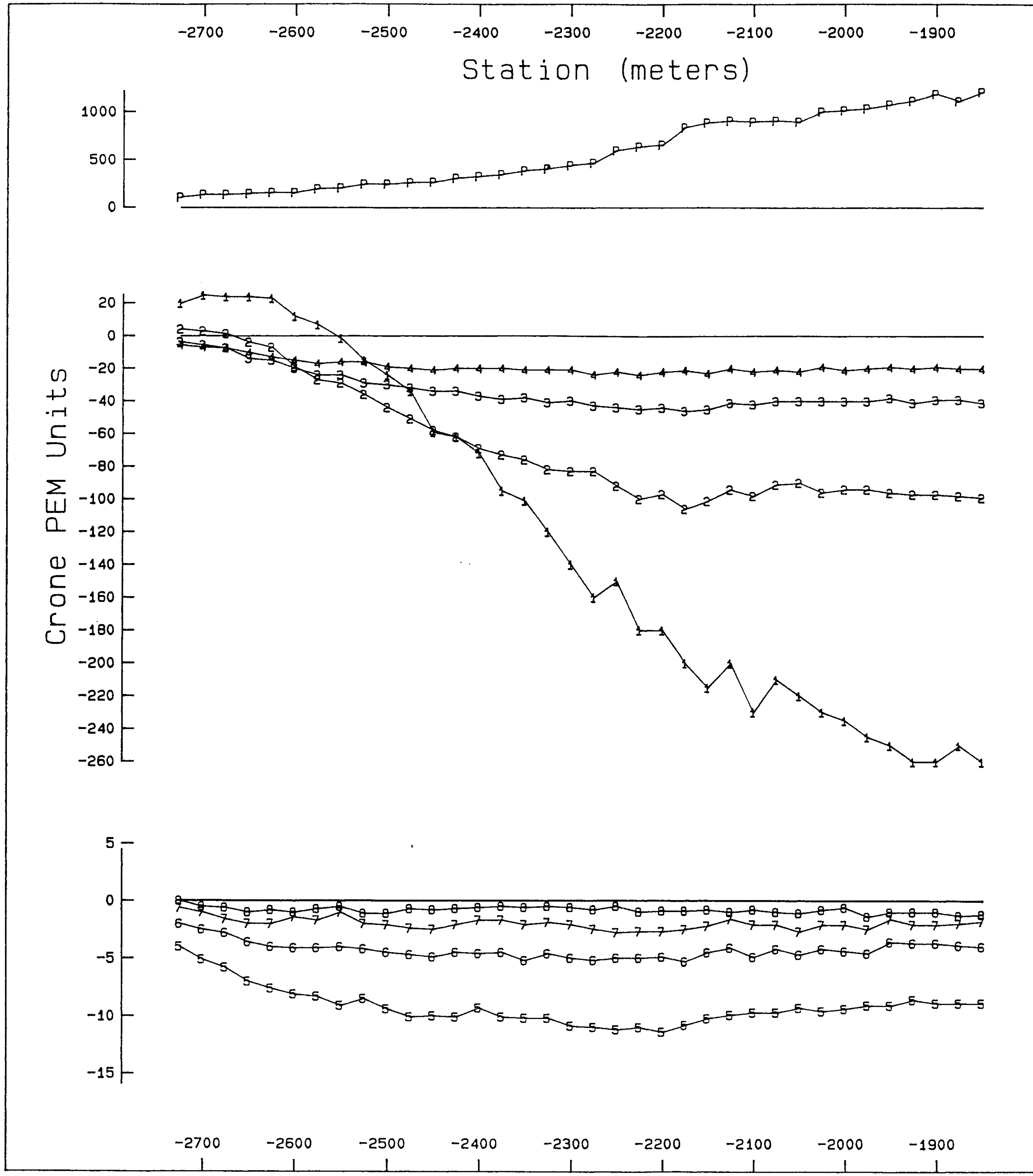
HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 1250S X LOOP 4

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 15a

WOODS GEOPHYSICAL CONSULTING



MINNOVA INC.

HORN PROPERTY - CLAIR GRID
SURFACE PULSE EM SURVEY
LINE 1250S Z LOOP 4

Scale 1: 5000.0

0 100 200 300 400 500 M

Date: June 1992	Survey: May 1992	Profile: 15b

WOODS GEOPHYSICAL CONSULTING