

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

14,240

**OPERATIONS REPORT
TRANSIENT ELECTROMAGNETIC SURVEY
MT. MAHON, BRITISH COLUMBIA**

02/85

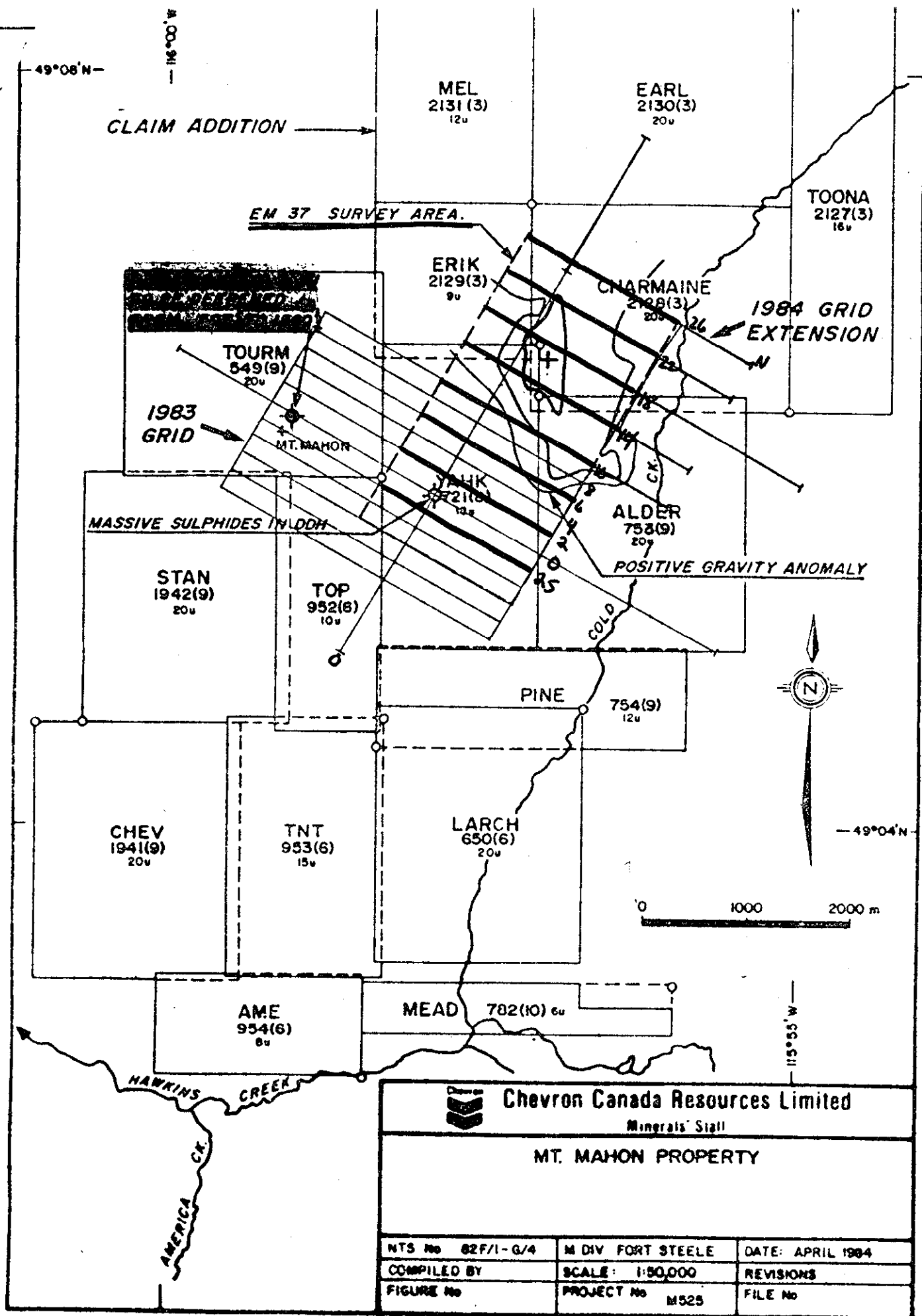
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Prepared For:
Chevron Resources Company
595 Market Street
San Francisco, CA 94105

Prepared By:
The Earth Technology Corporation
2801 Youngfield, #390
Golden, Colorado 80401

September 12, 1984

Job #84300



1.0 INTRODUCTION

In the following section an operations report pertaining to a Transient Electromagnetic Survey conducted by The Earth Technology Corporation for Chevron Resources Company is given. The survey area was located near Yahk, British Columbia, Canada, and is referred to as the Mt. Mahon project area. The geophysical equipment used for the survey was the Geonics EM 37 Transient System, the specifications of which are attached.

2.0 OPERATIONS REPORT

Authorization to proceed with the Transient Electromagnetic Survey was received on August 21, 1984 by Service Order S 135130. Actual field measurements at the Mt. Mahon survey area began on August 24, 1984, and concluded on August 30, 1984. During the seven field days approximately 245 receiver stations were read from three transmitter loops. The components measured were the time derivative of the vertical magnetic field (\dot{B}_z), and the time derivative of the horizontal magnetic field (\dot{B}_x) in the direction of the survey line. A sketch map of the lines accomplished and transmitter loop locations is given in Figure 1. Receiver stations were located at 50 meter intervals along these lines. Occasionally a 100 meter station interval was utilized to increase the area covered. The lines were read in the following chronologic order: 26N, 22N, 18N, 14N, 10N, 6N, 2N, 2S, 0.

Table 1 lists the daily production obtained with the EM 37 Transient System.

all data at 30 Hz

TABLE 1
DAILY PRODUCTION - EM 37 - Mt. MAHON PROJECT

Date	Line(s)	Station(s)	No. of Stations
8/24/84	26 + 00 N	1 + 00 E - 4 + 50 W	11
8/25/84	26 + 00 N	1 + 00 E - 11 + 00 E	18
	26 + 00 N	5 + 00 W - 1 + 00 E	12
8/26/84	22 + 00 N	1 + 00 E - 11 + 00 E	20
	18 + 00 N	1 + 50 E - 11 + 00 E	19
8/27/84	18 + 00 N	1 + 50 E - 5 + 00 W	13
	14 + 00 N	5 + 00 W - 3 + 00 E	17
8/28/84	14 + 00 N	5 + 00 W - 11 + 00 E	15
	10 + 00 N	5 + 00 W - 1 + 50 W	31
8/29/84	6 + 00 N	5 + 00 W - 11 + 00 E	31
	2 + 00 N	5 + 00 W - 1 + 50 W	8
8/30/84	2 + 00 N	1 + 50 W - 11 + 00 E	24
	2 + 00 S	3 + 00 W - 10 + 00 E	22
	0 + 00	1 + 00 W - 1 + 00 E	4

On August 23, the geophysical crew mobilized from Calgary, Alberta to the project site. On August 31 part of the day was spent reeling up the transmitter loop wires and demobilizing to Calgary, Alberta. The lower productivity obtained on 8/24/84 was due to a great length of time needed to position the first transmitter loop. Overall production for this terrain was high, however, typically 1 to 2 hours were lost daily due to breakage of the transmitter wire by wildlife.

APPENDIX A
GEONICS LIMITED

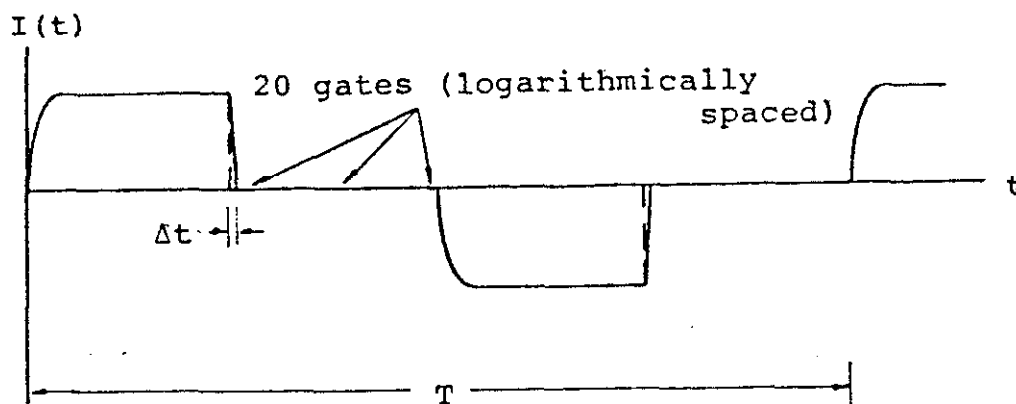
EM37 Ground Transient Electromagnetic System
Technical Specifications

Transmitter

- | | |
|------------------------------|---|
| Current Waveform | - See Fig. 1 |
| Repetition rate | - 3Hz or 30Hz in countries using 60Hz power line frequency; 2.5Hz or 25Hz in countries using 50Hz power line frequency; all four base frequencies are switch selectable. |
| Turn-off time (Δt) | - fast linear turn-off of maximum 300 μ sec. at 20 amps into 300x600m loop. Decreases proportionally with current and (loop area) ^{1/2} to minimum of 20 μ sec. Actual value of Δt read on front panel meter. |
| Transmitter loop | - any dimensions from 40x40m to 300x600m maximum at 20 amps. Larger dimensions at reduced current. Transmitter output voltage switch adjustable for smaller loops. Value of loop resistance read from front panel meter; resistance must be greater than 1 ohm on lowest voltage setting to prevent overload. |
| Transmitter protection | - circuit breaker protection against input over-voltage; instantaneous solid state protection against output short circuit; automatically resets on removal of short circuit. Input voltage, output voltage and current indicated on front panel meter. |
| Transmitter output voltage | - 150 volts (zero to peak) maximum;
20 volts (zero to peak) minimum |
| Transmitter output power | - 2.8 kw maximum |
| Transmitter wire supplied | - 1800m. #10 copper wire PVC insulated with nylon jacket; transmitter wire contained on 6 reels (supplied); 2 reel winders supplied. |
| Transmitter motor generator | - 5 HP Honda gasoline engine coupled to 120 volt, 3 phase, 400Hz alternator. Approximately 8 hours continuous operation from full (built-in) fuel tank. |

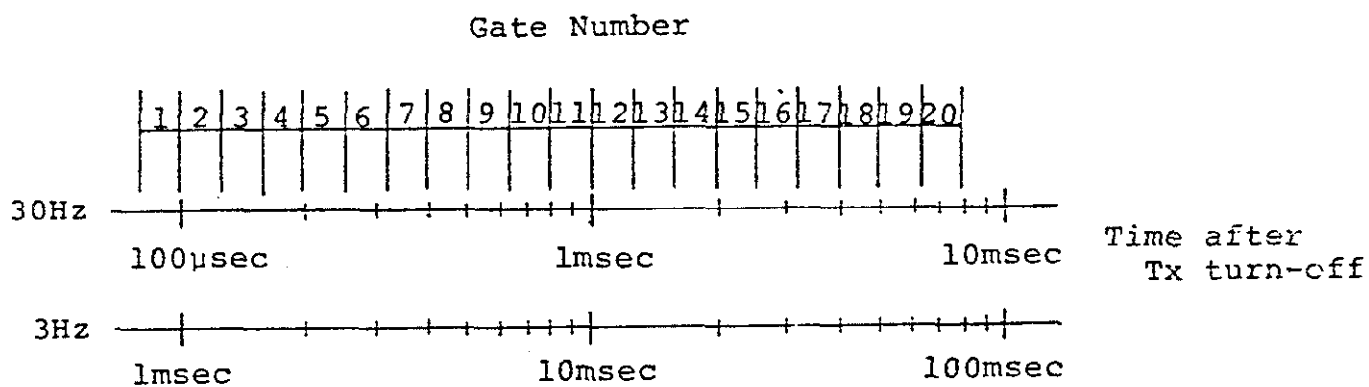
Receiver

- Measured quantity - time rate of decay of magnetic flux along 3 axes.
- Sensor - air-cored coil of bandwidth 40 kHz; 100cm dia. by 7x5cm cross-section. Coil holder supplied to facilitate measurement along 3 axes.
- Time channels - 20 time channels with locations and widths as shown in Fig. 2. Successive operation at 30Hz, then 3Hz, effectively gives 30 channels covering range from 80 μ sec. to 80 msec.
- Output display - 4 digit plus sign LED display; display also shows channel number and gain.
- Integration time - 2^n cycles at 30Hz; $n=4,6,8,10,12,14$ (switch selectable); similar integration times at other base frequencies.
- Receiver output noise referred to input - typically 1.5×10^{-10} volt/m² at last gate at 30Hz with integration time of 34 seconds. Noise will be higher during intense local spherics activity.
- Output connector - all 20 channels in analogue format and house-keeping functions in digital format available from output connector.
- Synchronization to Tx - any of the following (switch selectable)
(1) reference cable
(2) primary pulse
(3) 27 MHz radio link (40 channels)
(4) high stability (oven controlled) quartz crystals.
- Noise rejection circuitry - Selective clipping of atmospheric noise pulses at all times. Audio output of Rx coil (transmitter pulse blanked out) is available on built-in loud speaker for ready identification of interference.
- Receiver batteries - 12 volt rechargeable Gel-cell; 9 hours continuous operating time at 17°C. Two batteries and a battery charger supplied to permit charging of second battery from transmitter motor-generator during survey.



Transmitter Current Waveform

FIG. 1



Gate Location and Widths (30 and 3Hz)

FIG. 2

DATA REPORT

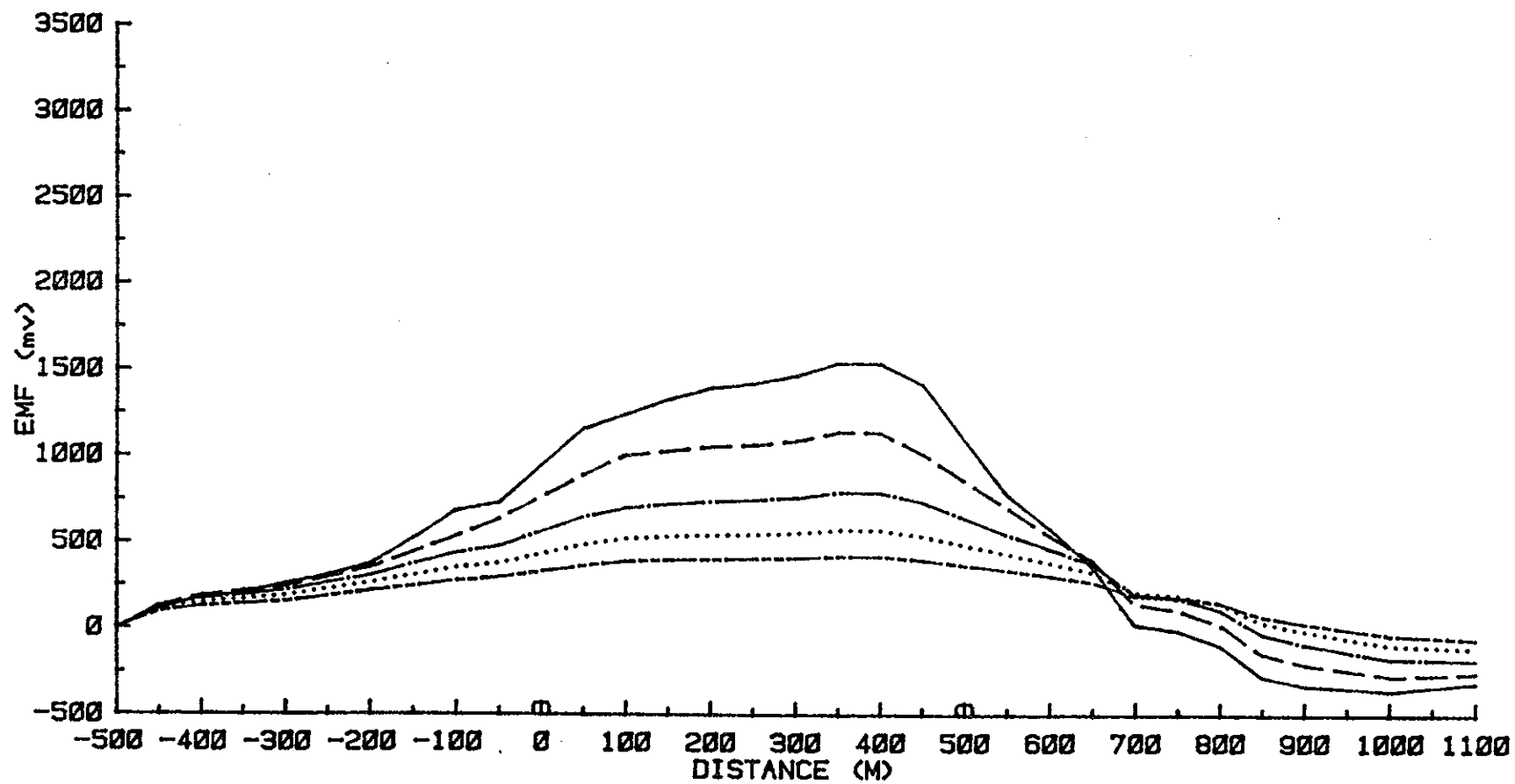
MT. MAHON, BRITISH COLUMBIA

Prepared For:
Chevron Resources
San Francisco, California

Prepared By:
The Earth Technology Corporation
2801 Youngfield, #390
Golden, Colorado 80401

All data at 30Hz

September, 1984
Job #84-3



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	- . - . -
CHANNEL	4	. . . . .
CHANNEL	5	- - - - -

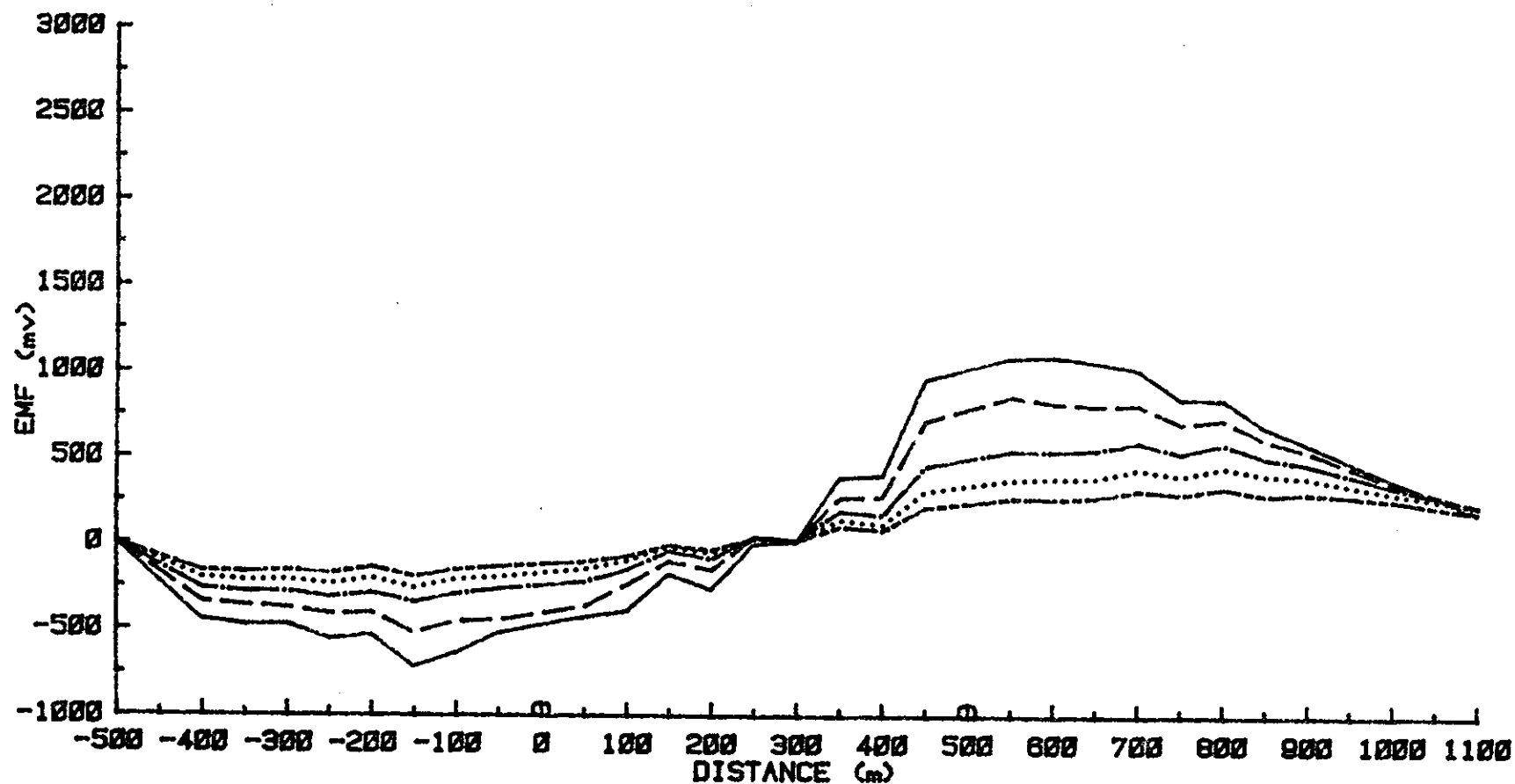
CHEVRON MT. MAHON

FILE 26-1

COMPONENT B_z LINE 26+00N

E84-03

FIGURE 1A



CHANNEL	1	_____
CHANNEL	2	-----
CHANNEL	3	_____
CHANNEL	4
CHANNEL	5	-----

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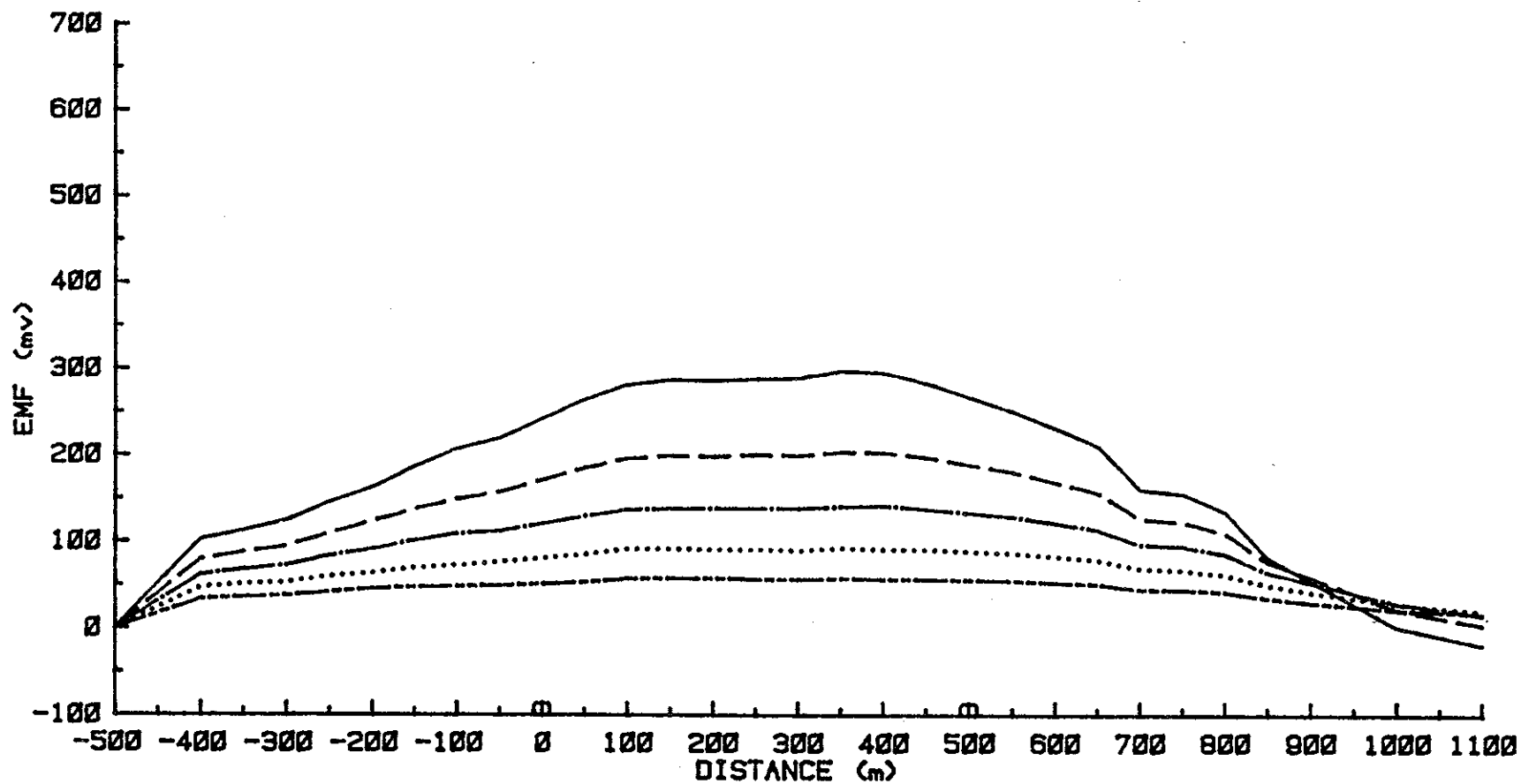
FILE 28-1

COMPONENT Bx

LINE 28+00N

E84-03

FIGURE 18



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	—————
CHANNEL	9	.....
CHANNEL	10	—————

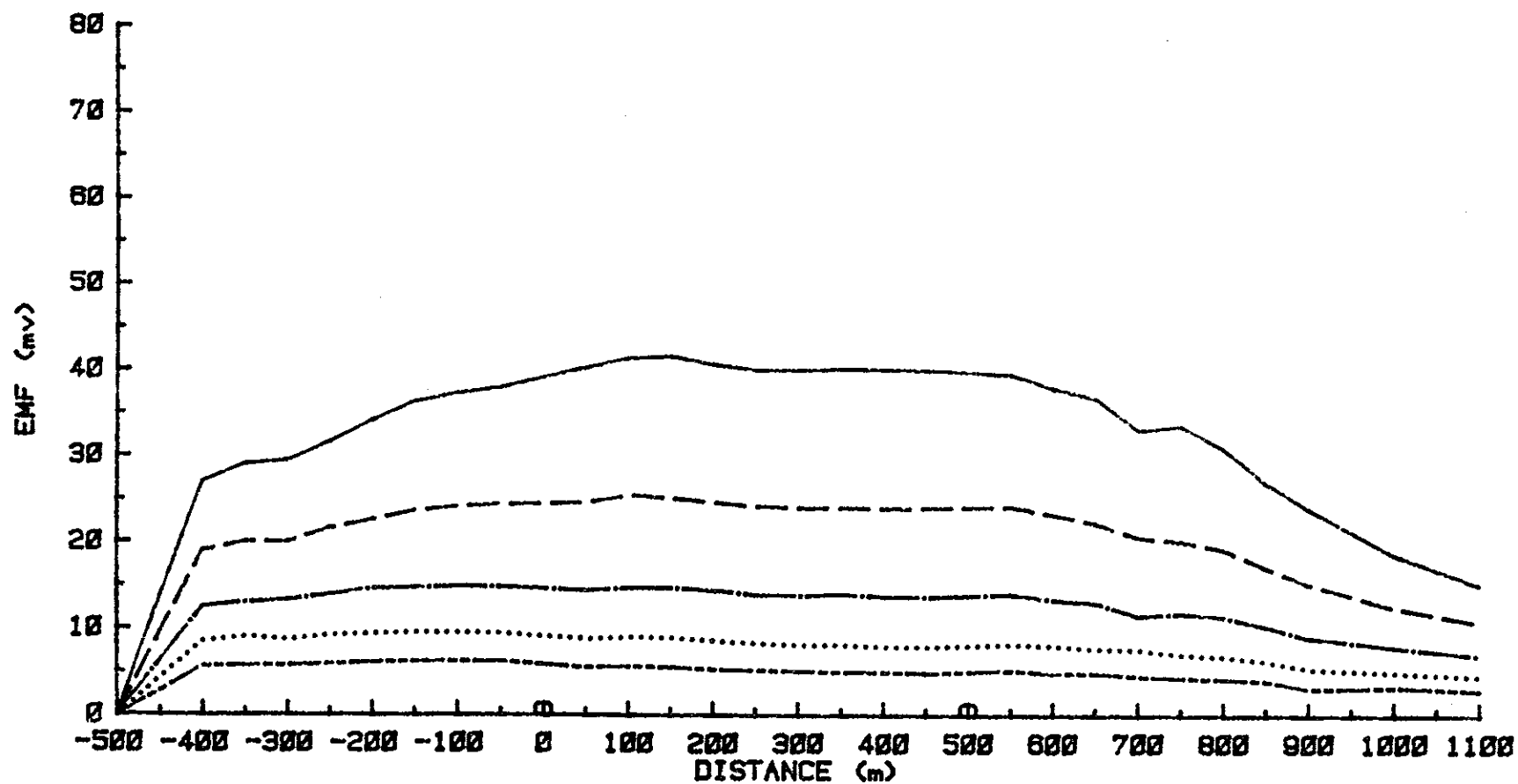
CHEVRON MT. MAHON

FILE 26-2

COMPONENT B_z LINE 26+00N

E84-03

FIGURE 1C



CHANNEL	11	—————
CHANNEL	12	-----
CHANNEL	13	—————
CHANNEL	14	.....
CHANNEL	15	-----

CHEVRON MT. MAHON

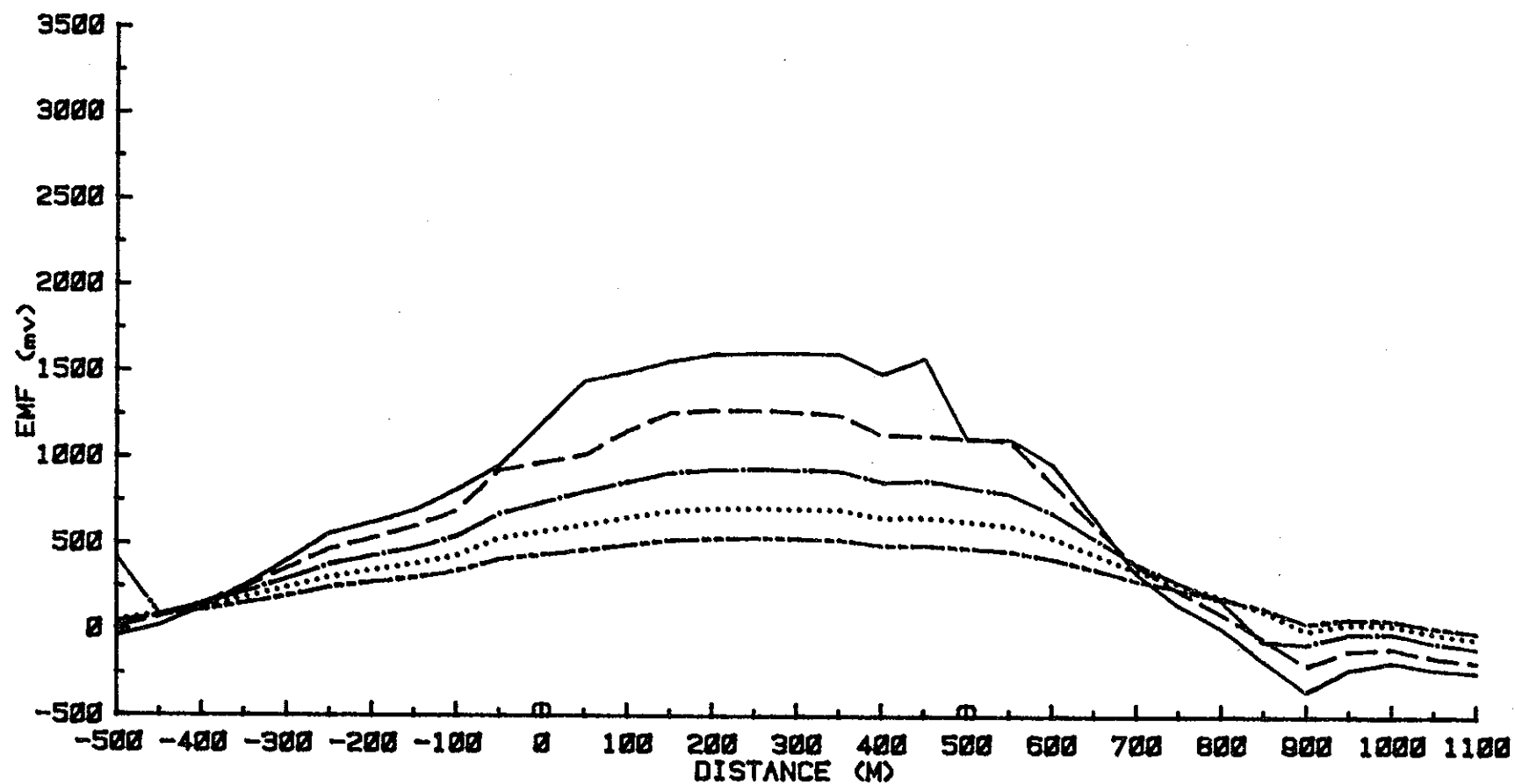
FILE 28-3

COMPONENT B_z

LINE 28+00N

FR4-03

FIGURE 1E



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	— · — · —
CHANNEL	4	·····
CHANNEL	5	- - - - -

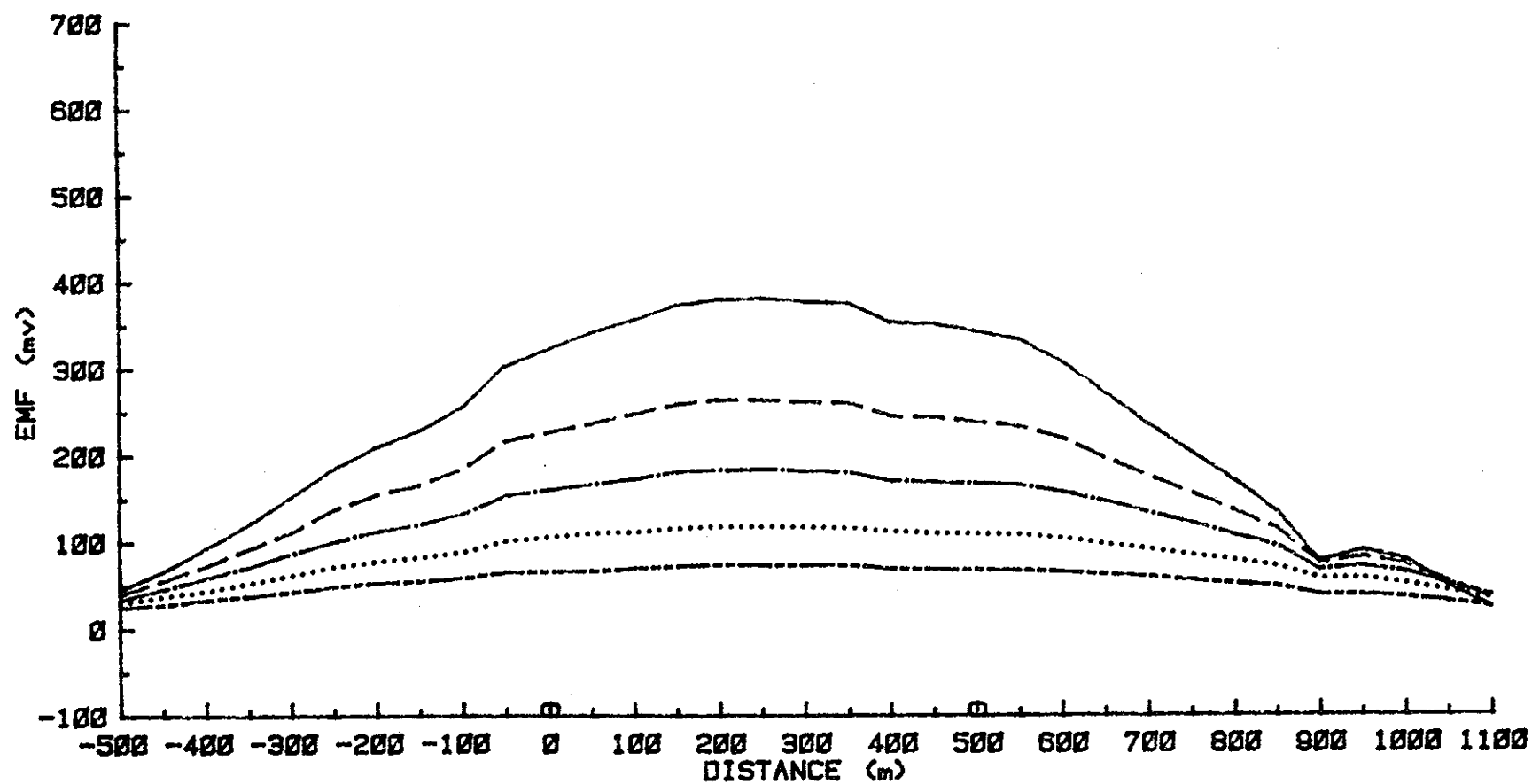
CHEVRON MT. MAHON

FILE 22-1A

COMPONENT B_x LINE 22+00N

E84-03

FIGURE 2A



CHANNEL 6 —————

CHANNEL 7 - - - - -

CHANNEL 8 — · — · — ·

CHANNEL 9 ·········

CHANNEL 10 — · — · — ·

CHEVRON MT. MAHON

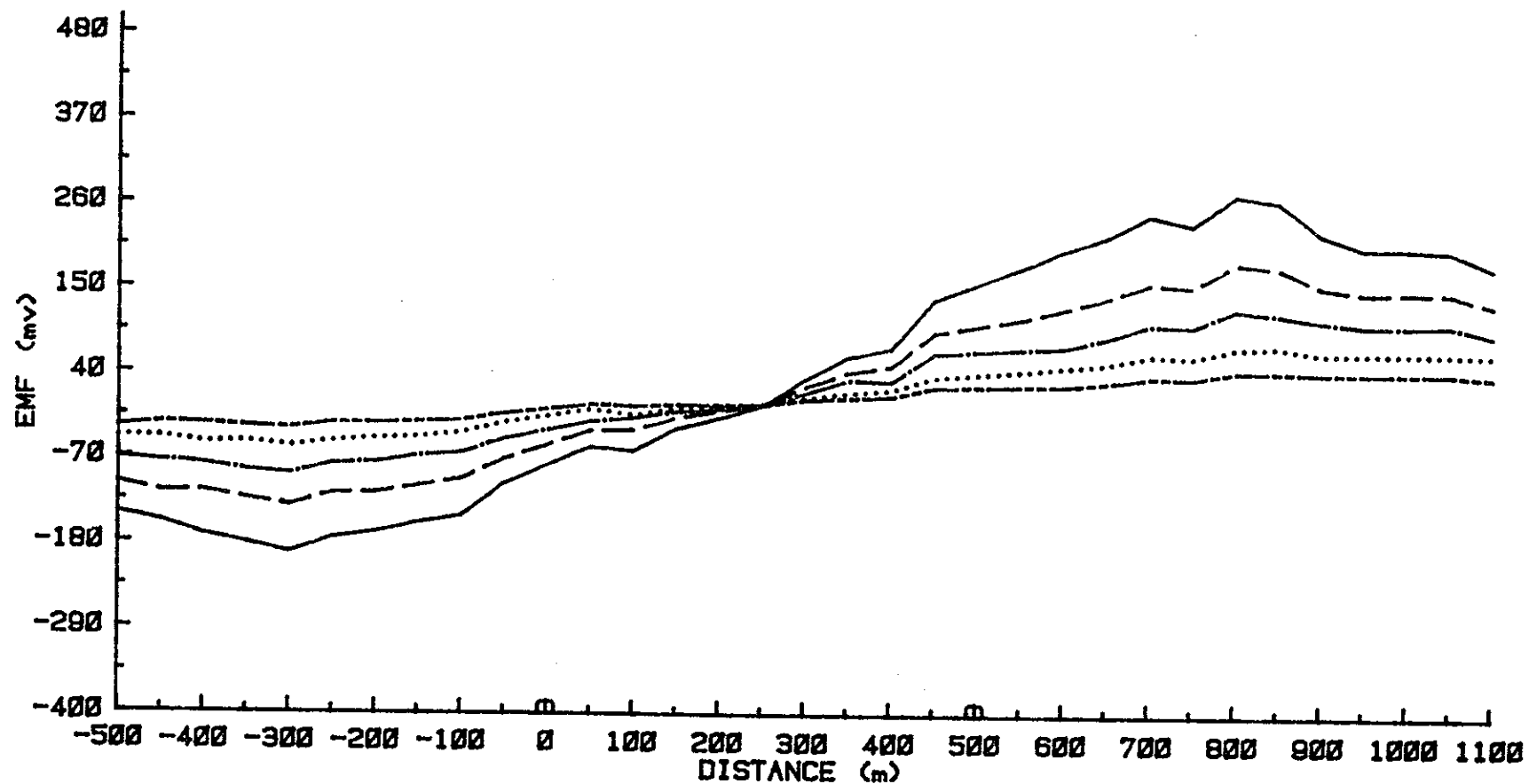
FILE 22-2

COMPONENT B_z

LINE 22+00N

ER4-03

FIGURE 2C



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- . - . - .
CHANNEL	9	. . . . .
CHANNEL	10	- - - - -

CHEVRON MT. MAHON

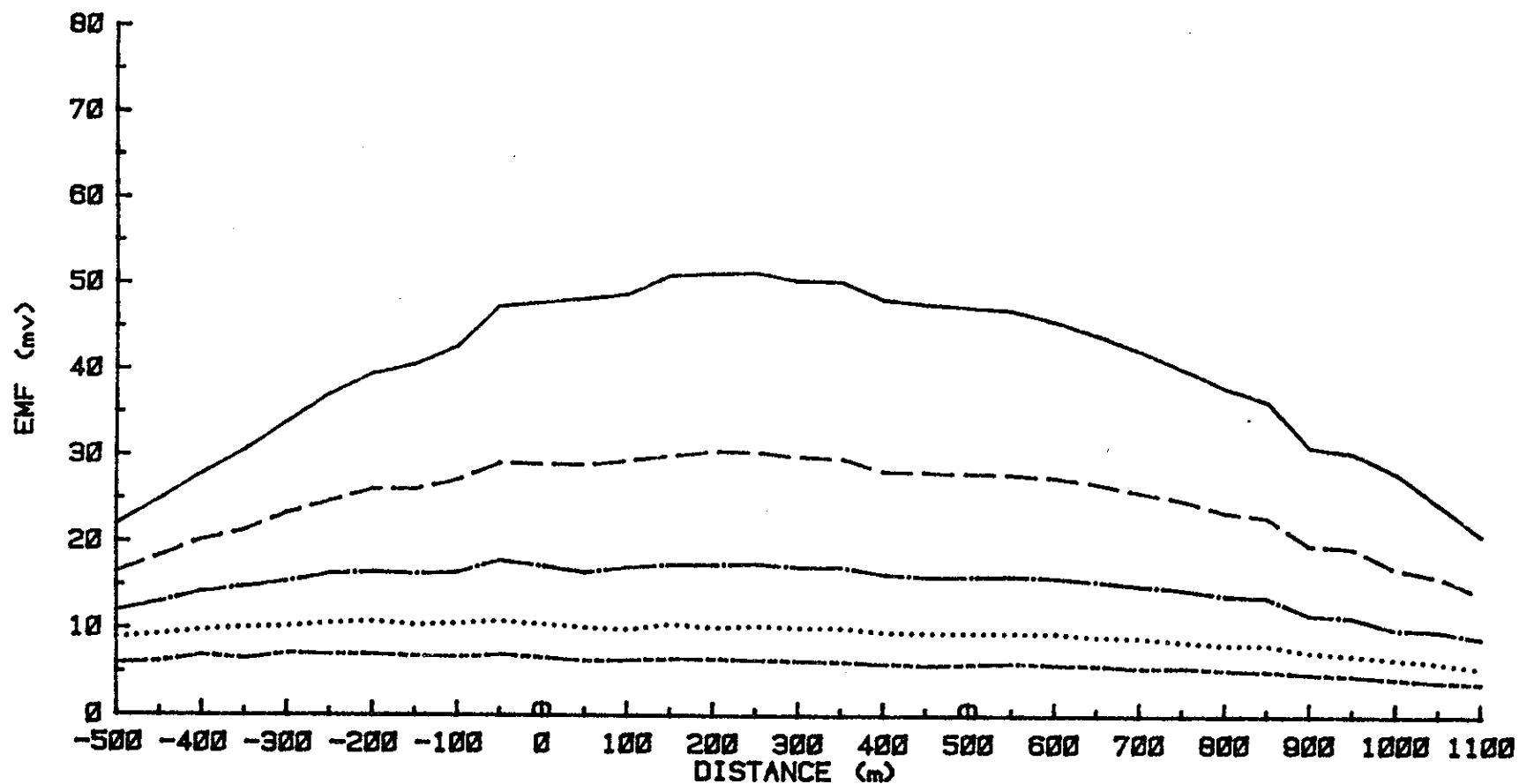
FILE 22-2

COMPONENT Bx

LINE 22+00N

FB4-03

FIGURE 20



CHANNEL 11 _____
 CHANNEL 12 - - - - -
 CHANNEL 13 _____
 CHANNEL 14
 CHANNEL 15 - . - . -

CHEVRON MT. MAHON

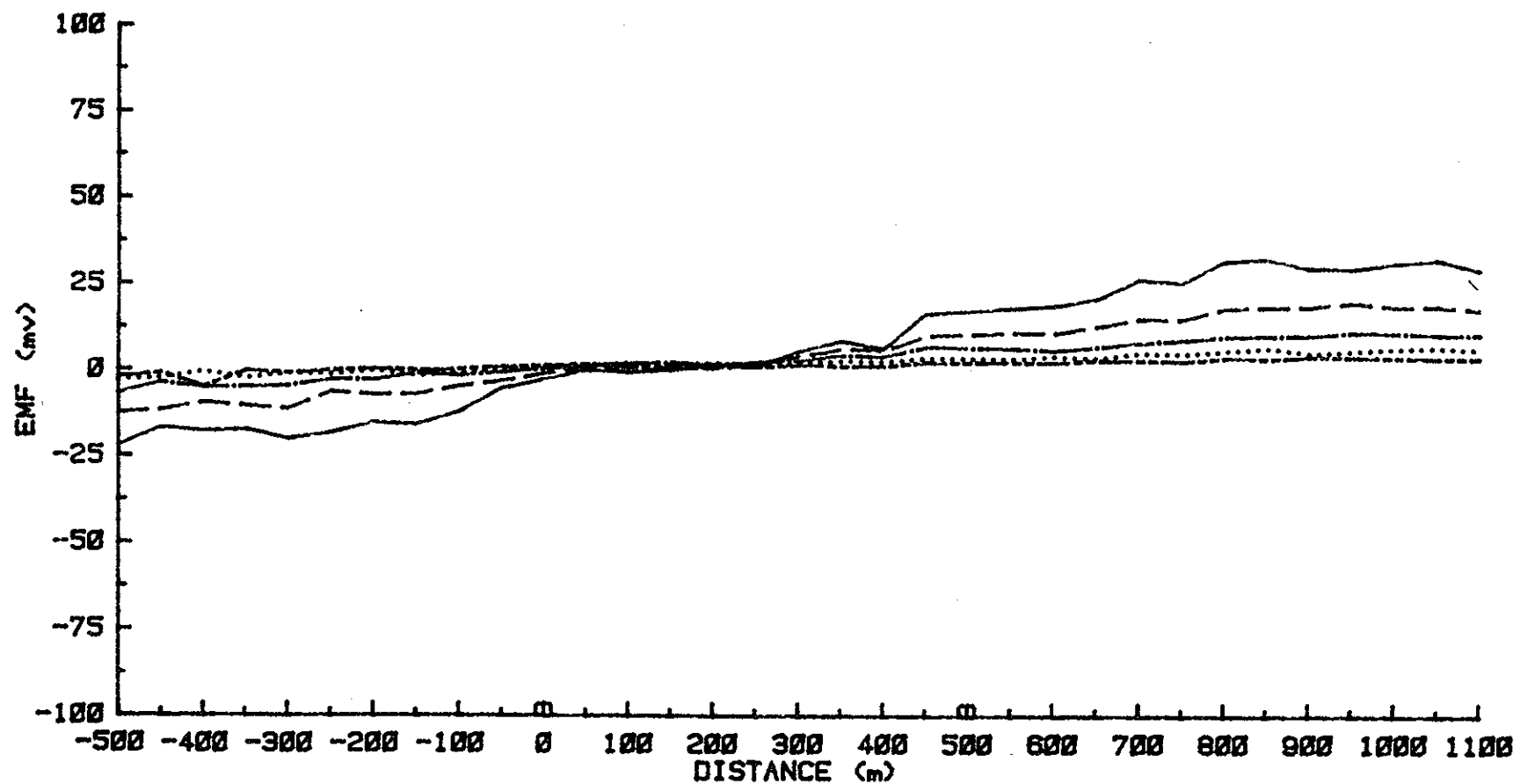
FILE 22-3

COMPONENT Bz

LINE 22+00N

ERR-02

ETUDE 25



CHANNEL	11	—————
CHANNEL	12	- - - - -
CHANNEL	13	—————
CHANNEL	14	.....
CHANNEL	15	- - - - -

CHEVRON MT. MAHON

FILE 22-3

COMPONENT Bx

LINE 22+00N

E84-03

FIGURE 2F

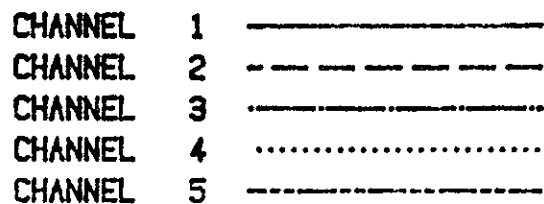
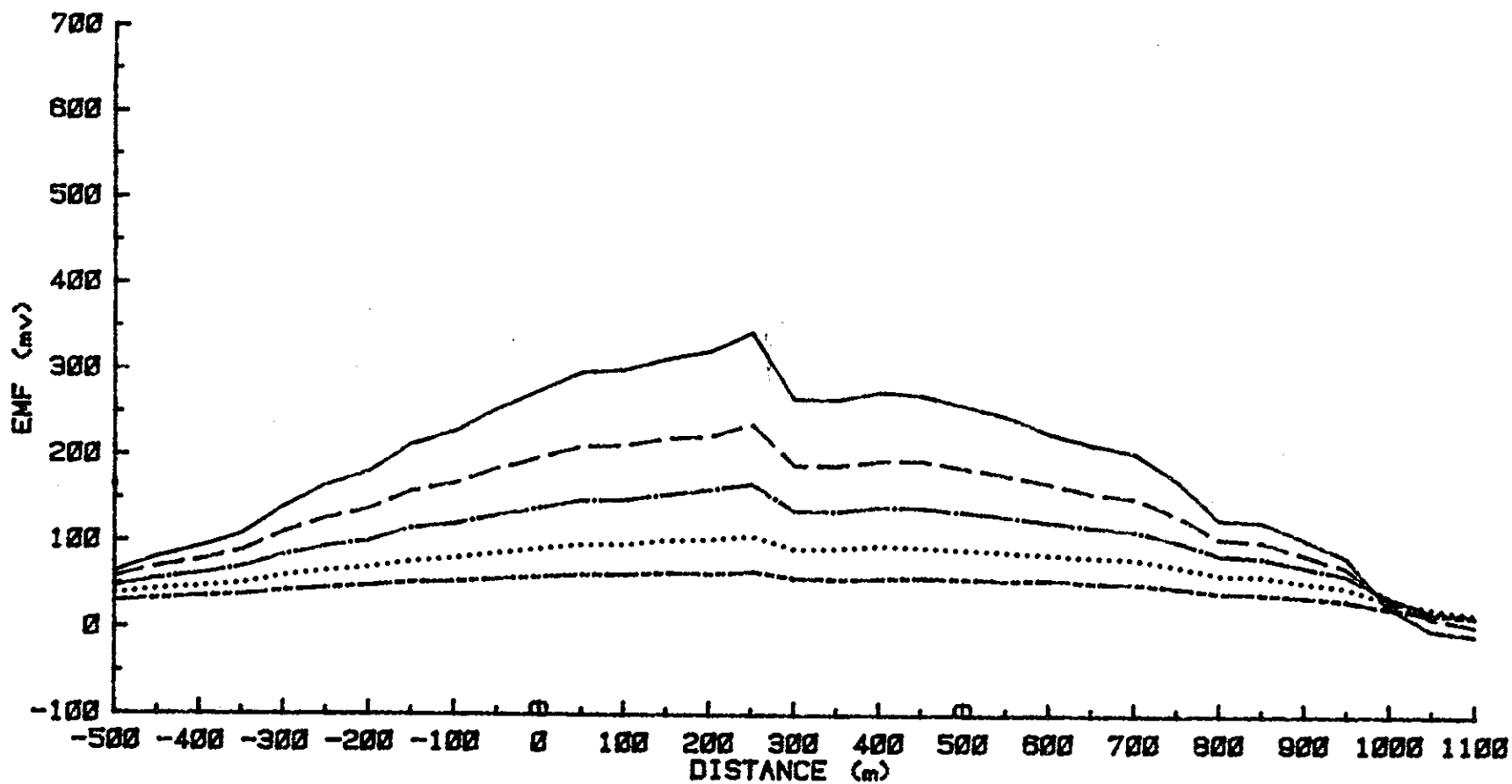


FIGURE 3A



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- . - . -
CHANNEL	9
CHANNEL	10	- - - - -

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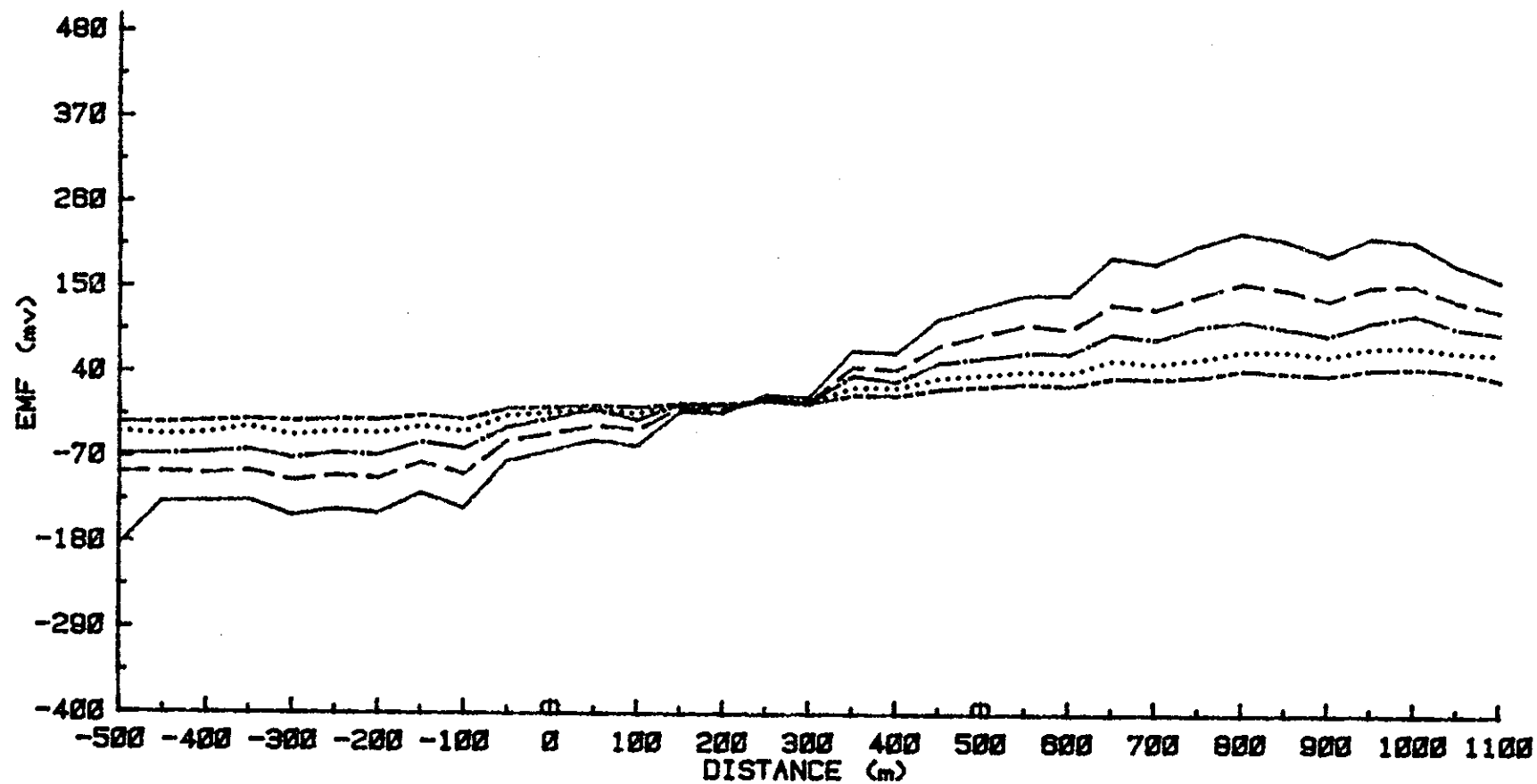
FILE 18-2

COMPONENT B_x

LINE 18+00N

E84-03

FIGURE 3C



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- · - · - ·
CHANNEL	9	· · · · ·
CHANNEL	10	- - - - -

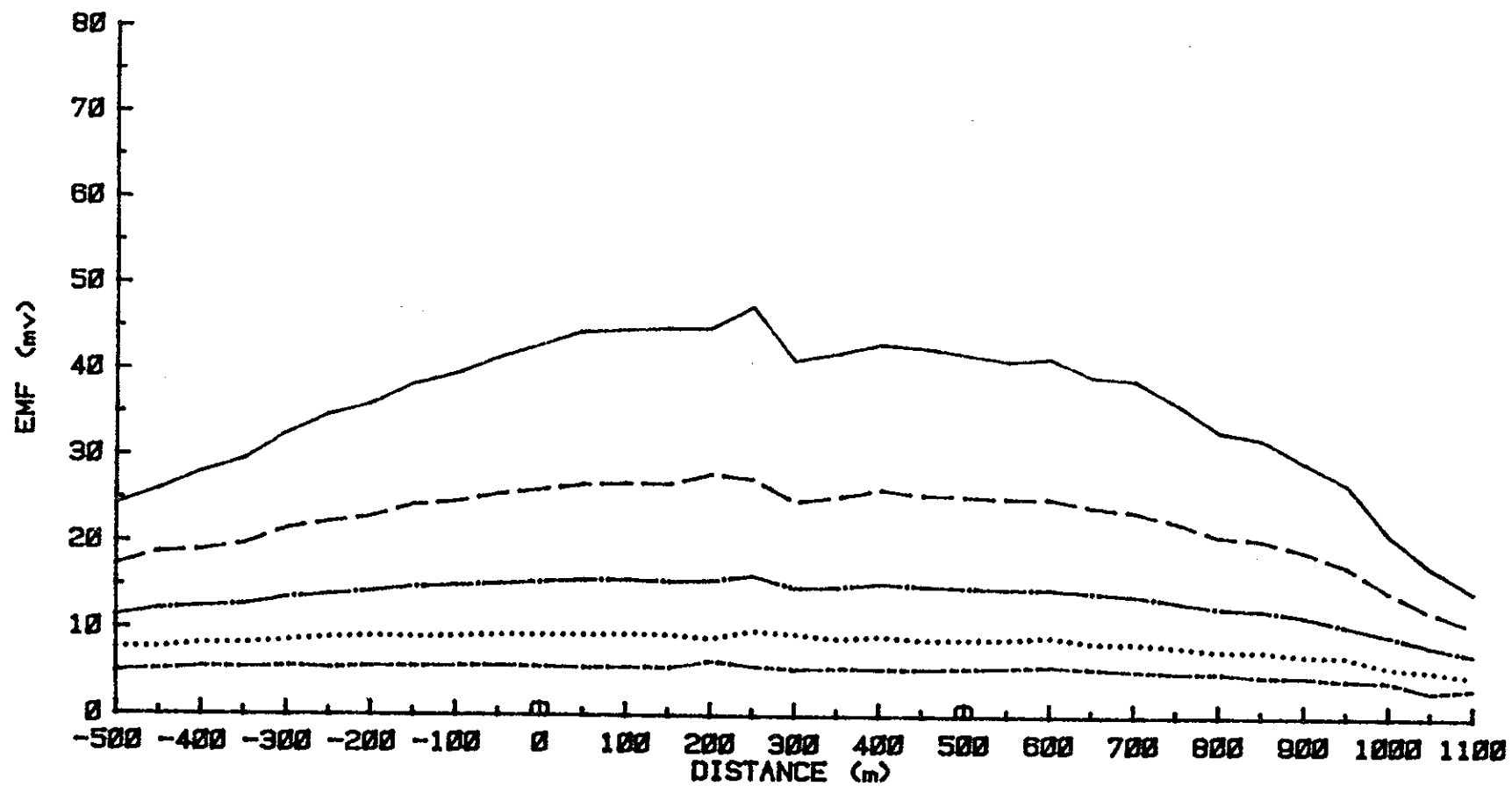
CHEVRON MT. MAHON

FILE 18-2

COMPONENT Bx LINE 18+00N

E84-03

FIGURE 3D



CHANNEL	11	—————
CHANNEL	12	- - - - -
CHANNEL	13
CHANNEL	14
CHANNEL	15	- . - . -

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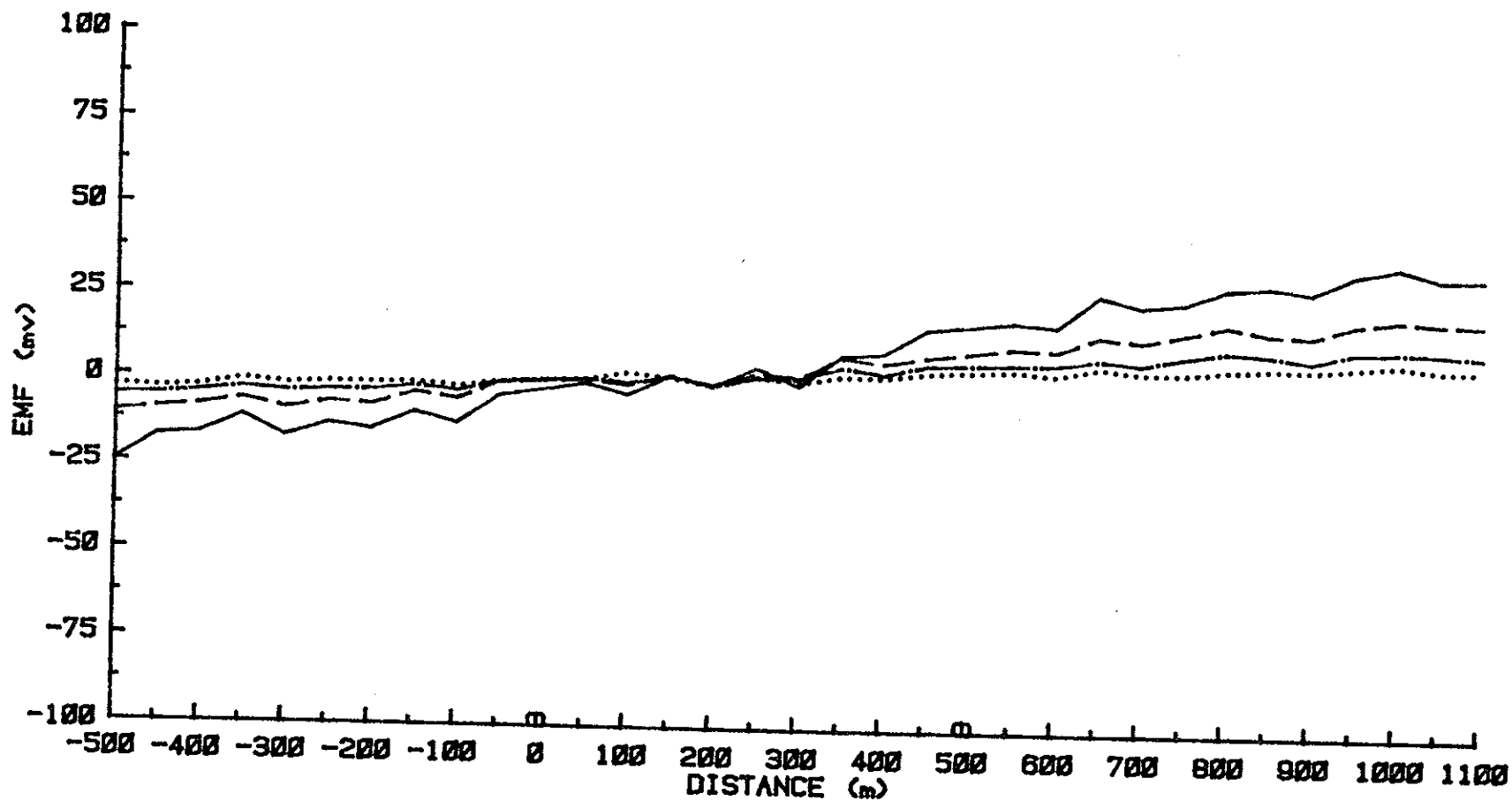
FILE 18-3

COMPONENT Bz

LINE 18+00N

E84-03

FIGURE 3E



CHANNEL 11 —————
 CHANNEL 12 - - - - -
 CHANNEL 13 - - - - -
 CHANNEL 14

CHEVRON MT. MAHON

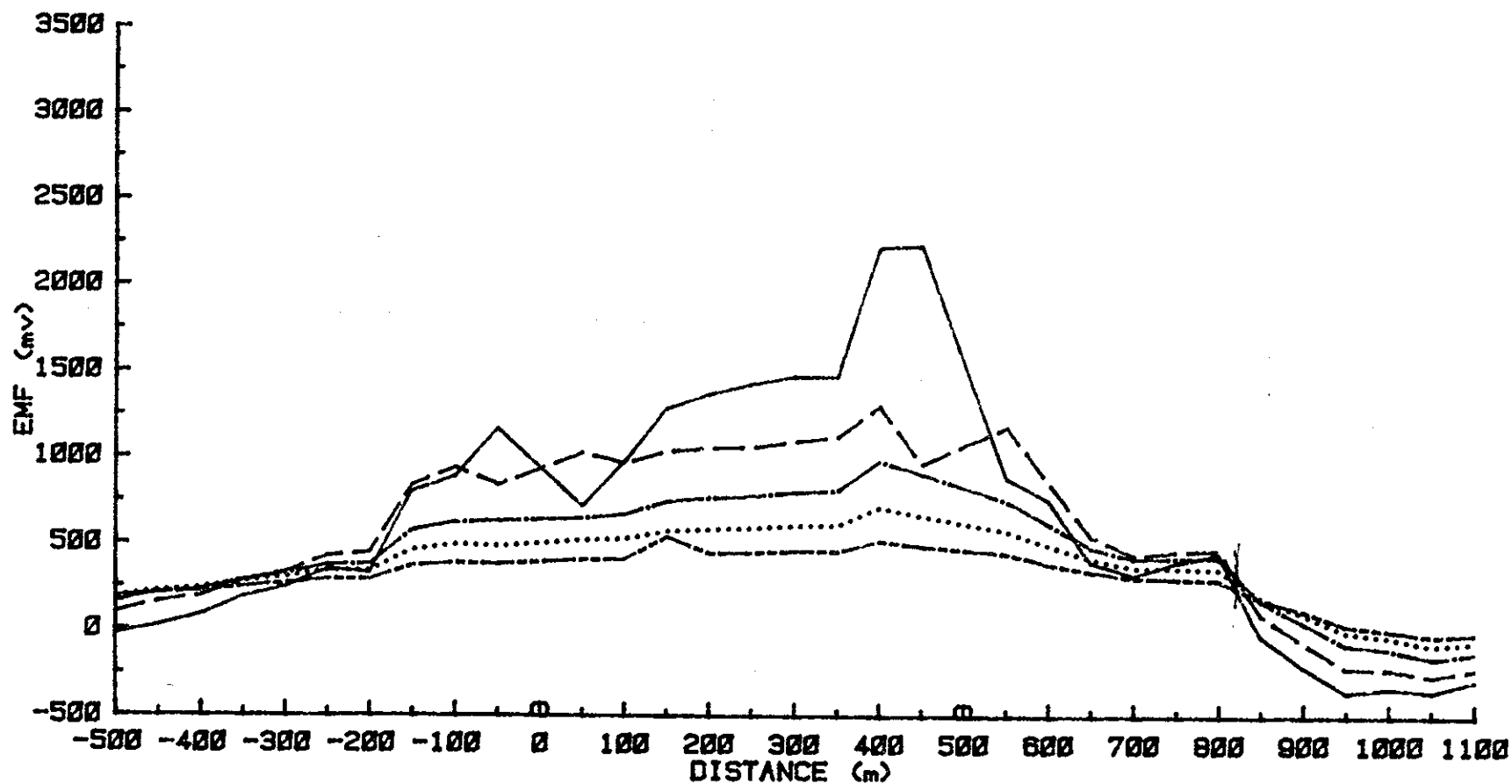
FILE 18-3

COMPONENT Bx

LINE 18+00N

FRA-02

FIGURE 2F



CHANNEL	1	_____
CHANNEL	2	-----
CHANNEL	3	_____
CHANNEL	4	.....
CHANNEL	5	-----

CHEVRON MT. MAHON

FILE 14-1

COMPONENT Bz LINE 14+00N

E84-03

FIGURE 4A

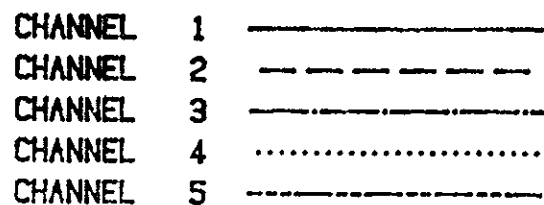
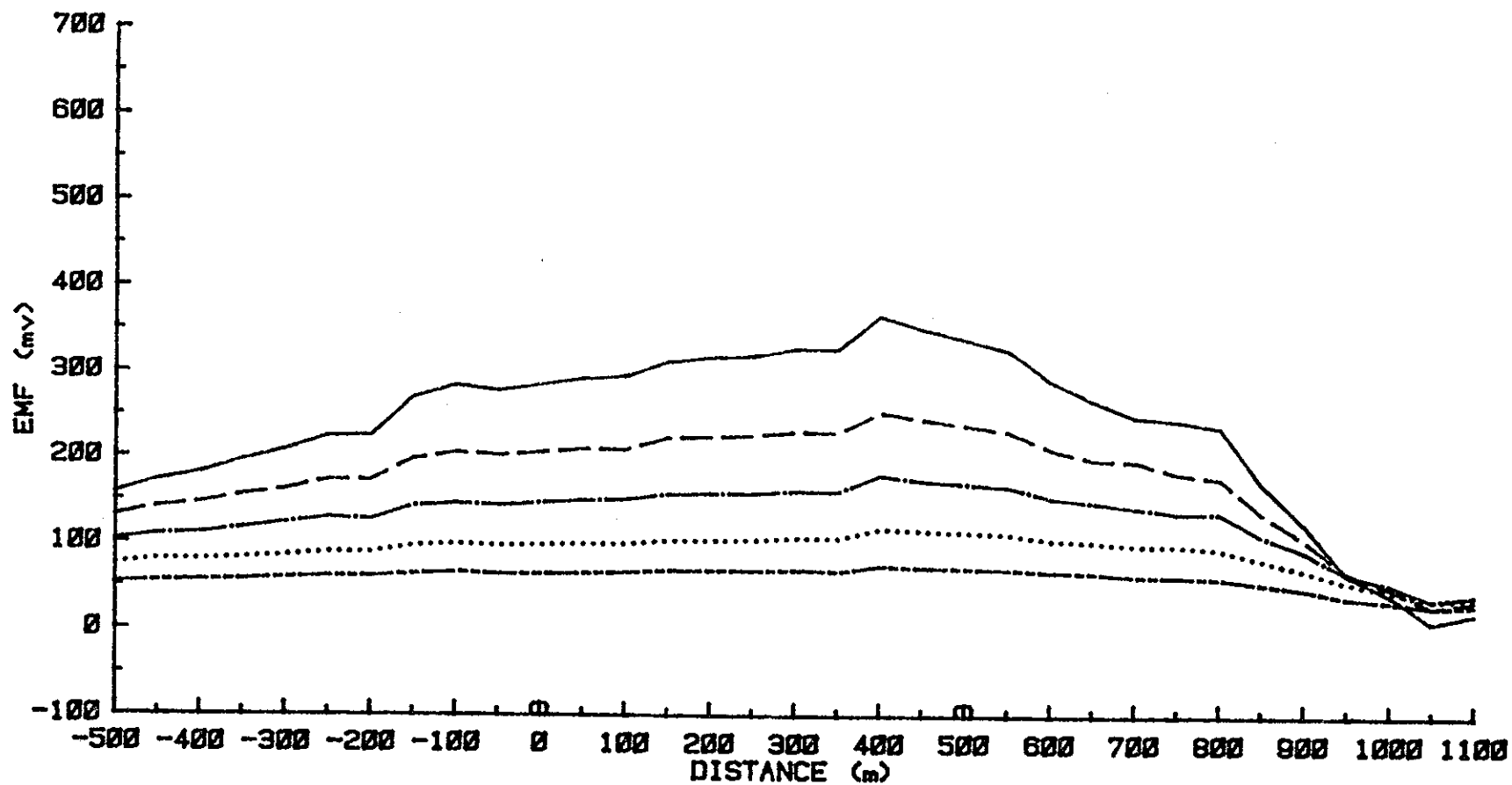


FIGURE 4B



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- · - · -
CHANNEL	9	· · · · ·
CHANNEL	10	- · - - -

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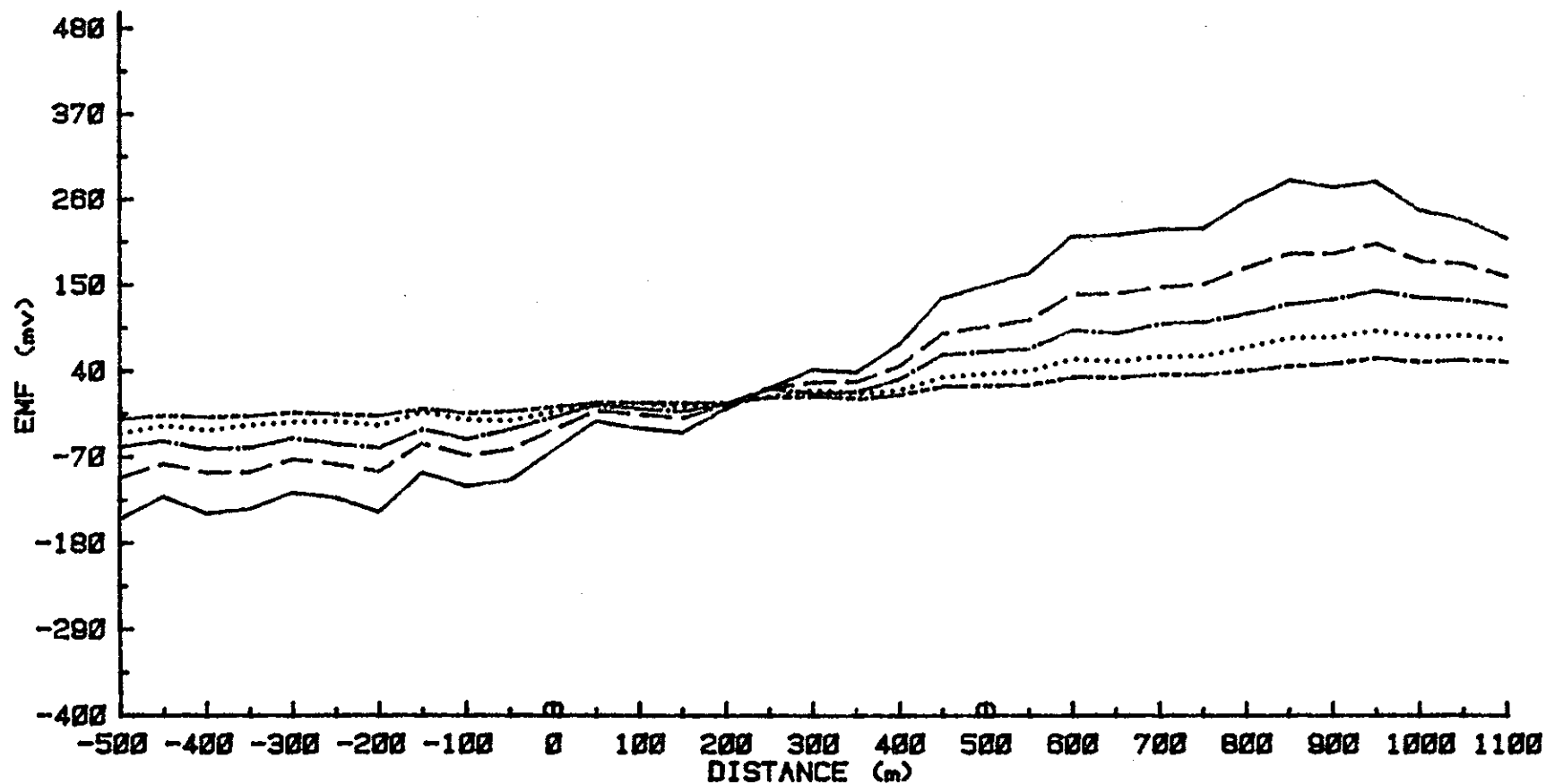
FILE 14-2

COMPONENT B_z

LINE 14+00N

E84-03

FIGURE 4C



CHANNEL 6 _____
 CHANNEL 7 - - - - -
 CHANNEL 8 - . - . - .
 CHANNEL 9
 CHANNEL 10 - - - - -

CHEVRON MT. MAHON

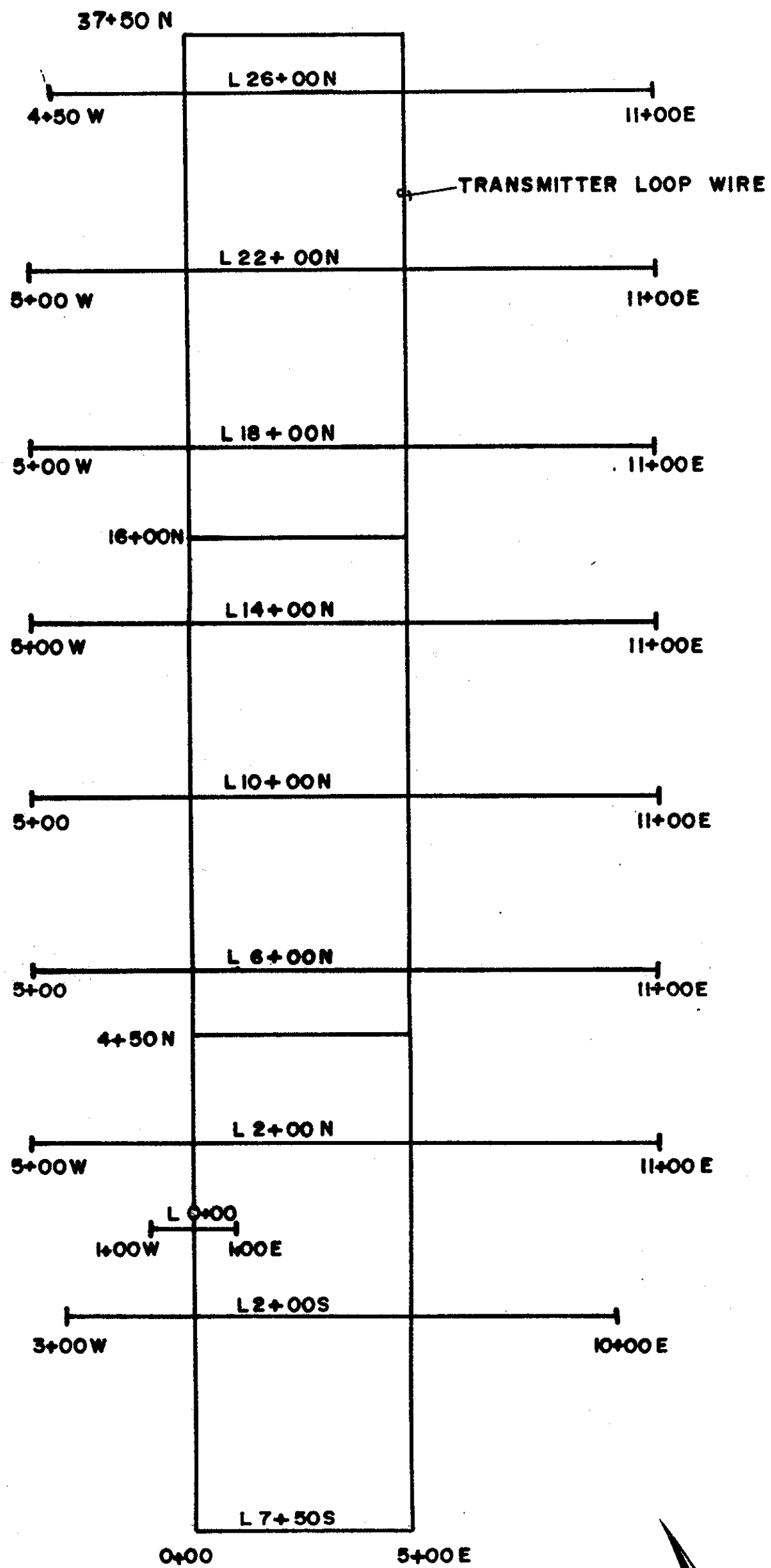
FILE 14-2

COMPONENT Bx

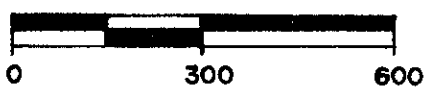
LINE 14+00N

E84-03

FIGURE 4D



SCALE 1" = 300 meters

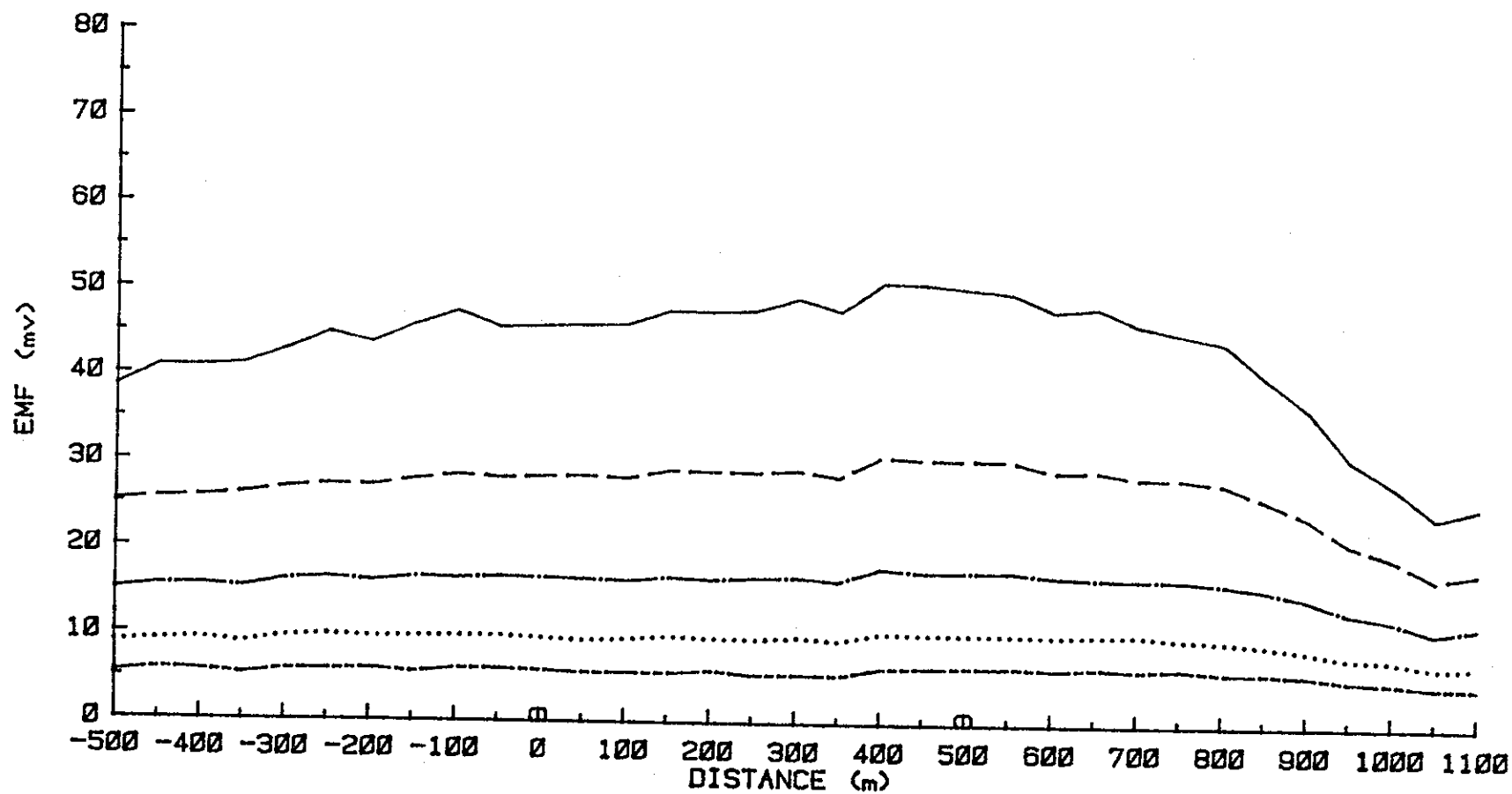


The Earth Technology Corporation

CHEVRON RESOURCES
E84-03

MT. MAHON PROJECT
APPROXIMATE LOOP & LINE LAYOUT

Figure 1



CHANNEL	11	—————
CHANNEL	12	- - - - -
CHANNEL	13	- . - . -
CHANNEL	14	. . . . .
CHANNEL	15	- - - - -

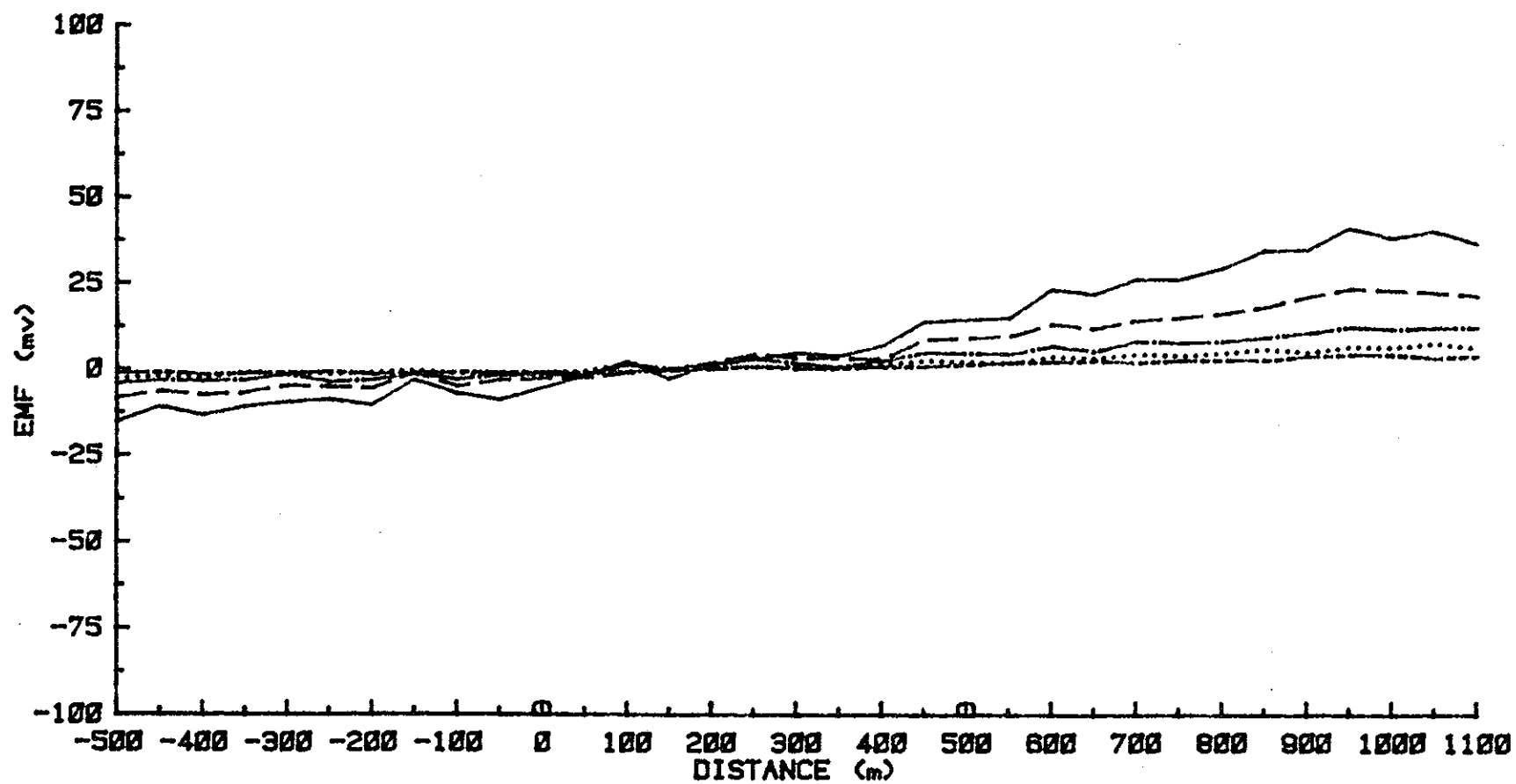
CHEVRON MT. MAHON

FILE 14-3

COMPONENT Bz LINE 14+00N

E84-03

FIGURE 4E



CHANNEL	11	_____
CHANNEL	12	-----
CHANNEL	13	_____
CHANNEL	14	.....
CHANNEL	15	-----

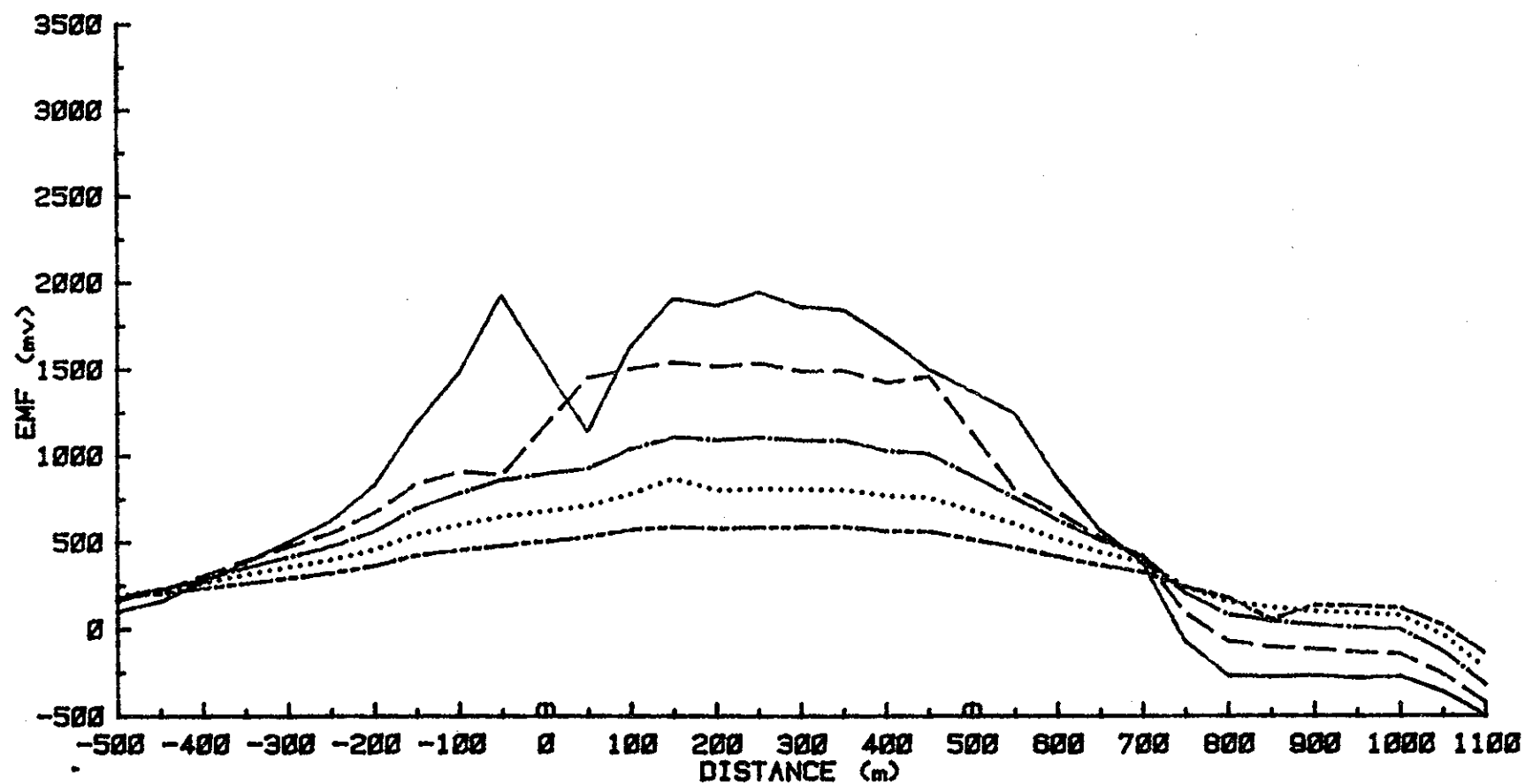
CHEVRON MT. MAHON

FILE 14-3

COMPONENT Bx LINE 14+00N

E84-03

FIGURE 4F



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	- . - . -
CHANNEL	4
CHANNEL	5	- - - - -

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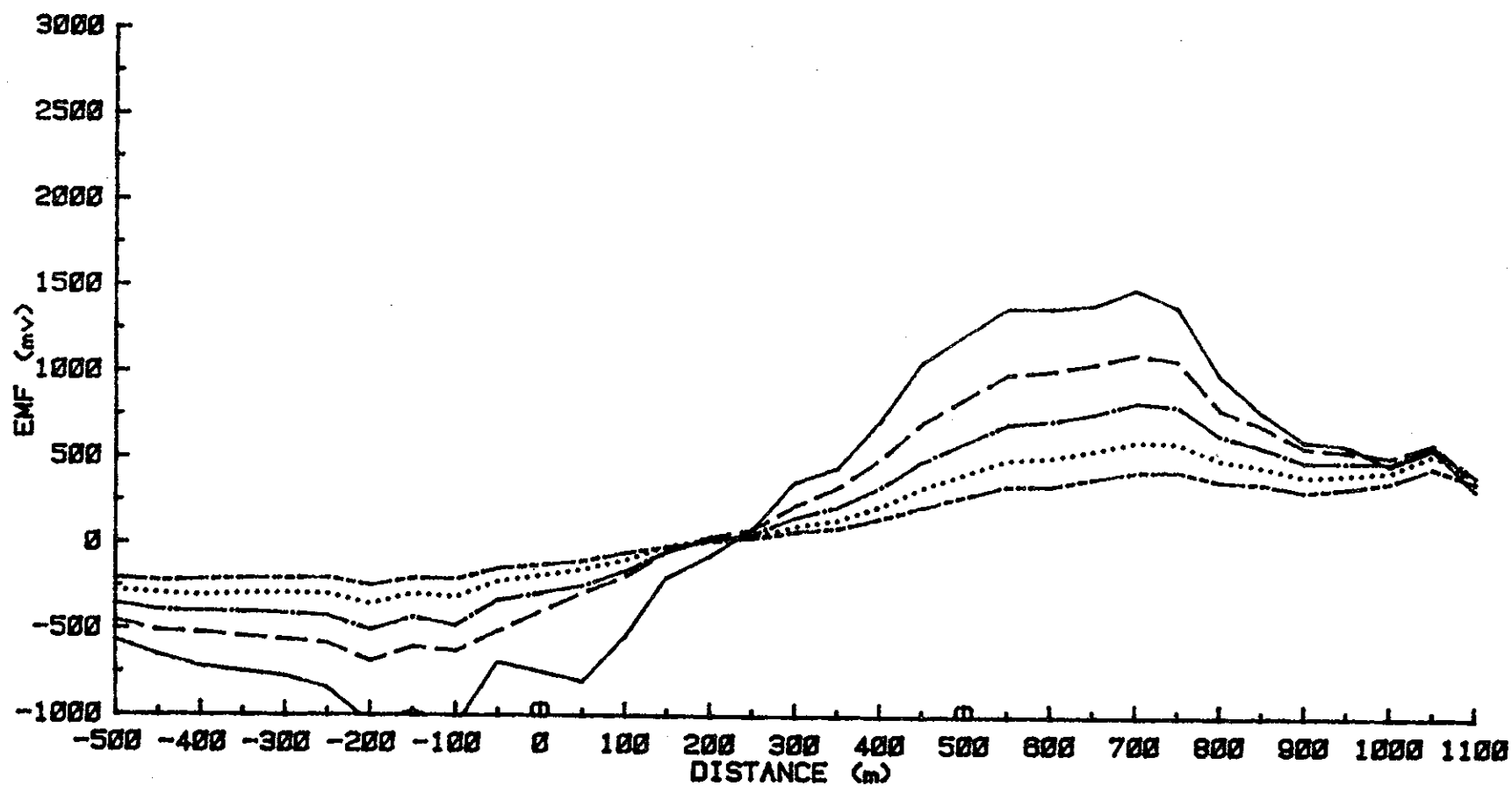
FILE 10-1

COMPONENT B_z

LINE 10+00N

E84-03

FIGURE 5A



CHANNEL	1	_____
CHANNEL	2	_____
CHANNEL	3	_____
CHANNEL	4	.....
CHANNEL	5	_____

CHEVRON MT. MAHON

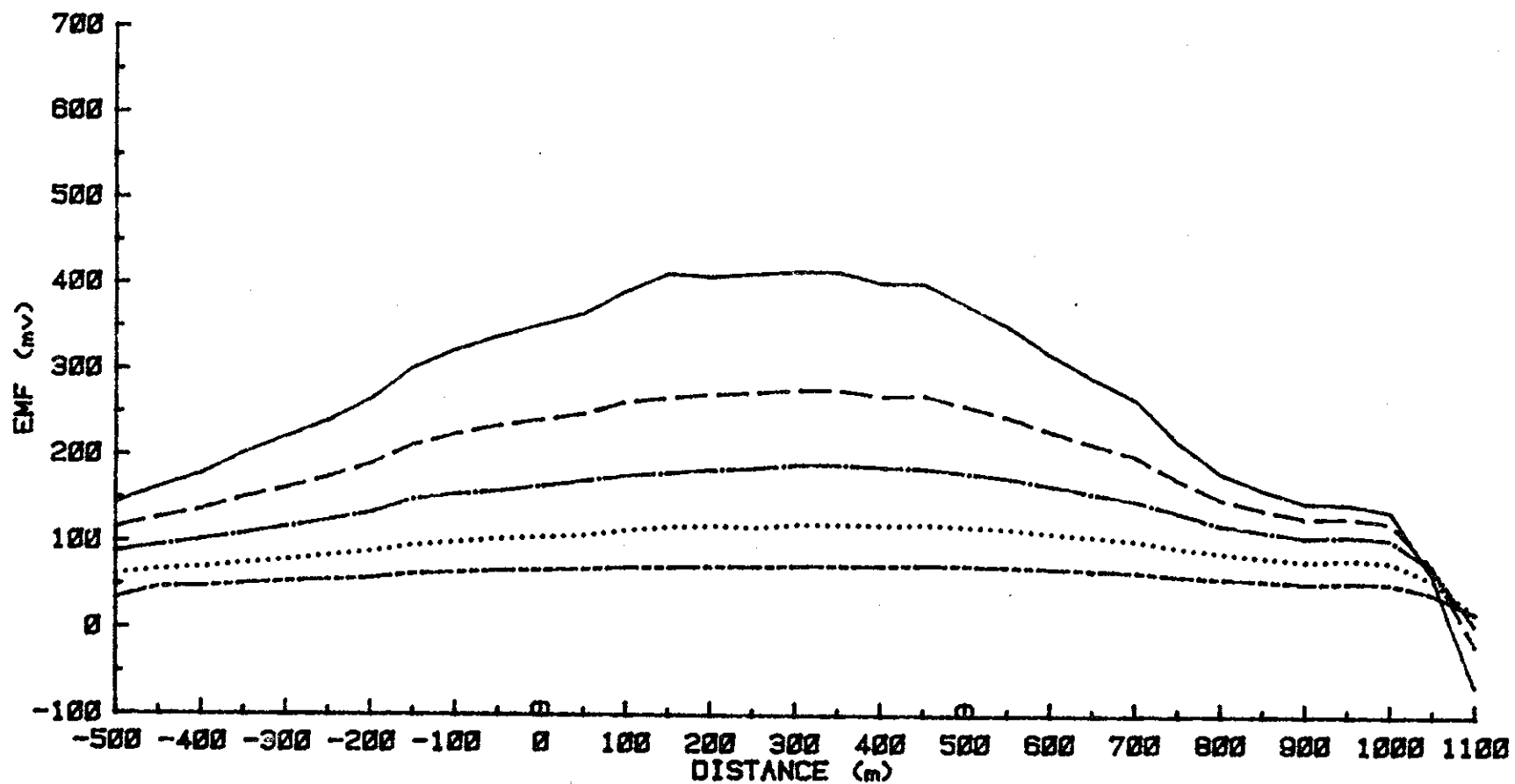
FILE 10-1

COMPONENT Bx

LINE 10+00N

E84-03

FIGURE 5B



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	.....
CHANNEL	9	.....
CHANNEL	10	—————

CHEVRON MT. MAHON

FILE 10-2

COMPONENT Bz

LINE 10+00N

E84-03

FIGURE 5C

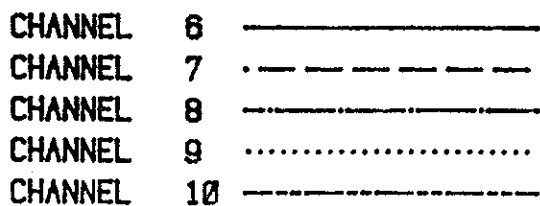
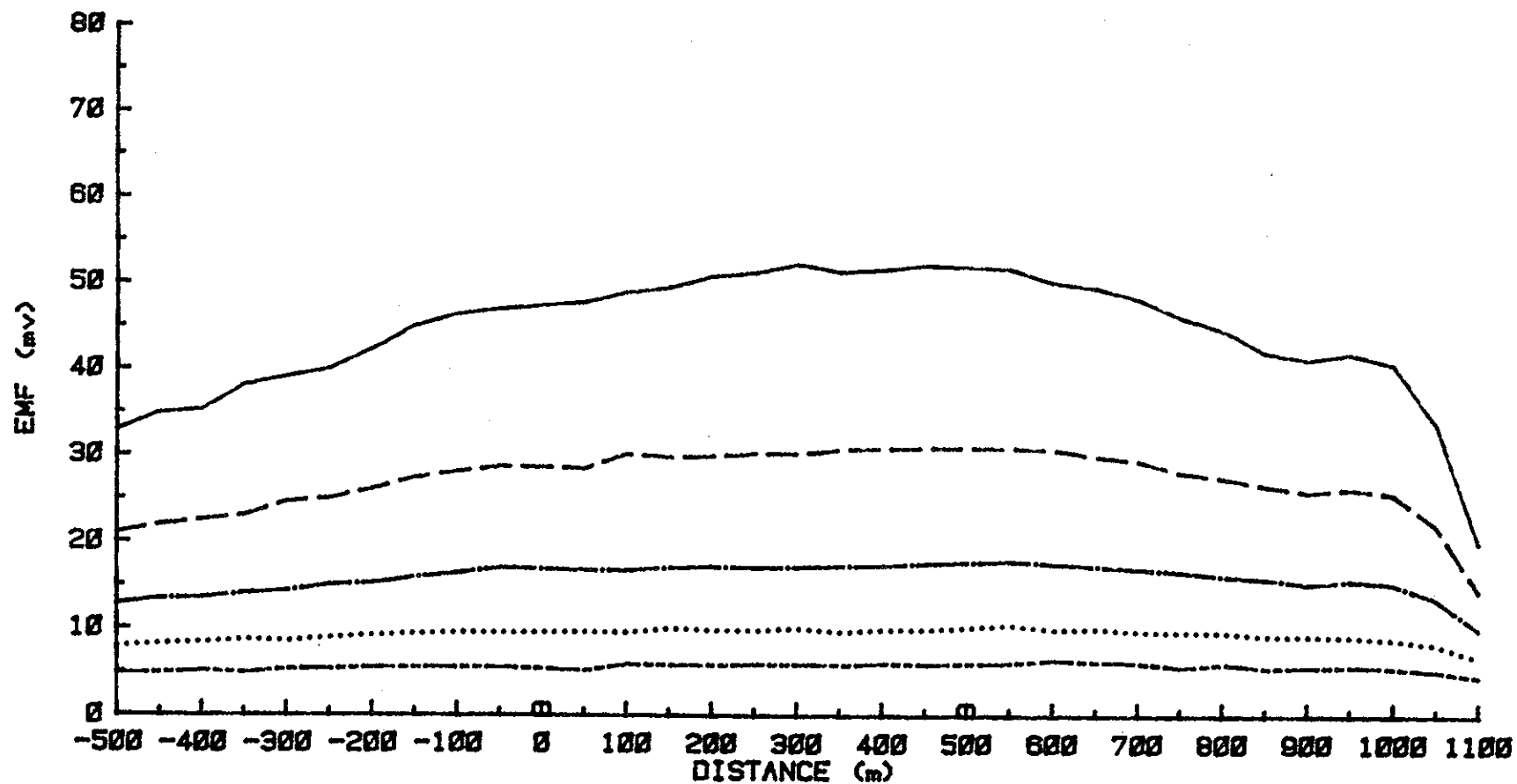


FIGURE 5D



CHANNEL 11 _____
 CHANNEL 12 - - - - -
 CHANNEL 13 - . - . - .
 CHANNEL 14
 CHANNEL 15 - - - - -

CHEVRON MT. MAHON

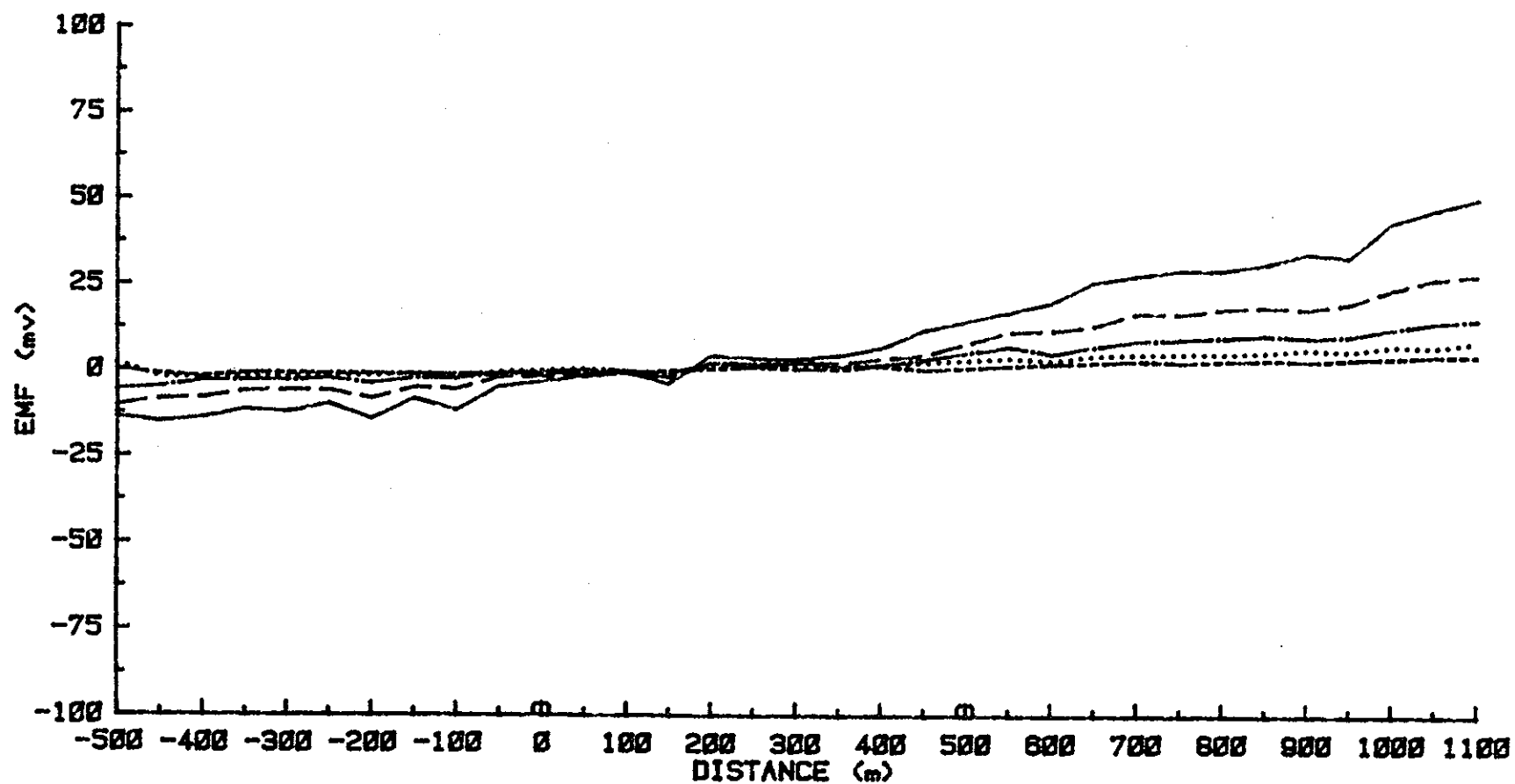
FILE 10-3

COMPONENT Bz

LINE 10+00N

E84-03

FIGURE 5E



CHANNEL 11 _____
 CHANNEL 12 - - - - -
 CHANNEL 13 - . - . - .
 CHANNEL 14
 CHANNEL 15 - - - - -

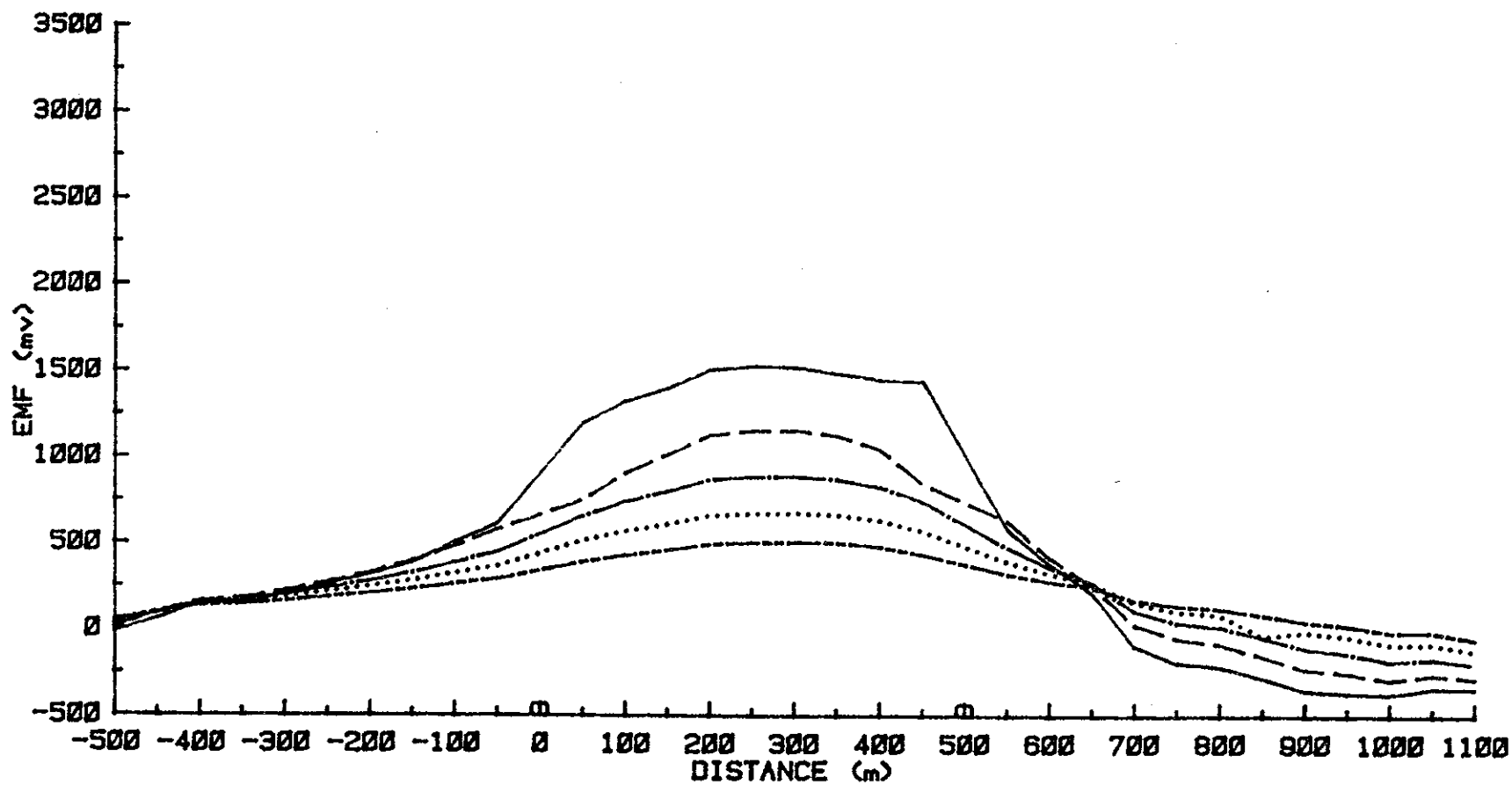
CHEVRON MT. MAHON

FILE 10-3

COMPONENT Bx LINE 10+00N

E84-03

FIGURE 5F



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	- . - . - .
CHANNEL	4	. . . . .
CHANNEL	5	- - - - -

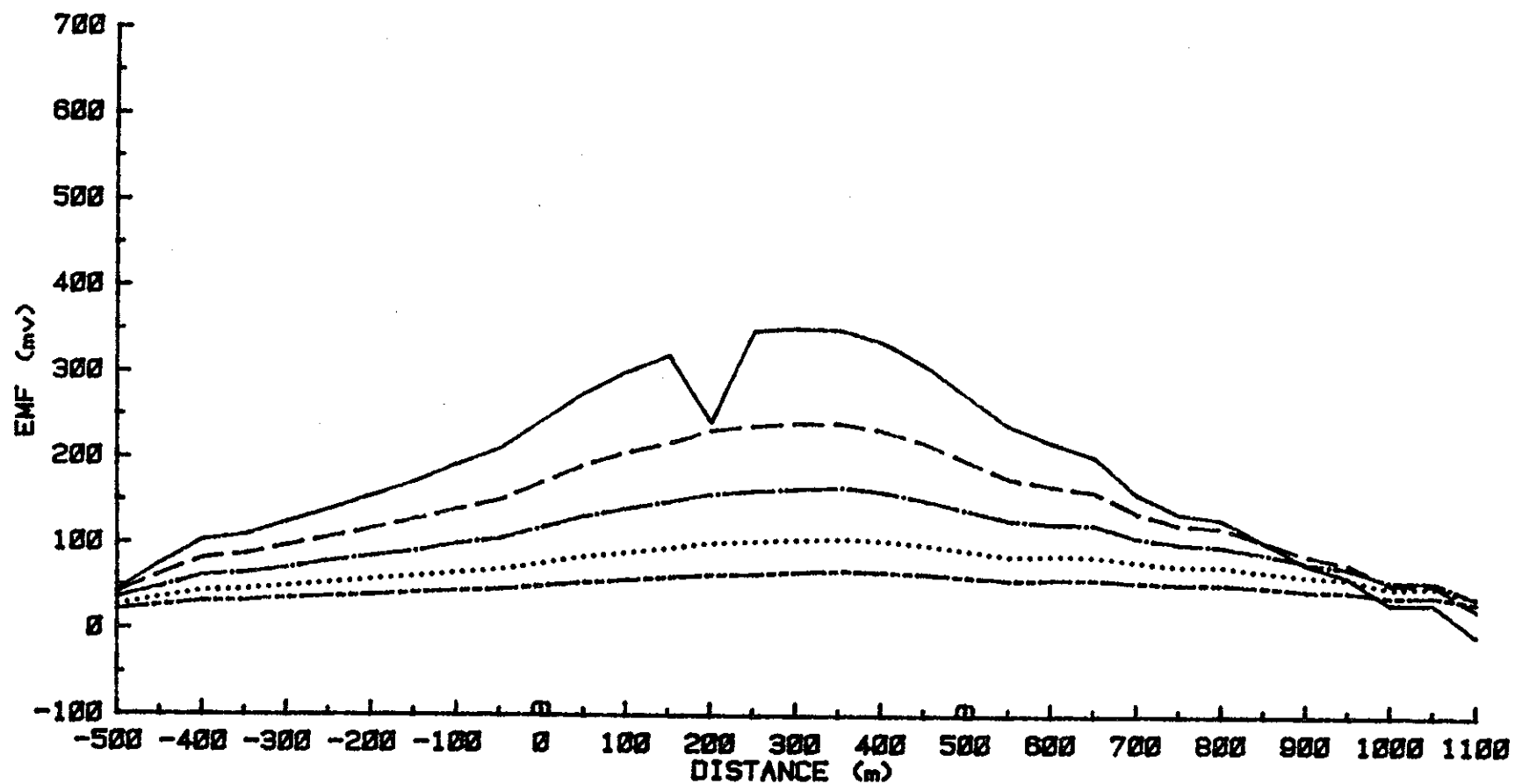
CHEVRON MT. MAHON

FILE 6-1

COMPONENT B_z LINE 6+00N

E84-03

FIGURE 8A



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	—————
CHANNEL	9	.....
CHANNEL	10	- . - . -

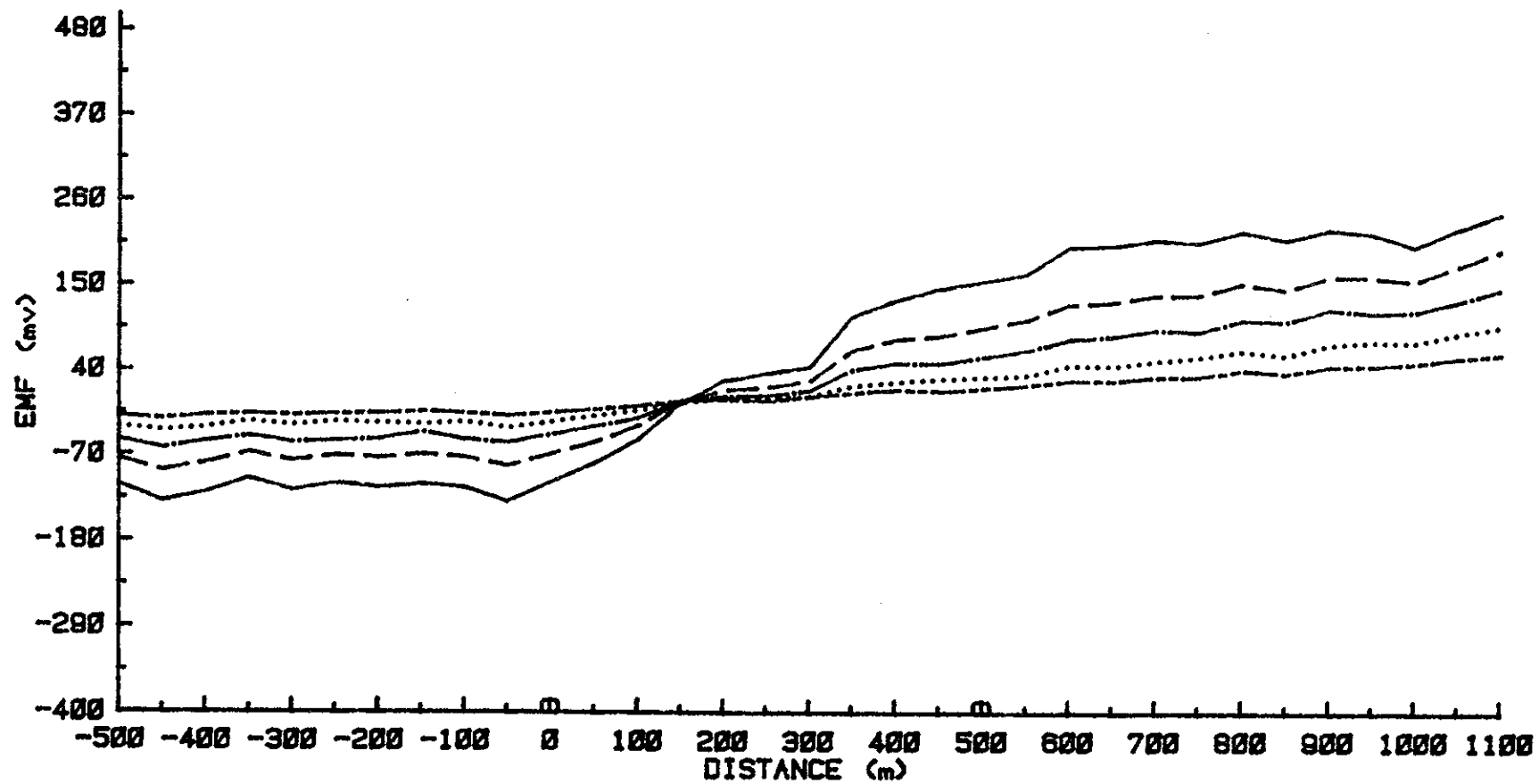
CHEVRON MT. MAHON

FILE 8-2

COMPONENT B_z LINE 8+00N

E84-03

FIGURE 8C



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- · - · -
CHANNEL	9	· · · · ·
CHANNEL	10	- - - - -

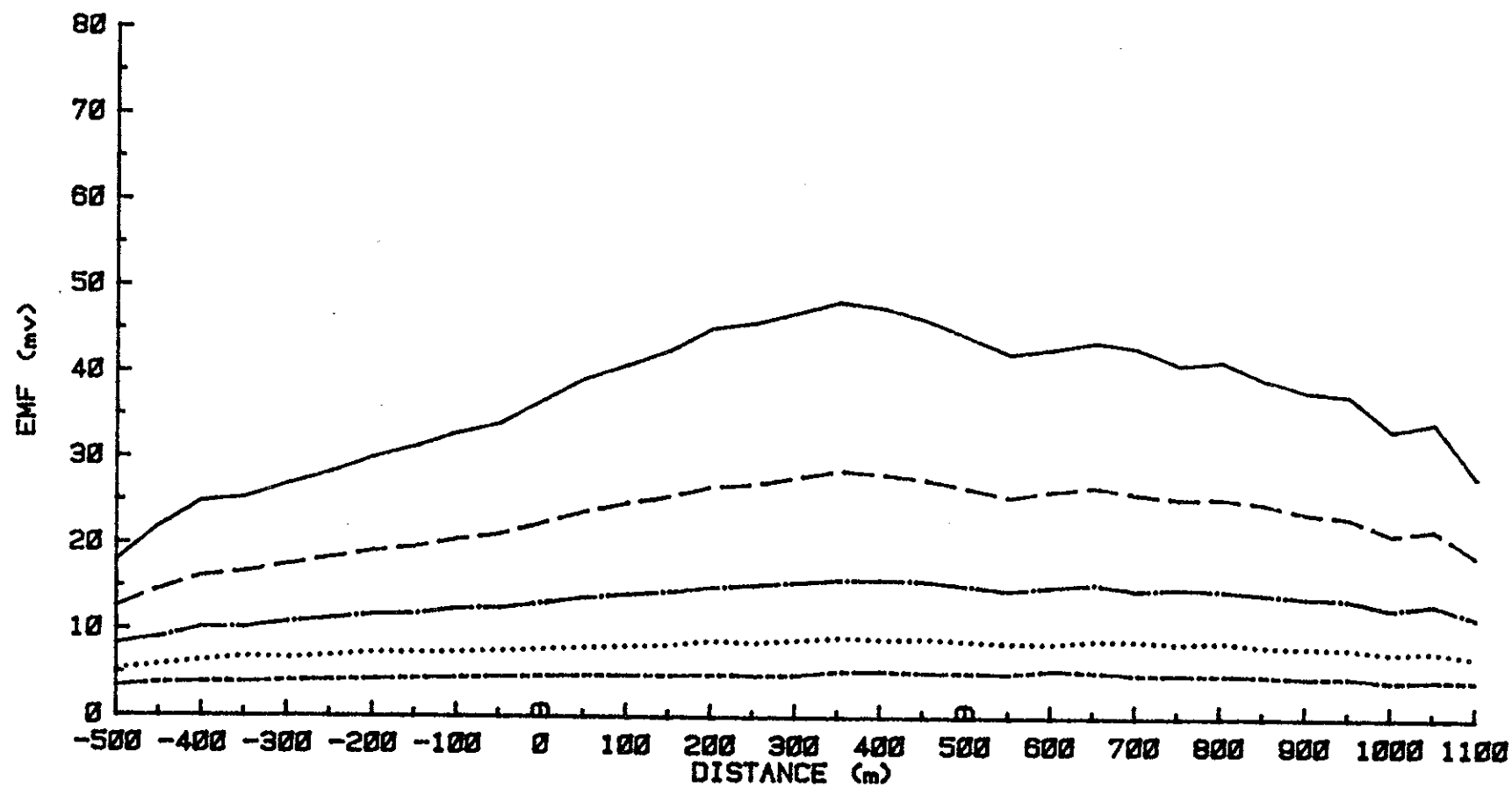
CHEVRON MT. MAHON

FILE 6-2

COMPONENT B_x LINE 6+00N

E84-03

FIGURE 60



CHANNEL	11	—————
CHANNEL	12	- - - - -
CHANNEL	13	- . - . -
CHANNEL	14	.....
CHANNEL	15	- - - - -

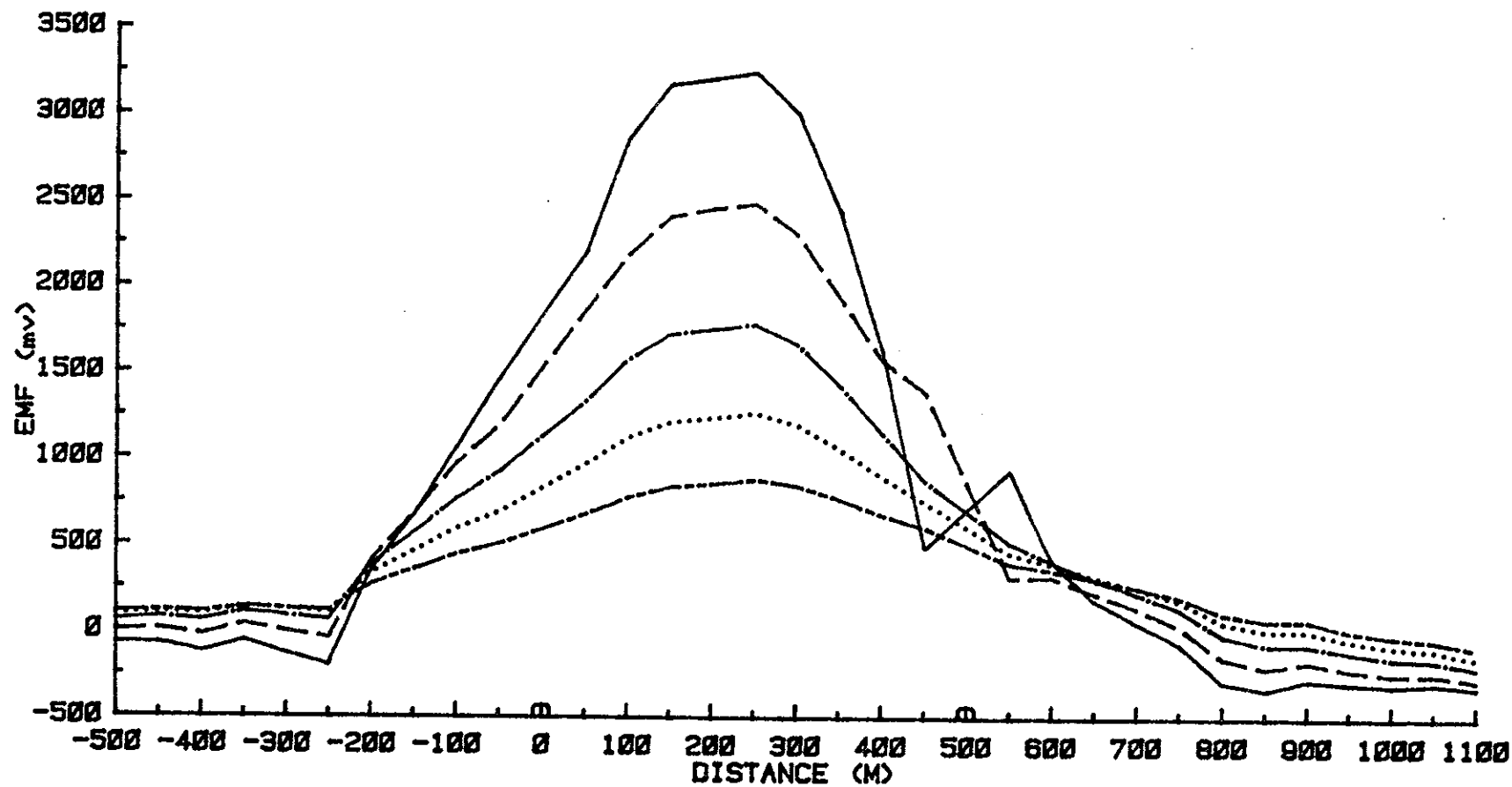
CHEVRON MT. MAHON

FILE 8-3

COMPONENT B_z LINE 8+00N

E84-03

FIGURE 6E



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	—————
CHANNEL	4	.....
CHANNEL	5	- - - - -

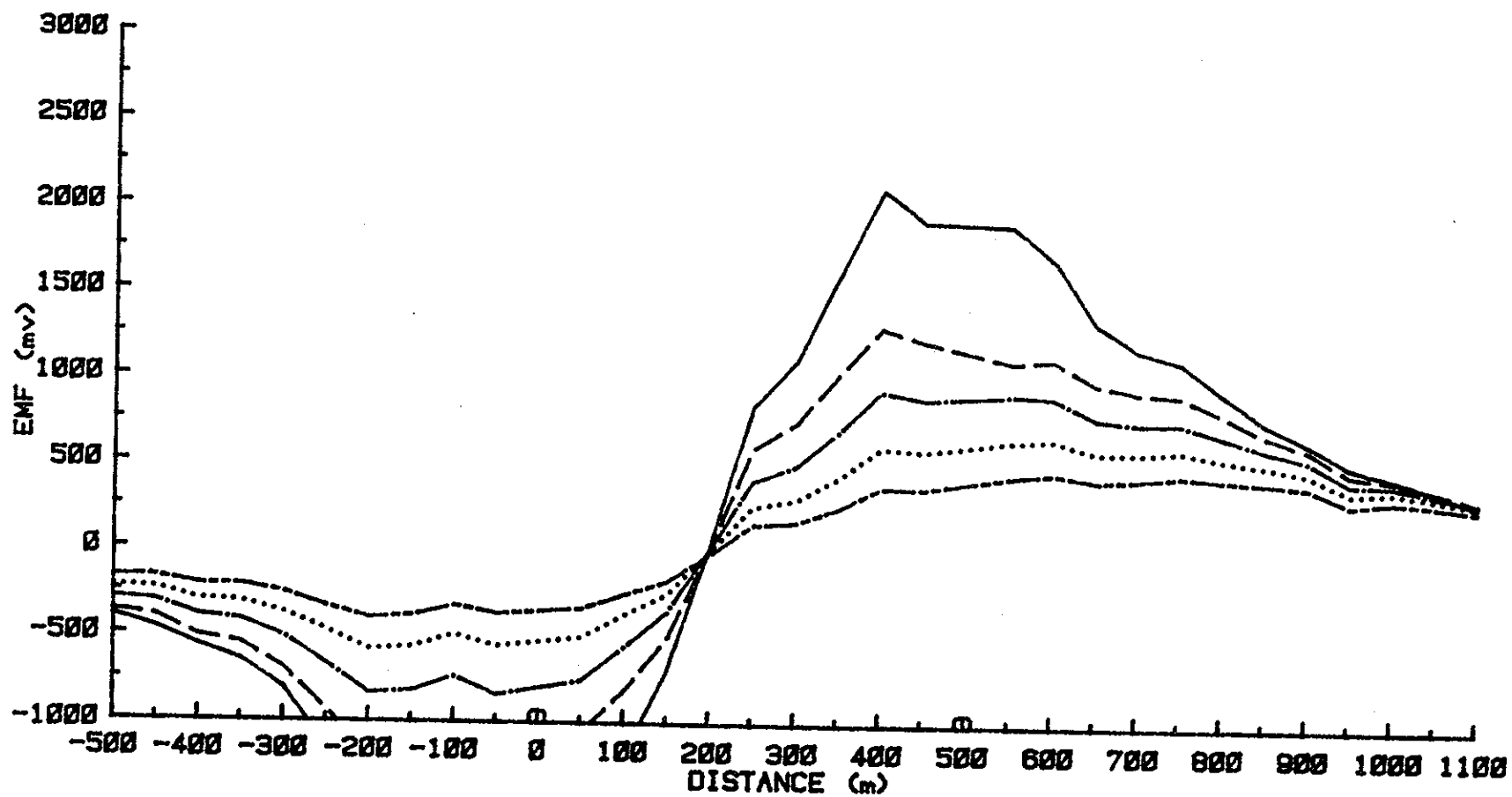
CHEVRON MT. MAHON

FILE 2-1

COMPONENT B_z LINE 2+00N

E84-03

FIGURE 7A



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	- . - . - .
CHANNEL	4	. . . . .
CHANNEL	5	- - - - -

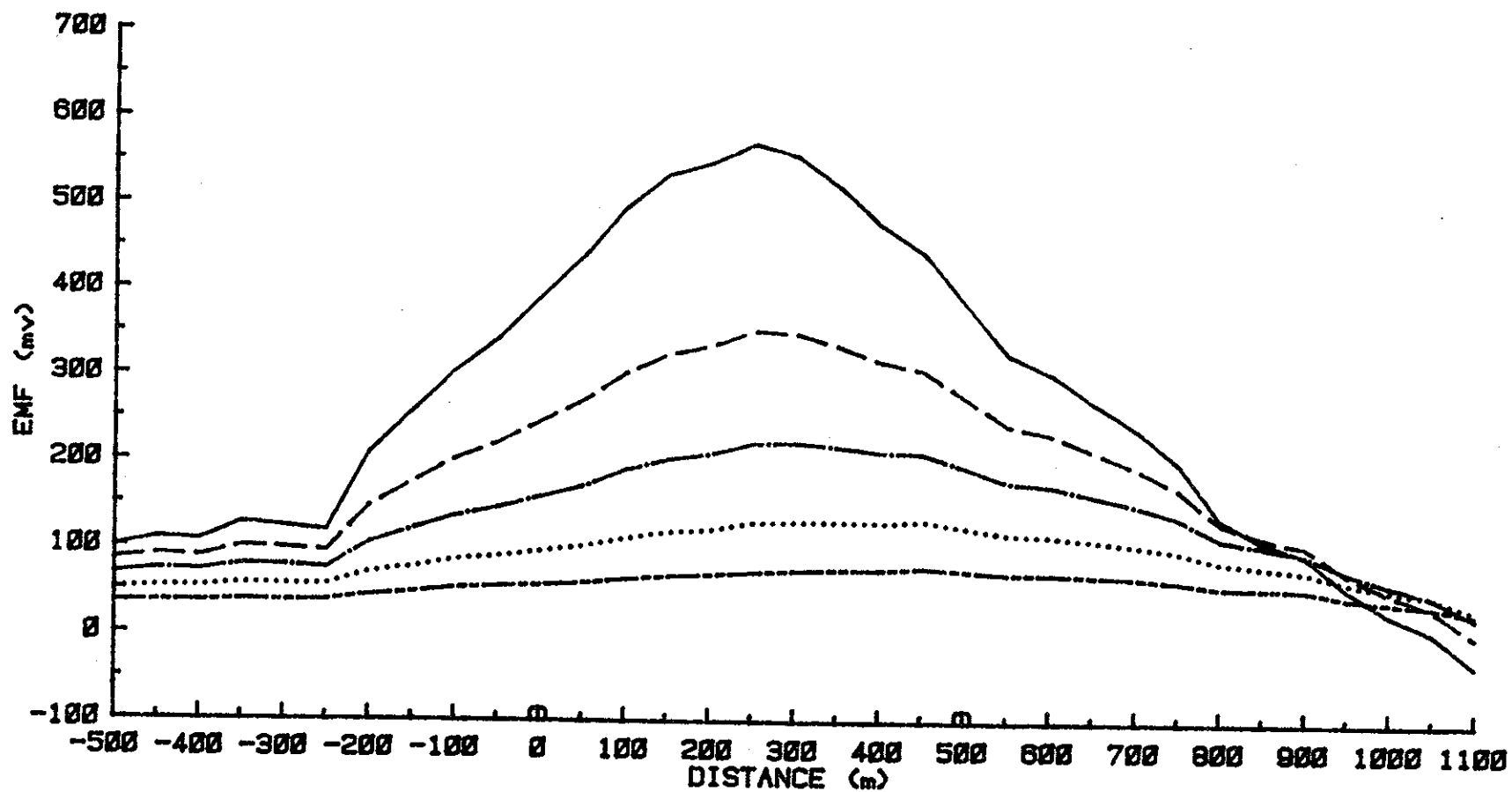
CHEVRON MT. MAHON

FILE 2-1

COMPONENT Bx LINE 2+00N

E84-03

FIGURE 7B



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	—————
CHANNEL	9	.....
CHANNEL	10	- - - - -

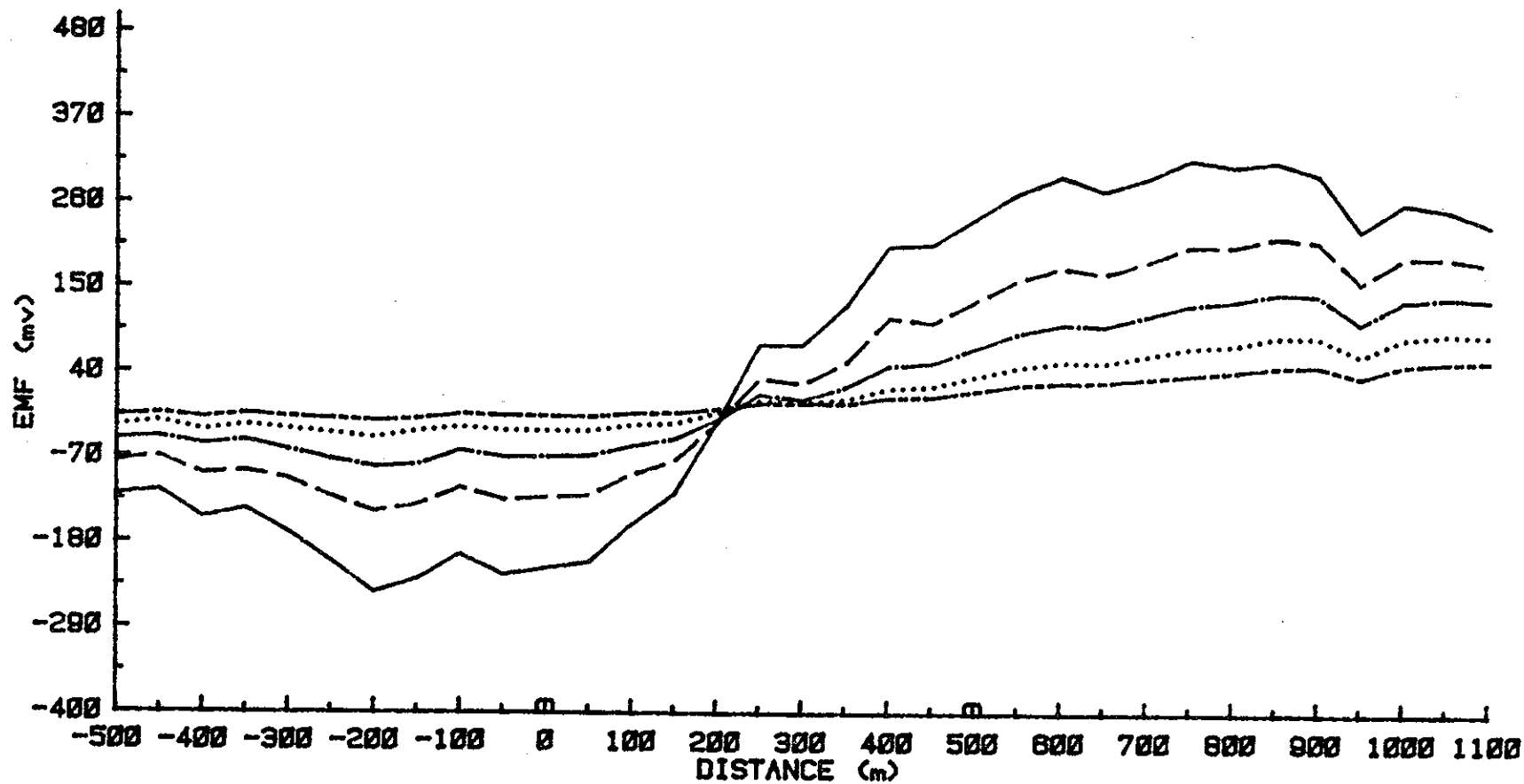
CHEVRON MT. MAHON

FILE 2-2

COMPONENT B_z LINE 2+00N

E84-03

FIGURE 7C



CHANNEL	6	_____
CHANNEL	7	_____
CHANNEL	8	_____
CHANNEL	9	_____
CHANNEL	10	_____

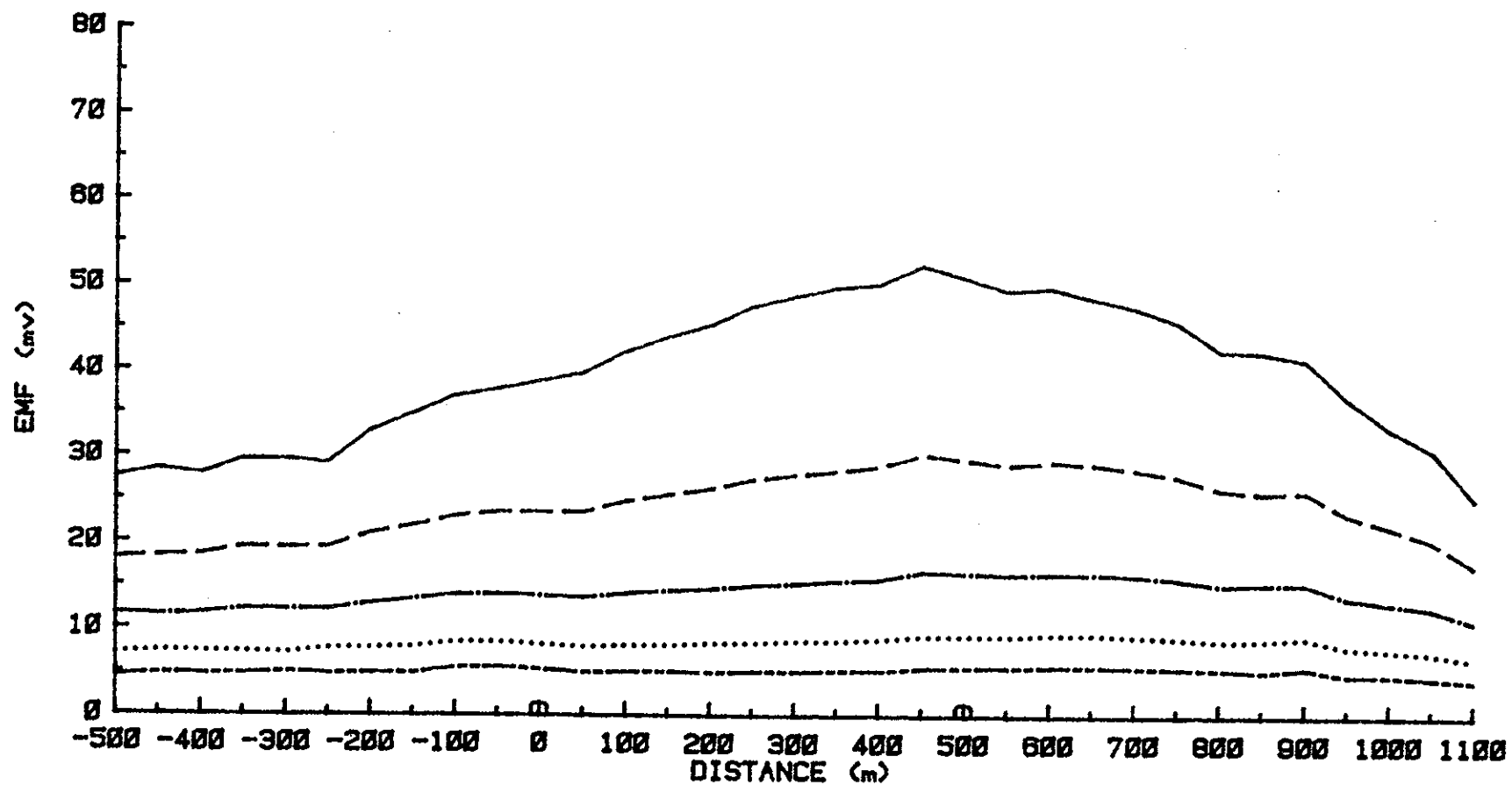
CHEVRON MT. MAHON

FILE 2-2

COMPONENT Bx LINE 2+00N

E84-03

FIGURE 7D



CHANNEL	11	—————
CHANNEL	12	- - - - -
CHANNEL	13	- . - . -
CHANNEL	14	. . . . .
CHANNEL	15	- - - - -

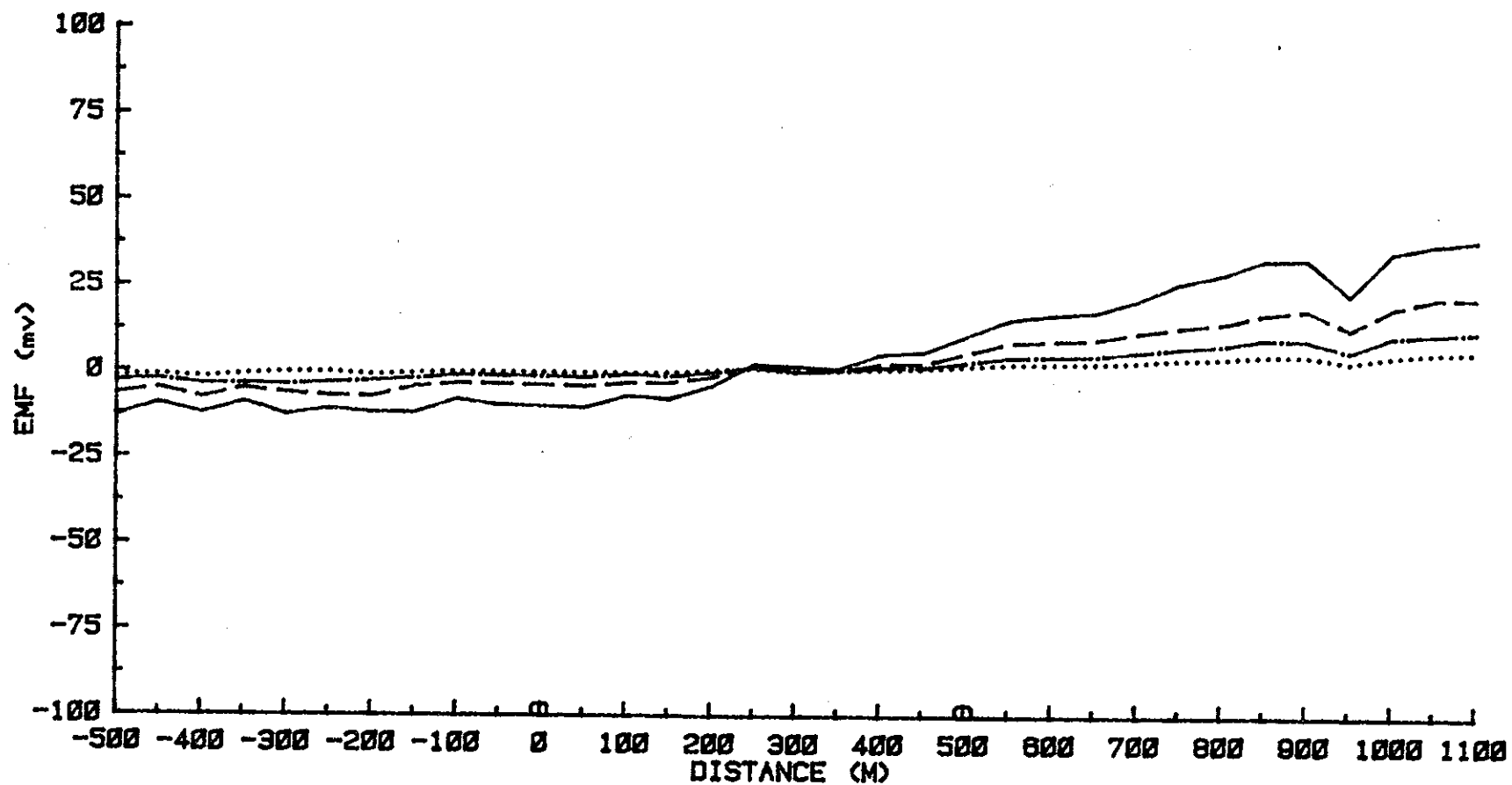
CHEVRON MT. MAHON

FILE 2-3

COMPONENT B_z LINE 2+00N

E84-03

FIGURE 7E



CHANNEL 11 _____
 CHANNEL 12 - - - - -
 CHANNEL 13 - . - . - .
 CHANNEL 14

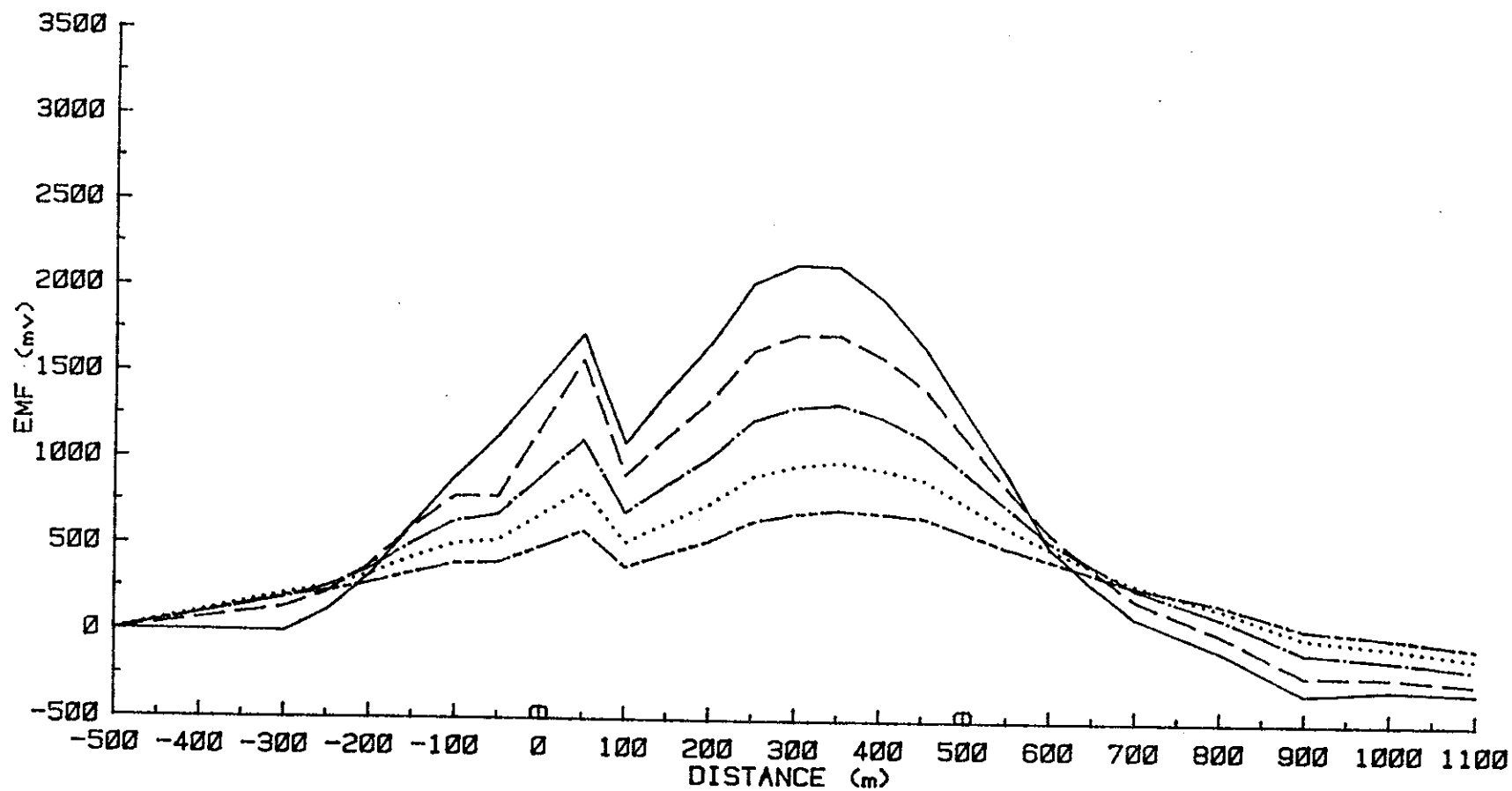
CHEVRON MT. MAHON

FILE 2-3

COMPONENT B_x LINE 2+00N

E84-03

FIGURE 7F



CHANNEL	1	—————
CHANNEL	2	- - - - -
CHANNEL	3	- . - . -
CHANNEL	4	.....
CHANNEL	5	- - - - -

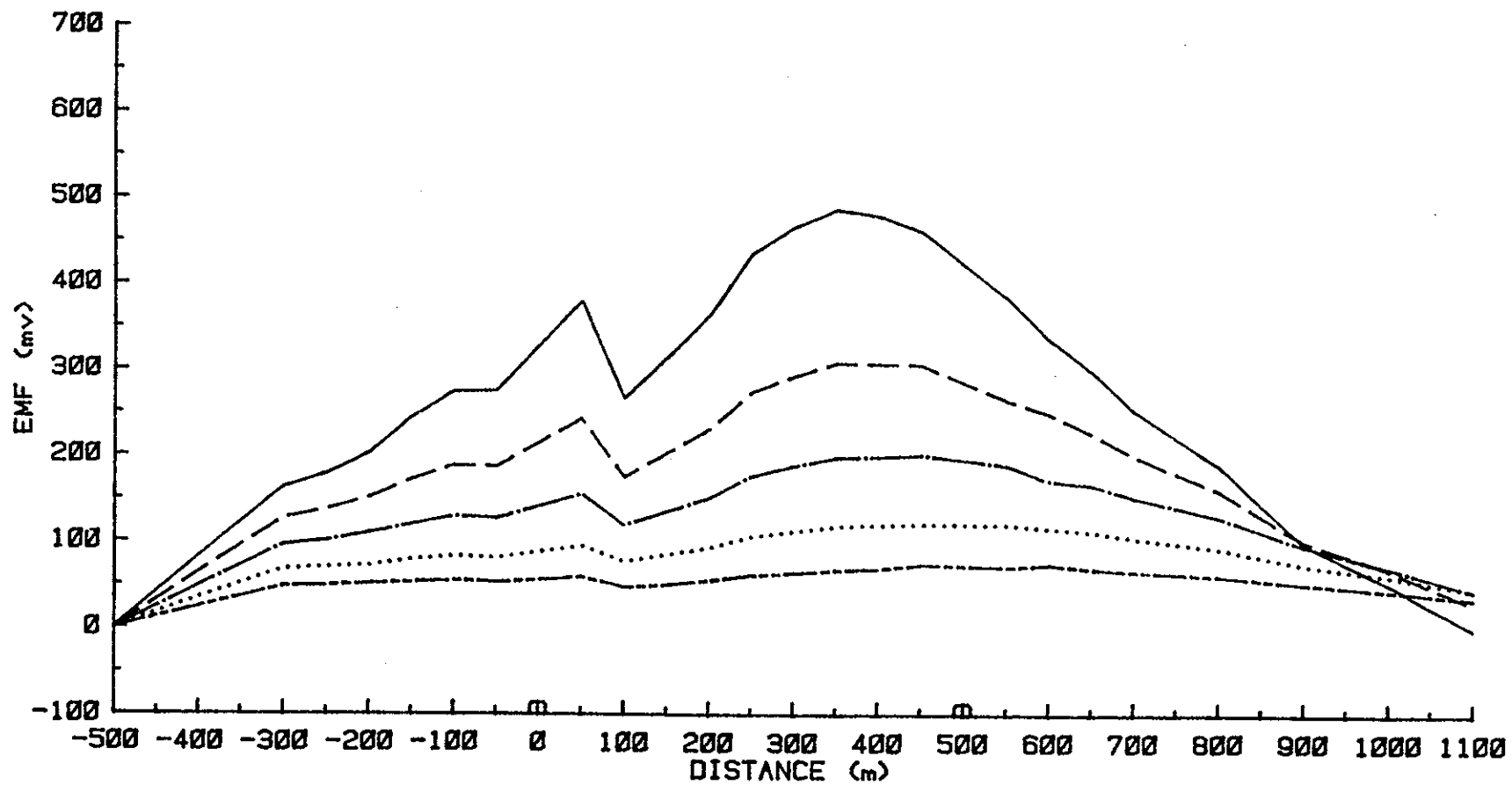
CHEVRON MT. MAHON

FILE 2S-1

COMPONENT B_z LINE 2+00S

E84-03

FIGURE 8A



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- . - . -
CHANNEL	9	. . . . .
CHANNEL	10	- - - - -

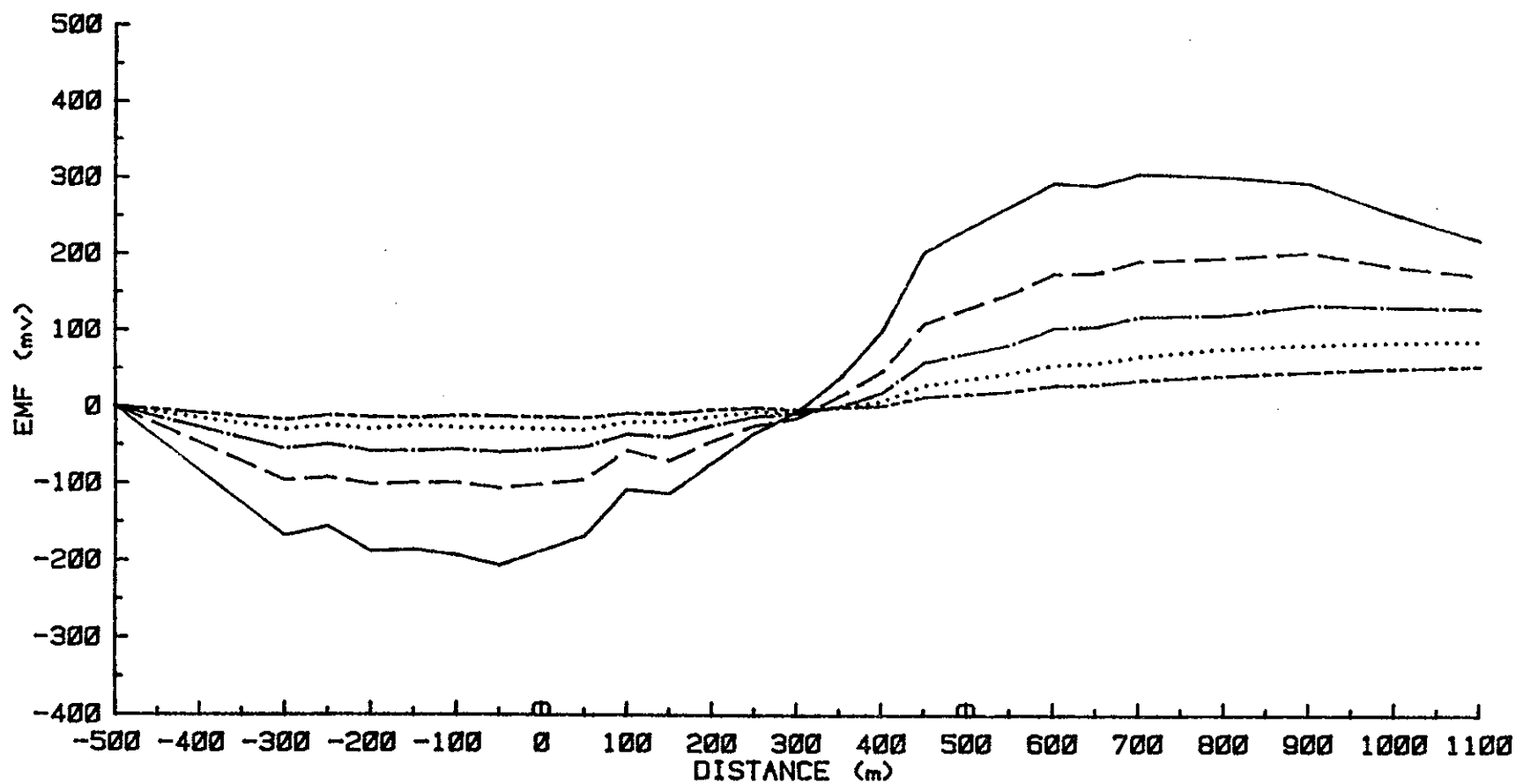
CHEVRON MT. MAHON

FILE 2S-2

COMPONENT Bz LINE 2+00S

E84-03

FIGURE 8C



CHANNEL	6	—————
CHANNEL	7	- - - - -
CHANNEL	8	- · - · -
CHANNEL	9	·····
CHANNEL	10	- - - - -

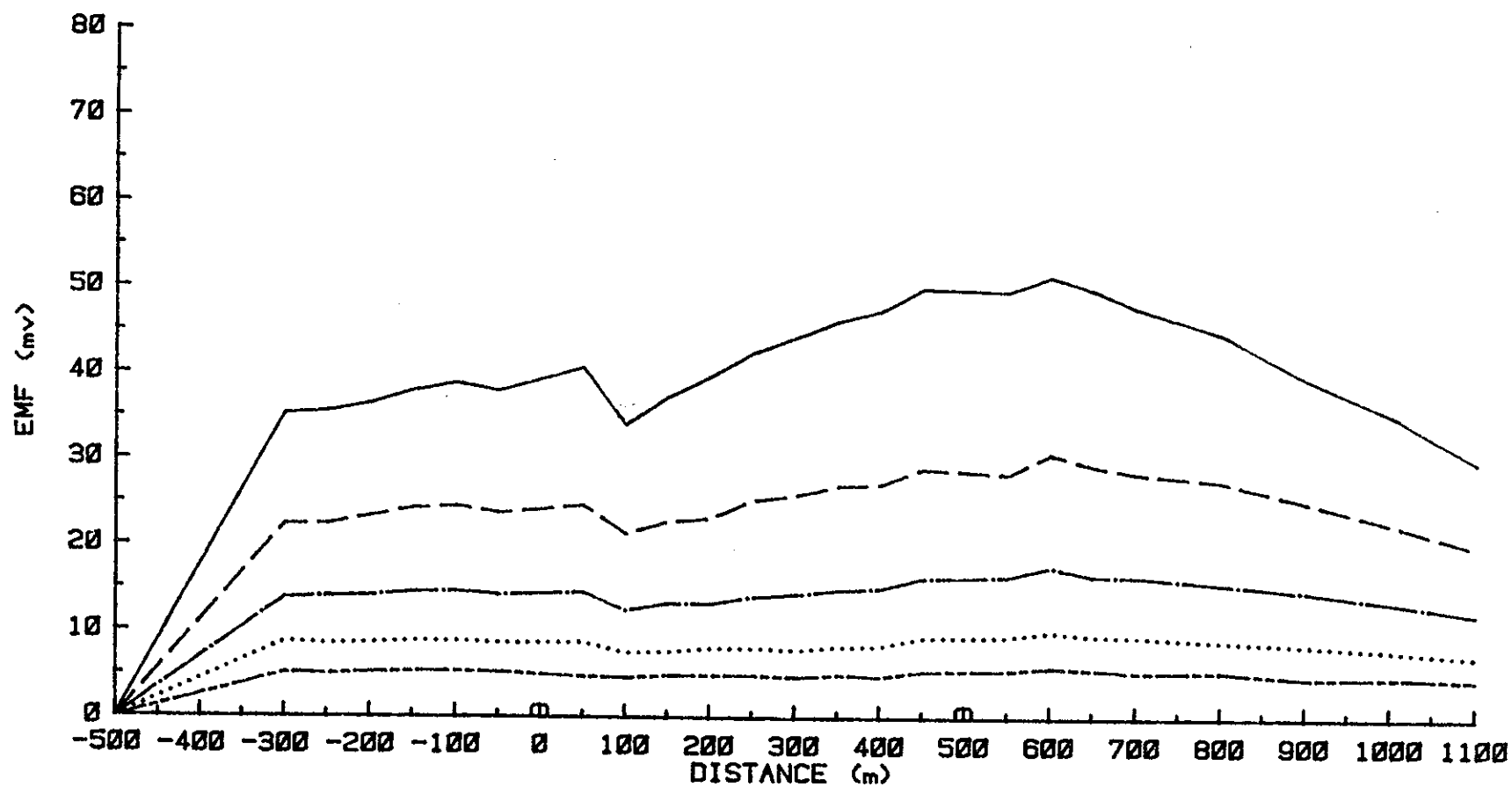
CHEVRON MT. MAHON

FILE 2S-2

COMPONENT Bx LINE 2+00S

E84-03

FIGURE 8D



CHANNEL	11	—————
CHANNEL	12	- - - - -
CHANNEL	13	· · · · ·
CHANNEL	14	· · · · ·
CHANNEL	15	—————

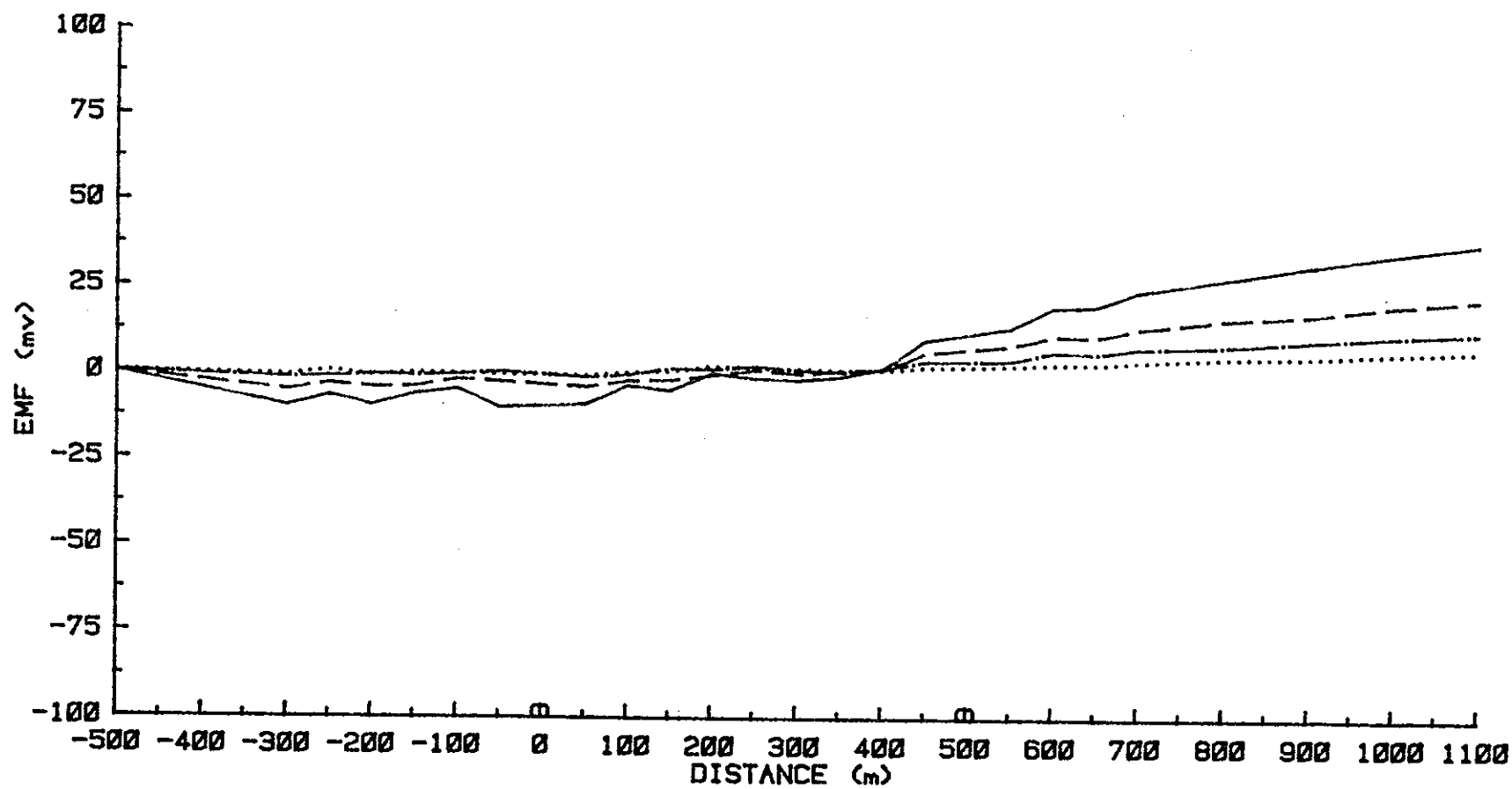
CHEVRON MT. MAHON

FILE 2S-3

COMPONENT Bz LINE 2+00S

E84-03

FIGURE 8E



CHANNEL 11 _____
 CHANNEL 12 - - - - -
 CHANNEL 13 - . - . - .
 CHANNEL 14

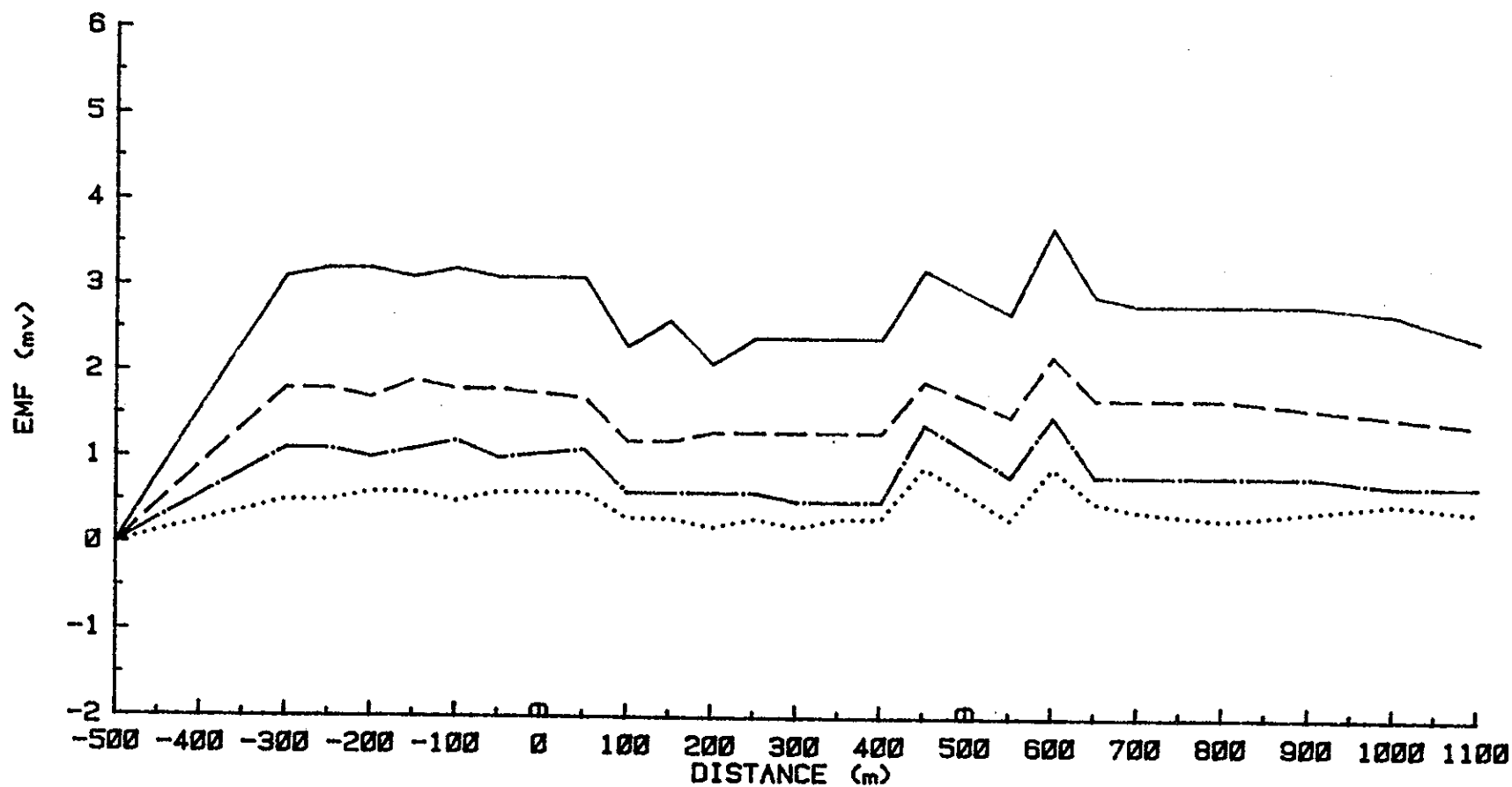
CHEVRON MT. MAHON

FILE 2S-3

COMPONENT Bx LINE 2+00S

E84-03

FIGURE 8F



CHANNEL	16	—————
CHANNEL	17	- - - - -
CHANNEL	18	- . - . -
CHANNEL	19	. . . . .

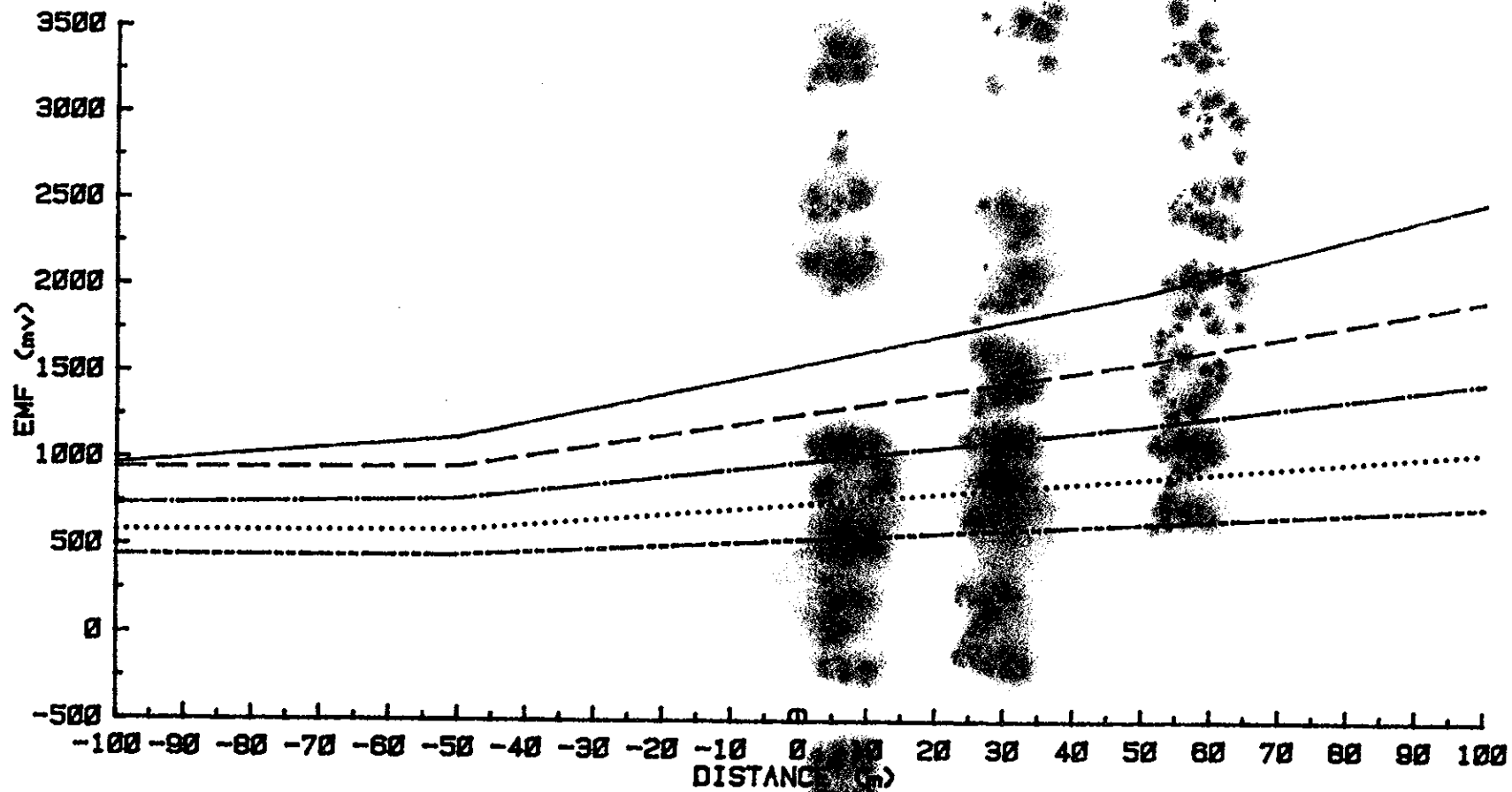
CHEVRON MT. MAHON

FILE 2S-4

COMPONENT B_z LINE 2+00S

E84-03

FIGURE 8G



CHANNEL	1	_____
CHANNEL	2	-----
CHANNEL	3	- . - . - .
CHANNEL	4	.....
CHANNEL	5	-----

CHEVRON MT. MAHON

FILE 0-1

COMPONENT Bz LINE 0+00

E84-03

FIGURE 9A