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PULSE ELECTROMAGNETIC AND AEROMAGNETIC SURVEYS

AT THE TENTH LEGION PROSPECT, WEST TASMANIA.

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CONTENTS

1. SUMMARY

A pulse electromagnetic test and low level high resolution aeromagnetic surveys were carried out at the Tenth Legion prospect near Zeehan in Western Tasmania. The surveys were intended to assist in geological mapping, to help evaluate geochemical bedrock sampling and to provide direct drilling targets.

2. CONCLUSIONS

Massive magnetite at Tenth Legion was mapped successfully by both the P.E.M. and aeromagnetic methods. Whilst the magnetite did give occasional ambiguous responses to E.M. there is no such ambiguity associated with its magnetic response.

Two major zones of magnetite were delineated. Aeromagnetics reflected the more massive nature of the northern magnetite horizon whilst P.E.M. uncovered moderate to good quality conductors in both zones.

3. RECOMMENDATIONS

a) The conductor on line 5700mE at 4710mN be drilled. Target depth should be 60m. A dip of approximately 77° to the south is postulated.

b) The conductor on line 5300mE at approximately 4400mN be further investigated - by drilling if possible. The target depth should be approximately 20 metres. A south dip is postulated but by no means definite.

c) close examination of the relationship between magnetite quality and tin mineralisation be made to guide future target delineation by P.E.M., and

d) a more detailed interpretation of the aeromagnetics be done with a view to defining structural detail in relation to mineralisation.

4. GEOLOGY

The geology and mineralisation of the Tenth Legion prospect is covered in detail by G.Broadbent in CRAE Report No.10785.

5. P.E.M. SURVEY

Selected lines on the prospect were surveyed with the Crone Pulse E.M. time domain electromagnetic system. The survey was conducted from the 24th to 31st of August, 1981, by Crone Geophysics Ltd, utilising the DEEPEM mode (i.e. large transmitter loop with small roving receiver). Three loop set-ups were used,these are indicated in Plan TASh 955 together with the geology. Station spacing was 25 or 50 metres. Both the vertical (Hz) and horizontal (Hx) components of the secondary field were sampled.

Field data is attached. The data is normalised to the maximum primary field and is, therefore, dimensionless. To convert to volts per amp, the following instrument channel gains should be applied:

Channel	Multiplier
1 (300 microsec)	100
2 (600 microsec)	71.9
3 (1100 microsec)	51.0
4 (1800 microsec)	37.3
5 (2900 microsec)	27.0
6 (4800 microsec)	19.3
7 (8000 microsec)	13.9
8 (12800 microsec)	10.0

and the result normalised to 18 Amps.

The conductivity thickness can also be calculated directly from the data by taking successive data in the following way:

$$\begin{aligned}
\text{Conductance} &= 2.09 / (\log S_1 - \log S_2 + 0.14) \\
&= 3.48 / (\log S_2 - \log S_3 + 0.14) \\
&= 4.88 / (\log S_3 - \log S_4 + 0.14) \\
&= 7.67 / (\log S_4 - \log S_5 + 0.14) \\
&= 13.2 / (\log S_5 - \log S_6 + 0.14) \\
&= 22.3 / (\log S_6 - \log S_7 + 0.14) \\
&= 33.4 / (\log S_7 - \log S_8 + 0.14)
\end{aligned}$$

where S is the system reponse for channels 1 to 8.

A line by line discussion of the data follows.

5.1 LOOP SET-UP 1

Line 5100mE

No significant responses occur on this line (Plan TASh 589). The horizontal component (Hx) implies the presence of magnetite between 4300mN and 4500mN, whilst the large responses in the first two channels of the vertical field (Hz), implies the presence of conductive overburden, with a poor quality conductor or contact occurring at 4550mN.

Line 5280/5300mE

No significant anomalous responses are present. Both Hx and Hz fields suggest a steep southerly dipping lithology with magnetite present to the south of 4550mN (Plan TASh 588 and 590).

Line 5400mE

The line is dominated by a magnetite - type response south of 4450mN. Conductive overburden is associated with the magnetite occurrence. Transmitter loop wire at 4400mN causes the large responses seen there. (Plans TASh 600 and 599).

Line 5500mE

A well defined four channel anomaly occurs in both components at 4300mN. The Hx component suggests a magnetite source. A conductance of 13 Siemens is evident. The time constant for the decay curve is 0.6 msec giving a conductance of 19 Siemens if an infinite vertical sheet is assumed. This compares well with the 13 Siemens derived from Crone's conductance formula.

The source is considered to be shallow (Plans TASh 586 587 and 956).

The response at around 4900mN is proportional to $t^{-2.4}$ which is a homogeneous half-space response at later time ($t^{-2.5}$ is the theoretical response).

Line 5700mE

No significant responses occur on this line; those evident being due to the magnetite response at 4565mN. A steep southerly dip is postulated. (Plan TASh 595).

5.2 LOOP SET-UP 2

Line 5300mE

A shallow conductor of 9 Siemens occurs at 4400mN. The time constant (1.1 msec) and the negative character of the Hx field suggests a sub-massive magnetite source. (Plan TASh 593).

Line 5400mE

The conductor outlined on line 5300mE continues on this line at 4325mN. The conductance has increased to 13 Siemens. It still appears to be shallow and magnetite caused. (Plan TASh 592).

Line 5500mE

The conductor continues from line 5400mE. Its conductance remains at 13 Siemens. Here it is situated at 4325-4350mN, a northerly dip is interpreted but not with much certainty. (Plan TASh 598)

5.3 LOOP SET-UP 3

Lines surveyed with this set-up mapped out an excellent quality, continuous, non-polarized conductor.

Line 5700mE

Data curves for this line are shown in Plan TASh 594. These indicate that, whilst the anomaly was not completely covered (due to the proximity of the loop), a strong cross-over in the vertical component and positive response in the horizontal component is evident through to the late time channels (channel 7 or 8).

Decay proportionalities for this anomaly vary between $t^{-1.9}$ at 4615mN to $t^{-1.3}$ at 4665mN reflecting a change from a homogeneous earth on the flanks of the anomaly to a discrete conductor at the peak of the anomaly. A plot of the transient decay curve for station 4715mN is shown in Plan TASh 957. The bi-modal nature of the Hz curve suggests that conductive overburden does exist and that the conductive zone is in contact with it causing signal enhancement to occur in the first channel.

The Vector Method of determining the induced eddy current paths was applied to this data. The method is simply to reconstitute the field vector from the horizontal and vertical components. This vector will, like the data, be dimensionless. Results of applying the method is shown in TASh 673. Resultant current path positions indicate:

i) ground resistivities are relatively high with localized conductive overburden occurring above the conductive zone as shown by channel 1 and 2 data,

ii) the conductive zone is well defined as indicated by the restricted nature of the current paths at all times (channels), and,

iii) the conductor is of good quality, becoming more conductive at the core as indicated by the shrinking of the current paths as they move into a more conductive core, and the persistance through time of those currents.

Conductances range from 4 Siemens at surface to 53 Siemens at depth. The average is around 33 Siemens.

Line 5600mE

Data curves for this line are shown in Plan TASh 597. Again the anomaly was not completely covered due to loop proximity, however, the anomaly is still evident in both components to channel five. The centre of the anomaly is postulated to be at around 4750mN.

The decrease in decay time constants, as evidenced by the decay curve at 4725mN (Plan TASh 958), is associated with a decrease in conductor quality. The induced eddy current position diagram (Plan TASh 672) shows in fact that the conductor here is much shallower and weaker - possibly the western end of an easterly plunging conductive zone.

A complicating factor on this line is the presence of massive magnetite and its effect on horizontal component measurements. The trail of current paths going off to the west in Plan TASh 672 is due to this magnetite. The negative horizontal component response of the magnetite was treated as being positive and (arbitraryily) given a 180 degree phase rotation.

Line 5500mE

Data curves for this line are shown in Plan TASh 596. As in the previous two lines the anomaly is still well defined in both components of the data. The centre of the anomaly is at 4775mN. A secondary anomaly is discernable at 4875mN, whilst negative horizontal component responses occur at the northern end of the line.

The range of decay time constants (-2.5 to -1.8) suggests that the anomalous zone is rapidly approaching a homogeneous half-space. Nonetheless, the vector diagram Plan TASh 671 does indicate a zone of low quality conductivity.

This is congruous with the halo of disseminated material which would be expected at the ends of a pinching out massive mineralised zone or a "sideward looking" effect.

5.4 P.E.M. GENERAL

The P.E.M. survey delineated two significant conductor axis and numerous minor responses.

On lines 5500mE to 5700mE loop set-up 3 defined an excellent quality conductor which appears to be associated with the contact between a calc-silicate sequence and siltstones and shales. The small anomaly on line 5500mE at 4875mN may also be associated with a similar contact there. The dip of these host rocks is northerly - in contradiction to the apparent southerly dip postulated for the conductor on line 5700mE.

It should be pointed out that this dip is derived from current positions reflecting the most conductive sections of the zone. This may be a shear direction or any trend in the zone transgressive to bedding. Thus there is no reason to believe it describes the actual dip of the conductor. Numerical modelling would have to be done in some detail to determine true dip.

The aspect of line 5500mE to the transmitted loop degrades the strength of the primary field on that line. If a conductor is present it would not be as well "illuminated" as if on lines 5600mE and 5700mE. On the other hand, if the interpreted plunge is true, there would no reason to expect the conductor to continue on line 5500mE.

The conductor trace spanning lines 5300mE to 5500mE (loop set-up 2) cannot be as easily attributed to any geologic feature, although, it does seem to reside wholly within a magnetite sequence.

A major problem encountered in the interpretation of this survey was the electrically polarizable nature of magnetite. Whilst in most cases this led to a negative response in the Hx field, there are examples of positive responses.

For example, magnetite has been mapped at 4250mN, line 5500mE and 4840mN, line 5500mE; the former gives a negative Hx anomaly, the latter a positive Hx anomaly.

In general, however, it can be stated that, together with magnetic data, P.E.M. can define the occurrence of magnetite and give clues as to its quality. If good tin mineralisation is associated with massive magnetite development, then the P.E.M. method has provided two well-defined targets for follow-up. If tin mineralisation is not controlled by magnetite development, this data will have to be re-assessed.

6. AIRBORNE MAGNETIC SURVEY

A ground magnetic survey, carried out over the entire grid, resulted in very noisy data. Ubiquitous magnetite scree smeared out the anomalous responses attributed to the magnetite horizons leading to ambiguous interpretations.

In an endeavour to faithfully map the distribution of these magnetite horizons, and because of the presence of a contractor in the vicinity, it was decided to fly the prospect with aeromagnetics.

6.1 Survey Specifications

Geoex Pty.Ltd. was contracted to fly the survey. A Cessna 185E (VH-ESE) aircraft with a Sonotek IGSS1 installation was employed. Nominal aircraft speed was 100 knots, altitude being 70 metres with the magnetometer bird at 33 metres. The magnetometer cycle rate was 0.8 seconds, and had an accuracy and resolution of 1.0 nanoTeslas. Flight line spacing was 100 metres in a magnetic north-south direction, but due to a contractors error, an east-west oriented survey was also flown. Approximately 15 line kilometres was flown in each of the surveys. Both sets of data are presented (Plans TASh 601 to 606). The survey was flown on the 18th December, 1981.

6.2 Comparison Between the Two Data Sheets

The appearance of the total magnetic intensity contour map will be heavily dictated by the distribution of data points. Data collected along a line will act as a two-dimensional filter as gradients are well defined along the line, but poorly defined across the line (when adjacent lines are considered). Gross features are therefore expected to remain identical for both data sets, but with differences in the more "subtle" features.

The north-south data set appears to be of superior quality due to the flight lines being approximately orthoganal to local strike directions. Line spacing was also far more consistant (cf.plans TASh 603 and TASh 606). Control on anomaly closure is thus much higher on the north-south data set. For example, the relatively simple high located at 356750mE, 360500mN on the north-south data set (Plan TASh 601) is well mapped by the flight lines,yet on the east-west data set, (Plan TASh 604) flight lines are irregularly distributed leading to a confused set of anomalies.

Positioning of anomaly centres also appears to be a problem associated with data point distribution. Shifts in anomalies of up to 135m between the two contour maps have been noted.

7. INTERPRETATION

The aeromagnetic survey has mapped out the occurrence and attitude of the massive magnetite horizons. The survey indicates that -

1. the discrete zones of magnetite occur in the survey area,
2. the southern zones constitutes a folded sequence with an east-west axis. This fold is interpreted as being anticlinal with a westerly plunge,
3. the northern zone parallels the northern limb of the afore-mentioned fold. From magnetic intensities, it appears that this zone is more massive than the southern zone,
4. complex faulting is noted in both zones.

8. MODELLING

The northern zone was forward modelled using a simple 2D dyke model with limited depth extent. The result indicates a steep (80°) northerly dipping body with a width of 95m. Depth extent is approximately 300 metres, although this parameter is usually unreliable. The body is modelled as being outcropping. A magnetic susceptibility of 0.85 S.I. indicates the body to have an equivalent magnetite content in excess of 25%.

Modelling of the two bodies making up the limbs of the fold indicates that the northern limb also has a dip of 80° to the north, whilst the southern limb has a dip of 75° to the south. Both of these bodies have a magnetic susceptibility of approximately 0.45 S.I. - being roughly equivalent to 12% magnetite by volume.

Once again, if tin mineralisation is associated with magnetite volume then it would appear that the northernmost magnetite zone is more prospective.

9. MAGNETIC SUSCEPTIBILITIES AND REMANENCE

Six core samples of massive magnetite from four drill holes were submitted to the Division of Mineral Physics at the C.S.I.R.O. Magnetic susceptibilities and remanent magnetisation measurements were carried out on them. Results are attached.

Although there appears to be some scatter in the remanence directions, possibly due to misorientation of core, the dominant north-east trend is obvious in the declination data. This matches relatively well with the earths present field. The inclinations of the remanence also approximates the present field. Even though the Koenigsberger ratio is high, the results from modelling would tend to be reliable.

An interesting observation is the high magnetic susceptibilities measured from these core samples.

The range of 0.34 S.I. (0.0271 cgs) to 3.81 S.I. (0.3032 cgs) is far in excess of the 0.425 S.I. to 0.85 S.I. derived from modelling. Any remanence usually enhances the apparent susceptibility; the discrepancy is obviously due to micro/macro differences.

Unfortunately samples could not be collected from around the fold; only the southern limb was sampled. Yet declination directions appear to be relatively constant from the south limb of the fold to the northern magnetite horizon, suggesting the last magnetisation event was post - deformation.

10. KEYWORDS

Geophysics, Pulse E.M., magnetics airborne.

11. LOCALITY

Queenstown SK55-5 1:250 000 map sheet.

12. LIST OF PLANS

TASh No.	Title	Scale
586	Tenth Legion P.E.M. Survey Line 5500mE (Loop 1) Part A	1:5000
587	Line 5500mE (Loop 1) Part B	"
588	Line 5300mE (Loop 1)	"
589	Line 5100mE (Loop 1)	"
590	Line 5280mE (Loop 1)	"
591	Line 5600mE (Loop 1)	"
592	Line 5400mE (Loop 2)	"
593	Line 5300mE (Loop 2)	"
594	Line 5700mE (Loop 3)	"
595	Line 5700mE (Loop 1)	"
596	Line 5500mE (Loop 3)	"
597	Line 5600mE (Loop 3)	"
598	Line 5500mE (Loop 2)	"
599	Line 5400mE (Loop 1) Part B	"
600	Line 5400mE (Loop 1) Part A	"
601	Tenth Legion Contours N-S	"
602	Tenth Legion Stacked Profiles N-S	"
603	Tenth Legion Flight Paths N-S	"
604	Tenth Legion Contours E-W	"
605	Tenth Legion Stacked Profiles E-W	"
606	Tenth Legion Flight Paths E-W	"
671	Tenth Legion Pulse E.M. Deepem Method induced E.C.P. positions line 5500E	1:2500

LIST OF PLANS(CONTINUED)

672	Tenth Legion Pulse E.M. Deepem Method Induced E.C.P. Positions Line 5600E	1:2500
673	Tenth Legion Pulse E.M. Deepem Method Induced E.C.P. Positions Line 5700E	"
955	Loop Positions/Geology	1:5000
956	5500mE/4300mN Loop 1 Decay Curve	As shown
957	5700mE/4715mN Loop 3 " "	"
958	5600mN/4726mN Loop 3 " "	"

13. LIST OF ATTACHMENTS

Attachment 1. Tenth Legion P.E.M. Data

Attachment 2. Magnetic Susceptibility and Remanence Measurements

ATTACHMENT 1

TENTH LEGION P.E.M. DATA

DEEP.E.M. SURVEY TENTH LEGION PROSPECT

ZEEHAN AREA, TASMANIA

Transmitter Loop Locations:-

Loop 1	(200m x 400m) :	5200mE, 4412mN to 4625mN 5600mE, 4412mN to 4650mN
Loop 2	(100m x 100m) :	5400mE, 4525mN to 4637mN 5500mE, 4550mN to 4650mN
Loop 3	(100m x 100m) :	5600mE, 4800mN to 4900mN 5700mE, 4800mN to 4895mN

Receiver Loop: 0.55m x 0.15m Roving

Gain for all lines : 800

Time Base : 20msec

Mid points of Channels in microseconds:

1 - 300
2 - 600
3 - 1100
4 - 1800
5 - 2900
6 - 4800
7 - 8000
8 - 12800

TENTH LEGION P.E.M. SURVEY

Line 5100mE

Tx: 200m x 400m (Loop 1)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4250mN	4	60	55	34	18	7	2	1			(No Sync)					
4300mN	-50	52	54	35	18	6	1	0	-110	-58	-26	-12	-8	-4	0	0
4350mN	-78	32	46	32	18	7	2	1	-120	-46	-11	-2	-2	-1	0	0
4400mN	-150	10	44	33	18	8	2	0	-240	-72	-10	4	3	1	0	0
4450mN	-36	44	48	32	18	7	2	0	-200	-43	4	10	9	4	1	0
4500mN	-150	21	48	35	19	8	2	1	-210	-31	0	9	6	2	1	0
4550mN			(No Sync)								(No Sync)					
4600mN			(No Sync)								(No Sync)					
4650mN	340	130	35	15	6	3	1	0	-32	24	24	15	6	2	0	0
4700mN	260	100	36	16	6	2	0	0	40	40	25	15	5	0	0	0
4750mN	300	120	37	16	5	2	0	0	46	36	21	11	5	2	0	0
4800mN	220	110	37	16	6	3	1	0	180	85	39	19	9	4	2	1

TENTH LEGION P.E.M. SURVEY

Line 5280-5300mE

Tx: 200m x 400m (Loop 1)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
3900mN	-90	-11	14	10	3	0	0	0	-30	-60	-60	-34	-20	-8	-3	-1
3950mN	-85	15	40	30	14	5	1	0	-70	-70	-60	-30	-20	-7	-2	0
4000mN	-80	39	60	40	18	7	2	1	-80	-70	-60	-30	-17	-6	-2	0
4050mN	-58	52	64	40	18	6	1	0	-70	-60	-40	-25	-13	-7	-2	0
4100mN	-63	55	68	45	21	9	3	1	-68	-58	-35	-22	-10	-5	-1	0
4150mN	-90	47	65	44	21	9	2	1	-60	-50	-31	-20	-10	-5	-1	0
4200mN	-210	6	54	43	22	9	2	0	-60	-49	-30	-19	-10	-5	-2	-1
4250mN	-420	-69	39	40	25	13	6	3	-210	-108	-40	-17	-9	-4	-1	0
4300mN	-430	-42	52	48	28	13	5	2	-610	-250	-75	-25	-10	-4	-2	0
4350mN	-280	20	80	64	36	16	6	3	-900	-340	-78	-15	-3	0	0	0
4400mN			(Loop Wire)								(Loop Wire)					
4450mN	950	400	140	44	16	5	0	0	-440	-180	-28	5	6	5	3	0
4500mN	1000	440	150	45	17	5	0	0	-79	-29	8	10	9	5	2	1
4550mN	950	400	140	43	15	4	0	0	160	65	36	18	9	4	1	0
4600mN			(Loop Wire)								(Loop Wire)					
4650mN	610	250	78	30	12	6	1	0	290	150	53	24	10	5	2	1
4700mN	490	200	66	27	11	4	1	0	250	140	54	25	11	5	1	0
4750mN	440	170	54	21	9	4	0	0	195	95	43	20	9	4	0	0
4800mN	440	160	50	19	8	4	0	0	240	130	50	24	10	5	1	0
4850mN	400	150	40	15	6	1	0	0	300	145	50	22	10	5	1	1
4900mN	110	55	25	10	4	3	1	0	360	150	41	18	9	4	0	0

TENTH LEGION P.E.M. SURVEY

Line 5400mE

Tx: 200m x 400m (Loop 1)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
3850mN	-31	9	11	6	1	0	0	0	-28	-38	-36	-39	-21	-10	-5	-2
3900mN	-84	8	26	19	8	4	0	0	-21	-65	-65	-46	-28	-12	-6	-3
3950mN	-30	34	50	34	16	7	3	2	-44	-75	-70	-46	-26	-11	-5	-1
4000mN	-95	40	65	45	23	10	4	2	-44	-65	-61	-42	-26	-13	-3	-3
4050mN	-90	40	68	50	27	11	4	2	-48	-38	-30	-34	-21	-10	-6	-2
4100mN	-96	38	71	54	30	15	5	4	-38	-41	-37	-26	-16	-8	-4	0
4150mN			(No Sync)								(No Sync)					
4200mN	-350	-50	50	49	30	13	5	3	-140	-75	-43	-26	-15	-7	-4	0
4250mN	-500	-95	60	60	34	20	7	3	-310	-150	-63	-30	-15	-5	-2	0
4300mN	-370	-60	58	56	35	16	6	3	-960	-395	-99	-25	-6	-1	-1	0
4350mN	740	340	160	76	38	16	5	3	-1700	-660	-150	-11	5	5	0	0
4400mN			(Loop Wire)								(Loop Wire)					
4450mN	1100	650	245	84	35	15	5	2	-190	-73	-8	9	6	4	0	0
4500mN	1010	500	200	71	30	11	3	0	74	50	31	17	8	3	0	0
4550mN	880	410	155	64	29	11	0	0	170	105	50	24	10	4	0	0
4600mN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4650mN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4700mN	560	230	71	28	11	5	3	0	290	155	64	32	12	9	4	1
4750mN	360	150	43	16	6	3	0	0	250	135	54	26	12	5	0	0
4800mN	640	245	73	32	19	10	4	0	540	195	54	23	12	6	3	1
4850mN	250	150	65	30	15	8	4	1	260	75	15	5	2	1	0	0

TENTH LEGION P.E.M.SURVEY

Line 5500mE

Tx: 200m x 400m (Loop 1)

Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4150mN	-210	-15	60	36	36	20	9	5	-110	-75	-49	-31	-19	-9	-4	-1
4200mN	-300	-43	62	62	41	22	11	6	-200	-110	-30	-24	-11	-4	0	0
4250mN	-340	-53	65	66	45	23	10	4	-360	-280	-86	-28	-10	-2	0	0
4300mN	-68	72	100	80	49	25	10	6	-1000	-450	-120	-25	-6	0	0	0
4350mN	860	300	220	90	48	21	9	4	-950	-440	-110	-20	-4	0	0	0
4400mN			(Loop Wire)									(Loop Wire)				
4450mN	1000	600	250	100	52	25	13	9	-250	-36	3	13	12	9	4	2
4500mN	900	300	200	88	46	20	9	5	25	56	40	23	16	9	4	0
4550mN	770	400	160	70	34	16	6	2	120	99	53	28	16	9	4	0
4600mN	-	-	-	-	-	-	-	-	160	120	60	30	16	8	1	0
4650mN			(Loop Wire)									(Loop Wire)				
4700mN	650	250	95	38	16	8	2	0	280	160	74	36	20	10	6	2
4750mN	760	300	90	34	14	4	0	0	310	56	12	6	2	0	0	0
4800mN	400	260	95	41	19	9	5	1	480	190	58	20	4	4	-2	-1
4850mN	260	200	90	40	18	6	0	0	590	250	76	34	20	6	2	0
4900mN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4950mN	-140	-15	21	16	6	2	0	0	250	190	79	42	21	8	3	1
5000mN	-110	-22	6	6	2	0	0	0	180	145	69	36	19	7	2	0

TENTH LEGION P.E.M. SURVEY

Line 5600mE

Tx: 200m x 400m (Loop 1)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4150mN	-150	4	65	60	42	25	11	6	-180	-47	-4	-6	-5	-5	-4	0
4200mN	-110	9	61	60	44	25	11	4	-180	-140	-78	-42	-21	-8	-4	-2
4250mN	-20	28	65	65	49	28	13	5	-460	-240	-80	-34	-17	-8	-4	-1
4300mN	160	110	95	75	51	28	11	4	-680	-340	-105	-27	-6	0	0	0
4350mN	520	320	160	86	50	26	10	3	-670	-320	-94	-20	-2	2	1	0
4400mN	700	410	200	94	51	25	10	4	-450	-200	-52	-6	4	5	4	2
4450mN	780	440	120	90	47	23	7	3	-240	-74	-7	10	10	7	2	0
4500mN			(Loop Wire)									(Loop Wire)				
4550mN			(Loop Wire)									(Loop Wire)				
4600mN			(Loop Wire									(Loop Wire)				
4650mN			(Loop Wire)									(Loop Wire)				
4700mN	800	300	105	43	19	9	3	1	245	100	45	23	10	4	1	0
4750mN	470	390	170	66	32	14	4	2	640	260	88	35	14	6	1	0
4800mN	160	150	68	35	19	9	2	0	530	255	80	36	16	3	1	0
4850mN	-6	100	67	36	20	8	3	1	495	245	85	41	21	10	2	0
4900mN	-120	21	36	21	9	4	1	1	330	210	89	44	24	10	3	1
4950mN	-140	-23	9	7	2	0	0	0	210	160	75	39	20	8	2	1

TENTH LEGION P.E.M. SURVEY

Line 5700mE

Tx: 200m x 400m (Loop 1)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4265mN	100	52	40	34	20	15	7	0	-290	-160	-61	-26	-13	-8	-3	0
4315mN	180	108	65	45	31	18	6	0	-260	-150	-49	-14	-3	0	0	0
4365mN	300	200	91	60	38	21	8	2	-280	-150	-53	-13	-4	0	0	0
4415mN	360	220	105	61	36	20	7	2	-200	-98	-28	-1	4	4	2	0
4465mN	445	250	120	62	34	19	6	0	-94	-30	3	9	6	3	1	0
4515mN	430	250	110	58	30	16	5	1	-84	-25	3	10	8	5	1	0
4565mN	500	250	110	63	40	23	8	2	31	37	31	21	15	7	2	0
4615mN	500	230	100	49	26	14	4	0	78	54	35	25	15	6	0	0
4665mN	700	340	140	52	26	11	4	1	130	11	-1	-1	-1	-1	0	0
4715mN	300	240	110	45	25	10	4	1	560	250	92	35	11	4	1	1
4765mN	-36	45	36	26	19	9	3	0	450	210	74	31	13	6	4	0
4815mN	-110	6	21	19	13	6	1	1	300	180	70	35	17	8	1	0
4865mN	-140	-30	2	5	5	2	1	1	220	150	65	35	18	7	1	0
4915mN	-150	-52	-11	-4	0	0	0	0	150	108	58	31	18	8	1	0
4950mN	-110	-46	-12	-5	-3	0	0	0	100	78	44	25	14	6	2	1

TENTH LEGION P.E.M. SURVEY

Line 5300mE

Tx: 100m x 100m (Loop 2)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4250mN	-38	-6	3	4	2	1	1	0	-24	-13	-5	-2	-1	0	0	0
4300mN	-41	-8	4	4	2	1	0	0	-54	-27	-10	-4	-3	-1	0	0
4325mN	-45	-8	5	4	2	1	0	0	-54	-25	-7	-2	-1	0	0	0
4350mN	-45	-5	6	5	3	1	0	0	-83	-34	-9	-2	0	0	0	0
4375mN	-20	6	10	5	3	1	1	0	-150	-48	-14	-3	-2	0	0	0
4400mN	45	24	12	5	3	1	0	0	-170	-51	-10	0	0	0	0	0
4450mN	102	46	16	5	2	0	0	0	-50	-19	-4	0	0	0	0	0
4500mN	110	49	18	5	2	0	0	0	-23	-6	-1	0	0	0	0	0
4550mN	108	46	16	6	2	1	0	0	-21	-6	-1	0	0	0	0	0
4575mN	102	44	15	5	2	1	0	0	-8	0	1	1	0	0	0	0
4600mN	95	41	15	6	3	1	0	0	6	7	4	2	0	0	0	0

TENTH LEGION P.E.M. SURVEY

Line 5400mE

Tx: 100m x 100m (Loop 2)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4250mN	-59	-14	4	5	3	1	1	0	-38	-20	-8	-4	-2	-1	0	0
4300mN	-49	-11	5	5	3	2	1	0	-90	-39	-11	-3	-1	0	0	0
4325mN	-21	1	8	6	3	2	2	1	-130	-60	-16	-4	-2	-1	0	0
4350mN	51	33	16	7	3	1	0	0	-160	-71	-20	-5	0	0	0	0
4375mN	130	54	22	8	3	1	0	0	-130	-50	-11	-1	0	0	0	0
4400mN	145	62	22	8	2	1	0	0	-92	-35	-8	-1	0	0	0	0
4450mN	150	60	22	7	3	1	1	0	-38	-12	-3	0	0	0	0	0

Line 5500mE

Tx: 100m x 100m (Loop 2)

4250mN	-26	-4	6	4	2	2	1	0	-58	-28	-9	-4	-3	-1	0	0
4300mN	-3	6	10	7	4	2	1	0	-100	-45	-14	-4	-3	-2	0	0
4325mN	36	26	15	8	4	1	0	0	-120	-56	-16	-5	-3	0	0	0
4350mN	80	45	19	8	4	2	1	0	-98	-44	-14	-6	-2	-1	0	0
4375mN	102	55	23	8	4	2	1	0	-84	-36	-10	-2	-1	0	0	0
4400mN	120	56	24	9	4	2	1	0	-65	-30	-11	-2	-1	-1	0	0
4450mN	130	56	24	11	4	2	1	0	-31	-11	-4	-1	0	0	0	0

TENTH LEGION P.E.M. SURVEY

Line 5500mE

Tx: 100m x 100m (Loop 3)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4600mN	64	21	4	1	0	0	0	0	-3	-3	-1	0	0	0	0	0
4650mN	85	30	8	3	0	0	0	0	3	3	2	2	2	0	0	0
4675mN	105	37	11	4	1	0	0	0	26	16	7	2	0	0	0	0
4700mN	150	48	15	4	1	0	0	0	34	20	9	4	1	0	0	0
4725mN	190	60	18	5	1	0	0	0	64	34	16	6	1	0	0	0
4750mN	350	104	26	6	1	0	0	0	210	73	24	7	1	0	0	0
4800mN	-110	-33	-11	-3	-1	0	0	0	240	93	34	14	4	2	0	0
4850mN	-145	-36	-9	-2	-1	0	0	0	150	64	24	8	2	2	0	0
4900mN	-200	-75	-21	-4	-1	0	0	0	59	35	14	5	2	0	0	0
4950mN	-100	-44	-14	-4	-1	-1	0	0	-74	-34	-15	-6	-3	-1	0	0
5000mN	-74	-33	-11	-3	-1	0	0	0	-61	-34	-16	-8	-5	-3	0	0

TENTH LEGION P.E.M. SURVEY

Line 5600mE

Tx: 100m x 100m (Loop 3)

	VERTICAL COMPONANT								HORIZONTAL COMPONANT (N-S)							
Channel:	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
4600mN	100	41	15	4	1	0	0	0	-36	-22	-10	-2	0	1	1	0
4625mN	150	58	25	7	1	0	0	0	-34	-25	-11	-2	1	1	0	0
4650mN	190	81	36	14	1	1	0	0	-42	-28	-12	-2	2	2	1	1
4675mN	290	150	56	23	3	0	0	0	-33	-20	-6	2	4	4	1	0
4700mN	470	210	84	30	4	0	0	0	49	21	14	8	5	3	1	1
4725mN	650	310	130	43	9	0	0	0	550	210	80	30	8	3	1	1
4750mN	-15	65	49	24	6	0	0	0	700	310	140	45	16	5	1	0

Line 5700mE

Tx: 100m x 100m (Loop 3)

4565mN	74	29	7	1	-1	0	0	0	7	2	1	1	1	0	0	0
4615mN	150	58	21	5	-1	0	0	0	29	7	3	4	3	3	1	0
4640mN	190	72	26	6	-2	-3	-1	0	85	34	14	8	5	3	1	0
4665mN	180	85	35	9	-2	-4	-2	-1	190	67	30	16	9	7	2	0
4690mN	68	59	27	8	0	-2	-1	-1	310	160	71	32	11	7	2	0
4715mN	-79	-30	-19	-9	-4	-2	0	0	430	250	130	52	20	8	3	0
4740mN	-250	-150	-80	-36	-13	-5	-2	-1	430	250	140	52	22	8	3	0
4765mN	-410	-250	-120	-55	-22	-8	-4	-2	430	230	120	49	20	9	2	1

ATTACHMENT 2

MAGNETIC SUSCEPTIBILITY AND REMANENCE MEASUREMENTS

CSIRO

Division of Mineral Physics
Delhi Road, North Ryde, NSW, Australia

A Division of the Institute of Energy and Earth Resources

PO Box 136, North Ryde, NSW, Australia 2113
Telephone (02) 887 8666
Telex AA25817

DAC/khh

9th July, 1982

Mr Marcus Flis
CRA EXPLORATION PTY LTD
Level 4, Bellerive Quay
Cambridge Road
BELLERIVE. Tasmania. 7018

Dear Marcus,

Please find enclosed results of our measurements on your magnetite/skarn samples. All the samples are strongly magnetic with susceptibilities ranging from 0.027 to 0.303 and all carry substantial remanence.

The remanence directions vary considerably suggesting that there may be problems with the orientation in some cases. However the NRMS appear to be streaked between a northerly direction with moderate nagative inclination (i.e. somewhat shallower than the present field) and an easterly direction with shallow positive (downward) inclination. The fact that the directions tend to fall on a great circle between these extremes is consistent with a two-component magnetisation. The orientations are therefore probably all right, albeit approximate, with the possible exception of TLC8 which has an anomalous direction.

Palaeomagnetic cleaning would be an appropriate way to test the hypothesis of a two-component (i.e. partially overprinted ancient remanence) magnetisation.

On the basis of this limited number of samples it appears the nett magnetisation direction of these bodies is generally in the NE quadrant and is substantially shallower than the present field.

I hope these results are helpful to your interpretation. Do not hesitate to contact me if you have any queries.

Yours sincerely,

Dave Clark

David Clark

c.c. Mr R.J. Smith
CRA Exploration Pty Limited
Norwood, S.A.

Encl.

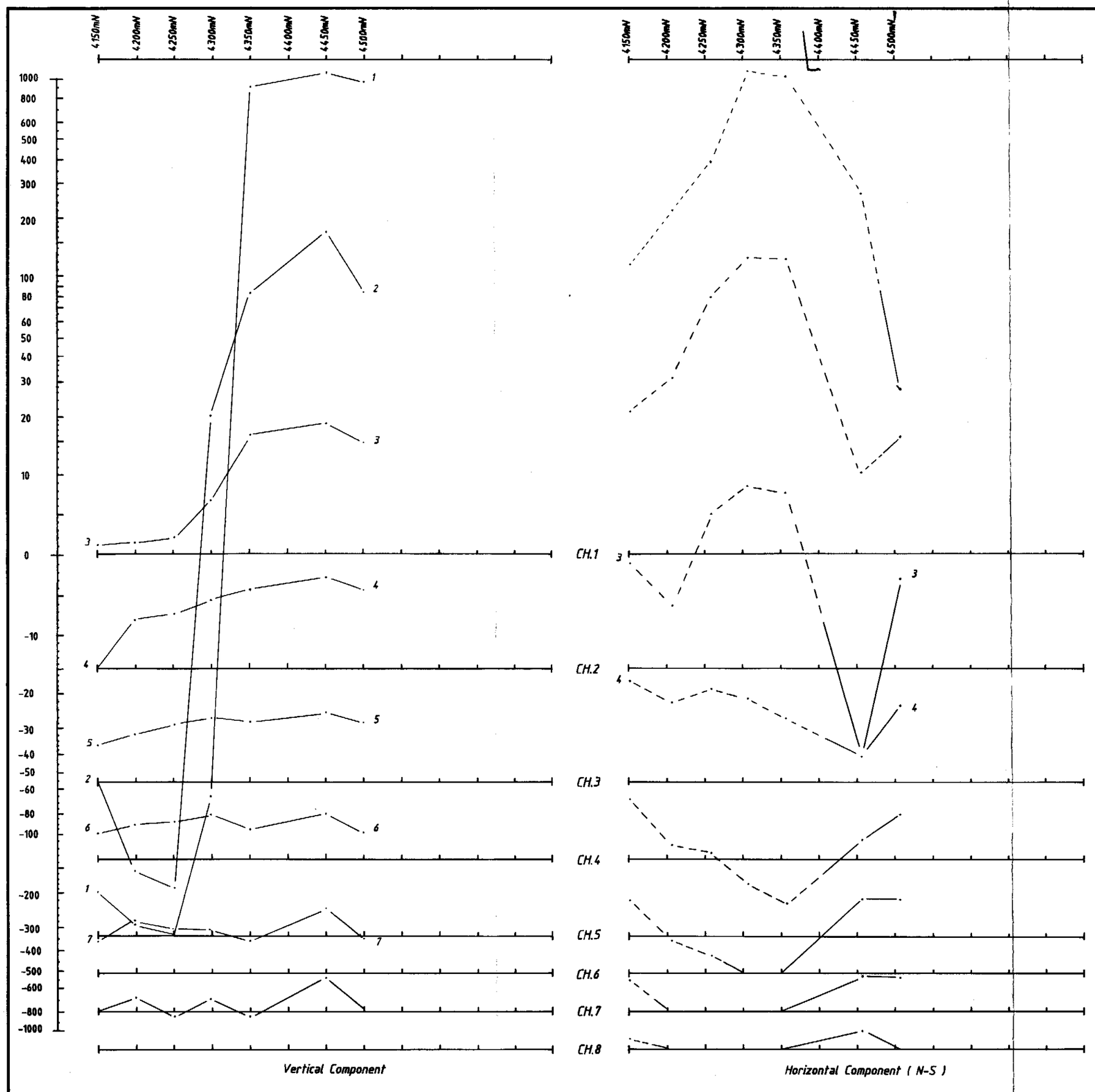
SAMPLE	k	J	Q	NRM Direction
TLC3 (51m)	147,600	~165,999	~1.8	(47^{o}, $+18^{o}$)
TLC3 (52m)	27,100	101,600	6.0	(1^{o}, -49^{o})
TLC8 (61.8m)	118,600	48,400	0.65	(152^{o}, -12^{o})
TLC9 (53.9m)	79,800	>600,000	>12	(79^{o}, $+27^{o}$)
TLC9 (57.5m)	303,200	190,600	1.0	(355^{o}, -36^{o})
TLC12 (82m)	231,600	61,800	0.42	(88^{o}, $+25^{o}$)

k = emu susceptibility x 10^{6}

J = NRM intensity in microgauss (10 microgauss = 1 "gamma")

Q = Koenigsberger ratio = Remanent magnetisation/Induced magnetisation
= J/kH, where H = 0.63 Oersteds

Directions are given in the form (declination, inclination)
where declination is positive clockwise from True North,
inclination is positive downwards from horizontal.



662031

5 cm

Negative Horizontal Component values indicated by dashed line.

6288

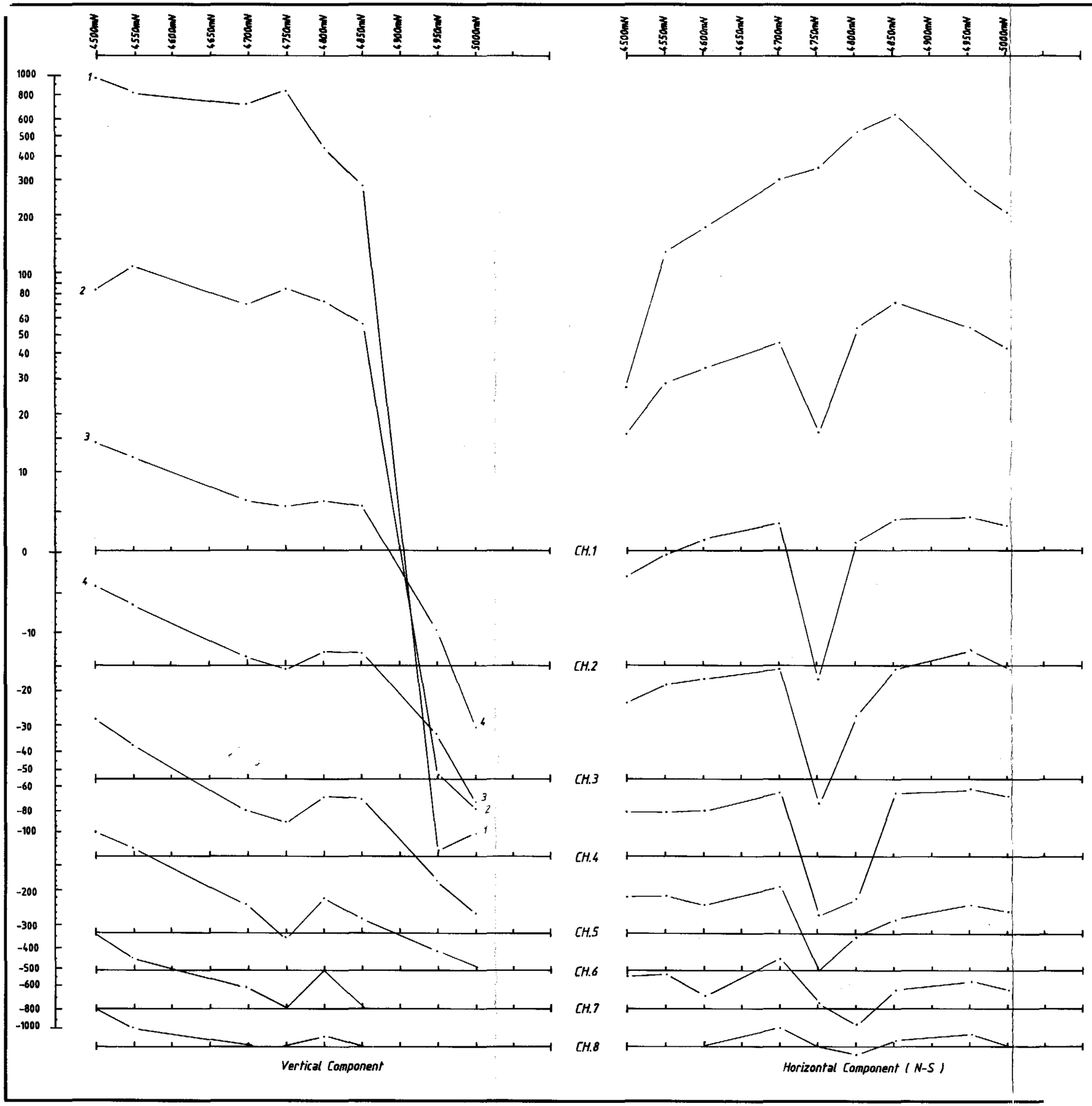
82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5500 mE (Loop 1)

Date:	Feb. 1982		
Ref:	SKSS - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N.I.	Plan N°:	TASb 586



662032

5 cm

6289

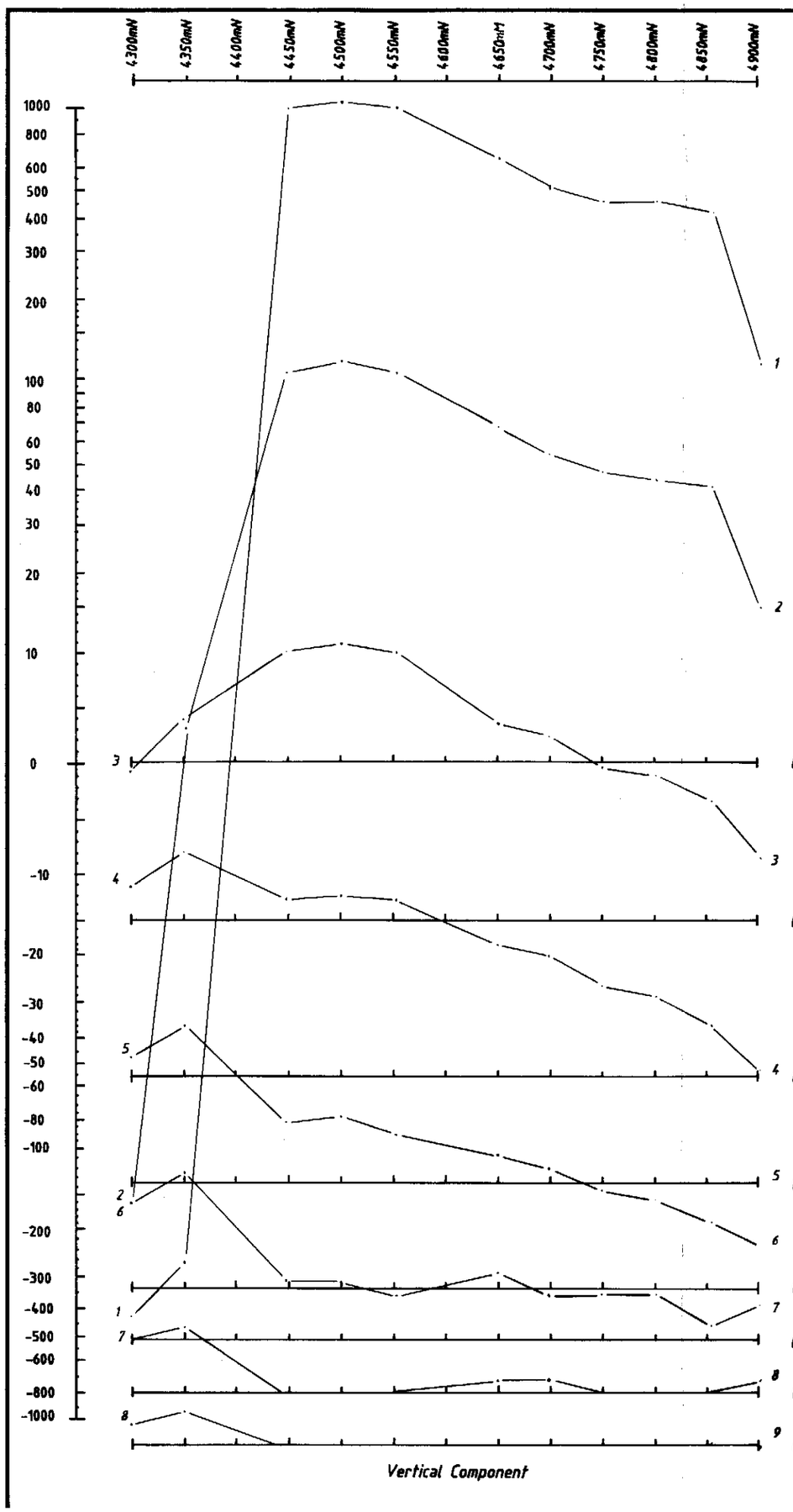
82-1883R

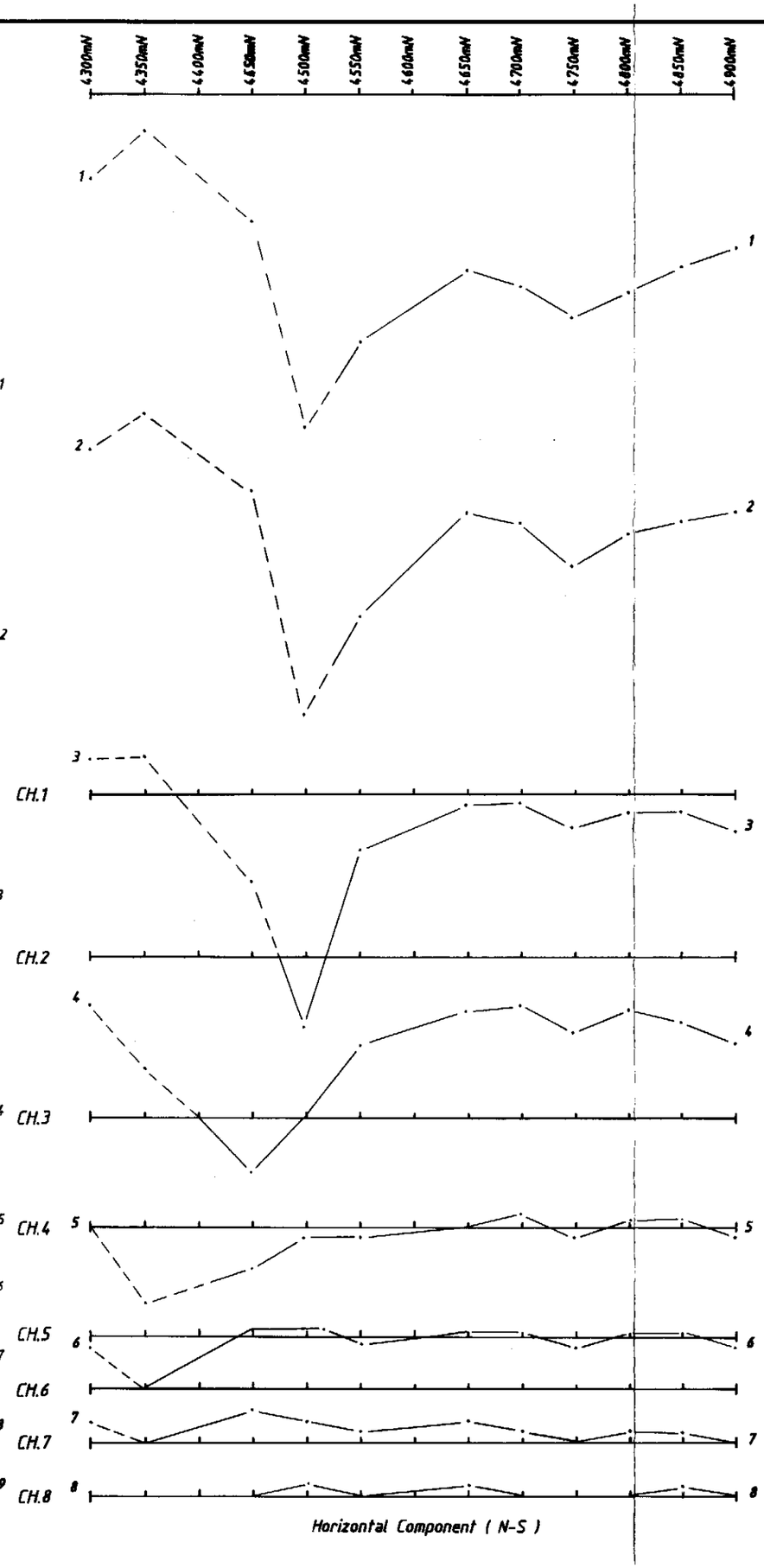
CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5500 mE (Loop 1.) (part b)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N°:	TASh 587





062033

5 cm

Negative Horizontal Component values indicated by dashed line.

6290

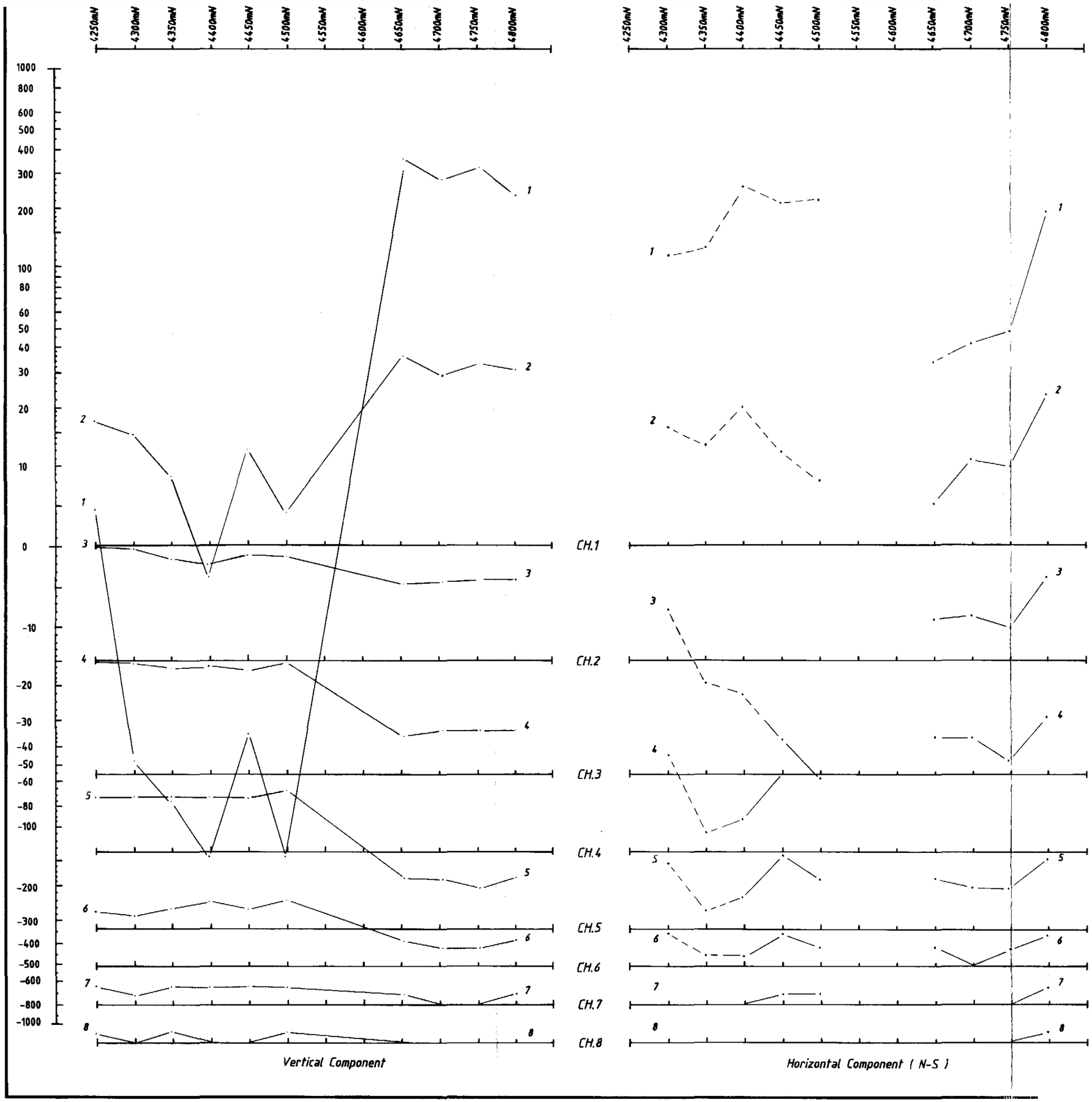
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5300 mE (Loop 1)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N° :	TASh 518



662024

5 cm

Negative Horizontal Component values indicated by dashed line.

6291

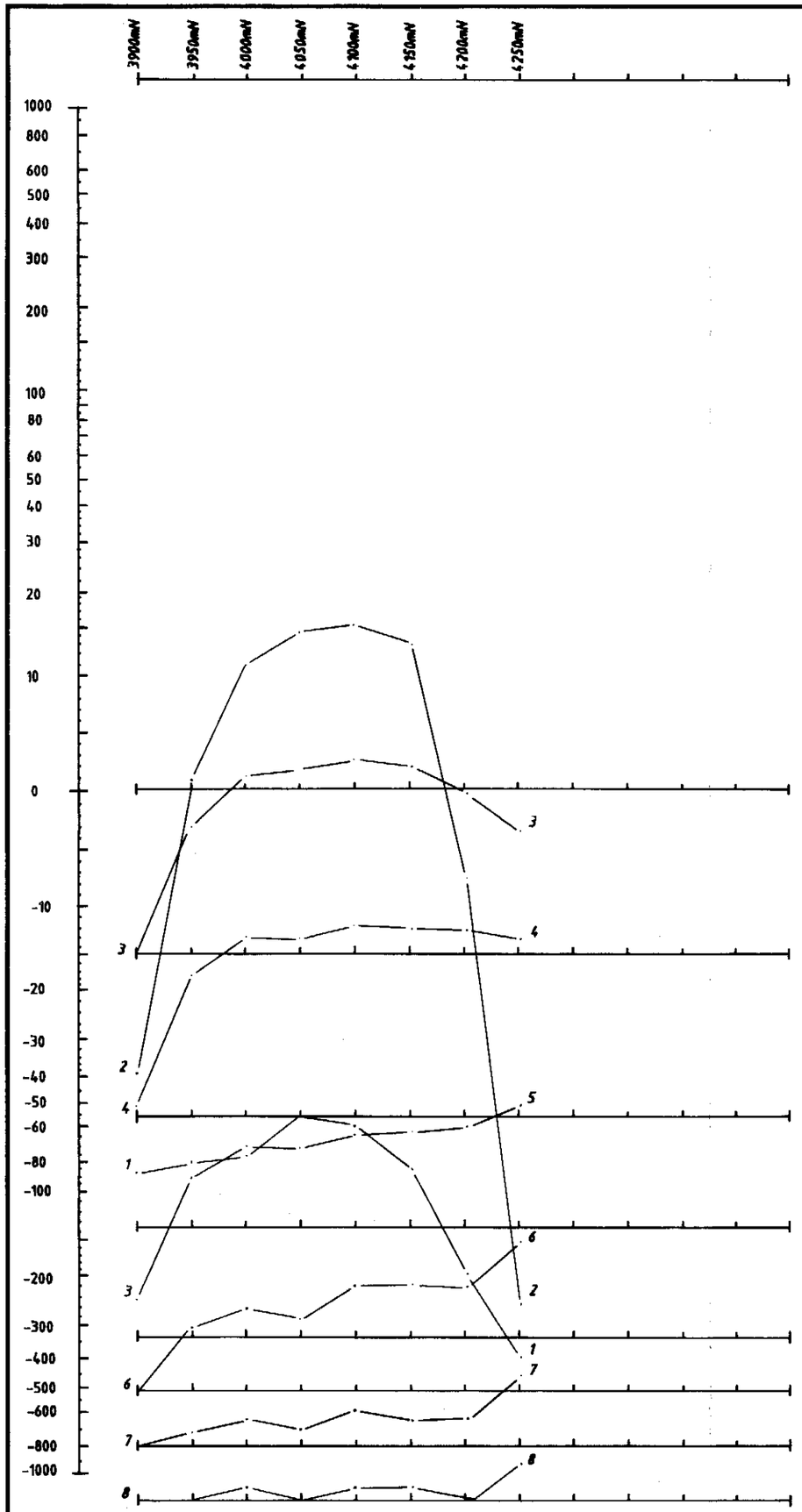
82-1883 R

CRA EXPLORATION PTY. LIMITED

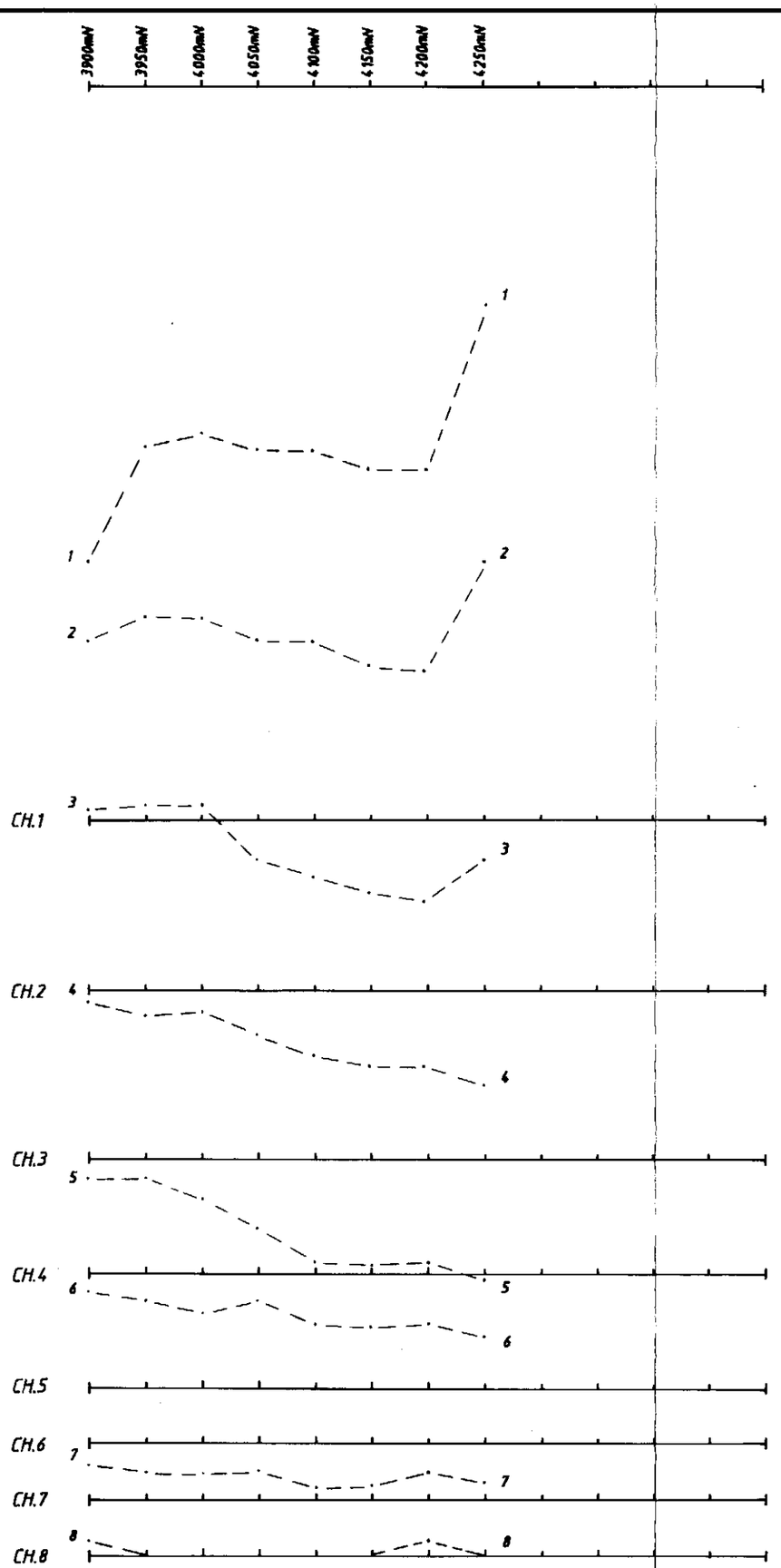
TENTH LEGION

P.E.M. SURVEY
LINE 5100mE (Loop 1)

Date:	*Feb. 1982*		
Ref:	*SK55 - 5*	*Scale:*	*1 : 5 000*
Author:	*M. FLIS*	*Report N°.:*	*11861*
Drawn:	*N.*	*Plan N°:*	



Vertical Component



Horizontal Component (N-S)

662035

5 cm

Negative Horizontal Component values indicated by dashed line.

6292

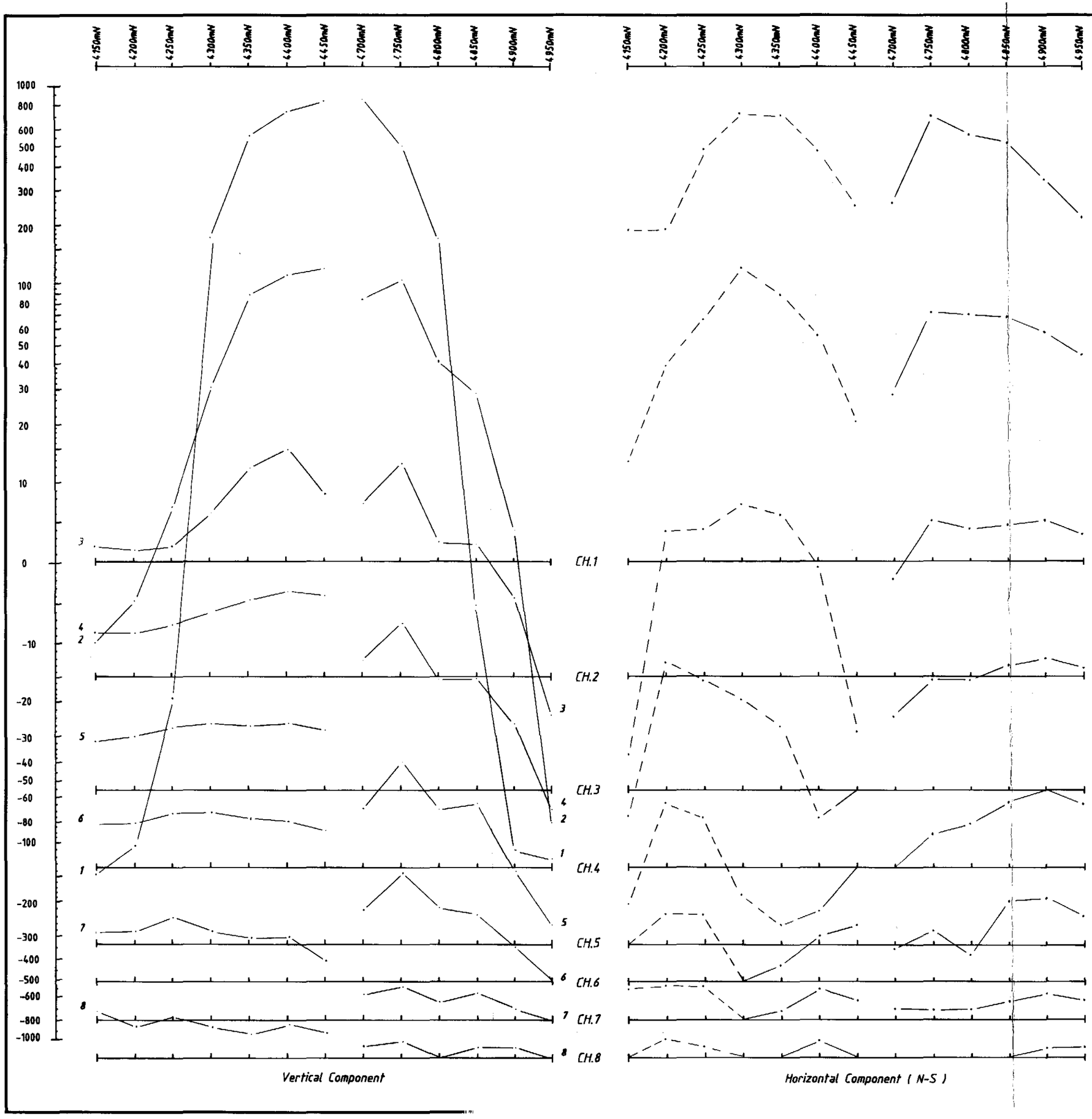
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5280 mE (Loop 1)

Date:	*Feb. 1982*		
Ref:	*SK55 - 5*	*Scale:*	*1 : 5 000*
Author:	*M. FLIS*	*Report N°.:*	*11861*
Drawn:	*N. L.*	*Plan N°:*	*TA/Sh 590*



662036

5 cm

Negative Horizontal Component values indicated by dashed line.

6293

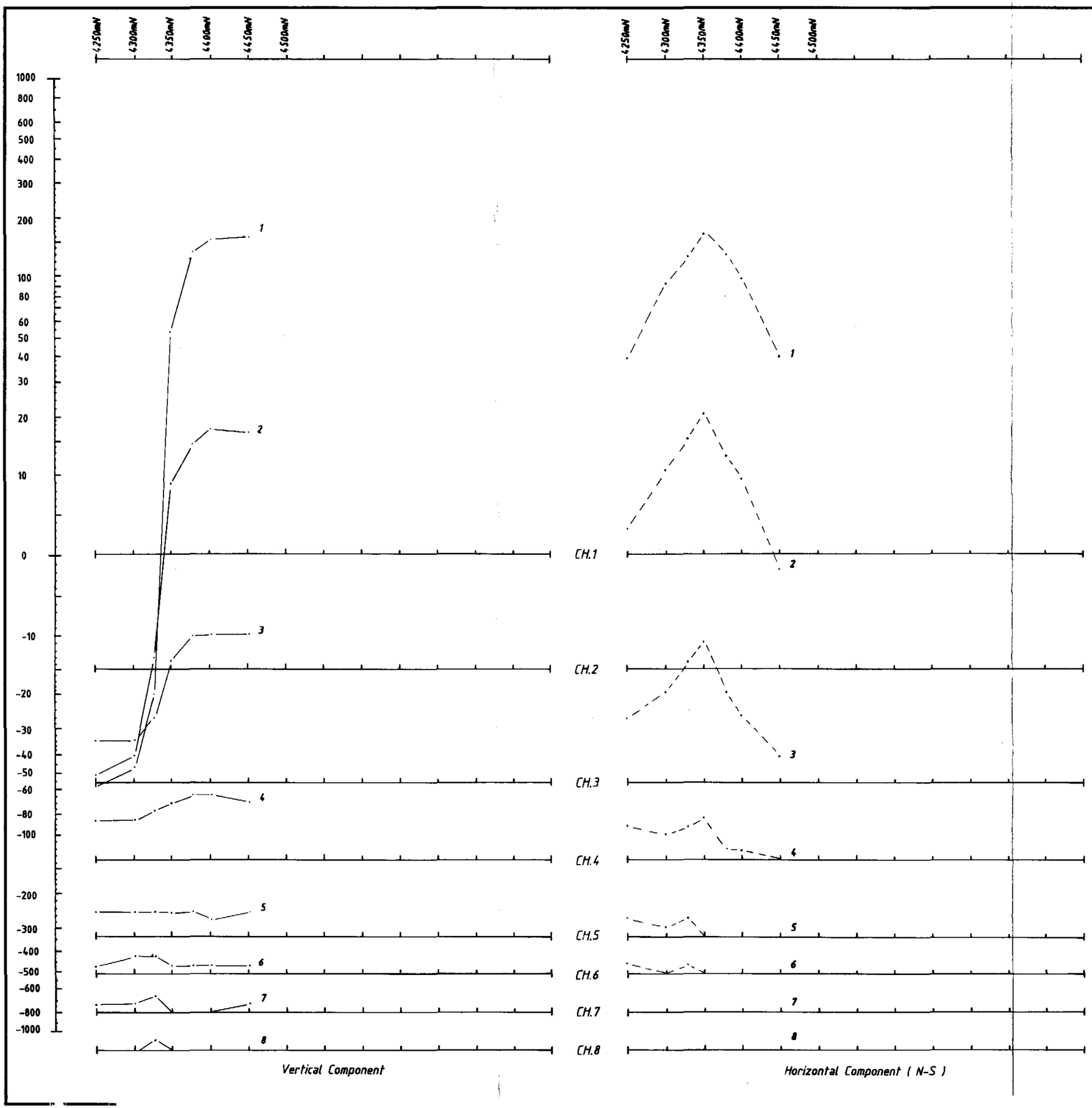
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5600mE (Loop 1)

Date:	*Feb. 1982*		
Ref:	*SK55 - 5*	*Scale:*	*1 : 5 000*
Author:	*M. FLIS*	*Report N°.:*	*11861*
Drawn	*N L*	*Plan N°*	*TASh 591*



662037

5 cm

Negative Horizontal Component values indicated by dashed line.

6294

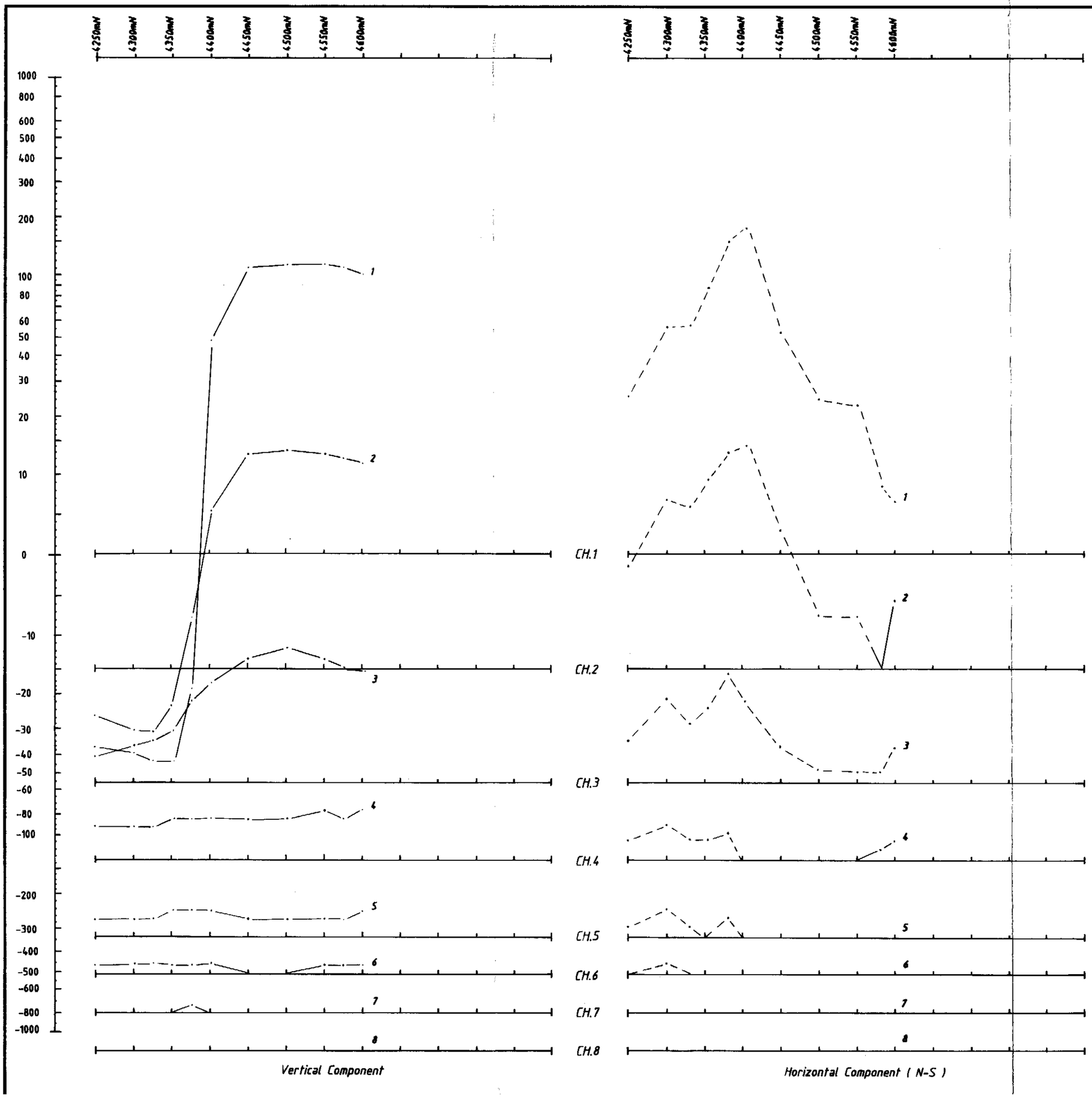
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5400mE (Loop 2)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	
Drawn:	N L	Plan N°:	TASh 592



66203S

5 cm

Negative Horizontal Component values indicated by dashed line.

6295

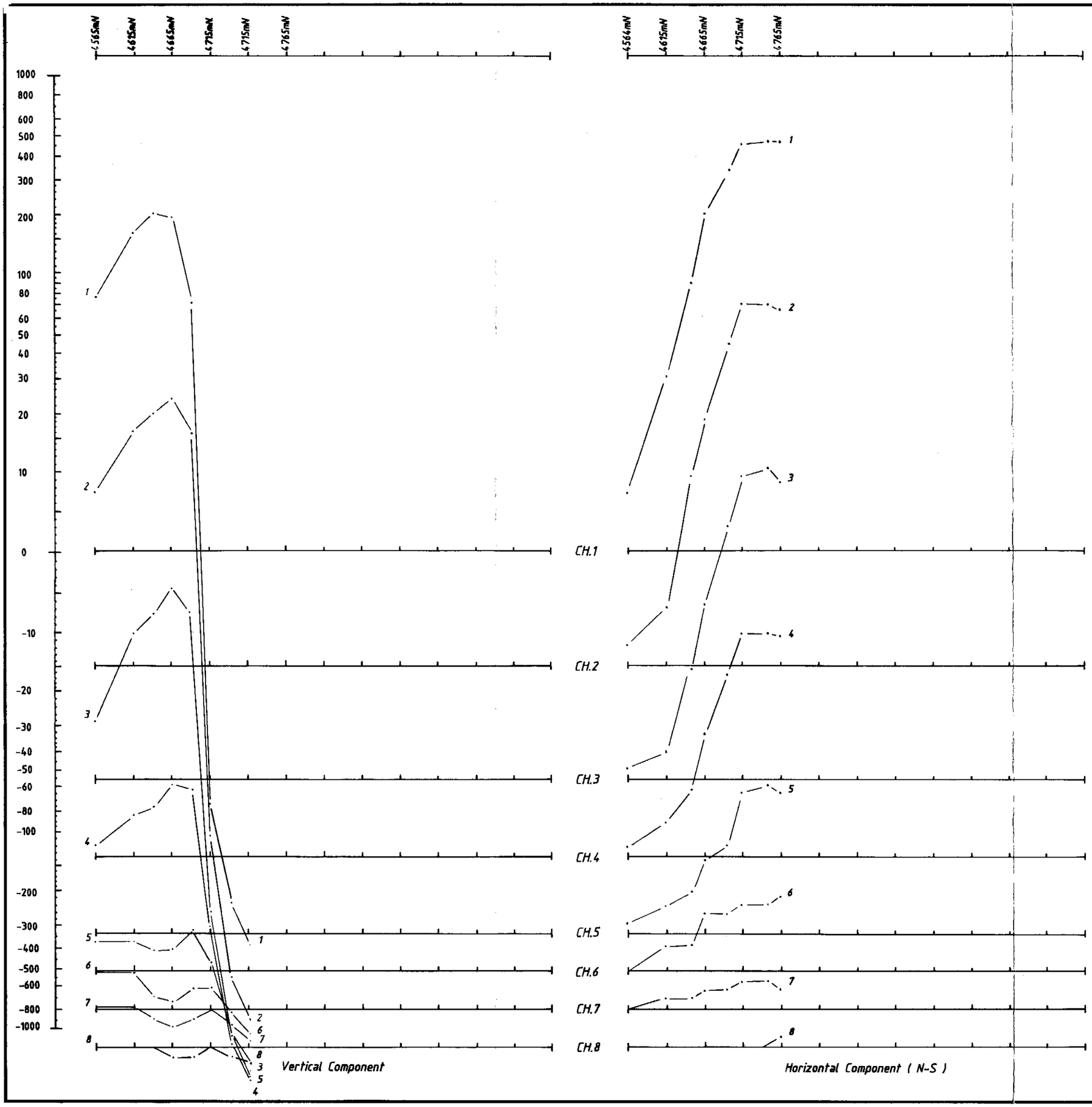
82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5300 mE (Loop 2)

Date:	*Feb. 1982*		
Ref:	*SK55 - 5*	*Scale:*	*1 : 5 000*
Author:	*M. FLIS*	*Report N°.:*	*11861*
Drawn:	*N.J.*	*Plan N°.:*	*T.P.L. 6295*



662039

5 cm

6296

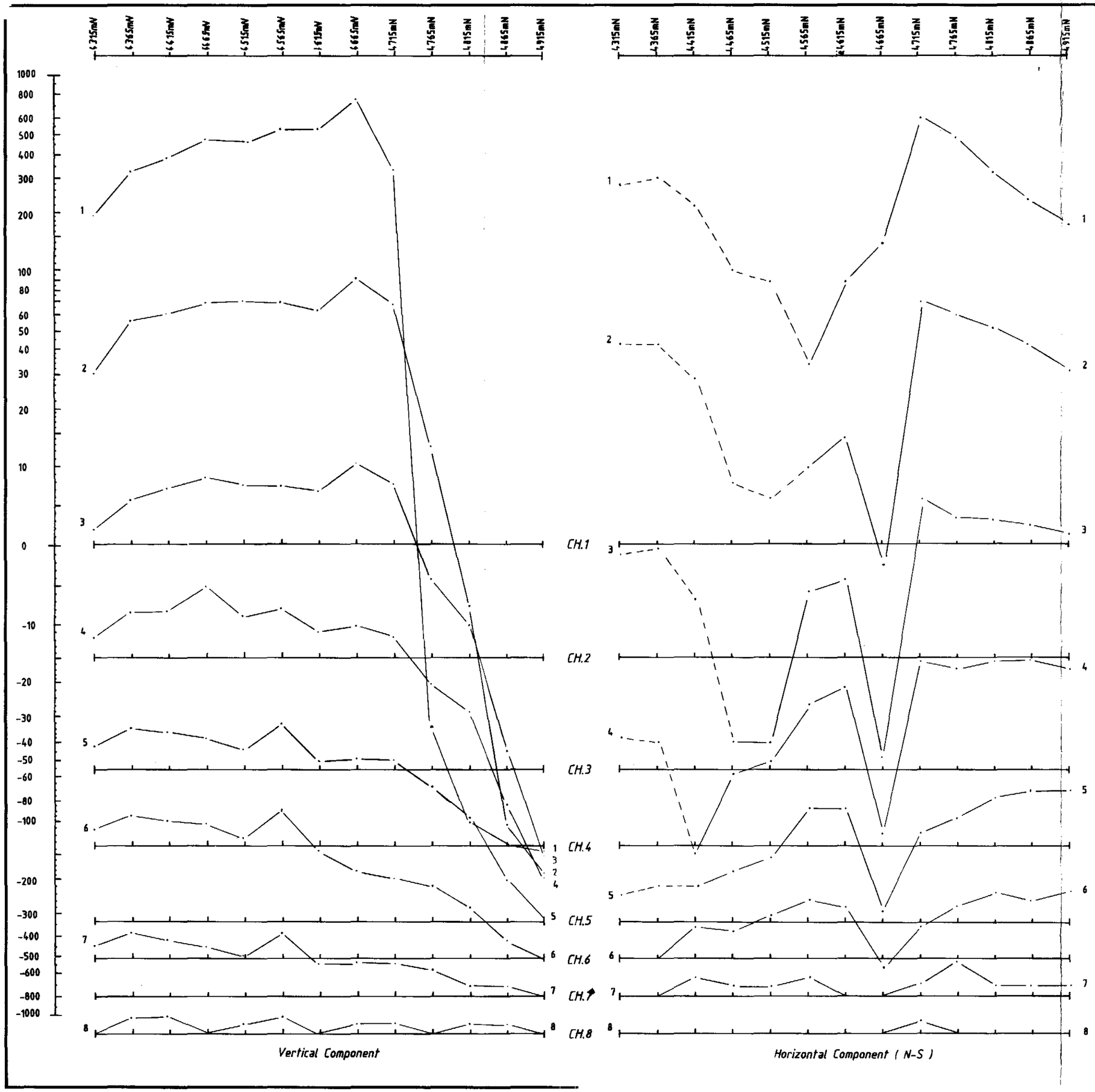
82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5700 mE (Loop 3)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N°:	TASh 594



662040

5 cm

Negative Horizontal Component values indicated by dashed line.

6297

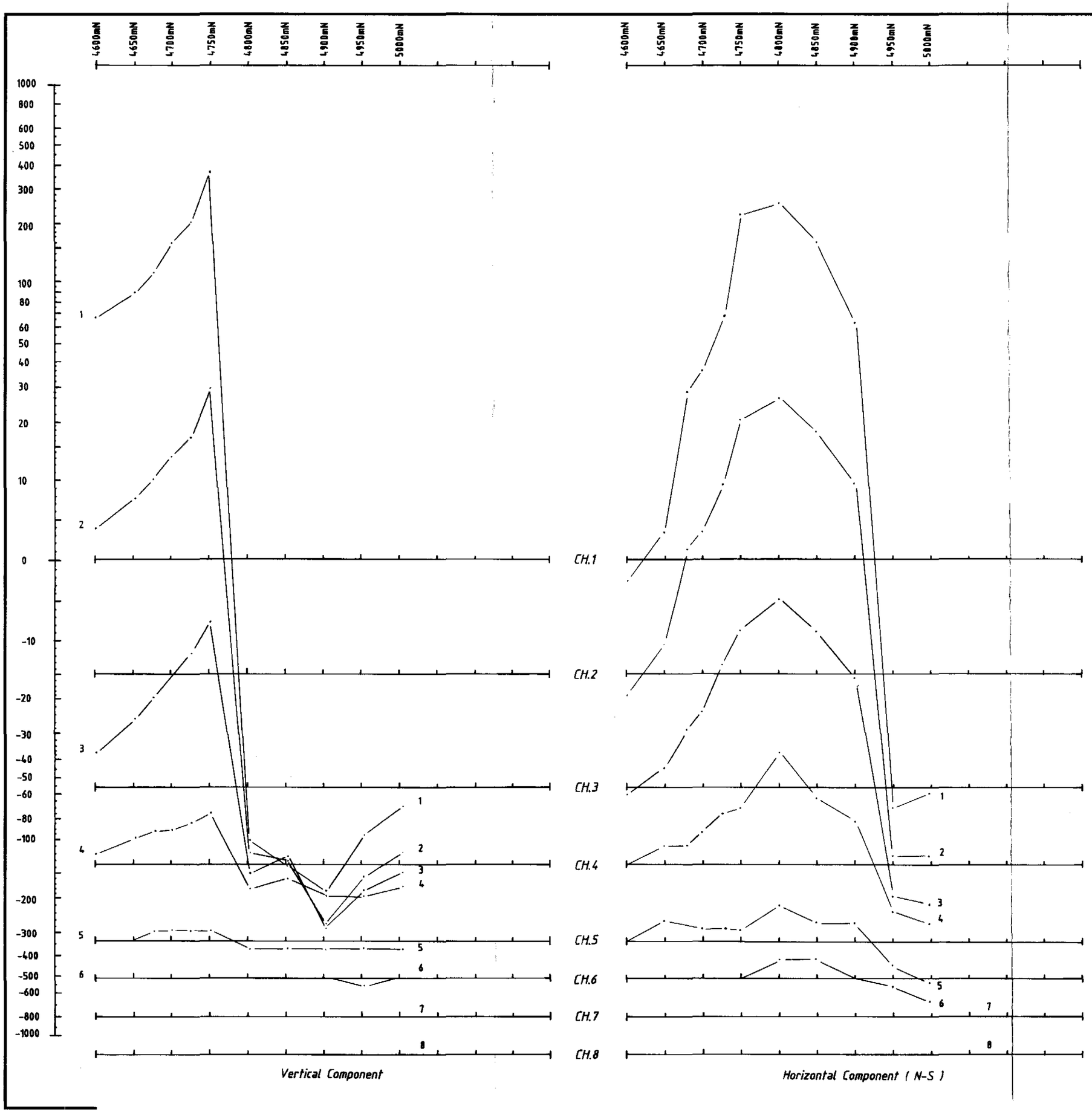
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5700 mE (Loop 1)

Date:	*Feb. 1982*		
Ref:	*SK55 - 5*	*Scale:*	*1 : 5 000*
Author:	*M. FLIS*	*Report N°.:*	*11861*
Drawn:	*N. L*	*Plan N°:*	*TASh 595*



662041

5 cm

6298

82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5500 mE (Loop 3)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N°:	74 - 596

4600mN 4650mN 4700mN 4750mN

1000 800 600 500 400 300 200 100 80 60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -80 -100 -200 -300 -400 -500 -600 -800 -1000

CH.1 CH.2 CH.3 CH.4 CH.5 CH.6 CH.7 CH.8

Vertical Component

Horizontal Component (N-S)

662042

5 cm

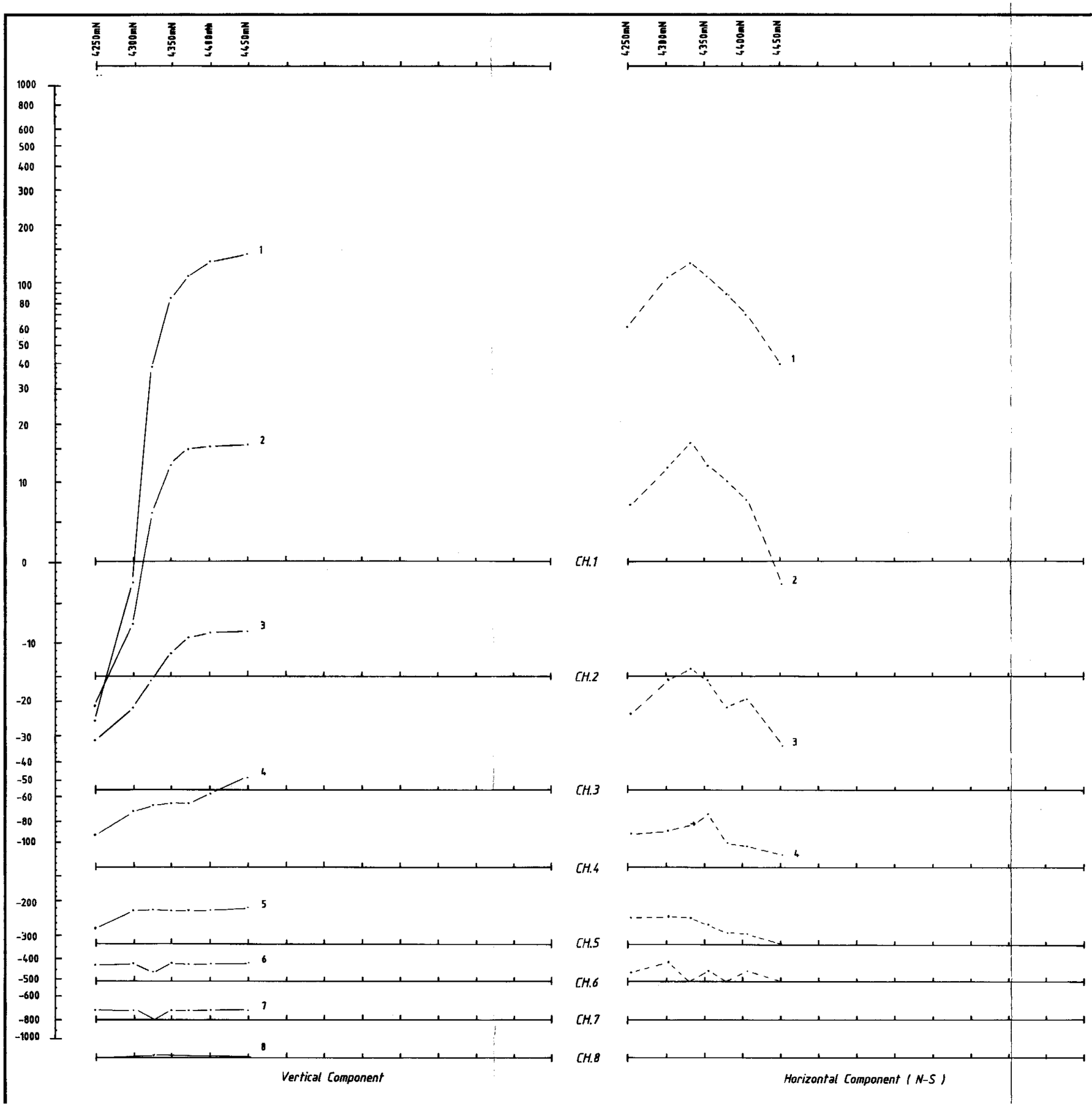
6299
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5600 mE (Loop 3)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N°:	TASh 597



662043

5 cm

Negative Horizontal Component values indicated by dashed line.

6300

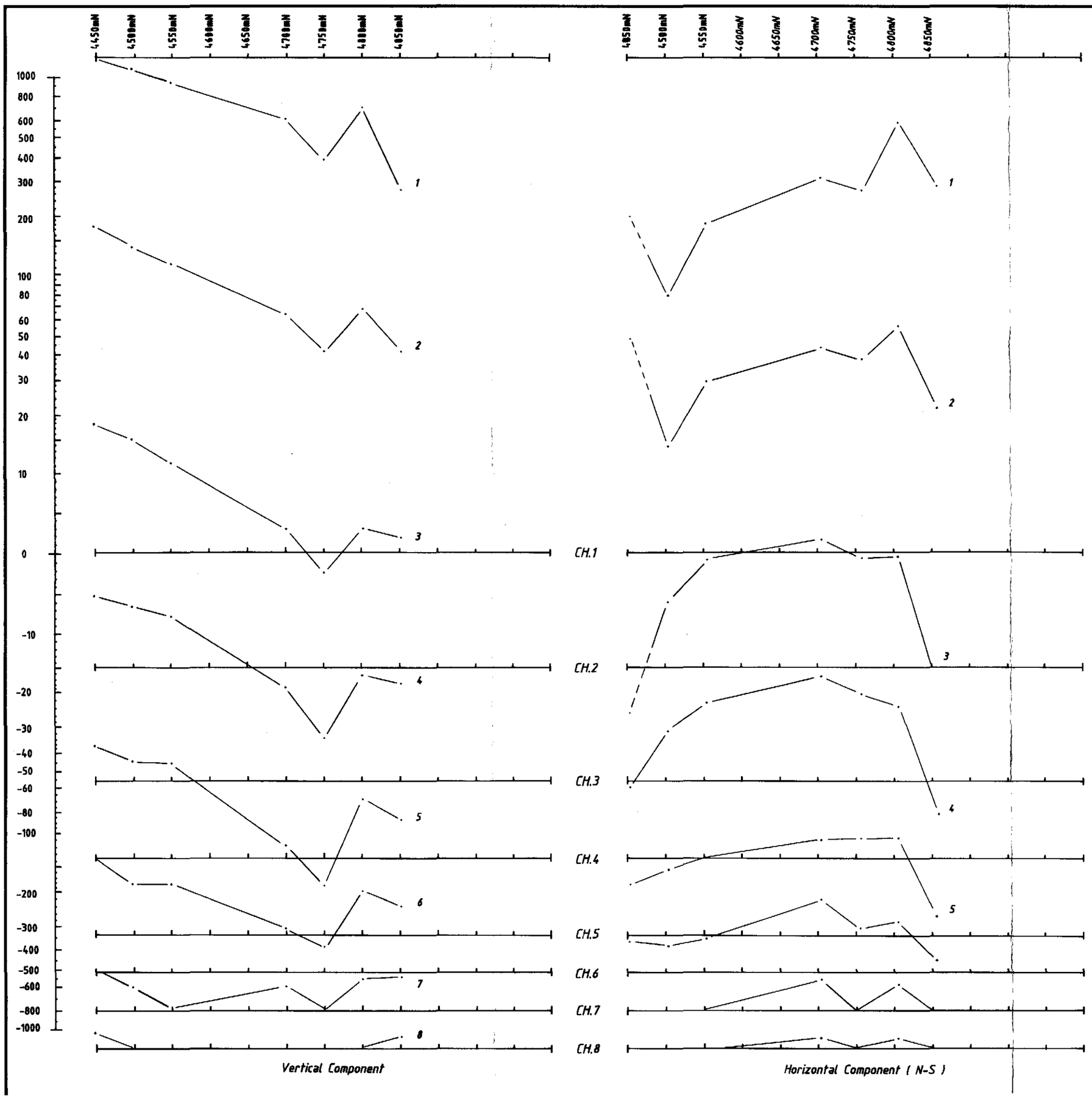
82-1883 R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5500 mE (Loop 2)

Date:	*Feb. 1982*		
Ref:	*SK55 - 5*	*Scale:*	*1 : 5 000*
Author:	*M. FLIS*	*Report N°.:*	*11861*
Drawn:	*N. L*	*Plan N°:*	*TASh 598*



662044

5 cm

6301

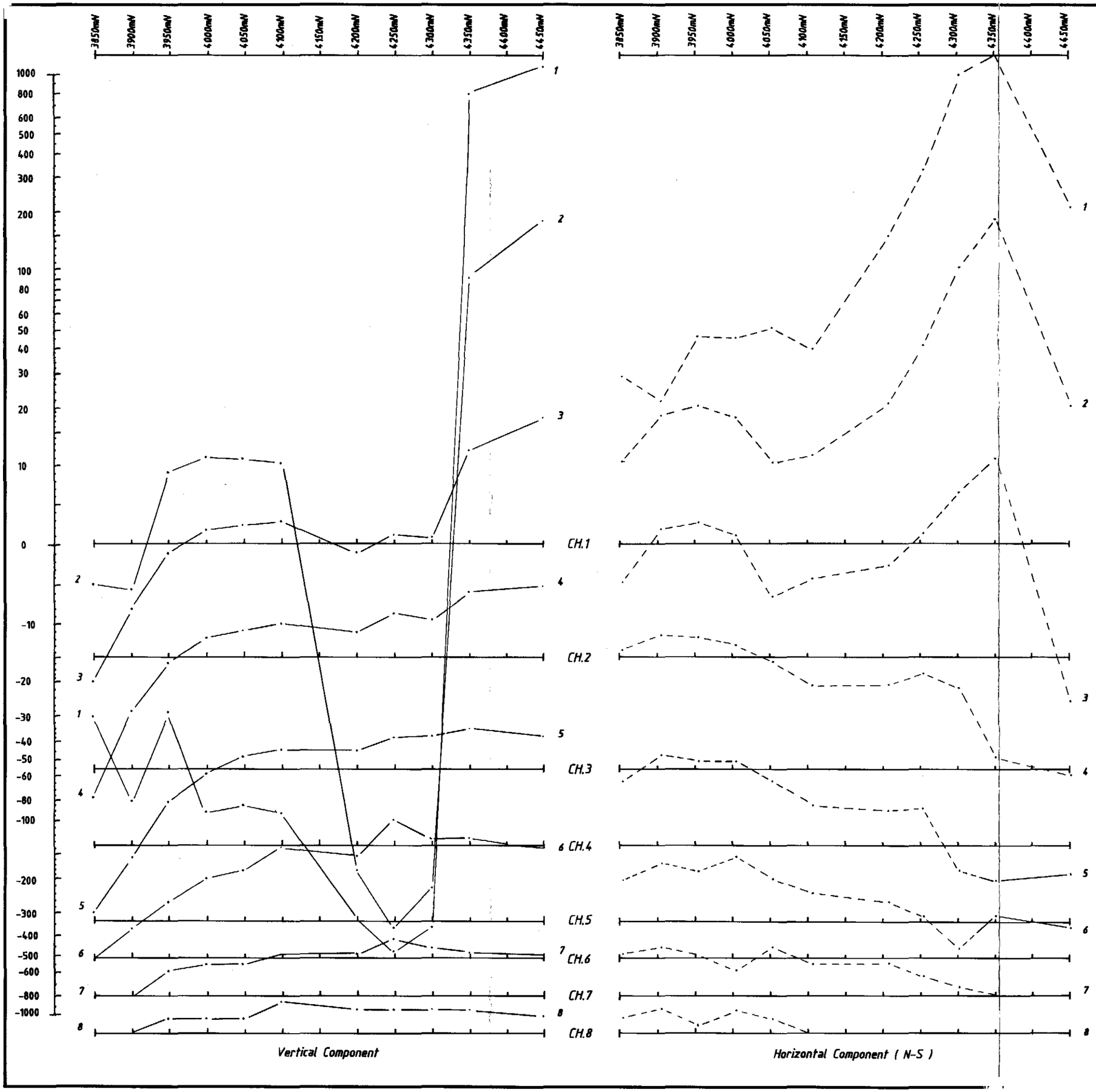
82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY
LINE 5400 mE (Loop 1) (part b)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N° :	TASh 599



662045

5 cm

Negative Horizontal Component values indicated by dashed line.

6302

82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION

P.E.M. SURVEY

LINE 5400 mE (Loop 1) (part a)

Date:	Feb. 1982		
Ref:	SK55 - 5	Scale:	1 : 5 000
Author:	M. FLIS	Report N°.:	11861
Drawn:	N L	Plan N°:	TASh 600

356000 356500 357000 357500 358000 358500 359000 359500

363500 363000 362500 362000 361500 361000 360500 360000 359500 359000

Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

for

C.R.A. EXPLORATION PTY.LTD.

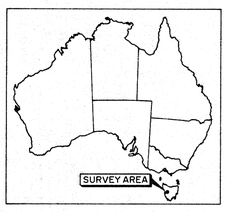
MT. AGNEW AREA TASMANIA

CONTOURS OF RESIDUAL TOTAL MAGNETIC INTENSITY

SCALE 1:5000

0 100 200 300 400 500 METRES

5 cm



SURVEY LOCATION

The data presented is the residual magnetic intensity, after subtracting the International Geomagnetic Reference Field from the observed Total Magnetic Intensity
The data was corrected for diurnal drift using a base station monitor at STRAHAN Airfield, Latitude 42.158 S Longitude145.290 E Altitude 21 Metres
The sensor height was 3 metres.
The adopted value for this location was 62888 nT
Final detailed levelling of the data was performed using tie-line crossover analysis.
A simple 3 point filter was applied to the data, which was then gridded and contoured using a 25m by 25m mesh cell.

SURVEY BOUNDARY

CONTOUR INTERVAL 20 nTesla

PROJECT NUMBER 82631 SURVEYED DECEMBER 1981

EQUIPMENT SPECIFICATIONS
Cessna A185E Aircraft
SONOTEK IGSS1 SYSTEM
0.1 nT MAGNETOMETER
256 CHANNEL SPECTROMETER
24 Litre NaI(T1) DETECTOR
KING KRA10 RADAR ALTIMETER
16mm Ground Tracking Camera
Industry Standard 9 track 32 RPmm Magnetic Tape
8 Channel Analogue Recorder
3 Channel Analogue Recorder for Magnetometer

The nominal flight line separation was 100 metres, and the nominal tie-line bearing was -90 degrees.
The observed mean sample interval in the flight direction was 25 metres, achieved with a nominal aircraft speed of 100 Knots, and a reading interval of 0.8 seconds. The mean sensor height was 33 metres, using a towed bird configuration. The magnetometer accuracy is 1.0 nT, and the resolution 1.0 nT.

Report No. 11861

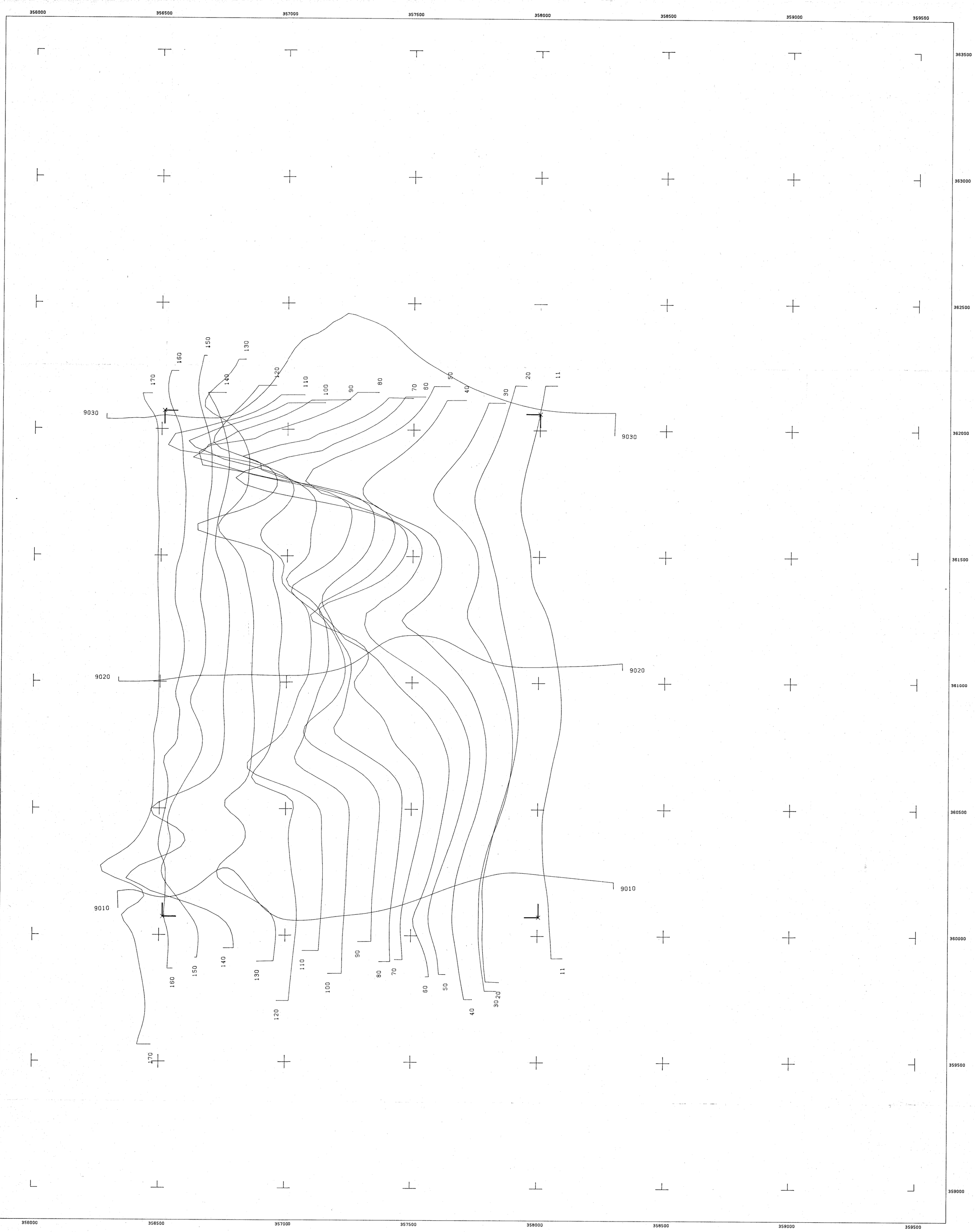
TASh 601

82-1883R

662046

6303

6303



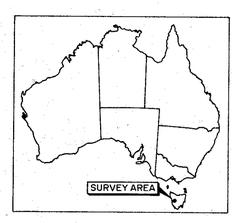
Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

for

C.R.A. EXPLORATION PTY.LTD.

MT. AGNEW AREA TASMANIA

PROFILES OF TOTAL MAGNETIC INTENSITY



SURVEY LOCATION

SCALE 1:5000

0 100 200 300 400 500 METRES

5 cm

SURVEY BOUNDARY 662047

BASELINE VALUE 0 nT VERTICAL SCALE 500

PROJECT NUMBER 82631 SURVEYED DECEMBER 1981

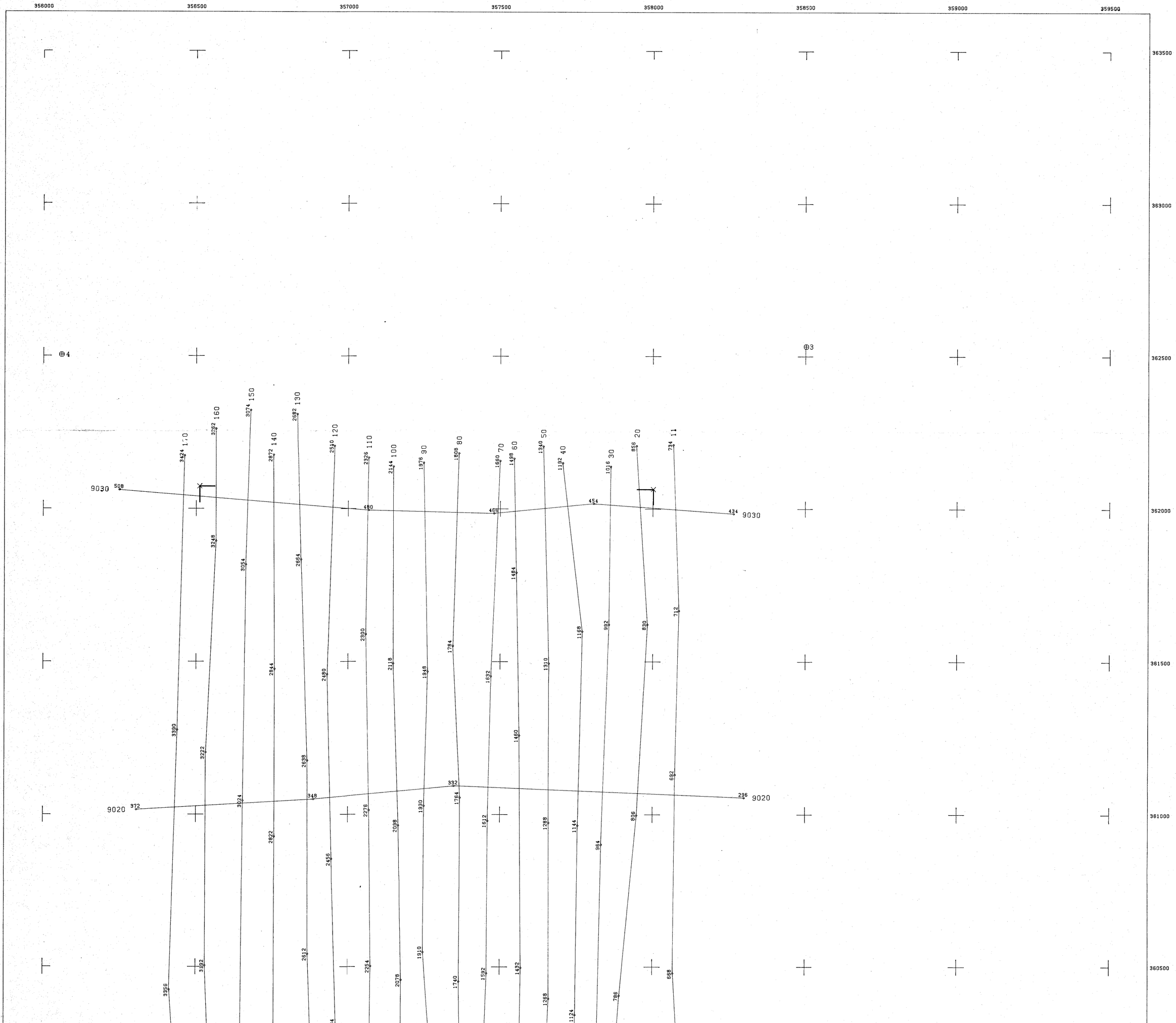
Report No. 11861

TASh602

82-1883R

6304

AGNE2 SCALE 5000 /1 BASE 0 VERT SCALE 500 FILTER 1



Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

for

C.R.A. EXPLORATION PTY. LTD.

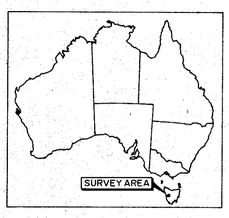
MT. AGNEW AREA TASMANIA

FLIGHT PATH PLOT

SCALE 1:5000

0 100 200 300 400 500 METRES

5 cm



SURVEY LOCATION

Navigation control was by reference to photomosaics and/or photo strips.
Flight path analysis was achieved by identification of 16mm. ground tracking photographs on the navigation control. The ground tracking camera was operated at a rate of one camera frame for two data samples, such that successive camera frames overlap.
An attempt was made to recover fiducials at intervals of 1.0 kilometre, and only recovered fiducials are shown on the map.
During processing the photomosaic was controlled using base maps supplied by the client, and this flight path map is an overlay for those maps.

SURVEY BOUNDARY
⊕ Registration point identified on photomosaic.
+ 500 metre grid, relative to arbitrary origin.

PROJECT NUMBER 82631 SURVEYED DECEMBER 1981
Report No. 11861

TASh 603

AGNE2 SCALE 5000

6305

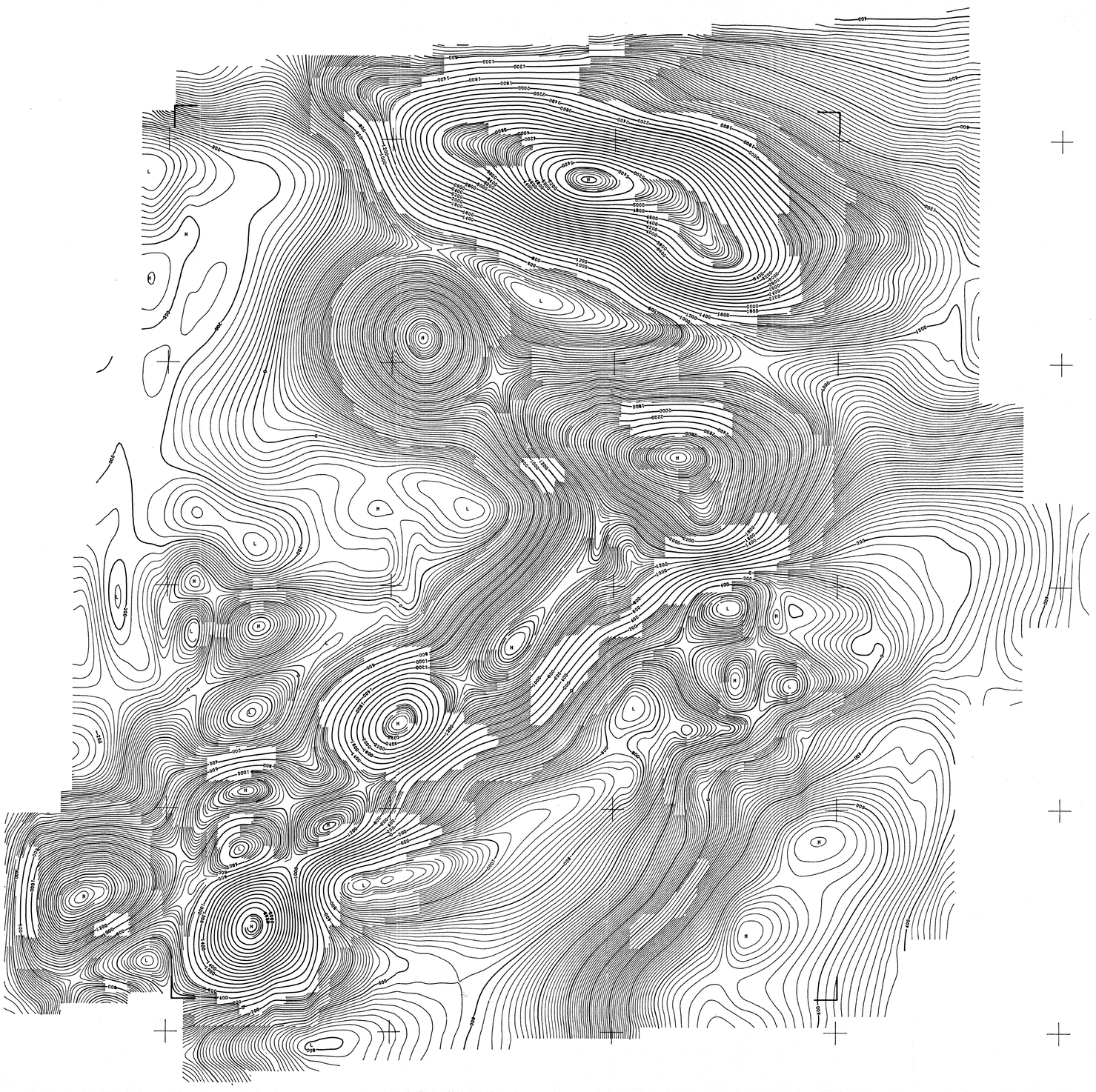
9305

82-1883R

662048

356000 356500 357000 357500 358000 358500 359000 359500

364000 363500 363000 362500 362000 361500 361000 360500 360000 359500



Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

82-1883-R

for

C.R.A. EXPLORATION PTY. LTD.

MT. AGNEW AREA TASMANIA

CONTOURS OF RESIDUAL TOTAL MAGNETIC INTENSITY

SCALE 1:5000

0 100 200 300 400 500 METRES

5 cm

SURVEY LOCATION

6306

6306

662049

The data presented is the residual magnetic intensity, after subtracting the International Geomagnetic Reference Field from the observed Total Magnetic Intensity. The data was corrected for diurnal drift using a base station monitor at STRAHAN Airfield, Latitude 42.158 S, Longitude 145.290 E, Altitude 21 Metres.
The sensor height was 3 metres.
The adopted value for this location was 62888 nT.
Final detailed levelling of the data was performed using tie-line crossover analysis. A simple 3 point filter was applied to the data, which was then gridded and contoured using a 25m by 25m mesh cell.

SURVEY BOUNDARY

CONTOUR INTERVAL 20 nTesla

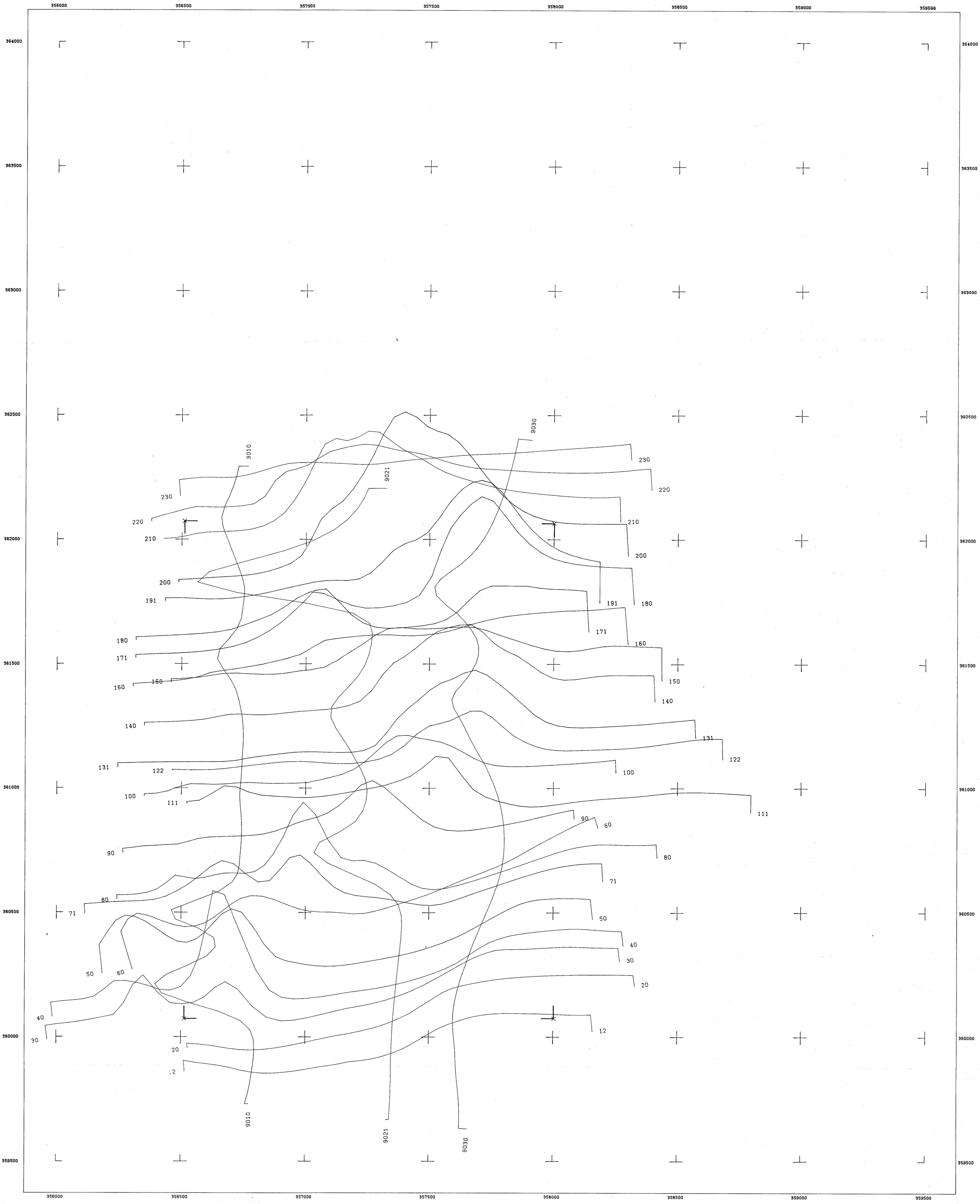
PROJECT NUMBER 82631 SURVEYED DECEMBER 1981

EQUIPMENT SPECIFICATIONS
Cessna A185E Aircraft
SONOTEK IGSS1 SYSTEM
0.1 nT MAGNETOMETER
256 CHANNEL SPECTROMETER
24 Litre NaI(Tl) DETECTOR
KING KRA10 RADAR ALTIMETER
16mm Ground Tracking Camera
Industry Standard 9 track
32 RFmm Magnetic Tape
8 Channel Analogue Recorder
3 Channel Analogue Recorder for Magnetometer

The nominal flight line separation was 100 metres, and the nominal tie-line bearing was 0 degrees.
The observed mean sample interval in the flight direction was 25 metres, achieved with a nominal aircraft speed of 100 Knots, and a reading interval of 0.8 seconds. The mean sensor height was 33 metres, using a towed bird configuration. The magnetometer accuracy is 1.0 nT, and the resolution 1.0 nT.

Report No. 11861

TASh 604



Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

662050 82-1883R

for

C.R.A. EXPLORATION PTY. LTD.

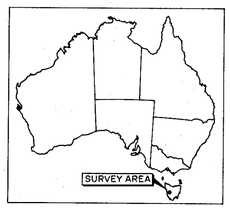
MT. AGNEW AREA TASMANIA

PROFILES OF TOTAL MAGNETIC INTENSITY

SCALE 1:5000

0 100 200 300 400 500 METRES

5 cm



SURVEY LOCATION

6207

6307

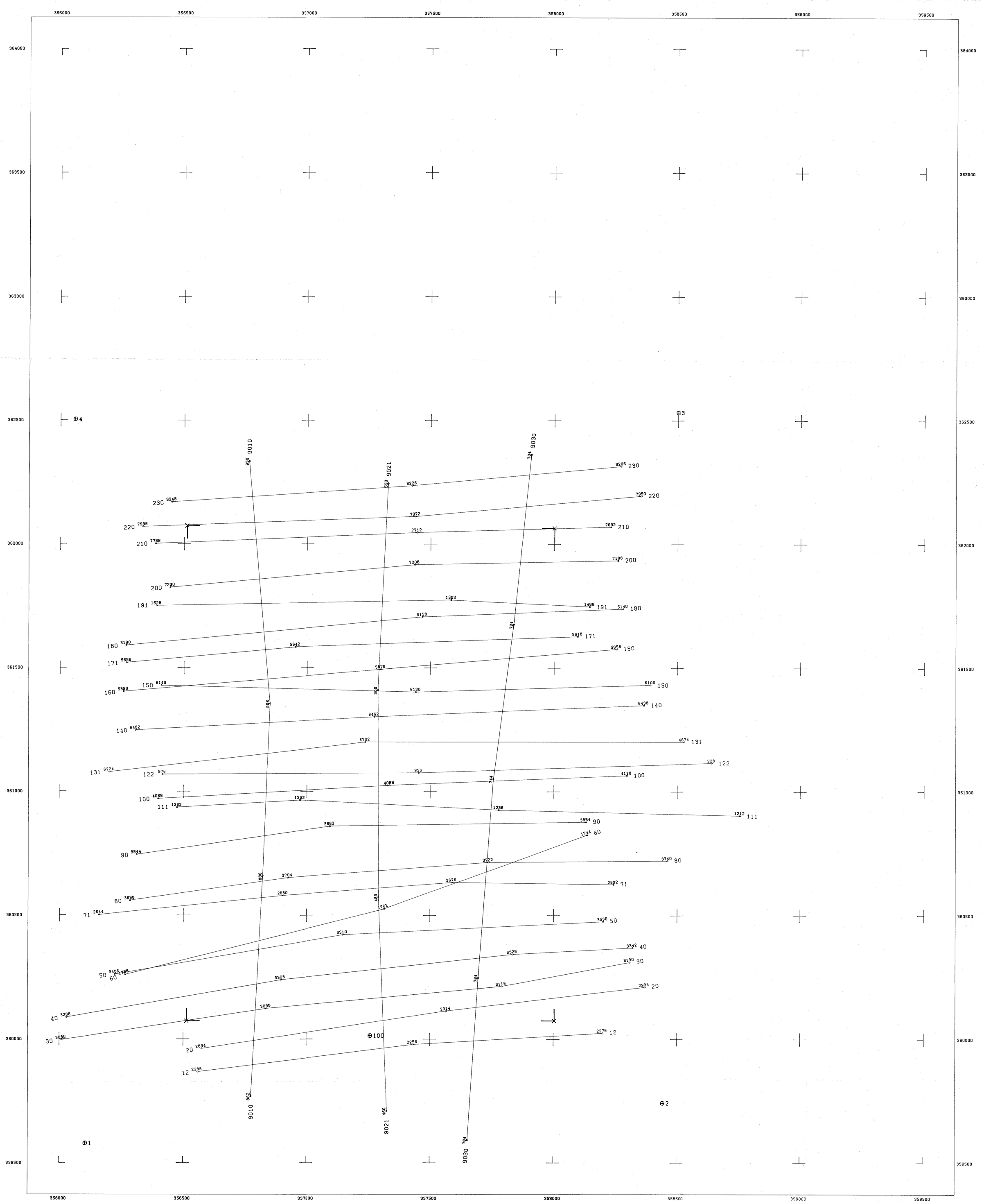
SURVEY BOUNDARY

BASELINE VALUE 62300 nT VERTICAL SCALE 500

PROJECT NUMBER 82631 SURVEYED DECEMBER 1981

Report No. 11861

TASh 605



Airborne Geophysical Survey and Compilation by GEOEX PTY LTD

for

C.R.A. EXPLORATION PTY. LTD.

MT. AGNEW AREA TASMANIA

FLIGHT PATH PLOT

SCALE 1:5000

0 100 200 300 400 500 METRES

5 cm

SURVEY LOCATION

8059

8238

662051

Navigation control was by reference to photomosaics and/or photo strips.
Flight path analysis was achieved by identification of 16mm. ground tracking photographs on the navigation control. The ground tracking camera was operated at a rate of one camera frame for two data samples, such that successive camera frames overlap.
An attempt was made to recover fiducials at intervals of 1.0 kilometre, and only recovered fiducials are shown on the map.
During processing the photomosaic was controlled using base maps supplied by the client, and this flight path map is an overlay for those maps.

SURVEY BOUNDARY

⊕ Registration point identified on photomosaic.

+ 500 metre grid, relative to arbitrary origin.

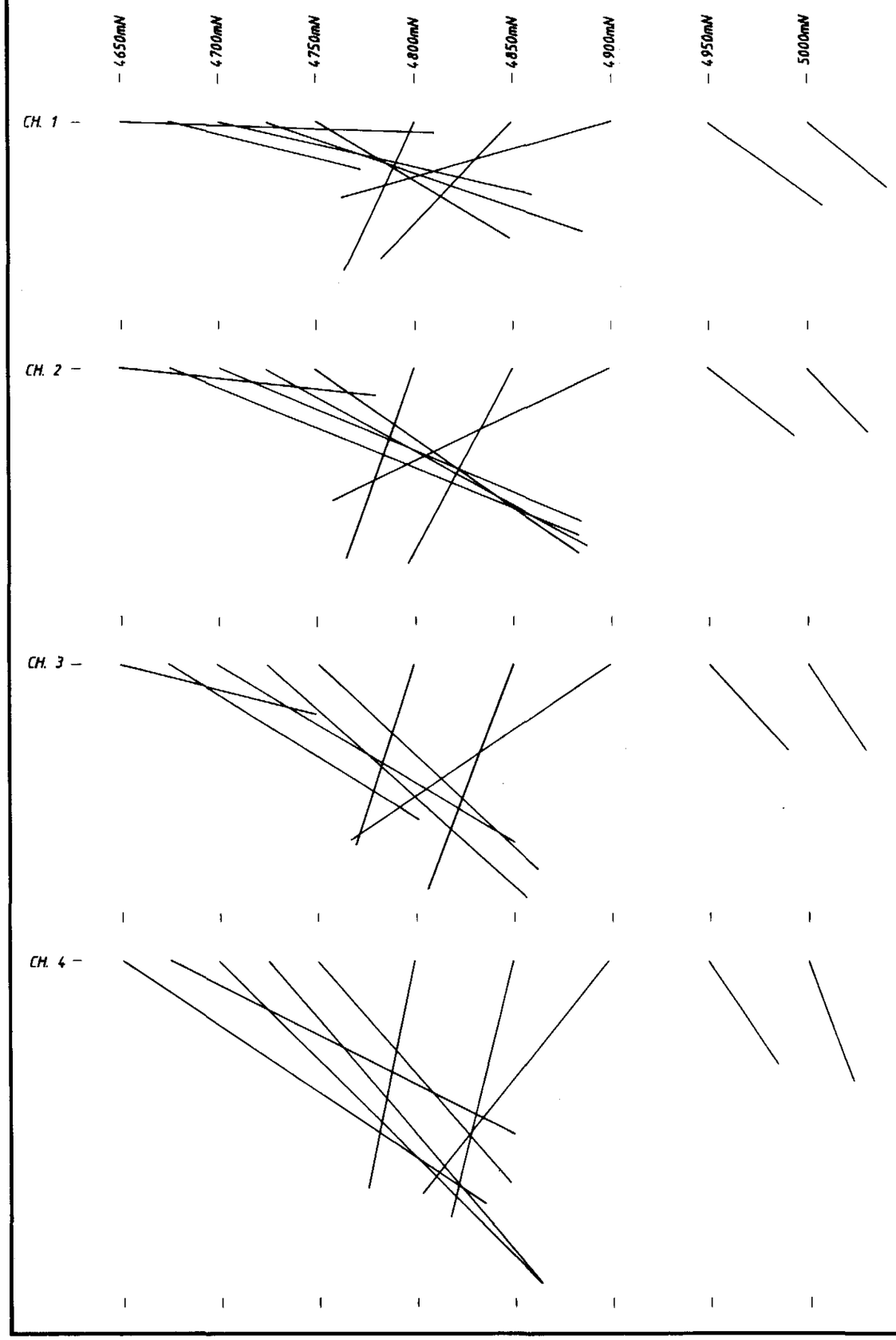
PROJECT NUMBER 82631 SURVEYED DECEMBER 1981

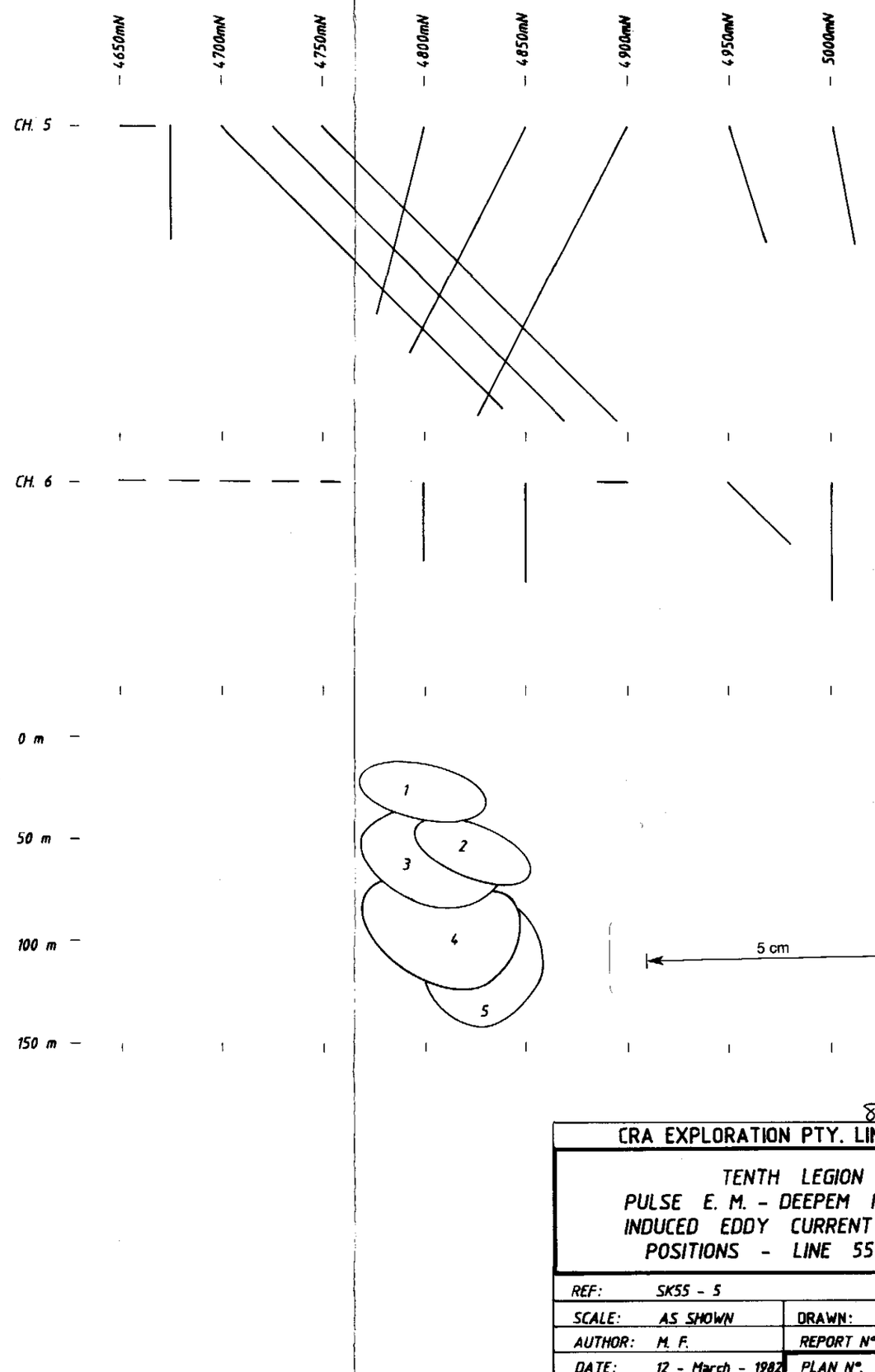
Report No. 11861

TASh 606

82-1883R

AGNE1 SCALE 5000





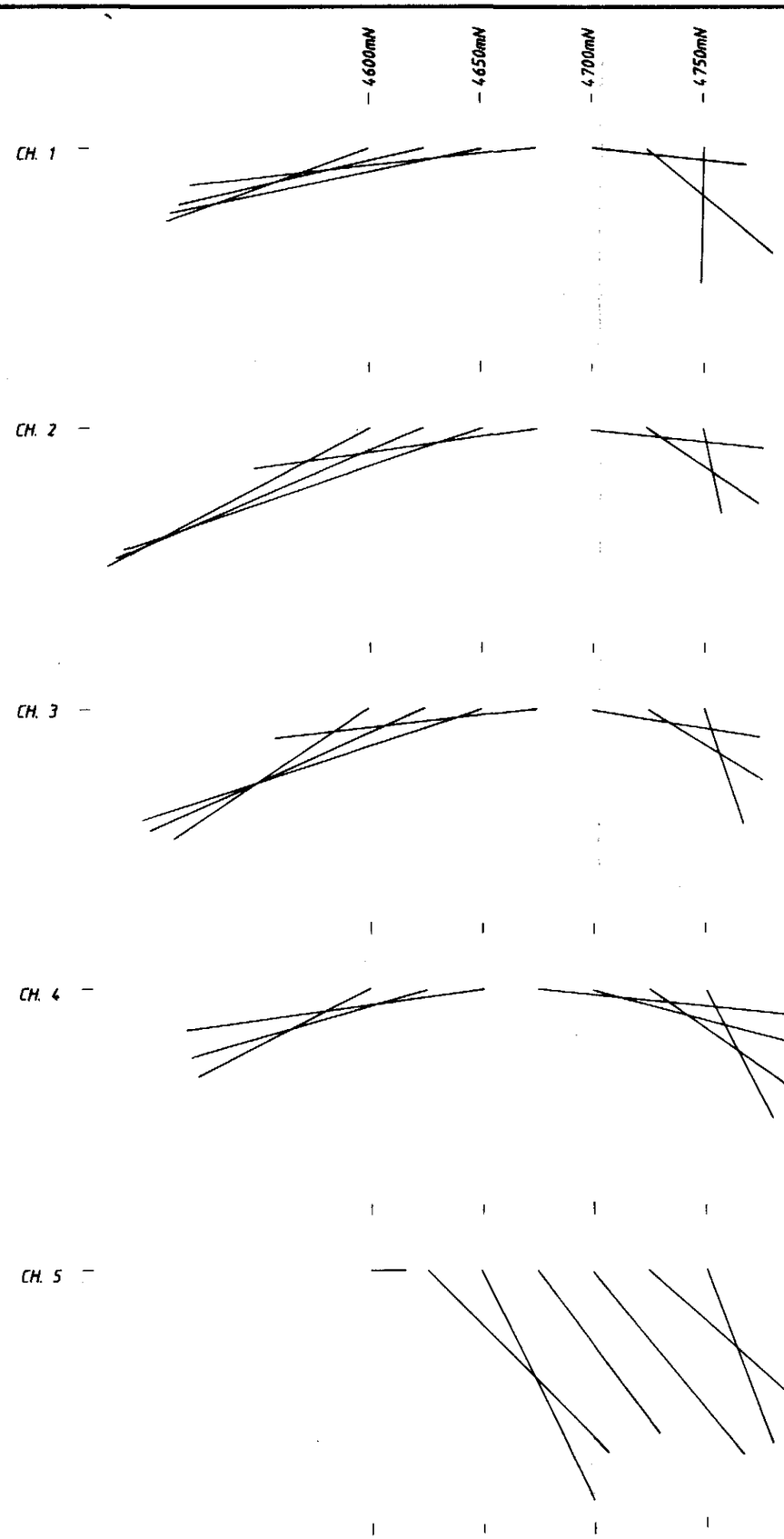
6309

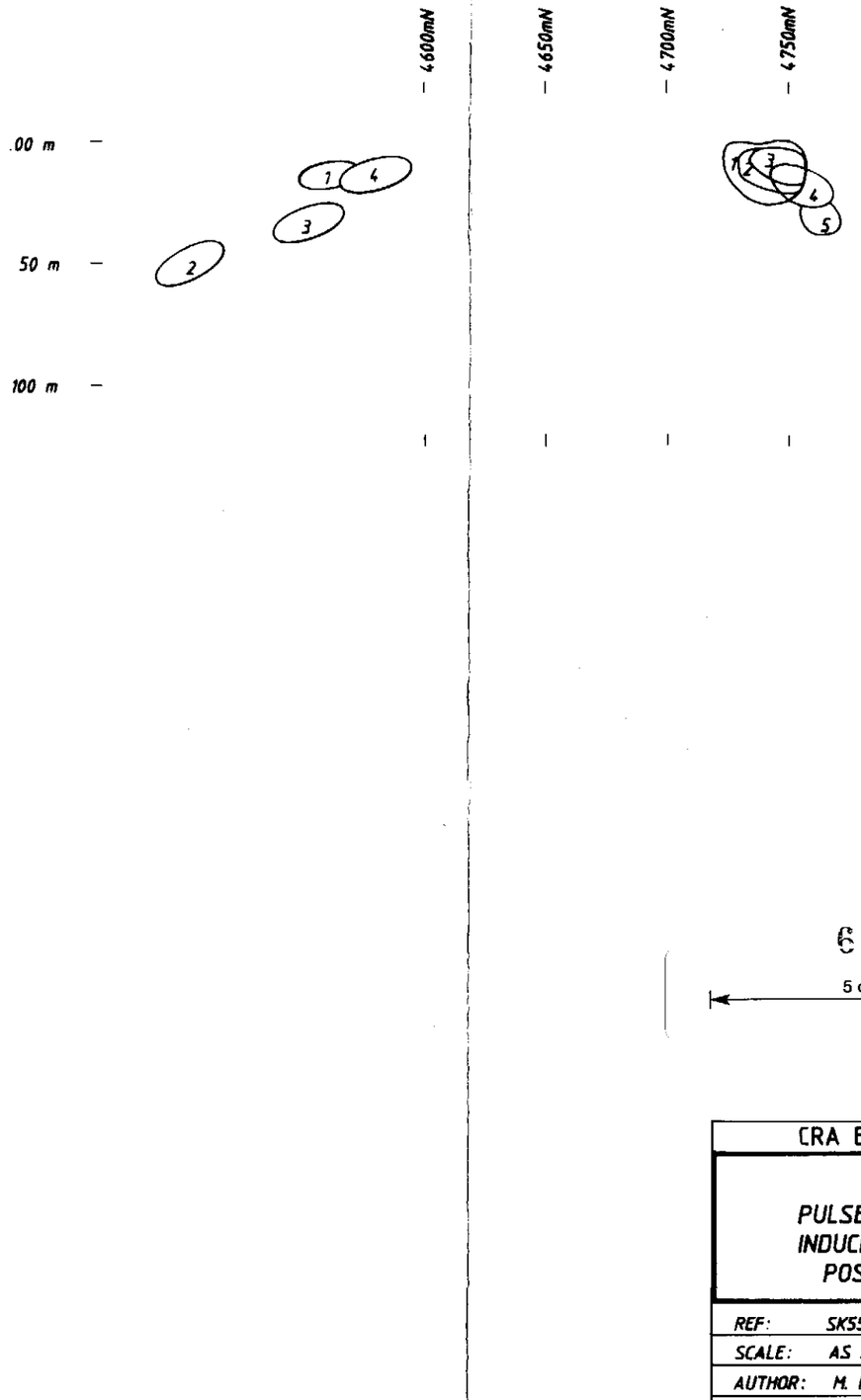
82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION
PULSE E. M. - DEEPEM METHOD
INDUCED EDDY CURRENT PATH
POSITIONS - LINE 5500mE

REF:	SK55 - 5		
SCALE:	AS SHOWN	DRAWN:	R.T.
AUTHOR:	M. F.	REPORT N°.	11861
DATE:	12 - March - 1982	PLAN N°.	TASh 671





662052

5 cm

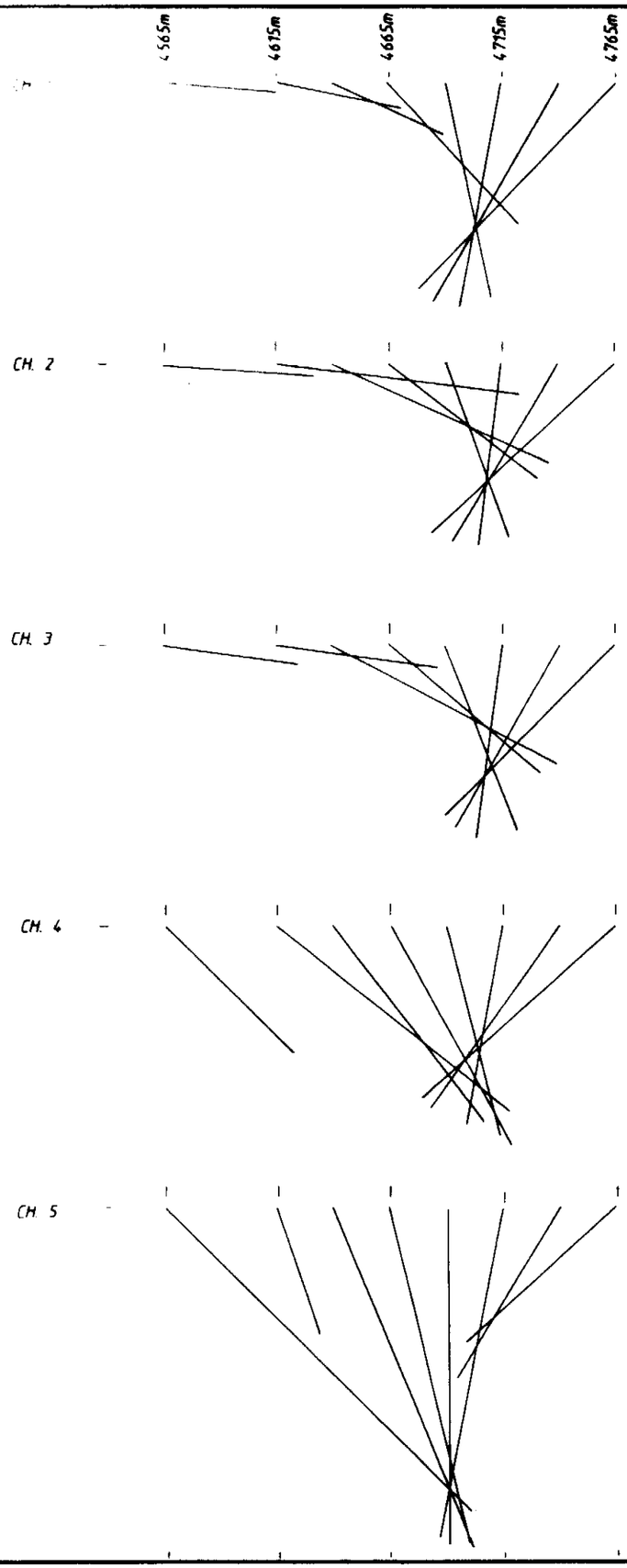
6310

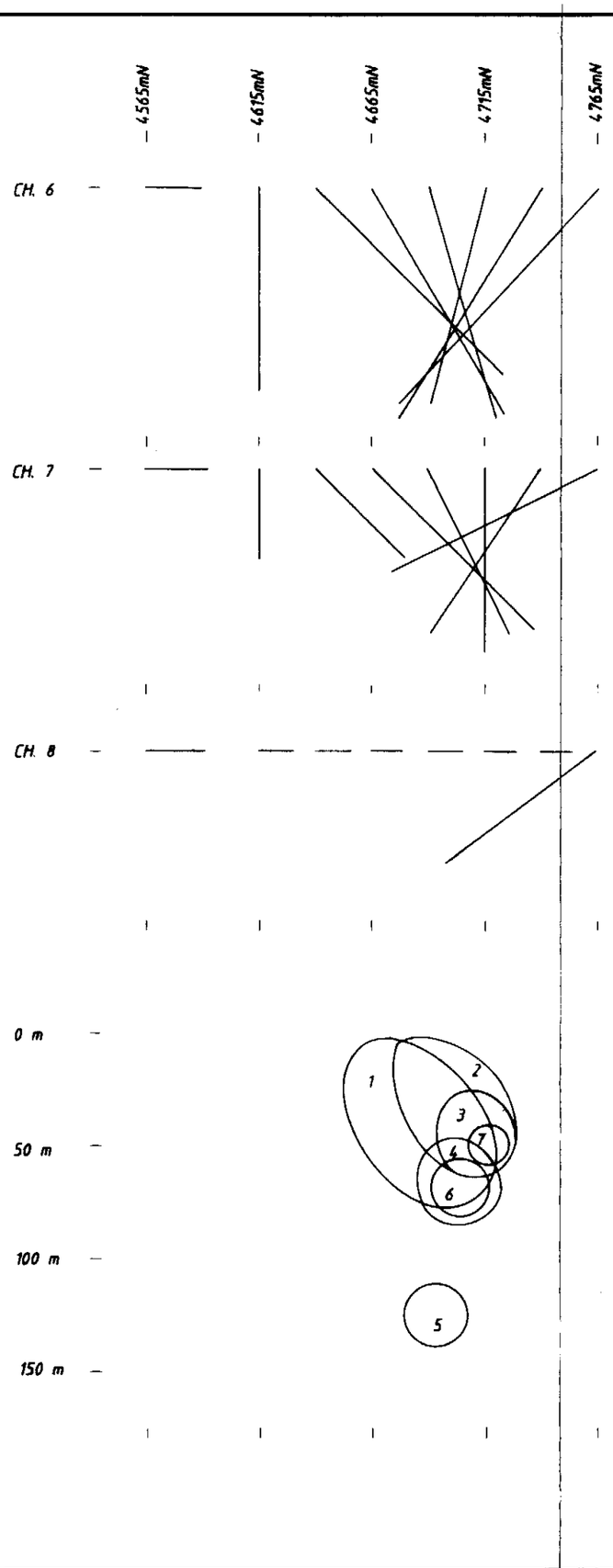
82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION
PULSE E. M. - DEEPEM METHOD
INDUCED EDDY CURRENT PATH
POSITIONS - LINE 5600mE

REF:	SK55 - 5		
SCALE:	AS SHOWN	DRAWN:	R. T.
AUTHOR:	M. F.	REPORT N°.	11861
DATE:	12 - 3 - 1982	PLAN N°.	TASh 672





662053

5 cm

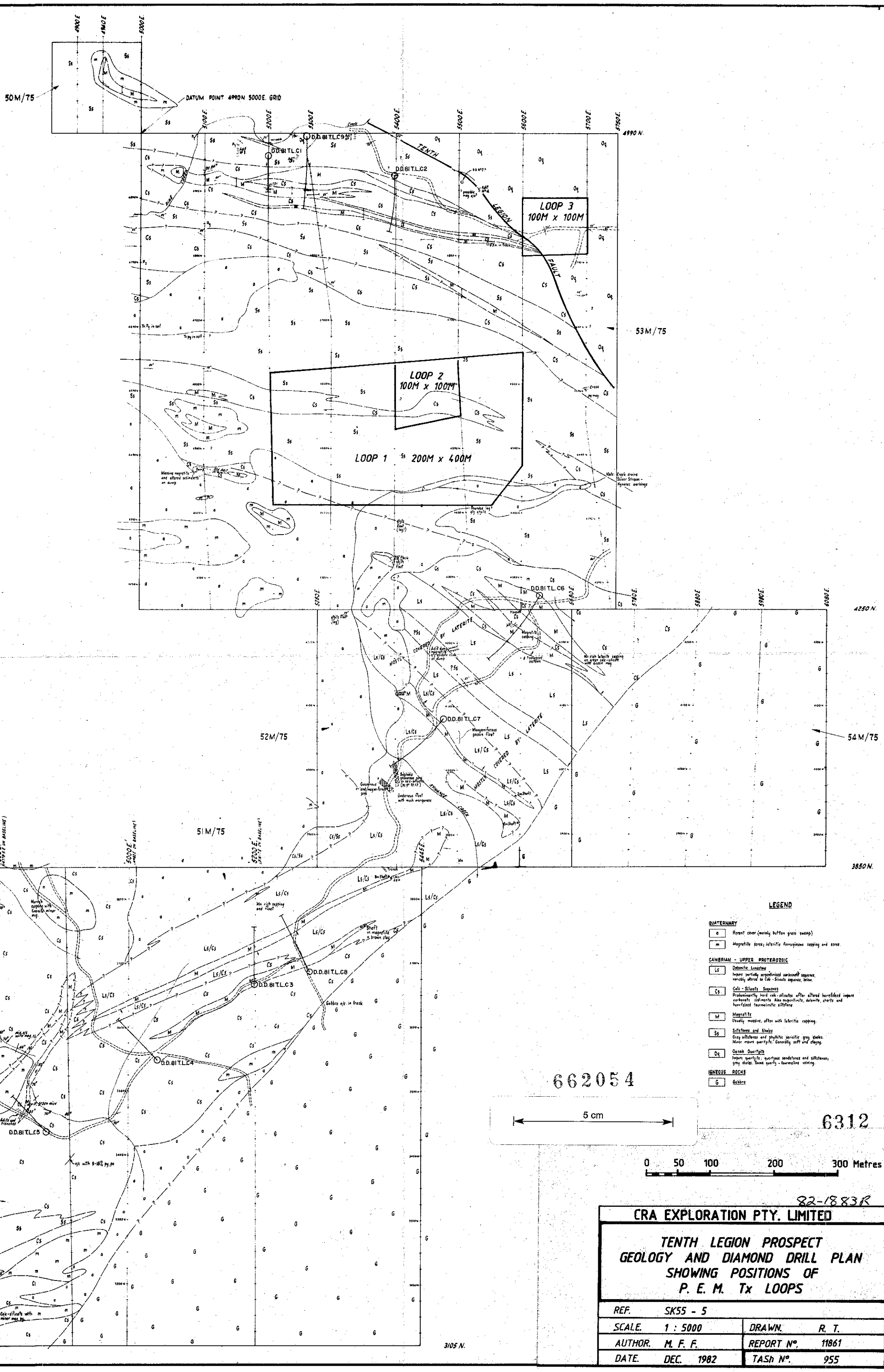
6311

82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION
PULSE E. M. - DEEPEM METHOD
INDUCED EDDY CURRENT PATH
POSITIONS - LINE 5700mE

REF:	SK55 - 5		
SCALE:	AS SHOWN	DRAWN:	R. T.
AUTHOR:	M. F.	REPORT N°.	11861
DATE:	12 - 3-1982	PLAN N°.	TASh 673



LEGEND

QUATERNARY

- a — Recent cover (mainly button grass swamp)
- m — Magnetite scree; lateritic ferruginous capping and scree.

CAMBRIAN - UPPER PROTEROZOIC

- Ls — Dolomitic Limestone: Impure partially serpentinised carbonate sequence, variably altered to Cale - Silicate sequence, below.
- Cs — Cale - Silicate Sequence: Predominantly hard cale-silicates after altered hornfelsed impure carbonate sediments. Also serpentinite, dolomite, cherts and hornfelsed tourmalinitic siltstone
- M — Magnetite: Usually massive, often with lateritic capping.
- Ss — Siltstones and Shales: Grey siltstones and phyllitic sericitic grey shales. Minor impure quartzite. Generally soft and clayey.
- Oq — Oonah Quartzite: Impure quartzite; quartzose sandstones and siltstones; grey shales. Some quartz - tourmaline veining.

IGNEOUS ROCKS

- G — Gabbro

662054

5 cm

6312

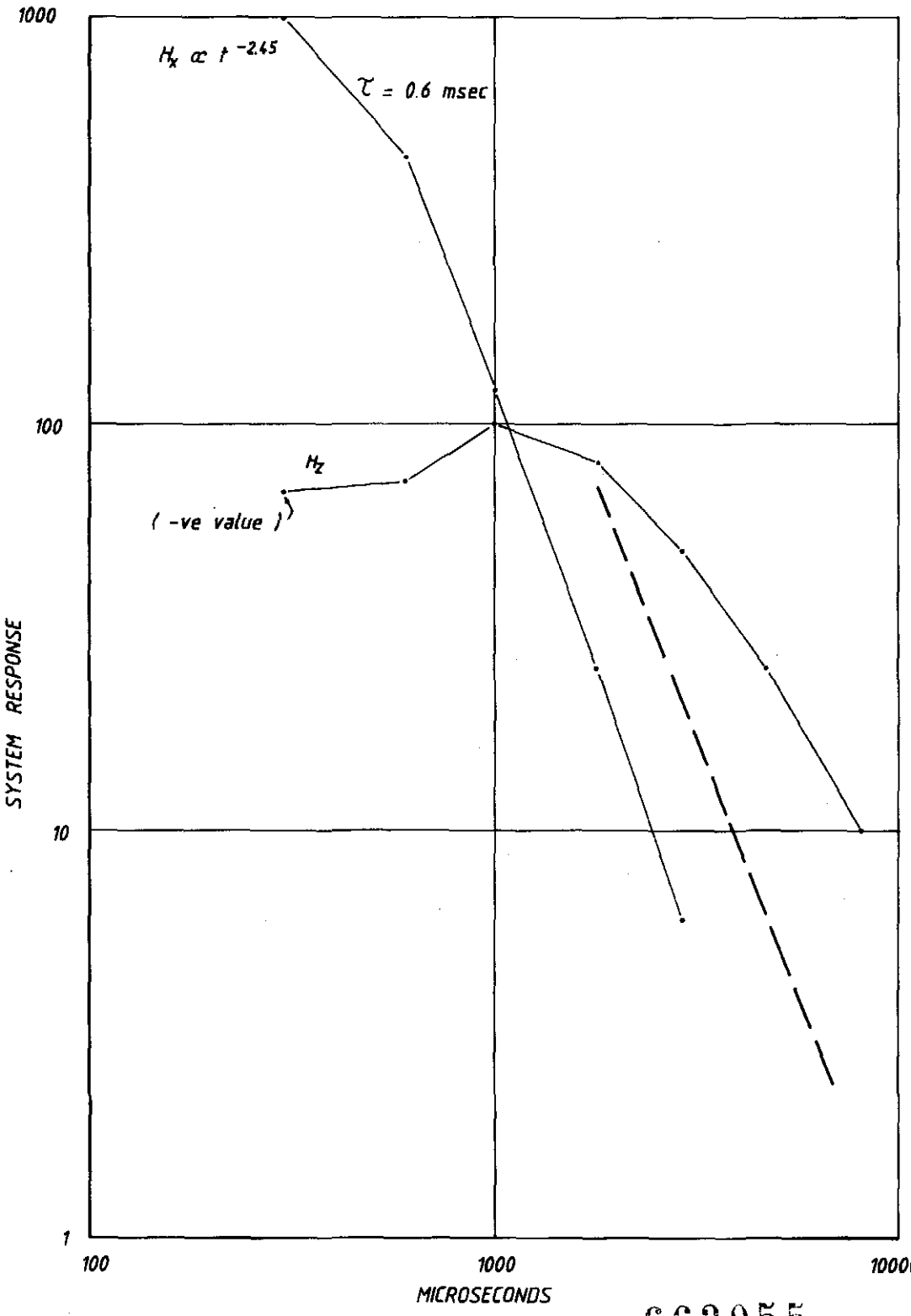
0 50 100 200 300 Metres

82-1883R

CRA EXPLORATION PTY. LIMITED

TENTH LEGION PROSPECT GEOLOGY AND DIAMOND DRILL PLAN SHOWING POSITIONS OF P. E. M. Tx LOOPS

REF.	SK55 - 5		
SCALE.	1 : 5000	DRAWN.	R. T.
AUTHOR.	M. F. F.	REPORT N°.	11861
DATE.	DEC. 1982	TASh N°.	955



6313

662055 82-1883/R

** NOTE **

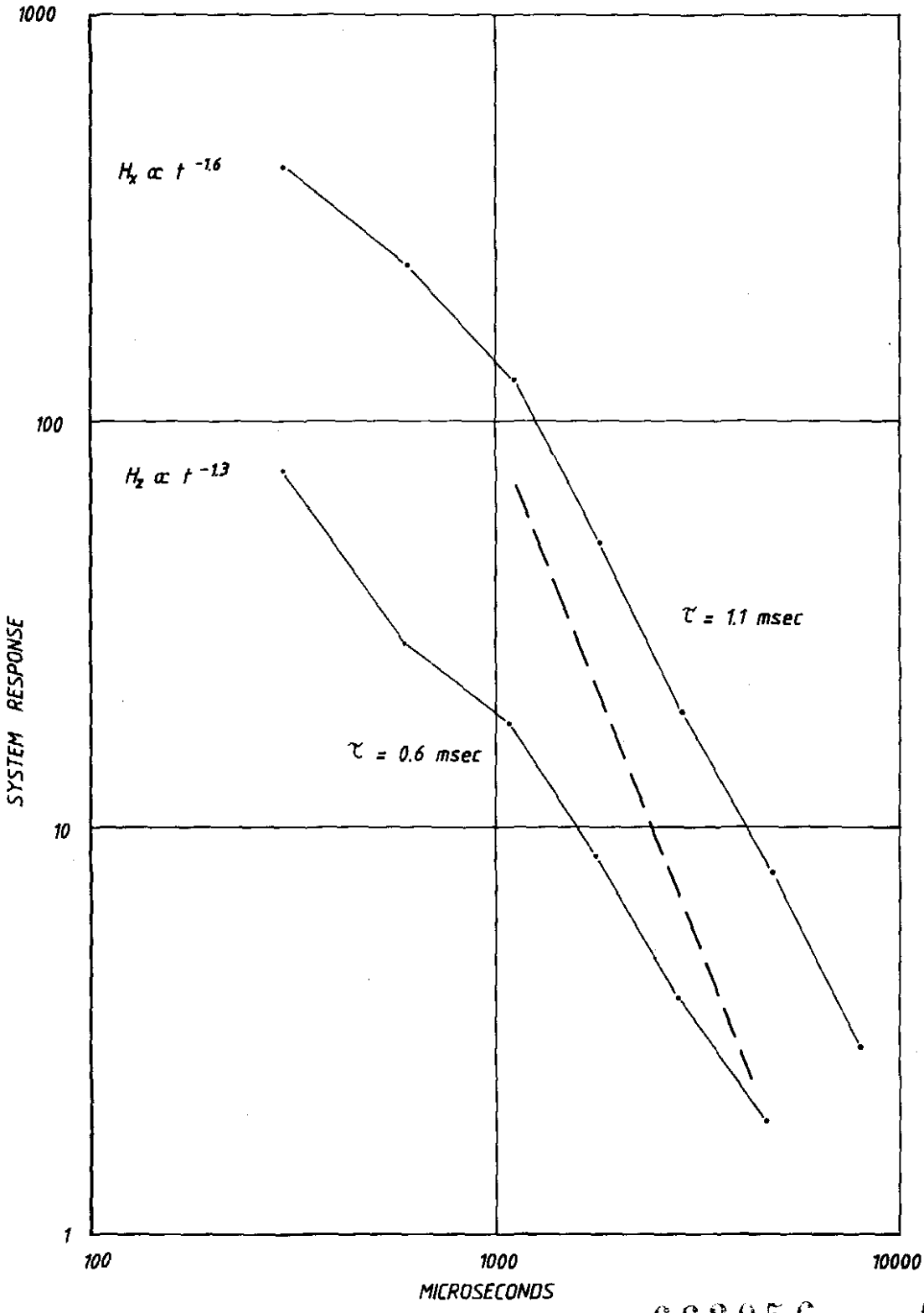
Theoretical Homogeneous Half Space Response shown as Dashed Line.

5 cm

CRA EXPLORATION PTY. LIMITED

TENTH LEGION
P.E.M. TRANSIENT DECAY CURVE
For: 5500 mE . 4300 mN
(LOOP 1)

REF.	SK55 - 5		
SCALE.	AS SHOWN	DRAWN.	R. T.
AUTHOR.	M. F.	REPORT N°.	11861
DATE.	NOVEMBER 1982	TASh N°.	956



662056 6314

** NOTE **

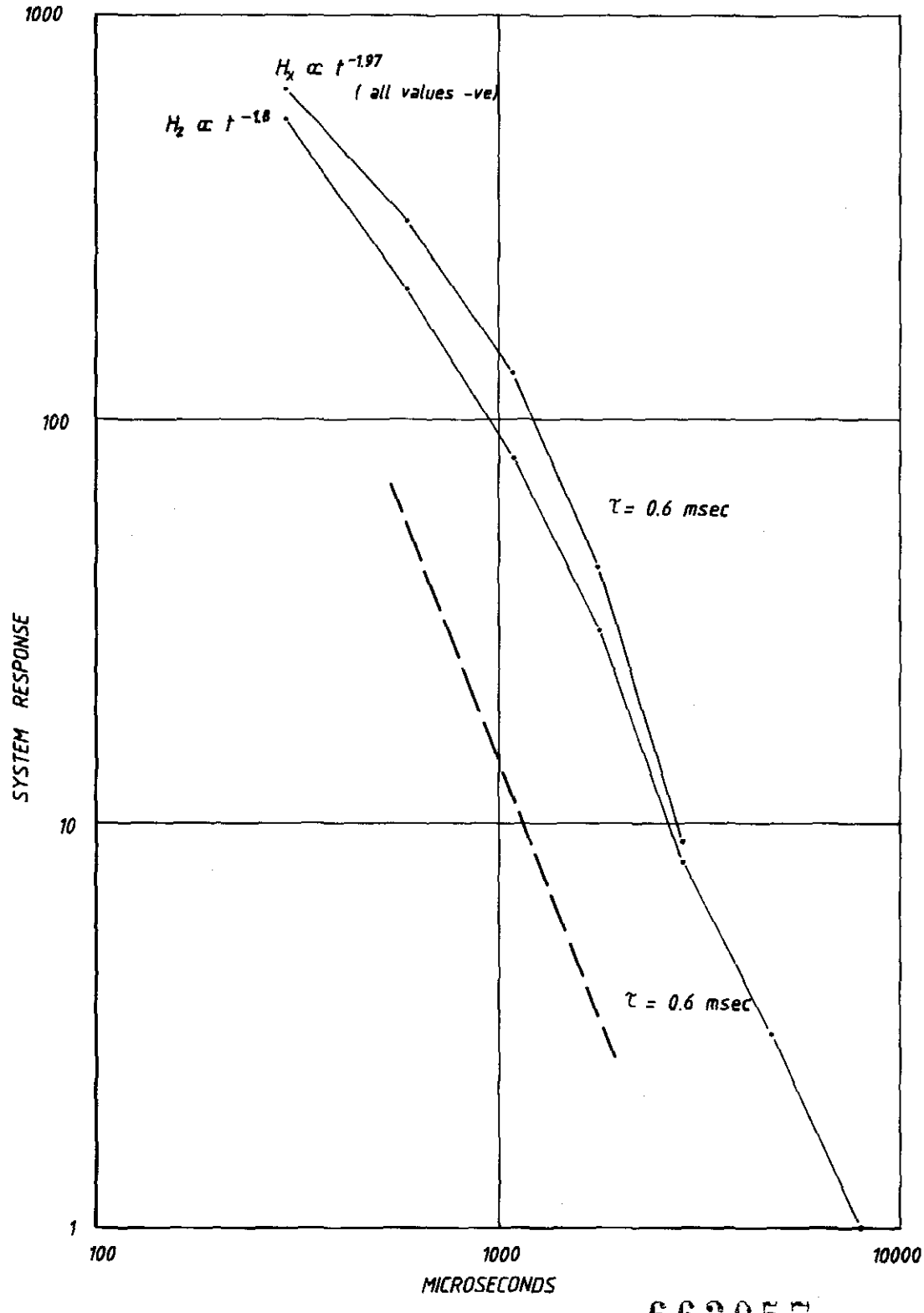
Theoretical Homogeneous Half Space Response shown as Dashed Line.

5 cm

CRA EXPLORATION PTY. LIMITED

TENTH LEGION
P.E.M. TRANSIENT DECAY CURVE
For: 5700 mE . 4715 mN
(LOOP 3)

REF.	SK55 - 5		
SCALE.	AS SHOWN	DRAWN.	R. T.
AUTHOR.	M. F.	REPORT N°.	11861
DATE.	NOVEMBER 1982	TASh N°.	957



662057

** NOTE **

Theoretical Homogeneous Half Space Response shown as Dashed Line.

5 cm

CRA EXPLORATION PTY. LIMITED

TENTH LEGION
P.E.M. TRANSIENT DECAY CURVE
For: 5600 mE . 4725 mN
(LOOP 3)

REF.	SK55 - 5		
SCALE.	AS SHOWN	DRAWN.	R. T.
AUTHOR.	M. F.	REPORT N°.	11861
DATE.	NOVEMBER 1982	TASh N°.	958