REPORT of GROUND EM SURVEY

JAMIESON II

1955

111 500'

63-775

Ground EM Jamieson II

INTRODUCTION

A ground electromagnetic survey was carried out by McPhar Geophysics Limited on the 29-claim group of Dominion Gulf Company's Jamieson II property. The location, accessibility and previous history of this property are adequately described in the Magnetometer Survey Report by C. W. Faessler ("References", No. 1).

The survey was commenced on June 30th, 1955. From then until August 7th, the crew consisted of two men, one of whom operated the transmitter and the other, the receiver. From August 7th until completion of the survey on August 15th, three men were used, two receivers in operation on opposite sides of the transmitter. The usual McPhar survey method was used. Three lines 400 feet apart were surveyed on either side of a stationary transmitter. The transmitter was then moved to a position on the third line, and the line of the original location was surveyed in addition to three new lines on the opposite side of the new set-up. The next transmitter location was on the seventh line beyond the second set-up. This new set-up was surveyed in the same manner as the first, and the whole process was then repeated. Lines were 2,000 feet to 2,400 feet long, with stations at 100-foot intervals. By using this procedure, "blanket coverage" may be obtained on a suitably shaped property with as few as 3 set-ups per 8 claims, an average of 12,000 feet of line being read per set-up, or 4,500 feet per claim. In the present survey, particular transmitter locations were chosen to give best possible coupling with features uncovered by the magnetometer survey. Basic coverage was obtained on the group of 29 claims with 13 transmitter set-ups. A total of 111,500 feet, or a little better than 21 miles, of line was surveyed. Of this, 9,300 feet were duplicated from two transmitter set-ups. Thus a total of 102,200 feet, or 3,500 feet per claim, of useful profile was obtained. Of the balance, roughly 500 feet per claim was under the river. The remaining 500 feet per claim was not surveyed because of inaccessibility or unfavourable survey conditions. One additional set-up was made, and 14,200 feet of line were surveyed in order to detail an anomalous area.

The equipment usedwas the McPhar vertical-loop, dual frequency apparatus. Two vertical triangular transmitting coils were fed by a 250 watt generator and tuned to 1,000 c.p.s. and 5,000 c.p.s., respectively. Two small multi-turn receiving coils, rigidly mounted in a box containing a clinometer, were used to measure the dips of the major axes of the polarization ellipses of the resultant electromagnetic fields at points along the survey lines. This was done by orienting the transmitting coils co-planar with each survey point in turn, and rotating the receiving coils about a horizontal axis through the planes of both receiving and transmitting coils. Audible signals were heard at both transmitter frequencies, and these reduced to minima when the axes of the receiving coils were perpendicular to the major axes of the two polarization ellipses. In the absence of surface or subsurface conducting bodies, the dip-angles should be zero everywhere. The measured dip-angles and information regarding the "quality" of the minima are related to the position, extent, attitude and nature of the conducting bodies.

The results of the survey, together with the writer's interpretation, are contained on the two attached maps. Dip-angles are plotted at a scale of 20 degrees to the inch at right angles to the survey line at each survey point. North angles, corresponding to north dips of the major polarization axis, are plotted to the east of the lines, while south angles are plotted to the west. The point on a survey line where the dip-angle profile crosses the line is called a "cross-over". If the profile crosses the line from east to west as the line is read southward, the cross-over is termed "normal". If from west to east, it is termed "reverse". The data are plotted on a map of the picket lines at a scale of 200 feet to the inch. A legend is provided describing the symbols used in the interpretation.

SUMMARY

A broad shear zone appears to traverse the property at a strike of 120°. A fault with this strike is observed near the centre of the zone at the bend in the Kamiskotia River. The zone is thought to be weakly mineralized in at least ten locations extending over a width of 800 feet and a strike length of 6,600 feet. The conductors are discontinuous and probably represent small replacement sulphide pods in shears in volcanic host rocks. The exact locations of the conductor axes are not known. The depth extent of the conductors may be fairly great. Some disseminated material appears to be mixed with the massive in several of the conducting bodies, and is spread very weakly over a large part of the shear zone.

Cross-faults with a strike of 15° to 20° cut the above mentioned shear zone in the south central part of the property. Where they traverse the shear zone, they appear to flatten out, cutting the zone roughly at right angles. They may resume their normal strike south of the shear zone. The faults appear to be fairly continuous, narrow, and dipping steeply to the southeast. Where they are mineralized, the mineralization appears to be of the fissure-vein type, the

bodies being very narrow, fairly massive and continuous over some considerable strike distance. Roughly 4,000 feet of conductor is suspected along the cross-faults.

RECOMMENDATIONS

It is recommended that further electromagnetic or electrical work be carried out in order to locate more exactly the positions of the strongest E.M. conductors. This work should be done with short range equipment, such as the Boliden or Turam E.M. apparatus, or by a resistivity survey using the Brandt "short-interval" method of profiling. Geochemical sampling should also be carried out.

Particular attention should be paid to the conductors numbered 3X on lines 0/00 and 8/00E, and to the conducting portion of fault number four.

INTERPRETATION

Some test work was carried out with the equipment to determine the accuracy of the data and to assess the personal factor in describing the "quality" of the minima. Errors of 2^0 in dip were found in several cases, even where the minima were sharp. Errors were greater on the 5,000 c.p.s. range than on the 1,000 c.p.s. Errors of up to 200% were found in the recorded widths of minima, while the ratios of widths on the two frequencies differed by as much as 100% between operators. The descriptions of the depths of the minima were inconsistent between operators, and were related more to the distance from the transmitter than to the out-of-phase component of the secondary field.

In the following interpretation of the attached data, the above sources of error were kept in mind. Cross-overs were examined for consistency on the two frequencies. Comparisons of data on overlapping profiles were made where possible. Widths of minima and width ratios were treated as unreliable in most instances.

Set-up No. 1

Nothing of significance shows up in the 1,000 c.p.s. data. The weak 5,000 cp.s. cross-over, 1X, may represent a conductor striking at about 120°. The two reverse cross-overs, 1RX, are thought to be caused by the addition of effects from the main conducting zone in the north and the small conductor at the south end of line 20W. The absence of 1,000 c.p.s. anomalies suggests that the south conductor is disseminated and of low conductivity.

Set-up No. 2

Weak cross-overs, 2X, are found on lines 8W and 4W at both frequencies. The 5,000 c.p.s. angles exceed the 1,000 c.p.s. by ratios of 2:1, on line 8W and 5:4, on line 4W. Two conductors are interpreted striking at 120° and dipping vertically. The bodies are thought to be small, mainly massive and of fair conductivity, increasing in size and in dissemination towards the east.

Set-up No. 3

A moderately strong cross-over, 3X, is found on line 0/00. Dip-angle ratios are high in the north, decreasing towards the south. The assymetry of the profiles is thought to be due to the effect of conductors 2X rather than to a dipping conductor. The body strikes at 120°, lies at fair depth (probably in excess of 100 feet), is partly massive and partly disseminated and decreases in grade rapidly to the east. On line 4E, a weak cross-over, 3X, lies in the river. South angles persist over most of the profiles, being much greater in the 5,000 c.p.s. than the 1,000 c.p.s. The profiles are thought to represent a broad, poorly conductive, disseminated zone with some massive material beneath the river. The zone continues east to line 8E, becoming more massive locally at cross-over 3X. It appears to pinch out sharply just west of line 12E. A cross-fault may be the cause of this pinch-out. Three conductors are interpreted on lines 16E, 20E and 24E. They are shown en-echelon, striking at 120°. The locations of the cross-overs, 3X, differ between frequencies, and because of interfering effects do not indicate the exact positions of the conductors. The anomalies are characterized by weak dip-angles, moderate to low dip-angle ratios and broad, irregular profiles. Some massive conducting material is believed to underlie the anomalies, becoming finely scattered or disseminated towards the south. The positions, 3X, may correspond to the regions of greatest mineralization. Mineralization is thought to be weak in this anomaly zone. The depth is probably not as great as was the case with the conductors to the west. The reverse cross-over, 3RX, and the appearance of the profiles on lines 20E and 24E near the river suggest conductors striking at 30° in the positions shown. The conducting material is mainly disseminated. The mineralization is more continuous along strike than is the case with the 120° conductors. Cross-faults numbers 1, 2 and 3 are postulated to account for this anomalous direction of mineralization and for the en-echelon appearance of the south conductors.

Set-up No. 4

The three lines, 28E, 32E and 36E, provide profiles which confirm the above interpretation of north-east trending conductors. The appearance of the profile at the north end of line 28E is consistent with a conductor to the west, striking at roughly 18° and dipping vertically or steeply southeast. Proceeding south, the profile shows a decrease in dip-angle size indicating a conductor in line 32E at 4RX. An anomaly at and south of the river indicates a stronger conductor at 4X on lines 32E and 36E. On line 32E, the reverse cross-over, 4RX, confirms the conductor there, while the strong anomaly to the south shows the marked effect of the conductor at 4X. The latter conductor strikes at 30° on line 32E, steepening to 17° east of line 36E. The dip is again steep and to the southeast. At the north end of the profile on line 36E, north angles are induced by the conductor to the west. Proceeding south, these give rise to south angles from the conductor to the east, causing the north cross-over, 4X. South of the river, the conductor crosses line 36E at 4X and swings west to 4X on line 32E. Cross-fault Number 4 is postulated to account for the strong conductors shown along its strike. The conducting bodies in fault number 4 have much the same characteristics as in the other faults. The conducting zone appears to extend over a strike length of up to 2,200 feet. It is very narrow, more massive than those to the west, and of considerable depth extent. The depth to the body at positions 4X is probably great. The appearance of the profiles near the river suggests that in this rather pronounced valley the overburden is thin and that the survey points here do not lie far above the upper edge of the conducting body.

<u>Set-up No. 5</u>

The profile on line 32E is consistent with the interpretation of a conductor at 4X. The conductor pinches out to the south and does not cross line 28E. Weak cross-overs on line 36E indicate a possible conductor striking at 120°. It is probably small, massive and very deep. The reverse cross-over, 5RX, on line 36E may be a reflection of this conductor. The reverse cross-overs, 5RX, on lines 28E and 32E are believed to indicate a mineralized zone in a cross-fault (number 5).

Set-up No. 6

Weak south angles are obtained on all lines from this set-up. These are believed to be due to mis-alignment of the transmitting coil rather than to any geological effects, such as a sloping bedrock surface.

Set-up No. 7

Weak south angles are again obtained and the same interpretation is made of them.

Set-up No. 8

The reverse cross-overs, 8RX, on lines 16E and 20E are induced by the conductor already interpreted in fault number 1. The anomaly and the reverse cross-over 8RX on line 24E are consistent with the interpretation of conductors shown in faults numbers 1 and 2. These conductors appear to be almost vertical and mainly disseminated. The strikes are 15° and 20°.

Set-ups Nos. 9 and 10

Weak south angles again appear, and are given the same interpretation as those of set-ups 6 and 7.

Set-up No. 11

Weak south angles are again induced on all profiles, probably by transmitter mis-alignment. Reverse cross-overs 11RX are produced by the main conducting zone at and south of the river.

Set-up No. 12

Weak south angles east of the transmitter may be due to transmitter mis-alignment or to a southward dipping bedrock surface. West of the transmitter north angles give way to south at cross-overs 12X on lines 16W and 20W. A northward dipping bedrock is postulated with minor 120° striking conductors at the cross-overs. These are of the same type as further east, but are shallower and probably only very weakly mineralized.

Set-up No. 13

Weak south angles show on the lines east of the transmitter, while north angles appear on the west. Transmitter mis-alignment cannot explain this phenomenon. A possible explanation is a bedrock surface dipping south from line 14W east and dipping north from line 16W west. This interpretation is consistent with that of set-up No. 12, and with the fact of outcrop appearing on lines 12W west, south and west of the river.

Set-up No. 14

This set-up was made in order to confirm the two directions of mineralization interpreted from set-ups Nos. 3 and 4. The new results checked very closely with the old, and the interpretation was not affected. Cross-overs 14X are displaced only slightly from cross-overs 3X and 4X. Thus, confirming their locations. A weak cross-over, 14X, appears just south of the river on the 1,000 c.p.s. profile only. This is thought to represent a small very poorly conducting body striking at 120°.

In reviewing the major features outlined above and weighing the information together with the geological evidence, strong support is found for the two postulated sets of conductors. The set of 120° striking conductors forms a zone some 800 feet wide and 6,600 feet long, itself striking at 120°. A fault is observed in rhyolite at the bend in the Kamiskotia River on line 12W. Temple ("Reference", No. 2) reports that the strike of this fault is 120°. Major shears of great length and roughly the same strike are common in the Robb-Jamieson area. These shears are usually found in the form of wide zones wherein the rocks are highly sheared and metamorphosed, though not always faulted. Mineralization in such zones is thought to seek the more open shears which are usually at the contacts of different rock types. At the KamKotia mine, three and a quarter miles to the northwest of the west end of the shear zone, sphalerite and chalcopyrite occur with pyrite and pyrrhotite as massive replacement bodies in a 115° striking shear zone at the contact of rhyolite and andesite. The main part of the ore body is less than 400 feet in length, but mineralization marked by gossan has occurred over a much greater distance throughout the shear zone. Cross-faulting has been observed in the southwest corner of Jamieson Township, four miles southwest of the mineralized portion of cross-fault number 4. There, a mineralized fissure-vein is continuous over 400 feet in a single outcrop. Sphalerite, pyrite and chalcopyrite occur in quartz, with moderate gold values where the chalcopyrite and pyrite are richest. Similar veins have been reported in Godfrey and Turnbull Townships. Shearing at 110° is observed in the Jamieson showing, with disseminated sulphides occurring in the shears. The structure and mineralization as interpreted from the results of the Jamieson II electromagnetic survey are notably similar to those reported by Ferguson and Berry ("References", No. 3) in the adjacent areas mentioned above

The writer postulates that sulphide mineralization is responsible for all the conductors in Jamieson II. Disseminated sulphides are thought to occur in small quantities over most of the shear zone, as shown on the attached 5,000 c.p.s. map. Massive sulphides occur as small replacement bodies in the vicinities of the indicated conductor axes. Mineralization in the cross-faults is thought to be of the fissure-vein type. A narrow sheet-like sulphide body of fair strike and depth extent is interpreted in fault number 4. In the other cross-faults, the mineralization is spotty and partly disseminated. The possibility of gold in these faults should not be overlooked.

N. R. Paterson

NRP:bh
Duplicate - Mr. Wyckoff

ATTACHMENTS

1. DGC Map - Electromagnetic Survey, Dip Angles, Jamieson II, Porcupine-Kirkland, Ontario - 42A/12S - Frequency 1,000 c.p.s. - Scales 1" - 200' and 1" - 20° - dated September 16, 1955.

2. DGC Map - Electromagnetic Survey, Dip Angles, Jamieson II, Porcupine-Kirkland, Ontario - 42A/12S - Frequency 5,000 c.p.s. - Scales 1" - 200' and 1" - 20° - dated September 16, 1955. - Interpretation by N. R. Paterson.

REFERENCES

1. DGC Interpretation of Ground Magnetometer Data, Jamieson II, Base Map 42A/12S - Porcupine Mining Division, Ontario - by C. W. Faessler - September 9, 1955.

2. DGC Detailed Geology, Jamieson II - Base Map 42A/12S - Porcupine-Kirkland, Ontario - by A. K. Temple - August 1, 1955.

3. "Geology of the Robb-Jamieson Area", by L. G. Berry and "Some Copper Properties in Robb, Jamieson and Godfrey Townships", by S. A. Ferguson - Ontario Dept. of Mines, Vol. 58, Part 4,1944 - pp. 15 - 25.

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REPORT OF GROUND MAGNETICS SUR

JAMIESON I

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Ground Magnetics Jamieson 1
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SUMMARY

The interpretation of the ground magnetometer data of a survey covering a group of 8 claims known as the Robb Section of the Jamieson I property held by Dominion Gulf Company, is presented on the accompanying map.

A number of diabase dykes are interpreted with a general north of northwesterly trend. Several deflections and changes in trend are suggested to indicate faulting. It is pointed out that anomaly D-6, although interpreted as diabase, could also be caused by a basic intrusive or possibly by a disseminated pyrrhotite mass.

Two anomalous zones, D-1 and D-2, have been investigated geologically, one on outcrop, the other by trenching, and have been found to be caused by minor amounts of pyrrhotite at or near the surface.

Another group of anomalous zones, labelled with the prefix A, are shown to parallel the geological trend of the area. It is shown that the data presented by a diamond drill hole through one of these zones, do not explain the anomaly A-1.

INTRODUCTION

This report presents the interpretation of the data collected during the ground magnetometer survey of a group of 8 contiguous claims known as the Robb Section of the Jamieson I Claim Group held by Dominion Gulf Company. As its designation implies, this group of 8 claims consists of that part of the Jamieson I property which is located in the unsurveyed Robb Township, Porcupine Mining Division, Ontario. These claims are numbered P-38476 to P-38482 inclusive and P-38788.

A north-south and east-west grid system was established by extending westward the concession line III-IV of Jamieson Township. North-south picket lines were turned off perpendicular to this base line. Tie-lines were cut along the northern and southern boundaries of the claim group .

The basic coverage consists of 50 foot readings along lines 200 feet apart. Where strong magnetic gradients were encountered, intermediate 25 foot readings were obtained. Five old northeasterly trending lines were found along the northeastern tie-line, and were cleaned out and re-chained. These, in conjunction with pace and compass traverses, were used in obtaining detailed magnetic data over an area of very steep magnetic gradients.

The instruments used are Askania-Schmidt type vertical component magnetic balances having a sensitivity of about 20 gammas per scale divisions. With these instruments, 1890 readings were read along 16.72 miles of chained picket lines, and 125 readings along 3300 feet of pace and compass traverses. The grand total is therefore 2015 readings obtained along 17.35 miles of picket lines and traverses, or an average of 116 stations per line mile.

The basic coverage of this claim group was obtained by R. M. McDonald, operator, assisted by D.H. Peters, during the months of January and February 1955. The detail data were collected by R. Hodgins operator, assisted by G. West, R. J. Buck and D. H. Peters at various times during the months of June and August 1955. During each of these surveys, a preliminary draft was made in the field, and the data were later checked, reprocessed and interpreted by the Dominion Gulf Company staff in Toronto.

The combined results of these surveys and the interpretation of the data are presented on the attached map, at ascale of 1 inch to 200 feet and with contour intervals of 100 gammas. This map includes an insert covering the detailed area, at a scale of 1 inch to 50 feet and contour intervals of 1000 gammas.

Other work done by the Company on this group of claims consists of a detailed geological survey (Report by A.K. Temple), an electromagnetic survey, a geochemical survey of the soil, and three diamond drill holes. The geological survey indicated an outcrop area in central claim P-38479, of rhyolitic lavas cut by a small acidic plug and by a basic intrusive of unknown shape. A small showing of pyrite and pyrrhotite is observed in the rhyolites. The electromagnetic survey revealed a number of weak conductors which are shown on the accompanying map and are numbered E-1 to E-4 inclusive. The geochemical survey revealed no anomalous metallic concentration in the soil. The diamond drill holes, drilled at a nominal 45 degrees inclination, cut andesitic lavas only. The vertical depth of overburden is: in D.D.H. No. 56-4, 125 feet, in No. 56-5, 145 feet, and in No. 56-6, 95 feet. D.D.H. No. 56-4 intersected a zone of weak mineralization (5% sulphides over 35 feet, mostly pyrite and little pyrrhotite) which coincides with the electromagnetic conductor E-1. D.D.H. No. 56-5 indicated another zone composed of narrow seams of 20% to 50% pyrrhotite which average out to 1.5% pyrrhotite over 7 feet. This zone coincides with conductor E-2. This hole also intersected a strong shear zone about 1 foot wide near the bedrock surface. D.D.H. No. 56-6 encountered a weak shear zone which coincides with the electromagnetic conductor E-2, but the drill core revealed no mineralization.

INTERPRETATION

The ground magnetometer survey revealed a number of magnetic anomalies of various sizes, shapes and intensities. Some are easily recognizable by their trend, continuity and intensity as diabase dykes. In this region, diabase dykes are known to be sometimes deflected by pre-existing structural features although these deflections cannot be magnetically distinguished from actual displacements. On the accompanying map, the diabase dykes are shown cutting the interpreted faults but with the understanding that one or more, of the dykes may also have suffered displacement by the faults.

In the west, diabase dyke D-1 is shown to divide into dykes D-2 and D-3. There is a good possibility that the wide dyke D-1 is actually two dykes located so close to each other that their magnetic anomalies coalesced to produce the wide anomaly observed.

Some 1500 feet to the east of D-2, another dyke, D-4, is seen to trend north-northwestward into claim P-38478 where it reveals two abrupt changes in trend within 700 feet, first to northeast and then to northwest, where it is labelled D-5. Similar changes in trend, but not quite so sharp nor so severe, are observed on the interpreted dyke labelled D-6 and D-7. This interpretation as shown on the accompanying map is thought to be the most probable, but not the only one possible. Minor alternatives are that the various segments of dykes meet or cut each other, in the northeastern corner of claim P-38478. But a major one is that segment D-6 is not diabase at all, on the basis of its lack of continuity southeastward, and its unusual trend for a diabase dyke. These objections can be partially answered as follows:

(1) Although characterised by their continuity, diabase dykes must have ends somewhere. The fact that so few ends of dykes have been observed so far is only an indication of their great continuity.

(2) The unusual northwesterly trend over some distance has been observed on at least two other dykes on the Company's Jamieson I property.

(3) The calculated susceptibility for the causative body is 0.004 c.g.s. units for a dike-like body approximately 150 feet wide under 70 feet of overburden. Such a susceptibility is well within the range of that of a diabase dyke.

For these reasons, the interpretation of D-6 as a diabase dyke is preferred by the writer. However, should this be incorrect, the calculated susceptibility indicates that the body described would have to contain about 1.5% magnetite or 20% pyrrhotite. The presence of that amount of pyrrhotite should have been detected by the electromagnetic survey but was not. This could be considered to be conclusive that such an interpretation is incompatible with the available data. However, the electromagnetic method is known to have overlooked richer disseminated sulphide deposits in the past, and therefore there is a possibility that D-6 is a disseminated magnetic sulphide body. The other possibility, that of a 1.5% magnetite content, is quite in order for a sill-like basic intrusive; some basic intrusives have been found along the edges of the main outcrop in central claim P-38479 but there, they are non-magnetic. Such a magnetite content is thought to be improbable for an andesite band, and is unheard of for a rhyolite band.

Several faults or shear zones are interpreted on the basis of the attitudes of the interpreted diabase dykes. Fault F-1 is clearly indicated by the deflection of dyke D-4 to D-5 and D-6 to D-7. F-1 can be extended northeastward on the basis of a ground magnetometer survey which covered the area to the north of this property and which was published by Hollinger Consolidated Gold Mines Limited.

The dike D-4 reveals another deflection near the southern limit of the property. Near D-1, the electromagnetically indicated weak conductor E-3 is on strike with the fault indication at D-4. It is therefore suggested that fault F-2, trends west-northwesterly, and is weakly conductive over part of its length to the east of D-1. Another weak conductor, E-4, is indicated to the west of D-1, about 300 feet south of the strike extension of E-3. It is believed that E-4, being quite similar to E-3, is caused by similar conditions as E-3, and therefore indicates fault F-3. The abrupt branching of D-1 into D-2 and D-3, strongly suggests fault F-4. The extension southwestward of fault F-1 intersects the diabase dyke in the same area as the other faults. It is therefore impossible to deduce the relationship between these various segments of faults.

Two anomalous zones have been labelled P-1 and P-2. P-1 is located on the outcrop in claims P-38479 and is caused by relatively small amounts of pyrrhotite at the surface. The zone P-2 is located in the northeastern corner of claim P-38477 and coincides with the electromagnetic conductor E-1. The detailed survey over this zone, as shown in the insert on the accompanying map was made to locate shallow depths of overburden. Trenching confirmed that the magnetic relief was due to pyrrhotite averaging 10% at very shallow depths. Zone P-2 ends fairly abruptly while the conductor E-1 is traced well into Jamieson Township. The core of drill hole No. 56-4 between lines 8+00W and 10+00W in claim P-38476, showed about 5% pyrite over 35 feet but little pyrrhotite. This, plus the difference in depth of overburden at P-2 and at D.D.H. No.56-4, explains the lack of magnetic relief east of zone P-2.

A last group of anomalous zones have been labelled A-1, A-2, A-3 and A-4. Zones A-1 and A-2 are believed to be one zone cut by P-2. Zone A-1 is traced southeastward into Jamieson Township where J. H. Ratcliffe labelled the individual anomalies 1, 2,4,5 and 10. These anomalies are thought to be related to similar rock formation. Their trends appear to correspond to the geological trend in this area. Diamond drill hole 56-5, which was drilled to investigate the conductor E-2, presents some useful data on the southeastern part of zone A-1. This drill hole intersected a sulphide mineralized zone, about 7 feet wide, which corresponds to conductor E-2. The mineralized zone is formed of narrow seams, two inches or less in width, containing pyrrhotite (up to 50%) and a little pyrite.

However, the average pyrrhotite content for the 7 foot wide mineralized zone is only about 1.5%. This pyrrhotite is clearly the observed conductor E-2, and cannot produce the magnetic anomaly of zone A-1. Three core samples of hole 56-5 were available and were submitted to magnetic susceptibility determination. The results were 0.00015, 0.00027 and 0.00023 units, or an average of 0.00022 c.g.s. units. However a minimum susceptibility of 0.001 c.g.s. units is required, or almost 5 times that observed in the core samples, to obtain the observed central values in the case of a dyke-like body. If it is assumed that the magnetic material is concentrated above the drill hole or below it, the susceptibility must be in the order of 0.004 c.g.s. units. On the basis of these considerations, the anomalous zone A-1 is far from being explained. Several possibilities are seen:-

(1) the three samples on which the susceptibility determinations were made, form a non-representative sample, and the average susceptibility of this andesite band is actually in the order of 0.001 c.g.s. units.

(2) the magnetic material is concentrated above or below the drill hole. The calculated susceptibility of 0.004 c.g.s. units would imply about 20% pyrrhotite alone or 1.5% magnetite alone, or a mixture of lesser amounts of both. If pyrrhotite is present to that amount elsewhere along zone A-1 and along similar zones, it could possibily be overlooked by the electromagnetic method, if it is well disseminated, and therefore the absence of a general response to this method by zone A-1 would be explained.

RECOMMENDATIONS

The areas of greatest interests at present are the A anomalous zones. Their causes are still quite uncertain and should be determined. The first step is a systematic sampling and susceptibility determination of the core of drill hole 56-5. It is suggested that samples be obtained at every five feet along the drill core and these samples be submitted to susceptibility determinations. If the average susceptibility so obtained is in the order of 0.001 c.g.s. units or better, then zone A-1 is explained and loses its economic interest. But if the susceptibility is in the same order as that of the previous samples, then it is recommended that a drilling program be established to explore the regions above and below drill hole 56-5.

It has been shown that anomaly D-6 could be caused by a disseminated magnetic sulphide body although the writer prefers the interpretation of a diabase dyke. It is recommended that these alternatives be verified by a drill hole located at 6+00 N on line 12+00 W, drilled to S 45° W at an inclination of 45°. This proposed drill hole would have the added advantage of exploring at the same time, zone A-3, Anomaly D-6, and another section of the conductor E-2, with a maximum down-hole length of 500 feet.

C. W. Faessler.

ATTACHMENTS

(1) Dominion Gulf Company - Ground Magnetometer Survey, Robb Section Jamieson I, 42 A/12S, Scale 1 inch = 200 feet, Contour Interval 100 gammas, September 7, 1956.

REFERENCES

(1) Dominion Gulf Company, Ground Magnetometer Survey, Robb Section Jamieson I (plus part of Robb I and Kamiskotia Mine), 42 A/12S, Scale 1 inch to 200 feet, Contour Interval 100 gammas, May 5, 1955.

(2) Dominion Gulf Company - Interpretation of Ground Magnetometer Survey, Jamieson I, by J. H. Ratcliffe, November 12, 1954.

(3) Dominion Gulf Company - Detailed Geology, Jamieson I (Robb Section) by A.K. Temple, July 12, 1955.

INTERPRETATION OF GROUND MAG SURVEY

JAMIESON I

40,750'

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INTRODUCTION

In this report is found the interpretation of the ground magnetometer survey performed on the eight claim group of the Jamieson I property held by Dominion Gulf Company in Jamieson Township, Porcupine Mining Division, Ontario. The claims involved are P-40495 to P-40502 inclusive.

The group was surveyed in June, July and August, 1956 by R. Hodgins, N. Stewart and W. Gannon assisted at various times by F. Deacon, W. Langley, W. McReynolds and P. Murtha. Progress was slow on the property due to the problems of rapidly changing personnel and by the presence of the Kamiskotia River hindering access to the property.

The instrument used was a Schmidt-type vertical component magnetic balance with a sensitivity of about 20 gammas per scale division. This was used to survey N-S picket lines which had been previously cut and chained and spaced 400 feet apart. Readings were taken at intervals of 50 feet on all the N-S lines with E-W tie-lines being surveyed wherever possible.

The survey involved a total of 40,750 feet of line, this including 835 stations read.

The data was reduced and checked in the field and then re-checked and plotted by the Dominion Gulf Company staff in the Toronto office.

SUMMARY AND RECOMMENDATIONS

In this group of claims have been traced four main diabase dikes D-1, D-2, D-3, D-4, all trending in a northwesterly direction, but showing up a major zone where they have been offset, just to the north of the Kamiskotia River. On dike D-2 was shown a major feature where apparently the dike in intrusion invaded a previous zone of weakness and flowed out in both directions from the dike itself.

Further to the south, dike D-1 has a more westerly trend and is not such a sharp feature. It appears then, that this dike was an invasion along a fault, shear or even a geological contact.

In the area four anomalous zones have been indicated. These tend to run more east-west than the apparent general strike of the rocks of the country. A-3 has been interpreted as a magnetic band of greenstones and the others may be of a similar nature in some way associated with the faulting indicated on the dikes in the vicinity.

It is suggested that the economic prospects based on magnetic results alone are not significant but the geology interpreted in the area may be a significant controlling feature. It is recommended then, that if any of the adjoining properties come under consideration that an extensive program of detail work be done including the running of 200 foot lines N-S and a series of E-W pace and compass traverses where interpreted features require it.

INTERPRETATION

The basic data on this property shows a relatively flat picture with four major diabase dikes trending slightly west of north. Without a more detailed coverage it would be hard to pick out minor features in the diabase dikes indicative of the faulting as was interpreted to the south of this area. However, it appears that the shearing that was encountered to the south in such great profusion is not so evident here and two major planes of weakness are the only outstanding features interpreted from the dikes in the area. These are marked on the interpretation map with this report as single faults, but are probably features several hundred feet wide.

Dikes D-2, D-3 and D-4 are the long sinuous features, with exactly the same appearance as other dikes encountered in this area. Dike D-1 on the other hand, has a north-westerly trend on this sheet but to the south assumes the appearance of other dikes in the area and runs north-south. It is, on this map sheet, a much broader feature than is encountered elsewhere and indicates different susceptibility conditions. This is possibly due to a contamination of the intruding magma along this plane of weakness, or may be merely a depth effect. This dike probably represents a major fracture as the magnetics of the property to the west show the north-south trending diabase dikes as being offset where they intersect this feature. Since faulting is not believed to have occurred since the intrusion of these dikes this feature must have existed at that time. Of course dike D-1 may have been intruded at an earlier stage than the other dikes of the region, but due to its continuity with the dike interpreted by C. Faessler in the claim group to the south as D-10, this interpretation appears improbable.

Anomalies A-1, A-2, A-3 and A-4 are not well defined by the present coverage and it is not certain what they represent. A-3 has been interpreted as a magnetic band of greenstones in a country rock mainly composed of rhyolite. It might also be associated with the general shearing in the vicinity. It is probable that A-2 and A-4 are features associated with shearing. A-1 appears to be a body dipping to the north and again is probably associated with the shearing in this area.

It is interesting to note that to the north of the river there is a sharp change in appearance topographically. To the south there is a series of sharp ridges while to the north there occurs a flat rolling sand plain. This may be associated with major faulting in the area and in fact sharp changes in direction of the Kamiskotia River may be due to this. The overburden is apparently not too thick in the area as there are rapids in this section of the river. Moreover just to the north of the river the diabase dikes appear to have a much sharper magnetic relief indicating the probability that the block north of the river was uplifted with respect to the southern block.

D. Strangway.

REFERENCES

(1) Dominion Gulf Company - Interpretation of Ground Magnetometer Survey - Jamieson I, Concession III, West Half, by C.W. Faessler, August 16,1956.

(2) Pleno Mines Limited and Babou Mines Limited - A Magnetometer Survey on part of the properties of Pleno Mines Limited and Babou Mines Limited, Jamieson Township, Concession IV - West Half, by Leo Prossard and T.H. Koulomzine, February -March, 1955.

ATTACHMENTS

(1) Dominion Gulf Company Map - Ground Magnetometer Survey - Jamieson I, Concession IV, Eight Claim Group - Scale 1" = 200 feet - Contour Interval - 100 gammas.

42A12SE0149 63.775 JAMIESON

040

REPORT OF EM SURVEY

JAMIESON I

132100'

42A12SE0149 63.775 JAMIESON

040C

Jamieson 1 or Baben Option

TABLE OF CONTENTS

INTRODUCTION

This survey was carried out in June and July, 1956 on two adjacent groups of claims in Jamieson Township, Concession IV, West Half. Both groups are held by Dominion Gulf Company, one as an option from Babcu Mines Limited including claims P-37484 to P-37493 and P-37498 to P-37505; the other group being known as the eight claim group of the Jamieson I property including claims P-40495 to P-40502.

The purpose of the survey was to attempt to locate conductors which might be of economic interest along the strike of the Kam-Kotia deposit, or in association with a major geological contact assumed to run through the property.

The work was carried out by D. Strangway assisted by C. Godin, A. Douloff, W. McReynolds and a few other assistants when required. The work was carried out using a vertical hexagonal transmitting coil with a radius of eight feet, powered by a 2200 volt-ampere, 900 cycles per second motor-driven generator. The receiving equipment consisted of two fourteen inch diameter coils mounted on tripods and working with amplifiers and ear-phones. The method of survey was to set up the transmitter coil and point it towards the point being surveyed on another picket line. The strike angle and dip angle of the field were measured and the width of the null recorded in degrees in the hope of getting a phase relationship between primary and secondary fields.

The total survey comprised the reading of 160,600 feet of line and 1707 readings on the Babcu option from nine transmitter set-ups; and 38,500 feet of line and 404 readings on the eight claim group from two transmitter set-ups. In all a total of 132,100 feet of picket line were covered although several of these lines were re-run from different set-ups in the hope of outlining conductors. These data were worked over in the field and then replotted and interpreted in the Toronto office of the Dominion Gulf Company.

The accompanying interpretation report shows a picket line map on a scale of 1 inch = 200 feet and plotted on it are the dip angles with a scale of 1 inch = 20 degrees.

SUMMARY AND RECOMMENDATIONS

This area has given a large number of conductors none of which appear to be economically significant. Diabase dikes trend slightly west of north in the whole area while the conductors trend in a more westerly direction. It is held that the conductors are due to open shears in the area, this shearing having taken place at a stage before the diabase dikes were intruded. It is also believed that the tectonic history of the area is quite complex there being at least three major directions indicating planes of weakness.

Several conductors have been offset at their intersections with the dikes, so the dikes are considered to be one of the latest features in the area. Two of the conductors in particular E-4 and E-8 seem to show extensions of faults indicated magnetically and it is believed that others of the conductors are of a similar nature.

Recommendations are necessarily rather difficult to make as gravity profiles have been run over some of the more promising conductors but results have been inconclusive, due partly to poor instrument performance. The only recommendation then is to suggest that gravity profiles be re-run with a more satisfactory gravimeter than that which was used.

INTERPRETATION

On this map sheet have been interpreted sixteen main conductors. There are numerous other small isolated features which have not been included as they would serve merely to confuse the picture.

It is outstanding that in the whole area dip angles tend to be small and except for occasional exceptions dip angle to null width ratios are small, leading one to believe that the conductors found do not have any great conductivity associated with them.

To consider individual features we look first at the interpreted fault labelled F-1. The evidence on this is found also in a gravity survey performed on this portion of the claim group, where a break in a gravity anomaly seems to indicate the possibility of a tension fault at the head of a fold linking part of this area to the Kam-Kotia ore-body.

The strongest evidence for this conductor is in a plot of the strike angles run along the 13+20N tie line - east-west from set-up 4-1. There is a very large crossover shown and it is believed that this is representative of a conductor running nearly parallel to the tie line but striking slightly north of east.

Conductors E-1 and E-2 are fairly well defined conductors and show on dip angle profiles from several transmitter set-ups. The angles involved however are not large and the dip angle to width ratios is small in the vicinity of the conductor giving one the impression of a rather poor conductor. This may indicate either a water filled shear zone or sparse sulphide mineralization. There are definite indications of a shear interpreted from a diabase dike on strike with E-2 while E-1 seems to have no such direct evidence of shearing on its strike. However it is probable that both of these represent water-filled shears.

Conductors E-3, E-10 and E-16 appear to be caused by the same conducting body. Once again the dip angles involved are not large and dip angle to null width ratios are not significant. It is presumed therefore that the feature is one of the nature already discussed where major shearing has caused a conducting body. In the survey it was hoped that the smallness of the dip angles was due only to a poor transmitter location for maximum coupling with such a body. However set-ups laid out on strike of the conductor did not present a different picture and so a shear is interpreted.

It is extremely interesting to note that wherever this conducting zone intersects a diabase dike, interpreted from the magnetics that there is a very distinct offsetting and a strong flexure in the magnetic picture of the dikes so intersected. This indicates the probability that the diabasedike D-3 was intruded along a plane of weakness and that where that plane intersected the shear plane there was a deflection of the intruding magma along the shear. This is particularly obvious in the case of conductors E-3 and E-10. In the case of intersections of conductors E-10 and E-16 with dike D-4 we have a slightly different case. Apparently the dike itself was intruded along a fault which was a feature subsequent to the shearing. This is shown in the case of E-10 and E-16 as they are definitely offset and represent a lateral movement.

In an exactly similar manner we must consider conductors E-6 and E-9 where an almost identical situation occurs indicating an offset along dike D-4, which is believed to represent an old fault. In support of this we note that conductor E-4 falls on strike of this dike and probably represents the fault which originally cut this area. This feature is shown topographically in the northwest corner of the property where a tag alder swamp occurs to the north of the conductor.

Similar to this effect is fault F-3. This is interpreted originally from spill-outs on the diabase dike D-6. Directly on strike with this is a conductor which probably represents the extension of this shear to the north-west.

Conductors E-5, E-8 and E-7 are rather small features without any great strike lengths. It seems that E-5 is probably deflected where it intersects dike D-5. Conductors E-7 and E-8 may be features associated with topography, or again they may be shear zones as the other conductors in this area have been interpreted.

Conductors E-11, E-12, E-13, E-14, E-15 and E-16 are all very similar features as those already described but do not seem to have any relation at all to the diabase dikes which they intersect. For this reason and since their dip angle to width ratios are not significant they appear to be topographic features, i.e. controlled by bedrock topography in which water may become trapped, and zones of conductivity become evident at surface.

D. Strangway.

REFERENCES

(1) Report on A Magnetometer Survey on Part of the Properties of Pleso Mines Ltd., and Babou Mines Ltd., Jamieson Township by Leo Prossard, Ted Koulomzine, dated February - March, 1955.

(2) Dominion Gulf Company - Gravity Anomalies - Jamieson I and Babou Option - by N.R. Paterson, dated July 27, 1956.

ATTACHMENTS

(1) Dominion Gulf Company - E.M. Profile Sheets, Scale 1 inch = 400 feet.

(2) Dominion Gulf Company map - Ground Electromagnetic Survey - Babcu Option and Jamieson I (eight claims) - Scale 1 inch = 200 feet.

EM SURVEY

BABCU OPTION AND JAMIESON I (B.W.S.)

JAMIESON TWP. CON IV WEST HALF

JUNE - JULY 1956

LEGEND

DIP ANGLE

STRIKE ANGLE

WIDTH

.3 .8 .6 RATIO $\left(\frac{DIP}{WIDTH}\right)$

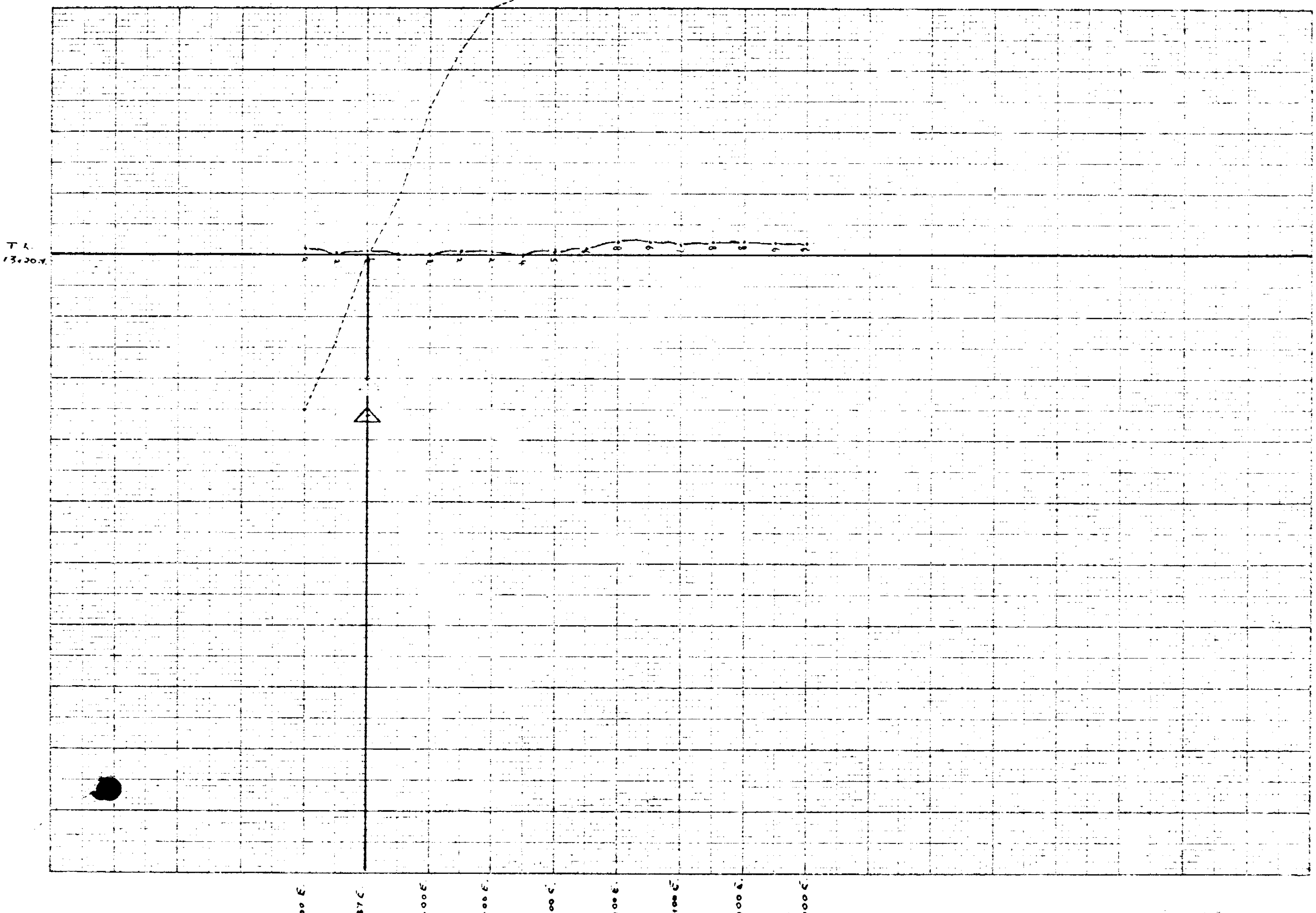
D.W. STRANGWAY

A. DOWLUFF

W. McREYNOLDS

G. GOPIN

BABCU OPTION SET UP #1 L.1+87E 8+00N



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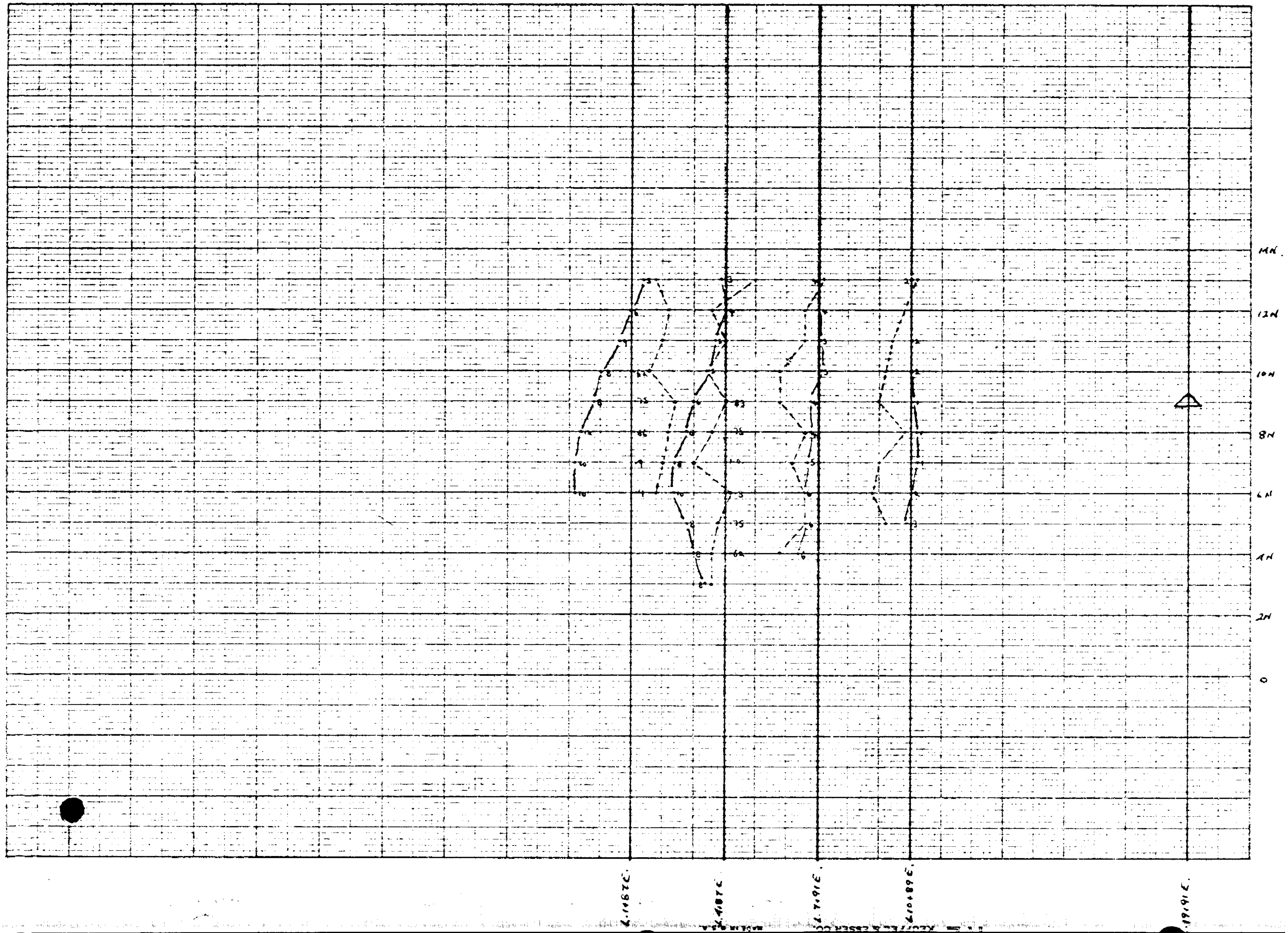

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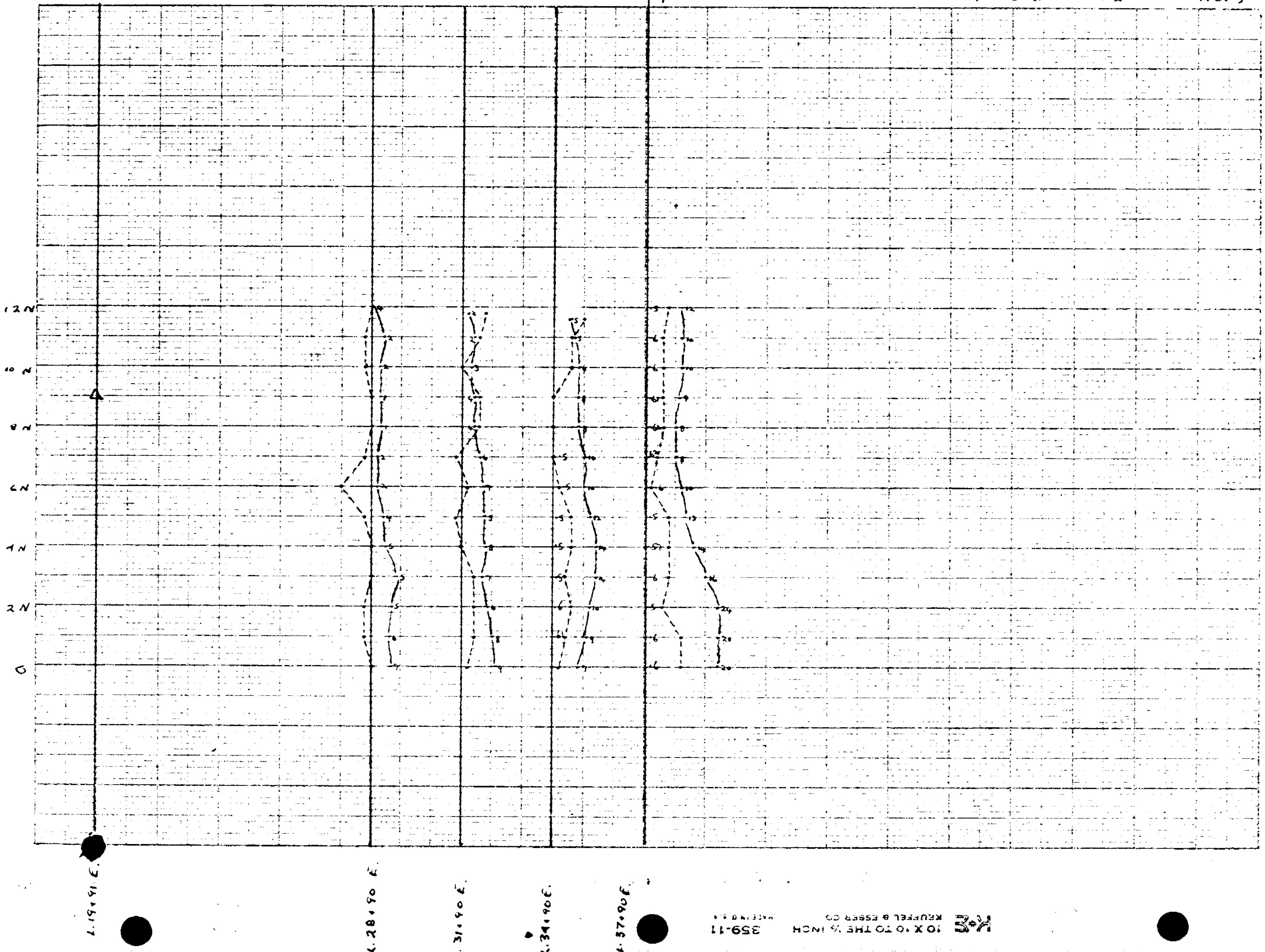

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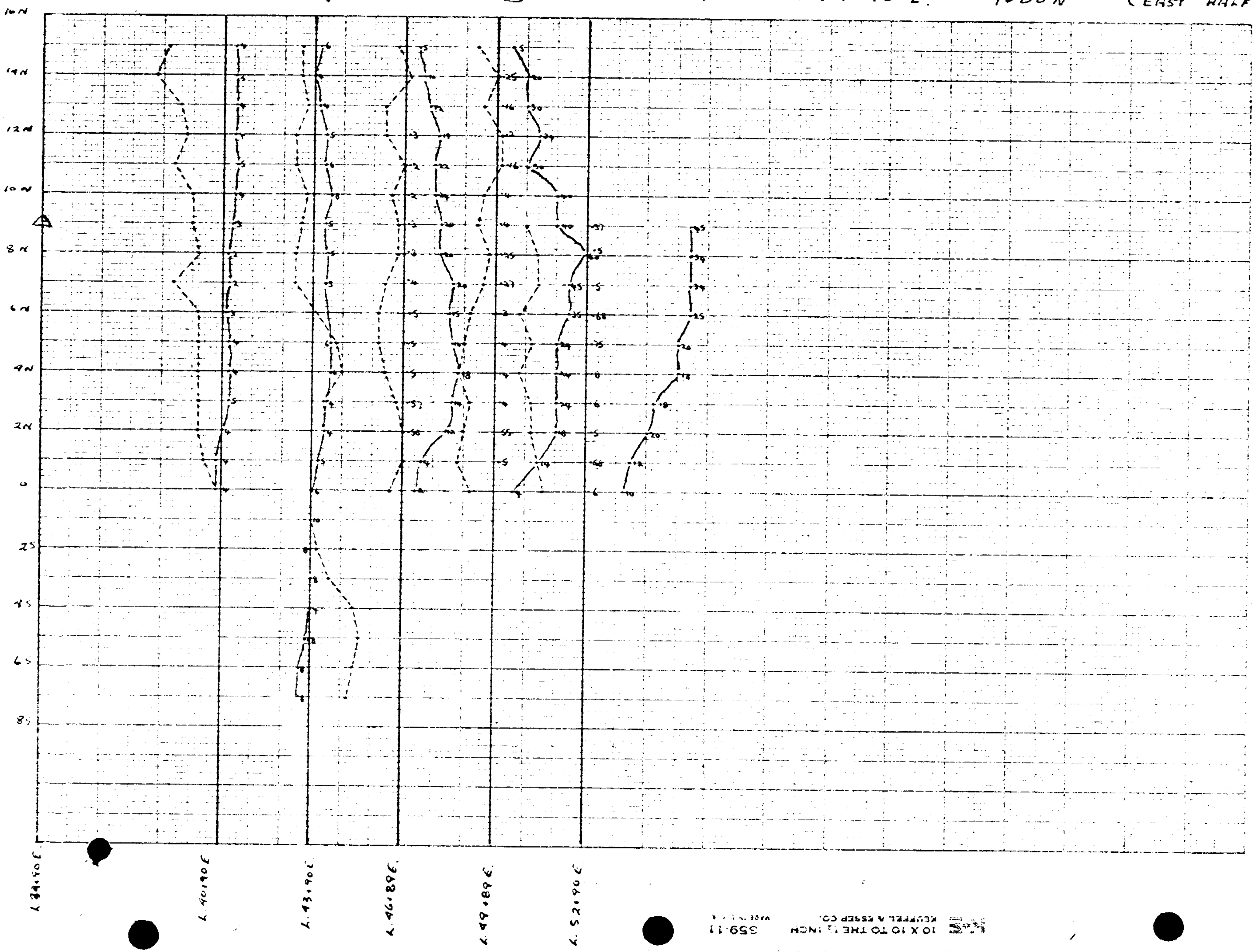

10 X 10 TO THE 1/2 INCH 359-11
KEUFFEL & ESSER CO.

BARCU OPTION SET UP #3 L. 34+90 E. 9.00N (WEST HALF)

BABCU OPTION SET UP #4 L. 40+90 E. 1+00 N. (WEST HALF)

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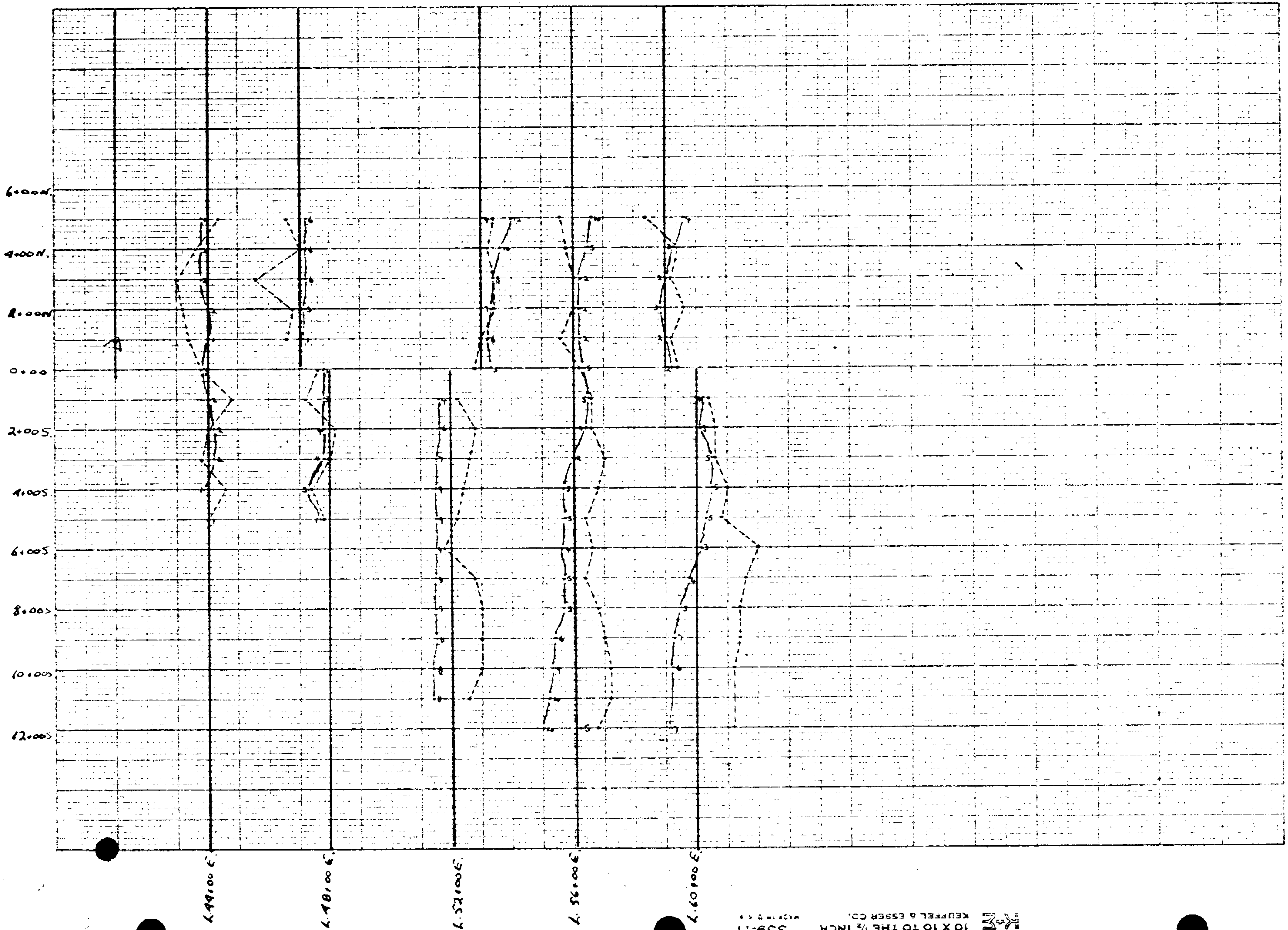

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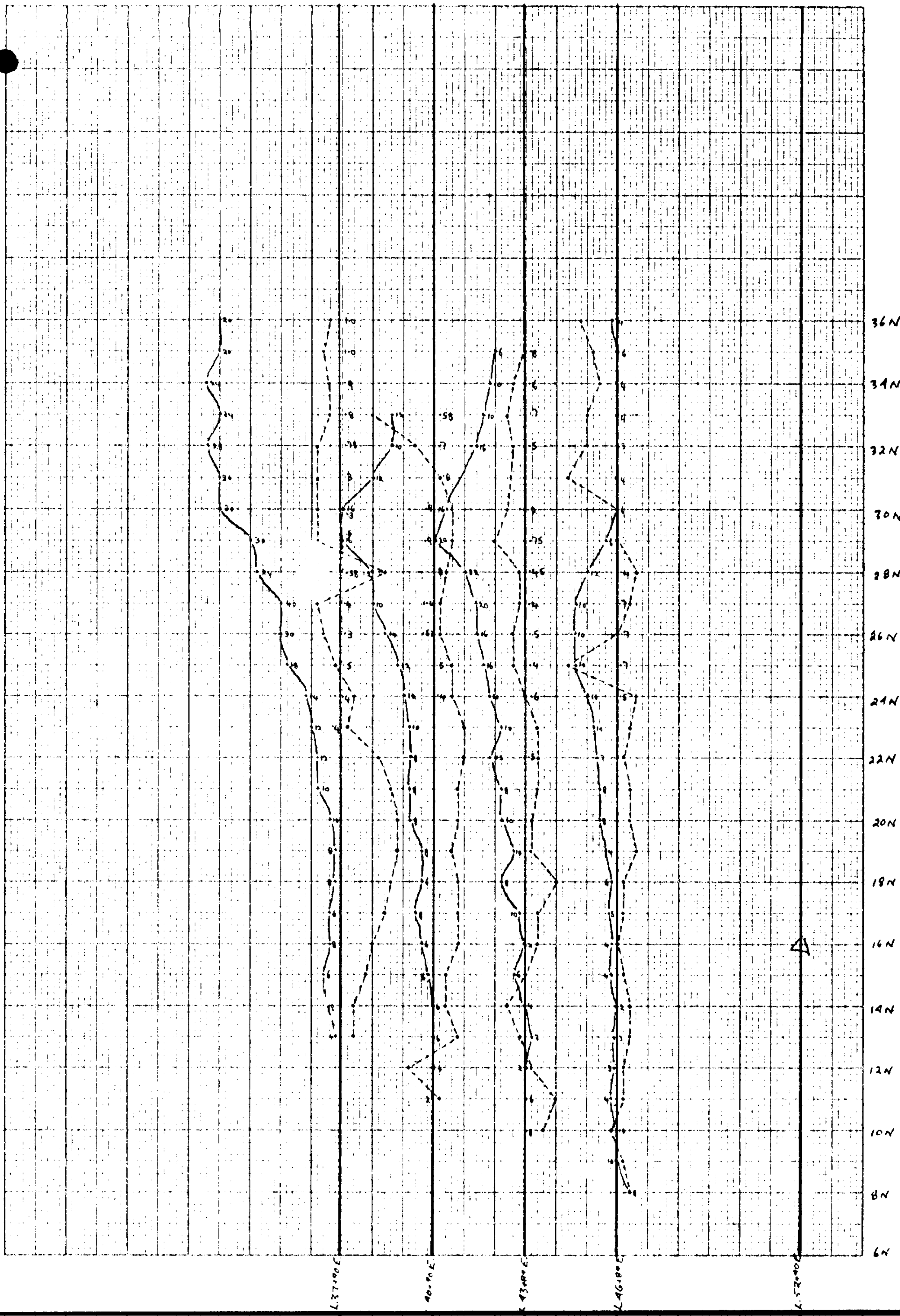

10 X 10 TO THE 1/2 INCH
KEUFFEL & ESSER CO.
359-11
MADE IN U.S.A.

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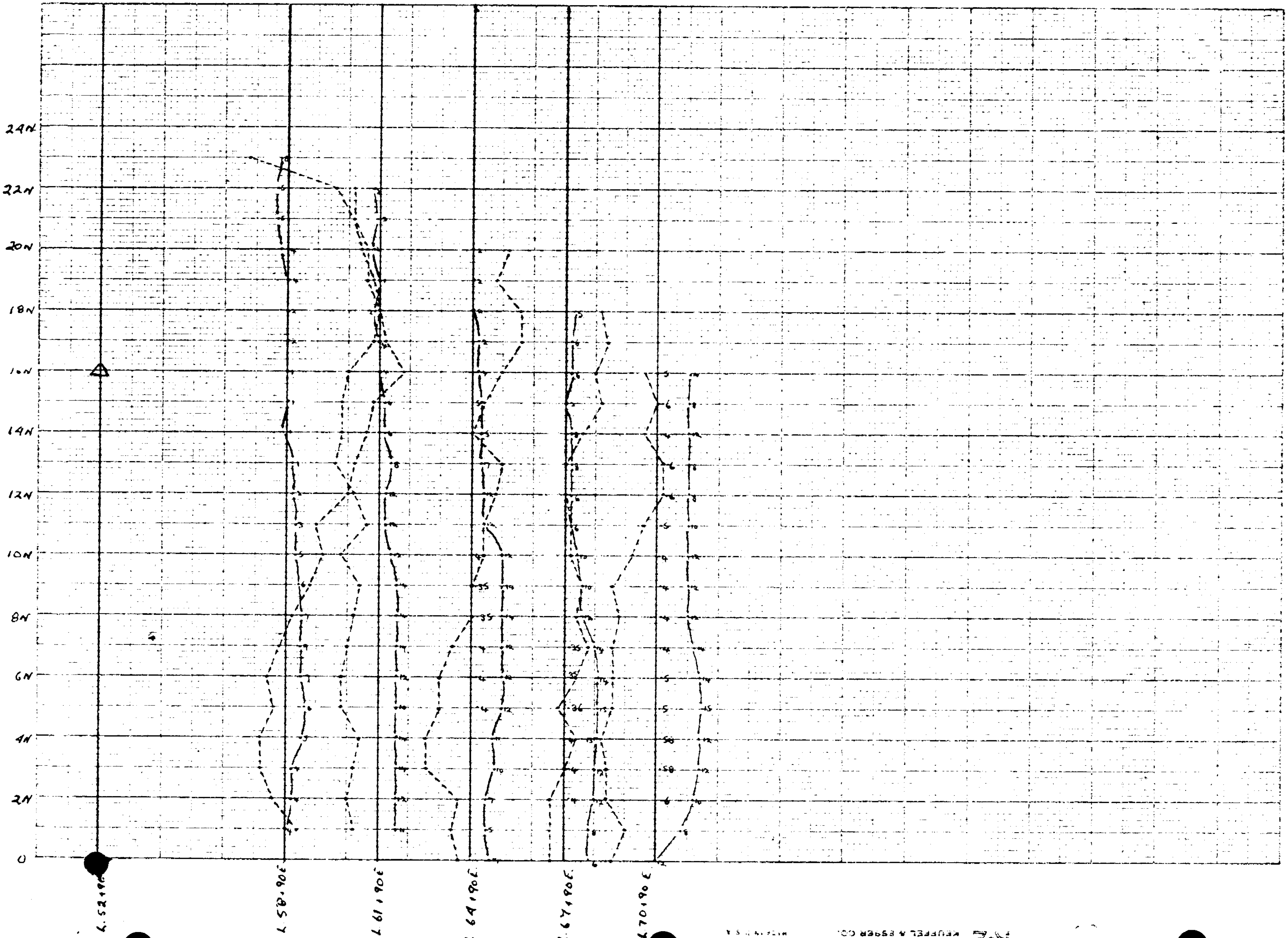

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KEUFFEL & ESSER CO.

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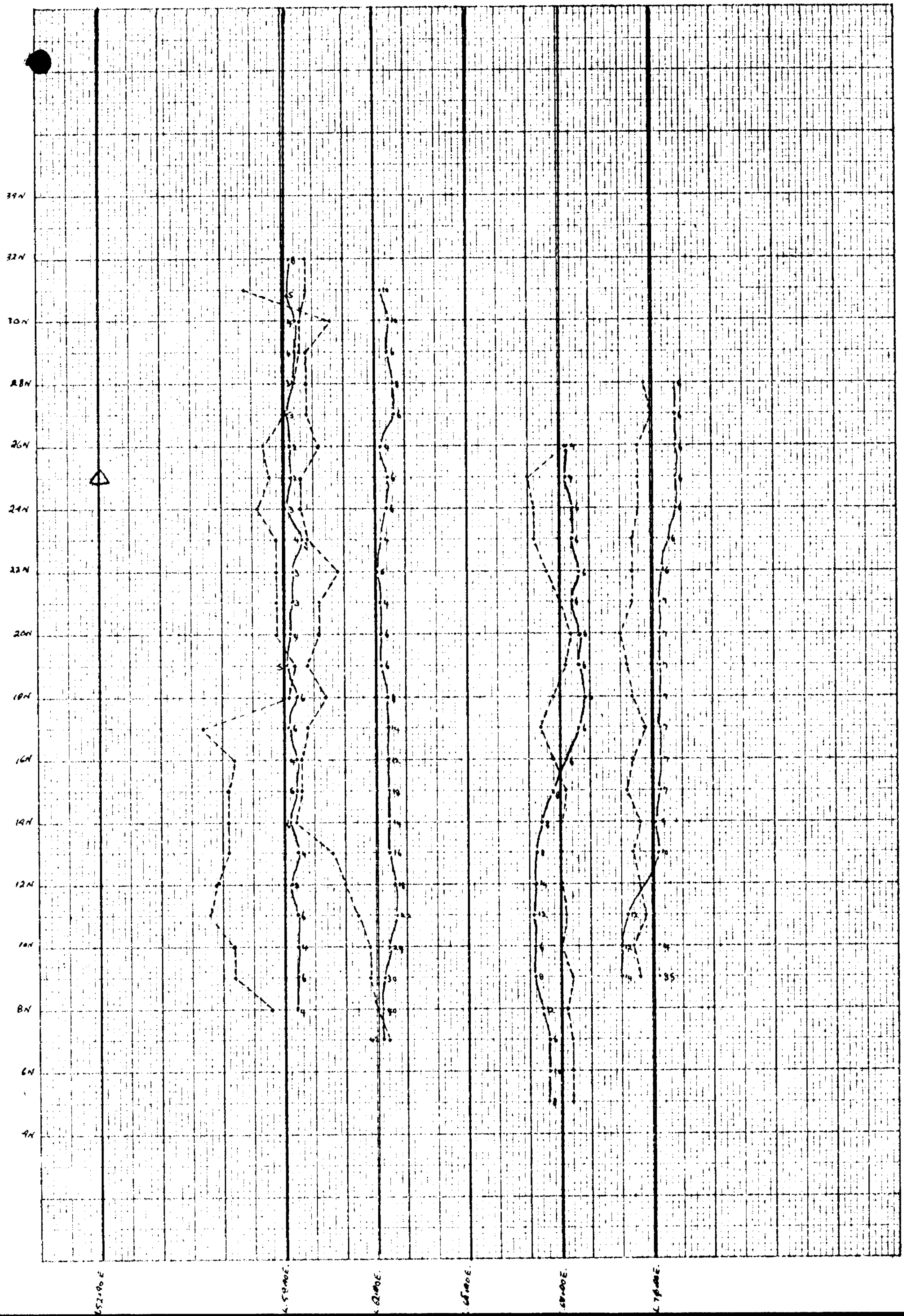

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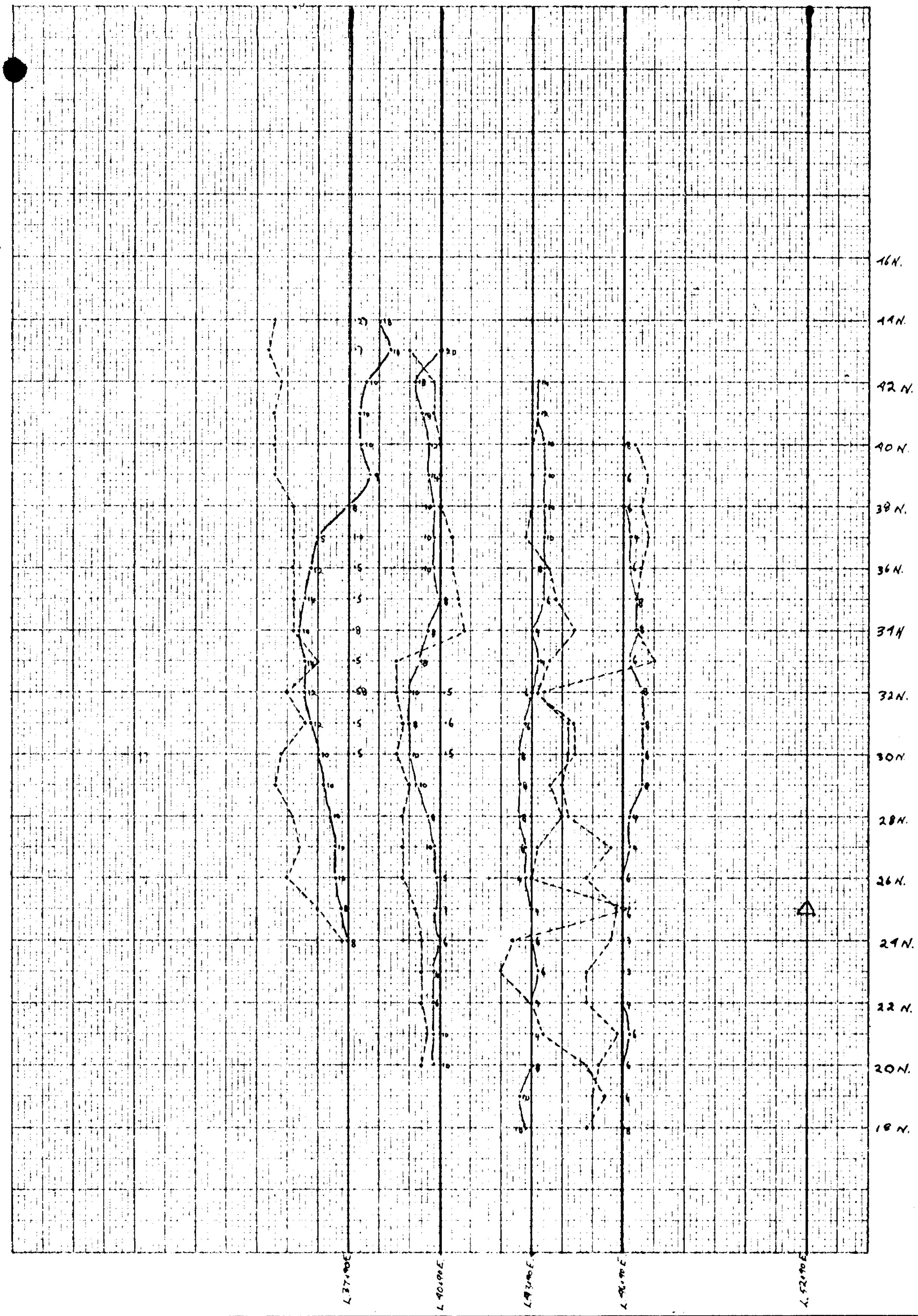

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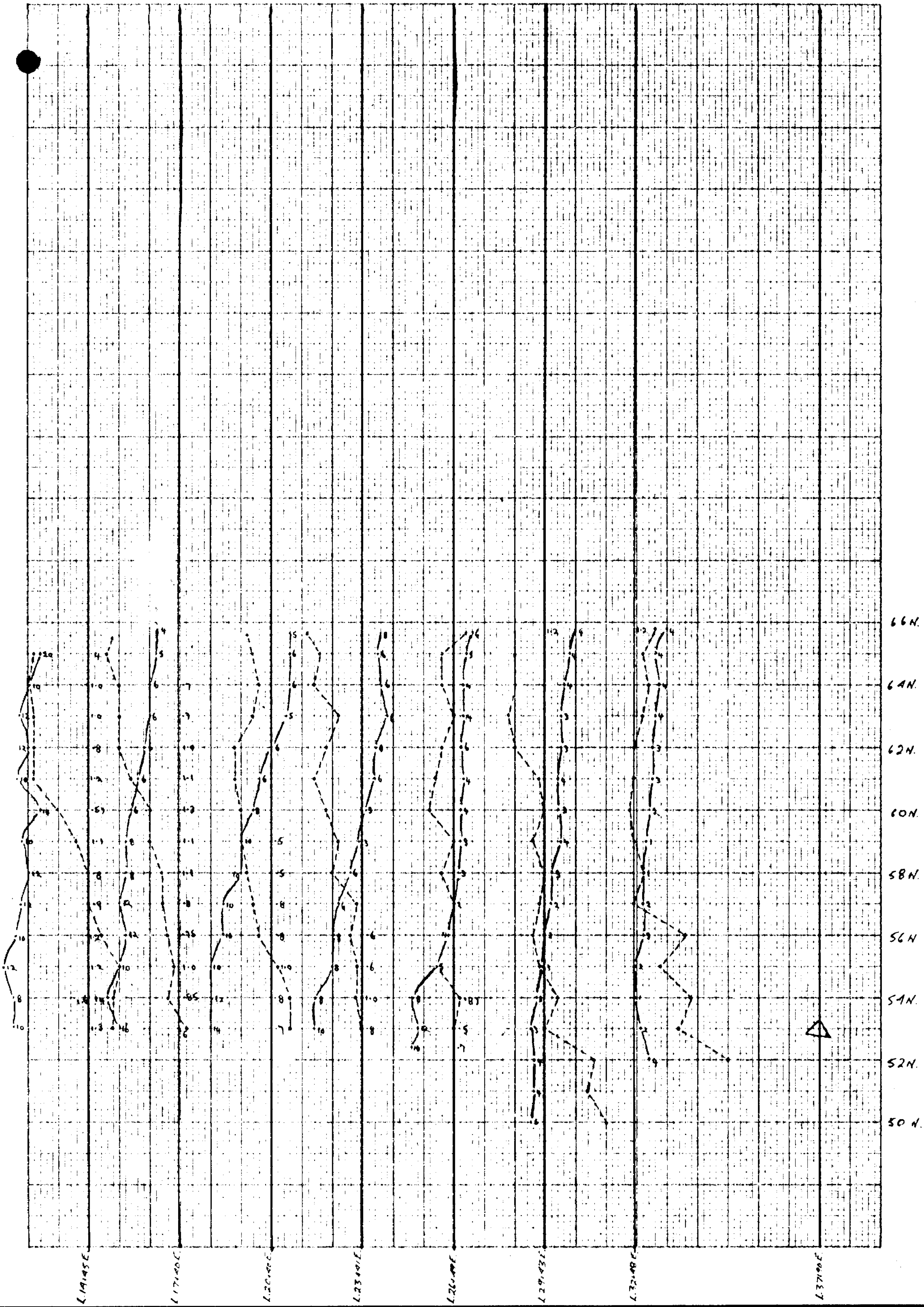

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KEUFFEL & ESSER CO.
359-11
MADE IN U.S.A.

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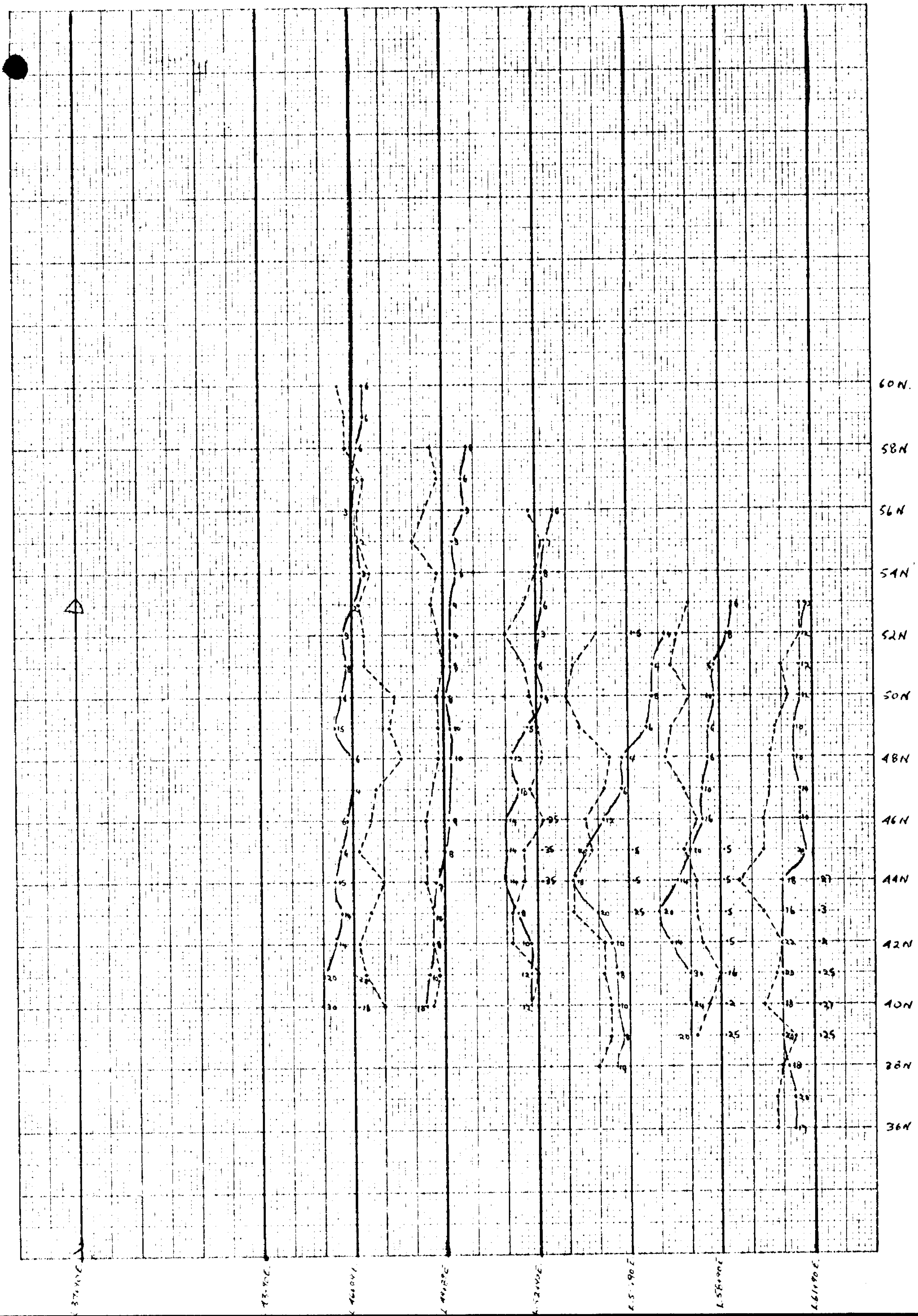

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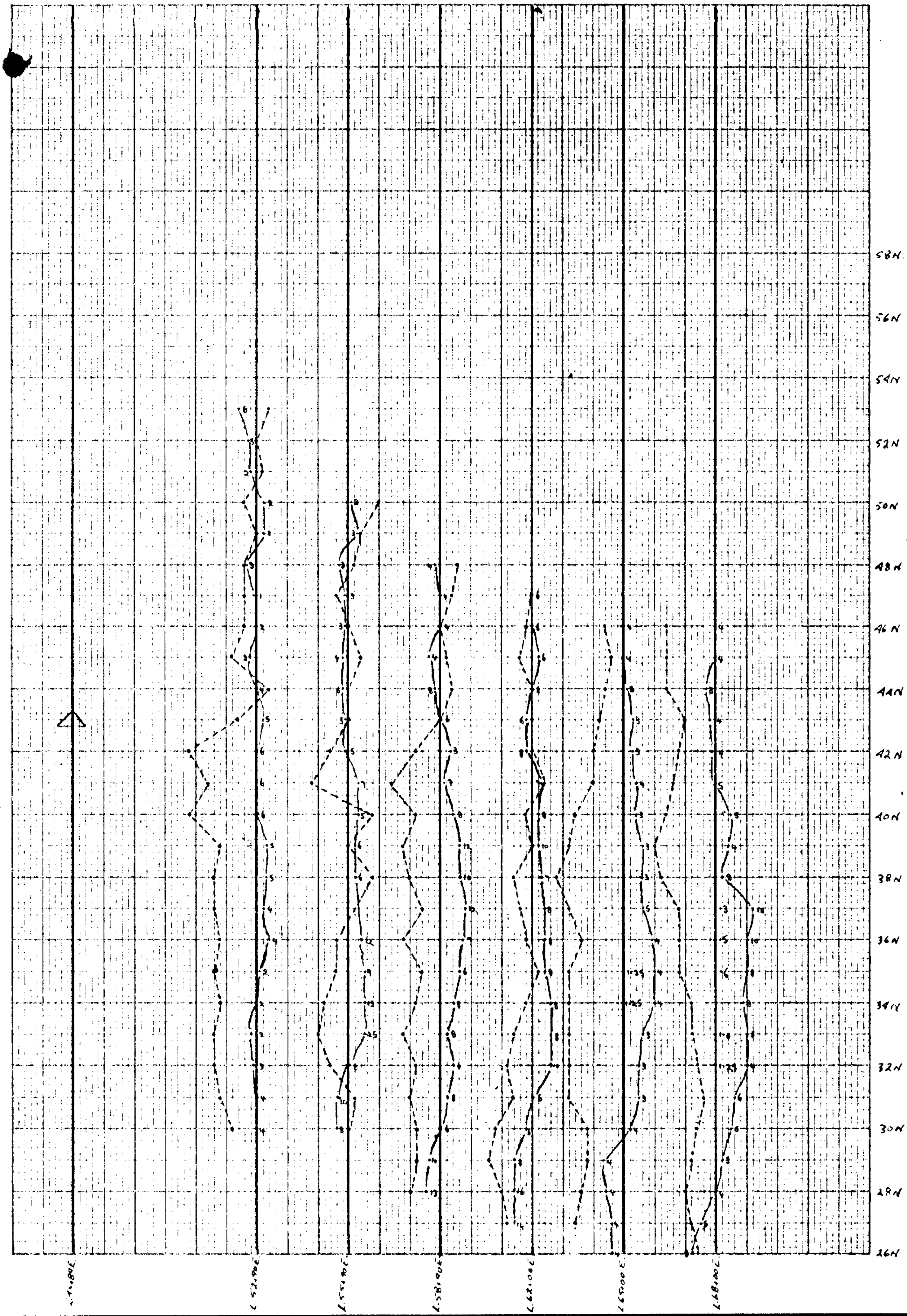

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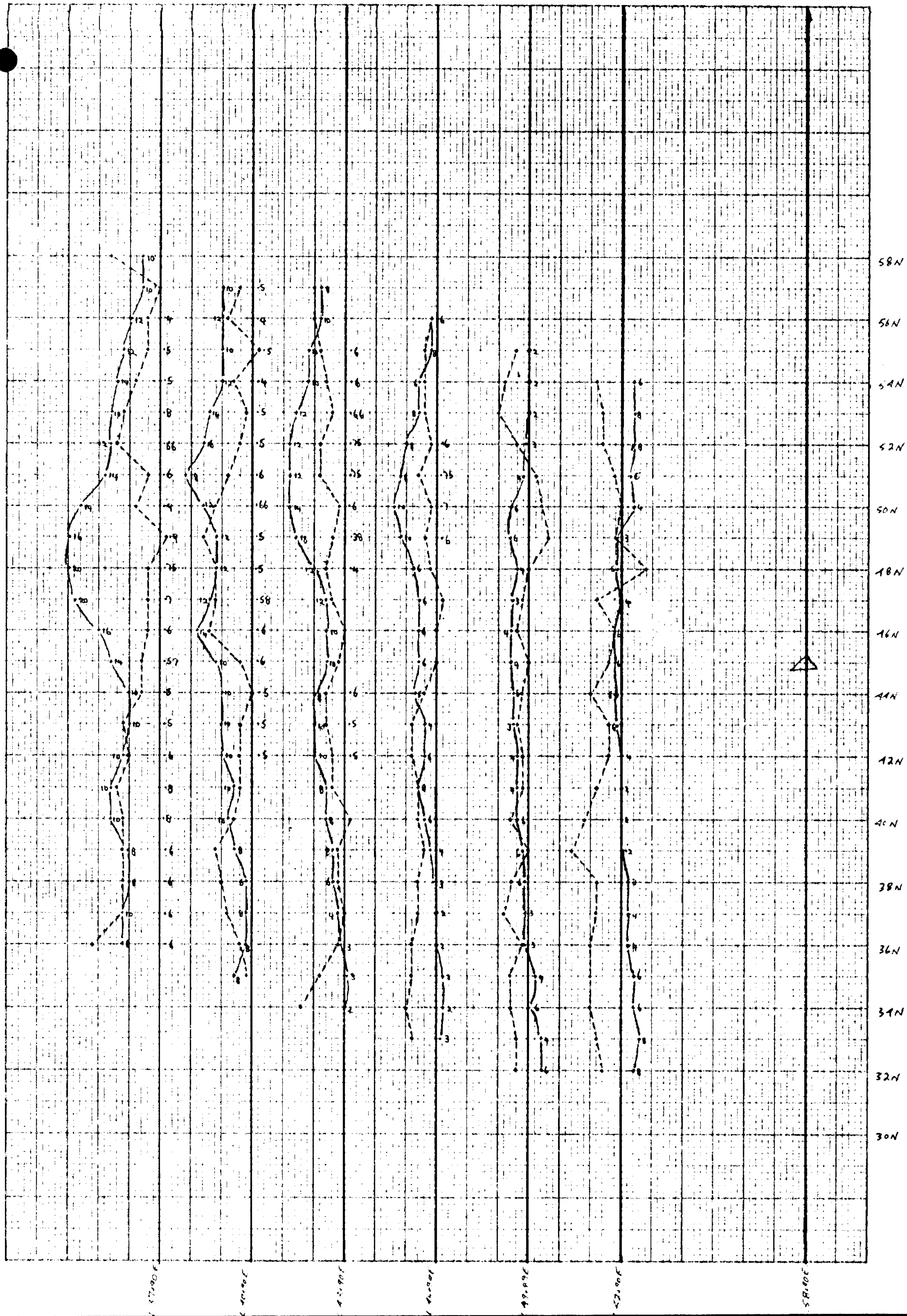

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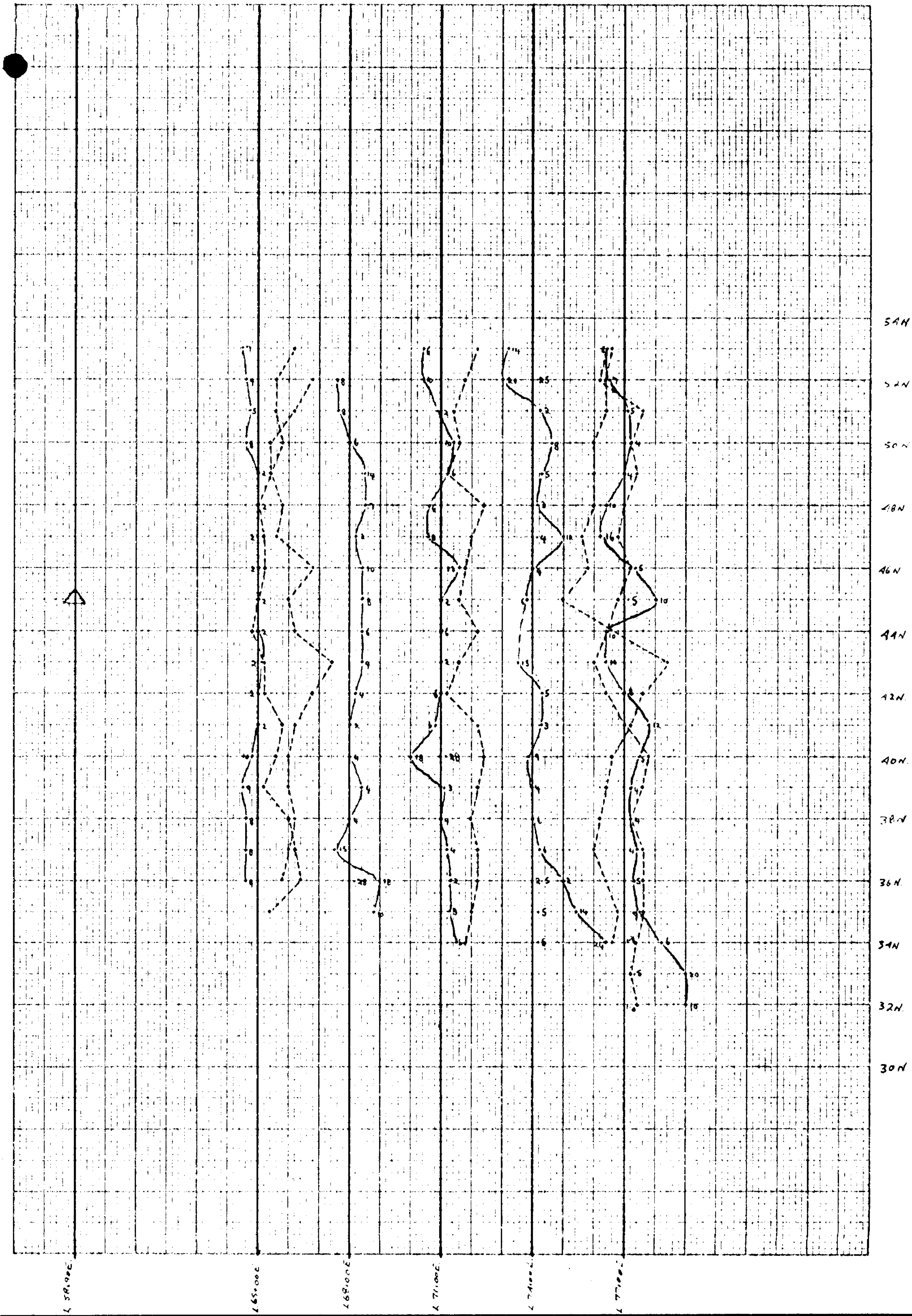

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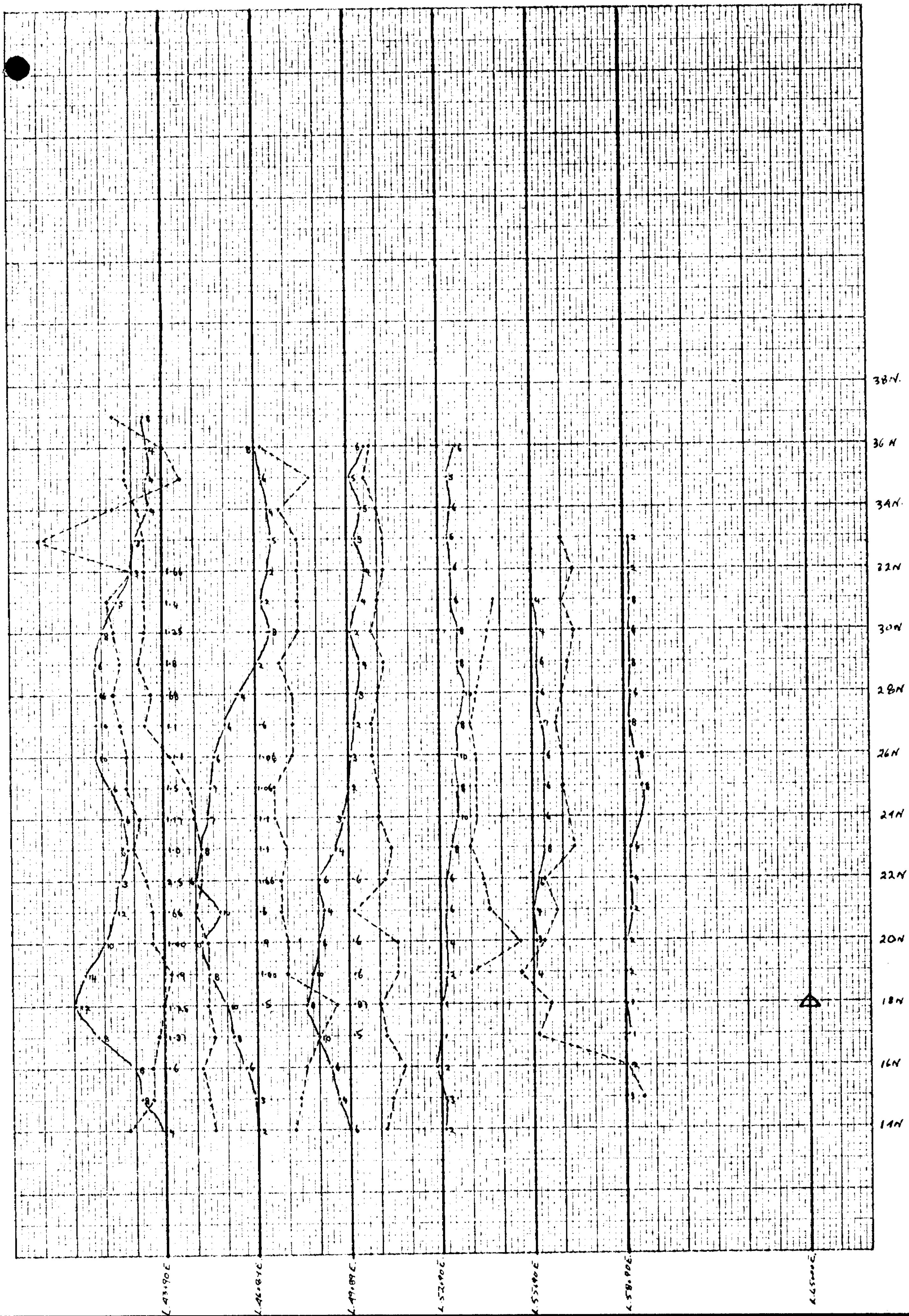

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KEUFFEL & ESSER CO.
359-11
MADE IN U.S.A.

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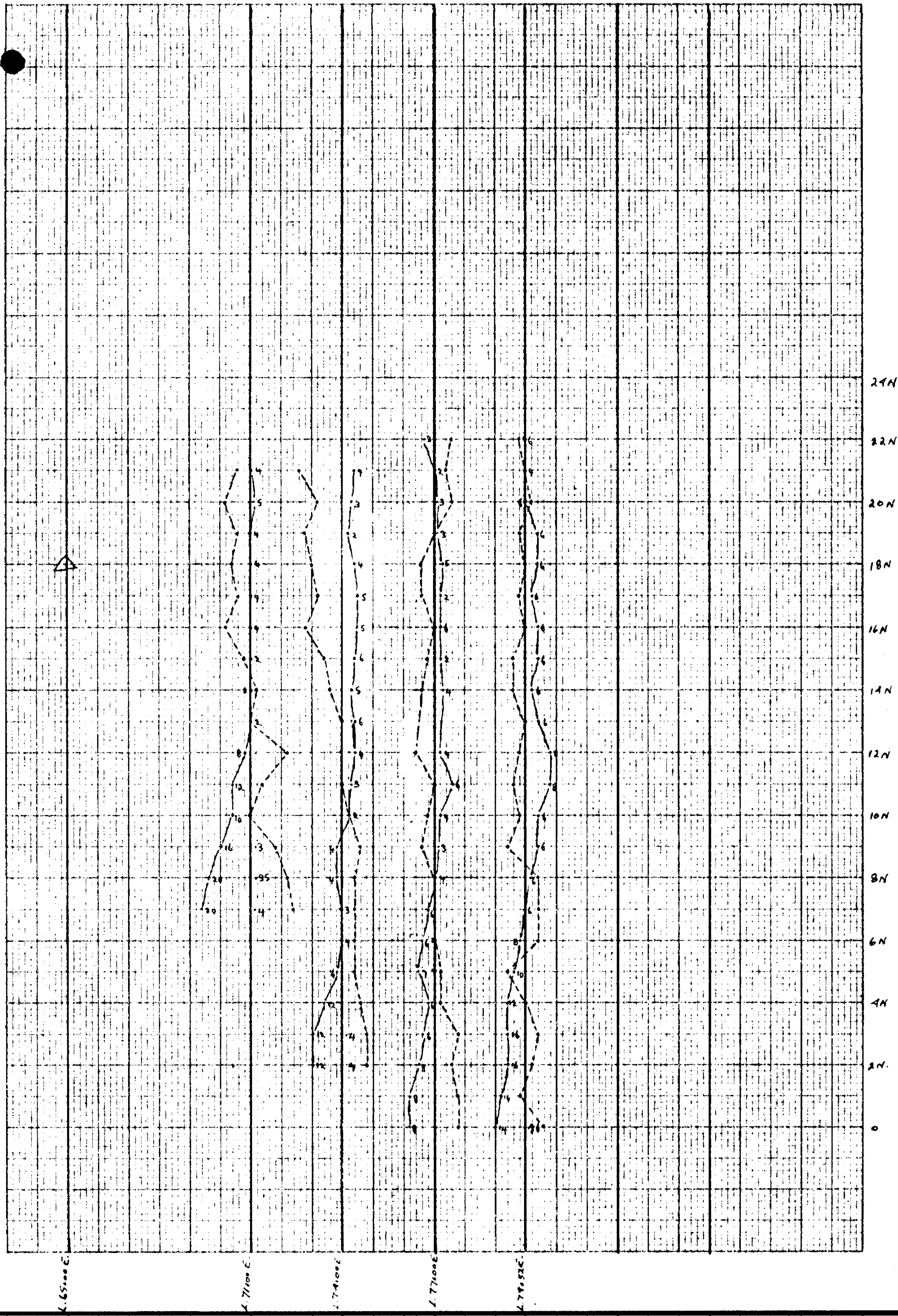
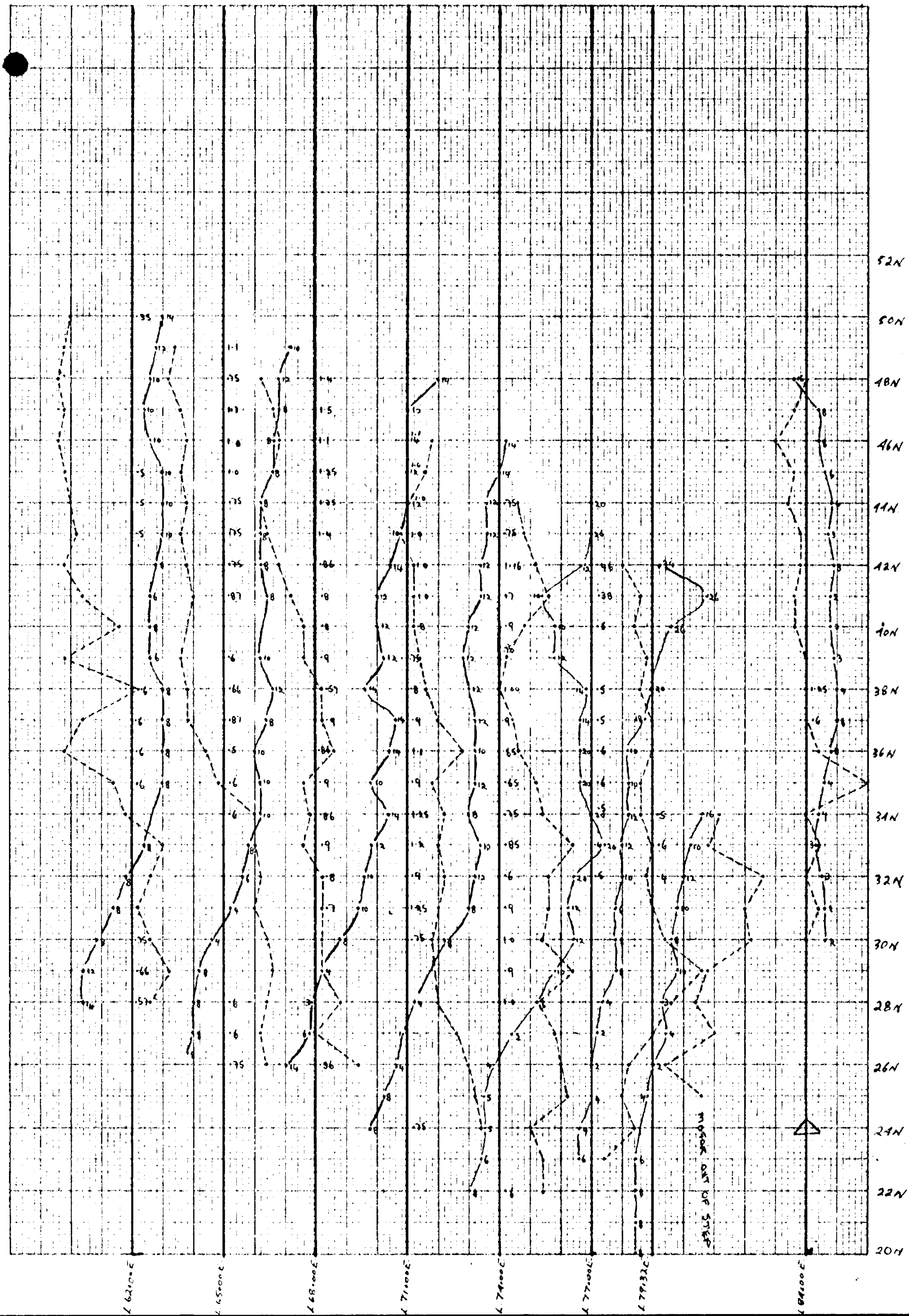


JAMIESON I (8c1) SET UP # 11 L 84+00E. 24+00N. (EAST HALF)

JAMIESON I (8d) SET UP #11 L 84+00E 24+00N (WEST HALF)



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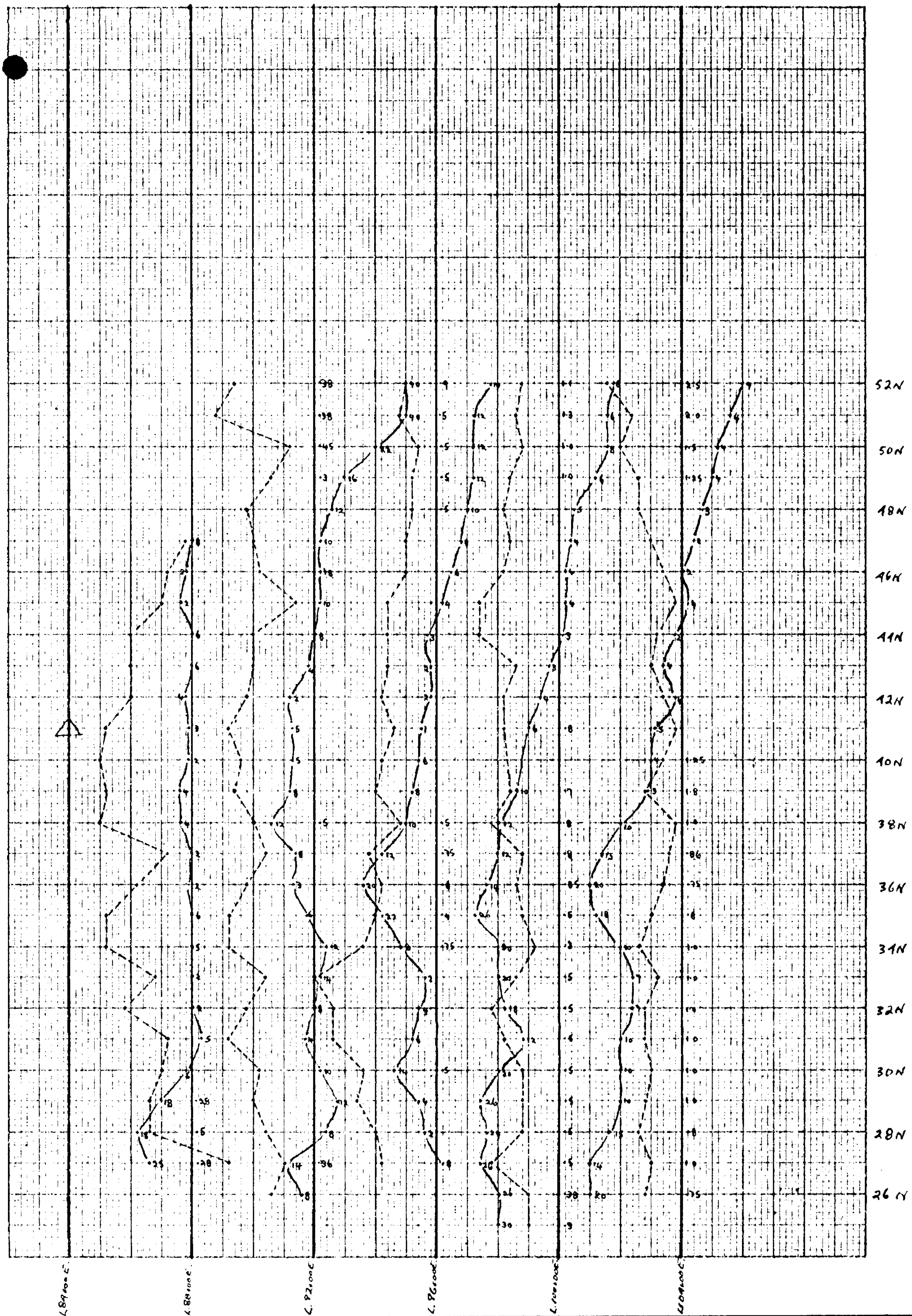

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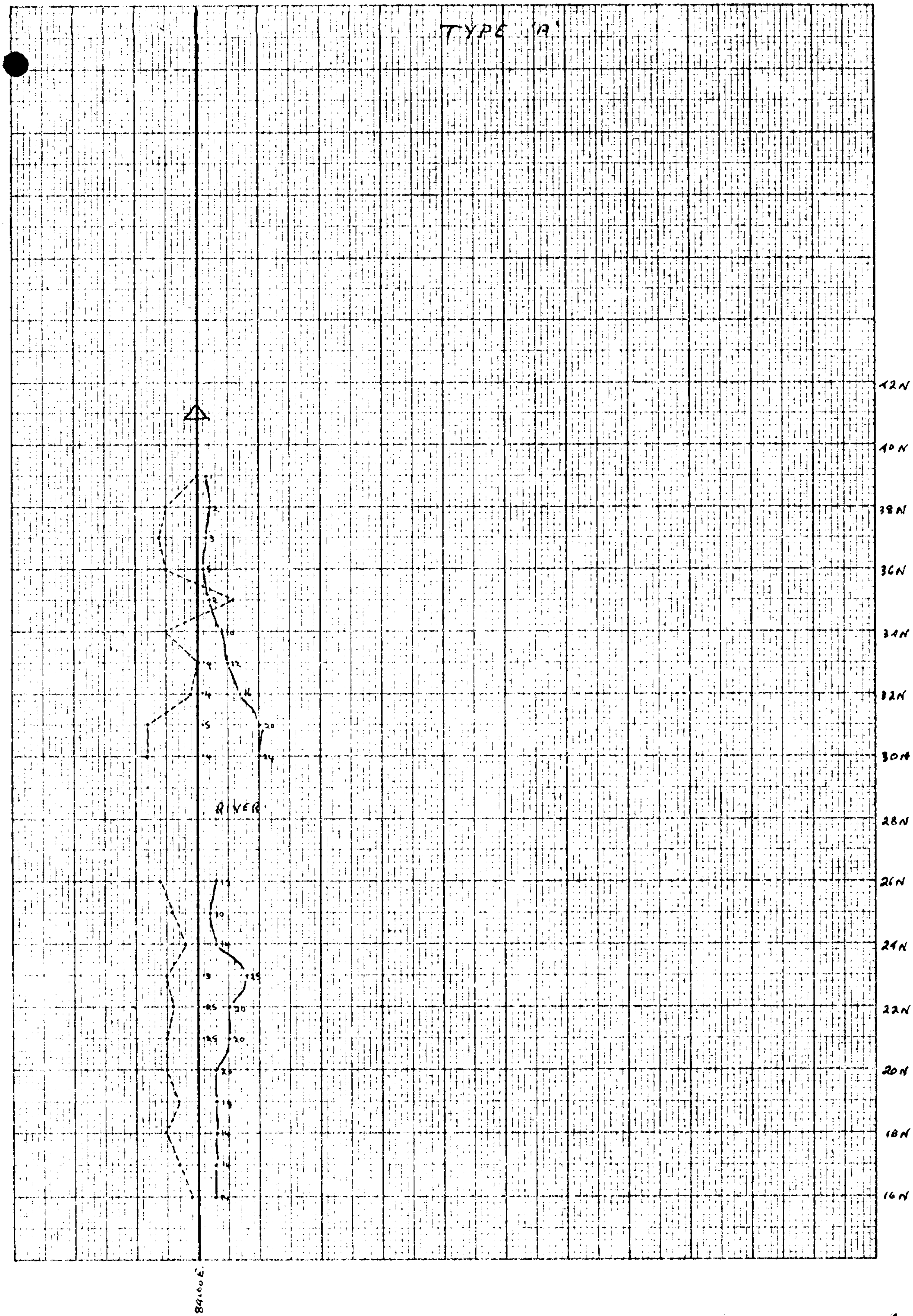

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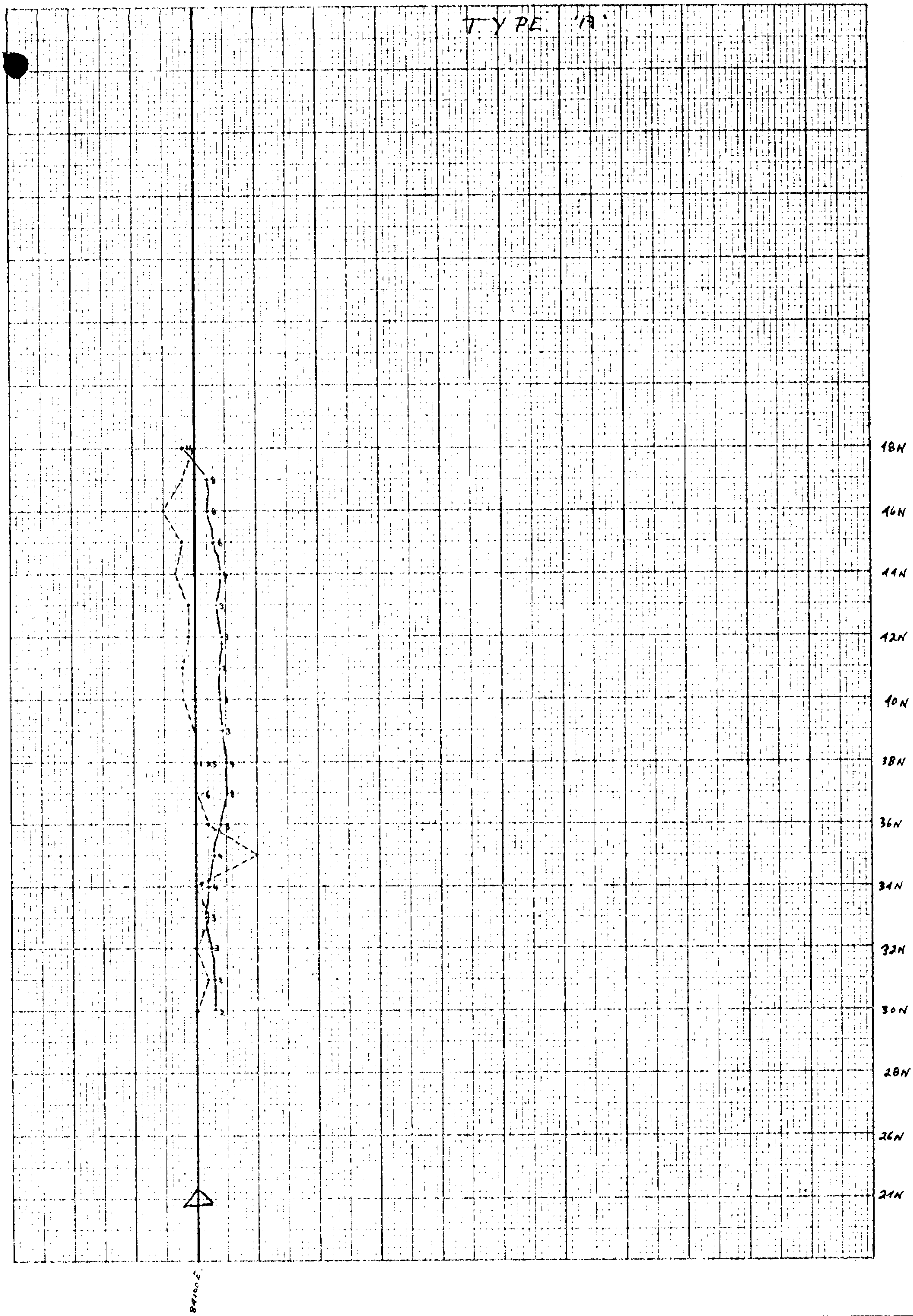

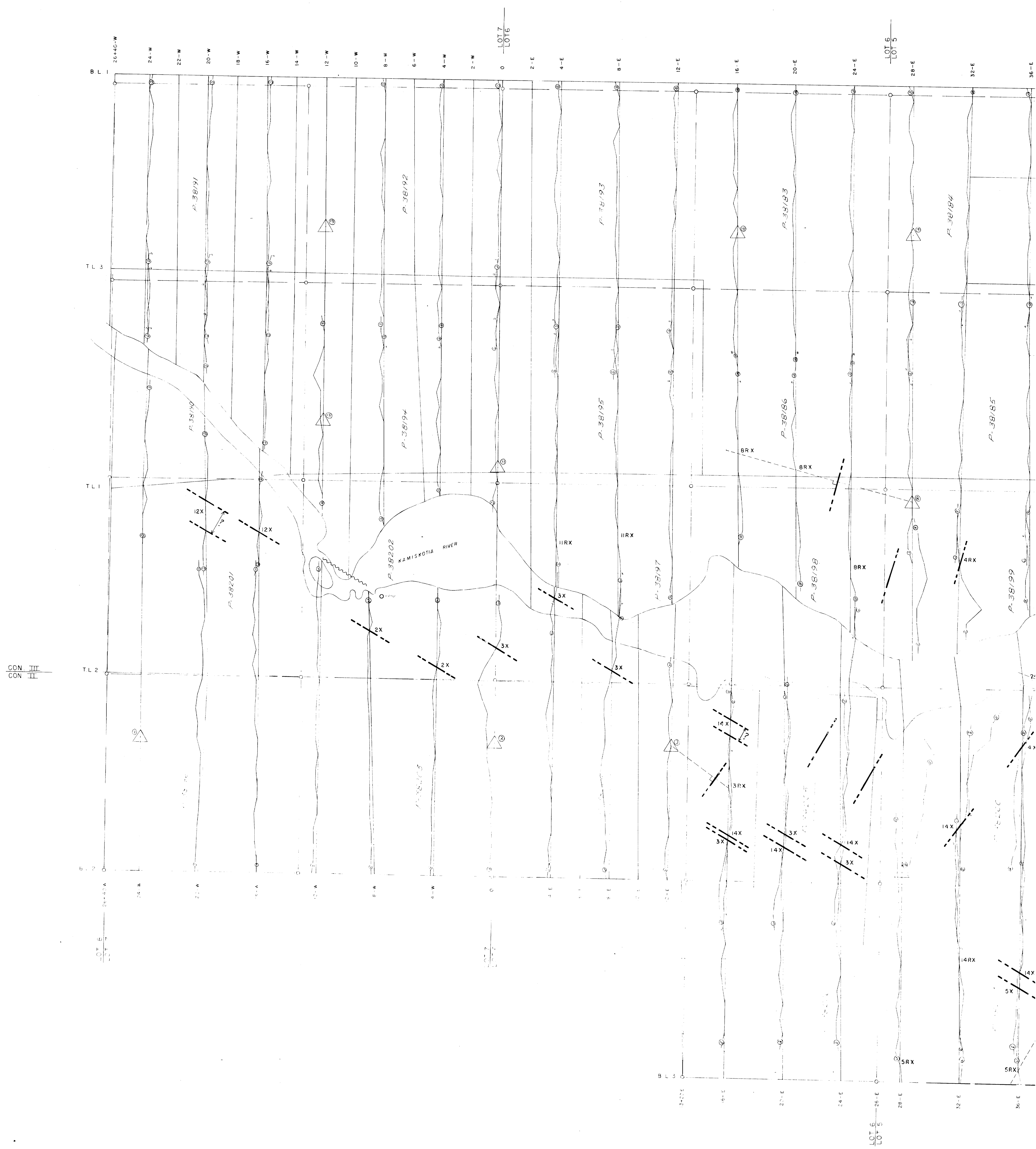
LOT 7
LOT 6
LOT 6
LOT 5
B.L.1
T.L.3
T.L.1
T.L.2
B.L.3
CON III
CON II
26+40-W
24-W
22-W
20-W
18-W
16-W
14-W
12-W
10-W
8-W
6-W
4-W
2-W
0
2-E
4-E
8-E
12-E
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P.38191
P.38192
P.38193
P.38183
P.38184
P.38190
P.38194
P.38195
P.38186
P.38185
P.38201
P.38202
P.38197
P.38198
P.38199
KAMISKOTIA RIVER
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8RX
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3RX
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5RX
5X
4X

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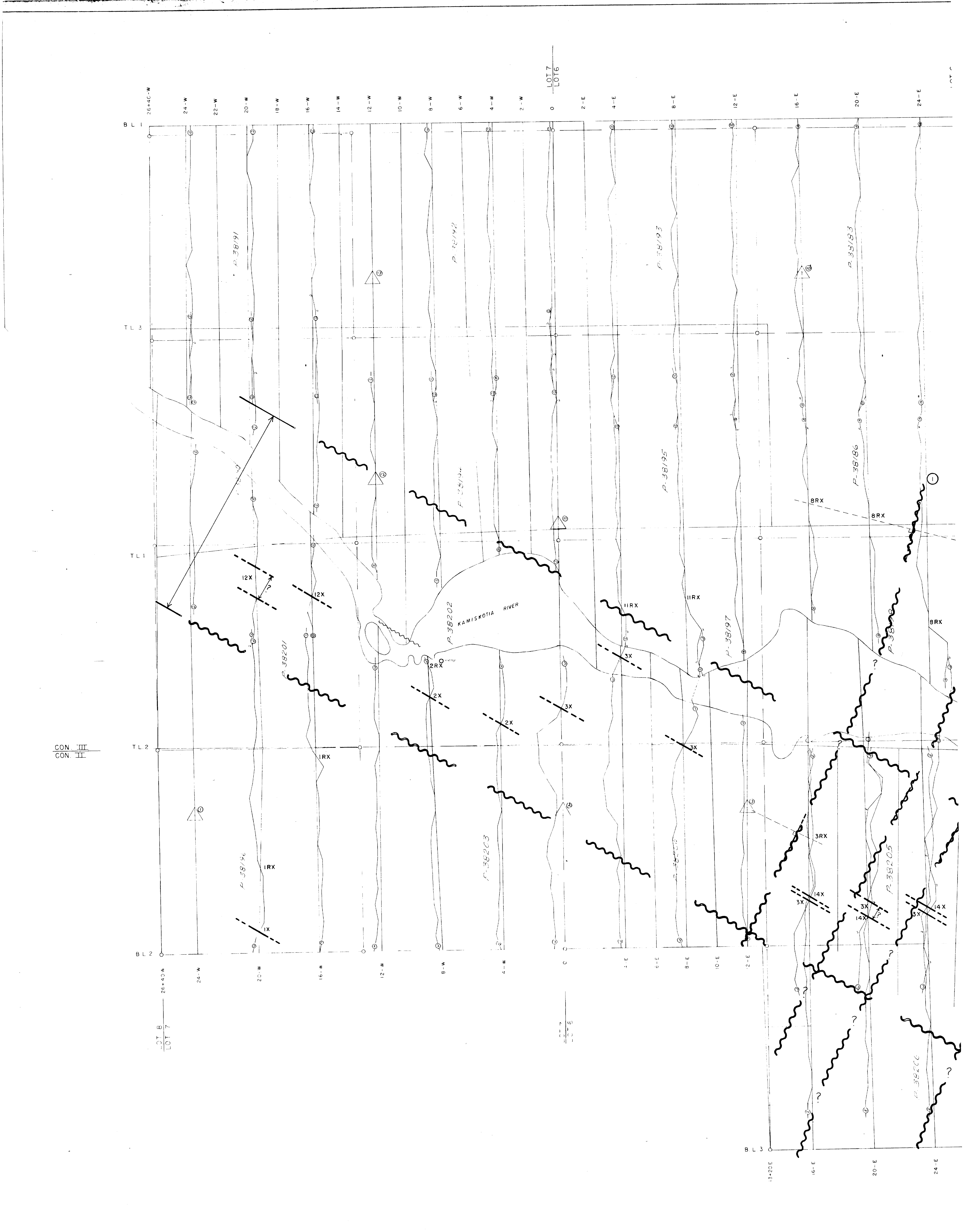

LOT 7
LOT 6
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TL 3
TL 1
TL 2
BL 2
BL 3
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CON. II
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P. 38195
P. 38186
P. 38202
P. 38201
P. 38197
P. 38203
P. 38205
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11RX
12X
12X
3X
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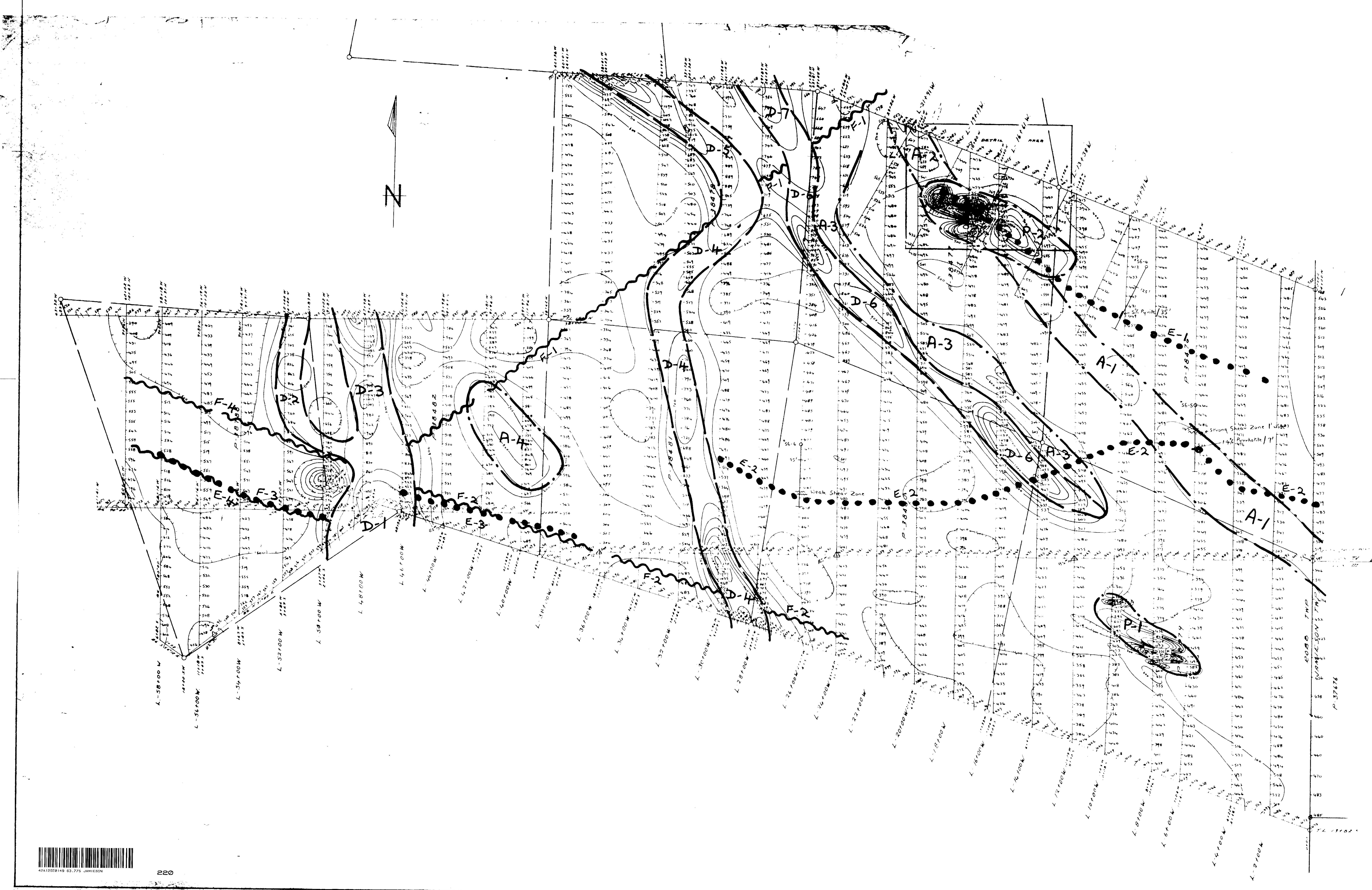
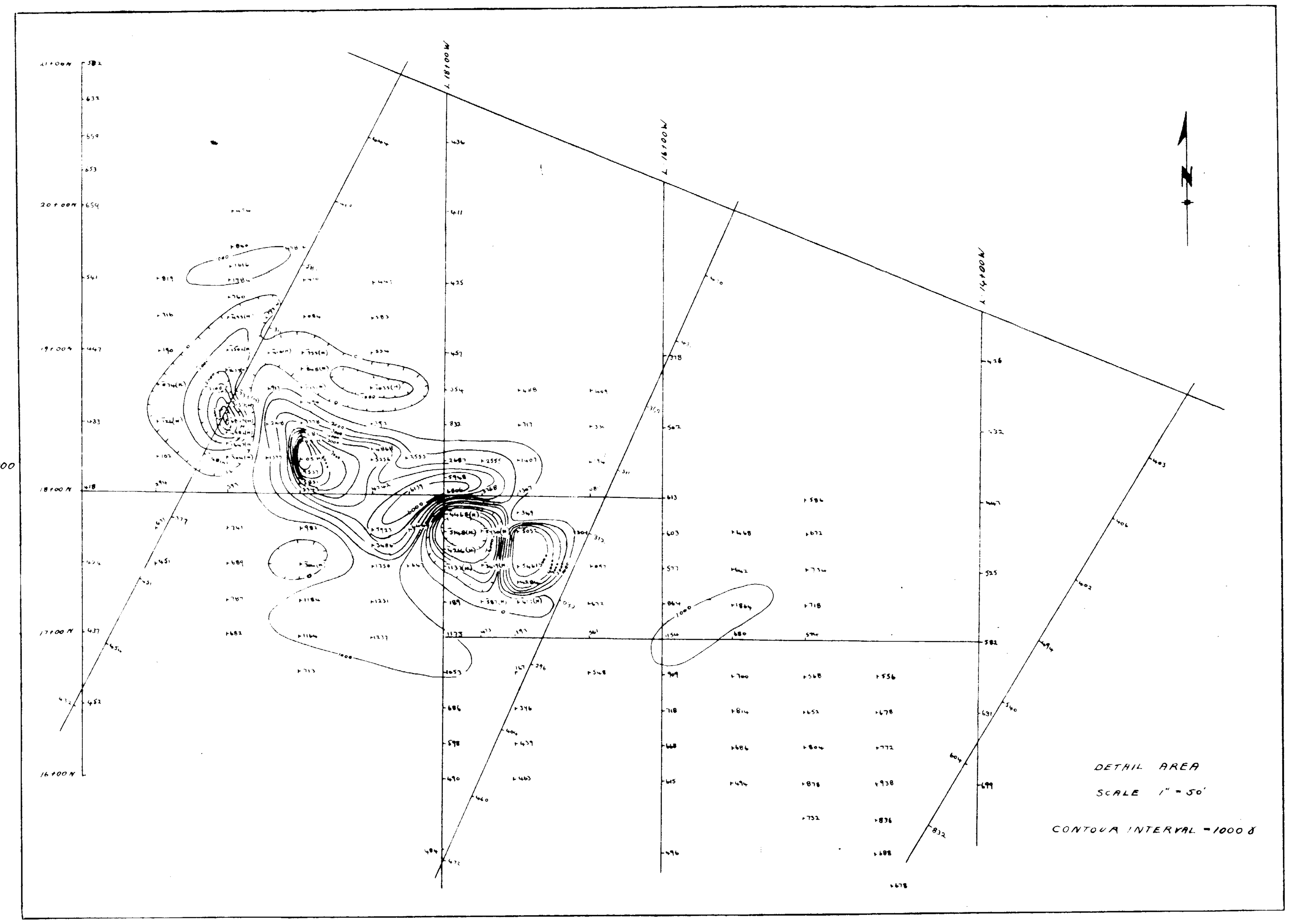
14X
LOT 8
LOT 7

210



LEGEND

- Interpreted Contact
- Interpreted Fault or Shear Zone
- Outline of Anomalous Zone
- Axis of Electromagnetic Conductor
- Drill-Hole No. 56-5
- Vertical Depth of Overburden
- Zone of Mineralization



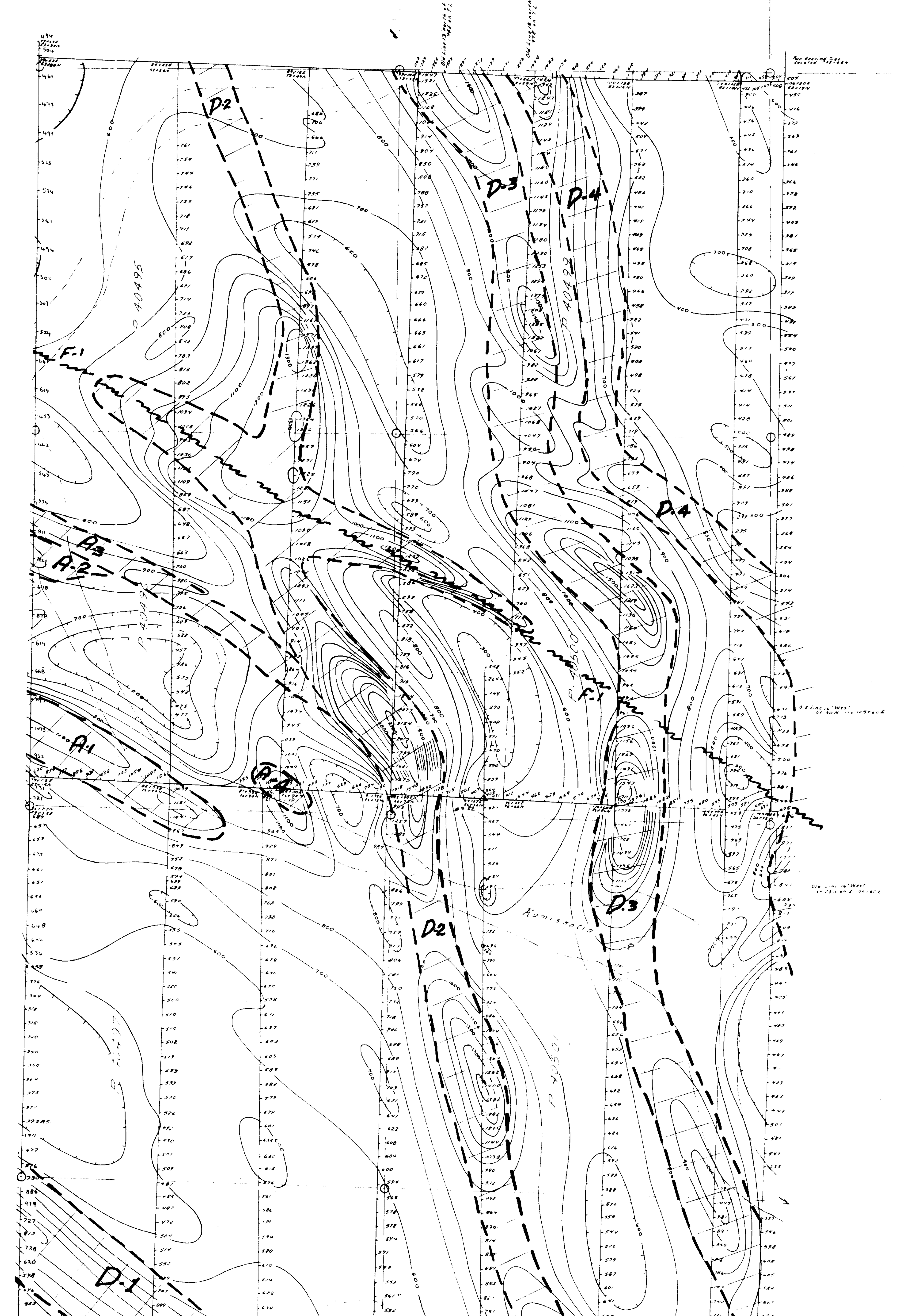
DOMINION GULF COMPANY
GROUND MAGNETOMETER SURVEY
ROBB SECTION
OF
JAMIESON I

ROBB TWP. 42A/12S ONTARIO
SCALE: 1" = 200' Sept. 7 1956
CONTOUR INTERVAL = 100 GAMMAS

Tagcompany Interpretation Report by C.W.F. Dated: Sept 7 1956

63.775

220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D-3
D-4
F-1
A-3
A-2
A-1
D-1
D3
F-2
CON IV
CON III
L-79+32E
L-84E
L-88E
L-92E
L-96E
L-100E
L-104E
L-105+60E

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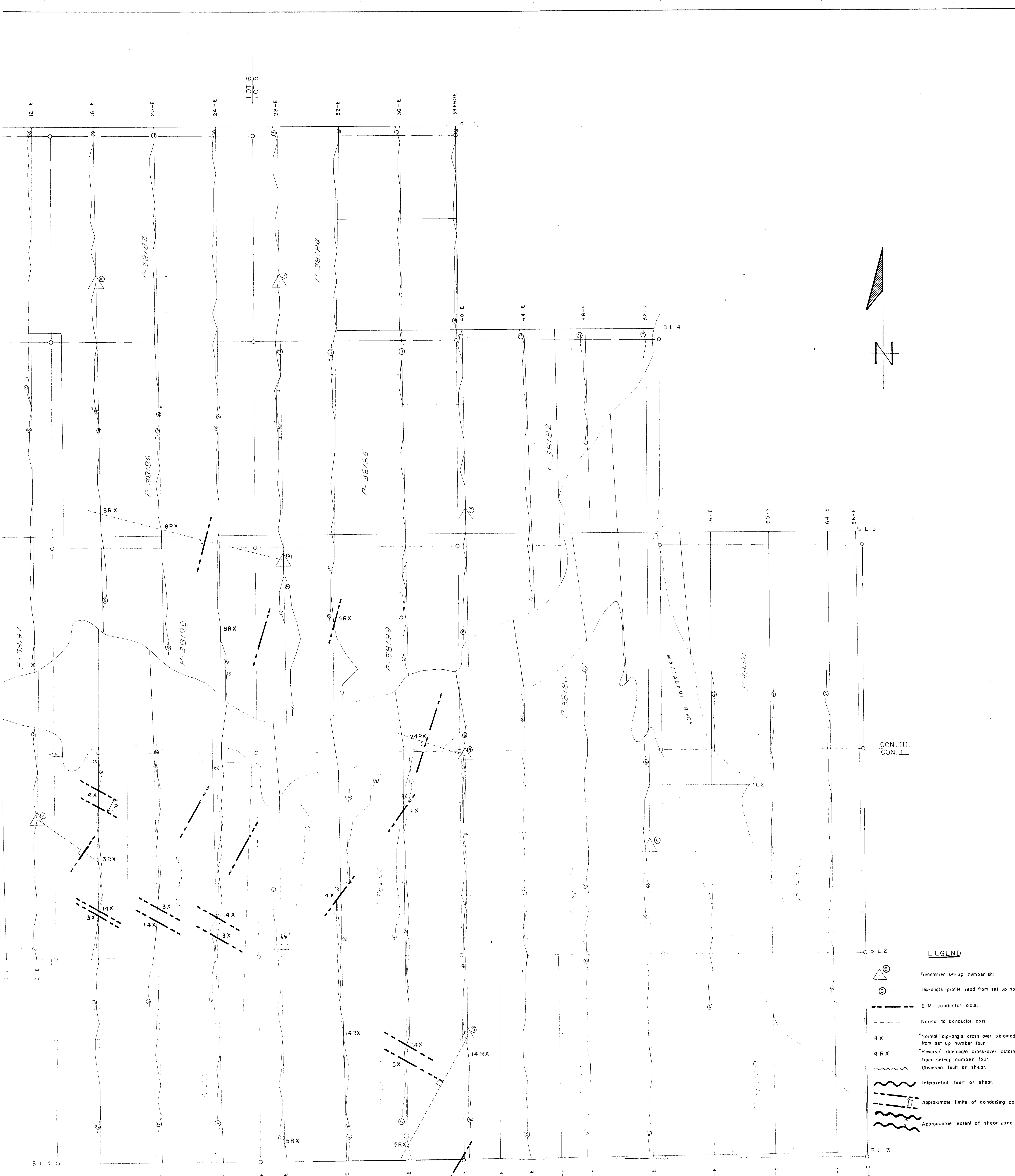


To accompany Interpretation Report by N.R. Paterson, dated Sept. 16, 1955.

DOMINION GULF COMPANY

ELECTROMAGNETIC SURVEY

DIP ANGLES

JAMIESON II

PORCUPINE – KIRKLAND, ONTARIO.

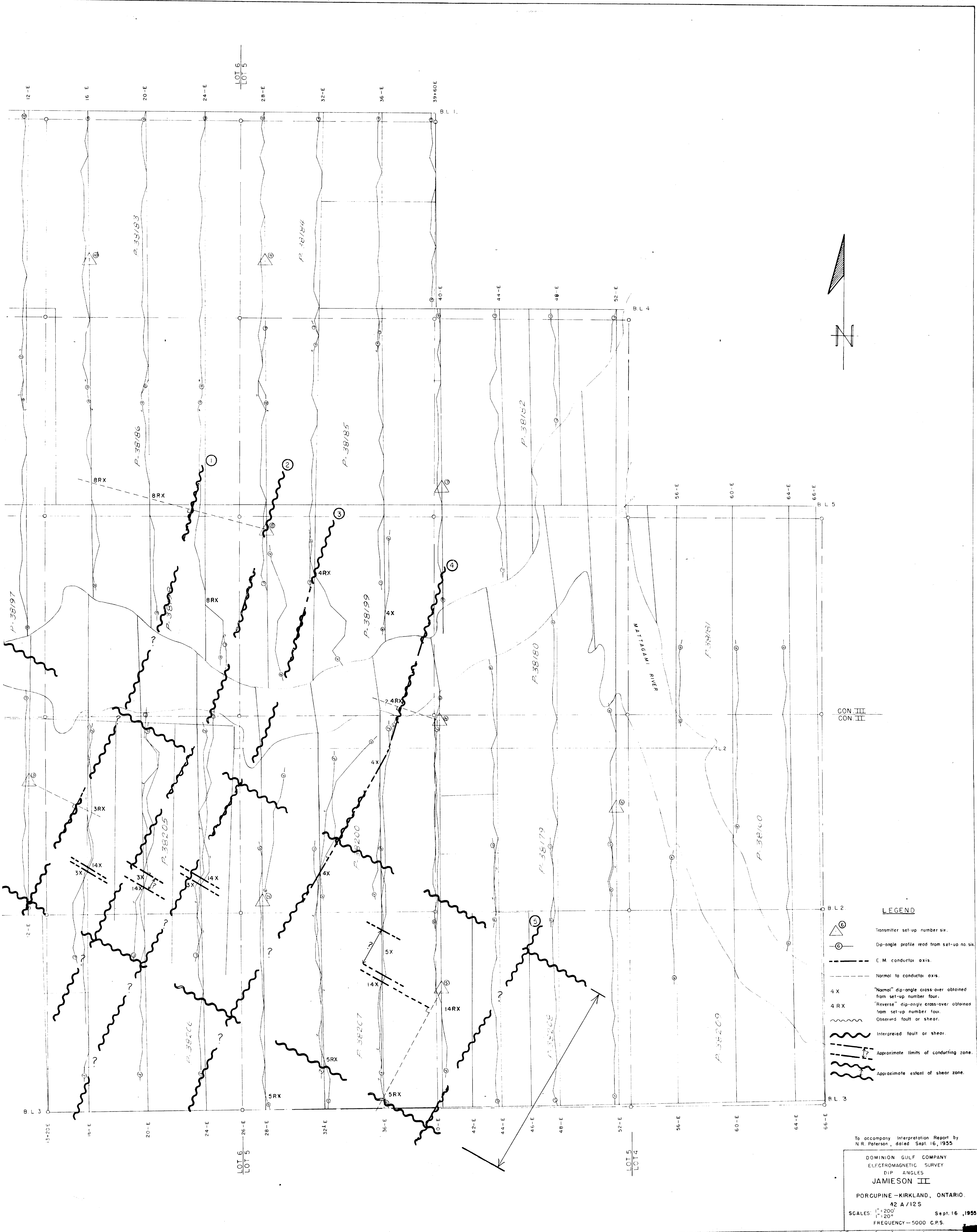
42 A/12S

SCALES: 1" = 200'; 1" = 20°

Sept. 16, 1955

FREQUENCY – 1000 C.P.S.

63.775 (3x5) (1558 ft) P.108-6



LEGEND

- Transmitter set-up number six.
- Dip-angle profile read from set-up no. six.
- E.M. conductor axis.
- Normal to conductor axis.
- 4 X — "Normal" dip-angle cross-over obtained from set-up number four.
- 4 RX — "Reverse" dip-angle cross-over obtained from set-up number four.
- Observed fault or shear.
- Interpreted fault or shear.
- Approximate limits of conducting zone.
- Approximate extent of shear zone.

To accompany Interpretation Report by N.R. Paterson, dated Sept. 16, 1955

DOMINION GULF COMPANY
ELECTROMAGNETIC SURVEY
DIP ANGLES

JAMIESON II

PORCUPINE – KIRKLAND, ONTARIO.
42 A / 12 S

SCALES: 1" = 200'
1" = 20°

Sept. 16, 1955

FREQUENCY – 5000 C.P.S.

63775 (3X5) 15

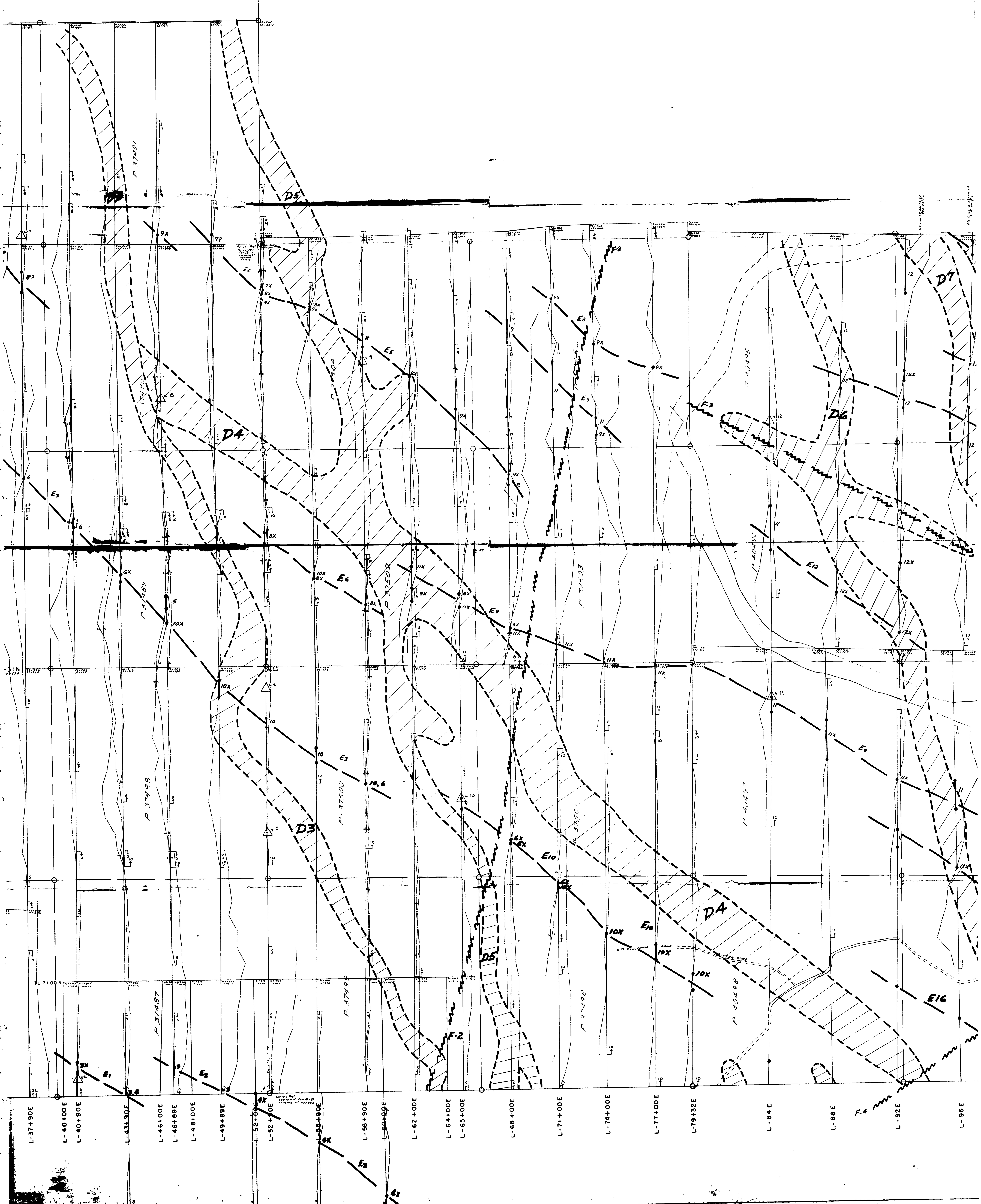
Contour Interval = 100 Gammas

DOMINION GULF COMPANY
GROUND MAGNETOMETER SURVEY
8 CLAIM BLOCK
JAMIESON I
BASE MAP 42A/12S PROV. OF ONT.
CONCESSION IV WEST HALF
Scale: 1" = 200' JUNE 29, 1956
To Accompany Report by D.W. Strangway Sept. 26/56.

63.775 (3x3) 9 sq ft

42A12SE0149 63.775 JAMIESON

240



D3
D4
D5
D6
D7
E1
E2
E3
E5
E6
E7
E8
E9
E10
E12
E16
F-2
F-3
F-4
P. 37491
P. 37504
P. 37502
P. 37503
P. 37500
P. 37488
P. 37489
P. 37487
P. 37499
P. 37498
P. 41497
P. 40498
L-37+90E
L-40+00E
L-40+90E
L-43+90E
L-46+00E
L-46+89E
L-48+00E
L-49+89E
L-55+90E
L-58+90E
L-60+00E
L-62+00E
L-64+00E
L-65+00E
L-68+00E
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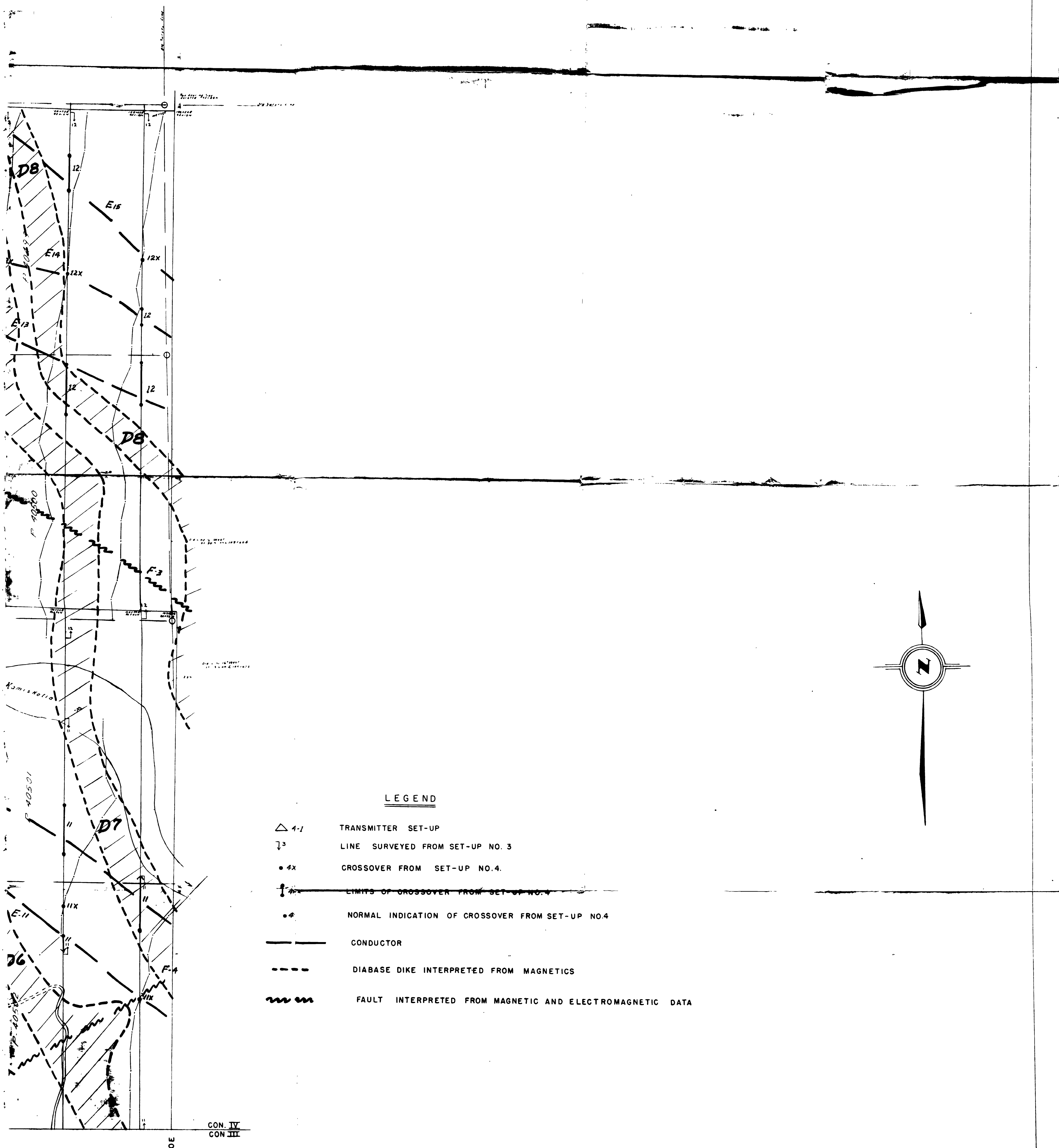
L-92E
L-96E



DOMINION GULF COMPANY
ELECTROMAGNETIC SURVEY
JAMIESON I
BASE MAP 42A/12S PROV. OF ONT.
CONCESSION IV WEST HALF
Scale: 1" = 200' JUNE 29, 1956
To Accompany Report by D. Strangway
Sept. 1956

63.775 (3½x6½) 23S