

DU PONT OF CANADA EXPLORATION LIMITED

REPORT OF GEOLOGICAL, GEOCHEMICAL
AND GEOPHYSICAL SURVEYS

ON

VAL (B) CLAIM

IN

WATSON LAKE MINING DIVISION, YT



NTS: 105-B-3

131°22'W/60°06'N



by

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1982 December 16

091414

This report is prepared by
the Geological Survey of Canada
under Section 53.4 of the Quartz
Mining Act and is allowed as
evidence for work done in amount

of \$ 3,000

R. Watson

Regional Manager, Mineral Resources and
Geological Services, Commissioner
of Yukon Territory.

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KL.82-21	Section/Line 350E
KL.82-22	" " 300E
KL.82-23	" " 250E
KL.82-24	" " 200E
KL.82-25	" " 150E
KL.82-26	" " 100E
KL.82-27	" " 50E
KL.82-28	" " 00E
KL.82-29	" " 50W
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LOCATION AND ACCESS

The VAL(B) group is located at the headwaters of Goddard Creek about 15 km NNW of Swift River on the Alaska Highway. The property lies within the Dorsey Range of the Cassiar Mountains on claim sheet 105-B-3 at about 60°06'N and 131°22'W.

The claims are accessible by helicopter from Swift River, 15 km to the south-southeast.

PHYSIOGRAPHY AND VEGETATION

The claimed area covers an east-west trending ridge about 300 metres high. The south slope is steep, however, definitely accessible with slopes of 30° to 40°. The north slope is a cliff and can only be traversed in a few places with difficulty.

Vegetation is limited to the south slope and consists of Alpine heather, grasses and flowers. At lower levels, some scrub birch and willow is evident. The property is completely above tree line.

PROPERTY STATUS

Most of the property had been allowed to lapse in January 1981. The only claims remaining in good standing were VAL 77 to VAL 82 inclusive. Six new claims were staked on 1982 July 7 to cover Skarn Ridge. These claims are VAL 101 to VAL 106 inclusive.

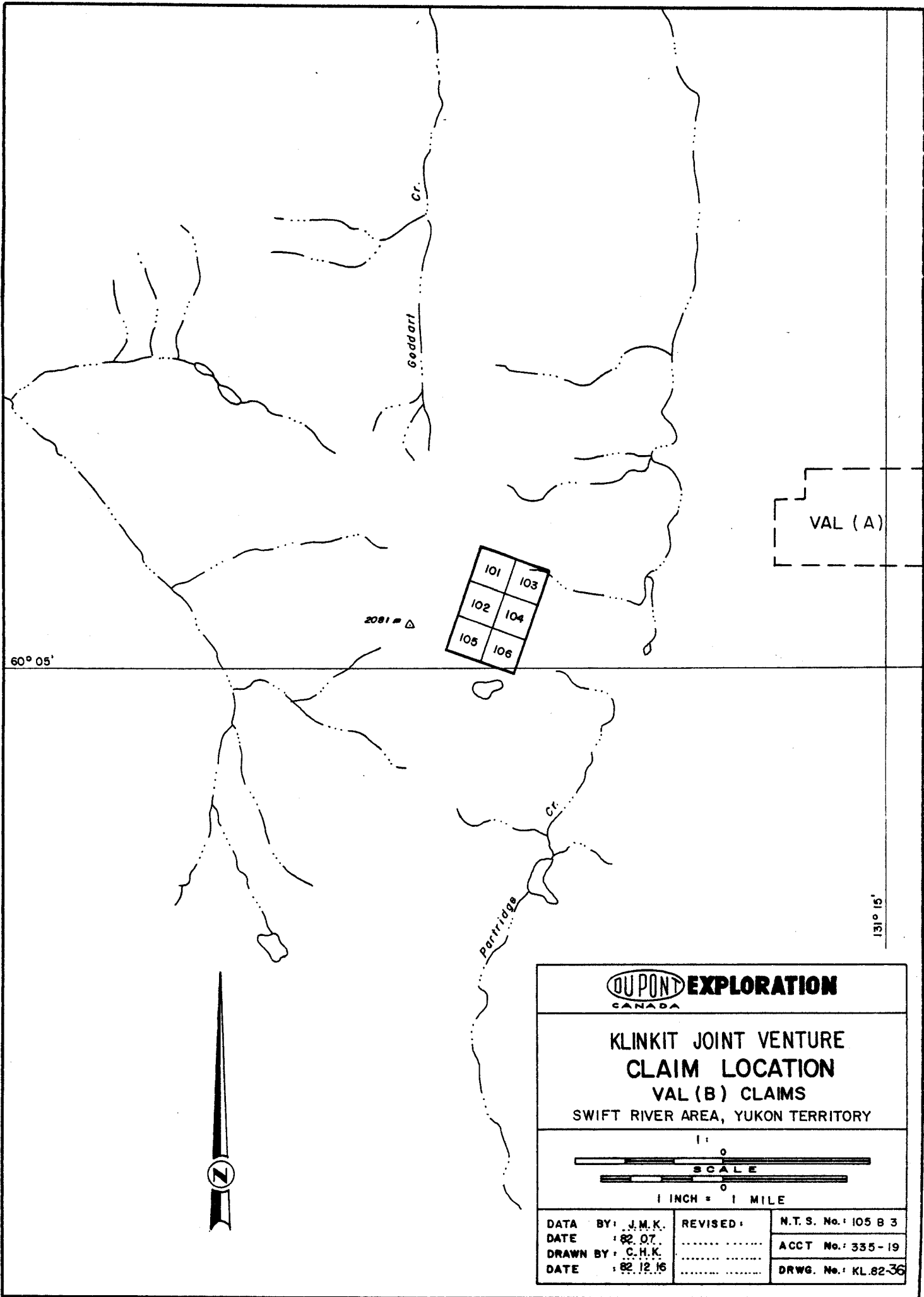
<u>Claim Name</u>	<u>Record Number</u>	<u>Expiry Date</u>
VAL 77-82	YA28849-YA28854	1982 01 10
VAL 101-106	YA68693-YA68698	1983-07-19

The VAL(B) group consists of twelve claims recorded in the Watson Lake Mining District in the name of Du Pont of Canada Exploration Limited.

HISTORY

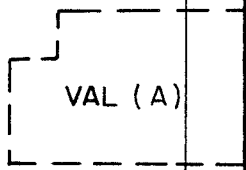
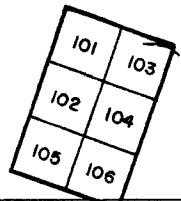
The area north of the VAL(B) property has had several years of exploration for massive sulphides in the Sylvester Group rocks. The last known work dates from 1969 when an El Paso subsidiary sampled two areas of sphalerite bearing skarn mineralization.

Several ages of old flags and old cans were noted throughout the northern part of the original claim block. Old claim posts are present along 'skarn ridge', the area just restaked by Du Pont. These claims covered extensive skarn mineralization containing sphalerite.



60° 05'

131° 15'



KLINKIT JOINT VENTURE CLAIM LOCATION VAL (B) CLAIMS SWIFT RIVER AREA, YUKON TERRITORY		
<p>1 : 0 SCALE 0 1 INCH = 1 MILE</p>		
DATA BY: J.M.K.	REVISED:	N.T.S. No.: 105 B 3
DATE : 82.07.	ACCT No.: 335-19
DRAWN BY: C.H.K.	DRWG. No.: KL.82-36
DATE : 82.12.16	

The MUN claims to the north were located in 1977 to cover several zones of scheelite bearing limy skarns.

PROPERTY EVALUATION

1. Surveying

A chain and compass survey was done over the top and south side of skarn ridge to provide control for geological mapping, geophysics and geochemistry. The surveyed grid had lines 50 metres apart and stations along the lines 25 metres apart. The grid covers an area 600 metres x 600 metres.

2. Geology (Dwg KL.82-15)

The geology was mapped at a scale of 1:2500 using the surveyed grid for control. The only area mapped at this detailed scale was "skarn ridge". The skarn unit was mapped at an even larger scale 1:1000 in order to show the differentiation of the skarns. Skarn Ridge is composed of a sequence of limestone, skarn, quartzite and siltstone intruded by an ultramafic complex of pyroxenite, gabbro and diorite. This whole suite of rocks has been further intruded by the granite of the Seagull Batholith. The metasediments are thought to be Devono-Mississippian Sylvester group rocks. The Seagull granites are Triassic in age.

The geological section is as follows:

f. Seagull Granite - Quartz Monzonite

VAL Ultramafic Complex

e. Diorite-Biotite Gabbro

d. Pyroxenite-Peridotite

Sylvester Group Sediments

c. Limestone

b. Skarns

a. Undifferentiated Clastic and Pelitic
Rocks (metamorphosed)

a. Undifferentiated Clastic and Pelitic Rocks

This unit varies from white to purple to green metamorphosed mudstones and siltstones. Also included within this group are fine- to medium-grained white to light grey quartzites. Near the contact with diorite the

quartzites become quite biotite-rich and take on a granitic character.

b. Skarn

Two main skarn types (southern skarn and northern skarn) are distinguished, each of which have been further sub-divided. The southern skarn is composed primarily of orange-brown garnet with dark green to black actinolite skarn and a lesser diopside-rich skarn. The northern skarn consists mainly of diopside and brown garnet skarn and lesser amounts of actinolite, calcite and black and green garnet skarn.

. Southern Skarn

Actinolite-Brown Garnet Skarn: This assemblage constitutes the main portion of the southern skarn. These rocks weather black to green with local rusty areas. Actinolite constitutes the major portion of this assemblage and occurs as medium- to coarse-grained, dark green to black radiating masses. Orange brown garnet interrupts the massive nature of this skarn as thin, discontinuous layers, lenses and pods.

Brown Garnet-Actinolite Skarn: On weathered surfaces, these rocks appear earthy green-brown in colour. The garnets are orange brown in colour, are commonly striated and are locally zoned. The texture is brown, fine-grained, sugary to coarse-grained subhedral. Interstitial to the garnet is fine-grained, dull black actinolite which when broken shows the garnet form imprinted on it. Locally, actinolite forms thin (2 cm) to thick (0.5 m), coarse-grained bands and/or lenses. Magnetite is less abundant in the garnet-actinolite skarn than in other types.

Actinolite-Magnetite Skarn: This skarn assemblage forms a large zone in the southeastern portion and a small patch in the west central area in contact with metasediment and limestone. The actinolite is dark green to black in colour. It forms fine- through coarse-grained, radiating, interlocking masses. There is very little structure to this assemblage with the exception of occasional garnet layers or garnet-rich zones and some fracturing. Magnetite occurs in random but abundant concentrations and appears to have been deposited late, evidenced by small magnetite veinlets.

Diopside-Quartz-Calcite Skarn: This skarn forms narrow resistant ribs in the south central and south western part of the main skarn body. These rocks weather to a chocolaty brown colour and contain black bands. They are very hard. No difference can be seen on fresh surfaces between the brown and black weathering material. The very fine-grained nature of these rocks makes positive identification of the mineral constituents difficult but coarser grained areas show a granular texture of diopside quartz and calcite. Coarse-grained black actinolite lenses which frequently contain fluorite and magnetite are common.

Northern Skarns

Diopside-Brown Garnet-Actinolite Skarn: Most of the skarn and almost all of the northern portion is made up of this assemblage. More detailed work may have allowed further division of these rocks (ie., diopside-quartz/diopside-brown garnet, etc.). This skarn weathers black through chocolate brown to dull green in colour and shows various shades of green on fresh surfaces. Its texture varies brown, fine-grained and sugary to coarse-grained. The lighter green diopside skarn is hard and probably contains more quartz. Calcite occurs in some places and tiny, evenly dispersed grained, brown garnet and dark green actinolite occur in the various textural forms of this skarn as coarse-grained pods, lenses and layers. Areas within the diopside assemblages, lateral to unskarned limestone show sharp zonation patterns away from fluid channel-ways(?). In one location, (D-54) crystalline limestone (marble) grades into a thin (1 cm) layer of medium-grained magnetite-diopside skarn then in to a 5 cm layer of green diopside-quartz skarn then into a 2 cm thick layer of greenish brown, coarse-grained idocrase skarn (possibly garnet) then into a 15 cm thick, coarse-grained, dark green actinolite skarn and finally into a coarse-grained actinolite, calcite, sphalerite, fluorite, limonite skarn of unknown thickness. At station D-61 a 1.5 m thick, fine-grained diopside core grades in one direction to a 0.75 m thick layer of coarse-grained actinolite and minor beryl or quartz and then to a medium-grained limestone. In the opposite direction, the diopside skarn changes to a 0.75 m thick layer of brown garnet, quartz, epidote, calcite skarn and then limestone. All contacts between layers of different mineralogy in these zonation patterns are sharp.

Magnetite is abundant locally but is less common here than in the southern skarns.

Diopside-Black Garnet Skarn: The mineralogy of this skarn assemblage is similar to the diopside-garnet-actinolite skarn however it also contains a sparse distribution of coarse-grained, translucent, zoned black garnets. The significance of these garnets is unknown.

. Other Minerals

Sphalerite, fluorite, magnetite and limonite occur in all skarn types, but most commonly in the actinolite-brown garnet skarn and the diopside-garnet-actinolite skarn as small rusty pods. Almost invariably, these pods contain fluorite, magnetite and sphalerite. Often the sphalerite cannot be seen but can be detected by an H₂S odour when HCl is applied. It is believed that the limonite, an unusual orange brown colour, is in part a weathering product of once abundant sphalerite (Fe-rich?). Unaltered sphalerite occurs as vitreous, red-brown, elongate blebs. Fluorite occurs as large (1 cm to 3 cm) masses, usually surrounded by dark green actinolite. Although the colour (clear, transparent) and habit (tabular) are not distinctive of fluorite, minor purple fluorite was seen grading into the clear variety. Varying amounts of fine-grained magnetite is usually present in these pods.

The origin of the pods is uncertain although they may have formed late in the metasomatic process (fluorite fills large interstitial cavities in the coarse-grained actinolite layers).

. Sphalerite-Galena

Sphalerite and minor galena were observed together near station D-55 in a green weathering skarn. The sphalerite, similar to that previously described, is present in amounts up to 8%. The galena, dull metallic grey and crystalline, is sparsely distributed (disseminated). The host rocks are calcareous and non-magnetic.

c. Limestone

Large unaltered pods of limestone are exposed within the skarn unit. These limestones are partially

silicified, white to grey laminated rocks. They are often interbedded with a weak, pink garnet skarn and metamorphosed siltstones. The geometric relationship between the skarn and limestone indicate a complex, fracture related flooding of hydrothermal fluids which caused the skarnification.

d. Pyroxenite-Peridotite

Pyroxenite is medium to dark green, medium- to coarse-grained, equigranular, and, in some places, contains substantial amounts of dark red-brown biotite. A thin section of pyroxenite reveals considerable alteration of pyroxene to a tremolite/epidote assemblage; a section of biotitic pyroxenite reveals a possible cumulate mixture of olivine and pyroxene in a matrix of intercumulate biotite. Pyroxenite accounts for over 50% of the mafic-ultramafic suite. Peridotite is fine grained and dark green when fresh; large bodies weather bright orange and are readily identified from a distance. Olivine is easily recognized in hand specimens of coarser varieties. Peridotite commonly occurs with pyroxenite in so intimate a mixture that it is inseparable.

e. Diorite

Gabbroic diorite is fine to medium grained, equigranular, with a salt and pepper appearance from evenly distributed white plagioclase and dark pyroxene. Hornblende is identified in thin section as patchy replacements of and rims around pyroxene. Plagioclase is of intermediate (An₄₉) composition, and it is on this basis that the rock name used is shortened from gabbroic diorite to diorite.

With one exception, some proportion of diorite (commonly mixed with biotite-pyroxenite) is always present where mafic-ultramafic rocks are in contact with the Seagull batholith. The northern arm of the pendant has proportionately more diorite than any other rock type, but it is intimately mixed with biotite-pyroxenite.

f. Seagull Batholith

The Seagull batholith underlies and surrounds sedimentary and mafic-ultramafic rocks on the VAL claims. Pendant contacts are generally sub-horizontal, but may be steeply concave beneath the mafic-ultramafic pendant.

Average compositions are about 30% quartz, 30% plagioclase and 40% K-feldspar.

It is thus classified as granite. Biotite is usually present in amounts of up to 10% (average 3 to 5%). Muscovite was noted only in thin section up to 5%, but is commonly an alteration product, and is not visible in hand specimen.

All possible textural variations of granitic rocks are evident in the Seagull batholith on the VAL claims. Coarsely equigranular and porphyritic varieties are present, along with aplite, fine-grained porphyries with rare to abundant phenocrysts, pegmatite and seriate varieties which may have aplitic and pegmatitic textures in a single hand specimen. The two most common varieties are as follows:

- Coarse-grained¹: 2 to 6 mm grain size; most commonly very light tan colour; can be very coarsely porphyritic; quartz pale to dark grey.
- Porphyritic²: groundmass 0.5 to 1.0 mm; feldspar and quartz phenocrysts up to 1 cm constitute less than 10% of the rock (they are often very rare and have been noted to amount to up to 30%); common orange colour (fresh and weathered); outcrops sometimes gossaned; quartz phenocrysts most commonly dark grey or black.

The coarse-grained variety is by far the most common on the VAL claims.

g. Structural Relationships

The structural picture of skarn ridge is one of vertical faults and shear zones with large blocks and slices of metasediments and ultramafic rocks overlying the granite. Even the granite surface appears to be affected in part by this vertical movement and jumble. Many

¹This textural subdivision is sometimes referred to as "Seagull phase" (or "Hake phase") by other authors or in other reports regarding the Seagull batholith.

²This textural subdivision is sometimes referred to as "DU phase" by other authors or in other reports regarding the Seagull batholith.

of the large unaltered limestone blocks are as a result of the vertical plumbing of shear zones which carried skarnifying fluids away from the granite. Most of the contacts between rock types on the ridge are tectonic in origin, either a fault contact or a shear contact. In general, the area is highly sheared and brecciated. Brecciation is common in ultramafics, diorite and skarn. Shearing of metasediments and intrusives is seen in locally well developed slaty cleavage, as well as apparent complex interfingering of the units.

3. Geophysics

A magnetometer survey was run over the grid placed on Skarn Ridge. Over areas of anomalous magnetic readings, a detailed magnetometer survey was run over the same lines using five metre stations. A Scintrex MP-2 Proton Precession magnetometer was used for the survey.

A VLF-EM survey using a Sabre Electronics VLF-EM unit was run on the surveyed grid. The station used for transmission was Hawaii.

4. Geochemistry (KL.82-19)

A soil geochemical survey was run over the grid using the "C" horizon of the soil as the sample medium. A total of 210 samples were taken. A 500 gram sample was taken using a mattock to dig the hole. The holes varied in depth from 12 to 25 cm.

The samples were sent to Min-En Laboratories Limited in North Vancouver where they were sieved to -80 mesh and analyzed geochemically for tin. The analytical method is described in Appendix A in the report.

Mineralized grab samples were taken from all parts of the skarn outcrop. These samples were all sent to Min-En where they were crushed, pulverized and analyzed for tin.

5. Geophysical Results

The magnetometer and VLF results are plotted together with surface geology and topography on several sections corresponding to the surveyed sample lines. These sections (Dwgs KL.82-20 to KL.82-31 inclusive) are located in Appendix B of this report. The contoured magnetometer results are also plotted on a 1:2500 plan map (Dwg KL.82-17).

The contoured magnetics indicate two magnetite-rich zones cutting across the grid at an angle of 45°. The western zone, indicated by the 59,000 gamma contour, is 200 metres long by 100 metres wide and runs from 0+00W, 0+75N to 0+50E, 2+00N. The eastern zone is quite narrow being 50 metres wide and 300 metres long. This zone runs from 0+50E, 0+25S to 2+50E, 1+25N. Both of these zones correspond directly to the magnetite bearing skarn zones described in the geology. A small magnetic anomaly at 1+50W, 2+50N corresponds to the peridotite unit. The magnetic profiles indicate that the eastern zone actually gives a weak magnetic response at 0+50W, 0+75S as opposed to 0+50E, 0+25S. This makes the long dimension of this zone 400 metres rather than 300 metres.

In section there is a very good correlation between high magnetic response and skarn. The VLF also gives definite dip angle cross-overs, at the contacts between the skarn and other units. The dip angles profiles often show similar patterns correlative between lines which probably indicate a geological unit. This pattern is particularly evident in mapping out the peridotite horizon.

The VLF-EM was also filtered using the Fraser method of filtering the dip angles. This filtered data was plotted on a plan map and then contoured.

The contoured EM map (Dwg KL.82-18) shows a large conductive zone which has three centres. The western zone agrees quite well with the western magnetite zone. The eastern zones do not agree with any particular unit as they both cut across geological boundaries. All three zones may denote areas of brecciation and may represent areas where hydrothermal fluids degassed.

6. Geochemical Results

The soil geochemistry is plotted on Dwg KL.82-16. Basic statistics were calculated using 176 samples and omitting the 28 samples that analyzed over 100 ppm Sn. One of these samples ran 3500 ppm Sn. The resultant statistics are:

Mean \bar{X}	= 18 ppm Sn	Range 1 ppm to 99 ppm
Standard Deviation S	= 22 ppm Sn	Omitted samples range from 100 ppm to 3500 ppm

Thus for this set of soils, the following statistics may apply:

Slightly Anomalous	$\bar{X} + S$	= 40 ppm Sn
Definitely Anomalous	$\bar{X} + 1.5 S$	= 51 ppm Sn
Extremely Anomalous	$\bar{X} + 2.0 S$	= 62 ppm Sn

The data is quite noisy and not contourable. The most significant pattern demonstrated by the soils is that the highs are concentrated near the proposed granite contact and the mapped ultramafic contact.

The rock geochemistry gives a similar pattern of highs near the intrusive contacts and lows directly over the magnetometer anomalies. Since these analyses are cassiterite specific, the indication is that these magnetite-rich areas do not contain cassiterite.

Four, five metre lines of rock chip samples were taken and analyzed for both cassiterite tin and total tin. These chips were all taken in locations high in magnetite. On three of the lines the cassiterite specific analyses indicated less than 50 ppm tin. These same three lines ran from 800 to 1500 ppm as total tin. The most northerly chip line ran from 400 to 600 ppm tin in the cassiterite specific analysis and 700 to 1800 ppm tin in the total analysis. These samples indicate that as much as 1500 ppm tin is present in these rocks bonded within the crystal lattices of various silicate minerals. The tin bearing silicate zone in a skarn is usually adjacent to the cassiterite bearing zone. The silicate zone is also distal to the granite relative to the cassiterite zone.

In general, the areas of high zinc mineralization occur in the upper parts of skarn ridge and contain very little tin, silicate or cassiterite. This is consistent with a general zoning picture for tin skarns where the zinc skarns are the most distant from the granite.

The rock chip geochemistry is listed in Table 1 of this report and also on the geology map Dwg KL.82-15.

7. Mineralization

As was discussed in the geology, several skarn assemblages have been mapped on skarn ridge. The assemblage that carries the most cassiterite tin on surface is the actinolite-magnetite skarn. Comments concerning this skarn often indicate presence of sulphides. This unit averages 460 ppm cassiterite tin and 1000 to 1800 ppm total tin. The unit contains so sphalerite. The brown garnet-actinolite skarn contains 30 ppm tin as cassiterite. It also contains over 1000 ppm tin as total tin. The other major skarn is a

TABLE 1

Rock Geochemistry - VAL "B"

<u>Sample No.</u>	<u>Location</u>	<u>Description</u>	<u>Analysis (ppm)</u>			
			<u>Sn</u>	<u>W</u>	<u>Pb</u>	<u>Zn</u>
2042F	D-34	Diopside? or actinolite, magnetite, limonite, sphalerite, chalcopyrite skarn. Near axinite skarn	560			11.03%
2043F	D-37	Brown and green garnet, actinolite, diopside skarn	17			
2044F	D-38	Dark green diopside, actinolite, fluorite, sphalerite	13			3.59%
2045F	D-46	Garnet, actinolite, fluorite, calcite, limonite, skarn - brecciated	11			
2046F	D-46a	Diopside, brown garnet, black garnet quartz? skarn	<2			
2047F	D-49	Diopside, calcite, magnetite, sphalerite and brown garnet skarn	140			1.44%
2048F	D-47 & D-48	Green pyroxene skarn. Diopside, actinolite, magnetite, limonite skarn	3250			
2049F	D-50	Diopside, magnetite skarn, minor sphalerite and brown garnet	240			
2050F	2+50E 1+25N	Black and rusty calcareous variably magnetic, actinolite skarn	4		<2	
2051F	1+90E 3+30N	Coarse-grained calcite, tourmaline skarn	3	<2		
2052F	1+40E 3+20N	Sphalerite, limonite skarn	<2	55	20	6500
2053F	1+50E 3+10N	Rusty actinolite skarn	7	<2		

TABLE 1, Rock Geochemistry (continued)

Sample No.	Location	Description	Analysis (ppm)			
			Sn	W	Pb	Zn
2054F	1+53E 1+25N	Rusty dense black magnetite skarn	1050	170		
2055F	1+00E 1+50N	Calcite, tremolite skarn	19	<2		
2056F	1+00E 1+75N	Actinolite, fluorite skarn	21	3		
2057F	1+00E 2+75N	Fluorite, pyroxene skarn	<2	6		
2058F	1+10E 2+95N	Limonitic actinolite sphalerite vein	2	2	72	6500
2059F	1+10E 2+95N	Limonitic fluorite, actinolite skarn	12	350	84	6100
2060F	A-79	Limonitic sphalerite, green pyroxene epidote, skarn	23		100	5700
2061F	A-81	Calcite, actinolite, epidote skarn	9			
2062F	A-82	Green garnet, hedenbergite, pink massive garnet skarn	<2			
2063F	A-83	Fluorite, actinolite, magnetite skarn with malachite staining	900			
2064F	A-85	Magnetite, actinolite skarn	320			
2065F	A-88	Magnetite, skarn	260			
2066F	1+35W 2+50N	Brown garnet, actinolite	16			
2067F	A-108	Hedenbergite, axinite skarn	2			
2081F	D-25	Brown and red garnet, idocrase, tremolite skarn	13	3		
2082F	0+25E 3+18N	Brecciated actinolite, sphalerite skarn	<2	32	130	6100
2083F	0+00E 2+91N	Brecciated sphalerite skarn	6	110	185	6500

TABLE 1, Rock Geochemistry (continued)

Sample No.	Location	Description	Analysis (ppm)			
			Sn	W	Pb	Zn
2084F	0+05E 0+78N	Tremolite, magnetite skarn	35	125		
2085F	0+00E 1+25N	Light green brecciated skarn	<2	<2		
2086F	0+12W 1+50N	Tremolite, actinolite, magnetite idocrase skarn	72	<2		
2087F	0+25E 1+85N	Brown garnet, actinolite skarn	15	<2		
2088F	0+30W 2+00N	Black actinolite, magnetite skarn	900	<2		
2089F	0+40E 2+90N	Actinolite, idocrase, fluorite skarn	11	<2	112	6100
2090F	0+10E 2+85N	Magnetite, actinolite, fluorite, sphalerite skarn	38	11	115	6000
2091F	0+50E 1+11N	Skarn containing brown garnets fluorite and actinolite	25	<2		
2092F	3+50E 1+80N	Magnetite, red garnet, actinolite	280			
2093F	D-26	Magnetic garnet, actinolite skarn	10			
2094F	D-27	Magnetic green actinolite skarn minor fluorite	220			
2095F	D-28	Magnetic garnet, actinolite skarn	160			
2096F	D-29	Magnetite veinlet cutting coarse-grained green actinolite skarn	8			
2097F	D-31	Brecciated green actinolite, brown garnet skarn	18			
2098F	D-32	Green actinolite skarn	70			
2099F	D-33	Limonite skarn	20			
2900F	D-51	Diopside, brown and black garnet skarn	6			

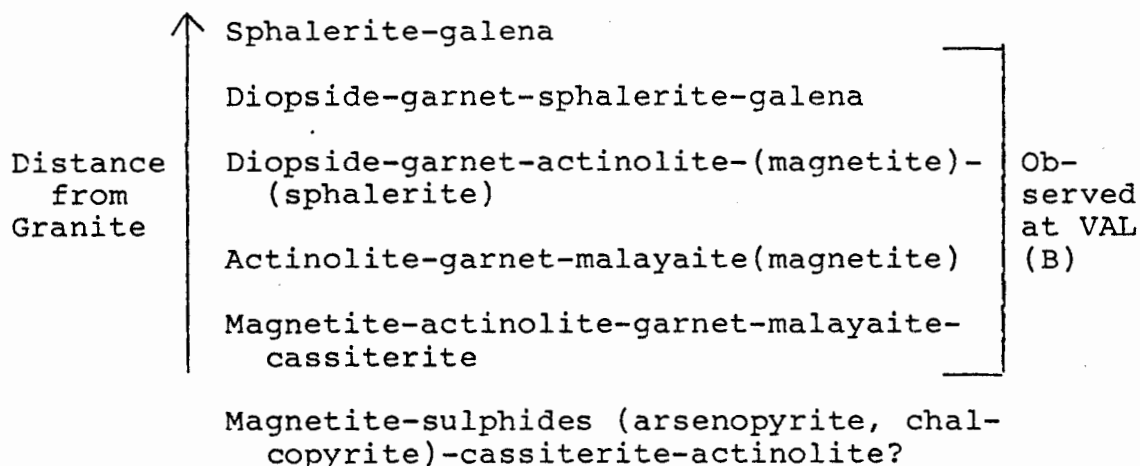
<u>Sample No.</u>	<u>Location</u>	<u>Description</u>	<u>Analysis (ppm)</u>			
			<u>Sn</u>	<u>W</u>	<u>Pb</u>	<u>Zn</u>
2901F	D-53	Diopside, quartz, calcite, fluorite, sphalerite, magnetite skarn	8		100	5700
2902F	D-62	Diopside, garnet skarn	5		200	4.50%
2903F	D-63	Diopside garnet skarn	48		100	5.52%

diopside-rich brown or black garnet skarn. This unit also contains sphalerite, fluorite, actinolite and some magnetite. It averages 27 ppm cassiterite tin.

No total tin analyses were run on this skarn. Two samples of the diopside-rich skarn were not included in the calculations. They contain magnetite, actinolite and chalcopyrite and run 560 and 3250 ppm tin as cassiterite. These two samples are quite anomalous from the other diopside skarns.

Excepting the two anomalous diopside skarn samples, there is a general relationship to the type of skarn and its tin and zinc content. The magnetite-actinolite skarns are nearest the granite. The diopside-garnet skarns are farthest away. The cassiterite content and sphalerite content also reflects this fact. The cassiterite is highest in the magnetite-actinolite skarn and lowest in the diopside skarn. Sphalerite is low in the magnetite skarn and high in the diopside skarn.

A rough mineralogical and metallic zoning is demonstrated on the VAL(B) property. The zoning is as follows:



GRANITE

The above zoning has been observed in VAL(B), however, the one zone which has the most economic potential, i.e., magnetite-sulphide-cassiterite-actinolite zone has not been observed, only hinted at. With the granite contact 50-100 metres below the lowest exposure of skarn, there is certainly room for this zone to exist.

SUMMARY AND CONCLUSIONS

The "Skarn Ridge" on the VAL(B) property contains extensive magnetite skarn mineralization containing up to 1800 ppm Sn in silicates. Very little cassiterite was found. The lowest level of outcrop on the ridge is at least 50 metres above the mineralizing granite where the most favourable skarn should be. The mineralogy of the skarn in outcrop demonstrates a skarn zonation similar to that of cassiterite bearing skarns and proximal to the actual cassiterite zone. Rough calculations demonstrate that there is enough room below the outcrop for an economic tin deposit to occur.

A few diamond drill holes, which would sample test the skarn down to the granite contact is all that is necessary to test this zoning model. A limited diamond drilling programme is being recommended in a memorandum stating the programme and budget for VAL(B) exploration in 1983 or 1984.

The property has an excellent chance of containing an economic tin deposit.

J. M. Kowalchuk
Senior Geologist
1982 December 16

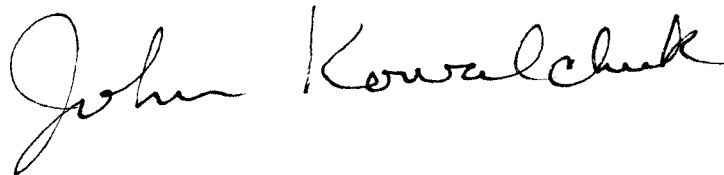


JMK/krl

QUALIFICATIONS

I, John M. Kowalchuk, do hereby certify that:

1. I am a geologist residing at 3086 Mariner Way, Port Coquitlam, British Columbia and employed by Du Pont of Canada Exploration Limited.
2. I am graduate of McMaster University, Hamilton, Ontario, with a B.Sc. in 1970.
3. I am a Fellow of the Geological Association of Canada.
4. I am a Member of the Canadian Institute of Mining and Metallurgy.
5. I am a Member of the Association of Exploration Geochemists.
6. From 1970 until 1982, I have been engaged in mineral exploration in British Columbia, Yukon Territory and Northwest Territories.
7. I personally participated in the fieldwork and assessed and interpreted the data resulting from this work on behalf of Du Pont of Canada Exploration Limited.

A handwritten signature in cursive script that reads "John Kowalchuk". The signature is written in dark ink and is positioned above the typed name and date.

John M. Kowalchuk
Senior Geologist
1982 December 16

STATEMENT OF EXPENDITURESJanuary 1 - December 31, 1982VAL(B) CLAIMS, YT

Travel Expenses - Property Exam.	\$ 1,671.73
Camp Expenses	1,970.60
*Mapping, Gr. Surveys, Maps, Reports	9,251.29
Freight, Hauling, Storage	645.09
Assaying	2,783.85
Salaries - Regular	5,202.53
Salaries - Temporary	7,288.52
Space Charges	144.00
Equipment Rental	1,117.61
Non-Capital Equip. Purchases	<u>810.17</u>
	<u>\$30,885.39</u>

*Includes helicopter charges.



APPENDIX A

OCT 21 1982

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

Corner 15th Street and Bewicke
705 WEST 15TH STREET
NORTH VANCOUVER, B.C.
CANADA V7M 1T2

ASSESSMENT PROCEDURE REPORT FOR TIN

1.000 gram of sample is weighed and digested with 2.0 grams of NH_4I into fusion tubes and the sublimates of the tin iodite is collected and dissolved in HCl.

The actual analysis is carried out on an aliquote by spectrophotometrically using a reducing buffer and than adding the Gallein color complexing agent to produce the actual color of the tin complex.

To increase sensitivity of the test the tin color complex is extracted by Iso-Amyl Alcohol.

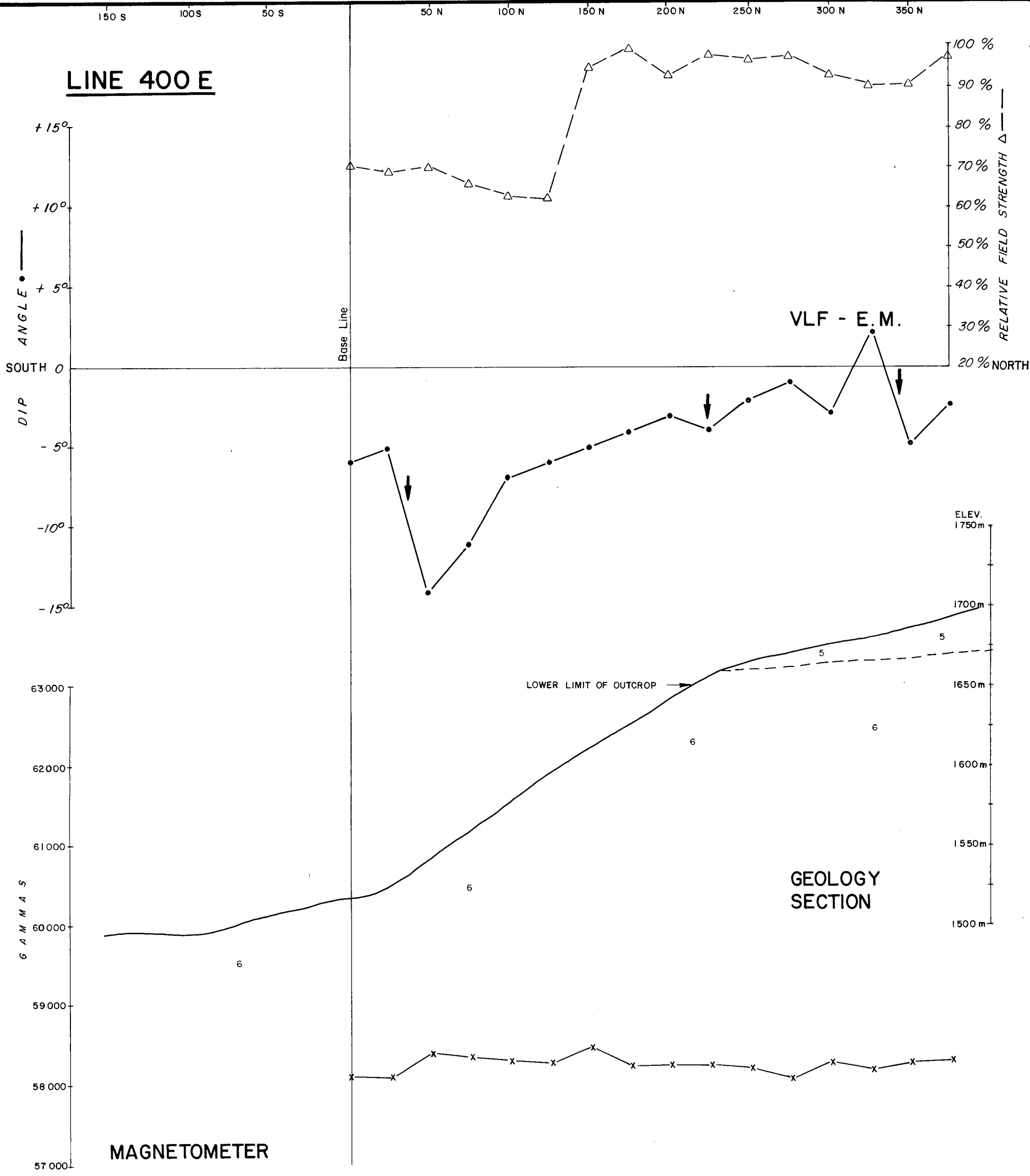
A set of standards is prepared all the way through the procedure and than cures are obtained to convert absorption into ppm.

Reference:

Geochemical Prospecting for Tin
Western Miner Feb. 1973 pp. 37-44.

APPENDIX B

LINE 400 E



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

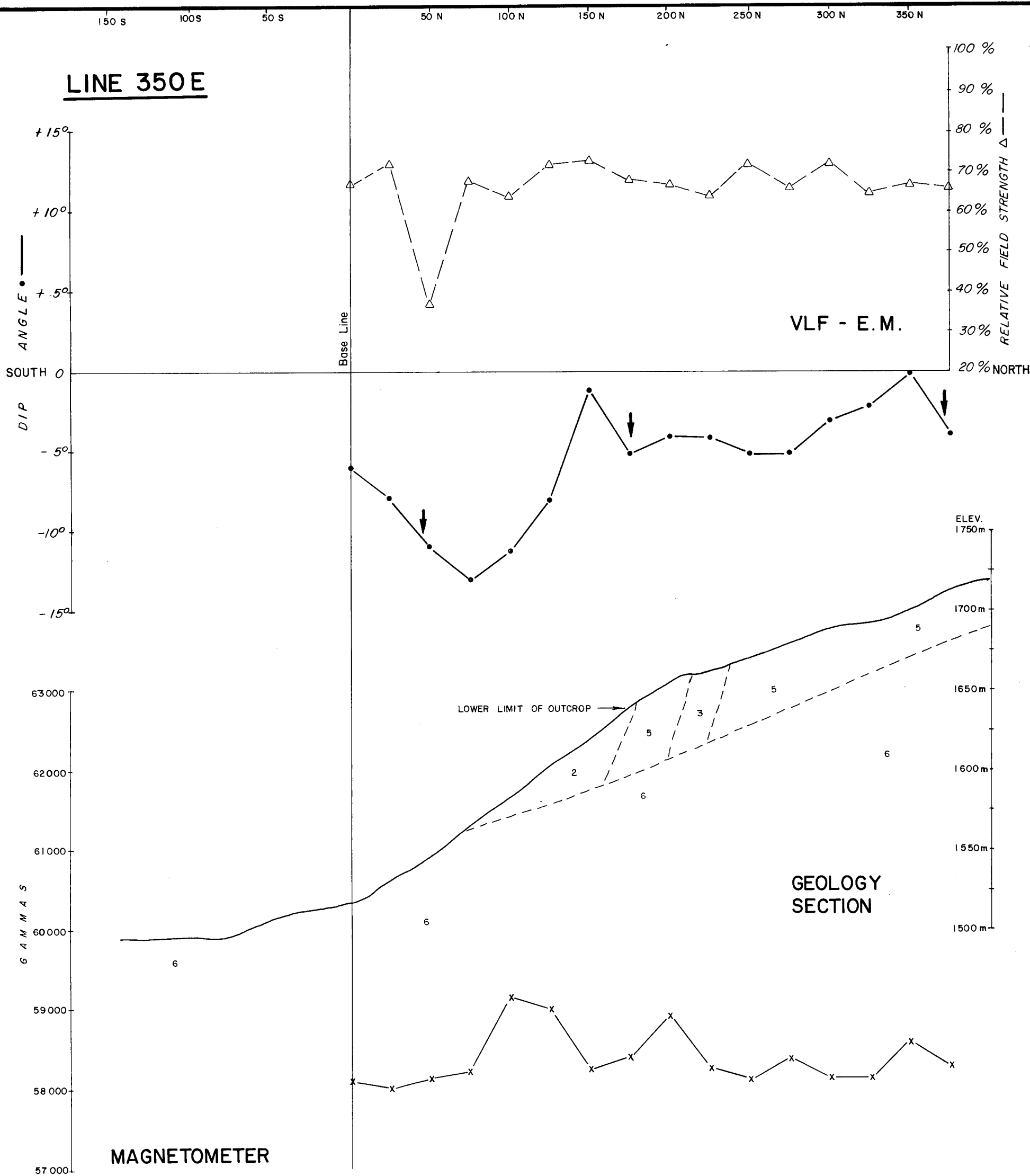
DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 400 E
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
1:2500

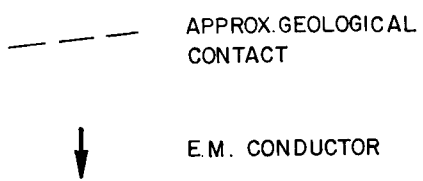
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1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No: 105 B 3
DATE: 82 07		ACCT No: 335 - 19
DRAWN BY: C. H. K.		DRWG. No: KL. 82 - 20
DATE: 82.11.03		



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS



DUPONT EXPLORATION
CANADA

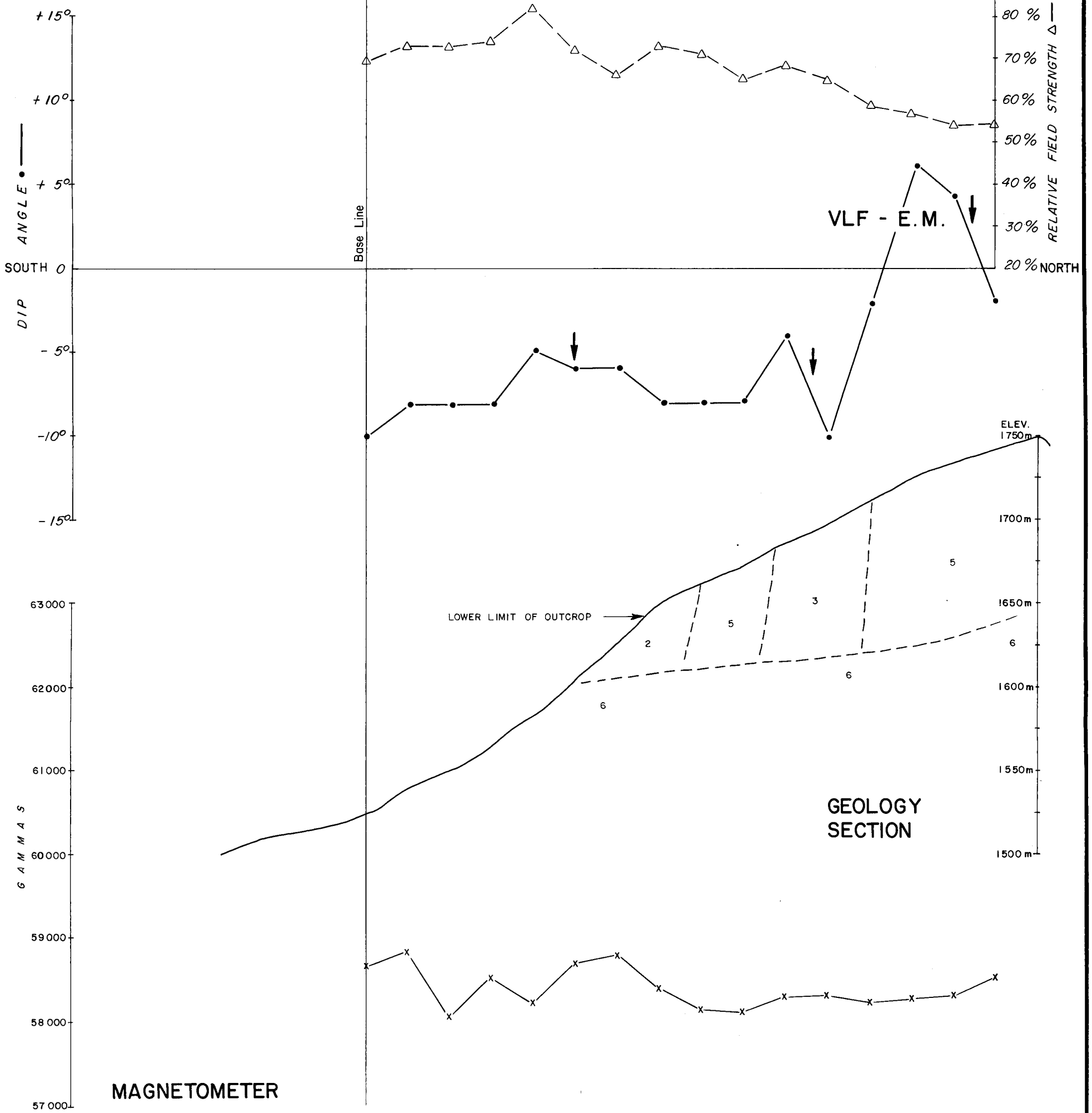
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GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 350 E
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
1:2500
m 100 75 50 25 0 100 m
1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No.: 105 B 3
DATE: 82.07		ACCT No.: 335 - 19
DRAWN BY: C. H. K.		DRWG. No.: KL. 82 - 21
DATE: 82.11.03		

150 S 100 S 50 S 50 N 100 N 150 N 200 N 250 N 300 N 350 N

LINE 300 E



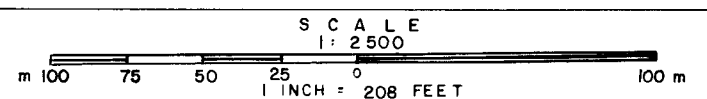
LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- - - - - APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR



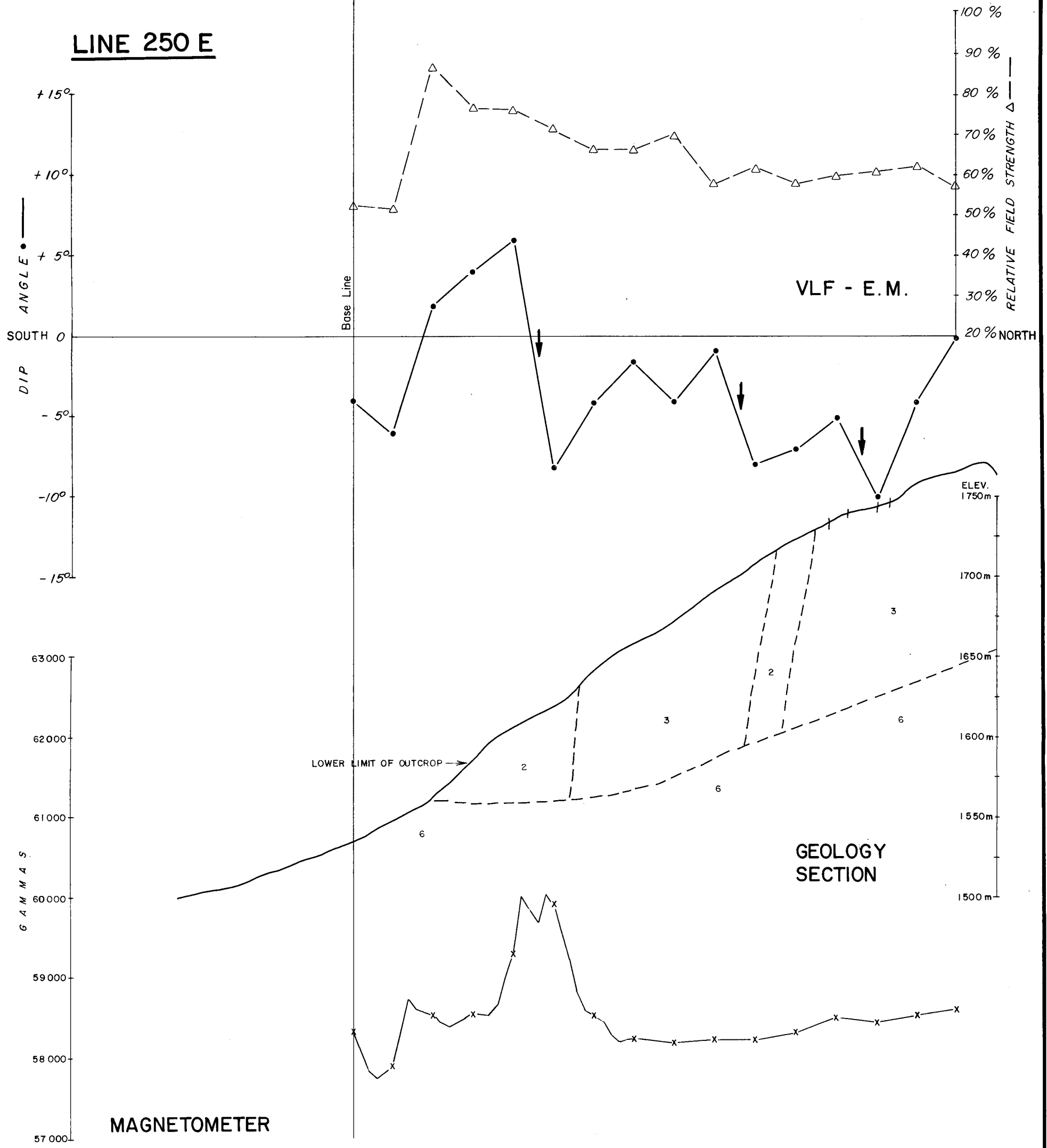
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VAL (B) CLAIMS
 SWIFT RIVER AREA, YUKON TERRITORY



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DATE: 82 07		ACCT No.: 335 - 19
DRAWN BY: C. H. K.		DRWG. No.: KL. 82 - 22
DATE: 82 10 26		

150 S 100 S 50 S 50 N 100 N 150 N 200 N 250 N 300 N 350 N

LINE 250 E



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

OU PONT CANADA EXPLORATION

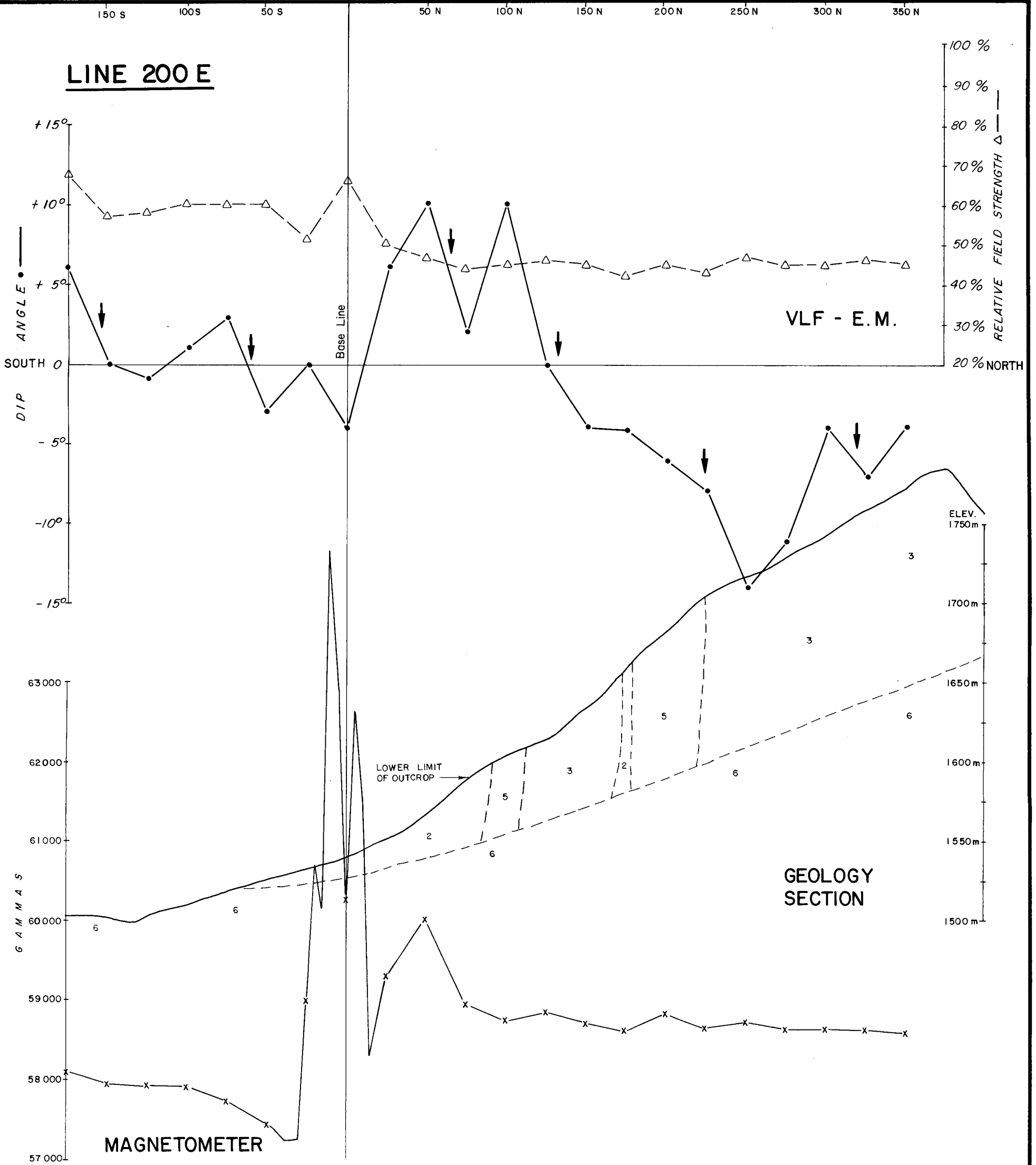
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LINE 250 E
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY**

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1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No. 105 B 3
DATE: 82 07		ACCT No. 335 - 19
DRAWN BY: C. H. K.		DRWG. No. KL. 82-23
DATE: 82 10 26		

LINE 200 E



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

DUPONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 200 E
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
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1 INCH = 208 FEET

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DATE: 82 11 03

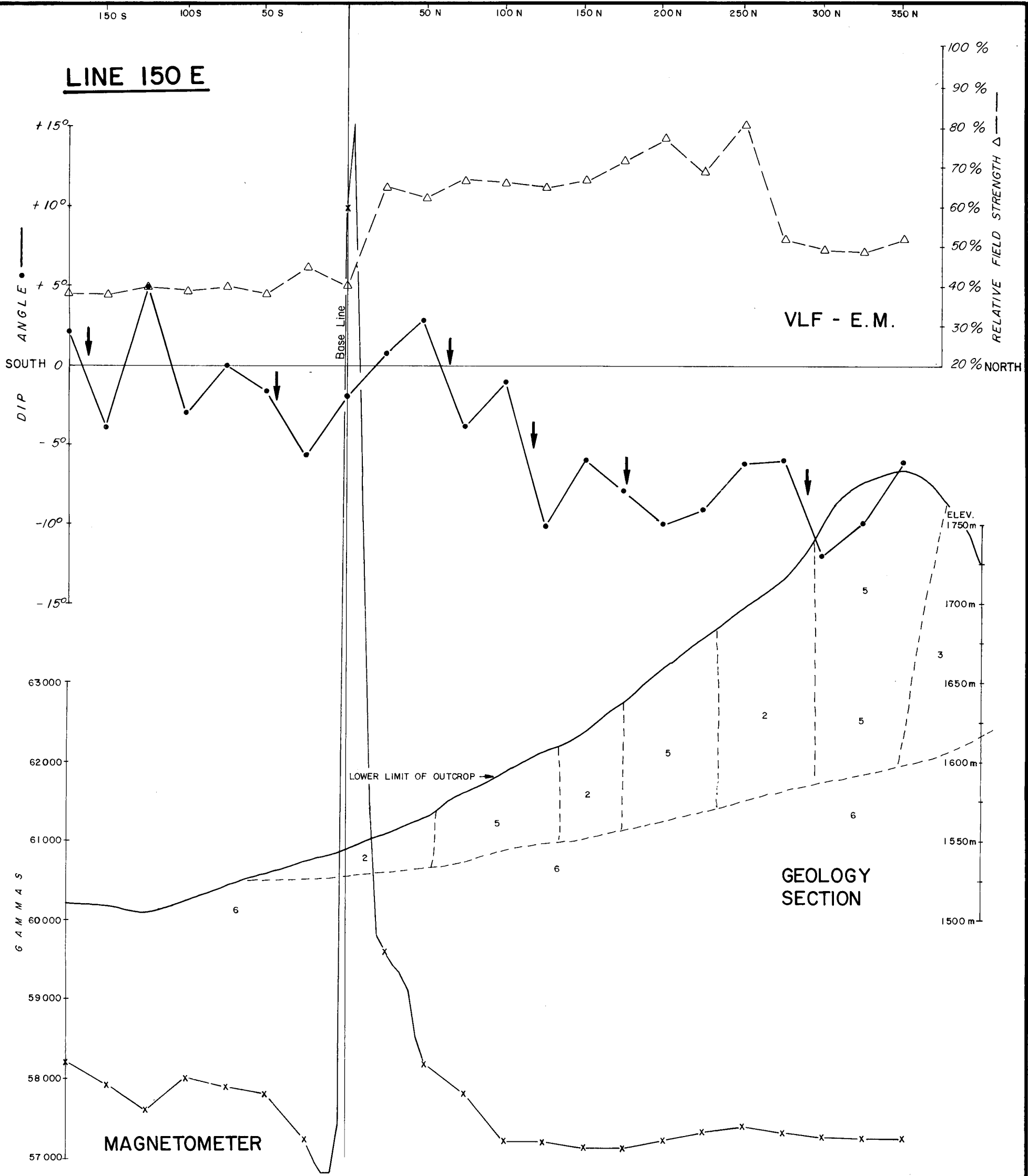
REVISED:

N.T.S. No.: 105 B 3

ACCT No.: 335 - 19

DRWG. No.: KL. 82-24

LINE 150 E



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- - - - - APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

DU PONT CANADA EXPLORATION

**KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 150 E
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY**

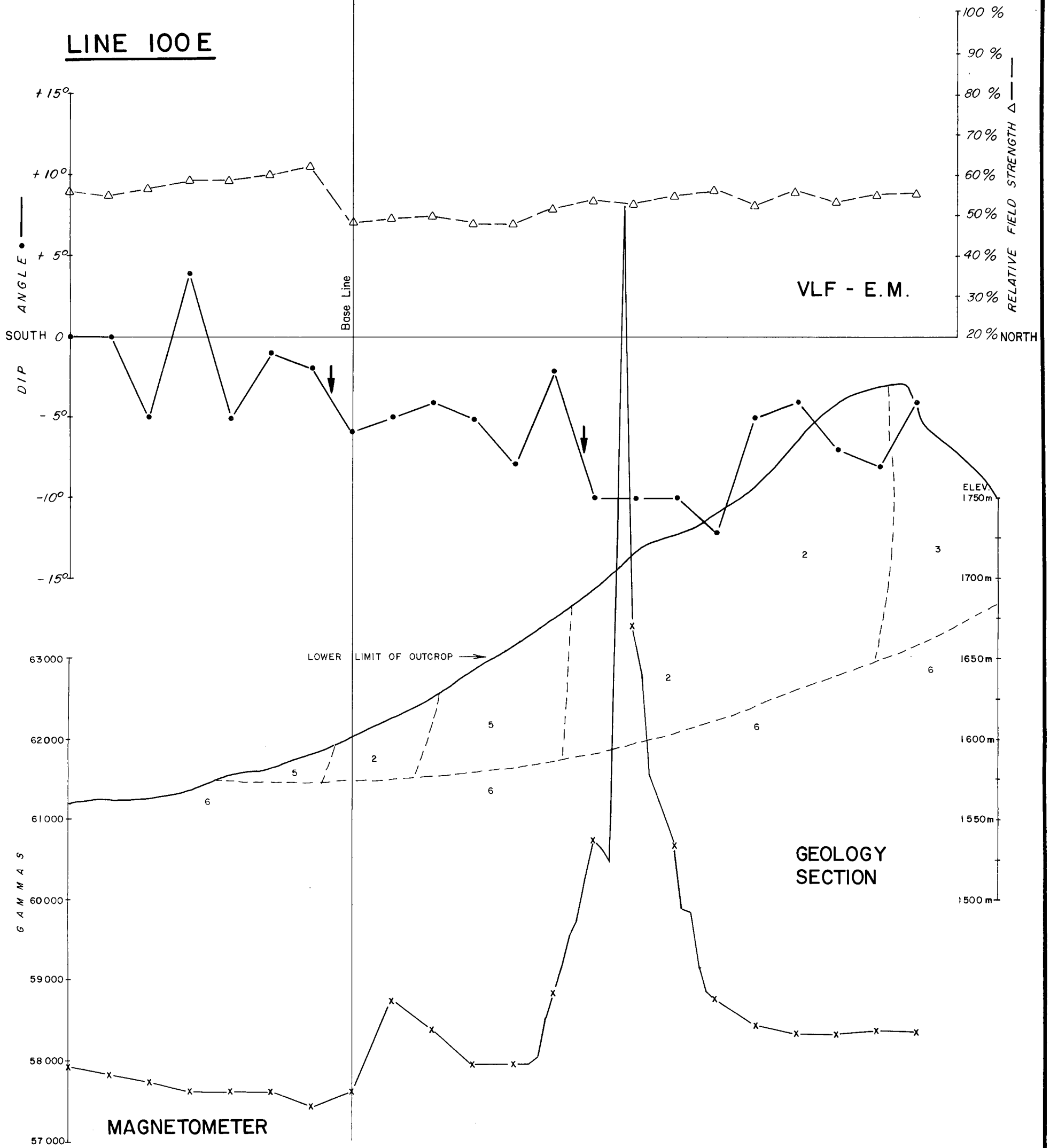
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INCH = 208 FEET

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DRAWN BY: C. H. K.		DRWG. No.: KL. 82-25
DATE: 82 10 26		

150 S 100 S 50 S 50 N 100 N 150 N 200 N 250 N 300 N 350 N

LINE 100 E



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

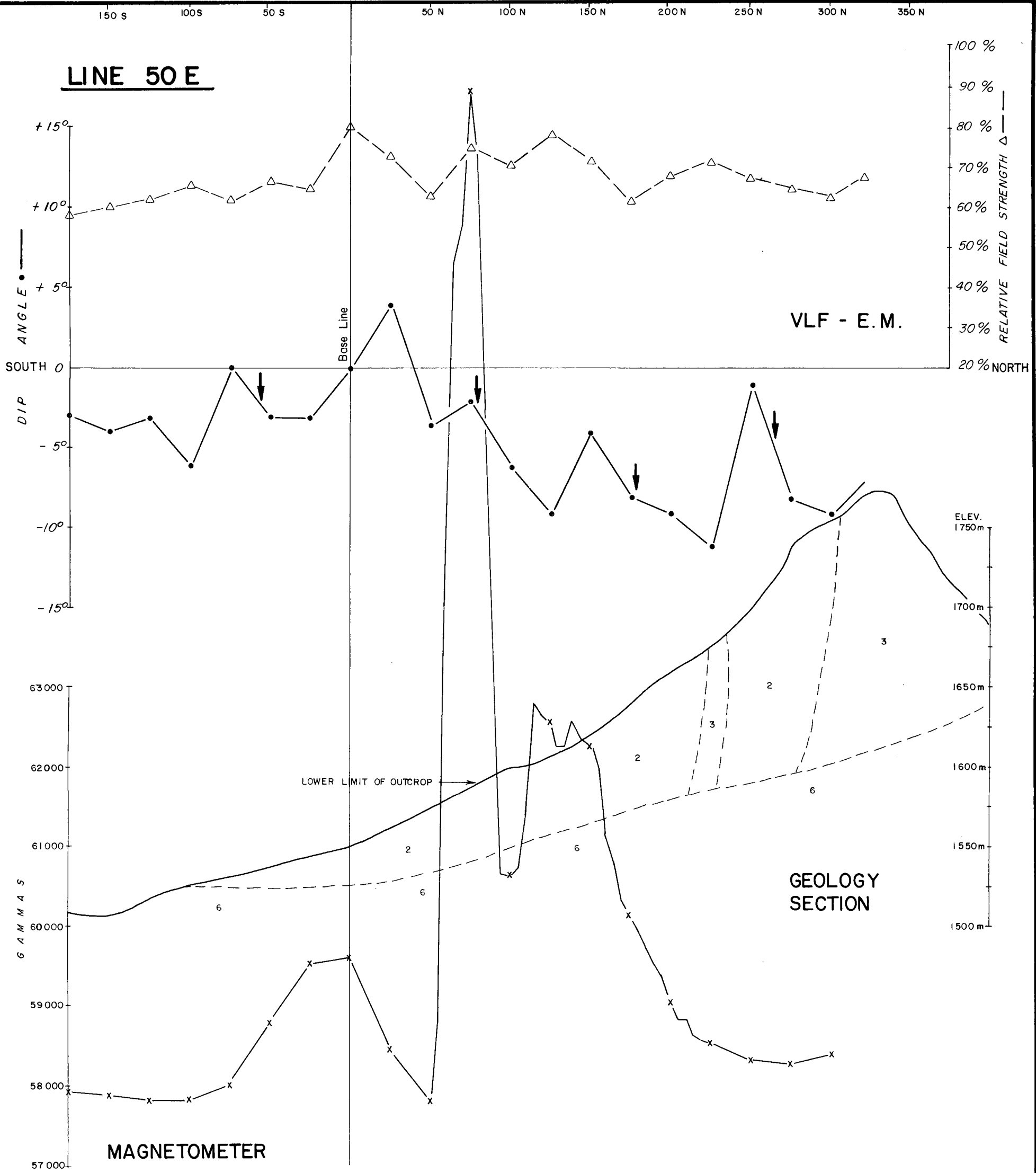
DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 100 E
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
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1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No.: 105 B 3
DATE: 82.07		ACCT No.: 335 - 19
DRAWN BY: C. H. K.		DRWG. No.: KL. 82 - 26
DATE: 82.10.26		



LINE 50 E

VLF - E.M.

GEOLOGY SECTION

MAGNETOMETER

LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

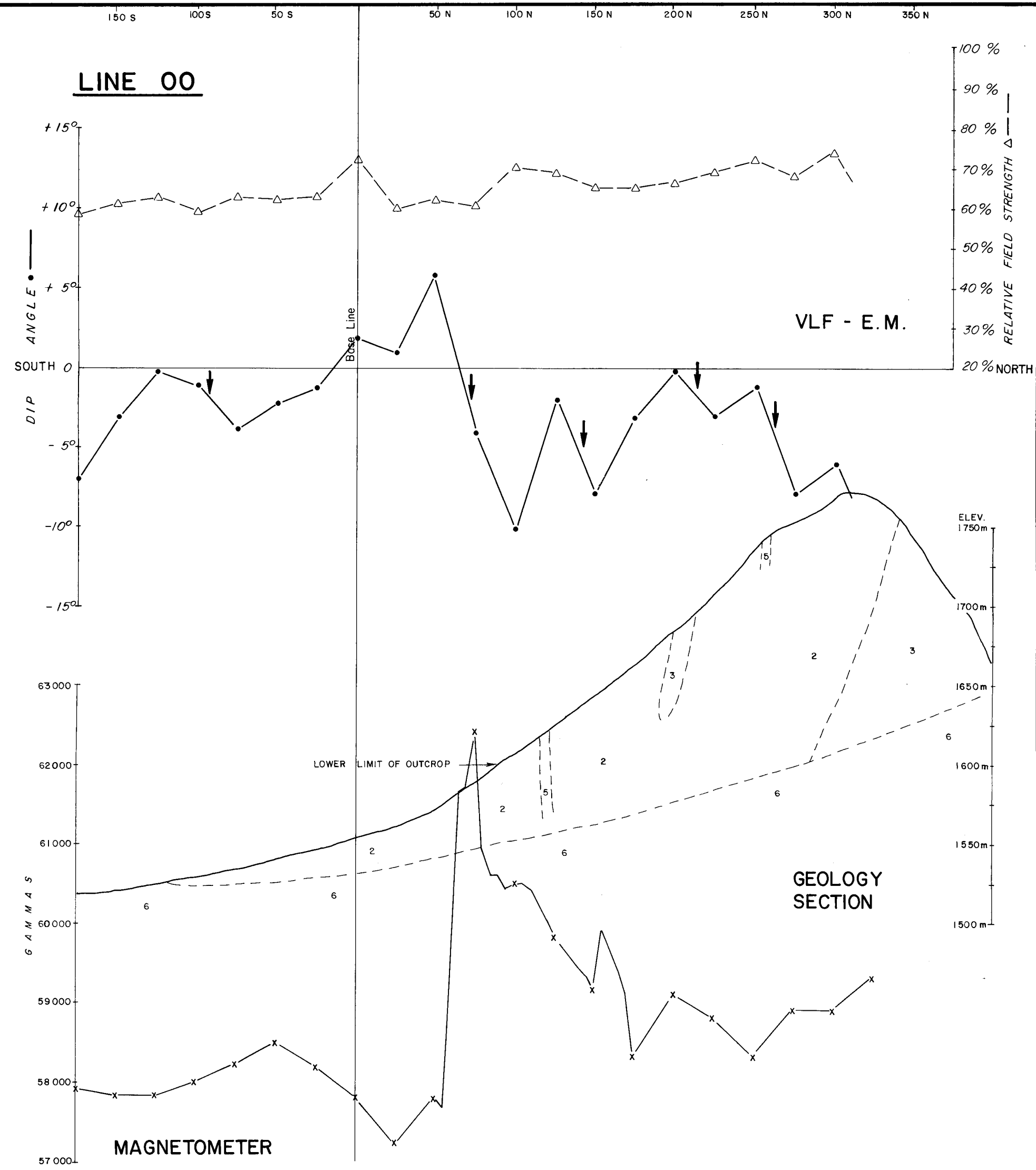
--- APPROX. GEOLOGICAL CONTACT
 ↓ E.M. CONDUCTOR

DU PONT EXPLORATION
CANADA

**KLINKIT JOINT VENTURE
 GEOPHYSICAL & GEOLOGICAL SECTIONS
 LINE 50 E
 VAL (B) CLAIMS
 SWIFT RIVER AREA, YUKON TERRITORY**

SCALE
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 1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No: 105 B 3
DATE: 82 07		ACCT No: 335 - 19
DRAWN BY: C. H. K.		DRWG. No: KL. 82 - 27
DATE: 82 10 26		



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- - - - - APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

DUPONT EXPLORATION
CANADA

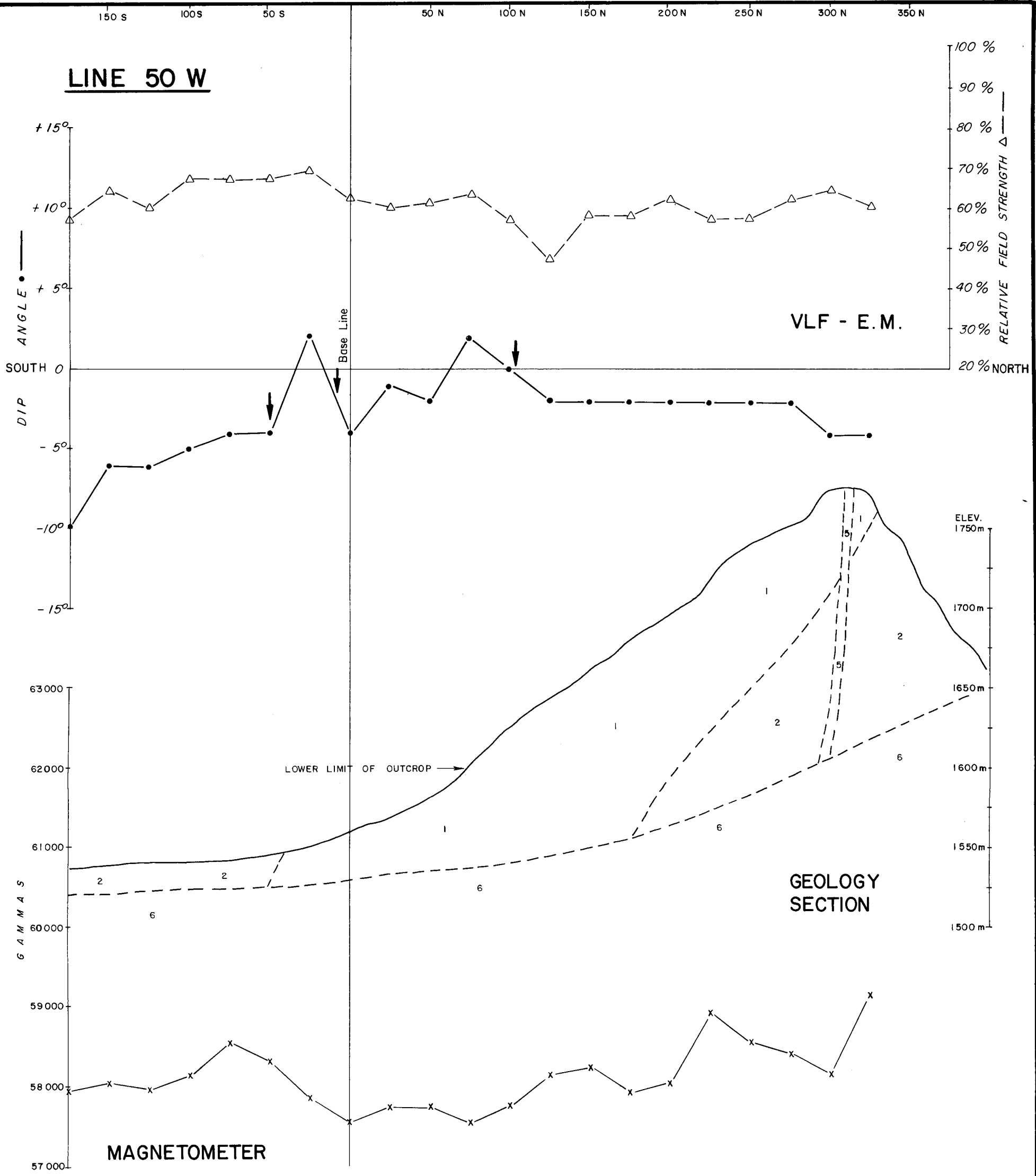
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GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 00
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
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1 INCH = 208 FEET

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DATE: 82 07		ACCT No: 335 - 19
DRAWN BY: C. H. K.		DRWG. No.: KL. 82 - 28
DATE: 82.11.03		

LINE 50 W



VLF - E.M.

GEOLOGY SECTION

MAGNETOMETER

LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- - - - - APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

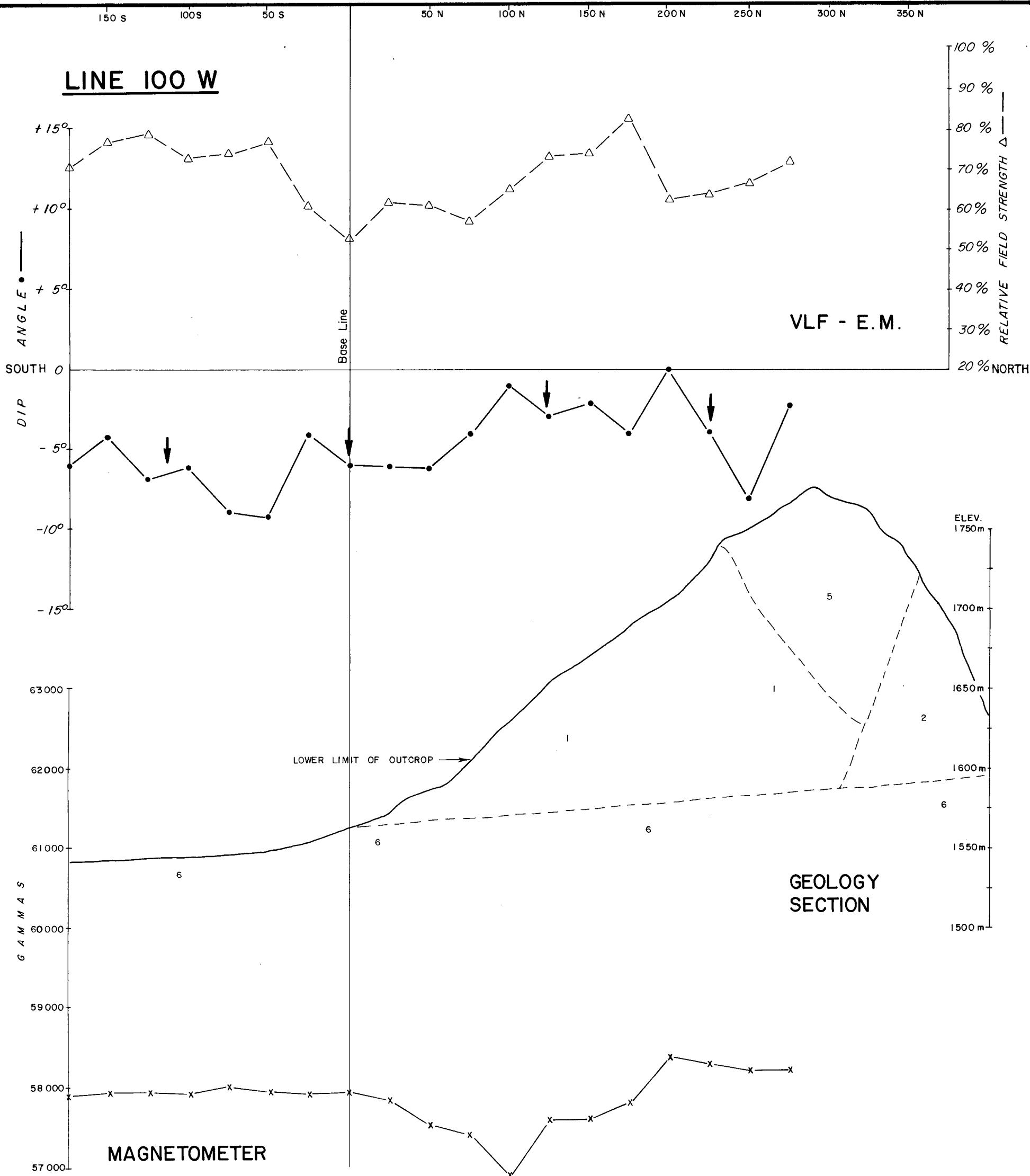
DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 50 W
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

SCALE
1:2500

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1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No.: 105 B 3
DATE: 82.07		ACCT No.: 335 - 19
DRAWN BY: C. H. K.		DRWG. No.: KL. 82 - 29
DATE: 82.10.26		



LINE 100 W

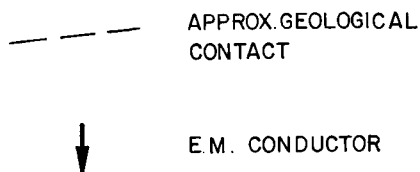
VLF - E.M.

GEOLOGY SECTION

MAGNETOMETER

LEGEND

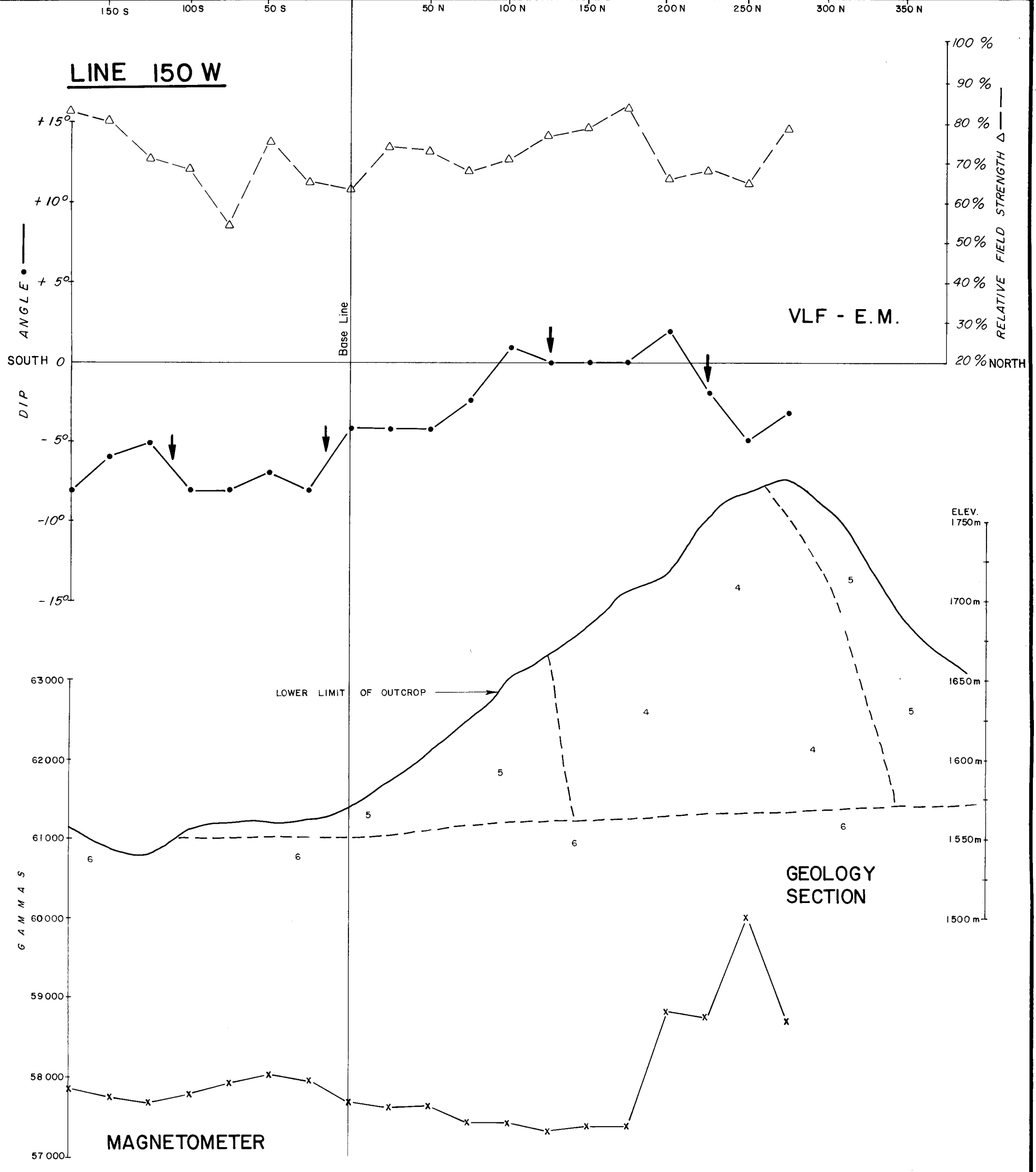
- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS



**KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 100 W
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY**

SCALE
1: 2500
m 100 75 50 25 0 100
1 INCH = 208 FEET

MAPPED BY: J. M. K.	REVISED:	N.T.S. No.: 105 B 3
DATE: 82 07		ACCT No.: 335 - 19
DRAWN BY: C. H. K.		DRWG. No.: KL 82 - 30
DATE: 82 10 26		



LEGEND

- 6 GRANITE
- 5 DIORITE
- 4 PYROXENITE
- 3 LIMESTONE
- 2 SKARN
- 1 META - SEDIMENTS

- - - - - APPROX. GEOLOGICAL CONTACT
- ↓ E.M. CONDUCTOR

DU PONT EXPLORATION
CANADA

KLINKIT JOINT VENTURE
GEOPHYSICAL & GEOLOGICAL SECTIONS
LINE 150 W
VAL (B) CLAIMS
SWIFT RIVER AREA, YUKON TERRITORY

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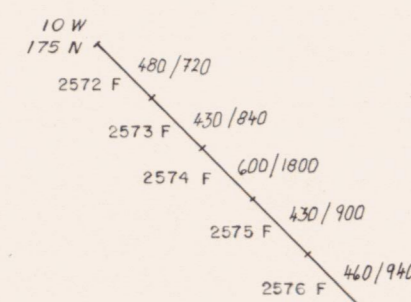
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INCH = 208 FEET

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DRAWN BY: C. H. K.		DRWG. No.: KL. 82 - 31
DATE: 82.10.26		

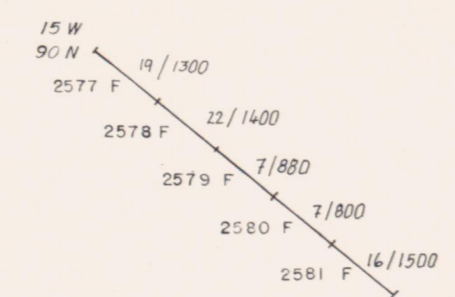
CHIP SAMPLE LOCATION DETAILS

SCALE: 1:100

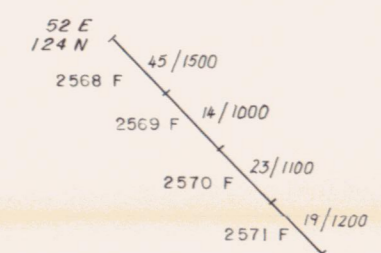
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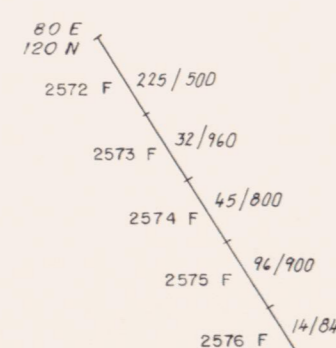
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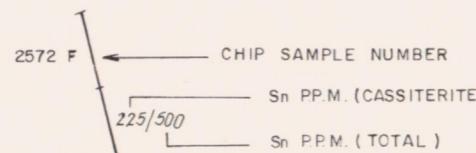
INSET 3



INSET 4



LEGEND FOR INSETS 1,2,3,4



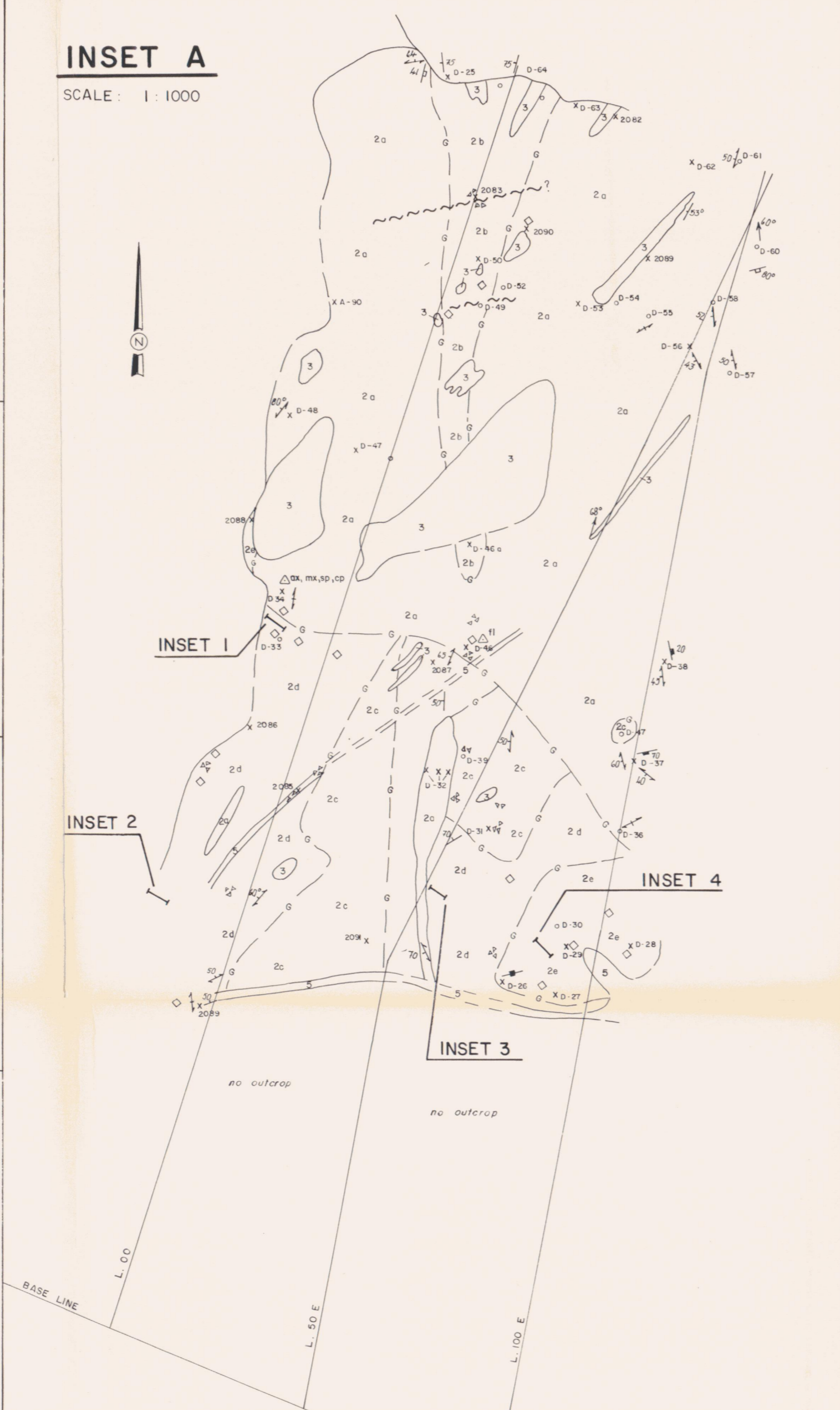
LEGEND

- 6 SEAGULL BATHOLITH: medium to coarse-grained, in places extremely rusty weathering, locally pegmatic granite.
- 5 DIORITE and BIOTITE GABBRO: variable from fine to medium grained salt and pepper quartz diorite to fine grained pyroxene/plagioclase diorite associated with fine to medium grained, rusty weathering biotite gabbro.
- 4 PYROXENITE: medium to dark green, fine to coarse grained, in places biotite rich, rusty weathering intrusive with occasional actinolite bands.
- 3 LIMESTONE: variable silicified white and light gray (algal) laminated. Fine grained limestones interbedded with weak skarn and hornfels. Clean, coarsely crystalline limestone.

- 2 SKARN: locally magnetic, locally fluorite/sphalerite/limonite bearing skarn, variable mineralogy.
- 2a DIPSIDE rich with local concentration of quartz, calcite, actinolite, fluorite, brown garnet, sphalerite, magnetite and limonite.
- 2b Same as above but contains sparsely distributed, coarse, zoned black garnet.
- 2c BROWN GARNET-ACTINOLITE - garnet more abundant than actinolite; garnets are orange brown in color, commonly striated, occasionally zoned, and occur as fine grained spongy to coarse grained masses. Interstitial to garnet is fine to medium grained, black actinolite.
- 2d ACTINOLITE-BROWN GARNET - actinolite more abundant than garnet; medium to coarse grained, dark green to black actinolite masses with thin layers and lenses of medium grained brown garnet.
- 2e ACTINOLITE-MAGNETITE - black weathering, fine through coarse grained, dark green actinolite with local magnetite rich zones and fluorite.
- 1 SEDIMENTS: white to greenish to purplish meta-siltstones/clean white to biotite-rich medium grained quartzites, transitional to intrusives as contacts are approached.

SYMBOLS

- GEOLOGIC CONTACT
 - inferred
 - approximate
 - observed
- - - GRADATIONAL CONTACT
- ~ ~ ~ FAULT
- STRIKE & DIP OF BEDDING
- STRIKE & DIP OF FOLIATION
- STRIKE & DIP OF JOINTING
- TREND & PLUNGE OF MINOR FOLD AXIS
- △ BRECCIA
- △ MINERAL OCCURRENCE
- LOCAL MAGNETITE CONCENTRATION
- x ROCK SAMPLE LOCATION
- o GEOLOGICAL STATION
- fl FLUORITE
- ax AXINITE
- sp SPHALERITE
- cp CHALCOPYRITE



ROCK GEOCHEMISTRY - VAL "B"

Sample No	Location	Analysis (ppm)			
		Sn	W	Pb	Zn
2042F	D-34	560			11.03%
43	D-37	17			
44	D-38	13			3.59%
45	D-46	11			
46	D-46a	<2			
47	D-49	140			1.44%
48	D-47 & D-48	3250			
49	D-50	240			
50	2450E 1425N	4		<2	
51	1490E 3430N	3	<2		
52	1440E 3420N	<2	55	20	6500
53	1450E 3410N	7	<2		
54	1452E 1425N	1050	170		
55	1440E 1450N	19	<2		
56	1400E 1475N	21	3		
57	1400E 2475N	<2	6		
58	1410E 2495N	2	72	6500	
59	1410E 2495N	12	350	84	6100
60	A-79	23		100	5700
61	A-81	9			
62	A-82	<2			
63	A-83	900			
64	A-85	320			
65	A-88	260			
66	1435W 2450N	16			
67	A-108	2			
2081F	D-25	13	3		
82	0425E 3418N	<2	32	130	6100
83	0400E 2491N	6	110	185	6500
84	0405E 0478N	35	125		
85	0400E 1425N	<2	<2		
86	0412W 1450N	72	<2		
87	0425E 1485N	15	<2		
88	0430W 2400N	900	<2		
89	0440E 2490N	11	<2	112	6100
90	0410E 2485N	38	11	115	6000
91	0450E 1411N	25	<2		
92	3450E 1480N	280			
93	D-26	10			
94	D-27	220			
95	D-28	160			
96	D-29	8			
97	D-31	18			
98	D-32	70			
99	D-33	20			
2900F	D-51	6			
01	D-53	8		100	5700
02	D-62	5		200	4,50%
2903F	D-63	48		100	5,52%

091414

OWPONT EXPLORATION CANADA

KLINKIT JOINT VENTURE

GEOLOGY

VAL (B) CLAIMS

SWIFT RIVER AREA, YUKON TERRITORY

SCALE: 1:2500

1 INCH = 208 FEET

MAPPED BY J.M.K.A.C.D.S. DATE 82.07.82 DRAWN BY C.H.K. DATE 82.12.10

REVISED: NTS No. 105 B 3 ACCT No. 335-19 DRWG No. KL-82-15



LEGEND

47 SOIL SAMPLE LOCATION WITH Sn VALUE IN PPM.

091414

KLINKIT JOINT VENTURE Sn GEOCHEMISTRY VAL (B) CLAIMS SWIFT RIVER AREA, YUKON TERRITORY	
m 100 75 50 25 0 100 m 1 2 500 0 SCALE 0 1 INCH = 208 FEET	
MAPPED BY: J.M.K., C.L.S. DATE: 82 07	REVISED: ACCT No: 335-19
DRAWN BY: C.H.K. DATE: 82 12 02	DRWG No: KL.82-16



LEGEND

— 57758 — SAMPLE LOCATION WITH
MAGNETOMETER READING IN GAMMAS
— 57078 —



NOTE: CONTOUR INTERVAL: 500 γ

091414

KLINKIT JOINT VENTURE MAGNETOMETER SURVEY VAL (B) CLAIMS SWIFT RIVER AREA, YUKON TERRITORY		
m 100 75 50 25 0 25 50 75 100 m SCALE 1 INCH = 208 FEET		
MAPPED BY: J.M.K., J.M. DATE: 82 07 12	REVISED: _____	N.T.S. No: 105 B 3 -
DRAWN BY: C. H. K. DATE: 82 10 11		ACCT No: 335 - 19
		DRWG. No: KL-82-17




LEGEND

-  POSITIVE FILTERED DIP READING IN DEGREES
-  NEGATIVE FILTERED DIP READING

NOTE: CONTOUR INTERVAL + 4°

091414

		
KLINKIT JOINT VENTURE VLF-EM SURVEY VAL (B) CLAIMS		
SWIFT RIVER AREA, YUKON TERRITORY		
m 100 75 50 25 0 2500 0 100 m SCALE 1 INCH = 208 FEET		
MAPPED BY J.M.K., M.P.D.	REVISD	N.T.S. No. 105 B 3
DATE 82 07		ACCT No. 335 - 19
DRAWN BY C.H.K.		DRWG No. KL.82-18
DATE 82 12 03		



091414

KLINKIT JOINT VENTURE GRID LOCATION VAL (B) CLAIMS SWIFT RIVER AREA, YUKON TERRITORY		
1 : 5000 SCALE 1 INCH = 400 FEET		
MAPPED BY : J. M. K. DATE : 82.07	REVISED : DATE : 82.12.16	N.T.S. No. : 105 B 3 ACCT No. : 335-19 DRWG. No. : KL.82-35

PCT-28