



PROJECT 522

REPORT ON 1978 FIELD PROGRAMME

HASL 1-118 CLAIMS

Lat. $62^{\circ}58'$

Long. $138^{\circ}50'$

115-5-15

C.J. RILEY

GEOLOGIST

090449

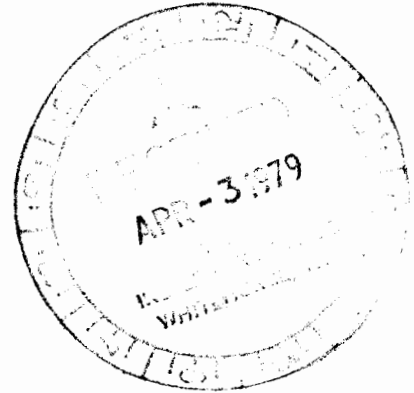


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IN POCKET

Uranium in Soils - Contoured Map
Radiometric Survey - Contoured Map
Magnetic Survey - Contoured Map

HASL CLAIMS

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A radiometric survey and a soil geochemical survey were carried out over 68 claims. A magnetic survey covered 6 claims. Rock chips were collected from C-horizon soils at geochemical sample stations and used to compile a geologic map.

CONCLUSIONS

1. Exact contacts between quartz monzonite, granite and gneiss are impossible to locate due to lack of outcrop. They may be considered as generally correct with local deviations.
2. Pits #1 and #2 indicate that uranium is being retained in permanently frozen soils and flushed out of thawed soils.
3. The consistently high uranium values from Pit #3 in alluvium indicate highly mobile secondary uranium in the area.
4. No mineralization could be located associated with the magnetic anomaly located during the survey. No explanation of the mag anomaly could be located due to overburden.

4.3 - RECOMMENDATIONS

1. Semi-detailed soil geochemistry and rock chip geology be extended to cover the remaining 38 claims.
2. A pilot resistivity survey be carried out over the three previously mentioned anomalies to determine if structures can be located by this method.
3. Diamond drilling of these anomalies should be carried out at a future date.

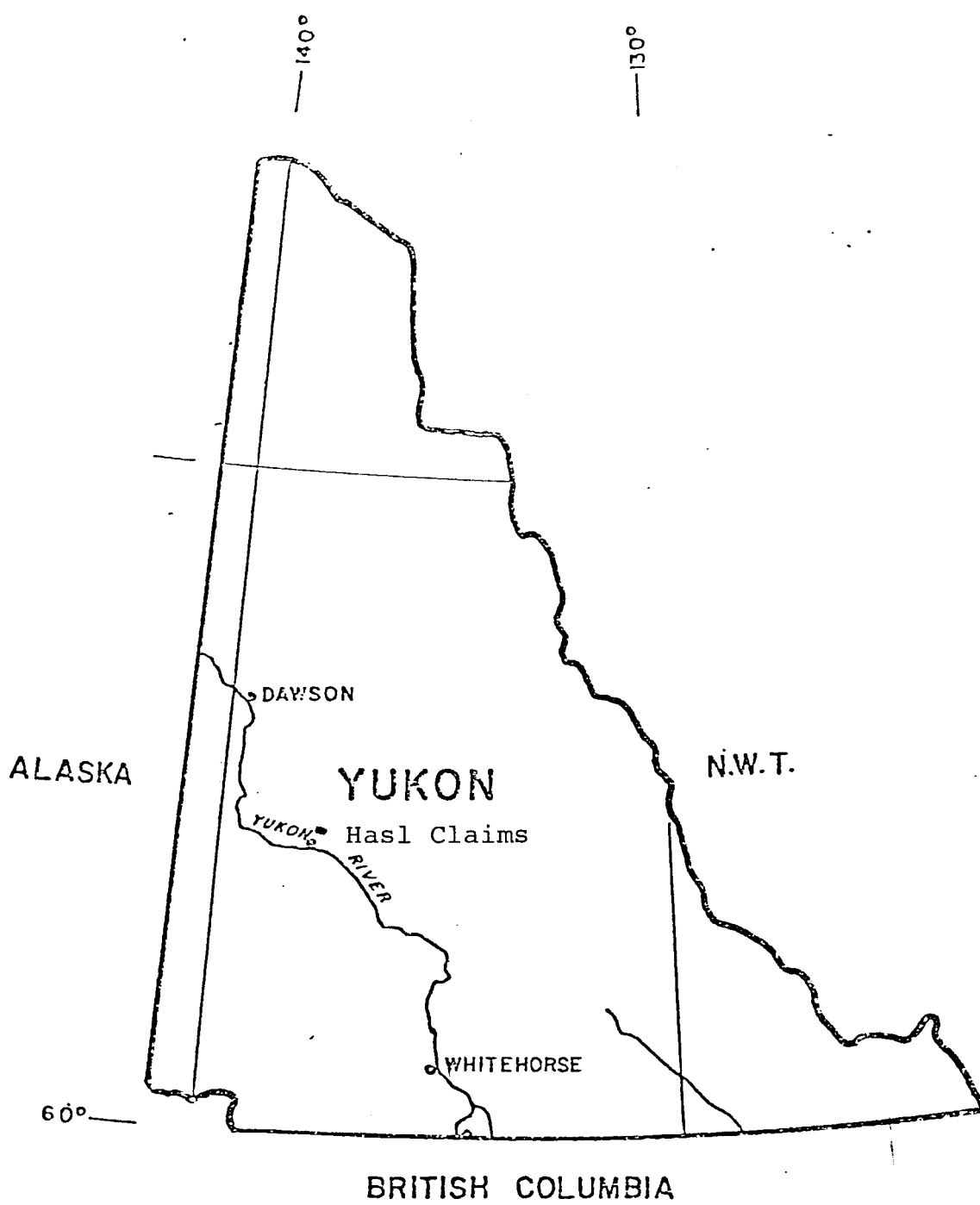


Fig. 1

ELDORADO NUCLEAR LIMITED

HASL CLAIMS
LOCATION MAP

SCALE: 1" = 120 mi



1 - GENERAL

1.1 - INTRODUCTION

The HASL property consists of 118 contiguous claims located at the headwaters of Pedlar Creek, approximately 22 kilometres north of the Yukon River. The claims are situated on claim sheet 115J/15 and centered on 62°59' latitude and 138°50' longitude.

Attention was drawn to this area by analysis of stream sediment data in 1977 which returned anomalous uranium values. Follow-up reconnaissance work confirmed the anomaly and 88 claims were staked. A semi-detailed soil geochemical survey was carried out over part of the claims and further reconnaissance geochemistry was done in the surrounding area. In 1978, a further 30 claims were staked and the geochemical grid extended to cover a total of 80 claims.

1.2 - PREVIOUS WORK

The geology of the area was mapped by D.J. Tempelman-Kluit and reported in Geological Survey of Canada Paper 73-41 entitled, "Reconnaissance Geology of Aishihik Lake, Snag and Part of Stewart River Map Areas, West Central Yukon".

In May of 1977, an Archer-Cathro and Associates crew accompanied by Eldorado Nuclear Limited's District Geologist, investigated the area by stream water and sediment sampling and geologic examination. Highly anomalous water and silt results were obtained in creeks. Initially, eight claims were staked and as reconnaissance results became available, the group was extended in a total of five steps. In September, a 100 metre grid was established over the central portion of the claims and a geochemical soil survey

and radiometric survey were carried out. Rock chips were collected from C-horizon at soil sample sites due to the almost complete lack of outcrop in the area. A two inch wide veinlet of uraninite-magnetite was located in felsenmeer which assayed 0.138% U_3O_8 . No other mineralization was located on the claims.

Ten anomalous values from three creek systems draining the granite plug were located by previous work. Values ranged from 14 to 105 ppm U. The follow-up Archer-Cathro survey tested these plus other creeks and located twenty anomalous silts ranging from 43 to 1,850 ppm U, with thirteen values of greater than 100 ppm U, and fifteen waters ranging from 19 to 304 ppb U with nine greater than 100 ppb.

1.3 - CLAIMS

Claims were staked on this showing in five separate steps in 1977 and one step in 1978. Initially, eight claims were staked to cover the most anomalous area. This was later expanded by sixteen claims to cover the drainage basin. Based on limited reconnaissance, a further sixteen claims were staked. At a later date, forty more claims were staked and a final eight claims to pick up the last edge of the granite. In 1978, thirty claims were staked to cover a suspected extension of the granite.

<u>CLAIM</u>	<u>GRANT NO.</u>	<u>RECORDING DATE</u>
HASL 1-8	YA10292-99	24/06/77
HASL 9-24	YA10397-412	29/07/77
HASL 25-40	YA10513-28	26/08/77
HASL 41 -80	YA10551-90	13/09/77
HASL 81-88	YA10744-51	20/09/77
HASL 89-118	YA29693-722	24/05/78

Assessment sufficient to hold HASL 1-24 for two years and HASL 25-80 for one year has been submitted but certificates have not yet been received from the Mining Recorder's office. Sufficient work has been carried out to hold all HASL claims until 1981.

2 - FIELD PROGRAMME

2.1 - INTRODUCTION

Work on these claims in 1978 involved extension of the radiometric survey and geochemical soil sample programme to cover a total of sixty-eight claims. Geologic investigation was carried out over the claims in general and a magnetic survey was run by proton magnetometer over a selected area where there appeared to be a magnetic anomaly.

The compass-oriented slope-corrected chained baselines from 1977 were extended and new ones established as necessary. Compass-controlled slope-corrected topofill lines were extended between the baselines and to the claim boundaries. Stations were established at 100 metre intervals. Soil samples were collected at each station as well as rock chip samples from the C-horizon. Radiometric readings were taken at 25 metre intervals along the lines. Dr. H.D. Knipping, Senior Geoscience Advisor of Eldorado Nuclear Limited and Dr. C.F. Gleeson, Consulting Geochemist, supplied technical advice and direction to the program.

2.2 - LOGISTICS

This work was carried out by a ten-man party operating from a base camp at Isaac Creek. The crew consisted of the following personnel:

<u>NAME</u>	<u>POSITION</u>
C.J. Riley	District Geologist
W.J. Olsson	Party Chief
E. Zaleski	Geologist
J. Pozzobon	Senior Assistant
G. Troop	" "
S. McAllister	Junior Assistant
B. Wilson	" "
B. Duncan	" "
M. Kozicki	Cook
D. Holden	Pilot
J. Douglas	Engineer

The following individuals visited the claims during the season:

<u>NAME</u>	<u>POSITION</u>
Dr. H.D. Knipping	Sr. Technical Adviser Eldorado Nuclear Ltd.
Dr. C.F. Gleeson	Consulting Geochemist Gleeson & Associates

Mobilization on May 15, 1978 of camp personnel and fuel was carried out by Twin Otter from Whitehorse and Carmacks to Casino airstrip. Camp was then slung by Hughes 500 helicopter to Isaac Creek. All aircraft were supplied by Trans-North Turbo Air. Daily access to the claim group was by Hughes 500 helicopter, attached to the party. The actual grid work was carried out between May 23 and June 2, inclusive.

The base camp was operated under Land Use Permit YB8J248, issued by the Renewable Resources Divison of the Department of Indian Affairs and Northern Development.

2.3 - GEOLOGY

Several traverses were made across the contacts of the granite plug with the Yukon group schists and gneisses. In all places, the contact was covered and could not be examined directly. Where possible, float was examined.

Rock chips were collected when possible at each soil sampling station. These have been examined and have been used to compile a geologic map of the claims.

2.4 - RADIOMETRIC SURVEY

The radiometric survey was carried out by taking readings at ground level at 25 metre intervals along lines spaced 100 metres apart. Total count was recorded in counts per second (cps). The instruments used were Scintrex BGS 1SL Total Count Scintillometers. Readings of these instruments were compared at a base station each morning for correlation. A contoured map of this survey is enclosed.

2.5 - GEOCHEMICAL SURVEY

Three orientation pits were dug and sampled under the supervision of C.F. Gleeson, consulting geochemist, to test various soil conditions. One pit was dug on a north-facing moss-covered slope underlain by permafrost. One was dug in a south-facing thawed slope, and one in a creek bottom area where high radioactive values had been recorded. Results are appended as Figure 4.

Under direction of Gleeson, personnel were trained and carried out sampling of B-horizon soils. In some places over frozen ground, a certain amount of organic material had to be included to obtain a sample. Soils were analyzed for uranium by Chemex Labs Limited, North Vancouver, British Columbia, by standard fluorometric methods on a 0.25 gram sample of ashed doubly acidified -80 mesh fraction material.

2.6 - MAGNETIC SURVEY

During the 1977 survey, several compass-oriented lines deviated considerably and from this it was inferred that a magnetic anomaly existed on the claims. In 1978, a total of six claims were covered with a magnetic survey. A Scintrex MK5 Proton Precession Magnetometer was used to take readings at 25 metre intervals along lines spaced 100 metres apart. In areas of high magnetics, readings were taken at 5 metre intervals. Traverses were looped back to tie to a base station and daily drift corrections were made for all readings. The results are presented on a contoured map.

3 - RESULTS

3.1 - GEOLOGY

Outcrop is very scarce on the claims. Some minor outcrops exist on the tops of the hills but the valleys and slopes are totally covered with residual soil. For this reason, the geology is imprecise as it is based on float and C-horizon rock chips. However, radiometric data indicates that contacts are reasonably accurate.

The area is underlain by the Yukon group, a term used to collectively refer to pre-Cambrian and Paleozoic rocks present in central Yukon. The rock units on the property consist of quartz-mica-amphibole-schist, intermixed with gneiss which are intruded by a stock of Coffee Creek granite of probable Cretaceous age. The schists and gneisses of the Yukon group are metamorphosed to the upper greenschist facies and have a well developed foliation. The age of these rocks in the vicinity of the HASL claims is unknown.

Examination of the granite shows it to vary between a true granite (quartz, microcline, K-feldspar, less than 5% biotite) and a quartz monzonite (quartz, plagioclase, K-feldspar, less than 5% biotite). The granite and quartz monzonite are equigranular anhedral to subhedral with some feldspar being fairly well developed while others are interstitial. The greatest difference, aside from feldspar composition, between the granite and the quartz monzonite is that the quartz in the monzonite tends to be smokey while in the granite it is clear to pale bluish. In both cases, quartz is corroded. The quartz monzonite appears to occur as envelopes surrounding cores of granite. Only minor muscovite was located in the complex.

No hornfelsic or other contact affects have been observed in the gneiss encompassing the granite. Outcrops of gneiss contained more felsic material in the form of lit-par-lit injection and some cross-cutting aplites as the contact is approached. From this and the apparent uniformity of grain size, it is inferred that the granite was at a fairly low temperature level when intruded. As the surrounding gneisses had already been raised to a higher level of metamorphism in previous orogenies, they were not much affected by the intrusion of the granite with the exception of some soaking by granitic material.

3.2 - RADIOMETRIC SURVEY

A histogram (Figure 3) indicates a distinct bimodal population of radiometric readings. This correlates readily with the geology, the lower population representing the gneiss and the higher one, the granite. The gneisses average 35-50 cps and the granite, 130-150 cps. Threshold for the granite appears to be 100 cps. Values of 200 counts and greater are considered anomalous.

The results have been contoured on a map including geology and topography with contour intervals chosen as:

50 cps
75 cps
100 cps
125 cps
150 cps
175 cps
200 cps
300 cps.

This choice of contours confirms the granite-gneiss contact inferred from geologic data. Some minor discrepancies can readily be explained as the geologic data is compiled from C-horizon rock chips, and not based on outcrop. Minor solifluction and down-slope creep could easily move the rock chips in the regolith.

3.3 - GEOCHEMISTRY

The results of the geochemical soil survey are presented on a contoured map. Contour intervals selected are:

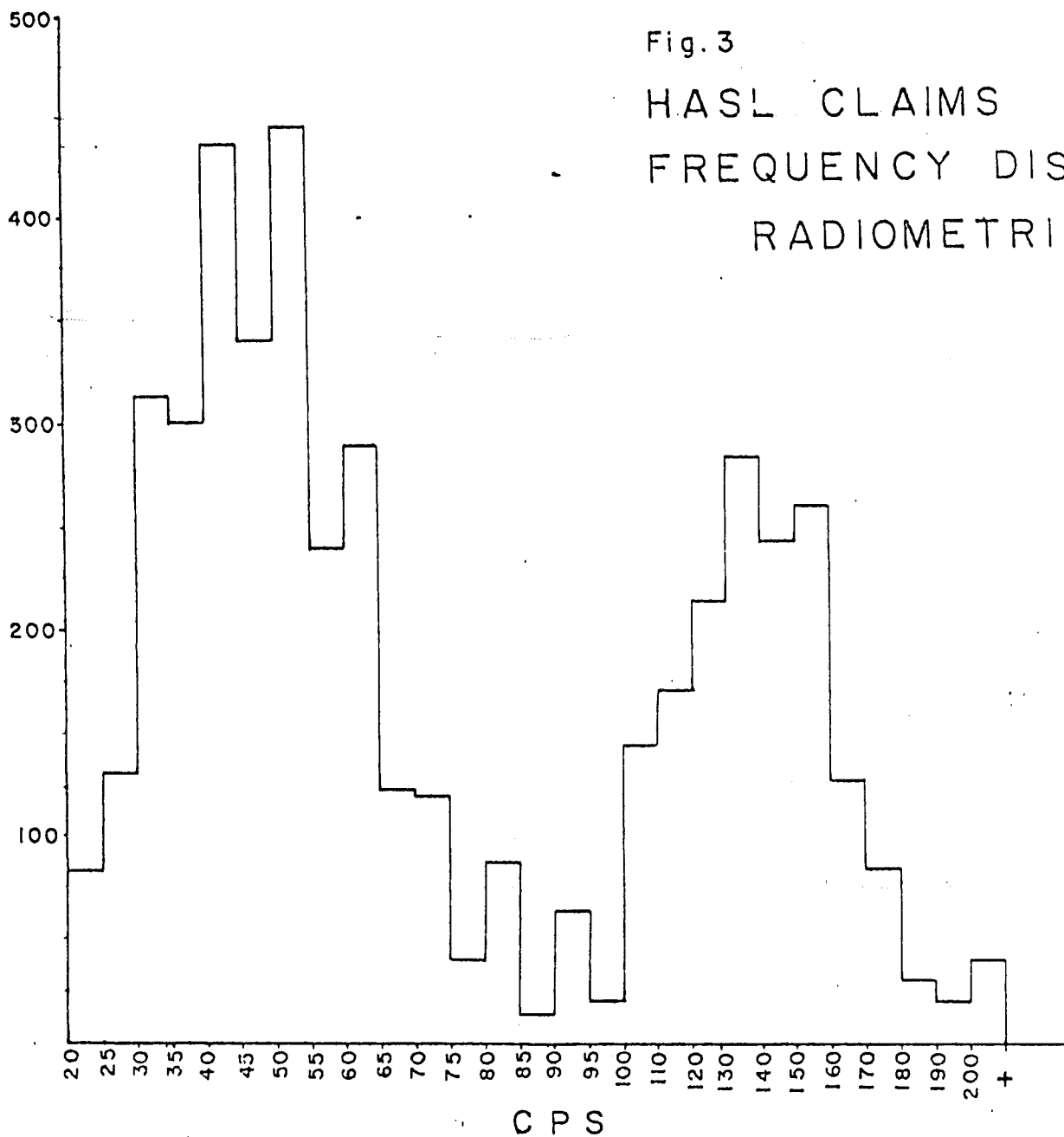
1 ppm
5 ppm
10 ppm
50 ppm
100 ppm
200 ppm
100 ppm increments.

Relatively few values above detection limits were recorded so a histogram has not been constructed for this survey.

Fig. 3

HASL CLAIMS
FREQUENCY DISTRIBUTION
RADIOMETRICS

FREQUENCY



Results of silt and water samples from seeps and drainage channels are not included in the contouring as they represent different sampling media. They are shown to try and indicate patterns and direction of surface migration of uranium.

Anomalous values tend to follow the same pattern established in 1977. They are concentrated along drainage patterns which are assumed to be surface expressions of underlying structure.

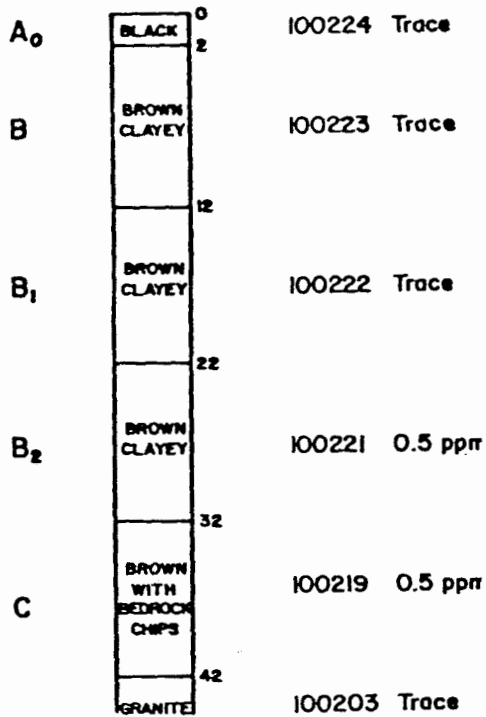
Orientation pit #1 was dug in a thawed slope with an over-story of aspen, an under-story of grass and cranberry. A thin, black A_o-horizon contained only trace uranium. A brown clayey B-horizon, and a brown clayey C-horizon with bedrock chips all assayed trace to 0.5 ppm U. A rock sample from the bottom of this pit also analysed as trace. Pit #2 was dug in a frozen slope with an over-story of black spruce and an under-story of moss. The soil was frozen at a depth of 5 centimetres. The A_{oo} horizon of green living moss was low in uranium (0.5 ppm U) but the A_o-horizon of brown mossy material contained 5.5 ppm U. The A-horizon, composed of frozen black humus contained 19 ppm U; the frozen brown stony B-horizon, 2.5 ppm U; the light brown stony frozen C-horizon, 3.5 ppm U; and rock chip material from the underlying rubble, 3.0 ppm U.

Pit #3 was dug in a creek bottom area where higher than normal radiometrics were recorded. It has an overstory of black spruce, an understory of moss and Labrador Tea. The soil was frozen from 5 centimetres down and initially was dug to a depth of 60 centimetres. At a later time when the soil had thawed, the depth was increased to 90 centimetres and finally to a metre. The A_{oo} moss analysed at

PIT 1

OVERSTORY : ASPEN

UNDERSTORY : GRASS AND CRANBERRY



1.4

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HASL CLAIMS

ORIENTATION SOIL PITS

VERTICAL SCALE : 1 cm = 5 cm

760 ppm U; the A₁ black humus contained 4,790 ppm U; the brown clayey B-horizon, 2,270 ppm U; and the underlying medium-brown gravelly alluvium decreased in value until it stabilized generally in the neighbourhood of 500 ppm U. A granite pebble at approximately 60 cm was analyzed at 44 ppm U. The frost encountered in this pit is assumed to be seasonal frost as it was lower each time the pit was sampled. The greatest concentration was in the overlying organics, however, the gravelly alluvium to a depth of at least a metre is still highly anomalous. The rock chips were not washed prior to analysis so it is not known whether the 44 ppm U represents secondary uranium clinging to the exterior or represents the uranium of the chips themselves.

3.4 - MAGNETIC SURVEY

The veinlet of magnetite and uraninite located in 1977 made the possible magnetic anomaly near the south contact of the granite interesting. The survey located a narrow linear magnetic anomaly with a peak value of approximately 200 gammas above background. This anomaly lies between lines 24 to 33W, approximately along line 27S. The area was traversed but no explanation of the magnetic anomaly could be located. No anomalous radiometrics or soil geochemical values are associated with it.

4 - DISCUSSION

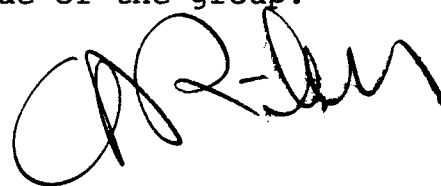
<u>Anomaly No.</u>	<u>Location</u>	<u>Max. Value</u>	<u>Size</u>	<u>Radiometrics</u>
Anomaly 1	15S, 30W	90 ppm U	300M x 50M	Nil
Anomaly 2	18S, 10W	12 ppm	400M x 50M	Nil
Anomaly 3	27+50S, 18W	80 ppm	Single value	140/60
Anomaly 4	22S, 23W	+400 ppm	700M x 200M	390/100
Anomaly 5	20S, 19W	8.5 ppm	Single value	Nil
Anomaly 6	17+50S, 22W	11.0 ppm	100M	200/150
Anomaly 7	17S, 25W	16 ppm	Single value	190/150
Anomaly 8	24S, 24W	7.0 ppm	Single value	Nil
Anomaly 9	22S, 27W	13 ppm	Single value	Nil
Anomaly 10	28S, 37W	+400 ppm	600M x 600M	250/100
Anomaly 11	17+50S, 36+50W	7.0 ppm	150M	Nil
Anomaly 12	26S, 41W	9.5 ppm	Single value	150/100
Anomaly 13	28S, 42W	14.0 ppm	Single value	200/100
Anomaly 14	20+50S, 43+50W	15 ppm	150M	Nil
Anomaly 15	33+50S, 49W	195 ppm	300M x 200M	180/130
Anomaly 16	35S, 58W	9.0 ppm	300M x 50M	150/100

There is a major northwest-southeast structural trend through the area which follows the contact between the granitic terrane and the gneiss.

The geochemical pattern indicates two other trends, one north-south, the other east-west. The north-south trend is best displayed in anomaly 4 with anomalies 5-6 and 8-9 indicating parallel structures. The east-west trend is weaker but still evident.

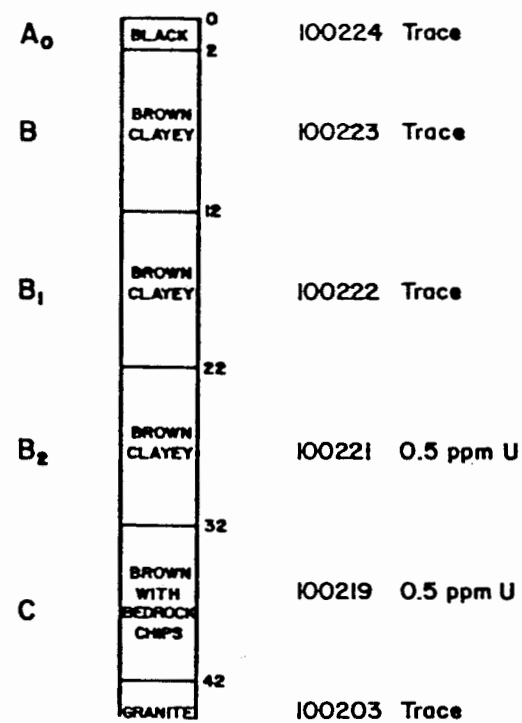
The three best anomalies are nos. 4, 10 and 15. Anomaly no. 4 extends into the granite 700 meters from the granite-gneiss contact. It has a width of between 150 and 200 meters. Anomaly 3 is located farther down the same drainage pattern and is a single point anomaly with a value of 80 ppm uranium. Anomaly 10 has the strongest value of any anomaly in the area. 880 ppm was recorded in a silt sample and 580 ppm U in a soil. The radiometric expression of this anomaly is $2\frac{1}{2}$ times background (250/100 cps). Anomaly 15 has a maximum value of 195 ppm and covers an area approximately 300 meters by 200 meters. There is no radiometric expression with this anomaly.

The next step in following up these anomalies would be to try and determine the extent of any structures underlying the three main anomalies. It is proposed that pilot resistivity surveys and VLF surveys be carried out over these anomalies. In addition, the northwestern and northern contact of the granite has not yet been examined. It is proposed to extend the grid radiometric and geochemical coverage to the 38 claims on the northwest side of the group.

A handwritten signature in black ink, appearing to be 'C.R. Smith', located at the bottom right of the page.

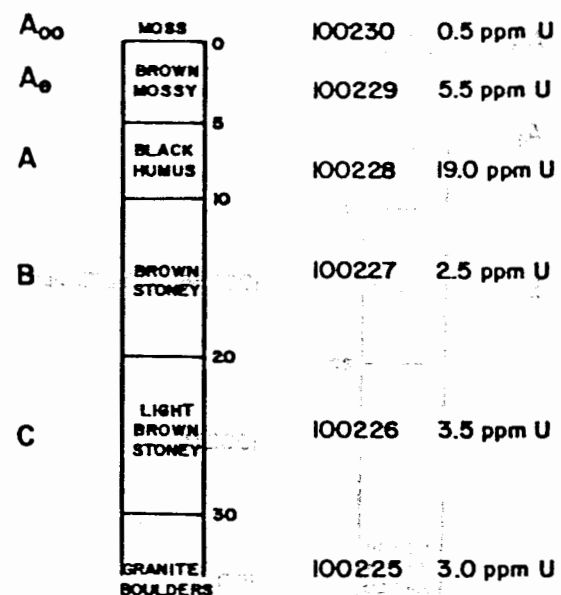
PIT 1

OVERSTORY : ASPEN
UNDERSTORY : GRASS AND CRANBERRY



PIT 2

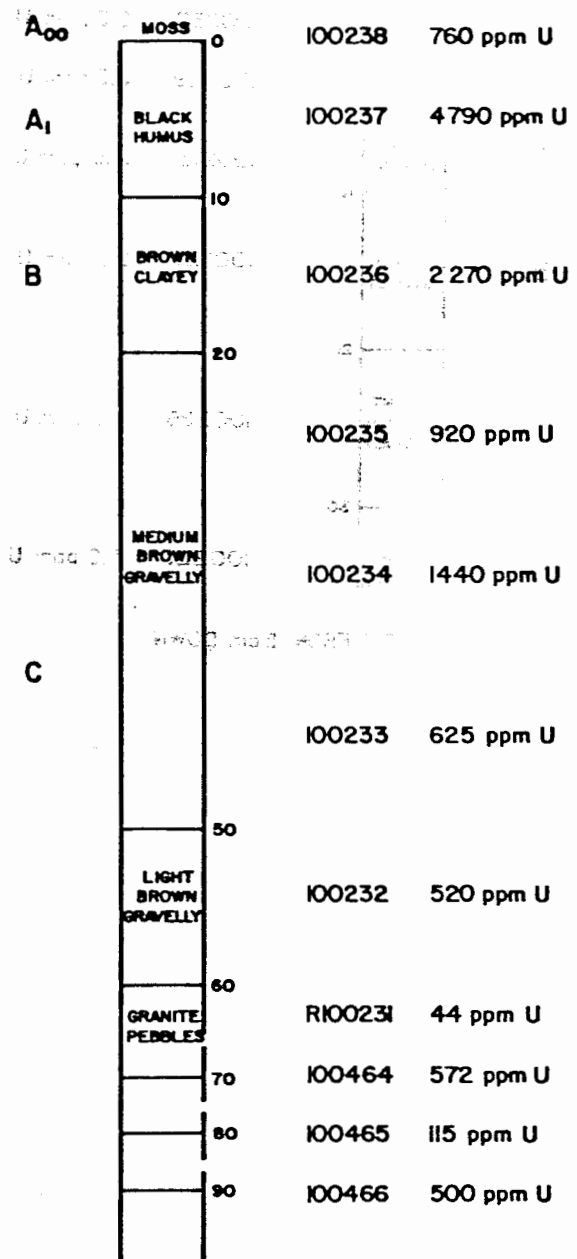
OVERSTORY : BLACK SPRUCE
UNDERSTORY : MOSS



SOIL FROZEN FROM 5 cm DOWN

PIT 3

OVERSTORY : BLACK SPRUCE
UNDERSTORY : MOSS AND LABRADOR TEA



SOIL FROZEN FROM 5 cm DOWN

Fig. 4

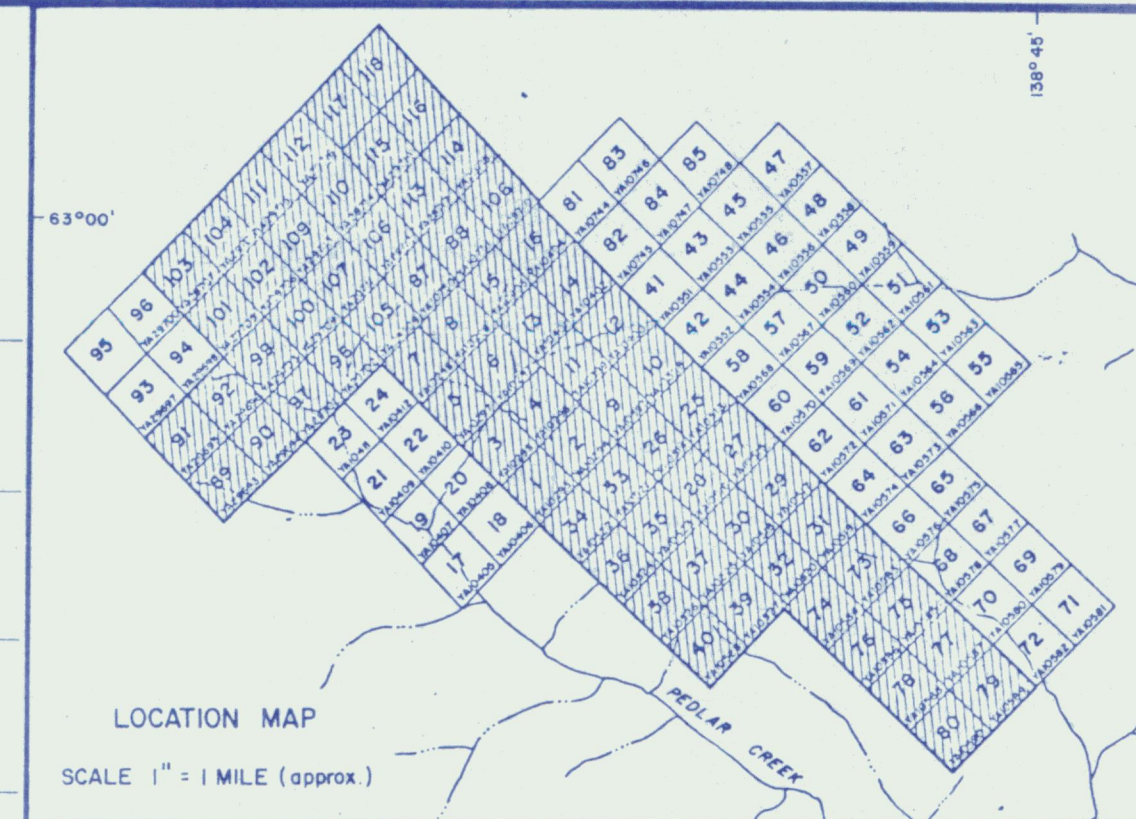
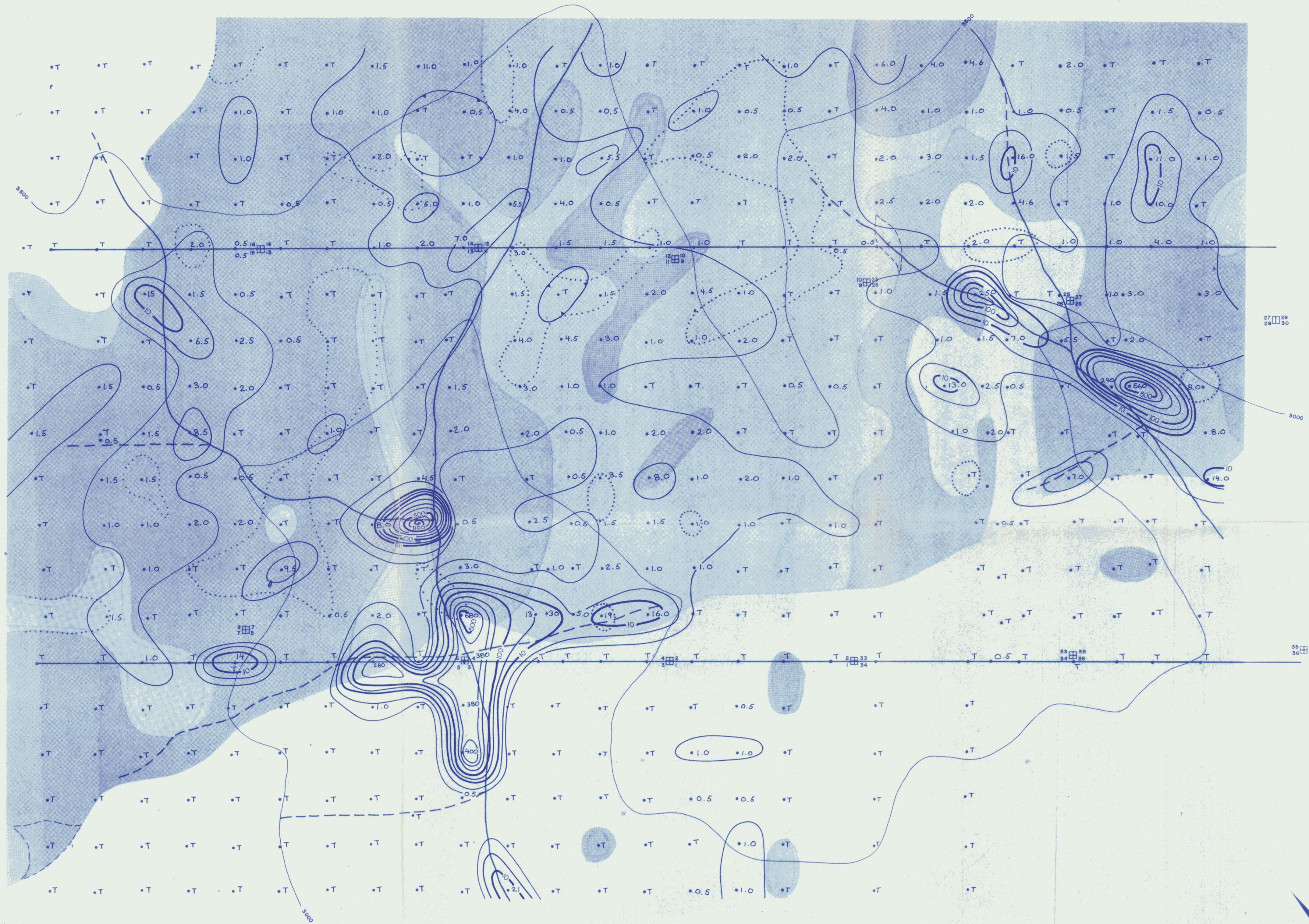
ELDORADO NUCLEAR LIMITI

PROJECT 522

HASL CLAIMS

ORIENTATION SOIL PITS

VERTICAL SCALE : 1 cm = 5 cm



15S
16S
17S
18S
19S
20S
21S
22S
23S
24S
25S
26S
27S
28S
29S
30S
31S
32S
33S

CONTOUR INTERVAL

- 1 ppm
- 5 ppm
- 10 ppm
- 50 ppm
- 100 ppm
- 200 ppm
- 300 ppm
- 400 ppm
- 500 ppm
- 750 ppm
- 1000 ppm
- 1100 ppm

LEGEND

- 1.0 SOIL SAMPLE STATION & NUMBER (Uranium in ppm)
- T TRACE
- TOPOGRAPHICAL CONTOURS
- BASELINE
- SAMPLE LOCATION
- - - STREAM
- CLAIM POSTS
- GNEISS
- GRANITE
- QUARTZ MONZONITE
- ⋯ APLITE PRESENT
- PEGMATITE

46W 45W 44W 43W 42W 41W 40W 39W 38W 37W 36W 35W 34W 33W 32W 31W 30W 29W 28W 27W 26W 25W 24W 23W 22W 21W

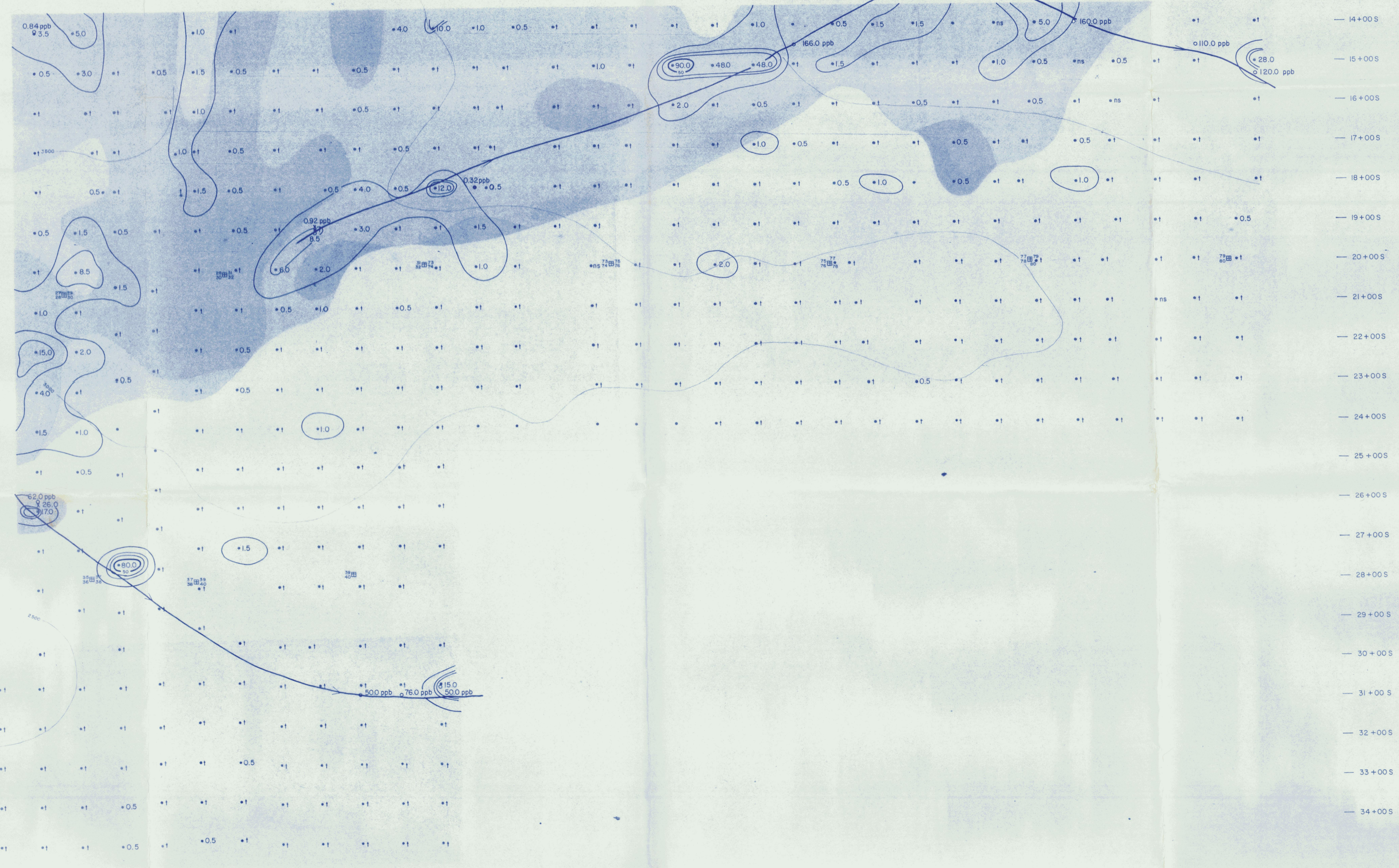
ELDORADO NUCLEAR LIMITED

PROJECT 522
HASL GRID
YUKON TERRITORY

URANIUM IN SOILS

SCALE 1:5 000

25+00 W 24+00 W 23+00 W 22+00 W 21+00 W 20+00 W 19+00 W 18+00 W 17+00 W 16+00 W 15+00 W 14+00 W 13+00 W 12+00 W 11+00 W 10+00 W 9+00 W 8+00 W 7+00 W 6+00 W 5+00 W 4+00 W 3+00 W 2+00 W 1+00 W 0+00 1+00 E 2+00 E 3+00 E 4+00 E 5+00 E 6+00 E 7+00 E 8+00 E 9+00 E 10+00 E



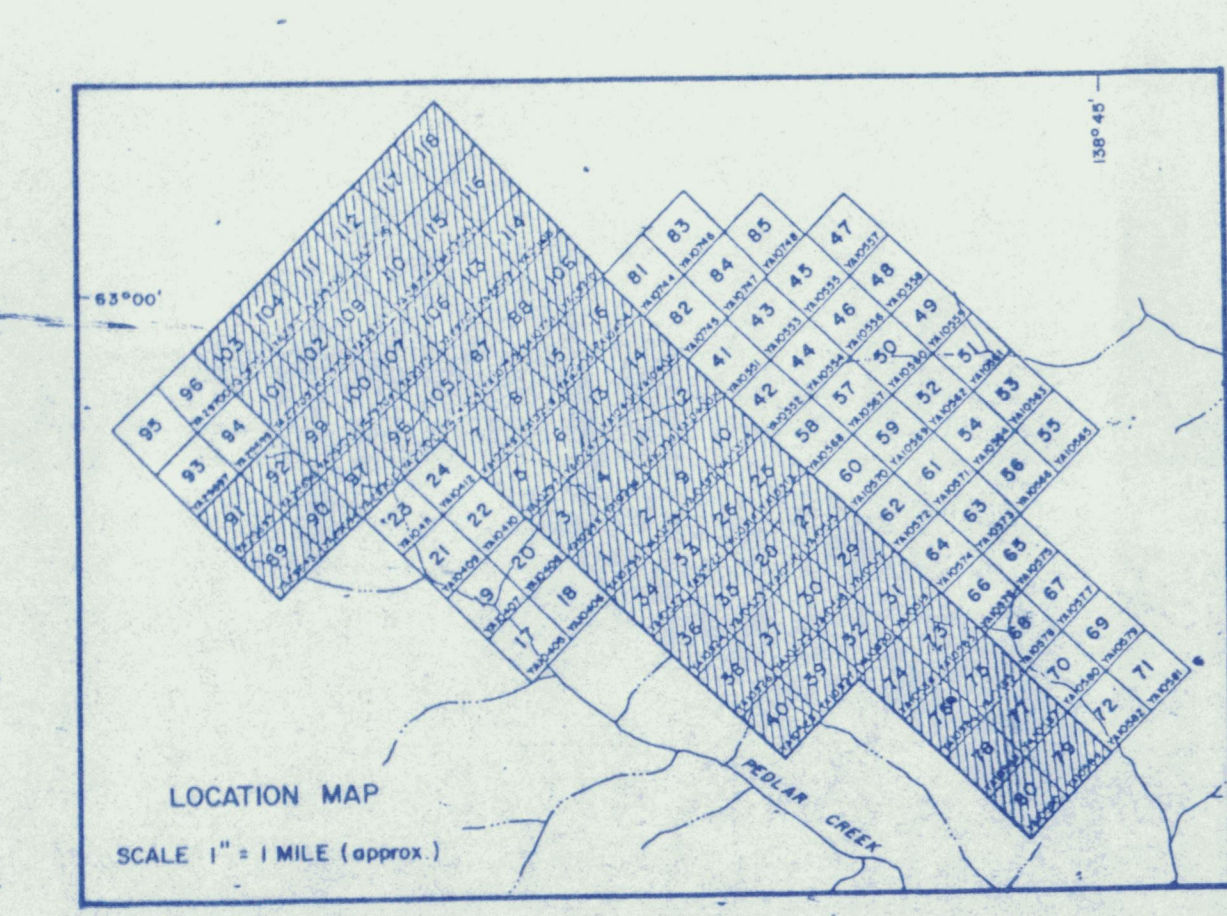
CONTOUR INTERVAL

1 ppm U
5 ppm U
10 ppm U
50 ppm U
100 ppm U
200 ppm U
300 ppm U
400 ppm U
500 ppm U

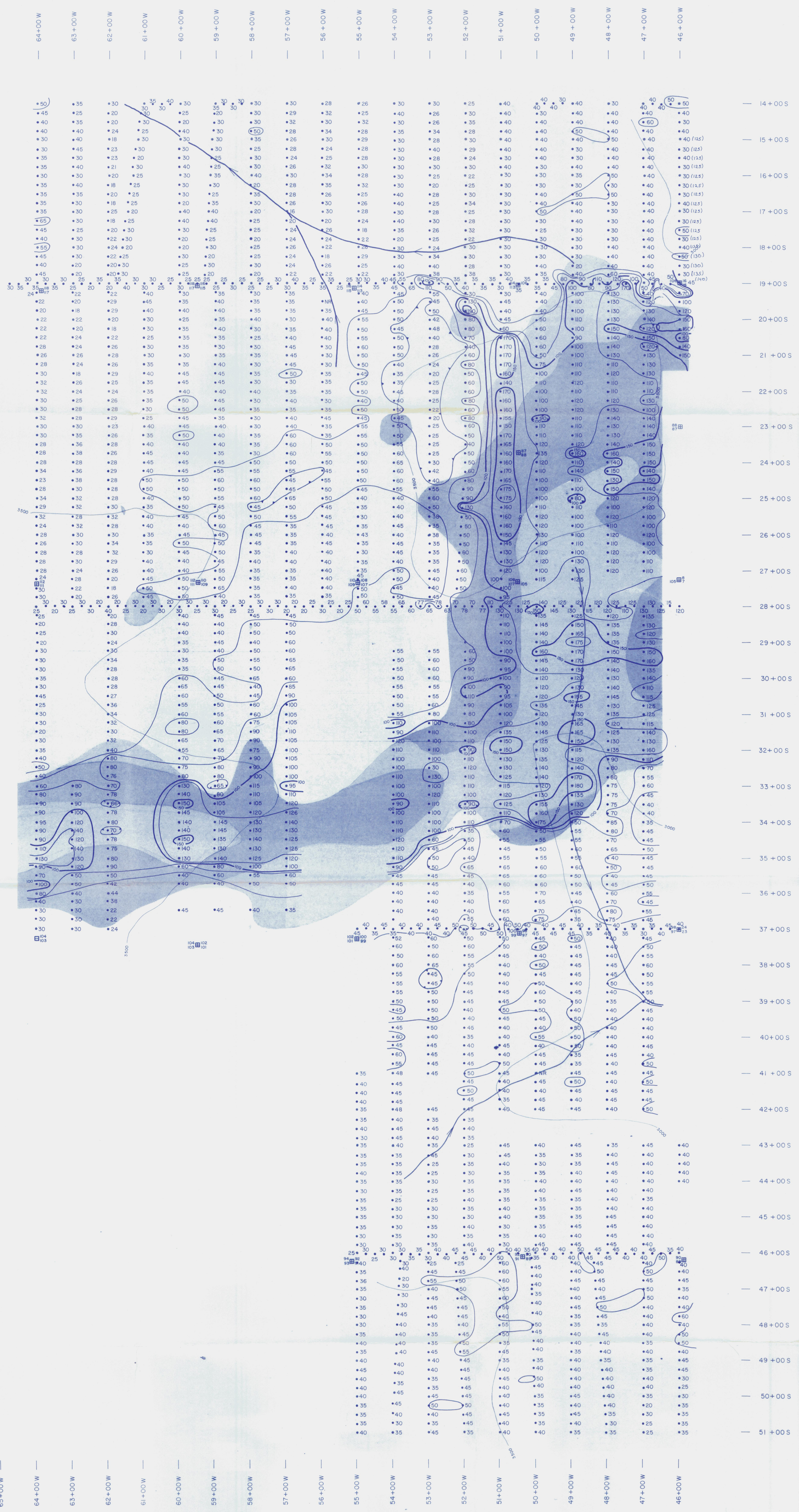
*1.6	SOIL SAMPLE STATION & NUMBER (Uranium in ppm)
o0.2	WATER SAMPLE STATION & NUMBER (Uranium in ppb)
x 2.7	SILT SAMPLE STATION & NUMBER (Uranium in ppm)

LEGEND

†	LESS THAN 0.05 ppm
ns	NO SAMPLE
■	GNEISS
■	GGANITE
■	QUARTZ MONZONITE
■	CLAIM POST
—	TOPOGRAPHICAL CONTOURS



ELDORADO NUCLEAR LIMITED
PROJECT 522
 DAWSON MINING DISTRICT
 HASL CLAIMS
URANIUM IN SOILS
 SCALE 1:5000

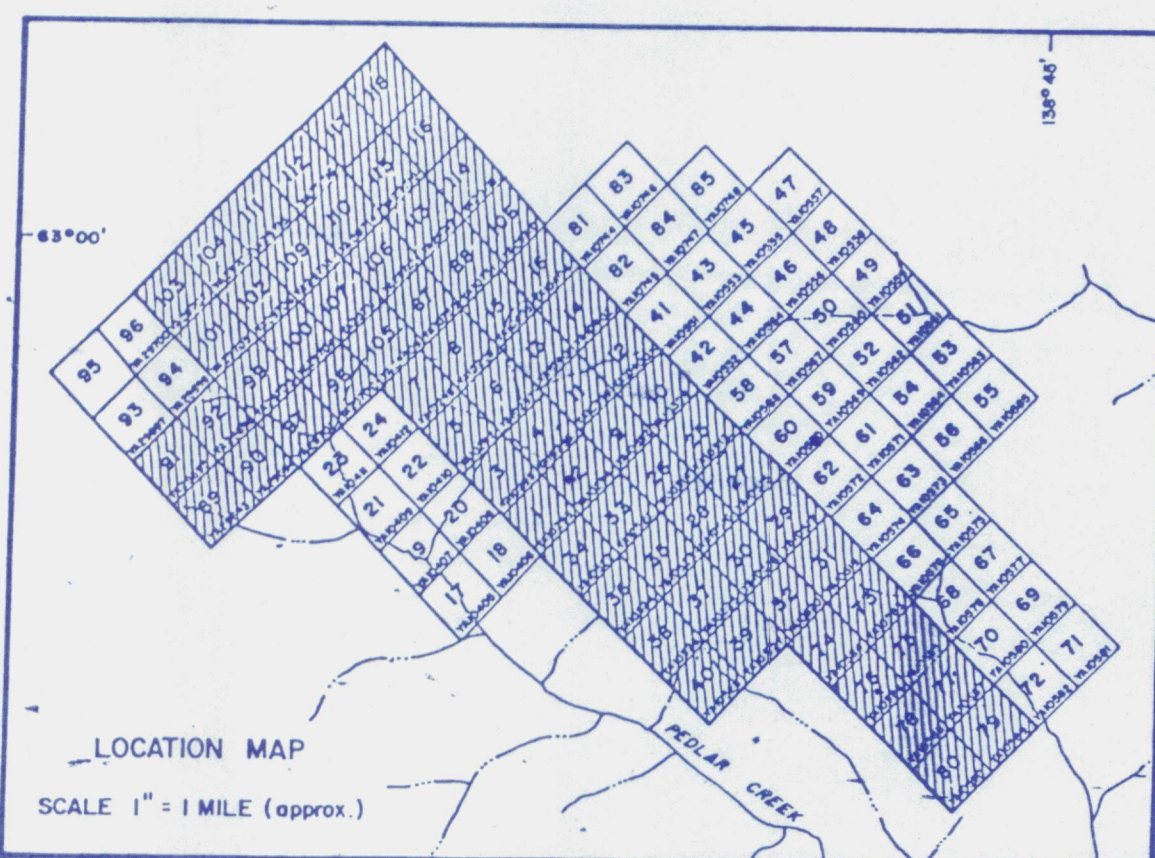


LEGEND

CONTOUR INTERVAL

- 50 ft
- 75 ft
- 100 ft
- 125 ft
- 150 ft
- 175 ft

- GNEISS
- GRANITE
- QUARTZ MONZONITE
- TOPOGRAPHICAL CONTOURS (500 ft. interval)
- CLAIM POST
- STATION (Radiometric value in counts per second)



ELDORADO NUCLEAR LIMITED

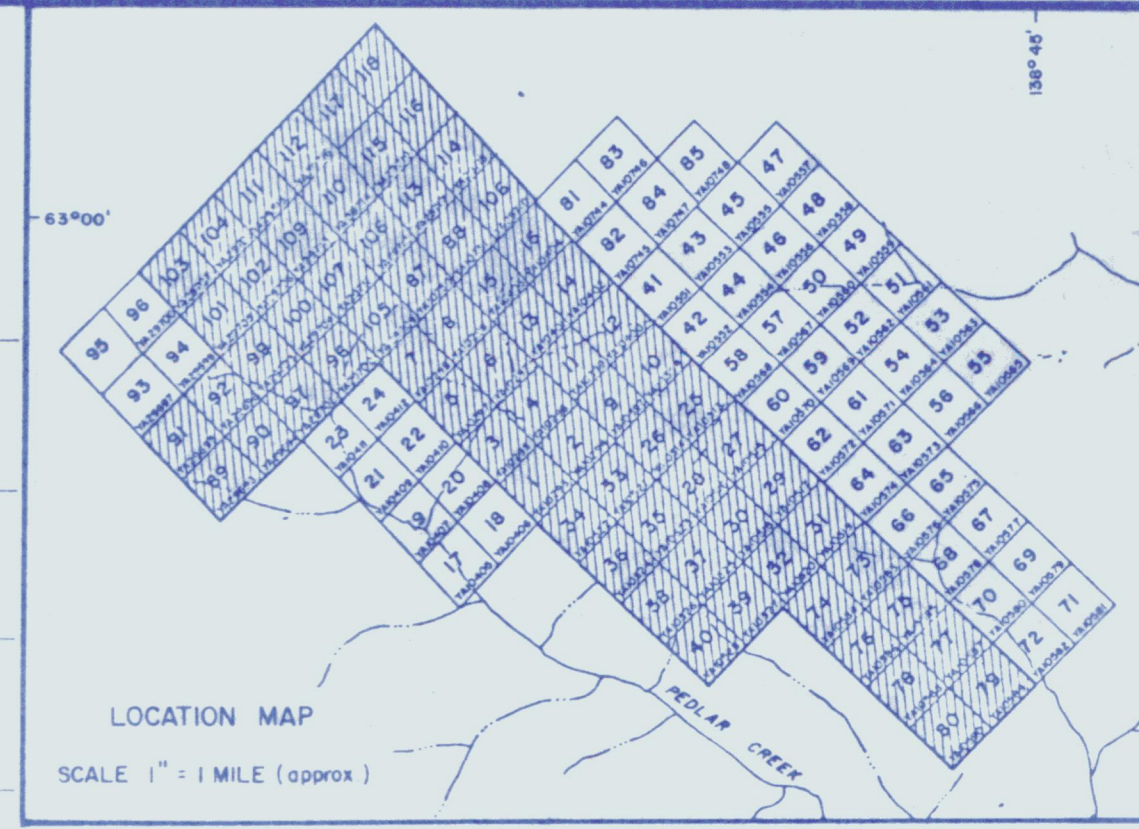
PROJECT 522

DAWSON MINING DISTRICT

HASL CLAIMS

RADIOMETRIC SURVEY

SCALE 1:5000



CONTOUR INTERVAL

50 ft
75 ft
100 ft
125 ft
150 ft
175 ft
200 ft
300 ft

LEGEND

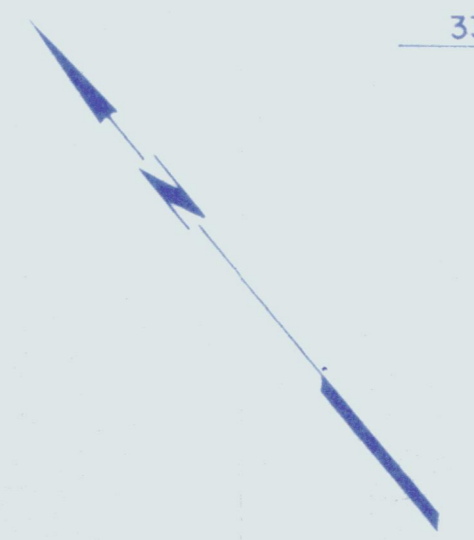
- TOPOGRAPHICAL CONTOURS
- BASELINE
- STATION (radiometric value in counts/second)
- STREAM
- CLAIM POSTS
- GNEISS
- GRANITE
- QUARTZ MONZONITE
- APLITE PRESENT
- PEGMATITE

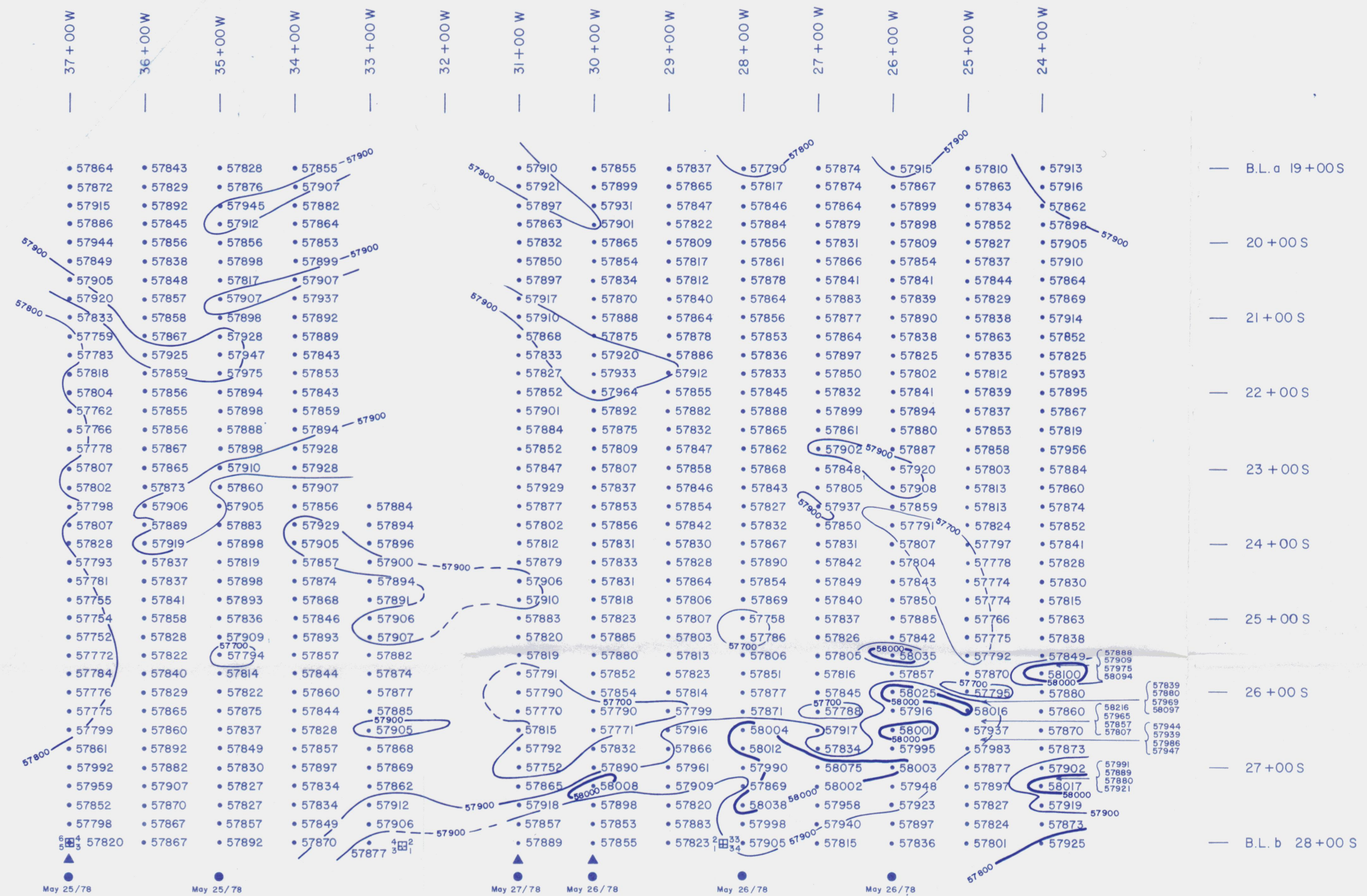
15S
16S
17S
18S
19S
20S
21S
22S
23S
24S
25S
26S
27S
28S
29S
30S
31S
32S
33S

46W 45W 44W 43W 42W 41W 40W 39W 38W 37W 36W 35W 34W 33W 32W 31W 30W 29W 28W 27W 26W 25W 24W 23W 22W 21W

ELDORADO NUCLEAR LIMITED

PROJECT 522
HASL GRID
YUKON TERRITORY
RADIOMETRIC SURVEY
SCALE 1:5 000





ELDORADO NUCLEAR LIMITED

PROJECT 522
 DAWSON MINING DISTRICT
 HASL CLAIMS
MAGNETOMETER SURVEY
 ANOMALY SB

SCALE 1:5000

MAY, 1978

LEGEND

- ▲ TIE CORRECTION BASE STATION
(for date given)
- DRIFT CORRECTION BASE STATION
(for date given)
- ▣ CLAIM POST LOCATION