

MAR 19680017: NORTHEASTERN ALBERTA

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19680017

ECONOMIC MINERALS
FILE REPORT No.
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INVESTIGATIONS
for
RADIOACTIVE MINERALIZATION
on
QUARTZ MINERAL PERMIT NO. 49
ALBERTA, August, 1968.

September 6, 1968.

by ERIC R. SMITH, B.Sc.,
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INVESTIGATIONS FOR RADIOACTIVE MINERALIZATION ON QUARTZ
MINERAL PERMIT NO. 49, ALBERTA - August, 1968.

INTRODUCTION

Quartz Mineral Permit No. 49 was acquired by the Company in 1968 from the Alberta Government. The Permit area is situated in close proximity to known occurrences of radioactive and sulphide mineralization. Previous research outlined the Permit area as being favourable for prospecting for these minerals.

The actual land encompassed by the Permit is as follows:

- 1) Northeast quarter, Twp 120, Range 3, W4M.
- 2) Sections 1-3, inclusive, and 10-12, inclusive, Twp. 121, Range 3, W4M.
- 3) Northwest quarter, Twp. 120, Range 2, W4M.
- 4) Sections 22, 27 and 34, Twp. 120, Range 2, W4M.
- 5) Sections 3-6, inclusive, Twp. 121, W4M.

This area covers approximately 20,000 acres, and is located approximately 60 miles northeast of Fort Chipewyan, Alberta.

Access to the property was from Uranium City, Saskatchewan, about 60 miles east. Chartered float-equipped

aircraft were obtained from McMurray Air Service Ltd. in Uranium City, who also provided the expediting service for this program.

The property was initially examined by an airborne radiometric survey, which was followed by ground investigation of outcrops and of areas outlined as having radiometric anomalies. Two-hundred line miles of airborne radiation measurements were flown, and approximately three weeks were spent on the ground examination. Two field camps were established from which ground work was based.

PREVIOUS WORK

No previous detailed study of this permit area had been made up to the time of this program. The only earlier work mentioned in published literature is the general reconnaissance which covered various parts of Northeastern Alberta by men like J.B. Tyrell (1892, 1893), F.J. Alcock, A.E. Cameron and H.S. Hicks (1929, 1930), and Riley (1959).

In 1962 the Geological Survey of Canada carried out aeromagnetic surveys in parts of Northeast Alberta. The Permit area was included in this survey, and the results are published in G.S.C. Map 2884G (1964).

J.D. Godfrey of the Research Council of

Alberta undertook an aerial photographic interpretation of Precambrian structures north of Lake Athabasca, the results of which were published in 1958. Since 1957, he has mapped most of northeastern Alberta, but at present, has not covered the actual geology in Permit area 49.

GAMMA-RAY SPECTROMETER

The prospecting tool used in detecting the radioactivity was a gamma ray integrating spectrometer. This instrument is the GIS-2 model made by Sharpe Instruments of Canada Ltd. It is able to discriminate easily between the various energy levels of gamma radiation coming from the many radioactive elements, and thus the instrument enables the operator to distinguish between uranium, thorium and potassium radiation.

The spectrometer is carried by means of shoulder straps, with the 12 volt power supply borne on the hip. This enables the operator to carry the detector approximately 2½ feet above the ground at all times. When detailed inspection of the outcrop is required, the detector can be removed from the shoulder and placed directly on the rock surface. When flying the instrument in an aircraft, the detector can be placed in any convenient position (e.g. - lying on the floor).

In this report, values given as "CPSU" refer:

to counts per second of gamma radiation which include energies of uranium and thorium, and "cpsTh" refer to those of thorium only.

AIRBORNE RADIOMETRIC RECONNAISSANCE

The gamma-ray spectrometer was used in an airborne radiometric reconnaissance survey over the mineral Permit area. A Cessna 180 aircraft was chartered from McMurray Air Services Ltd. of Uranium City. The survey was conducted at an altitude of 400 feet above the average ground level, with flight lines followed as shown on Map 2100-S-07-1. Approximately 200 line miles were flown over the Permit area.

Unfortunately, due to the rugged terrain, the aircraft was not always a constant height above ground - a factor which causes variations in the recording of the count rate. This caused some ambiguity in determining whether or not the radioactive anomaly was due to a geologic or a geographic effect.

As the best results for aerial reconnaissance were obtained when using the spectrometer at full energy acceptance, all radiation was measured. Therefore, no distinction between potassium, uranium or thorium anomalies was possible. Attempts were made to operate the instrument while airborne, using only thorium and uranium radiation, but as the count rate did not register a measurable amount, it became necessary to use the total radiation count.

GEOLOGY

The mineral Permit area lies in the Churchill province of the Canadian Shield, and is located less than 50 miles from the edge of the Shield where it disappears beneath the Interior Plains. The area is underlain by Precambrian granites and related rocks, and by complexes made up of gneisses, migmatites and granitic rocks. Several prominent faults are obvious on aerial photographs, but are hard to distinguish on the ground as they are generally filled with glacial deposits. Some supposed faults were found to be actual glacial ridges and eskers, but show up as possible faults on the photograph.

In general, the rock types forming most of the outcrop area are granitic gneisses, granites and related rocks (granodiorite, syenites) and mixtures of the two. One small island near the eastern shore of "Camp 1" lake appeared to be underlain by a meta-sedimentary unit composed of interlayered biotite schist and quartzite. The whole island was composed of this sequence, but it was not traceable to any other outcrop.

Pegmatites and other acid igneous intrusives cut most of the rock present, and in some cases, form a major part of some outcrops.

See Map 2100-S-07-1 for reference.

RADIOACTIVE MINERALIZATION

Although no radioactive minerals of any type or form were identified in the field, the presence of radioactivity was detected by the gamma ray spectrometer. The background radioactivity in areas of no outcrop was established as being 1.5 cpsU and 0.5 cpsTh (for explanation of symbols, see section on "Gamma Ray Spectrometer"). The radiation count over the granites and gneisses is considered normal if readings of 4 to 6 cpsU and 1 to 2 cpsTh are obtained when the radiation detector is at ground level. When flying the instrument at 400 feet above the outcrop surface, the background count is considered normal if it registers around 15 cps at full energy acceptance (i.e. - registers counts of uranium, thorium and potassium radiation together).

Above-background radioactivity was detected in certain coarse-grained pegmatitic granites, and in some biotite granites. It is thought that this abnormal radiation is due to a slightly higher content of radioactive elements within the rock, and not due to any concentration of radioactive minerals in veins, shears or in secondary enrichments. No mineralized structures were encountered. The highest count rate obtained in this permit area is 40 cpsU over a biotite granite in Area 2.

DESCRIPTION OF ANOMALOUS AREAS

A total of nine anomalous areas were identified during the airborne survey, eight of which were

examined by ground investigation. Of these eight, only four (Areas 1, 2, 4 and 6) seemed to have any above-background radioactivity connected with the rock. The remaining five zones are suspected of being caused by topographic and meteorologic effects.

The nine Areas are outlined as follows and can be located on Map 2100-S-07-1.

Area 1

The local granite gneiss complex found in this area gives a count rate of 4 - 6 cpsU and 1 - 2 cpsTh, except for a coarse-grained biotite granite phase in which counts of up to 15 cpsU were detected. The over-all grain of this gneiss strikes at N5°E, and this zone, containing the slightly radioactive biotite granite, appears to run 1,000 ft. parallel to strike with a width of up to 250 ft. However, the biotite granite of interest forms only 5% of the rock. Some sections of this coarse-grained biotite granites might be classed as pegmatite.

Outcrops found north and north-west of Area 1 disclose a similar geology, that is, granites and granite gneiss arranged in a quite disordered fashion, typical of this part of the Shield, and having a fairly uniform background radiation count of 4 - 6 cpsU.

Area 2

The anomaly registered in this area seems to extend for 1500 feet when flying the instrument. Ground investigation reveals that an outcrop area of 3000 feet N.W. by 1500 feet N.E. has a slightly higher count rate than is normal. The average count rate over all rocks present in this area has been recorded at 8 - 10 cpsU. There is one small (20' by 10') area of biotite granite which runs up to 40 cpsU and 14 cpsTh. This higher count rate was distributed evenly through the granite, and did not appear to have any concentration along veins or fracture zones. No uranium minerals were recognized in the field.

Area 3

This area coincides with outcrops of fairly high relief - most of the outcrop being from 50 to 150 feet higher than the surrounding topography. Granite gneiss is the predominant rock and it generally has a count rate of 4 - 6 cpsU. The airborne anomaly was, therefore, more of an elevation variation rather than a radioactive variation.

A small segment (about 200' by 5') of the gneiss lying approximately 2000 feet N.E. of this area, was found to contain a count rate of 10 cpsU and 3 cpsTh. A coarse-grained granitic inclusion within this zone went up to 35 cpsU and 13 cpsTh over a very small area. No other radioactive positions were encountered in this area.

Area 4

The granite gneiss country rock has a background count of 4 cpsU and 2 cpsTh. Some areas of red granite within this gneiss run up to 14 cpsU, 4.5 cpsTh, but only cover a very small area of the rock exposed. This outcrop area happens to be very upstanding with respect to the overall terrain, a factor which could account for the airborne anomaly being obvious.

About 1500 feet east of this area, and undetected by the airborne survey, lies a coarse-grained granite segment of the gneiss, having a count rate of 15 - 20 cpsU and 6 - 7 cpsTh. This does not involve too large an area (10% of outcrop within an area of approximately 100' by 200'). The lineation within the gneiss here is quite variable and the overall trend is indistinguishable.

Area 5

The radioactive anomaly detected here could not be located by ground investigation. However, the outcrop over which the airborne survey recorded the anomaly was found to have a topographic expression of 100 - 150 feet above the surrounding terrain. This, alone, could cause the anomaly while flying the instrument on a level flight path. The radioactivity in the local rock was at the normal value of approximately 4 cpsU.

Area 6

This area has good exposures of outcrop, the rock being granite gneiss and related rocks. Some radioactivity above background was recorded in hornblende granite forming part of the gneiss, but it only amounted to a count rate of 6 - 10 cpsU, compared to the background count in gneiss of 4 cpsU. Estimated 5 - 10% of outcrop has this slightly higher count rate.

Area 7

No radioactivity above the normal count (4 cpsU) was observed by ground investigation in this area. The only possible cause of the airborne anomaly would be the height of the outcrop present - 150 - 200 feet higher than the surrounding land.

Area 8

No abnormal radioactivity was detected in this area by ground investigation. The actual validity of this anomaly is questionable, as the operator of the instrument was not certain that it was surface radiation causing the deflection of the instrument. Meteorological affects might have caused the count rate to vary at this point, as the aircraft flew from beneath heavy cloud cover into bright sunshine at this instant.

Area 9

Only on one flight path crossing this area did the count rate seem to vary while traversing outcrop. This variation lasted while flying over the outcrop for about 3000 feet going northeast. Another pass over the same outcrop, going northwest, revealed no variation whatsoever in the count rate. This area was not inspected by ground reconnaissance, as the geology seemed to compare identically with the previous areas, and the validity of this anomaly is very doubtful.

SUMMARY

The ground investigation of the areas outlined by the airborne radiometric survey revealed that there is little or no evidence for the presence of economic radioactive mineralization on this permit area. Ground traverses made over the outcrops failed to uncover any other forms of mineralization.

Respectfully submitted,

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Geologist

September 6, 1968.

QUARTZ MINERAL EXPLORATION PERMIT No. 49

EDWIN RALPH GAYFER,

[REDACTED],
VANCOUVER I., B.C.,

DATE OF ISSUE - FEBRUARY 23, 1968

AREA - 19,840 ACRES

TP. 121

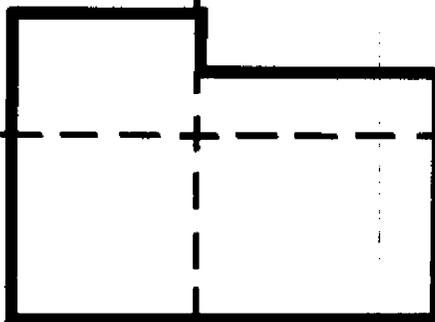
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TP. 119

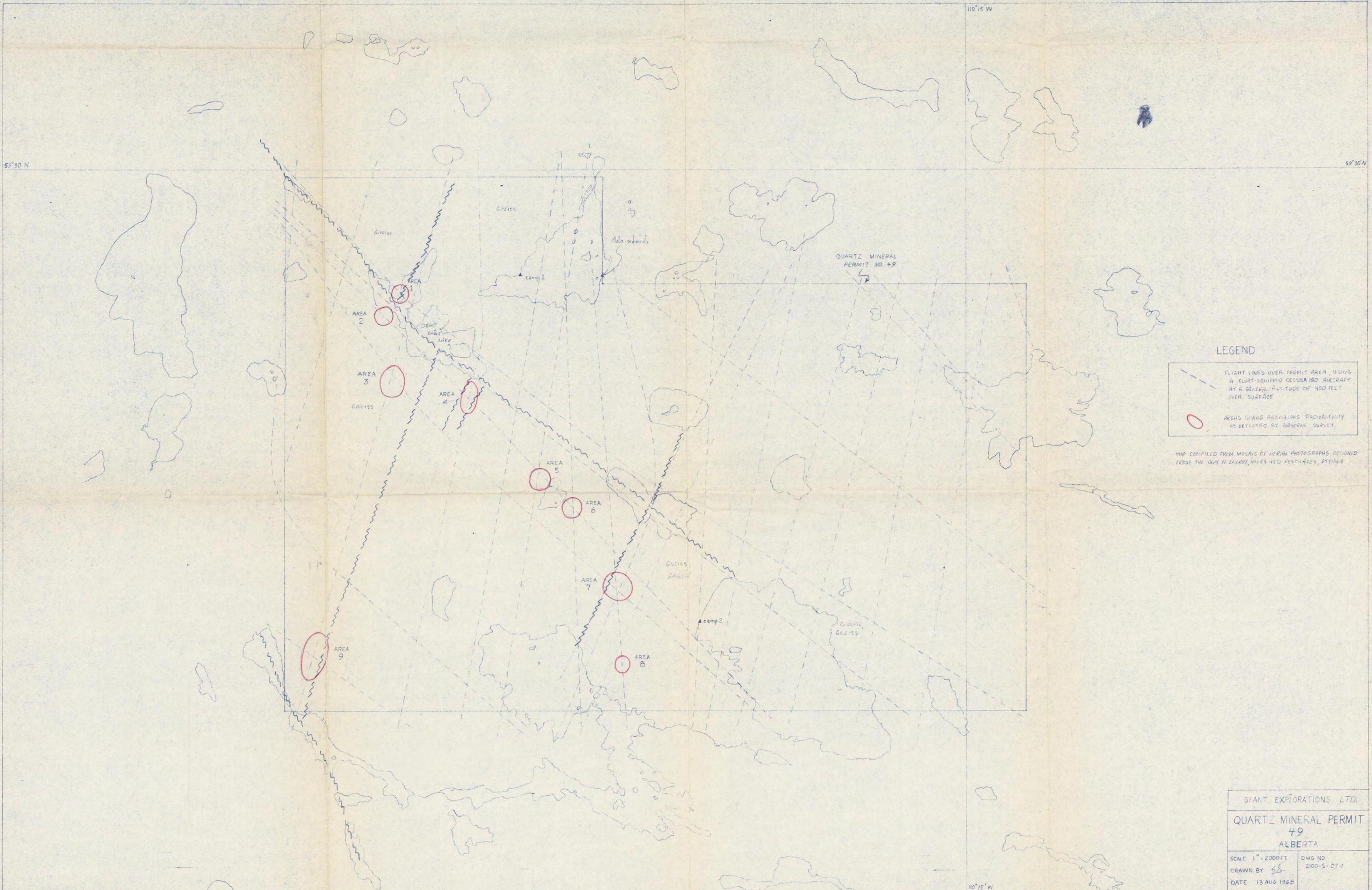
R. 3

R. 2

R. 1 W. 4 M.



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LEGEND

-  FLIGHT LINES OVER PERMIT AREA, USING A FLOAT-EQUIPPED CESSNA 180 AIRCRAFT AT A GENERAL ALTITUDE OF 400 FEET OVER SURFACE
-  AREAS GIVING ANOMALOUS RADIOACTIVITY AS DETECTED BY AIRBORNE SURVEY

MAP COMPILED FROM MOSAIC OF AERIAL PHOTOGRAPHS OBTAINED FROM THE DEPT. OF ENERGY, MINES AND RESOURCES, OTTAWA

GIANT EXPLORATIONS LTD.	
QUARTZ MINERAL PERMIT 49 ALBERTA	
SCALE 1" = 2000 FT	DWG NO. 2100-S-07-1
DRAWN BY <i>SS</i>	
DATE 13 AUG 1968	

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Map 2100-S-07-1