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MINING LANDS SECTION

KERR ADDISON MINES LIMITED

ASSESSMENT WORK REPORT

ESPANOLA PROJECT - "O-25"

SHAKESPEARE, COUGH, SALTER, VICTORIA, AND

SHEDDEN TOWNSHIPS, ONTARIO

G. HINSA, J.R. FOSTER

NOVEMBER 1976

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PROJECTS UNIT

LESTER ADRIAN MINE LIMITED

ASSESSMENT WORK REPORT

ESTABOLA PROJECT - "0-25"

SHANEFERS, COUCH, SALTER, VICTORIA, AND

SHADDEN TOWNSHIP, ONTARIO

O. HIMS, J.R. FOSTER

JAN 21 1976

connected copy of report attached at
See letter from Company
dated Feb. 24/77.



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abstract A and B showing disintegration of Thorium and Uranium 238

Table I Scintillometer anomalies, Table II Radon Gas Anomalies
Table III Correlation of Radon Gas and Scintillometer Anomalies

Maps in Folder

Number	Title	Scale
0-25-20	Group C, D and F; Radon Gas Survey	1" = 100'
0-25-21	Group C, D and F; Geological Map	1" = 200'
0-25-24	Group H and I: Survey Map-Geology Scintillometer Radon	1" = 100'
0-25-25	Group J: Radon Gas Survey	1" = 100'
0-25-26	Group J: Geological Map	1" = 200'
0-25-27	Group J: Radon Gas Survey	1" = 200'
0-25-28	Group J: Geological Map	1" = 200'
0-25-29	Group J: Radon Gas Survey	1" = 200'
0-25-30	Group J: Geological Map	1" = 200'
0-25-31	Group J: Radon Gas Survey	1" = 200'
0-25-32	Group J: Geological Map	1" = 200'
0-25-33	Group J: Radon Gas Survey	1" = 200'
0-25-34	Group J: Geological Map	1" = 200'
0-25-35	Group K: Radon Gas Survey	1" = 200'
0-25-36	Group K: Geological Map	1" = 200'
0-25-37	Group L: Radon Gas Survey	1" = 200'
0-25-38	Group K: Geological Map	1" = 200'
0-25-39	Group K: Radon Gas Survey	1" = 200'
0-25-40	Group K: Geological Map	1" = 200'

SUMMARY

Scintillometer and radon gas surveys combined with detailed geological mapping were used by Kerr Addison Mines Limited to outline anomalous radioactive zones in Huronian rocks with the Espanola Project. The project is located along the contact between granitic bedrock and Huronian sediments, from 46 to 70 miles west of Sudbury. Mapping indicated a nearly complete sequence of the sedimentary pile in Victoria Township, from the basal Hatinenda Formation to the Gowganda Formation. Radioactive anomalies corresponded with the Hatinenda, McKim, Mississagi and Espanola Formations. Further work over the most promising anomalies is recommended for 12 claims in Victoria Township, and 2 claims in Chedden Township.

ASSESSMENT WORK REPORT
ESPANOLA PROJECT - "C-25"

INTRODUCTION

Kerr Addison Mines Limited owns wholly a total of 119 claims in nine groups located in Shakespeare, Gough, Salter, Victoria and Shedden Townships.

With the exception of those groups or claims underlain by granites, all the claim groups were covered with line cutting, geology, scintillometer and radon gas surveys.

Several anomalous areas were outlined which will warrant further work.

PROPERTY

<u>Location</u>	<u>Lot</u>	<u>Concession</u>	<u>Township</u>	<u>Claim No.</u>
S 1/4	9	1	Shakespeare	438766, 438767
S 1/2	10	1	Shakespeare	438950, 439951
S 1/2	12	1	Shakespeare	438923, 438924
S 1/2	1	1	Gough	438919, 438920, 438921, 438922

The following claims are located in townships that are not subdivided into lots and concessions.

<u>Location</u>	<u>Section</u>	<u>Township</u>	<u>Claim No.</u>
NE 1/4	14	Salter	438773, 438774, 438775, 438776
NE 1/4	19	Salter	438777
SW 1/4	13	Victoria	438217
SW 1/4	14	Victoria	438213, 438214
SW 1/4	14	Victoria	438209, 438210
SW 1/4	15	Victoria	438202, 438207
SE 1/4	15	Victoria	438415, 438416
SE 1/4	16	Victoria	438667, 438603
SW 1/4	16	Victoria	438658, 438659, 438662, 438665
SW 1/4	17	Victoria	438648, 438649, 438650, 438651
SE 1/4	17	Victoria	438654, 438655, 438656, 438657

<u>Location</u>	<u>Section</u>	<u>Township</u>	<u>Claim No.</u>
SW ¼	18	Victoria	438633
SE ¼	18	Victoria	438640##, 438641##, 438642##, 438643##
NW ¼	19	Victoria	438634, 438635
NE ¼	19	Victoria	438638, 438639, 438644, 438645
SW ¼	19	Victoria	438636, 438637
NW ¼	20	Victoria	438646, 438647, 438652, 438653
NW ¼	21	Victoria	438660, 438661, 438662, 438663
NE ¼	21	Victoria	438668, 438669
NW ¼	23	Victoria	438413#, 438414#
NW ¼	24	Victoria	438399, 438400, 438401, 438402
NE ¼	24	Victoria	438407, 438408, 438409, 438410
NE ¼	23	Shedden	438301, 438302, 438307, 438308
SE ¼	23	Shedden	438303, 438304, 438305, 438306
NW ¼	24	Shedden	438293, 438294, 438299, 438300
NE ¼	24	Shedden	438289, 438290, 438291, 438292
SW ¼	24	Shedden	438295, 438296, 438297, 438298
NW ¼	19	Shedden	438712, 438717
SW ¼	19	Shedden	438713, 438714, 438715, 438716
SE ¼	19	Shedden	438707, 438708, 438709, 438710
NE ¼	19	Shedden	438706
NW ¼	20	Shedden	438701, 438705
NE ¼	20	Shedden	438317, 438700
SW ¼	20	Shedden	438702, 438703, 438704
SE ¼	20	Shedden	438698, 438699
NW ¼	21	Shedden	438313, 438716
NE ¼	21	Shedden	438209, 438312
SW ¼	21	Shedden	438314, 438315
SE ¼	21	Shedden	438310, 438311

These are water claims and will be covered at a later date with line cutting and a magnetometer survey.

Kerr Addison Lines Limited has applied for extensions of time in order to negotiate with the surface rights owners of these claims. Line cutting, geology, scintillometer, and radon gas surveys will be done on these claims at a later date.

LOCATION AND ACCESS

The most easterly claim group in the project area lies 46 miles west of Sudbury. The property extends for 25 miles to the west, more or less parallel to and at a distance varying from 1½ to 2½ miles north of

Highway 17, which runs between Sudbury and Sault Ste. Marie. Claim groups are in Shakespeare, Gough, Salter, Victoria and Shedden Townships.

Numerous secondary roads leading north from Highway 17 to agricultural, recreational and lumbering areas provide easy access to most of the project area.

PREVIOUS WORK

Sources of information for this section include Robertson (1965), Robertson (1976), Card and Palonen (1976), and the Resident Geologist's Files at Sudbury and Sault Ste. Marie.

Group C Glaciofluvial sands, gravels, and varved clays mask the bedrock in these two claims. No work has been recorded for either. However, to the southeast, a large cliff of Matinenda Formation arkoses and quartzites outcrops. In 1957, Delcan Minerals Limited put down three diamond drill holes totalling 1297 feet in Lots 8 and 9, Concession 1, Shakespeare Township. In one hole, an assay of 1.27 lb./ton U₃O₈ was obtained over 1.5 feet of sheared quartzite. No oligomictic quartz pebble conglomerates were recorded in the core logs.

Group D A bed of radioactive oligomictic conglomerate has been pitted on the western boundary of Lot 12, Concession 1, Shakespeare Township. In 1968 and 1969, Aggressive Mines Limited drilled several holes here, obtaining one assay of 6.0 lb./ton U₃O₈ over 0.7 feet. In 1969 also, Moncreiff Uranium Mines Limited did a geological survey, and drilled two holes totalling 1337 feet. Only trace uranium values are recorded in the core logs.

Group F The above showing in Group D extends into Lot 1, Concession I, Gough Township just north of Group F; previous work here is the same as for Group D.

Group H In 1956, three diamond drill holes were put down into Salmay Lake Formation metavolcanics for J. Gatcher. The core was assayed for copper; results were not recorded.

Group I No previous work is in the Resident Geologist's Files at Sudbury.

Group J Most of the work done in Group J occurred shortly after the founding of the Blind River - Elliot Lake mining camp. In 1954, a geological survey and diamond drilling programme was carried out in the Sugar Lake vicinity in Victoria Township. Five holes totalling 2538.5 feet were drilled in the SE $\frac{1}{4}$ of the S $\frac{1}{2}$ of Section 14, Victoria Township; no assays were recorded. Also in 1954, F.C. Knight did geological and geiger surveys near Denvic Lake (Section 19, Victoria Township). In 1954 and 1956, Peach Uranium and Metals Manufacturing Limited drilled seven holes within the Group J area in Shedden Township; four holes were in the unmetamorphosed Huronian sediments to the north of the Murray Fault, and three holes were in argillaceous schists to the south. No quartz pebble conglomerates or uranium values were recorded in the core logs. In 1955, airborne magnetometer and radioactivity surveys and a ground EM survey were conducted by Pronto Uranium Mines Limited over all of Shedden Township. No significant radioactivity was noted; also, the EM survey failed to locate any conductors. Minor radioactivity is associated with fractured quartzites of the Espanola Formation. In 1957, Victoria Algoma Mineral

Company Limited drilled and trenched these quartzites between Denvic and Sugar Lakes; full details are not available. Radioactivity is directly associated with the fractures (Robertson, 1976). In 1968, Hugh Pan Porcupine Mines Limited drilled 4526 feet with three holes in Victoria Township. No radioactive zones were found. J.A. Robertson, who mapped Victoria and Salter Townships for the Ontario Division of Mines in 1966 and 1967, submitted an unknown number of samples for uranium assay. Only trace amounts (0.02-0.04 lb./ton U_3O_8) were found in rocks of the Elliot Lake and Hough Lake Groups (Robertson, 1976).

Group K The only previous work recorded for this group was by Pronto Uranium Mines Limited (see Group J above).

GEOLOGY

a) General Description

The rocks within the Espanola Project can be divided into five categories: 1) Keewatin (Archean) metasedimentary and metavolcanic rocks found as inclusions within granitic intrusions (these do not form a significant part of the Archean bedrock, and will not be discussed further); 2) Granitic rocks of late Archean Age; 3) Clastic sediments and minor volcanics of the Huronian Supergroup; 4) Gabbro-diorite-anorthosite intrusions of uncertain age; and 5) Late Proterozoic (Keweenawan mafic dykes).

Granitic rocks (granites, granodiorites, aplites, related pegmatites) form the vast majority of the pre-Huronian bedrock. These are mainly coarse-grained, pink in colour, with high quartz content (20-30%) and little or no mafic minerals (generally less than 5%). The rest of the rock is feldspars; pink orthoclase and pink to white multiple twinned

plagioclase. Where the contact with the Huronian sediments is not faulted, the granite grades upward into a dirty, sericitic, quartz-rich regolith, which contains fine greenish-black "veins" (probably tiny fractures filled with chloritic minerals). This regolith is difficult to distinguish from a dirty quartzite. At least one set of pre-Huronian mafic dykes cuts the granites, trending northwest.

Unmetamorphosed Huronian strata are in fault or unconformable contact with the Archean granites to the north. The Murray Fault forms their southern boundary, separating unmetamorphosed sediments from their metamorphic equivalents to the south.

An almost complete exposure of the Huronian sequence is exposed north of the Murray Fault in Group J. South of the fault within the group, only the McKim Formation is encountered. Beginning the Huronian sequence are either mafic volcanics or quartzo-feldspathic sediments of the Elliot Lake Group. The volcanics and intercalated arkoses, greywackes, and oligomictic quartz pebble conglomerates belong to the Salway Lake Formation. These are locally extensive in Salter Township and the eastern extreme of Victoria Township; elsewhere in the Espanola Group they are not found. Quartzites, dirty arkoses and argillaceous sediments of the Matinenda Formation lie in unconformable contact with Archean basement in Shedden Township and the west half of Victoria Township on the north shore of Tube Lake. The quartzites exhibit good trough crossbedding, which was not noticed in quartzites of other formations. Current structures indicate provenance was to the northwest (Robertson, 1976). Interbedded with the quartzites are dirty arkoses and greywackes or argillites that sometimes have a rusty

weathering surface. Only one occurrence of quartz pebble conglomerate similar to the Blind River - Elliot Lake uraniumiferous conglomerates was encountered in the entire project; this was on the extreme southern end of the boundary between Gough and Shakespeare Townships. McKim Formation argillites, greywackes and quartzites are next in the sequence. North of the Murray Fault, argillite dominates this formation. It is dark grey to black, fine-grained, often intensely dragfolded. Commonly, it is interbedded with a medium grained greywacke, which does not display the laminations and slaty cleavage found in the argillite. Sulphides (pyrite cubes and pyrrhotite) are usually present as minor disseminations (less than 1%). Some radioactivity is associated with McKim argillites, however, the distribution of this is very irregular and limited. South of the Murray Fault, the McKim Formation is composed of a massive to rhythmically bedded argillaceous schist, often with intensely drag-folded stringers of quartzite.

The Hough Lake Group included the Ramsay Lake, Pecora, and Missisagi Formations. The first is a polystratic microconglomerate with dark grey or smokey quartz granules and pebbles (3-10 mm.) set in a black to light grey weathering siliceous matrix. Most of the clasts are quartz (up to 90%), others are granitic and sometimes greenstone. The quartz granules are subrounded to rounded. This conglomerate is probably of glacial origin (Robertson, 1976). The Pecora Formation of argillites, argillaceous quartzites and quartzites is in conformable contact with the Ramsay Lake Formation. The Pecora Formation was not easily distinguished in the field from argillaceous sediments of the McKim Formation, as the intervening Ramsay Lake conglomerate was generally not observed in outcrop.

Last in the Hough Lake Group are arkoses, quartzites and feldspathic quartzites of the Mississagi Formation. These form a high barren ridge running through Group J and I. Sericitic arkose beds, 30-100 cm. thick, are commonly interbedded with the quartzites. The latter are generally light grey to white or pink, medium to coarse-grained, with well sorted, well rounded grains. Planar crossbedding is strongly developed throughout most of this formation. Tops are to the south. One persistent horizon near the fire tower at Tube Lake and within Group K in Shedden Township, is a pink feldspathic quartzite, cut by numerous quartz veins and segregations. These have entirely disrupted the bedding. The boundaries between this rock and other quartzites are very gradational, marked only by an increase in the number and size of quartz veins as this rock is approached. These veins may be related to a period of faulting. Another strongly developed horizon within the Mississagi formation is an intraformational conglomeratic "breccia", found south of the large diabase sill near Denvic and Tube Lakes. Large angular pebbles and boulders (up to 3.6 metres, but usually up to 10-100 cm.) of sericitic arkose and quartzite occur in a highly chloritic and sericitized siltstone matrix. The matrix is smeared around the boulders. This appears to indicate transportation of partially consolidated quartzite as a turbidity or sand flow. The "breccia" lies between undisturbed Mississagi quartzites; it may be due to clumping or faulting during consolidation of these sediments.

An erosional unconformity appears to separate the Hough Lake Group from the Quirke Lake Group to the south. First in this group is another quartz granule microconglomerate, the Bruce Formation. It is very similar

to the Ramsay Lake Formation, in that most of the clasts are small smoky quartz granules, subangular to subround, well spaced within a dark siliceous matrix. It is present only in Group J. Overlying this is the poorly exposed Espanola Formation. It consists of calcareous siltstones, siltstones and quartzites, generally well fractured by numerous faults. The Serpent Formation completes the Quirks Lake Group. It consists of more light grey quartzites. These only outcrop in Shedden Township within Group J. The beds are generally massive, up to 1 metre thick with no crossbedding observed.

Rounding out the Huronian sequence within the Espanola Project is the Gowganda Formation of the Cobalt Group. It is a polystratic paraconglomerate, quite dissimilar to the Ramsay Lake or Bruce conglomerates. Large granitic boulders, cobbles and pebbles (5 to 30 cm.) are distributed in a greywacke matrix. Interbeds of pink to red arkose are common in both Victoria and Shedden Townships.

Intrusives of uncertain age are found along the Archean-Huronian interface throughout much of Victoria and Balter Townships, in Groups H (in the northern half) and J (north of Tube and Sugar Lakes). These are coarse-grained diorites and gabbros.

The entire sequence is intruded by diabase dykes and sills (Nipissing diabase). These trend northwest-south-east across the Huronian rocks, or east-west as stratabound sills.

b) Structural Geology and Tectonic History

The area of the Espanola Project lies within the Southern Province of the Canadian Shield. Archean granites to the north were replaced during the Kenoran Orogeny, the major mountain building period that ended 2500 m.y.

During the time following this and the interval of Huronian sedimentation (2450 m.y. to 2250 m.y.; Roscoe, 1973), the Archean paleosurface was eroded to the granitic basement. Downfaulting began the Huronian depositional basin. This was subject to repeated upwarping and downwarping of the crust, and probably further movement along old fault planes, giving rise to a distinctive sedimentation cycle (paraconglomerate, argillaceous sediments, quartzites) that characterizes the upper three groups of the Huronian Supergroup. The upwarping established periods of erosion responsible for local disconformities in the sedimentary pile. During sedimentation, faults were active in the basin, as shown by slump structures in argillite, quartz veining and brecciation of part of the Missisquoi quartzites. The close of the Huronian is marked by intrusions of Missisquoi diabase, and limited orogenic activity. The first major deformation of the sequence was the Hudsonian (Penokean) Orogeny (1750 m.y.). At this time, stresses from the south produced steep northeast trending folds. Faults which had earlier defined the boundaries of the depositional basin were reactivated, with deeply buried metamorphosed sediments being thrust up onto the unmetamorphosed rocks. A later orogenic pulse (1450 m.y.) was responsible for intrusion of Keweenaw diabase dykes. Limited tectonic activity associated with the Grenville Orogeny (960 m.y.) had only a little effect on the Esplanade Project area.

Huronian strata within the project are thrown into steep angled attitudes. In Shelden, Victoria and Salter Townships, the rocks form the south limb of the Gibleau anticline (Robertson, 1976). In Gough and Shakespeare Townships, Groups G, D and F are found on a faulted limb of the Baldwin Anticlinorium.

The major fault running through the entire project area is the Murray Fault. This has been traced from Sault Ste. Marie to Sudbury. Later faults have offset it sinistrally (i.e. The Webbwood Fault at Group D). The claim groups of the Espanola Project lie just to the north or straddle the Murray Fault. Other lesser faults parallel this major fault, or, like the Webbwood Fault, trend northwest across the map area.

c) Economic Geology

In the Blind River - Elliot Lake region, quartz pebble conglomerates of the Katinenda Formation are hosts for uranium minerals. The distribution of these conglomerates is controlled by depressions in the Archean paleo-surface, where initial deposition of quartz gravels took place. As such, the Katinenda Formation has been a focus of uranium prospecting. Only one outcrop of uraniumiferous quartz pebble conglomerate was observed in the Espanola Project area. This occurs on the boundary between Gough and Shakespeare Townships (claim no. 438923). The outcrop has been pitted, exposing a 2 metre wide lens of sulphide bearing radioactive conglomerate. Clasts are about 10 to 30 mm. in diameter, and make up 50% of the rock. These are well rounded, with little or no accompanying deformation. The sulphides are well weathered to an unknown depth; no estimate of their percentage was made. No samples were taken, as the surface exposure has been thoroughly leached of radioactive minerals. The conglomerate lies at the contact between a white, fine to medium grained quartzite to the north, and a highly contorted siltstone to the south. This contact is further exposed to the west, but no more conglomerate is present, as it pinches out rapidly to the east and west. In Shakespeare Township, the contact is obscured by thick overburden. The rapid pinching out of the

bed is due to the high degree of deformation here, shown also by the remobilization of the quartzite, intrusion and folding of quartz stringers in the siltstone, and strong dragfolding along the contact. This showing has been prospected by at least two companies (see Previous Work). One other trench in arkose and greywacke of the Matinenda Formation was visited on the north shore of Tube Lake (claim no. 438665). No conglomerate was present, although some rusty zones were noted.

In Grid H, Salmay Lake volcanics have been trenched and drilled for copper sulphides (claim no. 438775). Several shallow pits were observed during mapping; distribution of sulphides was poor.

Barnes and Lalonde (1973) have correlated the uranium bearing conglomerates at Agnew Lake Mine with the McKim Formation, based on local stratigraphy at the mine. Although some radioactive anomalies are associated with the McKim argillites on the north shore of Sugar Lake (claim no. 438209), these have not been trenched.

Several pits in the Mississagi quartzite exposed radioactive anomalies, although none are within the Espanola Project. The intraformational breccia in the Mississagi Formation is slightly radioactive. It has been trenched (claim no. 438646). Radioactivity was 5 to 10 times background.

Other radioactive showings occur in sheared and fractured quartzites and greywackes of the Espanola Formation. This has been trenched and drilled (see Previous Work). It appears that radioactive mineralization is restricted to the shears; this proved to be the case when the greywackes were checked with a scintillometer.

The Massey Mine in Salter Township was visited briefly. Mineralized zones containing chalcopyrite, bornite and chalcocite are found in argillites and quartzites of the Pecora Formation. This mineralization extends to the west, but not into Victoria Township (for a more complete description of the Massey Mine, see Robertson, 1976; p.p. 111-116).

WORK DONE

- a) Line cutting and chaining: 80.35 miles
- b) Geology: 80.35 miles
- c) Scintillometer survey: 65.1 miles
- d) Radon gas survey: 65.1 miles

a) Line Cutting and Chaining

Base lines were established in an east-west direction along existing concession or section lines where possible. Survey lines were cut at 90° to the base lines at 400 foot intervals. All lines were made by compassing and chaining. Stations along survey lines were chained at 100 foot intervals, and the station number recorded on orange flagging tape.

b) Geology

Outcrops were mapped by tying into survey lines, and extrapolation of outcrop contours between them. Approximately 80% of outcrop in the Espanola Project was visited. Rock types were distinguished in the field, according to a simple classification scheme (see legend of geological maps). Mapping was done at $1" = 200'$, and transferred to base maps of similar scale.

c) Scintillometer Survey

A scintillometer measures gamma-rays associated with the decay of Uranium, Thorium and Potassium isotopes, and transforms this radiation into a visual readout of radioactive intensity. The signal is displayed as

counts per second. Emission energy (expressed as millions of electron volts, Mev.) for unstable elements of interest to a radiometric survey are:

Potassium 40 (daughter product of Potassium 40) 1.46 Mev.
 Bismuth 214 (daughter product of Uranium 238) 0.608-2.44 Mev.
 Thallium 232 (daughter product of Thorium 232) 0.277-2.62 Mev.

Energy response of the Geiger-GMS-101 portable gamma-ray scintillometer used in this survey is to total counts (all energies above 0.05 Mev.). The crystal detector is 1.25" diameter by 1".

The scintillometer survey was done at the same time as the radon survey. The instrument was held at waist height for each reading, and kept on continually during each day's work.

Advantages of a scintillometer survey are speed and ease of operation. Also, it is ideal for use in areas of very thin overburden or bare rock or in wet soils where a radon survey cannot be done. The GMS-101 scintillometer is not useful in areas of thick overburden, as this masks gamma-ray radiation from radioactive sources. Also, it does not differentiate between the sources it detects (Potassium 40, Bismuth 214, Thallium 232).

Most of the scintillometer readings in the Espanola project were low, only 2 or 3 times the background of 20 counts per second. The survey was not done over areas underlain by granitic basement, as granites along the north shore of Lake Huron have proved to be poor targets for uranium exploration.

A number of distinct types of scintillometer anomalies were encountered (results were considered to be anomalous if over 2 times background).

The following table shows the association of each anomaly.

TABLE I

SCINTILLOMETER ANOMALIES

<u>Type</u>	<u>Association</u>
1	Granitic rocks
2	Thick overburden
3	Faults and shears
4	Amphibole and greywacke
5	arkose and quartzite
6	Oligomictic conglomerates

TABLE II

GROUND GRAD ANOMALIES

<u>Type</u>	<u>Association</u>
1	Granitic rocks
2	sand and gravel
3	dry ground
4	clay shale
5	amphibole
6	arkose and quartzite
7	Oligomictic conglomerates

1) Anomalies in granitic rocks. Certain granites in the Blind River to Espanola area are slightly radioactive, similar to those found at Theano Point on Lake Superior (Robertson, 1976). This was verified during mapping when granitic rocks north of Tube Lake in Victoria Township were discovered to have radioactivity 4 to 6 times background;

2) Anomalies in thick overburden. These are low (1 to 2 times background) and may be due to leached uranium minerals from Huronian sediment sources being redeposited under reducing conditions in sands and gravels;

3) Anomalies associated with faults and shears. Radioactive minerals redeposited along shear or fault planes are responsible for this type. This situation may mean that more extensive concentrations of uranium are present at depth;

4) Anomalies in argillite and greywacke. The reason for these anomalies is not clear. They are not considered to be significant.

5) Anomalies in arkose and quartzite. Concentrations of radioactive minerals in these rocks (not in shears) cause geinillometer highs. In general, these were limited in areal extent;

6) Anomalies in intraformational breccias. Again, these are considered insignificant. The source may be the argillaceous matrix;

7) Anomalies in oligonietic conglomerates. These are due to radioactive minerals in the matrix of the conglomerate. As such, they are the best target for further work.

A very distinct low in the geinillometer readings is found over the large diabase sill in Victoria and Shedden Townships.

d) Radon Gas Survey

The radon gas method detects and measures alpha radiation associated with Radon in soil gas. Radiation is measured by use of a Portable Radon Detector, Model RD200, manufactured by EDA Electronics Limited of Ottawa, Ontario. The technique has had long usage in Europe, and was introduced into Canada in 1968 by the Geological Survey of Canada. The present system (EDA - RD200) was based on an original design of the Atomic Energy of Canada Limited, in co-operation with the GSC.

Radon gas consists mainly of two isotopes: Radon 222 and Radon 220. The former is the sixth member of the disintegration series of Uranium 238. With a half life of 3.82 days, it decays by alpha emission to Polonium 218. Radon 220 is the fifth member of the disintegration series of Thorium 232, which decays with a half life of 54.5 seconds by alpha emission to Polonium 216.

The RD200 is a scintillometer that detects and counts alpha particles over a pre-set period (in this survey, one minute) so that it is possible to detect radiation sources obscured by overburden. The operation of the RD200 is rapid and easy, requiring that overburden be present to trap soil gas below or at the humus cover. The method involves augering a hole into the soil, inserting a hollow probe, and by means of a bulb pump, circulating the gas back into an alpha-sensitive zinc sulphate cell. This cell is coupled with the scintillometer that counts the alpha particles over a pre-set one minute sequence.

Radon gas readings were spaced 100 feet apart along survey lines. Where a reading exceeded 100 counts per minute over background, a second reading was taken at a 50 foot interval. For anomalies greater than

250 cpm over background, three consecutive one minute readings were taken, and the rate of decay of the radioactive source noted. In this manner, a Uranium source can be differentiated from a Thorium source, on the basis of their respective longer and shorter half lives.

The advantage of this technique over previously and better known gamma-ray geiger and scintillometer surveys is that gamma-rays associated with the decay of Uranium, Thorium and Potassium isotopes are easily masked by overburden, and therefore, only effective to bedrock exposures. There are a number of disadvantages to the radon gas method. Readings cannot be taken where soil is thin (less than six inches) or when the auger cannot penetrate into the ground (for example, boulder-rich tills, talus slopes). Also, if the soil is wet, a reading cannot be taken. In such a case, the wet earth likely indicates a high water table, which establishes a reducing environment. Uranium, which is water soluble under oxidizing conditions, is then able to precipitate very close to the surface. A sample taken in this situation would give an anomalous high reading, which would not at all reflect bedrock concentrations of radioactive minerals. The type and thickness of soil can also influence the strength of the radon gas anomaly. Impermeable clay layers will tend to mask bedrock effects, as the radon gas cannot escape into higher levels in the soil. Readings here would be low. Another possibility exists whereby a sample hole is augered through a clay layer where radon gas has collected, causing a high reading which may not be truly representative of the underlying bedrock.

As with the scintillometer survey, a number of types of radon gas anomalies were encountered. These are shown in Table II. Radon gas

readings were not taken in areas underlain by granites.

1) Associated with granites. Again, these are caused by radioactivity inherent in red granites to the north of the Huronian sequence;

2) Associated with sand and gravel. Radon gas is adsorbed to the surface of sand grains, thus accounting for the high readings;

3) Associated with wet ground. Uranium may be present in soil where reducing conditions are established (where the water table nears the surface in topographic depressions). Uranium in groundwater will precipitate out in such an environment, which is the likely cause of such anomalies;

4) Associated with clay soils. In this case, clay layers act as an impermeable barrier to the surface migration of radon gas. Such layers (hardpan) are common in podsollic soils, which are found throughout Northern Ontario. If a sample hole is tapered through clay into a zone where radon gas has accumulated, a high reading not necessarily indicative of bedrock conditions will be recorded;

5) Associated with argillite. Presumably, radioactive quartzites may be interbedded with argillite and not appear in outcrop. Again, these are not considered to be suitable for further work;

6) Associated with arkose and quartzite. These are good exploration targets;

7) Associated with olivinitic conglomerates. These are also suitable for additional work.

Table III shows the location and association of radon gas anomalies in the Espanola Project, and the correlation of these with scintillometer anomaly types.

TABLE III

CORRELATION OF RADON GAS AND SCINTILLATION ANOMALIES

Group	Location	Map Number	Radon Anomaly	Scint. Anomaly	Comments
C	entire group	0-25-20 & 21	2,3	2	Possibly also related to Murray Fault
D	L4W:2N	as above	1	1	Note the lack of a scint. or radon gas anomaly east of the U showing. This may be due to thick overburden or extreme pinching out of the radioactive source
	L20W:5N	as above	2,3	—	
	L32E:12N	as above	—	—	
H	L24E:0-7N	0-25-24	2	2	Very high readings in gravel pit - may coincide with arkosic beds of Salmay Lake Formation
	L12E:5N, 8N	as above	2	—	
	L4E:1N, 2N	as above	2	—	
I	L8E:2N	as above	6	weak	Weak anomaly in each survey
J	L152E:12S	0-25-25 & 26	6 (2)	—	No scint. anomaly in area of outcrop and thin sand overburden
	L144E:2S	as above	2	—	Occurs in area of Salmay Lake volcanics, which do have some radioactivity-note high scint. reading on L148E:3S of 110 cps in volcanics
	L136E:9S	as above	6,2	—	No scint. anomaly in area of thin overburden and outcrop
	L136E:14S	as above	2	—	Sand anomaly
	L124E-L116E, 12S-14S	as above	2,3(6)	—	Low scint. readings-anomaly may be due to slightly radioactive arkose beds in feldspathic quartzite
	L120E:10	as above	3	—	Swamp
	L112E:5S	0-25-25 & 26	2 (6)	—	Weak scint. readings, sand overburden
	L88E:11N	as above	2,1	1	Granite outcrop, sandy overburden

TABLE III

CORRELATION OF RADON GAS AND SCINTILLOMETER ANOMALIES

Group	Location	Map Number	Radon Anomaly	Scint. Anomaly	Comments
J	L60S:11N	0-25-27 & 28	3, (1 ^{1/2}) [?]	weak	Wet ground-note high scint. (5XBG.) in near by quartzites and arkoses near granite contact
	L4E:16N	as above	3, (6 ^{1/2}) [?]	6	High reading on feldspathic quartzite (?) outcrop at 7N
	L20W:19S	0-25-29 & 30	6	5,3	Associated with shears in Espanola quartzite
	L28W:5N	as above	2, (5)	—	Possibly caused by slightly radioactive argillite
	L32W:17N, 18N	as above	5,6	weak	Caused by slight radioactivity in Matinenda arkose and argillites
	L32W:5S	as above	6	—	Possibly due to radioactive arkose interbeds in quartzites
	✓ L40W:18S, 21S	as above	5,6	3, 4, 5	Follows trend of Espanola quartzites
	L44W:3S	as above	6	<u>weak</u>	Due to arkosic interbeds in quartzite, ties in with anomaly on L32W:5S
	✓ L44W:7S-18S	as above	6	5	Fairly strong scint. anomaly 5XBG., indicates radioactive minerals in arkose
	✓ L52W:L72W, 2N-12N	as above	2,5	—	Large radon anomaly in valley over argillites - may be interbedded arkoses at depth
	L88W-104W, 6S-2N	0-25-31 & 32	2,5,6	—	Large radon anomaly associated mainly with greywackes and arkoses (McKim Formation?)
	L88W:10S	025-31 & 32	2	—	Sand overburden, also possibly related to arkoses at depth
	L88W:18S, L92W:14S, L100W:12S	as above	2,4,6	weak	Anomaly appears to be related mainly to types of overburden and possibly arkoses at depth
	L100W:22S	as above	2,6	5, (3)	Anomaly is related to arkoses at depth, and to fractured greywackes and quartzites of the Espanola Formation - note high scint. readings in breccia zone just north of radon anomaly

TABLE III

CORRELATION OF RADON GAS AND SCINTILLOMETER ANOMALIES

<u>Group</u>	<u>Location</u>	<u>Hand Number</u>	<u>Radon Anomaly</u>	<u>Scint. Anomaly</u>	<u>Comments</u>
J	L104W:L132W, 65-105	025-31 & 32	3,6	5 (ltd.)	Long anomaly occurring over quartzites intruded by diabase - may be due to remobilisation of uranium minerals during intrusion, and concentration of these near contacts - wet ground readings also possible in some areas
	L116W:16S,18S	as above	6	—	As above
	L116W:26S	as above	6,(7 ³)	5 (ltd.)	Associated with breccia zone in Mississagi quartzite—follows zone along strike to anomaly at 100W:22S
	L116W:2S, L120W:2S	as above	2,5	—	Caused by argillites, also related to sandy overburden
	L132W:14S	as above	6	weak	Due to radioactive minerals in quartzite, possibly concentrated by diabase intrusion
	L132W:22S	as above	2,6	—	Related to arkose, sand overburden
	L144W:42S	as above	3,6	—	May be due to radioactive minerals leached from arkose to north and redeposited in soil down in topographic low—also wet soil
		0-25-33,34			Group J in Shedden Twp. is characterized by numerous small, rather weak radon anomalies. Only a few are discussed here
	L176W:13S	as above	2	—	Sand anomaly
	L188W:37S	as above	2,3,5	—	May be due to faulting, likely an effect of overburden or possibly slightly radioactive argillites

TABLE III

CORRELATION OF RADON GAS AND SCINTILLOMETER ANOMALIES

<u>Group</u>	<u>Location</u>	<u>Map Number</u>	<u>Radon Anomaly</u>	<u>Scint. Anomaly</u>	<u>Comments</u>
J	L200W:3S	0-25-33,34	4,(6)	--	Clay soil, may be due to radioactive arkose at depth
K	L87E:7N,8N	0-25-37 & 38	2	--	May be related to faulting
	L90E:15N,17N	as above	5,3	--	Does not appear to be significant
	L72E:11N,9N	as above	2,6	--	May be fault related
	L74E:7N-10N	as above	3	--	Wet ground
	L74E:14N	as above	1	1	Granite
	L40E:2N	as above	6	--	Not significant
	L28E:4N	as above	6	--	No scint. anomaly over area of thin overburden - anomaly cuts across bedding, maybe related to faulting
	L20E:5N	as above	6	--	Fault related?
	L6W:12E	0-25-39 & 40	5	5	Long anomaly from 12W to 8N, centered on 8W - coincides with argillite
	L8W:6N	as above	6	weak	Not significant
	L8W:1S	as above	6,4	--	May extend to 4E
	L8W:7S	as above	4	--	Clay overburden
	L12W:9N	as above	2	--	Sand overburden
	L12W:2N	as above	2,3	--	Sand overburden, wet ground
	L24W:7S	as above	2	--	Sand overburden
	L28W:9N	as above	5	4	Slight radioactivity
	L32W:4N,6N	as above	2,4	--	Samples taken through clay layer giving high readings
	L32W:0	as above	2,4	--	As above
	L32W:2S	as above	2	--	Sand overburden
	L44W:9S-11S	as above	2,3,4	--	Wet clays, sand
	L48W:5S	as above	2	--	Sand overburden
	L52W:19N	as above	3,6	5	Some correlation between radon and scint.
	L52W:6S	as above	2	--	Sand
L52W:12S	as above	2	--	Sand	
L56W:9S	as above	3	--	Sand	

CONCLUSIONS

A synthesis of geological, scintillometer and radon gas surveys was successful in outlining numerous radioactive anomalies within the Espanola Project. Of these, five were considered to be of enough significance to warrant further detailed work. This work will cover claim no. 438660, 438661, 438662, 438663 and 438669 along the Espanola Formation quartzites (Centre J Group, Victoria Township), 438654, 438657 and 438659 over argillites and arkoses (also Centre J Group), 438638, 438645, 438646 and 438654 (West Centre J Group, Victoria Township), and 438698 and 438699 (Centre K Group, Shedden Township).

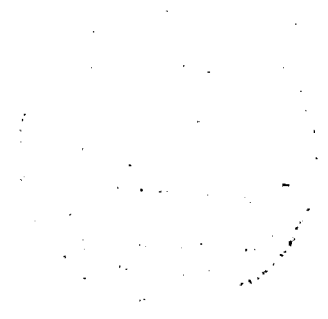
Respectfully submitted,

J. R. Foster

J. R. Foster

G. J. Hinso

G. J. Hinso, P. Eng.



CONCLUSIONS

A synthesis of geological, scintillometer, and radon gas surveys was successful in outlining numerous radioactive anomalies within the Espanola project. Of these five were considered significant enough to warrant further detailed work. This work will cover Claim no. 438660, 438661, 438662, 438663 and 438669 along the Espanola Formation (Group J, Victoria Township, Centre J Group)(map O-25-29); 438654, 438657 and 438659 over argillites and arkoses (also Centre J Group Map); 438638, 438645, 438646, and 438653 (West Centre J Group Map O-25-31, Victoria Township) and 438698 and 438699 (Centre K Group map, O-25-37, Shedden Township).

Respectfully submitted,

J R Foster

*Qualification
Not on record*

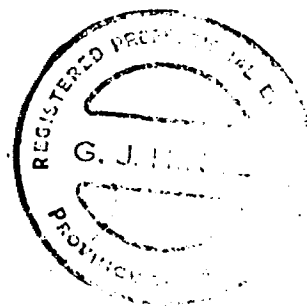
J. R. Foster

G. Huse

G. Huse, : : Eng.

Qualification

2.14.02



LIST OF REFERENCES

Barnes, F.Q., and Lalonde, D.J.

1973: Lower Huronian Stratigraphy, Hyman and Drury Township, Sudbury District; in Huronian Stratigraphy and Sedimentation, G.F. Young ed. Geol. Assoc. Canada Special Paper No. 12, 271 p.

Card, K.D., and Lalonen, P.A.

1976: Geology of the Dunlop - Shakespeare Area, District of Sudbury; Ontario Div. Mines, GR139, 52 p. Accompanied by Map No. 2313.

Robertson, J.A.

1965: Shedden Township and Part of T.R. No. 7, District of Algoma; Ontario Dept. Mines, Prelim. Geol. Map No. p.318, scale 1 inch to $\frac{1}{4}$ mile. Geology 1965.

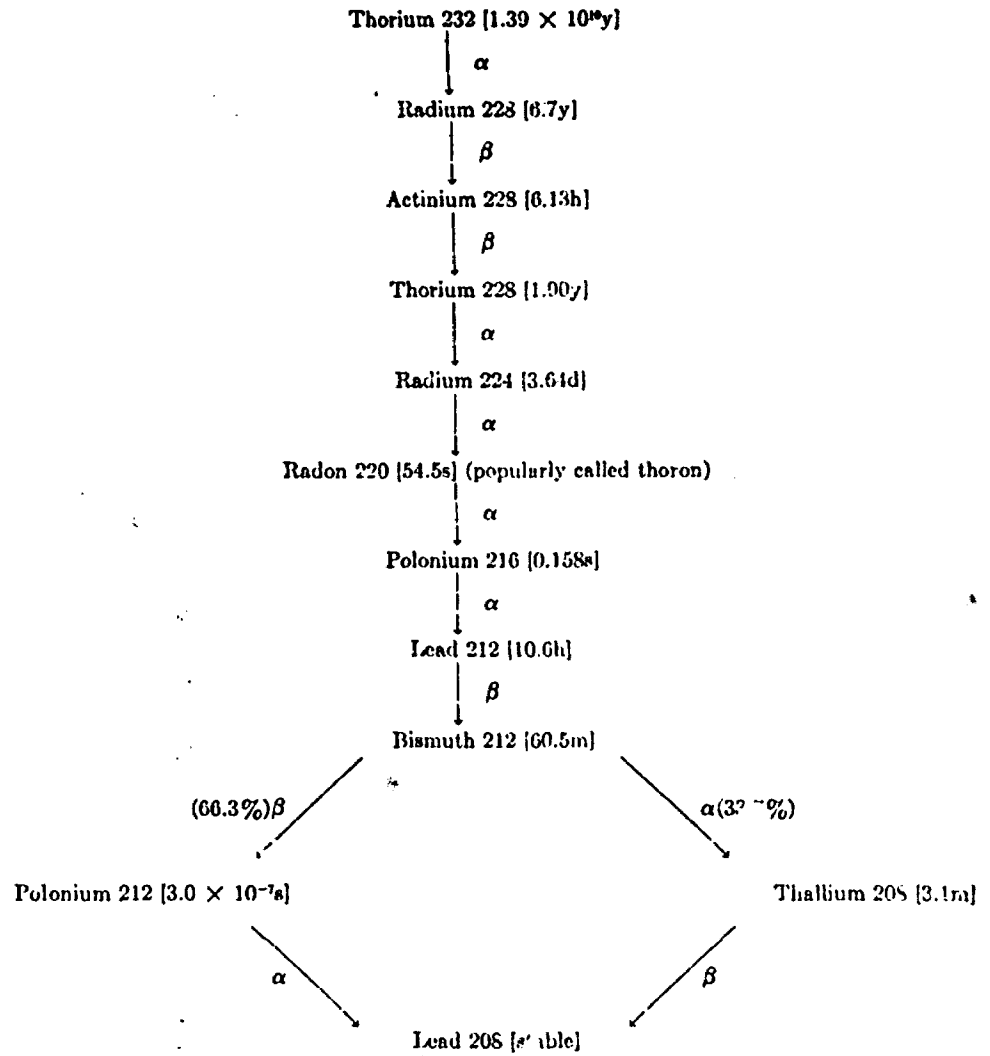
1976: Geology of the Massey Area, Districts of Algoma, Manitoulin, and Sudbury; Ontario Div. Mines, GR136, 130 p. Accompanied by Map No's. 2308, 2309 and 2 charts.

Roscoe, S.H.

1973: The Huronian Supergroup, a Paleoproterozoic Succession showing Evidence of Atmospheric Evolution; in Huronian Stratigraphy and Sedimentation, G.F. Young ed., Geol. Assoc. Canada Special Paper No. 12, 271 p.

ABSTRACT 1

Disintegration Series of Thorium

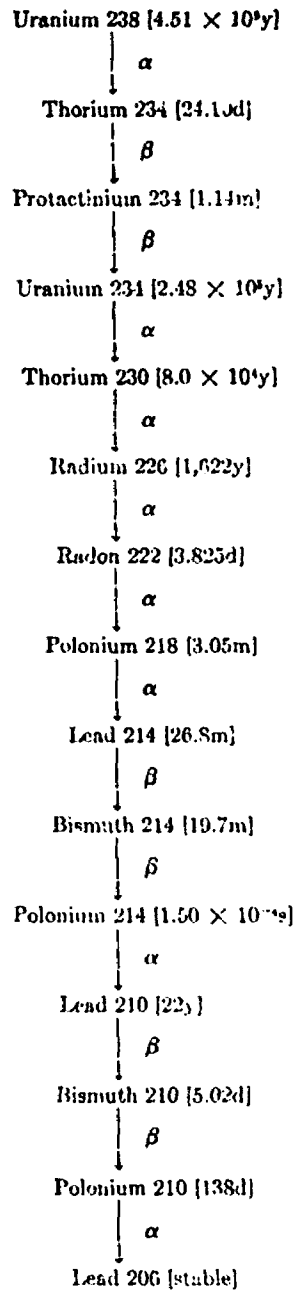


Reference: Canadian Deposits of Uranium and Thorium,
A.H. Lang, J.W. Griffith, H.R. Steacy,
Queen's Printer, Ottawa, Ontario; 1962.

ABSTRACT 2

Disintegration Series of Uranium 238

(Principal members only; isotopes constituting less than 0.2 per cent of the decay products are omitted)



Reference: Canadian Deposits of Uranium and Thorium,
 A.H. Lang, J.W. Griffith, H.R. Steacy,
 Queen's Printer, Ottawa, Ontario; 1962.



411055W9526 SHEDDEN 18 A1 SHEDDEN

900

Ministry of Natural Resources

File 2.2294
2.2094



GEOPHYSICAL - GEOLOGICAL - GEOCHEMICAL
TECHNICAL DATA STATEMENT

RECEIVED

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

AUG 16 1977

MINING LANDS SECTION

Type of Survey(s) Geological
 Township or Area Shedden Township
 Claim Holder(s) Kerr Addison Mines Limited
Box 91, Commerce Crt W., Toronto, Ont. M5L 1G7
 Survey Company Kerr Addison Mines Limited
 Author of Report G. J. Hinse
 Address of Author Box 1788, Espanola, Ont. POP 1C0
 Covering Dates of Survey Sept. 15 to Nov. 22, 1976
 (linecutting to office)
 Total Miles of Line Cut 33.4

MINING CLAIMS TRAVERSED	
List numerically	
SSM (prefix)	438289 (number)
SSM	438290
SSM	438291
SSM	438292
SSM	438293
SSM	438294
SSM	438295
SSM	438296
SSM	438297
SSM	438298
SSM	438299
SSM	438300
SSM	438301
SSM	438302
SSM	438303
SSM	438304
SSM	438305
SSM	438306
SSM	438307
SSM	438308
SSM	438309
SSM	438310
TOTAL CLAIMS <u>48</u>	

If space insufficient, attach list

<u>SPECIAL PROVISIONS</u> <u>CREDITS REQUESTED</u>	DAYS per claim
ENTER 40 days (includes line cutting) for first survey.	Geophysical
	- Electromagnetic _____
	- Magnetometer _____
	- Radiometric _____
	- Other _____
ENTER 20 days for each additional survey using same grid.	Geological <u>20</u>
	Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Nov. 22/76 SIGNATURE: G. Hinse
Author of Report or Agent

G. J. Hinse

Res. Geol. _____ Qualifications 9.1400 2.1400

Previous Surveys

File No.	Type	Date	Claim Holder

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing 400 feet

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: Fixed transmitter Shoot back In line Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

Base station value and location _____

Elevation accuracy _____

**INDUCED POLARIZATION
RESISTIVITY**

Instrument _____

Method Time Domain Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

CLAIM NO.

SSM 438311
SSM 438312
SSM 438313
SSM 438314
SSM 438315
SSM 438316
SSM 438317
SSM 438698
SSM 438699
SSM 438700
SSM 438701
SSM 438702
SSM 438703

CLAIM NO.

SSM 438704
SSM 438705
SSM 438706
SSM 438707
SSM 438708
SSM 438709
SSM 438710
SSM 438712
SSM 438713
SSM 438714
SSM 438715
SSM 438716
SSM 438717



Ministry of Natural Resources

GEOPHYSICAL - GEOLOGICAL - GEOCHEMICAL
TECHNICAL DATA STATEMENT

File 2.2294
2.2294

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FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

MINING LANDS SECTION

Type of Survey(s) Linecutting and Radon Gas Survey
Township or Area Sibbden Township
Claim Holder(s) Kerr Addison Mines Limited
P.O. Box 91, Commerce Crt W., Toronto M5L 1C7
Survey Company Kerr Addison Mines Limited
Author of Report G. J. Hinse
Address of Author Box 1788, Espanola, Ont. POP 1C0
Covering Dates of Survey Sept. 15 to Nov. 22, 1976
(linecutting to office)
Total Miles of Line Cut 33.4

MINING CLAIMS TRAVERSED
List numerically

SSM	438289
(prefix)	(number)
SSM	438290
SSM	438291
SSM	438292
SSM	438293
SSM	438294
SSM	438295
SSM	438296
SSM	438297
SSM	438298
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SSM	438302
SSM	438303
SSM	438304
SSM	438305
SSM	438306
SSM	438307
SSM	438308
SSM	438309
SSM	438310

SPECIAL PROVISIONS
CREDITS REQUESTED

DAYS
per claim

ENTER 40 days (includes
line cutting) for first
survey.

ENTER 20 days for each
additional survey using
same grid.

Geophysical _____
 -Electromagnetic _____
 -Magnetometer _____
 -Radiometric _____
 -Other Radon Gas 40
 Geological _____
 Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Nov. 22/76 SIGNATURE: _____
Author of Report or Agent

G. J. Hinse

Res. Geol. L.D Qualifications G. Hinse 9.1402
2.1402

Previous Surveys

File No. Type Date Claim Holder

File No.	Type	Date	Claim Holder

TOTAL CLAIMS 48

OFFICE USE ONLY

If space insufficient, attach list

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS -- If more than one survey, specify data for each type of survey

Number of Stations 1696 Number of Readings 1706
Station interval 100 feet and 50 feet Line spacing 400 feet
Profile scale
Contour interval 50 counts per minute

MAGNETIC

Instrument
Accuracy - Scale constant
Diurnal correction method
Base Station check-in interval (hours)
Base Station location and value

ELECTROMAGNETIC

Instrument
Coil configuration
Coil separation
Accuracy
Method: [] Fixed transmitter [] Shoot back [] In line [] Parallel line
Frequency (specify V.L.F. station)
Parameters measured

GRAVITY

Instrument
Scale constant
Corrections made
Base station value and location
Elevation accuracy

INDUCED POLARIZATION RESISTIVITY

Instrument
Method [] Time Domain [] Frequency Domain
Parameters - On time Frequency
- Off time Range
- Delay time
- Integration time
Power
Electrode array
Electrode spacing
Type of electrode

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

Corrections made _____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth - include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____ Radon Gas Survey

Instrument _____ EDA Electronics Portable Radon Detector RD - 200

Accuracy _____

Parameters measured _____ Decay products of Uranium 238 and Thorium 232 (Radon 222 and Radon 220 respectively)

Additional information (for understanding results) Radon gas measured in counts per minute

AIRBORNE SURVEYS

Type of survey(s) _____

Instrument(s) _____

(specify for each type of survey)

Accuracy _____

(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____



Ministry of Natural Resources

File 2.2296

GEOPHYSICAL - GEOLOGICAL - GEOCHEMICAL
TECHNICAL DATA STATEMENT

RECEIVED

AUG 16 1977

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC. MINING LANDS SECTION

Type of Survey(s) Scintillometer
Township or Area Shedden Township
Claim Holder(s) Kerr Addison Mines Limited
Box 91, Commerce Crt W, Toronto, Ont. M5L 1C7
Survey Company Kerr Addison Mines Limited
Author of Report G. J. Hinse
Address of Author Box 1788, Espanola, Ont. POP 1C0
Covering Dates of Survey Sept. 15 - Nov. 22, 1976
(linecutting to office)
Total Miles of Line Cut 33.4

MINING CLAIMS TRAVERSED	
List numerically	
SSM (prefix)	438289 (number)
SSM	438290
SSM	438291
SSM	438292
SSM	438293
SSM	438294
SSM	438295
SSM	438296
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SSM	438303
SSM	438304
SSM	438305
SSM	438306
SSM	438307
SSM	438308
SSM	438309
SSM	438310
TOTAL CLAIMS	<u>48</u>

If space insufficient, attach list

<u>SPECIAL PROVISIONS</u> <u>CREDITS REQUESTED</u>	DAYS per claim
ENTER 40 days (includes line cutting) for first survey.	Geophysical - Electromagnetic _____ - Magnetometer _____ - Radiometric <u>20</u> - Other _____
ENTER 20 days for each additional survey using same grid.	Geological _____ Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Nov. 22/76 SIGNATURE: G. Hinse
Author of Report or Agent

G. J. Hinse

Res. Geol. _____ Qualifications 2.1402 2.1402

Previous Surveys

File No.	Type	Date	Claim Holder

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS -- If more than one survey, specify data for each type of survey

7

Number of Stations 1696 Number of Readings 1706

Station interval 100 feet and 50 feet Line spacing 400 feet

Profile scale _____

Contour interval 50 counts per minute.

MAGNETIC

Instrument _____

Accuracy - Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: Fixed transmitter Shoot back In line Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

Base station value and location _____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method Time Domain Frequency Domain

Parameters -- On time _____ Frequency _____

-- Off time _____ Range _____

-- Delay time _____

-- Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

Corrections made _____

RADIOMETRIC

Instrument Exploranium GRS 101 Gamma-ray scintillometer

Values measured Total counts (all energy above 0.05 Mev)

Energy windows (levels) K40: 1.46 Mev; Bi214: .608 to 2.44 Mev; Th208: .277 to 2.62 Mev

Height of instrument Waist Level Background Count 30 cps

Size of detector Crystal 1.25 inch X 1 inch

Overburden Varying thickness and lithology
(type, depth - include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

Additional information (for understanding results) _____

AIRBORNE SURVEYS

Type of survey(s) _____

Instrument(s) _____
(specify for each type of survey)

Accuracy _____
(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____

W/SHEDDEN
(SCINT)

CLAIM NO.

SSM 438311
SSM 438312
SSM 438313
SSM 438314
SSM 438315
SSM 438316
SSM 438317
SSM 438698
SSM 438699
SSM 438700
SSM 438701
SSM 438702
SSM 438703

CLAIM NO.

SSM 438704
SSM 438705
SSM 438706
SSM 438707
SSM 438708
SSM 438709
SSM 438710
SSM 438712
SSM 438713
SSM 438714
SSM 438715
SSM 438716
SSM 438717



Ministry of Natural Resources

File 2.2294

GEOPHYSICAL - GEOLOGICAL - GEOCHEMICAL
TECHNICAL DATA STATEMENT

RECEIVED

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

AUG 16 1977

MINING LANDS SECTION

Type of Survey(s) Geological
Township or Area Shakespeare, Gough, Salter, Victoria Twp
Claim Holder(s) Kerr Addison Mines Limited
Box 91, Commerce Crt. W., Toronto, Ont. M5L 1B7
Survey Company Kerr Addison Mines Limited
Author of Report G. J. Hinse & J. Foster
Address of Author P. O. Box 1788, Espanola, Ont. POP 1C0
Covering Dates of Survey Sept. 15 to Nov. 22, 1976
(linecutting to office)
Total Miles of Line Cut 33.9

MINING CLAIMS TRAVERSED
List numerically

S	433950
(prefix)	(number)
S	433951
S	438203
S	438204
S	438207
S	438209
S	438210
S	438213
S	438214
S	438217
S	438399
S	438400
S	438401
S	438402
S	438407
S	438408
S	438409
S	438410
S	438633
S	438634
S	438635
S	438636
TOTAL CLAIMS <u>59</u>	

If space insufficient, attach list

SPECIAL PROVISIONS CREDITS REQUESTED	DAYS per claim
ENTER 40 days (includes line cutting) for first survey.	Geophysical
ENTER 20 days for each additional survey using same grid.	-Electromagnetic _____
	-Magnetometer _____
	-Radiometric _____
	-Other _____
	Geological <u>20</u>
	Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Nov. 23, 1976 SIGNATURE: G. Hinse
Author of Report or Agent
G. J. HINSE

Res. Geol. _____ Qualifications 2-1402 2-1402

Previous Surveys

File No.	Type	Date	Claim Holder

MINING LANDS SECTION

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS - If more than one survey, specify data for each type of survey

Number of Stations _____ **Number of Readings** _____

Station interval _____ **Line spacing** 400 feet

Profile scale _____

Contour interval _____

MAGNETIC

Instrument _____

Accuracy - Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: Fixed transmitter Shoot back In line Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

Base station value and location _____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method Time Domain Frequency Domain

Parameters - On time _____ **Frequency** _____

-- **Off time** _____ **Range** _____

-- **Delay time** _____

-- **Integration time** _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

W/S HARKESPEAR, GOMH
SALTER, VICTORIA
(6504)

Claim No.

S 438637
S 438638
S 438639
S 438644
S 438645
S 438646
S 438647
S 438652
S 438653
S 438654
S 438655
S 438656
S 438657

Claim No.

S 438658
S 438659
S 438660
S 438661
S 438662
S 438663
S 438664
S 438665
S 438667
S 438668
S 438669
S 438766

Claim No.

S 438767
S 438772
S 438773
S 438774
S 438775
S 438776
S 438919
S 438920
S 438921
S 438922
S 438923
S 438924

2.2294
3.2294

File

Ministry of Natural Resources



GEOPHYSICAL - GEOLOGICAL - GEOCHEMICAL
TECHNICAL DATA STATEMENT

RECEIVED

AUG 16 1977

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS

MINING LANDS SECTION

Type of Survey(s) Scintillometer
Township or Area Shakespeare, Gough, Salter, Victoria Twp
Claim Holder(s) Kerr Addison Mines Limited
P. O. Box 91, Commerce Crt W, Toronto, Ont.
Survey Company Kerr Addison Mines Limited
Author of Report G. Hinse & J. Foster
Address of Author P. O. Box 1788, Espanola, Ont. POP 100
Covering Dates of Survey Sept. 15 to Nov. 22, 1976
(linecutting to office)
Total Miles of Line Cut 33.9

MINING CLAIMS TRAVERSED	
List numerically	
S	433950
(prefix)	(number)
S	433951
S	438203
S	438204
S	438207
S	438209
S	438210
S	438213
S	438214
S	438217
S	438399
S	438400
S	438401
S	438402
S	438407
S	438408
S	438409
S	438410
S	438633
S	438634
S	438635
S	438636
TOTAL CLAIMS 59	

If space insufficient, attach list

SPECIAL PROVISIONS CREDITS REQUESTED	DAYS per claim
Geophysical	
--Electromagnetic	
--Magnetometer	
--Radiometric	20
--Other	
Geological	
Geochemical	

ENTER 40 days (includes line cutting) for first survey.
ENTER 20 days for each additional survey using same grid.

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: Nov. 23, 1976 SIGNATURE: G. Hinse
Author of Report or Agent
G. J. Hinse

Res. Geol. _____ Qualifications 2.1402 (2.1402)

File No.	Type	Date	Claim Holder

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA.

GROUND SURVEYS - If more than one survey, specify data for each type of survey

Number of Stations 2279 Number of Readings 1427

Station interval 100 feet and 50 feet over anomalies Line spacing 100 feet

Profile scale _____

Contour interval 25 counts per second

MAGNETIC

Instrument _____

Accuracy - Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: Fixed transmitter Shoot back In line Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

Base station value and location _____

Elevation accuracy _____

INDUCED POLARIZATION
RESISTIVITY

Instrument _____

Method Time Domain Frequency Domain

Parameters - On time _____ Frequency _____

- Off time _____ Range _____

- Delay time _____

- Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

Corrections made _____

RADIOMETRIC

Instrument Exploranium GRS 101 Gamma Ray Scintillometer

Values measured Total counts (all energy above 0.05 Mev)

Energy windows (levels) K40 1.46 Mev; Bi214 0.608 to 2.44 Mev; Th208 .277 to 2.62 Mev

Height of instrument Waist Level Background Count .30 cps

Size of detector Crystal 1.25" diameter x 1"

Overburden Varying thickness

(type, depth - include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

Additional information (for understanding results) _____

AIRBORNE SURVEYS

Type of survey(s) _____

Instrument(s) _____

(specify for each type of survey)

Accuracy _____

(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____

W/SHAKESPEARE, GUNN,
SALTER, VICTORIA
(SCINT)

Claim No.

- S 438637
- S 438638
- S 438639
- S 438644
- S 438645
- S 438646
- S 438647
- S 438652
- S 438653
- S 438654
- S 438655
- S 438656
- S 438657

Claim No.

- S 438658
- S 438659
- S 438660
- S 438661
- S 438662
- S 438663
- S 438664
- S 438665
- S 438667
- S 438668
- S 438669
- S 438766

Claim No.

- S 438767
- S 438772 ✓
- S 438773
- S 438774
- S 438775
- S 438776
- S 438919
- S 438920
- S 438921
- S 438922
- S 438923
- S 438924



Ontario

Ministry of Natural Resources

GEOPHYSICAL - GEOLOGICAL - GEOCHEMICAL
 TECHNICAL DATA STATEMENT

RECEIVED

AUG 16 1977

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
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 TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

MINING LANDS SECTION

Type of Survey(s) Radon Gas Survey
 Township or Area Shakespeare, Gough, Salter, Victoria Twp.
 Claim Holder(s) Kerr Addison Mines Limited
P.O. Box 91, Commerce Crt W., Toronto, M5L 1C7
 Survey Company Kerr Addison Mines Limited
 Author of Report G. Hinse and J. Foster
 Address of Author P. O. Box 1788, Espanola, Ont.
 Covering Dates of Survey Sept. 15 to Nov. 22, 1976 POP 100
 (linecutting to office)
 Total Miles of Line Cut 33.9

MINING CLAIMS TRAVERSED
 List numerically

S	433950
(prefix)	(number)
S	433951
S	438203
S	438204
S	438207
S	438209
S	438210
S	438213
S	438214
S	438217
S	438399
S	438400
S	438401
S	438402
S	438407
S	438408
S	438409
S	438410
S	438633
S	438634
S	438635
S	438636

SPECIAL PROVISIONS
CREDITS REQUESTED

DAYS
 per claim

ENTER 40 days (includes
 line cutting) for first
 survey.

ENTER 20 days for each
 additional survey using
 same grid.

- Geophysical _____
- Electromagnetic _____
- Magnetometer _____
- Radiometric _____
- Other Radon Gas 40
- Geological _____
- Geochemical _____

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
 (enter days per claim)

DATE: Nov. 23, 1976 SIGNATURE: G. Hinse
 Author of Report or Agent

G. Hinse

Res. Geol. _____ Qualifications 2.1402 2.1402

Previous Surveys

File No.	Type	Date	Claim Holder

TOTAL CLAIMS 59

OFFICE USE ONLY

If not sufficient attach list

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS - If more than one survey, specify data for each type of survey

Number of Stations 2356 Number of Readings 2448

Station interval 100 feet and 50 feet over anomalies Line spacing 400 feet

Profile scale _____

Contour interval 50 counts per minute

MAGNETIC

Instrument _____

Accuracy - Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

ELECTROMAGNETIC

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: Fixed transmitter Shoot back In line Parallel line

Frequency _____

(specify V.L.F. station)

Parameters measured _____

GRAVITY

Instrument _____

Scale constant _____

Corrections made _____

Base station value and location _____

Elevation accuracy _____

INDUCED POLARIZATION RESISTIVITY

Instrument _____

Method Time Domain Frequency Domain

Parameters -- On time _____ Frequency _____

-- Off time _____ Range _____

-- Delay time _____

-- Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

Corrections made _____

RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth -- include outcrop map)

OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey Radon Gas survey

Instrument Portable radon detector, model RD-200

Accuracy _____

Parameters measured Decay products of uranium 238 and thorium 232

(Radon 222 and radon 220 respectively)

Additional information (for understanding results) Radon gas measured in counts per minute

AIRBORNE SURVEYS

Type of survey(s) _____

Instrument(s) _____

(specify for each type of survey)

Accuracy _____

(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____

W/SHAKESPEARE, GUNN,
SALTER, VICTORIA
(RADON ON
SU)

Claim No.

S 438637
S 438638
S 438639
S 438644
S 438645
S 438646
S 438647
S 438652
S 438653
S 438654
S 438655
S 438656
S 438657

Claim No.

S 438658
S 438659
S 438660
S 438661
S 438662
S 438663
S 438664
S 438665
S 438667
S 438668
S 438669
S 438766

Claim No.

S 438767
S 438772 ✓
S 438773
S 438774
S 438775
S 438776
S 438919
S 438920
S 438921
S 438922
S 438923
S 438924

DEAGLE TP. M. 750

TOWNSHIP

2.2294

SHEDDEN

DISTRICT

1"=40 CH
ALGOMA

MINING DIVISION

SAULT STE. MARIE

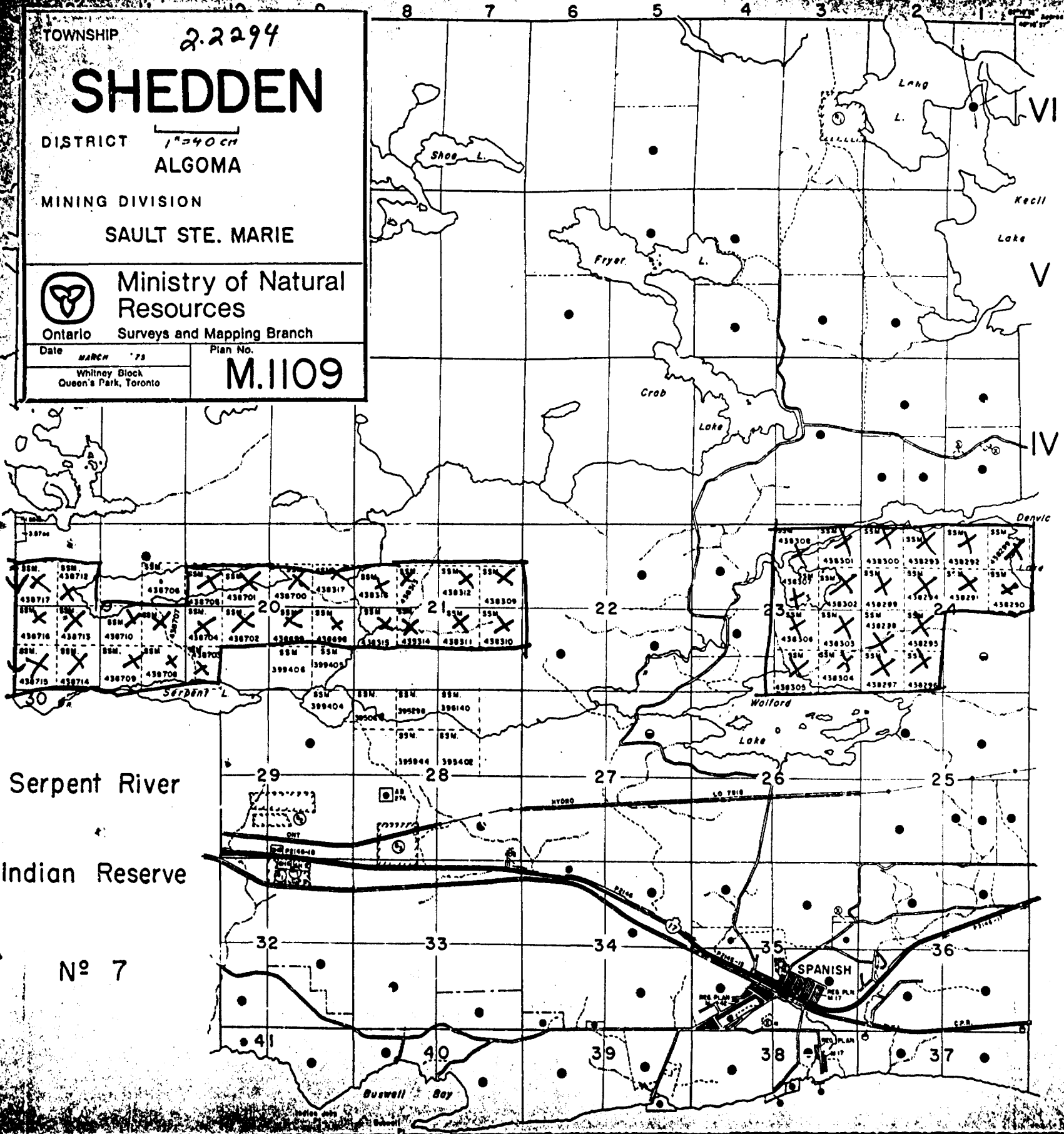


Ministry of Natural Resources
Ontario Surveys and Mapping Branch

Date MARCH '73
Whitney Block
Queen's Park, Toronto

Plan No.
M.1109

LEWIS TP. M. 988



VICTORIA TP. M. 1172

TWP. 129 M. 1208

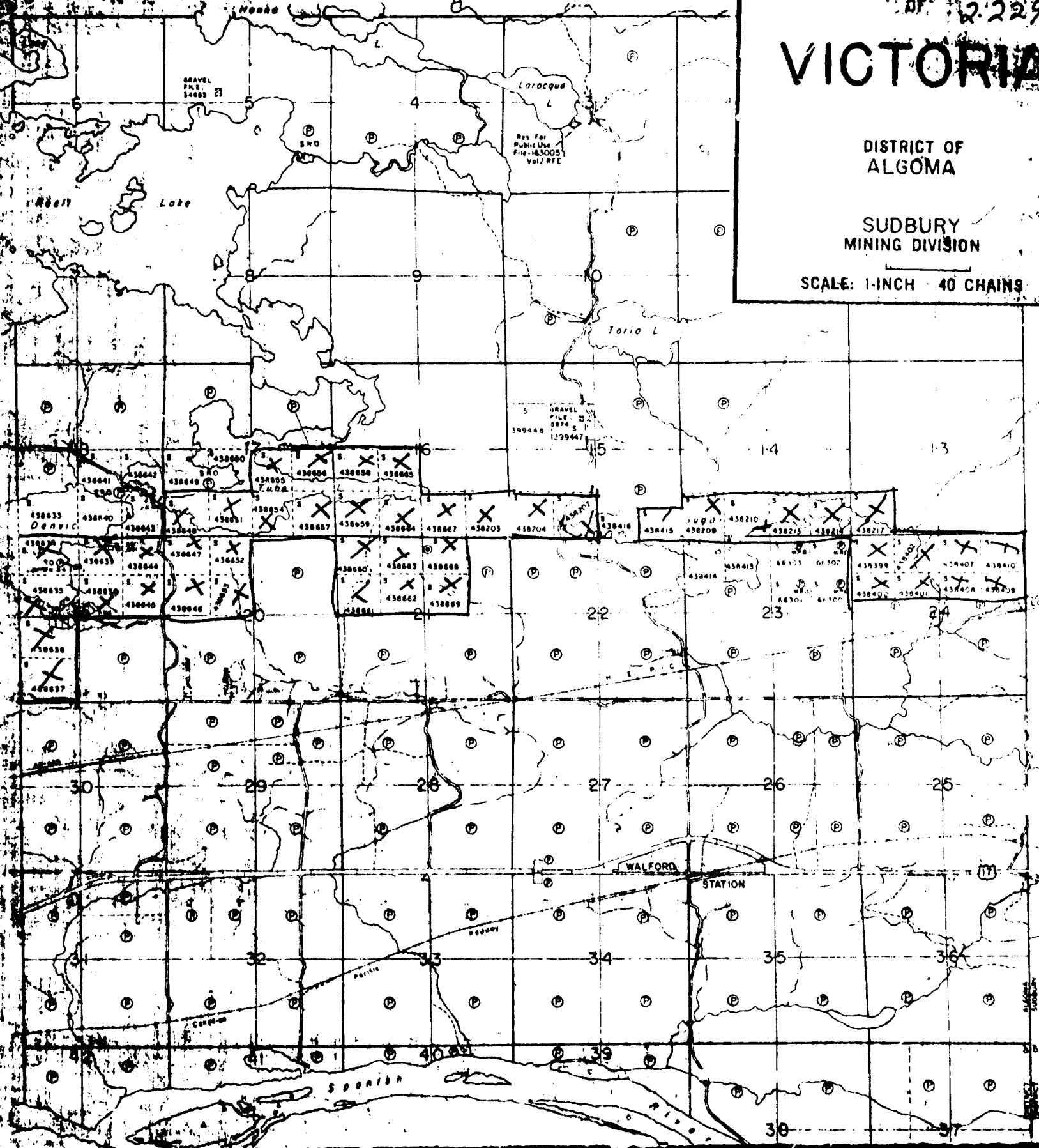
THE TOWNSHIP OF
VICTORIA
OF 2294

VICTORIA

DISTRICT OF
ALGOMA

SUDBURY
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS



SALTER TWP. M. 1087

TENNYSON TP. M.1155

COUGH TP

TOWNSHIP OF **2.2294**
SALTER

DISTRICT OF
SUDBURY
SUDBURY
MINING DIVISION

SCALE : 1 INCH = 40 CHAINS (1/2 MILE)

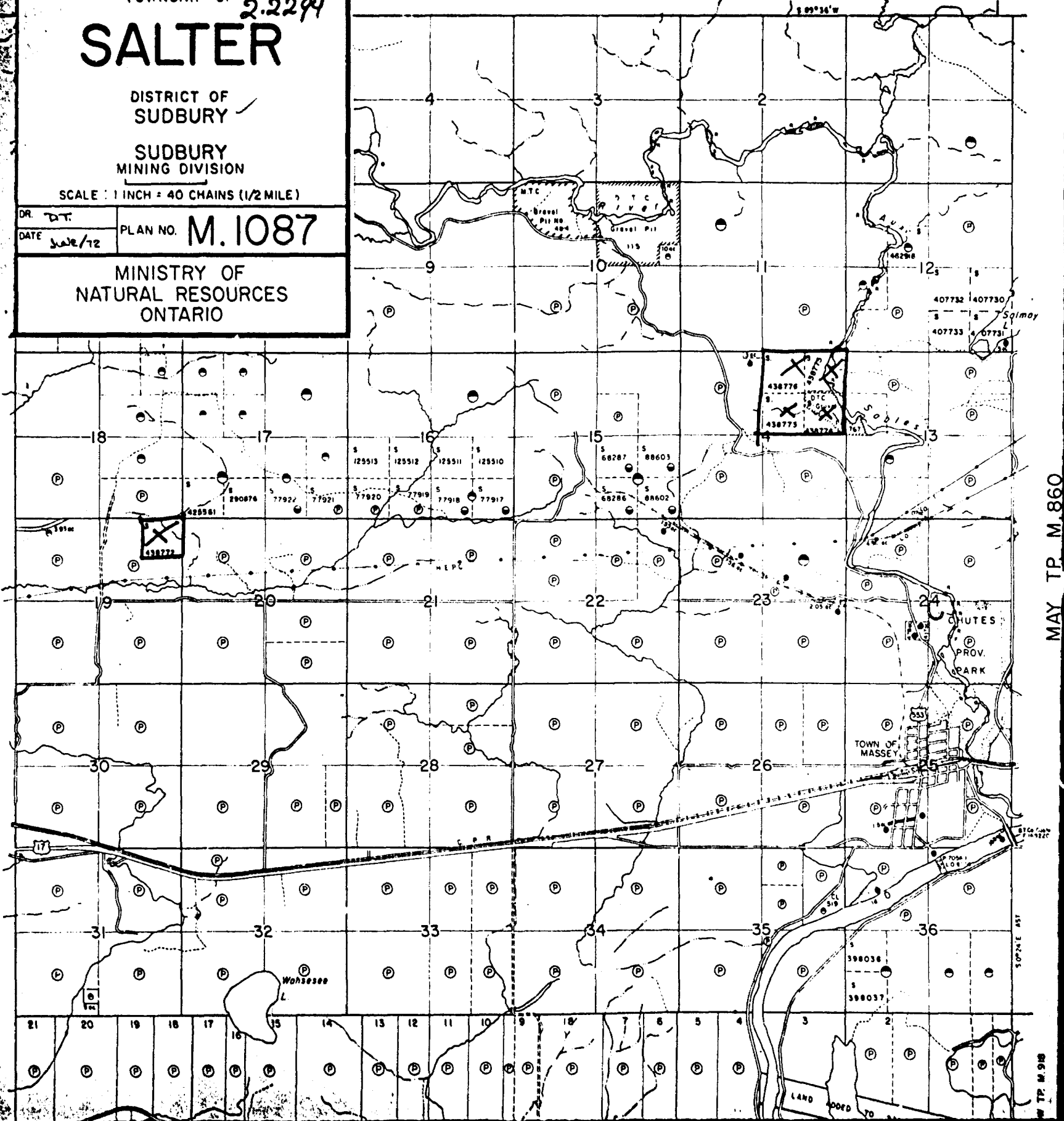
DR. D.T.
DATE June/12

PLAN NO. **M.1087**

MINISTRY OF
NATURAL RESOURCES
ONTARIO

VICTORIA TP. M.1172

MAY TP. M.860



TP. M.918

THE TOWNSHIP
OF 2.2294
GOUGH

DISTRICT OF
SUDBURY

SUDBURY
MINING DIVISION

SCALE: 1-INCH=40 CHAINS

1/2 DIVISION

ANNEX

Jenavson Twp

Shakespeare Twp

VI

V

IV

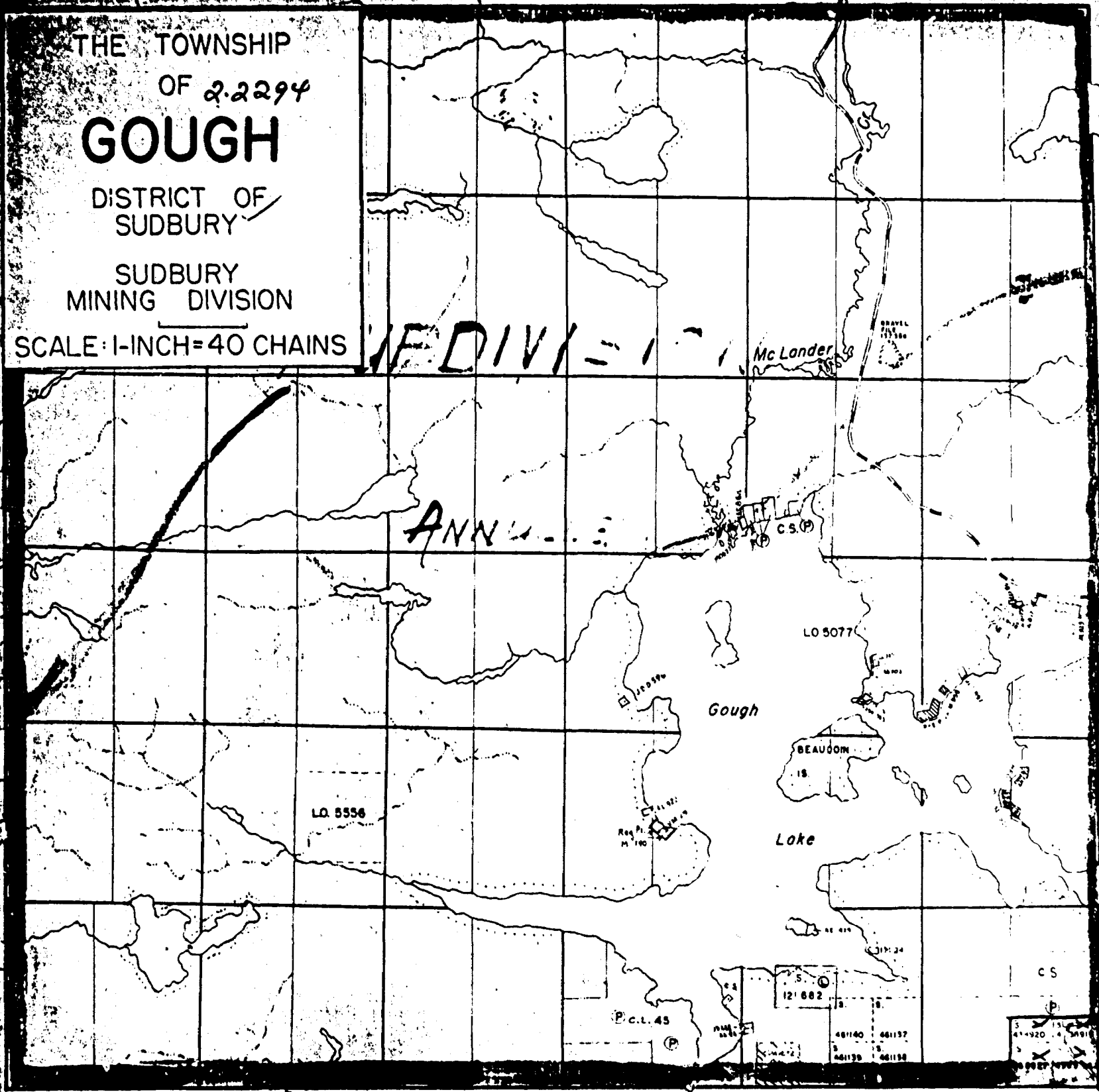
III

II

I

12 11 10 9 8 7 6 5 4 3 2 1

May Twp



Dunlop Twp. (M.771)

THE TOWNSHIP
OF 2.2294
SHAKESPEARE

DISTRICT OF
SUBBURY

SUBBURY
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

Agnew

VI

V

IV

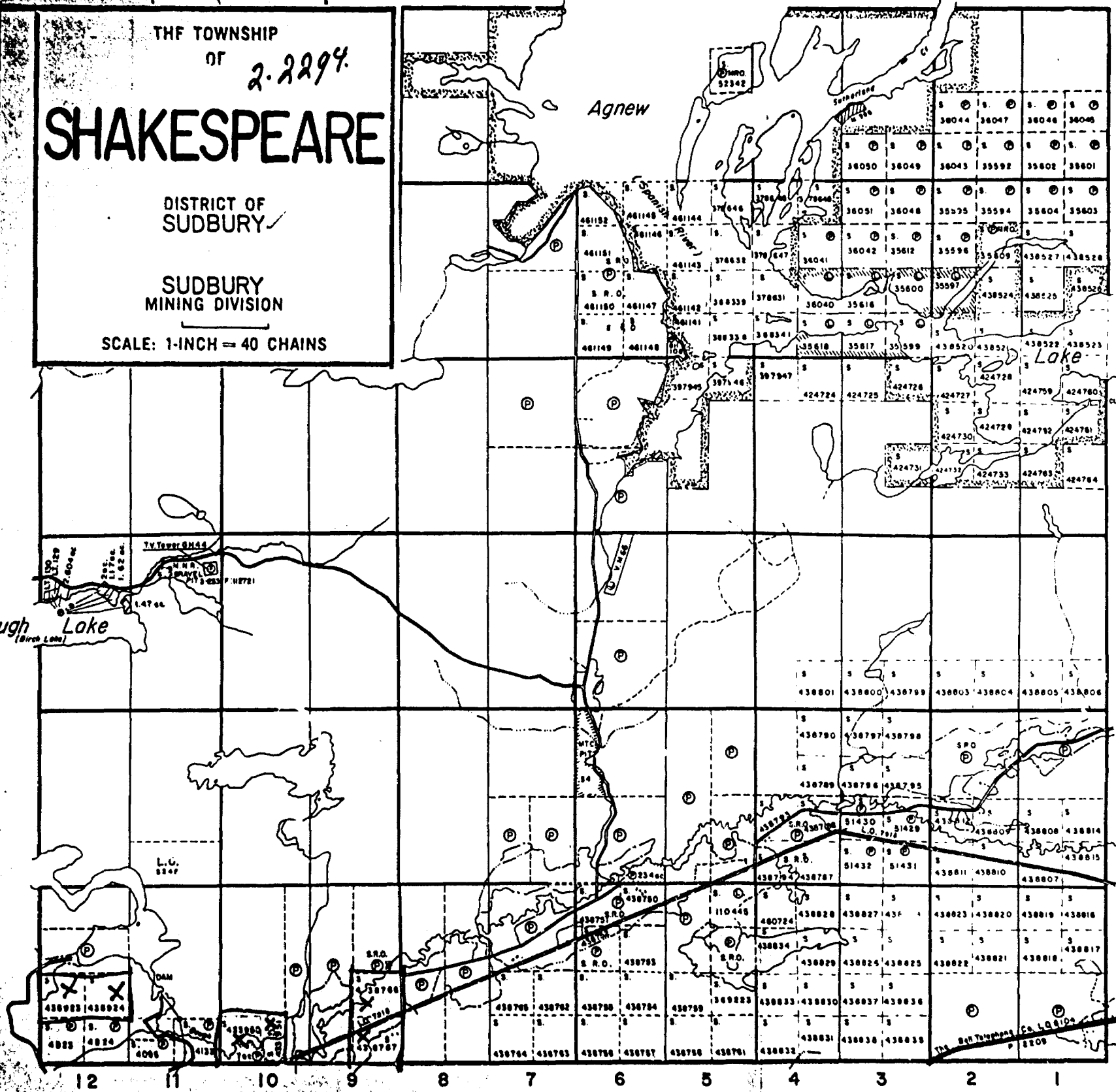
III

II

I

Gough Twp. (M.890)

Baldwin Twp. (M.645)



Hallam Twp. (M.909)

