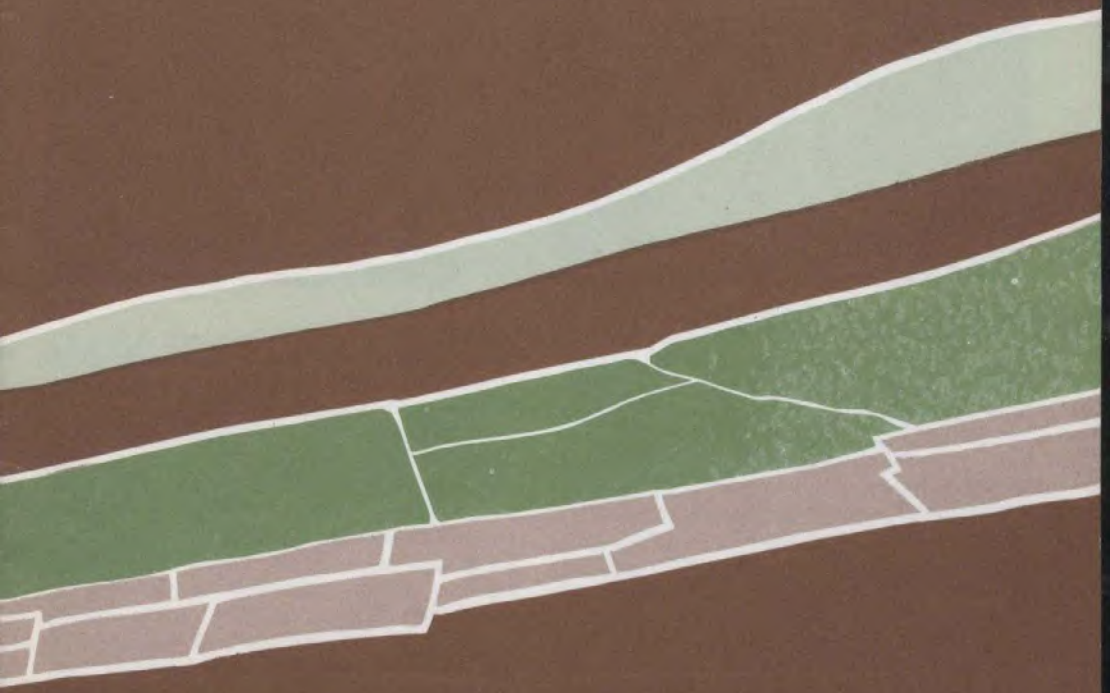
PROSPECTS FOR Kirkland Lake



GEOSCIENTIFIC SURVEYS

A Canada—Ontario Cost-Shared Program

Historical Note

Gold was first discovered in the Kirkland Lake area in 1906 near Swastika and Larder Lake, but the camp really began in 1911 when W.H. Wright made the find that became the Wright-Hargreaves Mine. The development of mines resulting from this and later discoveries in the next 30 years created the economic base of Kirkland Lake and the towns along the gold belt. In turn, the mines and settlements provided markets for agricultural and lumbering enterprises in the area. At the peak of mine production in the late 1930s, Kirkland Lake had 25,000 inhabitants, almost double its present population.

The significant gold producers were Macassa, Kirkland Lake Gold, Teck-Hughes, Lake Shore, Wright-Hargreaves, Sylvanite and Toburn at Kirkland Lake; Omega, Chesterville and Kerr Addison near Larder Lake; and Upper Canada between the two areas. Macassa and Kerr Addison are still operating.

The spectacular production of the Kirkland Lake Camp — 23 million ounces of gold valued at $737 million from 53 million tons of ore — tend to mask the difficult beginnings of all the mines. Success was not instant. Each property had its own intriguing story, but all required hard work of many people — prospectors, developers, industrialists and others — whose only encouragement was the modest success on neighbouring properties.

Because of new geoscientific concepts and techniques, there is every likelihood that new mineral deposits will be found in the Kirkland Lake area, and that determined people will make mines out of them.

Kirkland Lake Initiatives Program

The economic future of Kirkland Lake depends on a healthy and expanding mining industry.

But that industry has been declining in recent years.

The question: How do we reverse the decline?

The answer: Geoscientific surveys to stimulate exploration and mine discovery by private industry.

The Kirkland Lake Economic Development Commission has studied the problem and recommended a comprehensive geoscientific survey program . . . the Kirkland Lake Initiatives Program (KLIP), a $2.5 million, five-year program ending in 1983.

KLIP — the most sophisticated group of surveys yet undertaken — would not have been possible without joint funding by the federal and provincial governments. Through the 1974 Canada-Ontario General Development Agreement, both governments participate in the cost of long-term development programs such as this.

KLIP is sponsored by the federal Department of Regional Economic Expansion and the Ontario Ministry of Northern Affairs under the Community and Rural Resource Development Subsidiary Agreement.

The Ontario Geological Survey of the Ontario Ministry of Natural Resources has been appointed to design and carry out the program:

- KLIP will outline high-priority targets to promote gold, base metal and uranium exploration.
- KLIP will locate and define sand and gravel and other aggregate deposits.
- KLIP will provide essential information for land-use planning.
- KLIP will deliver a continuous flow of data to stimulate private exploration now and beyond 1983.

Gold Belt

The Kirkland-Larder Lake area is still a good place to look for gold. KLIP will use advanced exploration techniques and apply new geological concepts to outline rock formations where gold deposits are most likely to be found. It will employ geological mapping, drilling and geochemical sampling of glacial material to find evidence of bedrock gold occurrences in areas covered by heavy glacial deposits.

More than 60 years of successful prospecting and mining followed the recognition of the association of gold deposits with the Kirkland-Larder Lake Break (a major fault structure) and a flanking belt of sedimentary and volcanic rocks known as the Timiskaming Group.

The work of the provincial government's Ontario Geological Survey in the past few years has shown that gold mineralization occurs in specific rock units within the Timiskaming Group. When identified and outlined by detailed geological mapping, these particular rock types will be prime exploration targets.

Beginning in 1979 and continuing for the next three years, a 96-by-16 kilometre (about 60-by-10 mile) area will be covered by detailed geological mapping. The first work, in the Larder Lake area, will determine the boundaries of the Timiskaming Group and outline favorable gold-bearing horizons. It will distinguish the group from an older volcanic rock sequence that may have base metal potential (copper, zinc and lead), rather than gold, potential.

Beginning in 1980, a three-year gold deposit study will be undertaken in the immediate area of Kirkland Lake to

determine the relationship of gold deposits to particular rock units and rock fractures. This study will help to pick out high-potential areas for exploration.

Gold occurrences, being generally small and unidentifiable by remote sensing techniques, are extremely difficult to find in areas of debris (overburden) left by glaciers. Glacial scouring scatters gold and other metals from their bedrock source into the bottom layer of glacial debris (the basal till), often in minute amounts spread over a wide area. Sampling and analysis of the basal till can direct exploration to the bedrock source of the metals.

In the past decade, drilling methods have been developed to sample basal till and they are used extensively in prospecting glaciated areas.

Lightweight portable equipment is used ot sample glacial overburden up to 12 metres (40 feet) deep, usually around known mineral occurrences and geophysical indications.

Where the overburden is thicker, reverse-circulation rotary drills are used. These are heavy-duty rigs mounted on tracked vehicles. The dual-tube system of the drill produces a continuous, uncontaminated sample of the entire sequence of glacial deposits, and a few feet of the underlying bedrock. Thus, these samples provide pertinent information on the glacial materials and the bedrock geology.

During the 1979 field season, about 60 holes are being drilled with the heavy-duty rig in Catherine, Skead, Marter, McElroy Hearst and Bayly Townships in the southeastern part of the area. In the following years, an average of 15 holes per township will be drilled throughout the project area at the rate of four to six townships a year.

At the same time, minerals dispersed by glacial scouring (around known mineral occurrences and ore deposits) will be tested with lightweight sampling equipment. The results will be used to control the larger drilling project and help in interpreting assay data from basal till samples collected in unknown areas.

Base Metal Potential

Although historically a gold camp, geologically the Kirkland Lake area has good copper, zinc and lead potential, and a major portion of KLIP work will be aimed at stimulating exploration for these base metals.

The detection of sulphide mineralization (of base metals) by geophysical means depends on the sulphides' natural magnetism and ability to conduct electricity. The measurement of these properties with magnetometers and electromagnetic instruments provides data on the location, size, attitude and possible nature of a deposit. From the electrical response, it is often possible to distinguish between graphite and sulphide mineralization but, unfortunately, not between economic and non-economic sulphide deposits.

Magnetic and electromagnetic geophysical equipment works as well on the ground as in the air, but the airborne method is a fast, efficient and economical way to survey large areas. Airborne surveys measure the magnetic and electrical properties of the bedrock over wide ranges, and this helps in the general interpretation of the geology of the area.

An airborne electromagnetic survey of about 24 townships was completed early in 1979, and the results will be released as soon as the maps are prepared. The spacing between flight lines on the survey was 200 metres (660 feet) and the terrain clearance was 120 metres (400 feet). Flight line direction varied so as to cross the trend of the rock formation as close to right angles as possible.

The areas of strong electrical and magnetic response — the electrical conductors — detected by the survey are depicted on township maps. These maps show at a glance the location of the conductor, the intensity of conductivity and the magnetic correlation if any. The map symbols reveal the electrical characteristics, magnetic correlations and peak magnetic intensities of conductors, and provide a means of comparing conductors. A single sulphide deposit may be shown by a response on one flight or by a series of indications on several adjoining lines, depending on its length.

By combining geophysical survey information with other geoscientific data, priorities for staking and follow-up can be given to the conductive areas — or as they are called by geophysicists, "anomalies".

Basal till sampling is a useful tool in base metal as well as gold exploration, and in future the location of overburden drilling will be governed to some extent by the airborne electromagnetic results. This will apply particularly to areas of heavy overburden where the evaluation of conductors is difficult. Basal till sampling near the conductors should serve to establish target priorities for diamond drilling by the exploration industry.

Competition for the locations of both electromagnetic and basal till anomalies is expected to be keen on the day the results are released, with a host of stakers awaiting the releases, each anxious to be the first to reach and stake the best anomalies. All survey information will be published, and all releases will be advertised well in advance of the release dates.

Uranium Study

A study will be made of the uranium resource potential to determine if further work is warranted. The Ministry study will follow release of the results of an airborne survey, that measured radioactivity, under the Federal-Provincial Uranium Reconnaissance Program. It will include known uranium occurrences, their host rocks and their relationship to features of the regional geology.

Field work will start in 1981. If exploration for uranium is warranted, further work will be done in 1982 to establish geological guidelines to ensure maximum efficiency and cost effectiveness to prospectors.

Surficial Mapping

* (Surface Glacial Deposit)

Aggregate resources are important because of their extensive use in construction, road building and mine backfill. These resources are located and defined by the mapping of surficial, or glacial, deposits. Only a small portion of the glacial deposits in the Kirkland Lake area had been mapped before the beginning of KLIP.

KLIP is undertaking a surficial survey of the entire area as the knowledge of glacial deposits is essential both for land-use planning and the interpretation of geophysical and geochemical surveys.

The data provided by basal till sampling will add a third dimension to the surficial survey which, in turn, will be an aid in learning the source of indicator minerals found in the basal till — and thus benefit both gold and base metal studies.

The mapping of surficial deposits began in 1978 in the Englehart and Larder Lake areas. It covered the Ramore and Kirkland Lake areas in 1979, and will be extended to the Magusi River area in 1980. Beyond 1980 follow-up studies, mapping and basal till sampling will be continued.

Data Series Maps

As an additional aid to prospectors, Data Series Maps are being prepared to provide a visual display of all available exploration area on mineral prospects and properties in the Kirkland Lake area. Twenty-six maps have been released and about the same number will be released later in the year or early in 1980.

The exploration data include the following: property outlines; areas covered by the various types of surveys; locations of mineral showings, trenches and drill holes; depth of overburden and drill intersections. Data Series Maps indicate where exploration data may be found in the files of the Ministry of Natural Resources.

Mineral Exploration Assistance Program (MEAP)

In Kirkland Lake and other designated areas, the Ontario Government currently contributes up to one-third of the approved cost of the exploration programs under the Mineral Exploration Assistance Program (MEAP).

The maximum contribution is $33,333.33 to a project in any one designated area, with a maximum of $50,000 to any individual or company in any one year. If a producing mine is developed, the money contributed by the government is to be repaid without interest. A pamphlet describing the program may be obtained from the Ministry of Natural Resources.

Watch for the succession of reports that will appear as soon as survey program results become available. For further information, contact your local Ontario Ministry of Natural Resources District Office.

Location of Projects

Quaternary Surveys

Completed 1978
— Englehart & Larder Lake

Underway 1979
— Kirkland Lake & Ramore

Planned 1980
— Magusi

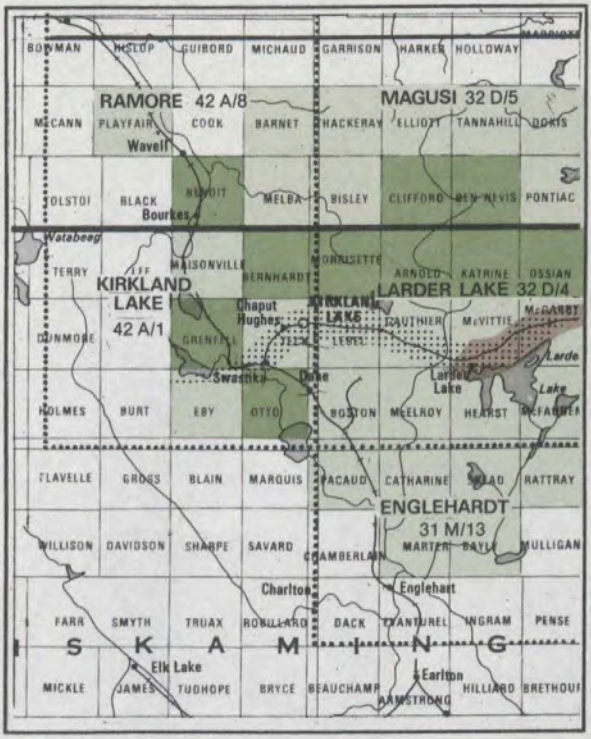
Data Series Maps

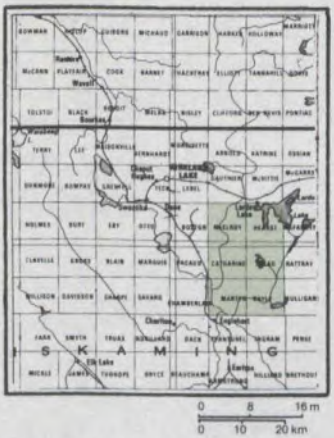
Published under K.L.I.P. as of Aug./79

Previous release

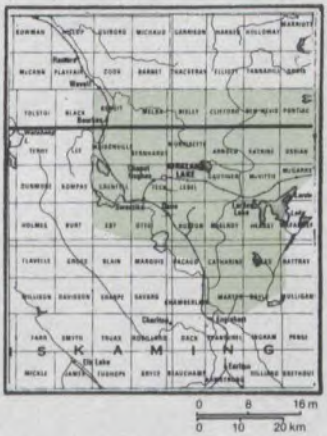
Stratigraphic Mapping
— Completed in 1979

Timiskaming Series





Basal Till Program 1979 Test Area
(Overburden drilling)



Airborne Electromagnetic Survey
Flown March 1979

KIRKLAND LAKE INITIATIVES PROGRAM PROJECTS

Government of Canada | Gouvernement du Canada

Regional Economic Expansion

Ministry of Natural Resources | Ministry of Northern Affairs

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