MINES BRANCH REPORTS

Mineral Exploration in the La Ronge and Reindeer Mining Districts

by A. J. Gracie*

Mineral exploration in the La Ronge and Reindeer Mining Districts during the past year has been almost exclusively for uranium. Land acquisition and exploration have increased over the previous year as a result of assessment work commitments and reports of two new uranium discoveries in Northern Saskatchewan. Exploration has been concentrated along the perimeter of the Athabasca Formation and in the adjacent metamorphic rocks. New dispositions were taken out within the Athabasca basin.

Uranerz Exploration and Mining Ltd., Saskatchewan Mining Development Corporation, and Canadian Longyear Ltd. have established offices in La Ronge. The Canadian Longyear office includes a parts distribution warehouse.

Highways to Pinehouse and Stanley have advanced and the highway to Patuanak will be completed this year. Winter roads to Key Lake and Uranium City were in use last winter.

Missi-Amisk Groups and Kisseynew Gneiss Domain

Aerodat airborne EM survey anomalies were tested by diamond drilling on the Consolidated Morrison Exploration Ltd. Permit No. 1 south of Amisk Lake. Saskatchewan Mining Development Corporation is participating in this joint venture. No significant values of copper and zinc have been reported in the sulphide mineralization encountered. Saskatchewan Mining Development Corporation Permit No. 17 covers a similar venture south of the former Hanson Lake mine (63-L-2, -7, -10). Both ventures involve exploration through and beneath the Paleozoic. Permit 17 covers a southern projection of the Tabbernor Lake fault. The discovery of an orebody at Embury Lake, Manitoba, prompted an increase in staking activity in the Flin Flon area during March and April 1977.

La Ronge-Reindeer Belt

An agreement has been reached to proceed with a feasibility study of a graphite

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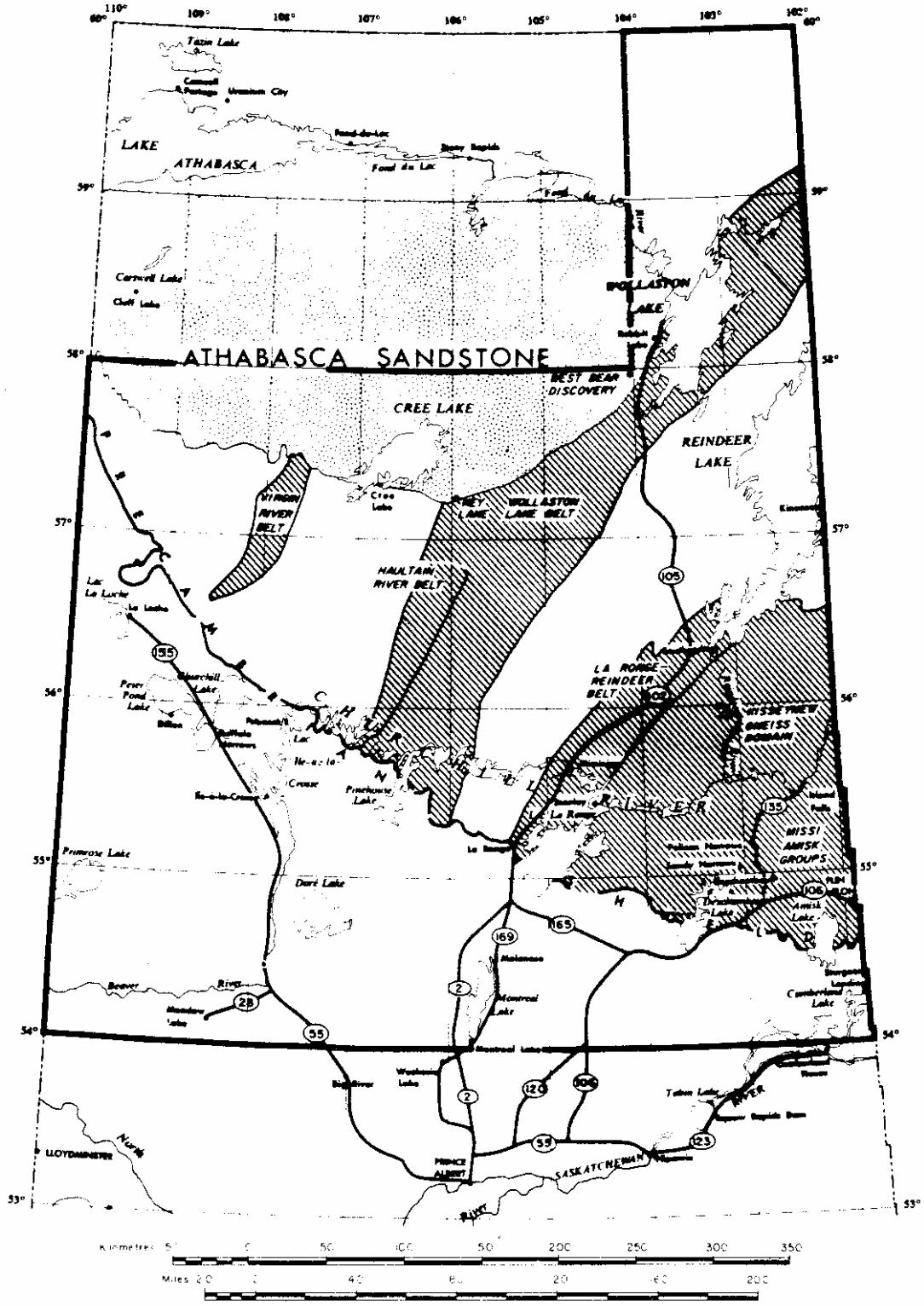

Fig. 1. Mineral exploration areas 1977 in the La Ronge-Reindeer Mining District. (For more up-to-date version of the Precambrian Shield and Athabasca Formation margins see other location maps, this volume).

mine on CBS 2016, (64-D-6) near the village of Southend. Participants in the agreement are Deep Bay Graphite Co., Regina, Sask., (a subsidiary of Superior Graphite Co., Chicago, Ill.) and Saskatchewan Mining Development Corporation. The mineralized zone is up to 43 m wide and at least 550 m long; open pit reserves are estimated to be 1.8 million tons containing 10.3% C to a depth of 60 m. Hudson Bay Exploration and Development Co. were reported to have performed a limited drilling program for uranium in the under-explored Brabant Lake area. A small crew from Urangesellschaft examined a uranium showing near Maribelli Lake (74-A-1-W).

Wollaston Lake Belt

Four new Permits were granted in the Wollaston Lake fold belt, which stretches from 64-M to 73-O. Most of Saskatchewan Mining Development Corporation Permits #7 to #11 are on these rocks. Questor Airborne Input EM Surveys, lake-centre sediment regional geochemical sampling programs, reconnaissance prospecting, and geological mapping have been performed this year. Water samples, for immediate radon analysis in camp, were also collected in conjunction with some lake sediment surveys. Areas of pelitic Aphebian meta-sediments surrounding Archean granites were re-investigated, using the Key Lake deposit as a geological model, although Athabasca Sandstone outliers are unknown in this area.

The Duddridge Lake area, scene of a 1974 uranium discovery (73-O-9), was inactive this year except for a drilling program southwest of the discovery conducted by the Saskatchewan Mining Development Corporation.

Athabasca Formation Perimeter

Development work on the Key Lake uranium discovery of Inexco Mining Co. (Canada), Uranerz Exploration and Mining Ltd., and Saskatchewan Mining Development Corporation continued throughout the year. The most recent detailed release describes the Gaertner orebody as having a length in excess of 1,370 m, a width ranging from 14 m to 23 m, and a thickness up to 14.5 m. An early estimate indicates approximately 500,000 metric tons of ore in place with an average grade of 4.54% U_3O_8 and 3.84% Ni, or approximately 49.4 x 10^6 lbs. Uranium Oxide and 41.8 x 10^6 lbs. Nickel.

A second deposit, the Deilman, discovered in June, 1976, appears to contain a similar grade of uranium-nickel mineralization. By the end of 1976, this mineralized zone had been preliminarily defined as extending over a length of 850 m with a width ranging up to 137 m and thickness up to 33.5. Based on limited data from the assays of 49 holes distributed along 550 m, Inexco Mining consultants estimated

in-place uranium oxide and nickel to be in excess of 12 x 10^6 lbs. uranium and 8 x 10^6 lbs. Ni. Both the Gaertner and Deilman deposits are amenable to mining by open pit methods. In a recent submission to the Cluff Lake Board of Inquiry, Uranerz Exploration and Mining Ltd. stated that there was a total of 40 to 50 million lbs. of uranium oxide in these deposits.

Gulf Minerals Exploration has confirmed three uranium discoveries in the area west of Wollaston Lake, in addition to the Rabbit Lake deposit. These are referred to as the Collins Bay, Raven, and Horseshoe deposits. The recently discovered West Bear prospect is also considered to be significant.

The Athabasca Formation perimeter, for the purposes of this report, includes the outer 8 to 16 km of the sandstone basin, and a zone of Aphebian/Archean rocks immediately adjacent to, but outside, the basin. An idealized regional exploration program in this area consists of the following stages:

1. Airborne radiometric, VLF electromagnetic, and magnetic surveys. Difficulties with the VLF airborne response over areas of the sandstone have been reported, but some of these responses have been interpreted as faults and used as drill targets.

2. Geoterrex EX-30, Tridem, or Questor Input airborne electromagnetic surveys. (Both the Gaertner and Deilman orebodies are associated with conductive graphitic schists.)

3. Helicopter-borne lake-centre geochemical sampling programs. Water samples for immediate radon analysis in camp, and for uranium content analysis, may also be collected as part of this program.

4. Linecutting on particular anomalies for ground control.

5. Surface prospecting, with total count scintillometers, on cut, blazed or compass lines, in attempt to locate radioactive boulders or outcrops.

6. Detailing specific grids with ground geophysics and geological mapping. Geophysical techniques used at this general stage are I.P., VLF, Magnetic and Max-Min surveys.

7. Radon and helium analyses. Radon analyses utilizing track etch cups, or emanometers for soil and water gas analyses are common.

8. Drilling. Overburden, percussion, and diamond drilling programs have all been used.

Drilling programs were common in the perimeter of the Athabasca Sandstone during the period 1976-77. Conwest Explorations (74-H), Gulf Minerals Canada Ltd.

(64-L) and Scurry Rainbow Oil (74-H-4, 74-G-1, 74-B-16) employed overburden drills on regional programs to test the overburden and upper part of the basement for uranium. Canadian Occidental Petroleum, Noranda Exploration, Conwest Explorations, Denison Mines and Hudson Bay Exploration and Development have operated diamond drilling programs. Immediately southwest of Key Lake, attempts have been made to test Aphebian graphitic conductors close to Archean granite contacts. Colt Resources tested their Highrock Lake property with a percussion drilling program.

Diamond drilling by Gulf Minerals Canada on CBS 4371 (73-H-16), in joint venture with Noranda Exploration and Saskatchewan Mining Development Corporation, revealed a narrow zone of uranium mineralization in the basal Athabasca sandstone and in the immediately underlying Aphebian rocks. A series of holes has been drilled to trace the extent of this mineralization. The company confirmed that high uranium values with traces of silver have been found. On an adjacent property, Conwest Explorations carried out a diamond drilling program along the possible southwest extension of this zone.

Athabasca Formation

Exploration is now being directed inside the Athabasca Basin at distances between 16 and 24 km from its edge. Approximately 20 claim blocks and 7 new permits have been taken out. Although details of the basement topography under the Athabasca Formation are not known, some interpretations have been made (Hobson and MacAulay 1969, Tapaninen 1976). Some dispositions are staked on the basis of magnetic highs that may represent basement topographic highs. Horsts in the basement may indicate areas of reduced thicknesses of the Athabasca Formation. Linear eskers and lake shapes may follow fault-controlled paleochannels in the basement underlying the sandstone. Basic dykes and faults cut the Athabasca Formation. An idealized exploration program resembles that indicated for the Athabasca Formation perimeter. Seismic and Geoprobe Maxi-Probe EMR 16 are methods being used with particular value. Electrical soundings are believed to have been used only on the perimeter of the Athabasca Formation.

Haultain River Belt and Areas Intermediate to the Main Meta-Sedimentary Belts

Work has continued in the Haultain River Belt with some additional staking at its northern end. Scurry Rainbow Oil has found uranium mineralization in calc-silicate rocks and in quartzite. Particular areas have been sluiced, trenched and drilled. Lake sediment sampling, emanometry, track etch, magnetometer, VLF and detailed geological surveys have been conducted on dispositions in this belt and

both Getty Mines and Wyoming Minerals have located radioactive showings. Results of the 1977 work have been rather disappointing.

Activity in the predominantly granitic areas lying between the main metasedimentary belts was very low. Eldorado Nuclear Ltd. staked an outlier of Athabasca sandstone at Reilly Lake in the Wathaman Batholith (64-E-3). The Rottenstone Domain was suggested as a possible objective for an exploration program designed to find a supergene uranium deposit in granite. E and B Explorations are prospecting scattered claim blocks in (74-B) south and north of Haultain Lake. One independent prospector trenched a pegmatite uranium showing on Porter Lake.

Phanerozoic Cover

United Uranium hold two claim blocks in 73-O on a possible extension of Haultain River Belt rocks under the Phanerozoic cover. Two northwest trending faults; airborne eU and Ni/U_3O_8 geochemical anomalies are reported from these claim blocks. Wollex Explorations consider uranium exploration models in the area to be replacement deposits in Devonian limestone, in bituminous horizons in the Cretaceous, and in meta-arkose in basement rocks.

Canadian Occidental Petroleum Ltd. initiated a drill program on a claim block and their Permit 3 (73-1) late in the fall of 1976. Drilling was resumed in September 1977. Exploration is for lead and zinc in carbonate rocks.

Carbonate Processors has optioned its property at the south end of Lac La Ronge to Missi Island Mines. Exploration is for limestone suitable as a source of lime required in the operation of the Gulf Minerals Canada Ltd. uranium mill at Rabbit Lake. Two old kilns exist on the south shore of Lac La Ronge. No current work is in progress.

Two quarrying leases for silica sand, covering two exposures on the Nipekamew River (73-1-10-NW), were sampled for the Provincial Government.

Mines Branch Field Offices

Mines Branch offices at La Ronge (Precambrian Geological Laboratory) and Creighton provide information and services to the mineral industry. Services provided include recording of mineral dispositions and sale of publications. The La Ronge office also maintains a library of assessment work records for the Reindeer and La Ronge Mining Districts and a core library with examination facilities. Thin sections and polished ore sections are made at the La Ronge office during the winter months, and expediting services are provided during the summer for Saskatchewan Geological Survey field crews.