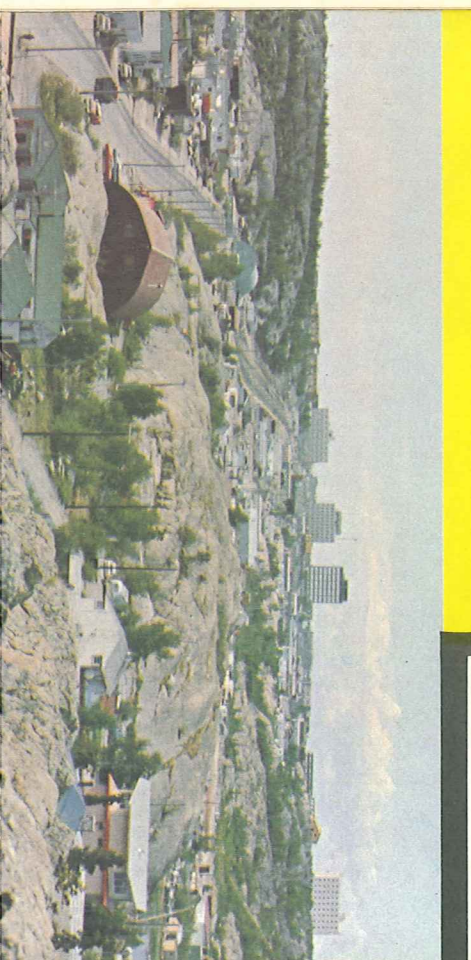


# Yellowknife

at a  
glance



YELLOWKNIFE MINES LIMITED

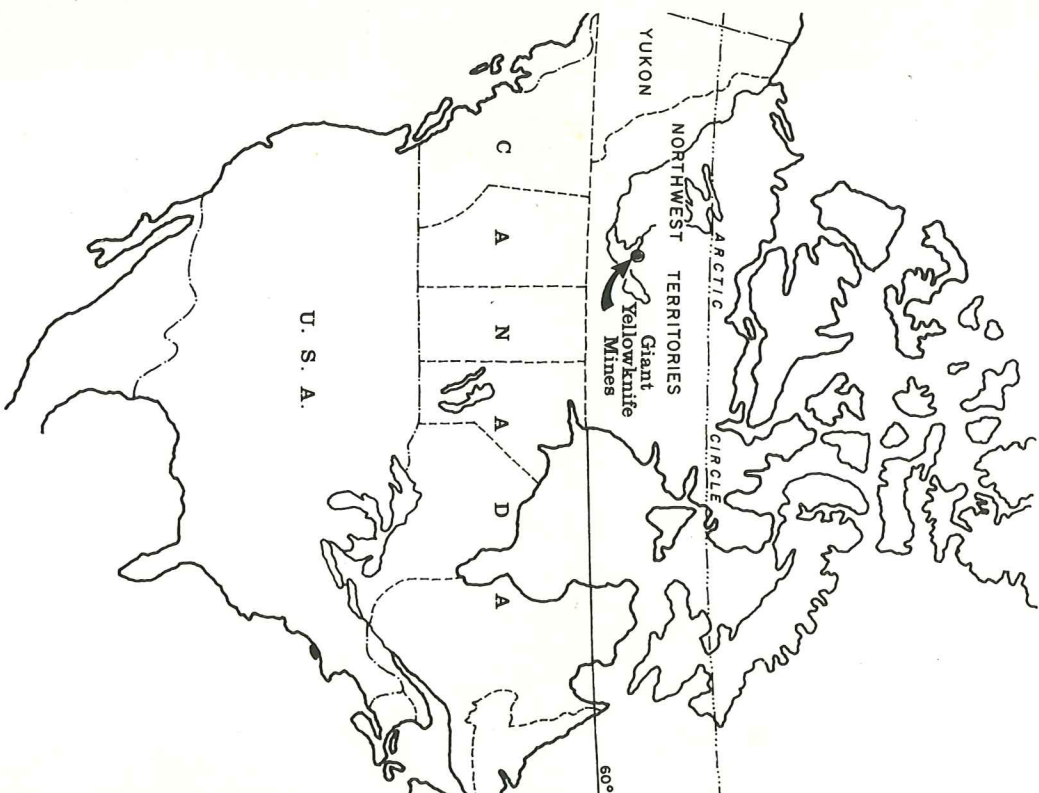
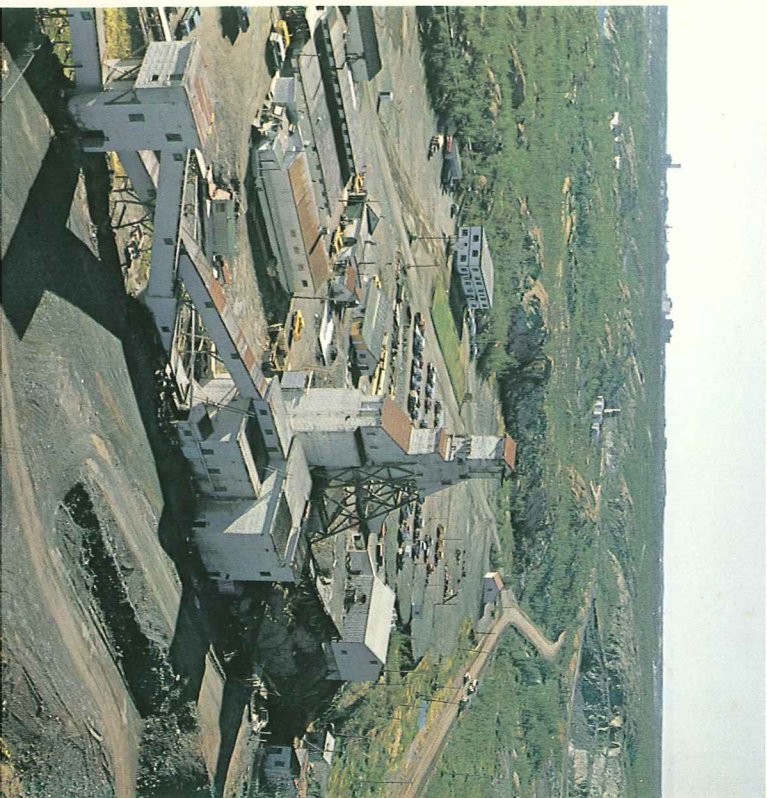
# GIANT YELLOWKNIFE MINES LIMITED

## WELCOME

Whether you're paying us a short visit or joining us as a new employee, we welcome you to Giant Yellowknife Mines Limited and know you'll enjoy the time you spend here.

If you would like to learn something about gold mining, this booklet should give you an understanding of how it is done at Giant.

We are proud of the operations and think that Giant is a fine place in which to work. With its lively community spirit and scenic location, Yellowknife too, can be interesting. Most of the families who have settled here look forward to becoming long-term residents.





## A BRIEF HISTORY

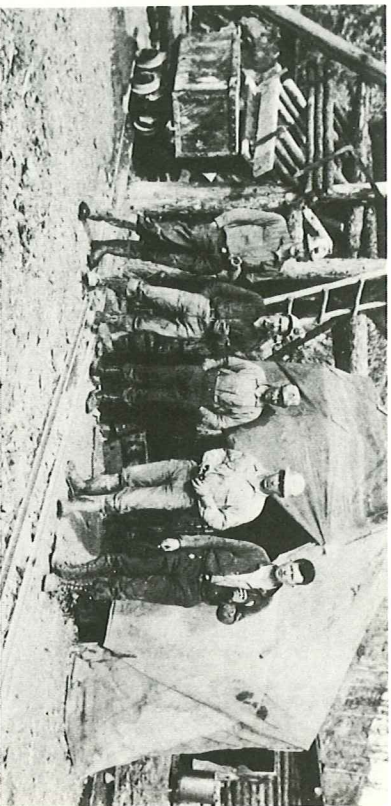
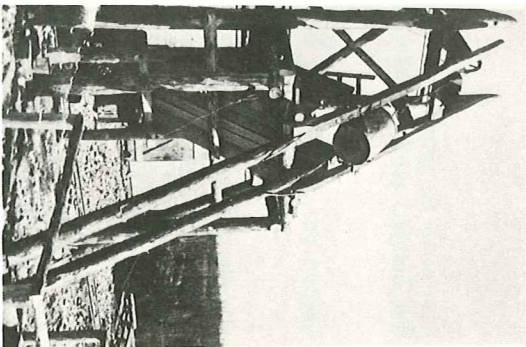
Gold was first found in the Yellowknife region in 1896 by miners on their way to the Klondike, but sporadic prospecting revealed nothing of importance. It took the Fort Norman oil find and the discovery of radium-bearing ores at Great Bear Lake to speed up the search for minerals in the Northwest Territories. In 1934, visible gold found on the east shore of Yellowknife Bay brought about a staking rush in the area.

The original 21 Giant claims were staked in July 1935 by C.J. Baker and H. M. Muir, prospectors with Burwash Yellowknife Mines Limited, after much of the east side of the bay had been staked but prior to the discovery of visible gold on the west side.

Giant Yellowknife Mines Limited was incorporated in August 1937. During the next few years the property was investigated and drilled but with little encouragement.

Meanwhile, a geological survey party reported visible gold immediately south of the Giant claims and activity that followed resulted in several small high-grade properties being worked. Development of Yellowknife as a mining community had begun.

Encouraging results were not obtained at Giant until 1941 when Don W. Cameron, a veteran prospector with Frobisher Explorations (a sub-



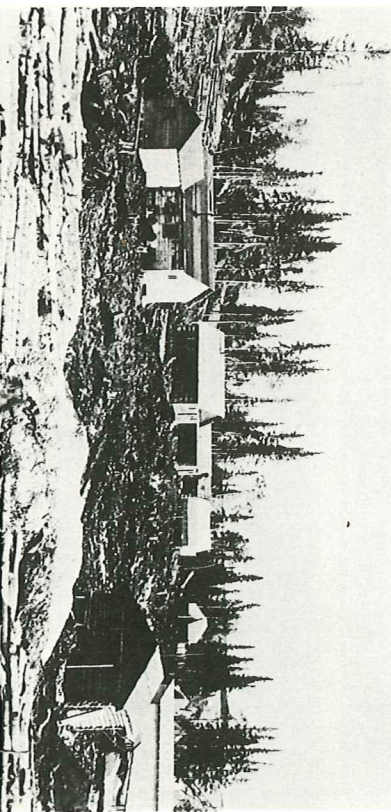
sidary of Ventures Ltd.), re-examined a promising quartz occurrence near the southeast boundary of the property. An agreement was signed in June 1943 under which Frobisher gained management control of Giant Yellowknife Mines Limited.

Frobisher's consulting geologist, Dr. A. S. Dadson, to whom was assigned the task of working out the complex geology of the area, deduced that the Baker Creek Valley, extending through the property to the east of the West Bay Fault, might be underlain by a major gold-bearing shear zone system. He embarked on an extensive diamond drilling program to test his theory. The spectacular results suggested an ore deposit far exceeding in size and grade



any known in the Northwest Territories and initiated an unprecedented rush to stake, re-stake and prospect throughout the Yellowknife region. Giant's subsequent history has continued to justify the high hopes raised by the drilling. Plans were adopted in keeping with the idea of a big mine. The first gold brick was poured in May of 1948 and since then more than 6,500,000 ounces have been produced, valuing more than \$300,000,000.

In 1962 Ventures Ltd. merged with the Falconbridge Group of Companies. Two adjacent properties operated by Giant are Lolor Mines Limited (87% owned) and Supercrest Mines Limited (50% owned).







The orebodies of the Giant Yellowknife Mine occur in zones of schist, in an assemblage of typical Archean volcanic rocks which form part of the Yellowknife Greenstone Belt. These rocks are about 2.7 billion years old. Schist is a foliated metamorphic rock whose grains have a roughly parallel arrangement. It is most often formed by shearing or fault movement. The favourable schist zone has been traced for a length of more than three miles to a depth of 2,000 feet.



Gold was probably carried by hot aqueous solutions from great depth. These solutions rose along fractures in the earth's crust, depositing gold and other metals in the schist zones.

Great earth movements along several structural faults took place subsequent to formation of the gold deposits. The greatest of these is the West Bay fault, which bisects the Yellowknife Greenstone Belt at an acute angle. It crosses the southern portion of the Giant property, and also marks the southern limit of the Giant ore zones. The Campbell Zone of the Con Mine, three miles to the south, is thought to be the continuation of the Giant system.

The gold ore at Giant appears at irregular intervals throughout the schist and is characterized by 40% to 80% quartz-carbonate and about 10% pyrite and arsenopyrite. The gold associated with sulphides forms a refractory ore, which causes milling and metallurgical complications.

Individual orebodies are extremely diverse in respect to grade, size and shape. Lengths of individual stopes or working places have varied from 50 to 400 feet and widths from less than 10 feet to more than 100 feet. Because of abrupt changes in dimension and attitude of individual ore shoots, close geological control is necessary to maintain profitable grades. Stope geologists and samplers visit each working place daily in order to mark ore contacts and give production supervisors necessary information as to location of ore for future mining.

To locate and define new orebodies, more than 100,000 feet of diamond drilling is done on the property each year. All pertinent geological and assay data are plotted on mine plans and sections.

In addition to the search for ore on the mine property, Giant also carries out extensive exploration for new orebodies throughout the Northwest Territories and elsewhere in Canada. Field work is done



## THE MINE

Visitors to Giant are first impressed by the 'C' headframe, an imposing structure that dominates the mine site. It is set over the mine's principal operating shaft which extends to a depth of 2,124 feet. A shaft is the main entrance to a mine and resembles an elevator shaft in a tall building.

'C' shaft is equipped with an 18-man aluminum 'cage', two skips for hoisting ore and waste to the surface, and emergency ladder-way. Access to underground workings at Giant is provided through four shafts, three large service raises and two declines, not all of which are presently in operation.

Miners descend into the underground areas to stations at various levels from which passageways lead off to the areas where they work.

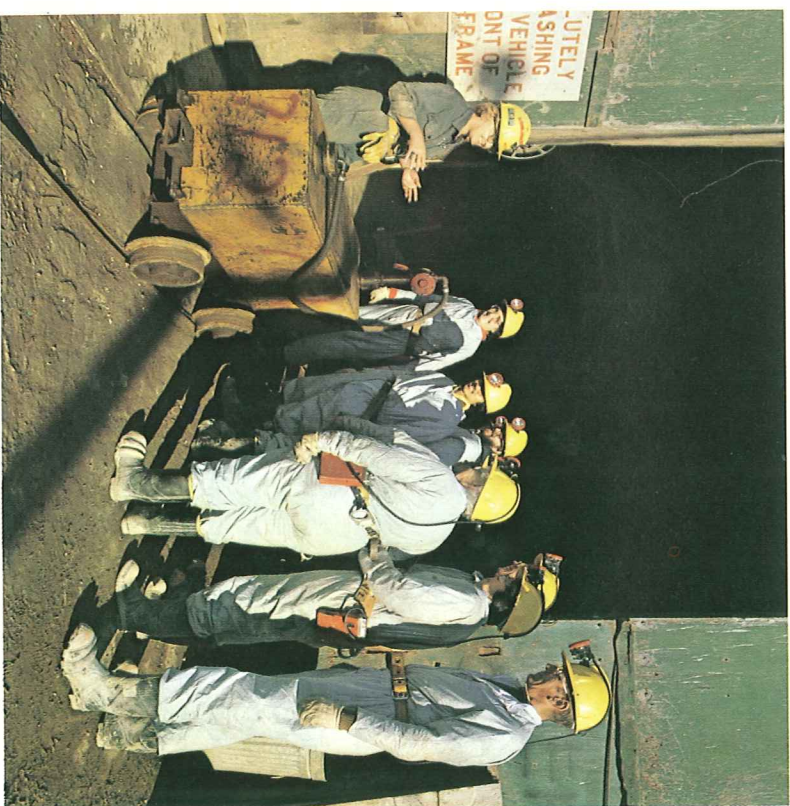
The stope is the workshop of the mine where the ore is first broken for transportation to the mill. Four methods of stope mining are employed at Giant. In determining which method is more suitable in a particular



area, the safety of the miner, the size, shape and grade of the orebody, and the rock or ground conditions, are all taken into consideration.

### LONGHOLE STOPPING — 70%

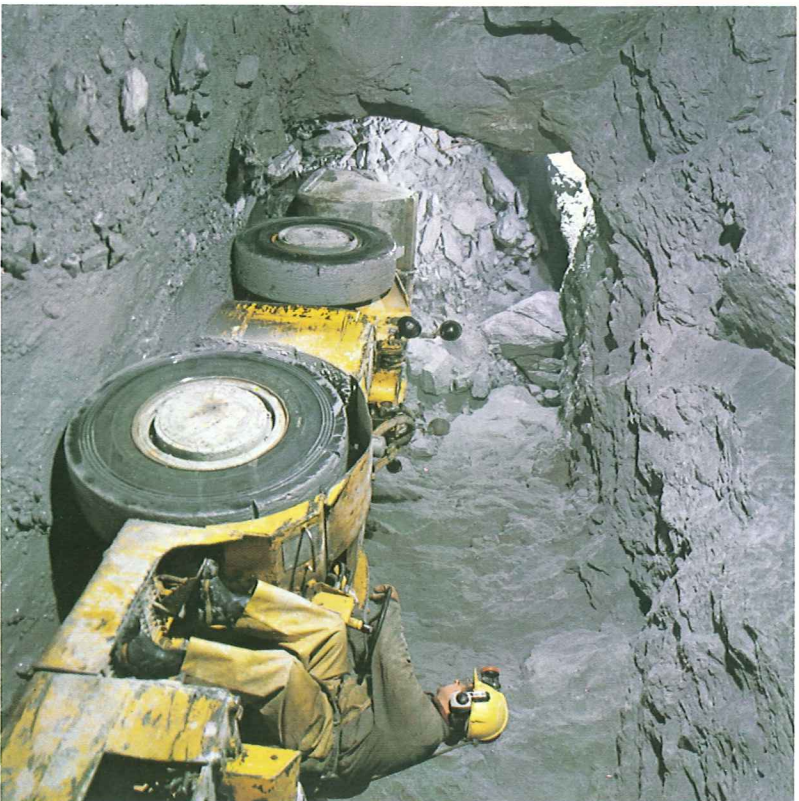
This method is applied in mining large and steeply dipping orebodies whose wall rocks will stand without support over considerable spans of excavation. A drift in ore is driven at the bottom of the stope and sub-drifts at 40 to 60 foot intervals of elevation extend the length of the orebody. Vertical slices of ore are then drilled and blasted to fall into the drawpoints at the bottom where the broken ore is loaded and moved to the shaft.



### SHRINKAGE STOPPING — 10%

In this method, a horizontal slice is mined and broken. Then sufficient





### OPEN STOPPING — 10%

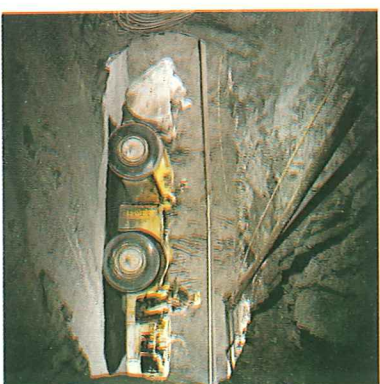
Open stopping is used to mine very flat laying or slightly inclined orebodies where no other method is suitable. These stopes are usually no more than 10 to 15 feet high. Broken ore is 'slushed' into mill holes from which the ore trains load their cars.

### CUT-AND-FILL STOPPING — 10%

This method is employed in mining orebodies with difficult ground conditions. The ore is mined from the bottom up, drilling and blasting ore lengthwise, horizontal slice at a time. Broken ore is transferred to mill holes by slusher or by rubber-tired load-haul-dump vehicles. After all the broken ore is removed from the stope, a new floor of waste rock is constructed (partly to support the exposed walls and partly to enable

### CONTROL

The mine engineers keep close tab on the stope as it advances. Twice a month stopes are surveyed to determine the dimensions and location of the ore which has been extracted. These data are recorded on maps kept in the Engineering Office. Besides being useful to the geological department, it provides the basis for calculating the bonus to be paid to the miners, most of whom work on an incentive system.



Giant works on a central blasting system, with explosives being detonated electrically from surface at 4 p.m. and 4 a.m., when all the men have evacuated the mine.

Ventilation to the mine is provided by four fans producing 90,000 cubic feet per minute of fresh air. Air is forced down 'B' shaft to 750 Level at which point it is divided. During winter, ventilating air is heated by a large propane heater to ensure hospitable working conditions and to prevent freezing of water lines.

The mine's compressed air supply is provided by 11 compressors at 5 locations. The compressed air is used to power rock drills, loaders, diamond drills and some slushers.

### OPEN PIT MINING

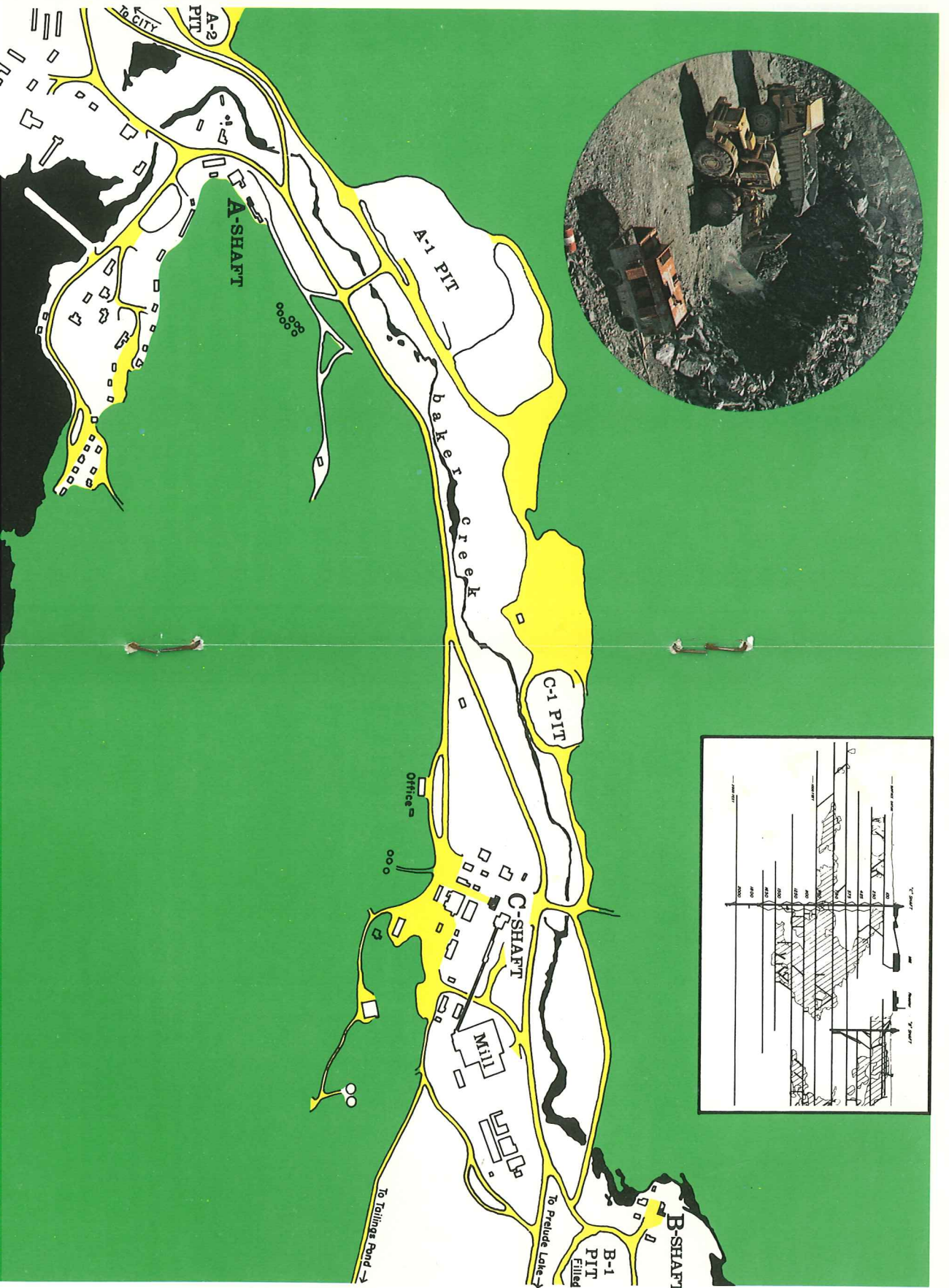
With improvements in gold price, an open pit mine was started in 1974 on low-grade ore located 3,000 feet south of 'C' shaft. It was completed in 1979. Three smaller pits are now being worked.

Although on first appearance the open pit operation may look simple, in its engineering and economic aspects it is anything but that. It calls for close planning in minute detail before any excavation takes place.

Front end loaders are used to load 35-ton trucks for hauling the ore to 'C' shaft. The ore is dumped either down a pass to the underground crusher or onto a new conveyor installation leading to surface crushers, or stock-piled and fed to the mill as required.

Sufficient ore is produced from the pits and underground to allow the mill to be operated at full capacity, 1,200 tons per day, seven days per

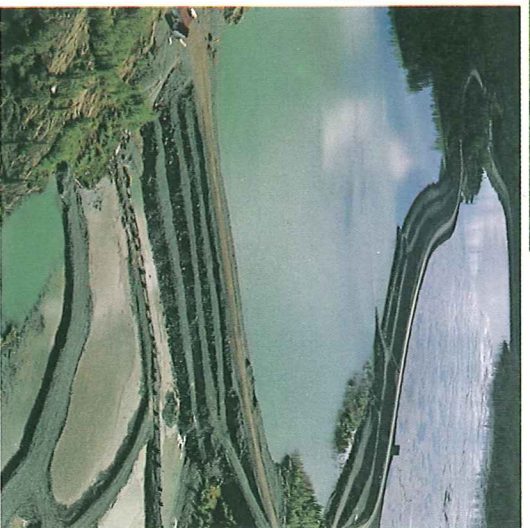






## ENVIRONMENTAL CONTROL

Awareness of our daily impact on the environment surrounding us has grown markedly in the past ten years and Giant Yellowknife Mines is no exception. It was realized soon after the operation started that an environmental control program would have to be developed and followed.



Gold present in the Giant ore is intricately bound with arsenic bearing materials. This arsenic is fumed off as a gas during the roasting operation. In October of 1951 a cold electrostatic precipitator plant was installed to collect the arsenic fumes and dust given off during roasting. In 1955 a second hot electrostatic precipitator was added in tandem for more efficient collection of the dust, and in November 1978 a Dracoco baghouse was installed to collect the fine grained arsenic condensed from the roaster gas. Collection efficiency of the system is now better

of this technology at Giant has resulted in ambient arsenic levels that are well within government standards.

The collected arsenic is pumped to special chambers prepared in competent bed rock in the upper parts of the mine where the ground is permanently frozen. These chambers are hermetically sealed and separated from the rest of the mine by massive concrete bulkheads capable of withstanding from 4 to 12 times the hydrostatic head that could develop if the mine should flood after closure.

Effluent water quality has also received close attention from Giant. The waste from the mill is treated with 3000 pounds of lime per day and pumped to a 112 acre tailings pond system surrounded by impervious dams. The solids settle out in the first pond allowing the clear overflow water to be decanted into a second pond to ensure complete settling. The effluent from the second pond is decanted into Baker Creek. The lime is added to remove as a precipitate any soluble arsenic or heavy metals dissolved in the milling process. The local water course as well as the tailings pond decant is monitored regularly for pollutants. Extensive research is being conducted continually by Giant personnel in a search for a means to improve effluent levels.

Throughout the productive life of the mine Giant has kept pace with new and advanced technology to safeguard health and protect the environment. The importance of industrial hygiene is continually being stressed as evidenced by the following programs:

1. Concentrations of airborne dust and arsenic are monitored throughout the mill working environment to ensure levels that meet the Canadian Public Health Association's recommended levels.
2. In work areas where exposure to contaminants are highest, protective equipment and suits have been developed to further reduce an employee's risk of exposure to dust and arsenic.
3. Both daily and monthly air quality is monitored in the workplace to protect against any exposure of an employee to hazardous gases or fumes.

Measures adopted have been developed to standards approved by the federal authorities and are designed to protect against both present and future contamination. It is Company policy to afford full co-operation to government authorities and to collaborate with them in fur-





Considerable importance is given to accident prevention and industrial health throughout the entire operation. Safety instruction is given to all employees and a continuing program of education is carried on. Meetings, poster displays and encouragement of safe working habits all contribute to the prevention of accidents and injuries. Machine guards, protective clothing and hearing protection are utilized to safeguard employees.

First aid courses are offered to employees throughout the year. Approximately 80 new employees are trained in this field each year. Some employees, because of outstanding qualities and job proficiency, are selected to take the Advanced First Aid course, and the Instructor's course.

In 1976 the Company won the Regional John T. Ryan trophy for the lowest accident frequency amongst metalliferous mines in the Prairie Provinces and the Northwest Territories.



Over 340 men and women contribute to making the Giant Yellowknife Mines operations run smoothly and efficiently. There are five major areas in which the employees work.

#### **MINE DEPARTMENT**

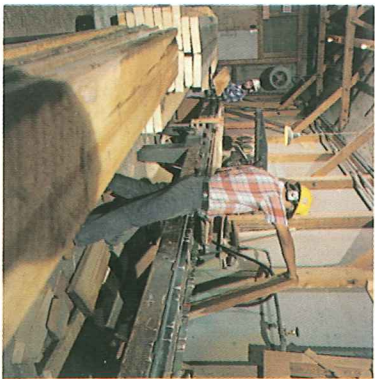
Underground is staffed by 13 supervisors and 124 hourly-rated employees. The crew works on a day and night shift five days a week. Training schools for stope miners and mucking machine operators are held continuously. The open pit is staffed by two supervisors and a crew of 17 working on three shifts, six days per week.



#### **MILL OPERATIONS**

The complexities of the milling process are such that a wide variety of technical maintenance and professional skills are necessary to extract





chemical analysis and planning improvements to operating and maintaining the mill machinery.

### SHOPS AND SERVICES

The Mechanical, Electrical and Construction departments employ close to 100 people. They are responsible for the maintenance and repair of all equipment and buildings on the property.

### ENGINEERING AND GEOLOGY SERVICES

The 26 people in this area outline ore reserves by exploration and produce plans to achieve the tonnages and grade objectives set by management. They provide technical assistance to all departments. Geological data are gathered by observation, mapping and by diamond drill core logging.



### ADMINISTRATIVE SERVICES

The management, personnel and accounting functions are handled by the office staff. The bulk of the accounting functions are calculated by computer. Living so far from factories necessitates carrying a large stock of parts and supplies in the Warehouse. The smooth operation of the plant depends to a large extent on the skill of the Purchasing Agent and his staff in gauging requirements and finding suppliers.

In order to help maintain a stable work force, the Company provides subsidized housing for married employees as well as eight bunkhouses and a staffhouse to accommodate single personnel. A cost-of-living allowance is given to those employees who reside in the City of Yellowknife.

Other benefits include low cost medical, sick leave, dental and insurance plans. The Company also offers a non-contributory pension

that includes return air-fare to Edmonton for employees and their immediate dependants.

The Company strongly supports the N.W.T. Apprenticeship Program and throughout the Company employees are trained on-the-job and promoted according to their talents and skills. Employees are also encouraged to take advantage of correspondence courses and evening classes offered in Yellowknife.

Each year Giant provides an undergraduate scholarship in honour of the late Dr. A. S. Dadson to a student whose home is in the Northwest Territories. During the summer months students are employed in several departments of the mine.

The Company supports a Recreation Association to which each employee contributes a small monthly fee. The Association operates a recreation hall with snack bar and library. Television, cards, chess, darts, table tennis and billiards are available for the member's enjoyment.

Giant also operates a two-sheet curling rink and sponsors teams in softball, basketball and hockey.





## LIVING IN YELLOWKNIFE

From its early days as a community of log cabins and tent frame houses huddled on the north shore of Great Slave Lake, Yellowknife has grown into a bustling, modern city of more than 10,000 people. The city was designated as the capital of the Northwest Territories in 1967.

Yellowknife is linked to Edmonton, Alberta by an all-weather highway, some 1,512 kilometers in length and daily jet air service. It serves as a distribution center for much of northwestern Canada.

Yellowknife has all the facilities of any other Canadian city of its size including hospital, high schools, banks, numerous shops, hotels, motels, restaurants, movie theatres, ball parks, tennis courts, golf course, hockey and curling rinks as well as a swimming pool.

The city boasts a great number of clubs and associations. For example there is a city band, a pipe band, a choral society, a drama group, a film society, a craft guild and a square dancing group. Recreational clubs exist that are devoted to such sports as baseball, broomball, hockey, swimming, sailing, canoeing, curling, snowmobiling, skiing, volleyball, tennis, cricket, soccer, badminton and gymnastics. Excellent hunting, fishing and boating are to be found in the district.

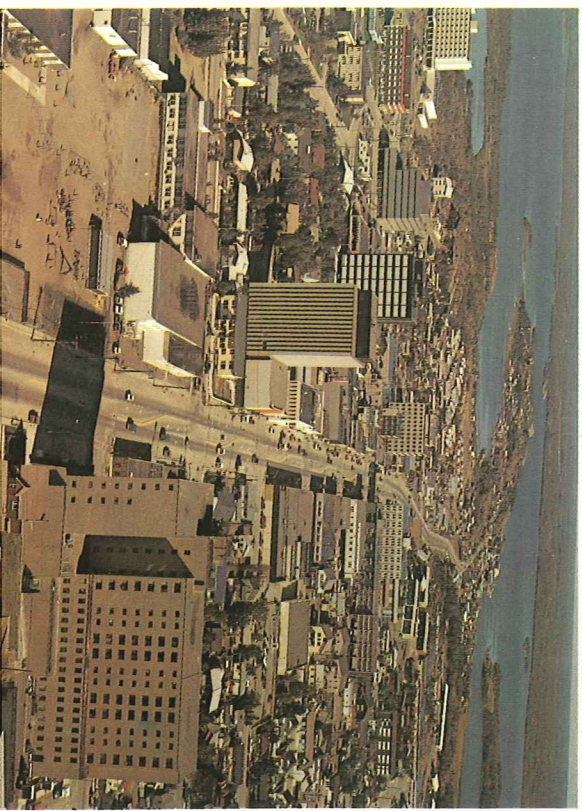


There are two weekly newspapers serving the city and two radio stations, CFYK and CJCD. C.B.C. television provides relay service via satellite from Vancouver and MacKenzie Media broadcasts live local television via cable in addition to videotapes from independent television from the south.

The topography of the Yellowknife area is typical of the Precambrian Shield. Though flat in general, the country is rugged in detail with rocky hills and ridges rising abruptly from innumerable lakes and muskegs. Almost continuous outcrop is present throughout the district but stands of spruce, pine, birch and poplar in valleys and on sand plains tend to soften the overall landscape.

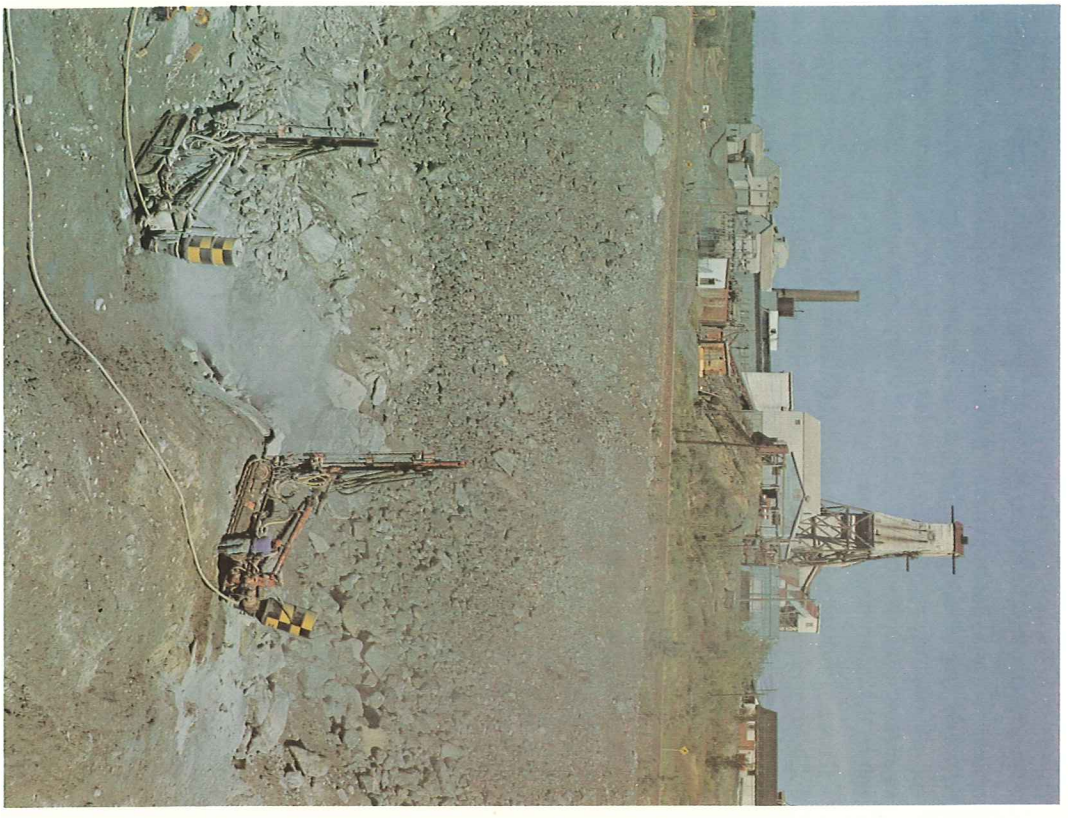
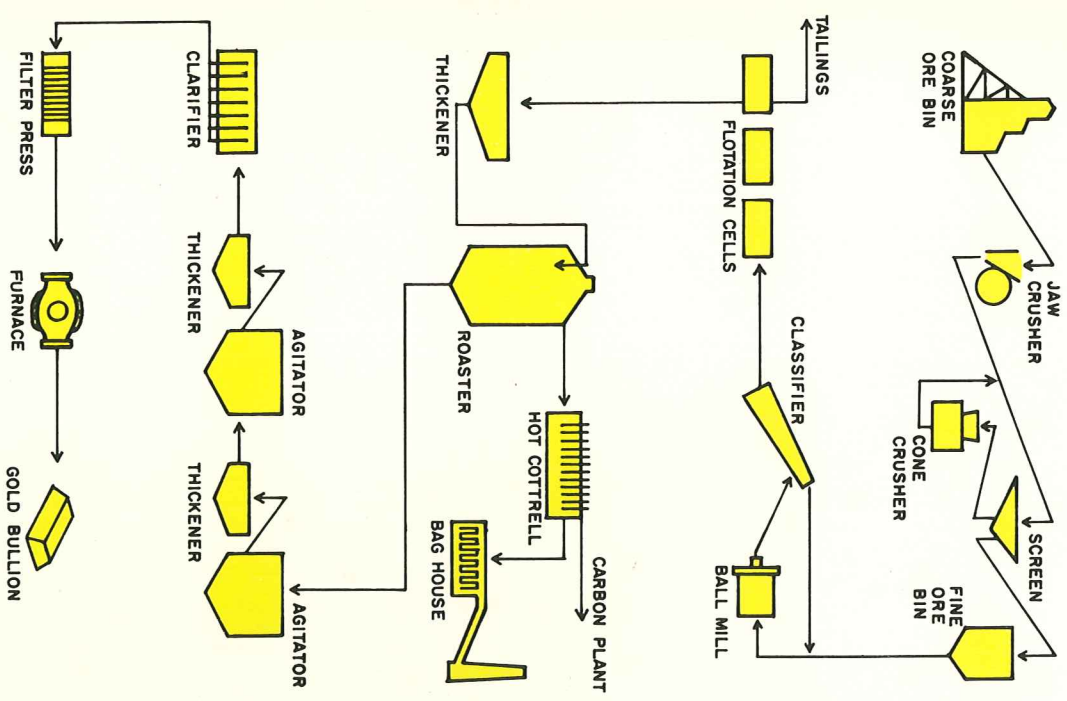
There is no denying the fact that Yellowknife winters are long and cold. Mean temperature for January is -29.0° C but clear, dry air makes the winters seem harsh. Many Yellowknifers prefer the blue skies and clear, cold days to the overcast, slushy conditions of many southern cities. Summers are warm and pleasant with a mean temperature in July of +16.0° C. Annual precipitation is less than 33 cm per year, of which approximately 13 cm is snow.

Gardening is possible due to the long hours of sunlight in June and July. There are approximately 92 frost-free days.





# SIMPLIFIED MILLING FLOW SHEET





## ACCOMMODATION

Explorer Hotel .....	120 rooms
phone 403 - 873-3531, Telex 034-45582	
Yellowknife Inn .....	162 rooms
phone 403 - 873-2601, Telex 034-45524	
Gold Range Hotel .....	52 rooms
phone 403 - 873-4441	
Twin Pine Motor Inn .....	44 units
phone 403 - 873-8511	
Frontier Inn .....	9 units
phone 403 - 873-4500	
Northland Motel .....	11 units
phone 403 - 873-2781	

## TRANSPORTATION

Air: Airport and float base.

Scheduled interprovincial airlines:

Pacific Western (Edmonton and points north),

Transair (Winnipeg and Whitehorse)

For detailed information on local and charter airlines, see Current Explorers Guide published by TravelArctic, Yellowknife, N.W.T.

Road: Mackenzie Highway all weather gravel road connection with Edmonton. Bus service three times weekly. Road closed up to a month during breakup and freezeup of Mackenzie River (ferry service summer, ice road winter). Five transport firms, taxi service, local bus service, four car rental firms.

Water: NTCL from Hay River, June to October, freight only.

## PEOPLE

Population 1978 (estimated) .....	10,900
1968 .....	4,675
Trading Area Population 1977 (estimated) .....	21,000
1967 (estimated) .....	9,000

## LAND

Area of City of Yellowknife .....	13,857 hectares (34,240 acres)
Industrial Area .....	162 hectares (200 acres)

## LOCATION

62° 28' N. 114° 26' W.

Yellowknife Bay, North Arm, Great Slave Lake

Distances by road:

Edmonton	947 miles	1,524 km.
Winnipeg	1,782 miles	2,867 km.
Vancouver	1,498 miles	2,410 km.
Toronto	3,086 miles	4,965 km.
Edmonton by air	600 miles	965 km.
South of		
Arctic Circle	275 miles	442 km.

## CLIMATE

Yellowknife enjoys a dry climate. Annual precipitation averages about 250 mm. (10 inches), about 140 mm. rain, 110 cm. snow.

Temperatures vary between a January minimum of below 40° Celsius and a July maximum of around +30° Celsius.

Mean daily temperatures:

January	April	July	October
-28	-7	+16	-1

Daylight is reduced to about six hours in depth of winter but in June the midnight sun makes possible the Midnight Marathon Golf Tournament which lasts 36 hours nonstop.

