# GM 28301

EXPLORATION OF GASPE OLIVINE

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Énergie et Ressources naturelles
Québec

# EXPLORATION OF GASPE OLIVINE

# QUEBEC, CANADA

by

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## ILLUSTRATIONS

## SUMMARY & RECOMMENDATIONS

IMC has an option on one of the largest known deposits of olivine in Eastern North America, located 28 miles inland (south) from the town of Ste. Anne des Monts, Quebec, on the south shore of the St. Lawrence Seaway. The results of reconnaissance topography and geology indicate that the deposit underlies a high ridge which trends SE-NW for more than 6,000 feet and averages several hundred feet in width. Conservative reserve figures are estimated in the seventy (70) million ton category but may exceed 100 million tons. Samples were collected for mill tests, analysis, and mineral processing studies at Libertyville and the University of Illinois.

Assuming favorable analytical and processing test results, it is recommended that the economics of producing and marketing olivine products from this deposit be investigated.

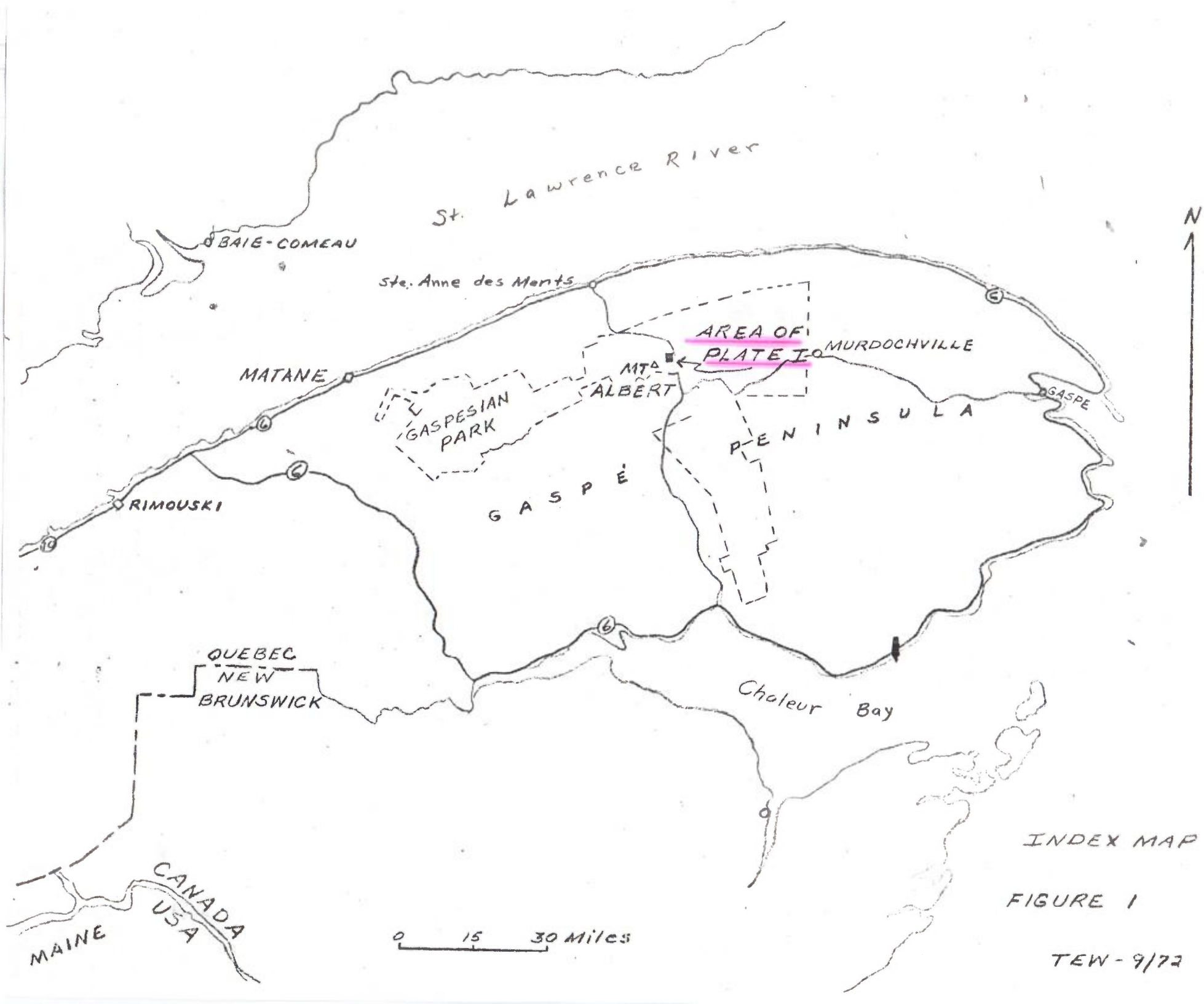
## INTRODUCTION

Approximately six (6) weeks during July and August, 1972, were spent sampling and preparing a topographic and geologic map (plane table) of a large olivine deposit in eastern Canada (see Plate I). The deposit occurs in the LaPotardiere and Lesseps Townships of Gaspe-Nord County in Quebec and lies within the boundary of the Gaspesian National Park (see Figure 1).

During 1965, Conwest Exploration Company, Ltd. of Toronto claimed part of the deposit; control of the Conwest claims (approximately 800 acres) was acquired recently by IMC under the terms of an option agreement which expires December 31, 1972.

The area is approximately twenty-eight (28) miles inland (south) from the town of Ste. Anne des Monts, on the south shore of the St. Lawrence Seaway. Dock facilities are available here, providing a water depth of twenty-six (26) feet as shown on a hydrographic chart of the dock and adjacent channel area (see Figure 2). From Ste. Anne des Monts the area is reached by the Trans-Gaspesian highway, a good two-land primary road. There are no roads leading from the highway to the deposit.

Elevations of the immediate area range from approximately 900 feet along the principal drainage (Ste. Anne River) to more than 2200 feet at the crest of a prominent ridge, known locally as Forsterite Hill, where large outcrops of olivine are exposed. The ridge has very steep grades and near-vertical cliffs in much of the eastern and northern portions. With rare exceptions natural rock outcrops are confined to the ridge crest and the northern and eastern slopes, where burned areas remain from a recent (1965) forest fire.




INDEX MAP

FIGURE 1

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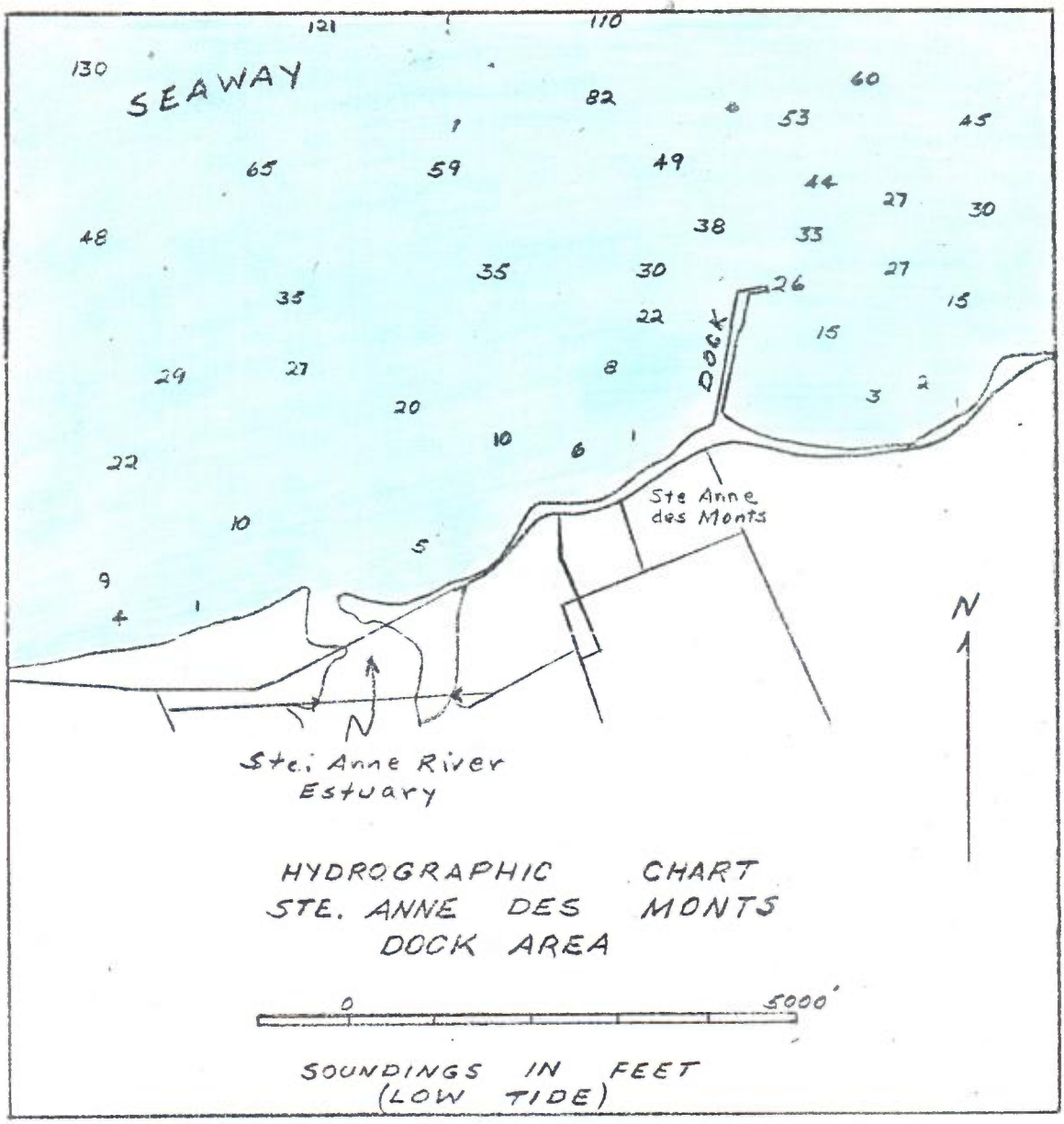


FIGURE 2

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## GEOLOGY AND MINERALOGY

Published results of regional geologic mapping projects are available from the Quebec Department of Natural Resources and from an unpublished thesis on file at Queen's University. The discussion herein includes a summary of pertinent regional data from available literature, data from Conwest correspondence, and some personal observations relative to the immediate area of the olivine deposit.

Bedrock of the region represents a northern segment of the Appalachian Mountains; all rocks are Lower Paleozoic. Metavolcanics of Cambro-Ordovician age and Ordovician sediments, both exhibiting various degrees of metamorphism, are dominant.

The olivine deposit on Forsterite Hill and a large surrounding area, including Mount Albert to the west of the deposit, have been mapped as serpentinite of Ordovician (?) age. Generally the area is considered part of the Mount Albert pluton of ultrabasic rocks. In addition to the dunite of the olivine deposit, other peridotites, hornblende gneiss, and volcanics crop out in the immediate area. Gneiss is probably the actual country rock surrounding the basic iron-magnesian peridotites, with the olivine or forsterite occurring as a central core. At the few locations available for examination, the rocks near or in assumed contact with the olivine are dense, fine crystalline, porphyritic peridotites comprised mainly of dunite but with a relatively low forsterite-fayalite ratio; these are referred to as "dunitic peridotites" in this report. They possibly represent an altered or gradational zone.

As mapped by Conwest, the forsterite deposit extends for almost the complete length of Forsterite Hill but is relatively narrow. Reconnaissance geology of exposed outcrops by Mr. K. H. Teague and the writer indicate a much broader width of the zone along the ridge. Considering the total area, accessible outcrops are scarce, being either obscured by the heavy forest growth or covered with thick moss, brush, and debris in the burned areas. Some small lenses of dunitic peridotite were observed in the dunite along the crest of the ridge.

Accessory minerals reported include enstatite and other pyroxenes, amphiboles, magnetite and chromite; the hydrous minerals of serpentinization such as tremolite, chlorite, antigorite, talc, and unidentified carbonates, occur as alteration products.

## EXPLORATION METHODS

Initial exploration and development by Conwest included staking five (5) mining claims, clearing, and surveying the claim lines; trenching, sampling, shallow diamond core drilling, and limited detailed geologic mapping in the northern portion of the deposit. Samples were evaluated from the results of chemical and mechanical analyses and microscopic studies; additional petrographic evaluations were made on thin sections from selected samples. Twenty (20) additional claims were staked during 1971-72 by Conwest, in order to gain control of peripheral portions of the deposit and provide potential access routes. Approximately 800 acres are now under claim.

IMC exploration to date has been confined to sampling, reconnaissance geology, and detailed plane table topography in the main portions of the deposit partially exposed by the forest fire; wide spaced, spot (intersected points) and line control was established in peripheral areas. A large sample (approximately five tons) was collected for mill tests and shipped to Buckingham; this material was obtained from stream gravel beds at the main drainage level and is more weathered than the rock exposed in the trenched area on Forsterite Hill.

Smaller samples representative of three (3) grades ("ore" = less than 5% enstatite; "probable ore" = less than 15% enstatite; "waste" = more than 15% enstatite plus talc) as designated by Conwest were collected from fresh exposures in the trenched area for analysis and study at Libertyville and the University of Illinois.

Costs to date of the recent sampling and mapping are:

| | | |
|---|---|---|
| Direct | - | $4,170.55 |
| Indirect | - | $3,280.00 |
| Total | - | $7,450.55 |

To date IMC has paid to Conwest and for legal fees about $9,000.00. Costs of quality evaluation cannot be made at this time.

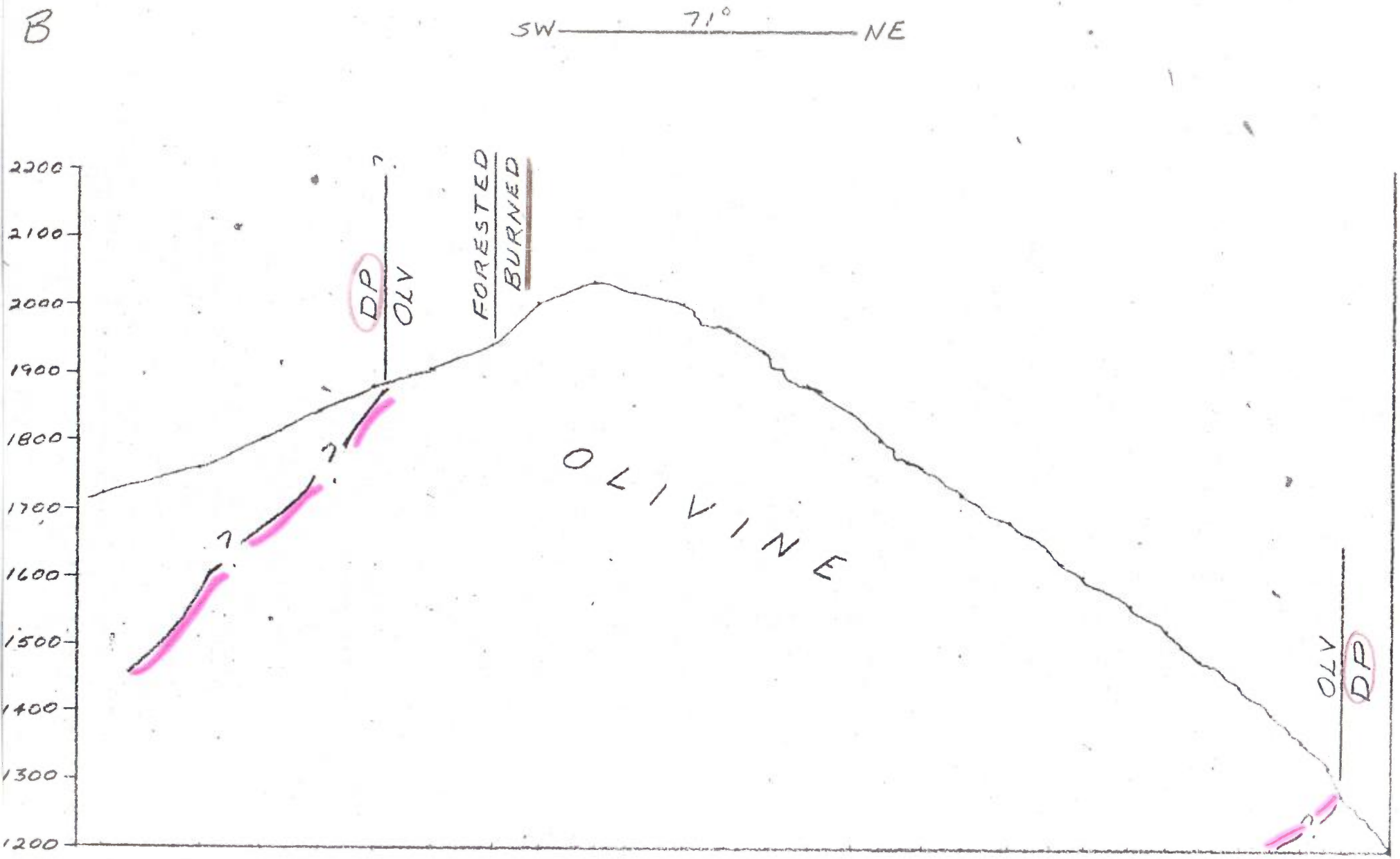
## RESERVES

The known dimensions of this deposit indicate an unusually large tonnage of olivine, even though neither of the horizontal dimensions can be determined accurately, owing to the scarcity of outcrops within the indicated and inferred olivine outcrop areas shown on Plate I. The upper portion of the vertical dimension is shown by the differences in elevation between the highest outcrop and the approximate contact along the slopes of the ridge (see longitudinal and cross sections); also, the shallow diamond core holes of Conwest penetrated only the uppermost 100-odd feet. Although the bottom of this deposit is not known, its apparent attitude indicates a deep vertical extension below observable points at ground surface. Total reserves should exceed 100 million tons.

Considering the magnitude of this deposit, a conscious effort was necessary to maintain conservative reserve figures: tonnage factor used is 11 cubic feet per ton; total volume in each category was reduced to account for irregularities in the erosion surface, waste zones, and other possible conditions. Dimensions (feet) applied to various reserve categories and other factors are noted below:

| | Measured | Indicated | Inferred |
|---|---|---|---|
| Length | 6000 | 6000 | 8000 |
| Width | 200 | 200 | 400 |
| Depth | 100 | 300 | 300 |
| Volume reduction | 30% | 40% | 50% |
| Adjusted tonnage | 7,000,000 | 20,000,000 | 43,000,000 |

Total tons - 70,000,000




FORSTERITE HILL
QUEBEC, CANADA
X-SECTION B-B'

FIGURE 3

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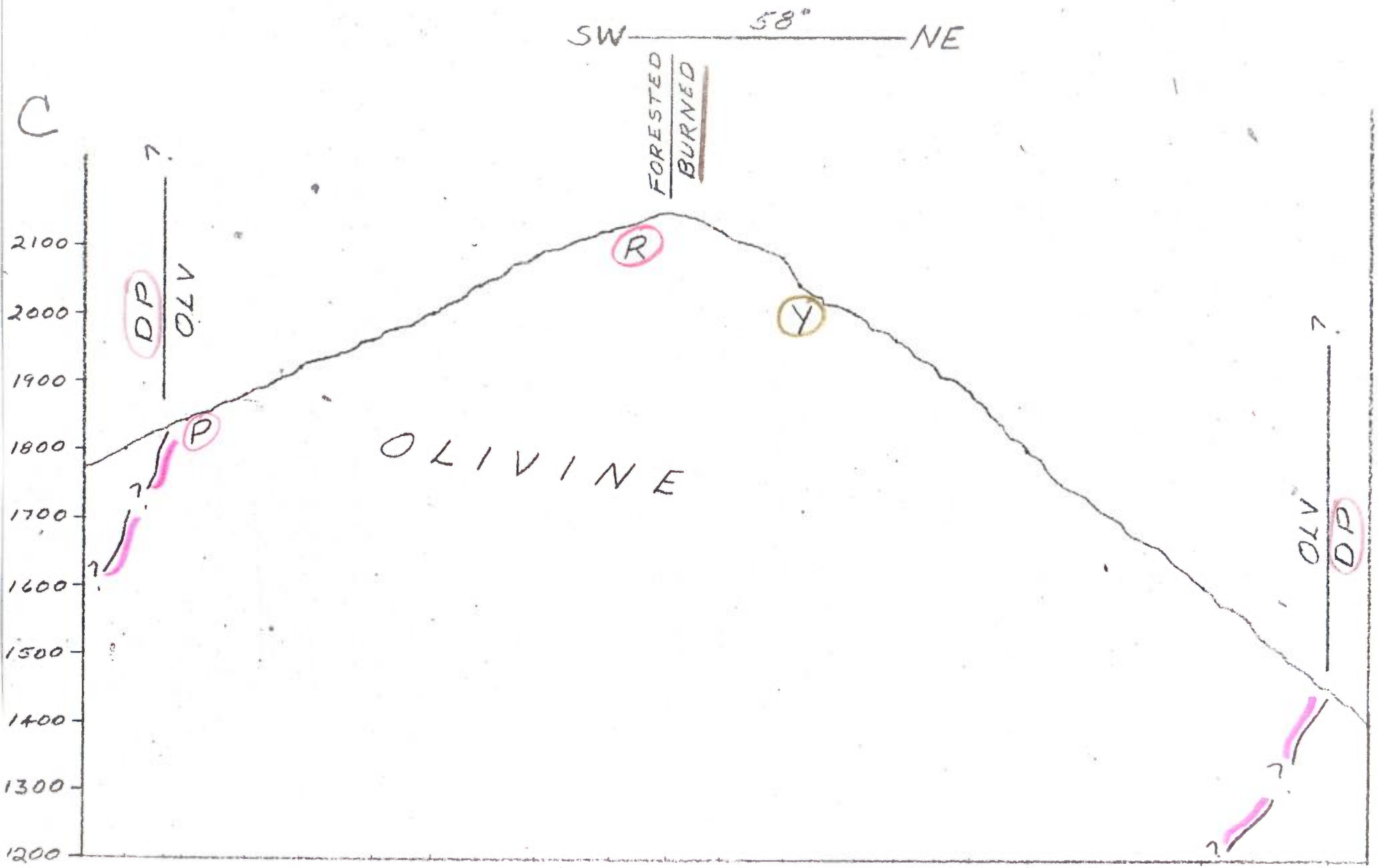


FORSTERITE HILL
QUEBEC, CANADA
X-SECTION C-C'

FIGURE 4

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Geological Map - Gaspe Peninsula, by H. W. McGerrigle (1953) and W. B. Skidmore (1967); Geological Exploration Service, Department of Natural Resources, Quebec.

Various Conwest company reports and correspondence in Geology files.