Program

major and trace-element chemistry corresponds closely to that of other kimberlites around the world. Ground magnetic and airborne EM-magnetometer surveys failed to indicate diagnostic responses.)

The Rocky Mountain diatremes appear to have been intruded in response to a period of mid-Devonian uplift and, with the exception of the original discovery, cannot be classified as kimberlites.

Paper 14—4:00 p.m.
Wall-Rock Alteration at the Sullivan Mine, Kimberley, British Columbia.
DAVID R. SHAW and C. JAY HODGSON, Department of Geology Queen's University.

The Sullivan orebody is a conformable Pb-Zn-Ag deposit hosted by metasediments of the Helikian Aldrige Formation. The deposit consists of two distinctive parts, an eastern part and a western part, characterized by major differences in footwall rocks, ore zone and hanging-wall rocks. In the eastern part of the mine, ore occurs as bedded sulphide rock interbedded with metasediments. Footwall and hanging-wall rocks are well bedded and have undergone little physical or chemical modification. In contrast, in the western part of the mine, ore occurs in a conformable lens consisting of a core of massive pyrrhotite, overlying bedded pyrrhotite-sphalerite-galena ore, and a central pyrite-rich zone which transects both massive pyrrhotite and overlying ore. The western part of the orebody is underlain by zones of breccia and vein-form and disseminated sulphide minerals, and is underlain and overlain by rocks rich in tourmaline, albite, chlorite, pyrite and other minerals not abundant in the eastern part of the mine.

Detailed mapping has shown that many of the unique rock types which occur in the footwall and hanging wall, and within the ore zone in the western part of the mine, are products of hydrothermal alteration. Tourmaline-rich metasediments (tourmalinite) underlie most of the western portion of the orebody, and extend at depth to at least 450 m below the ore zone. Metasediments enriched in chlorite, garnet and biotite, metasediments enriched in K_2O and depleted in Na_2O and CaO, and tourmalinite which has been altered to a rock very similar to ordinary tourmaline-poor metasediments occur along the eastern margin of the footwall tourmalinite zone. In the center of the tourmalinite zone, tourmalinite is locally altered to a rock rich in either albite, chlorite and pyrite or chlorite and pyrrhotite. Within the sulphide lens, the massive pyrrhotite zone has formed by alteration of bedded pyrrhotite-sphalerite-galena ore, and the central pyrite-rich zone has formed by alteration of both massive pyrrhotite and ore. In the hanging wall of the sulphide lens, rocks rich in albite, chlorite and pyrite occur up to 100 m or more above the ore zone in an area which overlies mineralogically similar alteration zones in the ore zone and footwall rocks. There are also minor volumes of tourmalinite present in the hanging-wall sediments.

The Sullivan orebody is interpreted as a synsedimentary, hydrothermal-exhalative deposit, and the western portion of the mine as the vent zone of the hydrothermal-exhalative system. Initial discharge of fluids from this system produced tourmaline-enriched footwall sediments, possibly in part as a pre-ore exhalative deposit, but mainly as an epigenetic alteration of footwall sediments. During the second stage of evolution of the system, exhalative pyrrhotite-sphalerite-galena ore was deposited at the sediment-seawater interface and then altered to massive pyrrhotite as the ore was buried beneath accumulating exhalative sulphides. During the final, post-ore stage of activity, hanging-wall sediments, ore, massive pyrrhotite, and footwall and hanging-wall tourmalinite were altered to rocks composed dominantly of albite, chlorite, pyrite and calcite. Some of the hanging-wall albite and chlorite-rich sediments may be exhalative deposits, but most are epigenetic alteration products.

2:00 p.m. SESSION 5, Milling and Metallurgy, with ARTHUR H. WINCKERS, Production Superintendent, Cominco Ltd.

Paper 15—2:00 p.m.
Post-Leach Flotation at Pine Point Mines Ltd.
B.M. LABADIE, Operating Metallurgist, Pine Point Mines Ltd.

Paper 16—2:30 p.m.
Oxidative Pressure Leaching of Zinc Concentrates.
E.G. PARKER, Senior Research Chemist, Cominco Ltd.

Sherritt Gordon's zinc pressure leaching process converts zinc sulphide concentrates directly to zinc sulphate solution and elemental sulphur. In 1977, Cominco Ltd. and Sherritt Gordon Mines Ltd. jointly operated a three-tonne-per-day pilot plant to demonstrate pressure oxidative leaching of Sullivan Mine zinc concentrate and the subsequent separation of elemental sulphur. Following the successful pilot operation, Cominco began building the world's first commercial zinc pressure leaching plant. This paper describes the general process principles, the results obtained from the pilot plant and the integration of the process into Cominco's operation at Trail, B.C. The application of pressure leaching to a "grass-roots" plant is also discussed and compared with conventional leach roasting.

 CIM Dept 6 Kimberley Oct 1980.