

Paper 17—3:00 p.m.

Heap Leaching of Gold and Silver Ores in the Little Rocky's.
H.A. SCHOLTZ, Landsby Mining, Zortman, Montana.

Paper 18—3:30 p.m.

Flotation Models.
A. MULAR and K. CHENG, University of British Columbia.

Saturday, October 25, A.M.

**9:00 a.m. SESSION 6, Mining, with
KEITH J. DURSTON or alternate**

Paper 19—9:00 a.m.

The Case for Fire-Resistant Fluids.
T.G. CARTER, Senior Mechanical and Electrical Inspector, British Columbia Department of Energy, Mines and Petroleum Resources.

Paper 20—10:00 a.m.

The Selection and Use of Fire-Resistant Hydraulic Fluids for Underground Mining Equipment.
A.J. HARRISON, General Sales Manager, Production Supply Company Ltd., Vancouver.

The general utilization and application of fire-resistant hydraulic fluids throughout the many facets of industry over the past 20 years has been achieved with success. However, the transition from conventional mineral hydraulic oils has not been without its problems during that time.

The technology required in designing equipment for use with fire-resistant fluids may be akin to that associated with conventional mineral oil, but in many respects a whole variety of additional and/or alternative considerations must be taken into account.

During the initial introduction of fire-resistant fluids to the Canadian underground mining industry, it was found that all hydraulic systems for which they were being considered were originally designed for mineral oil operation. This meant that each system had to be individually examined and assessed with regard to its suitability in terms of acceptable component life and operation. It has been found that by modifying the design of some systems and derating the operational parameters of individual components it is possible to achieve a system performance which is comparable to that obtained when mineral oil is used.

Paper 21 — 11:00 a.m.

Cominco Mining Explosives Practice.
W. RUSSELL, Explosives Development Engineer, Cominco Ltd.

**9:00 a.m. SESSION 7, Coal Mining, with
ARIST A. BRUEMMER or alternate**

Paper 22—9:00 a.m.

Control of Coal Quality at Kaiser Resources Ltd.
D.P. SHARMA, Manager, Quality Control, and
L.M. DWARKIN, Consultant, Kaiser Resources Ltd.

Paper 23—10:00 a.m.

Computerizing Load-Out Facilities.
T. SKINNER, Senior Systems Analyst, Fording Coal Ltd.

Paper 24—11:00 a.m.

The Use of Vertical Rock Drains Through Coal Mine Spoils at Fording Coal.

J.P. LANE, Reclamation Officer, and
R.J. BERDUSCO, Administrator of Environmental Services, Fording Coal Limited.

Open-pit mining for multiple coal seams in deep mountainous terrain poses many engineering and environmental problems. One major difficulty that must be overcome is the placement of large volumes of spoil in a narrow deep valley situation. The necessity to utilize all available spoil areas has promoted the use of vertical rock drains to allow spoiling in drainages while maintaining stream flows and spoil dump stability. The alternatives to the use of rock drains and the design principals involved are discussed.

**9:00 a.m. SESSION 8, Geology, with
PAUL W. RANSOM or alternate**

Paper 25—9:00 a.m.

Geologic Setting of Recently Discovered Shale-Hosted Barite-Lead-Zinc Deposits in Northeast British Columbia.
DON G. MacINTYRE, British Columbia Ministry of Energy, Mines and Petroleum Resources.

Potentially economic shale-hosted barite-lead-zinc occurrences have recently been discovered within the Rocky Mountain Fold and Thrust Belt of northeast British Columbia. This new mineral district is over 180 kilometres long and includes six major occurrences, namely Driftpile Creek, Mt. Alcock, Cirque, Fluke, Pie and Elf. The Cirque is the largest known deposit, with reserves in excess of 30 million tonnes grading 10% combined lead-zinc and 45 grams

per tonne silver. The host rocks for the Cirque and other deposits in the area are Middle to Upper Devonian carbonaceous black shales, siliceous argillites and cherts (Gunsteel "Formation"). These rocks overlie a succession of proximal to distal turbidites which are the basinal equivalent of platform carbonates to the east. The Devonian rocks are not well exposed and are typically restricted to synclinal troughs that have been overridden by thrust plates of older, more resistant strata.

The mineralized interval of the Devonian succession appears to be present throughout the basin of deposition, typically consisting of thin beds of nodular barite with interbedded pyrite laminae. This interval locally thickens and grades into lense-shaped bodies of massive bedded barite which may, or may not, contain sphalerite and galena. Minor zinc and lead mineralization is also found in lenses of laminated pyrite which are spatially associated with the bedded barite deposits.

Preliminary stratigraphic and sedimentological investigations suggest that the local thickening of the barite horizon is due to accumulation of brines in a third-order basin or trough. The mineralizing event appears to be associated with synsedimentary faulting and the development of graben and horst-type structures within the sedimentary basin, and is apparently contemporaneous with the beginning of a major marine transgression (crustal downwarping?) in Upper Devonian time. Dewatering of metal-enriched shales and subsequent brine discharge along interbasin faults, with the exhaled brines accumulating in seafloor depressions, is the mechanism envisaged for formation of the deposits. Convective circulation systems may have been established about the more deep-seated faults, in response to elevated heat flow levels.

Paper 26—9:30 a.m.

The Cirque Deposit.
W. ROBERTS, Cyprus Anvil Ltd.

Paper 27—10:00 a.m.

The Stratigraphic Setting of Lead-Zinc Occurrences in Howards Pass.
J. MORGANTI, Placer Development Ltd.

Paper 28—10:30 a.m.

Lead-Zinc in the Selwyn Basin.
S. BLUSSON, Geological Survey of Canada.

Paper 29—11:00 a.m.

Computer Applications in Geology at Butte, Montana.
Anaconda Ltd. (author to be announced)

**9:00 a.m. SESSION 9, Milling and Metallurgy, with
ARTHUR H. WINCKERS or alternate**

Paper 30—9:00 a.m.

Trail Modernization.
Group presentation by Cominco staff from the Trail Smelter.

Paper 31—10:00 a.m.

Process Control.
K.A. FORGAARD, Superintendent, Processing, Fording Coal Ltd.

Paper 32—10:30 a.m.

Instrumentation Changes.
C. BROWN, Island Copper Mines Ltd.

Saturday, October 25, PM

**2:00 p.m. SESSION 10, Mining, with
KEITH J. DURSTON or alternate**

Paper 33—2:00 p.m.

Experience Related to Hygiene Problems with Lead Oxides.
H. TEINDL, Industrial Hygienist, Cominco Ltd.

Paper 34—3:00 p.m.

A Model "T" for Hydraulic Drilling.
DONALD R. MacLEAN, MacLean Engineering & Marketing Co. Ltd., Thornbury, Ontario.

Hydraulic drills when first introduced were very expensive, large, sophisticated, delicate and suitable for holes over 1 3/4 inch. These traits, although acceptable for tunnelling and some large ore deposits, tended to preclude the use of hydraulic drills in much of Canadian underground mining despite high performance, low energy requirements, low parts consumption, and improved environmental aspects such as noise and fog. Recent developments have produced a family of hydraulic drills for 1 1/4-inch holes using 7/8-in. hex collared steel. They are very rugged, operate like a jackleg, weigh less than 50 lb and cost no more than a pneumatic drifter. This technical breakthrough has the factors required to produce a revolution in Canadian underground mining. The paper will cover the physical and technical aspects of the drill, applications to date and plans for future development.

Paper 35—4:00 p.m.

Problems with Diesels and Advances in Electrification.