

## Richard Dubinsky

"Today, not tomorrow is the time to talk about energy," said York University President H. Ian Macdonald, at the opening of last weekend's Gerstein Conference on Energy Sources for the Future.

Macdonald stressed the urgency of the energy problem, and the importance of the university in solving it. "The university is still the most important vehicle to train and provide researchers for Canada," he said.

### Oil Sands:

*"This is our solution to Canada's energy needs."*

The first of the conference's speakers was Dr. Maurice Carrigy, geologist and Vice-chairman of the Alberta Oil Sands Technology and Research Authority, who described the vast resources of Bitumen, a semi-solid resinous black substance mixed with sand, found throughout Alberta. "Our objective is to turn this into something that can be used in the gas tank." According to Carrigy, "This is our solution to Canada's energy needs."

Present reservoirs of Canada's oil are expected to last thirty years, but if a successful way is found to extract oil and gasoline from the bitumen impregnated tar sands, then Canada's energy needs can be met for many more.

Various techniques to achieve this were described.

While the use of hot water and steam has been the only economical means found to date, various techniques to achieve this were described. One alternative is solvent extraction. However, Carrigy stated that "it is unlikely that anything will be economically viable in this area for quite a while," because nearly 100 per cent recovery of the solvent is required for this process to be commercially successful. Other current projects were outlined; Hydrogen can be used to upgrade the bitumen for a higher liquid yield; injecting air for combustion of the tar sands is feasible but doesn't work according to the theory; the use of nuclear explosives were considered but despite the fact that much heat is generated for a short period, this is not as efficient as oil or steam. Carrigy closed his talk by saying that "it seems impossible that we will have to depend on bitumen in the 21st century but I cannot see a better method on the horizon."

**Nuclear Fission:**  
*"Canada is a leader in handling nuclear wastes."*

The use of nuclear energy in meeting Canada's energy needs was described by Dr. Eugene Critoph, Vice President of the Atomic Energy of Canada Limited in his talk, "Fission Now and Prospects for the Next Century".

Critoph proposed that "Fission can provide a large contribution for the energy of the 21st century...it is an economically and environmentally attractive means for our energy needs."

Although nuclear energy plays only a small role in meeting our present needs, the fission process can be used to produce heat to turn turbines for the generation of most of our electrical needs in the

future.

Fission occurs when a neutron hits a uranium atom (U-235). This causes the atom to split into two fission producers (Barium and Krypton), two additional neutrons and energy. The energy released from a single fission reaction is equivalent to 50 million times that of a simple chemical like the burning of coal.

Critoph said the costs for a nuclear generating plant were mainly incurred for its construction and that ultimately it would be 50 per cent less expensive than fossil fuel.

The main drawbacks in the fission process are the nuclear wastes from spent fuels. However, Critoph stated that "Canada is a leader in handling nuclear wastes." Continued research and development is expected to produce uses for nuclear by-products as well as more effective storage and handling techniques, he said.

The safety factors and the efficiency of resource utilization

are also serious concerns. Canada, according to Critoph, is a world leader in nuclear energy, having developed the CANDU "Heavy Water" reactor.

"Potential improvements can be made to increase efficiency," explained Critoph. Research programs concerning the "Fast Breeder" reactor indicate that efficiency can be significantly improved and a mixture of uranium and plutonium nuclear by-products could be used for the required generation of electricity. Unfortunately much of the research in Breeder Reactors is being done outside of Canada, although Ontario Hydro periodically reviews the progress in this field.

**Nuclear Fusion:**  
*The goal is to add energy to this plasma and get more out.*

Dr. M.P. Bachynski, president of MPB technologies presented an

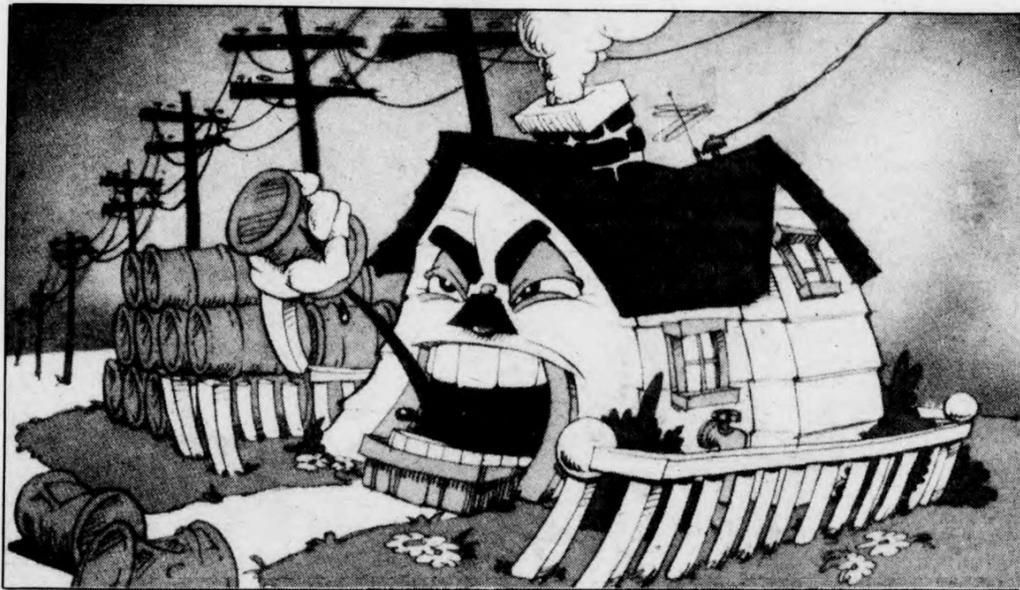
exciting talk entitled "Prospects for Fusion".

The most promising solution for future energy needs rests with fusion for numerous reasons.

The process of fusion starts with matter at a very high temperature in a "plasma" state; the goal is to add energy to this plasma and get more energy out.

Fusion may be regarded as an energy intensifier. At present this is done by combining deuterium and tritium (which are chemically identical to Hydrogen but have one or two extra neutrons in the atom respectively) and adding energy, to produce Helium (the fusion product) a neutron and more energy. The major problem is that the plasma must be maintained at a very high density and temperature. There are three approaches for doing this: Hold the plasma together using magnetic field forces (i.e. the Tokamak technique); be able to

See 'Fusion', page 7.



## Energy future threatened

### Jim Kolisnyk

Political and economic threats to Canada's energy security troubled two speakers at last week's Gerstein Conference.

In an address entitled "The Other Term in the Equation" delivered at the conference banquet Thursday night, James Gillies said that current oil pricing disputes have exposed a "Gordian Knot" of federal-provincial conflicts which contains the "seeds for the destruction of Canada."

In his view, only by cutting oil pricing free of the knot will a proper pricing scheme be found.

A prominent energy policy advisor in Joe Clark's Conservative government, Dr. Gillies believes that regional antagonisms in Canada result from having a political system "clearly designed for conflict."

How can we expect the people in western Canada to live with decisions made in Parliament," he asked, noting the lack of Liberal MP's west of Manitoba.

Gillies expressed support for a more rapid increase of domestic crude oil prices to world levels, arguing that such a move will create both the \$200-billion that industry needs by the year 2000 to supply Canada's oil needs, and an "unprecedented" boom for a national economy supplying a burgeoning West with goods. He also said that this policy would provide federal coffers with tax

revenue that could finance the national debt.

But the Professor of Policy and Environment in the Faculty of Administrative Studies remains doubtful that this proposal will be accepted federally without a battle. He commented that "It is impossible to articulate how difficult federal and provincial negotiations are."

Conversely, economic reality forms the basis of George Sinclair's fear of continued dependence on rapidly depleting fuels. Experienced as both an innovator and

entrepreneur of fusion technology, he has come to believe that only industrial innovation can solve this problem, and insufficient investment in energy innovators stymies realization of this solution.

Remarking Friday that "There will be no solution to the energy crisis," since financing innovative firms "is a very poor investment," he presented a sobering reflection on this second integral "term" in the Canadian energy security "equation".

## Ontario could produce relatively inexpensive oil

### James A. Carlisle

Ontario Hydro could produce 45,000 barrels of synthetic crude oil every day as a byproduct of its thermal generating plants, according to the Vice-President of Alberta's Energy Resources Conservation Board.

Dr. Norbert Berkowitz, a leading expert on coal technology told students and scientists at the Energy Sources for the Future Conference Thursday, "If Ontario Hydro would flash pyrolyze its coal before burning, it could produce an amount of synthetic crude equal to the Suncor Tar Sands Project."

Based on studies done at pilot plants in Alberta, the scientist concluded that the Hydro-produced oil could fulfill 7 per cent of Ontario's needs and still cost less than crude from the West. "Upgraded synthetic crude could be produced for \$23.10 per barrel," he said. "That is two-thirds to three-quarters of the estimated required price for the oil sands projects."

When questioned about the time and cost of introducing such a coal conversion process, Berkowitz replied that the initial investment would be 263 million dollars and the plants could be built in two or three years.

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