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Oil from Alberta's tar sands – NRC process may be the answer

For Canadians, one of the most important factors in the equation balancing future energy supplies and needs is the bitumen locked in the vast tar sand tracts of northern Alberta. The total reserves of synthetic crude oil that lie under these forested plains has been estimated at 1,000 billion barrels, of which 250 billion barrels (or 70 per cent of the Middle East reserves) are recoverable by today's extraction technology. The problem, at least for the present, is in the expense of removing the sand from the bitumen, a task made more difficult in many areas of the beds by the presence of clay, which tends to bond the two materials together.

Spherical agglomeration

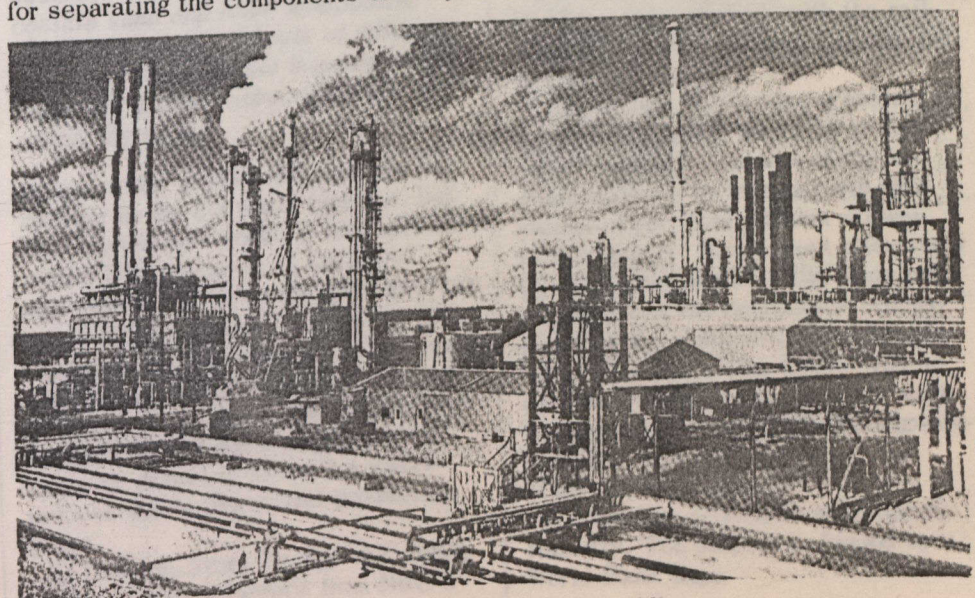
One attractive alternative to the existing technology that has received attention in the last few years is a process developed by the National Research Council of Canada's Division of Chemistry called spherical agglomeration. Dr. Ira Puddington, who recently retired as director and now acts as a consultant to the Division, is one of the principal scientists involved in the work. According to Dr. Puddington, spherical agglomeration is a general technique for separating the components of many kinds of mixture, with tar-sand extraction currently one of its more visible applications.

The name of the process describes its essence. When a mixture is suspended in an appropriate liquid and the right experimental conditions introduced, one or more of its components agglomerate or "pelletize" into spheres that separate readily from the remaining material.

"If the technique is used to upgrade ore, it is often the formed spheres that contain the valuable material," says Dr. Puddington. "In other instances, such as the upgrading of coal, it can be the unwanted impurities that pelletize, leaving the coal behind. This is the case with tar-sand extraction, where sand and other undesirable substances are agglutinated into spheres, leaving the valuable hydrocarbons that make up bitumen behind in solution."

New method

As Dr. Puddington describes it, the process begins with the dispersion of untreated tar sand in a tank containing kerosene, followed by agitation of the system: The bitumen hydrocarbons dissolve because they are hydrophobic (literally, "water-hating"), while the sand and other hydrophilic (water-



Information Canada

Great Canadian Oil Sands refinery, Fort McMurray, Alberta.