

Researchers extract methane gas from under permafrost

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Mackenzie Delta - Researchers working at the Mallik site in the Mackenzie Delta have successfully extracted methane gas from frozen gas hydrates found beneath hundreds of metres of permafrost.

The project was jointly funded by the governments of Canada and Japan. Natural Resources Canada and the Japan Oil, Gas and Metals National Corporation worked in partnership with help from the Aurora Research Institute in Inuvik acting as the operator for the project.

Gas hydrates are a potential energy source found in permafrost environments and under the sea floor. They form when water and methane gas come together under extreme pressure and in a cold environment. The water and gas are frozen together at a molecular level. One cubic metre of gas hydrates contains 164-cubic-metres of methane gas, and 0.8 cubic metres of water.

When frozen gas hydrates are heated or undergo a change in pressure, they melt. The water runs off and the methane gas is released.

This is not the first time this research team has extracted methane from gas hydrates. In 2002 they drilled down at the Mallik site and heated the gas hydrates to bring methane to the surface. Using heat required a large input of energy. In this experiment they lowered the pressure of the gas hydrates. Lowering the pressure for extraction required significantly less energy than heating.

Scott Dallimore, with Natural Resources Canada and chief Canadian scientist for the program, said the results of the Mallik tests were promising.

"A sustained flow (of methane) was observed," he said.

Since this is only a research project, and not a commercial venture, most of the methane was brought to the surface and burned off. There was no attempt to capture the methane.

The Japanese are interested in tapping undersea gas hydrate reserves off their coast, but they must first find out if it is economically feasible. The Mallik site is of interest to them because it is easier and cheaper to research the gas hydrates from the surface.



Masato Yashuda, left, of the Japan Oil, Gas and Metals National Corporation stands with Andrew Applejohn of the Aurora Research Institute and Scott Dallimore of Natural Resources Canada. The three groups worked together on the Mallik methane gas project in the Mackenzie Delta. - photo courtesy of Scott Dallimore

Dallimore said this was only early research, and it could be years before it is ever determined if gas hydrates are economically and environmentally feasible as an energy source.

As a fuel, methane is much cleaner burning than gasoline or oil. If countries like Japan could tap into gas hydrates they could significantly reduce their greenhouse gas emissions.

However, methane gas can release naturally from certain permafrost environments and on its own it is a potent greenhouse gas that is 21 times more active than carbon dioxide.

"We need to undertake long-term research and development and quantify the amount of gas hydrates in the Delta if we want to realize the commercial potential," said Dallimore. "We also must address environmental issues including the processes controlling methane release in the natural environment."

Inuvik Mayor Derek Lindsay said he was pleased with the results of the research so far, and that Inuvik could use the jobs that a new energy sector might bring, even if it is decades away.

"I think it's great and I'd like to see it continue," said Lindsay.