

# Downhole Microsensors for Improved Hydrocarbon Recovery

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## **Abstract**

*In November of 2012 the Petroleum Technology Research Centre (PTRC), along with its Dutch research partner INCAS<sup>3</sup>, achieved a major oil field milestone when nodes of variable sized (5, 7 and 9 mm) were injected into a well at a heavy oil reservoir and later recovered from a production well. The nodes – approximately 20,000 in total, and corresponding to the shape and size of microsensors under development by INCAS<sup>3</sup> – travelled the almost 350 metres in the space of two days. Close to 10% of the nodes were recovered.*

*The PTRC-INCAS<sup>3</sup> Innovation Centre (PI Innovation Centre, for short) is working with private sector partners to move field trials of these microsensor technologies forward in heavy oil regions of Saskatchewan and Alberta, with next steps including the actual injection of the sensors and the testing of communications between sensors and the surface. It is hoped that the mapping of CHOPS reservoirs will allow for optimal drilling and waterflood use and a doubling of recovery from these difficult-to-access deposits.*

*The PI Innovation Centre is also looking into field application of these microsensors to tight oil formations, such as the Bakken, where hydraulic fracturing with horizontal wells creates pathways within the reservoir for sensors to potentially pass and communicate reservoir characteristics to the surface. Such information would prove invaluable for the more effective water use, fracturing, and ultimately better exploitation of these wells.*

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**Dr. Malcolm Wilson** became the Chief Executive Officer of the Petroleum Technology Research Centre in Regina in 2011. As CEO he has overseen the International Energy Agency's Greenhouse Gas Weyburn-Midale CO<sub>2</sub> Monitoring and Storage Project – a research program that he was instrumental in starting in 1998. The recent publication of the Best Practices Manual from that project was the culmination of the most extensively monitored CO<sub>2</sub> storage project in the world. The PTRC has since moved on to develop Aquistore, which will investigate the storage of carbon dioxide in a deep saline formation in the Williston Basin in southern Saskatchewan, and continues to operate an on-going enhanced oil recovery research program. Dr. Wilson sits on the Executive Committee of the IEA's Greenhouse Gas R&D Programme.