



## Post-CHOPS Oil Reservoirs

Cold Heavy Oil Production with Sand (CHOPS) is a method that accelerates recovery of oil from unconsolidated sands by coproducing the sand.

However successful, this technology leaves reservoirs with often 85 to 90 per cent of the initial oil still in place, the solution gas that drives recovery depleted and a network of open channels – or “wormholes” – within the formation.

These wormholes, however, can act as quasi-horizontal wells for subsequent enhanced oil recovery.

**The Saskatchewan Research Council (SRC) offers two approaches of innovative advancement for post-CHOPS reservoirs:**

- Mobility control in wormholes
- Design and support of enhanced oil recovery processes that take advantage of wormholes



3-D physical model

## Mobility Control in Wormholes

Operators need to control how the in-situ fluids or the injected recovery agents flow around and through wormholes during waterfloods or other recovery practices, thereby obtaining effective conformance. SRC is studying how to properly apply two forms of gelling mobility agents, one to seal the dilated zone around wormholes and the other to seal off the wormholes themselves.

## Design and Support of Enhanced Oil Recovery Processes That Take Advantage of Wormholes

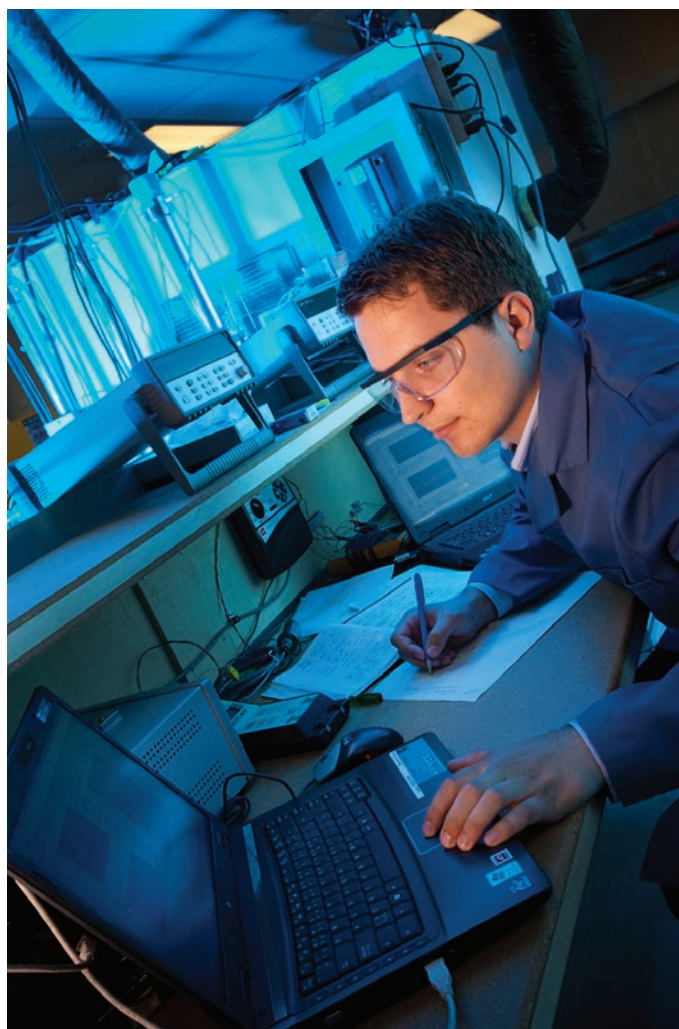
### *Solvent Vapour Extraction*

In solvent vapour extraction processes (like Vapex), the greatest challenge is how slowly solvents dissolve into viscous oils. Wormholes can be used to help distribute solvents inside a formation to improve their contact with the oil. SRC offers laboratory tests that show how operating conditions further enhance or restrict these rates. Research over the past several years has given SRC experts helpful insight into these processes.

### *Post-CHOPS In-Situ Combustion*

SRC is promoting the formation of a consortium to develop and test an in-situ combustion process that will take advantage of wormholes as pathways for producing the heated, mobilized oil quickly. The Lloydminster heavy oil region is the target for this initiative.

SRC also provides laboratory and simulation support to this and other in-situ combustion pilots by measuring the key reaction rates and fitting them to simulator-friendly reaction models.



Simulating wormholes

We conduct applied research, development, design, testing, piloting, scale-up, demonstration and technology commercialization relevant to our strategic economic sectors. We use the knowledge gained to help clients solve technology problems, make improvements, seize opportunities, maintain competitiveness, increase productivity and develop new markets.