

## Steam Additive Pilot to Enhance Thermal Recovery Efficiencies of Heavy Oil

Steam Assisted Gravity Drainage (SAGD) is a major oil recovery technology of the Alberta oil sands resources. This process involves injecting large amounts of steam into the reservoir to recover the bitumen. The steam is generated by burning natural gas, which creates CO<sub>2</sub> emissions and operational costs. An efficiency metric, the steam-oil ratio (SOR), is a common parameter used to measure the SAGD efficiency by measuring the unit volume of steam injected to recover unit volume of oil. Canadian Natural has been investigating using steam additives to improve SOR over the past several years. A new chemical has been identified through lab tests to have the potential to lower the SOR by increasing the needed to recover the resource.



**RECIPIENT:**  
Canadian Natural  
Resources Limited



**PARTNERS:**  
ChampionX



**TOTAL BUDGET:**  
\$2,573,333



**AI FUNDING:**  
\$900,000



**PROJECT DATES:**  
FEB 2024 –  
DEC 2026



**PROJECT TRL:**  
Start: 4  
End: 8

### APPLICATION

The new additive is a patented ether amine family with unique characteristics that makes it distinctive from other additives used in past industry trials. This newly formulated additive was developed by ChampionX, one of the largest oil field chemical suppliers, and lab tested in a simulated field condition at InnoTech Alberta, which is one of the leading research labs in Alberta. The lab test results suggest that meaningful improvement in oil production at the same steam injection rate in a steam assisted recovery process can be achieved by co-injection of a small amount of the additive (less than 0.1 wt%) with steam, resulting in GHG emissions reduction and freshwater usage reduction.



### PROJECT GOALS

Canadian Natural intends to consider further advancement of this technology by conducting a pilot to test the newly developed steam additive in a field demonstration.

### BENEFITS TO ALBERTA

- Improvement in energy efficiency and reduction in GHG emission intensity: The proposed steam additive process is expected to reduce steam oil ratio (SOR) by approximately 20% based on lab test results conducted by Innotech Alberta.
- Lower water usage intensity: Lower steam intensity may result in lower water usage intensity to produce the same oil and reduced operating costs per unit of produced oil.



## CURRENT STATUS

**MAR 2026**

Phase 1 test completed in Q3 2025 with encouraging results. Plan to start Phase 2 test in Q2 2026 to further investigate the technology.