

CLEAN RESOURCES

ADVANCED HYDROCARBONS

CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

FUNDING DETAILS

Enhanced Gravity Drainage Instrumentation

Imperial is testing the deployment of advanced down-hole instrumentation to enhance the bottom-hole surveillance of Gravity Drainage processes (e.g. Steam-Assisted Gravity Drainage (SAGD), Solvent-Assisted Steam-Assisted Gravity Drainage (SA-SAGD)). The enhanced surveillance will enable monitoring of steam chamber pressure, shape, distribution and the fluid flow conditions within the wellbore. The advanced down-hole instrumentation includes digital temperature sensor (DTS) by fiber optics and high pressure-high temperature pressure and temperature sensors. These instruments are installed in the horizontal producer well of one of the Cold Lake Pad T13 well-pairs.



RECIPIENT:
**Imperial Oil
Resources Ltd.**



PARTNERS:
N/A



TOTAL BUDGET:
\$1,078,000



AI FUNDING:
\$263,333



PROJECT DATES:
**MAR 2018 –
JAN 2021**



PROJECT TRL:
**Start: 7
End: 9**

APPLICATION

The enhanced surveillance will enable prevention of steam bypass from injector well to producer well resulting in reduction in steam to oil ratio (SOR) and the associated GHG emissions and water use per barrel of the produced bitumen. In addition, it will provide an alternative to use of seismic surveys to map the extent of steam chamber resulting in reduction in land use and disturbance.



ALBERTA INNOVATES CLEAN RESOURCES

ADVANCED HYDROCARBONS

CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

PROJECT GOALS

- This field trial will determine the technical feasibility of the advanced down-hole instrumentation coupled with the analysis workflows to estimate the liquid level variation and the chamber volume distribution along the horizontal well.
- Pending the successful trial of the instrumentations and the workflows, the project is aimed to demonstrate the ability to deliberately vary liquid level along horizontal well with operation feedbacks.
- It will assess the potential to relate, predict and prevent the steam coning events resulting in reduced steam and water use and the associated GHG emissions per barrel of the produced bitumen.

BENEFITS TO ALBERTA

- Improved efficiency of water use and natural gas combustion, reducing energy intensity and water make up intensities per barrel of bitumen produced.
- Increases in production efficiencies extending the economic life of well pairs reducing the volume of new wells to be drilled (and associated disturbance) to maintain plant production levels.
- Commercial implementation of this technology will encourage growth in the instrumentation service sector, providing potential opportunities for redeployment of underemployed HQSP in Alberta.
- Reduced seismic surveys in support of SAGD operations resulting in the reduction of supply cost of bitumen, reduction in land use and disturbance and the potential to accelerate the reclamation of disturbed lands to promote native habitat and species recovery



1 Publication



**1 – 10 Students
Trained**



1-10 Project Jobs



**10-200 kT/yr Future
GHGs Reduced**

CURRENT STATUS

JAN 2021

The project is complete. The advanced down-hole instrumentation and surface data acquisition systems were successfully deployed on one of the production wells of Pad T13. Following a number of remedial actions, high quality data were collected and analyzed providing insights into the feasibility of the technologies and their viability for field deployment. The Final Report including results from the project will be released In January 2022.