

CLEAN RESOURCES

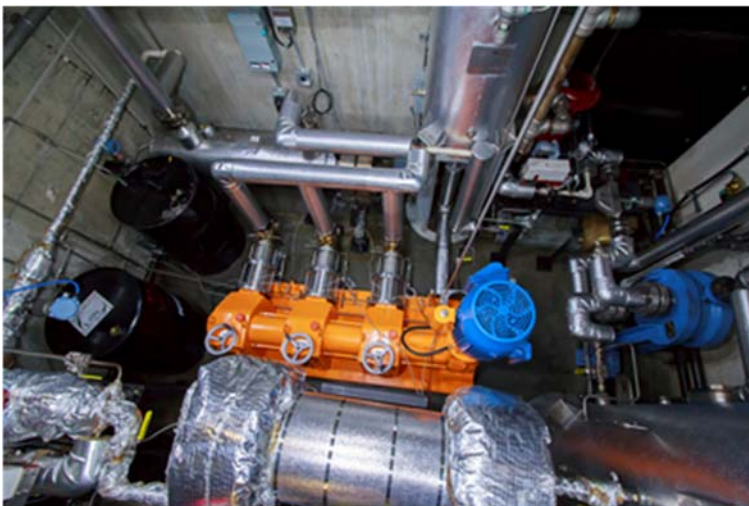
ADVANCED HYDROCARBONS

CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

FUNDING DETAILS

EVALUATING THE BENEFITS OF SOLVENTS AND FLOW CONTROL DEVICES FOR THERMAL PRODUCTION

Combining Flow Control Device (FCD) technologies with in-situ bitumen recovery processes, utilizing pure solvent, steam and solvent, or an optimized SAGD process involving injection of Non-Condensable Gas (NCG), has the potential to significantly reduce Alberta's greenhouse gas (GHG) emissions. However, optimizing the integration of these technologies will require an understanding of the complex thermal-hydraulic behaviour of these devices that would occur in these unique operating conditions. This project will first upgrade an existing high-temperature FCD test facility to enable full-scale testing of FCDs at these challenging operating conditions. To determine which devices are ideal for these processes, a variety of FCDs will be tested, including conventional FCDs, FCDs for (SAGD), or new device architectures specific to the above-listed recovery processes.



RECIPIENT:

C-FER Technologies



PARTNERS:

Suncor Energy
Imperial Oil
Cenovus Energy
Canadian Natural



TOTAL BUDGET:

\$3,058,402



AI FUNDING:

\$1,162,000



PROJECT DATES:

MAR 2019 –
JUN 2021



PROJECT TRL:

Start: 4-6
End: 7-9

APPLICATION

The industry partners (SAGD operators) were initially the primary users of this upgraded testing facility. These operators, as well as operators who were not involved in this project, are expected to conduct additional testing now that this project is complete. Vendors who supplied FCDs for testing as part of this initial test program, as well as additional FCD vendors interested in developing their own FCD technology, are expected to also participate in their own testing once this test program is complete.

ALBERTA INNOVATES CLEAN RESOURCES

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PROJECT GOALS

- The main objective of this project is to establish an industry accessible and independently operated new test facility for evaluating the performance of FCDs under operating conditions, including:
 - pure solvents;
 - solvent-assisted SAGD; and
 - SAGD with late-life Non-Condensable Gas (NCG) injection.
- The existing FCD testing facility at C-FER will be upgraded to safely accommodate solvents as test fluids, including propane, butane, and diluent.
- C-FER will conduct hydraulic characterization testing of various FCDs, either commercially available devices, prototype devices, or even simple flow control element architectures or "shapes", resulting in data to assist operators in selecting and implementing the best technologies for these various processes and will also assist vendors with identifying ways to optimize their device designs for the various

BENEFITS TO ALBERTA

Parties who will benefit from this program include:

- SAGD Operators: will better understand the ideal technologies for their fields, which should lead to more environmentally friendly oil recovery (i.e. reduced GHG emissions and water consumption) and improved project economics.
- Albertans: this research should help to provide long-term employment security for thousands of Albertans, stable royalty income for the province, and help to improve the public image of the Alberta oilsands.
- FCD Vendors: will use the test learnings to better understand FCD performance and enable them to further optimize FCD designs.
- C-FER Technologies: will operate a new, one-of-a-kind test facility, which could attract future applied research and testing work from around the world. It is expected that this test facility will help to keep a team of employees working for up to five years.



1-3 Publications



Up to 26,000 kT/yr
Future GHGs



1-3 New Products



1-10 Project Jobs



100-200
Future Jobs

CURRENT STATUS

JUL 2021

The JIP Participants, FCD vendors and C-FER Technologies worked together to finalize the project goals (including some scope expansions), confirm a testing plan, complete the detailed design, construction and commissioning of the upgraded flow loop, and complete some initial "screening testing" of eight FCD architectures. This project is now complete.