ALBERTA INNOVATES

CLEAN RESOURCES

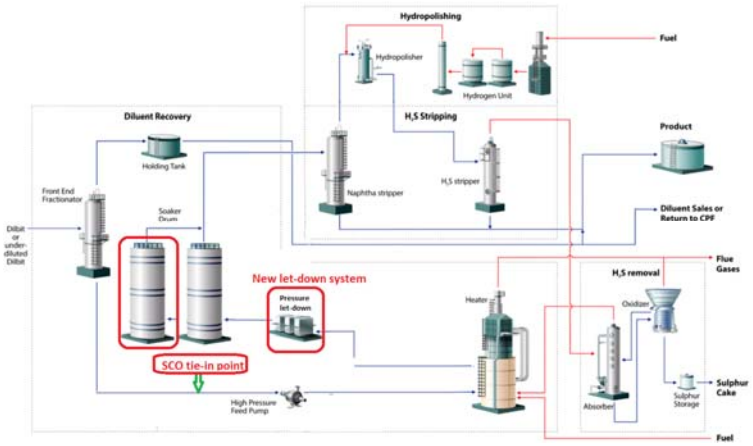
ADVANCED HYDROCARBONS

INNOVATIVE HYDROCARBON PRODUCTS – BITUMEN PARTIAL UPGRADING

FUNDING DETAILS

Husky Diluent Reduction (HDR) Technology - Market, Product and Trial

HDR technology is a novel process based on thermal cracking of bitumen in the presence of Synthetic Crude Oil (SCO) to reduce the diluent required for bitumen transportation, improve market value, and reduce energy and GHG emissions related to transportation and refining. The HDR Stage 1 demonstration was successfully completed in 2019 and most technical objectives were achieved. Stage 2 of the Project, located at Provost AB, builds on the success of Stage 1, including demonstration facility modifications to optimize the process, production of a final product, market and refinery assessments, and assessment of lifecycle GHG impacts.



RECIPIENT:
Husky Oil Operations Limited*

PARTNERS:
Alberta Innovates
NRCan

TOTAL BUDGET:
$9.9MM

AI FUNDING:
$5MM
TIER

PROJECT DATES:
MAR 2021
MAR 2023

PROJECT TRL:
Start: 7
End: 8

APPLICATION

The majority of Alberta's crude oil production is in the form of bitumen, a thick viscous fluid which needs diluent (30-40 vol%) for transportation via pipeline to U.S. refineries. Diluted bitumen typically sells at a significant discount to lighter crudes. HDR is designed to minimize the need for diluent by lightening the crude and partially replacing diluent with locally manufactured SCO. Cenovus and other SAGD producers could benefit from the technology, reducing costs and emissions which could generate further opportunities to develop the oil sands resource, creating benefits for the province and its people.

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PROJECT GOALS

- Cenovus's demonstration plant at Provost was modified to address the observed operational challenges. The main focus was screening operating conditions for HDR technology, along with evaluating other variations of the partial upgrading technology.
- The Project will focus on optimizing operating conditions to generate representative HDR sample drums for refinery acceptance and evaluation.
- The Project will resume looking to minimize the risk of commercial implementation, focusing on understanding product market pricing, product placement and acceptance.
- Successful completion of the Project will improve the project TRL from 7 to 8 (commercial ready).

BENEFITS TO ALBERTA

- Industry-wide implementation of the technology could realize new commercial opportunities as HDR facilities could be built alongside existing in-situ facilities.
- Through commercial HDR deployment, the need for imported diluent could decrease and the available pipeline capacity for crude oil export could increase.
- Significant job creation opportunities could occur.
- Commercial project implementation is expected to increase Alberta's GDP and royalties.

15 Students Trained

40 Project Jobs

4350 Future Jobs Expected

1 New Product/Service

2 Patents

Lifecycle GHG reductions expected in midstream and downstream boundaries

CURRENT STATUS

MAY 2023

The Provost, AB plant modifications and safe commissioning and startup were completed in August 2022, with the HDR Stage 2 demonstration successfully implemented from September to November 2022. Plant modifications are underway to ensure appropriate handling of sulfur emissions. The operation will complete additional activities required for commercial-ready status, including full product assays and refinery acceptance trials (to be conducted in collaboration with the Canadian Crude Quality Technical Association).

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