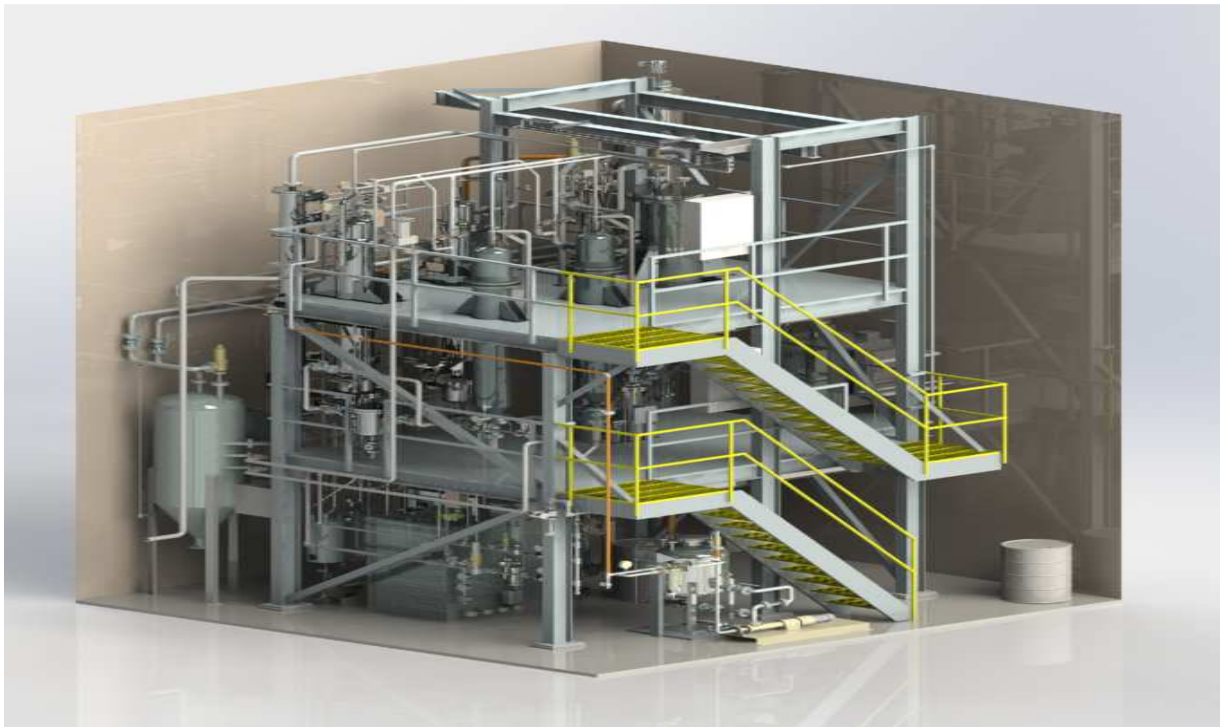


### Case Study - ETX – Design, Construction and commissioning of a Fluidized Cross-flow Oil Upgrader Pilot Plant

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ETX Systems Inc. is working towards commercializing a novel oil upgrader process. The core of the technology is an upgrader that operates with a more deliberated controlled cross flow pattern that significantly improves yields over conventional technology.

To demonstrate the technology a 1 barrel per day pilot plant was designed, built and operated. The design of the

pilot plant was done by NORAM Engineering and Constructors Ltd., with members of the ITC Group providing their expertise in the design of the multi-bed fluidized upgrader reactor system.

There were many design challenges to overcome, among them was the design of a compact fluidized reactor operating with solids moving in a plug flow pattern and the fluidization medium moving in a

cross-flow pattern. To meet the objectives, the group designed a novel compact cost effective reactor with a clever configuration to attain the required flow patterns.

The objectives of the project were to

- Demonstrate the concept of cross-flow fluidized bed coking
- Demonstrate hydrodynamic viability of the concept
- Ability to operate at lower temperatures than conventional cokers
- Demonstrate the potential product quality and yield of the process

- Verify product quality improvements

Process Key Equipment/systems:

- Liquid (pitch) storage and feed
- Feed pre-heating and injection
- Fluidization gas and metering (500-600 °C)
- Fluidized reactor (500-600 °C)
- Coke accumulation and removal
- Coke transport
- Generated gas handling system
- Product condensation and collection
- Heavy liquid recycle
- Solids particle size control
- Waste liquids and solids handling



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The ITC Group provides R&D and design expertise on fixed and fluidized bed systems involving mass transfer, reaction kinetics, and heat transfer phenomena. The group's research and piloting facility are located in Vancouver, British Columbia, Canada.

Contact us at [www.itc-group.ca](http://www.itc-group.ca)

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