Oil Pipeline from Alberta to the Arctic Ocean

The objective of this project is to design a pipeline and storage system to move oil from Alberta, and Norman Wells, NWT to Tuktoyaktuk for transport to world markets.

Featured results include: pipeline, heater, pump and heated storage tank system design.

According to the agreement signed on the submission of the project, the content of project (e.g. PFD, P&ID, and Equipment Sizing, etc.) is prohibited to be shared with 3rd party. However, some highlights can be concluded as below:

1. The entire transportation system has a length of 2,745 km

2. To overcome extreme weather (low temperature), multiple options were compared including diluent bitumen pipeline, heat tracing pipeline and heated pipeline with heat stations. Ultimately, heated pipeline with heat stations was chosen to be the more viable option.

3. Mineral Wool was chosen as the insulation material and its thickness was carefully calculated based on Heat Transfer Rule.

4. Heat tracing system was designed for storage tanks with temperature transmitter and controller.

5. To overcome long-distance friction loss and elevation gain during the transportation, locations of pump stations and line heaters were carefully calculated using Fluid Dynamics Rule and pump parameters were selected based on pump curves.

6. Line break valves are located at pump stations with low pressure alarms and low low pressure shutdowns to prevent significant loss of primary containment.

7. Storage system is designed for hydrocarbon flashing using floating roof tanks with pressure relief valves. The tanks are interconnected using control valves for the possibilities of having a single or dual offloading location.