Viscous Oil Polymer EOR in the Challenging Alaskan Arctic - It Works! But will it for the Heavy Oil in Ugnu?

Abhijit Dandekar, Ph.D. Professor and Chair, Department of Petroleum Engineering UAF College of Engineering and Mines (CEM)

> House Finance Subcommittee on the UA February 4, 2022



Outline

- ANS' (Heavy) Oil Resource Base
- Why is this important?
- Our Success To Date The ANS Field Laboratory
- Oil Recovery Forecasts
- Polymer alone for the Heavy Oil in Ugnu?
- Building on Current Success
- Heavy Oil Recovery Research Roadmap





ANS' (Heavy) Oil Resource Base





Figure sources: BPXA and Paskvan et. al. (2016) CAmerica's CArctic University

Why is this important?

America's Arctic Universitu



- Strategic importance to the State of Alaska and the Nation
- Technology development "in Alaska for Alaska"
- Resource too large to ignore, and within established infrastructure
- Prudhoe Bay type diluent crude still available for heavy oil transport through TAPS



Figure source: Alyeska Pipeline Service Company

Thanks to US DOE, NETL, Hilcorp Alaska Milne Point operators, and all researchers for DOE project Award Number DE-FE0031606



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Our Success To Date – The ANS Field Laboratory



Oil Recovery Forecasts Oil Recovery - Polymer Concentration



Polymer alone for the Heavy Oil in Ugnu? Several orders of magnitude viscosity contrast and injectivity constraints! Polymer 2,000+ upto a million cP Ugnu Oil flood? 300 cP Schrader Oil oil 30-40 cP Polymer

CAN sweep

Polymer flood

Building on Current Success

- Polymer alone not feasible a combination of polymer and "solvent" is needed
- Limitation of deploying thermal methods due to nearly continuous "permafrost"
- No other production techniques currently exist
- Another "Field Laboratory" in collaboration with Hilcorp to specifically target Ugnu and test novel enhanced oil recovery methods
- This is the right time to embark on this research don't want to lose the momentum
- Herein lies our "quest" for developing innovative solutions, leveraging our success to date, to unlock the potential for the 12-18 billion barrels of heavy oil



Heavy Oil Recovery Research Roadmap

Team Members:

- (1) Dr. Yin Zhang, UAF
- (2) Mr. Brent Sheets, UAF
- (3) Dr. Samson Ning, Hilcorp
- (4) Dr. Abhijit Dandekar, UAF

Workforce Development:

- (1) Postdocs
- (2) PhD, MS, UG students
- (3) Increase in enrollments
- (4) Key element of UA mission and vision

Project Duration:

- (1) 4 years similar to the current project
- (2) 3 months' overlap with current project
- (3) Our proposed solution for Ugnu needs to be proved quickly while the TAPS can handle it from a transport standpoint

Research Tasks:

- 1) Project Management Plan
- (2) Screening of polymer and a solvent
- (3) Laboratory studies to assess polymer/solvent compatibility and the recovery efficiencies
- (4) Field pilot test
- (5) Numerical simulation
- (6) Economic evaluation



