COSIA INNOVATION OPPORTUNITY

Mobilizing the world's minds and resources to improve environmental performance.

Reliable Solvent and Non-Solvent Additives Measurement

SOLUTION DESCRIPTION:

A 'plug & play' inline multiphase measurement technology suitable for detecting solvent and other additives in produced bitumen-water emulsion.

CREATED: (April, 2022)

All project proposals are evaluated and actioned as they are received.

INNOVATION OPPORTUNITY CHAMPION:

COSIA's members have identified 'Reliable Solvent and Non-Solvent Additives Measurement' innovation priority, which if realized, would help accelerate adoption of solvent technologies and dramatically reduce the amount of water needed and emissions per barrel of oil produced

For more information on this COSIA Innovation Opportunity please visit

www.cosia.ca/innovation-opportunities/water

SUBMIT YOUR IDEA HERE

Canada's Oil Sands Innovation Alliance (COSIA) accelerates the pace of environmental performance improvement in Canada's oil sands through collaborative action and innovation. COSIA Members represent more than 90 per cent of oil sands production. We bring together innovators and leading thinkers from industry, government, academia and the wider public to identify and advance new transformative technologies. Innovation Opportunities are one way we articulate an actionable innovation need, bringing global innovation capacity to bear on global environmental challenges.

Canadian Natural · cenovus ENERGY · ConocoPhillips Canada · Imperial · SUNCOR

RELIABLE SOLVENT AND NON-SOLVENT ADDITIVES MEASUREMENT

WHAT TO SUBMIT TO COSIA

COSIA requires sufficient non-confidential, non-proprietary information to properly evaluate the technology.

Some items that will be especially important to present in your submission are:

- Concept and basic unit operations
- Technical justification for the approach (e.g. laboratory batch or continuous experiments; pilot or demo plants; process modeling; literature precedent)
- Energy inputs – quantity and type(s)
- Capital and operating cost estimates if available based on described capacity targets
- Basis of cost estimation, including estimation scope, contingency, etc.
- IP status of your proposed technology
- What operating environment restrictions might your technology face:
    - Explosive atmospheres
    - Severe weather
    - Power fluctuations

FUNDING, FINANCIALS, AND INTELLECTUAL PROPERTY

COSIA Members are committed to identifying emerging technologies, while protecting the Intellectual Property (IP) rights of the owner of the technology.

HOW TO SUBMIT TO COSIA

Submit a summary of your solution using COSIA's Environmental Technology Assessment Portal (ETAP) Process, available at:

https://cosia.ca/focus-areas/e-tap

Please note: ETAP is a staged submission process. The initial submission requires only a brief description and limited technical information. Upon review by COSIA, additional information may be requested. Instructions for submission are provided on the ETAP site. All information provided is non-confidential. COSIA will respond to all submissions.

RELIABLE SOLVENT AND NON-SOLVENT ADDITIVES MEASUREMENT

PROBLEM STATEMENT

There is currently a lack of proven in-line multiphase measurement technology that that will accommodate the increasing measurement complexity of solvent and non-solvent steam additives

BACKGROUND

Measurement of production rate and composition from a well is fundamental to effective reservoir management. It is used to identify optimization opportunities and impacts future performance predictions that underpin investment decisions. In addition to the flow rates of oil, water and gas, solvent recovery processes require measuring the solvent content of the produced hydrocarbon phase for surveillance and regulatory reporting purposes.

There are a variety of well measurement configurations deployed amongst industry such as 3 phase (gas, bitumen, water) separators, 2 phase (gas, liquid) separators with water cut sensors, Coriolis meters & water cut sensors, and Coriolis meters & sampling, among others.

Multi-phase Flow Measurement technology has improved yet there is still not an absolute, stand-alone, measurement device. Current technology requires clean separation and measurement of individual phases. Separating bitumen and water in a 3-phase test separator increase cost of already expensive vessel. In field deployments, separating gas from liquid to improve water cut sensor accuracy has been less accurate than needed. Sampling is a common fallback but is difficult logistically, expensive, time consuming, and has inherent accuracy concerns, as well as cost and safety implications.

Measurement technology is rapidly advancing, with many physical systems being replaced by advanced flow meters for phase measurement. As such, traditional measurement technologies are being replaced, which is driven by pad facility cost reduction initiatives that frequently target well measurement.

- Test separators & chemical injection are being increasingly replaced by multiphase flow meters (MPFM) & sampling
- Multiple MPFM vendor products available
- Alternative multiphase separation with reduced vessel size kits emerging

COSIA members wish to take advantage of new technology to allow for composition measurement in the oil phase and vapor phase.

RELIABLE SOLVENT AND NON-SOLVENT ADDITIVES MEASUREMENT

EXPECTED RESULTS

Industry is seeking a ‘plug & play’ solution to well measurement that is cost effective and reliable, with reasonable accuracy and fit for solvent recovery processes surveillance. Collaboration is the fastest path to achieving such a solution amongst emerging technologies. Common well measurement setups improve data sharing amongst COSIA members.

CURRENT OR CONTEMPLATED PROJECTS

Knowledge sharing: what has worked, what has not worked & why

Bench testing: independent validation of vendor offerings; Field deployment of only most promising equipment tested under industry flow conditions

Virtual Metering: would an expanded training data set from multiple operators benefit a virtual meting effort? Or is each operation too unique to be effective