



# Project Updates

Crude Oil Quality Group (COQG) Meeting  
Philadelphia, PA  
June 18, 2009



# Project List

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- **Active projects**
  - Iron Fouling
  - Phosphorous in Crude Oil
  - Oilsands Bitumen Processability
  - TAN Project
  - NGL Contamination
  - Condensate/Diluent Quality
  
- **Project Proposals**
  - On-Line Contaminant Monitoring
  - Water Free Desalting
  - Fluorocarbons in Crude
  - H<sub>2</sub>S in Crude



# Iron Fouling Participants

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- BP
- ConocoPhillips
- Flint Hills Resources
- CITGO
- NCUT
- Imperial Oil Limited
- Maxxam – in kind
- Nalco
- NCRA
- Chevron Canada
- Encana
- Grace Davison
- Petro-Canada
- ARC – in kind



# Iron Fouling

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- **Scope**

- Examine the Role of Iron in Canadian Crude and Condensate
  - 🔥 Role as an emulsion stabilizer - desalter operations
  - 🔥 Role as a process foulant – distillation units, furnaces, filters, etc
  - 🔥 Role in catalyst fouling or deactivation

- **Current Activity**

- Emulsion samples supplied the PERF project have been tested for filterable solids and inorganic content
- Samples to be re-filtered and tested for toluene insoluble organics using the Deposit Analysis Protocol (DAP) developed by ARC
- More emulsion samples requested, including some from production treaters



# Phosphorous in Crude Oil Participants

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- BP
- Chevron Canada
- Clearwater Inc.
- Enerchem
- Imperial Oil Limited
- New Alta
- Total
- TESORO
- CCS Energy
- Gibsons
- ConocoPhillips
- Halliburton
- Maxxam Analytics
- Petro-Canada
- BJ Services



# Phosphorous in Crude Oil

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- **Initial CCQTA project in 1995**

- Distillation tower fouling in three refineries
- Potential sources of P were identified
- Encouraged and facilitated development of alternate chemistries with less P or less volatile P
- Enforcement of volatile P concentration began in early 2007.

- **Current Activity**

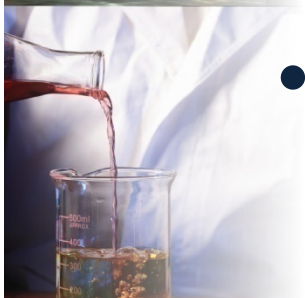
- Pipeline monitoring indicates a reduction in volatile P content of crude during 2008 and 2009, linked to:
  - 🔥 Reduced market activity
  - 🔥 Increased use of low volatile phosphorus alternatives
- ERCB has prepared a document outlining the handling and reporting requirements for frac returns





# Oil Sands Bitumen Processability Participants

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- BP
  - ConocoPhillips
  - NCRA
  - CITGO
  - Petro-Canada
  - MEG Energy
  - Devon
  - Encana
  - NCUT
  - Suncor
  - Marathon
  - Shell
  - Total
- Work in kind
- Maxxam Analytics
  - BakerPetrolite
  - Champion
  - ARC



# Oil Sands Bitumen Processability

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- **Scope:**

- Study unique features of Canadian Oilsands Bitumen that may enhance or impede processability.
  - 🔥 Solids, salts
  - 🔥 TAN, Asphaltenes
- Phase I → Front end - desalting
- Phase II → Back end – distillation, coking, cracking etc..

- **Current Activity:**

- First sample set tested for emulsification tendencies by BakerPetrolite and Champion
- Second round of samples tested for salt/solids
- Second round samples scheduled for coking/fouling studies
- Selected samples scheduled for detailed analysis using the DAP developed by ARC





# TAN Phase III Project Participants

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ARC

BP

Chevron

ConocoPhillips

ENCANA Corporation

IOL

JACOS

Laricina

MEG Energy

Marathon

NCUT

NCRA

Petrobras

Petro-Canada

Suncor

Shell

Total



# TAN Project

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- **Scope**

- Phase II

- Detailed study of Naphthenic acids in crude and crude fractions
    - Corrosion testing including some benchmark crudes

- Phase III

- Development of a novel corrosion testing apparatus (NCUT)
    - Testing of gas-oil fractions of several Canadian Heavy Crudes and refinery benchmark gas-oils

- **Current Activity**

- Phase III final report completed and distributed
  - Phase IV test protocol to be developed at the June project meeting



# NGL Contamination Participants

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- ARC- in kind
- BP
- Keyera
- Maxxam - in kind
- Pall Filters - in kind
- Shell

Alberta Envirofuels  
Dow Chemical  
Imperial Oil  
Nova Corporation  
Provident  
ConocoPhillips





# NGL Contamination

- **Scope**

- Understand the source of NGL plant fouling and potential impact on condensate quality
- Protocols and equipment designed to collect particulate material
- Protocols established for characterization of particulate material
- Work currently underway to collect and characterize additional samples and analyze data

- **Current Activity**

- 🔥 Collecting and testing samples of NGL Fractionator feed
- 🔥 Preparing the project final report
- 🔥 Additional sample of reboiler foulant being tested by ARC's DAP method



# Condensate Quality Participants

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- Imperial Oil
- Shell Canada
- Shell US Pipelines
- Devon
- ConocoPhillips
- Keyera
- Provident
- ARC – work in kind



# Condensate Quality

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- **Scope**

- Focus primarily on contaminant issues with railed and common diluent pool condensates

- **Current Activity**

- Testing of filters for condensate samples collected by CAPP/Enbridge
- Preparing to undertake additional pipeline sampling
- Filters for the CAPP/Enbridge sampling program being tested for organics via the DAP method



# On-Line Contaminant Monitoring

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- **Scope**

- Identify target contaminants for monitoring.
- Determine existing capabilities
- Select a location/plant for testing of existing/new technologies
- Determine effectiveness of monitoring tool(s)

- **Current Activity**

- Potentially interested parties to meet again in June
- Update existing capabilities
  - Presentation by Process NMR
- Establish areas of interest & future direction



# Water Free Desalting

- **Scope**

- Investigate options for reducing water makeup requirements and consequentially the environmental impact of refinery desalting
- Two broad approaches are being considered:
  1. Minimize or eliminate desalter water makeup in the refinery
  2. Do the desalting – salt and solids removal - at the production site and pipeline crude which does not require further cleanup at the refinery
- Review the extent oil/water/solids separation technology advances developed for SAGD production can be applied to the refinery

- **Current Activity**

- Interested parties to meet again in June to gauge levels of interest





# Fluorocarbons in Crude

- **Initial Scope**

Solicit information from members and interested parties on:

- the types and concentrations of fluorocarbons used in various oilfield chemicals.
- available information, tests, studies etc. on use and impact of fluorocarbons on refinery processes.
- available information on impact of fluorocarbons in finished refinery products and stability of fluorocarbons in typical refinery unit operations.

- **Next Steps:**

- Interested parties to meet in June
- Awaiting feedback from 3M on a study of the potential refinery impact of fluorocarbons
- Project development funding provided by the CCQTA



# H<sub>2</sub>S in Crude

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- **Initial Scope:**

Build a database on the current levels of H<sub>2</sub>S in major market crude oil streams

- All crudes, light, medium and heavy would be tested
- Defined sampling protocol
- Data collected would be made available to crude purchasers

- **Next Steps:**

- Interested parties to meet in Calgary June 24
- Project interest and funding to be discussed





# CCQTA Contacts

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