Canadian Crude Quality Technical Association Project Update

COQG Meeting
San Francisco, CA
October 31, 2007

Contact: president@ccqta.com or secretary@ccqta.com

October 17, 2007
CCQTA

Active Projects List

• Heavy Oil Manual
• Iron Fouling
• NGL Contamination
• Phosphorus in Crude
• Oilsands Bitumen Processability
• TAN Phase III

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Heavy Oil Manual Project

• Goal is to review methods applied to heavy oils and bitumens, identify issues associated with their application to a heavy oil matrix, and provide recommendations/upgrades to the test methods
• TAN, asphaltenes, sample preparation, viscosity and density completed
• Chlorides section out for review in draft form
• Sulfur section near completion of first draft
• Funded by CCQTA membership
• Project manager – Bryan Fuhr 1-780-450-5032

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Iron Fouling Project

Objective

- Project goal is to understand role of iron as a contaminant in condensate and crude oil
  - as an emulsion stabilizer
  - as a process foulant, i.e., in furnaces, reboilers, fuel gas filters, etc.
  - as a process contaminant, e.g., catalytic units
Iron Fouling Project

Participants

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

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Iron Fouling Project
Status

- Reviewing ECAT data from participants to establish metal/metal correlations
- Using correlations to identify potential sources of iron in feed (i.e., solids, porphyrins, frac fluids)
- Examining desalter emulsions for unusual iron behavior
- Project manager - Jack Suggett - 1-780-645-2807
NGL Contamination

Objective

- Understand the nature and source of plant fouling associated with;
  - processing field butane at the refinery/chemical plant (inlet filters/DIB reboiler)
  - processing of Natural Gas Liquids at Fractionators (C₂, C₃, C₄ reboilers)
NGL Contamination

Participants

- ARC
- BP
- Keyera
- Maxxam
- Pall Corporation
- Shell
- Alberta Envirofuels
- Dow Chemical
- Imperial Oil
- Nova Corporation
- Provident

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NGL Contamination Status

• Refiners employing mechanical filtration to help manage fC4 quality issues

• Work to date suggests that contamination sources appear to be related to pipeline interface management;
  – Condensate into field butane
  – Condensate into NGL

• Lab analysis identifies NGL Fractionator reboiler foulant as iron based deposit, salt and oxygenated organic compounds (carboxylates, esters, ethers, etc.)

• Project manager – Bob Falkiner 1-416-441-7145
Phosphorus in Crude

Objective

• Identify sources of Phosphorus based on plant fouling
• Develop alternatives to volatile Phosphorus
• Implement solutions
• Monitor effectiveness of solutions
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Phosphorus in Crude
Project Participants

- CCS Energy
- Chevron
- Clearwater
- Enerchem
- Halliburton
- Rev Fluids

- BP
- ConocoPhillips
- Imperial Oil
- Maxxam
- NewAlta
- Petro-Canada

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Phosphorus in Crude Status

• Evidence shows that Refinery tower fouling continues
• Recently, one Canadian refinery reported deactivation of ULSD hydrotreater catalyst after very short run – high P content on catalyst bed
• Phosphorus based fouling of jet engines reported by US military – USAF investigating jet for evidence of volatile phosphorus
Phosphorus in Crude
CAPP Enforcement Program

- Enbridge testing of receipt streams for sweet crude show no results for volatile phosphorus (P) over action limit of 1.5 ppm for composite samples
  - 21 of 78 however samples reported results greater than the detection limit but less than 1.5 ppm
- Project group recommended that CAPP change actions for composites with results \( \geq 1.0 \) ppm P
  - Test all individual samples used to create composite sample
- Project manager – Sachin Kansal (403) 237-3306
Oilsands Bitumen Processability Project - Objective

• Estimate potential processability issues associated with refining oilsands bitumen
• Initial phase focusing on density, gravity, asphaltene, salt content, filterable solids, TAN and metals of targeted streams
• Gather available information via questionnaire, identify gaps, collect and analyze samples to fill gaps
Oilsands Bitumen Processability Project - Participants

- BP
- ConocoPhillips
- NCRA
- CITGO
- Petro-Canada
- Encana
- NCUT
- Suncor
- Marathon
- Shell

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Oilsands Bitumen Processability Project - Status

- No useful data collected to date from information questionnaire
- Sample collection and analysis protocol developed and planned for targeted streams
- Project manager – Bruce Randolph (918) 661-5077
TAN Project Phase III

Objective

• Phase III goal is to confirm results of Phase II by conducting corrosion testing under vacuum conditions
  – Minimize influence of (H₂S) sulfur passivation
• First step involves validating new autoclave by running high Tan SJV
TAN Project – Phase III
Project Participants

- ARC
- BP
- ConocoPhillips
- ENCANA Corporation
- IOL
- JACOS

- Marathon
- NCUT
- NCRA
- Petro-Canada
- Suncor
- Shell

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TAN Project – Phase III

Status

• Qualification runs completed for SJV gas-oil
  • 48 hour test without coupons to test impact of process system on sample – negligible changes
  • 7 day test to establish capability of measuring high corrosion rates - successful

• Upgrader oilsands gas-oil has been tested

• Bitumen gas-oil sample from conventional operation just completed

• Project manager – Randy Segato (403) 920-8994
Next meetings

• Next project meetings to be held in Calgary in December and March.
• CCQTA GM in Calgary on December 4th or 5th.
• Joint CCQTA AGM/ COQG meeting scheduled for mid June in Calgary, Alberta
• See web site for details: www.ccqta.com