

CCQTA Project Activities Update for the COQG

May 26, 2005

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Active Projects List

- Heavy Oil BS&W – Phase III
- Phosphorus in Crude
- TAN Project – Phase II
- NGL Contamination
- Heavy Oil Emulsion Viscosity - Phase I/II
- Heavy Oil Methods Manual – in development
- Proton NMR Olefins Method Development

Heavy Oil BS&W Project Status Report

April 21st 2005

Project Manager:

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Heavy Oil BS&W

Participants - 21/04/05

- Baker Petrolite
- BP
- Champion Technologies
- CITGO
- Enbridge Pipelines
- Encana Corporation
- ExxonMobil
- GE Betz
- Husky Oil Operations Ltd.
- Maxxam Analytics
- Nalco Canada
- NCUT
- Petro-Canada
- Suncor Energy

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Heavy Oil BS&W Project Objectives

- Quantify the impact of individual solids and water components of BS&W on various sectors.
 - Phase 1
 - Detailed analysis of solids at production facilities
 - Phase 2
 - “Cradle to grave” tracking of BS&W components from production facilities to refineries
 - Phase 3
 - Investigation of the impact of other variables
 - Organic sediment, compatibility, foulant promoters

Heavy Oil BS&W Project Status

- Phases 1 & 2
 - No clear correlation between the abundance/composition of filterable solids and heavy oil processability
- Phase 3
 - Exploring the possible role of other factors:
 - Role of organic sediment (additives, natural chemicals) on desalter interface stability/fouling
 - Impact of blended crude/crude incompatibility on asphaltene precipitation at interfaces
 - Possible role of foulant precursors (eg. metals) on above

Heavy Oil BS&W Project Status

- Phase 3 - extended
 - Desalter testing modified to include multiple plant sites
 - BP Toledo – testing completed
 - BP Whiting – awaiting samples
 - Exxon Mobil Joliet – under consideration
 - CITGO Lemont – awaiting samples

Heavy Oil BS&W

Next steps

- Optimize filtration/extraction procedure
- Complete refinery testing program
- Review results at next meeting ~ June/July 2005



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Phosphorus in Crude Project Status Report

April 21st 2005

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Phosphorus in Crude

Participants - 21/04/05

- B.J. Services
- Chevron Canada Resources
- Clearwater Inc.
- Enerchem
- Halliburton Energy Services
- Imperial Oil Limited
- Maxxam Analytics
- Nalco Canada
- New Alta Corporation
- Petro-Canada
- United Refining

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Phosphorus in Crude Project Objectives

- Identify the source of tower fouling in affected refineries
- Understand the fouling mechanism
- Develop alternative chemistries/applications designed to alleviate fouling

Phosphorus in Crude Project Status

- Project participants have developed alternative “low-volatile” chemistries, and field treatment options.
- CAPP Crude Oil Quality Committee has reviewed CCQTA work and agreed to impose a phosphorus in crude spec of 0.5 wppm in the distillate fraction.

Phosphorus in Crude Project Status

- Spec implementation date and enforcement policy awaiting approval by the Crude Oil Committee.
- Information to be posted on CCQTA Website, which will serve as technical resource for interested parties

TAN Project- Phase 2 Status Report

April 21st 2005

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TAN Project

Participants - 21/04/05

- Alberta Research Council
- Baker Petrolite
- BP
- Conoco Phillips
- Enbridge Pipelines
- Encana Corporation
- GE Betz
- JACOS
- Marathon Ashland Petroleum LLC
- Maxxam Analytics
- Nalco Canada
- NCUT
- Petro-Canada
- Shell
- Suncor Energy
- Terasen Pipelines
- Total

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TAN & NAN Follow-Up

- Planned TAN & NAN follow-up activities nearing completion
- ASTM D665 (TAN) method can be made reliable for oil sands bitumen
- Proposed UOP-565 (NAN) sample wash step modifications not sufficient, further work proposed on this method

Corrosivity Testing

- MacKay gas-oil corrosivity test complete
- SJV gas-oil corrosivity test underway
- BCF sample in lab for distillation



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Additional Properties Testing

- Whole crude and gas-oil physical properties testing to be done once final sample distillation is complete
- Samples of whole crude and gas-oil cut collected for mass spec testing
 - NCUT paper shows that mass spec testing may not need to be done on distillation cut to provide gas-oil data

Project Status

- Concepts for Phase III under discussion
- Next project meeting to be upon completion of Phase II activities, anticipated for June



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NGL Contamination Project Status Report

April 21st 2005

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NGL Contamination Participants - 21/04/05

- ARC
- Alberta Envirofuels
- BP
- Dow Chemical Canada
- Keyera
- Imperial Oil
- Maxxam
- Nova Corporation
- Pall Filters
- Petro-Canada
- Provident Energy

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NGL Contamination Project Objectives

- Confirm the existence of a “common cause” contamination at multiple locations.
- Track contamination from affected plant(s) to source.
- Identify critical activity/process responsible for foulant generation.
- Develop management process to help reduce/eliminate contamination at source.

NGL Contamination Activities

- Testing of foulant from multiple sites to establish “common cause” source.
- Review of NGL supply system to;
 - Determine supply source(s) to individual plants
 - Determine contaminant variability within supply system.

Heavy Oil Viscosity Project Status Report

April 21st 2005

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Heavy Oil Viscosity Participants - 21/04/05

- Champion
- Conoco
- Encana
- Maxxam
- Suncor
- Total

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Heavy Oil Emulsion Viscosity Project Scope

- Literature search of available publications
- Review & summary of relevant publications
- Interview experts in the field
- Summarize existing state of knowledge in the area
- Propose potential Phase II activities to further the goal of accurate prediction of emulsion viscosities, specifically SAGD typical emulsions

Heavy Oil Emulsion Viscosity Project Status

- Literature review completed
 - 92 examined
 - 24 reviewed in detail
- Phase II conceptual proposal under consideration
- Phase II costs not yet developed

Heavy Oil Emulsion Viscosity Potential Next Steps – Phase II

- Confirm whether rheometers are accurate for viscosity measurement of pipe flow
- Verify that study findings apply to oil sands bitumen
- Compare viscosity via pressure drop (onsite measurements) with predicted data from current models
- Interested parties should contact Project manager


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CCQTA Heavy Oil Methods Manual Project

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Issues with Heavy oil Methods

- Most methods were developed for light crude oil or even for refined products
- Extension of method scope to medium crudes usually can be done without significant problems
- Methods frequently have problems when applied to heavy oils
 - e.g. sulfur content in heavy oil by XRF, method has an upper limit of 5 wt % due to quenching

Project Concepts Proposed

1. Produce revised ASTM methods
2. Produce a list of analysis methods used for heavy oils, with a discussion of the application issues and suggestions on how to work around them

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Revised ASTM Methods

1. Produce revised ASTM methods
 - Obtain permission to reproduce sections of ASTM methods
 - Revise to correct problems with heavy oil analysis
 - Distribute to interested parties
 - Quite costly for ASTM reproductions, also costly in terms of creation of ASTM type documentation

Heavy Oil Method Issues

- Provide a list of ASTM, UOP, IP methods that are commonly applied to crude oils
- Study methods for potential issues in their application to heavy crudes & bitumens
- Review previously published materials to avoid covering old ground
- Decide on any studies or research necessary to delineate application issues and remediation

Heavy Oil Method Issues

- Two significant sources were published on the topic of heavy oil analysis and related issues (no longer in print)
 - Syncrude Analytical Methods, Bulmer & Starr, 1979
 - Review of Analytical Methods for Bitumens and Heavy Oils, Wallace, 1988
- Also two relevant round robins were conducted
 - Alberta Committee on Oil Sands Analysis (ACOSA) round robin study, 1980 – 1988
 - United Nations Centre for Heavy Crude and Tar Sands, 1990 - 1995

Path Forward

- Group consensus was to follow the approach of issues identification
- Publication of results to be done via new website page(s)
- Funding formula to be determined, potential for funding at a CCQTA level rather than a project level
- Results to be publicly available, not membership limited