



CCQTA Project
Update
for CCQTA/COQA
joint meeting

San Francisco
October 31, 2014



CCQTA Background

The Canadian Crude Quality Technical Association membership consists of companies from multiple segments of the Canadian oil industry. The Association is established with the following educational and scientific objectives:

- To facilitate communications among industry stakeholders
- To provide a forum for the presentation and consideration of proposals for industry projects related to any aspect of crude oil quality.
- To improve industry knowledge and awareness of crude oil quality through the cooperative exchange of technical information among industry sectors.



but first ...



“I’m an expert”



[youtube video play link](#)





CCQTA Projects

- CCQTA currently has 83 member companies from 6 different sectors of the industry.
- 53 companies participating in 12 member funded projects
- 1 other project funded by the CCQTA
 - Crude Quality Tutorial



CCQTA Member Funded Projects

1. Tan Phase IV
2. Oilsands Bitumen Processability – Phase III
3. Heavy Oil Compatibility – Phase II
4. Phosphorus
5. Condensate Quality – Phase II
6. H₂S PVT – Phase II
7. Emulsion Characterization
8. Organic Chlorides
9. Bitumen Dewatering and Volume Discrepancy
10. TVP/RVP
11. Pipeline Corrosion
12. Crude Oil Flammability

CCQTA Projects

Refinery and Production

Emulsion
Characterization

Organic Chlorides

Phosphorus

Tan Phase IV

Oilsands Bitumen
Processability – Phase III

Heavy Oil Compatibility
– Phase II

Condensate Quality –
Phase II

Logistics

TVP/RVP

Pipeline
Corrosion

General Industry Support

Bitumen Dewatering
and Volume
Discrepancy

Crude Oil
Flammability





| 20/10/2014 | Active | | | | | | | | | | | | Total |
|---------------------------------|-------------|----------------------------|---------------------------|------------|-------------------------|--------------------|-------------------|-----------|-----------|--------------------|----------------------------------|--------------------------|-----------|
| CCQTA Projects Participant List | TAN Phase 4 | Oil Sands Processability 3 | Emulsion Characterization | Phosphorus | Heavy Oil Compatibility | Condensate Quality | Organic Chlorides | H2S PVT | TVP/RVP | Pipeline Corrosion | Bitumen Dewatering and Shrinkage | Crude Flammability Study | |
| ADOE | X | X | | | X | X | | X | X | X | X | X | 9 |
| AGAT | | | | | | | X | X | | | | | 2 |
| Athlon | | X | | | | | | | | | | | 1 |
| AITF | | X | | X | | X | X | X | X | | X | | 7 |
| Baker Hughes | | X | X | X | X | | | X | | | | | 5 |
| BP | X | X | | X | X | | X | | | | | | 5 |
| Cameron | | X | | | X | | | | | | | | 2 |
| CanmetEnergy | X | X | | | X | X | | X | X | | | | 6 |
| Calumet | | | | | | | X | | | | | | 1 |
| Cenovus | X | | X | | X | X | X | X | X | X | X | X | 10 |
| Chevron | X | | X | X | X | | | | | | | | 4 |
| CITGO | | | | X | | | X | | | | | | 2 |
| CNRL | | | | | X | | | | | | | | 1 |
| Crescent Energy | | | | | | | | | X | | | X | 2 |
| Devon | | X | | | | X | | | | | | | 2 |
| Enbridge | | | | | | X | X | X | X | X | | | 5 |
| Enerchem | | | | X | | | | | | | | | 1 |
| Exova | | | | | | | X | | | | | | 1 |
| Flint Hills Resources | X | | X | X | | | X | | X | | | X | 6 |
| GE | | | X | | | | | | | | | | 1 |
| Gibsons | | | | X | | | X | | | | | | 2 |
| Haliburton | | | | X | | | | | | | | | 1 |
| Husky | | | | X | | X | X | | X | | X | | 5 |
| Imperial Oil | X | | X | X | | X | | | X | | | | 5 |
| Interpipe | | | | | | | | | | X | | | 1 |
| Intertek | | | | X | | X | X | | | | | | 3 |
| Irving Oil | | | | X | | | X | | X | | | | 3 |
| Keyera | | | | | | X | | | | | | | 1 |
| Kinder Morgan | | | | | | | X | X | | X | | X | 4 |
| Marathon Oil | | X | | | | | | | | | | | 1 |
| Marathon Petroleum | | X | X | X | X | X | X | X | X | | | X | 8 |
| Maxxam Analytics | | | | X | | X | X | X | X | | X | | 6 |
| MEG Energy | | | | | X | X | | | | | | | 2 |
| Nalco Champion | | X | X | | | | X | | | X | | | 4 |
| Newalta | | | | X | | | | | | | | | 1 |
| Nexen | X | | | | | | | | | | | | 1 |
| PAC | | | | | | | X | | | | | | 1 |
| Pall Filters | | | X | | | X | | | | | | | 2 |
| PetroBras | X | | | | X | X | | | | | | | 2 |
| Phillips 66 | X | X | X | X | X | X | X | | X | | X | X | 10 |
| Pembina | | | | X | | X | | | X | | | | 3 |
| Plains Midstream | | | | | | | X | | | | | | 1 |
| Shell | X | X | | | X | X | X | | | | | X | 6 |
| Statoil | X | | | | | | | | | | | | 1 |
| Suncor Energy | X | X | X | X | X | X | X | X | X | X | X | X | 12 |
| Teck Resources | | X | | | | | | | | | | | 1 |
| Tesoro | | | | X | | | | | | | | | 1 |
| Total | X | X | | X | | X | | | | | | | 4 |
| Trans Canada Pipeline | | | | | | | X | X | X | X | | | 4 |
| Transport Canada | | | | | | | | X | X | | | X | 3 |
| United | | | X | | | | X | | | | | | 2 |
| Valero | | | | X | | | | | | | | | 1 |
| XOS | | | | X | | | | | | | | | 1 |
| Total Participants | 14 | 16 | 12 | 23 | 14 | 19 | 24 | 12 | 17 | 8 | 7 | 10 | 53 |



| 20/10/2014 | Active | | | | | | | | | | | | Total |
|---------------------------------|-------------|----------------------------|---------------------------|------------|-------------------------|--------------------|-------------------|-----------|-----------|--------------------|----------------------------------|--------------------------|-----------|
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| ADOE | X | X | | | X | X | | X | X | X | X | X | 9 |
| AGAT | | | | | | | X | X | | | | | 2 |
| Athlon | | X | | | | | | | | | | | 1 |
| AITF | | X | | X | | X | X | X | X | | X | | 7 |
| Baker Hughes | | X | X | X | X | | | X | | | | | 5 |
| BP | X | X | | X | X | | X | | | | | | 5 |
| Cameron | | X | | | X | | | | | | | | 2 |
| CanmetEnergy | X | X | | | X | X | | X | X | | | | 6 |
| Calumet | | | | | | | X | | | | | | 1 |
| Cenovus | X | | X | | X | X | X | X | X | X | X | X | 10 |
| Chevron | X | | X | X | X | | | | | | | | 4 |
| CITGO | | | | X | | | X | | | | | | 2 |
| CNRL | | | | | X | | | | | | | | 1 |
| Crescent Energy | | | | | | | | | X | | | X | 2 |
| Devon | | X | | | | X | | | | | | | 2 |
| Enbridge | | | | | | X | X | X | X | X | | | 5 |
| Enerchem | | | | X | | | | | | | | | 1 |
| Exova | | | | | | | X | | | | | | 1 |
| Flint Hills Resources | X | | X | X | | | X | | X | | | X | 6 |
| GE | | | X | | | | | | | | | | 1 |
| Gibsons | | | | X | | | X | | | | | | 2 |
| Haliburton | | | | X | | | | | | | | | 1 |
| Husky | | | | X | | X | X | | X | | X | | 5 |
| Imperial Oil | X | | X | X | | X | | | X | | | | 5 |
| Interpipe | | | | | | | | | | X | | | 1 |
| Intertek | | | | X | | X | X | | | | | | 3 |
| Irving Oil | | | | X | | | X | | X | | | | 3 |
| Keyera | | | | | | X | | | | | | | 1 |
| Kinder Morgan | | | | | | | X | X | | X | | X | 4 |
| Marathon Oil | | X | | | | | | | | | | | 1 |
| Marathon Petroleum | | X | X | X | X | X | X | X | X | | | X | 8 |
| Maxxam Analytics | | | | X | | X | X | X | X | | X | | 6 |
| MEG Energy | | | | | X | X | | | | | | | 2 |
| Nalco Champion | | X | X | | | | X | | | X | | | 4 |
| Newalta | | | | X | | | | | | | | | 1 |
| Nexen | X | | | | | | | | | | | | 1 |
| PAC | | | | | | | X | | | | | | 1 |
| Pall Filters | | | X | | | X | | | | | | | 2 |
| PetroBras | X | | | | X | X | | | | | | | 2 |
| Phillips 66 | X | X | X | X | X | X | X | | X | | X | X | 10 |
| Pembina | | | | X | | X | | | X | | | | 3 |
| Plains Midstream | | | | | | | X | | | | | | 1 |
| Shell | X | X | | | X | X | X | | | | | X | 6 |
| Statoil | X | | | | | | | | | | | | 1 |
| Suncor Energy | X | X | X | X | X | X | X | X | X | X | X | X | 12 |
| Teck Resources | | X | | | | | | | | | | | 1 |
| Tesoro | | | | X | | | | | | | | | 1 |
| Total | X | X | | X | | X | | | | | | | 4 |
| Trans Canada Pipeline | | | | | | | X | X | X | X | | | 4 |
| Transport Canada | | | | | | | | X | X | | | X | 3 |
| United | | | X | | | | X | | | | | | 2 |
| Valero | | | | X | | | | | | | | | 1 |
| XOS | | | | X | | | | | | | | | 1 |
| Total Participants | 14 | 16 | 12 | 23 | 14 | 19 | 24 | 12 | 17 | 8 | 7 | 10 | 53 |



Tan Phase IV



- Objective

- To compare the corrosivity of SAGD produced dilbits against other reference crudes



- Status

- Autoclave operation has been enhanced to promote NAP acid attack while minimizing decarboxylation.
- Selected crudes are presently being tested



Oilsands Bitumen Processability

- Objective

- To assess the refinery processability of various commercial dilbits/synbits.

- Status

- Targeted streams compared to other Canadian & International Heavy Streams
- All crudes tested for contaminants, emulsion forming tendencies, fouling, coking and cracking behavior
- No issues identified with any of the bitumen feedstocks

Heavy Oil Compatibility

- Objective

- To develop improved methods for predicting feedstock plant fouling issues

- Status

- Compared and assessed existing compatibility models.
- Exploring the use of alternate methods (ALCOR test rig) to better predict anomalous crude fouling behavior

Phosphorus


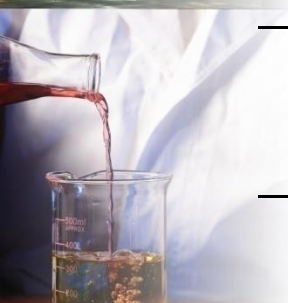


- Objective

- To identify source of P based tower/tray fouling in refineries



- Status

- Source identified (alkyl phosphate esters – oil based fracing)
 - Test methods developed & monitoring program implemented
 - Solutions and alternative chemistries proposed
 - Tracking P based issue in plants, other than tower fouling
 - Presently monitoring industry's efforts at volatile P reduction
- 
- 

Condensate Quality

- Objective

- To understand source of sediment and particulate contamination in condensates

- Status

- Developed test methods to measure sediment & particulates
- Identified the presence of Toluene Insoluble Material (TIOM) in condensates
- Working on identifying natures & source of TIOM

H₂S PVT

- Objective

- To develop a method for predicting H₂S in vapor phase under a variety of conditions

- Status

- Determine that PVT modeling is not a workable option (scavenger use in crude oil?)
- Tested a modified version of the TVP field tester to obtain direct measurement of vapor phase
- Presently working on miniaturizing equipment for field use.

Emulsion Characterization

- Objective

- To establish an analytical protocol to characterize plant emulsions

- Status

- Completed a literature search
- Testing emulsion samples from both production and refinery sites
- Developing a testing protocol to characterize various emulsions

Organic Chlorides

- Objective

- To identify source of 2013 incident of TOX in Canadian crude.

- Status

- Material determined to tetrachloroethylene. Source not identified
- Published recommendations on test methods and reporting protocol for TOX testing
- Developing an industry protocol for investigating future incidents



Bitumen Dewatering and Volume Shrinkage



- Objective

- To develop a commercially viable method for cleaning (dewatering bitumen)
- To upgrade existing shrinkage calculation methods for use with bitumens



- Status

- ASTM D5236 accepted as the most effective method for bitumen dewatering
- Pressure filtration to be used for solids removal
- Blending protocol developed & being assessed to extend the capabilities of API 12.3



TVP/RVP



- Objective

- To develop the best accepted standards to collect RVP & TVP data on Canadian crudes




- Status

- Essentially dropped RVP in favor of TVP (ASTM D6377)

- Developed a field unit for collecting TVP data

- Developed & submitted two methods for ASTM approval

- 
1. Determination of Vapor Pressure of Crude Oil: $VPCR_x - F(T_m^\circ C)$ (Manual Expansion Field Method)
 2. Determination of Light Hydrocarbons and Hydrocarbon Boiling Point Distribution and Cut Point Intervals in Live Crude Oils and Condensates via Gas Chromatography

Pipeline Corrosion

- Objective

- To develop a test method for measuring O_2 , CO_2 & H_2S in stabilized crude.
- To assess and/or develop at line/on line corrosion monitoring equipment

- Status

- Test method for gas measurement “ready to go”
- Preliminary assessment of TM0172 & ASTM G205
- Considerable effort spent assisting industry with the application of CSA Z662 (MR 0175) issue in stabilized crude oil pipelines

Crude oil Flammability

- Objective

- To assess the flammability of a variety of North American crude.

- Status

- Developed an initial testing and sampling protocol for the work
- Completing the initial “proof of concept” testing
- Coordinating work scope with other interested parties (i.e. Transport Canada, API)



CCQTA Activities

What's new

- The Association is considering changing its structure and operation.
 - Moving from a Working Board (volunteer) to a Governance Board (some hired staff).
 - Increasing annual fees to:
 - Pay staff (e.g. Executive/Technical Director)
 - Fund more CCQTA sponsored projects
 - Support the Association's teaching/education function



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