



**Crude Oil-by-Rail  
Presentation for COQA**

Author: Derek Fraser

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# Company Overview

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**50 Locations**

**18 Laboratories**

**12 Outsourced Laboratories**

**12 Service Centers**

**Receiving and Processing:**

- **2,300,000<sup>+</sup> samples/yr**
- **41,000,000<sup>+</sup> results/yr**

- **2,500 employees**
- **>75% possess technical degrees**
- **520 Technical Diplomas**
- **756 Bachelor Degrees**
- **192 Masters Degrees**
- **30 PhDs**

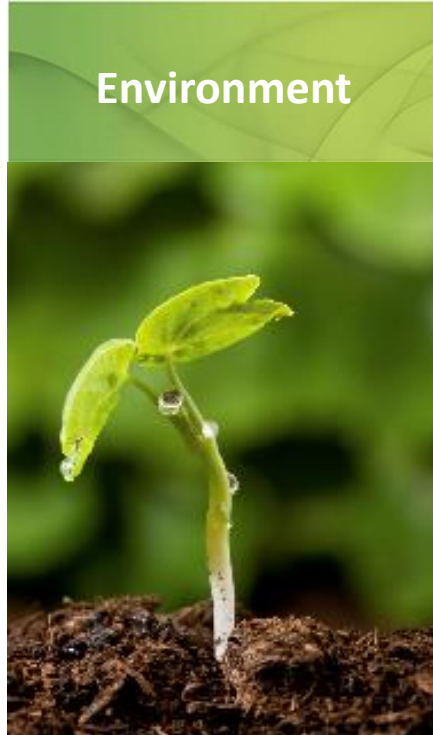
# Serving our core markets

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Energy



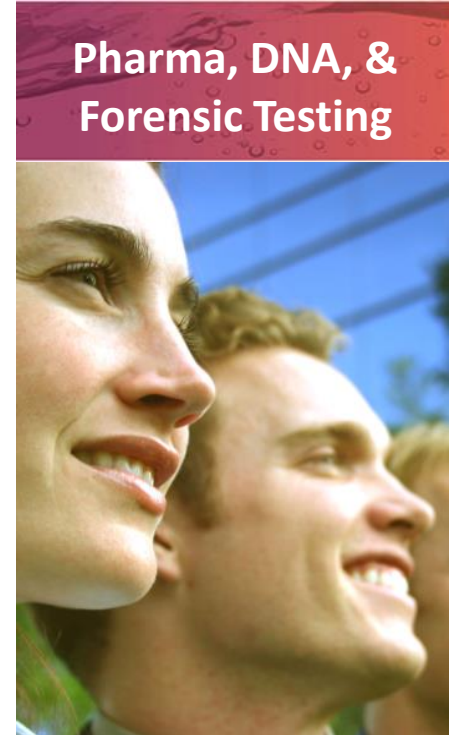
Environment



Food



Pharma, DNA, &  
Forensic Testing



# Maxxam: Delivering Analytical Services and Solutions

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## Energy

- Oil and gas analysis
- Fuels testing
- Field sampling mgmt
- Source & ambient test
- Mobile laboratory
- Tailings characterization
- Pilot plant analysis
- Laboratory outsourcing
- Core analysis
- Education & training
- R & D

## Environment

- Soil and Groundwater Testing
- Contaminated sites analysis
- Environmental forensics
- Analytical services for EIA and regulatory monitoring
- Ecotoxicology & ARD
- Ultra trace contaminant analysis (Air/HRMS)

## Food

- Microbiology
- Food-borne illness investigations
- Shelf life testing
- Food chemistry
- Nutritional labeling
- Residue testing

## Pharma, DNA, & Forensic Testing

- Forensic DNA testing
- Only outsourced lab for RCMP forensics
- Other Forensic Testing
- Animal DNA based parentage verification
- Paternity and immigration DNA testing
- Equine doping control
- Expert Witness Testifying

**#1 in Canada in all the markets we serve**

# A member of the Bureau Veritas Group of companies



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**61,400**  
employees



**140**  
countries



**400,000**  
clients



**1,330**  
Offices and labs

**8**  
global businesses



# Maxxam Analytics joins Bureau Veritas Group of Companies

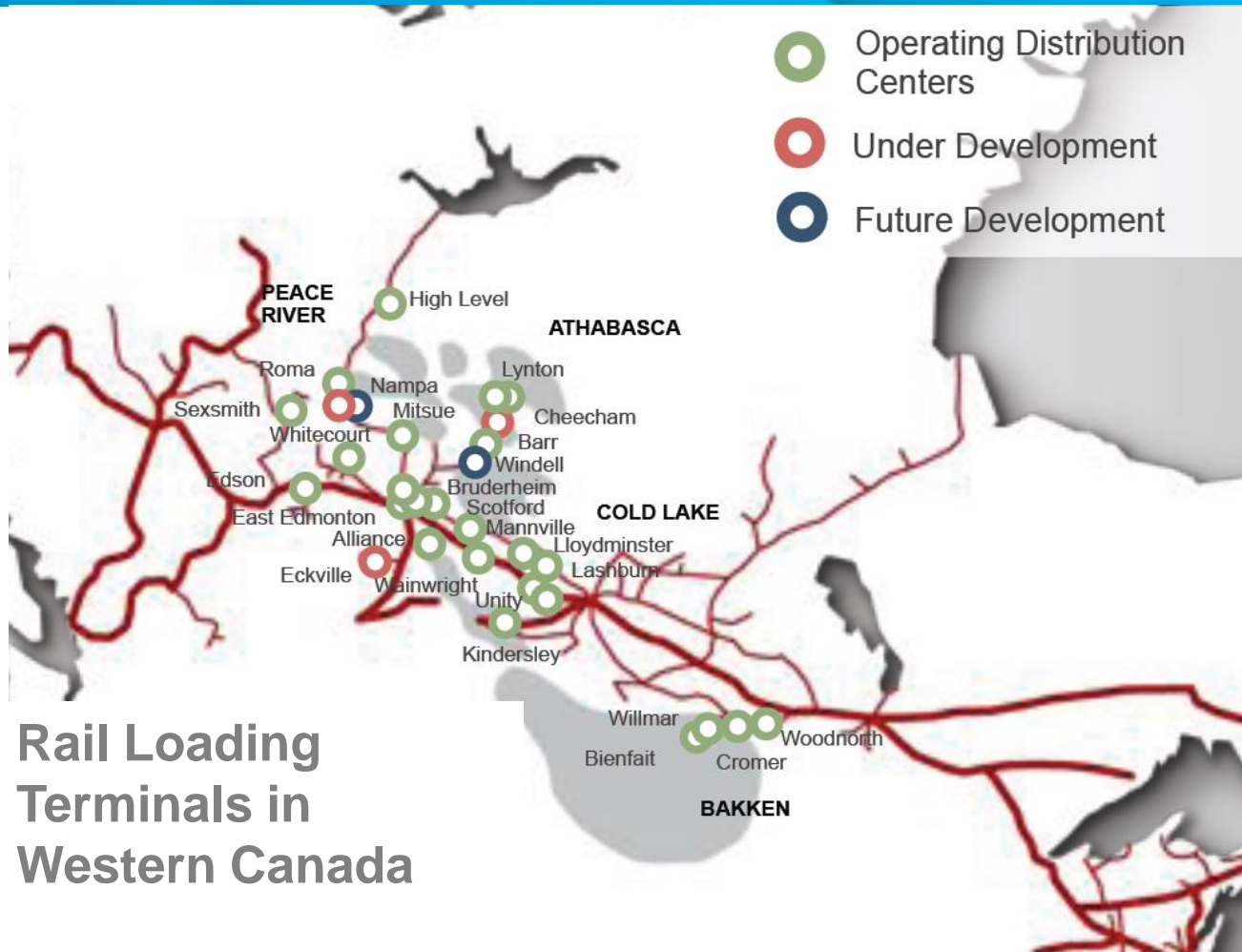
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- January 2014 – Maxxam Analytics formally joined Bureau Veritas
- Global leader in testing, inspection & certification (founded in 1828)
- Operations in Canada & United States
  - **ACME Labs** (geochemical and assaying lab)
  - **OTI Canada** (Inspection and Testing)
  - **Inspectorate Americas** (Inspection and Testing)
- Strong alignment on company values: integrity, ethics, data quality, impartial counsel, customer focus and safety!



# Canadian Crude-By-Rail Overview

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Rail Loading Terminals in Western Canada

# Canadian Crude-By-Rail Overview

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- Majority of the current transloading facilities are Manifest load locations
  - Most are truck to rail, some pipe/tank to rail
- Number of current Unit Train facilities in development for operation in the next 6 months (USDG Hardisty, Torq Tranloading Kerrobert) or operational (Canexus Bruderheim)





# Canadian Crude-By-Rail Overview

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- Lots of Options for Canadian crude-by-rail commodities:
  - Light Sweet Crude (Bakken, MSW, MGL etc.)
  - Light Sour Crude (PLS, LSB etc.)
  - Heavy Sour (SH, LLB, LLK etc.)
  - Oilsands derived bitumen
    - Synbit
    - Dilbit (15 - 25% diluent)
    - Railbit (7 - 14% diluent)
    - Neat Bit (0 - <5% diluent)

# Regulatory Framework: Transport Canada

## – Protective Direction 31

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- Protective Direction 31 release by Transport Canada – October 17, 2014
- Focus is on Crude Oil transported by Rail
  - The requirement is focused on rail transportation but includes road transport for Transportation of Dangerous Goods (TDG)
- Requirements for TDG testing and Safety Data Sheet (MSDS) requirements
  - States Classification 3 Packing Group 1 for all crude oil unless supported by safety data sheet
  - Infers new/updated safety data sheets (MSDS) required for products after July 7, 2013

# Transport Canada – Crude Oil Classification Recommendations

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- Transport Canada released on January 31, 2014 recommendations for Crude Oil Testing and Classification through a Canadian Association of Petroleum Producers (CAPP) Working Group

<http://www.tc.gc.ca/media/documents/tdg-eng/5806-2014-3479-F-BT8821720-CAPP-EDMS-238982-v1-Jan-31-14-GPAC-Test-C-en-rev-AAA.pdf>

# Analytical Parameters – TDG/MSDS

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Parameter for UN 1267	Procedure	TDG	Recommended for MSDS
Initial Boiling Point	D86	Required	
Flashpoint	D93M/D56/D3828	Required	Required
Viscosity	D7042	Required	Recommended
Physical State	Visual		Required
Appearance/Odor	Visual		Required
Simulated Distillation	D7169		Required
Light Ends	C <sub>10</sub> - by GC		Required
Density	D5002		Required
Vapor Pressure	D6377		Required
H <sub>2</sub> S (liquid phase)	D5623		Required
Pour Point	D5853		Recommended

**NOTE:** Majority of these parameters can be impacted by sampling due to light end component loss through sampling, container selection and subsampling.

# Crude-by-Rail Challenges – Representative Sampling

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- **Sample** - a portion extracted from a total volume that **may or may not** contain the constituents in the same proportions that are present in that total volume
- **Sampling** - the steps required to obtain a sample for analysis that is **representative** of the contents of any pipe, tank, or other vessel
- Crude oils are usually **nonhomogeneous** - concentration of entrained water is higher near the bottom of the vessel (ie. trucks)
- Sample point availability on rail cars are not consistent if present at all.



# Important Considerations During Sampling for Crude-By-Rail

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- Prevent the loss of any constituents (i.e. light ends)
- Do not add or contaminate the sample during sampling process
- Store the sample container in a cool, dry place
- Avoid exposure to direct sunlight
- Label the samples and deliver in the containers in which they were collected
- Adjust sampling frequency to match the anticipated variability in the data (truck loading vs. pipeline or tank connected locations)

# Crude-By-Rail Challenges – Sample Handling

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- Representative samples of crude oils are required for the determination of parameters used for establishing standard volumes, prices, and compliance with regulatory specifications
- Tank car sampling requirement - Sample the product after the car is loaded or just before unloading
  - example: Envirobox or at custody transfer meter
- Care and effort are required to maintain compositional integrity of samples from collection to testing
  - including sample transfer from container to analytical apparatus)
- Recommended sample containers:
  - 2 - 300 or 500 cc HP Cylinders
  - 2 - 1 liter metal cans & 1 – 1 liter plastic bottles

# Crude Oil-By-Rail Program Management

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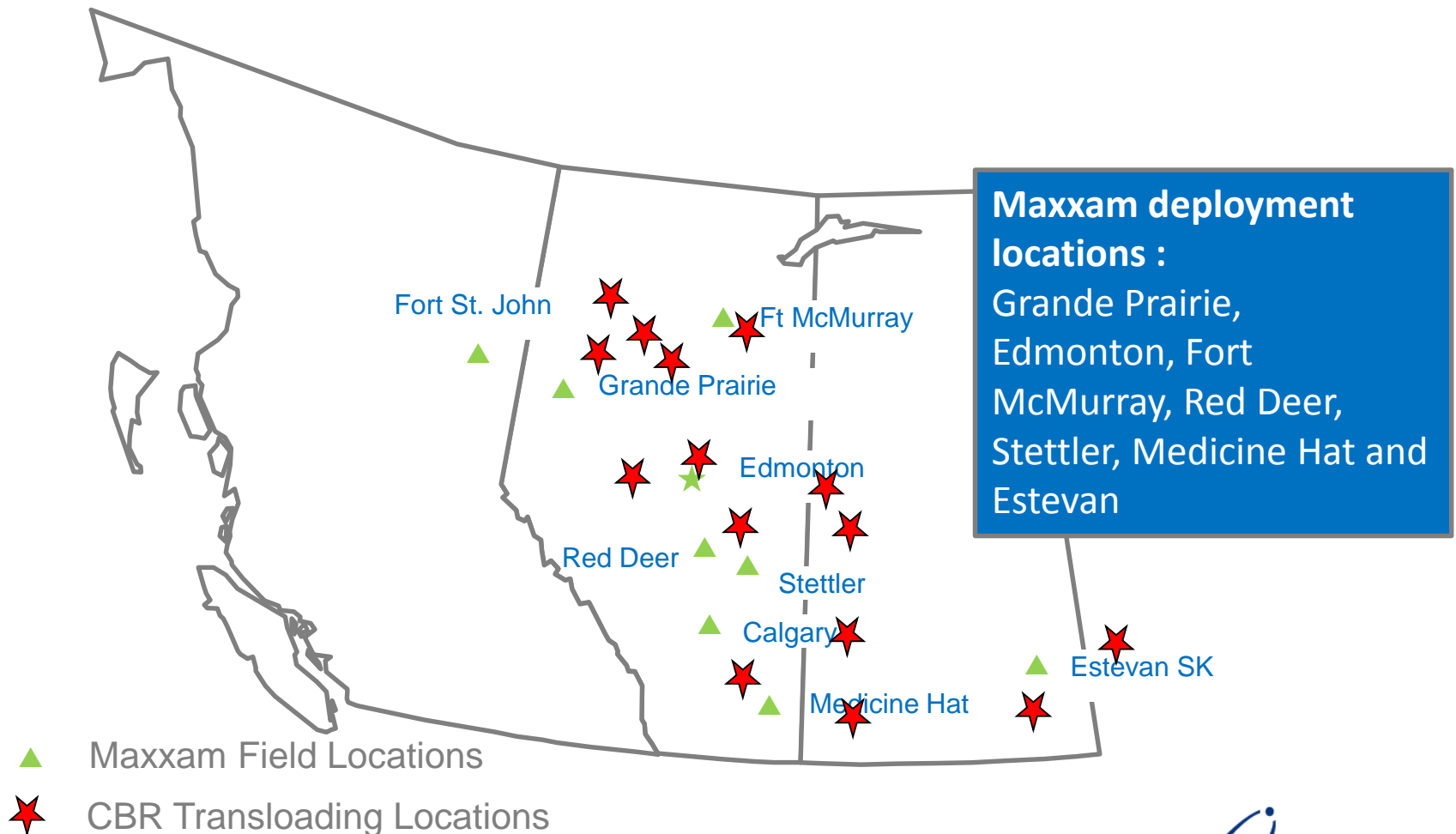
## ■ Areas of Challenges

- Coordination and organization of sampling events to coincide with loading events
- Sample coordination is extremely dynamic
- Sampling – location and sample container selections
  - Sample point identification and definition of suitable sample points for consistency from each loading locations (i.e. EnviroBox – mid flow)
  - Need to match the sample container to the analytical parameter for sample integrity through entire process (sampling to instrument)
  - Need to match the sample technique to sample container



# Field Services Locations – Deployment to Sampling Locations

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# Crude Oil-By-Rail Program Management

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## ■ Keys to Success

- Strong Dedicated Program Management Approach
- Continuous communications
  - Daily, weekly and monthly
  - Logistics coordination with loading events and the rail terminals
- Flexibility
  - Ability to mobilize quickly to sites
- Monitoring and Review
  - Quality Cross checks for data evaluation
  - Quarterly Program Review and Oversight

- Canadian Crude-by-Rail industry is rapidly growing
- Lots of opportunities and options for commodity types
  - Manifest vs. Unit Trains
  - Light Sweet to Heavy Sour and Syn/Dil/Neat Bitumen
- Regulatory framework is currently in development through Transport Canada/CAPP



# Thank you

## Questions & Discussion

COQA Presentation

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