GMI Expo 2103

Measurement of Emissions From Oil Storage Tanks

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Vancouver, Canada

Canada

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Objectives (PTAC Study)

- Evaluate vapour losses from heated heavy oil storage tanks and their composition.
- Determine variability in emission rates and their composition.
- Evaluate the impact of tank operating temperature on emissions.
- Develop emission factors.

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Work Completed

- Emissions tests performed on 6 heated heavy oil storage tanks at 6 different heavy oil batteries:
  - 3 in the Peace River Area
  - 3 in the Cold Lake Area

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Measurement Strategy

- Liquid flow rate and temperature into the tank:
  - Doppler & transit-time ultrasonic liquid flow meters.
- Liquid level in the tank:
  - Micro-wave radar system.
- Vent gas flow rate and temperature:
  - Transit-time ultrasonic gas flow meter featuring a flow cell and upstream flow straightener.
- Vent gas composition:
  - Micro gas chromatographs (GCs)

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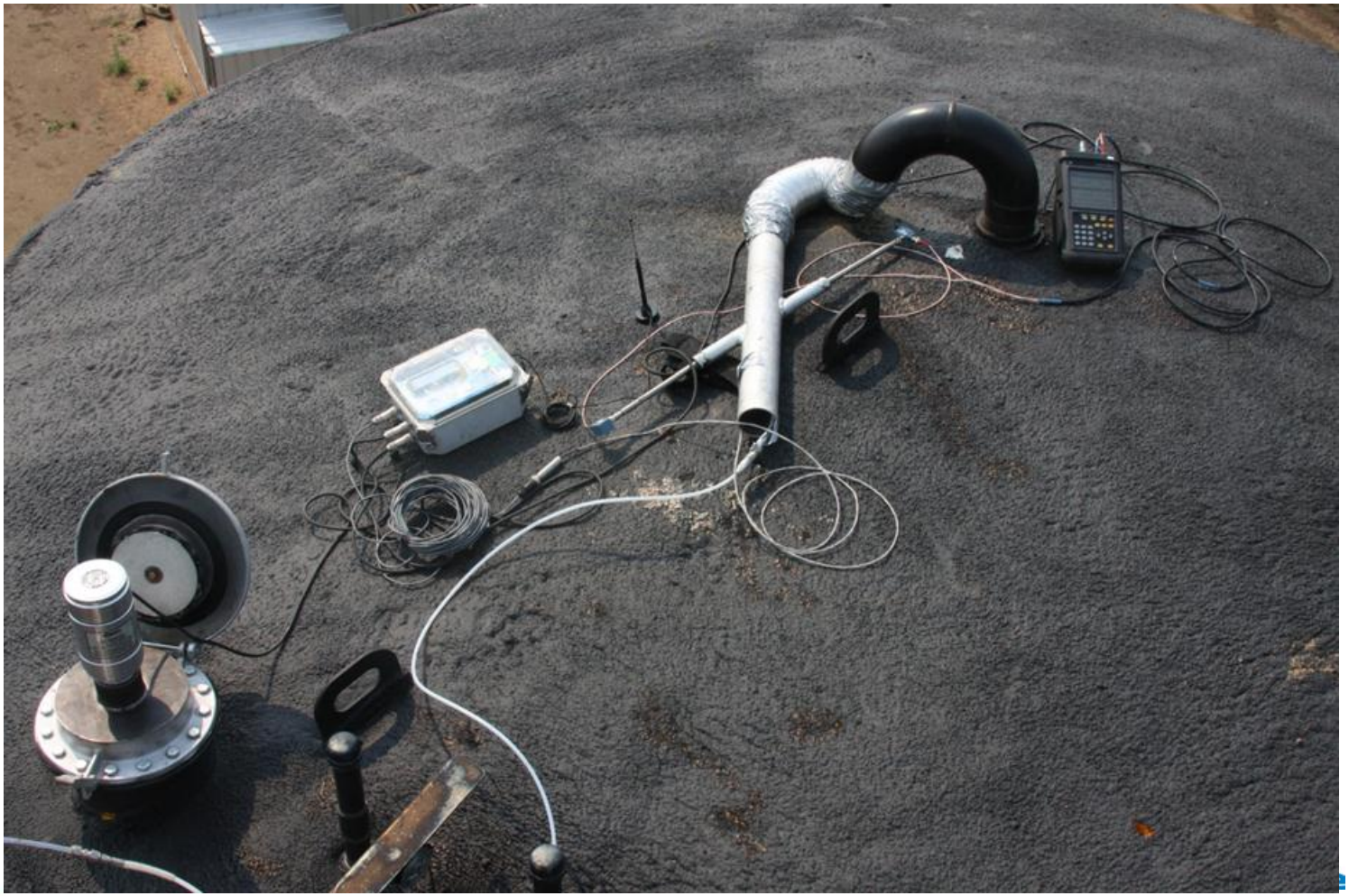
Typical Heavy Oil Battery

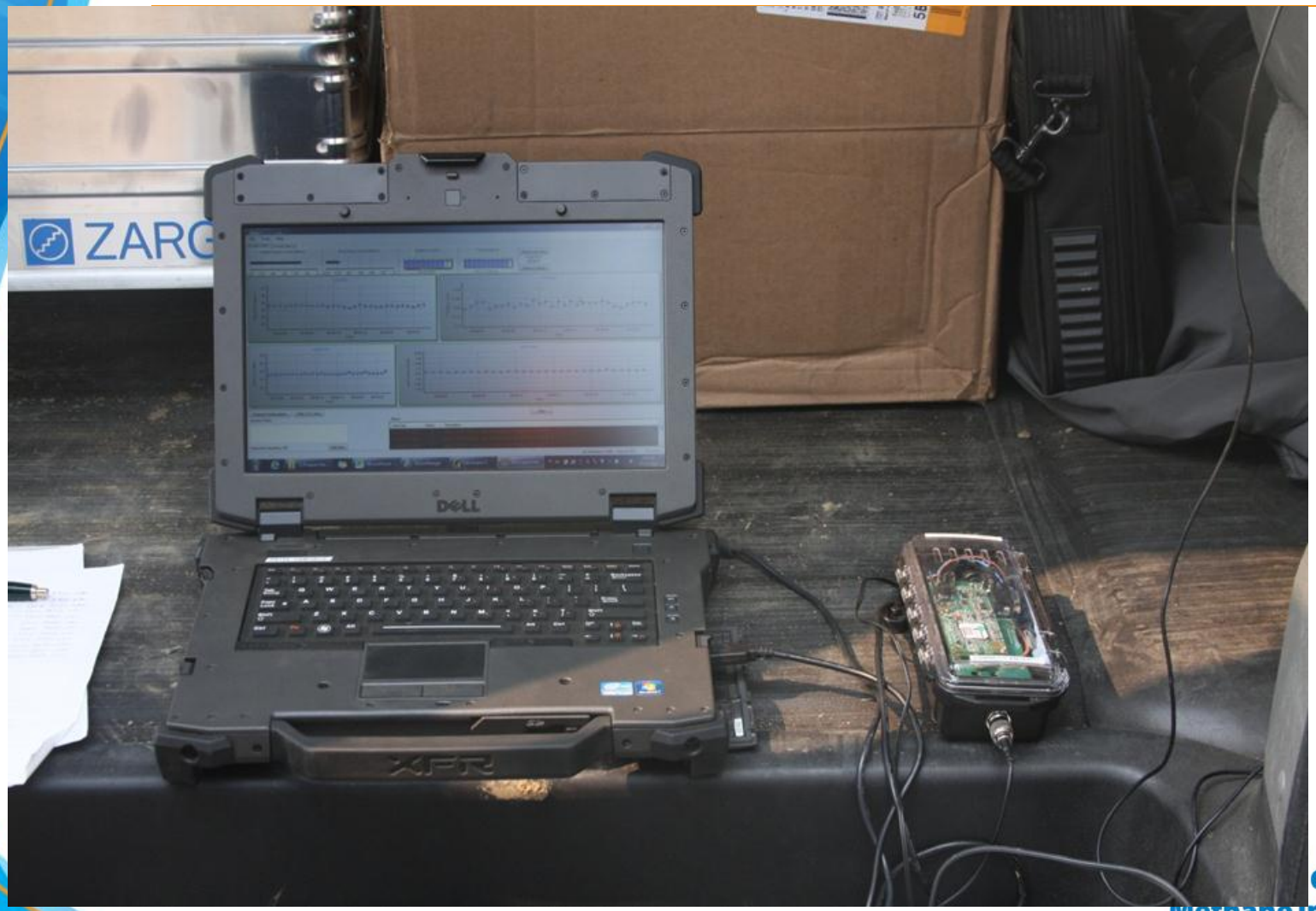
Clamp-on Transit-time and Doppler Ultrasonic Liquid Flow Meters

Radar Liquid Level Monitoring System

Vent Emission Monitoring System



Real-Time Trend Analysis



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Micro Gas Chromatographs & Sampling System

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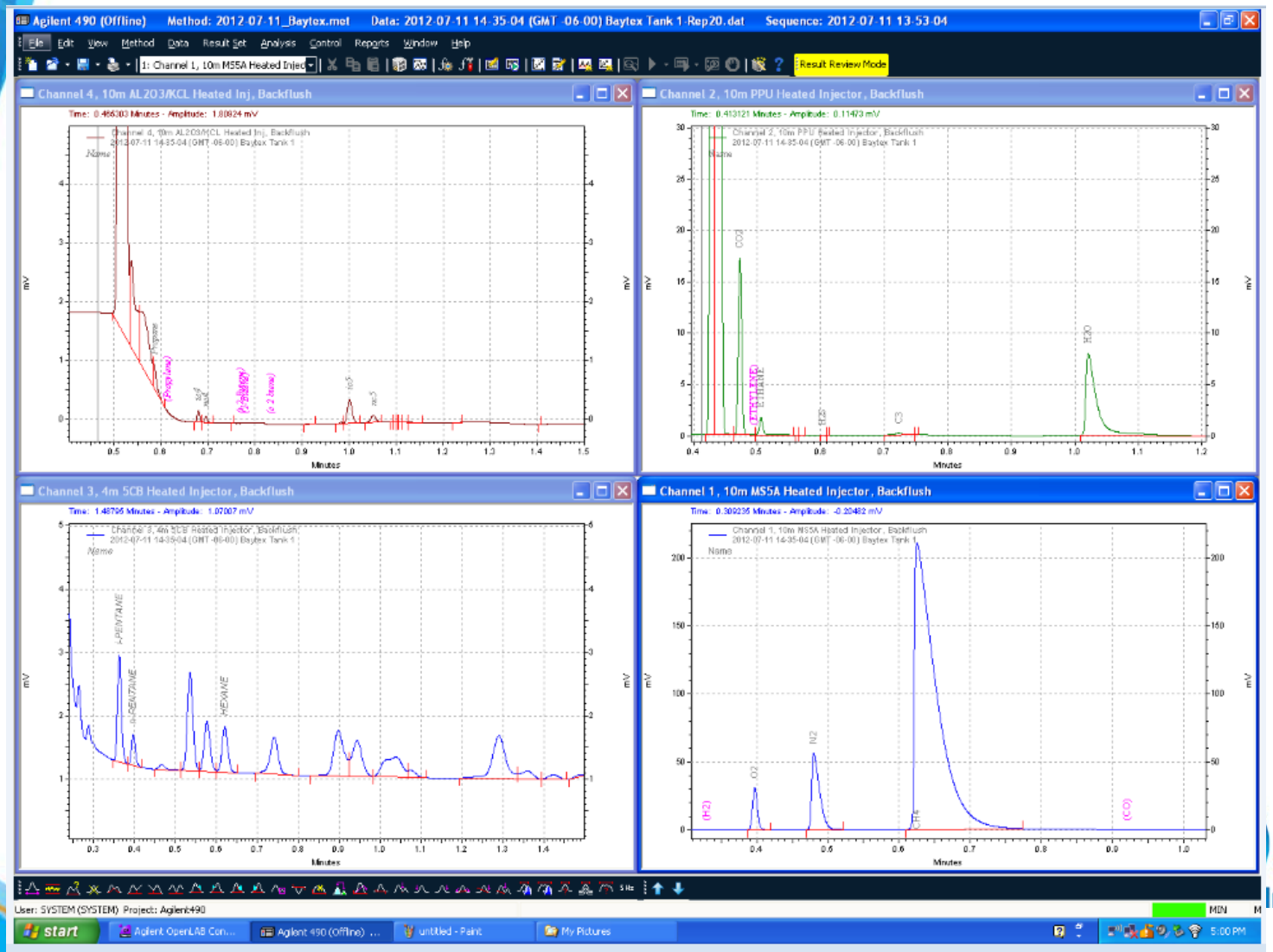
Micro Gas Chromatographs

Sample Gas Chromatograms



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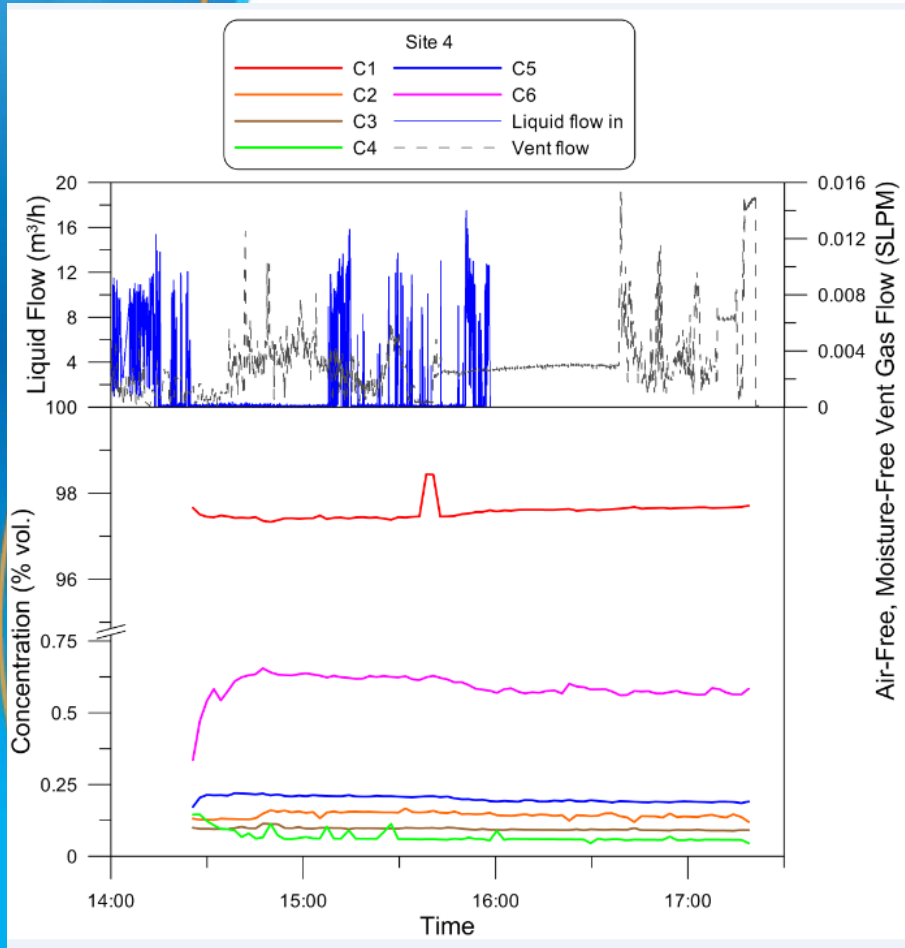
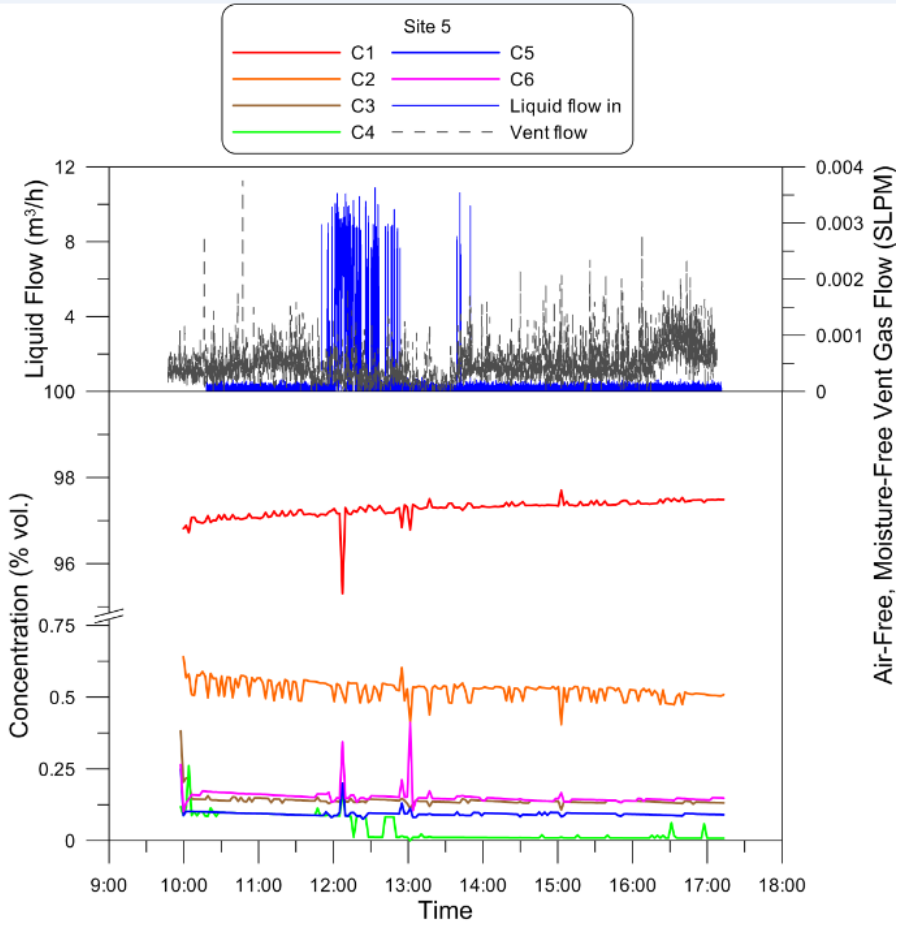
Sample Measurement Results Expressed on an Air-free Basis





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Key Findings

- Rigorous real-time monitoring of production tanks can be done using field deployable instruments.
- Key real-time monitoring outputs include:
  - Emissions trend analysis.
  - GORs
  - Vapor compositions.

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Key Benefits

- Reduced monitoring time requirements.
- Data needed to evaluate opportunities and engineer solutions.
- Data needed to extrapolate the results to other similar facilities.

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Thank you!

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