Methanol Quantification in Whole Crude Oil via In-Line Gas Chromatography

May 2001

PAC
Equilon Pipeline
Envantage, Inc.
ITS Caleb Brett
Topics of Discussion

- Background Information
- Methanol Analyzer Alliance
- History & Timeline
- Project Status & Forecast
- System Design /Data Evaluation
- Q&A
Background Information

◆ Problem - Ethane & Methane Hydrate formation of Offshore Sub-sea Wells.

◆ Temporary Solution - Use of Methanol (or LDHI containing Methanol) to Eliminate Hydrate Formation
  – Added During Production
  – Activation of Sub-Sea Wells
  – Gas Separators for Gas Wells

◆ Upstream Solution Creates Downstream Problem

◆ Early Detection System Required
Methanol Analyzer Alliance

- **Equilon Pipeline Company LLC**
  - Funding
  - Logistical Support - Houma, Louisiana

- **Envantage, Inc - Research & Development**
  - Method Development & System Design
  - Laboratory Prototype Beta Testing

- **PAC/Antek- Instrumentation Manufacturer**
  - In-Line Prototype Design & Development
  - Product Support

- **ITS Caleb Brett**
  - System Design - Sample Introduction System (Patent Pending)
  - Product & System Support
Project History & Timeline

- **October 1999** - ITS New Orleans Begins Intensive Testing Program
- **December 1999** - Initial Conversations w/ Equilon in Regards to In-Line System
- **Feb/Mar 2000** - Feasibility Study by Envantage Proved Positive
- **August 2000** - First Meeting in Houma to Discuss Project Objectives
- **Fall 2000** - Approval of AFE by Equilon to Fund R&D (Phase I begins)
- **Jan/Feb/Mar 2001** - Phase II Laboratory Prototype Developed and Laboratory Tested
Project Status & Forecast

- **March 27, 2001** - Install Laboratory Prototype in Houma

- **April/May 2001** - Side by Side testing of Laboratory Prototype with ITS In-House Methodology

- **May 2001** - In-Line Prototype Installed w/ Side by Side Testing
Generalized Crude Flow Schematic to Analyzer Building

Lab Building

Primary Manifold Assembly

Incoming Crude

1/2" 316 SS Tubing

Crude Return Line

Static In-Line Mixer

1/2" 316 SS Tubing

Low Pressure

Inst#1 Manifold

Inst#2 Manifold

Inst#3 Manifold

High Pressure

Generalized Crude Flow Schematic to Analyzer Building
C1 – C7 Hydrocarbons

Methanol
4 Pt. Calibration Curve

Methanol in Crude Analyzer Lab Prototype Calibration Curve

\[ y = 57.638x + 884.84 \]

\[ R^2 = 0.9999 \]
On-line Process Analyzer
Laboratory Prototype
Q & A

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