

**34<sup>th</sup> Annual Meeting  
October 23-25, 2002**

**Wednesday, October 23    Symposium on Pipeline Rupture and Leak Detection**

- 2:00 – 2:45 PM    02S1    *Exceeding The Requirements Of Mandated Leak Detection Testing*  
**Don Scott - Enbridge Pipelines, Inc.**  
**Ulli Pietsch - TAU Engineering Solutions, Inc.**  
The use of API 1149 calculations to determine the maximum theoretical leak detectability (or minimum threshold) is detailed in the paper. The use of simulated fluid withdrawals in a SCADA interfaced trainer environment to test the leak detection capabilities of a material balance system and the verification of these tests with actual fluid withdrawal tests is discussed. Finally, the costs and benefits of implementing this test system are presented.
- 2:45 – 3:30 PM    02S2    *Analysis Of The Hazardous Consequences Of Pipeline Ruptures*  
**Dr. Ole B. Rygg and Morten Haug Emilsen - Well Flow Dynamics AS**  
The paper describes the various available modeling techniques in the simulation of pipeline ruptures. It will include examples of simulation of rupture of live crude transportation pipelines. The effect of the operational conditions in the system will also be discussed including the influence of time delay for shut down as well as the effect of a network of pipelines
- 3:30 – 3:45 PM    *Break*
- 3:45 – 4:30 PM    02S3    *Gas Pipeline Rupture – Comparison Between Simulation Analysis Results And Measured Data From A SCADA System*  
**Rubén Omar Librandi - Transportadora de Gas del Norte**  
The results of simulations of a pipeline rupture are compared against measured data from a SCADA system. This enables the checking of the simulation models for accuracy.
- 4:30 – 5:15 PM    02S4    *Evaluation Of Cost-Effective Rupture Detection*  
**Ivan Salas and Faith Reid – El Paso Corporation**  
This paper presents several studies designed to explore low-cost methods of rupture detection on a natural gas transmission system. In each method, transient models are run with scheduled ruptures and the resulting pressure and/or flow data analyzed.
- 6:00 – 7:30 PM    *Reception*



## Wednesday, October 23

## Workshop Track 1

- 2:00 – 3:30 PM 02W1 *Demonstration Of Basic Simulation Techniques For Natural Gas Pipelines*  
**Jill Eberhard, Thomas Gilmour - Gilmour Educational Media**  
The basic flow equations will be reviewed together with a comparison of common “assumptions” when solving the equations. These assumptions are tested during the workshop. After testing the impact of the assumptions, real pipeline data will be used to see how well the model matched reality.
- 3:30 – 3:45 PM *Break*
- 3:45 – 5:15 PM 02W2 *The Making Of A Useful Pipeline Simulation Model*  
**Doug Fauer - Southern Natural Gas**  
The paper will discuss the following tuning techniques: Steady state tuning, Steady state tuning with transient factors, Transient tuning, and On-line tuning. Comparisons of the results of the different tuning techniques will be presented from actual studies performed on the SNG system. Tuning via pipe efficiency and roughness will also be addressed.

## Wednesday, October 23

## Workshop Track 2

- 2:00 – 3:30 PM 02W3 *Two-Phase Flow: Accounting For The Presence Of Liquids In Gas Pipeline Simulation*  
**Ben Asante - Enron Transportation Services**  
Multiphase flow of gas and low loads of liquids occurs frequently in natural gas gathering and transmission pipelines for both onshore and offshore operations. Literature and experimental investigations indicate that dispersed droplet and stratified flow patterns are obtained when gas and small quantities of liquids flow concurrently in a pipe. Very few correlations exist for the prediction of hold-up and pressure drop for these systems and fewer still give satisfactory results. Experimental studies for air-oil and air-water systems flowing through small diameter plastic and steel horizontal pipes ranging in size from 1-inch to 3-inches were studied. Data from actual operating gas pipeline systems transporting small amounts of hydrocarbon liquids were also evaluated.
- 3:30 – 3:45 PM *Break*
- 3:45 – 5:15 PM 02W4 *Update On Data Standards Initiative*  
**Ulli Pietsch**  
A presentation is made by the PSIG Data Standards Committee on the current status of efforts in developing a common data standard.
- 6:00 – 7:30 PM *Reception*



## Thursday, October 24

- 7:30 – 8:30 AM            *Registration*
- 8:30 – 8:45 AM            *Preliminaries*
- 8:45 – 9:30 AM    0201    *Turbine/Compressor Performance Monitoring Software And Flow Capacity*  
**Kevin Rahman and Rick Brown - Pacific Gas and Electric**  
This presentation involves the demonstration and discussion of a custom, in-house Visual Basic Applications program used at Pacific Gas and Electric to monitor turbine and compressor performance on its northern backbone pipeline.
- 9:30 – 10:15 AM    0202    *Taking the Rough With The Smooth – A New Look At Transmission-Factor Formulae*  
**Dr. John Piggot – Advantica Stoner**  
**Norman Revell - Advantica Stoner**  
**Dr Thomas Kurschat - Ruhrgas AG**  
The development of a very general transmission-factor formula is described that can be used as an alternative to the well-known Colebrook-White formula. The reasons for this alternative approach are presented.
- 10:15 – 10:30 AM            *Break*
- 10:30 – 11:15 AM    0203    *The Prediction Of Liquid Dropout And Associated Slugging In Offshore Pipeline Gathering Systems*  
**Dr. Ivor R. Ellul - Knowledge Reservoir, L.P.**  
**P. Blake Brooker - El Paso Corporation**  
The paper presents the methodology adopted in addressing the questions concerning the delivery of rich gas streams from the Deepwater areas to onshore receiving stations and on to processing facilities. Simulations are performed to investigate a variety of operational challenges such as liquid drop-out, slugging, and pigging frequency.
- 11:15 – 12:00 AM    0204    *Pipeline Thermal Models*  
**Dr. Jason Modisette - Energy Solutions International, Inc.**  
This paper investigates the impact of the thermal model on the overall pipeline model accuracy, especially on the linepack (for gas pipelines) and throughput. The isothermal assumption, various types of transient and steady state fluid thermal models, and coupled transient fluid and ground thermal models are compared for pipelines pumping gas, products, and crudes.
- 12:00 – 1:15 PM            *Lunch*
- 1:15 – 2:00 PM        0205    *Gas Management, Automation, Integration, Marketing And Simulation*  
**Jim Bowlin - Kinder-Morgan**  
**Patrick Willging, James Gregg - Gregg Engineering, Inc.**  
Automation and advanced computing techniques provide a natural link between the common goals of effective pipeline utilization and profitable operation. Techniques for maximizing the use of automation are discussed along with a recent implementation of some of these techniques.



- 2:00 – 2:45 PM    0206    *Statistical Modeling Techniques For The Design And Operation Of Pipeline Systems*  
**W.S. Chmilar - TransCanada PipeLines Ltd.**  
A number of statistical models have been developed and are routinely used to assist in evaluating the effects of operating variables and uncertainties on the design and operation of the pipeline system. This paper will provide a description of the concepts behind and resulting development of the specific statistical models. Examples of where and how the models have been used will also be presented along with a discussion of other applications where the models could provide a benefit through the insight they can provide.
- 2:45 – 3:05 PM    *Chairman's Session*
- 3:05 – 3:30 PM    *Break*
- 3:30 – 4:15 PM    0207    *Real Time Model As A Business And Operations Mission Critical System*  
**Todd Janzen - Alliance Pipeline Ltd.**  
Alliance Pipeline is a new natural gas transmission pipeline delivering high energy natural gas to the US Midwest from the Canadian Western Sedimentary Basin. The paper presents an overview of the real time modeling system as implemented on the pipeline.
- 4:15 – 5:00 PM    0208    *Practical Implementation Of A Leak Detection System In A Transient Thermal Environment*  
**Barry Guidry - LOOP, LLC**  
**Vlad Condacse - Energy Solutions International, Inc.**  
LOOP LLC's (Louisiana Offshore Oil Port) primary business interest is offloading foreign crude oil from tankers moored off the Louisiana coast. Offloading is performed through a 48" diameter, 45 mile long pipeline. Half of the pipeline lies on the bottom of the Gulf of Mexico wrapped in concrete, and the other half is buried on shore. This paper will discuss the thermal effects observed during implementation of a leak detection system on this pipeline and how those effects were accounted for to maintain high levels of leak detection sensitivity.
- 6:00 – 7:30 PM    *Reception*



## Friday, October 25

- 8:30 – 9:15 AM 0209 *Huldra: Initial Experiences In Real-Time Multiphase Pipeline Modelling*  
**Willy Postvoll and Dr Svein Thaulé - Gassco A/S**  
**Dr. Richard Spiers and Dr. Jonathan Barley - Energy Solutions International, Ltd.**  
Two pipelines emanate from the Huldra field – a 150 Km pipeline transporting wet gas from Huldra to the Heimdal platform and a 16 Km pipeline transporting unstabilised condensate, including water and MEG, to the Veslefrikk platform. This paper describes the requirements of the simulation engine and the pipeline modeling system. Additionally, the strategy for operating the pipeline and its impact on extending the functionality of the existing OLS system is presented. Finally, experiences from system start-up to the present are presented.
- 9:15 – 10:00 AM 0210 *Multiphase Pumping As An Alternative To Conventional Separation, Pumping And Compression*  
**Mack Shippen - Schlumberger**  
**Dr. Stuart Scott - Texas A&M University**  
This study explores the application of multiphase pumps as an alternative to conventional separation using rigorous steady-state simulation models incorporating a newly developed multiphase pumping model. The simulation results show that multiphase pumps are advantageous in not only reducing facilities, but can also increase production rates by lowering the backpressure on wells. Additionally the complexities associated with multiphase flow through a single pipeline are compared to running dual single-phase pipelines and important considerations observed with the steady-state simulation are highlighted.
- 10:00 – 10:30 AM *Break*
- 10:30 – 11:15 AM 0211 *Turbine/Compressor Performance Monitoring Software And Flow Capacity*  
**Kevin Rahman and Rick Brown - Pacific Gas and Electric**  
This presentation involves the demonstration and discussion of a custom, in-house Visual Basic Applications program used at Pacific Gas and Electric to monitor turbine and compressor performance on its northern backbone pipeline.
- 11:15 – 12:00 AM 0212 *Pipelines And Power: Integrating Electric Compression In Pipeline Design*  
**Anders Johnson and Ram Walloppillai - El Paso Corporation**  
The paper will describe electric driven operating equipment and the relationship between pricing and pipeline operation. Design consideration and strategies for incorporating electric motor driven compression in pipeline design and simulation will also be discussed.