Tuesday, May 6, 2014

#	Day	When	Author(s)	Affiliation	Title
		6:00 – 7:30			**Ice Breaker & Registration Opens**

Wednesday, May 7, 2014

			Track A AM Session - Gas System Modeling		
1401	Wednesday	8:30 – 9:15	Melissa Debevc	Union Gas Limited	**Design Day Demand Forecast** This paper will illustrate demand development focusing on using actual daily measurement data. It will explain differences between residential and industrial customer types and considerations to use when selecting design day demand. The paper will explore grouping customer types to take advantage of demand diversification. The paper will touch on the differences of demand developed using monthly billing records and daily measurement data. Lastly, the paper will discuss using upper confidence levels to ensure the design day demand is reasonable.
1402	Wednesday	9:15– 10:00	Michael Dew	Michael Dew Consulting, LLC	**The Difference Between Theory And Practice: Lessons Learned (And Still Being Learned) While Calibrating Access's Barnett Model** Calibration is an often-overlooked aspect of hydraulic modeling, but the impact of ignoring this potentially crucial step can be immense. It is not uncommon for significant pressure losses to be incurred in relatively small facilities that can often be glossed over as mere minutia when constructing a model. This presentation will provide insight into the challenges faced while calibrating Access Midstream's Barnett hydraulic model and some of the solutions that arose during that process.
		10:00 – 10:15			**Break**

1403	Wednesday	10:15 – 11:00	Ronald H. Brown Paul E. Kaefer Calvin R. Jay Steven R. Vitullo	Marquette University Johnson Controls, Inc.	**Forecasting Natural Gas Design Day Demand from Historical Monthly Data** In this paper we discuss methods and limitations of building daily natural gas demand models from historical monthly consumption data for the purpose of predicting demand on design day conditions. This paper provides an overview of new methods for building design day forecasting models based on coarse data availability using two HDD terms.
1404	Wednesday	11:00 – 11:45	Brent Mandich	DNV GL	**Using GIS Information to Build Pipeline Models** This paper discusses Geographic Information System (GIS) data and the role it can play in building pipeline models. The presentation will discuss the GIS data that is required to build pipeline models, the GIS data that is nice to have, and the holes typically found when utilizing GIS information. The presentation will also focus on keeping these models updated and the role GIS information plays in that process.
		11:45 – 1:30			**Lunch**
			Track A PM Session - Leak Detection		
1405	Wednesday	1:30 – 2:15	Gerhard Geiger Daniel Vogt	Westphalian University Gelsenkirchen Krohne Oil and Gas B.V.	**A Combined Leak Detection Method Using Pattern Recognition Techniques** After providing an overview of external and in particular internal leak detection methods, this paper presents a new leak detection methodology which uses pattern recognition techniques to combine two or more internal methods seamless into one scheme hence improving performance, robustness and applicability. The new method had been tested using a liquid multi-batch-pipeline, and corresponding results are presented.
1406	Wednesday	2:15 – 3:00	Greg Morrow Paul Dickerson	Energy Solutions International	**Leak Sensitivity, Robustness, and Location Accuracy in Natural Gas Pipelines** With the global expansion of unconventional gas plays and increased consumer demand, greater pipeline capacity to transport natural gas to market is a necessity. Leak detection is a crucial component of a pipeliner's risk mitigation. The major concerns in a leak detection system include robustness, leak sensitivity, and location accuracy. In this paper the effectiveness of gas pipeline leak detection by simulating several typical configurations is examined.
		3:00 – 3:15			**Break**

1407	Wednesday	3:15 – 4:00	Peter Han Mark Kim	ATMOS International, Inc.	**Optimizing Leak Detection Performance By Combining Statistical and Pressure Wave Leak Detection Technologies** This paper examines the benefits and technical challenges of combining the statistical analysis and negative pressure wave leak detection technologies on an oil pipeline. The presentation will include the details of the system integration and the results of product withdrawal tests on the pipeline.
1408	Wednesday	4:00 – 4:45	Rudolf Hajossy Igor Mračka Peter Somora Tibor Žáčik	Mathematical Institute, Slovak Academy of Sciences	**Cooling of a Wire as the Model for Rupture Location** It has been shown that the pressure drop of gas in a long pipeline after its rupture is described by similar equations as the temperature changes in a cooled wire. The heat models are suitable for the location of a rupture. Depending on the state of valves and the position of measuring devices, four different models have been applied for rupture location. The models are verified by more precise numerical simulations and by the analysis of three real accidents. Prerequisites for the utilization of these methods are also given.

			Track B AM Session - Multiphase and Liquid Pipelines		
1409	Wednesday	8:30 – 9:15	Ivor R. Ellul Michael Matlock Thomas C. Archer	RPS Knowledge Reservoir Devon Energy Corporation	**Challenges in Operating Onshore Multiphase System**s The paper reports a recent study undertaken for a major US onshore operator wherein the feasibility of conversion is assessed in light of the requirement to handle not insignificant quantities of liquids in a complex pipeline system originally designed to handle predominantly single phase gas. A review will be presented of analyses performed to quantify the amount and location of liquid hold-up as well as the operational approach to handling such quantities of liquid.
1410	Wednesday	9:15– 10:00	Augusto Garcia-Hernandez Kevin Supak	Southwest Research Institute	**Multiphase Assessment of an Offshore Production System** This paper discusses some of the challenges that are faced when a multiphase pipeline system is designed. A flow assurance study was conducted to improve the design and reliability of the off-shore transporting gas/liquid system. The studied pipeline operates with three phase; oil, water, and gas; thus, flow patterns vary from stratified to severe slugging for some operating conditions and locations. The presentation will discuss the modeling approach, results, and some of the proposed recommendations.
		10:00 – 10:15			**Break**

1411	Wednesday	10:15 – 11:00	Walker Manning Greg Lind	Enterprise Products	**Data Analysis and Discussion of Product Interface Growth on a Batched Crude Oil Pipeline** This paper examines the effects of, batch size, transit time, and DRA application on product interface growth for a batched crude oil pipeline. The presentation will discuss the comparison of measured interface growth versus calculated interface estimates using density driven turbulent mixing formulae.
1412 Withdrew	Wednesday	11:00 – 11:45	**Break**		
			Track B PM Session - Optimization		
1413	Wednesday	1:30 – 2:15	Baptiste Rossi Fayçal Djerourou Félix de Carpentier François Martin	GDF SUEZ CRIGEN GRTgaz	**Transient Optimization in Gas Transmission Networks, A New Approach on GRTgaz Network** This paper discusses an optimization program that minimizes flexibility sourcing costs and helps operators drive a natural gas transmission network from its current state to a desired target by optimizing line pack usage. The presentation will describe the challenges of operating a transmission network in Europe's complex regulations and market conditions, discuss the main physical concepts behind the tool, and the benefits of the tool in operations at GRTgaz, French TSO. A demo of the program will also be provided.
1414	Wednesday	2:15 – 3:00	Jennifer Worthen	Energy Solutions International	**An Application of Liquid Pipeline Optimization Through Parametric Studies** In this paper, we utilize an explorer tool to extract various subsets of the solution space for a pipeline model currently optimized through commercial pipeline software. Analysis of these subsets reveals unexpected system responses to changes in control variables, the knowledge of which can be exploited in operational planning.
		3:00 – 3:15			**Break**
1415	Wednesday	3:15 – 4:00	Andrew Daniels Sanjay Yadav Richard Carter	DNV GL	**The Effects of Compressor Constraints in Pipeline Modeling and Optimization** This paper discusses the effects of compressor station constraints on pipeline modeling and optimization results. The paper investigates a methodology for visualizing the effects of various constraints that a gas pipeline must satisfy for feasible operation. It also points out the problems associated with compressor models containing minimum constraints within pipeline

					simulation and optimization software.
1416	Wednesday	4:00 – 4:45	Richard G Carter Sanjay Yadav	DNV GL	**Algorithms For Pump Selection in Batched Pipelines** This paper presents a hybrid algorithm for batched liquid pipeline optimization. The combinatoric problem of unit selection is addressed in the context of optimizing both power costs and DRA injection costs in a gun barrel pipeline. The method is linear in station count and a low order polynomial in discretization size, and is suitable as a subcomponent for larger optimization problems that include other types of control variables.

Thursday, May 8, 2014

		8:00			**Conference Start**
1417	Thursday	8:30 – 9:15	Garry Hanmer Susan Bachman Greg Lind	ATMOS International, Inc. Enterprise Products	**Pipeline Surge Analysis Studies** This paper discusses pipeline surge analysis and looks to address the challenge of efficiently reviewing entire pipeline networks for pressure surges in order to comply with Department of Transport regulatory requirements. To reduce the effort required in conducting pipeline surge analysis studies for pipeline design, operational changes, and product changes, a surge analysis program has been developed to automate the procedure from the scheduling of simulation scenarios to the creation of the surge analysis report.
1418	Thursday	9:15– 10:00	Frank Vejahati Seema Dhanda	ENBRIDGE Inc.	**A Correlation for Predicting the Effectiveness of a Drag Reducing Agent** Drag reducing agent (DRA) has typically been used to overcome the pipeline capacity limitations, due to its dimensions and pressure constraints, by lowering the pressure drop across the pipe. Drag reduction is rapidly becoming an essential aspect of cost savings for pipeline industry. Optimum usage of DRA requires that the pipeline operator to be able to correctly predict the effectiveness of drag reducing agent as a function of agent concentration. This work is an attempt to develop a model that predicts the drag reduction predictions over a wide range of operating conditions and DRA concentration. The simple proposed model predicts the agent efficiency as a function of both DRA concentration and Reynolds number, based on the DRA filed test data. The model shows an excellent correlation with both parameters.
		10:00 – 10:15			**Break**

1419	Thursday	10:15 – 11:00	Ivor R. Ellul	RPS Knowledge Reservoir	**The Piper Alpha Disaster - A Forensic Pipeline Simulation Study** On July 6th 1988 a significant explosion and subsequent fire led to the destruction of the Piper Alpha platform in the North Sea. 167 men died (62 escaped). The sequence of events leading up to the explosion and fire will be reviewed and discussed as it appertains to the pipeline network systems that the Piper Alpha platform formed an integral part of. The results of simulations of the pipeline systems will be presented and history-matched against actual data recovered during the aftermath of the disaster. Conclusions will be drawn that will point to the cause and effect of the events that took place that day.
1420	Thursday	11:00 – 11:45	Mahmood Al-Rasheed Aussain Imran Ahmad Al-Hawsawi	Saudi Aramco	**Integrated Model application For the Largest Sea Water Injection System** This paper discusses a new integrated model that minimizes total energy and maintenance costs by optimizing pumps operations and chemical injection. The presentation will focus on utilizing a new pipeline modeling technology in our operations, which is a great enabler of more efficient, more reliable, safer, lower cost and more profitable operations.
		11:45 – 1:15			**Lunch**
1421	Thursday	1:15 – 2:00	Jerry L. Modisette Jason P. Modisette	Independent Consultant Atmos International, Inc.	**Pipeline Frost Heave (or the lack thereof)** Frost heave, sometimes called as *frost jacking*, is the lifting of buried solid objects by the freezing and expansion of accumulated moisture under the object. Moisture moves through unsaturated soil by two mechanisms: vapor transport and, for liquid water, capillary action. Both of these mechanisms move moisture from higher to lower temperature regions. Simulations of the dynamics (motion and change in configuration) of frost lines for rocks and pipelines buried in unsaturated soil illustrate the details of the formation of *ice lenses* that move buried rocks to the surface and show that such lenses are not formed for pipelines with product temperatures above freezing in the early life of the pipeline. The motion of the moisture is **away** from the buried pipe, so that the soil is dried out around the pipe. For pipelines or rocks buried in saturated soil there is no transport of moisture due to temperature differences, so frost heave does not occur.
1422	Thursday	2:00 – 2:45	Rob Hickox Galen Stanley Sharon L. Weaver, Matthew H. Ford	Schneider Electric	**Handling Theft Detection with a Real Time Transient Model** This paper discusses a technique that allows for the accurate modeling of theft detection during steady state pipeline operating conditions. Any leak

					event—no matter its size—will produce a decompression wave that will propagate longitudinally from the location of the leak that will subsequently register on neighboring pressure sensors. Reconstruction of this event solely from pressure sensor measurements allows for accurate calculation of the location and origination time of the theft event or commodity release. Since this method does not rely on flow calculations to determine leak location, it is also ideally suited to determine leak locations of a pipeline during shut-in periods.
	Thursday	2:45 – 3:15			Chairman's Session
		3:15 – 3:30			**Break**
1423	Thursday	3:30 – 4:15	Xuesong Wang Gerald T. Moreland	Foster Wheeler Upstream	**Practical Experience of Using Different Equations of State for CO2 Pipeline Simulation** This paper reviews up-to-date CO2 pipeline design and modeling especially focusing on the Equation of State (EOS). The economical CO2 transportation way is to keep it in dense phase. This is a big challenge for traditional Equations of State such as Peng-Robinson equation and SRK equation because they are suitable for the vapor-liquid equilibrium properties of hydrocarbon mixture systems. Pure CO2 property can be accurately predicted by Span-Wagner equation. But impurities in CO2 can change the property dramatically. It is reported that both Peng-Robinson and Span-Wagner equations have been utilized for CO2 pipeline simulation. This paper will present the results using different Equations of State for CO2 simulation. Different commercial software packages have been tested. The results show there are about 5% difference in density and 3% in viscosity. The Peng-Robinson equation with Peneloux volume correction is more conservative in pressure drop calculations for near pure CO2.
1424	Thursday	4:15 – 5:00	Roland Muwanga	Transcanada Corporation	**Successive steady state hydraulic model tuning through viscosity analysis** This paper will present a methodology for tuning a batched crude oil pipeline, using a successive steady state (SSST) hydraulic model with transients, and the challenges that arise. The pipelines effective viscosity profile has been selected as the parameter to tune the model against SCADA data. The effectiveness of this approach is demonstrated and future enhancements are discussed.
		6:00 – 7:30			**Reception**

Friday, May 9, 2014

		8:30			**Start**
1425	Friday	8:30 – 9:15	Augusto Garcia-Hernandez Jeff Bennett	Southwest Research Institute	**Evaluation of a Pumping System to Aid Machine Performance Testing** An exploration and production off-shore transport system has been hydraulically analyzed to determine its current transport capabilities and assess the effect of a possible change in the properties of the transported crude oil. As a part of the hydraulic analysis a performance testing of the existing equipment was required to estimate machine degradation and efficiencies which will help to optimize the system operation. However, due to the complexity of the system operation, it was very critical to determine precisely the machine configuration and flow conditions required to conduct the test. Thus, this paper presents the modeling approach and simulation results as well as their comparison with the actual performance testing results.
1426	Friday	9:15– 10:00	Brett Christie	Energy Solutions International	**On the correlation between Isothermal Compressibility and Isobaric Expansivity** For fluids pumped in the liquid phase, there appears to be a correlation between isothermal compressibility and isobaric expansivity. Liquids with high thermal expansion appear to also demonstrate high compressibility. This paper intends to investigate this correlation through examination of laboratory data for various fluids and then will attempt to understand and derive the correlation from a thermodynamic state equation perspective.
		10:00 – 10:15			**Break**
1427	Friday	10:15 – 11:00	F. Bahramian Simon Fung H. Mohammadi	Spectra Energy University of British Columbia	**Stress Analysis of Crack Propagation in Gas Transmission Pipelines** This paper uses an iterative finite element (FE) technique to study the effect of several factors like pipe size and material properties on longitudinal crack propagation and its growth in a typical gas transmission pipeline. The presentation describes the advantages of the approach used in the study and also discusses the results.
1428	Friday	11:00 – 11:45	Trevor Slade Yoshihiro Okamoto Jonathan Talor	Alyeska Pipeline Energy Solutions International	**Economic Benefits of Leak Detection Systems: A Quantitative Methodology** This paper discusses the need for economic risk comparison when evaluating leak detection systems and demonstrates a method for quantitatively comparing the risk reduction they provide. The presentation will discuss the development and implementation of this methodology. A

					simplified case study will also be presented.
		11:45			**Conference Close**