



Agenda

Symposium on Improved Profits Through Best Managed Practices November 1, 2005

- 8:30 Introductions
- Texas Commission on Environmental Quality - Emissions Banking and Trading
 - U.S. Environmental Protection Agency - Natural Gas Star Program
 - Texas A&M University – Chicago Climate Exchange
 - Texas Commission on Environmental Quality - Emission Survey of Houston/Galveston Airshed
- 10:00 1st Coffee Break 10 min.
- Total - EVRU Verification
 - Integrated Production Services - Pressurized “Online Swabbing™”
- 12:00 Lunch - Sponsored by Comm Engineering
- 1:00 Texas A&M University-Corpus Christi - Hydrocarbon Emissions Detection and Remediation Pilot Project (HEDR)
- ITT Industries - Test of Airborne DIAL Lidar for Hydrocarbon Emission Detection
- 2:30 2nd Coffee Break 10 min.
- Southern Research Ints. - Refuse Here is a Resource There ... Well, Really?
- 4:00 Adjourn

Emission Banking and Trading Program

by

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The Emission Banking and Trading Programs are designed to provide maximum flexibility with rules and regulations while still meeting the environmental goals of Texas. Emission Reduction Credit (ERC) and Discrete Emission Reduction Credit (DERC) programs allow companies to claim credits for making voluntary emission reductions beyond any local, state or federal regulatory requirements. Reductions that are surplus, real, quantifiable, enforceable and permanent may be claimed as credits. These credits may then be used as alternative compliance for other state requirements or to satisfy Non-attainment New Source Review Permits. The Emission Banking and Trading Programs provide an alternative method for companies to meet regulatory requirements.

http://www.tceq.state.tx.us/permitting/air/nav/air_banking.html

Natural Gas STAR Program Cost-Effective Methane Emission Reductions for Small and Mid-Size Natural Gas Producers

by

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The Natural Gas STAR Program is a voluntary partnership that encourages companies across the natural gas and oil industries to adopt cost-effective technologies and practices that improve operational efficiency and reduce emissions of methane. Methane, the primary component of natural gas, is a potent greenhouse gas 21 times stronger than CO₂.

In the U.S. the natural gas system encompasses hundreds of thousands of wells, hundreds of processing facilities, and over a million miles of transmission and distribution pipeline. All industry sectors, including gas production, processing, transmission, and distribution emit methane to the atmosphere to varying degrees. Methane emissions are generally process-related, with normal operations, routine maintenance, and system upsets being the primary contributors. In 2000, natural gas systems emitted an estimated 116.4 Tg CO₂ equivalent of methane.

<http://www.epa.gov/gasstar/overview.htm>

Chicago Climate Exchange

by

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The Chicago Climate Exchange (CCX) is the world's first and North America's only voluntary, legally binding rules-based greenhouse gas emission reduction and trading system. The mission of the (CCX) is to provide members from the private and public sectors with cost-effective methods for reducing their greenhouse gas emissions by building and operating a market-based emission reduction and trading program that is flexible, has low transaction costs, is environmentally rigorous and rewards environmental innovation.

Emissions of all non-CO2 Greenhouse Gases will be converted to metric tons CO2 equivalent using the one- hundred- year Global Warming Potential (GWP) values established by the Intergovernmental Panel on Climate Change. A CO2 common unit of emissions quantification has been established based on the GWP of each non-CO2 gas.

<http://www.chicagoclimatex.com/>

<http://agecon2.tamu.edu/people/faculty/mccarl-bruce/papers.htm>

Emission Survey of Houston/Galveston Airshed

by

Russ Nettles, Texas Commission on Environmental Quality

The Texas Commission on Environmental Quality (TCEQ) has been conducting helicopter flights around the Houston Ship Channel, the Texas City industrial area, and the Beaumont/Port Arthur industrial areas using an infrared camera to identify VOC emissions. The HAWK infrared video camera can view VOC plumes, such as gasoline vapors and ethylene, that cannot be seen by the human eye.

The project uses the Hawk infrared camera to identify and characterize VOC emission sources that have possibly been unreported or under-reported in the agency's emissions inventory. The goal is to develop a corrective strategy plan to minimize VOC emissions from identified plumes.

<http://www.tceq.state.tx.us/implementation/air/airmod/texaq-files/rsproject.html>

EVRU Technology Verification

by

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The EVRU is a non-mechanical eductor of a jet pump that captures low-pressure hydrocarbon vapors. It requires high-pressure motive gas to entrain the low-pressure vapors emanating from condensate storage tanks. The combined discharge gas stream exits at an intermediate pressure, which can be used on site as fuel or re-pressurized with a booster compressor and injected into a natural gas transmission line for sale. It is a closed loop system designed to reduce or eliminate emissions of greenhouse gases (CH₄ and CO₂) volatile organic compounds (VOCs), HAPs and other pollutants present in vent gas.

<http://www.epa.gov/etv/verifications/vcenter3-10.html>

Pressurized On-line Swabbing™

by

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When a gas well loads up due to an accumulation of produced fluids in the tubing, or as a result of treatment fluids pumped down the tubing, swabbing the well is a common solution. Typically the well would be piped in to a test or production tank to hold the recovered fluids, and the produced gas would be vented to the atmosphere during the swabbing operation.

Producers can now use the “On Line Swabbing™” method where specialized swabbing units have the capability to swab the well directly into the pressurized production system.

The capability to swab the well back in, or to “swab test”, against the system pressure has resulted in more effective fluid containment, reduced methane emissions, valuable well analysis information, and the ability to sell the produced gas during the swab operation

The re-completion or work-over procedures on gas wells typically require the introduction of fluids into the well bore. The final phase of the completion process is to clean up the well bore of the remaining fluid and any solids that have accumulated as a result of the work-over procedure. Traditionally these fluids and solids were produced during the “flow-back” stage into temporary open top tanks for containment and future disposal. The produced natural gas was vented to the atmosphere.

Producers can now use the “Green Flow-Back™” process where additional pressure control equipment, holding tanks, and more effective liquid and solid separators allow the now clean gas to be piped to the existing gathering system and sold. In addition to substantial reduction of methane emissions and more effective fluid containment the producer realizes reduced job costs due to the resulting sale of the produced gas.

<http://www.ipsadvantage.com/>

Hydrocarbon Emissions Detection and Remediation Pilot Project (HEDR)

by

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The Texas Commission on Environmental Quality (TCEQ) estimates that over 2000 tons of hydrocarbon based volatile organic compounds (VOCs) are emitted annually into the atmosphere in the Corpus Christi area by the oil and gas industry. While negatively these fugitive emissions contribute to ground level ozone pollution, which is harmful to plant and animal life, positively if these VOCs can be safely and effectively recovered, they can be recycled into useful products and generate more dollars for the oil and gas industry. Current methods of detecting hydrocarbon emissions which include ground-based and passive airborne systems have many limitations including safety issues and technology application over an extended period of time. Recently, ITT Industries has developed a new technology which appears to hold great promise to detecting hydrocarbon emissions. The ITT Industry's Airborne Natural Gas Emissions LIDAR (ANGEL™) system is an active airborne system that can operate safely and is not limited in anyway. The HEDR pilot project was designed by Pollution Prevention Partnership to fine tune and test the capability of this new system to detect (and perhaps quantify) low levels of hydrocarbon emissions. A staged release of gas was conducted at an El Paso Production well site near Kingsville, Texas while the ANGEL system flew overhead. Through the application of a combination of geospatial technologies of Geographic Information Systems (GIS), Global Positioning System (GPS), and Remote Sensing data was collected, processed, and analyzed.

<http://outreach.tamucc.edu/smallbusiness.html>

Test of Airborne DIAL Lidar for Hydrocarbon Emission Detection

by

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Over the summer of 2005 ITT Industries Space Systems Division successfully detected, measured, and imaged hydrocarbon vapors released from a battery of condensate storage tanks near Kingsville, TX. With R&D support from the United States Department of Transportation Pipeline and Hazardous Materials Safety Agency (DOT/PHMSA), ITT Industries is examining the ability of the ITT Airborne Natural Gas Emission LIDAR (ANGEL) System to detect and image a wide range of different hydrocarbons. The objectives of the DOT/PHMSA effort, was to: 1) develop an understanding of hazardous liquid pipeline leaks, 2) demonstrate the detection of hazardous liquids in the real world with the ANGEL System, and 3) use this information to design an airborne sensor system optimized for the detection of both natural gas and hazardous liquid leaks. As part of this study, ITT Industries, in cooperation with El Paso Production and Texas A&M–Corpus Christi, completed two separate sets of overflights of a natural gas condensate storage facility near Kingsville, TX. During each set of ANGEL System overflights, data was collected over the El Paso facility with the Vapor Recovery Unit (VRU) operating and again after the VRU was turned off and the thief hatches on each of the tanks opened to create large emissions. Data from each of the overflights was processed and the results analyzed. The ANGEL System was shown to be capable of detecting and mapping condensate vapor emissions flying an altitude of 1,000 feet at speeds of up to 120 mph.

<http://www.ssd.itt.com/angel/advantages.shtml>

Refuse Here is a Resource There ... Well, Really?

by

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Process streams which are considered waste or refuse in one application may, through transformation, constitute resources in others. Verification of whether the transformation is worth the effort, economically feasible, or “real”, however, may not be easy. Planning and execution of such verifications require:

- careful definition of verification goals
- consideration of all process inputs and outputs
- design and credible review of a test plan which will meet verification goals
- attention to process and testing variability
- valid statistical evaluations of the results

Natural gas dehydration processes have waste or fuel gas streams which, if recovered, could represent tangible resources. Their exhaust emissions certainly represent important regulatory issues as well as significant sources of greenhouse gases. Engineered Concepts’ “Quantum Leap Technology” (QLT) design appears to produce a salable product from a toxic process stream that, at a conventional dehydrator, would be vented. It also purports to provide significant natural gas fuel savings and virtually eliminate most toxic and stack gas emissions. The verification goal, in this case, was to show if these gains are real.

The test plan [1] discussed and specified:

- measurements to be taken
- field procedures, such as fluid sampling [2]
- laboratory and other analyses
- data quality determination procedures

It also provided a structure for field testing, site coordination, assignment of roles and responsibilities, and peer review.

The implementation of this test plan provided verification data showing that [3]:

- QLT reduced benzene, ethylene, toluene, xylene, and n-hexane (BTEX) emissions by 99.74 ± 0.01 percent as compared to a conventional natural gas dehydrator
- QLT produced 2.88 gph of salable hydrocarbon liquids, primarily BTEX
- use of the recovered non-condensable hydrocarbon vapors as fuel avoided the use of natural gas amounting to approximately 4.16 MMBtu/h, which represents annual savings if \$182,000 per year (gas at \$5.00 / MMBtu)

The quantification of these resources is real because the well-defined, peer-reviewed tests executed by independent personnel produced results of known accuracy and quality under real-world field conditions.

Southern Research Institute in cooperation with the EPA Environmental Technology Verification (ETV) program conducted all verification efforts. Southern has found that our verification tests provide significant credibility because of the rigor of our technical methods and our independence. Technology

designers, purchasers, financiers, government regulators, and others value our multifaceted, stakeholder-driven verification process and our cost-effective approach to difficult field testing projects.

Southern and the ETV program actively solicit verification candidates. The ETV program is a public process and all documents are freely available. Private product development projects, proprietary testing, or other efforts that are outside the scope of ETV are also welcome. For more information, please contact:

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References

[1] *Test and Quality Assurance Plan—Engineered Concepts, LLC Quantum Leap Dehydrator*, available at <http://www.sri-rtp.com/Quantum_Leap.htm>, Southern Research Institute Greenhouse Gas Technology Center, Research Triangle Park, NC 2002

[2] *Atmospheric Rich/Lean (ARL) Method for Determining Glycol Dehydrator Emissions*, GRI-95/0368, Gas Technology Institute, Chicago, IL 1996

[3] *Environmental Technology Verification Report—Engineered Concepts, LLC Quantum Leap Dehydrator*, available at <http://www.sri-rtp.com/Quantum_Leap.htm>, Southern Research Institute Greenhouse Gas Technology Center, Research Triangle Park, NC 2003

<http://www.sri.org/>

Scholarship Donations

Community Outreach at Texas A&M University-Corpus Christi has a scholarship program to assist students who are involved in active service to the community. You have an opportunity to help reward these deserving students as they continue their education here at Texas A&M University-Corpus Christi. Please take the time to fill out your contact information in the form below so that you can help to achieve the educational goals of these students.

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