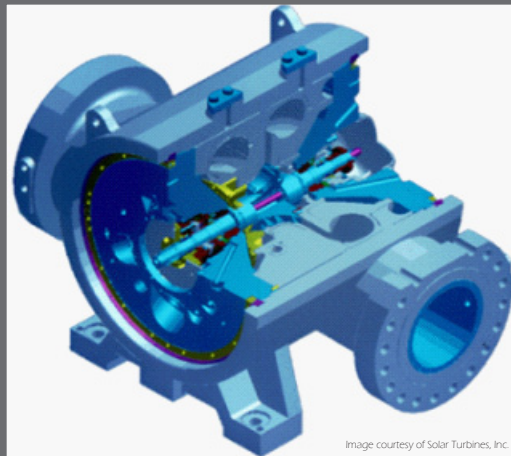


2012 Gas/Electric Partnership

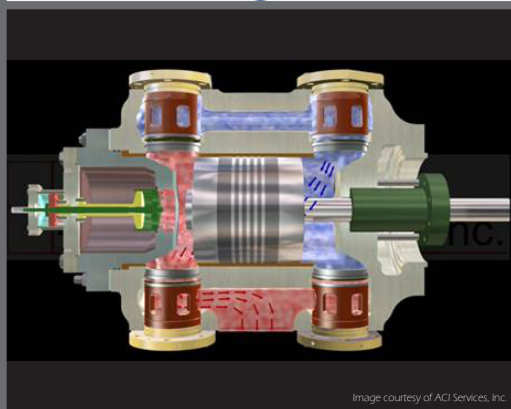
# COMPRESSOR TUTORIALS FOR GAS PRODUCERS

Held at Conference XX • February 7-10, 2012

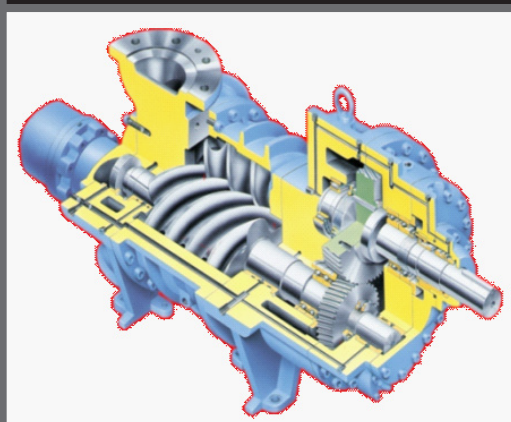
Northwest Forest Conference Center  
12715 Telge Road Cypress (Houston), Texas



**CENTRIFUGAL  
COMPRESSORS**



**RECIPROCATING  
COMPRESSORS**



**ROTARY  
SCREW  
COMPRESSORS**

## Tutorial Agenda

### Tuesday, February 7

8:00 am

#### *Rotary Screw Compressor Tutorial\** *Detection Technologies*

Andrew Miles, Detection Technologies

#### **BASICS**

The Physical Properties of Natural Gas  
Compressor Hardware

#### **THE COMPRESSION PROCESS**

The Compression Cycle  
Capacity Control  
Volumetric Ratio  
Over/Under Compression

#### **OIL MANAGEMENT**

Oil Characteristics  
Oil Temperature

#### **OTHER**

Maintenance and Troubleshooting  
Performance/Loading Curves  
Compressor Evaluation

12:00 Noon – Lunch

1:00 pm

#### *Reciprocating Compressor Tutorial\** *ACI Services, Inc*

W. Norm Shade, ACI Services, Inc.

#### **BASICS**

Reciprocating Compressor Types, Applications,  
Drivers and Rating Criteria  
Mechanical Components and Their Functions  
Basic Compression Thermodynamics and  
Terminology

#### **PERFORMANCE**

Compressor Capacity (Flow) and Horsepower  
Performance Curves  
Compressor Rod Load and Pin Reversal  
Multistage Compression  
Effects of Gas Properties

#### **CAPACITY CONTROL**

Capacity Control with Suction Throttling,  
Bypass, Clearance Pockets and End Deactivation  
Examples of Some Common Problems  
Recap

5:00 – Refreshments

### February 8-9

*Gas/Electric Partnership Conference*  
*(agenda on page 2)*

### Friday, February 10

8:30 am

#### *Centrifugal Compressor Tutorial\** *Southwest Research Institute*

Dr. Klaus Brun and Andrew Lerche,  
Southwest Research Institute,  
Dr. Rainer Kurz, Solar Turbines,  
Mrs. Marybeth Nored, Apache Corp.

#### **BASICS**

Centrifugal compressors:  
Basic Function  
Components  
Performance

#### **ROTORDYNAMICS & VIBRATION**

Theory  
Rotordynamic Modeling  
Vibration instrumentation  
Troubleshooting Vibration Problems

#### **DRIVERS**

Electric Motors  
Gas Turbines  
Engines

#### **APPLICATIONS**

Upstream  
Midstream  
Downstream

4:00 pm – Adjourn

*\*Certificate for Professional Development  
Hours will be earned.*

# Preliminary Conference Agenda

## Tuesday, February 7

- 8:00 am Rotary Screw Compressor Tutorial, Detechtion Technologies
- 12:00 pm Lunch
- 1:00 pm Reciprocating Compressor Tutorial, ACI Services, Inc.
- 5:00 pm Refreshments

## Wednesday, February 8

### Offshore Production Systems

- 8:30 am Global Offshore Oil and Gas Outlook, Steven Kopits, Douglas Westwood
- Floating Production Storage and Offloading, Cobie Loper, SBM Atlantia
- The Right Mix of Drivers and Power Generation on Offshore Platforms, Charles L. McDonald and Stan C. Beaver, BP/Clover
- 10:20 am Break

### Technology Updates – Session I

- 10:40 am Brief updates on recently available products and services, W. Norm Shade, ACI Services, Inc.

### Enhanced Oil Recovery

- 11:20 am New Developments in CO<sub>2</sub> Enhanced Oil Recovery, Robert Cornelius, Denbury Resources Inc.
- 11:55 am Lunch

### North America Shale Infrastructure

- 12:55 pm Infrastructure Development in the Eagle Ford Shale, Trisha Dixon, ConocoPhillips
- Hydraulic Fracturing and Ground Water Issues, Ian Duncan, University of Texas
- Impact of Shale Supply on Transmission, Hua Tran, Williams Gas Pipeline
- Prime Power in Midstream Gas, Blake Zimmerman, Horizon Power Systems
- 3:00 pm Break

### Compression in On-Shore Production

- 3:40 pm Benefits of Gas Lift, Jim Holt, Compressor Systems Inc.
- 4:10 pm Contract Compression Providers Address Gas Producers' Concerns, Panel. *Issues of declining gas prices and oversupply, frantic activity in oil rich shale plays, and tightening environmental regulations pressure both gas producers and rental fleet owners*
- 5:00 pm Refreshments

- 6:00 pm Gas/Electric Partnership Cocktails and Dinner Northwest Forest Town Hall

## Thursday, February 9

### Gas Industry Overview

- 8:20 am Energy Trends and Impacts on Gas Infrastructure, Amber McCullagh, Wood Mackenzie
- Air Regulatory Issues for the Gas Compressor Industry – Jeffrey A. Adams, BP America Production Company

### Transmission Compression – I

- 9:40 am Florida Gas Project – Lessons Learned, Arnold Eisenstein, Panhandle Energy
- 10:15 am Break
- 10:35 am Successful Pipeline Projects and What Was Learned from Them, Forum
  - 300-Line Project, William A. Thomas and Alex McConnell, El Paso Corporation
  - Lessons Learned, Matt Griswold, Boardwalk Pipeline

### Technology Updates – Session II

- 11:10 am Brief updates on recently available products and services, W. Norm Shade, ACI Services, Inc.

- 12:10 pm Lunch

### Transmission Compression – II

- 1:10 pm Issues for Interstate Pipelines, Panel – William E. Murrell, Federal Energy Regulatory Commission, and gas industry representatives. *Changing gas supply patterns impact fuel efficiency projects, pipeline utilization and even direction of flow, gas storage, and need for compressor flexibility.*
- Compressor Station of the Future, Jason Gatewood, Southwest Research Institute
- Electric Compression Costs and Reliability, Melissa Wilcox, Southwest Research Institute

- 3:15 pm Refreshments

## Friday, February 10

- 8:30 am Centrifugal Compressor Tutorial, Southwest Research Institute
- 12:00 pm Lunch
- 1:00 pm Centrifugal Compressor Tutorial part B, Southwest Research Institute
- 4:00 pm Adjourn

# Conference & Tutorial Registration

Fax to 713.529.3318 or email to [rschmeal@ix.netcom.com](mailto:rschmeal@ix.netcom.com)

- Yes, I plan to attend the Gas/Electric Partnership Conf., February 8-9, 2012.      \$625.
  
- I will attend the Partnership Dinner on February 8, included in cost.
  
- Add Rotary Screw Compressor Tutorial (February 7, Half Day)      +\$60
- Add Reciprocating Compressor Tutorial (February 7, Half Day)      +\$60
- Add Centrifugal Compressor Tutorial (February 10, Full Day)      +\$100

**Total Cost** \_\_\_\_\_

**For hotel reservations**, call Northwest Conference Center, 281.256.3548 or 800.256.3548 for special Gas/Electric Partnership rate. See website ([www.northwestforest.com](http://www.northwestforest.com)) and click on **Accommodations** and then **Trip Advisor** for reviews. Fishing poles provided.

Check payable to Gas/Electric Ventures is enclosed.  
Mail to: Gas/Electric Ventures, 5327 Mandell Blvd., Houston, TX 77005

Charge: \_\_\_\_\_  
Credit Card Number \_\_\_\_\_  
Expiration Date \_\_\_\_\_ Zip Code Associated with Card \_\_\_\_\_

Signed \_\_\_\_\_

Name \_\_\_\_\_

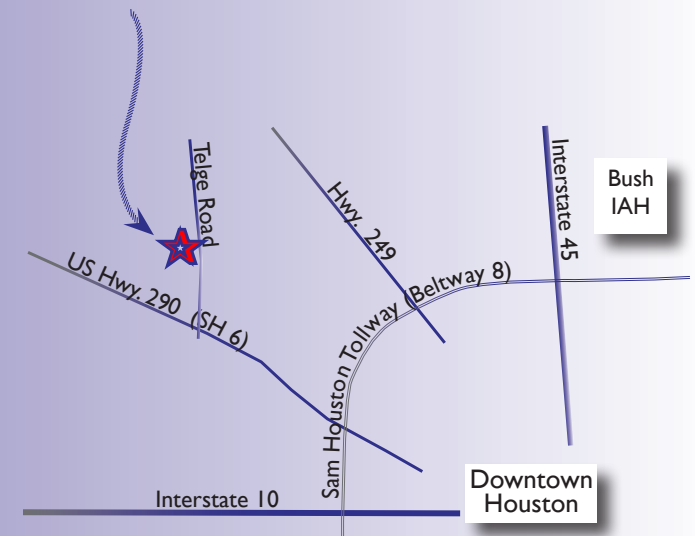
Firm \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone \_\_\_\_\_ E-Mail \_\_\_\_\_

## Northwest Forest Conference Center



Produced by **GAS/ELECTRIC VENTURES**

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