

**AUDIENCE**

Course is recommended for measurement specialists, engineers and technologist involved in the design, evaluation and/or daily operation of gas measurement systems.

**WHEN AND WHERE**

Scheduled as a TWO DAY course, with OPTIONAL attendance for the Manufacturers session on the first day to explore the different technologies currently on the market. To be held **October 5, 6 & 7 2004** at:

**TransCanada Calibrations  
Ile Des Chenes Facility  
Winnipeg, Manitoba**

**Course Fee \$ 400 USD.**

**Lunches and Refreshments Provided  
Reception will be Held on the  
Second Evening**

To register, please complete and return by September 06, 2004 via fax to:

**TransCanada Calibrations Ltd.**  
Suite 767, 450- 1<sup>st</sup> Street S.W.  
Calgary, Alberta, T2P 5H1  
Fax: 204 - 8784531  
403 - 9202442

Name: .....

Title: .....

Company Name: .....

Address: .....

.....

Telephone: .....

Fax: .....

E-mail: .....

**Course Fee: \$400 USD**

**Payment:**

Visa/MasterCard # .....

Expiry Date .....

Cheque Enclosed: Yes .... No .....

Send Invoice to Address Above: .....

or e-mail us at:

[jairo\\_mantilla@transcanada.com](mailto:jairo_mantilla@transcanada.com)  
[wayne\\_haner@tccalibration.com](mailto:wayne_haner@tccalibration.com)

**TransCanada Calibrations  
Ile de Chenes Facility  
Winnipeg, Manitoba  
Canada**



**Gas Measurement with  
Ultrasonic Technology**

**Two Day Training Workshop  
October 6 & 7, 2004  
Winnipeg, Manitoba**

**Organized by:**



## COURSE AGENDA

October 5

### Manufacturers Session

Intended as a forum for USM manufacturers to display and discuss current technology, this session will give attendees an opportunity to be exposed to current product offerings and meet with manufacturer representatives to discuss specific needs and applications.

### 8:00 AM – 11:30 AM

Technical presentation of first group of manufacturer and discussion session with attendees

### 11:30 AM – 1:00 PM Lunch

### 1:00 PM – 4:30 PM

Technical presentation of second group of manufacturer and discussion session with attendees



## COURSE AGENDA

October 6

### 8:00 AM – 9:00 AM Calibration facility Tour

Tour of TransCanada Calibration High Pressure Natural Gas Calibration Facility

### 9:00 AM – 11:30 AM Ultrasonic Metering

Principles of measurement, Performance factors, Meter Classification, Temperature and Pressure influences, Performance Key Indicators

### 11:30 AM – 1:00 PM Lunch

### 1:00 PM – 2:30 PM Hands on – Basic Ultrasonic Meter Repair, Connection and Meter interface

Transducer and communication board replacement, power, flow, pressure and temperature connections and software manipulation

### 2:30 PM – 4:30 PM Monitoring and Diagnostic Capabilities

Diagnostic parameters and log Evaluation, Operational Factors and meter field performance, Field Inspections, noise influence, meters in series cross checking

### 6:30 Reception Evening

## COURSE AGENDA

October 7

### 8:30 AM – 10:30 AM Flow Calibration

Temperature, Pressure and flow stability conditions during USM calibration, Uncertainty, traceability and Calibration Procedures, Calibration reports, Meter Recalibration, Ultrasonic Meter Station Evaluation

### 10:30 AM – 12:30 PM Real time Flow Calibration

Local and remote communication parameters, Basic parameters testing, Flow ranges, accuracy limits, adjustment procedures and effects on meter output, Real time test of an USM using TCC's calibration laboratory

### 12:30 PM – 2:00 PM Lunch

### 2:00 PM – 3:00 PM Ultrasonic Measurement System Performance in Flowing Conditions

Real time evaluation of the impact of profile distortion and path fail on meter performance using TCC's laboratory

### 3:00 PM – 4:30 PM Round Table Discussion

Open forum discussions of measurement related topics, as well as other general measurement questions and issues.