TransCanada Case Study:
Emissions Management System

Hasan Imran
Senior Advisor, Climate Change
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US EPA Natural Gas STAR 14th Annual Conference, Houston, Texas
How does TransCanada track and manage its emissions?
  - Development of an Emissions Management Strategy
  - Creation of an Air Emissions Database
  - Emissions Management Practices
  - Continual Investment in R&D

Quantifying Business Decisions
  - The Implementation of effective Practices and Procedures
TransCanada

- Leading North American company in natural gas transmission and power generation
- $25.9 Billion in pipe and power assets ($Cdn at December 31, 2006)
- 2007 named as a member of the Global 100 Most Sustainable Companies in the world
- Skilled, expert, energetic people with strong technical knowledge
- Strong financial position to capture opportunities going into the future
Quality assets and proposed projects

- approx. 59,000 km (36,500 miles) of wholly owned pipeline
  - transports 15 billion cubic feet/day (Bcf/d) from virtually all major supply basins on the continent
- 2,969 km of proposed oil pipeline, capable of transporting 435,000 barrels per day
- 16 power facilities with 7,700 megawatts of power generation
- two proposed liquefied natural gas facilities
  - 1.5 Bcf/d
GHG emissions from pipeline operations and methane reduction

TransCanada Pipeline Greenhouse Gas Emissions Breakdown

- CARBON DIOXIDE
- METHANE
- NITROUS OXIDE
- INDIRECT PIPELINE EMISSIONS

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• Decrease in methane emissions is due to effective leak detection and repair program (LDAR).
EMS - Emissions Management System

TransCanada Emissions Management System

Combustion Emissions
- CO₂
- CH₄
- N₂O

Energy Efficiency and conservation

CO
VOC’s
NOx

R & D

Vented Emissions (CH₄, CO₂)

Fugitive Emissions
LDAR
(lead detection & repair)

HFS
(measurement)

Blowdown Emissions
- transfer compression
- pipeline inspection tools
- buttering and hot tapping
- stopple plugs
- repair sleeves
- hot line lowering
- incineration

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Methane (Fugitive) Emissions Management: Program Successes

Fugitive Emissions in million ft³ CH₄

- 1997: 3,233 million ft³ CH₄
- 2006: 710 million ft³ CH₄

- 78% Reduction = 2.5 Bcf

Natural Gas $23M @ $7/GJ (1997)
Natural Gas $5M @ $7/GJ (2006)

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TransCanada’s Fugitive Emissions Management Program is Recipient of 2006 CCME Award
Air Emissions Database System

Allows TransCanada to:

- Develop confidence in handling complex issues
- Effectively and Efficiently manage incoming emissions data
- Retrieve and Store information easily
- Reduce wait times for data
- Assumptions made can be stated and defended clearly
Emissions Data Management Before

Current State Of GHG & CAC Inventory Tracking
Air Emission Data Management System
User Experience

Air Emission Data Management System Web Portal

- Maintenance & Configuration Web Pages and Services
- Microsoft Reporting Services
- opsEnvironmental
- NPRI Air Contaminants Electronic Reporting

ADMS Database
Air Emission Data Management System
Logical Design and Interfaces

TC Internal Systems

Avantis
(Pipe Equipment
Boiler, APU)

GeoFind
(Pipe Facility - C/S,
M/S, V/C)

Facility Subscriber
Web Service

Fuel Consumption Subscriber
Web Service

Med BizTalk
Data Broker
Global libraries, such as *Reference and *Reports are included in all facility models.

This is a pipeline system.

This is a compressor station.

This is a compressor unit.

This is the NPRI Facility Information for Frenchman River compressor station.
Emissions Management Team

A group of experienced people from many departments of the company that regularly reviews progress and sets targets and goals

- Uses reports to review progress
- Efficient decisions can be made
- Information is transparent and consistent
- Assumptions are clear upfront
Blowdown Emissions Management

Control Methods and Technologies Used

• Scheduling Practices
• Operational Adjustments
• Transfer (Pull-down) Compressors
• Buttered Stubs
• Hot Tapping
• Hot Line Lowering
• Sleeves
• Stopples
Supersonic Gas Injector

- Developed for capturing very low pressure vent gases and re-injection into a high pressure gas stream without the use of rotating machinery

- Savings
  - 4 million ft³/yr of gas savings from one compressor
  - Natural gas worth $28,000/yr/unit @$7/GJ
  - GHG emissions
  - Zero operating cost
Gas-Gas Ejector for Dry Gas Seal Leak Capture

Conceptual Flow Diagram

US & Canadian patent filed

Conceptual flow diagram for use of Ejector by TransCanada.
Ejector: Ludweg, EE, 1980.
Global Pipeline Honorable Mention Award

Received at Rio Pipeline 2007 Conference, Rio de Janeiro, Brazil

TransCanada
Use of Biofilteration for Methane reduction

- A joint venture of TransCanada & University of Calgary
- Methane gas can be oxidized biologically, with the use of methanotrophic bacteria
- Vented CH4 reduced to CO2: 21 times less global warming potential
- Implemented successfully at three sites
- No operating cost except monitoring
- Almost 80% oxidation rate achieved
- Biocell/Biocap/Biofilter research received 2007 Emerald Award
Use of Incinerator for Blowdowns

- Incineration of blowdown gas instead of venting (after transfer compression)
  - At Caron Compressor Station, Moose Jaw, November 2002

- Emission savings of 1,100 tCO2e
- Worth $17,000 @$15/t CO2E
End Results - EMS

- Confidence
  - The ability to quickly and accurately quantify inputs into important business decisions
  - The success of our measurement program can be widely used
  - The success of our Management System can be quantified
  - Internal interest and buy-in is fostered