Natural Gas STAR
Partner Experiences
Northern Natural Gas Company

By: Larry “Rick” Loveless

12th Annual Implementation Workshop
October 26, 2005
Houston, Texas
Outline

★ Who is Northern Natural Gas Company
★ Where Northern has been
★ Northern’s STAR I Program
★ Northern’s STAR II Program
★ Overview of Northern’s Future Plan
★ MidAmerican’s Environmental RESPECT Policy
★ Questions
Take Away Items!!!!

★ The EPA STAR Program adds value.

★ Gives you the opportunity to profitably achieve environmental stewardship.

★ Allows the environmental department/program to add to the bottom line

★ Take a look at some new technologies
Who is Northern Natural Gas Company?

★ Northern believes responsible environmental management is good business; it benefits our customers and improves the quality of the environment in which we live.

★ Our policy establishes the environmental RESPECT principles that guide our corporate commitment to the environment.
Northern Natural Gas System Map

- 13,000 miles of pipeline
- 96 Compressor Stations
- 1100 employees
- 2000 TBSs
STAR I & STAR II Programs

★ STAR I – The methane leaks from a Facility Leakage Audit (DI&M) that are repaired. Un-repaired leaks go into our “unaccounted for” volumes

★ STAR II – The volume of methane that is conserved during normal pipeline venting operations.
Northern’s STAR Accomplishments

- 5.6 Bcf in total reductions
- Annual Emissions Reductions:
  
  Previous: 144.2 MMCF
  
  1996: 87.6 MMCF
  1997: 884.2 MMCF
  1998: 731.9 MMCF
  1999: 548.1 MMCF
  2000: 331.4 MMCF
  2001: 172.8 MMCF
  2002: 59.6 MMCF
  2003: 408.7 MMCF
  2004: 832.8 MMCF
  2005: ?
  
  Total: 5637.4 MMCF

Methane Saved in MMCF/Year
Regional Goals and Objectives

- Conduct FLA at 25% of compressor stations
- Conduct FLA at 25% of TBS/Gate stations
- Create a STAR implementation team (SPIT)

- Pumpdown: 40%
- Pressure Reduction: 20%
- Hot Tap/Sleeve: 6%
- Transmission Lines: 18%
- ESD: 6%
- VRU: 6%
- DI&M: 4%
STAR I Emission Categories

- Dump Valves: 28%
- Rod Packing: 22%
- Blow-down: 26%
- Panel: 6%
- Valve Stems: 7%
- Fuel Runs: 5%
- Connectors: 3%
- Other: 3%
Leak Breakdown

★ 5% of leaks equal 67% of volume

★ 10% of leaks equal 79% of volume
Leak Breakdown

- >25 MCF/yr  11%
- >50 MCF/yr  22%
- >75 MCF/yr  32%
- >100 MCF/yr  35%
Plan

- Find leaks in that 5% or 10% region that are above 75 MCF

- Find a way to conduct rapid effective audits on TBSs

- Find a way to conduct rapid effective audits on underground storage well; and other above-ground facilities.
INDECO HiFlow
Hotwire Anemometer
NNG Unit A/B Leakage Rates

- Unit A
- Unit B

Year
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- LEP
Approximate packing replacement cost is $3000 per compressor rod (parts/labor)

Assuming gas at $5/MCF: 1CFM=28.316L

- 50 liters per min/28.316=1.766 scfm
- 1.766 x 1440 min/day=2543 scf per day
- 2543/1000=2.543 MCF
- 2.543 x 365 days=928 MCF per year
- 928 x $5 MCF=$4640 per year leakage
Rod Packing Direct Measurement
Facility Leakage Audits (DI&M)

- **2004 DI&M** 4% of 800 MMSCF = 32 MMSCF

- **2005 DI&M** = 670 MMSCF
Northern’s STAR Accomplishments

- 6.5 Bcf in total reductions
- Annual Emissions Reductions:
  
  Previous: 144.2 MMCF
  1996: 87.6 MMCF
  1997: 884.2 MMCF
  1998: 731.9 MMCF
  1999: 548.1 MMCF
  2000: 331.4 MMCF
  2001: 172.8 MMCF
  2002: 59.6 MMCF
  2003: 408.7 MMCF
  2004: 832.8 MMCF
  2005: 910.4 MMCF YTD

Total: 6547.8 MMCF

Methane Saved in MMCF/Year
MidAmerican Energy RESPECT Policy

- Respect
- Efficiency
- Stewardship
- Performance
- Evaluation
- Communication
- Training
Question?
Contact Information

★ Larry “Rick” Loveless
  (806) 345-3502 office
  (806) 282-8344 cellular

  rick.loveless@nngco.com

★ Please visit www.epa.gov/gasstar