



Natural Gas STAR Partner Experiences

Duke Energy Gas Transmission
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10th Annual Implementation Workshop
October 27 - 30, 2002
Houston, Texas



Natural Gas STAR Partner Experiences Outline



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- Pipeline Pull Downs
- Sleeve Repairs
- Use of Hot Taps
- Emergency Shut-Down Practices

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What is the Natural Gas Star Program?



The Natural Gas STAR Program is a flexible, voluntary partnership between the EPA and the oil and natural gas industry. Through the Program, the EPA works with industry companies to identify and promote the implementation of cost-effective technologies and practices to reduce emissions of methane, and potent greenhouse gases.

Overview of the Natural Gas STAR Program



The EPA and industry partners are successfully protecting the environment and improving profitability by working together to prevent/minimize gas losses. The program has over 90 partner companies and is endorsed by 11 major industry trade associations. Since the Programs inception in 1993, Natural Gas STAR partners have eliminated more than 176 billion cubic feet (Bcf) of methane emissions.

Who is Duke Energy?



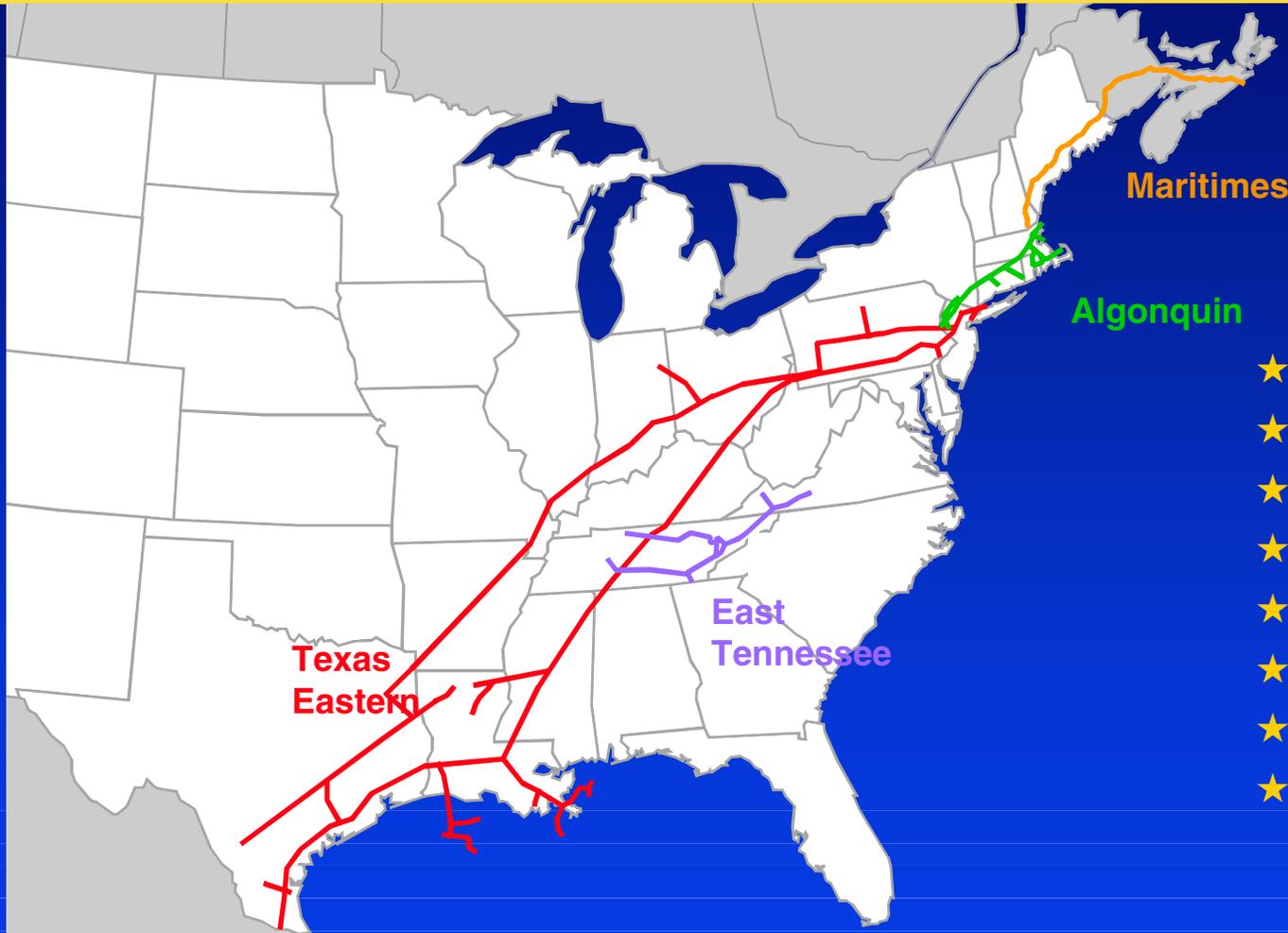
- ★ Throughout North America and key regions around the world, we gather, process, transport, store and market natural gas. We design, build, own and operate electric generating facilities. We manage and trade energy. We provide millions of customers with reliable energy.
- ★ We have approximately 25,000 employees worldwide dedicated to doing business right.
- ★ We're the largest owner of salt cavern natural gas storage facilities in North America, with over 250 billion cubic feet of storage capacity providing environmentally sound natural gas storage.

Duke Energy Gas Transmission



- ★ Natural gas operations include more than 17,500 miles of interstate transmission pipeline connecting major natural gas supply basins from the Gulf Coast, mid-continent and Canada with markets in Canada and the northeastern and southeastern U.S.
- ★ U.S. Operations accounts for more the 12,200 miles of the total transmission pipeline system

DEGT US Pipeline Systems



- ★ TETCO
- ★ ETNG
- ★ AGT
- ★ M&N
- ★ Patriot
- ★ Gulfstream
- ★ BC Pipeline
- ★ Union Gas

DEGT & EPA Natural Gas STAR Program



- ★ We take our role as a corporate citizen seriously, working to protect the environment where we live and work.
- ★ DEGT became an EPA Natural Gas STAR Program Partner in 2000
- ★ From 1993-2001, DEGT has quantified CH₄ emissions reduction of ~4 BCF (about ½ of the capacity DEGT transports on a daily basis.
- ★ 535 MMcf methane emission reduction in 2001 (\$1.6MM Savings)
- ★ DEGT awarded 2002 Transmission Partner of the Year

Key Factors Affecting Emissions Reduction



- ★ **Company wide effort to reduce gas loss within the pipeline system and gas vented to atmosphere**
 - **Improved operating practices**
 - ☐ **Coordinate repairs with pipeline outage**
 - ☐ **Alter ESD Practices**
 - ☐ **Reduce line pressure prior to repair**
 - ☐ **Use of Composite Sleeve Repair**
- ★ **Good Communications throughout**
 - **Clear and Concise O&M and SOP manuals**
 - **Key players are kept in the loop (Gas Control)**
 - **Several options are considered**

Partner Reported Opportunities



★ Pipeline Pull Downs – Minimize gas loss when P/L section is blown down

- Operationally reduce pressure to minimum
- Isolating and pumping down line pressure w/portable field compressors



★ Sleeve Repairs – Utilizing in-service repairs rather than pipe replacements.

- Steel type B sleeves
- Composite Sleeves (Clock Spring)



Partner Reported Opportunities



- ★ **Use of Hot Taps for New Connections – eliminates the need to blow down a valve section for branch tees**



- ★ **Emergency Shutdown Practices – Annual ESD tests conducted without venting the gas to atmosphere**



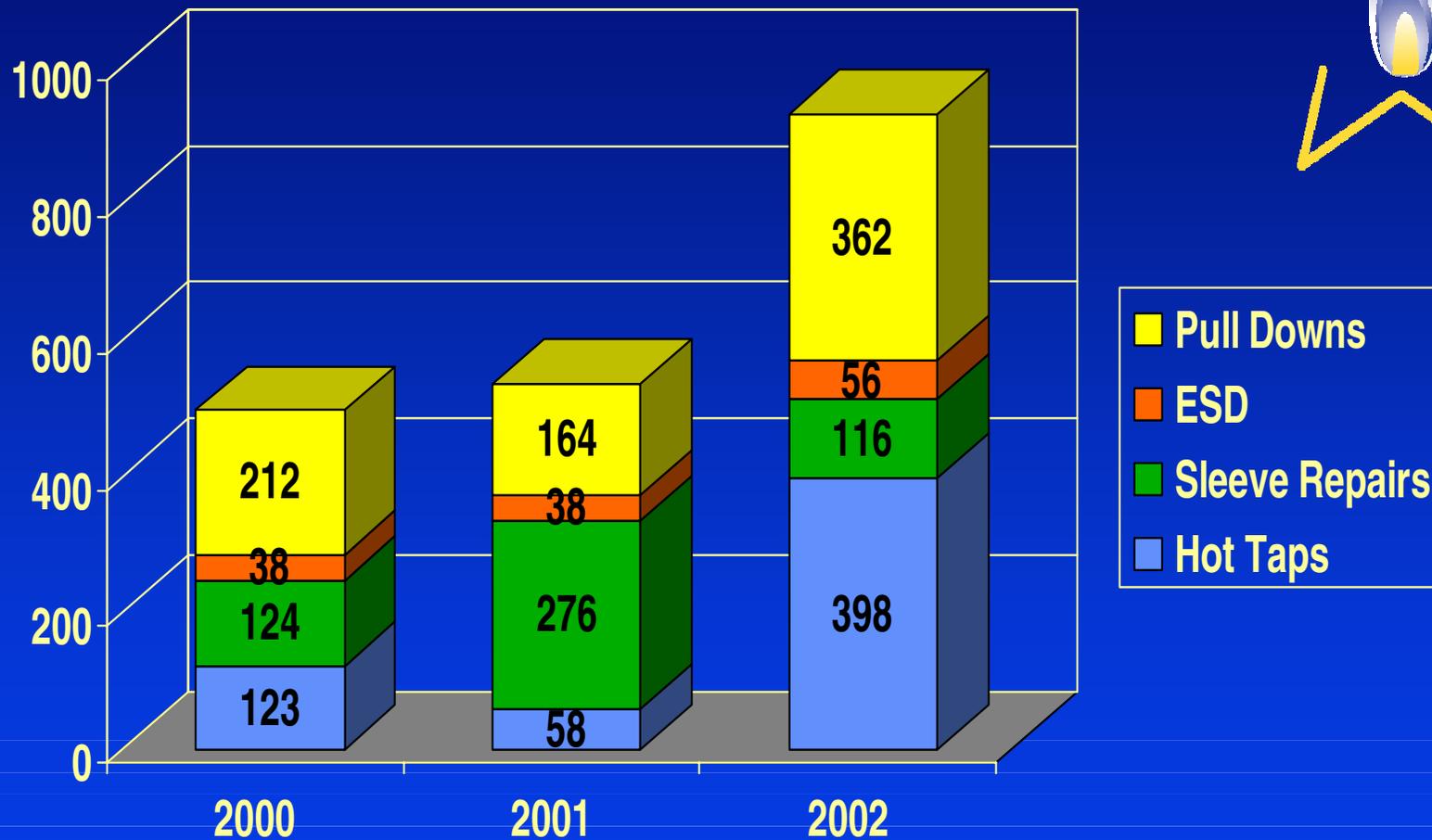
2002 Captured Emissions Reduction



Total of 931 MMcf Captured

* All values expressed in MMcf

3 Year Captured Emissions Comparison



* All values expressed in MMcf



Gas Transmission

Final Comments



- ★ Voluntary Program to reduce methane emissions
- ★ DEGT's customers save money through a reduction in shrinkage.
- ★ The environment benefits through reduced GHG emissions & conservation of a limited natural resource.
- ★ Participation in the Program further builds our relationships with the EPA and our neighbors, as a good corporate citizen.

End of Partner Experiences Presentation



Thanh V. Phan
Duke Energy Gas Transmission

AWARDS AND ACKNOWLEDGMENTS

The 2003 Partner of the Year Awards were presented at a special luncheon ceremony during the workshop. Awards were presented to companies that have displayed excellence in their vigorous pursuit of methane emissions reductions and in their continuing support of the Natural STAR Program. The 2003 Partner of the Year Awards were presented to:

- ★ BP (Production Sector)
- ★ Western Gas Resources (Processing Sector)
- ★ El Paso Pipeline Group (Transmission Sector)
- ★ Columbia Gas of Ohio (Distribution Sector)

Continuing Excellence Awards were also presented to three partners for their continuing support of the Gas STAR Program and continuing commitment to find and implement new emissions reductions opportunities:

- ★ Kerr-McGee (Production Sector)
- ★ ChevronTexaco (Production Sector)
- ★ Columbia Gas and Columbia Gulf Transmission (Transmission Sector)

EPA also recognized the following company as Rookie of the Year for outstanding implementation of the Natural Gas STAR Program during its first year of participation:

- ★ Northern Natural Gas Company (Transmission Sector)

Lastly, EPA recognized Reid Smith of BP as the Implementation Manager of the Year for exhibiting leadership in outreach and technology transfer of Natural Gas STAR Program goals.

In addition, EPA also welcomed 13 new partners to the Natural Gas STAR Program:

- | | |
|----------------------------------|--------------------------------|
| ★ Anadarko Petroleum Corporation | ★ Northern Natural Gas Company |
| ★ Devon Energy Corporation | ★ Gulf South Pipeline |
| ★ El Paso Production Co. | ★ Alliant Energy |
| ★ Energen Resources Corporation | ★ Consumers Energy (Iowa) |
| ★ Quicksilver Resources Inc. | ★ Puget Sound Energy |
| ★ Torch Energy Services, Inc. | ★ Enogex Inc. |
| ★ XTO Energy, Inc. | |

The remainder of this section highlights the methane emissions reductions progress of these companies and other contributions to the Natural Gas STAR Program that earned them these special recognitions.

Production Partner of the Year —

BP

- ★ BP p.l.c. is the holding company of one of the world's largest petroleum and petrochemicals groups. Main activities include exploration and production of crude oil and natural gas; refining, marketing, supply and transportation; and manufacturing and marketing of petrochemicals.
- ★ Joined the Natural Gas STAR Program in 1998 (upon merging with Amoco who joined in 1995).
- ★ Reported 1.9 Bcf in methane emissions reductions in 2002 (the highest volume for producers and more than twice as much as the next highest reporter).
- ★ 5th largest cumulative reporter for production companies with total equaling 12 Bcf.
- ★ Has implemented a significant number of BMPs and PROs since joining the Program, including:
 - Identifying and replacing high-bleed pneumatic devices
 - Installing “Smart” automation well uploading and plunger lift controls
 - Minimizing Well Unloading Venting
 - Implementing green completions
 - Optimizing Nitrogen Rejection Unit (NRU)
 - Eliminating glycol dehydrators
 - Installing desiccant dehydration units
- ★ Provides a strong presence in the Program, exhibiting leadership in emissions reductions, outreach, and technology transfer goals of Natural Gas STAR including:
 - Delivering presentations at the Annual Implementation Workshops, including this year's program.
 - Assisted with the development of journal articles, Lessons Learned Studies, and PRO Fact Sheets.
 - Has supported and presented at numerous regional Natural Gas STAR producer technology transfer workshops.
 - Helped launch the Program's processing sector and participated in an EPA-sponsored study of emissions reductions opportunities at gas processing plants.
- ★ Recognized for Continuing Excellence in 2002 and as Production Partner of the Year in 2001.