

# *EPA NATURAL GAS STAR PROGRAM*



## *EPA Welcomes a new Natural Gas STAR Partner*



Devon Energy  
becomes an  
official partner in  
the EPA Natural  
Gas STAR  
Program on  
July 21, 2003

# *Focus*

Primary focus for a successful program

- Encouragement and support from upper management
- Select the right implementation manager
- Roll the program out to operations
- Educate the field on the goals of the program
- Recognize successes
- Research historical reductions
- Locate documentation for reductions
- Develop a tracking system

# Challenges

## Previous Company Participation in the STAR Program

- Pennzoil Company
- Mitchell Energy
- Ocean Energy

Ocean Energy was the only company to submit emission reductions

- Numbers were inconsistent
- No documentation
- Inaccurate reports

# *Moving Forward*

Devon requested EPA take Ocean's reductions off of the books to allow Devon to start fresh

## Strategy

- Track down accurate accountable reductions
- Assure thorough documentation
- Encourage future reporting from the field

## Results

- Competition amongst divisions
- Accurate numbers
- Good documentation
- Team spirit

## *Program Participation - 2004*

Devon actively participated in a video shoot in the Bridgeport area showing Devon's involvement in the STAR Program Produced by a public TV station

- 2 minute version for airing during environmentally related segments
- 12 minute version to be used by the STAR Program to promote the Program to other companies

Participated in an interview for the “STAR Profile” section of the Program's fall edition of the STAR quarterly newsletter.

## *Program Participation - 2004*

Co-authored a SPE paper on the optimization of separator pressure to reduce methane emissions.

- Paper was presented at the annual SPE conference held in Galveston, Texas.
- Authored with the intent of creating a PRO Fact Sheet for the STAR Program.

Named EPA Natural Gas STAR “Rookie of the Year”

## *Program Participation - 2004*

Developed a monthly STAR newsletter to be distributed to managers to assure communications regarding the status of the Program. Newsletter contains:

- A STAR PRO Fact Sheet
- Graph reflecting Devon's emission reductions annually
- Status table providing a breakdown by
  - Division
  - Area
  - Activity

# Natural Gas STAR Partner Newsletter



September 2005

## Welcome

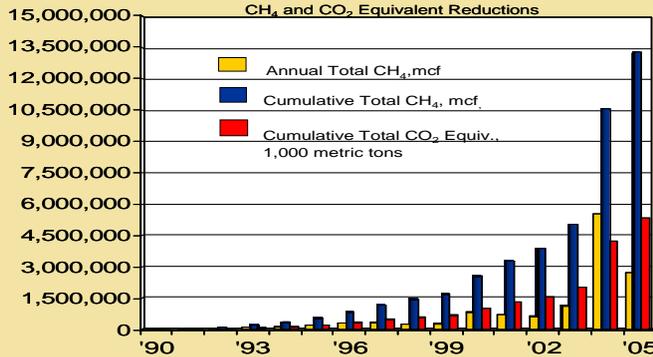
This is the September 2005 installment of a monthly newsletter highlighting Devon's activities in the Environmental Protection Agency (EPA) Natural Gas STAR Program. These monthly installments summarize Devon's methane emission efforts and a specific partner reported emission reduction opportunity that might be of benefit at certain Devon operations.

### STAR Reductions

Methane Reduction Activity	Methane Reductions (Cumm)	2005 YTD
Central Division	3,926,459	1,221,073
FWB	3,589,734	987,970
Mid-Continent	336,725	233,103
Southern Division	5,937,762	2,146,661
South Texas	2,525,364	445,870
Southridge	2,390,276	1,024,385
Groesbeck	1,022,121	676,406
Western Division	2,499,144	63,299
Rockies	950,244	56,565
Permian	1,548,900	6,734
Gulf Division	141,529	12,045
Midstream	1,753,827	263,645
<b>Total Reductions</b>	<b>14,258,721</b>	<b>3,706,723</b>

### In this Issue:

- Welcome
- Division Status Table
- Annual Reduction Graph
- PRO Fact of the Month



### PRO Fact Sheet of the Month

#### "Convert Pneumatics to Mechanical Controls"

This month, the highlighted PRO (Partner Reported Opportunities) Fact Sheet document is related to Converting Pneumatics to Mechanical Controls. The attached PRO Fact Sheet feature provides more details about this reduction opportunity.

If you have an idea or recognize an opportunity for a process change or pressure setting to improve efficiencies or reduce venting, please discuss these ideas with your EHS specialist or call Steve O'Connell at (405) 552-4672.

Check out Devon's EPA video on the K drive at: [K:/Universal/Permanent/EHS Dept. Presentations/ Natural Gas STAR](#)

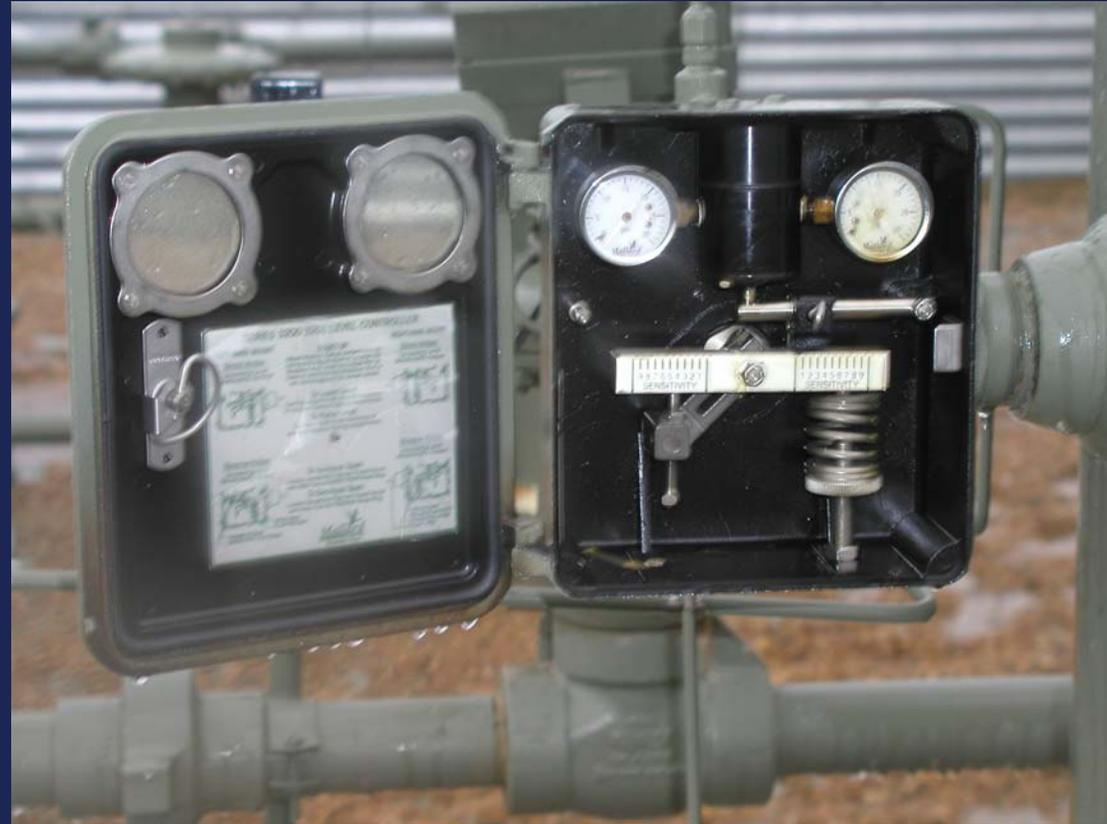
Each monthly newsletter contains a PRO Fact Sheet and a link to a Lessons Learned on the EPA Gas STAR website

## *Program Participation - 2005*

- Sponsored and co-sponsored EPA Natural Gas STAR Technology Workshops Oklahoma City and Casper
- Participated in a leak detection survey at the Bridgeport Plant (USEPA Natural Gas STAR DI&M Grant)
- Highlighted the STAR program as a pollution prevention initiative at an Environmental Federation of Oklahoma Pollution Prevention Workshop
- Developed a database to track future methane reduction activities
  - Database to be given to EPA for other Partners use upon completion

# *STAR Program BMP's*

- BMP 1: Replace High-Bleed Pneumatic Controls
  - ~2.23 Bcf of methane emission reductions through 2004



# *STAR Program BMP's*

BMP 2: Install Flash  
Tank Separators on  
Glycol Dehydrators  
— ~87.85 Mmcf of  
methane emission  
reductions through  
2004



# *STAR Program BMP's*

- BMP 3: Partner Reported Opportunities (PRO's)
  - REC's
  - AOF Testing



# Summary of Devon Reductions

- Overall Reductions - 14.6 Bcf (projected through 2005)
  - Low Bleed Pneumatics 2.881 Bcf
  - *Reduced Emission Completions* **8.175 Bcf**
  - VRU's 1.286 Bcf
  - Flared Volumes 1.112 Bcf
  - AOF Testing 487 Mmcf
  - Dehy Controls 91.27 Mmcf
  - Plunger Lift Systems 569 Mmcf

# *Devon's Accomplishments*

- Over 14.6 BCF in total methane emission reductions since 1990 (projected through 2005)
- 5.5 BCF reported for the year 2004
  - *54% from RECs*
  - 22% from low bleed pneumatics
  - 9% from VRUs
  - 7% from flared volumes/reduced venting
  - 4% from plunger lift systems

# *Economics*

Year	Volume	Gas Price	Revenue
1990	19.73 Mmcf	\$ 1.52	\$29,989
1991	38.25 Mmcf	\$ 1.88	\$71,910
1992	47.81 Mmcf	\$ 1.67	\$79,842
1993	98.24 Mmcf	\$ 1.95	\$191,568
1994	124.71 Mmcf	\$ 2.02	\$251,914
1995	205.41 Mmcf	\$ 1.62	\$332,764
1996	296.96 Mmcf	\$ 3.42	\$1,105,603
1997	341.71 Mmcf	\$ 4.09	\$1,397,593

# *Economics*

Year	Volume	Gas Price	Revenue
1998	254.81 Mmcf	\$ 2.20	\$560,582
1999	272.54 Mmcf	\$ 2.29	\$624,116
2000	846.36 Mmcf	\$ 3.77	\$3,190,777
2001	714.42 Mmcf	\$ 4.51	\$3,222,034
2002	623.60 Mmcf	\$ 3.16	\$1,970,576
2003	1.14 Bcf	\$ 4.96	\$5,654,400
2004	5.52 Bcf	\$ 6.15	\$33,948,000
<b>Total</b>	<b>10.55 Bcf</b>		<b>\$52,541,671</b>

# *Fort Worth Basin Success Story*

- Implementation Manager discussed STAR opportunities with the Production Supervisor in the FWB
- Reviewed opportunities to reduce venting during cleanup procedures after fracs
  - Evaluated portable flare systems
  - Supervisor discussed it further with superintendents and foreman
- Completions Superintendent decided there was a better option available

## *FWB Reduced Emission Completions (RECs)*

Previous procedure upon completion of the frac job

- Flow well back to frac tanks until clean up is completed
- Snub tubing in the hole while venting gas back to reduce the pressure on the well
- Run required tests to atmosphere to calculate the absolute open flow potential

## *FWB RECs*

Current procedure upon completion of the frac job

- Install temporary flowline and meter run on location during completion process
- Flow well back to frac tanks until gas is encountered



## ***FWB RECs***

- Turn well down line and *sell gas* while cleaning up the well
- Snub tubing in the hole while *selling gas* back to reduce the pressure on the well
- Run required tests *through sales* to calculate the absolute open flow potential



## *Benefits of FWB RECs*

- Reduces the volume of methane emissions
- Allows wells to be cleaned up longer with better results
- Additional gas sales
- Safer work environment



# *Economics of FWB RECs*

Initiated RECs in the FWB in March of 2004

<b>Gas Recovered *</b> <b>(mcf)</b>	<b>\$6.15/mcf</b>	<b>Incremental Cost</b>	<b>Net Gas Sale Value</b>
1,321,661	\$8,128,215	\$1,065,960	\$7,062,255

\* STAR credits – 1,116,804 mcf (methane - 84.5%)

## *Economics of FWB RECs*

Average Additional Sales per Well	\$59,330
Average Incremental Cost per Well	\$7,780
Additional Revenue per Well	\$51,549



# *Success Breeds Success*

- Measuring and reporting results in competition
  - Everyone benefits!
- Due to the success of the FWB RECs other areas are looking at using the technology
  - Completed several RECs in the Washakie Basin of Wyoming in August (constructed trailer mounted equipment in lieu of renting)
  - Completed the first REC in the Northeast Blanco Unit near Farmington, New Mexico this fall