EPA NATURAL GAS STAR PROGRAM
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
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
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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
Keeping the Program Alive

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.
Keeping the Program Alive

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”
Keeping the Program Alive

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
March 2005

Welcome

This is the March 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.

<table>
<thead>
<tr>
<th>STAR Reductions Through 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane Reduction Activity</td>
</tr>
<tr>
<td>Central Division</td>
</tr>
<tr>
<td>Southern Division</td>
</tr>
<tr>
<td>South Texas</td>
</tr>
<tr>
<td>Carthage</td>
</tr>
<tr>
<td>Greenbank</td>
</tr>
<tr>
<td>Western Division</td>
</tr>
<tr>
<td>Rockies</td>
</tr>
<tr>
<td>Permian</td>
</tr>
<tr>
<td>Gulf Division</td>
</tr>
<tr>
<td>Midstream</td>
</tr>
<tr>
<td>Total Reductions</td>
</tr>
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</table>

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

Check out Devon’s EPA video on the K drive:
K:/Universal/Permanent/EHS Dept. Presentations/Natural Gas STAR
Keeping the Program Alive - 2006

Devon will continue to support EPA in the Program through the following efforts:

• Sponsorship of EPA Natural Gas STAR Technology Workshop in Fort Worth, Texas.
  – Extending STAR activities into the operations of recently acquired properties in the FWB.

• Completion of a database, in conjunction with LSU and COMM Engineering, to track future methane reduction activities.
  – Database will be turned over to EPA for other Partners use upon completion.
Summary of Devon Reductions

- Overall Reductions - 18.4 Bcf (projected through 2006)
  - Low Bleed Pneumatics 3.143 Bcf
  - Reduced Emission Completions 9.115 Bcf
  - AOF Testing 533 Mmcf
  - VRU’s 1.286 Bcf
  - Dehy Controls 92.14 Mmcf
  - Plunger Lift Systems 962 Mmcf
  - Flared Volumes 1.236 Bcf
Devon’s Accomplishments

• Over 18.4 BCF in total methane emission reductions since 1990 (projected through 2005)

• 6.16 BCF reported for the year 2005
  • 78% from RECs
  • 7% from low bleed pneumatics
  • 3% from VRUs
  • 4% from flared volumes/reduced venting
  • 7% from plunger lift systems
## Economics

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
<th>Gas Price</th>
<th>Revenue</th>
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<tbody>
<tr>
<td>1990</td>
<td>19.73 Mmcf</td>
<td>$1.52</td>
<td>$29,989</td>
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<tr>
<td>1991</td>
<td>38.25 Mmcf</td>
<td>$1.88</td>
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<td>1992</td>
<td>47.81 Mmcf</td>
<td>$1.67</td>
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<td>1993</td>
<td>98.24 Mmcf</td>
<td>$1.95</td>
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<td>1994</td>
<td>124.71 Mmcf</td>
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<td>1995</td>
<td>205.41 Mmcf</td>
<td>$1.62</td>
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<td>1996</td>
<td>296.96 Mmcf</td>
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<td>1997</td>
<td>341.71 Mmcf</td>
<td>$4.09</td>
<td>$1,397,593</td>
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<th>Year</th>
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<tr>
<td>1998</td>
<td>254.81 Mmcf</td>
<td>$2.20</td>
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<td>1999</td>
<td>272.54 Mmcf</td>
<td>$2.29</td>
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<td>2000</td>
<td>846.36 Mmcf</td>
<td>$3.77</td>
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<td>2001</td>
<td>714.42 Mmcf</td>
<td>$4.51</td>
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<td>2002</td>
<td>623.60 Mmcf</td>
<td>$3.16</td>
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<td>2003</td>
<td>1.14 Bcf</td>
<td>$4.96</td>
<td>$5,654,400</td>
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<tr>
<td>2004</td>
<td>5.52 Bcf</td>
<td>$6.15</td>
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<td>2005</td>
<td>6.16 Bcf</td>
<td>$6.99</td>
<td>$43,058,400</td>
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<tr>
<td>Total</td>
<td>16.71 Bcf</td>
<td></td>
<td>$95,600,071</td>
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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 (REC)

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 **sale 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

<table>
<thead>
<tr>
<th>Gas Recovered * (mcf)</th>
<th>Incremental Cost</th>
<th>Net Gas Sale Value</th>
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<tbody>
<tr>
<td>2,402,510</td>
<td>$15,784,491</td>
<td>$14,166,751</td>
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* STAR credits – 2,030,121 mcf (methane - 84.5%)
Economics of FWB RECs

Average Additional Sales $65,496
Average Incremental Cost $6,712
Additional Revenue $58,784