



# Unocal Gulf Region USA Natural Gas STAR Case Study Series

**U**nocal Gulf Region

*USA's participation  
in EPA's Natural Gas*



*STAR Program illustrates how well-planned methane emission reduction pilot projects can lead to larger initiatives that significantly benefit the company's bottom line and the environment. Since joining the program in 1998, Unocal Gulf Region has successfully implemented and expanded several pilot projects that have yielded methane emission reductions of 640 million cubic feet (Mmcf), valued at nearly \$1.9 million. Word of Unocal Gulf Region's accomplishments as a Gas STAR partner has spread quickly, and its parent company, Unocal Corporation, has now made methane emission reductions a corporatewide priority.*

## PARTNER PROFILE

Unocal Corporation, an international energy resource and project development company, produced 175,000 barrels of petroleum liquid and more than 1,800 Mmcf of natural gas per day in 1999. Unocal Gulf Region USA, formerly Spirit Energy, is one of Unocal Corporation's exploration and production units, focusing on oil and gas resources in the Gulf of Mexico and onshore in Texas, Alabama, and

Louisiana. Headquartered in Sugar Land, Texas, Unocal Gulf Region employs approximately 1,300 people and operates more than 200 offshore platforms and about 1,500 active wells in numerous onshore and offshore fields. In 1999, Unocal Gulf Region's net natural gas production was 747 Mmcf per day, and net crude oil production was 40,000 barrels per day.





## Joining Natural Gas STAR

Unocal Gulf Region had already started a pilot project to reduce methane emissions from pneumatic devices when EPA approached the company about the Natural Gas STAR Program. Unocal Gulf Region reviewed the program's goals and determined that joining Gas STAR was consistent with the goals of the pilot project. In addition, the company felt that participation in Gas STAR would provide an opportunity to be recognized for its methane emission reduction activities and would improve its bottom line.

In 1998, Unocal Gulf Region joined the program with full support from its president and the health, environmental, and safety (HES) manager. The company immediately began promoting existing pilot programs and its new partnership with Gas STAR to employees as a unified undertaking. The new partnership helped Unocal Gulf Region focus its efforts on improving efficiency and reducing methane emissions across its production operations.



## Implementing Natural Gas STAR

Environmental specialist, James Frederick, is the implementation manager for the Gas STAR Program at Unocal Gulf Region. Upon joining the program, Frederick established two goals for initiating a successful partnership with EPA: 1) review and inventory past methane emission reduction efforts and 2) continue pilot projects as a way to demonstrate Unocal Gulf Region's commitment to methane emission reduction programs.

## Emission Reduction Inventory

Unocal Gulf Region began its participation by examining past emission reduction efforts. Frederick coordinated with nine HES coordinators and nine field supervisors to inventory best management practices and partner reported opportunities that Unocal Gulf Region implemented as early as 1990. The inventory highlighted several activities:

- Installation of flash tank separators on glycol dehydrators
- Replacement of high-bleed pneumatic devices
- Use of compressed air, rather than natural gas, in instrument systems
- Installation of vapor recovery units
- Installation of flare systems
- Consolidation of production tank batteries
- Performance of fugitive emission tests

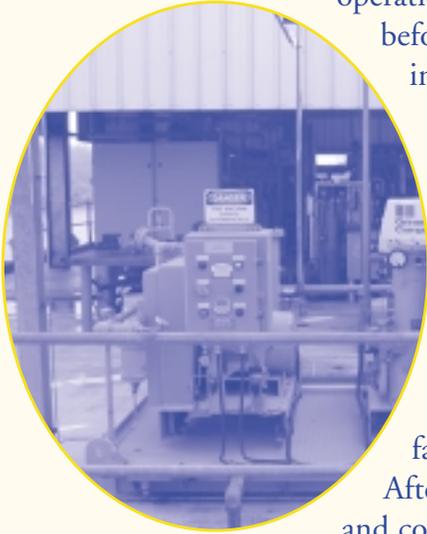
After verifying the inventory data, Frederick provided this information to EPA in the company's first annual Gas STAR report. The report documented that from 1991 to 1999 Unocal Gulf Region achieved methane emission reductions of 640 Mmcf, worth \$1.9 million. Frederick published the results internally on the company's intranet, spreading the word about Unocal Gulf Region's accomplishments and encouraging employees to think about what else the company could do to get the "biggest bang for the buck." He also continues to work with HES coordinators and field supervisors to find other past emission reductions that were missed during the first review.



## Pilot Projects

Unocal Gulf Region has found that using pilot projects to test new methane emission reduction activities is the best way to establish which practices will be most cost-effective to implement on a larger scale. Pilot projects help determine associated costs and savings, timeframes, staffing, and operational requirements

before the company invests in large-scale improvements.



Just before joining Gas STAR, the company initiated its first pilot project with the installation of an instrument air system at a facility in Louisiana.

After careful planning and consideration, Unocal

Gulf Region installed the pilot instrument air system, thereby achieving substantial emission reductions and cost savings. See page 4 for more details on this particular pilot project.

After the success of the instrument air project, Unocal Gulf Region began considering new projects to reduce gas losses from high-bleed pneumatic valves in the company's Gulf of Mexico operations. One of the options that the company evaluated was

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“Not only is Natural Gas STAR a good vehicle to promote our company, but it’s a good way to do business. Our business is the bottom line, and through STAR, we can make money.”

—James Frederick, *Environmental Specialist, Unocal Gulf Region USA*

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retrofitting all high-bleed instruments with Mizer low-bleed controllers. The low-bleed valves could reduce gas losses by up to 90 percent per device.



Initial testing was performed on two Mizer controllers to ensure that implementation of the pilot project would not create an additional maintenance burden for operators. In addition, the company analyzed operational and economic conditions at several of the proposed project locations. Unocal Gulf Region concluded that although the Mizer controllers were promising, there was enough electrical generation capacity at the evaluated sites to support the installation of an instrument air system. The instrument air alternative would eliminate gas losses and provide a quicker financial return.

Unocal Gulf Region is still considering the Mizer controllers at other platforms where there is not enough generation capacity for the instrument air system. The company hopes to accomplish conversions to either the instrument air system or Mizer controllers at all major platform facilities within the next two years.

## Expanding the Program Corporatewide

With Unocal Gulf Region’s successful pilots showing strong emission reductions and cost savings, Unocal Corporation decided to join the program in October 2000. Although only Unocal Corporation’s domestic facilities will report program activities to EPA, the corporation wants to

# USING A PILOT APPROACH FOR INSTRUMENT AIR CONVERSION

Before joining Gas STAR, Unocal Gulf Region started a pilot project in 1996 at its Fresh Water Bayou facility in Vermilion Parish, Louisiana. Unocal Gulf Region designed the pilot to test the conversion of its natural gas-powered pneumatic instrument system to a compressed air-powered system. Initially, Unocal Gulf Region intended this project to cut overall gas losses and ensure the facility was not a major source of volatile organic compound (VOC) emissions. However, the pilot project had the additional benefit of greatly reducing methane emissions caused by the intermittent bleed of gas from pneumatic controllers—one of the industry's largest sources of methane emissions.

To determine the cost-effectiveness of the pilot project, Unocal Gulf Region conducted a four-step analysis that involved the following:

**Step 1: Establishing the technical feasibility of an instrument air system.** The factors impacting technical feasibility included a facility layout conducive to equipment installation, ample power supply, and a large number of pneumatic controller conversions. Based on the facility's consolidated layout, onsite generators, and plans to convert all pneumatics, the Fresh Water Bayou facility met the technical conditions needed to maximize emission reductions and cost savings.

**Step 2: Estimating capital costs.** Unocal Gulf Region's primary costs were the purchase of two Quincy rotary screw-type air compressors, a dehydration system, piping, and installation labor, bringing the initial projected capital outlay to \$60,000.

**Step 3: Estimating potential savings.** Using a turbine meter at the system inlet to measure the volume of natural gas used daily to feed the pneumatic instruments (e.g., bleeding controllers, chemical pumps, generators, saltwater pump starter), Unocal Gulf Region estimated that the average gas lost was 190 Mcf per day. This loss was costing the company \$570 per day, based on a gas price of \$3 per Mcf.

**Step 4: Evaluating the economics.** After comparing the capital costs and potential savings, Unocal Gulf Region determined that it would realize a quick return on its investment. In addition, the extra revenue generated by the increased gas sales would more than cover the annual maintenance costs—averaging \$4,000 for both compressors—and the instrument air system would also protect the pneumatics from corrosion.

Unocal Gulf Region's conversion to an instrument air system at its Fresh Water Bayou facility is paying off. The company is reducing natural gas emissions by 69.4 Mmcf per year, including 62.4 Mmcf of methane emissions and 1.5 Mmcf of VOC emissions, saving more than \$208,000 annually. This success has prompted the company to look for other opportunities to convert to instrument air systems. In addition, the positive results helped convince Unocal Gulf Region's senior management that participation in Gas STAR is good for the company.

implement similar methane emission reduction activities at all of its international facilities.

The expansion of the Gas STAR Program has had strong support from Unocal Corporation's CEO and corporate Global Climate Change (GCC) Team, which is responsible for reducing the corporation's greenhouse gas emissions. The team promotes Unocal Corporation's global climate efforts internally through a Web site and conducts regular meetings to review corporate procedures, policies, and programs that impact global climate.

Frederick will be working closely with the GCC Team and will oversee Unocal Corporation's participation in Gas STAR. He believes that with the involvement of the corporate GCC Team, program expansion will be easy. The GCC Team has closely followed Unocal Gulf Region's participation in Gas STAR and will provide insight to help guide the expansion process. The Gulf Region has already assigned five gas measurement technicians to the corporation's Gas STAR Program and is designing an incentive program to encourage field employees to propose ways to control both methane and carbon dioxide emissions. The planned incentive program expects to reward employees with a gift certificate when their suggestions for operational improvements are successfully implemented.

In addition to the incentive program, several other efforts are planned to ensure the success of Unocal Corporation's Gas STAR Program. In the near future, the corporation intends to develop a database to make tracking emission reductions and cost sav-

## BENEFITS OF VOLUNTARY ACTIONS

Being a Gas STAR partner can benefit a company in more ways than one. Unocal Gulf Region has found that working with Louisiana's Department of Environmental Quality (DEQ) is becoming easier now that the company is a Gas STAR Partner. Because DEQ is aware of Gas STAR and the positive efforts and environmental benefits associated with the program, DEQ can expedite the permitting process for Unocal Gulf Region's methane reduction activities.

ings easier. It also is spreading the word about Gas STAR both internally to employees and externally to other members of the industry. A presentation on the Gas STAR Program is scheduled for the corporation's upcoming environmental conference. Furthermore, Frederick is planning to work with the Gulf Coast Environmental Affairs Group to encourage other companies to join Gas STAR by demonstrating that reducing methane emissions is cost-effective.

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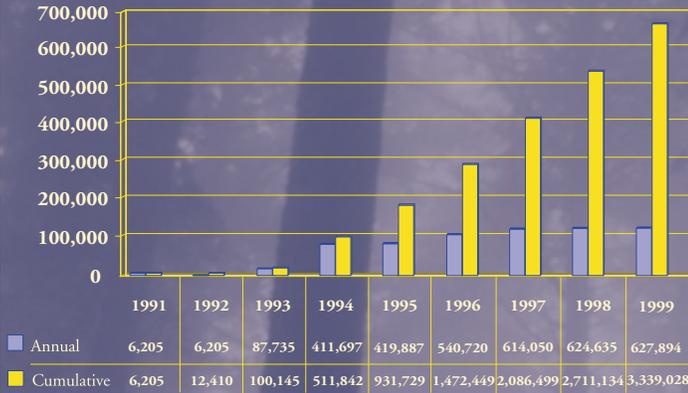
“As a Natural Gas STAR partner, we are recognized as an environmentally friendly company. Even regulators are aware of this partnership, which is just as valuable as the cost savings achieved by reducing methane emissions.”

—James Frederick, Environmental Specialist, Unocal Gulf Region USA

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# UNOCAL GULF REGION'S GAS STAR PROGRAM ACHIEVEMENTS

Unocal Gulf Region's Emission Reductions (Mcf)



Unocal Gulf Region reports average methane emission reductions of more than 371,000 Mcf each year.

Unocal Gulf Region's Emission Reduction Savings



Unocal Gulf Region reports an average of more than \$1.1 million in emission reduction savings annually.

## KEYS TO SUCCESS

Unocal Gulf Region has the following recommendations for companies looking to develop and implement a successful program:

- **Stress revenue gains.** Many companies do not realize that reducing methane emissions saves money, which means a quick payoff for implementing reduction activities.
- **Gain management support.** This is especially important for implementing a voluntary program because it adds significance to program activities and ensures employee cooperation.

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“Support from our president and CEO has been key to making our participation in Natural Gas STAR a success.”

—James Frederick,  
Environmental Specialist,  
Unocal Gulf Region USA

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- **Share results.** Sharing success stories internally, especially when numerous facilities are involved, encourages teamwork and enthusiasm companywide, guaranteeing program support.
- **Form a team.** When employees work together on targeted issues, the desired results are often easier to achieve.