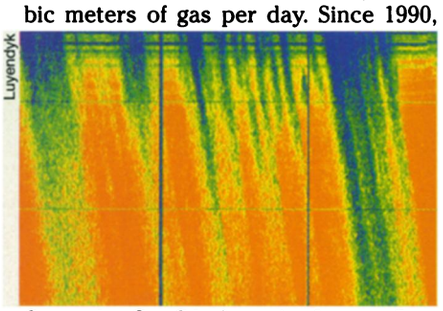
Do offshore wells fight natural pollution?

Environmental organizations have tarred the oil industry for its history of fouling the atmosphere and oceans, but a new study suggests some oil and gas wells may have helped clean up natural pollutants leaking from the seafloor off the coast of Santa Barbara, Calif.

Records of these seeps go back to the early Spanish explorers who sailed the Santa Barbara Channel and noticed oil slicks in the water. As the oil ages, it transforms into a goopy tar that washes up on shore. Natural gas leaks end up in the atmosphere. Area residents have long suspected that the dozens of wells offshore exacerbated the problem over the past 3 decades.

In the November GEOLOGY, however, Bruce P. Luyendyk of the University of California, Santa Barbara and his colleagues report that pumping oil and gas has actually decreased the amount of hydrocarbons leaking out of the seafloor. Evidence of this trend comes from two 30-meter-wide steel tents that oil companies set up on the seafloor to capture escaping gas and oil. Through the 1980s, the enclosures collected about 45,000 cubic meters of gas per day. Since 1990,



Sonar plot: Gas (blue) seeping from seafloor.

however, the emission rate has dropped to about half its peak level.

Sonar snapshots of rising gas bubbles at another site back up this finding. Surveys made in 1973 and 1995 show that the area of seepage decreased by half, most dramatically near a production platform.

"The main point is if you suck the oil out of the ground, the seepage rate is going to drop off," says Luyendyk. Removal of oil and gas over the years has decreased pressure in the subsea hydrocarbon formation, thereby reducing the amount of material oozing up to the seafloor, propose the researchers.

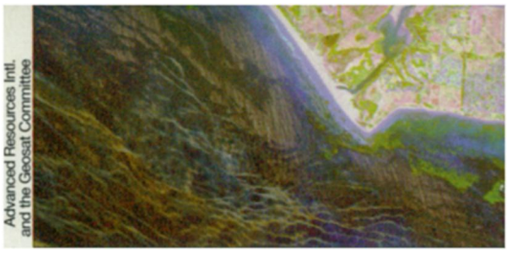
This pattern should hold at other wells, they say, unless fluids and gas are injected into the rock to drive up pressure—a common technique to boost production.

Keith A. Kvenvolden of the U.S. Geological Survey in Menlo Park, Calif., says that the hypothesis suggested by Luyendyk's team makes sense. "These guys have gone a long way toward proving it," he says.

If the new findings are correct, then the petroleum industry may be cleaning Santa Barbara's air, which occasionally fails to meet smog standards. In the Sept. 15 JOURNAL OF GEOPHYSICAL RESEARCH, Luyendyk and his colleagues report that the quantity of smog-forming reactive hydrocarbons coming from the seeps is twice the amount produced by automobiles in Santa Barbara County. The study also suggests that the county has greatly underestimated the volume of escaping gas.

Oil and gas companies could even be reaping global rewards. Concentrations of methane—a greenhouse gas—have been rising in the atmosphere, but the rate of increase has flagged in the last decade. The Santa Barbara scientists suggest that hydrocarbon production companies could take part of the credit for reducing methane seepage.

The new study, however, does not convince officials who monitor local air pollution near the seeps. Tom M. Murphy of Santa Barbara County Air Pollution Control District questions whether sonar data can offer a good measurement of the leaking gas. "We have always voiced concerns about the methodology," he says.



Oil slicks show up dark blue and orange in this airborne image of the ocean off Santa Barbara (top right).

Luyendyk's team has demonstrated that the vigorous seep sites under the tents have decreased their output over the years, Murphy says, but these covered spots haven't had an impact on air quality for decades. Whether other sites have also declined remains unclear, he says.

What's more, marine hydrocarbons may not contribute significantly to ozone pollution because the gases emitted by automobiles are more reactive in the atmosphere, he says. —*R. Monastersky*

Thalidomide combats myeloma blood cancer

Although recently developed drugs have made many cancers survivable, multiple myeloma has resisted scientists' best efforts. The likelihood of a patient withstanding this blood-cell cancer for 5 years remains less than 1 in 3—as it has been for 3 decades.

Now, the notorious antinausea drug thalidomide is demonstrating power that outclasses standard chemotherapy against myeloma. Banned in the 1960s for causing birth defects, thalidomide more recently has been shown to cure mouth ulcers and relieve complications of leprosy (SN: 11/11/95, p. 311; SN: 8/15/98, p. 111).

Thalidomide prescribed in gradually increasing doses brought about improvements in 27 of 84 multiple myeloma patients in whom standard treatments had failed, scientists report in the Nov. 18 NEW ENGLAND JOURNAL OF MEDICINE.

The researchers at the University of Arkansas for Medical Sciences in Little Rock tracked the effects of thalidomide for a year by testing patients' blood and urine monthly for unusual proteins associated with the myeloma. After the year, 2 of the 84 patients were free of these proteins, indicating the cancer was in complete remission.

Six others showed declines in the proteins to less than a 10th of the abnormally high concentrations seen after the patients failed chemotherapy. In 19 others, the concentrations fell at times to less than three-quarters of what they had been, says coauthor Seema Singhal, an oncologist now at the University of South Carolina Cancer Center in Columbia.

The other 57 patients didn't respond to the thalidomide or couldn't take the side effects. Many patients encountered constipation, nausea, dizziness, or rashes from the drug, and it made some so sleepy that doctors cut back their dose.

Twelve of the 27 patients who showed progress later relapsed, and 6 died. Of the other 57 patients, 30 died.

Despite the side effects and spotty success, the study suggests that thalidomide might work more consistently if it were chemically altered slightly, given in different doses, or given to healthier patients, Singhal says.

"This is a very exciting finding—more for the potential it opens up than for the actual results," says William I. Bensinger of the Fred Hutchinson Cancer Research Center in Seattle. "These responses were relatively low. But the fact that they occurred in patients who had demonstrated disease resistant to [chemotherapy and other treatments] was remarkable."

Chemotherapy for this myeloma destroys cancerous cells in bone marrow, where white blood cells are made, but it also kills healthy cells there. "It's like a sledgehammer," Singhal says. Moreover, while chemotherapy can slow the myeloma, it doesn't cure the cancer, says study coauthor Bart Barlogie, a hematologist and oncologist at Arkansas. "Thalidomide really represents the first new class of drugs [for this myeloma] in about 35 years," he says.

Thalidomide inhibits the formation of new blood vessels, which are essential to tumor growth. It isn't clear whether the drug actually prevents vessel growth in the marrow of these myeloma patients.

Barlogie is now beginning a randomized trial to compare standard myeloma treatment with a combination of standard therapy and thalidomide. —*N. Seppa*