#5

SOS CALIFORNIA
STOP OIL SEEPS CALIFORNIA

June 30, 2008

Dear Santa Barbara County Supervisors,

LATE DIST

We are founders of the non-profit organization, SOS CALIFORNIA, a state-wide organization that has now reached national media interest, established several years ago in response to our concern regarding the pollution caused by the natural oil seeps off our coast. We are writing in response to Agenda Item #5, the motion to consider a letter to the Congress, the President and California's Federal Legislative delegation endorsing a continuation of the Federal moratoria against offshore drilling in federal waters off the California coast.

The motion that you have before you is seriously flawed with misinformation that can have significant adverse fiscal impacts for our County. Your consideration of this motion with misstatements of facts and misleading representations will result in the County of Santa Barbara giving up the potential to receive hundreds of millions of dollars in revenue, and deny residents needed energy resources and environmental benefits. For these reasons, we urge you on behalf of our organization and the Santa Barbara County taxpayers to take no action on this matter or vote no on the proposal.

We ask that you review the materials enclosed in this packet, and seek further details so that you can make an educated and informed decision about this crucial matter of the oil drilling moratoria. Below are just a few examples of the errors and misstatements of facts in the information before you in the motion:

(1) The motion states that "it could take up to 15 years for new leasing to produce additional oil and gas". This is untrue. This materially misstates the facts regarding the potential for new offshore drilling in federal waters to produce oil and gas; oil and gas in many cases could be produced in as little as 3 years and certainly in a timeframe far earlier then 15 years.

(2) The motion references "consistent impacts" from existing offshore oil production. We believe that the motion is misleading and does not acknowledge that by far the largest oil related impacts to the Santa Barbara coast have been the natural oil seeps which produce approximately 50,000 barrels or more of oil seepage each year and that UCSB peer reviewed published research and other research has shown that existing offshore oil production has lead to reductions in seepage pollution. This combined with the time-tested modern safety record of the offshore oil industry is not acknowledged by the motion. The research and peer reviewed published scientific journals state that if offshore oil production were increased, it would likely lead to additional reductions in existing offshore oil seepage water pollution and reductions in air ROC emissions.

(3) We believe that the motion materially misstates that "potential new leasing would have an adverse effect on our local economy". The safety record of the offshore oil industry in the last 38 years, combined with new offshore oil slant drilling technology, allowing drilling from land or requiring fewer new platforms, has demonstrated there is little risk from additional oil production drilling in comparison to the much larger environmental impacts we face daily due to natural oil seepage pollution. In fact, there would be large positive effects on the local economy from expanding offshore oil production.

The County benefit from increased oil and gas production and from the potential accompanying increased County revenues from a negotiated agreement between the State of California and the

Federal Government may be enormous, estimated potentially to be hundreds of millions of dollars per year.

Due to recent changes in the federal policy regarding State retention of new royalties from federal OCS oil and gas production, the County can not afford to ignore this potential income source, and should exercise a fiduciary duty to determine the potential for royalty and tax revenue sharing agreements with the State of California regarding new or re-negotiated leases in the federal OCS for oil and gas production. These revenues for the County may change the entire makeup of the County Budget in future years and insure the citizens of Santa Barbara County will no longer have to settle for cutbacks in needed services as in the past.

Additionally these potentially increased County revenues could provide significant revenues to fund solar and other renewable energy and electric vehicle/plug-in hybrid vehicle funding to permanently move Santa Barbara County to renewable energy sources. The County currently lacks the economic resources to fund these programs. We also believe that potential future revenues derived from offshore oil production to the County could positively impact future County general funds, additional environmental programs and allow reductions in taxes to County taxpayers.

(4) U.S. Minerals and Management Service (MMS) estimates for oil and gas equivalent resources in the Federal OCS offshore Santa Barbara County exceeds 2 billion barrels of oil in easily accessible locations (estimates were based on $55 per barrel oil). Under recent indicated federal policy for encouraging States to negotiate retaining federal MMS production royalties of up to 18% for new leases, potential royalties to California exceed $ 50 billion. Since a substantial share of these royalty revenues could be directed to electric and plug-in hybrid vehicle rebates, the savings to local and statewide drivers would be substantial, since the cost for electric and plug-in hybrid electricity is approximately $0.70 per

equivalent gallon. Additionally, new oil production from an additional 2 billion barrel or more of offshore resource could reduced California's oil imports by greater then 50% (200,000 barrels). We also believe these oil production increases would lower California gas and diesel prices and substantially reduce foreign oil tanker traffic in California waters.

In consideration of our Items 1-4, we ask the Board to reject this motion for its serious flaws, lack of supportable information, and the potential economic damage it poses to Santa Barbara County residents, and future generations. The critical harm it will do to our County's immediate and long-term future will have resounding impacts both economically and environmentally.

Our Governor's office is examining this matter and revisiting these issues frequently in view of rising oil and gas prices and to presuppose that Governor Schwarzenegger will always support a no drilling position is premature and should not be assumed.

We, therefore, ask that the Offshore Oil Moratorium motion be withdrawn or disapproved, and that the County Board of Supervisors hold hearings to consider a request to approve a letter in support of lifting the Federal Offshore oil moratoria. We further request that the Board hold hearings on the potential positive fiscal impacts to the County Budget from revenue derived from new OCS oil and gas production and potential programs to fund solar electricity, plug-in hybrid and electric vehicle rebates and credits. Accelerated adoption of solar, electric and plug-in hybrid vehicles in the County would also have positive air quality impacts.

Respectfully,

Bruce Allen
Lad Handelman
Co-founders

SOS California
Stop Oil Seeps California

Interesting Excerpts from this Daily Sound article:

"The production of these fields, he *(Bruce Allen, SOS)* said, would bring tax revenues of $1.6 billion per year to the State of California and $330 million per year to Santa Barbara County for the next 20 years."

"By the end of the discussion, Allen *(SOS)* had Chiacos *(Community Environmental Council – CEC)* — a die-hard environmentalist who makes his own biodiesel from local restaurant waste — personally agreeing that drilling may be the right move for the future of Santa Barbara."

Sunday, June 1, 2008

Natural oil seeps: Are they dangerous?

BY JERAMY GORDON
DAILY SOUND STAFF WRITER

In a city where $5 a gallon gas prices have become a reality, a local nonprofit thinks it has the solution to eliminating California's dependency on foreign oil, fixing the budget crisis and making Santa Barbara an entirely "green" region.

A panel of experts on fossil fuels and the environment spoke at a town hall forum at the Santa Barbara Museum of Natural History on Saturday and, despite a few tense moments, one overlying theme was clear: Americans need to change their thinking on and consumption of fossil fuels. "If everyone in the world consumed the way we Americans do, we would need 25 planets to sustain us," said Karl Hutterer, executive director of the museum. "Change can not wait. We need to act now."

Town Hall 2: Oil in the Channel, was the second in a series of town hall meetings at the museum that focus on contentious issues. Natural oil seeps and their impact on the environment was at the forefront of discussion. SOS California, a Santa Barbara-based nonprofit, argued the answer to California's budget and energy crisis is simple: Just drill. Santa Barbara is home to the largest natural gas and oil seeps in the Western Hemisphere and the second largest, most active concentration of such seeps in the world. According to modern studies released by California State Lands Commission, there are more than 2,000 active submarine seeps along the California coast and more than 1,200 charted natural seeps in the Santa Barbara Channel, which S.O.S. California co-founder Bruce Allen says are polluting the Channel at an "astonishing rate."

"You often hear politicians talking about protecting our pristine coastline. Our coastline is not pristine," Allen said. "Our coastline is the most oil polluted coastline in the United States." This, he says, is due mostly to the natural seeps.
"Every day our coastal environment is polluted by natural oil seeps at an astonishing rate of approximately 10,000 gallons per day or 50,000 to 80,000 barrels every 12 months," Allen said. "The natural seeps don't garner as much attention as oil spills, but they're much more pollutant. "The amount of oil seeping from the ocean floor since 1970 equals more than 31 times the amount of oil spilled in 1969," he said. Over a 10-day period in 1969, an estimated 3 million gallons of crude oil spilled into the channel and onto the beaches of Santa Barbara County.

The 1969 oil spill was so large it sparked Earth Day, a national event dedicated to cleaning up the planet.

However, panelist Jon Day with the Energy Division of Santa Barbara County says seeps and spills are incomparable. "We should be careful when comparing seeps to spills," Day said. "It overlooks that seeps are natural and have very little impact, while spills can be

devastating." There is a huge uncertainty, too, on the volume of oil near these seeps, Day said. "The most reliable estimates are 34 years old," he said.

Panelist and UC Santa Barbara professor Bruce Luyendyk began studying oil seeps and their impact on the environment in 1994.
In a 1999 paper, he suggested that the reductions in natural hydrocarbon seepage can be attributed to offshore production at Platform Holly, off the coast of UCSB, reducing reservoir pressure. "I believe oil production can and will reduce seepage, but at what cost to environment? We just don't know," Luyendyk said.

"So, what's the solution?" Allen asked. "There is significant evidence oil extraction can reduce reservoir pressure and seepage pollution."
Day disagrees. "Oil development doesn't necessarily reduce seepage," Day said, adding that more studies need to be conducted.

Community Environmental Council (CEC) spokesman Michael Chiacos says more drilling is the last thing he and his organization want to see.
Santa Barbara-based CEC is an environmental nonprofit focused on energy efficiency, alternative transportation, and climate change. "We need to stop hunting and gathering pockets of oil and focus on renewable energy," Chiacos said.

But Allen and SOS California founder Lad Handelman argue that by allowing drilling near the natural seeps, Santa Barbara can greatly reduce the amount of pollution in its ocean and, through the extra tax revenue, fund research for and implementation of renewable forms of energy.

By the end of the discussion, Allen had Chiacos — a die-hard environmentalist who makes his own biodiesel from local restaurant waste — personally agreeing that drilling may be the right move for the future of Santa Barbara. Allen said there is potential to drill the equivalent of 1.8 billion barrels of oil from the Santa Barbara Channel from already discovered, but undeveloped fields.

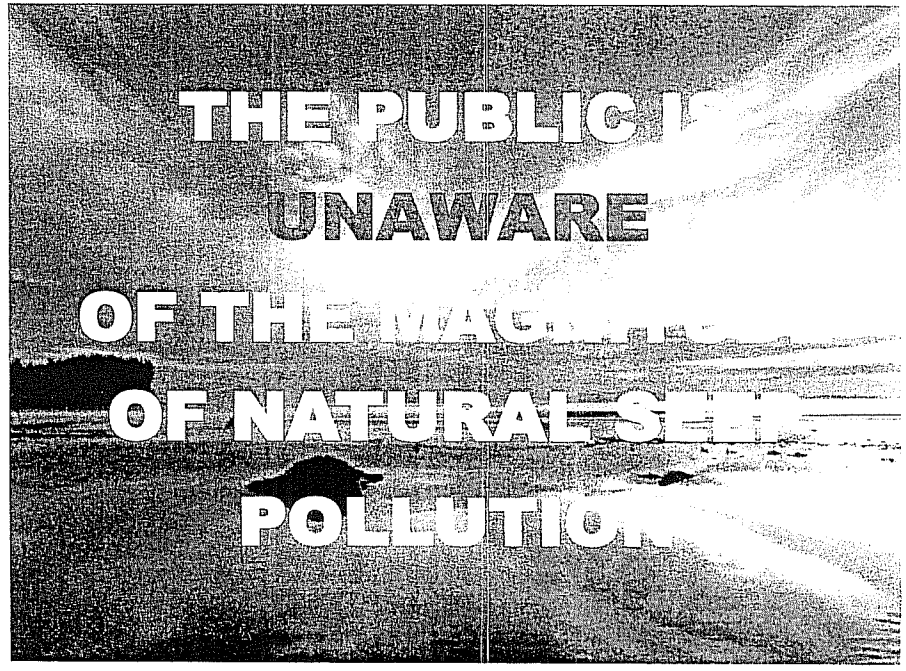
The production of these fields, he said, would bring tax revenues of $1.6 billion per year to the State of California and $330 million per year to Santa Barbara County for the next 20 years. Money he argued could then be used to build a solar thermal farm that could permanently supply 100 percent free solar electricity to every household in Santa Barbara County and provide a $10,000 credit on a new electric or hybrid vehicle every four years. "The money could also be used to fund new wastewater treatment facilities and education programs for Santa Barbara," Allen said.

OUR MISSION:

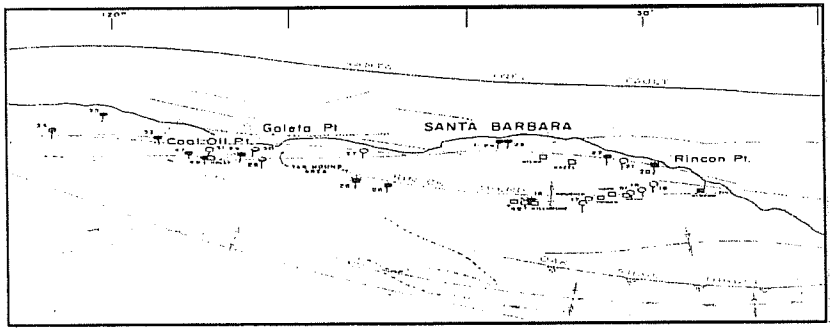
SOS California is a nonprofit organization dedicated to reducing the environmental impact of natural gas and oil seep pollution upon our ocean, our beaches and our air quality through education and awareness.

OUR CHALLENGE:

Can deeply entrenched beliefs be replaced by up-to-date science, facts and education?

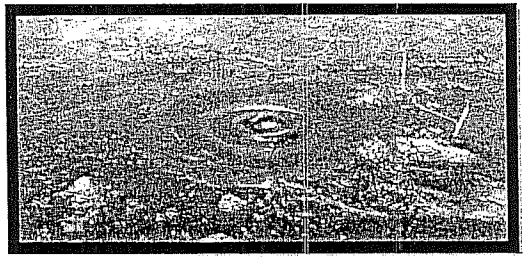


SB SEEPS + FAULT LINES



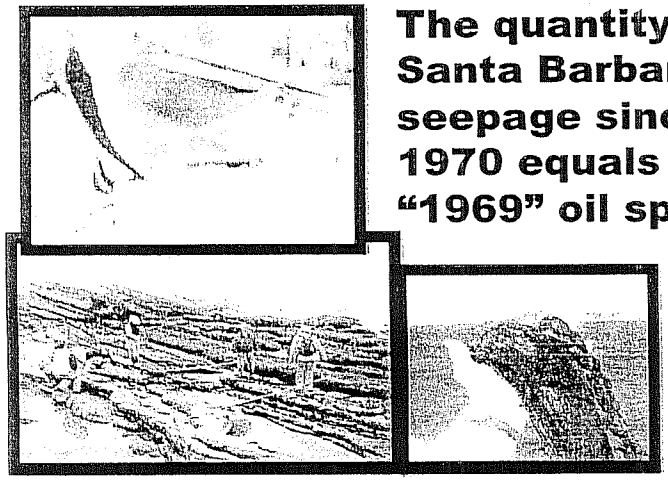
- 2,000 active natural seeps below fault lines along California Coast
- Earthquakes can expand sea floor fissures, releasing additional quantities of trapped oil

CALIFORNIA – LARGEST SEEP AREA IN WESTERN HEMISPHERE



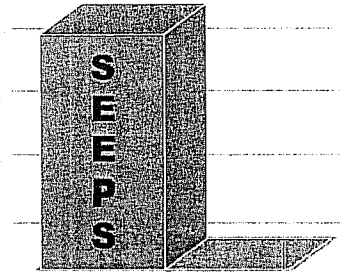
Every day our coastal environment is being polluted by natural oil seeps at the astonishing rate of approximately 10,000 gallons per day or . . .

EVERY 12 MONTHS:
50,000 – 90,000 BBL OF OIL



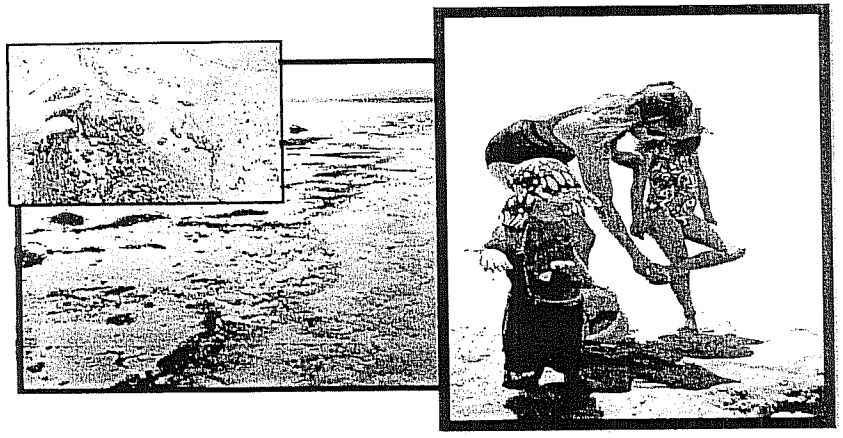
The quantity of Santa Barbara oil seepage since 1970 equals ~ 31 "1969" oil spills

SB COASTAL WATERS POLLUTION SINCE 1970



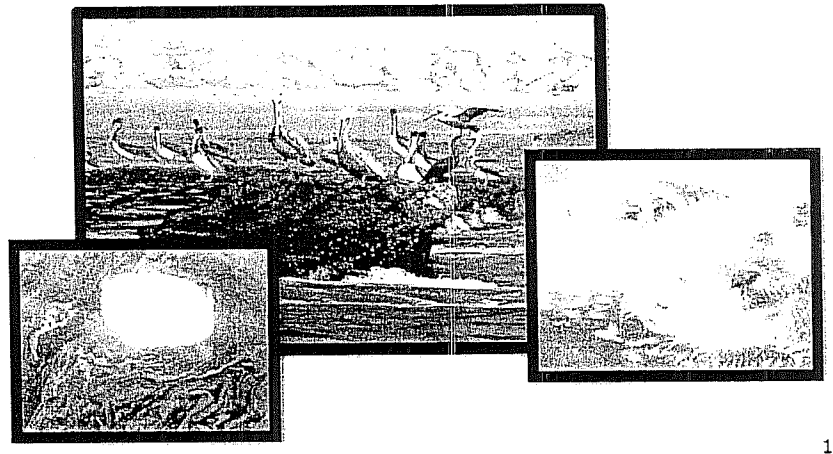
- Natural Seeps: 1,820,000 bbls
- Offshore Operations: 842 bbls

TAR ON THE BEACHES



Santa Barbara Coastline NOT PRISTINE

OIL SLICKS:
A DANGER TO COASTAL HABITAT



SANTA BARBARA COUNTY AIR QUALITY FACTS

- Santa Barbara's air quality has historically violated both state and federal quality standards. Strict regulations were enforced to reduce the man-made sources.
- Reactive organic compounds (ROC) are a significant pollutant contributing to the formation of SMOG.
- Offshore seeps contribute approximately 6,075 tons per year of ROC to Santa Barbara's air pollution - All transportation vehicles contribute about 4,000 tons.

[Ref. SB Air Pollution Control District - 2007 Clean Air Plan]

IS THERE A WAY FORWARD TO REDUCE SEEPAGE POLLUTION WHILE SAFELY PRODUCING MORE ENERGY AND INCREASING FUNDING FOR RENEWABLE ENERGY

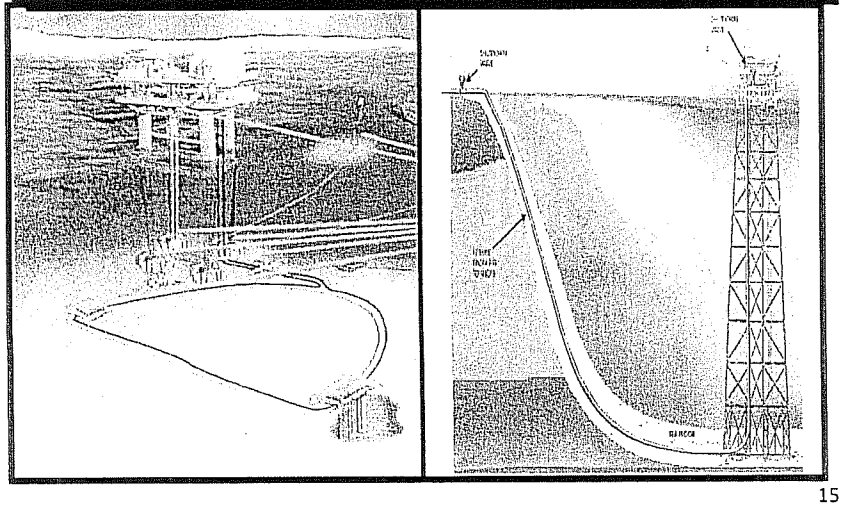
THERE IS SIGNIFICANT EVIDENCE OIL EXTRACTION CAN REDUCE RESERVOIR PRESSURE AND SEEPAGE POLLUTION

UCSB UNIVERSITY OF CALIFORNIA, SANTA BARBARA

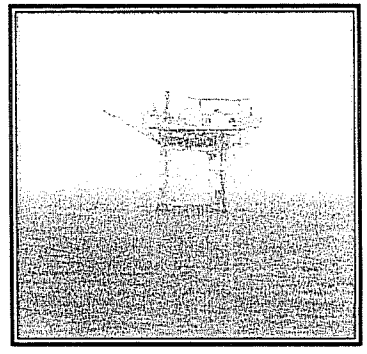
PRESS RELEASE: November 18, 1999

- Peer Reviewed Studies: Geology Magazine & Journal of Geophysical Research - Oceans
- "Natural seepage of hydrocarbons from the ocean floor... has been significantly reduced by oil production."
- "Studies of the area around Platform Holly show a 50% decrease in natural seepage over 22 years."
- If oil was pumped out of the La Goleta Seep, researchers state that there would be "a reduction in non-methane hydrocarbon emission rates equivalent to removing half of the on-road vehicle traffic from Santa Barbara County."

OFFSHORE FAIL-SAFE MECHANISMS



HURRICANES KATRINA & RITA: 150-YEAR STORMS



- **390 platforms damaged**
- **1,000 wells destroyed**

-- NO SIGNIFICANT OIL SPILLS--

POTENTIAL BENEFITS FROM REDUCING SANTA BARBARA SEEPS AND SAFELY INCREASING OFFSHORE PRODUCTION

POTENTIAL BENEFITS

Permanent reduction in seepage pollution

- Cleaner ocean waters and beaches, cleaner air

Increased oil and gas resources and revenue

- Reduced dependence on foreign oil
- Dedicated revenue to fund permanent solar and other renewable energy sources
- Money for environmental and education programs

Reduction in oil tanker traffic

POTENTIAL BENEFITS

MMS 2004 estimate for Pacific OCS exceeds 14 billion BOE oil and gas reserves

More than 1.8 billion BOE potential from already discovered but undeveloped offshore Santa Barbara fields*

CA Sate Revenue: **$1.6 billion/year** (15% royalty) **
SB County Revenue: **$330 million/year** (3% royalty) **

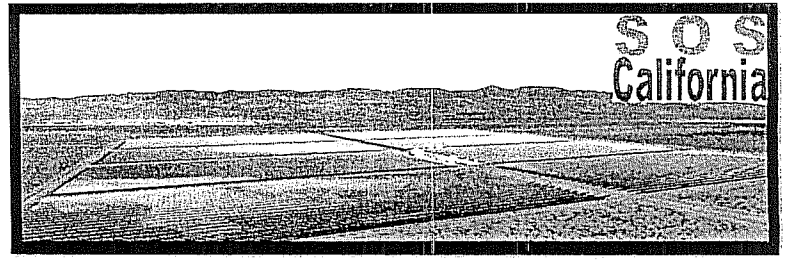
- Funds SB County to build 450 MW solar thermal farm from 3 ½ years royalty revenue and permanently supply 100% free solar electricity to every SB County residence (30 kwh per day per household)
- Provides County funds for every SB household to receive $10,000 credit for new electric or plug-in hybrid vehicle every 4 years
- Fund new wastewater treatment facilities and education programs for Santa Barbara County

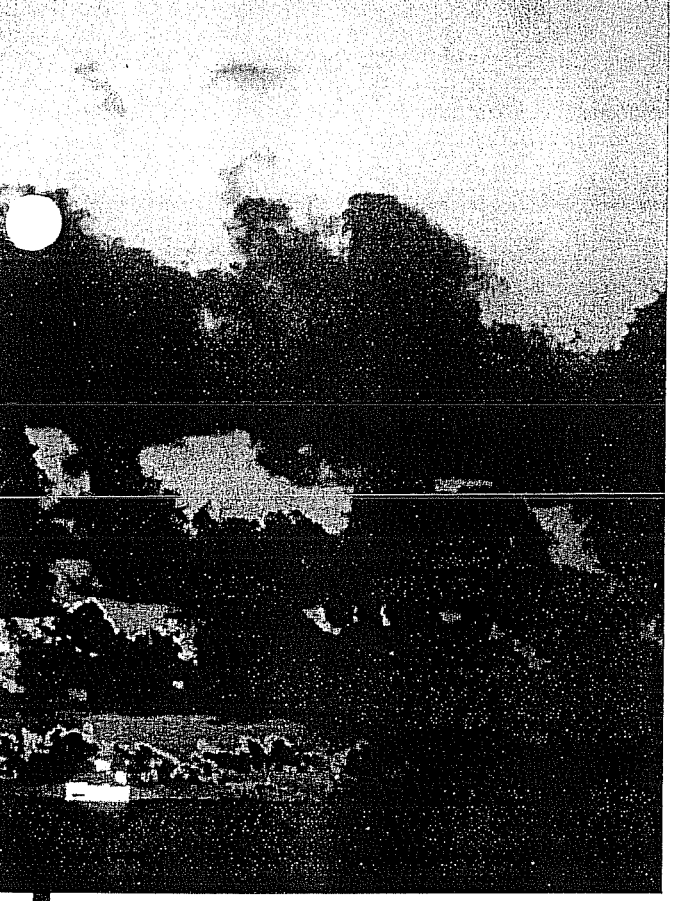
*Dr. Tom Bjorklund 2006 and MMS 2004 published offshore resource estimates
**Production of 1.8 billion bbl over 20 years at $120/bbl

IF YOU WANT

- **Cleaner air and water**
- **More energy independence**
- **More revenue to fund renewables**
- **Less tar on the beaches**
- **A cleaner ocean / shoreline habitat**

GET INVOLVED - MAKE A DIFFERENCE!





SOS California: Can the Oil Industry and Environmentalists Bridge the Gap?

Commercial diving industry legend **Lad Handelman** has a plan to achieve the impossible. The founder of two New York Stock Exchange companies, **Cal Dive International** and **Oceaneering International**, has made his mark on the subsea industry in countless ways, and now he hopes to have an impact on healing the chasm between California's liberals and conservatives on the subject of [gasp] **Big Oil!** This interview was conducted by Jim Buckley of the Montecito Journal, and is reprinted with permission.

Certain portions of the interview have been updated to reflect subsequent research and developments through July 2007.

Lad Handelman lost the use of his body from his chest down as the result of a 1985 skiing accident. His spectacularly modern home near the top of TV hill overlooks the South Coast of Santa Barbara County from Point Magu to the boat harbor below. He also looks out upon the Channel Islands and the Santa Barbara Channel, under which, Lad knows, lies an enormous pool of energy that both local and state officials have decided is not worth tapping into. Lad – a former oil-industry underwater contractor, and later abalone farmer – thinks this policy is extremely unwise.

"World Events are unfolding dangerously at a speed and scale unlike at any other time period in history," Lad says. "Intrinsic to and perhaps the root cause of this danger," he continues, is 'energy' – or, in America's case, the lack thereof." Mr. Handelman proffers that because California's environmental policies have driven the nation's environmental policy, America is being "strangled by its own irrational choices," e.g. blocking all future offshore development "regardless of the crying need for money and energy."

Lad Handelman wants to bring the energy business back to the Santa Barbara Channel and has formed a nonprofit organization, **SOS California**, to "bridge the gap" between the environmentalists and energy industry.

"Right now," he says, "there appears to be a huge unnecessary conflict fed by misinformation and political paralysis, e.g. many politicians know the facts and the benefits of development but for fear of losing votes, cannot reverse their anti-oil positions. Californians cannot afford this. In these times, we must be willing to take a new look – to challenge the unchallengeable. I believe that once they learn the facts, most Californians will agree that the basic premises supporting the anti-oil movement are outdated, and they will want to join our bridge-building effort."

Lad agrees that replacing oil and gas with new cleaner energy will remove a source of pollution in the air and water, and there will be a better place for us humans overall, but he says, "until that day actually comes, we need to preserve every bit of oil and gas energy we can." Lad has other concerns as well.

"Other than the obvious need to replace petroleum energy with clean energy there's another huge pollution problem that is staring us right in the face e.g., the enormous amount of natural pollution coming up from the sea floor, right here, in our own front yard."

He continues, "As I will explain later there is far more damage to our ocean waters and air quality now coming from these natural seeps than is coming from all the offshore production and onshore motor vehicles combined. The cause of this seep pollution can and needs to be removed. We can remove it by extracting it. Like pulling a sore tooth. Like purging a leaking septic tank."

You suggest that, by extracting the oil and gas that is now in the channel, we would be cleaning up the environment. How? Please explain.

The ocean environment right now, especially from Point Conception down, is a place where the biggest oil seeps in the Western Hemisphere come from.

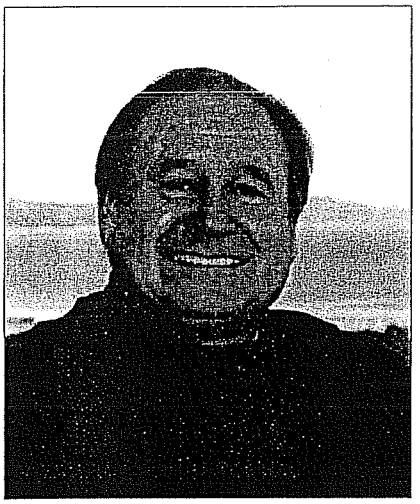
The Marine Science Institute at the University of California at Santa Barbara (UCSB) had earlier published its findings that about 4,200 gallons of oil oozes to the surface daily in a single 6-mile by 3-mile stretch seep area off Coal Oil Point. "But the amount now is easily more than double that." (Ira Leifer, UCSB Marine Science Institute, Research Scientist, February 1, 2005). That is just one seep area. According to the California State Lands Commission reports, there are one thousand two hundred recorded seeps south of Point Conception. Based on this new information when I visited with Leifer's research partner, Dr. Lyendyke, I asked "Is it fair to say that all-in there is now at least 10,000 gallons a day of seepage being released from below Point Conception down?" His reply, "Yes, you can say that."

At this rate of 10,000 gallons a day what this translates to is that over every twelve-month period, if nothing changes, if we do nothing, it is guaranteed that our environment will suffer the same amount of oil pollution as from the catastrophic '69 spill. **Our ocean is being chronically poisoned.** Unknowingly, by choosing to block development, which would eliminate this seep problem, we instead are condemning our ocean, our beaches and our air quality to never-ending pollution. Does blocking development make any sense?

So, are you saying that offshore development will help our problem with the tar on the beaches?

Yes I am. As a commercial diver, I could see large natural "pancakes" of oil slowly rising up from the sea floor, four to eight feet across and several inches thick. You could punch that oil with your fist, and it wouldn't make a mark on your glove because it was hard. These pancakes rose to the top, blanketed the kelp beds and presented a danger to marine mammals – sea otters for one. And they also came ashore.

Since beach tars and petroleum odors come from leaked oil and gas, the solution is to eliminate where this pollution is coming from. Those great quantities of submerged "oil-pancakes", thanks to past extraction, are pretty much gone now. And while oil tars still soil the beaches from Carpinteria up to Gaviota, overall there is much less now and in many spots only a fraction of what there was prior to extraction. It seems to me that too many of us are putting our concern in the wrong place—we have it backwards. Consider this: The total leakage from the last thirty-nine years of offshore production in all of California (842 barrels) has made less pollution than what is coming from Santa Barbara's natural seeps every single week! I suggest that it's time we stop worrying about the so called "risks" of production and deal with the real problem—getting rid of the seeps. Our beaches would be tar-free if the rest of the untapped reservoirs were also drained.



How can extraction help with pollution and how long would it take?

These reservoirs are mostly shallow. Oil seeps have been coming up from sea floor cracks for thousands of years. These reservoirs were originally under very high pressure, emitting enormous volumes of oil and gas. After the pressure has been reduced the seepage stops. Think of a balloon being squeezed and its contents are being squeezed out. It's the pressure that does that. But when the squeezing stops, what is left of the balloon's contents will be at equilibrium and remain inside.

If we can de-pressurize these reservoirs to where there is no more pressure to drive the oil and gas, there would be no more oil or methane gas being forced up through the sea floor cracks.

Reservoir development projects take many years. Typically, the life of a field being developed is 20-25 years. The first development at the Coal Oil Point reservoirs began decades ago and a portion of this area is still being produced. Scientific recordings demonstrate that seep levels here are less than half of the initial volume coming from seeps. These same scientists attribute this seep reduction to reservoir pressure relief, the result of extraction. We need to use this model as a way of dealing with ALL the remaining seeps. To me, to do any less would be like patching only half the holes that caused a flat tire.

Lad Handelman tells us that it is time that environmentalists, energy groups and politicians work together to benefit the environment and re-energize State and County coffers.

Lad Handelman proposes bringing the oil business back to California in an environmentally friendly way, and that funds from the oil industry should be used to help heal the ocean.

If you somehow convince the community to go ahead and pump out what oil and gas is there, what would the process of extraction look like?

It could be achieved in various environmentally friendly ways. Aside from slant drilling, another way would be to install one single production and collection platform in a new lease area which can then act as a hub for a multitude of pipelines emanating outward in various directions to distant sub-sea wellheads (a sub-sea wellhead is the uppermost component of a producing well which connects the oil flow coming up from the reservoir to a pipeline lying on the sea floor). Except for the central gathering platform, there will be nothing else to be seen.

Other types of discoveries might lend themselves to being developed **entirely** sub-sea, with pipelines from wellheads going directly to an onshore site requiring no platforms at all. These subsea/satellite methods are common practice today and after forty years, are well proven.

In the early 'sixties, between Coal Oil Point and Gaviota, thirty such entirely sub-sea production systems were installed in state waters close to shore, and the public never even knew they were there.

Twenty-five years later, when the reservoirs had been emptied, the subsea hardware was removed and hauled away. The public never saw them in all that time. These subsea installations provided California with trillions of cubic feet of natural gas and they generated millions of dollars of new revenue for state and county coffers.

This well-proven technology can be applied again right here.

How easy or difficult will it be to prevent, or at least minimize, the danger of another oil spill catastrophe like the one in 1969?

Nothing in the world is or will ever be 100% guaranteed failure-proof. Having said that, anyone who looks at the record can see that since the 1969 "catastrophe", 39 years and 10,000 new wells ago, even through hurricanes and destroyed platforms, offshore oil production is catastrophe-free. Since then, Santa Barbara's only "remarkable spill" was from a pipeline break off Point Pedernales, which was officially recorded as 163 barrels (Santa Barbara County Energy Department).

All told, in all these 39 years, only 842 barrels have spilled from offshore operations. And according to US Fish & Game records, with little, if any, damage to marine life.

By contrast, nearly 2,000 barrels a week, fifty-two weeks a year, are gushing up from natural seeps. Since the original spill in 1969, this means there have been only **842 barrels** spilled from offshore operations **versus 1,820,000 barrels** pouring out from these natural seeps. (Ref. MMS) And remember, this is the identical oil. There is no less damage from a fresh gallon of natural oil seep than a fresh gallon of pipeline spill. While anti-oil rhetoric claims state that because natural seeps are from nature and do not erupt all at once they cannot be compared to a production spill. That statement is nothing more than unscientific gibberish. Just ask a sea otter lying on the beach covered in oil from one of the seeps. See what he says just before he perishes. The same goes for all the dead birds found covered in oil.

That record is astounding. It sounds like you're saying we no longer have anything to fear from offshore development—so what has changed?

There are many reasons why offshore production has become as safe as it now is. In 1970, the year after the catastrophe, new and stricter regulations and other controls were established by the US Minerals Management Service (MMS), California's Environmental Protection agency and the newly created Santa Barbara Energy Department. Regulations were put in place requiring 24-hour/day monitoring and tough penalties for even minuscule violations (even a one pint leak must be reported).

They also required more and stronger safeguards. Should by chance a pipeline be snared and break, all flow is instantly stopped by automatic and redundant shut-in valves. Each and every offshore system is required by law to include several of these zero tolerance failsafe mechanical devices. And for even greater redundancy, onsite technicians monitor flow pressures and via remote controls can trigger a shut-in as well. A perfect current example is what happened in the Gulf of Mexico with Hurricanes Rita and Katrina. More than 100 drilling rigs, production platforms and pipelines were destroyed or torn out by their roots and moved miles away. Amazingly, there was not even one spill that amounted to anything. The failsafe shut-in systems worked! So when the next big earthquake hits and the city's gas lines rupture and explode, I'd rather be on an offshore platform than in my own home.

Based on all this, my personal take is that I am more concerned about my steering wheel coming off or my water heater blowing up than I am about another uncontrolled offshore catastrophic blowout. Lets put this fear to bed, where it now belongs!

> **For example, in the early sixties, we installed 30 of these subsea wellheads, piped to shore, and the public never knew they were there. They were taken out 25 years later and the public never saw them in all that time. They provided a great economic benefit to the county through the state system, and a great deal of energy.**

What about natural gas and methane seeps? How big of an issue are these?

This is a huge issue, as global warming, which comes from such emissions, has become the whole world's hot button. Once again, the public in general is unaware of the magnitude of these gas seeps and the extent of damage they reek on our air quality every day. According to Santa Barbara County Air Pollution Control's most recent report (2007 Clean Air Plan), the volume of greenhouse gases emitted by all our cars, trucks and vessels combined is polluting our atmosphere at the rate of 4,800 tons/year. This is a frightening amount which we're trying hard to reduce. And yet, according to these same records, even more pollution is spewing out from natural offshore seeps—a recorded 6,075 tons/year! I found this information unbelievable. When I asked the County officials what I thought was a reasonable next question, "Why in the world aren't we doing something about this?" The answer was, "Because these natural emissions are not regulated or controlled, addressing them is not included in the County's Clean Air Plan." So you see, dealing with this issue is not even on their radar and certainly not in their budget. **UNBELIEVABLE!**

The researchers may be able to validate the existence of these dangerous emissions using scientific methods, but what can we the public connect with to help us understand this phenomenon ?

From underwater, these gushers can be witnessed shooting out of holes on the seafloor, and occasionally observed as they boil into the atmosphere. For example, just a year ago a group of UCSB researchers were right on-site when a very visible and dramatic occurrence of one of these methane blowouts happened right next to their boat. Amazingly, they got the whole episode on film. The incident was written up by *Santa Barbara News-Press*, "Was Methane Blowout Earth's Warning Signal?" (August 27, 2006). This article describes "a big blowout of methane from an undersea seep... when three separate streams of bubbles burst out of the tar and shot up 60 feet to the surface where a cloud of methane drifted over the UCSB air monitoring station."

The article goes on to say that, "Scientists have suspected that underwater explosions of methane like this occur frequently and that a major explosion could trigger runaway global warming."

If we took the pressure out of these gas reservoirs, this danger, as remote as it may be, would go away. And we'll have dealt a blow in the fight against global warming.

Going back to the idea of extraction, if such extraction were allowed, how much oil and how much money are we talking about?

Referring to the Santa Barbara-Ventura Basin, a 1997 Minerals Management Service report stated: "Recoverable oil reserves from the Outer Continental Shelf waters alone are estimated at 9.0 to 12.6 billion barrels." This translates into new revenues in excess of $500 million per year, so the known financial prospect is huge. Yet one anti-oil spokesperson makes the unsupportable unchallenged claim that "even if produced, all of Santa Barbara's oil reserves would only supply the United States for 28 days." This anti-oil rhetoric is incorrect and of no relevance. Twenty-five years of new revenues and new energy is what we need, not rhetoric. We are talking about a lot of money that could do a lot of people a lot of good.

Everyone resents the large profits made by the huge oil companies. But look at it this way: First off, they'd have to pay out a sizeable chunk of their would-be profits in the form of royalties (e.g., the $500 million). On top of that, they would have to pay out to us nearly half of the remaining profits in the

form of corporate taxes, which means even more money to the state and counties. Can you imagine how much money we're talking about here?

Who would get all this money?
Once collected at the federal level a portion goes to the State and then a part of that amount finally is received at the county level. However, under the current political climate and the recent experience of other States, we know that if California is willing to reopen California offshore development, the energy companies will be willing to pay a higher royalty percentage. The end result will be a huge new revenue source to benefit all Californians and particularly help fund many needed projects throughout Santa Barbara County which have long been delayed for lack of funding.

So, you are hoping this money, or at least a good portion of it, could be dedicated to cleaning up the creeks, streams, and ultimately the ocean?
Absolutely. A stipulated portion of this new revenue can be earmarked to expand or replace Water Treatment Plants which were supposed to clean contaminated run-off water before it flows into the ocean. Our Sewage Treatment Facilities also need major modernizing and expansion to deal with the increased bacterial effects from our exploded population (public health and coastal wildlife are threatened, marine organisms are dying off).

Another stipulation would be to fund long-term UC research and development programs designed to accelerate alternative energy projects. By using all the brain power of UC's number of world-class scientists (UCSB alone has five Nobel Prize winners), we may be able to advance the advent of practical clean energy by many years. The money for these grants will be there to be had. Why not take advantage of this invaluable natural resource for these purposes- rather than seeing it squandered through cracks in the ocean floor? If my mother saw me allowing such wastefulness go on she would disown me.

Have any local politicians or community leaders come forward in support of your project?
No. We have only presented this to two of them – I won't say who they are – but they both are afraid to touch it because they see being in any way connected to this issue as "political suicide." At the same time, these same representatives say that if we can show them enough public voice for the project, they'd look at it again.

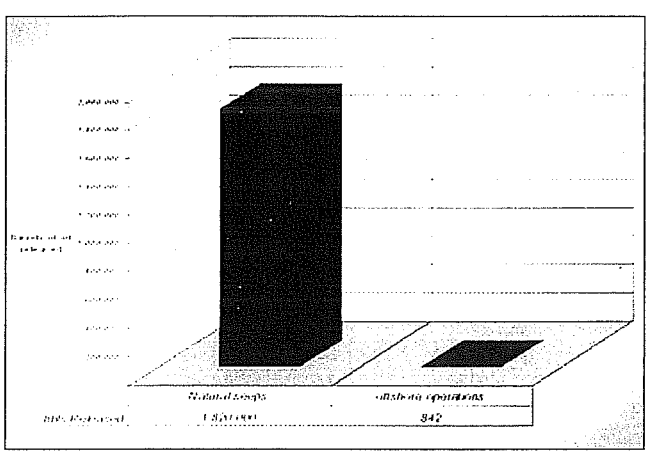
What's missing from this picture is that the public has not been informed or made aware of the facts, let alone had the opportunity to voice its opinion. I believe if the public did have the opportunity, it would voice very strongly that we cannot keep following our current path "to nowhere." I believe our populace will agree that it's time we re-examine things, that we need change!

What is SOS California's first step, to convince the public or environmental groups?
I don't think we can convince anyone of anything they don't want to be convinced of—that is not our job. Education is Step One and that is what **SOS California** is all about. Thanks to the advent of web sites and blogs, we can now spread information throughout the community and state within months, not years, and those that can look at it with open minds can see for themselves that it is time to put aside our fears from 1969 and join the rest of the world in making good use of energy.

So, what's your plan to roll out this information and begin the process of educating the public?
The first thing, which we are now working on, is to complete our website, **SOScalifornia.org**. This will allow people to check out the science, check out the records and satisfy themselves that our information is factual.

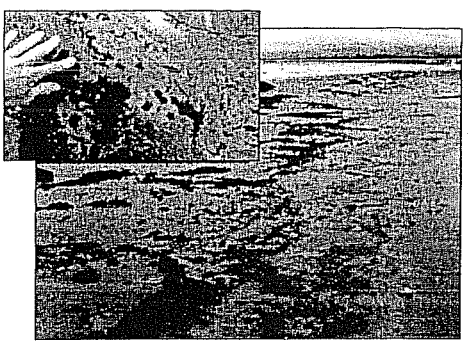
Next will be to expand this informational website into also becoming a central platform for all to share information and openly express their views and ideas. This becomes a vehicle for Californians to communicate their views to our politicians. I believe that once our politicians see this effort as a true grassroots movement, they'll have to listen. And perhaps, may even feel compelled themselves, to re-examine the current offshore energy blockade policy.

So **SOS'** job is to create the mechanism where all Californians can get current information,to see the whole picture- and then be empowered to do something about it.



A look at natural vs. manmade oil pollution offshore Santa Barbara since 1970. There is virtually no comparison between natural oil seepage and spills caused by man.

Aside from the steps you've just mentioned, what do you see as the longer term strategy?
Based on my experience, it would be futile at this time to detail any long-term plan. As events unfold, the optimal strategy will reveal itself. For now, we are concentrating our efforts on getting the word out.



The public, due to misinformation campaigns from the anti-oil environmentalist lobby, is unaware of the staggering magnitude of natural oil seepage.

For the record, what is in it for you?
What's in it for me is peace of mind from knowing that I did everything I possibly could do to promote change that is good for the environment and for California. My history demonstrates that I am an environmentalist. I've spent cash money, a couple hundred thousand dollars, replanting abalone in these islands. I have spent fifteen years of my life supporting marine mammal and other resource protection. I see myself as being a reality-based steward of the ocean. At this point in my life I do not need to prove anything to anyone. But neither can I sit back and let a few fear-mongers inflame the public with old information to promote their own self-serving agendas—living off the results of that fear—and in the process do more harm than good to our environment and to the best interest of the community.

I'm just an average guy who wants to do the right thing. I don't and won't get any money from this. I just want to go to sleep at night knowing that I spoke up for what I know is right. **UW**

For readers out there who want to help, we invite you to join our **SOS California** effort. You can go to our website or call the office and get started NOW! Contact:

Phone: 805-963-4596
email: info@SOScalifornia.org
SOScalifornia.org

SOS California

The bridge to our renewable future

KEY ACCOMPLISHMENTS

RADIO INTERVIEWS:

- The Roger Hedgecock Show – 600AM - San Diego's #1 talk radio show
- The Andy Caldwell Show – AM1440 - Central Coast's top-rated radio show
- Mark Schneidman's Radio Real Estate – 1290AM Santa Barbara

TV NEWS/INTERVIEWS:

- KEYT / ABC – 6 & 10 pm local news (Tri-County), Channel 3 (5/31/08 – Town Hall Meeting)
- Your Turn – Community Access 17 (5/29/08 – ongoing)
- SB News-Press TV – Online coverage (7/26/07 – Seeps Tour)

PRINT PUBLICATIONS:

- Santa Barbara News-Press – June 1, 2008 (Front-page/2-pgs w/photos)
- Daily Sound – June 1, 2008 (Front-page/3-pgs w/photos)
- CASA Magazine – May 30, 2008 (Article, photos, event promotion)
- CASA Magazine – July 2007 (Article with group photo)
- Montecito Journal – June 2006 (Interview with Lad/4-pg spread w/photos)
- Underwater Magazine – July/August 2006 (Interview with Lad/4-pg spread w/photos)

ONLINE PUBLICATIONS:

- Noozhawk (Tri-County) – May 16, 2008 (Article & SOS interviews)

PUBLIC PRESENTATIONS (September 2007 to June 2008):

- Santa Barbara Yacht Club – 80 attendees (general public)
- Santa Barbara Yacht Club – 45 attendees (SBYC membership)
- Air & Waste Management Association
- SB Lincoln Club
- SB County Industrial Association
- SB Geologists Association
- Ventural Geologists Association
- SB Ranchero Vistadores
- Derricks-to-Desks (WSPA Association + 80 educators)
- See the Seeps Tour (125 attendees)
- THM - *Oil in the Channel: Contentious Solutions* – Panelist (SOS co-founder, Bruce Allen)

"Natural Gas and Oil Seep Pollution in the Santa Barbara Channel: Can the Energy Industry and Environmentalists Bridge the Gap?"

Speakers: Bruce Allen, Consulting Physicist and Judy Rossiter, Executive Director of Stop Oil Seeps (SOS) California

The public may be unaware of the magnitude of naturally occurring seep pollution. Scientists have been studying the effects of the offshore oil and gas seepage in the Santa Barbara Channel since the 1940's. Every day our coastal environment is polluted by oil seeps at the astonishing rate of approximately 10,000 gallons per day or as much as 86,000 barrels per year—an amount equivalent to the 1969 Santa Barbara Oil Spill. In addition to the oil seepage and possible solutions, the presentation will discuss how methane and reactive organic gases (ROG) from the natural gas seeps are a major source of air pollution in Santa Barbara County, contributing to ozone formation and global warming.

Bruce Allen, Co-Founder of SOS California, is a Consulting Physicist with 26 years experience in scientific and space systems project management, and space systems technical management. He served as a Technical staff member for the Voyager Spacecraft mission to Jupiter and Saturn in the Tracking and Telemetry group at JPL's Deep Space Network. In 1981 he founded Intersol Corp, which developed specialized zero-g furnace designs for the Space Shuttle program and designed and manufactured solar energy devices and systems sold worldwide.

Judy Rossiter is an educator and marketing consultant, specifically working with organizations committed to environmental/social change. She is the Executive Director of Stop Oil Seeps (SOS) California, a nonprofit organization based in Santa Barbara, dedicated to educating the public about the environmental consequences of natural gas and oil seep pollution and its impact on the ocean, the beaches, and air quality.

Lad Handelman, Co-Founder of SOS California, is a long-time Santa Barbara resident who as a commercial fisherman/diver amassed over 10,000 hours underwater along California shorelines. He is the founder of two pioneering enterprises known for the development of subsea equipment and marine construction techniques, Cal Dive International and Oceaneering International—both now New York Stock Exchange companies. Having made his mark on the subsea industry in countless ways, including taking practical diving depths from 200′ to 3,000′, he is a legend in the commercial diving industry. Since losing the use of his body from the chest down as a result of a 1985 skiing accident, Lad has continued to sponsor and support projects and organizations that improve the quality of the ocean and its resources.

SOS CALIFORNIA

STOP OIL SEEPS CALIFORNIA

SOS California is a non-profit organization dedicated to reducing the environmental impact of natural gas and oil seep pollution on our ocean, our beaches, and our air quality, through education and awareness Our goal is to alert the public to the magnitude of natural seep pollution in the Santa Barbara Channel, and to the availability of an invaluable resource to fund environmental cleanup and develop alternative energy sources. It is through collaboration with an informed public that we can build the bridge to a healthy and sustainable future.

THE PROBLEM

The public is unaware of the magnitude of pollution naturally occurring from oil and gas seeps in the Santa Barbara Channel.

» Read more

THE SOLUTION

To replace deeply entrenched beliefs with up-to-date science, facts, education and to mobilize our community.

» Read more

COMMUNITY OUTREACH

Sole-utions is our community outreach/education initiative

» Read more

The Problem...

The Public Is Unaware of the Magnitude of Natural Seep Pollution

Do you know... *Natural Gas and Oil Seepage is the Greatest Source of Petroleum Pollution in the Ocean and Atmosphere*

As pointed out by the National Research Council (NRC) of the U.S. National Academy of Sciences, "natural oil seeps contribute the highest amount of oil to the marine environment, accounting for 63% per cent of the annual load to the world's oceans. Although they are entirely natural, these seeps significantly alter the nature of nearby marine environments. "

Do you know... *Offshore Santa Barbara has the Second Largest Marine Oil Seeps in the World*

The largest natural oil and gas seeps in the Western Hemisphere lie in the Santa Barbara Channel. According to the California State Lands Commission,they comprise more than 1,200 of the over 2,000 active submarine seeps along the California coast. Half of these occur within three miles of an area called Coal Oil Point, located just west of Santa Barbara near the University of California, Santa Barbara (UCSB) campus.

It is estimated that oil seepage for a single 6-mile stretch, including Coal Oil Point, averages 10,000 gallons of oil each day (240 barrels). Every 12 months about 86,000 barrels of oil seep into the ocean—the equivalent of the quantity of oil spilled in the 1969 oil spill in Santa Barbara. Since 1970, the quantity of oil that naturally seeps into the Santa Barbara Channel equals ~ 31 "1969" oil spills.

Do you know... *The Tar on the Santa Barbara Beaches is from Natural Oil Seeps in the Channel*

Do you know... *Hydrocarbon Offshore Seeps are the Largest Source of Air Pollution in Santa Barbara County*

Santa Barbara's air quality has historically violated both state and federal quality standards.

The natural seeps release more than 40 metric tons of reactive organic compounds (ROC) into the air every day. In the Air Pollution Control District (APCD) of Santa Barbara County 2007 Clean Air Plan, the ROC from these natural oil and gas seeps are identified as the greatest source of air pollution in the county significantly contributing to the formation of smog. The offshore natural seeps contribute approximately 6,075 tons per year of ROC to Santa Barbara's air pollution - All transportation vehicles contribute about 4,000 tons.

To the dismay of local beach-goers, sticky globules of tar lap up onto our coastline every day. This tar is an annoyance to many of us and is often perceived to be a man-made pollutant. In fact, the tar results from huge, natural seeps that have been spewing oil and gas into the Santa Barbara Channel for centuries.

Do you know... *55% of the Tar that shows up on Los Angeles County Beaches is from the natural seeps in the Santa Barbara Channel*

The most heavily impacted beaches are those between Goleta Point and El Capitan Beach, although wind and currents oftentimes take the oil slick northeast onto Santa Barbara city beaches and as far away as Los Angeles beaches. Surprisingly, scientific evidence indicates that the Coal Oil Point seeps are responsible for half of the tar that washes up on the Los Angeles County beaches.

SOS California is a 501 (c)(3) nonprofit organization and dedicated to reducing the environmental impact of natural gas and oil seep pollution upon our ocean, our beaches, and our air quality. Our goal is to raise public awareness regarding the magnitude of the natural seep pollution in the Santa Barbara Channel. An informed public can drive change and bring answers to this complex problem, wherein lies a unique and tremendous opportunity to fund environmental cleanup and alternative energy ... according to our straightforward plans for a healthy and sustainable state.

SOS California's Solution

Education

- Only through education can Californians and Americans learn the truth about the massive amounts of natural oil and gas seepage pollution coming from offshore Santa Barbara, California's coastal areas. Since Native Americans first arrived in coastal California, approximately 800 million barrels of oil have seeped into the coastal environment.
- Peer reviewed published reports document the connection between existing Santa Barbara offshore oil production and natural seepage pollution reductions over the last 20 years and the larger natural seepage pollution reduction potential through expanded offshore oil and gas production.
- Create public awareness of the offshore oil industry safety record in California using new exploration and production technologies. There is a 38 year safety record of oil and gas production offshore Santa Barbara with less then 1000 barrels spilled versus 2 million barrels of natural seepage over the 38 years.
- New technology now allows slant drilling from land out into the ocean, or from existing offshore platforms or temporary offshore platforms out to a range of over 5 miles horizontally.
- New California offshore oil and gas revenues can pay for California's conversion to solar and renewable electricity and electric/plug-in vehicles and reductions in taxes for all Californians.
- Join SOS California and actively support our mission with fundraising assistance, education, media and technical expertise and regulatory reform expertise.

Policy Changes We Support

- Lifting the California state and federal moratoriums on offshore oil exploration and production through legislative and executive action.
  - Registration of local and statewide initiatives if the state legislature and the California governor fail to act.

- Present SOS California's plan to local, state and national legislators, executive officers, industry and regulators which includes:
  - State of California and Federal Government- Allow new exploration and production of oil and gas resources within the offshore area of Santa Barbara County and adjacent Santa Barbara federal OCS waters.
  - Support studies to maximize oil production while maximizing additional natural oil and gas seepage pollution reductions off the Santa Barbara central coast.
  - Change California and federal regulations to allow already discovered but undeveloped Santa Barbara offshore oil and gas resources to be put into production in the near term.
  - California negotiates to retain the full fees and royalties for federal OCS leases and production revenue (18%) and dedicates royalties to fund solar thermal electricity, photovoltaics, wind energy sources, electric/plug-in hybrid vehicle programs, and lowering Californian's taxes. This funding will accelerate the build-out of the western U.S. solar and renewable energy infrastructure.
  - Santa Barbara County to negotiate with California a new royalty revenue and offshore oil/gas production and regulation agreement. Significant new revenues will fund solar renewables and electric vehicle program rebates, county taxpayer reductions, waste water treatment improvements and education programs.
  - These policy changes will lead to cleaner statewide air and water quality, more renewable electricity and electric/plug-in car usage, lower taxes, lower oil, gasoline, diesel, and natural gas prices, reduction or elimination of imported oil and gas to California and fewer oil tankers entering California state waters.

Click here for more information

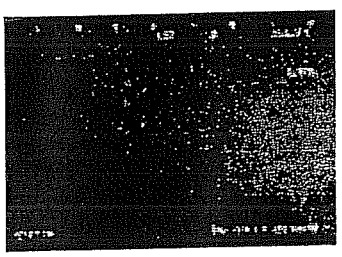
SOS CALIFORNIA
The Facts

- **The Facts**

Seep Facts

How Seeps Start
Crude oil and natural gas seeps naturally out of fissures in the ocean seabed and eroding sedimentary rock. These seeps are natural springs where liquid and gaseous hydrocarbons leak out of the ground (like springs that ooze oil and gas instead of water). Whereas freshwater springs are fed by underground pools of water, oil and gas seeps are fed by natural underground accumulations of oil and natural gas. Natural oil seeps are used in identifying potential petroleum reserves. *(Global Marine Oil Pollution Gateway)*

How Seeps Spread
Seeps release gas as bubbles or oil and gas as oily bubbles or oil as droplets that rise through the water column (*bubbleology.com*).



This photo shows gas bubbles from the tar seeps in the Coal Oil Point area near the underwater seep tents. http://www.mms.gov/omm/pacific/enviro/submarine-oil-seep-study/submarine-seeps.htm

Viewed at the sea surface, seeps range from being so diffuse that they are undetectable to appearing on the surface as areas of effervescence or boiling, measuring 1 to 10 meters in diameter. [6] A large amount of seepage takes the form of gas bubbles that emerge from the seafloor, carrying a thin coating of oil on their surfaces. Seepage also occurs as discrete oil droplets and as tar that oozes out and forms tar mounds on the seafloor. *(Santa Barbara County Energy Division)*

How Seeps Pollute
The Ocean/The Air
To understand the impact of seeps on the environment and global climate requires significant interdisciplinary advances in a range of areas. These include spatial and temporal distributions of seep emissions globally, bubble and bubble plume processes, the interaction of currents and winds and waves with seep plumes and surface oil slicks, multiphase migration through fractured rocks and faults, and improvement in numerical

modeling efforts. Additionally, seeps provide a bioavailable energy source, which supports chemosynthetic communities, but the carbon cycle pathways are just beginning to be understood. Fortunately, recent studies are rapidly increasing our knowledge and understanding *(bubbleology.com)*.

The Ocean: As seep bubbles rise to the ocean surface, substantial amounts of hydrocarbons dissolve in the water column, forming a subsurface gradient of dissolved hydrocarbons, principally methane. As the hydrocarbon-rich zone spreads out, methane concentrations decrease due to dilution and probably outgassing to the atmosphere. Part of the dissolved fraction may be carried hundreds of kilometers out to sea. Oil slicks of varying thickness form on the sea surface and spread out under the influence of wind and currents. As the oil loses its lighter fractions and undergoes weathering, some of it sinks to the ocean floor, some is dispersed by wave agitation into the water column, and some eventually washes up on shore or sticks to rocks near the high tide line (*Santa Barbara County Energy Division)*.

Even though the quantities released are comparable, there are differences in the impacts from the pollution from single-event, catastrophic oil spills and ongoing, chronic natural gas and oil seeps. However, many researchers use natural seep areas as living laboratories for the study of the fate and effects of oil spills.

It is also worth noting that there is the potential for earthquakes to account for unusually large flows from some seeps (Levorsen 1967). Following the 1971 San Fernando Valley earthquake, several of the previously inactive oil seeps in the area resumed activity. (Mandel 2004)

The Air: The remaining seep bubbles that do not dissolve continue to the surface and burst, releasing the gaseous components to the atmosphere. The more volatile liquid seep constituents soon enter the atmosphere by evaporation *(SB County Energy Division)*. Air pollution caused by the natural seeps is related to the amount of reactive hydrocarbons contained in the seep gas that escapes from the ocean floor and rises to the surface like carbonated soda bubbles. These hydrocarbons, known as reactive organic compounds (ROC), react with sunlight to create smog. Hydrocarbon seeps comprise the largest source of marine methane emissions. (Judd and Hovland 1992)

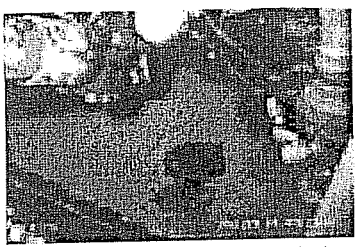
How Seeps Impact Santa Barbara

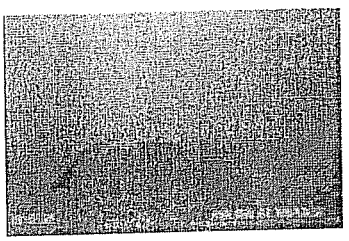
Huge, natural seeps have been spewing oil and gas into the Santa Barbara Channel for centuries. According to the Minerals Management Service (MMS) and other sources, the resulting tar was used by the Chumash and other native populations for water-proofing baskets and pitchers and for caulking small boats. Early California pioneers (circa 1850) used the oil from natural seeps to grease their wagon wheels and settlers and ranchers,

especially in the Santa Barbara, Ventura, Los Angeles, and Orange county areas, used seeped oil for lubricating farm machinery, for tarring roofs, and for illumination.

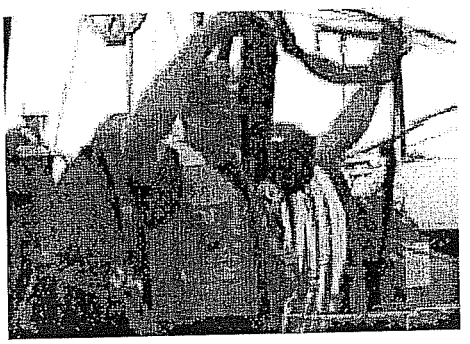
Scientists have been studying the effects of the intense offshore oil and gas seepage in the Santa Barbara Channel since the 1940s. Studies have shown that seeps are a major source of pollution in Santa Barbara County. Click here to see striking photographs taken during MMS studies of the seeps offshore Santa Barbara.
http://www.mms.gov/omm/pacific/enviro/submarine-oil-seep-study/submarine-seeps.htm

Tar seeps visible from the surface at Gaviota come from seeps that resemble flat patties on a predominately sandy ocean floor.





Tar "whips" on the ocean floor (left) break off and float to the surface



Heading: Seep Impacts

Sub Heading: Ocean

Hydrocarbon seepage from the world's continental shelves affects ocean chemistry. Methane bubbles dissolve other gases, notably hydrogen sulphide and carbon dioxide, during their ascent. Under suitable temperature-pressure conditions, gas hydrates may be formed close to or at the seabed. Black sulphide-rich sediments and mats of sulphur oxidizing bacteria are frequently observed close to the sediments surface at seep sites, where there might be a sharp oxygenated/anoxic boundary (Dando and Hovland 1992).

Beach

The natural oil and gas seeps beneath the Santa Barbara Channel cause oil to drift to the ocean's surface, producing a persistent oil slick that's usually carried north and west by ocean currents, generally coming ashore between Santa Barbara and Gaviota. As the oil rises to the surface and floats, it coagulates and biodegrades into tar. This is the same tar that is found on the beaches along the Santa Barbara coastline.

As a result of weather and ocean conditions, the greatest amount of tar appears on Santa Barbara beaches during the summer months. The amount of tar that ends up on the beach is also affected by wave activity, since high surf conditions tend to break up the oil slick and prevent it from reaching the beaches.

To the dismay of local beach-goers, sticky globules of tar lap up onto our coastline every day. This tar is an annoyance to many of us and is often perceived to be a man-made pollutant. In fact, the tar results from huge, natural seeps that have been spewing oil and gas into the Santa Barbara Channel for centuries.

The natural oil and gas seeps beneath the Santa Barbara Channel cause oil to drift to the ocean's surface, producing a persistent oil slick that's usually carried north and west by ocean currents, generally coming ashore between Santa Barbara and Gaviota. As the oil rises to the surface and floats, it coagulates and biodegrades into tar. This is the same tar that is found on the beaches along the Santa Barbara coastline.

As a result of weather and ocean conditions, the greatest amount of tar appears on Santa Barbara beaches during the summer months. The amount of tar that ends up on the beach is also affected by wave activity, since high surf conditions tend to break up the oil slick and prevent it from reaching the beaches.

The most heavily impacted beaches are those between Goleta Point and El Capitan Beach, although wind and currents oftentimes take the oil slick northeast onto Santa Barbara city beaches and as far away as Los Angeles beaches. Surprisingly, scientific evidence indicates that the Coal Oil Point seeps are responsible for half of the tar that washes up on the Los Angeles County beaches.

Marine Wildlife

Our coastal waters are home to rich and diverse marine environments. Point Conception is often identified as the transition point between two biogeograhic provinces: the colder Oregonian Province and the warmer California Province. Because of the confluence of these two bioregions, the areas offshore Santa Barbara support a great diversity of marine species, many of which are extremely rare and afforded special protection under federal and state law. These include over 195 species of birds that use the open water, shore, or island habitats in the area; at least 33 species of cetaceans; 7 species of pinnipeds; and the southern sea otter. All can be negatively impacted by oil pollution.

Oil pollution, in general, can have a smothering effect on marine life, fouling feathers and fur. It is a toxic poison that birds and mammals often ingest while trying to clean themselves. Fish absorb it through direct contact and through their gills. The fumes and contact with oil can also cause nausea and health problems for people in affected areas and influenced by weather, temperature and wind.

Even when the oil does not kill, it can have more subtle and long lasting negative effects. For example, it can damage fish eggs, larva and young – wiping out generations. It also can bio-accumulate up through the food chain as predators (including humans) eat numbers of fish that have sub-lethal amounts of oil stored in their bodies.

Although seep-related fatalities are rare, low-level hydrocarbon exposure might be a significant stressor for animals living in seep areas. Systemic poisoning from chronic exposure could weaken the animals, making them more vulnerable to disease and other perils, including oil spills *(SB County Energy Division).*

Marine Mammals: The natural oil seeps in Santa Barbara's Channel produce a persistent oil slick on the ocean's surface. It is the same oil that is extracted from formations in the area.

The lethargic behavior of oiled seals following the Exxon Valdez oil spill was not attributed to blanketing effects from a catastrophic spill, but rather to brain damage from inhalation of volatile fumes, since they breathe just above the water's surface. This was suggested as being especially threatening with less weathered oil on the calm waters and on haulouts early in the spill (Parks Canada 1999). The seeps at Coal Oil Point provide a constant supply of fresh oil and associated volatile fumes in an area frequented by harbor seal and other pinnipeds.

Recent studies on possible effects of oil on marine mammals have focused on the behavioral effects, thermal effects, and physiological effects due to contact, inhalation, and ingestion of oil.

Fur-Bearing Marine Mammals (MMS.gov/omm/pacific/enviro/calseaotter.htm): Fur-bearing marine mammals such as sea otters and fur seals are especially vulnerable to the effects of crude oil.

Fur seal pups drown if oil sticks to their flippers or to their bodies, and when it sticks to their fur it reduces or destroys the insulation of their wooly fur (called lanugo) and causes hypothermia. Adult fur seals have blubber and would not suffer from hypothermia if oiled.

Sea otters are the marine mammals most sensitive to the effects of oil contamination since they do not have a layer of blubber to protect them from cold water. Therefore, they must maintain a layer of warm, dry air in their dense (300,000 hairs per square inch) under-fur to insulate against the cold. Oil compromises this protective coat and even a small oiled area of their fur can cause hypothermia and potentially death of the sea otter.

Gray Whales: Twice each year, from December to May, the population of the California, or eastern North Pacific, gray whale passes through southern California on its migration between breeding and calving lagoons in Mexico and summer feeding grounds off Alaska. During this journey, most gray whales stay close to the coastline and pass

through the Santa Barbara Channel and the Santa Maria Basin—areas where most of southern California's natural oil and natural gas seeps are located.

Studies have shown that cetacean skin is nearly impenetrable to even the highly volatile components in oil. However, the toxic, volatile fractions in fresh crude oils could irritate and damage cetacean soft tissues, such as the mucous membranes of the eyes and airways and the effects could be as severe as death in extreme cases.

Oil could also adhere to the fringed baleen plates that gray whales use to filter their food, blocking the flow of water and interfering with feeding. Gray whales are among the most vulnerable of the baleen whales to effects of ingesting oil-contaminated prey or bottom sediments since they are mainly bottom feeders

Birds: Oil can be especially harmful to our seabirds—particularly diving birds, which must get their nourishment by entering the water. In the case of species such as the common loon and western grebe, oil interferes with the bird's ability to maintain its body temperature by reducing or destroying the insulation and waterproofing properties of their feathers, which can result in death from hypothermia. They also lose body weight as their metabolism tries to combat low body temperature. Oiled birds also become easy prey, as they are unable to fly when their feathers are matted from oil.

Chronic, low-level pollution may have a greater effect on bird populations than episodic spills (Camphuysen 1989; Wiens et al. 1996). Also, oil is particularly threatening at locations where seabirds are attracted, such as continental shelf and upwelling areas and areas of other ocean processes that concentrate fish and plankton feed (Berger 1993 b). Therefore, the chronic nature of the continuing release of oil and Coal Oil Point and its location on the Continental Shelf make it a particularly threatening area for seabirds that frequent the Santa Barbara Channel.

When it comes to natural seepage, where crude oil bubbles up from the depths, the most common species to be found oiled and stranded on Malibu beaches is the grebe—Western and Clark's. One reason is that grebes float together offshore in "rafts," in the hundreds, even thousands... the State does not help rescue birds that are injured by natural seep... Lampert-Keene-Seastrand Oil Spill Prevention and Response Act that called for better response and protection of wildlife injured by petroleum products resulting in the creation of OSPR in the first place. In California, the International Bird Rescue Research Center bears the expense of these injured birds. Each year, 75 to 100 birds oiled by natural seeps survive to be admitted into one of two facilities and it is estimated that each bird, its care and feeding, costs an average of $200 each. (*Malibu Surfside News).*

Air Quality

Hydrocarbon Seeps are the Largest Source of Air Pollution in Santa Barbara County

The natural gas and oil seeps beneath the Santa Barbara Channel cause gas to escape from the ocean floor and float to the surface like carbonated soda bubbles, releasing methane, a potent greenhouse gas, into the atmosphere. This phenomenon may explain an important piece about the historical global warming cycles and provide new, essential information on current climate changes.

Santa Barbara County's air quality has historically violated both state and federal ozone standards. According to the county's 2007 Clean Air Plan, offshore natural gas and oil seeps is a major source of the county's air pollution and responsible for putting more than 22 tons of reactive organic gases into Santa Barbara's air every day. By comparison, all of the motor vehicle trips in Santa Barbara County produce 18 tons of hydrocarbons each day.

The seep oil that is emitted with the seep gas forms natural oil slicks on the ocean surface that rapidly evaporate and further contribute to air pollution in Santa Barbara County. [Journal of Geophysical Research, Vol. 104, NO. C9, pages 20,703-20,711, September 15, 1999]

The ROG emission rates from the Coal Oil Point seeps are a large source of hydrocarbon pollution in Santa Barbara County (equal to twice the emission rate from all the on-road vehicle traffic in the county in 1990.) In 1977 it was estimated that the Coal Oil Point seep field contains only half of the marine seeps in Santa Barbara County. The official Santa Barbara County Air Pollution Control District estimate of seep ROGs in the entire county was therefore too low by at least a factor of 4. Reaching EPA air quality attainment status in Santa Barbara County may require an effective means of containing or remediating the natural seeps. *[Journal of Geophysical Research, Vol. 104, NO. C9, pages 20,703-20,711, September 15, 1999]*

An estimate of current seepage for the entire Coal Oil Point offshore area suggests oil seepage is presently on the order of 20,000 – 30,000 liters/day and gas emission on the order of 1-2 x 105 m3/day. This includes emission of methane, a greenhouse gas (2.4-5 x 1010 g/year), and ROGs which are precursors to smog forming ozone (20-20 metric tons/day). This confirms the notion that seepage is a significant natural source of hydrocarbons in the local environment and strengthens the case that such processes may also be important at the global scale *(OCS Study / MMS 2003-2004: Coastal Marine Institute, Marine Science Institute, University of California – Santa Barbara)*

Air pollution: Air pollution caused by the natural seeps is related to the amount of reactive hydrocarbons contained in the seep gas that escapes from the ocean floor and rises to the surface like carbonated soda bubbles. These hydrocarbons, known as reactive organic compounds (ROC), react with sunlight to create smog. Hydrocarbon seeps comprise the largest source of marine methane emissions. [Judd and Hovland, 1992]

Methane Emissions: The addition of methane to the atmosphere can have the following negative impacts *(Wikipedia.org/Methane)*:

- Methane is a relatively potent greenhouse gas with a high global warming potential (i.e., warming effect compared to carbon dioxide).
- The major source of methane is extraction from geological deposits known as natural gas fields, which includes [offshore] natural gas seeps.

Methane and Global Warming ...

- Methane in the Earth's atmosphere is an important greenhouse gas with a huge global warming potential--1 ton methane emission will have 25 times the impact on temperature of a 1 ton carbon dioxide emission during the following 100 years.
- Methane has a large effect for a brief period (about 10 years), whereas carbon dioxide has a small effect for a long period (over 100 years). Because of this difference in effect and time period, the global warming potential of methane over a 20-year time period is far greater (25 times more) than that of carbon dioxide.
- Since 1750, the methane concentration has increased by about 150% and it accounts for 20percent of the total radiative forcing from all of the long-lived and globally mixed greenhouse gases.
- One source estimates the size of the methane hydrate deposits of the oceans at ten trillion tons (10 exagrams). Theories suggest that should global warming cause them to heat up sufficiently, all of this methane could again be suddenly released into the atmosphere. Since methane is twenty-five times stronger than CO2 .
- At high pressures, such as are found on the bottom of the ocean, methane forms a solid clathrate with water, known as methane hydrate. An unknown, but possibly very large quantity, of methane is trapped in this form in ocean sediments. The sudden release of large volumes of methane from such sediments into the atmosphere has been suggested as a possible cause for rapid global warming events in the earth's distant past, such as the Paleocene-Eocene thermal maximum of 55 million years ago.

PRESS RELEASE

DEPARTMENT LINKS
Public Affairs Office
Featured News
Press Release Archives
Featured News Archives
93106
Key Staff Contacts

OTHER NEWS LINKS
Points of Pride
Education News
Engineering News
Parent Newsletter
UC Newswire
UC-TV
Campus Topics
Featured Events
Academic Conferences
Coastlines
Daily Nexus
KCSB-FM

OIL AND GAS SEEPAGE FROM OCEAN FLOOR REDUCED BY OIL PRODUCTION

November 18, 1999

(Santa Barbara, Calif.) Next time you step on a glob of tar on a beach in Santa Barbara County, you can thank the oil companies that it isn't a bigger glob.

The same is true around the world, on other beaches where off-shore oil drilling occurs, say scientists, although Santa Barbara's oil seeps are thought to be among the leakiest.

Natural seepage of hydrocarbons from the ocean floor in the northern Santa Barbara Channel has been significantly reduced by oil production, according to two recently published peer-reviewed articles, one in November's Geology Magazine, the other in the Journal of Geophysical Research - Oceans.

The Santa Barbara Channel provides an excellent natural laboratory, as it is among the areas with the highest levels of seepage in the world, said co-author Bruce P. Luyendyk, professor and chair of the Department of Geological Sciences at the University of California, Santa Barbara.

The studies were not funded by oil companies, but rather by the University of California Energy Institute and the U.S. Minerals Management Service, states Luyendyk, responding to the fact that the results favor off-shore oil production and are opposed by some environmentalists.

"We've done a good piece of science," said Luyendyk. "We've developed a good understanding of a natural process. It's all public data; it's all straightforward. If I thought the study was compromised I wouldn't be involved in it."

Most of the seepage is methane, a potent greenhouse gas which escapes into the atmosphere, said Luyendyk. About 10 percent of the seepage is composed of "higher hydrocarbons," or reactive organic gases which interact with tailpipe emissions and sunlight, creating air pollution.

The researchers state that the production rate of these naturally-occurring reactive organic gases is equal to twice the emission rate from all the on-road vehicle traffic in Santa Barbara County in 1990.

According to the articles, studies of the area around Platform Holly showed a 50 percent decrease in natural seepage over 22 years. The researchers show that as the oil was pumped out the reservoir, pressure that drives the seepage dropped.

"If the decrease in natural seepage found near Platform Holly is representative of the effect of oil production on seepage worldwide, then this has the potential to significantly alter global oil and gas seepage in the future," state the researchers in the article "The World's Most Spectacular Marine Hydrocarbon Seeps: Quantification of Emissions " in the Sept. 14 issue of the Journal of Geological Research - Oceans.

CONTACTS
Gail Brown
805-893-7220
Lillian Kurosaka
805-893-4620

UTILITIES
E-mail This Story
Print-Friendly Version

They continue, "For example if the 50 percent reduction in natural seepage rate that occurred around Platform Holly also occurred due to future oil production from the oil field beneath the La Goleta seep, this would result in a reduction in nonmethane hydrocarbon emission rates equivalent to removing half of the on-road vehicle traffic from Santa Barbara County. In addition, a 50 percent reduction in seepage from the La Goleta seep would remove about 25 barrels of oil per day from the sea surface, which in turn would result in a 15 percent reduction in the amount of tar found on Santa Barbara beaches."

They conclude by saying that the rate of increase of global methane atmospheric concentrations has been declining for the past 20 years, and that a "worldwide decrease in natural hydrocarbon seepage related to onshore and offshore oil production may be causing a global reduction in natural methane emission rates."

###

(124)

SANTA BARBARA NEWS-PRESS

— MONDAY, JUNE 2, 2008 —

Oil, gas seeps fouling Santa Barbara Channel

Panel of experts weighs in on possible solutions

By JEREMY FOSTER
NEWS-PRESS STAFF WRITER

When Dr. Bruce Luyendyk, professor of marine geophysics at UCSB, showed a current aerial view of the Santa Barbara Channel at a recent town hall meeting, the audience was surprised to see its beaches looking anything but pristine.

Along the channel was contamination caused by seeps — areas where oil and gas deposits rise up through rock fractures beneath the seabed — which appeared as black oblong shapes in the coastal waters.

One of the consequences of seeps is an iridescent sheen on the water, wherever a thin film of oil is present. Oil also washes up along the shorelines as tar balls.

About 100 people showed up for the public forum "Oil in the Channel: Contentious Solutions" on Saturday afternoon at the Santa Barbara Museum of Natural History. Moderated by award-winning filmmaker Mike DeGruy, the discussion was led by a panel of experts who weighed in on what — if anything — should be done about the seeps. Opinions were diverse, and the discussion spirited.

Dr. Luyendyk, one of a handful of researchers at UCSB studying Coal Oil Point seeps, gave a brief presentation on the history of seeps and their impact on the environment.

He traced the discovery of seeps, all the way back to 5000 B.C., to the Chumash Indians, who used tar from seeps to waterproof canoes, baskets and water bottles, and to make tools and jewelry. In 1792, British explorer George Vancouver was one of the first to log oil slicks in the Santa Barbara Channel. His and other explorers' discoveries led to the first offshore oil production in the U.S., along the coastline of Summerland, in 1896.

In 1941, oil seeps were first documented in Coal Oil Point. Soon after, studies of these fissures in the ocean floor began rolling out of academia.

What scientists have learned since, Dr. Luyendyk said, is that seeps — not offshore oil spills — are responsible for most of the oil mucking up the beaches along the Santa Barbara Channel.

For example, he added, seeps off Coal Oil Point near UCSB put an average of 4,200 gallons of oil into the ocean every day.

To put that number in perspective, Dr. Luyendyk noted that in a span of "five or six years" the amount of oil that comes out of these seeps equals "an Exxon Valdez oil tanker spill," the disaster that dumped 10.8 million gallons of oil into the Gulf of Alaska in 1989.

And oil is not the only thing seeping from the seabed. Natural gas bubbles up from the same fissures — approximately 100,000 cubic meters per day.

"That translates into about 3 million cubic feet a day," Dr. Luyendyk said. "Your typical household uses 250 cubic feet of gas a day."

Bruce Allen, a physicist, was on hand representing a local group called SOS (Stop Oil Seeps) California, whose chief concern is the seepage from the ocean floor and the pollution it creates in the environment.

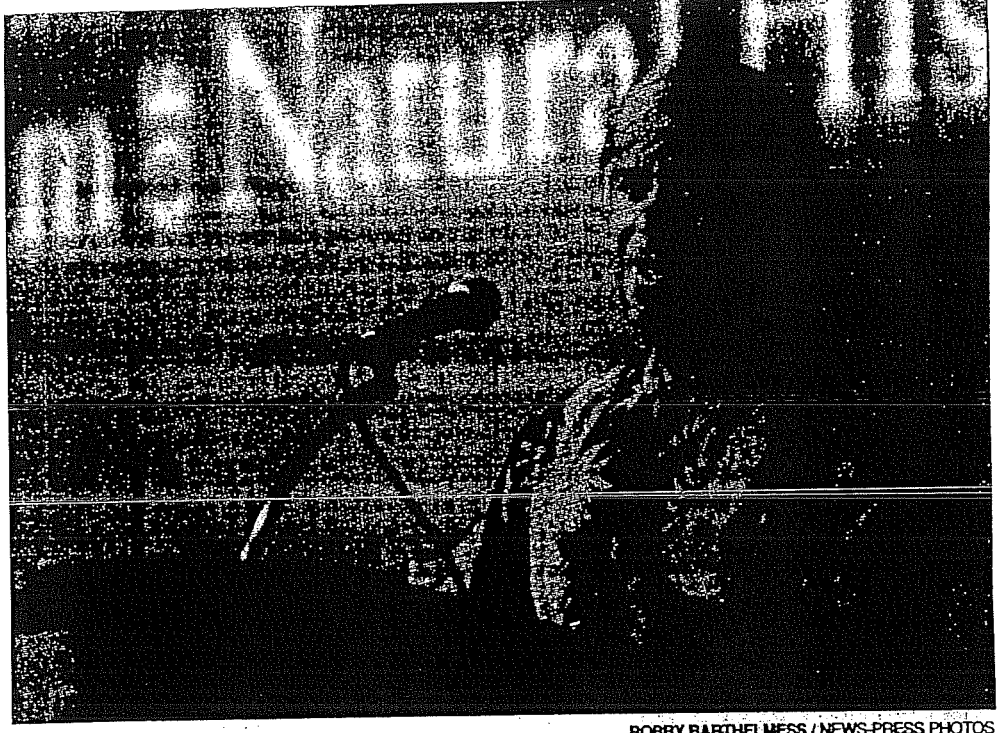
For an environmental group, his organization advocates an unorthodox way to deal with the seeps.

The orthodox way, some would say, is getting oil rigs out of the ocean.

"There is significant evidence oil extraction can reduce oil seepage," he said, referring to a 1999 UCSB study that found links between offshore oil production and decreased seepage.

Dr. Allen alluded to research suggesting that offshore oil spills are responsible for less contamination than natural oil seepage, and encouraged people to be more open-minded to the idea of extracting oil from the ocean as part

Please see **SEEPS** *on* **A8**



ROBBY BARTHELMESS / NEWS-PRESS PHOTOS

Mike DeGruy speaks to the crowd at the Natural History Museum during Saturday's public forum, "Oil in the Channel: Contentious Solutions."

Underwater leaks pollution source

SEEPS

Continued from Page A1

of an effort to reduce oil contamination of the environment.

"The public is unaware of the magnitude of natural seep pollution," he said. "They don't garner the same attention major oil spills do and that's something we want to educate the public about."

"There's a potential synergy we can take advantage of. We can reduce dependence on foreign oil, reduce tanker traffic, expand on alternative energy and clean up the environment."

Expanding oil production through offshore drilling, he said, would generate $1.6 billion a year for California, and $330 million a year for Santa Barbara County alone.

"In three and a half years we could afford to build a solar thermal farm and provide electricity for every resident in the county of Santa Barbara," he said, "and to provide (every resident) in four years a $10,000 credit to buy a hybrid vehicle."

Michael Chiacos, energy program senior associate for the Santa Barbara-based Community Environmental Council, brought a different perspective to the discussion.

"We need not invest in energy of the past," he said, "which any oil executive will tell you we're going to run out of. We need to stop hunting and gathering for the little pockets of wind, solar, geothermal energy."

Mr. Chiacos said mounting more oil platforms in the ocean is a "supply-focused" strategy. And the supply of oil, he said, will eventually run out. "We can't drill our way out of this problem," he insisted.

"I'd like to propose the main source of oil that we have in our county is actually beneath our feet, not in the ground but in our conversation and efficiency," Mr. Chiacos continued. "Europeans use half the petroleum that Americans use on a regular basis. And we know what a great county Italy or France is."

Characterizing his position on how to deal with the oil seeps as neutral, Dr. John Day, a planner with the Santa Barbara County Energy Division, warned of comparing natural oil seepage to oil spills.

"Oil seeps have relatively little impact, and spills can be absolutely devastating," he said.

Dr. Day argued that natural oil and gas from seeps are released gradually, allowing the currents and natural mixing to dilute their concentrations.

The impact of a major spill, however, can blanket the sea surface of a large area with fresh oil, he noted. Unlike oil and gas seepages, large oil spills kill large numbers of animals including sea birds and marine mammals, he added.

Mr. Chiacos added: "A solar panel on your roof is not going to cause a great deal of harm, whereas if you [illegible] as we saw in 1969, it can have devastating impacts on our environment."

Dr. Day also questioned the idea that increasing oil extraction is linked to decreased seepage. He acknowledged that seepage rates near Platform Holly, an offshore rig in the Santa Barbara Channel operated by Venoco Oil Company, have declined significantly since 1973, but said supporting a hypothesis and proving one are two different things.

"You can't say anywhere you drill you're going to reduce seepage," Dr. Day said. "It depends on the location of area being drilled, how many faults it has and how fractured it is. Just because in one case you have a reduction in one area doesn't mean you can extrapolate from that a categorical rule," he said.

Despite those arguments, Dr. Allen said new technology was making oil extraction environmentally safer. He also reiterated his point that the money raised from oil extraction expansion would give us the financial means to wean ourselves off fossil fuels and move toward Mr. Chiaco's society of conservation and alternative energy.

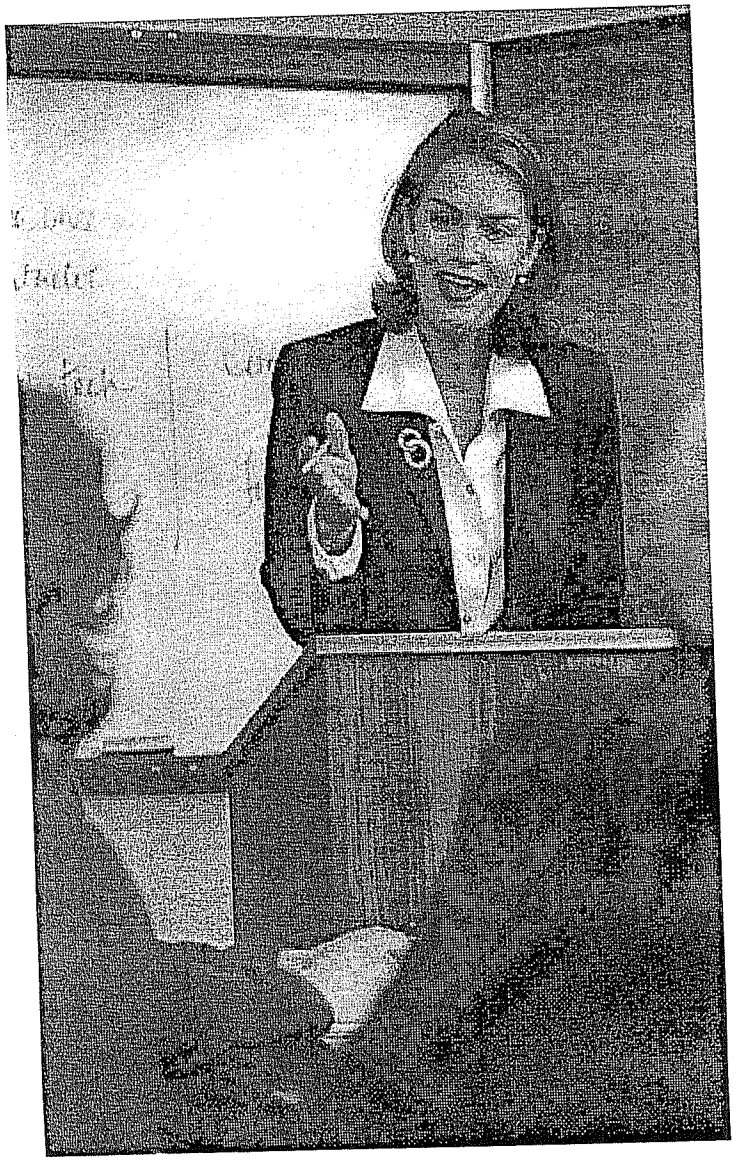
Dr. Day remained skeptical.

"The Energy Division is concerned about doing adequate environmental review. My analysis on oil seeps and oil spills is that there is that there is a greater risk from oil spills," he said. "And it's up to the community to decide whether that risk is worth it."

e-mail: jfoster@newspress.com


SOS California
Stop Oil Seeps
soscalifornia.org


OUR MISSION
SOS California is a nonprofit organization dedicated to reducing the environmental impact of natural gas and oil seep pollution upon our ocean, our beaches and our air quality.

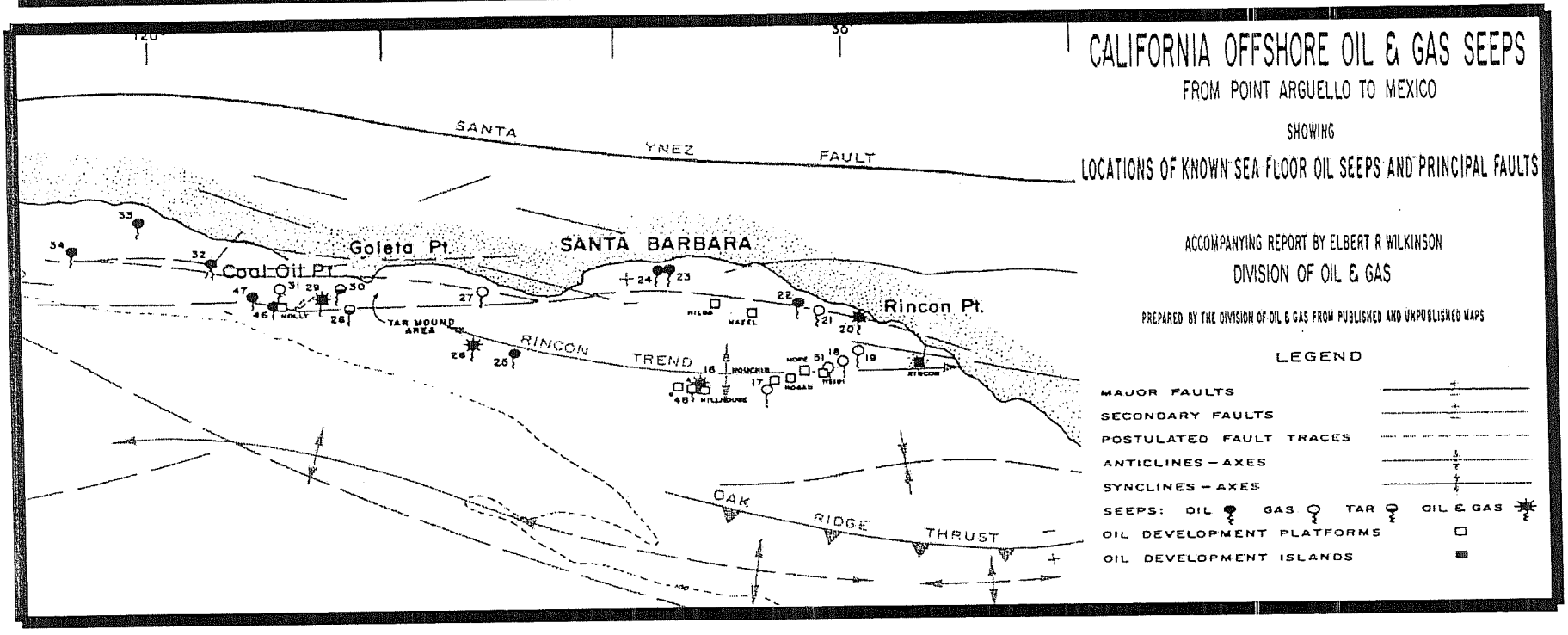


OUR CHALLENGE:

Can deeply entrenched beliefs be changed by up-to-date science, facts and education?

THE PUBLIC IS UNAWARE OF THE MAGNITUDE OF NATURAL SEEP POLLUTION

SB SEEPS + FAULT LINES

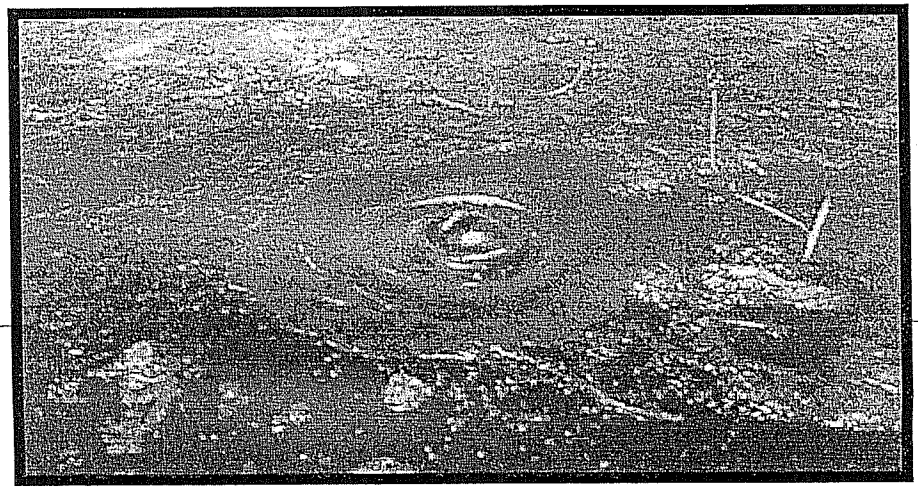


2,000 active natural seeps lie below fault lines along California Coast

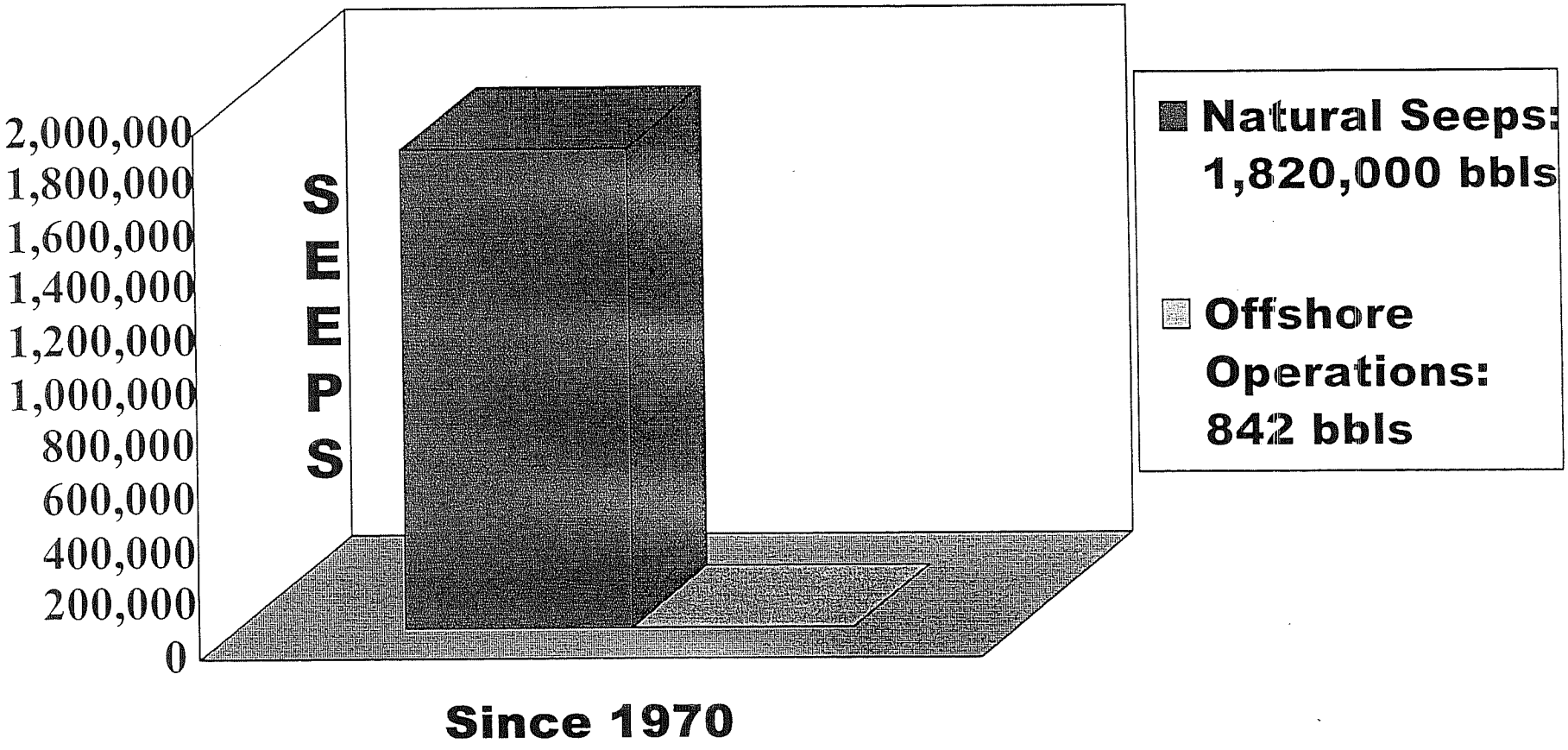
Earthquakes can also expand sea floor fissures, releasing additional quantities of trapped oil

Offshore Santa Barbara Has the Second Largest Marine Oil Seeps in the World

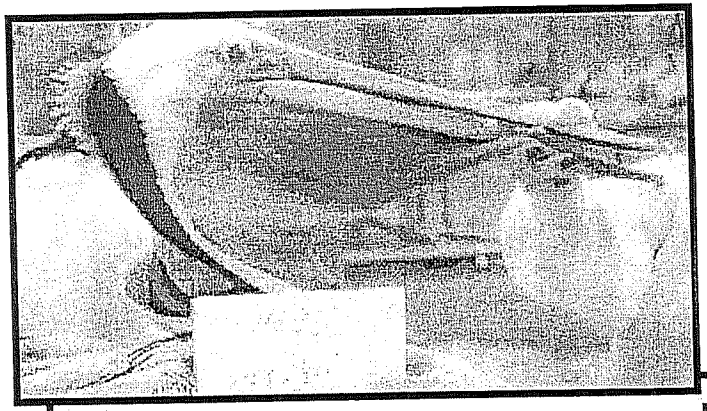
Every day our coastal environment is being polluted by natural oil seeps at the rate of approximately 10,000 gals/day or...



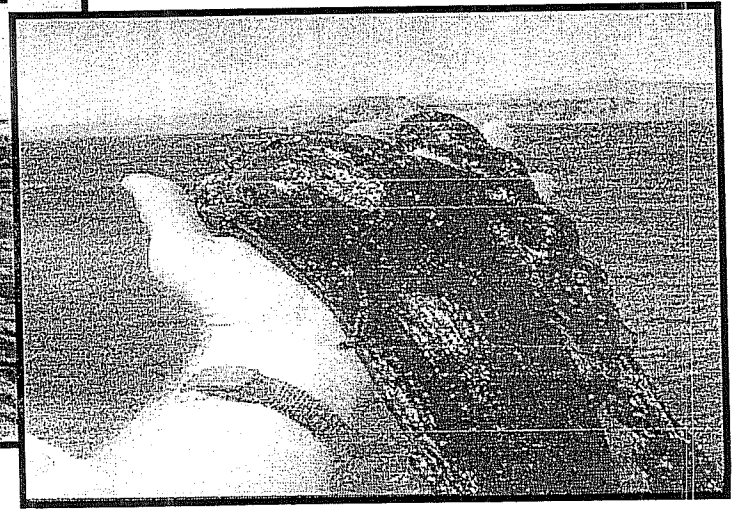
SB COASTAL WATERS POLLUTION SINCE 1970



EVERY 12 MONTHS:
40,000- 80,000 BARRELS OF OIL

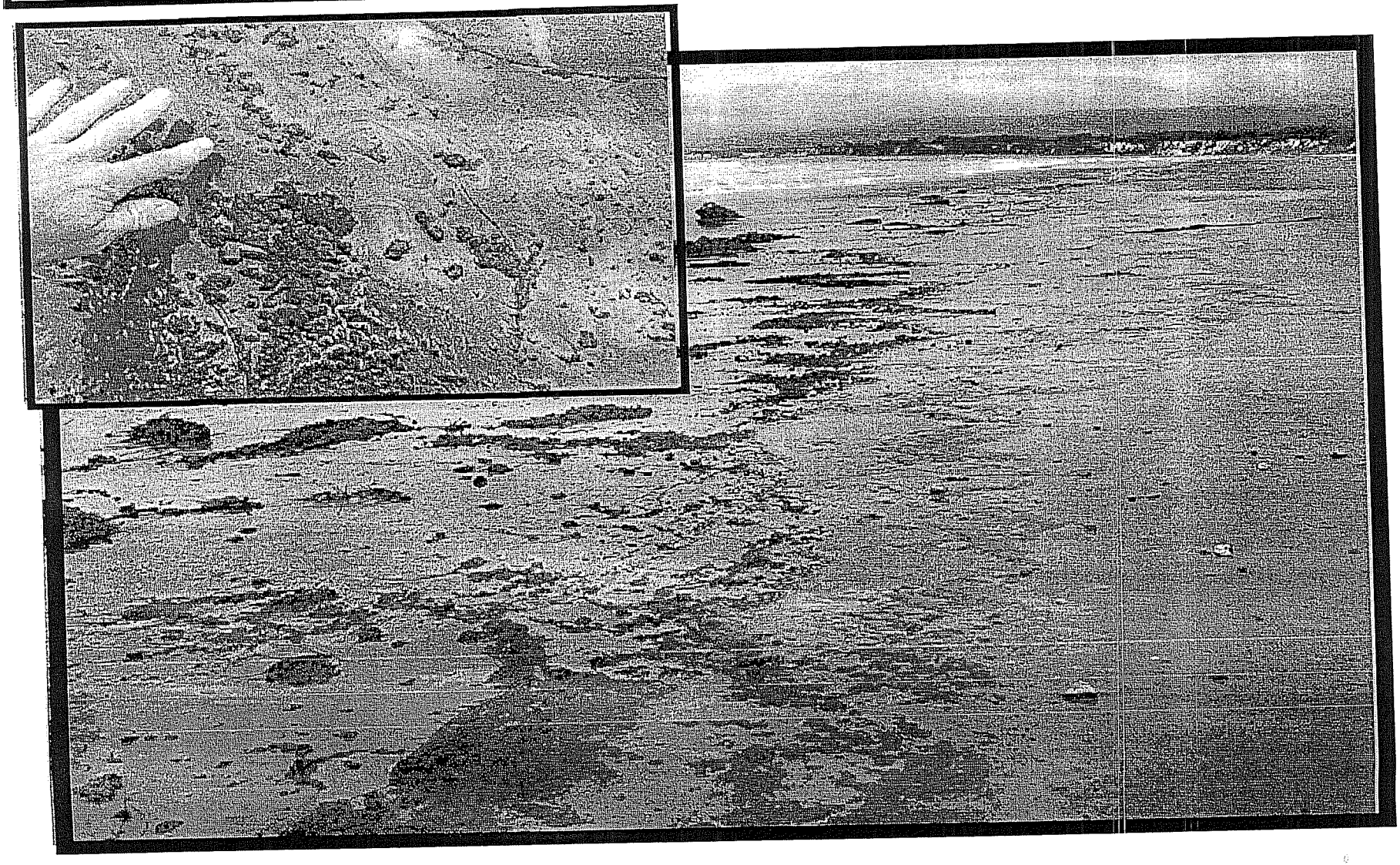


The Quantity of Santa Barbara Oil Seepage Since 1970 Equals ~31 "1969" Oil Spills

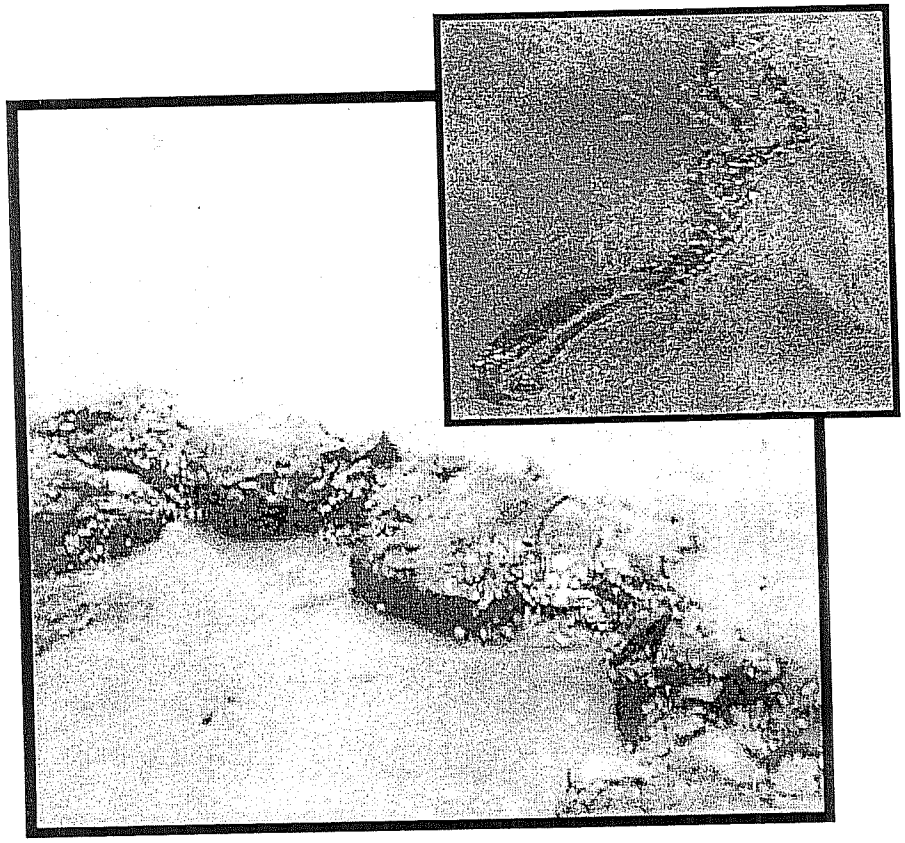


Santa Barbara Natural Oil Seepage Equals Exxon Valdez Spill Every 4 Years

NATURAL SEEPAGE TAR ON OUR BEACHES-
Santa Barbara's Coastline Is Not Pristine



SB Natural Offshore Seeps Pollute Beaches from Los Angeles To Monterey



55% of the Tar that Washes Up on the LA County Beaches Comes From Santa Barbara Offshore Seeps

Santa Barbara Oil Seeps Even Pollute Monterey County Beaches

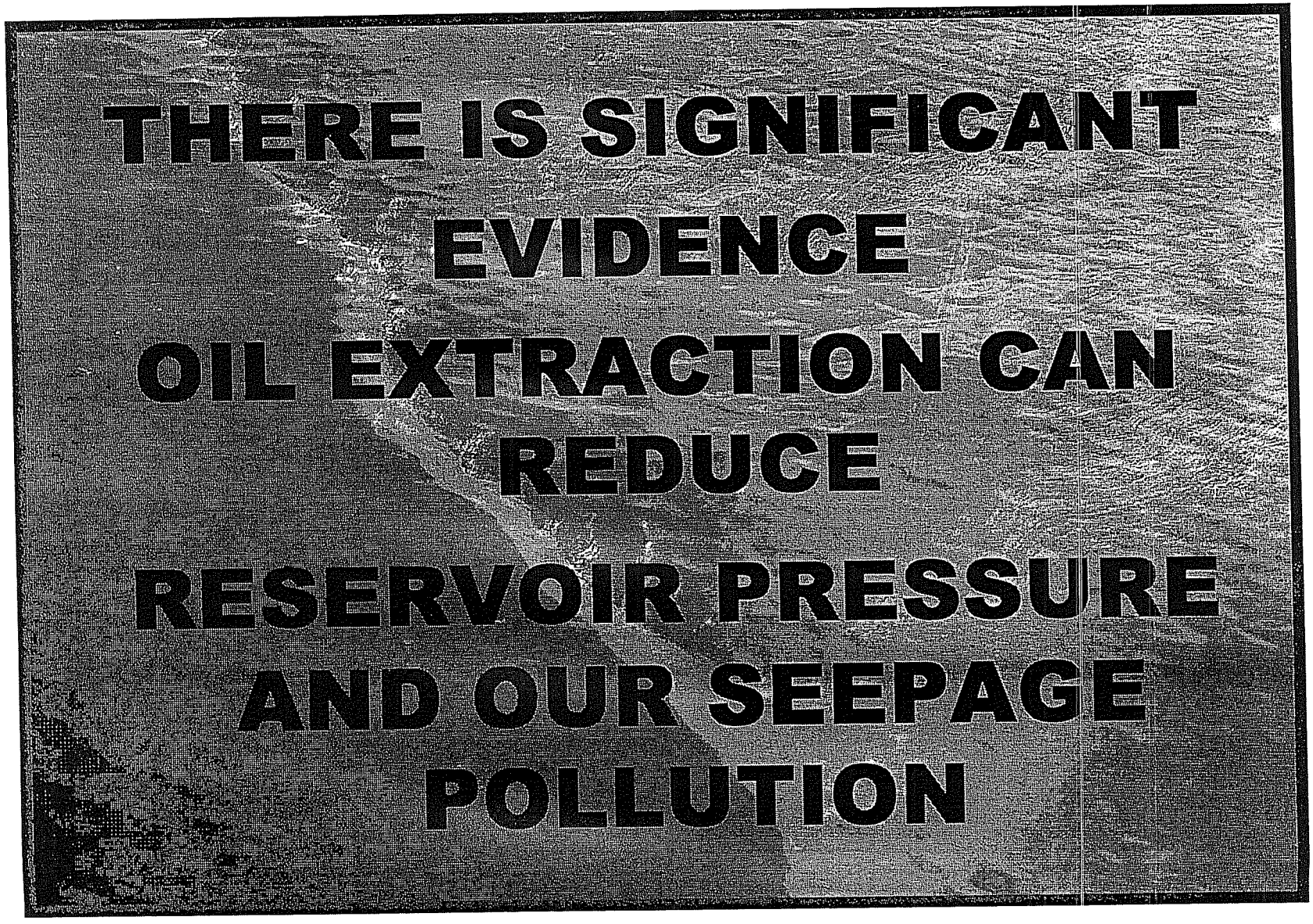
[Journal of Geophysical Research, Sept. 15, 1999, Vol. 104, No. C9, pgs. 20,703-20,711]

SANTA BARBARA COUNTY AIR QUALITY FACTS

- **Santa Barbara's air quality historically violated state and federal standards. Strict regulations enforced to reduce man-made sources of air pollution**
- **Reactive organic compounds (ROC) are a significant pollutant source contributing to formation of SMOG**
- **Offshore seeps contribute approximately 6,075 tons per year of ROC's to Santa Barbara's air pollution**
  - **All transportation vehicles in SB County contribute about 4,000 tons**

[Ref. SB Air Pollution Control District - 2007 Clean Air Plan]

Is There a Way Forward to Reduce Coastal Seepage Pollution While Safely Producing More Energy and Significantly Increasing Funding for Renewable Energy in California


THERE IS SIGNIFICANT
EVIDENCE
OIL EXTRACTION CAN
REDUCE
RESERVOIR PRESSURE
AND OUR SEEPAGE
POLLUTION

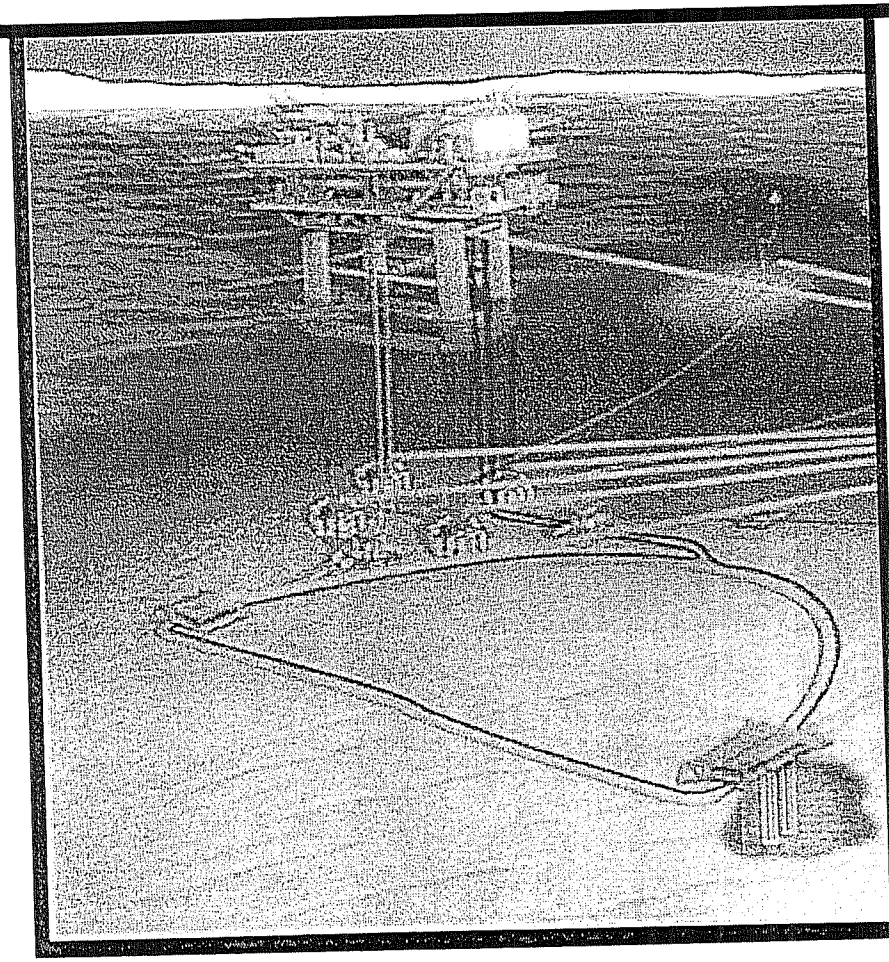
UCSB UNIVERSITY OF CALIFORNIA, SANTA BARBARA

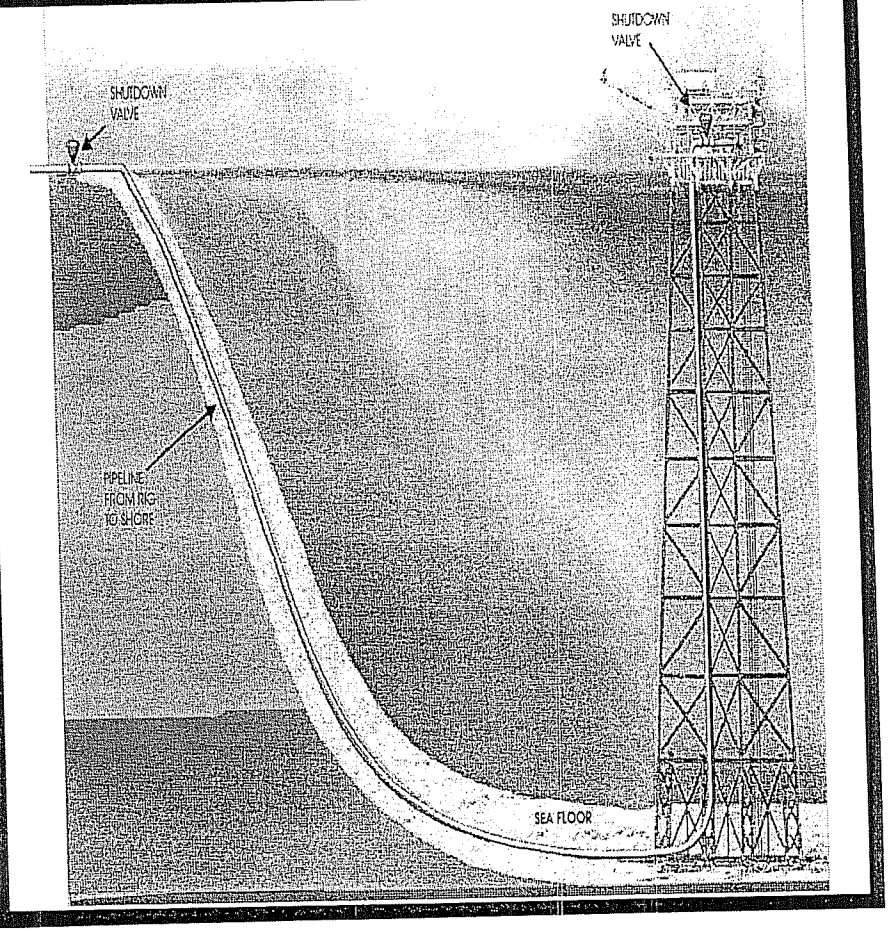
PRESS RELEASE: November 18, 1999

- **Peer Reviewed Studies- November 1999 Geology Magazine & Journal of Geophysical Research- Oceans**
- **"Natural seepage of hydrocarbons from the ocean floor... has been significantly reduced by oil production."**
- **"Studies of the area around Platform Holly show a 50% decrease in natural seepage over 22 years"**
- **If oil was pumped out of the La Goleta Seep, researchers state that there would be "a reduction in non-methane hydrocarbon emission rates equivalent to removing half of the on-road vehicle traffic from Santa Barbara County."**

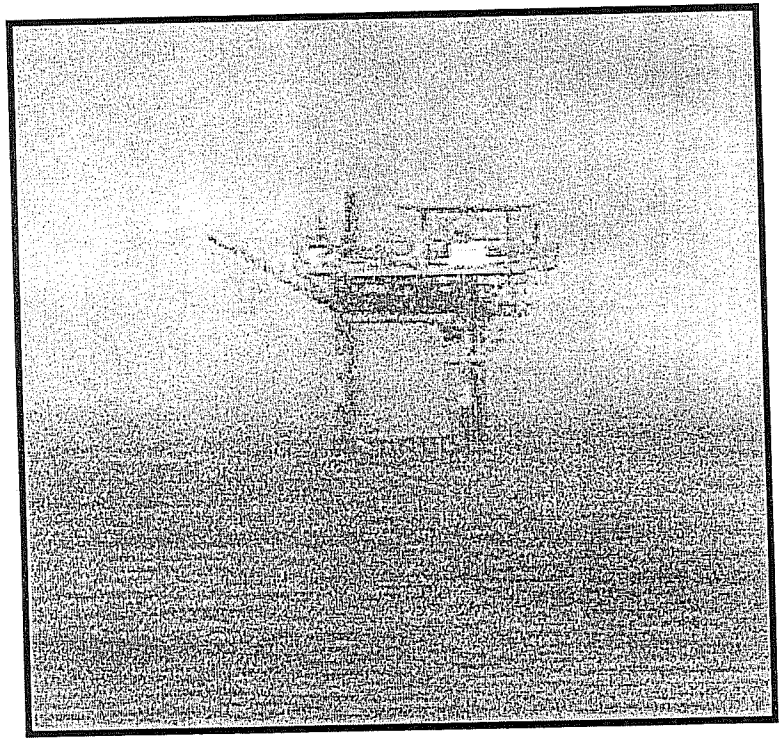
[excerpts from www.ia.ucsb.edu/pa/display.aspx?pkey=412

OFFSHORE FAIL-SAFE MECHANISMS





HURRICANES KATRINA & RITA:
100-YEAR STORMS



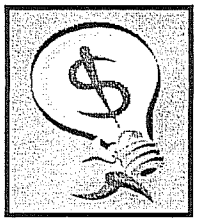
- 97% of 4,000 platforms survived
- No deaths or injuries to 30,000 offshore workers
- No significant spills from any offshore facility

NO SHORELINE OR WILDLIFE IMPACTS

POTENTIAL BENEFITS FROM REDUCING SANTA BARBARA SEEPS and SAFELY INCREASING OFFSHORE OIL EXTRACTION . . .

POTENTIAL BENEFITS

- **Permanent Reduction in Marine Hydrocarbon Pollution- Cleaner Ocean Waters & Beaches, Cleaner Air**
  - **Healthier Environment For Sea Mammals, Birds, Marine Life, People and California Coastline**
- **Increased Oil and Gas Resources and Revenue For California**
  - **Less Dependence on Foreign Oil and Lower Gas Prices**
  - **Dedicated Revenue to Fund Significant Permanent Solar and Other Renewable Energy Sources**
  - **Money For Environmental and Education Programs**
- **Reduction in Coastal Oil Tanker Traffic and More CA Clean Natural Gas at Lower Prices**



POTENTIAL BENEFITS

- **MMS 2006 Estimate For Pacific OCS Exceeds 13 Billion Barrels Oil & Gas**

- **Approximately 1.5-2.0 Billion BOE Potential From Already Discovered But Undeveloped Offshore Santa Barbara Fields. Discovered Fields Could Be Placed Safely into Early Production if Moratorium Lifted.**

- **If Previous Discovered 1.8 Billion Barrel Oil Fields Placed Into Production- Would Cut California Oil Imports by 50%**

- **State Oil & Gas Royalty Revenue Bonds Could Fund Solar Electricity Conversion & EV/Plug-in Cars Years Prior to Start of Actual Oil Production**

- **Large California Royalty Revenues Fund Solar Thermal Electricity Farm Subsidies, Photovoltaic Rebates, Wind Power and EV/Plug-in Hybrid Rebates**

    - $42 Billion* in CA Royalties Could Fund ~16 Gigawatts of New Solar Thermal Electricity Supplying More Than 50% of California Households.

    - More EV/Plug-in Hybrids Powered By Solar Electricity Would Further Cut California Dependence on Foreign Oil and Tanker Traffic, Reduce Gasoline and Natural gas Prices, Provide Cleaner Air and Reduce Corn Ethanol Demand

* Production of 1.8 Billion Barrels over 25 years @ $125/barrel

IF YOU WANT

Cleaner Air And Water

More Energy Independence

More Revenue To Fund Renewables

Less Tar On The Beaches

A Cleaner Ocean / Shoreline Habitat

Join Us- Get Involved - Make A Difference...

64 MW Acciona Solar Thermal Plant

DIFFERENCE! GET INVOLVED...MAKE A DIFFERENCE! GET
INVOLVED... MAKE A DIFFERENCE! GET INVOLVED...MAKE

JOIN OUR GRASSROOTS MOVEMENT!

INVOLVED MAKE A DIFFERENCE! GET INVOLVED...MAKE A
DIFFERENCE! GET INVOLVED...MAKE A DIFFERENCE! GET
INVOLVE ...MAKE
A DIFFERE NCE! GET
INVOLVE ...MAKE
A DIFFERE NCE! GET
INVOLVE ...MAKE
A DIFFERE NCE! GET
INVOLVED... MAKE A DIFFERENCE! GET INVOLVED...MAKE
A DIFFERENCE! GET INVOLVED...MAKE A DIFFERENCE! GET
INVOLVED...MAKE A DIFFERENCE! GET INVOLVED...MAKE

SOS
California
www.soscalifornia.org

THE BRIDGE TO OUR RENEWABLE FUTURE!

LETTERS TO THE NEWS-PRESS ABOUT FUEL COST

I'd like to comment about Rep. Lois Capps and some of our government leaders expressing disappointment over President Bush's proposal to lift the moratorium on offshore oil drilling along the coast of California and other coastal states.

While I agree America should invest in other fuel choices and technologies for the future, it's apparent our "courageous leaders" would rather just talk about it, watching millions of Americans pay for many years of indecision at the gas pumps while they ride out their terms in office making high salaries with great benefits until they retire to a fat pension.

For years, Mrs. Capps voted no to oil drilling off our coast, even though the oil companies have nt millions of dollars meeting safety demands of environmentalists to make it as safe as is possible. New technologies developed for safety drilling and delivering oil from off-shore is huge and our fanatical environmentalists are more interested in saving the much-alive snowy plover than providing us the means to maintain our livelihoods.

She'd have you believe America is not well-respected in other countries and that leaders like her know what's best for us. It's no wonder these are the same leaders who tell us Mr. Bush went into Iraq for one reason, the oil. Then where is it, and why are we not using it? It galls me to think other countries are drilling for oil off our coasts while we sit on our thumbs talking about future ways to save the planet.

How many safety systems do you think China and Thailand have incorporated into their drilling operations? Contact elected officials and complain.

Roy Belluz
Lompoc

I find it difficult to read or listen to comments about the price of gasoline. Basically, it's the law of supply and demand. As the largest and most wasteful country in regards to gasoline consumption, we now are paying for our low-mileage vehicles and the refusal of our politicians to open other areas for oil drilling.

You want to lower your gas bill? OK, drive less, car pool, take public transportation, follow all the tips on increasing your car's mileage, buy a car that gets more than 30 mpg, buy a bike or motor scooter. Quit whining and do something about it.

It's doubtful that gas will be cheaper in the future; if anything, it will be more expensive.

Why should we develop more of our own energy with off-shore drilling and in Alaska? Not to reduce today's cost of gas, instead to help ensure we even have gas supplies in the future 5, 10, 20 years from now.

If gasoline dropped to $3.50 per gallon, the smartest thing our politicians could do is add a 50-cent tax to get the price back over $4. That money could be used to fix our roads and bridges and provide funds for developing alternative energy sources. At the same time, it would persuade people to use less gas and buy more fuel-efficient cars.

We will be dependent on oil for the foreseeable future. Get used to it. Our problem in the future won't be the price of gas, it's whether or not we have enough.

Jim Christensen
Santa Maria

On June 19, the price of a barrel of oil went down by over $4. This was the direct result of action by speculators following news from China that the government there no longer would provide subsidies that artificially kept the cost low.

The speculators then speculated that the Chinese people would consume less and there'd then be reduced demand, thus bringing down the price.

The argument locally that opening new areas to oil production would not impact the cost of gasoline because of the years necessary to get new wells on line is false. When we make it a new policy to exploit our own resources like every other country, the speculation will then be that a new, large source of supply is in the pipeline, so to speak, and therefore, the price will be bid down, significantly.

Those same people who disingenuously argue that more supply or even discussion of it won't help relieve the current gas crisis are the same who claim there'd be a serious environmental impact. Hurricanes Rita and Katrina ripped loose and severely damaged dozens of rigs in the Gulf of Mexico, but not a drop of oil was spilled into the water. That is why using our spill in 1969 as exhibit A in the case against offshore drilling is such a canard. The technology is infinitely better with specific safety measures commonplace now that prevent spills under any scenario.

Further, drilling in the Santa Barbara Channel will have a net environmental benefit by reducing the natural seep that releases thousands of barrels a year into the channel. The sole cause of serious oil spills in the past 20-plus years have been accidents with ocean-going tankers.

There is no rational reason to oppose more drilling, just about anywhere.

Glenn Dorfman
Santa Barbara

SANTA BARBARA NEWS-PRESS

SUNDAY Voices

JUNE 29, 2008

Alternative energy is not Big Oil's job

Rather than do something productive to increase fuel supplies, Congress wastes time hunting bogeymen and fabricating distractions. Lately they have excoriated Big Oil for the cardinal sin of "under-investing" in alternative energy.

ExxonMobil "only spent $10 million on renewables last year," House Energy Independence Committee Chairman Ed Markey, D-Mass., moaned June 22 on ABC's "This Week."

"I am very angry, frankly, at the oil companies," presumptive Republican nominee, Sen. John McCain, R-Ariz., said June 12. "Not only because of the obscene profits they've made, but their failure to invest in alternative energy to help us eliminate our dependence on foreign oil."

"We are forcing oil companies to change their ways," Senate Majority Leader Harry Reid, D-Nev, told journalists May 7. "We will hold them accountable for unconscionable price gouging and force them to invest in renewable energy or pay a price for refusing to do so."

But before Congress dunks Big Oil's CEOs in crude and dips them in feathers for this alleged inaction, a simple question occurs:

So what?

Deroy Murdock

The author is a media fellow with the Hoover Institution on War, Revolution and Peace at Stanford University.

Where on Earth is it written that any industry must spend money to subvert its business model? Since when must any company plow scarce resources into helping consumers avoid its products? If enterprises now must meet this standard, the fascinating possibilities are endless:

- Shall Boeing develop "bullet trains" so Americans can de-plane jumbo jets and board high-speed rail cars?
- Why shouldn't Pfizer modernize traditional Chinese herbal medicine? Why create Viagra Jr. when the drug giant could craft better aphrodisiacs from deer antlers?
- Why won't Brooks Brothers invest in "alternative clothing," such as T-shirts, torn jeans, and flip-flops? Who do they think they are, producing that classic look embraced by the American Establishment?
- Why does Anheuser-Busch focus on beer, rather than wholesome fruit juices and dairy drinks? How

Please see **MURDOCK** *on* **G4**

Big Oil not responsible for alternative fuels

MURDOCK

Continued from Page G1

much longer must Americans wait for the Budweiser Berry Smoothie?

- Where is NBC's literature division? Shouldn't viewers click off their flat-screen TVs and pick up mentally stimulating books?
- And why does Senator Barack Obama (D-Ill.), insist on fundraising only for his campaign? When will he hold a benefit for John McCain?

Despite this notion's manifest absurdity, Big Oil, in fact, has spent plenty on alternative energy. While Washington politicians spit venom at the petroleum industry, it funds more of such research than does Uncle Sam.

In May 2006, the Institute for Energy Research and the Center for Energy Economics found that oil and gas companies spent $1.2 billion between 2000 and 2005 on wind, solar, geothermal, and other non-fossil fuels. Washington simultaneously appropriated $1.6 billion on such projects.

Meanwhile, Big Oil devoted $11 billion researching end-use technologies, including efficient heat and power co-generation, plus fuel-cell vehicles. Big Government plowed $800 million into such advancements.

All told, the evil oil companies expended $12.2 billion on new energy sources. That quintupled the federal government's $2.4 billion commitment.

BP in 2007 allocated $700 million to domestic wind-power projects. This year, five new BP wind farms worth $1.5 billion will generate 700 megawatts of electricity. BP, Chevron, Conoco Phillips, and Shell jointly have invested $3.5 billion in solar, wind, and biodiesel ventures.

Mr. Markey's bete noir, ExxonMobil, has spent $1 billion since 2004 on co-generation technology. It also is donating $100 million to Stanford University's Global Climate and Energy Project.

"We have 40 breakthrough programs underway looking at every aspect of renewables," ExxonMobil senior vice-president J. Stephen Simo told Mr. Markey's committee April 1. "We are looking at solar. We are looking at biofuels, bio ass."

Of course, if Exxon finally discovered how to extract fuel from banana peels, politicians who would burn CEO Rex Tillerson at the stake toc will berate Exxon tomorrow for making "obsce profits" on banana power.

If oil companies' shareholders and manager enjoy researching renewable energy, hooray! I the awful new idea that they should be coerce or compelled to do so should be stomped on w work boots until dead. No firm or industry sho be expected or required to invest in its own ob lescence. This is common sense. But most con cepts that waft from Washington, D.C. — like methane escaping a landfill — stopped makin sense ages ago. So it goes as Congress increasingly scorns alternatives to its own power.

Domestic oil drilling could solve our problems

Greg Johnson

The author lives in Goleta.

In a rather startling statement on her congressional Web site, Congresswoman Lois Capps writes that, "more drilling will do nothing to lower gas prices or make us more energy independent, but it will jeopardize California's economy and environment."

Just the opposite is true. In fact, the only two ways to lower the price of gas are to increase supply and/or decrease demand. Decreasing demand requires either rationing by the government or waiting for the price to get so high that buyers change their behavior and buy less. Increasing supply requires drilling more wells, pumping it out of the ground faster, and then refining it.

Mrs. Capps would have us believe that the government has already issued enough oil leases (about 70 million acres) on federal land to sustain our needs but she says the oil companies are "sitting" on this land and not drilling. Think about that statement. Our congresswoman, who believes that the oil companies are making "excess profits," is telling us that the oil companies are intentionally sitting on the oil they sell to make their "excess profits." So, are they making their "excess profits" by drilling for oil or by not drilling for oil? How does an oil company

Please see **JOHNSON** *on* **G4**

Liberals in the way of domestic drilling

JOHNSON

Continued from Page G1

make money by not drilling for oil?

It doesn't. One of the issues Mrs. Capps wants to avoid is the fact that there has not been a new refinery built in this country for over 30 years. Though many refineries have been expanded during that time, it has not been sufficient to meet our needs. When the refineries are working at 100 percent capacity, delivering more crude to them makes no sense, and we have far more pumping capacity than refining capacity. We all know that when the refineries are forced to switch over to summer or winter formulas or when a refinery is down for maintenance or repair, the price of gas at the pump spikes. This is because we are at 100 percent capacity and cannot increase refining at one facility to replace a refinery that goes offline, thus creating short-term shortages.

Another issue she ignores is the fact that oil companies are the favorite targets of environmental litigation. We all know the trials suffered by the oil companies in trying to open up Alaska's Prudhoe Bay field, and right here in Santa Barbara every step taken by the oil companies is watched, scrutinized and stopped by some group concerned about a salamander or fruit fly.

In fact, oil companies here can't even shut down an oil platform without getting sued. Oil companies, like any business, are geared toward making a profit and they cannot make money by paying lawyers while their men and equipment sit idle. As a constituent, I find it rather insulting that our congresswoman is always in league with the environmentalists who want to stop oil exploration while at the same time she criticizes the oil companies for not drilling in their existing leases.

In this election year we have two choices for energy policy. The Republicans who want to drill, build refineries and do research and development, and the Democrats who want to punish the oil companies for making a profit and allow the price of gas to continue to rise while they wait for the R & D of their pet alternative energy sources.

But just because the Democrats say that other fuels are preferable does not mean that we can stop producing gasoline and heating oil right now.

Mrs. Capps wrote that, "Senator McCain has missed an opportunity to push for real solutions to our energy needs, such as enhanced efficiency and alternative fuel sources."

But, Mrs. Capps, alternative fuel sources are not a real solution today tomorrow or next year, and we cannot put our lives on hold while we wait for whatever it is you think we're waiting for. And we who live on less than a six-figure income cannot afford gas at $5 per gallon without greatly diminishing our quality of life.

For now, our lives, and the world economy, run on oil and the United States has tremendous amounts of it right under our feet. Even here in Santa Barbara County there has been a discovery of more than 100 million barrels just off-shore from Vandenberg Air Force Base. The Arctic National Wildlife Reserve (ANWR) has enough oil to supply this country for decades and is dwarfed by the known reserves at Gull Island, where drilling also is prohibited. The Bakken Field in North Dakota is larger still and recent explorations in the Gulf of Mexico reveal the possibility of oil and natural gas reserves in staggering quantities.

So why not utilize our own oil resources while we develop technologies for the future? Why not start building new refineries now while we start sinking new wells in these newly discovered oil fields?

Democrats love to tell us that we should not develop these resources because it will be 15 years before that oil does us any good, so we should concentrate on new technologies that may be ready in that same 15 years.

We could be using oil from ANWR, Gull Island, North Dakota and the Gulf of Mexico in just a couple of years if the liberals will get out of the way, allow the construction of new refineries, and unleash the power of capitalism. And for those liberals who would tell us that bringing oil into production a year or two down the road will do us no good now, try letting the world know that we're going to start pumping from our known reserves and watch the price of crude oil fall.

Many experts believe that we have more oil under our own soil than the known reserves in Saudi Arabia. By wisely utilizing our own oil, coal and natural gas, we can lower the price of gas, create jobs for Americans, be less dependent on foreign oil and all of its entanglements, and provide revenue to the government.

I challenge Mrs. Capps to break from the social-environmental mantra of her party and do what is right for her constituents by getting the government out of the way of the oil business and embracing capitalism and free enterprise by allowing the oil companies to explore, drill, and refine the domestic oil we need to prosper.

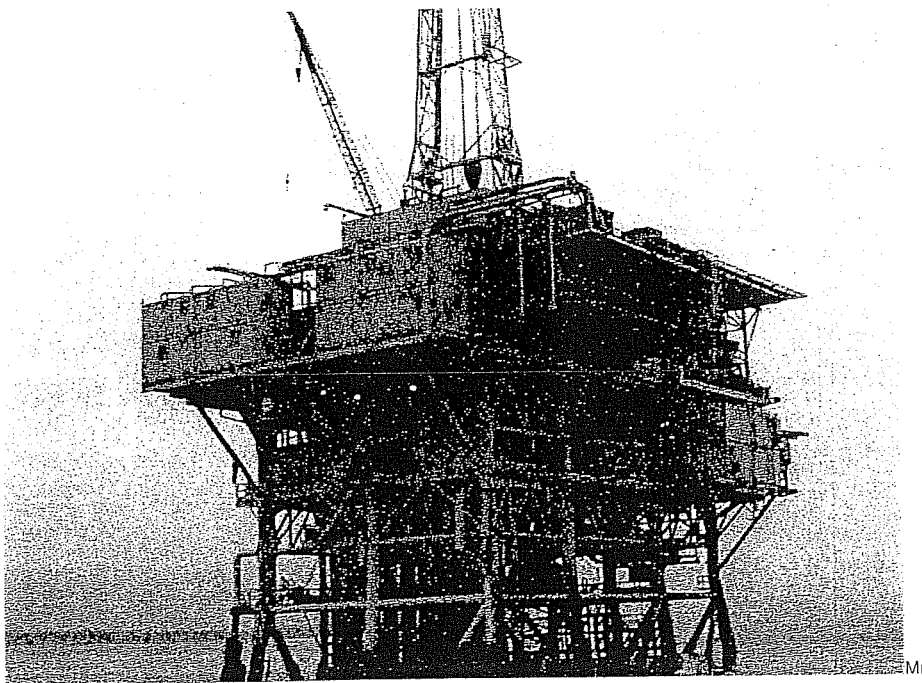
SUSTAINABLE LIFE »OIL SEEPS FUEL ENVIRONMENTAL DEBATE

Oil Seeps Fuel Environmental Debate

By SONIA FERNANDEZ, NOOZHAWK STAFF WRITER | Posted on 05/16/2008

EMAIL PRINT FRIENDLY COMMENT

Thousands of gallons of oil are released from the ocean floor each day, but would an increase in South Coast production help decrease pollution?



Much of the South Coast's oil drilling operations developed from the initial discovery of oil seeps. (Sonia Fernandez photo / Noozhawk)

Step onto a beach anywhere in the area and it's likely that sand won't be the only thing squishing between your toes. Tar balls – those pesky black, sticky chunks that stick to your flip-flops, ruin your neoprene wet suit and pretty much get on everything you lay on the sand – are part of a beachgoer's life on the South Coast.

Santa Barbara Sees Green As It Focuses on Reducing Pesticide Use
Tracy Shawn, Noozhawk Contributor

Serendipity: Sustainable Cool
Karen Telleen-Lawton, Noozhawk Columnist

San Luis Obispo Synagogue the First in World to Receive LEED Certification
Jim Shivers

SCEEP's Energy-Efficiency Program Pays Off for Local Businesses
Marjorie Wass

GreenWave Energy Solutions Generates Recognition of Its Efforts
Matt Guthrie

Cousteau Receives Lifetime Achievement Award
Laurel Bryant

Free Rain Sensors Available to Help You Save Water and Money
Kathy Kefauver

The source? Oil seeps, onshore and off.

.ating tar patties can travel for up to hundreds of miles from Santa Barbara, some ending up in Malibu and north of Monterey," said Dr. John Day, a planner with the Santa Barbara County Energy Division.

Oil seeps have been around for ages. The Chumash Indians used the tar from them to waterproof canoes and create tools. According to the late local historian Walker Tompkins, the petroleum-laden winds from coastal waters once were thought to be therapeutic and helped create Santa Barbara's long-standing reputation as a resort town. And, of course, where there's an oil seep, there's oil. Much of the South Coast's oil drilling operations developed from the initial discovery of seeps.

An oil seep, Day says, is a location where oil is released from the ground or the sea floor from a reservoir beneath the rock.

"My understanding is that the oil rises up through a combination of pressure underground and buoyancy of the oil compared to subsurface water," Day said.

Seeps can be gradual or release suddenly and intermittently, he said. Offshore, oil seeps can vary in composition, location and seep rate – from tiny bubbles to thick ropes as the oil works its way to the surface.

The oil that makes it to the surface gives the water an iridescent sheen, as the oil undergoes wind and wave action, hydrocarbon evaporation and consumption by ·oorganisms on its way to becoming tar balls.

One of the world's most prolific concentrations of seeps is outside UC Santa Barbara, at the aptly named Coal Oil Point. An estimated average of 100 barrels (4,200 gallons) of oil is said to seep out every day from 2,000 locations, although the amount of seepage varies greatly with tides, seismic activity, even rainfall.

And it's not just oil. Natural gas bubbles up from the same fissures and cracks in the ocean floor, up to 200,000 cubic meters per day. In 1982, several oil companies, including ARCO and Mobil, put down seep tents on the ocean floor to capture the gas. The operation now belongs to Venoco.

At least one local group is concerned about the amount of seepage from the ocean floor and the pollution problems it creates for the environment.

"The amount of oil that seeps out into the Channel every year is about equal to the amount of oil spilled in 1969," said Judy Rossiter, executive director of SOS California Inc., an environmental group with a decidedly different take on oil production. The spill from Platform A in 1969 was the event that sparked the region's environmental movement.

Taking their cue from a 1999 UCSB study that found links between oil extraction and decreased seepage, the founders of SOS California – Lad Handelman, a longtime c ·mercial diver and founder of Cal Dive International and Oceaneering ·. .national, and physicist Bruce Allen, who has decades of experience in space systems project management – are looking to decrease the amount of seepage from

Coal Oil Point by decreasing the pressure that causes the seepage.

"You could link improving the environment with production of oil off the coast of California," Allen said. By expanding oil production, and taking the pressure off the cracks and fissure, the natural seeps that cause water and air pollution in the region would decrease, he said.

"It's not just about more money, though," Allen said. "It's about what we can do with that money." Some of the money would come back to the county in the form of royalties, which the county could use to backfill its strained budget, he said. "There could be programs to ease the transition away from petroleum into alternative fuels," he said.

SOS California still will have to work hard to convince local dyed-in-the-wool environmentalists such as Get Oil Out, which formed directly as a result of the 1969 blowout.

"You can't look at the issue in a vacuum," GOO representative Carla Frisk said. For GOO, the risk is in the presence of oil rigs. Any spill, she said, would negate any beneficial effects oil extraction might have on the air and in the Channel waters.

Similarly, the county is skeptical that increased oil and gas extraction ultimately would have a significant affect on the amount of seepage.

"There is pretty good indirect evidence that oil production from Platform Holly has reduced seepage in the immediate vicinity of the platform. I think that's about all you say with any confidence," Day said. He says the oil from the seepage and the oil pumped out may not be from the same source. Furthermore, oil producers often inject produced water and gas into the oil reservoir to increase pressure, he said.

Despite those arguments, Allen maintains that the likelihood of decreased seepage is greater than what the county and anti-oil environmentalists think.

"The best peer-reviewed science out of UCSB showed there appears to be a strong connection between oil production and seepage reduction," he said. "That now appears to be the primary likelihood."

Regardless of whether increased production of oil proves to be the more environmentally sensible choice, the increasing price of oil and its falling supply will become more of a concern. The debate continues.

Residents can join the discussion May 31, as the Santa Barbara Museum of Natural History hosts a panel discussion on the topic. Day, SOS California and local environmental groups plan to attend.

Comments (4)

[a Comment

Name:

Please enter the word you see in the image below:

Submit

» CONFUSED wrote on 05/16/08 @ 07:33 AM

While this article is initially interesting, it created a naive question in my mind. How is something that naturally occurs through generations environmentally unfriendly? Whose environment are you talking about the earth's or our own (humans)? I don't understand why we'd want to interfere with something that naturally occurs?

» ENVIRONMENTALISTS??? wrote on 05/20/08 @ 04:05 AM

makes sense. Can somebody please define the word "Environmentalist".. In Santa Barbara, it is often used as a shroud for No-Growth NIMBY's and has become a tired term. We all love our environment. We also love to drive our cars to Lazy Acres and buy lots of plastic bottled water to fill up the land fills, and have lattes on the porch- as we pontificate how bad the oil industry is. But we recycle, talk bad about the oil companies and love the whales, so we are environmentalists.. This PC pseudo environmentalist attitude created our energy dependence on foreign oil and drove oil exploration out of Santa Barbara. We are now paying what we should as England and the rest of the world has for years. They pay 8.00 a gallon for gas. And now the same "environmentalists" are complaining about the cost of driving their car to get their latte.. The amount of oil discharge from simple land run-off in parking lots after a rain far exceeds the "69 spill" catastrophe. Think about that- its not the oil companies that pollute- its YOU! No oil, no nukes, etc.. The tired old Santa Barbara "Environmental" crowd has never provided leadership on anything in 40 years toward alternative energy. They just obstruct. Its time for different attitudes and different people to approach different ideas such as this one backed by science.

» JIM BELTRAN wrote on 05/20/08 @ 04:56 AM

I am 49 and grew up here. My Dad grew up here as well. When I was a kid and went to the beach, we came home with tar speckled feet. When we would complain, dad told us that when he was a kid, there was much more tar on their feet. 40 years later, there is much less tar on the beach now, than when I was a kid. I

remember the 69 oil spill and GOO. I can understand the knee jerk reaction that formed GOO. But, I believe GOO needs to get a grip on reality and function more e this SOS group (I have never heard of SOS before this article). If you look at the amount of oil and gas that didn't seep out (because of reduced pressure)it out ways the 69 oil spill. Even if we eventually have another spill like the one in 69, the gain from past and future years out ways the environmental impact of stopping the drilling. I for one, do not like seeing the rigs in the channel. Heck, I don't like seeing telephone poles blocking the views from my old house. Unfortunately, the reality of life is the telephone poles need to be there and so do the rigs. Maybe some day, someone can find a way to get the oil out or the ground with out the ugly rigs, but until then, people have to learn to live in the real world and not "Fantasy Island". Lastly, who are we to tell the rest of the world to produce more oil to lower the cost when we are trying to stop oil production here. And people wonder why American's are not well liked around the world.

» JACK EASTERBROOK wrote on 05/20/08 @ 08:46 AM

It is great to see some publicity re the seeps!! I have asked various presenters of programs to our Rotary Club "What are you doing to reduce the seeep ?" Response is that Nothing can be done! I guess it is better to make the Saudis rich!

Characteristics of an Oil Spill in Marine Waters

Sources, Frequency, and Prevention of Oil Spills into Marine Waters

Possible sources of oil spills into Santa Barbara's coastal marine waters include surface releases from offshore platforms, spills from the barge Jovalon that transports oil from Venoco's Ellwood processing facility, and spills from offshore vessels or tankers. Subsurface releases may occur from well blowouts or pipeline leaks or ruptures. Oil can also enter the ocean via creeks or rivers following spills at onshore coastal facilities, including storage and processing facilities and onshore pipelines.

Other sources of oil in the ocean include permitted platform discharges, natural petroleum seeps, urban runoff, rivers and creeks, municipal wastewater discharge, marine vessels and recreational boating. Volume of oil and grease in produced water released from Southern California's offshore platforms is estimated at 600-1,200 barrels per year.[1] Estimates of natural seepage volume are variable. A reasonable, recent estimate for seepage offshore of Coal Oil Point, the most prolific seep area, is 100 barrels per day.[2] Total seepage into southern California's coastal waters may amount to over 100,000 barrels per year.[3] Although no estimates of oil inputs to the ocean from urban runoff and stream flow in Santa Barbara are available, sampling conducted by the County's Project Clean Water indicates that the amounts are minor compared to natural seepage.[4]

Oil spills result from diverse causes, such as pipeline corrosion, equipment malfunctions, vessel-platform collisions, pipeline damage from anchor drag, well blowouts, or human error. Spills could also result from sabotage or terrorist attacks. A combination of factors, typically involving human error, is often to blame. A recent example is the 1997 Point Pedernales pipeline spill, officially estimated at 163 barrels of crude oil.[5] The spill occurred approximately two miles offshore of Vandenberg A.F.B., in 122 feet of water. A broken flange in the 20-inch crude oil emulsion pipeline caused the spill, and triggered an automatic low-pressure shutoff. The operator exacerbated the spill by overriding the shutoff and restarting the flow of oil.

Spills range from tiny, unarguably insignificant releases, which number in the thousands, to environmentally significant releases, which are relatively infrequent. For most types of spills, potential maximum worst-case spill volume is constrained by physical considerations, such as barge capacity, tank size, etc. For instance, the barge Jovalon carries about 55,000 barrels per load, which places an upper limit on the worst case spill volume. The *reasonable* worst-case spill volume is usually less than maximum capacity, as not all of the oil would be expected to escape into the environment. For pipelines, estimates of worst-case spill volume must take into account how long pumping might continue following a rupture and human error (e.g., failing to shut down or improperly restarting operations), as well as the volume of oil contained in the pipeline, that can drain out at the point of rupture. Some currently operating offshore pipelines have worst-case potential to spill thousands of barrels of oil.

Spill Statistics

Oil spills are, by nature, probabilistic. Small spills are fairly frequent and large spills are infrequent.[6] However, as decades of offshore oil operations have shown, some spills are bound to occur somewhere, despite the best efforts of offshore operators and regulatory agencies to maintain and inspect facilities and equipment, and to strive for safe operation.

The following statistics, drawn from several sources, illustrate both the relative infrequency and continuing occurrence of large spills. The statistics are intended to give a flavor of past and recent spill rates. They also illustrate that small spills are far more common than larger ones. The various analyses of spill rate data cover different time periods, define spill size classes differently, and may differ subtly in other ways. Therefore, the numbers may not be directly comparable. Rate comparisons should be based on the actual data sets using trend analysis or other appropriate methods. (Some trends are identified in the MMS analyses, discussed in the following section.)

For the period 1969-1999, a total of 841 oil spills appear in the MMS data base for Pacific Outer Continental Shelf (OCS) operations alone.[7]

- Estimated spill volumes were less than or equal to 1 barrel for 796 of these spills, between 1 and 50 barrels for 40 spills, and 50 barrels or more for 7 spills.
- The 796 smallest spills averaged 0.1 barrels (4.2 gallons).
- The 7 largest spills include the two 1969 Santa Barbara spills, which the MMS estimated to have a combined volume of 80,900 barrels.
- No spills exceeding 50 barrels were recorded from 1970 to 1989, but from 1990 to 1999, there were 5 spills over 50 barrels. The largest of these was the 1997 Point Pedernales spill.

For all the platforms and pipelines on the U.S. OCS (including the Gulf of Mexico and California) during the 1971-1999 period, there were 2,125 spills greater than 1.5 barrels. Of these, 106 were in the range of 50-999 barrels.[8]

From 1964 to 1999, there were a total of 11 platform spills and 16 pipeline spills of 1,000 barrels or greater.[9] No platform spills of this magnitude have occurred since 1980, but the rate of pipeline spills has not diminished.

Annual national spill averages given in a recent analysis by the National Research Council for the 10-year period between 1990 and 1999 included:

- 15 OCS platform spills greater than 100 gallons (average volume of 25 barrels). [10]
- 7.5 OCS pipeline spills greater than 100 gallons (average volume of 680 barrels). [11]
- 16 hydrocarbon spills from nearshore pipelines (average volume of 1,140 barrels).[12]
- many spills from marine terminals, storage tanks, and other onshore coastal facilities.[13]

Crude oil spills more than 1,000 barrels from barges and tankers into U.S. waters have been larger and more frequent than platform and pipeline spills. From 1974 to 1999 there were 46 tanker spills and 26 barge spills more than 1,000 barrels (187 barge spills if petroleum other than crude oil is included).[14] Of the 72 tanker and barge crude oil spills, 30 were over 10,000 barrels.

Most spills in recent decades have been in the Gulf of Mexico OCS region, because far more oil exploration and production takes place in the Gulf than in the Pacific Region. By the same token, the incidence of spills offshore Santa Barbara would be expected to increase if there were an increase in offshore exploration or production here.

Spill Risk Analysis

The MMS employs a model to estimate oil spill occurrence rates, which bases estimates of future spill rates on the spill rates observed in recent decades. The spill and production databases used in the rate calculations include all the OCS regions. Spill rates for different spill size classes are expressed as the number of spills per billion barrels of oil handled.[15] The number of spills expected to occur from development of reserves in a region is estimated by multiplying the estimated volume of recoverable oil reserves by the spill rate. Spill probabilities are calculated from the expected number of spills by applying the Poisson distribution. The intended and appropriate use of these statistics is for appraisal of potential oil spill risks of regional development of OCS oil fields, not to predict the risks associated with a particular project.

For the U.S. OCS as a whole, rates for spills of 1,000 barrels or greater are 1.33 pipeline spills and 0.32 platform spills per billion barrels of oil handled, based on 35 years of data.[16] Spill rate estimates based on the most recent 15 years of data are 1.38 for pipelines and less than 0.13 for platforms. For smaller spills, in the 50-999 barrel range, spill rates are higher. The rates used in recent MMS calculations are 7.75 spills per billion barrels of oil handled, for pipeline and platform spills combined.[17] Based on the most recent 15 years of data, the spill rate for this size class is estimated at 6.89 spills per billion barrels.[18]

Current estimates of spill risks for existing and possible future production in the Pacific OCS region (mainly offshore Santa Barbara and Ventura Counties) are summarized in the following table. The estimates do not include production from platforms in State waters, but do include oil produced at OCS platforms from State reserves.

Oil Spill Risks for Platforms and Pipelines on the Pacific OCS [19]

Spill Source	Estimated Recoverable Reserves (millions of barrels)	Spill SizeClass	EstimatedMean Number of Spills	EstimatedMean Number of Spills
Ongoing Production from OCS platforms	444.6 (incl. 63.0 from state reserves)	50-999 bbls. >1,000 bbls.	3.45 0.62	96.8% 46.2%
36 Undeveloped OCS Leases + Tranquillon Ridge (if developed)	758 (low est.)	50-999 bbls. >1,000 bbls.	5.90 1.04	99.7% 64.7%
	860 (high est.)	50-999 bbls.>1,000 bbls.	6.67 1.19	99.9% 65.6%

The estimated probability of a spill of 1,000 barrels or more is about 46% for ongoing production operations, from the present until all the recoverable oil reserves have been produced. The estimated probability of such a spill would be about 65% if all contemplated additional offshore development were to go forward. For smaller spills, the expected numbers of spills and their probabilities are much greater. The interpretation of such probabilities is a matter of judgement. A spill greater than 1000 barrels could happen tomorrow and another next year, or such a spill might never occur during the remaining life of existing offshore projects. Estimated spill probabilities for more than one spill, based on the estimated mean number of spills, are summarized in a graph in the Appendix.

The MMS methodology for estimating spill risk may be criticized, on the grounds that the connection between volume of oil handled and spill rates is weak or unsound, and that many factors other than volume of oil handled influence spill rate.[20] Other approaches to evaluating risk are available, such as evaluating equipment failure rates (including failures in the form of human error and 3rd party caused accidents). Such approaches may be the most appropriate way to analyze risks of a specific, identified project. In some cases, the resulting estimates may differ substantially from those obtained with the MMS method. However, the MMS method may give a reasonable, broad-brush indication of how many spills may result from future OCS development, considered at regional scales, because volume of oil handled is a reasonable gauge of the overall levels of oil drilling, production, and transportation activities. Our calculations indicate that the Pacific OCS spill rates for the past 15 years are consistent with the per barrel rates developed by the MMS using the entire OCS database.[21]

Blowouts

For current, ongoing, offshore production operations, the possibility of a blowout and uncontrolled oil release is extremely remote. Between 1992 and 2000, there were 36 blowouts on the U.S. OCS. Of these, 23 occurred in the 5022 operating production wells, while 13 occurred in the 3031 exploratory wells.[22] None of the blowouts in production wells resulted in oil spills exceeding 1 barrel, while two of the blowouts in exploratory wells resulted in spills of 100-150 barrels. (There were no other blowout-related spills that exceeded 1 barrel.) Onshore blowouts have also occurred in recent years, notably the 1998 blowout of *Bellevue 1*, an exploratory well in the Lost Hills oil field in Kern County. Blowouts have been described as follows:[23]

> *"We would like to define the term, "blowout." The more technical and accurate term, now used in the MMS website is, "loss of well control." The use of the term blowout engenders visions of oil rocketing into the air and people running for their lives. In reality, this very rarely happens, as MMS statistics indicate. Another term often used is, "taking a kick", which can mean a sudden increase in downhole pressures. A loss of well control can occur when pressures in the well unexpectedly exceed the hydrostatic pressure of the drilling fluid. Usually a well control problem results in materials in the well (for example, drilling fluid, gas, sand and rocks, oil, etc.) being forcibly ejected from the well and perhaps into the sea. Controlling a well is necessary because pressures from formations that are penetrated during the drilling process vary as the drill bit is guided to the target, oil- or gas-bearing formation. A well is controlled by such things as drilling muds, blowout preventers (BOPs), and the use of casing."*

> *"The great majority of well control problems are of short duration. Kicks are often routinely controlled and drilling continues. Occasionally, a classic "blowout" occurs where evacuation is necessary and rig personnel are forced to remove to a neighboring platform or vessel. If the well continues to flow, a relief well may need to be drilled. The MMS website documents a couple of these events."*

A major spill from a blowout in an existing production well offshore Santa Barbara is highly unlikely on two counts. First, the record of over 5,000 wells drilled on the U.S. OCS without a serious blowout-related spill during the past decade evidences the effectiveness of modern well control technologies. Second, the sub-sea reservoirs currently in production in Santa Barbara are not pressurized. The oil must be pumped to the surface by gas-lift methods or electric pumps, and does not flow out under its own pressure. A new drill hole could conceivably encounter a pressurized pocket, and the resulting kick, in combination with equipment failure and human error, could lead to a spill. However, while this scenario is not impossible, it would certainly be a rare event.

For exploratory drilling projects or wells directionally drilled into unproduced reserves, the likelihood of oil spills from blowouts may be greater than for ongoing production activities.

> *"The data indicate that virtually no oil has been spilled from development well blowouts. This is generally because the geology is better known [than that of exploratory wells] by the time development wells are drilled, so that kicks (increases in well bore pressure encountered during drilling) are better controlled. Also, note that there are a little more than twice the development wells than exploratory wells drilled which explains the overall higher number of blowouts encountered during development drilling. Drilling during exploration sometimes encounters very high pressures which can cause more severe blowouts which are more difficult to control. In any case, in most cases blowouts do not result in oil pollution because the pressures encountered are driven by gas, not oil."*[24]

Even so, exploration-related blowout spills are relatively rare events, as demonstrated by the record of just two potentially significant spills for over 3,000 exploratory wells drilled. Because such spills occur so infrequently, the data does not provide a sound statistical basis for predicting future blowout-related spills. All that can be said with confidence is that blowouts do occur, and that, on rare occasions, they may result in potentially significant oil spills. Improvements in drilling technology, assessment of reservoir geology, and regulatory oversight of offshore operations make a reenactment of the 1969 Santa Barbara spill very unlikely. Nevertheless, such an accident is still possible, particularly if human error were combined with unforeseen conditions and equipment failures.

Spill Prevention

Efforts to improve safety and prevent oil pollution from platforms, pipelines, and tankers over the past three decades were galvanized by several serious marine oil spills, most notably the 1969 Santa Barbara Platform "A" blowout and the 1989 *Exxon Valdez* tanker spill. As a result, offshore operations are now subject to more regulation, monitoring, and inspection than were previously in effect.[25] In particular, operators must prepare Oil Spill Prevention Control and Countermeasures plans and Oil Spill Contingency plans. As part of its Outer Continental Shelf Oil and Gas Program, the MMS has implemented an extensive safety program[26] that includes:

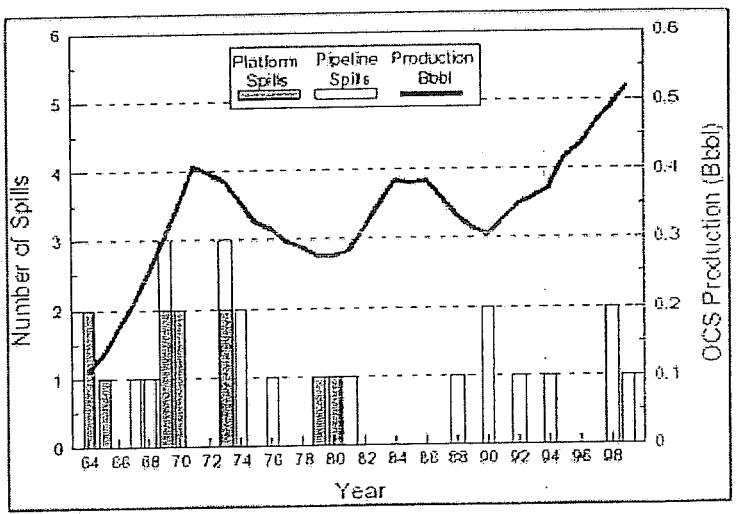
- production facility inspections,
- annual performance reviews of all OCS platform operators,
- accident investigations,
- safety alerts (to alert operators to accidents that have happened),
- safety awards for excellence,
- performance measures program (voluntary).

The State Lands Commission has begun a platform inspection program for operations in state waters. The County oversees operations within its jurisdiction through facility audits, permit enforcement, and the Systems Safety and Reliability Review Program. Greater accountability for operational compliance and liability for spill damages have prompted operators to place greater emphasis on safety and spill prevention. Most operators in the Santa Barbara area do, in fact, give safety high priority.

These changes in the regulatory environment in which offshore oil and gas development takes place have undoubtedly prevented some accidents and led to a reduction in marine oil spills from offshore and coastal operations. For example, as the figure shows,[27] there have been no OCS platform spills of 1,000 barrels or more since 1980. This is largely attributable to improvements in offshore safety practices and procedures, coupled with advances in drilling technology.

However, safety of offshore pipelines has not improved. Trend analysis indicates that the OCS pipeline spill rate for spills of 1,000 barrels or greater has increased from 1.32 spills per billion barrels of oil transported during the 1964-1992 period to 1.38 during 1985-1999.[28] Note that the rate increase cannot be accounted for by greater oil production volumes in the last 15 years, since the rates are expressed as "spills per billion barrels." The pipeline spill rate for spills of 10,000 barrels or greater for the same periods has decreased from 0.44 to 0.34.[29]

Number of U.S. OCS spills greater than or equal to 1,000 bbl. vs. U.S. OCS production, 1964-1999



Bbbl = 10^9 bbl

Based on 27 crude oil, condensate, and diesel spills, 12 Bbbl of crude oil and condensate production

Sources: MMS OCS Production Database, 2000; MMS OCS Spill Database, 2000

Crude oil barge spill rates for U.S. coastal, offshore, and inland waters have decreased substantially. Spill rate for spills of 1,000 barrels or more fell from 4.32 spills per billion barrels for 1974-1992, to 1.23 for 1985-1999.[30] There have been no crude oil barge spills of 10,000 barrels or more since 1985.

The trends for spills from platforms and barges are generally very favorable. Nevertheless, spills continue to occur in offshore waters, including Santa Barbara's. The five spills in the 50-200 barrel range that took place offshore Santa Barbara between 1990 and 1997 followed a 20-year period during which no spills over 50 barrels occurred. The spills roughly coincided with the peak in Santa Barbara's OCS production, which was reached in 1995. That more spills occurred during a period of higher production supports the MMS approach of estimating spill risk based on volume of oil handled. The flurry of spills after a 20-year lull also supports the argument that a disastrous spill could happen offshore Santa Barbara, even though the last one was in 1969.

The occurrence of spills, even if fairly rare, is an unavoidable side-effect of oil production. One major reason is that human error is often a contributing factor. The causes of the five spills, as listed in the MMS accident summaries,[31] include equipment malfunction, welding flaws, anchor snag, and human error. In 3 of the 5 spills various types of human error are explicitly cited as causal factors (e.g., judgement, negligence, disregarded of SOP, and failure to follow procedures). In the other two cases, human actions were at cause, but were not explicitly identified as "human error" in the summaries.

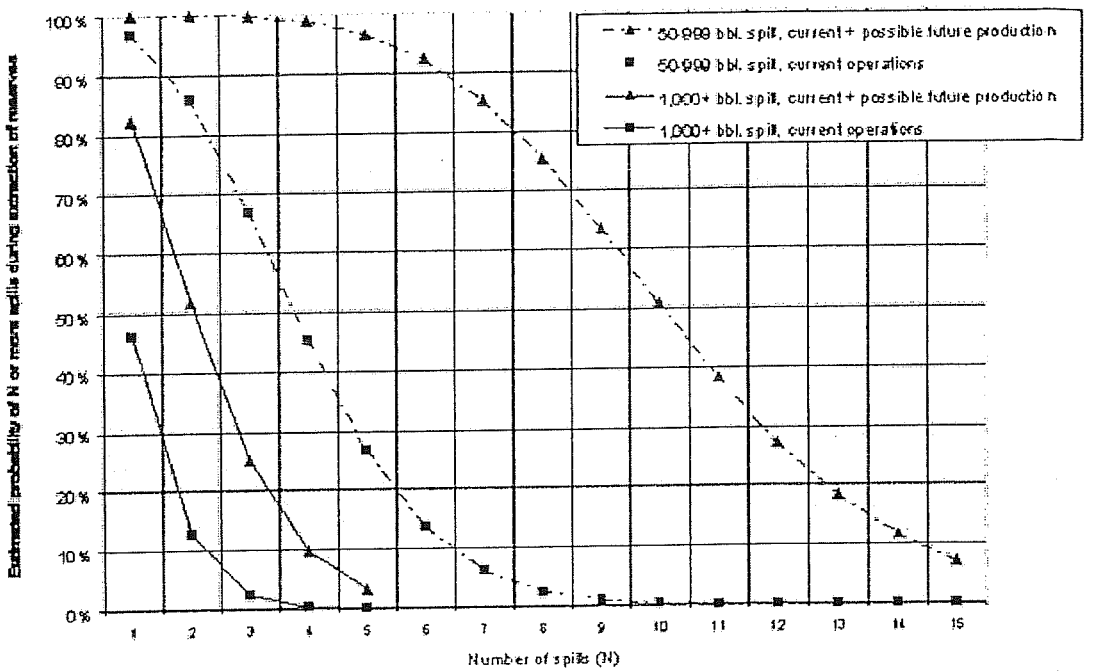
While prevention efforts and improvements in technology have been instrumental in reducing the rate of large platform spills to a very low level, it is not guaranteed that another will not occur in the future. Human error has been shown repeatedly to cause or contribute to accidents, in combination with unforeseen circumstances or equipment failures. Additional prevention measures, especially in the areas of training and pipeline safety, could lead to further reductions in spill rates.

---

[1]NRC, Op. Cit., 2002, p. D-18.
[2]UCSB Hydrocarbon Seeps Project website, http://seeps.geol.ucsb.edu/, accessed September, 2002.
[3]NRC, Op. Cit., 2002, p. C-3.
[4]Pers. comm., Rob Almy, Project Manager, Project Clean Water, Jan. 2002.
[5]State of California, Department of Fish & Game, Fact Sheet, 5/22/98 (PCA Number 7800-65679). However, calculations by Santa Barbara County's engineering consultant indicate spill volume may actually have been more than 1242 barrels.
[6]Note that spill volume estimates are often very imprecise or uncertain, as was the case for the Point Pedernales pipeline spill cited in the previous section.
[7]Minerals Management Service, Op. Cit., 2001, p. 5-16. (These figures do not include spills in state waters.)
[8]MMS Op. Cit., 2001, p. 5-18.
[9]Anderson and LaBelle, Op. Cit., 2000. (These figures do not include spills in state waters.)
[10]NRC, Op. Cit., 2002, Table D-1.
[11]Ibid., Table D-4.
[12]Ibid., Table D-5.
[13]Ibid., Table D-5, p. D-2, p. G-1.
[14]Anderson and LaBelle, Op. Cit., 2000.
[15]Smith et. al., Op. Cit., 1982.
[16]Anderson and LaBelle, Op. Cit., 2000, p. 311.
[17]MMS Op. Cit., 2001, p. A5-3; also Arthur D. Little, Op. Cit, 2002, p. H-12.
[18]Anderson and LaBelle, Op. Cit., 2000, p. 319.
[19]Data is from MMS Op. Cit., 2001, Tables 5.1.3.1-2, 5.1.3.1-3, and 5.1-1. (Probabilities were recomputed from the mean number of spills using the Poisson distribution, where this was made necessary because of regrouping of spill source categories.)
[20]Pers. comm., John Peirson, Marine Research Specialists, Ventura, Septemper, 2002.
[21]Pacific OCS production for 1986-2000 was 0.64 Bbbl. The mean expected number of spills >1,000 bbl. is 0.89, based on the MMS rate of 1.38 spills per Bbbl. The mean expected number of spills 50-999 bbl. is 4.98, based on the MMS rate of 7.75 spills per Bbbl. These numbers are in line with Pacific OCS spill rates for the past 15 years.
[22]Drilling statistics: MMS 2000 offshore stats newsletter [http://www.mms.gov/stats/PDFs/Offstats_Aug16.PDF]
Blowout data: MMS web site, Loss of Well Control pages [http://www.mms.gov/incidents/blowouts.htm]
[23]Pers. comm., David Panzer, MMS, Pacific OCS Region, September, 2002.
[24]Pers. comm., David Panzer, MMS, Pacific OCS Region, September, 2002.
[25]For a concise review of the applicable laws, see Arthur D. Little, Op. Cit., 2002, Sec. 5.1.2.
[26]http://www.gomr.mms.gov/homepg/offshore/safety/safety.html
[27]Figure from Anderson and LaBelle, downloaded from http://www.mms.gov/eppd/reports/1999SpillRates.pdf , September, 2002. (The same figure appears in Anderson and LaBelle, Op. Cit., 2000, p. 307.)
[28]Anderson and LaBelle, Op. Cit., 2000, p. 312.
[29]Ibid.
[30]Ibid., p. 316.
[31]http://www.mms.gov/incidents/pollution.htm

Appendix

Probability of OCS oil spills, based on production volume



Cumulative probabilities that there will be N or more spills were calculated as 1 minus the cumulative Poisson probability that there will be between 0 and N-1 spills, given the mean number of spills expected to occur during the production of the reserves. Estimated mean numbers of spills are from the Delineation Drilling EIS.[1]

SCENARIO	Expected number of spills 50-999 bbl.	Expected number of spills >1,000 bbl.
Ongoing OCS production [a]	3.45	0.617
Ongoing + possible future OCS production [b]	9.73	1.735

(a) Existing production from OCS operations (including Federal and State reserves).
(b) Existing production + Tranquillon Ridge + development of 36 undeveloped leases (using the average of high and low estimates).

[1] MMS, Op. Cit., 2001, Tables 5.1.3.1-2 and 5.1.3.1-3.

Support for Offshore Oil and Gas Drilling among the California Public

Eric R. A. N. Smith
Associate Professor
Department of Political Science, and
Environmental Studies Program
University of California, Santa Barbara
Santa Barbara, California 93110
e-mail: smith@polsci.ucsb.edu

Support for Offshore Oil and Gas Drilling among the California Public[1]

This report describes Californians' opinions about offshore oil and gas development. The report begins by describing the trends in support for offshore drilling since 1977. It then focuses on explaining the surge of support for offshore oil drilling that accompanied the rapid increase in gasoline prices in 2000 and 2001.

In this report, we present data from a series of public opinion polls of Californians, which were conducted between 1977 and 2001. The surveys were conducted by the Field Institute, a nonpartisan, not-for-profit public opinion research organization established by the Field Research Corporation.[2] The samples were representative cross-sections of California adults with sample sizes ranging from 485 to 1,034 (See the data appendix for details).

We should also note that this study updates some of the information published in a previous MMS report, *Trends in Public Opinion on Offshore Oil Development in California* (Smith 1995), and in the recently published book, *Energy, the Environment, and Public Opinion* (Smith 2002).[3]

Trends in Support for Offshore Oil Drilling

The earliest Field Poll question about offshore oil drilling was asked in 1977. Respondents were asked to agree or disagree with the statement,

> "Oil companies should be allowed to drill more oil and gas wells in state tidelands along the California seacoast."

That question was asked ten more times through 2001. Three possible answers were recorded—agree, disagree, and undecided. The percentage of undecided respondents varied from four to eight percent over the eleven surveys. The percentages of respondents favoring more oil and gas drilling are shown in Figure 1.

At the end of the 1970s, support for offshore oil drilling grew in California, peaking at 57 percent in 1980. This support was driven by the OPEC oil embargoes and the energy crisis of 1979/1980. After 1980, however, public support for offshore oil development along the California coast declined substantially. The decline in support for oil development from 1980 to 1998 was not smooth. Figure 1 shows a sharp drop in support for oil development between 1984 and 1989, and a bounce upward between 1989 and 1990. The overall trend of declining support in the 1980s seems to be the result of gradually declining oil prices, but the sharp drop in support in 1989 is no doubt the result of the *Exxon Valdez* oil spill in Alaska in March, 1989—shortly before the 1989 survey was conducted. The Field Poll asked its 1989 question in July, when newspapers were still covering the oil spill clean-up efforts and various legal actions against Exxon. Consequently, the level of support for further coastal oil development that we see in 1989 differs from what it would have been had people not been thinking about the recent oil-related disaster. By 1990, the *Exxon Valdez* presumably no longer jumped to mind when people were asked about offshore oil drilling, so the polls registered an increase in

support for drilling over 1989. However, we should note that the 1990 level of support is lower than the 1984 level. From a long-term perspective, the post-1980 decline in support for oil drilling can be seen to continue in both the 1990 and 1998 observations.

The last survey, conducted in May 2001, shows a sharp increase in support for offshore oil and gas development. Support rose from the historic low point of 20 percent in 1998 to 45 percent in 2001. More precisely, 45 percent favored more development; 46 percent opposed more development; and 8 percent were undecided.[4] The likely cause of the increase, of course, is the rapid increase in gasoline prices that began in 2000.

To explore the effects of the price of gasoline on support for offshore drilling, figure 2 adds the real price of gasoline to the public opinion data.[5,6] Here we see a fairly reasonable fit between the two trends. When the price of gasoline rose in the late 1970s, so did support for offshore oil drilling. When the price of gasoline fell in the 1980s, support for offshore oil fell as well. The 1989 survey shows a sharp drop in pro-development feelings that is not matched by gasoline prices, but it does correspond to the *Exxon Valdez* oil spill. The post-1998 rise in support again parallels the rise in gasoline prices.

The public opinion data are not even spaced across time, so regression analysis and other more sophisticated multivariate statistical methods are not appropriate here. However, an analysis of some national survey data on offshore oil drilling (reported in Smith 2002, chapter 3) shows that changes in the price of gasoline and in the consumer price index (which are highly correlated) both do an excellent job predicting public support for oil development in time-series regression models.

We can sum up the trend data by saying that we do not see a public that is strongly pro-environmental or anti-oil drilling. Instead, we see a public that responds to changes in the price of gasoline. When gasoline prices were low or falling, public support for oil development fell; when gasoline prices were rising, public support for more drilling rose. The public was rationally responding to real world events.

Figure 1. Support for Offshore Oil Drilling among Californians

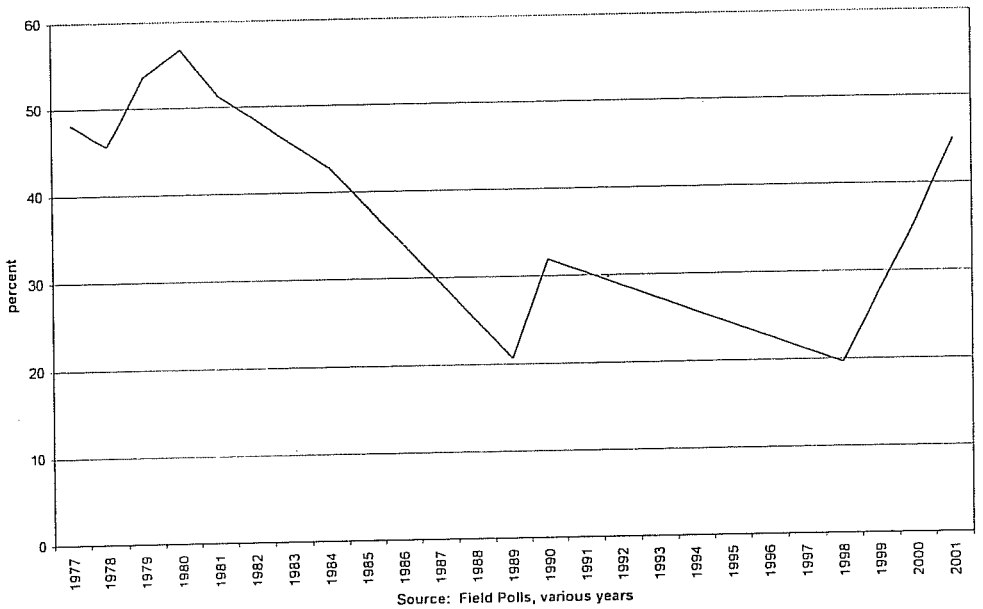
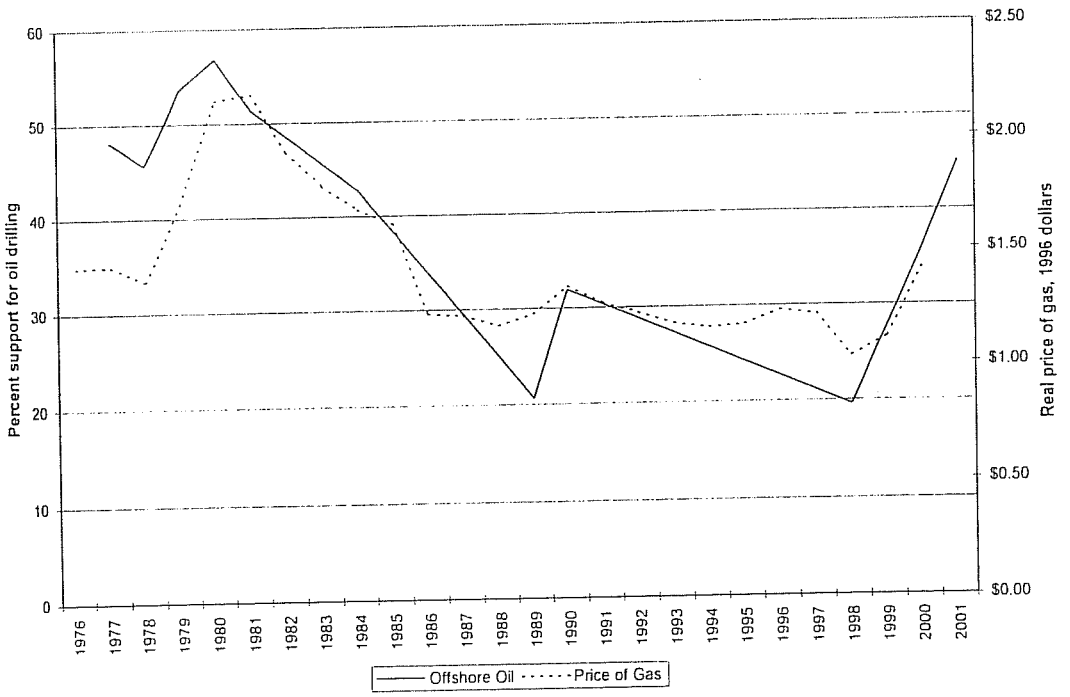


Figure 2. Support for Oil Drilling and the Price of Gasoline.



Who Changed Their Minds?

In order to learn more about what caused the 25 percent increase in support for offshore oil drilling between 1998 and 2001, we will compare the results of those two surveys. Although we cannot track individual change in opinion over that time period, we can examine how the patterns of support and opposition to oil development changed. The changes in those patterns will reveal what sorts of people changed most, and tell us something about what caused the changes.

Broadly speaking two sets of factors seem to explain the changing pattern of attitudes toward offshore oil drilling—self-interest and political orientations. We will begin with an examination of the role of self-interest.

The Self-Interest Explanation

The key indicator of self-interest is family income. People with the lowest incomes are most likely to be affected by the increase in gasoline prices because the increase represents a larger share of their household's disposable income. Upper-income people may not like paying more to drive their cars, but the increase certainly does not pose any kind of personal inconvenience.

Figure 3 presents the patterns of support for increased offshore oil development by income in 1998 and 2001. The upper, solid line represents the percentage of support for oil drilling in 2001; the lower, dashed line represents the percentage of support in 1998. In 1998, there is clearly no relationship. About 20 percent of the respondents at every income level favored more drilling. In 2001, however, two things changed. First, the overall level of support for drilling increased among all income groups. Second, the level of support for drilling increased most sharply among those earning less than $20,000 per year. In that lowest income group, support increased by 38 percent, while in the other income groups, support increased 18 to 24 percent. The group being hit hardest by the gasoline price hikes responded with a surge of support for increased offshore oil drilling.

The influence of income can perhaps also be seen the patterns of support for oil drilling by age. Normally, age is the most reliable predictor of pro-environmental sentiments (Jones and Dunlap 1992). The young lean in a pro-environmental direction (in this case, against oil and gas development), while the old lean toward pro-development stands. In figure 4, however, we see a reversal of the usual relationship. In 1998, the young were less supportive of oil drilling than the old. Whereas only 20 percent of those thirty and younger favored more drilling, 24 percent of those over sixty favored more drilling. The relationship is not very strong, but it does fit the typical pattern of the young being more pro-environmental. In 2001, however, the relationship reverses. The young are the most supportive of more oil drilling, with 48 percent in favor. The old are the least supportive at 42 percent. Again, the relationship is not very strong, but that hides the fact that support grew 18 percent among the old, but 28 percent among the young.

Figure 3. Support for Oil Drilling by Income, 1998 and 2001.

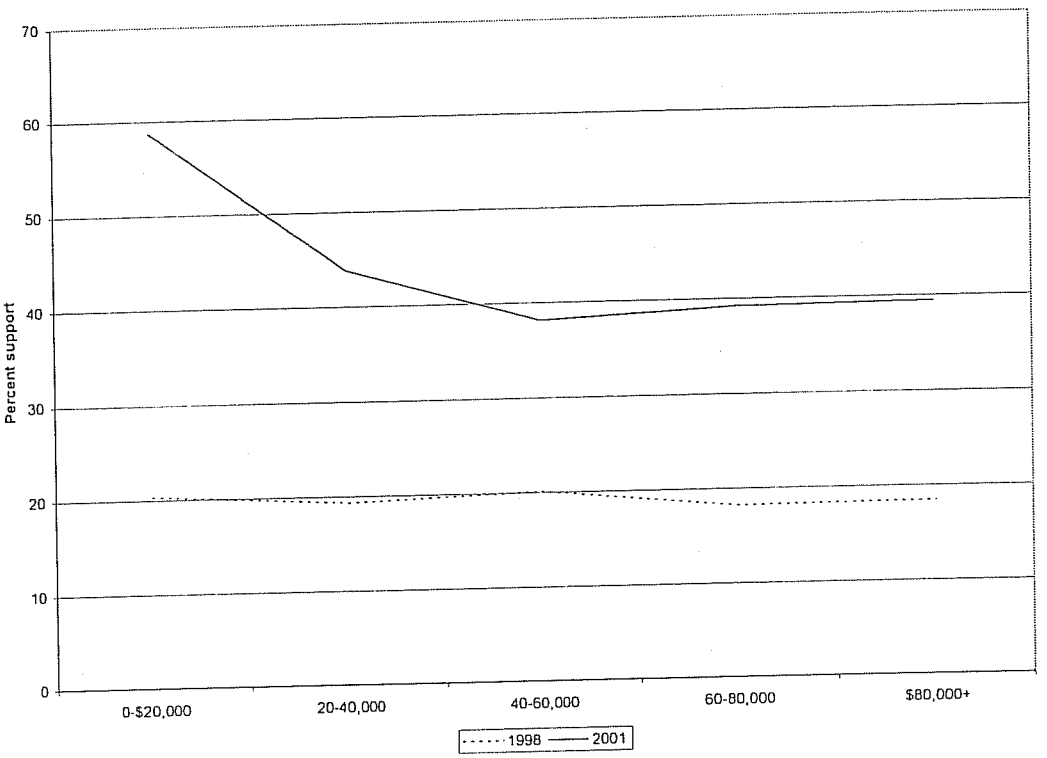
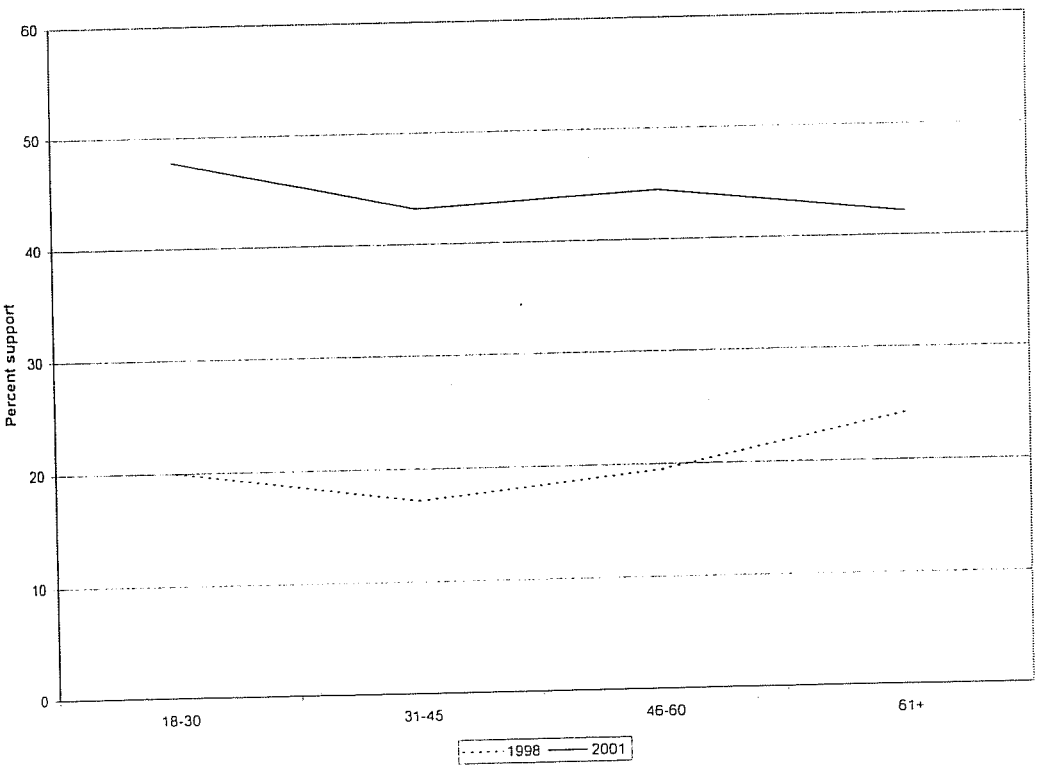


Figure 4. Support for Oil Drilling by Age, 1998 and 2001.



Why did the young move more strongly in a pro-drilling direction than older respondents? One part of the answer is probably that the young have lower incomes than older respondents. Among the youngest group in the 2001 survey, 27 percent fall in the lowest income category, and an additional 32 percent fall in the next higher category. Although those in the 61+ age group have incomes almost as low as the young, they drive far less. In the 1998 survey, 62 percent of the young drive to work, but only 12 percent of the oldest group do. In short, the rise in gasoline prices hit the youngest Californians the hardest, which seems likely to account for the jump in support for oil drilling among the young.

The influence of self-interest and income can also be seen in the changing patterns of support for oil drilling among different racial and ethnic groups. As figure 5 shows, whites—the group with the highest average incomes—changed the least between 1998 and 2001. In 1998, only 19 percent of Whites favored more drilling. Their support doubled to 38 percent three years later. In contrast, support for oil drilling grew by 27 percent among Blacks, 32 percent among Latinos, and 35 percent among Asians. Again, the lower income groups moved more strongly in favor of more oil drilling.

Because we have two surveys that asked questions of two different groups of respondents in two years, we cannot be absolutely certain about the causes of change. Nevertheless, the data on income, age, race, and ethnicity strongly suggest that two major causes of change in people's attitudes toward offshore oil drilling were self-interest and income. Low-income groups, who were hit hardest by the gasoline price hikes of 2000 and 2001, moved most strongly in favor of more offshore oil drilling. Middle- and upper-income groups also shifted toward a more favorable view of offshore oil drilling, but it would seem that because their incomes shelter them from the impact of higher prices, they shifted far less than lower-income groups.

The Political Orientations Explanation

The role of political orientations—such as party identification and ideology—is a bit more complicated than the role of self-interest. The argument about political orientations is that when they come into play depends on whether political issues receive media attention, and on whether the issues are controversial. When the news media ignore issues, and when politicians from opposite parties agree, partisan and ideological differences in the public tend to be small. In contrast, when the news media focus on issues and politicians jump in on opposite sides, partisan and ideological differences in the public tend to be large.

The partisan and ideological differences in the public stem both from two causes. First, people respond to political leadership. When Democratic leaders take one side in a dispute and Republican leaders take the opposite side, they are teaching—or leading—their respective followers in opposite directions. Of course, when political leaders ignore issues, or when they agree about them, Democrats and Republicans in the general public tend toward similar views. Second, people tend to bring their opinions on specific issues into line with their basic political values and predispositions *when they think about issues.*

Figure 5. Support for Oil Drilling by Race/Ethnicity, 1998 and 2001.

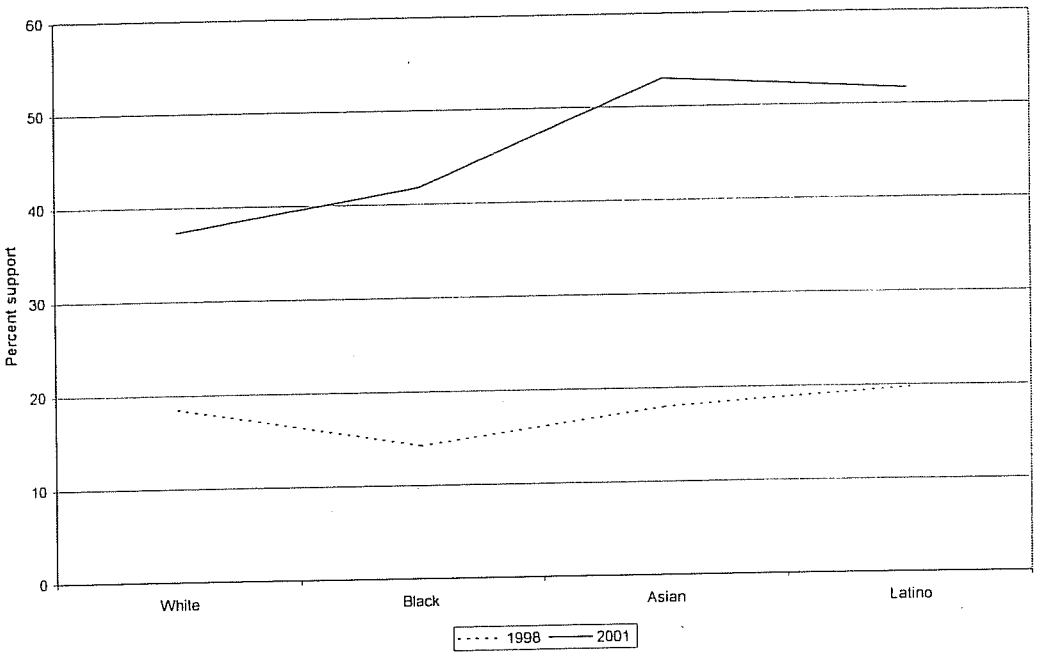
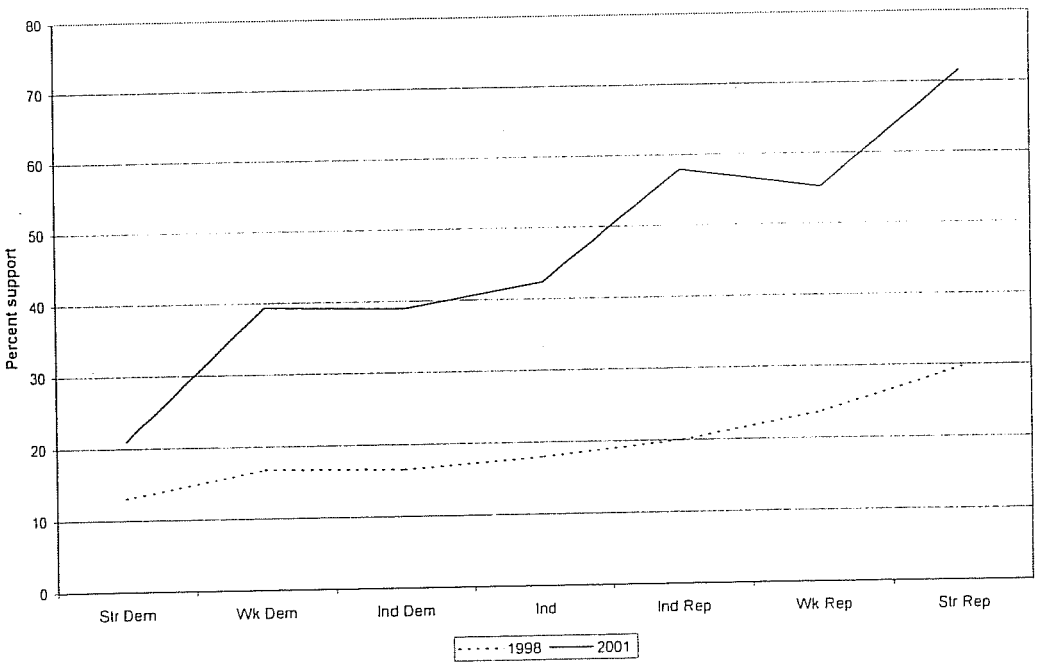


Figure 6. Support for Oil Drilling by Party Identification, 1998 and 2001.



Democrats and liberals tend to be egalitarian, and tend to lean toward pro-environmental stands when they begin thinking about issues. Republicans and conservatives, in contrast, share more individualist values, which lead them toward more pro-development positions. When issues do not receive much attention from the news media, people largely ignore the issues and, as a result, people's basic political values often do not match their opinions on specific issues. However, when issues do receive extensive media coverage, people think about the issues and, as a consequence, they tend to bring their opinions on specific issues into line with their overall political philosophies. (See Smith 2002 for a more detailed presentation of this argument.)

In our case, offshore oil development did not receive much media attention, and was not controversial in 1998. Gasoline prices (adjusted for inflation) hit a historic low point in 1998, with an average price of only $1.03 per gallon in the United States. Energy crises seemed to be events of the distant past. Neither Washington political leaders nor major oil companies were pushing to increase oil drilling off the coast of California. Democratic and Republican leaders in California joined one another in opposing offshore oil drilling. Under these circumstances, political orientations should not make much difference. In 2001, however, the situation had changed dramatically. Gasoline prices had shot up. Public opinion polls showed that the high price of gasoline was the most important issue to most Americans throughout the campaign year 2000 (Pew Research Center for the People & Press, 2000), and politicians began to disagree sharply along partisan lines about oil development. Most prominently, during the 2000 presidential campaign, Governor George Bush called for opening up the Arctic National Wildlife Refuge in Alaska to oil drilling, while Vice President Al Gore denounced that proposal (Bruni 2000; Mitchell 2000). As a result of these events, we should expect to see much sharper partisan and ideological differences in 2001 than in 1998.

Two measures of political orientations are available in our 1998 and 2001 surveys—party identification and ideological self-labels. Figure 6 presents the data on party identification. The lower, dashed line shows the various levels of support for more oil drilling across the political spectrum in 1998. A partisan difference clearly existed, but it was not very large. Whereas 13 percent of the strong Democrats supported more oil and gas drilling, 30 percent of the strong Republicans supported it. In 2001, however, the differences were far sharper. Among strong Democrats, support for more oil drilling had grown to 21 percent, but among strong Republicans, it had grown to 72 percent—a 42 percent increase.

The picture is largely the same with ideology, shown in figure 7. In 1998, 12 percent of the strong liberals favored more oil drilling, while 30 percent of the strong conservatives favored it. Three years later, support for drilling among strong liberals had grown to 19 percent, while support among strong conservatives had shot up to 61 percent. What had been a low-key issue with modest partisan and ideological differences in 1998 became a high-profile, highly partisan and ideological issue in 2001.

Figure 8 presents the party identification and ideology data in a slightly different format. Instead of showing the levels of support for offshore oil drilling, figure 8 shows the

Figure 7. Support for Oil Drilling by Ideology, 1998 and 2001.

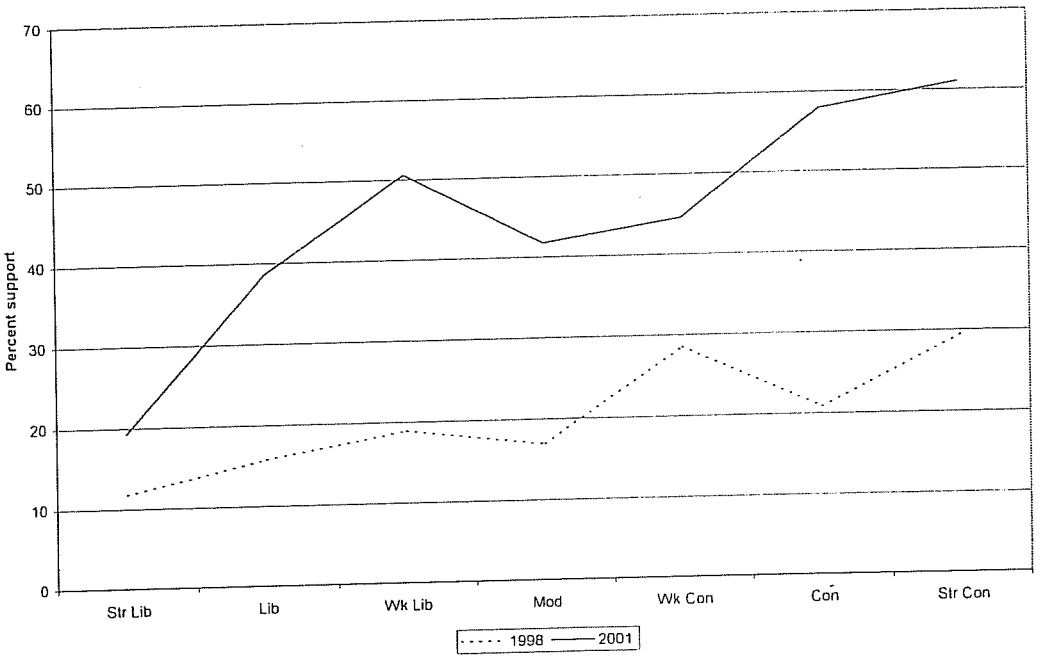
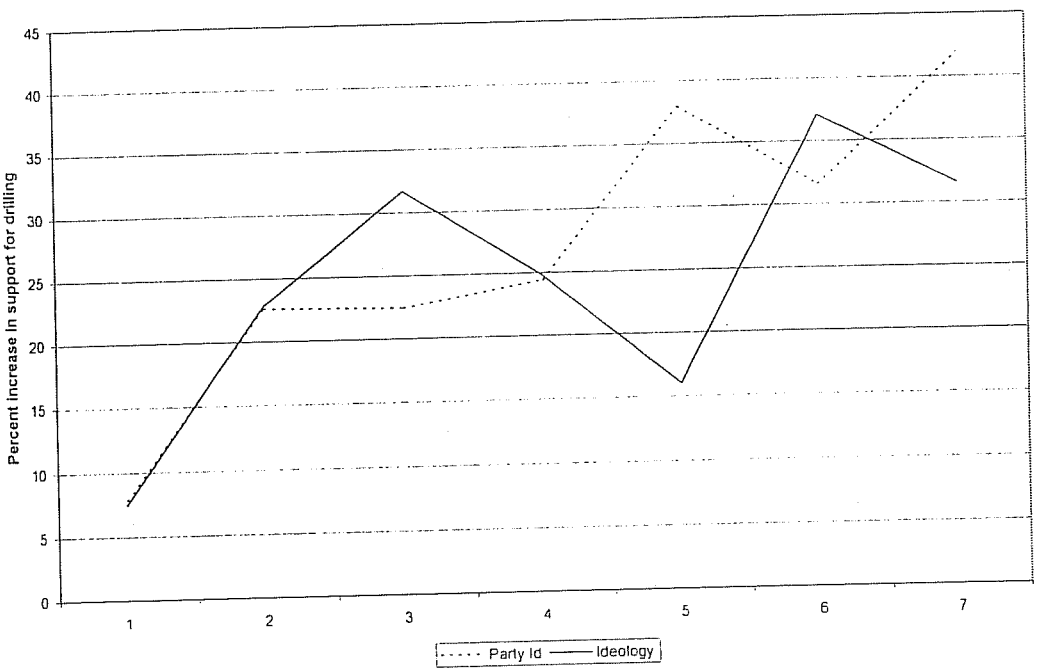


Figure 8. Growth in Support for Oil & Gas from 1998 to 2001



difference in levels of support between 1998 and 2001. Because both party identification and ideology are measured on 7-point scales, we can graph both relationships on a single chart. Point 1 represents strong Democrats and strong liberals; point 7 represents strong Republicans and strong conservatives. Here we see that the least amount of change—a mere 7 percent—occurred among strong liberals and Democrats at the left end of the figure. The largest change occurred at the opposite end of the political spectrum, among Republicans and conservatives. The effect of political leadership and media attention was a surge of support for more oil and gas development by Republicans and conservatives.

Conclusions

The data presented in this report allow us to draw several useful conclusions. First, the public responds rationally to events in the world. The public's views on offshore oil development are not fixed. They change when relevant conditions—such as the price of gasoline—change. In the most recent survey available, 45 percent of the California public supported more drilling along the coast of California, 46 percent opposed it, and 8 percent were undecided. That level of support represents a sharp increase over the level of support three years earlier, and it was doubtless due in large part to the corresponding increase in the price of gasoline.

Second, self-interest seems to be an important cause of the public's attitudes toward oil and gas development. The lowest income group in our survey, people earning less than $20,000 per year, moved most sharply in favor of more oil development. These, of course, are the people who would be hurt the most by higher gasoline prices. Similar shifts in favor of more oil and gas development can be seen in other low-income groups.

Third, political orientations seem to be another important cause of the public's attitudes toward oil and gas development. Republicans and conservatives increased their support for oil and gas far more than did Democrats and liberals. Previous research suggests that this happened because of two reasons. Republican and conservative leaders called for more oil development, while Democratic and liberal leaders opposed it. And Republican and conservative values are more predisposed to pro-development, free-market arguments than Democratic or liberal values.

Based on these considerations, we can conclude that future support for oil and gas development—both in California and elsewhere—will depend on the price of gasoline and on political leadership.

MMS Securing Ocean Energy & Economic Value For America

Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf, 2006

Using a play-based assessment methodology, the Minerals Management Service estimated a mean of 85.9 billion barrels of undiscovered recoverable oil and a mean of 419.9 trillion cubic feet of undiscovered recoverable natural gas in the Federal Outer Continental Shelf of the United States.

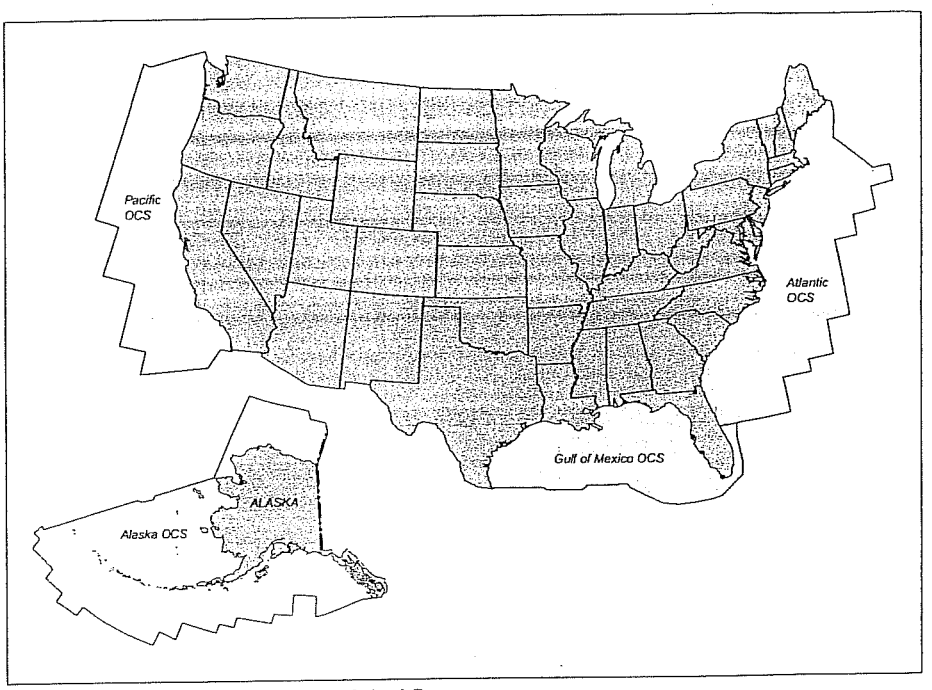


Figure 1. Federal OCS Areas of the United States.

Introduction

This report summarizes the results of the Minerals Management Service (MMS) 2006 assessment of the technically recoverable oil and gas resources for the U.S. Outer Continental Shelf (OCS) (see figure 1). The OCS comprises the portion of the submerged seabed whose mineral estate is subject to Federal jurisdiction. The 2006 assessment represents a comprehensive appraisal that considered relevant data and information available as of January 1, 2003, incorporated advances in petroleum exploration and development technologies, and employed new methods of resource assessment.

This assessment provides estimates of the undiscovered, technically and economically recoverable oil and natural gas resources located outside of known oil and gas fields on the OCS. It considers recent geophysical, geological, technological, and economic information and utilizes a probabilistic play-based approach to estimate the undiscovered technically recoverable resources (UTRR) of oil and gas for individual plays. This methodology is suitable for both conceptual plays where there is little or no specific information available, and for developed plays where there are discovered oil and gas fields and considerable information is available. After estimation, individual play results are aggregated to larger areas such as basins and regions. Estimates of the quantities of historical production, reserves, and future reserves appreciation are presented to provide a frame of reference for analyzing the estimates of UTRR.

More detailed information about the geology, assessment methodology, and economics will be published in separate regional assessment reports.

Commodities Assessed

The petroleum commodities assessed in this inventory are crude oil, natural gas liquids (condensate), and natural gas that exist in conventional reservoirs and are producible with conventional recovery techniques. Crude oil and condensate are reported jointly as oil; associated and nonassociated gas are reported as gas. Oil volumes are reported as stock tank barrels and gas as standard cubic feet. Oil-equivalent gas is a volume of gas (associated and/or nonassociated) expressed in terms of its energy equivalence to oil (i.e., 5,620 cubic feet of gas per barrel of oil) and is reported in barrels. The combined volume of oil and oil-equivalent gas resources is referred to as barrel of oil-equivalent (BOE) and is reported in barrels.

This assessment does not include potentially large quantities of hydrocarbon resources that could be recovered from known and future fields by enhanced recovery techniques, gas in

geopressured brines, natural gas hydrates, or oil and natural gas that may be present in insufficient quantities or quality (low permeability "tight" reservoirs) to be produced by conventional recovery techniques. In some instances the boundary between these resources is somewhat indistinct; however, we have not included in this assessment any significant volume of unconventional resources.

Estimates of undiscovered recoverable resources are presented in two categories, undiscovered technically recoverable resources (UTRR) and undiscovered economically recoverable resources (UERR). In addition, the quantities of historical production, reserves, and future reserves appreciation are presented to provide a frame of reference for analyzing the estimates of UTRR. The UERR results are presented as price-supply curves which show the relationship of price to economically recoverable resource.

Methodology

This assessment incorporated a comprehensive play-based (see list of terms) approach toward the analysis of hydrocarbon potential. A major strength of this method is that it has a strong relationship between information derived from oil and gas exploration activities and the geologic model developed by the assessment team. An extensive effort was involved in developing play models, delineating the geographic limits of each play, and compiling data on critical geologic and reservoir engineering parameters. These parameters were crucial input in the determination of the total quantities of recoverable resources in each play.

Due to the inherent uncertainties associated with an assessment of undiscovered resources, probabilistic techniques were employed and the results reported as a range of values corresponding to different probabilities of occurrence. For plays in frontier areas with sparse data, analogs were developed using subjective probabilities to cover the range of uncertainties. Most plays in the Alaska, Atlantic and some in the Pacific OCS were assessed this way. For mature areas with significant amounts of data, such as the Gulf of Mexico and southern California, plays were analyzed using a method based on statistical parameters of discovered pools and historical trends.

Assessment Results

The MMS completed an assessment of the undiscovered technically recoverable oil and natural gas resources of the OCS, which reflects data and information available as of January 1, 2003. This assessment was the culmination of a multi-year effort that included data and information not available at the time of the previous assessment (MMS, 2001), incorporated advances in petroleum exploration and development technologies, and employed new methods of resource assessment.

UTRR estimates are presented at 95th and 5th percentile levels, as well as the mean estimate. This range of estimates corresponds to a 95-percent probability (a 19 in 20 chance) and a 5-percent probability (a 1 in 20 chance) of there being more than those amounts present, respectively. The 95- and 5-percent probabilities are considered reasonable minimum and maximum values, and the mean is the average or expected value. Results for individual plays, basins, and planning areas will be presented in subsequent regional reports.

Estimates of UTRR for the entire OCS range from 66.6 Bbo at the F_{95} fractile to 115.1 Bbo at the F_5 fractile with a mean of 85.9 Bbo (figure 2 and table 1). Similarly, gas estimates range from 326.4 to 565.9 Tcf with a mean of 419.9 Tcf. On a barrel of oil-equivalence (BOE) basis 54 percent of the potential is located within the Gulf of Mexico. The Alaska OCS ranks second with 31 percent. The Pacific is third among the regions

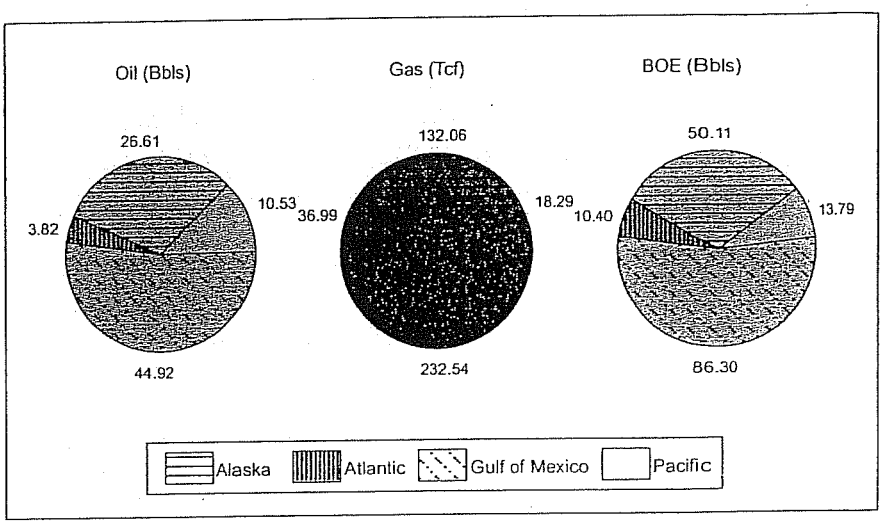


Figure 2. Undiscovered Technically Recoverable Resources by type and region.

in terms of oil potential and fourth with respect to gas. The Atlantic region, on the other hand, ranks third when considering gas potential and fourth in terms of oil.

Technological advances in hydrocarbon exploration and development are sure to occur in the future, yet the nature of advancement is extremely hard to predict and its impact difficult to estimate. However, past experience indicates most technological breakthroughs occur during high-cost scenarios and impact exploration and development by lowering the cost and sometimes by improving the chance of success. For the purpose of this assessment, recent technological advances in gathering, processing, and interpreting seismic data contributed to the identification and mapping of geological plays and development of geologic parameters used to model the plays. Similarly, recent technological advances in offshore drilling and development operations were incorporated through the assumptions associated with the costs of these activities.

However, no attempt was made to determine an empirical relationship between the future technological advancements and the estimated undiscovered resources. MMS believes that future technological advances will significantly affect the

Table 1. Undiscovered Technically Recoverable Resources of the OCS

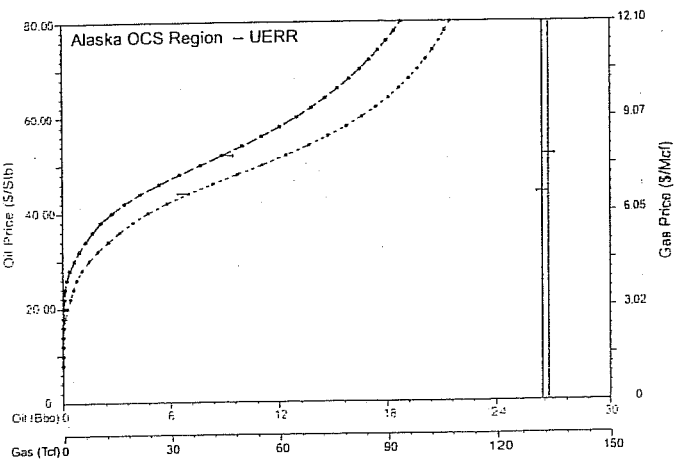
(Bbo, billion barrels of oil, Tcf, trillion cubic of gas. F95 indicates a 95 percent chance of at least the amount listed, F5 indicates a 5 percent chance of at least the amount listed. Only mean values are additive.)

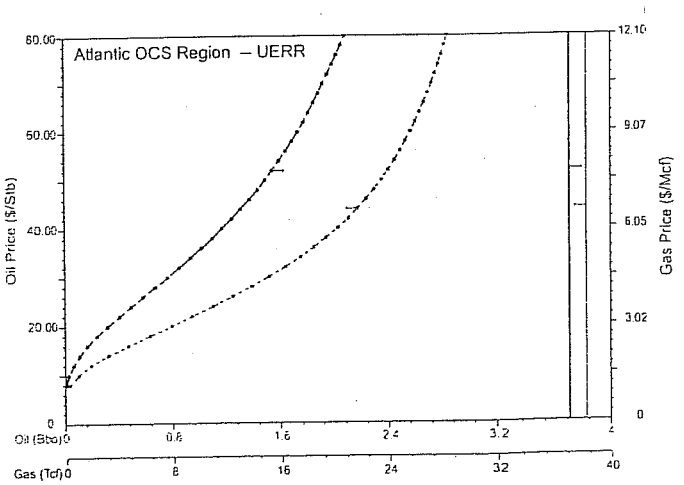
Region	Oil (Bbo)			Natural Gas (Tcf)			BOE (Bbo)		
	95%	Mean	5%	95%	Mean	5%	95%	Mean	5%
Alaska OCS	8.66	26.61	55.14	48.28	132.06	279.62	17.25	50.11	104.89
Atlantic OCS	1.12	3.82	7.57	14.30	36.99	66.46	3.67	10.40	19.39
Gulf of Mexico OCS	41.21	44.92	49.11	218.83	232.54	249.08	80.15	86.30	93.43
Pacific OCS	7.55	10.53	13.94	13.28	18.29	24.12	9.91	13.79	18.24
Total U.S. OCS	66.60	85.88	115.13	326.40	419.88	565.87	124.68	160.60	215.82

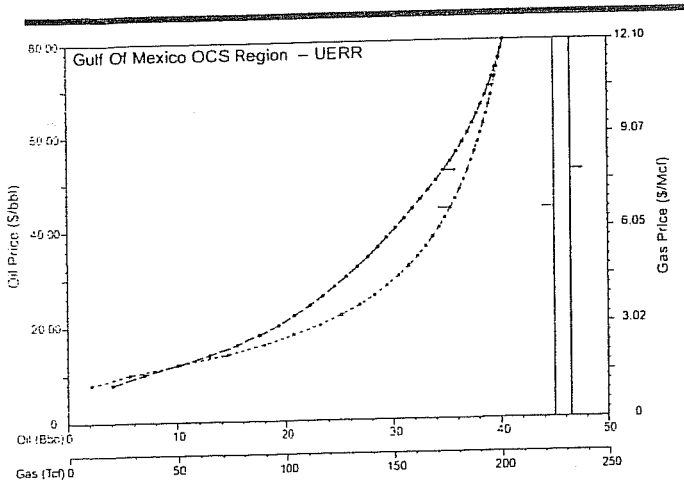
portion of the undiscovered resources represented by estimates of UTRR, resulting in an increased percentage being classified as economically recoverable resources.

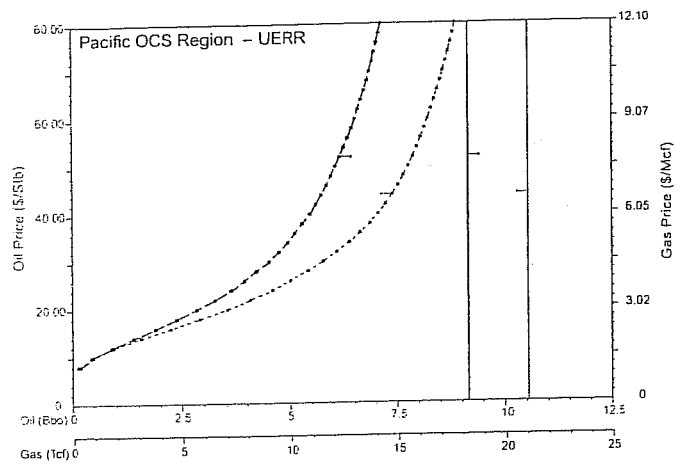
Estimates of UERR are presented as price-supply curves for the entire OCS as well as individual regions (figure 3). A price-supply curve shows the relationship of price to economically recoverable resource volumes (i.e., a horizontal line from the price axis to the curve yields the quantity of economically recoverable resources at the selected price). The price-supply curve for each region shows two curves and two price scales, one for oil and one for gas. The curves represent mean values at any specific price. They are not independent of each other; that is, one specific oil price cannot be used to obtain an oil resource and a separate gas price used to get a gas resource. The gas price is dependent on the oil price and must be used in conjunction with the oil price on the opposite axis to calculate resources. The reason for this condition is that oil and gas frequently occur together and the individual pool economics are calculated using the coupled pricing. A different gas price associated with the oil price would result in a different resource number than that shown on the curve.

The two vertical lines (green for oil and red for natural gas) indicate the mean estimates of UTRR. At high prices, the economically recoverable resource volumes approach the conventionally recoverable volumes. These curves represent resources available with sufficient exploration and development efforts and do not imply an immediate response to price changes.









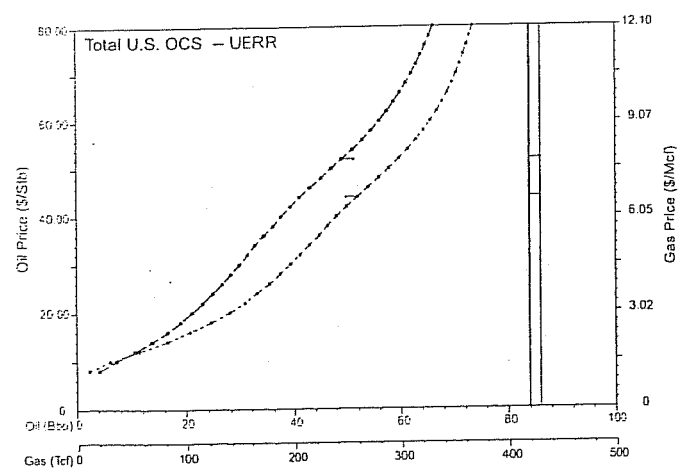


Figure 3. Price Supply Curves for Federal OCS Regions and Total Federal OCS.

Estimates of the quantities of historical production, reserves, and future reserves appreciation are presented to provide a frame of reference for analyzing the estimates of UTRR. The *total endowment* is the sum of historic production, reserves, future reserves appreciation, and UTRR. Mean estimates of the total endowment for the entire OCS are 115.4 Bbo and 633.6 Tcfg (228.2 BBOE). The total endowment distribution by resource category can be seen in figure 4 and table 2. More than 18 percent of the total endowment in terms of the mean estimate of BOE has already been produced. An additional 11 percent is contained within the various reserves categories, the source of near and midterm production. After more than 50 years of OCS exploration and development, 70 percent of the mean BOE total endowment is still represented by undiscovered resources.

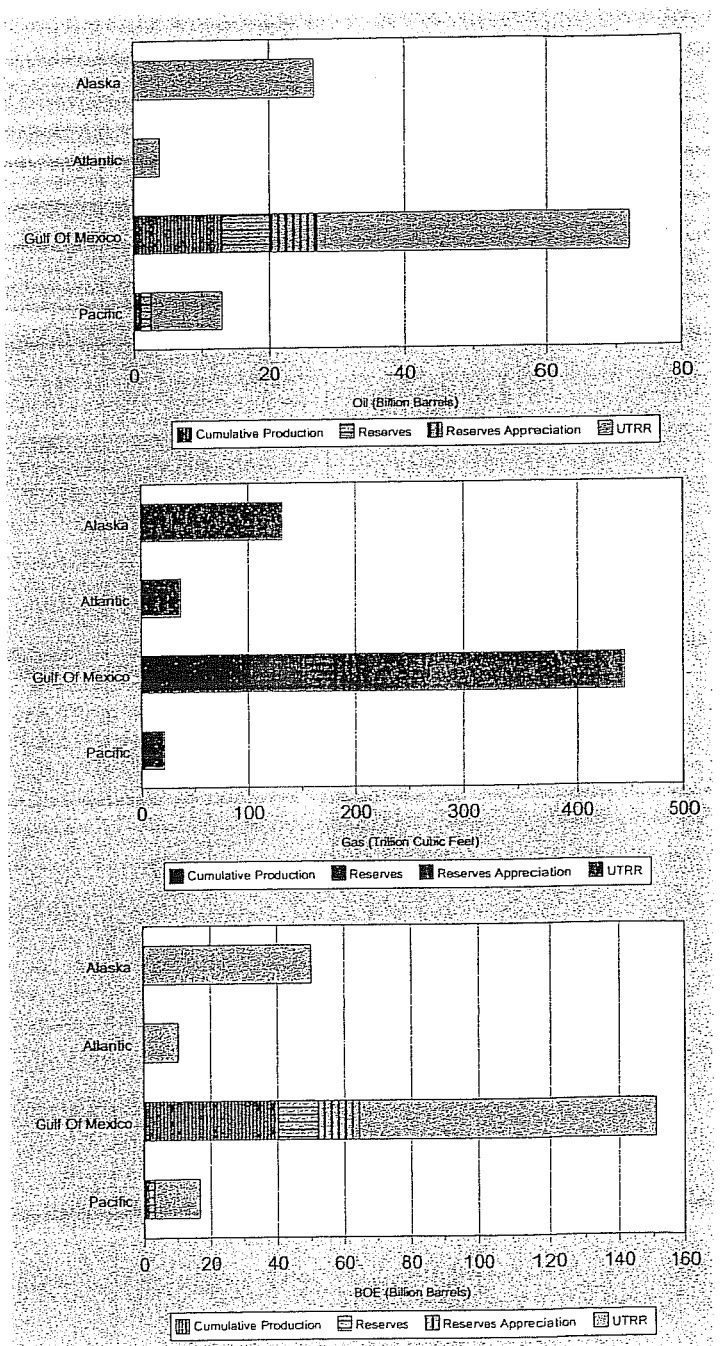


Figure 4. Distribution of total hydrocarbon endowment by type, region and resource category.

Table 2. Distribution of total hydrocarbon endowment by type, region and resource category.

Resource Category		Alaska	Atlantic	Gulf of Mexico	Pacific	Total OCS
Cumulative Production	Oil (Bbo)	.01	0	13.05	1.06	14.12
	Gas (Tcf)	0	0	152.25	1.32	153.57
	BOE (Bbo)	.01	0	40.14	1.29	41.45
Reserves	Oil (Bbo)	.03	0	7.06	1.46	8.55
	Gas (Tcf)	0	0	27.70	1.56	29.26
	BOE (Bbo)	.03	0	11.98	1.74	13.76
Reserves Appreciation	Oil (Bbo)	-	-	6.88	-	6.88
	Gas (Tcf)	-	-	30.91	-	30.91
	BOE (Bbo)	-	-	12.38	-	12.38
UTRR (Mean)	Oil (Bbo)	26.61	3.82	44.92	10.53	85.88
	Gas (Tcf)	132.06	36.99	232.54	18.29	419.88
	BOE (Bbo)	50.11	10.40	86.30	13.79	160.60
Total Endowment	**Oil (Bbo)**	**26.65**	**3.82**	**71.91**	**13.05**	**115.43**
	Gas (Tcf)	**132.06**	**36.99**	**443.40**	**21.17**	**633.62**
	BOE (Bbo)	**50.15**	**10.40**	**150.81**	**16.82**	**228.18**

Comparison with Previous Assessments

A general comparison of 1996, 2001, and 2006 assessment UTRR results is shown in figure 5. At the mean level, the estimates of UTRR for the entire OCS represent an increase compared to the previous (2001) assessment of 10.9 Bbo and 57.7 Tcfg or about 15 percent for oil and gas. The vast majority of this increase occurred in the Gulf of Mexico, where estimates of UTRR range from 41.2 to 49.1 Bbo and 218.8 to 249.1 Tcfg with a mean of 44.9 Bbo and 232.5 Tcfg respectively. Significant increases in the estimates for the deepwater areas were the major contributor to the overall growth in the estimates of UTRR for oil. The majority of the increase in the estimate of UTRR from gas was related to deep gas plays located beneath the shallow water shelf of the Gulf of Mexico. This increase in UTRR was also accompanied by approximately 4.5 Bbo and 14 Tcfg that were discovered in fields such as Thunder Horse and Holstein, whose resources were moved to the reserve category during this time period.

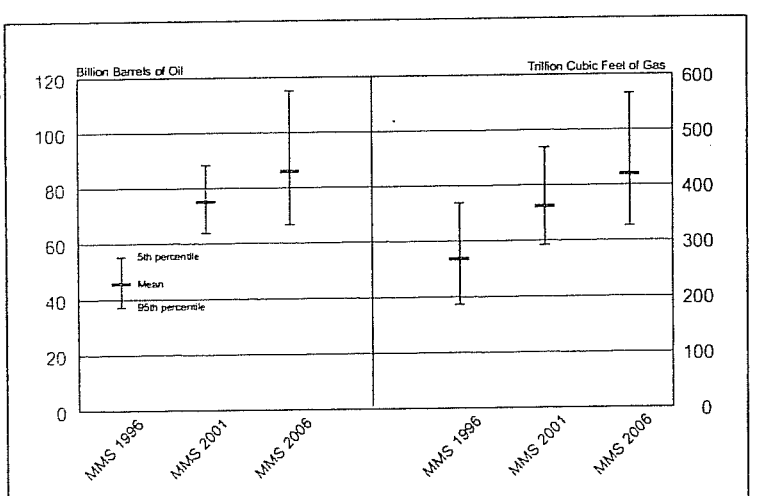


Figure 5. Comparison of UTRR from MMS 1996, 2001, 2006 assessments.

In the Pacific Region, the mean estimate for UTRR of 10.5 Bbo and 18.3 Tcfg represented a slight decrease for both oil and natural gas. The Atlantic estimate of UTRR ranges from 1.1 to 7.6 Bbo and 14.3 to 66.5 Tcfg with a mean of 3.8 Bbo and 37.0 Tcfg. The estimates represent a 66 percent increase in oil resources and a 33 percent increase in gas resources in the Atlantic OCS, when compared with the MMS 2001 assessment. The last remaining leases in the Atlantic OCS, on the Manteo Prospect, expired in 2002 without a well being drilled. However, significant new analog information was available as the result of recent exploration in the Scotian Shelf offshore Canada and the West African Continental Slope offshore Mauritania. Applying these new exploration ideas to the older Atlantic play models led to adjustments to risks in previously defined plays and the identification of additional new plays.

Estimates of UTRR on the Alaska OCS changed only slightly compared to the previous assessment. The mean oil estimate

increased by 1.7 Bbo, while the mean natural gas estimate declined by 6.7 Tcf. The first Alaskan OCS production occurred in 2001 from the joint state/Federal Northstar unit in the Beaufort Sea.

Fifty-four percent of the mean estimate of UTRR on a BOE basis was projected to be present in the Gulf of Mexico OCS. The Alaska, Pacific and Atlantic OCS comprise 31, 9 and 6 percent respectively of the total UTRR.

List of Terms

Cumulative production: The sum of all produced volumes of oil and gas prior to a specified point in time.

Pool: A discovered or undiscovered accumulation of hydrocarbons, typically within a single stratigraphic interval.

Play: A group of pools that share a common history of hydrocarbon generation, migration, reservoir development, and entrapment.

Probability: A means of expressing an outcome on a numerical scale that ranges from impossibility to absolute certainty; the chance that a specified event will occur.

Prospect: A geologic feature having the potential for trapping and accumulating hydrocarbons; a pool or potential field.

Reserves: The quantities of hydrocarbon resources anticipated to be recovered from known accumulations from a given date forward. All reserve estimates involve some degree of uncertainty.

Reserves appreciation: The observed incremental increase through time in the estimates of reserves (proved and unproved) of an oil and/or natural gas field as a consequence of extension, revision, improved recovery, and the addition of new reservoirs.

Resources: Concentrations in the earth's crust of naturally occurring liquid or gaseous hydrocarbons that can conceivably be discovered and recovered.

Undiscovered resources: Resources postulated, on the basis of geologic knowledge and theory, to exist outside of known fields or accumulations.

Undiscovered technically recoverable resources (UTRR): Oil and Gas that may be produced as a consequence of natural pressure, artificial lift, pressure maintenance, or other secondary recovery methods, but without any consideration of economic viability. They are primarily located outside of known fields.

Undiscovered economically recoverable resources (UERR): The portion of the undiscovered conventionally recoverable resources that is economically recoverable under imposed economic and technologic conditions.

Selected References

Minerals Management Service. 1996: An assessment of the undiscovered hydrocarbon potential of the Nation's outer continental shelf. OCS Report MMS 96-0034, 40 p.

———. 2001: Outer Continental Shelf Petroleum Assessment, 2000, 12 p.

Society of Petroleum Engineers and World Petroleum Congress. 1997: Petroleum Reserves Definitions, p. 4-7.

For Further Information

Supporting geological studies, previous assessment results, and methodologies used by MMS for resource assessment can be found on MMS's web site, *www.mms.gov/offshore*.

For further information on this study please contact:
Gary Lore, 703-787-1628
gary.lore@mms.gov

For detailed regional information please contact:

Alaska OCS:	Rance Wall, 907-334-5321 *rance.wall@mms.gov*
Atlantic OCS:	Dave Marin, 504-736-2710 *david.marin@mms.gov*
Gulf of Mexico OCS:	Dave Marin, 504-736-2710 *david.marin@mms.gov*
Pacific OCS:	Drew Mayerson, 805-389-7707 *drew.mayerson@mms.gov*

The case for using extended reach drilling to develop California OCS reserves from onshore locations

Tom Bjorklund

Department of Geosciences, University of Houston, Houston, Texas, 77204

1. Background

The Minerals Management Service (MMS) estimates that discovered and undiscovered conventionally recoverable oil and gas resources of the Pacific OCS Region range from 14 to 19 billion BOE. In the California OCS Santa Maria and Santa Barbara-Ventura Basins, 24 offshore fields with reserves of 1.3 billion BOE have been discovered but are undeveloped because of the 1982 Federal moratorium on offshore drilling. The high-side potential, including prospects in state waters, may reach 3.4 billion BOE. Very long horizontal offsets with extended reach drilling (ERD) from onshore locations may now provide an economically and environmentally acceptable alternative to offshore platforms to develop some of these reserves. Horizontal reaches of ERDs are approaching seven miles. Assuming ERD wells can develop reserves within 7 miles of the California coast, the potential exists to develop between 500 and 1000 MMBOE from onshore sites. Potential adverse effects of onshore development operations on marine biology and habitats would be mainly associated with marine seismic surveys for pre-development planning. The economic benefits to California of environmentally responsible development operations would include increased employment opportunities, an increased tax base and a windfall of royalty payments from federal lands. *In spite of significant regulatory and technical hurdles to overcome, the use of ERD to develop the offshore resources of the United States should be considered in the formulation of a rational, knowledge-based energy policy.*

2. Pacific OCS resources

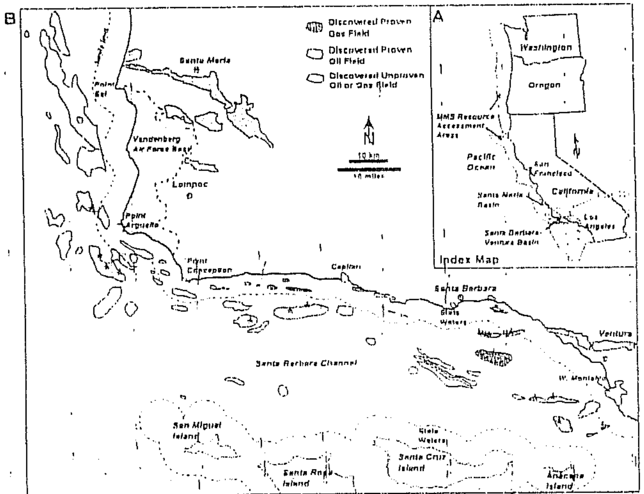


Figure 1. A. Pacific OCS Index Map (After Dunkel, C. A., 1999). MMS estimates of the discovered and undiscovered, conventionally recoverable oil and gas resources of the Pacific OCS range from 14-19 billion BOE, of which over 1.3 billion BOE have been produced since production began in 1968. B. Proven and unproven oil and gas fields in the Santa Maria and Santa Barbara-Ventura basins of the California OCS (After Sorensen, S. B., 2000). Twenty-four OCS fields (yellow areas in federal waters) have been discovered but remain undeveloped because of federal and state offshore drilling restrictions. Limited published data indicate that at least five prospects entirely in state waters remain unevaluated (yellow areas in state waters) (Reed, J. L., 2000). The total reserve potential of all undeveloped fields and prospects may range from 1.5-3.4 billion BOE.

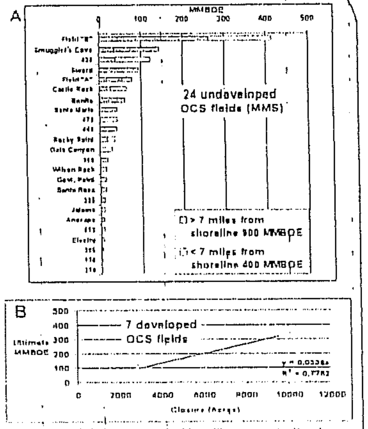


Figure 2. Statistical analyses of Pacific OCS reserves. A. Distribution of sizes of 24 OCS fields with unproven reserves (Figure 1B) based on 13600 BOE/acre (1.3 MMBOE/95000 acres) (Derived from Sorensen, S. B., et al., 2000). B. Linear regression analysis of the ultimate reserves of seven offshore fields producing mainly from the Monterey Formation and the closure areas of the fields (Santa Clara, Sockeye, Pescado, Pt. Arguello, Pt. Pedernales/T-Ridge Units, Sacate and Hondo). The best fit recovery factor is 33600 BOE/acre (Based on DOGGR, 2006). The recovery factors of 13600 BOE/acre and 33600 BOE acre are the basis for low-side and high-side estimates of the unproven and possible reserve potential of offshore southern California.

5. Conclusions

1. ERD technology has the potential to develop one-third of the undeveloped petroleum reserves that lie offshore California (500 million to 1 billion BOE).
2. Potential adverse effects of onshore development operations on marine biology and habitats would be nil or short-lived and minimal, mainly associated with marine surveys for pre-development planning.
3. The economic benefits to California of environmentally responsible development operations would be huge and would include increased employment opportunities, an increased tax base and a windfall of royalty payments from Federal lands.
4. A rational, knowledge-based national energy policy should provide for enabling legislation to develop offshore U.S. oil and gas reserves from onshore drill sites.

References

Anon., "Extended-Reach Drilling in Deepwater at Platform Heritage," [illegible], March/April, 2004, [illegible] p. 10.
Brockland, T., "Drilling advances [illegible] of Pacific OCS," Oil & Gas Journal, Aug. 7, 2006, p. 20-24.
DOGGR, "Annual Report of the State Oil and Gas Supervisor, California Department of Conservation," Pub. No. PR06, Sacramento, 2006, p. [illegible]
Dunkel, C. A., "Oil and Gas Resources in the Pacific Outer Continental," OCS Report [illegible] 2001-014, 2001.
Dunkel, C. A., and Piper, K. A., [illegible] "1995 National Assessment of United States Oil and Gas Resources Assessment of the Pacific Outer Continental Shelf Region," OCS Report [illegible] 1997.
Miller, K., "Project Expands," SantaInezTimes.com, [illegible] 2005.
Plains Exploration & Production Co. presentation at the [illegible] Energy Conference, [illegible]
Reed, J. L., MMS Pacific Region Update, http://[illegible] October 26, 2000.
Robertson, N., [illegible] Industry data [illegible] 2006.
Sorensen, S. B., et al., "Estimated Oil and Gas Reserves Pacific Outer Continental Shelf," OCS Report MMS 2000-[illegible], 2000.

3. Worldwide extended reach technology

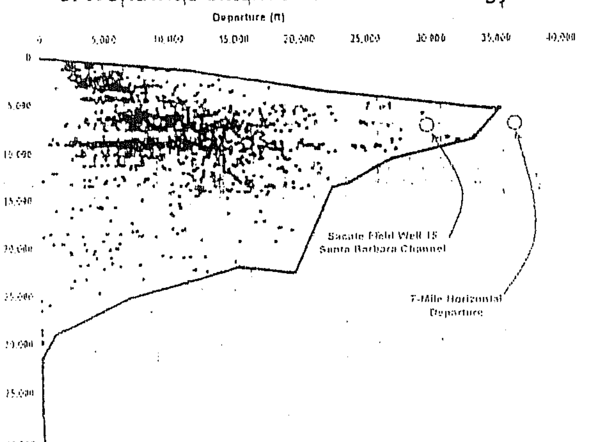


Figure 3. Industry drilling envelope (After Robertson, N. 2006). In 2006 Exxon drilled well Sa-15 in Sacate Field from Platform Heritage in Pescado Field with a departure of 29719 feet and a TVD of 7659 feet, which is the North American record for extended reach drilling and among the top ten wells worldwide (Figure 4.1). A well in BP's Wytch Farm Field in the UK reached within less than 2000 feet of a seven-mile departure.

4. Pacific OCS extended reach drilling

4.1 Completed ERD project

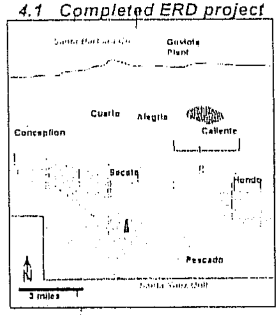


Figure 4.1. Since 1999 ExxonMobil has drilled 15 ERD wells from Platform Heritage into Sacate Field. The 15th well reaches over five and one-half miles from Platform Heritage and is the longest ERD well in North America (The red-dashed line is five and one-half miles long). Sacate Field has produced over 18 MMBO and 15 BCFG. The estimated ultimate recovery is 106 MMBOE (DOGGR, 2006). The environmental benefits of developing Sacate Field using ERD technology are fewer required wells, the elimination of the need for a new platform, reduced noise and visual impacts, reduced air emissions, and reduced impacts to the marine biology and habitats. (After Reed, J. L., 2000)

4.2 Proposed ERD project

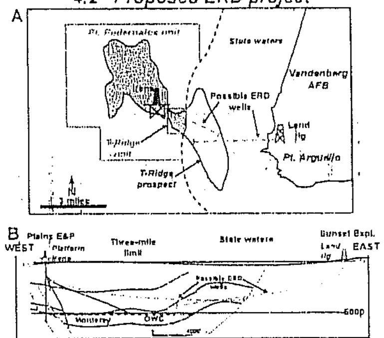


Figure 4.2.A. and 4.2.B. T-Ridge prospect map and cross section. Plains E&P has announced plans to use ERD from Platform Irene in their Point Pedernales Unit to develop the T-Ridge prospect in state waters and has applied to the State Lands Commission for a lease to carry out the development (Plains, 2005). Sunset Exploration has proposed a competing project to develop the T-Ridge structure using ERD from an onshore site on Vandenberg Air Force Base and has signed a letter of intent to participate in the project with ExxonMobil (Miller, K., 2005). The Sunset plan is a prototype of development that may be feasible in other OCS areas. The horizontal departure of a well to develop fractured Monterey Formation on the T-Ridge structure from either onshore or Platform Irene would be about four miles. Based on 3000 acres of closure, the potential of the T-Ridge prospect may range from 40-100 MMBOE (cf. Figures 2 and 4.3).

4.3 Possible ERD projects

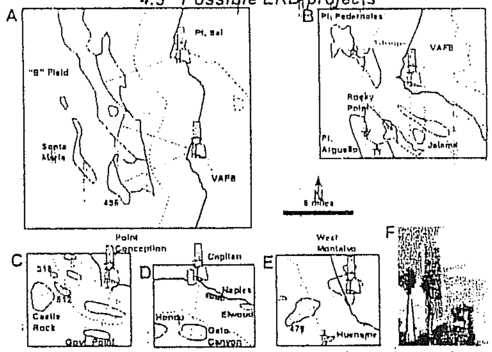


Figure 4.3 Vertical-lined patterns show unproven OCS reserves within seven miles of shoreline and possible reserves in state waters ([illegible]). Rig symbols locate six possible onshore drill sites. The total reserve potential of the six onshore drill sites ranges from 500 to 1000 MMBOE. The low-side and high-side recovery factors are 13600 BOE/acre and 33600 BOE acre (See Figure 2). The reserve potential of each drill site is: A. North Vandenberg Air Force Base 230-470 MMBOE. B. South Vandenberg Air Force Base 110-220 MMBOE. C. Pt. Conception 110-210 MMBOE. D. Capitan 30-60 MMBOE. E. West Montalvo 40-90 MMBOE. F. The drilling rig on the man-made Grissom drilling island near Long Beach, California is an example of the use of camouflaging to enhance the visual impact of operations in urban areas (Modified from photo by J. Jepson, California DOGGR website.)

Poster presentation modified from Brockland, T., 2006
Email: [illegible]

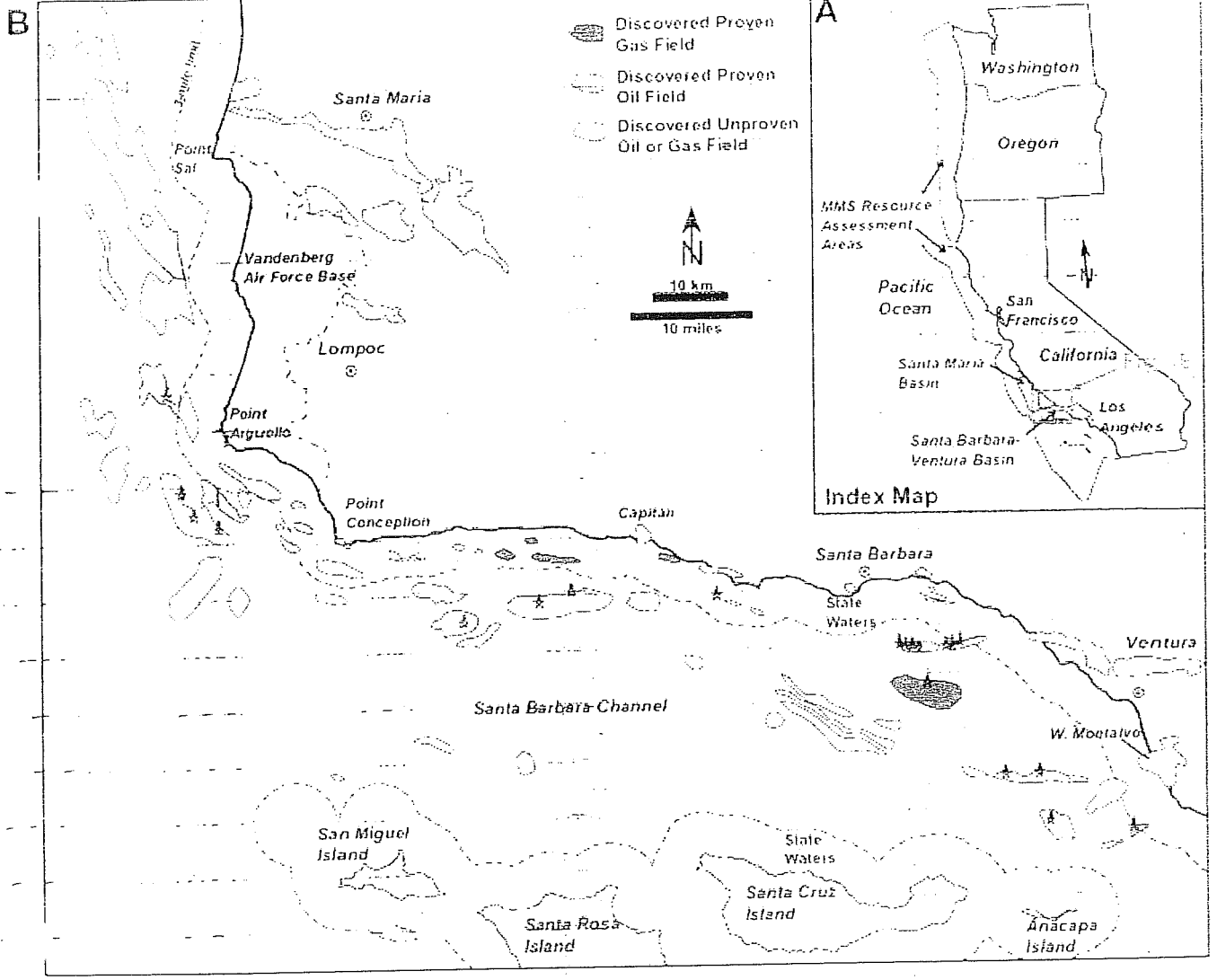


Figure 1. A. Pacific OCS index map (after Dunkel, 1999). MMS estimates of the discovered and undiscovered, conventionally recoverable oil and gas resources of the Pacific OCS range from **14-19 billion BOE**, of which over 1.3 billion BOE have been produced since production began in 1968.

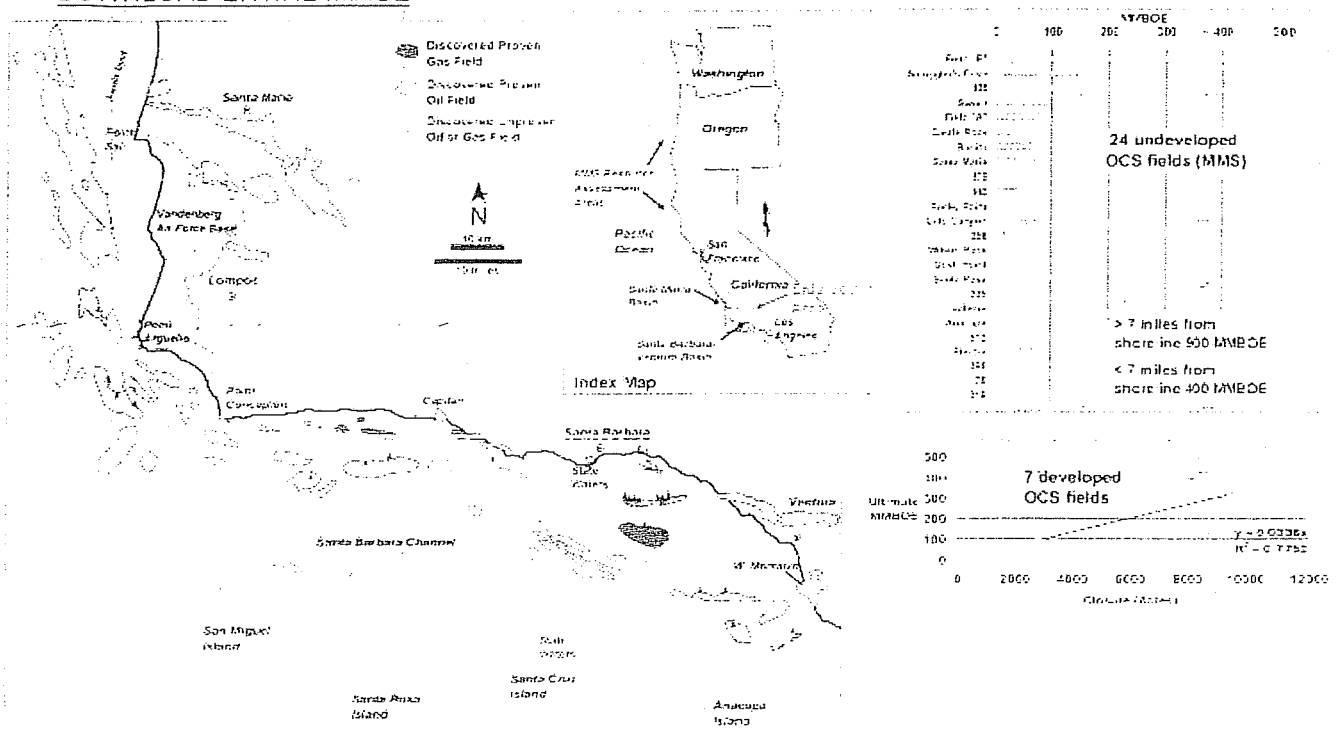
B. Proven and unproven oil and gas fields in the Santa Maria and Santa Barbara-Ventura basins of the California OCS (after Sorensen, 2000). Twenty-four OCS fields (yellow areas in federal waters) have been discovered but remain undeveloped because of federal and state offshore drilling restrictions. Limited published data indicate that at least five prospects entirely in state waters remain unevaluated (yellow areas in state waters) (Reed, 2000). The total reserve potential of all undeveloped fields and prospects may range from **1.5-3.4 billion BOE**.

Onshore / Offshore Drilling > Proven and unproven oil and gas fields ...

Proven and unproven oil and gas fields in the Santa Maria and Santa Barbara-Ventura basins offshore 'ifornia, where 24 OCS fields (chart; yellow areas in federal waters) have been discovered but remain eveloped due to federal and state drilling restrictions. Limited published data indicate that at least five prospects entirely in state waters remain unevaluated (yellow areas in state waters). The total reserve potential of all undeveloped fields and prospects may range from 1.5-3.4 billion BOE. The graph below, right, shows a linear regression analysis of the ultimate reserves in seven offshore fields producing mainly from the Monterey Formation, and the closure areas of the fields.

Graphics, data courtesy of Tom Bjorklund, Search and Discovery

DOWNLOAD ENTIRE IMAGE



Idea: Extended Drilling

Reach Out and Touch Some Oil

By LOUISE S. DURHAM
EXPLORER Correspondent

Bjorklund

Poster on Search and Discovery

Tom Bjorklund's complete poster, "The Case for Using Extended Reach Drilling to Develop California OCS Reserves From Onshore Locations," is available online at Search and Discovery, AAPG's online journal.

Search and Discovery has been striving to provide the latest geoscientific information for the past six years.

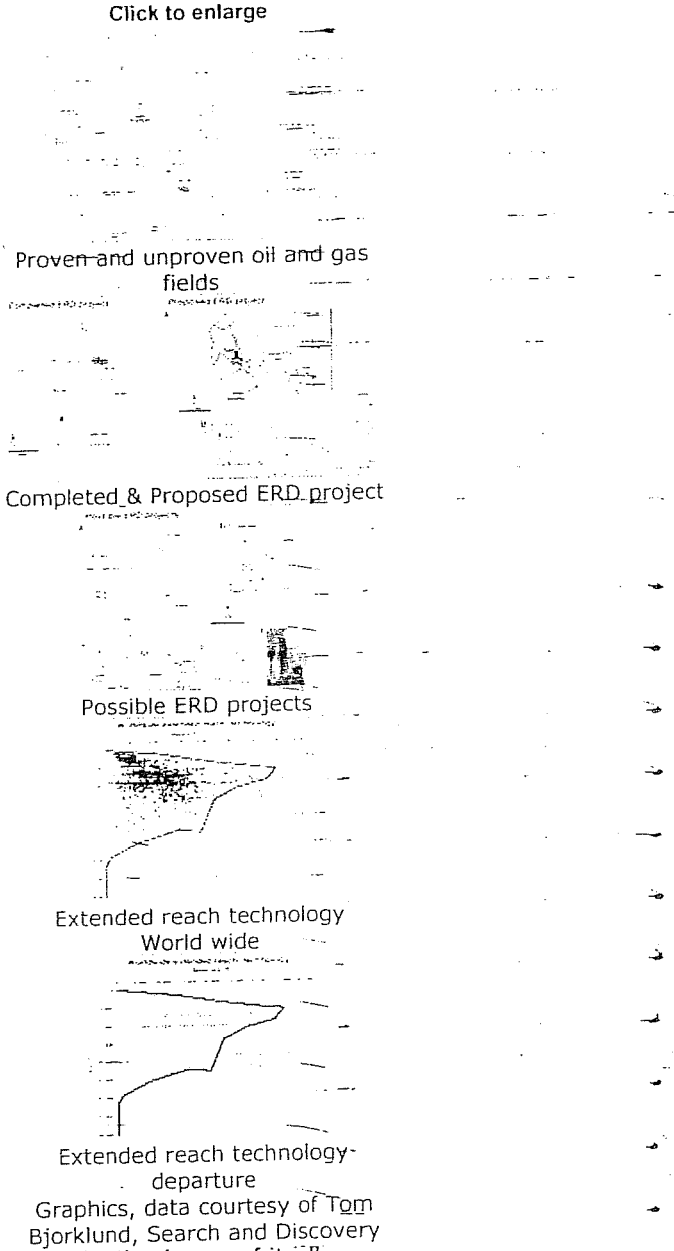
Anyone can access the online library and no password is needed. All articles are posted in two format versions: HTML and PDF for ease of use.

Bjorklund, a research scientist in the geosciences department at the University of Houston, presented the poster during the recent AAPG Annual Convention in Long Beach, Calif.

Go to Search and Discovery at searchanddiscovery.net, where you'll find access to a vast number of geosciences papers, posters and articles from around the world.

And if you have a scientific presentation that you think would make a good addition to Search and Discovery, call John Shelton at 1-918-560-2640, or e-mail your article to him at jws@aapg.org.

Click to enlarge



Graphics, data courtesy of Tom Bjorklund, Search and Discovery

Oh, the irony of it all.

Groups both pro and con battle passionately over offshore drilling in many regions of the United States -- and they battle so intensely that perhaps everyone is overlooking an obvious solution.

While the mere suggestion of installing drilling platforms in environmentally sensitive offshore areas such as California, Florida, etc., triggers a major freak-out among many elected officials -- and others -- a technology exists to tap some of the close-in offshore resources by drilling from an onshore location.

Is it possible that everyone can be happy?

The technology is called extended reach drilling (ERD), and it enables long horizontal offsets to be drilled to sites that might otherwise be inaccessible.

Perhaps the best known ERD success story can be found in southern England's BP-operated Wytch Farm field, which reportedly is the largest onshore oil field in western Europe. The field actually lies underneath Poole Harbor stretching out to sea beneath Poole Bay in the Dorset Coast region, which is one of the most environmentally sensitive areas in