THE ENVIRONMENTAL ASPECTS OF MODERN OIL AND GAS DEVELOPMENT

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTH CONGRESS

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OVERSIGHT HEARING ON "ENVIRONMENTAL ASPECTS OF MODERN OIL AND GAS DEVELOPMENT"

Wednesday, September 17, 2003
U.S. House of Representatives
Subcommittee on Energy and Mineral Resources
Committee on Resources
Washington, DC

The Subcommittee met, pursuant to call, at 10:04 a.m., in Room 1324, Longworth House Office Building, Hon. Billy Tauzin presiding.

Members Present: Representatives Tauzin, Gibbons, Rehberg, Pearce, Pombo (ex officio), Kind, and Udall of New Mexico.

Mr. TAUZIN. The Committee will please come to order.

Let me welcome all our witnesses and thank our colleague from Louisiana, Mr. Vitter, who will lead off the testimony today on this hearing on the environmental impacts of modern oil and gas development. The Chair will recognize himself briefly for an opening statement and will then yield to my friend, Mr. Kind, who will have an opening statement under the rules. Other members who have opening statements we will place them in the record, is my understanding.

The Chair recognizes himself for an opening statement.

STATEMNT OF THE HON. W.J. "BILLY" TAUZIN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. TAUZIN. Let me first thank all the witnesses for coming. As even our most recent former president Bill Clinton recognized, modern technology in the production of oil and gas in America has made rapid and dramatic improvements over the time that I have been here in the Congress over the last 23 years. In fact, President Clinton and Vice President Gore presided over a 1998 national oceans conference in Monterey, and the report from that conference which was requested by President Clinton from his cabinet on a coordinated disciplined long-term ocean policy contains the following statement: Advances in technology have made offshore oil and gas production cleaner and safer than ever.

Since 1980, 6.9 billion barrels of outer continental shelf oil has been produced, with a spillage rate of less than point 001 percent. And despite these advances, however, environmental concerns have

led to congressional and executive moratorium since 1981, and many of our coastal areas are closed to new leasing through the year 2012. In effect, the report was indicating that the policy is woefully lagging behind the advances in technology and has failed to recognize the fact that ocean production of oil and gas and other minerals can now be conducted in ways that have very insignificant impacts upon the environment. We will learn more about that proposition and more about the energy environmental aspects current technologies on production as we go forward.

There are only nine States in America that now produce more energy than they consume. And if America is worried about a 60 plus percent reliance on foreign oil, let me caution all our neighboring states who are not one of the nine States that produce more energy than they consume, that some of them have put themselves in extraordinarily vulnerable situations.

California, for example, consumes now twice as much energy as it produces. No surprise that California had an energy crisis. Right here in Maryland, by the way, Maryland consumes 10 times the energy that this State produces, right next to our Nation's capital. In Florida, the State that objects to any oil and gas production off its coast, yet it supports offshore pipeline projects from Alabama and Louisiana, et cetera, it consumes 23 times as much energy as it produces as a State. Imagine America being 23 times dependent on foreign sources for our energy. That is where Florida is.

And finally, my dear friend, Mr. Markey, who is not here yet, but Mr. Markey and I serve on the Energy and Commerce Committee together, as you know. Mr. Markey's State of Massachusetts uses 61 times the energy it produces. Only 9 States, my own State of Louisiana being one of them, produce more energy than they consume. In fact, Louisiana produces twice as much energy as it consumes, and yet Louisiana is one of the highest per capita energy consumers in America because of the petrochemical industry and other merchant energy plants that exist in our State.

About half of America's homes are heated by natural gas, and 90 percent of the new power facilities that are being brought on-line in the next 10 years will require natural gas. Mr. Greenspan has been here 5 times on the Hill to warn us of an impending crisis in natural gas, and yet we still lock up over 40 percent of the natural gas that could be produced in our country. The Department of Energy recently predicted that the gap between supply and demand will increase by another 50 percent in the next 20 years. And while we are at it, we ought to recognize that oil and gas production on the Federal lands and waters is providing about $130 billion to our National Treasury, much of that money needed for the programs that so many of our friends who oppose development are very willing and anxious to spend on behalf of programs that they are very interested in funding with the very money that they objected to being raised in oil and gas development.

Well, I want to go back quickly, and then I will yield to my friend, to the late 1980s when Senator Pete Domenici and I started something called the Keystone Energy Board Project. It is a project to bring environmentalists, public policymakers, and legislators from State and Federal sources together in a single board to talk about not the fight between environment and energy production

but the cooperative efforts and the way one could enhance the other and how one might, in fact, accommodate the other in ways that we can have the two of them and in a compatible system. That Keystone Energy Board did some remarkable work in building bridges between the developmental needs of our country and the environmental concerns of our country.

This hearing is designed to update us on the technology, on the condition, on the relationship between the environment and the new technology of energy production, and we certainly want to welcome that testimony. We believe, Chairman Pombo, that this is going to aid immeasurably to this Committee's knowledge and understanding of this issue as we move forward.

I thank the Committee, and I now am pleased to yield to the Ranking Democrat of the Subcommittee, Mr. Kind, for an opening statement.

STATEMENT OF THE HON. RON KIND, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WISCONSIN

Mr. KIND. Thank you, Mr. Chairman. And I, too, want to thank our colleague, Mr. Vitter, for his presence and testimony here today as well as the two panels that will be testifying. We look forward to hearing your testimony. This is an important hearing, and it is always good to get some updates on the progress being made with oil and gas development in this Nation. And I agree with you, Mr. Chairman, we need to be diligent in regards to exploring our energy resources as a Nation. But I would also hope that we can take a balanced approach, recognizing the other values that our society holds dear rather than just further exploration and development, but the protection of our vital natural resources and the conservation and the beautiful lands throughout the United States. I think that too is very important to keep in mind.

Today's hearing addresses environmental aspects of modern oil and gas development. Certainly, the oil and gas industry has worked diligently to improve its environmental track record during recent years and we will hear about some of these accomplishments from today's panelists. We will hear about oil rigs that are decommissioned and transformed into artificial reefs; we will hear about directional drilling and the ability to access more resource through fewer wills. We will hear about the footprint reduction in onshore development. All these examples are trends that should continue as new technology becomes available, and all constitute a step in the right direction.

However, there are some negative impacts related to resource development, and I understand that it is the desire from the Chairman and the Committee to try to focus a lot of today's discussion on the Gulf of Mexico, but there are also some challenges arising in other parts of the Nation too that deserve attention. News reports on the coalbed methane boom occurring in the Powder River Basin and other areas of the Rocky Mountain Region are published nearly every day. Just recently, administrative backlogs in the coalbed methane permitting process have begun to loosen, and thousands of new projects will soon break ground. In fact, up to 66,000 new coalbed methane and 3,000 oil and gas wells are expected to be drilled in Wyoming over the next 10 years. Yet, indus-

try has not addressed many of the negative impacts associated with this type of development.

Many western landowners do not own their land's subsurface mineral rights and therefore cannot prevent oil and gas developers from acquiring the right to drill on their property. The split-estate nature of western lands allows oil and gas companies to lease the subsurface mineral rights of lands that have been used by ranches for many generations. Thus, everyday ranchers are waking to the sound of industry on their lands and have virtually no say in the operations that follow. Toxic holding ponds, tainted groundwater, dry wells and roughshod roads, the inevitable impacts of the industrial gas production leave ranchers with dead livestock, ailing crops, and toxic water supplies. If we are to truly benefit from the production of coalbed methane, we must ensure that it is produced responsibly, both for the sake of our ranchers and for the environment.

One of the most serious energy issues in recent years is the shortage of natural gas, as the Chairman just cited. During our June 19th hearing in this Subcommittee, representatives of the oil and gas industry claimed the only solution to the gas shortage was increased domestic development. Five days later in another oversight hearing on domestic natural gas resources, the industry claimed that a large portion of western natural gas resources are restricted from development through a patchwork of wildlife protections and environmental safeguards. Now, make no mistake, part of the solution will come from increased domestic production. I think everyone recognizes that, and we have been holding countless hearings to that point. However, we shouldn't sacrifice years of work aimed to protect wildlife and the environment for the sake of resource development and oil and gas industry giveaways in this Nation. Wildlife enthusiasts including hunters and fishermen and other sportsmen are becoming increasingly concerned about the rapid pace of oil and gas development occurring in the Rocky Mountain region. They have testified that though designed specifically to protect wildlife, stipulations for seasonal restrictions are frequently waived at industry's request in order to accommodate drilling or other developmental activities.

At this time, I would like to submit for the record a list of all wildlife stipulation waiver requests submitted to the Pinedale, Wyoming Bureau of Land Management field office for last winter. It is evidence from first glance of this list that nearly all the waiver requests were granted. It is also relevant to note that the Jonah natural gas field, one of the largest gas discoveries in North America, is under the jurisdiction of the Pinedale field office. On the other hand, offshore development has enjoyed an impressive environmental track record for a number of years, with the advents of directional drilling, advanced platform design and dynamic positioning systems, offshore drilling has become a relatively clean production practice.

As we will hear from our colleague, Mr. Vitter, platforms are no longer removed from the environment; rather, they are transformed into artificial reefs and scientific research stations. These are good things and very beneficial.

Despite these advancements, there is one major issue facing the Gulf that continues to endanger the environment and even the residents of the Gulf Coast region. Mr. Ben Raines, a reporter for the Mobile Register, recently won the John Oakes Award for Environmental Journalism for a series of articles uncovering the serious problem of mercury contamination in the Gulf of Mexico sea life. Mr. Raines discovered that, largely due to federally licensed dumping of drilling muds from offshore rigs and platforms, marine worms, the primary feedstock of bottom-feeding gulf fish, have become highly poisoned with mercury. In fact, mercury concentrations in sand around some rigs are as high as levels found at some Federal Superfund sites now closed to fishing as a result of severe contamination by the toxic metal. Therefore, without objection, Mr. Chairman, I would submit Mr. Raines' articles on mercury contamination for the record at this time.

Mr. TAUZIN. Without objection, it will be ordered.

[NOTE: The articles have been retained in the Committee's official files.]

Mr. KIND. While we celebrate the accomplishments of modern oil and gas development here today, we must recognize and remember the environmental issues that continue to plague the industry. By cultivating a greater symbiosis between the development and the surrounding natural environment, we can fulfill our duty as stewards of this great land and continue to preserve its beauty and spirit. And, again, I thank our witnesses' testimony here today. We look forward to it. Thank you, Mr. Chairman.

Mr. TAUZIN. I thank the gentleman for his opening statement.

[The prepared statement of Mr. Kind follows:]

Statement of The Honorable Ron Kind, Ranking Democrat, Subcommittee on Energy and Mineral Resources

Today's hearing addresses environmental aspects of modern oil and gas development. Certainly, the oil and gas industry has worked diligently to improve its environmental track record over the years, and we will hear about some of these accomplishments from today's panelists.

We will hear about oil rigs that are decommissioned and transformed into artificial reefs.

We will hear about directional drilling and the ability to access more resource through fewer wells.

We will hear about footprint reduction in onshore development. All of these examples are trends that should continue as new technology becomes available, and all constitute a step in the right direction.

However, many negative impacts related to resource development persist. News reports on the coalbed methane boom occurring in the Powder River Basin and other areas in the Rocky Mountain region are published nearly every day.

Just recently, administrative backlogs in the coalbed methane permitting process have begun to loosen, and thousands of new projects will soon break ground. In fact, up to 66,000 new coalbed methane, and 3,000 oil and gas, wells are expected to be drilled in Wyoming over the next ten years, yet, industry has not addressed the many negative impacts associated with this type of development.

Many Western landowners do not own their land's subsurface mineral rights, and therefore cannot prevent oil and gas developers from acquiring the right to drill on their property. The "split-estate" nature of western lands allows oil and gas companies to lease the subsurface mineral rights of lands that have been used by ranchers for generations.

Thus, everyday, ranchers are waking to the sound of industry on their lands, and have no say in the operations that follow. Toxic holding ponds, tainted groundwater, dry wells, and roughshod roads, the inevitable impacts of industrial gas production, leave ranchers with dead livestock, ailing crops, and toxic water supplies. If we are

to truly benefit from the production of coal bed methane, we must ensure that it is produced responsibly, both for the sake of our ranchers and our environment.

One of the most serious energy issues in recent years is the shortage of natural gas in the United States. During our June 19th hearing, representatives of the oil and gas industry claimed the only solution to the gas shortage was increased domestic development. Five days later, in another oversight hearing on domestic natural gas resources, the industry claimed that a large portion of Western natural gas resources are restricted from development through a patchwork of wildlife protections and environmental safeguards.

Make no mistake, part of the solution will come from increased domestic production; however, we should not sacrifice years of work aimed to protect wildlife and the environment for the sake of resource development and oil and gas industry giveaway's. Wildlife enthusiasts, including hunters, fishermen and other sportsmen, are becoming increasingly concerned about the rapid pace of oil and gas development occurring in the Rocky Mountain Region. They have testified that though designed specifically to protect wildlife, stipulations or seasonal restrictions are frequently waived at industry's request in order to accommodate drilling or other development activities.

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Despite these advancements, there is one major issue facing the Gulf that continues to endanger the environment and even the residents of the Gulf coast region. Ben Raines, a reporter for the Mobile Register, recently won the John B. Oakes award for environmental journalism for his series of articles uncovering the serious problem of mercury contamination in Gulf of Mexico sea life. Mr. Raines discovered that, largely due to the federally-licensed dumping of drilling muds from offshore rigs and platforms, marine worms, the primary feedstock of bottom-feeding Gulf fish, have become highly poisoned with mercury. In fact, mercury concentrations in sand around some rigs are as high as levels found at some federal superfund sites now closed to fishing as a result of severe contamination by the toxic metal.

Therefore, without objection, I submit Mr. Raines' articles on mercury contamination for the record.

While we celebrate the accomplishments of modern oil and gas development here today, we must recognize and remember the environmental issues that continue to plague the industry. By cultivating a greater symbiosis between development and the surrounding natural environment, we can fulfill our duty as stewards of this great land and continue preserve its beauty and spirit.

Mr. TAUZIN. And without objection, other Members' opening statements will be made a part of the record.

We are now pleased to welcome my colleague and our colleague from Louisiana—Mr. Pombo, did you wish to make an opening statement? I believe you have the right as Chairman of the Committee. So, Mr. Pombo is recognized. Pardon my abuse of your rank, Mr. Pombo. I have been in that Commerce Committee so long, I forget sometimes.

STATEMNT OF THE HON. RICHARD W. POMBO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA, AND CHAIRMAN, COMMITTEE ON RESOURCES

Mr. POMBO. Well, just very briefly. I want to express my appreciation to you and the rest of the Committee for holding this hearing this morning. I do believe this is extremely important.

A lot of what the Ranking Member said this morning, I agree with. I do think that it is a matter of achieving a balance in terms of producing new energy and protecting our environment. I think many times what we have seen in recent years is a false choice that has been put in front of us, that either you protect the environment, or you produce energy. And being responsible legislators, I don't think we can stand for that false choice. We have to look at how do we use technology, modern technology and what we have learned over the many years that we have been producing energy in this country so that we don't make some of the mistakes of the past, so that we can look at how do we bring new areas on line and maintain the environment.

I would also just say that any time we do anything as human beings, we have an impact on the environment, whether it is recreating in our public lands, whether it is resource extraction from our public lands. Anything, any time that human beings have any kind of activity, there is an impact on the environment. Our goal is to mitigate that impact and to have it be as light as we possibly can.

I do believe that it is possible to have energy development, resource development in this country without having the devastating impact on our environment, and I believe it is our responsibility as Federal legislators to make that happen. And I thank the Chairman, and I yield back.

Mr. TAUZIN. The Chair thanks the Chairman of the full Committee. And, again, other Members' statements will be made a part of the record without objection.

And now the Chair is pleased to recognize the distinguished gentleman from Louisiana, the Honorable David Vitter who represents the first district of Louisiana and who has developed a very deep and abiding interest in this subject matter and has introduced H.R. 2654, the Rigs to Reef Act, which I believe he will discuss with us among other issues today.

Welcome, Mr. Vitter. We are honored to have you.

STATEMENT OF THE HON. DAVID VITTER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF LOUISIANA

Mr. VITTER. Thank you very much, Mr. Chairman, and members of the Subcommittee. And thank you for calling this hearing on what is a very important environmental and economic issue.

You know, members, I am sure there have been literally hundreds of hearings on the environmental impacts on oil and gas development in the history of the Congress, and I am equally sure that the vast majority of those hearings have focused purely on environmental problems and hazards. Now, those are real and those are important, and there is no disputing that. But there is the rest of the story, as Paul Harvey would put it, which is equally real and important. It is a story of thriving ecosystems that actually build and develop around, and solely because of, offshore platforms. And I applaud you for focusing on that story today.

Offshore oil and gas platforms are home to some of the most prolific ecosystems on our planet. These structures attract new coral populations and attach quickly after the platform is placed, and then continue to flourish for the entire life of the platform. And

with the corals come fish species, many of which are protected or endangered.

The scientist and experts we will hear from later can better explain how this happens, but what I know is what everyone who fishes Louisiana knows: The best fishing is under oil and gas platforms and around artificial reef sites. The coral that develops on the structures lays the foundation for thousands of fish and other species which helps create these thriving ecosystems. However, when platforms go out of production, current Federal regulations require that they be removed from the water and literally ripped out within a year. And what does that mean? It means that these thriving ecosystems are literally ripped from the water, fish habitats are completely disrupted and destroyed, and often many species including rare species of sea life are destroyed.

Now, there are roughly 4,000 platforms in the Gulf of Mexico, and about 120 to 200 are due to be removed each year for many years to come. With so many platforms being removed, I hope more options can be found for these useful structures. Alternative uses means continued benefits for the environment and opportunities for new jobs to replace those lost by the growing number of decommissioned platforms.

I am going to talk about three possible uses for these decommissioned platforms, and that is what my bill focuses on. And I will get to the details of the bill in a minute. One very real and possible use for these platforms is scientific research. With the thriving ecosystems underneath a platform, there is potential for research to do all sorts of things, find medical uses of the sponges that grow around some platforms, or promote studies involving rare aquatic species, or work on fish behaviors and much more. Second, these platforms could be used for fish farming and other mariculture uses. Mariculture could increase fish populations and thereby reduce our dependence or foreign seafood imports, and mariculture could prove useful in providing more protein rich food that is readily available and quickly produced to actually feed the world's hungry.

Japan, for example, is spending billions of dollars to create offshore structures specifically for mariculture. Meanwhile, our waters already have these structures which are better in many, many ways for these purposes. Those structures are in place, but our policy again is to remove and rip them out of the ocean, destroying thriving marine environments and really destroying that vast environmental and economic potential.

The third option for these decommissioned platforms is for them to become part of artificial reefs. This option leaves the ecological benefits of having the structure in the water, and would benefit the commercial and recreational fishing industries as well.

Now, recognizing the ecological benefit of these structures, my own State of Louisiana began a rigs-to-reefs program in 1986. It is State-based, but it is under some Federal guidance. This allows decommissioned platforms to become part of a reef site after they have ceased operating. Other states have similar programs. But all of these programs, quite frankly, while very beneficial, very productive, very well designed are limited in scope mainly because significant hindrances to this sort of work remains, including at the Fed-

eral level. Only about 8 percent of decommissioned platforms have been placed in reef sites since the beginning of these State-based programs. And with hundreds more due to be removed each year, there is potential for increasing the number of artificial reefs or other uses of decommissioned platforms and providing more homes for coral fish and other aquatic species that live around these structures.

Because I believe strongly in the usefulness of these decommissioned platforms, particularly in the three important categories I mentioned, I have introduced a bill here at the Federal level to remove some of the still existing hindrances that prevent greater alternative uses of decommissioned platforms. I believe we can safely leave these structures in the water in many cases for the uses I have discussed. These structures should not be removed from the water without at least examining in a very serious way their alternative uses without trying to minimize the environmental loss, the actual environmental disruption and loss that occurs when platforms are ripped out and removed.

H.R. 2654 is my Rigs to Reefs Act, and it would give the Secretary of the Interior authority to create a program to allow using decommissioned platforms for culturing marine organisms as an artificial reef or for scientific research. This would mean that the requirement for 1-year removal could be suspended under this program if platforms were carefully and properly decommissioned, cleaned up, and transferred to these other purposes.

The bill addresses liability issues, which is perhaps the key hindrance to alternative uses and artificial reefs, and a top reason these platforms are removed 92 percent of the time and only used as reefs or other things 8 percent of the time. Under my bill, liability claims involving oil and gas production stay with oil and gas company. But for actions following transfer and for activities completely unrelated to oil and gas production, the liability would follow the ownership of the platform. Without the hindrance of continued liability, platform owners would be far more likely to negotiate for alternative uses or transfer their platforms to artificial reef sites.

In addition, the bill directs the Secretary of the Interior to study and report back within a year how further removal of platforms will affect existing fish stocks and coral populations. This study would quantify the extent to which platforms are beneficial to the offshore underwater environment and the extent to which more platform removals would be actually harmful to fish stocks and coral. I am very confident that this study would complement other existing research and give us real science, real data and numbers to provide evidence about how these platforms and to what extent they are beneficial to the marine environment.

These alternative uses I have talked about, specifically three, mariculture uses, scientific research, artificial reefs, can all be implemented in a clean, safe way. Any alternative use under my bill as well as under existing State programs would only be allowed after the full and careful decommissioning of the platform, including the removal of heavy equipment, heavy machinery, industrial liquids, the cleaning of the platform, et cetera.

I also want to emphasize that my bill and this course of action would not mandate any course of action for a particular platform; it would simply create more options. And it specifically states that it does not supersede any existing lease authority the Secretary of the Interior already has, instead only adding new opportunities.

Right now, platform removal is almost the only option, with limited exceptions. And yet there lies great benefit for the marine environment if more potential uses can be explored in a practical way.

Mr. Chairman, thank you again for having this hearing. This is the first step in raising awareness of the ecological benefits of offshore oil and gas platforms. And I really do appreciate the effort of you and the rest of the Subcommittee in this regard. Thank you. I would be happy to answer any questions if any of the members of the Subcommittee would have any.

Mr. TAUZIN. Thank you very much, Mr. Vitter.

[The prepared statement of Mr. Vitter follows:]

Statement of The Honorable David Vitter, a Representative in Congress from the State of Louisiana

Madam Chairman and Members of the Subcommittee:

Thank you for calling this hearing on this important environmental and economic issue.

You know, members, I'm sure there have been literally hundreds of hearings on the environmental impacts of oil and gas development in the history of the Congress. And I'm equally sure that virtually every one of those hearings has focused purely on environmental problems and hazards.

Now those are real and important. But there's the rest of the story, as Paul Harvey would put it, that's equally real and important. It's the story of thriving ecosystems that actually build and develop around—and solely because of—offshore platforms. And I applaud you for focusing on that part of the story today.

Offshore oil and gas platforms are home to some of the most prolific ecosystems on our planet. These structures attract new coral populations that attach quickly after the platform is placed and then continue to flourish for the entire life of the platform. With the corals come fish species, many of which are protected or endangered.

The scientists and experts we will hear from later can better explain how this happens. But what I know is what everyone who fishes Louisiana knows: the best fishing is under oil and gas platforms and around the artificial reef sites. The coral that develops on the structures lays the foundation for thousands of fish and other species, which helps create these thriving ecosystems.

However, when platforms go out of production, current federal regulations require that they removed from the water and ripped out—within a year. What does that mean? Thriving ecosystems are ripped from the water, fish habitats are disrupted, and many rare species of sea life are even destroyed.

There are roughly 4,000 platforms in the Gulf of Mexico, and about 120-200 are due to be removed each year for years to come. With so many platforms being removed, I hope more options can be found for these useful structures. Alternative uses means continued benefits for the environment and opportunities for new jobs to replace those lost by the growing number of decommissioned platforms.

One possible use for these platforms is scientific research. With the vast ecosystems underneath a platform, there is potential for research to find medical uses of the sponges that grow around some platforms, studies involving rare aquatic species, work on fish behaviors, and much more.

Also, these platforms could be used for fish-farming and other mariculture uses. Mariculture could increase fish populations and thereby reduce our dependence on foreign seafood imports. And mariculture could prove useful in providing more protein-rich food that is readily available and quickly produced to help feed the world's hungry. Japan, for example, is spending billions of dollars to create offshore structures for mariculture. Our waters already have these structures in place, but our policy is to remove them, destroying thriving marine environments and removing vast potential.

A third option for decommissioned platforms is for them to become part of artificial reefs. This option leaves the ecological benefits of having the structure in the water and would benefit the commercial and recreational fishing industries.

Recognizing the ecological benefit of these structures, my home state, Louisiana, began a rigs-to-reefs program in 1986 under federal guidance. This allows decommissioned platforms to become part of a reef site after they have ceased operating. Other states have similar programs, but these programs are limited in scope because of many hindrances at the federal level. Only 8 percent of decommissioned platforms have been placed in reef sites. With hundreds more due to be removed each year, there is potential for increasing the number of artificial reefs and providing more homes for coral, fish, and the other aquatic species that live around these structures.

Because I believe strongly in the usefulness of these platforms and their ecological benefits, I have introduced a bill to remove some of the hindrances that prevent greater alternative use of decommissioned platforms. I believe we can safely leave these structures in the water for the uses I've discussed. These structures should not be removed from the water without at least examining their many alternative uses, or without trying to minimize the environmental loss that occurs when platforms are removed.

H.R. 2654, the Rigs to Reefs Act, will give the Secretary of Interior authority to create a program to allow using decommissioned platforms for culturing marine organisms, as an artificial reef, or for scientific research. This would mean that the requirement for one-year removal could be suspended if platforms were carefully and properly decommissioned and used for these other purposes.

The bill addresses liability issues, a key hindrance to alternative uses and artificial reefs and a top reason these retired platforms are removed. Under my bill, liability claims involving oil and gas production stay with the oil and gas company. But for actions following transfer for activities not related to oil and gas production, the liability will follow the ownership of the platform. Without the hindrance of continued liability, platform owners would be more likely to negotiate for alternative uses or transfer their platforms to artificial reef sites.

Additionally, the bill directs the Secretary of Interior to study and report back within a year how further removal of platforms will affect existing fish stocks and coral populations. This study will quantify the extent to which platforms are beneficial to the offshore underwater environment and the extent to which more platform removals would be harmful to fish stocks and coral. I am confident this study would complement other existing research and provide more evidence that these platforms are beneficial to the marine environment.

These alternative uses can be implemented in a clean, safe way. Any alternative use would only be allowed after the full and careful decommissioning of the platform, including the removal of engines, other heavy machinery, and any industrial liquids.

My bill would not mandate any course, only create more options. And it specifically states that it does not supercede any existing lease authority the Secretary of Interior already has, instead only adding new opportunities. Right now, platform removal is the only option, yet there lies great benefit for the marine environment in these structures and much potential for other uses.

Madam Chairman, thank you again for having this hearing. This is the first step in raising awareness of the ecological benefits of offshore oil and gas platforms, and I appreciate the efforts of you and the rest of the Subcommittee.

Mr. TAUZIN. Let me begin with a few questions. You mentioned in your statement the 1986 program in Louisiana to create a rigs-to-reefs program. Is that program limited to State waters?

Mr. VITTER. As far as I know, it is not limited to State waters. But it—well, actually, I have to check on that. I am not certain. But it is certainly limited in terms of how practically it is carried out because of the sort of hindrances, the biggest one being liability.

Mr. TAUZIN. I want to talk to you about liability. Even under the State's program right now, liability still follows the company; so that if the company turns a rig over for a rigs-to-reefs program, it is doing so at some risk. Is it not? If someone gets injured on that rig fishing or someone is doing experiments, or simply filming or

doing a study, gets injured on the rig, some rigging on the rig catches them and there is a claim of negligence and not having cut that rigging or something away, the company is still remains liability, doesn't it?

Mr. VITTER. Yes, that is true.

Mr. TAUZIN. Why would any company want to take that risk and leave a rig out there?

Mr. VITTER. Well, that is a great question. And, quite frankly, I think that is the dominant reason we have this figure of 8 percent use of the program versus 92 percent ripping these platforms out at much greater cost clearly.

Mr. TAUZIN. That is the point. I mean, if a company knows it has got to spend a lot of money to rip it out, but the other side of that is if it doesn't spend that money to rip it out, if it accepts the role in the rigs-to-reefs program, it accepts some rather long-term unlimited liability. Does it not?

Mr. VITTER. Correct.

Mr. TAUZIN. That is not a risk that stockholders would appreciate?

Mr. VITTER. Right.

Mr. TAUZIN. And do you agree with me that it probably is the single most important reason why more rigs are not left in place to serve as, as you pointed out, ecological centers for mariculture development than any other reason that we have ever heard of?

Mr. VITTER. Yes. I think it is the single biggest reason why, again, this figure is so low, 8 percent versus 92 percent ripping it out. Also, I think it is the reason that the State-based programs are pure artificial reef programs.

Mr. TAUZIN. Explain that to us. What do you mean by that?

Mr. VITTER. Well, I mean the only thing that happens with those 8 percent of rigs in the State-based programs is using the rigs as part of an artificial reef.

Mr. TAUZIN. In other words, all other potential uses are not even thought about because of the liability program?

Mr. VITTER. Correct.

Mr. TAUZIN. You don't want to put people on that rig to do experiments or to do mariculture activities because that is just too much liability?

Mr. VITTER. Right. That means you would have humans actively being on the platform. That is not even considered now. And although my bill is called informally rigs to reefs, it is actually broader than that because we specifically talk about three categories, not just artificial reefs but scientific research to mariculture.

Mr. TAUZIN. How would you handle that? Who would take over the liability for that reef under your bill and under your idea?

Mr. VITTER. Well, again, under the bill, any liability, first of all, that goes back to activity when the platform was an active oil and gas production owned by the oil and gas company still goes to the oil and gas company.

Mr. TAUZIN. You wouldn't relieve them of any liability for the negligence during their operation of the rig?

Mr. VITTER. No. Nor would we relieve them of any liability still associated, even after they sell the rig, with anything having to do with oil and gas production or activity.

Mr. TAUZIN. What does that mean?

Mr. VITTER. Just, for instance, if the rig was improperly capped and you had some accident because of that improper capping. Now that, as a general matter, doesn't happen. But that would relate back to their activity, and they would still be on the hook even if it happened 5 years after ownership of the platform past. However, if the liability on the other hand is after their ownership is over and has nothing to do with oil and gas activity, if there is—it is a scientific research station and someone gets hurt because people are climbing on the platform in its new use as a scientific research station, then the oil and gas company would not be on the hook for that.

Mr. TAUZIN. Who is on the hook for it?

Mr. VITTER. The new owner and operator of the platform, whoever that might be, would be on the hook for that. I mean, under normal court law.

Mr. TAUZIN. So if the State took this over as a platform for simply a rigs-to-reefs program, the State would then assume liability for any accidents or injuries occasioned by the negligence connected with the platform?

Mr. VITTER. Correct. Or if another private entity.

Mr. TAUZIN. Or if a nonprofit entity undertook or a profit entity took it over for mariculture production.

Mr. VITTER. Correct.

Mr. TAUZIN. It would assume liability for operations of that rig not associated with oil and gas development.

Mr. VITTER. Correct.

Mr. TAUZIN. All right. I thank the gentleman. Let me go to Mr. Kind and then I will come back.

Mr. Kind.

Mr. KIND. Thank you, Mr. Chairman.

Thank you, Mr. Vitter. I appreciate your testimony here today.

Mr. Vitter, in my opening statement I made reference to a series of articles that Mr. Ben Raines of the Mobile Register had written in regards to the mercury contamination in the Gulf. Are you familiar with those articles?

Mr. VITTER. No, I am not.

Mr. KIND. Are you familiar with the studies that have been taking place with regards to mercury contamination?

Mr. VITTER. I am familiar generally with the issue, but I certainly can't cite you the findings of the studies.

Mr. KIND. I understand there are some additional studies out there, too, that perhaps Mr. Raines hasn't cited and that, but this does seem to be a growing concern especially with the fishermen in the area, the consumers consuming the fish taken from the Gulf. And I would certainly be interested in following up with you at some point to see what we might be able to do in the ways of dealing with it, trying to get the best science possible to determine what is occurring and what the causes of that and what steps we might be able to take in order to reduce the increase in mercury contamination in a very important region. So perhaps at some point we can have a conversation about that or perhaps jointly request a hearing on mercury contamination in the Gulf before this Subcommittee so we can start working on some possible solutions.

Mr. VITTER. Sure. I would be happy to work with you on that. Just because of where I live in the world, I probably end up eating a whole lot more of that fish, as does my family, than virtually anyone in this room. So I have an abiding interest in that. And as I said at the beginning of my comments, those sort of issues having to do with possible negative impacts, environmental impacts of oil and gas development are very real, and I am not disputing that. But there is this other side of the equation, which is that there is certainly in this one area a very positive impact. Maybe not intended or certainly not the primary purpose of these oil and gas rigs, not why they were put there, but it is a positive impact. And yet we have this policy that basically destroys that positive impact and tilts the playing field away from trying to preserve as much of that positive impact as possible.

Mr. KIND. Well, we appreciate your awareness about it. We are concerned about you, quite frankly, and what you are consuming down there. And if there are some practical steps we can take to make sure that my good friend here from Louisiana, too, stays healthy and happy, we should be looking into that.

Mr. TAUZIN. Would the gentleman yield for a second?

Mr. KIND. I would be happy to yield.

Mr. TAUZIN. The Tabasco we put on that stuff, it kills all that other stuff. No problem.

Mr. KIND. Good luck. Thank you, Mr. Chairman. Thank you, Mr. Vitter.

Mr. TAUZIN. Thank you. Mr. Pearce has some questions.

Mr. PEARCE. Thank you, Mr. Chairman. Just going back to your question and who would be on the hook. And I appreciate the gentleman's efforts to bring the bill forward. I think my only point is as a clarification that no one is ever off the hook. And that is the honest truth. We might want these to continue as scientific platforms, but in my district, a lot of oil wells were drilled in the 1920s; they have gone through maybe 10 or 15 different owners. And if someone decides that they are going to bring a lawsuit for a damage that is occurring currently, they track back through every single owner and they list them all, because the outcome has nothing to do with right or wrong, it has to do with who has got the money to pay anything.

And so, while I support your efforts, I think that the concern of the manufacturers is not only if Shell builds a platform, not only Shell needs to be concerned, but also the people who did the welding on it need to be concerned; the people need to be concerned who maybe just trucked, that floated the steel to the location. Because the nature of our litigious society is that everyone is going to be involved. And so I think that is going to be the real stumbling block. And I would personally leave something out there if I had the option, but I will guarantee that companies have experienced the lawsuits so deep and so painfully that they are going to cut these things down regardless of what your bill says if we don't give real protection against lawsuits. And that is the honest truth. Thank you, Mr. Chairman.

Mr. TAUZIN. Thank you, Mr. Pearce. I totally agree with you.

Mr. POMBO. First of all, Mr. Udall. Do you have any questions?

Mr. TOM UDALL. No.

Mr. TAUZIN. Mr. Pombo for questions.

Mr. POMBO. Mr. Vitter, on the west coast, we have had some of the marine research groups that have talked to me about this, and they are very interested in being able to use the abandoned stands in the west as part of their research. If this bill as it is written were proved, would that be part of this? Would they be allowed to use those as research stations?

Mr. VITTER. Absolutely. Again, under this bill, we specifically talk about three alternative uses, which I think are the three biggest opportunities out there. One is mariculture, one is artificial reefs, but the third is scientific research. And that would be a specific exception put into what is current law, which demands that the rigs be ripped out within a year. So if it is going to be transferred to that purpose, the Secretary could waive that year requirement, the platform could stand, it could be used for scientific research.

Mr. POMBO. All right. Thank you.

Thank you, Mr. Chairman.

Mr. TAUZIN. Any other members seeking questions for Mr. Vitter? Mr. Vitter, we thank you for your presentation.

Mr. VITTER. Thank you.

Mr. TAUZIN. And, frankly, I think you have done a great deal to awaken us to the problems and potentials of the rigs-to-reefs bill. And we are going to certainly be very happy to work with you, as Mr. Kind said, to see if we can't move it forward. You are welcome, by the way, as a Member of Congress and a witness before these hearings, to join us at this dais if you would like to sit through the rest of the hearing.

Mr. VITTER. Thank you, Mr. Chairman. I am going to do that actually for as long as I could stay.

Also, to go back to your original question. Under the State of Louisiana program, it is not limited to State waters. And, in fact, most of the activity occurs in Federal waters. But the biggest limitation is exactly the one you are focused on: Because of these other issues, including liability, it is simply not done terribly often.

Mr. TAUZIN. I thank you, Mr. Vitter. And now would summon our second panel.

Our second panel also consists of half Louisianians. In fact, more than half. Steve Kolian, the Department of Environmental Quality, and who will be joined by Dr. Paul Sammarco, of the Louisiana Universities Consortium. By the way, those of you who may not be aware of the Consortium, it is a consortium of universities in Louisiana that all cooperate together to do marine biology research, and it is located in a beautiful place in my district called Cocodrie. And if you want to go fishing, CoCo Marina is one of the best places in the world to take off from. So you might visit the Consortium and take a fishing trip out at the CoCo Marina and have a great day of it—a great week of it, if you really want.

We also want to welcome Al Walker of Gulf Productions. Al is a diver who has been doing some productions, undersea productions focusing on the ecosystems around the rigs and has some great information to bring to this Committee.

And because this is a fair and balanced hearing, we also have invited Lisa Speer of the NRDC, who is not Fox, but we are fair and

balanced, to give us an environmental view of problems in oil and gas production even to this day. So we believe we have a balanced platform here, and we are anxious to hear from our witnesses.

Before that, I didn't have to swear in Mr. Vitter because we believe he is telling us the truth, but I have got to swear the rest of you in. So if you would please stand and take the oath.

[Witnesses sworn.]

Mr. TAUZIN. Then you may take seats, and I will welcome, first of all, Mr. Steve Kolian of the Louisiana Department of Environmental Quality for your statement, sir.

STATEMENT OF STEVE KOLIAN, LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Mr. KOLIAN. Thank you for your time. I appreciate being here today. I am wondering if I am limited to this chair. Some of the slides I am going to be presenting, I will have to point out some fish on there. But—

Mr. TAUZIN. Maybe you can get someone to stand up and help you to point.

Mr. KOLIAN. OK. Thank you.

Mr. TAUZIN. Modern technology at work here.

Mr. KOLIAN. OK. There is about 4,000 oil and gas platforms in the Gulf of Mexico, and each one of them is home to 10 to 20,000 to 30,000 fish. These fish you see on the slide right here, these are all herbivores, and they will feed right on the legs of the oil and gas platforms. If you could—you could see them right here. These are Bermuda chubs. And why don't you go back to that slide. These fish are one component of the ecosystem. They are the herbivores, there is also omnivores. There's things like file fish, and there is also fish that eat other fish. And each one of these communities are extremely large. They are much larger than they are in natural reefs. In fact, these are one of the most prolific ecosystems on the planet, and they are 10 to 30,000 fish in an area the size of half of a football field.

If you could continue the next one.

Are these fish merely attracted to these platforms, or are the platforms actually producing the fish? Some of you may have heard this argument before, and it is often misunderstood. And what I am doing here is I am pointing out the production aspects of the debate. One of them is, does the structure provide food? Also, does the structure provide protection from predation. And does it increase habitat? The bottom line is, does it increase biomass?

One way to look at this is to look at the juvenile fish, how fish are reproducing in these ecosystems. There are two types of—basically, two types of spawning. There is fish that lay eggs in an area, and there is fish that will mate and they will—let me do this. They will come up and they will swim around each other and they will disperse their eggs in the current and the gametes will fertilize and these larvae will drift in the ocean for a couple of weeks. What we are finding is, is that we are finding juveniles of both these types of fish. Why don't you please transfer to the next one.

What we have here are both these fish here are laying eggs right on the platform. This is a juvenile fish and this is bluehead wrasse. And this is a broadcast spawner. And so its larvae is floating in

to the platform and it's transferring to a post-larval fish. What's happening is, is it's receiving signals from all those organisms that are living on the platform and it's telling it to change from a larvae to a post-larval fish. And things like smell, taste, touch, and even sound will trigger that metamorphosis. This fish over here is an egg-laying fish. Why don't you proceed to the next one, please.

I don't know if you could tell on here, but here they are in about 2 millimeters, and this is just after post-larval State. Those fish there and that one right there. And those are broadcast spawners and they may have been drifting from weeks or months. They may have come all the way from the Yucatan to reach these oil and gas platforms. Please proceed.

Here is another, here's an example of egg-laying fish. These are blennies. And here's a juvenile and here's an adult. And we don't even know how many species of blennies are on the platforms. I gave an estimate of about 13 different species of egg-laying fish on the platforms and I—you know, there may be 13 species of blennies on the platforms. So please proceed.

Here's another. This is a cocoa damsel fish. The next one.

Trigger fish, a vicious fish. This thing is laying eggs on the platform as well and raising the young there. Another egg-laying fish. Next one.

A cardinal fish laying eggs right on the platform. This is a community of brown cromus. These are egg-layers as well. You could see how successful they are. The next one.

This is a combination of egg-laying fish and broadcast spawners. This fish right here is a broadcast spawner. That is a broadcast spawner. And these are egg layers. This is a broadcast spawner. We have about five different species of angel fish living on these platforms. That's a blue tang right there, another broadcast spawner. And let me remind you, these eggs may be coming from Key West, the Yucatan, or they could be coming from other platforms nearby. The larvae will drift for months and then, boom, it hits an oil rig and it turns into post-larval fish. You could see that—go back to that last one.

That angel fish is pregnant right there, so it's always spawning at the oil and gas platforms. Next.

Here is a rock beauty and a parrot fish. These are again broadcast spawners. And that's—go ahead. And the next one I'm sorry. French angel fish.

So what I'm trying to show here is there's huge communities of fish that are relying on these platforms to breed, spawn, and grow to maturity, and also gather all their food. Next one, please.

You could see the blue tang feeding on here. Next one.

Here's again juveniles of both types of fish. These are blue-headed wrasse and that's a hogfish. Next one.

You could see what I'm saying is that these larvae will come along and they will sense this type of an ecosystem there. These are wonderful devices to hide in as well. These little juvenile fish can keep away from predation on these platforms.

There's 4,000 of them, and that's what it looks like offshore Louisiana. There virtually are only hard substrate out there. And during the summer we receive a hypoxic zone in which covers the ocean floor along here. And so what these platforms are doing, is

they're reaching up through that layer of muck to provide hard substrate. And we are losing about 200 a year here for the next 5 years, and then it will go down to about 150 a year and then down to about 120 a year. So, but you could see right here there is a little area that has Caribbean habitat that that's the only place in Louisiana, offshore Louisiana where we have hard substrate, outside of these oil and gas platforms. Next one.

This is what's occurring. They blast them out of there, and all the organisms that live on the platform die. Many of the large fish die as well. But those cryptic fish that hide right in there, they are all dead. And those fish that do survive, they lose their habitat and they may get eaten on their way to the next hard substrate which they require. So there is 150 to 200 removed every year over the next 10 years, and that represents a significant amount of habitat loss offshore Louisiana, especially, because it's their only hard substrate.

There, that shows you the distribution of removal, platform removal. There's—it's evenly distributed. That's how many have been removed so far. And so far, only 150 of those have been reused as artificial reefs.

That's it for me. Thank you.

Mr. REHBERG. [presiding.] Thank you.

[The prepared statement of Mr. Kolian follows:]

Statement of Steve Kolian, Louisiana Department of Environmental Quality

Environmental Significance of Oil and Gas Platforms in the Gulf of Mexico

The Gulf of Mexico is home to 4,000 oil and gas platforms. They produce one of the most prolific ecosystems, by area, on the planet. Stanley and Wilson (2000) reported that 10,000-30,000 fish reside around the platform in an area about half the size of a football field. Live rock organisms, coral, endangered species, and "protected" fish and invertebrates colonize the platform's submerged structure. Many blue-water platforms create complex coral reef ecosystems, comprised of Caribbean flora and fauna that would otherwise not exist on thousands of square miles of generally featureless and silty continental shelf.

The platforms clearly produce fish rather than merely attract fish. An abundance of evidence suggests that they are Essential Fish Habitat (EFH), Coral Habitat, and Endanger Species Habitat (ESH). Over 50 species of federally managed fish, crustaceans, and Live rock organisms settle and forage around the offshore structures. The ecosystems they create are not designated as "protected habitat" under any of our current Gulf of Mexico Fisheries Management Plans. Over 120 of them will be removed every year for the next 40 years.

Post larval and juvenile reef fish can be found in remarkable numbers foraging in the thick mats of live rock and coral that attach to the platform legs. Thousands of herbivores such as Angle fish, Blue Tang, Chubs, and Parrotfish feed on the algae that grow on the platforms. Plankton pickers such as Brown Chromas, Creol Wrasse, and Creolfish are continously feeding on and off the platforms. The invertebrate community living on the platforms supports several species of Filefish, large schools of Spadefish, and a multitude of Sergeant Majors and Hogfish. Ultimately, the sharks, tuna, grouper, snapper, and jacks end up preying on the fish that live and feed on the platforms.

Photographic evidence demonstrates that >12 species of egg-laying fish are utilizing platforms to raise their offspring. More remarkably, platforms are being utilized as surrogate nesting grounds for several species (>13) of drifting larvae. Broadcast spawners or pelagic spawners cast fertilize eggs to the current after mating. The offspring can drift for days, weeks, or even months in the larvae state. Coral reefs, and, in some cases, sandy habitat, trigger a sensory mechanism in the infant fish, that tells the fish to transform into a post-larvae state. Once currents guide the larvae to the platform, the presence sponges, hydroids, mollusks, and coral stimulate metamorphosis. After transformation, the post-larval fish must begin feeding or perish. The surface area of the sponges and other attached invertebrates is

teaming with the essential food items for juvenal and post-larval fish, i.e. plankton, copepods, and amphipods.

Oil and gas platforms represent the only reef habitat over much of the Louisiana continental shelf. During the summer months, much of the ocean floor in the region is covered with an anoxic layer of decomposing algae resulting from excess nitrogen draining from agricultural fields along the Mississippi watershed. Petroleum structures are incredibly important to fish in the area in that they are only hard substrate that rises through the anoxic layer to provide reef habitat, food, spawning areas, nesting areas, and mating grounds. Obligatory reef fish spend their entire lives on the platforms in search of food, reproducing and competing for territory.

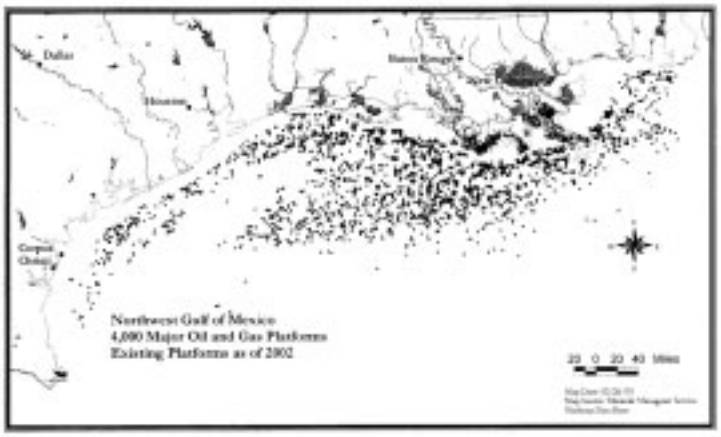
Critical Habitat on Texas-Louisiana Shelf

The platforms reside on thousands of sq miles of turbid ocean floor resulting from millions of year of sedimentation from the Mississippi and other tributaries. They provide reef fish in the region hard substrate and the necessary resources for survival.

Critical Habitat on Texas-Louisiana Shelf

Many of the petroleum fields are reaching an unproductive state, 2,000 platforms have been removed to date. Over the next 40 years, 100-200 platforms will be removed annually. Every year, the oil and gas industry spends $300 million to remove platforms. In 2003, >200 platforms will be removed, costing $400 million. Thousands of fish die, millions of invertebrates perish, and a reef ecosystem is lost when a platform is removed. Man and marine life would mutually benefit by leaving the structures in place.

Critical Habitat on Texas-Louisiana Shelf



The platforms reside on thousands of sq miles of turbid ocean floor resulting from millions of year of sedimentation from the Mississippi and other tributaries. They provide reef fish in the region hard substrate and the necessary resources for survival.

Critical Habitat on Texas-Louisiana Shelf

Many of the petroleum fields are reaching an unproductive state. ~2,000 platforms have been removed to date. Over the next 40 years, 300-250 platforms will be removed annually. Every year, the oil and gas industry spends ~$300 million to remove platforms. In 2003, ~200 platforms will be removed, costing ~$400 million. Thousands of fish die, millions of invertebrates perish, and a reef ecosystem is lost when a platform is removed. Man and marine life would mutually benefit by leaving the structures in place.

Mr. REHBERG. Dr. Sammarco.

STATEMENT OF PAUL SAMMARCO, LOUISIANA UNIVERSITIES MARINE CONSORTIUM

Dr. SAMMARCO. Thank you. Firstly, I would like to thank the honorable members of the Subcommittee for being willing to listen to my testimony today, and I consider it a privilege and an honor to be here.

My purpose is to—I have three purposes today, and that is, the first is to orient the Subcommittee with respect to recent findings on the development of coral communities on offshore oil and gas platforms in the northern Gulf of Mexico; second, to provide evidence for increased environmental value of those platforms; and, third, to point out that these platforms may be suitable for the mariculture of corals and pharmaceutically valuable marine organisms.

The coral portion of the study I have conducted with Amy Atchison, who is a graduate student of mine at LSU in Baton Rouge, and Greg Boland, in the environmental section of MMS in New Orleans. More recent collaborations regarding mariculture have been with my colleague Steve Kolian with respect to fish and Shirley Pomponi from the Harbor Branch Oceanographic Institution with respect to mariculture pharmaceutically valuable organisms. That's in Florida. And, MMS has supported the coral portion of this study for which I am most grateful.

Can I have the next slide. Next again.

There are tens of thousands of platforms which have been deployed since the 1940s. Next slide.

There are about 4,000 which are deployed right now. Next slide, please.

This region has not possessed hard substratum in shallow water—that is, in the northern Gulf of Mexico—certainly not at

present sea level, for many thousands of years. The platforms have provided this hard substratum. Soft bottom substratum previously expanded around the Gulf of Mexico for hundreds to thousands of kilometers. So there is basically nothing but mud down there and a few banks which are very deep. Many marine organisms settle on the platforms, including Caribbean sponges and gorgonians and demersal fish, as Mr. Kolian has just shown you. Next, please.

Preliminary observations suggested that the platforms are being colonized by Caribbean corals. Next, please.

This is significant since the only major set of coral reefs in the northern Gulf of Mexico are the flower garden banks. Now, the Flower Garden Banks have now been declared a NOAA national marine sanctuary. They're 110 nautical miles south-southeast of Galveston, Texas. This is the east bank which you are viewing the bathymetry of. These reefs are extremely isolated from neighboring reefs by, again, hundreds to thousands of kilometers. Next slide, please.

These reefs are formed on the tops of salt domes or salt diapirs, and they are often associated with oil and gas deposits. And this is why, in our case, they are surrounded by oil and gas platforms. Next slide, please.

We have surveyed 13 platforms covering about 40 to 60 kilometer radius around the flower garden banks, the two green areas of flower garden banks. Next slide, please.

We have found 11 species of Caribbean corals, eight of which are true, that is scleractinian; reef-building, hermatypic, Caribbean corals. And these corals are characteristic of mature coral communities. This is Madracis decactis, which was the most abundant coral found on the platforms. Next slide, please.

The common brain coral was the second most abundant coral found on the platforms. Again, it's indicative of the development of a mature coral community and it is also a true reef building coral. Next, please.

We found that coral abundance was strongly and positively correlated with platform age in a highly predictable fashion. Next slide, please.

This was also true for biodiversity, for species diversity of the corals. That is, the older the platforms were, the more corals are on them. The coral community simply become more mature with the age of the platform. Next, slide, please.

The presence of these new coral communities represents an expansion of coral communities into the northern Gulf of Mexico. Their presence also indicates the potential for mariculture of corals on offshore platforms because the conditions are right. The water temperature is right. The light levels are right. The turbidity is right, the salinity is right. And it increases the environmental value of those platforms, and this may have implications for decommissioning. Next slide, please.

The platforms also bear a rich community of associated fauna and flora. Next slide.

This includes sponges, hydroids, and soft corals. And these are groups which are known to harbor novel, complementary, or secondary metabolites. Now, these are often compounds which are associated with a given species. They are not like proteins or lipids

or carbohydrates. These are individual compounds that are found with one or two species of organisms. Some deepwater sponges produce toxins, such as discodermalide. There are some deepwater sponges which are found in the Caribbean like this. This particular compound, discodermalide, has valuable anti-cancer therapeutic properties. But also, this deepwater sponge is very rare, and the compound which occurs in it occurs in very low concentrations, and it is a large complex molecule and it is very difficult to synthesized.

In fact, it can't be synthesized at this point in time to the best of my understanding. The only source of this particular compound which is, I believe, in the stage 5 of seven—seven stages of development in FDA for use, pharmaceutical use. Its only source at present is the natural populations, which are being taken at an inordinate rate for experimental at work. It would be possible to grow these sponges and those like them in mariculture on the platforms for medicinal and testing use, while alleviating exploitation pressure on the natural populations. Next slide, please.

Other organisms exhibit the potential for harboring novel, complementary, secondary metabolites. Note the aggressive growth in this ascidean. All of the white that you see here is an ascidean called didemnid pellucidum which is a—there's a possibility that it's an invasive species from the Pacific, but it is overgrowing all of the barnacles, sponges, and everything else in here. In order to do that, it has to have the mechanism to do it and there is probably a toxic compound in it. Next slide, please.

My recommendations to the Subcommittee are as follows: Firstly, to extend coral surveys on platforms with respect to geographic range throughout the northern Gulf of Mexico and depth to determine the full extent of coral colonization there. Second, to consider the extent of coral colonization when examining future alternatives for use of post-production platforms. Third, to support the sampling of the platforms for potentially pharmaceutically valuable organisms. And, fourthly, to support research and development on the use of the platforms for mariculture of corals and pharmaceutically valuable marine organisms. And I thank you very much for your attention.

[The prepared statement of Dr. Sammarco follows:]

Statement of Paul W. Sammarco,
Louisiana Universities Marine Consortium (LUMCON)

Introduction

Firstly, may I thank the honorable members of the House Subcommittee on Energy and Natural Resources for allowing me to make this presentation today. I consider it a privilege and an honor.

The purpose of presentation is as follows: 1) to orient the Subcommittee with respect to recent findings on the development of coral communities on offshore oil and gas platforms in the northern Gulf of Mexico; 2) to provide evidence for an increased environmental value of those platforms because of these developments; and 3) to point out that these platforms may be suitable for the mariculture of corals and pharmaceutically valuable marine organisms.

The coral portion of this study was conducted with Amy Atchison (my graduate student in the Department of Oceanography and Coastal Studies at Louisiana State University) and Greg Boland of the Environmental Section of MMS in New Orleans. Remarks regarding mariculture stem from more recent collaborations with Steve Kolian (Eco-Rigs, Intl.) and Shirley Pomponi (Harbor Branch Oceanographic Institution). The coral portion of this study has been conducted under the auspices of MMS, and I am most grateful for their support, insight, and cooperation.

Development of Coral Communities on Oil and Gas Platforms in the Gulf of Mexico

Since the 1940s, 40,000 wells have been drilled, and tens of thousands of platforms have been deployed. 4,000 are currently in the northern Gulf of Mexico. This region has not possessed hard-substratum in shallow water, certainly not at its present sea level, for many thousands of years. In recent decades, the oil and gas platforms have provided this. Previously, deeper water soft bottom substratum extended for hundreds to thousands of kms.

The platforms have provided substratum for many marine organisms to settle on. These include a wide variety of Caribbean sponges, gorgonians, demersal fish, and the like. Preliminary observations suggested that platforms were being colonized by Caribbean corals as wells. This observation was significant for several reasons. Firstly, corals are protected from take and harvest by federal law and are also prohibited from trade by international treaty. Secondly, the only major set of coral reefs in the northern Gulf of Mexico is the Flower Garden Banks (FGB), which occur 110 nm S-SE of Galveston, TX. These reefs have now been declared a NOAA National Marine Sanctuary. They are isolated from neighboring reefs by hundreds to thousands of kms. They formed on crests of two salt domes (diapirs), raised up through the crust of the earth. Oil and gas deposits are often associated with such structures, and, indeed, this was the case with the Flower Garden Banks. These reefs are now surrounded by oil and gas platforms.

In our study, we have surveyed 13 drilling platforms, covering a 40-60 km radius around the FGB. Thus far, we have found a total of 11 Caribbean coral species, eight of which were scleractinian (true), hermatypic (reef-building) corals. Most of the species we have found are characteristic of mature coral communities. Madracis decactis was the dominant coral. The second most abundant coral was the common brain coral, Diploria strigosa. Both of these species are indicative of the development of a mature coral community. Pioneer species—those characteristic of young, disturbed, or newly developed communities, such as Agaricia spp. or Porites spp., were rare or absent, which is unusual.

We found that coral abundance was strongly, positively associated with platform age, in a highly predictable fashion. Coral species diversity exhibited the same relationship, increasing strongly with age of the platforms, indicating that the coral communities became more mature with age. This increases the environmental value of these platforms and may have implications for their decommissioning.

The presence of these new coral communities indicates an expansion of these populations through the northern Gulf of Mexico. Due to the limited sampling we performed in this pilot project, however, we do not know to what extent.

In addition, the mere presence of these corals indicates that mariculture of corals on offshore platforms is possible. The conditions are right for colonization and growth of corals there, and mariculture of these organisms would fill a market demand already present in the U.S. while helping to decrease exploitation pressure both on our own reefs and those in other countries.

Development of Associated Reef Fauna

Along with corals, the platforms also possess a rich variety of associated fauna and flora. This includes sponges, hydroids, soft corals, and other organisms. Some of these groups are known to harbor novel complementary/secondary metabolites. These are compounds which are found usually only in that one species, often having a specific function for that species. In many cases, these compounds are toxic. In some cases, we have highly valuable therapeutic use for those compounds. Probably the most famous example of such a metabolite is penicillin, which was found a century ago in bread mold.

Some deep-water sponges produce complementary metabolites such as these. For example, one produces discodermalide, a toxin which is now known to have valuable anti-cancer properties. Unfortunately, this deep-water sponge is quite rare. In addition, the compound occurs in low concentrations and is difficult to synthesize. Thus, there is a high demand on the natural populations of this scarce natural resource. It would be possible to grow these sponges in mariculture on the platforms, while simultaneously alleviating exploitation pressure on the natural populations.

There are other organisms which occur on the platforms which have exhibited aggressive growth characteristics which suggest that they harbor novel, toxic, complementary/secondary metabolites. One of these is a didemnid ascidean.

Recommendations

In lieu of these new data which have come to light, I would recommend the following:

- Extend coral surveys on platforms with respect to geographic range and depth to determine the full extent of coral colonization throughout the northern Gulf of Mexico;
- Once this information is available, and a larger database is available for decision-making, consider the extent of coral colonization prior to decommissioning of older platforms, where such is appropriate;
- Sample the platforms for potentially pharmaceutically valuable organisms; and
- Permit and support research and development regarding the use of platforms for mariculture of corals and pharmaceutically valuable marine organisms.

I thank you very much for your attention.

[A statement submitted for the record by Dr. Sammarco follows:]

Statement submitted for the record by Paul W. Sammarco, Louisiana Universities Marine Consortium (LUMCON)

Introduction

It was a pleasure being able to converse with the Subcommittee members on the subject of coral reef communities on oil and gas platforms in the Gulf of Mexico. A number of issues were raised during our discussions by both Subcommittee and Panel members. I would like to add some information regarding those issues, for purposes of clarification.

1. Mercury (Hg) on Platforms and the Contamination of Associated Organisms

I am aware of the reports of mercury in the water column and in the tissue of fish and other fauna associated with platforms, referred to by one of the panelists. I am also aware of additional research which has been performed investigating this issue. It is my understanding that there is equivocal evidence regarding both environmental mercury contamination and contamination of associated fauna and flora. For example, Windome and Cranmer (1998) found no contamination of fish associated with platforms. On the other hand, Pankratova et al. (1994) did find contamination of the environment, but only during active drilling operations. Dethlefsen and Tiews (1986) reported negative effects of mercury on fish fecundity (reproduction) derived from oil pollution in the North Sea. MacDonald et al. (1988) report that mercury from drilling muds contaminates crab embryos and larvae and lowers their fecundity. Published studies particular to the Gulf of Mexico are scarce. This may be an area which requires additional investigation in the Gulf.

One of the panelists implied that contamination of cultured fish on platforms may be a problem. The potential mariculture activities discussed were proposed to occur on platforms primarily during the post-production phase. Potential contamination may be expected to occur during the drilling or removal phase due to suspension or resuspension of sediments; therefore, contamination may not be of concern during the stable, post-production phase of the platform.

You may find some of the following references useful:

- Dethlefsen, V. and K. Tiews. 1986. Impact of North Sea pollution on fish and fisheries. Veroeff. Inst. Kuest.-Bunnenfishc. Hamb., Vol. 93, 51 pp.
- MacDonald, J.M., J.D. Shields, and R.K. Zimmer-Faust. 1988. Acute toxicities of eleven metals to early life-history stages of the yellow crab Cancer anthonyi. Mar. Biol. 98: 201-207.
- Pankratova, T.M., L.K. Sebakh, and M.S. Finkel'Shtejn. 1994. Assessment distribution and migration ways of heavy metals in the Karkinitsky Bay ecosystem. In, V.N. Yakovlev (ed.), Main Results of YugNIRO complex research in the Azov-Black Seas Region and the World Ocean in 1993. Tr. YugNIRO/Proc. South. Sci. Res. Inst. Mar. Fish. Ocean, Vol. 40, 1994, pp. 150-156.
- Siegel, B.Z., et. al. 1991. The protection of invertebrates, fish, and vascular plants against inorganic mercury poisoning by sulfur and selenium derivatives. Archives of Environmental Contamination and Toxicology 20: 241-246. (A review).
- Windom, H.L., and G. Cranmer. 1998. Lack of observed impacts of gas production of Bongkot Field, Thailand on marine biota. Mar. Pollut. Bull. 36 (10): 799-807.

2. Fish Stock Enhancement

From my personal observations on platforms, I have no doubt that the platforms are producing fish, not merely attracting them. Many of the fish located on the platforms are demersal reef fish and are not behaviorally adapted to migrate to these platforms from distant reefs, or even other nearby platforms. They arrive on the

platforms as larvae, settle there, grow into adults, and reproduce there. They are rigidly associated with their hard-bottom. I have also witnessed nests and egg-defense in some demersal fish on the platforms.

3. Platforms as Artificial Reefs

One of the panelists referred to the use of platforms as artificial reefs as "creating an underwater junkyard." This is an anthropomorphic view of this conversion. The sub-surface portions of the platform jackets act as artificial reefs by creating a three-dimensionally complex hard substratum on a feature-less soft bottom. Extensive flats of soft-bottom cannot compare to hard-bottom in terms of fish or benthic invertebrate production. This new hard bottom creates habitat for fish and other organisms which would otherwise not be able to settle, grow, and reproduce there. The fish do not perceive the substratum as a "junkyard"; they merely perceive it as new substrate, available for colonization.

4. Conversion of Platforms to Artificial Reefs, and Transfer of Liability

Through conversations with Minerals Management Service personnel, I have determined that platforms may be donated by their original owners to the joint federal/State "Rigs to Reefs" programs within a number of states, including Louisiana, Texas, Mississippi, and Alabama. Platforms are first identified as potential donations by the owner. The platform may then be designated as acceptable by the State and the U.S. Army Corps of Engineers. The platform is then approved for transfer to the program. It may be: a) left in place, as is; b) cut at a depth of 85 ft., and the upper portion toppled in place; c) cut 15 ft below the surface and toppled entirely in place; and d) moved to a State artificial reef site and toppled.

Perhaps most importantly, the original permit is issued to the owner by the Corps. This carries with it liability for the owner. During the transfer to the State "Rigs to Reefs" program, the platform is re-permitted to the State, and liability is also transferred to the State. MMS relinquishes its authority over regulation of the platforms once the platforms move into the post-production phase and are transferred to the State for use in this program.

5. Effects of Seismic Surveys on Fauna in the Vicinity

It should be noted that the mariculture activities discussed are proposed to take place on platforms during their post-production phase. Therefore, seismic surveys, associated with exploration and drilling, are not an issue in this regard.

6. Oil Spills

It was suggested that oil spills may have a negative effect on the proposed mariculture activities. Once again, the proposed mariculture activities are proposed to take place during the post-production phase for a platform, and such should not be a concern.

7. Legal Status of Scleractinian and Other Corals

Corals are protected within the U.S. from take and harvest by the Magnuson-Stevens Act. They are also protected from trade by international treaty. The OCS Lands Act requires that any oil and gas platform be decommissioned within one year after the cessation of all activities within the oil and gas lease.

The corals which my research team are finding on oil and gas platforms in the Gulf of Mexico are primarily scleractinian (true), hermatypic (reef-building) corals, protected by the first two pieces of legislation mentioned above. They are also older, larger colonies of reproductive age. This presents a problem, as the third piece of legislation appears to be countermanding the other(s). In my opinion, these pieces of legislation may need to be reviewed in concert, in light of these new data.

I hope this information will be of use to you. If you have any questions or require any additional information, please do not hesitate to contact me.

Mr. REHBERG. Thank you. Mr. Walker.

STATEMENT OF ALLEN WALKER, GULF PRODUCTIONS

Mr. WALKER. My name's Allen Walker, and I really appreciate you guys having us here today because we really believe in what we're doing here. There's something happening in the Gulf of Mexico, and it needs a change. In 10 years, half the ecosystem will be gone due to expiring oil rigs. I've been diving and fishing the Gulf of Mexico for over 20 years. I started a company by the name of

Gulf Productions because of my love of the underwater world. My purpose for starting this company is to assist science, industry, and the general public by making them aware of the positive effects oil and gas drilling brings to the underwater environment.

My passion is to educate people about what I witness on a daily basis in the Gulf of Mexico. This passion soon turned into a goal, and that goal is to save these oil rigs. I set out on this goal by picking up a camera and started obtaining 100 percent factual footage of the underwater environment. There is no doubt, after reviewing my footage, that drilling for oil in the Gulf has greatly enhanced the eco system beyond anybody's wildest dreams. I would go as far as saying it is mankind's contribution to the largest environment ever.

The multitude of microorganisms, sponges, fish species, as well as mammals actually depend on these structures to survive. There are oil platforms that are scheduled to be cut down as we speak today. With every removal of these remarkable givers of life, an unimaginable amount of life will perish. I have witnessed crimes against nature as an entire eco system changed with the removal of one single oil platform. There are structures going that host very large migrations of lobster that use them as an underwater motel and reproduce their genes. I know it's not only because of thousands of hours logged beneath the Gulf, but because of gentlemen in the '70s and '80s who I still dive with today who have handed their knowledge down to me.

I have dove platforms from Florida to west Texas for over 20 years and have seen the difference in the waters that have less structures. In makeshift structures such as old Army tanks, for example, there is no comparison in marine life which surrounds them, which is the opposite case of that of the oil platforms.

My company prides itself on being aware of all migrations of fish, mammal species and microorganisms. The most important thing to me is to bring to the forefront that so much is going undiscovered every day that could better mankind. For example, it gives me much pleasure that I could play a role in finding a cure for cancer by seeking out and finding rare sponges with medicinal use that could be responsible for saving somebody's life. I recently had the pleasure of working with Dr. Jose Castro, a renowned shark scientist, and the Discovery Channel. I was able to find and film a 500-pound-plus pregnant female for 6 hours at an oil and gas platform. This is the first time this event has ever been captured on film or recorded for science.

At this point I would like to share my opinion with you. I believe that cutting down an oil rig can be compared to cutting down a forest of 1,000-year-old oak trees, and I feel the structures should remain after minerals are extracted, and more should be employed to enhance the eco system and the economy.

Thank you very much.

Mr. REHBERG. Thank you.

[The prepared statement of Mr. Walker follows:]

Statement of Allen Walker, Founder, Gulf Productions Inc.

Hello. My name is Allen Walker and I would like to say it is an honor to be here with you today. There is something happening offshore and it has to change. In ten

years, half an ecosystem will be gone due to expiring rigs. I have been diving and fishing in the Gulf of Mexico for over twenty years.

I started a company by the name of Gulf Productions, Inc. because of my love of the underwater world. My purpose for starting this company is to assist science, industry, and the general public by making them aware of the positive effects oil and gas drilling brings to the underwater environment.

My passion is to educate people about what I witness on a daily basis in the Gulf of Mexico. This passion soon turned into a goal. And that goal is to save the oil rigs. I set out on this goal with camera in hand to start obtaining factual footage of the underwater environment. There is no doubt that after reviewing my footage the drilling for oil in the Gulf has greatly enhanced the marine ecosystem beyond anyone's wildest dreams. I would go as far as saying it is mankind's largest contribution to Mother Nature ever.

The multitude of microorganisms, sponges, fish species, as well as mammals, actually depend on these structures to survive. There are oil platforms that are scheduled to be cut down as we speak here today. With every removal of these remarkable givers of life, an unimaginable amount of life will perish.

I have witnessed crimes against nature as an entire ecosystem changed with the removal of a single oil rig. There are structures, for example, that host very large migrations of lobster that uses them as under water motels to nest and reproduce there genes. I know this not only because of my thousands of hours logged beneath the Gulf, but from gentlemen in their 70's that have passed on their eye-witnessed accounts of similar things as well.

I have dove platforms from east Florida to west Texas for over 20 years and I have seen the difference in waters that have less structures. In make shift structures such as old army tanks, there is clearly no comparison in marine life that surrounds them, which is the opposite case than that of the oil platforms.

My company prides itself on being aware of all migrations of fish, mammal species, and microorganisms. The most important thing to me to bring to the forefront is that so much is going undiscovered every day that could better mankind. For example, it gives me much pleasure that I could play a role in the research of finding a cure for cancer by seeking out and finding rare sponges with medicinal use and culturing these organisms, which could save a person's life.

I recently had the pleasure of working with Dr. Jose Castro, a renowned shark scientist, and the Discovery Channel. I was able to find and film a 500 pound-plus pregnant female for six hours at an oil and gas platform. This is the first time this even has been captured on film or recorded for science.

At this point I would like to share my opinion with you. I believe that cutting down an oil rig can be compared to cutting down a forest of thousand-year-old oak trees. I feel that structures should remain after minerals are extracted and more should be deployed to enhance the ecosystem as well as the economy.

Mr. REHBERG. Ms. Speer.

STATEMENT OF LISA SPEER, SENIOR POLICY ANALYST, NATURAL RESOURCES DEFENSE COUNCIL

Ms. SPEER. Thank you, Mr. Chairman, and thank you very much for the opportunity to be here today. My name is Lisa Speer, and I'm senior policy analyst with the Natural Resources Defense Council. My testimony here today addresses the environmental aspects of modern oil and gas development, but before I begin I wanted to touch on a couple of points that have been raised by the previous witnesses and offer a somewhat different perspective on the use of offshore oil and gas rigs.

First of all, the issue that Mr. Kind raised earlier is a critical one. There is clear evidence of elevated levels of mercury surrounding rigs in the Gulf. There is no dispute about that. One issue is the extent to which that mercury is accumulating through the food chain and affecting organisms. That is the subject of a number of studies, but until those issues get further along in terms of resolution, I think there's some real concerns there.

Second, there are, I believe, differing opinions in the scientific community about the value of these rigs to ecological health of regional oceans. For example, a blue ribbon panel was convened out in California called the Select Scientific Advisory Committee on the Decommissioning of Oil Rigs by the University of California, and they concluded, and I quote: The interdependence of populations means that impacts at any one location must be considered in the context of the regional set of local populations. Most assessments of possible biological effects of platforms are fundamentally flawed because they focus on local and not regional effects. At present, there is not any sound scientific evidence to support the idea that platforms enhance regional stocks of marine species. So, again, there's scientific issues around, and I'd like to submit this study for the record, if I might.

[NOTE; The report, "Ecological Issues Related to Decommissioning of California's Offshore Production Platforms," by the Select Scientific Advisory Committee on Decommissioning, University of California, has been retained in the Committee's official files.]

Ms. SPEER. More broadly, the idea of leaving junked drilling rigs on the ocean floor is one that I think deserves some attention and scrutiny. One can throw batteries out on the ocean floor, and stuff will grow on them. That doesn't mean it's a good idea. The use of the ocean floor as a junk pile is something I think we have to look at quite carefully before we move ahead.

The issues of liability are significant. Mr. Tauzin raised the question of whether stockholders would like to assume the responsibility of rigs that are decommissioned and left in the water. Taxpayers may also have similar issues with assuming liability from rigs left in water where the liability is transferred to the State.

Having raised those few issues, I'd like to turn now to the focus of my testimony, which is the environmental effects of current oil and gas activities.

The last two decades have unquestionably witnessed a dramatic improvement in the way oil and gas and the industry operates, both onshore and offshore. No longer are millions of gallons of toxic waste dumped into sensitive tundra ponds or the incredibly productive wetlands of coastal Louisiana. Spill preparedness has improved, and improved technologies such as the use of ice roads and pads instead of gravel in the Arctic, as well as coil tubing and a host of other technologies, have in many cases changed and in many cases reduced the effects of oil development on the environment.

Having said that, there are an awful lot of issues that remain out there. Some of those issues stem from the continued use of old technologies, and some stem from the use of new technologies, which, while ameliorating some impacts, causes others. I'd like to highlight some of the more important of these issues in looking at offshore first.

Oil and gas activities have a number of very important impacts at all stages of exploration, production and development. At the exploratory stage, for example, seismic surveys have been shown to significantly affect gray whales, sperm whales, beaked whales, and bowheads, and can injure fish at substantial distances. The concerns about seismic surveys are one of the reasons why we have

opposed provisions that were stripped out of the House energy bill to allow an inventory to be taken of the U.S. Outer continental shelf using 3-D seismic technology.

Drilling entails the generation of tremendous amounts of waste, an average of 180,000 gallons every single well. That waste contains toxic metals, including mercury, cadmium, and lead, and, as I said earlier, significantly higher concentrations of these metals have been found on these offshore platforms around the Gulf of Mexico. These raise concerns about the contamination of fish, but also of humans that eat the fish.

Air pollution and production operations also generate large amounts of air pollution—drilling and production operations produce large amounts of air pollution, including NOx, SOx, VOCs and carbon monoxide.

Oil spills. According to statistics compiled by the Interior Department, 3 million gallons of oil spilled from the OCS oil and gas operations in 73 incidents between 1980 and 1999. Unfortunately, as noted by a recent National Academy of Sciences report, we remain unable to clean up a significant portion of oil that has spilled into marine waters, and this problem is particularly significant in the Arctic under conditions of broken ice where the industry has not demonstrated basically any capability to clean that oil up.

People usually associate oil spills with oil development, but gas development can also result in spills, both from operations utilizing fuels of various kinds, but also because you never know whether you're going to find oil or gas when you drill. And that is what the industry tells us, and that is, in fact, true. We know of no lease in this country that prohibits the development of oil should oil be found in a gas-prone area, and we know of no company ever agreeing to such restriction in the history of the OCS program.

Onshore infrastructure, processing facilities, roads, pipelines, all of those things can have significant effects on the coastal zone. And the industrial character of offshore oil and gas is often at odds with the nature and economy of local communities along the coast.

Concerns over these and other environmental consequences of offshore oil and gas has led Congress to impose restrictions on OCS activities in sensitive areas of the Nation's coast ever since 1981. These restrictions, the moratoria, have been endorsed by a broad array of officials at every level of government and of all political persuasions, including former President Bush, President Clinton and current President Bush, who included the moratoria in his Fiscal Year '04 budget request.

We strongly support the continuation of the moratoria, especially in Bristol Bay. Bristol Bay is the single most important area of the outer continental shelf for marine resources, according to the National Marine Fishery Service.

Turning to onshore development, I'd like to quickly focus on the area of the North, which is the area of my expertise. In March of this year, the National Research Council of the National Academy of Sciences issued a new report entitled The Cumulative Effects of Oil and Gas Activities on Alaska's North Slope. The report documents the environmental and cultural damage that has occurred on the North Slope over the last three decades. The report found that although new technologies have reduced some damage, despite this

the expansion of oil development into new areas is certain to exacerbate existing effects and generate new ones.

A few of the more important findings include that development has directly effected some 17,000 acres spread over an area the size of the land area of Rhode Island. The environmental effects of this development are not limited to the footprint of the area actually covered by the gravel, but extend far beyond the footprint in many instances.

Only about 100 acres of this area has been restored. The Committee concluded that it was unlikely that most disturbed habitat on the North Slope will ever be restored, unless current conditions change dramatically, and because natural recovery in the Arctic is slow, the effects of unrestored structures are likely to persist for centuries.

There are other effects on animals, on wilderness, and these effects are felt not just in the Arctic of Alaska, but also throughout the western United States, where development is rapidly progressing.

In closing, Mr. Chairman, the environmental consequences of oil and gas development onshore and offshore are one reason why NRDC and other environmental groups support a different approach to energy security, one that shifts reliance away from fossil fuels and toward sustainable energy uses. It's unfortunate, but it's true, that although we've made progress on the environmental safety of oil and gas operations, we have a long way to go before environmentally sound oil development is no longer an oxymoron.

Thank you.

Mr. REHBERG. Thank you.

[The prepared statement of Ms. Speer follows:]

Statement of Lisa Speer, Senior Policy Analyst, Natural Resources Defense Council

My name is Lisa Speer. I am Senior Policy Analyst with the Natural Resources Defense Council (NRDC) in New York. NRDC is a national nonprofit organization dedicated to protecting public health and the environment with more than a million members and e-activists around the country. My testimony today addresses environmental issues surrounding oil and natural gas exploration, development and production.

Background

The United States has 5 percent of the world's population, but consumes nearly a quarter of the world's energy supply. Two distinct visions of an energy policy for the United States have emerged in the current debate over how to meet this demand. One vision focuses chiefly on extracting as much energy as possible, mostly in fossil fuel form (oil, coal and natural gas), in hopes that supply can catch up with demand. The alternative vision, however, calls for encouraging innovation and new technology to meet our energy needs in an environmentally responsible manner. This vision emphasizes efficient use of energy, and places priority on using energy resources that are least damaging to our environment. It promotes economic growth and American industrial competitiveness. This energy path would not force consumers to make sacrifices; instead it relies on improved technologies that will eliminate waste while increasing productivity and comfort. Such an approach will decrease America's reliance on foreign sources of energy in the near- and long-term, provide for America's energy needs, buffer the economy against short-term swings in the market, and protect the environment from the effects of oil and gas exploration, production and transportation, the subject of today's hearing.

The evolution of industry practices

The last two decades have witnessed important improvements in the way the oil and gas industry operates, both onshore and offshore. No longer are millions of

gallons of toxic wastes routinely dumped untreated into Alaska's sensitive tundra ponds or Louisiana's productive coastal wetlands. Oil-based drilling fluids are no longer allowed to pollute the waters off our coasts. Spill preparedness has improved, and innovative technologies such as the use of coiled tubing, ice roads and pads, and more accurate exploration methods have significantly changed, and in many cases reduced, environmental effects.

Despite this progress, however, critical environmental problems remain. Some stem from the continued use of old technologies, others result from newer practices that, while ameliorating some impacts, create others. The following is a brief overview of some of the more important issues offshore and onshore. The onshore portion of this testimony focuses on Alaska's North Slope.

Environmental consequences of offshore development

Seismic exploration: Recent scientific investigations indicate that seismic surveys can seriously affect gray whales, sperm whales, beaked whales and bowheads,[1] and can injure fish at substantial distances. The ears of fish are particularly vulnerable, and many species rely heavily on their hearing to avoid predators, locate prey, communicate, and sense their environment. Mortality is also possible in species that, like salmon, have swim bladders, which have been shown to rupture on exposure to intense sounds.[2] Salmon are of particular concern because of the endangered status of some populations off the Atlantic and Pacific coasts, and because of their apparent inability to detect and avoid low-frequency sound until damaging levels are reached.

Onshore damage: The industrial infrastructure associated with offshore oil or gas—roads, pipelines, processing facilities, etc.—can cause significant harm to sensitive coastal environments. For example, OCS pipelines crossing coastal wetlands in the Gulf of Mexico are estimated to have destroyed more coastal salt marsh than can be found in the stretch of land running from New Jersey through Maine.[3] Moreover, the industrial character of offshore oil and gas development is often at odds with the existing economic base of the affected coastal communities, many of which rely on tourism, coastal recreation and fishing.

Water pollution: Drilling muds are used to lubricate drill bits, maintain downhole pressure, and serve other functions. Drill cuttings are pieces of rock ground by the bit and brought up from the well along with used mud. Massive amounts of waste muds and cuttings are generated by drilling operations—an average of 180,000 gallons per well.[4] Most of this waste is dumped untreated into surrounding waters. Drilling muds contain toxic metals, including mercury, lead and cadmium. Significant concentrations of these metals have been observed around drilling sites, [5] raising concerns regarding the contamination of fish and other marine life, with potential implications for human consumption of fish.

A second major polluting discharge is "produced water," the water brought up from a well along with oil and gas. Offshore operations generate large amounts of produced water. The Minerals Management Service estimates that each offshore Gulf platform discharges hundreds of thousands of gallons of produced water every day.[6] Produced water typically contains a variety of toxic pollutants, including benzene, arsenic, lead, naphthalene, zinc and toluene, and can contain varying amounts of radioactive pollutants. All major field research programs investigating the fate and effects of produced water discharges have detected petroleum hydrocarbons, toxic metals and radium in the water column down-current from the discharge.[7]

Air pollution: Drilling an average exploration well generates some 50 tons of nitrogen oxides (NOx), 13 tons of carbon monoxide, 6 tons of sulfur dioxide, and 5 tons of volatile organic hydrocarbons. Each OCS platform generates more than 50 tons per year of NOx, 11 tons of carbon monoxide, 8 tons of sulfur dioxide and 38 tons of volatile organic hydrocarbons every year.[8]

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[1] See, e.g., NAS Report, p. 164 (bowheads); National Marine Fisheries Service, Southeast Regional Office, 2002. Final Biological Opinion, Gulf of Mexico Outer Continental Shelf Lease Sale 184, pages 37-48 (sperm whales).

[2] McCauley, R.D., J. Fewtrell and A.N. Popper, 2003. "High intensity anthropogenic sound damages fish ears." J.Acoust.Coc.Am. 113, January, 2003.

[3] Boesch and Rabalais, eds., "The Long-term Effects of Offshore Oil and Gas Development: An Assessment and a Research Strategy." A Report to NOAA, National Marine Pollution Program Office at 13-11.

[4] MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS), p. IV-50.

[5] Id.

[6] Id., p. IV-32.

[7] Id., p. IV-32-33.

[8] Id., p. IV-40.

Oil spills: According to statistics compiled by the Department of the Interior, some 3 million gallons of oil spilled from OCS oil and gas operations in 73 incidents between 1980 and 1999.[9] Oil is extremely toxic to a wide variety of marine species. Unfortunately, as noted by a recent National Academy of Sciences study, current cleanup methods are incapable of removing more than a small fraction of oil spilled in marine waters. Spills pose a particular problem in the arctic, where the industry has not demonstrated the ability to clean up oil spilled in conditions of broken ice.[10]

Oil spills are typically associated with the exploration, production and particularly transportation of offshore oil. But even in gas-prone areas, spills are an issue. If offshore areas are leased for gas exploration there is always the possibility that oil also will be found. We no of no instance where a lease prohibits an oil company from developing oil if oil is found in a "gas prone" region.

Concerns over these and other environmental consequences of offshore oil and gas development has led Congress to impose restrictions on OCS activities in sensitive areas off the nation's coasts every year since 1981. These moratoria now protect the east and west coasts of the U.S., Bristol Bay, Alaska, and most of the Eastern Gulf of Mexico. The moratoria reflect a clearly established consensus on the appropriateness of OCS activities in most areas of the country, and have been endorsed by an array of elected officials from all levels of government and diverse political persuasions, including former Presidents George H.W. Bush and Clinton and the current President Bush, who included the moratorium in his FY "04 budget request to Congress. We strongly support continuation of the moratoria, and oppose recent attempts to permit seismic exploration in the moratorium areas.

Environmental Consequences of Onshore Oil Development on Alaska's North Slope

In March of this year, the National Research Council of the National Academy of Sciences issued a report entitled, The Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope ("NAS report"). The report documents the environmental and cultural damage that has accumulated over three decades of oil development in the area. New technologies have reduced some damage, but despite this, the NAS report concluded that expansion into new areas is certain to exacerbate existing effects and generate new ones.[11]

Examples of effects that continue despite new technologies include the following (numbers in parentheses refer to page numbers in the Pre-publication version of the NAS report):

Footprint: Development has directly affected 17,000 acres spread across an area roughly the size of the land area of Rhode Island (67, 70). The environmental effects of oil development are not limited to the "footprint" (actual area covered by a structure), but occur at distances that vary depending on the environmental component affected, from a few miles (animals), to much farther (visual effects and seismic effects on whales) (8 and 15). For example, roads kill tundra vegetation beneath them, but they can also displace wildlife, impede wildlife movements, kill surrounding vegetation through the dust they generate, change hydrological patterns and destroy wilderness values (123 and 126);

Restoration: Only about 100 acres (1%) of the habitat affected by gravel fill on the North Slope have been restored (15). The report estimates that the costs of removing facilities and restoring habitat will run in the billions of dollars. No money has been set aside for this purpose by either the oil companies or the government (155). The Committee concluded that it is unlikely that most disturbed habitat on the North Slope will ever be restored unless current conditions change substantially (16). Because natural recovery in the arctic is slow, effects of unrestored structures are likely to persist for centuries, and will accumulate as new structures are added (16);

Climate change and new technologies: Climate change will continue to affect the usefulness of many oilfield technologies and how they affect the environment (8). For example, the length of the winter season when seismic and other off road tundra travel is permitted, and ice roads and pads are constructed, has been steadily decreasing since the 1970's (137 and 138) and will likely to continue to do so. The coastline of the North Slope is presently eroding at a rate of 8 feet per year, the fastest rate of coastline erosion in the United States, and this will accelerate with climate change (95).

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[9] MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS), pp. IV-50.

[10] National Academy of Sciences, National Research Council, 2003. Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, p. 15.

[11] Id., p. 21.

In addition, climate change is anticipated to affect the way in which animals respond to development. The Porcupine caribou herd, which calves in the Arctic National Wildlife Refuge, has the lowest growth capacity of the four arctic herds and the least capacity to resist natural and human-caused stress (187). Higher insect activity associated with climate warming could counteract any benefits of reduced surface development by increasing the frequency with which caribou encounter infrastructure (187).

Though limited development offshore has taken place to date, full scale industrial development offshore would displace polar bears and ringed seals from their habitats, increase mortality, and decrease their reproductive success. Predicted climate change is likely to have serious effects on polar bears and ringed seals that will accumulate with those related to oil development (169);

Wilderness: Oil development has compromised wilderness values over 1,000 square miles of the North Slope. The potential for further loss is at least as great as what has already occurred as development expands into new areas (239). Roads, pads, pipelines, seismic vehicle tracks, transmission lines, air, ground and vessel traffic, drilling activities, and other industrial activities and infrastructure have eroded wilderness values over an area that is far larger than the area of direct effects (227);

Air pollution: More than 70,000 tons of NOx are emitted each year by industrial facilities on the North Slope, along with thousands of tons of sulfur dioxide, carbon monoxide, volatile organic hydrocarbons, and millions of tons of carbon dioxide (66). Even though air quality meets national ambient air quality standards, it is not clear that those standards are sufficient to protect arctic vegetation (141). Not enough information is available to provide a quantitative baseline of spatial and temporal trends in air quality over long periods across the North Slope, and little research has been done to quantify effects;

Winter off-road seismic exploration and ice roads: The Committee estimates that more than 32,000 miles of seismic trails, receiver trails, and camp-move trails were created between 1990 and 2001, an annual average of 2,900 miles each year (154). If current trends continue, some 30,000 line miles will be surveyed on the North Slope over the next decade. These trails produce accumulating visual effects and can damage vegetation and cause erosion. Data do not exist to determine the period that the damage will persist, but some effects are known to have lasted for several decades.(252). Seismic exploration is expanding westward into the western arctic and the foothills, where the hilly topography increases the likelihood that vehicles will damage vegetation (252). The use of ice roads and pads has increased and will continue to do so, but little information is available on how long effects persist; and

Animals: The reproductive success of some bird species in the oilfields has been reduced to the point where some oil-field populations are likely maintained only by immigration from more productive "source" habitats elsewhere (200). An important consequence of this phenomenon is that loss of such "source" habitats can threaten the viability of a population even though most of the habitat occupied by the species in region remains relatively intact. The location of important source habitat for birds or other species is not well characterized for the North Slope. Thus, the spread of industrial development into new areas could result in unexpected species declines, even though total habitat loss might be modest (158, 253).

With respect to caribou, Although industrial development has not resulted in a long term decline in the Central Arctic Herd (the herd most affected by current oil development), the Committee concluded that by itself is not a sufficient measure of whether adverse effects have occurred (185). Female caribou exposed to oilfield activity and infrastructure produced fewer calves, and following years when insect harassment was high, that effect increased, which may have depressed herd size. The spread of industrial activity into other areas that caribou use for calving and relief from insects, especially to the east where the coastal plain is narrower than elsewhere, would likely result in reductions in reproductive success if disturbance is not reduced. (15, 254).

Environmental issues related to development on public lands in the West

The environmental problems associated with onshore oil and gas development in Alaska are mirrored on public lands in the Interior West. According to the Bureau of Land Management (BLM), there are currently over 94,000 producing oil and gas wells on the public lands that it manages within the Rocky Mountain West. In Fiscal Year 2001, the BLM permitted 4,472 drilling projects on those lands,[12] a

[12] BLM, Oil and Gas Activity on Public Lands, p. 5 (March 2002).

"strong increase" over 1999 and 2000 levels.[13] Since the Administration took office, 7, 158 APDs have been approved and the BLM has been fast-tracking land use plans and energy projects to achieve its stated goal of increasing domestic production.[14] The expedited list includes the Powder River Basin in Montana and Wyoming, where the agency recently approved the drilling of up to 66,000 new coalbed methane wells over the next 10 years.[15] Also included are public lands in the Farmington, New Mexico area, where the agency's "reasonably foreseeable development scenario" projected the drilling of 9,970 new wells during the next twenty years in an area that currently has over 19,000 producing oil and gas wells.[16]

Current practices in oil and gas development have had serious and widespread impacts across broad expanses of public land. Oil and gas fields have become spiderwebbed with pipelines and access roads, and pockmarked with well pads. Full-field development has often converted pristine wildlands and pastoral rural areas into industrial zones. The wild character of the public's lands has been destroyed, recreational values severely diminished, long-term degradation of scenic viewsheds, and wildlife habitats seriously degraded. Not only the environment, but also the cornerstones of the West's economy—outdoor recreation, hunting and fishing—have been affected.[17]

Research shows that roads and drill pads fragment and diminish the quality of wildlife habitat for elk, antelope, and sage grouse. A recent GIS analysis of an oil and gas filed in Wyoming's Upper Green River Valley indicates that 97% of the 166-square-mile study area was within one-quarter mile of a road, pipeline, or well pad, providing no habitat for the Greater Sage grouse, a potential candidate for the federal endangered species list.[18] Other research has shown that oil and gas development can have a major impact on big game animals, including elk.[19]

Seismic exploration activities can also have serious environmental impacts. Desert soils are susceptible to compaction and destruction from the heavy vehicles used for certain types of exploration and can take 50-200 years to recover.[20] Seismic activities can have negative impacts on big game as well as other wildlife species.[21]

The environmental consequences of oil and gas development onshore and offshore are an important reason why NRDC supports a different approach to energy security in this country, one that shifts reliance away from fossil fuels and toward more sustainable energy future.

Thank you for the opportunity to testify.

Mr. REHBERG. Let me begin by asking the panel a question. Obviously I'm a Congressman from Montana, so I don't have a deep knowledge of offshore drilling technology, so I apologize for my questions perhaps, but are these rigs cut out and taken for salvage,

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[13] Id. See also, BLM, Budget Justifications and Annual Performance Plan, Fiscal Year 2003, pp. III-116 through III-121.

[14] See, e.g., BLM, Land Use Plans and Major Environmental Impact Statements—Energy Development Workloads (December 28, 2001).

[15] We are among the groups that have filed suit over these decisions. However, neither we nor any of the other plaintiff groups have asked for any injunctive relief as of this date and BLM has begun approving APDs.

[16] Alberswerth, D. 2003. Testimony before the Senate Energy and Resources Committee, The Wilderness Society, Washington, DC.

[17] Hunters and anglers spend $5.5 billion each year in the Rocky Mountains, including $2 billion a year in Colorado. Recreation and tourism, much of which is dependent on public lands, brings in $8 billion annually to Colorado's economy. See, e.g., Morton, Peter A., Ph.D., Testimony before the Speaker's Task Force on Affordable Natural Gas, U.S. House of Representatives, August 25, 2003, The Wilderness Society, DC.

[18] Weller, C., J. Thomson, P. Morton, and G. Aplet. 2002 Fragmenting our lands: the ecological footprint from oil and gas development. The Wilderness Society, www.wilderness.org/Library/Documents/FragmentingOur Lands.cfm

[19] See, e.g., Powell, J.H., and F.G. Lindzey. 2001. 2000 progress report: Habitat use patterns and the effects of human disturbance on the Steamboat elk herd. Unpublished report, Wyoming Cooperative Fish and Wildlife Research Unit; Van Dyke, F., and W.C. Klein. 1996. Response of elk to installation of oil wells. J. Mamm. 77(4):1028-1041; Johnson, B., and L. Wollrab. 1987. Response of elk to development of a natural gas field in western Wyoming 1979-1987, Wyoming Department of Game and Fish Report.

[20] Belnap, J. 1995. Surface disturbances: Their role in accelerating decertification. Environmental Monitoring.

[21] See, e.g, Gillin, C. 1989. Response of elk to seismograph exploration in the Wyoming Range. M.S. Thesis, University of Wyoming; Menkens, G.E., and S.H. Anderson. 1985. The effects of vibroseis on white-tailed prairie dog populations on the Laramie Plains of Wyoming. Report to the U.S. Bureau of Land Management, Interagency Agreement #WY910-IA2-1187.

or are they cut out and left there? I guess my question would be what do they do, and, if they cut them and drop them, do they sustain more life by being in place or laying on their side? Certainly they wouldn't sustain as much life if they're entirely removed. My question would be for the four of you.

Mr. KOLIAN. I'll address that.

They put explosives 15 feet below the mud line, and they pop them out of there normally. Eight percent of the 2,000 platforms removed have been turned into artificial reefs.

When they topple them over like that, the community of fish is much smaller than when it is straight up like that, because what happens is you get fish that exist between zero and 30, and 30 and 60, and 60 and 90 and all that on one single location. When you topple it over like that, you lose all those shallow-water species. And I hope that addresses your—

Mr. REHBERG. Dr. Sammarco.

Dr. SAMMARCO. MMS has a number of options that they use in their Rigs-to-Reef program. Removal is by and large what is done, which is cutting these off below the surface of the sediment, floating them up, taking them in on a barge, and they're either scrapped or cleaned up, and they are perhaps used again.

The second option is they can take them and topple them completely, which then puts them into deep water, which is fine for deepwater organisms, but it's not fine for the shallow-water organisms.

The third option is they can take them and cut the top off at 85 feet, and they leave the platform up to a depth of 85 feet. The top is taken off, and the top is toppled next to it.

And then the last option is they leave it in place. If it is left in place, they have to maintain—whoever's looking after it has to maintain all the navigational aids, the lights, the horns, foghorns, and all that sort of thing, so—but by and large, over 90 percent of them are brought back to land and scrapped either for scrap metal or are cleaned and used again.

Mr. REHBERG. Mr. Walker and Ms. Speer, before you answer, I have not thoroughly studied your biographies. I assume the first two gentlemen have a scientific background.

Mr. WALKER. Yes.

Mr. REHBERG. I don't know what Gulf Productions does. Are you science-based?

Mr. WALKER. No, sir. My whole role in this thing here is to basically be the eyes underwater for these guys due to how much I do dive and have dove and the surroundings that I keep myself in as a charter boat captain and—

Mr. REHBERG. OK. Then from your observances—

Mr. WALKER. My observance of what you're speaking of now, I would like to comment also in seismographic, because I do do stuff for Federal agencies as well.

The top of a rig is simple to me; I mean, you should leave the platform in place. If you do cut it off, let it extend 85 feet out the water. The ones I do see like that are solar-powered, which keeps the foghorns going, keeps the lights going, which assists anybody that's sailing in that vicinity. But the most important reason, from my point of view, on why not to cut the platform below the surface

is because the community of fish that live up in the top 30 to 40 foot of that platform is where I see most of the nesting activity taking place, and that's from crustaceans to microorganisms and whatnot.

Mr. REHBERG. Thank you.

Ms. Speer, first of all, your background, and then if you could answer that question.

Ms. SPEER. Yes. I received a master of science from Yale University. I am a member of the Board on Environmental Science and Toxicology of the National Research Council, which is an arm of the National Academy of Sciences. It is my privilege to serve on the NRDC committee that examined the impacts of oil development on Alaska's North Slope, and I've worked on oil and gas issues offshore for 20 years.

Mr. REHBERG. Thank you. I sense from your testimony you would prefer those rigs not have been there in the first place, but now that they're there, is there a benefit to having them stand versus lay on their side? And I won't ask about the removal, just between the standing and the laying on its side.

Ms. SPEER. I—I think our issues go beyond that, and the question of whether they're upright or on their sides is not as crucial to us as getting them out of the water, regardless of where they're standing.

Mr. REHBERG. The question is, for any one of the four of you, I was listening to your testimony, but I didn't hear anybody specifically mention endangered species. Are there unique and endangered species involved in these platforms? We're not in the business of destroying endangered species, so can you tell me, are there endangered species involved?

Mr. KOLIAN. Yes. The Hawksbill turtle, which was put on the endangered species list in 1968, currently resides on the oil and gas platforms. They will actually hang on the transoms and sleep and rest. All the food requirements that they need, they feed on mollusk, they feed on passing jellyfish, a number of other organisms that are right on the platform, so that they eat, sleep and rest right on the platforms.

Mr. REHBERG. Dr. Sammarco, are there coral species that are unique that are perhaps endangered in some sense that these platforms create an environment for, or is that not an issue?

Dr. SAMMARCO. Well, the corals—well, first to bounce off what Steve said, I have seen turtles on the platforms. I haven't seen them to the extent that Steve and Al have, but I've certainly seen them there.

Second, with respect to the corals, the corals in general are protected species by Federal law, protected from take and from harvest, and also they're protected from trade by international treaty, so they are somewhat special. And I think there's a gray area here as to when the platforms are taken out and when the platforms are decommissioned, whether—where this falls with respect to Federal law, I don't know. I think it's something that needs to be clarified, because the Stevens-Magnuson Act and the decommissioning act for MMS seem to be out of kilter there, but I can't speak with a great deal of legal knowledge on this. Seems to me there was something out of kilter.

With respect to the corals themselves, they are protected. We are losing corals on reefs throughout the world at an alarming rate not just from bleaching, but all sorts of things, coral disease. The keys have been hit very hard. The interesting thing about these platforms which we now have, you know, 4,000 of in the northern Gulf of Mexico is that they seem to be harboring these corals, and the corals don't seem to be suffering from the problems that I see on other reefs. They don't seem to be suffering from disease or bleaching; probably, bleaching, because of the depth. And I do believe and this is my personal opinion, that they're acting as a stabilizing force for the corals on the flower garden banks, which are also very healthy at the moment. I think they're among the healthiest reefs in the Northern Hemisphere from what I've seen, which probably the corals from here—this is one thing that we're examining at present. We believe the flower gardens are seeding the platforms, but, in doing that, in creating these I don't know how many hundreds or thousands of populations out there in the Gulf of Mexico, those populations will also aid to stabilize the populations on the flower gardens, because if something ever happened to them, they could be reseeded from other populations around.

Mr. REHBERG. Mr. Walker.

Mr. WALKER. Yes, sir. Again, I'll state that I am their eyes underwater and am aware of the migrations of many of these species. As far as the Hawksbill turtle goes, I do have on film one resting, one feeding on a platform, first time ever captured. I do have a coral that I have now at home that Dr. Sammarco, as knowledgeable as he is about corals, I have one for him to sample that he's never, ever had a chance to look at.

There was a situation that just occurred that they were thinking about putting the white marlin on the endangered species list. I went and gathered some footage in that area as well around oil platforms. I do encounter many types of whales, sperm whales, pilot whales, whale sharks, and they do also frequent the platforms mainly to feed on squid, which I also have on film.

Mr. REHBERG. Ms. Speer.

Ms. SPEER. Yeah. My other responsibilities deal with fisheries, and my experience is that if the concern is endangered species, there is an awful lot of other things that would be far more effective in conserving endangered species like turtles and marlin. The most important is long lines; controlling long lines and keeping them out of areas where marlin frequent would be far more effective in protecting marlin—the same goes with turtles—than allowing these reefs to remain on the ocean floor.

Mr. REHBERG. Thank you.

Mr. Vitter, I understand you have to leave. Mr. Kind has been kind enough to yield to you.

Mr. VITTER. Thank you, Mr. Chairman. I appreciate that. I just have a couple questions for Ms. Speer.

First of all, let me go off my topic a little bit and ask you about the meat of your topic, which is ongoing oil and gas production. I think you said in your closing an environmentally sound oil and gas development is an oxymoron, so you basically do not think it exists on the plant now; is that correct?

Ms. SPEER. I'm saying there has been a lot of progress in the last 20 years since I started this business, but we still have a long way to go.

Mr. VITTER. So you don't think that environmentally sound oil and gas production exists now.

Ms. SPEER. Environmentally sound oil and gas production remains a goal that we are all shooting for, and particularly gas production. Gas, we recognize, is a very important part of the Nation's future, and fortunately most of the areas that are off limits to oil and gas production on Federal lands onshore and offshore do not contain most of the federally owned oil and gas.

Mr. VITTER. So, again, none of the production, right now, is environmentally sound.

Ms. SPEER. Again, it is a goal we remain anxious to reach.

Mr. VITTER. OK. I take that as a no, nothing's environmentally sound.

Do you support any increased oil and gas production in the domestic U.S. Or at our continental shelf?

Ms. SPEER. We have not opposed gas development where 80 percent of the gas on the Federal outer continental shelf is located, and that is in the central and western Gulf of Mexico. We also have not opposed development of Alaska's North Slope gas reserves, which far, far outweigh the reserves of oil and gas in protected areas of the outer continental shelf.

Mr. VITTER. Do you support that increased activity there?

Ms. SPEER. We have not opposed that activity.

Mr. VITTER. OK. My question is do you support that increased activity there?

Ms. SPEER. There were environmental questions that need to be resolved before we could respond to that question—

Mr. VITTER. So the answer is no.

Ms. SPEER. Construction of pipeline stuff is quite a significant thing that we would need to see evaluated before we took a position.

Mr. VITTER. So there is nowhere where you support increased activity.

Mr. REHBERG. Is that what she said?

Mr. VITTER. Is that correct?

Mr. REHBERG. That's not what she said. Perhaps just give her a question, allow her to respond, and then move on.

Mr. VITTER. OK. Can you name a spot in the domestic U.S. Or outer continental shelf where you support increased activity?

Ms. SPEER. I can name a sector where we support increased activity, and that is drilling the enormous quantities of energy that lie in inefficient electrical appliances, in refrigerators, in transformers, in the whole—in cars, the whole range of energy-consuming appliances and other conveyances that we could make—we could improve the efficiency of at far less environmental cost and provide energy that far exceeds the amount of oil and gas in protected Federal lands.

Mr. VITTER. OK. And so that conservation is the increased production that you support.

OK. Getting to the meat of my bill, I take it you're just opposed to allowing these platforms to stay in place after production increases; is that correct?

Ms. SPEER. Again, I think there are a lot of issues that remain unresolved about leaving these platforms in place, including, you know, the issues I articulated in my testimony.

Mr. VITTER. So, as of now you oppose any legal changes that would allow them to stay in place.

Ms. SPEER. We have not taken a position one way or another. I think the question remains there are a lot of issues out there that need to be looked at, the questions of health, contamination, liability, whether those reefs really do serve a purpose in terms of concentrating marine life or benefiting the marine ecosystem. All of these, I think, is open to question.

Mr. VITTER. You cited this California study talking about local versus regional impacts. I take it, to sort of translate that, that that study is based—that quote is basically saying, well, maybe these things just attract marine life, they don't create and help multiply marine life. Is that what that quote gets to? Is that the issue it gets to?

Ms. SPEER. I think the issue that it gets to is from an ecologic standpoint, the question is not so much whether there is increased life at the platform itself, but whether that benefits the ecosystem as a whole. And what I think they're saying, and, again, I would direct this question to the scientists who conducted this study because I don't want to speak for them, but my understanding of what they're saying is most studies out there look simply at the local effects and not at the bigger ecoeffects that are out there. And I know some people have expressed concern about the attraction problem with respect to things like rockfish, which in the West are in serious trouble, and you are simply attracting them to the rigs to allow them to be fished. Is that really a helpful thing?

Mr. VITTER. On this attraction versus production question, we've had testimony today from Mr. Kolian, but there is a lot of evidence out there that it is not primarily about attraction. It is primarily about actually producing more fish stock and coral life. As a layperson, that clearly seems to be the overwhelming weight of the evidence to me, from everything I've read. Do you disagree with that?

Ms. SPEER. I'm merely pointing out that they are—with all due respect to the other witnesses, that there are other points of view within the scientific community about that point.

Mr. VITTER. And if, in fact, these things are helping produce more marine life versus simply attracting it from elsewhere, are you also saying there is a negative side to that, because I'd like to understand what that could be.

Ms. SPEER. Well, if the goal is to increase diversity and productivity of the marine environment, there are far more effective ways of doing that. Creating large-scale marine protected areas not just at one little point, but much more broadly is one. Creating areas where you protect juveniles from fishing is another. There is just—if the concern is preserving marine biodiversity, this is not the most effective way to go about it.

Mr. VITTER. But, Ms. Speer, we rarely stop doing every productive thing on the list because there is something more productive on the list, too; in other words, if it's good for marine life, why not do it seems to me saying there's a more productive thing to do is not a reason not to do this, if it, in fact, is productive.

Ms. SPEER. And I guess there is still—my understanding is there are still different scientific views about, number one, whether it's more productive; number two, whether it actually helps the marine environment; number three, whether there are issues of contamination. Number four, is where the liability will rest at the end of the game, and who pays if somebody gets hurt, and a whole host of other issues that I think deserve some more examination before we rush forward here.

Mr. VITTER. OK. Thank you, and, again, thank you for your courtesy, Mr. Chairman.

Mr. REHBERG. Thank you.

Mr. Kind.

Mr. KIND. Thank you.

I want to thank the panelists for your testimony today. It's very enlightening.

Let me start with a couple of questions to Mr. Kolian and Dr. Sammarco. In regard to the bottom-line cost to the industry, in regard to the disposition of these oil rigs, given the various options that they're facing, what's most expensive, what's least expensive in regard to the disposition of these oil rigs?

Go ahead.

Dr. SAMMARCO. This is to the best of my understanding after interacting with MMS closely for the last few years. To the best of my knowledge, when the platforms are put in, the oil companies are required to place either a bond or open an escrow account which will cover the decommissioning of that when it is ready for such. The lowest amount that I've heard is $2.5 million, and that will be there whether the company is there or not. If the company goes bankrupt or whatever, the company is still there to pull that out.

Now, it is my understanding if there is an agreement made between the State government and Federal Government to donate the platform to the Rigs-to-Reef program, that they receive 50 percent of that bond back; that the other 50 percent is used, I presume, to move the rig or to help convert it. So this is a—this is an area where there are funds sitting already in regards to decommissioning of platforms.

Mr. KIND. Let me ask it in a more simplified manner. I'm assuming that the cost of decommissioning the rig and pulling it out and disposing of it and pulling it out of the water is going to be much more competitive than if they go to some of the other options of keeping it in in some reef form; is that correct?

Dr. SAMMARCO. Yeah, 2-1/2 half million will probably be a minimum. Sometimes these things can be very, very expensive to pull out, I guess on the order of tens of millions or hundreds of millions.

The maintenance fees per annum to keep it going, to keep the navigational aids, the figures that I've had from Texaco have been about 100,000 per year.

Now, in terms of other maintenance, compressors, painting, that sort of thing, I'm not certain.

Mr. KIND. And I'm assuming that they cut the first 85 feet off and let that drop into the bottom, that would be even less expensive.

Dr. SAMMARCO. Yes. There is no maintenance costs there.

Mr. KIND. Let me just invite the panel, if you've got any information or study in regards to mercury contamination in the Gulf of Mexico, forward them to us so I'll have a chance to look that. And I understand there are some studies that contradict that as well, but whatever you might have available, I'd encourage that type of feedback.

Ms. Speer, let me turn to you and quickly ask you if you had to give a grade to the oil and gas industry in regard to their ability to modernize with new technology and become more environmentally sensitive to the work that they're doing, where would you put that grade right now?

Ms. SPEER. Well, it really varies, Mr. Kind. I think it's impossible to give the grade overall, because the practices really differ substantially.

Mr. KIND. Fair enough. Fair enough.

Let me ask you, getting back to the Rigs-to-Reef program, perhaps I'm skewed in my viewpoint in seeing the success that's occurred with decommissioned ships and even boats being placed next to currently existing reefs and the value that that brings, and I think there's been a lot of success in doing that. How is the Rigs-to-Reef program different from that as far as the creation of reefs or complementing what exists in the ecosystem already?

Ms. SPEER. I am not familiar with putting—you know, sinking other vessels, et cetera, so I can't speak to those issues directly, but I do think that it's incumbent upon us to be responsible in approaching this question, and particularly given the concerns that have been raised about mercury, but, in addition to that, the question of whether we want to use the ocean floor as a dumping ground is really an important one to look at, because if we start doing this, and, you know, we've put subway cars off of where I live, we're putting ships down, it does become a question of where, in fact, are we going with this.

Mr. KIND. And your major concern, you don't feel there's been enough scientific study in the application of this idea and whether it makes sense for the ecosystem?

Ms. SPEER. Yes.

Mr. KIND. Well, I would be remiss if I didn't also ask you, in regards to the North Slope, a report that you and so many others put a lot of hard work in. I mean, this report that you cited from the National Research Council on the effects of North Slope drilling, and I'm serving on the Energy Conference Committee right now, and obviously one of the most contentious issues is whether we allow drilling in the Arctic National Wildlife Refuge. The work that you put in in regard to North Slope operation, what is your opinion with regard to drilling in the Arctic National Wildlife Refuge that is being proposed in this Energy Conference?

Ms. SPEER. I think—and I'm speaking as NRDC, not the committee—but I think the report unquestionably shows that there

are very profound and possibly permanent impacts on the environment of the North Slope that have developed from oil and gas development, and that moving into the oil and gas in the National Wildlife Refuge would increase those effects in an unacceptable way. But it is not just the Arctic refuge we're concerned about, of course. It's offshore in the Arctic, and it's also the National Petroleum Reserve which also harbors tremendous wildlife resources. So we believe this report lends further weight to the contention that we should not go there, and we don't need to go there, fortunately, because we have at our disposal a lot of other alternatives that are far more environmentally sound.

Mr. KIND. There have been a lot of arguments made that we're only talking about a footstep, maybe a postage stamp effect in this vast wilderness area. What's your response to that?

Ms. SPEER. A couple. First of all, the idea that this 2,000 acres would be developed conveys the idea that all of it would be in a little 2,000-acre chunk, and the reality is, according to the U S. Geologic Survey, the oil is spread out among many different pools so that 2,000 acres would be spread out throughout the National Wildlife Refuge's coastal plain to develop the oil. In addition, that doesn't include all the infrastructure that's required to support the development. And finally, the impacts—we found in our report, the NRDC report, that the impacts of oil development extend far beyond the actual footprint of the 2,000 acres. For example, the current North Slope development covers only 17,000 acres, but it's spread over an area larger than the size of Rhode Island. That's the kind of problem that we would face if we go into the refuge, and we strongly oppose that.

Mr. KIND. OK. Thank you.

Thank you all again.

Thank you, Mr. Chairman.

Mr. REHBERG. Thank you, Mr. Kind.

Mr. Walker, you had commented that I would like some additional opportunity on the seismic issue. Did you want to respond to that?

Mr. WALKER. Yes, sir. Again, I pride myself, along with my company, for bringing conclusions to either false theories or just plain theories, as it may be. I have done work with Federal agencies on this matter. I do assist in tagging the whales. I do assist in gathering feces from the whales. They normally let go of their feces when they sound.

The comment I'd like to make to Ms. Lisa Speer is whether we tag these whales, ironically they're following the seismograph boats along with the tuna and everything. The charter fisherman—when I see a seismograph boat, I go to it, and I fish it. The seismograph is comparable to the way the whale feeds already, by sonar, and it exposes prey that it normally wouldn't pick up. That's one theory.

Again, my job is to go out while they're seismographing, jump in the water with a camera, and show that the whales are living in perfect harmony with these so-called enemy of them. So I would go as far to say that there is not 100 percent proof seismographing is deterring or injuring any whale species.

Mr. REHBERG. Yes?

Ms. SPEER. There have been numerous studies, both in the Gulf of Mexico and on the North Slope of Alaska, that have shown that whales react to seismic vessels. This is the first time I've heard any dispute of that question, and, in fact, I'd like to submit for the record—I don't have it with me—the biological opinion of the National Marine Fisheries Service on the consultation and lease sale 180 in the Gulf of Mexico, which the biological opinion addressed this issue on seismic effects on whales and raised very significant concerns not only for the whales, but on their chief source of food, which is squid, and squid react very violently to seismic exploration, according to the biop.

Ms. SPEER. In addition, there have been many, many years of work done off of Alaska's North Slope. It has shown that seismic activities show very significant diverse narrow effects on those bowheads, and I think that those issues are increasingly important as we move forward in seismic exploration.

Mr. REHBERG. Thank you. For the panel, what other countries are farther ahead of this concept of leaving the rigs in place, and to what extent do they practice?

Mr. KOLIAN. Yes. In Norway they're developing a large comprehensive mariculture system that's utilizing their oil and gas platforms. Japan has a—the most advanced fisheries enhancement program in the world. They develop offshore oil and gas platforms specifically to raise fish. They utilize artificial reefs which look very similar to oil and gas platforms, except that ours are—will last 300 years. Theirs will last 30 years. Ours are much bigger, much stronger.

They will stock fish, feed fish, and grow them to maturity. They'll play music to the fish before they feed them, in which they'll respond and come up to the feed, and they have a very comprehensive mariculture program, utilizing offshore oil and gas platforms and artificial reefs.

Mr. REHBERG. One other question, and it's always bugged me. We have a tendency from an environmental standpoint to dump on the company because of arsenic when there's more arsenic naturally occurring in the environment than a mine could ever produce. And I can't speak to the mercury issue because I don't know if mercury naturally occurs in the environment. But does oil seepage naturally occur in the ocean environment? We don't have too many oceans in Montana, so I'm not familiar with what naturally occurs out there. So, one, is there a naturally occurring oil seepage; and, two, could the mercury concentration be some naturally occurring mercury?

Mr. KOLIAN. Well, I've done some research on the mercury issue. There is oil seepage all over the Gulf of Mexico. I'm not sure if the mercury's coming from that oil seepage. The one thing from mercury methylation, it takes time. It requires a certain PH level. It requires that, from the studies that I've read, below 7 pH, and the ocean is 8.0 pH. And also what occurs is the bacteria will be—you know, muck around in the mud which has mercury in it, and that has to transfer through all the trophic level to get to fish.

Now, I understand there are some worms which may hide in the mud, and then the fish come down and eat the mud, but—or eat the worms, but the anoxic conditions around these oil and gas plat-

forms, natural, it is mucky. These fish aren't going down eating these worms. They may in sandy areas, but offshore Louisiana, it is naturally hypoxic. I mean, not naturally, it's occurring from agricultural run-off, but also, if it's—if it's going from the bacteria to the plankton to the small carnivores to the large fish, that's going to take several days to weeks. And there's a 20- to 30-centimeter-per-second current in the Gulf of Mexico, so if it's—if there's mud around the platform, and it's going through a trophic system, that's going to happen miles—20, 30 miles away, so it will be dispersed. And it may be possible for the worms to collect mercury, but these fish are not going down and eating these worms because it's anoxic.

Mr. REHBERG. Thank you.

Dr. Sammarco, did you have a comment?

Dr. SAMMARCO. Just to confirm that there is natural oil and gas seepage in the Gulf of Mexico. There's not too much question about that, to varying degrees, and, in fact, if I remember correctly, it's because the Gulf of Mexico has a pretty good track record with respect to spills. I think that the latest data—and again you'd have to confirm this with MMS—I think the latest data shows that natural seepage is greater than any spills they have had in the last decade.

Mr. REHBERG. Mr. Kind, do you have any additional questions?

Mr. KIND. No.

Mr. REHBERG. All right. I'd like to thank you all for your testimony. It's been enlightening, and I appreciate your taking time to be with us today.

We'll adjourn the first panel and invite the second panel up, please.

Dr. SAMMARCO. Thank you.

Mr. REHBERG. As is customary in the Committee, I will please ask you to stand, raise your right hand and repeat after me.

[Witnesses sworn.]

Mr. REHBERG. Thank you very much. I'll waive introduction.

I would like to mention to the audience that panel number three is Hank Kulesza, with K&M Technology; Dr. Milton Love, Marine Science Institute; and John Amos, Skytruth.

And I apologize if I'm butchering your name, Hank. Why don't you begin.

STATEMENT OF HANK KULESZA, K&M TECHNOLOGY

Mr. KULESZA. You did a pretty good job on it. Most people don't get that close. Thank you.

Mr. Chairman, members of the Committee and distinguished guests, my name is Hank Kulesza. I'm the chief operating officer of K&M Technology based in Houston, Texas. Thank you for allowing me the opportunity to address your Committee this morning.

We are a drilling engineering firm that has been specializing in extended-reach drilling technology for the past 15 years. First I'd like to introduce you to this exciting technology which has helped minimize drilling's impact on the environment while still allowing us to develop oil and gas reserves in sensitive areas of our Nation and around the world.

In this example we are using an offshore platform environment which has been set to develop reserves beneath and around the

platform. Directional drilling technology is generally used to deviate the wells into key locations of the producing formation, which is illustrated on the slide by the various well paths. This technology has proven very effective in exploring our Nation's petroleum reserves.

Extended-reach drilling technology has taken directional drilling to its extreme. The wells are deviated very near the surface, the sea floor, to very high angles of inclination. This high angle is maintained, and the well is drilled onward to distant targets, often several miles away from the platform, and that's illustrated as well and noted as an extended-reach well on the slide.

Although many technical challenges exist when attempting wells of this nature, many of these challenges have already been met and overcome. Wells have already been drilled to reserves as far away as 35,000 feet, or 6-1/2 miles, from the drill center.

The next slide concerns several of the technologies which have enabled the industry to recover reserves once thought unattainable. The two developments which had major environmental impact have been the development of oil-based drilling fluids and stronger, more compact drilling units. The gravitational elements and friction factors extended-reach drilling produces necessitated the development of better drilling fluids. Oil-based drilling fluids better lubricate the well bore and better reduce the torque and drag in the well. However, conventional oil-based drilling fluids could not be discharged. The development of environmentally friendly oil-based drilling fluids have allowed extended-reach drilling to be used in areas where it was previously prohibited.

Today's drilling rigs are also becoming more compact and more powerful. They can produce more power, handle more fluids and equipment, and occupy a much smaller footprint, which translates into less environmental disruption. The new—this new rig technology enables the operator to drill out even further than it had in the past.

The impact of extended-reach drilling and its enabling technology is significant. This map of Long Beach Harbor in California depicts four drilling islands which were constructed around 1970. Each island has approximately 100 wells directionally drilled into the producing formations. Using today's proven extended-reach technology, the entire reserve under Long Beach Harbor could be developed from one onshore drill site.

There may be no better illustration on ERD's positive environmental impact than this slide. Extended-reach technology is now utilized worldwide to minimize the cost and environmental impact of developing oil and gas reserves. The technology allows us to reach previously unrecoverable reserves in environmentally sensitive areas. We can now drill offshore, back to shore. We can drill to offshore locations from land. We are doing so in Alaska, California, the United Kingdom, Australia, Russia and New Zealand. We are drilling under ship channels in the Gulf of Mexico, and we're drilling under lakes, rivers, reefs, and other restricted areas.

The above pictures are existing ERD applications. The upper left picture is an onshore rig which is drilling to an offshore reserve under a turtle reserve in western Australia. The upper right picture is of the witch farm project off the coast of southern England

in Poole Harbor. It was initially determined that a drill island would need to be constructed to recover the reserve located in the middle of Poole Harbor, and that would have been right out there. And you can imagine that constructing a drilling location in the middle of a harbor was not a very palatable issue for most people. Using ERD technology, an onshore drill site was developed to reach the reserve approximately 30,000 feet away.

The lower left picture is a development of the upper North Slope of Alaska. This is a land-based drill site which is drilling offshore under the ice floe.

The lower right picture is off the coast of California.

By using ERD technology, we are able to capture reserves without having to place another platform.

There is a consistent theme in these examples. If extended-reach technology was not used, all of the above examples would require an additional drilling facility in order to develop the available reserves. These facilities can cost upwards of $100 million or more in an offshore environment.

This slide is an example of extended-reach technology's positive environmental impact in the Gulf of Mexico. This grid represents typical 3-by-3-mile lease boundaries in the Gulf.

In 1985—excuse me, using 1985 drilling technology, the maximum typical reach for a well would have been approximately 1-1/2 miles from the platform, and it would have taken 49 drill centers to develop the 7-by-7 lease grid.

I think you're ahead of us. Can you move back one?

OK. That's the 49 drill centers.

By 1995, the drilling radius had been increased to 4 miles using ERD technology. The improvement in our ability to drill highly deviated wells reduced the number of drill centers to develop this grid down to nine. Today our technology and equipment capabilities allow us to drill out to distances as far as 6-1/2 miles, or roughly 35,000 feet, reducing the number of drill centers to develop this grid to just four.

Finally, we continue to look for ways to stretch our capabilities in extended-reach drilling. We believe that it's possible to reach out even further, probably beyond the 10-mile limit. In order for this to happen, new technological breakthroughs will be required. The proposed construction of the Complex Well Test Center located at the Rocky Mountain Oilfield Test Center in Casper, Wyoming, which is outlined in the draft energy bill, will be a significant step toward making this a reality. If this becomes a reality, we could reduce the number of facilities in this example to just slightly more than one.

Finally, to provide you an example more familiar, and to give you a better feel for the kinds of distances we're talking about, we have drawn the same circles around the map of Washington, using the White House as the center.

In 1985—1985's technology would get you out to about Georgetown. 1995 technology would get you to the middle of Arlington Cemetery. Today's technology would get you out to the Mazza Galleria area. And tomorrow's developments could take us out to Landover, Maryland, or even further.

Mr. KULESZA. Thank you for your time and your consideration. I hope this presentation was informative.

[The prepared statement of Mr. Kulesza follows:]

Statement of Hank Kulesza, Chief Operating Officer, K&M Technology Group

Madam Chairman, Congressmen and distinguished guests: My name is Hank Kulesza, Chief Operating Officer of K&M Technology Group based in Houston, Texas.

Thank you for allowing me the opportunity to address your committee this morning. We are a drilling engineering firm that has been specializing in extended reach drilling technology for the past 15 years.

First, I would like to introduce you to this exciting technology which has helped minimize drilling's impact on the environment while still allowing us to develop oil and gas reserves in sensitive areas of our nation and around the world.

In this example we will use an offshore platform environment which has been set to develop reserves beneath and around the platform. Directional drilling technology is generally used to deviate the wells into key locations of the producing formation. This technology has proven very effective in exploring our nation's petroleum reserves.

Extended reach drilling technology takes directional drilling to its extreme. The wells are deviated, very near the surface (sea floor) to very high angles of inclination. This high angle is maintained and the well is drilled onwards to distant targets, often several miles away from the platform.

Although many technical challenges exist when attempting wells of this nature, many of these challenges have already been met and overcome. Wells have already been drilled to reserves as far away as 35,000 ft, or over 6° miles, from the drill center.

The technologies that have enabled us to drill to these distances, thus far, have mainly focused on overcoming drag forces that prevent pipe from sliding into these wells and rotating friction forces that increase the amount of torque required to rotate the pipe for the drilling phase.

Casing flotation was one of the first innovations used to allow protective casing to be run and cemented in these wells. Our company led the development of this technology back in 1989.

The next challenges to overcome were the limitations of the connections on the pipe being used to drill and case these wells. The industry developed connections that were many times stronger than any that had been used before.

Conventional directional drilling technology quickly met its limits in extended reach drilling. New systems that rotated continuously (a key to being able to drill these wells) and were adjustable from the surface while drilling were the next major development.

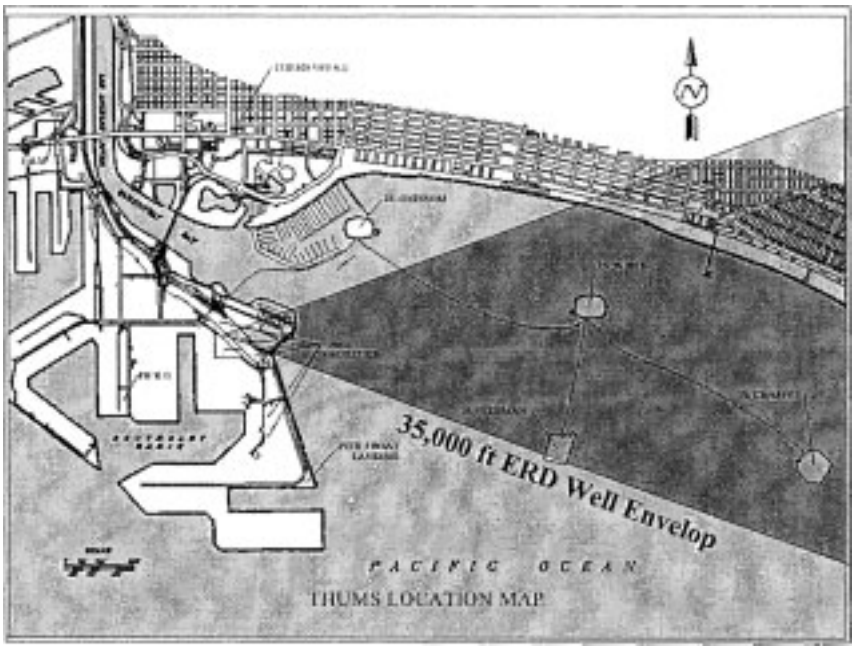
The gravitational elements and friction factors extended reach drilling produces necessitated the development of better drilling fluids.

Oil based drilling fluids better lubricate the wellbore and therefore reduce the torque and drag in the well. However, conventional oil based fluids could not be discharged overboard. The development of environmentally friendly oil based fluids have allowed extended reach drilling to be used in areas where it was previously prohibited.

Our drilling rigs are also becoming more compact and more powerful. They can produce more power, handle more fluids and equipment and occupy a much smaller footprint than the previous generation of drilling units. This new rig technology enables the operator to drill out even further.

The impact of extended reach drilling and its enabling technologies is significant.

This map of Long Beach Harbor in California depicts the 4 drilling islands constructed around 1970. Each island has approximately 100 wells directionally drilled into the producing formations.



Using today's proven extended reach drilling technology, the entire reserves under Long Beach Harbor could be developed from the THUMS Pier J drill site.

There may be no better illustration on ERD's positive environmental impact than this slide.

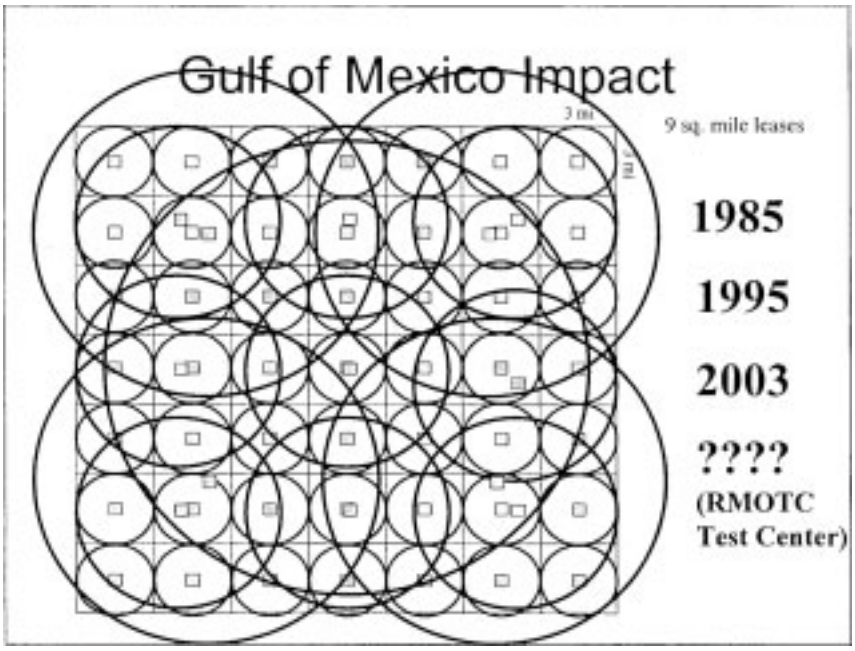
Extended Reach Technology is now utilized worldwide to minimize the cost and environmental impact of developing oil and gas reserves.

The technology allows us to:

- Reach previously unrecoverable reserves in environmentally sensitive areas;
- Drill from offshore back to shore;
- Drilling to offshore locations from land in Alaska, California, U.K., Australia, Russia and New Zealand;
- Drilling under shipping channels in the Gulf of Mexico; and
- Drilling under lakes, rivers, reefs and other restricted areas.
- All of these instances would have required an additional drilling facility in order to be developed, or the reserves would have simply been unrecoverable.

These facilities can cost upwards of $100 million, or more, in the offshore environment.

The slide is an example of extended reach technologies overwhelming positive environmental impact in the Gulf of Mexico.



This grid represents the typical 3 x 3 mile lease boundaries in the Gulf of Mexico.

Using 1985 drilling technology, the maximum typical reach for a well would have been approximately 1.5 miles from the platform and it would have taken 49 drill centers to develop this 7 x 7 lease grid

By 1995, the drilling radius had been increased to 4 miles using ERD technology. The improvement in our ability to drill highly deviated wells reduced the number of drill centers to develop this grid down to 9

Today, our technology and equipment capabilities allow us to drill out to distances as far as 6.6 miles, or roughly 35,000 ft, reducing the number of drill centers to develop this grid to just 4.

Finally, we continue to look for ways to stretch our capabilities in extended reach drilling. We believe that it is possible to reach out even further, probably beyond the 10 mile limit. In order for this to happen, new technological breakthroughs will be required. The proposed construction of the Complex Well Test Center located at RMOTC, in Casper, Wyoming, which is outlined in the draft Energy Bill will be a significant step towards making this a reality. If this becomes a reality we could reduce the required number of facilities, in this example, to just slightly more than 1.

Finally, to provide you an example more familiar and to give you a better feel for the kinds of distances that we're talking about, we have drawn these same circles on a map of Washington using the White House as the center.

- 1985 Technology Gets you out to just about Georgetown.
- 1995 Technology gets you into the middle of Arlington Cemetery.
- Today's technology would get you out to the Mazza Galleria.
- Tomorrow's developments could take us out to Landover, Maryland, or even further.

Thank you for your time and consideration.

Mr. NEUGEBAUER. [Presiding.] Thank you for your testimony.

The next witness is Dr. Milton Love with the Marine Science Institute.

STATEMENT OF MILTON LOVE,
MARINE SCIENCE INSTITUTE, UCSB

Mr. LOVE. Thank you, Mr. Chairman. I have been conducting research off of California on fishes that live around oil platforms and natural reefs for about 6 years. My funding comes from the Biological Resources Division of USGS, from Minerals Management Service, and from the California Artificial Reef Enhancement Program. The latter organization is funded completely by the oil industry. So I have both Federal funding and industry funding, and I must say at the outset that I am officially neutral on rigs to reefs issues. I give the same facts to any group, and then people filter them through their world view and probably ignore what I say half the time.

Basically, what I found is that all platforms are unique in terms of what fishes live around them. However, having said that, I am about to generalize, and the generalization is that platforms seem, at least in my area—and I have to be very specific, in California—seem to act more or less like natural reefs do. They produce some

fishes, I think that is fairly clear, particularly rockfishes, and they attract some fishes just like natural reefs do. Ironically, it seems that some platforms are actually better as fish habitat than many natural reefs, and that comes in two areas. One, platforms, many of them, tend to be better nursery grounds for rockfish than—and rockfishes dominate the system out there. They are very important economically for us and for the system. Platforms are large, and young fishes looking for places to settle out encounter platforms more easily than they encounter reefs, so you tend to find huge densities in some years of young fish.

And the other thing is that, unlike the Gulf of Mexico, we have very little fishing around many of our platforms. They act as de facto marine reserves. So you tend to find very high densities of overfished species around some of our platforms because they are not fished very much.

So what I would like to do is show you a videotape. I think it is more expressive than anything else I could say, and this sort of summarizes some of what we see.

As soon as we can get it to move. You want to try rebooting that? OK. You want to go to the next witness and come back, or how do you do this kind of stuff?

Mr. NEUGEBAUER. If you want to wait, we will come back to you and let you finish with that presentation.

Mr. LOVE. That will be fine.

Mr. NEUGEBAUER. Thank you, Dr. Love.

[The prepared statement of Mr. Love follows:]

Statement of Milton Love, Marine Science Institute, University of California, Santa Barbara

The following is a summary of the research I and my associates have conducted on the relationships between oil and gas platforms and fishes off southern California. This research was funded by the Biological Resources Division of the United States Geological Survey, the United States Minerals Management Service, and the California Artificial Reef Enhancement Program.

The full report summarizing our work is entitled The Ecological Role of Oil and Gas Production Platforms and Natural Outcrops on Fishes in Southern and Central California: A synthesis of Information, and is available in PDF format at our website www.id.ucsb.edu/lovelab.

Information Needed

Production of oil and gas from offshore platforms has been a continual activity along the California coast since 1958. There are 26 oil and gas platforms off California, 23 in federal waters (greater than 3 miles from shore) and 3 in state waters. The platforms are located between 1.2 to 10.5 miles from shore and at depths ranging from 11 to 363 m (35-1,198 ft.). Crossbeams and diagonal beams occur about every 30 m (100 ft.), from near the surface to the sea floor. The beams extend both around the perimeter of the jacket and reach inside and across the platform. The beams and vertical pilings (forming the jacket) and the conductors on all platforms are very heavily encrusted with invertebrates and provide important habitat for fishes. The sea floor surrounding a platform is littered with mussel shells. This "shell mound" (also called "mussel mound" or "shell hash") is created when living mussels, and other invertebrates, are dislodged and fall to the sea floor during platform cleaning or storms.

Once an industrial decision is made to cease oil and gas production, managers must decide what to do with the structure, a process known as decommissioning. Platform decommissioning can take a number of forms, from leaving much, or all, of the structure in place to complete removal. Along with the platform operator, many federal and state agencies are involved in the decommissioning process. All oil and gas platforms have finite economic lives and by the beginning of the twenty-first century, seven platforms in southern California had been decommissioned and a number of others appeared to be nearing the end of their economic lives.

Management decisions regarding the decommissioning of an oil and gas platform are based on both biological and socioeconomic information. This study addressed the need for resource information and better understanding of how offshore oil/gas platforms contributed to the fish populations and fishery productivity in the Santa Maria Basin and Santa Barbara Channel. Prior to our studies, there was almost no biological information on Pacific Coast platform fish assemblages. This necessary research involved broad scale sampling at numerous oil/gas platforms and natural reefs. Research objectives included 1) characterizing the fish assemblages around platforms and natural reefs, 2) examining how oceanography affects patterns of recruitment and community structure of reef fishes, and 3) describing the spatial and temporal patterns of fish diversity, abundance and size distribution among habitat types (e.g., platforms and natural outcrops).

Research Summary

Between 1995 and 2001, we studied oil and gas platforms sited over a wide range of bottom depths, ranging between 29 and 224 m (95 and 739 ft.) and sited from north of Point Arguello, central California to off Long Beach, southern California. However, most of the platform research occurred in the Santa Barbara Channel and Santa Maria Basin. The Santa Barbara Channel and Santa Maria Basin are situated in a dynamic marine transition zone between the regional flow patterns of central and southern California. The Santa Barbara Channel is about 100 km long by about 50 km wide (60 x 20 miles) and is bordered on the south by the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa). This area is bathed in a complex hydrographic system of currents and water masses. Generally, cool coastal waters from the California Current enter the Santa Barbara Channel through its west entrance at Point Conception. Warm waters from the Southern California Bight flow in the opposite direction into the channel through its eastern entrance. Surface waters are substantially warmer in the Bight than north of Point Conception due to less wind-induced vertical mixing, the solar heating of surface waters, and currents of subtropical waters entering from the south. The convergence of different water masses in the Santa Barbara Channel results in relatively large scale differences in physical parameters (e.g., temperature, salinity, oxygen, and nutrient concentrations) and biotic assemblages (e.g., flora and fauna).

Scuba surveys were conducted at shallow depths and submersible surveys, using the research submarine Delta, at greater depths. We also surveyed shallow-water and deeper-water rock outcrops, many in the vicinity of platforms. Nine nearshore, shallow-water rock outcrops, seven on the mainland and two at Anacapa Island, were monitored annually from 1995 to 2000. These natural outcrops are geographically distributed across the Santa Barbara Channel providing opportunities for spatial comparisons. In addition, we surveyed over 80 deeper-water outcrops, in waters between 30 and 360 m (100 and 1,180 ft.) deep, located throughout the Southern California Bight and off Points Conception and Arguello. These sites included a wide range of such habitats as banks, ridges, and carbonate reefs, ranging in size from a few kilometers in length to less than a hectare in area. On these features, we focused on hard bottom macrohabitats, including kelp beds, boulder and cobble fields, and bedrock outcrops. Most of these deeper-water sites were visited once, a few were surveyed during as many as four years and one outcrop, North Reef, near Platform Hidalgo, was sampled annually.

Most of our oil and gas platform surveys were conducted at nine structures (Platforms Irene, Hidalgo, Harvest, Hermosa, Holly, Gilda, Grace, Gina, and Gail) located in the Santa Barbara Channel and Santa Maria Basin. Between 1995 and 2000, we conducted annual surveys on the shallow portions of these nine platforms. The shallowest of the nine platforms, Gina, was surveyed from surface to bottom depths using scuba techniques. Deep-water surveys conducted between 1995 and 2001, using the research submersible, Delta, studied the same platforms excluding the bottom of Gilda and all of Gina. In 1998, one submersible survey was conducted around Platform Edith, located off Long Beach. In 2000 partial submersible surveys were completed around Platforms C, B, A, Hillhouse, Henry, Houchin, Hogan, and Habitat.

Patterns in Shallow-Water Habitats

Regional and local processes influenced patterns of outcrop fish assemblages in shallow waters. At regional spatial scales, outcrop fish abundance patterns often shifted abruptly as oceanographic patterns changed, roughly defining a cool-temperate assemblage in the western Santa Barbara Channel, and a warm-temperate assemblage in the eastern Santa Barbara Channel. This distinctive spatial pattern was observed in both oil and gas platform and natural outcrop habitats. In shallow waters, there was greater variability in platform species assemblages and

population dynamics compared to natural outcrop assemblages, and this was most likely caused by the greater sensitivity of platform habitats to changing oceanographic conditions. Local processes that affected fish distribution and abundance were related to habitat features, where depth, relief height, and presence of giant kelp all played important roles. On platform habitat, we found that the majority of newly settled rockfish juveniles resided at depths greater than 26 m (86 ft.), although there were differences among species.

Characterization of the Deepwater Platform Fish Assemblages

With the exception of the shallow-water Platform Gina, all of the platforms we surveyed were characterized by three distinct fish assemblages: midwater, bottom, and shell mound. Rockfishes, totaling 42 species, dominated these habitats. Fish densities at most platforms were highest in the midwater habitat reflecting the depth preferences of young-of-the-year rockfishes. Young-of-the-year rockfishes represented the most abundant size classes in platform midwaters. Platform midwaters were nursery grounds for rockfishes as well as for a few other species, including cabezon and painted greenling. The young-of-the-year of at least 16 rockfish species inhabited these waters. Settlement success was affected by oceanographic conditions. Densities of young-of-the-year varied greatly between years and platforms. Young-of-the-year rockfish densities often varied by an order of magnitude or greater among survey years and platforms. From 1996 through 1998, rockfish settlement was generally higher around the platforms north of Point Conception as compared to platforms in the Santa Barbara Channel. This finding is reflective of the generally colder, more biologically productive waters in central California during the 1980s and much of the 1990s. Colder waters in 1999 were associated with relatively high levels of rockfish recruitment at all platforms surveyed. In 2000 and 2001, juvenile rockfish recruitment at platforms in the Santa Barbara Channel remained higher than pre-1999 levels, possibly reflecting the oceanographic regime shift to cooler temperatures that may be occurring in southern California.

Subadult and adult rockfishes and several other species dominated the bottom habitats of platforms. The bottom habitat of some platforms is also important nursery habitat as, in some instances, young-of-the-year rockfishes were observed in very large numbers. In general, more than 90% of all the fishes around platform bottoms were rockfishes. Bottom depth strongly influenced the number of species, species diversity, and density of fishes living around platform bases. This is distinctly different than the pattern observed in platform midwaters. The platform base provides habitat for not only fishes but also their prey and predators.

Shell mounds supported a rich and diverse fish assemblage. As at other platform habitats, rockfishes comprised the vast majority of the fishes. The many small sheltering sites created by mussels, anemones, and other invertebrates on the shell mounds created a habitat occupied by small fishes. Many of these fishes were the young-of-the-year and older juveniles of such species as lingcod and copper, flag, greenblotched, and pinkrose rockfishes and cowcod. The adults of these species also inhabited the platform bottom.

Platform versus Reef Fish Assemblages

We compared the species composition of the fish assemblages at Platform Hidalgo and at North Reef, an outcrop located about 1,000 m (3,300 ft.) from the platform. The assemblages were quite similar, both were dominated by rockfishes. In general, the distinctions between the platform and outcrop assemblages were based on differences in species densities, rather than species' presence or absence. Most species were more abundant at Platform Hidalgo. Halfbanded, greenspotted, flag, greenstriped, and canary rockfishes, and all three life stages of lingcod (young-of-the-year, immature, adult) and painted greenling had higher densities around the platform. Five species (pink seaperch, shortspine combfish, pygmy, squarespot, and yellowtail rockfishes) were more abundant at the outcrop. Young-of-the-year rockfishes were found at both Platform Hidalgo (primarily in the midwaters) and at North Reef. Young-of-the-year rockfish densities were higher at the platform than at the outcrop in each of the five years studied. In several years, their densities were more than 100 times greater at Platform Hidalgo compared to North Reef.

Rockfishes numerically dominated the fish assemblages at almost all of the platform and hard sea floor habitats in our study. Overall species richness was greater at the natural outcrops (94) than at the platforms (85). There was a high degree of overlap in species between platforms and outcrops and differences were primarily due to generally higher densities, of more species, at platforms. In general, canary, copper, flag, greenblotched, greenspotted, greenstriped, halfbanded, vermilion rockfishes, bocaccio, cowcod, and widow rockfish young-of-the-year, painted greenling and all life history stages of lingcod were more abundant at platforms

than at all or most of the outcrops studied. Yellowtail rockfish and the dwarf species pygmy, squarespot, and swordspine rockfishes were more abundant on natural outcrops.

Findings

Our research demonstrates that some platforms may be important to regional fish production. The higher densities of rockfishes and lingcod at platforms compared to natural outcrops, particularly of larger fishes, support the hypothesis that platforms act as de facto marine refuges. High fishing pressure on most rocky outcrops in central and southern California has led to many habitats almost devoid of large fishes. Fishing pressure around most platforms has been minimal. In some locations, platforms may provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production.

Platforms usually harbored higher densities of young-of-the-year rockfishes than natural outcrops and thus may be functionally more important as nurseries. Platforms may be more optimal habitat for juvenile fishes for several reasons. First, because as structure they physically occupy more of the water column than do most natural outcrops; presettlement juvenile or larval fishes, transported in the midwater, are more likely to encounter these tall structures than the relatively low-lying natural rock outcrops. Second, because there are few large fishes in the midwater habitat, predation on young fishes is probably lower. Third, the offshore position and extreme height of platforms may provide greater delivery rates of planktonic food for young fishes. Most of the natural outcrops we found that had high densities of young-of-the-year rockfishes were similar to platforms as they were very high relief structures that thrust their way well into the water column.

Our research, and reviews of existing literature, strongly implies that platforms, like natural outcrops, both produce and attract fishes, depending on species, site, season, and ocean conditions. Platform fish assemblages around many of the deeper and more offshore platforms probably reflect recruitment of larval and pelagic juvenile fishes from both near and distant maternal sources, not from attraction of juvenile or adult fishes from natural outcrops. Annual tracking observations of strong year classes of both flag rockfish and bocaccio imply that fishes may live their entire benthic lives around a single platform. A pilot study showed that young-of-the-year blue rockfish grew faster at a platform than at a natural outcrop indicating that juvenile fishes at platforms are at least as healthy as those around natural outcrops.

Management Applications

In our report, we discuss the ecological and political issues that surround platform decommissioning in California, including the ecological consequences of the four platform decommissioning alternatives: (1) Complete Removal, (2) Partial Removal and Toppling, and (3) Leave-in-Place.

Complete Removal: In complete removal, operators may haul the platform to shore (for recycling, reuse, or disposal) or it can be towed to another site and reefed. A typical full-removal project begins with well abandonment in which the well bores are filled with cement. The topsides, which contain the crew quarters and the oil and gas processing equipment, are cut from the jacket and removed and the conductors are removed with explosives. Finally, the piles that hold the jacket to the seabed are severed with explosives and the jacket is removed.

Completely removing a platform for disposal on land will kill all attached invertebrates. If some of the platform structure is hauled to a reef area and replaced in the water, some of these animals may survive, depending on water depth and the length of time the structure is exposed to the air. The explosives used to separate the conductor and jacket from the sea floor kill large numbers of fishes. In a study in the Gulf of Mexico, explosives were placed 5 m (15 ft.) below the sea floor to sever the well conductors, platform anchor pilings and support legs, of a platform in about 30 m (100 ft.) of water. All of the fishes on or near the bottom and most of the adult fishes around the entire platform suffered lethal concussions. Marine mammals and sea turtles may also be indirectly killed by damage to the auditory system.

The use of explosives to remove or topple a platform may also complicate fishery-rebuilding programs. Cowcod, a species declared overfished by NOAA Fisheries, provides an example. This species is the subject of a federal rebuilding plan that severely limits catches. In 2001, this was 2.4 metric tons or about 600 fish. Based on our research, there are at least 75 adult cowcod on Platform Gail. If explosives are used to remove Gail, all of these fish will be killed. The loss of at least 75 adult cowcod may be sufficiently large to complicate the rebuilding plan.

Partial Removal and Toppling: Under both partial removal and toppling the topsides are removed. In partial removal, the jacket is severed to a predetermined depth below the surface and the remaining subsurface structure is left standing. In

toppling, the conductors and piles are severed with explosives and the jacket is pulled over and allowed to settle to the sea floor. In both partial removal and toppling, conductors need not be completely removed. Retaining conductors would add habitat complexity to a reefed platform.

While the immediate mortality impact to attached invertebrates of partial removal is greater than leaving the platform structure in place, mortality risks to both fishes and invertebrates are much lower than in both toppling and total removal. Partial removal causes fewer deaths than does toppling for two reasons. First, because partial removal does not require explosives (as does toppling), there is relatively little fish, marine mammal, sea turtle, and motile invertebrate (such as crab) mortality. In addition, when a platform is partially removed, vertebrate and invertebrate assemblages associated with the remaining structure are likely to be minimally affected. In contrast, when a platform is toppled, the jacket falls to the sea floor, and, depending on bottom depth, many, if not most of the attached invertebrates die.

Both partial removal and toppling would produce reefs with somewhat different fish assemblages than those around intact platforms. With the shallower parts of the platform gone, it is likely that partial removal would result in fewer nearshore reef fishes, such as seaperches, basses, and damselfishes. However, young-of-the-year rockfishes of many species recruit in large numbers to natural outcrops that have crests in about 30 m (100 ft.) of water or deeper. Thus, it is possible that partial removal would result in little or no reduction in young-of-the-year recruitment for many rockfish species. The pelagic stage of some rockfish species, particularly copper, gopher, black-and-yellow and kelp, may recruit only to the shallowest portions of the platform. For these species, both partial removal and toppling would probably decrease juvenile recruitment, depending on the uppermost depth of the remaining structure. Young-of-the-year rockfishes, which make up the bulk of the fish populations in the platform midwater habitat, would probably be less abundant around a toppled platform compared to a partially removed one. Because most California platforms reside in fairly deep water, toppled platforms might reside at depths below much rockfish juvenile settlement. Thus, toppling might result in lowered species composition and fish density. However, depending on the characteristics of the platform, a toppled structure, with twisted and deformed pilings and beams, might have more benthic complexity than one that is partially removed. This might increase the number of such crevice dwelling fishes as pygmy rockfishes.

It is difficult to catch fishes that live inside the vertically standing platform jacket. Our observations demonstrate that many of the rockfishes living at the platform bottom, such as cowcod, bocaccio, flag, greenspotted, and greenblotched rockfishes, dwell in the crevices formed by the bottom-most crossbeam and the sea floor. To a certain extent, these fishes are protected from fishing gear by the vertical mass of the platform, a safeguard that would persist if the platform were partially removed, particularly if the conductors remained in place. It would be much easier to fish over a toppled platform, as more of the substrate would be exposed to fishing gear.

Coast Guard regulations do not require a minimum depth below the ocean surface to which a decommissioned platform must be reduced. The decision on how much of the jacket and conductors is left in place is based on both a Coast Guard assessment and the willingness of the liability holder to pay for the navigational aids required by the Coast Guard. As mussels become rare below about 30 m (100 ft.) on most platforms, the mistaken assumption that all partially removed platforms must be cut to 24-30 m (80-100 ft.) below the surface has led some to conclude that this will inevitably lead to a severe reduction in the amount of mussels that fall to the bottom and, thus, to a change in or end to, the shell mound community. This is not necessarily the case.

Leave-in-Place: A platform could be left in its original location at the time of decommissioning. The topsides would be stripped of oil and gas processing equipment, cleaned, and navigational aids installed. If a platform were left in place, the effect on platform sea life would be minimal.

Research Needs

Our research demonstrates that additional biological information is needed in the decommissioning process. These information needs fall into three categories: (1) A comparison of the ecological performance of fishes living at oil platforms and on natural outcrops, (2) A definition of the spatial distribution of economically important species (of all life history stages) within the region of interest and a definition of the connectivity of habitats within this region, and (3) An understanding of how habitat modification of the platform environment (e.g., removal of upper portion or addition of bottom structure) changes associated assemblages of marine life at offshore platforms.

Major questions remaining to be addressed include:

What Fishes Live Around Platforms and Nearby Natural Reefs?

In order to assess the relative importance of a platform to its region, it is essential to conduct basic surveys not only around the platform, but also at nearby reefs. A majority of platforms have not been surveyed.

How Does Fish Production around Platforms Compare to that at Natural Outcrops?

It is possible to compare fish production between habitats by examining (1) fish growth rates, (2) mortality rates, and (3) reproductive output. A pilot study compared the growth rates of young-of-the-year blue rockfish at Platform Gilda and Naples Reef and another examining young-of-the-year mortality rates is planned. Additional work is needed to determine larval dispersal patterns and differences in densities at various study sites. For example, we now have enough data to study the relative larval production per hectare of cowcod and bocaccio at Platform Gail versus that on natural outcrops.

What Is the Relative Contribution of Platforms in Supplying Hard Substrate and Fishes to the Region?

This research would put in perspective the relative contribution of platforms in supplying hard substrate and reef fishes to their environment.

First, this requires knowledge of the rocky outcrops in the vicinity of each platform; this is derived from sea floor mapping. Once the mapping is complete, visual surveys of the outcrops, using a research submersible, will determine the fish assemblages and species densities in these habitats. Knowing the areal extent of both natural and platforms habitats and the densities of each species in both of these habitats, it is then possible to assess the total contribution of each platform to the fish populations and hard substrate in that region.

How Long Do Fishes Reside at Oil/Gas Offshore Platforms?

It is unclear how long fishes are resident to platforms. For instance, does the large number of fishes, particularly such species as the overfished bocaccio and cowcod, remain around the platforms for extended periods? Knowledge of the residence time of these species would allow us to more accurately determine if platforms form optimal habitat for these species.

What are the Effects of Platform Retention or Removal on Fish Populations within a Region?

As an example, what effect would platform retention or removal have on young-of-the-year fish recruitment? Would the young rockfishes that settle out at a platform survive in the absence of that platform? Our surveys demonstrate that planktonic juvenile fishes, particularly rockfishes, often settle to platforms in substantial numbers. If that platform did not exist, would these young fishes have been transported to natural outcrops? Knowing how long it would take rockfish larvae to reach suitable natural outcrops, and what percent of these larvae would likely die before reaching these outcrops, will give a sense of the importance of a platform as a nursery ground.

Similarly, using a synthesis of oceanographic information, it is possible to model the fate of larvae produced by fishes living at a platform.

How Does Habitat Modification of the Platform Environment (e.g., Removal of Upper Portion or Addition of Bottom Structure) Change Associated Assemblages of Marine Life?

All decommissioning options except leave-in-place involve modification of the current physical structure of offshore platforms. Is it possible to increase fish diversity and density by altering the sea floor or the platform itself? For instance, it would be useful to add complexity, in the form of quarry rock or other structure, to the shell mound around a platform, and follow the changes in fish assemblages.

Descriptive information such as depth distribution and life history information is also useful in determining how decommissioning options affect the environment. Experimental research, using a BACI design or similar approach, can aid in predicting how the biotic community will respond to such structural changes.

Mr. NEUGEBAUER. And our next panel member is John Amos. Is that correct?

Mr. AMOS. That is correct.

Mr. NEUGEBAUER. With Skytruth. John, thank you.

STATEMENT OF JOHN AMOS, SKYTRUTH

Mr. AMOS. Mr. Chairman and members of the Subcommittee, thank you very much for inviting me to appear here today. I would also like to thank my colleague for giving such a great presentation on the decreasing environmental impacts in the offshore of extended reach drilling. Truly the industry has made tremendous strides in technology and in reducing their footprint in the offshore arena. And the reason for that is primarily because it is a lot cheaper in deep water to drill multiple extended reach wells from one platform than it is to construct multiple platforms and drill the old-fashioned vertical way. But I am here today because that is actually not the case onshore. So we are still seeing a lot of really 20th century impact to the land surface from onshore oil and gas development.

My name is John Amos. I am trained as a geologist with a Master's Degree from the University of Wyoming. I worked for 10 years as a consultant to energy companies using satellite imagery as a tool to help them explore for oil and gas deposits around the world. Now I am President of Skytruth, a nonprofit organization that uses satellite images to study and communicate environmental issues. Since 2001 I have been working to inform the public about the effects of drilling for natural gas on public lands throughout the Rocky Mountain West, and I am here today in that capacity.

One of the main concerns related to onshore energy development is the impact of the infrastructure, primarily the drilling pads and access roads that are constructed to drill the wells. Direct impacts include the destruction of native vegetation and loss of wildlife habitat where these facilities are built. Indirect impacts cover a much larger area and may include air and water pollution, the introduction of noxious weeds, changes in the behavior and breeding success of wildlife, and the degradation of scenic landscapes.

The Jonah field in Wyoming provides a vivid illustration of this. With total reserves of 3 to 5 trillion cubic feet of natural gas, it is widely considered one of the most significant natural gas discoveries in North America. It now serves as a model to industry for future gas plays. New fields throughout the Rockies mirror the infrastructure footprint that we see in Jonah. And unless these low-impact technologies that we have heard about today are widely implemented onshore, we can expect to see much more development that looks just like the Jonah field. First slide, please.

OK. Let me tell you about the Jonah gas field. It spans 60,000 acres in the southern part of the greater Yellowstone ecosystem, an important corridor for antelope and mule deer migration as well as what biologists deem critical winter foraging range. Most of the land within the Jonah field and indeed through the interior mountain West is publicly owned and is administered by the U.S. Bureau of Land Management.

Jonah field was first discovered in 1993, and in 1998 BLM issued a final environmental impact statement that allowed full field development to occur. The EIS predicted that no more than 497 wells would be required to drain all of the natural gas in the field, and that 8 wells per square mile would be allowed, and drilling would take about 10 to 15 years to complete. BLM also estimated that each drilling pad would be about 2.5 acres of direct surface

disturbance to construct each pad, and that the entire infrastructure would only account for about 5 percent of the land area within the field.

Within a year and a half, over 150 wells have been drilled in the field. Analysis showed that each well pad was actually 3 to 4 acres in size, not the 2.5 that was originally estimated. By the fall of 2001, there were more than 300 wells installed in the Jonah field, and a year later, in the fall of 2002, over 400 wells and hundreds of miles of connecting access road and pipeline have been installed.

That infrastructure is about to actually triple. Earlier this year, there were proposed 850 new drilling sites; densities as high as 40 pads per square mile, quite an increase over the 8 per square mile that was originally estimated.

If approved, BLM estimates the total impact will now be almost four times their original estimate in the EIS and the footprint will consume 20 percent of the total land area in the field.

Here is what the gas field infrastructure looked like in Jonah field back in 2001. You see each of those bright spots is a well pad, about 3 or 4 acres in size. It is essentially a flat graded staging area for the equipment that is needed to drill to complete the well, and each one has an access road to it, again a graded dirt road that is about 40 to 60 feet wide.

Next slide.

Here is what the area looked like in space. This is a Landsat satellite image acquired through a U.S. Geological Survey that shows the area in 1986. There is not too much to look at there. You can see a couple of bright lines that intersect near the lower left portion of the image. Those are the only two graded access roads through the area. The rest of it is essentially undisturbed native sagebrush and grassland habitat.

Next slide.

There is what it looked like in 1999, after a total of about 150 wells have been installed in the field. Now you can see hundreds of these well pads throughout the area, and you get a feel for the density of the connecting infrastructure network that needs to be developed to accommodate this conventional one well per pad vertical drilling style.

Next slide.

And by 2001, we have more than 300 wells in the field.

Next slide.

2002, this is the latest image that I have for the field from the fall of 2002. Again, this is more than 400 wells that have been installed, one well per pad. If you look closely at some of these drilling pads, you will see small dark blue spots. Those are open pits of waste drilling fluids and water that is being produced in conjunction with the natural gas. And, again, we can expect that infrastructure that you see here on this image to triple in density.

So I think you can take away three lessons from the Jonah field which really represents the state-of-the-art in modern onshore oil and gas development in America today. One is that the BLM is a little bit behind the eight ball. BLM and industry in 1998 grossly underestimated the infrastructure that would be necessary to initially recover the gas from the field, and therefore significantly un-

derestimated what the environmental impact of that destruction would be.

Number two, once development is pursued, drilling actually proceeds very rapidly. In this case, it actually occurred at more than twice the rate of what BLM and industry predicted in the 1998 EIS.

And, finally, modern natural gas fields on public lands still have a major impact on landscape. Proven technologies that could minimize this, such as the directional drilling that has been so spectacularly successful in the offshore, are not being widely implemented in the onshore.

Thank you again for allowing me to present this information. I hope it provides you with a new perspective on the environmental impacts on onshore development in the 21st century. And I would be pleased to answer your questions.

[The prepared statement of Mr. Amos follows:]

Statement of John F. Amos, President, SkyTruth

Madam Chairwoman and members of the Subcommittee: Thank you for the asking me to appear before you today to participate in this important discussion. My name is John Amos, and I am President of SkyTruth, a nonprofit organization dedicated to applying satellite imagery for environmental analysis. I am trained as a geologist, with a bachelor's degree from Cornell University and a Master's degree obtained from the University of Wyoming. I have more than ten years of experience working as a consultant to oil and gas companies ranging from major multinationals to regional independents, using satellite images to evaluate the oil and gas potential of areas as diverse as Mongolia, offshore Venezuela, and the Green River Basin in Wyoming. Since 2001, I have applied my knowledge of satellite image acquisition, processing and analysis to help inform the public about the effects of drilling for natural gas on federally managed lands throughout the Rocky Mountain west. I am here today in that capacity.

One of the main environmental concerns related to onshore oil and gas development is the direct and indirect impact of the infrastructure—drilling pads, access roads, pipelines, pumping stations, processing plants and other facilities—that must be installed to extract, process and transport the oil and gas. Direct impacts include the destruction of native vegetation, soils and wildlife habitat by the construction of this infrastructure. Potential indirect impacts cover a much larger area than this drilling "footprint" and include:

- Increases in air pollution caused by emissions from vehicles, drill rigs, compressors and other engines, and dust caused by vehicular traffic;
- The introduction of noxious weed species and invasive alien species;
- Ground and surface water pollution caused by hydraulic fracturing operations and the disposal of drilling fluids and produced water;
- Noise and light pollution;
- Changes in the foraging behavior, breeding success, and migration patterns of wildlife; and
- Aesthetic loss resulting from the industrialization of essentially wild or pastoral landscapes.

Much of this impact could be reduced by applying well-demonstrated technologies to shrink the direct surface footprint of oil and gas operations. Those of us who follow these issues have heard a lot about the potential benefits of one of these technologies—"directional" drilling, where multiple wells can be drilled to extend outwards from one location, maximizing the ability to recover oil and gas while minimizing the number of drilling locations that must be established on the land surface. Industry and government frequently mention directional drilling as a solution when environmental concerns are raised about new development. Unfortunately, this proven technology is not being routinely applied to minimize the environmental impacts of energy development on public lands in the Rocky Mountain West, especially with regards to the booming business of natural gas production. My experience as a consultant to industry throughout the 1990s, and my ongoing analyses of energy development projects using satellite and aerial imagery, confirms that the majority of drilling on public lands is still being done in the conventional, vertical manner. This old-fashioned solution requires many closely spaced drilling

locations to efficiently extract natural gas from the low-permeability "tight gas" sandstone and coal bed methane reservoirs that are now attracting so much attention from industry, resulting in maximum environmental impact.

The Jonah natural gas field in western Wyoming vividly illustrates this situation. Jonah is widely considered by industry as one of the most significant natural gas discoveries in North America of the past decade, and it has proven to be one of the most lucrative for its owners and operators. Its discovery resulted from a combination of new exploration and well completion technology. The Jonah field created a new paradigm for onshore natural gas exploration, and lead directly to a recapitalization of the Rocky Mountain energy business that has generated a modern-day boom in exploration and drilling, mostly on federally managed lands. Jonah clearly represents the "state of the art" in modern onshore natural gas production, and serves as a model to industry for finding and exploiting future gas plays in the Rockies. Indeed, one energy-industry representative recently testified to this subcommittee that his company expects to find "2—3 more Jonah-sized accumulations" within their leased acreage alone in the Jonah area.

New natural gas fields throughout the Rockies, including tight-gas sandstone plays in the Piceance and Great Divide basins and coal bed methane plays in the Uinta, San Juan and Powder River basins, mirror the development footprint that we see in Jonah on satellite and aerial images. Unless low-impact technologies are widely applied, we can expect to see much more development in the immediate future that looks like the Jonah field.

Jonah Natural Gas Field—Background Information

Location: The Jonah natural gas field covers 59,500 acres located 32 miles south of Pinedale in Sublette County, western Wyoming. To biologists, it lies within the southern part of the Greater Yellowstone Ecosystem, an important corridor for antelope and mule deer migration as well as critical winter foraging range. To geologists, the Jonah area is located in the northern part of what is known as the greater Green River Basin, a broad sedimentary accumulation that hosts significant oil, gas, and mineral resources. Most of the land within the Jonah field is publicly owned and is administered by the U.S. Department of the Interior's Bureau of Land Management (BLM).

Geology: Jonah is a structurally controlled sweet spot within the continuous-type, basin-centered natural gas play of the Green River Basin. The reservoir is hosted by the Cretaceous-age Lance Formation, a low-permeability "tight gas" sandstone. Wells are drilled to a depth of about 8-10,000 feet and require special completion procedures that include fracture stimulation to effectively produce gas. The average pay-zone thickness is 500 feet.

Production: In 2000, the Jonah field yielded almost 200 million cubic feet (MMCF) of gas per day. By 2003, production had leaped to about 700 MMCF/day, with some individual wells initially producing up to 100 MMCF/day.

Reserves: At 3-5 trillion cubic feet (TCF), Jonah is the second-largest gas field in Wyoming and has earned the following praise from industry: "One of the largest gas discoveries in North America" and "Even by international standards, this is truly a significant gas play." The adjacent Pinedale Anticline, now in the initial stages of full-field development, holds an estimated 6 TCF.

Well Economics: In 1998, the average well cost $1.5M to drill, complete, and bring online. In 2000 the average Estimated Ultimate Recovery (EUR) of gas was 6-7 billion cubic feet (BCF) per well. Ultra Petroleum Corp. reported in 2000 that new wells pay out in only 6-8 months and will produce for 30 years. Some Jonah operators are experiencing up to 100% rate of return on investment. Because these "tight sands" reservoirs in the Jonah and Pinedale Anticline area qualify as "non-conventional deposits," natural gas extracted here would also qualify for Section 29 tax credits, which Congress is considering extending for several more years.

Jonah Natural Gas Field—Development Timeline

1975. Jonah Field is discovered by the Davis Oil—Wardell Federal #1 well. At only 303 thousand cubic feet (MCF) of gas and 2 barrels of oil per day the well is not economic, and there is little resulting activity. See Figure 2.

1992. McMurry Oil Company buys the field. There are only 3 existing wells in place. McMurry's first production of gas is reported to the State of Wyoming Oil and Gas Commission in 9/92.

1993. Aided by new 3-d seismic survey and well completion/stimulation technologies, McMurry "rediscovers" Jonah Field with the McMurry Oil—Jonah Federal #1-5 well, which produces 3.7 million cubic feet (MMCF) of gas and 40 barrels of oil per day.

1994. BLM issues "McMurry Oil Company Jonah Prospect Field Natural Gas Development Environmental Assessment" and limited drilling proceeds.

December 1997. 58 wells are in place (reported by BLM).

April 1998. BLM issues the Record of Decision for "Jonah Field II Natural Gas Development Project EIS" to allow full-field development:

- Operators state that no more than 497 wells will be required for full extraction of natural gas from Jonah (300—350 is considered the "most probable" number);
- One well is proposed at each drilling location, or "well pad";
- The maximum allowed drilling density is one well location per 80 acres (8 pads per sq. mile);
- BLM estimates there will be 2.5 acres of direct surface disturbance to construct each pad; the total surface disturbance is estimated to be 2927 acres, including the pads, connecting roads, pipelines, and other anticipated infrastructure;
- Full-field development of 497 wells will require 10—15 years (about 30 wells per year); and
- The total lifetime of the field will be 40-50 years.

December 1998. >90 wells are in place (reported by McMurry Oil Company).

December 1999. >150 wells are in place (reported in PTTC Newsletter). See Figure 3.

April 2000. 170 wells are in place (reported by BLM).

May 2000. BLM issues the Record of Decision for the adjacent Pinedale Anticline EIS:

- The Pinedale EIS estimates that each well pad alone disturbs 3.7 acres (5 acres for multi-well pads), and access roads have a disturbance width of 40-52 feet; and
- Analysis of aerial and satellite images shows that the development occurring in Jonah is consistent with these Pinedale EIS estimates.

June 2000. Alberta Energy Company buys out McMurry and becomes the major interest holder in Jonah; in 2002 they become EnCana Oil and Gas, the largest independent natural gas producer in N. America.

December 2000. BLM issues the Record of Decision that approves 40-acre spacing (16 pads per sq. mile) in the eastern half of the field ("Jonah Field Environmental Assessment, Sublette County, Wyoming"):

- Operators repeat that 497 wells is adequate to extract the natural gas; and
- In a Wall Street interview, Ultra Petroleum Corp. hails this decision as "clearing the path for dramatic growth in production, cash flow and earnings."

December 2000. >230 wells are in place (reported by BLM).

July 2001. 300 wells are in place (reported by BLM). See Figure 4.

March 2003. BLM reports that operators have requested permission for an infill drilling program that will add up to 1,250 new wells from up to 850 new pads ("Scoping Notice, Proposed Jonah Infill Drilling Project"):

- Surface well spacing will decrease to 16-acre (40 pads per sq. mile);
- BLM raises their estimate of surface disturbance for the original 497 wells and associated infrastructure by over 40%, from 2927 acres to 4225 acres;
- Infill drilling will:
  - * Add 7,225 acres to the surface impact, bringing the total to 11,450 acres (almost 4 times the original estimate given in 1998 EIS);
  - * Nearly triple the number of well pads that were considered adequate by operators and BLM in 1998, and again as recently as December 2000 (from 497 to 1347); and
  - * Directly impact 20% of the total land area enclosed by the Jonah project.
- The total field lifetime is reduced to 25 years, half of the original estimate.

May 2003. 435 wells are in place (reported by BLM). By late spring, BLM reports that over 500 wells are in place: more than allowed by the existing EIS, and installed in only five years rather than the 10—15 year estimate made in 1998. Satellite images graphically illustrate this explosive growth of infrastructure. See Figures 2—5.

August 2003. Media reports that a total of 3100 wells may ultimately be drilled in Jonah: 1300 in addition to the just-proposed infill program (Casper Star-Tribune).

Jonah Natural Gas Field—Development Illustration

The direct impact to the land surface of oil and gas infrastructure is clearly shown on pictures taken from earth-orbiting satellites. The examples here are from the Landsat series of satellites, which have been in continuous operation since 1972. Landsat is launched and operated by NASA. The images are distributed to government users and to the public by the U.S. Geological Survey. We purchased four Landsat images covering the Jonah field that were taken in 1986, 1999, 2000 and 2002. This time-series illustrates the extent of landscape impact and habitat

fragmentation associated with the construction of well pads, access roads, and other gas field infrastructure. It also illustrates how rapidly these impacts multiply once federal land managers approve drilling.

In the following sequence of satellite images (Figures 2—5), the same 7-mile x 7-mile area covering the Jonah field is shown in 1986, 1999, 2000 and 2002. Disturbed land is very bright because the bare, dry soil reflects sunlight much more than undisturbed topsoil and vegetation. Well pads and access roads clearly appear as bright spots and lines against the darker undisturbed background. Each well pad is a graded area ranging in size from about 3 to 4 acres. Access roads are also graded, and range in width from about 40 to 60 feet. Figure 1 is a photograph taken from a low-flying airplane that shows a typical well pad, with the well actively being drilled.

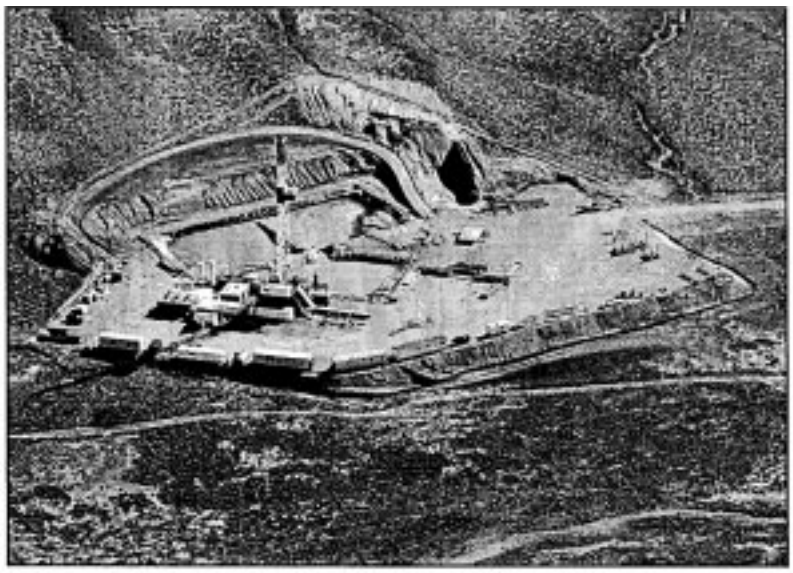


Figure 1. Photograph taken in 2002 of a gas well being drilled on a typical well pad. Note pits containing drilling fluids, equipment trailers, and access road.

Jonah Field – 1986

Figure 2. Jonah field before discovery, as it appeared on a Landsat satellite image taken on August 27, 1986. Only two dirt roads are visible in the area, intersecting in the lower left. The area is mostly undisturbed high-desert sagebrush and grassland, characteristic of the Rocky Mountain intermontane basins. The topography is mostly flat-lying plains and mesas dissected by ephemeral streams.

Jonah Field – 1999

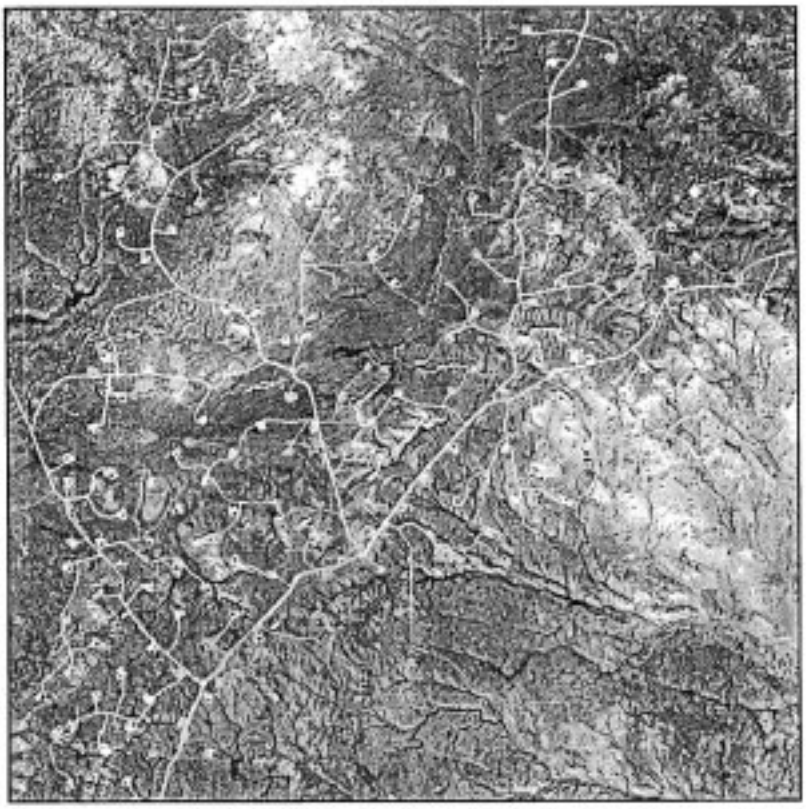


Figure 3. Landsat image of the same area, taken on October 26, 1999 after nearly 150 new gas wells and connecting roads had been installed with 80-acre spacing. Each bright rectangular region is a well pad as seen in Figure 1, representing the location of a single well. Dark spots on many of the pads are open pits containing drilling fluids and produced fluids that are separated from the gas.

Jonah Field – 2001

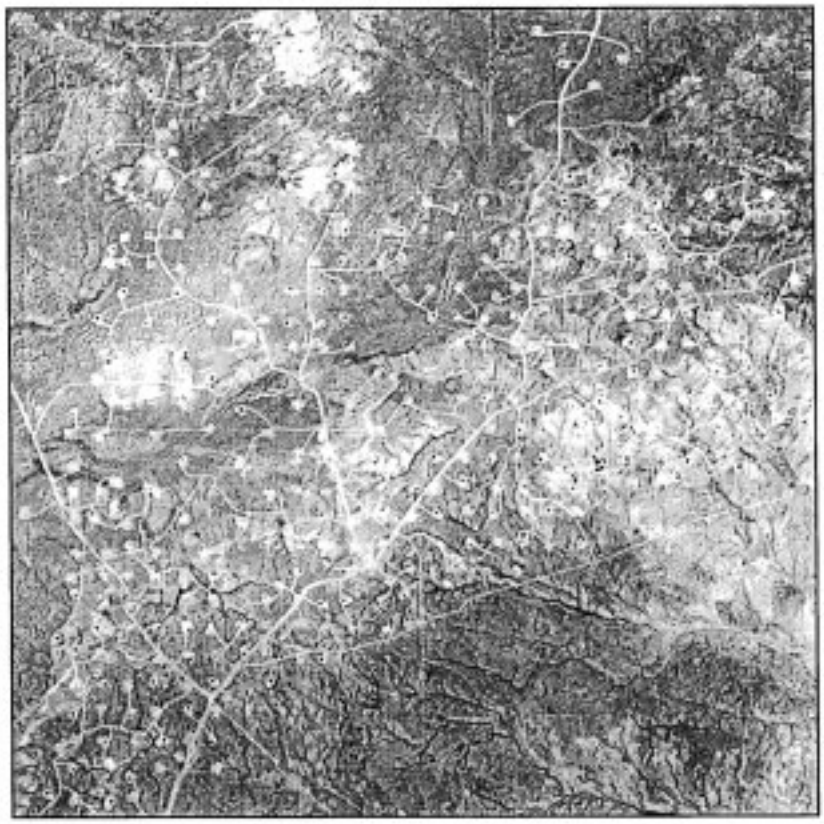


Figure 4. Landsat image taken on August 28, 2001. 40-acre spacing has been approved, and more than 300 gas wells have been drilled in the Jonah field at this point.

Jonah Field – 2002

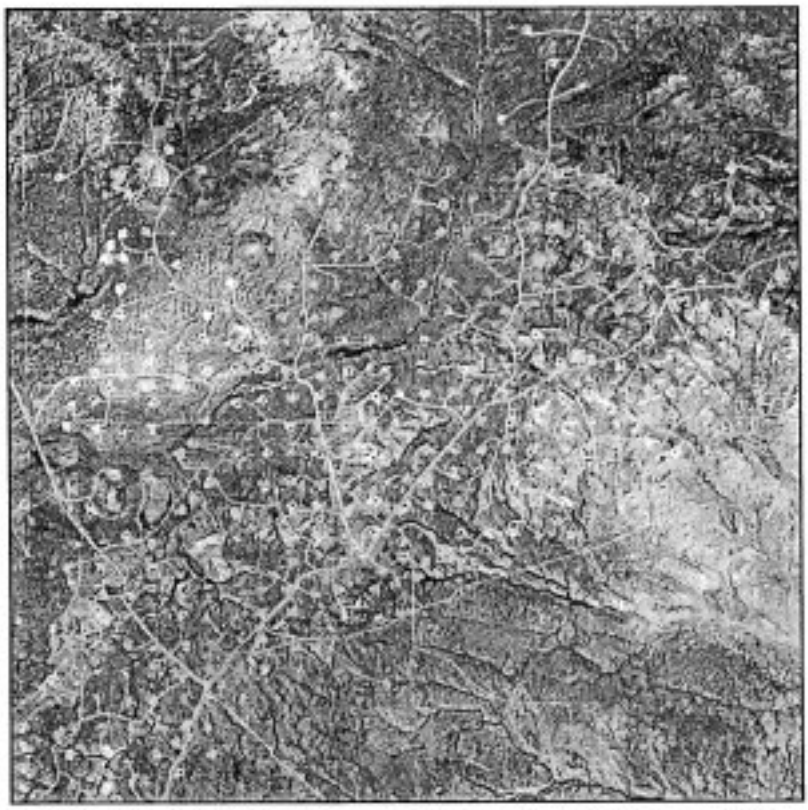


Figure 5. Landsat image taken on October 18, 2002. By this time Jonah field now contains more than 400 gas wells and hundreds of miles of connecting roads. If the infill-drilling proposal is approved, up to 850 new well pads will be added to the field.

Conclusion

I hope this information adds a new perspective to your understanding of the environmental impacts of onshore energy production. Proven technologies exist that could help lessen the direct environmental impacts illustrated by the Jonah example, but for a variety of reasons these are not being applied. I urge you to work together with industry, land-management agencies, and the environmental community to find mutually agreeable ways to better deploy these technologies, and to develop procedures for realistically evaluating the ultimate impact of development early in the scoping and approval process. For example, The Wilderness Society recently issued a report, entitled Fragmenting Our Lands: The Ecological Footprint from Oil and Gas Development, that contains a number of recommendations on how managers can better identify and plan for oil and gas activities in order to minimize their impacts on public lands.

Thank you for your time and attention today. I look forward to any questions you may have, and place myself at your disposal if I can be of further service.

Mr. NEUGEBAUER. Thank you, Mr. Amos.

Dr. Love, are you cued back up?

Mr. LOVE. Well, we are about to test it out. Technology marches on.

These shots were taken during various research cruises. This is the submarine that we use for the deeper water parts of the platforms. We look at natural reefs and platforms all throughout southern California. We have looked at about 200 natural reefs and 7 platforms, so we have a very good frame of reference about what fishes live on. Each—this is an untethered sub. There is two people in it. It dives down to 1,200 feet, which we kind of randomly and routinely do. We videotape all of the fish surveys so that we can always go back and recount fish if there is any question. This gives you an idea of the size of the sub. It is about the size of a phone booth.

This is what we see on a good year when we have lots of small fishes living around the platforms. Every one of these little dots is a young of the year rockfish, mostly of species that have been declared overfished by NOAA fisheries. Again, on years with high survivorship—and not every year is like this—there are tens and tens and tens of thousands of these young rockfishes. Here's closeups. These are all widow rockfish overfished declared by NOAA fisheries. The platform of course is covered in invertebrate life, in this case various kinds of anemones. And you can see that there is just astronomical numbers. Young of the year bocaccio, brandnew 6-month-old fish, which are again overfished according to NOAA fisheries. One of them does something very strange here, makes this little loopy-loop and I have never understood why. Where is that one? That one. Like that. What's going on there?

At the bottom of the platforms we see, as I mentioned, large numbers of adult fishes because they are not fished. This is—we call this candy cane lane because it is all these flag rockfishes. Again, most of what we see is rockfishes. They are the dominant group of fishes on natural reefs and platforms. Yellow eye rockfish overfished officially. Widow rockfish, overfished. Canary rockfish, overfished. And in our area, some of the last bastions for some of these fishes tend to be on platforms, because the reefs have been just slaughtered by recreational and commercial anglers for many decades.

The deepest platform we look at is Platform Gail, which has very high numbers of eufousets, which aren't associated with the platform but living there. And I think that leads to very large numbers of some very large fishes.

An economically important one, greenblotched rockfish. We like them because they don't move. They are really easy to count. And a species called a Mexican rockfish, which is right there, it is about 3 feet long. And then, ironically, the highest levels of bocaccio, which is a major overfished species that we have ever seen anywhere. The highest densities are at this one platform. Again, they are just very hard to fish and a lot of people don't fish them.

Around the platform there is a unique habitat formed by the shells of animals that fall off the platforms, primarily mussel shells, and they form a third habitat of very small young fishes. That is a baby cowcod, officially overfished, that tends to like to live on this low relief area. A baby black gill rockfish, a major commercial species, they also tend to like this kind of low lying stuff. And then the last species is what is called a pinkrose rockfish,

which is a dwarf species; it never gets very big. There it is right there. And it lives on this kind of low habitat.

Thank you very much.

Mr. NEUGEBAUER. And thank you very much. Is that the conclusion of your testimony?

Mr. LOVE. That is the conclusion. Thank you.

Mr. NEUGEBAUER. Thank you very much.

I have a few questions for the panel. I will start with you, Dr. Love. In your opinion, why are the rockfish and other marine creatures attracted to these oil and gas platforms? What is the attraction to them?

Mr. LOVE. Well, they are associated to habitat. They are attracted to habitat. And in terms, and particularly rockfishes really don't care what the habitat is. It can be a sewer line, it can be a pipe, it can be a cable car, it can be a platform. They just like to either just look at it, literally. They just sit there and look at it. Or they like to hide in it. And they don't make a distinction if the habitat is of the right kind of shape. That is what they are really interested in.

Mr. NEUGEBAUER. Is there a difference between the activity around the platforms while the platform is actively engaged in drilling and then when drilling then ceases on that platform and that platform is dormant?

Mr. LOVE. Well, I guess I should get a definition. Do you mean when it is producing versus when it is shut down?

Mr. NEUGEBAUER. Right.

Mr. LOVE. Right. We have never looked at a nonproductive well or facility, because the last nonproducing facilities were removed in the mid-1990s and we never really looked at them. My guess would be there would be not be, but that is just a guess.

Mr. NEUGEBAUER. So all of the research that you are doing is around active wells, is it?

Mr. LOVE. Right, ones that are either just producing or where there is some drilling and production going on.

Mr. NEUGEBAUER. OK. And I hope I pronounce this correctly. Mr. Kulesza. Is that right?

Mr. KULESZA. Kulesza.

Mr. NEUGEBAUER. Close. With a name like Neugebauer, I have had to pronounce mine also a couple of times.

Mr. KULESZA. I understand.

Mr. NEUGEBAUER. The gentleman brought up an interesting point a while ago about the technologies and surface impacts. Is industry developing technologies to minimize surface impacts from exploration and development?

Mr. KULESZA. The industry is. As I alluded to in my presentation, extended reach drilling, which is becoming a very accepted method of exploring for oil and gas, is being used by—which once was used only by the majors, are now being used by major independents and independents. So, yes, we are going toward areas that, where we can minimize certainly the capital investment, which also enhances the environmental impact of drilling for energy. And this is one of the areas that I think we are going to see greater acceptance and greater use.

Mr. NEUGEBAUER. You are familiar with the activity on the Alaska Northern Slope. Compare the activities and the technology available today as opposed to 25 years ago when we first began that process.

Mr. KULESZA. In the example that I used in my presentation, we showed an onshore drilling rig that was placed there, and then we were drilling offshore to recover a reserve. Back in 1985, the recovery of that reserve would have been impossible due to the ice formations and the ice flow. Putting an offshore platform in that environment would have been impossible to do. So that would have left that reserve, again, unrecoverable. So I think the big change now is that we can go into areas that we once could not, and we can do it with minimal surface disruption.

Mr. NEUGEBAUER. One of the things that is an issue is fluid containment during this process. Has there been some advancements in the ability to control the fluids during the process?

Mr. KULESZA. Yes, sir. Probably the biggest advancement is in the types of fluids that are used. The fluids now are much more environmentally friendly. There have been talks about mercury contamination. I can't speak to that. We have seen over the past 20 years we have been in the business the changes in the composition of drilling fluids that are much more environmentally friendly. And the retainage and disposal of the fluids have improved a great deal.

Mr. NEUGEBAUER. Dr. Love, so some of these platforms in some of the previous testimony were some of the only really habitat availability in some of the waters. So what are the advantages of having those platforms as opposed to not having them? In other words, if we remove those and we don't have them, kind of run me through the process there of how that—the advantages to that as opposed to not having them.

Mr. LOVE. Sure. And remember that every platform is different, so I am again going to have to generalize. It is fairly clear now that some of these platforms are producing overfished species. Let's take that as an example because it is the most emotionally laden. If you remove the platforms, a lot of the fishes that would have settled out as very young fishes probably would not have found a natural reef. So you are losing thousands if not tens of thousands of individuals to the system. That is the first thing. And, again, it is not for every platform.

And then in the case of this kind of reserve function, some of these platforms have some of the only adult bocaccio or cowcod or some of these other fishes within miles or tens of miles. And these are the only fishes potentially that are producing larvae in a small region anyway. And so you are going to lose those individuals, too. I must also say that—and this is out of my area but it is kind of fascinating. I am not sure that you can remove platforms that have large numbers of overfished species because in the process you are going to kill them all. And I am not—I don't know Federal law, but I really wonder if that is going to become an issue for some of these platforms, if you can actually remove habitat that contain large numbers of these fishes.

Mr. NEUGEBAUER. I find it very interesting that something that I was strongly opposed for a number of years of allowing those ac-

tivities has really produced these habitats that are—from testimony given today, that are very positive to the environment.

So I want to thank the witnesses for their valuable testimony and the members for their questions. Some of the members of the Subcommittee that aren't here or that had to leave may want to have additional questions, and they will submit those to the witnesses in writing, and you can forward your testimony back to them in writing to answer those questions. This hearing will be held open for 10 days for these responses.

And if there is no other further business before the Subcommittee, then I would again thank the witnesses and thank the members, and we stand in adjournment.

[Whereupon, at 12:23 p.m., the Subcommittee was adjourned.]

[A statement submitted for the record by Dr. Quenton R. Dokken, Associate Director, Center for Coastal Studies, Texas A&M University-Corpus Christi, and Executive Director, Gulf of Mexico Foundation, follows:]

Statement of Dr. Quenton R. Dokken, Associate Director, Center for Coastal Studies, Texas A&M University-Corpus Christi, and Executive Director, Gulf of Mexico Foundation

Ms. Chairman and Honorable Committee Members,

Thank you for the opportunity to present testimony to you today regarding the environmental impact of oil/gas platforms in the Northwestern Gulf of Mexico. Specifically, I would like to address the impact of these structures on the biological communities and dynamics of the northern Gulf of Mexico. I have been diving beneath these structures since 1969, and my research team and I have mounted intensive comprehensive studies of these structures since 1991. My testimony is based on the results of these studies.

Natural hard surface substrates are not abundant topographical features in the northern Gulf of Mexico. Consequently, offshore oil/gas production structures provide "islands of opportunity" for organisms that require hard surface substrates on which to settle, and eventually create dynamic artificial reefs that meet the habitat needs of mobile reef organisms, both invertebrate and vertebrate. In the northern Gulf of Mexico there are approximately 4,000 oil/gas platform structures located across the continental shelf from shallow coastal waters to the deep waters near the shelf edge (Figure 1). Artificial reefs numerically increase opportunities that suitable habitat will be encountered by larval and pelagic organisms. Artificial reefs also provide fishing opportunities with 8 0% o f t he offshore recreational fishing trips having platform reefs as the main destination. As dynamic biological communities (Figure 2), artificial reefs impact the biology, ecology, and socioeconomics of the Gulf of Mexico.

Artificial reefs have a positive effect the biology and ecology of the Gulf of Mexico on a local and regional scale. Platform based artificial reefs support diverse biological communities in the Gulf of Mexico, some of which are predominantly temperate in nature, others are tropical, and still other reefs are a mix of temperate and tropical. Artificial reefs meet the habitat needs of reef-restricted organisms and pelagic organisms. These communities enhance local and regional biodiversity. Conversely, they also create fisheries management challenges by making fishery-targeted species more accessible to a greater number of fishers. Artificial reefs can be evaluated and managed for multiple objectives. Creating suitable reef habitat for organisms to expand their distribution beyond the boundaries of their natural habitats can impact regional biodiversity. Artificial reef programs can also be designed to increase population densities of targeted fishery species. Artificial reefs can also be managed to make targeted species easier to catch. Management objectives must consider ecological, biological, and socioeconomic demands.

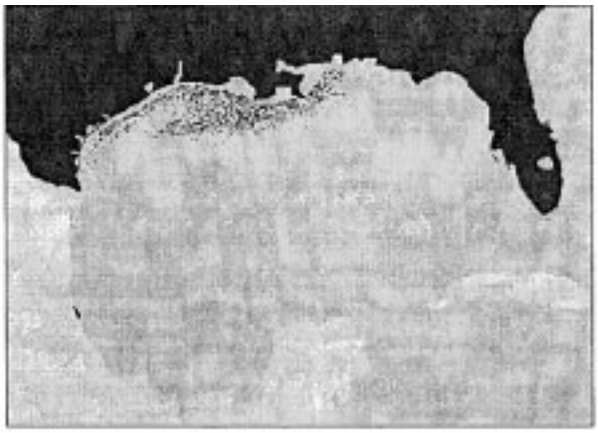


Fig. 1. Locations (black dots) of oil/gas production platforms in the Gulf of México (from MMS database, 1996).

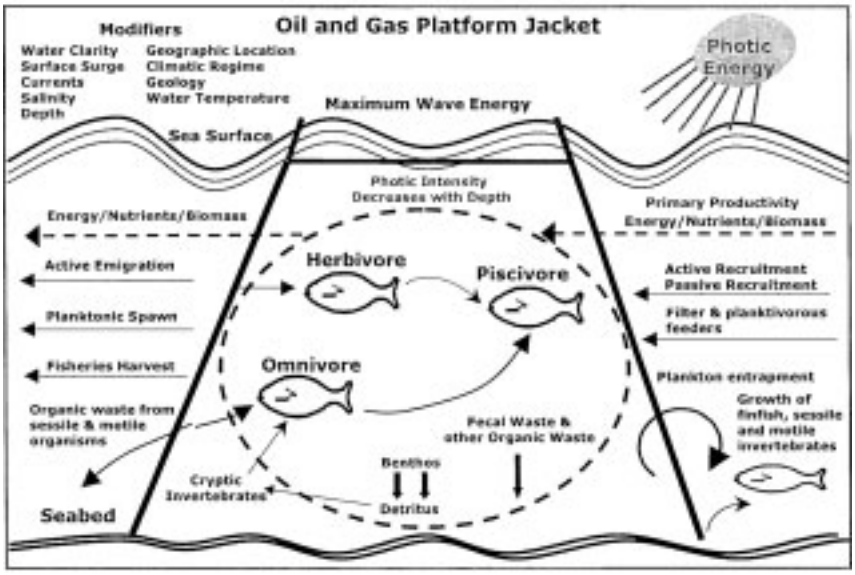


Fig 2. Conceptualized model of trophic dynamics of an oil and gas production platform artificial reef.

To maximize biodiversity, primary and secondary production, and fisheries production, reef sites are most effective when concentrated between the 40 and 75 in depth contours. This zone seems to be equally effective at attracting and supporting strictly tropical organisms transported in offshore blue-water of the Gulf of Mexico as well as those more temperate organisms found in shallow coastal waters. Seasonally clear waters exist in this area for at least six months of the year. Water depths are adequate to minimize bottom disturbances and seasonal meteorological conditions have less impact on water temperature than at shallow water sites. These water depths also keep a significant portion of the reef structure above the turbid nepheloid layer.

Artificial reefs also create fisheries management challenges by making targeted fishery species more accessible to a greater number of fishers. A possible strategy to mitigate for easier accessibility of targeted fishes at artificial reef structures and to support increased biomass of targeted fish stocks would be to establish fish reserves (i.e. no take zones) around artificial reef structures. The strategy would be to set aside an area, perhaps 1 km2, in an ecologically and environmentally advantageous area in water depths between 40 and 75 m. Concentrate reef material, perhaps having a standing platform as a center point, in this area. Place the reef material in a manner to increase the density and complexity with as much vertical relief as possible. Extend the reef structure to the shallowest depth allowable by shipping safety guidelines.

The debate of whether or not artificial reefs contribute to the biological productivity of the Gulf of Mexico inevitably is based on the productivity of fishery targeted fish species. This is understandable since the socioeconomic demand for sustainable fisheries has substantial influence on the management of living marine resources. Based on targeted fishery species, the question of impact is unanswered. But based on the n on-targeted fauna, particularly the sessile community, the answer is unequivocally yes—artificial reefs do contribute to the biological productivity of the Gulf of Mexico ecosystem.

My research indicates that when the upper proximal end of the reef structure is greater than 50 m from the sea surface, biological productivity is substantially reduced. If platforms such as East Breaks 110A (204 m water depth) and East Breaks 165A (260 m water depth) were severed below the seabed as is currently required by federal law and toppled in place, there would b e more than 1 25m from the top of the structure to the water surface and it is unlikely that these structures would form biologically productive reefs. If anything, they would function more as fish attractant devices (FADs), but only to a limited degree due to reduction in fish abundance below 100 m. Artificial reef structures should be designed to extend from the seabed to the upper high-energy zones near the sea surface. Geographic placement affects biodiversity and habitat diversity. Subsequently, placement in an area of environmental conditions that allow the greatest opportunity for development of increased habitat and biological diversity w ill increase the effectiveness of the structure as a biologically productive artificial reef.

A possible strategy to mitigate for the easier accessibility of targeted fishes at artificial reef structures and to support increased biomass of targeted fish stocks would be to establish a fish reserve (i.e. no-take zones) around artificial reef structures. The strategy would be to set aside an area, perhaps 1 km2, in an ecologically productive area in water depths between 40 and 75 m. Concentrate reef material, perhaps having a standing platform as a center point, in this area. Place additional reef material on the seabed surrounding the standing center platform, creating as much reef complexity and vertical relief as possible. Extend the reef structure to the shallowest depth allowable when considering shipping safety.

There remains a great deal of research to be done to fully understand the impact of artificial reefs upon the ecology and productivity of the Gulf of Mexico. With thoughtful consideration and planning based upon known facts of the dynamics of artificial reefs, they will contribute to meeting the ever-growing demand for marine resources and recreational opportunities.

CONCLUSION

- Oil/gas platform structures create dynamic and productive reef habitats.
- The platform reefs of the Northern Gulf of Mexico are a major part of the ecosystem dynamics of the Gulf.
- To the degree possible, these functioning reefs should be left intact, even after their useful life, as a producer of oil and gas is finished.
- The impact of these reefs on fishery targeted resources needs to be factored into fishery management strategies.
- Geographic placement and orientation of the structures will significantly impact the productivity of platform artificial reefs.
- Management strategies should consider biological and socioeconomic objectives.