

DEEP WATER

The Gulf Oil Disaster and the Future of Offshore Drilling

Recommendations

National Commission on the BP Deepwater
Horizon Oil Spill and Offshore Drilling

Dedication

This report is dedicated to the 11 men who lost their lives on the *Deepwater Horizon* rig on April 20, 2010 and to their families, in hope that this report will help minimize the chance of another such disaster ever happening again.

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Acknowledgements

We wish to acknowledge the many individuals and organizations, government officials and agencies alike that offered their views and insights to the Commission. We would especially like to express our gratitude to the Coast Guard's Incident Specific Preparedness Review (ISPR) for allowing Commission staff to participate in its interviews and discussions, which was invaluable to the preparation of this report. (A copy of the Coast Guard's ISPR report can be found at the Commission's website at www.oilspillcommission.gov). We would also like to thank Chevron for performing the cement tests that proved so critical to our investigation into the Macondo well blowout.

We also thank the Department of Energy, which served as our supporting agency, and all of the Department employees whose assistance was so essential to the success and functioning of the Commission. In particular, we would like to thank Christopher Smith, Deputy Assistant Secretary for Oil and Natural Gas, who acted as the Commission's Designated Federal Officer, as well as Elena Melchert, Petroleum Engineer in the Office of Oil and Gas Resource Conservation, who served as the Committee Manager.

But most importantly, we are deeply grateful to the citizens of the Gulf who shared their personal experiences as Commissioners traveled in the region, providing a critical human dimension to the disaster and to our undertaking, as well as the many people who testified at the Commission's hearings, provided public comments, and submitted statements to our website. Together, these contributions greatly informed our work and led to a better report. Thank you one and all.

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Oil Spill and Offshore Drilling

January 2011

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Photo: Susan Walsh, Associated Press

Foreword

The explosion that tore through the *Deepwater Horizon* drilling rig last April 20th, as the rig's crew completed drilling the exploratory Macondo well deep under the waters of the Gulf of Mexico, began a human, economic, and environmental disaster.

Eleven crew members died, and others were seriously injured, as fire engulfed and ultimately destroyed the rig. And, although the nation would not know the full scope of the disaster for weeks, the first of more than four million barrels of oil began gushing uncontrolled into the Gulf—threatening livelihoods, precious habitats, and even a unique way of life. A treasured American landscape, already battered and degraded from years of mismanagement, faced yet another blow as the oil spread and washed ashore. Five years after Hurricane Katrina, the nation was again transfixed, seemingly helpless, as this new tragedy unfolded in the Gulf. The costs from this one industrial accident are not yet fully counted, but it is already clear that the impacts on the region's natural systems and people were enormous, and that economic losses total tens of billions of dollars.

On May 22, 2010, President Barack Obama announced the creation of the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling: an independent, nonpartisan entity, directed to provide a thorough analysis and impartial judgment. The President charged the Commission to determine the causes of the disaster, and to improve the country's ability to respond to spills, and to recommend reforms to make offshore energy production safer. And the President said we were to follow the facts wherever they led.

This report is the result of an intense six-month effort to fulfill the President's charge.

From the outset, the Commissioners have been determined to learn the essential lessons so expensively revealed in the tragic loss of life on the *Deepwater Horizon* and the severe damages that ensued. The Commission's aim has been to provide the President, policymakers, industry, and the American people a clear, accessible, accurate, and fair account of the largest oil spill in U.S. history: the context for the well itself, how the explosion and spill happened, and how industry and government scrambled to respond to an unprecedented emergency. This was our first obligation: determine what happened, why it happened, and explain it to Americans everywhere.

As a result of our investigation, we conclude:

- The explosive loss of the Macondo well could have been prevented.
- The immediate causes of the Macondo well blowout can be traced to a series of identifiable mistakes made by BP, Halliburton, and Transocean that reveal such systematic failures in risk management that they place in doubt the safety culture of the entire industry.
- Deepwater energy exploration and production, particularly at the frontiers of experience, involve risks for which neither industry nor government has been adequately prepared, but for which they can and must be prepared in the future.
- To assure human safety and environmental protection, regulatory oversight of leasing, energy exploration, and production require reforms even beyond those significant reforms already initiated since the *Deepwater Horizon* disaster. Fundamental reform will be needed in both the structure of those in charge of regulatory oversight and their internal decisionmaking process to ensure their political autonomy, technical expertise, and their full consideration of environmental protection concerns.
- Because regulatory oversight alone will not be sufficient to ensure adequate safety, the oil and gas industry will need to take its own, unilateral steps to increase dramatically safety throughout the industry, including self-policing mechanisms that supplement governmental enforcement.
- The technology, laws and regulations, and practices for containing, responding to, and cleaning up spills lag behind the real risks associated with deepwater drilling into large, high-pressure reservoirs of oil and gas located far offshore and thousands of feet below the ocean's surface. Government must close the existing gap and industry must support rather than resist that effort.
- Scientific understanding of environmental conditions in sensitive environments in deep Gulf waters, along the region's coastal habitats, and in areas proposed for more drilling, such as the Arctic, is inadequate. The same is true of the human and natural impacts of oil spills.

We reach these conclusions, and make necessary recommendations, in a constructive spirit: we aim to promote changes that will make American offshore energy exploration and production far safer, today and in the future.

More broadly, the disaster in the Gulf undermined public faith in the energy industry, government regulators, and even our own capability as a nation to respond to crises. It is our hope that a thorough and rigorous accounting, along with focused suggestions for reform, can begin the process of restoring confidence. There is much at stake, not only for the people directly affected in the Gulf region, but for the American people at large. The tremendous resources that exist within our outer continental shelf belong to the nation as a whole. The federal government's authority over the shelf is accordingly plenary, based on its power as both the owner of the resources and in its regulatory capacity as sovereign to protect public health, safety, and welfare. To be allowed to drill on the outer continental shelf is a privilege to be earned, not a private right to be exercised.

“Complex Systems Almost Always Fail in Complex Ways”

As the Board that investigated the loss of the Columbia space shuttle noted, “complex systems almost always fail in complex ways.” Though it is tempting to single out one crucial misstep or point the finger at one bad actor as the cause of the *Deepwater Horizon* explosion, any such explanation provides a dangerously incomplete picture of what happened—encouraging the very kind of complacency that led to the accident in the first place. Consistent with the President's request, this report takes an expansive view.

Why was a corporation drilling for oil in mile-deep water 49 miles off the Louisiana coast? To begin, Americans today consume vast amounts of petroleum products—some 18.7 million barrels per day—to fuel our economy. Unlike many other oil-producing countries, the United States relies on private industry—not a state-owned or controlled enterprise—to supply oil, natural gas, and indeed all of our energy resources. This basic trait of our private-enterprise system has major implications for how the U.S. government oversees and regulates offshore drilling. It also has advantages in fostering a vigorous and competitive industry, which has led worldwide in advancing the technology of finding and extracting oil and gas.

Even as land-based oil production extended as far as the northern Alaska frontier, the oil and gas industry began to move offshore. The industry first moved into shallow water and eventually into deepwater, where technological advances have opened up vast new reserves of oil and gas in remote areas—in recent decades, much deeper under the water's surface and farther offshore than ever before. The *Deepwater Horizon* was drilling the Macondo well under 5,000 feet of Gulf water, and then over 13,000 feet under the sea floor to the hydrocarbon reservoir below. It is a complex, even dazzling, enterprise. The remarkable advances that have propelled the move to deepwater drilling merit comparison with exploring outer space. The Commission is respectful and admiring of the industry's technological capability.

But drilling in deepwater brings new risks, not yet completely addressed by the reviews of where it is safe to drill, what could go wrong, and how to respond if something does go awry. The drilling rigs themselves bristle with potentially dangerous machinery. The deepwater environment is cold, dark, distant, and under high pressures—and the oil and gas reservoirs, when found, exist at even higher pressures (thousands of pounds per square inch), compounding the risks if a well gets out of control. *Deepwater Horizon* and the Macondo well vividly illustrated all of those very real risks. When a failure happens at such depths, regaining control is a formidable engineering challenge—and the costs of failure, we now know, can be catastrophically high.

In the years before the Macondo blowout, neither industry nor government adequately addressed these risks. Investments in safety, containment, and response equipment and practices failed to keep pace with the rapid move into deepwater drilling. Absent major crises, and given the remarkable financial returns available from deepwater reserves, the business culture succumbed to a false sense of security. The *Deepwater Horizon* disaster exhibits the costs of a culture of complacency.

The Commission examined in great detail what went wrong on the rig itself. Our investigative staff uncovered a wealth of specific information that greatly enhances our understanding of the factors that led to the explosion. The separately published report of the chief counsel (a summary of the findings is presented in Chapter 4) offers the fullest account yet of what happened on the rig and why. There are recurring themes of missed warning signals, failure to share information, and a general lack of appreciation for the risks involved. In the view of the Commission, these findings highlight the importance of organizational culture and a consistent commitment to safety by industry, from the highest management levels on down.*

But that complacency affected government as well as industry. The Commission has documented the weaknesses and the inadequacies of federal regulation and oversight, and made important recommendations for changes in legal authority, regulations, investments in expertise, and management.

The Commission also looked at the effectiveness of the response to the spill. There were remarkable instances of dedication and heroism by individuals involved in the rescue and cleanup. Much was done well—and thanks to a combination of good luck and hard work, the worst-case scenarios did not all come to pass. But it is impossible to argue that the industry or the country was prepared for a disaster of the magnitude of the *Deepwater Horizon* oil spill. Twenty-one years after the *Exxon Valdez* spill in Alaska, the same blunt response technologies—boom, dispersants, and skimmers—were used, to limited effect. On-the-ground shortcomings in the joint public-private response to an overwhelming spill like that resulting from the blowout of the Macondo well are now evident, and demand public and private investment. So do the weaknesses in local, state, and federal coordination revealed by the emergency. Both government and industry failed to anticipate and prevent this catastrophe, and failed again to be prepared to respond to it.

*The chief counsel's investigation was no doubt complicated by the Commission's lack of subpoena power. Nonetheless, Chief Counsel Bartlit did an extraordinary job building the record and interpreting what he learned. He used his considerable powers of persuasion along with other tools at his disposal to engage the involved companies in constructive and informative exchanges.

If we are to make future deepwater drilling safer and more environmentally responsible, we will need to address all these deficiencies together; a piecemeal approach will surely leave us vulnerable to future crises in the communities and natural environments most exposed to offshore energy exploration and production.

The Deepwater Drilling Prospect

The damage from the spill and the impact on the people of the Gulf has guided our work from the very beginning. Our first action as a Commission was to visit the Gulf region, to learn directly from those most affected. We heard deeply moving accounts from oystermen witnessing multi-generation family businesses slipping away, fishermen and tourism proprietors bearing the brunt of an ill-founded stigma affecting everything related to the Gulf, and oil-rig workers dealing with mounting bills and threatened home foreclosures, their means of support temporarily derailed by a blanket drilling moratorium, shutting down all deepwater drilling rigs, including those not implicated in the BP spill.

Indeed, the centrality of oil and gas exploration to the Gulf economy is not widely appreciated by many Americans, who enjoy the benefits of the energy essential to their transportation, but bear none of the direct risks of its production. Within the Gulf region, however, the role of the energy industry is well understood and accepted. The notion of clashing interests—of energy extraction versus a natural-resource economy with bountiful fisheries and tourist amenities—misses the extent to which the energy industry is woven into the fabric of the Gulf culture and economy, providing thousands of jobs and essential public revenues. Any discussion of the future of offshore drilling cannot ignore these economic realities.

But those benefits have imposed their costs. The bayous and wetlands of Louisiana have for decades suffered from destructive alteration to accommodate oil exploration. The Gulf ecosystem, a unique American asset, is likely to continue silently washing away unless decisive action is taken to start the work of creating a sustainably healthy and productive landscape. No one should be deluded that restoration on the scale required will occur quickly or cheaply. Indeed, the experience in restoring other large, sensitive regions—the Chesapeake Bay, the Everglades, the Great Lakes—indicates that progress will require coordinated federal and state actions, a dedicated funding source, long-term monitoring, and a vocal and engaged citizenry, supported by robust non-governmental groups, scientific research, and more.

We advocate beginning such an effort, seriously and soon, as a suitable response to the damage and disruption caused by the *Deepwater Horizon* emergency. It is a fair recognition not only of the costs that energy exploitation in the Gulf has, for decades, imposed on the landscape and habitats—and the other economic activities they support—but also of the certainty that Americans will continue to develop the region's offshore energy resources.

For the simple fact is that the bulk of our newly discovered petroleum reserves, and the best prospects for future discoveries, lie not on land, but under water. To date, we have made the decision as a nation to exploit the Gulf's offshore energy resources—ruling much of the Florida, Atlantic, and

Pacific coasts out of bounds for drilling. The choice of how aggressively to exploit these resources, wherever they may be found, has profound implications for the future of U.S. energy policy, for our need to understand and assure the integrity of fragile environmental resources, and for the way Americans think about our economy and our security. Although much work is being done to improve the fuel-efficiency of vehicles and to develop alternative fuels, we cannot realistically walk away from these offshore oil resources in the near future. So we must be much better prepared to exploit such resources with far greater care.

The Commission and Its Work

While we took a broad view of the spill, it could not be exhaustive. There is still much we do not know—for instance, the blowout preventer, the last line of defense against loss of well control, is still being analyzed; and the *Deepwater Horizon* itself, after its explosive destruction, remained out of reach during our investigation. The understandable, immediate need to provide answers and concrete suggestions trumped the benefits of a longer, more comprehensive investigation. And as we know from other spills, their environmental consequences play out over decades—and often in unexpected ways.

Instead, the Commission focused on areas we thought most likely to inform practical recommendations. Those recommendations are presented in the spirit of transforming America into the global leader for safe and effective offshore drilling operations. Just as this Commission learned from the experiences of other nations in developing our recommendations, the lessons learned from the *Deepwater Horizon* disaster are not confined to our own government and industry, but relevant to rest of the world.

We wish we could say that our recommendations make a recurrence of a disaster like the Macondo blowout impossible. We do not have that power. No one can eliminate all risks associated with deepwater exploration. But when exploration occurs, particularly in sensitive environments like the Gulf of Mexico or the Arctic, the country has an obligation to make responsible decisions regarding the benefits and risks.

The Commission's full report is divided into three sections.

Chapters 1 through 3 describe the events of April 20th on the *Deepwater Horizon*, and, more important, the events leading up to it in the preceding decades—especially how the dramatic expansion of deepwater drilling in the Gulf was not met by regulatory oversight capable of ensuring the safety of those drilling operations.

Chapters 4 through 7 lay out the results of our investigation in detail, highlighting the crucial issues we believe must inform policy going forward: the specific engineering and operating choices made in drilling the Macondo well, the attempts to contain and respond to the oil spill, and the impacts of the spill on the region's natural resources, economy, and people—in the context of the progressive degradation of the Mississippi Delta environment.

Chapters 8 through 10 present our recommendations for reforms in business practices, regulatory oversight, and broader policy concerns. We recognize that the improvements we advocate all come with costs and all will take time to implement. But inaction, as we are deeply aware, runs the risk of real costs, too: in more lost lives, in broad damage to the regional economy and its long-term viability, and in further tens of billions of dollars of avoidable clean-up costs. Indeed, if the clear challenges are not addressed and another disaster happens, the entire offshore energy enterprise is threatened—and with it, the nation’s economy and security. We suggest a better option: build from this tragedy in a way that makes the Gulf more resilient, the country’s energy supplies more secure, our workers safer, and our cherished natural resources better protected.

Our Thanks and Dedication

We thank President Obama for this opportunity to learn thoroughly about the crisis, and to share our findings with the American public. We deeply appreciate the effort people in the affected Gulf regions made to tell us about their experiences, and the time and preparation that witnesses before the Commission dedicated to their presentations. We have come to respect the seriousness with which our fellow Commissioners assumed our joint responsibilities, and their diverse expertise and perspectives that helped make its work thorough and productive. On their behalf, we wish to recognize the extraordinary work the Commission’s staff—scientists, lawyers, engineers, policy analysts, and more—performed, under demanding deadlines, to make our inquiries broad, deep, and effective; and we especially highlight the leadership contributions of Richard Lazarus, executive director, and Fred Bartlit, chief counsel. Together, they have fulfilled an extraordinary public service.

Finally, to the American people, we reiterate that extracting the energy resources to fuel our cars, heat and light our homes, and power our businesses can be a dangerous enterprise. Our national reliance on fossil fuels is likely to continue for some time—and all of us reap benefits from the risks taken by the men and women working in energy exploration. We owe it to them to ensure that their working environment is as safe as possible. We dedicate this effort to the 11 of our fellow citizens who lost their lives in the *Deepwater Horizon* explosion.



Bob Graham, Co-Chair



William K. Reilly, Co-Chair

Recommendations

Introduction

The President asked this Commission to “develop options for guarding against, and mitigating the impact of, oil spills associated with offshore drilling”¹ in recognition of the compelling need to balance the nation’s interest in offshore energy resources with protection of our rich marine and coastal environments. To that end, the Commission’s full report details the complex web of decisions, actions, and circumstances that set the stage for the BP *Deepwater Horizon* disaster. Among the chief actors in that web was the government itself, which played a key role both in setting the policies that shaped offshore oil and gas activities in the Gulf over the course of many decades, and in overseeing responses to the spill once it began.

This report presents the Commission’s complete recommendations for addressing the causes and consequences of the spill. The recommendations reflect the government’s sweeping sovereign authority as both owner of the seabed and water column and as the regulator of activities, with the overriding responsibility to manage and protect the valuable resources of the outer continental shelf (OCS) on behalf of current and future generations of Americans. They are grouped in nine distinct areas:

- Improving the Safety of Offshore Operations: Government’s Role
- Improving the Safety of Offshore Operations: Industry’s Role
- Safeguarding the Environment
- Strengthening Oil Spill Response, Planning, and Capacity
- Advancing Well-Containment Capabilities
- Overcoming the Impacts of the *Deepwater Horizon* Spill and Restoring the Gulf
- Ensuring Financial Responsibility
- Promoting Congressional Engagement to Ensure Responsible Offshore Drilling
- Moving to Frontier Regions

The sections that follow summarize the context and rationale for each of the Commission’s specific recommendations. The commission’s full report, as well as staff working papers published by the Commission and available at www.oilspillcommission.gov, provide additional detail and further support for the recommendations.*

Improving the Safety of Offshore Operations: Government’s Role

Federal efforts to regulate the offshore oil and gas industry have suffered for years from cross-cutting purposes, pressure from political and industry interests, a deepening deficit of technical expertise, and severely inadequate resources available to the government agencies tasked with the leasing function and regulation.

*For each of the recommendations that follow, full citations to supporting sources can be found in the sections of the full report, or in the relevant staff working papers, that address the topic of the recommendation.



Satellite-eye views of the Gulf a month after the Macondo blowout reveal the extent of the spill. Oil appears lighter or darker in the photograph depending on the relative angles of sun and camera.

NASA/GSFC, MODIS Rapid Response

In the aftermath of the *Deepwater Horizon* oil spill, the Department of the Interior has already taken a series of significant and important steps to improve regulatory oversight of offshore drilling.

But given the deep-rooted problems that had existed at the Department's Minerals Management Service (MMS) before the spill occurred, and the near certainty that the oil and gas industry will seek to expand into ever more challenging environments in the years ahead, a more comprehensive overhaul of both leasing and the regulatory policies and institutions used to oversee offshore activities is required. The necessary overhaul, to be successful, must address three core issues: (1) reducing and managing risk more effectively using strategies that can keep pace with a technologically complex and rapidly evolving industry, particularly in high-risk and frontier areas; (2) assuring the independence and integrity of government institutions charged with protecting the public interest; and (3) securing the resources needed to provide a robust capability to execute the leasing function and adequate regulatory oversight.

The Need for a New Approach to Risk Assessment and Management

Neither the industry's nor the federal government's approaches to managing and overseeing the leasing and development of offshore resources have kept pace with rapid changes in the technology, practices, and risks associated with the different geological and ocean environments being explored and developed for oil and gas production. Nor do these approaches reflect the significant changes that have occurred in the structure of the oil and gas industry itself—especially the rise of specialized service contractors and the general trend toward outsourcing multiple functions. When the operator directly regulated by the government does not itself perform many of the activities critical to well safety, regulators face additional challenges due to the separation of these functions. However, MMS did not change its regulatory oversight to respond to these industry changes by making the service companies more accountable. In other countries, operators of drilling are required to demonstrate to the regulators their own fitness and risk management systems.

Also missing has been any systematic updating of the risk assessment and risk management tools used as the basis for regulation. MMS attempted under several administrations to promulgate regulations that would have required companies to manage all of their activities and facilities, and those of their contractors, under a documented Safety and Environmental Management System (SEMS). But, in the face of industry opposition, MMS did not adopt such a requirement until September 2010, after the BP *Deepwater Horizon* disaster. Industry objections also derailed a past MMS proposal to expand data reporting requirements as part of an effort to track and analyze offshore incidents and to identify safety trends and lagging and leading indicators. The proposal was abandoned when the Office of Management and Budget agreed with industry complaints about compliance cost (industry also complained about the potential for overlap with Coast Guard reporting requirements). As a result, there has historically been no legal requirement that industry track or report instances of uncontrolled hydrocarbon releases or “near misses”—both indicators that could point to a heightened potential for serious accidents. The United States has the highest reported rate of fatalities in offshore oil and gas drilling among its international peers, but it has the lowest reporting of injuries. This striking contrast suggests a significant under-reporting of injuries in the United States and highlights the need for better data collection to ensure needed attention to worker safety.

Government agencies that regulate offshore activity should reorient their regulatory approaches to integrate more sophisticated risk assessment and risk management practices into their oversight of energy developers operating offshore. They should shift their focus from prescriptive regulations covering only the operator to a foundation of augmented prescriptive regulations, including those relating to well design and integrity, supplemented by a proactive, risk-based performance approach that is specific to individual facilities, operations, and environments. This would be similar to the “safety case” approach that is used in the North Sea, which requires the operator and drilling rig owners to assess the risks associated with a specific operation, develop a coordinated plan to manage those risks, integrate all involved contractors in a safety management system, and take responsibility for developing and managing the risk management process.

*The term “safety case” is a shorthand expression for a comprehensive and structured set of safety documentation that provides a basis for determining whether a risk management system for a specific vessel or equipment is adequately safe for a given application in a given environment.

To accomplish these goals of creating a new approach to risk assessment and management, the Commission offers the following three recommendations:

Recommendations

The Department of the Interior should supplement the risk-management program with prescriptive safety and pollution-prevention standards that are developed and selected in consultation with international regulatory peers and that are at least as rigorous as the leasing terms and regulatory requirements in peer oil-producing nations .

The Department of the Interior should develop a proactive, risk-based performance approach specific to individual facilities, operations and environments, similar to the “safety case” approach in the North Sea.

Working with the International Regulators’ Forum and other organizations, Congress and the Department of the Interior should identify those drilling, production, and emergency-response standards that best protect offshore workers and the environment, and initiate new standards and revisions to fill gaps and correct deficiencies. These standards should be applied throughout the Gulf of Mexico, in the Arctic, and globally wherever the international industry operates. Standards should be updated at least every five years as under the formal review process of the International Organization for Standardization (ISO).



Even as *Deepwater Horizon* burns, oil from the blown out well begins to spread across the Gulf. Preventing such disasters in the future will take more effective government oversight. Most crucial, however, will be the oil and gas industry's commitment to fundamentally transform its own safety culture.

Photo: Gerald Herbert/Associated Press

More specifically, the following actions are needed to truly transition to a proactive, risk-based performance approach:

- Engage a competent, independent engineering consultant to review existing regulations for adequacy and “fit for purpose” as a first step toward benchmarking U.S. regulations against the highest international standards. Following this review, develop and implement regulations for safety and environmental protection that are at least as rigorous as the regulations in peer-oil-producing nations. A new regulatory entity for safety and environment (as described below) should ensure that while engaged in petroleum activities all drilling and production platforms are certified and operating at the highest level of international regulatory practice.
- Require operators to develop a comprehensive “safety case” as part of their exploration and production plans—initially for ultra-deepwater (more than 5,000 feet) areas, areas with complex geology, and any other frontier or high-risk areas—such as the Arctic. In addition, for lease sales in those and other areas, prospective lessees should be required to demonstrate competence, based on experience, financial capacity, and expertise, as a prequalification for bidding.
- Expand Safety Environmental Management System requirements to include regular third-party audits at three- to five-year intervals and certification. These plans should be expanded for frontier areas to encompass the full range of risk assessment and management.
- For both new and transferred leases, require the operator to participate in a new safety institute or agree to expert audits, and to contribute to safety and environmental research and development. Approval to transfer leases sold prior to this requirement should be conditioned on the new requirements based on risk factors related to the specific requirements of the lease. The lease stipulation should also include the requirement that the operator possess adequate capability to contain and respond to an oil spill, and sufficient financial capacity to compensate for damages caused by a spill.
- To cultivate and maintain government expertise on offshore drilling safety:
 - (1) Establish a process under the auspices of the National Academy of Engineering to identify criteria for high-risk wells and develop methodology to assess those risks. This process should include, to the extent that the National Academy deems appropriate, input from experts in the U.S. Geological Survey, the Department of Energy, the National Oceanic and Atmospheric Administration, and academia. Furthermore, the Department of the Interior should develop in-house competence to perform such sophisticated risk assessments. Such evaluations could guide the transition to a system where all operators and contractors are required to demonstrate an integrated, proactive, risk management approach prior to leases being granted or receiving permits for exploration wells and major development projects. As noted above, these efforts should initially focus on areas with complex geology, ultra-deep water, and any other frontier or high-risk areas—such as the Arctic.

- (2) Establish a coordinated, interagency research effort to develop safer systems, equipment, and practices to prevent failures of both design and equipment in the future. The federal government has relevant expertise in areas such as the application of remote sensing and diagnostics, sensors and instrumentation, and command electronics that could and should be transferred to the offshore industry.* The Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Program, an existing research and development program created by statute and managed by the Secretary of Energy, should be refocused toward mitigating the risks of offshore operations.
- Develop more detailed requirements for incident reporting and data concerning offshore incidents and “near misses.” Such data collection would allow for better tracking of incidents and stronger risk assessments and analysis. In particular, such reporting should be publicly available and should apply to all offshore activities, including incidents relating to helicopters and supply vessels, regardless of whether these incidents occur on or at actual drilling rigs or production facilities. In addition, Interior, in cooperation with the International Regulators Forum, should take the lead in developing international standards for incident reporting in order to develop a consistent, global set of data regarding fatalities, injuries, hydrocarbon releases, and other accidents. Sharing information as to what went wrong in offshore operations, regardless of location, is key to avoiding such mistakes.
 - Lead in the development and adoption of shared international standards, particularly in the Gulf of Mexico and the Arctic. Transparent information and data sharing within the offshore industry and among international regulators is critical to continuous improvement in standards and risk management practices. The United States shares the waters of the Gulf of Mexico and its sub-surface resources with Cuba and the Republic of Mexico. After many decades of declining investment and production in the Mexican part of the Gulf by PEMEX, the national oil company, a recent Mexican Supreme Court ruling has created the opportunity for U.S. and other foreign oil and gas companies to enter Mexican waters. PEMEX has indicated its intention to auction deepwater contracts beginning in 2012. Separately, Cuba has already leased blocks 50 miles off the coast of Florida with reported plans for seven exploration wells by 2014. Agreement on standards for operations should be part of any negotiation to define the maritime boundary between the United States, Mexico, and Cuba in the eastern Gulf of Mexico. The need for international standards for activities in the Arctic is also unquestioned: the United States having already awarded leases in the region and now it is incumbent on the United States to push for such standards.
 - Provide protection for “whistleblowers” who notify authorities about lapses in safety. All offshore workers have a duty to ensure safe operating practices to prevent accidents. To ensure all workers, regardless of employer, will take appropriate action whenever necessary, Congress should amend the Outer Continental Shelf Lands Act or specific safety statutes to provide the same whistleblower protection that workers are guaranteed in other comparable settings.

* Secretary of Energy Steven Chu advised the Commission on the capacity within the Department of Energy, the Nuclear Regulatory Commission, the Federal Aviation Administration and elsewhere in the federal government to undertake sophisticated risk and technology assessments. The Department of Energy and the national laboratories have the depth and breadth of research and technical experience in such areas as high-performance computing, image processing, mechanical/structural stress analysis, complex fluid flow simulations, and other areas that proved instrumental in diagnosing the state of the Macondo well blowout preventer and in assessing plans to stop the leak.

The Need for a New, Independent Agency

Primary responsibility for regulating the offshore oil and gas industry prior to the *Deepwater Horizon* accident was consolidated in a single agency, MMS. MMS was not only responsible for offshore leasing and resource management; it also collected and disbursed revenues from offshore leasing, conducted environmental reviews, reviewed plans and issued permits, conducted audits and inspections, and enforced safety and environmental regulations. And though the revenue management and resource management functions of MMS were separated into two distinct divisions, the mingling of distinct statutory responsibilities—each of which required different skill sets and fostered different institutional cultures—led inevitably to internal tensions and a confusion of goals that weakened the agency’s effectiveness and made it more susceptible to outside pressures.

At the core of this tension was a trade-off between, on the one hand, promoting the “expeditious and orderly development” of offshore resources, as mandated by the Outer Continental Lands Act of 1978, while also ensuring, on the other hand, that offshore development proceeded in a manner that protected human health, safety, and the environment. Over the course of many years, political pressure generated by a demand for lease revenues and industry pressure to expand access and expedite permit approvals and other regulatory processes often combined to push MMS toward elevating the former goal over the latter. At the same time, the fact that MMS lacked either a clearly articulated mission or adequate guidance for balancing its different missions led to inefficient management and a tendency to defer to industry, which successfully sought congressional and political intervention to shorten time frames for plan and permit reviews, blocked royalty valuation rulemakings, and advocated to delay and weaken rules aimed at improving the safety management of operations.

All of these problems were compounded by an outdated organizational structure, a chronic shortage of resources, a lack of sufficient technological expertise, and the inherent difficulty of coordinating effectively with all the other government agencies that had statutory responsibility for some aspect of offshore oil and gas activities. Besides MMS, other offices of the Department of the Interior as well as the Departments of Transportation, Commerce, Defense, and Homeland Security, and the Environmental Protection Agency (EPA) were involved in some aspect of the industry and its many-faceted facilities and operations, from workers on production platforms to pipelines, helicopters, drilling rigs, and supply vessels.

Not surprisingly, the Macondo well failure in April 2010 turned a harsh spotlight on all these bureaucratic inadequacies and shortcomings. And shortly after the accident, Interior Secretary Ken Salazar renamed MMS the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) and announced a plan to split its responsibilities into three separate offices.*

*The use of “BOEMRE” will be limited here to actions since MMS was renamed.

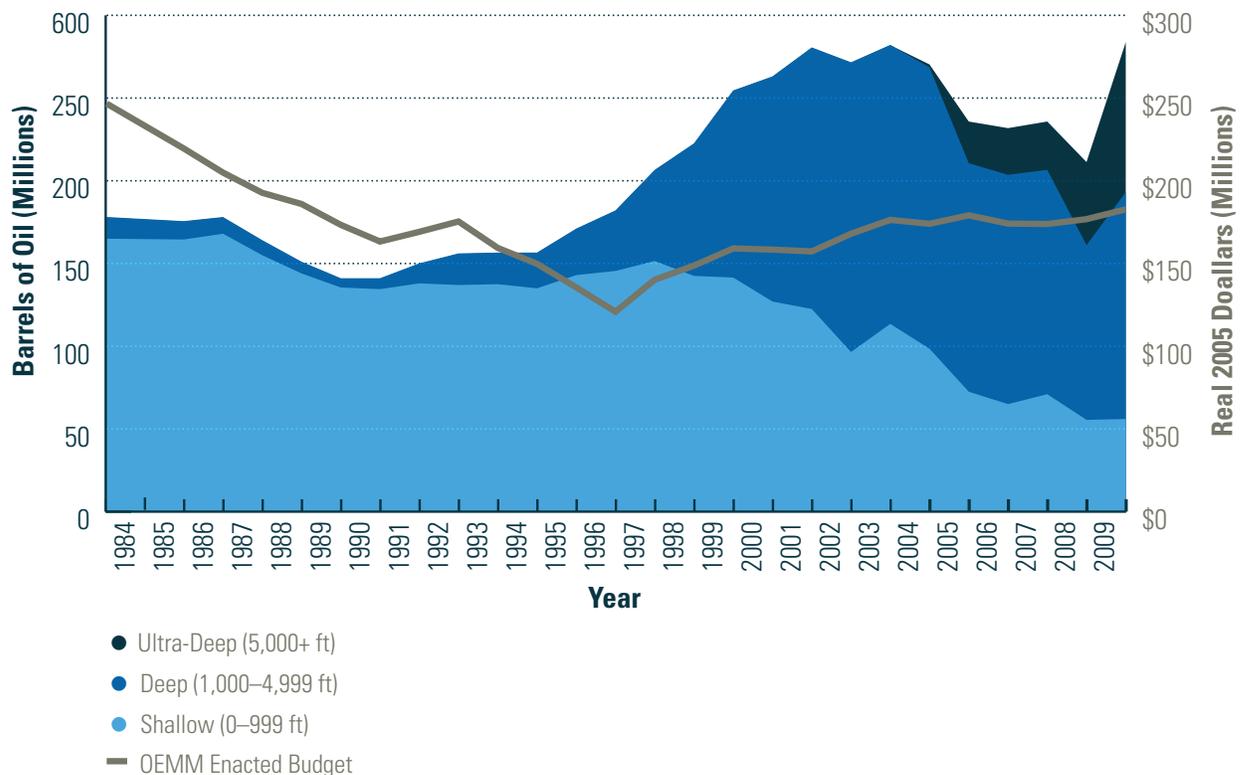
Although the proposed reorganization of Interior's offshore leasing, safety, and revenue management program represents a significant improvement, it does not adequately address the deeper problem of fully insulating the Department's safety and environmental protection functions from the pressures to increase production and maximize lease revenues.

Recommendations

Congress and the Department of the Interior should create an independent agency within the Department of the Interior with enforcement authority to oversee all aspects of offshore drilling safety (operational and occupational), as well as the structural and operational integrity of all offshore energy production facilities, including both oil and gas production and renewable energy production.

Congress and the Department of the Interior should provide a mechanism, including the use of lease provisions for the payment of regulatory fees, for adequate, stable, and secure funding to the key regulatory agencies—Interior, Coast Guard, and NOAA—to ensure that they can perform their duties, expedite permits and reviews as needed, and hire experienced engineers, inspectors, scientists, and first responders. (See additional discussion on page 52.)

FIGURE 1: MMS Budget and Gulf of Mexico Crude Oil Production, 1984-2009



In the last twenty years, MMS's leasing, environmental, and regulatory budget decreased or remained static while deepwater oil production in the Gulf of Mexico boomed.

Note: Office of Energy and Minerals Management (OEMM) has responsibility for renewable energy, leasing and environmental, resource evaluation, regulatory, and information management programs. It does not include revenue management or general administration.

Source: Commission Staff, Adapted from Department of the Interior and Energy Information Administration

The roles and responsibilities of the former MMS should be separated into three entities with clearly defined statutory authorities. One entity would be responsible for offshore safety and environmental enforcement; another would perform functions related to leasing and environmental science; and the third would manage natural resource revenues. The safety and environment enforcement authority or entity, in particular, should have primary statutory responsibility for overseeing the structural and operational integrity of all offshore energy-related facilities and activities, including both oil and gas offshore drilling and renewable energy facilities.

- A new office of safety should consolidate responsibility for safety—including infrastructure and operational integrity, as well as spill prevention and response—for all offshore fossil fuel and renewable resource development activities, structures, and workers. It should be an independent agency housed at the Department of the Interior to facilitate coordination with a new office for leasing and environmental science. Congress should enact an organic act to establish its authorities and responsibilities, consolidating the various responsibilities now under the Outer Continental Shelf Lands Act, the Pipeline Safety Act, and Coast Guard authorizations. The new office should have primary authority over facilities, structures, and units for offshore oil and gas drilling, production, and renewable energy that are engaged in energy-related activities, including authority to establish and enforce specific safety and environmental protection requirements for these units as well as requirements for operators who may be leasing the facilities.
- Congress should review and consider amending where necessary the governing statutes for all agencies involved in offshore activities to be consistent with the responsibilities functionally assigned to those agencies. The safety-related responsibilities of the new offshore safety agency should be included in a separate statute. (Further specifics regarding the Commission’s recommended organizational structure for new offices to regulate safety and leasing are discussed below).
- To ensure that Interior has the ability to provide adequate leasing capabilities and regulatory oversight for the increasingly complex energy-related activities being undertaken on the OCS, budgets for these new offices as well as existing agencies should come directly from fees paid by the offshore industry, akin to how fees charged to the telecommunications industry pay for the expenses of the Federal Communications Commission, which is essentially fully funded by such regulated industry payments. Through this mechanism, Congress, through legislation, and Interior, through lease provisions,² could expressly oblige lessees to fund the regulation necessary to allow for private industry access to the energy resources on the OCS, including renewables. Under existing law, the oil and gas industry already pays inspection fees that currently amount to about \$10 million per year or about 3 percent of BOEMRE’s annual budget, but this amount can and should be increased significantly. (For additional discussion of funding, see “The Need for Adequate Funding for Safety Oversight and Environmental Review” page 52.)

Implementing the Commission's recommendation to reorganize the former MMS into three offices and to enhance these offices' technical capacities will require a sustained effort over a period of years. The President or Interior Secretary should effect this reorganization to the extent possible administratively and request congressional enactment to confirm its permanence and provide for the statutory recognition of a term of office for the director of safety and environmental regulation.

Proposed Reorganization Of The Former Minerals Management Service

Offshore Safety Authority: This office would exercise independent statutory authority over technical and operational safety in all phases of OCS energy resource development projects, including the planning, designing, constructing, operating, and decommissioning of facilities and projects, and will have overall responsibility for fostering safe and environmentally sound offshore energy operations. The new agency would oversee all non-economic aspects of the operations and structures involved in drilling and production of oil and gas, pipelines, and wind towers, wave, tidal, and other renewable technologies located on the federal offshore zone. The new safety and environment authority would also have the lead coordination role in relation to other regulators with independent authority over offshore oil and gas activities, including EPA, NOAA and the Coast Guard. Key responsibilities include:

- Reviewing and approving (or denying) all permits under exploration, development, and production plans.
- Inspecting all offshore operations by expert teams through scheduled and unannounced inspections.
- Auditing or otherwise requiring certification of operator health, safety, and environmental management systems.
- Evaluating eligibility for lessees based on safety and environmental qualifications.
- Reviewing and approving the safety and feasibility of any environmental mitigation activities prescribed by National Environmental Policy Act (NEPA) documents and other environmental consultations, authorization, or permits in addition to enforcing such requirements over the duration of an operation.
- Collecting and analyzing leading and lagging indicators from all active parties for full risk evaluation.
- Promulgating all structural integrity, process, and workplace safety rules and regulations in order to create a foundation of prescriptive regulations to supplement performance-based ("safety case") regulations.
- Providing technical review and comment on the five-year leasing program and individual lease sales.
- Providing technical review of spill response and containment plans.
- Reviewing and approving all spill response and containment plans and advising the new safety authority on environmental considerations.
- Investigating all accidents and other significant events that could have potentially turned catastrophic.

The organization and staffing composition should be decided during a transition period, when the areas and activities are analyzed and categorized by risk. The director of the new organization should be a qualified executive with a relevant engineering or technical background, and should be appointed by the President for a five- to six-year term and confirmed by the Senate. In addition, the new agency should have classifications and salary scales for engineering and technical staff and inspectors similar to those of the Nuclear Regulatory Commission.

Leasing and Environmental Science Office: This office would act as the leasing and resource manager for conventional and renewable energy and other mineral resources on the OCS. Charged with fostering environmentally responsible and efficient development of the OCS, the office would ensure that the American people both receive fair market value for the rights conveyed and that the nation's rich marine environment remains protected. The United States cannot afford a repetition of the kind of contractual drafting mistake that is literally costing the nation tens of billions of dollars in lost revenues. Key responsibilities include:

- Conducting OCS resource planning processes, including the five-year leasing program and individual lease sales.
- Conducting individual lease sales for oil, gas, and renewable energy facilities offshore.
- Promulgating rules and regulations with respect to lease terms, resource access, and use.
- Approving nonengineering or operations aspects of exploration, development, and production plans, subject to review by the new safety authority to ensure no conflicts with permitting requirements for infrastructure and operations.
- Reviewing and approving all spill response and containment plans and advising the new safety authority on environmental considerations.
- Making resource management decisions, such as those related to timing of reservoir abandonment and shared reservoir issues, unitization, commingling, and optimizing oil and gas recovery.
- Reviewing and approving permits for seismic activities.
- Conducting NEPA reviews at all relevant phases and coordinating other environmental reviews when appropriate
- Administering the Environmental Studies Program.

The leasing and environmental science office would include two distinct divisions: a leasing and resource evaluation division and an environmental science division. To provide an important and equitable voice for environmental concerns during the five-year planning process and lease awards, the environmental science division would be structured with a separate line of reporting to the Assistant Secretary overseeing offshore drilling and the environmental science division would be led by a Chief Scientist. The Chief Scientist's responsibilities would include, but not be limited to, conducting all NEPA reviews and coordinating other environmental reviews when appropriate and administering the Environmental Studies Program. The Chief Scientist's expert judgment on environmental protection concerns would be accorded significant weight in the

leasing decision-making process, including on questions concerning whether and where leasing should occur and what environmental protection and mitigation conditions should be placed on leases that are issued. The new organization and process would also include enhanced review of environmental decisions and enforcement by the safety authority. It should track all mitigation efforts from NEPA documents and other environmental reviews to assist the new safety authority in its environmental enforcement duties.

Office of Natural Resources Revenue (ONRR): Revenue collection and auditing functions would remain with the Assistant Secretary for Policy, Management, and Budget as per the recent re-organization implemented by Secretary Salazar.

Improving the Safety of Offshore Operations: Industry's Role

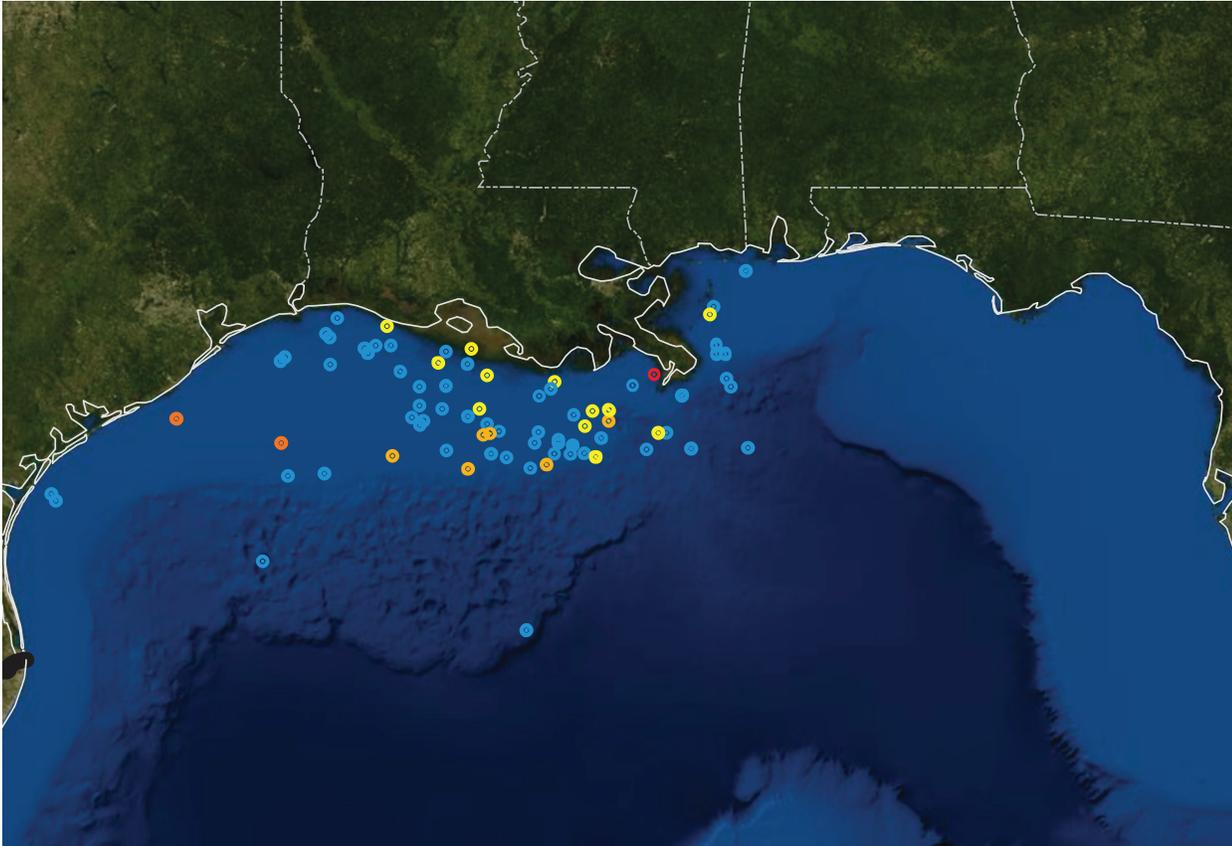
The Need for a New Industry-Run Safety Organization

Complacency about risks to safety had catastrophic consequences in the *Deepwater Horizon* explosion, and in turn created economic havoc for companies not implicated in the Macondo well and not known for cavalier disregard of process safety. A new, private-sector entity that will work with government bodies is needed to define best practices and police them, providing a mechanism for the leading companies to ensure the industry is not compromised by other enterprises with weaker safety standards and records. The public interest will also be served by such an entity, which will encourage excellence in operational integrity and help shape new safety norms and high safety expectations across the entire offshore oil and gas business.

The oil and gas industry currently has no discernable, broadly embraced culture of safety. As exploration and production move into ever more challenging environments, the public, the government, and even many in the industry lack confidence that all the companies can operate in the frontier and deepwater environments without creating unacceptable risks of harm to their workers, the local and regional economies, and the environment.

The Macondo well accident and subsequent investigations revealed that while industry had devoted billions of dollars to the technologies required for deepwater drilling, it had devoted essentially nothing to creating alternative capabilities to deal with the foreseeable consequences of a disaster. Other inherently risky industries and endeavors (e.g., the United States nuclear Navy, civilian nuclear power plant operators, and chemical manufacturers) have improved their safety culture and performance by creating self-policing organizations involved in standard-setting, auditing, exchanging best practices, training, ensuring accountability, and enforcement. The experience from offshore drilling and production activities, and knowledge of geologic and ocean conditions outside the U.S., can provide insights into potential risks and the best practices for managing them effectively.

FIGURE 2: Loss of Well Control Accidents



Loss of Well Control Accidents and Resulting Consequences

- Loss of Well Control
- Panel Investigation
- Fire or Explosion
- Fatalities
- Fire or Explosion with Fatalities or Injuries

Between 1996 and 2009, in the U.S. Gulf of Mexico, there were 79 reported loss of well control accidents—when hydrocarbons flowed uncontrolled either underground or at the surface. The regulator considers the following three factors when determining whether or not an accident will undergo a panel investigation: the actual and potential severity of the incident; the complexity of the incident; and, the probability of similar incidents occurring.

Source: Bureau of Ocean Energy Management, Regulation and Enforcement

Leading companies in the offshore petroleum sector should likewise take responsibility for re-shaping industry attitudes and practices to create an overall culture of safety. They should make a commitment to and investment in safer offshore operations by establishing an autonomous body focused solely on the core mission of achieving excellence in process safety. Key features of such a safety institute should include the following key features:

FIGURE 3: Examples of Decisions that Increased Risk at Macondo While Potentially Saving Time

Decision	Was There A Less Risky Alternative Available?	Less Time Than Alternative?	Decision-maker
Not Waiting for More Centralizers of Preferred Design	Yes	Saved Time	BP on Shore
Not Waiting for Foam Stability Test Results and/or Redesigning Slurry	Yes	Saved Time	Halliburton (and Perhaps BP) on Shore
Not Running Cement Evaluation Log	Yes	Saved Time	BP on Shore
Using Spacer Made from Combined Lost Circulation Materials to Avoid Disposal Issues	Yes	Saved Time	BP on Shore
Displacing Mud from Riser Before Setting Surface Cement Plug	Yes	Unclear	BP on Shore
Setting Surface Cement Plug 3,000 Feet Below Mud Line in Seawater	Yes	Unclear	BP on Shore (Approved by MMS)
Not Installing Additional Physical Barriers During Temporary Abandonment Procedure	Yes	Saved Time	BP on Shore
Not Performing Further Well Integrity Diagnostics in Light of Troubling and Unexplained Negative Pressure Test Results	Yes	Saved Time	BP (and Perhaps Transocean) on Rig
Bypassing Pits and Conducting Other Simultaneous Operations During Displacement	Yes	Saved Time	Transocean (and Perhaps BP) on Rig

Leadership and Incentives. Industry CEOs and their boards of directors should provide leadership for the new organization and for their companies' engagement with it. From rig hands to line managers, through top executive ranks to the board of directors, employees of cooperating companies should be engaged in system safety improvement and supportive of the role of the safety institute in each company's continuous progress toward safety excellence. The safety institute's board, drawn from the top ranks of the industry, should develop both positive and negative incentives (rewards and sanctions) to help all companies operating offshore overcome the natural enemies of safety: ignorance, arrogance, and complacency.

Auditing. One of the safety institute's most important functions should be auditing. Audits should be designed as learning opportunities. The audit process and follow-up should be able to assess a company's safety culture and its commitment to principles of system safety in practice, from design and operations to incident investigation and feedback.

Regular audits would assess operations against plans and hazard assessments. Audits would also assess member companies' job training, certification, and other key process safety metrics. Audit results would be used to provide feedback on performance to the companies, as well as to prepare case studies for shared learning and to contribute data that can be aggregated for analysis of safety trends.

Accountability. Audit results should be used to hold companies accountable for their performance to each other and to certain business counterparts, including joint-venture partners; suppliers; insurers; and through assurances by the companies' directors, investors.

The safety organization should institutionalize the member companies' accountability to one another through annual meetings at which institute leaders would compare safety records, approaches, and best practices, offering awards for top performers. Accountability could be enhanced by a requirement that companies report their audit scores to their boards of directors and insurance companies.

Transition to Risk-Based Regulation. The industry safety institute can facilitate a smooth transition to the risk-based regulatory regime recommended above. These recommendations are directed to the Department of the Interior; however, if implemented, they will appropriately shift responsibility to the regulated companies to demonstrate that they can maintain safe operations at all times. Meeting new regulations for safety and environmental protection that are at least as rigorous as the regulations in peer producing nations will result in consistently high quality system safety engineering and improved coordination between and among operators and contractors. The institute should drive continuous improvement in risk management practices, information sharing on accidents and near misses, and peer learning. It should drive improvement of safety and environmental standards and best practices by incorporating the highest standards achieved globally, including but not exclusively, those set by the American Petroleum Institute.

Governance. The safety institution should be of, by, and for the private sector. It will need to be created by the CEOs of leading companies and run by a director with unimpeachable integrity and a record of success in process safety that will be respected by its members and accepted by the public. For credibility, the new institute will need to be separate from API or any other advocacy or trade association so that it can maintain its independence and singular focus on safety, not compromised by competing goals or interests.

The companies should provide sufficient resources to support a well-funded, well-staffed, highly professional team that will take a systems approach to risk management and process safety. The institute director and staff must identify crosscutting risk factors, including leadership, ethics, behavior, and engineering.

Evaluation. No later than 3 months after the end of its first five years of operations, the industry safety institution should have itself audited by an independent third party that can evaluate how effective the organization has been in improving safety culture, safety practices, and process safety outcomes.

Integration with Regulation. Depending upon a finding that the industry safety institution has contributed to an improvement in safety culture, safety practices, and safety performance, the regulator of offshore drilling might make participation in the industry organization mandatory for all lease holders and well permit applicants.

Recommendation

The oil and gas industry should establish a private organization to develop, adopt, and enforce standards of excellence to ensure continuous improvement in safety and operational integrity offshore.

The Need to Develop and Maintain Readily Deployable Resources for Rescue, Response, and Containment

Industry's responsibilities do not end with efforts to prevent blowouts like that at the Macondo well. They extend to efforts to contain any such incidents as quickly as possible and to mitigate the harm caused by spills through effective response efforts. Once a spill occurs, the government must be capable of overseeing source control efforts. But government depends upon the resources and expertise of private companies to contain a blown-out well and to respond to a massive oil spill. Both the industry and government were woefully unprepared to contain or respond to Macondo: all parties lacked adequate contingency planning, and none had invested sufficiently in research and development to improve containment or response technology. After the Macondo spill, two industry spill-containment initiatives emerged that build on ideas and technology deployed in response to the Macondo blowout and spill: the Marine Well Containment Company and the Helix Energy Solutions Group. These efforts are too new to judge. However, it is clear that the oil and gas industry needs to develop large-scale rescue, response, and containment capabilities—including equipment, procedures, and logistics—enabled by extensive training, including full-scale field exercises and international cooperation.

These new efforts cannot rely solely on engineering and technology solutions. A future accident will, by definition, be unplanned and unexpected; containing its results will require the coordination of many complex activities going on simultaneously. To be successful—and to gain the trust of the industry, government, insurers and the public—these new efforts by industry must include extensive planning and preparations; developing scenarios of new types of potential accidents; and conducting full-scale drills and training exercises that involve both people and equipment—and industry must do all of these things continually.

As next-generation equipment is developed, industry must ensure that its containment technology is compatible with its wells. For instance, it may be useful to consider design modifications to blowout preventer stacks that would allow for more expeditious hook-ups of injection and evacuation networks and hoses, reducing the capital costs and increasing the flexibility of the spill containment companies or consortia. Capping and containment options should also be developed in advance to contain blowouts from platform wells.

Recommendation

The oil and gas industry should create and maintain readily deployable resources for rescue, response, and containment. Large-scale rescue, response, and containment capabilities need to be developed—including equipment, procedures, and logistics—and enabled by extensive training, including full-scale field exercises.

The Need for International Cooperation on Safety, Prevention, Rescue, Response, and Containment

The offshore oil and gas industry is global, with intensely localized activity and impacts. U.S. offshore production is concentrated now in the Gulf of Mexico, accounting for 96 percent of total federal offshore oil production in 2009 (and making up 29 percent of total U.S. crude oil production).³ Gulf of Mexico producers include the integrated super major companies and independent producers with global operations, as well as independent companies that operate solely in the United States. Together they comprise the mainstay of the petroleum industry's "business ecosystem" in the Gulf. All operators are served by drilling companies, cementers, and other specialist service companies, some strictly local and some global.

No matter what the geographic reach of their operations, operating energy companies and contractors must manage their enterprises to achieve safety objectives and must continually assess the effectiveness of their management programs. The experience from offshore drilling and production activities, and knowledge of geologic and ocean conditions outside the U.S., can provide insights into potential risks and the best practices for managing them effectively. They should contribute to an international effort to develop and assess new indicators of major hazards and safety culture. Best standards should be identified and applied internationally—regardless of their origin.

A new culture of safety must emerge throughout the industry, strong enough to overcome whatever local cultural features might keep safety from becoming the highest value. Because each offshore producing area offers only limited experience pertaining to deeper water and more complex geology, operators and contractors can and should learn important lessons from what happens elsewhere. To that end, peer audits across operators and major service companies might productively include international exchanges.

Recommendation

The U.S. oil and gas industry should cooperate internationally to ensure safety and preparedness in offshore production areas around the world.

Safeguarding the Environment

The adequacy of the existing regulatory regime to assure the environmental safety of offshore drilling (as distinct from worker or occupational safety) has come under a great deal of scrutiny since the *Deepwater Horizon* incident. In its work on this question, the Commission focused on two issues: (1) the application of NEPA requirements to the offshore leasing process and (2) the need for better science and greater interagency consultation to improve decision-making concerning the management of offshore resources.

The Need to Revise and Strengthen NEPA Policies and Practices in the Offshore Drilling Context

The Commission has reviewed the leasing and permitting processes that MMS followed in the Gulf of Mexico before the *Deepwater Horizon* incident. The results lead the Commission to conclude that the breakdown of the environmental review process for OCS activities was systemic and that Interior's approach to the application of NEPA requirements in the offshore oil and gas context needs significant revision. In particular, the application of tiering, the use of categorical exclusions, the practice of area-wide leasing, and the failure to develop formal NEPA guidance for the agency all contributed to this breakdown.

Tiering. Under MMS, the NEPA process for offshore oil and gas leasing relied heavily on "tiering"—a practice under which a broad environmental impact statement was used to cover "general matters" across a large area, while issues specific to a particular site or smaller area were addressed through "subsequent narrower statements of environmental analyses."⁴ Tiering was meant to encourage more thorough reviews at each subsequent stage of the offshore leasing process, and to avoid the duplication of general information that would have been covered in previous environmental reviews. As applied by MMS, however, tiering was not always consistent with its original purpose: instead, it created a system where deeper environmental analysis at more geographically targeted and advanced planning stages did not always take place.

Categorical Exclusions. The Council on Environmental Quality's implementing regulations for NEPA define "categorical exclusions" as "a category of actions which do not individually or cumulatively have a significant effect on the human environment . . . and for which, therefore, neither an environmental assessment nor an environmental impact statement is required."⁵ MMS has historically applied categorical exclusions to both Exploration Plans and Development Operations Coordination Documents⁶ in the Gulf of Mexico. Although there are legitimate differences between the Gulf and other regions of the OCS, the basis for such a wide disparity in the use of categorical exclusions is questionable. And in the aftermath of the BP *Deepwater Horizon* spill, it is difficult to argue that deepwater drilling is an activity that does not present at least some potentially significant risk of harm to the environment of the Gulf. That is no doubt why, prompted by a comprehensive review of MMS's use of categorical exclusions by the Council on Environmental Quality, Interior announced in August 2010 that it would restrict its use of categorical exclusions for offshore oil and gas development "to activities involving limited environmental risk," while it undertakes a comprehensive review of its NEPA process.⁷

Area-Wide Leasing. OCS lease sales cover such large geographic areas that meaningful NEPA review is difficult. A decision to dramatically increase the size of lease sales—known as area-wide leasing—was made over 20 years ago at the request of industry; it has necessitated environmental analyses of very large areas at the lease sale stage. For example, the Final Environmental Impact Statement for the 2007–2012 multi-lease sales in the Gulf of Mexico covered more than 87 million acres,⁸ while the Final Environmental Impact Statement for Chukchi Sea Lease Sale 193 covered about 34 million acres.⁹ Given that 2008 lease sales in the Central Gulf of Mexico and the Chukchi Sea attracted almost \$3.7 billion and almost \$2.7 billion in high bids, respectively, it is appropriate to conduct environmental reviews on a finer geographic scale before private-sector commitments of this magnitude are made to purchase leases.

NEPA Guidance. Though expected to prepare a handbook on NEPA requirements,¹⁰ MMS never developed formal NEPA guidance. As the Government Accountability Office noted in a review of the MMS Alaska Region Office: “The lack of a comprehensive NEPA guidance handbook, combined with high staff turnover, leaves the process for meeting NEPA requirements ill-defined for the analysts charged with developing NEPA documents.”¹¹ BOEMRE is currently in the process of developing an internal NEPA guidance document—a step that should ensure a higher level of NEPA consistency and transparency across regions.

Recommendation

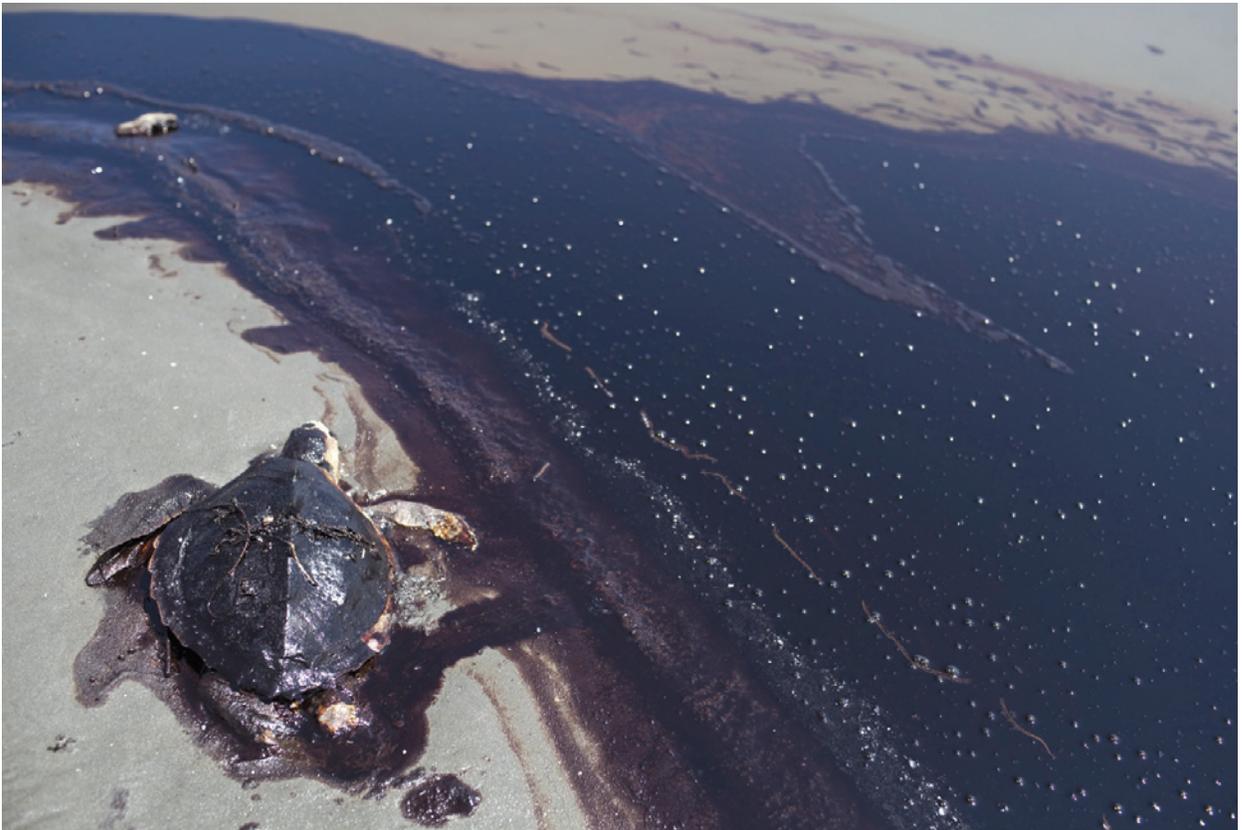
The Council on Environmental Quality and the Department of the Interior should revise and strengthen the NEPA policies, practices, and procedures to improve the level of environmental analysis, transparency, and consistency at all stages of the OCS planning, leasing, exploration, and development process.

Interior should take the following steps to strengthen NEPA review of the offshore leasing process:

- The new office of leasing and environmental science should, in consultation with the Council on Environmental Quality, develop and make public a formal NEPA handbook within one year. The handbook should address the issue of tiering and provide guidelines for applying NEPA in a consistent, transparent, and appropriate manner to decisions affecting OCS oil and gas activities.
- Interior should require, through this formal NEPA handbook, environmental impact statements for both the Five-Year Plan and for specific lease sales before plans for exploration, development, and production are approved in areas with complex geology, in ultra-deepwater, and in the Arctic and other frontier areas. Exploration plans and development and production plans in all other areas should be subject to NEPA review consistent with the Council on Environmental Quality’s implementing regulations.
- In less well-explored areas, Interior should reduce the size of lease sales so their geographic scope allows for a meaningful analysis of potential environmental impacts and identification of areas of ecological significance. A bidder on tracts in these areas and all other areas should be

able to demonstrate, in addition to financial prequalification and ability to contain a maximum size spill, experience operating in similar environments and a record of safe, environmentally responsible operation—either in the United States or as verified by a peer regulator for another country. The distinction between the OCS and less well-explored areas in the Gulf should be defined by the new entity in charge of leasing and environmental science.

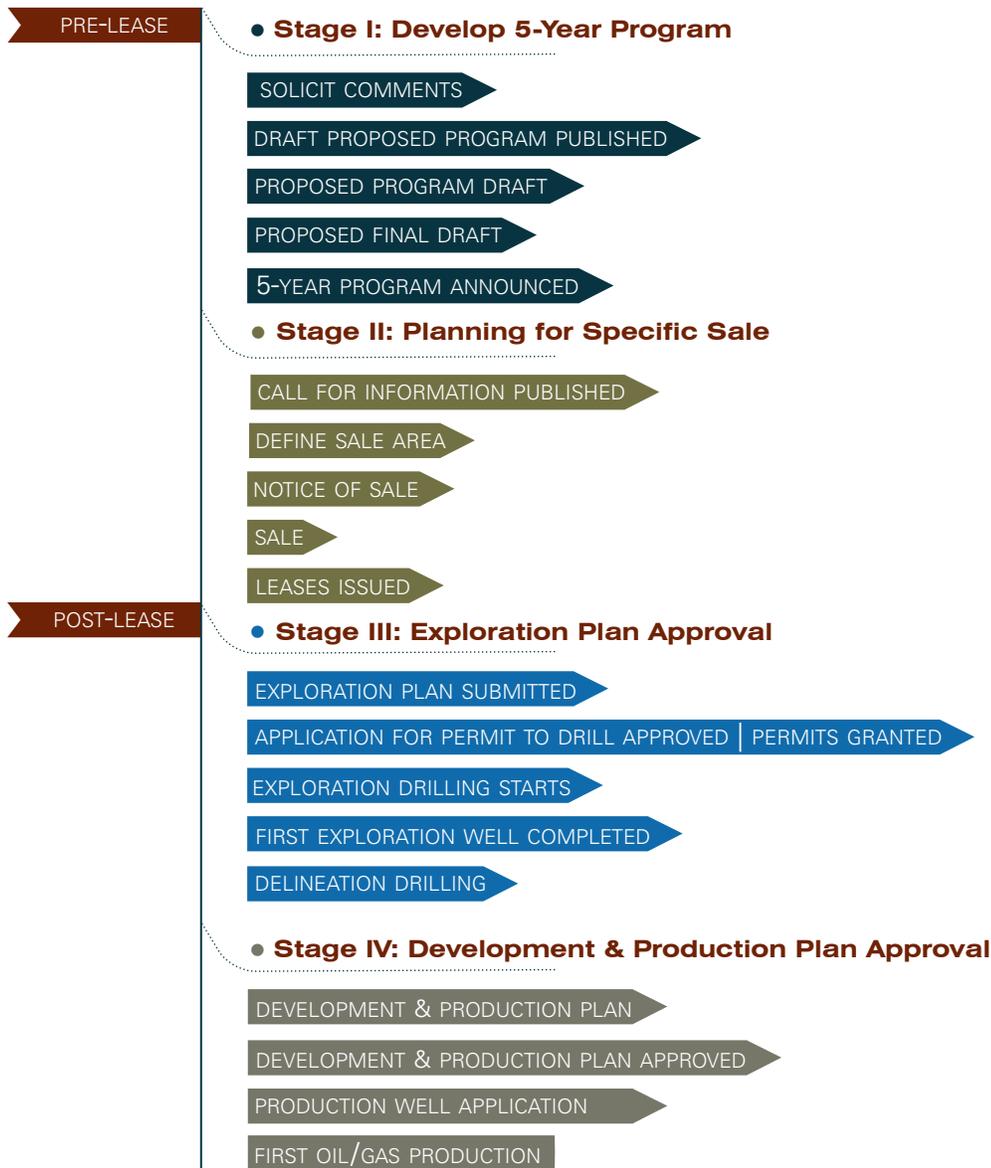
- Congress should amend the Outer Continental Shelf Lands Act to extend the 30-day deadline for approving exploration plans to 60 days. In addition, MMS should not consider such plans officially “submitted” until all of the required content, necessary environmental reviews, and other analyses are complete and adequate to provide a sound basis for decision-making. Exploration and development plans would be considered higher-level plans for purposes of agency review and approval under a reorganized regulatory structure. The office of safety and environment, separate from the office (or division) of leasing, would be responsible for permitting and approving well designs, drilling plans, and any structures.



Sad testament to the spill, a sea turtle lies dead beside the black tide that took its life along East Grand Terre Island in Louisiana. As of November 2010, the carcasses of more than 600 of the endangered reptiles had been collected. Countless others undoubtedly perished.

Photo: Benjamin Lowy/Edit by Getty Images

FIGURE 4: Outer Continental Shelf Oil & Gas Leasing Exploration and Development Process



Four major steps guide the Outer Continental Shelf leasing and development process, from the decision to open an area to drilling, to the operations during oil and gas production. Before a lease is granted, Stage I establishes the "5-Year Program," setting the schedule and possible locations for individual lease sales, and Stage II lays out the details by which each individual lease sale is conducted. After a company acquires a lease, Stage III plans and executes the oil and gas exploration activities, and Stage IV plans and executes the oil and gas development and production operations.

The Need for Greater Interagency Consultation

Under the Outer Continental Shelf Lands Act, it is up to the Secretary of the Interior to choose the proper balance between environmental protection and resource development. In making leasing decisions, the Secretary is required to solicit and consider suggestions from any interested agency, but he or she is not required to respond to the comments or accord them any particular weight. Similar issues arise at the individual lease sale stage and at the development and production plan stage. As a result, NOAA—the nation’s ocean agency with the most expertise in marine science and the management of living marine resources—effectively has the same limited role as the general public in the decisions on selecting where and when to lease portions of the OCS. A more robust and formal interagency consultation process is needed, with the goal of identifying precise areas that should be excluded from lease sales because of their high ecological importance or sensitivity. In addition to NOAA, other federal agencies that should be involved include the U.S. Fish and Wildlife Service and EPA.

Strengthened interagency coordination on offshore oil and gas activities will also be important in implementing the final recommendations of the Interagency Ocean Policy Task Force. These recommendations, adopted by President Obama by Executive Order on July 19, 2010, mandate a new national ocean policy that includes a framework for coastal and marine spatial planning, as well as a comprehensive, adaptive, integrated, transparent, ecosystem, and a science-based process for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas.¹² Coastal and marine spatial planning applies a multi-sector approach in an effort to simultaneously reduce user conflicts and environmental impacts associated with ocean and coastal activities. Integrating five-year leasing plans and associated leasing decisions with the coastal and marine spatial planning process will be an important step toward assuring the sustainable use of ocean and coastal ecosystems. It could also reduce uncertainty for industry and provide greater predictability for potential users of different areas.

To ensure that offshore oil and gas development and production proceed in ways that minimize adverse impacts to the natural and human environment, decisions about these activities must be grounded in strong science. With respect to funding the necessary science, Outer Continental Shelf Lands Act requires Interior to study the “assessment and management of environmental impacts on the outer Continental Shelf and coastal areas that might be affected by oil and gas or other mineral developments . . .”¹³ Initiated in 1973, funding for the Environmental Studies Program at Interior peaked in 1976 at roughly \$55 million, but had fallen to less than \$20 million during most of the 1990s and 2000s. It was only recently increased to approximately \$30 million.¹⁴

Future research must be conducted in a systematic way that strategically enhances understanding of the impacts of oil and gas activities and provides regulators with the timely and scale-appropriate information required for sound decisions. Long-term studies that provide critical scientific information on OCS frontier or lesser known areas,* or systematic efforts to fill data gaps in areas with existing oil and gas activity, can help ensure that the selection of new leasing areas is informed by a full understanding of potential impacts on important ecological resources. In frontier areas,

*The term “Frontier areas” include areas of the OCS that either have never been leased, or have not been leased in many years. It includes the Arctic (Beaufort and Chukchi Seas), the Atlantic and portions of the Pacific.

it will be important to collect data on prevailing environmental conditions on a broad geographic scale, not just at individual lease sites. Additionally, post-development ecological monitoring is critical to understanding the impacts of oil and gas activities and to facilitate an adaptive approach to environmental management. Expanded coordination and cooperation on scientific research efforts with NOAA, the U.S. Geological Survey, and other agencies with relevant expertise can improve the quality of science available for OCS decision-making. Much of this research will also be relevant to other offshore activities, including the development of offshore wind resources.

Recommendations

The Department of the Interior should reduce risk to the environment from OCS oil and gas activities by strengthening science and interagency consultations in the OCS oil and gas decision-making process.

Congress, by enacting legislation, and the Department of the Interior, through its lease provision, should require the oil and gas industry to pay fees that support environmental science and regulatory review related to OCS oil and gas activities to enable cooperating agencies to carry out these responsibilities. (For further discussion of funding issues, see page 52—“The Need For Adequate Funding for Safety Oversight and Environmental Review.”)

Several actions are needed to implement these recommendations:

- Congress should amend the Outer Continental Shelf Lands Act to provide NOAA with a formal consultative role during the development of five-year lease-plan and lease-sale stages. Consultation should occur no later than 60 days in advance of final Department of the Interior decisions on lease plans and sales. Specifically, NOAA should provide comments and recommendations concerning specific geographic areas that should be excluded from the leasing program or treated in a specific manner due to their ecological sensitivity or for other reasons relevant to NOAA’s ocean and coastal science expertise. Interior must adopt NOAA’s recommendations unless the Department determines that doing so would be inconsistent with important national policy interests. Moreover, Interior must publish in writing its rationale for rejecting NOAA’s recommendation.
- The Department of Energy, NOAA, the U.S. Geological Survey, and other interested agencies should establish a joint research program to systematically collect critical scientific data, fill research gaps, and provide comprehensive, ecosystem-based scientific reviews of OCS areas that are currently or will likely be open for oil and gas leasing, and for offshore areas being considered for the siting of sources of renewable energy such as wind power. This program should build on existing data; should aim to supplement data collected from individual lease sites by industry to develop information for broader geographic areas; and should engage the non-federal scientific community through such mechanisms as the National Oceanographic Partnership Program. The research should outline and develop the necessary data for: (1) decision-making related to future leasing, exploration, and development; (2) measuring and monitoring impacts on ecological resources; and (3) providing necessary data for natural resource damage assessment should an oil spill occur.

- The National Academy of Sciences should regularly evaluate the government's studies program in this area, preferably at five-year intervals.
- Together with NOAA, the new division of environmental science under the direction of the Chief Scientist in the Office of Leasing and Environmental Science should develop an environmental monitoring program or set of protocols to be implemented by oil and gas companies at lease sites once exploration and development and production activities begin. Areas of ecological interest and areas where data gaps exist should be targeted for monitoring programs. In addition, monitoring should be conducted in a way that is independently verifiable and allows for comparisons across individual sites. Companies should provide all monitoring data to the federal government.
- NOAA and other federal agencies with appropriate expertise should be encouraged to act as cooperating agencies in NEPA reviews of offshore energy production activities, including exploration and development plans and drilling permit applications. Federal agencies that submit comments to Interior as part of a NEPA process should receive a written response indicating how the information was applied and if it was not included, why it was not included.

Strengthening Oil Spill Response, Planning, and Capacity

Just as the events of April 20, 2010 exposed a regulatory regime that had not kept up with the industry it was responsible for overseeing, the events that unfolded in subsequent weeks and months made it dismayingly clear that neither BP nor the federal government was prepared to deal with a spill of the magnitude and complexity of the *Deepwater Horizon* disaster. This section discusses the Commission's recommendations in the area of oil spill response and planning. Broadly speaking they address three critical issues or gaps in the government's existing response capacity: 1) the failure to plan effectively for a large-scale, difficult-to-contain spill in the deepwater environment or potentially in the Arctic; 2) the difficulty of coordinating with state and local government officials to deliver an effective response; and 3) a lack of information and understanding concerning the efficacy of specific response measures, such as dispersants and berms.

The Need for Improved Oil Spill Response Planning

Oil spill response planning and analysis across the government needs to be overhauled in light of the lessons of the Deepwater Horizon blowout. A common interagency approach to analyzing oil spill risks and a common understanding of the issues and impacts involved are needed and must be consistently incorporated in environmental reviews, consultations, and authorizations. Environmental review and spill planning currently occurs at different levels within the government and industry, and these reviews and plans have not been sufficiently coordinated to ensure either searching review of industry plans or adequate preparation.

One of the common threads that runs through many of the environmental review documents prepared for Gulf of Mexico oil and gas activities in the years leading up to the *Deepwater Horizon* spill was their reliance on MMS oil spill risk and impact analyses. To the extent that any of these

documents contained errors or incomplete information, those gaps and errors carried through to subsequent environmental reviews by other agencies.

The government's spill-response planning occurs largely outside of MMS. The National Contingency Plan, mandated by the Clean Water Act, prescribes the nationwide response structure for spills of oil or releases of hazardous substances and creates a tiered planning process. Regional Response Teams include representation from federal agencies and state governments, and develop Regional Contingency Plans as well as preauthorization protocols for certain response strategies. The Area Committees, which develop Area Contingency Plans, similarly include federal and state representatives but are led by the Coast Guard. (The Coast Guard and EPA co-chair the regional teams.) The Area Contingency Plans are the most specific and the most relied-upon during the response to a spill.

While industry spill response plans must "be consistent with the requirements of the National Contingency Plan and Area Contingency Plans,"¹⁵ those industry plans presently require only the approval of BOEMRE.¹⁶ MMS regulations outline what needs to be included in these plans and direct the company to include information about a worst case scenario, including how to calculate the volume of oil, determine its trajectory, and a response strategy.¹⁷ As noted above, MMS oil spill risk and impacts modeling formed the basis of the required analysis. These response plans were not distributed to any federal agencies for review and comment outside of MMS. Additionally, only a small number of the plans developed for the Gulf were sent to the existing Office of Leasing and Environment for detailed environmental review within MMS or shared with other federal agencies with relevant expertise, such as NOAA or the Coast Guard. Finally, no provision was made for any form of public review or comment, and plans were not available to the public after they received MMS approval.

Recommendation

The Department of the Interior should create a rigorous, transparent, and meaningful oil spill risk analysis and planning process for the development and implementation of better oil spill response.

Several steps are needed to implement a rigorous, transparent, and meaningful oil spill risk analysis and planning process:

- Interior should review and revise its regulations and guidance for industry oil spill response plans in light of the lessons learned from the *Deepwater Horizon* experience.
- A new process for reviewing spill response plans is needed. This process should ensure that all critical information and spill scenarios are included in the plans, including oil spill containment and control methods to ensure that operators can deliver the capabilities indicated in their response plans. In addition, the new entity within Interior that is charged with overseeing offshore safety and environmental protection will have to verify operator capability to perform according to the plans.

- Interior must ensure that adequate technical expertise exists within the staff responsible for reviewing and approving spill response plans.
- In addition to the Department of the Interior, other agencies with relevant scientific and operational expertise should play a role in evaluating spill response plans to verify that operators can conduct the response and containment operations detailed in their plans. Specifically, oil spill response plans, including source-control measures, should be subject to interagency review and approval by the Coast Guard, EPA, and NOAA. Other parts of the federal government, such as Department of Energy national laboratories that possess relevant scientific expertise, could be consulted. This would help remedy the past failure to integrate multiple area, regional, and industry response plans, by involving the agencies with primary responsibility for government spill response planning in oversight of industry planning. Plans should also be made available for a public comment period prior to final approval and response plans should be made available to the public following their approval.
- Interior should incorporate the “worst-case scenario” calculations from industry oil spill response plans into NEPA documents and other environmental analyses or reviews. This does not mean that Interior would be required to conduct a “worst-case scenario analysis” under NEPA, but it does mean that Interior would use industry’s worst-case estimates for potential oil spill situations in its environmental analyses.

The Need for a New Approach to Handling Spills of National Significance

The Macondo well blowout caused the largest accidental oil spill in history—one that presented an unprecedented challenge to the response capability of both government and industry. Clearly, neither was adequately equipped: In fact it was quickly evident that even the response capacity indicated in industry’s spill response plans did not exist. Though the National Contingency Plan permitted the government to designate the spill as one of “national significance,” this designation did not trigger any procedures other than allowing the federal government to name a National Incident Commander.

The spill’s magnitude calls into question whether the National Contingency Plan establishes an appropriate relationship between the federal government and the responsible party, as the public demanded in the weeks and months following the *Deepwater Horizon* spill that the government demonstrate control of the response. The responsible party that caused the spill is clearly legally responsible for containing the spill and mitigating its harmful consequences. The federal government, not the responsible party, must be in charge of those efforts. As this spill demonstrated, the government unfortunately lacked both the expertise and the capacity to oversee aspects of the response at the outset of the spill—particularly the effort to control the well. Only as the full scope of the disaster unfolded and the government gathered and focused its resources from a variety of agencies was the government ultimately able to take charge.

Recommendation

EPA and the Coast Guard should establish distinct plans and procedures for responding to a “Spill of National Significance.”

Under existing law, EPA is the federal agency responsible for developing a National Contingency Plan, which is the federal government’s blueprint for responding to both oil spills and hazardous substances releases. In light of the *Deepwater Horizon* oil spill, EPA should amend or issue new guidance on the National Contingency Plan to add distinct plans and procedures for Spills of National Significance. In those amendments, EPA should:

- Increase government oversight of the responsible party, based on the National Contingency Plan’s requirement that the government “direct” the response where a spill poses a substantial threat to public health or welfare.¹⁸
- Augment the National Response Team and Regional Response Team structures to establish additional frameworks for providing interagency scientific and policymaking expertise during a spill. Further, EPA, NOAA, and the Coast Guard should develop procedures to facilitate review and input from the scientific community—for example, by encouraging disclosure of underlying methodologies and data.
- Create a communications protocol that accounts for participation by high-level officials who may be less familiar with the National Contingency Plan structure and create a communications center within the National Incident Command—separate from the joint information center established in partnership with the responsible party—to help transmit consistent and complete information to the public.

The Need to Strengthen State and Local Involvement

The response to the *Deepwater Horizon* disaster showed that state and local elected officials had not been adequately involved in oil spill contingency planning, though career responders in state government had participated extensively in such planning. Before the *Deepwater Horizon* spill, state and local elected officials were not regular participants in Area Committee meetings or familiar with local Area Contingency Plans. The Coast Guard and Area Committee member agencies had done little to reach out to state and local elected officials. These state and local officials were more familiar with hurricane response under the Stafford Act, in which the federal government provides funding and supports state and local governments, but does not control emergency response operations. As a result, state and local political officials had incorrect expectations about their roles. They understandably wanted to be responsive to citizens who were concerned about the spill and, regardless of the official response plans, sought state and local governmental assistance.

Unfamiliarity with, and lack of trust in, the federal response manifested itself in competing state structures and attempts to control response operations that undercut the efficiency of the response overall. Federal responders improved their relationship with state and local officials as the response progressed—but had better coordination and communication existed sooner, that relationship

could have been more productive in the early days of the spill response. Moreover, increased citizen involvement before a spill occurs could create better mechanisms to utilize local citizens in response efforts, provide an additional layer of review to prevent industry and government complacency, and increase public trust in response operations.

Recommendation

EPA and the Coast Guard should bolster state and local involvement in oil spill contingency planning and training and create a mechanism for local involvement in spill planning and response similar to the Regional Citizens' Advisory Councils mandated by the Oil Pollution Act of 1990.

EPA and the Coast Guard, as the chair and vice-chair of the National Response Team, should issue policies and guidance for increased state and local involvement in oil spill contingency planning and training. This guidance should provide protocols to:

- Include local officials from areas at high risk for oil spills in training exercises.
- Establish liaisons between the Unified Command and affected local communities at the outset of a spill response.
- Add a local on-scene coordinator position to the Unified Command structure.
- Provide additional clarification and guidance to federal, state, and local officials on the differences between emergency response under the Stafford Act and under the National Contingency Plan.

In addition, a mechanism should be created for ongoing local involvement in spill planning and response in the Gulf. In the Oil Pollution Act of 1990, Congress mandated citizens' councils for Prince William Sound and Cook Inlet. In the Gulf, such a council should broadly represent the citizens' interests in the area, such as fishing and tourism, and possibly include representation from oil and gas workers as ex-officio, non-voting members. The citizens' group could be funded by Gulf lease holders. The Commission further recommends that federal regulators be required to consult with the council on relevant issues, that operators provide the council with access to records and other information, and that entities (either in industry or in government) declining the council's advice submit their reasons to the council in writing.

The Need for Increased Research and Development to Improve Spill Response

The technology available for cleaning up oil spills has improved only incrementally since 1990. Federal research and development programs in this area are underfunded: In fact, Congress has never appropriated even half the full amount authorized by the Oil Pollution Act of 1990 for oil spill research and development. In addition, the major oil companies have committed minimal resources to in-house research and development related to spill response technology. Oil spill removal organizations are underfunded in general and dedicate few if any resources to research and development. Though some commentators and industry representatives have argued that more

research and development would not have allowed for a more effective spill response because no technology will ever collect more than a fraction of spilled oil, the fact is that neither industry nor government has made significant investments in improving the menu of response options or significantly improved their effectiveness. Thus any argument about the limited potential of response technology is speculative. After the *Deepwater Horizon* spill, agencies, industry, and entrepreneurs focused attention on developing new response technologies for the first time in 20 years, and a number of promising options emerged within a relatively short period of time—including beach-cleaning machines, subsea dispersant delivery systems, and new in situ burning techniques.

Recommendation

Congress should provide mandatory funding for oil spill response research and development and provide incentives for private-sector research and development.

Specifically, Congress should provide mandatory funding (i.e. funding not subject to the annual appropriations process) at a level equal to or greater than the amount authorized by the Oil Pollution Act of 1990 to increase federal funding for oil spill response research by agencies such as Interior, the Coast Guard, EPA, and NOAA—including NOAA's Office of Response and Restoration. To be sure, such mandatory appropriations are rarely done, but they are not unprecedented. Congress has included such a provision when, as here, Congress seeks to target appropriations to support a discrete category of activities where Congress perceives that the need is high and the concern is great that the desired activity will otherwise go unfunded over a sustained period of time. For instance, Congress has provided for an annual mandatory appropriation of \$100 million for emergency highway repairs for those damaged by natural disasters or catastrophic failures.¹⁹ Congress also provided for mandatory funding for five years for several farm conservation programs in the Farm Security and Rural Investment Act of 2002.²⁰ By similarly removing oil spill research and development funding from the ordinary appropriations process, Congress can avoid the experience that followed the *Exxon Valdez* spill, when support for response research and development decreased over time. Moreover, Congress can comply with its pay-as-you-go rules by supporting increased research and development funding with a fee on offshore lessees.

An advisory board, made up of experts from relevant offices of the Department of the Interior, U.S. Geological Survey, Department of Energy, EPA, and NOAA, as well as from professional societies, academia, industry, and non-governmental organizations, should be established to develop a research agenda and roadmap. In addition, to promote increased research investments by industry, the Coast Guard should revise its Effective Daily Recovery Capacity regulations to encourage the development and use of more efficient oil recovery equipment. At the same time, EPA should revise its oiled-water discharge regulations and streamline its permitting process for open-water testing. Finally, Congress and the Administration should encourage private investment in response technology more broadly, including through public-private partnerships and a tax credit for research and development in this area.



Dirty job, a cleanup crew bags oil-absorbent polypropylene “pom-poms” near a bird rookery in Louisiana. Containment booms snake past their feet. By August, cleanup efforts had generated some 40,000 tons of solid waste. Overall response to the huge spill posed unprecedented challenges to both government and industry.

Photo: Joel Sartore/Photo courtesy of National Geographic

The Need for New Regulations to Govern the Use of Dispersants

The decision to use dispersants involves difficult tradeoffs: If dispersants are effective, less oil will reach shorelines and fragile marsh environments, but more dispersed oil will be spread throughout the water column. Prior to the *Deepwater Horizon* incident, the federal government had not adequately planned for the use of dispersants to address such a large and sustained oil spill, and did not have sufficient research on the long-term effects of dispersants and dispersed oil to guide its decision-making. Officials had to make decisions about dispersant use without important relevant information or the time to gather such information. Under the circumstances, however, the Commission believes that the National Incident Commander, Federal On-Scene Coordinators, and EPA Administrator made reasonable decisions regarding the use of dispersants at the surface and in the subsea environment.

Recommendation

EPA should update and periodically review its dispersant testing protocols for product listing or pre-approval, and modify the pre-approval process to include temporal duration, spatial reach, and volume of the spill.

EPA should update its dispersant testing protocols and require more comprehensive testing prior to listing or pre-approving dispersant products. The Coast Guard and EPA, as co-chairs of the Regional Response Teams and leaders of the Area Contingency Plan drafting process, should modify pre-approvals of dispersant use under the National Contingency Plan to establish procedures for further consultation based on the temporal duration, spatial reach, or volume of the spill and volume of dispersants that responders are seeking to apply. EPA and NOAA should conduct and encourage further research on dispersants, including research on the impacts of high-volume and subsea use of dispersants, the long-term fate and effects of dispersants and dispersed oil, and the development of less toxic dispersants.

The Need to Re-evaluate the Use of Offshore Barrier Berms in Spill Response

Offshore barrier berms generally do not constitute a viable spill response measure for several reasons. These reasons include the time and cost of construction, and the highly variable and dynamic marine environment that limit effectiveness and pose the potential for negative environmental impacts resulting from dredging and filling. Thus, for instance, barrier berms constructed off the shores of Louisiana in response to the *Deepwater Horizon* spill could not be considered a success. Only a fraction of the project (approximately 6 percent) was completed by the time the well was capped, and no estimate of the amount of oil trapped by the berms is much more than 1,000 total barrels. In fact, the Louisiana berms project stands out as the most expensive and perhaps most controversial response measure deployed to fight the *Deepwater Horizon* spill. The decision to approve the project as one of the oil spill response techniques to be funded by the responsible party was based primarily on the demands of local and regional interests rather than on a scientific assessment of its likely efficacy.

Recommendation

The Coast Guard should issue guidance to establish that offshore barrier berms and similar dredged barriers generally will not be authorized as an oil spill response measure in the National Contingency Plan or any Area Contingency Plan.

Advancing Well-Containment Capabilities

The most obvious, immediately consequential, and plainly frustrating shortcoming of the oil spill response set in motion by the events of April 20, 2010 was the simple inability—of BP, of the federal government, or of any other potential intervener—to contain the flow of oil from the damaged Macondo well.

Clearly, improving the technologies and methods available to cap or control a failed well in the extreme conditions thousands of feet below the sea is critical to restoring the public's confidence that deepwater oil and gas production can continue, and even expand into new areas, in a manner that does not pose unacceptable risks of another disaster. Better technology and methods are also needed to gather accurate information in the event of an accident or failure. This section discusses the Commission's recommendations for advancing well-containment capabilities in the wake of the Macondo well blowout.

The Need for Government to Develop Greater Source-Control Expertise

At the time of the Macondo well blowout on April 20, the U.S. government was unprepared to oversee a deepwater source-control effort. Though the public expected federal authorities to take charge once the accident occurred, neither MMS nor the Coast Guard had the expertise or resources to supervise BP's well-containment efforts. Once the Secretary of Energy's science team, the U.S. Geological Survey, the national laboratories, and other sources of scientific expertise became involved, the government was able to substantively supervise BP's decision-making, forcing the company to fully consider contingencies and justify its chosen path. The government's oversight effort was assisted by outside industry experts, although their involvement also raised some concerns (about conflicts of interest, sharing of proprietary information, and potential liability for participants) that were never resolved.

Recommendation

The National Response Team should develop and maintain expertise within the Federal government to oversee source-control efforts.

The National Response Team should create an interagency group—including representation from the Department of the Interior, Coast Guard, and the Department of Energy and its national laboratories—to develop and maintain expertise in source control, potentially through public-private partnerships. The proposed Ocean Energy Safety Institute at the Department of the Interior could play a role in developing such expertise.

In addition, the EPA should amend the National Contingency Plan to:

- Define and institutionalize the role of federal agencies and the national laboratories that possess relevant scientific expertise in source-control.
- Create a mechanism for involving outside industry experts in source-control design and oversight.

The Need to Strengthen Industry's Spill Preparedness

Beyond attempting to close the blowout preventer stack, no proven options for rapid source control in deepwater existed when the blowout occurred. BP's Initial Exploration Plan for the area that included the Macondo prospect identified only one response option by name: a relief well, which would take months to drill. Although BP was able to develop new source-control technologies in a compressed timeframe, the containment effort would have benefited from prior preparation and contingency planning.

Recommendation

The Department of the Interior should require offshore operators to provide detailed plans for source control as part of their oil spill response plans and applications for permits to drill.

Consistent with the enhanced planning process described above, oil spill response plans should be required to include detailed plans for source control. These plans should demonstrate that an operator's containment technology is immediately deployable and effective. (BOEMRE has recently issued a Notice to Lessees requiring operators to demonstrate, as part of the spill response planning process, that they have "access to and can deploy surface and subsea containment resources that would be adequate to promptly respond to a blowout or other loss of well control."²¹ In enforcing this Notice, BOEMRE must ensure that operators provide detailed descriptions of their technology and demonstrate that it is deployable and effective.)

In applications for permits to drill, the Department of the Interior should require operators to provide a specific source-control analysis for each well. The analysis must demonstrate that an operator's containment technology is compatible with the well. (The Department of the Interior could implement this requirement through amendments to existing regulations²² or through a Notice to Lessees.²³ The latter option could be implemented more quickly, though the former might be more permanent.)

As with oil spill response plans, source-control plans should be reviewed and approved by agencies with relevant expertise, including the Department of the Interior and the Coast Guard.

The Need for Improved Capability to Develop Accurate Flow Rate Estimates

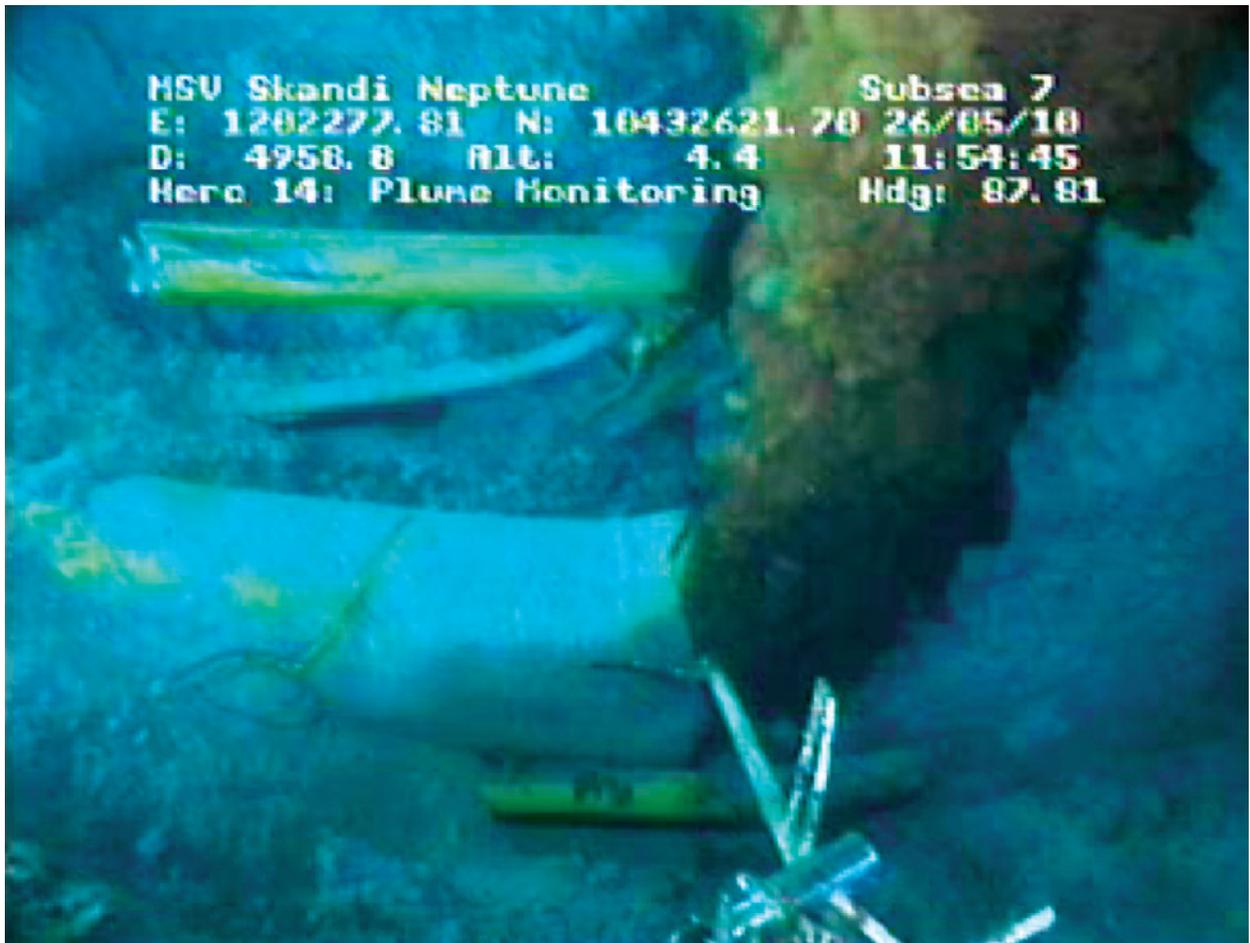
Early flow rate estimates were highly variable and difficult to determine accurately. However, the understated estimates of the amount of oil spilling from the Macondo well appear to have impeded planning for and analysis of source-control efforts like the cofferdam and especially the top kill. U.S. Geological Survey Director Marcia McNutt stated that if a similar blowout occurs in the future, the government will be able to quickly and reliably estimate oil flow using the oceanographic techniques that eventually provided an accurate estimate of the flow rate from the Macondo well.²⁴

Recommendation

The National Response Team should develop and maintain expertise within the federal government to obtain accurate estimates of flow rate or spill volume early in a source-control effort.

The National Response Team should create an interagency group—including representation from the Department of the Interior, the Coast Guard, the national laboratories, and NOAA—to develop and maintain expertise in estimating flow rates and spill volumes, potentially through consultation with outside scientists.

In addition, EPA should amend the National Contingency Plan to create a protocol for the government to obtain accurate estimates of flow rate or spill volume from the outset of a spill. This protocol should require the responsible party to provide the government with all data necessary to estimate flow rate or spill volume.



Oil spews unchecked from the *Deepwater Horizon's* severed riser pipe in this video frame taken May 26. When the rig sank, the riser broke off, settling on the sea floor. According to government estimates, the Macondo well ultimately disgorged some 4.1 million barrels of crude oil into the Gulf of Mexico.

Photo: © BP p.l.c.

The Need for a More Robust Well Design and Approval Process

Among the problems that complicated the Macondo well-containment effort was a lack of reliable diagnostic tools. The *Deepwater Horizon* blowout preventer had one pressure gauge accurate to plus or minus 400 pounds per square inch. This meant BP and the government could not get accurate pressure readings, which in turn hampered their ability to estimate the oil flow rate, undertake reservoir modeling, and plan for source control operations. In addition, the blowout preventer lacked a means of indicating whether and to what extent its rams and annular preventers had closed. Without such instruments, the government and BP expended significant resources on basic data-collection such as obtaining gamma-ray images of the blowout preventer and adding pressure sensors to the top hat after it was deployed. Meanwhile, the presence of rupture disks in the Macondo well's 16-inch casing led to concerns about well integrity that further complicated the source-control effort. BP had not considered the impact of these disks on post-blowout containment when it designed the well.²⁵

Recommendation

The Department of the Interior should require offshore operators seeking its approval of proposed well design to demonstrate that:

- Well components, including blowout preventer stacks, are equipped with sensors or other tools to obtain accurate diagnostic information—for example, regarding pressures and the position of blowout preventer rams.
- Wells are designed to mitigate risks to well integrity during post-blowout containment efforts.

Overcoming the Impacts of the *Deepwater Horizon* Spill and Restoring the Gulf

Even before the Macondo well was finally capped and oil stopped flowing, major efforts were underway to mitigate and begin to repair the environmental and economic harm caused by the spill. Those efforts are continuing—and likely will for years. Nevertheless, any effort to draw lessons learned from the *Deepwater Horizon* spill for the purpose of developing options (as the Commission’s charter states) to “guard against, and mitigate the impact of, any oil spills associated with offshore drilling in the future” would necessarily be incomplete without an early appraisal of progress toward longer-term restoration in the Gulf. This section describes the actions and initiatives that have been launched to assess and overcome the impacts of the spill, and presents the Commission’s recommendations for steps that should be taken to ensure the following three goals are met:

- The environment and the economy of the Gulf region recovers as completely and as quickly as possible, not only from the direct impacts of the spill, but from the decades of degradation that preceded it;
- The people of the Gulf are fairly compensated for the direct and indirect impacts of the spill; and
- Lessons learned from restoration efforts in the Gulf—including advances in scientific understanding, data collection, mitigation technologies and techniques, planning, and institutional coordination—result in enhanced capacity to remedy the impacts of future offshore oil spills and better manage the myriad economic, environmental, and social interests that must be balanced in the Gulf and other critical offshore areas.

The Need for Improved Understanding of Oil Spill Impacts, Particularly in the Deepwater Environment

A sophisticated understanding of the full range of impacts from a large-scale oil spill is critical to effective recovery and restoration efforts. Because, however, the concentration and toxicity of oil dissipate rapidly within the first few days to weeks of exposure to the elements, the window of opportunity to collect data in the aftermath of an accident is narrow. For this reason, advance planning and rapid response mechanisms, are essential to capitalize on research opportunities.

Independent scientists, many of who are long-time scholars of the Gulf ecosystem or have unique capabilities, were eager to study the spill and contribute to the injury assessment. However, the independent science community's ability to participate early on was hampered by a lack of timely access to the response zone. This had the effect of diminishing what was learned from the spill.

Recommendation

The Coast Guard, through the Federal On-Scene Coordinator, should provide scientists with timely access to the response zone so that they can conduct independent scientific research during an oil spill response and long-term monitoring in the future.

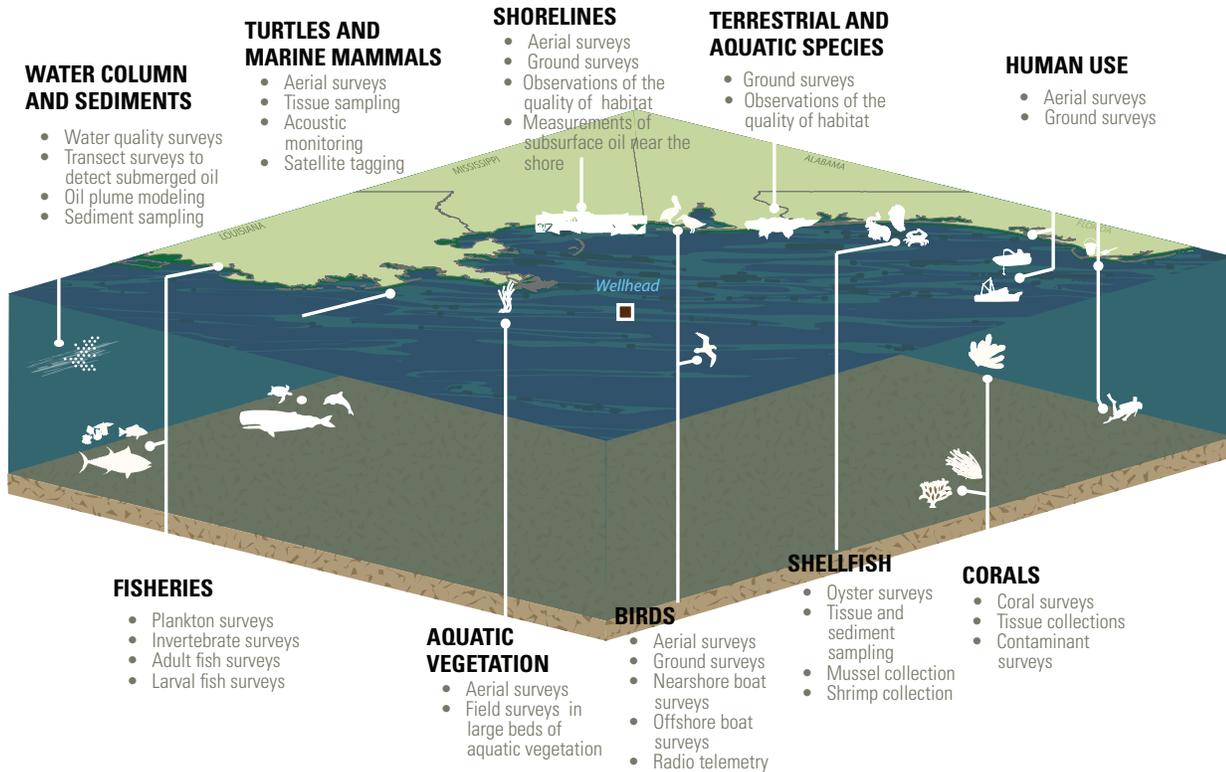
The National Science Foundation, in consultation with the new National Ocean Council, should expand on its RAPID grant program to create a framework under which independent science during a spill can be coordinated, with an emphasis on data-sharing, communication, and timely access within the response zone. By ensuring that independent scientists can receive expedited funding after an oil spill, government will gain a more complete understanding of spill-related environmental impacts. A demonstrated commitment to independent science will also serve to bolster public confidence and trust. The rush to study the impacts of the *Deepwater Horizon* spill put a strain on existing scientific resources in the Gulf. Independent, industry, and government scientists all wrangled for funding, equipment and vessels, often duplicating efforts in the process. A program that effectively coordinates research initiatives and resources will provide a significant added value to the scientific community under exigent conditions.

The Need for Fair, Transparent Compensatory Restoration Based on Natural Resource Damage Assessments

The *Deepwater Horizon* spill caused substantial damage to natural resources and habitats across the Gulf coast and in the deepwater offshore environment. Damages to natural resources are formally assessed subject to regulations established under the Natural Resource Damage Assessment provisions of the Oil Pollution Act. The Act requires that the public be compensated for injury to and lost use of public resources. The regulation provides that compensation should be "in-place" and "in-kind" wherever possible, thereby favoring restoration measures with a connection to oil spill impacts. The *Deepwater Horizon* spill is unprecedented in that five Gulf States were affected, each with its own restoration agenda, even though most of the damage occurred in Louisiana. The damage offshore is unprecedented and unknown. The Trustees* responsible for the damage assessment are under pressure to approve projects with an "equitable" (i.e., each state receives an equal portion) allocation of resources that may not be entirely consonant with the "in-place, in-kind" requirement.

* The Natural Resource Damage Assessment regulation provides for the designation of affected state, federal, and tribal Trustees to conduct the damage assessment of natural resources, achieve agreement on restoration goals, and design and implement restoration projects to meet those goals. In this case, the Trustees comprise designated federal and state officials who are encouraged to work together and achieve consensus on restoration goals and projects through a Trustee Council. While the regulation supports cooperation, it does not explicitly require consensus by the Trustees. If certain Trustees disagree with the direction of the Natural Resource Damage Assessment process, they are free to break away from the Council and seek reimbursement for natural resource damages on their own.

FIGURE 5: Assessment Categories for Natural Resource Damage Assessment



This figure represents the various natural resource categories being assessed as part of the *Deepwater Horizon* Natural Resource Damage Assessment. Such an assessment, which always follows an oil spill, is used to make the public whole for ecological damages caused by a spill. This graphic illustrates the three-dimensional challenges that an assessment of a deep sea blowout presents.

Source: NOAA (Adapted)

Another challenge for the Trustees is assessing and providing compensatory restoration for the potentially significant marine and deepwater impacts associated with this spill. Historically, most applications of the Natural Resource Damage Assessment process have focused on coastal restoration, but the Macondo well, which spilled oil 5,000 feet below the surface, may have damaged organisms in the water column or on the sea floor for which there should be compensation as well.

Recommendation

The Trustees for Natural Resources should ensure that compensatory restoration under the Natural Resource Damage Assessment process is transparent and appropriate.

Restoration decisions must be transparent, appropriate, and apolitical. The Trustees should appoint an independent scientific auditor to ensure that projects are authorized on the basis of their ability to mitigate actual damages caused by the spill, with special care taken to assess and compensate poorly understood marine impacts. Further, any potential settlement agreement between the responsible party and the Trustees should provide for long-term monitoring of affected resources for a period of

at least three to five years, as well as “enhancement”^{*} beyond the baseline. By hewing closely to the “in-place” and “in-kind” principles that underpin Natural Resource Damage Assessment regulations, Trustees will help ensure that injured public resources, and the communities that rely on them, are made whole to the fullest extent possible, regardless of state and federal boundaries. A focus on ocean impacts will provide an invaluable opportunity—missed during the Ixtoc spill of 1979—to assess and remediate damage to marine ecosystems after an oil spill.

The Need to Address Human Health Impacts, Especially Among Response Workers and in Affected Communities

The National Contingency Plan overlooks the need to respond to widespread concerns about human health impacts. For smaller oil spills, the response effort is generally carried out by trained oil spill response technicians, but given the scale of the response to the *Deepwater Horizon* spill and the need to enlist thousands of previously untrained individuals to clean the waters and coastline, many response workers were not screened for pre-existing conditions. This lack of basic medical information, which could have been collected if a short medical questionnaire had been distributed, limits the ability to draw accurate conclusions regarding long-term physical health impacts. Additionally, residents of coastal communities may believe that they suffered adverse health consequences resulting from both chemical exposure from the spill itself and the mental stress occasioned by the spill’s assault on their livelihoods.

Adequate funding and resources were not in place to deal with claims of physical and mental illness among Gulf coast residents resulting from, or exacerbated by, the spill, response actions, and the resulting impacts. Whether allegations that the spill created health problems for responders and Gulf Coast residents are warranted does not change the perception among some that government has not been responsive to health concerns.

The National Contingency Plan contains no specific guidance for responding to public health impacts of an oil spill or hazardous substances release. By contrast, the National Response Framework—which provides the structure for a national response to terrorist attacks, major disasters, and other kinds of emergencies—incorporates a protocol for responding to public health exigencies.

Recommendation

EPA should develop distinct plans and procedures to address human health impacts during a Spill of National Significance.

EPA should amend the National Contingency Plan to add distinct procedures to address human health impacts during a Spill of National Significance. Spills of this magnitude necessarily require a significant clean-up effort, potentially exposing workers to toxic compounds in oil and dispersants. Additionally, residents of coastal communities may suffer adverse health consequences due to both

* “Enhancement” is a term coined during settlement negotiations after the *Exxon Valdez* oil spill of 1989. It requires the responsible party to fund restoration beyond that needed merely to return injured resources to baseline conditions. Rather, any funding should be sufficient to ensure that restoration leaves the affected system better off than before a spill.

chemical exposure from the spill itself, and the mental stress occasioned by the assault on their livelihoods or way of life. With respect to worker health and safety, existing authorities²⁶ should be strengthened to ensure consistent application of medical screening and surveillance procedures for both formal response contractors and ad hoc citizen responders. Regarding public health, a medical services protocol similar to the Public Health and Medical Services Annex of the National Response Framework should be incorporated to ensure emergency medical care, timely dissemination of public health information,²⁷ and medical monitoring and surveillance.²⁸

Furthermore, a public health protocol requiring the collection of adequate baseline data and long-term monitoring would allow researchers to assess the human dimensions of oil spills with greater accuracy. Without sound data on the causal or correlative relationships between chemical (i.e., oil and dispersants) exposure and human health, a number of response methods may be used inappropriately—including the provision of appropriate protective gear for cleanup workers.²⁹



A lone beachgoer encounters bands of oil along Alabama's Orange Beach. Though wind and currents helped keep most of the spilled oil offshore, all told some 650 miles of Gulf Coast habitat were oiled to one degree or another—Louisiana was hardest hit—impacting ecosystems, the economy, and human health.

Photo: Tyrone Turner of National Geographic

The Need to Restore Consumer Confidence

Images of spewing oil and oiled beaches in newspapers and on television set the stage for public concern regarding the safety of Gulf seafood. Additional factors contributed to the lingering impression that the public could not trust government assurances that the seafood was safe: the unprecedented volumes of dispersants used, confusion over the flow rate and fate of the oil, frustration about the government's relationship with BP in spill cleanup, and lawsuits filed by fishermen contesting the government's assurance of seafood safety. The economic blow to the Gulf region associated with this loss of consumer confidence is sizable. BP gave Louisiana and Florida \$68 million for seafood testing and marketing, as well as money to assess impacts on tourism and fund promotional activities. As of early December, BP was considering a similar request from Alabama.

In future spills, however, there is no guarantee that a responsible party will have the means or the inclination to compensate such losses. Such indirect financial harms are currently not compensable under the Oil Pollution Act. Nevertheless, losses in consumer confidence are real and Congress, federal agencies, and responsible parties should consider ways to restore consumer confidence in the aftermath of a Spill of National Significance.

Recommendation

Congress, federal agencies, and responsible parties should take steps to restore consumer confidence in the aftermath of a Spill of National Significance.

The Need for a Long-Term Restoration Effort that Is Well Funded, Scientifically Grounded, and Responsive to Regional Needs and Public Input

A lack of sustained and predictable funding, together with failed project coordination and long-term planning, have resulted in incomplete and often ineffective efforts to restore the Gulf's natural environment. Currently, no funding source exists to support regional restoration efforts. Estimates of the cost of Gulf restoration vary widely, but according to testimony before the Commission, fully restoring the Gulf will require \$15 billion–\$20 billion, or a minimum of \$500 million per year, over 30 years. While a number of different sources currently provide funding to individual states for restoration, none of these sources provides funds for Gulf-wide coastal and marine restoration and none is sufficient to support the sustained effort required. Most policymakers agree that without a reliable source of long-term funding, it will be impossible to achieve restoration in the Gulf.

Several Gulf States and the federal government have filed or are expected to file suit against BP and other companies involved in the spill, which will likely create opportunities to direct new restoration funds to the region. In some cases, congressional action will be required to ensure that funds are directed to this purpose. Meanwhile, Congress has already begun considering other potential funding sources, including a higher per-barrel tax on oil production, increased royalties or fees, and direct appropriations for Gulf-wide restoration through the normal federal budget process. Although many of these proposals face political hurdles, the fact remains that resources are needed if progress

on coastal restoration is to continue. Inaction is a prescription for further degradation: since many Gulf ecosystems were already fragile and deteriorating before the spill, maintaining the status quo amounts to accepting their continued decline, with the longer-term risks and vulnerabilities this entails.

In order for funding to be most efficiently directed at long-term restoration, a decision-making body is needed that has authority to set binding priorities and criteria for project funding. The Gulf Coast Ecosystem Restoration Task Force, is now in place; it was recommended by a September 2010 report on restoration from Secretary of the Navy Ray Mabus to the President and subsequently established by Presidential Executive Order.³⁰ According to the language of the Executive Order, the job of the Task Force is to begin coordinating the different restoration projects being undertaken by various jurisdictions in the Gulf, coordinating related science activities, and engaging stakeholders. However, as many in Congress and the Administration have suggested, the Task Force lacks some features necessary to effectively direct long-term restoration efforts in the Gulf—most importantly the ability to set binding goals and priorities. A number of critical issues remain to be addressed, including how to allocate funding in a way that addresses the relative restoration needs of individual states; how to balance the roles and interests of the state and federal governments; how to ensure that decisions are made efficiently and quickly; how to incorporate good science without unduly slowing valuable projects; and how to incorporate meaningful public input.

Recommendation

Congress should dedicate 80 percent of the Clean Water Act penalties to long-term restoration of the Gulf of Mexico.

Congress and federal and state agencies should build the organizational, financial, scientific, and public outreach capacities needed to put the restoration effort on a strong footing.

The Commission's recommendations share much common ground with those outlined in Secretary Mabus' report this past September. For instance, the Commission recommends Congress—recognizing that dedicated, sustained funding is necessary to accomplish long-term Gulf of Mexico ecosystem restoration—should direct 80 percent of Clean Water Act penalties to support implementation of a region-wide restoration strategy. Directing such payments to the Gulf could, for the next 10 years, provide significant funding. If litigation arising from the spill results in civil or criminal penalties, a global settlement of litigation should include supplemental environmental projects* and community service projects that direct payments to the Gulf. Should Clean Water Act penalties not be redirected toward Gulf ecosystem restoration, Congress should consider other mechanisms for a dedicated funding stream not subject to annual appropriations.

The Commission recommends that Congress establish a joint state-federal Gulf Coast Ecosystem Restoration Council. The structure of the *Exxon Valdez* Oil Spill Trustee Council should

* "Supplemental environmental projects" are projects that a defendant agrees to undertake as part of a settlement with government of an enforcement action and that are above and beyond those necessary to comply with applicable legal requirements.

inform the structure of the Gulf Coast Council. The Gulf Coast Council should implement a restoration strategy for the region that is compatible with existing state restoration goals. This strategy should set short- and long-term goals with binding criteria for selecting projects for funding. Key criteria should include 1) national significance; 2) contribution to achieving ecosystem resilience; and 3) the extent to which national policies such as related to flood control, oil and gas development, agriculture, and navigation directly contributed to the environmental problem.

Experience in major restoration endeavors, including those in the Gulf, has shown that, absent binding goals to drive the process, restoration projects are insufficiently funded, focused, or coordinated. Establishing a region-wide council to coordinate agency activities represents a necessary first step, but without authority to set binding priorities and resolve conflicts, such a council will be hampered in its ability to achieve environmental goals. The Commission recommends that a region-wide council for the Gulf be given authority to set priorities that will govern the expenditure of funds and resolve any conflicts regarding eligibility of projects. The council should further define specific categories of projects that could meet each of the three needs. Projects could be categorized in a number of ways—for example, by habitat (key estuaries, sea grass, wetlands, coral reefs); by goal (biological productivity and ecosystem function, improving resilience, restoring fisheries); or by specific project type (river diversion, beach nourishment).

The Commission believes that having a comprehensive, binding strategy to guide the restoration effort is critical to success. By elaborating on the goals set by the governing entity and by providing specific milestones and restoration objectives, such a strategy would focus the overall effort and help ensure that projects are not duplicative. The strategy could also include a map that ties projects to specific places and provide a useful mechanism for public involvement. Congress should also ensure that the priorities and decisions of the Gulf Coast Council are informed by input from a Citizens Advisory Council that represents diverse stakeholders.

Finally, but essentially, restoration decisions must be rooted in science. An approach that draws heavily on information and advice from scientists will result in project selection and funding allocations that are more likely to lead to an effective region-wide restoration strategy. It will also advance transparency in decision-making and enhance credibility with the public. The Commission accordingly recommends the establishment of a Gulf Coast Ecosystem Restoration Science and Technology Program that would address these issues in three ways: (1) by creating a scientific research and analysis program, supported by the restoration fund, that is designed to support the design of scientifically sound restoration projects; (2) by creating a science panel to evaluate individual projects for technical effectiveness and consistency with the comprehensive strategy; and (3) by supporting adaptive management plans based on monitoring of outcomes scaled both to the strategy itself and to the individual projects or categories of projects included in it.

FIGURE 6: Coastal Vulnerability to Erosion Along the Gulf of Mexico



Coastal Vulnerability Index (CVI)

- Very High
- High
- Moderate
- Low

Source: U.S. Geological Survey National Assessment of Coastal Vulnerability to Future Sea-Level Rise—Open File Report 00-179

The Need for Better Tools to Balance Economic and Environmental Interests in the Gulf

Federal agencies charged with managing activities within the U.S. Exclusive Economic Zone have tended to work largely in isolation from one another. Responsive to the recommendations of the 2004 U.S. Commission on Ocean Policy, President Obama in June 2009 directed two dozen federal departments and agencies to provide in-depth recommendations about how federal policy can address inefficiencies in the nation's traditionally ad hoc management of its seas. The Interagency Ocean Policy Task Force reported in the summer of 2010; its recommendations were subsequently included in a Presidential Executive Order, issued on July 15, 2010, that created a new National Ocean Council to coordinate federal marine policy.

Prominent recommendations included a requirement that key regional and federal authorities develop and implement coastal and marine spatial planning, for ocean users and the public. This system is designed to optimize marine productivity. More broadly, scientific advice grounded in peer-reviewed empirical research inform strategy and decision-making in ocean management, including for energy, shipping, national defense, sustainable fisheries, and conservation.

Recommendation

The appropriate federal agencies, including EPA, Interior, and NOAA, and the Trustees for Natural Resources should better balance the myriad economic and environmental interests concentrated in the Gulf region going forward. This would include improved monitoring and increased use of sophisticated tools like coastal and marine spatial planning. Many of these tools and capacities will also be important to manage areas of the OCS outside the Gulf.

The Commission recommends that, as a part of management and restoration efforts in the marine environment, greater attention should be given to new tools for managing ocean resources, including monitoring systems and spatial planning. Marine scientists have emerged from the *Deepwater Horizon* incident with more precise questions to investigate and a better sense of monitoring needs in the Gulf of Mexico, which because of its multiple uses and economic value should be a national priority. To that end, the National Ocean Council should work with the responsible federal agencies, industry and the scientific community to expand the Gulf of Mexico Integrated Ocean Observing System, including the installation and maintenance of an in situ network of instruments deployed on selected production platforms. Participation in this system by industry should be regarded as a reasonable part of doing business in nation's waters.

Coastal and marine spatial planning has the potential to improve overall efficiency and reduce conflicts among ocean users. Congress should fund grants for the development of regional planning bodies at the amount requested by the President in the fiscal year 2011 budget submitted to Congress. Ocean management should also include more strategically sited Marine Protected Areas, including but not limited to National Marine Sanctuaries, which can be used as "mitigation banks" to help offset harm to the marine environment. Given the economic and cultural importance of fishing in the Gulf region—and the importance of Gulf seafood to the rest of the country—scientifically valid measures, such as catch share programs, should be adopted to prevent overfishing and ensure the continuity of robust fisheries.

Marine spatial planning was designed to ensure that myriad ocean management decisions are compatible and consistent, that they make sense. In the decades since marine protection began, scientists have developed a much more robust understanding of the Gulf's physical and ecological processes. Now, for example, Marine Protected Areas can be used—and should be used—to ensure the continuity and robustness of fisheries into the future. Rationalizing ocean use around this much improved scientific understanding—for example, by identifying which parts of the ocean are appropriate (or inappropriate) for certain uses—should serve to maximize the productivity of natural systems and end inefficient or harmful practices that have accumulated over time.

Ensuring Financial Responsibility

Oil spills cause a range of harms, both economic and environmental, to individuals and ecosystems. The Oil Pollution Act makes the party responsible for a spill liable for compensating those who suffered as a result of the spill—through property damage, lost profits, and other economic injuries—and for restoring injured natural resources. The Act also provides an opportunity to make claims for compensation from a dedicated Oil Spill Liability Trust Fund. The Oil Pollution Act, however, imposes limits on both the amount for which the responsible party is liable, and the amount of compensation available through the trust fund. In the case of the *Deepwater Horizon* spill, BP (a responsible party) has placed \$20 billion in escrow to compensate private individuals and businesses through the independent Gulf Coast Claims Facility. But if a less well capitalized company had caused the spill, neither a multi-billion dollar compensation fund nor the funds necessary to restore injured resources, would likely have been available.

It is critical that compensation to victims be paid in full, and that the process for receiving compensation is swift and efficient. The Commission offers recommendations that would increase assurances that responsible parties are able to compensate victims (and at the same time strengthens incentives to prevent accidents in the first place), and that the Oil Spill Liability Trust Fund provide any compensation not provided by responsible parties. It also recommends a close review of the Gulf Coast Claims Facility process to determine its effectiveness in adjudicating compensation claims and its value as a model for future Spills of National Significance.

The Need to Increase Existing Limitations on Responsible Party Liability

Liability for damages from spills from offshore facilities is capped under the Oil Pollution Act at \$75 million, unless it can be shown that the responsible party was guilty of gross negligence or willful misconduct, violated a federal safety regulation, or failed to report the incident or cooperate with removal activities, in which case there is no limit on damages. Claims up to \$1 billion above the \$75 million cap for certain damages can be made to, and paid out of, the Oil Spill Liability Trust Fund, which is currently supported by an 8-cent per-barrel tax on domestic and imported oil.

The Oil Pollution Act also requires responsible parties to “establish and maintain evidence of financial responsibility,” generally based on a “worst-case discharge” estimate. In the case of offshore facilities, necessary financial responsibility ranges from \$35 million to \$150 million. The financial responsibility requirement provides a direct link between the Oil Pollution Act and insurance, as the Act provides that financial responsibility may be “established by any one, or by any combination, of the following methods” if determined by the Secretary of the Interior to be acceptable: “evidence of insurance, surety bond, guarantee, letter of credit, qualification as a self-insurer, or other evidence of financial responsibility.”

There are two main problems with the current liability cap and financial responsibility dollar amounts:

- **Lack of Adequate Safety Incentives:** A threshold problem with any damages cap that limits liability well below levels that may actually be incurred is that such a cap distorts the incentives of industry participants to adopt cost-effective safety precautions. Decisions regarding safety precautions are made for a variety of reasons, some of which cannot be influenced by policy measures. The relatively modest liability cap and financial responsibility requirements provide little incentive for oil companies to improve safety practices.
- **Inadequate Damages Compensation:** BP's damages from the *Deepwater Horizon* spill will total in the tens of billions of dollars. The company has already paid claims that measure in the billions, and has waived the statutory \$75 million cap. But there is no guarantee that other companies in the future will agree to waive the cap. And if an oil company with more limited financial means than BP had caused the *Deepwater Horizon* spill, that company might well have declared bankruptcy long before paying fully for all damages. In the case of a large spill, the Oil Spill Liability Trust Fund would likely not provide sufficient backup. Thus, a significant portion of the injuries caused to individuals and natural resources, as well as government response costs, could go uncompensated.

Any discussion of increasing liability caps and financial responsibility requirements must balance two competing public policy concerns: first, the goal of ensuring that the risk of major spills is minimized, and in the event of a spill, victims are fully compensated; and second, that increased caps and financial responsibility requirements do not drive competent independent oil companies out of the market. A realistic policy solution also requires an understanding of the host of complex economic impacts that could result from increases to liability caps and financial responsibility requirements.

Recommendation

Congress should significantly increase the liability cap and financial responsibility requirements for offshore facilities.

To address both the incentive and compensation concerns noted above, Congress should significantly raise the liability cap. Financial responsibility limits should also be increased, because if an oil company does not have adequate resource to pay for a spill, the application of increased liability has little effect: Should a company go bankrupt before fully compensating for a spill, its liability is effectively capped. If, however, the level of liability imposed and the level of financial responsibility required are set to levels that bear some relationship to potential damages, firms will have greater incentives to maximize prevention and minimize potential risk of oil spills³¹ and also have the financial means to ensure that victims of spills do not go uncompensated.

Legislative attempts to raise the cap and financial responsibility requirements to significantly higher levels have been met with the argument that these changes will cause insurance carriers to drop oil pollution coverage, leading to an exodus of small and independent companies from the offshore drilling market. The counter-argument is that oil companies should bear the social costs of their activities, and if those costs are too large or unpredictable to be insurable, then it is appropriate that these companies exit the market.

There is legitimacy to aspects of both arguments. A company should not be able to cause billions of dollars of damage and walk away, simply because its operations contribute to the economy of the Gulf. Nor should smaller companies that can demonstrate the ability to drill safely and to pay for damages resulting from a large spill be forced out of the market. However, smaller companies that cannot demonstrate financial responsibility and meet risk requirements set and monitored by the Department of the Interior or a third party should not be allowed to make others pay for the costs of their accidents.

One option for keeping competent independents in the market is a mutual insurance pool. Under such an arrangement, individual companies engaged in offshore drilling would pay premiums into a pool, which would pay out damages caused by a company as a result of a spill. A possible downside is that the mutual pool could have the effect of undercutting incentives individual firms might otherwise have to improve safety practices—but this problem could be addressed, for example, by tying premium levels to the financial and safety risk posed by an individual company's activities. This option would allow companies to demonstrate financial responsibility for the cost of spills, at least to the limit paid out by the pool.

Another option would be to phase in increases in the liability cap and financial responsibility requirements, which would allow the insurance industry a period of adjustment. Although any increase in liability limits and financial responsibility requirements would test the capacity of the offshore drilling insurance market, over time such a change would almost certainly stimulate an increase in insurance capacity. A phased-in approach would allow Congress to re-assess any concerns about limited capacity in the insurance industry in light of actual experience.

Finally, regardless of how insurance is provided, smaller firms could be encouraged to partner with firms with greater financial resources. It should be noted that "joint ventures" between larger and smaller companies already exist; thus a policy change may not be necessary to encourage such arrangements.

The Need to Increase Limitations on Payments from the Oil Spill Liability Trust Fund

If liability and financial responsibility limits are not set at a level that will ensure payment of all damages for spills, then another source of funding will be required to ensure full compensation. The federal government could cover additional compensation costs, but this approach requires the taxpayer to foot the bill. Therefore, Congress should raise the Oil Spill Liability Trust Fund per-incident limit because the current limits are clearly inadequate.

Recommendation

Congress should increase the limit on per-incident payouts from the Oil Spill Liability Trust Fund.

Raising the Oil Spill Liability Trust Fund's per-incident limit will require the Fund to grow through an increase of the per-barrel tax on domestic and imported oil production. An alternative would be to increase the Trust Fund through a surcharge by mandatory provisions in drilling leases triggered in the event that there are inadequate sums available in the Fund. An increase in the Oil Spill Liability Trust Fund's per-incident limit would not provide an incentive to offshore facilities to mitigate risks, because risks are pooled and the Oil Spill Liability Trust Fund is funded by parties other than those who engage in offshore drilling activities. But raising the limit would help ensure that victims have access to compensation without the need to seek further specific funding from Congress, or otherwise burdening the taxpayer.

The Need for Better Auditing and Monitoring of Risk

The Interior Department currently determines financial responsibility levels based on potential worst-case discharges, as required by the Oil Pollution Act. Although the agency's analysis to some degree accounts for the risk associated with individual drilling activities, it does not fully account for the range of factors that could affect the cost of a spill, and thus the level of financial responsibility that should be required. Interior should analyze a host of specific, risk-related criteria when determining financial responsibility limits applicable to a particular company, including, but not limited to: geological and environmental considerations, the applicant's experience and expertise, and applicable risk management plans. This increased scrutiny would provide an additional guard against unqualified companies entering the offshore drilling market.

Recommendation

The Department of the Interior should enhance auditing and evaluation of the risk of offshore drilling activities by individual participants (operator, driller, other service companies). The Department of the Interior, insurance underwriters, or other independent entities should evaluate and monitor the risk of offshore drilling activities to promote enhanced risk management in offshore operations and to discourage unqualified companies from remaining in the market.

If liability and financial responsibility limits are raised, increased liabilities will be borne by insurance carriers, which will have a strong incentive to promote new safety techniques and methods, as well as to monitor risk. Insurance carriers might insist on certification of operators by an independent entity devoted to identifying best safety practices and monitoring risk, such as a self-policing safety organization for the oil and gas industry. Insurers or a self-policing safety organization for the industry also could provide a guard against unqualified companies entering the offshore drilling market.

The Need for Assessment of the Existing Claims Process

The Oil Pollution Act holds the responsible party liable for private claims brought by individuals or businesses for removal costs and certain damages. All claims must first be presented to the responsible party, but if the responsible party denies a claim, the claimant may pursue an in-court action or present an uncompensated claim for payment to the Oil Spill Liability Trust Fund. The Gulf Coast Claims Facility (Claims Facility), which is independently administered on behalf of BP (the responsible party), has established a claims processing mechanism that attempts to resolve claims against the responsible party outside of the courts.³² Kenneth Feinberg, formerly Special Master for the September 11th Victim Compensation Fund, administers the \$20 billion escrow account through the Claims Facility. Eligible claims include: 1) removal and clean-up costs; 2) physical damages to real or personal property; 3) lost profits or impairment of earning capacity; 4) loss of subsistence use of natural resources; and 5) physical injury or death. The Facility does not pay claims brought by the government, or related to real estate, the moratorium, or the Vessel of Opportunity program.³³

To date, some claimants have been dissatisfied with decisions to deny certain claims and with the amount and timeliness of compensation received from approved claims, which has required Feinberg to reconsider the rules and processes in place for reimbursement. The United States Department of Justice sent a letter to Feinberg on September 17, 2010, urging expediency.³⁴ In response, the Claims Facility noted that the large number of fraudulent and undocumented claims have slowed the process.³⁵ Nonetheless, after the September 17 letter, Feinberg made several adjustments to the program including streamlining processing time and removing geographic proximity to the oil spill as bar against payment, Feinberg also extended the timeframe within which claimants could receive interim payments without waiving their right to pursue litigation.³⁶ As of December 11, 2010, the Claims Facility has paid more than \$2.4 billion in claims to more than 164,000 claimants.³⁷ The Commission believes it would be useful to evaluate the effectiveness of the Claims Facility as a means of informing the compensation process in future large spills.

Recommendation

The Department of Justice's Office of Dispute Resolution should conduct an evaluation of the Gulf Coast Claims Facility once all claims have been paid out, in order to inform claims processes in future Spills of National Significance. The evaluation should include a review of the process, the guidelines used for compensation, and the success rate for avoiding law suits.

Promoting Congressional Engagement to Ensure Responsible Offshore Drilling

The Commission's recommendations in this report include some directed to Congress for specific legislation, and others directed to various specific federal agencies, responsible parties, and the oil and gas industry in general. The several recommendations directed to Congress, however, also highlight a further lesson: the need for Congress to engage more systematically in ensuring the safety of drilling in the OCS and environmental protection. This includes more active Congressional oversight, and also includes Congressional action to ensure that those in government responsible for safety oversight and environmental protection review have the resources necessary to do their jobs. To that end, this final set of recommendations addresses the need for Congress itself to take affirmative steps to ensure responsible offshore drilling.

The Need for Congressional Awareness and Engagement

In the years between the *Exxon Valdez* spill and the spring of 2010, Congress, like much of the nation, appears to have developed a false sense of security about the risks of offshore oil and gas development. Congress showed its support for offshore drilling in a number of ways, but did not take any steps to mitigate the increased perils that accompany drilling in ever-deeper water. Until the *Deepwater Horizon* exploded, 11 rig workers lost their lives, and millions of barrels of oil spilled into the Gulf of Mexico, Congress had not introduced legislation to address the risks of deepwater drilling.

The congressional committee structure makes it much harder to focus on safety and environmental issues associated with offshore oil and gas development. In the 111th Congress, multiple committees in both chambers claimed jurisdiction over offshore energy development. The House Natural Resources Committee, for example, had jurisdiction over "mineral land laws and claims and entries thereunder" and "mineral resources of public lands." Its Subcommittee on Energy and Mineral Resources was specifically charged with oversight of "conservation and development of oil and gas resources of the Outer Continental Shelf." But the House Committee on Energy and Commerce oversaw "exploration, production, storage, supply, marketing, pricing, and regulation of energy resources, including all fossil fuels," as well "national energy policy generally." Similarly, the jurisdiction of the Senate Committee on Energy and Natural Resources included "extraction of minerals from oceans and Outer Continental Shelf lands," and its Subcommittee on Energy was responsible for oversight of "oil and natural gas regulation" generally. By contrast, the Senate Committee on Environment and Public Works claimed oversight over "environmental aspects of Outer Continental Shelf lands." Yet, during the 110th and 111th Congresses, none of the subcommittees of environment and public works claimed oversight specifically over OCS lands issues.

In neither the House nor the Senate are any of these committees charged with directly overseeing the safety and environmental impacts of offshore development, separate from the conflicting goal of resource development and royalties. The House Committee on Education and Labor and the Senate Committee on Health, Education, Labor, and Pensions both emphasize occupational safety and health. But neither committee appears to focus on process safety—the vital approach identified by

this Commission's investigation that encompasses procedures for minimizing adverse events such as effective hazard analysis, management of risk, communication, and auditing. Finally, no oversight of any of these matters has been conducted by any of the several House or Senate committees or subcommittees responsible for the nation's tax policies or overall appropriations process, notwithstanding the significant impact those policies and appropriations have on both the extent of energy industry activities on the OCS and the government's ability to oversee that activity effectively.

After the *Deepwater Horizon* explosion and resulting oil spill, numerous committees took an interest in offshore safety and environmental issues and held hearings. In short, it took a catastrophe to attract congressional attention.

Recommendation

Increase and maintain congressional awareness of the risks of offshore drilling in two ways. First, create additional congressional oversight of offshore safety and environmental risks. Second, require the appropriate congressional committees to hold an annual oversight hearing on the state of technology, application of process safety, and environmental protection to ensure these issues receive continuing congressional attention.

The House and Senate Rules Committee should each assign a specific committee or subcommittee to oversee process safety and environmental issues related to offshore energy development. These committees should also be given the task of overseeing the Offshore Safety Authority, the creation of which this Commission has separately recommended.

- Congress should require the Secretary of the Interior to submit an annual public report on energy offshore development activities to the applicable congressional committees. This report should focus on the Department's progress in improving its prescriptive safety regulations; steps taken by industry and the Department to improve facility management; the Department's progress in implementing a stronger environmental assessment program, including developing improved NEPA guidelines; and on any other steps taken by industry or the Department to address safety and environmental concerns offshore. The report should also detail the industry's safety and environmental record during the previous 12 months. Finally, the report should highlight any areas in which the Department believes industry is not doing all that it can to promote safety and the environment and any areas where additional legislation could be helpful to the Department's efforts.
- Congress should require the Department of the Interior's Office of Inspector General to submit an independent annual public report to the applicable congressional committees. The report should provide an independent description of the Offshore Safety Authority's activities over the previous 12 months, including its efforts to improve offshore safety and to investigate accidents and other significant offshore incidents. The report should also include the Inspector General's evaluation of the Authority's efforts and the Inspector General's recommendations for improvement.

The Need for Adequate Funding for Safety Oversight and Environmental Review

Many of the earlier recommendations require adequate congressional funding in order to be implemented effectively. For instance, the new Offshore Safety Authority at Interior cannot be expected to succeed in meaningfully overseeing the oil and gas industry if Congress does not ensure it has the resources to do so. Agencies cannot conduct the scientific and environmental research necessary to evaluate impacts of offshore development if they do not receive adequate support from Congress. In short, Congress needs to make funding the agencies regulating offshore oil and gas development a priority in order to ensure a safer and more environmentally responsible industry in the future.

BOEMRE currently receives a portion of its funding from offsetting collections from industry. In its Fiscal Year 2011 Budget Justification, it requested that just less than half of its budget—\$174.9 million—come from these collections.³⁸ The oil and gas industry, however, should do significantly more and provide the funds necessary for regulation of offshore oil and gas operations and oil spill preparedness planning. The amount of funding needs to keep pace as industry moves into ever-more challenging depths and geologic formations because the related challenges of regulatory oversight likewise increase. This could be accomplished many different ways. Congress could, for instance, raise the inspection fees already imposed on facilities operating on the outer continental shelf—currently offsetting about 3 percent of BOEMRE’s annual budget—or impose a differently based annual regulatory fee on new and existing leases. Or Congress could instruct the Department of the Interior to include lease provisions that require the imposition of regulatory fees. Interior already possesses broad authority to include in leases “such rental and other provisions as the Secretary may prescribe at the time of offering the area for lease.”³⁹ No matter the precise mechanism, the oil and gas industry would be required to pay for its regulators, just as fees on the telecommunications industry support the Federal Communications Commission. Regulation of the oil and gas industry would no longer be funded by taxpayers but instead by the industry that is being permitted to have access to a publicly-owned resource. Future Congresses would therefore have less incentive to reduce agency funding.

Recommendation

Congress should enact legislation creating a mechanism for offshore oil and gas operators to provide ongoing and regular funding of the agencies regulating offshore oil and gas development.

Moving to Frontier Regions

The nation’s demand for domestic oil production will push the boundaries of technology and geography. The industry will develop new exploration and extraction techniques and equipment in new areas in the decades ahead. Drilling safely in the Gulf of Mexico requires a new industry safety culture and significantly improved regulatory oversight. Those reforms, and further heightened vigilance, will be required for oil exploration and production in frontier offshore regions. When the Macondo blowout dumped enormous volumes of oil into the Gulf waters, scientists and policymakers realized how little was known about biological systems, environmental conditions, and even key

aquatic and coastal species. Leasing of vast acreage combined with weak policies and limited funding had resulted in inadequate studies of unique habitats and sensitive environmental features where greater caution should be exercised. What information was available was often not shared, or was disregarded, in leasing and permitting decisions. And little, if any, research or policy existed to address human health impacts and the risks to responders from a major spill, or the far-reaching effects of such a disaster on other businesses dependent on the region's resources.

In addition to these challenges, each frontier area presents important differences in implementing any drilling program—different geologies, hydrocarbon formations, coastal communities and environments, and climate conditions, to mention some. Federal waters of the United States other than the central and western Gulf of Mexico, parts of Southern California, and the Lower Cook Inlet in Alaska would be regarded as frontier territory. In the late 1970s, attention turned briefly to areas off of northern California and Massachusetts (Georges Banks), and in the early 1980s, the potential of the outer continental shelf off Alaska attracted considerable investment. In recent years, the focus has turned to exploring in the Atlantic Ocean off the State of Virginia; in the eastern Gulf of Mexico; and, most notably, to taking another serious look at offshore regions in the Alaskan Arctic. Drilling water depths of 10,000 feet or more anywhere in the Gulf of Mexico might also be considered opening a new frontier, given the new technologies required.

In March 2010, President Obama and Interior Secretary Ken Salazar announced a plan to open the eastern Gulf and parts of the Atlantic coast—including offshore Virginia—to oil and gas exploration (subject to studies of the suitability of doing so in each area, and to the lifting of a congressional moratorium restricting drilling in the eastern Gulf). But on December 1, in the wake of the Deepwater Horizon experience and the resulting broad restructuring of regulations and the federal oversight capabilities, Secretary Salazar announced that the Administration would not proceed with drilling in areas where there are “no active leases” during the next five-year leasing plan. As a result, exploration and production in certain frontier areas—the eastern Gulf and off of the Atlantic and Pacific coasts—are deferred. The Secretary also indicated that plans for 2011 drilling in Alaska's Beaufort Sea would be subjected to additional environmental assessments. There will consequently be a continuing examination of the various stages of drilling, if pursued, consistent with national energy policy and with a full awareness of the risks and of the values that must be balanced in each region, and with assurance that operators rigorously adhere to the best practices of a functioning safety culture.

By their very location and nature, these frontier areas differ from the Gulf of Mexico and in important respects from each other. Environmental and biological conditions are at least as well understood along the Atlantic coast as in the Gulf—and there are also important facilities, such as Coast Guard installations in place; in contrast, equivalently detailed geological and environmental information does not exist for the Arctic exploration areas of greatest interest for energy exploration—and industry and support infrastructures are least developed, or absent, there. In the near term, the Alaskan frontier is likely to attract the greatest attention, and to require the closest scrutiny, given the potential energy resources and the physical and environmental challenges of pursuing them safely.

Large prospects in offshore Alaska. The interest in offshore Alaska reflects the likelihood of finding significant new sources of oil:⁴⁰ the Chukchi and Beaufort Sea areas off Alaska's north coast rank behind only the Gulf of Mexico in estimated domestic resources.⁴¹ The most recent federal lease sales for the Beaufort Sea, from 2003 to 2008, netted \$98 million, reflecting high levels of industry interest. And despite its remoteness and harsh conditions, the Chukchi Sea—with vast potential resources—attracted over \$2.6 billion in high bids for almost 2.8 million acres, including \$2.1 billion from Shell Oil Company, during a 2008 lease sale.⁴²

If deemed feasible, new offshore Alaskan oil production may be well-timed to offset the sustained decline in output elsewhere in Alaska. Oil production in the state (primarily from the onshore field at Prudhoe Bay) has decreased by more than two-thirds, from the 1988 peak of 2 million barrels per day to 645,000 barrels per day in 2009.⁴³ Depending on future prices, this decline could constitute a threat to the state's economy, which is highly dependent on oil and gas revenues and related employment. The Energy Information Administration projects that Alaska's production will continue to decline, to just 420,000 barrels per day by the end of this decade.⁴⁴ Such declines could threaten the viability of the Trans-Alaska Pipeline System, which transports oil from the North Slope to the port at Valdez.

Despite the Energy Information Administration's pessimism about long-term production trends in Alaska, other projections show a potential upswing. An optimistic scenario developed in 2009 study by Northern Economics for Shell Exploration and Development projects production from multiple Alaska outer continental shelf sites beginning in 2018 and eventually peaking at 1.8 million barrels of oil per day.⁴⁵ (New pipelines would need to be built to connect these reservoirs, if brought into production, to the Trans-Alaska Pipeline System.)

But finding and producing those potentially important supplies of oil offshore Arctic Alaska requires the utmost care, given the special challenges and risks associated with this frontier. Many of these challenges also arise elsewhere in the world, as Russia, Norway, Canada, and Denmark (Greenland) evaluate their Arctic oil and gas resources. The Alaskan Arctic is characterized by extreme cold, extended seasons of darkness, hurricane-strength storms, and pervasive fog—all affecting access and working conditions. The Chukchi and Beaufort Seas are covered by varying forms of ice for eight to nine months a year. These conditions limit exploratory drilling and many other activities to the summer months. The icy conditions during the rest of the year pose severe challenges for oil and gas operations and scientific research. And oil-spill response efforts are complicated year-round by the remote location and the presence of ice, at all phases of exploration and possible production.

The geological pressures in hydrocarbon deposits in shallow seas off Alaska are likely to be substantially below those encountered at Macondo, reducing some of the risks of a major blowout and challenges of containment. But oil spilled off Alaska (from blowouts, pipeline or tanker leaks, or other accidents) is likely to degrade more slowly than that found in the Gulf of Mexico because of lower water temperatures, reduced mixing of the oil into the water due to the presence of ice, and the shallower depths through which oil would travel from the wellhead to the surface. Some think the slow weathering could facilitate the skimming and in situ burning of escaped oil under ideal weather

conditions, but the slow pace of natural dispersion means that oil would linger much longer in the marine environment. And serious questions remain about how to access spilled oil when the area is iced over or in seasonal slushy conditions.

The Arctic ecosystem, the need for scientific information and informed decision-making, and Alaska native peoples. The stakes for drilling in the U.S. Arctic are raised by the richness of its ecosystems. The marine mammals in the Chukchi and Beaufort are among the most diverse in the world, including seals, cetaceans, whales, walruses, and bears. The Chukchi Sea is home to roughly one-half of America's and one-tenth of the world's polar bears.⁴⁶ In November 2010, the U.S. Fish and Wildlife Service ruled that a large part of the polar bears' "critical habitat" included sea ice in the Beaufort and Chukchi Seas.⁴⁷ The Chukchi and Beaufort Seas also support millions of shorebirds, seabirds, and waterfowl, as well as abundant fish populations.

It is known that these are vibrant living systems, but scientific research on the ecosystems of the Arctic is difficult and expensive. Good information exists for only a few species, and even for those, just for certain times of the year or in certain areas. As a result, the Commission recommends an immediate, comprehensive federal research effort to provide a foundation of scientific information on the Arctic (with periodic review by the National Academy of Sciences), and annual stock assessments for marine mammals, fish, and birds that use the Beaufort and Chukchi Seas. This initiative should be coordinated with the state of Alaska, native organizations, academic institutions, non-governmental organizations, the private sector, and international partners. The information generated should be capable of informing decision-making related to oil and gas leasing, exploration, and development and production in the Arctic; measuring and monitoring impacts of oil and gas development on Arctic ecological resources; natural resource damage assessment should an oil spill occur and protocols in any treaty negotiated among the Arctic nations. The existing gaps in data also support an approach that distinguishes in leasing decisions between those areas where information exists and those where it does not, as well as where response capability may be less and the related environmental risks may therefore be greater. The need for additional research should not be used as a de facto moratorium on activity in the Arctic, but instead should be carried out with specific timeframes in mind in order to inform the decision-making process.

The Inupiat Eskimos of Alaska's remote arctic and subarctic communities rely heavily for their subsistence on resources from the marine environment, particularly bowhead whales. Bowhead whales can reach 60 feet in length and weigh more than 120,000 pounds. They migrate from Russian to Canadian waters and back through the Chukchi and Beaufort Seas.⁴⁸ They are the most important subsistence animal for the coastal communities of northwest and northern Alaska.⁴⁹ Whale hunting and the customs surrounding it are also an important part of their cultural heritage. Oil and gas development has the potential, directly or indirectly, to affect hunting success or the habitats of species important to subsistence. (Of course, offshore oil development could play a positive economic role in the native communities; some Inupiat whaling captains also work in the oil industry, for instance.). An Arctic Regional Citizens Council could help assure the active participation of the people who know this region the best in planning and response.

Arctic spill response and containment. The remoteness and weather of the Arctic frontier create special challenges in the event of an oil spill. Successful oil spill response methods from the Gulf of Mexico, or anywhere else, cannot simply be transferred to the Arctic. Industry and academic organizations are conducting research on response to oil on ice, but more needs to be done. A comprehensive interagency research program to address oil spill containment and response issues in the Arctic should be developed, funded, and implemented within the federal government. Spill trajectory and weather models based on Arctic conditions must also be developed. This research should be funded promptly by the Oil Spill Liability Trust Fund, and the resulting analysis should inform when and where leasing occurs.

The National Contingency Plan requires the Coast Guard to oversee oil spill planning and preparedness, and to supervise an oil-spill response in coastal waters. Current federal emergency response capabilities in the region are very limited: the Coast Guard operations base nearest to the Chukchi region is on Kodiak Island, approximately 1,000 miles from the leasing sites. The Coast Guard does not have sufficient ice-class vessels capable of responding to a spill under Arctic conditions: two of its three polar icebreakers have exceeded their service lives and are non-operational.⁵⁰ In addition to overseeing spill response, the Coast Guard provides search and rescue capabilities in other areas. Without a presence in the Arctic, it would be very difficult for the Coast Guard to conduct any emergency search and rescue operations.

To deal with these serious concerns about Arctic oil spill response, containment, and search and rescue, the Commission recommends three approaches before the Department of the Interior makes a fully informed determination that drilling in a particular area is appropriate. First, the Department of the Interior should ensure that the containment and response plans proposed by industry are adequate for each stage of development and that the underlying financial and technical capabilities have been satisfactorily demonstrated in the Arctic. Second, the Coast Guard and the oil companies operating in the Arctic should carefully delineate their respective responsibilities in the event of an accident, including search and rescue, and then must build and deploy the necessary capabilities. Third, Congress should provide the resources to establish Coast Guard capabilities in the Arctic, based on the Coast Guard's review of current and projected gaps in its capacity.

International standards for Arctic oil and gas. The Arctic is shared by multiple countries, many of which are considering or conducting oil and gas exploration and development. The extreme weather conditions and infrastructure difficulties are not unique to the U.S. Arctic. The damages caused by an oil spill in one part of the Arctic may not be limited to the waters of the country where it occurred. As a result, the Commission recommends that strong international standards related to Arctic oil and gas activities be established among all the countries of the Arctic. Such standards⁵¹ would require cooperation and coordination of policies and resources. The Arctic Council has begun work in this direction, updating its voluntary Arctic Offshore Oil and Gas Operation Guidelines in 2009. The International Standards Organization is also developing international standards for Arctic offshore structures that would apply to the activities of petroleum and natural gas industries in Arctic and cold regions. These guidelines are expected to specify requirements and provide recommendations and guidance for the design, construction, transportation, installation, and removal of offshore structures

in the Arctic. Additional work is needed to strengthen these guidelines and standards, ensuring that they are both consistent and mandatory across the entire Arctic, and the United States could pay an important leadership role in securing these vital safeguards.

Bringing the potentially large oil resources of the Arctic outer continental shelf into production safely will require an especially delicate balancing of economic, human, environmental, and technological factors. Both industry and government will have to demonstrate standards and a level of performance higher than they have ever achieved before. One lesson from the Deepwater Horizon crisis is the compelling economic, environmental, and indeed human rationale for understanding and addressing the prospective risks comprehensively, before proceeding to drill in such challenging waters.

Conclusion

The President asked this Commission to recommend not only “improvements to Federal laws, regulations, and industry practices applicable to offshore drilling,” but also “organizational or other reforms of Federal agencies or processes necessary to ensure such improvements are implemented and maintained.” In carrying out this charge, the Commission has been mindful of the dangers of “fighting the last war”: that is, addressing the specific failures revealed by the *Deepwater Horizon* disaster, but neglecting to anticipate future problems whose contours are yet unknown. Our recommendations—for a new approach to risk assessment and management; a new, independent agency responsible for safety and environmental review of offshore drilling; stronger environmental review and enforcement; a reorientation of spill response and containment planning; and a revision of liability rules to better protect victims and provide proper incentives to industry—aim to establish an oversight regime that is sufficiently strong, expert, well-resourced, and flexible to prevent the next disaster, not the last. The oil and gas industry—remarkable for its technological innovation and productivity—needs government oversight and regulation that can keep pace.

Endnotes

- 1 Exec. Order No. 13543, 75 Fed. Reg. 29,397 (May 21, 2010).
- 2 See 43 U.S.C. § 1337(b)(6) (“An oil and gas lease issued pursuant to this section shall . . . contain such rental and other provisions as the Secretary may prescribe at the time of offering the area for lease.”).
- 3 Crude Oil Production, Petroleum Navigator, U.S. Energy Information Administration, July 29, 2010, http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbb1_a.htm.
- 4 These terms are taken directly from the Council on Environmental Quality (CEQ) NEPA implementing regulations. 40 C.F.R. § 1508.28.
- 5 40 C.F.R. § 1508.4.
- 6 A “Development Operations Coordination Document” in the Gulf of Mexico is functionally the same as a “Development and Production Plan” in other LES regions.
- 7 Press Release, Department of the Interior, *Categorical Exclusions for Gulf Offshore Activity to be Limited While Interior Reviews NEPA Process and Develops Revised Policy*, August 16, 2010.
- 8 Minerals Management Service, *MMS 2007-018 Gulf of Mexico OSC Oil and Gas Lease Sales: 2007-2010 Final Environmental Impact Statement* (April 2007), Volume I, 2-3 to 2-5.
- 9 Minerals Management Service, *MMS 2007-026 Chukchi Sea Planning Area Oil and Gas Lease Sale 193 and Seismic Surveying Activities in the Chukchi Sea Final Environmental Impact Statement* (May 2007), Volume I, 1.
- 10 Department of Interior, *Department Manual Part 516: National Environmental Policy Act of 1969* (September 2009), 3.4.
- 11 Government Accountability Office, *GAO-10-276 Offshore Oil and Gas Development: Additional Guidance Would Help Strengthen the Minerals Management Service’s Assessment of Environmental Impacts in the North Aleutian Basin* (March 2010), 21.
- 12 Council on Environmental Quality, *Final Recommendations of the Interagency Ocean Policy Task Force* (July 19, 2010), 41.
- 13 43 U.S.C. § 1346.
- 14 Commission staff analysis of MMS yearly budget request and enactments, by nominal and real (2005) dollars. See Bureau of Ocean Energy Management, *Office of Administration and Budget: Budget Division*, <http://www.boemre.gov/adm/budget.html>; Herbert Kaufman and Cheryl Anderson, Department of the Interior, *OCS Environmental Studies Contract Projects—Fiscals Years 1973 through 1983* (DOI Minerals Management Service Branch of Environmental Studies, December 1983), II-8.
- 15 33 U.S.C. § 1321(j)(5)(D)(i); 40 C.F.R. § 300.211.
- 16 30 C.F.R. § 254.2(a).
- 17 30 CFR § 254.126.
- 18 40 C.F.R. § 300.322.
- 19 See 23 U.S.C. § 125.
- 20 Pub. L. No. 107-171, § 2701, 116 Stat. 134, 278-279 (2002).
- 21 Department of the Interior, National Notice to Lessees and Operators of Federal Oil and Gas Leases, Outer Continental Shelf No. 2010-N10 (November 8, 2010), <http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2010NTLs/10-n10.pdf>.
- 22 See 30 C.F.R. §§ 250.410-418.
- 23 See 30 C.F.R. § 250.418(j).
- 24 Transcript, Deepwater Blowout Containment Conference (Sept. 22, 2010), <http://www.doi.gov/news/video/Deepwater-Blowout-Containment-Conference.cfm>.
- 25 Doug Suttles (BP), interview with Commission staff, October 13, 2010.
- 26 Response workers generally must be trained pursuant to the Hazardous Waste Operations and Emergency Response (“HAZWOPER”) regulation administered by the Occupational Safety and Health Administration. 29 C.F.R. § 1910.120. This regulation requires specific training and medical surveillance and monitoring for workers dealing with hazardous materials. While this regulation presumably applied

- to formal response contractors after the Deepwater Horizon spill, it was not applied consistently to citizen responders who also require its protections.
- 27 Public information should further be provided in languages and formats that are understandable to individuals with limited English proficiency and individuals with disabilities. See ESF #8 – Public Health and Medical Services Annex at 7.
- 28 Indeed, the Public Health and Medical Services Annex provides for long-term monitoring of potentially exposed individuals, requiring the Department of Health and Human Services to “assist[] State, tribal, and local officials in establishing a registry of potentially exposed individuals . . . and conducting long-term monitoring of this population for potential long-term health effects.” ESF #8 – Public Health and Medical Services Annex at 9-10. Rebecca Bratspies, et al., *From Ship to Shore: Reforming the National Contingency Plan to Improve Protections for Oil Spill Cleanup Workers* (Center for Progressive Reform, September 2010).
- 29 Whether or not respirators should be required for cleanup workers emerged as a major controversy in the response to the Deepwater Horizon oil spill.
- 30 Ray Mabus, *America’s Gulf Coast: A Long Term Recovery Plan after the Deepwater Horizon Oil Spill* (September 2010); Exec. Order No. 13554, 75 Fed. Reg. 62313–62317 (October 8, 2010).
- 31 Federal liability for damages is not the only potential liability that could result from an offshore drilling incident. Under the Oil Pollution Act, drillers are strictly liable for removal costs. Companies can also be subject to federal civil and criminal penalties as well as unlimited liability for damages under some state laws. These liabilities presumably drive business to internalize risk and mitigate safety, though not as fully as they might if damages liability were not capped.
- 32 Gulf Coast Claims Facility, Frequently Asked Questions, http://www.restorethegulf.gov/sites/default/files/imported_pdfs/library/assets/gccf-faqs.pdf.
- 33 Gulf Coast Claims Facility, Frequently Asked Questions, <http://www.gulfcoastclaimsfacility.com/faq#Q9>. Government claims for loss of revenue are being handled by BP: <http://www.bp.com/governmentclaims>. A \$60 million BP fund is in place for real estate claims across the five Gulf states and is being administered by National Catastrophe Adjusters, a claims adjustment firm: www.gulfreclaims.com; Kathy Jumper, “Realtors Tap National Catastrophe Adjusters To Administer Oil Spill Claims,” *Press-Register*, August 24, 2010, http://blog.al.com/live/2010/08/realtors_oil_claims.html. BP has set aside \$100 million for rig workers who experience hardship due to the moratorium, to be administered by the Gulf Coast Restoration and Protection Foundation: <http://www.gcrpf.org/>. Claims for repairs or damage to vessels involved in the Vessel of Opportunity program are being handled by BP.
- 34 Letter from Thomas J. Perrelli, Associate Attorney General, Department of Justice, to Kenneth Feinberg, September 17, 2010.
- 35 Leader on BP Claims Blames Fraud for Slow Payouts, *Associated Press*, October 5, 2010.
- 36 Press Release, Gulf Coast Claims Facility, Feinberg Announces Faster and More Generous Payments from GCCF, September 25, 2010, <http://www.gulfcoastclaimsfacility.com/press6.php>; Press Release, Gulf Coast Claims Facility, Feinberg Announces Clarification Regarding Geographic Proximity, October 4, 2010, <http://www.gulfcoastclaimsfacility.com/press7.php>; Editorial, “Are Victims of the Gulf Oil Spill Getting What They Deserve?,” *Washington Post*, November 25, 2010, <http://www.gulfcoastclaimsfacility.com/press>; Siobhan Hughes and Ryan December, “Feinberg Softens His Stance on Claims From Spill,” *Wall Street Journal*, November 26, 2010.
- 37 Gulf Coast Claims Facility, GCCF Program Statistics—Overall Summary, Gulf Coast Claims Facility, December 11, 2010, http://www.gulfcoastclaimsfacility.com/GCCF_Overall_Status_Report.pdf.
- 38 Minerals Management Service, Budget Justifications and Performance Information Fiscal Year 2011.
- 39 43 U.S.C. § 1337(b)(6).
- 40 There are also massive natural gas resources in and off Alaska, but until pipeline is built to the lower 48 states, the gas cannot be brought to market and used.

- 41 Department of the Interior, "Estimated Undiscovered, Economically Recoverable Resources," <http://www.doi.gov/whatwedo/energy/ocs/upload/UIERR-map-2012-2017-80-NoYear-Note.pdf>.
- 42 Bureau of Ocean Energy Management, "Lease Sales," December 2, 2010, http://alaska.boemre.gov/lease/hlease/LeasingTables/lease_sales.pdf; Minerals Management Service, "Summary of Company Bids," February 7, 2008, <http://alaska.boemre.gov/cproject/Chukchi193/193Saleday/Sale%20193%20Sum%20of%20Co%20Bids%20by%20Co%20Code.pdf>.
- 43 Energy Information Administration, *Annual Energy Review 2009* (August 19, 2010), Table 5.2, 131.
- 44 Energy Information Administration, *Annual Energy Outlook 2011*, Table A14.
- 45 Northern Economics, *Economic Analysis of Future Offshore Oil and Gas Development: Beaufort Sea, Chukchi Sea, North Aleutian Basin* (March 2009), ES-7, 9.
- 46 Audubon Alaska, "Chukchi Sea" <http://ak.audubon.org/issues-action/chukchi-sea>.
- 47 Press Release, Department of the Interior, U.S. Fish and Wildlife Service Announces Final Designation of Polar Bear Critical Habitat, November 24, 2010.
- 48 Lori Quakenbush, "Bowhead Whale," Alaska Department of Fish & Game, September 22, 2010.
- 49 *Ibid.*
- 50 Ronald O'Rourke, *Changes in the Arctic: Background and Issues for Congress* (October 15, 2010), 31 ("On June 25, 2010, the Coast Guard announced that Polar Sea had suffered an unexpected engine casualty and consequently will likely be unavailable for operation until at least January 2011.").
- 51 The Arctic Council is a multinational and intergovernmental group. Members include the governments of Canada, Denmark (including the Faroe Islands and Greenland), Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States of America. The Permanent Participants of the Arctic Council are: Aleut International Association (AIA), Arctic Athabaskan Council (AAC), Gwich'in Council International (GCI), Inuit Circumpolar Council (ICC), Russian Association of Indigenous Peoples of the North (RAIPON), and the Saami Council.



Appendix A

Commission Members



SENATOR BOB GRAHAM, Co-Chair, is the former two-term governor of Florida and served for 18 years in the United States Senate. After retiring from public life in January 2005, Senator Graham served for a year as a senior fellow at the Harvard Kennedy School of Government. There he commenced writing *America, the Owner's Manual*, published in 2009 as a guide to participatory citizenship. From May 2008 to February 2010, he served as chairman of the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism, and currently serves as a member of the Financial Crisis Inquiry Commission and the CIA's Executive Advisory Board.



WILLIAM K. REILLY, Co-Chair, is a founding partner of Aqua International Partners, LP, a private equity fund dedicated to investing in companies engaged in water and renewable energy, and a senior advisor to TPG Capital, LP, an international investment partnership. He co-chaired the National Commission on Energy Policy. Mr. Reilly served as Administrator of the U.S. Environmental Protection Agency (1989-1993) and president of World Wildlife Fund (1985-1989). He also served as the head of the U.S. delegation to the United Nations Earth Summit at Rio in 1992. *Photo: Mandel Ngan/AFP/Getty Images*



FRANCES G. BEINECKE, Member, is the President of the Natural Resources Defense Council (NRDC), a non-profit corporation that works to advance environmental policy in the United States and across the world. In addition, Ms. Beinecke currently serves on the Board of the World Resources Institute and the steering committees of the U.S. Climate Action Partnership. She is a member of the Aspen Institute's Commission on Arctic Climate Change, and on the advisory boards of the Yale School of Management and the Yale School of Forestry and Environmental Science.



DONALD F. BOESCH, Member, is President of the University of Maryland Center for Environmental Science, where he is also a Professor of Marine Science and Vice Chancellor for Environmental Sustainability for the University System of Maryland. He is a biological oceanographer who has conducted research on coastal ecosystems along the Atlantic Coast, the Gulf of Mexico, Australia and the East China Sea. A native of Louisiana, he has assessed the long-term environmental effects of offshore oil and gas development and multiple environmental problems of the Gulf Coast.



TERRY D. GARCIA, Member, is currently Executive Vice President for Mission Programs for the National Geographic Society, responsible for the Society's core programs that manage more than 400 scientific field research, conservation and exploration projects annually. From 1994 to 1996, he was General Counsel at NOAA and led the implementation of the *Exxon Valdez* Oil Spill Restoration Plan for Prince William Sound and the Gulf of Alaska. From 1997 to 1999, he was Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator of NOAA.



CHERRY A. MURRAY, Member, is Dean of the Harvard School of Engineering and Applied Sciences and John A. and Elizabeth S. Armstrong Professor of Engineering and Applied Sciences. She is currently the Past President of the American Physical Society. She was formerly Senior Vice President of Physical Science & Wireless Research at Bell Labs and past Principal Associate Director for Science & Technology at Lawrence Livermore National Laboratory. A member of the National Academy of Engineering and the National Academy of Sciences, she has served on more than 80 national and international scientific advisory committees, governing boards, and National Research Council panels, including chairing the Council's Division of Engineering and Physical Science.



FRAN ULMER, Member, is Chancellor of the University of Alaska Anchorage, Alaska's largest public university. Ms. Ulmer has served as Mayor of Juneau and Lieutenant Governor of Alaska. As a state legislator, she served on the Special Committee on the *Exxon Valdez* Oil Spill Claims Settlement. She has been a member of the North Pacific Anadromous Fish Commission, the Alaska Coastal Policy Council, the Alaska Nature Conservancy, the National Parks Conservation Association, the Aspen Institute's Commission on Arctic Climate Change, among many others.





On April 20, 2010, the Macondo well blew out, costing the lives of 11 men, and beginning a catastrophe that sank the *Deepwater Horizon* drilling rig and spilled over 4 million barrels of crude oil into the Gulf of Mexico. The spill disrupted an entire region's economy, damaged fisheries and critical habitats, and brought vividly to light the risks of deepwater drilling for oil and gas—the latest frontier in the national energy supply. Soon after, President Barack Obama appointed a seven-member Commission to investigate the disaster, analyze its causes and effects, and recommend the actions necessary to minimize such risks in the future.

The Commission's report offers the American public and policymakers alike the fullest account available of what happened in the Gulf and why, and proposes actions—changes in company behavior, reform of government oversight, and investments in research and technology—required as industry moves forward to meet the nation's energy needs.

Complementary reports, staff background papers, hearing records, and other materials produced by the Commission are available at www.oilspillcommission.gov.