A New *Horizon*?: The Need for Improved Regulation of Deepwater Drilling

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INTRODUCTION

On April 20, 2010, the *Deepwater Horizon* offshore oil rig caught fire and exploded fifty-two miles off the coast of Louisiana.[1] Soon after, the rig platform sank into the Gulf of Mexico, and the uncompleted Macondo exploratory well began releasing crude oil into Gulf waters at a rate of 5000 barrels—or 200,000 gallons—per day.[2] When the Macondo well was finally closed off on August 6, 2010—106 days after the initial explosion—it had released a total of 4.9 million barrels of crude oil into the Gulf,[3] devastating the environment and disrupting the local economy to such a great extent that the full long-term impacts of the damage have yet to be fully realized.[4]

In the weeks and months following the spill, government actors began to clean up the oil and allocate liability for the environmental and economic damage.[5] In the midst of these efforts came the ubiquitous call to ensure that a disaster of such magnitude would never occur again.[6] Responding to this call, the government

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1. U.S. DEP'T OF THE INTERIOR, INCREASED SAFETY MEASURES FOR ENERGY DEVELOPMENT ON THE OUTER CONTINENTAL SHELF 1 (2010), *available at* http://www.doi.gov/deepwaterhorizon/loader.cfm?csModule=security/getfile&PageID=33598.

2. U.S. ENERGY INFO. ADMIN., COUNTRY ANALYSIS BRIEFS: CURRENT MONTHLY ENERGY CHRONOLOGY 1 (2010) (on file with author).

3. *Id.*

4. *See, e.g.*, *How Does the BP Oil Spill Impact Wildlife and Habitat?*, NAT'L WILDLIFE FED'N, http://www.nwf.org/oil-spill/effects-on-wildlife.aspx (last visited Apr. 19, 2012) ("We likely will not see the full extent of impacts for many years, which makes creating and implementing successful restoration plans a serious challenge.").

5. *See, e.g.*, Press Release, White House Office of the Press Sec'y, Fact Sheet: Deepwater Horizon Oil Spill Legislative Package (May 12, 2010), *available at* http://www.whitehouse.gov/the-press-office/fact-sheet-deepwater-horizon-oil-spill-legislative-package ("[T]he President today sent Congress a legislative package that will: enable the Deepwater Horizon Oil Spill response to continue expeditiously, speed assistance to people affected by this spill, and strengthen and update the oil spill liability system to better address catastrophic events.").

6. *See, e.g.*, *Increased Safety Measures for Energy Development on the Outer Continental Shelf, Including Oversight of Recent Actions Recommended by the Department to Address the Safety of Offshore Oil Development: Hearing Before the S. Comm. on Energy & Natural Res.*, 111th Cong. 1–2 (2010) (statement of Sen. Jeff Bingaman, Chairman, S. Comm. on Energy & Natural Res.), *available at* http://www.gpo.gov/fdsys/pkg/CHRG-111shrg62344/html/CHRG111shrg62344.htm ("The challenge for regulators, and for Congress in enacting statutory responsibilities and authorities to those regulators, is to put appropriate requirements in place ensuring that this horrible price is not paid again."); Press Release, White House Office of the Press Sec'y, Weekly Address: President Obama Establishes

commissioned studies, established investigatory boards, and debated legislation.[7] Unfortunately, most of the prevention efforts proposed were far too narrow in scope, focusing on the failed blowout preventer ("BOP") aboard the *Deepwater Horizon* and potential leaks from offshore oil rigs[8] instead of broader regulatory failures and the lack of oversight in the oil industry generally.

Oil and gas extraction is fundamental to the economy of the United States, which is the world's largest consumer of crude oil, but only the third largest producer.[9] In 2010, the country consumed over 2.5 times as much petroleum as it produced.[10] As a result, the oil and gas companies that extract those resources domestically contribute significantly to the nation's economic success. Within the oil and gas extraction industry, offshore drilling plays a key role. Oil wells in the Gulf of Mexico produce more than 1.6 million barrels of crude oil

Bipartisan National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (May 22, 2010), *available at* http://www.whitehouse.gov/the-press-office/weekly-address-president-obama-establishes-bipartisan-national-commission-bp-deepwa ("We can only pursue offshore oil drilling if we have assurances that a disaster like the BP oil spill will not happen again.").

7. For example, President Barack Obama established the bipartisan National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, tasked with providing recommendations for preventing and mitigating the impact of future spills associated with offshore drilling. *See* Press Release, White House Office of the Press Sec'y, *supra* note 6. Relevant proposed legislation, discussed in greater detail below, includes the Blowout Prevention Act of 2010, H.R. 5626, 111th Cong. (2010), *amended by* Consolidated Land, Energy, and Aquatic Resources (CLEAR) Act of 2009, H.R. 3534, 111th Cong. (2010); the Emergency Relief Well Act, H.R. 5666, 111th Cong. (2010) (amending the Outer Continental Shelf Lands Act); and the Oil Spill Prevention and Mitigation Improvement Act of 2010, S. 3497, 111th Cong. (2010).

8. *See, e.g.,* H.R. 5626; H.R. 5666; S. 3497; *see also* Kim Hollaender, *The BP Oil Spill and Its Impact on Industry Players and Their Attorneys*, *in* ASPATORE SPECIAL REPORT: UNDERSTANDING THE BP OIL SPILL AND RESULTING LITIGATION (Thomson West 2010) (describing proposed legislation).

9. *Countries*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/countries/ (last visited Apr. 19, 2012) (may sort by "consumption" or "production" in upper-right corner).

10. In 2009, the U.S. produced 7,513,000 barrels of petroleum (crude oil, natural gas plant liquids, and other oils) per day, and consumed 18,771,000 barrels per day. *Oil: Crude and Petroleum Products Explained,* U.S. ENERGY INFO. ADMIN., http://www.eia.doe.gov/energyexplained/index.cfm?page=oil_home#tab2 (last visited Apr. 20, 2012). In 2010 alone, the U.S. consumed 98.1 quadrillion BTU. Thirty-seven percent of that consumption was oil, and twenty-five percent was gas. Only seventy-five quadrillion BTU was produced domestically, and, of that, only nineteen percent was oil and twenty-nine percent was gas. *U.S. Energy Facts Explained: Consumption and Production*, U.S. ENERGY INFO. ADMIN., http://www.eia.doe.gov/energyexplained/index.cfm?page=us_energy_home#tab3 (last visited Apr. 19, 2012). BTU stands for "British thermal unit," and represents the approximate amount of energy needed to heat one pound of water one degree Fahrenheit. *Energy Units and Calculators Explained: British Thermal Units (Btu)*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energyexplained/index.cfm?page=about_btu (last visited Apr. 19, 2012).

each day—nearly a third of the country's total production.[11] As of February 1, 2012, there were 6729 active leases in the Gulf of Mexico.[12] Deepwater extraction and production is expanding worldwide and will likely continue to expand because "[m]ost of the big new discoveries lie deep beneath the world's oceans, including in the Gulf of Mexico . . . . For the oil companies, these reserves . . . represent the industry's future."[13]

Unfortunately, appropriately protective regulations directed at the oil industry are usually only implemented after a high-profile accident inflicts catastrophic and irreparable harm to human health, the environment, or the nation's economy.[14] The United States is therefore in a continuous cycle of addressing the latest environmental disaster rather than anticipating the next potential threat.[15] The demonstrated environmental and economic costs of accidents involving deepwater drilling call for new levels of collective involvement and control over technologies as they develop.

This Note argues that environmental disasters like the *Deepwater Horizon* spill would be best avoided or mitigated if certain changes were made to the regulation of developing technologies in the oil industry. Part I discusses the *Deepwater Horizon* spill in 2010, its similarities to the *Exxon Valdez* tanker spill twenty years prior, and the regulatory shortcomings that contributed to the occurrence and severity of each spill. Part II argues that developing technologies are not regulated appropriately under the current scheme.[16] It

11. Clifford Kraus, *Accidents Don't Slow Gulf of Mexico Drilling*, N.Y. TIMES, Apr. 23, 2010, at A17, *available at* http://www.nytimes.com/2010/04/23/us/23offshore.html.

12. "Active leases" are leased areas that are subject to exploration or production. U.S. DEP'T OF THE INTERIOR, OIL AND GAS LEASE UTILIZATION—ONSHORE AND OFFSHORE, REPORT TO THE PRESIDENT 3 (2011). For a list of currently active leases, see BUREAU OF ENERGY MGMT., ACTIVE LEASES BY DESIGNATED OPERATOR (2012), *available at* http://www.data.boem.gov/homepg/pubinfo/repcat/lease/pdf/1360.pdf (listing all active leases in the Gulf of Mexico region as of May 1, 2012).

13. Jad Mouawad, *The Spill vs. a Need to Drill*, N.Y. TIMES, May 1, 2010, at WK1, *available at* http://www.nytimes.com/2010/05/02/weekinreview/02jad.html.

14. The *Deepwater Horizon* and *Exxon Valdez* spills, discussed herein, are but two examples. For a discussion of other similar spills, see *infra* note 20.

15. Professor Nancy Leveson of MIT calls the phenomenon a "sophisticated version of 'Whack-a-Mole' game, where symptoms are found and fixed but not the processes that allow those systems to occur," placing regulators and the industry in a "continual firefighting mode" and causing the same accidents to occur over and over again. NANCY G. LEVESON, ENGINEERING A SAFER WORLD: SYSTEMS THINKING APPLIED TO SAFETY 416 (2011).

16. The scope of this Note is limited to institutional solutions, rather than political ones. Consequently, the politics of delay, as well as concerns regarding lobbying by the oil industry, are not explored in depth here.

concludes that modified requirements under the National Environmental Policy Act ("NEPA"), greater independent oversight of last resort protections prior to implementation, and decreased reliance on human triggers of last resort protective technologies would achieve an appropriate level of regulation.

I. THE *DEEPWATER HORIZON* SPILL AND ITS CAUSES

Major accidents in the oil industry are not limited to those that attract national attention. In fact, the United States has averaged 792 incidents each year since 2006,[17] including almost twenty major spills annually.[18] Since 1964, over eleven million gallons of oil have been spilled in U.S. waters on the Outer Continental Shelf.[19] Because of the degree of attention and study that large-scale, high-profile accidents receive, such disasters are typically the catalysts for new or amended legislation affecting the energy industry. This Note begins with a discussion of one such disaster—the *Deepwater Horizon* spill in 2010—and its similarities to the *Exxon Valdez* tanker spill in 1989.[20]

17. "Incidents," as used in this statistic, include fatalities, injuries, loss of well control, fires, explosions, collisions, spills greater than fifty barrels, and other operational issues. *Incident Statistics and Summaries 1996–2011,* BUREAU OF OCEAN ENERGY MGMT., REG., & ENFORCEMENT, http://www.boemre.gov/incidents/IncidentStatisticsSummaries.htm (last visited Apr. 19, 2012). While this marks a huge increase in the number of reported spills as compared to previous years, changes in regulations for incident reporting made effective on July 17, 2006 may have contributed to the drastic increase in reported incidents. *Id.*; *see also* JAMES R. CHILES, INVITING DISASTER: LESSONS FROM THE EDGE OF TECHNOLOGY 19 (2001) ("Compared to the twenty-seven years of the offshore oil industry, major rig mishaps ha[ve] been hitting historic highs in recent years . . . .").

18. "Major spills," as used here, refers to those greater than fifty barrels. An average of 19.86 spills have occurred each year from 2006 to 2010, as documented by BOEMRE. BUREAU OF OCEAN ENERGY MGMT., REG., & ENFORCEMENT, *supra* note 17.

19. 11,646,243 gallons, or 277,291 barrels, of oil were spilled in the Outer Continental Shelf between 1964 and 2010. 163 of these spills were of fifty or more barrels. BUREAU OF OCEAN ENERGY MGMT., REG., & ENFORCEMENT, ALL PETROLEUM SPILLS ≥ 1 BARREL FROM OCS OIL & GAS ACTIVITIES BY SIZE, CATEGORY, AND YEAR, 1964 TO 2010 (2011), *available at* http://www.boemre.gov/incidents/Excel/PetroleumSpillsBySizeCatYearSourceFourTabs.xls (last visited Apr. 20, 2012) (see the second tab of the spreadsheet).

20. For a discussion of other spills, such as the Santa Barbara spill in 1969, the *Ixtoc I* well blowout in 1979, and the *Ocean Ranger* capsize in 1982, see President Richard Nixon, Statement on Coastal Oil Pollution at Santa Barbara, California (Feb. 11, 1969), *available at* http://www.presidency.ucsb.edu/ws/index.php?pid=2330&st=wells&st1; ERCO/ENERGY RES. CO., IXTOC OIL SPILL ASSESSMENT (1982), *available at* http://invertebrates.si.edu/mms/reports/IXTOC_exec.pdf; RESTREPO & ASSOCS., IXTOC I WELL OIL SPILL ECONOMIC IMPACT STUDY (1982), *available at* http://www.gomr.boemre.gov/PI/PDFImages/ESPIS/3/3930.pdf (detailing the economic impacts of the *Ixtoc I* oil spill); U.S. COAST GUARD, MARINE CASUALTY REPORT: MOBILE OFFSHORE DRILLING UNIT (MODU) OCEAN RANGER, O.N. 615641 (1983),

A. Background

For 106 days in the summer of 2010, crude oil gushed into the Gulf of Mexico from an extraction well that suddenly separated from its rig platform following an explosion and fire aboard the rig.[21] The Macondo well was briefly capped on July 15, 2010, and a "static kill" procedure put in place by the rig's owner, BP, successfully shut off the leaking well on August 3, 2010.[22] The ruptured well was ultimately cemented shut and declared "effectively dead" on September 19, 2010.[23] Long before that date, however, the *Deepwater Horizon* spill had become the worst in American history, releasing 4.9 million barrels of crude oil into the Gulf.[24] The spill was the nation's first declared Spill of National Significance ("SONS"); as a result, the federal government designated a National Incident Commander ("NIC") to oversee the containment and cleanup.[25] The spill's SONS designation illustrates not only the magnitude of the

available at http://www.uscg.mil/hq/cg5/docs/boards/oceanranger.pdf (detailing the impact of a rig disaster on marine life); Steven Mufson, *Since '64, a Steady Stream of Oil Spills Has Tainted Gulf*, WASH. POST., Jul. 24, 2010, at A01; Nat'l Comm'n on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *A Brief History of Offshore Oil Drilling* 3 (Staff Working Paper No. 1, 2010) [hereinafter Staff Working Paper], *available at* http://www.oilspillcommission.gov/document/brief-history-offshore-oil-drilling; *Countermeasures/Mitigation*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., http://www.incidentnews.gov/entry/508790 (last visited May 5, 2012).

21. For a detailed description of the events of the accident, see NAT'L COMM'N ON THE BP *DEEPWATER HORIZON* OIL SPILL AND OFFSHORE DRILLING, DEEP WATER: THE GULF OIL DISASTER AND THE FUTURE OF OFFSHORE DRILLING 87–172 (2011) [hereinafter COMMISSION REPORT], *available at* http://www.oilspillcommission.gov/sites/default/files/documents/DEEPWATER_ReporttothePresident_FINAL.pdf

22. *Id.* at 164–67.

23. *BP Oil Well 'Effectively Dead' 5 Months After Spill Began*, CNN (Sept. 19, 2010, 12:22 PM), http://www.cnn.com/2010/US/09/18/gulf.oil.disaster/index.html; *see also* Press Release, White House Office of the Press Sec'y, Statement by President Obama on Final Termination of BP's Blown Out Well in the Gulf of Mexico (Sept. 19, 2010), *available at* http://www.whitehouse.gov/the-press-office/2010/09/19/statement-president-obama-final-termination-bps-blown-out-well-gulf-mexi.

24. *See* Campbell Robertson & Clifford Krauss, *Gulf Spill Is the Largest of Its Kind, Scientists Say*, N.Y. TIMES, Aug. 2, 2010, at A14, *available at* http://www.nytimes.com/2010/08/03/us/03spill.html.

25. U.S. COAST GUARD, BP DEEPWATER HORIZON OIL SPILL: INCIDENT SPECIFIC PREPAREDNESS REVIEW (ISPR) 1 (2011), *available at* http://cdm15029.contentdm.oclc.org/cdm/singleitem/collection/p266901coll4/id/3532/rec/9. A SONS designation refers to a spill that, "due to its severity, size, location, actual or potential impact on the public health and welfare or the environment, or the necessary response effort, is so complex that it requires extraordinary coordination of federal, state, local, and responsible party resources to contain and clean up the discharge." *Spill of National Significance—Preparing for Oil Spill Disasters*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., http://oceanservice.noaa.gov/news/features/apr10/sons.html (last visited Apr. 20, 2012).

spill, but also serves as an acknowledgment by the U.S. government of the extensive resources needed to clean up the discharged oil in the Gulf.

The rig explosion and spill generated significant public demand for government action that would prevent a disaster of similar magnitude from occurring again. President Obama acknowledged this goal in his weekly address on May 22, 2010.[26] While no one argued that prevention of additional disasters should not be an important government objective, lawmakers, victims, industry representatives, political pundits, and the general public disagreed about the best method for avoiding a future catastrophic accident. Some environmental groups advocated an across-the-board ban on offshore drilling.[27] As was the case after prior high-profile oil spills, such as that off the coast of Santa Barbara, California, in 1969—the largest U.S. spill to date at the time—"correction rarely catches up with error and . . . even if it had, it would not have altered the fact that a mass reaction set in against offshore drilling."[28]

President Obama initially responded to the outcry by ordering a halt on exploratory drilling in thirty-three deepwater oil rigs in the Gulf of Mexico.[29] He also extended a moratorium on new deepwater wells for six months and suspended the issuance of new permits to drill new deepwater wells.[30]

Disagreement about the future of offshore drilling, however, was reflected in the Obama administration's inconsistent treatment of the drilling moratorium. Only weeks before the spill, President Obama had announced plans to expand oil and natural gas exploratory efforts in the Atlantic Ocean and eastern Gulf of

26. *See* Press Release, White House Office of the Press Sec'y, *supra* note 6.

27. *See, e.g.*, *Stop the Drill*, OCEANA, na.oceana.org/en/stopthedrill (last visited Apr. 22, 2012) (on-line petition to stop offshore drilling); *President Obama: Ban Offshore Drilling!*, 350.ORG, http://act.350.org/sign/offshore_drilling_ban/ (last visited Apr. 22, 2012) (same); *Save Florida's Shores*, ENV'T FLA., http://www.environmentflorida.org/programs/save-floridas-shores (last visited Apr. 22, 2012) (campaign to stop efforts that would allow drilling closer to Florida's coasts).

28. JOHN C. WHITAKER, STRIKING A BALANCE: ENVIRONMENT AND NATURAL RESOURCES POLICY IN THE NIXON-FORD YEARS 266 (1976).

29. *See* President Barack Obama, Remarks by the President on the Gulf Oil Spill at the White House East Room (May 27, 2010), *available at* http://www.whitehouse.gov/the-press-office/remarks-president-gulf-oil-spill; *see also* Katelyn Sabochik, "*Whatever is Necessary to Protect and Restore the Gulf Coast*," THE WHITE HOUSE BLOG (May 27, 2010, 4:47 PM), http://www.whitehouse.gov/blog/2010/05/27/whatever-necessary-protect-and-restore-gulf-coast.

30. *See* President Barack Obama, *supra* note 29.

Mexico.[31] The administration subsequently realigned itself with these interests by lifting the drilling moratorium on October 12, 2010, seven weeks ahead of schedule.[32] New rules were established in its place, tightening standards for well design, BOPs, and worker training.[33] One account characterized this move as providing the oil industry with "a conditional go-ahead" by requiring the "reasonable step" of heightened safety compliance, "consistent with the country's need to continue exploring for sources of domestic oil—but only if it can be done safely."[34]

In December 2010, only months after the establishment of the new drilling rules, the Obama administration once again reversed course and announced a seven-year ban on drilling new exploratory production wells off the Atlantic Coast and in the eastern Gulf of Mexico.[35] Both the administration and environmental groups cited a lack of effective regulation in justifying the decision.[36] Louisiana Governor Bobby Jindal criticized the seven-year ban on economic grounds, claiming that the moratorium would "send more economic capital and even more jobs overseas, in the wake of those oil rigs that already left our waters for Egypt, the Congo and Nigeria during the 'arbitrary and capricious' moratorium on deepwater drilling."[37] Other state officials agreed, claiming the government made "an

31. *See* Press Release, The White House Office of the Press Sec'y, Obama Administration Announces Comprehensive Strategy for Energy Security (Mar. 31, 2010), *available at* http://www.whitehouse.gov/the-press-office/obama-administration-announces-comprehensive-strategy-energy-security; Siobhan Hughes & Stephen Power, *Offshore Drilling Curbed Again*, WALL ST. J. (Dec. 1, 2010, 10:29 AM), http://online.wsj.com/article/SB10001424052748704594804575648623586731384.html.

32. *See* Press Release, U.S. Dep't of the Interior, Salazar: Deepwater Drilling May Resume for Operators Who Clear Higher Bar for Safety, Environmental Protection (Oct. 12, 2010), *available at* http://www.doi.gov/news/pressreleases/Salazar-Deepwater-Drilling-May-Resume-for-Operators-Who-Clear-Higher-Bar-for-Safety-Environmental-Protection.cfm; *see also* U.S. ENERGY INFO. ADMIN., *supra* note 2; Peter Baker & John M. Broder, *White House Lifts Ban on Deepwater Drilling*, N.Y. TIMES, Oct. 13, 2010, at A1, *available at* http://www.nytimes.com/2010/10/13/us/13drill.html.

33. *See* Baker & Broder, *supra* note 32.

34. Editorial, *A Conditional Go-Ahead*, N.Y. TIMES, Oct. 12, 2010, at A24, *available at* http://www.nytimes.com/2010/10/13/opinion/13wed3.html.

35. *See* Hughes & Power, *supra* note 31; *Obama Bans Eastern Gulf Drilling for 7 Years*, CNN (Dec. 1, 2010, 8:00 PM), http://www.cnn.com/2010/POLITICS/12/01/obama.gulf.drilling/index.html?iref=allsearch.

36. *See* Hughes & Power, *supra* note 31; *Obama Bans Eastern Gulf Drilling for 7 Years*, *supra* note 35. The administration, however, did not ban exploration efforts in new areas along the northern shores of Alaska, which may hold vast supplies of oil. *See* Hughes & Power, *supra* note 31.

37. *Obama Bans Eastern Gulf Drilling for 7 Years*, *supra* note 35 (quoting Louisiana Governor Bobby Jindal in December 2010).

irresponsible and short-sighted decision."[38]

The administration was also slow to issue permits for drilling operations in the rest of the Gulf even after lifting the moratorium, with some experts initially suggesting that oil companies would not receive approval to drill new deepwater wells until 2012.[39] The delay had the potential to affect not only the oil industry, but also the Gulf Coast economy and U.S. oil production generally.[40] The Department of Energy's research section, the Energy Information Administration, predicted that U.S. offshore oil production on the Outer Continental Shelf would fall approximately thirteen percent from the previous year as a result of the moratorium and subsequent sluggish return to drilling.[41] The Bureau of Ocean Energy Management, Regulation, and Enforcement ("BOEMRE"),[42] however, granted Noble Energy and BHP Billiton approval to begin operations in March 2011,[43] and it does not appear that the moratorium caused a drastic change in domestic production of crude oil.[44]

38. Hughes & Power, *supra* note 31 (internal quotation marks omitted) (quoting Virginia Governor Bob McDonnell).

39. *See* Ben Casselman & Daniel Gilbert, *Drilling Is Stalled Even After Ban Is Lifted*, WALL ST. J. (Jan. 3, 2011), http://online.wsj.com/article/SB10001424052970204204004576050451696859780.html.

40. *See id*.

41. *See Impact of Limitations on Access to Oil and Natural Gas Resources in the Federal Outer Continental Shelf*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/oiaf/aeo/otheranalysis/aeo_2009analysispapers/aongr.html (last visited Apr. 22, 2012).

42. Until October 1, 2011, BOEMRE was the regulatory body that effectively replaced the Minerals Management Service ("MMS"). *The Reorganization of the Former MMS*, BUREAU OF OCEAN ENERGY MGMT., http://www.boem.gov/About-BOEM/Reorganization/Reorganization.aspx (last visited Feb. 22, 2012). On October 1, 2011, BOEMRE was replaced by the Bureau of Ocean Energy Management ("BOEM") and the Bureau of Safety and Environmental Enforcement ("BSEE") as part of a major reorganization. *Id.* BOEM is responsible for managing environmentally and economically responsible development of the nation's offshore resources. Its functions include offshore leasing, resource evaluation, review and administration of oil and gas exploration and development plans, renewable energy development, NEPA analysis, and environmental studies. *Id.* BSEE is responsible for safety and environmental oversight of offshore oil and gas operations, including permitting and inspections of offshore oil and gas operations. *Id.* Its functions include the development and enforcement of safety and environmental regulations, permitting offshore exploration, development and production inspections, offshore regulatory programs, oil spill response, and newly formed training and environmental compliance programs. *Id.*

43. *The Obama Administration Is Slowly Reissuing Offshore Drilling Permits*, INST. FOR ENERGY RES. (Mar. 23, 2011), http://www.instituteforenergyresearch.org/2011/03/23/the-obama-administration-is-slowly-reissuing-offshore-drilling-permits.

44. *See U.S. Field Production of Crude Oil (Thousand Barrels)*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mcrfpus1&f=a (last visited May 5, 2012).

B. Causes

In response to the spill and accompanying public demand for action, the Obama administration established the National Commission on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling ("Commission").[45] The purpose of the Commission was to "examin[e] all the relevant facts and circumstances concerning the root causes of the *Deepwater Horizon* explosion and [to] develo[p] options to guard against, and mitigate the impact of, any oil spills associated with offshore drilling in the future."[46] In its final report to the President, the Commission issued general recommendations that, while non-binding, "could influence future court proceedings and energy policy."[47] While perhaps the most comprehensive report issued by the executive branch regarding the causes and consequences of the spill, the Commission's report is but one of many issued by interested and reputable parties following the spill.[48] Together, these reports offer a relatively clear picture of the primary failures that led to the occurrence and magnitude of the *Deepwater Horizon* spill.

1. The Blowout Preventer and Other Technical Failures

The most direct causes of the *Deepwater Horizon* spill were perhaps those involving technical failures. Pointing to a specific failure that single-handedly resulted in the spill and contributed to its magnitude, however, is neither a straightforward nor simple undertaking. Instead, the spill can be traced to a series of interconnected technical failures and missteps that were then exacerbated by human error.

In order to function as intended, the various parts of a deepwater

45. Press Release, *supra* note 6 ("If the laws on our books are inadequate to prevent such an oil spill, or if we didn't enforce those laws—I want to know it. I want to know . . . where oversight of the oil and gas industry broke down." (quoting President Obama)).

46. *About the Commission,* NAT'L COMM'N ON THE BP *DEEPWATER HORIZON* OIL SPILL & OFFSHORE DRILLING, http://www.oilspillcommission.gov/page/about-commission (last visited Apr. 22, 2012).

47. Ayesha Rascoe, *Panel Calls for Offshore Drilling Reform*, REUTERS (Jan. 11, 2011, 5:42 PM), http://www.reuters.com/article/idUSTRE70A3IN20110111?pageNumber=2; *see also* COMMISSION REPORT, *supra* note 21.

48. *See, e.g.*, CHIEF COUNSEL, NAT'L COMM'N ON THE BP *DEEPWATER HORIZON* OIL SPILL & OFFSHORE DRILLING, MACONDO: THE GULF OIL DISASTER (2011) [hereinafter CHIEF COUNSEL'S REPORT], *available at* http://www.oilspillcommission.gov/sites/default/files/documents/C21462408_CCR_for_web_0.pdf; NAT'L ACAD. OF ENG'G & NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., INTERIM REPORT ON CAUSES OF THE *DEEPWATER HORIZON* OIL RIG BLOWOUT AND WAYS TO PREVENT SUCH EVENTS (2010) [hereinafter NAT'L ACAD. REPORT].

well system must interact properly, and those supervising the system must be able to activate backups with sufficient expediency in the event of a malfunction. Like onshore drills, offshore wells use drilling mud[49] and rotary drill bits to create a hole in the earth.[50] The initial stages of this process are relatively uncomplicated: because the fracture pressure[51] close to the seafloor is low, the sediment requires little strength to be moved, and drilling mud is not necessary.[52] The rig crews are therefore not required to monitor and adjust the mud weight to maintain an ideal pressure,[53] rendering the process relatively automated. However, as the drill goes deeper into the earth, "[t]he mud column inside a well exerts downward hydrostatic pressure that rig crews can control by varying the mud weight."[54] During this stage, the rig crew must add a BOP that serves as "both a drilling tool and a device for controlling wellbore pressures."[55] As the drill reaches further into the earth and geologic pressures increase, individual rams in the BOP stack may be closed to prevent hydrocarbons from flowing up the well.[56] At a certain depth, if the rig crew continues to drill deeper without increasing mud weight, fluids, such as hydrocarbons from the deeper geologic formation, will flow into the well.[57] When the drill reaches such a depth that mud can no longer control pressure within the well, the crew must stop drilling and set a "casing string," made up of twenty- to forty-foot sections of steel pipe, that prevents high-pressure fluids like hydrocarbons from entering the well.[58] The casing string must then be cemented into place in order to seal the interior of the well from the formation outside the casing and to structurally reinforce the wellbore to give it mechanical strength.[59]

The Commission established by President Obama found that the immediate cause of the well blowout was "a failure to contain

49. "Drilling mud" is actually a "complex blend of oil- or water-based fluids and additives" that "must be recovered after it is pumped down a drill string" because it is expensive and potentially damaging to the environment if released. CHIEF COUNSEL'S REPORT, *supra* note 48, at 15.

50. *Id.*

51. "Fracture pressure" refers to "the pressure at which the geologic formation will break down." *Id.* at 9.

52. *Id.* at 13.

53. *Id.*

54. *Id.* at 9.

55. *Id.* at 16.

56. *Id.* at 21.

57. *Id.* at 10.

58. *Id.* at 12.

59. *Id.*

hydrocarbon pressures in the well," a problem that could have been controlled by several last resort protective technologies, including the BOP.[60] The Macondo well was outfitted with a BOP "designed to contain pressure within the wellbore and halt an uncontrolled flow of hydrocarbons to the rig," which was standard in the industry.[61] The Commission found, however, that when crew members attempted to engage the *Deepwater Horizon*'s emergency disconnect system after the initial explosion, the system did not "close the blind shear ram,"[62] nor did it "sever[] the drill pipe, seal[] the well, [or] disconnect[] the rig from the BOP," as it should have.[63] It was thus this series of technical failures, in addition to the malfunctioning BOP, that caused the *Deepwater Horizon* disaster.

Prior to *Deepwater Horizon*, the worst oil spill originating in U.S. waters was the *Exxon Valdez* tanker spill.[64] On March 24, 1989, the

60. *See* COMMISSION REPORT, *supra* note 21, at 115; *see also* CHIEF COUNSEL'S REPORT, *supra* note 48, at 203 (describing the function of a BOP). A preliminary investigation into the causes of the oil spill determined that the failure of the rig's BOP was the primary culprit. The National Academy of Engineering and the National Research Council found that the BOP, "relied on as a critical component for preventing uncontrolled hydrocarbon flows and avoiding a catastrophic blowout of a well," did not control the hydrocarbon flow in the Macondo well, once activated. NAT'L ACAD. REPORT, *supra* note 48, at 12. However, some assigned blame to MMS because it did not directly oversee any certification of the BOPs; instead the operator of the Macondo well self-certified the BOP. *See* John M. Broder, *Report Faults BP and Contractors for Rig Explosion and Spill,* N.Y. TIMES, Nov. 17, 2010, at A18, *available at* http://www.nytimes.com/2010/11/18/us/18BP.html (discussing reports that partially blamed MMS); Holly Doremus, *A Great Case for Worst Case Analysis*, CTR. FOR PROGRESSIVE REFORM, http://www.progressivereform.org/printPage.cfm?idBlog=5EA1951E-D646-B25D-64CBA328EDB489E2 (last visited May 10, 2012); *see also* NAT'L ACAD. REPORT, *supra* note 48, at 18. Debate remains regarding the extent to which technical or regulatory failures contributed to the ultimate failure of the BOP.

61. COMMISSION REPORT, *supra* note 21, at 114. *See generally* MELVYN F. WHITBY, DRILLING CONTRACTOR, DESIGN EVOLUTION OF A SUBSEA BOP: BLOWOUT PREVENTER REQUIREMENTS GET TOUGHER AS DRILLING GOES EVER DEEPER 36–37 (2007), *available at* http://www.drillingcontractor.org/dcpi/dc-mayjune07/DC_May07_BOP.pdf.

62. Blind shear rams are "designed to cut drill pipe in the well and shut in the well in an emergency well control situation. But even if properly activated, the blind shear ram may fail to seal the well because of known mechanical and design limitations." CHIEF COUNSEL'S REPORT, *supra* note 48, at 204 (internal marks omitted); *see also* 30 C.F.R. § 250.442 (2012) (establishing requirements for blind shear rams within a subsea BOP system); 30 C.F.R. § 250.515(b) (2012) (establishing the minimum BOP system requirements, including provisions for blind shear rams); 30 C.F.R. § 250.1624(b)(1) (2012) (requiring, at a minimum, that BOP stacks contain three hydraulically operated preventers, one of which must contain blind shear rams).

63. *See* COMMISSION REPORT, *supra* note 21, at 114 (citing *Hearing Before the* Deepwater Horizon *Joint Investigation Team*, 111th Cong. 165 (2010) (statement of Christopher Pleasant)).

64. *See How Much Oil Really Spilled From the* Exxon Valdez*?*, ON THE MEDIA (June 18, 2010), http://www.onthemedia.org/2010/jun/18/how-much-oil-really-spilled-from-the-exxon-

Exxon Valdez oil tanker crashed into the Bligh Reef in Prince William Sound off the coast of Alaska.[65] When the tanker ran aground, eight of the ship's eleven cargo tanks and two of its ballast tanks ruptured and spilled approximately eleven million gallons of crude oil into the sound.[66]

Like the calls for reform following the *Deepwater Horizon* spill, the public demanded investigations into the causes of the *Exxon Valdez* spill to ensure that a similar accident would not occur again.[67] Many called for legislation requiring that all oil tankers be outfitted with double hulls, which "provide[] a proven solution to the problem of how best to reduce oil leakage after a ship strikes another object or touches the bottom."[68] While agreeing that "federal oil spill legislation [wa]s long overdue," some argued that a double hull requirement was "quick-fix politics."[69] Continued and searching investigations into the causes of spills like *Exxon Valdez* and *Deepwater Horizon* are important. However, such efforts should focus not only on technical failures but also on the degree to which human interaction with the various technical failings in a system may have contributed to the accident's occurrence or magnitude.

2. The Failures of MMS and Lack of Oversight

More than just a simple failure of the BOP, the Commission found that the well blowout "was the product of several individual missteps and oversights by BP, Halliburton, and Transocean, which government regulators lacked the authority, the necessary resources, and the technical expertise to prevent."[70] The Commission determined that the "root causes" of the *Deepwater*

valdez/; *see also* Robertson & Krauss, *supra* note 24 (comparing the spill to *Ixtoc I*).

65. ALASKA OIL SPILL COMM'N, SPILL: THE WRECK OF *EXXON VALDEZ* 5–14 (1990) [hereinafter ALASKA OIL SPILL COMM'N], *available at* http://docs.lib.noaa.gov/noaa_documents/NOAA_related_docs/oil_spills/spill_wreck_ExxonValdez_1990.pdf.

66. *Id. But see* Elizabeth Bluemink, *Size of Exxon Spill Remains Disputed*, ANCHORAGE DAILY NEWS (June 10, 2010), http://www.adn.com/2010/06/05/1309722/size-of-exxon-spill-remains-disputed.html.

67. *See, e.g.*, Steve Cowper, Op-Ed., *An Oil-Spill Law—Now*, WASH. POST, June 13, 1990, at A23.

68. DF DICKENS ASSOCS., THE DOUBLE HULL ISSUE AND OIL SPILL RISK ON THE PACIFIC WEST COAST 25 (1995), *available at* http://www.env.gov.bc.ca/eemp/resources/pdf/double_hull_issue.pdf. Double hulls may either be built in new ships or retrofitted into existing oil tankers. *Id.* at 27.

69. Joseph Farrell, *Requiring Double Hulls Is Quick-Fix Politics*, USA TODAY, July 12, 1990, at 6A.

70. COMMISSION REPORT, *supra* note 21, at 115. Halliburton and Transocean were service contractors involved in construction and drilling operations on the *Deepwater Horizon*.

Horizon spill were "overarching management failures by industry" and "regulatory failures" by government agencies.[71] Industry exacerbated these problems by devoting "only minuscule amounts of money to planning to control or clean up after a significant spill."[72] While there was no evidence of any one individual explicitly deciding to save money at the expense of safety,[73] the Commission identified a "culture of complacency" in the industry generally, and with respect to BP in particular.[74] William K. Reilly, the Commission's co-chairman, said that the disaster "was almost the inevitable result of years of industry and government complacency and lack of attention to safety."[75]

Of particular note, the Commission's Chief Counsel's report asserted that MMS was unable to maintain updated technical requirements to ensure drilling safety as a result of "industry's rapidly evolving deepwater technology."[76] Because post-accident investigations tend to focus on last resort protective technologies, these technologies are the most likely to be regulated; developing technologies, on the other hand, usually escape regulation.[77] For

71. *Id.* at 122–27.

72. John M. Broder, *Oil Spill Findings Released by Panel*, N.Y. TIMES, Nov. 23, 2010, at A24, *available at* http://www.nytimes.com/2010/11/23/science/earth/23spill.html.

73. *See* John M. Broder, *Investigator Finds No Evidence That BP Took Shortcuts to Save Money,* N.Y. TIMES, Nov. 9, 2010, at A16, *available at* http://www.nytimes.com/2010/11/09/us/09spill.html.

74. *See* COMMISSION REPORT, *supra* note 21, at ix; Editorial, *A Culture of Carelessness*, N.Y. TIMES, Nov. 15, 2010, at A28, *available at* http://www.nytimes.com/2010/11/15/opinion/15mon2.html.

75. Rachel Streitfeld, *Panel Calls for Drastic Steps to Stop Future Deepwater Oil Spills*, CNN (Jan. 11, 2011, 3:37 PM), http://www.cnn.com/2011/US/01/11/gulf.oil.spill.report/ (internal quotation marks omitted); *see also* Editorial, *Failure in the Gulf*, N.Y. TIMES, Jan. 7, 2011, at A22, *available at* http://www.nytimes.com/2011/01/07/opinion/07fri1.html.

76. CHIEF COUNSEL'S REPORT, *supra* note 48, at 251.

77. "Developing technologies," as used here, refers to technologies that have been recently developed in the industry and represent new and generally untested (at least as a practical matter) methods of extracting oil. One example of a "developing technology" that remains largely unregulated is hydraulic fracturing ("fracking"), a natural gas extraction technique "that involves pumping a sand-filled, gel-like fluid down an extraction well's pipe at high pressure." Skip Hollandsworth, *That's Oil, Folks!*, TEX. MONTHLY, Sept. 2010, at 116, *available at* http://www.texasmonthly.com/2010-09-01/feature4.php. In fact, fracking was exempted from most federal regulation under the Safe Drinking Water Act by the Energy Policy Act of 2005. Energy Policy Act of 2005, 42 U.S.C. § 300h (2006). The exemption is commonly known as the "Halliburton loophole" because Dick Cheney, Vice President in 2005 and a past CEO of Halliburton, led the presidential task force on energy policy that worked on the Act. *See, e.g.*, Editorial, *The Halliburton Loophole*, N.Y. TIMES, Nov. 3, 2009, at A28, *available at* http://www.nytimes.com/2009/11/03/opinion/03tue3.html. Carbon capture and sequestration ("CCS") is another potentially dangerous developing technology that remains

example, at the time of the spill, MMS regulations only covered the most basic elements of well design, and the provisions that addressed the use of cement in offshore oil wells were extremely general.[78] Given the range of possibilities for energy extraction, it would prove both costly and difficult for the government to regulate every new frontier before industry established new and potentially dangerous practices. As Charles Perrow has stated, "of all the glorious possibilities out there to reach for, some are going to be beyond our grasp in catastrophic ways."[79] The *Deepwater Horizon* spill, calling to attention a relatively recent move toward deepwater oil extraction, illustrates exactly why this model of regulation creates risks that are problematic if sustained in the long term.

Several key discoveries by oil companies in the 1980s triggered an

unregulated. Many see the technology, in which emissions from coal-fired power plants could be cleansed of their carbon dioxide and stored underground, as the key to the future of the coal industry in the United States. *See, e.g.*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CARBON DIOXIDE CAPTURE AND STORAGE 3 (Bert Metz et al. eds., 2005), *available at* http://www.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf. CCS also has the potential to slow the effects of climate change, but, in order to do so, the carbon dioxide "must be stored for hundreds of thousands of years without leakage or environmental degradation." Cormac Rea, *Introduction: What is CCS (Carbon Capture and Storage*), CANADIAN GEOGRAPHIC http://www.canadiangeographic.ca/magazine/JF08/
indepth/ccs.asp (last visited May 10, 2012). In addition to its potential to retard the impact of global warming, CCS may facilitate oil extraction by making underground oil more fluid and thus easier to extract when the two are mixed. Kate Galbraith, *Carbon Dioxide, the Bane of Environmentalists, Is in Demand in the Oil Industry*, N.Y. TIMES, Jan. 7, 2011, at A17A, *available at* http://www.nytimes.com/2011/01/07/us/07ttcarbon.html. It is unclear, however, whether the prevention of leakage is currently possible; the technology is not currently operating on a large commercial scale, although a number of pilot plants do exist, and components are also being tested in various places. *Id.* As of mid-2005, there were three commercial projects linking carbon dioxide capture and geological storage, but CCS has not yet been applied at a large fossil-fuel power plant. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra*, at 19. Some efforts at implementing the CCS process on a large scale and similar suggestions have been made. *See, e.g.,* ERIC P. ROBERTSON, IDAHO NAT'L LAB., ENHANCED COAL BED METHANE RECOVERY AND CO_2 SEQUESTRATION IN THE POWDER RIVER BASIN 1–2 (2010), *available at* http://www.inl.gov/technicalpublications/Documents/4536713.pdf. Some oil extraction projects have been delayed because they do not have enough carbon dioxide. Galbraith, *supra*. *But see* *CO_2 Sequestration: Facts*, KIEL MARINE SCI., http://www.ozean-der-zukunft.de/english/research-areas/greenhouse-oceans/cosub2sub-sequestration/facts/ (last visited Apr. 23, 2012) ("Only when the contribution of carbon binding in a carbon management system has been determined, should the use of appropriate political measures and the introduction of incentives for carbon storage be examined."). A similar trend was observed in nuclear power regulation. *See* J. SAMUEL WALKER & THOMAS R. WELLOCK, NUCLEAR REGULATORY COMM'N, A SHORT HISTORY OF NUCLEAR REGULATION, 1946–2009 25–50 (2000), *available at* http://www.nrc.gov/about-nrc/short-history.html.

78. *See* CHIEF COUNSEL'S REPORT, *supra* note 48, at 254–55.

79. CHARLES PERROW, NORMAL ACCIDENTS: LIVING WITH HIGH-RISK TECHNOLOGIES 11 (1984).

industry-wide move into deepwater.[80] This move was "not gradual, as companies quickly leapfrogged each other to go deeper and deeper for new oil and gas."[81] The "special safety risks" of "harsh environments and remote locations" and the particular challenges posed by deepwater drilling[82] did not deter industry from pursuing opportunities in this high-profit area. Rather, "the world oil industry began a radical restructuring," as many companies and contractors relocated to cities on the Gulf Coast, such as New Orleans and Houston.[83]

Government regulation did not keep up with the shift toward deepwater drilling.[84] As Congressman George Miller of California noted, "The industry convinced nearly everyone in government that what they were doing was so sophisticated that it was both totally safe and impossible for government to understand, much less regulate."[85] Indeed, "[g]overnment was romanced . . . [a]nd it succumbed to the romance,"[86] because of the complex technical aspects of the new drilling mechanisms and the immense profits deepwater drilling generated. Similar government complacency regarding industry practices was also a characteristic of regulation prior to *Exxon Valdez*. As was the case in deepwater drilling, the success of the oil industry and corresponding profits resulted in "a general complacency . . . [within government that] permeate[d] the operation and oversight of the entire system."[87] However, the degree to which MMS ignored various warning signs regarding rig safety and the lack of oversight exercised by MMS in both the planning and execution of deepwater drilling operations cannot be

80. Among these discoveries was the Auger Field, located 136 miles off the coast of Louisiana, and its use of tension-leg (non-fixed) platforms. *See generally* COMMISSION REPORT, *supra* note 21, at 21–54.

81. Staff Working Paper, *supra* note 20, at 10.

82. Such challenges include increased water depth, changing geological conditions at the sea bottom, different sedimentary layers, and the high pressure under which oil and gas in deepwater reservoirs is contained. CHIEF COUNSEL'S REPORT, *supra* note 48, at 6, 8.

83. COMMISSION REPORT, *supra* note 21, at 43; *see* Brian Knowlton, *Oil Growth Boomerangs on Houston*, INT'L HERALD TRIB., Apr. 9, 2002, at 1 (describing Houston as the "capital of the world petroleum industry").

84. *See* NAT'L PETROLEUM COUNCIL, HARD TRUTHS: FACING THE HARD TRUTHS ABOUT ENERGY 26–27 (2007) ("Most energy technology is developed by industry in response to a resource opportunity . . . . Government has a role in creating new opportunities and developing the regulatory framework and infrastructure needed to extract new resources.").

85. Neil King Jr. & Keith Johnson, *An Oil-Thirsty America Dived into 'Dead Sea*,' WALL ST. J. (Oct. 8, 2010, 6:12 PM), http://online.wsj.com/article/SB10001424052748704657304575540063579696700.html (internal quotation marks omitted).

86. *Id.* (internal quotation marks omitted).

87. ALASKA OIL SPILL COMM'N, *supra* note 65, at 5.

excused merely because the work at issue was novel or overly technical.

The increased drilling in the Gulf region stimulated local economies, but it also exposed the region to potentially catastrophic environmental harms, in part because drilling in deepwater required technologies that had never been used previously in the oil extraction industry. Deepwater drilling marked an entirely new and distinct method of extraction,[88] requiring new approaches and the application of new technologies.[89] As a Commission Staff Working Paper noted, "Both the velocity and irregularity of underwater currents as well as extreme pressures and temperatures put extra stress on subsea equipment in the deep."[90] The pressure—and corresponding danger—became greater the farther the companies' operations extended below the surface.[91] The *Deepwater Horizon* drilled the Macondo well at over 5000 feet of water in the Gulf of Mexico, and then over 13,000 feet under the sea floor to the hydrocarbon reservoir.[92] "It is a complex, even dazzling enterprise" to drill this deep, but "the oil and gas reservoirs, when found, exist at even higher pressures . . . compounding the risks if a well gets out of control."[93] Thus, despite the industry's dedication to developing appropriate technologies for its newest endeavor,[94] the move into deepwater had the potential to cause more detrimental impacts than initially predicted.[95]

MMS did establish best practices standards for the offshore drilling

88. *See* COMMISSION REPORT, *supra* note 21, at 25–27; Jonathan Tilove, *New Permits for Shallow-Water Oil Wells Should Be Allowed Amid Deepwater Investigation, Industry Spokesmen Say*, NEW ORLEANS TIMES-PICAYUNE (May 20, 2010, 8:17 PM), http://www.nola.com/news/gulf-oil-spill/index.ssf/2010/05/new_permits_for_shallow-water.html.

89. COMMISSION REPORT, *supra* note 21, at 25–27.

90. Staff Working Paper, *supra* note 20, at 17; *see also* WILLIAM L. LEFFLER ET AL., DEEPWATER PETROLEUM EXPLORATION & PRODUCTION: A NONTECHNICAL GUIDE 59, 66–68 (2003).

91. *See* Staff Working Paper, *supra* note 20, at 17 ("Pressure control becomes more difficult as the drill bit descends because of the greater likelihood of encountering abnormal geopressures.").

92. COMMISSION REPORT, *supra* note 21, at viii.

93. *Id*. at viii, ix.

94. *See generally* COMMISSION REPORT, *supra* note 21, at 21–54.

95. *See* David Flesher, *Searching for Oil, Florida's Black Gold: How Exploration Could Affect Us All*, S. FLA. SUN-SENTINEL (Aug. 17, 2008), http://www.sun-sentinel.com/news/local/southflorida/sfl-flbdrilling0817sbaug17,0,2778178.story?page=1 (assuaging fears of a future catastrophic spill by noting that "improved technology" and "the passage of tighter regulations since the 1989 *Exxon Valdez* disaster" have decreased spill occurrence); Mike Salinero, *A Crude Awakening*, TAMPA TRIB., Aug. 18, 2006, at 1 (noting particular failure to predict environmental harm resulting from oil spills caused by natural disasters such as hurricanes).

industry.[96] Unfortunately, these standards were not adequately enforced by the agency.[97] Indeed, "[d]espite the aspirational language of the 'best available and safest technology' requirement, the *Deepwater Horizon* rig did not include any devices designed specifically to help rig personnel detect the presence of hydrocarbons in the wellbore."[98] The general and outdated regulations imposed by MMS were even more problematic due to the agency's financial incentive to promote offshore drilling,[99] which was "in tension with its mandate to ensure safe drilling and environmental protection."[100] For example, in January 1997, MMS altered an established policy that required testing of undersea BOPs weekly to one that required testing every two weeks,[101] a change that industry had pushed for because it saved an average of twenty-five million dollars a year, according to an MMS estimate.[102] Although reorganized and renamed after the *Deepwater Horizon* spill,[103] MMS came under "much deserved criticism for its failure to rein in BP's avaricious approach to drilling even where it was unable to respond to a worst-case scenario in a responsible and timely fashion."[104] Such criticism is warranted given that "MMS routinely

96. ALYSON FLOURNEY ET AL., CTR. FOR PROGRESSIVE REFORM, REGULATORY BLOWOUT: HOW REGULATORY FAILURES MADE THE BP DISASTER POSSIBLE, AND HOW THE SYSTEM CAN BE FIXED TO AVOID A RECURRENCE 13 (2010), *available at* http://www.progressivereform.org/articles/BP_Reg_Blowout_1007.pdf.

97. *Id.*

98. CHIEF COUNSEL'S REPORT, *supra* note 48, at 257.

99. *Id.* at 251.

100. CHIEF COUNSEL'S REPORT, *supra* note 48, at 251.

101. Press Release, U.S. Dep't of the Interior, Minerals Mgmt. Serv., Innovation 16: MMS Revises Testing Requirements for Blowout Preventers (Jan. 3, 1997), *available at* http://bsee.gov/BSEE-Newsroom/Press-Releases/1997/Press-Release-Catalog-1997.aspx (click on press release posted on Jan. 31, 1997 to download).

102. King Jr. & Johnson, *supra* note 85.

103. After the *Deepwater Horizon* spill, MMS was disbanded and reorganized as the Bureau of Ocean Energy Management, Regulation, and Enforcement, or BOEMRE. The stated purpose of the reorganization was "to separate and reassign the responsibilities that had been conducted by MMS into new management structures that will improve the management, oversight, and accountability of activities on the [Outer Continental Shelf]; ensure a fair return to the taxpayer from royalty and revenue collection and disbursement activities; and provide independent safety and environmental oversight and enforcement of offshore activities." *Frequently Asked Questions*, BUREAU OF OCEAN ENERGY MGMT., REG. & ENFORCEMENT, http://www.boemre.gov/ooc/newweb/frequentlyaskedquestions/frequentlyaskedquestions.htm (last visited May 5, 2012) (in response to the question "Why is BOEMRE reorganizing?"). It should be noted that BOEMRE did not truly replace MMS. Rather, MMS was renamed and reorganized. *Frequently Asked Questions*, BUREAU OF OCEAN ENERGY MGMT., REG. & ENFORCEMENT, http://boem.gov/BOEM-Newsroom/Frequently-Asked-Questions/Frequently-Asked-Questions.aspx (last visited Apr. 23, 2012).

104. FLOURNEY ET AL., *supra* note 96, at 1.

accepted assurances that a blowout was unlikely and adopted safety and environmental standards developed by industry" despite repeated warnings, like the U.S. Coast Guard's in 2002, that, absent greater regulation, the industry would not develop new technologies to prevent spills.[105]

Finally, after the *Deepwater Horizon* spill, it became clear that regulators had failed to consider several serious spills and near misses in the industry, such as a blowout in the Timor Sea and another on the *Louis Bouzigard* rig in the Gulf.[106] When accidents occur in the oil industry, regulators are under no statutory obligation to modify their procedures in light of problems revealed by the accident.[107] While it is impossible to examine the full implications of every single spill, the government should not ignore spills that tend to suggest ongoing problems.[108] Oil companies have also been criticized for failing to adequately consider published data on recurring problems in offshore drilling.[109] To date, "[n]o accident . . . has measurably slowed the rate of discovery and production."[110] Even after the *Deepwater Horizon* spill, oil

105. *Id.*; *see* LEVESON, *supra* note 15, at 6.

106. *See* Russell Gold & Ben Casselman, *Far Offshore, a Rash of Close Calls*, WALL ST. J. (Dec. 8, 2010, 10:35 PM), http://online.wsj.com/article/SB10001424052748703989004575652714091006550.html; Eric Lichtblau, *Records Show Concerns About Another BP Rig*, N.Y. TIMES, Dec. 16, 2010, at A26; Mufson, *supra* note 20.

107. Note, however, that the companies are arguably exposed to tort liability if their operations do not reflect the lessons of prior accidents.

108. The nuclear industry similarly ignored other, smaller accidents that had occurred prior to Three Mile Island because no major legislation had been passed to address these accidents or the possibility that the smaller problems would combine to create a catastrophe like Three Mile Island. CHILES, *supra* note 17, at 16, 21, 141, 45 ("We know so much about the problems [of nuclear accidents] only because the accident at Three Mile Island made it a subject for intense study."); *see also* PERROW, *supra* note 79, at 48 ("Two-thirds of the problems discussed in this issue are strikingly similar to ones previously reported in *Nuclear Safety* [*Magazine*] in the hope and expectation that we will all be able to learn from the experience of others . . . . Operators should take particular note of these occurrences so that they can more readily avoid similar happenings in their own plants." (internal quotation marks omitted)). The Three Mile Island meltdown was caused by "a combination of events—a stuck-open pressure-relief valve that allowed water levels in the reactor to drop, thus uncovering the radioactive core, plus indicators that showed the position of the switch controlling the valve but not the valve itself, plus operator training that cautioned operators about overfilling the reactor with water—[that] destroyed a billion dollar unit of the plant and changed the nuclear power industry forever." John S. Carroll, *Knowledge Management in High-Hazard Industries*, *in* ACCIDENT PRECURSOR ANALYSIS AND MANAGEMENT: REDUCING TECHNOLOGICAL RISK THROUGH DILIGENCE 127, 127 (James M. Phimister et al., eds. 2004).

109. *See* Staff Working Paper, *supra* note 20 at 17; *see also* Clifford Krauss, *Accidents Don't Slow Gulf of Mexico Drilling*, N.Y. TIMES, Apr. 23, 2010, at A17, *available at* http://www.nytimes.com/2010/04/23/us/23offshore.html.

110. Krauss, *supra* note 109.

companies lobbied for continued drilling "instead of focusing all [of their] energy on improving [their] capacity to prevent and respond to future blowouts."[111] While this criticism is overstated, as oil producers cannot focus *all* of their efforts on spill prevention, oil companies should consider data on previous spills and their causes with greater frequency and in greater detail in order to prevent or mitigate future incidents. Moreover, data detailing prior occurrences should not only be considered by industry and regulators, but also by legislators and those developing spill response plans.

C. Inadequacies in Proposed and Existing Legislation

While a public call for new legislation and corresponding legislative proposals immediately followed the *Deepwater Horizon* spill, no law directly addressing prevention of similar disasters was adopted.[112] This is concerning, as existing laws primarily focus on technical lessons learned from previous disasters (like the regulation of double hulls following the *Exxon Valdez* tanker spill),[113] and therefore, as demonstrated by *Deepwater Horizon*, make it difficult to successfully anticipate or mitigate disastrous events that do not have the exact same technical causes. Moreover, inadequate and inconsistent implementation of existing laws like NEPA and the Oil Pollution Act ("OPA") has caused severe misunderstandings regarding the potential for an accident like *Deepwater Horizon* and appropriate response efforts.[114]

Of the seventy-five bills introduced in Congress after the *Deepwater Horizon* spill, most focused on liability for the damage caused to human health, the local economy, and the environment.[115]

111. Editorial, *They Haven't Learned*, N.Y. TIMES, Dec. 13, 2010, at A24, *available at* http://www.nytimes.com/2010/12/13/opinion/13mon1.html.

112. *See* JONATHAN L. RAMSEUR, CONG. RESEARCH SERV., R42371, *DEEPWATER HORIZON* OIL SPILL: HIGHLIGHTED ACTIVITIES 2 (2012) (noting that "oil spill-related legislative activity in the 112th Congress has diminished compared to the 111th Congress"), *available at* http://www.fas.org/sgp/crs/misc/R42371.pdf; Bruce Alpert & Jonathan Tilove, *A Year After Gulf Oil Spill, Congress Is Sitting on Its Hands*, NEW ORLEANS TIMES-PICAYUNE (Apr. 10, 2011, 6:10 AM), http://www.nola.com/news/gulf-oil-spill/index.ssf/2011/04/a_year_after_gulf_oil_spill_co.html.

113. *See supra* Part I.B.1.

114. *See* U.S. COAST GUARD, *supra* note 25, at 3; Juliet Eilperin, *U.S. Exempted BP's Gulf of Mexico Drilling from Environmental Impact Study*, WASH. POST, May 5, 2010, at A04, *available at* http://www.washingtonpost.com/wpdyn/content/article/2010/05/04/AR2010050404118.html.

115. *See* Press Release, White House Office of the Press Sec'y, *supra* note 5. The Senate bill

Proposed legislation that did not focus on liability generally focused on specific last resort protective technologies that were believed to have failed on the *Deepwater Horizon*,[116] responding to the call for "some fundamental paradigm shifts" in technology to deal with deepwater conditions.[117] For example, the Blowout Prevention Act, subsequently incorporated into the Consolidated Land, Energy, and Aquatic Resources ("CLEAR") Act,[118] set forth new requirements for BOPs, well design, and cementing.[119] However, the CLEAR Act did not address the extent to which human triggers of last resort technologies need to be examined or changed, nor did it require any sort of pre-development environmental planning to modify NEPA's

that attracted the most media attention proposed to raise the cap on private party liability in the Oil Pollution Act from seventy-five million to ten billion dollars, and would have been retroactive to before the *Deepwater Horizon* spill. *See* Oil Spill Response and Assistance Act, H.R. 5356, 111th Cong. (2010); Lisa Lerer, *Congress Prepares Bill to Remove BP Liability Limit*, BLOOMBERG (June 3, 2010, 12:24 PM), http://www.bloomberg.com/news/2010-06-03/democrats-prepare-bill-to-remove-75-million-damages-limit-for-oil-spills.html. However, the proposal was met with bipartisan opposition, including from Senator Landrieu, who said, "We want to be careful before we change any of these laws that we don't jeopardize the operations of an ongoing industry, because there are 4000 other wells in the Gulf that have to go on." Lisa Lerer, *Effort to Increase Liability Limit for Oil-Spill Damages Fails in Senate*, BLOOMBERG (May 14, 2010, 2:09 PM), http://www.bloomberg.com/news/2010-05-14/effort-to-increase-oil-spill-liability-after-gulf-disaster-fails-in-senate.html. Retroactivity of such a bill may also violate due process and basic principles of fairness. *See Deepwater Horizon Liability: Hearing Before the S. Comm. on Energy & Natural Res.*, 111th Cong. 60–61 (2010) (statement of Robert Meltz, Legislative Attorney, Cong. Research Serv.), *available at* http://www.gpo.gov/fdsys/pkg/CHRG-111shrg61828/pdf/CHRG-111shrg61828.pdf (discussing a potential substantive due process challenge but concluding that it would likely not succeed). Another such bill was the Big Oil Polluter Pays Act, which proposed to reverse the Supreme Court's 2008 decision in *Exxon Shipping Co. v. Baker*, 554 U.S. 471 (2008), which slashed Exxon Mobil's punitive damages for the *Exxon Valdez* spill. *See* S. 3345, 111th Cong. (2010).

116. *See supra* note 7. The Oil Spill Prevention and Mitigation Improvement Act of 2010, which would have required oil companies to have a viable, peer-reviewed response plan to respond to a significant oil leak before any new offshore drilling lease could be issued, was never passed. *See* Scott Brown, Editorial, *Acting to Contain Disasters*, WORCESTER TELEGRAM & GAZETTE (June 24, 2010), http://www.telegram.com/article/20100624/NEWS/6240755/1054/OPINION&Template=printart.

117. WHITBY, *supra* note 61, at 37.

118. The Blowout Prevention Act of 2010, H.R. 5626, 111th Cong. (2010); the Consolidated Land, Energy, and Aquatic Resources (CLEAR) Act, H.R. 3534, 111th Cong. (2010).

119. H.R. 3534. According to Republican Congressman Joe Barton, the ranking minority leader on the Energy and Commerce Committee at the time the Blowout Prevention Act was proposed, "[t]he requirements in this bill [would] materially improve safety and environmental protection and materially increase the probability that never again will this committee or Congress or the president of the United States have to deal with a disaster of the proportion that we have now in the Gulf of Mexico." *Drilling Safeguard Bill Passes House Committee*, 22 WESTLAW J. UTIL. INDUSTRY, no. 3, Aug. 2010, at 7 (internal quotation marks omitted).

environmental impact statement policies or OPA's response plan requirements.[120] Although the Act passed in the House, it expired while awaiting review in the Senate.[121] As this Note goes to print, Congress has adopted no new legislation in this area.[122] Although some slight regulatory changes have been made, Part II of this Note will demonstrate why legislative reform is ultimately necessary to prevent similar disasters from occurring in the future.

Mirroring the period immediately following the *Deepwater Horizon* spill, the *Exxon Valdez* disaster prompted attempts at preventative legislation in Congress, which was characterized as unwilling "to accept the complacency that has settled over Washington about taking the necessary steps to prevent a similar disaster in the future."[123] The end result was OPA, which, among other things, required the preparation of response plans by various entities,[124] increased penalties for regulatory noncompliance, and preserved state authority to enact laws governing oil spills.[125] While OPA represented a response to the *Exxon Valdez* spill, similar to the

120. H.R. 3534.

121. *Id.* The Bill passed the House 209-193, but died in the Senate. *Bill Summary & Status: H.R. 3534*, LIBRARY OF CONGRESS, http://thomas.loc.gov/home/LegislativeData.php (select 111th Congress and search for bill number H.R. 3534) (last visited May 19, 2012).

122. Some relevant bills have been proposed in both houses of Congress. The most promising piece of legislation proposed is the Outer Continental Shelf Reform Act of 2011, S. 917, 112th Cong. (2011). It would "[a]mend[] the Outer Continental Shelf Lands Act to prescribe a program of structural reform for [the] management of the Outer Continental Shelf, including establishing two bureaus to carry out leasing, permitting, and safety and environmental regulatory functions," but has only reached the hearing stage in the Senate. *Bill Summary & Status: S.917*, LIBRARY OF CONGRESS, http://thomas.loc.gov/home/LegislativeData.php (select 112th Congress and search for bill number S 917)(last visited May 19, 2012). The Implementing the Recommendations of the BP Oil Spill Commission Act of 2011, H.R. 501, 112th Cong. (2011), was introduced in the House on January 26, 2011 and referred to the House Subcommittee on Workforce Protections on February 25, 2011. *Bill Summary & Status: H.R. 501*, LIBRARY OF CONGRESS, http://thomas.loc.gov/home/LegislativeData.php (select 112th Congress and search for bill number HR 501)(last visited May 19, 2012). Similarly, the Offshore Drilling Safety Improvement Act, H.R. 1520, 112th Cong. (2011), was introduced by Rep. Jay Inslee (WA) on April 13, 2011 and referred to the House Subcommittee on Energy and Power. *Bill Summary & Status: H.R. 1520*, LIBRARY OF CONGRESS, http://thomas.loc.gov/home/LegislativeData.php (select 112th Congress and search for bill number HR 1520) (last visited May 19, 2012).

123. Steve Cowper, Editorial, *An Oil-Spill Law—Now*, WASH. POST, June 13, 1990, at A23 (the author was governor of Alaska at the time of the *Exxon Valdez* disaster).

124. See *infra* notes 158–165 and accompanying text for a discussion of Regional Contingency Plans and Agency Contingency Plans.

125. *See* 33 U.S.C. § 2718(a)–(c) (2006); *Oil Pollution Act Overview*, ENVTL. PROT. AGENCY, http://www.epa.gov/emergencies/content/lawsregs/opaover.htm (last visited Apr. 24, 2012) (describing the provisions of the Oil Pollution Act, including a provision that increases penalties for regulatory noncompliance).

legislation proposed in the aftermath of *Deepwater Horizon*, the response was limited in scope, focusing primarily on the establishment of two advisory programs in Alaska to monitor the terminal facilities and crude oil tankers in the Prince William Sound[126] and a schedule for phasing out older single hull tankers from U.S. ports[127] instead of robust preventative measures.

State legislation in the aftermath of both disasters was also fairly limited. State legislation following the *Deepwater Horizon* spill, to the extent that it exists, has largely targeted company liability for environmental cleanup.[128] Demonstrating a similar concern for cleanup costs after the *Exxon Valdez* spill, California established an oil spill cleanup fund financed by taxing each barrel of oil within the state.[129] Alaska, on the other hand, did act to put in to place preventative measures, "announc[ing] . . . more stringent oil-spill prevention and response standards governing tankers, terminals, facilities, and the Trans-Alaska Pipeline System."[130]

The lack of new legislation following *Deepwater Horizon* is perhaps surprising, given that the laws in place prior to the accident failed to adequately address disaster prevention and mitigation. For example, the Environmental Impact Statement ("EIS") requirement of NEPA and the response plan system established by OPA failed to sufficiently prepare industry for the worst-case scenario that ultimately occurred. Under NEPA, a federal agency contemplating a major federal action that may significantly affect the environment must prepare an EIS, or a shorter Environmental Assessment ("EA") unless a categorical exclusion ("CE") applies.[131] An EIS requires the responsible federal agency involved to consider the environmental impacts of its activities and alternatives to those activities.[132] Typically, categorical exclusions are applied to activities that "do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in

126. Oil Pollution Act of 1990, Pub. L. No. 101-380, §§ 5001–5002, 104 Stat. 484, 542–53 (1990) (codified as amended in scattered sections of 33 U.S.C.).

127. 33 U.S.C. § 4115 (2006).

128. *See, e.g.*, H.B. 1186, 62d Leg., 2011 Reg. Sess. (Wash. 2011) (enacted) (increasing penalties for oil spilled within the state's waters).

129. *Oil Safeguards Become Law in California*, WASH. POST, Sept. 23, 1990, at A17.

130. *Alaska Announces New Rules for Responding to Oil Spills*, WASH. POST., Oct. 27, 1991, at A19.

131. 42 U.S.C. § 4332(C) (2006); 40 C.F.R. § 1508.4 (2012). A CE essentially represents an advance determination that a particular kind of action will not significantly affect the environment. *See* 40 C.F.R. § 1508.4.

132. *See* 42 U.S.C. § 4332(C).

procedures adopted by a Federal agency . . . ."[133] Any procedures allowing CEs must include "extraordinary circumstances," under which a CE would not apply.[134]

Confusion and uncertainty created by the complexity of the NEPA process on the Outer Continental Shelf may have contributed to the lack of preparedness for the spill. Prior to the accident, MMS employed a "tiering" process, encouraged by NEPA regulations, under which it covered "general matters in broader environmental impact statements . . . with subsequent narrower statements or environmental analyses . . . incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared."[135] When tiering occurs, "it is important that decisionmakers are made aware of the relevant portions of the previous NEPA environmental analysis to inform their subsequent decisions," but MMS's tiered analysis was not sufficiently specific to the "particular activity, geography, and impacts" of the Outer Continental Shelf, as required by the tiering process.[136] Reforms to this process on the Outer Continental Shelf would undoubtedly reduce the level of complexity and ambiguity that characterized NEPA review for the Macondo well.

Each step of the leasing process on the Outer Continental Shelf undergoes NEPA review unless categorically excluded.[137] BP was not required to prepare an EIS for its exploratory drilling operation on the *Deepwater Horizon*.[138] Instead, BP prepared an exploration plan ("EP") and applied for permits to drill the Macondo well.[139] BP called

133. 40 C.F.R. § 1508.4.

134. *Id.*

135. COUNCIL ON ENVTL. QUALITY, REPORT REGARDING THE MINERALS MANAGEMENT SERVICE'S NATIONAL ENVIRONMENTAL POLICY ACT POLICIES, PRACTICES, AND PROCEDURES AS THEY RELATE TO OUTER CONTINENTAL SHELF OIL AND GAS EXPLORATION AND DEVELOPMENT 3 (2010) [hereinafter CEQ REPORT] (quoting 40 C.F.R. § 1502.28 (2012)), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ceq/20100816-ceq-mms-ocs-nepa.pdf.

136. *Id.* at 23–24. An EIS had, however, been prepared on the leasing program for this part of the Gulf. *Id*. at 24 n.67 ("As operations moved into deeper waters, MMS recognized that both the technologies used and the potentially affected environments were not as well known." (citing MINERALS MGMT. SERV., STRATEGY FOR POSTLEASE NEPA COMPLIANCE IN DEEPWATER AREAS OF THE GULF OF MEXICO)).

137. *See* CURRY L. HAGERTY & JONATHAN L. RAMSEUR, CONG. RESEARCH SERV., R41262, DEEPWATER HORIZON OIL SPILL: SELECTED ISSUES FOR CONGRESS 15 (2010), *available at* http://assets.opencrs.com/rpts/R41262_20100730.pdf.

138. *See* Eilperin, *supra* note 114.

139. CEQ REPORT, *supra* note 135, at 18. MMS also prepared NEPA reviews for the five-year nationwide oil and gas leasing program for the Outer Continental Shelf, the planning of multiple proposed lease sales in the Central and Western Planning Areas of the Gulf of Mexico,

the prospect of an oil spill "unlikely," stating that "no mitigation measures other than those required by regulation and BP policy will be employed to avoid, diminish, or eliminate potential impacts on environmental resurface."[140] At a Congressional hearing entitled "Inquiry Into *Deepwater Horizon* Gulf Coast Oil Spill," Representative John D. Dingell of Michigan called this declaration "outrageous," particularly because "there was a new regime going on [at BP] that was aware of the environmental concerns as a Nation and the duties of that organization."[141]

MMS categorically excluded the exploration plan submitted by BP.[142] In doing so, the agency prepared a categorical exclusion review based on CE 15.4(C)(10), the exclusion applicable to EPs.[143] CE 15.4(C)(10) is the only exclusion that makes specific reference to an area on the Outer Continental Shelf, and it was established well before deepwater drilling became widespread.[144] A study by the Congressional Research Service found:

> Even if a blowout scenario was not prepared, it seems there would be significant amounts of oil released if the worst case scenario of a blowout occurred, oil at quantities greater than considered in the Multisale EIS or the Lease Sale 206 EA. However, because a CE was used for the EP, instead of an EIS or an EA, a review of the

the offering of a bundle of leases called Lease Sale 206, *see infra* note 145, and the lease of MC Block 252 (the area where the Macondo well was located) to BP. *Id.* For copies of these various documents, see MINERALS MGMT. SERV., U.S. DEP'T OF INTERIOR, OUTER CONTINENTAL SHELF OIL & GAS LEASING PROGRAM: 2007–2012 (2007), *available at* http://www.boemre.gov/5-year/2007-2012FEIS.htm (relevant figures and tables are available at http://www.gomr.mms.gov/PDFs/2006/2006-062-Vol1.pdf and http://www.gomr.mms.gov/PDFs/2006/2006-062-Vol2.pdf).

140. *Inquiry into the Deepwater Horizon Gulf Coast Oil Spill*, *Before the Subcomm. on Oversight and Investigations of the H. Comm. on Energy and Commerce*, 111th Cong. 28 (2010) (statement of Sen. John Dingell).

141. *Id.* at 28–29.

142. *See* KRISTINA ALEXANDER, CONG. RESEARCH SERV., R41265, THE 2010 OIL SPILL: MMS/BOEMRE AND NEPA 11–14 (2010), *available at* www.eenews.net/assets/2010/09/27/document_gw_01.pdf.

143. *See id.* at 12 (the text of CE 15.4(C)(10) reads: "Approval of an offshore lease or unit exploration development/production plan or a Development Operation Coordination Document in the central or western Gulf of Mexico (30 CFR 250.2) except those proposing facilities: (1) In areas of high seismic risk or seismicity, relatively untested deep water, or remote areas, or (2) within the boundary of a proposed or established marine sanctuary, and/or within or near the boundary of a proposed or established wildlife refuge or areas of high biological sensitivity; or (3) in areas of hazardous natural bottom conditions; or (4) utilizing new or unusual technology.").

144. *Id.*; *see* CEQ REPORT, *supra* note 135, at 20; *see also* COMMISSION REPORT, *supra* note 21, at 21–54.

> environmental impacts for a spill of this size was not conducted. They were not considered within the previous EISs or the EA either.[145]

No court has reviewed the CE that applied to the Macondo well, because it has not been challenged, either prima facie or as applied.[146] It has been suggested, however, that MMS was a "serial abuser" of the CE option available under NEPA, and routinely ignored the statute's requirement to consider "reasonably foreseeable significant and adverse impacts."[147] For example, in 2002, the Ninth Circuit held that MMS's use of a CE when approving lease suspensions was improper.[148] The court reasoned that MMS did not consider some exceptions to a CE that could have applied.[149] Similarly, several exceptions, such as effects on endangered species[150] and the potential for unknown environmental risks,[151] could have applied to the Macondo CE.[152]

Although the "catastrophic potential" of oil spills suggests a particular need for regulation and oversight,[153] even operations that are not categorically excluded from NEPA are no longer required to analyze worst-case scenarios in their EISs.[154] The removal of this

145. ALEXANDER, *supra* note 142, at 14. The Multisale EIS is the EIS prepared by MMS for the eleven lease sales in the Gulf of Mexico. *See* MINERALS MGMT. SERV., PROPOSED GULF OF MEXICO OCS OIL AND GAS LEASE SALE 206, CENTRAL PLANNING AREA, ENVIRONMENTAL ASSESSMENT (2007), *available at* http://www.gomr.boemre.gov/PDFs/2007/2007-059.pdf. Lease Sale 206 allowed BP to obtain the Mississippi Canyon Block 252, the oil tract where the Macondo well blowout occurred. *See* ALEXANDER, *supra* note 142 at 1, 4–6. *See generally* MINERALS MGMT. SERV., *supra* note 139.

146. HAGERTY & RAMSEUR, *supra* note 137, at 14.

147. FLOURNEY ET AL., *supra* note 96, at 3.

148. California v. Norton, 311 F.3d 1162, 1176–77 (9th Cir. 2002).

149. *Id.* at 1177–78.

150. *See* Endangered Species Act, 43 U.S.C. § 1334(a)(1) (2006).

151. *See* 43 C.F.R. § 46.215(d) (2012).

152. HAGERTY & RAMSEUR, *supra* note 137, at 14–15. The Ninth Circuit suggested in another case that a spill analysis might, in fact, be most appropriate in the exploration stage. Tribal Village of Akutan v. Hodel, 869 F.2d 1185, 1192 (9th Cir. 1988). Thus, MMS perhaps could have prevented the spill itself and much of BP's subsequent liability had it prepared a proper spill analysis for the exploratory well and similar deepwater leases in the Gulf. This conclusion necessarily assumes that someone at MMS was reviewing the EISs submitted for these operations and analyzing them in some manner, although, given the evidence of structural and managerial breakdown at that agency, this assumption may be unwarranted.

153. PERROW, *supra* note 79, at 37 ("Shoddy construction and inadvertent errors, intimidation and actual deception—these are part and parcel of industrial life. No industry is without these problems, just as no valve can be made failure-proof. Normally, the consequences are not catastrophic. They may be, however, if you build systems with catastrophic potential.").

154. *Oil Spill Liability Trust Fund, House Session*, C-SPAN (June 10, 2010), http://www.c-spanvideo.org/appearance/598291017 (statement of Sen. James L. Oberstar) ("Because of the

requirement in 1986 contributed to less rigorous planning by MMS, BP, and its industry colleagues conducting deepwater drilling in the Gulf and elsewhere.[155] While BP did voluntarily discuss a Worst Case Scenario Response in its initial EP, it only referred to blowouts in the context of a response plan and did not include a blowout scenario in the EP.[156] Better planning for contingencies may have prevented the spill or contributed to a more effective response.[157]

Under the National Response System, there are three levels of contingency plans—national ("NCP"), regional ("RCP"), and area ("ACP").[158] However, "while there is ample guidance in the Code of Federal Regulations for the development of the NCP and ACP, there is little regarding the RCP."[159] The U.S. Coast Guard has developed a "One Gulf Plan" that "essentially serves as the RCP."[160] As stated in a U.S. Coast Guard report, "[t]his lack of familiarity, and the missed opportunities to contribute to its development, may have complicated the execution of the response effort to the *Deepwater Horizon* incident because the One Gulf Plan is the fundamental response framework applicable to most of the Gulf."[161] Further, the magnitude of environmental harm and various failures in response to the spill revealed severe weaknesses in the One Gulf Plan.[162] The ACPs for the relevant areas were also flawed. They did not contain worst-case discharge scenarios involving offshore oil exploration activities, "resulting in a lack of preparedness for such events."[163] The ACPs also did not adequately address the potential for a spill of the size of the *Deepwater Horizon* accident, even though BP anticipated a much larger spill in its Oil Spill Response Plan ("OSRP").[164] Further, some ACPs had entire sections labeled "To Be Developed," despite a decade-long development process.[165] The

categorical exclusion, the additional environmental impacts for a worst case scenario were not evaluated.").

155. FLOURNEY ET AL., *supra* note 96.

156. ALEXANDER, *supra* note 142, at 13. BP had prepared a Worst Case Discharge ("WCD") scenario for the well that the *Deepwater Horizon* Mobile Offshore Drilling Unit ("MODU") was drilling when the loss of well control occurred, but the scenario was couched mostly in terms of response, rather than prevention. *See* U.S. COAST GUARD, *supra* note 25, at 28.

157. U.S. COAST GUARD, *supra* note 25, at 30–31.

158. *Id.* at 23.

159. *Id.*

160. *Id.*

161. *Id.*

162. *Id.*

163. *Id.* at 16.

164. *Id.* at 20.

165. *Id.* at 6.

glaring inconsistencies in the various response plans suggest that a lack of communication regarding the possibility of a worst-case discharge and the best approach for remedying such a spill was a root cause of the magnitude of the *Deepwater Horizon* spill.

The current regulatory structure failed to anticipate or prevent the *Deepwater Horizon* disaster, illustrating significant flaws in the system. Under the current pattern of legislative response to deepwater disasters, most new regulation is directed at the technologies that failed in the most recent environmental disaster.[166] Such regulation, demanded by a justifiably emotional public after a catastrophic event, would not be as necessary if broader government oversight was established for new technologies prior to implementation, including protections and tests for those new technologies as they develop.

166. *See, e.g.*, Oil Pollution Act, 33 U.S.C. § 2718(a)–(c) (2006) (provisions regarding double hulls and the area near Prince William Sound); *Oil Pollution Act Overview*, ENVTL. PROT. AGENCY, http://www.epa.gov/emergencies/content/lawsregs/opaover.htm (last visited Apr. 24, 2012) (describing the provisions of the Oil Pollution Act, including a provision that increases penalties for regulatory noncompliance).

II. EXISTING REGULATIONS AND LAWS MUST BE IMPROVED TO PREVENT SPILLS OF DISASTROUS MAGNITUDES FROM OCCURRING IN THE FUTURE

Following high-profile disasters like those discussed in Part I of this Note, there is never a shortage of opinion regarding what should have been done differently and what could be done to prevent a similar disaster from occurring in the future. This type of discourse can encourage investigation and study that improves the technologies and systems that failed in a particular accident. However, reactionary discourse generally fails to propose solutions that incorporate developing or yet-to-be-discovered technologies. The failure of post-*Exxon Valdez* legislation to prevent an accident of the magnitude of *Deepwater Horizon* illustrates the need for a different approach to regulation. While it is beneficial and instructive to study the causes of past disasters, industry and legislators should work to develop regulations that will create general, prospective oversight of the oil industry.

Three steps are in order to properly regulate the development of new technologies in the oil and gas extractive industry. First, regulators and legislators should reconsider preemptive requirements in NEPA and OPA, particularly given MMS's abuse of categorical exemptions in the Gulf of Mexico and the dangerous inconsistencies between various response plans. Second, in order to avoid harms caused by mismanagement at the agency level and abuse of industry power, an independent board should be established to facilitate communication and efficient regulation. Lastly, the complexity of energy extraction systems and the likelihood of human error indicate that less reliance should be placed on human triggers of last resort protective technologies.

A. NEPA and OPA Should Be Reexamined to Require a Detailed EIS for Major Oil-Related Developments and Greater Consistency Among Response Plans

In light of the failures of MMS, the government should establish more stringent protocols for the preparation of EISs. Merely preparing an EIS does not guarantee thoughtful analysis.[167] The

167. *See* 42 U.S.C. § 4321 (2006) (leaving establishment of substantive EIS requirements to agency regulations); *see also* 40 C.F.R. § 1502.14 (2012) (enumerating the substantive requirements that must be contained in an EIS). An agency's decision to include various alternatives in an EIS is bound only by a rule of reason and practicality test in most circuits.

process can potentially become a routine, box-checking exercise, as courts "may not rule an EIS inadequate if the agency has made an adequate compilation of relevant information, has analyzed it reasonably, has not ignored pertinent data, and has made disclosures to the public."[168] Therefore, strong protocols for predicting plausible accidents, assessing their impacts, and preparing responses for those impacts are crucial alterations that must be made to NEPA regulations in this industry.[169]

While it will likely be some time before NEPA is used optimally to ensure safety in offshore drilling operations, small reforms have been made since the *Deepwater Horizon* spill. BOEMRE has announced that all plans submitted for approval proposing an activity involving a subsea BOP or surface BOP on a floating facility will be subject to an EA.[170] While this reform recognizes the need for greater review of energy extraction technologies under NEPA, it only addresses the last resort protective technology that failed on the *Deepwater Horizon*: the BOP. Such a regulatory move is a good first step in the direction of proper oversight of drilling technologies, but more must be done to render oil and gas exploration safe while not unduly inhibiting innovation.

See e.g., Davis v. Mineta, 302 F.3d 1104, 1120 (10th Cir. 2002) ("An agency decision concerning which alternatives to consider is necessarily bound by a rule of reason and practicality" (internal citation omitted)); Ass'n of Pub. Agency Customers, Inc. v. Bonneville Power Admin., 126 F.3d 1158, 1185 (9th Cir. 1997) ("The 'rule of reason' guides both the choice of alternatives as well as the extent to which the Environmental Impact Statement must discuss each alternative."); N. Buckhead Civic Ass'n v. Skinner, 903 F.2d 1533, 1541 (11th Cir. 1990) ("Thus, an EIS is satisfactory if the treatment of alternatives, when judged against a 'rule of reason,' is sufficient . . . ."); City of New York v. U.S. Dep't of Transp., 715 F.2d 732, 742 (2d Cir. 1983) ("The agency itself is responsible for determining the range of alternatives to be considered and is supposed to follow . . . 'a rule of reason.'" (internal citations omitted)); Grazing Fields Farm v. Goldschmidt, 626 F.2d 1068, 1074 (1st Cir. 1980) ("The degree to which any alternative must be discussed must be measured by a 'rule of reason.'").

168. Sierra Club v. U.S. Army Corps of Eng's, 701 F.2d 1011, 1029 (2d Cir. 1983) (citing Suffolk Cnty. v. Sec'y of the Interior, 562 F.2d 1368 (2d Cir. 1977)) (holding that a decision made in reliance on false information cannot be a reasoned decision).

169. The Council on Environmental Quality has suggested that the relevant agency must "ensure that each step of its NEPA process is used to assist informed decisionmaking, and that agency decisionmakers have a clear understanding of potential environmental consequences." CEQ REPORT, *supra* note 135, at 22. The Council also recommended that BOEMRE (now BOEM and BSEE) reexamine the use of the tiering process to ensure tiering is clear and well defined. *Id.* at 23.

170. Memorandum from Michael R. Bromwich, Dir., Bureau of Ocean Energy Mgmt., Enforcement, & Regulation, on Use of Categorical Exclusions in Gulf of Mex. Region to Walter Cruickshank, Deputy Dir., Bureau of Ocean Energy Mgmt., Enforcement & Regulation (Aug. 16, 2010), *available at* http://www.doi.gov/news/pressreleases/loader.cfm?csModule=security/getfile&PageID=42011.

New extraction projects within the oil and gas industry should be excluded from CE analysis, and agencies analyzing such projects should be required to consider worst-case scenarios. If developing technologies are excluded from NEPA analysis, major risks can go unnoticed until it is too late. Legislation such as the Oil Pollution Environmental Review Act, which eliminates CEs for such operations, is therefore crucial to ensure that the industry operates in a manner that is safe to human health and the environment.[171] The current, watered-down guidelines for NEPA and the statute itself provide neither requirements nor adequate incentives to consider worst-case scenarios,[172] which, as the *Deepwater Horizon* spill illustrates, are possible. Implementing a NEPA worst-case analysis requirement, like the requirement that existed in 1978,[173]

171. *See* H.R. 5506, 111th Cong. (2010); *see also* Press Release, Congressman Gerry Connolly, Release: Connolly Bill Requires Full Environmental Study of Offshore Drilling Plans (June 17, 2010), *available at* http://connolly.house.gov/index.cfm?sectionid=44&parentid=6&sectiontree=&itemid=364.

172. National Environmental Policy Act, 42 U.S.C. §§ 4321–4370 (2006); 40 C.F.R. §§ 1500–1506 (2012). In 2001, the Ninth Circuit held that an EIS for an oil and gas development project off the coast of Alaska need not contain a site-specific oil spill trajectory analysis, although a spill response plan does require various elements of a worst case discharge scenario. *See* Edwardsen v. U.S. Dep't of the Interior, 268 F.3d 781, 785–86 (9th Cir. 2001) (construing 30 CFR § 254.26(b) (2012)). The Ninth Circuit also determined that the worst-case scenario of a 100,000-barrel oil spill need not be included in an EIS at the sale stage under OCSLA. *See* Vill. of False Pass v. Clark, 733 F.2d 605, 614 (9th Cir. 1984). This principle has been adopted by other circuits. *See, e.g.*, County of Suffolk v. Sec'y of the Interior, 562 F.2d 1368, 1378–81 (2d Cir. 1977), *cert. denied*, 434 U.S. 1064 (1978); Sierra Club v. Morton, 510 F.2d 813, 828 (5th Cir. 1975).

173. The 1978 regulation was upheld in *Sierra Club v. Sigler*, 695 F.2d 957 (5th Cir. 1983), which held that a proposal to allow oil tankers to operate in an estuary off the coast of Texas had to consider the "catastrophic impact of a total cargo loss by a supertanker" and "the probability of its occurrence." *Id.* at 972. In a 1981 guidance document, CEQ noted that the rule as it stood at the time required "reasonable projections of the worst possible consequences of a proposed action." Memorandum from Council on Envtl. Quality on Forty Most Asked Questions Concerning CEQ's NEPA Regulations to Agencies (Mar. 17, 1981), *reprinted in* 46 Fed. Reg. 18,026, 18,032 (Mar. 23, 1981). Rather than require analysis of a worst-case scenario, the current regulations require the federal agency preparing an EIS to consider "reasonably foreseeable significant adverse impacts." 40 C.F.R. § 1502.22(b) (2012). Those impacts do include "impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason," which falls short of being a true analysis of all worst case scenarios. *Id.* The Supreme Court subsequently upheld the regulation, holding that NEPA does not require a worst-case analysis. *See* Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 356 (1989). The initial regulation was criticized due to the "limitless nature of the task of conjuring the worst possible case," "the lack of expert support for worst-case analysis in the growing field of risk analysis," and the "minimal value of fanciful worst-case analyses to federal decision-makers who must balance a full range of proven competing interests." Vicki O. Masterman, *Worst Case Analysis:*

would prohibit federal agencies, often under the influence of oil companies, from ignoring major foreseeable risks.[174]

Better coordination in response planning could also mitigate the effects of future spills. A distinct lack of communication between various planning groups is evident from the inconsistencies between the RCPs and ACPs put forth by state and local officials and the OSRPs developed by oil companies.[175] A more comprehensive understanding of the type of worst case scenario that could occur would allow companies to appropriately allocate resources for preventative and responsive efforts, better facilitate government oversight of industry activities, and allow the expectations of all parties to converge.

B. An Independent Board Should Be Established to Monitor and Approve Developing Technologies Before Implementation

Instead of waiting for a disaster to occur, industry and regulators should cooperate with one another "long before a fire or explosion, at the design and planning stage."[176] An independent regulatory board tasked with overseeing the energy industry could monitor technological safeguards aboard rigs and other extraction structures, and could enforce settlement agreements, statutory requirements, and industry standards.[177] A board empowered to work with the oil industry to develop safe techniques for extraction—especially a board with power to mandate technological standards—would create more certainty for the industry and for the general public.[178]

The Final Chapter?, 19 ENVTL. L. REP. 10,026, 10,029 (1989). The *Deepwater Horizon* spill and the proliferation of smaller, yet all too frequent, oil spills, demonstrate why these disasters can no longer be considered "fanciful."

174. *See* Doremus, *supra* note 60.

175. U.S. COAST GUARD, *supra* note 25, at 6.

176. CHILES, *supra* note 17, at 281.

177. For example, in a complaint filed in the Delaware Chancery Court on May 21, 2010, the Southeastern Pennsylvania Transportation Authority (SEPTA) argued that the *Deepwater Horizon* spill could have been prevented if BP had installed the mechanical and operational safeguards it agreed to as a part of the 2006 settlement of a shareholder suit over a "massive oil spill and complete pipeline shutdown" at Prudhoe Bay in Alaska. Complaint at 36, Se. Pa. Transp. Auth. v. Hayward, No. CA5511-CC (Del. Ch. May 21, 2010); *see* Stipulation of Settlement, In re BP p.l.c. Derivative Litigation, No. 06-11929C, 2008 WL 8732542 (Alaska Super. Ct. Oct. 5, 2006). The type of board proposed in this Note could have enforced that settlement agreement to ensure the mandated safeguards were implemented aboard the *Deepwater Horizon*.

178. Jeffrey Ball, *Energy and the Environment: More Certainty, More Innovation*, WALL ST. J. (Nov. 22, 2010), http://online.wsj.com/article/SB10001424052748703688704575620843847497452.html (reporting on CEO conference advocating consistent federal energy policy).

The establishment of an independent board would also greatly improve inadequate government oversight.[179] Combining the knowledge of industry with the impartiality of government overseers would achieve a level of success that "depends on the personal knowledge and involvement of experts and knowledgeable individuals," while including a viewpoint that incorporates safety as much as it does industry profit.[180]

As part of the process for creating this board, the U.S. should examine successful systems abroad and in other industries for models. U.S. legislators and administrative officials should look to Europe in particular, where there are twice as many oil rigs and half as many spills as there are in the Gulf.[181] Other industries with potentially catastrophic impacts on the environment, human health, and safety, such as the airline industry[182] and the nuclear industry,

179. While this Note does not necessarily advocate additional oversight, it does suggest that existing levels of oversight would be improved by establishing an independent board.

180. Carroll, *supra* note 108, at 130. While this poses a significant risk of industry capture, a government employee may develop the deep knowledge of an industry necessary to operate in this capacity without unduly compromising impartiality. The Nuclear Regulatory Commission, which has generally been free of the agency capture issues confronted by MMS—should be used as a model for the proposed board to avoid co-optation by industry. For example, none of the current NRC Commissioners appear to have meaningful ties to the nuclear industry. *See Chairman Gregory B. Jaczko*, NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/about-nrc/organization/commission/jaczko.html (last updated Mar. 29, 2012); *Commissioner William D. Magwood*, NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/about-nrc/organization/commission/magwood.html (last updated Mar. 29, 2012); *Commissioner William C. Ostendorff*, NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/about-nrc/organization/commission/ostendorff.html (last updated Apr. 30, 2012); *Commissioner Kristine L. Svinicki*, NUCLEAR REGULATORY COMM'N, http://www.nrc.gov/about-nrc/organization/commission/svinicki.html (last updated Apr. 24, 2012).

181. *Rig Count Overview & FAQ*, BAKER HUGHES, http://investor.shareholder.com/bhi/rig_counts/rc_index.cfm (last visited Apr. 24, 2012); *see also Offshore Drilling Accidents*, OIL RIG DISASTERS, http://www.oilrigdisasters.co.uk/ (last visited Apr. 24, 2012). Among other regulations, Annex III of the Convention for the Protection of the Marine Environment of the North-East Atlantic requires contracting parties (which includes the EU, among others) to take appropriate measures to prevent pollution from oil rig accidents. Sept. 22, 1992, 2354 U.N.T.S. 67. It is a binding requirement of EU law. *Id.* Additionally, the International Convention on Oil Pollution Preparedness, Response, and Cooperation requires coordinated and approved oil pollution emergency plans, prepared by the operator, and requirements for reporting, information sharing, and international cooperation. Art. IV, VII, X, Nov. 30, 1990, 1891 U.N.T.S. 78.

182. *See* PERROW, *supra* note 79, at 146 ("In the aircraft system, more than in any other industry we shall consider, there has been the time, incentive, resources, and talent to design-in buffers and safety devices, and provide comparatively exemplary training for unusually expert operators."); *see also* Shelby Erdman, *U.S. Airlines Fly 2 Years Without Fatality,* CNN, http://www.cnn.com/2009/TRAVEL/01/12/us.air.safety/index.html#cnnSTCText (last visited Apr. 24, 2012). *Cf.* MALCOLM GLADWELL, OUTLIERS: THE STORY OF SUCCESS 221 (2008)

should also serve as valuable models for the energy industry because "disasters and near misses arising out of one field can provide valuable warnings to another."[183] One measure used in the nuclear industry that could prove particularly beneficial within the oil industry is the establishment of an independent commission that would work with industry in developing new technologies.[184]

Many other industries also have administrative bodies that investigate major accidents, a regulatory feature that should be improved upon in the oil industry. For example, the National Transportation Safety Board investigates airplane accidents, the U.S. Bureau of Mines investigates mining accidents, and mishaps with space missions, dams, and other systems are also reviewed at the federal level.[185] By contrast, the relatively private governance of the oil industry allows it to partially escape such scrutiny.[186] While the U.S. Chemical Safety and Hazard Investigation Board has been established as "an independent, non-regulatory federal agency charged by Congress with investigating major chemical accidents unreported to them [by] the public" and "conduct[ing] full root cause investigations and then . . . issu[ing] . . . safety recommendations . . . aimed at preventing similar events from occurring in the future,"[187] it has been chronically understaffed and underfunded, and its mandate does not apply to all petroleum-related incidents.[188] Employees of MMS, whose shortcomings were discussed in Part I, have also been found to "[be] overwhelmed, insufficiently trained, work without official procedures . . . and sometimes have insufficient support from their supervisors for resisting industry

(claiming that the single most important variable in determining whether a plane crashes is the culture the pilot comes from). Gladwell's claim has attracted quite a bit of controversy. *See, e.g.*, Alex Beam, *A Tipping Point for Gladwell?*, BOSTON GLOBE, Dec. 19, 2008, http://www.boston.com/ae/books/articles/2008/12/19/a_tipping_point_for_gladwell/; Rob Verger, *Malcolm Gladwell on Aviation and Air Safety*, WORLDHUM (Jan. 30, 2009, 2:00 PM), http://www.worldhum.com/travel-blog/item/malcolm-gladwell-on-aviation-safety-and-security-20090125.

183. PERROW, *supra* note 79, at 141.

184. *See id.* at 103 ("We know so much about nuclear power plants because there is a government oversight agency with the authority to inspect utilities.").

185. *Id.*

186. *Id.*

187. U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., PUBLIC HEARING ON REGULATORY APPROACHES TO OFFSHORE OIL AND GAS SAFETY 6 (2010), *available at* http://www.csb.gov/assets/document/Transcript_of_Public_Meeting_12_15_2010.pdf.

188. *See, e.g.*, Editorial, *Starved Watchdog: Plant-Safety Agencies Need More Funding, Staff*, HOUS. CHRON., Dec. 17, 2009, at B10, *available at* http://www.chron.com/disp/story.mpl/editorial/6774204.html.

influence . . . ."[189] A proper regulatory board, tasked with investigating the causes of accidents and working with industry to adopt appropriate, enforceable standards for developing technologies, could prevent accidents of the magnitude of the *Deepwater Horizon* spill without hindering industry growth.[190]

C. Industry Should Rely Less on Human Triggers of Last Resort Protective Technologies

Human supervision of complex systems, like those present on deepwater oil rigs, is both essential and the source of many problems. Greater automation within drilling systems, specifically for last resort protective technologies, like the BOP, could decrease the rate of system-wide failures that are inevitably worsened by human errors.

Following both the *Exxon Valdez* tanker spill and the *Deepwater Horizon* well blowout, public attention and investigations examined the role of human error in causing each disaster. Allegations were made that Joseph Hazelwood, the captain of the *Exxon Valdez*, was under the influence of alcohol at the time of the accident.[191] Similarly, investigations into the cause of the *Deepwater Horizon* spill claimed that human error might have been the primary cause of the explosion aboard the rig and worsened the extent of the environmental damage.[192] In particular, the Commission blamed *Deepwater Horizon* workers for failing to divert the flow of mud on the rig overboard or activate the blind shear rams.[193] Drilling experts agree that rig workers deserve much of the fault for the accident, and that "focus on blowout preventers misses [the] bigger problem[]of poor training . . . ."[194]

189. Matthew L. Wald, *Report Finds Oil-Drilling Inspectors in Disarray*, N.Y. TIMES, Dec. 8, 2010, at A24, *available at* http://www.nytimes.com/2010/12/08/science/earth/08spill.html.

190. To further prevent the influence of industry or corruption on the proposed board, leasing operations should be separate from oversight, so as to avoid the possibility of inappropriate links between profits and approval.

191. *See* ALASKA OIL SPILL COMM'N, *supra* note 65, at 5–11; *see also* Farrell, *supra* note 69. Hazelwood was subsequently cleared of charges related to his possible intoxication. *Oil Plagues Sound 20 Years After* Exxon Valdez, MSNBC (Mar. 24, 2009, 4:18 AM), http://www.msnbc.msn.com/id/29838444/ns/us_news-environment.

192. COMMISSION REPORT, *supra* note 21, at 121–22; Ben Casselman, *Rig Workers Had Chance to Prevent Explosion*, WALL ST. J., Sept. 11, 2010, http://online.wsj.com/article/SB10001424052748704505804575484053238831866.html?KEYWORDS=%22Rig+Workers+Had+Chance+to+Prevent+Explosion%22.

193. COMMISSION REPORT, *supra* note 21, at 121–22.

194. Jennifer A. Dlouhy, *Congress Wants New Blowout Preventer Rules to Shield Wells*, HOUS.

For these reasons, limiting regulation to the failing technologies of a particular disaster is detrimental to industry and environmental safety. Various components of many systems interact in ways that are not always anticipated by the designers.[195] Because "a chain is only as strong as its weakest link,"[196] it is vital that those tasked with supervising drilling operations are not only aware of a system's potential weaknesses, but also avoid becoming the "weak link" themselves.

A number of technical risk factors in the design, execution, and testing of the Macondo well contributed to the *Deepwater Horizon* disaster.[197] Among the most troublesome of the technical issues were the failure of the cement pumped to the bottom of the well to seal off hydrocarbons and the failure of rig workers to properly engage the BOP,[198] which takes anywhere from forty seconds to one minute to close its rams, even after it is activated by rig personnel.[199] One person familiar with the efforts required to activate the BOP aboard the *Deepwater Horizon* said, "It's a mystery, a huge Apollo 13-type mystery."[200] While this statement is inaccurate because the specific failures of the BOP have since been pinpointed, the complexity of the systems aboard deepwater drilling rigs and the reliance on the interaction between humans and machines contribute to confusion during and immediately after any incident or malfunction. Going forward, resource extraction technologies should generally be more automated to avoid unnecessary reliance on human understanding and potentially delayed reactions to technical failures on board rigs.

While better training would likely increase the speed and quality of responses to accidents like the *Deepwater Horizon* spill, the elimination or reduction of human-triggered, last resort protective technologies would better address the contribution of human error

CHRON., Aug. 8, 2010, at A1, *available at* http://www.chron.com/default/article/Congress-wants-new-blowout-preventer-rules-to-1713696.php.

195. *See* PERROW, *supra* note 79, at 4.

196. *See* CHILES, *supra* note 17, at 48 (noting that the three cooling systems for the reactor at Three Mile Island were like a chain in that each was essential in preventing the reactor from overheating).

197. CHIEF COUNSEL'S REPORT, *supra* note 48, at x–xi.

198. *Id.* at x. *See generally* COMMISSION REPORT, *supra* note 21, at 87–172.

199. CHIEF COUNSEL'S REPORT, *supra* note 48, at 21.

200. Henry Fountain, *Solution to Capping Well Stays Elusive*, N.Y. TIMES, May 1, 2010, at A10 (internal quotation marks omitted), *available at* http://www.nytimes.com/2010/05/01/us/01engineering.html.

to disasters.[201] One reason for this contribution is simply the limitations of human nature in unexpected situations. Where people perform the same routine task repeatedly, they often rely on habit and expectations, a fact that adversely affects their reactions when confronted with an accident.[202] "People need to have wall-to-wall knowledge of a system before they start disconnecting safety systems in an emergency," and given the complex nature of most energy extraction systems and the limited scope of any one worker's job description, such knowledge is not usually possible.[203] Experience in a particular industry does not guarantee improved response quality, because problems that arise in the disastrous situations examined here "may not be identical from place to place or time to time, and information may be 'sticky' or difficult to move from one location to another."[204] Even basic human limitations, such as wakefulness, physical endurance, and muscle power, can interfere with a worker's ability to respond to an incident.[205] Coupled with potentially inadequate safety exercises aboard offshore facilities, the merits of greater automation in disaster scenarios become quite compelling. While offshore workers often complete simulator sessions, which are important tools for training, they insufficiently prepare workers for unexpected emergency situations, particularly given the complex interactions in the types of systems[206] aboard deepwater oil rigs and other energy extraction structures.

Reducing or eliminating the degree of human interaction with a system during potentially catastrophic accidents would also prove beneficial because workers typically have only limited knowledge of complex system interactions at the time of an incident. Given the limits of human understanding and reflexes, "if . . . [an] operator is confronted by unexpected and usually mysterious interactions

201. *See* LEVESON, *supra* note 15, at 230 (arguing that correcting human errors cannot be done with training alone); *see also* PERROW, *supra* note 79, at 351–52 ("Better training alone will not solve the problem, or more gadgets, or promises that it won't happen gain [sic].").

202. *See, e.g.*, PERROW, *supra* note 79, at 83 ("In 1977 New York City experienced a massive and very costly blackout. One key contribution to the accident was an operator's expectation about the default reading for current flowing over a particular line.").

203. *See* CHILES, *supra* note 17, at 191 (explaining that operators must have this knowledge to avert extreme, but rare disasters).

204. Carroll, *supra* note 108, at 129–30 (citing Gabriel Szulanski, *Exploring Internal Stickiness: Impediments to the Transfer of Best Practices Within the Firm*, 17 STRATEGIC MGMT. J. (SPECIAL WINTER ISSUE) 27 (1996) & Eric von Hippel, *"Sticky Information" and the Locus of Problem Solving: Implications for Innovation*, 40 MGMT. SCI. 429 (1994)).

205. *Id.* at 169.

206. *Id.* at 126.

among failures, saying that he or she should have zigged instead of zagged is possible only after the fact."[207] In investigating the causes of the *Deepwater Horizon* spill, the Commission similarly championed greater automation, recognizing the limits of human nature and the system's complexity:

> There is no apparent reason why more sophisticated, automated alarms and algorithms cannot be built into the display system to alert the driller and mudlogger when anomalies arise. These individuals sit for 12 hours at a time in front of these displays. In light of the potential consequences, it is no longer acceptable to rely on a system that requires the right person to be looking at the right data at the right time, and then to understand its significance in spite of simultaneous activities and other monitoring responsibilities.[208]

The nuclear accident on Three Mile Island provides another illustration of the limitations of human knowledge during the chaos and uncertainty of an unexpected accident.[209] A supervisor at Three Mile Island testified,

> I think we knew we were experiencing something different, but I think each time we made a decision it was based on something we knew about . . . . There was logic at that time for most of the actions, even though today you can look back and say, well, that wasn't the cause of that, or that shouldn't have been that long.[210]

Because workers confront complex extraction systems routinely in the oil industry, the automation of certain processes is the best option available for preventing accidents in the future. It should be noted that industry and regulators should use caution against too much automation. Over-reliance on automated systems could lead to malfunctions in machinery and technology. Greater automation in general, however, would likely limit the occurrence of large, catastrophic mistakes, only rendering facilities, tankers, and other structures involved in extracting and transporting oil and gas "vulnerable to small errors."[211] Furthermore, "in some systems,

207. PERROW, *supra* note 79, at 9.

208. COMMISSION REPORT, *supra* note 21, at 121.

209. *See* Hope Babcock, *A Risky Business: Generation of Nuclear Power and Deepwater Drilling for Offshore Oil and Gas*, 37 COLUM. J. ENVTL. L. 63 (2012) (comparing government responses to the Three Mile Island and *Deepwater Horizon* disasters).

210. PERROW, *supra* note 79, at 27 (internal quotation marks omitted).

211. *Id.* at 200.

automatic controls are necessary because there is simply not sufficient time for operator reaction."[212] However, given the aforementioned limits on any individual worker's ability to adequately respond and the role human error played in the environmental impact of the *Deepwater Horizon* spill, the oil industry should reduce reliance on human triggers of last resort protective technologies.

III. CONCLUSION

Action must be taken to prevent a catastrophic accident like the *Deepwater Horizon* spill from occurring again. The proposed alterations to BOP design and post-spill liability schemes are good first steps toward making necessary changes in the oil industry, but more must be done to alter the relationship between industry and regulators so that the mistakes of *Exxon Valdez* and *Deepwater Horizon* are never repeated.

To achieve these changes in a meaningful and lasting manner, Congress should design and pass legislation subjecting energy extraction operations to heightened NEPA scrutiny and mandating greater coordination between drafters of OPA response plans. Further, an independent regulatory board should be established to work with industry to implement regulations for new extractive technologies as they develop. Finally, last resort protective technologies aboard rigs and other structures should be more automatic, relying less on human triggers that cannot anticipate the chaos and uncertainty that occur when various components in a system fail to interact properly. While these changes are likely to be criticized for slowing the development of a profitable industry, the prevention of disasters similar to the *Deepwater Horizon* spill should outweigh any significant inconvenience to industry.

212. *Id.* at 81.