

# The Deepwater Horizon Oil Spill Response and Impact

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## ABSTRACT

This dissertation is a review of the 2012 MIT Sloan School of Management Deepwater Horizon Case Study and the 2017 GuLF Study (Gulf Long-term Follow-up Study), which assessed the Deepwater Horizon crisis, and is the largest study ever conducted on potentially adverse health impacts resulting from an oil spill. This paper and the materials it reviews, investigates the underlying organizational causes of the 2010 BP Deepwater Horizon disaster, the subsequent response of the organization, and the long-lasting impacts of the catastrophe. As the largest marine oil spill in U.S. history, we seek to understand through a review of the research, not only how the Deepwater Horizon disaster might have been avoided, but also if the post-crisis response from BP was adequate, effective, and efficient. By doing so, our aim is to create a clear picture of the events leading up to the disaster and to propose scenarios and strategies that might have mitigated or prevented the disaster altogether. The focus of our research is primarily through an organizational perspective, scrutinizing BP's organization through a lens of critical analysis in the areas of human resource management, ethics, organizational structure, decision-making, and accountability. This dissertation asserts that the Deepwater Horizon disaster was in large part a direct result of failed organizational process, policy, leadership, management, and ethics, and challenges BP's post-crisis public relations machine, which propagated the narrative that the organization was blameless in the event, and that the disaster was a true accident.

**Keywords:** Deepwater Horizon, ethics, leadership, management, natural disaster, BP, GuLF Study, CSR, oil spill, risk management, occupational safety, environmental impact, environmental research, crisis response, petroleum drilling, equipment maintenance

**Disclaimer:** The views in this research are solely the views of the authors and are not the expressed views of any of their affiliated institutions.

## INTRODUCTION

On April 10, 2010, BP's Deepwater Horizon, an oil-drilling rig located in the Macondo Prospect of the Gulf of Mexico, exploded in spectacular fashion, taking the lives of 11 rig workers before sinking ("Deepwater Horizon – BP Gulf of Mexico Oil Spill | US EPA", 2018). The United States Environmental Protection Agency records the Deepwater Horizon disaster as the largest oil spill in the history of marine oil drilling operations, with nearly 4 million barrels of oil having spilled into the Gulf before the rig was finally able to be capped 87 days after the date of the rigs explosion and subsequent sinking (2018).

The Deepwater Horizon disaster was so catastrophic, in June 2010, a few months following the incident, the GuLF Study was initiated by the National Institute of Environmental Health Sciences.

The study is "the largest study ever conducted on the potential health effects associated with an oil spill, with nearly 33,000 participants" ("The GuLF STUDY", 2018). According to the NIH, the study is "focused on prospectively determining both physical and mental health effects related to the 2010 Deepwater Horizon oil spill and is collecting information that can be used by individuals, communities and governments to better understand the consequences of oil spills and plan for future disasters" ("The GuLF STUDY", 2018).

## BP COMPANY HISTORY AND STRATEGY

Founded in 1908, British Petroleum, known today simply as BP, officially began oil trading under the name Anglo-Persian Oil Company (APOC) when Englishman William D'Arcy's exploration team struck black gold in the Persian Gulf ("BP At a

Glance”, 2018). Today, BP operates in 70 countries, producing 3.6 million barrels of oil per day (2018). The discovery of oil, and invariably the presence of BP in the Middle East was beneficial to the countries there, giving the previously poor countries their vast wealth opportunities and influence politically. But with this also came anger and mixed feelings about the rising influence of the West through their companies in the area. Gradually, however, companies like BP expanded their operations, exploring not only in the Middle East but into African countries like Nigeria and Libya. However, they still focused on their exploration in the Middle East shipping about 140m tons of oil from the Middle East in 1975. Soon after, changes in the Middle East affected their operations and the volume of oil shipped from the Middle East went from 80% to 10% (Our history, n.d.).

Beginning as a purely oil producing company, in recent years, BP has made a concerted effort to shift its image from that of “dirty oil” to a company focused on exploring new and innovative means of drilling and producing oil, especially those which would reduce their environmental footprint (“Our Strategy”, 2018). Prior to the Deepwater Horizon oil spill in 2010, BP was sure they had a reputation for being an environmental friendly company (Deneen, 2010). Beyond their confidence in their being a green company, BP also had a long-standing reputation of being among the recognized leaders in sustainability reporting with the Global Reporting Initiative (Cort, 2010). More so, in the early 2000s, BP stood out as one of the leaders in the development of a sustainability program. To support this perception, BP launched a marketing campaign which presented their brand BP as ‘Beyond Petroleum.’ With this, they portrayed themselves as being a socially responsible, sustainable company that went beyond petroleum to focus on other sources of energy like solar and wind energy. However, these sustainable aspects of their business were only a small portion of their total businesses and the general perception about BP was not that they were a green company. BP tried hard to give the impression that they were not like most Oil companies who caused a lot of damage to the environment. They had maintained this reputation successfully for a number of years as the most

environmentally friendly of the big five oil companies (Sverjensky, 2010), even making the global 100 list of the most sustainable companies in the world, in 2005 and 2006 (MacDonald, 2010).

The company’s current strategy is based on “having a balanced portfolio with advantaged oil and gas, competitive downstream and low carbon activities, as well as a dynamic investment strategy” (“Our Strategy”, 2018). With public sentiment already pitted against “big oil” and a growing global awareness and concern for environmental conservation and preservation efforts, any strides BP may have made in putting forth a brand image of clean energy was quickly destroyed with the Deepwater Horizon Disaster in 2010 and the subsequent fallout from revelations regarding the companies flagrant negligence and disregard for environmental and employee safety, which ultimately resulted in the catastrophe. And while Deepwater Horizon wasn’t its first disaster, it was certainly the largest (ever) and most heavily publicized, due in part to the scale of the devastation, thus receiving the greatest public outcry. BP’s track record of maintenance failure, negligence, and cost cutting for creating larger profit margins came to light following the Deepwater Horizon disaster, and resulted in enormous financial loss for the organization, as well as loss in consumer trust and brand equity (Ingersoll, Locke & Reavis, 2012).

## **DEEPWATER HORIZON OIL RIG**

Deepwater Horizon was an “ultra-deepwater, dynamically positioned, semi-submersible offshore drilling rig” owned by Transocean at the time of the disaster (“Transocean :: Deepwater Horizon”, 2018). And although oil rigs under consistent production pressure must undergo regular maintenance and “rest”, it was later learned that the Deepwater Horizon “had not gone to dry-dock for nine years previous to the disaster and never stopped working at any point between the September 2009 audit and April 20, 2010” (Ingersoll, Locke & Reavis, 2012). It was no surprise the rig exploded - the Deepwater Horizon rig had a long list of pending maintenance issues. In a September 2009 safety audit conducted on the rig by BP, 390 repairs that needed immediate attention were identified, and which would require

more than 3,500 hours of labor to fix (Ingersoll, Locke & Reavis, 2012).

The Deepwater Horizon oil rig went down in flames on the night of April 10, 2010, when the rig unceremoniously exploded, pumping 4 million barrels of oil into the Gulf of Mexico, and killing 11 workers (“The GuLF STUDY”, 2018). The oil spill was particularly unique, and especially devastating due to the fact that the leak was on the ocean floor rather than on the surface (2018). The impact of the spill was so widespread and catastrophic that the GuLF Study (Gulf Long-term Follow-up Study) was established as a means to continue collecting data with the hopes of supporting affected residents and small businesses in the area, to evaluate health risks and threats, as well as the impact on the environmental ecosystem to ensure as quick as possible a clean-up and recovery (2018).

## DISASTROUS CONSEQUENCES

Different explanations are rife about where BP went wrong; there are speculations that their focus on the environmental impact of their operations dropped when they went from a publicly owned company to a privately-owned company in the 1980s. But this isn’t entirely true. Davies & Lawrence (2015) reveal that BP enjoys close ties with the government of the United Kingdom, indicating it was unlikely that government influence, or the lack thereof resulted in their nonchalance to environmental issues.

Evidence abounds that BP had already made a series of mistakes before the Deepwater Horizon oil spill. From the blast in a Texas refinery in 2005 which left 15 workers dead, to the spill of 200,000 gallons of crude oil in Alaska, following the rupture of a badly maintained oil pipeline in 2006 (Mouawad, 2010), there had been a number of accidents. The spill was in many ways an accident waiting to happen, the culmination of a long history of poor maintenance, operational negligence, and callous disregard for the environment in which BP operated. Lubin (2010) points out a few critical mistakes:

- BP downplayed operational risks when they applied for exemptions from federal inspection. By doing so, BP did not have to provide in any great detail an environmental

analysis of Deepwater Horizon, claiming an oil spill was unlikely

- BP appeared to cut corners in the design of their wells, increasing the likelihood of the well’s potential to release a blast of natural gas, which was what ultimately caused the explosion at the surface;
- BP did not properly fix known problems within the well walls. This was their more flagrant error. Numerous warning, if heeded, could have averted the Deepwater Horizon explosion;
- In addition to these errors, BP skipped major tests prior to the explosion, and used faulty equipment, falsified tests over a time period, and ignored several alarms and warning signs even on the day of the explosion.

To add insult to injury, BP did not have a good evacuation plan in place in the event of any disaster. This negligence resulted in the death of 11 employees and injuries to countless others, and a lasting trail of destruction in the wake of the Deepwater Horizon’s explosion.

## Ethical Issues

MacDonald (2010) points out the core ethical obligations expected from a business. These obligations include:

- Providing customers with the expected goods and services;
- Dealing honestly with vendors;
- Ensuring the workplace meets minimum health and safety requirements;
- Complying with environmental laws and industry best practices.

From the outside, BP appeared to meet the ethical obligations, especially in the weeks leading up to the Deepwater Horizon spill. It was certainly a part of their public persona and a carefully crafted brand image contrary to the actual state of the organization. BP did not meet minimum health and safety standards, utilized several pieces of faulty equipment, continued operating with poorly designed and unmaintained wells, and had nearly no evacuation plans or procedures in place. In addition, the company

was not fully compliant with environmental laws and industry best practices. Seeking to avert regulations that would tighten their profit margins, the company opted to take a stance of regulatory noncompliance, even applying for exemptions. This lack of protective measure and failure to adhere to regulation resulted in grave repercussions.

### **Leadership Issues**

A number of issues with BP's leadership and managerial corruption were cited as a major factor in the Deepwater Horizon Disaster. In the aftermath of the spill, United States federal prosecutors brought indictments against two supervisors in BP, insisting that they violated the Clean Water Act (Milman, 2015). The Clean Water Act "establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters" (USPA, n.d.). The indictment also alleged that the supervisors ignored reports that had been brought to them about the instability of the drilling wells. While these indictments were against supervisors, it was clear from the series of mishaps and accidents in BP leading up to the major Deepwater Horizon disaster in 2010 that the management at various levels were not as meticulous in fulfilling their ethical obligations both to the employees of BP and the society which was impacted by their decisions.

As Meigs (2016) rightly pointed out, the Deepwater Horizon oil spill was a major disaster that exposed the underlying past ethical (and other) issues with BP; it was actually a buildup of bad management decisions which saw BP frequently cutting corners. It is important to note that unethical did not necessarily mean they deliberately took actions which would cause such a huge catastrophe that would result in the death of 11 people and the injury of many others. Rather it meant, in this case, as Meigs put it, that the management had 'grown dangerously overconfident, and were pushing too close to the edge.'

Disasters like the 1986 loss of the Challenger shuttle opened the door for a new wave of investigation into organizational behavior and ethics (Meigs, 2016). One sociologist, Diane Vaughan, theorized that organizations with the best

management with good intentions can sometimes find themselves involved in dangerous and unethical behavior. A subsequent theory proposes that management in some companies were not necessarily in the habit of making disastrous and unethical decisions, but that sometimes, in the routine executing of their business, they became deceived about the real risks that could arise in their day to day jobs and eventually "systematically deluded themselves through a process called, the normalization of deviance" (Meigs, 2016). Many of these theories informed new developments in organizational best practice, with companies scrambling to integrate many of the recommendations in order to avert future disasters. The companies who adhered to the new best practice methodology were dubbed "high reliability" companies- those that strived to manage the unexpected through mindfulness (Models of HRO, n.d.). In retrospect, BP was not a high reliability organization, despite their efforts to appear one. The Deepwater Horizon spill quickly exposed the gaps in their ability to manage the expected, and the fundamental cracks in their health and safety systems, their management systems, and their ethics culture. It became apparent that more often than not, they opted for the quickest, cheapest methods to resolve issues, but not the safest, as was seen with the utilization of faulty, unmaintained assets, poorly designed equipment, and lack of any streamlined disaster protocol. One investigator rightly noted that the major cause of disasters like the Deepwater Horizon spill, was an aggregation of tiny contributing factors and issues that had been ignored by management and workers alike, which had accumulated over time. The more BP ignored critical issues without adverse consequences, the more they became emboldened to continue in their culture of turning a blind eye. This ultimately resulted in a major disaster with multiple casualties (Meigs, 2016).

### **POST-OIL SPILL CSR INITIATIVES**

Cort (2010) notes that prior to the explosion on Deepwater Horizon, BP was a recognized industry leader in sustainability reporting. Their reputation as a safety leader, and their status as a global top 100 company, seemed at odds with a disaster of such

magnitude. He raises the question of the integrity and credibility of company reports and “green” ratings, and whether the general public can actually put any faith in the information put forth by organizations.

The implications of corporate reporting mistrust are far reaching. The lack of transparency and clear reporting guidelines mean that companies can essentially shirk any real scrutiny of their operations and any accountability in the event of an incident. Cort asserted that beyond submitting periodic reports and getting blind ratings, it should be required of companies to go beyond the clearly laid out laws and regulations to ensure companies protect the interest of the environment from where their businesses benefit. Only then can they be truly described as socially responsible.

In addition, Cort (2010) recommends that:

- CSR experts must remain up-to-date on their methodology for evaluating CSR claims by companies;
- Companies must exceed baseline requirements of the GRI (and other such CSR frameworks) and be sensitive to their specific environmental needs, accepting that there is no one size fits all approach. Material issues in one environment may not be as material in another;
- Third party review of CSR reports must become standard

Dudovskiy (2012) outlined various CSR initiatives prudent for BP in the wake of the Deepwater Horizon spill to ensure future disasters do not occur:

- Assume a more proactive approach to dealing with sustainability issues in their immediate environments;
- Management to ensure environmental HSE and other standards are introduced, and the application of those standards enforced;
- Work closely with all external stakeholders to ensure company’s status as “high reliability” and the elimination of any possibility of environmental disasters
- Collaborate with competitors in the field to engage in knowledge sharing sessions on the

best practices which would prevent any future environmental disasters

In spite of the inherent limits posed by these CSR initiatives, BP, to build back their reputation needs to make attempts at them to ensure their reputation is rebuilt. We have seen though, that despite public outrage, BP’s brand image was, and still is, second to their bottom line interests, primarily because the demand for their commodity is essentially bulletproof.

## PUBLIC OUTCRY AND PR RESPONSE

Years after the Deepwater Horizon spill, BP still has a monumental task in rebuilding its reputation and regaining the trust and acceptance of consumers (Kaye, 2015). However, as Thielen (2015) states, BP won back the confidence of shareholders after the spill, not by becoming more socially responsible or through improved PR effort, but by remaining very profitable. In terms of their reputation with the public and the response they may expect to receive, as Mark

**Figure 1.** Academic interest in oil spills over time. Number of papers published on oil spills over the time period of 1968–2015. Data extracted from Web of Science using the Topic search (searching for the phrases ‘oil spill’ or ‘crude spill’ or ‘hydrocarbon spill’) on January 6, 2016. Inset shows semi-log plot of same data (black line) and growth of scientific literature as a whole (gray line). Source: Murphy et al., 2016, p. 373.

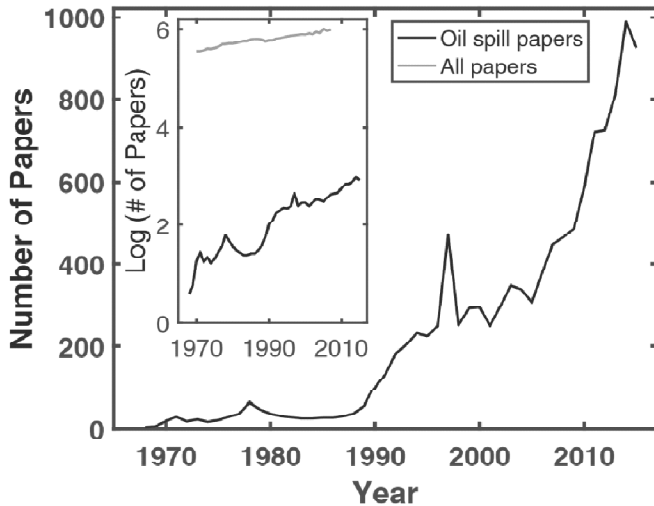
Swanson put it, “the court of public opinion only goes so far” (Symington, 2010). BP may try to rebuild their lost reputation over time, by proving relentlessly that they are indeed a CSR company and remaining transparent, but it is not a priority so long as they remain profitable.

## LITERATURE REVIEW

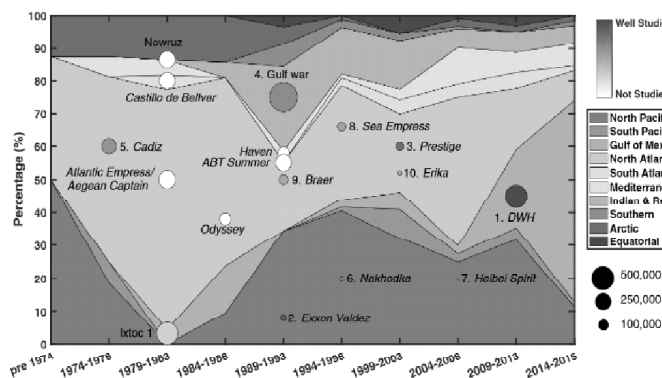
Even a cursory glance at the Web of Science database shows the increasing importance of the study of oil spills in general, and the Deepwater Horizon (DWH) in particular. Though there were a few papers in the first half of the 20th century, research on oil spills dramatically increased in the 1960’s after Torrey Canyon spill. Research in this area increased in the 1970’s, but then declined in the 1980’s. However, after the 1989 Exxon Valdez spill, interest in the area

led to a resurgence of papers in the 1990's, with a steady growth of research into the 2000's.

The DWH of 2010 incident created substantial growth in research on the field in the years that followed (see Figure 1).



This dramatic increase can be attributed to the DWH oil spill (see Figure 2). As the diagram shows, the Gulf of Mexico was the site of 2% of studies on oil spills from 2004-2008. However, by 2014-2015, it was the focus of 61% of such studies. In fact, DWH has become the most studied oil spill in history (Murphy *et al.*, 2016).



**Figure 2:** The geography of oil spill research. Percentage of oil spill research literature conducted within certain marine geographical regions over time. Also plotted are the top ten most studied oil spills (numbered) and the ten largest oil spills (by mass). Dot size corresponds to the spill size, and dot color corresponds to how well studied that spill is. Source: Murphy *et al.*, 2016, p. 374.

One of the main reasons for this increased attention was the creation of the Gulf of Mexico Research Initiative (GoMRI). In large part, this was responsible for over 500 individual research papers being published in peer-reviewed journals. Hence, parsimony dictates that only the main themes of this literature can be delineated. The overwhelming majority of these were concerned with environmental issues. Four key themes can be discerned in this literature.

First, this literature examined the environmental fate of the spilled oil and gas. Within this category, literature examined how the oil spread (Camilli *et al.*, 2010) and the use of oil-dispersing agents to minimize damage (Kujawinski *et al.*, 2011). This category also encompassed literature on the role of hydro-carbon degrading microbes in oceanic waters (Dubinski *et al.*, 2013). Additionally, how sunlight affected the oil was also examined (Ray *et al.*, 2014) as well as the chemical fingerprinting of the oil (Aeppli *et al.*, 2014).

The second main category of the literature examined the effect of the DWH oil spill on offshore organisms and ecosystems. Within this category, the literature examined the uptake and effects of the oil on microbiota and plankton (Chakraborty, *et al.*, 2012). There were also examinations of the effects on deep-sea benthos and corals (Landers *et al.*, 2014). Finally, the effect of the blowout on pelagic fish was examined (Ylitalo *et al.*, 2012).

Third, the contamination and effects in nearshore and coastline habitats and organisms were investigated. This included looking at the fate of the stranded oil (Michel *et al.*, 2013). Low-trophic ecological effects in coastal communities were studied (Fleeger *et al.*, 2015). The DWH blowout's effects on shallow-water corals was also examined (Etnoyer, *et al.*, 2015). Additionally, the effects on coastal invertebrates was looked at (Grey *et al.*, 2015). Finally, the effects on fish in coastal habitats was also investigated (Pilcher *et al.*, 2014).

The fourth main theme coming out of the research are the effects on long-lived marine tetrapod vertebrates. Three main groups of animals were studied: birds (Tran *et al.*, 2014); sea turtles (Hart *et al.*, 2014); and, marine mammals (Campagna *et al.*, 2011). Hence, the effects of pollution on the

environment have been well covered by GoMRI and other research.

Another area where there is a modicum of literature on the effects of the DWH blowout is that of business. However, this area is far less studied. There has been the odd article on shareholder wealth (Heflin & Wallace, 2017), legal liability (Lee & Garza-Gomez, 2012), and, Environmental Social Governance (ESG) disclosures (Utz, 2018). There have also been a few case studies (Spiro *et al.*, 2012). In general, however, the sheer volume of work coming out of the GoMRI far outstrips this area.

“The GuLF Study” falls into a body of literature that is even smaller. It studies the effects of the DWH spill on human health. As the study itself mentions, less than 1% of the works on DWH deal with this topic. As such, it provides a valuable contribution to the field and the lives of people affected by the DWH blowout.

#### **“THE GULF STUDY” RESEARCH DESIGN**

“The GuLF Study” was written to examine the health effects on Oil Spill and Response Cleanup (OSRC) personnel after the DWH blowout, the largest such event in American history. Specifically, it investigated mental and physical health effects due to spatial, temporal, and exposure variations. It sought to overcome weaknesses of previous oil spill studies, which included: small sample size; focus on short-term outcomes; limited follow-up; and, limited exposure assessment. This study examines data from the time of the oil spill with follow-up questionnaires for long-term monitoring. Researchers intend to continue with follow-up monitoring by questionnaires to learn about increased outcomes of interest derived from the literature on studies of workers conducted by the National Institute of Occupational Safety and Health (NIOSH). The Internal Review Board (IRB) of the National Institute of Environmental Health Sciences (NIEHS) approved the protocol for the study. No deadline for completion has been set. In fact, researchers hope to continue with their work well into the future (Kwok *et al.*, 2017).

The mechanics of the study are as follows: Potential recruits were selected from training and badge records, BP workers, NIOSH roster, rosters

of local, state, and federal workers. A community outreach program lead by NIEHS was done to publicize the study, after which contact with potential recruits were made. Initially, a 30-60-minute computer assisted, telephone interview was conducted. At this stage, some potential recruits were rejected because their work or exposure did not fit the parameters of the study. Others chose not to continue in the study. Ultimately, a full cohort of 32,608 completed the telephone interview. From this group, 11,193 were selected for a home visit in order to collect biological and environmental evidence. Those that participated in the home visit received a USD 50 gift voucher for their inconvenience. Although the researchers believe that the home visit sub-cohort represents a little under 10% of the total number of people affected, it is sufficiently representative of the full cohort and the general population of the area to provide a useful, representative analysis of the effects of the DWH oil spill (Kwok *et al.*, 2017).

To be sure, there are some shortcomings of this study. The main one is that data results of the effects of pollution on the different populations is not reported by Kwok *et al.* (2017). Additionally, by presenting USD 50 as incentive for people to allow home visits, the results could be skewed by people wishing to collect the reward. Finally, there is no theory on which the researchers are proceeding. However, as will be discussed further, this is understandable in that it seems the authors are using a grounded theory approach, which should be sufficient to answer any questions about data snooping.

Overall, the methodology being used in this study is acceptable given the constraints under which the researchers are working. As noted, a grounded theory approach is being used. So, the researchers are at the stage where they are collecting data. From this, they can try to develop theory later on. Although the report does not have a theory at this time, it does represent the creation of an excellent taxonomy that can be utilized for future research. This taxonomy breaks down types of pollution, occupations, geographical locations, and, health effects of pollution based on occupations and locations. This is an excellent starting point until more information is gathered to provide directions to proceed.

## A LOOK AHEAD

Eight years on from the catastrophic Deepwater Horizon Disaster, BP is still footing the bill for its negligence. According to Reuters, as of January 2018, BP's costs surrounding the spill have ballooned to \$65 billion after raising estimates for outstanding claims (Bouso, 2018). BP reports that "the claims were part of the Court Supervised Settlement Program that was set up in the wake of the disaster and included nearly 400,000 cases" (Bouso, 2018).

The consequences of the disaster are evident beyond BP's bottom line. The environmental impacts are still ongoing and significant. The oil spill, the largest in U.S. marine history, decimated the ecosystem, local wildlife populations, and the region's agriculture and fishing industries. Aside from the dramatic reduction in species and the loss of others, approximately \$527 - \$859 million was lost in recreation such as boating, fishing, and beach going revenues ("Assessing the Impacts from Deepwater Horizon | response.restoration.noaa.gov", 2017). The existence of the GuLF study itself is a testament to the need to continue studying the impacts of the oil spill and provide necessary support. Other organizations like the Environmental Defense Fund, the NOAA Office of Response and Restoration, and countless other groups continue clean-up efforts, public health advocacy, and industrial and business support for the affected region.

Although BP's post-spill response was laughable, literally being mocked by everyone from newspapers to late night TV show hosts, "the shape of the company's image among the general populace is largely irrelevant, because investors know mental images of Deepwater Horizon will not cause the end consumer in need of fuel to drive past a BP station on principle" (Olenski, 2014). With oil prices at their highest since late 2014 and BP shares back to levels not seen in more than eight years, it is evident that consumerism and capitalism is still king. Verily, it seems true that no disaster can dampen our collective demand for the very same oil that has destroyed our environment.

## REFERENCES

- [1] Aeppli, C., Nelson, R., Radovic, J., Carmichael, C., Valentine, D., & Reddy, C. (2014). Recalcitrance and degradation of petroleum biomarkers upon abiotic and biotic natural weathering of Deepwater Horizon oil. *Environmental Science & Technology*, 48(12): 6726-6734.
- [2] Assessing the Impacts from Deepwater Horizon response.restoration.noaa.gov. (2018). Response.restoration.noaa.gov. Retrieved 24 June 2018, from <https://response.restoration.noaa.gov/about/media/assessing-impacts-deepwater-horizon.html>
- [3] Bracey, L. (2018). *The importance of Business reputation*. Retrieved from <https://www.businessfocusmagazine.com/2012/10/the-importance-of-business-reputation/>
- [4] BP At a Glance. (2018). Retrieved from <https://www.bp.com/en/global/corporate/what-we-do/bp-at-a-glance.html>
- [5] BP (n.d.). *Our History*. Retrieved from <https://www.bp.com/en/global/corporate/who-we-are/our-history.html>
- [6] Bouso, R. (2018). BP Deepwater Horizon costs balloon to \$65 billion. Retrieved from <https://www.reuters.com/article/us-bp-deepwaterhorizon/bp-deepwater-horizon-costs-balloon-to-65-billion-idUSKBN1F50NL>
- [7] Camilli, R., Reddy, C., Yoerger, D., Van Mooy, B., Jakuba, M., Kinsey, J., ... & Maloney, J. V. (2010). Tracking hydrocarbon plume transport and biodegradation at Deepwater Horizon. *Science*, 330(6001): 201-204.
- [8] Campagna, C., Short, F. T., Polidoro, B. A., McManus, R., Collette, B. B., Pilcher, N. J., ... & Carpenter, K. E. (2011). Gulf of Mexico oil blowout increases risks to globally threatened species. *BioScience*, 61(5), 393-397.
- [9] Chakraborty, R., Borglin, S. E., Dubinsky, E. A., Andersen, G. L., & Hazen, T. C. (2012). Microbial response to the MC-252 oil and Corexit 9500 in the Gulf of Mexico. *Frontiers in Microbiology*, 3: 357.
- [10] Corporate Knights. (2006). *2006 Global 100 results*. Retrieved from <http://www.corporateknights.com/reports/2005-2011-archives/2006-global-100-results-11379462/>
- [11] Cort, T. (2010). *Lessons for the CSR industry from the Deepwater Horizon Spill*. Retrieved from <https://www.greenbiz.com/blog/2010/07/27/lessons-for-csr-reporting-from-deepwater-horizon-spill>



- [12] Davies, H. & Lawrence, F. (2015). *Revealed: BP's close ties with the UK government*. Retrieved from <https://www.theguardian.com/environment/2015/may/20/revealed-bps-close-ties-with-the-uk-government>
- [13] Deepwater Horizon – BP Gulf of Mexico Oil Spill | US EPA. (2018). Retrieved from <https://www.epa.gov/enforcement/deepwater-horizon-bp-gulf-mexico-oil-spill>
- [14] Deneen, S. (2010). *BP before the oil spill: an environmentally friendly company*. Retrieved from <https://www.aol.com/2010/06/11/bp-before-the-oil-spill-an-environmentally-friendly-company/>
- [15] Dubinsky, E., Conrad, M., Chakraborty, R., Bill, M., Borglin, S., Hollibaugh, J., ... & Tom, L. (2013). Succession of hydrocarbon-degrading bacteria in the aftermath of the Deepwater Horizon oil spill in the Gulf of Mexico. *Environmental Science & Technology*, 47(19): 10860-10867.
- [16] Dudovskiy, J. (2012). *British Petroleum (BP) and CSR*. Retrieved from <https://research-methodology.net/british-petroleum-bp-and-csr/>
- [17] Etnoyer, P., MacDonald, I., Wickes, L., Dubick, J., Salgado, E., & Balthis, L. (2015, February). Decline in condition of sea fans on mesophotic reefs in the northern Gulf of Mexico before and after Deepwater Horizon oil spill. In *Gulf of Mexico Oil Spill and Ecosystem Science Conference, Houston, TX, USA*.
- [18] Fleeger, J., Carman, K., Riggio, M., Mendelssohn, I., Lin, Q., Hou, A., ... & Zengel, S. (2015). Recovery of salt marsh benthic microalgae and meiofauna following the Deepwater
- [19] Frost, E. (2016). *Do you have the answer? Sharing big data in the Gulf of Mexico*. Retrieved from <https://ocean.si.edu/conservation/pollution/do-you-have-answer-sharing-big-data-gulf-mexico>
- [20] Grey, E. K., Chiasson, S. C., Williams, H. G., Troeger, V. J., & Taylor, C. M. (2015). Evaluation of blue crab, *Callinectes sapidus*, megalopal settlement and condition during the Deepwater Horizon oil spill. *PLoS one*, 10(8): e0135791.
- [21] Hart, K., Lamont, M., Sartain, A., & Fujisaki, I. (2014). Migration, foraging, and residency patterns for Northern Gulf loggerheads: implications of local threats and international movements. *PLoS One*, 9(7): e103453.
- [22] Hart, M. (2011). *The ethical lessons of Deepwater*. Retrieved from <https://www.asme.org/engineering-topics/articles/engineering-ethics/the-ethical-lessons-of-deepwater>
- [23] Heflin, F., & Wallace, D. (2017). The BP oil spill: Shareholder wealth effects and environmental disclosures. *Journal of Business Finance & Accounting*, 44(3-4): 337-374.
- [24] Hertsgaard, M. (2013). *The worst part about BP's oil-spill cover-up: it worked*. Retrieved from <https://grist.org/business-technology/what-bp-doesnt-want-you-to-know-about-the-2010-gulf-of-mexico-spill/>
- [25] High Reliability Organizing. (n.d.). *Models of HRO*. Retrieved from <http://high-reliability.org/Weick-Sutcliffe>
- [26] Ingersoll, C., Locke, R., & Reavis, C. (2012). *BP and the Deepwater Horizon Disaster of 2010*. MIT Sloan School of Management. Retrieved from [https://mitsloan.mit.edu/Learning Edge/CaseDocs/10%201110%20BP%20Deepwater%20Horizon%20Locke.Review.pdf](https://mitsloan.mit.edu/Learning%20Edge/CaseDocs/10%201110%20BP%20Deepwater%20Horizon%20Locke.Review.pdf)
- [27] Jacques, T. (2015). *Lessons from an oil spill: how BP gained – then lost – our trust*. Retrieved from <https://theconversation.com/lessons-from-an-oil-spill-how-bp-gained-then-lost-our-trust-40307>
- [28] Kaye, L. (2015). *Five years after Deepwater Horizon, can BP repair its reputation?* Retrieved from [http://www.sustainablebrands.com/news\\_and\\_views/marketing\\_comms/leon\\_kaye/five\\_years\\_after\\_deepwater\\_horizon\\_can\\_bp\\_repair\\_its\\_reputa](http://www.sustainablebrands.com/news_and_views/marketing_comms/leon_kaye/five_years_after_deepwater_horizon_can_bp_repair_its_reputa)
- [29] Kujawinski, E., Kido Soule, M., Valentine, D., Boysen, A., Longnecker, K., & Redmond, M. (2011). Fate of dispersants associated with the Deepwater Horizon oil spill. *Environmental Science & Technology*, 45(4): 1298-1306.
- [30] Kwok, R. K., Engel, L. S., Miller, A. K., Blair, A., Curry, M. D., & Jackson, W. B. (2017). The GuLF STUDY: a prospective study of persons involved in the Deepwater Horizon oil spill response and clean-up. *Environmental health perspectives*, 125(4), 570.
- [31] Kwok, R., Engel, L., Miller, A., Blair, A., Curry, M., & Jackson, W. *et al.* (2018). The GuLF STUDY: A Prospective Study of Persons Involved in the Deepwater Horizon Oil Spill Response and Clean-Up.
- [32] Landers, S., Nichols, A., Barron, N., Schimmer, C., Tao, R., Yu, K., ... & Olafsson, E. (2014). Nematode and copepod diversity (2012) from Louisiana near

- the Deepwater Horizon oil spill. *Proceedings of the Biological Society of Washington*, 127(1): 47-57.
- [33] Lee, Y., & Garza-Gomez, X. (2012). Total cost of the 2010 deepwater horizon oil spill reflected in US stock market. *Journal of Accounting and Finance*, 12(1): 73-83.
- [34] Lubin, G. (2010). *10 Disastrous mistakes BP made before the Deepwater Horizon exploded*. Retrieved from <http://www.businessinsider.com/bp-mistakes-2010-5?IR=T>
- [35] MacDonald, C. (2010). *BP and Corporate Social Responsibility*. Retrieved from <https://businessethicsblog.com/2010/09/01/bp-and-csr/>
- [36] Malek, M. (2018). *Oil in Iran between the Two World Wars*. Retrieved from [http://www.iranchamber.com/history/articles/oil\\_iran\\_between\\_world\\_wars.php](http://www.iranchamber.com/history/articles/oil_iran_between_world_wars.php)
- [37] Meigs, J. (2016). *Blame BP for Deepwater Horizon. But direct your outrage to the actual mistake*. Retrieved from [http://www.slate.com/articles/health\\_and\\_science/science/2016/09/bp\\_is\\_to\\_blame\\_for\\_deepwater\\_horizon\\_but\\_its\\_mistake\\_was\\_actually\\_years.html](http://www.slate.com/articles/health_and_science/science/2016/09/bp_is_to_blame_for_deepwater_horizon_but_its_mistake_was_actually_years.html)
- [38] Michel, J., Owens, E., Zengel, S., Graham, A., Nixon, Z., Allard, T., ... & Rutherford, N. (2013). Extent and degree of shoreline oiling: Deepwater Horizon oil spill, Gulf of Mexico, USA. *PloS One*, 8(6): e65087.
- [39] Milman, O. (2015). *Manslaughter charges dropped against two BP employees in Deepwater spill*. Retrieved from <https://www.theguardian.com/environment/2015/dec/03/manslaughter-charges-dropped-bp-employees-deepwater-horizon-oil-spill>
- [40] Mouawad, J. (2010). *For BP, a history of spills and safety lapses*. Retrieved from <https://www.nytimes.com/2010/05/09/business/09bp.html>
- [41] Murphy, D., Gemmell, B., Vaccari, L., Li, C., Bacosa, H., Evans, M., ... & Niepa, T. (2016). An in-depth survey of the oil spill literature since 1968: Long term trends and changes since Deepwater Horizon. *Marine pollution bulletin*, 113(1-2): 371-379.
- [42] Olenski, S. (2014). Retrieved from <https://www.forbes.com/sites/steveolenski/2014/01/24/nearly-four-years-after-deepwater-horizon-has-bps-brand-image-recovered/#4151d3bf61f6>
- [43] Our Strategy. (2018). Retrieved from <https://www.bp.com/en/global/corporate/what-we-do/our-strategy.html>
- [44] Pilcher, W., Miles, S., Tang, S., Mayer, G., & Whitehead, A. (2014). Genomic and genotoxic responses to controlled weathered-oil exposures confirm and extend field studies on impacts of the Deepwater Horizon oil spill on native killifish. *PloS One*, 9(9): e106351.
- [45] Ray, P., Chen, H., Podgorski, D., McKenna, A., & Tarr, M. (2014). Sunlight creates oxygenated species in water-soluble fractions of Deepwater Horizon oil. *Journal of Hazardous Materials*, 280: 636-643.
- [46] Spiro, E., Fitzhugh, S., Sutton, J., Pierski, N., Greczek, M., & Butts, C. (2012, June). Rumoring during extreme events: A case study of Deepwater Horizon 2010. In *Proceedings of the 4th Annual ACM Web Science Conference* (pp. 275-283). ACM.
- [47] Sverjensky, N. (2010). *Beyond Petroleum: Why the CSR community collaborated in creating the BP oil disaster*. Retrieved from <http://www.ethicalcorp.com/stakeholder-engagement/beyond-petroleum-why-csr-community-collaborated-creating-bp-oil-disaster>
- [48] Symington, A. (2010). *Legacy of the BP spill: What's a reputation worth?* Retrieved from <https://www.csmonitor.com/Business/2010/1018/Legacy-of-the-BP-spill-What-s-a-reputation-worth>
- [49] The GuLF STUDY. (2018). Retrieved from <https://www.niehs.nih.gov/research/atniehs/labs/epi/studies/gulfstudy/index.cfm>
- [50] Thielen, A. (2015). *How BP won back shareholders after the 2010 Gulf Oil spill*. Retrieved from <https://www.thestreet.com/story/13187318/1/how-bp-won-back-shareholders-after-the-2010-gulf-oil-spill.html>
- [51] Tran, T., Yazdanparast, A., & Sues, E. (2014). Effect of oil spill on birds: a graphical assay of the deepwater horizon oil spill's impact on birds. *Computational Statistics*, 29(1-2): 133-140.
- [52] Transocean :: Deepwater Horizon. (2018). Retrieved from <https://web.archive.org/web/20100619121120/http://www.deepwater.com/fw/main/Deepwater-Horizon-56C17.html>
- [53] United States Environmental Protection Agency. (n.d.). Summary of the Clean Water Act. Retrieved from <https://www.epa.gov/laws-regulations/summary-clean-water-act>
- [54] Utz, S. (2018). Corporate scandals and the reliability of ESG assessments: Evidence from an

international sample. *Review of Managerial Science*, 1-29.

[55] Ylitalo, G., Krahn, M., Dickhoff, W., Stein, J., Walker, C., Lassitter, C., ... & Wilson, S. (2012).

Federal seafood safety response to the Deepwater Horizon oil spill. *Proceedings of the National Academy of Sciences*, 109(50): 20274-20279.