Ethical Analysis of the Deepwater Horizon oil spill

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

The Deepwater Horizon oil spill resulting from the Macondo oil well explosion was one of the most disastrous hydrocarbon events in modern history. Lives were lost, billions of dollars worth of property was destroyed, and the environment was permanently polluted on a scale rarely seen. BP faced permanent consequences in fines and their carefully crafted image of a company trying to innovate for the future was tarnished. Because of the notoriety of the incident, many studies and reviews have been conducted about the events leading up to, during, the ensuing legal battles, and the aftermath of the event. These papers include ethics studies, technical reports, legal analyses, scientific studies, and many others. However, no paper utilizes an STS framework to try to understand why the failure occurred. To support my claim I will draw from the Chemical Safety Board's review of the incident, a legal study into the contracts between oil companies and rig operators, and a study of the media response from BP. By applying Actor Network Theory (ANT), I will show how BP improperly formed a network that was made to fail. Not applying ANT risks not considering and understanding how various technical, social, natural, economic, and conceptual actors came together and failed at the discretion of BP's attempt to form a network. Problems with ineffective contracts that skirt legal responsibility, poor management and leadership within BP, and its subsequent handling of contractors all transpired into a failed networking leading to the Macondo blowout and subsequent Deepwater Horizon oil spill.

Background

Off-shore drilling is a relatively new technology that exemplifies engineering prowess. An autonomous platform entirely built by humans designed to house hundreds of workers who work around the clock to extract oil and natural gas from the seafloor miles away from land.

Along with housing, these platforms store all the required equipment, safety mechanisms, and storage to perform this duty. Novel technologies have allowed these platforms to operate at depths of over 10,000 feet. Thousands of these platforms exist and operate in the hydrocarbon-rich Gulf of Mexico accounting for 15% of US crude oil production (EIA).

The Deepwater Horizon was a semi-submersible drilling rig that was owned and operated by Transocean Ltd. for BP (British Petroleum). On April 20, 2010, an explosion occurred on the rig while it was drilling a well in the Macondo Prospect in the Gulf of Mexico, resulting in a massive oil spill. The explosion killed 11 workers and injured 17 others (Viglione 2022). The rig burned for two days before sinking to the bottom of the ocean, approximately 5,000 feet below the surface. The wellhead at the bottom of the ocean also ruptured, releasing millions of barrels of oil into the Gulf of Mexico over several months. The oil spill caused significant environmental damage, harming marine life, coastal ecosystems, and the fishing and tourism industries in the Gulf of Mexico (Kujawinski 2020). The cleanup effort was one of the largest and most expensive in history, costing BP billions of dollars in damages, fines, and penalties. The incident prompted increased scrutiny of offshore drilling practices and safety regulations and spurred changes in the oil and gas industry to improve safety measures and prevent future accidents.

As a result of the Macondo Well explosion and subsequent oil spill, BP was forced to pay over $65 billion in charges and cleanup. BP was charged with 11 counts of manslaughter for the deaths of the rig operators. Some estimate the spill cost BP over $145 billion in the United States alone (Schwartz 2020). BPs name will forever be connected to the Deepwater Horizon spill.

Literature Review

"Beyond petroleum or bottom line profits only? An ethical analysis of BP and the Gulf oil spill" and "Toward an Ethical Model of Effective Crisis Communication" are two pieces of literature that have studied the Deepwater Horizon oil spill and attempted to analyze the tragedy through an ethical lens in the hopes that such an incident may be avoided in the future. Numerous reports and studies have been conducted to research not only the implications but also the factors that led to the Deepwater Horizon Oil Spill. In particular, ethical arguments have been made in comparison to the 2008 Financial Crisis which many attribute to corporate greed, lack of regulation, and bottom-line focus against ethics. In "Beyond petroleum or bottom line profits only? An ethical analysis of BP and the Gulf oil spill," Mark S. Schwartz investigates BP as a company and the ethics behind their actions before and after the spill as well as comparisons to the spill and the 2008 Financial Crisis. Similarly, because of the popularity of the spill, new ethical frameworks have been developed and implemented to understand the incident. In "Toward an Ethical Model of Effective Crisis Communication," Young Kim develops an ethics-based communication model and uses the Deepwater Horizon oil spill as an example to see how its implantation might've changed the outcome. Kim creates a three-part model to communicate in crisis focusing on transparency, two-way symmetrical conversation, and the right timing and applies it to the Deepwater Horizon spill to demonstrate how it could have made BP more ethically. The model is both a test for hindsight and a model for ethics as it is used in the paper to analyze BPs past mistakes as a test and as well as to show the steps they could have taken instead. Both papers use a hindsight approach and attempt to compare the crisis to one of the past using their unique models. They both apply well-known ethical frameworks. This report will build upon the work completed by these and other studies by analyzing how the STS framework provided helps explain the engineering failure. It is unique in that it does not try to create a model for future use, nor does it try to compare the actions of BP to another specific event. Instead, this paper will focus on the relationship between technology and human interaction and how it led to the Deepwater Horizon oil spill.

Conceptual Framework

Actor-Network Theory (ANT) serves as a robust framework for analyzing the Deepwater Horizon Oil spill. It simplified the task of connecting the various technical, non-technical, animate, and inanimate ‘actors’ into one broken-down system for investigation. ANT, described by French sociologist Michael Callon, breaks down large technological systems into networks composed of “heterogeneous elements, animate and inanimate, that have been linked to one another for a certain period of time” (Callon 1987). ANT differs from purely sociological theories by including non-human actors (Callon 1987). Large engineering systems are notoriously complex. In theory, they are combined by sometimes predictable networks of technology and inanimate objects. In practice, however, they are placed into social networks regularly interacting with animated components. ANT suits this combination of unpredictable connections between technological and social ‘actors’. Actor groups focused on in this paper include: technical, social, natural, and economic. Actors must be recruited by a network builder who establishes a problem and forms a network.

ANT moves through a problem in phases including: problematization, interessment, enrolment, mobilization, and black-box (Callon 1987). Problematization involves the identification of a problem and establishing a goal to solve the problem. The Interessment phase is where the network builder recruits actors to form a network. In the enrollment phase, the builder assigns clear roles and responsibilities. Mobilization is a natural transition from enrollment where the actors accept their roles and responsibilities in conjunction with other actors. Finally, in black-box, the actors work to full capacity and the network is formed and functional. While all translations are important in this paper, the focus will be on enrollment and mobilization. BP created a faulty network to extract oil from the ocean floor and ineffectively enrolled which led to the Deepwater Horizon oil spill failure.

Analysis

Network

BP's ineffective enrollment and subsequent failure to mobilize led to the Deepwater Horizon oil spill disaster. The first step of establishing ANT is determining the network. In this case, the network builder, BP, built a network and recruited actors to extract the economic and natural actors of oil out of the deep sea environment for profit. To accomplish this, they built a social network composed of their engineers, management, and a plethora of other contractors to service the operation. The complex engineering tools at their disposal also served as actors. After acquiring the rights to drill at the Macondo Prospect from the US Minerals Management Service, BP recruited Transocean, the drilling contractor and operator of the Deepwater Horizon oil rig, and Haliburton, another contractor, to help them in the installation of the rig to extract the valuable hydrocarbons from the well (CSB 2016). These contractors would handle most of the work while BP managers and representatives would supervise and make decisions that would affect everyone on the site. On the day of the incident, of the 126 members on the Deepwater Horizon, seven were from BP and the rest were contractors from companies such as Halliburton and Transocean. Relationships between contractors and BP "ultimately led to vaguely established safety roles and responsibilities that affected human performance and major accident risk management at Macondo" (CSB 2016).

Contracts

Before the project even began, contracts between the oil companies and the drillers created an uneven situation that lacked accountability and caused network failure as no actor was incentivized to prioritize overall safety in the operation. In the Interessment phase, BP had to recruit actors such as Transocean and Halliburton to build their network. These actors helped establish the Macondo oil well to extract the hydrocarbons underneath. In the enrollment phase, long before physical work even began on the project, BP established clear contracts that incentivized lapses in safety leading to the network failure. These contracts included "knock-for-knock" indemnities that were common in the oil and gas industry (Brown 2017). Indemnity clauses such as these came into effect following the disaster and ensuing litigation to account for personal injury claims, damage to the rig and equipment, damage to the reservoir, and pollution liabilities (Brown 2017). Indemnity allows a party to secure itself from financial punishment as a result of another party's actions. In the case of the Deepwater Horizon oil spill, this included billions of dollars worth of damages in the aforementioned liabilities. These "knock-for-knock" indemnities save oil companies enormous amounts of money in legal fees" and provide a sense of security in certainty about the result of a disaster such as the one that happened in this case (Brown 2017). For example, pollution damages could be pre-apportioned by allocating below-the-surface damages to the oil company and above-the-surface damage to the drilling company. There is an illusion that liabilities from faults from damages are already determined no matter what happens or who is actually at fault. On the Deepwater Horizon, members of all parties were working together on a single mission. If BP knows that it is not liable for certain damages, they are not as incentivized to act in the safest manner possible and may cut corners. Conversely, if a contractor doesn't feel as though their work is safe, it doesn't affect their liability; they may not speak up. Stop work authority over safety issues should not be disincentivized because of the effects of existing contracts. Process safety is a team effort where every party is responsible.

BP including "knock-for-knock" indemnities in their contracts harmed the integrity of process safety leading to a collapse of the network in the enrollment phase. One might argue that indemnity clauses actually aid process safety by providing clear liability for parties. By applying fault to parties ahead of time, they will be more cognizant of the risk and collaborate with other parties to mitigate their own risk. In hindsight, "the environmental damages paid by BP have far surpassed any other damages in litigation" and so they did end up paying a higher price for their actions (Brown 2017). While equivocating the financial settlement as a means of assessing the initial risk may be helpful in some circumstances, evidence suggests that these contracts hindered safety concerns throughout the process. "Rig survivors said it was always understood that you could get fired if you raised safety concerns that might delay drilling." (Schwartz 2020). A survey 1 month before the spill by Transocean showed that 50% of workers feared reprisals for speaking out (Schwartz 2020). Hazardous conditions were allowed to continue out of financial risk to the company because of these contracts. Operators are the front-line workers of heavy industries and often know which sections are dangerous and in need of maintenance. Not being able to speak up on these issues because of financial pressures is dangerous for everyone involved. Instead of taking accountability for their faults and liabilities in these contracts, BP accepted responsibility for the cleanup but not for the cause of the incident. Their CEO at the time stated "We are responsible, *not for the accident*, … but for the cleanup" (Schwartz 2020). Initial statements from BP pushed to immediately blame Transocean and Halliburton for the disaster (Schwartz 2020). Despite creating an environment where speaking up about safety concerns was de facto banned, BP continued to act as if they were not the ones at fault. These statements emphasize how BP refused to believe that they were at fault and rushed to blame anyone else even though they were responsible for the environment that these workers operated in. BP used this strategy for years to follow in congressional hearings and litigation because they "had everything to lose by taking responsibility for the Deepwater Horizon disaster" (Smithson & Venette, 2013). Contractual agreements between BP and their contractors did little to fairly apply blame in the aftermath of the incident. Before drilling, BP signed an obligation that predetermined fault and liability to save enormous amounts of money in the case of such an incident. During operations, these contracts stood to deny contracted employees the right to a safe working environment because of the threat of termination and loss of company revenue. After the disaster, BP solely left the contracts as a means to attempt a lower financial burden instead of accepting any responsibility for its actions. These contracts served in the interest of BP to maximize their financial gain while limiting actual liability. BP weaponized the relationship by immediately turning against the other parties to shield itself from further consequences. A faulty enrollment by BP ultimately set up the network for failure by denying a safe working environment that suppressed speak-up from actors.

Leadership and Management

During operations, the power dynamic from BP's highest organizational culture down to its management led to repeated overriding of safety recommendations leading to network failure by prioritizing profit over clear safety considerations internally and from contractors. Numerous times, suggestions were made to prioritize safety, but BP overrode them and subsequently went through with the unsafe operation. BP's attitude from the CEO down to the local site managers reflected the tone of prioritizing profit over safety leading to the overriding of key engineering principles. Tone from the top is quintessential in process safety and trickles down to the operators who must feel as though their managers care about their safety. According to the Chemical Safety Board's (CSB) report, no independent member on the Board of Directors had relevant professional experience in offshore drilling at the time of the Macondo blowout. The *Baker Report's* investigation of the BP Texas City Refinery explosion 5 years earlier confirmed this notion of extreme cost-cutting in the maintenance and safety departments (Ingersoll et al. 2012). This disaster came to foreshadow the Macondo blowout as many of the safety culture problems remained unaddressed at BP. BP's messaging and commitments to its employees were not much better. They continued to focus on cost-cutting and the bottom line above all no matter what it took. Out of BP's 18 "Group values" and four "Brand values", not a single value related to safety (Ingersoll et al. 2012). From board leadership to its marketing team, nobody in the corporate office was thinking about process safety. This corporate messaging and tone created a dangerous trend that carried down to the operators and employees who worked on the assets on a day-to-day basis. Based on interviews from the *Baker Panel* just five years earlier, significant portions of refinery workers did not believe process safety was a core value at BP (Ingersoll et al. 2012). Just as the Transocean contractors feared reprisal for speaking out, refinery workers around the country understood BP was an organization where profits took priority over process safety. The Managing practices of the top leadership were insufficient to support the network that had been formed to accomplish such a dangerous task. Further, leadership from the very top was focused on cutting costs to improve the profitability of BP. Before the CEO who oversaw the disaster at the Macondo oil well, CEO John Brown implemented a model known as "asset federation" where decision-making authority was shifted toward the asset managers to meet production goals which were tied to employee compensation (Ingersoll et al. 2012). This practice stressed the importance of meeting performance targets and placed their responsibility on site managers whilst also giving them overarching authority to do what it takes to meet that goal. Tying salaries to the performance led to production stresses that overlooked safety protocols and cut back on maintenance costs. The lack of disconnect between the safety of operations and financial pressures from upper leadership led to an unfortunate choice for middle management to connect the two. Macondo well site leader, Bob Kaluza, had very little experience in offshore drilling and "planned to learn about deepwater [drilling]" on the Deepwater Horizon rig (Ontario 2011). Even more troubling was Kaluza was one of two "company men" who were BPs managers responsible for supervising contractors such as those from Transocean and Haliburton who performed the actual work (Ontario 2011). The authority given to them combined with their production pressures led to several key decisions that bypassed safety and ultimately led to the demise of the rig. The two men in charge of overarching decision-making didn't even have adequate engineering knowledge for the task. Later reports from the National Academy of Engineering and the President's Report cited "inadequate training and supervision" and that "better management … would almost certainly have prevented the blowout." (Schwartz 2020). This lack of experience in management and authority over contractors combined with production pressures fostered an environment where any measure was to be taken to accomplish the job even if it meant cutting essential safety protocols. The production pressures were very real as by the time of the blowout the rig was already 29 days past schedule with every day costing BP $1.5 million over budget (Ingersoll et al. 2012, Schwartz 2020). Because the asset was burning money, this placed additional pressure to get the project moving no matter what corners had to be cut. These forces came together in several pivotal decisions that led to the eventual blowout and resulting disaster. In one such instance, there was a fierce debate about how many centralizers were to be used in the piping into the oil reservoir. Contracting company Haliburton was responsible for running a simulation to analyze how many centralizers should be used and what the effects might be. BP currently only had 6 available, but Haliburton's model showed that it would lead to a "severe gas problem" (Ontario 2011). They found that 21 would be needed, but their request was ignored by BP management in a documented email chain (Ingersoll et al.). BP drilling engineers later testified that they had not even read the full report (Ingersoll et al.). This is just one example of the back-and-forth interactions between management and frustrations from contractors who would become aware of safety issues in the operations of the Macondo well. Additionally, the ignorance of the BP engineers showed the sheer negligence and lack of concern of management to attend to the details of engineering practice. BP's messaging from the top all the way down to its site managers created a dysfunctional network, already built on poor enrolment, with shortcomings in mobilization ultimately causing network failure.

Conclusion

BP formed the network but failed to foster reliable connections between actors which ultimately led to network failure which transpired into the Deepwater Horizon explosion and subsequent oil spill. Poor actions by BP in enrollment and mobilization to save money and quicken the operation by forming unethical contract negotiations with contractors, poor leadership at all levels, and prioritizing profits over safety led to this network failure. The implications of this paper reach further than just the analysis of the Deepwater Horizon oil spill. Safety is a huge and emerging field, particularly in Chemical Engineering where large amounts of dangerous chemicals are mixed and reacted daily. An estimated 250,000 jobs were lost as a result of the disaster and lives were permanently ruined. Further research can be conducted using ANT and other frameworks to analyze the dozens of incidents that occur every year to prevent future incidents.

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