OIL AND WATER:
CORPORATE INTEREST AND
RISK COMMUNICATION PRECEDING THE
DEEPWATER HORIZON DISASTER

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DEDICATION

This thesis is dedicated to those whose lives were upended by the Deepwater Horizon disaster – the workers, their families, emergency responders, and community members, as well as the individuals who continue their work to mitigate the environmental and health impacts of the spill.

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Thank you to Trip for trekking with me through two years of research papers, conferences, and the high highs and low lows that come with being in graduate school.

Finally, I would like to incorporate into these pages of research a few words uttered by the late Charlie Chaplin in the film, *The Great Dictator*. These words have time and time again reminded me of why I must continue writing about such things:

"*Machinery that gives abundance has left us in want. Our knowledge has made us cynical. Our cleverness, hard and unkind. We think too much and feel too little. More than machinery we need humanity. More than cleverness we need kindness and gentleness. Without these qualities, life will be violent and all will be lost.*"

ABSTRACT

Palenchar and Heath (2006) claim that, “organizations find reason to implement programs whereby they increase the public’s understanding of technical processes as a means for lessening the fear of the threatening unknown and of increasing trust.” The research being proposed will hold the British Petroleum Company (BP) to these standards as they relate to communicating emanating from BP before, during, and after the Deepwater Horizon disaster of 2010.

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CHAPTER ONE

THE RESEARCH PROBLEM

On April 20th, 2010, the Deepwater Horizon offshore oil rig, whose furthest extremities stretched the length of fourteen Empire State buildings, began a nearly three-month series of catastrophic events that would later be recognized as the largest environmental disaster in American history (Lustgarten, 2012). The lives of eleven people as well as almost five million barrels of oil were lost. Blame for the event was placed on a myriad of factors – from freak occurrences to corporate greed. An internal survey of rig workers serving on the Deepwater Horizon showed that, “Many workers on the Deepwater Horizon oil rig were concerned about safety in the weeks before the 20 April explosion but feared reprisals if they reported problems,”(Kollewe, 2010). In the confidential survey, workers raised concerns that rig equipment was unreliable, “Which they believed was as a result of drilling priorities taking precedence over planned maintenance,” (Urbina, 2010).

While the measurement of public perception in the days following the Deepwater Horizon disaster have been covered in other bodies of research, such pre-event perception that was measured in the aforementioned survey of employees should be applied to the community member’s affected by events such as the Deepwater Horizon. This research marks an effort to

analyze how informed, via official online media, of risk Louisianans were prior to the events of April 20th, 2010. Was much of the risk of offshore drilling purposefully withheld, improperly communicated according to risk communication theory principles, or simply unknown to British Petroleum officials? It is the researcher's intention to illustrate a connection between corporate interest and poor risk communication strategies employed pre-incident. Special emphasis has been placed on the use of technical language, a byproduct of a risk society reliant upon industry experts as communicators (Giddons, 1991), and the evolution of BP's online resources after the Deepwater Horizon Oil Spill.

CHAPTER TWO

LITERATURE REVIEW: COMMUNICATION IN THE RISK SOCIETY

To illustrate BP's role within risk society and as conveyers of risk communication, literature detailing the qualities of risk society purveyors and the qualities of effective risk communication has been reviewed. The rise of offshore drilling in the 1980's allowed for the framing of risk society cornerstones as they relate to Reagan-era neoliberal ideology. Texts from the study of risk communication have been reviewed to provide an assessment of BP's specific strength and weakness as risk communicators within the risk society.

RISK SOCIETY

Both the human health and environmental dangers posed by modern day oil extraction technologies are a product of a risk society, a sociological concept asserting that our contemporary society and its continued economic growth is inextricably linked with unprecedented hazards and risks (Beck, 1992). The reliance on technological tools within contemporary society, represents a dichotomy from the risk our ancestors experienced. Prior to World War II, humans were subjected to risks posed by the natural world such

as floods and famine. In contrast, risk societies craft and take deliberate risks. For members living in a such a society, the risk is endemic (Barbosa, 2009).

A cornerstone of risk society theory is that a citizen's access to information regarding hazards to the environment and human health are restricted (Beck, 1992). While such information can be purposefully withheld from citizens, such as cases of proprietary technology that is sheiled from the public eye via embargos and patent law, much censorship of inherent risk is unintentional as, "technologies require multiple specialized experts who create abstract knowledge systems that are incomprehensible to the majority of citizens," (Giddens, 1991). In simpler terms, as technology and knowledge trek forward at a quickening pace, "many are left behind, panting in ignorance, increasingly unable to understand and control the machines on which they depend," (Barbosa, 2009).

This lack of understanding is fueled by an increased economic and societal dependence upon specialized experts. These leaders in their respective fields craft complex knowledge systems that are indecipherable by the general population (Giddens, 1991). Workers bear the brunt of the risk posed by technological progress. A former resident of Love Canal, New York, a site considered to be one of the more egregious environmental events in American history, expressed, "Communities perceive many flaws in risk assessment. The first is who is being asked to take the risk and who is getting the benefit. From a community's perspective, risk assessments are 'the risks

that someone else has chosen for you to take," (Gibbs, 1994).

Beck (1991) suggests that, as a result, citizens have lost faith in the institutions of modernity. Catastrophic events that occurred from a lack of foresight and proper risk assessment performed by science and industry elites have tainted public trust in them. While scientists weigh the distribution of risks and errors as a part of technological expansion, many of the said risks and errors are created by science itself (Barbosa, 2009). For example, while nuclear power technology has become a reality, the same scientists who helped to mold the technology into its usable form have weighed potential risks and expressed to the public that said technology is safe. As citizens are forced to rely upon these scientific institution's experts for vital information, events such as the Three Mile Island and Chernobyl disasters have sown distrust of industry officials (Barbosa, 2009).

The architect of risk society theory argues that, "the more emphatically the existence of world risk society is denied, the more easily it can become a reality," (Beck, 2006). Therefore, it is crucial to produce and distribute accurate risk assessments quantify so that effective policies can be formulated. The oil extraction industry is a prominent risk society participant because of its expansive production of toxic substances on which contemporary society depends.

This research analyzes the communication of potential risks that preceded the Deepwater Horizon disaster. Risk society markers in the technology and practices of offshore drilling will be highlighted, and media practices and the dissemination of risk information to the public will be audited.

NEOLIBERALISM AS A FUEL FOR RISK SOCIETY

The ideology of neoliberalism asserts that, “human well-being can best be advanced by the maximization of entrepreneurial freedoms within and institutional framework characterized by private property rights, individual liberty, unencumbered markets, and free trade,” (Harvey, 2007). Scholars critical of neoliberalism point to dangerous deregulation and resulting crises, such as the 1987 stock market crash, and the numerous corporate scandals of the 1990s (Marino, Mayper, and Tolleson).

Almost half a century before the Reagan era of neoliberalism took shape, political economist Karl Polanyi predicted that, “to allow the market mechanism to be sole director of the fate of human beings and their natural environment would result in the demolition of society.” (1944, p. 76) Seventy years after Polanyi’s prediction, sociologist Charles Perrow deemed that such

fears had come to fruition as, “we have moved from public oversight to a system wherein regulators cooperate with the regulated,” (2015, p. 203).

Over the last three decades, the United States, “has retreated from its regulatory responsibility over private-sector economic activities,” (Perrow, 2015, p. 203). In the 2000’s alone, government deregulation was blamed for events ranging from West Virginia’s Upper Big Branch mine explosion to declining work conditions for air traffic controllers that have resulted in the loss of human lives (Eley, 2011).

Consumers are protected via a common form of risk communication, that which, “provide(s) labels and other information for informing consumers about product risks and safe use practices,” (Baram, 1985,). In determining if risk communication practices performed by a company are within legal boundaries, “Certain criteria favorable to persons at risk are used in the courts to determine if company communication practices were adequate…” (Baram, 1985, p. 38). More specifically, the greater potential for harm that a company’s practices or products presents, “the more precise, clear, and obvious the warning must be to be found adequate,” (Baram, 1985, p. 39).

RISK COMMUNICATION

Successful dissemination of information within the realm of risk communication theory is described as that which, “raises the level of understanding of relevant issues or actions for those involved and satisfies them that they are adequately informed within the limits of available knowledge,” (Improving Risk Communication, 1989). Several federal laws outlaw corporation’s responsibility in properly implementing risk communication, from emergency planning and community right-to-know to environmental justice in minority populations (Lundgren and McMakin, 2004).

To evaluate a text’s ability to raise the level of understanding of a content consumer, researchers studying risk communication through content analysis, “Identify themes within a dataset and comparing those themes to the study purpose and existing literature,” (Penney et al, 2011). For the purpose of this research, Penney et al’s 2011 research on risk communication and informed consent served as a basis for the risk communication terms selected for content analysis.

Theories of risk communication cover communication methods both preemptive in nature and those that result from questions arising from communities, politicians, and activists concerned about potential ill effects of industry. In the event that risk is not properly communicated by industry

officials, “health, safety and environmental concerns remain at the forefront of media, community and public policy discussions,” (Palenchar and Heath, 2006).

As risk society theory claims that information is restricted due complex knowledge systems created by experts in a given field, the scientific positivism element of risk communication echoes this sentiment, “data and methodologies of scientists dominate community efforts to ascertain the degree of risk and subsequent communications about the risk on behalf of the community,” (Renn, 1992). According to the US Environmental Protection Agency (1993), “empowering the public with information helps assure [industry] compliance with existing laws and encourages companies to take additional measures to reduce industrial chemical releases.”

Study in the field of risk communication often resides in one of two paradigms that assert, “whether risk is a technical matter that is determined objectively or a social construction that emerges from communication among experts, affected parties, and public agencies,” (Cox, 2006). The former perspective, known as the technical model of risk, is criticized for its emphasis on communication deemed, “too often restricted to a technical sphere and thus excludes those who are most effected,” (Cox, 2006). The architect of Risk Society theory, Ulrich Beck encapsulated the problems with a solely technical approach to risk by stating, “there is a big difference between those

who take risks and those who are victimized by the risks others take," (Beck, 1998). As risk society theory claims that information is restricted due complex knowledge systems created by experts in a given field, the scientific positivism element of risk communication echoes the sentiment that, "data and methodologies of scientists dominate community efforts to ascertain the degree of risk and subsequent communications about the risk on behalf of the community," (Renn, 1992).

In response to the technical domination of risk communications, the cultural-experiential model was formed. This model deviates from the technical model of risk in that it seeks to highlight, "attention to the experiences of a community that might be left out of technical calculations," (Cox, 2006). Communications in this vein take into account familiar and often personal concerns within its language forgoing technical information that may be difficult to understand for the general population. Researchers of risk communication note that this model allows for, "requests of information regarding the experience and views of impacted populations and their assessment of risk," (Caron and Serrell, 2009).

These models provide an important lens through which to view content analyses of risk communication texts. By performing counts of technical language use, industry-specific terms, and overall complex language appropriate for high-reading level adults, risk communicator can be mapped

as conformers of the technical model of risk communication or the cultural model. Risk communication researchers have stated that industries who are communicating risk to the general public will find more effective avenues of communication via the cultural model than the technical model of risk communication (Cox, 2006). With this knowledge, organizations can make a conscious effort to adopt language changes that are more understood by their audience.

BP AND NEOLIBERALISM: THE RENEGADE REFINER

British Petroleum's foray into offshore drilling began in 1964 with the conversion of a barge into an offshore drilling rig named *Sea Gem*. Anchored 42 miles off the shores of Britain, this platform was projected to tap into 10 million cubic feet of oil, "enough to supply the fuel needs of a town of 300,000 people," (Britain: Sinking of the Sea Gem, 1996). Two years into operation the rig collapsed resulting in the total loss of the platform and the death of 13 crew members (On this day: Sea Gem oil rig collapses, n.d.).

The sinking of Sea Gem, as well as the subsequent sinking and spills of other company's rigs, led to a tightening of internal safety and technical policies within the realm of explosion protection, management and

administration, rescue, and rig construction (Pickering, 1994). Despite initial resistance from BP to adopt a statuary safety code for their offshore drilling rigs, the exploration of factors contributing to Sea Gem's demise softened BP's opposition to policy recommendations put forth by a British government inquiry committee (Kemp, 2014).

Though the loss of BP's first offshore drilling rig was a major financial and loss of legal freedom for the company, the development was already underway to begin the operation of BP's second offshore drilling rig as crews began clearing the wreckage of Sea Gem (TIME, 1996).

Today BP can no longer be found off the shore of their home country but instead in Alaska, the US lower 48, and the Gulf of Mexico, currently home to eight BP owned and/or operated rigs (Exploration and Production, 2017). With American shores promising a greater delivery upon investment due to the presence of large oil deposits, BP's exploration of the United State's crude oil extraction potential has proved mutually beneficial to the coffers of both BP and the American government.

Outside of funds collected by the Internal Revenue Service, the program leasing offshore oil resources has been the largest official source of revenue for the American federal government (Freudenberg, 1994). Unlike oil rich countries such as Iraq and Russia, free enterprise in the oil business within the United States can be traced back to the earliest days of oil drilling in the country. Not unlike other industries in America, the business of oil

extraction was heavily influenced by the wave of neoliberalism that began cresting within the Regan presidency.

Much of the current oversight of offshore oil drilling in the early 2000s was performed by the Mineral Management Service (MMS), an agency created during the Regan presidency and headed by secretary of the interior, James Watt, one of the most anti-environmental political appointees in American history (Freudenburg & Gramling, 2011). British Petroleum, now known as BP, was accused of showing influence within the MMS having convinced agency officials that the oil companies themselves could best asses the marine impacts of their operations as well as persuading regulators to ease existing public notification rules (Ladd, 2012). Within the 2010 MMS annual report, released before the events of Deepwater Horizon, it was concluded that more stringent rig regulations were superfluous given that industry practices were considered failsafe (Kennedy, 2010; Whitty, 2010).

A commission name by President Obama to investigate the Deepwater Horizon oil spill noted that, “MMS became an agency systematically lacking the resources, technical training or experience in petroleum engineering that is absolutely critical to ensuring that offshore drilling is being conducted in a safe and responsible manner,” (Report to the President, 2011). The Obama administration retooled the MMS in October of 2011 to become the Bureau of Ocean Management, Regulation and Enforcement. Critics were quick to note

that changes to the organization were, “only cosmetic changes and remains too close to the people it is supposed to regulate,” (Broder and Krauss, 2011).

BP’s ability to directly influence political elites became even more clear after Vice President Dick Cheney, within months of taking office, “held secret energy task force meetings with more than 100 oil officials to draw up a wish list of industry demands to be implemented by the oil-friendly administration,” (Ladd, 2012). Shortly afterward, a federal executive order set forth a requirement that the federal government was to expedite offshore drilling practices (Bolstad, 2010). Within this atmosphere of deregulation, BP garnered a reputation among OSHA officials as being, “the Renegade Refiner,” (Freudenburg & Gramling, 2011, p. 42).

From 2008 until the Deepwater Horizon oil spill in 2010, oil and gas companies spent more than $340 million on lobbying efforts in congress. BP CEO Tony Hayward increased his company’s lobbying budget to $15.9 million in 2009 specifically in order to dilute new laws aimed at preventing oil spill pollution (Kocieniewski, 2010; Whitty, 2010).

A decade before the Deepwater Horizon spill, Ulrich Beck (2002) predicted that, “in the world of global risks, the mark of neoliberalism rapidly loses its credibility to substitute the state and politics through economics.” The era of neoliberalism has ushered in a state of deregulation. Within the wake of

loosening and removal of federal regulations of offshore drilling has come the increase of risk, and ultimately, the loss of lives. When reviewing the events of the Deepwater Horizon spill, it is important to note that deregulation has largely influenced the level of risk that the communities and workers of offshore drilling have and are continuing to be exposed to.

THE EVENTS OF DEEPWATER HORIZON

The Deepwater Horizon explosion occurred after a three decades of neoliberal policies and approaches to offshore drilling. According to the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (2010), “Technology, law, and geology pushed oil exploration farther from U.S. shores, as land-based exploration became less fruitful, and the global demand for energy ramped up.”

It is estimated that the Deepwater Horizon spilled 4.9 million barrels of crude oil and natural gases were released into the waters forty-one miles off of Louisiana’s coast. In the days following the spill, responders, scientists, and BP itself would acknowledge the spill as the largest environmental disaster in American history (Nyankson, Rodene, and Gupta, 2015). Eleven workers were killed aboard the rig, sixteen others sustained serious injuries, and three

months passed before the leaking oil could be capped enough to prevent further damage to the environment (National Academy of Engineering, 2012).

A qualitative interview analysis of 139 Louisiana residents showed that nearly 50% of locals felt that they lacked information about the Deepwater Horizon spill (Simon-Friedt, et al, 2016). It is being proposed that further research into the preemptive risk communication will shed light on patterns of communication that may have left Louisianans underinformed about the dangers of offshore drilling.

A content analysis of BP.com will be utilized to uncover weaknesses and discrepancies in the risk communicated to community members and workers prior to the Deepwater Horizon explosion. Special attention will be given to language concerning risk that is rich in scientific jargon and are written for high reading level adults as opposed to the general population. It is questioned whether much of the risk communication emanating from BP's online sources were largely too complex in nature to adequately inform the general populous about risks relating to offshore drilling.

CHAPTER THREE

METHODS AND MATERIALS

Content analysis has become a common methodology for assessing risk communication practices. The methodology is defined by, “a domain of techniques designed to explore and describe qualitative verbal, written, and multimedia communication in a systematic, objective, and quantitative manner,” (Crano, Brewer, and Lac, 2015). Said methodology is commonly relied upon in the study of risk communication practices due to its ability to yield a variety of symbolic cues and shared themes within the human experience of accessing and evaluating risk information (Palenchar and Heath, 2002).

Given the presence of existing literature employing content analysis of websites illustrating risk communication practices, the content analysis used in this research employs the principles of deductive content analysis whereas the researcher, “determined the coding categories and units that will be the basis of the coding system prior to conducting the coding,” (Crano, Brewer, and Lac, 2015).

Coding categories in this research were supported by existing studies of online risk communication that employed content analysis, such as Penney et al’s 2011 study of risk communication and informed consent. Using past

studies' categories as a basis for determining risk communication categories to target for content analysis, ten risk communication items were targeted for this research:

- Reference to offshore drilling: language illustrating the use of offshore drilling techniques, the building and maintaining of offshore rigs, and exploration of offshore oil deposits
- Explicit reference to environmental sustainability: such specific targeting of language prevents the incorporation of mentions of sustainability as it relates to development and finances
- Evidence of professional membership or certification
- Explicit reference to safety
- Explicit reference to cleanups
- Mention of human health risks
- Mention of environmental risks: language illustrating the mitigation of potential dangers to the environment
- Reference to reporting requirements
- Reference to adherence with law
- Industry specific terms: language that is technical in nature and is specific to the energy industry

In addition to the content analysis framed by the aforementioned categories, this research also gauged the effectiveness of BP's online risk communication practices by employing the mathematical equation known as the Flesch Reading Ease Score. This score is described as, "a test designed to assess the comprehension and difficulty of reading passages of contemporary academic English," (Kong and Hu, 2015). According to Henderson et al (2015), "Previous research indicates that online health information tends to be written at a reading level that is more advanced than ability of the general population." Louisiana in particular has been reported to

have the one of the lowest reading proficiencies in the United States (Bacon-Blood, 2013). Though urban populations have shown higher reading proficiency than rural populations (Graham and Teague, 2011), 2015 data showed that within the Greater New Orleans area alone, “nearly 40 percent of the population aged 16 and older have a literacy rate below that of a 5th-grader,” (Facts and Statistics, 2016).

Use of the Flesch Reading Ease Score formula provides insight to the appropriateness and reliability of the language used on BP’s website. The formula provides a score on a scale of 0 to 100 where the higher the score, the more easily readable the text. The architects of the formula describe a score of 0 as unreadable and a score of 100 representing language use easily understood for a literate individual, (Flesch, 1948). This score is determined by the following equation:

Readability ease = 206.835 – (1.015 x Average Sentence Length) – (84.6 x Average numbers of syllables per word)

According to Flesch (1946), scores between 90 and 100 are appropriate for those at or above a fifth grade reading level. Scores between 60 and 70 are easily understood by individuals of middle school age. Finally, scores of 30 and below illustrates a reading level appropriate for college graduates.

Three iterations of BP's website were analyzed for risk communication language. A digital library hosted through the non-profit Internet Archive allowed the researcher to view the BP.com website in its original form on selected dates, specific categories of language based on other studies of risk communication effectiveness were identified and catalogued. The iterations chosen for this research were BP's archived website of

- October 20th, 1996, the earliest available archive of BP.com
- April 15th, 2010, five days after the Deepwater Horizon spill
- April 5th, 2016

Each of the website's pages relevant to the analyzation of risk communication were analyzed according to the Flesch-Kincaid Reading Ease Score formula. Each page of BP.com under the sections of *Environment* and *Safety* was tabulated for average sentence length, average number of syllables per word, and targeted content analysis categories were tallied. Flesch reading scores were averaged together representing the readability of risk focused pages for each year's iteration of the website.

Only content that was available via the HTML website was analyzed, not taking into account downloadable documents such as PDFs and graphs. These document remained outside of the scope of research as the documents were often technical and financial in nature, thus falling outside the interest of the general patron of the website seeking information about the environment, human health, and offshore drilling. Additionally, such

documents are frequently unavailable via internet archives unlike HTML snapshots. Furthermore, only featured pages such as those that could be accessed from main landing pages were not targeted in the content analysis.

BP ONLINE

According to web archives, BP unveiled its website to the public in autumn of 1996 (Web Archive, 1996). This first iteration of the company's online presence was typical of other websites of the time containing few page links and no embedded video. Despite only containing six hyperlinks to pages on the website, information on health and safety were present on day one of BP's existence on the information super highway. Under the main tab of *What We Care About* were four hyperlinks of related material labeled, Policies, People, the Community, and Health, Safety, and the Environment. Though BP's foray into offshore drilling began long before their foray into cyberspace, no mention of offshore drilling is mentioned in the content located via these hyperlinked headings. However, in this 1996 iteration of the website there is an acknowledgement that, "we aim to reduce total oil discharge to water, despite increased drilling activity and continued reservoir depletion," (Environmental Performance, 1996).

Several large scale oil spills occurred between the 1996 iteration of BP.com and the 2010 iteration. In 2007 when a new Chief Executive of BP settled a series of criminal charges related to these events, the company issued a statement pledging to improve their risk management (Mouawad, 2010).

From 1996 until 2005, visitors to BP's website could not be transported via hyperlink to pages about offshore drilling or oil spills directly from the homepage as illustrated in figure 1. It is in this 2005 version of the BP website that the *What We Care About* heading was transformed into a homepage heading titled *Environment and Society* indicating an effort to better showcase sustainability and safety specifics. This organization of pages and headings closely resembles the modern day website as it forms narratives around safety and sustainability concerns. Before the 2005 update, users of BP's website could find letters by BP executives rather than specific information about ongoing offshore drilling projects as well as environmental and health policies relating to offshore drilling.

Though the language concerning risk became more complex as BP.com evolved from 1999 to 2016, it should be noted that the website offered more non-text information about risk with each iteration of the website. In 1996, BP.com featured no video on the pages targeted by this research. By 2010, BP.com featured numerous pieces of video content on the subjects of human health and environmental risk, as well as hyperlinks to company social

media accounts such as YouTube. While literature on the efficacy of risk communication presented through text versus video is limited, recent research suggests that video can improve individuals understanding and retaining of information about risks (Garg et al, 2012).

Notably missing on BP.com days after the spill was information specific to community members within the immediate impact zone of the oil spill. This would be remedied in the summer of 2010 with the addition of website content that allowed visitors to file claims for damages. The summer 2010 version of BP.com also featured a list of emergency hotlines, a section that is not featured on the risk communication relevant portions of the website iterations analyzed in this research.

ASSESSING RISK COMMUNICATION WITHIN BP

Palenchar and Heath (2006) claim that, “organizations find reason to implement programs whereby they increase publics’ understanding of technical processes as a means for lessening the fear of the threatening unknown and of increasing trust.” While a myriad of qualitative risk analyses has been performed on the technical systems within projects such as the Deepwater Horizon and said event itself, “much less attention has been

focused on the human and organizational (sic) factors," (Skodalen & Vinnem, 2016).

From a post-spill perspective, BP's communication of risk has been analyzed according to federal and state regulations, most notable among these, the Emergency Planning and Communication Right-to-know Act (EPCRA). The act is described by the Environmental Protection Agency as having, "a significant role in protecting human health and the environment over the last quarter century by providing communities and emergency planners with valuable information on toxic chemical releases in their area," (30 Years of EPCRA, 2016). After being sued by the Center for Biological Diversity, a federal judge ruled that BP and Transocean, the owners of the rig itself, were not required to communicate risk as dictated by EPCRA due to language excluding spills comprised of petroleum (Rodriguez, 2015).

The Environmental Protection Agency (EPA) has been a leading resource for risk communication and emergency response planning (Baram, 1985). Despite their initiatives, online EPA documents about risk communication provides recommendations for practitioners but do not define risk communication as it adheres to federal law aside from corporate responsibility to draft contingency plans for environmental risks, (Guidance Documents, n.d.).

The contingency plan for BP's Deepwater Horizon rig was approved by the EPA and was reviewed as recently as one year before the catastrophe. The 582 page document was later noted as being riddled with oversights and errors. When documenting area wildlife for the gulf water habitat surrounding the rig, the contingency plan erroneously listed animals not present in the biosphere, such as sea lions and walruses (Clark, 2010). Additionally the plan listed, "a Long-deceased scientist as a recommended expert on wildlife contamination," (Clark, 2010).

The document described spills much more catastrophic than what occurred at Deepwater Horizon, yet made the false statement that even events that size, "fish, marine mammals and birds escape serious harm; beaches remain pristine; water quality is only a temporary problem," (BP Contingency Plans Vastly Inadequate, 2010). Despite this claim, wildlife was reported as being severely impacted and oil reached the shores of Florida within days of the spill (Clark, 2010).

CHAPTER FOUR

RESULTS AND DISCUSSION

Content analysis of BP.com on selected dates in 1999, 2010, and 2016 was performed via coding in ten categories of risk community as it related to both human health and environmental sustainability. 246 targeted terms were identified on BP.com in 1996, with the greatest number of mentions relating to language consistent with the description of environmental risks. 456 targeted terms were accounted for in the 2010 iteration of BP.com with the most numerous targeted items representing language that illustrated environmental risk. 396 terms were identified on the 2016 BP.com website with the most numerous robust coding category consisting of language describing oil spills. These items were illustrated for reference in Figure 2.

Each page was analyzed using the Flesch Reading Score Formula. As seen in Figure 3, the average score for each targeted website version was 38.5 for 1996, 36.9 for 2010, and 29.8 in 2016.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

While it may be assumed that BP's approach to risk communication has evolved after being implicit in the largest oil spill in history, as sociologist William Freudenburg (1997) states, "…if we do our jobs sufficiently well, our points should indeed be obvious, at least in retrospect. One of the surest signs that we have been clear in our explanations is when a phenomenon becomes obvious through our efforts." The analysis of targeted risk content in this research suggests that increased clarity has not been a byproduct of BP's evolution in cyberspace.

The average Flesch-Kincaid Reading Score of targeted BP.com pages illustrate growing complexity of language with each subsequent iteration of the website. As seen in Figure 2, pages related to community health and environmental sustainability on the 1996 version of BP.com rated at a Flesch-Kincaid Reading Score of 38.5. This score for similar pages present on the website days after the Deepwater Horizon Oil Spill rated at 36.9. The score for BP.com in 2016 was the lowest of the three with an average Flesch-Kincaid Reading score of 29.8. According to ratings developed by Flesch (1946), each of these score represent language appropriate that would be best understandable by college graduates.

Half of individuals within the immediate impact zone of the Deepwater Horizon Oil Spill claimed in a qualitative survey that they felt underinformed about the risks posed to their community (Simon-Friedt, et al, 2016). Should these individuals have accessed BP.com to get more information about human health and environmental risks, they would have faced content that was written far above the average reading level of the average citizen (Facts and Statistics, 2016). As seen in Figure 3, the iterations of BP.com crafted years after the spill have only increased in the complexity of its language according to this research.

Community members within the immediate impact zone of the Deepwater Horizon that visited BP's website would have found only 7 specific references to offshore drilling on the safety, community, and environmental sustainability sections website. Only two utterances of language regarding oil spill cleanups were detected in the content analysis. While these numbers have grown in updates to the websites, Louisianan's had very limited access to relevant risk information in the days following the Deepwater Horizon Oil Spill.

In January 2017, the EPA released new regulations under their Risk Management Program (RMP). In sum, "The RMP rule requires facilities that use extremely hazardous substances to develop Risk Management Plans," (Cave, 2017). As part of these plans, corporations will comply with risk communication regulation that will, "require the owner or operator of a

stationary source to distribute certain chemical hazard information for all regulated processes to the public in an easily accessible manner, such as on a company website," (Accidental Release Prevention Requirements, 2017). The regulations, put into action just days before the inauguration of President Donald Trump, face an uncertain future as Trump appointed EPA Administrator Scott Pruitt has been critical of said regulations in the past, (Cave, 2017). Should the Trump administration, known for its emphasis on deregulation, it may represent a lack of growth in terms of risk communication in the oil industry.

With the EPA currently facing budget cuts of 31% (Dennis and Eilperin, 2017), regulatory rollbacks that may occur via this administration will remain of interest to risk communication scholars. When new technologies intersect with deregulation, it is necessary to analyze environmental and human health mishaps when they occur in the future. How and why the risk surrounding these events should continue to be compared to past successes and failures in risk communication.

Communication within a Risk Society is defined by, "complex knowledge systems that are indecipherable by the general population," (Giddens, 1991). The increase in language complexity on BP.com illustrates a growing consistency with the parameters of the theory of Risk Society. When Polanyi (1944) stated that the allowing of market mechanisms to be the director of the fate of human beings and their natural environment would be

the downfall of society, he was speaking of the same forces of deregulation that allow companies such as BP to stay silent, or opaque on matters of risk.

It is inevitable that another disaster resulting in the loss of human life and the loss of environmental integrity will occur after the publishing of this research. When such an event unfolds, it is the responsibility of industry, the public, the media, watchdog groups, and the United States government to reflect on the responsibility to better preemptively communicate risk surrounding contemporary technologies. The case study of Deepwater Horizon illustrates that neoliberal policies that allow companies such as BP to police themselves in providing risk communication perpetuates the Risk Society, a world that provides increasingly diminishing returns for both society and the biotic realm.

LIST OF REFERENCES

30 years of EPCRA. (2016, September 28). Retrieved January 04, 2017, from https://www.epa.gov/epcra/30-years-epcra

Accidental release prevention requirements: risk management programs under the Clean Air Act. (2017, January 13). Retrieved June 20, 2017, from Accidental release prevention requirements: risk management programs under the Clean Air Act. (2017, January 13). Retrieved June 20, 2017, from https://www.gpo.gov/fdsys/pkg/FR-2017-01-13/pdf/2016-31426.pdf

Baram, M. (1985). Risk Communication: moving from theory to law to practice. In J. O. Mason (Ed.), The Federal Role in Risk Communication and Public Education.

Barbosa, L. C. (2009). Theories in Environmental Sociology. In K. A. Gould & T. L. Lewis (Eds.), Twenty lessons in environmental sociology (pp. 40-41). Oxford, NYNY: Oxford University Press.

Beck, U. (2002). The Terrorist Threat: World Risk Society Revisited. Theory, Culture & Society, 19(4), 39-55. doi:10.1177/0263276402019004003

Beck, U. (2006). Living in the world risk society. Economy and Society, 35(3), 329-345. doi:10.1080/03085140600844902

Bolstad, E. (2010, July 21). BP's oil spill caused by fed's "dangerous culture of permissiveness."

BP's spill contingency plans vastly inadequate. (2010, June 09). Retrieved June 23, 2017, from http://www.cbsnews.com/news/bps-spill-contingency-plans-vastly-inadequate/

Britain: Sinking of the Sea Gem. (1966, January 07). Retrieved June 10, 2017, from http://content.time.com/time/magazine/article/0,9171,834965,00.html

Broder, J. M., & Krauss, C. (2011, April 16). Regulation of offshore rigs is a work in progress. Retrieved May 30, 2017, from http://www.nytimes.com/2011/04/17/us/politics/17regulate.html

Cave, J. J. (2017, February 08). United States: nNew EPA risk management plan amendments face Trumped future. Retrieved June 25, 2017, from http://www.mondaq.com/unitedstates/x/566958/Clean Air Pollution/New EPA Risk Management Plan Amendments Face Trumped Future

Clark, A. (2010, June 09). BP contingency plan for dealing with oil spill was riddled with errors. Retrieved June 20, 2017, from https://www.theguardian.com/environment/2010/jun/09/bp-oil-spill-contingency-plan

Common Dreams.Org. Retrieved from http://www.commondreams.org/print/58547

Dennis, B., & Eilperin, J. (2017, May 23). EPA remains top target with Trump administration proposing 31 percent budget cut. Retrieved June 209, 2017, from https://www.washingtonpost.com/news/energy-

environment/wp/2017/05/22/epa-remains-top-target-with-trump-administration-proposing-31-percent-budget-cut/?utm_term=.4c13503b332d

Environmental performance. (1996). Retrieved June 10, 2017, from https://web-beta.archive.org/web/19961030162805/http://www.bp.com:80/envp.html

Exploration and production. (2017). Retrieved June 10, 2017, from http://www.bp.com/en_us/bp-us/what-we-do/exploration-and-production.html

Facts and statistics. (2016). Retrieved June 22, 2017, from http://www.loyno.edu/boggsliteracy/resources

Flesch, R. (1948). A new readability yardstick. Journal of Applied Psychology,32(3), 221-233. doi:10.1037/h0057532

Freudenburg, W. R. (1997). The crude and refined: sociology obscurity, language, and oil. Sociological Spectrum, 17 (1), 1-28. doi:10.1080/02732173.1997.9982148

Garg, V., Camp, L. J., Connelly, K., & Lorenzen-Huber, L. (2012). Risk Communication design: video vs. text. Privacy Enhancing Technologies Lecture Notes in Computer Science, 279-298. doi:10.1007/978-3-642-31680-7_15

Gibbs, L. (1994). Risk Assessments from a Community Perspective. Environmental Impact Assessment Review, 14, 327-335.

Giddens, A. (1990). The consequences of modernity. Stanford, CA: Stanford University Press.

Graham, S. E., & Teague, C. (2011). Reading levels of rural and urban third graders lag behind their suburban peers. Retrieved June 22, 2017, from http://scholars.unh.edu/cgi/viewcontent.cgi?article=1135&context=carsey

Guidance Documents. (2016, September 23). Retrieved June 19, 2017, from https://www.epa.gov/risk/risk-communication

Henderson, H. C., Hong, J., Friedman, D. B., Porter, D. E., Halfacre, A. C., Scott, G. I., & Lead, J. R. (2016). A content analysis of Internet resources about the risks of seafood consumption. International Journal of Environmental Health Research,26(4), 433-447. doi:10.1080/09603123.2015.1135313

Hu, A., & Kong, K. (2015). Readability assessment of online tracheostomy care resources. Otolaryngology, 151(1 Suppl). doi:10.1177/0194599814541629a50

Improving risk communication. (1989). Washington, D.C.: National Academy Press.

Kemp, A. G. (2014). The official history of North Sea oil and gas. London: Routledge.

Kennedy, R. F., Jr. (2010, May 5). Sex, lies, and oil spills. Common Dreams.Org. Retrieved from http://www.commondreams.org/view/2010/05/05-10

Kocieniewski, D. (2010, July 4). Oil industry angles to avoid taxes. Times-Picayune, p. A-8. Ladd, A. E. (2012). Pandora's Well: Hubris, Deregulation, Fossil Fuels, and the BP Oil Disaster in the Gulf. American Behavioral Scientist, 56(1), 104-127. doi:10.1177/0002764211409195

Kollewe, J. (2010, July 22). Deepwater Horizon workers 'concerned about safety before explosion'. Retrieved July 11, 2017, from https://www.theguardian.com/business/2010/jul/22/deepwater-horizon-workers-concerned-safety

Lundgren, R. E., & McMakin, A. (2004). Laws that Mandate Risk Communication. In Risk communication: A handbook for communicating environmental, safety, and health risks (3rd ed., pp. 29-72). Columbus: Battelle Press.

Mai-Due, C. (2015, May 20). The 1969 Santa Barbara oil spill that changed oil and gas exploration forever. Retrieved November 23, 2016, from http://www.latimes.com/local/lanow/la-me-ln-santa-barbara-oil-spill-1969-20150520-htmlstory.html

Merino, B. D., Mayper, A. G., & Tolleson, T. D. (2008, October 03). Neoliberalism, deregulation and Sarbanes-Oxley. Accounting, Auditing & Accountability Journal, 23(6), 774-792. doi:10.1108/09513571011065871

National Academy of Engineering. (2012). Macondo well Deepwater Horizon blowout: Lessons for improving offshore drilling safety. Washington, D.C.: National Academies Press.

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. (2010). A brief history of offshore oil drilling. Retrieved June 10, 2017, from http://web.cs.ucdavis.edu/~rogaway/classes/188/materials/bp.pdf

Nyankson, E., Rodene, D., & Gupta, R. B. (2015). Advancements in Crude Oil Spill Remediation Research After the Deepwater Horizon Oil Spill. Water, Air, & Soil Pollution, 227(1). doi:10.1007/s11270-015-2727-5

On this day: Sea Gem oil rig collapses. (n.d.). Retrieved June 10, 2017, from http://news.bbc.co.uk/onthisday/hi/dates/stories/december/27/newsid_4630000/4630741.stm

Palenchar, M. J., & Heath, R. L. (2006). Strategic risk communication: Adding value to society. Public Relations Review, 33(2), 120-129. doi:10.1016/j.pubrev.2006.11.014

Palenchar, Michael J. and Heath, Robert L., "Another part of the risk communication model: Analysis of risk communication process and

message content" (2002). School of Advertising and Public Relations Publications and Other Works. h p://trace.tennessee.edu/utk_advepubs/3

Penney, K., Snyder, J., Crooks, V. A., & Johnston, R. (2011). Risk communication and informed consent in the medical tourism industry: A thematic content analysis of canadian broker websites. BMC Medical Ethics, 12(1). doi:10.1186/1472-6939-12-17

Perrow, C. (2015). Cracks in the "Regulatory State". Social Currents. doi:10.1177/2329496515589855

Pickering, H. (1994). Legislative changes after Piper Alpha. Marine Policy, 5. Retrieved May 10, 2017.

Polanyi, K. (1944), The great transformation, Beacon Press, Boston, MA.

Renn, O. (1992). Concepts of risk: A classification. In S. Krimsky & D. Golding (Eds.), Social theories of risk (pp. 53–82). Westport, CT: Praeger

Rodriguez, J. C. (2014, September 15). Deepwater Fell Under EPCRA Reporting Exclusion, Judge Says. Retrieved January 03, 2017, from https://www.law360.com/articles/702450/deepwater-fell-under-epcra-reporting-exclusion-judge-says

Skogdalen, J. E., & Vinnem, J. E. (2012). Quantitative risk analysis of oil and gas drilling, using Deepwater Horizon as case study. Reliability Engineering & System Safety, 100, 58-66. doi:10.1016/j.ress.2011.12.002

Summaries of significant US and international oil spills. (n.d.). Retrieved December 4, 2016, from https://web.archive.org/web/20111121222456/http:kell//response.restoration.noaa.gov/book_shelf/26_spilldb.pdf

Urbina, I. (2010, July 21). Workers on doomed rig voiced concern about safety. Retrieved July 10, 2017, from http://www.nytimes.com/2010/07/22/us/22transocean.html

U.S. Environmental Protection Agency (1997). U.S. national profile on the management of chemicals: Executive summary. Retrieved March 29, 2006, from http://www.epa.gov/oppfead1/cb/csb page.

Web Archive. (1996, October 20). Retrieved March 10, 2017, from https://web.archive.org/web/19961020124035/http://www.bp.com:80/

Whitty, J. (2010). BP's deep secrets. Mother Jones, 35, 28-43.

APPENDIX

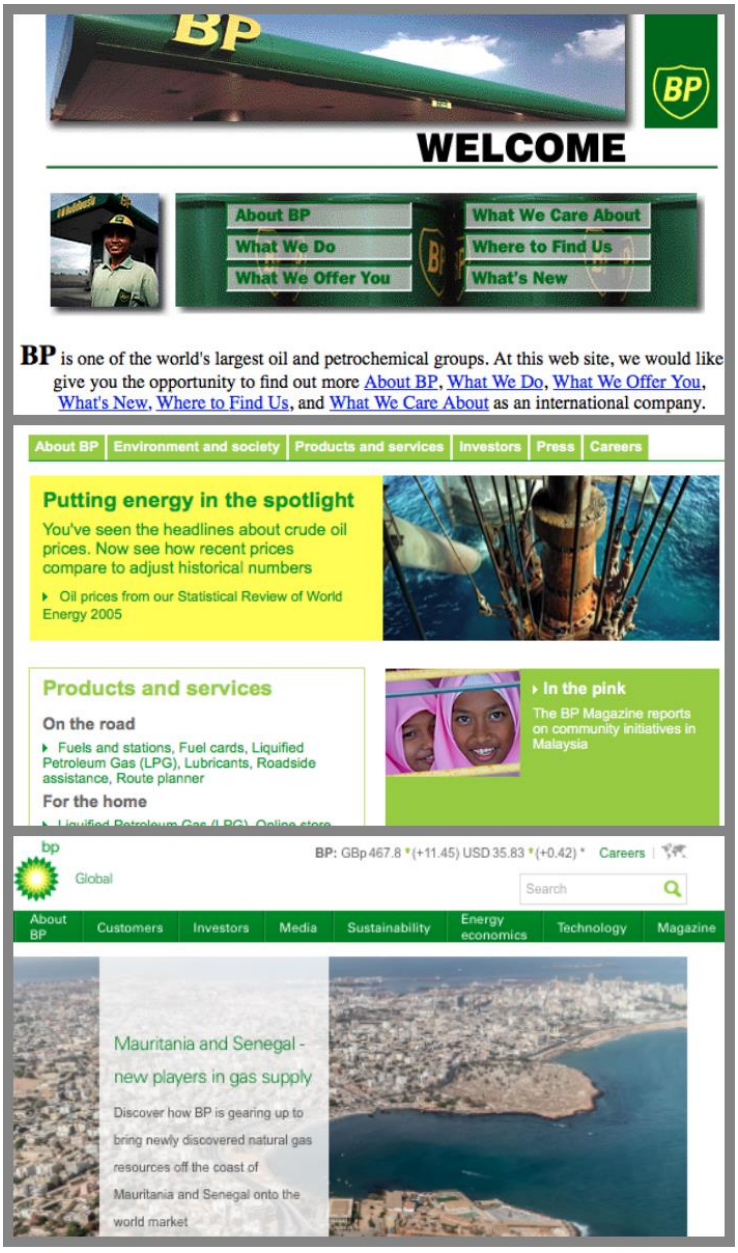

Figure 1: Archived images of BP.com via the Internet Archive, 1996, 2005, and 2017 homepages

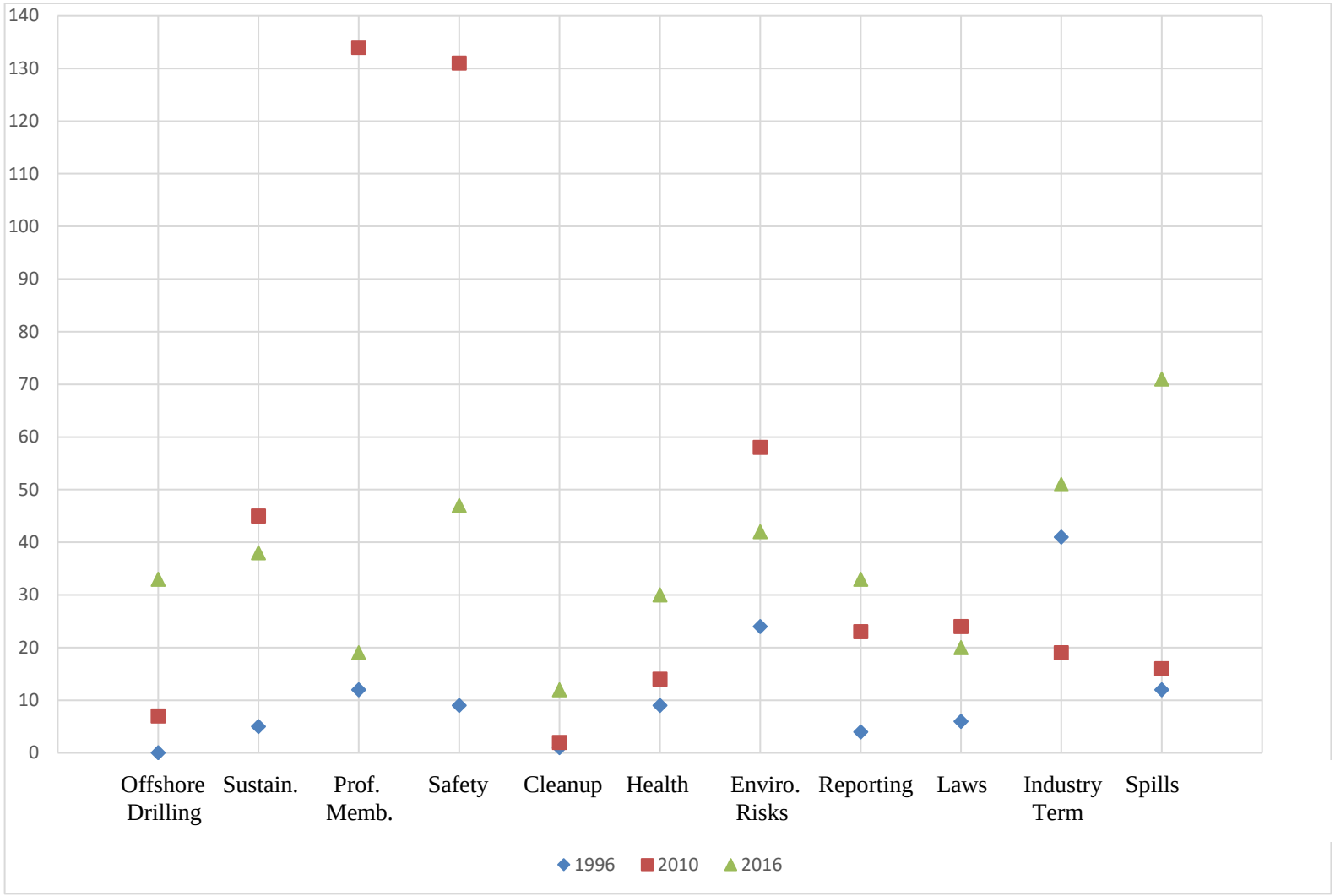

Figure 2: Content analysis of BP.com

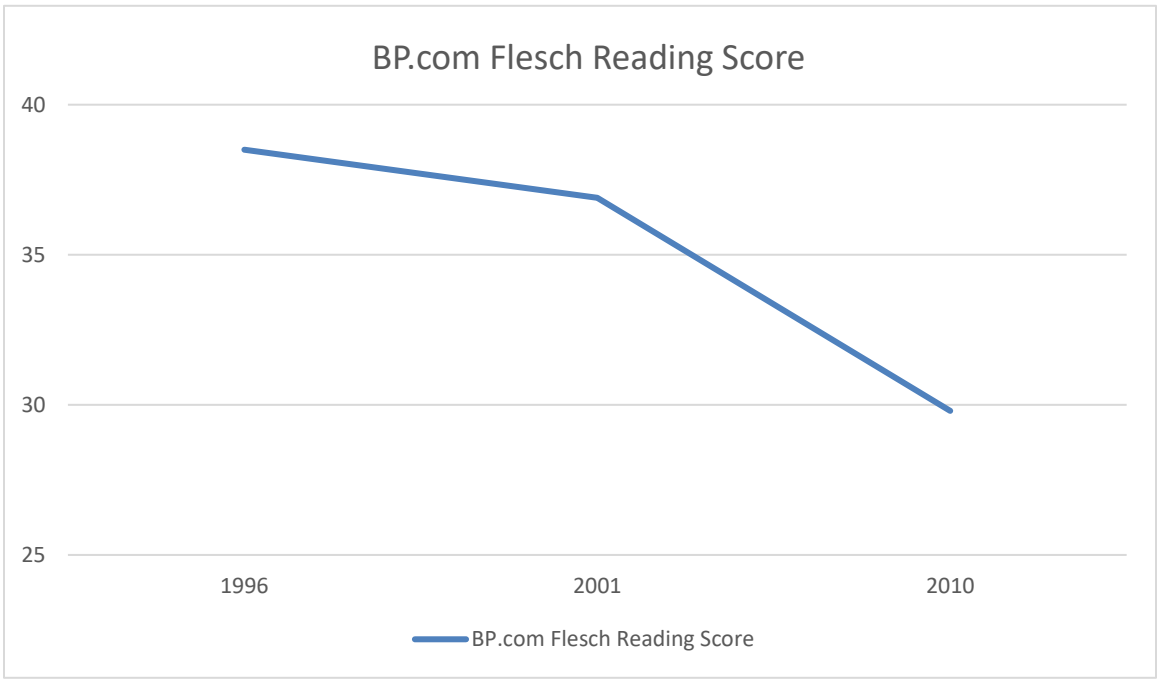

Figure 3: BP.com average Flesch Reading Score

VITA

Joshua Seth Cunningham was raised in Mount Holly, North Carolina where he attended East Gaston High School. He obtained two undergraduate degrees in Management from Johnson & Wales University in Charlotte, North Carolina. Upon graduation he committed himself to two years of national service with AmeriCorps where he worked as a wildland firefighter in El Dorado National Forest and later as the Water Quality Technician for the Town of Farragut, Tennessee. Before beginning the master's program in Communication & Information at the University of Tennessee, he served with KNOM Radio Mission as a volunteer fellow and later as the Sustainability Coordinator for the non-profit, Tennessee Clean Water Network. Upon completion of the program, Joshua will continue pursuing his passion for environmental communication serving as a Science Writer at Oak Ridge National Laboratory in Oak Ridge, Tennessee.