Chris Van Dam
Homeland Security
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The *Exxon Valdez* Oil Spill

On the 4th of March, 2009, the Alaska Dispatch News published a story that could have easily been skipped over by anyone not from the West Coast without a second glance; the title: "Hazelwood Offers 'heartfelt apology' for Oil Spill." While this simple title would suggest a minor incident, in reality it reflects upon a very dark time for Mr. Hazelwood (or Captain Hazelwood), the state of Alaska, Exxon, and the United States as a whole. The "oil spill" that Hazelwood was apologizing for in a twentieth anniversary commemorative book was none other than the Exxon Valdez oil spill of 1989, a spill that has been recorded as one of the greatest ecological and environmental disasters in the history of the United States.[1] There are those that believe they understand the story behind this travesty; a quick google search and Wikipedia investigation would lead one to believe that Captain Joe Hazelwood was sleeping off a drunken shore visit while the ship ran aground, or he was steering the vessel himself while impaired. The truth of the matter is that this disaster does not fall onto the shoulders of Captain Hazelwood alone, but also on the state of Alaska, Exxon, the Alyeska Pipeline Service Company, the U.S. Coast Guard, and by extension, the United States Federal Government.

The *Exxon Valdez* oil vessel struck the Bligh Reef in Prince William Sound, Alaska, on March 24, 1989, at 12:04 (0004) in the morning, but the problems in this specific case actually began before the *Exxon Valdez* was loaded with cargo on the 23rd. The protocol that was ignored before the accident was a reason that the accident occurred, and was a vital component to the

[1] Loy, Wesley. *"Hazelwood Offers 'heartfelt apology' for Oil Spill."* Alaska Dispatch News. 4 March 2009. Found at: http://www.adn.com/article/20090304/hazelwood-offers-heartfelt-apology-oil-spill.

drawn out response and recovery that has left oil along the shores of the Prince William Sound to this day. The objective of this paper is to chronologically explore the deficiencies of the Exxon Valdez oil spill preparedness, response, and immediate recovery operations and make the case that what could have been a minor collision with limited spillage turned out to be one of the greatest oil spills in the United States due to ignorance of procedure, technological limitations, and an all-around lack of a practiced emergency preparedness and response plan. Since the recorded operations of the Exxon Valdez recovery go for months, this report will cover the deficiencies leading up to the collision, the immediate response following the grounding of the *Exxon Valdez*, and the investigation of the immediate recommendations made from this experience.

Pre-Incident Issues

John Harrald, Henry Marcus, and William Wallace write in their assessment of Crisis Prevention and Management Systems relating to the Exxon Valdez oil spill that there are three aspects of prevention and management that must be implemented to mitigate chemical discharge disasters: risk reduction, contingency planning, and incident response.[2] In their argument, the lack of major maritime disasters in U.S. waters before 1989 prevented the "concerns about the prevention and control of hazardous cargo" from "becoming a major issue."[3] It would make sense that there was not a plan in place for prevention solely based on the amount of oil that leaked from the *Exxon Valdez* as well as the inability of the responders to implement an organized attack plan, but that is not the case. According to the May 1989 Presidential Report

[2] Harrald, John, Henry Marcus, and William Wallace. "*The EXXON Valdez: An Assessment of Crisis Prevention and Management Systems."* Interfaces, Vol. 20, No. 5. 1990. Pp 14-30. Accessed at: http://www.jstor.org.lib-ezproxy.tamu.edu:2048/stable/pdf/25061397.pdf.
[3] Harrald, pg 16.

composed of by Samuel Skinner, the Secretary of the Department of Transportation, and William Reilly, the administrator of the Environmental Protection Agency, there were six different contingency plans in place prior to the March 24 incident.[4] These plans addressed the areas of concern expressed by Harrald in relation to risk reduction, contingency planning, and incident response. Harrald, Marcus, and Wallace state that for there to be proper risk reduction there needs to be an assessment of port facilities, the marking of harbor channels, and control of vessel traffic. A contingency plan must be developed and based on accident scenarios and organizational, financial, and physical resource identification. The incident response must address actions that are to be taken to minimize the initial impact of the accident.[5]

Every single aspect of these preventative measures were addressed. The primary response plan was developed by The Alyeska Pipeline Service Company and was to be implemented with support from the Regional Response Team, the National Response Team, the State of Alaska, the Captain of the Port of Prince William Sound, and the Exxon Oil Company. The Alyeska Plan was a required response plan under Alaskan state law and required Alyeska to take responsibility of response on "cleanup operations of spills from tankers carrying Trans-Alaska Pipeline Systems oil through Prince William Sound."[6] The Alyeska plan provided three spill size case scenarios, including a large spill response plan that considered a spill of 8.4 million gallons of oil. The response was a timely and actionable plan where Alyeska barges and recovery vessels would be on site within 5 hours and use booming sites and oil transfers that recovered 50% of the oil at sea. This plan also explored the use of dispersants, but did not deem

[4] Skinner, Samuel, and William Reilly. "*The Exxon Valdez Oil Spill."* A Report to the President prepared by the National Response Team. May 1989. Accessed at: https://www.uscg.mil/history/webshipwrecks/ExxonValdezNRT1989Report.pdf.
[5] Harrald, pg 17.
[6] Skinner, pg 6.

them adequate for the further recovery.[7] The response plan was also practiced. The issue with this plan was that it did not consider the inclusion of the other plans nor mention them as an asset, and the other plans did not rely on the Alyeska Plan but only stated that they would work as support to a lead response plan.

This disconnect marks that first problem of the Exxon Valdez oil spill. This disconnect ensured that the response would be unorganized and therefore lose a sense of efficiency and actionability. The second problem of the response was the lack of adherence to procedures in place to ensure a timely response. A U.S. Coast Guard assessment of the situation makes note of the specified barge that Alyeska was to use in their response plan. The U.S.C.G. states that prior to March 24, Alyeska's only containment barge was tied up at the Valdez Terminal and was striped for repairs. They also note that this specific barge was not U.S. Coast Guard certified to receive oil transfers in a recovery situation.[8] The state of Alaska requires companies to notify the state when response equipment is taken out of service, however, Alyeska did not notify Alaska because the barge was technically still seaworthy. Along with an inoperable barge was the lack of sufficient skimmers and booms available to do an effective job for a spill the size of the planned scenario.[9] The post incident assessment conducted by Skinner and Reilly find another disturbing fact in the emergency preparedness plan for oil spills in the Prince William Sound; while the Alyeska Company had carried out several exercises prior to 1989, the critiques and recommendations for improvement following these exercises were not adequately utilized, this includes a lack of communication between the Alyeska coordinator and government agency

[7] Skinner, pg 6.
[8] U.S. Coast Guard Pollution Reports. Appendix A. Chronology. Accessed at: https://www.uscg.mil/history/webshipwrecks/ExxonValdezChronology.pdf.
[9] Exxon Valdez Oil Spill Trustee Council. "*Spill Prevention and Response*." Accessed at: http://www.evostc.state.ak.us/index.cfm?FA=facts.response.

personnel.[10] The preparedness plan was in place, but it was not kept up to date, the machinery required was not fitted, and the coordination was virtually non-existent.

The regional response was extremely lacking and ill prepared for the smallest incident. The *Exxon Valdez* oil tanker was also ill prepared to be operating in the Prince William Sound. Nancy Leveson, a leading expert in system and software safety and professor at MIT, assessed the equipment of the *Exxon Valdez* and discovered that the iceberg monitoring equipment promised by the oil industry was never installed. Since the vessel did not have the proper equipment for navigating the waters, the radar station in the port of Valdez was responsible for monitoring their progression. However, Leveson points out that here too there was a deficiency. Valdez had recently replaced their radar with less powerful equipment, and tankers near Bligh Reef could not be monitored effectively.[11] Along with the software problem, the hardware of the *Exxon Valdez* was also lacking. By Congressional approval, oil corporations were supposed to build and use double hull tankers in oil transportation, but the *Exxon Valdez* was a single hull tanker and the U.S. Coast Guard at Valdez assigned to conduct safety inspections did not perform this check.[12]

Just as the vessel was severely lacking, so too was the crew. A National Transportation Safety Board investigation into the Exxon Valdez oil spill dated September 18, 1990, found that the *Exxon Valdez* was operating with a reduced crew, and that the watch keeping safeguards were compromised because there was an insufficient number of crewmembers "to provide uninterrupted lookout capability" and the "lookout position routinely went unattended when the

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[10] Skinner, pg 8.
[11] Leveson, Nancy G. "*Software System Safety.*" Copyright by the author, July 2005. Accessed at: http://web.archive.org/web/20101108055426/http://ocw.mit.edu/courses/aeronautics-and-astronautics/16-358j-system-safety-spring-2005/lecture-notes/class_notes.pdf.
[12] Leveson, pg 13.

AB was called for other tasks or took a break."[13] The *Exxon Valdez* was loaded with cargo on March 23, 1989, and left the Port of Valdez that night. The crew was under staffed and exhausted from the day's loading responsibilities. According to the safety review, the third mate (the individual piloting the vessel at the time of the grounding) had as little as five hours of sleep in the 24 hours leading up to the collision.[14]

As the *Exxon Valdez* tanker left Valdez they were loaded with approximately 1.2 million barrels of crude oil in a single hull vessel in an area with out of date response plans, inadequate machinery, and uncoordinated communication. The pilot was sleep deprived and was operating a vessel that lacked the proper iceberg radar equipment as they entered the Bligh Reef area where Valdez radar assistance was lacking and the crew lookout position was vacant due to personnel shortages and the long loading day on the 23rd. The third mate maneuvered the *Exxon Valdez* out of the set transport shipping lane after observing obstacles, and ran aground on the Bligh reef, only 28.6 miles from Valdez, at 0004 on March 24, 1989.

Grounding and Response

The Marine Safety Office was alerted to the grounding of the *Exxon Valdez* on Bligh Reef 28 minutes after midnight. The initial oil spillage at 0028 was 510,000 gallons, and eight of the eleven tanks were damaged. Immediately after being alerted, the Captain of the Port closed Valdez and the Alyeska Marine Terminal dispatched their tugboat *Stalwart* to investigate the damage and begin the recovery plan. The Regional Response Team was notified an hour after grounding, and a PACAREA Strike Team was requested at 0249. After the assessment was

[13] Kolstad, James L. "*Safety Recommendation."* National Transportation Safety Board. 18 September 1990. Accessed at: https://web.archive.org/web/20100611194527/http://www.ntsb.gov/Recs/letters/1990/M90_26_31A.pdf.
[14] Kolstad, pg 1.

completed, and an oil slick half a mile south of the grounding was reported, the Alyeska Plan was officially launched. The desire for action was halted almost immediately. March 24, 1989, was Easter, and there were holiday personnel shortages that had to be remedied. Once the personnel was assembled the containment barge that was up for repairs had to be fitted for operation, costing more valuable time. At 0330, 5.8 million gallons of oil had discharged from the *Exxon Valdez.* The United States Coast Guard was aboard the grounded vessel at 0323, and by 0400 had assessed that the greatest threat was capsizing and the spillage of the entire 53 million gallons of oil, shortly after this assessment the *Exxon Baton Rouge* was contacted to respond and initiate oil transfer operations.[15]

At noon of the 24th, the Regional Response Team began a discussion of using dispersants and in-situ burning to address the growing problem, at this point the oil slick was 1,000 feet wide and four miles long. The topic of dispersants is a touchy area in oil response. While dispersants are able to break down the oil into smaller droplets to reduce the chance of the surface oil slick from reaching shores, they do not reduce the amount of oil entering the environment and make the ability to skim more difficult.[16] Before dispersants were used, the Alyeska barge arrived at 1230 with two skimmers, two 1,000 gallon bladders, and 8,000 feet of containment boom. Booms are floating physical barriers that slow the spread of oil and keep it contained while the skimmers remove oil from the surface of the water. In-situ burning, what was discussed with the

[15] U.S.C.G. Pollution Report
[16] Center for Biological Diversity. "*Dispersants."* Accessed at: http://www.biologicaldiversity.org/programs/public_lands/energy/dirty_energy_development/oil_and_gas/gulf_oil_spill/dispersants.html.

dispersants, is the use of fireproof booms to collect oil on the surface and then quarantine and ignite it, in-situ burning is only considered when oil is fresh and the weather is relatively calm.[17]

At 1310, 10.5 million gallons of oil had been released from the *Exxon Valdez,* the Alyeska Response Plan was 12 hours late in response, and difficulties were arising with the skimming. At 1510, the On Scene Coordinator (OSC) approved the test of dispersants due to the difficulties, this test was conducted with unsatisfactory results due to the calm sea creating a lack of mixing energy. At the end of the first day, the response plan proved inadequate and little ground had been made in addressing the oil spill. Early on the second day the oil transfer final began between the *Exxon Valdez* and the *Exxon Baton Rouge*, there is also advisory warning of shortage in oil supply space in Valdez. At roughly 0930, the Alyeska Company surrenders management of the situation to the Exxon Shipping Company. This shift is not relayed anywhere else for days, which creates a coordination problem between workers and command.[18]

After the transfer of responsibility, the response team began various measures to try and get the situation under control. A second dispersant trial utilizing C-130 cargo aircraft is planned as well as in-situ burning options, the dispersant trial yielded inconclusive results and the burn test consumed an estimated 15,000 gallons of oil but left 100 square feet of tar residue. While testing and operations were being conducted on the sea, multiple response teams began organizing to address the problems on shore. The response to the disaster was slow and unorganized, by the end of the third day there had only been 46,000 barrels of oil transferred to

[17] Office of Response and Restoration. "*Spill Containment Methods."* NOAA. Revised March 2016. Accessed at: http://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/spill-containment-methods.html.
[18] U.S.C.G. Pollution Report

the *Exxon Baton Rouge,* only 3,000 barrels recovered by the skimmers, and finally a satisfactory dispersant application test.[19]

Through a detailed recording of the first three days it is obvious to note how the apathy of companies and agencies hindered the response and adequacy of the work actually being done. The Exxon Valdez Oil Spill Trustee Council assessed that "despite the opportunity to skim the oil before it hit the shorelines, almost none was scooped up." They also assess that there were not enough skimmers and booms available to do an effective job, and that had dispersants been effective there was not enough on hand to make a dent in the oil slick.[20] The report by Secretary Skinner and Administrator Reilly eco this opinion. They state that the equipment required was not available when it was needed the most, some was not even in their inventory, and what equipment they did have was not certified for what they needed it to be.[21]

Conclusion:

The failure to integrate prevention, planning, and response greatly affected the management capabilities of this environmental crisis. The plans that were in place all agreed that should a spill occur the responses would be containment, booming and skimming, and options of chemical dispersion and in-situ burning. However, these plans did not provide guidance to cooperative response, the required manpower, nor a consideration of equipment required. Due to these limitations, the response plans for the Prince William Sound were essentially incomplete and were more of a hindrance than asset. The Alyeska Plan was not up to the standards required for a spill the size of the Exxon Valdez Oil Spill, even though they planned for a similar

[19] U.S.C.G. Pollution Report
[20] Exxon Valdes Oil Spill Trustee Council
[21] Skinner, pg 10.

scenario, and it never should have been left to act as the primary response plan considering the deficiencies in almost every aspect.

Captain Joe Hazelwood was held accountable and fired for this disaster, but when taken to court he was only found guilty of negligent discharge of oil and fined $50,000 and sentenced to 1,000 hours of community service. While he took the immediate brunt of the blame, it is easy to see that every party in this situation was to blame at some level. After the Exxon Valdez Oil Spill Congress passed the Oil Pollution Act of 1990. This act requires the U.S. Coast Guard to strengthen its regulations on oil tank vessels.[22] The U.S.C.G. also monitors full tankers with satellites as they pass through the Valdez Narrows while each tanker is accompanied by two escort vessels through the entire sound. There has also been a change in response requirements and contingency plans. Oil spill scenarios in the Prince William Sounds must include 12.6 million gallon situations and be drilled every year. The equipment assessable has also been updated. There is not seven barges available for skimming operations and seven times the amount of containment boom as there was available during the Exxon Valdez oil spill.[23] The preparedness and prevention plans have improved significantly, but the area is still dealing with the problems of 1989. As of 2005, there are indications that numerous species have not yet fully recovered as well as concern of the levels of oil still being seen in the system.[24] In time these problems will be resolved, but the necessity to prevent this disaster from ever happening again will require vigilance and constant assessment of procedure, equipment, and preparedness.

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[22] EPA. "*Exxon Valdez Spill Profile."* United States Environmental Protection Agency. Last updated March 2, 2016. Accessed at: https://www.epa.gov/emergency-response/exxon-valdez-spill-profile.

[23] Exxon Valdez Oil Spill Trustee Council

[24] Polsenberg, Johanna. ""Exxon Valdez" Oil Spill Still Impacting Alaskan Wildlife." *Frontiers in Ecology and the Environment,* Vol. 3, No. 2. Pg 74. March 2005. Accessed at: http://www.jstor.org.lib-ezproxy.tamu.edu:2048/stable/pdf/3868510.pdf?acceptTC=true.

Summary:

The contingency plans and outfitting of the oil tanker *Exxon Valdez* were insufficient for the safe transportation and safeguarding of oil in the Prince William Sound area. The response plans were negligent in updating problem areas, they were uncoordinated, and they offered incomplete information that is required in an emergency response situation along with the lack of follow through to ensure that the equipment that had been planned for was prepared and in working condition. The oil vessel was ill equipped in personnel, hardware, and software, and the makeshift answers to these deficiencies were improperly utilized. The problems with the vessel led to the grounding on Bligh Reef, and the response plan contributed to the lack of effectiveness in response through unrelated or overlapping efforts. The ignorance of procedure, technological impairments and limitations, and the lack of practiced emergency response made the Exxon Valdez Oil Spill worse than it should have been and equally contributed to the devastation of one of the greatest natural resources and ecosystems that the United States possesses.

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