JACKSON CLEANERS' REMEDIATION

INJUSTICE THROUGH INACTION

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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

From 1942 to 1953, the Hooker Chemical Company dumped chemical waste into Love Canal, a partially finished canal project off of the Niagara River (Kleiman, n.d.). Hooker Chemical Company then covered the landfill with clay and sold the land to the Niagara Falls School Board. In the late 1970s, newspapers began reporting abnormally high rates of various illnesses within the community surrounding the Love Canal landfill. These high rates were found to be caused by the leaching of chemicals into the basements and yards of the Love Canal community and even into the playground of the elementary school built directly on top of the buried toxic waste. The Love Canal tragedy, and the subsequent slow response from government officials, brought the concept of toxic waste dumping to the forefront of many Americans minds and led to new legislation regarding the handling of these sites.

In 1980, the United States Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (US EPA, 2015a). CERCLA addressed the nationwide issue of hazardous waste dumping and created the superfund program to finance emergency responses and cleanups. As of 2022, there are currently 1,881 sites that qualify for long-term remediation under the superfund program (US EPA, 2023).

Sites that are identified as superfund sites are subjected to a complex clean-up process. The first step in this process is a site assessment (US EPA, 2015b). Historical information about the site is reviewed in this assessment stage and a site visit is conducted to understand the potential threat more clearly. After this assessment, the site may be placed on the National Priorities List (NPL), which is a list of the most hazardous superfund sites. A remedial investigation begins next, which involves a more in-depth characterization of the site and an initial consideration of possible remediation technologies. After this stage, a remedial plan is

developed and implemented at the site. Routine monitoring continues after remediation is completed to ensure that the cleanup continues to be effective, and the site is hopefully able to be used again in some capacity.

One of these sites is located in Ypsilanti, Michigan at the site of a former dry cleaners, Jackson Cleaners. Dry cleaning services in the United States date back to the 1800s with the use of solvents such as gasoline, kerosene, and petroleum (Ceballos et al., 2021). When specialized dry cleaning machines were introduced in the 1900s, there was a sudden need to switch to a non-flammable solvent alternative. One of these alternatives was perchloroethylene (PCE), also known as tetrachloroethylene, which was used by Jackson Cleaners and leached into the soil surrounding the dry cleaning operation. To adequately remediate this site and protect the health of those who reside or work in Ypsilanti, my capstone team will design a remediation plan that removes the PCE and its byproducts from the groundwater, soil, and air. Secondarily, this thesis will investigate the delayed identification and remediation of chemically contaminated sites in the United States and examine how those delays exacerbate environmental injustice.

Technical

PCE is a volatile organic compound (VOC) that is used for cleaning and degreasing (CDC, 2021). A VOC is an organic compound that evaporates quickly under normal atmospheric conditions. PCE was first produced by physicist Michael Faraday in 1821, and it quickly became the most prevalent dry cleaning solvent (Britannica, 2011*).* It is harmful to humans, causing numerous health concerns, such as irritation to the skin, eyes, and lungs and harm to the reproductive system (NJ Health, 2011). The Environmental Protection Agency (EPA) has classified PCE as a likely carcinogen (US EPA, 2012). When it breaks down, it can form

trichloroethylene (TCE), dichloroethylene (DCE), and vinyl chloride (VC). TCE is a known carcinogen (NIH, 2018), and it can cause health concerns such as central nervous system harm. The toxicity of DCE on humans has not been well-studied, but has been shown to cause irritation to the skin and eyes of other animals and changes to the immune system (ATSDR, n.d.). VC is a known carcinogen, causing an increase in liver cancer, brain and lung cancers, lymphoma, and leukemia (NIH, 2015). In Ypsilanti, Michigan, the soil, air, and groundwater are inundated with these compounds due to the use of PCE in the operation of a dry cleaning business.

When PCE spills onto the ground, it travels downward in a preferential pathway, or the path of least resistance (Carlisle, 2023). Eventually, it will hit the groundwater, and it will travel with the flow of the groundwater while continuing to sink until it hits an impermeable geologic unit. It can remain in the soil as a vapor, and vapor intrusion occurs when these vapors enter into an occupied structure (US EPA, 2015c).

There are three main categories of remediation technologies that my team will be investigating: physical removal, chemical/biological, and containment. One example of physical removal is excavation. This involves removing contaminants from the site and then treating them. Another example of physical removal is multiphase extraction (MPE) which involves pumping out contaminated groundwater. This draws the water table down and allows for the volatilization and removal of the contaminants (ITRC, 2016). The second category of technologies is chemical/biological. In situ bioremediation is one prospective technology that falls into this category. This technology uses biological means to transform the contaminants into less harmful compounds. The third technological category that my team will be investigating is containment. One example of containment is pump and treat. Pumps are used to extract groundwater, and then that groundwater is treated above ground.

Injustice Through Inaction

In 2023, the EPA found that 50.2% of the population who live within one mile of a superfund site are minorities (US EPA, 2023). A study conducted in 2018 found that the closer you are in proximity to a superfund site, the more likely you are to find African American families, and it also concluded that minority populations are at a much greater risk of environmental health issues (Kramar et al., 2018). This blatant form of inequality in the United States can be traced back to practices such as redlining. The practice of redlining involved outlining areas with majority African American populations on maps in red to warn mortgage lenders against investing in these areas (Tabuchi & Popovich, 2021). One of the many unfortunate results of this practice is the prevalence of manufacturing facilities and plants in these redlined areas. Not only does this mean that these populations are breathing in dirtier air and facing numerous other environmental health issues, but it also means that they are more likely to end up living near a superfund site.

This injustice is only compounded when the identification and remediation process of superfund sites is prolonged. In Ypsilanti, Michigan, dry cleaning operations at the Jackson Cleaners site began in 1916 and ended in 2019 (Geosyntec Consultants, 2020). The site was first investigated for environmental concerns in March 2019. The site has not yet been fully remediated as of October 2023 (US EPA, 2023). Jackson Cleaners has been using and releasing PCE for a long time prior to 2019. Why did it take such a significant amount of time to identify this release?

I will be drawing upon David Pellow's (2004) environmental justice framework, as introduced in "The Politics of Illegal Dumping: An Environmental Justice Framework". Pellow's framework has four dimensions: the importance of viewing environmental inequality as a sociohistorical process rather than as a discrete event, a focus on the complex roles of the

stakeholders involved, the effect of social inequality on stakeholders, and agency or the power of populations faced with environmental inequalities to shape the outcomes of these conflicts. He uses this framework to highlight the causes and nature of environmental inequalities.

This framework will allow me to investigate chemically contaminated sites in the U.S. using the four dimensions to focus on environmental justice. By viewing environmental inequality as a sociohistorical process, I can better understand how the delay in remediation contributes to this environmental injustice. With this framework, I can also analyze the role of and the effects on the stakeholders and the power of the populations who face these environmental inequalities.

Research

There is often a delay in the remediation of contaminated sites, and as these sites continue to pose risks to nearby communities, it exacerbates the disparities in health and well-being among these populations. This brings up an important question: how does the delay in identification of and remediation of chemically contaminated sites in the United States contribute to environmental injustice?

To investigate this question, I plan to perform case studies on three superfund sites in the US. The three sites that I will perform case studies on are Diamond Alkail Co. in Newark, New Jersey, Michner Plating – Mechanic Street in Jackson, Michigan, and Des Moines TCE in Des Moines, Iowa. Case studies of these sites can reveal the historical and sociohistorical factors contributing to delays. Investigating these sites allows for a detailed examination of the roles of various stakeholders involved. This may include government agencies, responsible corporations, affected communities, and environmental advocacy groups.

Conclusion

The issue of environmental injustice surrounding superfund sites in the United States is a complex and deeply rooted issue that demands further investigation. Prolonged identification and remediation processes highlight a glaring aspect of this environmental injustice. The fact that it takes so long to identify and address the release of hazardous substances in certain areas raises critical questions about the efficiency and effectiveness of our environmental protection systems. David Pellow's environmental justice framework provides a valuable tool for understanding and addressing these issues. By emphasizing the sociohistorical context, it becomes clear that environmental inequality is not an isolated problem but a product of long-standing practices and policies. The framework encourages us to consider the complexity of stakeholders, highlighting the roles they play and the consequences of environmental injustice on them. The research I conduct through case studies will get to the bottom of these injustices and examine the roles of stakeholders, the impact of social inequality, and the potential for change.

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