Thesis Project Portfolio

Jackson Cleaners Environmental Remediation

(Technical Report)

Environmental Pollution as an Impetus of Change: A Case Study on Cancer Alley, Louisiana

(STS Research Paper)

An Undergraduate Thesis

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Evan Fee

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Department of Civil an Environmental Engineering

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Sociotechnical Synthesis

My capstone project involves the design of a remediation plan for a contaminated site in downtown Ypsilanti, Michigan. The source of pollution is the orphan dry cleaning service, Jackson Cleaners, which historically used and released the dry-cleaning solvent, tetrachloroethylene (PCE), a chlorocarbon considered a likely carcinogen by the EPA. The continual release of PCE into the environment has led to impermissible concentrations within the soil and groundwater, exceeding state and federal regulations. Possible risks include the migration of PCE and its byproducts into the Huron River, impaired indoor air quality, and exposure to contaminated soil. Using data provided by Geosyntec Consultants our team has created a conceptual site model (CSM). Using this model and research on numerous groundwater remedial technologies and methods, we created a remedial technologies matrix. Subsequently, we have chosen two remediation methods: the installation of a permeable reactive barrier (PRB) and soil vapor extraction (SVE). When designing our remedial technology, we also must consider the human and social impacts. Implementing the design might impact residents' daily lives and local businesses' revenue sources. As the placement of remedial systems in optimal locations may not be compatible with existing infrastructure.

Actor Network Theory (ANT) is a framework for analyzing the relationships surrounding a technology. The theory stipulates that a given technology is largely defined by the relationships amongst the actors, be it people, organizations, laws, or other technologies, that ultimately ascribe functionality and use. With respect to groundwater remediation technologies, ANT suggests a holistic analysis of the technology and its place within the built environment and the regulations, residents, consulting firms, businesses, and the state government that surround the site. Each of these pieces contributes to the success of the remedial technology, so a further

examination of these disparate actors could illuminate any impediments or stimuli for the success of remediation.

For my STS research I conducted a case study on Louisiana's "Cancer Alley," a region between Baton Rouge and New Orleans. To gather information, I conducted research on local newspaper articles, public forums, government reports (from local, state, and federal levels), corporate statements, and court documentation all pertaining to the people of St. James Parish's fight against Formosa Plastics. Through this research I shed light on the role of societal power dynamics in facilitating the persistence of polluted communities. Together, my capstone project and STS research imply the need for the work of engineers to serve the common good. And the need for appropriate advocacy for underrepresented communities who often do not have the resources, or power, to fight to change their condition.