Dickson County Landfill: Site Remediation and Environmental Justice Implications

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Abstract
The Dickson County landfill in Dickson, Tennessee has recently garnered national attention in regards to the presence of trichloroethylene (TCE) in drinking wells in the surrounding community. Containers full of TCE were routinely buried at the landfill prior to the implementation of more stringent landfill regulations and guidelines. TCE is a suspected carcinogen capable of causing heart and nervous system damage, and birth defects. The now closed Dickson County landfill is located approximately 1.5 miles southwest of the city of Dickson in a predominantly African-American community. In spite of official knowledge of the risks associated with drinking the well water, residents were unaware of this hazardous waste and have ingested it over many years. This paper briefly outlines the remedial activities that have historically occurred on the site, and what effect it has had on the largely minority population in the landfill vicinity. Written from an engineering perspective, the Dickson County landfill will serve as a case study on the implications of engineering ethics. A description of the remediation efforts that have occurred at the site to date will be examined, as well as, how issues related to environmental justice have played a part in these remediation choices.
Introduction

It has been well-documented that ethnic minorities and low-income populations throughout the United States have experienced a disproportionately higher incidence of exposure to hazardous toxins and pollutants from waste management facilities (Bullard, 1990; Costner and Thornton, 1990; Goldman and Fitton, 1994; Mohai and Bryant, 1992; United Church of Christ Commission for Racial Justice, 1987). This problem persists in spite of Executive Order 12898, signed by President Clinton in 1994, officially incorporating environmental justice issues into the United States regulatory process. The U.S. Environmental Protection Agency (EPA) responded to this order with its own environmental justice initiative, and the following definition of environmental justice: “Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no one group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, State, local, and tribal environmental programs and policies.”

An analysis of this definition reveals that the residents of a community can influence regulatory decisions that will effect their environment or health by being meaningfully involved: “Meaningful involvement means that: (a) The potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (b) the public's contribution can influence the regulatory agency's decision; (c) the concerns of all participants involved will be considered in the decision-making
process; and (d) the decision-makers seek out and facilitate the involvement of those potentially affected.” However this same definition underscores one of the underlying problems associated with past environmental injustices. Residents in a community cannot actively participate in regulatory decisions if they have not been properly informed about the risks. Unless “decision-makers” initiate community involvement, it is conceivable that certain segments of the population could be negatively impacted even if an assessment indicated they were at a higher risk. Center et al, (1996) concisely describes this situation: “The social disparity of risk assessment is apparent when we spatially disaggregate the data used to support a specific proposal or exposure standard. Beyond the rhetorical question of for whom this increased risk of death is acceptable, we have to consider who is likely to pay among the less-than-random sample in our population...”.

History has shown that “who is likely to pay” is often dictated by racial and socioeconomic biases. One example is the Cerrell Associates 1984 report to the California Waste Management Board, “Political Difficulties Facing Waste-to-Energy Conversion Plant Siting”. The study was leaked to the public in 1988 and subsequently reported in the media. The study advises builders of waste incineration plants that they would face less opposition if they constructed their plants near poor neighborhoods instead of wealthy ones. The report states, “All socioeconomic groupings tend to resent the nearby siting of major (waste disposal) facilities, but the middle and upper socioeconomic strata possess better resources to effectuate their opposition,...Middle and higher socioeconomic strata neighborhoods should not fall at least within (five miles) of the proposed site”. In addition to providing personality profiles of the most likely and least likely opponents of waste-to-energy plants, the report also outlines ways to diffuse opposition. It suggests that trash incineration can be made more palatable to lower
socioeconomic neighborhoods by presenting it as part of a recycling program. Meanwhile the most likely opponents of the projects, those considered more affluent and highly-educated, can be targeted in a public participation program and public relations campaign.

Another often cited example is a 1991 report prepared for the Chatham County North Carolina Board of Commissioners concerning the siting process for a radioactive waste repository. In this case, the county's legal counsel uncovered a parallel siting process undertaken by the state's contractor for the project. The siting process portrayed to the public followed federal and state statutes which required the site be chosen solely on technical grounds. A secondary concealed process used community, social, and political characteristics as criteria. The public relations staff of the contractor, in an attempt to disperse public opposition and maintain the perception that the siting process was devoid of bias, proposed that more than a dozen sites in numerous counties be submitted to the public for consideration, when in reality there were only a few under serious internal consideration. Comments recorded by the economic development and public relations staff of the state contractor during a drive-by survey of some of the potential sites show that affluent neighborhoods were not considered suitable, whereas, distressed communities were routinely targeted. The final site-selection screening presented to the state followed the aforementioned recommendations, although the comments themselves were excluded from the report. The classification was subsequently ratified by the state without any public debate on the specific basis for the order (Farren, 1992).

These examples of environmental injustice are of note because they reveal the nature of prejudiced policies that are responsible for the nations poor and minority communities bearing a disproportionate burden of environmental impacts. The chronology of events at the Dickson County Landfill in Dickson County, Tennessee serves as an appropriate case study for this
particular manifestation of environmental injustice. The landfill opened in 1968 as the Dickson City landfill and was operated until 1977. During this period, several local industries disposed trailer loads of solvents and other hazardous wastes at the site. In spite of this scenario, it has been shown that state and federal regulators took little action during this period, or in subsequent years, to mitigate the risks to the largely minority population near the waste site.

The circumstances that result in the siting of waste facilities near poor and minority communities are often perpetuated by the policies of state and federal regulatory agencies tasked with the enforcement of environmental laws. Regulators often do not proactively enforce monitoring environmental impacts if this monitoring would raise a public response. Residents near a polluted site may be suspected receptors for years without confirmation monitoring and mitigation of risks. The chronology of a typical superfund site will often show that regulators only begin to enforce this type of off-site monitoring when public outcry reaches a certain pitch. Consequently, environmental laws aside, regulators do not respond as proactively to environmental impacts when the impacted population is racially, socially, and economically disenfranchised. The extent of the injustices perpetuated on the citizens of Dickson County has many of the elements of environmentally impacted sites across the country, such as illegally disposed hazardous wastes, and responsible polluters evading financial responsibility through bankruptcy and legal maneuvering. This paper focuses on the actions of federal and state regulatory agencies in contrast to the stated intent of Executive Order 12898. It also demonstrates that environmental engineers, scientists and researchers must often practice in an atmosphere where biases and political concerns compete with objective risk assessment.
Dickson County Landfill

Dickson County is located in north central Tennessee approximately 40 miles from Nashville, Tennessee. According to census data, Dickson County has a population of 45,894. Although African-Americans comprise only 4.5 percent of the population, they are densely located in a small, rural area in close proximity to the Dickson County Landfill (Figure 1). In recent years, the landfill has been featured in local and national headlines due to the debate associated with the illegal dumping of trichloroethylene (TCE) at the site. TCE is a chlorinated hydrocarbon used as an industrial solvent for dry cleaning services. It is also used to degrease metal, and as an ingredient in adhesives, paint removers, spot removers, and correction fluids. TCE is a suspected carcinogen capable of causing heart and nervous system damage, and birth defects. State and EPA records reveal that this contamination has seeped into the groundwater of many residents who rely on wells for their water supply.

Figure 1: Southeast view of the Dickson County Landfill with the Transfer Station and mechanic shop (closer building) in background. Courtesy of USGS.
Oral accounts reveal that when the landfill was first proposed, it was advocated as “a good thing” that would be the catalyst for economic growth in the community. According to long-time residents, there was no “meaningful involvement” regarding the landfill siting. In addition, residents were not informed or educated about the possibility of leachate (runoff) from the landfill polluting the surrounding groundwater. Even in the absence of chemical hazardous wastes, the placement of the landfill proved to be an unfair burden on the minority population near the landfill due to the collateral issues of increased traffic to and from the site, odor problems, and unsightly blight.

Site History Summary

The controversy surrounding the Dickson County Landfill centers on the plight of the Holt family, an African-American family who reside in close proximity to the dump. State records show that high levels of TCE were found in the family’s well in 1988, but the U.S. Environmental Protection Agency officials sent the family a letter stating that their water was safe to drink. Initial sampling in the area was conducted at the behest of Ann Sullivan, a white resident of Dickson County. In July of 1988, Ms. Sullivan sent a letter to the Tennessee Department of Environment and Conservation (TDEC) requesting that a suspected contaminated creek on her property be sampled. The creek was mainly used for her cattle, who had been plagued with unexplained illnesses and death. Consequently, State officials conducted sampling of springs, creeks, and drinking wells in the vicinity of the landfill including those belonging to the Holt family. The EPA letter to the Holt’s stated that one of their well samples contained TCE above the Maximum Contaminant Level (MCL), and that a second contained TCE slightly below the MCL. It was noted that the high level sample was most probably the result of “laboratory or sampling errors”. EPA concluded that “there were no constituents
detected which exceeded EPA’s National Primary Drinking Water Regulations or any other adverse health based criteria”.

Environmental Justice Implications

The letter from the Environmental Protection Agency to the Holt’s is remarkable in two respects. First, there are inconsistencies in the EPA’s conclusion. The first sample was approximately 250 ppb, which is fifty times the MCL of 5 ppb. Due to the health implications associated with gross contamination at this level, standard protocol dictates that the EPA should have called for re-sampling before advising the Holt’s that is was safe to continue drinking their well water. TDEC officials said they deferred to the EPA’s opinion regarding the safety of the water, while EPA officials say that TDEC should have conducted further testing because the primary regulatory authority over the landfill is under the jurisdiction of the State. The second and most disturbing issue related to the sampling reports is the fact that Ann Sullivan, and other white residents, received letters from the EPA advising them to stop using the well water and to switch to city water. The Holt family, per EPA’s recommendation, continued drinking their well water for another nine years (1991-2000). During that time period, members of the family were diagnosed with lung cancer, prostate cancer, cervical cancer, diabetes, heart disease, heart murmurs, and stomach-lining disorders. Many also said they have been plagued with chronic skin rashes. On September 25, 2000 a memorandum was distributed from TDEC’s Nashville Environmental Assistance Center (NEAC) to the TDEC Commissioner and others within TDEC summarizing the events related to the Dickson County Landfill, the City of Dickson water supply, and the occurrence of orofacial clefts. As a result of continuous sampling and the detection of high concentrations levels of TCE, the Holt family was finally advised to switch from well water to city water on October 20, 2000.
Remediation Protocol

From an engineering perspective, there are definitive steps that need to be followed when dealing with this type of situation. The bedrock (karst) geology of the Dickson County site makes it nearly impossible to predict where contaminants will migrate. Frequent and extensive monitoring is therefore necessary. It is also evident that the Dickson County Landfill’s remedial efforts cannot be approached as a clean-up for a Municipal Solid Waste (MSW) landfill. The site must be regarded as a hazardous waste landfill because many different chemicals have been dumped into the ground. Since landfills are permanent disposal sites, and are closed with waste in place, closure and post-closure care requirements include installing and maintaining a final cover, continuing operation of the leachate collection and removal system (LCRS) until leachate is no longer detected, maintaining and monitoring the leak detection system, maintaining ground water monitoring, preventing storm water run-on and runoff, and installing and protecting surveyed benchmarks.

Cleaning up a hazardous waste facility through the Superfund Process also requires a specific protocol. The steps include a Preliminary Assessment/Site Inspection (PA/SI) which is used to investigate the conditions of the site and evaluate the potential for a release of hazardous substances from a site. Next, is the Hazard Ranking System (HRS) Scoring, which is a screening mechanism used to place sites on the National Priorities List (NPL). If the site meets the requirements of the screening, it is then placed on the NPL Site Listing Process where the most serious sites are identified for possible long term clean-up. The next step is a Remedial Investigation/Feasibility Study (RI/FS) where the nature and extent of the contamination is determined through a step-by-step flowchart process. The Records of Decision (ROD) is used to
explain which clean-up alternatives will be used at the NPL sites. Preparation and implementation of plans and specifications for applying site remedies is used for the Remedial Design/Remedial Action (RD/RA). The process ends with Construction Completion and Post-Construction Completion, which involves identifying completion of clean-up activities and ensuring that Superfund response actions provide for the long-term protection of human health and the environment.

Site Remediation Summary

In spite of these established protocols, limited remediation has been done at the Dickson County Landfill. According to federal government records, the discovery of hazardous waste contamination at the landfill dates back to February 1986. That same year, a preliminary assessment report was conducted by the state, and “low” was assigned as the priority level. Apparently, one of the reasons that the site was not given a higher priority was because a portion of the city’s drinking water supply came from Dickson Lake. This assessment disregards the fact that poor African-American residents adjacent to the landfill had probably been drinking contaminated groundwater from wells for up to twenty years. After the site inspection and sampling in 1991, the federal government assigned a “No Further Remedial Action Planned” status to this site. The site was then archived in 1993, and became un-archived by the EPA on their books. The remedial efforts made by the federal and state governments at the Dickson County Landfill consisted of the construction of a low permeability landfill cap to be installed and completed, costing 2.1 million dollars. In 1999, the construction of a leachate collection system commenced in order to contain and sample the mixture run-off from the landfill waste. This pipe system is usually placed under the landfill before the landfill begins operation. The state has addressed institutional controls by providing alternative water supplies, such as placing
residents on public water or household carbon adsorption units. However, as of 2006, an unknown number of people were still using private wells near the landfill because they could not afford the sewer line hook-up fees. Currently, as a remedial effort, the TDEC and Division of Solid Waste Management (DSWM) perform groundwater monitoring within a 1 to 3 mile radius of the landfill.

In February of 1992, a memorandum from the EPA was placed in the TN Solid Waste Management file stating that there was no “substantial evidence” to support that the Holt wells had been impacted by the Dickson County Landfill. Ironically, the series of events regarding the Holt family resulted in the site being kept off of the National Priority List. Halliburton NUS Environmental Corporation of the Superfund Division conducted a site investigation during this period and recommended that the site be ranked according to the Hazard Ranking System (HRS). In 1992, Halliburton and the EPA were able to keep the site off the National Superfund List by making two assumptions about the extent of the impact of groundwater contamination on human health. It was assumed that the population exposed to contamination in groundwater exceeding MCLs was limited to six people, and that the municipal well provided only three percent of the counties annual drinking water supply. Neither of these assumptions had any basis on fact or realistic interpretation of risk. Furthermore, these assessments were made without any community involvement. The HRS calculations based on these assumptions resulted in the site scoring “below actionable levels”, and the site was not placed on the NPL list. It is evident that if regulators had made an effort to delineate offsite migration, and if they had not given false and misleading information to the people who were impacted, that these assumptions would have not been viable and the site would have been placed on the Superfund list. This is of paramount
importance since the original polluters have evaded responsibility, and the only avenue for meaningful remediation of the site today is through Superfund dollars.

**Community Effects**

Dickson County, TN currently ranks number eight in the nation for the release of chemicals suspected of causing birth defects. A cluster of cleft palate birth defects was reported in the area beginning in 1997. Statistical data through the Tennessee State Health Department reveals that between 1997 and 2000, 18 children were born with cleft lip or cleft palate in Dickson County. Federal and State agencies still have not determined a cause for the increase in birth defects throughout the county. The Holt family, and many other families in the surrounding area, continue to suffer from cancer and other unexplained illnesses. Mary Wright, who lives adjacent to the landfill, expressed concern about her property and crop values. She suggests that consumers will not buy her hay because they feel it may be contaminated with TCE or some other chemicals.

The minority residents affected by the landfill have formed several community groups to advocate the cleanup and full site remediation of the now closed landfill. Members of the Holt family actively attend TDEC meetings and local council meetings. The Dickson County Branch of the NAACP works closely with environmental activist groups in Nashville and surrounding counties to not only address the problems in Dickson, but also in other low-income and minority communities with similar problems. Environmental activists in Dickson County have also partnered with local university researchers and engineers to document the problems associated with the landfill’s history. The Dickson County residents have reached an impasse with State officials. Researchers and experts working with the community activists feel that the logical course of action is to fully remediate the site to keep the contaminated groundwater from
spreading; whereas, State consultants claim the landfill cannot be cleaned up, and the groundwater migration is under control.

Conclusion

This paper has presented a brief summary of the long and ongoing case of the Dickson County Landfill. Although some will argue that the issues regarding the landfill are not linked to issues of environmental racism, it is clear that the largely minority, low-income population in Dickson County has been overwhelmed with this problem. What is also indisputable is the lack of “meaningful involvement”, as defined in the EPA’s environmental justice initiative statement, by the minority population who reside near the Dickson County Landfill. It has been shown that the potentially affected community residents did not have an appropriate opportunity to participate in the siting process, and were not informed about the potential effects the landfill would have on their environment. The Dickson County resident’s were not informed and involved throughout the Superfund process, nor did the decision-makers seek out and facilitate the involvement of those potentially affected.Remediation efforts at the landfill have not followed standard protocol, and appear to have been based on biased reports and assumptions that excluded the input of those most likely impacted.

According to the TCE Blog, there are at least 2,000 TCE contaminated sites in the United States. That is an average of 40 TCE-contaminated hazardous waste sites in every U.S. state, some sites yet to be fully cleaned, others that have never been touched. It is not clear how the Dickson County Landfill issue will be resolved, but is hoped that the Dickson community will remain strengthened and galvanized as they continue to fight against perceived injustices. Perhaps the Dickson County Landfill will shed light on the complicated interplay of politics, site remediation, engineering practices, and environmental injustices.
References


