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COLLABORATIVE DISPUTE RESOLUTION IN SUPERFUND ENFORCEMENT:
DOES THE RESOLUTION APPROACH VARY BY COMMUNITY-LEVEL
SOCIODEMOGRAPHIC CHARACTERISTICS?

by

MARY B. COLLINS
B.S. University of Wisconsin-Madison, 2000

A thesis submitted in partial fulfillment of the requirements
for the degree of Master of Arts
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ABSTRACT

This research examines environmental dispute resolution as applied to Superfund site cleanup and how the use of collaborative dispute resolution approaches, in particular Alternative Dispute Resolution and Community Involvement, are related to a community's socioeconomic and demographic profile. It examines the sociodemographic characteristics of residents living in census tracts containing Superfund sites in relation to the type of dispute resolution technique used. I hypothesize that collaborative dispute resolution techniques, as opposed to traditional settlement and/or litigation, are less likely to occur in Superfund communities with high poverty levels and high minority populations than in those with low poverty levels and low minority populations. Although minority and lower class communities are less likely to be placed on the National Priorities List (NPL), are slower to be cleaned up once on the NPL, and experience lower quality cleanups (O'Neil 2005; Sigman 2001; Omohundro 2004), the findings of this research indicate that the dispute resolution processes studied here do not contribute to such environmental clean up injustices. Minority status and poverty levels do not impact the likelihood that collaborative dispute resolution will be used in settling Superfund disputes. This analysis does show a significant correlation between education and the use of collaborative dispute resolution. Superfund communities in which residents have low educational attainment are less likely to use collaborative dispute resolution. Low educational levels may be the paramount disadvantage to overcome in the use and successful implementation of collaborative dispute resolution.

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LIST OF ACRONYMS

ADR.....	(Alternative Dispute Resolution)
ADRA.....	(Administrative Dispute Resolution Act)
ATSDR.....	(Agency for Toxic Substances and Disease Registry)
CAGs.....	(Community Advisory Groups)
CERCLA.....	(Comprehensive Environmental Response, Compensation and Liability Act)
CERCLIS.....	(Comprehensive Environmental Response, Compensation, and Liability Information System)
CI.....	(Community Involvement)
EJ.....	(Environmental Justice)
EPA.....	(Environmental Protection Agency)
HRS.....	(Hazard Ranking Score)
NFRAP.....	(No Further Response Action Planned)
NPL.....	(National Priorities List)
O&M.....	(Long term Operation and Maintenance)
OECA.....	(Office of Enforcement and Compliance Assurance)
OSWER.....	(Office of Solid Waster and Emergency Response)
PHDGPM.....	(Public Health Disparities Geocoding Project Monograph)
PRP or PRPs.....	(Potentially Responsible Party or Potentially Responsible Parties)
RD/RA.....	(Remedial Design/Remedial Action)
RI/FS.....	(Remedial Investigation and Feasibility Study)
ROD.....	(Record of Decision)
SARA.....	(Superfund Amendments and Reauthorization Act)
TAGs.....	(Technical Advisory Grants)

A. INTRODUCTION

For 25 years, controversy and criticism have surrounded the Superfund program. Critics have characterized the program as inefficient, excessively costly, and unjust with respect to both communities and industrial offenders. The contention and dispute within the remediation process are among the major factors that contribute to delays and high transaction costs. Superfund site remediation is fraught with conflict between stakeholders – between polluters, government regulators, and community groups; between federal and state agencies responsible for cleanup; between lawyers and environmental insurers; and between technical experts and government officials at all levels. These controversies often lead to greater expenditures on settling disputes than on the actual remediation of the contaminated site.

While many empirical studies have described and quantified the legal, economic, and environmental outcomes of Superfund, none have looked at how the specific dispute resolution processes that contribute to these outcomes are related to community characteristics. As summarized by Church and Nakamura (2003), the Superfund legislation broadly allows the Environmental Protection Agency (EPA) to take one of three approaches in working with polluters and other stakeholders to settle cleanup related disputes: (1) prosecutorial, (2) accommodation, or (3) public works. The prosecutorial approach takes a hard-line, demanding approach with polluters; the accommodation approach emphasizes negotiation, collaboration, and avoidance of litigation; and the public works approach involves more direct action by the EPA itself in

cleaning up sites. Though the use of these approaches varies by EPA region, the extent to which community characteristics influence the selection of Superfund dispute resolution processes is not well understood (Church and Nakamura 1993; GAO 2000).

The purpose of this research is to add to the body of knowledge on environmental dispute resolution as applied to Superfund site cleanup and how collaborative dispute resolution approaches are related to a community's socioeconomic and demographic profile. The approaches studied here are those that emphasize accommodation, face-to-face deliberations, problem solving, and consensus building among stakeholders as opposed to dispute resolution through court-based litigation. According to Bingham, less adversarial approaches to environmental dispute resolution include "a variety of approaches that allow the parties to meet face-to-face to reach a mutually acceptable resolution of the issues in dispute or potentially controversial situation ... that involve some form of consensus building, joint problem solving, or negotiation" (Bingham, 1986, p xv). While this can include many forms of public discourse, this study looks specifically at:

1. *Alternative Dispute Resolution (ADR)* as it is applied by the EPA within the Superfund enforcement process; and
2. *Community Involvement (CI)* as a means of public participation in Superfund site decision-making.

ADR is defined here as all dispute resolution approaches in which a neutral third party is used to reduce the probability of litigation. Techniques include, but are not limited to: advisory *ADR* processes, conciliation procedures, mediation, arbitration, and aggregating cases for settlement. *CI* can also take various forms, including the use of formally constructed Community Advisory Groups (CAGS), the carrying out of activities funded through Technical Assistance Grants (TAGS), and other forms of organized collective community action. While the EPA is required by law to allow public participation, communities take advantage of this to a greater or lesser degree, such that at many Superfund sites, *CI* does not meaningfully occur.

Several key findings suggest this as an important area for investigation. First, past research has shown that, compared to litigation, *ADR* is less costly, leads to a more rapid settlement, results in greater participant satisfaction, and is less stressful for the community at large (Marshall, Picou, and Schlichtmann 2004). The EPA states that it lowers transaction costs, focuses more on real issues rather than posturing, leads to settlements more closely tailored to the parties needs, and is less time-consuming (EPA 1995). *ADR* has also been used by the EPA specifically as a means to give voice to communities and to enable greater environmental justice (Consensus Building Institute 2003). In light of these advantages, it is important to know if all communities have equal access to *ADR* in the context of the Superfund cleanup process. Second, while research into Superfund cleanup equity has been limited, some studies have found that sites in areas having high minority populations undergo lower quality cleanups than those in low minority areas (Hamilton and Viscusi 1999). It is not known whether these

differences are due to factors stemming from collective community action (or inaction) or from variations in the EPA-led processes surrounding site remediation. Understanding the relationship between community characteristics and dispute resolution processes will help in designing strategies to empower disadvantaged communities.

This research brings together themes of both environmental dispute resolution and environmental justice (EJ). There have been few studies published to date at the intersection of ADR and the EJ movement as related to Superfund. In this research, I examine the sociodemographic characteristics of residents living in census tracts containing Superfund sites in relation to two indicators of participatory decision making: the differential use of ADR and the presence or absence of formally recognized CI as compared to traditional dispute settlement or litigation. Both ADR and CI are considered to be on a continuum of participatory decision making and collaborative dispute resolution, with CI being at the less formal end and ADR being at the more strictly defined and formally regulated end.

Given the frequency and emphasis placed on a community's race and class in the EJ literature, I chose to examine the relationship between the sociodemographic profile of Superfund communities and the use of collaborative dispute resolution approaches (ADR and/or CI). Minorities are more likely to live in toxic communities and are less likely to be active in community participatory dispute resolution (Bullard, Mohai, Saha,

and Wright/UCC 2007). Therefore, this research begins to answer the question: Does the class or race of Superfund site residents affect the likelihood that ADR/CI will occur during the site cleanup and enforcement processes?

Hypothesis 1. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with high poverty levels than in those with low poverty levels;

Hypothesis 2. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with higher minority representation than in those with lower minority representation;

Hypothesis 3. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with more single parent households than in those with less single parent households;

Hypothesis 4. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with less formal education than in those with more formal education.

Poverty and the effect of racial disadvantage (i.e. being of African American, Asian-Pacific-Islander, Native American or of some other descent) may decrease the likelihood of ADR/CI use for a number of reasons. Using similar reasoning to Daley and

Layton (2004), the Administrative Convenience/Transaction Costs model posits that bureaucrats are self-interested individuals who seek to attain their goals rationally (Downs 1967). As applied to Superfund cleanup and likelihood of ADR use, it is hypothesized here that the EPA will tend to reach an unaided settlement (one not requiring either ADR or litigation) with Potentially Responsible Parties (PRPs) more easily in communities where residents lack political power. If such a settlement is reached at an early stage in the enforcement process, neither ADR nor litigation will be required to compel cleanup by PRPs. It is in the self-interest of bureaucrats to bring each site to resolution as quickly as possible to offset criticisms that the Superfund program is inefficient and ineffective. This may, however, require that the EPA accept less stringent remediation approaches from PRPs, compromises that may go unchallenged in communities lacking political power.

Secondly, as related to cases where community members themselves take part in ADR processes focused on remedy selection, factors related to political and personal resources may also decrease the likelihood of ADR use. Involvement in ADR requires disputants to possess various organizational and political skills (making timely phone calls, getting ADR regional specialist involvement, getting sponsorship from Regional Counsel, and ultimate approval from EPA officers). Communities with depressed socioeconomic status or those with higher minority populations may be less likely than more affluent, non-minority communities to have the time and/or financial resources to accomplish the steps required to initiate and follow through with ADR initiatives.

CI is considered a form of collective action. The collective interest model, originally proposed by Finkel, Muller, and Opp (1989) and adapted by Lubell (2002) argues that “environmental activism is a function of citizen beliefs about collective benefits, the ability to influence collective outcomes, and the selective costs/benefits of participation.” (p. 431) It has been asserted by the U.S. Commission on Civil Rights that disadvantaged communities have less access to technical data, research, and other information necessary for effective community action (USCOCR 2003). Such communities may be less able to take advantage of Technical Assistance Grants (TAGs) and Community Involvement training offered by the EPA. In this research, it is hypothesized that because disadvantaged communities have less collective self-efficacy and less access to informational resources, they are less likely to engage in CI.

B. BACKGROUND AND LITERATURE REVIEW

B.1. Superfund/CERCLA

In December 1980, following the 10th anniversary of Earth Day and amid toxic waste fires in New Jersey and contamination at Love Canal, President Carter signed the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). President Carter stated that CERCLA was “landmark in its scope and impact on preserving the environmental quality of our country and that it fills a major gap in the existing laws of our country.” CERCLA, or Superfund as it is more commonly known, was formed primarily to deal with cleaning up hazardous waste sites where owners had shirked responsibility, but also to allow injured parties to sue in Federal court for damages. The EPA administers the Superfund program, in cooperation with state and tribal governments (EPA 2000c).

Subsequent legislation was passed in 1986, the Superfund Amendments and Reauthorization Act (SARA), which amended CERCLA in a number of ways. SARA stressed the importance of permanent remedies and innovative treatment technologies over more temporary ones; required greater coordination between Superfund and other environmental laws; provided new enforcement authorities and settlement tools; increased state involvement; encouraged greater citizen participation in making decisions on how sites should be cleaned up; and increased the size of the trust fund.

CERCLA also created another agency, the Agency for Toxic Substances and Disease Registry (ATSDR), to investigate the impacts of contaminants on public health

and to undertake public health measures. The ATSDR conducts public health assessments at Superfund sites and maintains a prioritized list of hazardous substances and their toxicological profiles. The agency also conducts epidemiological surveillance and provides physician education related to the health effects of hazardous substances.

Most toxic sites, comprising 65-70% of the total, are waste storage and treatment facilities, landfills, or former industrial properties. Many have been abandoned and most are contaminated by multiple toxic substances. A smaller number are active or inactive waste recycling facilities and mining sites. Federal government facilities, such as military bases and nuclear energy complexes, also make up a significant portion of overall sites (ATSDR 1997). In a study done in 1996, the ATSDR estimated that approximately 11 million people live within one mile of Superfund sites. A significantly higher percentage of minorities live near Superfund sites than in other parts of the affected counties (Reisch and Bearden 1997; Bullard, Mohai, Saha, and Wright/UCC 2007).

The extent of exposure to hazardous substances among people living near Superfund sites is unknown. However, exposure assessment studies conducted by the ATSDR show that compounds such as lead, arsenic, mercury, polychlorinated biphenyls (PCBs), and bromides are found at levels posing a health concern in people living near some hazardous waste sites. Exposure studies focusing on lead show that soil is the most common pathway of exposure among children living near hazardous waste sites.

Other studies have demonstrated increased exposure to several compounds from consuming contaminated vegetables, beef, milk, and fish raised and caught near hazardous waste sites (ATSDR 1997).

Under the *Polluters Pay Principal*, Superfund requires the cleanup costs at each site to be divided among those who dumped the wastes, known as Potentially Responsible Parties (PRPs). The basic legal tool by which the EPA compels cleanup is the system of tort liability under which PRPs are forced, by litigation or the threat of litigation, into paying the costs of remediation. Such liability is *joint and several*, implying that any PRP can be held liable for the entire cleanup, regardless of the extent to which they caused it. The issue of intent is also removed under the provision for *strict* liability, such that PRPs can be required to pay cleanup costs even when toxic releases were unintentional and without negligence. Sites where PRPs cannot be identified or are bankrupt are known as “orphan sites.” They are eligible for cleanup if they pose a substantial enough threat. Some sites have orphan shares, such that the federal government agrees to pay for a portion of costs for contamination contributed by missing PRPs.

The EPA’s inventory of hazardous waste sites is known as the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). It contains sites that have been prioritized for cleanup as well as potentially hazardous sites requiring preliminary investigation. The presence of a site in CERCLIS does not address liability for cleanup and does not indicate that cleanup will actually take place.

(See section B.2. for a summary of the cleanup process). EPA achieves sites within CERCLIS when the site is designated as *No Further Response Action Planned* (NFRAP). Information for CERCLIS is provided primarily through the regional program offices, through a Regional Information Management Coordinator.

Although CERCLIS contains many known hazardous sites, far more, that are believed to exist, have yet to be brought to EPA's attention. According to Probst and Konisky (2001), the Environmental Law Institute estimated that there are 69,000 hazardous sites throughout the country. The GAO (2000) estimated the number to be substantially greater at 150,000 - 500,000. Only a small percentage of these would be considered serious enough to warrant cleanup through the Superfund program (Probst and Konisky 2001).

Prior to the creation of Superfund and subsequent related legislation, nothing like it had ever existed. Over time, the program has evolved to create a regulatory framework intended to protect human health and the environment from the dangers of hazardous waste. Today, despite funding cutbacks and expiration of the original legislation, the Superfund program remains the primary resource for identifying contaminated sites and quantifying risks to health and the environment from a broad range of conditions, chemicals, and threats at uncontrolled hazardous waste sites.

B.2. The Superfund Cleanup Process

In pursuing its mission to assure the cleanup of toxic waste sites, the EPA has established a formal process for waste site assessment and cleanup. Exceptions to

this process occur when the site is seen as an emergency due to the degree of the threat to public health. If imminent danger exists, the EPA can undertake cleanup itself and seek cost recoveries from PRPs after the fact. In most cases, however, the series of steps for non-emergent sites are:

Site Discovery and Notification - The EPA is notified of actual or threatened releases of hazardous substances by private citizens, state agencies, or EPA regional offices. The site is then entered into CERCLIS.

Preliminary Assessment/Site Inspection (PA/SI) - A limited-scope investigation is performed on every CERCLIS site to distinguish between sites that are not harmful and those requiring further investigation. When this is complete, on-scene coordinators submit a preliminary assessment report to the regional and national response team, specifying whether the site falls under the jurisdiction of Superfund and whether it will move on to ranking within the Hazardous Ranking System (HRS) process.

Inclusion on the National Priorities List (NPL) – For a contaminated site to be cleaned up under the Superfund program, it must first achieve a priority level that will allow placement on the NPL. The first NPL was announced in 1983, with 406 priority sites identified. It is updated regularly based on the evaluation of both new sites and the progress of cleanup at sites already on the NPL.

EPA policy states that the Hazardous Ranking System (HRS) is the principal mechanism for deciding whether to place a site on the NPL. Inclusion on the NPL

requires a score greater than 28.5 on the HRS scale. Alternatively, a site can be placed on the NPL based on state nomination (states can only nominate one site) or recognition of the site as an imminent health threat by the ATSDR.

After a site has been placed on the NPL, it may then qualify for federal funding and may also receive regional or national attention. If a site is not determined to be of high enough priority to make the NPL, it may still be eligible for cleanup under state or voluntary programs.

The objectivity of the NPL listing process has been widely questioned by environmental justice researchers. (See section B.4., Environmental Cleanup Justice) Some have provided substantial evidence that placement of a site on the NPL is more related to political power and community influence than to the physical characteristics of the site (Hamilton and Viscusi 1999; Sigman 2001).

Remedial Investigation and Feasibility Study (RI/FS) – For sites that are placed on the NPL, a RI/FS is performed to determine the nature of the contamination and the recommended remediation approach. The RI and FS are conducted concurrently. The PRP may conduct the RI/FS if EPA determines that they are qualified. If conducted by the EPA, the EPA will then seek reimbursement from PRPs for its associated costs.

Record of Decision (ROD) – The findings from the RI/FS are used to generate a ROD, a formal document by which an EPA administrator (usually the Regional Administrator) specifies the remedy for cleaning up Superfund site.

Remedial Design (RD)/Remedial Action (RA) – During the RD phase, the technical specifications for cleanup remedies and technologies chosen and described in the ROD are designed. It includes engineering plans and specifications. The actual site work (RA) can then begin.

Long term Operation and Maintenance (O&M) - O&M activities are intended to protect the integrity of the remediated site. Monitoring includes such things as inspection, sampling and analysis, routine maintenance, and reporting.

NPL Site Deletion - EPA may remove a site from the NPL if it determines that no further action is needed.

As these steps suggest, this is a lengthy and highly expensive process. The average total time required to complete these steps is approximately eight years and the average cost of remediating a site, excluding legal expenses and other transaction costs, exceeds \$30 million (Church and Nakamura 1993).

States also have an important role in hazardous waste site cleanup. Thousands of sites that are not on the NPL (and are therefore ineligible for federal cleanup funds) are being cleaned up under State Superfund programs. States may be involved in Superfund

enforcement activities and often participate in negotiations with PRPs. In certain situations, the EPA finances State-led enforcement activities. Many voluntary cleanups by PRPs also occur at non-NPL sites. In these instances, owners of sites may clean them up in anticipation of real estate transactions or due to fear of future liability.

Since CERCLA's creation and implementation, the program has faced continuous growth. Fewer than 5 percent of the approximately 1,200 toxic waste sites currently on the NPL have been cleaned up completely and approximately 75% of the sites are in the early stages of cleanup (EPA 2000c).

B.3. Environmental Justice

For many years, the United States population was largely unaware of how the dumping of industrial and military wastes would affect public health and the environment. Indiscriminate dumping of toxic materials was standard practice on thousands of properties, resulting in landfills, warehouses and lakes contaminated by hazardous waste. In the late 1970's and early 1980's, awareness of chronically polluted areas increased with such incidents as Love Canal and Cancer Alley. During this time, there were also large-scale technological disasters, such as Three Mile Island and the Santa Barbara Oil Spill, which further fueled public concern about contamination.

Unfortunately, communities of color and less affluent communities have been the hardest hit by contamination. In response to environmental inequities, the environmental justice movement emerged and today remains a potent force (Bullard 1983; UCOC/CRJ 1987). The EPA defines EJ as "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 group of people, including racial, ethnic, or socioeconomic group, 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 programs and policies. Meaningful involvement means that: (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contribution can influence the regulatory agency's decision; (3) the concerns of all participants involved will be considered in the decision making process; and (4) the decision makers seek out and facilitate the involvement of those potentially affected" (EPA 2004).

Over the last twenty years, the EJ movement has substantially impacted public policy and industry practices, held national conferences, and inspired research and curriculum development. The EJ movement reached the White House in 1994 with the signing of Executive Order 12898. This order required the EPA to create an Office on Environmental Equity and led to the initiation of many other policies and programs. President Clinton further expanded upon such policies. Beginning in 2000, EJ initiatives met resistance from inside the EPA as well as within Congress and today still face

budget and program cuts. Regardless, EJ milestones are vast, ranging from grassroots organizations to formalized research and direct influence on national governmental policy (Bullard, Mohai, Saha, and Wright/UCC 2007).

Even with the many EJ milestones, America's people of color still make up the majority of those living in neighborhoods containing hazardous waste facilities. These racial and ethnic disparities are prevalent not only on a national basis, but also throughout all EPA regions and metropolitan areas. Overall, people of color are 1.9 times more likely to live in communities containing hazardous waste facilities as compared to non-minorities (Bullard, Mohai, Saha, and Wright/UCC 2007). Minorities have a higher excess lifetime cancer risk from Superfund sites than non-minorities and make up a higher percentage of site-related cancer cases than their national population percentage (Hamilton and Viscusi 1999).

However, such findings are not unequivocal in relation to Superfund. Greenberg (1994) looked at HRS rankings in relation to the race and ethnicity of area residents. He found no relationship between HRS rankings and minority status. A study by Clean Sites (1990) also reported no relationship between poverty and the location of hazardous waste sites. Others have questioned the empirical foundations of environmental justice research, pointing to methodological flaws in a variety of studies (Liu 2000; Bowen 2002). These findings highlight the need for further exploration of this topic.

B.4. Environmental Cleanup Justice

Despite the widely accepted assertion that minorities and the poor are at greater risk for exposure to environmental hazards, they are under-represented in the Superfund program as measured by the likelihood that a given toxic site will be placed on the NPL (O'Neil 2007). O'Neil (2005) found that sites in high minority areas take substantially longer to get to the NPL, if they are listed at all, and that census tracts with NPL sites have a lower than average percentage of female-headed households and a higher mean percentage of children. Sites with identifiable PRPs are more likely to reach Superfund listing, most likely due to their ability to provide cleanup funding. Communities with higher income and educational levels were also found to be more likely to be listed on the NPL. O'Neil notes the importance of political influence to NPL listing, as the support of community and local officials is necessary for a site to reach NPL (O'Neil 2005).

Other research has suggested that the power of interest groups has more to do with NPL placement than any objective ranking system. Sigman (2001) contends that bureaucracies set their workload priorities based on pressures from concentrated private interests. She examined the amount of time that sites on the NPL require to complete the three stages from listing to cleanup, using an econometric method for multiple sequential durations. Her conclusion was that little evidence exists to support the assertion that the EPA prioritizes sites according to their harms. Rather, the decision is primarily related to action by concentrated private interests, such as PRPs and local communities, which act to influence EPA priorities (Sigman 2001).

Omohundro (2004), in looking at citizen involvement in contaminated communities, concluded that EPA mitigation responses are formulated on a case-by-case basis, concluding only that the HRS score provides guidance in determining the placement of a site on the NPL. Two additional studies also found inequities in cleanup linked to race, though not to income (Hird 1993; Anderton, Oakes, and Egan 1997).

There is evidence that sites in areas having high minority populations undergo lower quality cleanups than those in low minority areas. Cleanups in high minority areas are completed with equal speed, but remediation methods appear to vary in relation to the racial and ethnic profile of the community (Hamilton and Viscusi 1999). At least one study has found that communities with high minority populations had fewer Superfund site cleanup plans as reflected by Records of Decision than low minority communities (Zimmerman 1993). Lavelle and Coyle (1992) found that the EPA chooses “containment” over “permanent treatment” more often at sites located in minority areas than in non-minority areas.

B.5. Superfund Enforcement

The enforcement process that begins simultaneously with the cleanup (as described in Section B.2.) is of particular interest because ADR/CI is most likely to occur in this context. As defined by the EPA, the enforcement process refers to “the actions that EPA takes to reach settlement or to compel responsible parties to pay for or undertake the remediation of the site” (EPA 1988). Enforcement begins with the search for the PRPs and is handled concurrently as a parallel process alongside technical

remediation. Most PRPs enter into settlements or voluntarily comply with administrative orders, rather than litigating or seeking other means of dispute resolution with the government (EPA 1987).

In the enforcement process, the EPA searches for the PRPs, and once identified, they issue an enforcement letter informing them of their general liability. At the time that the EPA informs each PRP of their potential liability, they also express their willingness to enter into settlement negotiations and provide the PRPs with detailed information regarding the site characteristics (Atlas 2000). The EPA then refrains from any action at the site for 120 days. The first 60 days provide the PRPs with an opportunity to negotiate a cleanup plan and allocate costs among themselves. During this period, PRPs may bring in a third party neutral to help them in reaching an agreement. The second 60 days allow time for the PRPs and the EPA to negotiate a proposal and its execution (Atlas 2000). When PRPs and the EPA fail to arrive at a satisfactory settlement within the allowable time period, litigation or alternative methods for dispute resolution are brought in. Exceptions to this general sequence of events can occur in cases of a pressing immediate public health threat.

Traditionally, litigation was used by the EPA to compel PRPs to undertake cleanup when settlement could not be reached. Critics have said that this emphasis on liability leads to more arguments than cleanups with more resources devoted to dispute resolution than to cleanup. A RAND corporation study published in 1992 reported that approximately one-tenth (12%) of the money spent by insurance companies to settle

Superfund environmental claims was used to clean up hazardous materials. Eighty-eight percent of the money from the insurance companies goes to legal fees and related costs. Insurance companies spent an estimated \$470 million on Superfund-related claims in 1989, almost twice their 1986 expenditures (Haggerty 1992).¹

The time and money involved in litigation are often cited as reasons for the slow clean up at Superfund sites. Many cases involve the federal government, industrial polluters, insurance companies, small businesses, and individuals. For example, at a site on Long Island, the EPA identified 257 PRPs as being responsible for cleanup estimated to cost almost \$8 million. The 257 PRPs sued a total of 442 insurance companies, and the site owner sued an additional 101 parties. Well over 200 law firms were hired and a lengthy legal battle ensued (Kamieniecki and Steckenrider 1997).

B.6. The Alternative Dispute Resolution (ADR) Movement

The alternative dispute resolution (ADR) movement began in the late 1960's as a populist attempt to return the dispute resolution process to disputants. Early ADR proponents aimed to take disputes out of courtrooms and into neighborhood justice centers. The movement worked to substitute mediation processes (in which the disputants are active in finding solutions to their problems) for adjudicative processes that assign control of outcomes to a neutral third party. The movement believed that

¹ Data are based four national insurance carriers receiving 13,000 claims related to hazardous waste cleanups.

this would allow disputants to negotiate outcomes more appropriate to their situation, that were more satisfactory, and that were more likely to contribute to the continuation of long-term relationships between disputing parties (Hensler 1991).

During the 1970's, the ADR movement entered the courtroom. In court settings, ADR became an efficiency mechanism, designed to speed disposition and decrease transaction costs by offering a satisfactory substitute for trial. Unlike the populist reformers, court reformers did not seek to change either the outcome of court disputes or the core rules underlying court dispute resolution. *Court-annexed* procedures frequently have been sold to attorneys and repeat-player litigants on the ground that they will not change the overall distribution of case outcomes (Hensler 1991).

There is also a third stream in the ADR movement, the privately contracted resolution of disputes between commercial partners. This part of the ADR movement actually has a longer history than court-annexed ADR, but until recently received little attention. Unlike other forms of ADR, these procedures require some prior understanding between the parties about how they will resolve future disputes (Hensler 1991).

While many proponents of ADR are primarily interested in reducing the transaction costs of civil cases, some have asked whether ADR procedures might remedy perceived problems in court procedures for dealing with scientific questions in toxic tort litigation. Specifically in the case of environmental liability, courts are asked to decide the relationship between exposure to toxic substances and the current and future health status of entire communities. These cases have generated significant debate

because of the alleged damages to litigants, the huge financial and social costs associated with the litigation, and because outcomes are often very controversial. Although there are many reasons why one would want to avoid litigation, some have suggested that the problems associated with these types of cases could be mitigated by modifying court procedures for dealing with the scientific questions on which the cases turn (Hensler 1991).

B.7. The Use Of ADR By The EPA

Since 1981, the EPA has been progressively moving toward broader implementation of ADR across a range of programs. Policy statements, pilot projects, and agency actions were announced periodically from 1981 through 2000, when the EPA announced its final ADR policy. In 1998, President Clinton established an interagency ADR committee commissioned by the Administrative Dispute Resolution Act (ADRA). In the course of establishing this committee, the President also instructed agencies to take steps to: (1) promote usage of the ADR techniques including mediation, arbitration, early neutral evaluation, agency ombuds, etc.; and (2) promote greater use of rulemaking via negotiation. Since then, the EPA has used ADR techniques ranging from traditional mediation to innovative processes aimed at enhancing stakeholder involvement in decision-making.

The decision to adopt the policy advocating the use of ADR was based primarily on perceptions among government personnel that ADR lowered transaction costs, focused on problem-solving as opposed to positioning, created a greater opportunity to tailor

dispute settlements that meet stakeholder needs, and saved time (O'Leary and Raines 2001). The increased use of ADR was one of fourteen key reforms listed by the EPA in bringing measurable improvements between 1993-1998 (GAO 2000).

The ADR techniques listed below are those that are most frequently used at EPA:

Mediation: Mediation is a confidential, informal process in which the disputing parties use a neutral third party to assist them in trying to work out a mutually acceptable solution to a problem. In 1999, more than 70% of all enforcement ADR cases involved mediation (EPA 1999).

Arbitration: Arbitration is a process involving the use of a third party that hears the issues and renders a decision. Such decisions may be binding or non-binding depending upon the parties' agreement. Non-binding arbitration is the second most common type of ADR used by the EPA in Superfund disputes (EPA 1999). The EPA is only allowed to use binding arbitration in small CERCLA claims of less than \$500,000.

Facilitation: Facilitation is a voluntary, informal and flexible process of communication guided by a third-party neutral. Facilitation can be used for meeting management purposes, or as a technique to engage parties in a productive discussion about a problem or challenge. By itself, facilitation may or may not result in resolution of any issues in controversy.

Convening: Convening is a process used to identify issues, interests, and sometimes parties involved in a dispute or potential dispute. The goal of convening is to assess the potential for use of ADR techniques in seeking resolution of a problem and to recommend a process that would best help address the issues at hand.

Early Neutral Evaluation: Early neutral evaluation allows the disputing parties to receive informal neutral evaluation of the strength of each party's position in a matter in controversy. The evaluation is nonbinding, but may be useful in promoting settlement.

Consensus Processes: A consensus process is any method by which all affected parties (stakeholders) are brought together at an early stage to develop a solution to a present or anticipated problem. Consensus processes that qualify as ADR involve a third-party neutral in a facilitation or mediation role. The term "consensus process" as used at the EPA typically refers to a mechanism for policy or regulatory development.

Cooperative Problem Solving: Cooperative problem solving involves a decision by parties facing a disagreement or potential disagreement to collaborate on a solution rather than insist on competition and compromise. Cooperative problem solving assisted by neutrals from within or outside of the EPA has been useful in addressing internal problems and challenges.

Interest-Based Process: An interest-based process seeks to generate creative solutions to problems between parties in an ongoing relationship. It makes extensive use of brainstorming and identification of creative solutions to address the interest of the participants.

Ombudsman or Ombuds: An ombudsman (or ombud) is an EPA official who is authorized to accept complaints and look into whether something can be done to address a particular concern. Ombuds do not have authority to change decisions, but they try to facilitate responsive solutions to problems raised in complaints. There are currently ombud functions in three programs at EPA: pesticides, hazardous waste, and small business.

While ADR is used across a number of EPA programs, it is most frequently used as a settlement tool during the Superfund enforcement process. Its use is advocated not only as a means for facilitating PRP negotiations, but as an approach to allow greater public participation in EPA decision-making. Mediated discussions between PRPs and the EPA (or between PRPs themselves) are used to initially establish liability, penalties, allocate costs, and to assure acceptance of responsibility by PRPs. Most frequently, ADR is used to address: penalty amounts (49%); cost recovery (15%); allocation of costs among PRPs (10%); remedial design and/or remedial action negotiations (7%), and community involvement (5%) (EPA 1999).

Overall, ADR is used in a small minority of Superfund cases because most are settled through direct negotiations between representatives of the EPA and the PRPs

without having to bring in a third party neutral or resorting to court action. The EPA reports a 95% success rate during such unaided negotiations, so a relatively small number of cases proceed to either ADR or litigation (EPA 1987). When ADR is used, the EPA claims that outcomes (quality of the ultimate settlement) are similar to those reached through litigation and negotiation. EPA asserts that since ADR addresses only the process (and not the substance) of case resolution, its use does not lead to more lenient results for violators (EPA 1987).

According to EPA policy, ADR is not meant to replace traditional litigation or unassisted negotiation, but as a supplement. It is used when traditional negotiations seem likely to fail, have already failed, or to expedite negotiations and promote efficiency. It is sometimes applied only to discrete parts of a particular case or may be used in a series of cases. It is also used during the discovery phase to assist parties in understanding the strengths and weaknesses of the case (EPA 1987).

ADR procedures may be initiated at any point as a case proceeds or while litigation is pending. However, EPA staff is encouraged to consider its use as early as possible in the progress of the case to avoid the divisive effects of protracted negotiations and lawsuits. If a case seems appropriate, efforts are made to employ ADR before referring a case for legal action. There are, however, times when cases which have been pending in court for a number of years without significant movement toward resolution are referred for ADR.

The literature contains few studies looking specifically at the EPA's use of ADR in Superfund enforcement or related actions. Abbott (1990) found that though the EPA successfully used ADR during the enforcement process, there was reluctance on the part of EPA officials to use ADR and distrust among PRPs for ADR-based settlements. In a study of institutional barriers to the adoption of ADR by the EPA, O'Leary and Raines (2001) found that despite the official policy promoting the use of ADR, its use was the exception rather than the rule. The same study found that the use of ADR was based more on each attorney's comfort and knowledge of ADR than objective factors. However, in interviews conducted with EPA officials and PRPs who had been engaged in ADR, there was a high degree of satisfaction (O'Leary and Raines 2001). Charla and Parry (1991) evaluated the advantages and disadvantages of ADR, concluding that desirable outcomes would likely result only if ADR was properly utilized.

B.8. Factors Known to Affect the Use of ADR by the EPA

B.8.a Case Characteristics

In the review process, each case is analyzed to determine whether ADR is appropriate. The reviewer typically considers whether the violations are well substantiated by the evidence in the case and whether there is sufficient time (from the standpoint of statutory time requirements) to conduct ADR negotiations. The case must also be considered negotiable, i.e., no precedent-setting issues are involved. After nomination and approval at the regional level, the case is referred to the Department of Justice for final consent. Personnel assigned to the case then approach the PRPs, gain their

acceptance of the process, and proceed to implement the chosen ADR approach. PRPs frequently use ADR among themselves to allocate costs before meeting with the EPA (Hyatt 1995). While regional personnel use their own judgment and experience to evaluate the ADR potential of cases, EPA policy particularly encourages it under the following circumstances:

- When negotiations have reached an impasse or there is a strong potential for impasse - This may occur due to such factors as personality conflicts, the presence of a large number of PRPs that make negotiations unwieldy; difficult technical issues that would benefit from independent analysis; or long delays in court rulings;
- In cases with broad impact or high visibility such as when remedies are proposed that directly affect communities or local governments rather than only the PRPs. This is becoming more common as EPA places greater emphasis on public participation in major remedy selection decisions. Such cases might include cases in which state or local governments have expressed a particular interest, but are not a party; those in which there is a particularly high level of citizen interest; or ones in which the remedy is likely to affect not only the violator, but the community in which the violator is located (e.g., those cases in which the contamination is wide-spread, leading to a portion of the remedy being conducted off-site).

Certain circumstances also make the use of ADR unlikely. These include disputes where a definitive legal precedent is needed; where government policy is unclear; where the case is considered to be of special importance (apparently this factor can make ADR either more or less likely depending on the nature of the importance); where ADR might result in inconsistent results; where the outcome will have a significant affect on parties who would not be involved in the ADR proceeding; where a full public record is important; and where the EPA needs to maintain full control over the outcome (Gullace 2001).

B.8.b EPA Regional Variations

The EPA policy on use of ADR in Superfund enforcement reflects the subjectivity of the decision to use or not to use ADR. Within the EPA's Office of Enforcement and Compliance Assurance (OECA), it is the policy to try to use ADR in every enforcement and compliance dispute whenever it could lead to more efficient or equitable resolutions. However, the policy goes on to say that if the decision to use ADR is made, it must reflect an assessment of the specific parties, issues and other factors. While PRPs may request that EPA consider the use of ADR, the decision by EPA to use or participate in ADR is made on a case-by-case basis by the regional EPA staff responsible for handling the particular case with oversight from higher level government decision makers.

ADR use varies considerably across the ten EPA regions. A report by the GAO indicated "the data show variations among the regions in implementing this reform that

do not correspond with differences in the sizes of their Superfund workloads". The report was unable to determine the degree to which opportunities for using ADR were being missed as managers in the regions did not track this (GAO 2000). In a separate study, Church and Nakamura (1993) found that the Superfund dispute resolution approaches varied by region with regions II and V tending to take a more prosecutorial, litigation-based approach; regions X and III tending to be settlement-oriented; and region IV seeing Superfund more as a public works program. Overall, interviews with EPA personnel have shown that the use of ADR depends on advocacy by those who have a personal interest in ADR and have the ability to persuade others to use it (O'Leary and Raines 2001).

EPA regions have implemented ADR programs to meet their particular needs. In some regions, ADR is organized more generically across different programs or areas. Some offices have staff experts to coordinate all ADR for a variety of unrelated areas such as in non-Superfund environmental programs, in the resolution of workplace disputes, to help in organizational problem-solving, as well as in Superfund cases (EPA 2000b).

B.9. ADR and Environmental Justice

Whether ADR, in this context, is an approach that supports environmental justice is still open to debate. A report by the Consensus Building Institute (2003), reviewed the use of ADR techniques to address environmental justice concerns. Through the review of six case studies, the report points out instances in which communities capitalized on environmental crises to improve environmental conditions, alter community-corporate

relations, and give greater voice to the interests of those residing in what are typically low-income communities of color. The authors note that, in general, environmental justice concerns have not been handled successfully through litigation. They point out that litigation is expensive; that it heightens the dependency experienced by victims of environmental justice; that it can increase the sense of isolation experienced by victims because it focuses on a few plaintiffs rather than the broader interests of the community; and that legal victories do not automatically translate into long term effective monitoring to ensure that remedies are enforced. The conclusion of the report is that there is clear evidence that community leaders are learning how to effectively use ADR as a means of pursuing environmental justice (Consensus Building Institute 2003).

An assessment by the U.S. Commission on Civil Rights is not as favorable. The Commission has suggested that ADR may not serve to advance environmental justice because it does not address certain underlying power inequities. They state that ADR fails to provide for the equal exchange of information (as in litigation); fails to provide any structure for a legal precedent; focuses on individual disputes rather than larger patterns of inequity; and does not address the unique cultural concerns of many minority communities. The Commission points out that community groups do not have the same level of knowledge about technical (remediation) issues, have less experience with negotiation, and that ADR favors groups with more money and greater availability to technical resources. This may lead to situations where disadvantaged groups are coerced into settlements that are not in their best interests (USCOCR 2003). In answer to these charges, the EPA claims to have instituted certain safeguards to address the

power imbalance, such as allowing all parties to have a voice in the choice of third party neutrals, training on how to effectively participate in ADR processes, technical advice, and funding through Technical Assistance Grants.

Other ADR critics suggest points of view that echo the concerns of the Civil Rights Commission. Some are suspicious of ADR techniques, viewing them as largely cooperative and demobilizing for citizen groups (Amy 1987) or as another instance of interest group bargaining that does not actually promote broader public discourse (Landy, Roberts, and Thomas 1990). Some have also suggested that the George W. Bush administration may be promoting ADR in an insincere effort to calm and seduce environmentalists (O'Leary, Nabatchi, and Bingham 2005).

The scarcity of empirical data on ADR outcomes makes it difficult to draw firm conclusions on the extent to which these techniques further the cause of environmental justice. More work is needed to link ADR to objective environmental outcomes in disadvantaged communities to enable valid conclusions on this question.

B.10. Community Involvement (CI) at Superfund Sites

When CERCLA was first enacted, a strong community relations component was envisioned as an integral part of cleanup efforts, even though analyses of risk, available technologies, and costs posed many complex problems that the layperson could not easily understand. However, the political climate and the leadership in the EPA in the early 1980's under Reagan greatly diluted the strength of community relations efforts and participatory policies were substantially downgraded (Sirianni and

Friedland 1995). The approach at the EPA remained very much a “top-down” one, where citizens could comment and advise, but had no decision-making power. In dealing with community residents, EPA officials often behaved defensively to avoid causing further alarm or creating additional government liability through admissions of the degree of environmental danger. Information was often withheld or presented in unnecessarily technical terms, fueling the mistrust, dependence, and anger among local residents (Sirianni and Friedland 1995).

With the passage of SARA in 1986, community relations policies were strengthened. SARA required public input into the selection of all cleanup plans through meetings and comment periods. It also required EPA staff to publicly explain the range of possible cleanup alternatives, justify alternatives chosen, and consider comments, criticisms and new data submitted by the public (Sirianni and Friedland 1995).

EPA public documents indicate that the agency sees itself as having gone from simply providing information to the public in 1980, to listening to public comments in 1986, to actually involving the public in decision-making in 1994. However, some still feel that community relations at the EPA falls considerably short of the desired level of public participation. Sirianni and Friedland (1995) contend that as long as innovative aspects of EPA community relations are discretionary and under-funded, staff will tend to focus attention on communities that are the most vocal.

In environmental disputes, giving a voice to members of a contaminated community is highly important for a number of reasons. The inclusion of public values into

decision-making is a key component of democracy. Lack of inclusion can be a driving force behind challenges to authority. Biederle and Cayford (2003) points out that there are often significant differences in opinion and risk perception between lay citizens and experts and that public participation is widely viewed as increasing the quality of environmental decision-making. Community members can also provide important information, identify mistakes, and generate creative solutions that lead to broader community satisfaction (Biederle 2003). From a practical perspective, community residents can help greatly in identifying PRPs due to their familiarity with the history of the area and of the site.

Some communities have more difficulty than others in becoming engaged in a collective action process. Petrie (2006) found that sites with a greater percentage of racial and ethnic minorities are less likely to participate in remediation decisions, while low income communities were more likely to participate in remediation. Effective participation in environmental decision-making requires the parties to be well informed about the issues and able to clearly voice their concerns about potential risk. In disadvantaged communities, communication may be difficult due to cultural and language differences, thereby engendering mistrust to and misunderstandings. Participation may also be impeded by an inability to grasp the complex jargon and data inherent to environmental issues. Members of such communities may have insufficient time and resources (such

as childcare, release from work, and transportation) to enable participation. However, at least one study reported that poverty tended to make community involvement in administrative decision making more probable (Stephan 2005).

B.10.a EPA Programs to Promote Community Involvement

To address the need for public input, the EPA developed programs to increase stakeholder involvement and to promote participatory decision-making. The EPA operates a Community Involvement Program within the Office of Solid Waste and Emergency Response (OSWER). This program manages the use of dispute resolution professionals to assist the participation of the affected public in EPA decisions, particularly relating to Superfund site remediation. A variety of initiatives are supported by the Community Involvement Program, including the availability of facilitation or mediation services on a “just-in-time” basis to address specific site problems or general concerns about the Superfund program (EPA 2000a).

The EPA uses a Community Involvement Plan to detail how the remedial team will involve the community and what the community’s role will be at each step in site remediation (EPA 2008). Along with traditional strategies such as public notices, public hearings, and ongoing community outreach, EPA encourages the development of Community Advisory Groups (CAGS) at certain Superfund sites and funds local initiatives through Technical Advisory Grants (TAGS). TAGS can be in amounts up to \$50,000 to allow communities to hire independent experts to help them interpret technical data.

B.10.b Effect of Community Involvement on the Remediation Process

Community involvement is generally seen as beneficial in producing higher quality outcomes. Many case studies report increased community satisfaction as a result of inclusion within the Superfund decision-making process (EPA 1999). Community pressure affects the degree to which the EPA takes action to place a site on the NPL and the adoption of stringent remediation approaches (Hamilton and Viscusi 1999). Daley (2007) reports that when controlling for other factors, the EPA is more likely to choose health protective clean-up approaches when CAGs and TAGs have been formed at Superfund sites.

Charnley and Englebert (2005) studied the outcomes of Superfund's Community Involvement Program. Their findings were mixed, but in general, community members who were most informed about and involved in the cleanup process at Superfund sites were also the most satisfied with the community involvement process and the job that EPA was doing in cleaning up the site. The EPA acknowledges that further evaluation of its community involvement activities is needed (EPA 2001).

However, some researchers have found that that public involvement at Superfund sites can also be associated with decreased remedial progress and less desirable forms of cleanup (Daley and Layton 2004; Petrie 2006). This is thought to be largely due to differences in opinion among community members leading to conflict and the

disintegration of community relations (Shriver and Kennedy 2005). The emergence of contentious community factions may contribute to less effective cleanup as disputes linger for many years.

In relation to ADR, community members who took part in collaborative environmental dispute settlement processes felt that they had used their resources more effectively than they would have if more adversarial approaches had been undertaken (Crowfoot and Wondolleck 1990). They believed that their organizations and their personal skills had been strengthened and that doors had been opened for continued dialogue with industry. In several of the case studies reviewed, community participants gained a role in implementing and monitoring the final cleanup decisions (Crowfoot and Wondolleck 1990).

C. METHODOLOGY

This research was aimed at understanding the way in which community sociodemographic characteristics influence the use of ADR/CI versus settlement/litigation in the Superfund remediation and enforcement processes. ADR and CI are both considered non-adversarial dispute resolution tactics as compared to traditional mechanisms (settlement/litigation). ADR and CI are looked at together because both involve higher levels of community participation and input as compared to settlement or litigation.

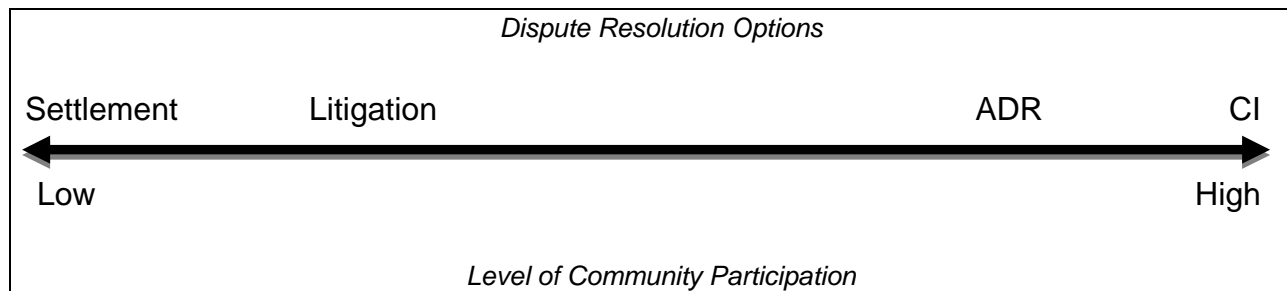


Figure: 1 Continuum of EPA Superfund Site Dispute Resolution Options

By examining the relationship between the sociodemographic profile of Superfund communities and the type of dispute resolution, I seek to answer the following question: Does the class or race of Superfund site residents affect the likelihood that ADR/CI will occur during the site cleanup and enforcement processes?

Hypothesis 1. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with high poverty levels than in those with low poverty levels;

Hypothesis 2. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with higher minority representation than in those with lower minority representation;

Hypothesis 3. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with more single parent households than in those with less single parent households;

Hypothesis 4. ADR/CI, as opposed to settlement/litigation, is less likely to occur in Superfund communities with less formal education than in those with more formal education.

As discussed earlier, the rationale for these hypotheses is based on behavioral expectations of both the EPA and community residents. ADR/CI may be initiated or encouraged by either the EPA or by community activists. In high minority, low income areas with low political power, EPA bureaucrats may have lower motivation to seek the active involvement required by ADR/CI and may tend to reach settlement with PRPs more easily.

In relation to community initiated actions, ADR/CI requires disputants to possess various organizational and political skills (making timely phone calls, getting ADR/CI regional specialist involvement, getting sponsorship from Regional Counsel, and ultimate approval from EPA officers); it is unlikely that communities with depressed socioeconomic status or higher minority populations in historically disadvantaged situations will have the time or financial resources to accomplish the steps required to initiate and follow through with ADR/CI initiatives (USCOCR 2003). In addition, such communities may have difficulty understanding technical documents due to low educational levels.

To answer the research question, I downloaded the EPA's CERCLIS file as of November 2007, geocoded it to identify the census tract in which each site was located, and joined it with sociodemographic data from the Census 2000 file. This allowed me to know the census tract for every site within CERCLIS, the sociodemographic profile of the census tract, and to analyze the relationship between the dependent variables and these characteristics. To reiterate, CERCLIS contains sites that have been prioritized for cleanup as well as potentially hazardous sites requiring preliminary investigation. EPA removes sites from active status within CERCLIS when the site is designated as *No Further Response Action Planned* (NFRAP). Information for CERCLIS is provided primarily by the regional program offices, through a Regional Information Management Coordinator.

While the entire CERCLIS database was initially downloaded, only a subset of CERCLIS was used in this research. The records analyzed included only those relating to sites where remediation/enforcement had actually occurred. For these records, analyses compared sites where ADR or CI occurred to sites where settlement or litigation was used (n=2,454). As noted, many of the sites within CERCLIS did not include any of these variables (ADR, CI, settlement or litigation) resulting in their exclusion from these analyses. This could be due to a number of reasons, including the possibility that they are orphan sites with no identifiable PRPs, because they are too early in the process, or because there are other unknown factors leading to inaction.

C.1. Data

C.1.a Accessing and Geocoding the EPA Superfund Data

The CERCLIS database as a whole contains over 12,000 active or archived Superfund sites. All historic and current Superfund data are publicly available. The complete database was downloaded and received in the form of 50 separate database files. These files can be used with any database management software, including Microsoft Access and SPSS.

Within these 50 database files, the “site” file contains all geographic Superfund site information. It includes the site’s name and address, including street, city, state and 5-digit zip code as well as various other geographic-type variables (congressional district,

USGS Hydrocodes, etc). This file was used to establish each site's census tract location using a batch geocoding process available through the company Teleatlas (www.geocode.com).

Teleatlas is a highly reputable company used by the US Census Bureau to establish census tract location information for individual addresses. Teleatlas' batch geocoding process uses geographic information system techniques to establish census tract location from a street address. Using the street address is the desirable way to conduct a geocoding process. Yet, if a street address fails to match, then the batch geocode process uses a secondary method to estimate the census tract using what is referred to as a zip code centroid. Although this is less accurate, the centroid method takes into account relative population loads within a given zip code and establishes what is referred to as a "balance point". The location of this balance point corresponds with the census tract that is assigned to the record. If there is a failure to code at the zip code level using the aforementioned centroid process, then no coding is completed for the record.

Overall, the geocoding matching process was successful with only six percent of the file failing to match. All Superfund addresses (12,071 records) were uploaded into the Teleatlas system and evaluated using the batch coding method. Table one shows the outcome of the Teleatlas geocoding process completed on the EPA's file that contains the Superfund site geographic information.

Table 1: Geocoding Match Types of Superfund Site Geographic Data

	(n=12,071)
Street address match	42%
Centroid match	52%
Failure to match	6%

C.1.b Accessing ADR Information by Superfund Site

Additional information within CERCLIS allows one to determine what types of actions were taken at a given site. The “action” file shows every type of action completed during a site’s life course through the Superfund program. ADR is an example of an action documented in this file. Other actions of interest include CI and various forms of litigation and settlement. By creating Microsoft Access queries, one can work within the action file to isolate the actions of interest. The action file was used to create the dependent variable for use in subsequent statistical testing. The dependent variable for this research was created in a binary fashion using several site actions.

Table 2: Dependent Variable Definitions²—Community Involvement (Code=1)

<i>EPA Action Code</i>	<i>EPA Action Code Title</i>	<i>EPA Action Code Definition</i>
CR	Community Involvement	The community relations activities, i.e. plan, implementation and responsiveness summary that must be completed at a site to address community concerns.

² Carol Quinn from the EPA CERCLIS Database department was contacted to provide additional clarity on all Superfund site actions.

Table 3: Dependent Variable Definitions—Alternative Dispute Resolution (Code=1)

<i>EPA Action Code</i>	<i>EPA Action Code Title</i>	<i>EPA Action Code Definition</i>
AD	Alternative Dispute Resolution	Decision to take cost recovery action by use of Alternative Dispute Resolution (ADR) including mediation, arbitration and mini-trial.

Table 4: Dependent Variable Definitions—Litigation (Code=0)

<i>EPA Action Code</i>	<i>EPA Action Code Title</i>	<i>EPA Action Code Definition</i>
SV	Section 107 Litigation	Judicial referral under S107 to recovery from Potentially Responsible Parties (PRPs)
SX	Section 106 Litigation	Judicial referral without settlement to compel Potentially Responsible Parties (PRPs) to do response work. Referral can also seek compliance with a previous settlement or order.
LT	Litigation (Generic)	This activity is used to code referrals for litigation that cover any combination of remedies or statutes (CERCLA, SARA, RCRA) not reflected in the conventional activity types of SX (Section 106), SV (Section 107) CL (combined 106/107, and SF (Section 104). If preferred, this activity can be used to code all referral types instead of using the conventional SX, SV, CL, SF codes. Because this activity is generic, coding the statutes (statute) and the remedy types (remedy) correctly is mandatory. All other edit checks and coding requirements that apply to SX, SV, CL, and SF apply to LT as well. Examples: action=LT, statute=106, remedy=RA is equivalent to SX; action=LT, statute=107, remedy=VA is equivalent to SV; action=LT, statute=106,107, remedy=VD, RA is equivalent to CL; action=LT, statute=104, remedy=SE, DE is equivalent to SF; action=LT, statute=104, 107, 106, remedy=DE, VM, RD, RA, is a combination not covered by SX, SV, CL, SF.

Table 5: Dependent Variable Definitions—Settlement (Code=0)

<i>EPA Action Code</i>	<i>EPA Action Code Title</i>	<i>EPA Action Code Definition</i>
CD	Consent Decree	Judicial agreement between the Federal government and the Potentially Responsible Parties (PRPs) fully or partially settling a claim under CERCLA. This agreement may settle litigation or may be presented concurrently with the complaint (achieved through negotiations). The agreement may be for response work, cost recovery, or both.
CA	Consent Agreement (Administrative)	Informal agreement used to initiate Potentially Responsible Party (PRP) response or cost recovery.
SD	State Consent Decree	Judicial agreement between a State and the potentially Responsible Parties (PRPs) fully or partially settling a claim under CERCLA. The settlement may be for response work, cost recovery, or both.
UA	Unilateral Administrative Order	Administrative order issued by EPA unilaterally (under Section 106 of SARA). Unilateral orders can compel Potentially Responsible Parties (PRPs) to conduct removal, remedial investigation/feasibility study, remedial design/remedial action, and may include cost recovery. Commonly abbreviated UAO.
AC	Administrative Order On Consent	A voluntary and enforceable agreement pursuant to CERCLA, signed by EPA and Potentially Responsible Parties (PRPs), whereby the PRPs agree to perform and/or pay for some or all of the response costs involved in site cleanup. The order describes the PRP response to be taken at a site, stipulated penalties, indemnification, effective date, and may be subject to public comment. It can be for removal, Remedial Investigation/Feasibility Study (RI/FS), Remedial Design (RD), and Remedial Action (RA), pre-SARA; but only removal and RI/FS, post-SARA.
ST	Settlement (Generic)	This action is used to code settlements that cover any combination of specific enforcement related settlements.

In this analysis there are 535 Superfund sites having at least one documented ADR or CI and 1,919 sites having at least one documented litigation or settlement action. Once these actions were isolated within Microsoft Access queries, the ADR information was integrated with the geocoded file.

C.1.c Incorporating Census Tract-Level Demographics into the Geocoded File

This research incorporates census tract-level demographic information related to each Superfund site location. Demographic data was garnered from two sources: the 2000

US Census summary file three (Census 2000) and the Public Health Disparities Geocoding Project Monograph (PHDGPM) (Krieger, Waterman, Chen, Rehkoph, and Subramanian 2000). Using SPSS syntax developed by the Interuniversity Consortium for Political and Social Research (ICPSR), the US Census data was incorporated (USDOC, Bureau of the Census 2002). Census tract-level poverty data are publically available via the PHDGPM. The PHDGPM provided a text file with the proportion of poverty (based on the 2000 US Census) for each of country's approximately 65,000 unique census tracts.³ The incorporation of census-tract demographic information creates a demographic profile corresponding to each Superfund site.

C.1.d Variables Used for Analysis Purposes

The goals of this research were to establish the sociodemographic characteristics of communities where the EPA has used non-adversarial dispute resolution tactics in the context of Superfund site remediation. Therefore relevant variables were selected based on ADR/CI and EJ literature. The EJ literature shows that racial minorities, people who live in urban environments, and those with lower socioeconomic status are more likely to live in contaminated communities (Bullard, Mohai, Saha, and Wright/UCC 2007). For this reason, minority status, urbanization level, and poverty status are included in the analysis.

³ This work was funded by the National Institutes of Health (1R01HD36865-01) via the National Institute of Child Health & Human Development (NICHD) and the Office of Behavioral & Social Science Research (OBSSR). Copyright © 2004 by the President and Fellows of Harvard College - The Public Health Disparities Geocoding Project.

Specifically in the context of Superfund sites, community power is noted as a factor in how the EPA prioritizes one site's cleanup over another (O'Neil 2005). For this reason, single parenthood and educational attainment are also included as independent variables as they are often associated with community power. The educational attainment variable looks at community members who have less than a high school education.

The EPA administers the Superfund program regionally. There are standard practices related to dispute resolution in all 10 EPA regions yet, there is considerable management freedom when it comes to dispute resolution specifics. Therefore, the 10 EPA regions are included within the analysis model.

Table 6: Variable Calculations

*Independent Variables**

1. Minority Status: Proportion of residents who are non-White (African American, Asian/Pacific Islander, Native American, Other)
Source: 2000 US Census
Variable Calculation: $(P6_1 - P6_2)/P6_1$
2. Urbanization Level: Proportion of residents who live in an urban setting (compared to a rural setting).
Source: 2000 US Census
Variable Calculation: $P5_2/P5_1$
3. Poverty Status: Proportion of residents who live in poverty.
Source: PHDGPM
(no calculation necessary)
4. Educational attainment: Proportion of residents with less than a high school degree (GED). Source: 2000 US Census
Variable Calculation: $(P37_3 + P37_4 + \dots + P37_10 + P37_20 + \dots + P37_27)/P37_1$
5. Single Parenthood: Proportion of residents who are single parents (mothers or fathers) with children under the age of 18 years.
Source: 2000 US Census
Variable Calculation: $(P12_9 + P12_27 + P12_9 + P12_12)/P12_1$
6. EPA Region: Regions are 10 groups of states defined by the EPA.
Source: EPA
Variable Calculation: Dummy variables created for each of the 10 regions.

*Dependent Variable**

1. ADR/CI vs. Settlement/Litigation: The EPA used ADR or community involvement dispute resolution techniques in an effort to resolve Superfund-related conflicts=1. The EPA used litigation or settlement in an effort to resolve Superfund-related conflicts=0. (See tables 2-5 for specific variable definitions)
Source: EPA (no calculation necessary)
- * (USDOC/Bureau of the Census 2002)

D. RESULTS

Means (incidence calculations) and standard deviations of all variables in the analysis are presented in table 7. Educational attainment, single parenthood, minority status, poverty status, and urbanization level are incidence calculations with a possible range of 0 to 1. Twenty-three percent of Superfund communities have less than a high school education (s.d.=0.13), 10 percent of Superfund community households are led by single parents with children less than 18 years of age (s.d.=0.07), 24 percent of Superfund communities are represented by people classified in minority groups (non-White) (s.d.=0.26), 15 percent of Superfund communities are living in poverty (s.d.=0.12) and 77 percent are in cities (s.d.=0.36). The series of dummy variables that addresses the EPA region where a Superfund-community is located are coded according to the details in table 4. The 10 EPA regions vary in the proportion of the country that they represent and, in total, 100 percent of the country is represented within these ten regions. Twenty-two percent of sites used ADR/CI, while 78 percent used settlement/litigation to resolve Superfund-related disputes.

Table 7: Means and Standard Deviations of Variables in the Analysis (n=2454)

Independent Variables	Overall Mean (Incidence)	Overall SD	ADR Mean (Incidence)	Settlm't/ Litigat'n Mean (Incidence)
1. Minority Status – Source: US Census <i>(Incidence of minorities – African American, Asian-Pacific Islander, Native American, and other)</i>	24%	0.26	18%	26%
2. Urbanization level – Source: US Census <i>(Incidence of urban vs. rural local)</i>	77%	0.36	73%	79%
3. Poverty Status – Source: PHDGPM <i>(Incidence of poverty)</i>	15%	0.12	13%	15%
4. Educational Attainment – Source: US Census <i>(Incidence of people with less than high school graduate)</i>	23%	0.13	20%	24%
5. Single Parenthood – Source: US Census <i>(Incidence of single parent households w/kids less than 18 years)</i>	10%	0.07	9%	11%
6. EPA Region (series of dummy variables) – Source: EPA				
Region 1: (1=ME, MA, RI, CT, VT, NH)	6%	0.24	7%	6%
Region 2: (1=NY, NJ)	11%	0.31	7%	12%
Region 3: (1=PA, WV, VA, DE, MD, DC)	13%	0.33	12%	13%
Region 4: (1=KY, TN, NC, SC, MS, AL, GA, FL)	16%	0.37	6%	19%
Region 5: (1=MN, WI, MI, IL, IN, OH)	23%	0.42	22%	23%
Region 6: (1=NM, OK, TX, AR, LA)	7%	0.25	10%	6%
Region 7: (1=IA, NB, KS, MO)	9%	0.29	16%	7%
Region 8: (1=ND, SD, MT, WY, UT, CO)	5%	0.22	10%	4%
Region 9: (1=HI, CA, NV, AZ)	7%	0.25	6%	7%
Region 10: (1=AK, WA, OR, ID)	3%	0.18	4%	3%
Dependent Variable				
1. ADR/CI vs. Settlement/Litigation – Source: EPA <i>(1=ADR/CI;0=settlement/litigation used in dispute resolution)</i>	22%	0.41	NA	NA

Binary logistic regression is used to test the hypothesis that ADR/CI is less likely to occur in communities with a higher incidence of minority populations and those with

higher poverty rates as related to resolution of Superfund-related disputes. The model as a whole is significant at a $p < 0.01$ level. The results of the binary logistic regression are presented in table 8.

Table 8: Binary Logistic Regression Coefficients (Likelihood of Using ADR/CI to Resolve Superfund-Related Disputes)

	Odds of Using ADR/CI
Minority Status – Source: US Census <i>(Incidence of minorities – African American, Asian-Pacific Islander, Native American, and other)</i>	-0.333 (.316)
Poverty Status – Source: PHDGPM <i>(Incidence of poverty)</i>	0.147 (.846)
Single Parenthood – Source: US Census <i>(Incidence of single parent households w/kids less than 18 years)</i>	0.103 (.936)
Urban level– Source: US Census <i>(Incidence of urban vs. rural local)</i>	-0.229 (.115)
Educational Attainment – Source: US Census <i>(Incidence of people with less than high school graduate)</i>	-1.879 (.002)**
EPA Region 1: (1=ME, MA, RI, CT, VT, NH)	0.021 (.948)
EPA Region 2: (1=NY, NJ)	-0.620 (.049)*
EPA Region 3: (1=PA, WV, VA, DE, MD, DC)	-0.086 (.771)
EPA Region 4: (1=KY, TN, NC, SC, MS, AL, GA, FL)	-1.060 (.001)**
EPA Region 5: (1=MN, WI, MI, IL, IN, OH)	-0.036 (.898)
EPA Region 6: (1=NM, OK, TX, AR, LA)	0.754 (.016)*
EPA Region 7: (1=IA, NB, KS, MO)	0.712 (.015)*
EPA Region 8: (1=ND, SD, MT, WY, UT, CO)	0.797 (.012)*
EPA Region 9: (1=HI, CA, NV, AZ)	0.104 (.759)
Constant	-0.660 (.022)*
-2 log likelihood	2406.501
N	2454
R ²	0.101

*Statistical significance at $p < 0.05$

**Statistical significance at $p < 0.01$

Although the results (table 8) do not show statistically significant support for either hypothesis I, II, or III they do show that when controlling for the effects of poverty status, single parenthood, minority status, urbanization level, and EPA region, communities with a higher incidence of people with less than a high school education are 1.9 times

less likely to live in a Superfund-community where ADR/CI was used to resolve Superfund-related disputes (hypothesis IV). This difference is statistically significant at the 0.01 level.

Other significant predictors of ADR/CI use when compared to settlement/litigation usage include being located in EPA region 6, 7, or 8. Communities located in region 2 and 4 are less likely to use ADR/CI when resolving Superfund-related environmental disputes. Urbanization level, minority status, and family structure are not significantly related to the odds of ADR/CI use once the other variables in the analysis are taken into account.

Since there were significant findings in EPA regions 2, 4, 6, 7, and 8, further analysis was completed within regions to ascertain whether or not the statistically significant education attainment finding remained. This was not the case. Within regions, most (if not all) statistically significant findings were not present. This indicates that the independent variables included in the model do not explain the variation within EPA regions. Further study should be conducted to understand why some EPA regions are more (or less) predisposed to ADR/CI usage in Superfund site dispute resolution.

E. DISCUSSION

Race and class are pervasive themes within the current EJ literature. This suggested that race and class were variables that should logically be studied at the intersection of ADR and EJ. For this reason, race and class comprised the main focus of my stated hypotheses. The analyses conducted do not support the stated research hypotheses. This shows that although minority and lower class communities are more likely to live in contaminated areas, to experience a lower quality cleanup process, and to receive fewer federal cleanup dollars (Bullard, Mohai, Saha, and Wright/UCC 2007; O'Neil 2005), I cannot conclude that the dispute resolution processes studied here are contributing to such environmental injustices. Minority status and poverty levels do not impact the likelihood that the collaborative dispute resolution methods studied here will occur.

Although the analysis did not support hypothesis one, two, or three, the significant finding related to educational attainment (hypothesis 4) is notable. Communities with low levels of educational attainment (less than graduating from HS) could face the same types of limited power and disadvantage as those historically associated with issues of race and class. According to the Collective Interest Theory as related to environmental activism, it is known that people will act collectively if they believe in the benefits, feel that they can actually influence outcomes, and feel that the benefits of participation outweigh the costs (Lubell 2002). Communities with low educational attainment could

be less likely to become involved in community activism because they are unable to satisfy some or all of the aforementioned collective interest theory characteristics.

The findings presented by the US Commission on Civil Rights cautioning the use of ADR in disadvantaged communities (USCOCR 2003) may not relate only to the stereotypical disadvantages associated with race and class. Lack of education is an important additional characteristic of a disadvantaged community. Low levels of educational attainment may be the paramount disadvantage to be overcome related to the use and successful implementation of ADR techniques. This is consistent with the finding by the US Commission on Civil Rights that disadvantaged communities are unlikely to use technical data or research to help them participate in community-level actions (USCOCR 2003).

Communities with less formally educated residents may be unable to complete key steps needed to bring alternative forms of dispute resolution into their communities and/or may be unable to actively support such processes during the time that they are carried out. ADR and CI are both dispute resolution actions that require community activism for maximum benefit. Conversely, litigation and settlement require little or no community activism to accomplish dispute resolution. ADR and CI program initiation and subsequent administration often require not only EPA support and initiative but also the involvement of communities themselves as active participants in the entire process from start to finish.

F. RECOMMENDATIONS

Non-adversarial dispute resolution has a strong, positive, and easily recognizable following according to the reviewed literature. Yet, there are real and important concerns related to implementation in disadvantaged communities. The US Commission on Civil Rights notes the importance of ADR specifically but cautions implementers, highlighting the need for trained experts to act as community advocates in order to prevent the scales from tipping towards the more powerful or savvy party—almost never the community recovering from toxic exposure (USCOCR 2003).

Without the aid of trained professionals, ADR in dispossessed communities can actually decrease the urgency of the dispute and ineffectively manage details (Delgado 1988). Without competent expert involvement, communities could end up in an unbalanced situation where the collaborative/participatory aspects of ADR/CI can become less beneficial and, instead, end up favoring parties based on financial and prejudicial characteristics (USCOCR 2003).

Despite this, there is a plethora of positive and encouraging information in the literature about the use of ADR/CI when resolving toxic exposure disputes. The EPA has taken a positive step toward using ADR/CI as a participatory approach in its toxic dispute resolution efforts (Consensus Building Institute 2003). Yet, implementation needs to be

done with care and active expert participation. The positive benefits of ADR will be lost if dispossessed communities are left to manage on their own without the advice and social justice work of experts.

G. LIMITATIONS, FUTURE RESEARCH, AND CONCLUSIONS

Valid outcomes from this research depend on an accurate understanding of the sociodemographic profile of the community in which each Superfund site is located. The methodology used assumes that the census tract location of the Superfund site will provide an appropriate level of detail to describe the community's profile. This method is considered appropriate and reputable, yet there are other methodologies that use distance-based (Bullard, Mohai, Saha, and Wright/UCC 2007) rather than census tract analysis methods. Redoing this project using distance-based methods could further inform the results of this project, including assuring that the sociodemographic profiles of Superfund communities are as accurate as possible.

This research doesn't allow me to make a value judgment on the benefits of using collaborative dispute resolution techniques in the context of Superfund. It relies in part on an acceptance of the literature stating that collaborative dispute resolution tactics are beneficial within communities when implemented responsibly. In the future, it would be valuable to conduct a qualitative study to examine more closely how sites are chosen for ADR/CI at the administrative level. This could be accomplished by conducting interviews among EPA regional coordinators. Through a guided discussion, additional factors affecting ADR/CI usage may come to light.

There are also various questions related to ADR/CI implementation that would provide useful information about how the use of ADR/CI impacts communities. Conducting case-study research in a Superfund community could help answer some of the

questions that remain following the completion of this analysis. For example, analyses specifically targeted at understanding how educational attainment impacts the likelihood of ADR/CI use in communities would help to explain these research findings further. Understanding EJ concerns and working towards their solutions is an extremely important endeavor for residents of disadvantaged communities living near toxic waste sites and for all others who care about such issues. Not only is it important to understand the extent and causes of disparities in exposure, it is also paramount that researchers, policy makers, and community leaders work together to come up with practical approaches that will allow governments and communities to work together to create healthy environments for all.

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