

Waste Management and Risk Assessment: Environmental Discrimination through Regulation ¹

Abstract: Despite conflicting views as to the cause, there is a wealth of evidence that poor people and residents in communities of color bear a disproportionate burden of toxic contamination. This article examines some of the mechanisms built into the U.S. regulatory system, and in particular through the use of quantitative risk assessment, that may contribute to this disproportionate social impact. The difference between environmental equity and environmental justice as policy goals is made clear, with implications considered for fair-share allocation and toxic use reduction as competing policy goals. Additional proposals for reform are considered, as suggested by the local activists themselves who are involved with struggles over hazardous waste facility location and toxic chemical clean-up efforts.

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Abundant evidence suggests that poor people and residents in communities of color tend to bear a disproportionate burden of toxic contamination, through the generation as well as the management of hazardous and solid wastes (e.g., Bowen, Salling, Haynes, and Cyran, 1995; Bryant and Mohai, 1992; Bullard, 1990; Goldman and Fitton, 1994; Hamilton, 1995; Lavelle and Coyle, 1993; Lazarus, 1993; and Perlin, Setzer, Creason, and Sexton, 1995). This is an outcome that the 1987 United Church of Christ (UCC) report on toxic waste and race concluded was not due to mere coincidence, but rather the result of what then-project director Benjamin Chavis termed "environmental racism" (United Church of Christ Commission for Racial Justice, 1987).²

This article begins with a brief introduction to the genesis of a local resistance to environmental contamination, and an assessment of the success of the grassroots effort to prevent waste facility location. It then considers the widely adopted practice of quantitative risk assessment by regulatory agencies as a means to secure public confidence in standard setting and siting decisions. Portraying the response of risk assessment as, in part, a quest for social accord, I suggest how the very tools now used through the regulatory system may contribute to a disproportionate social impact from environmental policy decisions. This is a possibility so far overlooked in the environmental racism debate. From there I will address the measures for reform leading to environmental justice put forward by the toxic victims themselves. En route, I intend to

challenge the language that we use to describe environmental injustice, for our conceptualization of the problem has a major bearing on the solutions proposed.

The Grassroots Movement for Environmental Justice

The modern environmental awakening began with the publication of Rachel Carson's book, *Silent Spring*, in 1962 (Carson, 1962). It was only in the wake of that exposition, documenting the ubiquitous spread of pesticides throughout the ecosystem and in the food chain, that the middle class finally awoke to the contamination in their own lives, thereby forging a powerful constituency for environmental protection. Yet degradation had already been occurring for decades earlier, in the run-down industrial sectors of our inner cities, among the denuded landscapes and impoverished peoples of Appalachia, in the factories and on the farms, and in other places where the materially disadvantaged work and also live.

Few in the liberal environmental movement that emerged in the 1960s were capable of making the critical connection between the operation of a competitive production system under private control, where capital and energy are freely substituted for labor in the quest for profit, and the introduction of thousands of toxic byproducts and millions of tons of pollutants to which the regulatory agencies, and the liberal environmental movement itself, could only respond and dare not challenge for control. In short, most participants in the mainstream, liberal environmental movement were not even ideologically aware that their own defense of residential and recreational consumption space against the negative externalities of free-market capitalism was itself a manifestation of contradiction inherent in that system, the solution to which would require structural change of a magnitude that the liberal environmental movement could not, and still cannot, accept (Heiman 1988).

Organized concern with working-class environmental contamination dates back at least to the 1890s when Alice Hamilton and Jane Adams led the push for industrial health reform through the Hull House in Chicago (Gottlieb, 1993). The toxic victims themselves picked up the fight in the 1920s through the trade union movement. Today, while concern about contamination of consumption, or residential, space is significant, the grassroots agenda remains more pressing than that of the liberal environmental movement because much of the working class continues to reside as well as work among the contamination. As a result, their personal stake is greater and the connections between production and consumption, between environmental regulation and the threat of job loss, and between the social and the environmental externalities of industrial capitalism, are better understood than is common among the mainstream environmental movement (Chavez, 1993; Gottlieb, 1993; Krauss, 1993; Schwab, 1994).

Beginning in the 1980s there emerged a growing and vibrant grassroots environmental activism in many rural and urban working-class communities. This occurred, for example, in Niagara Falls among homeowners seeking compensation for injuries attributed to Hooker Chemical's waste at Love Canal, in the San Joaquin Valley of California where the Farmworkers Union is still organizing against pesticide

contamination in the fields as well as where the workers reside, and throughout the rural South where African American and Native American peoples began to unite with their poor white neighbors to prevent the dumping of toxic waste in what the chemical industry and state bureaucracies had mistakenly taken for apathetic communities. Supported at the national level by such organizations as the Environmental Health Network, the Citizens Clearinghouse for Hazardous Waste (or CCHW--founded by Lois Gibbs of Love Canal fame), the Greenpeace Toxics Campaign, and Native Americans for a Clean Environment, these local grassroots groups now number in the thousands.³ Collectively they constitute one of the fastest-growing social efforts in America since the Civil Rights Movement of the 1960s. Indeed, for the many people of color involved, the grassroots movement for environmental justice is the logical, moral, and tactical heir apparent of that earlier effort.

By and large, this grassroots environmental movement arises in lower-income, working-class, urban neighborhoods already impacted by toxic chemical contamination from nearby factories, and in rural areas targeted as sites for new hazardous and solid waste treatment and disposal facilities. Most of the movement's leaders are women, and usually homemakers. They are motivated to act by perceived threats to their families' health and safety, as well as by a rising frustration with the disenfranchisement they were experiencing in the public, and clearly patriarchal, political arena (Krauss, 1993). As demonstrated at the Love Canal and Forest Glen Superfund sites in Niagara Falls, at Revielltown, Louisiana, at the Baytown, Texas Exxon refinery, and at dozens of similarly contaminated communities, the women gathered the original health data themselves. Often rebuffed by the scientific community and industry as providing non-controlled "hysterical housewife" data, their surveys and persistent lobbying actually led to the official documentation justifying their original concerns at the vast majority of federal Superfund sites subsequently uncovered (Gibbs, 1993; Levine, 1982).

For these local victims, their homes are no longer the physical and psychological refuge from the onslaught of industrial production (see Heiman, 1988, pp.10-15, 188-191). As a result, they feel threatened, stigmatized, and even betrayed, for the implicit pact made by labor with capital, whereby lack of control in the sphere of production would be compensated for by greater control in one's sphere of consumption or residence, is now collapsing. Poisoned at home and at work by the same industrial processes, the local activists are developing a good grasp of the critical connection between capital intensification, job loss, workplace hazards, and residential contamination (Gibbs, 1993; Krauss, 1993; Schwab, 1994). As a result, they often are willing to aggressively challenge conventional regulatory and political systems. The consequence is that they usually take an uncompromising, non-negotiation stand, on siting proposals.

For the past decade I have been busy as a participant in, and an advisor for, this grassroots movement for environmental justice. The movement represents an effort by residents to gain some control over the many attempts now underway to site hazardous and solid waste management facilities in low-income, working-class communities, often communities of color. It has been my experience that the activists today are moving away from negotiation over a specific facility siting or over a tightening of pollution emissions

into their communities, toward a demand for up-front pollution prevention and, by implicit extension, toward a challenge for control over the decision to pollute in the first place. The agenda is captured by their rejection of the NIMBY (or Not in My Backyard) label commonly conferred on them by industry and public officials, and their embrace, ever more common, of a NIABY (or Not in Anybody's Backyard) solidarity (Heiman, 1990).

This is not just wishful thinking on my part. I have seen it time and time again at grassroots conferences and strategy sessions. Here the local participants are joining together with residents from other targeted communities to adopt platforms calling for a cessation of the offending activity and for up-front source reduction. They are rejecting the negotiation, compromise, and compensation strategies proffered in a divide-and-conquer attempt to force a community to the bargaining table (Heiman, 1990; Schwab, 1994). In short, the grassroots movement for environmental justice represents a populist challenge to exclusive private control of production decisions, because the pollution prevention sought ultimately requires some form of production control.

In the interim, and short of democratic control over the means of production, the grassroots NIABY campaign has had a modest impact. For example, over the past twenty years, the price for commercial hazardous waste disposal has dramatically risen in response to tighter regulations, liability protection requirements, and limited licensed management options, all trends furthered by local resistance to siting proposals (Dowie, 1995, pp. 133-135). Nationally, among approximately one hundred applications for off-site commercial hazardous waste landfills and incinerators subject to state and federal regulation in the 1980s, only a few managed to get past grassroots resistance (Gerrard, 1994, p. 10; Heiman, 1990). The result has been that most major industrial generators are now committed in word, if not yet in deed, to reductions of anywhere from fifty-to-ninety percent in the amount of toxic chemicals they release to the environment and this, in turn, has undercut the market for commercial waste management.⁴

Waste Management and Social Discrimination

Just who is being targeted for new waste repositories? A 1984 report contracted by the California Waste Management Board to identify the characteristics of communities least likely to resist the siting of waste incineration facilities offers a clue. Demonstrating that siting is ninety-nine percent politics and, at best, one percent science, Cerrell Associates identified the ideal community for locating these noxious facilities. In California, with its large Hispanic population, this would be rural and Republican, with a blue-collar work force engaged with resource extraction or heavy polluting industry and a population that is non-native English-speaking, low-income, with very limited formal education, and preferably Catholic (Cerrell Associates, Inc., 1984). When reduced to the essential class and race implications of this process, the report could have served as a blueprint for project developers and for the state and federal regulatory agencies charged with facility siting and regulation, given the then-existing geography of hazardous and solid waste facility location. Indeed, a 1983 study by the U.S. General Accounting Office demonstrated that a majority of large commercial hazardous waste landfills in the

Southeast already were located in rural low-income communities of color, for this region, African American. (U.S. GAO, 1983). The GAO observation was reaffirmed four years later by the landmark UCC study, which noted that three out of five Black and Hispanic residents in the United States lived in communities with one or more uncontrolled toxic chemical dumps--a social concentration, according to the report, that was virtually impossible to achieve merely by chance (United Church of Christ Commission for Racial Justice, 1987).

One might assume that siting proponents have learned from prior public relations blunders, such as the now-infamous Cerrell report. On the contrary, environmental discrimination continues today precisely because it is still the economically efficient and political rational outcome of a production system predicated upon private incentive and profit in a competitive market where production decisions are outside local control. In 1991, a report prepared for the Chatham County Board of Commissioners was released concerning the siting process for a "low-level" radioactive waste repository in the State of North Carolina. Here, through court discovery, the county's legal counsel uncovered a parallel siting process undertaken by the state's contractor for the project, which is designed to take radioactive waste from eight southern states (Farren, 1992). One procedure was above board and under state and public review. Following federal and state statute, the site would be chosen on technical grounds alone, considering such physical factors as hydrogeology, soil characteristics, and depth to water table. For the other agenda, hidden from public oversight, social and political site characteristics were paramount. For example, the public relations staff of the contractor, in an attempt to disperse public opposition and maintain the perception that the siting process was open and devoid of political and land-ownership criteria, proposed that more than a dozen sites in numerous counties be floated to the public for consideration, even though there were only five-to-seven under serious internal discussion. Moreover, as the 21 remaining sites eventually were narrowed to 2 finalists, the impressions recorded during a drive-by "windshield survey" of these sites by the economic development and public relations staff of the contractor appeared significant, for affluent areas and politically organized communities were systematically dropped from recommendation (Farren, 1992).

The following is a partial list of the 21 sites, with recorded staff disposition expressed at a meeting following the survey on whether or not to leave the site under consideration (Farren, 1992):

Site Consideration at Meeting Disposition

Coleridge "houses fairly wealthy" out
Snow Camp "fairly affluent" out
Cherry Grove "residences of site minority-owned" in
Farmington 1 "fairly affluent" out
Gold Hill 1 "dynamite company--explosives/ munitions" out
Gold Hill 3 "very depressed area" in
Watson "poultry operations--impressive--Holly Farms" "some new homes--affluent" ⁵ out
Ghio "trailers everywhere" "forecloses then resells" "distressed county" in

Marston "distressed area" "buffer would have to be in game land" (which violates state criteria) out

Hoffman "distressed area" "major wetlands" in

Millstone Lake "Sheriff Goodman -- concerned about job loss" in

Slocumb "affluent" out

Berea "distressed county" in

With the public relations and economic development staff voting on an equal basis with technical personnel, the final site-selection screening presented to the state followed this format, though, understandably, absent the aforementioned comments. The classification was subsequently ratified by the state without public debate on the specific basis for this order (Farren, 1992).

The impasse is even more apparent, and the response more desperate, with the siting of a high-level radioactive waste repository. As with solid and hazardous waste proposals, attention has turned to Native American reservations. These sovereign nations, removed from restrictive state oversight, appear to offer a quick and easy solution, given desperate economic conditions and high unemployment.⁶ By now almost every tribe has been approached by the federal government's official Nuclear Waste Negotiator to accept planning and site characterization grants just for considering hosting a so-called Monitored Retrievable Storage Facility (MRS). Here highly radioactive spent fuel rods would be stored for the decades anticipated before a permanent geologic repository is available. According the former Federal Negotiator himself, when speaking at a Native American Conference in 1991:

Because of the Indian's great care and regard for nature's resources, Indians are the logical people to care for nuclear waste. Radioactive materials have half-lives of thousands of years [and] it is the Native American culture and perspective that is best designed to correctly consider and balance the benefits and the burdens.⁷

As might be anticipated, most of the Native peoples approached were repulsed by this suggestion and rejected the MRS proposal as yet another example of exploitation verging on continued genocide (Handcock, 1992). Nevertheless, the Tribal Council of the Mescalero Apache in New Mexico has voted to proceed with negotiations despite protest from reservation members engaged in more traditional resource management.

Debating the Evidence for Environmental Discrimination

There is a general consensus that people of color and low-income people experience disproportionate exposure to hazardous waste and pollution (see above). Particular exposures have been documented for air pollution and lead among urban African Americans (Perlin, Setzer, Creason, and Sexton, 1995; Gelobter, 1992; Gottlieb, 1993, pp. 244-250), pesticide contamination for Chicano farm workers (Moses, 1993; Chavez, 1993), radiation exposure among the Navajo (Proctor, 1995, pp. 188-192; Robinson, 1992), and waste management facilities in African American and Hispanic communities (Bullard, 1990; Costner and Thornton, 1990; Goldman and Fitton, 1994; Mohai and

Bryant, 1992; United Church of Christ Commission for Racial Justice, 1987). Turning to intent, however, evidence for overt targeting by race for waste management facilities is largely circumstantial. Moreover, the actual data supporting the conclusion that race itself is the central determining factor with waste facility location, have been challenged as less significant than age, income, and other demographic variables as siting predictors (Greenberg, 1993), with the research portrayed as relying on inappropriate units for analysis (e.g., unweighted zip codes or counties instead of finer-grain census tracts) (Cf. Anderton, Anderson, Rossi, Oakes, Fraser, Weber, and Calabrese, 1994; Bowen, Salling, Haynes, and Cyran, 1995; and Zimmerman, 1993; and in response Bullard, 1994; and Goldman and Fitton, 1994). In addition, studies suggesting race as the key siting determinant have been questioned for using inappropriate statistical tests to evaluate differences among population subgroups (Greenberg, 1993) and for ignoring the racial composition of the community at the time of the initial decision to site a facility (Hamilton 1995). Others have questioned the implication of racist intent with any disproportionate burden and suggest, instead, that the observed outcome is merely the result of housing market efficiency (Been, 1994).

Summarizing the results of ten major studies on hazardous waste facility location, including the United Church of Christ effort, a recent report by the U.S. Government Accounting Office (GAO) concludes that the studies yield an inclusive range of results depending upon the research questions asked, the sample size used, the type of facility studied, the geographic definition of an impacted community, and the research methods employed (U.S. GAO, 1995).⁸ Others suggest that geography also matters, for wherever one looks, in the South where African Americans often dominate the rural population (as in the 1983 GAO report), in the Hispanic and Native American regions of the Southwest, among the predominantly Caucasian population of the rural Northeast and Midwest, or in the inner-city African American, Asian, and Hispanic centers of many metropolitan areas, what one sees with regard to race and waste, depends upon where one is working (Heiman, 1996; Perlin, Setzer, Creason, and Sexton, 1995). Thus a utilitarian approach to new facility location, emphasizing land cost, reduced mediation and compensation expenses, and low population density, would drive siting away from already-blighted urban industrial zones toward respective rural ethnic groups (c.f., Bullard 1990; and Gerrard, 1994, p. 90).

One must not, however, become bogged down with inconclusive demographic evidence, nor by the "chicken-or-egg" debate over which came first, the toxic waste or the impacted population, or whether disproportionate facility siting and toxic contamination--when it does occur--is the result of overt racism or mere market efficiency. To do so would delay attention to needed remedies now for those people and communities--characterized by such mutually inclusive categories as race, age, gender, and class--who are already suffering from severe contamination, whether somehow "disproportionate" or not. With ethnic and class discrimination built into the very structure of our production system, as expressed through limited access to health care, political leverage, decent housing, and adequate employment and education opportunities, overt discrimination should not be the only trigger for action. We should move forward to address institutional discrimination when it does occur (Bullard, 1990; 1993; Feagin and Feagin, 1978). In the section to

follow, one such example of institutionalized discrimination is considered, the use of quantitative risk assessment, a regulatory exercise that through its wide adoption in recent years has far-reaching implications for environmental quality and social justice.

Overcoming the Siting Impasse through Risk Assessment

As carried by Public Radio and the mass media, the outcry over environmental racism has been loud and clear, loud enough to be heard even in Washington, D.C. Here the Environmental Protection Agency (EPA), after years of social neglect in its own siting, permitting, and exposure standards decisions, has finally decided to examine the social impact of its policies--policies that it now admits possibly disadvantage minority and poor working-class communities (Cushman, 1992). Common examples include emissions trading for air pollution permits whereby polluters may be under greater pressure to clean up in affluent areas, while electing to "pay-to-pollute" residents of poorer regions (Nelson, 1993); public participation programs and handouts exclusively in English for Hispanic neighborhoods; differential treatment in Superfund site designation, clean-up, and penalties assessed between white areas and communities of color (The National Law Journal, 1992; Lavelle and Coyle, 1993); and policy based upon ambient standards for pollution when select sub-populations, and in particular the poor, elderly, young, workers, and people of color, may be at much greater risk due to both physiological and socio-economic factors including occupation and access to health care (Rios, Poje, and Detels, 1993; Ginsburg, 1994).⁹ The negotiation, mediation, and compensation schemes favored by regulatory agencies and project sponsors, also may generate a heavy siting outcome among poorer communities, and very often communities of color, desperate for economic development (Bailey, Faupel, and Gundlach, 1993).

Notwithstanding public debate, the EPA clearly intends to stick with the "innocent-until-proven-guilty" model for regulated release of pollution rather than to implement the "zero-discharge-until-proven-harmless" model first envisioned under the 1972 Clean Water Act. Many environmental activists fear that the outcome of the EPA's revelation about environmental equity will be a few narrow regulations protecting impacted minorities from specific targeted facilities on a complaint-by-complaint basis, rather than a lowering of ambient exposure or facility discharge standards for toxic release. Of greatest concern for the grassroots activists, however, is the attempt by the EPA, the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA), and many state regulatory agencies, to use risk-benefit analysis, as informed through quantitative risk assessment, to prioritize the agenda and to establish "acceptable" exposure limits for regulated chemicals.

Promoted by William Reilly, the EPA's past director, the push for quantitative risk assessment actually arose with former EPA chiefs William Ruckelshaus and Lee Thomas. They responded with quantitative risk assessment as a basis for policy decisions when the federal courts and mounting citizen opposition challenged the accounting assumptions and the disaggregated social impact of the cost-benefit calculus then underlying EPA policy and air emission standards (U.S. EPA, 1987).¹⁰ With the grassroots movement for environmental justice successfully blocking the vast majority of new siting proposals,

Ruckelshaus envisioned another useful purpose for this exercise. Proclaiming that we must "reject the emotionalism that surrounds the current discourse," he offered "objective science" in the form of quantitative risk assessment, and its subjective application through risk management, to improve public confidence in the EPA's decisions (Ruckelshaus, 1983, p. 54). Reilly concurred, noting that "Science can lend a measure of coherence, predictability, authority, order, and integrity to the often costly and controversial decisions that must be made" (Reilly, 1991, p. 3).

Apparently President Clinton agreed, for on September 30, 1993, he signed Executive Order 12866 officially incorporating risk assessment into the U.S. regulatory process--something that even Dan Quayle, in his role as competitiveness czar, was unable to get past President Bush (Montague, 1993). Today risk assessment has become the cornerstone for the attack on existing "command-and-control" environmental regulation by industry and the Republican Congress. As passed by the House on March 3, 1995, the "Risk Assessment and Cost-Benefit Act of 1995 (Division D of HR 9) specifically mandates risk assessment and cost-benefit analysis before any measure involving 25 million dollars or more in cost to society, regardless of the benefits, can be implemented. These assessments would then be subject to peer review by panels of outside experts, including scientists from the impacted industries (Montague, 1995a)

When we take a closer look at the EPA's self-professed "objective" science of risk assessment, with its one-in-a-hundred-thousand or one-in-a-million additional "acceptable" deaths for toxic chemical exposure, we can appreciate the process for what it really is: public relations masquerading as science, with the negative outcomes (as with cost/benefit analysis), still destined to fall upon the exposed poor, working class, and people of color. To be brief, for the critique is well-documented, the science is just not there, as the procedure, based upon human extrapolation from animal megadose exposure to single chemicals, ignores bioaccumulation over time (O'Brien, 1990). Moreover, it focuses upon premature death from cancer, long considered the most sensitive indicator for exposure, while low birth weight, reduced intelligence (as with lead), asthma, and many other environmentally induced diseases, are ignored, and even as endocrine and immune system disruption now appear to be more immediate and sensitive indicators for organochlorine exposure (Hileman, 1993; Montague, 1995b). The process overlooks multiple pathways of exposure besides the assumed independent ingestion through consumption of fish, or drinking water, or breathing air (depending upon the chemical in question); nor does reliance on quantitative risk assessment sufficiently consider intergenerational equity or the fact that among tens of thousands of chemicals in commercial production we have human health assessments, more accurately, adult white male exposure data, on only a few dozen. Finally, quantitative risk assessment cannot adequately deal with the problem of synergistic interaction between these chemicals (EPA Journal, 1991; Gutlin, 1991; Winner, 1986). On this latter deficiency, the EPA is forced to admit that the mathematical models and statistical techniques used for single chemical and simple binary interactions, "cannot be extended to complex mixtures because the data requirements of such extensions lead to experimental designs that are impractical" (U.S. EPA Office of Research and Development, 1988, p., 5-1).

The social disparity of risk assessment is apparent when we spatially disaggregate the data used to support a specific siting 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, and who is likely to benefit from having the chemical, or facility in question, on the market and in our lives. OSHA's use of quantitative risk assessment to set occupational exposure standards (a practice dating from a 1980 U.S. Supreme Court ruling that a new benzene standard proposed had to significantly reduce the risk for exposed workers), provides one example of disproportionate risk (Gottlieb, 1993, p. 395). Here workers, often of color when in the most hazardous industries, are exposed to "acceptable" levels of lead and benzene, or to other heavy metals and volatile hydrocarbons, orders of magnitude higher than the general public under ambient standards for the Clean Air Act. This is a situation known as the "double regulatory standard," and justified as economically necessary to assure the production of socially desirable commodities (Derr, Goble, Kasperon, and Kates, 1981; Mann, 1991).

In Pennsylvania, as elsewhere, there is another example of disproportional impact through risk assessment in the form of legislation now under consideration that would raise the "acceptable" additional death rate estimated through quantitative risk assessment by one-to-two orders of magnitude for toxic remediation efforts in so-called "brownfields" compared to that for "greenfields" (Commonwealth of Pennsylvania Senate Bill 1, 1995). The former refer to inner-city industrial zones now ripe for redevelopment, while the latter are in rural areas of low population density (Holusha, 1995). Notwithstanding the economic incentive for reuse offered by such legislation, the social disparity of this lower standard is apparent when we consider that low-income people of color are likely to live around the blighted urban industrial districts such as in the South Bronx, South Chicago, East and South Central Los Angeles, and other areas where brownfield reclamation is contemplated.

Unlike the mythical random shot over New York City, with a one-in-a-million chance of hitting a specific person, the bullet here already has someone's name on it--perhaps a Mexican farm worker in the Rio Grande River Valley exposed to pesticides, an Akwesasne fisherman along the St. Lawrence River where PCBs have invaded the food supply, a white chemical factory worker in Niagara Falls who once lived at Love Canal where over 200 different toxic chemicals are buried, or the Black residents and workers of Louisiana's infamous "Cancer Alley" between Baton Rouge and New Orleans, home to twenty-five percent of the entire U.S. petrochemical complex. As many toxic victims point out, one-in-a-million doesn't sound like much until you find many of the additional deaths for the entire U.S. population (on a fictitious chemical-by-chemical basis) concentrated in a single common workforce. Then it sounds more and more like premeditated sacrifice as bad decisions are imposed on people of color and low-income communities for the sake of some unchallenged greater public benefit (Winner, 1986; Montague, 1995b). Moreover, the anticipated exposure advisory for these targeted populations, such as the Columbia River Basin's Native Americans, who consume more than the assumed national average of 6.5 grams of dioxin-contaminated fish per person per day (used by the EPA and the majority of states when calculating human health-based

ambient water quality criteria and setting exposure standards), is a poor excuse for needed strengthening of ambient standards to protect the entire ecosystem upon which they, and we all, depend (Columbia River Inter-Tribal Fish Commission, 1994; West, Fly, Larkin, and Marans, 1995).

Why should we call this process "risk" assessment in the first place? Risk, after all, implies some sort of macho quest undertaken by the bold and daring, where reward can be had if one just takes that slim chance (Winner, 1986).¹¹ How would it go over if it were called "death assessment" or, more precisely, "retardation, hormone deficiency, immunization failure, and impotency assignment?" One's definition of a problem helps shape subsequent inquiry into its features. As such, academics should join with the grassroots activists, union members, and impacted communities now challenging both the definition and the propriety of this process.

The entire procedure of risk assessment, with its quantified priorities and exposure standards, assumes that these risks are already an unavoidable fact in our lives. According to Freeman and Portney, senior fellows at Resources for the Future, "At some point decision makers will have to say to themselves that additional risk reductions will be so expensive that they are probably not worth additional effort" (Freeman and Portney, 1989, p. 4; see also Ahearne, 1993). If this assessment is accepted, however, then risks become benefits to be managed, or perhaps reduced, and are no longer dangers or deaths to be eliminated. In response, for the most hazardous chemicals and their building blocks, such as chlorine, the proper goal should be risk avoidance and not exposure management. In this process, the tactical goal is not zero risk exposure, nor necessarily a complete ban on the offending chemical or practice, as many industry spokespersons and proponents of the status-quo would like to portray the environmental activists as advocating. Rather, the agenda is to recognize environmental problems, uncover generative mechanism, and assess alternatives that provide socially desirable benefits without the inherent costs of existing practices.

What are the alternatives to acceptable risk or, as many would term it, death assessment, were society to move toward a production system that is environmentally sustainable, economically sound, and socially just? As Mary O'Brien (1994) points out, risk assessment accepts business as usual and then attempts to define an exposure level, siting outcome, and (with priority assessment) a specific ranking of impacts for the numerous resulting environmental problems. With alternatives assessment, however, one begins with the premise that humans can avoid or ameliorate the environmental problems they have created. All sectors of society are then enrolled, including workers and toxic victims, to find environmentally sustainable and socially acceptable alternatives. Working with the premise that no risk is acceptable if it is avoidable, O'Brien suggests that we must engage the process of alternatives assessment where democratic principles prevail and those at greatest risk can be heard.

Risk avoidance through alternatives assessment, and not exposure management, is the proper path to follow. According to Barry Commoner, twenty years of liberal regulation, negotiation, and compromise have resulted in some modest gains for a few pollutants

while the number and amount of toxic chemicals released into the environment and into our lives is actually increasing (Commoner, 1990). Moreover, for the major success stories, such as phosphates in Lake Erie, DDT in predatory birds, and air-borne lead in our inner cities, the results did not come through negotiation with affected industries over acceptable levels of public exposure, but rather through outright bans on the offending pollutants, or, where good substitutes do not yet exist, at least a phase-out of expendable uses. The existing competitive market is much more adaptive than individual producers from affected industries would have us believe. Despite the common-sense notion that increased costs are automatically passed on to the consumer (e.g., Nichols, 1994, p. 272), demand is often quite elastic for products produced from environmental and health toxins. In most cases, as with chlorofluorocarbons (CFCs), polychlorinated biphenyls (PCBs), chlorinated pesticides, and phosphate-based laundry detergents, alternatives quickly became available and consumers barely noticed the change when these products were banned or phased out. As Scandinavia and Germany have already demonstrated and mandated, there are less harmful alternatives for chlorine-bleached paper and polyvinyl chloride (PVC) plastics (Hileman, 1993; Floegel and Montague, 1993).

It isn't hard to recognize the successful strategy. As the grassroots activists demonstrate, society must move beyond the regulation of pollution emissions on a case-by-case basis, emissions that still fall heavily upon the poor and working class. For hazardous chemicals, we must embrace the uncompromising, non-negotiation goal of zero discharge--zero discharge into the community and zero discharge in the workplace. Again, this is a goal furthered through the intermediate tactic of toxic use reduction through alternatives assessment. The "all-or-nothing" argument of chemical producers, and the characterization of activists as demanding an impossible zero-risk society, only serve to detract us from needed reforms (e.g., Portney and Harrington, 1995). The argument then should no longer be over the assimilative capacity of our bodies for dioxins, dibenzofuranes, and other persistent bioaccumulative toxins, but rather the propriety, for example, of chlorine production and use itself when economically feasible alternatives already exist.

Conclusion: Overcoming Race and Class Oppression Through Democratic Control of the Means of Pollution

Let us return to the common-sense conclusion reached in the United Church of Christ study, picked up by National Public Radio and the popular press, and recently considered by the EPA, namely that racism itself is responsible for the disproportionate siting burden placed upon minority communities (United Church of Christ Commission for Racial Justice, 1987). Certainly people of color experience the whole gamut of capitalist contradiction through economic and social dislocation, in addition to environmental oppression. As it is easier to define communities on the basis of skin color than through dominant class position, analysts may miss class oppression with facility location and exposure standards, where race is used as a tangible marker. Again, geography affects one's observations. In the Northeast and Midwest, where people of European descent make up the bulk of the rural population, poor, working-class, white communities are often targeted for new waste repositories, while in the rural South and West, wherever

toxic landfills and incinerators are proposed, Native American, Hispanic, and African American communities are typically impacted (Gerrard, 1994, p. 90; Heiman, 1996).

Traditional economic efficiency arguments would have waste facilities located where they pose the least risk to the general population, have the lowest operation expenses, and afford the smallest opportunity cost for alternate land uses. Note that this is an ideal excuse for siting facilities where they are currently proposed, namely in poor rural areas with low response capacity, be they Hispanic, African American, Asian, or White. However, explaining away the socially disparate outcome as the result of market efficiency, or even social choice, with the poor moving in after the facility has been located, misses the entire process and history of institutionalized racism (e.g., Been, 1994; Anderton, 1994). On the one hand, racism clearly limits quality-of-life options, such as with redlining and exclusionary zoning (Bullard, 1990; Bullard, 1993; Hamilton, 1995). On the other, income and home-price, both appearing to correlate weaker than race with siting outcomes, may be poor substitutes for class itself (e.g., Mohai and Bryant, 1992, pp. 927 and 931). One would need better measures of key variables to demonstrate the superiority of one indicator over another (Cf. Greenberg, 1993; Goldman and Fitton 1994).¹² The road to such analysis will be difficult, however, as the U.S. is one of the only industrialized Western nations that does not collect mortality statistics by such class indicators as income, education, and occupation (Sexton, 1992).

Moreover, it appears that blaming the siting on race alone is safe, for industry can still go on with business as usual, directing the negative externalities now to poor white communities as part of a "fair-share" allocation program. The EPA's own working group on environmental equity--a term chosen in place of environmental racism because equity, according to the group's report, lends itself to scientific risk assessment, while racism sounds too subjective to them--defined environmental equity as "the distribution and effects of environmental problems and the policies and processes to reduce differences in who bears environmental risks"(U.S. EPA, 1992, p. 2).¹³ Many would disagree, claiming that the goal of the Environmental Protection Agency should be risk avoidance and elimination, not redistribution based upon some enlightened notion of environmental equity and racial justice.

Once we consider class oppression, as expressed through diminished response capacity as well as lack of production authority, at the base of siting outcomes, the dialogue changes from acceptable risk exposure and fair-share allocation to actual control over exposure to pollution, disproportionate or not. The progressive purpose of risk analysis should be to further democracy, that is to enable people to gain the knowledge and self-help skills necessary to take control of the forces affecting their lives. This includes real control over the environmental risks to which individuals are exposed. Invariably, democratic risk control leads to a dialogue over control of pollution and, by extension, over control of the production process itself. Fortunately, with quantitative risk assessment, ever more impacted citizens can sense the forest of oppression and deceit, where expert scientists and bureaucrats are still hung up trying to quantify the trees. Too often, the end result of quantitative risk assessment in the hands of such decision-makers, is to disempower toxic victims by applying a veneer of scientific objectivity over what is inherently a political

process with a class-serving outcome. If we can applaud the process of democratic reform in Eastern Europe and the former Soviet Union, we should, by example right here at home, assist people with the acquisition of knowledge necessary to take an active role in decisions affecting their own lives, instead of asking them to act rationally about an acceptable risk for the sake of some external agenda. As geographers, trained in interdisciplinary analysis and cognizant of the social production of knowledge, we are in an excellent position to recognize the class-serving outcome of regulatory reform, while furthering community empowerment necessary to promote environmental justice for all.

Endnotes

1. I have made a conscious attempt to present this article in a format and language readily accessible (through reprints) to the many grassroots activists with whom I work. I am also indebted to Laura Pulido for critical encouragement and to the external manuscript reviewers who provided a wealth of insightful comments, many of which I strove to incorporate, and all of which challenged me to provide a more cogent final product.
2. See Goldman and Fitton (1994) for an update on the UCC report, and Goldman (1993) for a thorough review of the literature on toxic waste disposal and equity. Empirical evidence for a disproportionate economic impact from environmental mismanagement, as well as through the regulatory response to air pollution, albeit without the suggestion of discriminatory intent, was already considered in the 1970s by geographers and economists (e.g., Berry, 1977; and Harrison, 1975).
3. The Citizens Clearinghouse for Hazardous Waste (CCHW) claims to work with more than 7,000 local grassroots groups while the Student Environmental Action Coalition has chapters at over 2,000 high schools and colleges in all 50 states (Citizens Clearinghouse for Hazardous Waste, 1995; Student Environmental Action Coalition, 1995,). See also Dowie (1995, p. 133) for estimates on the extent of the environmental justice movement.
4. As reported by industry through provisions of the federal Emergency Planning and Community Right-to-Know Act of 1986, the 1993 Toxic Release Inventory indicates a 42.7-percent reduction in the release of toxic chemicals over the 1988 base year, and a reduction of 38.6 percent in off-site transfers for purposes of

treatment and disposal (U.S. Environmental Protection Agency, 1995, pp. 157-158). In turn, a reduced demand for off-site waste management led to an oversupply of capacity. Chemical Waste Management, the nation's largest hazardous waste handler, took a 91 million-dollar after-tax charge in March of 1995 to reflect the diminished value of its hazardous-waste assets (Bukro, 1995). Browning-Ferris Industries, once the nation's second largest handler, got out of the hazardous waste business altogether with the sale of its CECOS subsidiary (Schwab, 1994, p. 464).

5. North Carolina's large commercial poultry farms are well-organized and vehemently opposed to facility location in their area of operation.

6. Many of the smaller reservations in Southern California are being targeted for sewage sludge disposal. Local residents are maintaining blockades at a number of sites such as the Torres-Martinez Reservation, where over half-a-million tons of sludge have already been dumped (Mydans, 1994). Elsewhere, across North America, Native lands are being targeted by waste management firms for landfills and incinerators (Beasley, 1991).

7. As reported in Viereck, (1993, p. 18).

8. See also Perlin, Setzer, Creason, and Sexton, (1995), on inconclusive data with air emissions; and Mohai and Bryant, (1992), for a contending analysis of the existing research record suggesting that race remains the dominant predictor for facility location.

9. In Kettleman City, California, where 95 percent of the residents are Latino and typically non-English speaking, community activists recently won a civil rights court order blocking the siting of what would have become the largest commercial hazardous waste incinerator west of the Mississippi, this to be placed next to the West's largest existing hazardous waste landfill (Kay, 1994; Schwab, 1994, pp. 75-76). Here the courts found evidence of discrimination when the county officials and project sponsors failed to translate hearing notices and testimony into Spanish.

10. See National Research Council (1983), for an overview of the structure and function of risk assessment as used by the federal government. Risk assessment as a federal policy tool arose in the 1960s when federal agencies began to use the process to set individual permissible emission, exposure, and clean-up levels for particular pollutants (Finkel, 1994). In 1983 EPA Administrator William Ruckelshaus, arguing before the National Academy of Science, stressed that one can not live in a risk-free world, and that the agency needed a sound scientific basis for evaluating which risks are worth addressing. Once the risks for particular exposures were characterized, the data could then be plugged into a cost-benefit analysis (Proctor, 1995, p. 85; Ruckelshaus, 1983). In the late 1980s, the process of comparative risk assessment took hold at the EPA and other federal agencies (see Finkel, 1994; United States Environmental Protection Agency, 1987). Here various documented risks are simultaneously juxtaposed with one another in order to prioritize them for remediation.

11. Consider the observation made in a Dow Chemical-sponsored public education handbook on risk: "Every one of us takes risks every day--small risks, medium risks, and big, significant risks. We risk our money buying a lottery ticket, because the opportunity to win a million-dollar jackpot for just a dollar or two is too good to miss" (Rogers, n.d., c.1993).

12. Hamilton (1995) suggests one measure for class response capacity, in which the propensity of a community to organize and engage in collective action (as measured by voter turnout in the 1980 presidential election), appears to be a stronger predictor for ability to resist a new proposed facility, or expansion of an existing one, than either race or income alone.

13. Responding to public criticism, the EPA's Office of Environmental Equity has since been renamed the Office of Environmental Justice. Notwithstanding, equity in allocation and protection remains central, with the EPA striving to assure that "No segment of the population, regardless of race, color, national origin, or income, as result of the EPA's policies, programs, and activities, bears disproportionately high and adverse human health and environmental effects, and all people live in clean and sustainable communities" (U.S. EPA,1994, p. 3).

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