IN SEARCH OF THE OLIVEFIELD: CASE STUDY OF A UNIQUE HAZARDOUS WASTE SITING CONTROVERSY

By

JEFFREY JAMES LOONEY

Bachelor of Science

East Texas State University

Commerce, Texas

1991

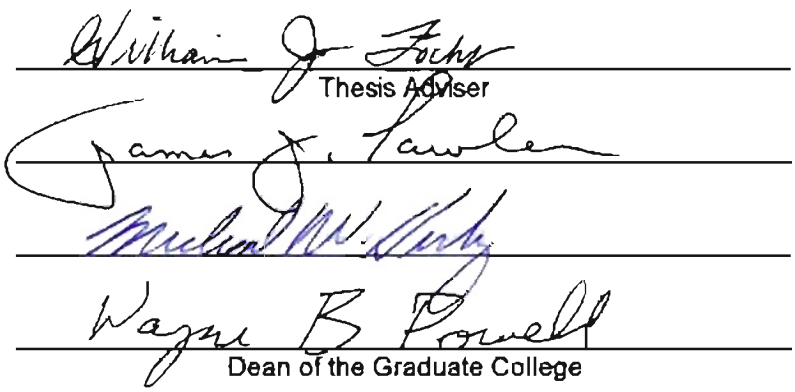
Submitted to the Faculty of the
Graduate College at
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
July, 1997

IN SEARCH OF THE OLIVEFIELD: CASE STUDY

OF A UNIQUE HAZARDOUS WASTE

SITING CONTROVERSY

Thesis Approved:



Thesis Adviser

Dean of the Graduate College

ACKNOWLEDGMENTS

There are several persons to whom I want to express my appreciation for their support on this project. First, I would like to thank Dr. Will Focht, my thesis adviser, for giving me an opportunity to do this study. His unending guidance, patience and assistance on this project are greatly appreciated. I also thank Dr. Jim Lawler and Dr. Mike Hirlinger for their time listening and letting me go my own way, and for serving on my committee. It was an honor and a great educational experience working under these gentlemen.

I owe special thanks to Teresa Dustin, former Environmental Science program coordinator, for her assistance in enrolling me in the program and for her guidance and caring thereafter. Without her, I probably would not be here. I also owe thanks to Robin Lacy and Ken Bosma for their assistance on getting me started and for their constant inspiration and support throughout this project.

I am also thankful of my girlfriend, Heather, for her patience putting up with me during this challenging period. Her revision of several drafts was of great help. This inspiration and help will not be forgotten.

I am most thankful to my parents, Dr. and Mrs. James Looney, for their constant support throughout the good and bad times of my educational endeavors. They are the ones that gave me the opportunity to extend my education. To them, I dedicate this paper.

TABLE OF CONTENTS

Chapter Page

Chapter Page

Chapter Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

The NIMBY Controversy

The subject of this case study is a siting controversy over the storage and disposal of Hazardous Waste Derived Fuel (HWDF) at the Ash Grove Cement Company (AGC) facility located in Foreman, Arkansas. This siting controversy is unique because it involves the conversion of an existing non-hazardous operation to a hazardous one. Previous studies of hazardous waste facility siting controversies focused on *de novo* siting proposals ("Greenfield" sites), remediation of contaminated facilities ("Brownfield" sites), and hypothetical siting proposals ("Fallowfield" sites) (Focht and Lawler 1996).

Proposed siting or permitting of hazardous waste facilities often triggers intense public opposition that is lodged in the fears of long-term risks to the health and welfare of the surrounding community (U.S. EPA 1979). This pattern of local conflict prevents successful facility siting, in part due to miscommunication between citizens and other stakeholders (usually government or industry). Prolonged conflict may eventually end in litigation and policy gridlock forcing public administrators and industry representatives to find "alternative, usually more expensive, solutions" (Focht 1993).

This opposition is commonly referred to as NIMBY (not in my backyard) and often involves uncertain knowledge, clashing values and interests, and different paradigmatic views about what is best for society and its future (Focht 1995:1). NIMBY has been defined as a pattern of protracted and intense public hostility and political-legal opposition to the local siting of environmental risky technologies (Marks and von Winterfeldt 1984; Syme and Eaton 1989; Wells 1982).

Opposition to the siting of hazardous waste facilities – referred to as LULUs ("locally unwanted land uses") by Popper (1981), has become so widespread that, according to Wedge (1985:84),

"almost every county in the nation has denied site applications." Edelstein (1988) claims that the intrusion of LULUs is the primary motive of NIMBY opposition. Hazardous waste management facilities were referred to by Marshall (1989) as the "the classic LULU." Although opposition to LULUs has been widely researched since 1977 (Kraft 1977), it remains a national policy problem.

Previous Studies of Siting Controversies in Oklahoma

In a comprehensive, multi-year, study of hazardous waste NIMBY controversies in Oklahoma, seven controversies were studied by a team of graduate students under the direction of Dr. Will Focht (see Adams (1993), Allenbach (1994), Harney (1994), Focht (1995), and Bosma (1996)) at Oklahoma State University. Three of the seven communities had experienced NIMBY controversies over hazardous waste facility siting proposals (Greenfield communities), two had experienced hazardous waste remediation controversies (Brownfield communities), and two had no prior experience with either type of controversy (Fallowfield communities) (Focht 1997). The purposes of these studies were to understand the perspectives of various stakeholders in each class of controversy (Focht 1995; 1996a), and to identify what siting decision criteria and processes are preferred by stakeholders (Focht 1996b).

In the study, the Oklahoma communities of Boise City, Haystack, and Ramona were included as Greenfield communities. "Greenfield" is an appropriate label for *de novo* siting disputes because contamination was not previously present and thus the fields were "green."

The Oklahoma communities of Cushing and Ponca City Oklahoma were included in the study because each was facing an existing hazardous waste contamination controversy. These communities were therefore labeled as Brownfield communities (i.e., Greenfield had turned brown).

Goals of this Research Project

This case study will identify the reasons underlying community opposition of the HWDF burning and permit proposal at AGC facility by eliciting and understanding the perspectives of the three stakeholder groups who participated in the controversy: local citizens', industry (AGC and

Cadence), government (ADPC&E). The research will also identify the siting decision criteria and process preferences of these stakeholders. The perspectives and preferences of the opposition group will be explained in light of earlier NIMBY studies.

The "Search for the Olivefield" will be conducted by identifying similarities and differences in opponents' viewpoints with the opponents' viewpoints from previous Greenfield and Brownfield community studies. Greenfield studies have demonstrated that opponents reject proposals to build hazardous waste facilities because they judge the health and environmental risks as unacceptable, which is primarily based on their pervasive distrust in proponents and regulators to protect them and their communities from these risks. Opposition is often fueled by perceptions of injustice resulting from the inequitable distribution of risks and benefits (the company is usually non-local and will import waste from other sites), citizens' unfamiliarity with the developer and its site operations, and a concern about stigmatization and disruption of community. Supporters usually couch their arguments in terms of economic growth and comparative risk. As these studies have amply demonstrated, opponents in Greenfield communities win more of these battles than they lose, probably because of the overwhelming tendency of citizens to be risk averse and preference for maintenance of the status quo.

Opponents in Brownfield communities, especially those that live in or near contaminated areas, are concerned with the presence of an environmental threat (actual or perceived) already existing. Controversies tend to concern remediation of the contamination, i.e., if, how and when to remove the threat, and how much. Supporters, on the other hand, argue, often quite convincingly, that the entire community is benefited economically by the polluting industry. This "love-hate" reaction among community residents aggravates the conflict. A reservoir of trust often exists in Brownfield communities based on familiarity and recognition of compensating benefits. Nevertheless, since opponents are often geographically limited and wish to change the status quo (by forcing the company to mitigate threats) and supporters are geographically widespread and wish to preserve the status quo (by refusing to engage in actions that may cause the company to relocate or cease operations), victories tend to accrue to the supporters.

A unique hypothesis of this research is that opponents' perspective in this study will be comprised of an amalgam of both the Greenfield perspective (based on a desire to prevent a change, in this case, the burning of hazardous waste derived fuel but yet keep the company in operation) and the Brownfield perspective (based on a desire to facilitate a change, in this case, reversion to burning natural gas). Since this case involves aspects of both Greenfield and Brownfield controversies, it is reasonable to expect that opponents may also exhibit ambivalence in their perspective. Defined as the "Olivefield" perspective (a mixture of green and brown), opponents in this study are expected to embrace a desire to both change and preserve the status quo of the community, i.e., they would like to keep AGC happy in Foreman but also change the operation of the facility. The characteristics of the Olivefield perspective that emerges from this study may be generally applicable to other Olivefield communities or they may be idiosyncratic; this will also be examined.

In the last chapter, based upon a review of literature and findings of this case study, suggestions will be offered toward resolving Olivefield controversies.

CHAPTER II

SITING CONTROVERSIES AND POLICY GRIDLOCK

Introduction

In this chapter, the issues surrounding the problem of siting hazardous waste facilities will be reviewed. Though numerous studies have been conducted on Greenfield controversies, only a few relating to hypothetical Fallowfield and contaminated Brownfield sites were found.

A Closer Look at the Problem

Many people lack trust in the ability of government (federal, state and local agencies) to protect them from exposure to hazardous waste facilities. In particular, they believe that the government is unwilling or unable to enforce environmental and health standards (Morell and Magorian 1982). Another basis of citizen distrust is that most citizens perceive risks in terms of consequences while experts emphasize probabilities (Krimsky and Golding 1992). Even more importantly, the disagreement among experts over acceptable exposure levels to toxic substances undermines social trust (Krimsky and Golding 1992).

Local opposition to hazardous waste facilities has been increasing over the last twenty-five years. In the late 1960's and early 1970's, people realized that they had the power to block unwanted facilities. This resistance occurs regularly, and is considered by many to be one of the most significant obstacles to facility siting (Duffy 1984; Mitchell and Carson 1986; Lake 1987). The siting problem boils down to a simple explanation: those opposing a facility have strong aversion to living next to the kind of facility being proposed and are predisposed to reject it (Armour 1991).

According to Morell and Magorian (1982), the magnitude of public opposition to hazardous waste facilities and the inability to site them have triggered political pressure to change the way siting decisions are made in the American political system. Attempts to address hazardous waste

problems have produced the most intractable conflicts yet experienced (Portney 1991). A deeper understanding of the basis of siting conflicts and the fundamental changes necessary to reform stakeholder involvement in decision making are important to the development of effective policies.

Siting gridlock produces a policy dilemma: everyone wants hazardous waste managed safely, but no one wants them managed near them. Yet, to protect public health and the environment, new facilities must continue to be sited and operated (Morell and Magorian 1982).

Industry's past failures to use environmentally sound waste disposal techniques have been widely publicized and has aroused public anxiety concerning the dangers associated with hazardous wastes (Bacow and Milkey 1982). Love Canal was arguably the principal factor in focusing public attention on the disposal of toxic wastes (Portney 1991). This has increased the public's distrust of industry and calls for additional government intervention.

Hazardous Waste Regulation

Congress reacted to the public outrage about the mismanagement of hazardous waste by enacting the Resource Conservation and Recovery Act of 1976 (RCRA). RCRA operates under the assumption that health and environmental concerns can be properly managed if prescribed standards are followed in the management of a hazardous waste facility (Harney 1994). RCRA regulates the handling of hazardous waste from its generation, through transportation, treatment, and storage, to ultimate disposal (Duffy 1983). According to Tarlock (1984), federal hazardous waste policy has three goals: (1) to clean up "orphan" sites; (2) to bring existing operating treatment, storage, and disposal (TSD) facilities up to minimum safety standards and then impose progressively higher levels of technology-based standards on them; and (3) to impose more stringent safety standards on new or expanded TSD facilities. Even though stringent hazardous waste regulations are mandated by RCRA, many local residents lack confidence in industry's and government's ability to protect public health and safety from major long-term risks posed by such facilities (Bacow and Milkey 1982).

Although RCRA was enacted to deal with the management of hazardous waste, the federal government has not prescribed guidelines for the siting of hazardous waste facilities (Harney 1994).

Each individual state has been delegated sole authority to determine siting procedures. "Duffy (1983) claimed that states' primary authority in facility siting developed from the federal government's belief in the proximity to the people and their siting needs" (as quoted in Harney 1994:9).

Bases for Siting Opposition

Morell and Magorian (1982) have identified four types of local costs that are the basis for public objections to proposed hazardous waste facilities: health and safety risks; nuisance costs and "quality of life" concerns; property value and other monetary losses; and increased need for community services (depletion of community budget). In contrast to the costs of hosting a hazardous waste facility, the benefits to the community itself are rather limited, for example, increased tax revenues and the creation of a few jobs (Morell and Magorian 1982).

Studies such as those by Armour (1991) and Duberg, Frankel, and Niemeczewski (1980) have shown that community resistance to siting proposals is linked to four important concerns. These include inequities in the distribution of costs and benefits, perceived risks, feelings of loss of control over forces affecting the quality of one's life and community, and lack of trust in proponents and regulators.

Differing Perceptions of Risk

Lowrance (1980:6) defines risk as the mathematical product of the probability and the severity of the consequences of exposure to a toxicant. Thomas (1981:27) defines risk perception as "an idiosyncratic process of interpretation, which involves a subjective probability judgment about the occurrence of an unpleasant event, and an interpretation by the individual that reflects how he or she defines and feels about the outcome." While experts may weigh risk probabilities and consequences, Rubin (1986) found that laypersons were primarily concerned only with consequences. How people perceive adverse impacts has been shown a motivating factor in NIMBY opposition (Portney 1991). Risk perceptions were found to be a significant factor motivating opposition in the previous Greenfield and Brownfield studies (Adams 1993; Bosma 1996).

Research demonstrates that experts define risk in a narrow technical way, whereas the public has a richer more complex view that incorporates value-based considerations such as equity, controllability, and catastrophic potential (Krimsky and Golding 1992). There is strong evidence in the literature to suggest that citizens perceive risks differently when compared to experts (Slovic, Fischhoff and Lichtenstein 1984; Slovic 1987; Armour 1991). Adams (1993) found that citizens perceive risk differently when they experience contamination first hand than hypothetically judging its effects. Johnson (1992) shows that risk perception not only depends on the qualitative characteristics of the risk itself, but also on characteristics of the perceiver. These may include prior risk experience (Fessenden-Raden 1987), prior risk beliefs developed from media and other sources (Slovic 1987), or attitudes toward risks, such as risk averse on technical confidence, institutional trust, and optimistic bias (Weinstein 1984). People who associate health risks events or health problems with a treatment facility are much more likely to oppose the siting of a facility than who only associate non-health consequences with the facility (Portney 1991). Focht (1992) found that risk perception was a significant behavior predictor of NIMBY behavior in actual NIMBY disputes, but is not in hypothetical disputes.

When a state of nature is unknown experts tend to assign a probability simply because no one can exactly predict what outcome will be produced. Fears of harm develop from the perception imposed by risk and the uncertainty resulting from the management of these risks (Armour 1991; Adams 1993). Schwartz, McBride and Powell (1989) found that people living near proposed hazardous waste sites typically perceive risks to be high which feeds their opposition. Adams (1993) and Mitchell (1992) found that information about risks alone does not reduce the risk perceptions of those living near a contaminated site; only risk control and agency credibility reduces concern. Portney (1991) found risk perceptions to be a consistently stronger influence on opposition than any other demographic characteristic.

Vlek and Stallen (1980) have found that risk acceptance depends more on value orientation and less on factual information. Slovic, Fischhoff and Lichtenstein (1984) claim that experts consider only the properties of the risk event itself in deriving risk estimates and that lay perceptions tend to be faulty and in need of calibration through education and communication. Bord and O'

Conner (1992) found that people highly value their health, property rights, and individual freedom, therefore, generally reject risk assessments that conflict with, or threaten, these values (as quoted in Bosma 1996:8). Though quantitative risk assessment is becoming a more dominant decision rule in government policymaking (EPA 1990) and the business sector, it raises deep philosophical problems (MacLean 1982). For example, what constraints are justified in those cases in which risks are imposed on individuals and no direct compensation is possible?

Government efforts to regulate problems associated with technological advances have stimulated a new brand of litigation that focuses directly on issues debated among scientific experts (Jasanoff and Nelkin 1987). Technological developments in areas outside biological sciences may not directly interfere with the processes of life and death, but nevertheless frequently pose risk to human health, safety, and the welfare thorough indirect means (Jasanoff and Nelkin 1987). These authors add that legislation to control environmental and health and risks such as the National Environmental Policy Act, Clean Air Act, and the Toxic Substances Control Act, will require decisions based on the "best scientific information" as well as relevant social and economic considerations. A primary concern of risk assessors today is to determine how safe is safe enough in situations where individuals, acting individually, are not able to reach a satisfactory solution (MacLean 1982).

Distrust Toward Government and Industry

Focht (1995:275) defines institutional trust as that which the public has in societal institutions, including government agencies and their decision making and communication processes, technological/economic institutions such as the market and its technological participants (especially industry), and technological progress itself. Kasperson, Golding and Tuler (1992) envision institutional trust as a four-dimensional concept: commitment (fulfillment of fiduciary obligation), competence (technical), caring (demonstrated concern), and predictability (over time). Craig (1993) agrees that trust is related to performance over time. Institutional distrust was found a significant factor in the previous Fallowfield, Greenfield, and Brownfield studies (Adams 1993; Allenbach 1994; Bosma 1996; Harney 1994).

Fischhoff, Slovic and Lichtenstein (1983), Lawler and Focht (1989), and Lawler, Focht and Hatley (1994) provide evidence that government agencies share a technical orientation with industry in permit/remedial decisions. Wynne (1992:277) and Trauth (1994) found that citizens often believe the siting procedures are biased in favor of the developer. Distrust, as Kraft and Clary (1991:322) argue, is what "fuels emotion, which heightens fear of the perceived risks."

Whether one is supportive or skeptical of a project depends on how much one trusts the veracity, technical competence, and commitment to the public welfare of the agency responsible for managing the technology (Hill 1992). Hill adds that public unease about of science and technology has been compounded by a corresponding loss of trust in government regulators. Armour (1991) agrees there is general expectations that facility operators will take shortcuts and break rules if it saves money; and that their tasks will become routinized (as quoted in Allenbach 1994:15). Government officials usually have low credibility with the public which tends to see them as unwilling to question the competence of technical analysis, overly concerned with economic interests, and blinded by short-term political gains (Allenbach 1994). Hodges and Coppel (1987) discovered that government's and industry's low credibility is the main cause of siting controversy, which propels people toward uncompromising opposition (Kraft and Clary 1991). Collins (1985) describes why institutions are distrusted: government is distrusted due to its past failures to protect citizens from threats to human health, safety, welfare and the environment. Business and industry are distrusted because of their legacy of irresponsibility, absence of care, and liability shifting. Scientific and technical expertise is distrusted because of contradictions, discrepancies, and disagreements in analyses of risks and impacts.

The public recognizes that many technical decisions contain major assumptions that are political in nature. Local residents usually have their own notions about site suitability and are angered when their concerns are not taken seriously in the siting process (Armour 1991; O'Hare, Bacow and Sanderson 1983). Bord and O'Connor (1992) found that scientific risk assessments and technical decision criteria are distrusted because they effectively isolate the public from effective participation in the decision process.

Importance of Equity

Equity issues arise when agencies seek to site a hazardous waste facility in areas away from the general population. People in rural communities do not want to bear the risks for industrial development (Portney 1991) without sharing the benefits (Edelstein 1988:185). There is justification for locating hazardous waste facilities in remote, rural locations that minimize risk to populated areas. Smith and Desvousges (1986) claim that citizens are willing to pay ten times the amount to reduce risks at a Brownfield site than they would to avoid risk from a Greenfield site. These authors believe that this difference is due to the fact that involuntary imposition of risk at a Greenfield site requires no compensation; whereas, at a Brownfield site, contamination is already present and citizens want it removed – even if they have to pay for it. Community opposition to facilities posing adverse impacts has been attributed to its refusal to bear uncompensated costs and risks (Goetze 1982). Bosma (1996) found that this was true in his Greenfield study. With the exception of health and safety, the perceived unfairness in the distribution of risks, costs and benefits has been the most studied reason for NIMBY opposition (Morell and Magorian 1982; O'Hare, Bacow and Sanderson 1983; Tarlock 1984; Lake 1987; Armour 1991; Portney 1991).

Legitimacy Concerns

The social contract theory of democracy states that those government decisions that are resisted are judged as politically illegitimate and triggers citizens' unwillingness to voluntarily accept those decisions. Hill (1992) claims that direct citizen control has not been pursued because it is seen by many as impractical and undesirable. Democratic institutions in this country are founded on the premise that actions of government should represent the wishes of the vast majority (Allenbach 1994:17). The goal of democratizing political institutions is to make government policies and actions more responsive to public's demands. According to Allenbach (1994), this objective runs counter to the development of modern government and its increasing reliance on complex expertise-dependent technologies.

Referendum and direct citizen involvement was found to be opponents' preferred participation strategies in Fallowfield and Greenfield controversies (Bosma 1996; Allenbach 1994; Harney

1994). However, in a Brownfield controversy in which contamination is present, Adams (1993) found that citizens' preferred an oversight board while government and industry preferred preemption, consultation and oversight boards.

Bosma (1996) found that the community's sense of well-being can be affected by a sense of a loss of control if they perceive that it is unable to stop an unwanted proposal. Edelstein (1988) found that threatening events can shatter people's basic assumptions about the world, giving way to new perceptions marked by threat, danger, insecurity, and self-questioning (as quoted in Bosma 1996:56).

The perceived failure of decision-makers to address community values and fears, thereby denying the legitimacy of citizens' concerns, has been found a reason for NIMBY opposition (Wynne 1992). NIMBY opposition is both realistic and legitimate as Kraft and Clary (1991) claim, because it forces additional inputs into the decision making process which in turn creates questions concerning the validity and utility of scientific-technical data. If the public believes they are being excluded from decision making, Adams (1993) found that they lose confidence that the outcome will represent the common interest. In this atmosphere of distrust, Folk (1992) claims that only substantive citizen participation can restore legitimacy. Adams (1993) found that concerns are best addressed in a cooperative, rather than conflictual, atmosphere.

Folk (1992:78) believes risk analysis decision making is political, not a technical decision; it is about "who risks what, where and when". Morell and Magorian (1982) found those communities that are not afforded sufficient opportunities for direct public input were likely to oppose siting decisions. Armour (1991) best describes the NIMBY legitimacy problem: "When the public feels they have not been given the opportunity to be fully informed, to have their concerns listened to, and to exercise their basic democratic rights, they are not very likely to accept recommendations and decisions, even if there are volumes of technical studies substantiating those decisions" (as quoted in Focht 1995:264).

Demand for Increased Participation

Because ADPC&E uses public hearings as their primary public participation strategy, it is necessary to discuss its use. "A public hearing is usually announced and scheduled after the agency has initially decided on a course of action, e.g., after preparing a draft permit" (Focht 1995:62). The purpose of the hearing is to challenge comments from the public on the proposed action. Comments are accepted during the comment period in oral or written form and are usually responded to in writing. Duffy (1984) claims that fourteen states use public hearings as their chief public participation strategy. Its popularity is explained by the public hearing's ability to (1) satisfy minimum compliance with public participation legal requirements, (2) be used as a public relations device, (3) diffuse antagonism, and (4) legitimize a decision already made (Checkoway 1980).

Much evidence indicates that public hearings do not succeed in averting public opposition to siting proposals (Arnstein 1969; Checkoway 1980; Peelle and Ellis 1987). Morell and Magorian (1982:119) refer to public hearing and comment opportunities as examples of "glorified formalism over true public influence on agency decisions" and paternalism that will simply lead to the rejection of one site after the next." Fiorino (1990) claims hearings tend to be dominated by organizational interests with economic interests. Focht (1995) reports that government believes that fear of risk, skepticism of the facility's need, and the inequity of the distribution of risks and benefits are the major triggers of citizen participation demands.

Portney (1991) finds ample evidence to suggest that participatory processes might be effective, and indeed might be needed, to build long-term trust and personal capacity that can make facility siting possible. Some have confirmed that NIMBY can be reduced by increasing public participation in the decision making process (Elliott 1984; Johnson 1987; Kraft 1988). This was also found to be true in hypothetical Fallowfield and contaminated Brownfield studies (Adams 1993; Harney 1994; Allenbach 1994). Adams (1993) found that having honest and effective communication can create a positive atmosphere.

Ironically, as early as 1979, EPA raised objections to increasing citizen involvement in siting decision. If citizens are given too large a substantive role, they argued, opponents would probably block all siting attempts. Tarlock (1984) expressed concern about a public participation paradox:

"though effective public participation is crucial to establishing the legitimacy of siting decision making, increased public involvement is no guarantee of success" (as quoted in Focht 1995:46). Scoville (1989:123) is similarly concerned: "Involving the public may not guarantee success, but not involving the public just about guarantees failure." This public participation paradox, according to Focht (1995), is the most important obstacle to finding a solution to NIMBY gridlock.

Focht (1995:76) recognizes two problems with the referendum as a public participation process: it is "usually structured as a for-or-against vote with no opportunity to indicate preferences for intermediate, or qualitatively different, alternatives...[and it measures] the direction of public opinion but not the intensity." Morell and Magorian (1982) identify other problems with referenda such as oversimplification of issues, voter manipulation through misleading claims, influence of money on advertising, potential for confusion due to wording of the questions, and the potential influence of ballot timing.

CHAPTER III

CASE HISTORY

Site History

Ash Grove Cement Company (AGC) owns and operates a Portland cement plant near Foreman, Arkansas. Foreman is located approximately 1 mile north of the fertile Red River farming basin in the Southwest corner of Arkansas, 7 miles from the Texas-Oklahoma border. Foreman is a small rural community with a population of approximately 1200. The area economy depends on local school districts, agriculture, and AGC's cement plant. According to the hazardous waste manager, AGC employed 190 employees at its facility in 1996.

The facility is located on Highway 108 West, approximately one and one half miles southwest of Foreman. The plant property consists of 1,752 acres and is bordered by a combination of fencing and natural barriers (a limestone quarry and man made ponds). Part of the property is considered a designated wildlife habitat. The cement plant was built in 1958 by Arkla Gas Company and was purchased by AGC in 1985.

Facility Operation

AGC makes general use and specialty cements for construction. The cement plant has three cement kilns which use nearly 18 billion British thermal units (BTUs) of energy per day to chemically react cement raw materials to form cement stones known as "clinker" by a "wet" process. Specific operational processes are described below.

Ash Grove's Cement Production

The cement production process encompasses the following steps (ADPC&E 1995a:2): (1) quarrying and crushing of limestone, followed by the addition of other raw materials; (2) grinding of raw materials and the addition of water to form a slurry mixture; (3) pyroprocessing the slurry in rotary cement kilns to form clinker; and (4) grinding the clinker with gypsum to form portland or masonry cements.

To form the clinker, the slurry is pumped to the three rotary kilns and introduced into their upper ends. From there, the slurry slowly travels toward the kilns' lower ends as it is heated, calcified, and dried. Containerized solid waste-derived fuel (SWDF) was fed fired at the mid-sections of the kilns whereas coal, natural gas, or liquid waste-derived fuels (LWDF) are fired at the kilns' lower ends. The slurry begins to calcify as it approaches the high temperature zone midway down the kiln. At the lower end, the calcified material fuses together to form clinker stones. The clinker is cooled, mixed with gypsum (and sometimes chalk), to form cement. The exact proportions depend on whether portland or masonry cement is being made. The cement is ground to the desired fineness. After grinding, the cement is stored for later packaging and shipping (ADPC&E 1995a).

Ash Grove's BIF Process

Before 1986, AGC used only fossil fuels (natural gas and coal) in its kilns. AGC began mixing hazardous waste-derived fuels (liquid waste-derived fuels, or LWDF, in 1986, and solid waste-derived fuels, or SWDF, in 1988) with fossil fuels to save on fuel costs. After the US EPA issued regulations covering such operations, AGC installed continuous emissions monitoring systems (CEMS) on each of the three cement kiln exhaust stacks. When burning HWDF, stack concentrations of sulfur dioxide, nitrogen oxides, carbon monoxide, total hydrocarbons, and oxygen are continuously monitored and recorded. If HWDF is not being burned, only sulfur dioxide, nitrogen oxides, and carbon monoxide are monitored. If, when burning HWDF, monitoring results indicate that the kilns or control equipment is operating outside acceptable ranges, HWDF feed

must be stopped. The CEMS and other monitoring devices must be routinely calibrated and maintained. At regular intervals, the CEMS are tested to ensure that the precision and accuracy of the reported values is maintained throughout the operating life of the equipment (ADPC&E 1994b).

All HWDF received at the facility is supplied through Cadence Environmental Energy, Inc., which is located on site. Cadence is a waste-as-fuel marketer and technical consultant who supplies waste derived fuels. In addition to supplying HWDF, Cadence provides AGC with technical support in permitting activities, environmental engineering and compliance matters, as well as analytical and other related HWDF management services (ADPC&E 1995a).

HWDF shipments arrive at the facility by motor carrier and rail via various Department of Transportation approved shipping modes. The waste-derived fuels contain organic solvents and thinners from the coating, ink, paint and chemical industries, as well as energy-bearing wastes generated by other industries (ADPC&E 1994a). Upon receipt of a shipment and before storage, a representative sample is analyzed for selected constituents and properties in accordance with the facility's waste analysis plan. The parameters tested and analyzed are radioactivity, compatibility, stability, pH, heat of combustion, chlorine, polychlorinated biphenyls (PCB's), pesticides, and metals. If the analysis demonstrates that LWDF can be burned, then bulk shipments are transferred to the HWDF storage tanks. Until 1996, containerized shipments of SWDF destined for burning were received in six-gallon plastic pails on pallets, labeled "Ready to Burn," and moved to the solid waste derived fuel conveying and feed system.[1]

Environmental Regulatory Status

AGC is regulated by federal hazardous waste management regulations governing the burning of hazardous waste for energy recovery in boilers and industrial furnaces (40 CFR 266 Subpart H, the "BIF Rule"). The BIF Rule was promulgated August 21, 1991 to meet specific requirements of Subtitle C of the federal Resource Conservation and Recovery Act (RCRA) (ADPC&E 1994a).

This facility is a "major stationary source" subject to the requirements of the Arkansas Plan of Implementation for Air Pollution Control (also known as the State Implementation Plan) (ADPC&E

1995a). AGC is also subject to federal air pollution control regulations, specific to portland cement plants for the control of volatile organic compound (VOC) emissions and benzene waste operations (ADPC&E 1995a). AGC is currently burning HWDF under a RCRA interim status permit pending issuance of a final consolidated storage and burning permit.

Permit Applications and Processes

In response to the new BIF regulations, AGC submitted its RCRA Part B permit application for the storage of hazardous waste and for the operation of its cement kilns (BIF units). According to the 1995 permit fact sheet, AGC filed a final RCRA Part B permit application on August 19, 1992. AGC originally submitted a Part A permit application for storage before burning HWDF on site and received interim status for 180,000 gallons of LWDF tank storage. This was later revised to allow interim status for 120,000 gallons of LWDF tank storage and 60,000 gallons of SWDF container storage. In November 1988, AGC submitted a part B permit application for HWDF container and tank storage. After several revisions to this application, the permit was drafted by ADPC&E, gone through public notice, and was issued on February 5, 1993 and interim status for fuel burning in BIFs remains in effect.

ADPC&E is considering the issuance of a consolidated permit as the result of the combined storage and permit application. AGC has stated that the proposal to consolidate the permit applications is predicated on the assumption that the consolidation would have no effect on the Foreman plant's interim status for the storage and burning of HWDF (ADPC&E 1995b). AGC's rationale for the submission of the consolidated part B permit application was to enhance public input, reduce duplicative effort, and save ADPC&E staff resources.

Due to AGC's recent re-evaluation of its HWDF operations, the significant changes in the application are:

- Reduce the design storage capacity of the proposed SWDF Container Storage Unit from 180,000 gallons to 60,000 gallons.

- Change the tank configuration of the proposed LWDF Tank Storage Unit from six 30,000 gallon capacity aboveground storage tanks to six 25,000 gallon capacity aboveground storage tanks.
- Add a proposed LWDF Tank Treatment Unit, which will be comprised of two 100,000 gallon above-ground blend/burn tanks.
- Reduce the number of LWDF tank truck unloading bays currently from seven to four and provide the capability to unload two trucks simultaneously (Greer 1996).

AGC submitted a complete copy of the amended Consolidated RCRA Part B Permit Application (Volumes 1 and 2) to ADPC&E on or before June 7, 1996. According to AGC, the amended permit application did not reflect any significant changes in the environmental protections incorporated in the design and operation of the facility or the operation of the cement kiln BIF's (Greer 1996). ADPC&E is currently reviewing that application for completeness and adequacy. A public notice for the new draft permit for the storage units and burning of hazardous waste for energy recovery in the three cement kilns has not yet been issued (ADPC&E1995b).

Birth of Public Controversy

A previous controversy had already sensitized the Foreman community to hazardous waste siting proposals when, in 1989, another business known as Foreman Recycling tried to obtain a permit from ADPC&E to build a hazardous waste recycling facility in west Foreman. The citizens of the community were not aware of the proposal until after the developer filed an application for a construction permit. A few citizens investigated the developer and discovered a record of noncompliance. This discovery motivated the formulation of a grassroots citizen opposition group known as "Friends Organized for a Responsible Environment" (FORE). The group opposed the construction permit application. A permit was never issued and the proposal was withdrawn.

The present controversy started when AGC began burning hazardous waste-derived fuel in their cement kilns to reduce energy costs 1986 to save on fuel costs. ADPC&E issued a public notice on the initial draft storage permit for which the public comment period ended on May 13,

1993. ADPC&E held the public hearing for the initial draft permit for storage in Foreman on May 3, 1993. According to interviews, approximately 40 to 50 people attended the public hearing. For the most part, AGC's employees and family members were supportive of the decision, although most agreed AGC should burn fossil fuels and natural gas. Two members of Friends United for a Safe Environment (FUSE) and a member of Friends Organized for a Responsible Environment (FORE) alleged, with cited literature, that harm to human health and the environment could from cement kiln incineration. Most citizen were concerned about threats to public health and the environment from emissions and the ability of AGC to compensate the community for damages caused by its operations. According to an ADPC&E official, these concerns were not addressed at the hearing because they did not pertain to the storage of hazardous waste. ADPC&E received over 200 letters from the public and AGC concerning HWDF. Those comments and responses are included in ADPC&E Responsiveness Summary (ADPC&E 1994b).

Endnote

[1] Since SWDF burning has become unprofitable, AGC suspended burning SWDF at Foreman in 1996 (Greer 1996).

CHAPTER IV

METHODOLOGY

Introduction

This chapter provides a description of the methodology used to survey stakeholders' opinions and preferences regarding the AGC waste fuel burning controversy – including population sampling, procedures for administering the survey, instrument pretesting, final survey design, and data analysis. This chapter closes with a description of each of the specific instruments used in the study.

To add validity, a multi-instrument methodology was used which combined both qualitative and quantitative methods. This multi-instrument survey consisted of a structured questionnaire, an open-ended personal interview, Q methodology, and two card ranking exercises.

Stakeholder Sampling

Only those stakeholders who were knowledgeable of the permitting dispute were selected to participate in the survey. Included were local citizens of Foreman, AGC and Cadence employees, and ADPC&E officials identified through contacts with stakeholders known to be involved. Each stakeholder was contacted in person or by telephone and informed of the purpose of the study. Only those stakeholders who were knowledgeable, available and willing to recollect their experiences and beliefs about the dispute were invited to participate. Of the 19 eligible participants identified and contacted, 15 agreed to participate: three local citizens, one AGC representative, eight Cadence employees, two ADPC&E officials, and a former mayor. Two citizens were not invited because they believed that they could not accurately recollect their beliefs and experiences and two other citizens could not be reached after repeated attempts.

Procedures for Administering the Survey

Personal interviews were administered at the participant's place of employment or home. The interview began with the presentation of research credentials, brief personal introductions, and a more complete explanation of the study. All questions from participants were answered. Participants were then asked to sign a consent form confirming that their participation was voluntary, that interview results would be held in strict confidence, and that participants would remain anonymous to anyone outside the research team. The survey was presented in the following order: initial and final questionnaires, open-ended interview, Q sort, and rank-ordered card sort. Before administering each instrument, participants were informed of its purpose and given appropriate instruction. In addition, participants were invited to take breaks and informed that they could terminate the interview at any time. At the conclusion of the interview, respondents were thanked for their participation, given a proposed date for completion of research report, and asked if they would like to be provided a complimentary copy.

Initial Survey Design and Pretest

The generic survey design, developed by the project director, was adapted by the individual members of the research team in a group setting with 16 citizen activists from Ponca City, Oklahoma involved in a Brownfield controversy. Two versions of the pretest were administered. The results were analyzed to determine whether the questions asked were understandable and unambiguous, and whether the responses were consistent. The results indicated the need for personal interviews instead of group interviews, and the refinement of several questions. The instruments were made flexible enough to apply in all types of hazardous waste management disputes, but still allow consistency in data collection and later cross-community comparison.

The survey instruments for this case study were revised and adapted to address the important issues in the Ash Grove permitting controversy. Thorough understanding of events not only informed the adaptation and revision of instruments but also helped facilitate conversation between the researcher and participants. Informational interviews with employees of AGC and Cadence

provided an understanding of the facility's history and present status. City of Foreman library records and site narratives from ADPC&E in Little Rock provided additional background information on the events surrounding the controversy.

Structured Questionnaire

A structured questionnaire was administered as two parts: initial and final. The initial questionnaire, administered at the beginning of the interviews, was entitled "Relationships and Roles in the Foreman Situation" (see Appendix A). This questionnaire consisted of eight questions (multiple choice and completion). The questions were intended to identify the extent to which the participants were involved in the siting dispute, their relationships with the various other groups involved, and the sources from which they received information about the controversy. This information was also used to interpret the Q factors and in the discussion of results prescribed in Chapter V. Each participant was given a copy of the initial questionnaire and asked to complete it. The completed questionnaire was immediately reviewed by the researcher for legibility and completeness.

The final questionnaire was administered at the end of the interview inquired about the participant's age, gender, education level, major subject in school, occupation, whether or not the participant was involved in any citizens' groups or service organizations, and how close they lived to the AGC site (see Appendix A). These data were collected for purposes of linking demographic, social, and physical variables with responses from the other methodologies used in the survey. The questionnaire also consisted of eight questions, multiple choice and completion, and was given to the participant and to fill out. This questionnaire was also checked for legibility and completeness before ending the interview.

Open-Ended Interview

The open-ended interview was administered following the final questionnaire. This script contained 12 questions concerning participants' opinions and recollections of the hazardous waste burning controversy. All questions were read aloud by the interviewer and participants were asked to respond to the questions based on their perspectives of the dispute. Efforts were made during the interview not to influence respondents in any way that would bias their responses. Due to the length of the responses, all open-ended interviews were recorded and eventually transcribed.

Analysis of the open-ended interview facilitated interpretation to the Q sort and rank order card sorts (see below) in that it allowed participants free expression of their views. Participants were encouraged to honestly express their feelings and concerns, and clarify on any potential misinterpretations. The questions in the interview probed the individual's role in the controversy, his or her reasons for getting involved and concerns about the hazardous waste burning, those issues on which people agreed, whether or not the permitting situation could have been handled differently by ADPC&E and AGC, and whether those actions by the citizens were right or wrong concerning the permitting proposal. The participant was then asked whether there was anything else that he or she would like to offer about their feelings, concerns, or suggestions about how the permitting process was implemented or about hazardous waste burning in general that had not been covered. The interview ended with a request for other potential participants who may have a unique perspective and may want to participate in the study (see Appendix B).

Rank Order Card Sorts

Two rank order card sorts were separately administered following the open-ended interview. One set consisted of thirteen cards (see Appendix C) describing those decision criteria which are typically used by policy makers when proposing construction of hazardous waste management facilities. This was aimed at determining what participants believed should be important in siting decisions involving hazardous waste facilities. The second set of rank order cards was composed of nine cards that listed decision strategies for public participation in the decision making process

(see Appendix D). This sort was intended to determine the decision processes that participants believed were best suited to averting decision gridlock.

Each set of rank order cards was shuffled and given to the participant. The participant was asked to read each card and place it in a line extending from low importance to high importance. After each set of cards was ranked, participants were asked to separate them into three groups corresponding to absolute importance: high importance, moderate importance, and low importance. Frequency distributions were then calculated for each card rank using median, individual, group, and weighted individual ranking methods. (These ranking methods will discussed in more detail in Chapter VII.) These card sort results will be compared to those from the in-depth interview and the Q methodology (discussed next) in Chapter VIII.

Q Methodology

Q methodology, invented and advanced primarily by William Stephenson (1935, 1953), was designed to assist in the orderly examination of human subjectivity (Brown 1980). Q reflects the interpretations of a person's beliefs in relation to the stimuli that is the focus of attention in the form of a Q sort (Stephenson 1972). Q also reveals a participant's subjectivity with minimum researcher-induced bias.

Q methodology is the body of theory and principles that guide the application of technique, method, and explanation (Brown, 1980). It provides flexible procedures for the examination of subjectivity within an operant framework. Q methodology is a scientific paradigm designed specifically for the direct measurement of an individual's point of view (Brown, 1980). Individuals are factored across statements instead of statements across individuals.

Q Technique

Q technique is a set of procedures where a sample of objects is placed in a significant order by a single person. The Q sample involved statements of opinions, beliefs, recollections, or reactions to other stimuli relating to the topic under study. The Q sample in this study consists of 47 statements from comments, discussions, and opinions about environmental decision making (see

Table 3). Each statement was printed on a card and read by the participant while recalling their beliefs and feeling in the dispute. The participants were asked to spread the cards out, reread the statements, and place each on the form board according to their beliefs from most agree (+5) to least agree (-5), working from the ends toward the middle. The form board was constructed as a pyramid of 47 rectangles arranged in a quasi-normal distribution (eleven piles with frequencies of 2, 3, 4, 5, 6, 7, 6, 5, 4, 3, 2). Q items were placed on the form board as constructed forcing participants to identify the few statements about which they felt most strongly and which therefore plays the greatest role in factor interpretation. Each participant was free to rearrange any statement on the form board at any time, and was encouraged to examine the arrangement when finished to make sure it reflected their beliefs. Each statement's unique number was recorded on a score sheet by the researcher.

The Q sort configurations were factor-analyzed at Oklahoma State University using PC QUANAL, a statistical factor analysis program specifically designed for Q methodology (Van Tubergen 1975). PC QUANAL correlates the Q sorts and the correlation coefficient matrix is factor analyzed using the principal components method and orthogonal varimax rotation to reveal commonly shared perspectives, opinions, beliefs, values or attitudes. QUANAL outputs factor score arrays for the common factors retained following rotation. After analysis, the researcher attempts an interpretation of each common factor based on the factor score arrays and on other relevant information including prior interviews. These interpretations are then validated by reinterviewing the highest and purest loader(s) on each factor. The highest loader is the person whose sort correlates most highly with the common factor. The pure loader is the individual who best represents a common or shared perspective by loading most "cleanly" on a common factor. In many cases, the high and pure loader is the same person.

Q methodology results are discussed in Chapter VI.

CHAPTER V

QUESTIONNAIRE AND INTERVIEW RESULTS

Results of the Questionnaires

Fifteen stakeholders participated in this case study. Nine Ash Grove and Cadence employees were supporters of the storage and burning of hazardous waste-derived fuel (HWDF) at Ash Grove Company's (AGC's) facility, two state officials and the mayor reported a neutral stance, and three local citizens of Foreman were opponents' of the storage and burning of hazardous waste at the facility. Table 1 summarizes the demographic characteristics of each stakeholder.

TABLE 1

DEMOGRAPHIC PROFILE OF STAKEHOLDER PARTICIPANTS

*Stake-holder	Proximity to site (miles)	Frequency of Civic Participation	Sex	Age	Education	Occupation	Stance Toward HWDF
FI1	40	Never	M	53	4 yr. College	Chemical Engineer	Supporter
FI2	7	Never	F	30	4 yr. College	Chemist	Supporter
FI3	1	Never	M	31	3 yr. College	Chemist	Supporter
FI9	10	Never	M	40	4 yr. College	Chemist	Supporter
FI10	8	Never	M	26	4 yr. College	Chemist	Supporter
FI11	8	Never	M	27	High School	Chemist	Supporter
FI12	25	Never	F	24	4 yr. College	Chemist	Supporter
FI13	10	Seldom	M	37	High School	Chemist	Supporter
FI14	40	Never	M	27	2 yr. College	Chemist	Supporter
FC4	1	Seldom	F	42	Masters	Mother	Opponent
FC5	6	Never	F	47	1 yr. College	Homemaker	Opponent
FC15	2	Continuously	F	>50	Masters	Teacher	Opponent
FG6	150	Frequently	M	47	5 yr. College	Civil Engr.	Neutral
FG7	150	Never	M	42	Masters	Inspection Engr II	Neutral
FG8	18	Never	M	71	High School	Former mayor	Neutral

*Stakeholder Identification: F = Foreman; C = Citizen; I = Industry; G = Government

Data abstracted from the final questionnaire demonstrated that nine of those who participated in this study lived within 10 miles of the facility and three resided more than 20 miles away. ADPC&E officials lived approximately 150 miles away and the former mayor lived 18 miles away. Four participants were active in service organizations or citizens' groups; two were very active.

Table 2 presents the data summarized from the initial questionnaire. This questionnaire sought to identify the information sources upon which participants relied concerning the HWDF siting proposal and which of those sources they most trusted and distrusted. The questionnaire also inquired about the type and extent of political participation participants engaged in during the siting controversy. Fourteen of the 15 participants completed the questionnaire.

TABLE 2

RELATIONSHIP AND ROLES OF PARTICIPANTS

STAKE-HOLDER	Sources of info about proposal	Most trusted source	Most distrusted sources	Public participation	Relationship to env. groups
FI1	Developed info	Self	Env groups	Public hearing	Familiar
FI2	Media, AGC, ADPC&E	ADPC&E	Media	Public hearing	Familiar
FI3	Media, AGC, ADPC&E	Permit Application	Media	None	Familiar
FI10	Media, AGC, ADPC&E	EPA	Friends & neighbors	Public hearing	Familiar
FI11	Media, Friends, AGC, EPA	EPA, ADPC&E	Media	None	Familiar
FI12	Media, Friends, AGC, EPA	EPA	Media	Public hearing	Familiar
FI13	EPA	Cadence	Citizens	Public hearing	Familiar
FI14	Cadence, fellow workers, citizens	Cadence	Citizens	None	None
FC4	Media, friends, public hearing, permit application	Draft Permit at library	Friends & neighbors	Public hearing	FORE member
FC5	Media, friends, public hearing,	Env groups	AGC	Public hearing	FORE member
FC15	EPA, ADPC&E	Information on permit	An EPA officer	ADPC&E workshops, spoke at hearing	Member of several env. groups
FG6	Permit applicat'n	EPA	N/A	Permit process	Familiar
FG7	Permit writer	EPA	Media	N/A	N/A
FG8	Media	EPA	Media	None	Familiar

Industry

Most industry participants obtained information about the HWDF proposal only from official sources: the news media, AGC, ADPC&E, and the US EPA. This can be explained by their employment: all worked for AGC or Cadence. Two participants, however, informally obtained additional information through friends. One industry participant even helped develop public information for AGC about the siting proposal that was distributed at the public hearing.

With respect to trust, industry participants again relied on official sources that were deemed knowledgeable, such as ADPC&E, US EPA, and Cadence. Interestingly, no industry participant mentioned AGC as most trusted – though AGC was not mentioned as most distrusted either. The news media were deemed untrustworthy, primarily because unfavorable reporting by the *Texarkana Gazette* and the *Little River News*, the local print news outlets. One industry participant reported that he relied on his own expertise and experience as a primary knowledge source. Several industry participants distrusted the information provided by the environmental group because they believed it to be biased and uninformed.

Five of the nine industry participants attended the public hearing for HWDF storage. (Interestingly, no one mentioned the hearing as a source of information.) All industry participants except one knew of the opposing environmental group (FUSE) but had no dealings with them. The consensus opinion among industry participants was that the siting opponents were either ignorant or misinformed concerning the risks posed by HWDF burning and therefore were unjustifiably opposed.

Citizens

Citizens obtained information about the HWDF proposal from the news media, friends, and the public hearing. One also obtained information from the permit application at the library. Another citizen researched the HWDF proposal through EPA and ADPC&E. Two citizens trusted the information on the draft permit while the other citizen trusted information provided by the environmental group, Friends United for a Safe Environment (FUSE). Since the citizens were not employees of AGC, Cadence, or the government, they preferred to rely on archival sources of

information generated by government, the media, and the companies.

The sources of information most distrusted by citizens were friends and neighbors (they were either employees of AGC or Cadence or else they were uninformed), AGC, and an EPA employee (who seemed uncooperative when one of the citizens attempted to obtain further information). Instead the citizens trusted hard data included in reports and information provided by environmental groups.

Two citizens participated in the permitting proposal by attending the public hearing for HWDF storage. The third citizen actively participated by attending ADPC&E workshops, obtaining background information in AGC and Cadence areas of operation, and speaking at the public hearing. One citizen was an active member of several organized grassroots groups, both on a regional and national level. The other two citizens were not active with any organized groups other than Friends Organized for a Responsible Environment (FORE). Most of the participation was directed at obtaining information, at first to educate themselves about the risks of HWDF burning and the compliance history of the AGC and Cadence and later, to oppose the facility proposal.

Government

As the permit writer, one ADPC&E official acquired information directly from the permit application. The other ADPC&E official relied on the permit writer for information. The former mayor learned about the permitting proposal from the media.

The most trusted source of information was the US EPA, primarily because of their expertise and quality of their technical guidelines and standards. The most distrusted source of information was the news media. The local print media was judged unreliable by these officials because the reporters were judged not to be knowledgeable, they tend to focus on controversy rather than science, and they rely on biased sources for part of their reporting.

Government employee political participation was limited – primarily confined to professional practice. The permit writer participated by processing the permit application, i.e., public notice and hearing and responding to public comments. The former mayor did not participate in the permitting process.

Results of the Personal Interviews

Citizens

Citizens opposed the storage and burning of HWDF at AGC because they perceived the risks to their health and the environment posed by the operations as unacceptably high. Specifically, they worried about contamination of land and water supplies and wondered if recent incidents of cancer, rashes, and respiratory problems could be related to emissions from AGC. Other concerns included the proximity of the facility to the elementary school (one mile) and to an adjacent road upon which there was heavy traffic and the probability of an accident high.

Citizens' trust of government and industry to protect the community from exposure to harmful chemicals was very low. For example, they were skeptical of industry's claims about the safety of hazardous waste burning in cement kilns:

> *"I don't particularly think cement kiln incineration is safe; that's like taking landfills and putting them in the sky."*
>
> *"Two doctors have spoken out against hazardous waste burning."*
>
> *"Livestock around here are having an unusual number of prolapses, and several calves have difficulty nursing."*
>
> *"There have been a number of new cancer cases, upper respiratory ailments and rashes that are not seasonal as such ills once were."*
>
> *"Everyone's allergies started acting all at once. I think it's something in the air from the cement plant."*
>
> *"Most people agreed that hazardous waste is probably harmful, but they do not want to close the plant."*
>
> *"Our area is becoming saturated with metals and toxins. This is, no doubt, working its way into the food chain, groundwater, surface water, and is loading the air we breathe."*

The location of the HWDF storage and disposal was a particular concern among citizens:

> *"Storing that stuff next to the road and railroad tracks is a potentially dangerous situation."*
>
> *"How can they let them burn hazardous waste one mile from the elementary school?"*

Expressions of distrust of Ash Grove included these:

> *"Ash Grove didn't even notify the local public about burning hazardous waste. They already had a air permit, which was drafted in."*
>
> *"You can't trust these companies – they are in it for the money."*
>
> *"They have ways of getting around the emission standards."*
>
> *"They tried to skirt the issues; that's what made us skeptical about it."*

Asked about the role that Cadence and AGC played during permitting, citizens were skeptical:

> *"They did nothing. They had not, as of summer of 1993, registered to do business in the State of Arkansas. Neither had they bothered to become certified as a lab in the State of Arkansas."*
>
> *"Cadence tried to reassure people, because of the recycler that tried to locate here, by having open house and tours."*
>
> *"Someone asked me about them, and I didn't even know they were out there until the part B [permit application] hearing."*
>
> *"Ash Grove waged a PR blitz following the hearing. They removed a tree from the cemetery, repaired the school's playground equipment which they should have bought new and built a gazebo at the end of Foreman's main street."*
>
> *"Ash Grove made contributions mainly to keep things smoothed over."*

They even distrusted local officials:

> *"Local officials knew about Ash Grove's hazardous waste burning, yet remained mum until pressed for information. Who do they really represent?"*
>
> *"Local officials knew that they were burning hazardous waste; yet no information of intent had been posted locally."*

Citizens' distrusted ADPC&E due to its lack of forthrightness and openness concerning the permit:

> *"The state agency has knee jerk reactions when someone calls in about the permits."*
>
> *"I don't think its any accident that it took no less than 15 letters and phone calls to get the draft permit sent to Foreman. And I don't think its any accident that the meat of the permit wasn't sent. Somehow it didn't get copied, but it was in the table of contents. Either they don't know what they are doing, or they intentionally didn't want to send it down here. That was the problem."*
>
> *"I believe ADPC&E bungled the Ash Grove matter. Why not post notices here and place information in the library here. They have, on every Ash Grove issue, opted to place materials elsewhere."*

Citizens expressed concern about the fairness of the distribution of the risks and benefits associated with the burning of hazardous waste in Foreman:

> *"We don't want waste coming in from other states, let them take care of their own waste."*
>
> *"Why should we be responsible for someone else's problem.*
>
> *"Some thought Ash Grove should be required to landfill their own waste;*
>
> *"I think they should be required to dump the cement dust in a hazardous waste landfill instead of pits behind the plant.*

Interestingly, the citizens saw a silver lining behind the proposal:

> *"I believe the community has pulled together because of the recycler that tried to locate here."*
>
> *"Our community has probably somewhat benefited from a few more jobs out there."*

"I am not against the cement plant. People got a misconception about the opposition. We didn't want the shut the cement plant down. That's a lot of people's livelihoods out there."

Another had a few good words about ADPC&E:

"ADPC&E was cooperative. Try to be reasonable and work through their channels – like any other bureaucracy."

Citizens' were asked what lessons they had learned during the permitting process:

"Citizens' should be better informed, and less afraid of being involved."

"Things could have been more public, up and on the table. More open."

"What things have ADPC&E and EPA done right? I hope they follow the law to the letter or they will be challenged."

"I found out if you get involved, you can get something done."

Industry

Participants representing industry (AGC and Cadence) expressed views quite different from citizens concerning the controversy. Their views are briefly reviewed below. AGC defended the corporate decision to substitute HWDF with fossil fuels based on its need to compete with modern fuel efficient cement plants. The AGC representative had confidence in the safety of HWDF burning and believes AGC is a responsible regulated company:

"We are disposing hazardous waste as cleanly and effectively as it can be done without endangering human health and the environment."

"If the plant lost its ability to burn hazardous waste, it would probably shut down eventually because it can't compete with the more modern fuel efficient plants."

"This business is so specialized, it is hard for the average person to understand."

"Hazardous waste minimization has cut way back on the amount of hazardous waste generated in the last few years."

"ADPC&E do their inspections."

"The thing people can do is to be better informed."

Cadence representatives had opinions about the testing and safety of HWDF:

"Their [ADPC&E] waste analysis plan in more comprehensive than most."

"There are a lot of things we do that we don't have to do."

"We do run test samples. When a [reference compound] is [tested], we do pick it up. It's pretty obvious."

"I strongly feel that burning of waste as a fuel is a very good thing for all of us. It's regulated properly, and it is a very, very safe way of getting rid of hazardous waste."

"I think as long as it is regulated, I can't think of anything better to do with it."

"I would be more concerned about the cement dust than the fumes or whatever."

"If it's [waste-derived fuel] out of EPA guidelines, it's sent out of here. In most instances, we don't get close to their guideline [limits]."

"We follow all regulations. We give tours, I've even seen school kids in here [the lab]."

Cadence and AGC were asked about their reactions to the permitting process, public hearing, and public concerns:

"At the public hearing, it was clear that many of the citizens were poorly informed about the types of material that constitute hazardous waste and the number of complex tests ran on the material to assure that it meets required specifications."

"I'm not really sure a majority of these idiots agreed on anything."

"A lot of the public concerns were about fumes and liability."

"Most of the disagreement was based on the lack of knowledge."

"The public didn't know what they were looking for – mainly because of the lack of information."

"They [public] asked about pesticides. First of all, we are not allowed to burn pesticides; but even if we did, it [high cement kiln temp.] would destroy them."

"ADPCE handled the public hearing, and they shouldn't allow someone to stand up there for 45 minutes."

"The owner got up and said, 'This is my family's business and we don't do some these things.' He was referring to citizens' allegations,' he was furious."

They elaborated on their sense of the community: how it has changed and how they view it.

"As a whole, the people are happier. More people I know have jobs."

"I don't believe it has noticeably changed, if any at all."

"Economically, the community has benefited overall from the growth of the cement plant."

"Lifestyle hasn't changed other than a little more money to spend."

"I don't thing the community has changed at all."

Finally, Cadence and AGC were asked what could have been done to serve better all members of the community during the permitting process.

"I feel that the company [AGC] should have done more to inform the community of what exactly they were doing, and how they were doing it."

"They should have provided more information to the public."

"If they [the public] knew what was going on, it [the burning] wouldn't bother them as much."

"There needed to be more public knowledge of what's going on out here."

"Cadence joined with Ash Grove to purchase a fire truck."

"We had an open house to take all the mystery out of it."

"There needed to be more specific information concerning the nature of HWDF and comparisons of the potential risks associated with HWDF as compared to conventional fuels such as coal and gasoline."

"Education is the only salvation to the situation."

Government

The two ADPC&E officials were involved in the drafting and review of the storage and burn permits and in the public hearing. They expressed concerns about the permits and the permit process:

"We are not successful in issuing permits quickly because we make sure a facility meets all requirements – and that takes time."

"Ash Grove had several revisions [to the storage permit], and there was an attempt to deny [on storage permit], because it didn't meet all the requirements."

"I believe there were six or seven reviews [on storage permit] because it wasn't technically sound."

"It is better to be under a strong permit than interim status regulations."

"If a facility is legally in place, under interim status, meets all the requirements, and has a good compliance history, we have no choice but to issue the permit."

They also expressed opinions and recommendations about the public comment and hearing procedures:

"Public hearings educate the public about the facility."

"ADPC&E presented the draft permit and the public had their time to comment."

"The public agreed that Ash Grove should burn natural gas."

"Employees of Ash Grove were supportive of the decision."

"Some citizens tried to kill the permit."

"Citizens' could have provided comments on storage and treatment, but most were about burning.

"Citizens' need to be better informed about the application."

Summary

As evident in these results, participants had different opinions, attitudes and reactions concerning AGC's HWDF operation and permitting proposal. Citizens' dominant concerns involved trustworthiness, the safety of HWDF burning, fairness, and openness.

Citizens' trust of AGC and ADPC&E to protect the community from exposure to harmful exposures was very low. Following citizens' research on AGC and Cadence compliance history, their distrust increased. Discovering that important information was missing from the permit application only fanned the flames of distrust. Citizens believed that AGC and ADPC&E should have provided more information and been more open with the HWDF burning and proposal.

Citizens not only distrusted AGC's claims of the safety of HWDF burning in cement kilns but also believed that its justification of burning HWDF was made solely on economic grounds. Citizens were also concerned about the fairness of the distribution of risks and benefits of HWDF; however, one citizen acknowledged that the community benefited from additional jobs.

Although ADPC&E were cooperative for the most part, citizens believed the agency lacked forthrightness and openness concerning the permit. Local officials were distrusted because they did not forewarn the public about AGC's intent to burn HWDF.

In contrast to the citizen opponents, AGC and Cadence participants were confident in the safety of HWDF burning and believed it was necessary to substitute with HWDF to compete more successfully with modern fuel efficient cement plants. They believed that HWDF burning is clean, efficient and well regulated. Unlike citizens, they distrusted information provided by the environmental group (FUSE), media, and citizens. The industry participants that attended the public hearing believed citizens were poorly informed about HWDF and the results of trial burn tests showing that the waste could be burned safely. They believed that if citizens had attended the lab tour sponsored by Cadence, they would have been more willing to accept HWDF burning. Nevertheless, most agreed that AGC should have provided more specific information concerning HWDF and provided it earlier than it was.

Both ADPC&E officials claimed that permit applicants must meet all requirements before permits are issued. One of these officials claimed that many citizens were poorly informed about

the permit application based on their written comments on the draft permit for HWDF storage. Both ADPC&E officials suggested that citizens should be better informed before opposing hazardous waste permits.

These results suggest that the controversy was fueled primarily by distrust. Citizens distrusted industry's motives based on missing information, lack of forthrightness, and hidden economic agendas. Citizens distrusted government based on perceived pro-industry bias and reluctance to be more open and forthright on information dissemination. Industry and government distrusted citizens, environmental groups, and the media based on their belief that these parties were ignorant and biased. The results of the interviews and questionnaires suggest that trust building would have been the key to avoiding, or at least minimizing, this controversy.

CHAPTER VI

Q FACTOR RESULTS

Three Factor Q Analysis

The 47-item Q sort data was entered into a software program known as PC QUANAL (van Tubergen 1975). Two, three, four, and five factor extractions were accomplished using the principal components method. These factors were rotated to simple structure by varimax rotation, which minimizes unexplained variance.

Only the three factor solution was retained for analysis. Justifications for keeping the three factor solution are: (1) each retained factor explained at least 13% of the total variance; (2) each factor produced high and pure factor loadings; (3) the total explained variance increased only 5% with the fourth factors; (4) the eigenvalue for the fourth factor was only 0.49, well below the 1.0 value that is often used as a stopping criterion; (5) additional factors produced higher commonalities and lower purities indicating that three factors best represent unique stakeholder perspectives; and (6) the factors and are of theoretical importance. Each common factor score array was interpreted by the author and validated by telephone confirmation with the stakeholder whose perspective best correlated with the perspective manifest by the common factor. The three factors collectively explain 58% of the total variance.

Table 3 contains the re-ordered factor score matrix for the three factor solution after varimax rotation. The critical value for a significant factor loading is 0.451 (using a confidence level of 99.9%). This value is calculated as the two-tailed z-score corresponding to a specified level of significance (in this case, α=0.001) multiplied by the standard error of the loading estimate, where SE_r equals $1/\sqrt{N}$ and N = number of Q items. Bold factor loadings in Table 3 are those that are statistically significant. Thirteen participant's loadings proved significant, one loading was

TABLE 3

RE-ORDERED FACTOR MATRIX

PARTICIPANTS	FACTOR A LOADING	FACTOR B LOADING	FACTOR C LOADING	PURITY
FACTOR A				
FI-3 Chemist	**0.74**	-0.08	0.12	0.96
FI-14 Chemist	**0.74**	0.19	0.03	0.94
FG-6 Engineer	**0.61**	0.16	0.12	0.90
FI-12 Chemist	**0.69**	-0.05	0.32	0.82
FI-10 Chemist	**0.78**	0.16	0.39	0.77
FI-11 Chemist	**0.72**	0.09	0.40	0.76
FI-2 Chemist	**0.67**	0.19	0.40	0.70
FI-1 Engineer	**0.60**	0.07	0.41	0.68
FG-8 Mayor	**0.59**	-0.09	**0.55**	0.53
FI-9 Chemist	0.43	0.19	0.36	0.53
FACTOR B				
FC-4 Mother	0.03	**0.81**	0.07	0.99
FC-15 Teacher	0.16	**0.84**	-0.02	0.96
FC-5 Homemaker	0.12	**0.78**	0.18	0.94
FACTOR C				
FG-7 Engineer	0.20	0.00	**0.63**	0.91
FI-13 Chemist	0.20	0.18	**0.61**	0.83

p<.001, critical value equals 0.45

confounded (FG-8), and one was found not to be significantly loaded on any of the three factors (FI-9).

Table 4 presents the z-scores for each of the statements comprising each of the factors. The z-scores are used to represent the structure of a common factor by identifying each statement's relative importance. These scores are used in interpreting the perspectives held by those participants who significantly load on the factor. Those statements which scores nearer to $\pm$ 1.00 are particularly useful because these statements are those which elicited strong reactions (indicating higher quantsal of importance) by the participants. Differences between item scores across factors, especially for those items 2 scores varying by more than 1.0 (distinguishing items), those less than 1.0 (consensus items), also aid factor interpretation.

Q Factor Interpretation

Q factor interpretation is accomplished by item scores across factors, incorporating information obtained from other techniques used in this research and theoretical insights in other

TABLE 4

TYPAL ARRAY Z-SCORES

Q ITEM	FACTOR A	FACTOR B	FACTOR C
1. Waste facility means economic growth and prosperity for the community.	0.6	-1.4	-0.4
2. Offering cash payments to a community is the same as a bribe.	0.4	-0.3	-1.1
3. When jobs are scarce, an increase in employment is good even if there is resulting pollution.	-1.0	-1.0	-0.9
4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed.	-1.4	-1.6	-0.2
5. Industry works with communities to maintain a good public image.	0.7	0.2	-0.3
6. Scientific risk assessment should be the major consideration in siting decisions.	0.7	-0.2	1.4
7. Citizens need to control which risks they have to put up with.	0.1	0.6	0.9
8. We should not take any chances with the environment.	1	0.1	-0.8
9. I tolerate risk as a fact of life, but I don't like it.	-0.1	0.2	-0.9
10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem.	-2.0	-1.9	-0.8
11. The world would be a better place to live if we could go back to the good old days.	-1.3	-0.8	-1.1
12. It is better to put facilities in communities with high unemployment; the people there need the jobs.	0.2	-1.3	-1.1
13. The people who benefit the most from a waste facility are not the ones who bear the risk.	-0.2	0.7	-1.2
14. Government and industry know what they are doing; they are the experts.	0.1	-1.8	0.2
15. Cost effectiveness is more important to industry and government than environmental issues.	-0.8	1.3	-1.4
16. The government adequately enforces environmental laws to protect human health and safety.	0.8	-0.5	1.8
17. Industry usually complies with environmental laws even when it costs them money.	0.6	-1.5	0.4
18. Environmental laws are full of loopholes for industry advantage.	-1.3	1.6	0
19. The character of a community changes after a waste facility is located there.	-0.4	1	0.2
20. Allowing a waste facility to locate in a community divides a community.	-0.2	-0.4	-0.9
21. Waste facilities give a community a bad reputation.	-0.8	0.7	0.9
22. Citizens should be involved in every step of a siting decision.	0.1	1.3	0.9
23. Citizens have ample opportunity to be involved in siting decisions in their community.	0.7	-1.2	-0.4
24. Industry, government and the public should decide together what level of pollution should be allowed.	0.6	-0.1	1
25. All information should be shared in easily understood language as soon as it is available.	1.8	1.6	1.1
26. Who provides information makes a difference to me; the person must be honest.	1.8	1.2	0.7
27. It is really hard to know if decision makers have the same value as I do.	0.8	0.1	1.3

TABLE 4

TYPAL ARRAY Z-SCORES

Q ITEM	FACTOR A	FACTOR B	FACTOR C
1. Waste facility means economic growth and prosperity for the community.	0.6	-1.4	-0.4
2. Offering cash payments to a community is the same as a bribe.	0.4	-0.3	-1.1
3. When jobs are scarce, an increase in employment is good even if there is resulting pollution.	-1.0	-1.0	-0.9
4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed.	-1.4	-1.6	-0.2
5. Industry works with communities to maintain a good public image.	0.7	0.2	-0.3
6. Scientific risk assessment should be the major consideration in siting decisions.	0.7	-0.2	1.4
7. Citizens need to control which risks they have to put up with.	0.1	0.6	0.9
8. We should not take any chances with the environment.	1	0.1	-0.8
9. I tolerate risk as a fact of life, but I don't like it.	-0.1	0.2	-0.9
10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem.	-2.0	-1.9	-0.9
11. The world would be a better place to live if we could go back to the good old days.	-1.3	-0.8	-1.1
12. It is better to put facilities in communities with high unemployment; the people there need the jobs.	0.2	-1.3	-1.1
13. The people who benefit the most from a waste facility are not the ones who bear the risk.	-0.2	0.7	-1.2
14. Government and industry know what they are doing; they are the experts.	0.1	-1.8	0.2
15. Cost effectiveness is more important to industry and government than environmental issues.	-0.8	1.3	-1.4
16. The government adequately enforces environmental laws to protect human health and safety.	0.8	-0.5	1.8
17. Industry usually complies with environmental laws even when it costs them money.	0.6	-1.5	0.4
18. Environmental laws are full of loopholes for industry advantage.	-1.3	1.6	0
19. The character of a community changes after a waste facility is located there.	-0.4	1	0.2
20. Allowing a waste facility to locate in a community divides a community.	-0.2	-0.4	-0.9
21. Waste facilities give a community a bad reputation.	-0.8	0.7	0.9
22. Citizens should be involved in every step of a siting decision.	0.1	1.3	0.9
23. Citizens have ample opportunity to be involved in siting decisions in their community.	0.7	-1.2	-0.4
24. Industry, government and the public should decide together what level of pollution should be allowed.	0.6	-0.1	1
25. All information should be shared in easily understood language as soon as it is available.	1.8	1.6	1.1
26. Who provides information makes a difference to me; the person must be honest.	1.8	1.2	0.7
27. It is really hard to know if decision makers have the same value as I do.	0.8	0.1	1.3

TABLE 4 (continued)

TYPAL ARRAY Z-SCORES

Q ITEM	FACTOR A	FACTOR B	FACTOR C
28. It is impossible to know whether or not a process is really safe without adequate technical education.	1.5	-0.9	1.6
29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.	1.7	-0.9	0.7
30. Citizens should have their own experts.	-0.2	1.2	0.5
31. We would all be better off if the legal procedures were easier to follow.	0.8	0.1	-0.3
32. Government shouldn't be trusted in making siting decisions.	-1.2	-0.6	-0.5
33. Government uses citizen opinion against them.	-1.0	-0.6	-1.6
34. Economic special interests have too much influence in siting decisions.	-0.2	1.4	-1.8
35. The people living in a community know best what is good for them.	-0.9	0.1	0.3
36. Citizens should initially oppose all proposals for siting by industry.	-1.5	-0.9	-0.3
37. It is better to be active today than to be radioactive tomorrow.	0	0.4	2
38. If you have enough money, you can get away with polluting.	-1.3	0.5	-2.3
39. Conflict in decision making is necessary and healthy.	0.7	0.7	0.7
40. Consensus is impossible when activists become involved in environmental decisions.	-0.3	-1	0
41. The chief function of government is to support the economy.	-0.4	-0.4	-0.9
42. Just being physically present in situations where environmental decisions are made is not enough.	0.7	0.4	0.2
43. The siting process is unfair because results provide greater risks to the people who are ethnically different or poor.	-1.1	0.6	-0.7
44. Environmental radicals are necessary to bring balance to the issues.	-1	-0.4	0.9
45. There are clean technologies available that must be used now to reduce pollution.	1.9	1.4	1.1
46. Government and industry skew their risk estimates to suit their own purposes.	-0.9	0	0.2
47. Industry must be required to recycle, reduce waste, and use safer techniques and raw materials.	1.6	2.2	0.9

relevant studies. All factor interpretations are given short descriptive titles that best characterize the perspective revealed by the factor scores. Bold z-scores represent the factor that is the subject of the immediate discussion. Each of the three factor interpretations are explained and defended below.

Factor A: Self-confident Supporters (SS)

This factor accounts for 30% of the total explained variance and is the dominant factor among the three factors found in the study. This factor represents the perspective shared by seven Ash

Grove and Cadence permit supporters, one neutral Arkansas Department Pollution Control and Ecology (ADPC&E) official, and the neutral mayor (who is confounded on this factor and factor C). Those who share this perspective believe AGC is a responsible regulated company.

Q ITEM	SS	SC	TC
18. Environmental laws are full of loopholes for industry advantage	**-1.3**	1.6	0
17. Industry usually complies with environmental laws even when it costs them money	**.6**	-1.5	.4
10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem	**-2.0**	-1.9	-.9
8. We should not take any chances with the environment and lay citizens should trust them to make informed decisions about the HWDF operation	**1.0**	.1	-.8
26. Who provides information makes a difference to me; the person must be honest	**1.8**	1.2	.7
32. Government shouldn't be trusted in making siting decisions	**-1.2**	-.6	-.5

They value HWDF as a technological advancement

11. The world would be a better place to live if we could go back to the good old days	**-1.3**	-.8	-1.1

and (weakly) as economic progress.

1. Waste facility means economic growth and prosperity to the community	**.6**	-1.4	-.4

Self-confident Supporters realize the HWDF compliance issues are complex,

31. We would be better off if the legal procedures were easier to follow	**.8**	.1	-.3

which motivates them to stress the importance of technical education

42. Just being physically present in situations where environmental decisions are made is not enough	.7	.4	.2
28. It is impossible to know whether a process is really safe without adequate technical education	**1.5**	-.9	1.6

to improve lay citizens' understanding and appreciation of technology.

29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it	1.7	-.9	.7

They believe that citizens should give the proposal the benefit of the doubt and that proposals should be objectively evaluated on its own merits.

36. Citizens should initially oppose all proposals for siting by industry	**-1.5**	-.9	.3
44. Environmental radicals are necessary to bring balance to the issues	**-1.0**	-.4	.9
35. The people living in a community know what is best for them	**-.9**	.1	.3

Self-confident Supporters believe the current decision making processes are fair, and opportunities for citizen involvement are adequate.

43. The siting process is unfair because results provide greater risks to the people who are ethnically different or poor	-1.1	.6	.7
23. Citizens have ample opportunity to be involved in siting decisions in their community	.7	-1.2	-.4

In short, those who share this perspective are confident that their views and opinions on the merits of the proposal are more informed and more accurate than others. They believe that both government and industry are acting responsibly and should be deferred to in making informed decisions. They believe opposition may be based on non-rational concerns or ignorance. They strongly believe that technical education is necessary to gain an understanding and appreciation of the HWDF process. They believe the current decision making process is fair and that opportunities for citizen involvement are adequate. Self-confident Supporters value HWDF as both technological and economic progress.

Factor B: Skeptical Citizens (SC)

This factor accounts for 14% of the total explained variance and describes the perspective of the three citizens who actively opposed the HWDF permits. Citizens loading on this factor favor regulations to eliminate AGC's use of HWDF in favor of safer fuels

Q ITEM	SS	SC	TC
47. Industry must be required to recycle, reduce wastes and use safer techniques and raw materials	1.6	2.2	.9

and believe that economics rather than environmental concerns underlie support for the decision to burn HWDF.

17. Industry usually complies with environmental laws even when it costs them money	1.8	1.5	.4
4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed	-1.4	-1.6	-.2
15. Cost effectiveness is more important to industry and government than environmental issues	-.8	1.3	-1.4
34. Economic special interests have too much influence in siting decisions	-.2	1.4	-1.8

They do not believe there are adequate net benefits available to the community from HWDF burning to compensate for the social costs and environmental risks.

1. Waste facility means economic growth and prosperity for the community	.6	**-1.4**	.4
19. The character of a community changes after a waste after a waste facility is located there	-.4	**1.0**	.2
13. The people who benefit most from a waste facility are not the ones who bear the risk	-.2	**.7**	-1.2

and trading jobs against risking the environment is inappropriate.

3. When jobs are scarce, an increase in employment is good even if there is resulting pollution	-1.0	**-1.0**	-.9
12. It is better to put facilities in communities with high unemployment; the people there need the jobs	.2	**-1.3**	-1.1

Skeptical Citizens distrust government and industry to ensure their safety,

18. Environmental laws are full of loopholes for industry advantage	-1.3	**1.6**	0
17. Industry usually complies with environmental laws even when it costs them money	1.6	**-1.5**	.4
16. The government adequately enforces environmental laws to protect human health and safety	.8	**-.5**	1.8
14. Government and industry know what they are doing; they are the experts	.1	**-1.8**	.2
38. If you have enough money, you can get away with polluting	-1.3	**.5**	-2.3

and believe there should be additional opportunities in decision making, with technical assistance, to ensure that their concerns are addressed.

43. The siting process is unfair because results provide greater risks to the people who are ethnically different or poor	-1.1	**.6**	.7
22. Citizens should be involved in every step of a siting decision	.1	**1.3**	.9
23. Citizens have ample opportunity to be involved in siting decisions in their community	.7	**-1.2**	-.4
40. Consensus is impossible when activists become involved in environmental decisions	-.3	**-1.0**	0
30. Citizens should have their own experts	-.2	**1.2**	.5

Interestingly, citizens do not believe that they would accept the HWDF burning permit even if they were technically informed.

28. It is impossible to know whether a process is really safe without adequate technical education	1.5	**-.9**	1.6
29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it	1.8	**-.9**	.7

The distinguishing feature of this perspective is the pervasive distrust of government and industry. This distrust is based, at least on part, on the belief that economic influence rather than environmental concern underlies the decision to burn HWDF. Distrust also appears to be based on their perceptions of the ineffectiveness of government and industry to provide them with adequate

protection from risks associated with HWDF. Skeptical Citizens insist on aggressive citizen oversight and involvement to ensure that the environmental quality interests of the community are protected.

Factor C: Trusting Communitarians (TC)

Factor C accounts for 13% of the total explained variance. Two participants, one neutral ADPC&E official and one Cadence proponent, significantly load on this factor. They trust the current decision making process and are not concerned about the influence of money in environmental policy and decision making.

Q ITEM	SS	SC	TC
16. The government adequately enforces environmental laws to protect human health and safety	.8	-.5	**1.8**
15. Cost effectiveness is more important to industry and government than environmental issues	-.8	1.3	**-1.4**
38. If you have enough money, you can get away with polluting	-1.4	.6	**-2.3**
34. Economic special interests have too much influence in siting decisions	-.2	1.4	**-1.8**
2. Offering cash payments to a community is the same as a bribe	.4	.3	**-1.1**

Trusting Communitarians realize the importance of technical criteria in decision making.

6. Scientific risk assessment should be the major consideration in siting decisions	.7	-.2	**1.4**
28. It is impossible to know whether a process is really safe without adequate technical education	1.5	-.9	**1.6**

They are inclined to become politically active if they are threatened by environmental exposures.

37. It is better to be active today than to be radioactive tomorrow	-1.4	.4	**2.0**

Perhaps, most interesting, they are concerned about communitarian issues such as stigma, shared values, and equity.

21. Waste facility gives a community a bad reputation	-.8	.7	**.9**
27. It really hard to know if decision makers have the same values as I do	.8	.1	**1.3**
13. The people who benefit most from a waste facility are not the ones who bear the risk	-.2	.7	**-1.2**

Trusting Communitarians also recognize the importance of involving all stakeholders in decision making.

7. Citizens need to control which risks they have to put up with	.1	.6	**.9**
24. Industry, government and the public should decide together what level of pollution should be allowed	.6	.1	**1.0**

44. Environmental radicals are necessary to bring balance to the issues	-1.0	-.4	.9
22. Citizens should be involved in every step of a siting decisions	.1	1.3	.9

The two participants who share this somewhat moderate perspective recognize the importance of technical as well as non-technical issues in decision making. They identified communitarian issues such as community values and character of the community as important to preserve community traditions and identity. Trusting Communitarians recognize the importance of the involvement of all stakeholders in decision making ostensibly to ensure protection of community values. They also have faith that current decision making processes are not biased toward industry and money.

Similarities among Perspectives

There are four consensus statements among the factors which are particularly salient (z-score near or greater than 1.0).

Q ITEM	SS	SC	TC
45. There are clean technologies available that must be used now to reduce pollution be	1.9	1.4	1.1
47. Industry must be required to recycle, reduce waste, and use safer techniques and raw materials	1.6	2.2	.9
3. When jobs are scarce, an increase in employment is good even if there is resulting pollution	-1.0	-1.0	-.9
25. All information should be shared in easily understood language as soon as it is available	1.8	1.6	1.6

All three common perspectives agree that environmental regulation and the use of clean technologies are necessary and that environmental-economic tradeoffs are inappropriate. Each factor also acknowledges the importance of sharing all information involved as soon as possible. Apparently, the stakeholders in Foreman all agree that risks should be minimized before tradeoffs are considered. The agreement that information should be shared, however, may mask an underlying distinction among stakeholders. Since Skeptical Citizens do not trust the government and industry to protect their communities, they want independent access to information; whereas Trusting Communitarians and Self-confident Supporters want to share information in order to educate citizens on technical issues.

Differences among Perspectives

Statements that score more than one standard deviation apart across factors are particularly helpful in explaining differences in perspectives. Only item scores that differ by 1.5 standard deviations or more will be discussed (see Appendix G for a complete list of item scores greater than 1 standard deviation apart).

Self-confident Supporters (SS) have little in common with the Skeptical Citizens (SC) as indicated by their low interfactor correlation coefficient (.233). The strongest points of disagreement concern the HWDF process,

Q ITEM	SS	SC
29. If the public were more familiar with the waste facility, they would be more willing to consider it	1.7	-.9
28. It is impossible to know whether or not a process is really safe without adequate technical education	1.5	-.9

institutional trust,

14. Government and industry know what they are doing; they are the experts.	1.0	-1.8
18. Environmental laws are full of loopholes for industry advantage and the influence of money in the decision making process	-1.3	1.6
38. If you have enough money, you can get away with polluting	-1.3	.5
15. Cost effectiveness is more important to industry and government than environmental issues	-.8	1.3
17. Industry usually complies with environmental laws even when it cost them money.	.6	-1.4
34. Economic special interests have too much influence in siting decisions.	-1.6	1.4

They also have different views about the fairness of the siting process and the extent that citizens should be allowed to participate in the decision-making process.

43. The siting process is unfair because results provide greater risks to the people who are ethnically different or poor	-1.1	.6
23. Citizens have ample opportunity to be involved in siting decisions in their community.	7	-1.2

They also have different beliefs about the net benefits and the social costs of HWDF.

1. Waste facility means economic growth and prosperity for the community.	.6	-1.4
21. Waste facility gives a community a bad reputation	-.8	.7

SSs differ from SCs in their belief that citizens would accept HWDF if educated on technical issues. SCs differ in that they distrust AGC because they believe that economics rather than environmental concern underlies their proposal to burn HWDF. SCs also differ from SSs as they

believe the siting process was unfair with inadequate opportunities to be involved in the decision making process.

The SS and the Trusting Communitarian (TC) perspectives share several features in common, as indicated by the relatively high correlation coefficient (.496). On interesting example concerns statement #8. SSs, at first blush, seem to be more risk-averse. However, as will be discussed in the next section on factor interpretation validation, this was a superficial difference only.

Q ITEM	SS	TC
8. We should not take any chances with the environment	1.0	-.8

However, there are clear differences between TCs and SSs. SSs are less sympathetic to uninformed radical involvement than TCs

44. Environmental radicals are necessary to bring balance to the issues	-1.0	.9
36. Citizens should initially oppose all proposals for siting by industry	-1.5	-.3

and are less concerned about community stigmatization.

21. Waste facility gives a community a bad reputation	-.8	.9

SSs are also less concerned about the influence of money in the decision making process.

34. Economic special interest have to much influence in siting decisions	-.2	-1.8
2. Offering cash payments to a community is the same as a bribe	.4	-1.1

SCs have little in common with TCs as indicated by their low interfactor correlation coefficient (.163). Their strongest points of disagreement concern the influence of money

Q ITEM	SC	TC
34. Economic special interest have to much influence in siting decisions	1.4	-1.8
38. If you have enough money, you can get away with polluting	.5	-2.3
15. Cost effectiveness is more important to industry and government than environmental issues	1.3	-1.4

and trust in AGC and government to make environmentally sound decisions.

18. Environmental laws are full of loopholes for industry advantage	1.6	0
16. The government adequately enforces environmental laws to protect human health and safety	-.5	1.8
14. Government and industry know what they are doing; they are the experts	-1.8	.2
17. Industry usually complies with environmental laws even when it costs them money	-1.5	.4

SCs have different views on the importance of technical competence as a decision making criterion.

28. It is impossible to know whether or not a process is really safe without adequate technical education	-.9	1.6
6. Scientific risk assessment should be the major consideration in siting decisions	-.2	1.4

They also are more concerned about the fairness of the distribution of risks and benefits of HWDF burning among stakeholders.

13. The people who benefit most from a waste facility are not the ones who bear the risk.	.7	-1.2

TCs are far more willing to trust government and industry in making environmentally sound decisions than SCs. SCs differ from TCs in that they distrust government and industry based on their belief that economic influences rather than environmental concerns led to the decision to burn HWDF. SCs also are unique in their lack of confidence in science as a panacea for environmental protection.

Q Factor Validation

After initial interpretation of each factor, those participants with the highest loadings of the three factors were contacted by telephone to confirm the author's interpretations. Because statements in the Q sort can have different meanings to different readers, confirmation of the author's interpretations are important to validity.

Two factor interpretations had in fact been accurately interpreted. However, the initial interpretation of factor C needed revision. The highest loader (an ADPC&E official) on factor C reported a misinterpretation on statement #8 concerning taking chances with the environment. The validated interpretation is that HWDF burning is the best technology available to dispose of hazardous waste; therefore, he did not believe it constituted taking unreasonable chances. Thus both Trusting Communitarians and Self-confident Supporters are more risk accepting than Skeptical Citizens.

Summary

All three perspectives agree that environmental regulation and the use of clean technologies are necessary and that environmental-economic tradeoffs are inappropriate. Each factor also acknowledges the importance of sharing all information involved as soon as possible.

Self-confident Supporters believe both government and industry are acting responsibly and should be trusted to make informed decisions and that opposition is acting irrationally or out of ignorance; hence they are confident that their support of the HWDF burning is justified. They strongly believe that technical education is essential to understanding and appreciating the HWDF process. Self-confident Supporters value HWDF as both technological and economic progress. They believe that the current decision making process is fair and opportunities for citizen involvement are adequate. They differ from the Skeptical Citizens in their belief that citizens would accept HWDF if technically informed of the issues. Self-confident Supporters differ from Trusting Communitarians in their unwillingness to accept radical involvement.

The distinguishing feature of the Skeptical Citizens' perspective is the pervasive distrust of government and industry and the skepticism of HWDF burning. This distrust is based, at least in part, on the belief that economic influence rather than environmental concern underlies the decision to burn HWDF. Distrust also appears to be based on the ineffectiveness of government and industry to provide them with adequate protection from risks associated with HWDF. This motivates them to insist on aggressive citizen oversight to ensure that the environmental quality interests of the community are protected. Skeptical Citizens differ from Self-confident Supporters in the belief that economics rather than environmental concern supported their decision to burn HWDF. Skeptical Citizens also differ in their belief that the siting process was unfair; citizens were provided inadequate opportunities to be involved in decision making. Skeptical Citizens differ from Trusting Communitarians in their distrust of government and industry and their belief that desires for economic growth supersede environmental concern. Skeptical Citizens are less confident that science to protect them from potential risks posed by HWDF burning than are Trusting Communitarians.

The two participants comprising Factor C are labeled as Trusting Communitarians due to their identification with communitarian issues and trust. Trusting Communitarians acknowledge the importance of both technical and non-technical criteria in decision making. They recognize the importance of preserving the existing character and values of the community. They are confident that science will protect the public's health and the environment. Trusting Communitarians

understand the importance of citizen involvement and consensus in decision making. They also have faith that the current decision making processes are not biased toward industry and money (even more so than Self-confident Supporters). Trusting Communitarians are much more willing to trust government and industry to make environmentally sound decisions than are Skeptical Citizens.

CHAPTER VII

PREFERENCE RANKING OF DECISION CRITERIA AND PUBLIC PARTICIPATION STRATEGIES

Introduction

In Chapter V, the results of the open-ended and quasi-structured personal interviews were presented. In Chapter VI, the common perspectives of the stakeholders were presented based on Q methodological analysis of stakeholders' statements made during these and other interviews. These two research methods are important to grounding the results of a third method used in this research: preference ranking. As part of this effort to better understand siting controversies, it was important to determine what, if any differences, exist among stakeholders' preferences concerning the criteria that should be used making siting decisions and the means by which the public should participate in making these decisions. Preferences were elicited by a technique known as card ranking.

Card Ranking Technique and Analysis

The stakeholders who participated in this study were each asked to participate in a card ranking exercise immediately following the Q sorting exercise discussed in Chapter VI. The card ranking exercise consisted of two parts: decision criteria and public participation strategies.

In the first part of the card ranking exercise, stakeholders were first asked to rank thirteen cards, each of contained a decision criterion, with a brief description, which could be used in making siting decisions. They were instructed to read through all 13 cards and then linearly arrange them from least preferred (rank order = 13) to most preferred (rank order = 1).

In the second part of the card ranking exercise, the stakeholders were asked to repeat this process – this time with nine cards on each of which was written, with a description, a public

participation strategy that could be used in making siting decisions. In either event, after arranging the cards in linear fashion, the stakeholders were asked to group the cards into three groups – those that they judged as having high importance, those having moderate importance, and those having low or no importance. The raw decision criteria and raw participation strategy card ranking data are included in Appendices D and F, respectively.

The results of the rank order exercises were combined across all stakeholders and by stakeholder demographic type (industry, government, and citizen). In either case, the results were analyzed using five methods, which are discussed in the next section. The fifth method, a composite of the results of the first four, was used in interpreting the card ranking results.

Following the description of analytic methods, the decision criteria ranking results are discussed. This is followed by a discussion of the public participation strategy ranking results. Finally, the relationship between these rank order results is explored.

Card Rank Analytic Methods

Five card ranking analyses were used to deduce a composite rank order of decision criteria and public participation strategies across stakeholders and stakeholder types. Each of the first four methods has its strengths and weaknesses. As a result, the rank order used in the interpretation of card ranking data was computed using a fifth method that combines the results of the first four.

Analytic Method #1: Median Rank Order

The median rank order method was selected because of its suitability in finding a measure of central tendency in ordinal data. The individual rank order scores of each decision criterion and each public participation strategy were arranged in ascending order and the middle (median) rank order score was determined. The median, as the measure of central tendency for ordinal data has an advantage over other descriptive statistics because it excludes outlying (extremely high or low) ranks. Unfortunately, it suffers from a loss of data richness by the loss of outlier rank scores. It also suffers from a failure to consider the relative importance that stakeholders attached to each criterion or strategy.

The composite median rank order was determined by arranging the criterion-specific and strategy-specific median scores from high (low preference) to low (high preference).

Analytic Method #2: Individual Rank Order

The individual rank order method was used to maximize the resolution the combined rank order by preserving the full richness of the data in the composite results. In this method, the individual rank order scores for each criterion and strategy were summed. The composite rank order was computed by arranging the sums in a manner identical to that used for median scores. Though this method is richer than the median method, it still fails to take into account the subjective importance that each criterion and strategy has to the stakeholder and it is sensitive to extreme values.

Analytic Method #3: Group Rank Order

The group ranking method is useful because it distinguishes the relative importance that each criterion and strategy has to the stakeholder. To compute a composite rank order score using this method, each individual's criterion and strategy importance rating (high = 1, moderate = 2, low = 3) was summed with those of other stakeholders. The sums were arranged as above to deduce the composite rank order. Though this method captures relative importance, it suffers from a lack of resolution (scores vary from 1-3, rather than from 1-13 or 1-9 for decision criteria and public participation strategies, respectively).

Analytic Method #4: Weighted Individual Rank Order

In an attempt to combine the advantages of the individual and group rank order methods, a combination of these methods was used. To develop a composite rank order using this method, the individual rank order scores were first multiplied by an assigned value as follows: high importance = 1, moderate importance = 2, and low importance = 3). These products were then summed by criterion or strategy to compute a composite score for that criterion or strategy. The final rank order was computed by arranging the summed products in ascending order as described above. Though this method combines the advantages of the individual and group ranking methods, it still suffers from the bias produced by extreme values.

Analytic Method #5: Overall Rank Order

The overall rank order, calculated from the four rank orders described above, represents the composite rank order of criteria and strategies. The overall rank order score was computed as the sum of the median, individual, group, and weighted individual rank orders. The composite overall rank order was determined using the same ascending array of rank order scores as was used in the four previous methods.

In the discussion of card sort results, a criterion is referred to as method independent when the rank order for that criterion is constant across each ranking method. Method independence was common among those criteria and strategies that were ranked near the most preferred or least preferred; minor mixing of rank orders was found for those criteria and strategies ranked in the middle.

Decision Criteria Preference Ranking Results

Decision Criteria Considered

As mentioned in the chapter introduction, 13 decision criteria were considered by the stakeholders in their ranking exercises. A brief description of each is presented below. The specific definitions of each criterion are included in Appendix C.

Environmental Criteria

Six of the 13 criteria can be included in this criterion grouping. Four of the six are primarily technical criteria: scientific risk estimates, technical/legal education, access to information, and use of alternative technologies. The fifth and sixth are non-technical but are included here because they also relate to environmental concerns: personal view toward technology and personal risk perception/judgment. It is expected that the rankings of these criteria will tend to be clustered.

Economic Criteria

Three criteria concern economic impacts: economic impact on the company, economic impact on the community, and fairness and justice. While the first two deals with allocational impacts, the third concerns the equity of the distribution of risks, costs, and benefits among

stakeholders. As in the case of technical and environmental criteria, it is expected that these three criteria will tend to be clustered in their rankings.

Community-Based Criteria

Two of the criteria involve community-based concerns. Community disruption and understanding local culture are directly tied to community-level impacts. Again, it is expected that these two criteria will be clustered in the ranking results.

Institutional Trust Criterion

Trust in government and industry was the 12th criterion presented to stakeholder for their consideration in judging the relative importance that the criteria should play in siting decisions. No particular relationship between trust and any other criterion is expected, though it is certainly reasonable to expect that the importance of trust may vary directly with the importance of citizen involvement and non-technical criteria and indirectly with technical environmental criteria. The relationship between trust, technical criteria, and citizen involvement is proposed because those stakeholders who believe that trust is not important can be expected to believe that citizens should defer to institutional expertise and discretion; thus technical criteria would dominate and citizen involvement would subordinate. On the other hand, those who believe that institutional trust is highly important to siting decisions may be inclined to insist on increased citizen involvement and the inclusion of non-technical environmental and community-based criteria in decision making.

Citizen Involvement Criterion

The relative importance of citizen involvement in siting decision making is tested with this criterion. As mentioned in the trust criterion paragraph, though no particular clustering of this criterion with any other is explicitly anticipated, it is reasonable to suppose that those who judge this criterion as important may be less inclined to judge technical criteria as important and more inclined to believe that institutional trust is important.

Industry-Permit Supporter Preferences

Table 5 presents the distribution of decision criteria card rankings among industry stakeholders who supported the HWDF permits. The criterion that those in this group most preferred (order-independent rank of 1) in siting decision making is reliance on alternative technologies. Eight of the nine industry stakeholders highly favor the use of alternative waste-derived fuel (HWDF) is such an alternative technology technologies in siting hazardous waste management facilities. They believe that hazardous waste-derived fuel conserves fuel, saves costs, and safely incinerates hazardous wastes, simultaneously.

The second most-preferred (also order-independent) decision criteria among industry stakeholders are access to information and technical/legal education. Six of the nine industry stakeholders highly prefer and the remaining moderately prefer these criteria. This indicates that the permit supporters strongly believe that the technical arguments for the use of HWDF as an alternative fuel should dominate decision making, taking precedence over non-technical arguments. As will be further discussed in Chapter VIII, these stakeholders also believe that technical criteria can be used to forge a consensus on the use of HWDF whereas non-technical criteria cannot.

The fourth-most preferred criterion among industry stakeholders, with an order independent rank of 4, is the use of scientific risk estimates in decision making. Group rank data shows that five strongly favor, three moderately favor, and one does not favor the use of scientific risk estimates. This result lends further evidence to the claim that this group prefers objective, scientific arguments in siting decision making.

Personal judgments of risk follow with a median rank order of 4 and a overall rank order of 5. Interestingly, three of the nine industry supporters ranked this criterion highly important. Though this may at first appear to conflict with their avowed preference for objective criteria, their explanation demonstrated that they were referring to their own judgment and those of similarly trained professionals, not those of non-technically trained persons.

Trust in government and industry rated an overall rank order of 6 and a group rank order of 4, with four highly favoring and five moderately favoring trust as important to siting decision making.

TABLE 5

DECISION CRITERIA PREFERENCES

(Industry - Permit Supporters)

CRITERION	MEDIAN RANK		INDIVIDUAL RANK		GROUP RANK					WEIGHTED INDIVIDUAL RANK		OVERALL RANK	
	Score	Order	Score	Order	High	Mod	Low	Score	Order	Score	Order	Score	Order
Access to Information	4	2	36	2	6	3	0	12	2	4	2	8	2
Alternative Technologies	1	1	24	1	8	1	0	10	1	1	1	4	1
Citizen Involvement	9	9	82	12	1	7	1	18	8	96	10	39	11
Community Disruption	12	13	91	13	1	1	7	24	13	169	13	52	13
Economics on Community	7	6	68	7	3	5	1	16	6	42	7	26	7
Economics on the Firm	7	6	77	10	2	3	4	20	11	100	11	38	10
Fairness and Justice	9	9	77	10	1	7	1	18	8	80	8	35	8
Personal Risk Judgments	6	4	59	5	3	5	1	16	6	30	6	21	5
Personal Views of Technology	9	9	70	8	1	5	3	20	11	80	8	36	9
Scientific Risk Estimates	6	4	51	4	5	3	1	14	4	16	4	16	4
Technical/Legal Education	4	2	36	2	6	3	0	12	2	4	2	8	2
Trust in Gov't and Industry	8	8	60	6	4	5	0	14	4	24	5	23	6
Understanding Local Culture	10	12	76	9	3	1	5	19	10	108	12	43	12

An explanation of this finding is that these stakeholders believe that reliance on verifiable objective facts is sufficient therefore, institutional trust is less important.

Community economic impacts, fairness and justice in the distribution of benefits and risks, personal views toward technology, and economic impacts on the company were ranked 7 through 10 in importance, respectively. Three of these criteria concern economic impacts. These results suggest that industry stakeholder's accord only moderate importance to economic considerations whether they be on the community, the firm, or on particular segments of the community. Apparently, these stakeholders are unwilling to explicitly acknowledge the legitimacy of economic criteria concomitant with that of environmental and health impacts. As will be seen below, this is contrary to the view of industry held by the citizen-opponents.

The least important criteria to industry stakeholders are community disruption, understanding local culture, and citizen involvement. Community disruption is order-independently ranked last (13th), with only one highly favoring and seven not favoring community disruption. Understanding local culture was overall ranked 12th. These stakeholders apparently do not believe the daily life, norms, or traditions of the community change as a result of HWDF burning; therefore, such concerns are irrelevant to decision making. (In a minor split, three of these stakeholders rated understanding local culture as highly important. This is explained by their belief that the community should appreciate the historical value of the cement plant to Foreman).

Citizen involvement is ranked 11th overall. Only one industry supporter highly favored it as a decision criterion whereas seven only moderately favored it and one did not favor it at all. In general, industry stakeholders resist uninformed citizen involvement. Apparently, perhaps based on their experience with community opposition to the permits, they are not optimistic that citizens will become sufficiently informed and therefore their involvement is not important.

Citizen-Permit Opponent Preferences

Table 6 presents the results of citizens' decision criteria card rankings. The most-preferred criterion is access to information, followed by alternative technologies and citizen involvement. All three citizens highly favored these criteria. Citizens believe that it is very important that they be afforded the ability to obtain relevant information in a timely manner and in an understandable way and that they be involved in siting decisions that may affect their community. Like industry, citizens prefer alternative technologies but unlike industry, citizens prefer a safer alternative than HWDF for cement production.

The fourth-preferred decision criterion among citizens is fairness and justice, with an overall rank order of 4. Two citizens highly favored fairness while the other citizen moderately favored it. These citizens do perceive an unequal distribution of costs, benefits, and risks to the community in waste facility siting decisions.

Trust in government and industry follows fairness with an overall rank order of 5. Group data indicates that two citizens believe trust in government and industry is highly important in decision making while the other citizen ranked trust last due to her skepticism that trust could ever be earned by industry and government. Her skepticism was sustained by her belief that AGC and ADPC&E had tried to conceal and restrict access to permitting information.

Economic impact on community was ranked 6th overall by the citizen-opponents but only 9th using the group rank method. One citizen rated this criterion highly important while the other two ranked it only moderately important. These two citizens recognized that AGC is important to the local economy but that importance should not supersede the importance of the environmental and health risks that the company's burning of HWDF poses.

Personal judgments of risk were the citizens" 7th most preferred criterion. Group rank data indicates that citizens are split with one favoring, one moderately favoring, and one not favoring personal judgments of risk in siting decision making. The citizen highly favoring personal judgments of risks believes that her judgment of the risks associated with HWDF burning in cement kilns is sufficiently informed. Personal views of technology and technical/legal education tied for 8th

TABLE 6

DECISION CRITERIA PREFERENCES

(Citizen – Permit Opponents)

CRITERION	MEDIAN RANK		INDIVIDUAL RANK		GROUP RANK					WEIGHTED INDIVIDUAL RANK		OVERALL RANK	
	Score	Order	Score	Order	High	Mod	Low	Score	Order	Score	Order	Score	Order
Access to Information	2	2	6	1	3	0	0	3	1	1	1	5	1
Alternative Technologies	1	1	7	2	3	0	0	3	1	2	2	6	2
Citizen Involvement	3	3	10	3	3	0	0	3	1	3	3	10	3
Community Disruption	8	7	26	8	0	2	1	7	9	72	11	35	10
Economics on Community	6	5	17	4	1	2	0	7	9	36	6	24	6
Economics on the Firm	12	13	28	11	1	0	2	7	9	99	12	49	13
Fairness and Justice	8	7	21	5	2	1	0	4	4	20	4	21	4
Personal Risk Judgments	6	5	23	7	1	1	1	6	6	42	7	25	7
Personal Views of Technology	9	9	21	12	2	0	1	5	5	60	8	34	8
Scientific Risk Estimates	11	12	31	13	1	0	2	7	9	117	13	47	12
Technical/Legal Education	9	9	27	9	0	1	2	6	7	63	9	34	8
Trust in Gov't and Industry	4	4	21	5	2	0	1	5	5	20	4	23	5
Understanding Local Culture	10	11	27	9	0	1	2	6	7	63	9	36	11

and scientific risk estimates was ranked 12th. Only one citizen moderately favored technical/legal education and the other two citizens do not judge such education as particularly important. Obviously, the citizens do not accord much legitimacy to technical criteria in siting decision-making. Given the importance attached to such criteria by industry representatives, it is no surprise that the HWDF proposal was resisted and that communication between the two groups was ineffective at reducing conflict.

The least important decision criteria to citizens as a stakeholder group were community disruption, economic impact on the firm, scientific risk estimates, and understanding local culture. Firm economic impacts ranks last with an overall rank order of 13. The one citizen that rated this criterion as highly important did so out of recognition of the important role that the company plays in community's economic welfare. Understanding local culture and community disruption were ranked 11th and 10th, respectively. This finding, though not anticipated, can be explained by the citizens' overriding concern about environmental and health concerns as well as concerns about fairness and rights of citizen involvement. Communitarian concerns were obviously less important.

Government-Permit Neutral Preferences

Table 7 presents the overall distribution of decision criteria preference rankings for the government stakeholder group: two ADPC&E officials and the former mayor of New Boston. The most-preferred criterion is technical/legal education. Group data indicates that each government representative highly favors this criterion in decision making. These officials believe that siting issues are difficult to understand without the proper technical/legal education.

The government stakeholders rank alternative technologies 3rd and fairness and justice 4th. Group rank data indicates that two officials highly favored these criteria while one (the former mayor) only moderately did so. The ADPC&E officials believe that innovative technologies can be used that will reduce toxic emissions to the environment while also encouraging economic growth. Both also seem to recognize that, as public servants, that they must also consider the equity and fairness in the distribution of risks, costs, and benefits in their decisions.

TABLE 7

DECISION CRITERIA PREFERENCES

(Government – Permit Neutrals)

CRITERION	MEDIAN RANK		INDIVIDUAL RANK		GROUP RANK					WEIGHTED INDIVIDUAL RANK		OVERALL RANK	
	Score	Order	Score	Order	High	Mod	Low	Score	Order	Score	Order	Score	Order
Access to Information	7	6	17	6	2	1	0	4	2	12	4	18	5
Alternative Technologies	5	4	14	3	2	1	0	4	2	6	2	11	2
Citizen Involvement	2	2	13	2	2	0	1	5	6	12	4	14	4
Community Disruption	9	9	27	10	1	0	2	7	8	80	10	37	10
Economics on Community	10	11	28	11	0	1	2	8	11	121	11	44	11
Economics on the Firm	13	13	37	13	0	0	3	9	12	156	13	51	13
Fairness and Justice	5	4	15	4	2	1	0	4	2	8	3	13	3
Personal Risk Judgments	9	9	26	9	0	2	1	7	8	72	9	35	9
Personal Views of Technology	10	11	32	12	0	0	3	9	12	144	12	47	12
Scientific Risk Estimates	8	7	22	8	1	1	1	6	7	56	8	30	8
Technical/Legal Education	1	1	6	1	3	0	0	3	1	1	1	4	1
Trust in Gov't and Industry	8	7	20	7	2	1	0	4	2	14	6	22	6
Understanding Local Culture	3	3	16	5	0	2	1	7	8	40	7	23	7

Citizen involvement and access to information were ranked 4th and 5th, respectively. Both ADPC&E officials highly favor citizen involvement and access to information but the former mayor does not favor citizen involvement and only moderately favors citizen access to information. Whereas the State officials appreciate that citizens want to be informed and involved, the mayor adopts the paternalistic view that citizens need not concern themselves with technical and economic decisions that are best made by experts and elected representatives. Coupled with fairness, the ADPC&E officials recognize the importance that citizen involvement and information play in building consensus in decision making.

Government participants are also split in their preferences for scientific risk estimates in decision making with a group rank order of 7 and an overall rank order of 8. One ADPCE official highly favors the use of scientific risk estimates in siting decisions, the other ADPC&E official moderately favors its use, and the former mayor sees little utility in its use. The mayor favored economic criteria over risk criteria. The State officials split can be explained by their different view concerning the proper role of non-technical criteria in siting decisions. Trust in government and industry was ranked as the 7th most important criterion. Both State officials ranked it highly important and the mayor ranked it moderately important. It is surmised that these public officials recognize that maintenance of public trust is important in carrying out their duties, though, apparently, not as important as direct and empowered citizen participation. It is possible that the State officials, at least, recognize that the public does not have so much trust in them that they are willing to unquestioningly defer to their judgment.

Understanding local culture (6th), personal risk judgments (9th), community disruption (10th), and economic impact on the community (11th) were ranked moderately important by the government stakeholders. Clearly community-based and non-technical criteria enjoy enhanced legitimacy among members of this stakeholder group over that enjoyed by the other two groups. Perhaps this can be explained by their sense of fiduciary obligation that they bear as public servants.

The least important decision criteria in the opinion of government officials are economic impact on the firm and personal views toward technology, with overall rank orders of 13 and 12,

respectively. Not surprisingly, all three government participants are reluctant to place firm economics above community health and concerns. On the other hand, personal concerns about technology must take a back seat to technical, political, and community-wide concerns in siting decisions.

Comparison of Decision Criteria Preferences

Table 8 presents an overall rank order comparison of decision criteria preference rankings by each stakeholder group. This section will identify the important similarities and differences among the stakeholder groups.

Citizen-Government

Both citizen and government stakeholders believe that alternative technologies, fairness, and citizen involvement should be important in decision making. They agree that innovative technologies that produce non-toxic emissions to the environment should be used in place of traditional technologies that are more polluting. They also agree that inequities in the distribution of risks, costs and benefits are unfair and must be avoided. Finally, they agree that citizens have a right to be involved in siting decisions.

Both groups dismiss the importance of economic impacts on the firm, community disruption, and personal views of technology in decision-making. Economic impacts on the firm are less important than protection of the community from adverse environmental impacts. Their agreement on the low importance of community disruption and technological views is probably superficial; these issues never became salient in this controversy.

Citizens more strongly believe that access to information and economic impact on the community are more important in siting decisions than to government officials. Given their high distrust of government and industry, citizens want independent, immediate, and free access to information that they believe will help them protect themselves and the welfare of the community. To government officials, economic impacts are less important than legal compliance and acceptable risk. Also government officials would generally prefer that citizens defer to the.

TABLE 8

COMPARISON OF STAKEHOLDERS' DECISION CRITERIA PREFERENCES

CRITERION	CITIZEN-OPPONENTS	GOVERNMENT-NEUTRALS	INDUSTRY-SUPPORTERS
	Overall Rank Order	Overall Rank Order	Overall Rank Order
Access to Information	1	5	2
Alternative Technologies	2	2	1
Citizen Involvement	3	4	11
Community Disruption	10	10	13
Economic Impact on Community	5	11	7
Economic Impact on the Firm	13	13	10
Fairness	4	3	8
Personal Judgments of Risk	6	9	5
Personal Views of Technology	11	12	9
Scientific Risk Estimates	12	8	4
Technical/Legal Education	8	1	2
Trust in Government and Industry	7	6	6
Understanding Local Culture	9	7	12

expertise of the agency making immediate access to information somewhat less important than it would be otherwise. Instead, government officials believe that technical and legal education should be elevated in importance to ensure that citizens can understand the many complex technical and legal issues involved in siting decisions

Citizen-Industry

Citizens and industry both prefer alternative technologies and access to information – but for different reasons. Industry believes HWDF is an appropriate alternative technology to fossil fuels whereas citizens reject HWDF as an appropriate alternative. Citizens' distrust of AGC and ADPC&E motivates them to demand that information be provided so that the community can independently make judgments concerning the propriety of the siting proposal whereas industry favors citizen access to information as a palliative to ignorance-based opposition.

Both also reject community disruption and economic impact on the firm as important decision criteria in siting decisions. Neither group believes that AGC's burning of HWDF has disrupted the community in any significant way and they agree (at least explicitly) that AGC's ability to make a profit should not influence siting decisions.

Citizens differ from industry personnel however in the importance placed on citizen involvement and perceived inequities in the distribution of costs, benefits, and risks to the community. Not suprisingly, industry does not believe that citizens should play much of a role in siting decision making – at least until they become much better informed on relevant technical and legal issues. Industry officials also do not accept the legitimacy of citizens' concerns about fairness; in their opinion, employment, tax, and other economic benefits generated by AGC flow to the entire community.

Similar to government stakeholders and for the same reasons, industry representatives differ from citizens in their judgment of the importance of scientific risk estimates and technical/legal education in siting decision-making processes. Industry is much more confident in the use of risk-based decision making – especially when it is tempered with a sensitivity to economic welfare.

Government-Industry

Government and industry both highly value technical/legal education and alternative technologies in siting decisions. Each believes that siting issues are difficult to understand without proper technical and legal education. They also believe that new and innovative technologies are important to protecting the environment.

Both also understand that community disruption and the ability of a company to make a profit is not important when making siting decisions. Their agreement on community disruption is, in part, for different reasons. Industry rejects believes that the community has not been disrupted by HWDF. Government takes no stand on whether disruption did or did not occur; they simply recognize that there are several, more important variables relevant to siting decisions.

Industry stakeholders have a stronger preference for economic impacts on the firm, personal judgments of risks, and scientific risk estimates as decision criteria. This is explained by their belief that HWDF burning is necessary if AGC is to successfully compete in the market. Because they work daily with HWDF, they are more familiar with the risks involved. This familiarity leads them to subjectively judge the risks lower and gives them additional confidence that scientific risk estimates of HWDF burning prove that there is no danger to the public's health or the environment.

Public Participation Strategy Preference Ranking Results

Public Participation Strategies Considered

The nine public participation strategies presented to the stakeholders for their consideration can be arranged along a gradient from no citizen power (preemption) to maximum citizen power (citizen control). Low power strategies do not provide any meaningful opportunity for influencing a decision outcome and include public hearing and comment (one way communication) and consultation (two-way communication). Moderate power strategies offer a greater chance for citizen influence on the outcome and include non-binding agreement (face-to-face discussions), mediation (third party facilitation), and binding arbitration (third party decision). High power strategies offer substantial influence opportunities and include oversight board (shared power), referendum (community approval or veto of entire package), and, of course, citizen control. It can be expected that citizen opponent stakeholders may prefer high power strategies while industry

may prefer low power strategies. Government stakeholders may be more sympathetic to moderate power strategies as they seek a balance between Weberian efficiency (calling for limited involvement) and fiduciary responsibility (consistent with increased involvement).

Specific definitions of each of these strategies are included in Appendix E.

Industry-Permit Supporter Preferences

Table 9 presents the results of the industry stakeholder preference rankings of public participation strategies. The most-preferred (and method-independent) participation strategy is consultation. Third party mediation was a close second with a group rank order of 1 (tie with consultation) and a overall rank order of 2. Seven industry participants highly favor and two moderately favor both of these strategies. This suggests that industry recognizes that while exclusion of the public is not preferred, limiting the public's influence is. Consultation and mediation both allow the public to "have its say" but neither offers much direct influence, meaning that decision power remains in the hands of industry and government.

An oversight board is the industry stakeholders' third-most preferred participation strategy followed by the currently used public comment and hearing, with overall ranks orders of 3 and 4, respectively. Five industry stakeholders highly favor an oversight board and two highly favor public comment and hearing. These rankings suggest that industry stakeholders split in their preferred public participation strategy if consultation and mediation are not available: some are willing to share power while others prefer to limit public involvement to a consideration of citizens' opinions and distribution of information about the HWDF process. A similar split is apparent in industry stakeholders' fifth and sixth preferences: binding arbitration (increased citizen power) and non-binding agreement (decreased citizen power).

The least preferred participation strategy among industry stakeholders is citizen control with an overall rank order of 9. Only one industry participant did not indicate offer a low rating of citizen control. Referendum merited an overall rank order of 7, with four moderately favoring this participation strategy and the remaining five gave it a low preference rating. These two results imply that industry stakeholders are not willing to give up power in the siting process. Perhaps

TABLE 9

PUBLIC PARTICIPATION STRATEGY PREFERENCES

(Industry – Permit Supporters)

STRATEGY	MEDIAN RANK		INDIVIDUAL RANK		GROUP RANK					WEIGHTED INDIVIDUAL RANK		OVERALL RANK	
	Score	Order	Score	Order	High	Mod	Low	Score	Order	Score	Order	Score	Order
Binding Arbitration	4	4	38	5	2	2	5	21	6	30	5	20	5
Citizen Control	9	9	72	9	0	1	8	26	8	72	8	34	9
Consultation	1	1	16	1	7	2	0	11	1	1	1	4	1
Non-Binding Negotiation	6	6	50	6	1	5	3	20	5	30	5	22	6
Oversight Board	3	2	36	3	5	2	2	15	3	9	3	11	3
Preemption	8	8	70	8	0	0	9	27	9	72	8	33	8
Public Comment	4	4	36	3	3	5	1	16	4	12	4	15	4
Referendum	6	6	60	7	0	4	5	23	7	49	7	27	7
Third Party Mediation	3	2	27	2	7	2	0	11	1	2	2	7	2

Ironically, preemption was ranked 8th and had a group rank order of 9. Apparently, industry stakeholders realize that though they prefer to retain power over the siting decision outcome, they recognize that excluding the public is infeasible, even foolhardy.

Citizen-Permit Opponent Preferences

Table 10 presents the results of citizens' public participation strategy preferences. Their most preferred (and method-independent) participation strategy is referendum, unanimously highly preferred by the citizen stakeholders. As expected, opponents tend to prefer high power strategies. The second-most preferred (also method-independent) participation strategies (tie) are binding arbitration and consultation with an overall rank order of 3. While the preference for binding arbitration is consistent with opponent's desire for increased influence, their preference for consultation is quixotic. As in the case of industry stakeholder preferences, there appears to be a split among members of the citizen stakeholder group for power preferences, with one highly favoring, one moderately favoring, and one not favoring these participation strategies. This identical split found also in their stated preferences for oversight board, public hearing and comment, and third party mediation. Citizens prefer decision making processes that either seek direct community approval and oversight or third party intervention to help reach an voluntary agreement.

Citizens least preferred participation strategies that preemption public participation (method-independent rank = 9), non-binding negotiation (overall rank = 8), and citizen control (overall rank = 7). These rankings imply that though citizens do not want to be excluded from the decision making process, they do they want entire control over the process either. They also do not believe that non-third party facilitated, non-binding agreements have much merit.

Government-Permit Neutral Preferences

In Table 11, government stakeholders' most-preferred participation strategy is an oversight board, with an overall rank order of 1. Interestingly, the group rank data indicates that an oversight

TABLE 10

PUBLIC PARTICIPATION STRATEGY PREFERENCES

(Citizen – Permit Opponents)

STRATEGY	MEDIAN RANK		INDIVIDUAL RANK		GROUP RANK					WEIGHTED INDIVIDUAL RANK		OVERALL RANK	
	Score	Order	Score	Order	High	Mod	Low	Score	Order	Score	Order	Score	Order
Binding Arbitration	4	2	10	2	1	1	1	6	2	4	2	8	2
Citizen Control	8	8	18	7	1	0	2	7	7	49	7	29	7
Consultation	4	2	12	3	1	1	1	6	2	6	3	10	3
Non-Binding Negotiation	7	7	20	8	0	2	1	7	7	56	8	30	8
Oversight Board	6	5	16	6	1	1	1	6	2	12	6	19	6
Preemption	9	9	27	9	0	0	3	9	9	81	9	36	9
Public Comment	6	5	15	5	1	1	1	6	2	10	5	17	5
Referendum	1	1	4	1	3	0	0	3	1	1	1	4	1
Third Party Mediation	5	4	13	4	1	1	1	6	2	8	4	14	4

board, binding arbitration, consultation, and public hearing and comment all share a rank order of 1 with two government officials highly favoring and one moderately favoring each of these participation strategies. Apparently, government stakeholders prefer strategies that involve some form of shared power arrangement, favoring neither public exclusion nor public control. They acknowledge the importance of including all parties in the decision making process in order to gaining consensus for their actions. Thus, they favor inclusive public participation strategies that represent all parties and prefer non-adversarial arrangements in which the community and industry reach voluntary, but binding, agreements (mediation was ranked 5th but non-binding agreements rated only a 7).

Despite the tie in group ranking, the overall ranking sorts out the differences in preferences as follows: binding arbitration and consultation tie with a rank of 2 and public hearing and comment trails with a ranking of 4 – suggesting that government stakeholders may slightly prefer to offer more power to the public than to restrict it.

Least preferred were participation strategies which were grossly imbalanced vis a' vis the public in siting decisions. Preemption obtained a method-independent rank of 9. Referendum was ranked 8th and citizen control was ranked 6th.

Comparison of Public Participation Strategy Preferences

Table 12 presents an overall rank order comparison of participation strategy preferences by each stakeholder group.

Citizen-Government

Both groups favor binding arbitration and consultation. It is not surprising that both understand the importance of increased citizen influence to gaining consensus in the siting decision making process. However, their joint preference for consultation, a low power strategy, is paradoxical. Citizens' preference for consultation may be explained by a possible confusion as to the meaning of the strategy as the study defined it. "Consultation" may have been interpreted as a mutual dialogue designed to produce consensus rather than a two-way communication with little meaningful power over the decision outcome.

TABLE 11

PUBLIC PARTICIPATION STRATEGY PREFERENCES

(Government – Permit Neutrals)

STRATEGY	MEDIAN RANK		INDIVIDUAL RANK		GROUP RANK					WEIGHTED INDIVIDUAL RANK		OVERALL RANK	
	Score	Order	Score	Order	High	Mod	Low	Score	Order	Score	Order	Score	Order
Binding Arbitration	3	3	9	2	2	1	0	4	1	2	2	9	2
Citizen Control	8	8	19	6	1	0	2	7	6	36	6	26	6
Consultation	2	1	10	3	2	1	0	4	1	3	3	9	2
Non-Binding Negotiation	7	7	20	7	0	1	2	8	7	49	7	28	7
Oversight Board	2	1	7	1	2	1	0	4	1	1	1	5	1
Preemption	9	9	26	9	0	0	3	9	9	81	9	36	9
Public Comment	3	3	10	3	2	1	0	4	1	3	3	10	4
Referendum	6	6	21	8	0	1	2	8	7	56	8	29	8
Third Party Mediation	4	5	13	5	0	3	0	6	5	25	5	20	5

These groups also agree on the moderate importance attached to third party mediation and public hearing and comment: both are familiar but neither has proven particularly efficacious in producing consensus. They both reject non-binding negotiation and citizen control as participation strategies. Government apparently recognizes that exclusive control of citizens and face-to-face discussions are not effective strategies in facility siting. Citizens also realize that citizen control and non-binding negotiation are ineffective, if not impossible.

Citizens more strongly prefer the use of referendum because it affords the community the ability to veto a proposal that it finds unacceptable. Government much more prefers the use of an oversight board that simultaneously provides the community additional information and influence and preserves many of the prerogatives of the government as the ultimate decision authority.

Citizen-Industry

These two groups agree on very little concerning public participation strategies. The only (within two rank order positions apart) participation strategies that industry and citizens agree are important are consultation and third party mediation. Again, consultation may be explained by citizens' belief that this process involves dialogue leading to consensus. Industry's high preference for consultation is likely due its two-way communication, facilitated distribution of information, and limited citizen influence on the decision making process. Their agreement on third party mediation may be based on their own experience with the Foreman controversy; they both would like to avoid such controversies in the future.

Both stakeholders groups, however, share the view that excluding citizens from siting decisions or allowing citizens to exclusively control the process are not preferred. Apparently, neither side trusts the other to make these decisions alone.

Citizens differ from industry in that they prefer substantial influence in the decision making process as evidenced by their higher preferences for referendum and binding arbitration. Industry, on the other hand, prefers consultation and oversight boards. Industry appears to welcome limited citizen input in the decision making process.

TABLE 12

COMPARISON OF STAKEHOLDERS' PUBLIC PARTICIPATION STRATEGY PREFERENCES

CRITERION	CITIZENS-OPPONENTS	GOVERNMENT-NEUTRALS	INDUSTRY-SUPPORTERS
	Overall Rank Order	Overall Rank Order	Overall Rank Order
Binding Arbitration	2	2	5
Citizen Control	7	6	9
Consultation	3	2	1
Non-Binding Negotiation	8	7	6
Oversight Board	6	1	3
Preemption	9	9	8
Public Comment	5	4	4
Referendum	1	8	7
Third Party Mediation	4	5	2

Government-Industry

Government and industry acknowledge that the public hearing and comment strategy is ineffective in diverting public opposition. Both also realize the inappropriateness of excluding the public as each disapproves of preemption. They seem to have come to the conclusion that some accommodation of public involvement is necessary. This is apparent in their joint preference for oversight boards and consultation and their rejection of referenda – these preferences suggest that these stakeholder groups favor strategies which give the appearance of power sharing but essentially preserve current power arrangements.

Government stakeholders have a higher preference for binding arbitration, citizen control, and oversight board, probably because they believe that such strategies may gain more public support. Industry prefers third party mediation, perhaps because this group believes that it may have an advantage in such a setting due to its experience with such techniques in labor negotiations and its preference to restrict arguments to objective scientific and economic criteria. Industry may also see neutral-party mediation as a trust-building mechanism because it can be seen as being willing to engage in direct discussions with the public (but not necessarily submit to the public's will, as evidenced by it relative non-preference for binding arbitration).

Relationship between Decision Criteria and Public Participation Strategies

As discussed earlier in this chapter, the decision criteria and participation strategies are directly and indirectly related and will tend to be grouped together according to their relationship. This section will identify and discuss the clustering of different decision criteria and participation strategies as indicated by their overall rank order.

Relationship Among Industry's Preferences

Decision Criteria

The most important decision criteria to industry are five of the six environmental criteria. This group of criteria is tightly clustered, particularly the technical criteria: alternative technologies, access to information, technical and legal education, and scientific risk estimates. While personal

judgments of risks follow closely and conflicting with the technical criteria, they do not attach much importance to their personal views of technology. While not related, institutional trust and citizen involvement are of less importance, especially citizen involvement. Although personally confident about the risks involved with HWDF and conflicting with the technical criteria, this relationship suggest that industry relies on the technical criteria rather than the non-technical criteria. They believe lay citizens' are technically incompetent to participate and opposed citizens' should defer to institutional expertise and discretion. This relationship of preferences suggest that the issues of importance are technically related, and that by providing access to technical information, including risk assessments, will educate opponents and reduce their fears of HWDF burning.

The next favored criteria among industry are the economic criteria, which are also clustered, especially economic impact on the community and fairness. The third economic criterion (economic impact on the firm) is of lower importance and does not tightly cluster. This preference relationship suggest industry is unwilling to profit and risk public health and the environment, they recognize the importance of providing equitable distribution of risks and benefits to the community.

The community-based criteria (understanding local culture and community disruption) are tightly clustered with low importance. This clustering suggest that industry does not believe HWDF burning has resulted in community-based stigmatization. Though citizen involvement is not related and clusters with community-based criteria, it is reasonable to believe that industry would reject citizen involvement with claims of community disruption or decreased quality of life concerns because of HWDF burning.

Participation Strategies

Industry low preference for citizen involvement in the decision criteria is further strengthened as they initially prefer public participation strategies that provide little influence in the decision making process: consultation, third party mediation, citizen control and referendum. However, they do not prefer to exclude citizens' from participating in decision making process either. Interestingly, an oversight board is industry's third preference followed the current public comment and hearing. An oversight board would allow substantial influence with all parties, including government, to participate in and bind to any agreement that may result. These preferences suggest that industry

is willing to sharing power if two-way communication and third party facilitation fails to produce consensus among opposition. Their preference of sharing power over the current process may be explained by the ineffectiveness of the current processes in diverting public opposition. Binding arbitration and non-binding negotiation cluster as moderate importance and would allow a greater chance for citizen involvement. Overall, these relationships suggest that industry prefers to retain control over the decision making process by favoring consultation (two-way communication) and addressing concerns through third party facilitation (third party mediation).

Relationship Among Citizens' Preferences

Decision Criteria

Citizens' differ from industry in their clustering of decision criteria and participation strategy preferences, especially with respect to the technical environmental criteria and the extent citizens should be involved in the decision making process.

The environmental criteria were loosely clustered by citizens with two of the four technical criteria highly preferred: access to information and alternative technologies, along with citizen involvement. Technical and legal education and scientific risk estimates are ranked as having low importance. Personal judgments of risk, a non-technical concern, is preferred over the technical criteria used in siting facilities. Personal views of technology is of little importance. These preferences indicate that citizens distrust industry's and government's technical arguments in the safety and need for the HWDF, therefore, they demand independent access to information to allow them to make personal judgements about the wisdom of HWDF in their community.

Like industry, citizens tightly cluster two of the three economic criteria: fairness and economic impact on the community, but unlike industry these are given higher preferences. They also discard the importance of economic impact on the firm. Citizens apparently are more concerned about the potential inequities of the distribution of costs and benefits to the community posed by HWDF burning.

Citizens' cluster the two community-based criteria as low importance: understanding local culture and community disruption. This implies that citizens' view HWDF as a trust and risk related

concern, not as not as a cultural related concern. Citizens trust in AGC and ADPC&E to protect them from the long-term public health and environmental risk associated with HWDF burning are their major concerns.

Participation Strategies

Citizens' preferences among participation strategies lend further support of their demand for citizen involvement in decision making. For example, citizens' preferences for public participation include high and moderate power strategies. However, citizens' recognize they are not competent alone to make siting decisions (they rank citizen control 7^{th}) nor do they want to be excluded siting process (preemption is ranked 9^{th}). Citizens' first preference would allow a veto, while their second preference, binding arbitration, would allow the power to be shared among all stakeholders. Inexplicably, citizens' third most preferred strategy is consultation, a low power strategy, which would allow little opportunity to influence a siting decision. Inconsistencies in citizens' clustering of power strategies is also evidenced by the grouping of third party mediation, public comment and hearing, and oversight board - which are moderate, low, and high power strategies, respectively. Despite these inconsistencies, these results suggest that citizens' initially prefer strategies such as a vote to determine if community residents approve of HWDF burning in Foreman, and binding arbitration that allow substantial, but not complete, control over decision making. Due apparently to distrust, citizens favor strategies that provide neutral third party education and facilitation to help reach an agreement that could be included in any permit issued by the government.

Relationship Among Governments' Preferences

Decision Criteria

The most important decision criteria to government stakeholders are the technical environmental criteria: technical and legal education and alternative technologies. This group of criteria tightly clustered with fairness, citizen involvement, access to information, and institutional trust. Interestingly, another technical criterion used in decision making, scientific risk estimates, is not included in this group. This clustering can be explained as government's belief that citizens' motives to oppose HWDF are related to their fear of environmental risks; therefore, they believe

that concerned citizens should be involved in decision making and be provided with technical information to address these fears. Government also may believe that trust hinges on its efforts to fairly distribute risks and benefits in the community.

The community-based concerns to government officials are of moderate importance while the personal risk-based and economic criteria are of less importance. These clusters suggest that government officials recognize the importance of understanding community culture and traditions when siting hazardous waste facilities. They believe that siting decisions should primarily involve technical and legal issues, which are currently used in reducing fear and proving the need for hazardous waste management facilities.

Participation Strategies

Government's belief in the importance of citizen involvement in decision making is further supported by their preferences of participation strategies. Their most preferred participation strategy is the oversight board. This strategy allows substantial citizen monitoring of compliance, but does not allow influence of the decision itself. Binding arbitration and consultation, which are tie for second, allow moderate and low citizen influence, respectively. Their fourth-preferred strategy is public comment and hearing followed by third party mediation, which allow low and moderate influence, respectively. Although inconsistencies occur in the power arrangements of moderately preferred strategies, government apparently prefers to retain control over the siting decision processes. For example, government ranks citizen control, non-binding negotiation, and referendum - all high citizen power strategies, as low importance.

Summary

The different preferences among stakeholders concerning the criteria that should be used making siting decisions and the means by which the public should participate in making these decisions shed light on the reasons for the Foreman controversy. Citizens' unwillingness to defer to government expertise and discretion suggest that public trust (as technical competence and fiduciary obligation) in ADPC&E and AGC has eroded.

Citizens' see participation demands as a trust issue; specifically, trust in ADPC&E and AGC technical arguments about the need for and safety of HWDF burning in Foreman. They distrust the technical arguments used in the risk assessment and management of risks and are not persuaded to accept HWDF burning. Citizens perceive that an unequal distribution of costs, benefits, and risk accrue to the community as a result of HWDF burning. As a result, citizens' are motivated to participate to ensure independent access to information to make personal judgments about HWDF. They prefer enhanced influence - seeking direct community approval and oversight or third party intervention to help reach a voluntary agreement. It is reasonable to believe that citizens' trust depends upon government and industry's willingness to involve them in decision making process and provide them with the relevant information, including information about the safety of and need for HWDF burning.

Industry stakeholders, on the other hand, believe that technical arguments for the use of HWDF should dominate the decision making process. Their confidence in scientific risk estimates can be explained by their familiarity with the technical analyses, which they believe proves that public health and the environment are adequately protected. Based on their experience with community opposition, they do not believe citizens' should play much of a role in the decision making process until they become better informed on relevant technical and legal issues. Industry favors citizen access to the verifiable objective information as a palliative to ignorance based opposition. They believe that citizens' fear of risk, disbelief about the need for HWDF, and inequitable distribution of costs and benefits are citizens' major concerns. The remedy, in industry's view, is to provide information and education (1) on scientific risk estimates (to reduce fear), (2) on the lack of suitable alternatives (for successful market competition), and (3) on the fairness of distribution of risks and benefits (to gain public trust) that are all based on factual evidence.

State government officials also believe that technical and legal education should dominate the decision making process and that trust is important in carrying out their duties. They recognize that siting issues are difficult to understand without proper technical and legal education. Government understands that citizen involvement coupled with equity and fairness in the distribution of the risk, costs, and benefits are essential to building consensus in decision making. They favor participation

strategies that represent all parties and prefer non-adversarial arrangements in which the community and industry reach voluntary, and perhaps, binding agreements. They prefer to offer more power than restrict it, but only slightly so. State officials realize that personal views are of less importance than technical, political, and community wide concerns in siting decisions.

CHAPTER VIII

INTEGRATION OF FINDINGS AND CONCLUSIONS

The results of this research indicate that differences between facility proponents' (industry) and opponents' (citizens) views on sense of control, perceptions of risks, judgments of fairness, technical familiarity, scientific certainty, and, most importantly, institutional distrust were the dominant factors motivating public opposition to the hazardous waste-derived fuel (HWDF) burning permit proposal in Foreman. These findings support and build upon studies such as those by Armour (1991) and Duberg, Frankel, and Niemeczewski (1980) that have shown that community resistance to siting proposals is linked to four important concerns: inequities in the distribution of costs and benefits, perceived risks, feelings of loss of control over forces affecting the quality of one's life and community, and lack of trust in proponents and regulators. These findings also support Portney's (1991) risk perception conversion theory, which states that qualitative attributes of risk objects such as familiarity, scientific uncertainty, equity in distribution of risk and benefits, and institutional trust affect the level of risk that is perceived.

The four research instruments used in this study consistently produce evidence that distrust - citizens distrust of industry and government and industry's distrust of citizens – is an important, if not the most important, basis of this siting controversy.

The structured questionnaire and open-ended personal interviews of stakeholders revealed a clear lack of trust among citizens related to missing information, lack of forthrightness, and hidden economic agendas. A perception by proponents that opponents, environmental groups, and the media were uneducated only added to the distrust.

Q methodology confirmed the results of the interviews and questionnaires, which identified three perspectives among stakeholders in the Foreman controversy. Self-confident Supporters

(SSs), who are confident in their technical views and opinions about the safety of HWDF, believe that opposition was based on non-rational concerns or ignorance, which, in turn, motivated them to stress the importance of technical criteria in analyzing HWDF. Skeptical Citizens (SCs), on the other hand, distrust both AGC and the state regulatory agency (ADPC&E) to ensure their safety, believe that the siting process was unfair, and conclude that the decision to burn HWDF was based largely on economic influence without due regard to environmental and health concerns. The Trusting Communitarians (TCs), who are represented by an industry and a state official, recognize the importance of preserving community identity and values. They trust the current decision making process and are not concerned about the influence of money. They also believe that stakeholder involvement is necessary for consensus in decision making.

The card ranking results further support the Q methodology results in identifying the preferred decision criteria and participatory processes. Citizens distrust technical arguments and are frustrated in their inability to influence the decision making process. Industry is confident in the technical criteria that citizens distrust, and believe that citizens should have a limited role in the decision-making process at least until they become more technically informed. State officials are more prepared to legitimate citizens' distrust and to encourage citizen involvement - if non-adversarial participatory arrangements are implemented.

One ADPC&E official adopted the Self-confident Supporter perspective believe opponents should trust government officials to make honest, fair, and responsible decisions and believe that citizens should learn more about technical issues before opposing HWDF operations and proposals. The other ADPC&E official and an industry participant adopted the Trusting Communitarian perspective – concerned about understanding local culture and recognizing the importance of citizen involvement in decision making. The mayor does not have a unique point of view as he shares elements of both the Self-confident and Trusting Communitarians perspectives.

The following sections review the differences between opponents and proponents that produced siting gridlock.

Lack of Opponents' Sense of Control Produced Gridlock

Citizens (Skeptical Citizens) felt excluded from the decision-making process based on their beliefs that ADPC&E, AGC, and local officials failed to notify the community and provide them with useful information regarding HWDF burning, which, in turn, led to a loss of their sense of control over their own affairs. Frustrations over a lack of control was apparent in the interviews, as illustrated by the following quotes:

> *"Ash Grove didn't even notify the local public about burning hazardous waste. They already had an air permit, which was drafted in."*
>
> *"Local official knew about Ash Grove's hazardous waste burning, yet remained mum until pressed for information."*
>
> *"I believe ADPC&E bungled the Ash Grove matter."*
>
> *"They have, on every Ash Grove issue, opted to place materials elsewhere."*

This led citizens to believe there were hidden agendas, risks, and injustices in the decision making process, and that AGC could not be trusted to protect the community. For these reasons, opponents took matters into their own hands – researching cement kiln incineration and obtaining environmental compliance records of AGC and Cadence. Hill (1992) argues that citizens' previous experience and other implicit knowledge determine how citizens assess risky proposals. According to the public comments on the draft permit for HWDF storage, opponents tried to kill the HWDF proposal.

Industry, on the other hand, admitted that they should have provided more specific objective information about HWDF burning, but defended their position that they believed that the proposal to substitute fossil fuels with HWDF was a corporate (AGC) decision and that most AGC and Cadence employees were supportive of the decision. Some industry representatives insisted that opponents take more responsibility in their efforts to be involved and educate themselves. They distrusted opponents who they believed were distributing inaccurate information about HWDF burning and viewed opponents as both uninformed and misinformed. ADPC&E officials also claimed many citizens were poorly informed, based on the public hearing and written comments.

The following quotes summarize AGC's and Cadence's position vis a' vis the community's sense of control:

> *"I feel that the company [AGC] should have done more to inform the community of what exactly they were doing, and how they were doing it."*
>
> *"The owner got up and said, 'This is my family's business and we don't do some these things. He was referring to citizens allegations,' he was furious."*
>
> *" We had an open house to take all the mystery out of it."*

Differences in Risk Perceptions Produced Gridlock

There is strong evidence to support this claim from the open-ended interviews, Q sorts, and decision criteria. Opponents' perception of risks were a significant factor motivating opposition motivated by their belief that ADPC&E and AGC skirted salient issues and could not be trusted to ensure citizens' safety. Scientific uncertainty and distrust predisposes citizens to judge harshly the risks associated with HWDF burning as indicated in the open-ended interviews:

> *"Everyone's allergies started acting all at once."*
>
> *"I think it's something in the air from the cement plant. Our area is becoming saturated with metals and toxins."*
>
> *"This is, no doubt, working its way into the food chain, groundwater, surface water, and is loading the air we breathe."*
>
> *"I don't particularly think cement kiln incineration is safe; that's like taking landfills and putting them in the sky."*

Citizens are also concerned about the social costs (#19. The character of a community changes after a waste facility is located there.) of HWDF burning on the community.

Another distinction in risk preference is apparent in the Q sort results as opponents and proponents disagree on the need and safety of HWDF burning (#47. Industry must be required to recycle, reduce waste, and use safer techniques and raw materials.). Opponents prefer that AGC burn clean fossil fuels, whereas proponents technical familiarity leads them to believe that HWDF is a safe technology and that its use is needed to compete with more modern fuel-efficient cement plants.

Proponents and state officials embrace a scientific-technical construction of risk and rely on technical rationality to assess risk acceptability. Their technical familiarity leads them to believe risks posed by HWDF are low and that they can be controlled through technology. Trusting Communitarians believe HWDF burning is the best technology available to dispose of hazardous waste; therefore, they do not believe they are taking chances with the environment. These results suggest that proponents and ADPC&E officials are more willing to accept risk whereas opponents are uncomfortable with risk, particularly the scientific risk estimates of it. The following quotes summarize proponents' low perception of risks:

> *"I strongly feel that burning of waste as a fuel is a very good thing for all of us.*
>
> *"It's regulated properly, and it is a very, very safe way of getting rid of hazardous waste."*

Lack of Fairness in the Distribution of Costs and Benefits Produced Gridlock

Q sort results indicate that proponents and opponents disagreed on the fairness of the HWDF burning and permit proposal, even though decision criteria show they agreed that fairness should be important in siting decisions.

Opponents believe the siting process was unfair (# 43. The siting process was unfair because results provide greater risks to the people who are ethnically different or poor.) and that only AGC would truly benefit from HWDF burning. They indicated in their open-ended interviews that the siting process was unfair and illegitimate, and that additional opportunities (# 23. Citizens have ample opportunity to be involved in siting decisions in their community.) should have been provided to notify the community about AGC's HWDF burning (which, of course, fuels their distrust of ADPC&E and AGC). Although opponents acknowledge AGC contributions, economic support, and the few additional jobs from HWDF burning, they also believe that there are inadequate net benefits (# 1. Waste facility means economic growth and prosperity for the community.) to compensate for the environmental risks and social costs posed by HWDF burning (# 13. The people who benefit the most from a facility are not the ones who bear the risks.).

Opponents expressed in the interviews that they do not want to bear the risks for industrial

development. They favor management of hazardous waste at the point of generation:

> *"We don't want waste coming in from other states, let them take care of their own waste."*

Proponents, on the hand, believe the siting process was fair (#43. The siting process was unfair because results provide greater risks to the people who are ethnically different or poor.) and that Foreman has economically benefited from HWDF burning (# 1. Waste facility means economic growth and prosperity for the community.). They reject citizens' claims of inequities as they also acknowledge AGC contributions, additional employment, and other economic benefits associated with HWDF burning.

Differences in Technical Familiarity Produced Gridlock

There is strong evidence to support this difference. Proponents who work routinely with HWDF are personally familiar with technical analysis. According to their decision criteria preferences, technical familiarity leads them to subjectively judge the risks lower and increases their confidence that risks can be controlled through technology. Their familiarity is further supported in the Q sort results in that they believe that HWDF is a clean, safe technology (#45. There are clean technologies available that must be used now to reduce pollution, and # 47. Industry must be required to recycle, reduce waste, and use safer techniques and raw materials.), which motivates them to welcome public participation based on their technical arguments and technological appreciation of conserving fossil fuels (#42. Just being physically present in situations where environmental decisions are made is not enough, and # 28. It is impossible to know whether or not a process is really safe without technical education.). Proponents' familiarity also leads them to believe that opponents would accept HWDF burning if they were familiar with relevant technical issues (# 29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.). Their technical familiarity and trust is clearly expressed in the following quotes:

> *"We are disposing hazardous waste as cleanly and effectively as it can be done without endangering human health and the environment."*

"Most of the conflict was due to the lack of knowledge." "The HWDF business is so specialized that it is difficult for lay persons to understand."

"Education is the only salvation to the HWDF opposition."

This finding is consistent with Lynn's (1986) argument: those employed in industry are politically more conservative, favor pro-chemical assumptions in risk assessments, and think that the public is over-concerned and risk-phobic.

ADPC&E officials are also familiar with HWDF, is evidenced by their claim that incineration is the best available technology to dispose hazardous waste. They also strongly express the importance of technical and legal education along with citizen involvement in siting hazardous waste management facilities.

The lack of citizen familiarity with HWDF facilities appeared in the open-ended interviews. Opponents claimed that their concerns about HWDF burning were not adequately addressed at the public hearing for the HWDF storage permit. Q sort results indicate that opponents believe there should have been opportunities, with technical assistance, to become familiar with relevant objective information. Their lack of familiarity fueled their distrust of AGC and ADPC&E because these organizations were not open and forthright in providing information relevant to the burning permit proposed.

Differences in Belief of Scientific Certainty Produced Gridlock

Decision criteria preferences and Q sort results demonstrates the difference in stakeholders' views of scientific and technical criteria. Proponents and Trusting Communitarians are confident in their views that scientific risk estimates are sufficient bases for decision making and ensure adequate protection of public health and the environment.

Opponents' lack of faith in scientific risk estimates is apparent in their decision criteria preferences and open-ended interviews. Opponents indicated in the interviews that companies can find ways to circumvent compliance with emissions standards; therefore, scientific claims of safety are insufficient. The obvious inherent uncertainty in scientific risk estimates led opponents to reject the importance of scientific and technical criteria and to rely more on their own judgments of risks.

Q sort results suggest that opponents are skeptical about accepting HWDF burning even after becoming technically informed on relevant issues.

Differences in Social Trust of Institutions Produced Gridlock

The results of this case study provide overwhelming evidence that supports the role that trust played in this controversy. Opponents distrust AGC and ADPC&E to protect the community from risks of HWDF burning. Open-ended interviews and Q sort results indicate that AGC was distrusted (# 14. Government and industry know what they are doing; they are the experts, #17. Industry complies with environmental laws even when it costs them money, and # 18. Environmental laws are full of loopholes for industry advantage.) because of their reluctance to notify the community and be forthright with relevant information. Opponents also distrusted AGC based on their perception of the dominance of economic criteria over community interests and concerns. ADPC&E was distrusted (# 14. Government and industry know what they are doing; they are the experts, #16. The government adequately enforces environmental laws to protect human health and safety, and #18. Environmental laws are full of loopholes for industry advantage.) because of their apparent pro-industry bias, failure to provide community notification, lack of openness concerning permitting information, and dearth of environmental enforcement. Distrust is also evident in the decision criteria card sorts in that citizens insisted on independent verification of objective information concerning HWDF burning. Distrust, as Hadden (1991) claims, motivates citizens to seek to assert more control over the decision making process (e.g., preference for referendum and citizen involvement as indicated in their decision criteria and participation strategy card sorts).

Proponents, on the other hand, believe that AGC is a responsible company that should be trusted to protect human health and the environment. Q sort results indicate that proponents recognize the complexity of technical criteria (# 31. We would all be better off if the legal procedures were easier to follow.) and believe that citizens would trust them if they understood the objective information involved with HWDF (#29. If the public were more familiar with the operation

of a waste facility, they would be more willing to consider it). ADPC&E officials also indicated in the open-ended interviews that companies are sufficiently regulated and should be trusted to protect public health and the environment.

Conclusions

Opponents' distrust of AGC and ADPC&E may be the primary basis for siting gridlock in Foreman. This siting controversy was sparked by public concern over HWDF burning in Foreman, which could have been reduced, if not prevented, if citizens were forewarned about HWDF burning through early, honest and inclusive dialogue about all salient issues concerning the proposal.

Many citizens of Foreman were already sensitized to hazardous waste issues, which had brought them together to oppose the previous siting attempt based on concerns about public health and their sense of community. These factors also influenced citizen participation in the AGC controversy.

Once citizens became aware of AGC's use of HWDF and wondered why the community had not been notified about HWDF burning, suspicion grew about the wisdom of deferring to AGC and ADPC&E to protect their environmental and health interests. Citizens were disappointed that their concerns and fears were not taken into consideration as illustrated by the following quote: "Because AGC had an Air Permit [prior to the BIF regulations], they were not required to notify the public about their intent to burn HWDF."

In 1986, AGC did substitute HWDF as an alternative fuel for energy recovery to reduce energy cost and boost profits. Citizens' reservoir of trust of AGC was damaged as they recognized and questioned the need for HWDF burning. Citizens claimed AGC could have competed, as they had been, without HWDF, and that AGC was burning HWDF for economic interest only without regard to public health and community concerns.

Citizens began to ask themselves and each other what kind of hazardous materials were being burned and the nature of the impacts that may result from the emissions. However, they remained silent about their concerns because they simultaneously recognized the importance of

AGC employment and economic sustenance of the small community.

Later, as citizens began to wonder if a sudden outbreak of asthma could be related to the emissions, they confronted AGC. AGC responded, as one citizen stated: "They gave us a bunch of generic names, which didn't mean anything, and they [AGC] said it [HWDF burning] was safe, and well monitored." This lack of responsiveness further drained the public's reservoir of trust of AGC.

Citizens perceived that they needed to conduct further research. After studying AGC's and Cadence's environmental compliance history and Smith's (1994) literature on cement kiln incineration, citizens trust in AGC, Cadence, and ADPC&E in protecting the community's health and environment was further eroded.

After the BIF regulations went into effect in 1991, AGC applied for a hazardous waste storage permit and went through public notice and hearing in 1993. ADPC&E officials saw themselves as fulfilling their professional obligation by soliciting and, considering citizens' concerns about hazardous waste storage, making the siting decision based on the objective scientific and technical criteria. Following the state's action, citizens trust in AGC and ADPC&E plunged and perceptions of risks rose. It became obvious that citizens' HWDF burning concerns were not adequately addressed at the public hearing nor influenced by the permitting decision. These findings suggest that the delegitimization of citizens' concerns resulted in institutional distrust and ultimately policy gridlock.

CHAPTER IX

IN SEARCH OF THE OLIVEFIELD

Introduction

This chapter presents the extreme opponent Q sort results from the combined Greenfield and Brownfield communities and compares these results with the Skeptical Citizens Q results to the determine the Olive (Greenish-Brown) characteristics of opponents' viewpoints in this unique study. This comparison is accomplished by identifying similar viewpoints and z score loadings from Focht's (1995) combined Q analysis of each community type, which was introduced in Chapter I.[1]

Participants in each community type were examined using the same 47 Q statements. The results of each provide unique insights into those issues that hold varying importance. Opponents' in this study reacted uniquely to the conversion of a non-hazardous operation to an ongoing hazardous waste burning facility, just as those in Greenfield communities reacted uniquely to *de novo* proposals to site hazardous waste facilities and those in Brownfield communities reacted uniquely to threats from contamination from existing hazardous waste facilities.

The total number of participants in the Greenfield communities was 27 citizens, seven government officials, and two industry representatives. Focht's combined Q analysis of the 36 participants produced a five-factor analysis, which explained 3/5 of the total variance. These Q factor perspectives were titled: Skeptical Citizen, Technical Rationalist, Moderate Supporter, Optimistic Deliberator, and Local Controller. Of these perspectives, the Skeptical Citizen perspective, the extreme of opponent stakeholder viewpoints in the combined Greenfield communities, was most closely related to citizens in this Olivefield study.

Thirty-six stakeholders from the two Brownfield communities participated in the Brownfield study: 23 citizens, seven government officials, five industry representatives, and one community opinion leader. Focht's (1995) combined Q analysis of these communities produced a four-factor analysis that also explained 3/5 of the total variance. These four perspectives were titled: Environmental Consultant, Technical Paternalist, Skeptic, and Communitarian perspectives. Of these perspectives, the Skeptic perspective was the extreme opponent stakeholder viewpoint in these Brownfield communities, and was most closely related to the citizens in this study.

Table 13 presents the Skeptical Citizens Q sort results from this Olivefield study and each extreme opponent factor from the Greenfield and Brownfield communities obtained from Focht's (1995) combined Q analysis. In the table, underlined z scores represent true Olivefield characteristics (where the z scores are a combination or an average of Greenfield and Brownfield characteristics) and bolded z scores (z scores five tenths greater or less than the range beyond both Greenfield or Brownfield z scores) represent unique characteristics of opponents' viewpoints in this study.[2] Although some Q items are not distinguishing items (range > 1.0), and do not vary much between types, they provide interesting insights when compared across community types.

TABLE 13

TYPAL ARRAY Z-SCORES OF OPPONENTS' IN COMMUNITY TYPES

Q ITEM	*GREEN	*OLIVE	*BROWN
1. Waste facility means economic growth and prosperity for the community.	-1.7	-1.4	-1.3
2. Offering cash payments to a community is the same as a bribe.	.7	-.3	0
3. When jobs are scarce, an increase in employment is good even if there is resulting pollution.	-1.8	**-1.0**	-1.5
4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed.	-1.7	**-1.6**	**-1.8**
5. Industry works with communities to maintain a good public image.	-.8	**.2**	**-.4**
6. Scientific risk assessment should be the major consideration in siting decisions.	-.2	-.2	-.3
7. Citizens need to control which risks they have to put up with.	.9	.6	.2
8. We should not take any chances with the environment.	1.5	**.1**	1.7

TABLE 13 (continued)

TYPAL ARRAY Z-SCORES OF OPPONENTS' IN COMMUNITY TYPES

Q ITEM	GREEN	OLIVE	BROWN
9. I tolerate risk as a fact of life, but I don't like it.	-.4	.2	.2
10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem.	-2.2	-1.9	-1.9
11. The world would be a better place to live if we could go back to the good old days.	-.6	-.8	-.7
12. It is better to put facilities in communities with high unemployment; the people there need the jobs.	-1.3	-1.3	-.8
13. The people who benefit the most from a waste facility are not the ones who bear the risk.	1.8	.7	1.0
14. Government and industry know what they are doing; they are the experts.	-2.0	-1.8	-1.9
15. Cost effectiveness is more important to industry and government than environmental issues.	.2	1.3	.9
16. The government adequately enforces environmental laws to protect human health and safety.	-1.4	-.5	-1.9
17. Industry usually complies with environmental laws even when it costs them money.	-1.5	-1.5	-1.8
18. Environmental laws are full of loopholes for industry advantage.	1.3	1.6	1.2
19. The character of a community changes after a waste facility is located there.	.1	1.0	-.2
20. Allowing a waste facility to locate in a community divides a community.	.5	-.4	.1
21. Waste facilities give a community a bad reputation.	.6	.7	-.4
22. Citizens should be involved in every step of a siting decision.	1.2	1.3	1.0
23. Citizens have ample opportunity to be involved in siting decisions in their community.	-.6	-1.2	-1.0
24. Industry, government and the public should decide together what level of pollution should be allowed.	.2	-.1	.5
25. All information should be shared in easily understood language as soon as it is available.	.4	1.6	1.0
26. Who provides information makes a difference to me; the person must be honest.	1.0	1.2	1.0
27. It is really hard to know if decision makers have the same value as I do.	.6	.1	.9
28. It is impossible to know whether or not a process is really safe without adequate technical education.	.3	-.9	.2
29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.	-.9	-.9	-.6
30. Citizens should have their own experts.	.9	1.2	.3
31. We would all be better off if the legal procedures were easier to follow.	.5	.1	.7
32. Government shouldn't be trusted in making siting decisions.	.4	-.6	.7
33. Government uses citizen opinion against them.	-.3	-.6	.7
34. Economic special interests have too much influence in siting decisions.	.7	1.4	1.1
35. The people living in a community know best what is good for them.	.7	.1	.1

TABLE 13 (continued)

TYPAL ARRAY Z-SCORES OF OPPONENTS' IN COMMUNITY TYPES

Q Item	GREEN	OLIVE	BROWN
36. Citizens should initially oppose all proposals for siting by industry.	-.6	-.9	-.8
37. It is better to be active today than to be radioactive tomorrow.	.7	.4	1.0
38. If you have enough money, you can get away with polluting.	.9	.5	1.0
39. Conflict in decision making is necessary and healthy.	.1	.7	.1
40. Consensus is impossible when activists become involved in environmental decisions.	-.6	-1.0	-1.0
41. The chief function of the government is to support the economy	-1.0	-.4	-.7
42. Just being physically present in situations where environmental decisions are made is not enough.	.4	.4	.5
43. The siting process is unfair because results provide greater risks to the people who are ethnically different or poor.	.3	.6	.4
44. Environmental radicals are necessary to bring balance to the issues.	-.4	-.4	-.5
45. There are clean technologies available that must be used now to reduce pollution.	.9	1.4	1.5
46. Government and industry skew their risk estimates to suit their own purposes.	.2	0	.9
47. Industry must be required to recycle, reduce waste, and use safer techniques and raw materials.	1.4	2.2	1.6

* Represents the z scores from the opponents' Q analysis in this Olivefield study and Focht's (1995) combined Q analysis of the extreme opponents' in the Greenfield (Skeptical Citizens), and Brownfield (Skeptics) communities

The following sections present the Q factor perspectives of each opponent factor from the Greenfield and Brownfield studies. These interpretations were taken from Focht's (1996b) identification of stakeholder perspectives.

The Skeptical Citizen Perspective from the Greenfield Communities

The Skeptical Citizen perspective was shared by 15 of the 27 citizens from the combined Greenfield communities. Fourteen of the 15 were active siting opponents and one claimed a neutral position. These participants were risk averse and favored pro-active regulations of industrial activities to reduce risks. They were also concerned that environmental risks and economic benefits were not equitably distributed and believed that economics rather than environmental concern underlies support for siting proposals. Skeptical Citizens distrusted government and industry to ensure their safety, which motivated them to insist on substantive

participation in all stages of the decision making process. Lastly, and perhaps most importantly, they preferred egalitarian criteria based on justice and community-wide concerns.

The Skeptic Perspective from the Brownfield Communities

Eighteen citizens shared the Skeptic perspective from the Brownfield communities with 16 opponents and two neutrals. These participants were strongly risk averse and believed that only environmentally appropriate technologies should be used to protect the environment from insult. They also felt that protection of the environment should take precedence over economic considerations. The problems, as far as they were concerned, is that government and industry were not trustworthy and had not fulfilled their role in protecting the environment and interests of the citizens in the communities in which they govern and operate. Under these undesirable circumstances, citizens felt they needed to become involved and insisted on aggressive citizen oversight to ensure that the interests of the community were safeguarded. Their demand for access to information was less important than their demand for community participation because their concerns were not as technical as they were trust-related.

Comparison of Skeptical Citizens Viewpoints across Communities Types

Though Focht's (1995) perspectives of opponents' viewpoints from the combined Greenfield and Brownfield studies are similar to the Skeptical Citizen viewpoints in this study, particular characteristics of these viewpoints do vary.

The following sections will present arguments based on the factor loadings of citizen opponents from each community type, literature reviews, and knowledge of Bosma's (1996) Greenfield and Adams' (1993) Brownfield studies. The comparison of each community type with the Olivefield community produces some unique and interesting insights.

Greenfield -- Olivefield Comparison

Greenfield opponents have not experienced hazardous waste and, as a result, are more concerned about the proposed facilities posing risks to their communities. Greenfield opponents

more strongly believe governments are motivated by economic criteria (item # 41 (-1.0,-.4) Greenfield and Olivefield opponents z-scores, respectively)), and more strongly believe companies can get away with polluting if they have enough money (item # 38 (.9, .5)).

Greenfield opponents more strongly believe that they know what is best for their communities (item # 35 (.7, .1)), that proposed hazardous waste facilities will divide their communities (item # 20 (.5, -.4)). They have stronger perceptions that they will bear the risks associated with hazardous waste management facilities (item # 13 (1.8, .7)), which may be explained by their stronger aversion toward risks (item # 8 (1.5, .1)). Greenfield opponents are more reluctant to risk their community values and traditions with hazardous waste. In fact, understanding local culture was citizens' opponents' overall preferred decision criterion in Bosma's (1998) Greenfield study.

Olivefield opponents have more faith in government to adequately protect human health and safety than do Greenfield opponents (item # 16 (-.5, -1.4), Olivefield and Greenfield z-scores, respectively), and more strongly recognize that government and industry should be trusted in siting decisions (item # 32 (-.6, .4)). Olivefield opponents want to trust the state regulatory agency (ADPC&E) and Ash Grove Company (AGC) to ensure their safety because AGC is presently burning hazardous waste-derived fuels (HWDF) in their community. Olivefield opponents' also have stronger demands for information than do Greenfield opponents (item # 25 (1.6, .4)) because of their lack of trust in ADPC&E and AGC to ensure their safety from the HWDF burning. As a result, Olivefield opponents have stronger distrusting views about technical education (item # 28 (-.9, .3)).

Olivefield opponents also more strongly recognize the influence of money in the decision making process (items # 15 (1.3, .2) and # 34 (1.4, .7)) and the inadequacy of opportunities to be involved in the siting process (item # 23 (-1.2, -.6)). Their firsthand experience with the cement facility allowed them to recognize the influence of money in AGC's decision to substitute HWDF with fossil fuels. The lack of BIF regulations at that time excluded citizens from directly participating in the siting process when AGC substituted their fuels. Olivefield opponents also more strongly recognize that companies work with communities to maintain a good image (item #

23 (.2, -.6)) and less concerned about cash payments as bribes (item # 2 (-.3, .7)).. This is explained in Olivefield opponents' acknowledgment of AGC contributions and other donations to the community.

Although Olivefield opponents do not believe the community has been disrupted (10th overall card rank preference), the HWDF burning leads them to perceive more change in the character of the community than the Greenfield opponents (item # 19 (1.0, .1)). This may explain Olivefield opponents' low preference for community culture and traditions in card ranking preferences (11th).

Brownfield – Olivefield Comparison

Brownfield opponents are unique in their strong distrust of government and industry because they have experienced hazardous waste contamination in their community. They manifest a much stronger distrusting view about the lack of environmental enforcement (item # 16 (-1.9, -.5), Brownfield and Olivefield z scores, respectively) than the Olivefield opponents. Brownfield opponents want the contamination cleaned up, but disagreement exists on the extent clean up necessary and how safe is safe. This produces a stronger belief that the legal procedures are complicated (item # 31 (.7, .1)) and government and industry skew their risk estimates to suit their own purposes (item # 46 (.9, 0)). The perceived threat from the contamination motivates Brownfield opponents to more strongly believe that government, industry, and the public should seek common ground (item # 27 (.9, .1)), and decide together what level of residual pollution should be tolerated (item # 24 (.5, -.1)) and not to take chances with the environment (item # 8 (1.7, .1)).

Brownfield opponents are less willing to admit that contamination has changed the character of the community (item # 19 (-.2, 1.0)). This may be explained by Brownfield opponents' recognition that despite the presence of contamination, there has been little change in the character of the community. Nevertheless, Brownfield opponents do not highly value their local culture. In fact, Adams (1993) found that citizen opponents ranked understanding local culture as low importance (8th) because of the presence of contamination in their community.

Olivefield opponents have more faith that government will adequately protect human health and safety (item # 16 (-.5, -1.9) Olivefield and Brownfield z scores, respectively), and more strongly recognize that they should be trusted in siting decisions than do Brownfield opponents (item # 32 (-.6, .7)). Again, they want to trust ADPC&E and AGC to ensure their safety from HWDF burning. Olivefield opponents also have stronger requests for the access to information (item # 25 (1.6, 1.0)), which again is a direct result of the perceived lack of openness and forthrightness with permitting information. As a result, Olivefield opponents distrust AGC and ADPC&E claims of safety, which inclines them to be more skeptical about the utility of technical education (item # 28 (-.9, .2)) and a stronger belief they should be provided with their own experts (item # 30 (1.2, .3)). Olivefield opponents want to ensure that they are protected from the risks of HWDF burning. They also more strongly recognize the influence of money in the decision making process than do Brownfield opponents (item # 15 (1.3, .9)).

Olivefield opponents' recognize that the community has not been disrupted or divided as a result of HWDF burning (item # 20 (-.4, .1)), their experiences with HWDF lead them to perceive larger changes in the character of the community (item # 19 (1.0, -.2)) and a stronger belief that HWDF burning has given the community a bad reputation (item # 21 = (.7, -.4)). Olivefield opponents' experience with HWDF burning in their community may explain the lower preference for understanding local culture in card ranking preferences (11^{th}).

Conclusions

The findings of this research suggest that Olivefield opponents do provide viewpoints that contain elements of both Greenfield and Brownfield perspectives. However, HWDF burning opponents also share a perspective that contains elements different from both Greenfield and Brownfield perspectives, some of which may be unique to Foreman. Apparently, the citizen opponents' perspective in this study is more unique than "olive."

The "Olive" Characteristics of the Opponents' Olivefield Perspective

A few citizen opponents' Q items were found to lie between the placements of those in the Brownfield and Greenfield studies. These Q items are #1 - Waste facility means economic growth and prosperity for the community; #7 - Citizens need to control which risks they have to put up with; and #45 - There are clean technologies available that must be used now to reduce pollution. These items support the larger implication of the Q methodological study: Olivefield opponents recognize the economic importance of AGC's cement facility to their community (item #1), but distrust (#7) and a belief that the risks associated with HWDF burning are unacceptable (#45) has led them to oppose its use as fuel. Their ambivalence, as hypothesized in Chapter 1, can be summed up this way: HWDF burning opponents wish to preserve AGC's contribution to Foreman's economy but also want AGC to revert to using natural gas.

Olive characteristics were also manifested by the card ranking exercises. Opponents preference for technical and legal education and scientific risk estimates in the decision criteria afford this study olive characteristics. For public participation, opponents' preference for citizen control and non-binding negotiation also yields olive characteristics. Although institutional distrust is present, these preferences may be explained by the recognition that the protection of their community is in reliance with the technical criteria.

Unique Characteristics of the Olivefield Opponents' Perspective

Olivefield opponents differ from both Greenfield and Brownfield viewpoints in several ways. Olivefield opponents in Foreman uniquely sorted 12 of the 47 Q statements. They perceive HWDF burning as a threat to public health based on AGC's and ADPC&E's apparent lack of openness and forthrightness. Institutional distrust triggered the strongest demand among the three opponents' perspectives for independent access to the relevant information and expert advice. Olivefield opponents are unique in their strong faith that government will adequately protect human health and safety and should be trusted in siting decisions. Nevertheless, distrust lends them to be most skeptical about technical education. Olivefield opponents demand factual information so they can make independent personal judgments about the wisdom of HWDF in their community. Although they are unique in their recognition that the community has not been

divided, their low regard for community culture and traditions may be explained by their judgments of the unacceptably high social costs and social stigma that HWDF burning can create, which in turn increases distrust. The Olivefield opponent perspective is also unique in its recognition of the influence of money in the decision making process. Olivefield opponents believed that AGC's decision to use HWDF to supplement fossil fuel was to increase profits in the production of cement – ignoring community interests.

The last unique aspect of the Olivefield perspective among community types is the belief that the HWDF siting process was unfair – it provided inadequate opportunities for community influence over the burning decision. This is probably an idiosyncratic finding because, as one citizen stated, "AGC didn't notify the local public about their burning hazardous waste, because they already had an air permit [prior to the BIF regulations in 1991]." This situation is not possible today because BIFs are now regulated, and therefore, companies are required to go through public notices and hearings in order to obtain a permit and must meet stringent regulatory requirements once the permit is issued.

Unique Characteristics of the Greenfield Opponents' Perspective

Greenfield opponents are confident in their knowledge of what is best for their communities and highly value status quo community values, cultures, and traditions. They believe that proposed hazardous waste facilities will divide their communities and that companies can get away with polluting if they have enough money. They also believe that there is a lack of environmental enforcement to ensure adequate protection from these facilities and that government is more concerned about economic criteria than they are about community interests. In sum, Greenfield opponents demonstrate a strong aversion to risks associated with hazardous waste facilities and a strong unwillingness to accept hazardous waste in their highly valued "non-hazardous" communities.

Unique Characteristics of the Brownfield Opponents' Perspective

Brownfield opponents, on the other hand, express a strong distrust of both industry and government based on their experience with hazardous waste contamination in their community. They differ from Greenfield opponents' in relative low regard for community culture and traditions. Brownfield opponents distrust is fueled by industry's noncompliance with environmental laws and their recognition of the lack of environmental enforcement, which contributed to the hazardous waste contamination in their communities. They strongly believe that government, industry, and the public should seek common ground and decide together what level of pollution should be allowed in their communities. Brownfield opponents exclusively prefer an oversight board, which allows citizens to oversee remediation decisions.

Characteristics Shared by All Opponents' Perspectives

Several Q items are held in common by opponents, regardless of the type of controversy. The strongest consensus views among opponents concern threats posed by hazardous waste facilities. Each strongly believes that environmental restrictions should not be relaxed, even if companies cannot make profits. They also judge government and industry as incompetent to protect human health and the environment from environmental insults, which motivates them to directly influence siting decisions that affect their communities.

ENDNOTE

[1]The Trusting Communitarians and Self-confident perspectives were found to be analogous to the Greenfield Moderate Supporter and Technical Rationalist perspectives and the Brownfield Communitarian and Technical Paternalist, respectively, and therefore are not discussed herein.
[2]Q items with z scores of .4 to .5 represent discriminating items, i.e., lies at least 2 columns apart on the 47 Q sort form board, as specified in the Q analysis software program entitled PCQ3 (Strickland 1996).

CHAPTER X

IMPLICATIONS

Unfortunately, there are no easy solutions to the problems associated with the siting of hazardous waste facilities. However, a few recommendations can be made based on this case study to help reduce opposition in the future. The research on siting provides hope that participatory processes might be effective in building long-term trust.

Having shown that citizens' concerns about the legitimacy of decision criteria and processes are indeed motivated by their judgments of trust, government and industry should expand opportunities for citizen input, at least until the community develops a sufficient level of trust of industry's competence and motives.

Third party mediation and an oversight board were the only two public participation strategies that were acceptable to all participants in Foreman. In third party mediation, a neutral mediator attends all meetings between citizens and AGC representatives to consider the siting proposal. The mediator attempts to help parties forge a consensus. If successful, the agreement would be forwarded to ADPC&E for their consideration, which is free to include none, part, or all of the agreement in its permit (though failure to include important conditions would likely lead to significant opposition). An oversight board, is composed of equal number of citizens (selected by a consensus of citizen interest groups), AGC representatives, and ADPC&E officials. The board provides continuous oversight and control over facility operations. All parties agree to abide by the oversight board's decisions. Both of these strategies offer citizens an opportunity to influence the facility's design and operation.

Perhaps the most important prerequisite to avoiding opposition is to build trust. Not until opposing citizens perceive that ADPC&E and AGC are honoring their fiduciary obligation to

safeguard the community's best interests will trust be engendered. When the public notice and hearing for the consolidated permit expires, ADPC&E and AGC should attempt to empower dialogue within the community. This will require an honest, forthright, and comprehensive two-way information flow and sustained efforts toward consensus.

Fears can be addressed by providing risk assessment results and educating the public on risk information and interpretation. Access to and understanding of technical information can enhance the legitimacy of siting decisions, and perhaps will build social trust in ADPC&E and AGC. Having honest and effective communications about salient issues (Adams 1993) can create social trust. Concerned citizens should attend these dialogues, accompanied by their own technical expert, if necessary, to address concerns about risks and, perhaps, to legitimize the issues involved with HWDF burning in Foreman.

BIBLIOGRAPHY

Adams, T. 1993. "An Evaluation of Environmental Activists Opposition to Risk: A Case Study of the Cushing, Oklahoma Kerr-McGee Facility Controversy." Master's Thesis, Oklahoma State University.

Allenbach, E. 1994. "A Case Study Exploring Deficient Mechanisms in Current Environmental Decision-Making Processes: A Greenfield Perspective." Master's Thesis, Oklahoma State University.

ADPC&E (Arkansas Department of Pollution Control and Ecology). 1994a. *Site Narrative: Ash Grove Cement Company*. June.

ADPC&E (Arkansas Department of Pollution Control and Ecology). 1994b. *Summary Report Relative to Permit Application: Ash Grove Cement Company*. June.

ADPC&E (Arkansas Department of Pollution Control and Ecology). 1995a. *Site Narrative: Ash Grove Cement Company*. June.

ADPC&E (Arkansas Department of Pollution Control and Ecology). 1995b. *Permit Fact Sheet: Decision to Defer Permit Action: Ash Grove Cement Company*. April.

Armour, A.M. 1991. *The Siting of Locally Unwanted Land Uses: Towards a Cooperative Approach*. New York: Pergammon Press.

Arnstein, S. 1969. "A Ladder of Citizen Participation," *Journal of the American Institute of Planners* 35:216-24.

Bacow, L.S., and J.R. Milkey. 1992. "Overcoming Local Opposition to Hazardous Waste Facilities: The Massachusetts Approach," *Harvard Environmental Law Review* 6:265-305.

Bord, R.J., and R.E. O'Connor. 1992. "Determinants of Risk Perception of a Hazardous Waste Site," *Risk Analysis* 12:411-16.

Bosma, K. 1996. "Exploring NIMBY Gridlock: A Case Study of the Haystack Hazardous Waste Facility Siting Controversy." Master's Thesis, Oklahoma State University.

Brown, S.R. 1980. *Political Subjectivity: Applications of Q-Methodology in Political Science*. New Haven: Yale University Press.

Checkoway, B. 1980. "Public Hearing Are Not Enough," *Citizen Participation* 1:6-7, 20.

Craig, S.C. 1993. *The Malevolent Leaders: Popular Discontent in America*. Boulder, CO: Westview Press.

Duberg, J.A., M.L. Frankel, and C.M. Niemczewski. 1980. "Siting of Hazardous Waste Management Facilities and Public Opposition," *Environmental Impact Assessment Review* 1:84-89.

Duffy, C. 1983. "State Hazardous Waste Facility Siting: Easing the Process Through Local Cooperation and Preemption," *Boston College Environmental Affairs Law Review* 11:755-805.

Duffy, C. 1984. "State Hazardous Waste Facility Siting: Easing the Process Through Local Cooperation and Preemption," *Environmental Affairs* 11:755-804

Edelstein, M. 1989. *Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure.* Boulder, CO: Westview Press.

Elliott, M.L. 1984. "Improving Community Acceptance of Hazardous Waste Facilities Through Alternative Systems for Mitigating and Managing Risk" *Hazardous Waste* 1:397-410.

Fessenden-Raden, J., J Fitchen, and J. Heath. 1987. "Providing Risk Information in Communities: Factors Influencing What is Heard and Accepted," *Science Technology and Human Values* 12(3,4):94-101.

Flynn, J., P. Slovic, and C.K. Mertz. 1993. "Decidedly Different: Expert and Public Views of Risks from a Radioactive Waste Repository," *Risk Analysis* 13:643-8.

Focht, W.J. 1992. "The Role of Risk Judgment in Predicting Political Participation." Master's Thesis, Oklahoma State University.

Focht, W.J. 1995. "A Heuristic Inquiry into NIMBY Conflict: Exploring Solutions to Gridlock." Ph.D. Dissertation, Oklahoma State University.

Focht, W.J., and J. Lawler. 1996a. "The Use of Q Methodology in Policy Dialogue." Presented at the Symposium on Q Methodology, Association for Public Policy Analysis and Management, Pittsburgh. (November).

Focht, W.J. 1996b. "Identifying Stakeholder Preferences for Legitimated Siting Decision Criteria and Processes." Presented at the International Society for the Scientific Study of Subjectivity, Chicago, IL.

Folk, E. 1991. "Public Participation in the Superfund Cleanup Process," *Ecology Law Quarterly* 18:173-221.

Goetze, D.B. 1982. "A Decentralized Mechanism for Siting Hazardous Waste Disposal Facilities," *Public Choice* 39:361-370.

Greer, Walter L. 1996. Letter to David Clanton, ADPC&E regarding permit revisions (April).

Harney, A. 1994. "A Case Study Exploring Deficient Mechanisms in Current Decision-Making Processes; A Greenfield Perspective." Master's Thesis, Oklahoma State University.

Hill, S. 1992. *Democratic Values and Technological Choices.* Stanford, CA: Stanford University Press.

Hodges-Koppel, J. 1987. "State Roles in Siting Hazardous Waste Facilities," *Forum for Applied Reseach and Public Policy* 2(3):78-88.

Jasanoff, S., and D. Nelkin. 1987. "Science Technology, and the Limits of Judicial Competence." *Resolving Locational Conflict*, ed. Robert W Lake. New Brunswick, NJ: Rutgers.

Johnson, B.B. 1987. "Public Concerns and the Public Role in Siting Nuclear and Chemical Waste Facilities," *Environmental Management* 11:571-86.

Johnson, S.D. 1992. "Public Response to Environmental Health Risks," *The National Environmental Journal* (July/Aug):36-39.

Kasperson, R.E., and P-J.M. Stallen, eds. 1991. *Communicating Risks to the Public: International Perspectives*. Boston: Kluwer Academic Publishers.

Kasperson, R.E., D. Golding, and S. Tuler. 1992. "Social Distrust as a Factor in Siting Hazardous Facilities and Communicating Risks," *Journal of Social Issues* 48(4):161-87.

Kraft, M.E. 1988. "Analyzing Technological Risks in Federal Regulatory Agencies." *Technology and Politics*, ed. Michael E. Kraft and Norman J. Vig. Durham: Duke University Press.

Kraft, M.E., and B.B. Clary. 1991. "Citizen Participation and the NIMBY Syndrome: Public Response to Radioactive Waste Disposal," *Western Political Quarterly* 44(2):299-328.

Krimsky, S., and D. Golding. 1992. *Social Theories of Risk*. Westport, CT: Praeger

Krimsky, S., and A. Plough. 1988. Environmental Hazards: *Communicating Risks as a Social Process*. Dover, MA: Auburn House.

Lake, R.W., ed. 1987. *Resolving Locational Conflict*. New Brunswick, NJ: Transaction Publishers, Rutgers, Center for Urban Policy Research.

Lawler, J.J., and W.J. Focht. 1989. "Risk Communication and Citizen Participation Under Superfund, Title III; Strategies for Reconciling Citizen Participation with Technical Opinion Under the Emergency Planning and Community Right-To-Know Act." Presented at the Annual meeting of the Southwestern Political Science Association, Little Rock.

Lawler, J.J., and W.J. Focht, and E.L. Hatley. 1992. "Citizen Participation in Hazardous Waste Controversies: NIMBY and Beyond," *National Social Science Perspectives Journal* 7:61-75.

Lowrance, W.W. 1980. "The Nature of Risk." In *Societal Risk Assessment: How Safe is Safe Enough?* ed. R.C. Schwing and W.A. Albers, Jr. New York: Plenum Press.

Lynn, Frances M. 1986. "The Interplay of Science and Values in Assessing and Regulating Environmental Risks," *Science, Technology and Human Values* 2(2): 40-50.

MacLean, D. 1986. *Values at Risk*. Savage, MD: Rowman and Littlefield.

Marks, G., and D. von Winterfeldt. 1984. "Not in My Backyard: Influence of Motivational Concerns on Judgments About Risky Technology," *Journal of Applied Psychology* 69:408-415.

Marshall, P.G. 1989. "Not in My Back Yard!" *Editorial Research Report* 1(21):305-319. (Washington, DC: CQ).

Mitchell, J.V. 1992. "Perceptions of Risk and Credibility at Toxic Sites," *Risk Analysis* 12:19-26.

Mitchell, R.C., and R.T. Carson. 1986. "Property Rights, Protest, and the Siting of Hazardous Waste Facilities," *American Economic Review* 76:285-290.

Morell, D., and C. Magorian. 1982. *Siting Hazardous Waste Facilities: Local Opposition and the Myth of Pre-emption*. Cambridge, MA: Ballinger.

O'Hare, M., L. Bacow, and D.R. Sanderson. 1983. *Facility Siting and Public Opposition*. New York: Van Nostrand Reinhold Company, New York.

Peelle, E., and R. Ellis. 1987. "Beyond the 'Not-In-My-Backyard' Impasse," *Forum for Applied Research and Public Policy* 2(3):68-77.

Portney, K.E. 1991. *Siting Hazardous Waste Treatment Facilities: The NIMBY Syndrome*. New York: Auburn House.

Renn, O. 1991. "Risk Communication and the Social Amplification of Risk." *Communicating Risk to the Public: International Perspectives*, ed. R.E. Kasperson and J.M. Stallen. Boston: Kluwer Academic.

Rubin, N. 1986. *Probability Times Consequences: Rational and Scientific, or Just Imprudent?* Toronto: Pollution Probe.

Schwartz, M., R. McBride, and R. Powell. 1989. "Models for Aiding Hazardous Waste Facility Siting Decisions", *Journal of Environmental Systems* 18(2):97-122.

Slovic, P. 1987. "Perception of Risk," *Science* 236:80-85.

Slovic, P., B. Fischhoff, and S. Lichtenstein. 1984. "Perception and Acceptability of Risk from Energy Systems." In *Public Reaction to Nuclear Power: Are there Critical Masses?*" ed. W.R. Freudenburg and E. Rosa. Boulder, CO: Westview.

Smith, J. 1994. "Montana at Risk", *Montana Public Interest Research Foundation*. Montana 2000 Writing and Publishing, Bozeman, MT.

Smith, V.K., and W.H. Desvousges. 1986. "Asymmetries in the Valuation of Risk and the Siting of Hazardous Waste Disposal Facilities," *American Economic Review* 76:291-94.

Stephenson, William. 1972. "Applications of Communication Theory: I. The Substructure of Science," *Psychological Record* 22:17-36.

Syme, G.J., and E. Eaton. 1989. "Public Involvement as a Negotiation Process," *Journal of Social Issues* 45:87-107

Tarlock, A.D. 1984. "Siting New or Expanded Treatment, Storage, or Disposal Facilities: The Pigs in the Parlors of the 1980s," *Natural Resources Lawyer* 17:429-61.

Thomas, K. 1981. "Comparative Risk Perception: How the Public Perceives the Risks and Benefits of Energy Systems," *Proceedings of the Royal Society of London*, Series A 376:35-50.

U.S. Environmental Protection Agency. 1979. *Siting Hazardous Waste Management Facilities and Public Opposition*. Washington, DC: Centaur Associates, Inc. (US EPA, SW-809).

U.S. Environmental Protection Agency. 1990. Hazardous Substances in Our Environment: *A Citizens Guide to Understanding Health Risks and Reducing Exposure*. PB91-131987. Washington, DC: USEPA.

Van Tubergen, G.N. 1975. *QUANAL Users' Guide*. Lexington: Department of Communication, University of Kentucky.

Viek, C., and P-J.M. Stallen. 1980. "Rational and Personal Aspects of Risk," *Acta Psychologica* 45:273-300.

Wedge, B. 1985. "The NIMBY Complex: Some Psychopolitical Considerations." In *Not in My Backyard!: Community Reaction to Locally Unwanted Land Use*. Charlottesville, VA: Institute for Environmental Negotiation, University of Virginia.

Weinstein, N. 1984. "Why It Won't Happen To Me," *Health Psychology* 3:431-57.

Wells, D. 1982. "Site Control of Hazardous Waste Facilities," *Policy Studies Review* 1(4):728-35.

Wynne, B. 1992. "Risk and Social Learning: Reification to Engagement." In *Social Theories of Risk*, ed. S. Krimsky and D. Golding. Westport, CT: Praeger.

APPENDIXES

APPENDIX A

STRUCTURED QUESTIONNAIRES

INITIAL QUESTIONNAIRE
Relationships and Roles in the Foreman Situation

The following 8 questions concern the situation that exists in the Foreman area.

1. What relationship did you have in the Foreman area at the time of the proposed permitting?

[ ] I lived in the Foreman area
[ ] A member of my family lived in the Foreman area
[ ] I own property in the Foreman area but did not live there
[ ] My children went to school in the Foreman area
[ ] I visited a park in the Foreman area
[ ] Other (please specify)

---

2. From what sources did you get information about the proposed permitting?
CHECK ALL THAT APPLY

[ ] News media
[ ] Friends and neighbors
[ ] Cadence or Ash Grove
[ ] Environmental groups such as the National Toxics Campaign
[ ] Fellow workers at my place of employment
[ ] ADPCE
[ ] US EPA
[ ] Arkansas State Department of Health
[ ] Local government
[ ] Other (please specify)

---

3. Which of the sources listed in question #2 did you most rely on and trust?
LIST TOP 3 IN ORDER

Most Important:_____
Second Most Important:_____
Third Most Important:_____

Why? (Explain these choices)

4.Which of the sources listed in Question #2 did you least rely on and trust?
LIST BOTTOM 3 IN ORDER

Least Important:_____
Next to Least Important:_____
Third Least Important:_____

Why? (Explain these choices)

5.How would you describe your participation in the situation at the time?

CHECK ALL THAT APPLY

[ ] I did not participate
[ ] I signed a petition
[ ] I contacted a government official
[ ] I attended a meeting of concerned citizens
[ ] I spoke at a meeting of concerned citizens
[ ] I helped organize a meeting of concerned citizens
[ ] I attended a government meeting or public hearing
[ ] I testified at a government meeting or public hearing
[ ] I participated in a rally or demonstration
[ ] I helped organize a rally or demonstration
[ ] Other (specify)

---

6. How often did you participate?

[ ] Never [ ] Seldom [ ] Occasionally [ ] Frequently [ ] Continuously

---

7. At the time of the situation, what relationship, of any, did you have with any organized opposition group?

[ ] I did not know anything about any organization and had no dealing with them?
[ ] I knew about a group but I had no dealings with them
[ ] I attended at least one meeting or other function sponsored by an organization but I never became an active supporter or member
[ ] I was an active supporter or member of an organized group
[ ] Other (please specify)

8. What relationship did you or a family member have with Cadence or Ash Grove before or during that period?

[ ] I /family member had no employee or business relationship with Cadence or Ash Grove before or during the period of the situation
[ ] I/family was a Cadence or Ash Grove employee during at least some of the period of the situation
[ ] I/family was a Cadence or Ash Grove employee before the situation began but not during it
[ ] I/family had a non-employee business relationship with Cadence or Ash Grove during at least some of the period of the situation
[ ] I/family had a non-employee business relationship with Cadence or Ash Grove before the situation began but not during it
[ ] Other (please specify)

FINAL QUESTIONNAIRE
Demographic Characteristics

Interview Number F-____

1. How close do you live to the hazardous waste burning site?

_____
_____

2. Are you now an active member of any citizen's group or service organization?
[ ] No [ ] Yes

3. How often do you participate in these organizations' activities?
[ ] Never [ ] Seldom Occasionally
[ ] Frequently [ ] Continuously

4. How old are you?_____

5.Gender
[ ] Female [ ] Male

6. What is the highest level of formal education you have received?

_____
_____

7. What was your major subject of study in school?

_____
_____

8. What is (or was, if retired) your primary occupation?

_____
_____
_____

APPENDIX B

OPEN-ENDED INTERVIEW SCRIPT

OPEN-ENDED INTERVIEW SCRIPT

1. How long have you lived in the Foreman area?
2. Let's talk about the proposed hazardous waste burning permit. I am interested in your opinions and recollections of events that occurred then. I understand that you played an active role, is that correct?
3. Approximately, when did you get involved? (ask for a date)
   - For what reasons?
   - Which of theses is most important?
   - Who was most responsible for influencing your involvement?
4. What were your concerns about the permitting of the hazardous waste facility in your community?
5. At the time of the permitting situation, there were some people who agreed with the permitting proposal and some who disagreed. On which things about the permitting proposal do you think most people agreed?
6. I what to ask you now about how things have changed in the community since the time you were active in the situation. How would you say things have changed in your community economically since then? [gotten better, worse, less jobs, etc.]
7. How have things changed insofar as your sense of community as a place to live and what it means to you? [people not as friendly as before, community has become stigmatized, neighborhood disruption, traditions abandoned or changed, etc.]
   - Has the sense of the community become stronger?
8. Has there been any other proposals to site a hazardous waste facility in your county? If so, did you feel more or less able to effectively respond to the proposal?

Now, I what to ask you whether or not the permitting situation could have been handled differently. I am interested in your views of what things could have been done in dealing with the permitting to better serve all members of your community.

9. Let's first talk about the government's dealings with the permitting.
   - What things did EPA, ADPCE, and local government officials do right in presenting the proposal to the community?
   - What do you believe they might have done wrong?
10. Now, let's talk about industry.
    - What things did Cadence or Ash Grove do right in presenting the proposal to the community?
    - What do you believe they might have done wrong?
    - What do you believe Cadence or Ash Grove could have done in order to best serve all members of the community?
11. Finally, let's talk about citizens of your community.
    - What things did citizens do right in dealing with the permitting proposal?
    - What do you believe might have done wrong?
    - Is there anything the citizens could have done to act in the best interest of all community members?
12. Is there anything else that you would like to tell me about your feelings, concerns or suggestions about the Foreman situation or about the hazardous waste permitting in general that we haven't covered so far?

APPENDIX C

DECISION CRITERIA CARDS

DECISION CRITERIA CARDS

CARD 1: Fairness

Even though a decision may produce a community benefit when all costs and benefits are added up, some citizens or neighborhoods may experience more harm than good and other citizens or neighborhoods may experience more good than harm. Some people may consider that an unequal distribution of costs, benefits, and risks in a community is unfair.

In my view, fairness of the distribution of benefits, costs, and risks should be included in making community environmental siting decisions.

CARD 2: Understanding Local Culture

Communities vary in their traditions, customs, values, attitudes and identities. Decisions that can affect a community may require that decision makers be knowledgeable about the local culture. Since different communities and regions of the nation have different cultures, it is not always easy to know what local values may be.

In my view, understanding a community's culture and values should be considered when making community environmental siting decisions.

CARD 3: Technical and Legal Education

Decisions about siting hazardous waste facilities involve various technical and legal issues. Technical issues may include the proper management of long term health risks, whether a technology will operate as it was designed, and what the odds are of a plant upset or spill that would result in a major environmental threat to the community. Legal issues may include how to understand complicated laws and regulation and what procedures apply in the decision making process. Many of these issues are difficult to understand without technical and legal education.

In my view, adequate training in the relevant technical and legal areas should be assured when making community environmental siting decisions.

CARD 4: Trust in Government and Industry

Trust has different meanings. For example, acting in the community's best interest (being a good neighbor), credibility (truthfulness, believability), and openness (accessibility, forthrightness), may each be important to judgments about whether a person or organization is trustworthy.

In my view, citizens' level of trust in government and industry is important when making community environmental siting decisions.

CARD 5: Community Disruption

Environmental siting activities may disrupt the normal flow of a community. For example, rerouting of traffic, separation of one neighborhood from another, and loss of reputation may cause a decline in a sense of community and an interruption of long-held traditions.

In my view, factors that could potentially disrupt a community should be considered when making community environmental siting decisions.

CARD 6: Alternative Technologies

It used to be commonplace to dispose of waste by dumping it into landfills and open pits. Recently, there have been efforts to find alternatives to land disposal. One approach is to develop new manufacturing techniques that do not generate toxic waste, for example, by recycling wastes back into the process and by using less dangerous raw materials. For those toxic waste that cannot be eliminated, new and innovative waste treatment methods are being developed that can convert them into non-toxic forms without creating emissions or discharges to the environment.

In my view, alternative technologies such as new and innovative waste treatment methods should preferred and included in community environmental siting decisions.

CARD 7: Citizen Involvement

Some citizens choose to become actively involved in decisions that affect their community or them personally. The amount of involvement not only depends on their willingness and ability to participate, but also on the opportunities that the decision process offers for participation.

In my view, adequate citizen involvement is a very important provision and should be considered when making community environmental siting decisions.

CARD 8: Economic Impact on the Community

Community environmental siting decisions can affect the economic health of the community. Economic benefits could include creation of jobs; increase in tax revenue; compensation in the form of cash payments; and improvements to parks, libraries, schools, or hospitals. Economic costs could include loss of tourism, change in land use, traffic disruption, and increase in demand for community services.

In my view, economic impact on the community is important and should be considered when making community environmental siting decisions.

CARD 9: Personal Judgments of Risk

People often make judgments about whether to accept or avoid risks. Factors that may be important in judging environmental risk include personal familiarity and understanding of the risk involved, whether the risks are voluntary and controllable, whether experts agree on the amount of risk, whether children or future generations are affected, and whether the risks are reversible or have delayed effects.

In my view, personal judgments of risks should be important in making community environmental siting decisions.

CARD 10: Economic Impact on the Company

Private companies want to make a profit to stay in business. Ability to make a profit can be affected by various costs, including costs of environmental remediation, compliance with regulations, construction and operation, legal liability, compensation payments to the community, and limits on how the company will operate.

In my view, company's ability to make a profit should be important in making community environmental siting decisions.

CARD 11: Access to Information

The ability to easily obtain relevant information in a timely manner and in an understandable way can help people make informed decisions. This is especially true if the decisions involve complex issues where it is important to consider all the facts.

In my view, assurances that citizens' timely access to relevant information should be considered in making community environmental siting decisions.

CARD 12: Scientific Risk Estimates

Scientific experts in government and industry claim that they can scientifically measure risk to human health and the environment. To estimate the risk that may result from a harmful event, they multiply the seriousness of the potential harm by how likely it is that the harm may happen.

In my view, scientific risk estimates should be important in making community environmental siting decisions.

CARD 13: Personal Views Toward Technology

Some people claim that continuing advances in technology are important to improving quality of life. Others question whether reliance on technology is always a good thing. For example, some people believe that some technologies create more harm than good and should not be used.

In my view, citizens' views toward technology should be important in making community environmental siting decisions.

APPENDIX D

DECISION CRITERIA CARD SORT RESULTS

TABLE A-1

DECISION CRITERIA CARD SORT RESULTS

	STAKEHOLDER PARTICIPANT														
CRITERION	FI1	FI2	FI3	FC4	FC5	FG6	FG7	FG8	FI9	FI10	FI11	FI12	FI13	FI14	FC15
Alternative Technologies	*3	1	1	1	1	*6*	5	3	1	1	4	2	*10*	1	5
Trust in Government and Industry	1	*8*	*8*	13	4	4	8	*8*	6	2	5	*8*	*9*	*13*	4
Access to Information	*6*	2	*4*	2	2	3	7	*7*	3	3	1	*9*	4	4	2
Technical and Legal Education	*5*	3	*6*	*8*	10	1	4	1	4	4	*6*	4	2	2	9
Economic Impact on Community	*8*	*7*	2	4	*6*	12	10	*6*	12	*5*	11	*6*	5	*12*	*7*
Personal Judgments of Risk	4	4	*5*	5	12	*9*	12	*5*	*8*	*6*	2	13	*11*	*6*	*6*
Fairness	*10*	*11*	11	*10*	*8*	*5*	6	4	*7*	*7*	*7*	3	*12*	*9*	3
Scientific Risk Estimates	2	5	*7*	*7*	11	*8*	2	12	2	10	*8*	1	6	*10*	13
Personal Views of Technology	13	*10*	*9*	*9*	*9*	10	9	13	*9*	9	10	*5*	7	*11*	11
Citizen Involvement	*9*	*9*	10	6	3	2	1	10	5	*8*	*9*	*11*	*13*	*8*	1
Understanding Local Culture	11	13	13	12	*5*	11	3	2	10	13	3	*7*	3	3	10
Economic Impact on Company	*7*	*7*	3	3	13	13	13	11	13	11	13	*10*	*8*	5	12
Community Disruption	12	12	12	11	*7*	*7*	11	9	11	12	12	12	1	*7*	*8*
STANCE**	S	S	S	O	O	N	N	N	S	S	S	S	S	S	O

*__Bolded__ numbers represent most preferred,
italicized numbers represent somewhat preferred
numbers in normal font represent not preferred.

**Stance - S =Support, O = Oppose, N = Neutral

APPENDIX E

PARTICIPATION STRATEGY CARDS

PARTICIPATION STRATEGY CARDS

CARD 1: Consultation

Government conducts public meetings, distributes information, conducts surveys, and asks for comments throughout the siting process. Government considers all public comments before making siting decisions.

In my view, public should voice their concerns throughout the siting process, and government should have the final say in community environmental siting decisions.

CARD 2: Non-Binding Negotiation

Company officials are required to enter into preliminary negotiations with citizens representatives of the community. Any agreement that may be reached will be delivered to government decision makers for their considerations. However, the siting decisions will be made by the government. Its decisions may or may not include any or all of the agreement.

In my view, company's should try to meet the concerns of the citizens before government makes any community environmental siting decisions.

CARD 3: Third Party Mediation

A neutral third party attends all meeting between citizen representatives of the community and the company concerning environmental siting decisions. The mediator attempts to help the parties to reach an agreement. The agreement is then forwarded to the government for their consideration; however, the government is free to include none, part, or all of the agreement in its decisions.

In my view, government should be able to choose which agreements to include the siting decision; however, agreements between the company and the community should be reached before the government makes the community environmental siting decision.

CARD 4: Binding Arbitration

A fixed period of time (e.g., one year) is provided to allow community and industry representatives to try to reach a voluntary agreement on siting the facility. If no agreement is reached during this time, an experienced arbitrator will consider the positions of both parties and develop a document that binds both parties. Industry is required to pay for, but the citizens select, the arbitrator. Subject to verification of the legality, the government is required to attach the agreement to its permit and enforce it as part of its oversight duties.

In my view, an experienced arbitrator should be available to resolve disputes between industry and citizens concerning siting decisions and that government should be required to enforce the arbitrator's decisions.

CARD 5: Oversight Board

An oversight board composed of an equal number of citizens (selected by a consensus of public interest groups in the community), industry representatives, and government representatives

provides continuous control of the entire decision making process. All parties agree to abide by the oversight board's decisions.

In my view, an oversight board composed of an equal number of representatives from industry, government, and select citizens should be used to oversee the entire environmental siting processes.

CARD 6: Referendum

Any proposed environmental siting decision must be approved by a majority vote of the citizens of a community before they can take effect.

In my view, any environmental siting decision should be approved by a majority vote of the citizens of a community before it can take effect.

CARD 7: Citizen Control

The community itself controls the siting decision process. A citizens committee, whose representatives are chosen by members of various community environmental action, community development, and other groups, makes all decisions. The government and industry are bound by the decisions of the committee.

In my view, environmental decisions should be made by the citizens of that community and that industry and government should be bound by those decisions.

CARD 8: Preemption

The expertise of government officials is relied on to make siting decisions. The public is excluded from participating directly in the decision making process.

In my view, only experts in government and industry should have the direct final control in environmental siting decisions.

CARD 9: Public Comment and Hearing

The government makes a tentative siting decision, announces it to the public, considers comments received from the public, and then makes a final decision.

In my view, all environmental siting decisions should be made by the government, but only after all comments are carefully reviewed from the public.

APPENDIX F

PARTICIPATION STRATEGY CARD SORT RESULTS

TABLE A-2

CITIZEN PARTICIPATION STRATEGY CARD SORT RESULTS

	STAKEHOLDER PARTICIPANT														
STRATEGY	**FI1**	**FI2**	**FI3**	**FC4**	**FC5**	**FG6**	**FG7**	**FG8**	**FI9**	**FI10**	**FI11**	**FI12**	**FI13**	**FI14**	**FC15**
Consultation	*5**	**1**	**1**	**1**	*4*	**1**	**2**	**3**	**2**	**1**	*3*	**1**	**1**	**1**	7
Third-Party Mediation	**2**	**3**	**2**	*5*	**3**	*5*	*4*	*4*	*4*	**3**	*4*	**3**	**3**	**3**	5
Oversight Board	**3**	**2**	*5*	*6*	7	*4*	**1**	**2**	**3**	*4*	**2**	8	7	**2**	**3**
Public Comment, Hearing	*6*	*4*	*4*	**3**	*6*	**2**	**3**	*5*	*5*	**2**	**1**	*4*	**2**	8	6
Referendum	8	8	6	**2**	**1**	*6*	6	9	*6*	8	*5*	*5*	8	*6*	**1**
Non-Binding Negotiation	*4*	*6*	**3**	7	*5*	7	7	*6*	7	*5*	7	7	*6*	*5*	8
Binding Arbitration	**1**	7	7	*4*	**2**	**3**	*5*	**1**	**1**	6	6	**2**	*4*	*4*	**4**
Citizen Control	9	9	9	8	8	8	8	7	9	7	8	9	*5*	7	**2**
Preemption	7	5	8	9	9	9	9	8	8	9	9	6	9	9	9
STANCE**	**S**	**S**	**S**	**O**	**O**	**N**	**N**	**N**	**S**	**S**	**S**	**S**	**S**	**S**	**O**

*__**Bolded**__ numbers represent most preferred,
*__*italicized*__* numbers represent somewhat preferred
numbers in __normal__ font represent not preferred.

****Stance** - **S** =Support, **O** = Oppose, **N** = Neutral

APPENDIX G

DESCENDING ARRAY OF DIFFERENCES BETWEEN FACTORS

TABLE A-3
DESCENDING ARRAY OF DIFFERENCES BETWEEN FACTORS A AND B
(DIFFERENCES GREATER THAN ONE)

	Factor A	Factor B	Diff.
29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.	1.7	-0.9	2.5
28. It is impossible to know whether or not a process is really safe without adequate technical education.	1.5	-0.9	2.4
17. Industry usually complies with environmental laws even when it costs them money.	0.6	-1.5	2.1
1. Waste facility means economic growth and prosperity for the community.	0.6	-1.4	2.0
14. Government and industry know what they are doing; they are the experts.	0.1	-1.8	1.9
23. Citizens have ample opportunity to be involved in siting decisions in their community.	0.7	-1.2	1.9
12. It is better to put facilities in communities with high unemployment; the people there need the jobs.	0.2	-1.3	1.5
16. The government adequately enforces environmental laws to protect human health and safety.	0.8	-0.5	1.3
22. Citizens should be involved in every step of a siting decision.	0.1	1.4	-1.2
19. The character of a community changes after a waste facilityis located there.	-0.4	1.0	-1.4
30. Citizens should have their own experts.	-0.2	1.2	-1.4
34. Economic special interests have too much influence in siting decisions.	-0.2	1.4	-1.5
21. Waste facilities give a community a bad reputation.	-0.8	0.7	-1.5
43. The siting process is unfair because the results provide greater risks to the people who are ethnically different or poor.	-1.1	0.6	-1.8
38. If you have enough money, you can get away with polluting.	-1.3	0.5	-1.9
15. Cost effectiveness is more important to industry and government than environmental issues.	-0.8	1.3	-2.1
18. Environmental laws are full of loopholes for industry advantage.	-1.3	1.6	-2.8

TABLE A-4
DESCENDING ARRAY OF DIFFERENCES BETWEEN FACTORS A AND C
(DIFFERENCES GREATER THAN ONE)

	Factor A	Factor C	Diff.
8. We should not take any chances with the environment.	0.9	-0.8	1.8
34. Economic special interests have too much influence in siting decisions.	-0.2	-1.8	1.7
2. Offering cash payments to a community is the same as a bribe.	0.4	-1.1	1.5
12. It is better to put facilities in communities with high unemployment; the people there need the jobs.	0.2	-1.1	1.3
31. We would all be better off if the legal procedures were easier to follow.	0.8	-0.3	1.1
23. Citizens have ample opportunity to be involved in siting decisions in their community.	0.7	-0.4	1.1
1. Waste facility siting means economic growth and prosperity for the community.	0.6	-0.4	1.1
26. Who provides information makes a difference to me; the person must be honest.	1.8	0.7	1.1
29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.	1.7	0.7	1.0
16. The government adequately enforces environmental laws to protect human health and safety.	0.8	1.8	-1.0
7. Citizens need to control which risks they have to put up with.	-0.1	0.9	-1.1
10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem.	-2.0	-0.9	1.1
46. Government and industry skew their risk estimates to suit their own purposes.	-0.90	0.20	-1.1
35. The people living in a community know best what is good for them.	-0.9	0.3	-1.1
4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed.	-1.4	-0.2	-1.2
18. Environmental laws are full of loopholes for industry advantage.	-1.3	0	-1.3
36. Citizens should initially oppose all proposals for siting by industry.	-1.5	-0.3	-1.3
21. Waste facility give a community a bad reputation	-0.8	0.9	-1.7
44. Environmental radicals are necessary to bring balance to the issues.	-1.0	0.9	-1.9
37. It is better to be active today than to be radioactive tomorrow.	0	2.0	-2.1

TABLE A-5
DESCENDING ARRAY OF DIFFERENCES BETWEEN FACTORS B AND C
(DIFFERENCES GREATER THAN ONE)

	Factor B	Factor C	Diff.
34. Economic special interests have too much influence in siting decisions.	1.4	-1.8	3.2
38. If you have enough money, you can get away with polluting.	0.5	-2.3	2.8
15. Cost effectiveness is more important to industry and government than environmental issues.	1.3	-1.4	2.6
13. The people who benefit the most from a waste facility are not the ones who bear the risk.	0.7	-1.2	1.9
18. Environmental laws are full of loopholes for industry advantage.	1.6	0	1.6
43. The siting process is unfair because the results provide greater risks to the people who are ethnically different or poor.	0.6	-0.7	1.4
47. Industry must be required to recycle, reduce wastes, and use safer techniques and raw materials.	2.2	0.9	1.3
9. I tolerate risk as a fact of life, but I don't like it.	0.2	-0.9	1.1
40. Consensus is impossible when activists become involved in environmental decisions.	-1.0	0	-1.0
27. It is really hard to know if decision makers have the same value as I do	0.1	1.3	-1.2
44. Environmental radicals are necessary to bring balance to the issues.	-0.4	0.9	-1.3
4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed.	-1.6	-0.2	-1.4
29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.	-0.9	0.7	-1.5
6. Scientific risk assessment should be the major consideration in siting decisions.	-0.2	1.4	-1.6
37. It is better to be active today than to be radioactive tomorrow.	0.4	2.0	-1.6
17. Industry usually complies with environmental laws even when it costs them money.	-1.5	0.4	-1.9
14. Government and industry know what they are doing; they are the experts.	-1.8	0.2	-2.1
16. The government adequately enforces environmental laws to protect human health and safety.	-0.5	1.8	-2.3
28. It is impossible to know whether or not a process is really safe without adequate technical education.	-0.9	1.6	-2.5

APPENDIX H

RESEARCH APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 10-21-96 **IRB#: AS-97-019**

Proposal Title: IN SEARCH OF THE OLIVE TREE: CASE STUDY OF A UNIQUE HAZARDOUS WASTE SITING CONTROVERSY

Principal Investigator(s): Will Focht, Jeff Looney

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:  Date: November 13, 1996

Chair of Institutional Review Board

VITA

Jeffrey James Looney

Candidate for the Degree of

Master of Science

Thesis: IN SEARCH OF THE OLIVEFIELD: CASE STUDY OF A UNIQUE HAZARDOUS WASTE SITING CONTROVERSY

Major Field: Environmental Science

Biographical:

Personal Data: Born in Texarkana, Texas, on June 12, 1965.

Education: Graduated from New Boston High School, New Boston, Texas in 1983; Associate in Air Technology from Texarkana Community College, Texarkana, Texas in May 1985; received Bachelor of Science in Biology from East Texas State University, Commerce, Texas in May 1991. Completed requirements for the Master of Science degree with a major in Environmental Science at Oklahoma State University in July 1997.

Experience: Gas Chromatographic Technician, Cadence Environmental Energy, Inc., Foreman, Arkansas, 1992-1993; Heavy Equipment Operator, Three Sides Farm, Dekalb, Texas, 1991-1992; Ranch Foreman, Looney Ranch and Farms, New Boston, Texas, 1983-1988; Wingman, Tedder Aviation, New Boston, Texas, 1980-1983.

Professional Memberships: National Association of Environmental Professionals and Aircraft Owners and Pilots Association.