

AN EVALUATION OF ENVIRONMENTAL ACTIVISTS'
OPPOSITION TO RISK - A CASE STUDY OF
THE CUSHING, OKLAHOMA KERR-MCGEE
FACILITY CONTROVERSY

By

TERESA L. ADAMS

Bachelor of Arts

Wichita State University

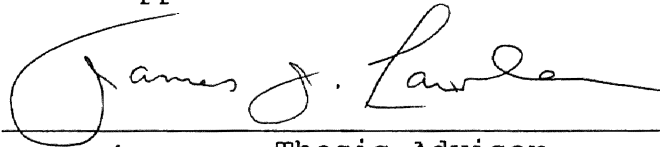
Wichita, Kansas

1990

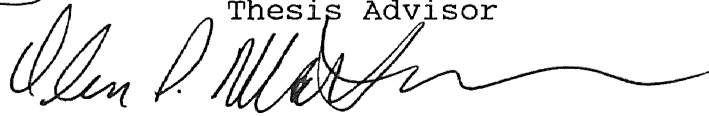
Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 1993

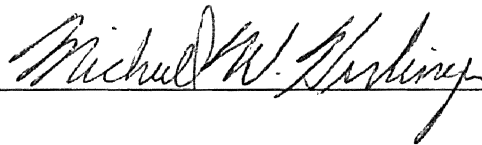
AN EVALUATION OF ENVIRONMENTAL ACTIVISTS'
OPPOSITION TO RISK - A CASE STUDY OF
THE CUSHING, OKLAHOMA KERR-MCGEE
FACILITY CONTROVERSY

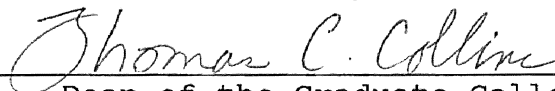
Thesis Approved:



Thesis Advisor







Dean of the Graduate College

ACKNOWLEDGMENTS

I would like to express my gratitude to many individuals for their guidance and support throughout this research project. First, to Dr. Jack Vitek, without whom I would not have been able to pursue my graduate education in the first place, thank you for believing in me and giving me the opportunity to believe in myself. To Dr. James Lawler, I extend my appreciation for serving as my advisor and for your interest in and support of this research.

I am most indebted to Will Focht, my good friend and mentor for the past two-and-a-half years. The amount of time and effort he has devoted to helping me with this research project will not be forgotten. Will, you have helped me to find my "Pete Rose" in my career, and in life as well. I greatly value all that I have learned from you, and I will always treasure our friendship.

Additional thanks go to Dr. Mike Hirlinger and Dr. Paul Matthews for providing valuable insight and for serving on my graduate committee.

Finally, I extend my great appreciation to my mother and father, my family, and my good friends for standing by me through many rough times, and for their unending love,

patience, and understanding. Without their support, this would have been a much more difficult task to accomplish.

This thesis is dedicated to the citizens of Cushing, Oklahoma and to the Kerr-McGee Corporation. May we all learn from their experiences.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Statement of the Problem	1
Purpose of the Study	4
History of the Case Study Site	5
II. REVIEW OF THE LITERATURE	15
Introduction	15
A Closer Look at the Problem	15
Previous Investigation of the Cushing Cleanup Controversy: The Next Steps ...	17
Theoretical Foundation of Q Methodology ..	19
III. METHODOLOGY	21
Introduction	21
Determination of Case Study Site	21
Selection of Subjects	23
Instrument Development and Pretest	23
Description of Instruments and Procedures	24
Close-Ended Interview	25
Open-Ended Interview	26
Rank-Order Card Sorting	26
Q Sorting	27
Methodological Considerations	29
IV. DISCUSSION OF RESULTS	33
Introduction	33
Demographics	35
Preferred Decision Criteria	36
Preferred Citizen Participation Strategies	41
Description of Q Sort Data	45
Technically-Oriented Sympathizers	45
Citizens Taking Responsibility	51
Points of Agreement	56

V. FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS	58
Findings	58
Conclusions	61
Recommendations	64
BIBLIOGRAPHY	66
APPENDIXES	69
APPENDIX A - Survey Instrument	70
APPENDIX B - Rank-Order Card Sort Decks #1 & #2	83
APPENDIX C - Card Sort Rankings, by Respondent	91
APPENDIX D - Q Sort Data for Decision Criteria Cards	93
APPENDIX E - Q Sort Data for Public Participation Strategy Cards	95
APPENDIX F - Q Sort Varimax Rotation Results and Factor Correlations	97
APPENDIX G - Q Sort Concourse and Item Scores	99
APPENDIX H - Factor A and Factor B Arrays and Significant Loadings	103
APPENDIX I - Consensus and Distinguishing Items for Factors A and B	105

LIST OF TABLES

Table	Page
I. Breakdown of Interview Subjects by Origin	34
II. Number of Respondents for Each Methodology (Sorts Only)	35
III. Frequency Distribution: Ratings of Highly, Somewhat, and Not Important Decision Criteria	38
IV. Frequency Distribution: Ratings of Highly, Somewhat, and Not Preferred Public Participation Strategies	42

CHAPTER 1

INTRODUCTION

Statement of the Problem

"If we don't do something to clean up the environment, who will...and when?" (CES 1990a). This quotation, taken from a citizen activists' newsletter, expresses obvious frustration over the present condition of the environment and the lack of resources to improve the condition. However, public policy proposals directed at siting hazardous waste facilities to deal with the overwhelming quantities of hazardous waste (and illegal disposal practices) are routinely rejected by citizens in the communities in which they are proposed. Cleanups of hazardous waste facilities have resulted in similar types of intense public opposition.

Citizen rejection of the imposition of unacceptable health and/or environmental risks is frequently manifested in various forms of the NIMBY (not-in-my-backyard) syndrome. This pattern of local conflict prevents successful facility siting and remediation, results in the breakdown in

communication between citizens and the other stakeholders involved (usually government or industry), and eventually results in protracted litigation and policy gridlock. This creates a policy dilemma for public administrators and industry representatives who must attempt to find "alternative, usually more expensive, solutions" (Focht 1993).

To address this problem, seven case studies are being conducted at Oklahoma State University by graduate students and faculty from multiple academic backgrounds. Each of the case studies researches an Oklahoma community in which some form of NIMBY or TIMBY (threat-in-my-backyard) dispute has occurred or may occur. By discovering the nature of citizen activists' concerns in these communities, the environmental decision-making criteria they believe to be important, and the public participation strategies they prefer, we hope to determine how present decision-making processes may be deficient, and how conflict could be resolved through the consideration of additional decision criteria, and the efficacy of alternative decision-making strategies.

The results obtained from the seven case studies will be combined (Focht, forthcoming), so that the focus is broadened and many attributes and forms of NIMBY can be explored in a comparative manner across the state of Oklahoma.

Our research hypothesis is that the NIMBY syndrome is sustained by pervasive institutional (i.e., governmental)

distrust and a "crisis of legitimacy" (Focht 1993). Legitimacy is defined "as the willingness of citizens to voluntarily accept the decisions of its government, even when they go against self-interest" (Focht 1993). The NIMBY syndrome is a rejection by citizens of this concept: they are refusing to accept decisions made ultimately by their government without their consent. All previous attempts to resolve NIMBY gridlock situations have failed because they neglected to increase the perceived legitimacy by the affected public of the decision making process and institutions (Focht 1993).

In this study, we seek to verify that this "crisis of legitimacy" does exist, and to verify that distrust underlies the crisis. If legitimacy and trust are in fact elements missing from the environmental decision-making process, then the consideration of additional decision criteria salient to citizens and the use of alternative public participation strategies that incorporate these criteria should build a foundation for consensus-building in decision-making involving environmental risk. In essence, the goal of this research is to examine methods for building a bridge between the various disputants in NIMBY controversies - one that will lead to consensus and the avoidance of gridlock (Focht 1993).

Purpose of the Study

The Cushing controversy has been selected as one of the seven case studies in the NIMBY research project due to its unique approach to citizen involvement, and its unique outcome among the cases studied. The approach by citizens to dealing with the cleanup controversy was described by Lawler, Focht, and Hatley (1990), as unique because, "from the beginning (citizens) wanted to pursue a local solution in cooperation with the decision makers." Early in the Cushing citizen group's formation, leaders expressed the desire to remain non-confrontational, and refused offers of outside assistance from other environmental groups (Lawler, Focht, and Hatley 1992).

The purpose of this case study is to examine the reasons behind the success of the outcome of the Cushing controversy, in the views of citizens, Kerr-McGee representatives, and local and state government officials who were involved in the controversy beginning in 1989. It is hoped that by examining a situation that began similarly to other NIMBY (or TIMBY) situations but yet did not end up in the typical NIMBY-induced gridlock, a first step toward understanding how to "build a bridge" for consensus can be constructed.

History of the Case Study Site

Cushing, Oklahoma is a town of approximately 10,000 people located 25 miles southeast of Stillwater in Payne County. The location of several oil refineries and oil-based businesses and industries during the oil boom, Cushing has experienced an economic downturn as a result of the drop in oil prices during the last decade.

As early as 1915, the Deep Rock Oil Refinery was built on a 330-acre site two miles north of the city of Cushing. In mid-1956, Kerr-McGee Corporation purchased the Deep Rock Refinery and operated it under its name until it was closed in 1972. Today, the site's area totals approximately 560 acres.

In 1962, Kerr-McGee purchased the nuclear fuels division of the Spencer Chemical Company of Crestline, Kansas, and began a nuclear reactor fuel production plant on the grounds of its oil refinery operations in Cushing. The purchase included the management, production equipment, and atomic patents, as well as the Atomic Energy Commission (now the Nuclear Regulatory Commission) operating license (Barnes n.d.). From 1963 until 1966, Kerr-McGee Corporation produced uranium oxides and uranium and thorium metal from depleted and enriched materials at the Cushing facility (US EPA 1991). The AEC conducted inspections of the Kerr-McGee nuclear fuels facility on five separate occasions: January 1964, January 1965, May 1965, September 1965, and June 1966.

Numerous violations were cited during these inspections, including poor radiological safety practices and emissions that exceeded the "maximum allowable concentration of uranium in air discharged to unrestricted areas on several occasions" (CES n.d.). After several explosions at the plant which resulted in numerous injuries and one death as well as releases of radioactive materials to the atmosphere in unknown quantities (Barnes n.d.), the nuclear operations were terminated and the plant decommissioned in 1966.

According to EPA records, the Kerr-McGee site was decontaminated and surveyed by Kerr-McGee using the acceptable practices of that time (which later turned out to be unsatisfactory), before the AEC licenses were terminated in July 1966. In 1972, soil and wash water containing thorium was placed in a surface impoundment labeled Pit #4 when Kerr-McGee ended their refining operations at the Cushing site. Following the facility's shut-down, many portions of the original refinery property were sold to other parties, only to be later repurchased by Kerr-McGee by 1987.

In May 1986, an EPA contractor, Ecology and Environment, Inc., inspected the facility, detecting uranium, radium, chromium, and lead in on-site monitoring wells, which suggested possible groundwater contamination and migration. In June 1987, EPA's contractor conducted a site assessment of the site to determine the "potential immediate threat to public health and the environment"

(Ecology and Environment 1989). The primary goal of the visit to the Kerr-McGee site was to determine if potential contamination migration pathways existed off-site through waterways. It was discovered that a ten acre oil/asphalt lagoon, which had previously been used as a dump for oil refinery operations, was the source of several releases of various unknown oily substances, including acid compounds and liquid tar, into nearby Skull Creek. These releases were caused by a lack of adequate freeboard (the distance from the top of the lagoon contents to the top of the dike), in the lagoon. The amount of material released from the lagoon into Skull Creek and the number of releases that occurred were not known (Ecology and Environment 1989).

As a result of further sampling conducted by EPA, the main contaminants of concern at the site were determined to be crude oil; hydrochloric, sulfuric, and nitric acids; sodium hydroxide (a caustic); lead and other heavy metals; volatile organics such as benzene and toluene; and hydrocarbons (waste oil) of unknown nature and quantity (Ecology and Environment 1989). The high acid content of the lagoon presented a high corrosivity hazard to Skull Creek and its tributaries. Though groundwater contamination from migrating and leaching contaminants might have also occurred, no groundwater monitoring wells had been installed on or near the site to verify this.

Soil contamination was visible at the site, and noticeable odors "indicating some organic vapors and/or

semi-volatile components" were also detected (Ecology and Environment 1989). Sampling results indicated levels of radioactive contamination in waste lagoons were at or below normal background for metals, cyanide, radioactive isotopes, and alpha, beta, and gamma radiation (Ecology and Environment 1989). After a subsequent 1988 inspection, the site received a Hazard Ranking System score of 34.6, on a scale on which 28.5 is the threshold score needed for Superfund listing. The site was therefore proposed for listing on the National Priorities List - a list of the worst of the nation's contaminated sites that qualify for federal Superfund cleanup money, in October of 1989 (Lawler, Focht, and Hatley 1992).

Despite these findings, Morgan Moore, Executive Vice President of Kerr-McGee stated in a June 1, 1989 *Stillwater News Press* article, that tests taken at the site showed that there was "no harm to surface or ground water in the area," and that "Cushing's water supply is not threatened."

Until the Spring of 1989, the Cushing citizenry was generally uninformed of the potential health and environmental hazards that existed at the Kerr-McGee site. It was at this time that public meetings were begun in Cushing to discuss the Kerr-McGee site, the possibility of threats to the public's drinking water supply and threats from radioactive contamination at the site. These meetings were initiated by a former Cushing police officer who discovered in 1986 that the EPA had been investigating the

Kerr-McGee Cushing site for possible inclusion on the National Priorities List of Superfund, and further, that there was concern by firefighters over radioactive contamination at the facility. The firefighters stated that they would not respond to any calls at the site because they believed the ground to be "hot" (Lawler, Focht, and Hatley 1992). Between 1986 and early 1989, the police officer gathered documents from the State Department of Health (OSDH) and the EPA. He also searched newspapers and engaged in discussions with citizens and former Kerr-McGee employees. By the spring of 1989, he believed that the citizens of Cushing should be informed of the threats he perceived existed at the site. The city council, concerned citizens, state and local government agencies, and Kerr-McGee representatives were invited to attend the first of many public meetings.

The group of citizens that banded together in early to mid-1989 with the goal of gathering and disseminating information about the Kerr-McGee site and its progression towards being declared a Superfund site initially called themselves the "Concerned Citizens of the Cimarron Valley", after the Cimarron River valley that passes through the area. From the beginning, the Concerned Citizens group declared that they were not interested in a fight with Kerr-McGee, but instead wanted to inform the public about a situation that could directly affect the community. Concern over the cleanup originated from the citizens' desire to

discover what the problem was, to know if it would adversely impact individuals and families in Cushing, and to know how the problem would be corrected. The most commonly mentioned concerns included groundwater contamination (especially of the drinking water supply), radiation contamination, and the possible health effects resulting from exposure to these contaminants.

Initial predictions that the site would be put on the Superfund list by September 1, 1989 did not materialize, leaving the citizens group (since renamed the Citizens for Environmental Safety, or CES) still waiting for that determination in February of 1990. Promises were made by the EPA to announce the final Superfund determination for the Cushing site by March.

Meanwhile, approximately a year after CES initially met, the city manager and board of commissioners of Cushing appointed members of CES, as well as several citizens considered to be knowledgeable about specific issues related to the cleanup, to serve on the Kerr-McGee Oversight Board (CES 1990a). The Oversight Board's task was to keep informed of current progress at the Kerr-McGee facility, follow the conduct of the cleanup, understand tests and studies, and communicate this information to the city commission and the rest of the Cushing community.

In January of 1990, a Health Assessment Report was prepared from a site inspection conducted by the EPA, Oklahoma State Department of Health (OSDH), and the Agency

for Toxic Substances and Disease Registry (ATSDR). The areas of environmental contamination were determined to include five acid sludge pits located on different areas of the site, and ranging in surface area from approximately 55,500 square feet to 501,200 square feet.

One of the primary concerns of the Cushing citizens group was the possibility that the groundwater of the area had been damaged by the pollution from the Kerr-McGee facility. To address this issue, the City of Cushing consulted a detailed geological and hydrological study that was conducted in 1955. Results of the study showed that the Kerr-McGee facility was situated on "a dense, impervious shale formation...impervious to any possible leak into the fresh water sands. Thickness of the shale layer was about 250 ft." (Dunaway 1993). Samples of water from local wells in the area were analyzed, with no contamination "even to the slightest degree" determined to exist in the fresh water they supplied (Dunaway 1993).

To address the concern over threats from radiation contamination, studies were conducted wherein radiation readings were taken on the surface over the entire plant area in line with a grid system that divided the site into 30-foot squares with readings taken at every intersection of horizontal and vertical grid lines. The readings obtained by using this method were illustrated on a map. The readings of radiation contamination were generally at low levels and "harmless to the environment", except for near a

building where an explosion had occurred many years earlier and proper cleanup had not occurred, a pit (pit #4) in which nuclear waste had been disposed, and a few smaller areas north of pit #4. The CES group reacted to these Health Department findings with mixed feelings and, in 1991, secured the services of a nuclear radiation expert from Tulsa, Oklahoma, to act as an impartial third party to interpret the data. After reviewing the data, he told a meeting of the Oversight Committee that even the higher radiation readings obtained near the pit "were not excessive", and that only in situations of long term exposure would the levels detected be hazardous (Dunaway 1993).

On March 1, 1990, the State Department of Health and Kerr-McGee filed a petition in district court for a consent decree to allow Kerr-McGee to begin cleanup of the site. After reviewing the document, the CES group expressed concern that the state's and Kerr-McGee's desire to keep the EPA "out of this" might not be in the citizens' interest .

"It has been the EPA that has documented, studied, analyzed and characterized this site. We wonder how the OSDH can assure us that citizen's health and environmental concerns can best be served by excluding the EPA from this proposal" (CES 1990b).

Other concerns were expressed over proposed sampling procedures and the lack of proposed health studies. After a meeting between Kerr-McGee officials and the Citizen's Oversight Committee to discuss the proposal (CES 1990b),

Kerr-McGee signed a Consent Order with the Oklahoma State Department of Health to remediate the site on May 4, 1990, and began conducting a remedial investigation/feasibility study (RI/FS) under the State Health Department's oversight (US EPA 1991). Pursuant to the Consent Order, Kerr-McGee conducts the cleanup, the Oklahoma State Department of Health provides oversight, and the U.S. Environmental Protection Agency has final approval authority (Dunaway 1993).

In February 1991, the Kerr-McGee facility was officially withdrawn from inclusion on the Superfund National Priorities List (US EPA 1991). Some believe the decision was made for purely political reasons, while others interviewed believed that the site's removal from the NPL was an indication that the site was being satisfactorily cleaned up by Kerr-McGee. The official explanation was that the contamination posed no threat to human health or the environment due to the hydrogeological conditions underlying the Kerr-McGee site (Dunaway 1993).

Currently, Kerr-McGee is remediating the non-radiological acid sludge wastes in the five pits located on the site. These pits cover a surface area of approximately 21 acres at an average depth of 12 feet - a volume of about 400,000 cubic yards. The feasibility study for the cleanup of the pits has been completed, and the remediation alternative has been selected by Kerr-McGee and the Oklahoma State Department of Health (now known as the Oklahoma

Department of Environmental Quality). The acid sludges will be neutralized and stabilized and contained in a landfill to be constructed on-site. The project cost is estimated at \$35 million and will take 3 years to implement (ODEQ 1993).

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This chapter will first examine the issues surrounding the problem of NIMBY and citizen opposition to risk in greater detail, and in light of relevant literature on the topic. Next, a discussion of previous research conducted on the Cushing Kerr-McGee facility cleanup controversy will show why further research on this site was needed. Lastly, the applicability of Q methodology to this research project will be examined by discussing the theoretical foundations on which it is based.

A Closer Look at the Problem

"As the problem of waste disposal has acquired a priority position on municipal agendas across the U.S., the issue of public opposition has become the central concern" (Weller 1984). Past reactions to the challenge of dealing with public opposition to risk have centered on trying to find easy answers, but these answers do not address the emotions and legitimate concerns associated with local opposition (Morell and Magorian 1982). These legitimate

concerns originate from the fact that "the criteria by which decisions are made do not reflect social values expressed through the political process, but rather political decisions hidden behind the rationale of technical standards made by experts. Thus, the question of acceptable risk has little to do with people's values, but much to do with the economic and political forces concerned with the costs of environmental standards" (Edelstein 1988). The continued focus on objective, rational considerations in environmental decision-making, and the continued inattention to subjective, non-technical considerations, has resulted in an increasing deterioration of trust on the part of citizens toward decision-makers.

The solution to the problem of citizen opposition to risk involves bridging the gap between "technocracy and democracy, between objective facts and subjective values, between scientific risk assessments and lay risk judgments, and between conflict and cooperation" (Focht 1993). The next logical question would then be, "how do political institutions close the gap between those who have the most complete understanding of the means - the technical experts - and those who are the final arbiters of value - ordinary citizens?" (Hill 1992). Solutions to these issues must incorporate factors such as openness, communication, and empowerment (Edelstein 1988). But perhaps most importantly, solutions must include strategies for "direct and

substantive citizen participation in the decision making process" (Focht 1993).

The importance of including factors other than those involving technical and scientific issues in environmental decision-making processes is not new. For example, a panel reviewing health studies conducted by the New York Department of Health scientists (and others) for the controversial Love Canal cleanup, expressed the opinion that, "the State (of New York) may also wish to include non-scientists, local residents, and others in future deliberations" (Levine 1982). The prevalence of NIMBY and TIMBY conflicts today indicates that even though these approaches were promoted in one of the earliest of the United States' remediation controversies, the lesson was not learned.

Previous Investigation of the Cushing Cleanup Controversy: The Next Steps

The Cushing Kerr-McGee cleanup controversy has been previously examined by Oklahoma State University students and faculty in a comparative study of hazardous waste sites in Oklahoma (see Lawler, Focht, and Hatley 1992). The objectives of the previous comparative study were to document local hazardous waste controversies in terms of the NIMBY experience, to develop a conceptual model for analyzing NIMBY political encounters, and to provide an

empirical basis for refining the "NIMBY" concept (Lawler, Focht, and Hatley 1992).

Results of the Lawler, Focht, and Hatley study indicated that government policy implementers should take more responsibility for providing meaningful opportunities for citizen participation, and also insure adequate consideration of citizen input when reaching final decisions in order to avoid conflict. Issues that were not addressed in the comparative study include the types of input citizens in each of the cases studied feel are important, as well as what they consider to be "meaningful opportunities for citizen participation".

In order to address these issues, it is important to examine the final outcome of the Cushing cleanup dispute. Although the cleanup by Kerr-McGee is not yet complete, an up-to-date documentation of events and citizen feelings and perspectives on the situation is important for determining the reasons why this particular controversy did not lead to a typical NIMBY result of conflict and policy gridlock. Current reflections by citizens (after most of the controversy has subsided) about what they believe to be important decision factors and public participation strategies will serve as an important point of comparison to NIMBY controversies that have not resulted in consensus.

Theoretical Foundation of Q Methodology

Q methodology is a technique that provides an "approach by which maps of opinion terrains held in common by many individuals may be discerned... most particularly attitudes, values and beliefs" (Thomas 1990). This methodology is especially useful for studying "situations in which the self is intimately involved", points of conflict and consensus at issue in the social sciences, public opinion, values, groups, and communication (Brown 1980). The Q technique focuses on measuring subjectively the correlations between persons as functional wholes (Brown 1980). Q has advantages over other techniques, such as the commonly used R method. The R method deals objectively with trait differences between individuals, by breaking the subject(s) to be studied into less meaningful component parts which must then be reconstructed in order to examine the "whole picture" (Brown 1980). The Q method is extremely useful in this particular research because a large variety of statements reflecting ideas, comments and opinions about an issue (i.e. community environmental decisions) can be transformed via the Q sort (the rank ordering of a set of statements by a subject under a specified condition of instruction) into a smaller subset of groups of attitudes or factors. These sorts can then be implemented as an explication of the beliefs and values common to the attitudes represented. This methodology is ideal for the larger goal of this

research: to ascertain what decision criteria citizens believe to be important in environmental siting and remediation decisions, and how to build consensus among the parties so that NIMBY can be avoided. For this case study, Q technique provides another method to examine why the Cushing controversy ended in consensus instead of gridlock; the attitudes and beliefs of each of the groups involved can be examined for similarities and differences.

CHAPTER III

METHODOLOGY

Introduction

Multiple methodologies, both qualitative and quantitative, and subjective and objective in nature, are being used in this case study to address validity challenges that are common in the social sciences. The three methods being used in this project: in-depth interviewing, R methodology, and Q methodology, combine to create triangulation in the research design.

Determination of Case Study Site

The Cushing, Oklahoma Kerr-McGee cleanup controversy was included as one of the seven case studies for several important reasons. The community of Cushing is the location of a controversy that began in 1989, and that represents a "TIMBY", or "threat in my backyard" controversy (Focht 1989). This situation differs from that of a NIMBY controversy because the presence of a threat (actual or perceived) leads to a controversy over how and when to remove threats. In NIMBY situations, on the other hand, the controversy involves a proposal to impose threats where they

did not exist previously. In TIMBY situations, reasons for citizen involvement and decision-making strategies effective for avoiding gridlock may differ from those in NIMBY contexts. This makes it imperative that various forms of NIMBY are examined so that alternatives to traditional decision-making processes are selected based on knowledge from more than one type of controversy.

Secondly, the situation in Cushing involves the cleanup of a site currently owned by Kerr-McGee Corporation, on which an oil refinery and uranium and thorium processing facility were located, making the waste to be cleaned up at the facility both hazardous and radioactive. None of the other seven communities studied dealt with both types of waste, and the associated technical, legal, and social implications that this problem brings to the industry, government, and citizens.

The third, and perhaps most important, reason for including the Cushing case study in this research is the unique outcome achieved in this controversy. The perception on the part of citizens, state and local governmental agencies, and Kerr-McGee is that initial citizen concerns have been addressed, the cleanup is being handled satisfactorily, and significant further involvement by Cushing citizens in the cleanup events is not warranted. No demonstrations, protests, or litigation resulted from the Cushing situation, as they have in other similar cleanup controversies (see Levine 1982).

Selection of Subjects

Interview subjects were selected from the three stakeholder populations: citizen activists involved with either the original citizens group (CES) or the Citizens Oversight Board, the Kerr-McGee Corporation, and local and state government officials. Only citizens who were active were included because it is they who kept the controversy going, and would be expected to have the strongest opinions about how the cleanup was handled.

Instrument Development and Pretest

The survey instrument was initially developed by members of the research team and pretested on a group of citizen activists from Ponca City, Oklahoma - one of the seven case studies being conducted. Because the Ponca City controversy was also a TIMBY controversy and the questions asked on the survey instrument were similar in content to those asked in the final Cushing questionnaire, the Ponca City pretest had particular value to the development of the Cushing survey instrument.

Two versions of the pretest were given to Ponca City activists, with a total of sixteen respondents. The pretest questionnaire was composed of four parts, and was administered in a group setting. The responses obtained

from pretest surveys indicated the need to administer the survey via a personal interview, rather than a group setting, in order to insure that the respondent clearly understood the question being asked or the task to be performed.

The pretest results were qualitatively analyzed to determine whether the questions asked were understandable and unambiguous, and whether the responses obtained were consistent. The final survey instruments were developed to overcome the problems made apparent in the pretested version.

Description of Instruments and Procedures

The final survey instrument was revised and adapted to address the issues of importance in the Cushing case study. Archival research and informational interviews were conducted to gain an understanding of the past history and present status of the controversy and the site. Cushing library records, Citizens for Environmental Safety newsletters, Cushing newspapers, EPA reports, and previous scholarly papers written on the Cushing cleanup provided a historical background of the events surrounding the controversy. Informational interviews with a local newspaper reporter who covered several stories surrounding the Kerr-McGee cleanup, an environmental activist who had previously done research on this site, and the President of

the CES group provided more detailed information, including names and phone numbers of potential interviewees, and sources of further information.

Close-Ended Interview

The first section of the survey instrument is titled, "Relationships and Roles in the Cushing Kerr-McGee Facility Situation" (see Appendix A). It is composed of 11 multiple choice, or close-ended, questions that seek to identify the extent to which citizens were involved in the 1989 controversy, their relationships with the various groups involved in the situation, and the sources from which they received their information about the situation at that time. The respondents were given a copy of the questionnaire as the interviewer read the questions out loud, and asked to indicate their answers from among the choices given.

The last section is a questionnaire regarding demographic characteristics of the respondent. This questionnaire addresses customary demographic data such as age, gender, education level, and primary occupation, as well as how close the respondent lived to the Kerr-McGee site, and whether or not the respondent is a member of any other citizen's groups or service organizations (see Appendix A).

Open-Ended Interview

The second section of the interview consists of open-ended questions designed to elicit elaborated answers. It consists of 12 questions concerning the individual's role in the controversy, reasons for getting involved in the situation, concerns about the cleanup, perceptions about the possible effect the cleanup situation has had on the community, and reflections on whether or not the situation could have been handled differently by each of the involved parties (Appendix A).

Rank-Order Card Sorting

Following the interview questionnaire, two rank order card sorting tasks were given to the respondents. The first card sort task involves a set of thirteen cards on which are described decision criteria that may be important for government decision-makers to consider in making environmental cleanup decisions (for card content see Appendix B). After the cards were shuffled and placed in no particular order, the respondent was asked to read through the cards, ranking them from most to least important, in order to reveal their beliefs about which criteria should be most important in making environmental decisions. After ranking them ordinally, the respondent was asked to group the cards in groups such as "highly important", "somewhat

important", and "not important", to indicate the relative importance of each card to the others.

The second set of rank order cards consisted of nine different citizen participation strategies that varied in the extent to which citizens can provide input to the decision process, and their power to influence decisions (for card content see Appendix B). After they were shuffled, the respondents again read through the cards, ranking them in the order of preference, and grouping them into groups of "highly preferred", "somewhat preferred", and "not preferred" strategies.

The frequency distributions were calculated for each of the items on the cards, for both decision factor cards (Sort #1), and public participation strategy cards (Sort #2). Additionally, Q methodology was used to interpret the rankings given to the items in the card sorts through the use of factor analysis. The data obtained through these analyses are compared to responses given in the in-depth interview questions and to the results of Q sorts completed by respondents. The differences and similarities between responses, and preferences of the group as a whole, or individually are also evaluated.

Q Sorting

The last part of the in-depth interviews consisted of a Q sort. The Q sample consisted of forty-seven statements

derived by the research team from comments, discussions, and opinions of various environmental activists and groups (see Appendix E). Each of these statements was printed on a card and sorted by the respondent according to whether he or she agreed or disagreed with the statement in light of a specific condition of instruction. The cards were sorted along an eleven point continuum, from "most unlike" the respondent's beliefs about what is important in environmental decision-making (-5), to "most like" the respondent's beliefs about what is important in environmental decision-making (+5). In the sorting process, the respondent selected the two statements that were most like their beliefs, and placed them in the +5 column. Next, they selected the two statements that were least like their beliefs and placed them in the -5 column. Then the respondent went back to the positive side, selecting the three statements that they agreed with next-most strongly, and placed them in the +4 column, and so on, until all forty-seven statements were placed on the form board. The respondents were free to rearrange the statements on the form board at any time, and were encouraged to examine the arrangement when they had finished to make sure it reflected their beliefs.

The Q sort configurations were then entered into the Oklahoma State University mainframe computer, and factor analyzed by a program called "p.c.q.3". The program, through factor rotation, computes a single array of factor

scores for each factor. Each of the resulting factor arrays (Factor A, Factor B, etc.) is representative of a group of individuals who sorted the statements in a similar fashion to the arrangement of the factor array. The factor array therefore represents a common or shared perspective among those individuals sorting the statements similarly to the resulting array.

Methodological Considerations

There are several potential limitations involved with the approach and methodologies used in this case study. Because this research did not take place during the time that the Cushing situation actually occurred, reliance on second-hand archival and verbal information is necessary in order to understand the historical and contextual atmosphere surrounding the controversy. The objectivity of sources used to obtain this type of information must be evaluated and taken into account.

Further, the selection of interview subjects is dependent to some degree on their availability, both physically and temporally. Some individuals had moved away from the community, or had become tired of dealing with the situation and refused to participate in the study. This effect could have a negative impact, especially if the individual has important information to contribute, or if (as in this case) the sample of respondents is already

small. As well, there are limitations inherent in not actually living in the community itself, such as a reduced ability to meet with respondents, gather information, attend public meetings, and schedule interviews.

Another concern is the ability of individuals interviewed to accurately recollect their experiences, thoughts, and feelings as they existed at the time of their involvement with the situation. Several questions in the open- and close-ended interview sections ask the respondent to remember the original reasons they got involved, how they felt about a certain situation, etc. This is frequently difficult for the respondent to do, in light of what they may have learned about the situation or the issues involved since that time. Strategic bias can also enter into answers to questions when the individual wishes to give what they perceive to be the "correct" answer to interview questions.

The limitations of the card sort tasks are several as well. Due to the length of the entire interview process (an average of 1 1/2 hours), respondents sometimes felt tired by the end of the interview when the card sorts were presented. This factor, possibly combined with distractions occurring at the interview location, could result in inaccuracies in card sorts. A lack of understanding of terms and/or concepts used in the descriptions of the decision factors and participation strategies can also act to impede accurate data collection.

To overcome these limitations, care was taken to collect archival data from a variety of sources, and to verify dates and events for accuracy between the sources. Informational interviews and media reports, combined with government, citizen group, and industry records, were collected and compared to one another. Interview subjects were located through several "primary contacts", or individuals with a knowledge of both the situation and those involved in it, thus overcoming many of the difficulties of locating and "coercing" people to participate in the interview process. For individuals who no longer resided in Cushing, it was possible to conduct interviews with several of them in their new locales. Furthermore, for this research it was not necessary to interview all those involved in the controversy, as long as all perspectives were represented by the data obtained from the interviews.

To deal with the problem of inaccurate recollection of historical events, thoughts, and feelings, the survey "script" emphasized the time frame that the questions were being asked in. No doubt was left on the part of the respondent as to the time frame they were to recollect. Strategic bias was controlled by the wording of both structured and unstructured questions, so that they were free from value judgments. The interviewers were trained by research project leaders in sessions held prior to the data collection phase to be objective, and to refrain from

injecting personal opinions and values into questions and discussions with respondents.

The limitations of the card sorts were addressed by first explaining the importance of the individual's response to the research being conducted. Emphasis was put on the interactive nature of the activity, as opposed to the previous task of simply answering questions to encourage cooperation in responding. Also, priority was given to certain of the three card sorts (the two rank-order and one Q sort) in the case of lack of time, interest, or suitable location for conducting the exercises. In this way, specific sorts could take precedence over others.

To deal with misunderstandings or lack of knowledge of terms or concepts discussed on the rank-order card sort exercises, explanations of the factors or strategies were given on the cards, above the statement to be sorted. The respondents were asked to read the cards in their entirety, and then ask any questions or obtain clarifications before sorting the cards.

CHAPTER IV

DISCUSSION OF RESULTS

Introduction

A total of seventeen interviews were conducted for this case study. Due to the fact that the Citizens for Environmental Safety group is a small, cohesive group, the initial goal of twenty interviews was not met. Except for one particular meeting that approximately 100-125 people attended, the citizens in attendance at city commission and public meetings were primarily the CES group members. Because the goal was to interview those citizens who were most active in the controversy, individuals attending just one meeting would probably not be sufficiently knowledgeable to provide good responses to interview questions. In addition to this problem, three of the original group members refused to be interviewed for this research. This seemed to be due to either a lack of time, or to "burnout" (several researchers had previously interviewed members of the citizens group in Cushing, and some are tired of being asked questions about something that is no longer important to them).

Time and budget factors also played a part in not being able to interview more individuals for this research. As

this research project was unfunded, extensive traveling was not a viable option (for example, to interview people who have moved away from the Cushing area).

However, the data obtained by the interviews that were conducted are representative of each of the parties involved in the Cushing controversy. The responses to questions and card sorts throughout the interview process were found to be fairly thorough and consistent, both between respondents and between interview methods. Thus there is no need to further characterize the participants in the controversy. The breakdown of interview respondents is as follows:

TABLE 4.1
BREAKDOWN OF INTERVIEW SUBJECTS BY ORIGIN

Origin	Number of Interviews Obtained
Citizens	
- CES Members	7
- Oversight Board	4
Kerr-McGee	3
Local government	1
State government	1
Other*	1
TOTAL	17

* One interview was conducted with a local environmental activist who did not live in Cushing or take part in CES or Oversight Board activities directly, but who has significant knowledge of the situation and is acquainted with state

environmental issues. This interview was conducted for comparison purposes.

The distribution of the two rank-order card sorts and the Q sort among the respondents of the interviews is as follows:

TABLE 4.2
NUMBER OF RESPONDENTS FOR EACH METHODOLOGY
(SORTS ONLY)

Respondent(s)	Card Sort #1	Card Sort #2	Q Sort
Citizens	9	8	8
Kerr-McGee	2	2	2
State Gov't.	1	1	1
Local Gov't.	1	1	1
Other	1	1	1
TOTAL	14	13	13

Demographics

Demographic questions were asked of all citizen respondents in order to characterize the Cushing activists. Of the activists interviewed, six were men and five were women, ranging from 29 to 85 years old. All citizens in the group had at least a high school education, with two Bachelor's degrees, one Master's degree, one "in progress" Juris Doctorate, and one Juris Doctorate. Subjects of study

in school were as varied as the primary occupations of the citizens. The most common primary occupation was that of small business owner, with 3 responses. Typically, citizens involved in the dispute had resided in Cushing for an average of 26 years. Most citizens still live within about five miles of the Kerr-McGee site, although a few have moved away from Cushing since their initial involvement in the 1989 events. To ascertain the citizens' affinity to joining or belonging to groups, the question was asked if the individual was an active member of any citizens' group or service organization (other than CES) (see Appendix A). The responses to this question were about evenly split - five of the eleven citizens interviewed reported they are not involved in any other group activities, while the remaining six reported participating in group activities, other than CES, either "frequently" or "continuously".

Preferred Decision Criteria

Frequency distributions were calculated for the data obtained from the first of the rank-order card sorts, the thirteen decision criteria cards (see Table 4.3). Results of the frequency distribution broken down into stakeholder groups indicates that Cushing citizens feel the most important criteria to consider in environmental decision-making are citizens' timely access to relevant information, and the provision of adequate opportunities for citizen

involvement. Responses from Kerr-McGee representatives indicate they prefer alternative technologies and scientific risk assessments as the most important criteria to be considered in environmental decision-making. Government officials agreed that assurances of adequate training in relevant technical and legal areas should be the most important criterion in community environmental decisions.

Card sort participants were asked to group the cards into groups of highly, somewhat, and not important criteria after placing them in rank order. The grouping preferences of citizens, industry, and government respondents combined are represented below:

TABLE 4.3
 FREQUENCY DISTRIBUTION:
 RATINGS OF HIGHLY, SOMEWHAT, AND NOT IMPORTANT
 DECISION CRITERIA

Criteria	Highly	Somewhat	Not
Access to Information	12	1	-
Citizen Involvement	11	2	-
Technical/Legal Education	11	2	-
Alternative Technologies	8	5	-
Scientific Risk Estimates	6	6	1
Personal Risk Judgments	6	6	1
Institutional Trust	6	5	2
Community Economics	2	8	3
Views Toward Technology	2	7	4
Understanding Local Culture	2	7	4
Firm Economics	2	4	7
Community Disruption	1	7	5
Fairness	-	8	5

In addition to the rank-order card sort frequency distributions, Q methodology was used to interpret the rankings given to the environmental decision criteria cards by the respondents. In this analysis, the Q sort statements are identical to the decision criteria card content (see Appendix B).

The factor analysis derived a two factor solution, with an interfactor correlation of 14%. There were two confounded sorts, defined as an individual loading significantly on both factors. Nine of the fourteen sorts were significant on Factor A, and three were significant on Factor B (for loadings and factor arrays, see Appendix D).

The nine individuals loading on Factor A are primarily

Cushing citizens and Oversight Board members, but also included is one government official. The Factor A array indicates that this group believes the following criteria to be most important when making environmental decisions:

Card #5. Access to Information (+6).

Card #11. Citizen Involvement (+5).

Card #12. Technical and Legal Education (+4).

These results are consistent with earlier frequency distribution results from card sort rankings, in which citizens chose access to information and citizen involvement as the most important decision criteria. Combined rankings of criteria (see Table 4.3) also indicate this order of importance, and show technical and legal education to be the third choice of the respondents overall. Individuals loading on Factor A dismissed the importance of the following criteria:

Card #2. Economic Impact on the Company (-6).

Card #7. Fairness (-5).

Card #10. Community Disruption (-4).

These Q sort rankings are also consistent with three criteria most frequently deemed as "not important" in the frequency distributions calculated for the decision criteria. The fact that individuals with significant loadings for the Factor A array are primarily citizens validates the results of the R sort rankings and frequency distributions. Criteria ranked as important and unimportant by citizens in the card sort are the same criteria of which

Factor A is composed. Individuals with significant loadings on Factor A are the members of the same stakeholder group as those who were linked with these particular criteria on the frequency distribution.

Factor B significant loadings represent individuals from Kerr-McGee and government. The following are criteria believed to be most important to the decision-making process by this group:

Card #3. Scientific Risk Estimates (+6).

Card #13. Alternative Technologies (+5).

Card #12. Technical and Legal Education (+4).

The criteria believed to be least important to the decision-making process by the Factor B group are:

Card #4. Personal Judgments of Risk (-6).

Card #6. Personal Views Toward Technology (-5).

Card #10. Community Disruption (-4).

The most important criteria for the Factor B group are perfectly consistent with previous findings of card sort rankings for the industry and government respondents. The criteria at the opposite end of the array (least important) reflect a lesser value placed on citizen-oriented criteria. For the Factor B group, technical criteria are far more important to the environmental decision-making process than are social and cultural criteria.

Preferred Citizen Participation Strategies

Frequency distributions were also calculated for the data obtained from the second rank-order card sort, the nine public participation strategy cards. Results from the frequency distribution for these thirteen sorts (see Table 4.4) show that citizen respondents preferred the oversight board option over other participation strategies. The two responses from Kerr-McGee indicate preemption (wherein decisions are made by experts in government and industry), and the oversight board are favored over other options. Government representatives chose preemption and consultation (in which decisions are made by the government, with the public being given the opportunity to voice its concerns throughout the decision making process), as their preferred strategies for public participation.

Participants were asked to group strategy cards into three groups: highly, somewhat, and not preferred, after placing them in rank order. The responses from the three groups combined are presented below:

TABLE 4.4
 FREQUENCY DISTRIBUTION:
 RATINGS OF HIGHLY, SOMEWHAT, AND NOT PREFERRED
 PUBLIC PARTICIPATION STRATEGIES

Strategy	Highly	Somewhat	Not
Oversight Board	10	1	1
Consultation	8	3	1
Public Comment & Hearing	6	5	1
Third Party Mediation	4	8	-
Non-Binding Negotiation	3	8	1
Binding Arbitration	3	7	2
Preemption	2	3	7
Citizen Control	1	6	5
Referendum	-	6	6

Q methodology was also used to interpret the rankings given to the public participation strategy cards by the respondents. In this analysis, the Q sort statements are identical to the participation strategy card content (see Appendix B).

The factor analysis for participation strategies derived a three factor solution (see Appendix E for significant loadings and factor arrays). One sort was confounded, and one was not significant (meaning that it did not load on any of the three factors). Four sorts were significant for Factor A, five for Factor B, and two for Factor C. Individuals loading on Factor A consisted of two citizens, one Kerr-McGee representative, and one government official. Factor A's preferred the oversight board (+4) and

consultation (+3) as the most effective public participation strategies. They ranked citizen control (-4) and preemption (-3) as the least preferred strategies. These rankings would seem to suggest that Factor A's prefer moderate participation strategies, as opposed to more extreme techniques. Preemption and citizen control are on opposite ends of the hierarchy of power, with preemption as the least amount of citizen input and power, and citizen control as the most amount of citizen power. The choices of oversight board and consultation as preferred strategies suggests that Factor A's value citizen input and power, but do not dismiss the need for other views to be included in the decision-making process. This may be the result of the mixed composition of respondents who loaded significantly on this factor.

Factor B is composed of five citizens (two are Oversight Board members). Oversight board (+4) and binding arbitration (+3) were the preferred participation strategies for this group - both strategies having relatively high levels of citizen power. Least preferred strategies for Factor B's were preemption (-4) and consultation (-3). Factor B's are similar to Factor A's in their dislike of preemption (A:-3, B:-4), and referendum (A & B:-2) as preferred strategies. Similarities also exist between their rankings of the oversight board (A & B:+4) as the most preferred strategy. The most distinguishing factor between Factors A and B is the ranking of consultation (in which

environmental cleanup decisions are made by the government, with the public being allowed to voice its concerns throughout the process) (A:+3, B:-3). The preference of this strategy by the Factor A group, which is half composed of industry and government representatives, can be explained by the importance that they place on their roles as decision-makers. The relative unimportance given to this strategy by the Factor B group is indicative of the citizen composition of the group, and the lower level of citizen power that this strategy holds.

The third factor, Factor C, has less in common with Factors A and B, and is composed of one Kerr-McGee and one government representative. Factor C prefers preemption (+4) and consultation (+3) over other strategies, and least prefers binding arbitration (-4) and referendum (-3). The preferred strategies for Factor C respondents are those with little or no citizen power and input, and their least preferred strategies are those with more citizen input and power.

Description of Q Sort Data

Varimax rotated centroid factor analysis of the Q sort data produced a two factor solution, accounting for ten of the thirteen Q sorts collected. Two sorts were confounded, meaning that the individuals loaded significantly on two factors instead of one. One of the sorts was not significant on any factor. Results of the varimax rotation are shown in Appendix F. Factor A contains six sorts, accounting for 29% of the total variance in the correlation matrix. Factor B contains four sorts, accounting for 25% of the variance. Factors A and B together explain 54% of the variance. Configurations of both factors, with significant loadings, are shown in Appendix H. Content and item scores for each of the forty-seven statements are listed in Appendix G. Consensus and distinguishing items for both factors are listed in Appendix I. The interfactor correlation between factors A and B is thirty percent, indicating little overlap of opinion between factors, as shown in Appendix F.

Technically-Oriented Sympathizers

Factor A, named the Technically-Oriented Sympathizers, is composed of two Cushing citizens (one of which is an Oversight Board member), two Kerr-McGee representatives, and both governmental representatives (state and local). See

Appendix F for significant loadings (factor structure) for the Factor A group. Factor A agreed most strongly with the following statements:

25. All information should be shared in easily understood language as soon as it is available. (+5)

6. Scientific risk assessment should be the major consideration in siting decisions. (+5)

29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it. (+4)

26. Who provides information makes a difference to me; the person must be honest. (+4)

47. Industry must be required to recycle, reduce wastes, and use safer techniques and raw materials. (+4)

Of these five statements, three (25, 29, 26) concern the availability of information and education for the public. The other two statements concern technical issues. Statements #6 and #29, taken together, allude to the importance of technical issues in decision-making, and the importance of educating the public on these technical issues as well. From their agreement with these statements, the Factor A group seems to value the importance of technical criteria in decision-making. Mixed in with this is the feeling that industry and government must act responsibly, and provide honest, timely, and relevant information to those citizens impacted by their activities.

The attitudes of the Factor A group are further revealed by examining the statements with which they strongly disagree:

10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem. (-5)

36. Citizens should initially oppose all proposals for siting by industry. (-5)

41. The chief function of government is to support the economy. (-4)

3. When jobs are scarce, an increase in employment is good even if there is resulting pollution. (-4)

46. Government and industry skew their risk estimates to suit their own purposes. (-4)

In these statements, strong disagreement with #36 and #46 indicate Factor A respondents feel that industry and government are at least somewhat trustworthy. The idea of industry and governmental responsibility for protecting the environment is evident once again in disagreement with statements #10 and #3, and possibly in #41 - if the respondents believe that protecting the environment is another chief function of government (i.e. aside from supporting the economy).

The statements which distinguished Factor A respondents from Factor B respondents (see Appendix I), but were not necessarily ranked in the +5, +4, -5, or -4 columns on the Factor A array are as follows:

9. I tolerate risk as a fact of life, but I don't like it. (+3)

17. Industry usually complies with environmental laws even when it costs them money. (+3)

21. Waste facilities give a community a bad reputation. (-2)

28. It is impossible to know whether or not a process is really safe without adequate technical education. (+2)

32. Government shouldn't be trusted in making siting decisions. (-2)

38. If you have enough money, you can get away with polluting. (-3)

These statements characterize Factor A respondents because of the difference between the ranks given by the Factor A and B groups (at least three columns apart on the form board). These statements once again show the technical orientation of the Factor A respondents, as well as the importance they place on educating those who do not understand technical processes (statement #28). Factor A's agreement with statement #9 involving risk would seem to indicate that the respondents are somewhat risk averse. Due to their technical orientation, they may understand that risk is inherent in our society, but the fact that they "don't like it", may be responsible for their beliefs that industry and government should be responsible for protecting the environment, and not making trade-offs that may sacrifice the environment (statement #3). Scores given to

statements #17, #21, #32, and #38 show that the Factor A respondents once again believe that industry and government should not be viewed as inherently negative. The support of Factor A respondents for industry and governmental interests, the attitude that these entities can be trusted to do what is right, and the view that those individuals not educated in technical issues ought to be, seems to point to a technospheric view on the part of the Factor A group. It is for this reason that Factor A was named the Technically-Oriented Sympathizers. Their education and background in technical areas has provided an outlook that values technocratic solutions but also sympathizes with the need to protect the environment and not compromise it for economic gain. Factor A people also believe that citizens need more information about the issues and a greater knowledge and appreciation of the underlying technical bases for environmental decision-making.

The above interpretation of Factor A is representative of sorts having positive significant loadings for that factor. If we were to hypothetically examine what bipolar, or negative, loadings on Factor A would look like, the interpretation would be much different. Essentially, the Factor A array, as it is represented in Appendix H, would be reversed. Individuals having negative significant loadings on Factor A would definitely not be interested in protecting the environment, as evidenced by their treatment of the following statements:

47. Industry must be required to recycle, reduce wastes, and use safer techniques and raw materials. (-4)

10. It doesn't matter how much we pollute today because tomorrow's technology will solve the problem. (+5)

3. When jobs are scarce, an increase in employment is good even if there is resulting pollution. (+4)

The issue of trust would be somewhat evident in negative Factor A's agreement that government and industry skew their risk estimates to suit their own purposes (+4), and that citizens should initially oppose all proposals for siting by industry (+5). But, those statements that would be thought to address issues of trust would be rejected by the negative Factor A's. For example:

25. All information should be shared in easily understood language as soon as it is available. (-5)

29. If the public were more familiar with the operation of a waste facility, they would be more willing to consider it. (-4)

26. Who provides information makes a difference to me; the person must be honest. (-4)

Another contradiction in the beliefs of negative Factor A's lies in their disagreement with the technical basis for environmental decision-making:

6. Scientific risk assessment should be the major consideration in siting decisions. (-5)

At the same time, they believe that technology will solve problems we create today, such as pollution (statement #10).

It is clear that positive and negative loadings for Factor A possess opposite beliefs and attitudes about environmental decision-making. It might be hypothesized that positive and negative Factor B loadings will be opposite in content from those represented by positive and negative Factor A. As it is examined in the next section, we will see that this is not the case.

Citizens Taking Responsibility

Factor B, named Citizens Taking Responsibility, is composed of four citizens. See Appendix H for significant loadings for Factor B. Factor B respondents agreed most strongly with the following statements:

47. Industry must be required to recycle, reduce wastes, and use safer techniques and raw materials. (+5)

8. We should not take any chances with the environment. (+5)

15. Cost effectiveness is more important to industry and government than environmental issues. (+4)

22. Citizens should be involved in every step of a siting decision. (+4)

34. Economic special interests have too much influence in siting decisions. (+4)

While statement #47 involving industry responsibility for the environment seems to be common to both Factors A and B, the Factor B respondents seem to feel more strongly about

protecting the environment than the Factor A group does. Further, they believe that government and industry do not share their views, and therefore citizens must be involved in the decision making process (statement #22). These views are further elaborated by looking at the statements that Factor B respondents disagreed with:

14. Government and industry know what they are doing; they are the experts. (-5)

4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed. (-5)

16. The government adequately enforces environmental laws to protect human health and safety. (-4)

17. Industry usually complies with environmental laws even when it costs them money. (-4)

1. Waste facility siting means economic growth and prosperity for the community. (-4)

Again, the Factor B respondents do not seem to trust government or industry to make environmental decisions (statement #14), nor do they trust the government to enforce environmental laws, or industry to abide by those laws. It is not surprising that based on these beliefs, the citizens of Factor B believe they need to be involved in every step of a siting decision. Factor B respondents also feel that protection of the environment takes precedence over economic considerations, but more strongly than the Factor A group (see statement #3 - Factor A). If faced with an actual

waste facility siting (statement #1), Factor B respondents believe strongly that the impact would not benefit the community in which it was located.

The lack of trust and confidence that the respondents of the Factor B group have in government and industry is further substantiated by examining the statements that distinguish Factor B from Factor A:

30. Citizens should have their own experts. (+3)

32. Government shouldn't be trusted in making siting decisions. (+2)

38. If you have enough money, you can get away with polluting. (+3)

46. Government and industry skew their risk estimates to suit their own purposes. (+3)

Three of these statements (#32, #38, #46), were previously listed as statements that distinguished the Factor A group. However, the Factor B group feels about these statements equally as strong, except in the opposite direction. In other words, they agree with the statements as strongly as Factor A disagreed with them. And again, these statements involve the issue of trust: the citizens of the Factor B group do not believe they can depend upon government or industry to do what they have been entrusted to do. This belief leads to Factor B's agreement with statement #30, that citizens should have their own experts. "Toxic victims frequently note that a source of information independent of government is needed if trusted

interpretations are to be made" (Edelstein 1988). These attitudes and opinions were expressed many times in open-ended interviews with Cushing citizens as well:

"If you're relying on the polluter to tell you the correct information when it's going to cost them money to clean it up, they aren't going to tell you what you want to hear."

"It's hard to know what's really going on when you can't afford to hire your own experts to do testing."

"Some of the first 'experts' that they (Kerr-McGee) sent said you could eat the dirt at the site and it wouldn't hurt you, which no one believed."

The respondents included in Factor B are named Citizens Taking Responsibility due to their feeling that government and industry have not proven themselves to be trustworthy, and have not fulfilled their role in protecting the environment and the interests of the citizens in the communities in which they govern and operate. Under these less-than-desirable circumstances, the citizens feel the need to become involved and take responsibility where others have not.

The significant loadings for Factor B discussed above are negative values (see Appendix H). It is interesting to hypothetically examine what individuals with positive loadings would agree and disagree with in the Q sort. If we reverse the Factor B array, positive Factor B's would support and trust industry and government, and believe that they are the experts, as evidenced by:

15. Cost effectiveness is more important to industry and government than environmental issues. (-4)

14. Government and industry know what they are doing; they are the experts. (+5)

16. The government adequately enforces environmental laws to protect human health and safety. (+4)

17. Industry usually complies with environmental laws even when it costs them money. (+4)

These beliefs seem similar in content to the industry and government-supporting beliefs of the positive Factor A group previously discussed. In contrast however, the positive Factor B group would believe quite strongly that environmental protection and regulation should not stand in the way of economic gain and prosperity. The scores given to the following statements illustrate this belief:

47. Industry must be required to recycle, reduce wastes, and use safer techniques and raw materials. (-5)

8. We should not take any chances with the environment. (-5)

4. If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed. (+5)

1. Waste facility siting means economic growth and prosperity for the community. (+4)

Points of Agreement

Even though the Factor A and Factor B groups have differing views and attitudes about environmental decision-making, there are some of the Q sort statements that they felt similarly about. These consensus items (see Appendix I) either received identical scores, or scores within one rank of each other on the form board. The consensus items include:

11. The world would be a better place to live if we could go back to the good old days. (A:-3, B:-2)

13. The people who benefit the most from a waste facility are not the ones who bear the risk. (A & B:+2)

40. Consensus is impossible when activists become involved in environmental decisions. (A & B:-3)

42. Just being physically present in situations where environmental decisions are made is not enough. (A:+2, B:+1)

44. Environmental radicals are necessary to bring balance to the issues. (A:-2, B:-1)

Consensus on statement #11 by both groups indicates they both feel that technological advancement is important, and that going back "to the good old days" is not desirable. The importance of fairness in siting decisions to both groups is evident in their agreement with statement #13 involving risk versus benefit issues in waste facility siting. Responses by both groups to the last three statements (#40, #42, #44) show that they agree that

involvement in environmental decision-making is important, and that just because activists become involved does not mean that consensus is impossible. However, both factor groups feel that "environmental radicals" are not a necessary part of the environmental decision-making process.

CHAPTER V

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Findings

The ways in which community groups respond to toxic exposure is subject to many influences, including the characteristics of the area, and the characteristics of the group's members (Edelstein 1988). Although many factors influenced the outcome of the Cushing controversy, one of the most easily observed factors was the non-confrontational and non-adversarial approach Cushing citizens adopted toward Kerr-McGee and the state and local government. This approach can be attributed to a combination of the culture of Cushing and the background of the primary leaders of the Citizens for Environmental Safety group. Cushing's long history as an oil town, and the citizens' awareness of the associated problems (such as pollution) of an economy based on this type of industry is an important factor. The citizens' reaction to a perceived threat by the Kerr-McGee facility cleanup might have been stronger if Kerr-McGee were the only facility of its kind in the area.

As was discussed in the demographic results, three of the citizens who originated the citizens group were small business owners in Cushing. As the primary leaders of the

group, the outlook and the direction they gave other members of the group was important. One of the influencing factors for their unique approach was a personal stake in the health (both physically and economically), and spirit of the community. Their livelihoods and the success of their businesses depended on their reputation within the community. For the small business owners, they were not interested in alienating fellow citizens by being perceived as "radical environmentalists", in a community which did not favor such approaches. One CES member stated that being involved with the citizens group concerned about the cleanup while, at the same time, being a business owner was, "a difficult situation to be in". This feeling certainly contributed to the cooperative approach taken by the group in dealing with their concerns over the Kerr-McGee cleanup.

The beliefs and attitudes of the citizens and other stakeholder groups concerning environmental decision-making are another critical factor in the unique outcome observed in Cushing. Results from the Q sort suggest that the citizens involved in the cleanup issue in Cushing do not fully trust government or industry in the decision-making process. They believe that criteria considered important by industry and government are not the same as those considered important by citizens. Card sorts of decision criteria reveal that the most important criteria to citizens are access to information and citizen involvement. These criteria address the problem the citizens perceive to exist:

they need information and opportunities to be involved to counteract the distrust they feel toward those making the decisions - government and industry. Based on their beliefs, it could be predicted that citizen respondents would select public participation strategies that incorporate high levels of shared input and power. In the second card sort, citizens chose the oversight board as the preferred public participation strategy. This strategy, while not at the top of the power hierarchy, does incorporate equality into decision-making by bestowing all stakeholder groups with equal input and power.

Industry and government respondents in the Q sort believed technical issues to be the most important consideration, but did not entirely dismiss the importance of protecting the environment, and informing and educating the public on environmental issues.

Based on these beliefs, it could be predicted that technically-oriented respondents would choose scientifically-based, rather than socially-based, criteria as most important. Results from the first rank order card sort showed that alternative technologies, scientific risk assessment, and adequate training in technical and legal areas were the most important criteria to industry and governmental respondents. Subsequently, preferred participation strategies by industry and government included preemption, oversight board, and consultation. Two of these

three, preemption and consultation, represent low levels of citizen input and power.

Conclusions

Having established an understanding of the environmental decision criteria and public participation strategies important to citizens, government officials, and Kerr-McGee representatives involved in the Cushing cleanup, the next step is to determine why the Kerr-McGee cleanup controversy resulted in consensus rather than gridlock.

It is clear from the data obtained through both R and Q methodology that institutional distrust and a "crisis of legitimacy" existed at the time of the controversy in Cushing. Citizens were not willing to accept the decisions of the government or of Kerr-McGee regarding the site cleanup when they perceived the site to be a threat to the health and welfare of Cushing. They wanted to be informed about what was happening, how it would affect them, and what was going to be done about it. Citizens wanted to be involved to insure that their concerns were addressed, that the problem was taken care of, and that it did not end up in "someone else's backyard".

The research hypothesis states that if in fact NIMBY is a result of institutional distrust and the associated "crisis of legitimacy", then consideration of additional decision criteria and the use of alternative public

participation strategies incorporating these criteria will build a foundation for consensus (Focht 1993). Legitimacy and trust are regained and NIMBY avoided, not by a further rationalization of the process, but through openness, communication, and empowerment (Edelstein 1988). These are the elements that contributed to the success of the outcome in Cushing.

It has been established that institutional distrust and a legitimacy crisis existed on the part of the citizens. However, because of the non-confrontational approach taken by citizens toward Kerr-McGee, and the honesty and effective level of communication of Kerr-McGee toward the citizens, a somewhat positive atmosphere was created. Citizens interviewed indicated that Kerr-McGee took full responsibility for the site cleanup, and fulfilled every task requested of them by the citizens group. Kerr-McGee presented citizens with the positive and negative information about the hazards existing at the site, in addition to being thorough in their explanations of data and answers to questions. The desire on the part of citizens to have access to relevant information was thus fulfilled.

The creation of the Citizen's Oversight Board to oversee the progress of the cleanup at the site allowed the citizens a much higher level of involvement and power than they had previously in the cleanup situation, but it was through their involvement with the Citizens for Environmental Safety group that most citizens interviewed

felt they had achieved the greatest level of participation and involvement. Because of the communication and cooperation between citizens and Kerr-McGee, citizens received the information they desired and achieved a greater sense of shared power and input as their requests for things such as radiation warning signs were fulfilled. Because of the fact that the Oversight Board was not created for the purpose of overseeing the entire decision making process of the cleanup, but instead for monitoring the conduct of the cleanup after most of the citizens concerns were addressed, it cannot be given credit for resolving potential conflict or helping to increase citizen power to a large extent. The primary effect of the Oversight Board, according to citizen interviews, is that it now provides a mechanism for insuring that the community (leaders and residents) are informed and aware of the progress and other developments regarding the Kerr-McGee site, and that an avenue for communication is maintained to prevent further controversy from occurring.

It has been shown that the Cushing Kerr-McGee cleanup controversy did not end in consensus as a result of similar beliefs between citizens, industry, and government about which types of decision criteria should be considered in environmental decision-making. Nor did it end in consensus because of similar beliefs about which public participation strategy should be used to resolve conflict. Instead, the lesson we learn from the residents of Cushing and the Kerr-McGee Corporation is that in situations of distrust and

perceived illegitimate decision-making, citizen concerns are best addressed in a cooperative, rather than conflictual, atmosphere. In the Cushing situation, citizen trust has not been completely regained by Kerr-McGee, but the reasons for citizen concern that initiated the original controversy (in other words, the decision criteria that the citizens believed were not adequately considered) have been satisfactorily addressed, and citizens can observe that the cleanup is progressing as they were promised it would.

Recommendations

Several recommendations could be made for further research as a result of the findings of this case study. A consideration of the level and immediacy of the threat existing in the community may be an important avenue for further examination. Differences between the citizen opposition to a risk that can be seen (such as hazardous wastes seeping into basements), versus risks that cannot be experienced firsthand (such as groundwater contamination or radioactive contamination), may elicit quite different types of opposition from citizens.

Also important for examination is the culture and composition of the community in which the controversy occurs. The composition of the CES group in Cushing, with leaders and members who had interests in both the economic and environmental welfare of the community was an important

factor in the outcome of the cleanup controversy. These factors affected the outcome by impacting the initial relations developed between the stakeholders. In Cushing, citizens decided to adopt a non-confrontational approach, adopting a more radical stance only if the situation could not be resolved in a positive manner. This seems to be a somewhat unique approach, as mentioned earlier, and had a definitive impact on the outcome of the conflict. Further research on the effects of the citizen's approach to dealing with their opposition on other stakeholder's responses, and on the outcome of NIMBY situations in general, is warranted by the findings of this case study.

BIBLIOGRAPHY

- Barnes, Charles C. "Report on Wastes at the Former Kerr-McGee Deep Rock Oil Refinery/Nuclear Products Plants Site, North of Cushing, OK." 22 May 1989. Photocopied.
- Barnes, Charles C. "Kerr-McGee Cushing, Oklahoma, Nuclear Fuels Plant." Unfinished Publication. No date.
- Berger, James D., Oak Ridge Associated Universities. Letter to Leland C. Rouse, Nuclear Regulatory Commission. "Scoping Study - Former Kerr-McGee Facility at Cushing, Oklahoma." 27 October 1989. Photocopied.
- Bohrnstedt, George W., and David Knoke. Statistics for Social Data Analysis. Itasca, Illinois: F.E. Peacock Publishers, Inc., 1988.
- Brown, Steven R. Political Subjectivity - Applications of Q Methodology in Political Science. New Haven: Yale University Press, 1980.
- Citizens for Environmental Safety. Newsletter. 11 February 1990a.
- Citizens for Environmental Safety. Newsletter. 15 March 1990b.
- Citizens for Environmental Safety. "A Brief History of the Kerr-McGee Refining Facility." No Date. Photocopied.
- Dunaway, George, Member of Observation Committee. "Opinion of George Dunaway, Geological Engineer." 14 May 1993.
- Ecology and Environment, Inc., to J. Chris Petersen, EPA - Region 6. "Boydston Property Draft Action Memorandum." 17 May 1989. Photocopied.
- Edelstein, Michael R. Contaminated Communities - The Social and Psychological Impacts of Residential Toxic Exposure. Boulder, CO: Westview Press, 1988.
- Eshleman, J. Ross, Barbara G. Cashion, and Laurence A. Basirico. Sociology - An Introduction. Glenview, IL: Scott Foresman and Co., 1988.

- Focht, Will. "Groundwater Remediation Controversy in Ponca City: A Case for Negotiated Decision-Making." Edmond, OK: Presented at the Annual Meeting of the Oklahoma Academy of Science, Central State University, 10 November 1989.
- Focht, Will. "The Role of Risk Judgment in Predicting Political Participation." M.A. thesis, Oklahoma State University, December 1992.
- Focht, Will. "Use of the Analytic Hierarchy Process in Environmental Dispute Resolution: An Evaluation of NIMBY-Activists' Opposition to Risk." Proposal for Policy Research Project, 1993. Photocopied.
- Hill, Stuart. Democratic Values and Technological Choices. Stanford, CA: Stanford University Press, 1992.
- Jenkins-Smith, Hank C., and Amelia A. Rouse. "Subjective Knowledge, Its Origins and Relationships to Perceptions of Risk." Albuquerque: University of New Mexico, February 1992.
- Lawler, James J., Will Focht, and Earl L. Hatley. "Citizen Participation in Hazardous Waste Controversies: NIMBY and Beyond." National Social Science Perspectives Journal 7 (1992): 61-75.
- Lawler, James J., Will Focht, and Earl L. Hatley. "Hazardous Waste Controversies in Oklahoma: NIMBY and Beyond." Fort Worth, TX: Presented at the Southwestern Political Science Association Meeting, 28-30 March, 1990.
- Levine, Adeline Gordon. Love Canal: Science, Politics, and People. Lexington, MA: Lexington Books, 1982.
- Moore, Morgan, Kerr-McGee. Letter to Robert E. Layton, Jr., EPA - Region 6, 23 May 1988. Photocopied.
- Morell, David, and Christopher Magorian. Siting Hazardous Waste Facilities - Local Opposition and the Myth of Preemption. Cambridge, MA: Ballinger Publishing Co., 1982.
- Oklahoma Department of Environmental Quality. "Proposed Plan of Action for the Kerr-McGee Cushing Refinery Site." 22 June 1993.
- Rowe, William, EPA - Region 6. Letter to Citizen's Kerr-McGee Oversight Committee, 2 April 1990. Photocopied.

Thomas, L. Lee. "Nuclear Waste Concerns, The Media, and the 1990 Nebraska Governor's Race: An Application of Q-Technique." 21 December 1990. Photocopied.

United States Environmental Protection Agency - Region 6.
"Quarterly Status Report of Superfund Sites." February 1991.

Weller, Phil. Comments in A. Armour (ed.), The Not-in-my-backyard Syndrome. Downsview, Ontario: York University, 1984, 76-78.

APPENDIXES

APPENDIX A
SURVEY INSTRUMENT

CUSHING

DATE: _____

INTERVIEW #: _____

OPENING STATEMENT:

Hello. My name is Teresa Adams. I am a student at Oklahoma State University and am participating in a study of communities and environmental issues in the State of Oklahoma. As I said on the phone, this study is about people's involvement in their community in making decisions about environmental issues, such as the cleanup of the Kerr-McGee facility. The purpose of our study is to gain a better understanding of what issues are important to people like yourself who get involved and how best to get those issues considered as part of early decisions. Here is a copy of a letter of introduction from the project director, Dr. Mike Hirlinger, at OSU. Here is my student ID. (pause).

Our interview will take about 2 hours. We are interested in your views. In order to allow me to make a better record of your answers to my questions, I would very much like to request your permission to allow me to record this conversation on this tape recorder. I will use this tape to double-check or fill in any blanks in my notes. We will never release the notes or tapes of our conversation to anyone outside of the research team. We are only interested in your responses as a citizen, not as a particular individual. We can assure you that all of your responses will be kept strictly confidential. Here is a consent form that I would like you to take a moment to read. (pause). Do you have any questions about this study? (pause; answer questions: see tip sheet). If you have no [further] questions, would you please sign the consent form? (pause.) Now, we can begin.

TELEPHONE SCRIPT

Hello. My name is Teresa Adams. I am a graduate student at Oklahoma State University. I am participating in a study of community and environmental issues in the State of Oklahoma. This study involves talking with people in communities who have been involved in expressing their views about the environment. I talked to Rick Reiley and he suggested that you and others have an interest in such issues. (wait for acknowledgement, then proceed).

I would like to talk to you about the Kerr-McGee facility cleanup issue in North Cushing. I would like to take about 2 hours of your time and discuss your opinions and views. If convenient, I would like to come by your home sometime this week and talk to you in person. If there is another location that is better, we can meet there. When is the best time for us to meet?

[If accepts]: (record date and time on phone log). Where can we meet? (record place on phone log). (Confirm appointment by repeating back time and place). When I come, I will have a letter from the University research project director and proper University identification for your inspection. Thank you for your time. I look forward to meeting you. Goodbye.

[If declines]: (record response on phone log). OK. I want to thank you for your time. Goodbye.

TELEPHONE LOG

DATE: _____

TIME: _____

PERSON CALLED: _____

TELEPHONE NO.: _____

CONTACT MADE? _____ CALL BACK? _____

SCHEDULED APPOINTMENT DATE: _____

SCHEDULED APPOINTMENT TIME: _____

SCHEDULED APPOINTMENT PLACE:

_____COMMENTS:

INITIAL QUESTIONNAIRE
Relationships and Roles in the Cushing Kerr-McGee Facility
Situation

The following 11 questions concern the situation that began in Cushing in 1989 regarding the cleanup of contamination at the Kerr-McGee facility.

1. What relationship did you have with the Kerr-McGee facility at the time of the situation?

- I lived in the area of the facility
- A member of my family lived in the area of the Kerr-McGee facility
- I owned property in the area of the Kerr-McGee facility, but did not live there
- Other (specify) _____

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

- News media
- Friends and neighbors
- Kerr-McGee
- Environmental groups such as the National Toxics Campaign
- Fellow workers at my place of employment
- The CES (Citizens for Environmental Safety)
- US EPA
- The AEC (Atomic Energy Commission)
- Oklahoma State Department of Health
- Local government/City Commission
- Other (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. At the time of the situation, did you believe that a clean-up of the Kerr-McGee facility was necessary? CHECK ONLY ONE ANSWER

- No
- Yes
- I was unsure whether a clean-up was necessary
- I had no opinion one way or the other
- I don't remember what my belief was then

6. At the time of the situation, did you believe that the Kerr-McGee site should have been listed on the NPL (National Priorities List)? CHECK ONLY ONE ANSWER

- No
- Yes
- I was unsure whether it should have been listed on the NPL
- I had no opinion one way or the other
- I don't remember what my belief was then

7. How would you describe your participation in the situation at that 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) _____

8. How often did you participate?

- Never Seldom Occasionally
 Frequently Continuously

9. At the time of the situation, what relationship, if any, did you have with the group known as the Citizens for Environmental Safety (CES)?

- I didn't know anything about CES and had no dealings with them
 I knew about CES but I had no dealings with them
 I attended at least one CES meeting or other function sponsored by them but I never became an active supporter or member
 I was an active supporter or member of CES
 Other (specify) _____

10. What relationship did you have with Kerr-McGee before or during that period?

- I had no employee or business relationship with Kerr-McGee before or during the period of the situation
 I was a Kerr-McGee employee during at least some of the period of the situation
 I was a Kerr-McGee employee before the situation began but not during it
 I had a non-employee business relationship with Kerr-McGee during at least some of the period of the situation
 I had a non-employee business relationship with Kerr-McGee before the situation began but not during it
 Other (specify) _____

11. What relationship did any family member of your household (other than you) have with Kerr-McGee before or during that period? CHECK ALL THAT APPLY

- No household family member had an employee or business relationship with Kerr-McGee before or during the period of the situation
 At least one household family member was a Kerr-McGee employee during at least some of the period of the situation
 At least one household family member was a Kerr-McGee employee before the situation began, but no member was a Kerr-McGee employee during it

- [] At least one household family member had a non-employee business relationship with Kerr-McGee during at least some of the period of the situation
- [] At least one household family member had a non-employee business relationship with Kerr-McGee before the situation began, but no member had a business relationship with them during it
- [] Other (specify) _____

OPEN-ENDED INTERVIEW SCRIPT

1. How long have you lived in the Cushing area?

2. Let's talk about the Kerr-McGee cleanup situation. 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. About when did you get involved? (ask for a date).

- * For what reasons?
- * Which of these was most important?
- * Who was most responsible for influencing your involvement?

4. What were your concerns about the cleanup of the Kerr-McGee facility? (Add most important concerns to the card deck used in the ranking and sorting task, if they are not already represented there.)

5. At the time of the cleanup situation there were some people who agreed with the way that it was being handled and some who disagreed. What things about the cleanup proposal do you think most people agreed on?

6. I want 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 Cushing economically since then? [gotten better, worse, less jobs, etc.]

7. How have things changed insofar as your sense of community is concerned? In other words, how you view Cushing as a place to live and what Cushing means to you? [people not as friendly as before, community has become stigmatized, neighborhood disruption, traditions abandoned or changed, etc.]

* Has the sense of community become stronger?

8. Does the Kerr-McGee facility seem to be as much of a health or environmental threat to you now as it had then? Why?

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

9. Let's first talk about government's dealings with the cleanup.

What things did EPA, OSDH, and local government officials do right in presenting the proposal to the community?

- * What do you believe they might have done wrong?
- * What should they have done in handling this situation that would have best served all members of the community?

10. Now, let's talk about industry.

What things did Kerr-McGee officials do right in presenting the proposal for cleanup to the community?

- * What do you believe they might have done wrong?
- * What do you believe Kerr-McGee could have done in order to best serve all members of the community?

11. Finally, let's talk about the citizens of your community.

What things do you believe the citizens did right in dealing with the cleanup proposal?

- * What do you believe citizens 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 Kerr-McGee cleanup situation or about hazardous waste cleanups in general that we haven't covered so far?

13. Before moving on to the next part of this interview, I have one more question. Is there anyone else that I should talk to about the issues we have discussed?

Name: _____ Telephone: _____

Can you recommend a good time to contact her/him?

Why do you think this person would be important for me to talk to?

Would you mind if I mentioned your name in my conversation with her/him?

Name: _____ Telephone: _____

Can you recommend a good time to contact her/him?

Why do you think this person would be important for me to talk to?

Would you mind if I mentioned your name in my conversation with her/him?

FINAL QUESTIONNAIRE
Demographic Characteristics

Interview Number C- _____

1. How close did you live to the Kerr-McGee facility during the time of the dispute?

2. Are you now an active member of any citizens' group or service organization (other than the CES)?

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 attained? _____

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

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

APPENDIX B

RANK-ORDER CARD SORT DECKS #1 AND #2

CARD DECK #1

CRITERIA IMPORTANT TO COMMUNITY ENVIRONMENTAL DECISION
MAKING

CARD #1: Economic Impact on the Community

Community environmental cleanup 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 increases in demand for community services.

I believe that economic impact on the community should be important in making community environmental cleanup decisions.

CARD #2: 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 may operate.

I believe that a company's ability to make a profit should be important in making community environmental cleanup decisions.

CARD #3: 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.

I believe that scientific risk assessments should be important in making community environmental cleanup decisions.

CARD #4: 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.

I believe that citizens' judgments of risk should be important in making community environmental cleanup decisions.

CARD #5: 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 decision involves complex issues where it is important to consider all of the facts.

I believe that assurance of citizens' timely access to relevant information should be important in making community environmental cleanup decisions.

CARD #6: 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.

I believe that citizen's views toward a technology should be important in making community environmental cleanup decisions.

CARD #7: 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.

I believe that the fairness of the distribution of benefits, costs, and risks should be important in making community environmental cleanup decisions.

CARD #8: Trust in Government and Industry

Trust has different meanings. For example, acting in the community's best interests (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.

I believe that citizens' level of trust in government and industry should be important in making community environmental cleanup decisions.

CARD #9: 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.

I believe that an adequate consideration of the local community's culture and values should be important in making community environmental cleanup decisions.

CARD #10: Community Disruption

Environmental cleanup 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.

I believe that consideration of the potential for community disruption should be important in making community environmental cleanup decisions.

CARD #11: 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.

I believe that the provision of adequate opportunities for citizen involvement should be important in making community environmental cleanup decisions.

CARD #12: Technical and Legal Education

Decisions about the cleanup of community environmental contamination involve various technical and legal issues. Technical issues may include the proper measurement 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 regulations and what procedures apply in the decision making process. Many of these issues are

difficult to understand without technical and legal training.

I believe that assurances of adequate training in relevant technical and legal areas should be important in making community environmental cleanup decisions.

CARD #13: Alternative Technologies

It used to be commonplace for waste to be disposed of 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 and processing techniques that do not generate toxic waste, for example, by recycling wastes back into the process or by the use of less dangerous raw materials. For those toxic wastes 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.

I believe that preference for alternative technologies such as recycling and non-emitting waste treatment should be important in making community environmental cleanup decisions.

CARD DECK #2: CITIZEN PARTICIPATION STRATEGIES

CARD #1: Preemption

The expertise of government officials is relied on to make cleanup decisions. The public is effectively excluded from participating directly in the decision making process. I believe that community environmental cleanup decisions should be made by experts in government and industry.

CARD #2: Public Comment and Hearing

The government makes a tentative cleanup decision, announces it to the public, considers comments received from the public, and then makes a final decision. I believe that community environmental cleanup decisions should be made by the government, but only after the public has had a chance to comment on the proposals.

CARD #3: Consultation

Government conducts public meetings, distributes information, conducts surveys, and asks for comments throughout the entire cleanup decision process. Government considers all public comments before making cleanup decisions. I believe that community environmental cleanup decisions should be made by the government, but the public should be allowed to voice its concerns throughout the entire decision making process.

CARD #4: Non-Binding Negotiation

Company officials are required to enter into preliminary negotiations with citizen representatives of the community. Any agreement that may be reached will be delivered to government decision makers for their consideration. However, the final cleanup decision will be made by the government. Its decision may or may not include any or all of the agreement. I believe that the citizens of a community and the company should be allowed to try to reach an agreement before the government makes community environmental cleanup decisions.

CARD #5: Third Party Mediation

A neutral third party attends all meetings between citizen representatives of the community and the company concerning the environmental cleanup of the community. The mediator attempts to help the parties to reach an agreement. This 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.

I believe that a mediated agreement between the community and the company should be reached before the government makes community environmental cleanup decisions; however, the government may pick and choose which, if any, parts of the agreement to include in its decisions.

CARD #6: 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 how environmental cleanup of a community would be accomplished. 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 legality, the government is required to attach the agreement to its permit and enforce it as part of its oversight duties.

I believe that an independent arbitrator should be brought in to resolve any disputes between citizens and industry concerning community environmental cleanups and that the government should be required to enforce the arbitrator's decisions.

CARD #7: 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.

I believe that an oversight board, composed of equal numbers of representatives from government, industry, and self-selected citizens, should be used to oversee the entire decision making process concerning community environmental cleanups.

CARD #8: Referendum

Any community environmental cleanup proposal must be approved by a vote of the majority of the community before it can take effect.

I believe that community environmental cleanup proposals should be approved by a majority vote of the citizens of a community before they can take effect.

CARD #9: Citizen Control

The community itself controls the community environmental cleanup decision process. A citizens' committee, whose representatives are chosen by members of various environmental, community action, neighborhood development,

and other citizens' groups, make all decisions. The government and industry are bound by the decisions of the committee and must provide whatever funds are necessary to comply with the decisions of the committee.

I believe that community environmental cleanup decisions should be made solely by the citizens of a community and that industry and government should be bound by those decisions.

APPENDIX C
CARD SORT RANKINGS, BY RESPONDENT

CARD SORT RANKINGS, BY RESPONDENT

	C-1	C-3	C-4	C-5	C-6	C-8	C-9	C-10	C-11	C-12	C-13	C-15	C-16	C-17
Criterion														
Community Economics	11	7	12	11	6	10	6	8	12	4	13	9	10	2
Firm Economics	4	13	13	13	13	12	13	9	13	3	8	13	13	4
Scientific Risk Assessment	9	5	10	6	8	7	1	5	3	2	1	10	4	7
Risk Perception	2	10	1	3	5	5	10	6	4	13	10	4	8	13
Access to Information	3	1	5	1	2	3	3	1	2	6	5	3	3	5
Technological Views	10	12	7	8	7	11	9	10	5	12	9	6	9	12
Fairness/Equity	12	9	9	12	10	9	11	13	7	8	6	12	12	6
Institutional Trust	6	3	4	4	1	6	8	11	8	9	12	8	5	10
Culture	13	11	6	10	11	8	12	7	10	10	11	2	11	8
Sense of Community	8	8	11	9	12	13	7	12	11	11	7	11	7	11
Public Participation	1	2	3	5	4	6	4	3	1	7	3	1	2	3
Education	7	4	8	2	3	2	5	4	9	5	4	7	1	1
Alternative Technology	5	6	2	7	9	1	2	2	6	1	2	5	6	9
Participation Strategies														
Pre-emption	9	4	X	9	9	9	6	8	9	1	7	3	7	1
Public Hearing/Comment	7	3	X	6	5	8	3	2	1	4	3	1	5	5
Consultation	4	1	X	8	7	3	7	1	3	3	2	2	1	2
Non-Binding Agreement	1	7	X	3	3	6	4	7	5	6	5	9	2	6
Mediation	2	5	X	4	2	5	5	3	4	5	4	4	4	7
Binding Arbitration	5	6	X	2	4	4	1	4	6	8	6	8	6	9
Oversight Board	3	2	X	1	1	1	2	5	2	2	1	6	3	4
Referendum	8	9	X	7	6	7	8	9	7	7	8	5	8	8
Citizen Control	6	8	X	5	8	2	9	6	8	9	9	7	9	3

APPENDIX D

Q SORT DATA FOR DECISION CRITERIA CARDS

Decision Criteria - Rank Order Card Sort #1

FACTOR A

Factor Array:

-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
2	7	10	1	9	6	3	8	13	4	12	11	5

Sorts with significant loadings:

Cushing C-3	+58
Cushing C-4	+82
Cushing C-5	+88
Cushing C-6	+72
Cushing C-8	+87
Cushing C-10	+77
Cushing C-11	+73
Cushing C-15	+71
Cushing C-16	+79

FACTOR B

Factor Array:

-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
4	6	10	8	9	7	5	1	11	2	12	13	3

Factors with significant loadings:

Cushing C-12	-83
Cushing C-13	-59
Cushing C-17	-61

APPENDIX E

Q SORT DATA FOR PUBLIC PARTICIPATION STRATEGY CARDS

Public Participation Strategies - Rank Order Card Sort #2

FACTOR A

Factor Array:

-4	-3	-2	-1	0	+1	+2	+3	+4
9	1	8	6	4	5	2	3	7

Sorts with significant loadings:

Cushing C-10	+79
Cushing C-11	+93
Cushing C-13	+93
Cushing C-16	+70

FACTOR B

Factor Array:

-4	-3	-2	-1	0	+1	+2	+3	+4
1	3	8	2	9	5	4	6	7

Sorts with significant loadings:

Cushing C-3	+78
Cushing C-5	+98
Cushing C-6	+80
Cushing C-9	+46
Cushing C-15	-70

FACTOR C

Factor Array:

-4	-3	-2	-1	0	+1	+2	+3	+4
6	8	9	4	5	2	7	3	1

Sorts with significant loadings:

Cushing C-12	+77
Cushing C-17	+73

APPENDIX F

Q SORT VARIMAX ROTATION RESULTS AND FACTOR CORRELATIONS

Varimax Rotation

Sort	Factor	1	2	h2
1	C-1	35	5	12
2	C-3	73*	-41	70
3	C-4	48*	-58*	57
4	C-5	4	-89*	79
5	C-6	5	-81*	66
6	C-8	23	-78*	66
7	C-10	70*	-13	51
8	C-11	55*	-49*	54
9	C-12	76*	2	58
10	C-13	78*	-18	64
11	C-15	-9	-61*	38
12	C-16	71*	-21	55
13	C-17	53*	4	28
eigens		3.71	3.27	6.98
% var.		29	25	54
				totals

* denotes a loading significant at .45

Factor correlations:

factor	A	B
A	--	30
B	30	--

factors processed = 2

APPENDIX G

Q SORT CONCOURSE AND ITEM SCORES

Q Sort Concourse and Item Scores

	Factors	A	B
		--	--
1.	Waste facility siting means economic growth and prosperity for the community.	-1	-4
2.	Offering cash payments to a community is the same as a bribe.	-3	-1
3.	When jobs are scarce, an increase in employment is good even if there is resulting pollution.	-4	-3
4.	If environmental restrictions limit the ability of a company to make a profit, the restrictions should be relaxed.	-1	-5
5.	Industry works with communities to maintain a good public image.	0	-2
6.	Scientific risk assessment should be the major consideration in siting decisions.	+5	-1
7.	Citizens need to control which risks they have to put up with.	+1	+1
8.	We should not take any chances with the environment.	+1	+5
9.	I tolerate risk as a fact of life, but I don't like it.	+3	0
10.	It doesn't matter how much we pollute today because tomorrow's technology will solve the problem.	-5	-3
11.	The world would be a better place to live if we could go back to the good old days.	-3	-2
12.	It is better to put facilities in communities with high unemployment; the people there need the jobs.	0	-2
13.	The people who benefit the most from a waste facility are not the ones who bear the risk.	+2	+2
14.	Government and industry know what they are doing; they are the experts.	0	-5

15.	Cost effectiveness is more important to industry and government than environmental issues.	-1	+4
16.	The government adequately enforces environmental laws to protect human health and safety.	0	-4
17.	Industry usually complies with environmental laws even when it costs them money.	+3	-4
18.	Environmental laws are full of loopholes for industry advantage.	-1	0
19.	The character of a community changes after a waste facility is located there.	0	0
20.	Allowing a waste facility to locate in a community divides a community.	0	0
21.	Waste facilities give a community a bad reputation.	-2	+1
22.	Citizens should be involved in every step of a siting decision.	+1	+4
23.	Citizens have ample opportunity to be involved in siting decisions in their community.	+1	-1
24.	Industry, government and the public should decide together what level of pollution should be allowed.	+2	0
25.	All information should be shared in easily understood language as soon as it is available.	+5	+2
26.	Who provides information makes a difference to me; the person must be honest.	+4	+1
27.	It is really hard to know if decision makers have the same values as I do.	+1	+2
28.	It is impossible to know whether or not a process is really safe without adequate technical education.	+2	-1
29.	If the public were more familiar with the operation of a waste facility, they would be more willing to consider it.	+4	-2
30.	Citizens should have their own experts.	0	+3

31.	We would all be better off if the legal procedures were easier to follow.	+3	+1
32.	Government shouldn't be trusted in making siting decisions.	-2	+2
33.	Government uses citizen opinion against them.	-2	-1
34.	Economic special interests have too much influence in siting decisions.	-1	+4
35.	The people living in a community know best what is good for them.	-1	0
36.	Citizens should initially oppose all proposals for siting by industry.	-5	-2
37.	It is better to be active today than to be radioactive tomorrow.	+3	+1
38.	If you have enough money, you can get away with polluting.	-3	+3
39.	Conflict in decision making is necessary and healthy.	+1	+2
40.	Consensus is impossible when activists become involved in environmental decisions.	-3	-3
41.	The chief function of government is to support the economy.	-4	-3
42.	Just being physically present in situations where environmental decisions are made is not enough.	+2	+1
43.	The siting process is unfair because the results provide greater risks to the people who are ethnically different or poor.	-2	0
44.	Environmental radicals are necessary to bring balance to the issues.	-2	-1
45.	There are clean technologies available that must be used now to reduce pollution.	+2	+3
46.	Government and industry skew their risk estimates to suit their own purposes.	-4	+3
47.	Industry must be required to recycle, reduce wastes, and use safer techniques and raw materials.	+4	+5

APPENDIX H

FACTOR A AND FACTOR B ARRAYS AND SIGNIFICANT LOADINGS

FACTOR A

Factor Array:

	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
10	41	2	32	34	12	22	13	37	29	25	
36	3	38	44	4	16	23	28	9	26	6	
	46	40	33	18	19	8	42	31	47		
		11	43	35	30	7	45	17			
			21	1	20	39	24				
				15	14	27					
					5						

Sorts with significant loadings:

Cushing C-3	+73
Cushing C-10	+70
Cushing C-12	+76
Cushing C-13	+78
Cushing C-16	+71
Cushing C-17	+53

FACTOR B

Factor Array:

	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
14	16	10	36	23	35	21	32	38	15	47	
4	17	3	11	44	24	26	39	46	22	8	
	1	41	29	28	19	31	27	30	34		
		40	12	6	9	7	13	45			
			5	33	20	37	25				
				2	18	42					
					43						

Sorts with significant loadings:

Cushing C-5	-89
Cushing C-6	-81
Cushing C-8	-78
Cushing C-15	-61

APPENDIX I

CONSENSUS AND DISTINGUISHING ITEMS FOR FACTORS A AND B

Consensus and Distinguishing Items

Consensus Items:

	Factors	A	B
		--	--
3.	When jobs are scarce, an increase in	-4	-3
7.	Citizens need to control which risks they	+1	+1
11.	The world would be a better place to live	-3	-2
13.	The people who benefit the most from a waste	+2	+2
18.	Environmental laws are full of loopholes	-1	0
19.	The character of a community changes after	0	0
20.	Allowing a waste facility to locate in a	0	0
27.	It is really hard to know if decision makers	+1	+2
33.	Government uses citizen opinion against them	-2	-1
35.	The people living in a community know best	-1	0
39.	Conflict in decision making is necessary	+1	+2
40.	Consensus is impossible when activists	-3	-3
41.	The chief function of government is to	-4	-3
42.	Just being physically present in situations	+2	+1
44.	Environmental radicals are necessary to	-2	-1
45.	There are clean technologies available that	+2	+3
47.	Industry must be required to recycle, reduce	+4	+5

Distinguishing Items:

(at least 3 piles apart)

	Factors	A	B
		--	--
1.	Waste facility siting means economic growth	-1	-4
4.	If environmental restrictions limit the	-1	-5
6.	Scientific risk assessment should be the	+5	-1
8.	We should not take any chances with the	+1	+5
9.	I tolerate risk as a fact of life, but I	+3	0
14.	Government and industry know what they are	0	-5
15.	Cost effectiveness is more important to	-1	+4
16.	The government adequately enforces	0	-4
17.	Industry usually complies with environmental	+3	-4
21.	Waste facilities give a community a bad	-2	+1
22.	Citizens should be involved in every step of	+1	+4
25.	All information should be shared in easily	+5	+2
26.	Who provides information makes a difference	+4	+1
28.	It is impossible to know whether or not a	+2	-1
29.	If the public were more familiar with the	+4	-2
30.	Citizens should have their own experts.	0	+3
32.	Government shouldn't be trusted in making	-2	+2
34.	Economic special interests have too much	-1	+4
36.	Citizens should initially oppose all	-5	-2
38.	If you have enough money, you can get away	-3	+3
46.	Government and industry skew their risk	-4	+3

VITA 2

Teresa L. Adams

Candidate for the Degree of
Master of Science

Thesis: AN EVALUATION OF ENVIRONMENTAL ACTIVISTS'
OPPOSITION TO RISK - A CASE STUDY OF THE
CUSHING, OKLAHOMA KERR-MCGEE FACILITY
CONTROVERSY

Major Field: Environmental Science

Biographical:

Personal Data: Born in Wichita, Kansas, On July 6,
1968, daughter of Michael E. and Shonnie Adams.

Education: Graduated from Wichita Heights High School,
Wichita, Kansas in May 1986; received Bachelor of
Arts degree in Political Science from Wichita
State University, Wichita, Kansas in August 1990.
Completed the requirements for the Master of
Science degree with a major in Environmental
Science at Oklahoma State University in December
1993.

Professional Experience: Graduate research assistant,
Environmental Sciences Program, Oklahoma State
University, 1991-93; research and field assistant,
Scientific Investigations Co., Inc., Wichita, KS,
1990-present.

Professional Societies: National Association of
Environmental Professionals, National Association
of Professional Environmental Communicators.

Honors and Awards:

Lew Wentz Service Award, OSU, 1992-93
Presidential Incentive Award, OSU, 1991
Pi Sigma Alpha Political Science Honor Society
William Coulson Scholarship, WSU, 1986-88

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
FOR HUMAN SUBJECTS RESEARCH

Date: 04-12-93

IRB#: AS-93-064

Proposal Title: PRAGMATIC APPROACHES TO RESOLVING GRIDLOCK IN
THE SITING AND REMEDIATION OF HAZARDOUS AND RADIOACTIVE
WASTE FACILITIES

Principal Investigator(s): Mike Hirlinger, Keith Willet, Jim
Lawler

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW
BOARD AT NEXT MEETING.

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:

Maria S. Tilley

Chair of Institutional Review Board

Date: April 23, 1993