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**THE ROLE OF CITIZEN PARTICIPATION IN DECISION-MAKING
FOR ENVIRONMENTAL PLANNING AT THE U.S. DEPARTMENT OF
ENERGY'S FEED MATERIALS PRODUCTION CENTER, FERNALD, OHIO**

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ABSTRACT

This study will analyze the role of citizen participation in the cleanup at the U.S. Department of Energy's Feed Materials Production Center and how this participation has affected the plans for remediation of environmental contamination and future use.

A case study approach is used to focus on two different areas: the role of citizen participation in the cleanup and how this participation has affected the plans for remediation of environmental contamination and future use, as part of the site's stewardship plan. The U.S. Department of Energy's Feed Materials Production Center was chosen because it has serious environmental problems and an extensive formal process for citizens to participate in planning a response to the environmental problems. The unit of analysis is the U.S. Department of Energy's Feed Materials Production Center, its citizens, and government stakeholders. The methodological tools supporting the case study are document reviews and open-ended interviews.

The result of this study indicates that citizen participation has played an important role in the decision-making process. Citizen participation has influenced the stewardship plan for remediation of environmental contamination and future use of the Fernald site. The remediation activities continue and are expected to be completed in 2006.

The involvement of citizens in the decision-making process has confirmed the good citizen practices of Bierle's concepts of social goals for citizen participation.

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CHAPTER 1

INTRODUCTION

1.1. Statement of the Problem

The need to remediate the contaminated area and plan for future use at the U.S. Department of Energy's Feed Materials Production Center near Fernald, Ohio, became necessary when production stopped in 1989. At that time, citizens argued they should be actively involved in the decision-making process in order to improve their quality of life and the cleanup process. This study will analyze the role of citizen participation in the cleanup at the U.S. Department of Energy's Feed Materials Production Center and how this citizen participation has affected the plans for remediation of environmental contamination and future use.

1.1.1. Project Description

The environment is the most important component of life support systems. Human beings depend on the environment for our health and welfare (Connelly, 1999, p. 9). In turn, we have a responsibility to sustain the natural world. While we may cause environmental destruction, we are also able to develop and implement solutions to that destruction. Human activities can cause severe environmental problems, such as what has happened at the U.S. Department of Energy's Feed Materials Production Center near Fernald, Ohio.

The Feed Materials Production Center produced high-purity uranium metal from uranium ore for the U.S. Department of Energy's nuclear weapons complex. During its

years of operation, from 1953 to 1989, it is estimated that 1,000,000 pounds of uranium were discharged into the environment, most of it in the form of airborne dust emissions which settled on the soil around the plant. A large aquifer runs under the plant, and parts of it are severely contaminated with uranium from surface run-off and leachate from disposal pits and production processes. Other hazardous substances are present at the site, but uranium is by far the most significant. Therefore, the U.S. Department of Energy's Feed Materials Production Center¹ is listed on the National Priorities List for Superfund cleanup (Fernald Citizen Task Force, 2000, F-2).

Citizens who live near the Fernald site have been actively encouraging cleanup since 1984, and in recent years the site management has increasingly required the input of the public in cleanup decision-making. In 1993, the Department of Energy established a "site-specific advisory board" – the Fernald Citizens Task Force – comprised of members of numerous stakeholders groups, to advise on key cleanup decisions. One of the tools used by the Task Force called FutureSite² was developed to help members visualize the complex and interrelated contamination issues at FEMP (Fernald Citizen Task Force, 2000, F-3).

FutureSite is a proposal that addresses the level of soil cleanup needed to protect the aquifer in development. Thus, FutureSite has developed a simulation that models the volumes of contaminated soil that had to be remediated to allow use of the Fernald property. The objective was to determine what future use (or uses) the property should

¹ When production ceased in 1989 the site's name was changed to the Fernald Environmental Management Project (FEMP).

² The volume of contaminated soil: total for On-Site disposal + Total for Off-Site disposal (Fernald Citizen Task Force, 2000, F-7).

have, by removing specific concentrations of contaminated material (Fernald Citizens Task Force, 2000, F-3).

One response to environmental problems is the involvement of citizens in correcting those problems. Citizens need to know what happens at a site and they need to participate in decisions that affect their lives, their property, and the things they value. Citizens have increasingly become aware of the environment and the need to protect it. Through citizen participation, citizens can be the voice of nature and the environment. As Nagy (1994, p.1) stated, the “voice of the people” has always been important in the political decision-making process in a democratic society. Thus, citizen participation can influence political decision-making processes. Citizens’ ideas become input for the government in making environmental decisions.

The United Nations further emphasized that environmental issues are best managed by citizens through their involvement in decision-making as discussed in Principle 10 of The Rio Declaration as follows:

Environmental issues are best handled with the participation of all concerned citizens, on a relevant level. On a national level, each individual should have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States should facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, should be provided (Nagy, 1994, p. 3).

This implies that the role of citizens in environmental decision-making is both necessary and increasing. As Beierle stated, “Citizen Participation has taken center stage

in the play of influences that determine how society will manage and protect the environment” (2002, p. 1).

However, the main goal of citizens is to get the government to listen to their concerns in order to improve their quality of life and to protect their environment.

1.1.2. Objectives

There are two primary objectives to this study. The first is to review the role of citizen participation in decision making for environmental planning. This will provide a better understanding of how citizens try to reach their goals by participating in the process of decision-making. The second objective is to evaluate how citizen participation has affected the plans for the remediation of environmental contamination and future use at the Fernald site. The researcher provides data on the ongoing clean-up program and the plans for future use.

The following research questions will be answered:

1. What has been the role of citizen participation at the US Department of Energy’s Feed Materials Production Center?
2. How has citizen participation affected the plans for the remediation of environmental contamination and future use of the US Department of Energy’s Feed Materials Production Center?

An answer to these questions was prepared through a review of the relevant literature and an in-depth case study analysis.

1.2. Literature Review

The literature reviewed for this study is organized into four sections: citizen participation in the United States, relation between citizen participation and environmental issues, the history of the U.S. Department of Energy's Feed Materials Production Center at Fernald, and the citizen participation in the planning of remediation and future use.

In the first section, the researcher discusses the literature on the concepts and issues related to citizens' roles in environmental decision making. This section requires a thorough study of various articles, books and reports written on the subject of citizen participation in the United States, the role of citizen participation, values of citizen participation, participatory techniques, and the social goals for citizen participation as well as the stakeholder involvement model. The researcher reviews each of these subjects in the study. There are two perspectives the researcher wants to discuss: why citizens participate in the process of environmental decision-making and what citizens want. The central concept informing the study arises from Beierle's concept of the five goals of citizen participation. According to Beierle (1999, p. 6), there are five social goals for citizen participation that can determine whether the citizen participation will be successful or not in the process of environmental decision-making. They are as follows:

Goal 1: Incorporating public values into decisions

This goal intends to manage and incorporate the various citizens' ideas into decisions. Their input will help the process come to agreement on value-related issues. The researcher will evaluate this goal by examining how much influence citizens' values

have on environmental policy decisions. Because citizens hold a range of views, it is particularly important to identify who is represented in the participation process (Beierle, 2002, p. 14).

Goal 2: Improving the substantive quality of decisions

Citizens are widely recognized as a source of knowledge and ideas for decision-making (Fiorino 1990; Raffensperger 1998; Stern and Fineberg 1996) because they are more aware of what happens in their area and what they expect for their area. Their ideas will be necessary to improve the substantive quality of decisions in several ways, such as by offering local or site-specific knowledge, discovering mistakes, or generating alternative solutions that satisfy a wider range of interests (Beierle, 2002, p. 14). The researcher will evaluate whether citizens' input improves the substantive quality of decisions through problem solving, innovative ideas, or new information. The researcher will examine this goal based on eight criteria, divided into two sets. The first set measured whether decisions were superior to likely alternatives in terms of cost-effectiveness, joint gains, the opinions of citizens, or other measures. The second set of criteria measured whether citizens added information, provided technical analysis, contributed innovative ideas, or contributed a holistic perspective (Beierle, 2002, p. 25).

Goal 3: Resolving conflict among competing interests

This goal measures the extent to which conflict³ that existed before the process started (or emerged during the process) is resolved. The researcher will examine this

³ Conflict refers to a sharp disagreement or collision in interests, ideas, etc. and emphasizes the process rather than the end (Guralnik, 1998, p. 298).

measure that has to account for how much conflict existed at the beginning of a process as well as at the end to determine the change in conflict. The focus is not on relationships between the citizens and government but on relationships among participating groups within the citizens (Beierle, 2002, p.28).

Goal 4: Building trust in institutions

Trust in institutions means the citizens believe that a lead agency is capable of understanding and serving the citizens' interests (however defined) and obliged to do so. Like resolving conflict, this goal requires combining information about preexisting trust with information about the level of trust at the end of the process. The researcher will evaluate this goal by seeking a range of evidence regarding changes in trust, including changes in the citizens' perceptions about an agency's credibility, legitimacy, or competence as well as information about changes in rapport or respect between citizens and a lead agency (Beirle, 2002, p. 30).

Goal 5: Educating and informing the public

Increasing public understanding of environmental problems builds the capacity for solving those problems. Education in this context refers to more than science lessons. It integrates information about the problems, experiences, and local knowledge to develop a shared understanding and a collective perception of solutions. Such an education helps citizens build the capacity needed to formulate alternatives and to level the playing field between the citizens and government. The researcher will evaluate

capacity building in terms of whether citizens become better educated and informed about environmental issues (Beirle, 2002, p. 15).

In a discussion of values of citizen participation, the researcher discusses the normative guidelines for planning and implementing citizen participation programs that are proposed by Langton (1978, p. 105). This is necessary to maintain the integrity of the participation process. Next, the researcher discusses the rise of dual citizen-participation movements. The two types of citizen-participation movements are the *citizen-initiated*, which stresses the importance of citizen action to influence and monitor government, and *government-initiated*, which stresses the importance of involving citizens in improving and gaining support for administrative decisions and government programs (Langton, 1978, p. 1-2). In order to get a better understanding of which type of citizen participation will influence the government, the researcher discusses a “ladder model” of participation and non-participation proposed by Arnstein (1969, p. 217). The steps include: manipulation, therapy, informing, consultation, placation, partnership, delegated power and citizen control. These steps may be a simplification of the varying degrees of participation and imply certain political leanings. Finally, the researcher discusses several models of soliciting citizen input in the decision-making process. This input is informed by Beirle’s social goals. In addition to that, the researcher discusses the stakeholder involvement model from Williams. This model is a recently developed approach of citizen participation. Some of the more common methods of involving citizens include public meetings/workshops, surveys, the review and comment process, advisory groups, and media outreach (newspaper, participatory TV, hotlines, and others) (Kahle, 1999, p. 24).

In the second section of the literature review, the researcher discusses how citizen participation has affected environmental decision making and how environmental policy has influenced the implementation of the Fernald cleanup program. First of all, the researcher discusses why interest in environmental issues increased during the 1970s and how the government responded to these issues. The researcher collects information through written work and the Internet. Next, the researcher examines U.S. environmental policy and how the need for Superfund arises out of the citizen's concern for the environment. Because the contamination at the Fernald site is released uranium, a hazardous waste, the researcher will provide information on environmental policy under the Superfund legislation known as the Comprehensive Environmental Response, Compensation, and Liability Act or CERCLA. This was intended to provide for cleanup of abandoned toxic dumpsites (Harker, 1995, p. 289). This discussion is also based on "Superfund" by Christine Jolly (1996, p.217) and other sources. Next, the researcher discusses why citizen participation in environmental decision-making has increased at all levels of government in the last decade (Beierle, 2002, p. 739). Based on a discussion of the five social goals of Beierle, the researcher also examines how citizen participation affects environmental decision-making. Other authors have also provided the researcher with an invaluable reference list of relevant literature. DeSario and Langton have provided information on the process for citizen involvement in environmental decision-making. Finally, the researcher discusses the stewardship plan, a long-term plan for remediation at Fernald.

In the third section, the researcher discusses the history of the U.S. Department of Energy's Feed Materials Production Center. The researcher provides demographic and

land use data; exposure pathways to humans and the environment; and information about the Fernald Citizens Advisory Board including the long-term stewardship plan. This section uses the findings from various written works and interviews. To provide demographic and land use information, the researcher seeks information on the Fernald Environmental Management Project website, Fernald Citizens Advisory Board, and the reports of Fernald Citizens Task Force. In order to get information on how the hazardous chemical may have reached citizens and the environment, the researcher seeks the information from the Site Restoration Services Department's "*1995 Site Environmental Report.*" Stated in this report (1996, p. 23), a pathway is "a route by which materials could travel between the point of release and the point of delivering a radiation or chemical dose to a person." Thus, the way citizens and the environment are exposed to hazardous chemicals can be from a primary pathway, through contaminated air or water, or through secondary pathways, such as the food chain. Next, to obtain information on how the Fernald Citizens Task Force works, the researcher interviewed members, stakeholders⁴, regulators⁵ as well as operators⁶, and collected information from various documents. The Fernald Citizen Task Force was convened by the U.S. Department of Energy, together with its regulators, the U.S. Environmental Protection Agency (Region V), and the Ohio Environmental Protection Agency in 1993. Its task is to make detailed recommendations on the central issues posed by the remediation of the U.S. Department of Energy's Feed Materials Production Center.

⁴ Stakeholders are defined as specific persons, organizations, and groups who are affected in some way by a specific public policy. Stakeholders can be residents, businesses, elected officials, interest groups, professional groups, workers, and other persons who are affected by a specific public policy (Williams, 2002, p. 2).

⁵ Regulators are defined as persons or organizations that regulate and control the specific field (Guralnik, 1980, p. 1187).

⁶ Operators are defined as persons or organizations that operate the cleanup site.

In the last section of the literature review, the researcher discusses the process and outcomes of the involvement of citizen participation at the Fernald site. This section presents the findings from the documents and interviews that the researcher conducted during the research from January to March 2003.

1.3. Methodology

Given the nature of this thesis, qualitative methods of research and analysis were used. For this study, the researcher will use a case study method. Because a case study focuses on a single organization, institution, event, decision, policy, or group (Baker, 1994, p. 229), the area of study can be narrowed and identified in a specific strategy. Yin (1989) says that the case study is appropriate when the research question to be addressed asks how and/or why. Often the reason to study a particular case is to try to figure out why a certain situation prevails or how an organization or group has succeeded (Baker, 1994, p. 300). It is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence is used” (Yin, 1989, p. 23).

The researcher chose the U.S. Department of Energy’s Feed Materials Production Center because it has serious environmental problems and an extensive formal process for citizens to participate in during the planning of a response to the environmental problems. The unit of analysis is the U.S. Department of Energy’s Feed Materials Production Center and its citizens, and other stakeholders. The methodological tools supporting the case study are document review and open-ended interviews.

Interviews, an important basis of collecting information, were conducted as part of the research. The interviews related to the social goals for citizen participation, and the process of decision-making in regard to environmental policy and its implementation. By doing this, the researcher collected information on the major roles for citizens and organizations in dialogue about policy and its implementation. Next, the researcher used Beierle's concept of the five social goals for citizen participation to evaluate the success or failure. Thus, the researcher came to understand the results of citizen participation in planning the remediation and future use of the U.S. Department of Energy's Feed Materials Production Center.

Nine people were interviewed. The interviews included representatives of the following:

Group 1: Resident Stakeholders

- The Fernald Citizens Advisory Board (FCAB) members
- The Fernald Residents for Environment, Safety and Health (FRESH) members
- Resident (member of FRESH, but not representing FRESH)

Group 2: Regulators

- The US Environmental Protection Agency (USEPA)
- The Ohio Environmental Protection Agency (OEPA)

Group 3: Technical Experts⁷

- The Department of Environmental Health, University of Cincinnati
- The Perspectives Group, Alexandria, Virginia

⁷ Technical Experts are defined as persons or organizations who advise the Task Force in a specific field at Fernald site.

Group 4: Operators

- The US Department of Energy (DOE)
- Contractor (Local Site)

The interviews were broken into four main parts. First, in order to better understand issues related to the principles of citizen participation and decision-making for planning, the researcher interviewed three people from stakeholder groups. Second, the researcher interviewed two people considered to be regulators in order to know whether the citizens' ideas had influenced the plan for remediation of environmental contamination in Fernald site. Third, in order to elicit an answer concerning the impact of released uranium on human health and the environment, the researcher interviewed two people considered to be technical experts. Fourth, the researcher interviewed two people considered to be operators asking how they address the health risks associated with working with uranium contamination, and what they expect for the future for Fernald site.

Notes from the interviews were analyzed for common elements and conflicting issues in relation to the principles of citizen participation and decision-making for planning. The interviews were examined for patterns regarding perceptions about constraints, successes and approaches to participation, and the value and contributions of citizen participation.

CHAPTER 2

LITERATURE REVIEW

2.1 Citizen Participation

Planners as decision makers realize that citizen participation has an important role in the environmental decision-making process. According to Renn, Webler, and Wiedemann (1995), “the decision makers and affected parties engaged in solving environmental problems are recognizing that traditional decision making strategies are insufficient” (p.1). Thus, there is the need for citizens to be involved in the decision making process as citizens can give valuable input to the planner. Renn, Webler, and Wiedemann (1995) assert that citizen participation in decision making has been widely recognized as a potential and partial solution to environmental problems (p.1).

Citizen participation means different things to different people. Renn, Webler, and Wiedemann (1995) adopt the definition of citizen participation as “forums for exchange that are organized for the purpose of facilitating communication between government, citizens, stakeholders and interest groups, and businesses regarding a specific decision or problem” (p. 2). In addition to that, Langton (1978) says that “citizen participation refers to purposeful activities in which citizens take part in relation to government” (p. 17).

According to Zillman (2002, p. 22), citizen participation is desirable because it can serve the following ends:

- Raise public awareness and educate the public;
- Give the public an opportunity to express its concerns;

- Foster a sense of empowerment in participants;
- Strengthen local communities and other groups;
- Reduce conflict among competing interests;
- Facilitate governmental accountability;
- Increase public acceptance of decisions reached; and
- Contribute legitimacy to decisions.

It implies that citizen participation is one way to solve environmental problems. The government needs citizen input to make decisions.

2.1.1. Citizen Participation in the United States

Modern forms of the citizen participation movement in the United States began after World War II when congress established the Administrative Procedure Act in 1946. The purpose of this act was to give citizens an opportunity to tell agencies their concerns about proposed policies that would affect them. Citizens would tell the agencies their concerns in public hearings. The citizen participation movement continued into the 1960s after Congress passed several legislative acts that required federal agencies to allow citizen participation in the agencies' decision making activities (Williams, 2002, p. 13).

According to Langton (1978, p.1), the rise of dual citizen-participation movements in the United States was in response to demands for more citizen participation in government. Many citizens have organized themselves to influence and improve government, and many officials have attempted to make government more accessible and responsive to citizens. Consequently, two citizen participation movements, the citizen-initiated movement and the government-initiated movement, have grown

simultaneously in the last decade. The citizen-initiated movement has stressed the importance of citizen action to influence and monitor government. Meanwhile, the government-initiated movement has stressed the importance of involving citizens in improving and gaining support for administrative decisions and government programs (Langton, 1978, p.2).

Myriad rules and regulations for citizen participation now exist at all levels of government. There has been rapid growth in participation in American government; today, citizen participation represents an extremely dynamic, diverse, and pervasive force in the society (Langton, 1978, p. 2).

2.1.2. The Ladder of Citizen Participation

The first task of a planner in any public involvement process is to recognize the pattern for degree of involvement. This pattern explains the scenarios in which citizen involvement is least intense and those in which citizens have substantial or total control. Arnstein (1969, 217) classified “participation” and “nonparticipation” into “A Ladder of Citizen Participation,” with eight types that are arranged in a ladder pattern with each rung corresponding to the extent of the citizens’ power in determining the end product (See Figure 1).

The bottom rungs of the ladder are (1) *Manipulation* and (2) *Therapy*. They describe levels of “non-participation” that have been contrived by some to substitute for genuine participation. Their real objective is not to enable people to participate in planning and conducting programs, but to enable power holders to “educate” or “cure” the participants. Rungs 3 and 4 progress to levels of “tokenism” that allow the have-nots

to hear and to have a voice: Rungs (3) and (4) are *Informing* and *Consultation*. Under these conditions citizens lack the power to insure that their views will be heard by the powerful. Rung (5) *Placation*, is simply higher level tokenism because the ground rules allow have-nots to advise, but retain for the power-holders the continued right to decide. Rung (6) *Partnership* is where the level of citizen power has increased decision-making clout. In this level, citizens are able to negotiate and engage in trade-offs with traditional power holders. At the highest rungs, (7) *Delegated Power* and (8) *Citizen Control*, have-not citizens obtain the majority of decision-making seats, or full managerial power (1969, p. 217).

2.1.3. Values of Citizen Participation

There is a need to follow normative guidelines in planning and implementing citizen-involvement programs in order to have an effective citizen participation program. Stuart Langton (1978, p. 105-106) proposes the eight normative guidelines as follows:

1. Citizen participation is not a technique. It is a strategy, an approach and a philosophy.
There is no method that can be applied in all conditions. It is not the technique that is important as much as the people who employ the technique and their attitude.
2. Citizen participation is not a substitute for the representative political process.
However, it will have an impact on the political process.
3. No one-citizen participation program can claim to have “represented” the people.
Planners should know that a citizen participation program could not be used as the interpretation of the public will, but it can be used to show different views of that will.

4. Citizen participation is not a panacea. The issue is not how much citizen participation will cost, but whether planners can do anything without citizen participation.
5. Think of the positive contributions of citizen participation--how it can supplement and improve other technical efforts that will make better decisions.
6. The goals of a citizen participation program and the roles of participants must be clearly defined.
7. Be honest. Citizen participation will be disastrous if it is based on false assumptions.
8. Be prepared to accept and implement the decisions that will be made by a citizen participation program.

It is necessary to have good cooperation to maintain the integrity of the participation process. Without following the normative guidelines, citizen-participation cannot be well implemented.

2.1.4. Participatory Technique

To work effectively with citizens, planners need to know many kinds of participatory techniques. Some common techniques of involving citizens are public meetings, public hearings, surveys, workshops, advisory groups, and media outreach (newspaper, newsletter, Internet, hotlines, TV and others). Thomas (1995, p. 12-13) proposes some techniques of soliciting citizen input, including both traditional techniques and newer techniques such as the following:

1. Key contacts. The simplest means for involving citizens is for planners to consult with "key contacts," usually either economic leaders or leaders of other organized

groups. This approach remains popular for informally checking community opinions.

2. **Public meetings.** Public meetings are one of the most common means for soliciting citizen participation.
3. **Advisory committees.** The advisory committee is another popular option. In this technique, representatives of various relevant groups are asked to serve on a committee that then advises on a particular policy or issue.
4. **Citizen surveys.** The survey is prominent among the new approaches to public involvement. During the 1960s and 1970s, an increasing number of governmental agencies used questionnaire surveys to solicit citizen opinions on a wide range of public issues and governmental services (see Webb and Hatry, 1973). If conducted on random samples of the relevant population, surveys hold the promise of providing the representative opinions that are an uncertain outcome of any other approach.
5. **Citizen contacts.** Citizens have created their own techniques of citizen involvement. These contacts usually focus on very specific problems, such as missed garbage pick-up.
6. **Negotiation and mediation.** This technique uses a third party to seek resolution between disputants. Mediation first became popular as an approach to citizen involvement in the effort to resolve environmental conflicts between government, developers and environmentalists, but the techniques have now been adapted to a broad range of issues.

According to Langton (1987), there are two innovative citizen participation procedures which have been used successfully to aid bureaucrats. One promising way is Delbecq's Nominal Group Techniques that brings together citizen representatives into groups (p. 31). Individuals list problems which are then aggregated and organized into priorities. This can be implemented at one meeting or over a period of time. This technique produces higher quantity, quality, and variety of information. Another technique is the Dephi Technique (p. 31). This technique is especially useful for long-term goal setting and to determine whether consensus exists. The first stage is the use of a questionnaire to tabulate individual response. During the second stage, the questionnaires are returned with a notation on the individual and group responses. The individual can choose to change his or her mind or position. The bureaucrat can accept the most common response or to continue the discussion and listen to the minority arguments.

Finding the appropriate forms is an important step toward achieving effective citizen involvement, but if the appropriate form is to be used effectively, planners must also know how to interact with the citizens. Much research has indicated that citizen organization such as advisory boards or committees is an effective way of structuring citizen input (Kweit and Kweit, 1981). In addition, Beierle explains in "The Risk Analysis" (Vol. 22, No. 4, 2002, p. 743), that in most public hearings, meetings, and workshops, participants often simply contribute ideas and information that agencies use to inform decisions, while in negotiation and mediation, participants make decisions themselves. However, based on his research, the advisory committee is the most effective way of soliciting citizen input.

2.1.5. The Social Goals for Citizen Participation

To evaluate how well citizen participation has performed in its central role in environmental policy making, Beierle provides a systematic analysis based on what he calls the social goals for citizen participation. Beierle (1999) proposes five “social goals” for citizen participation:

Goal 1: Incorporating public values into decisions

This goal measures the extent to which participants influence policy decisions (Beierle, 2002, p. 24). He stated that although participants had a high degree of influence in the government level, important questions remain about how well those participants reflected the values of the public they were meant to represent.

Goal 2: Improving the substantive quality of decisions

Citizen participation should not only help incorporate citizen values into decisions but also improve the substantive quality of decisions, as measured by relatively uncontroversial quality criteria (Beierle, 2002, p. 27). One of the emerging challenges to the growing role of citizen participation is concern that the citizen makes bad decisions. In order to improve decision quality, he proposes the following eight quality criteria: cost-effectiveness, joint gains, opinion, added information, technical analysis, innovative ideas, holistic approach and other measures. By measuring the substantive quality of decisions, it is expected that the decision will be better.

Goal 3: Resolving conflict among competing interests

This goal measures the extent to which conflict that existed before the process started (or emerged during the process) is resolved. The focus is not on relationships between the citizen and government but on relationships among participating groups

(Beierle, 2002, p. 28). This goal generally needs a long process to resolve the problems. The advisory committee needs time to put all information, ideas or opinions from citizens into the framework. As Beierle (2002, p.29) mentions, the process emphasized several approaches to citizen involvement, including a stakeholder advisory committee, a series of public meetings, and various efforts to solicit information and opinions from the wider public. Brown (1984, p. 331) also stated that “the process helped to resolve more than a decade of controversy and bitter attacks, and facilitated the development of broad support for a new plan.”

Goal 4: Building trust in institutions

This goal measures the preexisting level of trust. It illustrates how participation can build trust. If the important issue among various groups within the public is in conflict, then the central issue between the public and government is lack of trust (Ruckelshaus 1996; SEAB 1993). Beierle (2002, p. 30) explains that trust in institutions means the public believes that a lead agency is capable of understanding and serving the public interest (however defined) and obliged to do so. He seeks a range of evidence regarding changes in trust, including changes in the public’s perceptions about an agency’s credibility, legitimacy, or competence as well as information about changes in rapport or respect between participants and a lead agency.

Goal 5: Educating and informing the public

This goal measures the knowledge level of citizens about environmental problems. Knowledge of the environment is required because whenever citizens lack knowledge, it can hamper the planning process in environmental decision-making; citizens cannot actively participate in the process. That is why it is expected that citizens

learn about relevant technical issues through workshops, reports written by technical advisory committees, and direct deliberation with experts (Beierle, 2002, p. 31). An interesting model for processes that emphasize education is the citizen jury, run by the Jefferson Center in Minnesota (Crosby, Kelly, and Schaefer 1986). In a citizen jury, a panel of socioeconomically represented citizens (the “jury”), listens to testimony and asks questions of a series of experts (the “witnesses”) and renders their informed judgment on policy topics. In processes run by the Jefferson Center, topics are often quite technically and socially complex. Nevertheless, participants consistently learn a great deal and thus are able to provide insightful policy recommendations.

There are two main objectives to educate and inform the public. First and foremost is to develop an understanding of the social value of citizen participation, that is, its “added value” for society. To do so, several “social goals” for citizen participation are identified and used as criteria for evaluating the success of public participation efforts. The second objective is to understand what makes some processes successful and others not. Beierle examined how the success of citizen participation varies with the kinds of issues under debate and other aspects of the context in which the participation takes places. He also compared the effectiveness of several different approaches to citizen participation (Beierle, 2002, p. 1-2).

2.1.6. Stakeholder Involvement Model

Williams (2002, p. 1-2) conducted research in order to know what techniques of citizen participation were effective at Fernald. The purpose of his study was to examine the changes that occurred in the policy making process in recent years. He tested a newer

approach known as “Stakeholder Involvement.” The study focused especially on stakeholder involvement as a technique for citizen participation. The stakeholder involvement group examined was the Fernald Citizens Advisory Board.

Williams used the single case study research method. Questions asked of those interviewed concerned the following subjects: the degree of satisfaction with the stakeholder involvement agreements; the strengths and weaknesses of the process; the differences between the process and the traditional regulatory process for resolving disputes; and recommendations for improving the process. Implications and conclusions based on the study case method were also discussed (Williams, 2002, p. 23).

2.2 Public Participation in relation to the Environment

Citizen participation in environmental decision making activities emerged during the 1970s. The involvement of citizens in environmental decision-making activities occurred because Congress passed several laws that required federal agencies, such as the EPA, to inform people about the effects of proposed environmental policy changes. These laws required agencies such as the EPA to encourage, provide for, and assist public participation activities (Williams, 2002, p. 14).

Citizen participation has influenced decision-making at the government level. The objective of citizen participation in the decision-making process is to correct a specific problem, not to affect broader policy changes (Cable and Cable, 1995, p. 112), such as, the environmental problem that occurred in Fernald. Citizens can become involved in the discussions, negotiate with the government, and influence the certain parts of the stewardship plan. According to Beierle (2002) “over the past 30 years, citizen

participation has taken center stage in the play of influences that determine how society will manage and protect the environment” (p. 1). It indicates that the role of citizen participation is increasingly essential for understanding how government makes and carries out environmental policy.

2.2.1. Environmental Issues

As discussed above, citizens’ concern about environmental problems has grown rapidly since the 1970s. Environmental problems have become a major national issue, especially when citizens came to believe that the government was failing to protect their lives and property from environmental pollution, and that pollution costs were being unfairly imposed on them. The perception of environmental injustice is shaped by citizens’ experiences because the government does not respond to their complaints. As a result of the feelings of environmental injustice, citizens have created a new form of social control: the community-based grassroots environmental organization. Such organizations act as an informal control mechanism when formal mechanisms (environmental regulations) fail (Cable and Cable, 1995, p. 104).

The environment is now clearly recognized as a serious political issue. For evidence of this, one must only look at the number of world leaders attending the Rio Earth Summit; the intense lobbying tactics of industrialists in the run-up to the Kyoto climate negotiations; and different types of environmental pressure groups who discuss environmental problems. The environment is an issue that resonates at all levels of political action, from the local everyday practices of individuals and communities through international diplomacy (Connelly and Smith, 1999, p. 305). The United Nations

has called for protecting the environment in a document referred to as Agenda 21, as discussed below:

One of the fundamental prerequisites for the achievement of sustainable development is broad public participation in decision-making. Furthermore, in the more specific context of environment and development, the need for new forms of participation has emerged. This includes the need of individuals, groups and organizations to ... participate in decisions, particularly those that potentially affect the communities in which they live and work (and to) ... have access to information relevant to environment and development ... (and) environmental protection measures” (United Nations Conference on Environment and Development (UNCED), 1992, Chapter 23).

The response to all levels of policy making has been fairly impressive. The point is not whether governments and other significant actors have responded, but *how* they have responded. With regard to this, the writer wants to discuss the emergence of environmental grassroots organizations in the United States.

Environmental grassroots organizations are neighborhood-based environmental organizations that emerged because of environmental problems that existed within a particular neighborhood. DeSario and Langton (1978) asserted a large part of the contemporary environmental movement was initiated by an almost “grass-roots” reaction to Rachel Carson with her book *Silent Spring* (p. 114). Since then, several grassroots environmental organizations have emerged and have had a significant influence on the environmental movement. (Williman, 2002, p. 15). The grassroots environmental movement has improved the lives of many citizens and spread environmental awareness among the public (Cable and Cable, 1995, p. 115). As Norman J. Vig and Michael E. Kraft (1997) said “Over the past two decades, public concern and support for environmental protection has risen significantly, spurring the development of an expansive array of new policies that substantially increased the government’s

responsibilities for the environment and natural resources, both domestically and internationally” (p. 26).

Based on the above discussions, it can be assumed that the government has the responsibility for protecting the environmental and natural resources. Whenever environmental problems come up, the government should take action. In order to solve environmental problems and prevent environmental degradation, the government has an environmental policy process in which the public can become involved, as part of the decision-making to define their future.

2.2.2. Environmental Policy (CERCLA/SUPERFUND)

In 1980, the first congressional law to deal with the nation’s hazardous waste was passed. This law is called the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund. The purpose of Superfund is to eliminate the short-term and long-term effects of hazardous waste. Congress appropriated \$1.6 billion dollars to clean up the nation’s highest risk hazardous waste sites. The fund was obtained from excise taxes on petroleum and feedstock chemicals, a tax on certain imported chemical derivatives, an environmental tax on corporations, appropriations made by Congress from general tax revenues, and any monies recovered or collected from parties responsible for site contamination (EPA, 1991).

In 1986 Congress extended Superfund for five more years by passing the Superfund Amendments and Reauthorization Act (SARA). Congress appropriated \$8.5

billion more in order to continue to clean-up of the hazardous waste sites. The following are items SARA was intended to do:

- emphasize the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites;
- require Superfund actions to consider the standards and requirements found in other state and federal environmental laws and regulations;
- provide new enforcement authorities and settlement tools;
- increase state involvement in every phase of the Superfund program;
- increase the focus on human health problems posed by hazardous waste sites;
- encourage greater citizen participation in making decisions about how sites should be cleaned up (<http://www.epa.gov/superfund/action/law/sara.htm>).

In order to be eligible for Superfund, each state is required to compile a list of their worst hazardous waste sites to be evaluated by the EPA for cleanup. The government ranks the sites in order from the highest to the lowest risk to human health and the environment. This ranked list is known as the national priorities list (NPL). If a site makes the NPL, it is then eligible for federal money through the Superfund program.

In order to understand how Superfund works, it is necessary to look at the structure of the Superfund program. The EPA was given responsibility as the designated manager of the trust fund by CERCLA. The policies Superfund follows come from the EPA headquarters. However, the EPA has ten regional offices in cities throughout the

country. These regional offices control program decisions and operations. This makes it easier to keep closer scrutiny on what is going on at any particular site. **Figure 2** shows the political structure of Superfund (Jolly, 1996, p. 221).

Superfund follows the policy that each citizen has a right to know what happens at a contaminated site. The EPA desires the citizens' help for many aspects of Superfund cleanups. Superfund is mandated by law to involve the citizen in all aspects of a contaminated site except the Potentially Responsible Party (PRP) legal activities. Whenever a contaminated site makes it on to the National Priority List (NPL), the citizens are given information and comment period. Citizen apprehensions are analyzed and occasionally influence the decision toward an alternative remedy (Jolly, 1996, p. 223).

2.2.3. The procedure for Citizen Involvement in Environmental Decision-making

The involvement of citizens in environmental decision-making is more common than in any other policy area. Based on the 1946 Administrative Procedure Act (APA), citizens have an opportunity to influence environmental policy. According to DeSairo and Langton (1987), "the rights for citizens to intervene in government decision-making and to participate in public hearings are the obvious avenues of influence; the procedural and substantive requirements of the National Environmental Policy Act (NEPA) indirectly create opportunities for access through litigation which have been frequently utilized" (p. 114).

The EPA established Superfund community involvement, the process of getting community members actively involved in planning for and cleaning up a Superfund site. Community involvement is founded on the belief that people should know what the EPA is doing in their community and be able to have some input in the decision-making process. Superfund community involvement is not supposed to be a public relations effort to sell the Agency or its plans, and it is not just a one-way communication of information. Community involvement is the process of engaging in dialogue and collaboration with community members.

The goal of Superfund community involvement is to advocate and strengthen early and meaningful community participation during Superfund cleanups. According to EPA guidelines, Superfund community involvement staff will strive to:

- Keep the community well-informed of on-going and planned activities.
- Encourage and enable community members to get involved.
- Listen carefully to what the community is saying.
- Take the time needed to deal with community concerns.
- Change planned actions where community comments or concerns have merit.
- Explain to the community what EPA has done and why.

(<http://www.epa.gov/superfund/action/community/index.htm>)

Thus, citizens have the right to be involved in the process of decision-making. To accomplish this, there are several activities in which citizens can be involved, such as public hearings, newsletters, public workshops and others.

2.3. Stewardship Plan

Long-term stewardship is required at the Fernald Closure Project (FCP) to ensure that all remediation activities continue to be effective and protective of human health and the environment following the completion of site remediation. The purpose of the long-term stewardship plan is to satisfy the requirements of DOE-HQ to begin the planning process for long-term care of sites like the FCP. It is DOE's intent to continue to refine this plan with the full involvement of stakeholders and regulators to ensure that stewardship activities are appropriately planned to meet regulatory and stakeholder requirements (US Department of Energy, January 2003, p. 7).

2.3.1. The involvement of citizen participation in decision-making at Fernald

According to the Organization for Economic Co-operation and Development (OECD), (2001), engaging citizens in policy-making is a valuable investment and a core element of good governance. Citizens' input becomes sources of information for the government. Thus, the government has perspectives and potential solutions, and improves the quality of the decision reached. The most important contribution of citizen participation is that it builds public trust in government and raises the quality of democracy (p. 11).

In 1995, the DOE invited and encouraged stakeholders to participate in decisions affecting the remediation of Operable Unit 2. This included a solid waste landfill, lime sludge ponds, an inactive flyash pile, an active flyash pile and the South Field area, and Operable Unit 5 that encompassed the environmental media⁸ on the Fernald property and

⁸ Environmental media include the groundwater, surface water, soils, sediments, vegetation and wildlife throughout the Fernald facility and surrounding area (Fernald Environment Management Project, January 1995, p. 7).

surrounding area which could be impacted by the facility. This area also included the South Plume, an area of off-property groundwater contamination (Fernald Environment Management Project, January 1995, p. 6-7). The increased stakeholder awareness pushed the DOE to move from the non-participatory “decide, announce, defend” strategy to the two-way approach of shared decision-making. Through two-way communications, the DOE and its stakeholders worked together toward the common goal of site remediation. Interested stakeholders commented on the proposed plans for these operable units during public hearings. As a result, stakeholder input was considered by USEPA and OEPA during the approval processes for both of the Records of Decision⁹ (1995 Site Environmental Report, 1996, p. 75).

Stakeholder input regarding Fernald activities and issues was solicited through regular briefings for the local citizens’ environmental interest group (Fernald Residents for Environmental Safety and Health/FRESH) and local township trustees, person-to-person communication through the Fernald Envoy Program, workshops designed to provide information and solicit stakeholders’ concerns, Fernald Visitor’s Bureau programs, including the speakers’ bureau and site tours; dissemination of various fact sheets, publication of “The Fernald Report,” a monthly community newsletter, and “Fernald Progress,” a bi-monthly newsletter; and availability of other types of literature. In addition, materials related to the Fernald decision-making process were also available to the community at the Public Environmental Information Center (1995 Site Environmental Report, 1996, p-74-75).

⁹ Record of Decision is a written report of the alternatives found in the remedial investigation and feasibility study (RI/FS) and reasons for the selection of a treatment technology (Jolly, 1996, p. 223).

In addition to their own individual efforts, stakeholders had an opportunity to take part in and become informed about Fernald-related activities and issues through the Fernald Citizens Task Force. Established by the DOE in 1993, the Fernald Citizens Task Force is a site-specific advisory board that includes members who are local residents, local elected officials, and representative of FRESH, DOE, USEPA, and OEPA (1995 Site Environmental Report, 1996, p. 75-76).

CHAPTER 3

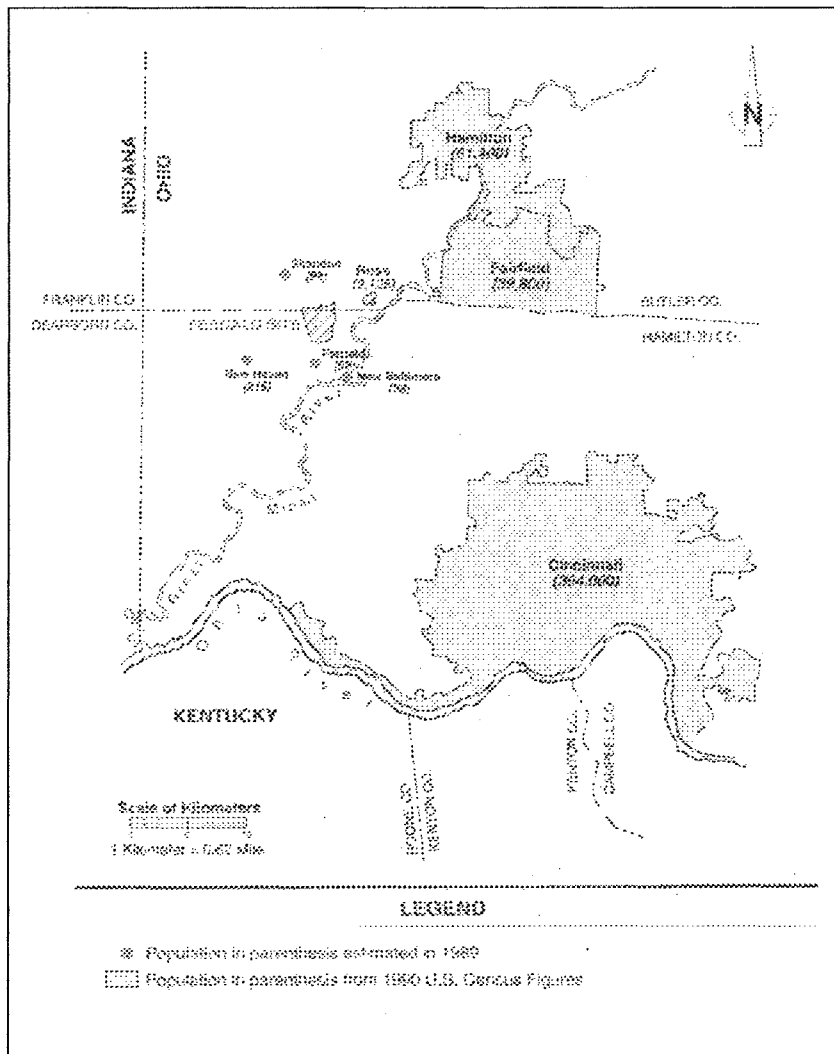
THE DEPARTMENT OF ENERGY'S NUCLEAR WEAPONS HISTORY AND FERNALD CITIZEN ADVISORY BOARD (FCAB)

3.1. Demography and Land Use

Scattered residences and several villages, including Fernald, New Baltimore, Ross, New Haven, and Shandon, are located near the site, as shown in **Map 1**. Downtown Cincinnati is approximately 18 miles (29 km) southeast of the site. The cities of Fairfield and Hamilton are 6 and 8 miles (10 and 13 km) to the northeast, respectively. There was an estimated population of 14,600 within 5 miles (8 km) of the site (1989 estimate) and an estimated 2.74 million within 50 miles (80 km). Economic activities in the area of the site relied heavily on the physical environment. Farming and raising beef cattle accounted for the majority of the land use in the area. Major crops included field corn, sweet corn, soybeans, and winter wheat. Several nearby farms sold produce locally or in nearby urban markets (1995 Site Environmental Report, 1996, p. 22-23).

Other important commercial products from the area included sand, gravel, and water from the aquifer. Many gravel pit operations exist in the Great Miami River valley. A water company is located 2 km (1.25 miles) upstream of the site's effluent discharge to the river; this company pumps about 76,000 m³ (20 million gallons) of groundwater per day, for sale primarily to Greater Cincinnati industries (1995 Site Environmental Report, 1996, p. 22-23).

Map 1: Communities near the Fernald Site



Source: 1995 Fernald Site Environmental Report

3.2. Exposure Pathways to Humans

To protect the local environment, the Environmental Monitoring Program focuses on exposure pathways. An exposure pathway is a route by which materials could travel between the point of release (a source) and the point of delivering a radiation or chemical dose (a receptor). At the FEMP, two primary exposure pathways (liquid and air) have been identified. A primary pathway is one that may allow pollutants to directly reach the

public and/or the environment. Therefore, the liquid and air pathways provide a basis for environmental sampling and information useful for evaluating potential dose to the public and/or the environment (1995 Site Environmental Report, 1996, p. 23).

Secondary exposure pathways have been thoroughly evaluated under previous environmental monitoring programs. Secondary exposure pathways represent indirect routes by which pollutants may reach receptors. An example of a secondary pathway is biota, or produce. Through the food chain, one organism may accumulate a contaminant and then be consumed by humans or other animals. The contaminant travels through the air and to the soil, where it is absorbed into produce through the roots, and is consumed by humans or animals. An evaluation of past monitoring data has shown that secondary exposure pathways at the FEMP are insignificant routes of exposure to off-site receptors. Therefore, the FEMP focuses on the primary exposure pathways (Integrated Site Environmental Report, 2000, p. 3).

Air Pathway

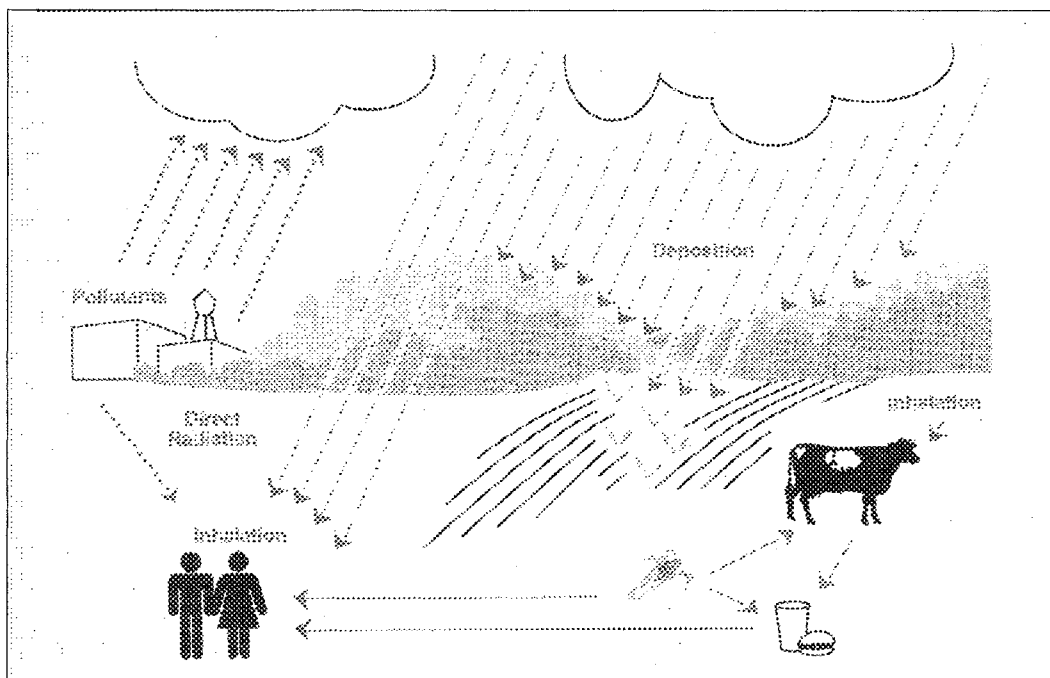
The air pathway includes the airborne pollutants that may be carried from the site through emissions and direct radiation, as shown in **Figure 3**. Airborne pollutants are subject to existing weather conditions; thus, wind speed and direction, rainfall, and temperature play a role in predicting how pollutants are distributed in the environment.

Stack and building vent emissions are obvious sources of airborne pollutants, but dust from construction and remediation activities, waste handling, and wind erosion are also potential sources. The form and chemical makeup of pollutants influence how they are dispersed in the environment as well as how they may deliver radiation doses. For example, fine particles and gases may be inhaled, while larger, heavier particles tend to

settle and deposit on grass or soil. Chemical properties determine whether the pollutant will dissolve in water, be absorbed by plants and animals, or settle in sediments and soils (1995 Site Environmental Report, 1996, p. 22-23).

For the environmental scientist, the first step in monitoring the air pathway is to measure the pollutants at the point of release. Measurements may include particle size distributions, chemical form of pollutant, and temperature and velocity of the pollutants as it leaves the stack. All of these factors and others can influence dispersion and behavior of pollutants. It is also possible to estimate the concentration of contaminants in the air once the emissions pass through the stack. During 1995, the site operated 20 air monitoring stations 24 hours a day, seven days a week, to monitor these air emissions.

Figure 3: General Air Pathway to Humans



Source: 1995 Fernald Site Environment Report

Liquid Pathway

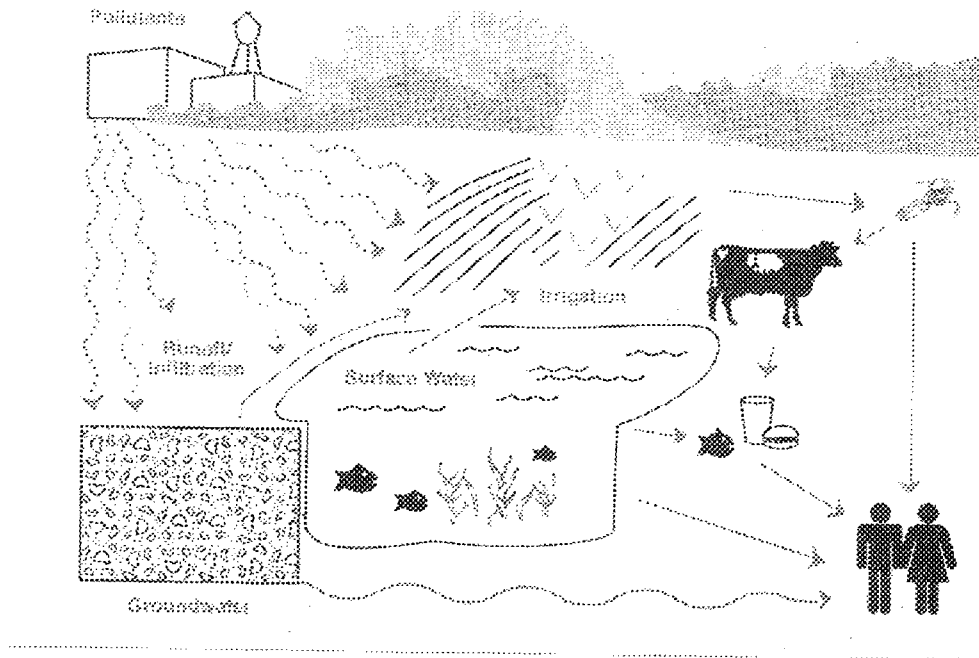
The liquid pathway includes all releases that could carry waterborne pollutants (see **Figure 4**). The principal liquid pathways include the effluent discharge line to the Great Miami River, the overflow spillway from the Stormwater Retention Basin which discharges to Paddys Run, uncontrolled stormwater runoff (much of which also flows to Paddys Run), and groundwater (see **Map 2 and 3**). The first step in monitoring the liquid pathway is to sample the effluent streams as they leave the site. The potential dose that could be delivered via the liquid pathway can be estimated by the type and concentration of each pollutant. Some pollutants in the liquid effluent may be carried along as suspended solids, which eventually settle out as sediment in the stream bed; other pollutants are dissolved in the water and could be absorbed by plants and animals (1995 Site Environmental Report, 1996, p. 25-26).

Sediment sampling in Paddys Run and the Great Miami River provides information on whether pollutants are accumulating in the stream beds. Fish sampling can show whether pollutants are being absorbed by aquatic animals and how much radioactive material could reach people if they eat fish from the Great Miami River. Fish are known as biological indicators because they can concentrate certain pollutants as they come into contact with them. Therefore, the longer-term influence of the site can be measured through fish sampling.

Groundwater is an important component of the liquid pathway because it is the source of water for homes and farms in the area. Extensive sampling of the wells on-site and in the surrounding area provides information about the aquifer. By sampling the

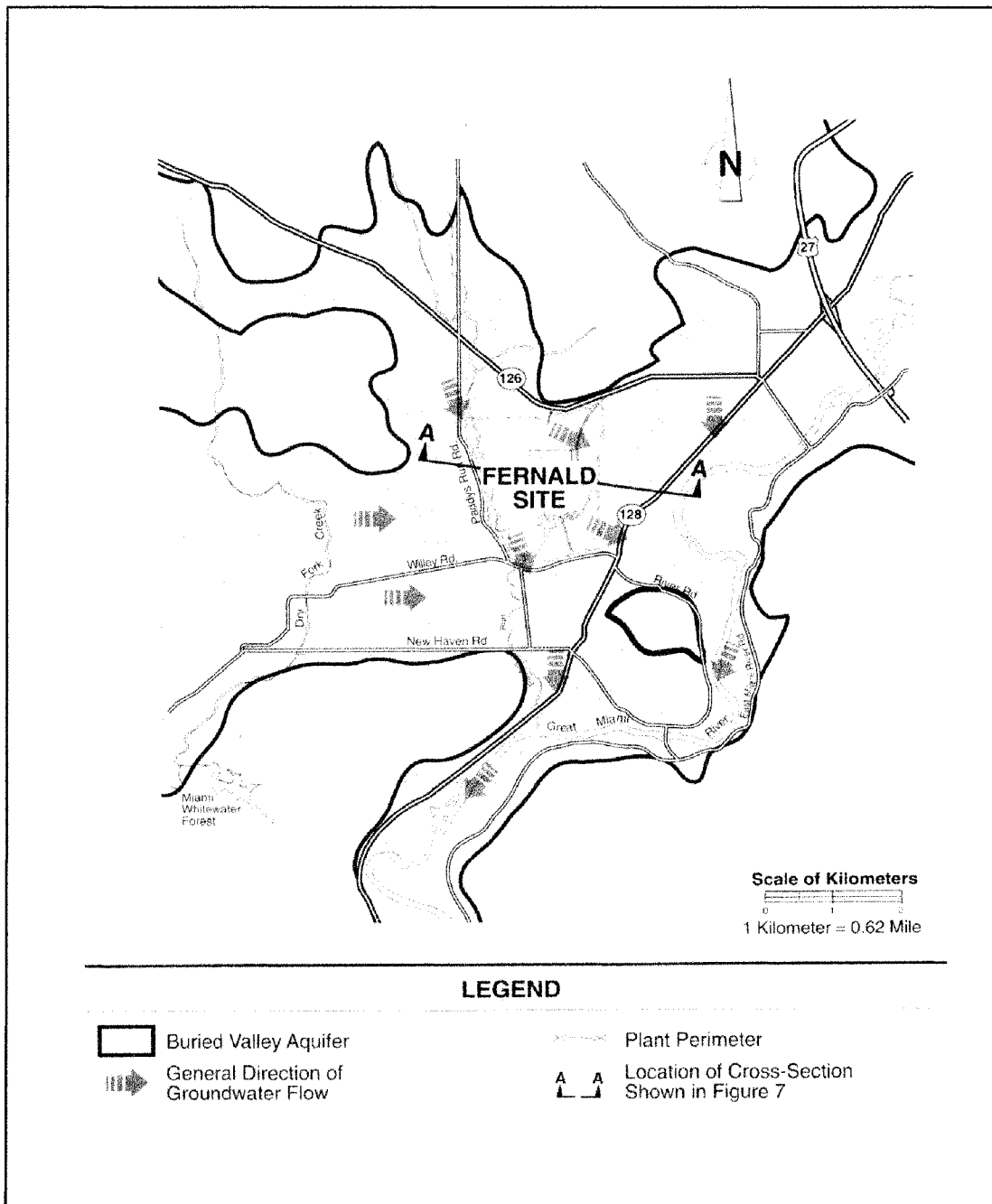
aquifer in many locations and at varying depths, scientists can determine the extent of any contamination (1995 Site Environmental Report, 1996, p. 26).

Figure 4: General Liquid Pathways to Humans



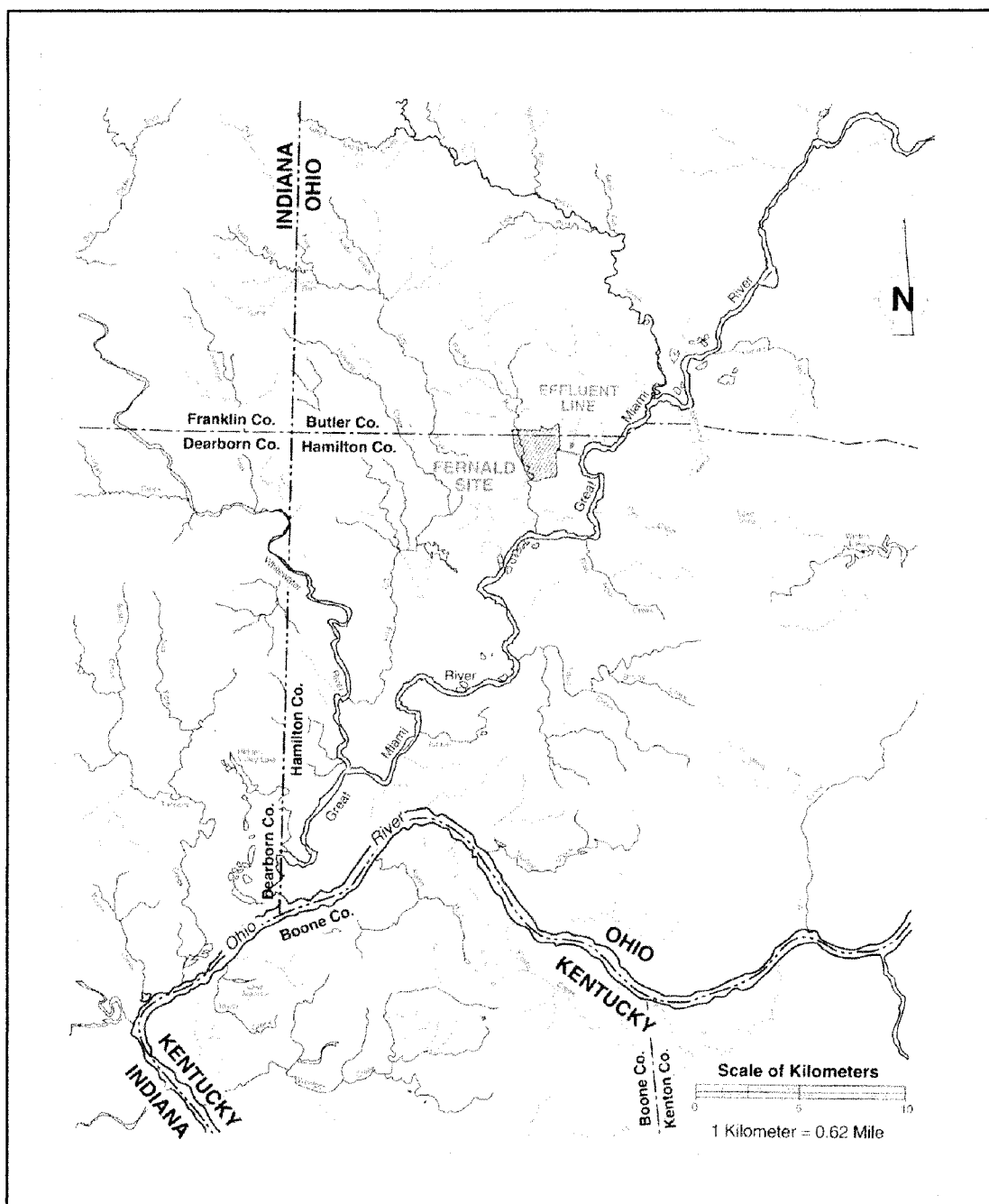
Source: 1995 Fernald Site Environment Report

Map 2: Buried Valley Aquifer Underlying the Fernald Site and Vicinity



Source: 1995 Fernald Site Environment Report

Map 3: Great Miami River Drainage Basin



Source: 1995 Fernald Site Environment Report

3.3. Fernald Citizens Advisory Board

In the 1980s, it was discovered that the Fernald facility had been contaminating local drinking water for many years. Local residents and the State of Ohio separately sued the Department of Energy (DOE). Since then, the DOE began to address site remediation and paid \$78 million in damages to area residents for past actions. Diminishing trust of the Department and its contractors resulted in strong activity by grassroots citizens. In 1984, citizens concerned about health effects established Fernald Residents for Environmental Safety and Health (FRESH) to evaluate the levels and types of contamination in the community. Thus, this group has been a leader in pressuring for remediation efforts throughout the Fernald site (Fernald Citizen Task Force, 1995, p. 11).

As work progressed under the 1991 Amended Consent Agreement¹⁰, DOE managers at Fernald recognized that many important, far-reaching decisions surrounding remediation of the Fernald site would have a profound impact on the long-term interests of local citizens. The DOE managers also realized that direct citizen involvement would be essential to making sound decisions. In 1993, DOE decision makers at Fernald decided that a citizen's advisory board would be the most effective means of obtaining focused stakeholder input on the pressing issues regarding remediation of the Fernald site. At about the same time, a model of citizen participation was emerging from the Federal Facilities Environmental Restoration Dialogue Committee (FFERDC). The FFERDC recognized that opportunities were needed for the full spectrum of stakeholders to voice their interests and concerns.

¹⁰ Amended Consent Agreement: legal agreements that establish cleanup plan (www.fernald-gov/Future/flu.htm).

To correct this situation, the FFERDC recommended establishing independent public bodies called site-specific advisory boards (SSABs), to provide policy and technical advice regarding key remediation decisions to the regulated and regulating agencies. The FFERDC suggested that establishing SSABs would improve decision making by

1. Providing a setting for direct, regular contact between agencies and a diverse set of stakeholders,
2. Providing a forum for stakeholders and agencies to understand the competing needs and requirements of the government and the affected communities,
3. Providing a forum for discussing citizen issues and concerns, thus enabling the development of a more complete and satisfactory plan or decision,
4. Enabling citizen review and the evaluation of plans and their technical adequacy in more depth than is possible in most single opportunity public participation efforts,
5. Permitting a more detailed consideration of issues that is possible as a result of the minimal legal requirements identified in various state and federal laws, and
6. Broadening consideration of issues to include values as well as facts.

(Fernald Citizens Task Force, 1995, 12):

The DOE established the Fernald Citizen Task Force as one of the first SSABs in the Nuclear Weapons Complex, together with its regulators, the U.S. Environmental Protection Agency (Region V), and the Ohio Environmental Protection Agency. The aim of this SSAB is to help design and monitor environmental management and remediation activities at the Fernald site. In July 1997, the Fernald Citizens Task Force changed its name to the Fernald Citizen Advisory Board (FCAB). The FCAB consists of fourteen

stakeholders and two alternates to serve on the board. Representatives from the U.S. EPA, Ohio EPA, and DOE are ex-officio members of the FCAB. The ex-officio members participate in the advisory group's discussion and serve as advisors and are non-voting members on all of the FCABs. The Task Force decided that it must obtain technical and facilitation support from a source other than DOE and the site contractor to ensure independence and neutrality. Douglas J. Sarno from Phoenix Environmental served as a consultant directly to the Task Force (Fernald Citizens Task Force, 1995, p. 16).

The FCAB members represent various stakeholders affected by Fernald's cleanup activities. The stakeholders represented on the SSAB include the following groups: local residents, labor organization, and various local governments. The SSAB members were chosen in accordance with the requirements of the Federal Advisory Committee Act of 1972 (FACA). FACA requires that persons selected to participate on federal advisory boards must be representatives of stakeholder groups affected by a particular public policy. These advisory boards were established so that its members could discuss the concerns and recommendations of the affected stakeholder groups with the agency responsible for implementing the public policy.

The work plan was designed to focus on the four key recommendations requested of the task force: future use, remediation levels, priorities, and waste disposition.

Recommendations on Remediation Levels

The task force established remediation levels to protect the Great Miami Aquifer and to provide consistent human health across all environmental media and land uses. It sought to balance the absolute requirement to protect human health and safety with the desire to minimize the impact of the environment resulting from remediation itself. To

achieve background conditions would require surface soil excavation for five miles surrounding the site, a consequence the task force found unacceptable. Ultimately, the task force arrived at recommended remediation levels that were protective and required little off-site excavation. These levels were based on restoring and protecting the aquifer to conform to maximum contaminant levels under the Safe Drinking Water Act, and to keep cancer risks within one in ten thousand, and non-cancer risks not to exceed the EPA hazard index¹¹ of one (Fernald Citizens Task Force, 1995, p. iii-iv).

Recommendations on Waste Disposition

The aim of the recommendation is to evaluate the political and logistical considerations involved in disposing of over three million cubic yards of contaminated material. In addition, it must also be determined whether or not a balanced approach, in which less hazardous waste is disposed of on-site and more-hazardous waste is disposed of off-site, is most prudent. Of paramount importance was ensuring the removal of the most-hazardous wastes off-site, safe disposal, and no new wastes arriving at Fernald for disposal. The task force, therefore, concurred with existing DOE, EPA and OEPA decisions that the most highly contaminated materials be disposed of off-site, and recommended that an on-site disposal facility be constructed to accept materials with low levels of contamination from the Fernald site only (Fernald Citizens Task Force, 1995, p. iv).

Recommendations on Priorities

Originally, site priority recommendations were envisioned as a sequencing of activities importance according to the concerns and goals of stakeholders. However, as

¹¹ Hazard Index of one: maximum contaminant level for all contaminants under the Safe Drinking Water Act (Fernald Citizen Task Force, 1995, p. 30).

dramatic cuts in the DOE budget began to occur, the nature of the problem shifted. Reduced annual budgets resulted in shortening remediation time frames from 25 years to an approximately 10-year schedule. This schedule would provide both rapid protection of human health and the environmental, and a large reduction in the overall costs of remediation (Fernald Citizens Task Force, 1995, p. iv).

Recommendations on Future Use

The task force focused its future-use recommendations on creating a broad understanding of how the Fernald site could best be used following remediation, rather than identifying specific land-use plans for the property. The task force recommended that residential and agricultural uses for the Fernald site should be avoided once the cleanup activities were completed. Accordingly, remediation levels recommended by the task force allow for all other use, including recreation and industry. The task force also recommended that a substantial buffer area separate the on-site disposal cell and any other uses of the property (Fernald Citizens Task Force, 1995, p. iv).

The task force formally reports to the DOE Assistant Secretary for Environmental Management, the EPA Region V Regional Administrator, and Director of the OEPA (Fernald Citizens Task Force, 1995, p. 14). They are committed to the concept that a Citizens Advisory Task Force will serve the public interest and provide useful information and ideas. Because environmental restoration activities are at a pivotal juncture in the decision-making process, the task force's contributions are critical to the successful remediation of the Fernald site. There is a mutual understanding that stakeholders desire and deserve a role in the process whose outcomes that will influence their future for generations. In relation to this, the task force has developed Charter and

Ground Rules¹² as bases to manage the involvement of citizens in the process of decision-making, as shown in Appendix 1 (Fernald Citizens Task Force, 1995, p. C-2).

The site is scheduled for closure in 2006, meaning that the site will meet agreed-upon levels for contaminants and that contaminated groundwater will be contained, with long-term treatment and monitoring in place by the end of 2006. When closure comes and remediation activities end, the site will retain a high volume of contaminated materials in its on-site disposal facility, and site soils will contain radioactive contaminants at levels too high to permit unrestricted property use. Physical barriers and legal restrictions on future use of the site will be required to prevent excessive exposure to these residual contaminants. The ongoing management of the site to protect human health and the environment from these hazards is called “long-term stewardship” (The Perspective Group, October 2002, p. 7).

As the environmental remediation of the Fernald site nears completion, the citizens have become increasingly concerned about the future availability of information during long-term stewardship (The Perspective Group, October 2002, p. 7).

¹² Charter and Ground Rules: a document setting forth the aims and principles of a united group and regulation (Guralnik, 1980, p. 1245).

CHAPTER 4

RESEARCH METHODS

4.1. Case Study Approach

A case study approach is used to focus on two different things: the role of citizen participation in the cleanup, and how this participation has affected the plans for remediation of environmental contamination and future use. This is part of the site's stewardship plan.

There are several reasons to use the case study approach. First, the plan for remediation is long-term, and there is an important need to narrow the focus of the study. As Baker notes (1994, p. 299), a case study will serve better for this purpose when it focuses on a single organization, institution, event, decision, policy or group. Second, Yin (1989) says the case study is appropriate when the research question to be addressed asks how and/or why. Often the reason to study a particular case is to try to determine why a certain situation prevails or how an organization or group has succeeded (Baker, 1994, p. 300). A case study is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence is used" (Yin, 1989, p. 23). By using the case study approach, the role of citizen participation can be examined in regard to how citizens are involved with the process of decision-making and how this participation has affected the site's stewardship plan.

As described in a previous chapter, qualitative method and analysis were used for this study. The reason the qualitative method is used is to give a more complete

understanding of the phenomenon of the study. As Leedy (2001, p. 148) says, a qualitative study can help define what is important -- that is, what needs to be studied. The U.S. Department of Energy's Feed Materials Production Center was chosen because it has serious environmental problems and an extensive formal process for citizens to participate in the planning of a response to those environmental problems. The unit of analysis is the U.S. Department of Energy's Feed Materials Production Center and its citizens and government stakeholders. Peshkin (1993) states that the purpose of qualitative methods is to enable us to gain insights about the nature of a particular phenomenon and to discover the problems that exist within the phenomenon (Leedy, 2001, p. 148). Thus, by using qualitative methods it gives the opportunity to gain the insight, discover problems, and interpret phenomenon.

However, as described in the literature reviews, to examine whether the citizen participation has an important role in decision-making and whether participation has affected the Fernald site stewardship plan, the writer uses Beierle's concept of the social goals of citizen participation. The writer uses these goals as criteria for evaluating whether the Fernald Stewardship plan of citizen participation has been successful.

4.2 The Process of Gathering the Data

The writer has used several means for collecting data. Primary data sources include interviews and observation of meetings. Secondary sources include reports, website, brochures, and materials of FCAB, such as a video tape.

4.2.1 Primary Sources

The writer used open-ended interviews, an important basis of collecting information. The interviews related to the social goals for citizen participation, and the process of decision-making in regard to environmental policy and its implementation. Nine persons were interviewed. The interviews were being broken into four main parts. First, in order to better understand issues in relation to the principles of citizen participation and decision-making in planning issues, the writer interviewed three people from a citizens' group. Second, the writer interviewed two people from a regulator group to find out if the ideas of citizens had influenced the plan for remediation of environmental contamination at the Fernald site. Third, in order to elicit an answer concerning the impact of released uranium on human health and the environment, the writer interviewed two people from a technical expert group. Fourth, the writer interviewed two people from an operator group, asking how they prevented the health risks associated with working with uranium contamination, and what they expected for the future at the Fernald site.

The interviews were conducted separately by the writer. Although these interviews were initiated in January and February 2003, the interviewing process, including follow-up question, lasted until the middle of March 2003. Most interviews lasted between thirty and sixty minutes; only one respondent gave brief answers without spending much time elaborating. Some of the interviews took place at the subjects' offices; another took place in coffee shop in West Chester, and the last was conducted at a private residence. In some cases, interviews were conducted by email and telephone, because the subjects were outside the Cincinnati area. All interviews were audio tape

recorded with the permission of the subjects. Notes were taken during the interviews, and more extensive notes were taken later during replays of the interviews (See Appendix 1).

4.2.2. Secondary Sources

Secondary sources of data were important sources of information. A number of data sources were used to understand the background of FCAB. These sources, including reports, websites, brochures, and materials of FCAB (such as the video tape), were collected from DOE personnel at the Fernald site. These data sources were chosen to describe the history, goals, objectives and structures of organization.

Secondary data such as annual reports and notes of meetings were gathered from the field visits. This data will be used to analyze the implementation of citizen participation in the process of environmental decision-making.

4.2.3. Direct Observation

The purpose of direct observation was to understand fully the complexities of the relationships involved, how citizen participation was actually implemented, and whether or not Beierle's social goals for citizen participation were advanced by the meetings. The writer attended several meetings at the Fernald site and in Ross, Ohio. There were several groups involved in the planning process for remediation. Each group held a monthly meeting to discuss the problem that had not yet been resolved, and to review the reports from the contractors regarding the progress of the cleanup program.

The following are some meetings that the writer attended:

1. Full FCAB Meeting, January 22, February 13, and March 15, 2003, Fernald, Ohio.

The FCAB is a U.S. Department of Energy (DOE) Site Specific Advisory Board chartered under the Federal Advisory Committee Act. The FCAB consists of 13 members of the local public including local residents, labor representatives, local government officials, academia, and local business representatives, along with non-voting ex-officio members from DOE, USEPA, OEPA, and the Agency for Toxic Substances and Disease Registry. FCAB recommendations and advice are aimed at providing the DOE an understanding of the issues and concerns that are important to local stakeholders and to ensure that these perspectives are incorporated into planning and decision making on the FEMP site. The focus of the meeting was on big-picture items, such as budget and remediation progress. Committee structure and topics are evaluated on an annual basis to ensure the needs of the Board and Community are met with efficiency and effectiveness. Committees decide which issues within their scope are best evaluated in committee or with the full board. The FCAB focuses its energies on topics and issues that are most important to the local community and are most appropriate to constructing citizen input .

(<http://www.fernaldcab.org/backandhist.html>).

2. Fernald Residents for Environment, Safety and Health (FRESH) Meeting, January 23, 2003, in Ross, Ohio.

FRESH was formed by local residents in 1984 and has played a leading role in providing community input on the characterization and remediation of the Fernald site. FRESH continues to play a leading role in decisions regarding public use of the

facility closure of the site. The purpose of this meeting was to keep citizens informed of current events at Fernald and offer technical spokespersons to discuss timely topics where appropriate or requested (Fernald Environmental Management Project, January 1995, p. 25).

3. DOE Public Briefing Meeting, April 08, 2003, Fernald, Ohio.

The purpose of this meeting was to solicit citizen's comments on key issues and offer opportunities for citizens to interact with Fernald decision-makers, regulators and natural resources trustees (Fernald Environmental Management Project, January 1995, p. 25). They discussed the progress of the cleanup projects, so every manager reported what has been done and what will be done for the next step. See the progress of the projects in **Appendix 2**.

4. Fernald Health Effects Subcommittee (FHES) Meeting, February 02, 2003, Fernald, Ohio.

The Fernald Health Effects Subcommittee was established in 1996 to provide community-based advice and recommendations to the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) concerning the agencies' public health activities at the former FMEP (Fernald site). The focus of the meeting was to discuss the effect of uranium or pollution concerning people's health and the environment and how to prevent them from becoming contaminated.

4.3. The Process of Analyzing the Data

The writer used interpretation analysis to analyze the data because this analysis matches with the goal of this study. It will provide the result that derives from the findings. Peshkin (1999) emphasized that the purpose of interpretation analysis is to enable a researcher to gain insights about the nature of a particular phenomenon, to develop theoretical perspective about the phenomenon, and to discover the problems that exist within the phenomenon (Leedy, 2001, p. 148). Therefore, the results of this study are primarily based on the primary and secondary sources. Responses from the interviews as well as observations during the meetings are analyzed and categorized, then compared to Beierle's social goals of citizen participation and William's findings. Next, the writer discusses them based on the literature, and the findings will determine whether the role of citizen participation has an important role in environmental decision-making at Fernald site and how this citizen participation has affected the plans for remediation of environmental contamination and future use.

The findings are summarized and the final product of this study contains strategies as recommendations that might be useful for Fernald site.

4.4. Limitation of the Research

Nine people were interviewed as a sampling of citizens' opinions. Each person interviewed was the head of each group with the exception of one who is a resident (member of FRESH, but not representing FRESH). The writer realizes that these individuals are not a representation of a broader citizens' group. However, the comments

and opinions voiced by citizens present at the meetings were similar to those of the leaders interviewed. There were only a few dissenting opinions from citizens.

CHAPTER 5

RESULT OF INTERVIEWS

This chapter presents the results of interviews conducted between January and March 2003. The purpose of these interviews was to determine whether citizen participation has played an important role in the decision-making for the Fernald Stewardship Plan, and how citizens have affected the plans for remediation and future use at the Fernald site. The research questions, as discussed in the previous chapter, were as follows:

1. What has been the role of citizen participation in the development of the “Stewardship Plan” at the Fernald site?
2. How has citizen participation affected the plans for the remediation of environmental contamination and future use at the Fernald site?

To explore the research questions, the writer interviewed nine individuals from four groups (citizen stakeholder, regulator, technical expert and operator groups) and observed FCAB, FRESH, and F-HES meetings, as well as a DOE Public Briefing where citizens were directly involved in discussions of the Stewardship Plan. The interviews were structured to relate to Beierle’s concept of social goals for citizen participation and the process of decision-making with regard to environmental policy and its implementation. Through the interviews, the researcher collected information on the major roles for citizens and organizations in environmental policy and its implementation. As a result of the interviews, the researcher has come to better

understand the role of citizen participation in planning the remediation and future use at the Fernald site.

The responses from the citizen stakeholder, regulator, technical expert, and operator groups provide insight for the role of citizen participation in the decision-making process for the Stewardship Plan. The responses also provide a look into the citizen's ability to affect the plans for the remediation of environmental contamination and future use for the Fernald site. Those interviewed generally believed that citizen participation was important. They also generally agreed that citizen involvement in the discussion about the Stewardship Plan influenced plans for the remediation and future use of the Fernald site.

This chapter describes the responses to the interviews in terms of Beierle's concept of social goals for citizen participation. The five social goals for citizen participation are:

Goal 1: Incorporating public values into decisions,

Goal 2: Improving the substantive quality of decisions,

Goal 3: Resolving conflict among competing interests,

Goal 4: Building trust in institutions, and

Goal 5: Educating and informing the public.

The first section of this chapter uses Beierle's concept of social goals for citizen participation as the basis for analyzing the interview responses. The second section addresses the observations of citizen involvement at meetings as part of the discussions of the Stewardship Plan.

5.1. Results from Interviews

Goal 1: Incorporating public values into decisions

Beierle (2002) stated that this goal measures the extent to which participants influence policy decisions and how well those participants reflect the values of the public they were meant to represent (p. 24).

The FCAB allows citizens to participate in the decision-making process for the Stewardship Plan. Actually, the citizen involvement in the decision-making process began when citizens established FRESH in 1989. Two respondents from the Citizen Stakeholder group confirmed that they could communicate with the DOE representative in 1989 (Interview, March 13, 2003).

Another respondent also asserted that communication became effective when DOE established its Community Relations Plan. He said that,

“That plan encouraged an active role for citizens who live in or near affected communities. The plan was intended to ensure that all individuals have the opportunity to participate in the decision-making process, and to ensure that resulting decisions are made with full knowledge of the public’s view. Fernald managers also strived to establish meaningful community dialogue on such matters as health concerns, environmental issues, remedial action construction plans, and specific site activities” (Interview, March 21, 2003).

When individuals in the stakeholders group were asked whether citizen participation has played a role in the decision-making process for the Stewardship Plan, they generally believed that citizen participation had an important role in that process. One respondent said,

“Citizens have been effective participants in the cleanup decision process. The local citizens are the ultimate end users from the area and have been effective in providing their ideas and visions in both cleanup and long-term stewardship” (Interview, March 7, 2003).

The individuals in the technical expert group also confirmed that citizens have been effective participants in the decision-making process. They said that “citizens have been effective participants in the cleanup decision process” (Interview, January 24 and March 15, 2003).

Also asked was how much influence the citizens have had on the decision-making process for the Stewardship Plan. One respondent from the regulator group stated that “Citizens have had a fairly significant impact as demonstrated by the “balanced approach” to environmental restoration at Fernald (Email, March 25, 2003).

Another respondent also asserted that citizens were able to affect the Stewardship Plan. He explained as follows:

“Citizens have a huge role in influencing the decision making. More of a relationship developed between the DOE, the contractors, the regulators and the citizens and that has led to the success. There has been a revolution in the process, where the process has been opened up, opened communication and sharing information. That was “real education” because there were a lot of different parties that can educate each other, such as took place during the discussions on chemical and political issues. Through that process they came up with the solution to the problems. Success can be measured by looking at the progress on the cleanup. Fernald has been successful on the cleanup because the involvement of different groups in the decision-making process. As a result of their relationships and openness, they can make decisions through the process” (Interview, March 7, 2003).

The issue of how to incorporate different opinions and how to reach agreement about the prioritization of key site issues was also addressed. One respondent said, “different opinions from the FCAB members and other citizens were part of the process. They provide the minority opinion in the recommendations” (Interview, March 21, 2003).

One respondent from the regulator group revealed that they had a lot of discussion on priorities for key issues:

“FCAB, DOE and Flour had strategy meetings to discuss the top priorities for the coming year. To reach an agreement, they worked together to resolve their problems, and identified what were the most important challenges that they had to get through, such as the on-site disposal facility” (Interview, March 7, 2003)

In general, the responses from all those interviewed indicated that the efforts of FCAB to incorporate the different ideas from citizens into the Stewardship Plan decision-making process did meet the first part of Beierle’s social goals for citizen participation. They believed citizens’ input can influence policy decision.

The second part of this goal was also met. This part says that citizens’ represented the values they were supposed to represent. This is evident because citizens repeatedly questioned FCAB, DOE and the contractor as to the progress off the restoration projects for cleaning up the area and protecting their health. FCAB, DOE and the contractor ensured citizens that they would protect their health and the environment and that they understood citizens’ concerns.

Goal 2: Improving the substantive quality of decision

Beierle (2002) said that by improving the substantive quality of decisions, the decisions will be better (p. 27). To improve the quality of decisions, he proposed the following quality criteria: cost-effectiveness, joint gains, opinion, added information, technical analysis, innovative ideas, holistic approach and other measures. Individuals in the citizen stakeholder group agreed the Stewardship Plan process did use citizen

participation to improve the quality of decisions. One respondent, a member of FRESH, explained that,

“The quality of decisions was improved by attending the workshops. Citizens could listen and ask questions, and have documents in hand so they could read and make comments. Thus, the workshops were educational and very beneficial for everybody” (Interview, March 13, 2002).

She added that the technical forums as well as having “a good, hard discussion” improved the technical quality of decisions directly related to them. That is the way to have a good decision-making process. Decisions are made after fully considering the input of citizens (Interview, March 13, 2002).

Citizens also improved the quality of decisions through creative problem solving, innovative ideas, or new information. One respondent from the citizen stakeholder group explained that,

In order to come up with innovative ideas or solutions to problems, the citizens should work through the process, such as attending the meetings held by FCAB and discussing specific issues on the cleanup process. From this point, citizens know and understand what is going on at the site. Indirectly, these meetings are intended to educate the citizens on the environmental problems. From the FCAB meetings, citizens would learn how decisions are made by consensus. The FCAB has established ground rules for consensus (**See Appendix 3**) (Interview, March 21, 2003).

One respondent from the regulator group also confirmed that,

One thing that stands out is the Fernald version of the "Cleanopoly" game (1994 to 1995 time frame). It allowed the citizens to visually understand the balance of waste streams and disposition options at the Fernald site. This enhanced the decision making of the Citizens Task Force, leading to solid recommendations (Email, March 25, 2003).

The interviews also addressed whether the decisions or recommendations made through citizen participation led to actions that were more cost-effective than a probable

alternative for solving an environmental problem. An individual from the regulator group gave an example, noting that money was saved by using a "balanced approach." It was explained that "the decision to have various types of waste disposed, both on and off-site, will likely save about \$2 to \$4 billion over the lifetime of the project" (Interview, March 7 and Email, March 25, 2003).

Based on the interview responses, it can be concluded that the substantive quality of the decision for the Stewardship Plan improved as a direct result of citizen participation. This is evidenced by the reported impact on the quality of decisions of the meetings and workshops where citizens have participated. It shows that efforts to improve the quality of the Stewardship Plan decisions have met with the second goal of Beierle's concepts for citizen participation.

Goal 3: Resolving conflict among competing interests

This goal measures the extent to which conflict that existed before the Stewardship Plan process started (or emerged during the process) is resolved. The focus is not only on relationships between the citizen and government, but also on relationships among participating groups (Beierle, 2002, p. 28).

Differences in opinion between the various stakeholders continue to the present. This is illustrated by the FCAB's decision to have a trail on the Fernald site. One respondent from a citizen stakeholder group claimed that "the conflict was not resolved yet because they have not come to the end of the process" (Interview, January 26, 2003). She explained that citizens do not agree with the plan to have trails on the site, and disagree about who will take care of the site after the cleanup is completed. While the

FCAB has already selected Grand Junction from Colorado to take care of the site after the cleanup is completed, some citizens disagree with the FCAB's choice. The reason is that citizens want to have the representative near the Fernald site, so whenever something happens, it will be easy for them to call the representative. Also the waste disposal on-site issue is still in debate because DOE continues to keep waste disposal on site (95%). However, DOE and contractors have argued that the waste disposal on site is a low level of contaminant and there is no risk to human's health and the environment. It was reported that the meeting helped to resolve differences in opinions (Interview, January 26, 2003).

The citizen stakeholder groups believed that the FCAB strives for consensus. One respondent stated,

“The consultant becomes a mediator whenever the participants of the meeting have different opinions on the issues. This is a key reason why citizen participation has been successful at Fernald, because the consultant sits in the middle and promotes consensus” (Interviews, March 13, 2003).

Another respondent asserted that the members of FCAB agree to disagree. He explained that,

“When there is disagreement, the board will include in the reports a minority opinion. The board writes recommendations (a reflection of the decisions made), with the minority opinion as an attachment and the report in its entirety is submitted to DOE. There is no problem in submitting such reports to DOE; they accept the reports” (Telephone interviews, March 21, 2003).

The respondents agreed that the board gives fair consideration to dissenting opinions. One respondent from citizen stakeholder groups described that

“Citizens wanted to make sure that the board writes dissenting opinions and goes along with the recommendation. Even though one may have a different opinion, there is no need to insult another person and all should control their emotion” (Interview, March 13, 2003).

Another respondent also affirmed that the board is careful to consider dissenting opinions. Dissenting opinions are included in the form of minority opinions. The board tries to find consensus using agreed upon ground rules. Any report issued should have both majority and minority support (Telephone Interview, March 21, 2003).

Based on the discussion above, the interview responses suggest that all conflict would not be resolved until the remediation activities are complete in 2006. In general, citizens agreed with the stewardship plan, though they did not agree on all specific items, such as trails and the on-site disposal. Even though the responses from the interviews indicated that there is conflict, the citizens agree that conflict has been reduced. The FCAB provided minority opinion in the recommendations for dissenting opinions. It concludes that the third goal of Beierle’s concept for citizen participation has partially succeeded.

Goal 4 - Building trust in institutions

Another significant goal for citizen participation is to build trust in institutions. Beierle (2002) states that trust in institutions means the public believes that a lead agency is capable of understanding and serving the public interest as they are obliged to do so (p. 30).

The stakeholders believe that the level of trust has improved among citizens and FCAB. One respondent from the regulator group confirmed that, “there has always been

a fair level of trust between the government agencies and citizens” (Email, March 25, 2003).

The other respondent asserted that the trust in institutions changed over the period. He further explained that,

“During the mid-eighties there was no trust between DOE and citizens. Initially, there was much anger, feelings of injury, frustration and mistrust of the agency. Over time, however, a number of things happened. They realized that they should move on, and now everything is under control. The agency is doing the cleanup at the Fernald site. DOE has worked together closely with citizens in an effort to develop trust. They improved the level of trust and relationships with the citizens” (Interview, March 7, 2003).

When asked whether the FCAB contributed to trust and confidence in DOE, one respondent from the operator group said that, “the board contributes to trust and confidence in DOE. The FCAB’s decisions were carried out with DOE and the FCAB trusts DOE to look out for their interest” (Interview, February 3, 2003).

Another respondent from the operator group stated that, “the stakeholders came to know DOE and developed a level of trust in the individuals, not as representative of a larger institution at all” (Interview, March 15, 2003).

In order to improve the level of trust between citizens and government agencies, FCAB held meetings and workshops. In these ways, they communicated with each other. The other important item to be assessed is how to improve the relationships among DOE, FCAB, and citizens. One respondent from the operator group said that,

“The relationships have certainly improved between DOE and the public because there have been a number of issues to be addressed and discussed. That means there was a level of trust among DOE, citizens, and FCAB. DOE has been more open and were able to give information to FCAB and citizens, and discussed the key issues that affect clean up. In general, citizens are satisfied with those recommendations” (Interview, February 3, 2003).

In general, the respondents believed that the level of trust in government agencies has improved, even though it is still not one hundred percent. The respondents explained that the way to build trust with the citizens is to allow participation in the decision-making process. Stakeholders can work together to develop a cleanup plan or a stewardship plan for future use. The responses indicate that the fourth social goal of Beierle’s concept for citizen participation has been substantially met.

Goal 5 - Educating and informing the public

The fifth social goal of Beierle’s concept for citizen participation is to educate and inform citizens. The activities held by FCAB were important education opportunities for citizens. By attending the meetings and workshops, citizens were able to become more knowledgeable about environmental problems. The stakeholder groups believed that educated citizens were the single most important resource for the Stewardship Plan process, because citizens were expected to actively participate in all activities. All respondents agreed that the educational outreach was effective because citizens learned about the technology for cleanup.

The FCAB held a series of public workshops of which the aim was to assist the community to understand what is going on at the site and the alternatives for its future

use. Thus, the workshops focused on the Stewardship Plan and the design for the Future of Fernald. The workshops had the following purposes:

Workshop 1 Held on April 20, 1999, this workshop introduced future use concepts under consideration and provided an opportunity to identify community issues and concerns about future use.

Workshop 2 Held on May 24, 2000, this workshop introduced future use issues to the public and also provided a forum to identify goals for the future use of Fernald.

Workshop 3 Held on September 26, 2000, this workshop allowed the Stewardship committee to present to the public a draft stakeholder vision statement for the Future of Fernald based on the results of the second workshop. Participants revised and agreed to the vision statement and then conceptualized how the vision statement might be implemented at the site.

Workshop 4 Held on March 13, 2002, this workshop involved a community design charette involving a broad spectrum of community members in the development of the visual design elements of the selected future use for the site (Perspective Group, October 2002, p. 97).

Another concern about citizen education was whether the citizens learned enough about the issues while they were actively engaged in the decision-making process. All respondents from the citizen stakeholder groups asserted that,

“Citizens got enough information on the issues when they were actively engaged in the decision-making process. The citizens were educated, they had technical information and they knew how the process worked, so they felt confident about making comments on the issues. Citizens were satisfied with the quality of the decision-making process. (Interview, January 26, March 13 and 21, 2003).

All stakeholder groups believed that the citizens developed their knowledge of the issues by attending the series of public workshops. Citizens became better educated and informed about environmental issues. Increasing the citizens' understanding of environmental problems built the capacity for solving remediation and use problems. The FCABs efforts to educate citizens suggest that Beierle's fifth social goal for citizen participation has been met by the Stewardship Plan process.

5.2. Observations

The writer attended a number of meetings at the Fernald site and in Ross, Ohio, during the research that was conducted from January to March 2003. The writer attended FCAB, FRESH, F-HES, and DOE Public Briefing meetings. The purpose of attending these meetings was to understand fully the complexities of the relationships involved, how citizen participation was actually implemented, and whether Beierle's social goals for citizen participation were advanced by the meetings. In this section, the writer assesses how citizens participated in these meetings using Beierle's five social goals for citizen participation as the basis for evaluation

Goal 1: Incorporating public values into decisions

The FCAB employed a consultant when the board was established in 1993 to help them manage and focus their work. The consultant's responsibility was to make sure that the citizens had the information they needed, to design their dialogues and discussion processes and facilitate their work (Interview, March 15, 2003).

Whenever citizens did not understand or objected to parts of the Stewardship Plan proposed by DOE, they asked for explanations until they were satisfied with the answers. Usually, the consultant took charge of the meeting when there were disagreements, until both sides agreed with the consultant's explanation and/or one of the FCAB member would continue to ensure that FCAB listened to the citizens' opinion. During the meeting, the consultant gathered input not only from the citizens but also from FCAB members. There was a good example of how FCAB incorporated public values into the decision-making process when DOE described the role of the Grand Junction in maintaining the Fernald site for the future. Residents had received an older version while DOE was using a newer version, and thus there was confusion and debate on the issue. Residents objected and DOE agreed to revise the Comprehensive Stewardship Plan based on the comments from Ohio EPA and the FCAB, before submitting it to DOE headquarters. The revised version would be more explicit regarding the role of Grand Junction in maintaining records for conducting stewardship, and also would include more information on DOE's obligations to monitor ground water. This is an example showing movement toward Beierle's first social goal for citizen participation at the meeting.

The writer attended one FRESH meeting that was held January 23, 2003, in Ross, Ohio. DOE and contractor representatives were present to explain the remediation activities that were being implemented. FRESH members described the results of the FCAB meeting from January 22, 2003, as well as the plans for the remediation. They also discussed the questions and listened to other residents' opinions. Sometimes, the residents related their experiences with contamination. The communication between

citizens, DOE and contractors appeared effective. Citizens obtained information they needed and they appeared to be satisfied.

The writer also attended a F-HEC meeting on February 2, 2003, in Crosby Township, Ohio. At that time, a doctoral student from the Department of Environmental Health, University of Cincinnati explained her findings concerning how environmental contamination affects a human's health and the environment, and the strategies to handle it.

The other meeting that the writer attended was the DOE Public Briefing meeting on April 8, 2003, held in Fernald, Ohio. This meeting focused on the Fernald cleanup progress. Each project manager reported the progress for Silos, Waste Pits, Decontamination and Demolition, Soil and Disposal Facility, Aquifer and Wastewater, as well as Waste Management. In this meeting, Beierle's first social goal for citizen participation was advanced. DOE listened to the citizens' comments.

The way FCAB, FRESH, FHES, and DOE incorporated citizens' input into decisions was by listening to their voices and revising the Stewardship Plan based on their input.

Goal 2: Improving the substantive quality of decision

The most useful method to improve the substantive quality of decisions is to conduct education outreach for citizens, such as workshops and public meetings. By doing this, citizens can learn and obtain more information and become more knowledgeable about environmental concerns. Another way to improve the quality of decisions is by attending meetings. By attending the meetings, citizens indirectly learn

how the decision-making processes works. Thus, citizens can fully understand what the problems are and what is going on in their area of interest. When citizens get involved in the meetings and express their opinions, the substantive quality of the resulting decisions should improve. There is an example of how citizens retained their opinion to have their clean area when they discussed the restoration projects that were being implemented. It showed that citizens understood what the contractor did for the restoration projects.

It is indicated that this goal has been met with Beierle's social goal for citizen participation.

Goal 3: Resolving conflict among competing interests

There were differences of opinion about specific items between citizens and the FCAB, such as whether to bury the low-level waste on the Fernald site. The decision to store low-level waste on-site (95%) was made to save money, even though citizens were opposed to this decision. Despite the opposition, the DOE and the contractor argued that on-site disposal of low-level waste posed no risk to human health and the environment, but citizens were still unconvinced.

Another item discussion at the FCAB, FRESH and DOE Public Briefing meetings was the plan to have trails on the Fernald site. Some citizens objected to this plan, reasoning that if DOE stored waste on-site, those using the trails may be at risk. Based on the interview with one member of the operator group, the purpose of the trails is to preserve the environment and educate people. By bringing people to the site and education center, citizens can learn about the areas of the Native American, of the Cold War, and of the cleanup process history (Interview, March 7, 2003).

There are several stewardship issues which did not reach resolution and need more discussion, such as DOE's obligations to conduct long-term surveillance and monitoring of the site (Minutes of Meeting, January 22, 2003). However, FCAB listened to the citizens' input. FCAB even provided a minority opinion in the recommendations to give added voice to these dissenting opinions. Citizens appeared satisfied that FCAB provided "Minority Opinions" in the recommendations.

Based on the discussion, it indicates that this goal has been partially met with Beierle's third social goal for citizen participation.

Goal 4: Building trust in institutions

FCAB made an effort to build trust with citizens by listening to their input, working together and having a good relationship, and being consistent in decisions. In the past, there was little trust of the government agencies involved at Fernald because citizens felt they were not listened to. It took many years for the government to build trust by ensuring citizens that the government would listen to their voices. In order to make sure that the government listened to them, citizens established a group and became actively engaged in monitoring the cleanup process. These groups wanted to make sure the government understood their concerns and would serve the citizens' interests.

Even though citizens still do not completely trust the government agencies, the writer believes the level of trust has improved because when the president of FRESH and a resident were asked, they said the FCAB, DOE and government agencies at least listen to citizens' input. Perhaps the best ways to build the trust of citizens would be to hold monthly meetings, like FCAB, and to hold frequent public meetings. From those events,

citizens could get a sense of whether or not their voices and opinions were really heard and included in the decisions by FCAB and other governmental agencies.

Based on my observation, FCAB's effort to build trust in the institutions has been improved. This met with the fourth of Beierle's social goals for citizen participation because trust has been developed between the citizens and governmental agencies.

Goal 5: Educating and informing the public

The FCAB's efforts to educate and inform citizens have worked well. FCAB has held a series of large public workshops and public meetings, and has provided information, such as the Fernald fact sheets, newsletters, reports and video tapes. In addition, DOE and Fluor have a library called "The Public Environmental Information Center" (PEIC). They have also provided information on a website. The efforts of FCAB, DOE and Fluor suggest that this goal has been substantially met.

5.3. Results

By using Beierle's social goals for citizen participation, it was found that citizen participation in the Stewardship Plan process at Fernald has been effective. The interviews and observations suggest that four of Beierle's five social goals have been met as part of the Stewardship Plan process.

Beierle's five social goals for citizen participation are as follows:

Goal 1- Incorporating public values into decisions

This goal has been met because the Fernald Citizen Advisory Board (FCAB) has developed consensus and solicited citizens' input into decisions.

Goal 2 – Improving the substantive quality of decisions

This goal has been successfully met because citizens have been actively involved in making decisions in the meetings and they have attended a series of workshops.

Goal 3 – Resolving conflict among competing interests

This goal has not fully been met because the conflict has not been resolved in the specific items. FCAB listened to citizens' opinions and used "minority opinions" to acknowledge dissenting opinions.

Goal 4 – Building trust in institutions

This goal has been improved. However, some citizens do not agree on all specific elements of the Stewardship Plan, such as development of trails and the on-site waste disposal.

Goal 5 – Educating and informing the public

This goal has successfully been met because FCAB has held the public meetings and a series of workshops. In addition, FCAB has provided Fernald fact sheets, video tapes, newsletters, and reports or documents as well as an established library and website.

5.4. Key Components for Advancing Beierle's Social Goals for Citizen Participation

In this assessment of the effectiveness of citizen participation at the Fernald site, the writer has prepared **Table 1** showing the key components of the Fernald Stewardship Plan process for advancing Beierle's social goals for citizen participation. Table 1 is based on the result of interviews and meeting observations.

Table 1: Key Component from the Fernald Stewardship Plan Process for Advancing Beierle's Social Goals for Citizen Participation

No.	Social Goals for Citizen Participation	Key Components of the Stewardship Plan Process	Result based on the research
1.	Incorporating public values into decisions	Discussion of the different opinions Development of a consensus Soliciting citizens' input into decision Revising the Stewardship Plan	This goal has been met because the Fernald Citizen Advisory Board (FCAB) has developed consensus and solicited citizens' input into decisions.
2.	Improving the substantive quality of decisions	Attending the meetings Holding educational outreach, such as workshops, and providing technical information	This goal has been successfully met because citizens have been actively involved in making decisions in the meetings and they have attended a series of workshops.
3.	Resolving conflict among competing interests	Holding the meetings Listening to citizens' opinion Discussing the problems and find solutions Providing minority opinion in the recommendation for dissenting opinions	This goal has not fully been met because the conflict has not been resolved in the specific items. FCAB listened to citizens' opinions and used "minority opinions" to acknowledge dissenting opinions.
4.	Building trust in institutions	Listening to the citizen's voice Working together with citizens Building good relationships Being consistent with the decision Serving the citizens' interests Understanding citizens' concerns Establishing a citizens' group	This goal has been improved. However, some citizens do not agree on all specific elements of the Stewardship Plan, such as development of trails and the on-site waste disposal.
5.	Educating and informing the public	Holding the meetings, public meetings, workshops Providing Fernald fact sheets, video tapes, newsletters, reports or documents Establishing a library and website	This goal has successfully been met because FCAB has held the public meetings and a series of workshops. In addition, FCAB has provided Fernald fact sheets, video tapes, newsletters, and reports or documents as well as an established library and website.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1. Conclusion

This study examined the role of citizen participation in the cleanup at the U.S. Department of Energy's Feed Materials Production Center and how this citizen participation has affected the Stewardship Plan for remediation of environmental contamination and future use. For accomplishing this, the writer applied Beierle's concept of social goals for citizen participation. The timeframe covered by this study was from 1999-2003 when the long-term stewardship planning process was initiated.

Based on the findings it was determined that the role of citizen participation in the Stewardship Plan's environmental decision-making has been effective. Citizens have been actively involved during the planning for remediation activities. DOE and its contractor are continuing activities to cleanup the site, with expected completion by 2006. Fernald's contractor has produced a series of briefing sheets that describe the issues being addressed at the site and each of the remediation projects underway. **Appendix 2** includes a summary of the remediation efforts that are expected to be entirely finished by 2006.

However, the FCAB has recognized that Fernald citizens will continue to play an important role in the management of the site because the citizens will manage and maintain the site for its future use after the remediation activities are complete. To meet this expectation, the citizens need ongoing access to valuable information concerning the site. To maintain the integrity of the remediation and restoration projects, and to ensure protection of human health and the environment for many generations to come, DOE and

citizens must work together to build a future that will sustain citizen awareness of the site and its history. To accomplish this end, the FCAB held a series of public workshops to provide the citizens with needed information.

It was not easy to evaluate the success or failure of the role of citizen participation in environmental decision-making processes. However, the writer concludes that citizen participation has been successful at the Fernald site for the following reasons:

1. The Fernald Citizen Advisory Board (FCAB) allowed citizens to play a role in creating the environmental policies that affected them. Citizens have been allowed to express their opinions and criticize what the Department of Energy (DOE) has done or has planned to do for the site's remediation and future use. Even though DOE and some citizens may not always agree, at least the dissenting opinions are put in a minority opinion.
2. The FCAB employed a technical consultant to help them organize and manage their use of information and decision-making. Whenever necessary, the technical consultant became a facilitator.
3. The citizens have been actively involved in the process of environmental decision-making. The president of Fernald Residents for Environmental, Safety and Health (FRESH) has added much needed experience and proven leadership skills as an environmental activist and organizer. She has actively organized local citizens over health, safety, and environmental issues at Fernald since 1984.
4. FCAB, FRESH, F-HES (Fernald Health Effects Subcommittee), the Living History Project and DOE have developed a trusting and effective relationship. They meet together to facilitate the exchange of information.

This conclusion is based on the results of the interviews and observations. The responses indicated that Beierle's social goals for citizen participation have been successfully achieved through the Stewardship Plan process. By looking at the given responses, it can be said that most respondents agreed citizen participation has played an important role in the Stewardship Plan process, even though some issues of conflict have yet to be resolved, and probably will not be resolved until the remediation activities are complete.

It is clear that citizens have had a substantial affect on the Stewardship Plans for the remediation of environmental contamination and future use at Fernald site (See **Figure 5-7, and Table2**).

6.2. Recommendations

Even though the FCAB has undertaken a study to identify the actions that are necessary to ensure public access to information during the long-term stewardship of the Fernald site, the writer has the following recommendations for Fernald:

1. The citizens' access to future information must be assured. Citizens should have access to user-friendly technical information, such as that provided on the Fernald website. The education center with related documents and other materials should remain intact so that people can learn about the site's history and plans for the future.
2. The communication between the citizens and the DOE at Fernald must continue to improve, so citizens will be more trusting of the government agencies. To accomplish this, the DOE must continue to listen to citizens' voices, improve the relationships,

work together, serve the citizens' interest, and be consistent with the decisions. It is important that citizens trust the government agencies designated to serve them.

Ultimately, citizens will do whatever is necessary to protect their health and the environment. Government agencies that are responsible for protecting the health of residents and the environment have a choice. They can earn the trust, respect and cooperation of citizens by making them full partners in decision-making. Alternatively, they can create suspicion, mistrust and opposition by excluding citizens from decision-making. In terms of producing desired results, the first approach is more successful. It is fortunate that the stewardship plan process at Fernald has sought to use the first approach.

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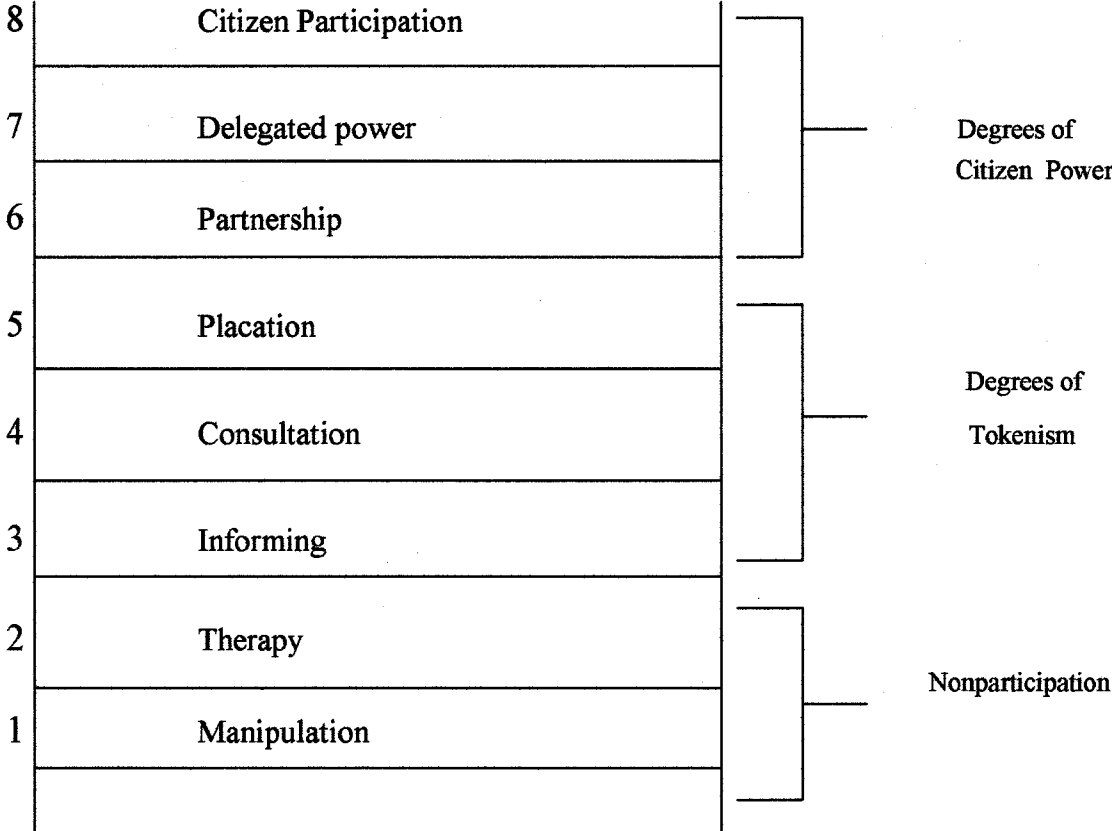
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visited 10/04/2002.

<http://www.fernaldcab.org/> (Fernald Citizens Advisory Board), visited 10/04/2002

FIGURES AND TABLES

Figure 1: Eight Rungs on Ladder of Citizen Participation



Source: Sherry R. Arnstein

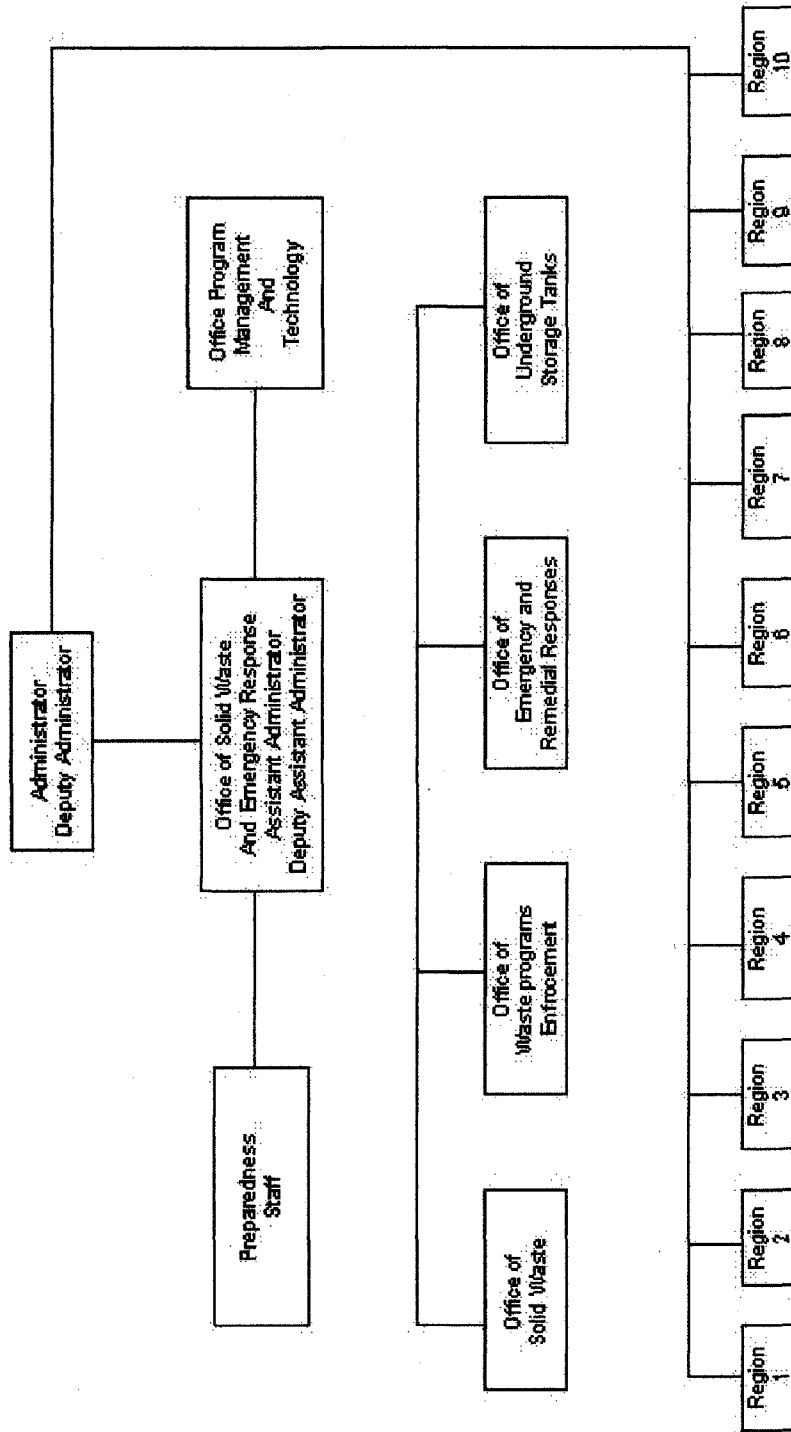
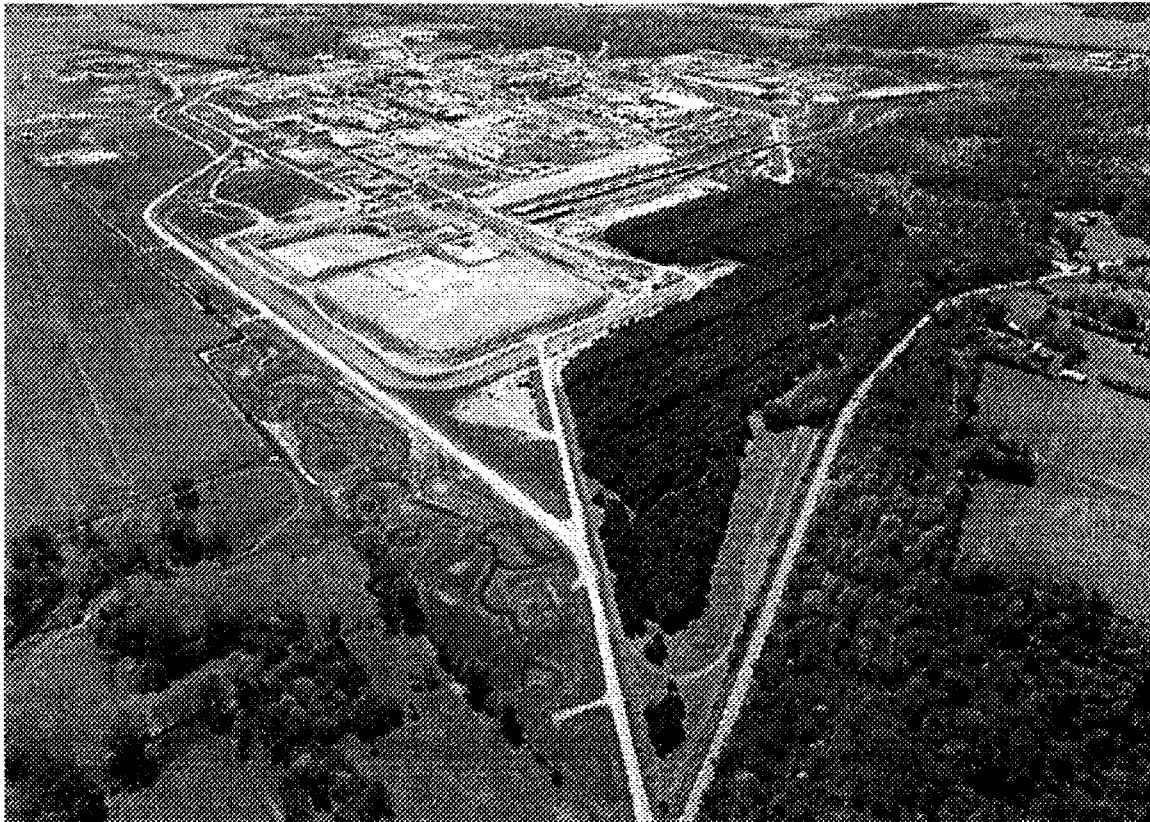


Figure 2: EPA Superfund Organization

Source: Christine Jolly, 1996

Figure 5: Future of Fernald

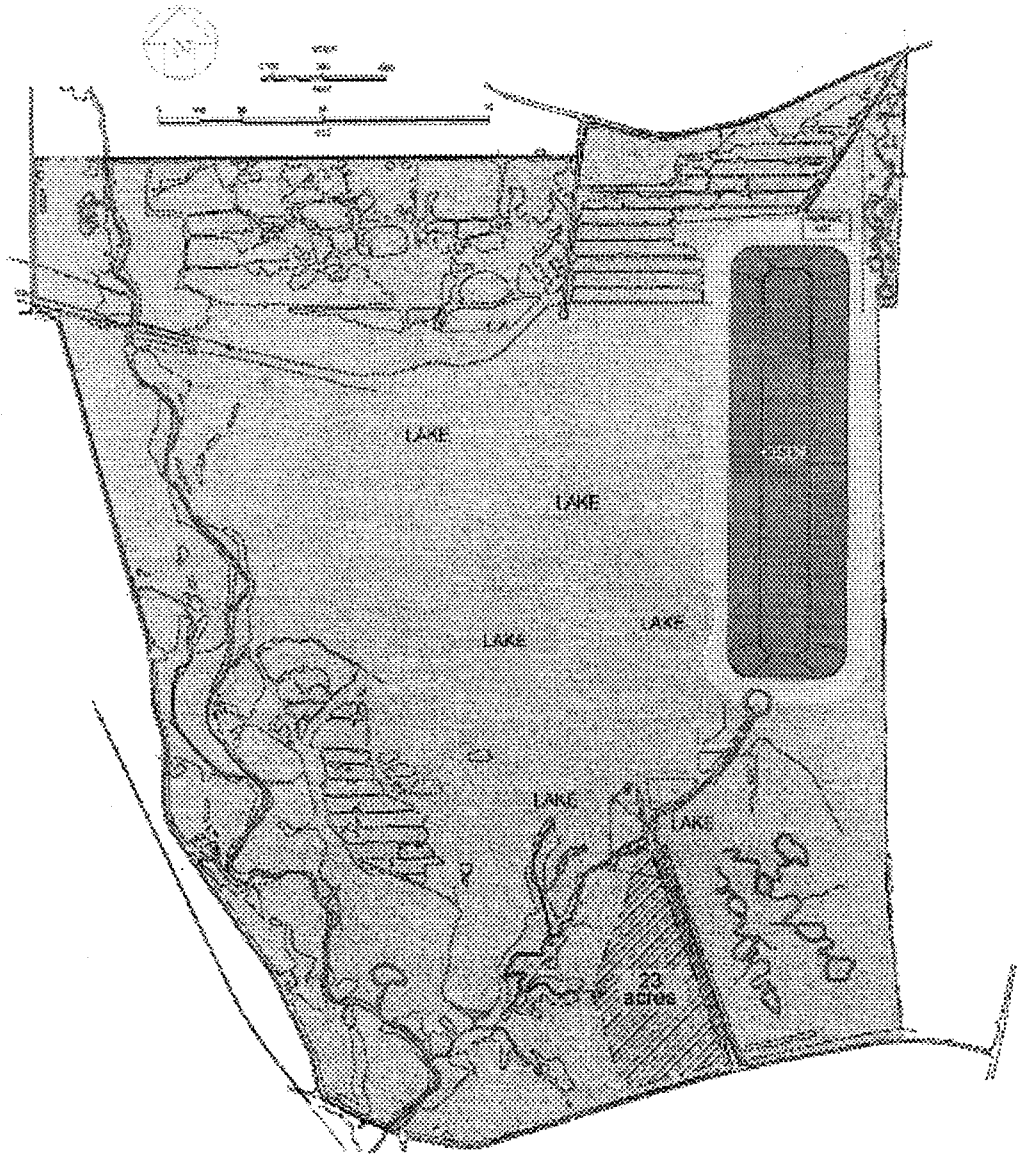


Fernald develops new wetlands, forests and savanna ecosystem.



Source: www.fernald.gov/Future/Future.htm

DOE and its cleanup contractor, Fluor Fernald, have been working closely with the community and regulators to plan for the future when site closure is complete.

Figure 6: Stewardship Requirements at Fernald

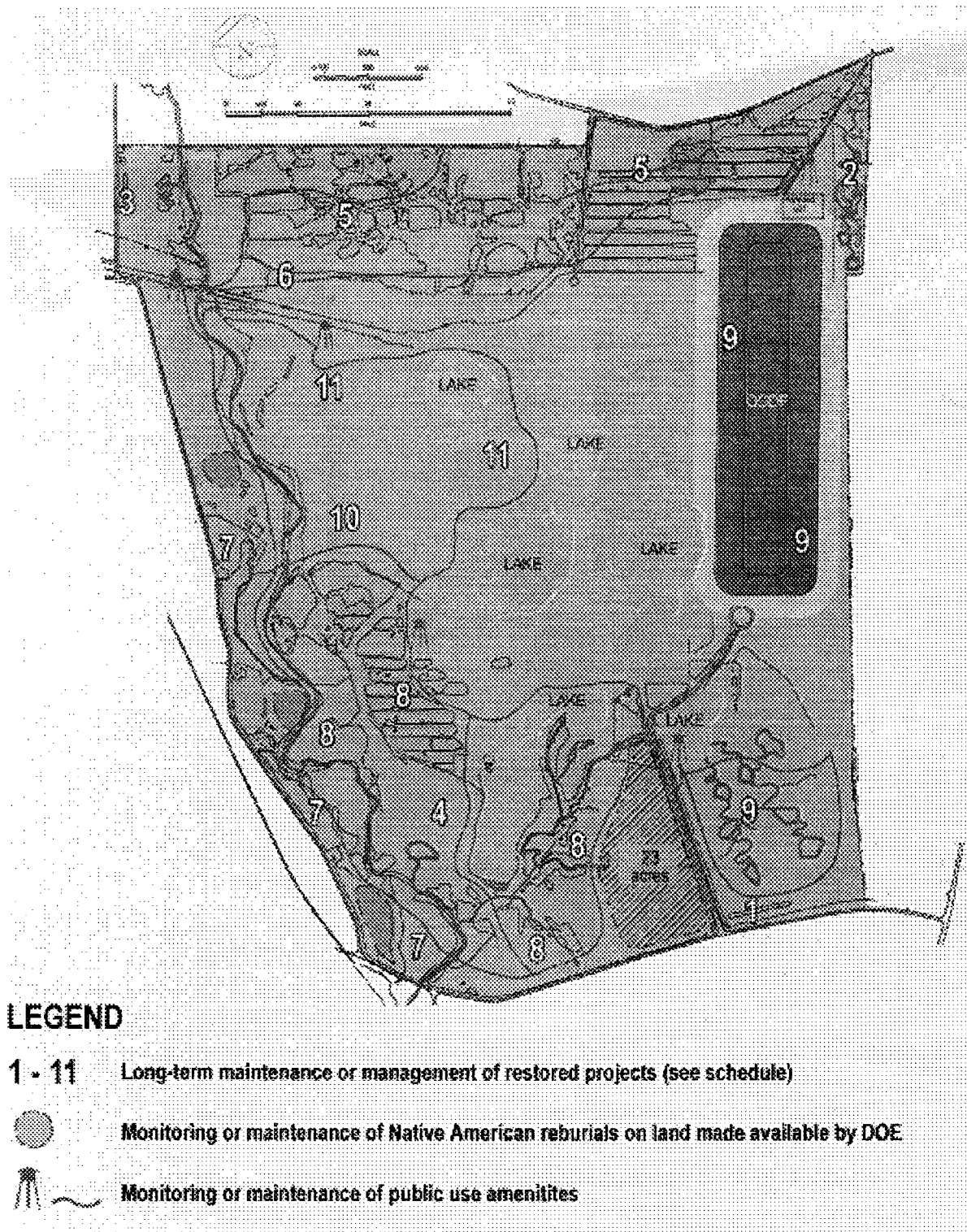


LEGEND

-  Perpetually monitor and maintain the OSDF
-  Perpetually monitor and maintain institutional controls

Source: DOE, March 2003

Figure 7: Activities outside DOE's LTS Scope



Source: DOE, March 2003

Table 2: Restoration Projects Schedule

Map Location	Restoration Project	Fiscal Year to Complete	Acres Restored
1.	Aesthetic Barrier	1998 Complete	1
2.	Wetland Mitigation	2000 Complete	12
3.	Demonstration Forest Project	2001 Complete	18
4.	Southern Waste Unit	2003 In Process	30
5.	Northern Pines/Woodlot	2004 In Process	186
6.	Wetland Mitigation Phase II	2004 In Design	10
7.	Paddys Run West	2005 In Design	120
8.	Paddys Run East	2006	128
9.	OSDF/Borrow Area	2006	190
10.	Silos Area	2007	10
11.	Production/Waste Pit Area	2007	190

Source: DOE, March 2003

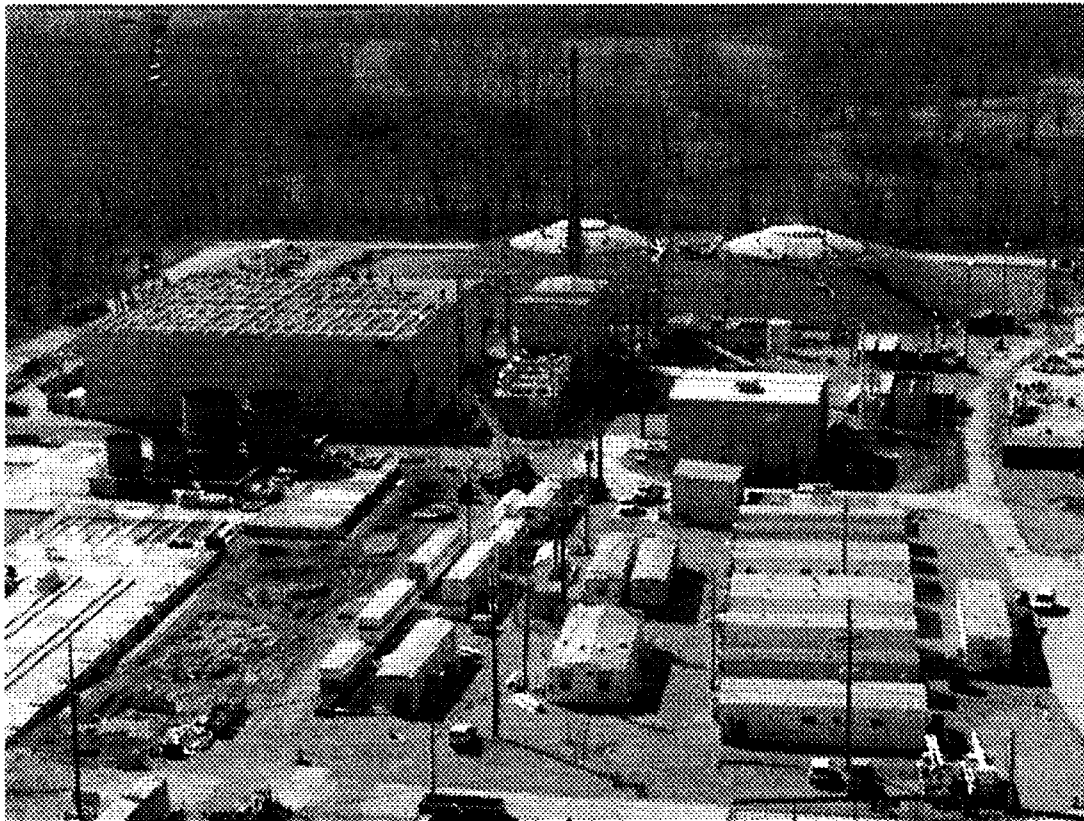
APPENDECIES

Appendix 1: List of Interviews

- Bierer, Jim, FCAB chair. 2003. Interview by author, March 21, Cincinnati, Written notes. Telephone interview, Cincinnati.
- Crawford, Lisa, President of FRESH. 2003. Interview by author, March 13. Fernald. Tape recorded. Fernald.
- Jablonowski, Gene, U.S. EPA. 2003. Interview by author, March 25, Cincinnati. Email. Cincinnati.
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- Sarno, Douglas J., Principal of Perspectives Group. 2003. Interview by author, March 15. Tape Recorded. Fernald.
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- Wagner, Jeffrey A. Director, Public Affairs, Fluor Fernald, Inc., Fernald. Interview by author, March 15. Tape Recorded. Fernald.
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Appendix 2: Summary of Remediation Efforts scheduled to be completed by 2006

Silos 1 and 2 (Project Completion – 2006)



After the completion of the Radon Control System, workers have turned their attention to the construction of the treatment facility that will be used to process the Silos 1 and 2 waste for off-site shipment and disposal.

Source: www.fernald.gov/Cleanup/Silos1-2.htm

Work scope

- Remove 8,900 cubic yards of high activity low-level waste from two concrete silos
- Chemically stabilize waste and ship off site for disposal

Cleanup Remedy

- Record of Decision signed in December 1994
- Record of Decision Amendment for Operable Unit 4 Silos 1 and 2 Remedial Action approved in July 2000.
- Remove waste using sluice and pump process
- Stabilize waste to reduce leachability and decrease moisture content, package and ship off site for disposal

Status

- Project – 12 percent complete (design 100 percent complete)
- Accelerated Waste Retrieval Subproject – 55 percent complete
- Jacobs performing engineering and Fluor Fernald performing project management, construction management and operations.

2006 Strategy

- Use commercial design-build approach to integrate project activities and accelerate schedule by 18 months
- Implement a detailed constructability process to maintain required coordination of efforts.
- Revise design to increase operating flexibility and reduce downtime
- Develop backup options for transportation and disposal

Silo 3 (Project Completion – 2005)

Work scope

- Remove 5,100 cubic yards of low-level waste from one concrete silo
- Ship waste off site for disposal

Status

- Project – 17 percent complete (design 100 percent complete)
- Jacobs performing engineering and Fluor Fernald performing project management, construction management and operations.

2006 Strategy

- Prepared Record of Decision Amendment and Revised Proposed Plan to allow for treatment only as required to meet permitted disposal facility's waste acceptance criteria
- Planning for opportunities funding that would allow early completion

Waste Pits Remedial Action Project (Project Completion – 2005)

Work scope

- Remediate the contents of six waste pits, which range in size from a baseball diamond to a football field and vary in depth from 13 feet to 30 feet

- Pits contain low-level radioactive waste byproducts of uranium and thorium processing generated during Fernald's 37-year production mission

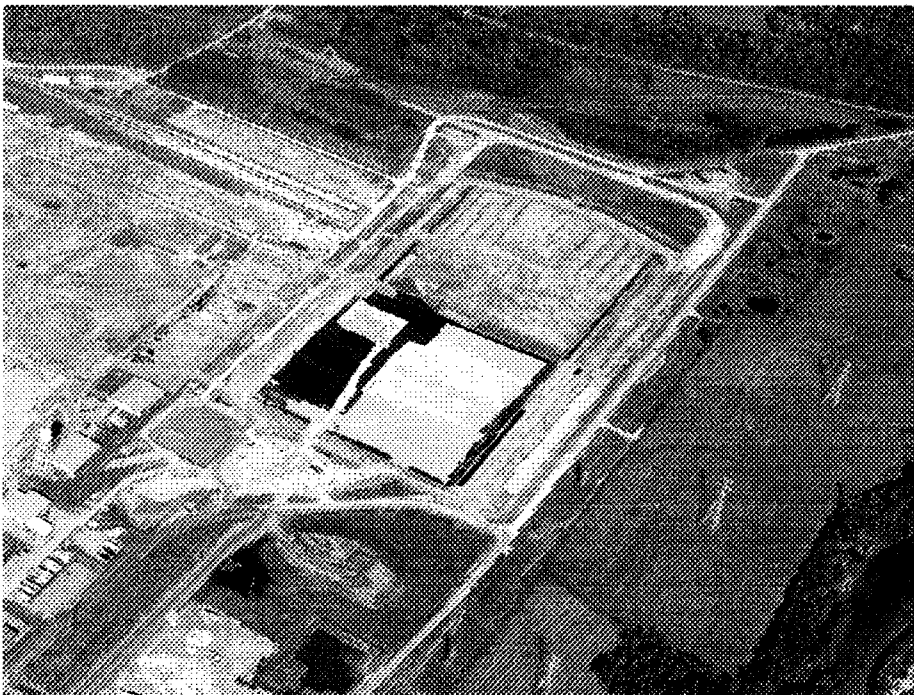
Status

- Project – 60 percent complete
- Shipped 506,636 tons of waste of an estimated 790,000 tons
- Transported 80 unit trains (4,709 cars) to Envirocare of Utah, Inc. for disposal

2006 Strategy

- Operate dryers 24/7 to address increased waste tonnage
- Lease 35 additional railcars bringing the total to 225
- Evaluate plans to reduce number of shipments to Envirocare

Soil and Disposal Facility Project (Project Completion – 2006)



With the completion of Cell 1's cover and the construction of Cells 4 and 5, workers will resume waste placement in Cells 3, 4 and 5 of the On-Site Disposal Facility in the spring.

Source: www.fernald.gov/Cleanup/sdfp.htm

Workscope

- Remediate and dispose of contaminated soil

- Certify site as “clean” and perform substantial natural resource restoration

Status

- Project – 38 percent complete
- Cell 1 – filled and covered
- Cell 2 – filled, final cover under construction
- Cell 3 – 51 percent filled
- Cell 4 – 9 percent filled
- Cell 5 – 3 percent filled
- Over 1.1 million cubic yards of contaminated soil have been excavated and dispositioned
- Over 54 percent of the site is certified “clean”
- Completed four natural resource restoration projects

2006 Strategy

- Adopt a self-perform approach to work execution
- Resequence work with more parallel activities
- Greater integration with D & D and Waste Pits projects
- Add Cell 8 to accommodate scope increase

Decontamination and Demolition Project (Project Completion – 2006)

Work Scope

- Dismantle 223 former production plants, support structures and associated components

Status

- Project – 53 percent complete
- Dismantled 119 structures
- Completed Safe Shutdown in March 1999, two years ahead of schedule and \$7 million under budget
- Current activities focused on D & D of Plants 2/3, 8, General Sump, Pilot Plant and the Analytical Laboratory

2006 Strategy

- Add additional work crews, safety personnel and equipment
- Expedite demolition of structures

Aquifer Restoration and Wastewater (Project Completion – 2006)

Work scope

- Remediate contaminated portions (approximately 170 acres) of the Great Miami Aquifer, one of the largest sole-source aquifers in the nation
- Treat stormwater and wastewater resulting from site remediation activities

Status

- Project – 64 percent complete
- Extracted more than 11.7 billion gallons of water from the aquifer since 1993
- Treated more than 6.9 billion gallons of water
- Removed more than 4,450 pounds uranium from aquifer since 1993
- Successfully using re-injection well technology to speed aquifer remediation

2006 Strategy

- Continue aggressive cleanup of the aquifer while weighing options to reduce water treatment infrastructure

Waste Management Project (Project Completion – 2003)

Work Scope

- Characterize, sample, package and dispose of low-level radioactive, hazardous and mixed waste site inventories
- Provide sitewide support for waste planning and off-site shipping
- Emphasize waste minimization, recycling or reuse wherever practical

Status

- Project – 96 percent complete
- Shipped 6.4 million cubic feet low-level waste to the Nevada Test Site for disposal – 98 percent complete

- Shipped 163,912 of 188,972 gallons low-level liquid mixed waste off site for incineration – 87 percent complete
- Transferred 345,431 of 508,500 cubic feet low-level waste to WPRAP – 68 percent complete
- Transferred 545,691 of 712,000 cubic feet low-level waste to OSDF – 77 percent complete
- Shipped 16,470 of 33,721 cubic feet low-level mixed waste off site for treatment – 49 percent complete
- Approximately 13,700 containers remaining in inventory
- Continue characterization, visual inspection and packaging of uranium waste

2006 Strategy

- Disposition all containerized waste on Plant 1 Pad by June 2003
- Maximize disposition paths for low-level waste
- Pursue off-site treatment of mixed waste and low-level waste

Nuclear Materials Disposition (Project Complete – 2002)

Work Scope

- Characterize, package and ship nuclear materials off site

Status

- Project – 100 percent complete
- Dispositioned 31 million pounds of nuclear product through:
 - Transfer to other DOE sites for programmatic use
 - Sale to private sector
 - Transfer to Portsmouth Facility for interim storage under DOE's Uranium Facility Management Group (9.1 million net pounds transferred since June 1999)
 - Burial of Department of Defense materials off site

Commitment to the Community

Work Scope

- Provide opportunities for public participation in Fernald's decision-making process

- Inform stakeholders of cleanup progress and long-term stewardship issues that will affect the site and community after cleanup
- Give back to the community through volunteerism, corporate donations and outreach

Status

- In 2002, DOE and Fluor Fernald conducted seven Cleanup Progress Briefings and participated in numerous community meetings on many different topics
- Envoy provided two-way communication to public on cleanup progress and post-closure issues
- Regulators and stakeholders accepted DOE's proposed future public use plan, that allows limited public access for educational purposes
- Fernald Community Involvement Team donated more than 2,000 hours to community service projects which included Wish Tree, Habitat for Humanity, Backpack Basics and New Beginnings
- The Fluor Foundation and Fluor employees contributed nearly \$315,000 to the community through United Way, scholarships and corporate donations
- Employees reached more than 11,000 people through educational programs, tours and speaking engagements

2006 Strategy

- Monitor site cleanup and closure and finalize long-term stewardship and other post-closure issues.

Appendix 3: FERNALD CITIZEN TASK FORCE GROUND RULES

A. TASK FORCE OPERATIONS

The affairs of the Task Force will be conducted according to its Charter, the Interim Report of the Federal Facilities Environmental Restoration Dialogue Committee (February 1993), and these Ground Rules. In case of conflicts, the Charter is controlling.

B. MEMBERSHIP

- 1. Personal membership.** While the membership of the Task Force is intended to represent a variety of stakeholders in the Fernald restoration, membership in the Task Force is personal and not representative. Members may not vote by proxy, and attendance and other requirements of membership cannot be satisfied by substitutes.
- 2. Attendance.** Attendance at regular and special meetings is required of members of the Task Force. Except for emergencies or other compelling circumstances (as determined by the Chair), a member who misses either three consecutive meetings or five meetings over a twelve-month period shall be deemed to have resigned. Attendance ordinarily means the entire length of a meeting.
- 3. New members.** The Task Force shall be continuously attempt to identify stakeholders not represented on the Task Force. The Task Force shall recommend to U.S. DOE's Assistant Secretary of Environmental Restoration and Waste Management the appointment of new members as necessary. The Chair of the Task Force may appoint a committee to find and interview candidates for membership.
- 4. Ex officio.** In some cases, potentially responsible parties (PRPs) from the private sector that are directly involved in or affected by site cleanup activities could be added as ex-officio (non-voting) members at the discretion of the Task Force.

C. MEETINGS

- 1. Regular and special meetings.** The Task Force intends to hold regular monthly meetings. The chair of the Task Force will schedule monthly meetings and may schedule additional special meetings with notice to all members.
- 2. Notice.** Except in emergencies, the chair shall give notice of special meetings by mail or by telephone at least seven days in advance. Notice shall include the time, place, and subject of the meeting.

3. **Agenda.** An agenda for regular monthly meetings shall be provided to all members in advance of the meeting. The agenda shall include at least the time and place of the meeting, the topics to be covered, identification of relevant documents, and the times and places of non-Task Force meetings of importance.
4. **Public Participation.** The public shall be informed of the time, place, and subject of all public meetings of the Task Force, and the public shall have an opportunity to participate in public meetings, in the manner deemed most appropriate by the chair or by the Task Force.

Adopted October 14, 1993.

Appendix 4: Summary of the Results of Interviews

Group 1: Resident Stakeholders

Respondent 1: The Fernald Citizens Advisory Board (FCAB)

Respondent 2: The Fernald Residents for Environment, Safety and Health (FRESH)

Respondent 3: Resident (member of FRESH, but not representing FRESH)

Group 2: Regulators

Respondent 4: The U.S. Environmental Protection Agency (USEPA)

Respondent 5: The Ohio Environmental Protection Agency (OEPA)

Group 3: Technical Experts

Respondent 6: The Department of Environmental Health, University of Cincinnati

Respondent 7: The Perspectives Group, Alexandria, Virginia

Group 4: Operators

Respondent 8: The U.S. Department of Energy (DOE)

Respondent 9: Fluor Fernald (Local Site)

Table 1: Citizen Stakeholder Group

No.	Question	Respondent
1.	Was the conflict that was present at the beginning of decision-making process resolved by the end?	1. Agreed. The “Minority Opinion” was provided. 2. No, the conflict was still in discussion. 3. No, the conflict did not come to an end yet.
2.	How did the citizens come up with innovative ideas or creative solutions to problems?	All (1-3) said this could be done by attending the FCAB meetings.
3.	Did citizens improve the technical quality, the environmental benefits, or other aspects of a decision? If so, please explain.	All agreed. Citizens attended the workshops and technical forums.
4.	Did citizens learn enough about the issue to actively engage in decision-making?	All agreed. Citizens were actively engaged in the decision-making.
5.	Was educational outreach effective to the citizen? How and why?	All agreed. It could be done by attending a series of large public workshops so citizens better understood what was going on at the site.
6.	Has the FCAB established processes and procedures?	All agreed. The FCAB has a Charter and established Ground Rules.
7.	Did the FCAB contribute to a constructive working relationship among the participants?	All agreed. The FCAB, FRESH, the Living History Project, the Health Effect Subcommittee and Stewardship Plan Group came together in one meeting once a month.
8.	Did the FCAB strive for consensus?	All agreed. The FCAB strived for consensus.
9.	Did the FCAB give fair consideration to dissenting opinions?	All agreed. The dissenting opinions went to the minority support.
10.	Did the FCAB respond to inquiries and comments about its decisions?	All agreed. The FCAB responded to inquiries and comments about its decisions.

The respondents felt that citizens participated actively in the Stewardship Plan decision-making process. By attending the meetings and the workshops, the citizens better understood how to solve environmental problems and learned how to make decisions. Indirectly, citizens learned about the planning processes. Despite the positive feeling about the citizen participation process, two of three of the respondents felt the original conflict had still not been resolved.

Table 2: The Regulator Group

No.	Question	Respondent
1.	How much influence have citizens had on the decision making at Fernald?	4. Citizens had a fairly significant influence in the decision making. 5. Citizens had a huge role influencing the decision making.
2.	Did stakeholders improve decisions through creative problem solving, innovative ideas, or new information? And how was that done?	Both agreed. The "Cleanopoly" game allowed citizens to visually understand the balance of waste streams and disposition options at the Fernald site.
3.	Did trust of agencies change over the period of decision making? How?	Both agreed. They believed that a fair level of trust changed positively over the period of decision making.
4.	Have the decisions or recommendations made by stakeholders led to actions that were more or less cost-effective than a probable alternative in solving an environmental problem? How?	Both agreed. Money was saved by using the "balanced approach."
5.	Did you feel the citizens were effective participants in the cleanup decision process? If yes, explain why and how?	Both agreed. The local citizens were the ultimate end users from the area and have been effective by providing ideas and visions in both cleanup and the long-term stewardship plan.
6.	Did the regulators make important contributions to the board's work? If yes, how?	Both agreed. They proposed and discussed the current situation and their perspective on the cleanup status.
7.	How did you reach agreement about prioritization of key site issues?	4. They achieved consensus on their decisions and provide their recommendations. 5. FCAB, DOE and Flour had strategy meetings to discuss what the top priorities were to do over the next year.
8.	How did you help define site problems?	4. Site problems were defined through CERCLA. 5. By looking at the plans and field work, site problems were defined also through the meetings.
9.	Do you think the FCAB has improved DOE's site decision?	Both agreed. The FCAB has improved DOE's site decision.
10.	How did DOE discuss with the board important policies that affect site decisions?	Both agreed. They discussed openly in most cases.
11.	Do you think the decision making process by DOE at (a particular) site was effective in furthering site cleanup? Explain.	Both agreed. 4. The decision-making process is ultimately CERCLA-based with stakeholder outreach beyond what is required by policy/ law. 5. The decision-making process is effective now compared to the early nineties.

12.	Do you think DOE paid attention to the FCAB's advice on key site issues?	Both agreed. DOE paid attention to the FCAB's advice on key site issues.
13.	Was DOE committed to cleaning up the site?	Both agreed. DOE was committed to cleaning up the site.

For this part, most respondents came up with the agreement that the citizens' ideas had influenced the plan for remediation of the environmental contamination at the Fernald site. The operator group believed citizens had influenced the decision making process at Fernald.

Table 3: The Technical Expert Group

No.	Question	Respondent
1.	What is the impact of released uranium on human health and the environment?	6. It can cause lung cancer. The aquifer became contaminated by uranium.
2.	How should uranium contamination be handled?	6. Uranium contamination should be handled by doing cleanup and taking the waste out of the silos. The silos should be covered.
3.	Do you feel the citizens have been effective participants in the cleanup decision process? Why?	Yes, both agreed. Part of the Stewardship Plan is based on citizens' input.
4.	When did the board decide to have a consultant? Why?	7. The board was established in 1993 to manage and focus the meetings.
5.	What was the consultant's responsibility?	7. To make sure that the stakeholders had the right information to design their dialogues, discussions, and processes, and also to facilitate their work.
6.	Do you think a consultant had an important role in citizen participation? Why?	7. Yes, agreed. Consultant should be facilitator and mediator whenever necessary.
7.	Do you think citizen participation had an important role in the decision-making process? Why?	7. Yes, agreed. Part of the Stewardship Plan was based on citizens' input.

The respondent from the Department of Environmental Health at the University of Cincinnati stated that the released uranium has had an impact on human health and the environment. The released uranium could cause lung cancer and an aquifer to become contaminated.

The respondent from the Perspective Group agreed that the consultant has had an important role in helping the FCAB to make sure that the stakeholders had the right information they needed to design their dialogue and discussion processes, and to facilitate their work.

Table 4: The Operator Group

No.	Question	Respondent
1.	What did you do to prevent the health risks associated with working with uranium contamination?	They followed the standard guidelines for personal protective equipment.
2.	What did you expect for the future for the Fernald site?	They expected the projects can be completed by 2006.
3.	Do you feel the citizens have been effective participants in the cleanup decision process? Why?	Both agreed. Citizen participation can influence the cleanup decision process.
4.	Did the FCAB contribute to trust and confidence in DOE? Why?	Both agreed. 4 He believed that FCAB's decisions were carried out by DOE. FCAB trusted DOE to look at their interests. 5 The stakeholders came to know DOE and developed a level of trust in phases. Individuals were treated not as representatives as a larger institution.
5.	How have the relationships between DOE and the public improved since the formation of the board?	The relationships have improved through a discussion of the issues.

The result of interviews indicated how to prevent the health risks associated with working with uranium contamination and what the respondents expect for the future of the Fernald site. The responses showed that the DOE and the Contractor followed the standard guidelines for personal protective equipment and they expect the cleanup projects to be completed in 2006.

Based on the responses, those interviewed believed that citizen participation has been successful in the development of the Stewardship Plan at the U.S. Department of Energy's Feed Materials Production Center. Overall, the responses indicated that citizen

participation has played an important role in influencing the plans for the remediation of environmental contamination and future use of the U.S. Department of Energy's Feed Materials Production Center. This statement will be supported by the discussion for Beierle's concept of social goals for citizen participation in the next discussion.

Discussion of Beierle's concept of social goals for citizen participation

This section discusses the results from interviews that are related to Beierle's concept of social goals for citizen participation. The five social goals for citizen participation are:

Goal 1: Incorporating public values into decisions

Goal 2: Improving the substantive quality of decisions

Goal 3: Resolving conflict among competing interests

Goal 4: Building trust in institutions

Goal 5: Educating and informing the public

Questions asked in the research were structured to evaluate Beierle's concept of social goals for citizen participation.

There are five tables that have questions corresponding to each of the five social goals for citizen participation.

Table 5: Goal 1 – Incorporating public values into decisions

No.	Question	Respondent
1.	How much influence have citizens had on decision making at Fernald?	4 & 5. Citizens have played a huge role influencing the decision making. Part of the Stewardship Plan was based on citizens' input.
2.	Did the FCAB respond to inquiries and comments about its decision?	1, 2, and 3 agreed. The FCAB responds to inquiries and comments about its decision.
3.	How did DOE discuss with the board important policies that affect site decisions?	4 and 5. In most cases, they discussed openly.
4.	How did regulators reach agreement about the prioritization of key site issues?	4. They achieved consensus on their decisions and provided their recommendations. 5. FCAB, DOE and Flour had strategy meetings to discuss what the top priorities to get done for the next year.
6.	How did regulators help define site problems?	4. Site problems were defined through CERCLA. 5. By looking at the plans and the field works, site problems were defined also through the meetings.
7.	Did regulators think the DOE should pay attention to FCAB's advice on key site issues?	4 and 5 agreed. DOE should pay attention to the FCAB's advice on key site issues.
8.	Was DOE committed to cleaning up the site?	4 and 5 agreed. DOE was committed to cleaning up the site

The respondents stated that they solicited the different ideas of citizens and that they believed citizens' input helped the decision-making process come to agreement. This indicated that the first of Beierle's social goals for citizen participation has been met.

Table 6: Goal 2 - Improving the substantive quality of decisions

No.	Question	Responses
1.	Did citizens improve the technical quality, the environmental benefits, or other aspects of a decision? If so, please explain	1, 2, and 3 agreed. It can be done by attending the workshops and technical forums.
2.	Were stakeholders improving decisions through creative problem solving, innovative ideas, or new information? And how was that done?	4 and 5 agreed. It can be done through the "Cleanopoly" game, which allowed citizens to visually understand the balance of waste streams and disposition options at the Fernald site.
3.	Have the decisions or recommendations made by stakeholders led to actions that were more or less cost-effective than a probable alternative in solving an environmental problem? How?	4 and 5 agreed. They saved money by doing the "balanced approach."
4.	Did regulators think the FCAB has improved DOE's site decision? How?	4 and 5 agreed. This was done by discussing the priorities of which part of the site should be taken care of first. To reach solutions, it took about a year and a half to get a decision for the cleanup. The FCAB has continued to be productive in those areas and the FCAB has developed of consensus.
5.	Do you think that citizen participation has an important role in the decision-making process?	7 agreed. Part of the Stewardship Plan was based on citizens' input.
6.	How did citizens come up with innovative ideas or creative solutions to problems?	1, 2, and 3 said this can be done by attending the FCAB meetings.
7.	Do you feel citizens have been effective participants in the cleanup decision process? If yes, explain why and how?	4, 5, 8 and 9 agreed. The local citizens are the ultimate end users from the area and have been effective by providing ideas and visions in both cleanup and long-term stewardship plan.
8.	Do you think the decision making process by DOE at (a particular) site was effective in furthering site cleanup? Explain.	4 and 5 agreed. 4. The decision-making process was ultimately CERCLA-based with stakeholder outreach beyond what was required by policy/ law. 5. The decision-making process was effective now compared to the early nineties.

The respondents believed that citizens improved the substantive quality of decisions. The responses stated that citizens have been active in the cleanup decision process and it reflected that citizens' input was necessary to make decisions. The technical forums and

having a “good, hard discussion” were cited in improving the technical quality of decisions that directly affected stakeholders. Beierle further asserts (2002, p. 14) that citizens are widely recognized as a source of knowledge and ideas for making-decisions because they know better as to what happened in their area and what they are expecting for their area. This indicated that the second of Beierle’s social goals for citizen participation has been met.

Table 7: Goal 3 - Resolving conflict among competing interests

No.	Question	Responses
1.	Was the conflict that was present at the beginning of the decision-making process resolved by the end?	1. Agreed. The “Minority Opinion” was provided in the recommendations. 2. No, the conflict was still in discussion. 3. No, the conflict did not come to the end yet.
2.	Did the FCAB strive for consensus?	1, 2 and 3 agreed. The FCAB strived for consensus.
3.	Did the FCAB give fair consideration to dissenting opinions?	1, 2, and 3 agreed. The dissenting opinions went to the minority opinion in the recommendations.

Two respondents stated that the conflict would not be resolved until the remediation activities were complete in 2006. In general, citizens agreed with the stewardship plan. However, they did not agree on specific items, such as trails and the waste disposal on-site. Citizens worried that the disposal on site would affect their health and the environment. However, DOE and contractor revealed that the waste disposal on-site was of a low-level contamination and there would be no risk to human health and the environment. FCAB provided the minority opinions in the recommendation for dissenting opinions. Citizens appeared satisfied with the recommendations. Based on the responses, it indicated that the third of Beierle’s social goals has been met partially.

Table 8: Goal 4 - Building trust in institutions

No.	Question	Responses
1.	Did citizens' trust of agencies change over the period of decision making? How?	4 and 5 agreed. They believed there has always been a fair level of citizens' trust of governmental agencies.
2.	Did the FCAB contribute to trust and confidence in DOE?	8 and 9 agreed. FCAB believed that their decisions were carried out by DOE. FCAB trusted DOE to look at their interests.
3.	Has FCAB established processes and procedures?	1, 2 and 3 agreed. The FCAB has Charter and Ground Rules.
4.	Did FCAB contribute to a constructive working relationship among the participants?	1, 2, and 3 agreed. The FCAB, FRESH, the Fernald Living History Project, the FHES and Stewardship Plan Group came together in one meeting once a month.
5.	How have the relationships between DOE and the public improved since the formation of the board?	8 and 9. The relationships have been improved since there have been a number of issues to be addressed and discussed.

The respondents believed that the level of trust between citizens and government agencies is improved now, even though not one hundred percent. In the past years, there was no trust in government agencies because the agencies did not listen to citizens' opinions. It took many years for citizens to be ensured that the government would listen to their voices. In order to make sure that the government listens to them, citizens established a group and actively engaged in meetings. The citizens wanted to be sure their concerns were heard and understood.

The respondents explained that the way to build trust with citizens was to allow them to participate in the decision-making process. They worked together to develop the stewardship plan for future use. This indicated that the fourth of Beierle's social goals for citizen participation has been met.

Table 9: Goal 5 - Educating and informing the public

No.	Question	Responses
1.	Was educational outreach effective to the citizen? How and why?	1, 2 and 3 agreed. Citizens attended a series of large public workshops. Citizens better understood what was going on at the site.
2.	Did citizens learn enough about the issue to actively engage in decision-making?	1, 2 and 3 agreed. Citizens were educated, they had technical information and they knew how the process worked. Citizens felt much more confident about making comments on the issues. Citizens were satisfied with the quality of the decision-making process.

The respondents believed that the knowledge of citizens developed by attending a series of large public workshops. Citizens became better educated and more informed about environmental issues. Increasing citizens' understanding of environmental problems built a capacity for solving those problems.

The discussions above indicated that the fifth of Beierle's social goals for citizen participation has been successfully met. This can be determined by looking at the responses from the respondents. Most respondents agreed that citizen participation has played an important role in the environmental decision-making process.