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FERNALD CITIZENS TASK FORCE TRANSMITTAL OF APPENDICES AND FIGURES

06/30/95

APPLEGATE TASK FORCE
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FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

MEMORANDUM

TO: Task Force Members

FROM: John Applegate

DATE: June 30, 1995

RE: Transmittal of Appendices and Figures

As promised, enclosed are drafts of the appendices, executive summary, and figures. Also included is a draft preface that I would like to include from me. We will discuss the entire report on July 8th. Please bring any grammatical or typographical comments in writing as we may not have time to go through each one at the meeting. See you on Saturday.

P. O. Box 544 Ross, Ohio 45061 513·648·6478

To the Reader:

The report that follows concludes a chapter of the history of the Fernald site. It records the results of a remarkable experiment in public participation in environmental decision making. In the summer of 1993, the Department of Energy, together with its regulators, the U.S. Environmental Protection Agency (Region V), and the Ohio Environmental Protection Agency, convened the Fernald Citizens Task Force to make detailed recommendations on the central issues posed by the remediation of the Fernald Environmental Management Project. Two years later, the task force has reached consensus (and in nearly all cases unanimity) on those issues. Since the consensus process included the Department and its regulators, the task force's recommendations in effect provide an outline for the near-term and in some areas the long-term future of the Fernald site. This in turn should enable the Department to move forward decisively to remediate the site and to return much of it to locally beneficial uses.

The success of the task force process can be attributed to many factors, but I want to emphasize three. First, the task force received solid and enthusiastic support from the Department of Energy, U.S. Environmental Protection Agency, and the Ohio Environmental Protection Agency. Tangible support–financing, information, time, and expertise–has been amply provided by the Department and by its contractor, the Fernald Environmental Restoration Management Corporation (FERMCO). Many, many individuals in the Department and FERMCO gave unstintingly of their time and energy to provide information, advice, and other kinds of assistance to the Task Force. Their names (and I apologize in advance for any inadvertent omissions) are listed in Appendix H.

Second, the task force has enjoyed an efficient and dedicated administrative staff since its inception. The efforts of Sarah Snyder and her successor Judy Armstrong, FERMCO employees detailed to the task force, have been instrumental to our work. The task force was also extremely fortunate to obtain the services of Douglas J. Sarno of Phoenix Environmental Corporation, as our technical consultant. His considerable talents in identifying, assembling, digesting, translating, and presenting key issues and information were essential to the successful completion of the Task Force's work. I know that all of the members of the task force join me in appreciation of his many contributions to our efforts.

Most important, I want to recognize the task force members themselves. They have endured a barrage of technical information, seemingly endless Saturday mornings in windowless meeting rooms, and the responsibility for hard choices among often unpleasant options. Their faithfulness in attending meetings, seriousness of purpose, consistent civility and above all their unswerving commitment to getting something done has been a model for responsible citizen involvement in public policy.

This report concludes a chapter, but it does not close the book on Fernald. While we can feel heartened, as the report goes to press, that remediation of the Fernald site may indeed be largely completed in the foreseeable future, there is still much that remains to be done. It is my hope that this report and the hard work behind it will provide a valuable outline for the next chapters in the Fernald story.

John S. Applegate
Chair, Fernald Citizens Task Force

EXECUTIVE SUMMARY

The Fernald Environmental Management Project site is a 1,050-acre facility operated by the United States Department of Energy (DOE), which was once a major part of the nation's nuclear weapons complex. Located approximately 18 miles northwest of Cincinnati, Ohio, the Fernald site was in operation between 1951 and 1989. Over that period of time, more than 500 million pounds of high-purity uranium metals were produced. One significant consequence of this production was the release of over 1 million pounds of uranium into the surrounding environment. Now that the plant is closed, efforts have turned to the environmental damage and human health risk resulting from nearly 40 years of production.

Over 3 million cubic yards of waste and contaminated material must be safely managed before the Fernald site can conclude its contribution to the cold war. DOE established the Fernald Citizens Task Force in August 1993 as a site-specific citizens advisory board for the Fernald facility. The board was chartered to provide DOE, the U.S. Environmental Protection Agency (EPA), and the Ohio Environmental Protection Agency (OEPA) with recommendations regarding four specific questions:

1) What should be the future use of the Fernald site?
2) What residual risk and remediation levels should remain following remediation?
3) Where should the waste be disposed?
4) What should be the priorities among remedial actions?

This report is the culmination of the effort of the task force to answer these four questions. The task force began its work in September, 1993 and developed and released its recommendations over a seven month period from November, 1994 through May, 1995. Each recommendations is supported by a detailed discussion of issues and rationale. With the exception of waste disposition, all recommendations represent full consensus of the board.

Recommendations on Remediation Levels

The Fernald Citizens Task Force identified specific cleanup levels based on total uranium in soil and groundwater as uranium makes up the bulk of the contamination at Fernald. Of primary concern to the task force in establishing these cleanup levels was protection of the Great Miami Aquifer and consistent protection of human health across all environmental media and land uses. The task force sought to balance the absolute requirement to protect human health and safety with the desire to minimize the impact on the environment resulting from remediation itself. To achieve background conditions would require surface soil excavation for five miles surrounding the site, a condition the task force found unacceptable. Ultimately, the task force arrived at recommended remediation levels which were protective and required little off-site excavation. These levels were based on restoring and protecting the aquifer to conform with maximum contaminant levels under the Safe Drinking Water Act, and to keep cancer risks within one in ten thousand, and non-cancer risks below the EPA hazard index of one.

Recommendations on Waste Disposition

The Fernald Citizens Task Force evaluated the political and logistical considerations involved in disposing of over three million cubic yards of contaminated material and determined that a balanced approach in which low-level waste was disposed of on site and high-level waste was disposed of off site was most prudent. Of paramount importance was ensuring the removal of the highest level wastes off site for safe disposal and that no new wastes come to Fernald for disposal. The task force, therefore, concurred with existing DOE 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.

Recommendations on Priorities

Originally, site priority recommendations were envisioned as a sequencing of activities according to their importance to the concerns and goals of stakeholders. However, as dramatic cuts in the DOE budget began to occur, the nature of the problem shifted, and the task force was faced with remediation time frames stretching to 25 years at total costs of twice what was expected in order to work within reduced annual budgets. Such a long approach to remediation would not remove the highest level contaminants from the site quickly nor conduct remediation in a cost-effective manner. Therefore, the task force recommended that Fernald accelerate remediation on a 7- to 10- year schedule. This schedule will both provide rapid protection of human health and the environment and greatly reduce the overall costs of remediation.

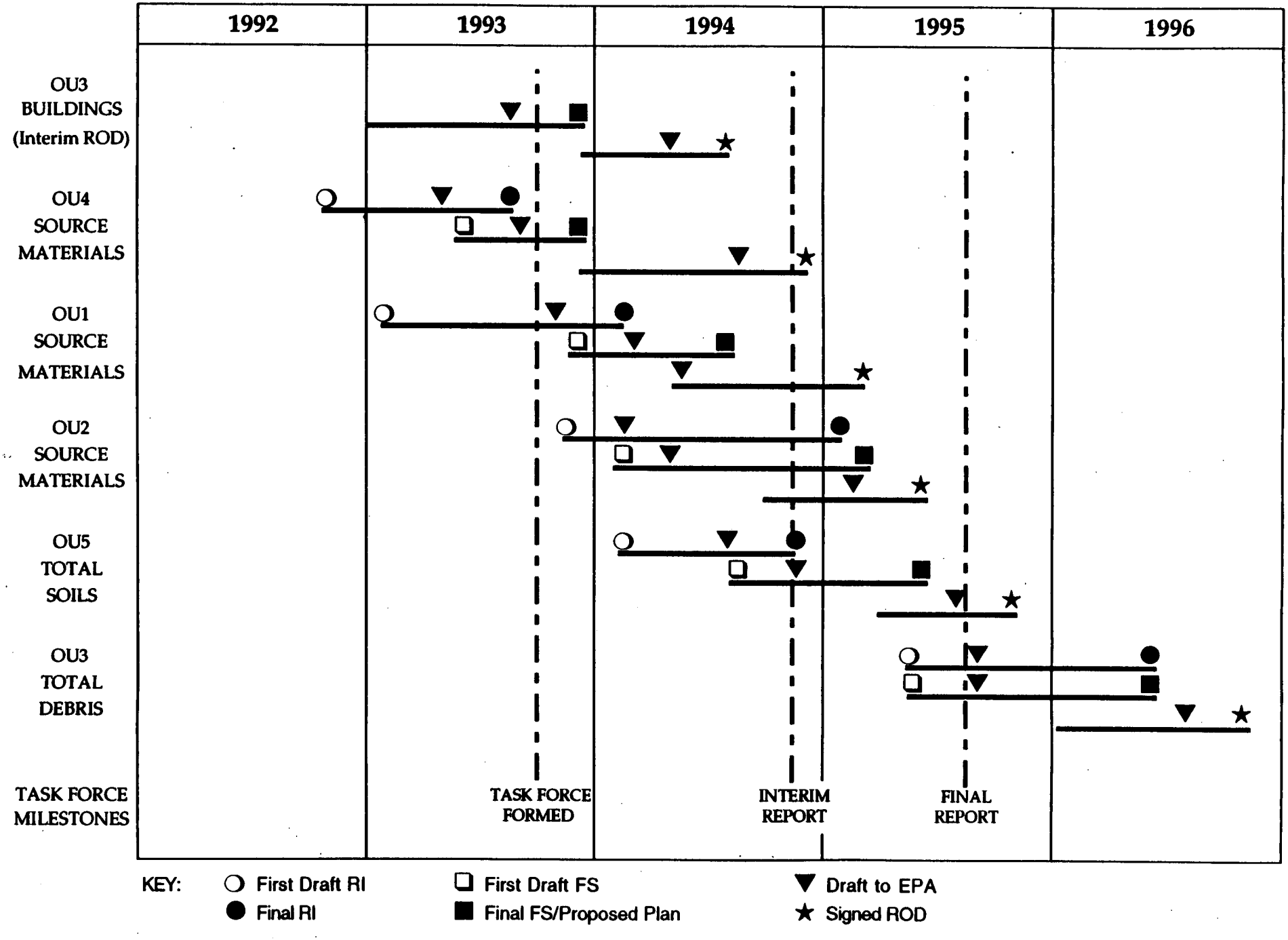
Recommendations on Future Use

The Fernald Citizens 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 plans for the future use of the property. The task force recommended that residential and agricultural uses be avoided on the property. However, it was also important to the task force that the land be used productively, so the cleanup levels recommended for the site would allow for all uses other than these. The task force also recommended that a substantial buffer area separate the on-site disposal cell and any other uses of the property. Ultimately, the task force recommended that specific uses of the property would be best determined at the time of reuse and by the people most impacted by that use, within the guidelines set forth.

Next Steps

The initial mission of the Fernald Citizen's Task Force has been completed with this presentation of its recommendations, both task force members and the DOE feel the task force's usefulness has not ended. Continuing task force activities are expected to include monitoring the implementation of task force's recommendations into the design and construction phases, evaluating closure, and long-term monitoring of the facility. The task force will reconvene in the fall of 1995 to evaluate these options and plan future activities.

Figure 4. Schedule of Key Fernald Activities and Task Force Milestones



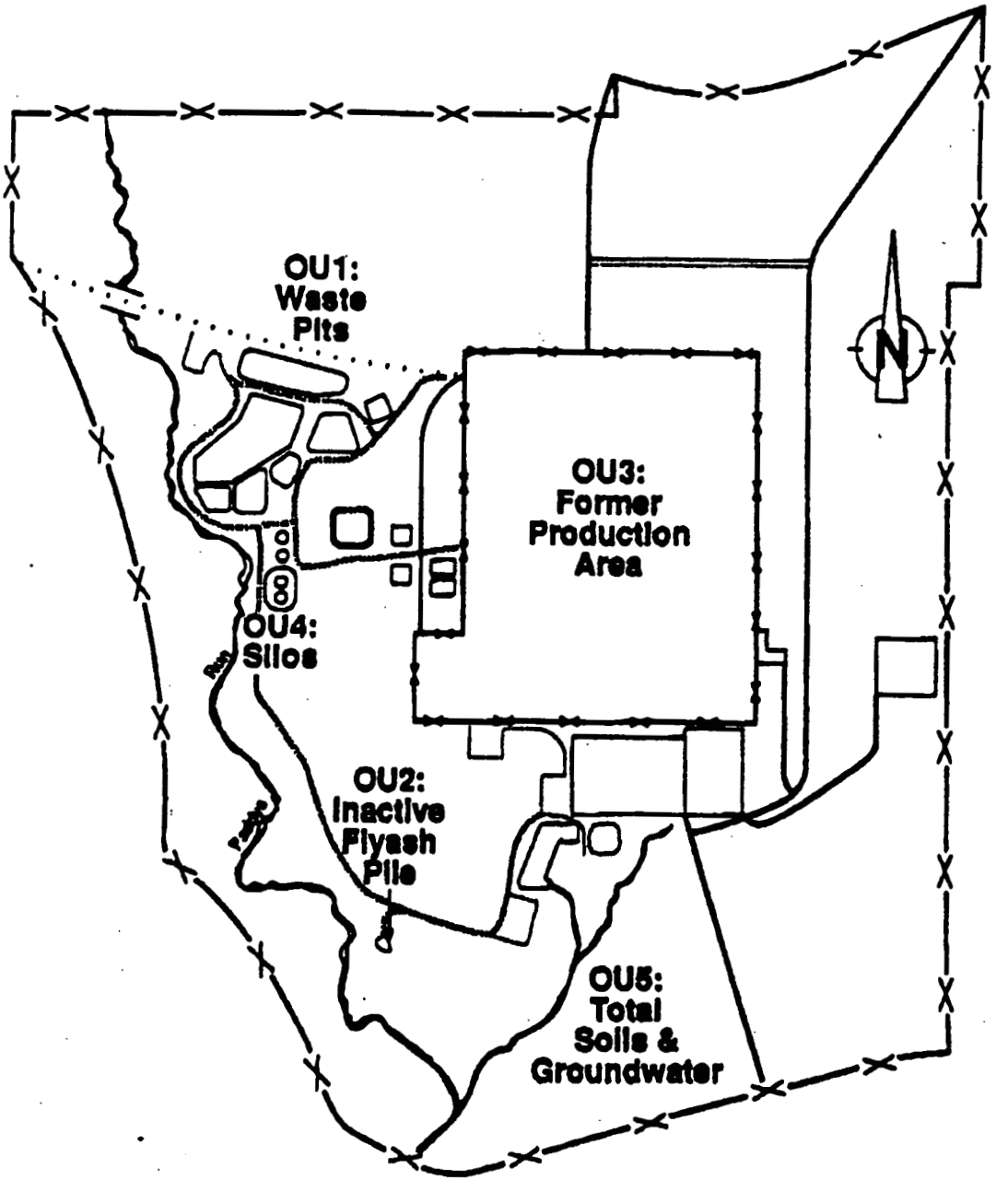


Figure 2: Location of Operable Units

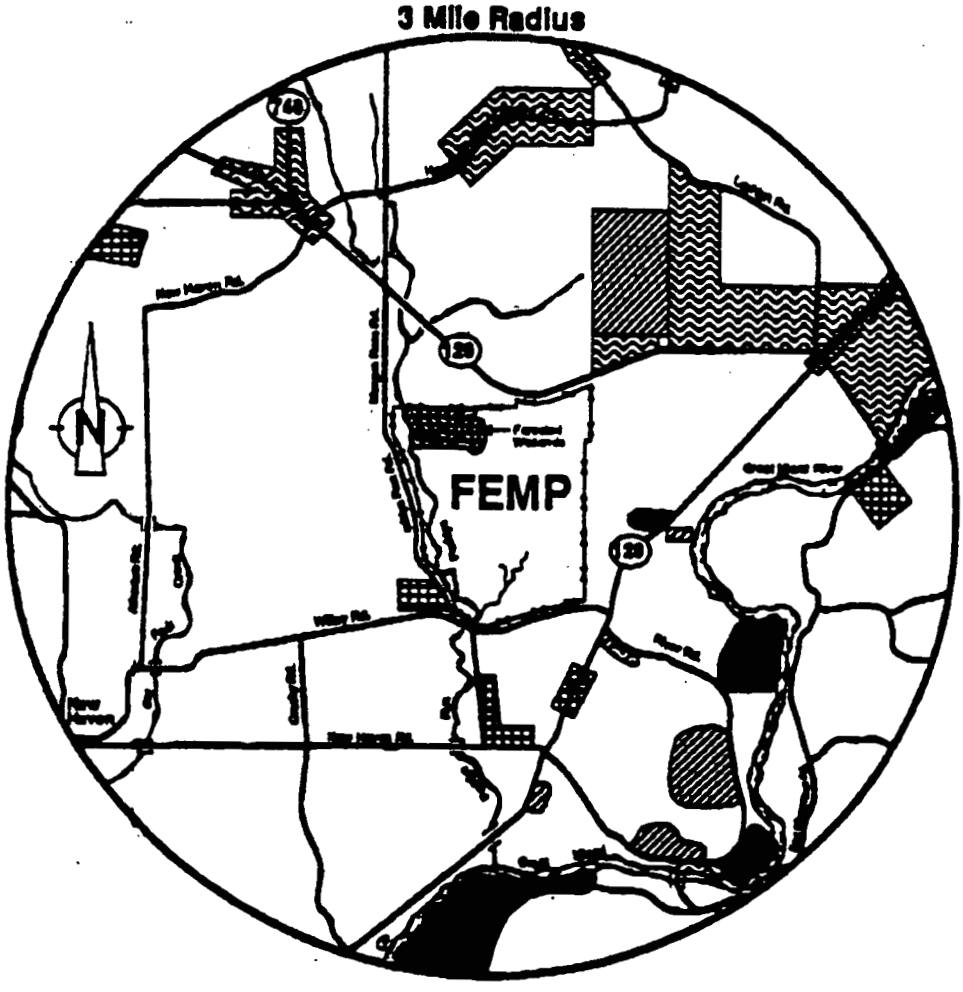


Figure 1: Land Uses and Natural Resources Surrounding Fernald

GLOSSARY

GLOSSARY

aquifer - A permeable body of rock capable of yielding quantities of groundwater to wells and springs.

asbestos - A strong and incombustible fiber widely used in the past for fireproofing and insulation. The small, buoyant fibers are easily inhaled or swallowed, causing a number of serious diseases including: asbestosis, a chronic disease of the lungs that makes breathing more and more difficult; cancer; and mesothelioma, a cancer (specific to asbestos exposure) of the membranes that line the chest and abdomen.

background levels - concentrations of contaminants equivalent to that found naturally in the environment.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund), the federal law that guides cleanup of hazardous waste sites.

contaminants of concern - those compounds believed to be present at concentrations exceeding health-based levels of concern.

consent agreement - a legal agreement, entered into voluntarily between two or more parties.

exposure scenarios - the set of assumptions regarding human use of land and natural resources which identifies the amount of exposure to contamination that individuals can expect to incur.

Federal Facilities Restoration Dialogue Committee - a national dialogue group consisting of representatives of several federal agencies, state agencies, state governmental associations, national environmental groups, and other stakeholders convened to conduct a national policy dialogue on federal facility environmental priority-setting.

Federal Facility Compliance Agreement - a formal legal agreement between a federal agency owning or operating contaminated property and the U.S. Environmental Protection Agency and potentially the relevant state regulatory agency to conduct remediation efforts.

feasibility study (FS) - the Superfund study following a remedial investigation which identifies, develops, evaluates and selects remedial action alternatives.

glacial overburden - soils originally deposited by glacial activity.

groundwater- Water beneath the earth's surface that fills pores between materials such as sand, soil or gravel. Groundwater is a major source of water for agricultural and industrial purposes and is an important source of drinking water for about half of all Americans.

half-life - The time required for a radioactive substance to lose 50 percent of its activity by decay. The half-life of the radioisotope plutonium-239, for example, is about 24,000 years. Starting with a pound of plutonium-239, in 24,000 years there will be one-half pound of plutonium-239, in another 24,000 years there will be one-fourth pound, and so on. (A pound of material remains, but it gradually becomes a stable element.)

hazard index - a measure of noncarcinogenic risk posed by chemicals.

heavy metals - trace metals whose densities are at least five times greater than water, such as cadmium, lead, and mercury.

Maximum Concentration Limit (MCL) - the regulatory limit for various constituents, usually organics and inorganics; there are different levels for different media, such as air, soil, and water. The MCL cannot be exceeded.

National Priorities List - those hazardous waste sites identified under the Superfund program as the nation's most dangerous.

nuclear weapons complex - the collection of federal facilities, largely owned and operated by DOE, used in the manufacturing and assembling of nuclear weapons.

operable units - a component of overall site remediation that is approached as a discrete problem. Usually comprised of specific geograhical locations or like contamination.

perched aquifer - a layer of groundwater that is generally trapped in a small geologic

polychlorinated biphenyl (PCB) - a synthetic, organic chemical once widely used in electrical equipment, specialized hydraulic systems, heat transfer systems, and other industrial products. Highly toxic and a potent carcinogen. Any hazardous wastes that contain more than 50 parts per million of PCBs are subject to regulation under the Toxic Substances Control Act.

proposed plan - a document which outlines the alternatives being considered for remediaiton of a site and identifies the preferred option of the agency conducting remediation.

radium - a radioactive metal generally found in uranium ore.

record of decision (ROD) - the formal document which states the remediation option chosen at a Superfund site.

remedial investigation - the physical and chemical analyses conducted to characterize the nature and extent of contamination at a site.

radon - A radioactive gas produced by the decay of one of the daughters of radium. Radon is hazardous in unventilated areas because it can build up to high concentrations and, if inhaled for long periods of time, may cause lung cancer.

sole source aquifer - a groundwater resource which comprises the sole source of drinking water to a given community.

solvents - a group consisting of hundreds of organic compounds used to dissolve other hydrocardons in industrial operations.

Superfund - see CERCLA.

thorium - a radioactive metal, Fernald was a national repositiry for Thorium during operation.

uranium - the heaviest element found in nature. Approximately 997 out of every 1000 uranium atoms are uranium-238. The remaining 3 atoms are the fissile uranium-235. The uranium-235 atom splits, or fissions, into lighter elements when its nucleus is struck by a neutron.

APPENDIX A.

EXCERPT OF FFERDC INTERIM REPORT

3.0. RECOMMENDATIONS FOR IMPROVING THE PROCESS OF SOLICITING INPUT FROM AFFECTED STAKEHOLDERS

3.1. BACKGROUND AND STATEMENT OF NEED

As federal agencies have instituted massive environmental restoration programs designed to investigate and remediate contamination at their facilities, there has been a growing desire by those affected by these clean-up efforts (who are referred to here as affected stakeholders) to have a greater role in the clean-up decision-making process. This desire for a greater role is a result of many factors, including an increased awareness of the environmental and health effects of contamination at federal facilities sites, a recognition of the complexity and scientific uncertainty surrounding many decisions at sites, and a mistrust of the government's intentions to consider the concerns of local citizens sufficiently.

In response to this concern for a greater role in the decision-making process, various statutory, regulatory, and other mechanisms have been established to help solicit input from affected stakeholders. Historically, however, these opportunities for citizen involvement have been inconsistent and have not necessarily provided for a meaningful dialogue between participants. Among the issues of greatest concern to these stakeholders are:

1) Affected stakeholders have not been substantively consulted in the early stages of decision-making. At sites where FFAs have been negotiated, for example, public comment has typically been solicited only after the signing agencies have agreed to circulate a draft agreement. The perception is that the public is consulted only after the key decisions have been negotiated by the agencies.

2) The laws governing the generation and disposal of wastes did not contemplate problems of the complexity and scale that exist at federal facilities. The public involvement mechanisms in these laws tend to focus on the specific proposal at issue, and do not allow consideration of how that proposal may relate to other proposed or existing activities.

3) Compounding the problem of late public involvement in decision-making is the lack of opportunity for meaningful dialogue in the formal comment and response process used in the regulatory decision-making process. Some perceive there is a strong tendency for this process to serve the needs of agencies to defend decisions rather than incorporate common or insightful concerns into decision-making. Likewise, it does not allow for an interactive and substantive exchange that promotes better understanding and consensus-building.

4) Finally, the burgeoning number of public involvement opportunities – including NEPA, those required by regulators in permitting, FFA processes, and other voluntary and required facility-sponsored events – is in many instances overwhelming and dissipates the public's ability and interest to participate effectively. There is a need to focus, coordinate, and streamline, where possible, the public involvement process especially at larger sites involving literally dozens of permitted units.

The net result is that many stakeholders consider the current methods for soliciting input to be too late in the process, inefficient due to overlap with other efforts, and ineffective because the result is often a one-way communication instead of a two-way dialogue.

3.2. DEMONSTRATED SUCCESSES OF SITE-SPECIFIC ADVISORY BOARDS

Site-specific advisory boards (SSABs), as the term is used in this report, are independent public bodies established to provide policy and technical advice to the regulated and regulating agencies with respect to key clean-up decisions. The Committee believes that such boards can improve the decision process 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 than 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.

For these reasons, both citizens and federal agencies will benefit from the creation of SSABs. Such boards provide unique opportunities for public participation in the decision-making process for environmental restoration, either not found or not fully available in more traditional fora such as public hearings or public meetings. There have been some exceptional examples of circumstances where the public has been successfully allowed and encouraged to advise the decision-making process. The information in the box below provides an example of the effective use of a site advisory board.

3.3. RECOMMENDATIONS REGARDING THE ESTABLISHMENT OF SITE-SPECIFIC ADVISORY BOARDS

3.3.1. Overview and Scope

In order to realize the benefits of citizen/federal agency interaction, the Committee believes a process is needed that accomplishes the following goals:

- consistent opportunity for involvement;
- regular, early, and effective public participation in federal clean-up programs; and
- consolidation of the many public involvement initiatives addressing clean-up.

THE MOFFETT MODEL

Moffett Naval Air Station, Pacific headquarters for the Navy's subchasing P-3C "Orion" aircraft, sits in the heart of Silicon Valley, at the southern edge of the San Francisco Bay. Its 26 Installation Restoration Program sites include a massive plume of shallow groundwater contaminated with TCE and other volatile organic compounds. The plume, shared with electronics industry Superfund sites just to the south, threatens local drinking water supplies as well as the Bay and its wetlands.

The Navy first discovered contamination in 1983, and the base was added to the NPL in 1987. In 1989-1990, when Moffett first negotiated its interagency agreement with state agencies and the EPA, community groups, area newspapers, and the other Superfund parties called the Moffett timetable too slow.

In early 1990, the base commander, Captain Tim Quigley, established a Technical Review Committee (TRC), composed of Navy personnel, regulators, and representatives of the local community, including the Silicon Valley Toxics Coalition (SVTC). Quigley established an active community relations program, disseminated fact sheets, and shared more detailed technical information upon request.

Through the TRC and other community relations activities, local residents and their representatives gained respect for the Moffett clean-up program, but the SVTC and others remained critical of the remediation schedule. They took their case to the press, elected representatives, and Defense Department officials. Informed by participation in the TRC, they focused on the so-called "regional" TCE plume.

In late 1991, after Moffett was approved for closure, the Navy proposed dividing Moffett into six distinct operating units. Clean-up of the main plume, the highest priority operating unit, was accelerated three years. This solution has won praise from all parties. The SVTC believes that the Moffett experience shows that if you give activists a "seat at the table," they can participate effectively in the setting of clean-up priorities. SVTC has applied to EPA for a Technical Assistance Grant to aid in its involvement in the clean-up process.

The Committee recommends that, as an important step toward achieving these goals, the agencies should establish and make use of SSABs, where appropriate and practicable. The Committee believes that SSABs will improve the effectiveness and consistency of public involvement at federal facility sites by providing focused and timely advice to the regulated and regulating entities on environmental restoration activities occurring at the site level. The recommendation is to have, at most, one SSAB at any facility or group of facilities to help coordinate advisory efforts and decision-making initiatives.

The Committee wishes to make clear that SSABs should be used to complement rather than duplicate or supplant broader site level FFER public involvement initiatives. Nor is it the Committee's intent that SSABs should be established at all federal facilities or sites where clean-up activities are taking place. Rather, such boards should be established on an as-needed basis, as is described below. In addition, such boards should in no way hinder or impede the effectiveness of broader public involvement activities, including those that are required by law and those that are not. Not every affected stakeholder will have the time or inclination to participate in SSABs and the Committee believes that it is vitally important that all members of the public be afforded their full rights and privileges with respect to public involvement.

The following recommendations detail when SSABs should be established and propose a model approach to implementing this recommendation. The Committee believes that it is essential for the federal agencies to work closely with local communities to ensure that SSABs reflect and are responsive to local community needs and concerns. The Committee recognizes that the recommendations in this Interim Report will need to be tailored to meet the needs of each federal site and its local stakeholders.

The recommendations contained in this section are intended to apply broadly to all FFER activities, regardless of the statute under which they are conducted. For example, the recommendations that are presented in this section could be applied to clean-ups under CERCLA, RCRA, BRAC, FUDS, UMTRA, and FUSRAP, as well as other state and federal requirements, as described earlier in Section 1.4.2.

3.3.2. When Site-Specific Advisory Boards Should be Established or Restructured

The Committee recommends that agencies form SSABs at sites where no advisory committee currently exists and where there is a need as evidenced by:

- an affected local, state, tribal or federal government entity requesting the establishment of an SSAB; or
- at least fifty residents of the community or region in which a site is located signing a petition requesting an SSAB.

Where site advisory boards already exist, the Committee intends for its recommendations to build upon existing groups and not to supplant them, particularly where they have proven successful.[6]

State and federal agencies will need to assess their existing public participation initiatives addressing environmental restoration issues to determine the extent to which they operate according to the model described below, and then implement the recommendations where needed. For example, where an advisory board, committee, or group currently exists for addressing clean-up issues, agencies may need to increase the scope of issues to be addressed by the group, add members to ensure representation of a wider constituency, change the way in which the group interacts with the general public, etc., in order to be consistent with these recommendations. When more than one group exists, agencies should consider consolidating their activities.

Regardless of whether or not a site advisory board currently exists at a site, the Committee does not intend for the implementation of SSABs to be a replacement or substitute for current public involvement activities such as community relations plans under CERCLA or the legally required public involvement in the Record of Decision (ROD) process. SSABs would be complementary to existing public

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[6] Currently, only the DOD is required by law to establish site advisory boards. See Appendix D for more detailed information regarding these statutory requirements.

involvement requirements. As such, they are not intended to hinder the continued ability of citizens to comment and participate individually or in groups of their own selection.

3.3.3. Model Approach to the Formation of SSABs

The following model approach to the formation of SSABs is intended to serve as an example for how to establish SSABs at sites where they do not currently exist and as guiding principles for how existing advisory groups should be revised to be consistent with these recommendations. These recommendations build upon the lessons learned from both the successes and failures of other site advisory boards. In addition, the Committee believes that its recommendations are sufficiently broad to permit flexibility for each agency and the affected communities to adapt them to their own circumstances.

a) Charter

A charter outlining the mission and duties of the SSAB should be developed at each site. It should provide for SSABs to advise both the regulated and regulating agencies on key policy and technical issues and decisions related to environmental restoration at the site. The Committee discussed the potential application of the Federal Advisory Committee Act (FACA) to the recommended SSABs. The Committee believes that the approach that it has taken is consistent with the spirit of FACA to create advisory committees that are balanced and subject to an open and fair process. Because of this, and in order to facilitate the implementation of these recommendations and avoid unnecessary administrative burdens, the Committee does not believe that it is necessary or prudent to charter SSABs as federal advisory committees. This is consistent with the current practice with DOD's Technical Review Committees and numerous other site-level efforts where advice is given to federal agencies.

b) Scope

In all federal departments, environmental restoration issues are often integrally linked with waste management issues. Also, the people within the communities surrounding federal facilities that are concerned about environmental restoration issues are also likely to be the same people who are concerned about other environmental management issues at that site. The Committee recognizes there may be pressure to use SSABs as a "sounding board" for site-level environmental issues that go beyond environmental restoration. The Committee believes it is vitally important that SSABs not become the general community advisory board for any and all environmental or other issues of concern to communities that surround federal facilities. For example, the Committee believes SSABs should not be used to address land and wildlife management issues that are not related to environmental restoration. However, the Committee does recommend such Boards be used to address waste management and technology development issues that are related to environmental restoration.

In focusing on environmental restoration, the boards should provide advice on issues related to:

- identifying clean-up activities and projects (including those necessary to meet regulatory requirements such as milestones in FFAs);
- tracking progress on those activities/projects (as per the recommendations contained in Section 4);
- providing information and perspectives on clean-up priorities;

- addressing important issues related to clean-up, such as land use, level of clean-up, acceptable risk, and waste management and technology development issues related to environmental restoration; and

- developing clean-up strategies.

The SSABs should have the discretion to hear presentations on the social, economic, cultural, aesthetic, and worker health and safety effects of environmental restoration and waste management and technology development issues related to environmental restoration. In addition, the Committee agrees that SSABs may hear presentations on other environmental management decisions that SSAB members regard as relevant and appropriate.

c) **Role of Regulated and Regulating Agencies**

As stated above, the SSAB is intended to be a forum through which advice can be given to both the regulated and regulating agencies on environmental restoration and waste management and technology development issues related to environmental restoration.[7] As such, senior representatives of both regulated and regulating agencies should serve as "ex-officio" members of the SSAB. The term ex-officio is used here to imply that representatives of these agencies should attend SSAB meetings and participate in SSAB discussions. However, because the advice to be given by the SSAB will be directed at their agencies, these agency representatives should not take part in any decisions about what advice should be given.[8]

The regulated agency should serve as the host of the SSAB and should provide administrative assistance, meeting facilities, etc., as necessary. Also, because of the important role that operations and maintenance (O&M) and environmental restoration contractors often play in actually conducting environmental restoration activities on behalf of regulated agencies, agencies should include contractor representatives as part of their team. However, because contractors serve as subordinate agents of the regulated agency, the Committee agrees that contractor participation in SSAB discussions should never serve as a substitute for the participation of senior representatives of the regulated agency. Contractor salaried employees (i.e., those in managerial positions) should not serve as members of SSABs.

d) **Membership and Membership Selection Process**

The Committee recommends that SSABs should reflect the full diversity of views in the affected community and region and be composed primarily of people who are directly affected by site clean-up activities. Thus, in addition to regulated and regulating agencies serving as ex-officio members, the

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[7] As used here and elsewhere in this document, the terms regulated and regulating agencies refer to those agencies that are either regulated or serve as regulators regarding site level environmental restoration activities. In the case of regulating agencies, the Committee assumes that this will principally include state and federal regulators and, where applicable, tribal regulators.

[8] Similar to the recommended role of state and federal regulators of environmental restoration activities, where any other government agencies participate on SSABs they should operate in an ex-officio capacity (by not taking part in SSAB decisions about what advice should be given) on matters in which they serve as regulators.

Committee recommends the following affected stakeholders be given primary consideration for SSAB membership:

- individual residents that live in the communities or regions in which a site is located;
- representatives of citizen, environmental, and public interest groups whose members live in the communities or regions in which a site is located;
- workers or representatives of workers involved in or affected by clean-up operations at the site, with a priority for clean-up and production workers who are currently employed at the site; and
- representatives of Indian Nations and other indigenous people that have treaty or statutory rights that are affected by clean-up activities at the site.

The Committee recommends that in order to address environmental equity concerns, special efforts should be made to provide notice and opportunity to participate for people who are or have historically been disproportionately impacted by site contamination.

In some cases, potentially responsible parties (PRPs) from the private sector that are directly involved in or affected by site clean-up activities could be added as ex-officio (non-voting) members at the discretion of the SSAB. The Committee believes that participation on an ex-officio basis is appropriate because PRPs may stand to benefit or gain financially from decisions of the SSAB. For example, at Moffett Field (which is described above) contamination from sites owned by private sector PRPs has mixed with the ground water plume from Moffett Field. Because clean-up activities at these private sites, from a technical perspective, must be addressed in conjunction with Moffett Field clean-up activities, these PRPs can be said to be "affected by" the federal facility clean-up efforts. In other cases, companies have been named as PRPs for the actions they took on federal facilities, such as in the case of Shell Oil at the Rocky Mountain Arsenal. In these cases, such PRPs can be said to be "directly involved in" the clean-up activities at the site. In both cases, these private sector PRPs should be distinguished from the O&M and environmental restoration contractors for the regulated agency, whose proper role is described in Section 3.3.3.c) above.

The Committee recommends that the size of the boards should be limited to promote efficiency and encourage participation, while also ensuring that the major stakeholders or groups of stakeholders are adequately represented. With some exceptions, given the wide variety of circumstances, the Committee believes the optimum size for SSABs will typically be 10-20 people, not including the ex-officio members. Every effort should be made to include divergent interests and viewpoints, regardless of technical expertise. The Committee recommends that appropriate qualities for an SSAB member include:

- an ability to focus on environmental restoration issues irrespective of any interest in or concern over other issues that are unrelated to environmental restoration; and
- a willingness to devote the time necessary to serve on a board.

In order to ensure confidence and trust in the establishment of SSABs that represent the full diversity of views within a community on FFER issues, the Committee recommends an SSAB membership selection process that has the following features:

1) Regulating agencies shall actively and publicly solicit nominations for SSAB membership from interested individuals and organizations, ensuring that ample notification is given to those with an active interest or obvious stake in environmental restoration activities at the site.[9] Such notification should also be given to national organizations that have expressed an interest in that agency's environmental restoration program.[10] Interested organizations and individuals, including those whose nomination has not been solicited by the regulating agencies, should submit nominations for SSAB membership to the regulating agencies. Furthermore, the regulating agencies shall solicit nominations from the governor, local congressional representative(s), state legislators, and affected county, city, and tribal governments.

2) Based on the criteria set forth above, the regulating agencies should review all nominations, submit a proposed list of SSAB members to the regulated agency, and make this list publicly available. Furthermore, this list should be mailed to all who were nominated or submitted nominations.

3) The regulated agency shall accept the recommended list of SSAB participants unless it determines that the list does not ensure a sufficient diversity of viewpoints or an appropriate balance of affected interests. Decisions of the regulated agency to accept or reject the proposed list must be made and explained openly and publicly. Once again, all who have been nominated or submitted nominations as per Step 1 should be notified of the decision of the regulated agency.

4) If the regulated agency rejects the proposed list, the regulating agencies, with the advice of federal, state, tribal, and local government representatives, shall propose, and make publicly available, an alternative list that addresses the specified imbalance or lack of diversity.

5) If SSAB membership selections issues have not been resolved after step 4, the regulating and regulated agencies will refer the matter to higher levels of authority within their agencies for final resolution.

SSABs, once established, should develop procedures for adding, replacing, or removing Board members. In doing so, the SSAB should consider carefully the need to assure that the Board does not become too large so as to be unmanageable and that the full diversity of views in the community/region are fairly represented. Procedures for adding new members should give special emphasis to:

- interests that, in the view of the SSAB, are not adequately represented at the time of the initial formation of the SSAB; and

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[9] The Committee believes that ample notification can best be accomplished by the regulated, regulating, and affected agencies and institutions jointly pooling their resources to develop a contact list for purposes of soliciting nominations for SSAB membership.

[10] Notification of national organizations is for the purpose of allowing those organizations to themselves notify any local members who may have an interest in participating on an SSAB.

- expressions of new interests that may not have existed or were not considered at the time of the initial formation of the SSAB.

Notwithstanding the recommended role of the SSAB on these matters, it remains the obligation of all participants – including the regulated and regulating agencies – to ensure the membership of the SSAB is composed of a manageable number of people, is properly balanced, and adequately represents the diversity of views within the affected community.

e) **Interaction with the Public**

As noted above, SSABs operate in a larger context in which members of the public, who may not have the time, resources or inclination to participate on an SSAB, must be kept adequately informed of and involved in clean-up decisions that affect their lives and their communities. As such, SSABs should conduct their activities in a manner that complements rather than duplicates or supplants broader public involvement efforts, some of which will be legally required. To this end, members of the SSAB, along with the participating regulated and regulating agencies, should make every effort to coordinate the timing and focus of SSAB activities with the need for broader public involvement activities. The Committee encourages regulated and regulating agencies to use the SSAB to obtain advice as to how and when such broader public involvement activities should be conducted. In addition, in order to maintain trust and accountability, interested members of the public should be notified of SSAB meetings, SSAB meetings should be open to the public, and some type of record documenting the meetings should be made available to the public. Finally, SSABs should provide opportunity for public comment at their meetings and should make every effort to respond to both written and verbal comments that are submitted to it in a timely manner.

f) **Operating Procedures**

At the establishment of each SSAB, SSAB members as a group should develop appropriate ground rules and operating procedures to allow for the efficient and productive operation of the group. Each SSAB should consider establishing procedures regarding the following:

- Determining explicitly how the SSAB will make decisions about what advice and recommendations it should give and, in particular, how to ensure that minority or dissenting views are addressed;

- Naming a chairperson, hiring a coordinator, or appointing an independent facilitator, as deemed necessary by the SSAB, whose principal role would be to ensure that:

  - SSAB meetings are run effectively and in a manner that is consistent with the SSAB's agreed upon ground rules;

  - the board maintains its focus on environmental restoration issues and waste management and technology development issues related to environmental restoration; and

  - whatever logistical and administrative tasks that the SSAB determines are necessary to play its advisory role effectively are accomplished.

- Forming subcommittees where and when it is appropriate;
- Providing training to SSAB members regarding relevant regulatory processes;
- Determining what type of public record is kept of meetings (video, minutes, general summary, etc.);
- Establishing procedures for adding, replacing, and removing SSAB members;
- Deciding what, if any, terms, rotational schedule, term limits, or use of alternates are appropriate to help ensure a balance of interests and continuing opportunity for and access to SSAB participation; and
- Determining when the work of the SSAB is complete or the overall interest in participating has diminished to such a level that the SSAB should be dissolved.

In addition to the above, the regulated agency shall establish and make public operating procedures that, to the extent possible, attempt to ensure continuity in the availability of the staff who are principally responsible for interacting with the SSAB.

g) Accountability

Federal agencies and regulators should respond to recommendations and advice from SSAB members by providing information on which recommendations or advice can be implemented, which need to be modified in order to be implemented, and which cannot be implemented. The SSABs may request a written response to any recommendation or advice made by its members. SSABs and agencies should maintain a record of recommendations or advice made by the board and the status and substance of all responses. SSABs also have the responsibility to respond to issues raised by the regulated agencies. A log of such issues and responses should be kept.

Members of the SSAB have a responsibility to share information with and provide feedback from the constituencies they represent. In addition, members have an obligation to attend all SSAB meetings to the extent possible. Finally, members of SSABs have a responsibility to portray accurately data or information provided to them as members of the SSAB. If members distribute documents to others outside of SSAB, they must indicate the preliminary or draft nature of the document.

APPENDIX B.

MEMBER PROFILES

FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

FERNALD CITIZENS TASK FORCE

Biographies

John Applegate: Chair of the Fernald Citizens Task Force, he is an environmental law professor at the University of Cincinnati College of Law. His academic areas of specialty include risk issues and public participation. He received his undergraduate degree from Haverford College in Pennsylvania and his JD from Harvard University. Prior to entering academia, Applegate worked as an attorney in Washington, D.C.

James Bierer: A 7th grade science teacher in the Ross Local School District, which is located near the Fernald site. He is also involved in DOE's Community Leaders Network and has helped develop education outreach programs for Fernald. He is a member of the Task Force's Waste Disposition Subcommittee.

Marvin Clawson: A long-time area resident whose family owns property near the Fernald site. He is a retired farmer and toolmaker.

Lisa Crawford: President of the citizens group, Fernald Residents for Environmental Safety and Health (FRESH) and a long-time activist. She is employed as the volunteer coordinator for a state hospital, the Lewis (Pauline Warfield) Center. Crawford is a member of the Task Force's Membership Subcommittee and the Waste Disposition Subcommittee.

Pam Dunn: Is employed as an auditor with the State of Ohio, and works primarily in the greater Cincinnati area. She also is the treasurer of Fernald Residents for Environmental Safety and Health (FRESH). She received her BBA from the University of Cincinnati. She serves on the Task Force subcommittee responsible for securing outside staff.

Dr. Constance Fox: A psychiatrist in private practice in Cincinnati, she is a member of Physicians for Social Responsibility and of the Sierra Club. She serves on the Task Force subcommittee responsible for securing outside staff.

Guy Guckenberger: Currently the president of the Hamilton County Commission, which is the governing body for one of the two counties in which the Fernald site is located. In addition to his political activities, Guckenberger also is a practicing attorney. He is a member of the Task Force's Membership Subcommittee.

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FERNALD CITIZENS TASK FORCE

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J. Phillip Hamric: Currently the head of DOE's Ohio Field Office in Miamisburg, Ohio, Hamric until June 15, 1994, was the site manager at Fernald. He also has worked at DOE's Hanford site and the INEL. He serves as an ex officio member of the Task Force.

Darryl Huff: An area businessman, he also is the vice chairman of the Morgan Township Zoning Board. The Fernald site is located in three townships, of which Morgan is one. Huff also is chair of the Task Force's Waste Disposition Subcommittee, which is making a recommendation to the full Task Force on waste disposition and transportation issues.

Graham Mitchell: The head of the Ohio Environmental Protection Agency's Federal Facilities Office, he has a masters degree in environmental science from Miami University. Until his promotion to the Ohio EPA's Federal Facilities Office, Mitchell was the lead coordinator for state oversight of the Fernald site. He serves as an ex officio member of the Task Force.

Jerry Monahan: The secretary/treasurer of the Greater Cincinnati Building and Construction Trades Council, which is one of the two primary union organizations representing wage workers at the Fernald site.

Tom Rentschler: A retired businessman and banker, he is chair of the Miami River Conservancy District, which is responsible for maintaining the integrity of the Great Miami River and associated habitats. The Fernald site has a permit to discharge into the Great Miami River. Rentschler also is active in Ohio politics. He received an undergraduate degree in engineering from Haverford College.

Jim Saric: Is the Fernald site remedial project manager for the U.S. Environmental Protection Agency, Region 5. He has a BS and MS and also is an avid bass fisherman. He serves as an ex officio member of the Task Force.

Warren Strunk: Is an elected trustee in Crosby Township, one of the three townships in which the Fernald site is located. He is employed as a machine tool operator.

Robert Tabor: Is Director of Health and Safety for the Fernald Atomic Trades and Labor Council (FATLC), one of the primary union organizations

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representing wage workers at the Fernald site. He attended Purdue University and Cincinnati University. In 1992, he completed the DOE/Westinghouse School of Environmental Excellence. He also is employed as a millwright at the Fernald site. He is a member of the Task Force's Waste Disposition Subcommittee.

Thomas E. Wagner: Is a professor of community planning at the University of Cincinnati and an expert in dispute resolution. He also served as dean of students for the University of Cincinnati before returning to teaching full time in 1994. He had is doctorate in education.

Gene Willeke: Is a professor in the Institute of Environmental Sciences at Miami University, he received his doctorate from Stanford University and undergraduate degrees from Ohio Northern University.

APPENDIX C.

CHARTER AND GROUND RULES

FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

CHARTER

Citizens of Ohio have expressed an interest in providing a local viewpoint to guide the federal and state governments as critical decisions are made in the restoration and future uses of Fernald. The Department of Energy, U.S. Environmental Protection Agency, the Ohio Environmental Protection Agency 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 that will influence their future for generations.

SCOPE

The focus of the Task Force is the future of the Fernald site. The Task Force will make recommendations regarding the potential uses of the Fernald site and the criteria for cleanup to ensure an environmental restoration that is appropriate for current and future generations. The Task Force recommendations will be made to the Assistant Secretary for Environmental Restoration and Waste Management (hereafter "Assistant Secretary"), the U.S. EPA Region 5 Administrator and the Director of Ohio EPA.

MEMBERSHIP

The Task Force is to be composed of no more than 15 Ohio residents, who are interested in the future of this site and who bring knowledge, views, technical expertise, and other skills to bear on a complicated technical and social problem: Fernald Cleanup. The members are appointed by the Assistant Secretary, with the concurrence of U.S. EPA Region 5 Administrator and the Director of Ohio EPA. Appointment of half of the original members of the Task Force shall be for 3-year terms and half for 2-year terms. Subsequent appointments will be for 2-year terms. No one is eligible for more than 2 terms. Two non-voting alternate members may be appointed and participate in the deliberations.

In the future, new members shall be appointed by the Assistant Secretary with the concurrence of U.S. EPA Region 5 Administrator and the Director of Ohio EPA, from a list of interested citizens that has been prepared by a subcommittee of the Task Force. Ex-officio members (non-voting) shall consist of one responsible person from each of the interested governmental

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agencies, U.S. DOE, U.S. EPA, and Ohio EPA. A quorum is 3/5ths of the voting members, and shall be required for decision-making.

RESPONSIBILITIES OF CHAIR

The Assistant Secretary with the concurrence of U.S. EPA Region 5 Administrator and the Director of Ohio EPA shall appoint one voting member of the Task Force to be its Chair. The Chair represents the Task Force in all official communications; presides at meetings; sets the times, places, and agenda for meeting; appoints committees; and retains consultants and is otherwise responsible for the administration of the Task Force.

TERMINATION OF TASK FORCE

The Task Force shall evaluate its work at 3 year intervals and decide whether to continue. The decision to discontinue must be agreed to by at least 2/3rds of the full voting membership of the Task Force.

FUNDING AND SUPPORT

The Assistant Secretary shall provide adequate funding for administrative support (including staff), travel and other expenses of the members, and technical assistance (including research, honorarium and travel of experts) that the Task Force deems is necessary.

WORK PRODUCT

The Task Force shall be guided by the deadlines under the Consent Agreement so that their advice is timely, and by the Interim Report of the Federal Facilities Environmental Restoration Dialogue Committee (February 1993). Recommendations from the Task Force to the agencies shall be in the form of written reports as deemed appropriate and shall respond to the following questions: 1) What should be the future use of the site? 2) Determinations of cleanup levels (How clean is clean?) 3) Where should radioactive and hazardous waste be disposed that is generated as a result of restoration activities? and 4) What should be the cleanup priorities?

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Response to these questions depend on a set of conditions including but not limited to: 1) State of Ohio regulations and disposal criteria; 2) other state regulations regarding acceptance of waste; 3) available data on health effects and risks from the specific contaminants at the site; and 4) monies appropriated for cleanup. It is desirable that the Task Force set priorities for responding to questions and provide as much guidance as possible regarding their assessments.

DECISION MAKING

The Task Force shall work toward consensus reports regarding recommendations on various issues, however, on certain issues a minority report may be necessary. In these rare instances it is necessary to articulate in writing both the areas of agreement and disagreement and the reasons why there continues to be differences. Remedies recommended should be consistent with CERCLA.

AGENCY COLLABORATION

The agencies participating as ex-officio members of the Task Force shall assist the Task Force by providing technical expertise and assuring that all information necessary for Task Force deliberations is made available in a timely manner.

MEETINGS

The Task Force shall have regular public meetings in addition to working group meetings which will be announced in advance with an agenda. Such meetings shall be open to the public and opportunities for public comment shall be designated. The Task Force may vote to meet in executive session and formally vote during these sessions. Minutes of these meetings shall be available.

Adopted October 14, 1993

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FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

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 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 or alternate 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 D.

PUBLIC OUTREACH ACTIVITIES

AND SUMMARY OF COMMENTS

FERNALD CITIZENS TASK FORCE

A U.S. DEPARTMENT OF ENERGY SITE-SPECIFIC ADVISORY BOARD

PROFILE OF COMMENTS FROM THE PUBLIC

Comments from October 14, 1993 Meeting:

A member of the audience asked if site activity could explain why employees are not patronizing merchants, as often as they had previously. Possible explanations included that the thirty minute employee lunch break was being enforced and that one of the access roads to the community had been closed because of the strike potential.

Comments from November 18, 1993 Meeting:

An unidentified member of the audience said that he was confused because he thought the task force was only deciding what to do with the site after cleanup. The response to his statement was that other issues are related to the question of what alternatives exist for the site after cleanup.

Ken Moore, of the Hamilton County Regional Planning Commission introduced himself and offered his agency's services.

Comments from December 9, 1993 Meeting:

A member of the audience voiced the opinion that the Task Force would not be able to decide on future use until it had an idea of where the waste would be disposed.

Comments from January 15, 1994 Meeting:

Some members of the audience volunteered potential options during the discussion of future land use. Those ideas include:

1) Transportation Hub
2) Sports Complex - community or professional
3) Regional Airport

Comments from February 12, 1994 Meeting:

Members of the audience volunteered potential criteria during the Task Force's discussion of future use criteria at Fernald. Vicky Dastillung, Vice President of FRESH, suggested that the Task Force consider funding under long-term management. Another individual suggested looking at guidelines on long-term interim storage. Ken Moore, of the

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Hamilton County Planning Department, suggested adding public utilities as a potential use.

Comments from March 12, 1994 Meeting:

Public participation consisted of identifying potential risks associated with contamination at the site along with the major components of remediation. Doug Sarno explained that this information would form a basis for addressing the question of future use.

Comments from April 9, 1994 Meeting:

There were no public comments.

Comments from May 14, 1994 Meeting:

Public comments consisted of scenarios developed by members of the public while playing FutureSite at prior community meetings.

Comments from June 11, 1994 Meeting:

A member of the public asked how quickly contamination is migrating off site. John Applegate, Task Force Chairperson, responded that migration has slowed virtually to a stop and under the South Plume Removal Action extraction wells are removing contaminated groundwater for treatment.

Comments from September 10, 1994 Meeting:

There was a great deal of discussion, in which the public participated, focused on whether future uses that do not protect the groundwater should be considered. There was additional public input during the review of future use alternatives.

Comments from October 8, 1994 Meeting:

Peggy Collins, Co-president of the Hamilton-Fairfield Chapter of the League of Women Voters, told the Task Force that she endorsed its recommendation regarding the aquifer.

Additional public input was received during discussions about protecting the groundwater and review of the future use alternatives.

Comments from November 12, 1994 Meeting:

Bill Knollman, of Knollman Dairy, responded to questions regarding the economic impacts of grazing, as it pertains to the Fernald property. He stated he leases the property for approximately ten dollars an acre. Knollman informed participants that he maintains the fences, except the perimeter fences which DOE maintains. He also said his family is going to discontinue the dairy operation in April and exclusively graze beef cattle. He added that dairy cows will not be pastured on the leased areas after Thanksgiving of this year. Knollman stated that his family plans to use the pasture for cattle grazing and expanding the grain operation. Knollman iterated that grazing is important to his operation and that he does not want to see grazing discontinued as a use of the Fernald property in the short-run because, economically, it would negatively impact his business. "I don't know of any group of cows that have been tested any more than ours have" he said, explaining that the cows are tested monthly by FERMCO, a federal group, and the State of Ohio.

A member of the public, who introduced herself as Chris Tickle with CLEAN, Inc., addressed the Task Force by making an analogy about perceived risk: "When a person invests money, that person has a sense of the risk. Everyone here has idea of what is acceptable risk after gauging the data. To me, that kind of explains why there is such a dialogue on the perception of risks on the site. It seems that you are going to have to find consensus somewhere in between. The land is a resource and it's our land. I would prefer, if the data is there, to allow the land to be used, if it can be used. A person will have information on the deed, if the land is sold. We aren't responsible for educating everyone who walks by and we can't be responsible for everyone's uneducated level."

Edwa Yocum also addressed the Task Force: "I'm sitting here and I'm getting rather mad because I am thinking we have lost all respect for ourselves. Connie Fox talked about the emotional and psychological effects of watching the cattle graze. We let the cows graze and we drink the milk and eat the meat and we are slowly poisoning ourselves. The government will outlaw second-hand smoke and cholesterol, but we will let ourselves be poisoned. Don't allow grazing. There is a question as to whether the government is really doing its job." Yocum said she didn't think money should be the cleanup driver and that safety is paramount. Later in the discussion, Yocum posed the question to a Task Force Member whether he would like to have his company next to a disposal cell.

Additional public input was received during the discussion concerning grazing.

Comments from December 8, 1994 Meeting:

Dave Young, of Ross Township, said he was glad to see some open minds on the Task Force. He iterated that money should not be overly emphasized because neighbors did not ask for the site to be located there. He also said that he would be attending more upcoming meetings.

Larissa Gilham, Ohio Department of Health, said the Task Force also needs to be aware of the interest other sites have in protecting themselves from Fernald waste products.

Additional public input was received during the discussion surrounding the work plan.

Comments from January 14, 1995 Meeting:

Peggy Collins, Co-president of the Hamilton-Fairfield Chapter of the League of Women Voters, said that she agreed that it was of the utmost importance to protect the aquifer located beneath the Fernald site. She further stated that given the risks of off-site transport, keeping some radioactive waste on site was reasonable.

Bob Copeland, a Morgan Township trustee, said he had submitted a written statement to Gary Stegner, DOE. He stated that Morgan Township could accept an on-site disposal cell if the surrounding conditions were satisfactory. He added that he was personally concerned about off-site waste being brought to Fernald as a result of the Midwest Compact. The Midwest Compact is responsible for sitting a low-level radioactive waste repository in the midwest region of the United States.

Additional public input was received during the discussion concerning waste disposal issues, including long-term storage of non-Fernald waste at the Fernald site.

Comments from February 18, 1995 Meeting:

Milton Whaley, a resident of Ross, Ohio asked Task Force members to vote for off-site shipment of radioactive materials.

David Young, Ross Township Trustee, also encouraged off-site disposal of radioactive materials and suggested that, if given thirty days, he could put together another meeting with Ross Township citizens in attendance.

Additional public input was received during the discussion to construct a disposal cell.

Comments from March 28, 1995 Meeting:

Don Thiem, Ross Township Trustee, directed a question to the Ohio EPA which Tom Schneider answered.

Richard Garrett, a resident of Ross and an employee at FEMP, stated he was working on a scenario that would achieve cleanup in five to eight years, but, he was not at liberty to discuss the matter. He suggested contacting your Congressperson because the "window of opportunity" is open.

Additional public input was received during the discussions about the waste disposal facility and the DOE budget presentation for the Fernald site.

Comments from April 8, 1995 Meeting:

Tom Szymoniak, a FERMCO consultant, shared information about the study he is conducting on the plants and grasses that grow in this area that could be planted on the disposal facility and grow compatibly with native vegetation.

Larissa Gilham, Ohio Department of Health, said that the State of Ohio legislature is currently considering a bill regarding low level waste disposal facilities in Ohio, which also addresses access controls and environmental monitoring zones.

Comments from May 6, 1995 Meeting:

Vicky Dastillung, a member of FRESH, asked about liability if someone developed health ailments after being within the 300 feet buffer zone. Doug Sarno explained that only low-level radioactive materials will be placed in the disposal cell which does not present a health hazard. Dastillung subsequently inquired whether the OU2 Record of Decision (ROD) included federal ownership as a requirement. Graham Mitchell responded by suggesting that the five year review plan for the RODs might be a good point for future use adjustments.

CALLS ON TASK FORCE TELEPHONE LINE

An unidentified man called over 50 times between fall of 1994 and present. He suggest that Fernald should become a future wildlife sanctuary, also the CSX line could be made a bike trail and connect it out at Oxford and then Houston Woods Park. He also called and had a question for Guy Guckenburger. The question was does he plans to retire out-of-state in a quiet area with less air pollution and read as a hobby about wildlife habitat and by diversity after the sewerlines and housing development around Fernald is finished. He also asked Jerry Monahan if after they build their last house by Fernald, if they next plan to build a corporate park on the south side of Rumpke dumps mountain off of Colerain Road.

An unidentified woman believes that Fernald should be saved as a future wildlife sanctuary or a forest nature preserve. Also CSX right-a-way should be a future bike trail connected to Oxford and Houston Woods and also Miami Whitewater Forest.

Ralph Hennert or Hennon, President of IGAU, called in December of 1994 and said he is going to speak to DOE and other groups because he wants to know why the FCTF thinks it is such an elite group that it leaves out important stakeholders from belonging to the Fernald Citizens Task Force. He is making a recommendation to DOE that all support funds be cut from the FCTF.

In March of 1995 Lillie Grover called, she stated she saw in the paper that it was voted to allow some of the radioactive waste to stay on site. She feels that this is a bad idea to do so. She also stated that if we start keeping radioactive waste on site that we will start getting waste from other areas, and we don't have the facilities to control all of this. She said that she lives 15 miles away and would like the waste moved to Nevada or Utah (get rid of it while we can). She would like to speak to someone about this matter and how the decision was made.

In March 1995, a Chinese or Japanese man called from a magazine in Washington D.C. (I couldn't understand what he said his name was). He stated that he would be in town on March 30 and 31, and he would like to meet with someone (a representative) of Fernald and do an article on Fernald. He also stated that he wanted to show his article to his own country. He left a phone number (202) 783-0186, and asked that someone from our organization call him back.

In March 1995, another gentleman, very hard to understand, I think his name is Howard Sam, wants a copy of our March 28, 1995 meeting minutes. He is from the U.S. EPA Region 5. He also left his number (312) 353-2310.

In April 1995, a woman named Terri Fricky from Welden Springs, a superfund site in St. Charles, Missouri, wants to know how the Task Force is run. There site was just given a government grant to form a committee. She would like for someone to call her at [redacted]

In May 1995, a man (Bill Bangert) who is from WLW radio, wants more information on the Task Force and its meetings. His phone number is 736-4464 (this is a voice mail where we can leave him a message). Will be sending him a Task Force folder.

May 1995, Connie Nash called to be taken off the Task Force mailing list. She also suggested that we make up a 1-800 number for the people who want to be taken off the mailing list, she thinks in the long run it will save alot of trees. If we have any questions call [redacted]

June 1995, Steve Baca called to change his address and to get another copy of the minutes for March 28, and April 8 meetings. His phone number is [redacted]

June 1995, an unidentified woman from the Ohio Environmental Council called to change the name of the person we mail things from the Task Force to. The new persons name is Vicky Deisner.

APPENDIX E.

KEY ELEMENTS OF

THE TASK FORCE TOOLBOX

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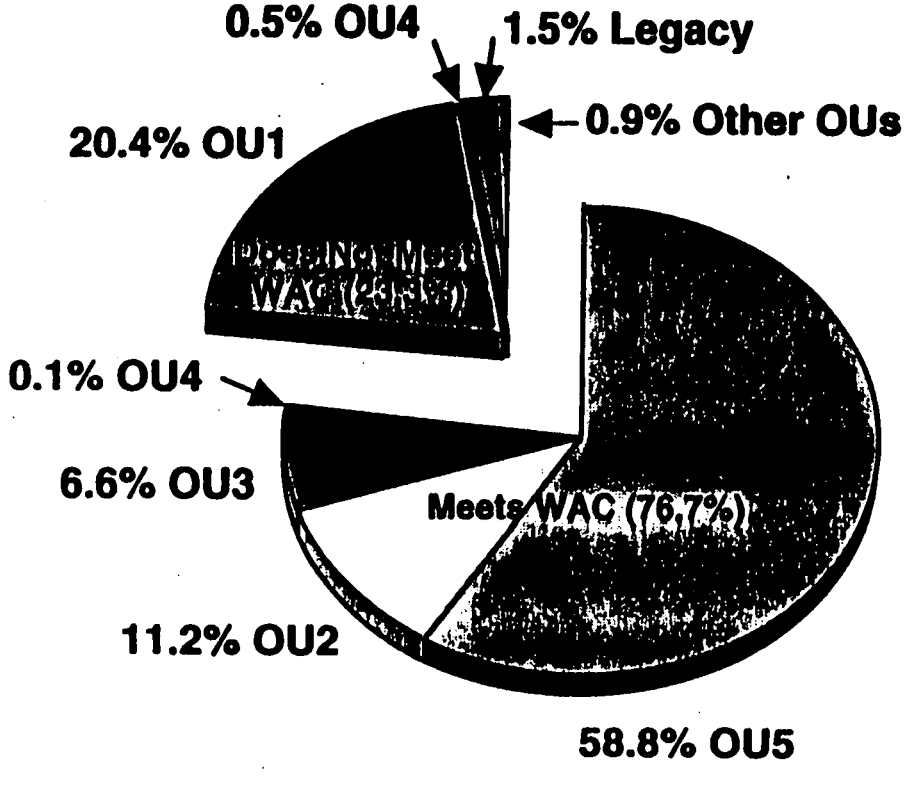
Waste Disposition Section

Priorities Section

POTENTIAL DISPOSITION OF FEMP WASTE CONSIDERING WASTE ACCEPTANCE CRITERIA (WAC)



Waste Source

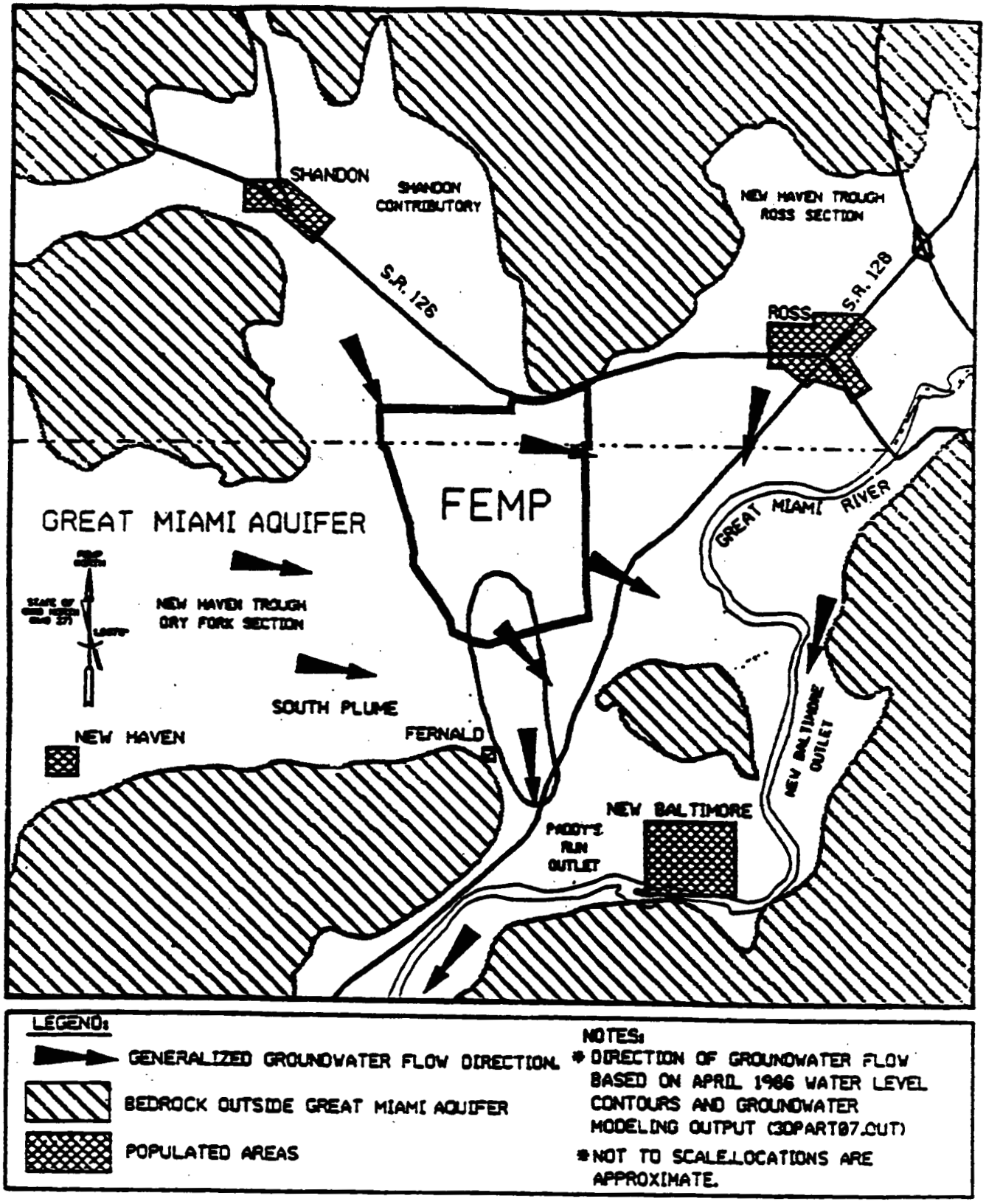
- OU5
- OU4
- OU2
- Legacy
- OU3
- Other OUs
- OU1

	Total Volume	Volume Meeting WAC
OU1	628200	0
OU2	348600	345000
OU3	201600	201600
OU4	17000	3000
OU5	1835000	1810000
Legacy	46760	0

MAJOR AREAS OF CONTAMINATION AT FERNALD

COMPONENTS	DESCRIPTION	PATHWAYS AND CONTAMINANTS OF CONCERN[a]	LEADING REMEDIAL ALTERNATIVE
Pit Sludges (OU1)	Contents of waste pits 1 through 6 and the Clearwell plus cap and liner materials in direct contact with waste; sludges generated in the AWWT (similar characteristics to waste pit sludges)	Ingestion of water from the Great Miami Aquifer (GMA) provides the largest contribution to overall risk for both carcinogens and chemical toxicants. The total carcinogenic risks are approximately 1 in 10 (10^{-1}) for all exposure routes. Ingestion of groundwater containing metals (arsenic) and ^{238}uranium contributes almost half of this receptor's total risk followed by external exposure to surface soils/pit materials and inhalation of dust. Uranium and thorium isotopes and arsenic are the major carcinogens for these exposure pathways. Other pathways with cancer risk exceeding 1 in 10,000 (10^{-4}) or hazard quotient greater than 1 include: ingestion of food affected by dust; direct contact with soils and pit materials; domestic and agricultural use of groundwater; and ingestion of meat and dairy products from cows grazed and watered on-site.[b]	Removal, treatment (thermal drying) and Off-site disposal at permitted facility
Flyash Piles (OU2)	OU2 consists of the following subunits: the Active Flyash Pile, South Field, Inactive Flyash Pile, lime sludge, and solid waste landfill	The highest total carcinogenic risk (RME on-property farmer) for all of Operable Unit 2 is about 1 in 270 (3.7×10^{-3}). The risks and hazards from OU2 result primarily from the three subunits which contribute most to the ground water contamination (i.e., Active Flyash Pile, South Field, and Inactive Flyash Pile). The major pathway for the carcinogenic risk is soil containing ^{228}thorium, ^{228}radium, and beryllium. The second major pathway is ingestion of water from the Great Miami Aquifer due to the presence of ^{238}uranium.[c]	Off-site disposal of Thorium- Radium contaminated materials and In-Situ or other on-site containment for low hazard waste
Total Soils (all OUs)	Contaminated soils and rubble amenable to or requiring decontamination by treatments such as soil washing prior to disposition (i.e., Soil under OU1 waste pits, waste and contaminated soil excavated from OU2, soil and rubble from OU3, soil from OU4 and OU5)	If this material is treated as proposed, the primary risk will be from airborne dust generated during excavation. The contaminants of concern in soils under the waste pits should be the same as those which leach into the GMA (i.e., arsenic and uranium). For OU2 wastes, the most likely contaminants of concern are ^{228}thorium, ^{228}radium, ^{238}uranium, arsenic, and beryllium. Soil and rubble from OU3 is not well characterized at this time. Contaminants of concern will probably include radium, thorium, uranium, and miscellaneous organics. For OU4 and 5 soils, cancer and noncancer risk are highest to the on-property farmer. The cancer risk for this individual is about 1 in 15 (6.5×10^{-2}) with uranium and arsenic being the contaminants of concern. The primary chemical toxicant is also uranium with a Hazard Index of 270.	Deferred to OU5 Feasibility Study/Proposed Plan

a The information in this column is taken the exposure assessment for the on-property reasonable maximum exposure (RME) resident farmer
b REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 1, Volume 5, Appendix E, section E.7.1
c REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 2, Volume 4, Section 6.3.6, Operable Unit 2 Cumulative Risk



GENERAL GROUND WATER FLOW

CHARACTERISTICS OF KEY FERNALD CONTAMINANTS

KEY CONTAMINANTS	CHARACTERIZATION OF THREAT	HALF-LIFE OR PERSISTENCE	BACKGROUND LEVELS[a]	LEGAL STANDARDS: DRINKING WATER	LEGAL STANDARDS SOIL/OTHER
Uranium	Cancer of the lung and lymphoma; kidney toxicity	^{238}U = 4.5 billion years, decays to lead	^{238}U(+ 2 progeny) = 1.22 pCi per gram of soil	(Proposed)[b]: 20 µg U_{total} per liter (parts per billion) of water (30 pCi per liter)[f]	
Thorium	Cancer of the bone and liver	^{228}Th = 1.91 years ^{232}Th = 14.1 billion years	^{228}Th = 1.43 pCi/g	(Current)[c]: 15 pCi gross alpha activity per liter of water (excluding Rn and U)	
Radium	Cancer of skin and bones	^{226}Ra = 1602 years ^{228}Ra = 6.7 years	^{226}Ra (+5 progeny) = 1.45 pCi/g ^{228}Ra (+1 progeny) = 1.19 pCi/g	(Current): 5 pCi per liter total Radium. (Proposed): 20 pCi per liter each (^{226}Ra and ^{228}Ra)	Soil: 5 pCi total radium per gram (surface) and 15 pCi radium per gram (subsurface)[d]
Radon	Cancer of the lungs	^{222}Rn Effective-Half-Life=30 minutes		(Proposed): 300 pCi radon per liter of water	Air: 20 pCi/-m^2-s emission rate per source[e] (e.g., K-65 silos)
Asbestos	Cancer, asbestosis	Sable		(Current): 7 million fibers per liter	NESHAP-No visible emissions; OSHA PEL-0.2 fibers per cc[g]
Arsenic	Skin cancer (ingestion) lung cancer (inhalation)[h]	Stable	8.45 mg/kg	(Current[c] - under review): 0.05 mg per liter (50 ppb)	
Beryllium	Dermatitis, acute pneumonitis, probable human carcinogen	Stable	0.6 mg/kg	(Current)[c]: 0.004 mg/l (4 ppb)	
Cadmium	Kidney/liver toxicity	Stable	0.82 mg/kg	(Current)[c]: 0.005 mg/l (5 ppb)	
Cobalt	Allergen, pneumoconiosis	Stable			
Organics (e.g., PCB's, PAH's)	Cancer of the skin and stomach	Very persistent	0.00 mg/kg[f]	Chemical specific	

*Footnotes are on the back

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SIGNIFICANT PATHWAYS AND RECEPTORS FOR CONTAMINATION AT FERNALD

PATHWAY	ON-PROPERTY RESIDENTS	OFF-PROPERTY RESIDENTS	VISITOR	GROUNDS KEEPER	TRESPASSER	GMR USER	HOME BUILDER	OFFSITE USER OF MEAT/ MILK PRODUCTS
Inhalation of Dusts	Yes	Yes	Yes	Yes	Yes		Yes	
Inhalation of Radon	Yes							
Ingestion of Soil/Sediment	Yes			Yes	Yes	Yes	Yes	
Ingestion of Drinking Water	Yes	Yes						
Dermal Contact with Soil/Sediment	Yes			Yes	Yes	Yes	Yes	
Irradiation from Soils and Sediments (Outdoors)	Yes		Yes	Yes	Yes	Yes	Yes	
Ingestion of Homegrown Fruits and Vegetables	Yes	Yes						
Ingestion of Meat and Milk	Yes	Yes						Yes

KEY CHARACTERISTICS OF LEADING REMEDIAL ALTERNATIVES FOR SOURCE COMPONENTS

COMPONENT	DISPOSAL VOLUME (yd^3)	WASTE MANAGEMENT METHOD	OFF-SITE DISPOSAL (yd^3)	OFF-SITE DISPOSAL (Truckloads)[a]	ON-SITE STORAGE (yd^3)	ON-SITE STORAGE (Acres)[b]	COST ($1,000)
Pit Sludges (OU1)[c]	780,000	Off-Site Disposal at Envirocare	780,000	39,000	0	0	$513,050
Flyash Piles (OU2)[d]	250,300	On-Site Disposal	3,600[e]	180	246,700	10	$64,429
K-65 Wastes (OU4)[f]	13,995	Vitrify/Off-Site Disposal at NTS	13,995	700	0	0	$101,052
Structural Debris (OU3, OU4)	114,511	On-Site Disposal	0	0	114,511	5	$41,678
Transite (OU3)	1,800	On-Site Disposal	0	0	1,800	0.1	$655
Misc. equipment (OU3)	86,066	On-Site Disposal	40,930	2,047	45,136	2	$49,829
Steel (OU3)	2,242	Recycle and On-Site Disposal	7,700	112	0	0	$1,830
TOTALS			846,225	42,039	408,147	17.1	$772,523
Off-Site Soil Volumes at 10^{-5}	190,000	On-Site Disposal				8	$69,160
Off-Site Soil Volumes at 10^{-6}	5,200,000	On-Site Disposal				208	$1,892,800

a assumes 20 yd^3 per truckload
b assumes 25,000 yd^3 per acre
c includes soils from cap and liner
d includes the solid waste landfill, lime sludge ponds, active and inactive flyash piles
e includes waste that does not meet waste acceptance criteria for on-site cell
f includes bentonite grout, sludge, dry waste and water.

SHORT-TERM RISK SUMMARY

SOURCE	CONSEQUENCES	RECEPTOR	PATHWAYS	MITIGATION TECHNIQUES	MITIGATION EFFECTIVENESS
Waste hauling vehicles	Physical effects[a]	Public along the transportation route	Public highways and railways	Minimize off-site shipments, use alternative conveyance	Transfers risk to other receptors, pathways, and time frames; high-volume conveyance may reduce risk
Waste handling equipment and material	Physical effects[a]	On-site and off-site workers	All related activities	Engineering controls, safety training, minimize distance	Real reduction in risk; minimizing waste volume changes short-term to long-term problem
Resuspended material and contaminated soil, radon	Increased cancer risk from inhalation of radionuclides	On-site nonremediation worker, near-property resident	Inhalation	Dust control: capture; removal; suppression and encapsulation	Feasibility and effectiveness depends on project size and duration
Handling of radioactive material and contaminated wastes on site	Increased cancer risk from radiation	On-site remediation worker	Inhalation, direct contact	Engineering controls, minimize distance, shielding	Real reduction of risk, consistent with occupational health and safety
Handling of radioactive material and contaminated wastes off site	Increased cancer risk from radiation	Off-site workers and public along transportation route	Inhalation, direct contact	Reduced volume of off-site disposal	Transfers risk to other receptors, pathways and time frames
Resuspended contaminated soil/materials, volatile chemicals	Increased cancer risk from chemical inhalation	On-site nonremediation worker, near property resident	Inhalation (no respiratory protection device)	Control of fugitive emissions, capture; suppression, and encapsulation	Feasibility and effectiveness depends on project size and duration
Resuspended contaminated soil/materials, volatile chemicals	Chemical toxicity	On-site remediation workers, near-property resident	Inhalation (no respiratory protection device)	Control of fugitive emissions, capture; suppression, and encapsulation	Feasibility and effectiveness depends on project size and duration
Removal of asbestos-containing material	Increased risk of asbestosis and cancer	On-site remediation worker	Inhalation	Engineering controls, personal protective equipment, training	Able to reduce risk to acceptable levels

[a] Physical effects include injuries and fatalities and are assumed to be proportional to the number of hours that an activity is performed. Historical data indicates the risk of fatalities is much lower than the risk of injuries.

FERNALD CITIZENS TASK FORCE

POPULATIONS AND DEMOGRAPHICS OF SURROUNDING COMMUNITIES

The Fernald site is located is two Ohio counties, Hamilton and Butler, and their combined population is 1.2 million people. Hamilton County has about 866,228 people, while Butler County has a population of 291,479. Most of the communities surrounding the Fernald site are unincorporated towns varying from an estimated population of 20 in Fernald proper to about 6,383 in Ross. Most of the communities have been characterized as agricultural or as "bedroom communities" for commuters in the Greater Cincinnati area.

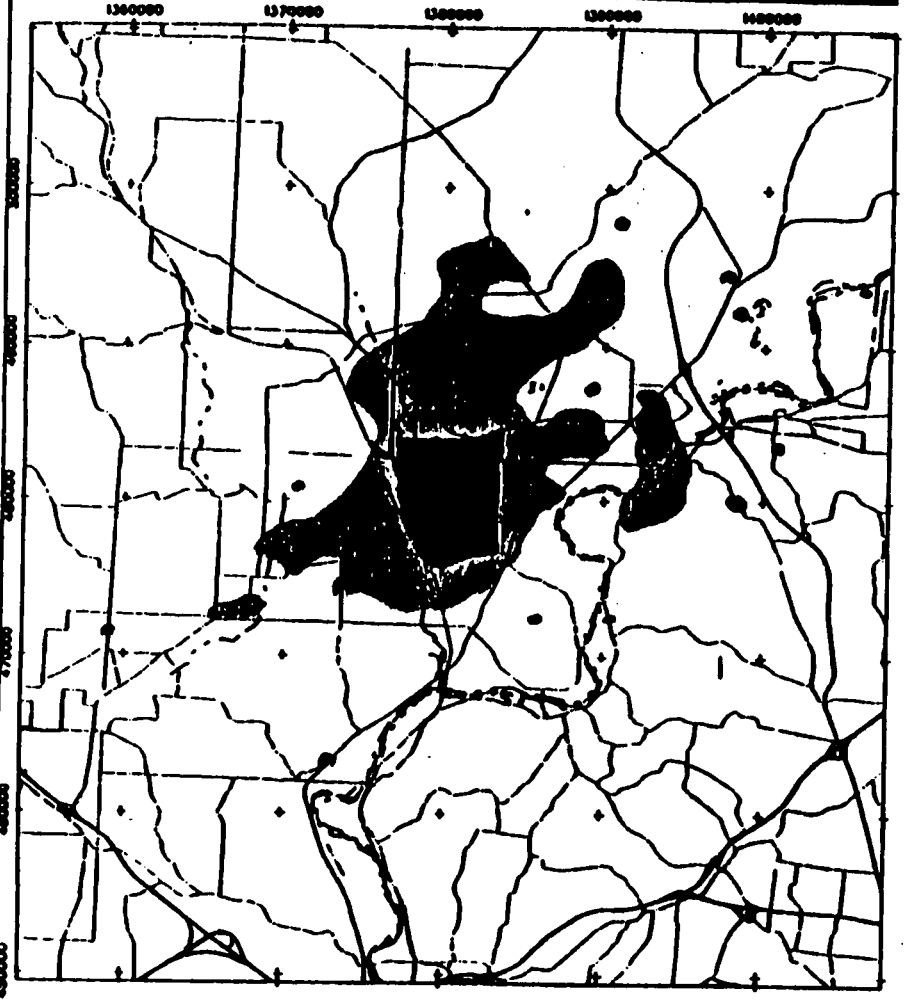
The area immediately in the vicinity of Fernald is racially and ethnically homogenous. There is no appreciable minority population in the rural area around Fernald. The nearest city to Fernald is Harrison, which is about 8 miles from the site. According to the Census, there are about 4 African-Americans, 7 Native Americans, and 27 people of Hispanic origin living in Harrison - or about .5 percent of the total population. There are 13,134 African-Americans and 1,467 people of Hispanic origin living in Butler County, but they reside predominately in or near the City of Hamilton, beyond a 12-mile radius from the Fernald facility. To date these communities have not shown an interest in Fernald. Hamilton County has a substantial minority population, but it is centered in the City of Cincinnati and its suburbs. The nearest historically black college is over 150 miles away. Native American lands or significant historical sites are not implicated at Fernald.

The average income for residents of Butler County is $21,772, while it is $22,959 for Hamilton County residents. The unemployment rate for Butler and Hamilton counties, respectively, is 6.6 and 4.5 percent. In Butler County, about 30 percent of the employed work as professionals; the percentage is 34.6 percent for Hamilton County. The remainder of the work force in these counties is employed predominately in the manufacturing and service sectors. About 10 percent of the population in Butler County lives below the poverty level; it is 13.3 percent in Hamilton County. According to the Census, 18.7 percent of the population in Butler County has attended school for 16 years or more, and about 76 percent of the population has had 12 years or more. 23.7 percent of the residents in Hamilton County have had 16 years or more of school, and 75.6 percent have had 12 years or more.

COMMUNITY	POPULATION	CAUCASIAN	AFRICAN-AMERICAN	OTHER[1]	MEDIAN HOUSEHOLD INCOME
Hamilton County	866,228	77.7%	20.9%	1.4%	$29,498
Cincinnati	364,040	60.5%	37.9%	1.6%	$21,006
Crosby Township	2,665	99.6%	.4%		$28,706
New Baltimore[2]	350				
Fernald[2]	20				
New Haven[2]	300				
City of Harrison	7,528	99%	.0004%	.001%	$33,866
Butler	291,479	94%	5%	1%	$32,440
Morgan Township	4,972	99.5%	.001%	.004%	$39,247
Ross Township	6,383	99.5%	.1%	.4%	$38,680
Ohio-Kentucky-Indiana Region	1.7 Million				

1 Includes Native Americas, Hispanics
2 Demographic breakdowns not available

OFF-SITE SOILS REQUIRING REMEDIATION AT 10-6 RISK

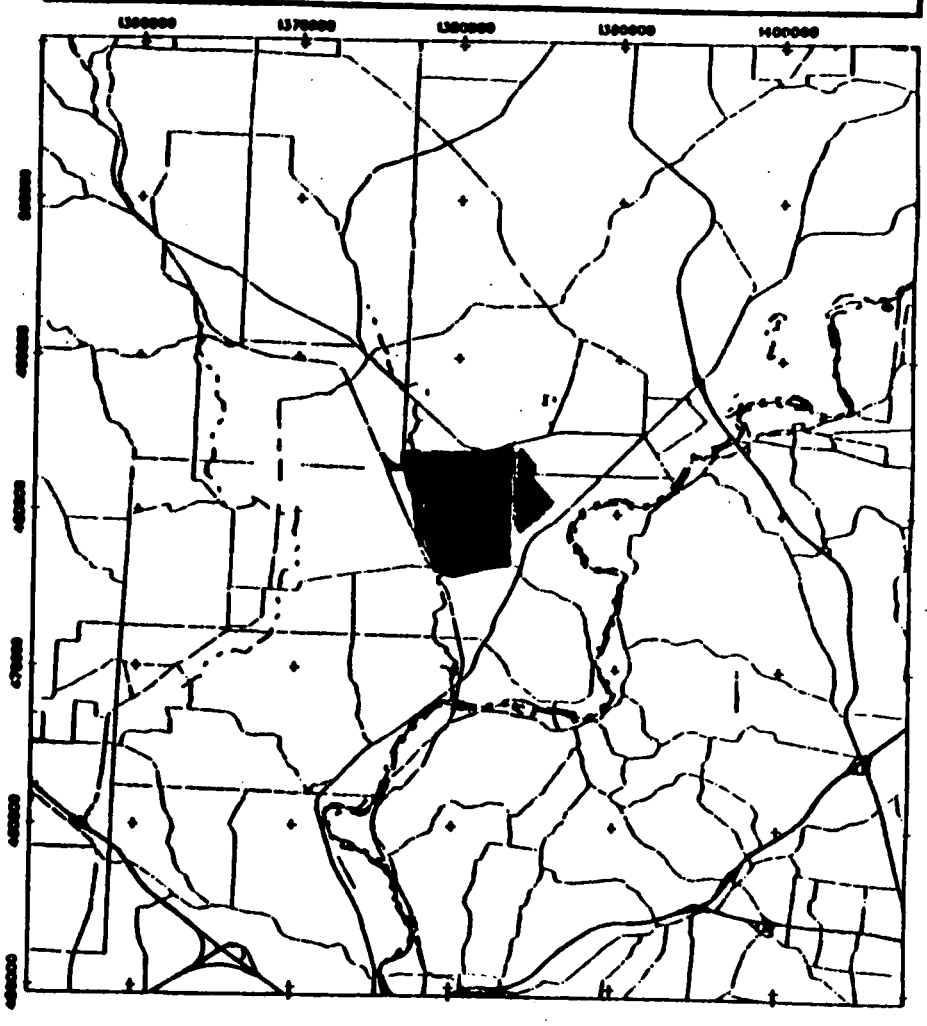


LEGEND:

10⁻⁶ RISK EXCAVATION FOOTPRINT (5,020,000 yd.³)

FEMP BOUNDARY

OFF-SITE SOILS REQUIRING REMEDIATION AT 10-5 RISK



LEGEND:

10⁻⁵ RISK EXCAVATION FOOTPRINT (190,000 yd.³)

FEMP BOUNDARY

SCALE

9000 4500 0 9000 FEET

7077

FUTURE USE SCENARIOS DEVELOPED FOR EVALUATION

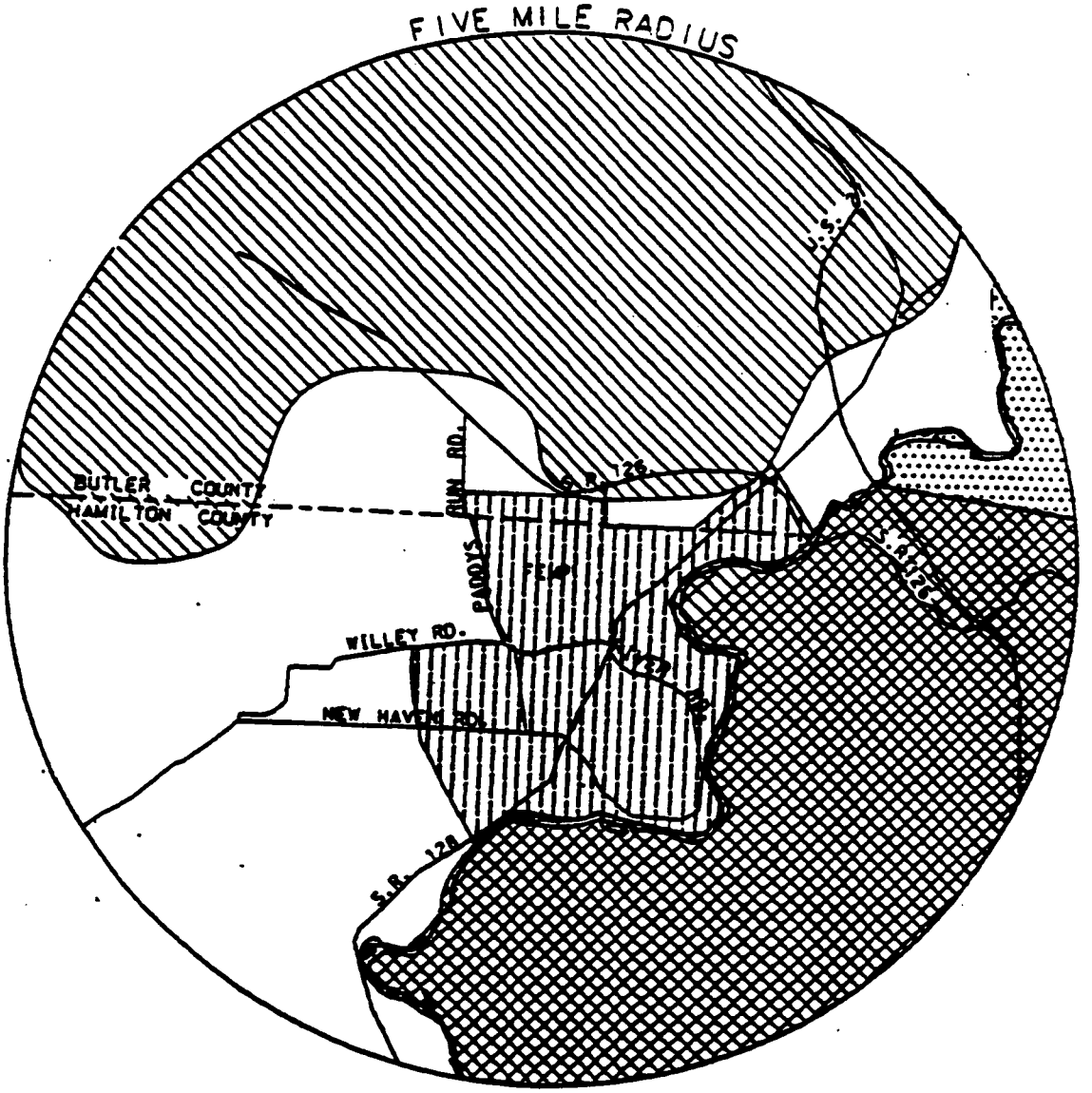
Cleanup levels used in developing scenarios were based on one of four land use categories or protection of groundwater as identified below:

FUTURE USE CATEGORY	EXPOSURE ASSUMPTIONS	LEVELS AT 10^{-4} RISK	LEVELS AT 10^{-5} RISK	LEVELS AT 10^{-6} RISK
Resident Farmer	Assumes full-time life-long resident growing crops for human consumption and grazing livestock.	130 ppm	15 ppm	5 ppm
Industrial	Assumes maximum exposure to on-site groundskeeper.	1200 ppm	125 ppm	15 ppm
Developed Park	Assumes free access recreational facility with developed sports, picnic, and rest room facilities.	3490 ppm	350 ppm	40 ppm
Green Space	Assumes unlimited access to nature trails, but with no developed facilities.	8820 ppm	885 ppm	90 ppm
Zone I GMA Protection	Assumes soil concentrations required to prevent contamination leaching into aquifer.	10^{-4} does not Protect GMA	20 ppm	5 ppm
Zone II GMA Protection	Assumes soil concentrations required to prevent contamination leaching into aquifer.	10^{-4} does not Protect GMA	100ppm	10 ppm

A Total of 9 scenarios were developed for evaluation as a result of the Future Site exercise and protection of the aquifer. Most of the scenarios follow the cleaner border concept which emerged from the FutureSite exercise. Volumes and costs for these scenarios were developed at 10^{-4}, 10^{-5}, and 10^{-6} risk levels. The scenarios are listed below and are compared in the table on pages X-3 through X-9 along with groundwater protection options 10a, 10b, and 10c and off-site soil cleanup requirements at 10^{-5} and 10^{-6} risk levels. Maps and excavation profiles of selected scenarios begin on page X-10.

Scenario 1 Resident Border/Industrial Center
Scenario 2 Resident Border/Park Center
Scenario 3 Resident Border/Green Space Center
Scenario 4 Industrial Border/Park Center
Scenario 5 Industrial Border/Green Space Center
Scenario 6 Park Border/Green Space Center
Scenario 7 Total Green Space
Scenario 8 North Green Space/South Industrial
Scenario 9 Total Resident
Scenario 10 Protection of Aquifer to MCLs
Scenario 10a Protection of Aquifer and Perched Groundwater to MCLs
Scenario 10b Protection of Aquifer to 10^{-6}

MAJOR WATER USERS WITHIN FIVE MILE RADIUS



SCALE

9000 4500 0 9000 FEET

LEGEND:

- AREA WITHOUT WATER SERVICE
- SOUTHWEST REGINAL WATER DISTRICT
- CINCINNATI WATER WORKS (CWW)
- NEW SERVICE AREA (CWW)
- FAIRFIELD WATER DISTRICT
- FEMP BOUNDARY

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COMPARISON OF FUTURE USE SCENARIOS (continued)

SCENARIO	VOLUME OF ON-SITE SOILS (yd^3)[a]	ACRES OF CELL IF TOTAL ON SITE[b]	# TRUCKS IF TOTAL OFF SITE[c]	# TRAINS IF TOTAL OFF SITE[d]	TOTAL COST IF ON SITE ($1,000)	AQUIFER PROTECTION	NATURAL RESOURCE PROTECTION[e]
Scenario 3 at 10^{-4}: Resident/ Green Space	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 3 at 10^{-5}: Resident/ Green Space	835,000	33	41,750	121	$150	Does not protect GMA. 794,000 yd^3 additional soil removal required.	Disrupts 646 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 3 at 10^{-6}: Resident/ Green Space	1,719,000	69	85,950	249	$460	Does not protect GMA. 2,290,000 yd^3 additional soil removal required.	Disrupts 1008 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 4 at 10^{-4}: Industrial/ Park	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 4 at 10^{-5}: Industrial/ Park	694,000	28	34,700	100	$125	Does not protect GMA. 775,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 4 at 10^{-6}: Industrial/ Park	889,000	35	44,450	129	$150	Does not protect GMA. 2,492,000 yd^3 additional soil removal required.	Disrupts 1008 acres of terrestrial habitat and 35.9 acres of wetlands

COMPARISON OF FUTURE USE SCENARIOS

SCENARIO	VOLUME OF ON-SITE SOILS (yd^3)[a]	ACRES OF CELL IF TOTAL ON SITE[b]	# TRUCKS IF TOTAL OFF SITE[c]	# TRAINS IF TOTAL OFF SITE[d]	TOTAL COST IF ON SITE (millions)	AQUIFER PROTECTION	NATURAL RESOURCE PROTECTION[e]
Scenario 1 at 10^{-4}: Resident/ Industrial	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 1 at 10^{-5}: Resident/ Industrial	835,000	33	41,750	121	$150	Does not protect GMA. 794,000 yd^3 additional soil removal required.	Disrupts 646 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 1 at 10^{-6}: Resident/ Industrial	2,033,000	105	101,650	296	$600	Does not protect GMA. 1,976,000 yd^3 additional soil removal required.	Disrupts 1008 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 2 at 10^{-4}: Resident/ Park	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 2 at 10^{-5}: Resident/ Park	835,000	33	41,750	121	$150	Does not protect GMA. 794,000 yd^3 additional soil removal required.	Disrupts 646 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 2 at 10^{-6}: Resident/ Park	1,768,000	71	88,400	256	$500	Does not protect GMA. 2,208,000 yd^3 additional soil removal required.	Disrupts 1008 acres of terrestrial habitat and 35.9 acres of wetlands

COMPARISON OF FUTURE USE SCENARIOS (continued)

SCENARIO	VOLUME OF ON-SITE SOILS (yd^3)[a]	ACRES OF CELL IF TOTAL ON SITE[b]	# TRUCKS IF TOTAL OFF SITE[c]	# TRAINS IF TOTAL OFF SITE[d]	TOTAL COST IF ON SITE ($1,000)	AQUIFER PROTECTION	NATURAL RESOURCE PROTECTION[e]
Scenario 7 at 10^{-4}: Total Green Space	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 7 at 10^{-5}: Total Green Space	694,000	28	34,700	100	$125	Does not protect GMA. 775,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 7 at 10^{-6}: Total Green Space	700,000	28	35,000	78	$125	Does not protect GMA. 2,622,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 8 at 10^{-4}: North Green South Indust.	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 8 at 10^{-5}: North Green South Indust.	694,000	28	34,700	100	$125	Does not protect GMA. 775,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 8 at 10^{-6}: North Green South Indust.	1,127,000	45	56,350	163	$225	Does not protect GMA. 2,195,000 yd^3 additional soil removal required.	Disrupts 789 acres of terrestrial habitat and 11.4 acres of wetlands

COMPARISON OF FUTURE USE SCENARIOS (continued)

SCENARIO	VOLUME OF ON-SITE SOILS (yd^3)[a]	ACRES OF CELL IF TOTAL ON SITE[b]	# TRUCKS IF TOTAL OFF SITE[c]	# TRAINS IF TOTAL OFF SITE[d]	TOTAL COST IF ON SITE ($1,000)	AQUIFER PROTECTION	NATURAL RESOURCE PROTECTION[e]
Scenario 5 at 10^{-4}: Industrial/ Green Space	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 5 at 10^{-5}: Industrial/ Green Space	694,000	28	34,700	100	$125	Does not protect GMA. 775,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 5 at 10^{-6}: Industrial/ Green Space	841,000	34	42,050	122	$150	Does not protect GMA. 2,481,000 yd^3 additional soil removal required.	Disrupts 1000 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 6 at 10^{-4}: Park/ Green Space	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 6 at 10^{-5}: Park/ Green Space	694,000	28	34,700	100	$125	Does not protect GMA. 775,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 6 at 10^{-6}: Park/ Green Space	705,000	28	35,220	102	$125	Does not protect GMA. 2,617,000 yd^3 additional soil removal required.	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands

COMPARISON OF FUTURE USE SCENARIOS (continued)

	VOLUME OF SOIL (yd^3)[a]	ACRES OF CELL IF TOTAL ON SITE[b]	# TRUCKS IF TOTAL OFF SITE[c]	# TRAINS IF TOTAL OFF SITE[d]	TOTAL COST IF ON SITE ($1,000)	AQUIFER PROTECTION	NATURAL RESOURCE PROTECTION[e]
Off-site Soil Removal to Achieve Resident Farmer at 10^{-5}	190,000	8	9,500	28	$50	Protective of GMA	236 acres of terr. habitat and unknown acres of wetlands
Off-site Soil Removal to Achieve Resident Farmer at 10^{-6}	5,200,000	208	260,000	754	$2,100	Protective of GMA	6,474 acres of terr. habitat and unknown acres of wetlands

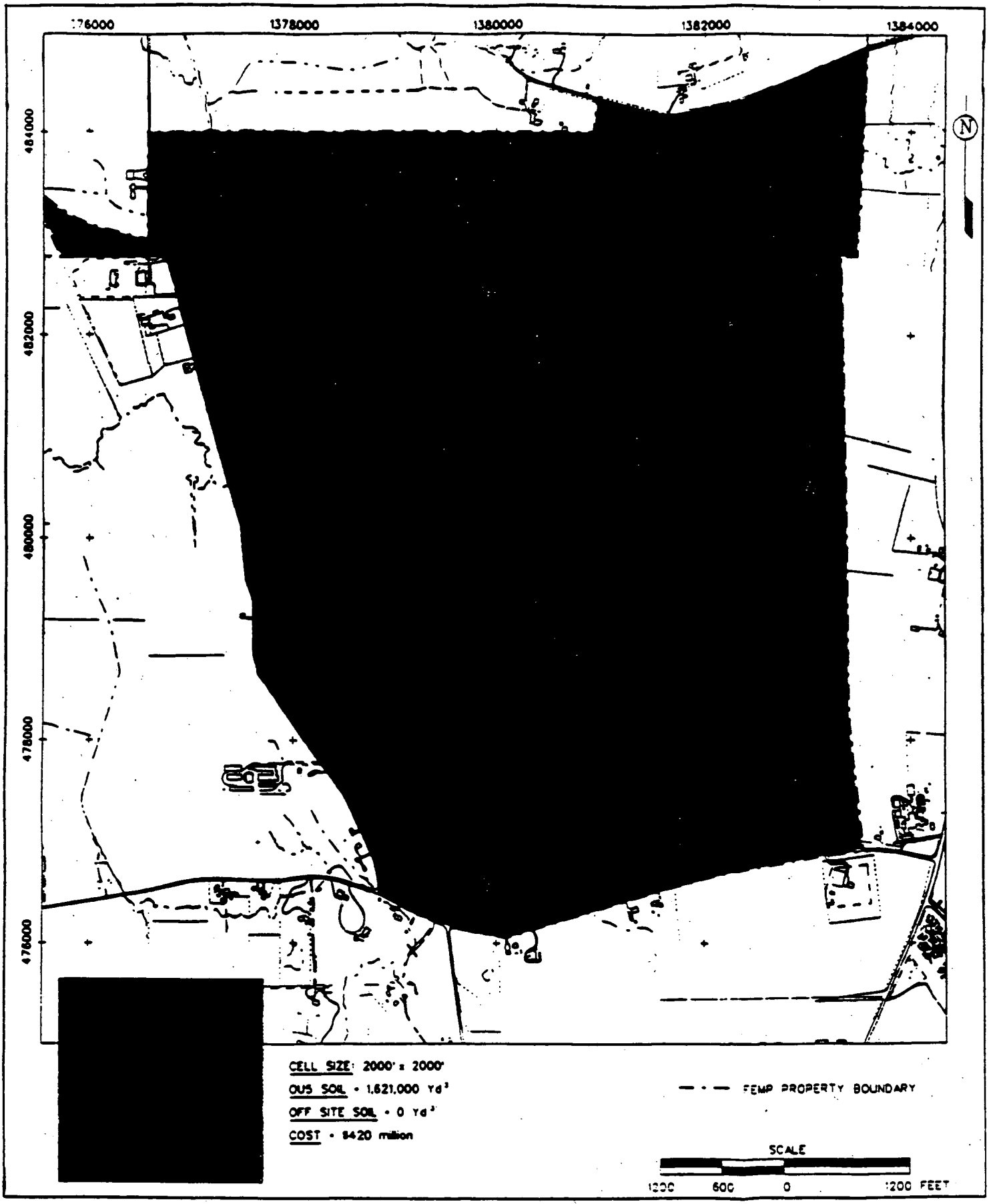
Notes

a) Includes all soils and debris from all OUs for on-site disposal
b) 25,000 yd^3 per acre
c) 20 yd^3 per truck
d) Approximately 6,900 yd^3 per 130 unit train
e) All scenarios present potential impacts to Paddys Run and threatened and endangered species

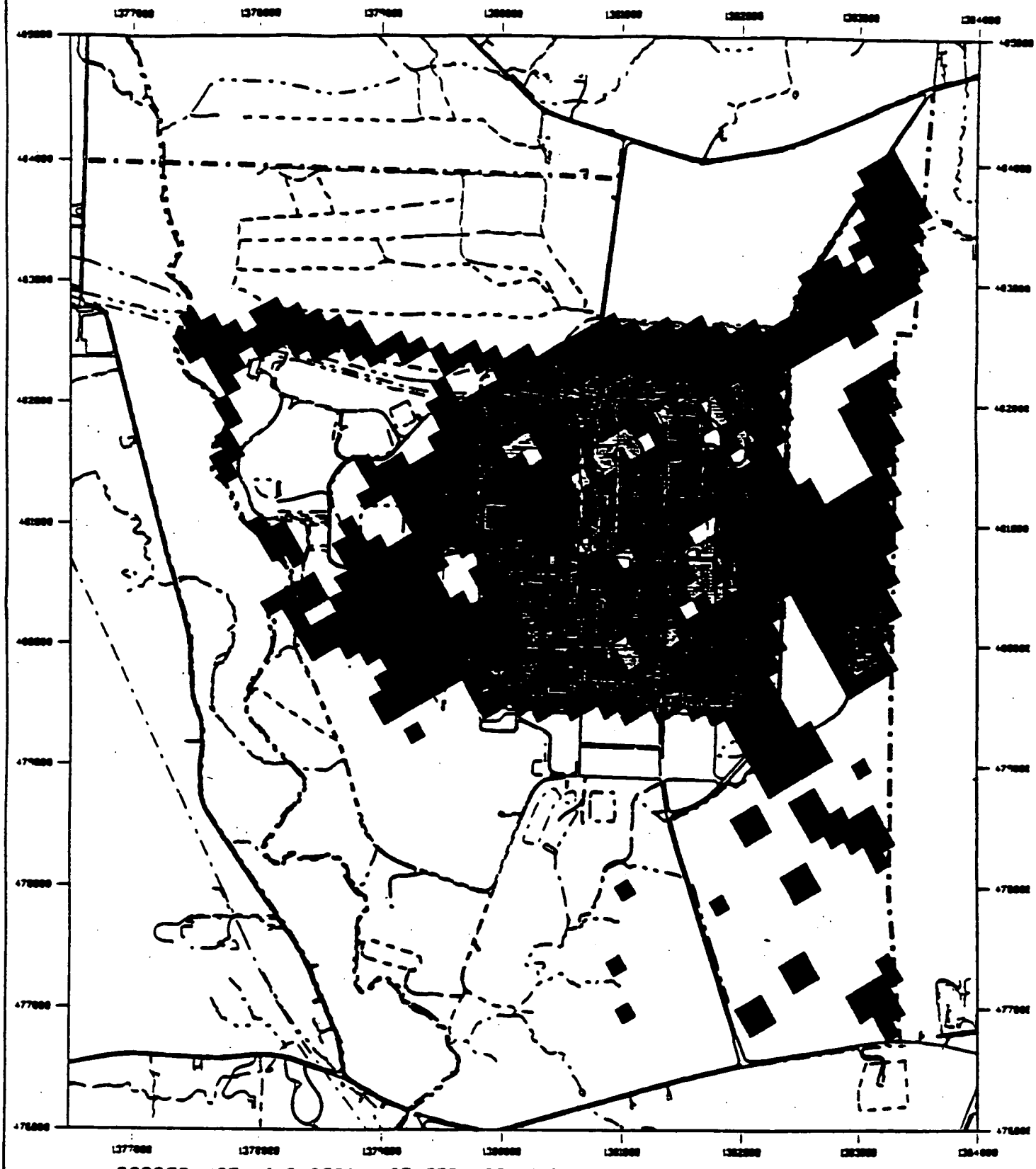
COMPARISON OF FUTURE USE SCENARIOS (continued)

SCENARIO	VOLUME OF ON-SITE SOILS (yd^3)[a]	ACRES OF CELL IF TOTAL ON SITE[b]	# TRUCKS IF TOTAL OFF SITE[c]	# TRAINS IF TOTAL OFF SITE[d]	TOTAL COST IF ON SITE ($1,000)	AQUIFER PROTECTION	NATURAL RESOURCE PROTECTION[e]
Scenario 9 at 10^{-4}: Total Resident	694,000	28	34,700	100	$125	GMA protection to drinking water standards is not achieved at 10^{-4}	Disrupts approx. 500 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 9 at 10^{-5}: Total Resident	1,154,000	46	57,700	167	$265	Protective of GMA but 835,000 yd^3 of additional soil removal required.to protect perched groundwater	Disrupts over 650 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 9 at 10^{-6}: Total Resident	3,618,000	145	180,900	524	$1,600	Protective of GMA but 652,000 yd^3 of additional soil .to protect perched groundwater	Disrupts over 1,000 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 10: Protect GMA to MCLs	1,114,000	45	55,700	161	$250	Protective of GMA.to MCLs	Over 650 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 10a: Protect GMA and perched to MCLs	1,503,000	60	75,150	218	$380	Protective of GMA and perched gw to MCLs.	Over 650 acres of terrestrial habitat and 35.9 acres of wetlands
Scenario 10b: Protect GMA to 10^{-6} risk	3,385,000	135	169,250	490	$1,400	Protective of GMA and perched groundwater to 10^{-6}	Over 1,000 acres of terrestrial habitat and 35.9 acres of wetlands

CLEANUP SCENARIO TO MEET MCLS AND HI OF 1 FOR RESIDENT FARMER



Excavation Profile to Meet MCLs and 10^{-4} for Resident Farmer



FERNALD CITIZENS TASK FORCE

OPTIONS FOR WASTE DISPOSITION

	ON SITE	OFF SITE	TREATMENT
REQUIREMENTS	Protection of GMA for 1000 years. State and Federal design requirements Waiver from State siting regulation Aesthetically acceptable	Assurance of avaialable capacity Transportation regulations Citizen/political acceptance along route and at disposal facility Receiving facility waste acceptance criteria	Treated material must meet cleanup criteria State and Federal regulations for design and operation Treatment process cannot be reversible Generated wastes must be manageable
OPTIONS	Cap materials in place (without liner) Consolidate and cap materials (without liner) Disposal facility with liner and cap	Nevada Test Site Envirocare of Utah	Soil washing with release of the clean portion Soil washing with consolidation of the clean portion
OPTIONS THAT MEET REQUIREMENTS	Disposal Facility (assuming waiver from State siting requirements)	Nevada Test Site Envirocare of Utah	No treatment option is available Treatment options being pursued as potential waste minimization tool in conjunction with on- or off-site disposal
DESCRIPTION	Multi-layer cap and liner Above ground disposal Gradual slope to minimize erosion On best available geology Federal ownership Long-term monitoring	Majority of material to Envirocare via bulk rail transport Containerized truck transport to NTS for wastes that do not meet Envirocare criteria	

KEY ISSUES FOR GROUNDWATER REMEDIATION

ISSUE		AT 20 ppb (MCLs)	AT 3 ppb (10^{-6} risk)
Current Impact of Fernald on GMA	Gallons	1.7 billion	5.8 billion
	% of Total GMA	0.018 %	0.062%
Projected conditions if soil is removed (without groundwater treatment)	10 years	2.1 billion	6.8 billion
	25 years	2.5 billion	8.1 billion
	50 years	2.7 billion	9.9 billion
Projected conditions if soil is not removed (without groundwater treatment)	10 years	2.1 billion	6.8 billion
	25 years	2.6 billion	8.1 billion
	50 years	3.4 billion	11 billion
	1000 years	23 billion	32 billion
Current areal impact of contamination	acres	n/a	1,500
	residential wells	n/a	9
	industrial wells	n/a	8
	total households	n/a	19
	total businesses	n/a	7
Projected maximum areal impact of contamination	acres	n/a	4,200
	residential wells	n/a	58
	industrial wells	n/a	26
	total households	n/a	403
	total businesses	n/a	25
Time to reach cleanup levels if source soils are removed	Full pump & treat	35 years	70 years
	South plume wells	90 years	350 years
	No pumping	160 years	500 years
Time to reach cleanup levels if source soils are not removed		thousands of years	thousands of years
Time until contamination reaches the Great Miami river without pumping		140 years	40 years
Cost of Groundwater Cleanup (assumes soil is remediated)	Begin today	$396 million	$800 million
	Begin in 10 years	$485 million	$952 million
	Begin in 25 years	$590 million	$1.12 billion
	Begin in 50 years	$644 million	$1.4 billion
	Property purchase	$750 million	$750 million

FERNALD CITIZENS TASK FORCE

ON-SITE DISPOSAL OVERVIEW

DESIGN PARAMETERS FOR DISPOSAL FACILITY

- The proposed disposal facilility for Fernald consists of a multilayered cap and bottom liner to isolate the contaminated material for above-grade disposal. Figure 1 provides a to-scale cross-section of the cell as currently envisioned.
- Cell is designed to minimize infiltration of water into waste and remove any water that does reach the waste. These design parameters are illustrated in Figure 2.
- Maximum reliance is on natural materials of construction (i.e., clay and gravel) and on-site materials to extent practical.
- Isolates waste from human and biotic intrusion.
- Provides for leachate detection and collection.
- Gradual slope on cap to minimize erosion and infiltration.
- Material is placed in cell in bulk (no containers) and compacted in layers to inhibit settlement.
- Construction is phased to minimize exposed contaminated material.
- The layers of the cap as illustrated in Figure 3 are:

Vegetative Layer	Provides rooting zone for vegetation. Provides water storage for plant growth. Protects underlying biotic barrier from erosion. Frost protection (together with the filter layer). Vegetation transpires moisture back to the atmosphere, reduces infiltration, stabilizes soil against erosion, and competitively excludes deep-rooted plants.
Filter Layer	Prevents piping of soil into biotic barrier. Drains infiltration from vegetative layer and retards further root growth. Frost protection (together with the vegetative layer).
Biotic Layer	Prevents root growth and animal intrusion. Prevents inadvertent human intrusion. Serves as backup erosion and frost protection if upper layers are eroded.

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FERNALD CITIZENS TASK FORCE

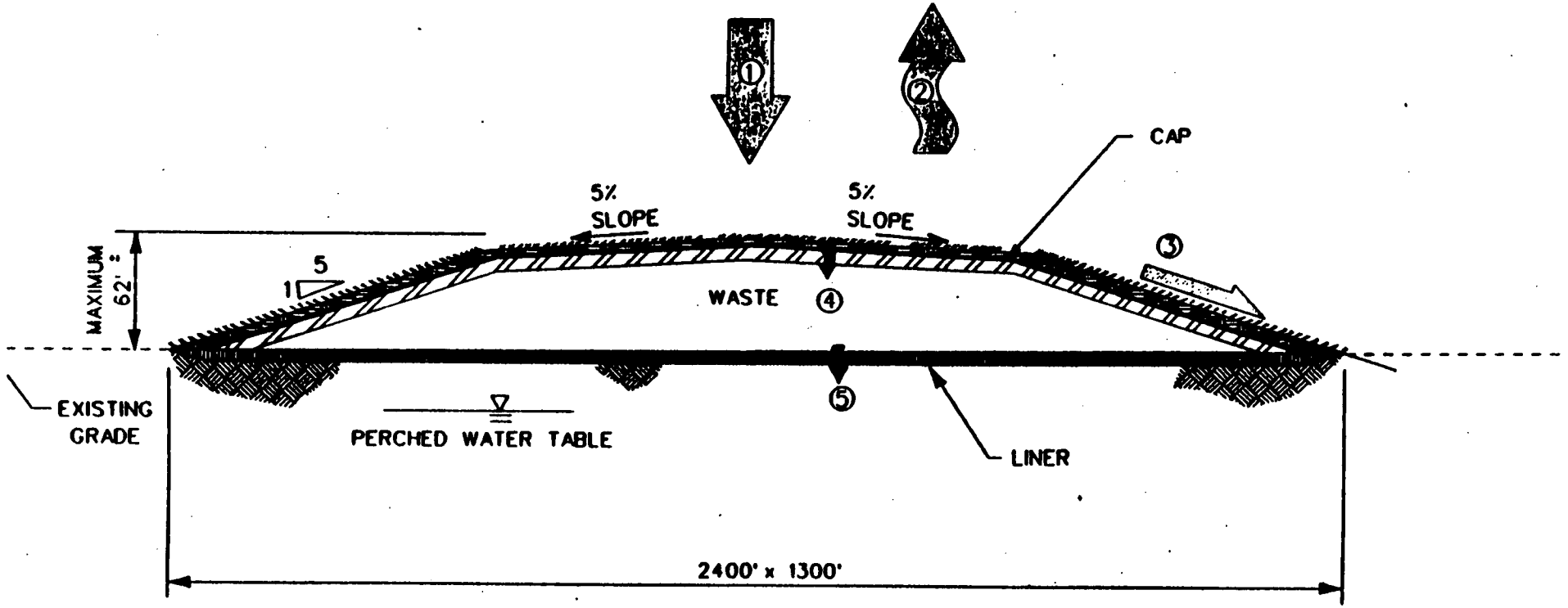
SUMMARY OF ON-SITE AND OFF-SITE DISPOSAL OPTIONS

	ON SITE	OFF SITE
COST	Unit Cost: $175/cubic yard Volume 2.4 million cubic yards Total Cost $420 million Annual O&M $1.4 million	Nevada Test Site Unit Cost: $1440/cubic yard Volume 2.4 million cubic yards Total Cost $3.46 billion Envirocare Unit Cost: $530/cubic yard Volume 2.4 million cubic yards Total Cost $1.27 billion
TIME TO IMPLEMENT	Approximately 20 years (linked to building demolitions).	Approximately 20 years (linked to building demolitions).
KEY ADVAN-TAGES	Minimizes transportation risk for large quantities of material (2.4 million cubic yards). Keeps materials at the site that can be managed safely within site imposed constraints. Does not "shift" custodial care for these materials elseware. Reserves capacity offsite for other materials from other sites that cannot be managed safely within site imposed constraints. Minimizes transportation "opportunity costs" such as for fossil fuel consumption and air pollution along transportation route. Lowest total cost option to taxpayer.	Provides highest level of certainty of long-term protection of human health and environment at the FEMP site. Eliminates perpetual institutional care requirements at FEMP. Frees up the maximum footprint of FEMP land for available alternate use. Eliminates reliance on modeling forecasts/ future projections of risk that cannot be quantified with a high level of certainty.
KEY CONCERNS	Relies on models to assess future potential risk and degree of protection provided. Triggers need for perpetual institutional care of the waste disposition area. Engineering and institutional controls must be relied upon to provide protection over the long term. Requires dedication of approximately 10% of FEMP property to perpetual care.	Transportation risks and logistics of shipping 2.4 million cubic yards of material more than 1500 miles. Relies upon forecasted disposal capacities nationwide which remain uncertain. Relies upon State acceptance of transportation along the route and disposal at the receiving States. Less control over the ultimate costs of the remedy (disposal site capacity and nationwide demand for such capacity come into play for FEMP remedy).

		EXPECTED (inches/year)	MODELED (inches/year)
①	RAINFALL	40.6	40.6
②	EVAPOTRANSPIRATION	30.0	30.0
③	DRAINAGE	10.5	9.0
④	FLOW THROUGH WASTE	0.1	1.2
⑤	FLOW INTO SOIL	0	1.2

FERNALD CITIZENS TASK FORCE

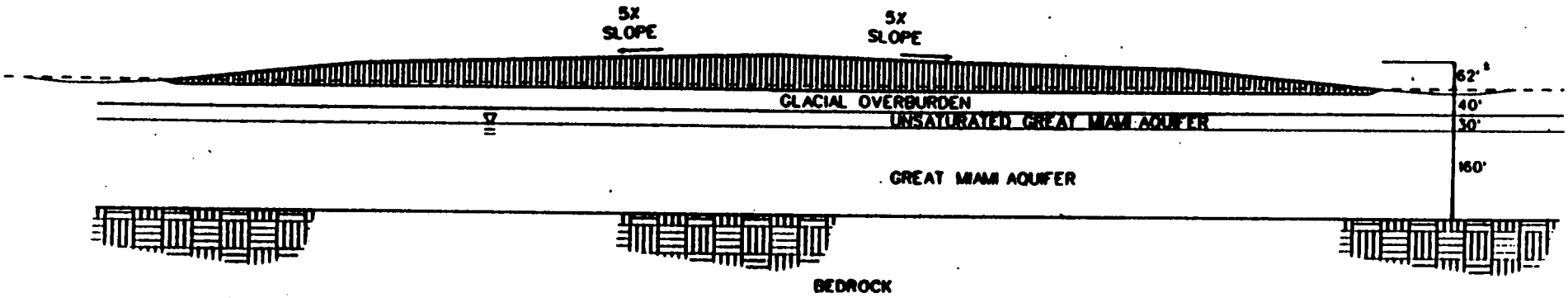
Figure 2. DESIGN OF CELL

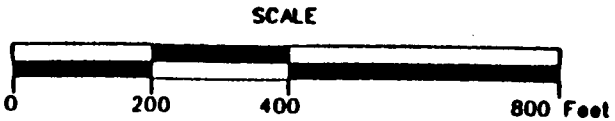


(SCALE EXAGGERATION: APPROXIMATELY 1-VERTICAL TO 5-HORIZONTAL)

FERNALD CITIZENS TASK FORCE

Figure 1. SCALE VIEW OF CELL





DESIGN PARAMETERS FOR DISPOSAL FACILITY (continued)

Drainage Layer	Drains water laterally off infiltration barrier, thus reducing water pressure on barrier and infiltration through cap system. Protects infiltration barrier from larger rock in biotic barrier.
Infiltration Barrier	Barrier against infiltration of moisture into disposed material. Barrier against emanation of radon.
Contouring Layer	Allows construction of proper contours on which to lay cap system.

- The layers of the bottom liner as illustrated in Figure 4 are:

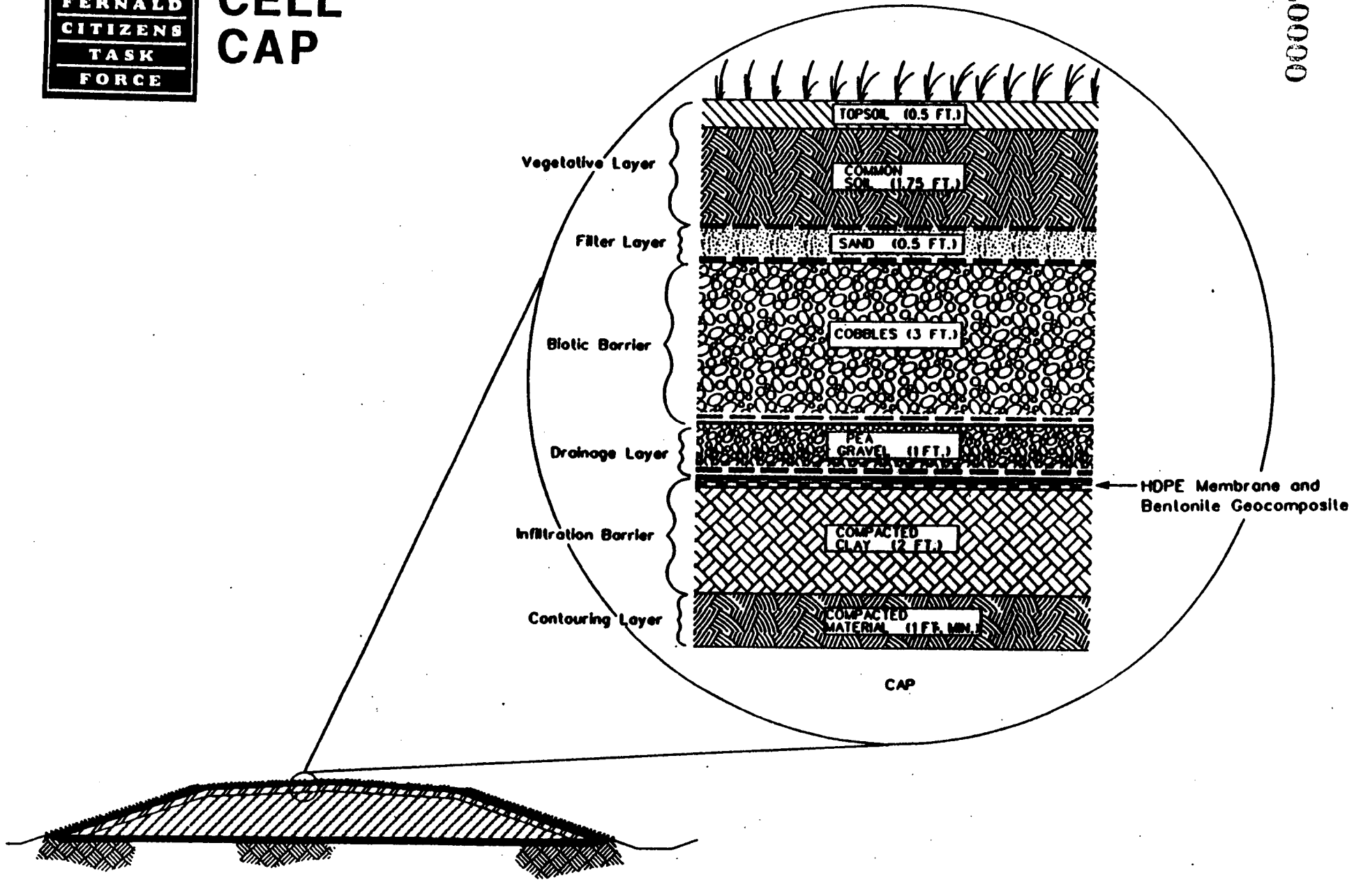
Cushion Layer	Prevents debris within disposed material from damaging liner system.
Leachate Collection System	During construction, captures water that runs off or infiltrates through waste. Following completion of construction, captures water that infiltrates cap system Captured water drains laterally to central collection facility, and water pressure on primary liner is reduced.
Primary Liner	Minimizes downward vertical movement of water during and after construction.
Leak Detection	Provides a means of determining if primary liner system is functioning properly. Intercepts and collects water that passes through primary liner. Captured water drains laterally to central collection facility, and water pressure on secondary liner is reduced.
Secondary Liner	Provides final engineered barrier against downward vertical movement of water that has infiltrated or run off the disposed material.

LOCATION OF DISPOSAL FACILITY

- Best available site geology (ongoing siting study has narrowed best geology to the northeast portion of FEMP).
- Location must take into account minimizing aesthetic impact on neighbors.
- State required buffer zones:
  300 foot required by State from line
  1,000 feet from nearest domicile or well.

FERNALD CITIZENS TASK FORCE

Figure 3. CELL CAP



WASTE ACCEPTANCE CRITERIA

- Maximum concentration for uranium in disposal facility is 1,080 ppm.
- Maximum concentration for other contaminants also required to protect aquifer to MCLs for 1,000 years.
- Waste acceptance criteria based on Fernald wastes only.
- Limitations will be placed on maximum size of construction debris to ensure cell stability. Construction debris must be mixed with soil to ensure stability.

REGULATORY REQUIREMENTS

- Placement of waste over sole source aquifer requires a waiver from State of Ohio regulation. Waiver based on demonstration that facility design in combination with geology will provide an equivalent standard of performance.
- Must meet Federal and State facility liner and cap design requirements.

PROJECTED CAPACITY AND SIZE

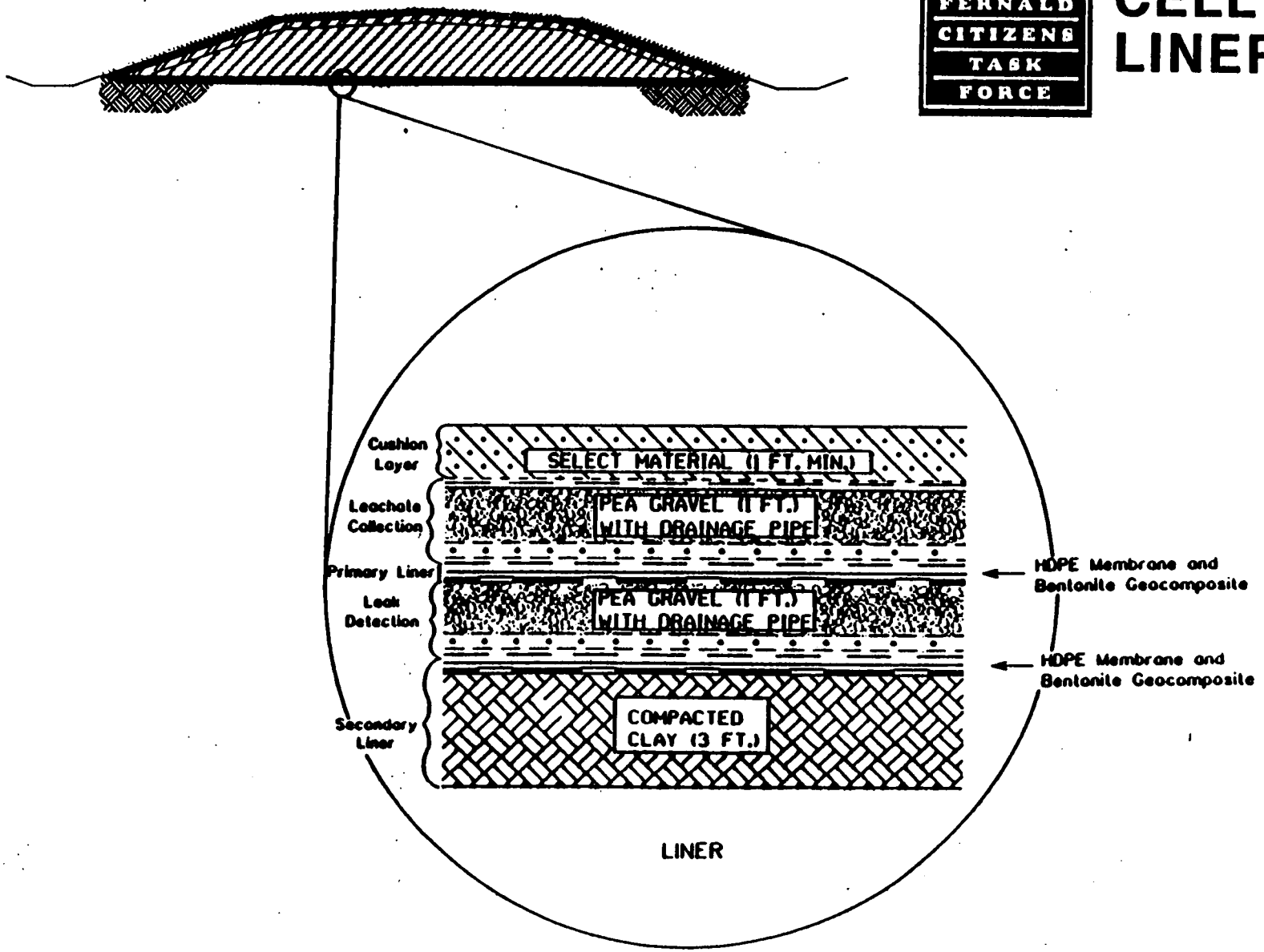
- Approximately 2,4000,000 cubic yards being considered for on-site disposal under Task Force recommended cleanup levels.
- Size will be determined by final volumes and aesthetic parameters, conceptual design for cell size is 2400' x 1300' or approximately 72 acres. The 300' buffer zone would encompass an additional 59 acres.
- As conceptually designed average height will be 56 feet and maximum height will be 62 feet at peak.

COST

- Total disposal facility capital cost is $420 million ($175 per cubic yard).
- Total disposal facility annual operation and maintenance cost is $1.4 million.

FERNALD CITIZENS TASK FORCE

Figure 4. CELL LINER



RISK DURING IMPLEMENTATION

- Risk to on-site remedial workers:

Carcinogenic	7.3×10^{-3} (without respirators, see note)
Carcinogenic	7.3×10^{-4} (with respirators, see note)
Non-carcinogenic	HI = 27
Mechanical injuries	200
Mechanical fatalities	0.8

Note on use of respirators:
Use of respirators is not assumed unless air emissions are at levels requiring their use because of expense, loss of productivity, and increased risk of accident. Workers are at increased health risk due to stress and fatigue. Decreases in efficiency result in more time to perform the task and thus increased exposure to mechanical accident. Decreased visibility and communication also contribute to increased risk of accident. Use of personal protective equipment including half-mask respirators increase project costs by $26,300 per worker per year.

- Risk to on-site non-remedial workers:

Carcinogenic	5.3×10^{-7}
Non-carcinogenic	HI = 0.0038

- Risk to off-property public at fenceline:

Carcinogenic	4.4×10^{-7}
Non-carcinogenic	HI = 0.0024

USE OF MAN-MADE LINER MATERIALS AT FERNALD

- **The proposed waste disposal cell** design relies completely on natural materials to achieve the 1,000 year design life. Man-made high density polyethylene (HDPE) liners are included in the design for compliance with the legal requirements of the design and because they provide redundant protection during the short-term while the water level in the contaminated material placed in the cell reaches equilibrium. The HDPE is not expected to last 1,000 years however, and is not considered in the modeling of disposal cell performance.

- **The storm water retention basin** constructed in 1986 uses a man-made liner of a 40 mil synthetic fiber combined with 18" of soil-bentonite mix and drainage to detect and collect leaks. Holes thought to be caused by stones beneath the synthetic liner were found during repairs in 1994. Liner seams were sound.

- **The biosurge lagoon** constructed in 1985 uses the same double liner design as above using HDPE, however, the placement of drainage pipes resulted in only 6" of soil-bentonite beneath the pipes which resulted in some leaks. The system has since been redesigned to add 6" of sand above the HDPE liner with a resin coated fabric on top. Some leaks were detected early on, but is now considered to be performing well.

- **Pit 5** constructed in 1968 was installed with a rubbe er that had a 15 year guarantee. Initial inspection found 36 splices that h leak potential. Liner was reinforced, reinspected and put into service on October 21, 1968. Liner guarantee expired in 1983.

MAINTENANCE/MONITORING/INSTITUTIONAL REQUIREMENTS

- Continued Federal ownership of disposal facility area.
- Permanent Markers identifying location of disposal facility.
- Fencing around disposal facility, similar to current site fencing.
- Long-term groundwater monitoring system.
- Long-term leachate collection system.
- Routine inspections and sampling every six months.
- Maintenance of cap as required.
- Reviews of system performance, at least every five years by DOE and EPA.

RETRIEVABILITY

- Consolidation without waste form modification permits future recovery in the event of improved or cost-effective treatment.

LONG-TERM PERFORMANCE

- Modeled performance of disposal cell for 1,000 years into future.
- Waste acceptance criteria was developed under assumed failure of synthetic components of cap and lining systems.
- Conservative assumptions used for underlying geology.

DURATION

- Earliest possible receipt of contaminated material in disposal facility is fall 1997.
- Disposal is expected to continue through 2017 (20 years), but will be dependent upon budgets and progress of building demolition.

TRANSPORTATION REQUIREMENTS

- Nevada Test Site
  - 2,200 miles from Fernald
  - Truck transport, no rail service
  - 120,000 truck loads
  - Dedicated trucks
  - 15 loads per day for 20 years
  - 528 million total truck miles.
    - 176 million gallons of gas
    - 2,600 tons of CO emissions
    - 755 tons of hydrocarbon emissions
    - 28,572 tons of NOx emissions

- Envirocare
  - 1,913 miles from Fernald
  - Both truck and rail, rail preferred
  - 900 train loads
  - Dedicated trains
  - One train of 47 cars every 8 days for 20 years
  - 3.4 million total rail miles.

TOTAL COST

- To Nevada Test Site: $3.46 billion ($1,440 per cubic yard)
- To Envirocare: $1.27 billion ($530 per cubic yard)

DURATION

- 20 year estimate based on budget projections and building demolition.

RISK DURING IMPLEMENTATION

- Risk to on-site remedial workers, assuming respirators are not used:

Carcinogenic	4.2×10^{-3}
Non-carcinogenic	HI = 18
Mechanical injuries	138
Mechanical fatalities	0.6

- Risk to on-site non-remedial workers:

Carcinogenic	4.4×10^{-7}
Non-carcinogenic	HI = 0.0025

OFF-SITE DISPOSAL OVERVIEW

OFF-SITE DISPOSAL LOCATIONS

- There are two U.S. facilities available to accept the waste types found at Fernald.

- Nevada Test Site
  - DOE owned and operated facility
  - Located 65 miles northwest of Las Vegas, Nevada
  - Waste disposed in shallow pits and trenches with earthen cover

- Envirocare
  - Commercially owned and operated facility
  - Located near Clive, Utah 80 miles west of Salt Lake City
  - Waste disposed in clay lined cells

WASTE ACCEPTANCE CRITERIA

- Nevada Test Site
  - Accepts low-level nuclear wastes
  - Does not accept hazardous or mixed wastes
  - Wastes must be containerized
  - All Fernald low-level wastes meet criteria
  - No current limit on capacity.

- Envirocare
  - Accepts low-level nuclear wastes
  - Accepts hazardous wastes meeting Federal land disposal restrictions
  - Accepts both containerized and bulk wastes
  - Imposes size restrictions for debris
  - Limits concentrations of individual hazardous constituents
  - All 2.4 million under consideration meet criteria
  - 2.5 cubic yards of capacity permitted and developed
  - Up to 18 million cubic yards total capacity.

RISK DURING IMPLEMENTATION

- Risk to on-site remedial workers:

Carcinogenic	7.3×10^{-3} (without respirators, see note)
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Non-carcinogenic	HI = 27
Mechanical injuries	200
Mechanical fatalities	0.8

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RISK DURING IMPLEMENTATION (continued)

- Risk to off-property public at fenceline:
  - Carcinogenic 3.6×10^{-7}
  - Non-carcinogenic HI = 0.002

- Risk to off-property transportation worker:

  Envirocare Option
  - Carcinogenic 1.5×10^{-5}
  - Transportation injuries 15
  - Transportation fatalities less than 1

  Nevada Test Site Option
  - Transportation injuries 29
  - Transportation fatalities 2

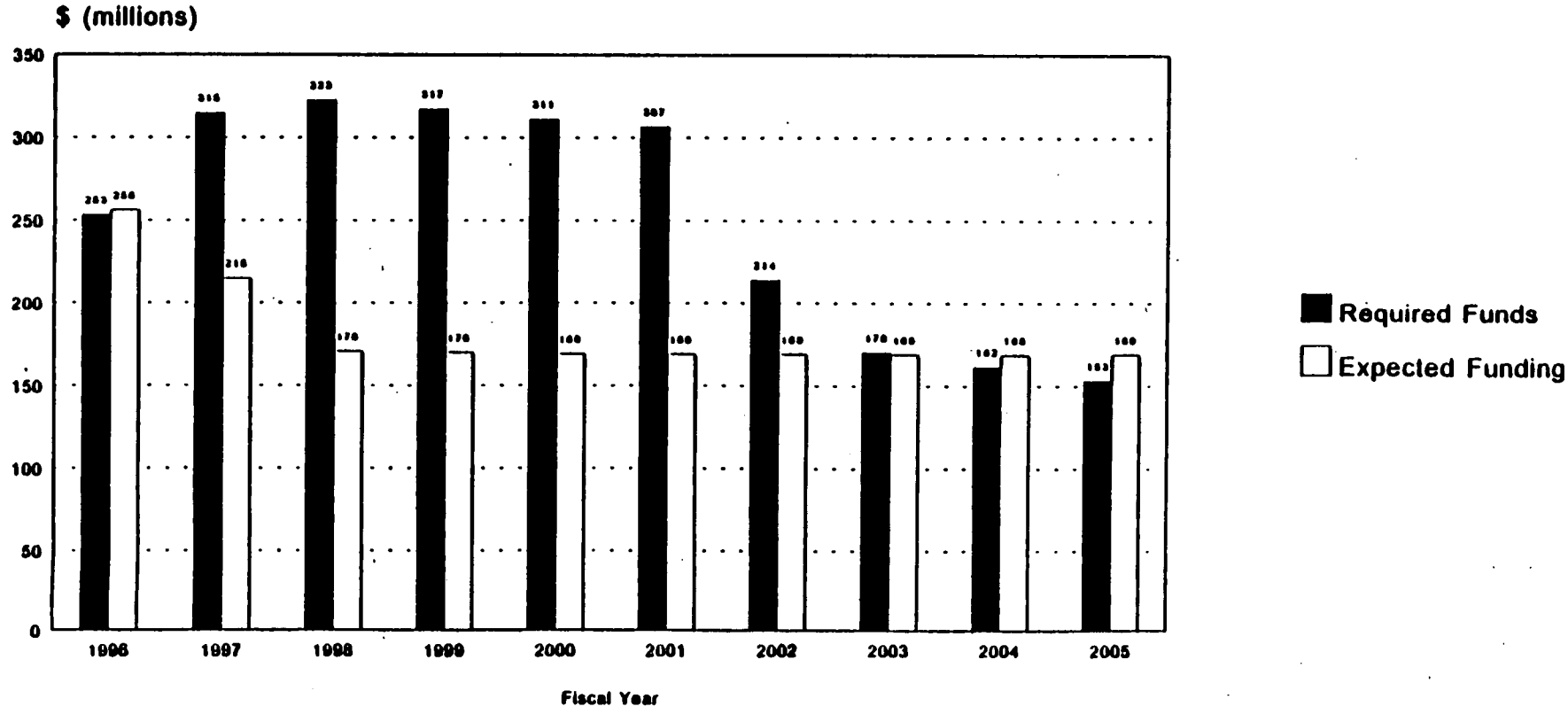
- Risk to public along transportation route:

  Envirocare Option
  - Carcinogenic 1×10^{-7}
  - Transportation injuries 22
  - Transportation fatalities 6

  Nevada Test Site Option
  - Transportation injuries 86
  - Transportation fatalities 9

10-YEAR CLEANUP SCENARIO

FEMP Funding Required vs Expected Funding - Unescalated



Constant 1995 dollars.

T80000

2202

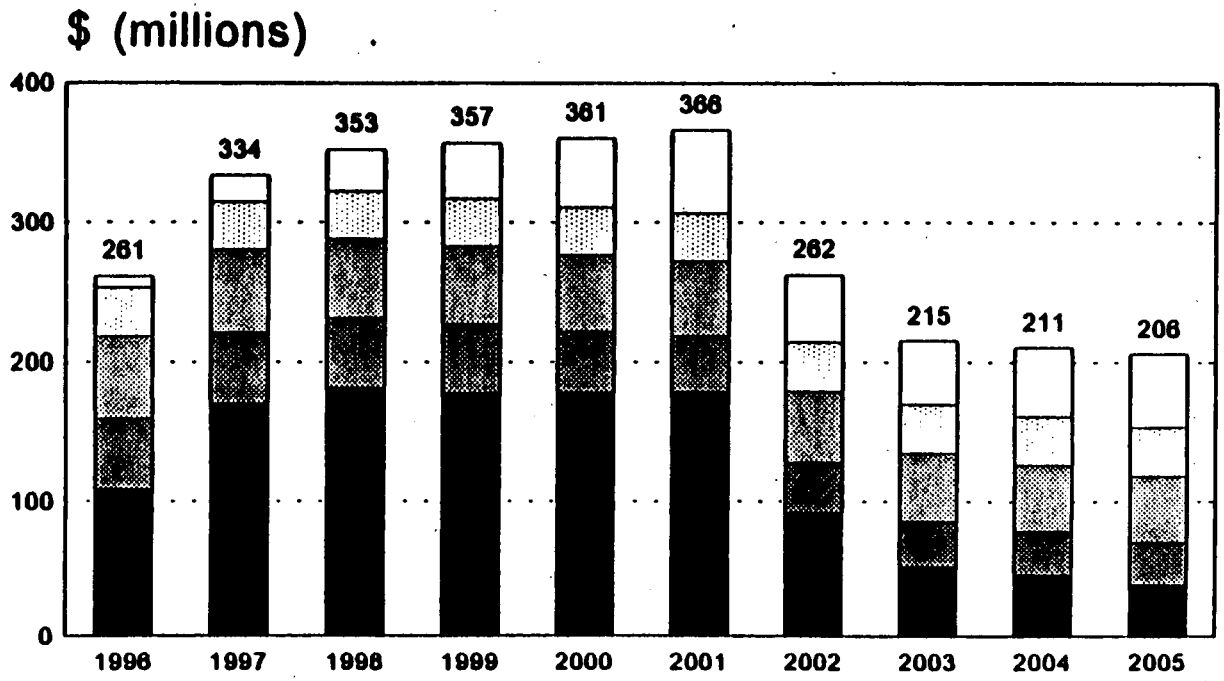
Comparison of Constrained and Unconstrained Funding Scenarios

Activity Description	*Duration in Months/ (Approx. End Date) 10-Year Schedule*	*Cost in FY-95 Dollars 10-Year Schedule*	*Duration in Months/ (Approx. End Date) 25-Year Schedule*	*Cost in FY-95 Dollars 25-Year Schedule*
OU 1 Response Actions	84 (2003)	$371,000,000	168 (2009)	$622,000,000
OU 2 Response Actions	57 (2001)	$46,000,000	36 (1999) - 24 (2011)	$61,000,000
Inactive Flyash Pile	12	$9,400,000	1999	
Active Flyash Pile	12	$9,100,000	1999	
South Field	12	$9,300,000	1999	
Landfill	3	$9,000,000	2011	
Lime Sludge	2	$9,200,000	2011	
On-Property Disposal Facility	* (2006)	$127,000,000	48 (2002) - 132 (2020)	$166,000,000
OU 3 Response Actions	108 (2004)	$291,000,000	48 (2002) - 108 (2017)	$319,000,000
Safe Shutdown Summary	48	$39,000,000	2000	
Building/facility D&D; Waste Disposition	108	$252,000,000	2017	
OU 4 Response Actions	84 (2003)	$145,000,000	96 (2004)	$167,000,000
OU 5 Response Actions	**	$281,000,000	300 (2020)	$329,000,000
Groundwater	**	$81,000,000	(2020)	
AWWT operations thru 2006	120	$58,000,000	(2020)	
Soil	120 (2006)	$122,000,000	96 (2019)	
Legacy Waste Management	12 (1997)	$22,000,000	24 (1998)	$60,000,000
Administration/Project Management	120 (2006)	$536,000,000	300 (2020)	$766,000,000
Landlord	120 (2006)	$420,000,000	300 (2020)	$840,000,000
TOTAL		$2.2 Billion		$3.3 Billion

* Earliest possible date the on-property disposal facility will be available to receive materials is August 1, 1997. The cap will be in-place 12 months following the receipt of last materials.

** OU5 response actions — specifically groundwater — will continue until completion in 2020. Operation of AWWT will continue as necessary beyond 2005 to attain discharge limitation to the Great Miami River.

10-Year Cleanup Scenario
Cost Projection with Escalation



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Escalation Cost	8	19	30	40	49	60	48	45	49	53
Other Costs	35	35	35	35	35	35	35	35	35	35
Program MGMT.	59	59	56	55	54	53	51	50	49	49
Base Services	51	51	50	49	44	40	36	34	32	31
Remediation	109	171	182	178	178	179	92	51	45	38

Fiscal Year

Other costs include DOE support and fees.
Escalation estimated at 3% per annum.
1995 is Base Year.

APPENDIX F.

SUMMARY OF TASK FORCE MEETINGS

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FERNALD CITIZENS TASK FORCE

SUMMARY OF FERNALD CITIZENS TASK FORCE MEETINGS

Key decisions are indicated with a ★

September 9 and 18, 1993 Meetings:

- Orientation

October 14, 1993 Meeting:

★ • The Task Force charter was approved.

★ • The ground rules were approved.

★ • Task Force members agreed that they wanted outside staff support. A subcommittee was created to develop a scope of work for outside staff.

★ • The Task Force recommended to DOE that Darryl Huff, a Morgan Township resident, be added to the Task Force.

December 9, 1993 Meeting:

★ • The Task Force recognized future use as its first priority because recommendations on future use are the foundation for decisions on other strategic issues.

January 15, 1994 Meeting:

★ • The Task Force asked DOE to develop a public notification plan regarding waste shipments to and from Fernald.

- In a brainstorming session, the Task Force discussed future land use options for the Fernald site in a brainstorming session. The options offered by members include:

Note: ● indicates potential future uses, while ★ represents those future use possibilities considered criteria by Task Force members.

- Industrial Park
- Residential
- Site will be split
  North/South - Storage
- Recreational
- Museum of Nuclear Power Energy
  Education, History
- Wildflowers, scenic preserve
- Extended Employment - Atomic "Deprocessor"
- Natural Ecosystem Preserve
- Research facility
- Agriculture, grazing
- Memorial park/cemetery
- Storage facility for wastes
- Industrial - Use of existing infrastructure
- Disposal facility
- Technology and development - research facility
- Memorial to site activities
- DOE control forever
- Police/fire/CPR training facility
- Waste cells in northern part of site, away from groundwater
- Trees/sanctuary
- Hospital - national focus
- Reading room/accessible historical
- Wetlands/Preserve/Research
- Limited access/DOE control
- Avoiding repetitive mistakes
- Tax base protected under any ownership
- Park
- Multiple uses
- Reduce physical barriers
- Government offices
- Restriction of off-site materials
- Paddy's Run undisturbed
- Wetlands/Natural Areas Preserved
- Existing infrastructure contaminated
- Power Plant (gas, nuclear)

- Creation of trust for control
- Yard waste/composting
- Connection to Great Miami River
  Increase public access/green space
- Centralized training/education center
  Emphasizing nuclear/environmental education
  Both government and private
- Pristine cleanup
- Ecology center
- Get to the point of no negative impacts
  Let nature take over/green space
- Give back to community
- Rail system transportation options
- Low level radiation disposal
- Self supporting/non-DOE facility
- Do not preclude better cleanup in the future
- Federal government (not necessarily DOE) control/responsibility, regardless of owner
  oversight and responsibility
- All uses should have acceptable risk
- Federal penitentiary
- Waste Water Treatment facility
- Build on existing technology and infrastructure
- Federal Facility Compliance Act Treatment Center
- Public school
- Water processing/water sales
- Preserve site history - research
  Educational tools created
- Archives, DOE records
- Warehouses
- Uses over time may change
- Recycling center
- Any process should be non-hazardous
- Laboratory
- Full health care retirement village
- Creation of environmental monitoring zone/research
- Vocational training, community college
- Identify significant natural areas
- Expand and connect with existing off-site uses
- No increase in risk
- No further defacement of environment
- Must be reconciled with local zoning/planning
- Must include input from public at large
  Beyond five-mile radius

Upon request of the chair, some members of the audience volunteered potential options during the Task Force's discussion of future land use at Fernald. Those ideas included:

- Transportation Hub
- Sports Complex - community or professional
- Regional Airport

February 12, 1994 Meeting:

★ • The Task Force approved its work plan which outlined issues to be addressed, work product to be developed, and a tentative schedule.

★ • The Task Force approved DOE's hazardous materials and waste shipments notification plan subject to providing the information to local governments and emergency management officials, as well as any individual or group that requests it, and including notification of incoming hazardous materials.

• The Task Force identified future use criteria for consideration. The criteria include:

■ Environmental Criteria
  - Identify/preserve significant natural ecosystems
    - wetlands
    - Paddys Run
    - threatened/endangered species
  - No future defacement of environment
  - On-site storage must be protective of groundwater
  - Protect the great miami aquifer, protect air and soils, future protection
  - No net increase in risk

■ Social and Human
  - Give back to community
    - beneficial to the community
  - Avoid repetitive mistakes
  - All uses must have acceptable risks
  - Current and future generations
    - safety be kept in mind
  - Inclusive of ideas from the public at large (radius greater than five miles)

- Complementary to off-site uses that are compatible with surroundings
- Promotes history/research/education (site, nuclear energy)
- Shifting a negative situation to a positive situation

■ Economic
- Provide employment opportunities
  - acknowledge that unemployment might accompany the phase that follows cleanup
- Protect tax base
- Build on existing infrastructure, if possible (cushioning the impact on employment at the site)

■ Long Term Management
- Create trust and funding mechanism for control
  - long-term entity to control property, responsibility in perpetuity
- Reconcile w/local zoning and planning
- Flexibility to provide for future changes in use/better cleanup (tradeoffs)
- Federal government must retain responsibility/ownership regardless of ownership (discussion of ownership came up in terms of taxes for local communities)
- Assurance of citizen participation in decision process concerning the site
- Monitor and be accountable for any contamination and waste left on site

■ General Use
- Recognize that multiple uses may be appropriate
- Reduce physical barriers
  - to be a better neighbor to surrounding communities
- No waste import
- Recognize impact of off-site waste shipment
  - political, safety and health ramifications
- Only non-hazardous uses
- No net increase in risk
  - decrease of risk is desirable

★ ● The Task Force decided it needed specific information in order to focus on developing a future use recommendation. That information included:

- History and strategy for managing uranium discharges (where it is, how it got there, where is it going, where will

it be in future, etc.)
- Vocabulary and concepts regarding land use planning
- Levels of contamination (how hot is it, contamination primer, levels, type, etc.)
- Format similar to the draft Site Development Plan
- Consistency of data in tables
- How and to what extent the aquifer is being affected
- Terminology be defined, chemicals, metals, emergent wetlands
- Disposal storage, tradeoffs discussion
- Information about the quality of the resources (Great Miami River) and infrastructure
- Methods of removing wastes, technologies
- Resource people available from DOE and FERMCO
- Current situation -- what's going on on-site, current happening and work force activities

★ • The Task Force agreed to use in its discussions the classes of land use previously identified by DOE:

- Industrial/commercial (usually no living on site, no minors as would be the case for day care centers or schools)
  - assumes large amount of site is covered with asphalt or concrete in the risk assessment
- Residential (small children playing in dirt, etc.)
- Agricultural (can be most stringent because of farming, grazing, intake into animals, etc.)
- Recreational (usually allows for higher levels of contamination because of limited surface use and limited amount of time on that site)
- Native American/cultural

March 12, 1994 Meeting:

- The Task Force and members of the public in attendance identified these threats from Fernald that have relevance to future use considerations:

  - Drinking water wells and contaminated water off site
  - Air quality during remediation
  - Risks of transportation
  - Lack of funds
  - Loading the aquifer with contamination
  - Combined risks of multiple contamination
  - Long-term impacts of not having information (secrecy)

- Impact of Paddy's Run Road Site
- Time management
- Complex-wide decision impacts
- Not having off-site disposal options
- Lawsuits from mismanagement
- Vulnerable populations
- Shipments from off-site
- Changes in laws and regulations
- Natural disasters
- Worker and resident health and safety
- Non-uranium contaminants
- Environmental risks from remediation to wildlife
- Stress/psychological risk from process and unknowns
- Agricultural products
- Exposure to any radioactivity
- Exposure to any toxics
- Property values
- Any residual contamination
- Radon
- Natural Resources
  - Aquifer
  - Wildlife
  - Land (soils)
  - Air
- Loss of jobs/impact on local economy
  Perception of mismanagement
- Unachievable goals

April 9, 1994 Meeting:

- The Task Force discussed potential technologies for cleaning the Fernald site, including:

  - Vitrification (turning contaminated materials into glass)
  - Soil washing (using a solvent to remove contamination)
  - Cementation (immobilizing constituents in waste with cement)
  - Thermal drying (removing water and other liquids with heat)

May 14, 1994 Meeting:

- The Task Force and members of the public played *FutureSite*, a hands-on exercise designed to allow players to explore various future use scenarios. The objective is to move various colored chips, which represent different volumes and concentrations of uranium-contaminated soil, in order to achieve particular future uses. Specifically, the exercise uses stacks of different colored chips to represent uranium-contaminated soil at the Fernald site. The different colors indicate varying concentrations and volumes of contaminated soil. The "game board" is a map of the site that is marked with a 1000-square-foot grid. The object of the exercise is to move chips into on-site or off-site disposal bins to achieve the desired future use. Players then have an accurate idea of how much soil must be cleaned to reach a certain land use. Players also tally the cost associated with moving chips to calculate the estimated cost of such a cleanup.

June 11, 1994 Meeting:

- The Task Force and members of the public played *FutureSite* again, at the more conservative 10^{-6} risk level. Other changes made to the game include:
  - New numbers for volumes of contaminated soil that incorporate volumes of material from Operable Unit 2 and Operable Unit 3.
  - Elimination of the treatment option because under current interpretation of the regulations, the "clean" fraction of soil would still have to be handled as waste.

- DOE officials, contractor managers, and members of the public also played *FutureSite*; the Task Force discussed the preliminary findings playing the game. Two basic variables were analyzed:

  1. Use of Property
     Restricted
     Undeveloped Park/Greenspace
     Developed Park
     Commercial/Industrial
     Residential/Agricultural

  2. Disposition of Waste
     On-Site
     Off-Site (limited to one million cubic yards)

These strategies emerged from playing *FutureSite*:

1. The Buffer Strategy
   Many groups were concerned most with cleaning up the edges of the property as much as possible and leaving the more contaminated materials in the center of the site at the location of the former processing facility.

2. The Incremental Land Use Volume Strategy
   Some groups approached the problem from an incremental cost-benefit approach by removing successively less contaminated material to achieve a higher level of allowed use and stopping after each iteration to calculate total cost.

Regardless of the strategy employed, the result was to clean up to allow for two uses: less restrictive on the borders and more restrictive in the center. In each case, the location of the disposal facility coincided with the more contaminated center.

Three preliminary scenarios have resulted from the initial rounds of the exercise:

1. Residential Border, Commercial Center
   100 percent on-site disposal: $662 million (127 acres)
   With 1 million cubic yards off-site: $1.262 billion (50 acres)

2. Residential Border, Park Center
   100 percent on-site disposal: $661 million (127 acres)
   With 1 million cubic yards off-site: $12.61 billion (50 acres)

3. Commercial Border, Park Center
   100 percent on-site disposal: $459 million (88 acres)
   With 1 million cubic yards off-site: $1.006 billion (11 acres)

Approaches used by players include:

A. Clean To Residential, But Not Allowing Residential
   Several groups sought residential cleanup levels, but did not wish to see the property to be used for anything other than green space.

B. Prevent Ecological Destruction
   Some groups were concerned with the ecological damage that would coincide with large-scale removal of soil and vegetation.

C. Limit Off-Site Transportation
Some groups were highly concerned with the number of trucks or trains that would be required for large volumes of off-site waste disposal.

D. No Physical Sign of Contamination
One group raised concern about uses that would result in physical access restrictions to property.

E. Adjacent Property at Same Use
Several groups were concerned that the property immediately at the border of the site was cleaned to the same use as that off-site.

- The Task Force agreed to cancel its July and August meetings in order to allow for future use scenario evaluation by the consultant.

September 10, 1994 Meeting:

★ • The Task Force reached agreement on its consensus values, which developed from the future use criteria. The consensus values are:

ENVIRONMENTAL VALUES

- Identify and preserve significant natural ecosystems with a special emphasis on:
  naturally occurring wetlands
  Paddys Run
  threatened and endangered species
- Minimize impacts on the environment during remediation and maximize restoration of environment after remediation.
- Ensure that any waste left on-site be controlled to prevent further contamination of the Great Miami Aquifer, air and soils on and off-site.
- Any future site use must be protective of the environment.

SOCIAL AND HUMAN VALUES

Future uses must have a positive impact on the surrounding communities, including:

- Risks acceptable to the current and future residents and workers of the Fernald community with a special emphasis on the effects on children and future generations.

- Input and involvement from the public at large.
- Compatibility with current and projected off-site uses.
- Demonstration of how a negative situation can be turned into a positive situation by not repeating the mistakes of the past which resulted in the current conditions at Fernald.

ECONOMIC VALUES

- Emphasis should be placed on future uses which provide some level of continued employment for area residents, but not necessarily in categories that have traditionally been present at the site.
- Future uses and ownership should be structured so that local tax revenues or payments in lieu of taxes are provided.
- Where practical, infrastructure should be used to enhance the suitability of the property for future use subject to environmental and health values.
- The cleanup of the Fernald facility should be done in such a way as to reduce the stigma of past practices at the site and assist in the continuing use and development of surrounding properties.

LONG-TERM MANAGEMENT VALUES

- A long-term control mechanism for the site must be established to ensure the perpetual moral and financial responsibility of the Federal government. Specifically, the federal government should be responsible for the continued management, monitoring, and emergency response capability regarding all wastes left on the facility.
- Long-term uses and institutional control mechanisms must be reconciled with local zoning and planning.
- All selected uses resulting in waste being left on site must have the built in flexibility to provide for future changes is use if warranted by financial, technical, or demographic developments.
- A long-term mechanism must be established to ensure citizen involvement in the control, management, and future decisions at the site.

GENERAL USE VALUES

- Any future use plan must recognize that a mixed use strategy may be the most effective for the long-term use of the site.
- Emphasis should be placed on reducing the physical barriers and physical evidence of past use of the site and focus on ways that Fernald can be a better neighbor to the surrounding community.

- Under no circumstances should a post-remediation future use be permitted at the facility which requires the importing of hazardous, radioactive, mixed or solid waste for any reason.
- All uses and cleanup plans for waste, shipments, and treatments must explicitly recognize all political, safety and health impacts.
- Future uses of the site must be focused on non-hazardous activities.

- The Task Force discussed how the volume of uranium-contaminated soil presents the most significant consideration for future use at Fernald. Therefore cleanup levels -- expressed in parts per million (ppm) -- were developed with the future use scenarios. (To provide a context, a part per million is roughly equivalent to one automobile in bumper-to-bumper traffic from Cleveland to San Francisco.) These cleanup levels are based on one of four land use categories or protection of the groundwater. The categories, the assumptions for each, and the cleanup levels are:

  - Resident farmer; assumes full-time life-long resident growing crops for human consumption and grazing livestock; cleanup levels at 10^{-5} risk, 20 ppm; cleanup levels at 10^{-6} risk, 5 ppm
  - Industrial; assume maximum exposure to an on-site groundskeeper; cleanup levels at 10^{-5} risk, 100 ppm; cleanup levels at 10^{-6} risk, 15 ppm
  - Developed park; assume free access recreational facility with developed sports, picnic, and restroom facilities; cleanup levels at 10^{-5} risk, 430 ppm; cleanup levels at 10^{-6} risk, 50 ppm
  - Green space; assumes unlimited access to nature trails, but with no developed facilities; cleanup levels at 10^{-5} risk, 1090 ppm; cleanup levels at 10^{-6} risk, 115 ppm
  - Protection of aquifer; assumes soil concentrations required to prevent contamination from leaching into aquifer, and the site is divided into two zones according to geology and solubility; cleanup levels at 10^{-5} risk in Zone 1 is 20 ppm and in Zone 2 is 100 ppm; cleanup levels at 10^{-6} risk in Zone 1 is 5 ppm and in Zone 2 is 10 ppm

- The future use scenarios mostly allow for a cleaner border around the Fernald facility. The options the Task Force initially developed are:

Scenario 1	Resident Border/Industrial Center at 10^{-5}
Scenario 1a	Resident Border/Industrial Center at 10^{-6}
Scenario 2	Resident Border/Park Center at 10^{-5}
Scenario 2a	Resident Border/Park Center at 10^{-6}
Scenario 3	Resident Border/Green Space Center at 10^{-5}
Scenario 3a	Resident Border/Green Space Center at 10^{-6}
Scenario 4	Industrial Border/Park Center at 10^{-5}
Scenario 4a	Industrial Border/Park Center at 10^{-6}
Scenario 5	Industrial Border/Green Space Center at 10^{-5}

Scenario 5a	Industrial Border/Green Space Center at 10^{-6}
Scenario 6	Park Border/Green Space Center at 10^{-5}
Scenario 6a	Park Border/Green Space Center at 10^{-6}
Scenario 7	Total Green Space at 10^{-5}
Scenario 7a	Total Green Space at 10^{-6}
Scenario 8	North Green Space/South Industrial at 10^{-5}
Scenario 8a	North Green Space/South Industrial at 10^{-6}
Scenario 9	Total Residential at 10^{-5}
Scenario 9a	Total Residential at 10^{-6}
Scenario 10	Protection of Aquifer at 10^{-5}
Scenario 10a	Protection of Aquifer and perched groundwater at 10^{-5}
Scenario 10b	Protection of Aquifer at 10^{-6}

- The Task Force determined that the impact of soil uranium contamination on the concentrations of uranium in groundwater are critical to groundwater protection. If the goal is to protect the aquifer, then most land use options can be eliminated because the concentrations of uranium in the soil would not allow the proposed land uses.

  If the groundwater is to be protected, only four of the 21 future use scenarios are viable:

  - Total Residential at 10^{-5}
  - Resident Border/Industrial Center at 10^{-5}
  - Total Industrial at 10^{-5}
  - Total Residential at 10^{-6}

<u>October 8, 1994 Meeting</u>:

★ • The Task Force agreed to endorse a 10^{-5} risk level for groundwater and protect to MCLs.

★ • The Task Force agreed to eliminate the 10^{-6} risk level from further consideration for soil.

★ • The Task Force agreed to adopt a maximum risk level of 1×10^{-4} for land uses only.

★ • The Task Force agreed, to be consistent with the groundwater and soil recommendations, to eliminate from further consideration all new residential and agricultural uses of DOE's Fernald Environmental Management Project property.

November 12, 1994 Meeting:

★ • The Task Force agreed that the best use of DOE's Fernald property would not include agricultural or residential uses.

★ • The Task Force agreed to recommend 50 ppm for off-property soil contaminated by uranium to achieve the Hazard Index of 1 for cleanup levels.

December 8, 1994 Meeting:

■ • The Task Force approved the draft work plan outlining activities for 1995.

January 14, 1995 Meeting:

■ • The Task Force approved a motion on disposal and storage of non-Fernald wastes. The motion reads: "The Fernald Citizens Task Force strongly opposes the use of the Fernald site for the permanent disposal or long-term storage of any waste materials originating from other locations."

February 18, 1995 Meeting:

★ • A motion was presented that stated "The Fernald Citizens Task Force recommend favoring an on-site disposal cell that would accept waste only from the site and within acceptable levels." The Task Force agreed to draft a resolution favoring an on-site disposal cell. The draft resolution reads:

> The Fernald Citizens Task Force recommends the construction of an on-site disposal facility to accept, from the Fernald site only, materials solely with low levels of contamination meeting the waste acceptance criteria.

★ • An amendment to the motion was presented and was added to identify the key considerations that went into making this recommendation. These considerations include:

- Provides the most immediate way to protect the aquifer,
- Least total transport risk;
- Cost considerations/availability of funds;
- Risk to other communities;

- Risk to environment;
- Availability of disposal area elsewhere;
- Risk to remedial workers and public;
- Political realities;
- Off-site waste;
- Low levels of waste going in;
- Definition of waste acceptance criteria;
- Aesthetics, technology, and design;
- Availability of monitoring;
- Long-term ownership (Department of Energy);
- Retrievability/new technology;
- Risk at cell failure.

March 11, 1995:

★ • The Task Force used much of the meeting time rewording the considerations and conditions of the formal "Recommendation For An On-Site Disposal Facility At Fernald".

March 28, 1995:

★ • This special meeting was scheduled to continue the site priorities discussion that had not been completed at the March 11, 1995, meeting. The Task Force created a list of criteria for the priorities recommendation offering suggestions for the listed items and raising questions that they would like to have answered. The list reads as follows:

Questions:

- 10 year schedule - why the lull in '98 - '99?
- Measures of efficiency?
- Adequacy of staffing levels?

Statement:

Fernald is different - Model for cleanup - Change the System (exist to go out of business)

Recommendation suggestions:

- Special nuclear materials
- Safe shutdown
- Legacy waste
- Simplify overlapping regulations
- Staffing levels

★ • The Task Force asked the chair and the consultant to create a draft recommendation of site priorities and an accelerated remediation plan for the April 8, 1995, meeting.

April 8, 1995 Meeting:

- It was suggested that the first sentence of the second paragraph of the "Recommendation For An On-Site Disposal Facility At Fernald" be reworded for clarity. After some discussion, the Task Force voted unanimously to reword the sentence.

★ • The Task Force amended and unanimously approved the Site Priorities Draft Recommendation. The Recommendation will be sent to Secretary O'Leary and Assistant Secretary Grumbly with a request for comment.
- The Task Force asked the chair and the consultant to create a draft recommendation regarding the future use of the Fernald property for the May 6, 1995, meeting.

May 6, 1995:

★ • The Task Force approved the final "Recommendations Regarding Future Use Of Fernald Property".
- The Task Force endorsed the DOE Fernald Remediation Status Report that will be submitted to DOE Headquarters. A letter of concurrence will be included with the report stating that the Report coincides with Task Force recommendations previously submitted to DOE.
- A rendering of the disposal cell was presented to the Task Force.
- The Task Force requested that a draft of the final report and a list of appendices be prepared for the June meeting.

June 10, 1995:

APPENDIX H.

ACKNOWLEDGMENTS

The Fernald Citizens Task Force would like to thank the following people, whose skills and support were instrumental to our success:

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APPENDIX __.

DESCRIPTION OF FUTURESITE EXERCISE

FUTURESITE

Introduction and Instructions

INTRODUCTION

The Fernald Environmental Management Project (Fernald), formerly 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 to the environment, most of it in the form of airborne dust emissions, most of 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 Fernald, but uranium is by far the most significant; with a few exceptions, cleaning up the uranium will clean up everything else. Fernald is listed on the National Priorities List for Superfund cleanup, and an agreement is in place to accomplish it.

Citizens who live near Fernald have been actively encouraging cleanup since 1984, and in recent years the site management has increasingly sought the input of the public in cleanup decisionmaking. In 1993, the Department of Energy established a "site-specific advisory board" – the Fernald Citizens Task Force – comprising representatives of numerous stakeholder groups, to advise it on key cleanup decisions. *FutureSite* was developed to help members of the Task Force to visualize the complex and interrelated contamination issues at Fernald.

As is the case at many Superfund sites, cleanup at Fernald requires the removal and/or treatment and/or disposal of hazardous waste and of environmental media (soil and groundwater) contaminated by those wastes. There is little dispute over the need to remove and/or treat and/or dispose of the waste materials themselves – called source materials – though *how* to do it may generate considerable controversy. They present a clear danger unless neutralized or isolated. Rather, it is the cleanup of contaminated soil and water that presents a difficult problem because (A) there are large volumes of contaminated material, meaning high costs, (B) the risk presented by contaminated material is real but the harm is seldom imminent, (C) the technology for treating them is often imperfect and always costly, and (D) they must be disposed of somewhere and no one especially wants to host them.

FutureSite addresses the media contamination. At Fernald, the cleanup question can without undue distortion be simplified to: how much uranium-contaminated soil must be removed from the site to make it acceptably safe to persons on or near it? The answer to this question is, in turn, driven by two considerations: (1) protection of the groundwater under the site, and (2) risks to persons on the surface who are in contact with the soil.

(1) The relationship of soil contamination to groundwater is not obvious, but is of critical importance. The uranium in the soil reaches the groundwater from surface run-

off into streams that are in direct contact with the aquifer, and from the leaching of uranium down through the soil to the aquifer. The more soil is contaminated and the greater its degree of contamination, the greater the risk to the aquifer.

(2) The relationship of soil contamination to persons who use the surface of the land is more direct: the more contact one has with the soil and the more contaminated the soil is, the greater the risk. Two variables must be considered, however. (a) First, the risk to a person on the surface will vary considerably depending on what that person is doing. A farmer who lives on the site would have a great deal of contact with the soil, while an occasional hiker through a wildlife preserve would have very little. Hence one cannot assign a level of safety without asking, "Safe *for what*?" (b) Second, one must also decide what level of risk constitutes an adequate degree of safety. A relatively risk-preferring person could farm on the same land that a risk-averse person would only feel safe hiking on.

This version of *FutureSite* concentrates on the questions arising from surface use; a version that addresses the level of soil cleanup needed to protect the aquifer is in development. If the players decide that groundwater protection is the first priority (the use of the Safe Drinking Water Act as an ARAR [Applicable or Relevant Appropriate Requirement] under CERCLA suggests this), then they would begin by removing squares to accomplish that goal. Of course, those squares must be treated and/or disposed of just like squares removed on account of surface use. On the other hand, because this is an exercise, players may wish to ignore or modify groundwater protection to explore other possible future scenarios.

OBJECTIVE

FutureSite is a simulation that models the volumes of contaminated soil that must be remediated to use the Fernald property. The objective is to determine what future use (or uses) the Fernald site should have, by removing specific concentrations of contaminated material. The exercise ends when the players are satisfied that they have reached their desired level of cleanup to achieve their vision of Fernald's future use, and have accounted for all of the contaminated materials by either leaving them in place or disposing of them.

COMPONENTS

- **Fernald Overview** is an introduction to the site and its contamination.
- **Map** of the Fernald facility divided into a grid of 1,000 foot squares. (Each square on the grid represents about 25 acres of land.) For each square, the volume of material that must be removed to achieve alternative future uses has been calculated and indicated on a "chip."
- **Squares** representing soil contaminated with various concentrations of uranium. Each chip represents a specific volume of soil containing a specific range of contaminants allowed for various future use categories based on risk – Restricted Access (pink),

Undeveloped Green Space (yellow), Developed Park (green), Commercial/Industrial (blue), and Residential/Agricultural (white). The purple squares represent all materials that must be removed to achieve even restricted use; salmon squares represent the volume of waste from Operable Unit 3 (former production area) and Operable Unit 2 (active and inactive flyash piles, lime sludge ponds, sanitary landfill). There are also squares representing non-soil – flyash, demolition debris, waste pits, and production wastes – materials that must be disposed of. Three sets of squares are provided so the exercise can be played at the risk levels permitted by CERCLA, 10^{-6}, 10^{-5}, and 10^{-4} excess cancer risk. (The exercise originally used colored poker chips to represent volumes and contamination levels. This configuration produced a strong visual effect, but it is very difficult to transport and reproduce. The poker chip version can be reproduced using the information on the printed squares.)

- **Disposal Options** are limited to either on-site disposal or off-site disposal. All "squares" removed must be placed into one of these disposal options. Off-site disposal is estimated to cost $1,000 per cubic yard; on-site disposal is estimated to cost $400 per cubic yard.
- **Tally Sheet** allows players to calculate the consequences of their decisions and to determine the volume of material involved in their cleanup, cost of the cleanup scenario, amount of space needed for the disposal facility, and transportation impact.

SET UP

Each grid square on the map is designated with a letter and number as indicated on the top and left side of the map (A-1, A-2, A-3, etc.). The color squares are stacked on the appropriate grid square indicated on each chip. The Aquifer Cards are inserted into the stacks as indicated on the cards. (BE SURE THAT ALL OF THE Squares AND CARDS ARE FROM THE SAME RISK SCENARIO – 10^{-4}, 10^{-5}, OR 10^{-6}. DO NOT MIX THEM.) The order of the colors is the same for each risk scenario – (from bottom to top) white, blue, green, yellow, pink, purple, and salmon. Because the level of contamination varies across the site, not all of the squares will have all of the colors. Place the sheets representing the two disposal options (on-site and off-site) next to the board.

RUNNING THE EXERCISE

Each chip represents soil containing the range of contaminant concentrations allowable for the future use indicated on the chip. To achieve a future land use on a given square, players must remove all of the squares representing contamination at concentrations above that required for the selected use. For example, to achieve commercial/industrial use for a given square, all squares above the blue one on that square must be removed. Players can make a square "cleaner" than its intended future use to achieve a margin of safety. The level of clean determines your range of future use options.

The players first remove the squares down to the level of cleanup desired. To remove a chip,

they must place it on one of the disposal option sheets, either on-site or off-site. There is a cost and impact associated with each option.

- **Off-Site Disposal** - Material placed in off-site disposal is assumed to go to a long-term disposal facility in an arid part of the western United States, thus incurring substantial transportation and disposal costs. Due to its high degree of hazard, source Material from the silos and waste pits have already been placed in this category. The volume of off-site disposal is limited to 1,000,000 cubic yards **in total.**

- **On-Site Disposal** - Contaminated material left on site for disposal will be disposed of in an engineered facility to isolate it from the ambient environment. It is assumed that each 13,000 cubic yards of contaminated material will require one acre of land for a disposal facility, including all ancillary operations and buffer space. Space on site must be reserved for placement of disposal facilities at the completion of the exercise. Because operation of a disposal facility is considered a commercial/industrial activity, the area selected for the on-site disposal cell must first be cleaned at least to a commercial/industrial use level.

- **Treatment** - For technical reasons, soil treatment was not feasible at Fernald, so it is not part of this exercise.

FUTURE USES AND CHIP VALUES

FUTURE USE CATEGORY	CLEANUP LEVELS AND RANGES AT 10^{-4}	CLEANUP LEVELS AND RANGES AT 10^{-5}	CLEANUP LEVELS AND RANGES AT 10^{-6}
Restricted Access (Pink)		1,739 ppm (> 1,739 ppm = purple)	180 ppm (> 180 ppm = purple)
Undeveloped Green Space (Yellow)	8,820 ppm	1,259 ppm (1,259-1,739 ppm)	132 ppm (132-180 ppm)
Developed Park (Green)	3,490 ppm (3,490-8,820 ppm)	390 ppm (390-1,259 ppm)	42 ppm (42-132 ppm)
Commercial/Industrial (Blue)	1,200 ppm (1,200-3,490 ppm)	138 ppm (138-390 ppm)	18 ppm (18-42 ppm)
Residential/Agricultural (White)	130 ppm (130-1,200 ppm)	21 ppm (21-138 ppm)	6 ppm (6-18 ppm)
Background (Board)	3.6 ppm	3.6 ppm	3.6 ppm

FINISHING THE EXERCISE

After the players have removed all the squares necessary to achieve their cleanup and future use goals, they can calculate the total volume of materials removed, dollar cost, transportation impact, and space needed (if any) for on-site disposal by adding up the appropriate values from all of the squares in each disposal option. They will also want to fix a location for on-site disposal (if any), taking the geography and infrastructure of the site into account.

KEY ASSUMPTIONS

Uncertainty in Volume and Cost Data

Soil volumes and cost data were developed using the best available data, but are only estimates of actual values. As the concentrations of soil contaminants get lower, it becomes harder to assure the accuracy of the measurement data; consequently, confidence in the precision of the soil volumes gets lower. Approaching "background" levels of cleanup, the volume of soil represented could be several times that currently generated by the model used to calculate these volumes.

Treatment and handling costs will vary based on the type of material, volume, technology, etc. The cost estimates for *FutureSite* are based on average costs for similar activities and simplified for the purpose of this exercise. Like soil volumes, cost data should be used for relative comparisons of solutions, not as actual cost estimates.

Risk and Cleanup Level

EPA guidance provides for a range of acceptable risk of excess cancer of between one in ten thousand (10^{-4}) and one in one million (10^{-6}). Therefore, for the purposes of this exercise, volumes for one in ten thousand (10^{-4}), one in one hundred thousand (10^{-5}), and one in one million (10^{-6}) have been developed to illustrate potential cleanup requirements. Cleanup levels were calculated based upon the risks to human health and do not include ecological risk. A table showing cleanup levels for uranium under each risk target is included.

Off-Site Disposal Limitations

An arbitrary limit of one million cubic yards has been placed on off-site disposal to reflect realistic logistical and political considerations. At present there are only two facilities able to accept large volumes of low-level radioactive waste from Fernald. Both face significant political pressures on accepting large amounts of out-of-state wastes and one has a limited capacity for new waste. Players may choose to exceed this limit for off-site disposal for this exercise, but the ability to dispose of greater than one million cubic yards is currently considered unlikely.

Source Material

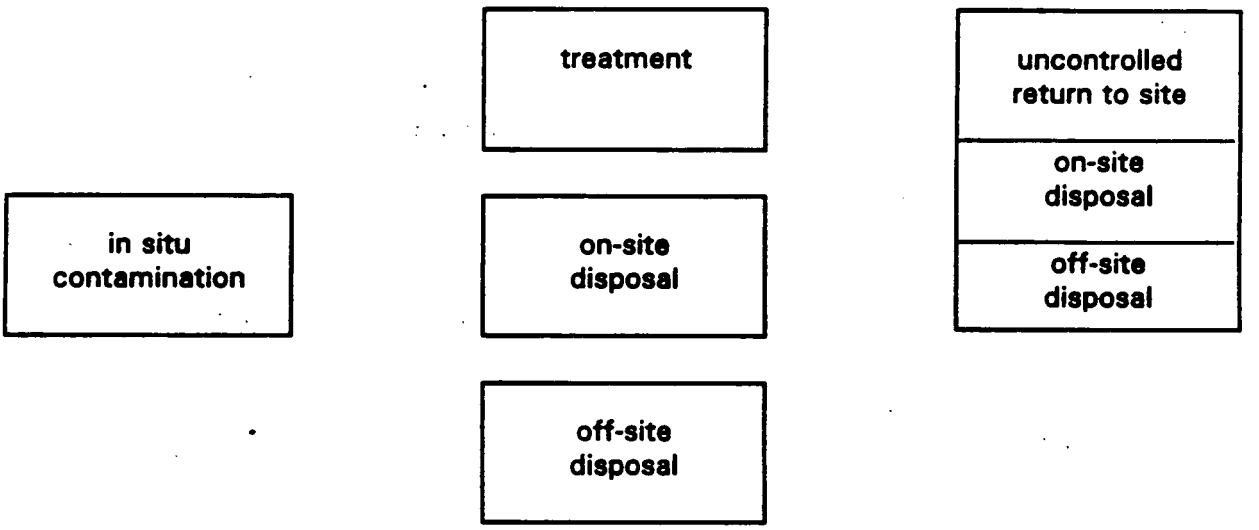
A number of decisions regarding disposition of source material from various operable units have already been drafted and have been incorporated into the exercise according to the potential impact on future use. Source materials from the silos and the waste pits are assumed to be completely removed and disposed of off-site. Therefore, they will not affect the use of the site, but their volume is included in off-site disposal, limiting that option. Players, however, are free to move these volumes into on-site storage if they wish. Debris from site buildings has also been designated by salmon squares in the production area, and it can be disposed of on- or off-site.

Off-Site Contamination

In this exercise off-site contamination has been ignored. It is not anticipated that large volumes of off-site soil will need to be excavated.

Treatment

Even though a treatment option is not included in the present exercise, it could be added as a way-station between the map and eventual disposal, as follows:



Because treatment is just an intermediate step, it results in a contaminated fraction and a "clean" fraction. The contaminated fraction is highly concentrated and must go off-site. Depending on the efficacy of the treatment, the clean fraction can either be returned uncontrolled to the site, or (if it is still above the hazard threshold) placed in an on-site or off-site disposal facility. In the latter case, disposal costs and impacts still accrue. An earlier version of the exercise assumed a cost of $300/cubic yard, and a contaminated/clean ratio of 30/70.

FutureSite

TALLY SHEET

ON-SITE DISPOSAL

Total cubic yards of purple = _____

Total cubic yards of red = _____

Total cubic yards of yellow = _____

Total cubic yards of green = _____

Total cubic yards of blue = _____

Total cubic yards of white = _____

TOTAL VOLUME = _____

SIZE OF DISPOSAL CELL (in acres):

Total volume _____ + 13,000 = _____

TOTAL COST:

Total volume _____ x $400 = _____

OFF-SITE DISPOSAL

Total cubic yards of purple = _____

Total cubic yards of red = _____

Total cubic yards of yellow = _____

Total cubic yards of green = _____

Total cubic yards of blue = _____

Total cubic yards of white = _____

Volume from Waste Pits = 630,200

Volume from Silos = 13,990

TOTAL VOLUME = _____

COST:

Total volume _____ x $1,000 = _____

TRUCKLOADS:

Total volume _____ + 25 = _____

TRAINLOADS (40 cars each):

Total volume _____ + 80 = _____

TOTAL COST OF FUTURE USE SCENARIO:

Total for On-Site Disposal _____ + Total for Off-Site Disposal _____ = _____

APPENDIX __.

SUMMARY OF FERNALD REPORTS

Post-it® Fax Note 7671 | Date 6/30/95 | # of pages 2
To [redacted] | From Tom Walsh
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Phone # 738-0003 | Phone # 648-5295
Fax # 738-8273 | Fax # 648-5273

STILL UNDER DEVELOPMENT

Operable Unit #1

Document	Due Date	Date[A] Completed	Comments
~~ISA~~	~~01-04-91~~	01-04-91	- A review of all alternatives
Final RI	02-08-94	02-04-94	- Characterization of site and extent of contamination, potential health impacts.
Final FS	07-01-94	07-01-94	- Recommends the cost-effective alternative
Final ROD	01-05-95	01-26-95	- Identifies which alternative(s) will be used
~~Final RD~~	07-31-95		- Development of design specifications

Operable Unit #2

Document	Due Date	Date[A] Completed	Comments
ISA	04-18-91	04-18-91	See OU #1 comments
Final RI	06-13-94	06-15-94	
Final FS	08-24-94	08-24-94	
Final ROD	04-10-95	04-07-95	
Final RD	10-26-95		

Operable Unit #3

Document	Due Date	Date[A] Completed	Comments
ISA	01-19-96		** incorporated into Draft RI/FS PP
Final RI/FS	01-19-96		
			See OU#1 comments
Final ROD	09-25-96		
Final RD	04-24-97		

1 ROD

Operable Unit #4

Document	Due Date	Date[A] Completed	Comments
ISA	10-31-90	10-31-90	See OU#1 comments
Final RI	08-23-93	08-23-93	
Final FS	12-29-93	12-22-93	
Final ROD	11-04-94	11-04-94	
Final RD	05-16-95	05-16-95	

A = Date all documents sent to EPA

FERMCO:EC Division, June 30, 1995

7077

Operable Unit #5

Document	Due Date	Date[A] Completed	Comments
ISA	03-26-93	03-26-93	See OU#1 comments
Final RI	11-01-94	11-01-94	
Final FS	05-19-95	05-19-95	
Final ROD	09-01-95		
Draft RD	04-02-96		
Final RD	TBD		

ISA = Initial Screening of Alternatives
RI = Remedial Investigation
FS = Feasibility Study
ROD = Record of Decision
RD = Remedial Design

Source for dates = June 27, 1995 issue of "Condensed Extract From..." by rpmjs

Source: Glossary of Environmental Terms, USEPA, OPA-87-017 (August, 1988); see below:

Feasibility Study: 1. Analysis of the practicability of a proposal;e.g., a description and analysis of the potential cleanup alternatives for a site or alternatives for a site on the NPL. The FS usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is underway; together, they are commonly referred to as the "RI/FS". The term can apply to a variety of proposed corrective or regulatory actions. 2. In research, a small-scale investigation of a problem to ascertain whether or not a proposed research approach is likely to provide useful data.

Record of Decision (ROD): A public document that explains which cleanup alternatives(s) will be used at NPL sites where, under CERCLA, Trust Funds pay for the cleanup.

Remedial Design: A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

Remedial Investigation: An in-depth study designed to gather the data necessary to determine the nature and extent of contamination at a Superfund site; establish criteria for cleanup of the site; identify preliminary alternatives for remedial actions; and support the technical and cost analyses of the alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS".

A = Date all documents sent to EPA

FERNCO:EC Division, June 30, 1995