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Environmental Restoration Program

OPERABLE UNIT 1
PROPOSED PLAN

MOUND PLANT
MIAMISBURG, OHIO

October 1994

Final
(Revision 0)

U.S. Department of Energy
Albuquerque Operations Office

EG&G Mound Applied Technologies

ENVIRONMENTAL RESTORATION PROGRAM

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EG&G MOUND APPLIED TECHNOLOGIES

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CONTENTS

1. INTRODUCTION 1

2. BACKGROUND 2

3. SCOPE AND ROLE OF ACTION 2

4. SITE RISK 2

5. BASELINE RISK ASSESSMENT 4

6. SUMMARY OF ALTERNATIVES 6

7. EVALUATION OF ALTERNATIVES 7

8. SUMMARY OF THE PREFERRED ALTERNATIVE 11

FIGURES

1. Mound Plant operable unit boundaries 3

TABLES

1. Summary of Remedial Action Alternative Comparison 9
2. Summary of Detailed Cost Analysis 10

ACRONYMS

ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
NPDES	National Pollutants Discharge Elimination System
PCE	tetrachloroethene
RI/FS	remedial investigation/feasibility study
TCE	trichloroethene
VOC	volatile organic compound

1. INTRODUCTION

This Proposed Plan identifies the preferred option for cleaning up contamination within Operable Unit 1 at the DOE Mound Plant. In addition, the Plan includes summaries of the other alternatives analyzed for this site. This document is issued by the Department of Energy (DOE), the lead agency for site activities. DOE, in consultation with U.S. and Ohio Environmental Protection Agencies (EPAs), will select a final remedy for the site only after the public comment period has ended and the information submitted during this time has been reviewed and considered.

DOE is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This document summarizes information that can be found in greater detail in the Remedial Investigation and Feasibility Study (RI/FS) Report and other documents contained in the administrative record file for this site. The administrative record file is available at the following location:

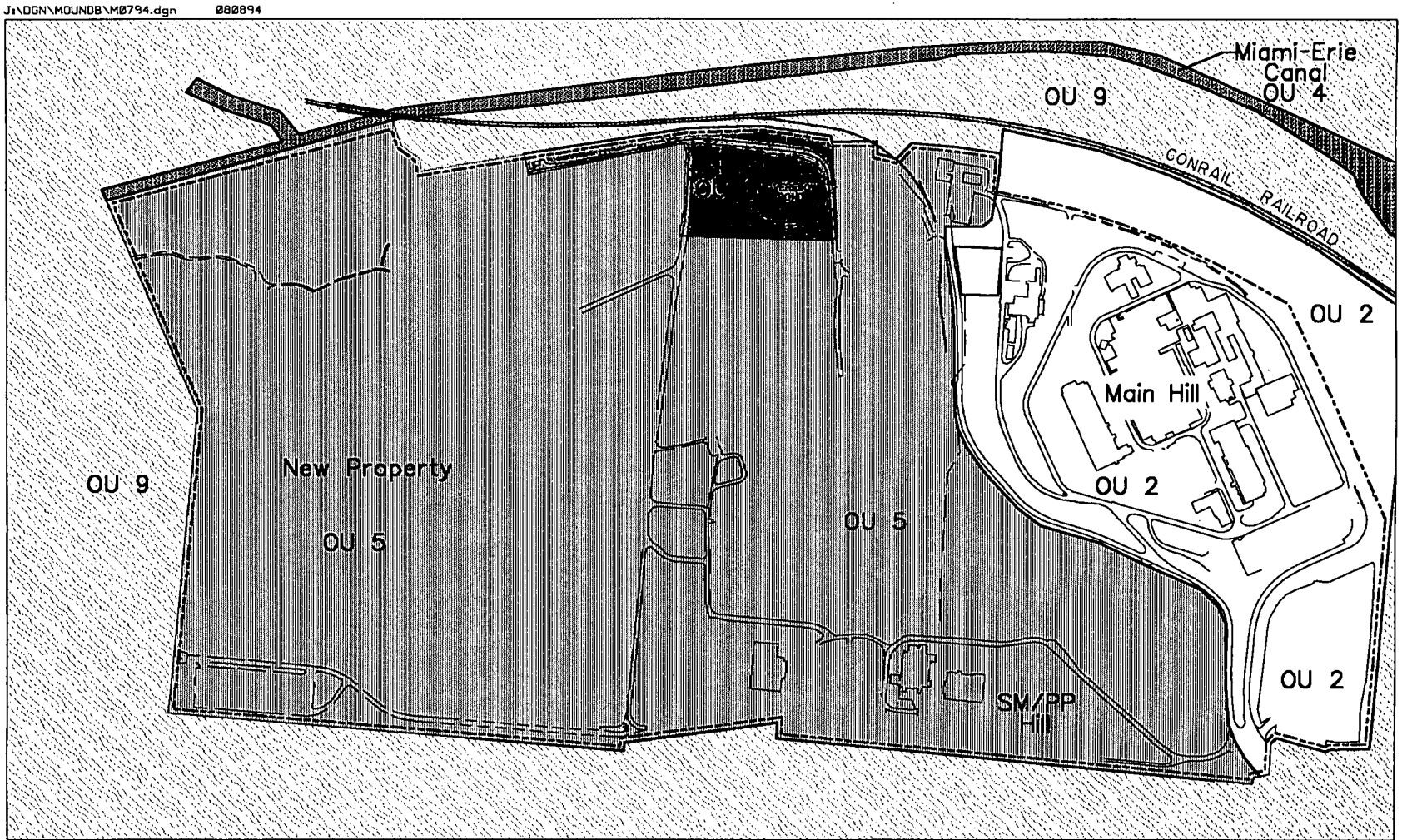
Miamisburg Senior Adult Center
305 E. Central Ave.
Miamisburg, Ohio 45343
Hours:

Monday	12pm - 8pm
Tuesday	8:30am - 1:00pm;
	4:00pm - 8:00pm
Wednesday	12:00pm - 8:00pm
Thursday	8:30am - 1:00pm
Friday	10:30am - 4:30pm

DOE, in consultation with the EPAs, may modify the preferred alternative or select another response action presented in this Plan and the RI/FS Report based on new information or public comments. Therefore, the public is encouraged to review and provide written comments on all the alternatives identified here. There will also be an opportunity for a public meeting to discuss this proposed plan. Submit written comments to:

Arthur W. Kleinrath
ER CERCLA Program Manager
US Department of Energy
Dayton Area Office
P.O. Box 66
Miamisburg, OH 45343

Public Comment Period dates are as follows: **TBD**



Note: Operable Unit 9 encompasses the cumulative impact of all other operable units on the offsite environment, including characterization of the Buried Valley aquifer and the plant drainage system.

Operable Unit 6 occupies small areas within the larger boundaries depicted; these are not shown separately.

Legend

- Structures
- Paved roadway
- Unpaved roadway
- Mound Plant boundary
- Operable unit boundaries

True North N

0 700
Scale in Feet

Figure 1. Mound Plant operable unit boundaries.

2. BACKGROUND

Operable Unit 1, Area B, of the DOE Mound Plant in Miamisburg, Ohio occupies approximately 4 acres in the southwestern portion of the Plant (Figure 1 [Same as Figure 1.2 in FS]). Area B includes a historic landfill site, which was used by the Mound Plant from 1948 to 1974. Plant waste materials that were disposed of in Area B included general trash and liquid waste. Much of this waste was later relocated and encapsuled in a site sanitary landfill constructed in 1977. An overflow pond was constructed at the same time, partially covering the historic landfill site. After 1977, waste was no longer disposed of in Area B. There are known releases of volatile organic compounds (VOCs) from Area B into the adjacent Buried Valley aquifer. In addition, tritium has been detected in water samples taken from wells in Area B, although the concentration was below the drinking water maximum contaminant level.

The Mound site was placed on the CERCLA National Priority List in 1989. The DOE signed a CERCLA Section 120 Federal Facility Agreement with the U.S. EPA, effective October 1990. A similar tripartite agreement was signed among the DOE, U.S. EPA, and Ohio EPA in 1993. The RI/FS was conducted between 1991 and 1994 to identify the types, quantities, and locations of contaminants and to develop ways of addressing the contamination problems.

3. SCOPE AND ROLE OF ACTION

Because of the magnitude and complexity of the Mound Plant RI/FS, the Site has been divided into operable units as a means of managing the investigation. Operable Unit 1 encompasses a historical waste disposal area (landfill) from which there have been known releases of VOCs to the Buried Valley aquifer, a sole source aquifer.

The cleanup remedy for Operable Unit 1 is selected from the alternatives discussed in the FS, which is available to the public for review. The contaminated groundwater in Operable Unit 1 is a principal threat at this site because of the potential for direct ingestion of contaminants through drinking water wells and possible offsite migration of the VOC-contaminated plume. The soils in Area B are restricted to the area of past disposal activity with no discernible source detected.

4. SITE RISK

Contaminant Occurrence

Contaminated media at Area B include both soils and waste materials within the site and the groundwater system beneath and adjacent to the site. Actual or threatened releases of hazardous

substances from this site, if not addressed by implementing the response action selected by this Proposed Plan, may present a current or potential threat to public health, public welfare, and/or the environment.

Soils

The only discernible pattern for all the compounds detected during the surface and subsurface soil sampling appear directly related to activities in and around the site sanitary landfill. A single major source of the contaminants has not been detected, but it is believed that a random pattern of dispersed contamination is the source of the compounds.

Groundwater

The recent groundwater sampling data (for June 1992 through March 1993) identified five VOCs at levels above proposed or established regulatory limits in the groundwater beneath Area B. These VOCs are vinyl chloride, trichloromethane (chloroform), 1,2-*cis*-dichloroethene, trichloroethene (TCE), and tetrachloroethene (PCE). Only one VOC, 1,1,1-trichloroethane, shows concentrations offsite; the pattern of occurrence suggests a source outside Area B. Two metals (chromium and nickel) were detected above primary drinking water standards from December 1991 to March 1993. No consistent trend exists for concentrations of metals in the area.

Immediate Points of Exposure

The most immediate point of exposure for contaminants originating in Area B also lies within the confines of Operable Unit 1—the system of plant production wells. Production well 1 (0071) was taken off-line due to increasing levels of VOCs in the discharge water. Production well 3 (0076) is now the primary source of process and potable water for the plant. Production well 2 (0271) is pumped as required to provide a supplemental source of plant water.

5. BASELINE RISK ASSESSMENT

The baseline risk assessment for Area B, Operable Unit 1, addressed future public health risks, assuming that no remedial actions would be performed. This baseline risk assessment focused on exposure of hypothetical future residents and site workers to soil and groundwater contamination through inhalation, incidental ingestion, external exposure to radiation emitted from radionuclides in soil, or dermal contact of the soil by an on-site industrial worker. In addition, the baseline risk assessment evaluated risks associated with future potential on-site residential use of groundwater

which could result from direct exposure to contaminants by groundwater ingestion, incidental ingestion and dermal contact through use in a swimming pool, ingestion of groundwater-irrigated produce, and dermal contact and inhalation of VOCs while showering with groundwater. The analysis dealt with all the contaminants of concern.

Ingestion/inhalation contribute almost all of the risk; groundwater is the most important exposure medium (90 to 100 percent of each category). Tetrachloroethene had the highest overall carcinogenic risk in each exposure scenario; tetrachloromethane had the highest noncarcinogenic hazard index (80 to 90 percent of the contribution in each category). Because groundwater would contribute most of the carcinogenic and noncarcinogenic risks to future onsite residents or workers, it is the focus of the remedial efforts to significantly reduce the overall risk.

Remedial Action Objectives

Remedial action objectives are descriptions of how the remedial actions will protect human health and the environment and achieve the remediation goals.

Soils

To protect human health, the remedial action objective will be to prevent or reduce infiltration and migration of contaminants that would result in groundwater contamination in excess of remediation goals. Additionally, soil contaminants should not lead to an aggregate excess cancer-risk greater than 1×10^{-5} or a hazard index greater than one for occupational exposures.

Groundwater

To protect human health, the remedial action objective will be to prevent ingestion of water with contaminant concentrations in excess of remediation goals (1×10^{-4} aggregate cancer risk for chemical risk and radiological risk combined). To protect environmental health, the objective will be to control or reduce contaminant concentrations to remediation goals in the aquifer adjacent to Area B so that contaminant movement into the Buried Valley aquifer will be prevented to ensure that the Buried Valley aquifer remains a safe drinking water source. The specific cleanup level of each contaminant will be based on drinking water standards and the limits of analytical capability to measure, as discussed in Section 2 of the FS.

6. SUMMARY OF ALTERNATIVES

The alternatives analyzed for Operable Unit 1 are discussed below. A more detailed description of the alternatives is provided in the FS.

Common Elements

All alternatives now being considered for the site would include a number of common components. Each alternative includes surface controls, the implementation of institutional controls to limit access to the site, and long-term groundwater monitoring. Surface controls, such as grading and lining of existing ditches, would manage the runon and runoff and reduce infiltration. Reduction of infiltration would slow the rate at which contaminants migrate from the unsaturated soil into the groundwater. Institutional controls would be designed to control land and groundwater use. Such controls could take the form of access restrictions and fencing around the site to minimize contact with soils and deed restrictions to prevent groundwater usage onsite and downgradient. The monitoring activities will be conducted to document the effectiveness of the selected remedy.

Alternatives 3 through 7 include extracting the groundwater for disposal through the Mound Plant National Pollutant Discharge Elimination System (NPDES)-permitted outfall. This groundwater extraction would be effective at capturing contaminated groundwater before migration could occur offsite.

Description of the Alternatives

The alternatives contain elements that range from limited action through capping, containment and *in situ* treatment. Descriptions of these elements are provided below. A more detailed description of the alternatives is provided in the FS.

- The no action alternative (Alternative 1) involves no additional activities at the site, whatever.
- The limited-action alternative (Alternative 2) consists only of the common elements described above.
- The collection-and-disposal alternative (Alternative 3) also encompasses extraction of groundwater for disposal through the Mound Plant NPDES-permitted outfall. Under this alternative, the soil contamination would be left in place.
- Under the alternatives incorporating a treatment option (Alternatives 4 through 7), groundwater would be extracted and treated onsite to remove VOCs.

- Under the capping alternatives (Alternatives 5, 7, and 9), a surface cap of low-permeability soil would be placed on the ground surface above known waste disposal areas that could be considered potential sources of groundwater contamination. The cap would be designed for integration into the existing cap for the site sanitary landfill and surface drainage structures so that erosion and infiltration would be minimized.

- Under alternatives incorporating a subsurface barrier (Alternatives 6 and 7), groundwater would be contained onsite with a low-permeability subsurface wall around the western and southern perimeter of Area B, which would be constructed by the slurry column technique. Groundwater within Area B would be extracted only at a rate sufficient to maintain a hydraulic gradient across the containment barrier toward Area B.

- Under the *in situ* treatment alternatives (Alternatives 8 and 9), subsurface permeable treatment walls would be composed of a mixture of iron shavings and sand installed in the subsurface downgradient of the site. Slurry columns would serve to direct the flow of groundwater toward the treatment walls and minimize movement of groundwater offsite.

7. EVALUATION OF ALTERNATIVES

This section presents a detailed analysis of the alternatives that were considered. Each alternative is evaluated in detail using nine CERCLA evaluation criteria, which are categorized into three criteria groups:

- Threshold Criteria:

  - Overall protection of human health and the environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

  - Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether a remedy will meet all of the ARARs or other Federal and State environmental laws and/or justifies a waiver on the basis of technical impracticability.

- Primary Balancing Criteria:

  - Long-term effectiveness and performance refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

  - Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies a remedy may employ.

  - Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

  - Implementability is the technical and administrative feasibility of remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes estimated capital and operations and maintenance costs, expressed as net present worth-costs.

- Modifying Criteria:

  - State/support agency acceptance reflects aspects of the preferred alternative and other alternatives that the support agency favors or objects to, and any specific comments regarding State ARARs or the proposed use of waivers. The Proposed Plan does not speculate. The assessment of State concerns may not be complete until after the public comment period on the RI/FS and Proposed Plan is held.

  - Community acceptance summarizes the public's general response to the alternatives described in the Proposed Plan and in the RI/FS, based on public comments received. Like State acceptance, evaluations under this criterion usually will not be completed until after the public comment period is held.

The modifying criteria are not used to analyze the alternatives in this section. State acceptance of any of the alternatives will be determined by draft-document review by the Ohio EPA. After the FS report is finalized and the proposed plan is released, a public comment period will follow. The nature of the public comments will determine the public acceptance of any alternative.

The evaluation of alternatives is summarized on Table 1; cost detail is provided on Table 2. This section profiles the performance of the preferred alternative against the remedial evaluation criteria, noting how it compares to the other options under consideration. Because the no-action and institutional controls alternatives are not protective of human health and the environment, they are not considered further in this analysis as an option for this site.

Overall Protection

All of the alternatives would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, or institutional controls.

Compliance with ARARs

All remaining alternatives would meet their respective ARARs. The preferred alternative would deal with VOC concentrations in the discharge water from the remediation system and will comply with the Chronic Freshwater Criteria ARARs.

Table 1. Summary of Remedial Action Alternative Comparison

Alternative	Short Title	Complies With ARARs	Short-term Effectiveness	Long-term Effectiveness	Protects Human Health and the Environment	Reduces TMV	Implementability	Total Cost
1	No Action	No	No	No	No	No	Easy	$0
2	Institutional	No	No	No	No	No	Easy	$3,980,000
3	Collect/ Disposal	Yes	Adequate[a]	Yes	Adequate	Yes	Less Difficult	$262,000[c]
4	Collect/Treat/ Disposal	Yes	Adequate[a]	Yes	Adequate	Yes	Less Difficult	$1,740,000[c]
5	Collect/Treat/ Disposal/Cap	Yes	Adequate[b]	Yes	Adequate	Yes	Less Difficult	$2,390,000[c]
6	Contain/Collect/ Treat/Disposal	Yes	Adequate[b]	Yes	Adequate	Yes	Moderately Difficult	$2,650,000[c]
7	Contain/Collect/ Treat/Disposal/ Cap	Yes	Adequate[b]	Yes	Adequate	Yes	Moderately Difficult	$3,300,000[c]
8	In-situ GW Treatment	Yes	Adequate[b]	Yes	Adequate	Yes	More Difficult	$1,980,000[c]
9	In-situ GW Treatment/Cap	Yes	Adequate[b]	Yes	Adequate	Yes	More Difficult	$2,630,000[c]

[a]Quicker implementation when compared to other alternatives.
[b]Longer construction time when compared to other alternatives.
[c]This Total Cost is in addition to the Total Cost shown for Alternative 2 (common cost).
ARARs - Applicable or relevant and appropriate requirements.
TMV - Toxicity, mobility, or volume.

Table 2. Summary of Detailed Cost Analysis

Alternative Number	Short Title	Total Capital Cost[a] (TCC)	Annual Operation and Maintenance without Common Cost[a]	Present Value of 30-yr Annual Operation and Maintenance without Common Cost[a]	Total Present Value without Common Cost[a]
1	No Action	$0	$0	$0	$0
2	Institutional	$139,000	$201,000	$3,840,000	$3,980,000
Each of the following entries is IN ADDITION TO the cost shown for line 2 (Alternative 2).					
3	Collect/Disposal	$205,000	$3,000	$57,300	$262,000
4	Collect/Treat/Disposal	$567,000	$61,000	$1,170,000	$1,740,000[b]
5	Collect/Treat/Disposal/Cap	$857,000	$80,000	$1,530,000	$2,390,000
6	Cont/Collect/Treat/Disposal	$1,330,000	$69,000	$1,320,000	$2,650,000
7	Cont/Collect/Treat/Disposal/Cap	$1,620,000	$88,000	$1,680,000	$3,300,000
8	*In situ* GW Treatment	$1,650,000	$17,000	$325,000	$1,980,000
9	*In situ* GW Treatment/Cap	$1,940,000	$36,000	$688,000	$2,630,000

[a]Represents the common cost used in each cost estimate.
[b]Represents highest likely cost for treatment technology.

NOTE: Figures rounded to three significant digits after computations completed.

8. SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for cleaning up the soils and groundwater at Operable Unit 1 is Alternative 4 - Collection, Treatment, and Disposal of Groundwater. Based on current information, this alternative would meet the remedial evaluation criteria from the EPA. The alternative meets the threshold criteria and satisfies the primary balancing criteria at least cost. Because it reduces toxicity and volume and controls migration, the alternative is also protective of the Mound Plant well field. The preferred alternative would be effective in capturing contaminated groundwater beneath the Operable Unit 1 site before migrating offsite. Reduction of the contaminant mass in the subsurface would occur over an extended but unpredictable period of time. The treatment system specified for this site could efficiently remove the VOCs to the preliminary remediation goals. All extracted groundwater would be treated to levels that will comply with the requirements of the Mound Plant NPDES Permit.

The UV oxidation treatment system is one of several potentially viable treatment trains for VOCs. Both cascade aeration and conventional air stripping offer the possibility of adequate treatment. Since only one representative technology is needed to support thorough discussion of an alternative, only UV oxidation is presented. Final selection of technologies will be done during remedial design, when any of these systems may be determined to be optimal.

Thus, the preferred alternative, collection, treatment, and disposal, will provide a cost-effective remedial option that is easy to implement and that will adequately protect human health and the environment.