Environmental Restoration Program

REMOVAL ACTION WORK PLAN
OPERABLE UNIT 4, MIAMI-ERIE CANAL

MOUND PLANT
MIAMISBURG, OHIO

Draft-Final

August 1996

U. S. Department of Energy
Ohio Field Office

EG&G Mound Applied Technologies

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ACRONYMS

AM	Action Memorandum
ARAR	Applicable or Relevant and Appropriate Requirements
ASAP	as soon as possible
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	(EPA) Certified Laboratory Program
D&D	Decontamination and Decommissioning
DM	Design Memorandum
DOE	Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
EG&G	EG&G Mound Applied Technologies
EPA	Environmental Protection Agency
ER	Environmental Restoration
FFA	Federal Facilities Agreement
FIDLER	Field Instrument for the Detection of Low Energy Radiation
FSP	Field Sampling Plan
GPS	Global Positioning System
H-3	Tritium
HSP	Health and Safety Plan
MAC	Mound Action Committee
MCD	Miami Conservancy District
nCi/g	nanocuries per gram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
pCi/g	picocuries per gram
PPE	Personal Protective Equipment
Pu-238	Plutonium-238
QAPjP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSE	Removal Site Evaluation
RWP	Radiation Work Permit
SAFER	Streamlined Approach for Environmental Restoration
SCA	Soil Contamination Area

ACRONYMS (continued)

SDWA	Safe Drinking Water Act
TBC	To Be Considered
Th-230	Thorium-230
U-238	Uranium-238
WD	Waste Disposal
WMP	Waste Management Plan
yd^3	cubic yard

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EXECUTIVE SUMMARY

The Operable Unit (OU) 4 Miami-Erie Canal Removal Action Work Plan provides the overall direction for a "non-time critical removal action" that encompasses part of the Canal and associated waterways containing plutonium-contaminated soils next to the Department of Energy's (DOE's) Mound Plant. The Environmental Protection Agency (EPA) regulations developed for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) govern the performance of non-time critical removal actions. The DOE's Mound Plant Environmental Restoration (ER) Program is responsible for performing the OU4 Removal Action project.

OU4 is immediately west of Mound Plant in the City of Miamisburg, Ohio. It includes the watershed occupied by the former Miami-Erie Canal, the Drainage Ditch from Mound Plant to the Canal, the Overflow Creek from the Canal to the Great Miami River, the Runoff Hollow between the Canal and Mound Plant boundary, and the South Pond in the Community Park. In 1969, stormwater runoff from Mound Plant deposited plutonium-contaminated soils in the sediments of OU4. Subsequent sediment deposits carried in the Mound Plant drainage have covered the contaminated sediments.

Sampling studies identified a maximum plutonium concentration of 4560 picocuries per gram (pCi/g) in the Canal soil and sediment, with an average value of approximately 530 pCi/g (DOE 1994). - data for 1975 timeframe

With input from Mound Stakeholders, the DOE has determined that the goal of the removal action is to excavate most soils and sediments contaminated by plutonium-238 at concentrations exceeding 75 pCi/g. The Mound Stakeholders include representatives from DOE, the City of Miamisburg, EPA, public interest groups and individuals. Based on this standard, all available data show that only the North and South Canal, and offsite portions of the Mound Plant Drainage Ditch, will fall within the scope of this removal action.

The DOE prepared a conceptual model of the conditions expected at the site including the nature, location, and extent of contamination. The Work Plan strategy used the Streamlined Approach for Environmental Restoration (SAFER) program to identify contingency plans if the site conditions vary from the expected conditions. Because of these preparations, DOE established a design basis for excavation, temporary storage, waste management, and disposal of contaminated soils for this removal action. This design basis includes expected site conditions, potential deviations from these conditions, methods to monitor deviations, and

contingency plans for Mound site personnel to follow when deviations occur. They will perform the removal by following this Work Plan, under the lead of the Mound ER CERCLA program.

The removal action design is a series of phased excavations along the Canal and Drainage Ditch pathways. To support the removal action, the following additional projects must be completed:

- Offsite Drainage Reroute -- to remove site drainage flow from the South Canal to permit work in the Canal bed.

- Access Road Extension -- to provide a transportation route for haul vehicles carrying excavated soil from OU4 to a staging area on Mound Plant.

- Rail Spur Upgrade - to provide rail access from Mound Plant to existing Conrail lines, allowing rail transport of waste to the Envirocare disposal site in Utah.

The removal action will be performed by Mound Plant personnel and selected subcontractors, as needed. Prior to actual soil removal, the site will be cleared of all trash, brush, and trees, a security fence will be installed around the perimeter, and Mound will monitor the remaining surface to confirm soil locations to be excavated. Once Mound has prepared the site, they will excavate the soils in the selected area using earthmoving equipment. The soil will be placed into haulers, transported to the Mound Plant Staging Area, and loaded onto railcars. Conrail trains will ship the railcars in groups to the Envirocare disposal site in Utah.

During the removal action, Mound will monitor the materials excavated from the site (including soil, sediments, and debris) for radiological contamination. Field instruments will be used to scan exposed excavation surfaces to ensure that conditions do not exceed worker health and safety limits.

Once each phase of the excavation is completed, DOE will sample 600-700 locations within OU4 to verify whether or not the cleanup standard has been achieved. Mound will backfill the excavated site with clean fill and topsoil as soon as possible after sampling, in order to restore the site. Equipment and vehicles used during the removal action will be decontaminated, as needed, and demobilized.

The removal action is expected to require between 12 to 24 months to complete at an estimated cost of $20 million (within an accuracy of +/- 20%).

This Work Plan is supported by the following detailed plans and specifications: Design Memorandum, Field Sampling Plan, Quality Assurance Project Plan, Health and Safety Plan, and the Waste Management Plan.

1. INTRODUCTION

EG&G Mound Applied Technologies, Inc. (EG&G) operates the U.S. Department of Energy (DOE) Mound Plant under prime contract with the DOE. Mound Plant was placed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, i.e., Superfund) National Priorities List in 1989 and, subsequently, a Federal Facilities Agreement (FFA) was established between the DOE, the U.S. Environmental Protection Agency (EPA) and the Ohio Environmental Protection Agency (OEPA). Per the FFA, the Mound Plant Environmental Restoration (ER) Program developed Operable Units (OUs) to organize site remediation efforts. OU4 addresses contamination of the Miami-Erie Canal which is located near the Mound Plant site in Miamisburg, Ohio. The primary contaminant of concern is plutonium-238 in the soils of OU4.

1.1. PURPOSE

The purposes of this Work Plan are to: 1) provide the technical direction for conducting a removal action at OU4 in accordance with CERCLA requirements, 2) clearly define the activities which need to be conducted so the removal action achieves the cleanup goal, and 3) serve as the project planning document for review and input by the OU4 Stakeholders. (Mound Stakeholders include representatives from DOE, the City of Miamisburg, EPA, public interest groups, and other individuals).

1.2. WORK PLAN FORMAT

The remainder of Section 1 of this Work Plan summarizes the background of OU4, the work performed to date justifying the basis for conducting a non-time critical removal action under CERCLA, and the objectives of the Work Plan.

Section 2 provides the conceptual model for the OU4 removal action project as well as a detailed uncertainty analysis prepared under the DOE's Streamlined Approach for Environmental Restoration (SAFER) program.

Section 3 outlines the design basis for conducting the removal action, including applicable or relevant and appropriate requirements (ARARs) and cleanup criteria, as established by DOE and the Mound Stakeholders.

Section 4 describes the specific activities required to perform the removal action, including site preparation, mobilization, soil excavation, waste management, disposal, and site restoration. The Design Memorandum (DM) is a separate document containing details of the removal action design.

Section 5 addresses the field sampling requirements of the removal action during excavation and waste management activities, and as part of the post-removal verification.

Sections 6, 7 and 8 provide brief discussions of the OU4 Quality Assurance, Health and Safety, and Waste Management activities, respectively. Each of these activities is described in a separate document supporting the Work Plan.

Section 9 describes activities related to, but distinctly separate from, the OU4 removal action project. These activities include the community relations plan, access road project, site drainage reroute project, railroad spur upgrade project, and technology development, all of which will be sufficiently completed to support the beginning of removal action activities.

Section 10 summarizes the removal action project organization using a DOE/EG&G/Contractor organizational chart and a brief discussion of the project performance methodology using currently available resources at Mound Plant.

Section 11 provides an integrated project schedule for the removal action including activities related to the performance of the removal action. This schedule will be periodically updated to show progress of the removal action.

Section 12 summarizes the cost estimate for conducting the removal action.

Section 13 lists the references used to prepare this Work Plan.

Appendix A is a copy of the exemption memorandum which allows waste generated from OU4 to be disposed of at a commercial disposal facility. Appendix B is a table showing the screening process for OU4 ARARs. Appendix C is a copy of the DOE Removal Action contractor selection memorandum.

1.3. BACKGROUND

In 1969, a Mound Plant underground pipeline carrying plutonium-238 in a nitric acid solution ruptured, releasing the plutonium to the surrounding soils. During the pipeline remediation, a rainstorm washed some of the contaminated soils and sediments through natural drainage pathways into the Miami-Erie Canal. In 1974, Mound Plant performed a comprehensive study (Rogers 1975) to determine the impact of the plutonium contamination on the Canal and surrounding waterways. The results of the 1974 study indicated that the plutonium contamination, which was measured down to depths of about five feet in sediments of the Canal, did not present a human health or environmental hazard (DOE 1994).

Subsequent environmental monitoring and studies, including the 1992 - 1993 study by the Agency for Toxic Substances and Disease Registry (ATSDR 1993), have supported the findings of the 1974 study that the Canal contamination does not pose a public health hazard under the current land use and ownership. In 1993, the DOE determined that a removal action was warranted due to the change in mission for the Mound Plant and the potential for future change in the Canal land use and ownership. DOE selected a removal action alternative involving excavation and off-site disposal of the plutonium-contaminated soil (DOE 1995a), which is the subject of this Work Plan.

In 1993, DOE performed a Special Canal Sampling Study (DOE 1993a) to determine whether chemical contamination exists in the Canal soils which would require the excavated soils to be classified as mixed hazardous waste. Results of the study indicated that although some chemical contamination exists, it occurs at low levels and is probably from sources other than Mound Plant. Also, the pattern of the sampling results indicated that concentrations of radiological and chemical contaminants are not coincident, thereby decreasing the likelihood of any mixed waste conditions occurring in the canal. In addition, the Special Canal Sampling Study confirmed the radionuclide sampling results indicated by the past studies at OU4.

Further details concerning the background of OU4 can be found in the Removal Site Evaluation (RSE) report (DOE 1993b).

The decision to perform a removal action was further supported by Stakeholders' input to the DOE that led to a cleanup goal which requires excavation of soils with concentrations of plutonium-238 greater than 75 picocuries per gram (pCi/g) (DOE 1995b).

1.4. OBJECTIVES

The objectives of this OU4 Removal Action Work Plan are:

- To provide the current status of the removal action activities at OU4;
- To advise the Mound Stakeholders of the expected conditions, the potential unexpected conditions, and the proposed responses to the likely deviations from the expected conditions relating to the OU4 removal action;
- To advise the Stakeholders of the specific tasks to be implemented for the removal action and at what specific locations;
- To develop the removal action alternative recommended in the Engineering Evaluation/Cost Analysis (EE/CA) (DOE 1995a) in sufficient detail to serve as the framework for implementing the removal action; and
- To summarize removal action details contained in supporting documents such as the DM, Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPjP), Waste Management Plan (WMP), and the Health and Safety Plan (HSP).

1.5. RSE; EE/CA; AM DESCRIPTION

In 1993, DOE prepared an RSE (DOE 1993b) to determine the need for a removal action in the Miami-Erie Canal. The report concluded that there was no current threat to human health or the environment, and, on this basis, a removal action was not warranted. However, the DOE decision to change the mission of the Mound Plant could result in a future change in land use and ownership of the Canal, which could alter the human health risk evaluation. On this basis, DOE recommended performing a removal action in the Miami-Erie Canal.

In 1995, DOE completed an EE/CA (DOE 1995a) which evaluated five removal action alternatives on the basis of effectiveness, implementability and cost. Of the alternatives, DOE recommended excavation and offsite disposal for OU4. DOE prepared an Action Memorandum (AM) (DOE 1995b) to document selection of the removal action alternative for OU4.

2. CONCEPTUAL MODEL

A conceptual model of the OU4 removal action is presented in this section. The conceptual model is used as a decision tool during the planning and implementation of activities such as removal actions. The DOE SAFER program provides guidance and assistance in developing the decision model to expedite the removal action planning.

The conceptual model includes the expected conditions associated with the removal action, a problem statement describing the intent of the removal action, and the uncertainty analysis. The uncertainty analysis identifies the potential deviations from the expected conditions that may arise during the removal action, the techniques used to monitor the potential deviations, the contingency plans for responding to deviations, and an evaluation of whether the contingency plan is to be included in the removal action design.

2.1. EXISTING INFORMATION

Available information on OU4 includes previous field sampling results (DOE 1993a and DOE 1994), documents submitted in accordance with the National Oil and Hazardous Substances Contingency Plan (NCP) requirements for non-time critical removal actions (DOE 1993b, DOE 1995a, and DOE 1995b), and the results of public participation activities. A summary of this information is presented in Sections 1.3 and 1.5.

Figure 2.1 is a site plan of OU4 that identifies the location of the Miami-Erie Canal, South Pond, Mound Plant Drainage Ditch, Runoff Hollow, and the Overflow Creek.

2.2. PROBLEM STATEMENT

For the purpose of developing a conceptual model, DOE has prepared a statement to define the problem being addressed by this removal action. The problem statement identification and development is essential to focus the entire approach to the removal action. The problem being addressed by this removal action is the presence of plutonium-238 in the soil and sediment at concentrations exceeding 75 pCi/g in the Miami-Erie Canal bed and banks, the Mound Plant Drainage Ditch, the South Pond, the Runoff Hollow, and the Overflow Creek areas of OU4.

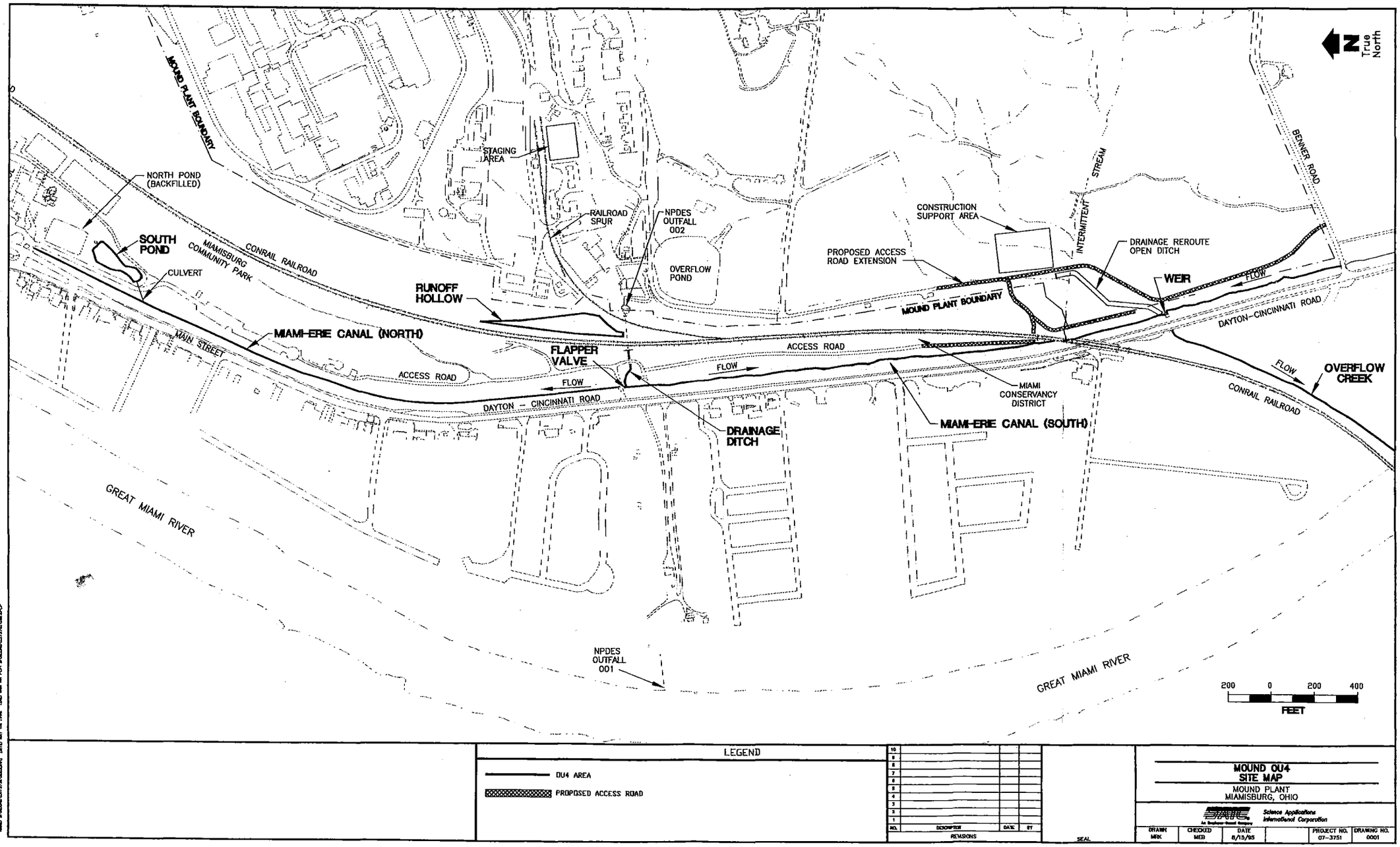

Figure 2.1. OU4 Site Map

2.3. EXPECTED CONDITIONS

Using the information from the various studies conducted at OU4 and recent information relative to the removal action, DOE has developed a conceptual model of the expected conditions. The following sections provide an overview of the expected conditions identified for the removal action.

2.3.1. Site Features

The Miami-Erie Canal has a number of physical features that will be monitored during the excavation. Directly beneath the base of the North Canal there is a sanitary sewer with manholes extending above the surface. The depth of the sewer is expected to be well below the bottom of the proposed excavation. Other buried utilities are also located along the Canal berm. The removal action should not impact these utilities. At the far south end of the North Canal, abandoned metal tanks (or similar geophysical anomalies) are suspected to be buried beneath the base of the Canal. The exact depth and characteristics of the tanks are unknown.

Surface water from the Mound Plant overflow pond National Pollutant Discharge Elimination System (NPDES) Outfall 002 is continuously discharged to the Mound Plant Drainage Ditch and conveyed to the South Canal. Mound plans to reroute the drainage flows away from the South Canal, eliminating all surface water from the areas targeted for the removal action.

The Conrail trestle crosses the southern end of the Canal. Portions of the trestle supports are in the Canal bed and the trestle itself limits working clearance beneath.

The Canal surface water discharges via an overflow weir into the Overflow Creek which runs parallel to the Conrail tracks, and empties into the Great Miami River.

The South Pond is located in the Community Park just east of the Canal at its northern end. A culvert allows transfer of water between the South Pond and the North Canal. Because of the space required, it is expected that the Community Park will be closed to the public during most of this removal action.

The Runoff Hollow is located between the Conrail tracks and the Mound west property line, just north of the Mound Drainage Ditch. There is normally no surface water in the hollow, which discharges to the Drainage Ditch.

2.3.2. Site Access

OU4 encompasses property owned by the City of Miamisburg, Conrail, and the Miami Conservancy District (MCD). DOE has attained Site Access agreements from these organizations for the conduct of this removal action. Vehicle access to the Canal is currently limited to two locations. The principal access point is from the Miamisburg Community Park. The other location is from the Dayton-Cincinnati Road near the point where the Mound Plant Drainage Ditch discharges to the Canal. When completed, the Canal Access Road project will permit access to the OU4 site from Mound Plant during the removal action period of performance.

2.3.3. Distribution of Contamination

Contamination at OU4 is limited to the soil and sediment. No significant surface water or groundwater contamination has been detected at the Canal (DOE 1995a). Contamination in the soil and sediment decreases uniformly away from the Drainage Ditch along the Canal and associated waterways. Previous sampling efforts have not identified significant concentrations of hazardous chemical constituents (DOE 1993a). Consequently, mixed waste (waste having hazardous chemical and radiological contaminants) is not expected to be found during the removal action.

Of the radionuclides detected in OU4 (tritium, thorium-230, uranium-238, and plutonium-238), plutonium-238 is the primary contaminant of concern. The maximum concentration of plutonium-238 detected in the Canal soil is less than 4,560 pCi/g with an average concentration of 530 pCi/g (DOE 1994). Soil concentrations of plutonium-238 above 75 pCi/g have been detected in the North and South Canal and in the Drainage Ditch. The South Pond, Overflow Creek, and the Runoff Hollow all have maximum concentrations of plutonium-238 below 75 pCi/g. All other radionuclides detected in OU4 occur at trace levels in soils already contaminated with plutonium-238.

2.3.4. Boundary Conditions

Based on the distribution of contamination, the boundary conditions for the removal action can be established. Except for a few locations, available sampling information at OU4 indicates that the concentration of plutonium-238 above 75 pCi/g is confined to the soil and sediment from the surface to three feet deep in the Canal and Drainage Ditch. The data indicate that removal of the plutonium-238 contamination above the cleanup goal will also remove other radiological and non-radiological contamination. A contamination profile can be interpolated between known sampling locations to define the areas to be excavated. Accordingly, DOE estimates that nearly 21,400yd^3 of material will have to be excavated (DOE 1995a).

2.4. UNCERTAINTY ANALYSIS

The purpose of the uncertainty analysis is to support the removal action by identifying what potential deviations from the expected approach may occur, the method for monitoring the deviations, and the contingency plan for responding to an unexpected condition. This approach allows the removal action to proceed without a full characterization of the subsurface media. Included in the analysis is an evaluation of the likelihood of each potential deviation being encountered. Based on the likelihood of deviation occurrence, decision rules have been developed for including or excluding the potential deviation into the basis for design. Table II.1 presents the uncertainty analysis for the OU4 Removal Action.

Table II.1. OU4 Removal Action Uncertainty Analysis
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Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation	Schedule Impact
1. Except for a few locations, the contamination (Pu-238 > 75 pCi/g) is confined to the soil and sediment from zero to four feet deep in the bed portion of the canal.	Contamination is deeper than four feet in many locations. Contamination is along berm/outside canal bed.	FIDLER[1] can identify Pu-238 > 200-300 pCi/g.	Use FIDLER during excavation. Further screen selected samples to 75 pCi/g using mobile lab. Verification sampling results can identify any remaining hot spots.	Include field screening to supplement existing contamination data to detemine final extent of excavation.	Amount of schedule delay depending on frequency and extent of additional contamination.
2. Contamination profile can be interpolated between known sampling locations.	Actual contamination pattern is different than assumed.	FIDLER can identify Pu-238 > 200-300 pCi/g.	Perform random sampling to confirm expected condition. If condition is not confirmed, revise excavation plan.	Provide for contingency in design.	None.
3. There is no surface water or groundwater contamination.	Water is contaminated.	Water will be collected in storage tanks and sampled to determined if contaminated.	Except for stormwater events, surface water should not be present at time of removal action, and groundwater will be addressed in OU9. Remove standing water after stormwater events.	To ensure that no surface water is present during removal action, include contingency for stormwater removal in excavation plan.	Minor schedule impact to sample, handle, and treat contaminated water.
4. Soil and sediment contamination is distributed uniformly along the canal and associated waterways.	Hot spot contamination exists.	FIDLER can identify Pu-238 > 200-300 pCi/g.	Soil to be excavated per known contamination pattern, which does account for hot spots. Mobile lab and verification sampling can identify remaining hot spots.	Provide for contingency in excavation plan to address hot spot removal.	Amount of schedule delay depending on frequency and extent of additional contamination.
5. Pu-238 concentration in canal is up to 4,560 pCi/g.	Higher (unknown level and location) concentration exists.	FIDLER can identify Pu-238 > 200-300 pCi/g.	Higher PPE protection levels may be required.	Provide for contingency in HSP.	None, except for preparation for offsite disposal if Pu > 10,000 pCi/g.
6. H-3 concentration in canal is up to 110 nCi/g.	Higher concentration and/or dissimilar pattern to Pu-238.	None for H-3.	Use verification sampling to measure for H-3.	No H-3 soil cleanup standard. Adjacent H-3 contamination in groundwater shown < SDWA criteria. Low probability. Wait for results of verification sampling.	None, except for preparation for offsite disposal if H-3 > 20,000 nCi/g.

Table II.1. OU4 Removal Action Uncertainty Analysis
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Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation	Schedule Impact
7. Th-230 concentration in canal is up to 38 pCi/g.	Higher concentration and/or dissimilar pattern to Pu-238.	FIDLER can identify thorium isotopes > 10-25 pCi/g.	Further screen samples to 5 pCi/g using mobile lab. Verification sampling results can identify any remaining hot spots.	Provide for contingency in design.	None, except for preparation for offsite disposal if Th > 15,000 pCi/g.
8. Uranium concentration in canal is up to 39 pCi/g (U-238).	Higher concentration and/or dissimilar pattern to Pu-238.	None.	Use verification sampling to measure for uranium isotopes.	No uranium soil cleanup standard. Low probability. Wait for results of verification sampling.	None, except for preparation for offsite disposal if U > 28,000 pCi/g.
9. Existing sanitary sewer line under N. canal (manhole "mounds") is below expected depth of contamination.	Contaminated soil throughout region where pipeline is located.	FIDLER can identify Pu-238 > 200-300 pCi/g.	Evaluate insitu condition vis-a-vis contamination level. Use soil screening results to confirm depth of contamination > cleanup standard. Adopt more careful excavation approach if insufficient clearance is found.	Include contingency in excavation plan.	Amount of schedule delay depending on extent of contamination in vicinity of pipeline.
10. The buried utilities adjacent to the canal will not be adversely affected.	Sewer line in poor physical condition.	Visual inspection before and after excavation. Utility records.	Provide shoring during excavation if in vicinity of utilities. Repair pipeline if indicated after final inspection.	Include contingency in excavation plan.	Amount of schedule delay depending on extent of deterioration of pipeline.
11. Drainage ditch discharge pipeline construction project will not interfere or prevent removal activities.	Drainage project delayed or presents an obstacle to excavation.	Coordination with project managers.	Revise removal schedule or work location of either project. Delay start of removal pending completion of drainage pipeline project. Provide temporary stormwater reroute in canal.	Include stormwater reroute contingency in excavation plan. Work in N. Canal ASAP after 9/96, until drainage reroute project complete.	Major schedule impact on start and rate of progress in S. Canal.
12. Suspected tanks or metal anomalies buried in the N. canal will not be encountered during excavation.	Buried tanks encountered.	Results of previous Geophysical survey.	Use metal detectors during excavation in areas of suspected subsurface anomalies.	Include contingency in excavation plan to remove buried tanks.	None.
13. The Miamisburg Community Park will be available for use as a staging area.	Community Park not available until September, 1996.	Coordinate land access agreement strategy.	Use site on Mound property for construction support / staging areas.	Include contingency in excavation plan. Park will not be used for support or staging.	None.

Table II.1. OU4 Removal Action Uncertainty Analysis
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Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation	Schedule Impact
14. Excavation will remove all Pu-238 concentrations above 150 pCi/g and concentrations above 75 pCi/g to a 95% confidence limit.	Results of excavation does not satisfy cleanup standard. Other areas in OU4 do not satisfy cleanup standard.	FIDLER can identify Pu-238 > 200-300 pCi/g. Screening / verification sampling results.	Excavate soil in known location where verification sampling indicates Pu-238 exceeds standard of 75 pCi/g.	Low probability. Decide further action after results of verification sampling are known.	Amount of schedule delay depending on extent of additional contamination requiring removal. No schedule impact on planned excavation.
15. Insitu volume of excavated material will be about 21,000 yd^3.	Greater volume must be excavated. Insufficient railcars/storage space available to handle greater volume.	Monitor available storage and railcar supply.	Procure more railcars. Arrange for more site storage. Increase shipping volume/schedule. Provide volume reduction.	Estimate is conservative. Include strategy in excavation plan to monitor available disposal/shipping capacity with actual production.	Amount of schedule delay depending on frequency and extent of additional contamination.
16. No significant amounts of mixed wastes will be encountered.	Significant mixed waste encountered.	Monitor waste shipments for mixed waste.	Obtain authorization for mixed waste disposal.	Low probability. Include mixed waste monitoring in Waste Management Plan.	Amount of schedule delay in shipping waste offsite depending on extent of mixed waste encountered. No impact on excavation and onsite transport.
17. Pu-238 exceeds 75 pCi/g in N. and S. canal and drainage ditch.	Actual concentration does not exceed cleanup standard.	Results of previous sampling studies indicate concentration exceeds cleanup standard in these locations. Results of mobile lab screening will confirm.	None. Less excavation required.	Existing strategy is conservative.	None.
18. Pu-238 is less than 75 pCi/g in overflow creek, S. pond, and runoff hollow.	Actual concentration exceeds cleanup standard.	Results of sampling studies indicate concentration does not exceed cleanup standard in these locations.	Revise excavation plan to include contaminated areas, based on verification sampling results.	Low probability. Await verification sampling results.	Amount of schedule delay depending on frequency and extent of additional contamination.

Table II.1. OU4 Removal Action Uncertainty Analysis
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Expected Conditions	Potential Deviations	Monitoring	Contingency Plan	Evaluation	Schedule Impact
19. Site access agreements will be obtained.	Site access agreements not obtained.	Coordinate land access agreement strategy.	Delay start of removal pending completion of access agreements. Work in areas where access is permitted.	Include contingency in excavation plan.	Field work will be delayed until access agreements completed.
20. Clearing and grubbing is feasible.	Vegetation removal constrained by obstacles, insufficient operating clearance, interference with utilities, etc. Vegetation is contaminated.	Pre-excavation site survey. Sample vegetation for contamination.	Perform phased excavation to minimize clearing and grubbing requirements.	Include contingency in excavation plan.	Amount of schedule delay depending on frequency and extent of vegetation contamination.
21. Removal of all Pu-238 contaminated soil > cleanup standard will remove all other contamination, rad and non-rad.	Non-Pu contamination pattern differs significantly from Pu-238 distribution.	Results of previous sampling studies indicate coincident contamination patterns.	Evaluate results of verification sampling.	Low probability. Await verification sampling results.	Amount of schedule delay depending on extent of additional contamination requiring removal. No schedule impact on planned excavation.
22. The access road extension to Mound Plant under the Conrail trestle will be completed for the Removal Action.	Access road will not be completed.	Coordination with Project Managers.	Delay start of removal until access road site in canal near trestle has been cleaned. Install access road in canal and clean site after all sites north are cleaned and backfilled.	Include contingency in excavation plan. Establish transport coridor as part of project site controls. Include phased approach for excavation.	Can make up excavation schedule delays by increasing quantity of available haul vehicles.

1. FIDLER - Field Instrument for the Detection of Low Energy Radiation.

3. DESIGN BASIS

This section presents the design basis for the removal action considering the known and anticipated conditions at OU4 and the potential deviations (identified in Section 2) that are likely to occur during the removal action. DOE used these features to develop the expected approach for implementing the removal action. Also, the ARARs, which are part of the design basis and which are discussed in the EE/CA (DOE 1995a), are summarized in this section to identify the specific regulations, orders, and guidelines that can be practically applied to this removal action.

In addition to the expected approach, this section discusses alternative methods and procedures for completing the removal action, such as temporary re-routing flows from the Canal, staging of excavated material on Mound site, and other waste management alternatives.

The design basis includes cleanup levels selected by DOE for the soil and sediment in OU4, and the decision rules to be administered during the excavation to ensure that the objectives (Section 1.4) of the removal action are achieved. A flow diagram of the proposed progression of work is included in this section to provide a visual representation of the steps involved in completing the removal action.

3.1. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The activities described for this removal action will be conducted in accordance with all ARARs to the extent practicable (per NCP regulations, Title 40, Code of Federal Regulations [CFR] Part 300.415). ARARs are grouped according to whether they are chemical, location, or action-specific. The ARARs identified for the OU4 removal action have resulted from discussions among the DOE, EPA, and OEPA (DOE 1993c, EPA 1993, OEPA 1993). From this compilation, the ARARs specific to the removal action alternative chosen for OU4 are listed in the following sections. The justification for including/excluding the ARARs as specified in the EE/CA (DOE 1995) is provided in Appendix B.

3.1.1. Chemical-Specific ARARs

Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies that establish concentrations or discharge limits for particular chemicals. The following chemical-specific ARARs have been identified for the OU4 removal action:

1) 40 CFR Part 61, Subpart H: (EPA) National Emission Standards for Emissions of Radionuclides Other Than Radon from DOE Facilities;

2) 10 CFR Part 20: (Nuclear Regulatory Commission [NRC]) Standards for Protection against Radiation;

3) 10 CFR Part 61: (NRC) Licensing Requirements for Land Disposal of Radioactive Waste;

3.1.2. Location-Specific ARARs

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations. The following location-specific ARARs have been identified for the OU4 removal action:

1) 40 CFR Part 6, Appendix A: (EPA) Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands);

2) Clean Water Act §404: (EPA) Requirements to dredge and fill wetlands; and

3) 16 United States Code §661: Fish and Wildlife Conservation Act - requires action to protect fish and wildlife from actions modifying streams.

3.1.3. Action-Specific ARARs

Action-specific ARARs are usually technology- or activity-based requirements or limitations applied to specific actions. The following action-specific ARARs have been identified for the OU4 removal action:

1) 10 CFR Part 830.120: (DOE) Quality Assurance Requirements;

2) 33 CFR Parts 320 thru 330: (Army Corps of Engineers) Limits on discharge of dredge and fill materials to waters of the U.S;

3) 40 CFR Part 230: (EPA) Limits on discharge of dredge and fill materials to waters of the U.S.;

4) 40 CFR Parts 260-266: (EPA) Hazardous waste management requirements;

5) 40 CFR Parts 268.1-268.9: (EPA) land disposal restrictions - general;

6) 40 CFR Part 268.50: (EPA) Limits on storage of banned waste (e.g., mixed waste);

7) Resource Conservation and Recovery Act (RCRA) §3004(e): (EPA) Requirements for dust suppression;

8) Ohio Administrative Code (OAC) §3745-15-01 through §3745-15-09 and §3745-49-01 through §3745-49-04: Requirements include measurement of emissions of air contaminants, scheduled maintenance, reporting, and malfunction of equipment;

9) OAC §3745-17-01 through §3745-17-11: Measurement of ambient air quality and allowable emission standards;

10) OAC §3745-22: Limits on the discharge of dredged or fill material to surface waters;

11) OAC §3745-27-01 through §3745-33-10: Requirements include authorized solid waste disposal methods, operational requirements for solid waste disposal facilities, and closure requirements;

12) Ohio Revised Code (ORC) §3767: Prohibits noxious exhalation or smells, obstruction or pollution of water courses, or other nuisances;

13) ORC §6111: Prohibits pollution of waters within the state;

14) 29 CFR Part 1910: (Occupational Safety and Health Administration [OSHA]) Requirements include general standards for worker protection;

15) 49 CFR Parts 172 & 173: (Department of Transportation) Hazardous Materials Transportation and Hazardous Material Employee Training Requirements.

3.1.4. Requirements To Be Considered

Requirements to be considered (TBC) supplement ARARs. TBCs are additional guidance or standards not included in ARARs. The following TBC requirements have been identified for the OU4 removal action:

1) 40 CFR Part 300: NCP (EPA) Superfund Hazardous Substance Response;

2) DOE Order 5400.5: Radiation Protection of the Public and the Environment;

3) EPA/230/02-89/042: Methods for Evaluating the Attainment of Cleanup Standards;

4) RCRA: EPA Guidance for Implementing RCRA Regulations; and,

5) EPA Office of Solid Waste and Emergency Response, Directive No. 9355.0-25A: Use of Removal Approaches to Speed Up Remedial Action Projects.

3.2. CLEANUP GOAL

As the lead agency, DOE developed a plutonium cleanup goal for the OU4 Removal Action, with input and concurrence from the Stakeholders: OU4 Focus Group and Mound Action Committee (DOE 1995b). The

plutonium-238 cleanup goal requires development of a field excavation plan to remove areas of soil and sediments in the Canal known to have plutonium contamination levels greater than 75 pCi/g, which is achievable with state-of-the-art field sampling and analysis techniques. Plutonium-238 soil concentrations less than 75 pCi/g will not require excavation from the Canal. To meet this goal, the field excavation plan calls for removal of all soils and sediments having plutonium-238 contamination down to 25 pCi/g (As Low As Reasonably Achievable) in the vicinity of areas that now exceed 75 pCi/g. Table III.1 summarizes the plutonium cleanup goal for the OU4 Removal Action.

Table III.1. OU4 Removal Action Plutonium-238 Cleanup Goal

Standard	Pu-238 Concentration	Field Verification Method
As Low As Reasonably Achievable	25 pCi/g	None (based on results of previous sampling)
95% Confidence Limit	75 pCi/g	Mobile Lab Analysis of Field Samples
Maximum Residual	150 pCi/g	Post-Removal Sampling

3.2.1. Decision Rules

To achieve the required cleanup goal, the following decision rules will be applied:

- If the soil contamination in a given location is greater than seventy-five (75) pCi/g of plutonium-238, remove all soil whose plutonium-238 concentration exceeds twenty-five (25) pCi/g; and

- If soil sampling (via mobile lab) indicates areas where the plutonium-238 soil concentration exceeds seventy-five (75) pCi/g, excavate additional soil.

3.3. EXPECTED APPROACH

Based on the ARARs and the cleanup goal, DOE developed the expected approach for the OU4 removal action. This approach is organized in the following sections under site preparation, excavation, waste management, and site restoration tasks to correspond to the proposed sequence of work. Figure 3.1 is a flow diagram presenting the expected approach for the sequence of work.

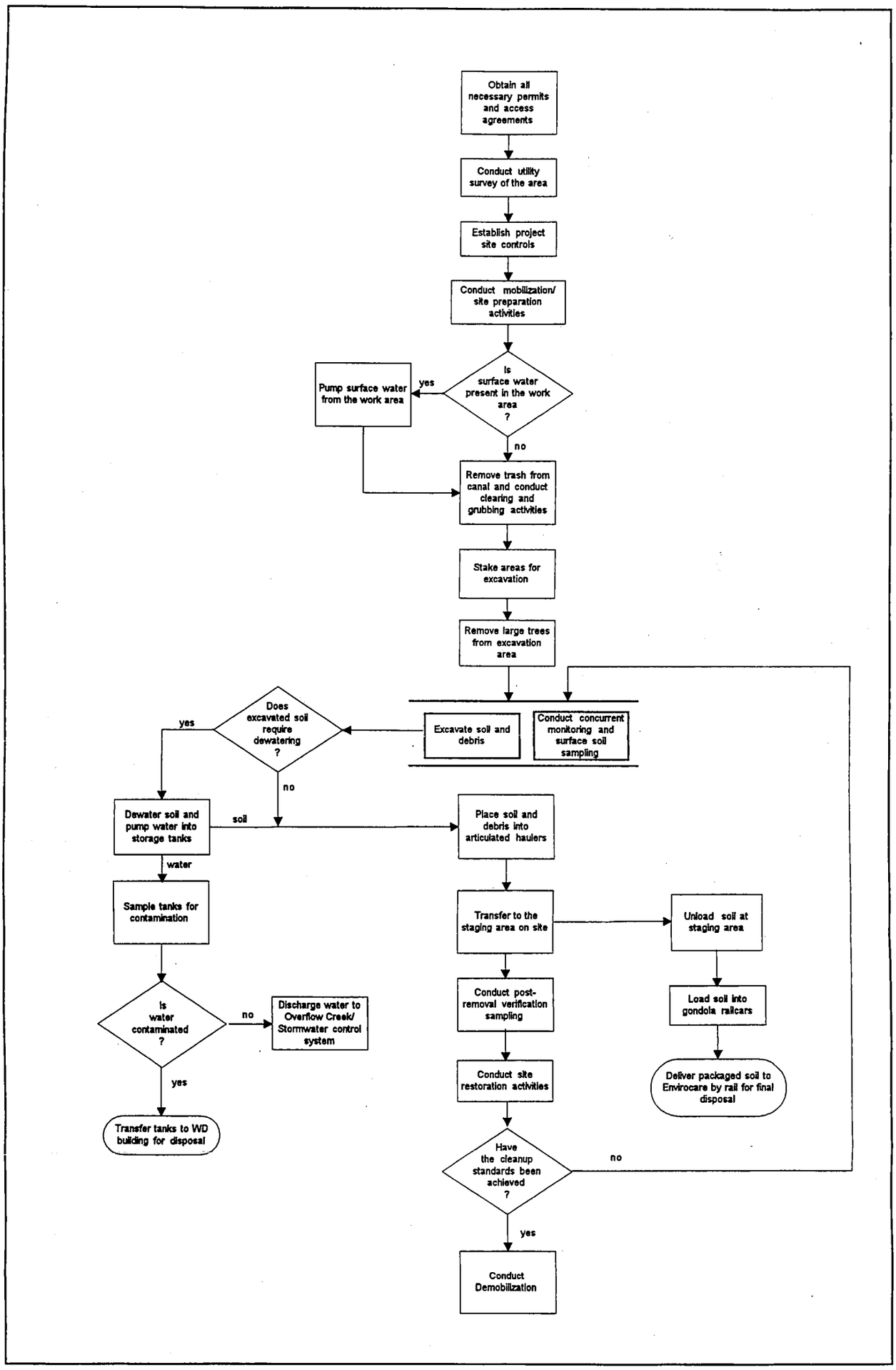


Figure 3.1. Flow Diagram of Expected Approach

3.3.1. Site Preparation

The site preparation task includes all activities that must be completed or in place before initiation of soil excavation. This task includes:

- Obtaining all permits and access agreements;
- Completing surveys of underground utilities;
- Installing site controls;
- Establishing site construction support facilities including temporary utilities;
- Mobilizing supplies, equipment, and personnel to the site;
- Establishing work zones and staging areas;
- Identifying areas for clearing and grubbing;
- Diverting Mound Site drainage from the Drainage Ditch and Canal;
- Extending Access Road from Mound Plant to Canal; and
- Upgrading Rail Spur.

DOE has signed access agreements for this removal action with the City of Miamisburg, the MCD, and Conrail. DOE will obtain all required Mound work permits prior to the start of the removal action.

A field survey will be conducted to stake areas for excavation, confirm the location of above ground and underground utilities, and identify areas for clearing and grubbing. This will include marking trees near the excavation that are not to be removed.

Site controls will be implemented as part of the site preparation activities. Site controls include fences and access gates around the OU4 boundary (DOE 1995b). These site controls will be implemented in phases to minimize the size of the controlled area. The portion of the Access Road located in OU4 will be restricted to all but project field personnel during the removal action. (The portion of the Access Road next to the North Canal will not be restricted until after September 3, 1996, per the access agreement with the City.) The Mound site road connecting the end of the OU4 Access Road and the Mound Staging Area will remain under the current restricted access in force for Mound Plant during the removal action. Since other Mound Plant workers will be using this portion

of the road at the same time as the OU4 project, traffic will be regulated to reduce congestion and hazards during the time that project vehicle and rail traffic movements occur. A gate will be added to the Access Road extension at Benner Road to permit field workers to access OU4 during the removal action project.

The City access agreement specifies that the Community Park area will be available for use as site access and a community relations center after September 3, 1996. Equipment storage, decontamination areas, and construction trailer sites will be established in the Construction Support Area located on Mound Plant. Temporary utilities including power and potable water will be made available to the Construction Support Area as necessary.

A number of related projects influence the site preparation activities. DOE plans to permanently reroute the Mound Plant Drainage Ditch flow to eliminate Mound Plant discharges to the South Canal. (If this project is not completed in time for the removal action, site preparation may include installation of a temporary dewatering system to keep the Canal dry.) Mound is locating the Waste Staging Area and Construction Support Area on Mound property. The Access Road along the east side of the Canal will be extended south and pass under the Conrail railroad trestle to provide site access from Mound Plant property. Mound plans to conduct the removal action in phases to limit the amount of site controls required at one time. This approach will reduce the area of soil to be disturbed and exposed at any time during excavation. One phase will include construction of the Access Road near the Conrail railroad trestle over contaminated soils in the South Canal.

The expected approach will follow all applicable Mound site procedures since the waste management activity will be conducted on Mound Plant property.

3.3.2. Excavation

The excavation approach for the removal action will consist of four steps:

- Remove the surface debris from the Canal;
- Clear and grub brush and small trees;
- Clear trees that would interfere with the excavation; and
- Remove contaminated soil, sediment, roots, and subsurface debris within the limits delineated on the detailed drawings.

Surface debris, brush, and trees will be removed from the excavation area and loaded into trucks for transportation and disposal as solid waste. Figure 3.2 shows the general area that will require the majority of the clearing and grubbing. Representative samples will be collected to confirm that the material to be cleared and grubbed is not contaminated. The excavation design will include procedures for handling and disposal of above ground vegetation that may be contaminated.

In general, the excavation task will progress in phases from the Drainage Ditch junction in the Canal southward (in the South Canal) to the Overflow Weir, and from the head wall in the North Canal (next to the former North Pond) southward to the Drainage Ditch. Prior to these activities, the initial phases of the excavation will be required to allow the new drainage ditch pipe-line to connect to the Overflow Creek at the weir, and to allow the Access Road to be extended near the Conrail trestle. Sod, roots, sediment, soil, and subsurface debris will be excavated and transported to the Mound Staging Area. Figure 3.3 shows the approximate area to be excavated. Detailed specifications of the planned volume of soil to be excavated from each phase of the removal action are shown on the design drawings, as referenced in the Design Memorandum [DM]. Prior to excavation, Mound will monitor the surface soil for plutonium-238 concentrations with a Field Instrument for the Detection of Low Energy Radiation (FIDLER). Once the excavation reaches the planned boundary limits, the excavation will again be monitored for plutonium-238 with a FIDLER and soil samples will be collected and sent to the mobile laboratory (located at the Construction Support Area). If the results of the sampling indicate that the cleanup levels have been achieved, the removal action will move to the next excavation point. If the results indicate that the cleanup levels have not been attained, the excavation plan will include procedures for additional excavation and sampling.

The excavation design and the HSP contain procedures for handling contaminated soil where the concentrations of the contaminants are higher than expected. Contingency plans are included in the excavation design to remove and dispose of stormwater that comes into contact with the contaminated soil and to remove stormwater from the Canal prior to excavation.

The excavation design also includes contingency plans for responding to subsurface features that have a potential for impacting the removal action. These plans include:

- Special excavation techniques to remove contaminated soil around the sanitary sewer system or other utilities;
- Options for providing shoring to support utilities adjacent to the excavation;

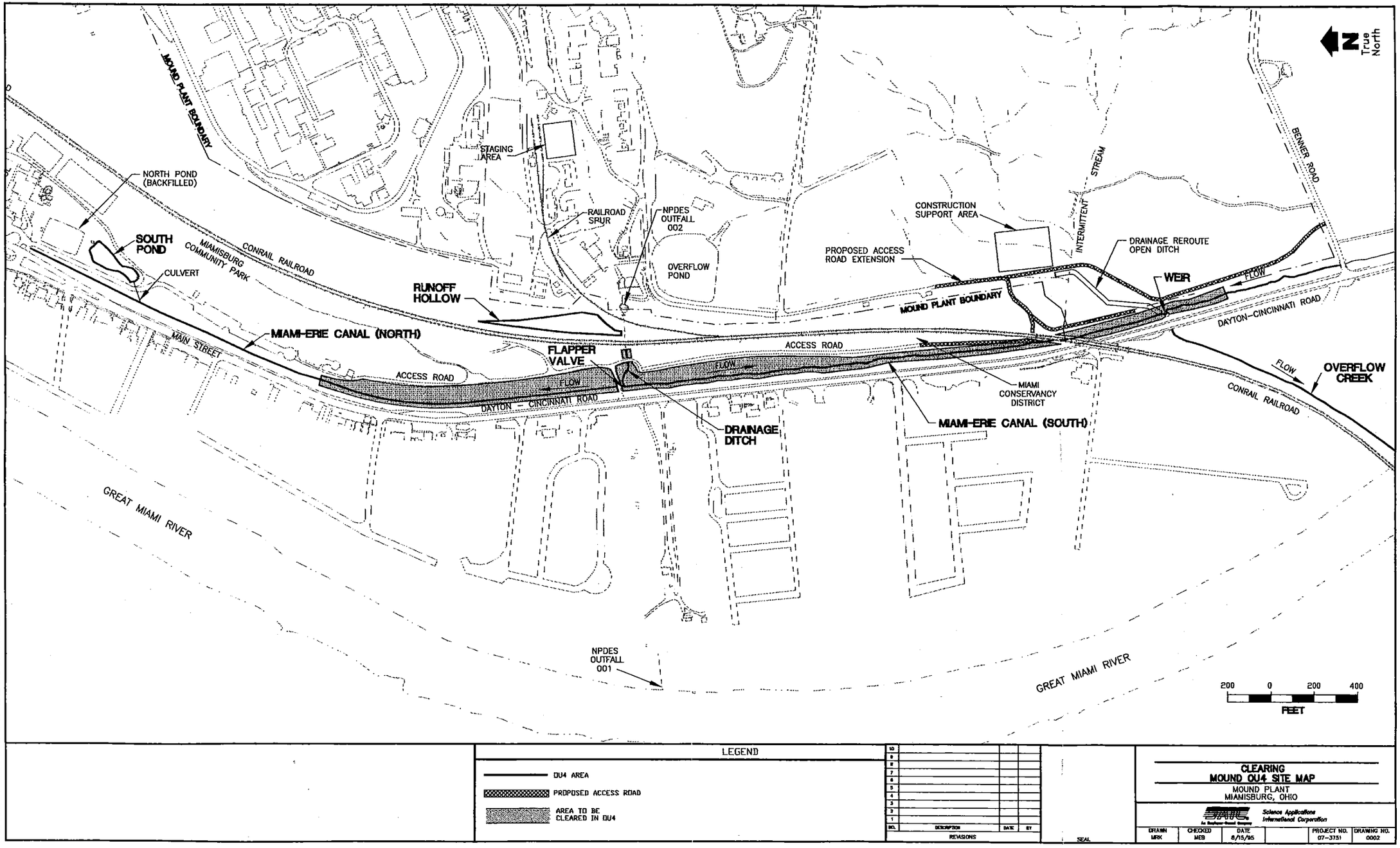


Figure 3.2. Clearing and Grubbing Site Map

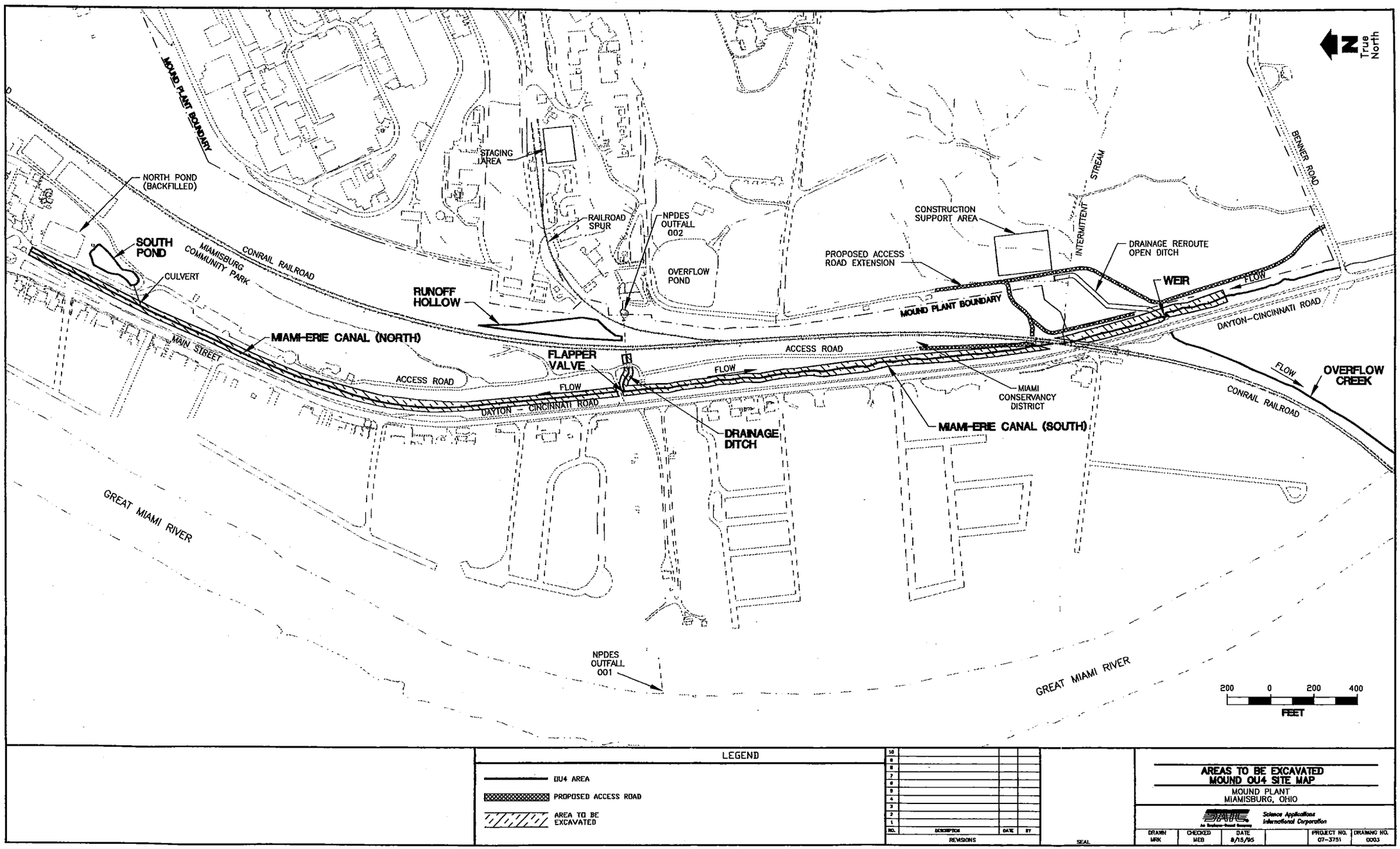


Figure 3.3. Excavation Site Map

- Use of a second excavator to facilitate soil transfer in hilly terrain; and,
- Procedures for removing abandoned tanks and other geophysical anomalies.

3.3.3. Waste Management

The waste management task includes the handling and disposal of the waste material generated during the removal action. The expected approach requires the handling and disposal of:

- Surface debris (trash) collected from the Canal;
- Brush and trees;
- Soil and sediment;
- Subsurface debris;
- Contaminated surface water;
- Excavation equipment decontamination rinsate;
- Sampling waste; and,
- Used personal protective equipment (PPE)

Mound will manage debris collected from the waterways and the brush and trees removed during the clearing and grubbing. A wood chipper may be brought onsite to reduce the size of the trees that are marked for removal.

Excavated soil, sediment, roots, and subsurface debris will be loaded into articulated haulers and transported to the Mound Staging Area. From there the soil will be loaded into railcars for disposal at the Envirocare (Utah) facility. This approach requires that the Access Road be extended under the Conrail trestle for controlled access to the Mound property. The rail spur to the Mound property will be upgraded before it is used for transporting waste material offsite. The loaded railcars will be queued along the rail spur until they are scheduled for transport to Envirocare by Conrail trains.

Surface water that collects in the Canal during the removal action may have the potential to come into contact with contaminated soil. This water will be collected and pumped, or removed by other means, to plastic storage tanks, sampled, and transferred to the Mound Plant Waste Disposal (WD) Building for treatment and disposal, as required.

Excavation equipment and haulers exposed or potentially exposed to contaminated material will be decontaminated after use. All decontamination rinsate stored in plastic tanks will be transferred to the Mound Plant WD Building for treatment and disposal.

The waste management approach includes contingency plans to respond to deviations from the expected conditions that are likely to occur. These contingency plans include:

- Alternatives for handling, staging, and disposal of the excavated material;
- Removal of a larger volume of contaminated material than projected;
- Disposal of tanks or vaults discovered during the excavation; and,
- Options for dewatering contaminated soil.

Appendix A is a copy of the DOE memorandum providing exemption to use commercial radioactive waste disposal facilities instead of federal sites for low-level waste. The preferred method for handling excavated soil is loading the material into articulated haulers for transport to the Mound Staging Area. There the bulk material will be loaded into railcars for transport to Envirocare. A contingency plan is available, if needed, to transport the excavated material to the Mound Staging Area where it would be packaged in supersacks. The supersacks would then be loaded into rail cars or trucks and delivered to Envirocare for disposal.

The waste management approach also includes methods for disposal of a larger volume of material than projected. The specific approach will depend on the selected handling and disposal option. The waste management approach includes methods for handling and managing any excavated tanks or geophysical anomalies to conform with the waste acceptance criteria of the Envirocare facility.

If the excavated soil is saturated, it will be dewatered to comply with the Envirocare waste acceptance criteria. Soil may be dewatered at the excavation or at the Mound Staging Area. Water drained from the soil will be collected, sampled, and sent to the WD Building, if required.

3.3.4. Site Restoration

The project site will be restored once the excavation is complete, and samples taken (in accordance with the FSP procedures presented in Section 5) to confirm that the cleanup standards have been achieved. The goal is to restore the site to a condition acceptable to the Stakeholders for future land use options. The final Canal

configuration will look essentially the same as, but slightly deeper than, the existing Canal features. Therefore, although the Canal site will still collect stormwater from the vicinity of OU4, it will no longer be a conduit for Mound surface water discharge after the removal action.

In the North and South Canal areas, Mound will transport clean fill with low permeability from approved off-site sources and place it in the excavation. The material will be compacted along the base and sides of the Canal. A layer of top soil will be placed over the compacted material and hydroseeded. Mound will use best management practices to prevent erosion until surface vegetation is established.

Restoration of the Drainage Ditch will conform to the detailed plans for rerouting the Mound surface water drainage flow from the Drainage Ditch and Canal.

3.3.5. Contamination Control

Mound will control the potential spread of contamination during this removal action by adhering to Mound health & safety contamination control procedures. An area where soil contamination is possible is designated as a Soil Contamination Area (SCA) or a Radiological Buffer Area. The objective of the Mound contamination control program is to ensure that contamination is not spread from the following SCAs:

- Excavation sites (canal)
- Articulated hauler payloads
- Mound Staging Area
- Construction Support Area (Decon Station)

Figure 3.4 shows the location of these SCAs, and Figure 3.5 shows the contaminated material process flow diagram for the OU4 removal action. The following discussion refers to these figures when discussing Mound's contamination control strategy.

By following the procedures specified in this Work Plan, Mound will reduce the potential spread of contamination. For example, during excavation it is standard practice to apply water mist sprays onto excavated soil during dry conditions, to prevent airborne contamination. Similarly, once the excavated soil is placed into the bed of an articulated hauler, the bed will be covered to prevent material releases during transfer to the Mound

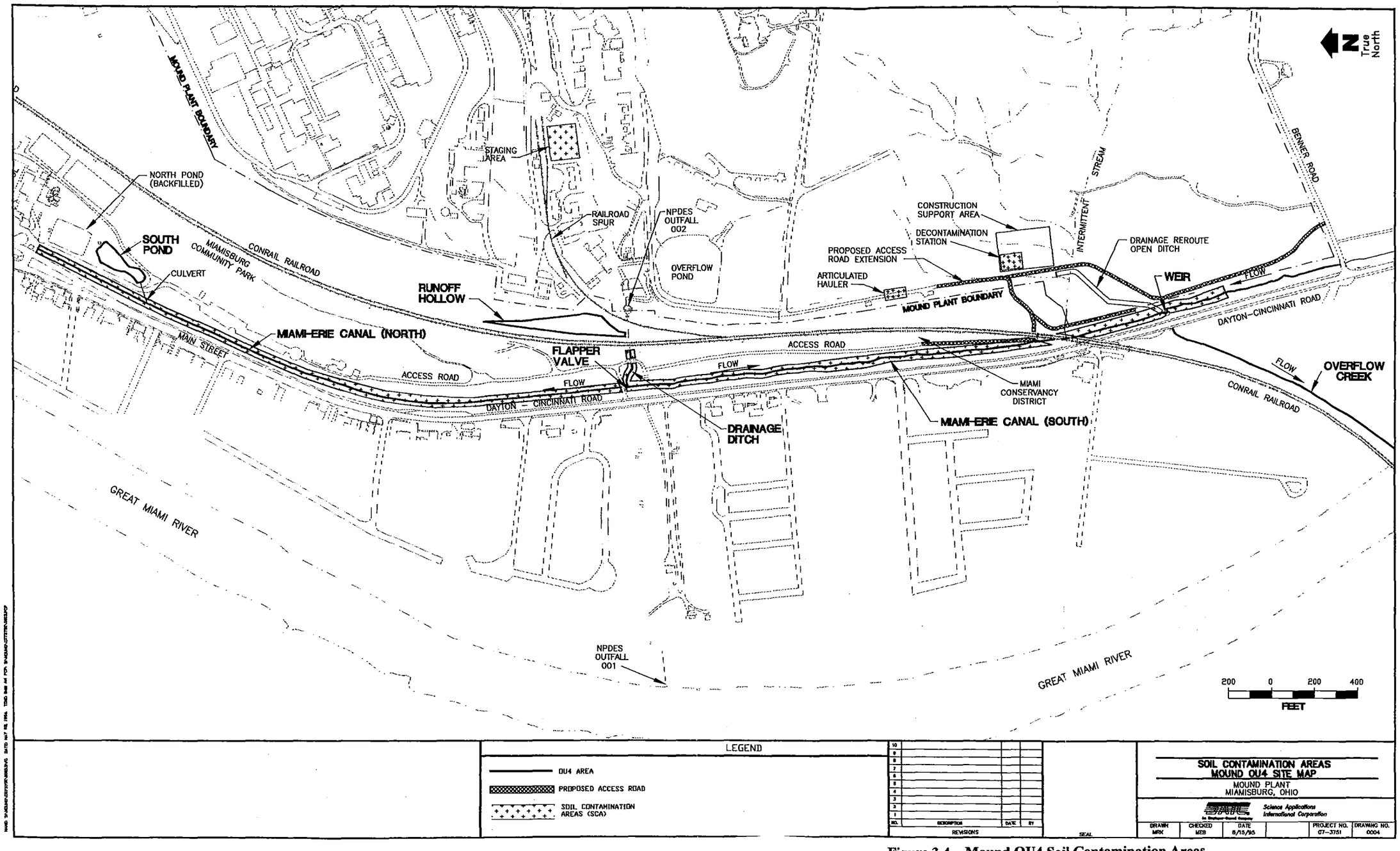


Figure 3.4. Mound OU4 Soil Contamination Areas

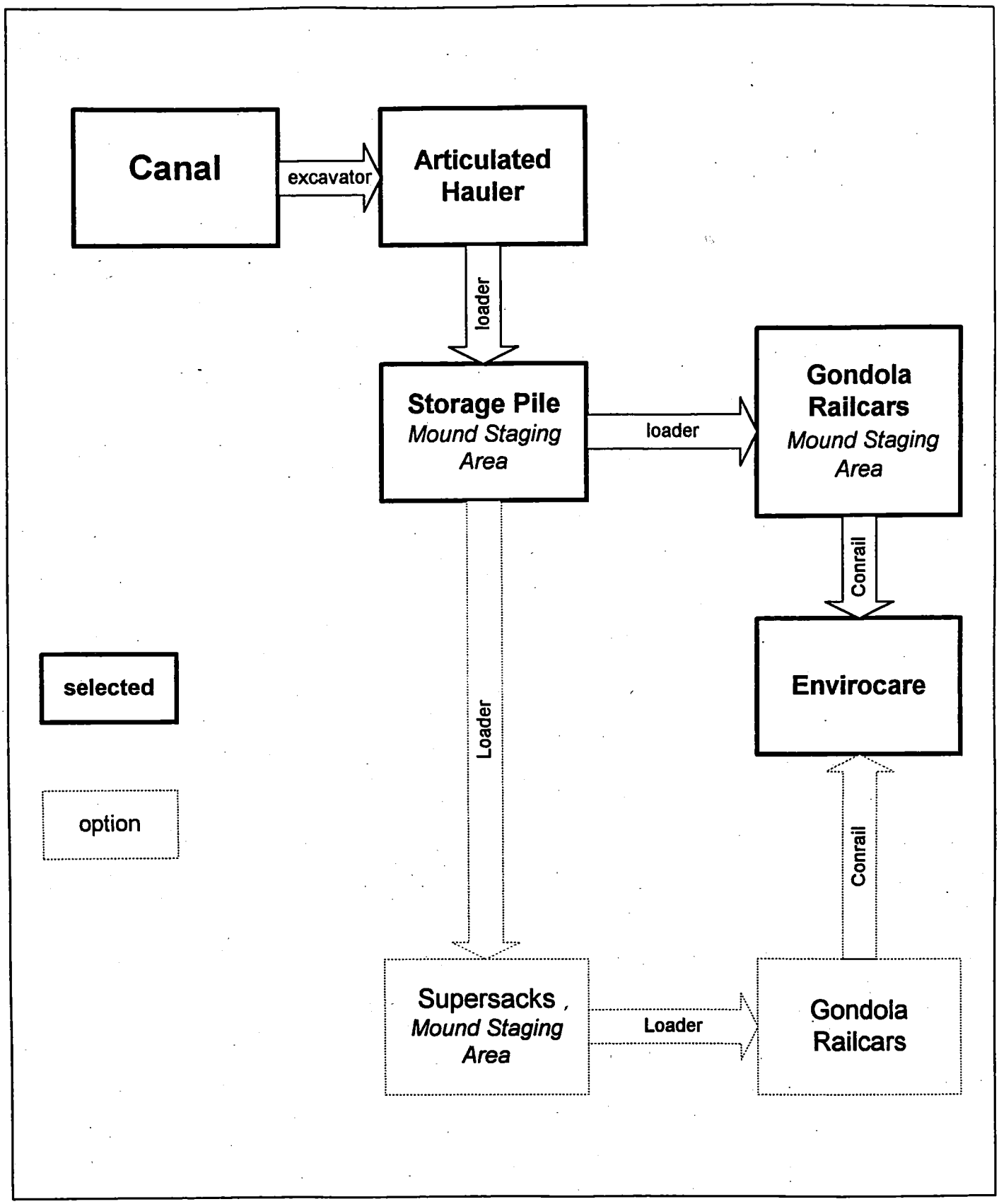


Figure 3.5. Contaminated Material Process Flow Diagram

Staging Area. Water sprays and covers will also be used to control the spread of contamination during soil movements in the Mound Staging Area.

Because of this work process, Mound will institute secondary contamination controls, i.e., decontamination procedures. Potential items that may become contaminated include workers and equipment (excavators, loaders, articulated haulers, and containers). To prevent the spread of contamination, Mound will decontaminate these items (as required) before they exit from a SCA. At the end of the removal action, Mound will decontaminate all salvageable materials and equipment, per Section 11, OU4 HSP, and release them for future Mound projects.

The following sections describe the specific contamination controls for each SCA.

3.3.5.1. Excavation Sites (canal)

Mound will temporarily establish a SCA exclusion zone around each excavation site in the Canal. Prior to exiting the exclusion zone, workers and equipment will be monitored and decontaminated, if necessary, according to Section 11, OU4 HSP. Normally, the excavator will not leave the excavation site SCA; it will progressively move along the canal as required. In cases where the excavator requires transfer to other sites, Mound will monitor and decontaminate the excavator as necessary. Additionally, the excavator will normally operate from a base of undisturbed (uncontaminated) soil. This practice will limit the extent of contamination to the excavator bucket surface. On rare occasions, the excavator may be moved into an excavation site, if necessary, to remove hot spots identified by the screening process. In such cases, the excavator base will be monitored and decontaminated as necessary prior to proceeding into the next excavation site.

3.3.5.2. Articulated Haulers

Articulated haulers will contact the boundary of the excavation site exclusion zone during the loading process. The safe work control practices will ensure that the exterior surface of the articulated haulers will not contact the excavated material. These practices include careful loading of the soil into the hauler bed (i.e., not "heaping" the load), placing a cover over the filled bed after loading, and monitoring the external surfaces of the hauler bed prior to leaving the excavation site. Mound will remove any unacceptable contamination, according to the OU4 HSP, prior to release of the hauler for transport.

By ensuring that the articulated haulers are not contaminated before leaving the excavation SCA, the potential for contamination occurring in the Access Road environment will be small. In addition, Mound will restrict portions of the Access Road assigned to the removal action (and Mound Plant roads) to authorized access only during the removal action. After the articulated haulers unload the excavated soil at the Mound Staging Area, Mound will periodically monitor the articulated haulers to ensure that no unacceptable contamination exists. Mound will remove any unacceptable contamination found, according to the OU4 HSP, prior to release of the haulers from the Mound Staging Area for return to the excavation site. Note that this requirement does not apply to the articulated bed surface, which will generally contain residual contaminated soil material during the removal action. Consequently, the articulated haulers will be dedicated for the duration of the OU4 removal action project.

3.3.5.3. Mound Staging Area

The front-end loader will be dedicated to transferring excavated material within the Mound Staging Area for the duration of the OU4 removal action project. Consequently, it will not require decontamination until it leaves this SCA. Mound will control the staged piles of excavated soil (needed if an empty railcar is not available for loading) to prevent air/water emissions of contamination.

Prior to leaving the Mound Staging Area, workers and equipment will be monitored and decontaminated, as necessary, using the procedures in Section 11, OU4 HSP. During the removal action, Mound does not intend to maintain the Mound Staging Area as an uncontaminated area.

Mound will use gondola railcars for the transport of contaminated soil to the Envirocare facility (Utah). (Per the agreement with DOE, Envirocare will be responsible for ensuring that empty railcars returning to Mound will not be contaminated.) After Mound fills a railcar, they will cover and seal it, and monitor its exterior surface. Mound will remove any unacceptable contamination, according to the OU4 HSP, prior to releasing the railcar for transport. Mound will take steps to reduce the potential spread of any contamination resulting from loader movements near the railcar.

As a contingency, DOE may decide to store excavated soil in supersacks, if railcar shipments are delayed. In this case, the loader would transfer soil unloaded from the articulated haulers to supersack loading stations at the Mound Staging Area. Mound would then stage the filled supersacks at the Mound Staging Area, or at some other designated location. As railcars become available, the supersacks would be loaded directly onto gondola railcars (see figure 3.5). If the supersacks are stored at the Mound Staging Area, they would require no additional

monitoring. If the supersacks are not stored at the Mound Staging Area SCA, they will require contamination monitoring prior to transfer from the SCA.

3.3.5.4. Construction Support Area Decon Station

At the end of each work day, Mound will store the articulated haulers and other equipment in the Construction Support Area (Mound). Even though the contamination controls (above) should preclude any contamination spread from the SCAs, as an added precaution, prior to entering the Construction Support Area, Mound will monitor the articulated haulers again to confirm that they are not contaminated (except the bed interior surface, which will be covered when the haulers are not in use). If they require decontamination, or if any rainwater has collected in the hauler beds, Mound will use the Decon Station at the Construction Support Area. The Decon Station will have the capabilities of rinsing the hauler surface, collecting the rinsate, and transferring it to a plastic storage tank. Mound intends to maintain the Construction Support Area as an uncontaminated area, except for the Decon Station operations. Therefore, Mound will not treat surface water runoff from the Construction Support Area as potentially contaminated.

3.3.5.5. Secondary Excavator (contingency)

If necessary, Mound will use a second excavator at the canal excavation site, to help transfer excavated soil from the excavation to the articulated hauler. (This contingency may occur at a few locations where surface features preclude the excavator in the canal from being directly accessible to the articulated hauler.) In this situation, the primary (canal) excavator would transfer excavated soil to a pile at the near side of the excavation (within the exclusion zone). The second excavator (outside the exclusion zone) would pick up the excavated soil from the pile and transfer it to the articulated hauler. This second excavator will reside on undisturbed (uncontaminated) soil or a plastic tarp, as necessary, to control the spread of contamination.

Two areas of contamination control would be required: (1) The second excavator bucket will require decontamination before that excavator can leave the vicinity of the excavation SCA, and (2) the ground surface between the soil pile and the articulated hauler may be contaminated by material dropped from the excavator bucket. Like the primary excavator, Mound intends that the second excavator stay at the excavation SCA for as long as it is required. Then, Mound will monitor and decontaminate the second excavator, according to the OU4 HSP, prior to moving the excavator away from the excavation SCA. Only the bucket will require any decontamination. Mound will segregate the ground surface between the soil pile and the articulated hauler as a

SCA, and it will remain such until the excavation front approaches. At that time, Mound will remove the soil surface (by the primary or secondary excavator) and include it with the canal excavated material for disposal.

4. REMOVAL ACTION ACTIVITIES

This section describes the strategy for implementation of the removal action. These activities are based on the excavated soil being loaded into articulated haulers and transferred to a staging area located near the Mound rail spur. The soil will be loaded into rail cars and shipped to the Envirocare site in Utah for disposal. Details of the engineering procedures to be performed for the OU4 removal action project are described in the DM report.

4.1. PROJECT SITE CONTROLS

Complete the activities in the following sections to establish the project site controls.

4.1.1. Permits

a. Initiate and approve all Mound permits such as Radiation Work Permit (RWP), excavation/digging permit, and penetration permit prior to implementing site control field activities.

b. Secure all access agreements from property owners before installing site controls on their property. [*Access agreements completed with all property owners as of July, 1996.*]

c. Secure formal disposal agreement between Mound/DOE and the Envirocare disposal facility for the OU4 removal action project.

4.1.2. Health and Safety Requirements

a. Verify that all field personnel have received radiological and hazardous operations training before initiating field activities. Field personnel must have completed the following training programs:

1. DOE General Employee Training;

2. OSHA 40-Hour Hazardous Waste Operations and Emergency Response Training; and,

3. DOE Radiation Worker II Training.

4.1.3. Site Surveys

a. Survey and stake all property lines prior to the installation of site controls between property lines.

b. Notify utility companies before initiating any digging activities.

c. Secure all items requiring lockout/tagout.

4.1.4. Access Controls

a. Install site controls including fencing and warning signs, in accordance with the detailed drawings and Mound procedures.

b. Install chain link fencing and gates, separating the project area from the general public, and warning signs before initiating construction of other site controls.

c. At each excavation site, install radiation barrier rope and warning signs to separate SCAs from general work areas within the Mound Health Physics Control Areas. Establish a control point at the entrance of each SCA.

Note: Established SCAs will encompass each soil excavation location only during active periods, i.e., from start of excavation through backfilling.

d. Coordinate site control activities with the OU4 Stakeholders to provide reassurance of the site safety practices.

4.2. SITE PREPARATION

Perform the following activities to prepare the site for execution of the planned removal action.

4.2.1. Health and Safety Requirements

a. Follow all worker training and qualification requirements of the HSP. Document conformance by signing the acknowledgment form.

b. Use safety equipment as specified in the HSP to ensure compliance with regulations and to ensure worker safety.

c. Ensure all equipment on site conforms to Mound safety standards and is available for inspection by Mound Safety Personnel.

d. Use direct reading air monitoring and radiation instruments as specified in the RWP and the HSP, at the direction of Mound Health Physics personnel.

e. Prepare water supply to control fugitive dust emissions.

4.2.2. Survey for Utility Lines

a. Survey Canal area to determine location of overhead, surface, and subsurface utilities. Current information indicates the following utilities exist in the Canal vicinity:

1. Subsurface sanitary sewer line and manhole risers (North Canal);

2. Utility poles;

3. NPDES Outfall 001 conduit;

4. Underground electrical and/or telephone lines; and,

5. Overhead discharge pipeline from groundwater well pumphouse near Drainage Ditch.

b. Remove utilities from service temporarily, as required, in accordance with Mound lockout/tagout procedures.

c. Perform video camera inspection of sanitary sewer line in North Canal. [*Survey completed August, 1996*]

4.2.3. Clearing and Grubbing Requirements

a. Survey the Canal area to determine the requirements for removal of vegetation (see Figure 3.2).

b. Procure additional clearing equipment if survey shows such equipment will be necessary to remove vegetation.

c. Take random sample of vegetation to determine if materials are contaminated.

4.2.4. Construction Facilities

a. Prepare the site for Construction Support Area facilities in accordance with design drawings.

b. Erect/install the Construction Support Area facilities (i.e., parking areas, mobile lab, and trailers) in accordance with design drawings.

c. Provide electrical power, potable water, and telephone services (as necessary) to the Construction Support Area.

d. Provide trash collection and restroom facilities (as necessary) adjacent to the Construction Support Area.

4.2.5. Decontamination Areas

a. Locate portable decontamination areas within the control zones at each excavation site, as determined by the Site Health and Safety Officer.

b. Construct decontamination facility at the Construction Support Area, consisting of a vehicle wheel-wash and rinse water collection system.

c. Construct a similar decontamination station at the Mound Staging Area.

4.2.6. Staging Area

a. Upgrade the Mound Staging Area with the following components:

1. Access to the Staging Area for railcars arriving onsite to receive packaged waste soil and debris.

2. A designated portion of the Staging Area where the unloaded soil and debris can be safely stored prior to being loaded into the railcar containers.

3. Access to the Staging Area for articulated haulers to unload excavated soil.

4. Access around existing utilities (overhead steam lines, fire post indicator valve, etc.) to accomodate waste handling activities.

5. A collection system for potentially contaminated runoff from the staged waste pile.

b. Procure the following equipment to handle excavated waste:

1. Loader to transfer excavated soil into railcars.

2. Front-end Loader to stage railcars.

3. Contingency equipment to load soil into supersacks.

4.2.7. Site Drainage

a. Procure stormwater control materials and equipment to temporarily divert flows from the Drainage Ditch and South Canal to the Overflow Creek which feeds the Great Miami River (see design drawings for details).

4.2.8. Access Road

a. Extend the Access Road on Mound Plant property to the Construction Support Area, the South Canal near the Conrail trestle, and the South Canal near the Overflow Weir. [*Extension completed July, 1996.*]

Note: Final portion of Access Road linking existing road north of the Conrail trestle with the new road east of the trestle will be installed after the drainage reroute project (see Section 9.2) is complete.

4.2.9. Rail Spur

a. Upgrade the existing Mound Plant rail spur to permit shipment of packaged waste soil via Conrail railcars to the Envirocare facility. [*Upgrade completed April, 1996.*]

4.3. MOBILIZATION

Mobilize the following resources in preparation for this removal action.

4.3.1. Personnel

a. Certify that all field personnel have received all required training.

b. Obtain acknowledgment that field personnel have received and read the HSP.

c. Make available, as needed, all support personnel including Waste Management, Health Physics, and Industrial Hygiene.

4.3.2. Equipment

a. Procure and make available all necessary excavation and waste handling equipment, such as excavators, backhoes, loaders, articulated haulers, bulldozers, hand tools, tanker trucks, fork lifts, and generators, as required.

4.3.3. Instrumentation

a. Procure, calibrate, and make available all necessary field and mobile lab instrumentation, such as air monitoring stations, required by the RWP and the HSP.

4.3.4. Soil Packaging Supersacks

a. As a contingency, procure a sufficient number of supersacks for packaging waste soil and debris, for storage at the Mound Staging Area.

4.3.5. Storage Containers

a. Procure and make available at the canal excavation site and the Mound Staging Area at least two 1200-gallon plastic storage containers for collection of potentially contaminated water and runoff from the staged waste pile.

b. Procure and make available at the Construction Support Area on Mound site at least two 1200-gallon plastic storage containers for collection of decontamination rinsate.

4.3.6. Utilities

a. Procure and make available all necessary utilities, such as electrical power, communications, and potable water for the Construction Support Area.

4.3.7. Personal Protective Equipment (PPE)

a. Procure and make available all necessary PPE as specified by the RWP and HSP.

b. Ensure all PPE is in proper working order.

4.4. EXCAVATION OF CONTAMINATED SOIL

As described in Section 3.3.2, the excavation of the contaminated soils and sediments in OU4 will proceed using a phased approach (see Figure 3.1). The approach will include clearing all surface debris, brush, small trees, and selected large trees; selecting an area for the next stage of removal; marking areas to be excavated; excavating designated soils, sediments, roots, and associated subsurface debris; and transferring materials in

articulated haulers to the Mound Staging Area. This approach will continue until all areas designated for this removal action have been addressed (refer to excavation plans shown in Figures 3.2 and 3.3). The following sections describe the required steps to accomplish the excavation, along with selected contingencies. The reader will be referred to detailed plans (i.e., health and safety, quality assurance, and sampling plans) for information about associated activities required to be performed during this removal action. The DM describes in detail the specific phases of the OU4 removal action which are based on the following strategy.

4.4.1 Standing Surface Water

If standing surface water is encountered at an excavation site prior to excavation, the following contingency plan will be implemented:

a. Use pumps to remove standing water to one of the 1200-gallon plastic storage tanks.

b. Sample and analyze water for contamination prior to disposal.

c. Transfer water to a tanker truck.

d. If uncontaminated, empty contents of the tanker truck into a retention pond at Mound Plant.

Note: Standing surface water in the Canal will not be considered contaminated if it has not come into contact with a potentially contaminated (i.e., excavated) surface. If the water analysis indicates it is contaminated, it will be transferred to the WD Building in accordance with Section 8.4 (Potentially Contaminated Water).

Note: Plant surface water discharge flowing through the South Canal must be either permanently or temporarily rerouted in order for the removal to proceed. It is not intended that the contingency plan above should be used to remove continuous flowing surface water from the Canal. A discussion of the site drainage reroute project is presented in Section 9 (Other Activities).

4.4.2. Debris Removal

a. Within an area designated by the Field Coordinator, remove all debris from the ground surface and place it in trash bags (see note, below).

Note: Debris is defined as all removable, non-vegetation trash, such as man-made paper products, food containers, building materials, rocks, animal carcasses, and similar non-indigenous materials.

Note: Debris can be placed in conventional plastic bags (i.e., bags are not required to be those designated for contaminated materials).

b. Dispose of debris as per Section 8.2. (Trash and Vegetation).

4.4.3. Clearing and Grubbing

a. Using equipment and materials at hand, clear and grub all vegetation from the ground surface (see Figure 3.2) and place in trash bags (see note, below).

Note: Vegetation is defined as attached flora, including tall grasses, brush, bushes, small trees, and other native plants, excluding sod.

Note: Uncontaminated vegetation can be placed in conventional plastic bags (i.e., bags are not required to be those designated for contaminated materials).

b. Dispose of uncontaminated vegetation as per Section 8.2. (Trash and Vegetation).

c. Based on vegetation sample results per Section 4.2.3 (Clearing and Grubbing Requirements), place any contaminated vegetation in supersacks. Transport supersacks to Mound Staging Area for offsite disposal at Envirocare.

4.4.4. Tree Removal

a. Stake area designated for excavation.

Note: Locations of surface features and buried structures to be preserved unharmed during the removal, such as utilities, city monuments, and warning signs, shall be marked for protection. Barriers shall be erected as necessary to prevent damage to protected features during the removal action.

b. Within the area selected for excavation, the Field Coordinator shall select trees to be removed prior to performing excavation activities.

c. Using equipment and materials at hand, cut the selected trees to within one foot of ground level.

Note: Trees may require size reduction before disposal. Trees can be placed in conventional plastic bags (i.e., bags are not required to be those designated for contaminated materials). Tree stumps will be handled in accordance with Section 4.4.5 (Contamination Removal).

d. Dispose of uncontaminated trees as per Section 8.2. (Trash and Vegetation).

4.4.5. Contamination Removal

Perform the following activities to excavate contaminated soil, sediment, stumps, and roots within areas selected for removal (see Figure 3.3).

a. Perform removal monitoring and sampling at the onset of, and as required during, the excavation activities, in accordance with Section 5.1 (Removal Action Sampling) and the OU4 HSP.

b. Excavate the selected surface to the required elevation, in accordance with the excavation design drawings, using an excavator or equivalent earthmoving equipment.

Note: A water mist may be sprayed on all freshly exposed soil and sediments as necessary based on the Field Coordinator's or the Site Health and Safety Officer's determination to eliminate airborne dust.

c. Place the excavated soil and sediments into articulated haulers for transfer away from the OU4 area in accordance with Section 8.1.2. (Soil Handling and Disposal).

Note: All soils designated for excavation shall be treated as if they are contaminated. Manage any subsurface debris encountered in accordance with Section 8.3. (Underground Debris). The Field Coordinator shall be notified when any unknown debris or unexpected utilities are uncovered by the excavation equipment.

Note: Identify unknown debris either by monitoring or sampling. The Site Health and Safety Officer will evaluate PPE requirements and adjust PPE as required.

Note: Examine unexpected utilities uncovered by the excavation equipment to determine who owns the utility; if the utility is active or inactive; and if the utility can be rerouted, removed, or taken temporarily out of service.

d. Monitor exterior surface of loaded articulated haulers before leaving the excavation SCA, in accordance with the RWP or at the direction of the Site Health and Safety Officer.

e. Decontaminate the articulated haulers, as required, in accordance with Section 11, OU4 HSP.

f. Dispose of an decontamination rinsate in accordance with Section 8.4 (Potentially Contaminated Water).

g. Remove saturated contaminated soils with an excavator to a dewatering area, as designated by the Field Coordinator, prior to placing soils into an articulated hauler.

Note: Use sump pumps of adequate capacity as necessary to remove small volumes of standing water which may be present in the area chosen for excavation. Transfer water to a plastic storage tank at the site, in accordance with Section 8.4. (Potentially Contaminated Water).

h. When the excavation "front" has progressed sufficiently, and before any planned work stoppages, cover the exposed surface with liners to minimize airborne transport effects.

Note: Repeat steps in Section 4.4.5 in the area designated for removal if the results of removal sampling (Section 5.1) indicate that additional hot spots require excavation.

i. Continue with the excavation procedures in this section for each area designated for removal.

4.4.6 Decontamination Control

Perform the following activities to decontaminate workers and equipment before leaving any SCA.

a. Monitor workers and equipment prior to leaving any SCA, in accordance with the RWP or as directed by the Site Health and Safety Officer.

Note: The SCAs for this project are designated as the Canal/Drainage Ditch areas selected for excavation, the loaded articulated haulers, the Mound Staging Area, and the Construction Support Area Decon Station (see Figure 3.4).

b. Decontaminate workers and equipment, as required, in accordance with Section 11, OU4 HSP.

c. Dispose of any decontamination rinsate in accordance with Section 8.4 (Potentially Contaminated Water).

d. Monitor workers and equipment in accordance with the RWP or at the direction of the Site Health and Safety Officer prior to entering the Construction Support Area only after exiting a SCA.

Note: Workers/vehicles/equipment entering the Construction Support Area from other than an OU4 SCA need not be moniotred for contamination.

4.5. SITE RESTORATION

This section describes the site restoration procedures to be followed once the excavation activities (including verification sampling) are completed. Site restoration includes backfilling the Canal and Drainage Ditch excavations with a layer of low-permeability material (such as clay), placing top soil over the low-permeability material, seeding and planting in accordance with the detailed landscape plans, partial removal of the Access Road, and demobilization. Each of these tasks is described below.

4.5.1. Low-Permeability Backfill

a. Procure low-permeability clay backfill from an approved off-site source and place within the excavated areas to depths as indicated on design drawings.

Note: Before backfilling, verify that the excavated area is not porous, frozen, or spongy.

Note: If the backfill material is procured from Mound pre-approved clean fill vendors, no additional sampling/analysis will be required to verify that no hazardous materials are present.

Note: The minimum thickness of the backfill material will be as specified on the detailed drawings.

b. Verify that the low permeability backfill is visually free of rocks, with a nominal size of one inch, and free of organic matter and other debris. The soil will not have irreducible clods greater than three inches, which may affect the permeability of the soil.

c. Using earthmoving equipment, construct the low-permeability layer in nominal six inch lifts.

4.5.2. Top Soil

a. Procure a layer of top soil from an approved off-site source and place on the low-permeability backfill. The top soil layer will conform with the thickness and final contours shown on the detailed design drawings.

Note: The top soil layer will have a minimum thickness to support vegetation. The soil will be inorganic or organic, fine-grained, and conform to the soil classifications required by the detailed design drawings.

b. Using earthmoving equipment, construct soil layers to achieve nominal six inch compacted lifts.

4.5.3. Seeding and Planting

a. Apply fertilizer and agricultural lime once the final lift of the top soil layer has been graded.

b. Hydroseed all areas to be restored as grass areas.

Note: Seeding operations will be performed as many times as necessary in order to ensure a complete and dense vegetative cover.

c. Follow best management practices to prevent erosion from hydroseeded areas until grass is established.

d. Perform routine inspections of the seeded areas and erosion control systems. Perform all necessary repairs to the erosion control systems and seeded areas.

e. Install all trees, shrubs, and plants in accordance with the final landscape plans.

4.5.4 Partial Access Road Removal

If the Access Road extension west of the Conrail trestle was constructed in the Canal before the contaminated soils were removed from the Canal bed, the following removal action is required.

a. Ensure that all portions of the OU4 removal action project requiring movement of materials and equipment north of the Conrail trestle have been completed.

Note: The Field Coordinator will designate the extent of the Access Road to be removed. The requirement is to remove all areas of the Canal that exceed the cleanup goal.

b. Using earthmoving equipment, carefully remove the Access Road surface and base and load into a decontaminated articulated hauler.

Note: The Access Road material is expected to be clean based on the contamination controls in place. Do not excavate this material in such a way that any indigenous (i.e., non-road) material is disturbed.

c. Transfer the excavated material to the Mound Construction Spoils Area for disposal.

d. After removing as much of the Access Road material as practicable, continue with the Canal removal action in accordance with the steps in Section 4.4.5 (Contamination Removal).

Note: Proceed with the Access Road removal and the Canal soil and sediment removal process from north to south, in order to maintain access with the Mound Plant facilities.

e. After this portion of the Canal has been excavated and verification samples have been obtained, proceed with site restoration steps in Sections 4.5.1 through 4.5.3 for this segment of the Canal.

4.5.5. Demobilization

a. Decontaminate all equipment and materials.

b. Return all utilities temporarily removed from service to operation in accordance with Mound Lockout/Tagout procedures.

c. Collect and dispose of all temporary fencing and warning signs at the direction of the Field Coordinator.

d. Remove all temporary utilities from service.

e. Remove all field trailers from the project site.

f. Complete demobilization activities at the direction of the Field Coordinator so as to minimize disruption to local traffic.

g. Perform final inspection of sanitary sewer line under North Canal with video camera.

5. FIELD SAMPLING

Two types of field sampling will be performed for this removal action: 1) during the removal, and 2) after the removal. No additional pre-removal sampling is required. (The FSP describes the details of the field sampling activities.) Waste characterization sampling of excavated material is described in the Work Plan, Section 8.1.1 (Pre-Excavation Sampling).

5.1. REMOVAL ACTION SAMPLING

After each section of OU4 is cleared, grubbed, and staked for excavation, an initial field survey for plutonium will be performed on the surface with a FIDLER before excavation commences. The objective of this survey is to confirm whether any hot spots (equivalent to greater than 300 pCi/g concentration of plutonium-238) exist, and to confirm that the selected level of protective equipment chosen for field personnel will be appropriate.

The selected options for removal action sampling are shown in table V.1 and are discussed below.

Table V.1. Sampling Options: During Removal

Parameter	Options	Selected Option
Timing of Sample	•Pre-excavation •Post-excavation •Post-backfill	•Post-excavation
Scope of Analysis	•Pu-238 only •Rads only •Selected chemicals and rads	•Pu-238 only
Area to be Sampled	•Excavated sites only •Entire OU4	•Excavated Sites only
Analytical Facility	•Mound Soil Screening Facility •Mobile Lab (Construction Support Area) •CLP Lab	•Mobile Lab
Sample Locations Survey	•Formal (GPS[1]) •Temporary	•Formal (GPS)

1. GPS = Global Positioning System

After excavation, the exposed surface will be surveyed (FIDLER) to identify any remaining hot spots. Surface soil samples (less than 6 inches deep) will be taken and screened at the mobile laboratory for plutonium-238 to determine whether surface concentrations exceed the cleanup standard (75 pCi/g). The FSP specifies that approximately 4,800 screening soil samples will be taken during the removal excavation activities. Results of sample screening will be available to field personnel within a few hours of taking the samples, to enable the excavation process to be modified, if necessary, to remove additional soil contamination.

The nature of this real-time sampling approach is such that the results are considered to be approximate, and not as accurate, precise, or to a low-enough detection level that will be required for post-removal (i.e., verification) sampling. Field sampling does not include laboratory analysis, (other than by the mobile laboratory) and covers only plutonium-238 in those soil areas selected for excavation. The location of individual removal action samples will be determined on a random sampling basis, and will be surveyed for future reference. At a given cross-section, samples will be taken at locations to be specified in the FSP.

5.2. POST-REMOVAL SAMPLING

Following excavation of the selected portion of the OU4 area, but before backfilling, soil samples will be taken of the remaining surface contour to verify that the cleanup goal has been achieved. Sampling will be performed in accordance with the post-removal procedures specified in the FSP. The objective of this sampling process is to provide data with which to confirm that the removal action was successful. As such, the FSP describes a program comparable to a CERCLA Remedial Investigation (RI)-type approach. The selected options for post-removal sampling are shown in table V.2 and are discussed below.

Like sampling during the removal action (Section 5.1), post-removal sampling will not include subsurface samples. However, the post-removal sampling will conform to RI-quality specifications for collection, handling, analysis, and evaluation. Also, samples will be analyzed for selected analytes including plutonium-238. The entire OU4 site will be included in the post-removal sampling, whereas sampling during the removal will only include areas associated with the excavation. Post-removal sampling will include soil only. Groundwater investigation and remediation are included in the Mound OU9 project scope. The locations of the post-removal samples will be surveyed for future reference.

Table V.2. Sampling Options: Post-Removal

Parameter	Options	Selected Option
Timing of Sample	•Pre-excavation •Post-excavation •Post-backfill	•Post-excavation
Scope of Analysis	•Pu-238 only •Radiological constituents only •Selected chemicals and radiological constitiuents	•Selected chemicals and radiological contituents
Area to be Sampled	•Excavated sites only •Entire OU4	•Entire OU4
Analytical Facility	•Mound Soil Screening Facility •Mobile Lab (Construction Support Area) •CLP Lab	•CLP Lab
Sample Locations Survey	•Formal (GPS) •Temporary	•Formal (GPS)

The FSP defines the number, location, types, and frequency of field samples to be taken both during this removal action, and to verify the attainment of the cleanup goals after the removal. The FSP is consistent with the Mound OU9 Remedial Investigation/Feasibility Study (RI/FS) Field Sampling Plan and EPA's sampling guidance (EPA 1989).

The FSP specifies that a total of 600-700 soil samples will be taken in OU4 for verification of site cleanup. Of these, approximately 600 will be taken from the Canal/Drainage Ditch locations.

All of the verification samples will be analyzed at an EPA-certified laboratory for concentrations of plutonium-238. In addition, 20% of thesse samples will also be analyzed for concentrations of selected analytes (e.g., inorganics, semi-volatile organics, and other radionuclides as specified in table III.5, in the FSP). Although interim results will be reported, the final results of the verification sampling effort, i.e., the decision on whether or not the removal action has met its goal, will be reported at the completion of the removal action.

6. QUALITY ASSURANCE

The work to be performed in OU4 will be consistent with the QAPjP prepared for this removal action. The QAPjP is consistent with DOE regulations in 10 CFR Part 830.120, EPA guidance in EPA-QA/R-5, and the EG&G Mound RI/FS OU9 QAPjP, with additional requirements to include design and field removal activities. The project QAPjP addresses verification sampling quality assurance requirements for field activities, laboratory analyses, and data validation. Specific quality assurance requirements are incorporated into written and approved procedures and personnel training programs. Mound personnel will also conduct periodic surveillance, inspections, and/or audits to verify compliance throughout the execution of this removal action.

7. HEALTH AND SAFETY

The work to be performed in OU4 will be consistent with the HSP prepared for this removal action. The HSP identifies, evaluates, and selects controls for all health and safety hazards. The HSP details all applicable Mound Standard Operating Procedures, worker training requirements, worker protection, fugitive dust control, air monitoring, and general site control measures, for the protection of the public and workers during the removal action. In addition, the HSP provides for emergency response to hazardous conditions. The HSP is consistent with OSHA regulations in 29 CFR Part 1910.120 and Mound Technical Manual MD-10286, Issue 15, "Mound Safety and Hygiene Manual," (9/26/94).

The health and safety requirements for the field activities will be documented in a checklist format that will be posted at all locations where field activities occur.

8. WASTE MANAGEMENT

This section describes the strategy to be followed for handling, staging, sampling, and disposal of waste generated during excavation as well as other activities associated with the removal action. These wastes include excavated soil, vegetation from clearing and grubbing activities, contaminated underground debris, rinsate from the decontamination facility, used PPE, and water collected from the canal or from dewatering of excavated soil. Details of the waste management procedures to be performed for the OU4 removal action project are described in the OU4 WMP.

8.1. EXCAVATED SOIL

This section describes two phases of waste management related to handling excavated soil. The first phase is pre-excavation planning which includes all negotiations with the waste disposal facility and the required pre-shipment sampling. The second phase is the handling and disposal procedures for the contaminated soil after excavation.

8.1.1. Pre-Excavation Planning

Note: Mound has been granted an exemption from DOE Order 5820.2A (Radioactive Waste Management) which allows low-level radioactive waste generated from OU4 to be disposed of at a commercial disposal facility (i.e., Envirocare) instead of at a federal site. A copy of this exemption is included in Appendix A.

a. Ensure conditions specified in the DOE Exemption are met.

b. Collect representative samples of the Canal soil for analysis at Envirocare's Utah certified laboratory.

Note: Envirocare has established activity concentration limits for each isotope that they are permitted to receive. The limits applicable to this removal action for plutonium-238 are as follows:

- 10,000 pCi/g (maximum)
- 8,200 pCi/g (if decay products present in equilibrium)
- 1,000 pCi/g (average)

Note: Depending on the results of the representative sample analysis, DOE and Envirocare will develop a "fingerprint" waste profile to include acceptable hazardous chemicals and radionuclides (and mixed waste) concentrations for constituents other than plutonium-238.

c. Complete the Envirocare waste profile forms based on the analytical results provided to Mound by the Utah certified laboratory.

d. Submit lab analysis, profile forms, transport summary, and additional samples to Envirocare, as required.

Note: The additional samples required will be used by Envirocare to establish acceptance criteria for all future waste shipments coming from the Miami-Erie Canal. If the contents of a waste shipment deviate significantly from the acceptance criteria, future waste shipments could be delayed, or additional costs could be incurred.

8.1.2. Soil Handling and Disposal

a. Transport excavated waste in articulated haulers from the excavation site to the Mound Staging Area on the newly constructed Access Road.

b. Empty the articulated haulers onto the waste handling pad located at the Mound Staging Area.

c. Monitor the exterior surface of the empty articulated haulers before leaving the Mound Staging Area to return to the excavation site, in accordance with the RWP, or at the direction of the Site Health and Safety Officer.

d. Decontaminate the articulated haulers, as required, in accordance with Section 11, OU4 HSP.

e. Dispose of any decontamination rinsate in accordance with Section 8.4 (Potentially Contaminated Water).

f. Using a front-end loader, transfer the soil and debris into a railcar located at the loading station in the Mound Staging Area.

Note: If a sufficient quantity of empty railcars is not available, stage the excavated soil onto a designated area. At the OU4 Project Manager's direction, transfer the excavated soil into supersacks and stage either at a designated area within the Mound Staging Area, or transfer soils to another location designated on the Mound Site.

g. Prepare filled railcars for shipment (e.g., secure plastic covers).

h. Monitor the exterior surface of filled railcars, in accordance with the RWP, or at the direction of the Site Health and Safety Officer.

i. Decontaminate the railcar, as required, in accordance with Section 11, OU4 HSP.

j. Dispose of any decontamination rinsate in accordance with Section 8.4 (Potentially Contaminated Water).

k. Comply with all rail transportation requirements by submitting the propoer documentation.

Note: Approximately 380 shipments of 90-ton gondola railcars will be necessary to transport the expected volume of waste soil generated by this removal action.

l. Monitor workers and equipment in accordance with the RWP or at the direction of the Site Health and Safety Officer, prior to exiting the Mound Staging Area.

m. Sample selected railcars for conformance with Envirocare waste acceptance standards.

8.2. TRASH AND VEGETATION

a. Dispose of trash in a bulk receptacle, leased from a licensed trash hauler.

b. Transport uncontaminated vegetation to an off-site solid waste disposal facility.

c. At the Field Coordinator's direction, chip and store vegetation, such as large trees, for future use on site.

8.3. UNDERGROUND DEBRIS

Note: Underground debris refers to any material encountered below the surface that is not soil, such as roots, large rocks, abandoned construction materials, etc.

a. Manage underground debris encountered in soils known to be contaminated as contaminated material.

b. Combine such debris directly with the excavated low-level radioactive waste soil as long as the following conditions have been met:

1. The presence of the debris will not result in a violation of the waste acceptance criteria established by Envirocare. Small deviations may be accepted, but shipment of a large quantity of unanticipated debris may have to be negotiated with Envirocare.

2. The amount of debris present in the waste soil shipments does not exceed 10% of the total volume. This calculation is based on the total waste shipped over the entire removal action.

3. Except for tree stumps and roots, no debris may exceed the size limitations established by Envirocare. This limitation requires that one dimension be less than 10 inches. The other two dimensions must each be less than 8 feet. Debris larger than this must be cut into smaller pieces to be disposed of at Envirocare.

Note: The only size restrictions for stumps and roots is that they fit into the railcars.

8.4. POTENTIALLY CONTAMINATED WATER

Note: Potentially contaminated water includes (1) surface water that has come into contact with the open excavations of the Canal, (2) water generated during dewatering of excavated soil, and (3) rinsate generated from decontamination control.

a. Store water generated from the three sources described above in one of the 1200-gallon plastic storage tanks.

b. Sample the water in the tanks to determine if it can be treated and disposed at the Mound Plant WD Building.

c. Transfer the contents of the storage tanks to the WD Building via tanker truck.

Note: Water will be disposed of at this facility if sampling indicates contaminants do not exceed the WD Building acceptance criteria.

d. If the water cannot be disposed of at the WD Building, transfer the contents of the tanks to Mound Plant, as directed by the Field Coordinator, for storage pending alternate disposal.

9. OTHER ACTIVITIES

This section describes other activities associated with the Canal removal action: community relations, Canal access road upgrade project, Mound offsite drainage reroute project, the Mound rail spur upgrade project, and technology development. Each of these activities has an impact on, and may be impacted by, this removal project.

9.1. COMMUNITY RELATIONS

Ongoing and planned public participation and community relations throughout the removal action project include:

- OU4 MAC group meetings;
- Stakeholder involvement in establishing the cleanup standard;
- Checkpoints to inform MAC of Work Plan progress, and to obtain feedback for Work Plan revisions;
- Public meeting forums and open houses to describe the status of removal action activities;
- During the removal action, community activities will include site displays and presentations at the Site Community Relations Office, site tours, etc.; and
- Roles of volunteers during removal activities (DOE 1995b).

These community relations activities are described in detail in the Mound Community Relations Plan (DOE 1993d).

9.2. CANAL ACCESS ROAD PROJECT

Mound is currently extending the existing Access Road (located along the east side of the Canal, from the Community Park to the Conrail trestle) to proceed under the Conrail trestle and onto the Mound New Property, where it will join an existing site road (see Figure 2.1). Completion of this project, which is shown on the overall removal schedule (Section 11), is crucial to the preferred option for transporting excavated material onto Mound Plant for staging and preparation for offsite disposal.

9.3. SITE DRAINAGE REROUTE PROJECT

DOE has decided to use the occasion of the Canal removal action to re-route the offsite drainage flow directly to the Overflow Creek, bypassing the South Canal. This strategy will also facilitate the performance of the removal action by permitting the excavation to proceed under dry conditions. As such, the removal activities in the South Canal cannot proceed according to plan until the current offsite drainage flow in the Canal is halted.

The project plan is to install a combination pipeline and open channel along the Mound Plant west property line from the NPDES Outfall 002 to the Overflow Creek. The site drainage reroute project requires coordination with the Canal Access Road project (Section 9.2) because the drainage culvert right-of-way passes under the proposed Access Road path.

As a contingency, in the event that the site drainage reroute project is not completed in time to adequately dry the South Canal, the removal action design includes provision for stormwater controls, including temporary rerouting of flow out of the South Canal. (See DM for details).

9.4. RAIL SPUR UPGRADE PROJECT

The preferred mode of transportation is to move the excavated materials from the Mound Plant Staging Area to the Envirocare facility by railcar. The existing rail spur from the Conrail tracks running along the Mound western site boundary has been upgraded to permit railcar movement between the Mound Staging Area and the Conrail tracks (see Figure 2.1).

9.5. TECHNOLOGY DEVELOPMENT

DOE supports the development of technologies that may contribute to performing site remediation projects at Mound more efficiently, safely, effectively, or in any manner that reduces short-term or long-term risks to the public health and safety or to the environment. The OU4 EE/CA assessed technologies to develop the most effective, achievable, and cost-effective removal action alternative for the Miami-Erie Canal project (DOE 1995a). As part of that evaluation, treatment technologies such as soil washing, chemical and physical separation, immobilization, size reduction, and extraction were considered. The EE/CA concluded that excavation combined with offsite disposal was the recommended removal action alternative. Although judged

to be effective, DOE considered other alternatives that included treatment options were insufficiently developed to warrant selection at the time. Mound Stakeholders concurred with the decision to eliminate soil treatment technologies from further consideration for use in the Canal remediation. Nevertheless, DOE continues to monitor developments of several candidate technologies to be ready to incorporate new methods that could improve the performance of the Mound ER Program.

10. PROJECT ORGANIZATION

Mound will establish the project organizational structure for the personnel performing this removal action to ensure that proper lines of authority and safety responsibilities are clearly defined. The removal action project organization will contain the following communication links and key job classifications.

10.1. PROJECT MANAGEMENT

The organizational structures for the overall project and the corresponding field organization are shown in Figures 10.1 and 10.2, respectively.

10.1.1. Program Manager

The Mound Program Manager (R. Stanley) is responsible for the overall operation of the OU4 Removal Action. The Program Manager will act as the point of contact with the DOE Project Engineer.

10.1.2. Field Engineer

The Field Engineer (K. McMahan) reports to the Mound OU4 Program Manager and is responsible for the day-to-day safe operation of the removal action project. The Field Engineer shall ensure that the Site Health and Safety Officer is present during all activities indicated in Section 4 (Removal Action Activities). The Field Engineer will interact with Mound site organizations (Waste Management, Industrial Hygiene, Health Physics, etc.) to coordinate performance and schedule.

10.1.3. Site Health and Safety Officer

The Site Health and Safety Officer (M. Daubenmire) reports to the Field Engineer and is responsible for implementing the HSP requirements. This individual is responsible for air monitoring of chemicals and dust, radiation monitoring, frisking personnel and equipment prior to removal from the exclusion zone, maintaining the contamination reduction zone, overseeing construction safety, and conducting initial site safety training and daily safety briefings.

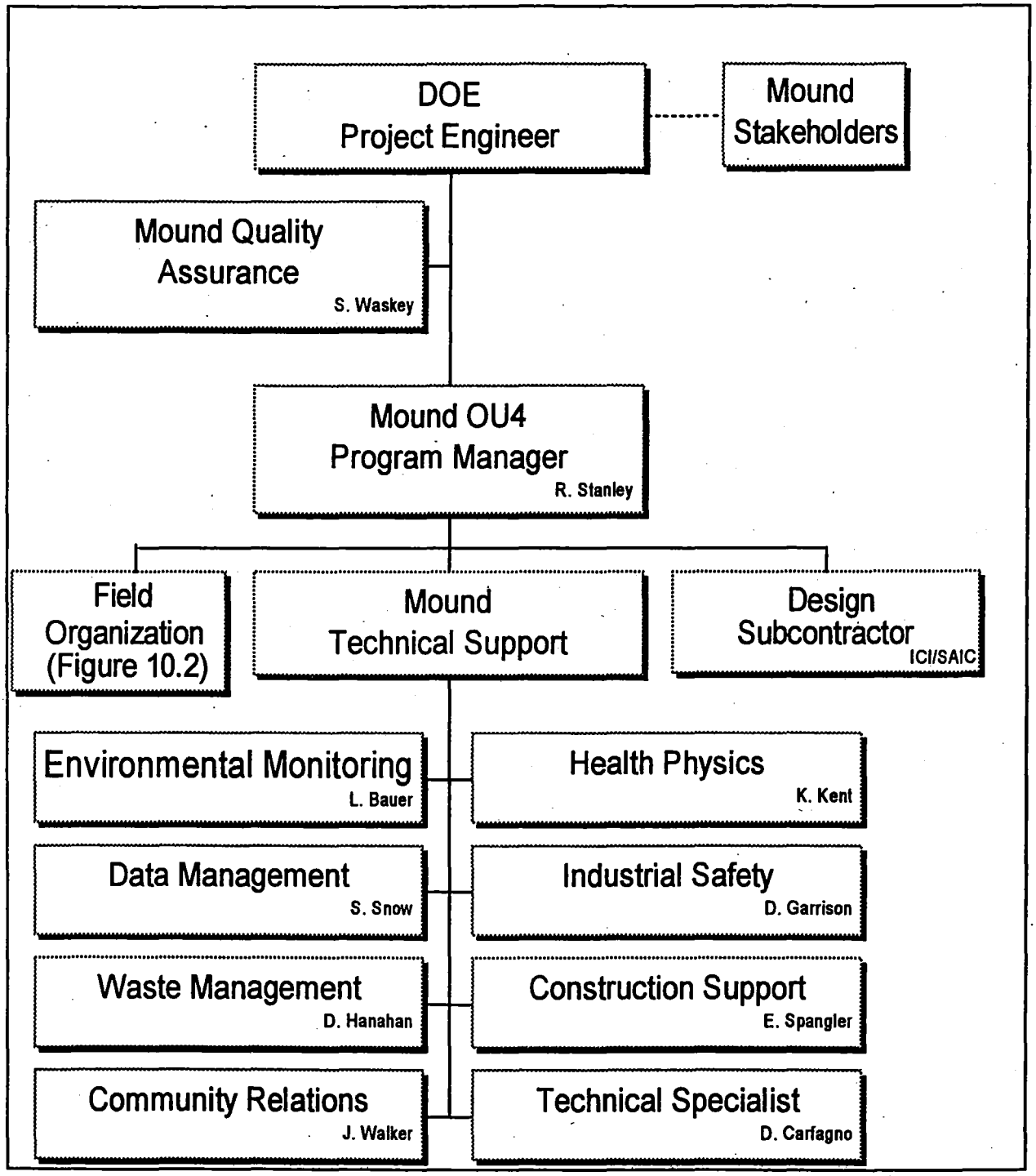


Figure 10.1. Project organization

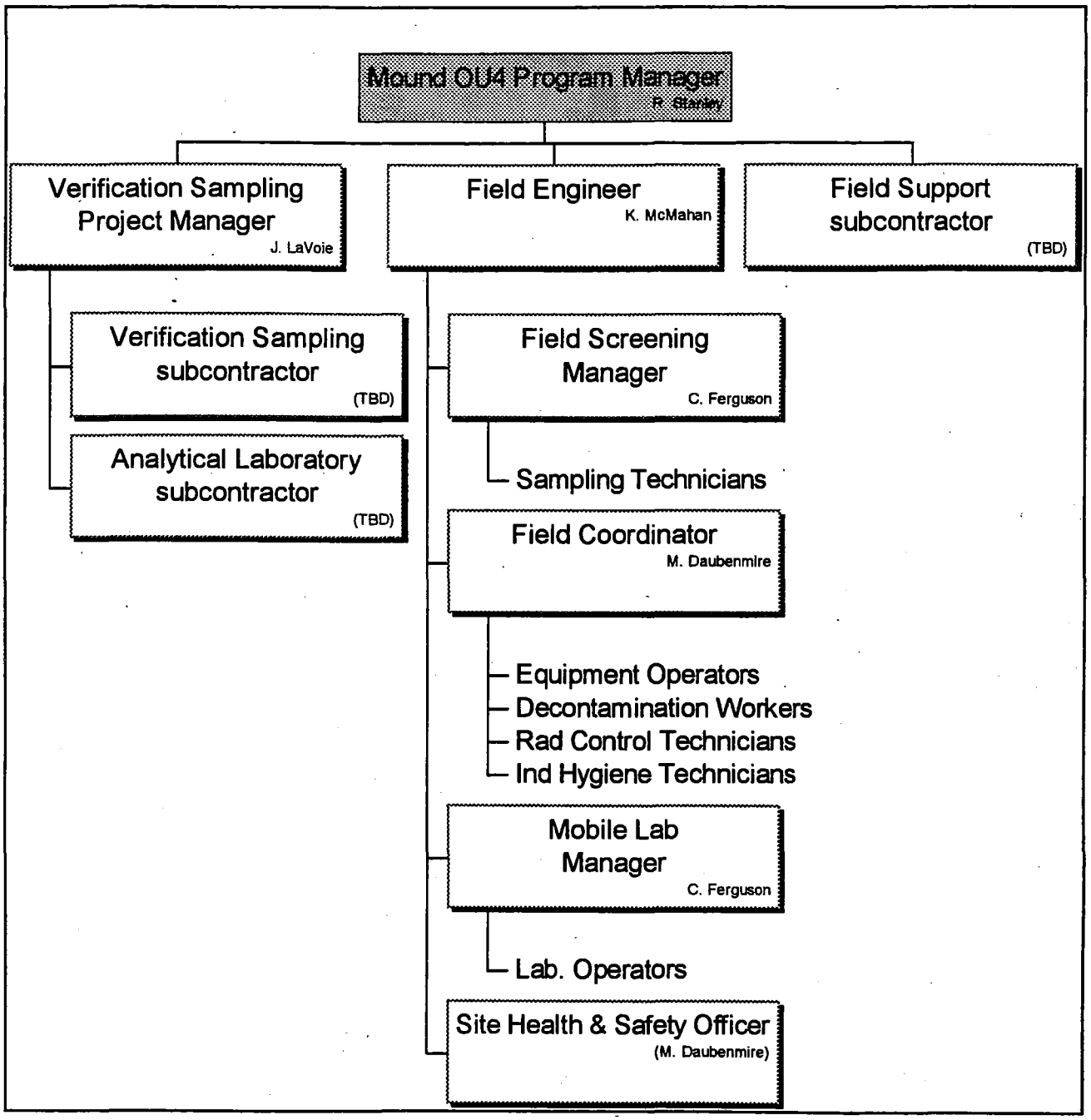


Figure 10.2. Field Organization

10.1.4. Quality Assurance Officer

The Quality Assurance Officer (S. Waskey) reports to the DOE Project Engineer and is responsible for implementing the QAPjP. This individual is responsible for conducting periodic surveillance of field activities, reporting non-conformances, and ensuring that corrective actions are implemented.

10.1.5. Verification Sampling Project Manager

The Sampling Project Manager (J. LaVoie) reports to the Mound OU4 Program Manager and is responsible for implementing the FSP. This individual is responsible for the collection, handling, packaging, and documentation of all field samples obtained during the verification sampling phase. The Sampling Project Manager shall coordinate all verification sampling activities with the Field Coordinator and the Field Screening Manager.

10.1.6. Field Coordinator

The Field Coordinator (M. Daubenmire) reports to the Field Engineer and is responsible for implementing the excavation plan. This individual is responsible for the clearing and grubbing, surveying, excavation, waste handling and packaging, backfilling, and construction activities during this removal action. The Field Coordinator shall coordinate all excavation activities with the Verification Sampling Project Manager.

10.1.7. Mobile Lab Manager

The Mobile Lab Manager (C. Ferguson) reports to the Field Engineer and is responsible for operating the Mobile Lab. This individual is responsible for the receipt, storage, analysis, and reporting of results of all field screening samples obtained during the excavation phase of the removal action. The Mobile Lab Manager shall coordinate all Mobile Lab analysis activities with the Verification Sampling Project Manager and the Field Screening Manager.

10.1.8. Field Screening Manager

The Field Screening Manager (C. Ferguson) reports to the Field Engineer and is responsible for the monitoring, collection, handling, packaging, and field documentation of all field screening samples obtained

during the excavation phase of the removal action. The Field Screening Manager shall corrdinate all screening sampling activities with the Field Coordinator and the Mobile Lab Manager.

10.2. PROJECT IMPLEMENTATION

The options available to DOE for the performance of the removal action as specified in this Work Plan include using Mound personnel, such as members of the Decontamination and Decommissioning (D&D) department, or an outside environmental contractor. By using Mound staff (with specialty subcontractors as required), the removal action can be initiated sooner than if an outside contractor is used, because of the time required to solicit, evaluate, and negotiate with a contractor. In addition, Mound personnel are more familiar with the Mound site, including OU4, than most outside contractors. For example, Mound D&D staff have experience excavating and handling plutonium-contaminated soils. For these reasons, DOE has decided to use Mound personnel to perform the removal action (Appendix C).

11. SCHEDULE

The schedule for the OU4 removal action is shown in Figure 11.1, which also includes project planning, related projects (reroute of the site drainage, Canal access road and rail spur upgrades), and the post-removal activities related to the OU4 CERCLA program activities (RI/FS, Record of Decision, etc). A detailed schedule of the field activities is in the OU4 DM report.

The project schedule is based on the following assumptions:

1. The yearly window available for field work is early March to mid-December.
2. Single excavation crew.
3. Access to North Canal (excavation) prohibited until after September 3, 1996.
4. Access road and rail spur upgrade projects must be completed before excavation can start.
5. Drainage reroute project must be completed before excavation in South Canal may start. (Use temporary diversion of any flow in the South Canal, as required.)

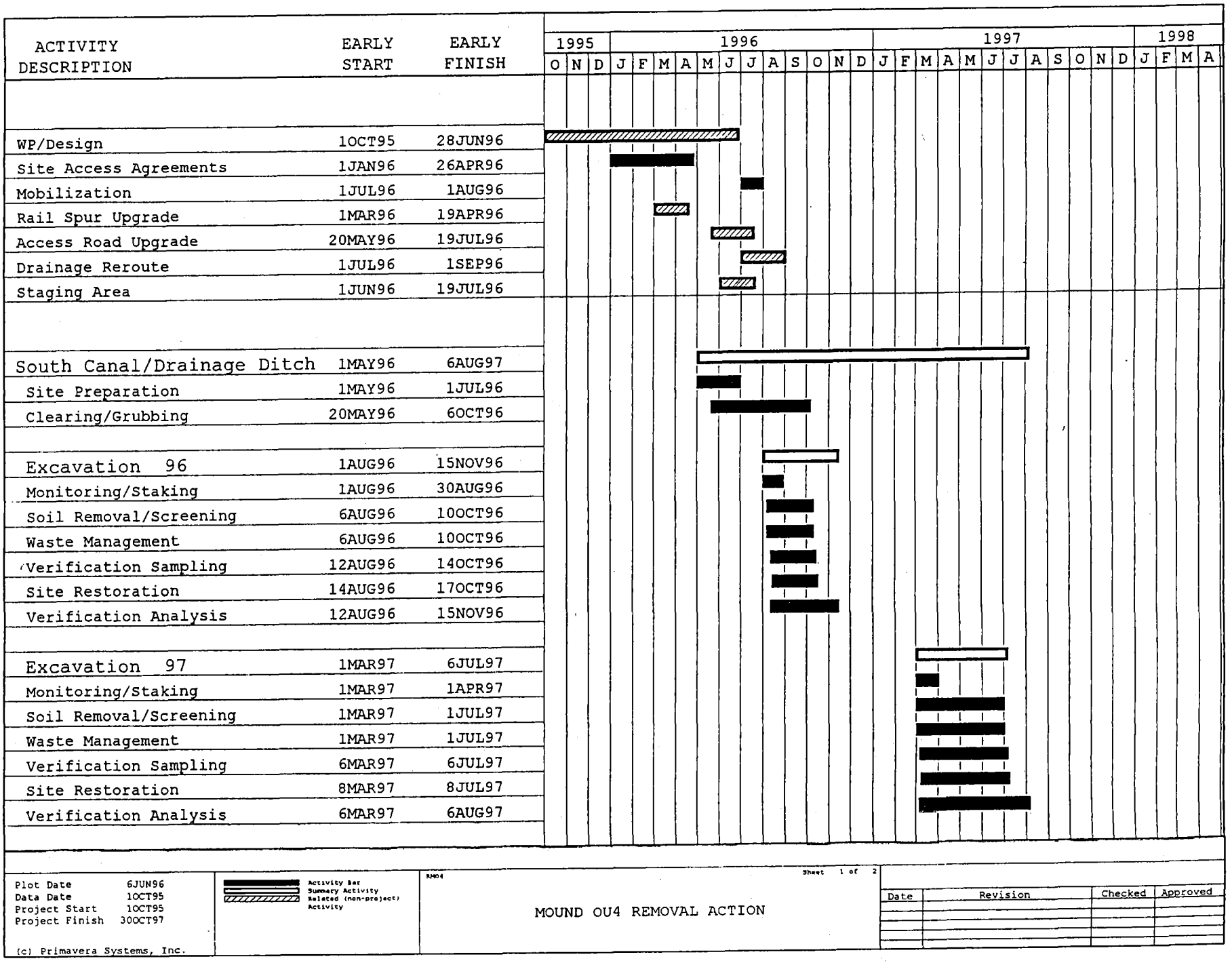
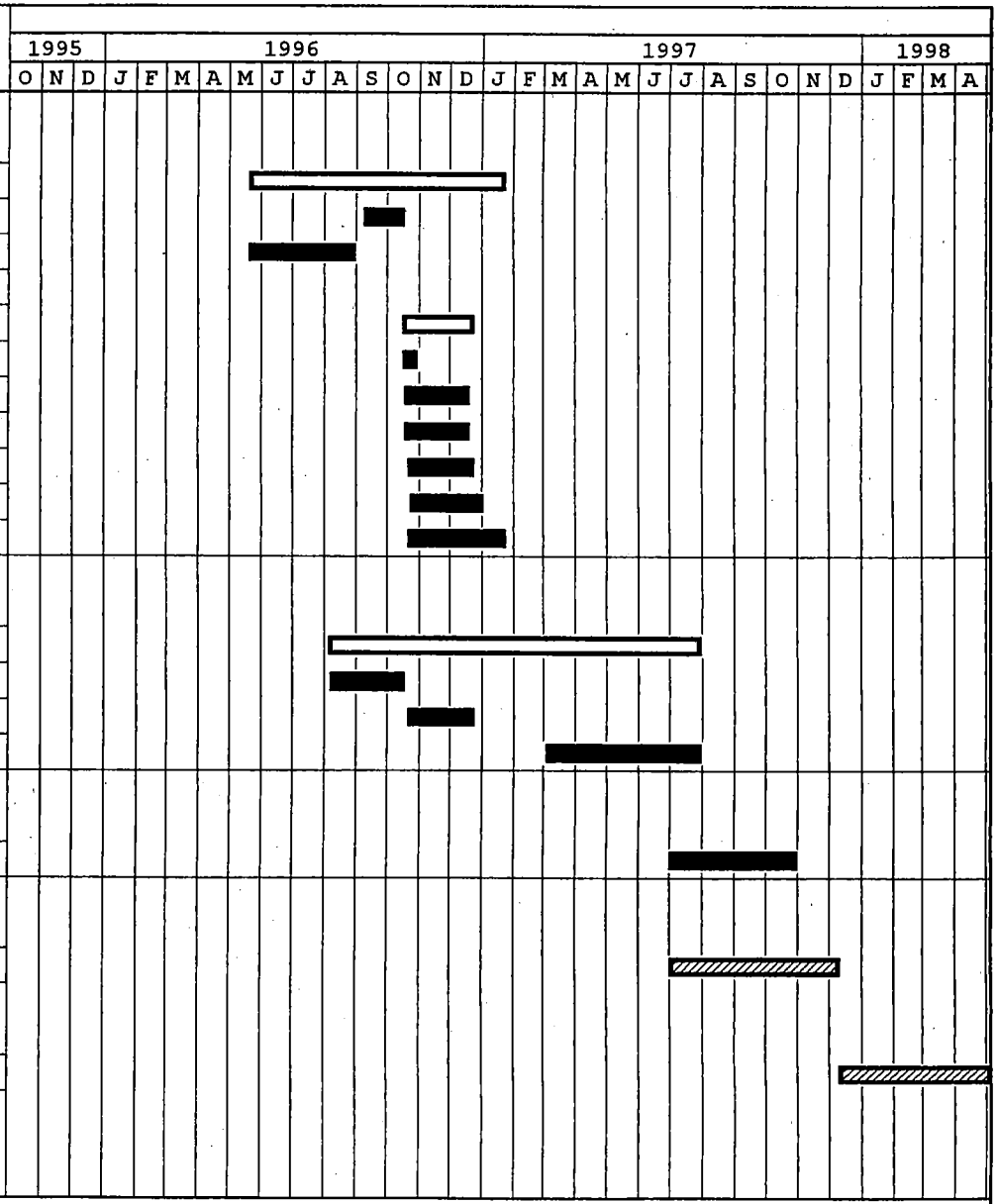


Figure 11.1. OU4 Removal Action Work Schedule

Figure 11.1 (Continued)

ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH
North Canal	20MAY96	23JAN97
Site Preparation	8SEP96	16OCT96
Clearing/Grubbing	20MAY96	30AUG96
Excavation	16OCT96	23DEC96
Monitoring/Staking	16OCT96	29OCT96
Soil Removal/Screening	18OCT96	19DEC96
Waste Management	18OCT96	19DEC96
Verification Sampling	21OCT96	23DEC96
Site Restoration	23OCT96	1JAN97
Verification Analysis	21OCT96	23JAN97
Waste Disposal	5AUG96	30JUL97
Load Railcars (S. Canal - 96)	7AUG96	17OCT96
Load Railcars (N. Canal)	21OCT96	23DEC96
Load Railcars (S. Canal - 97)	4MAR97	30JUL97
OSC Report	1JUL97	30OCT97
RI/FS Report	1JUL97	10DEC97
ROD	10DEC97	5MAY98



Plot Date 6JUN96
Data Date 1OCT95
Project Start 1OCT95
Project Finish 30OCT97

(c) Primavera Systems, Inc.

Activity Bar
Summary Activity
Related (non-project) Activity

RMO4

Sheet 2 of 2

MOUND OU4 REMOVAL ACTION

Date	Revision	Checked	Approved

12. COST ESTIMATE

The cost estimate for performing the removal action (field portion, plus management support) is shown in Table XII.1. This estimate is based on the following assumptions:

1. Ship excavated soil via gondola railcars to Envirocare site in Utah for offsite disposal.

2. Volume of soil to be excavated (based on a cleanup standard of 75 pCi/g):

a. North canal	=	7,900 yd^3
b. South canal	=	12,400 yd^3
c. Drainage ditch	=	1,100 yd^3
TOTAL	=	21,400 yd^3

3. Volume of soil to be disposed equals 27,800 yd^3 (excavated volume increased by 30% to account for uncompacted soil).

4. Gondola railcar capacity is approximately 90 tons.

5. Screening sampling total equals 4800 samples; verification sampling total equals 600 samples.

6. Backfill volume equals 4,000 yd^3 clean fill and 4,000 yd^3 top soil.

7. Work schedule is composed of 50 weeks/year, 4 days/week, 10 hours/day.

8. Costs are based on equipment and labor usage rates (including overhead and profit) obtained from Means (1996).

9. No long-term Operations & Maintenance costs.

10. Contingency costs include supersacks, electricity, water, and communications.

11. Compared to the Cost Estimate in the DM report, the Work Plan Cost Estimate:

    A. Lists equipment as a separate line item.

    B. Includes a contingency equals 25% of direct capital costs.

    C. Has subdivided field support into field and project subcategories, and includes additional field support personnel.

    D. Includes actual equipment costs rather than estimates.

The resulting Work Plan Cost Estimate is $3.2 million higher than the DM estimate (90% phase).

Table XII.1. Summary Cost Estimate for OU4 Removal Action

DIRECT CAPITAL COSTS	
Site Preparation	$200,000
Excavation	$320,000
Waste Handling	$260,000
Offsite Transportation	$2,650,000
Disposal	$7,760000
Canal Sampling	$1,190,000
Site Restoration	$120,000
Field Support	$540,000
Project Support	$520,000
Equipment	$1,815,000
TOTAL DIRECT CAPITAL COST	$15,375,000
INDIRECT CAPITAL COSTS	
Drainage Reroute	$800,000
Access Road Upgrade	$150,000
Rail Spur/Staging Area Upgrade	$100,000
Clear and Grub	$200,000
Contingency (25% of Direct Capital Cost)	$3,840,000
TOTAL INDIRECT CAPITAL COST	$5,090,000
TOTAL CAPITAL COST	$20,465,000
Annual Operation and Maintenance	$ 0
TOTAL COST	**$20,465,000**

13. REFERENCES

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DOE. 1993b. "Removal Site Evaluation, Operable Unit 4, Miami-Erie Canal." [Final Revision 3], prepared by EG&G Mound Applied Technologies for the U.S. Department of Energy. May 1993.

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DOE. 1995a. "Removal Action Engineering Evaluation/Cost Analysis, Operable Unit 4, Miami-Erie Canal." [Final Revision 1], prepared by EG&G Mound Applied Technologies for the U.S. Department of Energy. January 1995.

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EPA. 1989. "Methods for Evaluating the Attainment of Cleanup Standards, Volume 1: Soils and Solid Media," EPA/230/02-89/042, U.S. Environmental Protection Agency, 1989.

EPA. 1993. Letter from Diana Mally (USEPA) to Arthur Kleinrath (DOE/DAO) May 7, 1993.

OEPA. 1993. Letter from Martha Hatcher, Division of E&RR (OEPA) to Arthur Kleinrath (DOE/DAO), May 7, 1993.

Means. 1996. "Heavy Construction Cost Data," 10th Annual Edition, R.S. Means Co., Inc., Kingston, MA 1996.

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APPENDIX A

LOW-LEVEL WASTE EXEMPTION MEMORANDUM

United States Government | Department of Energy

memorandum

DATE: APR 12 1995

REPLY TO ATTN OF: EM-453 (J. Sands, 427-1012)

SUBJECT: Exemption for Use of Commercial Radioactive Waste Disposal Facilities for Low-Level Waste

TO: Manager, Ohio Field Office

This memorandum approves the use of commercial radioactive waste disposal facilities under Department of Energy (DOE) Order 5820.2A for low-level radioactive waste from the Mound Plant. This exemption is limited to waste consisting of 6000 drums of solidified operations waste and 70,000 cubic yards of soil/debris from operable units 2, 4, and 5 and decommissioning soil and building projects. As such, it constitutes an approved exemption from DOE Order 5820.2A as you requested in your March 17, 1995, memorandum. The conditions are discussed below.

This exemption is consistent with the June 1992 Inspector General Report IG-0308 ("Packaging, Transportation, and Burying of Low-Level Waste").

Conditions

The same conditions that apply to the prior commercial radioactive waste disposal exemption (attached) apply to this exemption; they are as follows:

- Appropriate environmental documentation under the National Environmental Policy Act or the Comprehensive Environmental Response, Compensation, and Liability Act shall be prepared. These documents shall consider several possible waste disposal alternatives, including possible disposal at DOE facilities as well as available commercial facilities.
- Manifests and similar documents shall be prepared for shipment of waste.
- Appropriate procurement or contracting documents shall be prepared for waste disposal services.
- Prior to execution of a contract, the permits, licenses, approvals, and regulatory record of any proposed disposal facility shall be reviewed to establish the types of waste that may be accepted and to assess the operational performance of the facility. This review shall also document that the appropriate low-level waste compact or host State has no objection to the acceptance of DOE waste at the disposal facility. It is strongly encouraged that the DOE field organization communicate with the appropriate low-level waste compact or State staff early in the planning process.
- The waste shall be accurately characterized to ensure the concentrations are within the limits of the license held by the prospective disposal facility.

- Prior to the beginning of each shipment campaign, Waste Management's Program Integration Division, EM-33, shall be notified of the waste type total volume, and destination.

- Prior to shipment of waste, the regulatory status of the facility shall be confirmed.

- Periodic reviews/audits of the commercial facility or facilities will be conducted by your staff. If there is a continuing use of any particular facility, either (1) these reviews/audits shall be conducted annually, o (2) reference to a similar effort by another DOE entity shall be provided.

Exemption

In consultation with EH-1, an exemption to DOE Order 5820.2A is approved, subject to the above conditions, to allow the specified projects at the Mound Plant to use commercial disposal facilities for radioactive waste whenever commercial disposal represents the best programmatic alternative for managing waste.

James M. Owendoff
Acting Deputy Assistant Secretary
for Environmental Restoration

Attachment
Memorandum from Grumbly to Distribution dated October 12, 1993

Pursuant to DOE Order 5820.2A, the required consultation with the Assistan Secretary for Environment, Safety, and Health has been accomplished for thi exemption.

Raymond P. Berube
Deputy Assistant Secretary
for Environment

Date: 4/13/95

Tara O'Toole, M.D., M.P.H.
Assistant Secretary for
Environment, Safety and Health

Date: 4-13-95

APPENDIX B

OU4 REMOVAL ACTION ARAR SCREENING SUMMARY

INTRODUCTION

The ARARs compiled by DOE, as reviewed by OEPA and USEPA, are shown in the first two columns of table B.1. The third column indicates whether the ARARs are practicable or not for the specific alternative selected for the OU4 removal action, i.e., excavation and offsite disposal. The rationale for excluding any of the listed ARARs is indicated in the last column. Those ARARs that remain from this screening process are listed in Section 3.1 of this Work Plan.

Table B.1 OU4 Removal Action ARAR Screening Summary

Chemical-Specific ARAR	Description of ARAR	Applicable to OU4 Removal Action ?	Explanation (if excluded)
40 CFR 61, Subpart H	National emission standards for radionuclides other than radon from DOE facilities	Yes	
40 CFR 141.11 - 16	MCLs for chemical and radiological contaminants	No	Scope of OU4 removal action does not include ground water
40 CFR 141.50-51	SDWA MCL Goals	No	Scope of OU4 removal action does not include ground water
40 CFR 191	EPA radiation protection standards for managing and disposing of nuclear fuel, high-level and transuranic radioactive waste	No	OU4 removal action involves only low-level waste
40 CFR 192	EPA environmental standards for uranium and thorium mill tailings and licensed commercial processing sites	No	Scope of OU4 removal action does not include mill tailings or processing wastes
40 CFR 264.94	RCRA ground water protection concentration limits	No	Scope of OU4 removal action does not include ground water
10 CFR 20	NRC Standards for protection against radiation	Yes	
10 CFR 61	NRC Licensing requirements for land disposal of radioactive waste	Yes	
OAC 3745-81-15 A,B	MCLs for radium-226, 228, and grtoss alpha emitters in community water systems	No	Scope of OU4 removal action does not include water
OAC 3745-81-16 A,B	MCLs for beta particle and photon radioactivity from man-made sources in the community water systems	No	Scope of OU4 removal action does not include water
CWA 304	Clean Water Act water quality criteria	No	Scope of OU4 removal action does not include water

Table B.1. (Continued)

Location-Specific ARAR	Description of ARAR	Applicable to OU4 Removal Action ?	Explanation (if excluded)
40 CFR 264.18	Regulations regarding siting hazardous waste facilities near fault zones or flood plains	No	Scope of OU4 removal action does not include siting of hazardous waste facilities
40 CFR 6, Appendix A	Executive Order 11988 (Floodplain Management) and 11990 (Protection of Wetlands)	Yes	
OAC 3745-27-07	Regulations which specify locations in which solid waste landfills are not to be sited	No	Scope of OU4 removal action does not include siting of landfills
OAC 3745-1-21	Regulations which establish water use designations for stream segments within the Great Miami River basin	No	No change in water use designation is anticipated
CWA 404	Dredge or fill wetland	Yes	
16 USC 661	Fish and Wildlife Ccordination Act requires action to protect fish and wildlife from actions modifying streams	Yes	

Table B.1. (Continued)

Action-Specific ARAR	Description of ARAR	Applicable to OU4 Removal Action ?	Explanation (if excluded)
10 CFR 830.120	DOE Quality Assurance requirements	Yes	
10 CFR 834	DOE requirements for radiation protection of the public and environment	Yes	
33 CFR 320 - 330	Army COE requirements for discharge of dredge and fill material to waters of the U.S.	Yes	
40 CFR 122.44	Point source discharge of treatment system effluent to waters of the U.S.	No	Scope of OU4 removal action does not include treatment systems
40 CFR 230	Discharge of dredge and fill material to waters of the U.S.	Yes	
40 CFR 264.13	Waste analysis	Yes	
40 CFR 264.111	Closure with no post-closure care (e.g., clean closure)	Yes	
40 CFR 264.117	Restrict post-closure use to prevent damage to cover	No	Scope of OU4 removal action does not include capping
40 CFR 264.171-176	Container storage	Yes	
40 CFR 264.228	Surface impoundment closure requirements and post-closure care	Yes	
40 CFR 264.251	Waste piles	Yes	
40 CFR 264.310	Landfill closure requirements and post-closure care	No	Scope of OU4 removal action does not include landfill closure
40 CFR 268	Land Disposal Restrictions, excavation and placement	Yes	
40 CFR 268.50	Storage of banned waste (e.g., mixed waste)	Yes	
40 CFR 260-266	RCRA hazardous waste management	Yes	
RCRA §3004(e)	Dust suppression	Yes	

Table B.1. (Continued)

Action-Specific ARAR	Description of ARAR	Applicable to OU4 Removal Action ?	Explanation (if excluded)
OAC 3745-15-01 thru 09 and 3745-40-01 thru 04	Requirements include measurement of emissions of air contaminants, scheduled maintenance, reporting, and malfunction of equipment	Yes	
OAC 3745-17-01 thru 11	Measurement of ambient air quality and allowable emission standards	Yes	
OAC 3745-22	Establishes criteria for the discharge of dredged or fill material to surface waters	Yes	
OAC 3745-27-01 thru 10	Requirements include authorized solid waste disposal methods, operational requirements for solid waste disposal facilities, and closure requirements	Yes	
ORC 3767	Prohibits noxious exhalation or smells, obstruction, pollution, or other nuisances of water courses	Yes	
ORC 6111	Prohibits poolution of waters within the state	Yes	
33 USC 1318	Guidelines and standards for effluent, pretreatment standards, and discharge of treatment system effluent	No	Scope of OU4 removal action does not include water treatment systems
29 CFR 1910	OSHA requirements include general standards for worker protection	Yes	
49 CFR 172 & 173	DOT rrequirements for hazardous materials transportation and employee training	Yes	

Table B.1. (Continued)

Requirements To Be Considered (TBC)	Description of TBC	Applicable to OU4 Removal Action ?	Explanation (if excluded)
40 CFR 300	Superfund off-plant policy and technological approaches to cleanup of radiologically contaminated CERCLA sites	Yes	
EPA RAGS	Provides pathway model to correlate risk assessment and contaminant concentration	No	Will be applicable to post-removal action risk assessment
EPA (draft guidance)	Guidelines for cleanup of accidental releases of transuranics to the environment	No	Scope of OU4 removal action does not include transuranic waste
EPA/230/02-89/042	Methods for evaluating the attainment of cleanup standards	Yes	
USEPA Health Effects Assessment Guidance	Health Effects Assessment Summary Tables (HEAST) and Integrated Risk Information System (IRIS)	No	Will be applicable to post-removal action risk assessment
RCRA	Guidance for implementing RCRA regulations	Yes	
EPA/540/2-88/002	Technological approaches to the cleanup of radiologically contaminated Superfund sites	No	Removal action technology selected in EE/CA report
NRC proposed policy	Proposed Below Regulatory Concern (BRC) dose of 10 mrem/yr	No	Policy withdrawn
DOE/Mound	Mound On-Site Cleanup Policy	No	Superseded by DOE/Stakeholder established cleanup goals
EPA OSWER Directive No. 9355.0-25A	Use of removal approach to speed up remedial action projects	Yes	

APPENDIX C

REMOVAL ACTION CONTRACTOR SELECTION MEMORANDUM

95-561

United States Government

Department of Energy

memorandum

Ohio Field Office
Miamisburg Area Office

DATE: NOV 3 1995

RECEIVED

REPLY TO ATTN OF: MB:RHC:5400.

NOV 7 1995

SUBJECT: Recommendations as to Who Should Clean-up the Miami - Erie Canal

Action to
Reply Due
Route Copy to

TO: J. Phil Hamric, Manager, OH

Attached is a synopsis of estimates received from EG&G, Corps of Engineers (COE), and an unsolicited proposal, submitted to MB for the purpose of performing the work necessary to clean-up the off-site Canal contamination. These estimates were correlated as closely as possible to be able to provide an "apples to apples" comparison.

The cost of the reroute of the surface waters from the canal area and the rail spur upgrade was omitted from this synopsis because the COE estimate was based on temporary reroute, where the reroute would be permanent, thus requiring a more substantive structure. The rail spur upgrade was omitted because only EG&G provided an estimate for this activity. Since the overhead costs that this project would bear would have to be paid whether the project is contracted to the COE or conducted by EG&G, the overhead dollars were subtracted from the EG&G estimate (EG&G - Overhead Column).

As with most estimates, there are advantages and disadvantages of selection. The advantages of EG&G and COE are provided below, as these are the two solicited proposals by DOE:

1. Advantages of EG&G Site Workers:

- Knowledge of site history and experience
- More DOE control through the M&O process
- Greater flexibility provided through the M&O process
- Smaller probability of on-site union issues
- Greater public trust from proven experience
- Easier for DOE
- Greater ease in flexibility in scheduling of specific task (i.e., sampling, etc., to address stakeholder concerns)

2. Advantages of COE Contractor:

- Broad based knowledge
- Supports FN issues
- $ savings
- Deals with Contractor transition issues
- Avoids possible outside legal challenge from unions
- DOE may avoid some liabilities with contractor insurance

Recommendation: EG&G should do the remediation utilizing in-house resources with the following considerations made:

1. An evaluation of the excavation technology proposed by the COE should be conducted to evaluate the reduction of excavation cost.

2. The difference in sampling costs between the two proposals must be reconciled.

3. FN must be advised of decision so that impacts can be addressed.

4. MB must detail how the project will be impacted during contract transition.

A demonstrated and successful project "core team" approach will be used for remediation of the canal. This project field team will consist of a field coordinator, decon workers, and heavy-duty operators assigned directly to the project and reporting to the ER Project Manager and Field Engineer. Key support team members (DOE, Safety, Health Physics, Plant Engineering, Community Relations, Project Controls, Waste Management) have been identified and will be directly involved in both the design and remediation phases."

The Scope of this work will be developed in union with DOE and EG&G. DOE will position themselves to be an equal "custodian" during the entire remediation effort. This will allow for ease of transition from EG&G to whoever succeeds, following DOE's guidance.

George R. Gartrell
Director

Attachment

cc w/o attachment:
Earl Fray, EG&G

Approved: 11/3/95

J. Phil Hamric Date

Disapproved:

_____

J. Phil Hamric Date