

9 May 01 RAB JB

SUMMARY

TNT AREA B

REMEDIAL INVESTIGATION/FEASIBILITY STUDY FORMER PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO

Presented To:

Restoration Advisory Board

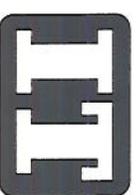
May 9, 2001



Remedial Investigation/Feasibility Study

- A remedial investigation/feasibility study (RI/FS) was conducted at TNT Area B beginning in 1998 to:
 - Characterize site conditions
 - Determine the nature of the waste
 - Assess risk to human health and the environment
 - Evaluate the potential performance and cost of the treatment technologies that are being considered.

NOTE: TNT Area B RI/FS is currently in review. Therefore, findings, recommendations, and conclusions presented herein are subject to revision.



Remedial Investigation/Feasibility Study

- The RI/F/S served as the mechanism for the development, screening, and detailed evaluation of remedial action alternatives (RAOs).
- The RI/F/S process at TNT Area B included these phases:
 - Scoping
 - Site characterization
 - Development of RAOs
 - Screening of remedial action technologies
 - Development and detailed analysis of remedial alternatives.



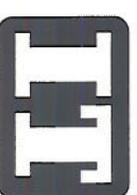
Scoping

- **Collection of existing site data:**
 - Morrison-Knudsen Ferguson Corporation in 1993
 - Dames and Moore in 1994
 - IT Corporation in 1996 and 1997.
- **Based on review of the existing site data:**
 - Define the boundaries of TNT Area B
 - Identify likely RAOs and determine if interim actions were necessary.



Scoping

- **Scoping activities included:**
 - **Initiating the identification and discussion of potential Applicable or Relevant and Appropriate Requirements (ARARs) with the support agency.**
 - **Determining the types of decisions to be made, and identifying the data and other information needed to support these decisions.**
 - **Preparing the work plan, sampling and analysis plan, and health and safety plan.**



Site Characterization

- **Field sampling and laboratory analyses were initiated during the site characterization phase of the RI/FS.**
- **A baseline human health risk assessment and an ecological risk assessment were completed to identify existing or potential risks to human health and the environment by site contaminants.**



Site Characterization



Building 469. Acid and Fume Recovery Building



Site Characterization



Building 466. Wash House



Site Characterization

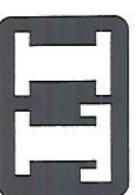


Building 476. Wash House



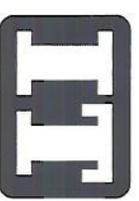
Development and Screening of Alternatives

- **The development of remedial alternatives required:**
 - **Identification of RAOs**
 - **Identification of potential treatment, resource recovery, and containment technologies that would satisfy these objectives**
 - **Screening the technologies based on their effectiveness, implementability, and cost**
 - **Assembling technologies and their associated containment or disposal requirements into alternatives for the contaminated media at TNT Area B.**



Development of Remedial Action Objectives

- **RAOs are cleanup objectives (preliminary remediation goals [PRGs]) developed for protection of human health and the environment**
- **Results of the risk assessments were used to select the most conservative receptor (hypothetical on-site resident)**
- **PRGs were developed for 13 chemicals of concern.**



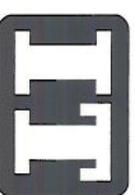
Preliminary Remediation Goals

Contaminant of Concern	PRGs (mg/kg)
Nitroaromatics	
2-amino-4,6-dinitrotoluene	0.40
4-amino-2,6-dinitrotoluene	0.40
2,4-dinitrotoluene	7.50
2,6-dinitrotoluene	2.75
2-Nitrotoluene	74
2,4,6-trinitrotoluene	3.36
Polychlorinated Biphenyls	
Aroclor 1254	0.16
Aroclor 1260	2.87
Polynuclear Aromatic Hydrocarbons	
Benzo(a)anthracene	5.43
Benzo(a)pyrene	0.54
Benzo(b)fluoranthene	5.43
Dibenz(a,h)anthracene	0.65
Indeno(1,2,3-cd)pyrene	5.43



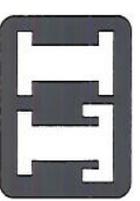
Estimated Soil Volumes Exceeding PRGs

- Approximately 3,078 cubic yards exceed PRGs
 - 560 cubic yards contaminated with 2,4-DNT
 - 2,520 cubic yards contaminated with TNT
 - 400 cubic yards contaminated with PCBs (also contaminated with 2,4-DNT and TNT)



Screening of Technology Process Options

- **Capping**
- **Excavation**
- **Off-Site Disposal**
- **Ex-Situ Chemical Stabilization**
- **In-Situ Chemical Stabilization**
- **Windrow Composting.**



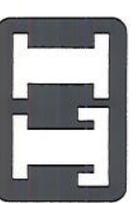
Detailed Analysis of Alternatives

- **No further action**
- **In-situ chemical oxidation, excavation, and off-site disposal**
- **Excavation, ex-situ stabilization, and off-site disposal**
- **Excavation, composting and off-site disposal.**



Detailed Analysis of Alternatives

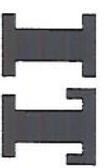
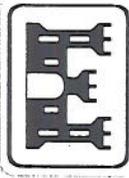
- Alternatives are evaluated in detail with respect to nine evaluation criteria that address the statutory requirements and preferences of CERCLA. These nine criteria include:
 - Overall protection of human health and the environment
 - Compliance with ARARs
 - Long-term effectiveness and permanence
 - Reduction of toxicity, mobility, or volume
 - Short-term effectiveness
 - Implementability
 - Cost
 - State acceptance
 - Community acceptance.



Comparative Analysis of Alternatives

- The alternatives were analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses.

		Evaluation Criteria						
Alternatives	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, or Volume	Short-Term Effectiveness	Implementability	Cost	
Alternative 1 - No Action	Low	High	Low	Low	Low	High	Low	
Alternative 2 - In situ chemical oxidation, excavation and off-site disposal	High	High	High	High	High	High	\$814K	
Alternative 3 - Excavation, Ex-Situ Stabilization, and Off-Site Disposal	High	High	High	Moderate-High	High	High	\$358K	
Alternative 4 - Excavation, On-Site Composting, and Off-Site Disposal	High	High	High	High	High	High	\$828K	



Comparative Analysis of Alternatives (Continued)

- **Alternative 3: excavation, ex-situ stabilization, and off-site disposal, was selected because:**
 - **It can be quickly implemented in a cost effective manner**
 - **All the contaminants of concern in soil would be stabilized**
 - **All hazardous waste generated as part of the excavation would be treated**
 - **The health risk at the site would be permanently reduced.**



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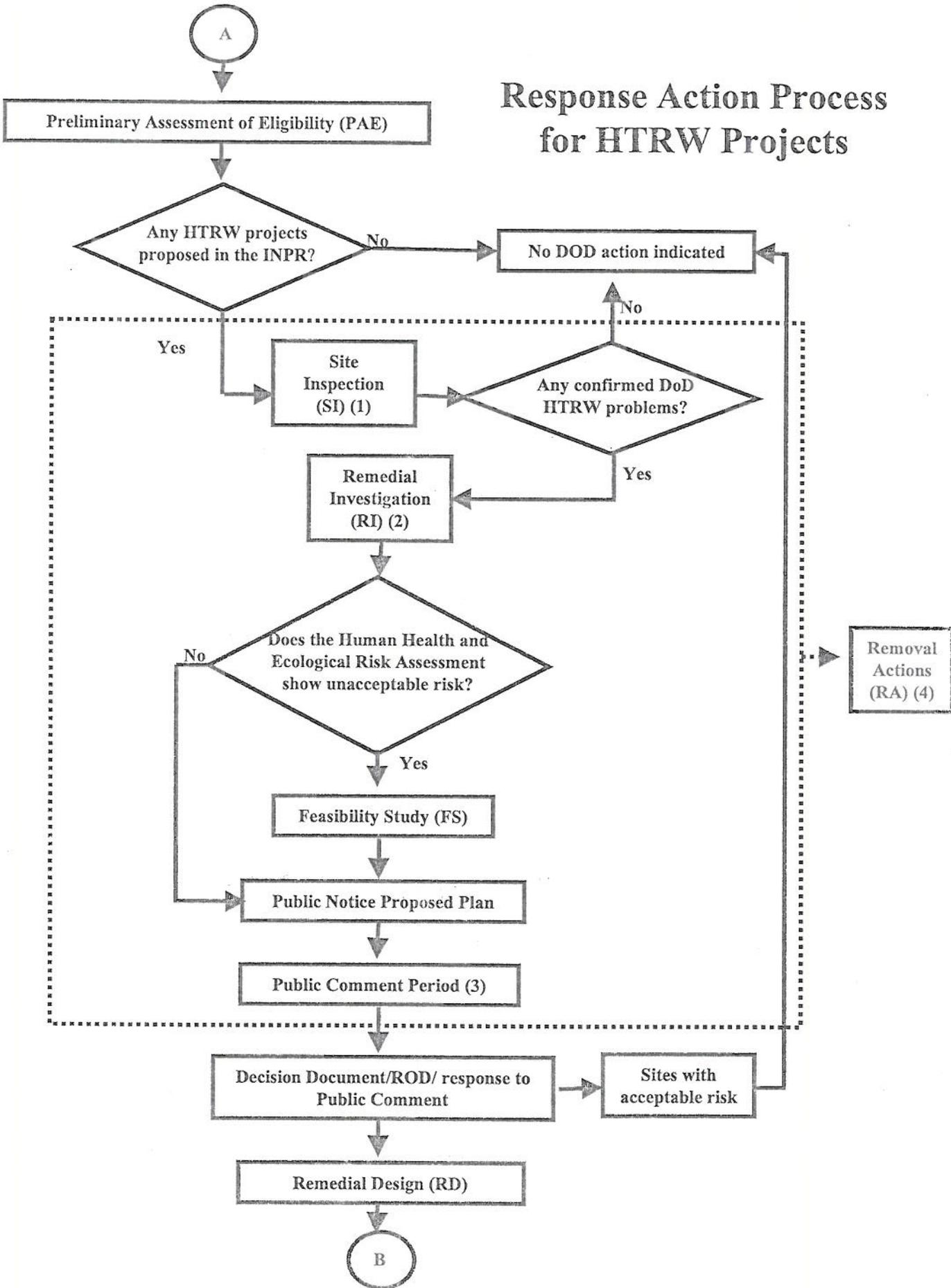
The FUDS/CERCLA Process

Presented By

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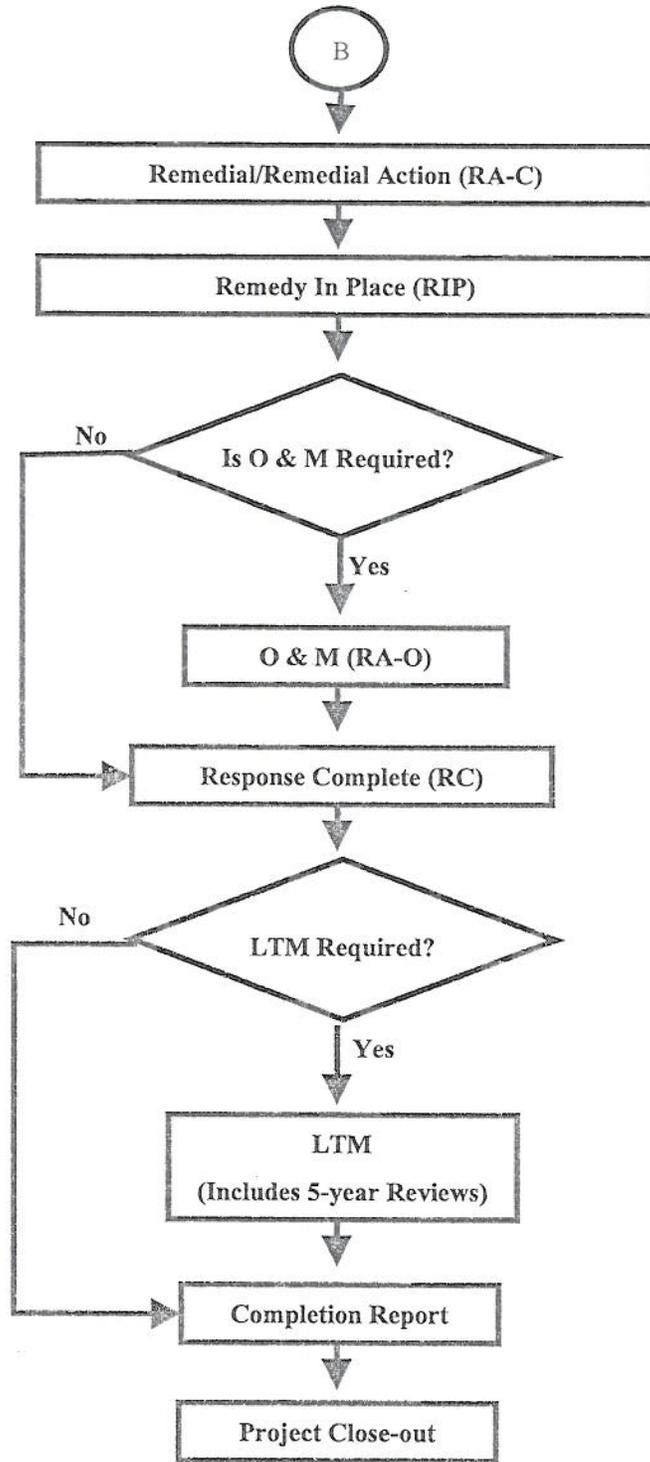
Plum Brook Ordnance Works
Restoration Advisory Board Meeting
May 9, 2001

Response Action Process for HTRW Projects

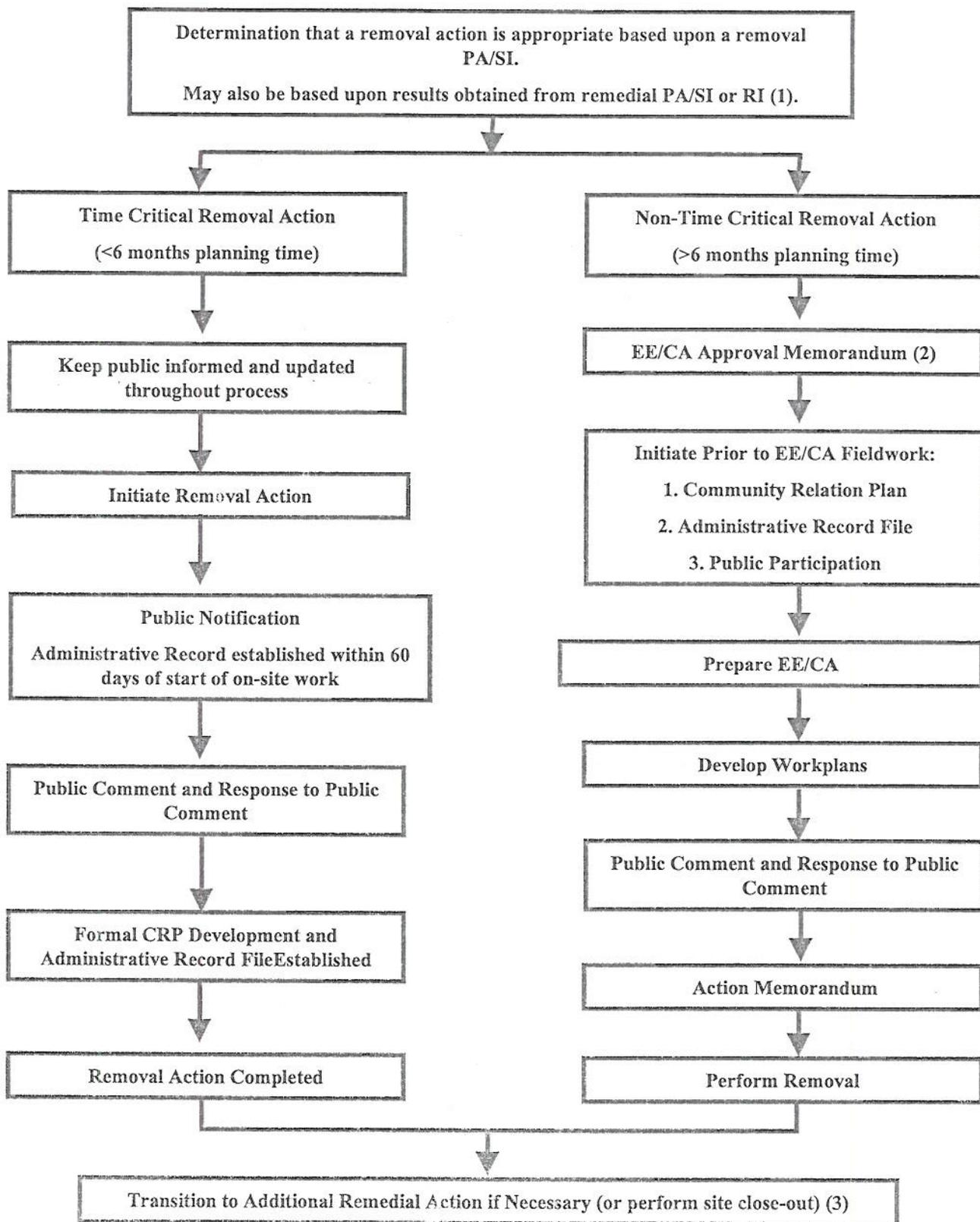


FOOTNOTES

- (1) DERP Statute requires state/EPA notification [DERP Statute Sec 2705 (a) & (b)] Include preparation of FSP/QAPP documents.
- (2) Includes RI workplans (FSP/QAPP and Community Relations Plans: Initiate Administrative Record file.
- (3) Includes providing opportunity for public meeting.
- (4) A Removal Action may be taken at any time during the process as long as it occurs prior to the decision document.



HTRW Removal Action at a FUDS Property



EE/CA Outline

- Executive Summary
- Site Characterization
- Identification of Removal Action Objectives
- Identification and Analysis of Removal Action Alternatives
- Comparative Analysis of Removal Action Alternatives
- Recommended Removal Action Alternative

Site Characterization

- Site description and background
- Previous removal actions
- Source, nature and extent of contamination
- Analytical data
- Streamlined risk evaluation

Identification of Removal Action Objectives

- Statutory limits on removal actions
- Determination of removal scope
- Planned remedial activities

Identification and Analysis of Removal Action Alternatives

- Effectiveness
- Implementability
- Cost