Former Plum Brook Ordinance Works – Sandusky, Ohio
Reservoir No. 2 Burning Ground

Value Engineering Study

Phoenix, Arizona

Dates: 02-May-2011 to 06-May-2011

VE Team:

Angel Acosta

Paula Coleman

Edward Mauch

Mark Walton

Rachel Whitermore

Outline

1. F.A.S.T. Diagram
2. Matrix Analysis
3. Proposal
4. Other Potential Solutions

Matrix Analysis:

			Performance Measures			
Alternative Number	**Description**	**Cost**	**Meets Regulatory Requirements**	**Length of Effectiveness**	**Land Re-Use**	**Constructability /Implementability**
1	No Action	$0	Poor	Poor	Poor	Excellent
2	Excavate and off-site treatment and disposal	$3.5M	Fair	Excellent	Excellent	Good
3	Excavation, windrows composting, chemical stabilization, on-site and off-site disposal	$3.8M	Excellent	Excellent	Good	Fair
4	Excavation, alkaline hydrolysis, chemical stabilization, on-site and off-site disposal	$2.8M	Excellent	Excellent	Excellent	Good
2a, 3a, 4a (mod)	Re-grade 2 foot contaminated area rather than backfilling	$58,000	Excellent	Excellent	Good	Good

Proposal:

After analyzing the four alternatives as required by the CERCLA process, it was determined that Alternative 4 was the most viable. This solution entails using all of the following processes:

- Excavation
- Alkaline Hydrolysis
- Chemical Stabilization
- On-Site Disposal
- Off-Site Disposal

Through the Value Engineering process, it was determined that modifying the re-grading and back filling within the two foot contaminated areas would be a viable cost savings opportunity. This modification could save up to a potential $58,000.

The advantages of this solution as a whole are as follows:

- Implementability
- Proven Technique
- Meets Threshold Criteria for Human Health
- Meets Unrestricted Land Use
- Produces Usable, Structural Fill
- Low Cost

Similarly, the disadvantages are:

- Newer Technology
- More Hazardous to Workers
- Time Consuming
- Does Not Degrade PCBs, Lead or Dioxins

Other Potential Solutions:
(generated by

- No Action
- Windrows Composting
- Alkaline Hydrolysis
- Flooding
- Burning
- Fencing
- Off-Site Disposal – Hazardous Waste Landfill
- Capping
- Excavation and Removal
- No Backfill, Just Re-grade
- Employ Sheep or Other Animals
- Dilution with more Soil
- Chemical Stabilization
- Sell Land for Redevelopment
- Don't Clean Up to Residential Levels
- Hydro-Cyclone
- Phyto-Technology (Indian Mustard, Corn or Pea Plants)
- Don't Backfill Excavation
- No Compaction

Former Plum Brook Ordinance Works – Sandusky, Ohio

Reservoir No. 2 Burning Ground

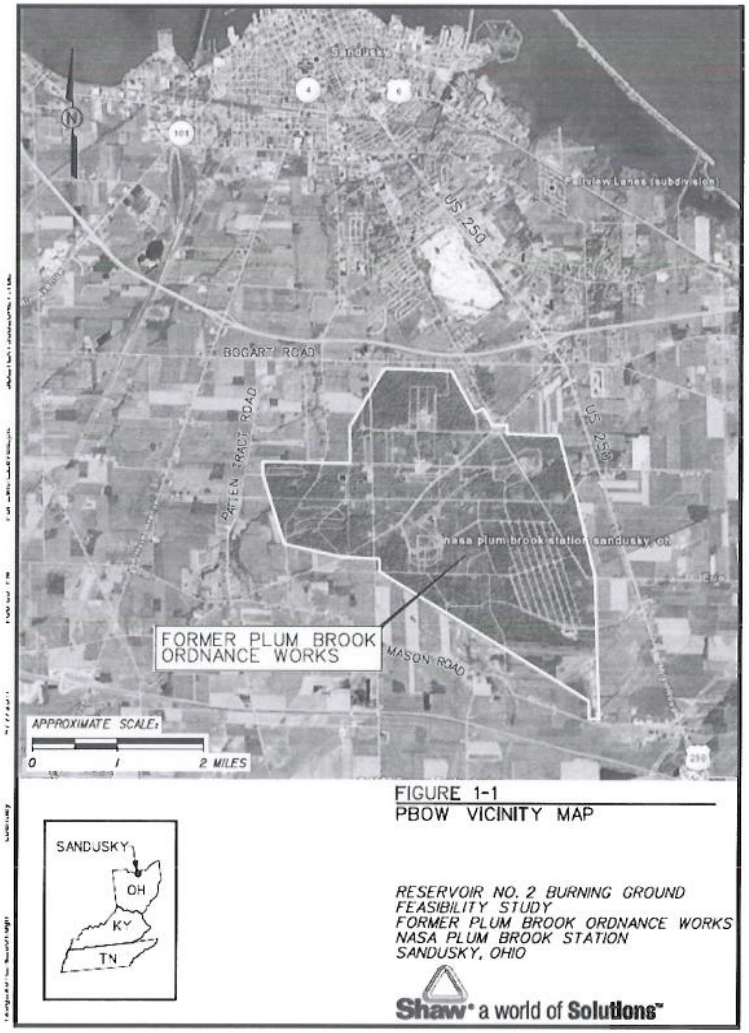
VE Team:
Angel Acosta
Paula Coleman
Edward Mauch
Mark Walton
Rachel Whitermore

Site Background

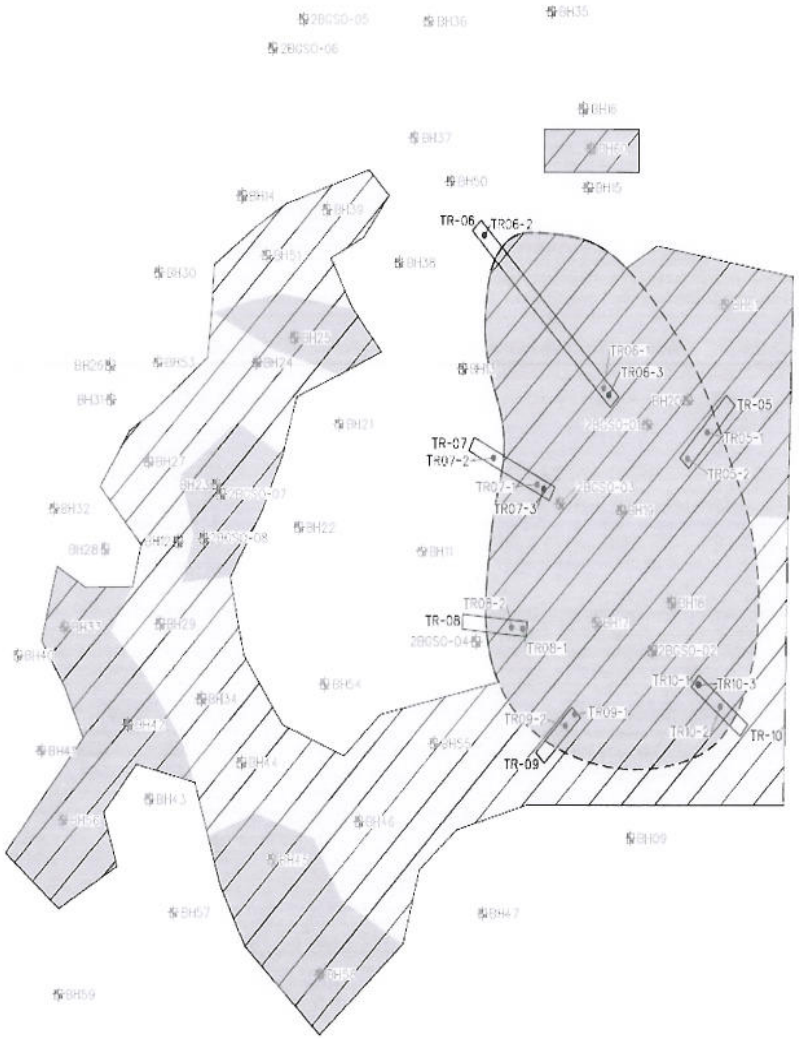
- Plumb Brook Ordnance Works in Sandusky OH, was operational from 1941-1945 as a manufacturing plant for nitro-aromatics.

- The site is currently maintained by NASA and is operated as the John Glenn Research Center.

- USACE is the lead agency in the clean up of the legacy materials remaining from the weapons related manufacturing activities.



Project Description



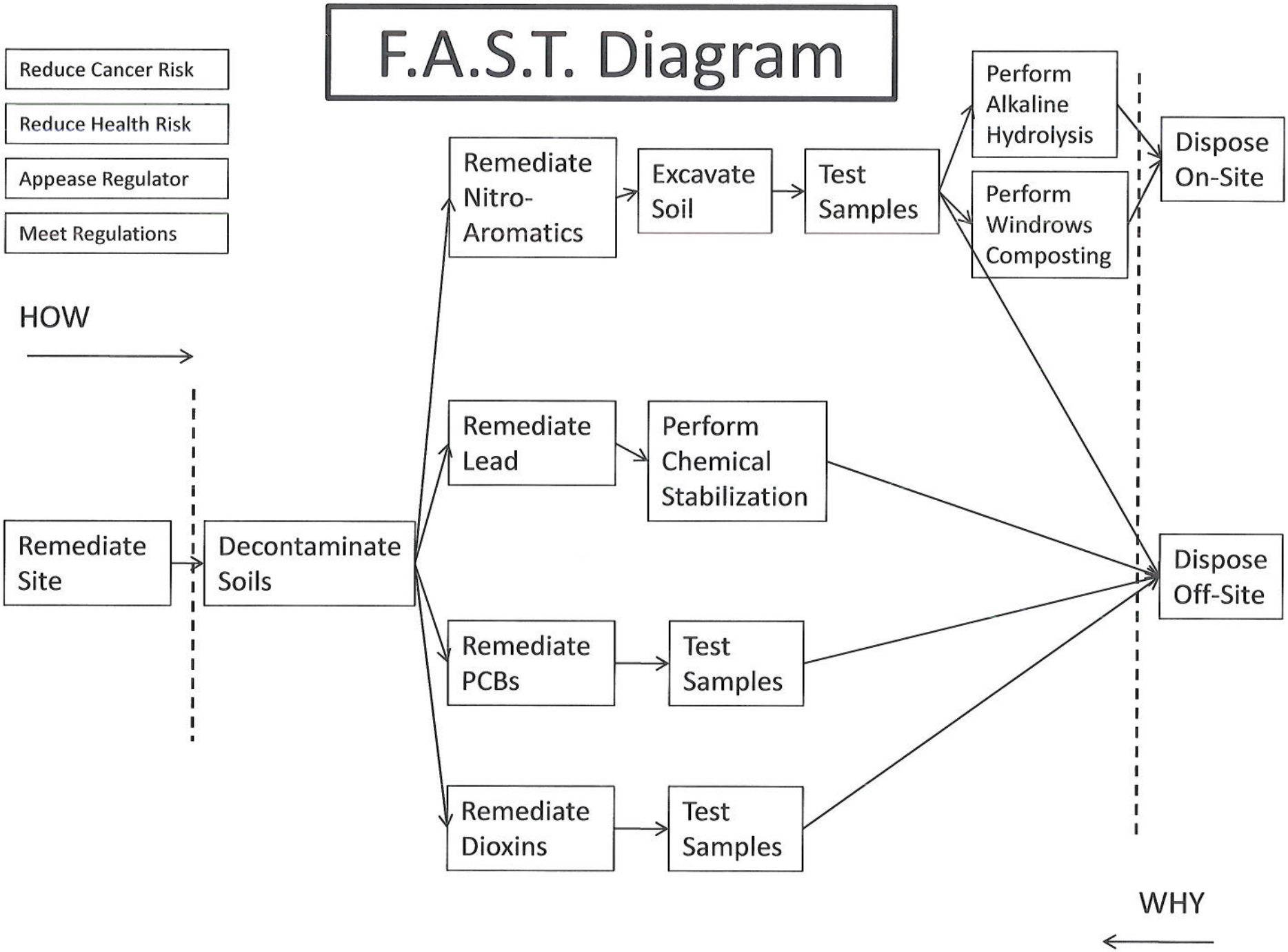
LEGEND:

- TRENCH LOCATION
- SURFACE SOIL SAMPLE LOCATION NOT ANALYZED FOR PCDD/Fs
- SURFACE SOIL SAMPLE LOCATION FULL SUITE ANALYSIS INCLUDING PCDD/Fs
- TRENCH SAMPLE LOCATION OF BURN LAYER (SUBSURFACE)
- TRENCH SAMPLE LOCATION OUTSIDE BURN LAYER (SUBSURFACE)
- TRENCH SAMPLE LOCATION BELOW BURN LAYER (SUBSURFACE)
- BURN LAYER BOUNDARY (BASED ON JACOBS 2004 TRENCHING)
- REMEDIAL AREA - NONHAZARDOUS FOR 2,4-DNT (<2.6 mg/kg)
- REMEDIAL AREA - HAZARDOUS FOR 2,4-DNT (>2.6 mg/kg)
- REMEDIAL AREA - HAZARDOUS FOR LEAD (>400 mg/kg)

- Objective: To remediate contaminated soils in the Reservoir #2 Burning Grounds for unlimited future land use.

- Delineated Contaminates of Concern (COC):
  - 2,4-DNT
  - Lead
  - PCBs
  - Dioxins, Furans.

F.A.S.T. Diagram

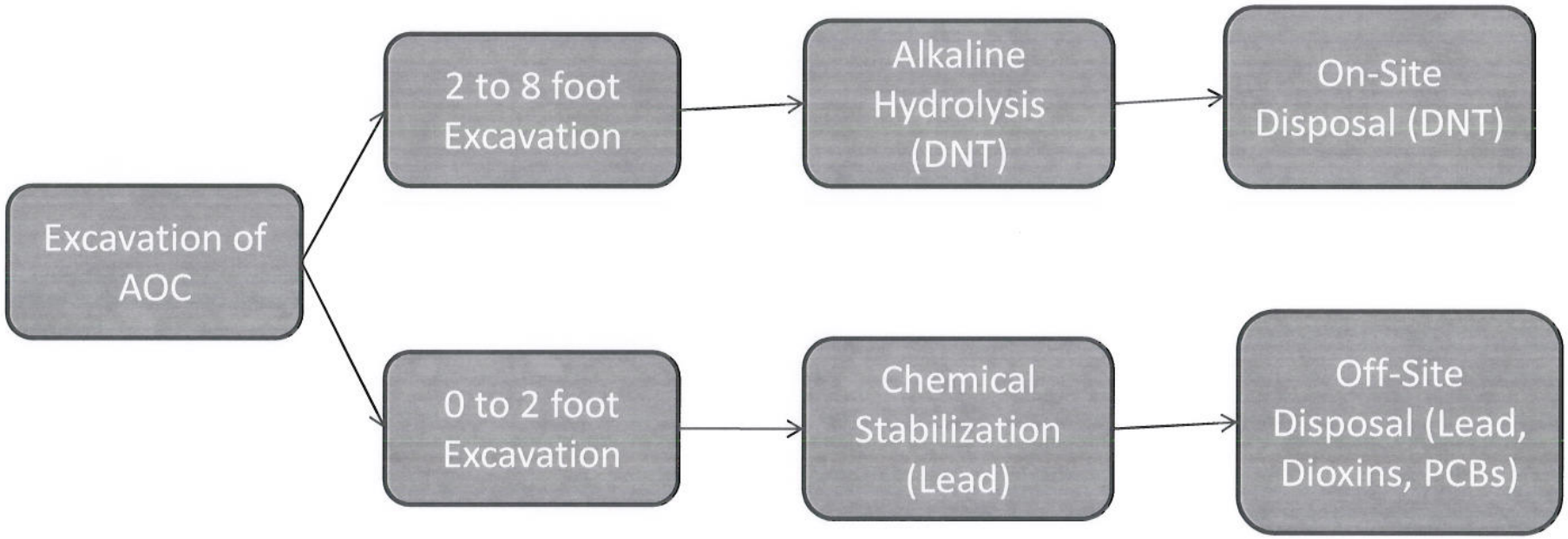


Matrix Analysis

			Performance Measures			
Alternative Number	**Description**	**Cost**	**Meets Regulatory Requirements**	**Length of Effectiveness**	**Land Re-Use**	**Constructability /Implementability**
1	No Action	$0	Poor	Poor	Poor	Excellent
2	Excavate and off-site treatment and disposal	$3.5M	Fair	Excellent	Excellent	Good
3	Excavation, windrows composting, chemical stabilization, on-site and off-site disposal	$3.8M	Excellent	Excellent	Good	Fair
4	Excavation, alkaline hydrolysis, chemical stabilization, on-site and off-site disposal	$2.8M	Excellent	Excellent	Excellent	Good
2a, 3a, 4a (mod)	Re-grade 2 foot contaminated area rather than backfilling	$58,000	Excellent	Excellent	Good	Good

Proposed Solution

Alternative 4 with Modified Re-Grading and Backfilling



<u>Modification / Value Engineering:</u>

Re-Grade 2' Contaminated Areas as Opposed to Using Back Fill

Cost Savings

Total Original Cost: $2.8 Million
(Alternative 4 per Shaw Consultants)

Significant Line Items:
Excavation: $294,489
Chemical Stabilization: $116,197
Alkaline Hydrolysis: $1,163,386
Off-Site Disposal: $183,662
Site Restoration: $250,739

Modification / Value Engineering:
Re-grade with No Backfill in 2' Contaminated Areas: $58,000

Advantages

- Implementability
- Proven Technique
- Meets Threshold Criteria for Human Health
- Meets Unrestricted Land Use
- Produces Usable, Structural Fill
- Low Cost

Disadvantages

- Newer Technology
- More Hazardous to Workers
- Time Consuming
- Does Not Degrade PCBs, Lead or Dioxins

Summary

- Performed Information, Function Analysis, and Creative Phases
  - F.A.S.T. Diagram and Matrix Analysis

- Determined Proposed Solution
  - Alternative 4 with Modification to Proposed Re-grading and Back Fill

- Analyzed Proposed Solution with Advantages, Disadvantages and Cost Savings
  - Modification Leads to About $58,000 in Savings

QUESTIONS?