DuPont Chambers Works FUSRAP Site Meeting Agenda

- Introductions
- Project History/Overview
- Proposed Plan
- Community Involvement/Upcoming Meetings

Philadelphia District
US Army Corps of Engineers

Manhattan Engineer District (MED) Background

- ✓ **Work in support of Nation's early atomic energy program**
- ✓ **1940s – 1960s**
- ✓ **Several federal and private sector facilities**
- ✓ **Research and production level activities**

More than 40 locations across the country supported the Nation's early atomic energy program.

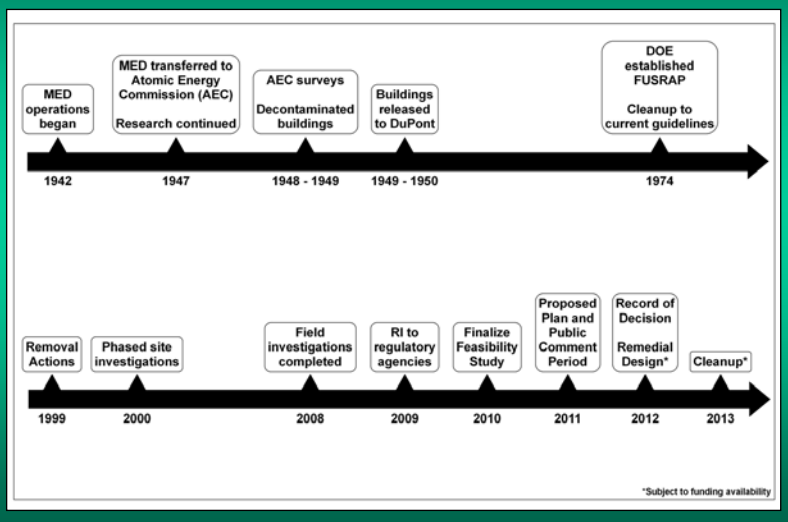
Philadelphia District
US Army Corps of Engineers

MED Activities at Chambers Works

- ✓ DuPont converted uranium oxides to uranium tetrafluoride and uranium metal
- ✓ No uranium enrichment or depletion occurred
- ✓ End products shipped offsite for uranium enrichment at other locations

Philadelphia District
US Army Corps of Engineers

MED and FUSRAP Activities at Chambers Works



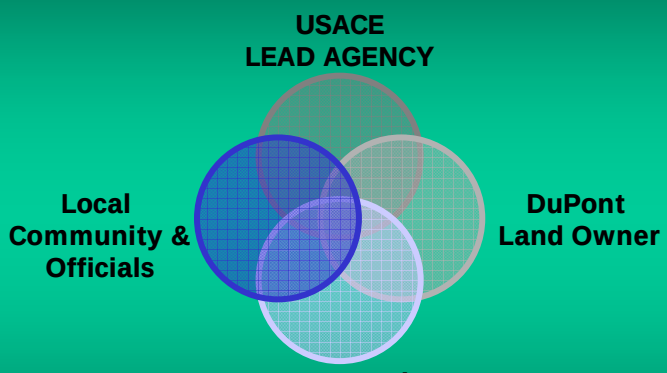
Philadelphia District
US Army Corps of Engineers

FUSRAP Activities at Chambers Works

- ✓ Investigation and cleanup conducted in accordance with CERCLA
- ✓ Seven year phased investigation – all media
- ✓ Remedial Investigation and Baseline Risk Assessment completed
- ✓ Feasibility Study (engineering study) in review by regulatory agencies

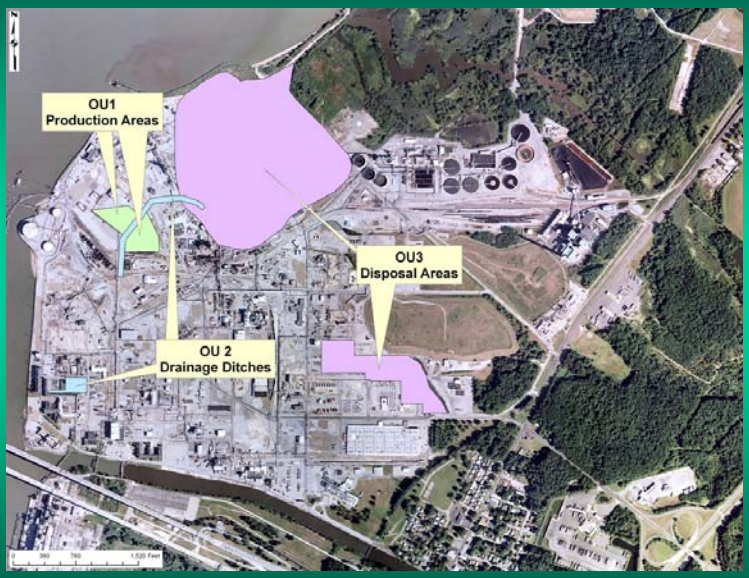
FUSRAP = Formerly Utilized Sites Remedial Action Program

Environmental Cleanup Stakeholders



USACE investigation and cleanup follows administrative, procedural, and regulatory provisions of CERCLA and the NCP

The Site - Operable Units



Philadelphia District
US Army Corps of Engineers

Sitewide Remedial Investigation
FUSRAP Eligible Contaminants

- **Radionuclides Only:**
  - U_{nat}
  - Th-230
  - Ra-226

Philadelphia District
US Army Corps of Engineers

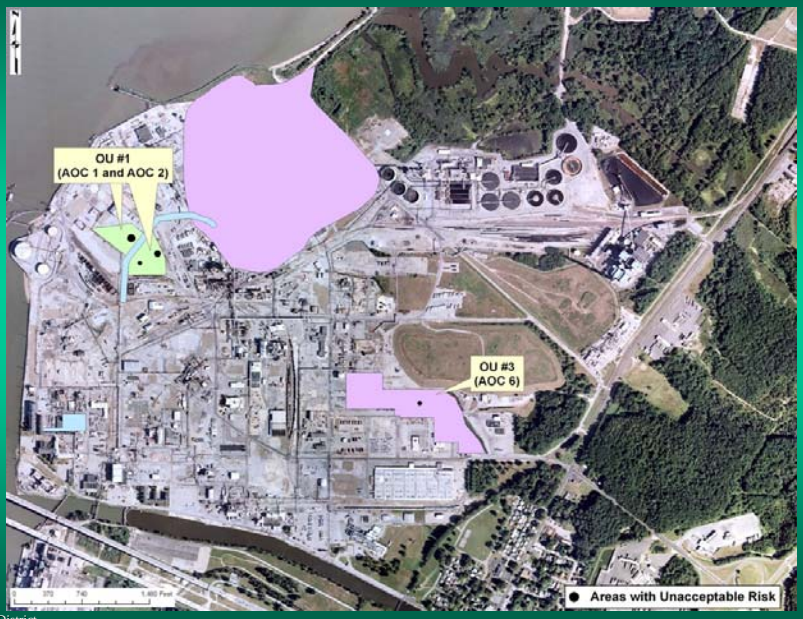
Remedial Investigation Results

- **Soil:** ~ 2.5 acres in OU 1, <0.1 acre in OU 3. Shallow contamination primarily <8 feet bgs.
- **Groundwater:** Little or no migration. Vertical impact <20 ft.
- **Sediment:** Limited impact in drainage ditches near source zones.
- **Surface water:** No impact.

Investigative Screening Value =

14 pCi/g Total Uranium

Unacceptable Risk in OU 1 and OU 3 [AOC 6]



Current Status

- ✓ Sitewide Remedial Investigation
- ✓ Baseline Risk Assessment
- ✓ Feasibility Study

All documents submitted to regulatory agencies and DuPont for review.

Philadelphia District
US Army Corps of Engineers

Project Schedule

FY 11 Proposed Plan – Regulator and Public Review
Public Meeting and Public Comment Period
Responsiveness Summary

FY 12 Record of Decision and Remedial Design*

FY 13 Cleanup to Begin*

**** subject to funding availability***

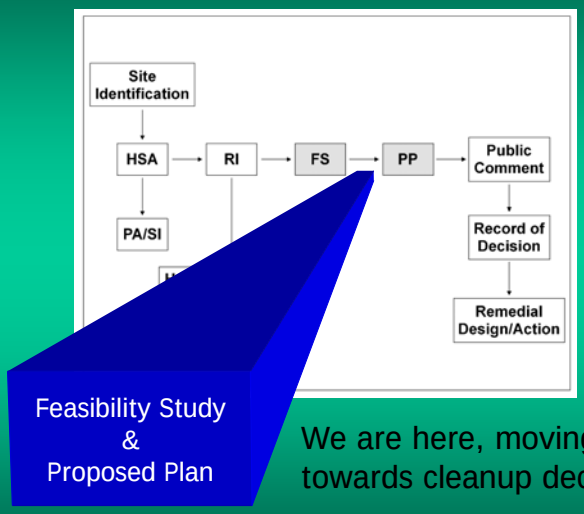
Philadelphia District
US Army Corps of Engineers

Cleanup Alternatives

Carl Young, Cabrera Services

Philadelphia District
US Army Corps of Engineers

Environmental Cleanup Process



We are here, moving towards cleanup decisions

Philadelphia District
US Army Corps of Engineers

Soil Alternatives

Alternative	Description of Alternatives
S1	No Action
S2	Land Use Controls / Site Maintenance
S3	Capping
S4	Excavation / Off-site Disposal
S5	Excavation /Treatment /Off-site Disposal

Groundwater Alternatives

Alternative	Description of Alternatives
GW1	No Action
GW2	Land Use Controls / Site Maintenance
GW3	Ex-Situ Treatment
GW4	Monitored Natural Attenuation

Before Making Cleanup Decisions…..
CERCLA Requires

- **Possible cleanup alternatives to be evaluated against nine specific criteria**
- **Grouped into 3 categories**

1. Threshold Criteria – must be met
2. Balancing Criteria – which will work best
3. Modifying Criteria – acceptable to stakeholders

Stakeholders review and comment on all cleanup alternatives and proposed plan.

Threshold Criteria

- ❖ Does the alternative protect human health and the environment?
- ❖ Does the alternative comply with federal and state regulations?

If the answer to either question is "NO" then the alternative is not evaluated further.

Balancing Criteria

- Is the alternative effective for long-term solution?
- Does the alternative reduce toxicity, mobility, or the volume of the contamination?
- Is the alternative effective for short-term solution?
- Can the alternative be implemented at the Site?
- Is the alternative cost effective?

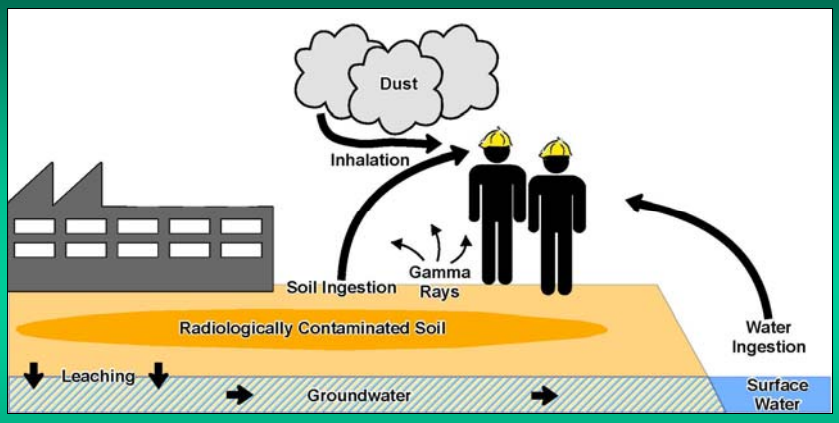
Law requires evaluating benefits and consequences of taking no action.

Modifying Criteria

- Will regulatory agencies support the alternative?
- Will the community accept the alternative?

These criteria are evaluated after the public has the opportunity to review and comment on the proposed plan and preferred alternative.

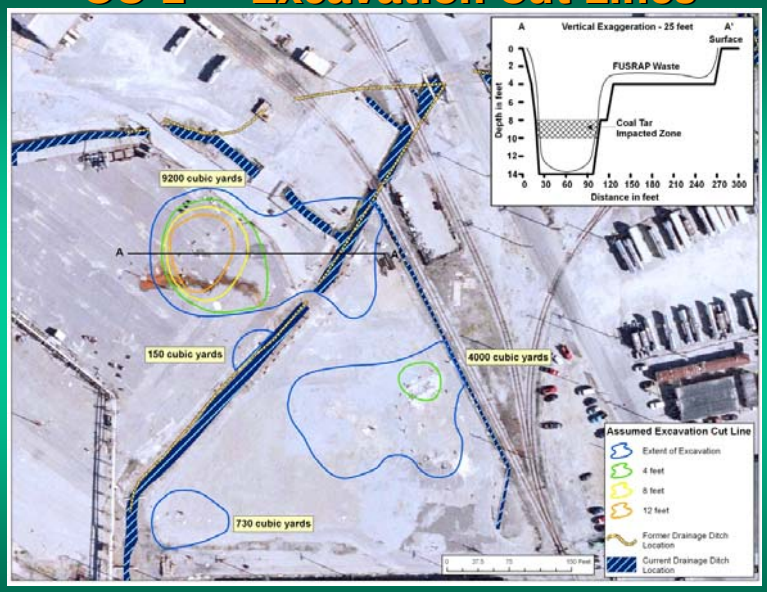
Remediation Goal



Proposed Remedial Action Objectives:

Minimize human exposure to contaminants in soil and groundwater;
Limit migration until Groundwater Quality Standards are achieved.

OU 1 – Excavation Cut Lines



Offsite Disposal: 21,000 yds³ of soil

OU 3 [AOC 6] – Excavation Cut Lines

Offsite Disposal: 1,200 yds³ of soil

Purpose of Proposed Plan

- ✓ **Summarize alternatives evaluated in FS**
- ✓ **Describe USACE's preferred alternative**
- ✓ **Solicit Public Review and Comments**

Public comment period – minimum of 30 days

Encourage stakeholders to review all alternatives considered and comment on preferred alternative

Potential Cleanup Costs*

Soil: $28 M

Construction Phase (<1 year)

Groundwater: $4 M

Monitoring (20 years)

**** subject to funding availability***

Philadelphia District
US Army Corps of Engineers

Offsite Transportation and Disposal

Rail and Truck Transport of Radioactive Materials Occurs Every Day

Philadelphia District
US Army Corps of Engineers

Offsite Transportation and Disposal

Shipments transported only by licensed waste haulers to disposal facility

Philadelphia District
US Army Corps of Engineers

Offsite Transportation and Disposal

Typical Disposal Facilities

Philadelphia District
US Army Corps of Engineers

TOOLS FOR ASSURING EFFECTIVE CLEANUPS

- Pathway Scenarios
- DCGLs
- Applications of DCGLs

Claude Wiblin, CHP, Cabrera Services

Philadelphia District
US Army Corps of Engineers

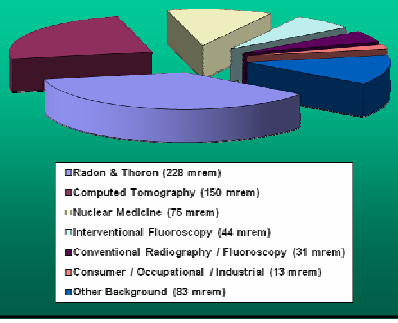
Dose Limit

- New Jersey's *Soil Remediation Standards for Radioactive Materials (NJAC 7:28-12), a dose limit criterion of 15 millirem per* year (mrem/yr)

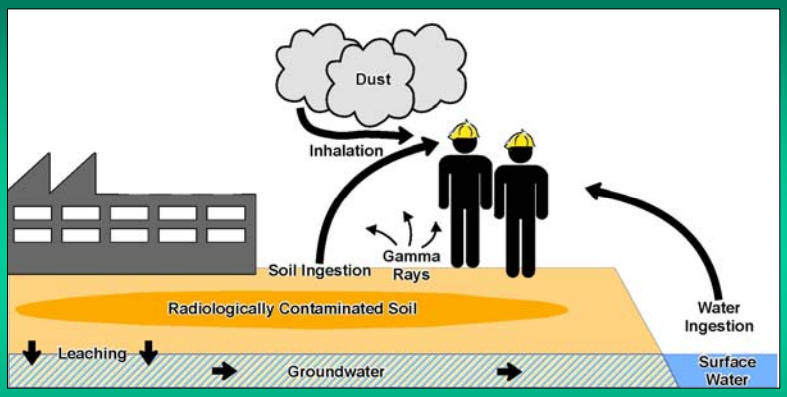
Philadelphia District
US Army Corps of Engineers

Sources of Radiation Exposure In The U.S. Annual Average Exposure (from NCRP Report No. 160, 2009)

- The U.S. total radiation exposure from all sources, natural and man-made, is approximately 620 mrem/yr
- Typically an average person receives less than 100 mrem per year from natural sources (excluding radon)



Remediation Goal



Proposed Remediation Goals:

Soil - 65 pCi/g Total Uranium

Groundwater – 30 ug/L Uranium

Pathway Scenarios

- Various pathways and scenarios are used to translate a dose standard to residual radioactivity levels (measurable quantities)
- Construction worker scenario

Derived Concentration Guideline Levels (DCGLs)

- DCGLs refer to average levels of residual radioactivity above background levels
- Provided for soil contamination (pCi/g)
- DCGLs will be obtained from regulatory guidance or from site-specific pathway modeling

Final Status Survey

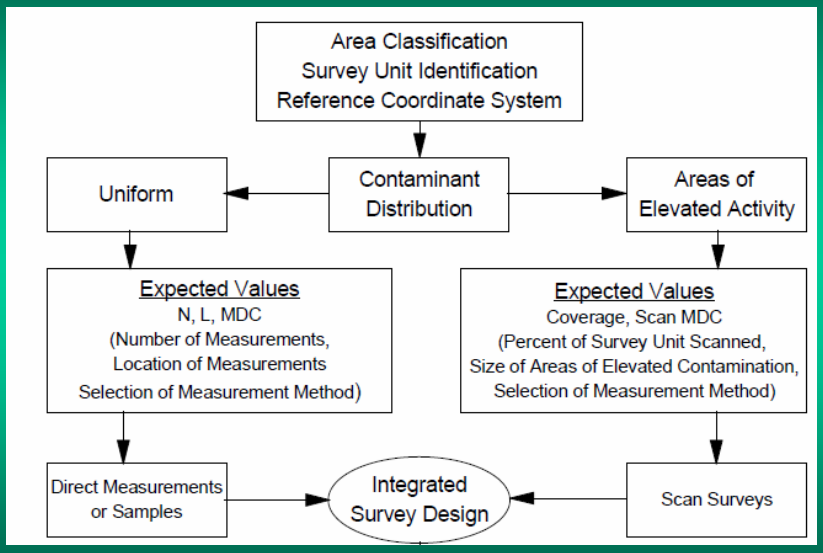
Several agencies responsible for radioactive material safety and cleanup

Guidelines for consistent survey methods to:

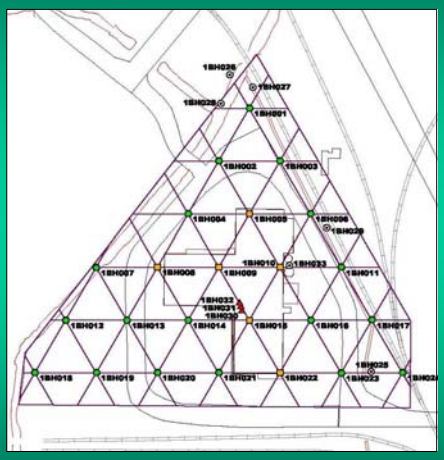
- demonstrate cleanup is complete
- residual radioactivity < cleanup level

Multi-Agency Radiation Survey & Site Investigation Manual

Approach – Final Status Survey



Suggested Final Status Survey Units



- Class I
- Class II
- Class III

MARSSIM

Suggested Final Status Survey Units

Classification	Suggested Area
Class 1	
Structures	up to 100 m^2
Land Areas	up to 2,000 m^2
Class 2	
Structures	100 to 1,000 m^2
Land Areas	2,000 to 10,000 m^2
Class 3	
Structures	no limit
Land Areas	no limit

Recommended Survey Coverage

Area Classification	Structures		Land Areas	
	Surface Scans	Surface Activity Measurements	Surface Scans	Surface Soil Measurements
Class 1	100%	Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3); additional direct measurements and samples may be necessary for small areas of elevated activity (Section 5.5.2.4)		Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3); additional direct measurements and samples may be necessary for small areas of elevated activity (Section 5.5.2.4)
Class 2	10 to 100% (10 to 50% for upper walls and ceilings) Systematic and Judgmental	Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3)	10 to 100% Systematic and Judgmental	Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3)
Class 3	Judgmental	Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3)	Judgmental	Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3)

Statistical Tests

Survey Result	Conclusion
Difference between maximum survey unit measurement and minimum reference area measurements is less than $DCGL_W$	Survey unit meets release criterion
Difference of survey unit average and reference area average is greater than $DCGL_W$	Survey unit does not meet release criterion
Difference between any survey unit measurement and any reference area measurement greater than $DCGL_W$ and the difference of survey unit average and reference area average is less than $DCGL_W$	Conduct WRS test and elevated measurement comparison

Community Involvement Program
DuPont Chambers Works FUSRAP Site

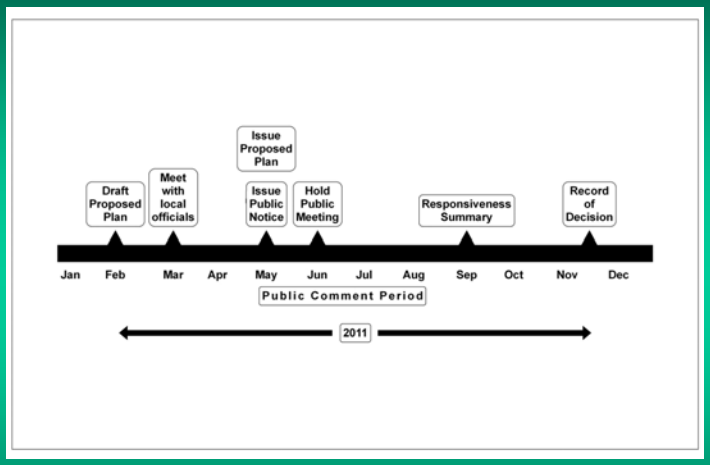
FUSRAP Community Board

Same group, new name

Working with USACE for effective cleanup decisions

Philadelphia District
US Army Corps of Engineers

Increased Community Involvement



To discuss the proposed plan and preferred cleanup actions

Philadelphia District
US Army Corps of Engineers