DuPont Chambers Works FUSRAP Site
Meeting Agenda

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

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.
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

MED and FUSRAP Activities at Chambers Works

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<tr>
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</thead>
<tbody>
<tr>
<td>MED operations began</td>
<td>MED transferred to Atomic Energy Commission (AEC)</td>
<td>Research continued</td>
<td>Buildings released to DuPont</td>
<td>DOE established FUSRAP Cleanup to current capabilities</td>
</tr>
</tbody>
</table>

- Removal Actions | Phased site investigations | Field investigations completed | NTS regulatory agencies | Finalize Feasibility Study | Proposed Plan and Public Comment Period | Record of Decision | Remobilization Design | Cleanup **

*Subject to funding availability*
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 LEAD AGENCY

- Local Community & Officials
- DuPont Land Owner
- NJ DEP and EPA Region 2

**USACE investigation and cleanup follows administrative, procedural, and regulatory provisions of CERCLA and the NCP**
The Site - Operable Units

Sitewide Remedial Investigation
FUSRAP Eligible Contaminants

- Radionuclides Only:
  - $U_{\text{nat}}$
  - Th-230
  - Ra-226
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.

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
Cleanup Alternatives

Carl Young, Cabrera Services

Environmental Cleanup Process

We are here, moving towards cleanup decisions
### Soil Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description of Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>No Action</td>
</tr>
<tr>
<td>S2</td>
<td>Land Use Controls / Site Maintenance</td>
</tr>
<tr>
<td>S3</td>
<td>Capping</td>
</tr>
<tr>
<td>S4</td>
<td>Excavation / Off-site Disposal</td>
</tr>
<tr>
<td>S5</td>
<td>Excavation /Treatment /Off-site Disposal</td>
</tr>
</tbody>
</table>

### Groundwater Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description of Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW1</td>
<td>No Action</td>
</tr>
<tr>
<td>GW2</td>
<td>Land Use Controls / Site Maintenance</td>
</tr>
<tr>
<td>GW3</td>
<td>Ex-Situ Treatment</td>
</tr>
<tr>
<td>GW4</td>
<td>Monitored Natural Attenuation</td>
</tr>
</tbody>
</table>
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
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

Offsite Transportation and Disposal

Rail and Truck Transport of Radioactive Materials Occurs Every Day
**Offsite Transportation and Disposal**

Shipments transported only by licensed waste haulers to disposal facility
TOOLS FOR ASSURING EFFECTIVE CLEANUPS

• Pathway Scenarios
• DCGLs
• Applications of DCGLs

Claude Wiblin, CHP, Cabrera Services

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)
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
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*
Suggested Final Status Survey Units

- Class I
- Class II
- Class III

MARSSIM

<table>
<thead>
<tr>
<th>Classification</th>
<th>Suggested Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td></td>
</tr>
<tr>
<td>Structures</td>
<td>up to 100 m²</td>
</tr>
<tr>
<td>Land Areas</td>
<td>up to 2,000 m²</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
</tr>
<tr>
<td>Structures</td>
<td>100 to 1,000 m²</td>
</tr>
<tr>
<td>Land Areas</td>
<td>2,000 to 10,000 m²</td>
</tr>
<tr>
<td>Class 3</td>
<td></td>
</tr>
<tr>
<td>Structures</td>
<td>no limit</td>
</tr>
<tr>
<td>Land Areas</td>
<td>no limit</td>
</tr>
</tbody>
</table>
### Recommended Survey Coverage

<table>
<thead>
<tr>
<th>Area Classification</th>
<th>Structures</th>
<th>Land Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Surface Scans</td>
<td>Surface Activity Measurements</td>
</tr>
<tr>
<td>Class 1</td>
<td>100%</td>
<td>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)</td>
</tr>
<tr>
<td>Class 2</td>
<td>10 to 100% (10 to 50% for upper walls and ceilings) systematic and judgmental</td>
<td>Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3)</td>
</tr>
<tr>
<td>Class 3</td>
<td>Judgmental</td>
<td>Number of data points from statistical tests (Sections 5.5.2.2 and 5.5.2.3)</td>
</tr>
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</table>

### Statistical Tests

<table>
<thead>
<tr>
<th>Survey Result</th>
<th>Conclusion</th>
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<tbody>
<tr>
<td>Difference between maximum survey unit measurement and maximum reference area measurements is less than DCGL_{n}</td>
<td>Survey unit meets release criterion</td>
</tr>
<tr>
<td>Difference of survey unit average and reference area average is greater than DCGL_{n}</td>
<td>Survey unit does not meet release criterion</td>
</tr>
<tr>
<td>Difference between any survey unit measurement and any reference area measurement greater than DCGL_{n} and the difference of survey unit average and reference area average is less than DCGL_{n}</td>
<td>Conduct WRS test and elevated measurement comparison</td>
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Community Involvement Program
DuPont Chambers Works FUSRAP Site

FUSRAP Community Board
Same group, new name

Working with USACE for effective cleanup decisions

Increased Community Involvement

To discuss the proposed plan and preferred cleanup actions