FERNALD SILOS PROJECT
PROGRESS BRIEFING
April 2002

6:30 p.m.
Opening Remarks
Fernald Citizens Advisory Board
Silos Project Background
Accelerated Schedule
Waste Retrieval
Silos 1 and 2
Silo 3
Question and Answer Session

8:30 p.m. Adjourn

Gary Stegner
Jim Bierer
Nina Akgunduz
Ray Corradi
Bruce Schweitzer
John North
Doris Edwards
Panel
SILOS PROJECT

Background - 2000

- May - Rocky Mountain Remedial Services began site preparation construction for Silo 3 project

- June - Foster Wheeler Environmental Corporation began site preparation and construction on the Waste Retrieval Transfer Tank Area and Radon Control System Building

- July - Record of Decision (ROD) Amendment signed

- December - DOE awarded site closure contract to Fluor Fernald and teaming partners Jacobs Engineering Group and Duratek
SILOS PROJECT

Background - 2001

- January - Rocky Mountain Remedial Services subcontract terminated
- April - Jacobs Engineering Group begins Silos 1 and 2 conceptual design
- June - Foster Wheeler Environmental Corporation subcontract terminated. Fluor Fernald assumed AWR work with Jacobs Engineering Group as design authority
- June - Began Silo 3 Pre-conceptual design
SILOS PROJECT

Background - 2001 (Cont.)

- July/August - DOE completed the Site Closure Contract (2009) Baseline Review
- September - Jacobs Engineering Group completed Silos 1 and 2 conceptual design
- December - Fluor Fernald and DOE agreed to 2006 closure and rebaseline
SILOS PROJECT

Background - 2002

- January - Fluor Fernald completed Transfer Tank Area concrete work
- January - Jacobs Engineering Group completed Silo 3 conceptual design
- March - Fluor Fernald completed two transfer tanks and the concrete building that will house the Radon Control System
- March/April - DOE in process of reviewing the 2006 Closure Baseline
ACCELERATED SCHEDULE

Why Accelerate to 2006?

- Reduce public risk
- Reduce occupational exposure
- Improve project efficiency
- Reduce total cost to taxpayers
ACCELERATED SCHEDULE

Ground Rules for Acceleration

• Maintain safety
• Maintain planning
• Do not compromise scope
• Accommodate minor changes by making some design components adaptable
• Build as parts of design become ready
ACCELERATED SCHEDULE

What Changed in Silos?

- Fluor changed project delivery methods to achieve closure in 2006
- New baseline removed funding constraints
- Implemented a rigorous constructability process with an experienced staff
- Planned to carefully coordinate start of construction with completion of design for each phase
ACCELERATED SCHEDULE

Project Delivery Change

Previous Approach

Design | Bid | Build

Current Approach

Design | Bid | Build

Schedule Acceleration
ACCELERATED SCHEDULE

Benefits of Fast Track/Design-Build

• Focuses engineering efforts on construction priorities
• Allows for early identification of issues without cascade effects
• Takes advantage of interactive design and construction involvement
• Decreases material staging space needs
• Offers resource leveling opportunities to meet project priorities
• Allows better quality control for discrete tasks
• Allows for well-planned project acceleration
ACCELERATED SCHEDULE

Risks of Work Package Execution

- To avoid late equipment changes: must get approved information and vendor installation support
- To avoid lack of interface definition: must perform cross-discipline checks and use experienced constructability planners and package owners
WASTE RETRIEVAL

Major Components

- Radon Control System (RCS)
- Bridges over Silos 1 and 2
- Silos 1 and 2 sluicing and slurry pump modules
- Silos Waste Retrieval System pipe rack
- Transfer Tank Area (TTA)
WASTE RETRIEVAL

Radon Control System Components

- Fans
- Desiccant dryers
- Carbon beds
- Exhaust stack
- Electrical, mechanical, instrument and control support systems
RADON CONTROL SYSTEM
CARBON BEDS
RADON CONTROL SYSTEM
CONSTRUCTION
WASTE RETRIEVAL

How the Radon Control System Works

- Filters air in the silos headspace to remove radon
- Air circulates through two desiccant dryers
- Air then circulates through four carbon beds which adsorb radon
- Air returns to the silos or is vented through the exhaust stack
WASTE RETRIEVAL

Radon Control System Operation

- Phase 1 during bridge construction and material removal components installation
- Phase 2 during material transfer from Silos 1 and 2 to the transfer tanks
- Phase 3 during material treatment
WASTE RETRIEVAL

Radon Control System Statistics

• Operates at up to 2,000 cubic feet per minute
• Will condition air to 40 degrees Fahrenheit
• Will condition air which contains up to 15 percent relative humidity
• Each 1,500-cubic-foot carbon bed contains 45,000 pounds of carbon
WASTE RETRIEVAL

How Waste Retrieval Works

- Bridges over Silos 1 and 2 support sluicing and pump modules
- Sluice jets inside silos mix waste material with water
- Slurry pumps draw material through double containment piping into transfer tanks
WASTE RETRIEVAL

Waste Retrieval Statistics

- Silos 1 and 2 contain a total of 1.8 million gallons of waste
- Each of the four transfer tanks holds 750,000 gallons; total of 3 million gallons
- Each of the two bridge spans is 175 feet long
TRANSFER TANK AREA
TRANSFER TANK CONSTRUCTION
TRANSFER TANK AREA
ROOF ASSEMBLY CONSTRUCTION
TRANSFER TANK ROOF ASSEMBLY LIFT
WASTE RETRIEVAL

Waste Retrieval Construction Schedule

- August 2002  Crews to complete construction on Radon Control System
- November 2002  Radon Control System start-up. Crews to complete Silos Waste Retrieval System pipe rack construction
- December 2002  Start Silo 1 and 2 bridge construction
- August 2003  Sluice and slurry system construction
SILOS 1 AND 2

Agenda

• 2006 baseline approach
• Facilities/process design overview
• Engineering/Procurement/Construction approach
• Issues/risks
• Look ahead
SILOS 1 AND 2

2006 Baseline Approach

- Dewatering and chemical stabilization/solidification (unchanged)
- Treated grout product placed in sealed steel containers (unchanged)
- Gondola cars ship waste containers by rail to licensed commercial disposal facility
- Treatment operations overlap Waste Retrieval operations by 3-4 months
- Treatment operations begin February 2005 and end February 2006
SILOS 1 AND 2 WASTE TREATMENT FACILITY
SILOS 1 AND 2 WASTE TREATMENT FACILITY
GRAPPLER AND GRAPPLER LIFT
SILOS 1 AND 2

Engineering/Procurement/Construction Approach

• In April 2002, DOE and CAT will review and comment upon the Preliminary Design Package
• Procurement of major process equipment and systems will begin in April 2002
• Final Design issued as discrete packages to support logical sequencing of construction
• Final Design packages will be complete by February 2003
• Crews will complete construction in June 2004
## SILOS 1 AND 2

Early Procurement Packages

<table>
<thead>
<tr>
<th>Award</th>
<th>Equipment/System</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2002</td>
<td>Clarifier system</td>
</tr>
<tr>
<td>June 2002</td>
<td>Tank agitators</td>
</tr>
<tr>
<td>July 2002</td>
<td>Product mixers</td>
</tr>
<tr>
<td>July 2002</td>
<td>Container handling, filling and lidding systems</td>
</tr>
</tbody>
</table>
SILOS 1 AND 2

Early Construction Packages

Begin 
July 2002 
September 2002 
October 2002 

Package
Warehouse 
Rail facilities 
Treatment facility mat foundation
SILOS 1 AND 2

Issues and Risks

- ROD amendment and licensing of commercial disposal facilities
- Availability of rail cars and on-site rail facilities
- Procurement and construction prior to total design completion and Remedial Design (RD) package approval
SILOS 1 AND 2

Look Ahead

- April 2002  Preliminary Design Package review
- May 2002   Begin equipment/system procurement
- July 2002   Begin early construction packages
- August 2002 Submit draft RD Package to EPA
  (milestone date: December 20, 2002)
- February 2003 Complete final design
SILO 3

Agenda

- Material properties
- Remediation design approach
- Shipping and packaging
- Engineering/procurement/construction (EPC) approach
- Look ahead
SILO 3

Material

- 5100 cubic yards metal oxide
- DOE classification 11(e)2 byproduct material
- Stored in 80-foot diameter silo which is a little over 26 feet high
- Calcined, incinerated, non-explosive material containing no organics
- Brown powder, rust-like because of metals, behaves like flyash or salts
SILO 3 WASTE MATERIAL
SILO 3

Material Radiological Concerns

- Radium 226: gives off radon
- Thorium 230: ranges from 26,000 pCi/g (picocuries per gram) to 76,000 pCi/g
- Alpha emitter: particles can be stopped by paper and Personal Protective Equipment
- Inhalation hazard
SILO 3

Remediation Design

- No treatment
- Removal, packaging and shipping
- Two retrieval strategies: pneumatic (vacuuming) and mechanical (excavation)
SILO 3

Retrieval Strategies: Pneumatic (Vacuuming)

- In the 1950s, workers pneumatically conveyed material into Silo 3
- Dome access evaluation
- Containment over Silo 3
- Access platforms over manways
SILO 3 DUST COLLECTOR REMOVAL

Graphics # 7507.2G  4/02  Photo # 4849-28

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SILO 3 REMEDIATION FACILITIES
SILO 3

Retrieval Strategies: Mechanical (Excavation)

- Engineers recently completed analysis on cutting opening
- Crews will install reinforcing material around the silo
- Plans include a separate excavator room for retrieval
SILO 3 REMEDIATION FACILITIES
SILO 3 EXCAVATOR ROOM

Graphics # 7507.2L 4/02

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SILO 3

Packaging

- Packaging area will have closed system
- IP-2 package
- Package meets requirements of Department of Transportation (DOT) standard, 49 CFR 173.411
- Inner liner for worker protection and contamination control
- Outer shipping container
SILO 3 PACKAGING AREA
SOFT-SIDED PACKAGE TESTING
SILO 3 REMEDIATION FACILITIES
SILO 3

Shipping

• Ship material offsite without treatment
• Meets DOT risk evaluation criteria (Rad-Tran analysis)
• Evaluating options to reduce dispersibility
• Requirements for thorium DOT classification:
  WPRAP LSA-I 5400 pCi/g
  Silo3 LSA-II 76,000 pCi/g
• Upper limit of LSA-II is 541,000 pCi/g
• IP-2 packaging requirement
• Conducting radon emanation testing
SILO 3

Design Packages

April 2002  Silo reinforcing
April 2002  Site preparation
May 2002    Civil/concrete
June 2002   Mechanical
July 2002   Electrical and instrumentation
SILO 3

Early Construction Activities

May 2002 Start field work
December 2002 Complete field work
SILO 3

Look Ahead

• Submit Remedial Design package to EPA
• ROD amendment: no treatment
• Disposal contract
• Packaging and Shipping Request for Proposal (RFP)
<table>
<thead>
<tr>
<th></th>
<th>SILOS 1 &amp; 2</th>
<th>SILO 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAZARDS</td>
<td>Radon gas, radium, gamma does</td>
<td>Thorium 230 dust</td>
</tr>
<tr>
<td>RETRIEVAL</td>
<td>Sluice material to AWR Transfer Tanks</td>
<td>Vacuum loose dry material and excavate compacted material</td>
</tr>
<tr>
<td>TRANSFER</td>
<td>To treatment facility</td>
<td>Directly to packaging</td>
</tr>
<tr>
<td>TREAT</td>
<td>Chemically treat RCRA metals</td>
<td>No on-site treatment</td>
</tr>
<tr>
<td>STABILIZE</td>
<td>Free moisture and material mixture</td>
<td>No moisture requiring stabilization</td>
</tr>
<tr>
<td>PACKAGE</td>
<td>Sealed cylindrical metal canisters</td>
<td>Sealed plastic liner inside IP2 certified lift liner bag inside cargo container</td>
</tr>
<tr>
<td>SHIP</td>
<td>Seven canisters to each shielded gondola car; dispatch as unit trains</td>
<td>Four cargo containers to one flatbed railcar; three cars attached to each Waste Pit unit train; total of 38 cars</td>
</tr>
<tr>
<td>CURRENT MANDATES</td>
<td>Record of Decision (ROD) calls for chemical stabilization and disposal at Nevada Test Site (NTS)</td>
<td>Explanation of Significant Differences (ESD) calls for chemical stabilization or encapsulation to meet RCRA limits and disposal facility Waste Acceptance Criteria (WAC). Disposal at either NTS or permitted offsite facility</td>
</tr>
<tr>
<td>ROD AMENDMENTS</td>
<td>Proposed amendment would allow alternate disposal and treatment as required by permitted offsite facility's WAC</td>
<td>Proposed amendment would allow disposal as required by permitted offsite facility's WAC</td>
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