



February 26 – March 1, 2012 ♦ Phoenix, Arizona

**Portsmouth Gaseous Diffusion Plant
Decontamination & Decommissioning Project
Piketon, Ohio**

Panel Chairman – William Murphie

Presentations by:

Dr. Vincent Adams, DOE

Joel Bradburne, DOE

Dennis Nixon, Fluor B&W Portsmouth

Dennis Carr, Fluor-B&W Portsmouth

Session No. 79

Contents

- 1 History
- 2 Portsmouth Transition
- 3 D&D Execution
- 4 Regulatory Framework
- 5 Potential On-Site Disposal Facility
- 6 Asset Recovery/Revitalization

Portsmouth



Panel Participants



William Murphie, DOE, Panel Chairman

William Murphie has been the manager of the Portsmouth/Paducah Project Office (PPPO) since 2003.



Dr. Vincent Adams, DOE

Dr. Vincent Adams became the PORTS Site Director in the summer of 2010.



Dennis Carr, Fluor-B&W

Dennis Carr is the deputy program manager for Fluor-B&W and has extensive D&D experience.



Joel Bradburne, DOE

Joel Bradburne is the PORTS Site Lead and has been with PPPO since 2009.



Dennis Nixon, Fluor-B&W

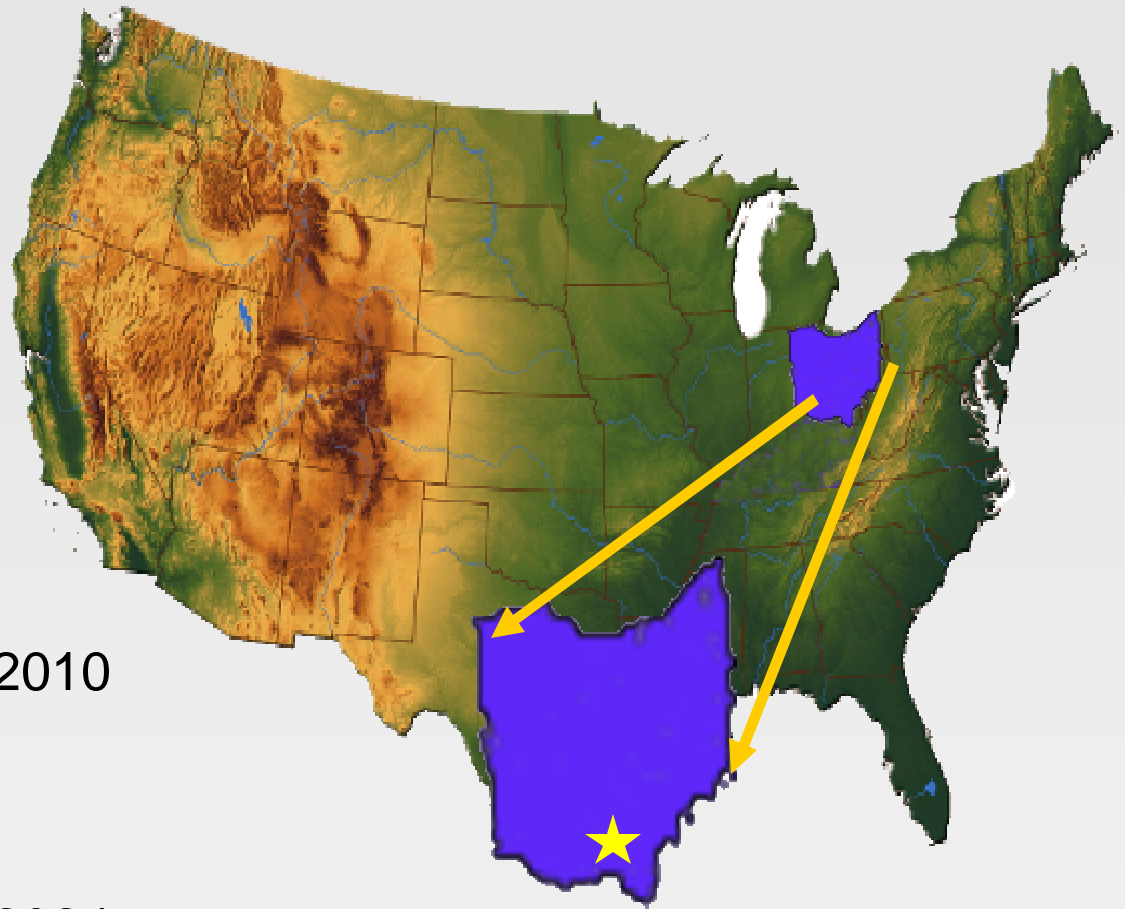
Dennis Nixon is Fluor-B&W's director of planning and site-wide integration.

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History

- ▶ Built from 1952-56
- ▶ Operations began in 1954
- ▶ USEC Privatized 1998
- ▶ Cold Standby in 2001
- ▶ Cold Shutdown in 2006
- ▶ D&D Contract awarded in 2010
- ▶ D&D began in March 2011
- ▶ Completion scheduled for 2024



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PORTSMOUTH TRANSITION

Presented by Joel Bradburne
Portsmouth/Paducah Project Office
Portsmouth Site Lead



Portsmouth In Transition

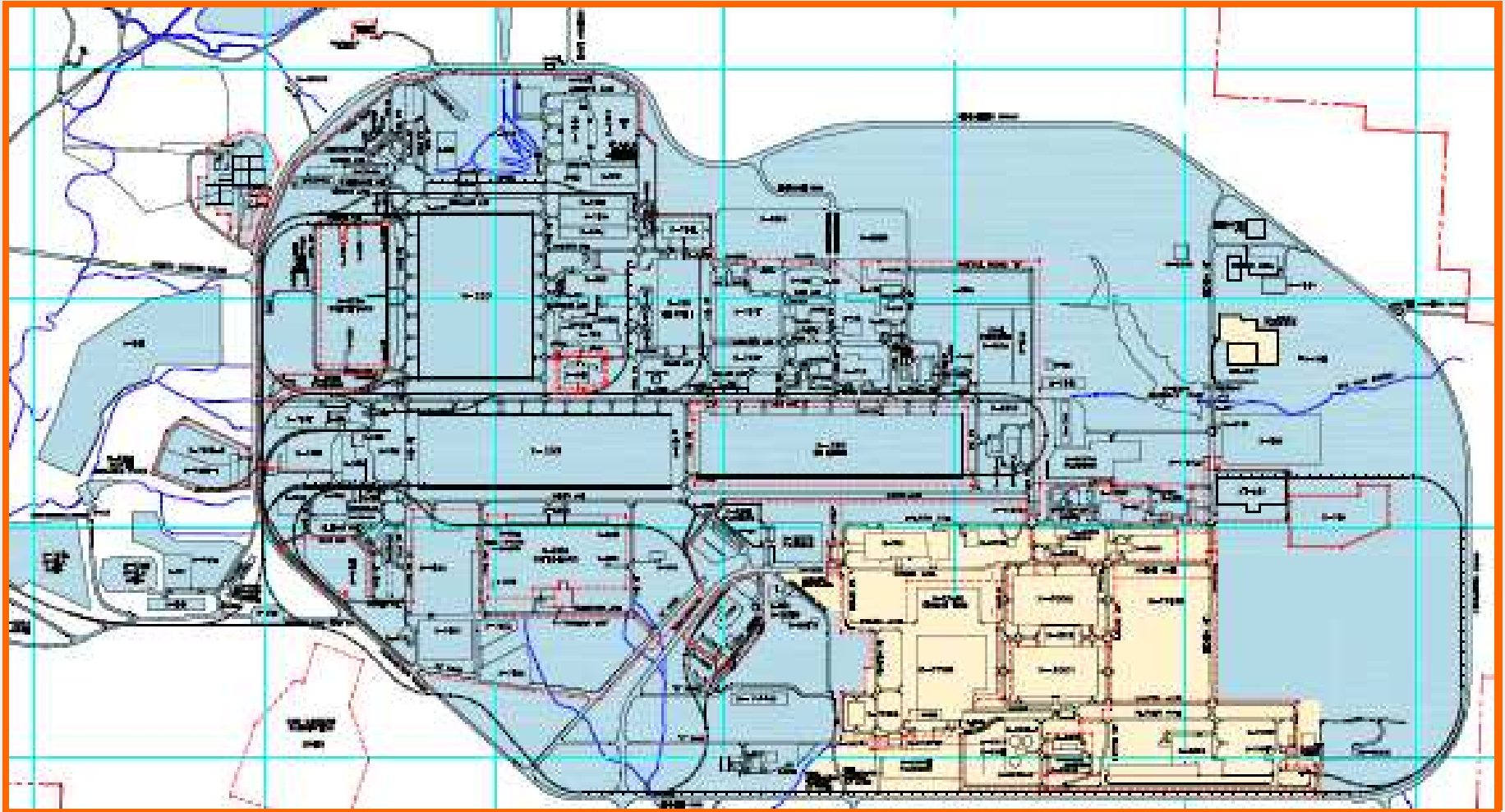


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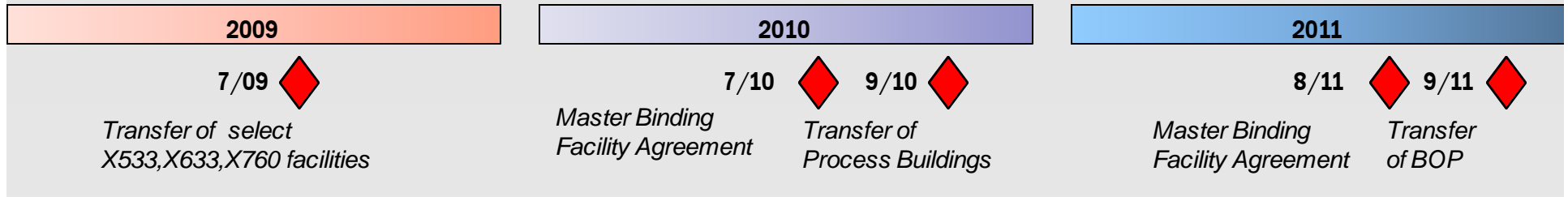


Site Transition

FY 11



USEC-DOE Transition

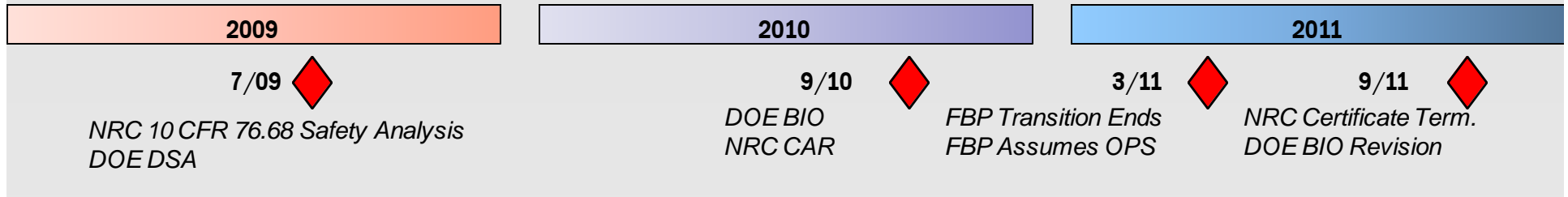


- ▶ **De-Lease process with USEC and DOE/ORO/PPPO**
 - ▶ GDP Lease between DOE and USEC
 - ▶ Real & Personal Property Transfer
- ▶ **Master Binding Facility Agreement**
 - ▶ System Boundaries and Site Services Agreement
 - ▶ Nuclear Material & Waste Inventory Reconciliation
 - ▶ Information Technology Transfer Issues
 - ▶ Equipment for Paducah or American Centrifuge Project (ACP)
- ▶ **Safety Authorization Basis**
 - ▶ Hot Transfer of Facilities

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Regulatory Transition

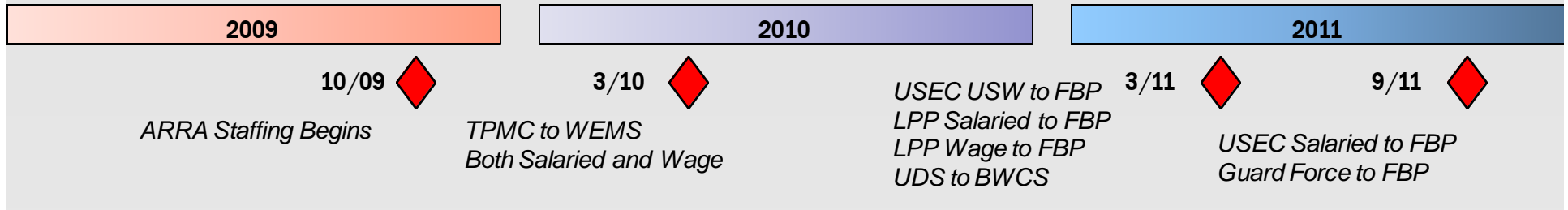


- ▶ **Gaseous Diffusion Plant Returned to DOE in Three Pieces**
 - ▶ NRC Safety Analysis/ NRC Certificate Amendment Request/ NRC Certificate Termination
- ▶ **Safety Authorization Basis**
 - ▶ Remediation Contractor Performed D&D under DOE DSA
 - ▶ NRC SAR to DOE BIO for Former Uranium Enrichment Facilities (FUEF)
 - ▶ ACP NRC License
- ▶ **Environmental Regulatory Transfer**
 - ▶ Ohio EPA & U.S. EPA Permits
- ▶ **Security Program Transfer**
 - ▶ NRC to DOE

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Staff Transition



▶ Workforce Continuity

- ▶ ~ 2,400 Employees Affected
- ▶ DOE DSA/BIOS – NRC Certificate and License compliance
- ▶ Position Qualification and Certificates
- ▶ Multiple Bargaining Units with Collective Bargaining Agreements

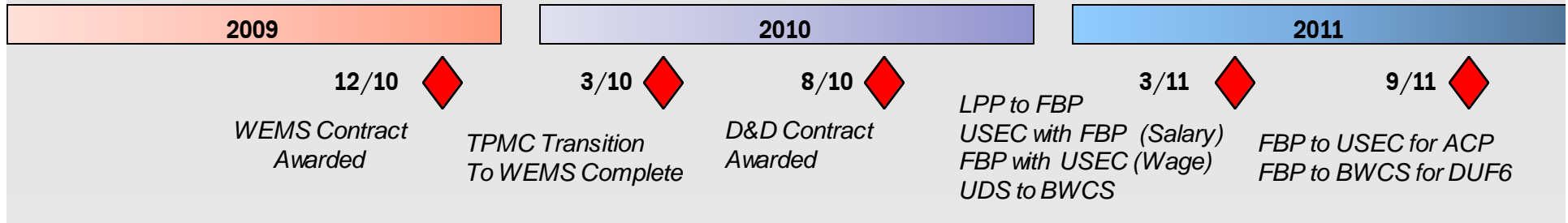
▶ Multiple Prime Contracts

- ▶ United States Enrichment Corporation - USEC
- ▶ Fluor-B&W Portsmouth – FBP
- ▶ Wastren-EnergX Mission Support – WEMS
- ▶ Restoration Services, Inc. – RSI
- ▶ Babcock-Wilcox Conversion Services – BWCS

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Contractor Transition



▶ Government Contractor to Government Contractor

- ▶ TPMC to WEMS
- ▶ LPP to FBP
- ▶ UDS to BWCS

▶ Private Corporation Business Segment to Government Contractor

- ▶ GDP Lease between DOE and USEC
- ▶ Staff support between USEC Government Services and FBP
- ▶ USEC Government Services to FBP

▶ Contract Alignment Opportunities

- ▶ Complete return of Gaseous Diffusion Plant
- ▶ Remediation in progress / Operational Facilities

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Transition Summary

3/10

TPMC Transition
To WEMS Complete

8/10

D&D Contract
Awarded

9/10

USEC Returns
Process Buildings

Transition Ends
DOE BIO

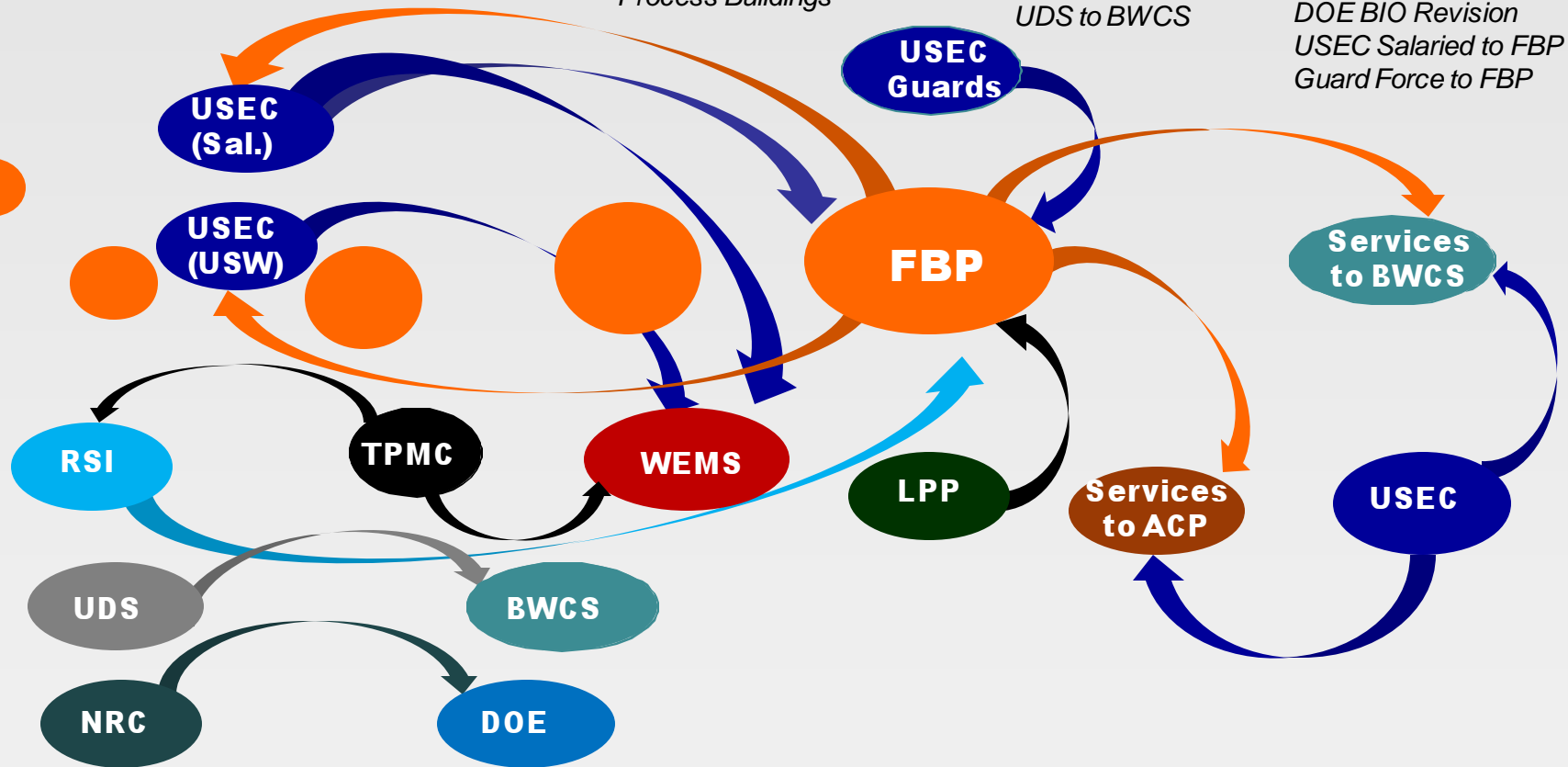
3/11

USEC USW to FBP
LPP Salaried to FBP
LPP Wage to FBP
UDS to BWCS

9/11

Transfer of BOP
NRC Certificate Ends
DOE BIO Revision
USEC Salaried to FBP
Guard Force to FBP

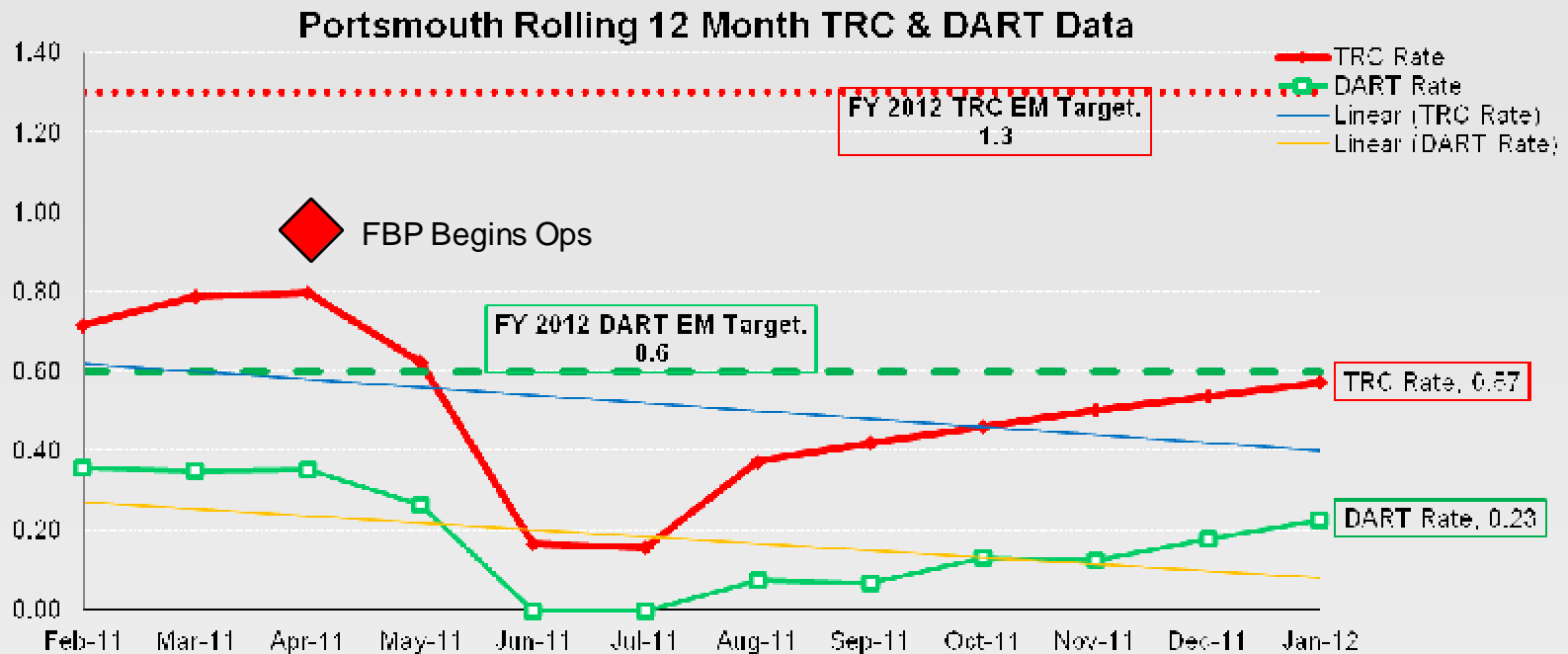
PROGRAM TRANSITION



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A Safe Transition



- ▶ Favorable Safety Trend
- ▶ Hot Operational Transfer
- ▶ Hot Transfer of Utilities
- ▶ Significant Field Activities
- ▶ ARRA Completion
- ▶ 8M lbs. of Recycle Materials
- ▶ Waste Shipments
- ▶ Multiple Safety Management Programs

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Looking Ahead

FY 2012-2016

◆ 7/13
10/11
De-Lease
Complete

◆ D&D and WD
Record
of Decisions

6/16 ◆
X-326 Demolition

FY 2017-2020

12/17 ◆
X-326 Soil
Remediation

FY 2017-2020

6/19 ◆
X-330 Demolition

12/20 ◆
X-330 Soil
Remediation

FY 2021-2024

6/22 ◆
X-333 Demolition

12/24 ◆
X-333 Soil
Remediation





D&D EXECUTION APPROACH

Presented by Dennis Nixon
Fluor-B&W Portsmouth
Planning and Site-wide Integration Director



D&D Execution

Fluor-B&W Portsmouth Contract

- ▶ Fluor and B&W – Small business partners



- ▶ The Contract : \$2.1B, Cost + Award Fee
 - ▶ Duration: 5 Yr **Base** + 5 Yr Option
 - ▶ Contract awarded on August 16, 2010
 - ▶ Completed transition and initiated execution March 29, 2011
 - ▶ Accepted responsibility for all site facilities and infrastructure including security, emergency services, fire and utility operations
October 1, 2011

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D&D Execution

GFS&I

- Operate site utilities / infrastructure
- Security/Emergency Services/Fire Protection

D&D

- Main process buildings (deactivation/hazard abatement/ equipment removal, demolition)
- Balance of the Plant (deactivation and demolition)

On-site Disposal Cell

- Meet DOE and regulatory requirements
- Complete design and geotechnical
- Construct and operate the disposal site if selected

Regulatory Documents

- Complete Balance of Plant EE/CA
- Complete Building / Waste Disposition RODs

Soil Remediation

- Characterize, remediate, and systematically make land available for reindustrialization

Groundwater Remediation

- Complete treatment facility upgrades
- Continue pump and treat operations

Facility S&M / Operations

- Drive the mortgage cost down by optimizing utilities
- Continue operations in X-342, X-344, X-345, X-705

Waste Management

- Disposition of legacy waste , X-847; and Uranium Management Center
- Ship X-326 equipment to NNSS
- Onsite disposal operations if selected

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D&D Execution

Technical Approach Summary



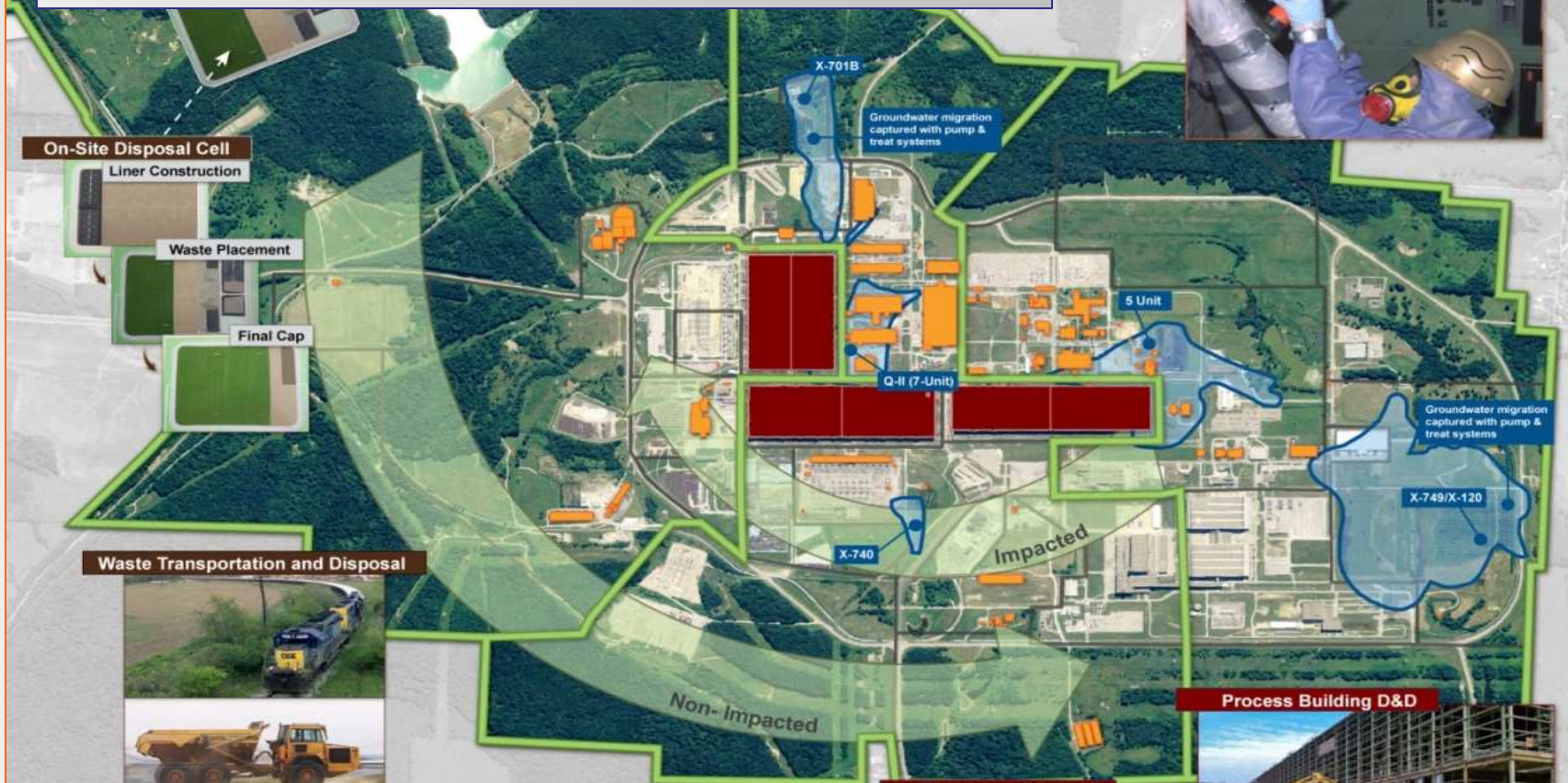
➤ Assumes regulatory decision process selects On-site Disposal

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Regulatory – Accelerate decision process including Waste Disposition and Building Records of Decision (ROD)



- Cell Housing Removal Crews
- Cut-and-Cap Crews
- Rig-and-Remove Crews
- Process-Pipe-Removal Crews

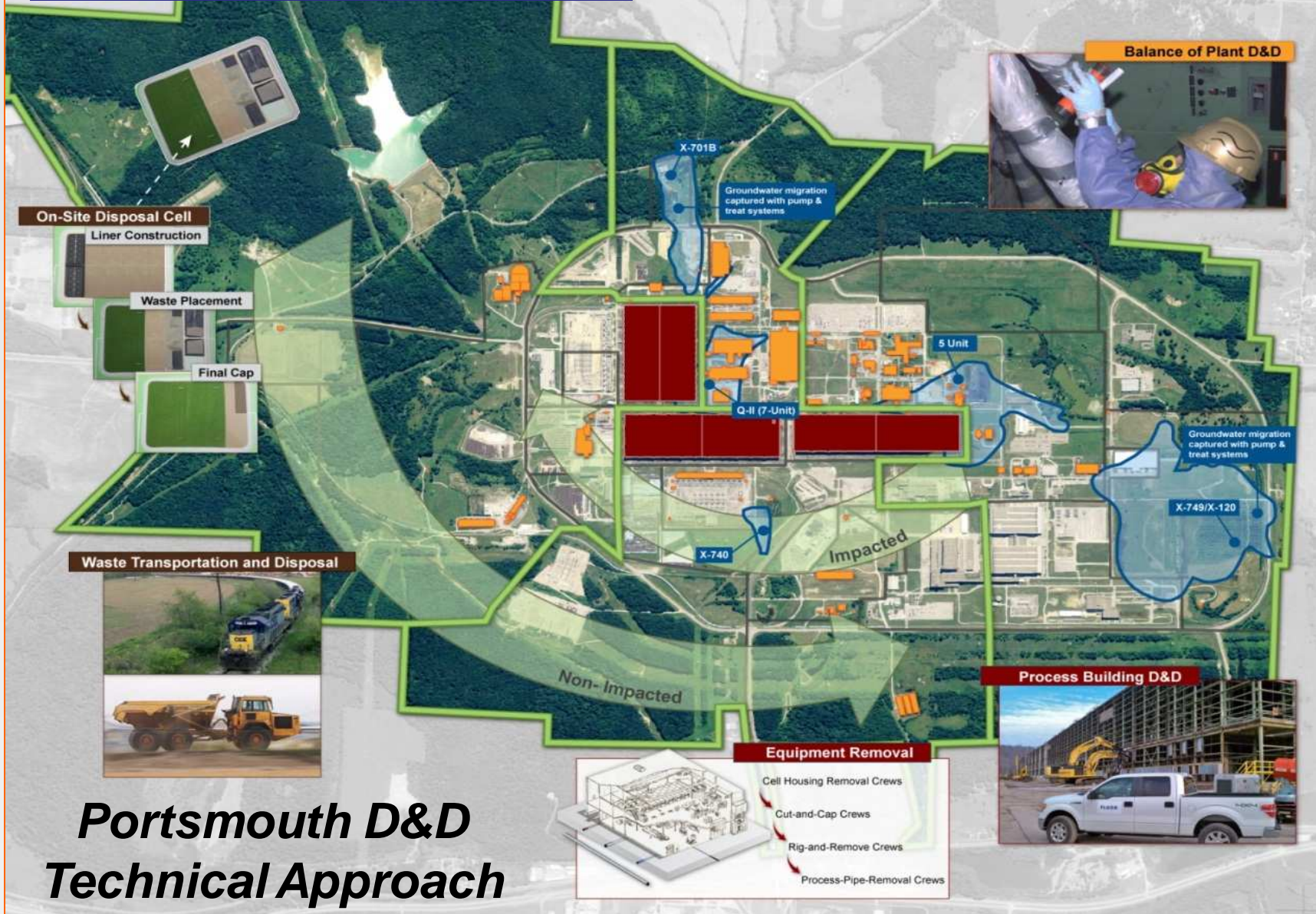
Portsmouth D&D Technical Approach

S&M – Drive overhead down, take building to a stasis mode, redirect funds to critical path



Portsmouth D&D Technical Approach

Deactivation – “Rolling Wave”



Portsmouth D&D Technical Approach

- Cell Housing Removal Crews
- Cut-and-Cap Crews
- Rig-and-Remove Crews
- Process-Pipe-Removal Crews



D&D – Overlaps deactivation activities
– Balance of Plant D&D is integrated with process building deactivation and demolition



Waste Transportation and Disposal



Equipment Removal

- Cell Housing Removal Crews
- Cut-and-Cap Crews
- Rig-and-Remove Crews
- Process-Pipe-Removal Crews



Portsmouth D&D Technical Approach

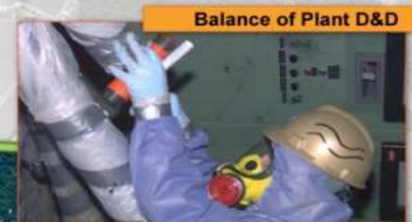
Soil Remediation – Soil Remediation and certification follow D&D to allow reindustrialization



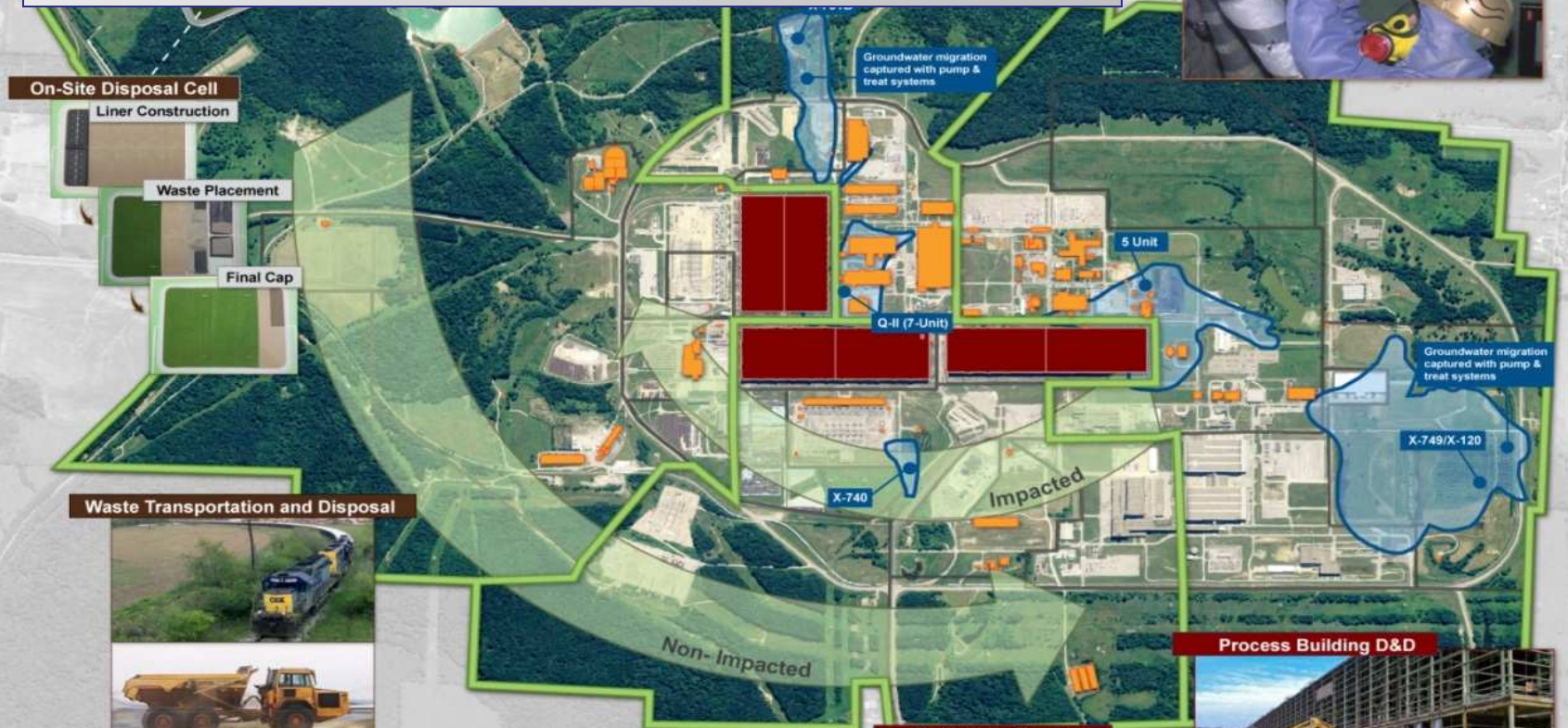
Portsmouth D&D Technical Approach

Waste Disposition

- X-326 equipment shipped offsite as generated
- Bulk of remaining waste disposed of consistent with Waste Disposition ROD



Balance of Plant D&D



On-Site Disposal Cell

Liner Construction

Waste Placement

Final Cap

Waste Transportation and Disposal



Equipment Removal

- Cell Housing Removal Crews
- Cut-and-Cap Crews
- Rig-and-Remove Crews
- Process-Pipe-Removal Crews

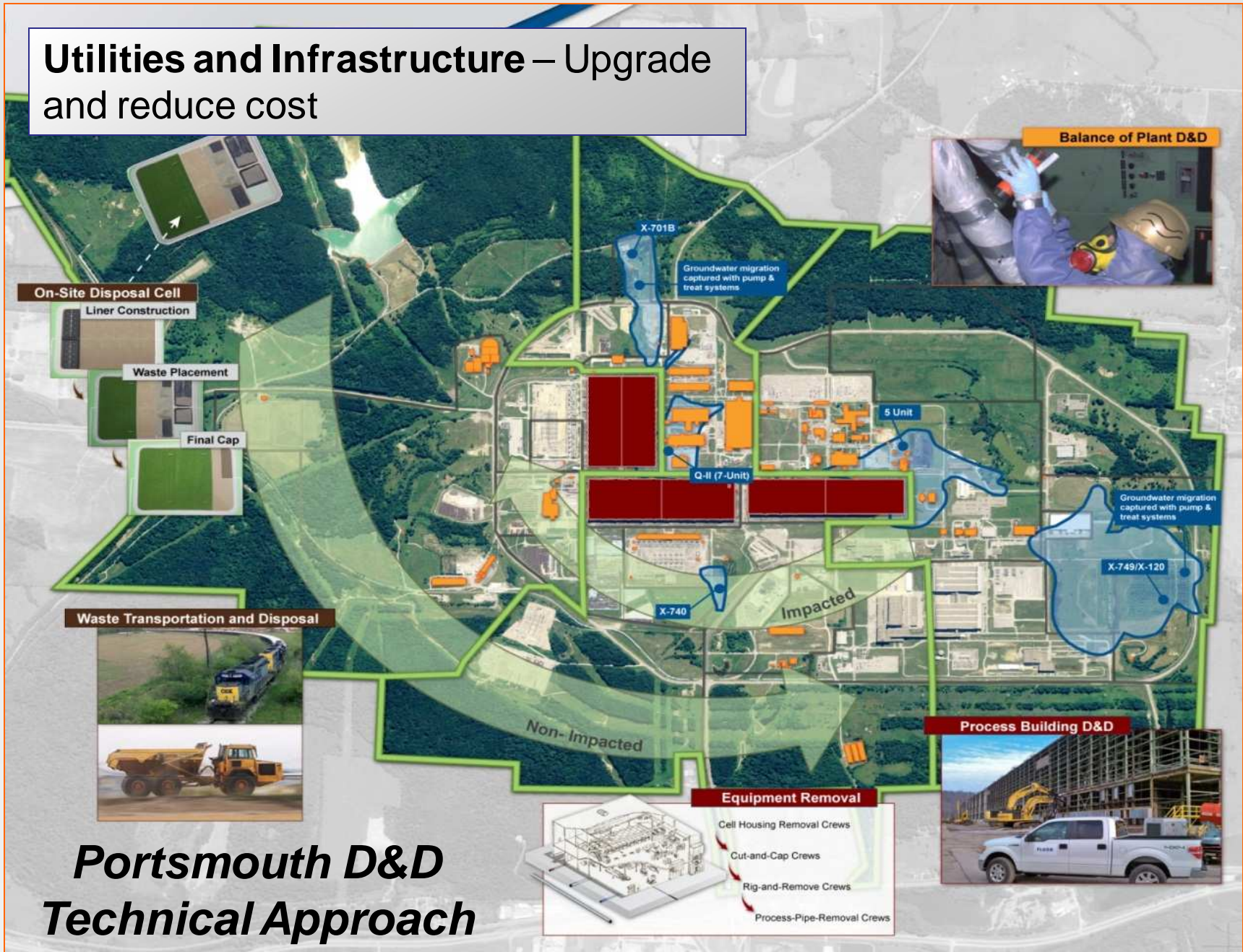


Process Building D&D



Portsmouth D&D Technical Approach

Utilities and Infrastructure – Upgrade and reduce cost

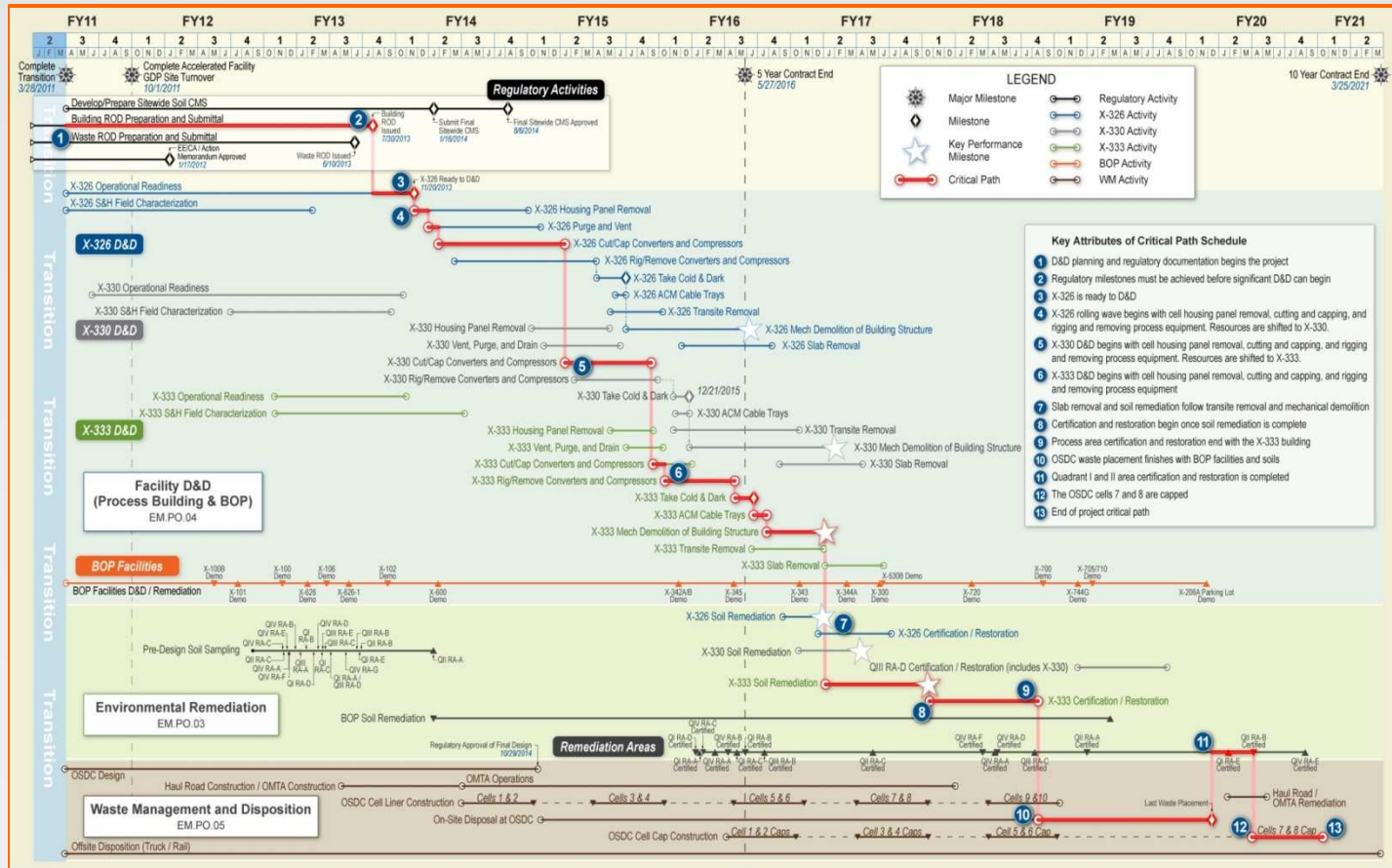


Portsmouth D&D Technical Approach

D&D Execution



Optimal Critical Path Schedule



➤ Assumes regulatory decision process selects On-site Disposal

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D&D Execution

Key Risks

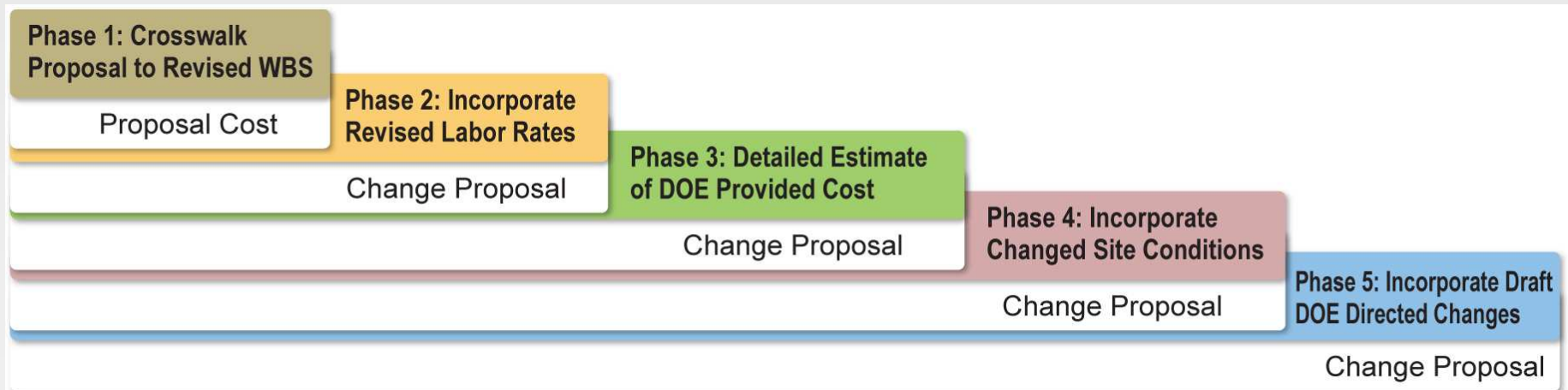
- ▶ **The regulators select off-site transport and disposal of wastes rather than construction and operation of an OSDC**
- ▶ The OSDC WAC approved by the regulators is too restrictive and the OSDC may no longer represent a viable disposal alternative
- ▶ Approval of Waste Disposition and Building D&D decision documents are delayed
- ▶ Uranium deposits in process equipment exceed OSDC WAC
- ▶ Stakeholder involvement process changes the proposed end use from industrial to residential with more restrictive soil and groundwater cleanup criteria
- ▶ **Funding availability**

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D&D Execution

- ▶ The technical approach is documented in the Portsmouth GDP D&D Project – Performance Measurement Baseline (Lifecycle D&D PMB) – Delivered **December 19, 2011**
- ▶ Completes D&D scope by **March 28, 2021** - Based on Optimal Funding
- ▶ The “Lifecycle D&D PMB” was developed utilizing a regimented five-phased approach to maintain traceability to the original proposal



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D&D Execution

PMB Development Process

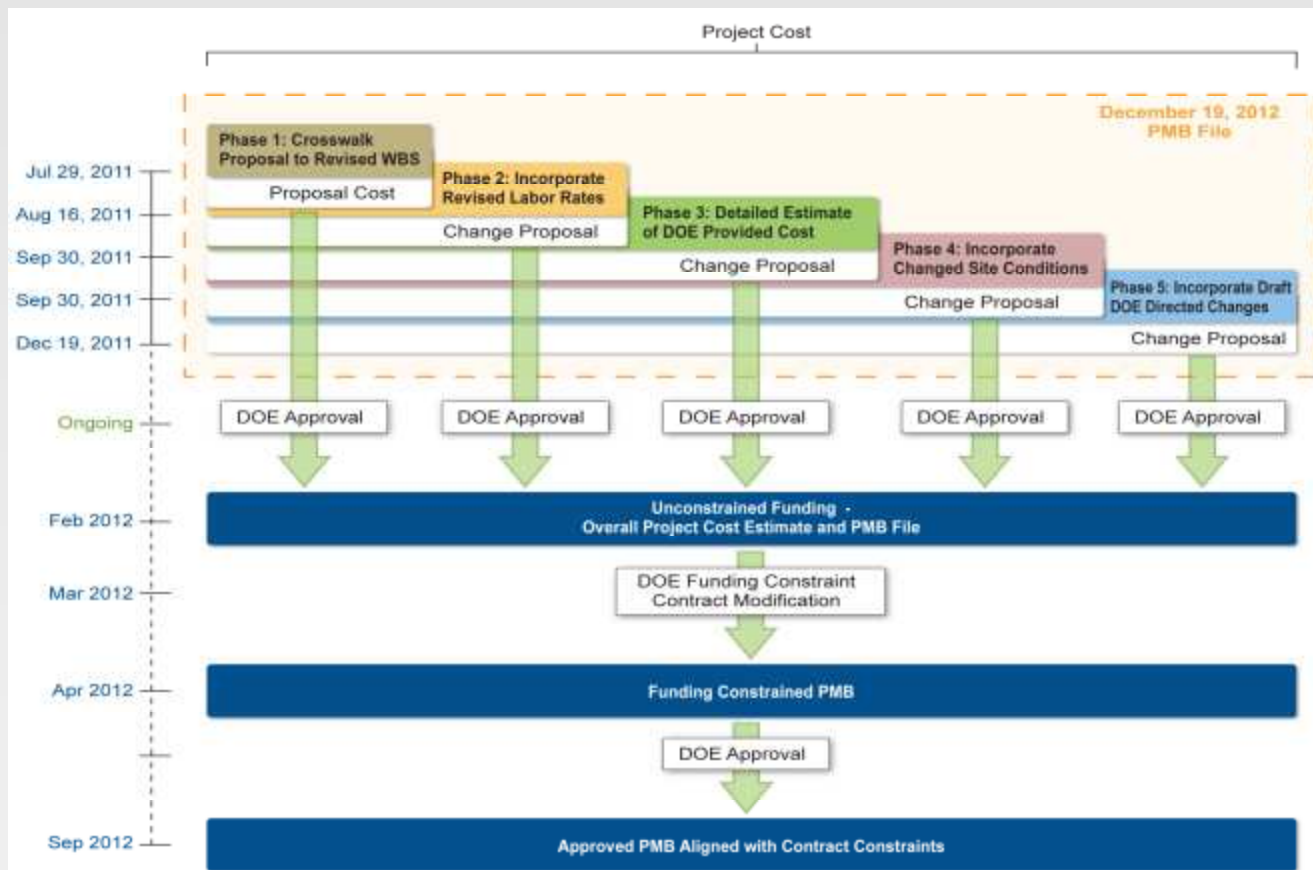
- ▶ Finalizing the Lifecycle D&D PMB has been driven by:
 - ▶ Accelerated de-leasing of the process buildings and non-GDP facilities
 - ▶ Transfer of the utilities and infrastructure from USEC in October
 - ▶ Evolving funding profile
- ▶ Final approval of the PMB is anticipated in September 2012
- ▶ FBP is managing to and measuring performance against the “Initial” or “Near-Term” D&D Performance Measurement Baseline (PMB) for FY-11 and FY-12
- ▶ **What’s left to do?**

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D&D Execution

PMB Development Process



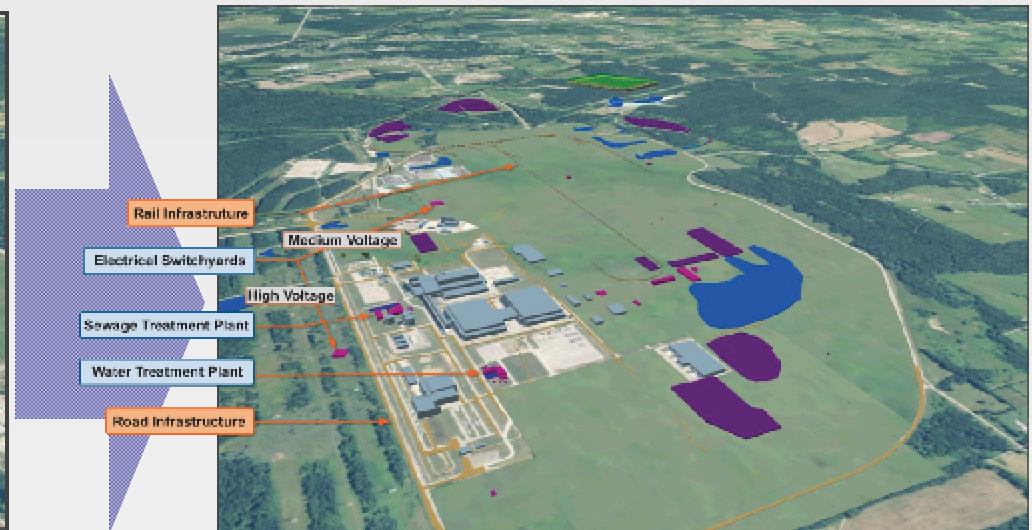
- ▶ March 9, 2012 FBP will submit the cost proposal to incorporate the USEC scope into the FBP contract
- ▶ April 16, 2012 FBP will resubmit the PMB to DOE fully aligned with the anticipated funding profile for the Portsmouth site
- ▶ September 2012 Lifecycle D&D PMB approved

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D&D Execution

- ▶ Consolidation of the USEC work scope under FBP lengthened the site transition and ultimately the baselining process, however, will ultimately provide considerable value:
 - ▶ Greatly improves the overall efficiency of the site cleanup by putting the D&D contractor in charge of the entire site
 - ▶ While change is significant to FBP net result is minimal to the site
 - ▶ Entities working together for the net benefit of the site and the workforce



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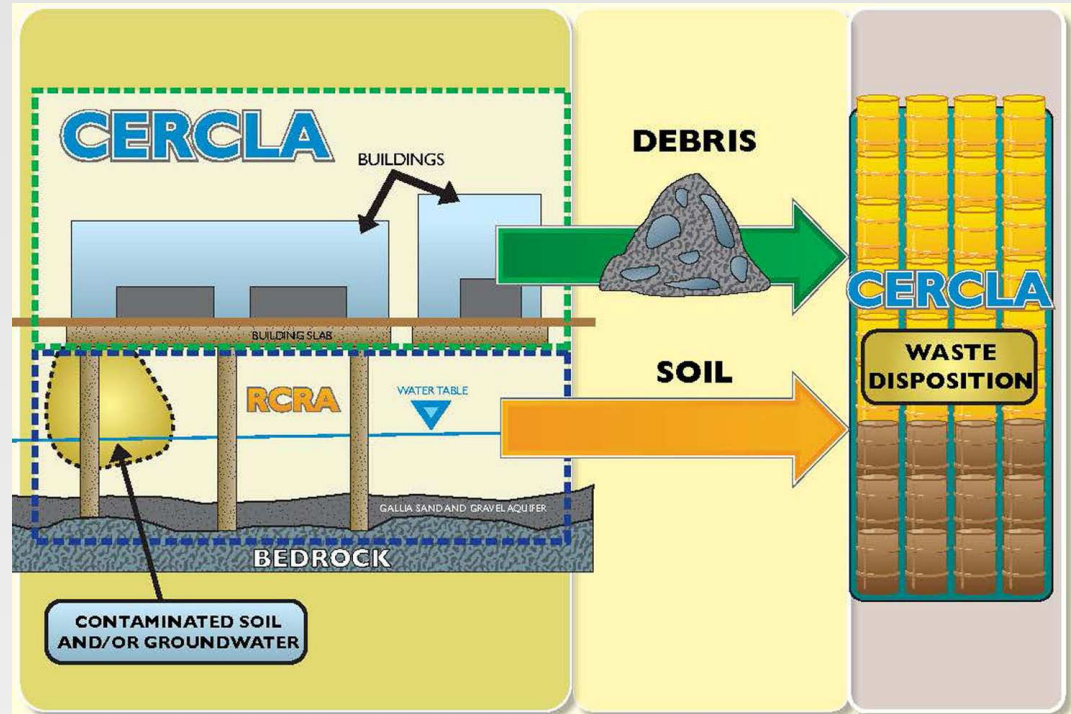
REGULATORY FRAMEWORK

Presented by Dennis Carr
Fluor-B&W Portsmouth
Deputy Program Manager



Regulatory Framework

- ▶ Buildings and site waste disposition being addressed under CERCLA.
- ▶ Soils and groundwater are being addressed under RCRA.
- ▶ CERCLA and RCRA processes will be integrated.



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Regulatory Framework

▶ Remaining Regulatory Decisions

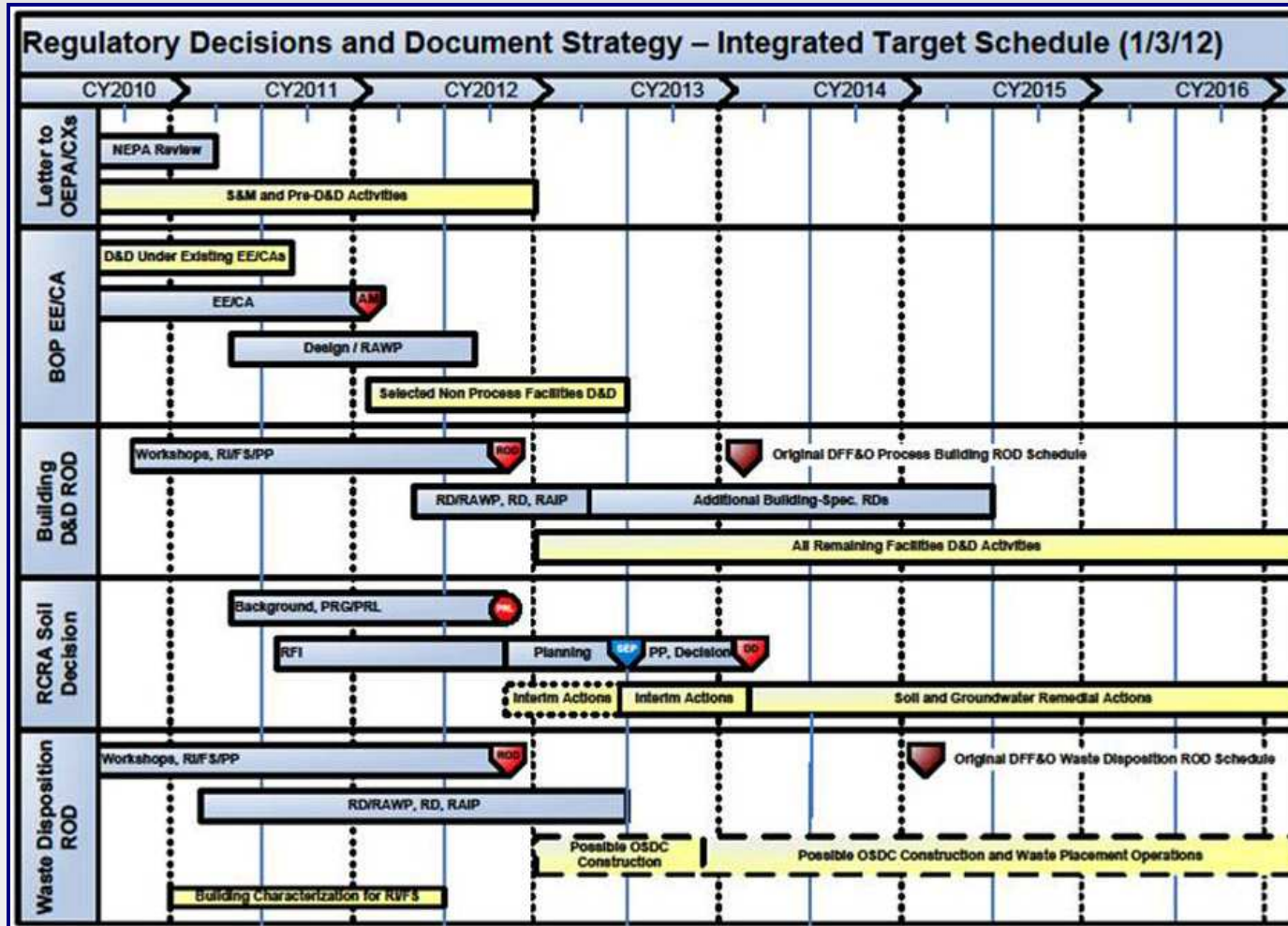
- ▶ No further use for process buildings
- ▶ Sitewide waste disposition
- ▶ Final soil cleanup levels



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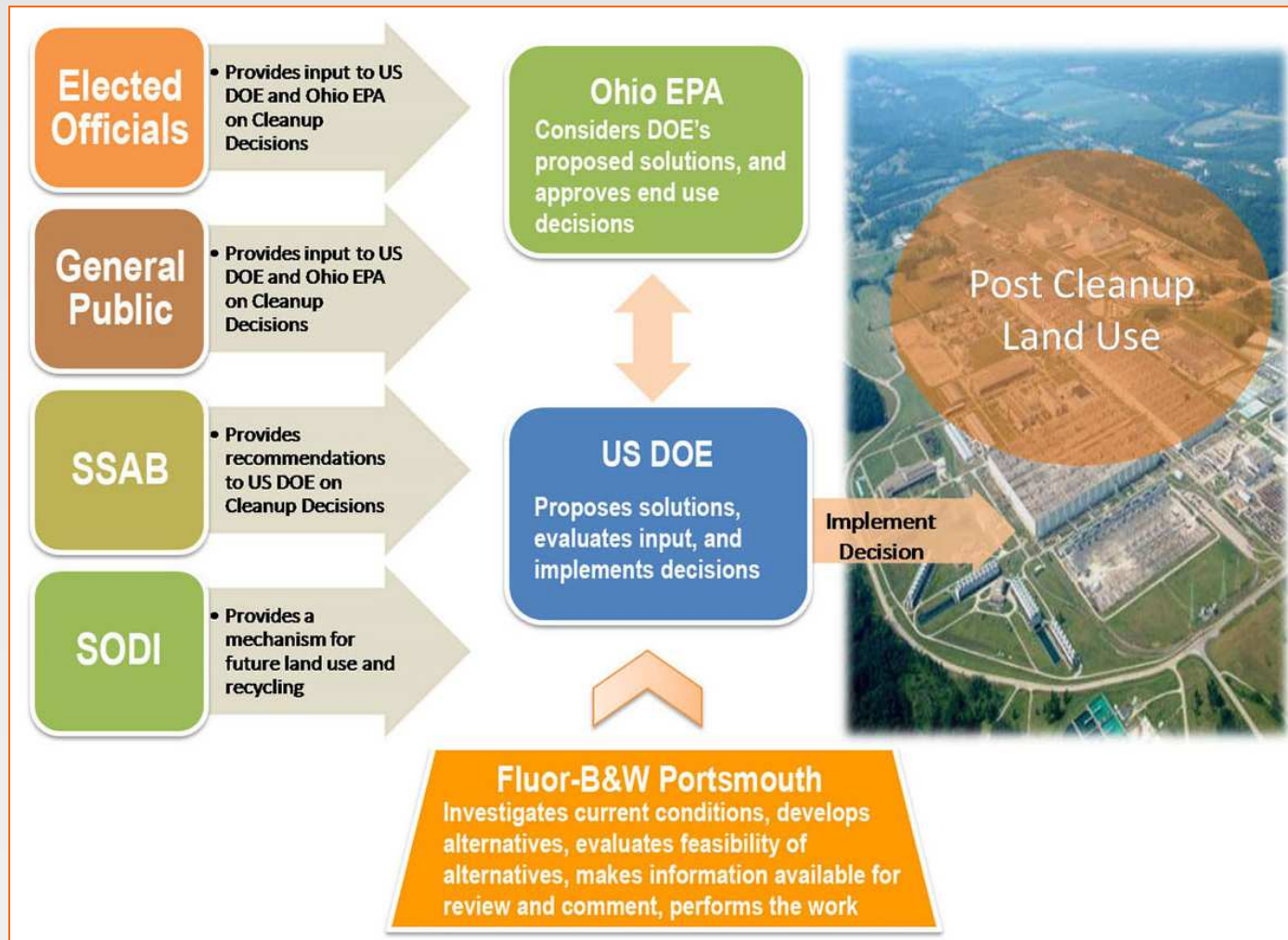
Regulatory Framework



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Regulatory Framework



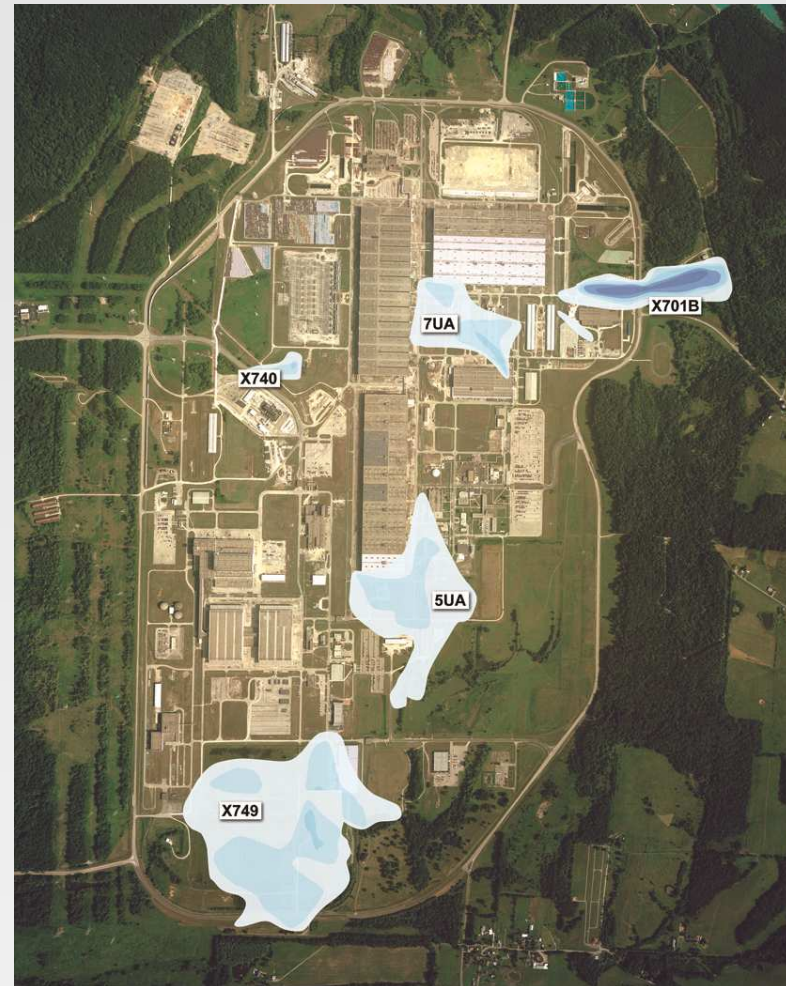
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Groundwater Cleanup

▶ By the numbers ...

- ▶ More than 1,000 groundwater monitoring wells installed around the site.
- ▶ 628 million gallons of groundwater treated since early 1990s (20,900 rail tanker cars).
- ▶ More than 35,000 pounds of degreasing solvent (TCE) removed from groundwater.



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Soil Cleanup

Existing Capped or Closed Landfills and Capped Soil Contamination Areas

- ▶ **By the numbers ...**
 - ▶ 5 general locations, 16 closed sites
 - ▶ Current site landfills cover about 94 acres of site land (85 football fields)
 - ▶ Landfills contain about 1 million cubic yards of soil and waste



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Regulatory Framework



Envoy Program

Community Outreach

At left, Envoy Manager Jack Williams addresses members of the Envoy program at the kick-off meeting on September 1, 2011.



At right: Val Francis (left) and Dick Snyder (middle) of the SSAB greet EM Acting Assistant Secretary David Huizenga during his visit to the site in 2011.

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Regulatory Framework



Community Outreach

At left: Nearly 250 residents and community members attended the second in a series of informational meetings held January 31, 2012, at Waverly High School.

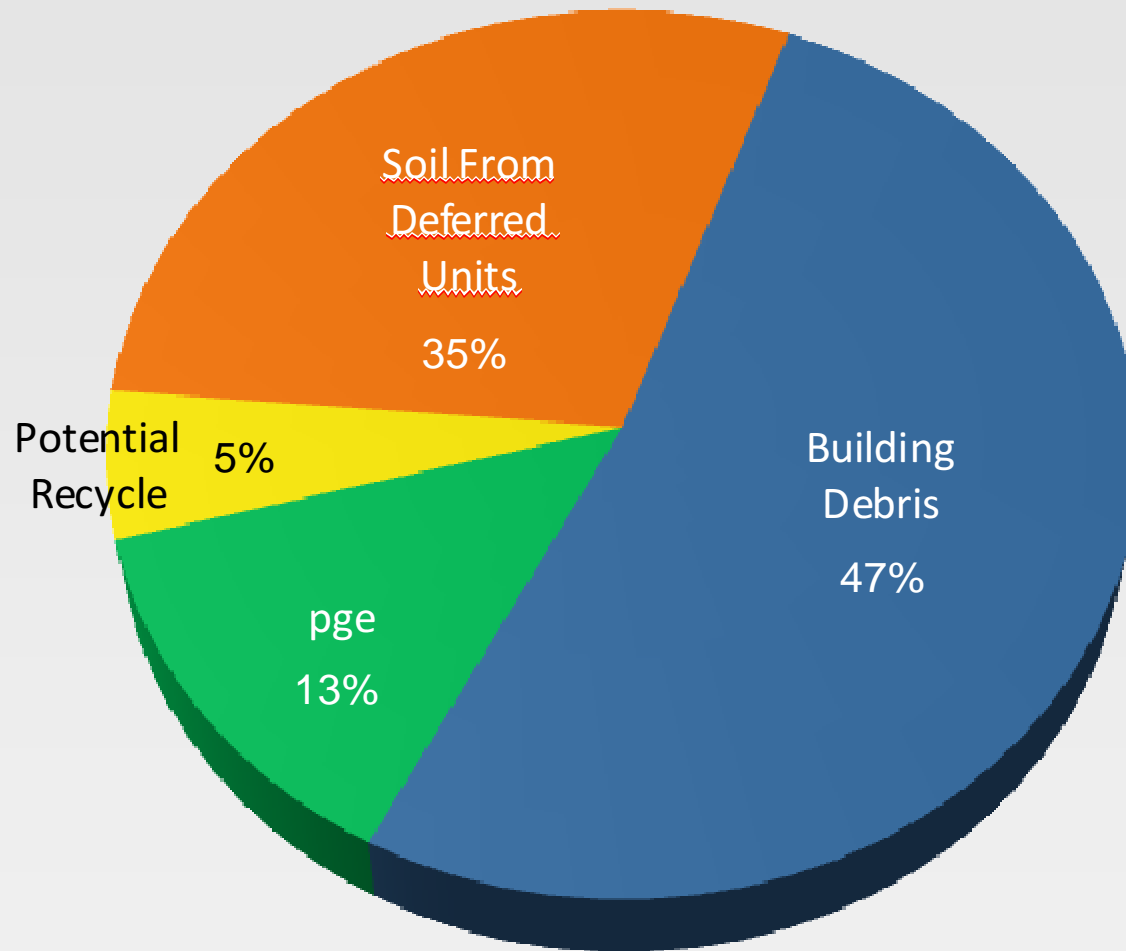
At right: Dr. Vince Adams, DOE Site Director for the Portsmouth Site, addresses those in attendance at the meeting for plant neighbors.



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Where will the waste go?



Total Volume = 2.177M cy

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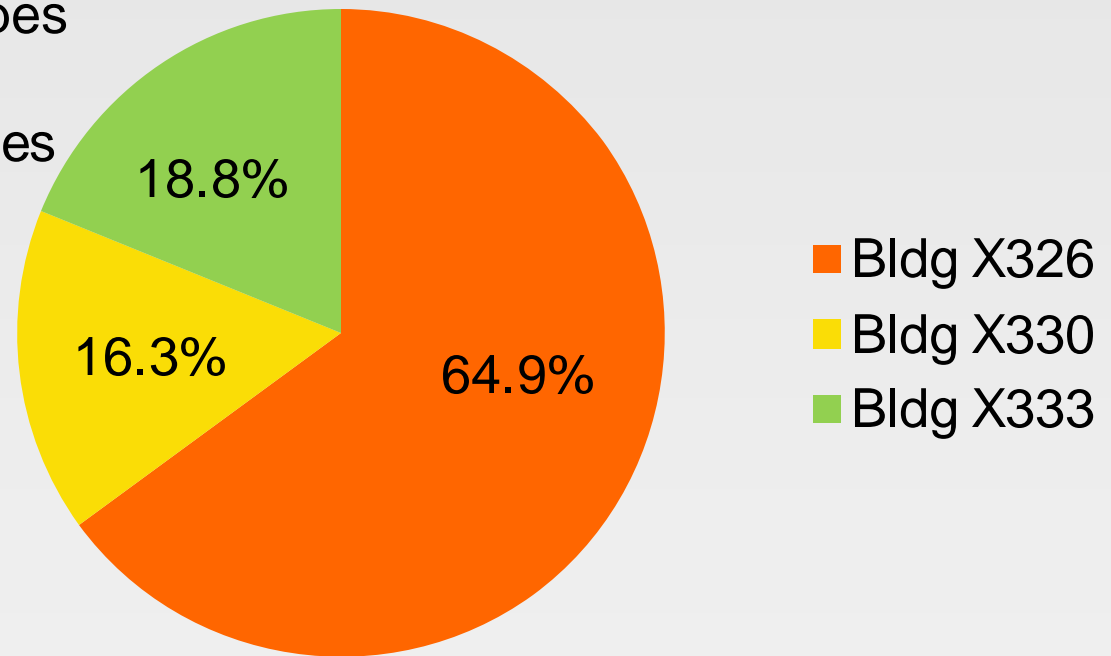


Where will the waste go?

▶ 150 Curies in Process Buildings

- ▶ Physical sample results for Tc-99 and TRU isotopes
- ▶ NDA results for U isotopes

Percent of Total Curies in Process Buildings



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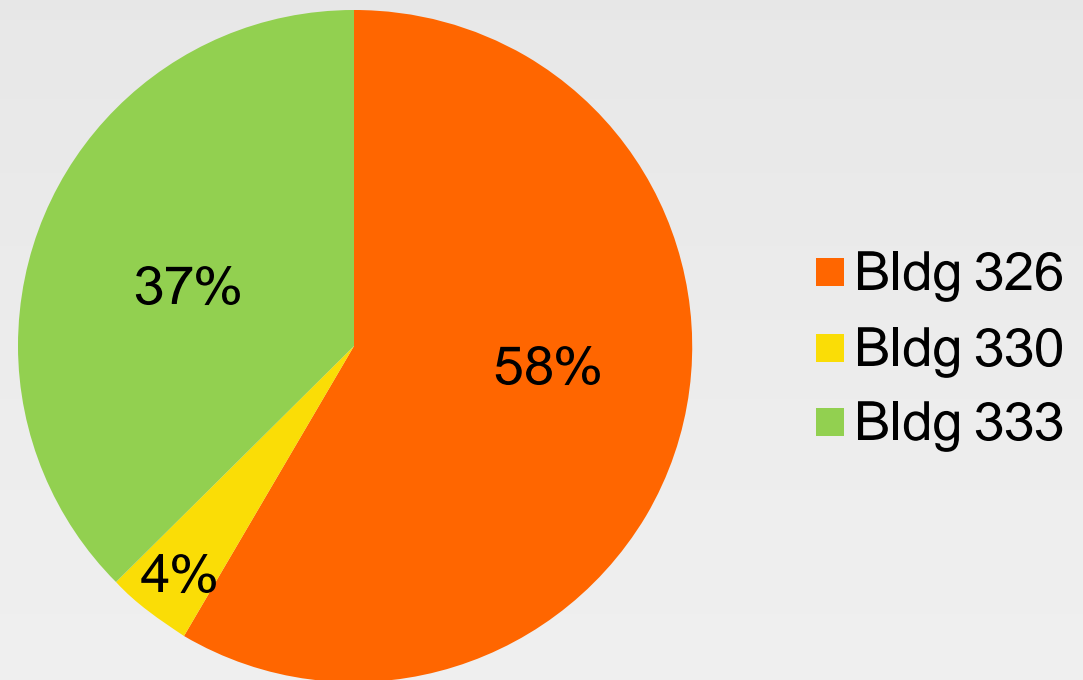


Where will the waste go?

▶ 150 Curies in Process Buildings

- ▶ Risk in Bldg. X-326 because of Tc-99 and U isotopes
- ▶ Risk in Bldg. X-333 > Bldg. X-330 because of much higher U mass

Percent of Total Risk for External Radiation



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Waste Disposition

► By the numbers...

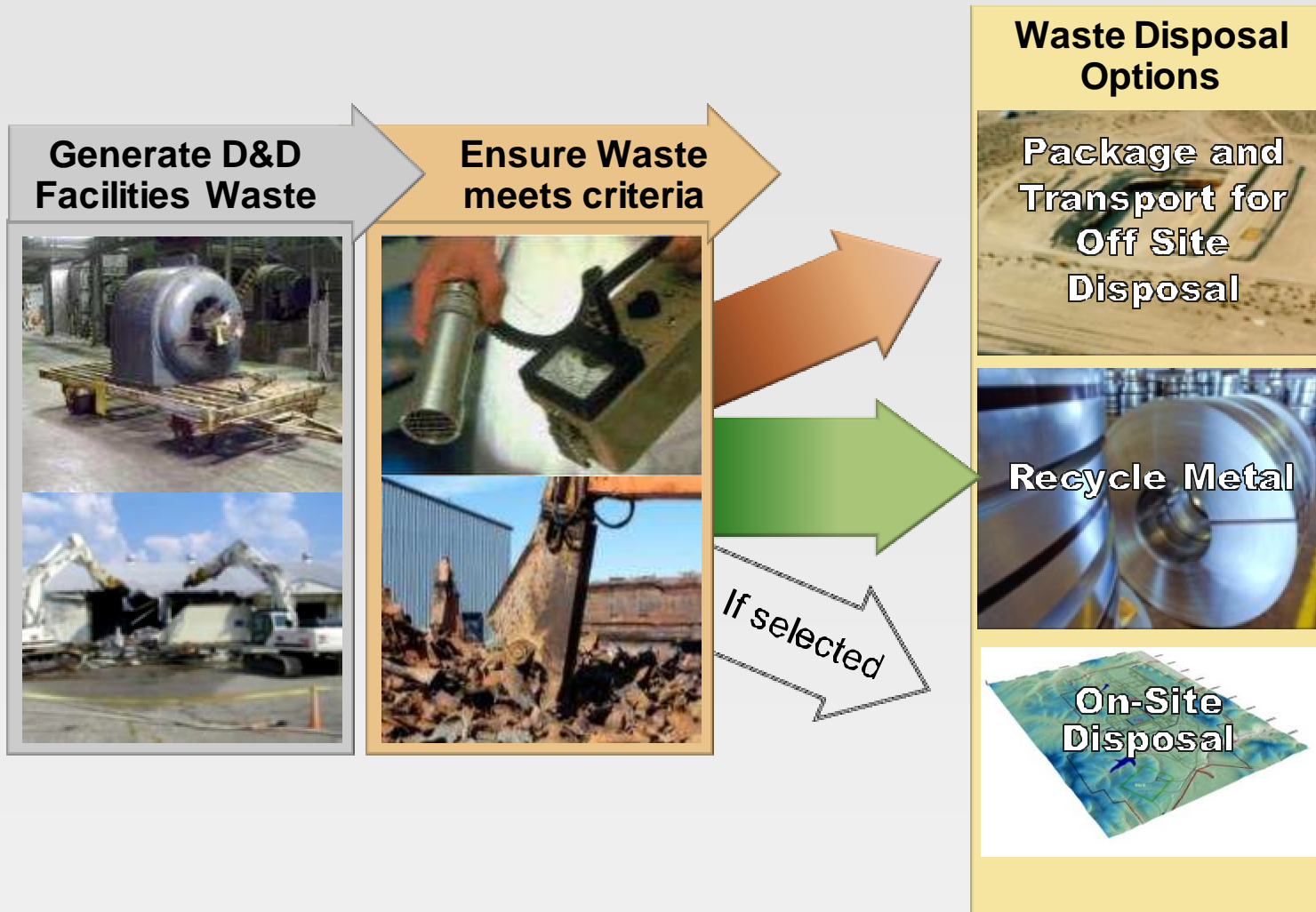
- More than 1,442,000 cubic feet of clean, radioactive, hazardous, and mixed wastes were shipped off site in 2011.
- More than 33% of the mixed hazardous waste inventory has been shipped off site for treatment.



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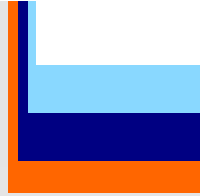
Waste Disposition Alternatives



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Waste Disposition Alternatives



▶ **Alternative 1:**

- ▶ Ship all soils, debris and equipment to off-site disposal facilities

▶ **Alternative 2:**

- ▶ Ship materials with highest contamination off site.
- ▶ Dispose of lower contaminated materials in an engineered on-site disposal facility.
- ▶ On-site disposal facility may only receive materials from Portsmouth site – No off-site waste allowed.
- ▶ Additional restrictions or prohibited items may be incorporated into final agreement with the Ohio EPA.
- ▶ Permanent care of on-site disposal facility is required by DOE.

▶ **Alternative 3:**

- ▶ Leave it alone.

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Off-Site Disposition

Alternative 1

Local Landfill ("Clean" waste only)
Pike County, Ohio



EnergySolutions
Clive, Utah



Waste Control Specialists
Andrews, Texas



Recycling



DOE Nevada
National Security Site
(formerly Nevada Test Site)
Nevada

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Off-Site Disposition

Alternative 1

- ▶ Current estimates show that ~2.2 million cubic yards of demolition debris/remediation wastes will be generated during D&D/remediation of the Portsmouth Gaseous Diffusion Plant. For Alternative 1, this is projected to result in:



- ▶ More than 25,000 trucks* (local and to DOE's Nevada National Security Site) traveling 43 million miles.
- ▶ 15,000 rail cars* traveling 55 million miles.

*With addition of "bulking factor" in equation



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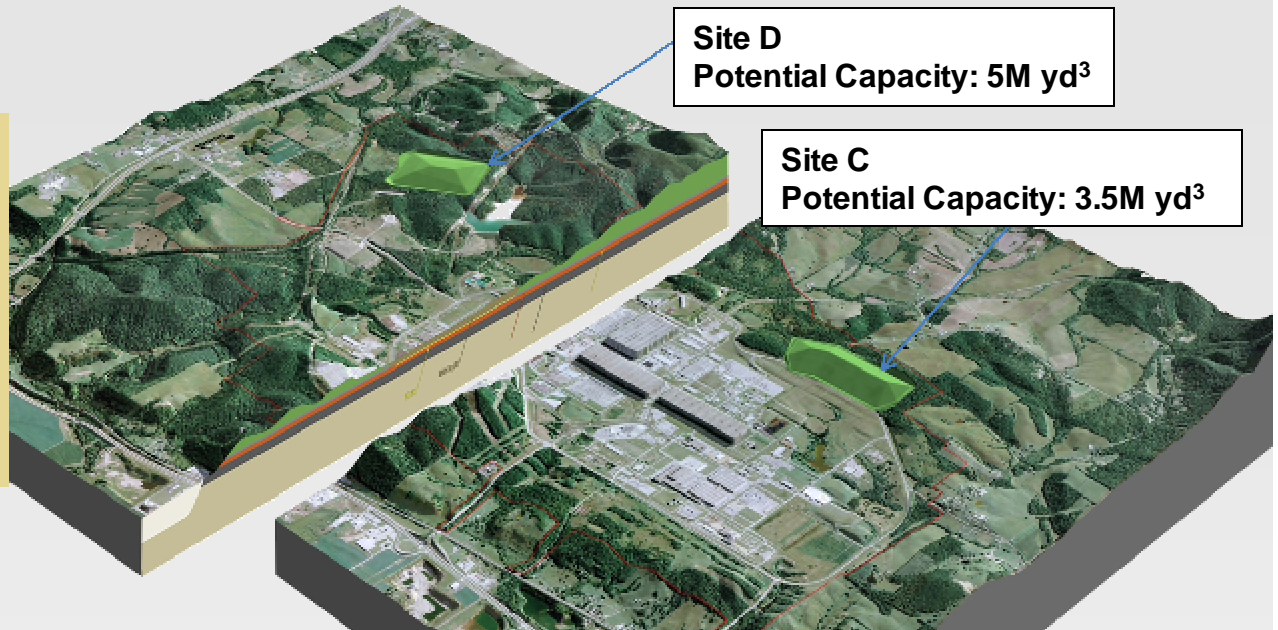


On-Site Disposition

Alternative 2

Location Factors

- ▶ **Best available geology**
- ▶ Compliance with the regulations
- ▶ Compatible with future site uses
- ▶ Cost
- ▶ Logistics



Size / Volume Factors

- ▶ **Volume of non-recyclable contaminated debris**
- ▶ **Amount of soil to mix with debris for structural stability**
- ▶ Desire to consolidate existing landfills
- ▶ Waste Acceptance Criteria
- ▶ Desired height

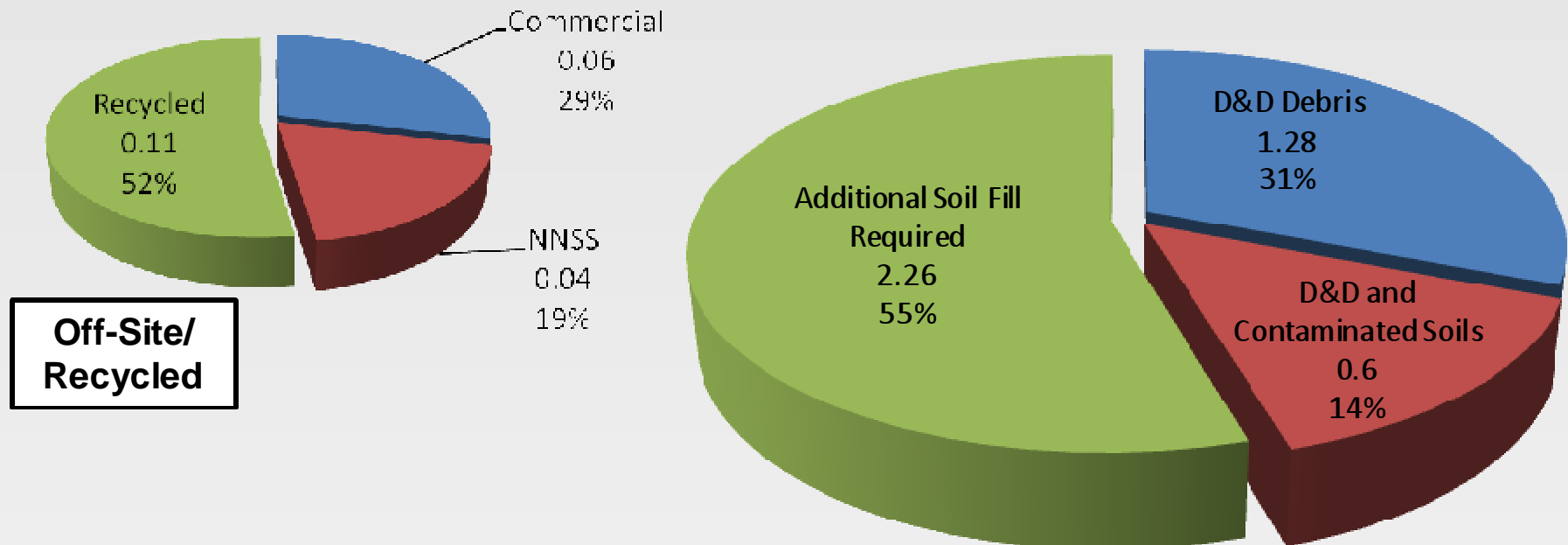
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On-Site Disposition

Alternative 2

Volumes For "On-Site" Alternative In The R/FS



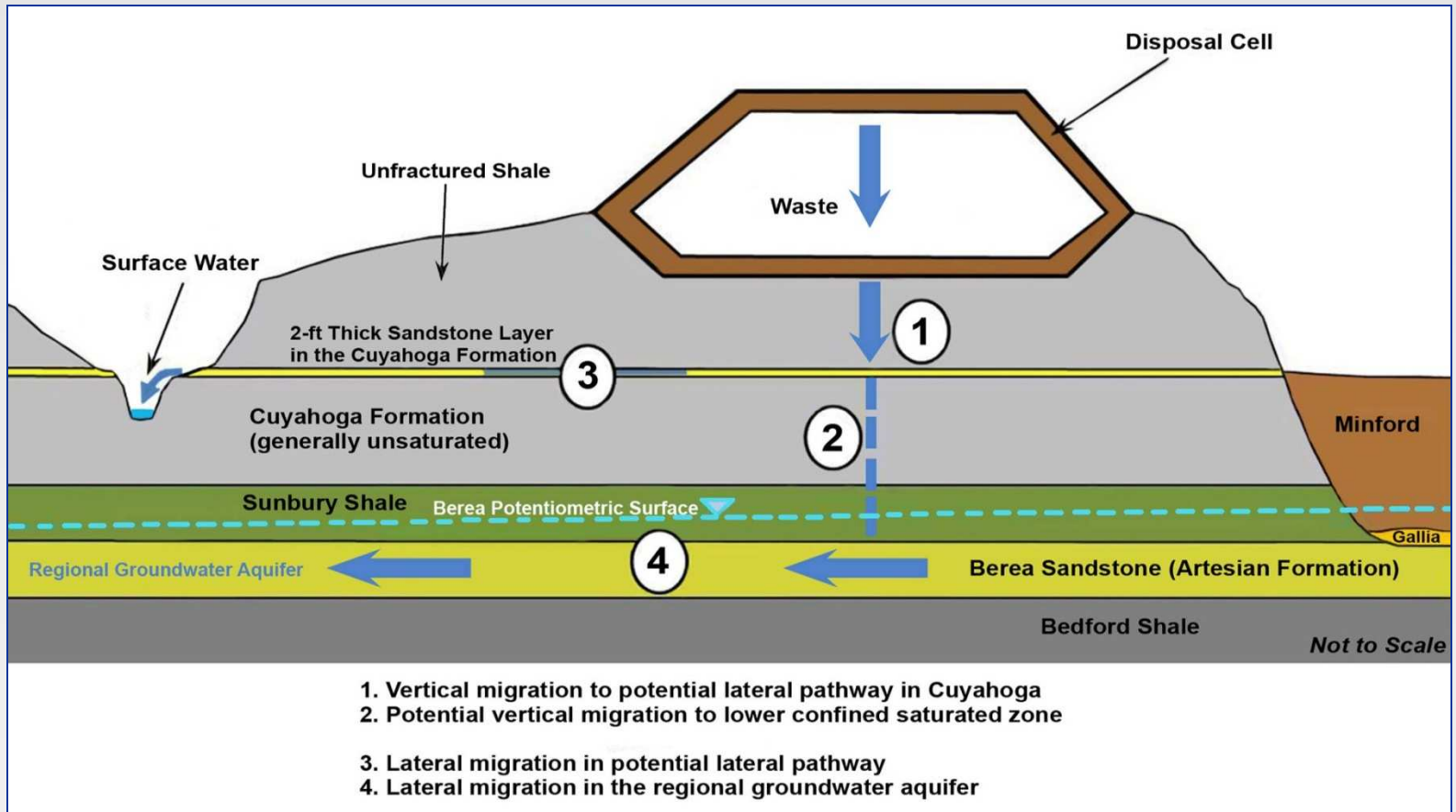
- ❖ Volumes (in millions of cubic yards) are preliminary and subject to revision.

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On-Site Disposition

Alternative 2

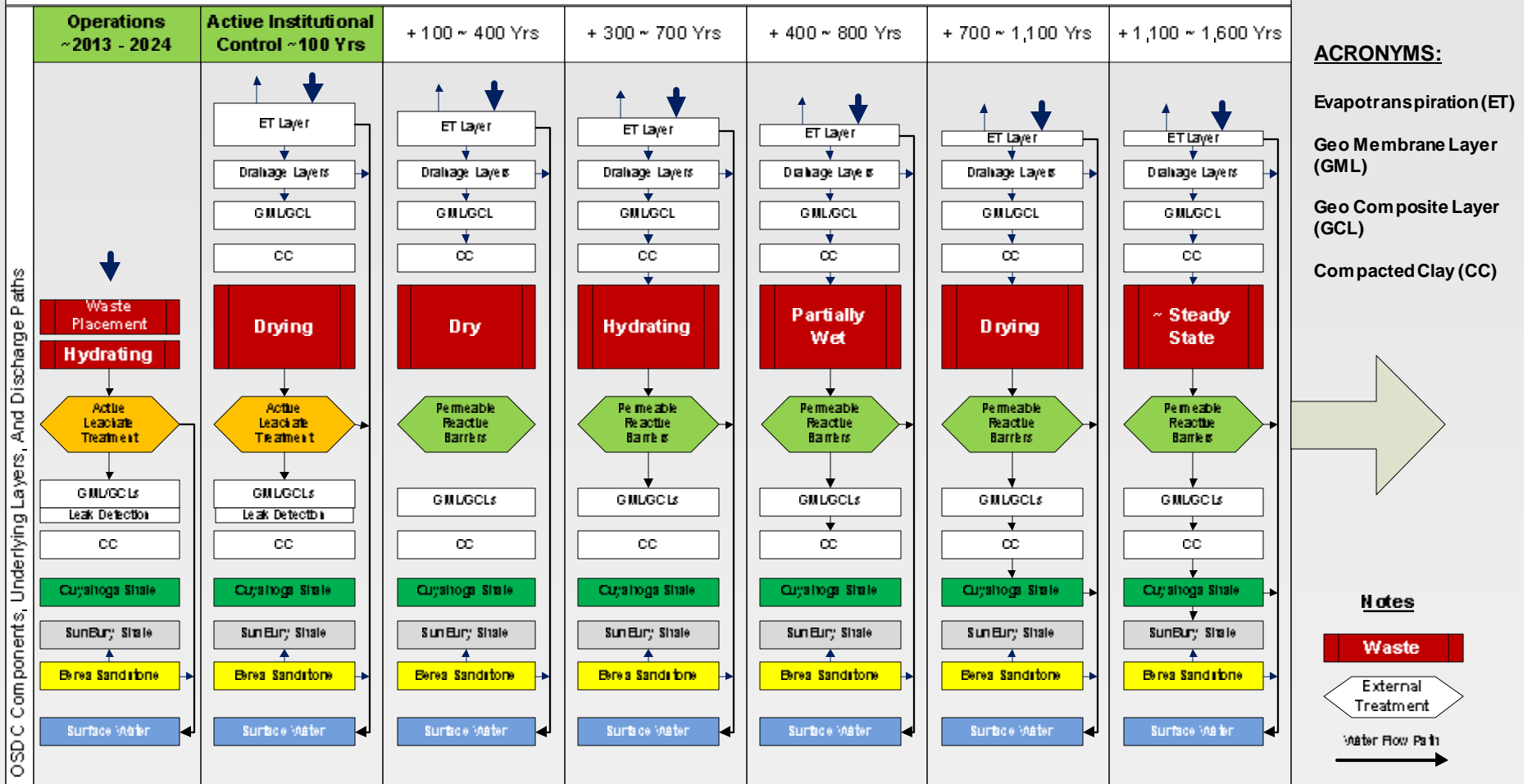


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On-Site Disposition

OSDC Conceptual Long-Term Performance Stages And Starting Times



Alternative 2

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On-Site Disposition

Alternative 2

- ▶ **Current estimates show that ~2.2 million cubic yards of demolition debris/remediation wastes will be generated during D&D/remediation of the Portsmouth Gaseous Diffusion Plant. For Alternative 2, this is projected to result in:**

- ▶ 157,000 trucks* (local and to the DOE's Nevada National Security Site) traveling 24 million miles.
- ▶ 260 rail cars* traveling 950,000 miles.

*With addition of "bulking factor" in equation



A visual display of the On-Site Disposal Cell alternative was available at the Department of Energy's quarterly public meeting held January 31, 2012, at nearby Waverly High School.

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Alternative Comparison

Data related to the 2 proposals have been determined based on current funding profiles. These are only projections; proposals are still subject to Ohio EPA review and are highly sensitive to changes in funding.

Proposal	Cost	Duration	Hours of Work	Volume
Alternative 1 Off-Site	\$1.62 Billion	18 years	2.0 million hours	100% off site
Alternative 2 Off-Site / On-Site	\$668 million	12 years	4.3 million hours	10% off site; 90% on site

- ▶ Roles of DOE and Ohio EPA
- ▶ SSAB consideration and recommendation
- ▶ Public comment period
- ▶ DOE, Ohio EPA decisions on path forward

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End Points

- ▶ Decisions for process building demolition, soil cleanup levels, and waste disposal have not been made.
- ▶ Excellent working relationship with SSAB and Ohio EPA.
- ▶ Ohio EPA supporting accelerated regulatory decision process.
- ▶ Formal public comment process will be this year.

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ASSET RECYCLE & REUSE

Presented by Dr. Vincent Adams
Portsmouth/Paducah Project Office
Site Director



Asset Recycle & Reuse

3,714 acre federal reservation – 1,200 acres within the 7-mile long perimeter road around the facilities

Building X-326
~½ mile long
30-acre roof
2,600,000 ft² of floor space

Building X-330
~½ mile long
33-acre roof
2,800,000 ft² of floor space

Building X-333
~¼ mile long
33-acre roof
2,824,640 ft² of floor space

3 process buildings, floor size about 200 football fields

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Asset Recycle & Reuse

Recycle Drivers

- ▶ Pollution Prevention Act of 1990
- ▶ Solid Waste Disposal Act
- ▶ Executive Order 13514
- ▶ Department of Energy Order 450.1A
- ▶ RCRA Orientation Manual
- ▶ FBP Contract Clause



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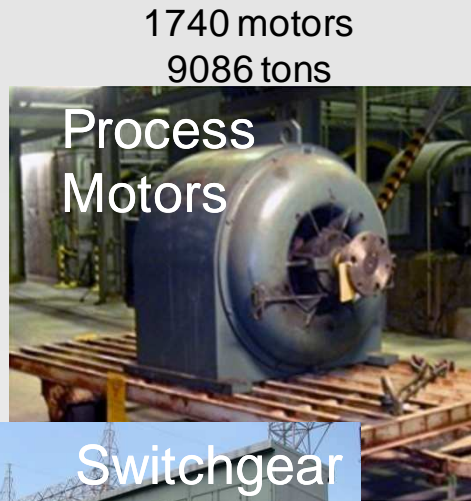


Asset Recycle & Reuse

Potential for
recycle?



Mixed steel,
copper, aluminum
2100 tons



1740 motors
9086 tons



Hundreds



190 miles
1800 tons

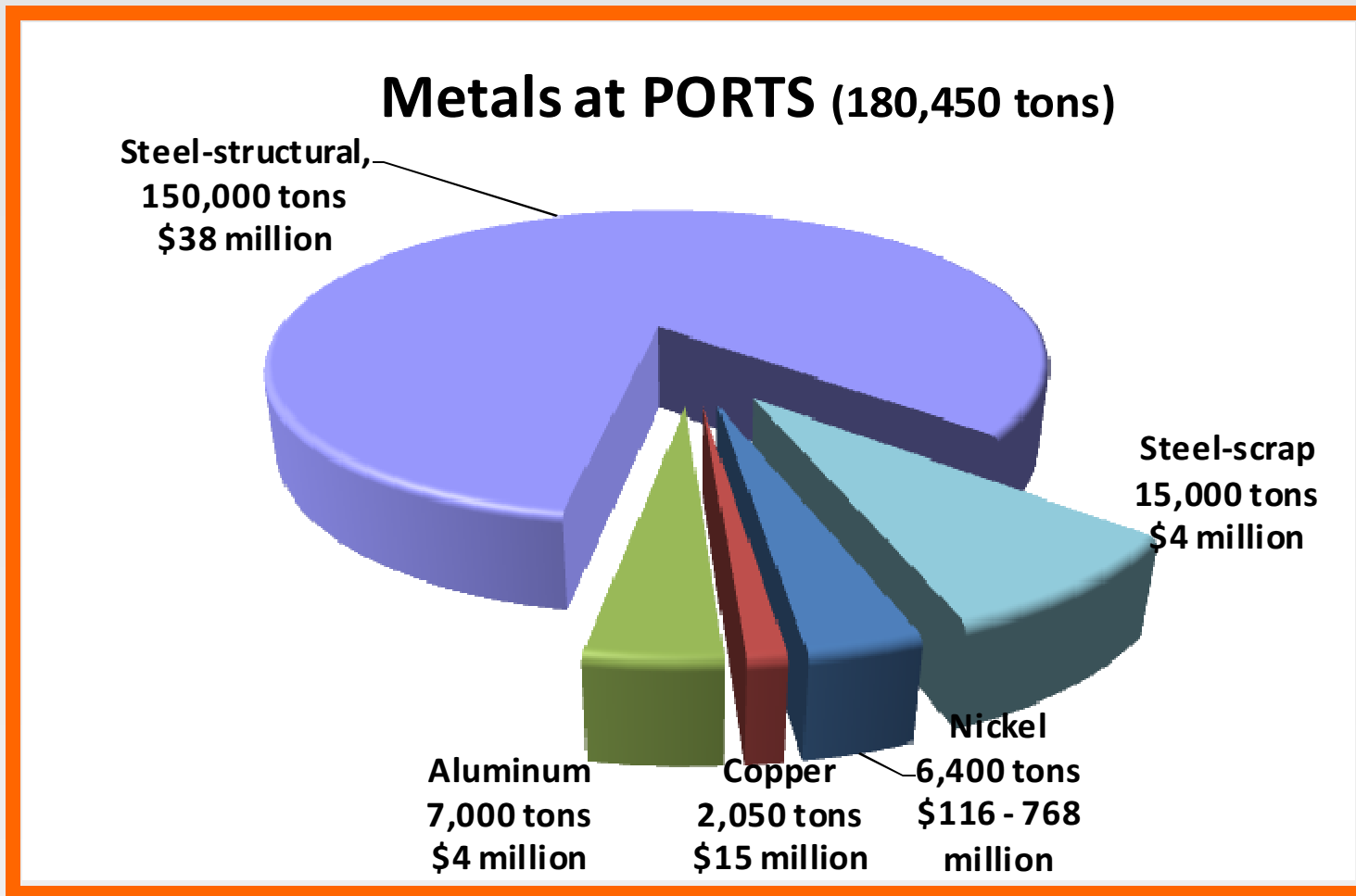
Potential
for reuse?



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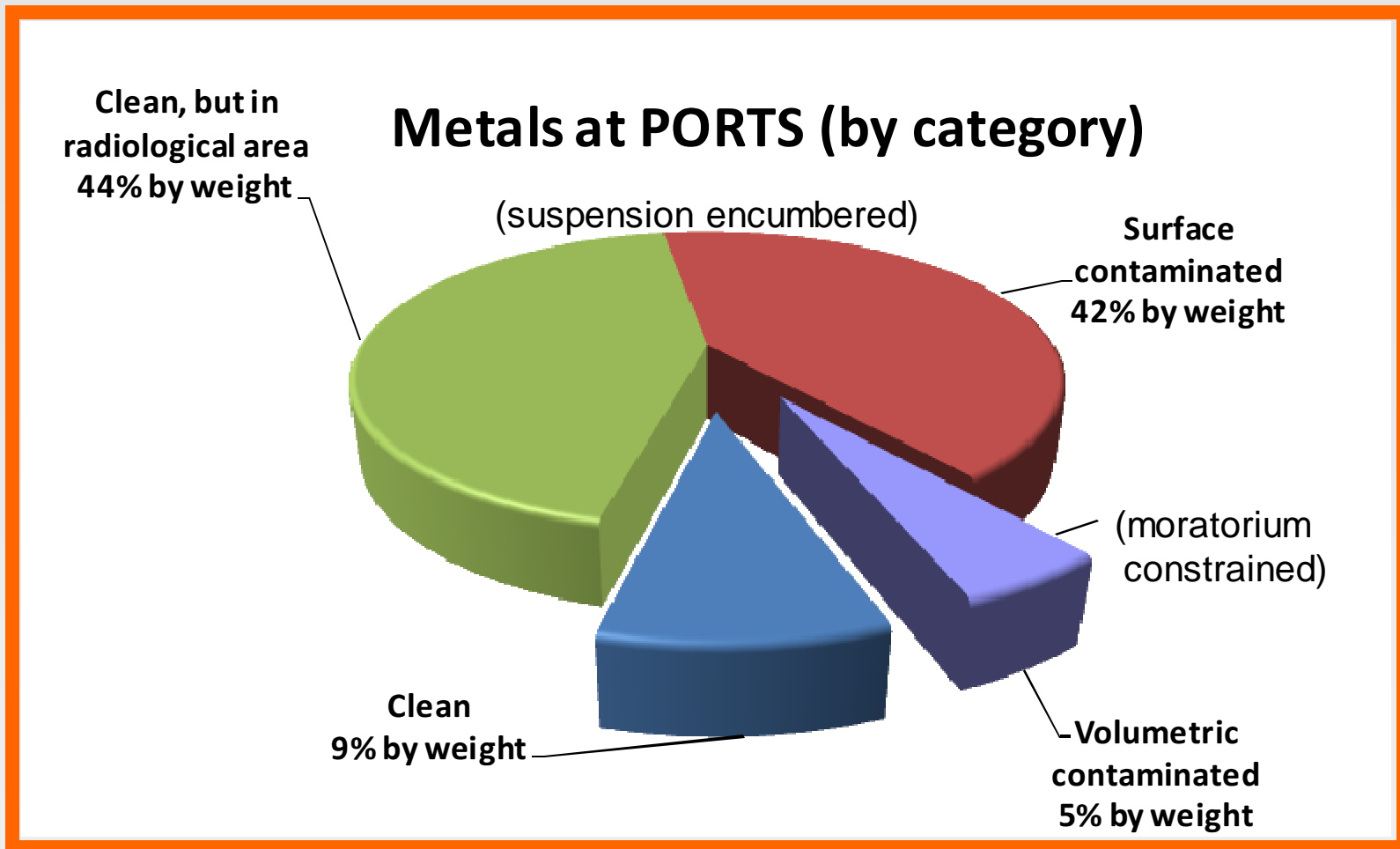
Asset Recycle & Reuse



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Asset Recycle & Reuse



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Asset Recycle & Reuse

CLEAN - SUCCESSES

Transformer Recycle

- ▶ Transferred 17 units to Southern Ohio Diversity Initiative (SODI)



Switchyard D&D Recycle/Reuse Success

- ▶ Recycled >7.8 million pounds of mixed steel, copper, and aluminum



Dollars for Community Development

Portsmouth



Asset Recycle & Reuse

CLEAN

Net Benefit/Regional Impact to Date

- ▶ Recycled through Community Reuse Organization
- ▶ Generated more than \$2 million for CRO
- ▶ Avoided ~ \$800,000 in waste disposal costs
- ▶ CRO \$150K grant to local Port Authority
 - ▶ **Leveraged to create 100 new jobs**
- ▶ CRO \$150K grant to local Water Commission
 - ▶ **Leveraged to expand drinking water supplies**

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Asset Recycle & Reuse

SUSPENSION

Policy for release of suspension encumbered metals

- ▶ DOE “Suspension Policy” issued July 13, 2000
- ▶ Allows recycle, once conditions satisfied
 - ▶ Release materials determined to be compliant with DOE Order 458.1 requirements
- ▶ HQ assessment of site release procedures/processes
 - ▶ Follow-up completed, corrective actions in progress
- ▶ Path forward will be determined after completion of Headquarters Programmatic Environmental Assessment

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Asset Recycle & Reuse

SUSPENSION

Challenges

- ▶ Facilities undergoing evaluation to determine status regarding suspension
 - ▶ Work efficiency, avoid repeat dress-outs
 - ▶ Determine extent and impact of historical operations
- ▶ Limited impact of operations to non-process auxiliary systems and building structures

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Asset Recycle & Reuse

MORATORIUM

DOE “Moratorium” Policy, Jan. & Feb. 2000

▶ NICKEL

- ▶ Volumetrically contaminated
- ▶ Classified
- ▶ Up to 30,300 tons (\$550M-\$3.6B)
 - ▶ **PORTS – 6,400 tons (\$116M-\$768M)**
 - ▶ ORO – 5,600 tons (\$102M-\$672M)
 - ▶ PAD – 18,300 tons (\$332M-\$2.2B)
- ▶ Less than 1% of annual global nickel market

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Asset Recycle & Reuse

MORATORIUM

Objective:

- ▶ **Solicit Commercial Purification Technologies:**
 - ▶ Clean or cleaner than commercial for ultra-pure applications
 - ▶ Clean to ALARA levels for other applications
 - ▶ (E.g., naval components; NRC/DOE waste containers; hybrid automobile batteries)
 - ▶ Safe, environmentally sound and cost effective

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Asset Recycle & Reuse

Comparison of Commercial Nickel vs. Decontaminated DOE Nickel

Radionuclide	commercial nickel		IAEA Release Limits	Lowest decon level reported		Ratio IAEA : decon	Ratio commercial : decon
²²⁸ Th	0.043	M	27	0.043	M	632 : 1	1.0 : 1
²³⁰ Th	0.1013	a	27	0.035	M	771 : 1	2.9 : 1
²³⁴ Th	1.000	M	27	1.00	M	27 : 1	1.0 : 1
²³⁴ U	0.9393	a	27	0.015	M	1,800 : 1	63 : 1
²³⁵ U	0.0396	a	27	0.015	M	1,849 : 1	2.7 : 1
²³⁸ U	0.0162	a	27	0.010	M	2,700 : 1	1.6 : 1
²³⁷ Np	0.0250	M	27	0.025	M	1,080 : 1	1.0 : 1
²³⁹ Pu/ ²⁴⁰ Pu	0.0250	M	2.7	0.025	M	108 : 1	1.0 : 1
²⁴¹ Pu	2.70	M	270	2.70	M	100 : 1	1.0 : 1
⁹⁹ Tc	2.920	M	27	2.92	M	9.25 : 1	1.0 : 1

a = actual

M = Minimum Detection Level

Isotropic Activity, pCi/g

Testing of limited quantity of GDP nickel

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Asset Recycle & Reuse

- ▶ **Very High Demand for Ultra Pure Nickel**
 - ▶ **Foam electrodes** - light weight, long life, high capacity batteries
 - ▶ **Nano powders** for fuel cells - reduce catalyst costs by 95%
 - ▶ **Nano fibers** for radio-frequency shielding for space, national defense uses
 - ▶ **Powders** for manufacture of high precision tools and dies
 - ▶ **Metallic coatings** for extended life of mechanical bearing and wear surfaces
 - ▶ **Corrosion resistant ceramic metal refractory (Cermets)**
 - ▶ **ITER contribution** of \$360M of low cobalt nickel to minimize activated cobalt issues for operations and disposal

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Asset Recycle & Reuse

- ▶ **Nickel Actions in progress**
 - ▶ Information Memorandum to Secretary for Path Forward
 - ▶ Expression of Interest (EOI) for Commercial Technology
 - ▶ Characterization of nickel in commerce
 - ▶ Complete Nickel Release Environmental Assessment

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Asset Recycle & Reuse

▶ Challenges

- ▶ Privatization of Purification & Marketing
- ▶ NRC/AEA Regulatory Jurisdiction
- ▶ Environmental Regulatory approach
- ▶ Overcome “drop & bury” mentality/D&D approach
- ▶ Retention of recycle revenue to reduce cost of D&D

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Q&A



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