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Exploring National and International Alternatives for D&D Planning at Portsmouth and Paducah

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Waste Management ’09

EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

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Portsmouth / Paducah Gaseous Diffusion Plants

- **Portsmouth Plant**
  - **History**
    - Built in 1952-1956 to enrich uranium for the nation's nuclear weapons program and later for commercial nuclear reactors
    - Production ceased 2001; currently in Cold Shutdown prior to future Decontamination & Decommissioning (D&D)
  - **Location**
    - South central Ohio, approximately 75 miles south of Columbus and 22 miles north of the Ohio River
  - **Acreage**
    - DOE reservation is 3,777 acres
  - **Other Missions**
    - DOE leases former centrifuge facilities onsite to USEC Inc. for deployment of American Centrifuge Plant

Portsmouth / Paducah Gaseous Diffusion Plants

- **Paducah Plant**
  - **History**
    - Site was originally known as Kentucky Ordinance Works – WWII munitions plant
    - 1950, site selected by AEC for construction of uranium enrichment plant
    - Operations began 1952
  - **Location**
    - Western Kentucky, 10 miles west of Paducah, KY
  - **Acreage**
    - DOE reservation is 3556 acres
  - **Other missions**
    - Gaseous diffusion plant still operated by the United States Enrichment Corporation (USEC)

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PPPO D&D Statistics

	Portsmouth	Paducah (Still in operation)
Number of buildings	134	419
Total Square footage	~10.6M More than 1.5 Pentagons	~8.6M Triple the US Capitol
Groundwater , Deferred units	5 groundwater plumes under treatment. 41Units to defer further investigation until plant D&D.	Deferred Units include remediation of the soils under and around the site buildings after D&D.
Other	Facility D&D is expected to generate more than 1.7M m^3 of waste.	D&D activities include S&M, and post-decision operations.

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Challenges Ahead

- Evaluating D&D waste disposition alternatives
- Assessing potential for recycling and reutilization of equipment, metals, concrete debris
- Determining future end use for the site
- Develop a cost effective strategy for the return of groundwater to beneficial use

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Previous US D&D Efforts

- Oak Ridge – East Tennessee Technology Park
  - Sister plant to Portsmouth and Paducah
  - Similar issues with waste disposal
  - Similar D&D regulatory environment
- Portsmouth Building X-770
  - Model for the larger process buildings on site
  - Serves as an example for D&D and waste disposition

Previous International D&D efforts

- Capenhurst GDP – UK
  - Smaller than US GDP's
  - Similar processes and hazards
  - D&D Completed 2008
- Pierrelatte GDP – France
  - Multiple large facilities in one location
  - Four separate processing facilities
  - D&D completed

Site D&D Similarities

- Pre D&D efforts
  - Conduct Ur deposit removal prior to D&D
    - Reduces criticality concerns
    - Reduces possible worker exposure
  - Processing of hazardous materials
    - PCB oils removed and incinerated
    - Freon removal and treatment

Site D&D Similarities

- D&D processes
  - Waste minimization
    - Volume / size reduction
    - Segregation of contaminated and non-contaminated
  - Decontamination processes
    - Mechanical
    - Chemical

Site D&D Differences

- Recycle of radiologically impacted metals
  - Capenhurst
    - UK established “free release” thresholds
    - Decontaminated and recycled 94% of metals
  - Pierrelatte
    - French regulations restricted recycle of materials that were ever exposed to radioactive contaminants
    - Recycle / reuse of materials was not a barometer of success

Site D&D Differences

- Recycle of radiologically impacted metals
  - January 2000 Moratorium
    - NRC has indefinitely deferred establishing limits
    - Doe policy on recycled metal remains in place
  - Portsmouth / Paducah
    - Large volume of metal from D&D could be recycled to meet IAEA exemption limits for commercial re-use

Common Lessons Learned

- Advantages of detailed early planning
  - Greatest opportunity for cost savings
  - Achieve stakeholder buy in
  - Improves communication with outside entities
    - Contractors
    - Labor
    - Waste disposal sites

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Common Lessons Learned

- Continuous monitoring of nuclear material
  - Early measurement and inventory of hold-ups
  - Pre D&D deposit removal
  - Monitor movement of Uranium inventory
  - Enhanced Criticality controls
  - Limit worker exposure
  - Opportunity to share Lessons Learned with international community

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Common Challenges

- Material and Waste disposition decisions
  - Can be single highest expense
  - Greatest source of delay
- Workforce management
  - Adapting for a different skill mix
  - Motivating workforce in a closure environment
- Future site use
  - Reindustrialization or preserve

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Sharing Lessons Learned

- Continue to employ successful past practices to meet challenges
- Share lessons learned from PPPO with international community through IAEA/IDM