



Preliminary Discussion of Lead Cascade Decommissioning and License Termination (SNM-7003)

U.S. Nuclear Regulatory Commission Headquarters
Rockville, MD

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AGENDA

I. Background

II. Decommissioning Activities

III. Decommissioning Issues

IV. Next Steps

I. Background

1. Licensing Basis
2. Operating History
3. Current Status

Licensing Basis

- Part 70 license as a “...laboratory scale facility designed and used for experimental and analytical purposes only” per 10 CFR 70.2, “Definitions” section
 - Up to 240 operating machines
 - Up to 250 kg UF₆
 - Up to 10 wt% U-235
 - Recycle cascade operation; enriched and depleted streams were refed
- License Application submitted February 2003
- License issued February 2004 (for 5-year period)
 - Initial expiration date February 2009

History and Status

- **Operating History**

- Operations actually began August 2006
 - 30-month “construction and testing period” recaptured
- License Renewal submitted May 2011 for 5-year period (ending Aug 2016)
- License will remain in “timely renewal” until license termination
- Completed DOE Test Program April 2014
 - Test program addressed technical issues raised during DOE Loan Guarantee review
- DOE funded Technology and Operations May 2014 to Sept 2015
- Centrus ceased operations February 2016

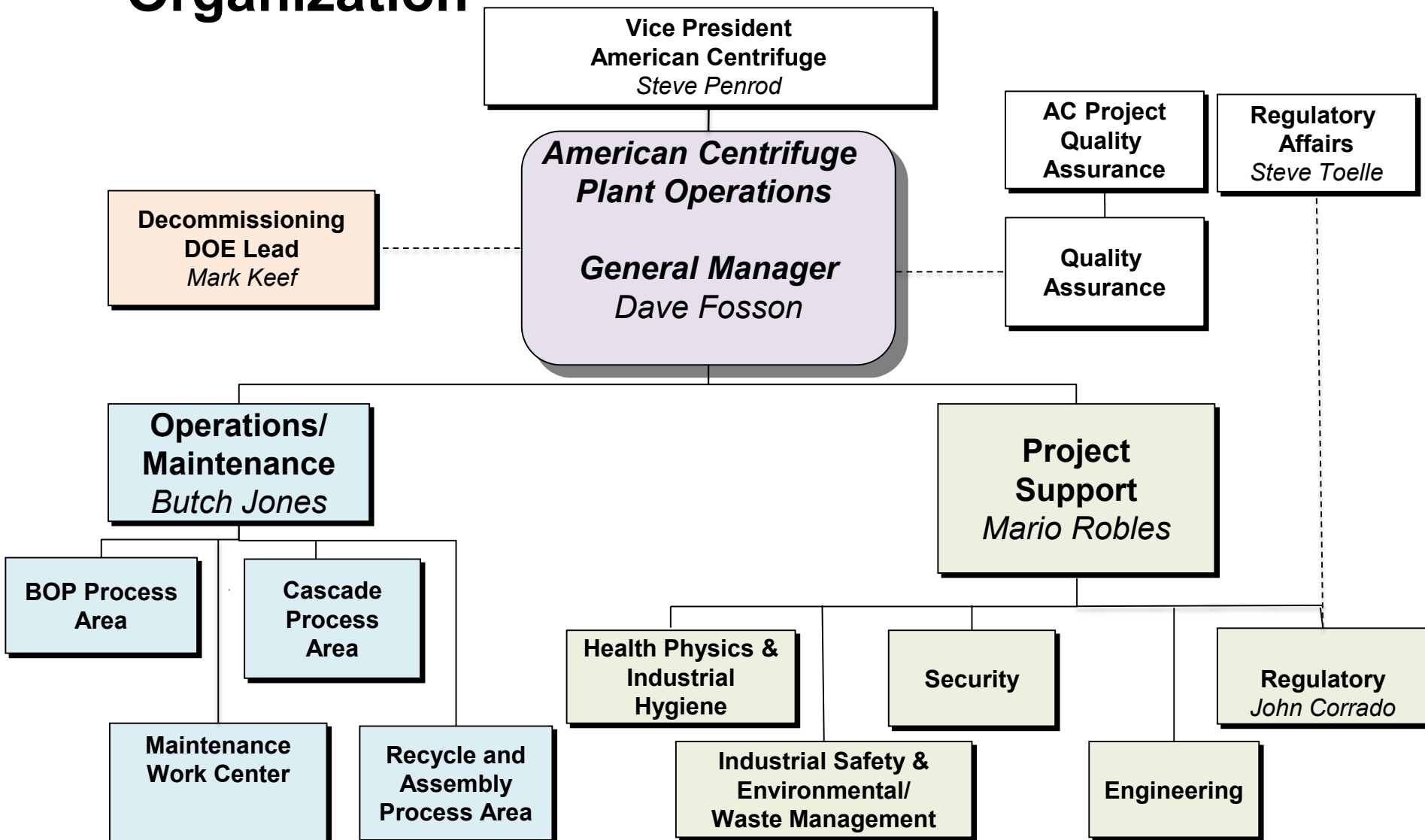
- **Current Status**

- Centrifuges de-inventoried and at rest
- Mass spectrometers shut down; no longer needed to monitor assay
- Inventory in process headers has been evacuated
- Feed cart shut down and disconnected

II. Decommissioning Activities

1. Organization
2. DOE Lease
3. Scope
4. Disposal Paths
5. Timeline
6. Nuclear Material Removal
7. Final Radiation Survey

Organization



DOE Lease

- Centrus retains DOE lease consistent with long-term vision to build an enrichment plant in Piketon
 - Evaluating mid-term options to use lease premises for activities bounded by the American Centrifuge Plant (ACP) license
 - In the short-term, Lead Cascade operations have ceased and pursuing license termination
- Some demonstration equipment is owned by DOE and leased to Centrus
- Per lease, Centrus prepares Disposition Plan for DOE property appropriate to sensitivity of the general category of property covered by the plan
- In addition, the lease requires that DOE approve a list of the leased property that will be dispositioned

Scope

UNCLASSIFIED

- DOE-owned (listed in Exhibit B of DOE Lease)
 - Primarily property salvaged from GCEP facilities for commercial plant
 - Requires DOE approval of Disposition Plan
- Centrus-owned
 - Primarily Commercial Plant inventory reduction unrelated to LC license termination
 - Security plan for ECI/UCNI plan approved by Centrus
 - Work scheduled to start mid-April 2016

CLASSIFIED (regardless of ownership)

- Centrifuges, service modules, and interconnected piping and components
 - Plan to dispose of equipment at an approved disposal site
 - Contracting for approved service provider
 - Requires DOE-approved Disposal Plan (to be submitted in July)

Disposal Paths

UNCLASSIFIED

- Surveyed for radiological contamination, segregated, volume reduction
- Disposal at off-site recycling facility or landfill for disposal
- Use current site programs

CLASSIFIED

- Similar to plan developed for GCEP facility cleanout in 2004
- Applicable 282 built centrifuges, 21 service modules, and associated piping/components
- Classified property will be cut/shred for volume reduction and waste stream sorted and packaged
- Casings will serve as shipping cask for centrifuge internals and other classified components
 - Openings will be welded shut
- Service modules cut to allow shipment via Sea-Land container (approximately 60), everything else will be loaded into approved containers
- Service agent will certify that waste meets acceptance criteria and DOT shipping requirements, and will transport packages to disposal site
- Contaminated waste will be low-level radioactive class A or B
- Mixed waste will be disposed of separately

Timeline

- Goal is to terminate license as soon as possible
- Key schedule drivers are DOE and NRC approval date assumptions

| 2016 | | | 2017 |
|---|--|---|---|
| 2 nd Quarter | 3 rd Quarter | 4 th Quarter | 1 st Quarter |
| <ul style="list-style-type: none"> • DOE approves UNCLASSIFIED Disposition Plan • DOE approves disposition of Exhibit B material • Transfer spare AC100s to Oak Ridge • Submit Decommissioning Plan • Commence disposal of Centrus- / DOE-owned UNCLASSIFIED/ uncontaminated material • Prepare plant systems for dismantling | <ul style="list-style-type: none"> • Submit CLASSIFIED Disposition Plan • DOE approves CLASSIFIED Disposition Plan • DOE approves use of disposal path • NRC approves Decommissioning Plan • DOE approves packaging plan • Finalize engineering packages for equipment removal | <ul style="list-style-type: none"> • Remove equipment and package • Commence shipment of material | <ul style="list-style-type: none"> • Complete shipment of material • Perform Final Radiation Survey and submit to NRC • Complete sanitization of CLASSIFIED areas and submit Certification of Non-Possession of Classified Holdings • Submit request to terminate license • NRC approves Final Radiation Survey • NRC terminates Lead Cascade license |

- Nuclear material removal date TBD

Centrus items in **BLACK**
DOE items in **BLUE**
NRC items in **RED**

Nuclear Material Removal

- UF_6 inventory has been transferred into 12B cylinders in accordance with inventory removal procedures
 - 37 12B cylinders in our possession
 - Currently consolidating the UF_6 into one cylinder that should have ~120 kgU
 - Other 36 cylinders will be heeled out to < .3 kgU (approximately 1 pound UF_6)
- On April 5, 2016, submitted a request to PORTS DOE contractor to accept up to 37 cylinders and are awaiting response

Final Radiation Survey

- Centrus will ensure contamination levels are equal to or less than levels reported in the 2004 Baseline Survey
 - Prior to leasing GCEP facilities, a baseline survey was performed
 - Basis of 2004 Baseline Survey was to ensure facility met the limits stated in 10 CFR 835 Appendix D
- Utilize Ludlum Model 2224-1 Alpha-beta Scaler Ratemeter equipped with a 100-cm² alpha beta scintillation probe to determine contamination levels
 - 1 m² areas will be scanned and multiple stationary readings taken in the area if elevated levels detected
- Removable contamination samples will be analyzed using a Tennelec LB5100
- DCGL – evaluating DandD software since screening values for uranium not listed in NUREG-1757

2015 Scoping Survey Results

- 2015 results consistent with 2004 Baseline Survey results
- Removable contamination levels < 20 dpm/100 cm²
- Two small areas (<100 ft²) with fixed contamination levels >500 dpm/100 cm² (Other areas may exist after equipment removal)
- Average contamination levels: α 29 dpm/100 cm² and β 597 dpm/100 cm²

| 2015 Baseline Verification Summary | | | | | | | |
|------------------------------------|--|------------------------------|------|------|-------------------------------|------|------|
| Surv. Unit | Area | Beta dpm/100 cm ² | | | Alpha dpm/100 cm ² | | |
| | | Ave. | 1 SD | Max | Ave. | 1 SD | Max |
| 1 | X-7725 BSA | 362 | 186 | 700 | -3 | 18 | 33 |
| | X-3001 Xfr Cor | 553 | 203 | 891 | 46 | 40 | 121 |
| | X-3012 Maintenance | 569 | 113 | 745 | -4 | 19 | 44 |
| | X-7727H | 543 | 169 | 800 | 115 | 69 | 241 |
| | Total for Survey 1 | 477 | 192 | 891 | 25 | 57 | 241 |
| 2 | X-7726 (CTTF) | 194 | 667 | 1781 | -1 | 24 | 33 |
| 3 | X-3001 N Mezzanine | 718 | 178 | 1136 | 39 | 25 | 103 |
| 4 | X-3001 Train 3 | 650 | 191 | 1101 | 17 | 28 | 88 |
| 5 | X-3001 N Utility Bay | 643 | 411 | 2711 | 75 | 314 | 1729 |
| 6 | Lead Cascade Equipment/Components | -469 | 579 | 3881 | 27 | 34 | 141 |
| | Concrete Floors (all areas) | 597 | 274 | 2711 | 29 | 125 | 1729 |
| | All removable contamination samples < MDA | | | | | | |
| | Survey 1 areas chosen based on contamination potential | | | | | | |

| 2004 Baseline Survey Summary | | | | | | |
|--|------------------------------|------|------|-------------------------------|------|-----|
| Area | Beta dpm/100 cm ² | | | Alpha dpm/100 cm ² | | |
| | Ave. | 1 SD | Max | Ave. | 1 SD | Max |
| X-3001 Trains 1-2 | 411 | 147 | 696 | 45 | 22 | 99 |
| X-3001 Train 3 | 293 | 197 | 1059 | 70 | 25 | 128 |
| X-3001 Train 4 | 148 | 162 | 527 | 38 | 28 | 103 |
| X-3001 Xfr Cor | 206 | 128 | 504 | 20 | 15 | 42 |
| X-3001 N Utility Bay and Mezzanine | 421 | 172 | 778 | 26 | 18 | 72 |
| X-7726 (CTTF)* | 755 | 604 | 1721 | 64 | 45 | 198 |
| X-7727H | 632 | 181 | 1073 | 38 | 18 | 73 |
| x-7725 BSA | 1008 | 214 | 1603 | 59 | 59 | 178 |
| X-3012 Maintenance ** | 1009 | 309 | 1535 | 81 | 30 | 141 |
| Reference Point X-3012 Corridor | 1017 | 144 | 1367 | 71 | 26 | 115 |
| Reference Point surveyed daily during span of survey to evaluate data collection consistency | | | | | | |
| * 2 Data points removed: floor drains and ceramic tiles | | | | | | |
| ** 5 Data points removed; ceramic tiles in Change Rooms | | | | | | |
| All removable contamination samples < MDA | | | | | | |

III. Decommissioning Issues

1. Nuclear Material Control & Accounting
2. Fee Re-categorization and Reduction
3. Decommissioning Plan
4. Calibration Sources Controlled Under ACP License

Nuclear Material Control and Accounting

- Possession limit of 250 kg UF₆ corresponds to 169 kgU
- Balance of receipt and shipment is 140 kgU
 - Last physical inventory measured 84 kgU
 - Depleted (Near normal) 76 kgU
 - Normal 6 kgU
- Approximately 56 kgU inventory difference
 - Balance is “holdup” throughout centrifuge and process equipment
- During transfer of nuclear material, Centrus plans to divide holdup “evenly” over total shipments for NMC&A accounting
 - Non-Destructive Assay uncertainty is too large for accurate accounting

Fee Re-categorization and Reduction

- Centrus notes that NRC approved a downgrade of the fee category for the Paducah Gaseous Diffusion Plant when it removed enrichment from the “Authorized Uses”
 - Moved from Uranium Enrichment to Limited Operations fee category
- Similarly, Centrus plans to request removal of enrichment from the “Authorized Uses” for the Lead Cascade and a re-categorization and fee reduction
 - Move from Gas Centrifuge Enrichment Demonstration to Limited Operations fee category
 - Reduction in \$1.64 million per year (charged quarterly)
- Centrus would continue to be charged separately for review and inspection hours

Decommissioning Plan

- The Decommissioning Plan will request NRC approval of the conditions acceptable for license termination
- Centrus will perform decommissioning activities using existing approved NRC license processes, that includes determining whether prior NRC approval is required before implementation of any new procedures per Condition 16 of license
- Centrus will submit a Decommissioning Plan that addresses NRC letter (TAC L34282) dated September 8, 2014
 - “Derived concentration guidelines, disposition of contaminants from decommissioning activities, confirmatory surveys, future use of the site (unrestricted/restricted)”... [so that there is]... enough information for a reviewer to evaluate the acceptance criteria in NUREG-1757, Chapter 6 on radiological criteria for decommissioning.”

Radioactive Calibration Sources

- In 2011, NRC approved a request to utilize the ACP License for possession and use of radioactive calibration sources and byproduct material calibration sources needed to support LC operations
- These sources were previously held by USEC at the GDPs
- At the time of approval, NRC stated that these do not require financial assurance
- Current plan is to either return the sources to DOE or add to waste stream after the final radiation survey

IV. Next Steps

- DOE Approvals
 - Approval of Disposition Plan
 - Approval of disposition list of DOE-owned equipment
- Decommissioning Plan documentation
 - Submittal 2nd Quarter 2016
 - Request approval of conditions acceptable for license termination
- Regulator Oversight and Inspection
 - Recommend bi-weekly communication updates with NRC HQ, NRC Region, and DOE