Seismic Upgrades Status Update

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UNCLASSIFIED
RANT Safety Basis - Outline

- Background

- Current condition of Radioassay and Nondestructive Test Facility (RANT)

- Options for moving forward
Shipping – RANT Facility

RANT Facility

- TRUPact II loading capability
- Redundant cranes for reliability
- TRUPact III loading capability can be added
- Facility operations paused due to seismic vulnerability with the RANT Building. RANT remains in COLD STANDBY pending seismic upgrade.
- Mobile loading outside the RANT Building on the RANT Site is allowed in the RANT Safety Basis

RANT Facility, TA-54

February 23, 2017
Background

- DNFSB issued letter to Administrator Klotz that identified issues related to the RANT Safety Basis – December 9, 2014

- LANS declares a PISA based on information brought forward indicating incorrect assumptions for the BIO/DSA from the seismic analysis – December 17, 2014
  - Although the facility is credited to withstand a PC-2 event, the existing analysis shows that it will not survive a PC-1 event.
  - Annual Probability of Unacceptable Performance for the RANT structure is in the range of 9.6x10^{-4} to 1.3x10^{-3}
    - BIO assumed range was acceptable for an existing PC2 structure with a performance goal of 1x10^{-3}
    - DOE STD 1020 allows for evaluation of existing SSCs at twice the hazard frequency.
    - Calculations show that evaluation of loads to the RANT structure at twice the hazard frequency exceed structure capacity.

- NA-LA rescinded the SER which approved the 2013 RANT DSA and TSRs on December 19, 2014

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RANT Current Condition

- Facility in COLD STANDBY (No nuclear material in the facility)

- Current Safety Basis is 2012 BIO and TSRs, adequate for operations under COLD STANDBY

- RANT ESS-15-001-R0 PISA – Incorrect Assumption for RANT BIO Seismic Analysis
  - Operational Restriction put RANT in Cold Standby.

- RANT has been Identified as an Enduring Facility, but no Immediate Need for Shipments
  - No need to execute shipments until WIPP re-opens.
  - Emergent shipping needs can be met with Mobile Loader at TA-55

February 23, 2017
Current:

- **Seismic upgrades – add drilled piers, shear walls, and reinforce roof structure**
  - Design for seismic upgrade completed in 2006 is being updated to current codes and seismic hazard.
  - Current point cost estimate for work is slightly less than a line item estimate
    - Cost estimate will be finalized with 100% design (estimated March 2017)
  - Construction duration (award to closeout) less than 1 year
  - Determined not to be a Major Modification under safety basis requirements
  - Design has been funded to completion in FY17.
  - Funding for construction is dependent upon if the estimate remains in the range of GPP or increases to Line Item (LI)

- **Revise DSA to DOE-STD-3009-2014 to incorporate facility modifications**
RANT 2006 Seismic Upgrade Design Status

- **Loads have increased significantly:**
  - Ground acceleration motion has increased by 50%.
  - Code required redundancy factors have resulted in an additional increase of 40%

- **Load changes have impacted all elements of the design:**
  - Sizes and reinforcement of concrete collector elements at the perimeter of the roof - relatively minor.
  - Size and reinforcement of the concrete shear walls and grade beams - significant impact but not much can be done to minimize.
  - Change to structural upgrade of roof from concrete reinforcement to a Carbon Fiber Reinforced Polymer
  - Size and number of concrete piers that are the foundation of the upgrade - significant impact. Geotechnical firm has been engaged to drill boreholes and collect samples to solidify pier design inputs
    - Field work completed in December 2016
    - Preliminary data & report expected in February 2017
    - Final report expected in March 2017
The diaphragm design has changed to take advantage of our knowledge gained with Carbon Fiber Reinforced Polymer (CFRP) use at PF4.

- CFRP has replaced the light weight concrete diaphragm that the 2006 design used
- CFRP is much lighter in weight and provides the needed strength required to resist the increased seismic load.

90% design is to be released in March but dependent on geotechnical findings and recommendations.
Reinforced concrete collector ~ Typical at perimeter of the roof

Reinforced concrete shear wall ~ Typical on four sides

Carbon Fiber Reinforced Polymer overlay on roof

Reinforced concrete collector ~ Typical at perimeter of the roof

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RANT Seismic Upgrade – Typical Wall Elevation

Existing construction:
- Precast concrete wall panels
- Reinforced concrete grade beam
- Reinforced concrete caissons

Proposed reinforced concrete drilled caisson

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• Design is progressing, nearing completion

• Next key dates
  • Completion of Geo Tech evaluation
  • Preliminary evaluation expected within a week
  • Final report expected end of March
  • Finalize foundation design end of March
  • Cost estimate finalization following Geo Tech estimate
  • Execution strategy decision

• Next update proposed May 2017