

Generator Assistance Services NASA Plum Brook Facility (Cadmium Control Rods)



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Nevada Test Site (NTS) Generator Workshop
April 22, 2008



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Topics

- History
- Cadmium (Cd) control rod waste stream
- U.S. Department of Energy (DOE) eligibility determination
- Profile and treatment approach to meet Nevada Test Site Waste Acceptance Criteria (NTSWAC)
- Verification/certification
- Conclusion



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History

- NASA operated research reactor until 1973
- Mission was for testing materials suitable for use in air and space nuclear propulsion
- Majority of the waste stream from the decontamination and decommissioning (D&D) of reactor was sent to Barnwell, SC and Clive, UT
- Cd control rods were not suitable for disposal at either Barnwell or Clive due to Nuclear Regulatory Commission radioactive waste classification
- NASA's D&D contractor at the time requested a variance from South Carolina Department of Health and Environmental Control to dispose at Barnwell - denied



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Cd Control Rod Waste Stream

- In 2004, after 31 years of decay, Cd control rods had dose rates up to 8 Sieverts per hour (Sv/hr)
- Rods employed a riveted design where outer stainless steel plates surrounded a Cd plate
- Toxicity Characteristic Leaching Procedure (TCLP) results nearly 1,000 times the reporting limit of 250 micrograms per liter ($\mu\text{g/L}$)
- Rods stored in high integrity container (HIC) which was stored inside a Dufrane secure environmental container (SEC)



DOE Eligibility Determination

- Current cleanup contractor, MOTA, subcontracted with WMG, who worked with its subcontractor, Visionary Solutions, to determine that this waste stream was eligible for disposal at NTS
- Eligibility determination took considerable time
 - Nevada Site Office was instrumental in obtaining State of Nevada Division of Environmental Protection concurrence that a DOE nexus existed
- Eligibility granted since waste was generated from a reactor licensed by DOE's predecessor, the Atomic Energy Commission (AEC), and involved materials testing in support of AEC/DOE research



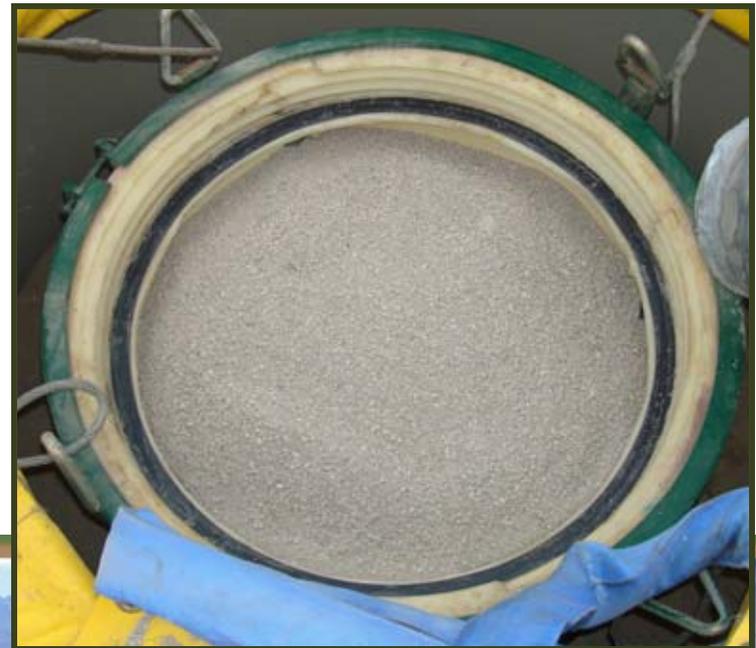
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Profile and Treatment Approach to Meet NTSWAC

- Visionary Solutions obtained support from LATA/Parallax to submit original profile
- Profile identified the HIC with the proper sealing of the vent holes as appropriate macroencapsulation per 40 CFR 268.45
- HIC was placed in a stainless steel (SS) liner to satisfy strength requirement and void space filled both inside the HIC and SS liner
- 14-212 Type A cask was used for shipment to the NTS



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Verification/Certification



- Visionary Solutions requested NSTec to perform final certification
- NSTec submitted profile and pre-treatment notification and obtained approval
- NSTec deployed Waste Generator Services staff and a Waste Certification Official to assist with the final packaging and perform waste certification
 - Radioactive Waste Acceptance Program personnel were present to perform mixed low-level waste verification



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Generator Site to NTS



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Conclusion

- As Low As Reasonably Achievable (ALARA) practices were implemented – exposure was much less than anticipated
- Successful project with support from NASA, MOTA, WMG, Visionary Solutions, LATA/Parallax, the Nevada Site Office and NSTec
- Project demonstrates the success of a waste generator “piggy-backing” on another generator’s NTS-approved program to achieve disposal



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