
BWXT Y-12 Waste Management

**Lessons Learned Lessons Learned
Concerning**

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AWCO for B & W Y-12



BWXT Y-12 Waste Management Lessons Learned

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BWXT Y-12 Waste Management Lessons Learned

Waste/Material Generation Activities at Y-12

- Nuclear Manufacturing - includes Depleted and Enriched Uranium Operations; Special Materials Operations; and the Assembly, Disassembly, and Storage Operations, all in support of the nation's nuclear stockpile.
- Directed Stockpile Work - includes dismantlement and disposition of retired weapons, design and certification of transportation containers for weapon components and manufacture of components used across Nuclear Weapons Complex for testing and evaluation.
- Infrastructure Reduction – modernization of the Y-12 Security Complex through extensive reuse of existing facilities, construction of necessary new facilities, and removal of infrastructure not required to accomplish missions.
- Unneeded Materials & Chemicals (UMC) Project – Disposition of chemicals and materials that have no designated future use.

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Discovery

- Nondestructive Analysis (NDA) detected larger than expected activities of CS-137 in ST-90 boxes containing waste associated with Enriched Uranium Operations (EUO).
- Waste management personnel trying to determine cause of unexpected condition were made aware that a material not evaluated when characterizing this waste stream had been introduced into the uranium recovery process.
- Based on the finding above, it was suspected that some part of the process generating the waste may have not been evaluated, raising questions concerning current characterization of the waste.

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The Culprit

- Further investigation revealed that highly enriched uranium components from the Super Kukla Prompt Burst Reactor operated at the Nevada Test Site had been introduced into EUO processes.
- The Super Kukla Prompt Burst Reactor operated at the Nevada Test Site from 1964 to 1978. The reactor was used for neutron irradiation of test specimens, including material used in weapons.
- The reactor configuration included rods, disks and rings made of a uranium alloy.

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The Issue

- The NTS waste profile for EUO process waste considered a number of highly enriched uranium (HEU) material types but not Super Kukla components.
- The isotopes associated with these forms considered highly conservative assumptions which resulted in a definitive nuclide distribution that was validated.
- NDA results (discussed previously) from waste affected by the introduction of Super Kukla into the EUO process for uranium recovery invalidated the nuclide distribution established in the NTS waste profile.

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The Issue (continued)

- Metal boxes (ST-90s) of EUO waste undergo NDA at a facility designed for NDA and pack and ship operations where the NDA instrument is capable of only measuring boxes and is calibrated to report Cs-137.
- Drums of EUO waste undergo NDA at the EUO material processing facility and the NDA instrument does not report Cs-137. Nuclide distribution is scaled from the measured uranium content at the EUO processing facility used for Nuclear Materials Control and Management (NMC&A).

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The Issue (continued)

- Because radiological data from NDA of drums was limited to U-235 and nuclides were scaled based on the original evaluation of the waste stream that did not identify Cs-137 as a nuclide of concern, drums that may have included reportable quantities of Cs-137 were shipped to NTS. Radiological data from NDA of boxes actually reported Cs-137 and were deemed outside profile limits and segregated with a QA Hold Tag.
- Waste packages may have been disposed at the Nevada Test Site that contained Cs-137 as a reportable nuclide that was not identified on the PSDR.

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Cause

- The characterization of the waste stream generated by EUO (prior to introduction of Super Kukla) did not consider Cs-137 as a nuclide of concern because the materials processed did not have a Cs-137 activity high enough for reporting in the profile or package storage and disposal request (PSDR).
- Waste management was not informed of plans to include Super Kukla in the uranium recovery process and the impact on the waste stream was not evaluated.

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Cause

- Had the effects of introducing Super Kukla into the waste stream been evaluated, NTS waste profiles would have been revised to address changes to the waste stream resulting from the introduction of Super Kukla material to the waste generating process.

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Immediate Actions

- Suspended shipments of EUO waste to Nevada Test Site.
- Assigned conservative Cs-137 values to ensure Y-12 waste storage facility safety limits were not being approached.
- Tagged out and segregated boxes of waste with greater than anticipated Cs-137 activity.
- Initiated a Nonconformance Report (NCR) documenting the issue.
- Informed NTS of the issue.

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Actions

- Obtain the data needed to re-characterize Enriched Uranium Operations waste streams affected by processing of Super Kukla material.
- Revised original NTS waste profile to address Super Kukla process waste based on new data.
- Submit revised Package and Storage Disposal Requests (PSDRs) for the affected waste packages disposed at the NTS
- Establish a standing monthly meeting between the Enriched Uranium Operations process managers, work for others project managers and the Waste Management Department to review planned projects/initiatives.

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Actions (continued)

Conduct training sessions with Enriched Uranium Operations process managers and work for others project managers to reinforce the need to notify the waste management department when there are plans for process changes or when events have occurred that may affect the process.