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LANL Nonmixed Waste Streams

TA-55-43 and TA-55-45

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Introduction

LANL has been able to identify nonmixed waste streams for shipment to WIPP. The characterization process used to determine that this waste is nonmixed and to certify the waste for disposal at WIPP is described in this presentation.

Why did LANL choose these waste streams?

- They were generated from an extremely simple, well contained, well characterized process.
- The waste was listed on the waste storage database records as being nonmixed.
- The waste was not listed in the LANL STP.

Acceptable Knowledge on the waste generation process was:

- Compiled according to WIPP requirements using procedures already audited and certified by CAO.
- Documented in detail in an "AK Summary Report", record TWCP-1042.
- Supported by records that were copied and placed in the TWCP records center.

Acceptable Knowledge on these waste streams includes:

- Generating process descriptions and flow diagrams
- Analysis results (trace element and isotopic) for all input material to the process
- Analysis results for process intermediates

Acceptable Knowledge on these waste streams includes (con't):

- Generator documentation of waste materials placed in each waste drum
- Signed generator statements that the wastes are nonmixed

What is the waste generation process?

- Fabrication of "heat sources" for use in nuclear warheads and for space program applications
- Requires strict quality control, especially for impurities, due to the use of the final products
- Uses Pu-238, meaning fabrication activities are physically separated from other processes

What is the waste generation process (con't)?

- Uses Pu-238 oxide material as-received from SRS, after impurity analysis
- Includes NO chemical separations - just heat source assembly
- Includes initial and intermediate high temperature treatments (775C-1600C), so that organic impurities, if present, would be destroyed

What does AK tell us?

- Chemical analysis of input materials shows that chromium is present in the Pu-238 oxide feed above toxicity characteristic regulatory levels
- However, economic discard limits for Pu-238 are so low that the discarded waste materials contain Cr levels below the regulatory threshold

What does AK tell us ? (con't)

- Chemical analysis of intermediate process material shows no significant impurities are introduced during fabrication
- No organic chemicals or solvents of any type were used in the process

What do generator records tell us?

- List material type and weight of each waste item that went into each waste drum
- List the process code for the process step that generated each waste item
- List radioassay results for each item in each waste drum
- Include generator assessments of the RCRA-regulatory status of the waste

Further characterization is required by WIPP

- Radiography to confirm drum contents
- Visual examination to QA radiography
- Headspace gas analysis for VOCs, hydrogen, and methane
- Radioassay and gamma spectroscopy to confirm radionuclide content

Headspace Gas Analysis Results

- Meet WIPP requirements for acceptance of the waste as nonmixed
- Show minor amounts of acetone and trace amounts of other organic compounds in the headspace gas

Headspace Gas Analysis Results (Con't)

- We know that acetone is not allowed in gloveboxes at TA-55 because it poses a fire hazard - this is particularly true for areas handling Pu-238
- Literature references indicate that many organic compounds, particularly acetone, are formed from radiolysis of waste materials

Waste must be repackaged to meet the TRAMPAC

- Pu-238 has a very high thermal wattage
- Waste items must be separated, placed into SWBs, and confinement layers punctured to meet shipping requirements

Summary

- LANL has chosen waste generated from a very simple, well characterized process
- AK for the process shows that the waste is nonmixed
- Waste is being repackaged to meet transportation requirements
- Minor amounts of organic compounds detected in the headspace gas are believed to be produced by radiolysis of the waste materials