Transportation Safety Excellence in Operations Through Improved Transportation Safety Document

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Inter-Facility Transportation at the Materials and Fuels Complex

Proper Transfer of >HC 3 Waste at MFC is a Concern to Nuclear Facility Personnel

- DOE-STD-1027-92
- Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.

DOE-STD-1027-92

Defines:

- Nuclear facilities required to have SARs
- SAR implementation plan and schedule
- **The hazard categorization methodology to be applied to all facilities**
- Accident analysis techniques appropriate for the graded approach in DOE Order 5480.23
- The hazard categorization methodology to be applied to all facilities (to all shipments)

Example Summation

[Inventory of isotope A/HC-3 threshold of isotope A] + [inventory of isotope B/HC-3 threshold of isotope B] + [inventory of isotope N /HC-3 threshold of isotope N]

= > 1

Radionuclides	Ci Present in Shipment	HC-3 Threshold (Ci)	Fraction of HC-3 Threshold
H3	6.84E-06	1.60E+04	4.28E-10
Co58	1.29E-05	9.00E+02	1.43E-08
Co60	5.65E-04	2.80E+02	2.02E-06
Mn54	9.37E-03	8.80E+02	1.06E-05
Sb125	7.29E-05	1.20E+03	6.08E-08
Cs134	7.88E-05	4.20E+01	1.88E-06
Cs137	9.62E-04	6.00E+01	1.60E-05
Eu154	8.88E-06	2.00E+02	4.44E-08
Eu155	6.50E-05	9.40E+02	6.91E-08
Sr90	6.99E-04	1.60E+01	4.37E-05
Y90	6.99E-04	1.42E+03	4.92E-07
Pu239	9.61E-02	5.20E-01	1.85E-01
U235	7.34E-08	4.20E+00	1.75E-08
U238	1.69E-10	4.20E+00	4.02E-11
Am241	6.00E-01	5.20E-01	1.15E+00
Pu238	2.81E-03	6.20E-01	4.53E-03
Pu241	2.37E-01	3.20E+01	7.41E-03
Pu240	2.24E-02	5.20E-01	4.31E-02
	9.709E-01		***1.394E+00***


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Applicable Regulations

- 10 (Energy) CFR 830 (DOE) Subpart B Table 2 to Appendix B and
- 49 (Transportation) CFR 173 (Shippers general requirements for shipments and packaging, radioactive material) Part 415 (Type A) and 416 (Type B)

10 CFR 830 Subpart B Table 2 to Appendix A

(Item number 9) Transportation activities

- Preparing a Safety Analysis Report for Packaging in accordance with DOE-O–460.1B, Packaging and Transportation Safety, October 2, 1996, or successor document
- Preparing a Transportation Safety Document in accordance with DOE-G–460.1–1, Implementation Guide for Use with DOE O 460.1B

49 CFR 173.415 (Type A)

- Type A Containers were used at MFC for transuranic waste to meet the Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria (WAC), but drums carrying >HC-3 quantities of waste were not included in the MFC TSD.
- MFC needed to revise the TSD to add >HC-3 quantities of waste for inter-facility transfers.

Type A drums are used for WIPP WAC and exceed DOT fissile Type A limits

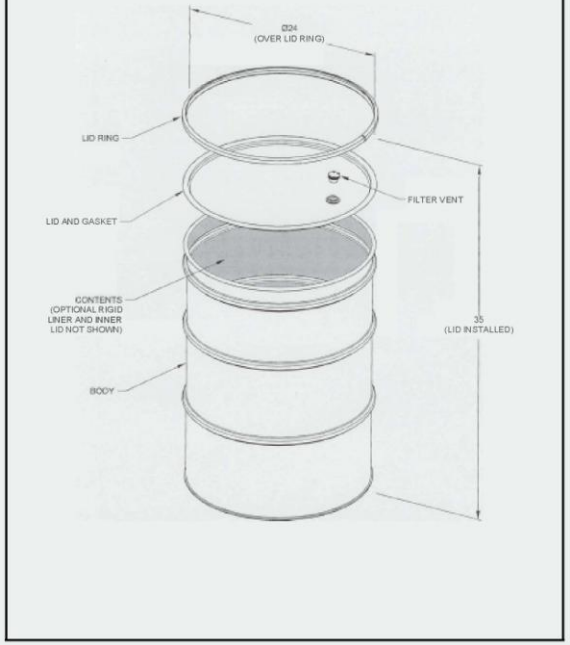

Figure 2.9-1 – 55-Gallon Drum

Type B Containers

Type B containers were not practical for transfer of transuranic waste between buildings (e.g. Analytical Laboratory and storage building) at MFC because of the design rigor and cost.

49 CFR 173.416 (Type B)

PLN-1851

The “Transport Plan for the Transfer of Waste Containers between RWMC and INTEC and RWMC and MFC” (PLN-1851) provided an equivalent example of safe transport activities, in compliance with the DOT Hazardous Material Regulations required by DOE O 460.1B and Title 10 Part 830 Subpart B of the Code of Federal Regulations.

Streamlined Safety Analysis

Incorporating the DOT Type A drums into the MFC TSD took less time and effort than expected because safety analysts utilized PLN-1851, which provided analysis that could also be used for the revision to the TSD.

Because PLN-1851 had already been approved and was in use by the Idaho Cleanup Project (ICP), MFC was able to justify the addition of the DOT Type A configuration to the MFC TSD.

Criticality Analysis from PLN-1851

Criticality is an area where MFC analysts used analysis from PLN-1851.

- Analysis of fissile loading states that each shipment (truckload) must be limited to a maximum of 32 drums (Appendix B, B.2.1.1) with the following load limit:
  - Load limit of ≤ 1,500 g of Pu-239 fissile gram equivalency (FGE) per truckload.

Summary

MFC learned that analyzing current processes to find better ways of meeting the requirements of multiple disciplines within a safety basis can lead to a more cost-effective, streamlined process. Also, streamlining a process can be made more feasible by considering analysis that has already been completed. This is extremely effective when the analysis being used is already approved and in use, since this validates the new change.