

Central Internet Database
Transuranic Waste

National Stakeholders Meeting
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Historical Background

(Pre-1970)

- Before 1970
 - No waste category for “TRU” waste.
 - The Low Level Waste Policy Amendments Act defines LLW as radioactive waste not classified as high-level waste, spent nuclear fuel or by-product material specified as uranium or thorium tailings and waste.
 - Wastes containing transuranic radionuclides were managed as LLW, and were disposed of by shallow land burial.
 - Some wastes containing transuranic radionuclides were dumped in burial sites without high-integrity packaging (e.g., cardboard, plastic bags).

Historical Background

(Post 1970)

- After 1970
 - TRU waste did not exist, by definition until 1970.
 - DOE established a Transuranic waste category to distinguish it from low level waste.
 - The DOE Order on management of radioactive waste (5820.2A, now under revision) defines TRU as radioactive waste that, at the time of assay, contains more than 100 nCi/g of alpha emitting isotopes with atomic numbers greater than 92 and half-lives greater than 20 years.
 - Original threshold concentration for TRU was established in 1973 as 10 nCi/g. It was changed to 100 nCi/g in 1984.
 - TRU wastes were “retrievably stored” and are now going to a deep geologic repository (WIPP).

Sources of TRU Waste

- Historical Sources:
 - Chemical Separation
 - Nuclear Weapons Production and Testing
 - Research and Development Activities
- Additional Sources (Current or Anticipated)
 - Environmental Restoration
 - Spent Fuel and Operations Activities
 - Decontamination and Decommissioning

DOE Sites Reporting TRU Waste

(As reported to EM in May 1999; draft data)

SITE	ANL	HAN	INEL	LAN	LLN	MND	NTS	ORN	RFS	SRS
CH	X	X	X	X	X	X	X	X	X	X
RH		X	X	X				X		

CH: Contact Handled; RH: Remote Handled

Other Sources: Small Quantity Sites; Environmental Restoration Activities;
Decontamination and Decommissioning

Previous TRU Data Sources

- Multiple TRU waste data sources identified
 - Site databases (current and historical data)
 - Annual Integrated Database Reports
 - TRU Waste Baseline Inventory Report

Central Internet Database Source: TRU Waste Data

- EM's Annual Data Call (IPABS or AVS) will be the source for TRU data for the Central Internet Database
 - TRU inventory
 - TRU waste shipping volumes
 - TRU projections from restoration activities
 - Characterization data collected October 1999
- 1999 Annual Data Call is currently being reviewed.

Buried TRU Waste

(Pre-1970)

- Little or no historical records on Buried TRU, especially 1944-1964.
- Five major sites
 - Idaho
 - Hanford
 - Oak Ridge
 - Savannah River
 - Los Alamos
- Confusion over Buried TRU definition
 - Site-to-site variations
 - Flexibility in definitions and practices

Problems with Buried TRU Data

(Pre-1970)

- Past data is inconsistent
 - Historical documentation is limited or inconclusive
 - Loss of personnel with knowledge of corporate history
 - Limited characterization conducted
 - Multiple data sources
 - Production, Research, and Disposal Site Records
 - Classified Documents

Central Internet Database Sources: Buried TRU Waste Data (Pre-1970)

- External and internal questions concerning validity of estimates of volume, characterization, and status
- In March 1998, EM-1 committed to:
 - Establishing comprehensive guidance for buried TRU data collection
 - Improving data QA procedures
 - Issuing a new data call for buried TRU

The goal is to achieve accuracy and consistency for analysis, tracking, and reporting of TRU and Buried TRU (pre-1970) data by establishing DOE corporate sources

TRU Back up Slides

Current Transuranic Waste Definition

- Transuranic (TRU) Waste
 - Contains radionuclides with atomic numbers greater than 92
 - Has TRU radionuclides with half-lives greater than 20 years
 - Contains TRU radionuclides at levels greater than 100 nCi/g

Periodic Table

IA												0					
1 H 1.008	IIA											III A	IV A	V A	VIA	VII A	2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	IIIB	IVB	VB	VIB	VII B	VIII B			IB	IIB	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 * La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226.0)	89 ** Ac (227)	104 Rf	105 Ha	106 Unh	107 Uns	108	109 Une									

* 58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
** 90 Th 232.0	91 Pa (231)	92 U 238.0	93 Np (244)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

TRU Disposal at Waste Isolation Pilot Plant (WIPP)

- Near Carlsbad, New Mexico
- Disposal Operations began March 26, 1999
- Regulatory Limits for WIPP
 - Defense TRU waste
 - Contact handled waste (<200 mrem/h)
 - Remote handled waste (>200 mrem/h, but <1000 mrem/h)
 - 6.2 million cubic feet total
 - 250,000 cubic feet remote handled

Buried TRU Data Call Status

(Pre-1970)

- Data call delayed until January 1999 in order to be consistent with other data collection efforts
 - Questionnaire developed in late 1998 through joint efforts of EM-40 and Carlsbad Area Office
 - Goal to eliminate inconsistencies
 - Initial responses have been received
 - Draft data currently being evaluated; working with sites to clarify issues
- Final data set will be the DOE corporate source for Buried TRU data for reporting and analysis

DOE Policy on Management of Buried TRU

- Since 1983, driven by cost/benefit/risk concerns
- Policy consists of:
 - Monitor buried TRU sites
 - Take necessary remedial actions,
 - Re-evaluate safety periodically
 - Conduct technology development as necessary
 - Pursue as part of RCRA/CERCLA programs