Idaho Cleanup Project

Sodium Bearing Waste Disposition Plans

Presented To: U.S. Nuclear Waste Technical Review Board

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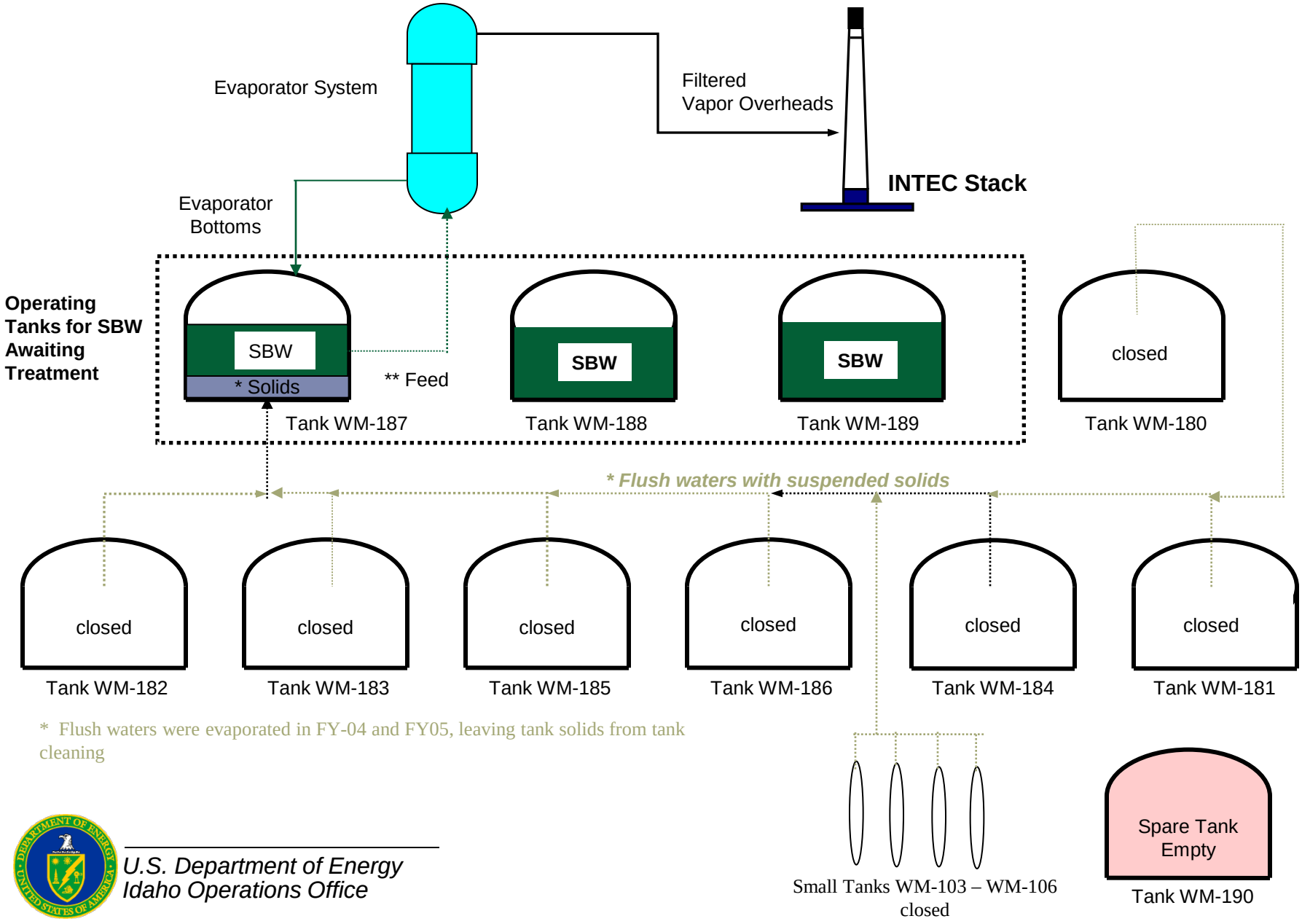
Brief History of INTEC Tank Farm Facility

- *INTEC Tank Farm Facility (TFF) consists of 11-300,000 gallon stainless steel tanks contained in by concrete vaults.*
- *Seven tanks have undergone RCRA closure (emptied, cleaned and grouted)*
- *Four tanks in service*
- *The Tank Farm Facility (TFF) has been used to store liquid waste from reprocessing SNF*
  - ***1st cycle extraction wastes (HLW)***
  - ***Sodium Bearing Waste (SBW)***
    - ***2nd and 3rd cycle extraction wastes***
    - ***Decon solutions and Newly Generated Liquid Waste***
- *1st cycle extraction wastes were kept separate from other wastes*
  - ***Some cases of adding small amounts of SBW to the 1st cycle extraction waste***

Brief History of TFF (Cont.)

- *HLW (1st Cycle) has been processed through calcination into a dry solid form*
- *The remaining waste in storage is SBW with <1% 1st cycle waste*
- *The remaining waste must be processed to allow cease use and closure of Tank Farm Facility per State of Idaho RCRA Consent Order*

Tank Farm Condition

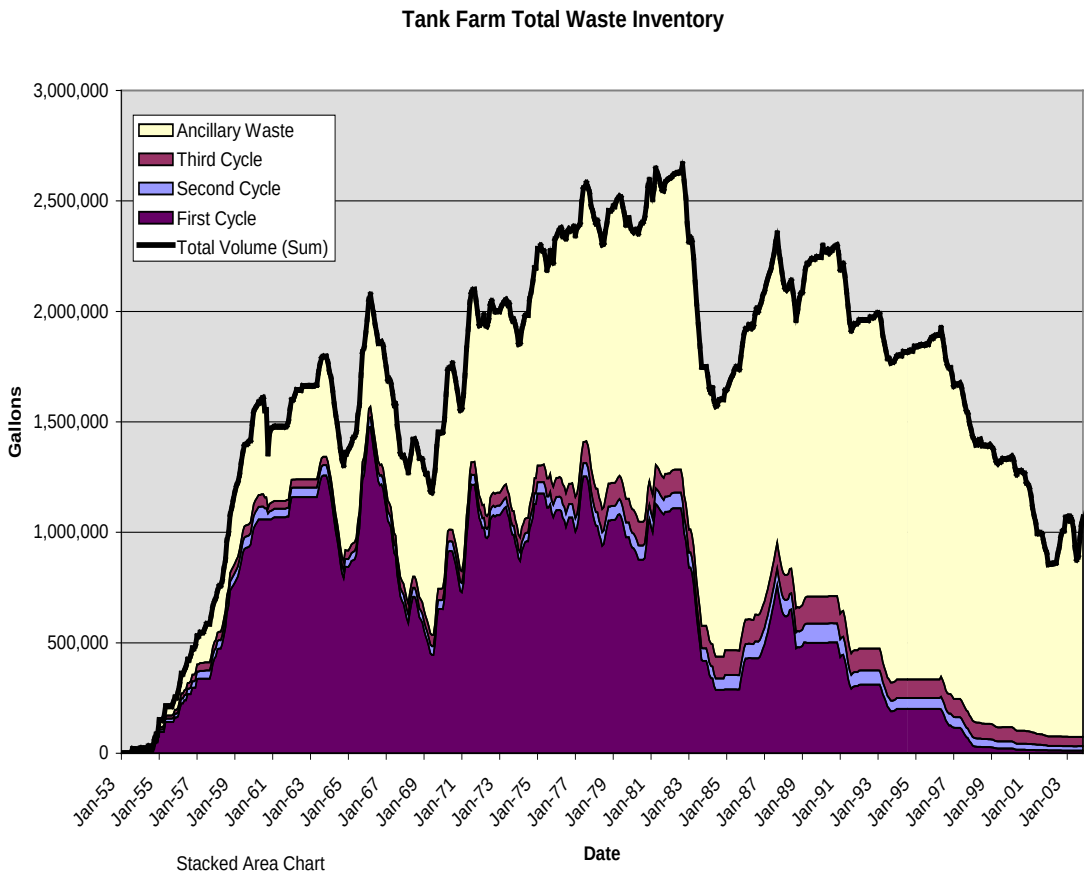


* Flush waters were evaporated in FY-04 and FY05, leaving tank solids from tank cleaning

SBW Description

- *Remaining 900K gallons of tank waste called SBW*
  - *~93% Dilute wastes after concentration, jet dilution, high fluoride decontamination wastes*
  - *<1% 1st cycle waste, ~2% 2nd cycle waste, ~4% 3rd cycle waste*
- *SBW solids – a layer (up to a few inches deep) of small solid particles exist on the tank bottoms*
- *Approximately ~500,000 curies (80% liquids/20% solids)*
  - *Liquids activity: ~99% due to cesium/strontium*
  - *Solids activity: ~90% due to cesium*

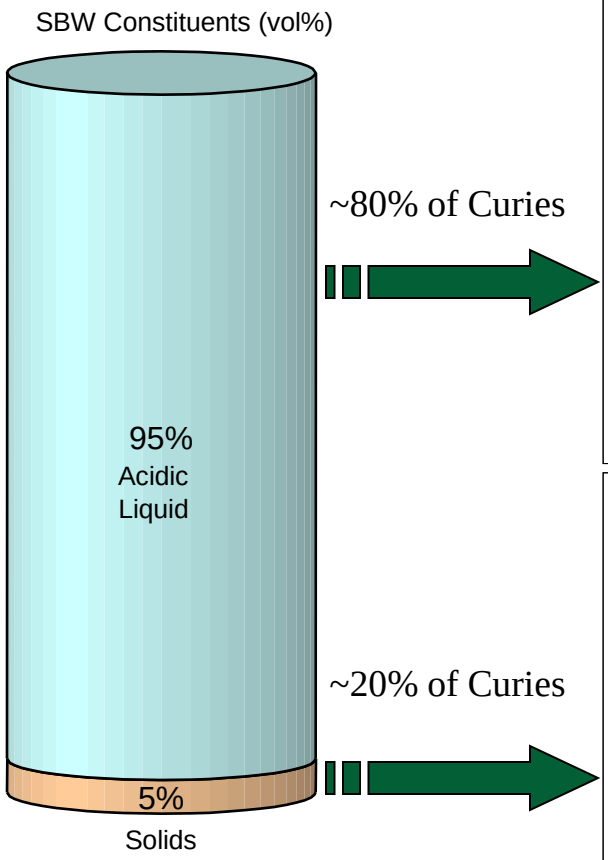
Origin of SBW



- Tank farm tanks which stored 1st cycle reprocessing wastes (HLW) were emptied in 1998 by conversion of the waste to dry, solid particles (calcine)
- Separate tank farm tanks were used for storage of less radioactive facility wastes:
  - 2nd/3rd cycle reprocessing wastes,
  - Ancillary wastes, such as decontamination solutions, lab wastes, spent fuel basin water treatment discharges, off-gas cleanup scrub solutions, off-gas filter leach solutions, condensate from steam jet transfer equipment, and contaminated facility sump water.
- This mix of other, less radioactive facility wastes is termed “sodium-bearing waste” (SBW) due to relatively high sodium content
- Once emptied, the HLW tanks were re-used for storage of SBW
- Waste transfer equipment limitations did not allow HLW tanks to be completely emptied prior to re-use; therefore, the SBW is contaminated with a small volume (< 1%) of 1st cycle wastes

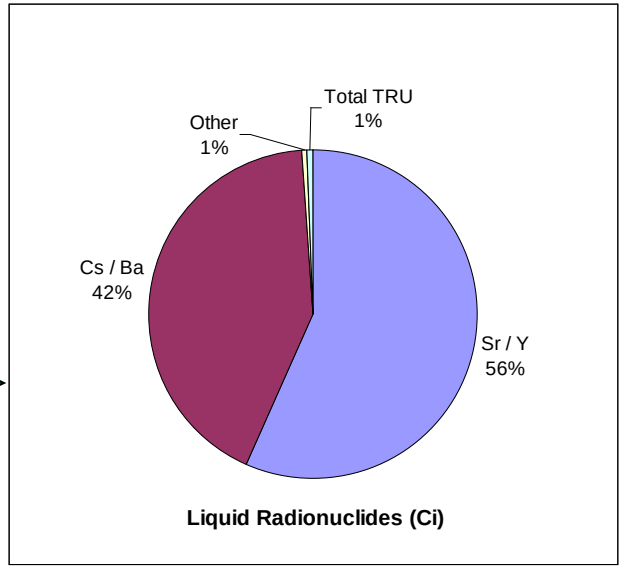
Idaho Sodium-Bearing Waste Radionuclide Constituents

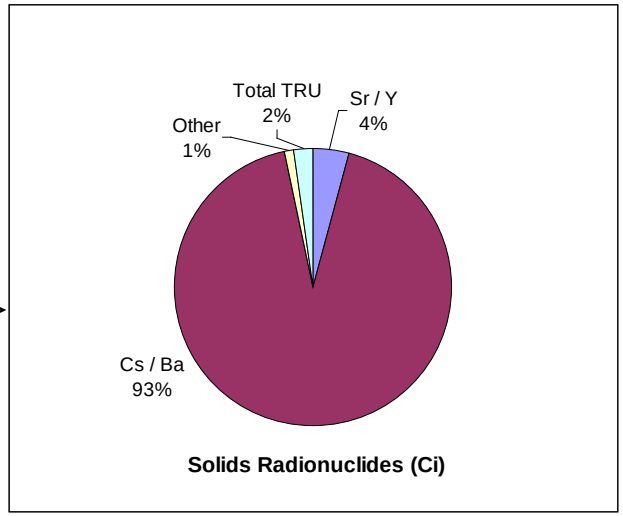
SBW Totals
~900,000 gallons
~500,000 curies



~80% of Curies

~20% of Curies





SBW Characteristics

	WM-180	WM-188	WM-189	Total Ci	Total Ci
	Ci/liter	Ci/liter	Ci/liter	liquid	solids
Sr-90	2.03E-02	4.83E-02	3.88E-02	114,400	1,830
Y-90	2.03E-02	4.83E-02	3.88E-02	114,400	1,830
Tc-99	9.38E-06	2.24E-05	9.96E-06	45	12
Cs-137	2.62E-02	6.39E-03	5.01E-02	87,400	41,700
Ba-137	2.48E-02	6.04E-02	4.74E-02	82,700	39,470
I-129	2.39E-08	6.81E-08	5.30E-08	0.16	0.05
Pu-238	5.71E-04	5.36E-04	4.64E-04	1,670	1,640
Pu-239	8.27E-05	6.34E-05	5.22E-05	210	197
U-235	3.95E-08	9.49E-08	6.01E-08	0.21	0.022
U-238	2.34E-08	1.28E-08	4.35E-08	0.084	0.002
Total	9.29E-02	1.11E-01	1.77E-01	404,000	90,000
Tot TRU	7.32E-04	6.69E-04	6.04E-04	2,130	1,880

Classification of SBW

- *Because SBW was co-mingled with the HLW residuals – its classification is in question*
- *The Department's preference for the treated SBW waste is disposal as TRU waste at WIPP (Idaho High-Level Waste EIS Record of Decision, 12/19/2005)*
- *DOE Order 435.1 allows SBW to be managed as TRU waste provided it can meet specific criteria:*
  - *Have key radionuclides been removed to the extent technically and economically practical?*
  - *Can it meet disposal criteria for TRU waste?*
  - *Can it be made into a solid form?*

Disposition Status

- *Previous reviews Indicate SBW can be managed as TRU waste*
  - *Nuclear Regulatory Commission staff technical consultation review (2002)*
  - *National Academy of Science review (1999)*
- *Requires Class 3 permit modification at WIPP*
- *Waste Determination under DOE Order 435.1*
- *Treated SBW will be stored at IWTU*

DOE Waste Determination Process (DOE O 435.1)