January 2015 Tank Waste Committee

Jeff Lyon
TSOC Project Manager,
Nuclear Waste Program

DEPARTMENT OF ECOLOGY
State of Washington

Risk-Based Retrievals?

Each Tank is Different

	Starting Tc-99	Post-Retrieval Analysis	Predicted Post Retrieval	Predicted Post Retrieval
Tank			Using Actual Volume	Volume of 360 cu.ft.
	Curies	Curies	Curies	Curies
C-101	0.70			0.003
C-102	1.32			0.003
C-103	34	0.05	0.048	0.043
C-104	58	0.3		0.08
C-105	81			0.13
C-106	Retrieved 2003	0.17	0.20	0.20
C-107	38	0.77		0.07
C-108	6.19	0.05	0.063	0.06
C-109	32	0.01		0.26
C-110	32	0.05		0.24
C-111	2.7			0.02
C-112	61			0.41

Chemical Variations Technetium (Tc-99)

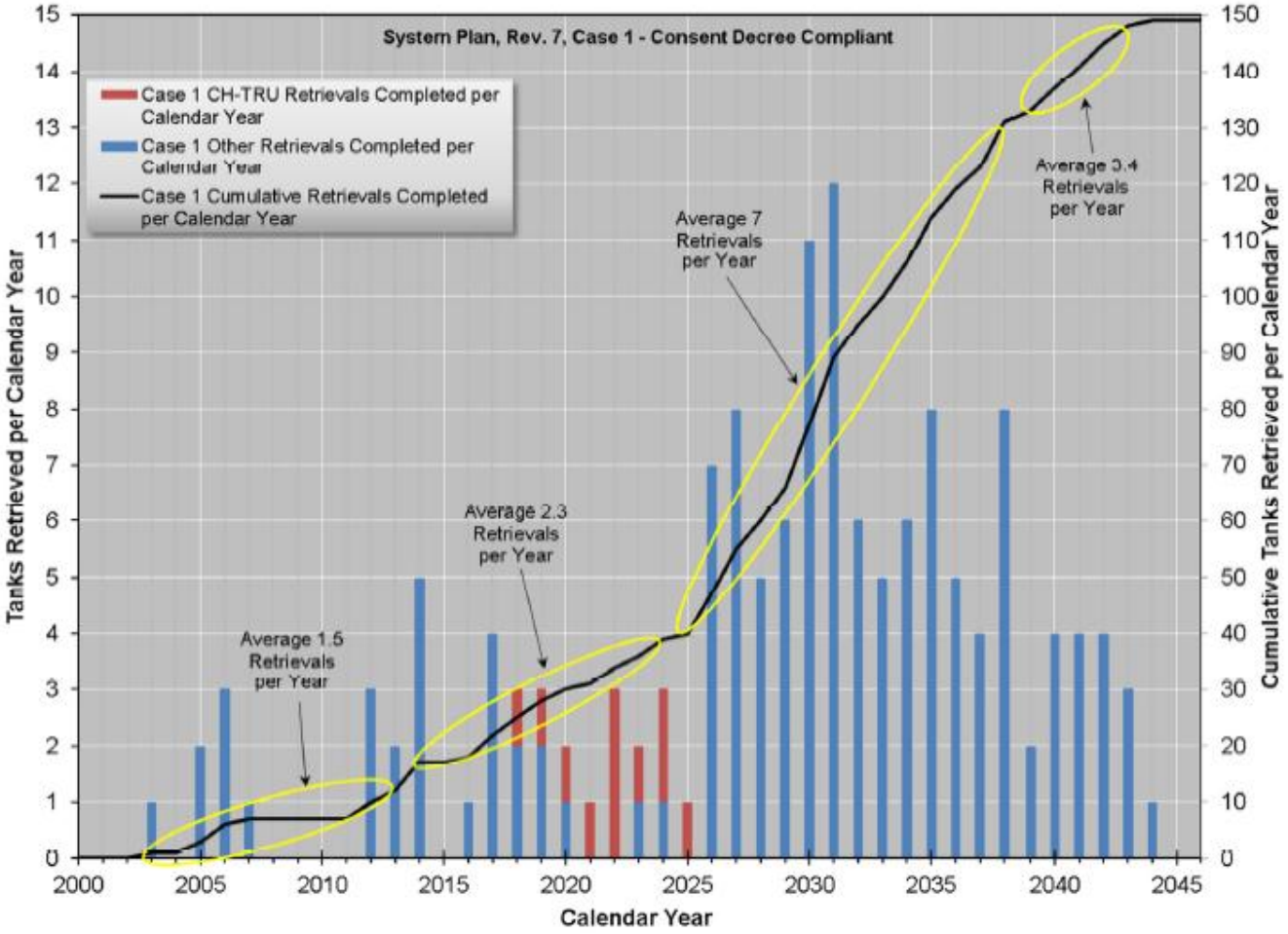
- We consider all technetium as the soluble TcO_4
- Tc-99 can be bound to iron hydroxides when it co-precipitates in the tank
- After retrieval much of the Tc-99 is bound to iron hydroxides and is not readily mobile
- Rust from the tank will also aid in Tc-99 sequestration
- So , how should Tc-99 be modeled in tank releases?

Chemical Variations
Uranium

- Uranium forms a variety of compounds and minerals as uranium can substitute for calcium
- Studies show soluble, slightly soluble, or insoluble forms
- Addition of lime to the residuals will precipitate the leaching uranium
- How can this information be used in modeling

Retrievals System Plan 7

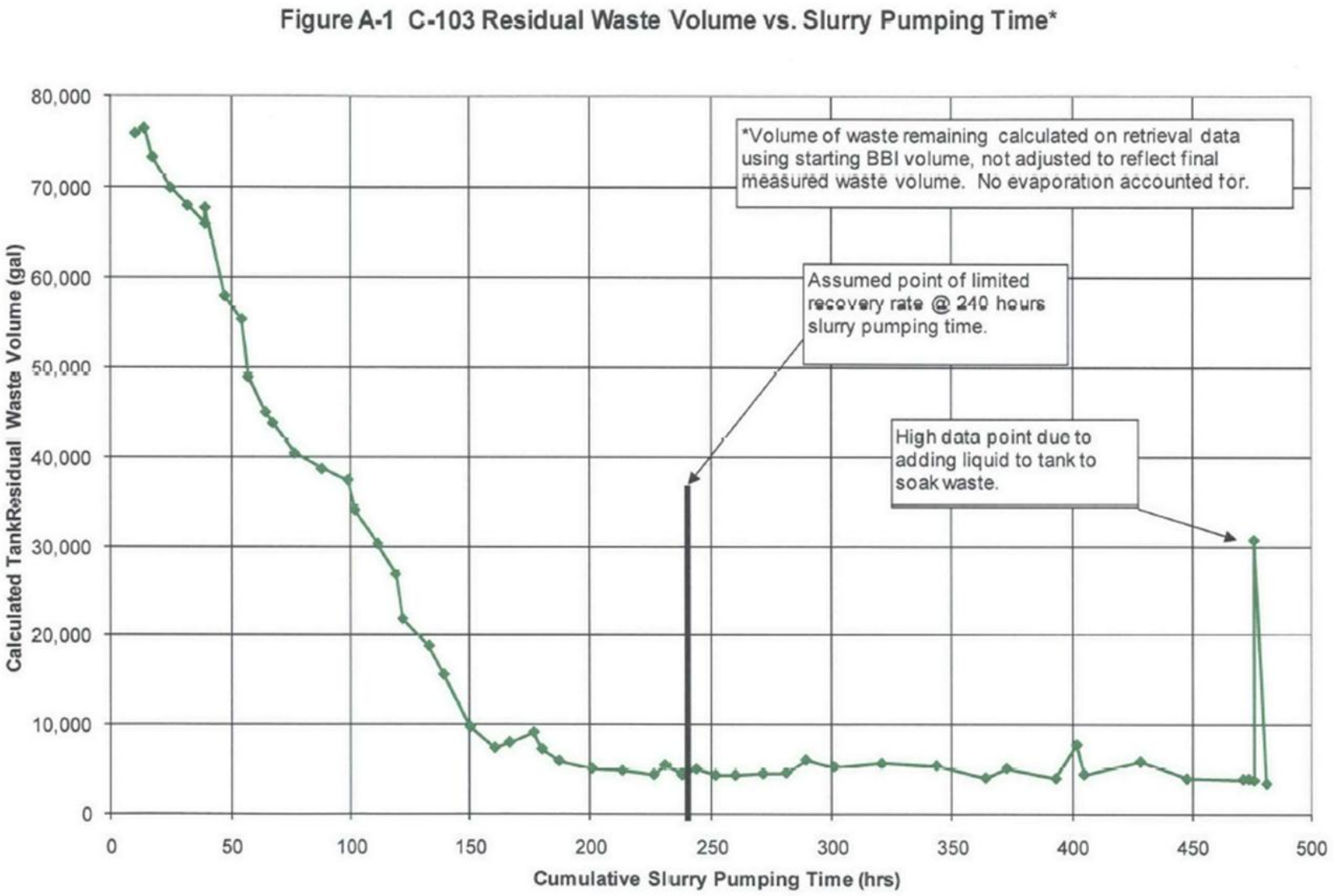
Figure 4-3. Case 1 Single-Shell Tank Retrievals Completed per Calendar Year.



Points of Interest

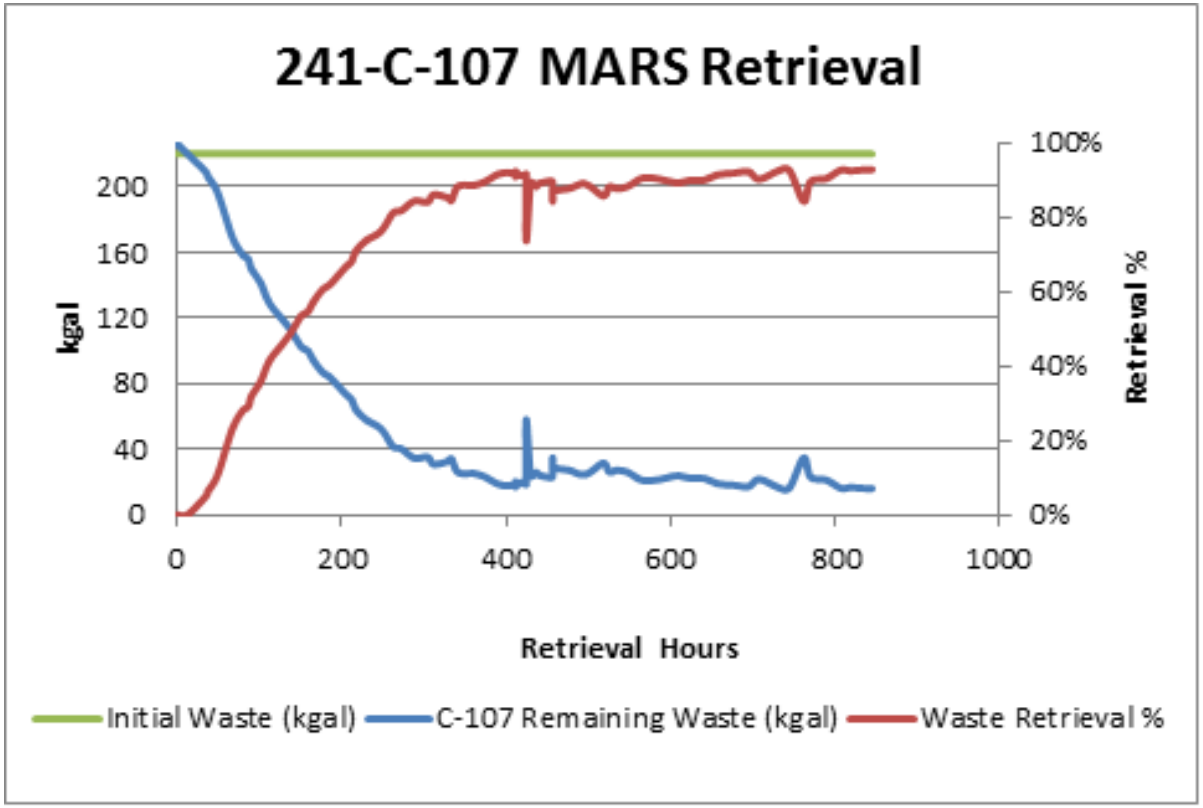
- Current retrieval rate approximately **135,000** gallons per year (C-farm)
- Planned maximum approximately **1,100,000** gallons per year

When do we Stop Retrieving?



BBI = best basis inventory

C-107, When to Stop?



The Costs are Growing!

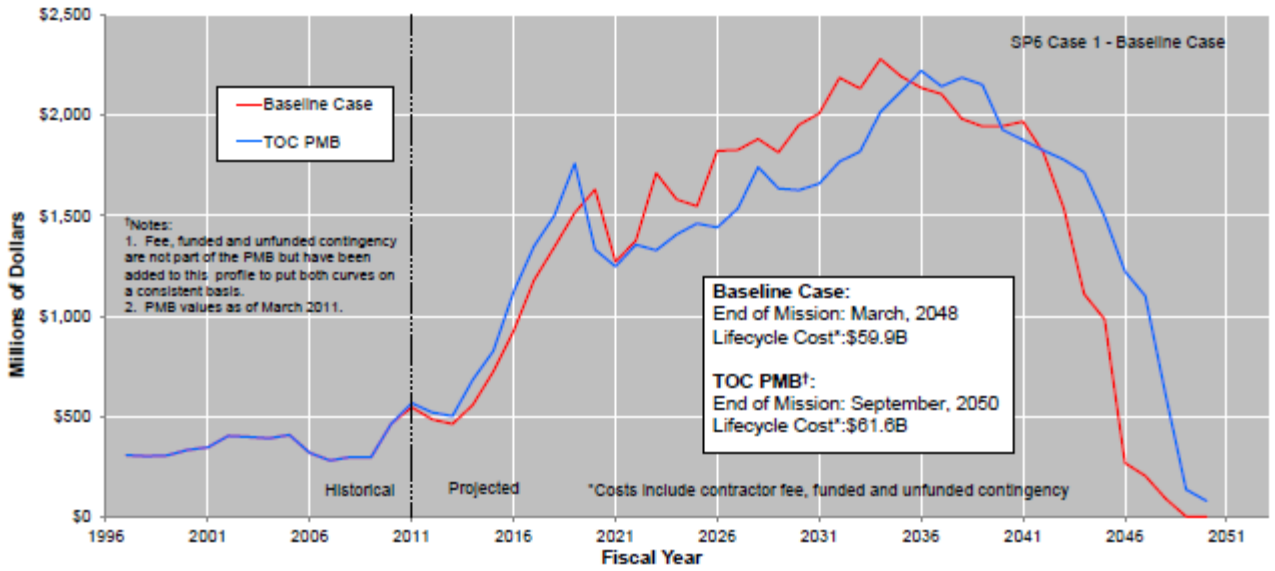


Figure 5-1. Life-Cycle Cost Profile for the Baseline Case

Impacts - EIS

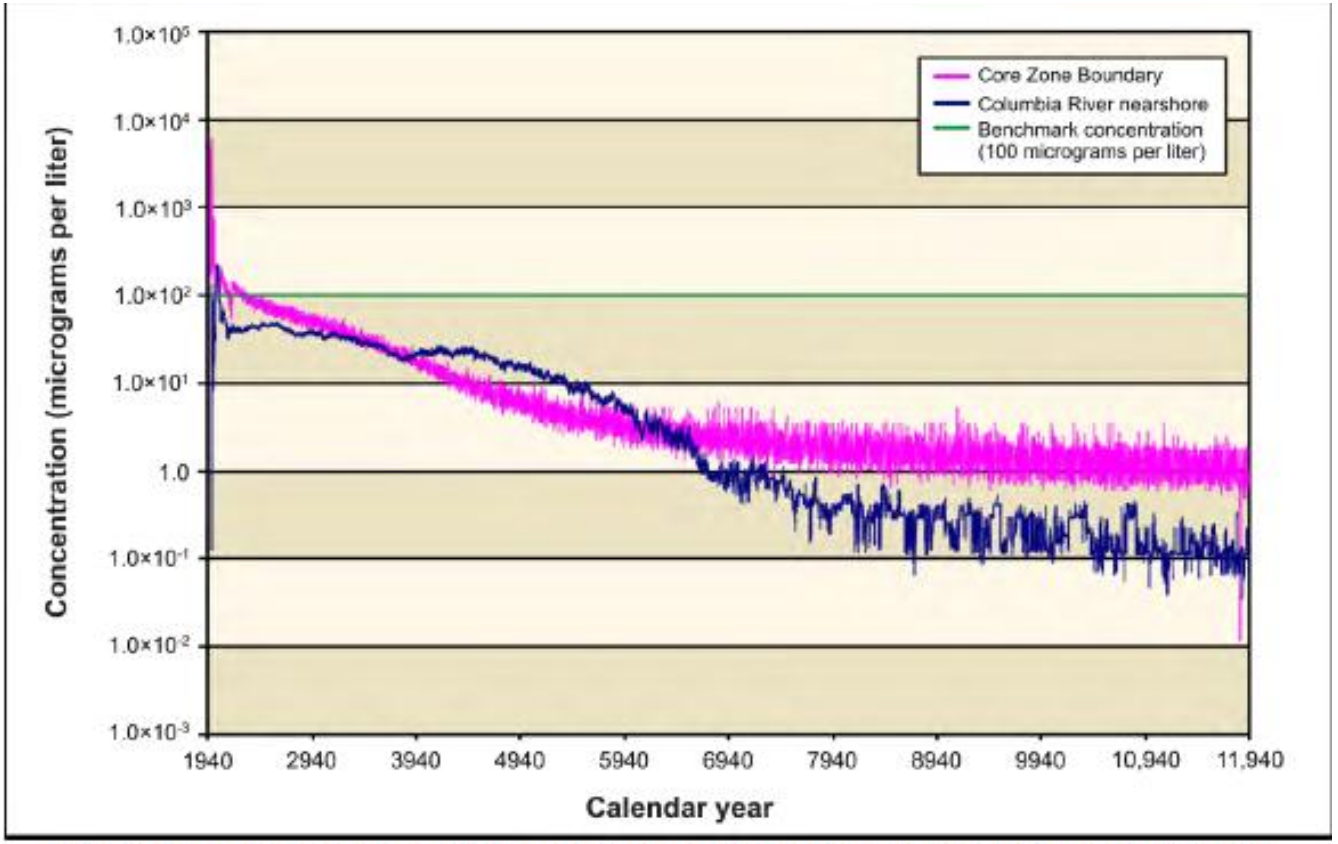


Figure 5–82. Tank Closure Alternative 2B, Case 1, Chromium Concentration Versus Time

Further Discussions?

- Retrievals are taking longer than forecast
- Retrieval of "leaking" SSTs currently takes much longer
- A means of evaluating and comparing risk of individual tanks within a farm is required
- Particularly "risky" tanks may require additional information on physical properties for technology selection
- The SSTs will not last forever, which future tanks are most susceptible to corrosion

Further Discussions?

- The leak-loss evaluations conducted by ORP, Ecology and WRPS led to much better evaluation and documentation of tank leaks, tank liner leaks, tank overfills and spill documentation
- Why couldn't a similar group evaluate and provide useful information on risk, risk evaluation and uses?