DEPARTMENT OF ECOLOGY
State of Washington

Hanford Tank Leak Briefing

Washington State House of Representatives Environment Committee

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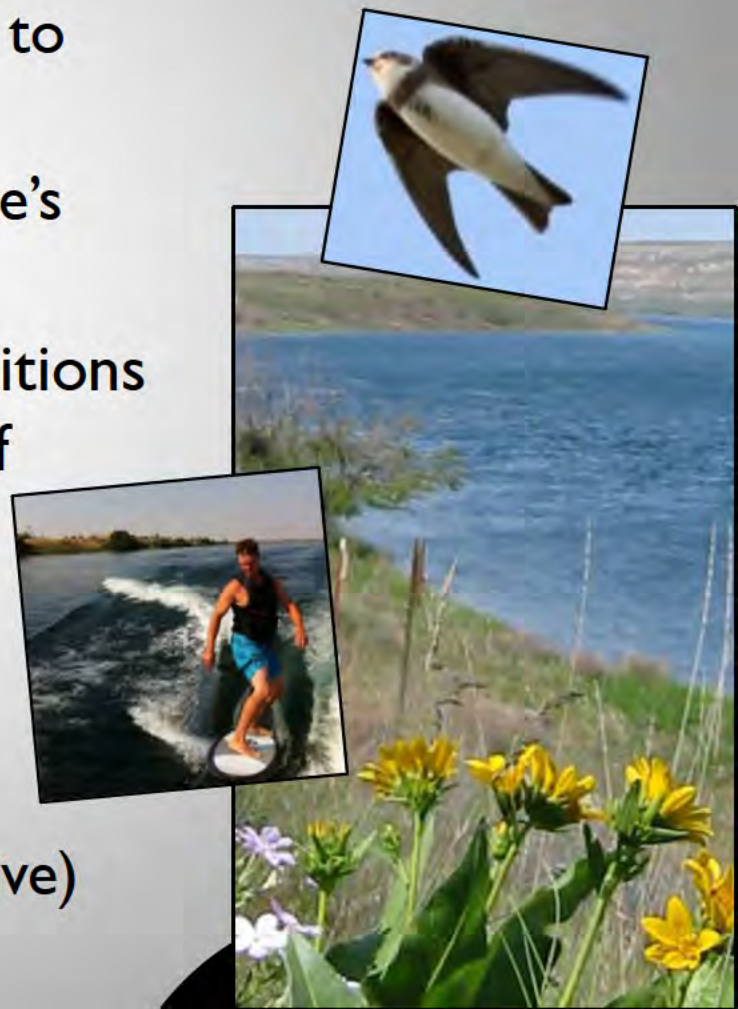
Ecology's role at Hanford

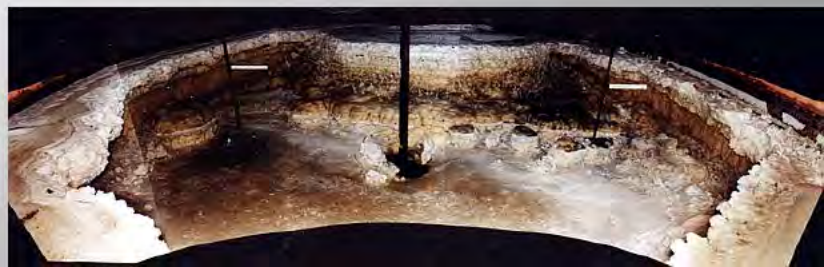
- Ensure that Hanford cleanup protects the Columbia River by following state laws to protect our air, land, and water
- Protect, preserve, and enhance the state's environment
- Ecology RCRA* permit outlines conditions for treatment, storage, and disposal of chemically hazardous wastes
  - ✓ Management of dangerous and mixed wastes
  - ✓ Cleanup of spills, leaks and other contamination (non-radioactive)



*Resource Conservation & Recovery Act

Tank contents & history

- 177 underground storage tanks
  - 28 double-shell tanks (DST) (built 1968–1986)
  - 149 single-shell tanks (SST) (built 1944–1964)
- High-Level Waste – millions of curies of radioactive materials, long- and short-lived (300 years)
- Dangerous Wastes – acids, caustic sodas, solvents, toxic heavy metals, cyanides
- Tanks exhibit constant chemical/radiochemical reactions generating gaseous chemicals and new chemicals
- 67 SSTs in 12 farms leaked over 1 million gallons
- In 2004, USDOE completed interim stabilization (all free liquids pumped from SSTs). The six tanks of current concern were stabilized between 1981 and 1995.



Right: Remaining tank waste "heel" being dissolved to reach 99% waste removal.

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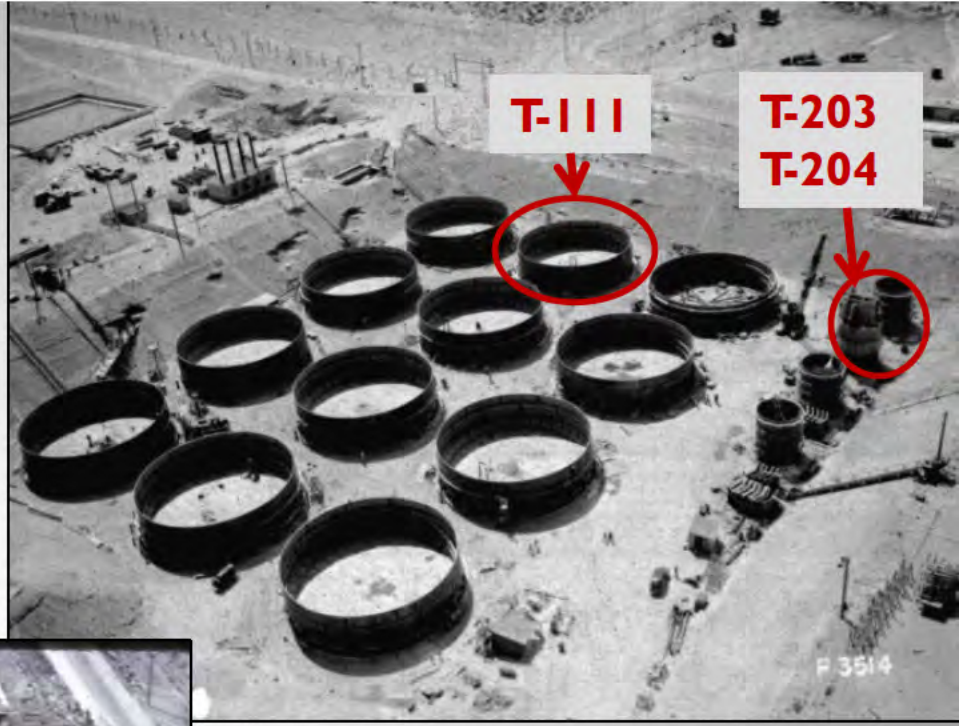
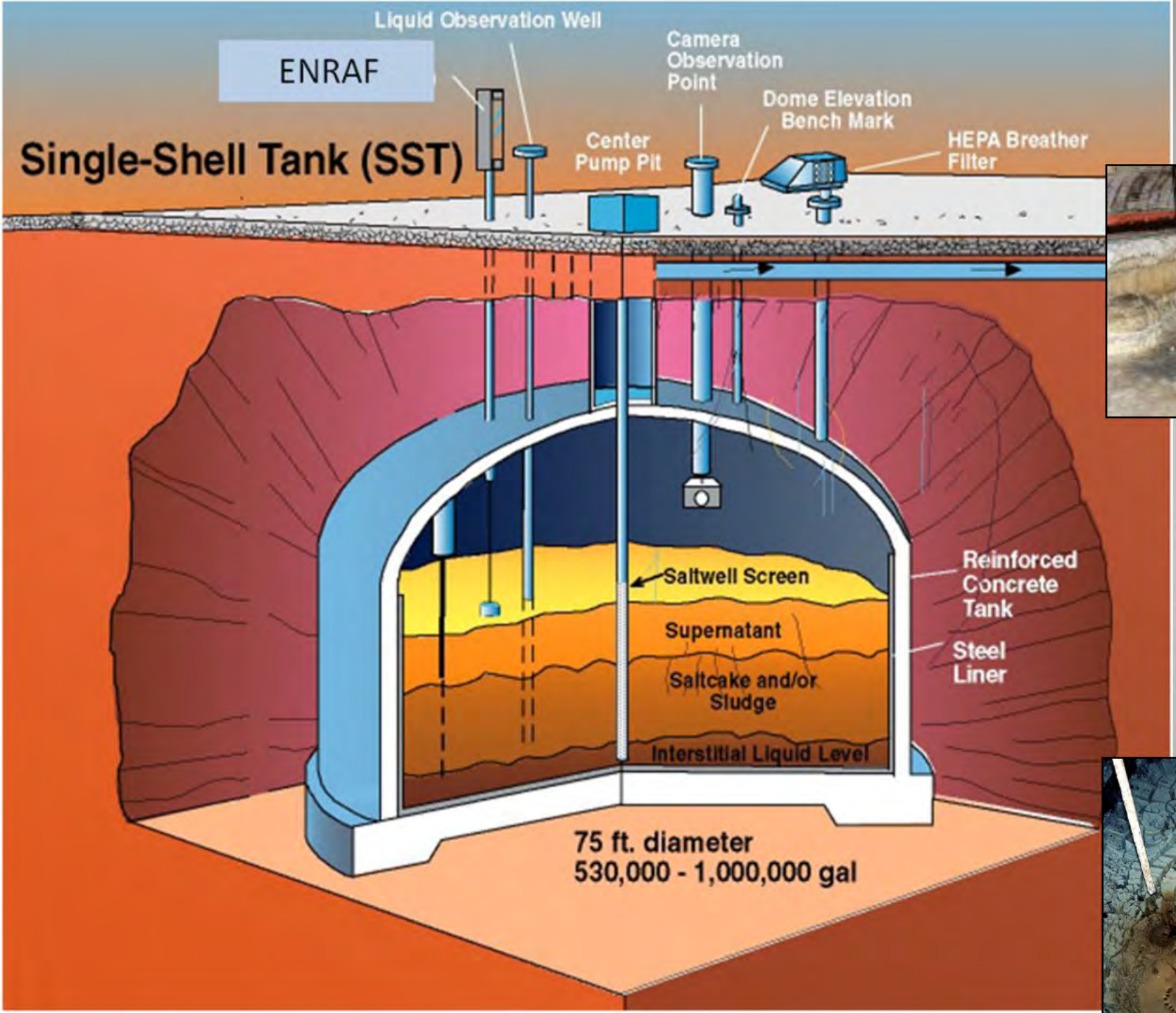
Single-shell tanks under construction



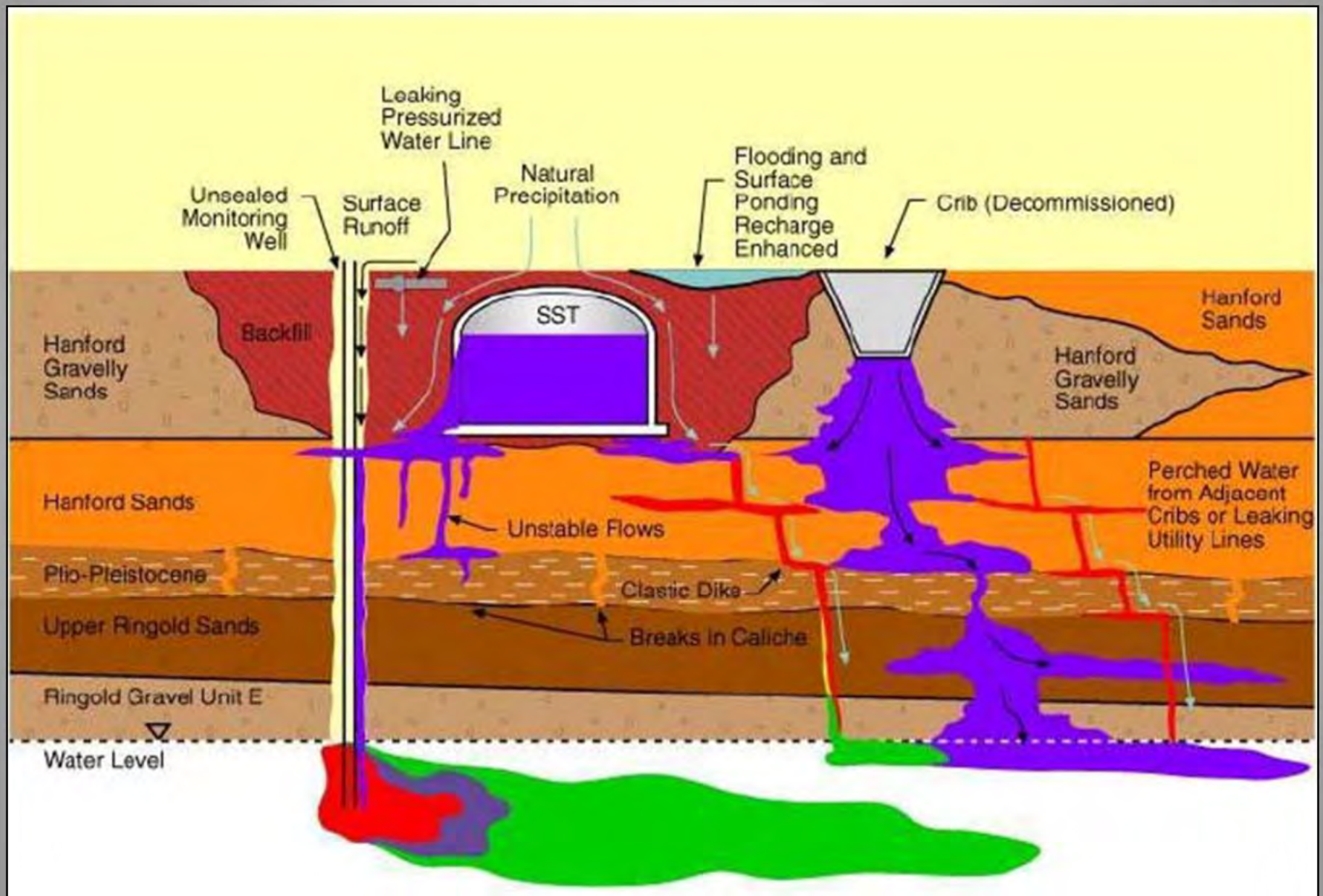
Above: T Tank Farm, 1944

Left: B Tank Farm, World War II



Above and below: Saltcake inside SSTs

Hydraulic drivers at SST farms



No immediate or near-term health risks

- Underground tanks between 5–8 miles from the Columbia River and far from any residences or agricultural facilities
- No route from the leak to agricultural areas = no risk of food crop contamination
- Groundwater is ~200-300 feet below tanks, so current leaks will take decades to reach it
- Pre-existing Hanford groundwater contamination is actively remediated with a system of pump & treat facilities, keeping contamination from the river

None of this mitigates the State's concerns — we have a zero tolerance policy on leaks.

The discovery of leaking tanks underscores the importance of retrieving and treating this tank waste as quickly as possible to mitigate the chances for further releases to the environment.

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Recent tank issues

- SST review findings:
  - 52 under investigation for precipitation entering (intrusion)
  - 6 leaking, 14 more under investigation for declining levels
- DST AY-102 leaking between shells (annulus)
- The State believes new, compliant tanks are needed to support SST retrievals and vitrification plant operations
- The greater concern is over the amount of mobile contaminants (technetium-99, nitrates) in the leaked liquids, not just the total gallons of leaked liquids

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Governor Inslee on leaking tanks

"The Secretary and I agree that the State of Washington and the federal government must have a thorough and candid discussion about the need for additional storage tanks. Frankly, the State Department of Ecology is not convinced that current storage is adequate to meet legal and regulatory requirements."

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Leaking SSTs

Tank	Capacity	Current vol.	~ leak rate	Leaked before 2013?
B-203	55,000 gal	49,000 gal sludge 1,000 gal liquids	15 gal/yr	yes
B-204	55,000 gal	49,000 gal sludge 1,000 gal liquids	15 gal/yr	yes
T-111	530,000 gal	447,000 gal sludge	300 gal/yr	yes
T-203	55,000 gal	36,000 gal sludge	15 gal/yr	no
T-204	55,000 gal	36,000 gal sludge	15 gal/yr	no
TY-105	758,000 gal	231,000 gal sludge	300 gal/yr	yes

Hanford tanks vary in capacity from 55,000 to 1 million gallons.

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In-tank monitoring options

- In-tank data is available measured by:
  1. Tracking one location on the waste surface over time (ENRAF)
  2. Tracking one location of the interstitial liquid level over time (LOW, used in 80 tanks)
- Visual inspections conducted through risers
- Measuring challenges due to complex waste

Right: Risers are the only way to access tank waste unless other modifications are added for retrieval purposes.

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Ex-tank monitoring options

- Dry wells around the tanks can be logged to detect leaked radioactive material near the dry well
- Resistive methods can be used to track changes in the soil conductivity and characterize potential soil contamination

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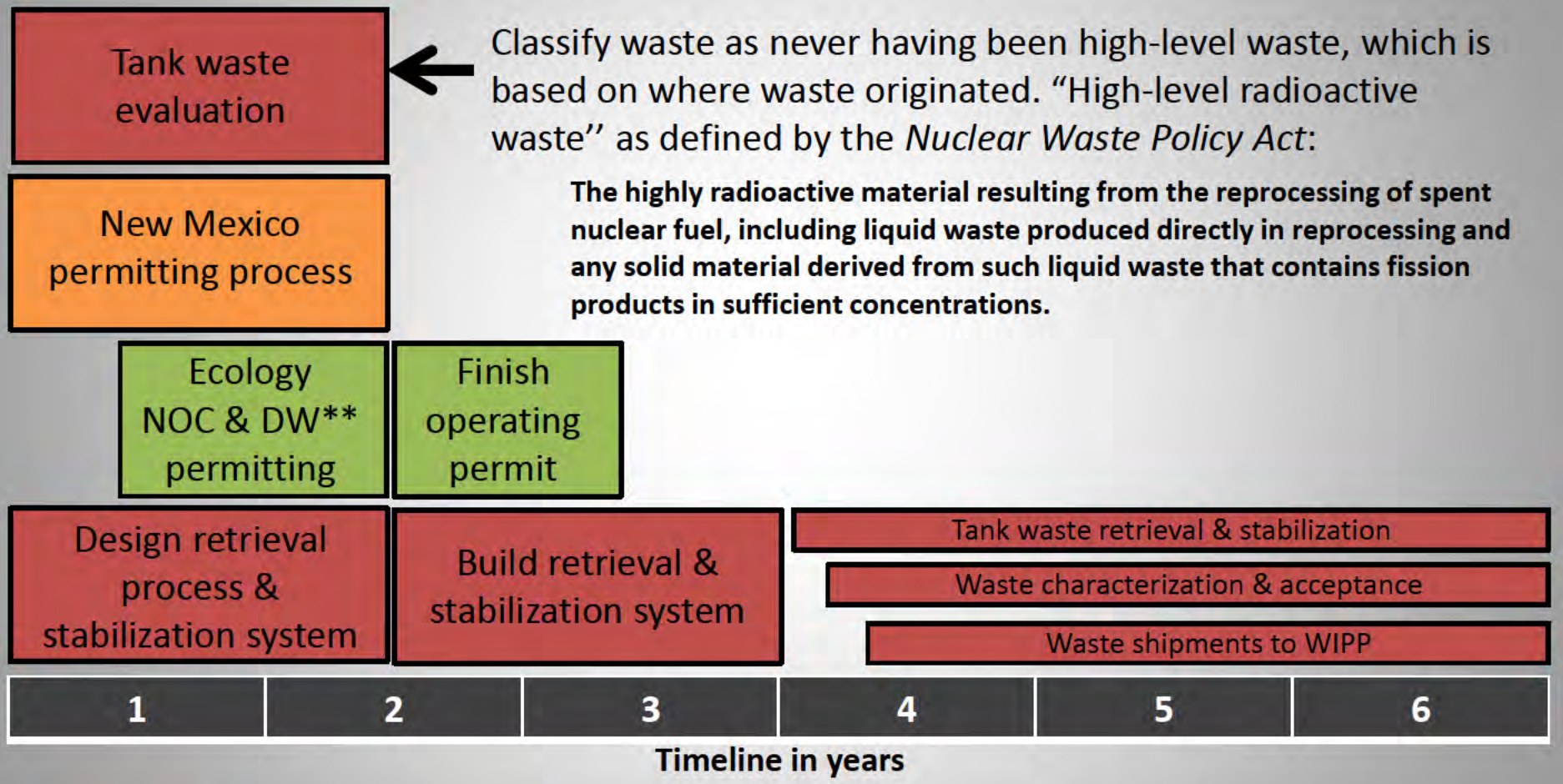
SST next steps

- Pursue sending TRU* waste to WIPP**
- Independently analyze data that led USDOE to determine 6 SSTs are leaking
- Consider options to address leaks and mitigate releases to soil, for example:
  - Increase monitoring and sampling
  - Remove liquids with portable evaporator
  - Place interim barriers
  - Develop new waste retrieval technologies

* Transuranic
** Waste Isolation Pilot Plant, New Mexico

Timeline for delivery of Hanford tank waste to WIPP*



*Individual timelines based on current information from USDOE and optimistic assumptions regarding parallel processes.

**Notice of Construction & Dangerous Waste

Tank waste treatment considerations

Policy issues

- 2010: Treatment start date delayed 8 years, after 3 false starts and 2 delays in the current plan, resulting in **21 years total delay**
- Budget shortcomings
- More delays may occur

Above: $12.3-billion vitrification plant Bechtel National, Inc., is constructing at Hanford

Technical issues

- Black cell design
- Erosion/corrosion
- Pulse jet mixers
- Particulate build-up
- Flammable gas

Final waste disposition

- Low-activity waste: Integrated Disposal Facility at Hanford
- High-level waste: national deep geologic repository

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Questions?

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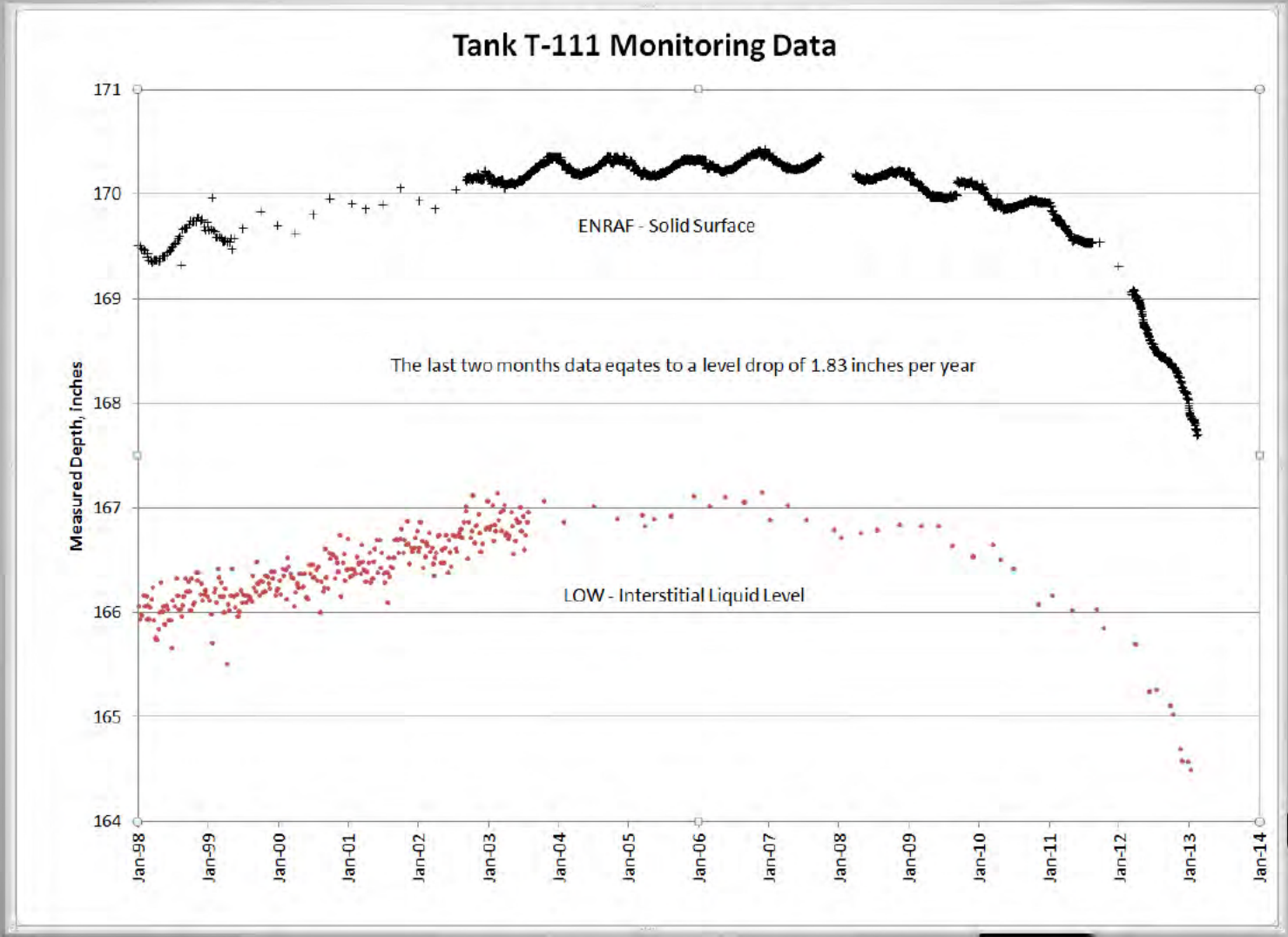
T-111 LOW and ENRAF Data