Ecology's Perspective on the TC & WM EIS

Suzanne Dahl, Jeff Lyon

December 15th Presentation for the Tank Waste Committee

Why This EIS Matters

- How much waste to retrieve before tanks are closed
- How to close the single-shell tanks
- How to treat tank waste
- Disposal of Hanford waste
- Whether the site can handle any more offsite waste
- How to address secondary waste
- How to dismantle FFTF

History

- Initiated an Memorandum of Understanding (MOU), 2003
- MOU changed to include Hanford Solid Waste EIS settlement, 2006
- Key MOU points
  - Cooperating agency
  - SEPA
  - Access to information
  - Regular status briefing
  - Website issues list

Topics

- What we did (Elements of our Cooperation)
  - Key modeling assumptions agreement
  - Review process
  - Inventory
  - Groundwater and vadose modeling review
  - Pre-decisional review
  - Cumulative impact
  - Ecology requirements for Settlement Agreement
- Status today
- Key Points
- Summary

Elements of our Cooperation

- Key modeling assumptions agreement Technical Guidance Document
- Compromise, to benefit communication based on many different sources of information
- Key parameters
  - Maintained currency MODFLOW visualizations.
  - Reviewed waste form release.
  - Thoroughly reviewed waste inventories.

Elements of our Cooperation

- Review process
  - QA slices
  - GAO QA participation
  - Frequent meetings to review key information
  - Pre-decisional Draft review

Elements of our Cooperation

Review Process - Staff Review

- Observed Input of data into STOMP model
- Reviewed STOMP users guide
- Reviewed Randy Kay USDOE QA Report
- Reviewed SAIC QA SOP's (QA management plan)
- Reviewed Technical Review Group process and results
- Reviewed Model Status Reports
- Reviewed Local Users Group criteria and deliverables
- QA Slices: Air impact analysis, Alternatives to supplemental treatment analysis

Elements of our Cooperation

Inventory

- Hired temporary employee with the following mission:
  - Independently collect inventory information.
  - Build data base to store information.
  - Participate in meetings about the EIS.
  - Review inventory data packages supplied by DOE and its contractors.
  - Review inventories in a pre-draft version on the EIS.

Elements of Our Cooperation

Inventory

- Alternatives:
  - Best Basis Inventory (BBI).
  - Hanford Soil Inventory Model (SIM).

- Cumulative Inventories:
  - Hanford Soil Inventory Model (SIM).
  - Other DOE reports.

Elements of Our Cooperation

Inventory

- Special evaluation of inventories of I-129 and Tc-99 in tank inventories.
- Evaluation of mass inventories of Uranium and Plutonium.
- Evaluation of inventories in the 100 and 300 Areas.
- Long term effects from Waste Management.

Elements of Our Cooperation

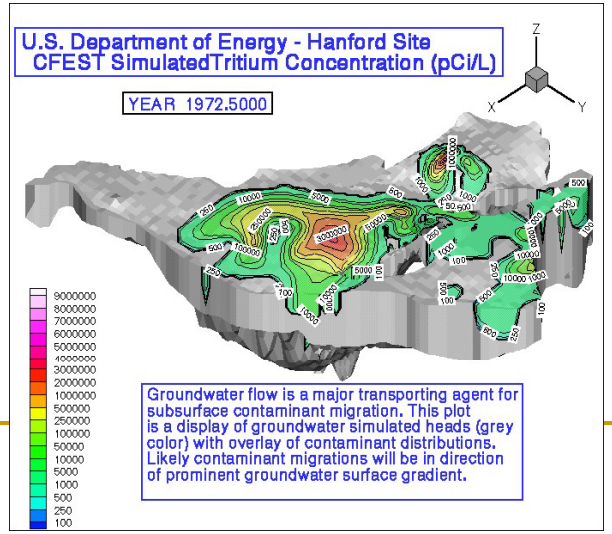
Inventory - Conclusions

- The inventories for the alternatives used in the EIS are as good as can be achieved.
- The some of the cumulative inventories for older waste sites have significant uncertainty.
- The tank waste inventories of I-129 and Tc-99 used in the EIS are higher than newer estimates, a conservative approach was used.
- The waste form and its inventory of I-129 and Tc-99 plays the biggest role for the long term effects.

Modeling
Groundwater and Vadose Zone

- Ecology staff reviewed waste release mechanisms, vadose zone modeling, and groundwater modeling.

- Ecology contracted Shannon & Wilson to review the vadose zone and groundwater flow and contaminant transport modeling.



Modeling

- Shannon & Wilson:
  - Reviewed documents related to subsurface movement of contamination at the Hanford Site.
  - Reviewed interim modeling results.
  - Reviewed groundwater flow and contaminant transport related portions of the draft TC&WM EIS.
  - Hanford conceptual site model.
  - Vadose zone model - STOMP.
  - Saturated zone groundwater flow model - MODFLOW.
  - Saturated zone contaminant transport model - Blue Dot X (modification of RAND3D).
  - Sensitivity Analysis.

Modeling

Groundwater 3-D flow field model

- 3-D Modeling:
  - Impacts on alternatives for 10,000 year period.
  - Basis provided for cumulative impacts.
  - Effects of uncertainties and gaps in input data.
- Met Technical Guidance Document requirements:
  - Use transient flow field with operational recharge to the aquifer of 3.5 mm/year.
  - Investigate both a base case (east flow) and alternate case (north flow).
  - Use Vadose zone and contaminant transport modeling framework.
- Monte Carlo model optimization and uncertainty analysis.

Modeling Conclusions

- Meets the standard of practice for the industry.
- Adequately represents the known physical processes that control water and contaminant movement in the subsurface at Hanford.
- Meets the requirements for decision processes for the TC&WM EIS for evaluation of alternatives.
- Does not contain sufficient detail to evaluate closure processes for individual sites, but this was not the purpose of the model.

Elements of Our Cooperation

Pre-decisional Review

- Did a detailed review of early draft.
- We submitted general and detailed comments (~360).
- Met in Washington DC to participate in DOE Headquarters comment resolution workshop.
- Real time revisions.
- Final release reviewed and approved by the current administration.

Elements of Our Cooperation
Pre-decisional Review

- Reviewed the EIS to make sure it meets the various assumptions and scenarios agreed by USDOE and Ecology in the Technical Guidance Document For Tank Closure EIS.
- Participated in discussions with the USDOE and independent Expert Panel (MTRG-Panel) and resolved a number of technical issues (e.g. calibration, model validation) from the Hanford Solid Waste EIS.

Elements of Our Cooperation

Cumulative Impact: Technical Approach

History Matching and Uncertainty

- Reviewed the model validation steps to make sure a defensible validation is achieved.
- Tested the results at a number of selected waste sites both at a local and regional basis.
- Reviewed the various sensitivity analysis to address uncertainty.
- Historical matching of sitewide plumes were found to be reasonable with the predicted studies which was one of the major concerns of the previous Hanford Solid Waste EIS.

Elements of our cooperation

Cumulative Impact

- The 3 Cumulative Combinations USDOE evaluated are adequate to see the overall cumulative impact within the broad ranges:
  - Minimal /No action
  - DOE's preferred alternatives
  - Maximum Action: Maximum potential short-term impacts with lowest long-term impacts on groundwater.
- Ecology is currently reviewing to find out if different point of calculations are needed (other than the core zone boundary and the Columbia River near-shore).

Met Ecology Requirements from Settlement Agreement

- Ecology requested the use of Particle Tracking for:

  1)Point of compliance.

  2)Generate plume maps.

  3) Show waste with highest impact.

- Particle Tracking met requirements by:
  - TGD directed comparison of two flow fields 1) Base Case – eastward flow direction 2) Alternate case- northward.
  - Used for model tracking, calibration, geographic concentrations, dispersal (spreading), and sensitivity analysis.

Ecology Status

- Foreword is published in the Draft EIS.
- Focus sheet that summarizes the Foreword.
- We are currently conducting a detail review of the Draft EIS.
- Soon we have available Focus Sheets on multiple Draft EIS topics describing our perspective and findings.
- We will develop detailed comments on the Draft EIS and submit them in a letter.
- Will attend and present at the various public meetings.

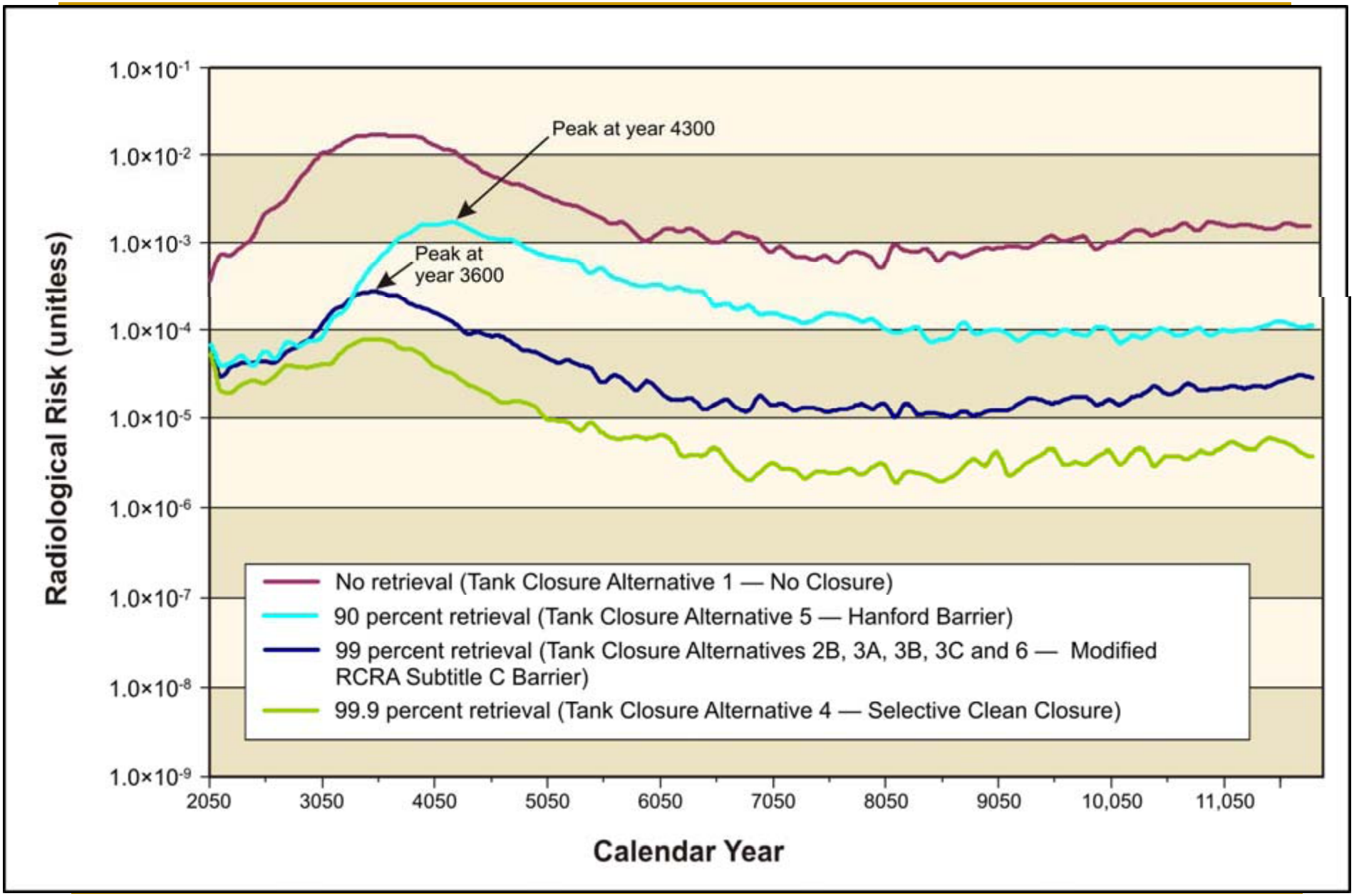
What Ecology Thinks is Important in the EIS

- We want USDOE to vitrify all Low Activity Waste (second LAW plant) -- Alternative 2B.
- EIS indicates that greater than 99% retrieval makes a difference.
- Deep vadose zone remediation is needed (tank farms and elsewhere)
- FFTF entombment is okay. Doesn't have a significant impact.
- Integrated Disposal Facility in 200 East is better from impact to groundwater.
- Offsite waste disposal causes significant environment impacts.
- Secondary waste disposal causes significant groundwater impacts and should be mitigated to below levels of concern.

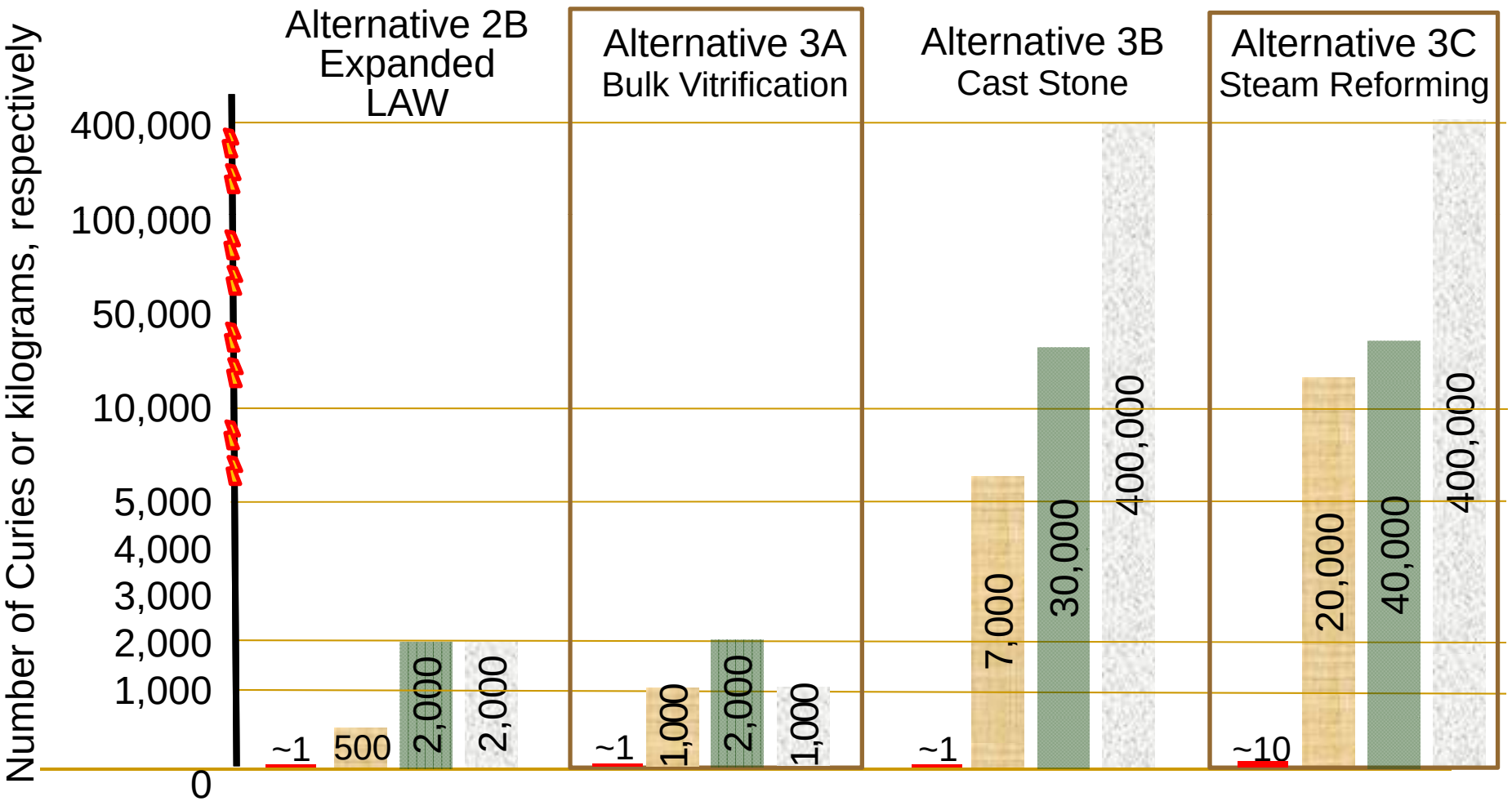
Summary

- Agreed with alternatives presented.
- Doing detailed review and will provide comments for clarification and to identify any SEPA issues.
- Data and QA are acceptable.
- Cumulative Analysis is acceptable.
- Presentation of the data makes it hard to find some answers.

Back Up Slides


Radiological Risk (unitless)
1.0×10-1
1.0×10-2
1.0×10-3
1.0×10-4
1.0×10-5
1.0×10-6
1.0×10-7
1.0×10-8
1.0×10-9
Peak at year 4300
Peak at year 3600
No retrieval (Tank Closure Alternative 1 — No Closure)
90 percent retrieval (Tank Closure Alternative 5 — Hanford Barrier)
99 percent retrieval (Tank Closure Alternatives 2B, 3A, 3B, 3C and 6 — Modified RCRA Subtitle C Barrier)
99.9 percent retrieval (Tank Closure Alternative 4 — Selective Clean Closure)
2050
3050
4050
5050
6050
7050
8050
9050
10,050
11,050
Calendar Year

Contaminants of Potential Concern (Released to the Environment)



“Off-Site Waste” Currently Identified in the Waste Management Programmatic EIS

Hanford is one of two national repositories identified for potential disposal of low-level radioactive waste (LLW) and “mixed” (chemical/radioactive) low-level waste (MLLW) in the Waste Management Programmatic EIS.

Hanford had been identified as a site available for “interim storage” of certain transuranic (TRU) and TRU mixed (TRUM) waste from other USDOE sites, before eventual disposal at a facility in New Mexico.

Site-Specific National Environmental Policy Act evaluation upcoming.

"Off-Site Waste"—Current Situation

- Washington v. Bodman settlement: moratorium on off-site LLW/MLLW and TRU/TRUM until USDOE finalizes the TC&WM EIS and publishes a record of decision.
- There are certain exceptions, such as reactor compartments from the Puget Sound and Pearl Harbor Naval Shipyards.

Commitment with Settlement Agreement

- Letter between State of Washington, U.S. Department of Justice hinges Consent Decree entry on inclusion by USDOE of “no off-site waste” preferred alternative in the draft TC&WM EIS.

- Preferred alternative would continue current moratorium covering LLW and MLLW disposal, TRU and TRUM storage (w/ same limitations and exceptions) until at least when the Waste Treatment Plant is operational (i.e., ~2022).

What's not covered by Waste Moratorium?

- New moratorium would not apply to wastes/materials for which there is no current USDOE decision such as:
  - Greater than Class C waste
  - Elemental Mercury