



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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2006I-075

December 8, 2005

Mr. Todd Martin
Hanford Advisory Board
713 Jadwin Ave., Suite 4
Richland, WA 99352

Re: Hanford Advisory Board (HAB) Consensus Advice #183:
Bulk Vitrification

Dear Mr. Martin:

Thank you for the Board's letter of advice on the Bulk Vitrification Demonstration Project. Ecology shares many of your concerns and appreciates the time and attention the Board has devoted to this project.

Background

Ecology agrees that the bulk vitrification process must produce a glass product that performs as well as the Low Activity Waste (LAW) glass referenced in the 2001 ILAW Performance Assessment to be a viable alternative to a second Waste Treatment Plant (WTP) LAW melter facility. Assuming the bulk vitrification process can produce "good" glass, the state has additional criteria for determining if we will allow a full scale bulk vitrification facility at Hanford. Design, construction, and operational costs are significant factors. However, Ecology must consider other important factors in its decision process which include: the timing for when a full scale bulk vitrification facility can be operational; flexibility on treating different wastes; ability to achieve higher waste loading; the volume of waste produced; secondary waste; and, a variety of lesser issues. These criteria have been shared previously with the Board and are provided as an attachment to this letter.

We agree that the increased costs of the Bulk Vitrification Demonstration Project are a matter of concern. However, we think it is important to note that the \$150 million not only includes construction of the project, but also includes all previous lab and field testing and analytical costs, retrieval of S-109, and projected operational costs for production and testing of the 50 waste boxes. It is important to compare like costs when analyzing the costs of the project. The projected construction cost of the Bulk



Vitrification Demonstration Project is \$97M. This is the figure we will be using to estimate the cost of a full scale facility. This represents a much smaller percentage of the baseline cost compared to construction of the existing LAW Vitrification Plant. Further, the cost of the existing LAW Vitrification Plant is also increasing. We will be able to review new Estimate at Completion data in spring of 2006. If a second LAW Vitrification Plant is built, it will need to be twice the size of the current LAW Vitrification Plant.

The state is extremely concerned that the federal government has not provided sufficient funds to complete the requirements of all TPA milestones. This includes the demonstrations necessary to meet TPA Milestone M-62-08 and determine how we will treat the remaining Hanford tank waste. The state continues to believe that bulk vitrification has the potential to provide additional "good as glass" tank treatment while providing additional advantages over a second WTP LAW facility. The Bulk Vitrification Demonstration Project is the only way to evaluate these possibilities.

Response to Advice

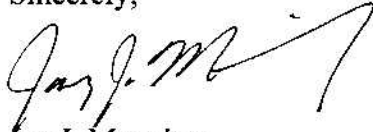
- **Ecology's decision to stop the Bulk Vitrification Demonstration Project is different from and much more subjective than our decision to choose bulk vitrification to treat the remaining waste.** Each test box is designed to answer specific questions about the viability of the technology as described by our criteria to accept bulk vitrification as a treatment option. We are watching these tests very closely and our main priority is that it produces good glass. The nature of a demonstration project is that you don't know what the technology can do, and stopping too soon could mean missing an opportunity to do better than the baseline. We share your concerns on cost and will keep that in perspective as we move through this demonstration.
- **We agree with the Board's suggestion for an interim cost comparison to be delivered in June 2006.** The new BNI estimate at completion (EAC) will have been completed and reviewed by the Corps of Engineers. Additionally, U.S. Department of Energy will have completed the design of the demonstration project and should be able to provide an accurate cost estimate for the full-scale facility. However, we are not sure there will be enough data to evaluate all the *performance aspects* of bulk vitrification glass at this time.
- **Ecology will be comparing the results of the Bulk Vitrification Demonstration Project to the criteria for accepting bulk vitrification as an alternative to a second WTP LAW facility.** When Ecology becomes convinced that the potential benefits of bulk vitrification are outweighed by the drawbacks and risks, we will stop the demonstration. While it is difficult to identify a specific point, we can say that if

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tests demonstrate that the quality of bulk vitrification glass is not comparable to the WTP LAW glass, or that the bulk vitrification glass could not adequately capture contaminants of concern, we would stop the demonstration.

Again, thank you for the Board's advice and consideration. If you have additional questions or concerns, please contact Suzanne Dahl at (509) 372-7892.

Sincerely,



Jay J. Manning
Director

Enclosure

cc:

Laura Cusak, Ecology
Suzanne Dahl, Ecology

Supplemental Treatment Selection

Current Information on Comparisons

Identified Goals, Criteria, and Measures Approach and Basis for Evaluation

GOAL	CRITERION	MEASURES	Bulk Vitrification	Cast Stone	Steam Reforming	Second ILAW Plant
Ensure worker and public safety	Achieve Safe System	Independent safety experts' assessment (Dose Based)	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	
Maximize schedule acceleration	Confidence in meeting 2029 date Process Capacity	Can technology achieve 10 GPM in time to meet 2029? Metric tons of waste (Mn) processed for 2029 Wt% Product Immobilized Waste MnO Loading (Mn) Mn by 2029	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	75 MTPD 60% 1.6E 41,000 MT Mn
Maximize operability	Process/Operability risk	Independent expert assessment	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Number of packaged items per year is 87,000
Minimize overall system interface	System interface impacts Dose of waste package Volume returned to DDT's	Liquid effluent compared to ETP capacity Dose of waste package Volume returned to DDT's	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	200 - 300 cubic feet design volume provides packaging over capacity
Provide environmental protection comparable to current vitrified waste disposal plan*	Disposal system performance Disposal space required Secondary wastes produced Liquid Waste Volume Solid Waste Volume Waste form performance	Disposal system performance Disposal space required Secondary wastes produced Liquid Waste Volume Solid Waste Volume Waste form performance	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	WTP glass that allows for the disposal of 1.4E+10 in 2029. 1.2E+10 glass that allows for the disposal of 1.4E+10 in 2029. 1.2E+10 glass that allows for the disposal of 1.4E+10 in 2029.
Meet PCB Framework Agreement Criteria	For DDT waste, meet TSCA disposal requirements and demonstrate effective decontamination following dilution associated with packaging treatment	For DDT waste, meet TSCA disposal requirements and demonstrate effective decontamination following dilution associated with packaging treatment	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	WTP glass is vitrified and the aluminum decontaminated by the glass. WTP glass is vitrified and the aluminum decontaminated by the glass. WTP glass is vitrified and the aluminum decontaminated by the glass.
Maximize cost effectiveness	Life cycle cost** Peak year cost	Life cycle cost (LCC) Peak year cost	Based on available DOE and Preliminary Design Assessment (PDA) data, the Bulk Vitrification process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Cast Stone process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	Based on available DOE and Preliminary Design Assessment (PDA) data, the Steam Reforming process is the most effective for ensuring worker and public safety. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field. The process is well understood and has been demonstrated in the field.	WTP range of cost for 100% of volume is 1.4E+10 to 1.1E+10 (conservative) WTP Target Range WTP-12118 Run 1 September, 2028 WTP-12118 Run 2 September, 2028 WTP-12118 Run 3 September, 2028 WTP-12118 Run 4 September, 2028 WTP-12118 Run 5 September, 2028 WTP-12118 Run 6 September, 2028 WTP-12118 Run 7 September, 2028 WTP-12118 Run 8 September, 2028 WTP-12118 Run 9 September, 2028 WTP-12118 Run 10 September, 2028

* Achieve comparable level of environmental performance to vitrification considering the nature of waste, pretreatment, and performance of the immobilized waste form under disposal conditions.
 ** Substantive cost goals include consideration of the difficulty of obtaining facility permits, waste characterization, additional inventories required, increased disposal costs based on waste volume differences, etc.

1. Under capital intensive, input number indicates that volume glass is 1.4E+10
 2. Under capital intensive based on 6.1E+10 GPM
 3. Higher waste-to-glass ratio would require additional capacity for Cast Stone and Steam Reforming
 4. Bulk Vitrification cost conservative results based on 1.4E+10 GPM without additional capacity
 5. Comparison is by total volume of immobilized waste for 41,000 MT of Mn

Costs are based on DOE
 Resources are based on CH2M
 WTP measures are the primary for production