

## Draft HAB Advice on Safety Culture at the Waste Treatment and Immobilization Plant

---

### Background:

The Waste Treatment and Immobilization Plant (WTP or Vit Plant) is the cornerstone of Hanford cleanup. There is broad agreement that Hanford's tank waste urgently needs to be removed and vitrified. The Board is issuing the following advice because it wants the WTP to effectively and safely vitrify Hanford's tank waste.

The Board is concerned that the U.S. Department of Energy (DOE) started down a path to design and build a facility to vitrify Hanford's high-level tank waste without an adequate technical basis. This approach has created a cascade of events that has led to the current situation in which there is uncertainty about whether the plant will work safely and effectively. For example, DOE's contract with Bechtel for WTP narrowed the initial design concept to British Nuclear Fuels, Ltd. Design, which may have contributed to current problems.

The Board believes that DOE's lack of technical understanding of the WTP design, project management, and accountable contracting strategy (i.e. DOE's inability to influence contractor safety management plans) are some of the root causes of safety culture issues at the WTP.

It is essential that DOE and the WTP contractor have a highly trained staff with strong skills in chemical, nuclear, systems engineering, and complex project management.

Principles of Integrated Safety Management (ISM) should have been applied to risk identification and mitigation as defined in DOE Order 4700.1. Application of ISM principles requires establishing a safety-based final design before proceeding with construction of the safety related components of WTP. The Board believes that two major errors were made: 1) Failure to apply principles of ISM to facility design; 2) Failure to adhere to principles of behavior based on the core values of a safety culture essential to the implementation of ISM.

The Board believes that healing a broken safety culture is an essential step in a process to get the WTP back on track. The Board agrees with DOE that a robust safety culture is an organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect workers, the public, and the environment.

### Advice Points:

- The Board advises that there needs to be an independent and authoritative entity to drive nuclear safety as the overriding priority.
- The Board advises that DOE should ensure DOE and contractor project managers have the technical expertise to guarantee design and construction of all elements of the WTP are performed with a "safety first" posture. [*combine with #3 below?*]
- The Board advises DOE to increase their technical staff in order to more competently oversee contractor activities. In addition, DOE should maintain a group of consultants from university, national labs, etc. who could provide technical advice when needed to assist in independent contractor oversight. [*combine with #2 above?*]

- The Board advises DOE to ensure that there is an independent, functioning design authority.
- **[Shorten/revisit]** The Board advises that DOE assemble an independent and highly technically qualified oversight team to :
  - Identify and resolve issues
  - Conduct a full systems analysis of the problem
  - Understand the properties of the waste as a critical path
  - Consider the implications of an alternate glass form
  - Develop and implement a sound technical and programmatic basis for operation
  - Identify a technical and operating strategy to process all the waste
  - **[Reword]** Review the design and process issues (i.e., reconsider black cell concept, pulse jet mixers)/ ...Investigate and consider alternatives to the current system design...pretreatment facility
- DOE should require regularly scheduled, transparent, self-assessments of DOE and contractor project staff to evaluate safety and technical performance against best management practices and nuclear safety standards (i.e. 10 CFR 830).
- The Board advises DOE to implement the definition of safety culture as accepted and articulated in the Energy Facility Contractors Group Report (**publication date?**) and DOE's Office of River Protection's Improvement Plan (April 2012): "Safety culture is an organization's values and behaviors modeled by its leaders and internalized by its members, which serve to make safe performance of work the overriding priority to protect workers, the public, and the environment."
- **[Shorten?]** The Board advises DOE to enforce the following behaviors in its work to make safe performance of work the overriding priority and to hold DOE and contractor managers and employees at all levels accountable for these behaviors:
  - Demonstrate that safe performance of work is preeminent in everything, including design, design approval, safety analysis, procedure writing, procurement, construction, product quality, operations, maintenance, demolition, and remediation.
  - Ensure that personal relationships with contractors, or other factors, do not result in a loss of oversight mentality by DOE staff.
  - Invite a critical analysis of work through an open, honest, and transparent process.
  - Identify and eliminate behaviors that undermine and prevent the reporting of concerns and issues.
  - Protect those who report concerns from retaliation.

- Demonstrate that cost and schedule milestones do not artificially constrain and compromise safety. As a principle, milestones may always be changed to ensure that no shortcuts to safety are made.
- Reward employees for raising safety concerns and issues when they are observed; communicate actions that demonstrate accountability.
- Ensure senior management demonstrates, through active listening and communications, that it respects and cares for the welfare of the employees. Validate senior management's attitude through an open, non-adversarial employee feedback process.
- The Board advises DOE to have DOE's Office of Health, Safety and Security (HSS) frequently assess safety culture using the above behaviors to identify areas for improvement and ensure that these behaviors are institutionalized.
- The Board advises DOE to continue to integrate tank farms and WTP as a single system.
- The Board advises that DOE establish and maintain a culture that welcomes worker input and responds in a manner that is protective of the employee and inspires trust. The Board advises DOE to meet with U.S. Naval Reactors Headquarters to learn from them how Naval Reactors culture is created and safety is performed with an eye toward emulating that culture within DOE operations.
- The Board advises that DOE should ensure that the Employee Concerns Program is independent and demonstrates their intolerance of reprisal from contractors or its own personnel (see HAB Advice XXX).
- The Board advises DOE to award contracts on cost plus fixed fee for projects such as the WTP. If the contract is to be incentivized, award should be made for a long term functioning WTP which ensures safe construction and operations. The Board advises DOE not to incentivize DOE or WTP contractors for TPA milestone dates over safety and successful operations.
- The Board advises DOE to communicate behavioral expectations to contract leadership and require the contractor to assess the leadership behavior of their management.
- Incorporate ISM safety risk assessment and mitigation analysis to examine the potential risks during future operations. The analysis should include, but not be limited to:
  - Ability to accommodate all the waste
  - Mitigation [clarity of what this mean?] of technical misunderstandings
  - Equipment failure
  - Maintenance risks
  - Management of operator error