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**To:** <andrewt@dnfsb.gov>  
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**Subject:** DNFSB Recommendation 2011-1

Greetings --

I am writing to comment on the Defense Nuclear Facility Safety Board's recent recommendation regarding safety culture problems at the U.S. Department of Energy's Waste Treatment Plant on the Hanford site in Washington State. In 2005, I authored a study for Science and Global Security at Princeton University, which covers this concern in some detail.  
<http://www.princeton.edu/sgs/publications/sgs/pdf/13%201-2%20alvarez%2043%2086.pdf>.

At a life-cycle cost range between \$66.8 to \$74.4 billion, the Waste Treatment Plant is the, perhaps, the single largest, most complex and potentially risky nuclear project undertaken in the United States. The accident consequences at Hanford's Waste Treatment Plant are comparable to those at a large nuclear reactor. The waste treatment plant involves processing of tens of megacuries of radiochemicals, posing potential risks of leaks, nuclear criticalities, explosions, fires and large environmental releases.

Safety issues associated with pre-treatment of wastes such as criticality prevention, pipe and pump plugging, hydrogen gas build-up, fire-proofing are especially important given the paucity of waste characterization data. The National Research Council finds that Hanford waste data "is of little value in designing chemical remediation processing." In light of these uncertainties, worldwide high-level waste vitrification experience encourages extraordinary caution be exercised at Hanford. But DOE has raised the stakes by deciding to forego a pilot plant using actual Hanford wastes and to concurrently design and construct a full-scale facility.

The Nuclear Regulatory Commission (NRC) reported in 2001 that plant "has more stored chemical energy for prompt potential events directly involving the radionuclides in their mobile forms," and thus, radiological consequences to members of the public could result in doses in the hundreds or thousands of rems ( NUREG-1747, p. 26) Chemicals also pose significant hazards. Tank failures containing nitric acid and anhydrous ammonia could cause severe injuries and death and, according to the U.S. Nuclear Regulatory Commission "render the facility uninhabitable" to an area extending beyond a mile (NUREG-1747, p.57).

During design and construction of a nuclear facility, DOE is required by regulation to encourage higher margins of safety and to envelop uncertainties inherent with first-of-a-kind, ultra-hazardous operations. The issues raised by the DNFSB have been raised before by the NRC, which prior to 2001, was preparing to license this operation. The NRC concluded that "regulatory and safety issues associated with a much larger facility do not appear to have been considered...On many occasions, there was an implication that regulatory reviews were not allowed to impact cost and schedule (NUREG -1747, p. 134-135).In fact in 2003 a DOE contractor announced

that it had taken steps to "reduce conservatism" in its high-level waste safety controls at Hanford to "allow work to be performed more quickly ( U.S. Department of Energy, Integrated Mission Acceleration Plan, CH2MHill, RPP 13678, Rev. 0, March 2003, p. 8.4).

The Energy Department's safety culture at the Waste Treatment Plant and high-level waste tank farm operations continues to leave much to be desired. The Board is well justified in issuing this recommendation.

Sincerely,

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