

EXECUTIVE SUMMARY

Reducing the Risks of High-Level Radioactive Wastes at Hanford

A new report, published by Robert Alvarez in collaboration with the Government Accountability Project and the Institute for Policy Studies, reveals serious safety risks in the future operation of the Hanford Nuclear Site's Waste Treatment Plant. The full report can be found at www.whistleblower.org.

Background

- High-level radioactive wastes resulting from plutonium production at the U.S. Department of Energy's (DOE) Hanford site in Washington State are among the largest and most dangerous byproducts of the nuclear arms race. (See Full Report "Reducing the Risks of High-Level Radioactive Wastes at Hanford", p. 1)
- The Energy Department plans to terminate its environmental mission at Hanford and all other DOE sites over the next 30 years. DOE intends to dispose of approximately 90 percent of Hanford's high-level wastes onsite, process the remainder into glass for geological disposal, and permanently close 177 large tanks, containing 53 million gallons of high-level nuclear waste. (Report, p. 1)
- Central to the department's goal at Hanford is to speed up the most expensive, complex, and risky environmental project in the United States. Estimated life-cycle costs for processing Hanford's wastes are between \$41.6 and \$56.9 billion. No country has processed anything like Hanford's large, complex brew of wastes. (Report, p. 6)

Significant Processing Risks

- The Nuclear Regulatory Commission (NRC) estimated that the overall unmitigated risk of major radiological and chemical accidents at Hanford's high-level waste operations was a 50-50 chance over an estimated 28 years of operation of the facility. (Report, p. 19)
- According to NRC more than two-dozen significant safety issues and over fifty specific topics remained unresolved. (Report, p. 18)
- Existing engineering controls and administrative methods can reduce accident risks at the Hanford Waste Treatment Plant to acceptable levels, with the possible exception of glass melters, designed to mix radioactive wastes with molten glass. They will be the largest in the world and pose the most severe consequences. (Report, p. 19)
- NRC warned that "few tests appear to be planned to verify safety parameters prior to construction." (Report, p. 19)

Department of Energy Experience

- Since 1991 there have been at least eight melter-related accidents and failures at DOE sites, including two steam explosions. (Report, p. 21)
- Storage problems stemming from the Cold War practices add significant risks to waste processing. More than a third of Hanford's tanks have leaked approximately one million gallons, contaminating groundwater that eventually enters the Columbia River. The structural integrity of dozens of aged tanks "represent immediate concerns," says the NRC. (Report, p. 12)

Disposal Risks

- DOE seeks to greatly expand onsite burial of defense high-level wastes at several sites. DOE's policy to further reduce high-level waste canister production, will lead to the onsite disposal of substantially larger amounts of radionuclides. (Report, p. 2)
- Before DOE initiated an accelerated cleanup plan in 2002, at least 98 percent of the total radioactivity was to be removed from soluble wastes at Hanford. Instead, DOE intends to bury wastes onsite from dozens of tanks without radionuclide separation, as well as undetermined amounts of tank residuals, and failed processing equipment containing high-level wastes. (Report, p. 14)
- As a result, at least 35 megacuries of radioactivity could be disposed on site at Hanford – more than twice the amount agreed to in 1997 by the NRC staff. (Report, p. 24)
- The National Research Council recently concluded that knowledge of the fate and transport of tank wastes into the Columbia River is tenuous, at best; and that premature failure of environmental barriers is likely. Current estimated disposal of iodine-129 (17 million year half-life) from processing wastes, appear to violate DOE's waste performance requirements and could contaminate groundwater in excess of EPA drinking water limits for thousands of years. (Report, p. 3)
- In 2002 by the U.S. Environmental Protection Agency found that fish near the site have the highest contaminant concentrations in the Main Stem Columbia River Basin. EPA estimated that lifetime fatal cancer risks from fish consumption to tribal people are as high as 1 in 50. Usually, EPA takes regulatory action when contaminant risks exceed 1 in 10,000 to 1 in 1,000,000. (Report, p. 30)

Project Management Issues

- The National Research Council finds that Hanford waste data "is of little value in designing chemical remediation processing." Yet, DOE has decided to forego a pilot plant using actual Hanford wastes and to concurrently design and construct a full-scale facility. (Report, p.34, 36)
- Capital costs for the Hanford vitrification plant are a relatively small portion of the total life-cycle costs for the project. The failure to address critical uncertainties in the design of and construction of the plant could significantly impact processing and disposal costs, and the overall success of this endeavor. DOE's policy to put concurrent design and construction on a "fast track" has led to costly and time-consuming mistakes. (Report, p. 4)
- Over the past 20 years, less than five percent of all defense high-level wastes have been processed, while costs soar, projected to exceed \$100 billion. DOE's inability to manage these projects is a major factor behind these difficulties. (Report, p. 5)

- The National Research Council has reported:
 - Environmental projects suffer from major delays and are about 50 percent more expensive than comparable federal and private-sector projects;
 - Up-front project planning is inadequate;
 - There is no consistent system for evaluating project risks; and
 - DOE is not in control of many of its projects. (Report, p. 32)

Recommendations

To reduce the risks of Hanford's high-level wastes this paper makes the following recommendations:

- The Nuclear Regulatory Commission should be authorized to regulate the design and construction of Hanford's waste processing operations; and certify the safety of storage tanks; (Report, p. 29)
- Risk-based criteria identified by the DOE that would allow for the geological disposal of all DOE HLW canisters should be adopted; (Report, p. 31)
- More restrictive limits for onsite disposal of tank wastes should be imposed on the permanent onsite disposal of high-level tank wastes. These limits should be developed with affected states and Indian tribes and public stakeholders This should be done under existing law, through formal rule making by of the NRC; (Report, p. 31)
- The Energy Department should build pilot operations for high-level waste pretreatment, feed preparation and melters using actual Hanford wastes; and
- DOE should strengthen its oversight of this project by establishing a full-time Hanford high-level waste processing project management group, reporting to the Assistant Secretary for Environmental Management. (Report, p. 33)