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Case No. 21, Day 2
Date Due: Oct. 16, 2011

Learning Objective: Describe the Defense Nuclear Facilities Safety Board report, the 2010 Beryllium disease report, 2007 tank farm vapor exposures, and worker safety culture.

Hanford's Worker Safety Culture Has Created a Sometimes Hostile and Unsafe Work Environment that Exposes Workers to Greater Health Risks and May Lead to Larger Safety Issues at the Vitrification Plant Still Under Construction

Abstract: The worker safety culture of any organization can be seen as a power relationship, in which management has the greatest role in setting risk levels and promoting safety for employees. While some potential human exposure to nuclear waste and hazardous material is inevitable at the Hanford Nuclear Reservation, the most contaminated Superfund site in the United States, complaints by Hanford workers have questioned how committed the U.S. Department of Energy and its contractors are in assuring a strong nuclear safety culture. Cases involving the waste treatment plant, beryllium exposure to workers, and vapors from tanks holding highly hazardous materials point to failures by the department and its contractors to fulfill a 20-year-old federal nuclear safety policy mandate.

Introduction: Our new policy analyst joining the Washington Department of Ecology Nuclear Waste Program starts his new job addressing human exposure issues to radioactive materials amid serious allegations about the worker safety culture at the Hanford Nuclear Reservation. Walter Tamosaitis, a former engineering manager for the $12 billion waste treatment plant (WTP) at Hanford still under construction by contractor Bechtel National, Inc., repeatedly has been profiled in the news for having been removed from his position in July 2010 immediately after raising serious safety concerns about the WTP with senior management.[1] He claimed explosions in the plant's pipes could occur, setting up a dangerous set of reactions. The plant is designed to "vitrify" into glass logs the more than 50 million gallons of heavy metals and radioactive elements within Hanford's 177 underground waste tanks, but reports have alleged serious plant equipment failures could occur, even "nuclear-chain reactions."[1] Upon his removal, Tamosaitis filed whistleblower complaints alleging "a failed safety culture" at the plant.[1,2] These are not the first allegations of worker safety issues at Hanford; recent concerns have focused on workers' exposure to beryllium and hazardous wastes at the site's tank farm. The charges contradict the messages about a workplace safety culture that are posted throughout the reservation and at the south entrance, where a large sign reads: "Welcome to Hanford: where safety comes first."

Worker Safety Environment at Hanford: The Department of Energy (DOE), which manages Hanford, coordinates the work of its major contractors and acknowledges "most of the risk is

borne by the workers themselves." However, DOE stresses that safety is a priority for the estimated 10,000 contract workers at the Hanford site and that safety standards at Hanford can and do exceed standards set by the federal Occupational Safety and Health Administration.[3] According to the DOE, Hanford's Worker Safety and Health Rule provides the framework for the many contractors and subcontractors "to ensure there are clear roles, responsibilities, and procedures to ensure the safety and health of workers in the workplace."[4] To that end there is a Worker Safety and Health Program in place applicable to all contractors, though it does not cover a separate chronic beryllium disease prevention program.[5]

The nature of the massive cleanup project at Hanford puts workers into contact with highly radioactive debris. They are potentially exposed to beryllium and carcinogens, and they work at a site that contains more than 50 million gallons of high-level radioactive wastes and toxic chemicals that are slated to be vitrified in the WTP.[6] Workers also face a range of occupational risks associated with any major construction site.[3] However, the workers are cleaning up the nation's most contaminated nuclear site for a federal agency that has no independent federal safety oversight. Neither OSHA nor the Nuclear Regulatory Commission have jurisdiction at Hanford; DOE regulates itself.[6] Internally, DOE created the Office of Health, Safety and Security (HSS) in 2006 to implement nuclear safety and worker health issues and provide "independent oversight inspections and reviews of contractor and DOE performance in safety and security."[7] Ultimately, the risks faced by Hanford workers will be driven by the safety culture of the organization for whom they work and workplace where the work is performed, and how successful, or unsuccessful, that organization's safety-related operations are.[8]

Safety culture can be defined as "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior" that determine an organization's commitment to health and safety management.[9] However, a safety culture should be viewed more as a power relationship within organizations, which are arenas for conflicting interests where disagreement is common. Ultimately, the promotion of safety requires a high degree of control over all aspects of risk, for which management has the greatest responsibility.[9] Seen in this framework, the DOE and its principal contractors such as Bechtel National, Inc, which is building the WTP, have a disproportionate degree of leverage, and they control the mechanisms that mitigate the risks and that promote safe working conditions in a highly challenging Superfund site. (See appendix 1 for diagram of a top-down approach to worker safety culture.) In

the past few years, the DOE's and its contractors' safety record has been repeatedly called into question.

Chronic Beryllium Disease Concerns: One risk faced by Hanford workers is chronic beryllium disease (CBD), a legacy of contamination from past work at Hanford using beryllium alloys in equipment.[10,11] Long-term exposure to beryllium can increase a person's risk of developing lung cancer, and up to 15% of persons exposed to the metal in the air become sensitive to it and may develop CBD, an irreversible condition leading to permanent scarring of the lungs (see appendix 1).[12] In June 2010, the DOE's HSS issued a report on Hanford's CBD program, in response to complaints by Hanford Advisory Board (HAB), a consortium of stakeholders who provide non-binding advice the DOE on issues relating to Hanford's safety and cleanup. HAB demanded that DOE do more to alert retired workers they might be at risk of CBD, and the HAB complained that the DOE's two previous reviews of Hanford's CBD program had not been implemented.[13] As of February 2010, 32 workers were diagnosed with CBD and 95 sensitized to CBD, mainly due to beryllium dust exposure in buildings where the metal was used in reactors.[13] The June 2010 report agreed with the HAB and concluded "the level of attention applied to beryllium has not been sufficient to ensure that all programs are adequately implemented." The report identified a number of required corrective actions, including possible changes to further strengthen worker protection, but did not agree with the stakeholder groups that "Hanford management does not place sufficient priority on the health and safety of Hanford workers."[10]

Storage Tank Safety Issues: Another potential safety concern at Hanford is the waste retrieval process from the 177 buried tanks that contain the more than 50 million gallons of toxic slurry and sludge dating from Hanford's plutonium production from the 1940s to 1980s. Contractors are presently retrieving the waste from older single shell tanks and moving them to double shell tanks. The ultimate goal is to vitrify the waste at the WTP into glass logs for long-term storage.[14] During the waste retrieval process, workers are potentially exposed to chemical vapors from the tanks, which hold more than 1,500 known chemicals and radioactive materials.[14] Concerns about the safety of tank farm vapors received national media attention in 2004, when workers called attention to the possible health effects from working at the tank farms and reported exposures (eye and throat irritation, breathing problems, nausea). As a result of complaints, managers of the conducted a chemical hazard evaluation, provided voluntary air

respiratory protection for all workers, and sought out worker involvement to develop solutions.[14] A company funded study by the Hanford contractor CH2M Hill found only limited exposure areas to toxic vapors, but reported that "a small percentage of workers still feel uncomfortable even in the zones that have been determined safe."[14] A DOE investigation of a 2007 workplace spill of about 85 gallons of tank waste found a number of program problems, including the timely monitoring for exposures by workers. In that case, the monitoring occurred more than 13 hours after the incident. However, the report also found that the event would have been more severe—including exposure to higher radiation levels and concentrations of chemicals—had more workers been near the site during the accidental release.[15] While serious, these incidents would soon be overshadowed by more serious safety issues raised by Tamosaitis in mid-2010.

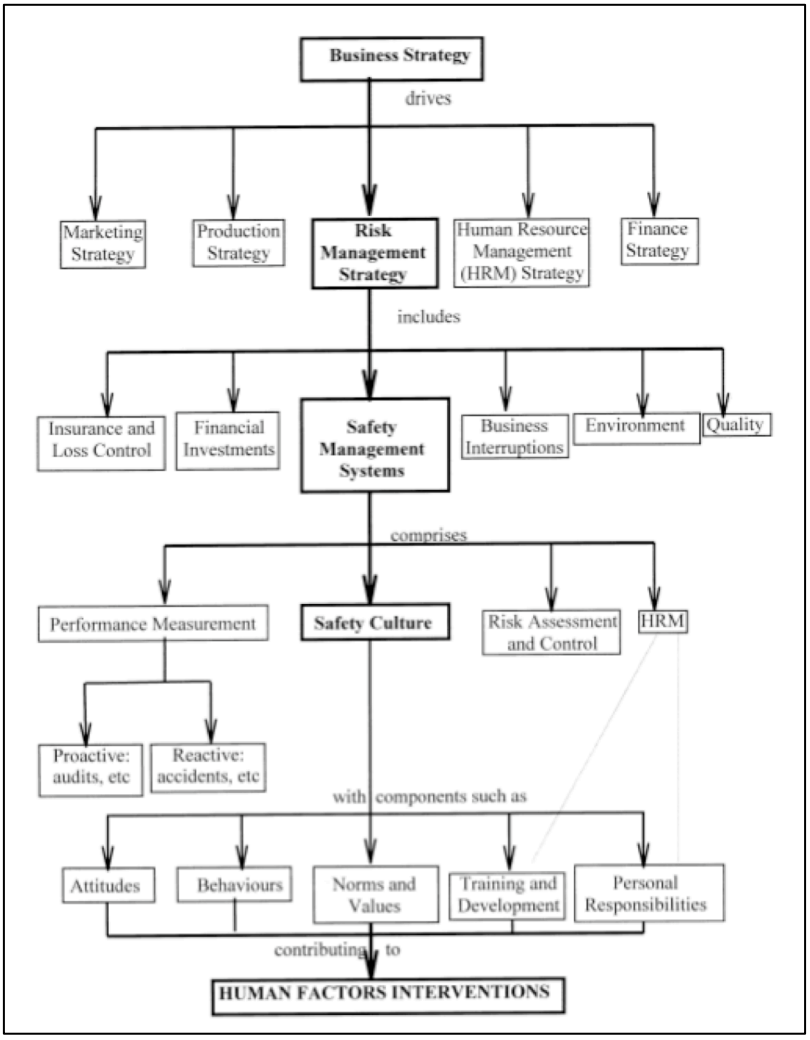
Major Criticism of Worker Safety Culture: As a result of Tamosaitis' whistleblowing about the WTP, the Defense Nuclear Facilities Safety Board issued a scathing indictment of the worker safety culture at the WTP in early June 2011. The board is an independent federal agency mandated under the Atomic Energy Act is to provide safety oversight over the nuclear weapons complex operated by the DOE.[16] The board concluded WTP's safety culture was "flawed" and that it defeated the DOE's mandate to establish and maintain a strong safety culture at its nuclear facilities.[2] The board interviewed 45 witnesses, reviewed 30,000 pages of documents, and held closed and public hearings on safety issues at the WTP.[2] The board's report found that "DOE and contractor project management behaviors reinforce a subculture that deters timely reporting, acknowledgement, and ultimate resolution of technical safety issues."[2] Expressions of technical dissent regarding safety, especially those impacting schedules and budget, were discouraged. The board noted it was critical that "workers feel empowered to speak candidly without fear of retribution or criticism" and that failing to so "can lead to catastrophic consequences." The board squarely blamed management for creating an atmosphere in which the fear of retribution undermined the goal of "building a safe and operationally sound nuclear facility."[2] The board called upon Steven Chu, secretary for the DOE, to champion corrective actions, otherwise the mission of the WTP would be jeapordized.[2]

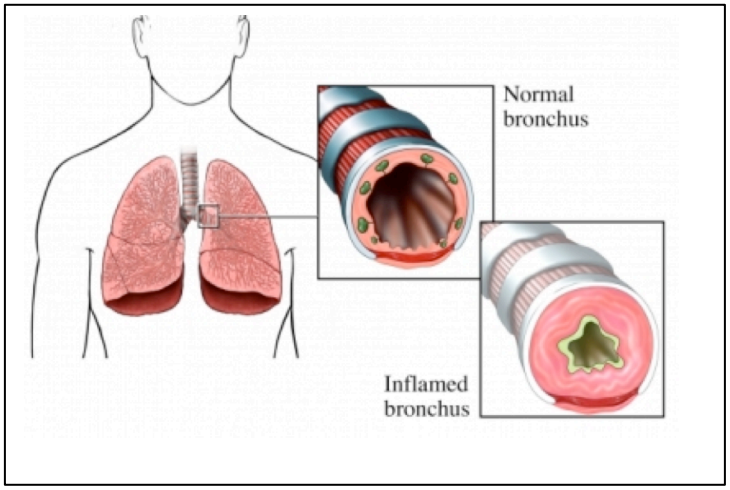
In response, Secretary Chu reiterated DOE's commitment to "maintaining a strong nuclear safety culture." Chu's reply later in June 2010 said an internal DOE investigation by the HSS with more than 250 employees found "the fundamentals of a robust safety culture" at the WTP, and that "corrective actions" by Bechtel, the prime contractor, had been taken for more than a

year, such as programs allowing line management and site employees to raise concerns, a hotline for worker complaints, and the creation of an ombudsman.[17] Chu's letter also rejected some of the board's findings that a failed safety culture existed at the WTP. Chu's letter noted safety-related reporting mechanisms were being implemented and that an independent review of the WTP's safety culture in the whole complex would be conducted, including town hall style meetings. He vowed to be "personally engaged in asserting federal control," to ensure corrective actions were taken to change the culture in the contractor and federal workforces.[17] The DOE's Office of River Protection at Hanford, which was alleged by the safety board to have buried safety issues brought to its attention,[2] said Tamosaitis' current lawsuit and concerns would "take a lot of investigation" and eventually be "worked out in the courts."[3]

Conclusion/Back to the Case: An investigation by a federal oversight agency of worker safety issues seen in this case raises concerns if the safety culture can be reformed at Hanford, given the DOE's long record of challenging critics of Hanford and its historic culture of military secrecy surrounding nuclear weapons production. Our new policy analyst on the HAB will need to sort out how to weigh the criticisms against the official rebuttals. Our analyst also will find that problems have long occurred prior to Tamosaitis' case going public. Secretary Chu's response clearly seeks to undermine official criticism, and it is unclear if any of the reforms proposed will allow for workers or managers at the WTP to call attention to problems at the controversial, costly facility. As noted, a safety culture is an expression of a power relationship, and clearly the DOE is comfortable using its power to contest its critics, like the downwinders, a group of nearly 2,000 people who have fought for decades for compensation for alleged exposure to iodine-131 from Hanford.[18] Reports found for this analysis suggest that while safety issues can and will be acknowledged by the DOE, a more deeply ingrained mission culture at DOE may drive project management at the Superfund site that is still—and perhaps for legitimate security reasons—hidden from public scrutiny. That barrier makes third party oversight and reforms challenging. Direct involvement from the most senior levels of the presidential administration, which ultimately overseas all executive branch agencies, may be needed.

Appendix 1: A top-down organization model of worker safety culture and an illustration of the human pathway for beryllium exposure linked to chronic beryllium disease.[9,11]





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