

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

## Selected Excerpts from last Quarter, 2009 from

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**TO:** T. J. Dwyer, Technical Director

**FROM:** W. Linzau and R. Quirk, Hanford Site Representatives

**SUBJECT:** Hanford Activity Report for the Week Ending November 6, 2009

Tank Farms: While transferring waste from double-shell tank AN-101 to AP-105 (see Activity Report 10/23/09), **the contractor failed to correctly perform radiological monitoring surveys that were developed to check for waste leaks.** The detailed radiological monitoring plan, a corrective action for the S-102 spill, provides specific locations where dose readings are to be taken as well as a value that, if exceeded, could indicate a leak, and requires the pump to be shut down. **The worker assigned to conduct the surveys was poorly briefed and supervisors failed to request the results from the periodic surveys. Therefore, nobody noted that the dose rates had exceeded the shutdown criteria during operations last week, and the Senior Supervisory Watch only noted the discrepant condition this week after hours of operation above the limit.** Upon noting the discrepancy, personnel were directed to re-enter the farm and verify the dose values, but operators did not immediately secure the transfer as required by the procedure.

**The contractor's inadequate understanding of the AN-101 pump starting characteristics led to errors in the design of a low-flow pump trip and resulted in two failed attempts to start the pump.** Design and procedure changes will be implemented this weekend before the planned restart of the transfer on Monday. The continuing problems with the design, operation, and safety strategy for this portion of the waste transfer system have caused the site reps to have increased concern.

Plateau Remediation Contractor: The site rep observed the contractor's Safety Leadership Workshop, which is intended to improve the safety culture, but some of the material presented was inconsistent with that objective. **Instructors made analogies, omissions, and inferences that reinforced the concept that nuclear safety requirements hinder safe completion of work and cause overly complex procedures.** A senior contractor manager committed to ensure the training is realigned with its original intent and management expectations.

The contractor completed the investigation into the drop of an interim storage cask at the Canister Storage Building complex (see Activity Report 10/9/09) and determined that the cause was human error with a potential contributing cause of a mechanical deficiency.

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## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

**SUBJECT:** Hanford Activity Report for the Week Ending October 30, 2009

Office of River Protection: ORP completed an internal independent assessment of their implementation of DOE O 226.1A, and concluded that they are performing the activities described in the Order but identified four findings. **The findings include: the ORP quality assurance program did not provide independent assessment of nuclear safety, environmental compliance, and health and**

safety; the management assessment process was inadvertently removed from ORP's assessment procedure, and while ORP organizations did self-assessments, several organizations did not do structured management assessments; and lessons learned are not consistently disseminated to all the appropriate ORP organizations.

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

October 23, 2009

**TO:** T. J. Dwyer, Technical Director  
**FROM:** W. Linzau and R. Quirk, Hanford Site Representatives  
**SUBJECT:** Hanford Activity Report for the Week Ending October 23, 2009

Tank Farms: The contractor plans to use a non-safety-related (general service) variable frequency drive (VFD) to protect the safety-significant (SS) waste transfer lines and isolation valves from over-pressure during transfers from double-shell tank (DST) AN-101. The system had SS relief valves, but they were determined to be inoperable because they are not code compliant (see Activity Report 8/28/09). Therefore, the contractor decided to limit system pressure with a VFD on the transfer pump, but the VFD and supporting software do not have a safety pedigree. When the site rep questioned this control strategy, the Office of River Protection (ORP) confirmed that they believe the design complies with the approved DSA and will not object to using this new equipment for waste transfers. It is unclear why transfers with this system will be allowed when it appears to violate the basic tenets of nuclear safety in which only qualified equipment can be credited for a safety function. There are no near-term safety drivers to complete these transfers.

During operational acceptance testing, the AN-101 pump was shut down because flow rates were higher than expected. While following the procedure to restart, the pump unexpectedly started when VFD power was restored, but before the start button was pushed on the control cabinet. The shutdown and restart sequences in the procedure did not prevent this unexpected pump start.

The ORP Safety Review Board is reviewing major changes to the Tank Farms DSA that were formally submitted by the contractor last month. The changes are intended to: implement recent ORP direction related to criteria for SS controls (see Activity Report 5/1/09); make the DSA compliant with the requirements for specific administrative controls (SACs) invoked by change notice three to DOE STD 3009; support closure of a Justification for Continued Operation for inadequate commercial grade dedication; and provide the basis for closing three Unreviewed Safety Questions. The reduction in the number of controls is largely possible because the exposure criterion for collocated workers was increased to 100 from 25 rem TEDE. Major changes include the downgrade of the DST ventilation system, leak detectors, and master pump shutdown system from SS to less than SS.

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**SUBJECT:** Hanford Activity Report for the Week Ending October 16, 2009

Tank Farms: The contractor determined that for the last three years they had not correctly performed TSR-required flammable gas sampling for tank C-204. Workers took samples from the wrong riser

that had a passive filtered vent, which invalidated the results. The work order provided to the technicians provided conflicting instructions for the sample point. This discrepancy was overlooked during the three annual performances. The cause of the mismatch between the procedure and field condition appears to be related to the failure to correctly update the procedure when the riser-mounted equipment was modified. Additionally, the procedure used for TSR compliance provided little guidance to the personnel taking the sample other than to take it from a specific riser. The site rep compared this procedure with another tank farm TSR surveillance procedure and noted the second procedure had a more appropriate level of detail. The site rep suggested to the contractor operations manager that an extent of condition review be performed to check for similar weaknesses in other TSR compliance procedures.

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**SUBJECT:** Hanford Activity Report for the Week Ending October 9, 2009

Waste Treatment Plant (WTP): The Office of River Protection (ORP) notified the contractor that it was unacceptable for the contractor to approve a change to the authorization basis (AB) that deleted quality requirements for safety-significant (SS) structures, systems, and components (SSCs). Prior to the change, SSCs designated SS to provide protection from toxicological hazards had to meet NQA-1 compliant requirements, but this requirement was deleted without explicit concurrence of ORP. In August, the site rep questioned ORP about this contractor-approved change to the Preliminary Documented Safety Analysis (PDSA) (see Activity Report 8/14/09). ORP directed the contractor to take the following actions: rescind the change to the PDSA; procure SSCs to the quality requirements described in the Safety Requirements Document if they are functionally classified as safety class (SC) or SS for any reason; revise procedures to ensure quality requirements are applied to SC and SS SSCs; conduct extent of condition evaluations for SS SSCs released for procurement or fabrication with downgraded quality requirements and immediately notify ORP of all SSCs found with this condition; and implement corrective actions to preclude further contractor-approved changes that are not consistent with ORP's procedure for AB management.

Waste and Fuels Management Project: An Interim Storage Cask dropped less than a foot while being placed by a crane on a concrete surface at the Canister Storage Building complex. No evidence of damage to the cask could be seen and no radiological releases were discovered. The contractor ensured the cask was in a safe configuration and is investigating the possible causes. The contractor determined that a recovery plan is required before proceeding.

The Richland Operations Office (RL) sent a letter expressing concerns about a series of events that have occurred related to compliance with safety basis controls, assumptions, and requirements. RL noted five events or issues that occurred between August 24 and September 20, 2009: three events involved critical lift, one issue was related to the use of combustible materials, and another issue was associated with the operation of an excavator at a retrieval trench. RL requested that the contractor report on the actions to address common factors from these events and provide the supporting analysis.

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**SUBJECT:** Hanford Activity Report for the Week Ending October 2, 2009

Tank Farms: The Office of River Protection (ORP) sent letters to the contractor expressing concerns with their ability to perform work in a safe manner. The first letter addressed an assessment of the contractor's emergency preparedness (EP) program. The review team noted significant deficiencies in four of the 10 EP program elements, and the program at the tank farms was rated less than satisfactory. ORP determined that these problems in the EP program will require significant management attention. The Emergency Planning Hazards Assessment and Emergency Action Levels were noted to be deficient in the Type A Accident Investigation Report for the S-102 spill dated September 2007, but ORP has yet to approve the revisions.

The second letter addressed a significant number of problems with the quality of work instructions as well as with work execution. The cumulative significance of these work document and execution problems resulted in ORP defining this as a "concern" and will require an extent of condition review and a formal root cause analysis. The problems with the EP program as well as work procedures and conduct of operations have been previously noted by DOE (see Activity Reports 9/21/07, 1/4/08, 12/19/08, 1/16/09, 4/24/09, and 8/28/09).

224-U Facility D&D: Workers were exposed to airborne uranium oxide while drilling holes into a contaminated duct. The workers were drilling two-inch holes in the duct to allow the interior to be sprayed with fixative prior to dismantlement. After drilling the second hole, the worker felt air flow out of the hole and noted yellow dust in the air. The workers informed the radiological controls technicians (RCTs) who conducted surveys with negative results, so the crew continued to work in the area. After the work was completed, an RCT noted the filter paper on the air sampler was yellow, which indicated a potential for higher than anticipated airborne concentrations. Air samples counted for the work area indicated that levels were about 4.5 DAC/hrs. The workers were wearing lapel air samplers but not respiratory protection because they believed that it was unlikely to have significant quantities of uranium powder suspended. The site rep questioned why an engineering control such as a HEPA vacuum was not used, and the response provided during the critiques was that they preferred to fix contamination in the duct during D&D and not collect it in a vacuum. This is the third event involving radiological practices at U-Plant facilities in the last month (see Activity Reports 9/11/09 and 9/18/09).

Waste Encapsulation and Storage Facility (WESF): Operators made three unplanned entries into Limiting Conditions of Operation (LCOs) in less than a month due to maintenance activities. Workers are replacing the steam heating coils with electric units. During the removal of the large steam coils, they cut or damaged control air lines. The loss of control air caused disruption of the ventilation system for the storage pool area and entries into the LCO. It appears that poor work planning and communications contributed to these recurring events.

Management Changes: C. Spencer became the president of Tank Operations Contractor and N. Brosee replaced him as the president of the River Corridor Closure Contractor.

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**SUBJECT:** Hanford Activity Report for the Week Ending September 4, 2009

**Tank Farms:** The contractor declared a potential inadequacy in the safety analysis because they could not verify the positions of some safety-significant valves used to prevent misrouting of waste. The site rep, accompanied by a senior contractor operations manager, subsequently performed a walkdown of the AP tank farm to understand how the interim corrective actions would be implemented for a waste transfer that was scheduled to start later that day. The site rep noted inconsistencies in the procedure for indicating which valves could be used for double-valve isolation. The system engineer explained how he determines which valves can be used for this TSR control and who verifies that the selected valves are adequate isolation devices.

During the waste transfer the contractor noted that a valve in the AP farm was leaking into the valve pit. This is one of the valves that was identified as having leaked in the past but was tested and did not leak (see Activity Reports 7/17/09 and 7/24/09). The ball valve was tested in the closed position, but leaked around the packing when open during this transfer. After moving the valve position slightly and removing the long T-handle operator, the leakage stopped.

The Office of River Protection directed the contractor to use a different software code to analyze the consequences to the public, which will result in lower estimated doses in the safety analysis. The goal is to be consistent with the software proposed for use at WTP. The staff has questioned the deposition velocity selected from the DOE software guidance for use at WTP.

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**SUBJECT:** Hanford Activity Report for the Week Ending August 14, 2009

**U-Plant D&D:** A worker almost fell 40 feet while erecting a scaffold in an ancillary building at U-Plant. The worker was inspecting a partially completed scaffold prior to proceeding with its construction when he grabbed a horizontal support that rotated and caused him to lose his balance. The worker was able to grab a secure support, which prevented a fall. The worker was not wearing fall protection gear because the procedure allowed the worker, in the role of the competent person, to decide if fall protection was feasible. The site rep questioned why the worker was allowed to take the risk of not having any fall protection without specific authorization from management or safety personnel and why no alternative was considered if a fall restraint was not possible. Senior contractor management informally instructed the projects that decisions to perform work at elevations without fall protection requires a second check from management or a safety representative, but a formal management directive has not been issued.

**Tank Farms:** The contractor declared a violation of a Technical Safety Requirements (TSR) administrative control because instruments used for measuring tank farm temperatures were not calibrated or functionally checked. Tank temperatures are an important parameter for calculating the time to reach lower flammability limit concentrations. The problem was discovered during a review of TSR specific administrative controls (see Activity Report 7/2/09).

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

**SUBJECT:** Hanford Activity Report for the Week Ending August 7, 2009

River Corridor Closure (RCC) Project: The Richland Operations Office (RL) completed the Type B Accident Investigation Report for the event where a worker fell from a bridge crane maintenance platform (see Activity Report 7/2/09). The report lists several root causes, including: the shortage of work supervisors and safety representatives as well as inadequate work planning was deemed acceptable by contractor management and the workforce; the work control process was inadequately implemented; and neither the fall protection program nor its implementation complied with OSHA standards. The report notes that the initial planning for demolishing the building did not address the removal of the bridge crane, which led the work to be characterized as low risk. The work scope was modified to remove the crane before demolishing the building, but the risk ranking, and therefore the development of controls and oversight, was not revised. RL plans to conduct a self-assessment to determine why they had not identified the problems before the event.