

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 22, 2002

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
J. J. McConnell, Deputy Technical Director
FROM: R. T. Davis/ T. D. Burns
SUBJECT: SRS Report for Week Ending November 22, 2002

Receiving Basin For Offsite Fuels: Last week, during sampling activities at the Receiving Basin for Offsite Fuels (RBOF), a Radiological Controls Inspector (RCI) received an unexpected dose of approximately 226 mrem. No DOE or site exposure limits were exceeded. There are 9 overpack containers that contain Heavy Water Components Test Reactor (HWCTR) fuel assemblies currently stored in RBOF. As a part of the RBOF deinventory, these containers will be shipped to L-Basin. To support this activity, RBOF personnel were in the process of sampling liquid from these containers. Four containers were successfully sampled without problems. RBOF personnel obtained a 250 ml sample from the 5th container. Subsequently, the RCI determined that the dose rate from this sample was approximately 2 rem/hr whole body dose. Based on the high dose rate, the RCI moved the sample to maximize the distance from personnel. After discussion with a RBOF supervisor, the RCI was directed to pour the contents into the basin and suspend the work activity. The highest dose received by other personnel in the area was 32 mrem.

Based on this event, DOE-SR sent a letter to WSRC identifying the need to improve integrated safety management for radiological work. The primary issue identified was the need to improve work planning and execution. The Job Hazards Analysis (JHA) performed for this activity identified the potential for high radiation and noted that the RCI should monitor at the pump during sampling. However, neither the JHA nor actions to take in case of high radiation were reviewed during the pre-job brief. In addition, work activities continued after the radiological work permit suspension limit (50 mrem/hr) was exceeded.

Tank 40 Hydrogen Release: A quiescent time program has been implemented in the tank farms to eliminate the potential for excessive hydrogen accumulation in the headspace of sludge bearing tanks during a seismic event. Under this program, slurry pumps are run periodically to evolve trapped hydrogen gas. The periodicity is set to preclude reaching the Lower Flammability Limit (LFL) for hydrogen concentration in the tank headspace assuming an instantaneous release of all trapped gas. As an additional precaution for some tanks, slurry pump speed is increased in a gradual manner to minimize the transient headspace hydrogen concentration during gas evolution. Implicit in this precaution is the empirically-supported presumption that the release rate of trapped gas is proportional to slurry pump speed.

On Thursday, one of the four slurry pumps in Tank 40 was run at low-speed as part of a post-maintenance testing procedure (Tank 40 was within its quiescent time and not due for periodic slurring). This activity initiated the evolution of trapped gas at an unexpectedly high rate. Of particular concern was the fact that the gas evolution did not stop when the pump was stopped as anticipated. The hydrogen concentration exceeded the Limiting Condition for Operation limit of 10% of the LFL and peaked at 16% LFL. A recovery plan was developed and successfully executed to restore the headspace hydrogen concentration below 10% LFL within eight hours. A special engineering evaluation is now required prior to commencing any new slurry operations, and WSRC is investigating the cause of the abnormal hydrogen release phenomenon.