

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 20, 1998

**TO:** G. W. Cunningham, Technical Director  
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**FROM:** M. T. Sautman, R. F. Warther

**SUBJ:** RFETS Activity Report for Week Ending February 20, 1998

**Tap and Drain.** Building 771 personnel have been trying to determine why an explosive mixture of hydrogen was found in the oxalic acid system piping. The Job Hazards Analysis (JHA) is being revised and an USQD is being performed. In addition, a root cause analysis is being performed to determine why the original JHA did not identify this hazard. Engineers are evaluating various methods for venting and/or purging the system and will revise the Integrate Work Control Package to reflect any new controls.

Analyses and modeling suggest that the hydrogen was primarily generated by corrosion of the stainless steel pipes rather than from radiolysis. Although oxalic acid is a weak acid, it corrodes stainless steel and is commonly used in standard tests to measure intergranular corrosion. The solution samples that were mostly oxalic acid had elevated chromium concentrations that reflect this leaching. On the other hand, the solution samples that were mostly nitric acid had metal concentrations that indicate general corrosion. This corrosion was not able to be confirmed by ultrasonic analysis of pipe wall thickness since variations in the wall thickness could not be differentiated from variations due to manufacturing tolerances and measurement error. However, calculations indicate that even corrosion that is undetectable by nondestructive testing (e.g., 0.001 inch) can easily produce the hydrogen concentration measured in the gas sample, even if most of the hydrogen leaked out during storage. At this time, the subject matter experts believe that explosive mixtures of hydrogen should be assumed to be present in all acidic or actinide solution systems to be drained. Engineers are evaluating the design of the Portable Vacuum Liquid Transfer System to make sure it is safe to operate with explosive gas mixtures.

**Recommendation 94-1.** In response to RFFO's request, K-H has proposed new residue milestones that assume the safeguards termination limit issue is resolved and characterization data confirm that most residues are low risk. These proposed Implementation Plan modifications were briefed to DOE-HQ. The Site Reps and technical staff have been reviewing the proposed modifications and have provided comments to DOE.

**Plutonium Stabilization and Packaging System (PuSPS).** RFFO had an Independent Technical Review Team examine the PuSPS. The team consisted of DOE-HQ, Pantex (Herb Berman) and other personnel. The team expressed numerous concerns with the quality of the safety analysis, industrial hazards, and system reliability. They also felt that the tests being performed on the system did not adequately validate operability of the safety features.

**Building 779.** The draft B779 Decommissioning Safety Analysis has been completed. In order to accommodate building decommissioning, many Limiting Conditions for Operations can be discontinued when certain criteria are met. For example, ventilation exhaust filtration requirements

can be discontinued for an area when each room in that area has a total plutonium inventory less than 55 g and no equipment to be moved contains more than 44 g. Since this authorization basis will likely be used as a template for the decommissioning of other buildings, the Site Reps and technical staff are reviewing the hazards analysis and the technical bases for discontinuing engineered controls.  
cc: Board Members