

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 13, 1998

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

SUBJ: RFETS Activity Report for Week Ending February 13, 1998

Tap and Drain. Even an “easy” reagent system like oxalic acid is demonstrating the risk of relying too much on process knowledge. The tanks and pipes on the second floor were expected to be dry, but 28 liters were found. When the pump was turned on for the first tap, orange fumes came out rather than solution. The operators soon realized something was wrong and quickly isolated the system. When the fumes were determined to contain NO_x, everyone present at the incident was sent to the medical department to be examined for NO_x inhalation. Subsequent analysis of the gas found that it contained an explosive mixture of approximately 22% H₂, 12% O₂, and 2.6% NO_x. Analysis of previously drained solution found the tank solution to be mostly nitric acid while solution from the other end of the system was mostly oxalic acid. The nitric acid may have come from two sources. Nitric acid was reportedly mixed in the oxalic acid tanks. In addition, the oxalic acid system used to be tied into a nitric acid system.

The Site Reps later learned that the characterization samples were only analyzed for actinide concentrations and pH, but not to determine the chemicals present. No respiratory protection was being used since oxalic acid has an extremely low vapor pressure. Hydrogen was not expected because the very low plutonium concentration would cause little radiolysis. The source of the hydrogen is still unknown, but might be due to corrosion. Corrosion would produce hydrogen and would be consistent with the concentration of metals in the solution. Fortunately, the operators were using the tap and drilling techniques that they use for hydrogen environments. Even before this event, RFFO had been telling the contractor that they expected more rigorous hydrogen hazards analyses for upcoming systems to make sure that the controls were adequate to prevent an ignition.

Salt Pyro-Oxidation. During the week, the total amount of salt processed passed 100 kg. The Carlsbad Area Office also approved a series of sampling and nondestructive assay equivalencies and exemptions for certifying that the salts meet WIPP Waste Acceptance Criteria.

Pipe Overpack Container (POC) Testing. Hydrostatic testing was performed on a 12" POC, which will be used for storing residues. The filter was replaced with a water tight plug that allowed pressurized water to enter. At 900 psi, the flange lid and pipe bottom began to bulge. The test was stopped at 1000 psi. Although the lid and bottom were found to be bulging about 1/4 inch, no leakage occurred during the test.

Plutonium Stabilization and Packaging (PuSAP) System. BNFL has temporarily suspended most work being performed by Raytheon due to cost overruns. Raytheon was building the stabilization portion of PuSAP. This suspension will delay upcoming tests.

Radiological Protection. There has been a noticeable increase in radiological incidents in 1998 so far. This includes several occasions where administrative dose limits or RWP suspension limits were exceeded. Personnel have also repeatedly entered contamination and airborne areas without anti-

contamination clothing or a respirator.

cc: Board Members