

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 16, 1998

TO: G. W. Cunningham, Technical Director

FROM: M. T. Sautman

SUBJECT: RFETS Activity Report for Week Ending October 16, 1998

B779 Hydride Reaction. Workers were cutting a pipe that connected a vacuum pump to a filter housing on one of the plutonium hydride boxes. The port-a-band saw had cut nearly through the pipe when workers saw sparks and flames shooting out of the cut. The reaction stopped after about 10 - 15 seconds. Airborne contamination levels in the tent sharply increased to an estimated 1.6 million DAC (derived air concentration). The foreman performed a quick visual inspection of the Premaire suits before directing the workers to exit the size reduction tent. Although the suits were very contaminated, the lapel samplers inside the suit indicated that the workers received less than 1 mrem internal exposure. The next day the pipe was filled with MgO and set aside. This reaction was expected and had been discussed in the hazards analysis and pre-evolutionary brief. Later this week, size reduction of this glovebox was completed without any other problems. The other hydride glovebox is nearly finished.

B779 has also recently modified their response to high airborne radioactivity events. Originally, when 50,000 DAC was exceeded, work was stopped and workers exited the area. Now work is still stopped, but the workers just move to a "safe zone" inside the tent that is expected to have less airborne radioactivity, such as near the door. If airborne radioactivity exceeds 100,000 DAC, the workers go to the door, but do not exit the tent until airborne radioactivity decreases to a "safe level." The reason for this is to avoid spreading contamination to the vestibules, where the workers doff their suits and could become contaminated or inhale the plutonium.

The Site Rep and technical staff do not believe that radiation exposures are being kept as low as reasonably achievable. Workers go into the "safe zone" for an indefinite period of time no matter what the airborne concentration of radioactivity is. One solution would be to add an additional vestibule to the tent. Then workers could wait in the first vestibule during high airborne radioactivity events without spreading contamination into the vestibules used for doffing the suits. Adding another vestibule would also help protect workers in a hydride fire. Hydride fires are different from normal airborne radioactivity spikes caused by size reduction work since stopping the work may not stop sending contamination into the air. RFETS' policy has always been to allow plutonium hydride fires to burn until completion since it burns fast and the hydride can reignite once the MgO is removed. The radiological impacts of hydride burning were minor inside a glovebox, but are more significant inside a tent because the hydride fire continues to send plutonium oxide into the air. If the reaction is more than a flash, the workers in the "safe zone" inside the tent could be exposed to airborne radioactivity that is quickly increasing at an unknown rate. Usually, extinguishing the fire is not safe

option because it puts the workers and their Premaire suits at risk. The safest option may be for the workers to exit the size reduction area of the tent. Unfortunately, B779 does not plan to add another vestibule since the first vestibule in their current tents are too small to fit three workers in supplied air. Future tents, however, could incorporate this feature.

Another issue is that until their lapel samplers are measured afterwards, there is no data to confirm that the “safe zone” is actually safe. This might be resolved since the B779 Radiation Safety Authority is looking into the Site Rep’s suggestion of adding an air sampler head in the “safe zone” to confirm that the airborne contamination levels are acceptable.

Engineers are developing a way to react any remaining hydride in the pipe under controlled conditions. The current plan is to put the pipe on a pan inside a B-box. A vacuum hose, whose nozzle is fitted with a spark arrester screen, would be used to reduce the spread of contamination. The Site Rep will continue to follow this issue.

Emergency Drill. The Site Rep observed the Emergency Operations Center (EOC) response to an emergency drill. The scenario involved a disgruntled worker who exploded a bomb on a truck carrying TRU waste drums and hid another bomb at RFETS. Although much of the drill focused on security issues, there were radiological issues associated with the breached drums. The Hazards Assessment Center conservatively estimated the consequences although there were problems getting them accurate information on the condition and contents of the drums. Initially, the Shift Superintendent did not notify any senior managers of the bomb threat or issue protective actions because he did not believe the threat to be credible. Even after the bomb exploded, he did not notify them or declare a site area emergency for an additional 30 minutes. Protective actions for site personnel were not announced until 45 minutes after the bomb exploded and breached the TRU waste drums. There were also problems with EOC personnel and field support teams getting out of the protected area because of the lockdown.

cc: Board members