

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 12, 1999

TO: G. W. Cunningham, Technical Director

FROM: M. T. Sautman

SUBJECT: RFETS Activity Report for Week Ending March 12, 1999

RMRS Work Control. There has been a series of work control incidents in RMRS facilities recently. The following three events illustrate some of the problems:

In B788 (Clarifier), DWRC electricians were checking out problems with a forklift battery when they noticed the door to a control panel was ajar in an unsafe condition. They decided to check the voltages on the energized panel without an energized work permit. This work was outside the scope of what had been authorized. Although a RMRS Construction Superintendent ordered an immediate stop work, the electricians continued to try to repair the interlock so they could close the panel door. When they tried to measure the voltage with a meter mistakenly set on amperage, there was an electrical arc. The superintendent again ordered the work to stop without success. Finally, the individual was directed to stop work a third time and ordered to leave the facility, which he did. During this time, one worker reportedly stepped over a radiation barrier (i.e., rope) in order to see around a corner. For some reason, an occurrence was not declared until the next day and DOE was not notified promptly of the incident.

In B440 (Waste Storage), a subcontractor disconnected equipment from a portable generator, leaving the bare wire leads from the generator coiled up and laying on the ground near some railroad tracks. When a contractor electrician turned on the generator a few days later, he heard "arcing sounds."

In B729 (Filter Plenum Building for B779), subcontractors performing independent verification of final surveys entered the building without conducting a pre-evolutionary brief or checking in with the Configuration Control Authority (i.e., shift manager). This group was doing work in the same area as a second crew, although the two groups could not see each other. Because the second crew was doing some decommissioning work, the area needed to be posted as an airborne radioactivity area. The first group did not don respirators despite two speaker announcements that the area was going to be posted. When the first group returned to the main area, they realized that they should be wearing respirators. Nasal smears were then taken. According to workers in the second crew, the first group was unfamiliar with the building and did not know the room number.

Besides these three events, other recent cases involve workers entering radiation areas without dosimeters, entering airborne radioactivity areas without respirators, smoking cigarettes while filling a diesel fuel tank, or performing out-of-scope work (see last week's report). Most of these events involve 3rd tier subcontractors, but the Site Rep and facility representatives have seen examples of

weak conduct of operations by RMRS personnel also. On Wednesday, RMRS shut down all field activities by 3rd tier subcontractors. Work will not be allowed to restart until project managers implement 100% oversight of 3rd tier subcontractor work. The Site Rep has discussed these issues with RFFO, K-H, and will be meeting with RMRS's Chief Operating Officer and Deputy General Manager next week.

B707 Shut Down. The B707 Project Manager shut down all nuclear operations for approximately a day because there had been 4 criticality infractions in 3 weeks. The last one involved a high-plutonium loading drum that required special handling.

Recommendation 94-1. RFETS has completed their milestone for sampling and analyzing high risk residues to a 95/5% confidence level. A total of 1358 residue containers were sampled.

The Site Rep reviewed the Post Acceptance Testing Report for the Plutonium Packaging System. The findings of this review were mostly negative. A summary of the findings is attached.

EM-70 issued revisions for the 9965 and 9968 Certificates of Compliance. The new hydrogen gas requirements prevent any additional shipments of sand, slag, and crucible residues to SRS in the 9965 or 9968. These containers had been used for many of the shipments to date. Future shipments will have to be made with the 9975 and with a 20 Ci limit until the 9975 certificate is revised.

K-H Radiological Improvements. As a result of past radiological incidents, senior contractor managers identified several corrective actions to reduce the number and severity of radiological occurrences. The Site Rep examined the effectiveness of two of the corrective actions that have been implemented in B779. The first was a guide to help concentrate discussions at pre-evolutionary briefs on hazard identification and mitigation. The Site Rep observed how it was used and discussed its use with building personnel. Although a worthwhile goal, this guide is not being implemented to management's expectations and its effectiveness is questionable. The Foremen have been rereading the lessons learned from the same 4 incidents (all of which occurred about 6 months ago) for several weeks now. The Site Rep and building management believe the process could be improved. The second corrective action was to develop a standard size reduction procedure. Other than prerequisites, steps that invoke other procedures, or ones generic to any radiological activity, there is little guidance for performing the actual work. There are a total of 4 steps for D&D personnel concerning the how to perform glovebox size reduction. Three of these steps just say make the first cut, rig as necessary before making subsequent cuts, and package waste in accordance with requirements. Neither of these corrective actions, as implemented, appear to satisfy their intended purpose nor will they likely improve safety at RFETS.

cc: Board members

Attachment 1: Summary of Post Acceptance Testing Report for the Plutonium Packaging System

The K-H team did not recommend that the packaging system (PS) be installed into B371 for nuclear operations as originally configured because it is not ready for production operations. They concluded that the PS as currently configured is not reliable, would cause exposure in conflict with ALARA principles for maintenance workers, could cause contamination incidents, would experience significant downtime, would have difficulty passing a Readiness Assessment, and would be unlikely to meet DOE expectations for the packaging of all plutonium at RFETS by May 2002.

The main problem was that the PS could not sustain the desired level of reliability and consistency in automatic mode. The maximum number of containers produced in a series automatic mode was 8. Of the 60 containers in the test, only 29 could be produced in fully automatic mode. Twenty required operation in the manual mode and eleven required the maintenance mode. Work in these two modes required operator/engineer intervention up to and including physical repairs of failed components. There were 14 different equipment failures encountered, some more than once. For example they had sensors failed 12 times, actuators 6 times, and the laser 5 times. These equipment failures took from a few minutes to an entire day to fix. The average repair took nearly 4 hours to complete. The remaining failures were resolved by operation of the semiautomatic or manual computer interface modes.

Other issues included:

- Some of the design checks had not been verified by DOE prior to turnover of the PS. Of 112 design checks performed, 11 were determined to have failed the specified requirements.
- Although analysis indicated that all weld criteria had been met, a statistical analysis by the K-H team suggested that the amount of variation in the results could lead to failures or non-compliances over larger sample sizes (e.g., a 2000 container production run).
- The design of the oxide convenience can fill system, designed to prevent the spread of powder, was found to be the source of the contamination spread. After powder was deposited on the can track, the next can was dragged through the contamination.

The team made 25 recommendations to address these problems. The team recommended that the PS be installed in B371 if the recommendations were implemented. Recommendations included:

- Assign specifically qualified systems engineers to operations to troubleshoot and repair failures as they occur
- Develop aggressive preventative maintenance program and spare parts strategy
- Replacing or adding several pieces of equipment