

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 30, 1998

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

SUBJ: RFETS Activity Report for Week Ending January 30, 1998

Tap and Drain. The Management Review (MR) for the B771 oxalic systems was conducted this week by SSOC. The 94-1 milestone for starting draining by the end of January was met Friday. Although the Site Reps believe that this operation can be performed safely based on the hazards and the operators' performance, several observations were noted on the conduct of the MR and shared with RFFO and SSOC management. These are listed in Attachment 1. Operators also expressed dissatisfaction with their involvement in developing the instructions and controls.

The Site Reps visited the off-site training facility where the Portable Vacuum Liquid Transfer System (PVLTS) is stored. The PVLTS will be used for draining actinide solutions. Demonstrations included normal filling and draining operations, safety interlocks and alarms, and backflushing. The system performed well and its design incorporates defense-in-depth.

Residue Characterization. To date, SSOC has sampled 713 residue containers. Graphite fines have been sampled to a 95%/5% confidence level. None of the samples were water reactive or pyrophoric. SSOC is developing a paper recommending that this IDC be reclassified as low risk.

Emergency Preparedness Drill. The Site Reps observed an emergency preparedness drill held on Thursday. In contrast to numerous drills conducted satisfactorily in the EOC over the past year or more, the site's performance in the EOC was very poor during the 1/29/98 drill. Several actions and training upgrades were identified. The details of performance deficiencies are included as Attachment 2.

State of the Flats. The Site Reps attended the first "State of the Flats" meeting among RFFO, K-H and members of the public. In general, most were in agreement that significant progress had been made in CY97. DNFSB, EPA and CDPHE briefly provided their perspectives on the site and issues for 1998. The public shared concerns in two broad categories. First, the public was not involved to the degree some members of the public desired. Second, some members of the public are concerned that work is being accomplished over safety. The contractors and RFFO stated that a serious incident would result in a shutdown of the site which would stop work. The regulators (EPA, CDPHE and DNFSB oversight) responded by stating that they were focusing their efforts on reviewing the content of procedures as well as adequate implementation of procedures.

cc: Board Members

Attachment 1 Comments on the Oxalic Acid System Management Review

1. Checklist 5 of the Plan of Action lists the dry run demonstration criteria for the management review. Three of the five criteria were not satisfied as written:
 - a. *Tap installation technique is demonstrated on a cold mockup.*

The B771 liquid removal team did not demonstrate installation of a tap on a cold mockup during the MR. They had seen installation demonstrated by other personnel in other facilities. During the dry run, installation was only discussed and not all the equipment was available.
 - b. *Personnel can demonstrate accessibility of the drain points.*

This was not demonstrated for drain points 4 - 8. Although the liquid removal team reportedly demonstrated this during training, they did not demonstrate this to the MR team by touching the valves inside or above the glovebox, but told them verbally that they were accessible.
 - c. *Personnel can demonstrate proper operation of the peristaltic pump.*

Personnel explained operation, but did not actually demonstrate its operation. This could have been easily performed by turning the pump on and transferring a liter or so of water or other solution.
2. It appears that the management review started prematurely. Revision 1 of the Integrated Work Control Package modified approximately 3/4 of the steps. It was approved right before the MR began. Operators spent the first two days of the MR performing training dry runs with the revised IWCP and decontaminating the glovebox involved. SSOC management waived the requirement that the MR was not to start until the building had conducted a satisfactory dry run. The building was not ready to conduct the MR dry run until the third day. It appears the building's rush to start was driven by a performance measure.
3. At the dry run pre-evolutionary brief, it was stated that revision 1 of the IWCP was to be used. Afterwards it was discovered that all working copies of revision 1 had been replaced with revision 2, which was still unapproved. The dry run was conducted using the unapproved revision 2 although the operators stated that they had not been previously briefed of the changes. This does not demonstrate proper document control.
4. The MR team stated that an adequate dry run had been performed after draining of only one of the ten drain points had been performed - the one point requiring a tap. K-H then requested that gravity draining of a tank's piping and site glass be demonstrated. Neither sampling nor draining of the 5 drain points near Line 1 was demonstrated. These points were different because some involve glovebox work, removal of gaskets and flanges, or replacement of a paddle blind with a new gasket.

Attachment 2

Emergency Preparedness Drill of 1/29/98

The Site Reps have noticed a steady improvement in performance of personnel assigned to the Emergency Operations Center (EOC) over the past year or more. However, during the 1/29/98 drill, the performance was very poor. More significantly, many site personnel did not recognize how poor the performance was until the very end of the drill. The Site Reps noted that several new personnel were assigned to respond to this drill, and may not have been as knowledgeable or well-trained as other members of the EOC.

The drill simulated a truck with four Standard Waste Box (SWB) containers filled with TRU mixed waste. Each SWB is allowed to contain 320 grams of Pu, although these four boxes were simulated to contain a total of 30 grams of Pu. One container was simulated to be on fire. Personnel at the scene could not immediately identify which container.

Lacking any specific data, personnel in the EOC initially assumed that the box contained 320 grams of Pu. This was an appropriate and conservatively bounding assumption given the initial lack of data. However, they did not recognize that this amount of Pu in a fire can have significant offsite consequences, with 50 year committed effective dose equivalent (CEDE) values to the public measured in Rem or possibly 10's of Rem. As a result, the drill and level of emergency response was misclassified from the outset. The following other issues were noted:

- Personnel in the Hazards Assessment Center (HAC) relied exclusively on the computer to model dose consequences to the public and workers. They were unable to mentally calculate the consequences of a release of Pu during a fire using thumb rules and professionally-based bounding estimates.
- Off-site consequence calculations were slow to be reported to the Crisis Manager because the HAC had to wait for data from the field to enter into the computer. This problem was exacerbated by erroneous quantities reported by personnel at the scene.
- Personnel in the HAC finally modeled off-site dose consequences of 10R at the site boundary based on a 30g Pu release (the amount of Pu in all 4 SWBs, 100% release fraction). Personnel in the HAC did not believe this off-site consequence number, even though it is reasonably accurate based on the amount of Pu involved and the assumed release fraction.
- One person in the HAC stated that 10R at the boundary couldn't be correct because only 2 curies were involved (from the 30g release, a correct number) and the Curie-meter-rem/hr (CMR) thumb rule contradicts this conclusion. He failed to recognize that the CMR thumb rule applies to Co-60, not Pu.
- Based on the preceding observation and other comments heard in the EOC, it is obvious that many personnel are not familiar with the mechanisms associated with Pu exposures and the terms 50 year CEDE, uptake, etc.
- The HAC's rationale for not believing their calculated off-site dose consequences was "substantiated" by measured surface contamination levels around 300,000 dpm. Personnel in the HAC failed to recognize that the water sprayed on the fire was shielding the alpha emissions, thereby significantly reducing contamination levels as read on the instruments. Unfortunately, given these two apparently contradictory data sets, personnel in the HAC chose to believe the less conservative, and erroneous number.

- Paradoxically, personnel relied significantly on the computer and conducted few, if any mental or back-of-the-envelope calculations. However, when the computer provided non-favorable answers, personnel refused to believe the output.
- Finally, even though personnel in the HAC were significantly confused for most of the drill, a controller stated that “they did a good job.” The Site Reps are not sure if the controller didn’t want to make incriminating statements directly to the HAC or if the controller’s training is as weak as members of the HAC. This is of concern in either case.

RFFO and executives at K-H recognize the poor performance and verbally committed to conduct additional training, including table-top scenarios that rely on the ability to quickly perform thumbrule calculations that conservatively bound an accident for initial response. In parallel, the staff of the EOC will deliver a set of guidelines, including initial response guides for use by the EOC. This deliverable is purported to contain thumbrule calculation methodologies. RFFO and K-H also committed to rerun the drill several times.