

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 17, 1997

TO: G. W. Cunningham, Technical Director
FROM: R.F. Warther, M.T. Sautman
SUBJECT: RFETS Activity Report for Week Ending January 17, 1997

Bob Warther was on military leave this week. David Hayes was on-site to observe RFFO's assessment of the Nuclear Criticality Safety Program. Other staff members (Hunt, Kasdorf, Hurt) conducted a review of deactivation activities that will be discussed in their trip report.

1. Residue Rebaselining Based on the results of Phase I Rebaselining, RFFO directed K-H to pursue the following treatments:

- a. pyro-oxidation followed by distillation for electro-refining (ER) and molten salt extraction (MSE) salts,
- b. pyro-oxidation followed by aqueous dissolution for direct oxide reduction (DOR) salts, and
- c. vitrification of graphite fines.

In addition, RFFO wants to resolve DOE-HQ and DOE-SR issues before deciding whether to ship sand, slag, and crucible (SS&C) to SRS for processing or to vitrify it at RFETS.

On Friday, K-H made the following Phase II rebaselining recommendations to RFFO.

- a. Vitrify ash using furnaces.
- b. Pursue graded improvements to the wash and dry process for combustibles. The improvements to consider are: cryo-crush/shred, increase batch size to 5 kg by using criticality safe vessels, hot N₂ drying to eliminate the need for absorbent, sonication to separate Pu, and use of filtered bags and 30-gallon drums. The new process would be designed so that these modifications could be added to the system as they are developed, but would not be required for processing to start. K-H also recommended that the system be designed to process dry combustibles. Headspace analysis of TRU waste dry combustibles suggests that nitric acid and carbon tetrachloride may be present.
- c. Convert fluorides to oxide by dissolution, precipitation, and calcination.
- d. For sludges, glass, firebrick, and inorganics that exceed Safeguards Termination Limits (STL), pursue STL exemptions. Vitrify them with the ash furnaces if exemptions are denied. For those items meeting STLs, repack as needed.
- e. Use furnace vitrification for graphite fines. Maintain microwave vitrification for SS&C, but conduct a four-month proof-of-concept for furnace vitrification.

2. Tank Draining/CWTS Approximately 124 liters of solution were drained from tank 55B in 371. Since this solution had previously been concentrated in the evaporator, it had the highest Pu concentration (9.3 g/l) and acid concentration of the 371 tanks. The site reps are concerned about conduct of operations in 371 because procedures continue to be violated or informally modified. At the pre-evolutionary brief, SSOC changed their method for blending the solution to a concentration below 6 g/l from what was described in the procedure and Plan of Action. This change was approved after an informal discussion with RFFO, but was not formally changed in the procedure. Questionable operator actions (e.g., using a bolt to plug up a tube, pouring solution into a tube without a funnel) have resulted in plutonium solution being spilled onto the glovebox floor and left to evaporate. There was also a 36 liter discrepancy between the measured tank volume before and after sparging that has not been explained yet.

As operators become more familiar with the Caustic Waste Treatment System (CWTS) in 371, they are starting to process three to four batches per day consistently. As of Thursday, 916 liters had been processed in the CWTS.

3. Building 444 Alert Freezing temperatures caused fire and domestic water lines to rupture in Building 444, the former Depleted Uranium Manufacturing Facility. The building is not operational, but is used to store depleted uranium, low-level waste, beryllium, and non-radioactive classified shapes. Between five and ten thousand gallons of water were released. Much of this water was contained by berms or went down process waste lines (and subsequently transferred to Building 374), but some leaked from a contamination area on the second floor to cold areas on the first floor. An Alert was declared Tuesday evening to make adequate resources available for containing the water, to clean up a dock that was slightly contaminated with depleted uranium, and to assess the potential for an electrical shock hazard from water splashing onto a switchgear cabinet. The actual physical damage was limited to the loss of ceiling tiles and two damaged water lines.

4. Interactions with the Public David Abelson, who works in Rep. Skaggs' local office, called up the site reps with several questions concerning the Board's responsibilities for resumption of plutonium operations in buildings at RFETS. Mr. Abelson received an inquiry from a RFETS employee concerning whether this statute was still in effect and whether it applied for ash and salt residue stabilization. In response to Mr. Abelson's questions, the site reps summarized past resumption efforts at RFETS, described the scope of the Board's reviews, explained current plans for treating residues, discussed how "plutonium operations" had been interpreted by the Board, and provided a status of Recommendations 90-2, 90-5, and 91-1. The site representatives also explained that nuclear weapons production was not resuming, but that some plutonium separation may be required to put the plutonium in a safer form or to meet STLs. In response to questions about public involvement in the Board's deliberations, the site reps explained why public hearings were held for earlier efforts, but not for more recent ones. The site reps faxed him a copy of Rec. 95-2 since it has replaced 90-2 and offered to provide copies of all supporting documentation used for recent deliberations. Mr. Abelson seemed satisfied with the information he was given.

cc: Board Members