DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 2, 1999

TO: G. W. Cunningham, Technical Director

FROM: M. T. Sautman

SUBJECT: RFETS Activity Report for Week Ending April 2, 1999

Residues. The characterization reports for both aqueous (e.g., nitric acid) and organic (e.g., carbon tetrachloride) Ful-Flo filters and wet combustibles have been written. The good news is that none of the results indicate that these residues are unstable. Differential thermal analysis results for cellulosic materials that may have contacted nitric acid were nearly identical to other combustible material. However, as shown in the attachment, many of the drums are corroded or have filter problems. About 50% of the drums had moderate or heavy corrosion. Filter corrosion and degradation was common. In particular, 91% of the filters on drums of organic Ful-Flo filters were corroded. Testing found that 4% of the drum filters in this category failed and 32% had unacceptably high air flow. (Paradoxically, high air flow is believed to be a precursor to filter plugging due to degradation of the filter element adhesive and corrosion of the filter housing.) Free liquids, many of them strong acids, have been found in nearly every container for some categories. The pH's indicate that CCl_4, PVC, TCE and other chlorinated material are forming hydrochloric acid in the organic drums. Finally, one drum of wet combustibles was found to contain 1.65% H_2 in its headspace. At this time it is not known how H_2 reached this concentration in a vented drum.

RFETS is considering using bags of granulated activated carbon (GAC) to adsorb CCl_4 and hopefully mitigate corrosion. A LANL study examined a variety of GAC/CCl_4 ratios and found that using a ratio of 5:1 usually reduced headspace gas concentrations to below 1000 ppm after a couple of days. However, mass balance calculations raise questions on the accuracy of the results. In one case, measurements of the residual CCl_4 mass and the GAC mass increase indicated that the CCl_4 concentration in the headspace should have been 60,000 ppm. However, the measured value was only 2010 ppm - a factor of 30 lower. This implies that either 1) the headspace concentration is very heterogeneous and much higher elsewhere, 2) some of the volatile CCl_4 leaked out of the sample container awaiting analysis, or 3) measurement error. (The time between sampling and analysis was as long as 18-days sometimes.) As a result, there is still some uncertainty whether GAC can be relied on as the sole method for addressing CCl_4 issues without additional data.

RFFO and K-H are working on a proposal to address the various corrosion and filter issues. Until RFETS actually starts shipping this material to WIPP, the length of time it might be between repacking and ultimate disposal at WIPP is uncertain. Based on discussions with RFFO and K-H, they appear to be taking an optimistic approach to resolving these issues. The technical staff is working on a counterproposal that might provide additional defense-in-depth with minimal impact to the repacking rate.

The Implementation Plan states that Salt from Bad DOR Run (IDC 365) and Impure Salt from Cell Clean-out (IDC 413) will be pyro-oxidized. The reasons for this were their high plutonium content (some over 80%) and process knowledge concerns with their stability. In order to speed up stabilization, K-H is considering separating the chunks of plutonium metal in IDC 365 from the bulk salt. The metal (and residual salt) would be thermally stabilized and put in a 3013 can while the remaining salt would be pyro-oxidized. K-H is also looking at the feasibility of reclassifying IDC 413 as a low risk residue and directly repacking the salt. These proposals may require changes to the Implementation Plan. In addition, the Site Rep met with K-H to discuss the possibly unstable salt discussed in the 3/19/99 report. K-H has agreed to pyro-oxidize this salt and any similar ones.

Recommendation 98-1. For the last two weeks, an EH-22 team has been conducting an operational review of RFETS. The review has focused on buildings 371 and 779. Many of the team's observations to date have been favorable, especially in the areas of the Integrated Work Control Program (IWCP), worker involvement, authorization bases, and RFFO and K-H management. Potential areas of concern include work definition, some areas of work performance (industrial safety, radiological protection, lock out/tag out), IWCP and supervisor training, and repair of safety class equipment (e.g., B371 emergency generator). The formal debrief will occur in mid-April.

The findings from the 1995 EH RFETS review have not been formally transmitted yet. However, the EH team is using data from the current review to see which of the older findings could be completely or partially closed. Based on informal discussions, about half of the old findings are issues that are being reviewed again. Others, like the fire protection program, are outside the scope of this year's review.

cc: Board members

Attachment 1: Summary of Combustible Characterization Results

Table 1	**Drum Corrosion %**		**Free Liquids**	
Residue Category	Heavy	Moderate	% w/ Liquid	Vol Range (L)
Ful-Flo Filters-Aqueous	17	37	100	0.05-1.0
Ful-Flo Filters-Organic	22	19	50	0.06-0.25
Wet Combustibles-Aqueous	33	19	*	
Wet Combustibles-Organic	31	12	*	

*18% of 336 found with free liquids (not broken down)

Table 2	**Drum Filter Testing Results and Condition (%)**			
Residue Category	High Flow	Low Flow	Failed (Clogged)	Corroded
Ful-Flo Filters-Aqueous	4	2	2	42
Ful-Flo Filters-Organic*	32	0	4	91
Wet Combustibles-Aqueous	6	0	1	38
Wet Combustibles-Organic	11	2	4	41

*On at least 1 of 5 tests

Table 3	**Final Solution pH During Water Reactivity Test**	
Residue Category	pH range	Median pH
Ful-Flo Filters-Aqueous	0.3-10.4	3.6
Ful-Flo Filters-Organic	0.5-4.0	1.2
Wet Combustibles-Aqueous	2.0-8.2	Only 3 samples
Wet Combustibles-Organic	0.7-4.9	1.9