DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 2, 1998

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

SUBJ: RFETS Summary Report for Calendar Year 1997

This report summarizes activities during calendar year (CY) 1997 at RFETS, issues currently being followed by the Board's staff, and issues to be reviewed and evaluated during calendar year 1998.

1. Recommendation 94-1/SNM. Most of the staff's CY97 efforts were focused on Recommendation 94-1 issues. Significant progress was made with the liquids program. The residues and metal and oxide programs progressed as well, but not as rapidly as the solutions program. The residues and metal and oxide programs will require continued effort from the staff during CY98.

a. *Liquids.* With the exception of some low Pu concentration tanks in B371 and holdup in some equipment and piping systems (estimated to be between 3,000 and 10,000 liters), all fissile material bearing liquids were drained and stabilized or removed from the site. Based on discussions with criticality engineers, this reduces the risk of a criticality accident by nearly an order of magnitude.

i. Pu solutions. All the high-level solution tanks in B771 were drained. The Pu solutions at this and other facilities were processed using three processes: cemented in the bottle box in B774; precipitated using a hydroxide processes in B771; or precipitated using the CWTS system in B371. Approximately 2000 liters of low-level solution were stabilized through the bottle box. This processing will continue in CY98. Approximately 300 liters of Pu solutions containing uranium and chloride were precipitated using the hydroxide precipitation process. Hydroxide processing essentially started in January 1997 and was completed during the summer. No future Pu stabilization using this process is anticipated. Processing through CWTS was initiated in December 1996. To date, more than 10,000 liters of solutions have been processed through the Caustic Waste Treatment System. The site is using this system to process solutions from B771. The staff will review the site's efforts to increase feed concentration levels in CY98. Increasing feed concentrations will speed processing of high level solutions from B771.

ii. B371 Category B Tanks. K-H and SSOC completed draining six Cat B tanks. Nearly 6,000ℓ of solution (Pu concentration <6g/ℓ) were drained from these six tanks and processed through the CWTS system.

iii. HEUN solutions. All 2700ℓ of HEUN solutions were drained from B886 and shipped to NFS in Erwin, TN. The B886 Material Access Area (MAA) was closed on February 26, and the fence surrounding the protected area was removed. The facility was downgraded to a Category III facility. No liquids remain in the facility.

b. *Residues.* Stabilization of residues continued to progress at the site, although not as well as solutions. Perhaps the single largest residue stabilization and disposal effort is related to the site's pursuit of a strategy to characterize residues, place stable

residues in a pipe overpack component, and ship the residue material to WIPP. This strategy became viable in CY97 because: (1) the NRC issued a certificate of compliance for the pipe overpack container; (2) the residue characterization program improved significantly in CY97; and (3) WIPP is scheduled to open in CY98. All WIPP Waste Acceptance Criteria (WIPP-WAC) would be met under this strategy. Safeguard Termination Limits (STLs) might have to be reviewed and waivers granted for some materials. Personnel from DOE-NN are considering using some controls that are designed primarily to demonstrate compliance with environmental requirements to demonstrate compliance with or partially address issues with STLs. This has the potential to improve the viability of this strategy. This will be an area of continued Board staff involvement.

i. Resins. During the year, K-H and SSOC neutralized all ion exchange resin residues. Over 25% of the resins have been cemented. This will be a continued area of staff involvement during CY98.

ii. Sampling program. SSOC sampled approximately 600 residue containers. The results of these analyses will be used to determine processing requirements, and viability of the pipe and go strategy for selected IDCs.

iii. Salts. K-H and RFFO completed their Readiness Assessments for salt residue stabilization. At the end of CY97, SSOC had not corrected all the prestart findings. Salt processing is scheduled to begin in January 1998. One of the issues that the staff will continue to follow is related to heater element failure. Although the heater elements fail safe (i.e., burn out), two concerns exist. First, poor reliability and equipment availability may put pressure on stabilization schedules and milestones. This is not an issue today. Second, the staff will ensure that any replacement heater elements meet existing electrical system design specifications.

c. *Pits, Metal and Oxide.* Significant progress was achieved related to metal and oxide. Several pit shipments to Pantex were completed and eU hemishell shipments to Oak Ridge were initiated. Installation of the PuSAP in B707 progressed, but this Recommendation 94-1 milestone is in jeopardy.

i. Pits. Over 40 shipments of pits from RFETS to Pantex were completed in CY97. RFFO and K-H hope to complete this activity during CY98, but funding issues at Pantex threaten completion of this milestone. Crimp and seal operations were completed about 30 Stockpile Reliability Evaluation Program pits.

ii. Metal and oxide. K-H and SSOC initiated thermal stabilization of reactive Pu oxide in CY 96. This activity, originally scheduled for completion in October 1996 was completed in January 1997. The PuSAP is scheduled for installation and startup in CY98. B707 Module J has been stripped and is essentially ready for PuSAP installation, but the schedule is threatened because of problems with the Broomfield installation. PuSAP is Government Furnished Equipment (GFE) provided by BNFL to the RFFO. BNFL plans to brief RFFO personnel in January 1998. The staff will continue to follow this issue.

iii. eU hemishells. Decontamination of eU hemishells began in B707 Module A in 1997. Although several hemishells have been decontaminated, the rate of decontamination has been slower than anticipated. K-H is reviewing alternatives, including shipping eU hemishells to LANL for decontamination,

or shipments to SRS for canyon processing to accelerate site closure. Decontamination of these hemishells continues in parallel with investigations into these alternatives. Additionally, funding issues at Oak Ridge threaten to retard the rate that eU hemishells can be shipped to that site.

2. Recommendation 94-3 B371. The Implementation Program Plan (IPP) for Recommendation 94-3 was completed and accepted by the Board at the end of CY96. Implementation of the IPP got off to a slow start in CY97. Several problems were noted with the B371 BIO control set, and upgrades to the facility were almost immediately behind schedule. The 94-3 project manager was replaced, and the new project manager immediately overhauled the upgrade program. However, several QA and QC problems were noted with much of the work at the facility. In spite of these issues, significant progress was made in CY97 to reduce the risk from operations through upgrades and implementation of the BIO.

a. *B371 BIO*. SSOC completed the BIO for B371 in July 1997. The Authorization Agreement for the BIO was signed in August and implementation is progressing. Most revised TSRs that reflect the current control set have been implemented. Several procedures must be rewritten to fully comply with the BIO requirements. These will be completed during CY98. The staff will continue to review and evaluate implementation of the B371 BIO.

b. *Facility upgrades.* Table 3-1 in the Recommendation 94-3 IPP contains a list of safety upgrades required for B371. An abbreviated Table 3-1 and the status of completion are shown below.

Safety Upgrade Description	Completion Status
Line T Joint	Complete
Filter Plenum Demister Analysis	Complete
Fire Walls	Complete
Combustible Loading Program	Complete
Seismic HVAC Upgrades	Partial
Fire Doors	Complete
Subsurface Drains	Complete
HVAC Isolation Valves	July 98
Plenum Deluge System Modifications	April 98
Egress Route Upgrades	Complete
Life Safety Code	Complete
Basement Fire Walls	Complete
Seismic Bracing for Attic Pipes	January 98
Relocate High Risk Residues	Complete

Implement Stacker/Retriever Load Limits	Complete

3. **Recommendation 95-2.** RFFO committed to implementing Recommendation 95-2 in Buildings 371 and 771 as part of the Recommendation IP. The status of B371 is summarized in the preceding paragraph. The B771 BFO is nearly implemented. B771 personnel have initiated decommissioning activities. K-H and SSOC have removed many of the hazards from the facility that were highlighted during BFO development. One of the highest risk accidents identified in the BFO was a drum fire in the B771 annex. K-H and SSOC removed all drums from the annex during CY97. A fire involving gloveboxes with benelex shielding was also an accident scenario identified during BFO development. To date, more than 275 ft^2 of Benelex have been removed from B771 gloveboxes.

4. **Decommissioning/SNM Consolidation.** RFFO and K-H initiated decommissioning activities for several facilities in CY97. Over 50,000 ft^2 of Contaminated Area (CA) were decontaminated and redesignated Radiological Buffer Areas (RBA). Over 20,000 ft^2 of Airborne Radioactive Areas (ARAs) were eliminated. Approximately 2500 ft^2 of Highly Contaminated Areas (HCA) were removed. A large amount of SNM and waste material was consolidated or removed from the site. Contamination levels in three "infinity" rooms in B371 were reduced or fixed. A limited number of decommissioning activities were initiated in B776. All SNM from B776 Room 152 was removed. This room was located in a part of the building especially susceptible to risk from high winds. Five pencil tanks were removed from B776. Decommissioning was initiated in Buildings 771, 779 and 886.

   a. *B771*. The following was accomplished in this facility:
      i. All Cat I and II SNM was removed from B771.
      ii. All drums from the annex were removed.
      iii. K-H and SSOC initiated removal of Benelex from the glove boxes. Benelex removal will continue in CY98. The staff will continue to review this activity.
      iv. All tanks were drained. Tap and drain is scheduled to begin in CY98, probably late winter or early spring. The staff will continue to review and evaluate this activity.

   b. *B779*.Decommissioning activities were initiated at the beginning of CY97. K-H and SSOC removed all SNM from this building and removed the MAA. Additionally, all chemicals were removed. A hydride glovebox filter containing about 2 kg of Pu was safely removed in March 1997. This was discovered in 1996, but not removed because of criticality concerns. Approximately 4 kg of Pu holdup has been removed from this facility. K-H and SSOC also initiated work to decontaminate some gloveboxes. The site hopes to remove all gloveboxes in CY98. Two other management points should be noted about this project. First, SSOC and RMRS have entered into the equivalent of a joint venture agreement for this activity. Second, B779 and B771 are the first two facilities to implement a facility reengineering strategy. This strategy alters the project management and watch organizations.

   c. *B886*. K-H and SSOC completed draining all HEUN tanks in this facility and shipping the solutions to NFS. All contaminated raschig rings were removed from the HEUN tanks. Virtually all the holdup was removed from the facility. B886 is not scheduled for decommissioning in CY98 at this time. RFFO and K-H have determined that other risk reduction activities are more important. The risk from B886 is minimal at this point. The staff will continue to follow activities in this

facility, but efforts likely will be minimal unless otherwise dictated.

5. **Waste Management.** K-H completed several waste management and removal milestones during CY97. These are:
   a. Removed 85% of containerized waste from the Pu buildings.
   b. Initiated characterization of TRU drums in preparation for WIPP's opening. Completed characterization of about 500 drums. This is an effort that will accelerate in CY98.
   c. Completed shipment of all saltcrete (4275 m^3).
   d. Implemented the B440 BFO and initiated storage activities.
   e. Completed venting all TRU waste drums
   f. Shipped more than 12,000 drums of low level mixed waste (LLMW) (about 20% of the site's inventory).
   g. Shipped more than 6,000 drums of low level waste (LLW).
   h. Shipped over 27,000 containers of non-radioactive hazardous chemicals
6. **Criticality.** Several criticality issues were identified in CY96 that retarded progress in completion of 94-1 activities. The Board noted this deficiency in its February 1997 visit. By September 1997, the backlog of criticality issues was reduced to zero.

cc: Board Members