

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 29, 1998

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

**SUBJ:** RFETS Activity Report for Week Ending May 29, 1998

**Recommendations 95-2/94-1.** K-H completed their Implementation Validation Review (IVR) of the B771 Authorization Basis Implementation Status. B771 is one of the priority facilities under Recommendation 95-2. Four pre-start and four post-start findings were identified. No violations of the Authorization Basis were identified, but the IVR team believed that 6 of the findings should be considered programmatic deficiencies of administrative control requirements. The review team concluded the following regarding the elements of ISMS:

Define Scope of Work	Satisfactory
Hazard Identification and Analysis	Satisfactory to degree evaluated
Identification & Implementation of Controls	2 pre-start findings, 2 post-start findings, and 1 weakness identified
Work Performance	1 pre-start finding & 1 weakness identified
Feedback	1 post-start finding identified

During the IVR, a management review was also conducted for purging the oxalic acid system and then resuming the draining of that system. This activity is allowed to restart upon satisfactory resolution of the IVR pre-start findings.

**Recommendation 97-2.** A standing order was issued to address assay measurement variances for residues. The criticality safety value (CSV) is the maximum likely fissionable mass of the material and will be used to verify compliance with criticality limits. The CSV is determined by either 1) assuming the entire material mass is fissionable or 2) adjusting the fissionable material mass quantity assay value to take into account a 95% confidence level for assays and any batching uncertainties. For example, the correction factor for DOR salts is 2.5. The current mass values will continue to be used for non-criticality limits (e.g., authorization basis or material-at-risk) and safeguards. Some residue work is expected to resume next week. RFETS has had a hard enough time complying with criticality limits with only one mass value. The Site Reps are concerned that trying to track two mass values will lead to confusion and even more infractions.

**Recommendation 94-1.** RFFO hosted a lessons learned workshop on the Plutonium Stabilization and Packaging System (PuSPS). Most of the issues dealt with project management issues such as a poorly written contract and technical specifications, cost overruns, and schedule delays. Attachment 1 summarizes some of the many technical issues.

**Emergency Preparedness.** The Site Reps and staff (Bamdad and Kasdorf) reported previously that differences between emergency preparedness and safety analysis consequence calculations existed at RFETS. K-H tasked its safety and emergency preparedness personnel to review these differences and explain the reasons for the differences. Two major conclusions were made in the report. First, the

new statistical approach shows consequences two to four times higher than the previous analysis result for the fire scenario. Second, the new statistical approach shows consequence values two to ten times higher than the previous analysis result for the spill scenario.

Attachment

cc: Board Members

## Attachment 1 Selected PuSPS Lessons Learned

- No 30%, 60%, or 90% design reviews performed.
- The original technical specifications did not include requirements for the Quality Assurance rule, OSHA, fire protection, health and safety, or site work practices. The seismic specifications were wrong.
- The performance specifications did not require that the system be run at the maximum throughput for several days without major failure. The only contract requirement was to demonstrate packaging two cans in a 8 hour shift. There was no warranty clause for the prototype system.
- Parts of the current system are difficult, if not impossible, to easily repair or replace.
- The stabilization system used English units, the packaging system metric units. In addition, the British portion uses part sizes not available in the U.S. and its wiring did not meet the National Electric Code.
- The contract did not require a formal test plan and did not limit the allowable number of exceptions during a test. Raytheon only tested interlocks, but not the functionality of components. The functionality of some subsystems were not tested until a demonstration was conducted for the overall system. Not all the key system components were tested in a nitrogen atmosphere, which reduces the reliability of some equipment.
- Parts identified by DOE as being susceptible to failure are already failing (e.g, furnace door).
- Calibration records and stickers were only provided after repeated requests.
- The noise level of the furnaces is 95 to 107 dB.
- Acceptable contamination levels were not specified. Many of the surfaces were not visible after only two days of testing.
- The contract did not allow DOE to approve the operating procedures, safety bases, and criticality limits. BNFL initially stated that the PuSPS did not have to comply with OSHA requirements.
- The contract allowed compliance with the specifications to be shown with reports or undefined design reviews. The contract did not require demonstrations of emergency shutdowns, safety features, response to upsets, ability to handle different types of material (e.g., impure oxide), and minimization of contamination spread.
- The contract did not require that the sequence and alignment for starting and shutting down the entire system be provided.
- During shipping, the laser crystal and glove box windows were broken. All sensors had to be readjusted. This took several months to fix.
- The contract allowed BNFL to modify the QA Plan and the System Design Document and System Specification without prior DOE approval.
- The safety analysis documents were not revised to incorporate system modifications.
- Software configuration control was only implemented after several months had passed and testing had begun.
- Equipment size limitations were ignored.
- An evaluation of the welder concluded that the current laser size is borderline for ensuring that full penetration is achieved to meet ASME VIII requirements.
- There might not be enough He present after can welding to validate leak test results.