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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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October 12, 1995

The Honorable Thomas P. Grumbly
Assistant Secretary for Environmental Management
Department of Energy
Washington, D.C. 20585

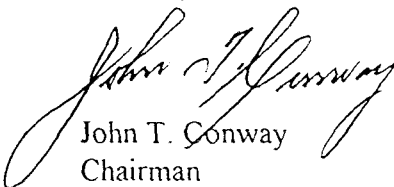
Dear Mr. Grumbly:

Members of the Defense Nuclear Facilities Safety Board's (Board) staff recently reviewed training, qualifications, and conduct of operations for the Defense Waste Processing Facility at the Savannah River Site. Significant deficiencies were noted in all three areas. The enclosed report on this topic is provided for your review.

As you know, the Operational Readiness Review by the Westinghouse Savannah River Company (WSRC) is scheduled to begin October 18, 1995. Prior to declaring readiness in accordance with your own Order, WSRC line management is required to assure that training and qualifications are complete and the level of knowledge of operations personnel at the facility is adequate to support safe operations. Significant effort will need to be expended to achieve this level of experience. Levels of readiness for these programs should be commensurate with those of a facility handling both high-level radioactive waste and hazardous chemicals.

Please contact me if you need any additional information or assistance.

Sincerely,


John T. Conway
Chairman

c: Mr. Mark Whitaker
Dr. Mario Fiori

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 13, 1995

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: Daniel G. Ogg

SUBJECT: Training, Qualifications, and Conduct of Operations at the Defense Waste Processing Facility, Savannah River Site, Report of Site Visit, August 21-25, 1995

1. **Purpose:** This memorandum documents the results of the Defense Nuclear Facilities Safety Board's (Board) staff visit to the Defense Waste Processing Facility (DWPF) at the Savannah River Site. The review focused on conduct of operations and training and qualifications for radioactive operations. The review team included staff member Daniel Ogg and outside experts Ralph West and James Collins.
2. **Summary:** The Board's staff found that the DWPF training program was struggling to meet schedule commitments for startup of radioactive operations. Training development, classroom training, simulator training, and on-the-job training were all progressing in a reactive mode at the possible expense of quality. Interviews of operators, supervisors, and technical support personnel indicated significant knowledge deficiencies.

Specific examples of deficiencies include:

- Most personnel interviewed had inadequate knowledge of the radiological hazards presented by processing high-level radioactive waste (HLW) at DWPF.
- Shift Technical Advisor (STA) training and qualification lacked rigor and the interview of one STA revealed significant knowledge weaknesses.
- One Shift Test Engineer (STE) did not have an engineering degree as required by the applicable Department of Energy (DOE) Order and, contrary to this Order, there was no procedure for determining equivalencies for education.
- Personnel training records reviewed were incomplete and did not provide an accurate status of qualification.
- Training exceptions and several changes to the training program were not properly documented and approved.

- The Westinghouse Savannah River Company (WSRC) Operational Readiness Review (ORR) is scheduled to start prior to completing radioactive operations qualifications contrary to a Plan of Action prerequisite.

Furthermore, a review of the WSRC Readiness Self Assessment (RSA) for conduct of operations revealed a lack of performance-based observations. The review by the Board's staff noted several conduct of operations errors during the few evolutions observed, thus, indicating potential problems in this area.

3. **Background:** The DWPF is completing non-radioactive testing and is scheduled to begin processing HLW at the end of December 1995. Westinghouse Savannah River Company (WSRC) Operations and Engineering Department personnel have been operating DWPF for testing under interim qualifications status. Training and qualification for radioactive operations is currently underway and is scheduled to be complete in November 1995. The Board's staff recently reviewed DWPF training in March and July 1995.
4. **Discussion:**
 - a. Training and Qualification: The Board's staff reviewed the training and qualification records of DWPF personnel. Although required by DOE Order 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*, the training files and records were not easily auditable and were incomplete.

WSRC stated that few evaluations of On-the-Job Training (OJT), referred to as Job Performance Measures (JPMs), remained to be accomplished. Many of these JPMs for Control Room Operators and Supervisors were performed on a simulator in the second half of 1993. At that time it was thought that qualification and facility startup would occur by June 1995. Although there is no clear guidance in DOE Order 5480.20A concerning the time between JPMs and completion of qualification, there is a requirement in Chapter I, Section 7.d(1) and Section 10, to requalify every two years. This requirement implies that a review of performance and knowledge is required at that frequency. WSRC management recognized this issue, but decided that it was too difficult to correct with the short time remaining before startup. WSRC has decided to sample JPMs to determine if personnel are still at the level of operational proficiency required for completion of qualification. Additionally, it was found that recent JPMs for Control Room Operators and Supervisors were not performed in the same one-on-one manner as had been done previously. JPMs were also not documented with the same checklist record as was done previously as required by the WSRC Training Manual. The authority for changing this was unclear and undocumented.

Records showed that STA training and qualification were essentially the same as those for Control Room Supervisors (CRS). DWPF systems and chemical process training is not provided at a greater level of detail for STAs. The STA is an engineering-educated

position with the responsibility of providing safety envelope and chemical process advice to the CRS and Shift Manager. Furthermore, it should be noted that the STA who was interviewed displayed significant level of knowledge weaknesses regarding the process system and chemical reactions.

Another example of improper documentation was the record of one qualified STE who did not have a college degree as required by the relevant WSRC qualification standard and DOE Order 5480.20A. The STE provides engineering assistance to the shift. WSRC management was unable to produce documentation accepting experience as equivalent to education nor did it address the requirement in the Order (Chapter I, Section 13.a) that experience not be used for more than 60 semester hours equivalency. The same STE did not have a qualification card that indicated he was qualified to stand watch as an STE. Engineering Department management explained that his previous qualification as a cognizant engineer was equivalent to that of an STE and that further qualification or designation was not required. Upon further questioning it was found that no list of qualified STEs existed. To date, STE training and qualification have been essentially identical to cognizant engineer training and no additional qualification has been required for STE assignment on shift. Additional STE classroom training and JPMs were under development.

Training conducted in the simulator and an oral board for a Control Room Operator were observed. Both of these processes were conducted well. For example, after a training session in the simulator, the crew conducted a self critique, followed by a critique by the instructors. Interaction among the various shift operators in conducting the critiques was effective. In addition, partial conduct of a JPM (canister decontamination) was observed. The checkout was thorough and required in-depth understanding of the processes by the trainee, a prospective Building Supervisor.

- b. Knowledge Level: The Board's staff interviewed 12 operators, supervisors, and technical support personnel. Seven of the 12 persons interviewed had less than adequate knowledge of the radiological hazards presented by the processing of high-level waste in the DWPF. They were unfamiliar with the types and levels of radiation to be expected, the means of minimizing exposure to radiation, and the purpose and use of a radiation work permit.

An STA was unable to describe the various chemical reactions occurring in the Salt Processing Cell, including those involved in the nitric acid flow sheet. A CRS was unable to explain several reactions occurring in the process and discuss significant aspects of a change to the nitric acid flow sheet. A First Level Building Operator did not know which round sheet readings were required by the Operational Safety Requirements and stated that it was allowable to adjust readings marked as Limiting Condition of Operations-related before informing the Control Room. There was a

general weakness among the interviewed Building Supervisors and Building Operators regarding hazards associated with the refrigerant in use in the facility.

- c. Conduct of Operations: The Board's staff observed a laboratory technician drawing samples from the Sludge Receipt and Adjustment Tank. The operator was following an approved procedure and called for the lab supervisor appropriately to verify sample bottle numbers. During the performance of the sample procedure, the valve handle of a valve in an adjacent line prevented the operator from fully positioning the sample bottle placement lever. The operator repositioned the handle of the interfering valve, placing the valve in the open position and continued with the sampling procedure. The procedure did not include direction for the operation of the interfering valve, nor did it caution the operator that such a condition existed. Furthermore, it was not evident that the operator had checked the status of the system in which the interfering valve was located or whether flow was initiated as the result of opening the valve. When questioned about this practice, the operator and the supervisor stated that the interference had been reported and that a Request for Engineering Assistance (REA) had been submitted to resolve the problem. The Board's staff believes that operation of valves without proper guidance is a potentially unsafe practice and is inconsistent with good conduct of operations.

Several minor problems were noted with the special procedure for adding formic acid to the Melter Feed Tank (MFT). The chemical process cell operator improperly secured the MFT agitator by shifting to slow speed instead of placing it in off, as required by the procedure. This resulted in the agitator stopping in a fault condition. After resolution, the amount of formic acid to be added to the MFT was passed to the chemical process cell operator on a scrap of paper with no indication of review and approval. A valve lineup conducted as part of this procedure was satisfactory. However, the location of one valve was improperly described in the procedure. The operator took proper action to correct this error.

- d. WSRC Readiness Self Assessment: The WSRC RSA is still in progress, but is expected to be completed prior to the start of the WSRC ORR, scheduled for October 18, 1995. This date is prior to the completion of operator and supervisor qualification for radioactive operations contrary to a prerequisite of the WSRC ORR Plan of Action.

The staff reviewed the functional area pertaining to conduct of operations that was completed May 31, 1995. The conduct of operations review identified six findings and three open items requiring closure prior to declaring readiness to operate. The findings were in the areas of operations organization, round sheets, turnover checklists, required reading, operator aid postings, and radio usage postings. The open items concerned incorporation of new Technical Safety Requirements (TSR) into operations procedures, revising the TSR database, and evaluating the performance of management overview and facility monitoring tours program. The assessment director also noted that the

Management Tracking System contained about 150 operational items that needed to be corrected prior to radioactive operations.

Review of the lines of inquiry used during the review of conduct of operations found that few observations of operations were conducted, or even required to be conducted. For example, in the section on shift routines and operating practices, the only observations made were two shift turnovers. No observation was made to validate the operating practices of the shift personnel during operations. In the area of control of equipment and system status, the only direct observation that occurred was another attendance at a shift turnover; there was no evidence that direct observations were made of personnel controlling equipment. In the area of operating procedures, the lines of inquiry specified observing four operators on each shift while they performed operating procedures. The RSA records were difficult to audit and it was unclear what procedures were observed and their degree of difficulty. The staff believes that an effective performance-based review should include a significant number of observations of actual work being conducted in the plant.

The self assessment noted few conduct of operations deficiencies; however, several problems were noted by the Board staff during the few operations observed. This provides further indication that the assessment was not thorough and additional attention is required to ensure the proper level of conduct of operations is attained.

5. **Future Staff Reviews:** The staff will continue to follow the efforts of WSRC and DOE-Savannah River as they prepare for radioactive operations at DWPF. Specific issues related to the training, qualification, and conduct of operations programs at DWPF will be reviewed by the staff prior to the DOE ORR and radioactive operations.