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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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October 3, 2002

The Honorable Everet H. Beckner
Deputy Administrator for Defense Programs
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0104

Dear Dr. Beckner:

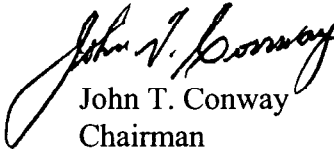
The staff of the Defense Nuclear Facilities Safety Board (Board) recently observed the contractor Operational Readiness Review (ORR) for resumption of Wet Chemistry Operations in Building 9212 at the Y-12 National Security Complex (Y-12). Based on the observations of demonstrations during the contractor ORR, the Board's staff found that the preparations in the areas of conduct of operations and training were inadequate. The Board understands that the contractor ORR team also identified these deficiencies, as well as deficiencies in the functionality of the operating procedures. The ORR has been suspended.

The inability to complete the contractor ORR indicates that the corrective actions taken by the contractor in response to several Board letters on this topic have not been effective in ensuring that line management achieves an adequate state of readiness prior to starting the readiness review process. Deficiencies with a readiness review at Y-12 during 2001, previously presented to the Board by the contractor, were:

- Emphasis was on getting ready for the ORR, not in getting the facility ready to operate,
- Line managers did not understand the need to validate facilities, equipment, and process functionality,
- Engineers/line managers/workers did not appreciate the significance of clear, concise, and equipment-specific operational instructions, and
- Line management, including senior management, was not effective in overseeing the preparation and determination of readiness.

These deficiencies in readiness preparation remain a challenge at Y-12. The enclosed issue report is provided for your use, as appropriate, to aid in correcting them.

Sincerely,



John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.
Mr. William J. Brumley

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

Staff Issue Report

September 9, 2002

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: T. Dwyer

SUBJECT: Conduct of Operations and Training Preparations for a Contractor's Operational Readiness Review at Y-12 National Security Complex

This report documents observations made by the staff of the Defense Nuclear Facilities Safety Board (Board) during the contractor's Operational Readiness Review (ORR) for resumption of Wet Chemistry Operations in Building 9212 at the Y-12 National Security Complex (Y-12). The Y-12 contractor, BWXT Y-12, declared readiness on August 20, 2002, and the contractor's ORR began the next morning. T. Dwyer and M. Forsbacka of the Board's staff observed Wet Chemistry personnel conducting demonstrations of selected procedures during the next three days. Additional demonstrations of procedures, scheduled for the following week, were not observed.

Background. Wet Chemistry Operations is part of the process used to recover and purify enriched uranium from scrap generated by Y-12 operations or from off-site customers. The operation includes six processes: oxide dissolution, primary extraction, intermediate evaporation, secondary extraction, wiped film evaporation, and denitration. The operation has been shut down since September 1994. The feed and product tanks still contain legacy fissile material, which limits the ability to conduct demonstrations of all processes. Therefore, extensive use of simulations and walk-throughs were planned by BWXT Y-12 management. The Board's staff observed several demonstrations during the contractor's ORR to gauge the effectiveness of the contractor's training and conduct of operations programs. The National Nuclear Security Administration's ORR will also be observed by the Board's staff to gauge readiness of Wet Chemistry Operations to start up.

The Board has previously identified problems with the ability of Y-12 line management to achieve an adequate state of readiness prior to starting the review process for the startup/restart of an activity. The Board, in an August 1999 letter, took issue with repeated premature declarations of readiness to start reviews. Y-12 was explicitly cited in this letter. The problem of premature declarations of readiness was highlighted again in a Board letter dated March 8, 2000. In a letter dated June 28, 2001, the Board explicitly noted that the readiness process at Y-12 was falling short of the standards expected, especially with regard to failure of line management to ensure a campaign was ready to operate.

Discussion. Process operations observed included: (1) intermediate evaporators system alignment; (2) primary intermediate evaporator gamma monitor test; (3) primary intermediate

evaporator operations; (4) secondary intermediate evaporator operations; and (5) secondary extraction (centrifugal contactor) system operations.

Intermediate Evaporators System Alignment—Two operators conducted this system alignment using appropriate, formal conduct of operations practices, including exacting valve/switch identification, repeat-backs, and acknowledgments. It was apparent that facility management had paid significant attention to appropriately labeling all equipment, providing approved and controlled operator aids, and ensuring all system sensors were in calibration. One valve was found out of position; operators and supervisors took appropriate corrective actions. Both operators were knowledgeable of locations of all system components.

Primary Intermediate Evaporator Gamma Monitor Test—Two operators conducted this test using appropriate, formal conduct of operations practices. Both operators knew the locations of all system components and expected responses to valve and switch manipulations.

Primary Intermediate Evaporator Operations—Two operators attempted to conduct this procedure as a cold run with fissile solutions isolated from the process. However, several deficiencies in the procedure and in operational practices prevented completion of the operation. The most significant procedural deficiency prevented the steam control valve from opening when the operator manipulated the control switch. The process engineer determined that an interlock with a recording device that the operators had not been directed to energize by the procedure was at fault. This deficiency had not been uncovered prior to the ORR because the planned demonstration during the ORR was to have been the first time that the operators would have applied live steam to the evaporator since 1994.

The lack of live training experience also resulted in several conduct of operations violations. For example, operators were not sure what feedback to expect upon activation of a reset hand switch. This led to an unauthorized reactivation of the switch, as well as a subsequent out-of-sequence valve manipulation. Further discussions with supervisory personnel and the process engineer also revealed that several redline steps in the demonstration procedure had been inserted to provide training to the operators (e.g., a particular pump controller was specifically disabled so that the operators could learn how quickly the pump's feed tanks filled under steaming conditions). The Department of Energy standard, DOE-STD-3006-2000, *Planning and Conduct of Operation Readiness Reviews*, requires that ORR demonstrations be focused on verifying readiness to operate, not achieving readiness by providing necessary training.

Secondary Intermediate Evaporator Operations—Two operators attempted to simulate this operation. However, several deficiencies in the procedure and in operator training led to a series of interruptions and conduct of operations violations. Again, operators indicated that they had no actual experience running this equipment. As this is a computer-controlled operation, it would seem to have been relatively easy to provide a computer simulation training program to aid in operator qualification—facility management personnel indicated that a simulation program was being developed, but had not been provided prior to the ORR. The operator was unable to log on to the system for the ORR demonstration. Lack of familiarity with the computer system was also evident in erroneous manipulations attempted later in the day, as well as conduct of operations

violations that required supervisory intervention when the ORR team directed simulation of an abnormal operating condition. The operators also exhibited confusion with regard to the difference between sensor indications and selectable pushbuttons on the computer screen.

During manipulation of several valves to line up the system prior to commencing computer-controlled operations, the operators indicated that they were not sure what physical feedback they would expect upon completion of the process step. The operators were familiar with the valve line-up required to conduct the operation, and therefore performed one particular sequence of steps despite the fact that plant conditions did not meet the requirements to authorize entry into the conditional sequence. The procedure also contained several series of steps to perform similar operations that were written or organized in completely different manners, leading to potential confusion among operators. This included different alarm response procedures for the same condition.

Secondary Extraction (Centrifugal Contactor) System Operations—Two operators attempted to simulate this operation. However, a deficiency in the current system alignment prevented the demonstration. The second step of this procedure requires that the supervisor (together with the shift manager) determine if a full or partial system alignment is required. The supervisor reported completion of this step, having determined that the latest alignment was adequate. However, upon investigation, the ORR team found that a series of valves were not properly aligned for secondary extraction system operations, and that facility management had approved the misalignments (including hanging a caution tag out) until Revision 15 of the facility Basis for Interim Operation had been approved. Revision 15 was in effect when management declared readiness for the ORR, yet the tagout had not been cleared and the system alignment had not been restored to normal in preparation for operational activities.

Conclusion. The difference in levels of operator performance between the first two operations observed and the final three demonstrations attempted is stark. The key component missing from the latter demonstrations is adequate hands-on training. Lacking this significant experience, operator abilities are limited, qualifications are suspect, and facility readiness is deficient. It appears that BWXT Y-12 management must re-emphasize hands-on training and procedure validation in all facility start-up programs.

The noted deficiencies also indicate that Y-12 management remains unable to prepare their people and procedures for a readiness review prior to declaring readiness. Despite interactions on this issue with the Board as recently as last year, it appears that corrective actions taken by line management at Y-12 have been ineffective.