

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 28, 1993

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director

**COPIES:** Board Members

**FROM:** D. F. Owen

**SUBJECT:** Savannah River Site - Trip Report of Staff and Outside Expert Visit to H-Canyon

1. Purpose: This memorandum provides a report of a visit to H-Canyon on May 4-6, 1993 by Don Owen, DNFSB staff and Dick Thompson, outside expert. The purpose of the trip was to observe DOE-SR Operations office interviews of Westinghouse Savannah River Company (WSRC) H-Canyon personnel to assess their knowledge and training. In addition, a limited review of the status of certain operations and training issues was performed, including a tour of the facility.
2. Summary: The DOE-SR review consisted of a series of interviews of various H-Canyon personnel including operators, maintenance and supervisory personnel. The DNFSB staff and outside expert observed the DOE-SR interviews of many of these personnel, from operators to the facility manager. The interview questions were in the areas of radiological protection, training programs, conduct of operations and conduct of maintenance with a small number of questions on system processes and safety limits. Based on staff and outside expert observation of the interviews, weaknesses were evident in operator and supervisor level of knowledge and deficiencies were evident in training and qualification of operators and supervisors. These weaknesses are similar to those noted during the previous staff reviews of F-Canyon in April 1993 and HB-Line in May 1992 (prior to DOE actions to improve the readiness of HB-line).

Based on a limited review of certain operations and training issues, the staff and outside expert also have the following observations:

- a. Training Programs: The H-Canyon training program is not in accordance with DOE Order 5480.20, Personnel Selection, Qualification, Training and Staffing Requirements At DOE Reactor and Non-Reactor Nuclear Facilities. Operators and supervisors have received little formal engineering fundamentals training, particularly in the specific processes and systems for H-Canyon, though efforts in this area have started. Supervisors have not been trained to higher technical standards than operators. The H-Canyon training program status is similar to that noted by DNFSB staff for F-Canyon in April 1993.

Plans to complete implementation of DOE Order 5480.20 are under development

including revised training programs and qualification requirements for operators, supervisors and shift technical engineers.

- b. Tank Data Evaluation: In response to the recent experience with follow-up of tank data on F-Canyon tanks 9.6 and 9.8, H-Canyon has recently instituted data trend monitoring for major H-Canyon tanks. The shift turnover checklist now requires shift manager review for adverse trends in data shift-to-shift, and engineering support personnel will now be reviewing these trend charts.
  - c. DOE-SR Facility Representatives: The current DOE-SR facility representative for H-Canyon is not fully qualified as facility specific training for his position is still being developed. He will not complete qualification until October 1993. Most facility representative concerns are transmitted informally to WSRC and no clear guidance for how such concerns should be transmitted to WSRC is provided.
  - d. Lockout/Tag-out: H-Canyon is in the process of implementing a revised process for lockout and tagout of equipment which is to be consistent with the system being implemented sitewide. Some equipment was tagged in accordance with the previous system and some to the new system. A locked valve tagged "Do Not Operate" was discovered with the lock open by the DOE-SR facility representative during a tour of the canyon.
3. Background: The H-Canyon's mission is to dissolve irradiated fuel material from the Savannah River reactors and the Receiving Basin for Off-site Fuels (RBOF) and purify the solutions via ion exchange and solvent extraction processes. Purified plutonium solutions are subsequently precipitated, calcined to oxide or converted to metal in the HB-Line facility.

In April 1993, the staff conducted a limited review of training and conduct of operations in F-Canyon. The F-Canyon facility performs separations and purification operations similar to H-Canyon. This review was prompted by an occurrence wherein excessive evaporation in plutonium bearing tanks 9.6 and 9.8 over a twenty-month period was allowed to occur despite tank level and plutonium concentration data being available. During this limited review, the staff found F-Canyon training and conduct of operations deficiencies indicative of problems observed by the staff early in the preparations of HB-Line in May 1992. Definition and implementation of compensatory measures in F-Canyon for recognized deficiencies did not appear sufficiently advanced to ensure safe facility operation.

As a result of the staff observations, DOE-SR developed their own assessment plan to quickly perform a review of personnel at F-Canyon, H-Canyon and RBOF facilities. Specifically, the assessment plan tasked four DOE-SR representatives to conduct interviews of WSRC facility personnel.

4. Discussion:

a. DOE-SR H-Canyon Review: The DOE-SR review consisted of a series of interviews of H-Canyon operators, maintenance personnel, health protection technicians, shift engineers and shift supervisors. The DNFSB staff and outside expert observed most of these interviews. There were a total of 36 personnel interviewed over a three day period. The interviewers included three DOE-SR personnel and one DOE-SR support contractor. Questions were generally limited to radiological protection (asked by the support contractor), training programs, conduct of operations and conduct of maintenance (asked by DOE-SR personnel). There was also some limited questioning on system processes and safety limits. The questions in the areas of radiological protection were the most technically oriented with the most follow-up upon discovery of a weakness. The questions were generally consistent from one interviewee to the next with adjustment for supervisory personnel to ask about their implementation of these programs. Based on staff and outside expert observation of the interviews, weaknesses were evident in operator and supervisor level of knowledge and deficiencies were evident in training and qualification of operators and supervisors. Some of the deficiencies observed by DNFSB staff and outside expert during the interviews include:

- (1) Knowledge Weaknesses: Weaknesses observed include knowledge of radiological fundamentals, radiological hazards, process knowledge and system limits and interlocks, configuration control and lockout/tagout procedures. One operations first line supervisor could not explain where or how to determine the safety basis of limits in procedures and could not explain differences in various radiation hazards or biological effects. A control room operator did not know acid concentration limits for key tanks, could not explain the function of an interlock and did not know the difference between a "Caution" and a "Do Not Operate" tag on a piece of equipment. A control room supervisor could not describe various features of the solvent extraction process.
- (2) Supervisor Qualification: It was clear from the inter-views that supervisors are not required to be qualified in areas they supervise, nor has there been technically oriented training for supervisors beyond that given to operators.
- (3) Implementation of ALARA: Some supervisors had no clear knowledge of goals or actions toward reducing radiation exposure to ALARA. One supervisor said that he would not be concerned about an operator with an exposure of 1,250 mrem since it is below the limit and went on to say he never saw a change to a maintenance procedure based on an ALARA review.

These deficiencies are similar to those noted during the previous staff reviews of F-Canyon in April 1993 and HB-Line in May 1992 (prior to DOE actions to improve the readiness of HB-line).

- b. Training Programs: The H-Canyon training program is not in accordance with DOE Order 5480.20, Personnel Selection, Qualification, Training and Staffing Requirements At DOE Reactor and Non-Reactor Nuclear Facilities. Operators and supervisors have received little formal engineering fundamentals training, particularly in the specific processes and systems for H-Canyon. Supervisors have not been required to achieve operator qualification on those positions they supervise and have not been trained to higher technical standards than operators. The F-canyon training program status is similar to that noted by DNFSB staff for FCanyon in April 1993.

Plans to complete implementation of 5480.20 are under development including revised training programs and qualification requirements for operators and supervisors. Development of qualification requirements is being slowed by a lack of adequate process and system description documentation. Efforts are underway to utilize subject matter experts to complete qualification requirements by the end of June 1993. Supervisors have begun on a limited basis to become operator qualified on those positions they supervise. Limited fundamentals training in math and chemistry has been initiated; however, the full scope of fundamentals training is still under development. The training and qualification program for shift technical engineers was not reviewed. This program is the responsibility of the Separations Engineering group instead of Operations.

- c. Tank Data Evaluation: In response to the recent experience with follow-up of tank data on F-Canyon tanks 9.6 and 9.8, H-Canyon has recently instituted data trend monitoring for several H-Canyon tanks. The shift turnover checklist now requires shift manager review for adverse trends in data shift-to-shift, and engineering support personnel will now be reviewing these trend charts.
- d. DOE-SR Facility Representatives: The current DOE-SR facility representative for H-Canyon has been assigned to H-Canyon about one year but is not fully qualified. Facility specific training objectives and detail knowledge requirements including knowledge of safety limits, system descriptions, etc. for his position were still being developed at the time of this review. He does not expect to complete qualification until about October 1993.

The H-Canyon facility representative office has been located in the F-Canyon area (about 2 miles from H-Canyon). His office will soon move to a location next to F-Canyon. He states that backlog of occurrence reports and other paperwork allow for visits to radiologically controlled areas about two or three times a week. After noting concerns during his visits and tours, most of his concerns are transmitted informally to WSRC. He stated that there is no clear guidance for how concerns should be transmitted to WSRC.

While not fully trained and qualified, the facility representative appeared to be competent and observant. He was previously a chief refueling engineer at a naval

nuclear shipyard. During the tour of the facility, the facility representative discovered a manual process air valve in the warm gang valve alley with a "Do Not Operate" tag in which the lock about the valve operator was unlocked.

- e. Lockout/Tagout: H-Canyon is in the process of implementing a revised process for lockout and tagout of equipment which is to be consistent with the system being implemented sitewide. Some equipment was tagged in accordance with the previous system and some to the new system. It was noted that a new valve labeling and numbering system is also being implemented.
  - f. Control Room Operations: Shift turnover, control room logs/records were reviewed. The shift turnover was professionally done with display and operating board walkdowns being thorough and deliberate. Control room logs and records were clearly filled out with no discrepancies observed.
  - g. Supervisor Tours: The supervisor tour program was reviewed and is based on approved procedures. A small sample of supervisor tour reports were reviewed and found to have substantial observations. Effectiveness of tour observation followup and corrective actions through the H-Canyon commitment tracking system was not reviewed.
  - h. H-Canyon Facility Tour: The acting facility manager, facility representative and maintenance coordinator led a tour of the H-Canyon including the control room, crane control room, warm gang valve alley, crane maintenance areas, tank sampling stations and outside facilities. While this is an aging facility, housekeeping was generally good. During the tours, both the facility manager and the facility representative (as discussed above) were taking notes on their observations.
5. Future Staff Reviews: As discussed above, many of the efforts at H-Canyon are in the developmental stages and DOE-SR may be taking additional actions. Upon implementation of these actions, the staff intends to complete more detailed reviews of the issues noted above and review of the specific processes in H-Canyon, safety basis and technical safety requirements contained in safety documentation, radiation protection, maintenance and compliance with DOE Orders. These reviews will be done with a focus on DOE-SR application of improvements across all separations facilities.