DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 22, 1993

MEMORANDUM FOR:	G. W. Cunningham, Technical Director
COPIES:	Board Members
FROM:	Daniel G. Ogg, Program Manager for SRS HLW
SUBJECT:	Savannah River Site (SRS) H-Tank Farm and In-Tank Precipitation Facility - Trip Report (November 22-23, 1993)

1. **Purpose:** This memorandum documents the DNFSB staff visit to H-Tank Farm and the In-Tank Precipitation (ITP)/Extended Sludge Processing (ESP) facilities at the Savannah River Site (SRS) during November 22-23, 1993. The review team included DNFSB technical staff member Daniel Ogg and outside expert Douglas Volgenau. The purpose of this trip was to review the conduct of operations and training upgrades at both facilities and to review the preparations for restart of the 1-H Evaporator and for startup of the ITP facility. A July 1993, DNFSB staff visit to the Tank Farm facilities had noted weaknesses in the areas of environmental protection, training, and conduct of operations.

2. **Summary:** There has been some progress in improving the training, qualification and conduct of operations in the Tank Farm facilities since the July 1993 DNFSB staff visit. However, a need for significant further improvement for operators and supervisors in all of these areas remains. Many of the efforts and programs put in place to correct noted deficiencies are immature and not yet fully effective. An occurrence in the F-Tank Farm area, in October 1993, involving the inadvertent siphoning of 15,000 gallons of liquid waste, revealed a number of conduct of operations related deficiencies. Training for engineering support and health protection personnel is lacking. The management surveillance and drill programs require strengthening. Details of these weak areas are provided in the discussion below.

   Corrective actions for the H-Tank Farm Concentrate Transfer System (CTS) ventilation contamination incident have been completed. However, based on interviews conducted by the review team, new conduct of operations measures that were put in place are not well understood by all Westinghouse Savannah River Company (WSRC) personnel. More recent occurrences in H- and F-Tank Farms continue to show fundamental weaknesses in the conduct of operations area.

   The training and qualification programs for the ITP/ESP facility appear, as briefed, to be well structured and comprehensive. The ability to effectively train on occurrence causative factors and lessons learned from significant events is weak. Planning for the startup of the ITP facility is progressing.

3. **Background:** The High Level Waste (HLW) organization at WSRC operates 51 HLW tanks in H- and F-Area at SRS. At the time of the review, no large scale operations were being conducted and only surveillance activities and routine transfers of waste

water occurred on a daily basis. All operation of the H- and F-Area evaporators was stopped after the H-Tank Farm CTS ventilation system contamination incident to implement conduct of operations upgrades. During the review trip, restart preparations for the operation of the 1-H evaporator were being completed, and on December 9, 1993, DOE-SR authorized restart of the facility.

The ITP facility is conducting cold chemical testing and continues to make preparations for radioactive operations. It was learned by the DNFSB staff during the review trip that the original date for radioactive operations of early 1994 will not be met due to difficulties with the testing program. The new scheduled date for radioactive operations is December 1994.

4. **Discussion:**

   a. **Training and Conduct of Operations:** The DNFSB review team received briefings from WSRC on the training programs at H-Tank Farm and at ITP. A tour of each facility's control room was conducted and five operators and supervisors were interviewed. Several observations were made as noted below:

      1. A new High Level Waste Tank Farm Manager has recently been assigned by WSRC. This, and some other management changes, have resulted in a refocusing of effort on improving the training, qualification and conduct of operations in the Tank Farm facilities.

      2. Supervisors and operators currently in the tank farms have received an initial qualification under an incumbent qualification program. This qualification program consisted of the previous training and qualification program, experience and education requirements, supervisor and operator self-assessment questionnaires, an oral board and approval by HLW management. A second phase of qualification involves an interim program, designed to significantly upgrade operator knowledge by September 1994. Completion of full qualification is expected to take at least 1 1/2 years.

      3. Approximately 70 new operators have recently been assigned to the HLW operator training organization from the reactor operator training organization. This transfer of people, who had previously received intensive training, was planned by WSRC as an important ingredient in the development of an upgraded training program. However, the number transferred was significantly fewer than had been anticipated. These individuals are currently undergoing training in system fundamentals.

      4. To compensate for the lack of training, qualification, and conduct of operations knowledge, the HLW management instituted a deliberate operation plan. This plan encompasses training enhancements, procedure improvement, and conduct of operations emphasis. An important ingredient is the use of increased oversight and precautions during the conduct of "critical evolutions". Although the deliberate plan seems to be

having a positive effect on operator performance, there is confusion on the part of management and the operators as to what constitutes a "critical evolution" and when specific compensatory actions are required.

5. The Site Conduct of Operations Manual (WSRC 2S Manual) has been issued and HLW management has developed an implementation plan. Although some conduct of operations related training has been given to managers, supervisors, and operators, it has not been sufficient to ensure a detailed understanding of the important principles.

6. Engineering support and health protection personnel have not received the same level of training as have the facility supervisors and operators. There is no formal facility-related training program for the HLW engineering personnel. These problems result from neither group being assigned to the HLW management for training responsibility. This is a significant short-coming as these individuals are heavily involved in the day-to-day operations of the tank farm facilities and should have a formally required level of knowledge.

7. A program to provide training and drilling on abnormal procedures has recently been developed. Few (13) drill scenarios exist and few (7) drills have been conducted. The program is immature, lacks sophistication and the critique process requires improvement. The ability to identify root causes and appropriate lessons learned from drills and from off-normal occurrences is lacking. This lack of ability is significantly limiting the effectiveness of training sessions on these topics.

8. The inclusion of support divisions in the planning of routine work, noted as lacking by the CTS event investigation, has improved. However, the HLW engineering personnel have not been properly briefed on their responsibilities for participation and as a result have been somewhat reluctant participants. The process of effective prejob briefings is not well understood by some levels of HLW management.

9. The incidence of frequent nuisance CAM alarms was noted in the CTS event investigation and a recommendation in this regard was provided. Although actions have been taken to investigate causes and to provide some correction, non-valid CAM alarms have continued to occur. Further effort is required to resolve this.

10. A program to ensure involvement of management personnel in the facility observing performance has been developed. Tours and surveillances are being conducted. Rather detailed check-off cards/sheets are used. The check-offs contain some errors and inconsistencies. Few deficiencies were identified during a number of recent surveillances conducted. It was noted that no senior manager had documented a tour or surveillance during a weekend or backshift.

11. WSRC Quality Assurance surveillances conducted in H-Area consisted primarily of reviews of procedures and directives. The QA organization needs to become more active in conducting performance based surveillances instead of paper reviews.

12. The senior manager at the tank farm complex does not feel he has sufficient middle and upper level managers assigned to ensure the implementation and enforcement of an effective conduct of operations program. He indicated there were about ten shortages and that it was not clear as to when additional people would be assigned. This area had been documented as a potential weakness during the CTS event investigation.

13. On October 9, 1993 an occurrence, in the F-Tank Farm area, involving the inadvertent siphoning of approximately 15,000 gallons of high level waste was reported. Although review of this occurrence had not been completed at the time of the visit, preliminary indications reflect a number of conduct of operations related deficiencies.

14. Interviews of five individuals were conducted. These included an engineering manager, two supervisors, one operator and a health protection (HP) inspector. All demonstrated weaknesses in conduct of operation principles, although there was an awareness of their importance and that the WSRC 2S Manual was an important reference. Little knowledge was demonstrated as to the root causes and lessons learned from the CTS contamination event. Knowledge deficiencies in facility radiological hazards and the personal implications of these were noted. The HP inspector was weak overall. One supervisor demonstrated good knowledge overall.

15. During a tour of the H-Tank Farm some deficiencies were noted. The control room operator was not familiar with the location of logkeeping requirements. Operators were not familiar with the requirements for alarm acknowledgment stickers and many installed stickers were poorly affixed to the alarms. One poor radiological practice was noted where clean rubber gloves were loosely stowed directly adjacent to a contamination boundary.

16. An in-plant drill, involving a pump pit exhaust air high activity alarm, at the H-Tank Farm was observed. Some deficiencies were noted. The drill was not conducted as prescribed in the drill scenario. Although there were good reasons for this, the scenario was not changed at the pre-brief to take these reasons into account. This results from an inflexibility in the planning and conduct of drills. An unnecessarily low limit on the total number of people allowed in the control room resulted in no one other than an initiator serving as a drill monitor. Because of drill artificiality, he was busy talking during most of the drill so could not be an effective monitor. Too much unnecessary conversation in the control room interfered with prosecution efforts. This was primarily due to the presence

of the shift manager and the shift engineer in the control room and their conversations. Neither appeared sure of their role during drill/casualties. The HLW management needs to decide the specific purpose of a given drill and the desired termination point, prior to the drill, if the drill value is to be significantly enhanced.

b. **Corrective Actions for H-Tank Farm CTS Contamination Event:** On April 15, 1993, the CTS ventilation system was inadvertently flooded while flushing a system demister and reheater. The ventilation system flood resulted in the spread of radioactive contamination from the ventilation piping to the surrounding area. DOE-SR initiated a Type B investigation into the event and issued its report on June 7, 1993.

   A response to the Type B investigation was originally issued by WSRC on July 26, 1993. This was done without the review or concurrence of DOE-SR. Subsequently, DOE personnel expressed many concerns about the corrective actions proposed. On November 15, 1993, an updated response to the Type B investigation was issued. In general, the updated responses appeared to the DNFSB staff to be adequate, however, final validation by DOE-SR was required prior to the authorization of the restart of the 1-H evaporator. The DNFSB team reviewed the DOE-SR validation plan and found that much of the plan lacks formality. Additionally, it does not specify either the format or content requirements for the readiness evaluation report.

   Subsequent to the DNFSB review, restart preparations including the WSRC ORR and the DOE-SR validation were completed, and authorization for restart was granted by the manager, DOE-SR, on December 9, 1993. At the date of this report the facility had not yet restarted.

c. **ITP/ESP Start-up Preparations:** The visit to ITP/ESP involved reviewing the status of the training and qualification of personnel, touring the facility and reviewing the startup schedule and ORR preparations. The following observations are provided:

   1. The training and qualification programs, as briefed, appear to be well structured and comprehensive. Process and Tank operators have been fully qualified. The plan provides for full qualification for other operators and supervisors prior to facility startup. There appears to be little ability to effectively determine root causes and lessons learned from such things as drills and off-normal occurrences and to relate these to such things as the conduct of operations principles and then to effectively train operators.

   2. A tour of the ITP/ESP facility revealed a lack of knowledge of logkeeping requirements and alarm acknowledgment stickers placement similar to that noted in the H-Tank Farm control room. One poor radiological practice was observed during the tour. An HP inspector outside of a contamination

area was seen handling a respirator that was taken from inside the contamination area without being frisked.

3. WSRC planning for the ITP facility startup is proceeding. The startup plan has been submitted to DOE headquarters for review and approval. WSRC anticipates approval in January 1994. The DOE order compliance assessment is in progress. This assessment is also expected to complete in January 1994. WSRC is planning for a facility startup in calendar year 1994.

4. DOE-SR has prepared a validation plan designed to signify WSRC readiness for the ITP facility startup to DOE headquarters. The plan could be improved. For example, it does not include provision for documenting deficiencies noted and for transmitting these to the contractor. Also, DOE-SR self-assessment provisions are interspersed with those for validation of WSRC which adds confusion to the validation plan.

5. **Future Staff Actions:** The DNFSB staff will continue to maintain close communications with the DOE-SR HLW operations division to remain appraised of the operational status of the 1-H evaporator and other facilities at the Tank Farms and at ITP/ESP. Additionally, the staff continues to receive daily written status reports from the DOE-SR and the WSRC HLW organizations. Reviews of the ITP ORR will be planned when the facility schedule becomes more firm. Reviews of DWPF conduct of operations, and chemical processing and H-Area geotechnical investigation are scheduled in the next five months.