

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 7, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: J. W. Troan

SUBJECT: Savannah River Site (SRS) Replacement Tritium Facility (RTF)
Emergency Preparedness and Radiation Protection Follow-up
Review

- 1. Purpose:** This memorandum documents the Defense Nuclear Facilities Safety Board (DNFSB) technical staff follow-up review of select Emergency Preparedness and Radiation Protection topics. The review was conducted during a visit to the Savannah River Site (SRS) Replacement Tritium Facility (RTF) on January 20-21, 1994.
- 2. Summary:** DNFSB Staff Radiation Protection and Emergency Preparedness Topic Papers that were prepared to support Board deliberation on the SRS RTF gram level increase identified DNFSB Staff plans for follow-up. On January 20-21, 1994, approximately three months following RTF gram level increase, the staff reviewed select Emergency Preparedness and Radiation Protection topics at the SRS RTF.

The Emergency Preparedness follow-up review focused on Compliance Schedule Approval (CSA) compensatory measures and milestones for DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*, and SRS RTF Emergency Response Organization (ERO) training and qualifications.

- Some Planned Action Milestones for RTF programs addressed by the RTF CSAs have experienced schedule delays up to approximately two months. These delays were projected to result in a five week delay in the effective date for the revised RTF Emergency Classification procedure. The compensatory measures outlined by the subject CSA were overviewed and reported by RTF Emergency Preparedness management as being in place.
- The facility's ERO training and qualification program has continued to be improved. Participation in a critiqued drill or a formal walk-through drill is now a prerequisite to ERO position qualification.
- Evaluation of drills are now following a more structured approach where objectives are defined from a Source Control Document (SCD), (i.e., SCD-4), and performance based assessment criteria is applied.

The Radiation Protection follow-up consisted of a review of training and qualification for Radiological Control Technicians and their Supervisors, as well as a review of the

implementation of the Tritium Bioassay and Silica Gel Sampling Program at RTF, along with performance and operation of RTF Kanne Tritium Monitors.

- Radiological Control Technicians and Radiological Control Technician Supervisors who were previously qualified to the pre-Radiological Control Manual (RCM) training standards are participating in a program that upgrades their knowledge. However, upon completion of this training, they will not have completed qualification in accordance with the DOE-RCM. SRS Radiological Control Managers indicated that planning was in progress to move towards accelerating the training (i.e., Job Performance Measures) to meet the December 1994 training date, but that full qualification (i.e., Final Oral Board) was not expected to occur until approximately March 1996.
- Several groups in the organization appear to manage and track parts of the Radiological Control training and qualification process. As a consequence of this division of responsibility, it does not appear that the process is consistently coordinated and integrated down to the facility level. For example, from the RTF information provided, the DNFSB staff was only able to identify that nine persons were "Tritium/RTF Radiological Control Inspector Qualified," and noted that the RTF Radiological Control Technician Supervisors were not included on the Inspector Qualification matrix.
- In support of a phased approach to establishing tritium bioassay sampling frequencies, workers in select rooms at RTF had been on Special Daily Bioassay samples following the admittance of high concentrations of gas to gloveboxes. The Tritium Facility Radiological Control Operations Manager's review of all results from samples have not indicated an increase or detection of tritium exposure from any RTF routines or functions. Based on these results, it was decided that monthly routines and job specific bioassay were the proper bioassay frequency for RTF operation.
- The Silica Gel Sampling Program has been instituted at the RTF. Selected rooms have been sampled, and Tritium Oxide (HTO) concentration results have been measured at less than 1×10^{-10} uc/ml.
- Spurious Kanne Tritium Monitor alarms were reported as typically occurring at a frequency of approximately 0 to 2 per day, which was down from the approximate 6 per day that was experienced during last summer. Although recent data shows that the average number of alarms per day is approximately 2, the lower average may shadow the days where alarms occur at a greater rate. Based on the recent performance trends, the upgrades that were previously considered were determined by a RTF System Engineer as not warranted. An engineering evaluation to substantiate this position was not available.

3. **Background:** In 1993, the DNFSB Staff reviewed Radiation Protection and Emergency Preparedness at the SRS RTF prior to RTF gram limit increase. These reviews were conducted in support of providing the Board with information relevant to their deliberations on public health and safety.

Topic Papers No. 13 and No. 15 were prepared for Radiation Protection and Emergency Preparedness, respectively. Based on the information reviewed, technical exchanges conducted, and on-site observations, the DNFSB Staff believed that no further action was required by the Board on these topics prior to RTF gram level increase. However, the DNFSB Staff planned to follow selected technical areas, as indicated in the Topic Papers.

The objective of this review was to conduct follow-up reviews consistent with the DNFSB Staff's plans. The review was conducted by Jim Troan, DNFSB Staff member.

4. **Discussion/Observations:**

In addition to the details discussed in the Summary Section of this memorandum, additional information from the review is available to amplify and supplement the preceding observations.

5. **Future Staff Actions:** Staff actions are expected to include the following:

- a. Monitor progress of implementing RTF Compliance Schedule Approvals (CSAs) for DOE Order 5500.3A following select milestones.
- b. Monitor the performance of RTF Kanne Tritium Monitors.
- c. Review and monitor the Westinghouse Savannah River Company (WSRC) Radiological Control Technician and Radiological Control Technician Supervisor Training Programs. The review is planned for March 1994, and monitoring will follow key milestones.
- d. Review the technical basis for establishing the sampling frequency for the periodic Silica Gel sampling program at the RTF.
- e. Review the DOE-SR Surveillance of Tritium Sampling Programs that was conducted during August and September 1993.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 7, 1994

MEMORANDUM FOR THE RECORD

FROM: J. W. Troan

SUBJECT: Savannah River Site (SRS) Replacement Tritium Facility (RTF) Emergency Preparedness and Radiation Protection Follow-up Review (January 1994)

1. **Purpose:** This memorandum documents the Defense Nuclear Facilities Safety Board (DNFSB) technical staff discussions and observations from a follow-up review of select Emergency Preparedness and Radiation Protection topics. The review was conducted during a visit to the Savannah River Site (SRS) Replacement Tritium Facility (RTF) on January 20-21, 1994.

2. Discussion/Observations:

- a. Emergency Preparedness: The Emergency Preparedness follow-up review focused on Compliance Schedule Approval (CSA) compensatory measures and milestones for DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*, and SRS RTF Emergency Response Organization (ERO) training and qualifications.

Upgrades to the RTF ERO training and qualification program were discussed. The training and qualification program appears to have continued to be improved. The following are examples of changes that have improved the program:

- Participation in a critiqued drill or a formal walk-through drill is now a prerequisite to ERO position qualification. The drill participation may be in one of a variety of drills, with the objective of experiencing generic tasks relative to the ERO position, such as reporting to the required place of duty, communications, etc.
- Evaluation of drills are now following a more structured approach where objectives are defined from a Source Control Document (SCD), (i.e., SCD-4), and performance based assessment criteria is applied. However, pass-fail criteria is not specified.
- Previous DNFSB Staff reviews identified that some Radiological Control Technicians and their Supervisors had elapsed on their biennial Radiation Worker qualification. Originally, the need to maintain Radiation Worker qualification was discounted by SRS management based on the rationale that the personnel maintained this expertise by virtue of being qualified Radiological Control Technician or Supervisors. This approach is permitted by the DOE Radiological Control Manual. However, this approach assumes that the Radiological Control Technician or their Supervisor has the requisite training, which may not exist given the upgrade training program at the SRS.

The Tritium Facilities Radiological Control Operations Manager now requires that RTF Radiological Control Technicians and Supervisors stay current with Radiation Worker Qualifications, regardless of their Radiological Control qualification. The DNFSB Staff believes this approach will ensure that personnel who are currently in the long term training upgrade program maintain the required level of knowledge and expertise before achieving their final qualification in accordance with the DOE Radiological Control Manual.

The Emergency Preparedness follow-up review also focused on Compliance Schedule Approval (CSA) compensatory measures and milestones for DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*. The status of compensatory measures and progress of implementing RTF Compliance Schedule Approvals (CSAs) for DOE Order 5500.3A was discussed. In addition, the review included discussions on the progress made on the RTF Hazard Assessment in support of subsequent modification of RTF Emergency Action Levels (EALs) in accordance with the subject CSA milestone dates. The following highlights the review:

- Some Planned Action Milestones for RTF programs addressed by the RTF CSAs have experienced schedule delays up to approximately two months. These delays were projected to result in a five week delay in the effective date for the revised RTF Emergency Classification procedure (March 31, 1994 changed to May 6, 1994). These changes were attributed to the Hazards Assessment review taking longer than originally anticipated. Changes to the approved CSAs are processed within Westinghouse Savannah River Company (WSRC) per their administrative procedures, and DOE involvement in the CSA change approval process was not apparent.
- The compensatory measures outlined by the subject CSA were overviewed, and reported by RTF Emergency Preparedness management as being in place.
- The administration of the CSAs was discussed. Since the subject CSAs were approved, management has recognized that some were more appropriately covered by a Site Level CSA instead of a Facility Level CSA. CSA SRS-DOE-5500.3A-181-B was identified as one in this category, and SRS personnel explained that a Site Level CSA was approved in December 1993. In this particular Site Level CSA, an Estimated Completion Date (ECD) change for the Consolidated Emergency Response Facility (CERF) from the original CSA was noted by SRS personnel. The new ECD was not identified.
- The administrative packaging of CSAs to include similar requirements

was discussed. The designation of the DOE Order 5500.3A CSA appears to give the basic Emergency Preparedness system requirement, and provides the umbrella for the more specific requirements to satisfy the function of the system by referencing the other orders.

- b. **Radiation Protection:** The Radiation Protection follow-up consisted of a review of training and qualification for Radiological Control Technicians and their Supervisors, as well as a review of the implementation of the Tritium Bioassay and Silica Gel Sampling Program at RTF, along with performance and operation of RTF Kanne Tritium Monitors.

Training and qualification accomplishments for the Radiological Control Technicians and their Supervisors were reviewed, and the status of the development of the RTF Radiological Control Technician Supervisors Training and Qualification Program was discussed. The following highlights the discussions:

Radiological Control Technicians and Supervisors who were previously qualified to the pre-RCM training standard are presently participating in the SRS Topic Training Program which upgrades their knowledge. Upon completion of this training, they will have received classroom training in the "fundamentals," but will not have completed qualification in accordance with the DOE-RCM. Following completion of the Topic Training in March 1994, these personnel will enter biennial requalification. It did not appear that the present plan would produce a Radiological Control Technician fully qualified in accordance with the DOE RCM until completion of the biennial requalification in March 1996. Discussion with SRS Radiological Control Managers indicated that planning was in progress to move towards accelerating the training (i.e., Job Performance Measures) to meet the December 1994 training date, but that full qualification (i.e., Final Oral Board) was not expected to occur until approximately March 1996. Correspondence from SRS to DOE on this topic appeared to be in the works.

RTF Radiological Control Technician training and qualification was discussed, and a detailed matrix that identified individual accomplishments was provided for the RTF Technicians. From this information, the DNFSB staff was only able to identify that nine persons were "Tritium/RTF RC Inspector Qualified." The following highlights the information from the review:

- The RTF Radiological Control Technician Supervisors were not included on the Inspector Qualification matrix. However, other information that identified some training requirements was provided for supervisors. In addition, information concerning the Radiological Control First Line Supervisor Training Program was given to the staff.
- Radiological Control Supervisor training requirements were noted as required

to be completed 18 months after promotion, or by November 1996 for incumbents.

- Supervisor accomplishments were provided in spreadsheets, but the format provided a history that would require an analysis to the requirements in order to assess an individual's qualification.
- Inspectors who had qualified prior to 1990 were listed on a matrix, but details concerning their specific RTF qualifications were not given .

Several groups in the organization appear to manage and track parts of the training and qualification process. As a consequence of this division of responsibility, it does not appear that training will consistently be coordinated and integrated down to the facility level. There appears to be a lack of consolidated information that gives a comprehensive picture of past accomplishment and future requirements which would lead to management of the total process.

As for improvements, the Tritium Facility Radiological Control Operations Manager stated that he now requires that RTF Radiological Control Technicians and their Supervisors to stay current with Radiation Worker Qualifications, regardless of their Radiological Control qualification. This item was discussed in detail in the preceding discussion on Emergency Preparedness. In addition, the Tritium Facility Radiological Control Operations Manager stated that all of the Tritium HP Technicians are working to qualify to the RTF Radiological Control Technicians Training and Qualification Standard, and since the last visit, three persons have started working towards Radiological Control Supervisor qualification. The Tritium Facilities Radiological Control Operations Manager stated that the Radiological Control Technician Supervisors trainees were required to follow the RTF Radiological Control Technicians Training Program Description.

The implementation of the Tritium Bioassay and Silica Gel Sampling Program at RTF, along with the performance and operation of RTF Kanne Tritium Monitors was reviewed. The following discussion highlights are provided:

- Tritium Bioassay Program - The Tritium Bioassay Program at the RTF was discussed with the Tritium Facilities Radiological Control Operations Manager. The manager provided a copy of a memo describing the RTF Bioassay Plan for gram level increase. Though not totally consistent with the Westinghouse Savannah River Company (WSRC) Internal Dosimetry Managers recommended RTF Start-up Tritium Bioassay Sampling Protocols, it does meet the objective of a phased approach to increasing the time between samples based on operating experience. On November 17, 1993, the Tritium Facilities Radiological Control Operations Manager provided an update stating that select rooms at RTF had been on Special Daily Bioassay samples due to the

admittance of high concentrations of gas to gloveboxes, and that review of all results from samples have not indicated an increase or detection of tritium exposure from any RTF routines or functions. Furthermore, he indicated that the results of the program had been discussed with the Manager of the Bioassay Programs, and that he agreed that the design of the facility has proven itself. Based on these results, it was decided that monthly routines and job specific bioassay were the proper bioassay frequency for RTF operation. The new plan was to go into effect on December 1, 1993.

- Silica Gel Sampling Program - The Silica Gel Sampling Program has been instituted at the RTF. All rooms have been sampled per the WSRC procedure with Tritium Oxide (HTO) concentration results less than 1×10^{-10} uc/ml. The procedure was discussed, and the DNFSB Staff questioned why the frequency of sampling varied between the Tritium and Reactors Area. The reason for the difference, or more specifically, the technical basis for the sample frequency was not identified during the review.

DOE-SR personnel present during the discussion stated that they had conducted a surveillance of the Tritium Sampling Programs in the August through September 1993 time frame. The surveillance report was not available at the time of the review.

- RTF Kanne Tritium Monitors - The performance of the RTF Kanne Tritium Monitors was discussed. The System Engineer for the RTF Kanne Tritium Monitors described that he performs a monthly assessment of the trend of performance, and that based on the performance, the upgrades that were previously considered were not warranted. The System Engineer and the RTF Program Manager indicated that spurious Kanne alarms were typically occurring at a frequency of approximately 0 to 2 per day, which was down from the approximate 6 per day that was experience in the Summer 1993. A "Kanne Evaluation Report from the November 1993 time frame was mentioned, but did not materialize following discussion. The DNFSB Staff obtained a record of RTF Kanne alarms for the period of November 2, 1993 through December 27, 1993, and a cursory evaluation for the approximate 2 month period identified the following unknown or abnormal alarms:

Probable Cause	Number of Alarms
Unknown	32 (November), 49 (December); 81 (Total)
Electrical Anomaly (e.g., spike, voltage drop)	25 (November), 0 (December); 25 (Total)
Mechanical Failure	4 (November), 1 (December); 5 (Total)

Probable Cause	Number of Alarms
Atmosphere Control Changes	11 (November), 8 (December); 19 (Total)
TOTAL of the above categories	72 (November), 58 (December); 130 (Total)

Although this data shows that the average number of alarms per day is approximately 2, the lower average may shadow the days where alarms occur at a greater rate. A more comprehensive understanding of the RTF engineering evaluation of this issue is necessary.

RTF personnel indicated that alarms were responded to in accordance with the Alarm Response Procedure, and that the alarms have not held up work in the last couple of months.