[DNFSB LETTERHEAD]

November 1, 1990

Mr. Victor Stello, Jr.
Deputy Assistant Secretary for Facilities
Office of Defense Programs
Department of Energy
Washington, DC 20585

Dear Mr. Stello:

Enclosed for your consideration and action, where appropriate, are a number of observations concerning radiological protection for the K reactor area of the Savannah River Site (SRS). These observations were developed by Daniel L. Burnfield of the Defense Nuclear Facilities Safety Board staff based on a visit to the SRS during the week of October 22, 1990.

We would be pleased to answer any questions or consider any comments you may have on these observations. We plan to schedule another visit to the SRS in two to three months to continue our review of radiological protection at this site.

Sincerely,

John T. Conway
Chairman

Enclosure

[DNFSB LETTERHEAD]

October 31, 1990

MEMORANDUM FOR	Mr. Edson G. Case, Member
FROM:	Daniel L. Burnfield
SUBJECT:	Major Observations in Radiological Protection at SRS

I. **Introduction:** During the week of October 22 1990 I conducted a review of radiological protection for the K reactor area of the Savannah River Site (SRS). I concluded that the SRS has significant basic radiological protection problems in this area which require immediate attention.

II. **Contacts:**

DNFSB

D. L. Burnfield
A. G. Stadnik

DOE

F. R. McCoy
R. L. Huskin

WSRC

E. P.Rahe	L. V. Dewitt
T. M.Anderson	E. W. Bauman
C. L. Peckinpaugh	D. P. Lambert
H. J. Stafford	M. D. Matheny
D. A.Stevenson	R. O. Zimmerman
M. H. Martin	A.L. Goodwyn
R. S. Peters	W.H. Wilkie
R. W. Garner	N. D. Johnson
D. B. Rose	G. H. Clare
L. E. Weisner	W. E. Webb
J. L. Jones	
K. L. Wickes	
J. L. Collins	

III. **Method of Review:** The extent of the review included:

a. Staffing of the health physics department.

b. Training of health physics inspectors, and radiation workers.

c. Training provided all workers in general radiological protection.

d. Training for workers who must work in air-fed suits.

e. Health physics support for reactor operations.

f. Health physics support for maintenance operations, including the use of mockup training for maintenance personnel.

g. Planned implementation of radiological protection in engineered work packages.

h. Maintenance and operational radiological protection conditions at the K reactor and waste tank farm.

i. Operations of the Emergency Operations Facility and the Technical Support Center.

j. Radiation exposure records and internal monitoring records.

k. Radiological unusual occurrence reporting system and implementation of DOE Order 5003A.

l. Calibration of instrumentation.

m. Change control for local radiological standards.

IV. **Findings:** The following findings represent the most significant observations noted during this review. Nevertheless no attempt has been made to document all problems that were identified or discussed:

a. *The K reactor area has little effective contamination control.*

- Contaminated areas were improperly posted. Areas where contaminated material was located were either not posted or not posted correctly. For example, the access to a possible airborne contamination area was posted such that workers would either have to violate the posting or don respiratory equipment in an area where no air supply was located. Certain areas were posted with signs only, where a standard yellow and magenta barrier tape or rope should have been used. For example, the hand railing in the disassembly area (which is infrequently posted with signs) should have been posted with barrier tape or painted yellow and magenta to warn personnel that leaning against the rails could result in a clothing or a skin contamination.

- A major source of contamination was roped off instead of being removed. The area underneath a pump in the disassembly area was posted as being contaminated up to 200,000 uuCi/100cm2. This pump has been repaired several times during the past two years and has been the cause of at least six clothing or skin contaminations. The rusted area underneath the pump is a catch basin for contamination. To avoid future problems this area should be decontaminated. In addition, the replacement of the pump should be considered to preclude future contamination of this area.

- The disassembly area pool was squalid. A scum was noted on the surface of the pool

and many dead insects were seen floating in the pool. Either biological growth or corrosion was noted on several of the components in the pool indicating that water chemistry control was or has been deficient.

- Ropes were being used to hang materials into the disassembly area pool. No mechanical device was present to withdraw the ropes from the pool. The only method of removing the objects from the pool was by lifting the ropes hand over hand. This method of removing items from the pool has a high probability of spreading contamination to the workers or to the general area.

- Although most tools on the -20 level were marked with orange paint to designate the tools as potentially contaminated a vast majority of the tools which were in contaminated areas through out the plant were not marked. It was not evident how these tools would be controlled to prevent the removal of potentially contaminated material from the plant and possible release to the public.

- Radiation protection personnel entered and exited a contaminated area without performing a frisk.

- Used anti-contamination clothing was seen discarded on the floor of the disassembly area.

- Contaminated barrels of process water are being stored outside. These barrels are required to be tagged; however, many of the tags were missing and loose tags were laying on the ground. In addition, the barrels are not permanently marked to preclude inadvertent release for unrestricted use. Other unmarked contaminated material was also observed being stored in this same area. Outside storage of contaminated material could result in additional contamination of the environment and costly clean up efforts.

- Clean tanks were being stored in a contaminated area. These tanks had numerous areas where restricted access would have precluded direct survey or wiping to determine contamination levels. This makes it difficult to release the tanks for unrestricted use and to allow workers to install the tanks without invoking radiological protection measures.

- DOE Order 5480.11 specifies the wiping techniques required (dry wipes over an area equivalent to 100 cm2) to be used to determine the level of removable contamination. The SRS is not complying with this requirement. Instead it is using large area wipes and averaging the resultant contamination over many square centimeters. This technique could result in the inadvertent release of material contaminated above the limits specified in DOE Order 5480.11.

2. *Improper use of Air-fed suits.*

- There is no alarm to notify the workers if air pressure is being lost. Without the alarm workers are at a greater risk of being exposed to a life threatening event.

- Air fed-suits are being used without posting airborne radioactivity areas. Personnel working in air-fed suits were observed installing collection bottles for potential process water leaks on the -20 level of K reactor. No airborne radioactivity postings

were present. Unprotected personnel were present in the immediate area. All personnel should be protected when there is a potential for an air-borne release of contamination.

- The site has implemented a two man rule for the use of these suits, but it is not being enforced. For the task identified above the workers were often more than 30 feet away from each other and out of audible or visual contact. The other personnel in the immediate area were performing other tasks and no one was fulfilling the role of observer.

- The air hoses and suits are not being adequately controlled. Several suits and hoses were observed laying in uncontrolled areas of the K reactor where potential damage could have resulted or dirt and debris could have entered the air lines. One suit was observed laying on a table which had been used for grinding metal. The metal remnants could have easily damaged the suit.

- The workers are not adequately trained (using practical demonstrations and individual participation) in the procedures for emergency removal of the air-fed suit in the event of a loss of air.

3. *There is a lack of respect for Radiological Protection.*

   The site radiological protection organization is not capable of demanding respect.

   - The average seniority of the radiological protection personnel in the field is less than two years, and the training of these personnel is inadequate. The site has recently instituted a training program for new hires, but has not yet instituted continuing training for current employees.

   - The training program that was instituted only covers the basic knowledge requirements and the remainder of the training is conducted on-the-job. This on-the-job training is being documented using qualification cards. However, no exams are currently scheduled to ensure the qualifications are adequately conducted.

   - Personnel are not obeying postings. Often the postings are incorrect or are placed in an area where they can not be read. On one door to a radiologically controlled area several radiological control postings were covered by maintenance personnel who were in the process of painting the area on the other side of the door. The radiological supervisor although aware that the postings had been covered was not aware that health protection personnel, who he supervised, had approved the covering of these postings. Neither the supervisor nor the health protection specialists realized the importance of not covering postings to a radiologically controlled area.

4. *The site and to a lesser extent DOE radiological protection personnel did not notice the problems that existed during a tour of the K reactor area.*

   - At several points during the tour senior site and DOE radiological controls personnel passed significant radiological controls problems without identifying the problems. The site and DOE had been previously briefed that they were to identify all problems. Following the tour it was noted that DOE personnel had performed audits of some of these areas recently and had also identified a limited number of the same deficiencies.

5. *The K reactor emergency annunciating system could not be understood in the fuel assembly or disassembly areas.*

    - Several announcements were made using the K reactor annunciating system during the tour of the fuel assembly and disassembly areas. This system acts not only as a general annunciating system but also as the emergency annunciating system. During the tour of these areas most of the work force was at lunch, thus reducing the typical background noise level. Yet, none of these announcements were understandable. A WSRC subcontractor noted that funds had previously been appropriated to correct this situation but that the funds had been spent to correct other problems.

6. *Fire protection equipment appeared to be somewhat neglected.*

    - Fire extinguishes were noted as being overdue for weighing and weights were improperly documented.

    - A fire alarm panel was out of service. This deficiency had been identified by DOE to Westinghouse a week before the tour but fire fighting personnel did not respond to correct the deficiency until we brought the deficiency to SRS attention again.

7. *It is not clear whether adequate controls are being taken to ensure the control of material designated as radiological waste.*

    - Two year old radiological waste tags were found in a desk drawer. It is not clear whether this material was adequately controlled to ensure proper disposal.

8. *There is no calibration recall program to determine when radiation protection survey meters are in need of calibration.*

    - The calibration program relies on the radiological controls personnel to return survey meters for calibration. No recall program has been established for these meters to ensure that meters are not used in the field which are overdue for calibration. In addition meters were found which were not in calibration and which would not pass an electrical safety inspection.

9. *The dosimetry program is deficient.*

    - The program does not record internal exposures from tritiated process water when urinalysis reveals no detectable exposure. Unless all exposure information is recorded the records do not permit a later review to determine if in fact the correct evaluation was conducted.

    - Ten randomly selected dosimetry records were reviewed to determine if the SRS was meeting the requirements established by the SRS. Two of the ten contained significant observations.

    - There is an 11 month backlog in entering data into the official records.

10. *The control of calibration sources is in need of improvement.*

    - Many of the sources are not being properly accounted for or kept under lock and key. Although not all sources (e.g., sources used to source check field instruments) are required to be kept under lock and key, all sources should be inventoried to provide assurance against inadvertent loss.

11. *The radiological protection training of personnel is deficient in many areas. In addition to the training observations identified in b. and c. above, the observations below were noted.*

    - The training of radiation workers should be more focused on the needs and educational levels of the workers. The training program provides details in unimportant areas and yet fails to provide basic knowledge in other more practical areas. For example, the program discusses the biology of the human cell including a discussion on the components of the cell, but the practical knowledge of how to combat a spill is not demonstrated. Although the detailed information, which the SRS agrees is not required knowledge, should be provided for the information of the workers, it should be clearly distinguished from the required material.

    - The radiation worker and radiation protection specialist examinations are simplistic and are all multiple choice.

    - Maintenance personnel are not receiving integrated mockup training prior to conducting major tasks. Although mockup training is conducted no attempt is made to involve radiation protection or quality assurance personnel to ensure the training actually represents the actual job conditions.

12. *The procedure used to prepare engineered work packages requires improvement.*

    - The use of engineered work packages has been instituted and they do include a minimal amount of radiological protection information (e.g., the correct protective clothing is included). However, important more detailed radiological protection items such as hold points, metal removal techniques, and other job specific items are not included.

    - The engineers who prepare the work packages are not being held accountable for the radiological protection measures that are contained in the work package. Instead radiological protection personnel are responsible for including radiological - protection measures in the work packages. The radiological controls engineering personnel could better be used to provide oversight of the engineering work packages to ensure they provide the needed radiological protection. The current in depth involvement of the radiological protection engineers precludes the work packages receiving an adequate level of oversight.

    - The site is not using engineered contamination containments to restrict the spread of contamination.

13. *SRS is not incompliance with DOE Order 5003A regarding the reporting of off normal events.*

- The site has not implemented this Order.
- The program which is in use is not efficient in tracking problems, determining the cause and notifying other DOE sites.