

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 16, 1995

MEMORANDUM

FOR:

G. W. Cunningham, Technical Director

COPIES:

Board Members

FROM:

Joseph Sanders

SUBJECT:

DOE Order 6430.1A Compliance Review of the In-Tank
Precipitation Facility

1. **Purpose:** The purpose of this review was to determine whether the In-Tank Precipitation (ITP) Facility complies with Department of Energy (DOE) Order 6430.1A, *General Design Criteria*. This review included teleconferences between the Board's technical staff (J. Sanders, R. Zavadoski, J. Blackman, and T. Arcano) and representatives from Westinghouse Savannah River Company (WSRC) on January 20, 1995 and February 3, 1995.
2. **Summary:** It is the staff's opinion that satisfactory compliance of the ITP Facility with DOE Order 6430.1A has not been demonstrated. The Board staff believes that it would be prudent for WSRC to consider the following actions to define the design basis of the facility: (1) unequivocally state the design basis or Code of Record of the facility for which DOE has granted approval; (2) evaluate the facility against this design basis; and (3) where not in compliance, make modifications to achieve compliance or take exemptions to requirements. Furthermore, the ITP design does not have safety class items that perform accident mitigation or post-accident monitoring functions, as required by DOE Order 6430.1A.
3. **Background:** The ITP project was initiated in 1985. DuPont was the Maintenance and Operating (M&O) contractor for the Savannah River Site (SRS) at that time. The contract in force between DOE and DuPont invoked DuPont Standards as the general design criteria in lieu of DOE Order 6430.1, the predecessor of 6430.1A, which existed at the time. In most cases, the design criteria invoked were comparable to those required by 6430.1A.

In 1989, the WSRC became the M&O contractor for SRS under a contract that appropriately placed emphasis on DOE Orders as the core requirements for the site. In that same year, DOE Order 6430.1A was issued providing the general design criteria of nonreactor nuclear facilities. This Order states that for existing facilities, original design criteria apply; however, additions or modifications to the facility shall comply with the current version of the Order.

As part of the ITP Facility Startup Plan and as required to demonstrate readiness, United Engineers & Constructors (UE&C) performed an independent assessment to compare the as designed (vice as built) ITP facility design criteria with the requirements of DOE Order 6430.1A and identify differences. The assessment did not evaluate all requirements of the Order. Of significance, the assessment did not evaluate

what facility systems, structures, and components should be safety class per the requirements of the Order. Furthermore, it did not evaluate the adequacy of the confinement systems.

4. **Discussion:** The staff reviewed and evaluated selected areas of the ITP Facility's compliance assessment with DOE Order 6430.1A. Critical areas were selected based on their importance to safety. They included selection of safety class items (Section 1300-3.2) and evaluation of special facility requirements applicable to a facility handling radioactive liquid waste (section 1323). The following observations are made regarding the adequacy and extent of compliance:

- a. The design basis or Code of Record, for which DOE must grant approval, is unclear for the ITP facility. At project initiation, DuPont standards were contractually in force although DOE Order 6430.1, the predecessor of DOE Order 6430.1A, existed. After WSRC replaced DuPont as the M&O contractor, the design criteria in force for ITP became murky. Clearly, new facilities would be required to be designed to 6430.1A, but this facility was already partially designed and constructed at that time. Although WSRC has not stated what design criteria apply, they had UE&C perform a compliance assessment of the ITP design with portions of DOE Order 6430.1A and made some modifications. Section 0101-1.2 of DOE Order 6430.1A clearly states, "DOE organizations with first-line responsibilities for facility projects shall determine to what extent these criteria shall be applied to projects in process under prior issuances of DOE Order 6430.1A." It also states, "additions or modifications (subsequent to the issuance of 6430.1A) shall comply with this Order."

According to WSRC document no. 01100-02-R, *Engineering Requirements - Design Criteria for Structures, Systems, and Components*, if Code of Record design criteria cannot be determined from the documentation comprising the Authorization Basis, then current design criteria must be applied. If DOE Order 6430.1A is determined to be the governing set of design criteria, it will require WSRC to develop and formally document criteria deviations, and submit them to the DOE line organization for approval. For deviations to the safety class criteria, where the deviation may constitute an adverse impact on environmental protection, safety, or health, DOE Headquarter's approval is required. WSRC has not yet applied for any criteria deviations, although deviations from DOE Order 6430.1A apparently exist.

- b. DOE Order 6430.1A has certain requirements mandating the classification of certain systems, structures, or components as safety class items. Generally, safety class items are those whose failure could adversely affect the environment, and the safety and health of the public. UE&C did not evaluate the adequacy of selection of safety class items per the requirements identified in Section 1300-3.2 of DOE Order 6430.1A as part of their compliance assessment. The only safety class items of the ITP Facility currently identified by WSRC are the tank structure, which serves as primary containment of the radioactive liquid waste, and the emergency portable ventilation equipment. The ITP design has no safety class items that perform accident mitigation or post-accident monitoring

functions, as required by DOE Order 6430.1A.

- c. There are several means by which the risks of accidents can be reduced. One method is to reduce the probability of an accident (the posture taken at ITP by developing portable ventilation equipment); another is to mitigate the consequences of accidents. Given this, Section 1300-1.4.2 of DOE Order 6430.1A states, "Releases of hazardous materials postulated to occur as a result of design basis accidents (DBA) shall be limited by designing facilities such that at least one confinement system remains fully functional following any credible DBA (i.e., unfiltered/unmitigated releases of hazardous levels of such materials shall not be allowed following such accidents)." The confinement provided by the ITP facility design does not provide the level of confinement required by DOE Order 6430.1A; a post-accident unfiltered release can occur. Furthermore, safety class monitoring equipment does not exist to monitor such releases.

Section 1300-1.4.2 of DOE Order 6430.1A also requires that, "Facility designs shall provide attenuation features for postulated accidents (up to and including DBAs) that preclude offsite releases that would cause doses in excess of the DOE 5400 series limit for public exposure." This is followed by Section 1300-3.2 that states, ". . . safety class items are those systems . . . whose failure would produce exposure consequences that would exceed the guidelines in Section 1300-1.4, Guidance on Limiting Exposure to the Public, at the site boundary or nearest point of public access." It is impossible to ascertain compliance with these requirements for the ITP facility because WSRC does not state what DOE 5400 series limit is being used and does not consider the nearest point of public access.

- d. DOE Order 5481.1B, *Safety Analysis and Review Systems*, by Section 3.a.(3) requires that "the (safety) analysis shall . . . identify and demonstrate conformance with applicable guides, codes, and standards. Deviations from current DOE design criteria shall be evaluated and documented in the facility safety analysis report." This Order has been used in the preparation of the ITP Safety Analysis Report (SAR).

This Order and the applicable requirements of DOE Order 6430.1A would lead one to reasonably expect explicit documentation in the SAR of how the criteria of DOE Order 6430.1A are met. This includes in part a justification for each deviation taken from the criteria as well as all the applicable criteria from Divisions 0100, 1100, 1300, 1500, and 1600 related to ventilation systems.