

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 23, 1994

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members

FROM: C. H. Keilers, Jr.

SUBJECT: Hanford - Review of Preparations to Install K-Basin Chute Barriers

1. **Purpose:** This report documents a review of preparations to install isolation barriers in the Hanford K-Basins and thereby resolve an Unreviewed Safety Question (USQ). This review was performed by D. Grover, P. Gubanc, C. Keilers, and D. Winters of the Defense Nuclear Facilities Safety Board (Board) technical staff on November 14-16, 1994.
2. **Summary:** Installation of the isolation barriers represents significant progress in mitigating the basin seismic vulnerabilities and improving their safety. A Westinghouse Independent Design Review Committee reviewed the barrier design. Contingent on satisfactory resolution of their comments, the staff believes the barriers will perform as intended. However, the potential for subcontractor operations to effect the safe and timely installation of the barriers needs more attention. In particular, the critical lift procedure should be thoroughly reviewed, and rigging personnel qualifications should be evaluated. Detailed comments on rigging and handling are provided in the Attachment.
3. **Background:** The K-Basins are separated from their reactor buildings by unreinforced joints in the basin chute. These joints have leaked before and were repaired with epoxy. Furthermore, an earthquake could produce relative motion across the joints, causing a higher leak rate than that evaluated in the safety analysis report (SAR).

To resolve this condition, Westinghouse Hanford Company (WHC) plans to install barriers that will isolate spent fuel and sludge from the potentially leaky chutes. Before installation, WHC will remove several nearby loaded canisters in the K-West basin and several empty canisters in the K-East basin. A subcontractor (Sonsub, Inc.) will then cut away nearby fuel racks, prepare the chute opening, and mount a new sealing surface. Next, Kaiser Hanford Company will bring each barrier into the facility, rig it into position, and secure it in place. After installation, WHC will confirm by test that the leak rate past the barriers is less than half the SAR limit.

4. **Discussion:** The Board staff reviewed preparations for K-Basin barrier installation, including observing the WHC Readiness Assessment for the installation and discussing comments made on the barriers by the WHC Independent Design Review Committee. The staff considers that the overall conduct of the WHC Readiness Assessment was

satisfactory. However, the scope of the assessment was limited and did not include the procedures and personnel qualifications of the subcontractors (Kaiser and Sonsub). In particular, the Kaiser critical lift procedure was not evaluated.

Inadvertently dropping a barrier (2700 lbs.) could damage the attached rubber seal and significantly delay installation. Dropping a barrier could also damage fuel canisters or the existing epoxy joint repair in the chute, resulting in basin leakage. The Kaiser critical lift procedure is key to ensuring safe installation of the barriers. However, this procedure does not fully comply with the Department of Energy (DOE) approved Hanford site rigging manual and cannot be performed exactly as written. The technical basis for the procedure is also not apparent due to a lack of load calculations for the rigging equipment. The attachment contains more observations on this procedure.

Satisfactory resolution of comments from the Independent Design Review Committee is key to ensuring that the barriers will function as intended. In particular, the seismic adequacy of the island following an aftershock that drains the chute needs to be understood. Resolution of the Committee's comments appears to lack sufficient facility management priority and may warrant a pre-start finding. The Board staff is still following the resolution of these comments and believes the barriers will perform as intended, contingent on satisfactory resolution.

5. Future Planned Activities: The Board staff will continue to follow the barrier installation.

Board Staff Comments on Isolation Barrier Critical Lift Procedure

1. Requirements: The DOE approved site rigging manual¹ states that a manager may authorize an item be handled as a critical lift when dropping, upset, or collision could cause costly damage, unacceptable delays, release of radioactivity, etc. According to the rigging manual:
 - a. The manager shall designate a Person In Charge (PIC) who will ensure a step-by-step procedure is prepared for the critical lift.
 - b. Certain information should be in a critical lift procedure, such as item description, weights, rigging equipment and capacities, rigging sketches, load-path sketches, verification signatures, etc.
 - c. A practice lift is recommended.
 - d. Revisions to a critical lift procedure shall be reviewed and approved through the same cycle as the original procedure.
2. Board Staff Observations: The Board staff reviewed the critical lift procedure prepared for the K-Basin barrier installation² and discussed the procedure with Kaiser personnel. The staff considers that the procedure is cursory in nature, does not fully comply with the site rigging manual, and cannot be performed exactly as written.

Examples of deficiencies found by the staff include:

- a. The procedure does not provide step-by-step instructions. Such instructions are included in a Process Control Plan, but it is not referenced in the procedure.
- b. The current rigging sketches are too general to be used. Personnel seemed inclined to rely on impromptu rigging configurations.
- c. The rigging sketches do not include all operations. Particularly, angled rigging operations needed to transfer the barriers onto the monorail are not shown, even though these may be the most difficult and may generate the highest stresses.
- d. The rigging sketches conflict with the procedure regarding use of accessories. The text implies shackles and wire rope are optional while the sketches imply only those at the monorail are optional. Furthermore, the sketches do not identify by type and capacity all the rigging equipment to be used in each lift.
- e. No load vectors are included on any sketches for any equipment.
- f. It appears that load calculations have not been performed, and that personnel need training on the significance of load vectors.

- g. No formal checks of rigging equipment loads and capacities were evident. It appears that, in the past, informal capacity checks have been done using Department of Transportation tables.
- h. No basis is evident for the worst case rigging equipment load rating cited in the procedure (62 percent of capacity) or to which of the five lifts it applies.
- i. The shackle orientation shown on the rigging sketches for the barriers violates section 10.0 of the site rigging manual. At the time of the review, Kaiser stated that a different shackle orientation than that shown would be used in practice.
- j. No practice lifts, in the shop or using mockups, are planned.