

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

July 1, 1997

**MEMORANDUM FOR:** G. W. Cunningham

**COPIES:** Board Members

**FROM:** H. W. Massie

**SUBJECT:** Review of Authorization Basis for Startup of Salt Residue Stabilization at Rocky Flats Environmental Technology Site, June 25-26, 1997

This report documents a review by members of the staff of the Defense Nuclear Facilities Safety Board (Board) H. W. Massie, L. M. Zull, and T. M. Huntley and site representative M. T. Sautman. This review addressed the following areas: the basis for conducting a readiness review, the Activity Control Envelope (ACE), material-at-risk (MAR) controls for Building 707, worker safety controls, and simulated operations in a mockup facility. Board Recommendation 95-2 was used as guidance for the review.

**Readiness Plans.** The Department of Energy (DOE) Rocky Flats Field Office (RFFO) will conduct a Readiness Assessment (RA) under the direction of DOE Order 425.1, *Startup and Restart of Nuclear Facilities*. The basis for conducting an RA instead of an Operational Readiness Review is the similarity between salt oxidation and ongoing thermal stabilization of plutonium oxide in Building 707, the existence of an extensively reviewed Building 707 infrastructure, and the existence of a current authorization basis. In response to staff comments prior to the meeting, DOE RFFO agreed to retain final approval authority for the RA; previously, DOE RFFO had delegated the approval authority to Kaiser-Hill, the integrating contractor. Current plans are for Safe Sites of Colorado (SSOC) to initiate the RA by August 11, 1997, and for DOE to authorize startup in September 1997. The schedule is extremely tight.

**ACE Review.** The staff performed an in-depth review of the ACE for salt residue oxidation in Module A of Building 707; a cross-table review with SSOC, Kaiser-Hill, and DOE RFFO was conducted at the meeting. The ACE contains the process hazards analysis of the proposed activity and generally identifies adequate controls for protection of workers and the public. The staff suggested some improvements in worker controls based on review of operations in the mockup discussed below.

The staff determined that for the initial startup of salt residue oxidation, DOE RFFO must limit the type of salt drums entering Building 707 to those with less than 4684 weapons-grade fissile grams equivalent of plutonium (includes americium-241, which results in 109 times more dose per gram). This is necessary in order to stay within the current authorization basis safety analyses for Building 707. The limiting accident for public risk is a drum spill and fire on the building dock. The staff requested that DOE RFFO's authorization agreement for initial startup and processing include the above limits.

**MAR Controls.** DOE RFFO has directed SSOC to prepare a Basis for Interim Operations (BIO) appendix to the current authorization basis, formally incorporating MAR controls into building operational safety requirements. The current MAR controls, documented in Operations Order OO-707-119, limit MAR in Modules A-H to 70 kg of total weapons-grade plutonium, which includes the americium-241. The MAR limit for Modules J and K limit is 165 kg. The new BIO appendix (when approved by DOE RFFO) will maintain the 70 kg limit and increase the MAR for Modules J and K to 295 kg. Additionally SSOC has proposed increasing the drum MAR from 4,684 to 10,000 g. Based on the ACE, the Board's staff objected to this latter increase for the initial startup. DOE RFFO agreed not to increase the drum MAR above 4,684 grams at this time. The BIO appendix will also formally incorporate combustibles controls. The staff provided DOE RFFO with a list of questions on the BIO appendix, which is under revision.

**Mockup and Worker Safety Controls.** The staff observed two process operators conducting post-stabilization activities in a glovebox mockup in Building 705. SSOC had melted down a calcium chloride salt the previous day in a furnace identical to those installed in Building 707. The post-stabilization activities consisted of removing the furnace head after furnace cooldown, removing the salt tin crucible within a pull-can, removing the crucible containing the stabilized salt, removing the crucible extension, weighing a salt sample and the crucible, placing a slip-lid on the crucible can, bagging out the crucible in a filtered plastic bag, heat sealing the first plastic bag, adding a second plastic bag, and placing the package in a stainless steel container with a vent. The staff noted that the work was very tedious and required a great deal of dexterity by the operator. For example, to remove the metal extension from the metal crucible (i.e., existing slip-lid can bottom), the operator had to hold the can and use numerous strikes of a hammer. The staff suggested that SSOC use a stop device (e.g., holder) so the operator could remove the extension more quickly and easily. SSOC agreed with this suggestion.

**Bulging Salt Containers.** The Board's staff also discussed how potentially pressurized (i.e., bulged ) produce cans containing salt would be handled if discovered during initial drum opening in the contamination cell in Module A of Building 707. Recently, RFFO found two bulged cans of salt residue in produce cans. The cans were not pressurized, but appeared to have been at one time. SSOC will train the operators to identify any special circumstances when opening residue drums in the contamination cell and to take appropriate action, such as notifying management or the shift technical advisor.

**Future Actions.** Prior to the start of the RA, the staff plans to review radiological protection; criticality safety; fire protection; conduct of operations, including operator training; and the BIO appendix. MAR and combustible controls will be reviewed during the RA in August.