

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 17, 1997

MEMORANDUM FOR: G. W. Cunningham, Technical Director

COPIES: Board Members
S. Krahn

FROM: D. Winters
J. Roarty

SUBJECT: Review of Waste Isolation Pilot Plant (WIPP) Safety Authorization Basis Documentation

This report documents observations made by members of the staff of the Defense Nuclear Facilities Safety Board (Board) D. Winters and J. Roarty during a June 10–13, 1997, trip to the WIPP. The primary objective of the trip was to evaluate the adequacy and appropriateness of the WIPP Safety Analysis Report (SAR) and the corresponding Technical Safety Requirements (TSRs). Among other issues, the staff was concerned that the only TSRs invoked were administrative controls.

DOE plans to receive the first shipment of transuranic waste (TRU) for disposal at WIPP in May 1998. The Operational Readiness Reviews of the contractor, Westinghouse Waste Isolation Division (WID), and the Department of Energy/Carlsbad Area Office (DOE/CAO) are expected in January and March 1998, respectively. A preliminary review of the current version of the WIPP SAR (Rev.1, March 1997) indicates that although there are no apparent significant safety risks to the public, there are some potential long-term health risks to individual site workers from various postulated accidents resulting in the release of respirable TRU contamination. The SAR assumes there is no mitigation resulting in worst case consequences.

The Board's staff met with DOE/CAO and WID personnel on Wednesday, June 11 and Thursday, June 12, 1997. Issues discussed included the SAR as a component of the WIPP safety authorization basis, the relationship between the SAR and the safety management plan, the lack of TSRs other than for administrative controls, dose evaluation guidelines for worker protection, preventive/mitigative safety systems, use of "single-failure" criteria, fire protection/multiple waste package events, and waste hoist preoperational check requirements.

The WIPP SAR makes extensive use of a non-deterministic approach to accident analyses, whereby frequency estimates and failure rates are used to screen out a number of accidents. The bounding accidents identified in the SAR involve minimal releases to the public, but have potential long-term health consequences for workers. For example, puncture of a waste drum during handling produces a dose of 32 rem (50 year CEDE), while failure of the hoist used

to transport drums below ground yields 500 rem (50 year CEDE). The hoist failure event and underground roof fall events are classified as not credible based on probabilistic screening evaluations.

No safety-class systems, structures, or components are defined in the WIPP SAR, nor are any safety-class TSRs. Administrative controls are identified as a defense-in-depth strategy. Lack of specificity in the control of accidents and hazards is evident throughout the SAR. As an example, the operating procedure for the waste hoist control equipment specifies a preoperational test that is of paramount importance to system reliability. This procedure, which is performed at 12-hour intervals, may not significantly upgrade the reliability of the system. The staff believes a re-examination of the hoist operating system (e.g., single failure criterion) would be advisable.

It would be prudent to re-examine the use of evaluation guidelines in the WIPP SAR as screening or compliance criteria in light of the recently issued DNFSB/TECH-16, *Integrated Safety Management*.

The Board's staff also observed that site management personnel currently in charge of safety analysis and SAR update activities appear to lack the level of knowledge and experience in this arena seen elsewhere in the DOE complex. This observation suggests that a greater degree of independent review in this area would be desirable.

The staff plans to follow up on this visit with a review of various safety and hazard analysis documents requested during the site visit. In addition, the next iteration of the WIPP SAR will be reviewed when it is issued in the spring of 1998. Any concerns noted by the staff, as a result of these further reviews will be brought to the attention of the Board.