

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 12, 1997

MEMORANDUM FOR G.W. Cunningham, Technical Director

COPIES: Board Members

FROM: M. B. Moury

SUBJECT: AT400A Pit Repackaging Startup

This report documents a review by Defense Nuclear Facilities Safety Board (Board) staff member M. Moury. The review focused on the readiness of the AT400A pit repackaging process for startup, and included observing the first week of the Department of Energy (DOE) Operational Readiness Review (**ORR**), conducted July 21-25, 1997.

Conduct of the ORR. The DOE Albuquerque Operations Office (AL) ORR was well run and met the requirements of DOE Order 425.1, *Startup and Restart of Nuclear Facilities*. The team members effectively prosecuted their areas of expertise. The DOE-AL Team Leader and the senior advisor did an excellent job of keeping the team focused and on scope. Besides the AL team members, Core Technical Group members from the Nevada Operations Office, the Rocky Flats Field Office, and DOE Headquarters were also on the team. This was an excellent method for bringing off-site expertise to the ORR and providing ORR experience that the team members could take back to their sites.

The **ORR** team observed deficiencies leading to 5 **pre-start** findings and 15 post-start findings. The team concluded, and the Board's **staff agreed**, that Mason and Hanger Corporation (**MHC**) and the DOE Amarillo Area Office (**AAO**) had effectively demonstrated their readiness to start pit repackaging. The team recommended approval of startup for the W48 Mod 1 (**low-radiation-dose** pit) only. **AAO** must determine the appropriate level of review necessary to ensure readiness before repackaging other pit types.

The five **pre-start** findings involved (1) combustible loading controls in the bays, (2) wearing of lead-loaded gloves when directly handling pits, (3) correction of errors in operational procedures, (4) lack of formal analysis for a significant chemical hazard (cleaning solution used during welding operations), and (5) lack of adequate radiological characterization of the AT400A work area. The ORR team considered these findings "isolated issues" and not an indication of any "broad weakness."

AT400 Program. The AT400A program dates back to December 1992, when the Pantex Zone 4 Safety Analysis Report Technical Safety Review Panel recommended replacing the current pit storage container, the ALR8, with containers certified for off-site transportation. The AT400A is a modified version of the DOE-designed AT400R Russian **fissile** material container.

It is composed of a pit-holding fixture placed within an inner welded stainless steel containment vessel (**CV**), which is then placed in a stainless steel overpack. The modified holding fixture accepts all pit sizes except one; it also serves to transfer decay heat away from the pit. As a result, the AT400A maintains pits approximately **10°F** cooler than does the ALR8. The entire system is designed to maintain containment of radioactive materials during the postulated hypothetical transportation accident conditions specified in 10 **CFR 71**, *Nuclear Regulatory Commission Regulations for Packaging and Transportation of Radioactive Material*. The off-site transportation certification is not complete, although the container has passed the required testing at Sandia National Laboratory-New Mexico.

Although the original plan was to package over 60 pits per month and all pit types, the current plan is to repackage approximately 20 pits per **month**, and only the W48. The W48 was selected as the first pit for repackaging because it was considered to have the most restrictive temperature limit. However, pit temperature limits subsequently provided by the design laboratories show other pits having lower temperature limits. According to DOE and MHC personnel, the W48 pit repackaging design had progressed too far by the time the new pit **temperature** limits were provided to allow shifting to a pit with a more restrictive temperature limit. The decision on whether to use the AT400A for the storage of other pit types will not be made until after the record of decision is made in June 1998 on whereto process surplus pits.

The two principal hazards associated with the manual pit repackaging are (1) the consequences of weld burn-through of the CV, and (2) the high doses to which workers will be exposed when handling the pits (300–1 700 **mrem/hr** on contact, depending on the pit version). Calculations predict that the bum-through accident would result in a dose of 10–350 rem cumulative effective dose equivalent (CEDE) to a worker **from** the release of radioactive material into the workspace; there are no off-site consequences. The **safety** system designed to prevent welder bum-through consists of two independent and redundant current monitors and two independent and redundant CV rotation sensors. The welder current and the CV rotation must be within specified ranges in order for the interlocks to permit **welding** on the CV. Many design and administrative controls have been implemented to reduce worker exposure when handling the pits. In **addition**, the highest-dose-rate pits will not be repackaged until after repackaging of the **lower-dose-rate** pits has been completed. At that point, **MHC** should have exposure data that will allow more accurate prediction of the worker dose, and implementation of any additional controls needed.

Future Staff Actions. The Board's staff will follow the AT400 pit repackaging startup, the technical basis for the decision on whether to use the container for other pit types, and the evaluation of controls for handling higher-dose-rate pits.