

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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January 6, 2010

The Honorable Inés R. Triay
Assistant Secretary for Environmental
Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0113

Dear Dr. Triay:

The staff of the Defense Nuclear Facilities Safety Board (Board) attended the Non-Destructive Examination Independent Review, sponsored by the Department of Energy (DOE) and held in Atlanta, Georgia, during August 25–27, 2009. One of the goals of the review was to explore faster and improved inspection techniques for high-level waste tanks. DOE is responsible for controlling general corrosion, pitting, and stress corrosion cracking of high-level waste tanks, but current technology cannot sample more than a small portion of the tank wall. Thus, the sampling data are insufficient to make confident conclusions. Various vendors presented state-of-the-art inspection techniques used to determine the condition of piping and tank walls in the chemical and pipeline industries. In addition, the liquid waste system contractor at the Savannah River Site presented the results of an expanded ultrasonic test inspection of Tank 29. Given the limitations of current inspection techniques, the Board suggests that DOE pursue new technologies for tank inspection that may prove to be more efficient and effective at reducing uncertainties associated with tank corrosion by generating more data on tank conditions.

The Board understands that researchers in the DOE complex have proposed and are developing new and more efficient techniques for inspecting the walls of high-level waste tanks. New screening techniques, such as the electromagnetic acoustic transducer inspection, may provide quick scans of a large portion of the tank wall to confirm that major flaws do not exist.

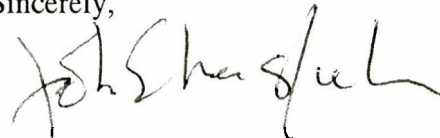
Generally, much uncertainty remains regarding tank corrosion:

- Some corrosion mechanisms are not easily predictable or well understood, particularly for pitting and crevice corrosion and at the liquid-air interface
- Some corrosion mechanisms observed in the laboratory cannot be reproduced in the high-level waste tanks and vice versa—for example, investigators have been unable to duplicate in the laboratory crevice corrosion that is observed on in-tank corrosion coupons

- It is unclear that the same chemistry controls that address stress corrosion cracking also address pitting
- The tanks are beyond their design lives and are continuing to age—improved and expanded data collection and analysis supports extension of the service lives of the high-level waste tanks

Further research and development of new techniques for tank inspections would produce valuable tools for use in DOE's tank integrity programs particularly with regard to justifying longer tank life and avoiding surprises. The enclosed staff issue report is provided for your information and use.

Sincerely,

A handwritten signature in black ink, appearing to read "John E. Mansfield". The signature is fluid and cursive, with a large initial "J" and "M".

John E. Mansfield, Ph.D.
Vice Chairman

Enclosure

c: Ms. Shirley J. Olinger
Mr. Jeffrey M. Allison
Mr. Mark B. Whitaker, Jr.