National Nuclear Security Administration

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

September 19, 2006

The Honorable A. J. Eggenberger
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004-2901

Dear Mr. Chairman:

This letter is in response to your letter dated August 16, 2006. I am pleased to learn that the Board concurs with our staff and the outside experts' conclusions that the presence of cracks does not compromise the operability of the Device Assembly Facility (DAF). However, your letter indicated the Board still has some concerns that need to be addressed.

Regarding verification of in-situ concrete strength, concrete cylinder tests during construction of the DAF indicated that the concrete had fully achieved design strength. Stringent requirements for concrete inspection during placement are contained in the national and local building codes. We have confirmed that appropriate inspection requirements from applicable codes were incorporated in the construction specifications and enforced by the Army Corps of Engineers, the project construction manager. In-situ testing, as recommended by the Board staff, will not conclusively establish the concrete strength to aid in the planned structural analysis because the recommended test will provide only a relative value, not an absolute value. In addition, use of the in-situ test is not recommended for concrete older than 90 days by an authoritative reinforced concrete design reference. Rather than relying on relative values provided by in-situ testing, the National Nuclear Security Administration (NNSA) will rely on technical standards, such as the American Society of Civil Engineers 43 (ASCE 43), to conduct the planned structural analysis.

The physical configuration of the DAF (i.e., heavily reinforced, thick concrete walls, roof, slabs, and engineered-fill between and over the buildings) considerably restrains contraction of structural members. The combination of concrete shrinkage due to volume change and physical configuration restraints generate stress in concrete that far exceeds its low tensile strength, thus causing unavoidable cracks.

Your letter noted that potential corrosion of the steel reinforcement should be eliminated to prevent long-term degradation of structural capacity of the DAF. The Leak Repair Plan submitted to the Board on March 13, 2006, indicated four cross wall cracks out of the

forty one recorded leaks. Most other leaks are either through the expansion joints, where no reinforcement bars cross, or a few construction joints, where reinforcing bars exist. As indicated in the Bechtel National Incorporated report, no rust staining or other evidence of corrosion was observed at any of the cracks. NNSA concurs with Bechtel experts that without any evidence of rust staining, it is not likely that steel corrosion has occurred at the DAF.

In order to eliminate water infiltration into DAF, NNSA plans to repair the roof. A copy of our "Water Leak Repair and Crack Monitoring/Evaluation Program," was previously transmitted to the Board on March 13, 2006.

Regarding the elastic stiffness of structural elements, NNSA agrees that cracking plays an important role in concrete structures' response to applied loads. In order to address this issue, we are considering an approach that would evaluate a series of soil-structure interaction scenarios to bound the seismic response of the individual DAF buildings. The Nevada Site Office, through the facility operator, has organized a panel of prominent seismic and structural analysis experts to perform those evaluations using the (ASCE 43) criteria for cracked concrete stiffness due to dead and seismic loads.

If you have any questions, please contact me or have your staff call Ms. Deborah D. Monette of the Nevada Site Office at (702) 295-3128.

Sincerely,

Thomas P. D'Agostino
Deputy Administrator
for Defense Programs

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