

**[DNFSB LETTERHEAD]**

September 21, 1994

The Honorable Victor H. Reis  
Assistant Secretary for  
Defense Programs  
Department of Energy  
Washington, D.C. 20585

Dear Dr. Reis:

On June 7-11, 1994, outside experts who advise the Defense Nuclear Facilities Safety Board (Board), observed the BASEBALL exercise at the Nevada Test Site (NTS). The BASEBALL exercise consisted of a potshot drillback into a historical nuclear test event site, and was conducted by the Joint Test Organization (JTO). The Board is providing the enclosed observations from this exercise for your information and use.

The drilling team, health physics personnel, and personnel from other organizations and support contractors worked well as a disciplined team for the BASEBALL exercise. However, this review yielded several observations that call into question the contribution made by this exercise to ensuring retention of safety-critical, testing-related skills. Most notably: (1) the JTO had not completed consolidation of conflicting laboratory procedures into JTO-approved operating procedures prior to BASEBALL, so procedures that presumably are to be used in the future in further exercises and possible tests were not used; (2) no individuals were observed participating in this exercise in an "under-instruction" capacity; and (3) the hypothetical radiological conditions of a potshot drillback operation did not appear to be accurately simulated.

In Recommendation 93-6, Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex, the Board recommended that "a program be developed and instituted for maintaining expertise in operations key to safety of nuclear testing at the Nevada Test Site, to ensure that if testing is resumed at any future time, it can be performed with requisite safety." On July 5, 1994, the Secretary of Energy committed to the establishment of such an exercise program. However, the observations from the recent BASEBALL exercise indicate that the Department of Energy's (DOE's) current approach may focus too heavily on exercising the considerable, but non-formalized, skills of the incumbents. While this practice has some value, the Board noted in Recommendation 93-6 that efforts are needed to institutionalize the knowledge of these skilled individuals, and to transfer it, in both written form and by practical application, to those who may be called upon to perform the activities in the future.

The Board suggests that the DOE consider whether its current approach to exercise design at NTS is adequate to ensure that the maximum safety benefit is gained. The DOE should consider the following options for incorporation in the testing exercise program that responds to Recommendation 93-6: (1) formal definition of skills critical to safety that each exercise should test and reinforce; (2) quantitative assessment of the achievement of the objectives; and (3) use of

trained independent observers/evaluators to provide critical evaluations of performance during and/or after the exercise.

The Board wishes to be advised of the follow-up actions that are taken on this matter. Mr. Steve Krahn of the Board's Technical Staff will be available to provide any assistance in addressing the issues discussed in this letter.

Sincerely,

***John T Conway***  
***Chairman***

c: Mark Whitaker, Acting EH-6  
Robert Nelson, Manager, Nevada Operations Office

Enclosure

## Summary of Observations on BASEBALL Exercise

### 1. Background:

- a. The decision was made to conduct a potshot drilling exercise at BASEBALL in June 1994 (the BASEBALL event was conducted on January 15, 1981 and no potshot drillback was conducted at the time). This potshot drillback exercise was intended to provide readiness training for all personnel involved in potshot drillback activities and serve as a functional test of all equipment normally used in conjunction with a drillback.
- b. The BASEBALL exercise objectives were to: (1) train drill crews in drilling techniques, (2) train containment personnel in operations of blow-out-preventers, (3) train contractor personnel for electronic surveying, whip stocking (directional drilling), and potshot operations, (4) train laboratory logging (gamma detection) people, (5) obtain radiochemical samples for analysis in Los Alamos, (6) to try out new containment/drill rig configurations, and (7) learn more about area hydrology.

### 2. Conduct of Operations Observations:

- a. The drilling team, health physics personnel, and personnel from other organizations and support contractors worked well together as a disciplined team. This resulted from the use of experienced people and from the efforts of the Joint Test Organization (JTO). However, Department of Energy Nevada (DOE-NV) on-site oversight of the exercise was limited.
- b. There currently is no single set of procedures that govern the conduct of a Nevada Test Site (NTS) JTO potshot drillback operation. Also, the overall document governing this exercise contained out of date and incomplete material. This lack of institutionalization causes concern regarding the ability to safely duplicate the process after a lengthy hiatus.
- c. In general, discussions with managers, supervisors and workers, and observation of actual practices, revealed a lack of understanding of conduct of operations concepts, including procedure compliance.
- d. Although this drilling operation may be the last one of its kind for some time, no individuals were noted at the site in an "under-instruction" capacity. This is especially important given the prominent role played by on-the-job training in the applicable standard, LANL Potshot Drilling Operations and Responsibilities Manual.

### 3. Radiological Controls Observation:

- a. The actual radiological conditions of a potshot drillback operation were not

accurately simulated. During a pre-shift briefing, the senior on-site Radiological Control Manager said that the core samples taken were to be assumed to be reading 10 rem/hr on contact, as might be seen during a real time potshot drillback. During the sampling operations, the review team did not observe accurate simulations of this radiation level: efforts did not appear to be taken to adequately shield the sample or the operator, and the sample handling process was not consistent for each sample. No manager, supervisor, or worker questioned could acceptably explain the personnel radiation exposure hazard associated with a sample that read 10 rem/hour on contact. Actual samples did not exceed a contact reading of 1.5 mrem/hour.

- b. Radiological control personnel were not familiar with the location, proper operation, or purpose of radiation detection equipment positioned on the drilling rig and platform to provide early indication of a high radiation sample. A radiation survey instrument probe, located to give such early indication, was mounted in the vicinity of the drill head and configured to be remotely read. Questioning revealed that no radiological control technician (RCT) or RCT supervisor knew the location of the instrument or its proper use. The Board's Staff considers that such basic knowledge should have been covered as part of RCT and RCT supervisor training outlined in the Radiological Control Manual (RCM) Articles 641-644.
- c. Both LANL and LLNL have provision in their procedures to complete an equipment checklist covering radiological preparations prior to the start of the drilling operations. The LANL checklist did not include items such as boundary labeling, the equipment requirements for dealing with people in anticontamination clothing, and the removal of extraneous material within the boundary. Additionally, the checklist had not been completed until over 24 hours after the area was established.
- d. The marking of the Base Station exit door did not provide sufficient, easily recognizable identifications to mark the door as a portal for a contamination area as required by RCM, Article 231.
- e. The Base Station portal monitor routinely alarmed at the exit of individuals indicating possible alarm malfunction, however, no action was observed to be taken by radiological control people to resolve the problem with the alarm. The lack of action is not consistent with the RCM, Article 125 which calls for prompt action to address and resolve such radiological control deficiencies.
- f. There were no approved radiological control procedures that governed this NTS JTO drillback exercise as required by the RCM, Article 315. Although both LANL and LLNL have radiological procedures for these operations, neither was applicable since the equipment and processes in use were a combination of those from both laboratories.

- g. Routine swipe surveys, including half-hourly swipes at the two drinking water locations, were not counted in a timely manner. One occasion was observed where the half-hourly swipes were not counted and logged for nearly three hours after being taken.