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## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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July 24, 1996

Mr. Mark B. Whitaker, Jr.  
Department of Energy  
1000 Independence Avenue, SW  
Washington, DC 20585-0119

Dear Mr. Whitaker:

Enclosed for your information and distribution are two Defense Nuclear Facilities Safety Board staff reports. The reports have been placed in our Public Reading room.

Sincerely,

George W. Cunningham  
Technical Director

Enclosures (2)

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 8, 1996

**MEMORANDUM FOR:** G. W. Cunningham, Technical Director

**COPIES:** Board Members

**FROM:** J. Deplitch

**SUBJECT:** Report on the Rocky Flats Environmental Technology Site  
Annual Emergency Preparedness Exercise, READY- 96

- 1. Purpose:** This report documents Defense Nuclear Facilities Safety Board's (Board) staff observations made during the conduct of the Rocky Flats Environmental Technology Site (RFETS) Annual Emergency Preparedness Exercise, READY- 96, on April 17, 1996, and follow-up reviews. Board staff observers were J. Deplitch, D. Thompson, R. Warther, and M. Sautman.
- 2. Summary:** RFETS performed a multiple incident emergency preparedness (EP) exercise with the intent of significant offsite participation for the most severe incident. The exercise was intended to fulfill the annual site-level exercise requirement. The exercise involved four incidents: three short duration onsite incidents with no offsite consequences and one longer duration offsite incident. None of the three onsite incidents required declaration of any emergency or any protective action recommendations. The offsite incident involved a 2,500-gallon fuel fire, two contaminated casualties, and 0.05 curies of Plutonium-239 (a hazard of concern only in the immediate area of the accident).

RFETS's performance on this exercise was significantly improved from the previous drills and exercises in the past year. However, there were many weaknesses and inconsistencies involving assessment of the hazards, determination of emergency action levels, selection of protective actions, use of personal protective equipment, contamination control, use of radiological instruments, use of procedures/checklists/references, and exercise control. Overall, the Board staff observers considered that RFETS marginally demonstrated its ability to respond to an onsite emergency, but failed to demonstrate an ability to coordinate with state and local emergency response organizations for an offsite emergency.

Offsite agency participation included activation, manning, and operations at the State Emergency Operations Center, Offsite Coordination Center, Joint Public Information Center, and RFETS Emergency Operations Center. Offsite organizations also responded to the offsite incident with local fire department, hazardous material, medical, and law enforcement personnel and equipment. Except for the Radiological Assistance Teams (requested from the Department of Energy), offsite organizations performed few actions to respond, assess, control, and mitigate the accident.

- 3. Background:** The exercise was intended to demonstrate the preparedness of emergency response personnel, procedures, facilities, and supporting systems for an emergency at RFETS; to demonstrate RFETS's ability to notify, coordinate, and support state and local agencies for an offsite emergency; and to exercise emergency response capabilities of the state and local agencies. RFETS controlled, evaluated, and critiqued their own participation in the exercise, while state and local agencies provided their own control, evaluation, and critique of their participation in the exercise. Department of Energy (DOE) Headquarters Office of Emergency Management (NN-60) provided limited external evaluation to RFETS's participation in the exercise.

The RFETS exercise included four simulated incidents. The first incident involved a commercial delivery truck colliding with the northern-most gate booth of the West Gate as it exited the site. The impact caused minor injuries to the driver and passenger, leaked antifreeze and transmission fluid, and scattered three boxes containing Iodine-123 (20 millicuries each, salt form). One box was opened and the contents partially scattered on the ground. The Iodine-123 was still in its inner container and no contamination resulted. The second incident involved an accident between a 2,500-gallon gasoline tanker and a commercial transport truck carrying low-level waste from RFETS, just north of the East Gate, on Indiana Road. As a result of the accident, several crates of machine parts and drums of corrosive solvents, all contaminated with plutonium, were ejected from the truck trailer; the trucks, drivers, and cargo were burned in the fire; and the transport truck passenger and an individual, who was following the truck and went to aid of the passenger, were injured and contaminated. The third incident involved the Crisis Support Team manager losing consciousness while performing his duties in the EOC. The fourth incident involved a technician dropping a box of hydrochloric acid bottles, breaking one bottle. The technician's leg was burned and the fumes produced respiratory difficulty.

**4. Discussion/Observations:**

The Board's staff observed activities of exercise conduct and control and activities at the accident scenes, Incident Command Posts (ICPs), RFETS Emergency Operations Center (EOC), Joint Public Information Center, Offsite Coordination Center, and State Emergency Operations Center. The Board's staff also reviewed RFETS emergency action level (EAL) procedures and protective action recommendation (PAR) procedures.

EALs and PARs were determined arbitrarily during the exercise. The Incident Commander did assess the accident and determine a timely EAL and PAR, but the EAL and PAR did not coincide, i.e., he declared an Alert and gave an order to Shelter for all onsite facilities (corresponding to a Site Area Emergency). The Incident Commander did not refer to available procedures to determine the appropriate levels and recommendations. A later Board's staff review of EAL procedures showed that the procedures lacked sufficient detail to clearly identify and classify an accident. Review of the PAR procedures showed a clear and logical decision-making process,

but decisions were based upon default bounding effects and accidents only. The procedures lacked a broad spectrum of potential accidents that can lead to an operational emergency; such as, potential accident conditions and observable indications that can be identified easily and that trigger specific EALs and PARs. As written, the procedures required accident and consequence assessment before EAL and PAR could be accurately determined, otherwise the determination could be overly conservative (alarmist) or not adequate to protect the workers and public. For Incidents 1 and 2 the EAL and PAR were overly conservative; for Incident 4 the PAR was slow.

The Hazard Assessment Center (HAC) was not effective in collecting and evaluating data. The HAC accepted the Reportable Quantity value for Iodine-123, 10 curies, as the quantity involved with the West Gate incident and did not aggressively seek actual accident data. As a result, unnecessary protective actions were initiated and persisted. The HAC did not have an appropriate model for assessing the Iodine-123 hazard and deployed only one Field Sampling Team. The HAC apparently did not understand the difference between the reporting chains for Field Sampling Teams and Radiological Assistance Teams (under the Radiological Assistance Program) and, therefore, had difficulties with collecting and coordinating for the field survey data.

The ICP had communication and coordination problems. Duties and responsibilities changed several times among the ICP staff, causing redundant coordination and communications and delayed responses. The truck manifest for the West Gate incident was available to accident scene responders in about ten minutes, but the information was not communicated to decision makers for reevaluation of protection actions for nearly an hour. Also, the ICP was located so close to response vehicles with their engines running at high idle speed that communications were very difficult. Very high winds exasperated the communications problem.

Contamination control was poor, particularly during the East Gate incident response. Contaminated responders walked into clean areas with unprotected personnel; unprotected personnel walked into contaminated areas, especially while treating the casualties. No measures were taken to control access to the contaminated areas, e.g., through designated entry and exit points. During the hydrochloric acid spill incident a worker (other than the responders) walked through the spill area.

The use of personal protective clothing and equipment (PPE) was inconsistent. Responders wore different levels of protection while in the same potentially contaminated area. Some wore self-contained breathing apparatus, while others wore full-face respirators with particulate cartridges, partial-face respirators with no cartridges, or no respirator protection. A clear level of protection was not prescribed or maintained. At one time during the West Gate incident, the Industrial Hygienist prescribed and incorrectly identified the PPE in use as Level A protection. Gas tight chemical resistant clothing, Level A, was not required for the accident hazards, worn by any responders, or included with the PPE for the accident responders. A properly assessed level of protection would ensure each responder is adequately protected, but not overburdened.

Radiological measurement instruments were not used properly. Personnel were frisked for contamination too fast and at an inappropriate distance. Thermoluminescent dosimeters and self-reading dosimeters were worn incorrectly, i.e., underneath protective clothing. During the East Gate incident, probes were used in a manner that would have made it impossible to detect the plutonium contamination. Air sampler operators were not trained to operate the samplers.

The exercise was well-designed and well-controlled, except for the lack of adequate pre-exercise coordination with the local and state jurisdictions expected to participate. This lack of coordination was a major contributor to the poor performance and response to the offsite incident. The perceived effort on the part of RFETS and offsite agencies for planning and participating in the exercise and demonstrating poor overall performance for responding to the offsite incident indicates strongly the need for future integrated training, drills, and exercises with offsite agencies.

One major controller deficiency was noted. During the large fire at the East Gate, one controller indicated that the fire was out after fifteen minutes. Another controller stated the fire was still raging one hour after the incident. As a result, there were many misunderstandings about what responses should or could occur, on the part of both the players and controllers.