

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 12, 1994

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

**COPIES:** Board Members

**FROM:** R. Arcaro, Technical Staff

**SUBJECT:** Los Alamos National Laboratory TA-55, Training and Qualification and Conduct of Operations Review, November 17-18, 1993.

1. Purpose: This report describes and provides comment on the Conduct of Operations and Training and Qualification Programs at the Los Alamos National Laboratory (LANL) Technical Area 55 (TA-55), specifically the Cassini Project. The review was conducted by DNFSB Technical Staff members Ralph Arcaro and Outside Experts John Drain and David Boyd.
2. Summary:
  - a. Training and Qualification: The training and qualification program for operators at LANL TA-55 does not meet the requirements of DOE Order 5480.20, Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities. The following deficiencies were noted:
    1. Operators are certified to perform individual procedures rather than to perform at a particular position as envisioned by the Order. Although this certification method is not prohibited by the Order, it results in a cumbersome program that contributes to several other deficiencies.
    2. Group Leaders (the equivalent of a process facility manager) do not take an active role in the operator certification as required by DOE-STD-1056-93, Guide to Good Practices for Line and Training Manager Activities Related to Training.
    3. There is no technical fundamentals or systems training for operators/technicians as required by DOE Order 5480.20, Section IV.5.a.
    4. The continuing training program does not include many of the technical subject areas required by DOE Order 5480.20, Section I.7.d.(4).
    5. Proficiency requirements for operators and supervisors have not been established as required by DOE Order 5480.20, Section IV.6.

6. The TA-55 Training Implementation Matrix has not been approved.
  7. The use of advance-decreed scientists and engineers as a compensatory measure for lack of a formal supervisor training program is not documented or justified.
- b. Conduct of Operations: DOE and TA-55 management have recognized their deficiencies in the area of Conduct of Operations and have taken meaningful actions to improve the situation. Significant actions include establishment of the DOE Mentor program, use of interim Area Work Supervisors for work control, and a table-top progress assessment of Conduct of Operations to prioritize identified improvement actions.

The following comments from tours, observations, and interviews by the DNFSB staff confirm that improvement is required in the area of Conduct of Operations:

1. Tours of the facility and observation of operations indicated deficiencies in procedural compliance.
  2. The Lab and facility Lockout/Tagout procedures are cumbersome and do not meet all the requirements of DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, on Lockout/Tagout.
  3. The TA-55 management assessment of Conduct of Operations did not include a field verification.
3. Background: In support of the Cassini Mission, the TA-55 facility at the Los Alamos National Laboratory (LANL) will perform two steps in the manufacturing of three Radioisotopic Thermoelectric Generators and 157 smaller Radioisotopic Heater Units. These steps are 1) pelletization of Pu-238 oxide produced at the Savannah River Site HB Line, and 2) encapsulation of the pellets in iridium capsules.

Because of recent personnel contamination incidents at TA-55 resulting from poor conduct of operations, the DNFSB staff performed a review of operations at the Cassini Project of TA-55 to determine if practices at the facility were consistent with safe operation.

4. Discussion/Observations:
- a. Training and Qualification: The majority of the deficiencies noted in the training and qualification programs at TA-55 have been independently identified and communicated to LANL TA-55 by the DOE Mentor responsible for training and operations. DOE is currently working with LANL to develop and implement a program to certify Fissionable Material Handlers in accordance with DOE Order 5480.20. A parallel effort to identify and certify Fissionable Material Handler

Supervisors is also underway. These programs will be the subject of further DNFSB staff review.

1. General: Nearly all training is given as on-the-job training (OJT), which in most cases is one-on-one instruction by a certified OJT instructor followed by work under supervision of a certified operator until proficient, then oral examination by an OJT certifier. If satisfactory, the certifier designates the operator as certified and the Group Leader approves the designation based on the certifier's report, and possibly, a review of the individual's training file. (Figure 1 shows a simplified organizational chart to show the line management reporting relationships.)

Division Director for TA-55

Group Leader for Heat Source Technology  
(Cassini Project Leader)

Section Leaders  
(Advanced-decreed Scientists)

Technicians  
(High School-educated Operators)

Figure 1 - TA-55 Organization

"Operator certification" is done on an operating procedure basis, not on a job position basis as is the case at most chemical processing plants within the DOE weapons complex. There is no group of operating procedures that constitute a position such as a defined "chemical operator" position. Although by itself this certification method is not prohibited by the Order, it has contributed, either directly or indirectly, to the following deficiencies:

- (1) Group Leaders (the equivalent of a process facility manager) do not take an active role in the operator certification as required by DOE-STD-1056-93, Guide to Good Practices for Line and Training Manager Activities Related to Training.
- (2) There is no technical fundamentals or systems training as required by DOE Order 5480.20, Section IV.5.a.
- (3) The continuing training program does not include many of the technical subject areas required by DOE Order 5480.20, Section I.7.d.(4) such as theory and principles of facility operation, specific facility operating characteristics, and use of facility systems to control or mitigate accidents.

- (4) Proficiency requirements for operators and supervisors have not been established as required by DOE Order 5480.20, Section IV.6.
- (5) The training program lacks many important elements of a training program for certified Fissionable Material Handlers as required by DOE Order 5480.20, Section IV.5.b. Examples include instrumentation and control and consequences of their malfunction, and facility operating characteristics.
- (6) The TA-55 Training Program Manual allows operators to be trained and certified by the same individual, often an immediate supervisor, contrary, to DOE Order 5480.20, Section I.6. Record review of certified Cassini Project operators revealed this situation was aggravated in some cases where several operators were apparently trained and certified by the same instructor at the same time.

- 2. Supervisor Training: TA-55 lacks a formal program to train supervisors to a greater depth than the operators. Neither Lead Technicians nor Area Work Supervisors are trained in accordance with the supervisor training requirements of DOE Order 5480.20. However, TA-55 management reported that day-to-day supervision of the operations is the responsibility of the Section Leaders that report directly to the Group Leader for Heat Source Technology. The Section Leaders are often individuals with advanced degrees in chemistry or other scientific fields. This situation may provide LANL TA-55 with a justifiable position of not requiring an additional supervisor training program. However, this position has not been formally presented either in a Compliance Schedule Approval (CSA) or other compliance document.
- 3. Training Implementation Matrix: The TA-55 Training Implementation Matrix (TIM) that schedules facility compliance with DOE Order 5480.20 was submitted to DOE over a year ago but has not yet been approved. TA-55 management reported that the TIM was recently returned by DOE Albuquerque (DOE-AL) for format changes.

b. Conduct of Operations

- 1. General: TA-55 management completed a table-top progress assessment of implementing elements of DOE Order 5480.19, Conduct of Operations Requirements at DOE Facilities, in October 1993. Deficiencies were grouped into 21 areas. Of these areas, six were identified as priority areas; those that when corrected, would resolve the most deficiencies. Resource-loaded schedules to address the six priority areas have been worked into an Integrated Program Plan. Actions planned to correct the six

priority areas are:

- (a) Develop Conduct of Operations Policies
- (b) Improve Policies and Procedures Implementation Practices
- (c) Renovate the Lockout/Tagout Procedures
- (d) Develop TA-55 Operations Manual
- (e) Develop Records Management Program
- (f) Develop Operators Aids Procedure

If effective, these actions can be expected to correct many of the deficiencies noted by the DNFSB review team.

2. Area Work Supervisors: The Area Work Supervisor (AWS) position was established to control work release. (Improper work control was identified as a contributing cause of recent radiological contamination occurrences.) The AWS is responsible for ensuring that work is performed in accordance with current approved procedures and that nonroutine work is properly evaluated and approved before being released.
3. Mentor Program: The DOE Mentor program was intended to improve Conduct of Operations and Radiological Controls at TA-55. The program has broadened its scope at LANL TA-55 to include management organization and Order compliance. LANL managers indicated that many of the issues raised during the DNFSB Staff review were previously raised by the responsible DOE Mentors. Preliminary indications are that the Mentor Program is fulfilling its intended function; however, the ability of the mentors to effect changes to resolve identified issues will be the subject of ongoing review.
4. Procedural Compliance: Observations of operations and tours of the TA-55 facility revealed some deficiencies in strict procedural compliance in accordance with DOE Order 5480.19:
  - (a) A DNFSB review team member observed the performance of a ball-milling process procedure. This procedure was being observed by a DOE NE-53 team auditing operator certifications. During the observation, an NE-53 team member pointed out that an operator was intending to load a charge of weight outside of parameters specified by the procedure. Work was stopped to resolve the discrepancy. The same procedure error was narrowly averted the

following day when work was again stopped just prior to an operator loading an underweight charge. Corrective action from the previous day was insufficient to prevent a similar occurrence.

- (b) During a tour of the process area, it was noted that the presence of fuel in one glovebox was indicated by an informal handwritten note stuck to the glovebox window. No work was being performed in the glovebox. Review of the procedure and logs indicated that this informal operator aid was the primary means by which operators knew of the presence of fuel in the glovebox.

5. Lockout/Tagout: LANL uses a complex system of different colored locks and tags that satisfy their perception of the OSHA requirements in 29 Code of Federal Regulations Section 1910.147 (29 CFR 1910.147). The colors indicate the purpose of the lockout, be it for personal protection during maintenance, personal protection during nonservice operations or other reasons such as environmental protection.

- (a) The administrative system used to prepare and attach locks and tags is more cumbersome than those observed at other sites or that suggested in DOE Standard 1030-92, Guide to Good Practices for Lockouts and Tagout. The more significant difference between the LANL policy and that in the DOE Standard or DOE Order 5480.19 is that LANL has no requirement for independent verification of the LO/TO preparation or of the isolation and locking and tagging of equipment or systems; too much reliance is placed on the performance of a single individual. DOE Order 5480.19, Chapter X, "Independent Verification" strongly recommends a second person's involvement, particularly for safety-related systems.
- (b) LANL's criteria for lockout of "single energy source equipment" do not encompass all eight of the criteria in 29 CFR 1910.147 or the recommendations of DOE Order 5480.19 and DOE-STD-1030-92. These references list 8 conditions which must be satisfied in order to use a single source LO/TO and be exempt from written documentation.
- (c) LANL also permits "modification" of equipment under a "single energy source lockout", an element of work that goes beyond the scope of "servicing or maintenance of machines or equipment" stated in the references cited. Modifications, in the experience of the Board's staff, are changes that require approved plans and controlled testing before restoring a system or component to operation.

LANL's cognizant managers recognize the need to restructure the LO/TO system and have identified this need as a priority action for improving Conduct of Operations.

5. Future Staff Actions: As noted above, DOE and TA-55 management have recognized several of the deficiencies noted in this report. In particular, the DOE mentors and actions planned to address conduct of operations and training and qualification program weaknesses should have a positive effect on future Cassini Project operations. The staff will continue to monitor the progress of corrective actions instituted by the DOE mentors.