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Recent Changes to the Criticality Safety Programs at LLNL

J.S. Pearson, J. Burch, S.T. Huang

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Recent Changes to the Criticality Safety Programs at LLNL

by John S. Pearson, Jennifer Burch and Song T. Huang

INTRODUCTION

During the 1996 audit, a corrective action program was developed and implemented to enhance the Criticality Safety Program at Lawrence Livermore National Laboratory. The Criticality Safety Program at LLNL has been rebuilt to combine a strong core criticality safety program with direct field support to floor operations. Field staff are integrated into the supported facility and program efforts. This method of operation effects all aspects of the criticality safety program including, as examples, development of criticality safety controls and training.

CRITICALITY SAFETY CORE SUPPORT

The criticality safety "core" effort provides essential support to the criticality safety staff and the Criticality Safety Program. The "core" establishes procedures and guidance for the Criticality Safety Program and staff consistent with DOE Orders, Guides, and the ANSI/ANS-8 series of standards which have adopted into the LLNL Work Smart Standards. The "core" also provides resources to the criticality safety staff to enhance staff performance. This includes administrative support such as secretarial, filing, processing documents, etc. It also includes computer hardware and software support including purchase of hardware and software, verification and validation of codes, etc. The "core" also provides independent peer review of criticality safety evaluations according to a formalized process, and the training and professional development of criticality safety staff. Technically competent management oversight and a formalized, procedure-driven process provide consistency in the field support to diverse programs and facilities. Experience at LLNL has shown that a strong centralized "core" function is essential to provide a strong, consistent criticality safety support to floor operations.

CRITICALITY SAFETY FLOOR SUPPORT

The field staff supporting floor operations at LLNL "live" with the customers, but remain accountable to the "core" criticality safety management. Field staff offices are located in the key supported facilities. This facilitates day-to-day contact with facility and program staff at all levels. Facility management strongly supports this arrangement and considers it a key to the success of the Criticality Safety Program.

Criticality safety support utilizes formal "point of contact" relationships. For example, every room, operation and workstation in the Plutonium Facility is assigned to a responsible criticality safety engineer and a back-up engineer who provide support and oversight. The criticality safety staff work closely with the program Responsible Individuals (RIs) to develop criticality safety controls. Every room, workstation and operation also has an assigned RI from the program who is, among other things, responsible for the criticality safety in those operations. The criticality safety staff assignments are chosen consistent with the RI assignments. This system has distinct advantages:

- Every room, operation and workstation is covered by a knowledgeable program RI and a criticality safety engineer.

- It fosters a working rapport between the criticality safety staff and their customers.
- It fosters criticality safety staff familiarity and ownership of the supported operations.

Since criticality safety staff report to the "core" criticality safety management who provide oversight, and the "core" also provides independent peer reviews, an important element of separation is maintained to protect the institutional interests.

Criticality safety field staff spend much time with operations on the floor, both formal and informal. For example, a formal 100% walk-through program assures formal, documented walk-through inspections of all rooms and operations in the Plutonium Facility. A detailed checklist guides and documents each inspection. In addition to checking criticality safety compliance, each walk-through also includes discussions with the operators concerning criticality safety issues and recent operational experience. This requires that criticality safety engineers schedule walk-through inspections to ensure the required discussions with operators, but the resulting contact with program staff is considered worth the extra effort. Unscheduled walk-through inspections are also performed.

Criticality safety staff employ various avenues to foster feedback and discussions with operations staff. Regular meetings with small groups of program staff who regularly work with each other on common programs and equipment fosters a more comfortable setting for discussions. Criticality safety staff also regularly participate in weekly operator "Safety Feedback and Improvement" meetings. Full-time criticality safety staff presence in supported facilities greatly fosters discussions with program and facility staff on a daily basis. Before this system was adopted, criticality safety staff expressed concern that constant interruptions might make "real work" more difficult. However, experience has shown that any such interruptions are out-weighed by the advantages of better, faster communications and improved working relations.

Criticality safety field staff participate regularly at program and facility planning meetings. This, too, fosters communication and a working relationship. In the Plutonium Facility, for example, this includes participation at daily facility "stand-up" and staff meetings, safety review meetings, daily facility activity-planning meetings, and program planning meetings. In order to assure equitable and consistent participation, criticality safety staff attendance is formally assigned and scheduled.

STANDARDIZED CRITICALITY SAFETY CONTROLS

Recognizing that previous criticality safety controls and guidance had become complicated and sometimes confusing, a major effort was undertaken to standardize criticality safety controls as much as possible. Hence, a system of Standard Criticality Control Conditions (SCCCs) was developed. The wording of SCCCs remains consistent, so any SCCC means the same thing anywhere it is applied. Recognizing the need for unique controls at some workstations to assure adherence to the double contingency principle, workstation-specific controls are also used when necessary. Considerable interaction occurs between the criticality safety, program and facility staff when specifying SCCCs and workstation specific controls. Once adopted, formal facility procedures and a two-person rule govern the posting and changing of SCCCs. The

postings for the SCCCs were also simplified, standardized and color-coded to improve understanding by the operators.

CRITICALITY SAFETY TRAINING

Criticality safety training for operations personnel is viewed as another opportunity for interaction between operations and criticality safety staff. Hence, the Criticality Safety Section developed and teaches criticality safety training which meets the requirements of ANSI/ANS-8.20. A basic course curriculum is expanded and tailored for specific student groups and needs. The criticality safety field staff also participate in operator training on safety procedures and plans. This participation provides field staff with yet another opportunity to interact directly with their customers. As another example, criticality safety field staff periodically provide workshops on criticality safety and how it applies to facility operations for operators preparing to take their handler certification boards. In these workshops the operators have the opportunity to ask the criticality safety staff questions concerning criticality safety and how it effects their daily programmatic work. In addition to these ongoing methods of training, a hands-on class is under development, which will include measurement of reactivity changes when criticality safety parameters are changed.

ENHANCED EMERGENCY RESPONSE TRAINING

During the last two years, LLNL has significantly expanded and improved its criticality safety emergency response training program to meet the requirements of ANSI/ANS-8.23. The program includes classroom training, drills and exercises tailored to appropriate personnel groups. The improved training, drills and exercises involve appropriate facilities, programs and support personnel including staff from criticality safety, health services, fire department, and the rest of the LLNL emergency response structure. Classroom training is followed by a drill and/or exercise including staff evacuation, response group operations in the field, a tabletop recovery exercise, feedback and lessons learned.

CONCLUSION

The Criticality Safety Program at LLNL has been significantly changed to provide enhanced support to floor operations. The program combines a strong criticality safety "core" program with field staff who are closely integrated into the facility and program effort. By maintaining a balanced program of core and field support, the Criticality Safety Program provides timely, coordinated customer support while protecting institutional oversight and interests.

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