

Lawrence Livermore National Laboratory

Nuclear Criticality Safety and Operations Interface at LLNL

June 17, 2009



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This work performed under the auspices of the U.S. Department of Energy by
Lawrence Livermore National Security, LLC under Contract DE-AC52-07NA27344

UCRL-PRES-413735

The LLNL Criticality Safety Program combines three key elements for an effective interface between CS and Programmatic staff

- A strong “core” Criticality Safety Program
- Criticality Safety staff “in the field”
- Program “Responsible Individuals” (RIs)



Criticality Safety Core Program provides essential support to CS staff and the CS Program

- **It establishes procedures & guidance consistent with DOE orders and ANSI/ANS standards**
- **It provides resources**
 - Administrative, document storage & retrieval
 - Independent review of CSEs
 - Qualified CS staff
 - Technically competent management oversight
- **It protects institutional requirements**

A strong centralized “core” function is essential to provide a strong Criticality Safety Program

Criticality Safety “Field Staff” are integrated into Facility and Program operations

- **CS field staff reside in the program facility**
 - Near customers (management & staff)
 - Near Radioactive Materials Area laboratories
- **Close proximity facilitates day-to-day contact with facility and program staff at all levels**
 - Performing formal & informal walk-through inspections
 - Participating in meetings with customers at all levels
 - Interfacing with customers regarding CS reviews & evaluations
 - “Just answering questions”
- **CS Field staff are qualified IAW DOE-STD-1135-99**

Laboratory and Facility management consider this close proximity “key” to success of the Criticality Safety Program

CS Field Staff interactions with other CS professionals is important

- **Regular interactions between field and core staff is emphasized**
 - Regular staff meetings
 - Regular CS seminars
 - Formal and informal discussions
 - Evaluation reviews
- **Interactions with the outside CS community is strongly supported**
 - Conferences
 - Standards working groups
 - DOE activities (e.g. NCSP End Users, CSSG, etc.)

Program Responsible Individuals (RIs)

- **RIs are generally senior operators (Senior Certified Fissile Material Handlers)**
- **RIs have formal line management responsibilities, including**
 - Ensuring safety (including criticality safety) of assigned operations
 - Verifying completion of required training for all operators
 - Ensuring proper implementation of CS controls and postings
 - Working with CS staff to develop CS controls
 - Providing input to the criticality safety evaluations
 - Acting as the CS coordinator for Operational Safety Plans (OSPs) which include CS controls

Program Responsible Individuals (RIs) – Continued

- **RI responsibilities are formally documented**
- **RI responsibilities are similar to those of Criticality Safety Officers (CSOs) at other sites**

Program Responsible Individuals play a key role in the Criticality Safety Program

Criticality Safety Program utilizes point-of-contact relationships

- **Every room, operation, and workstation is assigned both a CS engineer and a program RI**
- **CS engineers work closely with corresponding RIs**
- **This arrangement has obvious advantages:**
 - Every room, operation & workstation is covered
 - It facilitates rapport between CS staff and their customers
 - It facilitates operation familiarity and “ownership” by CS staff and corresponding program RIs



Key elements of the Criticality Safety Program

■ Providing criticality safety training

- CS training is provided by CS staff and RIs
- CS staff teach “Fundamentals” classes & workshops for operator certification boards
- RIs teach operation-specific safety classes (with help from CS staff) on OSPs and CS controls

■ Providing detailed, documented walk-through inspections (as well as informal inspections)

- CS staff perform 100% quarterly walk-through inspections
- Every room, workstation, operation is included
- Appropriate RI participates in each inspection
- A detailed checklist guides & documents each inspection

Key elements of the Criticality Safety Program - continued

- **Providing reviews of safety plans, authorization basis documents, equipment/facility changes, etc.**
 - CS staff provide formal, documented reviews with input from Program RIs
- **Providing a solid technical basis through documented criticality safety evaluations**
 - CS staff perform CS evaluations IAW DOE-STD-3007-2007 and ANSI/ANS 8 standards
 - CS staff work with RIs who request evaluation, provide program information, review controls, etc.

Key elements of the Criticality Safety Program - continued

- **Providing support for off-normal events (e.g. emergencies or potential non-compliances)**
 - CS staff respond according to formal written procedures
 - CS staff interface with RIs who provide programmatic input
- **Providing fire-fighting guidelines**
 - CS staff provide fire-fighting guidance posted on each room using NFPA 704 signs
 - CS staff work with Program RIs to determine appropriate firefighting guidance



Key elements of the Criticality Safety Program - continued

■ Providing criticality safety limits, controls and postings

- Limits, controls & postings are developed by CS staff with input and review from RIs and other program/facility staff
- Formal facility procedures are used for changing controls and postings
- CS postings are standardized & color coded

CRITICALITY SAFETY LIMITS	
Workstation XXXX	CONDITION D
1. MATERIAL & FORM	
Pu any form	2500 g
or	
²³⁵ U any form	3600 g
2. MODERATORS	
Liquids and solids intermixed with fissionable material	1 liter
Liquids and solids not mixed with fissionable material	2 liters
3. REFLECTORS	
Cladding	≤ 0.25 inches
4. SHAPE	
	Uncontrolled

This is an aid for Fissile Material Handlers.
Complete controls are found in OSP 332.XXX

Key elements of the Criticality Safety Program - continued

- **Providing direct floor support to facility and program staff on a daily basis**
 - CS staff, residing in the facility, provide on-going interactions and support to Program/Facility staff and management, including Program RIs

Both Criticality Safety staff and Program Responsible Individuals (RIs) play an important role in each of these key Criticality Safety Program elements

Facility, Program and CS management & staff continue looking for opportunities for improvement

- **A recent “Process Improvement” team identified potential improvements to the CS Program**
 - Simplify CS controls
 - Improve work request process
 - Standardize identified operations
- **The team was composed of representatives from CS staff, Program RIs, and other Facility/Program staff**



In Summary

- **The Criticality Safety Program at LLNL provides enhanced support to floor operations by combining three key elements**
 - **A strong “core” criticality safety program provides resources & protects institutional requirements**
 - **Criticality safety “field staff” are integrated closely into facilities and programs**
 - **Program “Responsible Individuals” interface with CS professionals and perform programmatic CS functions & responsibilities**
- **This balanced program provides timely, coordinated customer support while addressing institutional & regulatory requirements**