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The Role of Criticality Safety Officers at Los Alamos National Laboratory

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Agenda

■ Introduction

- History of the LANL criticality safety and CSO programs
- Nuclear Facilities & Fissile material operations at LANL

■ Role of Criticality Safety Officers (CSOs) at LANL

- Recent increase in formality of operations
 - Qualification program
- Roles and responsibilities

■ Future Plans

■ Conclusions

Introduction – Program History

- **History of the LANL Criticality Safety Program**
 - Fissile material operations began during the Manhattan Project
 - < 1957
 - NCS was handled within Hugh Paxton’s group
 - People assigned as necessary to support the laboratory
 - Expert-based and very little documentation was needed
 - > 1957
 - NCSC was established institutionally – oversight
 - Hugh Paxton’s group supported CSE development
 - 1961 – Dave Smith became the first full-time NCS specialist/Laboratory CSO
 - 1960’s-1970’s
 - Most LANL criticality safety support was done by Dave
 - NCSC performed annual walk downs in 2 person teams

Introduction – Program History

- Mid-to-Late 1970's
 - 1973 – Tom McLaughlin began to help Dave – a single person was not enough
 - LANL Pu Facility was being designed (gloveboxes and vaults)
 - Operations began in 1978
- 1980s
 - 1980 – Dave and Tom were moved to the ESH division
 - First dedicated NCS group at LANL
 - 1981 – First CSO appointed in an operating facility (Pu facility)
 - Functioned as a liaison between the facility staff and the NCS group
 - Tom performed PF-4 NCS work with the CSO and process supervisors
 - These interactions permitted consistency of the requests and products (CSEs, procedures, requests, walk downs, etc.)
 - 1987 – Dave stepped down as group leader
 - NCS group had 4 people
 - 1988 – Tom became NCS group leader
- 2004 – Tom retired and Shean Monahan became group leader

Introduction – Program History

- Current NCS program status
 - PIP is in progress
 - All ~600 fissile material operations must have a DOE-STD-3007 compliant evaluation
 - NCS program infrastructure is being improved as a result of lessons learned since 2005
 - Conduct of operations (CSO program)
 - Configuration management
 - Management/supervisor/operator training
 - etc.
- Papers have been presented at recent ANS meetings that have discussed the current group status
 - “Criticality Safety Program Improvement (PIP) Plan at Los Alamos National Laboratory,” 2007
 - “Nuclear Criticality Safety Lessons Learned at Los Alamos National Laboratory,” 2008

Nuclear Facilities at LANL

■ LANL Nuclear Facilities

- Plutonium Facility – 7 CSOs (~87%)
- Chemistry & Metallurgy Research (CMR) facility – 3 CSOs (~8%)
- Nevada Test Site – 1 CSO
 - Device Assembly Facility/Critical Experiment Facility (~3%)
 - U1a Complex
- TA-35 – NDA Measurement Laboratory (NDA Courses) – 1 CSO (<1%)
- Waste Facilities – 1 CSO (<1%)
 - Radioactive Liquid Waste Treatment Facility
 - Waste Characterization and Repackaging Facility
 - Radioassay and Non-destructive Testing Facility
 - LLW storage
- On and Offsite Transportation of SNM – 1 CSO (<1%)

Role of CSOs at LANL

■ CSO Program Recent History

- The CSO Role Was Very Informal in the Past (pre-2006)
 - Request evaluation support
 - Coordinate process walkdowns with NCS staff
 - Maintain implementing documentation
 - Positions not recognized as a formal job duty
 - Performed in their spare time
 - Usually assigned to newer staff members with minimal NCS experience
 - Inconsistent interactions depending upon the group CSO and the nature of their operations
- Has evolved to a much more formal program since 2006
 - Institutionally driven
 - Individual facilities are developing qualification programs
 - Job descriptions recognize the CSO duties

Role of CSOs at LANL

- **Late 2005 – LANL NCS program was formally implemented and formally defined the responsibilities of a CSO**
 - Serve as the operating organization criticality safety administrator by maintaining, as appropriate
 - Criticality Safety Evaluation documents
 - Criticality Safety Limit Approval (CSLA) documents
 - Criticality safety postings
 - Coordinate all criticality safety work requests
 - Perform or participate in reviews of suspected criticality safety infractions
 - Perform or participate in periodic criticality safety assessments of all the significant quantity fissile material operations

Role of CSOs at LANL

■ Current Issues

- NCS program not well implemented across the laboratory
 - Some CSOs are not aware of their responsibilities
 - People chosen are typically new to their organization
 - Typically perform the CSO duties in their spare time, i.e., not yet part of their formal duties

■ CSO Qualification Program Established for PF-4

- Formalized the CSO position
 - Position duties were made consistent with the CSO responsibilities required by the LANL NCS program
 - Qualification standard identifies the training and qualification requirements to support PF-4 groups
 - CSO position valid for two years
 - Refresher training required to maintain the position

Role of CSOs at LANL

- **CSO positions formalized at other facilities**
 - No formal qualification at the other facilities
 - Currently being considered
 - CSO duties are commensurate with the facility NCS risk
 - Single CSO can support multiple facilities/groups (waste facilities)
 - – Operations change infrequently
 - – Operating limits are outside of operator control

Future Plans

- **Qualification program at all facilities**
- **More NCS training for CSOs**
 - Classroom training
 - Critical experiments
 - More one-on-one interactions with NCS staff
 - Work as an augmented staff member of the NCS group
- **Criticality safety group will manage facility documentation using a state-of-the-art database**

Conclusions

- **CSO position continues to evolve and become more formal**
 - Can assist with operational compliance
 - Assessments
 - Infraction investigations
 - Assist with training supervisors and operators about NCS
- **Graded approach to CSO duties seems to work very well**
- **Danger of taking too much of the NCS engineer duties**
 - Don't want the CSOs to replace the NCS engineer presence in the field
 - The two should work together to ensure good communications, trust, operational awareness, etc. is still the important consideration