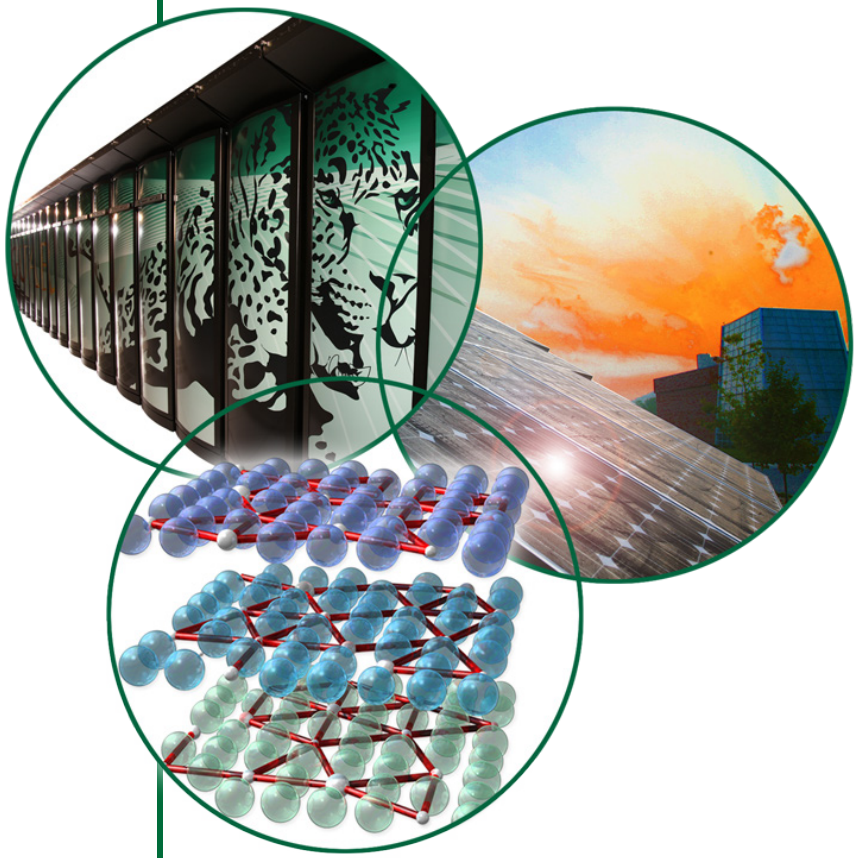
US DOE NCSP Criticality Safety Support Group (CSSG) Functions & Activities



Calvin M. Hopper

Chair CSSG

US DOE Technical Seminar
Oak Ridge National Laboratory
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U.S. DEPARTMENT OF ENERGY

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

CSSG*

- Mission
- Scope of Activities
- Membership
  - Current names
  - Expertise
- Activities
  - Historic overview
  - FY10 & FY11

*See U.S. Department of Energy Nuclear Criticality Safety Program website, http://ncsp.llnl.gov/cssgMain.html

Mission – Provide Operational & Technical Expertise to the NCSP Manager

- **Support DOE Missions**
  - **Stockpile Stewardship**
  - **Materials Stabilization**
  - **Transportation**
  - **Storage**
  - **Facilities Decommissioning**
  - **Waste Disposal**
- **Recommend Implementation & Execution of the Coherent & Efficient NNSA-administered NCSP***

See *http://ncsp.llnl.gov/NCSP-MV-COMPRESSED.pdf

Scope of Activities

- Apart from participation in officially approved and funded CSSG meetings, expenditure of NCSP funds in support of activities shall be by formal *Tasking* from the NCSP Manager to the CSSG Chair
- Technical support to the NCSP manager in the execution of the NCSP including reviews for:
  - Activities or conditions that have the potential for serious degradation of nuclear criticality safety at DOE facilities
  - New nuclear facility designs where criticality accidents are a credible hazard
  - New or revised DOE Directives, Standards, and Guides related to criticality safety
  - Contractor nuclear criticality safety programs at DOE facilities in support of DOE Line Management
- Generally limited to addressing DOE complex-wide topics – not for one-of-a-kind site-specific problem solutions
- Meet face-to-face at least twice a year to review NCSP objectives & activities

CSSG Membership

Member	Affiliation	Ex-officio Member	Affiliation
Calvin M. Hopper, Chair	ORNL (ret.)	A. Nichole Ellis	SAIC/DOE-NA
E. Fitz Trumble, Dep. Chair	WSMS	James R. Felty	SAIC/DOE-NA
Richard E. Anderson	LANL	Ivon E. Fergus, Jr.	DOE-HS
David G. Erickson	SRS	Richard D. McKnight	ANL
Adolf S. Garcia	DOE-ID	Gladys O. Udenta	DOE-NA
David K. Hayes	LANL	Lori Scott	SAIC/DOE-NA
David P. Heinrichs	LLNL	Hazel Slemmons	SAIC/DOE-NA
Kevin D. Kimball	Y-12		
Thomas P. McLaughlin	LANL (ret.)		
James A. Morman	ANL		
Davis A. Reed	ORNL		
Robert E. Wilson	DOE-EM		

Emeritus Member	Affiliation
Jerry N. McKamy	DOE-NA
Thomas A. Reilly	WSMS (ret.)
Hans Toffer	Fluor Gov't Group
R. Michael Westfall	ORNL (ret.)

CSSG Member's Expertise

- Critical and Sub-Critical Integral Experiments
- Differential Nuclear Physics Measurements
- Nuclear Data Evaluation
- Computational Methods
- Criticality Safety Training and Qualification
- Management of Criticality Safety Programs
- Criticality Safety Evaluations
- Criticality Safety Consensus Standards

Historic Overview of CSSG 25 *Tasking* Activities Since January 2006

(See http://ncsp.llnl.gov/cssgMain.html - “tasking/responses”)

Tasking ID	Title
2006-01	Review of Criticality Safety Infractions & Deficiencies at Identified Priority Sites
2006-02	Recommendation on Internet Availability of Criticality Safety Related Reports
2006-03	Review and Recommendation on the LLNL Hands-On Criticality Safety Training Course Syllabus
2006-04	Review and Prioritization of Proposed NCSP Tasks for FY07
2006-05	Assessment of Criticality Safety and Nuclear Data Needs Requiring a Super-SHEBA Capability
2006-06	Assessment of Criticality Safety and Nuclear Data Needs Requiring Solution Critical Experiments Involving Other than Uranyl-Nitrate Solutions
2006-07	Technical review of the draft document, "Preclosure Criticality Analysis Process Report”
2007-01	Review and Prioritization of Proposed NCSP Tasks for FY08
2007-02	Review of Site Criticality Safety Infractions and Deficiencies Occurring in Calendar Year 2006

Historic Overview of CSSG 25 *Tasking* Activities Since January 2006 (cont.)

Tasking ID	Title
2007-03	Technical review of the document, "Preclosure Criticality Analysis Process Report, Rev.1 [dated – March 08, 2007]" and License Application Section 1.14 [Story Board Draft D] and Resolution of Previous CSSG Comments.
2007-04	Review of Fluor-Hanford Draft Criticality Safety Evaluation Report
2007-05	Review of RevCom Draft DOE-STD-1189
2007-06	CSSG Self-Assessment
2007-07	Review of the Technical Basis for IEZ at Y-12 (Y/DD-1242)
2008-01	OUO
2008-02	OUO
2008-03	Recommendation on the DOE needs for a large, multi-purpose horizontal split table critical assembly device
2008-04	Definition of critical in terms of calculated reactivity for use in probabilistic risk analysis
2008-05	OUO
2009-01	Position Paper on the Purpose, Structure and Operation of Criticality Safety Committees
2009-02	Development and Recommendation of a Uniform Criticality Incident Categorization Scheme

Historic Overview of CSSG 25 *Tasking* Activities Since January 2006 (cont.)

Tasking ID	Title
2009-03	Recommendations for the Future DOE NCSP Training and Education Infrastructure Program
2009-04	Review of the 2009 Revision to DOE-STD-1158, Self-Assessment Standard for DOE Contractor Criticality Safety Programs
2009-05	**Development of a training guide for DOE-STD-1173-2009, Criticality Safety Functional Area Qualification Standard, DOE Nuclear Facilities Technical Personnel**
2009-06	**Review of the Technical Criticality Safety Basis for the Hanford Tank Farm**
2010-01	**Balanced Technical Approaches for Addressing Potential Seismically Induced Criticality Accidents in New Facility Design**
2010-02	**Role Of Criticality Safety In Facility Hazard Categorization**
2011-01	**Review of DOE O 420.1C**

(March 2010 – March 2011 responses)

Historic Overview of CSSG 25 *Tasking* Activities Since January 2006 (cont.)

(March 2011 – March 2012 Products/Activities)

Tasking ID	Title
2011-02	CSSG Participation in Drafting and Review of the Final DOE HS-21 Revision to DOE-STD-3009
2010-01 (Rev. 1 Final)	CSSG Response to Tasking 2010-01 Revision 1, Balanced Technical Approaches for Addressing Potential Seismically Induced Criticality Accidents in New Facility Design
2011-03	CSSG Response to DNFSB Staff Member on CSSG Position in Regards to Seismic Design
2011-04	CSSG Review of the UPF Facility Position on Criticality Safety in Regards to Seismic Design
2011-05 (1)	Independent Review of Godiva Safety (Assessment of Operational Safety)
2011-05 (2)	Independent Review of Godiva Safety (Assessment of DNFSB Concerns)
2011-06	Focused Criticality Safety Review at LANL Plutonium Facility (PF-4) – in process

Four FY11 & FY12 Tasking Activities

- 2011-02, *CSSG Participation in Drafting and Review of the Final DOE HS-21 Revision to DOE-STD-3009*
- 2010-01, *Balanced Technical Approaches for Addressing Potential Seismically Induced Criticality Accidents in New Facility Design* (final revision 1)
- 2011-03, *CSSG Response to DNFSB Staff Member on CSSG Position in Regards to Seismic Design*
- 2011-04, *CSSG Review of the UPF Facility Position on Criticality Safety in Regards to Seismic Design*
- 2011-05, *Independent Review of Godiva Safety* – 1
- 2011-05, *Independent Review of Godiva Safety* – 2
- 2011-06, *Focused Criticality Safety Review at LANL Plutonium Facility (PF-4)* (in progress)

2011-02, CSSG Participation in Drafting and Review of the Final DOE HS-21 Revision to DOE-STD-3009 – Response

Conclusion

Overall the review indicates that criticality safety is being appropriately represented in the new language in 3009. Suggested wording changes, or other thoughts, to the primary criticality safety related sections are included in the response.

2010-01, Balanced Technical Approaches for Addressing Potential Seismically Induced Criticality Accidents in New Facility Design (final revision 1) – Response

Conclusions

- Criticality safety engineers should participate throughout all facility design stages to ensure appropriate hazard categorization of the facility based on the guidance provided in the CSSG Response to Tasking 2010-02
- The principal role of the criticality safety engineer throughout the design process is to identify SSCs for defense-in-depth and worker safety based on their required function following an earthquake as credited in NCSEs

2010-01, Balanced Technical Approaches for Addressing Potential Seismically Induced Criticality Accidents in New Facility Design (final revision 1) – Response (cont.)

Conclusions

- The purpose of a CAAS is to provide a prompt evacuation alarm to protect facility workers. Additional, often very large, costs associated with the seismic tolerance of criticality accident alarm systems may be avoided if emergency evacuation is provided by seismic instrumentation or earthquake evacuation procedures
- Criticality safety engineers are encouraged to work closely with structural analysts to consider possible cost savings by suggesting innovative and inexpensive preventive measures such that seismic damage does not result in a criticality accident. This would permit limit states A, B and C and not require designing to the "no damage" limit state D.

2011-03, CSSG Response to DNFSB Staff Member on CSSG Position in Regards to Seismic Design – Response

- Generated from an inquiry by a DNFSB staff member questioning the CSSG conclusions in 2010-01
- Response provided a reiteration or clarification of 2010-01 conclusions, i.e.,
  - The conclusion that SDC-1 and LS-B may be assigned to SSCs important to criticality safety is valid, provided that NCSEs show that no credible upset condition, including the potential SSC damage/deformation caused by the DBE consistent with the SDC and LS selected, results in a criticality accident. The CSSG recommendation for the SDC and LS assignments is not based on dose considerations alone.

2011-04, *CSSG Review of the UPF Facility Position on Criticality Safety in Regards to Seismic Design* – Response based upon interim safety documents

Conclusions

- Criticality safety related requirements are being appropriately applied to the UPF project
- Significant conservatism is provided in the CSPSs (cost effectiveness should be considered)
- The UPF safety strategy endorses the use of passive engineered features over administrative controls (may simplify operations)
- The safe-shutdown strategy adopted by the UPF project in response to a design basis earthquake by providing for a safe and orderly evacuation of the facility is acceptable

2011-05, *Independent Review of Godiva Safety* – 1, Response

Conclusions

- The Godiva reactor can be safely operated within the framework of documentation that currently exists
- Each of the seven Topics of Review was considered and concluded to be adequately covered by the associated documentation or hardware systems
- Compliance of the documentation with current DOE regulations, standards and guides was not evaluated and is not included in this review team conclusion

2011-05, *Independent Review of Godiva Safety – 2*, Response

- **Conclusions**
- **The conclusions of Report 1 of CSSG Tasking 2011-05 is restated:**

  Planned Godiva operations incorporate adequate operational safety, consistent with guidance of national consensus standards ANSI/ANS-1-2000 and ANSI/ANS-14.1-2004

- **The review team concurs with the NNSA response to DNFSB concerns titled "Unmitigated Dose Analysis for Godiva," "Effects of Fuel Cracking," and "Design of Safety Instrumented Systems."**
- **The team provides recommendations for a path-forward for near-term actions (Godiva assembly and startup) and future actions (experiments with samples of 239Pu or other actinides) that allows for resolution of DOE-STD-3009-94 CN-3 documentation issues.**

2011-06, Focused Criticality Safety Review at LANL Plutonium Facility (PF-4) – in process

Tasking summary:

- **Using DOE-STD-1158 perform a focused criticality safety program review of the LANL plutonium facility (PF-4) emphasizing conduct of operations and management practices**
- **Perform a limited scope review LASO NCS oversight using a graded approach focusing on the LASO response to recent criticality safety events in PF-4**
- **Provide report to the LASO Site Manager upon completion and approval by the DOE Nuclear Criticality Safety Program (NCSP) Manager**

Details about the CSSG and Taskings are at:

http://ncsp.llnl.gov/cssgMain.html

"tasking/responses"

Questions?