

# EFCOG SAWG Safety Basis Workshop – Meeting Minutes

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Jerry Hansen – Safety Basis Subgroup and Workshop Chairman

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Below is a summary of the workshop sessions provided by the individual session chairmen. These workshops are intended to provide a national working forum for discussion of DOE safety basis issues. Workshop dialogue towards issue resolution, potential benefit, and priority will direct the EFCOG SAWG focus in the coming year. The session topics were determined through previous EFCOG SAWG workshops and meetings, and were refined with DOE HQ nuclear safety personnel and DNFSB staff representatives at a September 2008 meeting in Germantown.

**Topic: DOE-STD-1189 Implementation** – Brad Evans, lead. This panel discussion included representatives from Sites and Projects that are implementing DOE-STD-1189-2008, *Integration of Safety into the Design Process*.

1. Alan Ramble, CH2M Hill Plateau Remediation Company (CHPRC), discussed the Safety Design Integration Team (SDIT) as provided in DOE-STD-1189, Chapter 2, “Project Integration and Planning.” The SDIT was formed to support the Hanford Site Sludge Treatment Project. The qualification of people on the SDIT is important; their roles and responsibilities should be defined in a formal SDIT charter.

Also discussed was the process to down-select a project option for sludge treatment. The available alternatives include a new facility, modifying an existing facility, or a combination of these options. To support a recommended alternative, a “Risk Consideration Document” was prepared, which focused on major hazards, anticipated controls, and cost-schedule impact of each considered alternative.

2. Paula Ostby, Idaho National Laboratory (INL), presented several examples of Major Modification evaluations performed by INL using the criteria of DOE-STD-1189, Section 8.1.3, “Determining a Major Modification.” The process and criteria have been applied successfully. At INL, formal Major Modification Determination packages are prepared, but the evaluations are not submitted to DOE for approval.

3. Bates Estabrooks, Y-12 National Security Complex, presented the topic of chemical hazard treatment for the Uranium Processing Facility (UPF) Project. The project had to develop a rigorous screening process to implement DOE-STD-1189, Appendix B, “Chemical Hazard Evaluation.” The new process implemented by UPF project did not apply the following screening criteria of Appendix B: “No known or suspected toxic properties” or “Because of physical form. . . Do not present and airborne exposure hazard” Also, there was no initial screening of “Standard Industrial Hazards” (SIH); an analytical approach is planned for SIH determination. In general, the project is more conservative than the approach provided for chemical hazard screening in an effort to demonstrate that all chemical hazards are appropriately considered.

4. M. Kent Sasser, the CMRR Project Safety Basis Senior Consultant for Los Alamos National Laboratory (LANL), discussed some project challenges for implementing DOE-STD-1189 late in the project cycle. The project had an equivalent of an SDIT from the beginning of the process. The project has “fully embraced” 1189 and added the collocated worker as a receptor for 500 hazard analysis scenarios as provided by DOE-STD-1189, Appendix A, “Safety System Design Criteria.” The collocated worker has not been previously considered at LANL.

**Topic: STD-1189 Chemical Consequence Analysis – Panel Discussion.** Panelists included JC Laul (LANL), Bruce Zimmerman (Washington River Protection Solutions), Dave Pinkston (LLNL), and Wayne Davis (WSMS). JC gave a presentation on how computer models (ALOHA and EPIcode) may be used to estimate consequences of a chemical release. He compared model results to the value of X/Q required in STD-1189 ( $3.5E-3$  s/m<sup>3</sup>). The models consistently give higher X/Q values.

Bruce reported that at Hanford Tank Farms, if they use typical accident analysis techniques, chemical consequences dominate. Thus far, they’ve been unsuccessful in developing arguments to substantially reduce these consequences, due in part to a lack of health effects data for many compounds. They believe their methodology is overly conservative for chemicals and are trying to develop a technical basis for reducing this conservatism.

Wayne Davis reviewed chemical screening criteria in STD-1189 and encouraged their use to reduce the number of chemicals requiring analysis. The Standard Industrial Hazard exclusion is unnecessary and may conflict with other screening criteria in Appendix B. Use of the standard source term formula or X/Q value may be inappropriate for many chemical releases (e.g., do not adequately account for evaporative source term or dense gas effects).

Questions from the room included applicability and experiences on use of the Chemical Mixtures Methodology documented in STD-1189. There was a request for a White Paper on a consensus approach for screening chemicals and modeling chemical releases. It was suggested that SAWG request participation by SCAPA in developing this White Paper.

**Topic: DNFSB Recommendation 2008-1, *Safety Classification of Fire Protection Systems*,** presented by Jim O’Brien, Director of DOE’s, Office of Nuclear Safety Policy and Assistance.

In February 2008, the DNFSB issued Recommendation 2008-1 which recommended that DOE establish guidance for the design of fire protection systems used in safety significant and safety class applications. In July 2008, DOE issued its Implementation Plan (IP) for the recommendation, which identified numerous milestones. Some of the early milestones included a survey of fire protection systems used (and planned to be

used) in safety class and safety significant applications and an analysis of design requirements for fire protection systems used in high risk applications at DOE and other government and non-government facilities.

During the development of the IP, DOE formed a working group (led by DOE's Office of Nuclear Safety Policy and Assistance) to begin work on some of the early milestones and in particular to work on the development of guidance for sprinkler systems used in safety class and safety significant applications. An annotated outline of the guide has been identified and subgroups formed to research several topics that will be addressed in the guide including seismic analysis, quality assurance, and application of single failure criteria.

**Independent Validation Review (IVR) Panel**, chaired by Don Statile, Bechtel Jacobs Company, LLC (BJC). Don briefly described some of the implementation issues at BJC. Caren Wenner presented the IVR process at Sandia National Laboratory and Paula Ostby described the Idaho National Laboratory's IVR process. Jim O'Brien then presented the Department of Energy (DOE) perspective on IVRs. The Defense Nuclear Facility Safety Board (DNFSB) position was presented by Jeff Shackelford.

From the panel presentations and audience participation, it became apparent that the different sites and contractors have differing IVR processes. This difference includes the overall approach and the level of detail of the validation process. The DNFSB position is that TSR requirements are not being implemented properly. Therefore, additional DOE direction is needed for the IVR process. The DNFSB indicated that, at least, a new standard is required, if not a new order. Many contractors believe that only a guidance document is needed and worry about direction that is too restrictive to allow site/contractor variances in the process.

**Topic: System Design Descriptions and Revision of DOE-STD-3024**, presented by Bruce Wilson, Facility Safety Chief Engineer, B&W Technical Services, Y-12. The revision of STD-3024 is an initiative of the Engineering Practices Working Group, led by Ken Keith. The revision is intended to update the standard to incorporate guidance from DOE-STD-1189, Integration of Safety into the Design Process. Standard 3024 is primarily written with the perspective of operating facilities and needs to better reflect new nuclear facilities and facilities undergoing major modifications.

A flow chart of the projected development of SDDs during each Critical Decision phase of the Uranium Processing Facility was described. The SDDs will incorporate the crosswalk of design criteria and implementing guides recommended by STD-1189. One of the objectives of the presentation was to solicit input from SAWG members to contribute to the revision of STD-3024. Five individuals indicated an interest and will be contacted for their input. The presentation also solicited input on a draft white paper from Ken Keith titled, *Safety Classification of Systems and Components in DOE Non-Reactor Nuclear Facilities*. Additional volunteers for this project will be greatly appreciated.

**Topic: Proposed Revision of DOE USQ Guide (DOE G 424.1-1B) and Evaluation of the Safety of the Situation (ESS)**, presented by Mark Mitchell, EFCOG SAWG USQ Subgroup Chair (Session Lead), and James O'Brien, Division Director, HS-21, DOE-HSS. The proposed revision of the *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements* (DOE G 424.1-1B) is an initiative to consolidate the text pertaining to the PISA process into a single, unified section (an appendix) and address a variety of issues with the Guide as exists today, particularly with regard to ESS. Previously, little specific guidance has been issued on expectations for an adequate ESS.

Three sessions were held to discuss the proposed revision. First, a presentation to the entire SAWG workshop summarized the proposed revision and provided background about the reasons for a revision. Second, the proposed revised text was summarized and discussed with a smaller working group. Third, the path forward was presented. During these discussions, a solution was developed to help aid discussion by eliminating confusion caused by different individuals using different definitions for the same terms, i.e. focusing on requirements rather than controversial terminology. The need to minimize new requirements while clearly meeting 10 CFR 830 was discussed.

The path forward is to develop a flow diagram and functionality map reflecting the DOE expectations of 10 CFR 830(g). The EFCOG USQ Subgroup teleconferences are to discuss several possible flow diagrams, reach a consensus, and use that as the basis for both revising the EFCOG ESS white paper and providing input to DOE on the proposed revision, DOE G 424.1-1B. The EFCOG USQ Subgroup is also to collect lessons learned about details of implementation and samples of ESS. This will help DOE and the contractor communities assess potential impacts of implementing the revision.

Proposed actions:

1. EFCOG SAWG USQ Subgroup develops PISA flow diagram and functionality map.
2. EFCOG SAWG will publish the ESS white paper.
3. EFCOG SAWG will work with DOE to incorporate the guidance into the proposed revision to the Guide, DOE G 424.1-1B.
4. EFCOG SAWG work with DOE on the general revision to DOE G 424.1-1B.

**Topic: Design of Safety Class and Safety Significant Instrumented Systems (SIS)** standard development project, presented by Pranab Guha, DOE/HS-21, Larry Suttinger, SRS/SRNS, and John Schwenker, SRS/URS-WSRC. A new standard for the safety instrumented systems design is being developed using the ISA 84.00.01-2004, *Functional Safety: Safety Instrumented Systems for the Process Industry Sector*. The standard would use risk-informed and performance-based methodology, called Safety Layer Matrix, for the safety instrumentation systems design. The standard will be used by new and major modification projects.

Currently, a Working Group, consisting of experts from across the DOE sites, is developing the standard. The Working Group is interested in comments from SAWG, since this is a new and improved approach for the design of Safety Significant instrumentation systems. The understanding, input, and support from the members of the SAWG, the EFCOG, interfacing areas of expertise and their management is desired and encouraged.

**Topic: Chemical Hazards and the DSA**, presented by Brad Evans, Nuclear Safety Engineering Manager, Pacific Northwest National Laboratory, and Richard Englehart, Nuclear Safety Engineer for the DOE Office of Nuclear Safety Policy and Assistance (HS-21). The issuance of DOE-STD-1189, *Integration of Safety into the Design Process*, included Appendix B, “Chemical Hazard Evaluation,” which provides a more specific and objective set of chemical screening and evaluation criteria than that found in DOE-STD-3009. The ensuing discussion evaluated the circumstances under which incorporation of Appendix B guidance into a revision of STD-3009 would be feasible. The conclusion is that DOE-STD-3009 would benefit from including DOE-STD-1189 Appendix B guidance for chemical hazard screening and evaluation. This is most feasible for projects that have invoked 1189 into their safety-in-design considerations prior to Conceptual Design. Projects that have “back-fitted” 1189 at a later stage cannot be said to have designed in accordance with 1189 unless this can be demonstrated. Major modifications are an issue since only part of a facility or its operations may have incorporated 1189 concepts. Also, DOE G 420.1-2 is being revised to incorporate safety SSC design provisions from 1189.

**Topic: Criticality Safety Control Selection Panel. Session Lead: Kevin Carroll.**

The Panel members included:

Alan Ramble (Hanford) – lessons learned from implementation of STD 3007-2007

Cris Worley (Y12) – lessons learned from implementation of STD 3007-2007

Kevin Kimball (Oak Ridge) – implementation of STD 3007-2007 and STD 1189

Andrew Prichard (PNNL) – DOE STD 1027 and NCS impact

Brenda Hawks (DOE EM) – DOE EM 60 Workshop efforts

Larry Berg (DOE EM) – CNS (Chief Nuclear Safety) perspective

The results of the panel, including audience participation, resulted in a healthy discussion of key areas of integration between Criticality Safety and Safety Basis disciplines. A good discussion of increased interaction of criticality safety engineers in the DSA process was noted in presentations, while key areas requiring additional work were noted. Key concepts that surfaced during the discussion include:

1. STD 3009 change to support/clarify STD 3007
2. USQ guide change to support/clarify STD 3007
3. Further refinement/enhancement of the screening guidance in STD 3007 related to the Criticality Control Review document
4. Additional information provided to the NCS Engineers on expectations for them in STD 1189.

Follow-on discussion at the EFCOG SAWG Steering Committee will review if sufficient continuing interest exists in the above topics to warrant a Criticality Safety Subgroup. (note: results of SAWG SC is to pursue standing up of that subgroup.)

**Topic: Panel discussion on Specific Administrative Controls.** Panel Chair was Bruce Wilson, Facility Safety Chief Engineer, B&W Technical Services, Y-12. Panelists included Jeff Shackelford, DNFSB, John Titus, Facility Safety Engineer, B&W Y-12, Jeff Harvey, Director of Nuclear Safety, Idaho Clean-up Project, Jim O'Brien, DOE-HSS, and John Rice, Principal Analyst, Epsilon Systems Solutions, Inc. Mr. Shackelford presented a brief history of the DNFSB Recommendation, 2002-3 and a perspective of where the Board views the current status of SAC implementation in the complex. Mr. Titus and Mr. Harvey presented SAC implementation issues at their respective sites. Finally, Dr. O'Brien and Mr. Rice discussed recent findings and issues from assessments at some of the DOE complex sites.

It was concluded that although SACs have been implemented at all DOE complex sites, implementation issues continue to surface. There are several types of problems including; lack of specificity in SAC statements, conflicting direction in style (i.e., LCO vs directive action), conflict with using a SAC as compared to a programmatic element, and inadequate training of SAC developers and operations personnel who implement the SAC. The DNFSB perspective is that not much has changed in the last year. The SAWG recommended an effort to gather successful examples from across the sites and/or present a training course at the Las Vegas annual meeting devoted to Technical Safety Requirements and Specific Administrative Controls.

**Topic: Safety Analyst Training,** presented by Julie Johnston, Los Alamos National Laboratory, Safety Basis Academy (SBA) Project Leader. The SBA, a comprehensive training program, supports the needs of personnel with safety basis responsibilities at hazardous DOE facilities.

The SBA consists of 8 basic-level courses and 15 specialty-level courses. Nineteen of these were piloted during 2007-2008 with 4 courses to be piloted during 2009. The SBA is a collaborative effort with NNSA Chief of Defense Nuclear Safety – Authorization Basis Senior Advisor. LANL supports this work as the technical lead for the Safety Basis Academy. Logistics, roles, and responsibilities need to be established for the DOE National Training Center as the distribution point-of-contact for the SBA courses for both federal and contractor sites. EFCOG SAWG representatives must be involved in technical review of applicable courses when these are presented through the DOE National Training Center.