

SAFETY ANALYSIS WORKING GROUP

2009 ANNUAL REPORT

Chair: Brad Evans, Pacific Northwest National Laboratory

Vice-Chair: Rob McKeehan, University of Tennessee-Battelle (Oak Ridge National Laboratory)

INTRODUCTION

Vision - The Safety Analysis Working Group (SAWG) will be the prime nuclear safety resource of the Department of Energy (DOE) community to foster ideas, advance initiatives, and team with contractors and DOE to develop and implement effective and efficient initiatives, solutions, and programs in the area of safety analysis.

Purpose - The SAWG promotes excellence in nuclear safety applications and programs throughout the DOE and National Nuclear Security Administration (NNSA) community with a primary focus in the area of safety analysis.

Objectives - The SAWG is actively involved and integrated with contractor and DOE customers to:

- Establish initiatives and programs to advance nuclear safety throughout the DOE complex
- Prioritize initiatives and programs through the SAWG Steering Committee
- Facilitate initiatives and programs through subgroups and task teams
- Investigate safety analysis strategies, leverage experiences, and share lessons learned
- Maintain networking and interfaces using current technology
- Provide a forum to effectively accomplish activities and conduct business
- Train safety analysts, engineers, and managers

Scope - The SAWG scope encompasses the following:

- The implementation of nuclear safety requirements associated with Title 10, Code of Federal Regulations, Part 830 (10 CFR 830), "Nuclear Safety Management", Subpart B, "Safety Basis Requirements"
- Hazard and accident analysis applications in support of safety analyses
- Safety documentation development for nuclear and hazardous facilities, projects, and activities
- Training of managers, engineers, scientists, and subject matter experts in these applications and requirements
- Technical exchange of information, experience, and lessons learned

MEMBERSHIP AND ORGANIZATION

MEMBERSHIP

The membership of the SAWG has approximately 80 participants, and includes representatives from 22 EFCOG member companies representing over 15 DOE and NNSA sites, national laboratories, and contractors that support their work. Relationships have also been developed with Environmental Protection Agency and Nuclear Regulatory Commission staff, and with the American Nuclear Society.

During the year, over 250 people participated in SAWG activities. Managers, engineers, scientists, and subject matter experts are welcome to attend SAWG workshops and training, participate in subgroup activities, and become active members.

ORGANIZATION

Leadership in the SAWG is comprised of:

Chair: Brad Evans, Pacific Northwest National Laboratory

Vice-Chair: Rob McKeehan, University of Tennessee-Battelle (Oak Ridge National Laboratory)

Secretary: None

The SAWG has four Subgroups - Accident Analysis, Criticality Safety, Safety Basis, and Unreviewed Safety Question, as well as a training liaison function, and a hydrogen safety interest group. The Chairs of the four Subgroups are:

- Accident Analysis Subgroup Chair – Mukesh Gupta, URS Washington Division
- Criticality Safety Subgroup Chair – Kevin Carroll, Lawrence Livermore National Laboratory
- Safety Basis Subgroup Chair – Bonnie Shapiro, Sandia National Laboratory
- Unreviewed Safety Question Subgroup Chair - Mark Mitchell, Lawrence Livermore National Laboratory

EFCOG Sponsoring Director: Pam Horning, Babcock & Wilcox

DOE Sponsors: Mark Blackburn, Office of Health, Safety, and Security (HSS); Jim O'Brien, HSS; and, Pranab Guha, HSS

Currently succession planning for the SAWG is managed by the SAWG Steering Committee, with officers nominated by the Steering Committee and elected annually. The officers normally serve no more than two annual terms.

ACHIEVEMENTS

In FY 2009, SAWG achievements included the following:

- The Safety Basis Workshop was held in Albuquerque, New Mexico in October. Over 100 participants contributed to workshop panel discussions and presentations on several topical issues:
 - DOE-STD-1189, "Integration of Safety into the Design Process", Implementation Panel
 - Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2008-1, "Safety Classification of Fire Protection Systems"
 - Independent Validation Review Panel
 - Revision of DOE-STD-3024, "Content of System Design Descriptions"
 - Proposed revision of DOE Guide 424.1-1A, "Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements"
 - Design of safety class and safety significant instrumented systems
 - Chemical hazards and documented safety analysis

- Criticality Safety Control Selection Panel
- Specific Administrative Controls Panel
- Safety analyst training
- The 19th annual Safety Analysis Workshop was held in Las Vegas, Nevada on May 8-14, 2009. The workshop provided training, technical presentations, and panel discussions to the 150+ participants from across the DOE complex. The workshop is unique in that it is the only national forum of its type, bringing together many significant policy makers, line managers, analysts, trainers, reviewers and approvers of DOE safety basis-related activities, applications, and documentation. Over 100 people attended training in the following areas:
 - Analytical modeling techniques overview
 - Hazard evaluation techniques II
 - Control selection for technical safety requirements
 - Specific administrative controls
 - Risk analysis fundamentals
 - Radiological Safety Analysis Computer program version 7.0 (RSAC 7) for modeling dose consequences of a release of radionuclides to the atmosphere
 - Integration of safety with design
 - Unreviewed safety question (USQ) refresher course

Details about these training courses as well as the technical sessions, panel discussions, and invited speakers at the workshop are located at <http://www.nstec.com/efcog/>.

- A new Criticality Safety Subgroup was established to advance integration of activities undertaken by DOE-Headquarters, DOE field elements, DOE contractors, and the American Nuclear Society (ANS). The Subgroup's primary areas of focus in 2009-2010 are 1) the integration of criticality safety and safety basis practices as provided by ANS Standards, DOE Orders, and DOE Standards, 2) determining the role of criticality safety in hazard categorization of DOE nuclear facilities, 3) recommending revision of DOE-STD-3007, "Guidelines for Preparing Criticality Safety Evaluations at Department of Energy NonReactor Nuclear Facilities", and 4) participating with the DOE Office of Environmental Management at the Nuclear Criticality Safety Improvement Workshop.
- The SAWG training of DOE-STD-1189, "Integration of Safety into the Design Process", was converted into a version appropriate for DOE to pilot for a project in the field. The SAWG also supported delivery of that pilot training at Los Alamos National Laboratory.
- Supported key DOE Initiatives in the areas of specific administrative controls (closeout of a DNFSB item), independent validation reviews (development of new DOE guidance), and update of DOE Guide 424.1-1A (to be released in 2010).
- Established liaison with the DOE Safety Basis Academy at Los Alamos National Laboratory and the DOE National Training Center in Albuquerque, New Mexico, to coordinate delivery of safety analyst training, maintain a course schedule on the EFCOG webpage, and provide classes at the Safety Analysis Workshop.
- Initiated participation with the DOE Nuclear Safety Research and Development Coordinating Group and hosted a panel discussion at the 2009 Safety Analysis workshop to identify potential areas of research and provide status of these activities since this effort was last undertaken in 2005.

- Initiated review and feedback on DNFSB Recommendation 2009-1, “Risk Assessment Methodologies at Defense Nuclear Facilities”.
- Established an interest group in the area of hydrogen safety to develop a common approach to address hazards associated with hydrogen generation in radioactive waste process streams, and related flammable gas issues. A group charter was developed and an initial set of conference calls among interested individuals have been initiated to coordinate the activities of the group.
- Participating in the DOE Safety Software Expert Working Group “Toolbox Code” validation and verification update.
- Developed a white paper in the area of “Evaluation of the Safety of the Situation” in support of the update of DOE Guide 424.1-1A.

PLANNING FOR THE NEXT YEAR

The SAWG including its Subgroups will hold periodic teleconferences (normally monthly) to coordinate work, track actions, and discuss emergent issues and concerns. Face-to-face meetings are held at least twice per year and of each Subgroup at least once per year. Planning for FY 2010 includes the following activities:

- Expand upon a pilot project undertaken by management of the Y-12 National Security Complex at Oak Ridge, Tennessee for the development and implementation of the “Expert-Based” USQ process. This pilot has demonstrated significant cost savings in the performance of the USQ process without compromising effectiveness.
- Continuing DOE-STD-1189 implementation activities, including:
 - Revise SAWG training based on DOE pilot course and deliver to project managers, design engineers, and safety analysts at a variety of venues, including the 2010 Safety Analysis Workshop, and at contractor locations (e.g., the Waste Isolation Pilot Plant in Carlsbad, New Mexico)
 - Support revision of DOE Directives and Technical Standards to incorporate DOE-STD-1189 principles, including
 - DOE-STD-3009, “Preparation Guide for U.S. Department of Energy NonReactor Nuclear Facility Safety Analyses”
 - DOE G 420.1-1, “NonReactor Nuclear Safety Design Criteria and Explosives Safety Criteria Guide” for use with DOE O 420.1 “Facility Safety”
 - DOE G 420.1-2, “Guide for the Mitigation of Natural Phenomena Hazards for DOE Nuclear Facilities and NonNuclear Facilities”
- Hold the 2010 Safety Basis Workshop in Albuquerque, NM. Areas of focus will include the USQ process improvements, nuclear criticality safety deliverables, hazard categorization process, and hydrogen safety. Deliverables from the workshop will be tracked by the SAWG or assigned to a subgroup.
- Hold the 20th annual Safety Analysis Workshop in Knoxville, Tennessee on April 24-29, 2010. The theme for the workshop is “Streamlining for Safety and Risk Performance.”
- Support implementation of DNFSB Recommendation 2009-1 and provide review and feedback on potential applications
- Interface with the DOE Nuclear Safety Research and Development Coordinating Group to continue initiative to identify and prioritize areas of nuclear safety research and development

activities

- Complete work on the DOE Safety Software Expert Working Group “Toolbox Code” validation and verification effort
- Work with DOE to develop revisions of the following four cost-saving initiatives throughout the DOE complex:
 - DOE Guide 424.1-1A related to USQs (supporting innovations such as the Y-12 National Security Complex pilot study improvements to the USQ process)
 - DOE-STD-3007, to integrate common safety basis and criticality safety practices
 - 10 CFR 830, Section 830.203, “Unreviewed Safety Question Process “(long-term strategy to reform the USQ process at the source)
 - DOE Standard on hazard categorization (long-term strategy to reform the hazard categorization process at the source)
- Continue support for development of a Technical Standard on Design of Safety Class and Safety Significant Instrumented Systems
- Continue to work with the EFCOG Engineering Practices Working Group in supporting the revision of DOE-STD-3024, “Technical Standard for Content of System Design Descriptions”
- Develop one or more EFCOG best practices based on the above planned activities

EFFECTIVENESS EVALUATION

The SAWG continues to be a very effective Working Group as evidenced throughout FY 2009 by its widespread base of participation at its events, training, and technical sessions. It has materially contributed to the development of the DOE-STD-1189 training, the DOE USQ Guide (DOE 424.1-1A), and formal DOE guidance on the independent validation review process. It continues to provide direct contributions to members in the form of addressing emergent issues and concerns, and is an ongoing resource to DOE and NNSA in the area of nuclear safety and safety analysis applications.

LESSONS LEARNED

In response to identified additional needs of SAWG members, EFCOG member companies, and workshop participants, the SAWG has augmented its focus over the past several years toward training of safety analysts, engineers, managers, and subject matter experts. As more “stove-piped” processes become integrated in support of more efficient delivery of programs and requirements, more staff whose primary expertise lies outside the traditional realm of safety analysis requires continuing training and professional exposure to contemporary hazard and accident analysis expectations.

RECOMMENDATIONS

Based on the ongoing value of the SAWG to the DOE community, the Working Group should continue, along with its current suite of subgroups and other groups. Further, the SAWG recommends the following initiatives remain priorities:

- A prime area of innovation with the potential to provide substantial, tangible improvement to DOE operations is the “expert-based” USQ process - the SAWG will propose leveraging the experience at the Y-12 National Security Complex to other sites
- Continued focus on DOE-STD-1189 implementation activities