SAFETY ANALYSIS WORKING GROUP (SAWG)
ANNUAL REPORT TO THE DIRECTORS
(FY 2007)

Introduction

The purpose of the Energy Facility Contractors Group (EFCOG) Safety Analysis Working Group (SAWG) is to promote excellence in safety analysis applications and programs throughout the Department of Energy (DOE) community. The SAWG provides a forum for accomplishing its purpose through its Steering Committee (SC), Subgroups (SGs), meetings, teleconferences, workshops, and training. The SAWG is actively involved and integrated with facility and DOE customers to accomplish the following:

- Establish initiatives and priorities.
- Facilitate initiatives through subgroups and task teams.
- Investigate safety analysis strategies, leverage experiences, and share lessons learned.
- Maintain safety analysis networking and interfaces using current technology.
- Provide a forum to effectively accomplish activities and conduct business.
- Train safety analysts, engineers, and managers.

The SAWG adheres to the following principles:

- Operate within the framework of the EFCOG charter.
- Ensure that planning and actions promote EFCOG objectives.
- Follow applicable DOE and contractor requirements.

Membership

The membership of the SAWG SC and its three current SGs includes representatives from EFCOG member companies representing most DOE Sites, national laboratories, and contractors that support their work. Currently there are 24 members on the SC, representing contractors at over 15 DOE sites (see attached roster). In addition, effective communication with DOE Headquarters (HQ) personnel is facilitated through their active participation on the SC, SGs, workshops and training functions. Relationships have also been developed with Environmental Protection Agency (EPA) and Nuclear Regulatory Commission (NRC) staff and with American Nuclear Society (ANS) organizations. During the year, over 200 people participated in SAWG activities. Each EFCOG member company is encouraged to provide a representative to the SC. All safety basis professionals are welcome to attend SAWG workshops and training and participate in SG initiatives.

The working group is chaired by Andrew Vincent of Washington Savannah River Company (WSRC) with Brad Evans of PNNL as vice-chair, Richard Englehart of DOE-

Health, Safety and Security (HSS) as the DOE Sponsor, and Pamela Horning of BWX Technologies (BWXT) as the EFCOG Sponsoring Director. Nominations for chair and vice-chair of the SC are accepted from SC members and elections are held annually on a CY basis.

Leadership of SAWG Steering Committee and Subgroups for FY 2007

Steering Committee Chairman	Andrew Vincent, WSRC
Steering Committee Vice Chairman	Brad Evans, PNNL
DOE Sponsor	Dick Englehart, DOE-HSS
Accident Analysis Subgroup Chair	Mukesh Gupta, WSMS
Safety Basis Subgroup Chair	Rob McKeehan, ORNL
USQ Subgroup Chair	Mark Mitchell, LLNL
Training Liason	Dave Satterwhite, LANL

Objectives and Achievements

The SAWG conducts business through its SC and SGs. The SC coordinates the SG actions, recommends changes, and establishes priorities. The SC also undertakes short-term activities through informal task teams or as a collective effort. The SAWG SC added several new members during FY 2007.

Steering Committee

Annual Workshop

- One of the most significant SAWG activities each year is hosting the annual Safety Analysis Workshop. The workshop provides training, technical presentations, and panel discussions as it encourages interaction among the entire DOE community. 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. The 17th Annual Safety Analysis Workshop was held in Idaho Falls, ID, May 18-24, 2007… and was sponsored by Idaho National Laboratory (INL). There were approximately 180 participants from the DOE, contractors, and the Defense Nuclear Facilities Safety Board (DNFSB) who attended this workshop. The theme “”Excellence in Operations Through Safety Analysis,” continued the long-standing success the workshop has maintained by providing high quality training, outstanding exchange of information, and a venue for DOE and contractors to discuss safety basis compliance issues.

- Ten different training courses were provided and over 150 DOE and DOE contractors attended one or more of these courses. The courses consisted of:

- Criticality Accidents and Lessons Learned
- Risk Analysis Fundamentals
- Introduction to Plutonium Metallurgy
- Control Selection Process
- Technical Safety Requirements (TSR)
- Unreviewed Safety Question (USQ) Refresher
- Leak Path Factor
- Safety Design Integration
- Fire Severity and Source Term Analysis
- Chemical Dispersion and Consequence Assessment

Two hands-on computer code courses were also offered in CFAST and MACCS2. American Board of Industrial Hygiene (ABIH) awarded Industrial Hygiene (IH) certification maintenance points for each course. These courses were offered to participants at no additional cost.

Dr. David Hill, Deputy Laboratory Director for Science and Technology at INL provided a keynote address on "The Nuclear Renaissance. The World is Moving Forward."

William Wark, U. S. Chemical Safety and Hazard Investigation Board, provided a luncheon presentation on the Board activities, recent accidents, lessons learned from investigations and Process Safety Management.

DOE-STD-1189, Integration of Safety into the Design Process

In FY-2007, the SAWG, with representatives of the EPWG, led the effort with DOE to complete the initial draft of DOE-STD-1189. In addition to the series of team meetings in FY-2006 at DOE-Nevada, Atlanta, Germantown, Denver, and Albuquerque, a final team meeting was held during December of 2006 in Salt Lake City. The team then supported the DOE edit prior to release for complex-wide review via DOE RevCom, and subsequent comment disposition. A final series of meetings to resolve outstanding DOE issues are scheduled for December 2007 in Denver and January 2008 at Oak Ridge. Release of the Standard is planned to follow these meetings by 2-6 months.

Additionally, details pertaining to implementation of DOE-STD-1189 were discussed during SC, USQ and Safety Basis Subgroup teleconferences and meetings to share developments and lessons learned across the DOE Complex.

DOE STD-1027 Supplemental Guidance, and Revision Input

The EFCOG SAWG provided primary support for a DOE HQ, HS-22, Office of Nuclear Safety and Environmental Assistance led working group for developing a Supplemental Guidance for DOE Standard 1027, "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports".

Ten members of the SAWG provided the essential technical and implementation bases for both the Supplemental Guidance (issued in May 2007), and potential revision to STD-1027 (currently under consideration). The SAWG and DOE HQ, HS-22 integrated several working group meetings, SAWG workshops, and subgroup efforts to provide the SG and preparation for revision of the STD.

Safety Basis Supplement Paper

The SAWG drafted a white paper on the use of Safety Basis Supplements and presented it for comment at the Idaho Falls, ID, Safety Analysis Workshop and Albuquerque, NM, Safety Basis Workshop.

Fire Analysis Paper

A paper on fire analysis development for FHA and DSA's was drafted, as a joint effort of the SAWG, the Engineering Practices Working Group, and DOE. The genesis of the paper was concerns over potential issues in the integration of FHA's and DSA's, and also with base fire analysis assumptions leading to DSA decisions. The paper is to be issued early CY 2008, and the SAWG will work with DOE toward integration of the paper into the directive system.

Subgroup/Task Group Objectives and Achievements

Accident Analysis Subgroup

The overall objective of the Accident Analysis (AA) subgroup is to improve nuclear safety, manage operational risk, and achieve a better and more consistent understanding of the residual risk of nuclear operations through consistent implementation of accident analysis. These objectives are pursued in a prioritized, cost/effective manner.

- The AA SG supported the development of draft DOE-STD-1189 relative to the role of the accident analysis.

- Members of the AA SG provided Software Quality Assurance (SQA) support to DOE HQ in including IMBA (Integrated Modules for Bioassay Analysis) code to DOE Toolbox code. IMBA Gap Analysis and Code Guidance Report were completed. Also, support is provided in completing the HOTSPOT Gap Analysis and Code Guidance Report. The expected completion date is December 2007.

- Members of the AA SG continue to provide support to DOE safety research topics.

- AA SG members completed a V&V of the new version of MELCOR code (1.8.6) and presented a paper at the 2007 EFCOG/SAWG Annual meeting in Idaho Falls.

- AA SG members supported the Supplemental Guidance for STD-1027, Hazard Categorization & Accident Analysis Techniques for Compliance with DOE O 5480.23.

- AA SG members are supporting the development of guidance on Integration of FHA and DSA.

- AA SG did not complete the use of computer codes to support evaluation of control effectiveness due to lack of interest and support.

Safety Basis Subgroup

- The Safety Basis (SB) SG hosted the 2007 Safety Basis Workshop at the Kirkland Air Force Base in Albuquerque, NM on January 23 and 24, 2007. Over 100 participants from DOE and contracting organizations were in attendance. The session topics were: issues and potential changes to DOE STD-1027-92 for facility hazard categorization; safety basis training information; scope and applications of Vital Safety Systems; the threshold for Potential Inadequacies in the Safety Analysis; development of new DOE STD-1189 for safety and design integration; new DOE STD-3007 for preparing Criticality Safety Evaluations; status and information on safety and security integration; quality and maintenance of safety basis assumptions, and ensuring active confinement ventilation. The Workshop served to further the attendees' knowledge on these topics and to stimulate further progress in several of these areas, particularly on developments in safety and design integration and potential improvements in facility hazard categorization.

- The SB SG held a meeting on May 21, 2007 at Idaho Falls immediately prior to the SAWG Safety Analysis Workshop. At the SG meeting, there was discussion on the Defense Nuclear Facility Safety Board concerns with existing application of Justifications for Continued Operation, means of making modifications to the existing safety basis, application of Specific Administrative Controls, and the safety basis development, review, and approval process. One outgrowth of this meeting was the initiative by the SG to develop a white paper on the topic of the nature and content of a safety basis change for a planned interim modification.

- The SB SG members participated in regular monthly telephone conferences to discuss new and pending developments of significance to the SB process and to offer lessons learned. Our DOE sponsor was a regular participant and was helpful in offering insights for application to SB issues.

- Because of the interest and number of issues associated with the USQ process this year, a USQ SubGroup was charted to facilitate addressing those issues. This Group is being chaired by Mark Mitchell, Lawrence Livermore National Laboratory (LLNL),.

USQ Subgroup

- The USQ Subgroup was charted this year in response to the positive response to the USQ Interest Group initiated last year The USQ Working Subgroup is a working committee whose intent is to facilitate the objectives of the EFCOG as related to the particular area of the USQ process, including PISA, JCOs, Evaluation of the Safety of the Situation (ESS), and safety basis amendments. The purpose of the USQ Working Subgroup is for members to promote excellence in Department of Energy (DOE) USQ programs by sharing information and lessons learned, and by facilitating the application of information and techniques to the degree appropriate for their contract/facility.
- The USQ Subgroup conducted monthly teleconferences as well as a working session at the Safety Analysis Workshop and panel discussions at the Safety Analysis Workshop and the Safety Basis Workshop. The USQ Subgroup also worked with the Safety Basis Subgroup on the VSS panel discussion.
- The USQ Subgroup promoted, coordinated, and facilitated the active exchange of successful USQ best practices, procedures, lessons learned, and other pertinent information of common interest through the monthly USQ teleconferences, which included:
  - Applicability of the USQ Process
  - USQ Process Entry Conditions,
  - Categorical Exclusions,
  - USQ Screens,
  - USQ Determinations (USQDs),
  - USQ Review/Assessment processes utilized by DOE contractors,
  - Interface between the USQ process and institutional procedures,
  - Interface between the USQ process and site-wide DSAs (aka Generic DSAs),
  - Interface between the USQ process and DOE contract transition (aka blue sheeting)
  - Interface between the USQ process and Occurrence Reporting,
  - PISA, Evaluation of the Safety of the Situation (ESS), and Justification for Continued Operation,
  - Initiation of Safety Basis Amendments,
  - Training
  - USQ reviews for quality assurance,
  - Lessons learned from site-specific USQ procedure development and implementation, and
  - Other USQ related lessons learned.
- In response to a DOE contractor request, the USQ Subgroup conducted a survey to better understand the statistics, workload, and staffing requirements of the USQ process across the DOE Complex. This effort was to determine if there is a norm with respect to number of staff, number of USQ documents (Categorical Exclusions, Screens, and USQDs) prepared in a year, as well as ratio of Categorical Exclusions/Screens/USQDs. The result of the survey was that USQ statistics can not be quantitatively compared across facilities due to a number of

variables. Instead, the survey determined that facilities with similar types of operations and stages of life cycle must be compared. The number of USQ documents prepared by a Hazard Category 2 (HC-2) facility with research activities or changing mission or during start up can not be compared to a HC-3 waste facility in the middle of the operating life cycle; instead such facilities must be compared with comparable facilities in the same stage of operations. The DOE USQ Guide (DOE G 424.1-1A) requirement for new procedures to receive a USQD alters the ratio of Categorical Exclusions and Screens to USQDs for facilities during start up. Categorical Exclusions and Screens are very important to properly utilize limited tax payer/DOE resources and to focus limited DOE resources on evaluating the appropriate changes undergoing the USQ process.

- The SB SG held a panel discussion at the spring 2007 Safety Analysis Workshop on Vital Safety Systems (VSS) in relation to the safety basis, including USQ process.

Training - 2007

While the Training Subgroup was stood down, the SAWG is maintaining a liason relationship to the Safety Basis Acadamy (SBA), due to its direct relevance to the interests and purposes of the SAWG. A summary of the SBA activities follows.

From March through August 2007, the Safety Basis Academy Project delivered nine (9) pilot courses:

Safety Basis Overview
Safety Basis Document Preparation – Advanced
Technical Safety Requirements Developer
Hazard Evaluation Techniques I & II
Modeling Code (DOE Toolbox) courses: MACCS2, CFAST, ALOHA, EPIcode

After piloting each course, vetting and comment resolution took place before each course was finalized. At the end of 2007, seven of these courses (all expect Hazard Evaluation Techniques I & II) were handed over to the DOE National Training Center for future distribution and maintenance.

During 2007, the Safety Basis Academy pilot courses were held in several locations: Los Alamos and Sandia National Laboratories, DOE National Training Center (Albuquerque), and DOE Las Vegas Site Office. There were 182 total participants in the nine pilot courses with an average of 20 per class and approximately a 50/50 split between DOE/NNSA and contractors as participants. DOE/NNSA Site Offices that had participants in the course pilots include the following: Los Alamos, Sandia, Pantex, Oak Ridge, Chicago, and Nevada along with several programmatic offices including Chief of Defense Nuclear Safety and the CDNS – Authorization Basis Senior Advisor. Contractor site participation included LANL, SNL, LLNL, Y-12, SRS, BNL, RL, ANL, INEL, ORNL, NTS, and WIPP.

The Safety Basis Academy has set the stage to continue development and implementation of a comprehensive Safety Analyst Training Program.

Planning for the Year Ahead

Steering Committee

- PNNL and Flour Hanford will host the 18th Annual Safety Analysis Workshop in Hanford, WA, May 3 - 8, 2008. Training, subgroup meetings, technical paper presentations, panel discussions, and invited speakers will be featured.

Subgroup/Task Group Planning for the Year Ahead

Accident Analysis Subgroup

- The SG will continue to coordinate with DOE on Software Quality Assurance (QA) improvements per DNFSB Recommendation 2002-1 and DOE Toolbox codes.

- The SG will continue to recommend and review DOE safety research topics.

- The SG will continue to work in developing the Integration of FHA and DSA.

- The SG will support the issuance/development of Accident Analysis Guidebook initiated by DOE HQ.

- The SG will develop Guidance on explosion analysis methodology if members have interest and provide support.

Safety Basis Subgroup

- Sandia National Laboratories hosted the a Safety Basis Workshop in Albuquerque, NM, on November 6 and 7, 2007. This SB Workshop was moved forward by the SC from those previously held in the winter timeframe in order to have a better time interval before the May 2008 Safety Analysis Workshop. The sessions included:
    - Safety basis change mechanism for planned temporary modifications
    - Application of the transuranic waste standard DOE STD-5506
    - STD-1189 implementation
    - Progress on the DOE 413.3 Guides
    - DOE STD-1027 Supplemental Guidance implementation
    - DOE STD-3007 implementation
    - Justification for Continued Operation actions

  The SG is evaluating these topics for further action of value.

- The SG will continue to hold monthly teleconferences to track progress, maintain awareness of DOE initiatives, and identify emerging issues.

USQ Subgroup

- At the request of HS-21 and the DOE contractor community, the USQ Subgroup will develop a white paper on Evaluation of the Safety of the Situation (ESS).
- The USQ Subgroup will continue to conduct monthly USQ teleconferences on the aforementioned areas of interest to the DOE complex.
- The USQ Subgroup will continue to work closely with other EFCOG organizations, such as the Safety Basis Subgroup.
- The USQ Subgroup will hold a working session and panel discussion at the 2008 Safety Analysis Workshop.

Training Liason

The Safety Basis Academy Project has fourteen (14) courses to be piloted. Based on the current funding allocation For FY2008, seven (7) of these are scheduled for piloting. This leaves an additional seven (7) courses that remain to be funded and scheduled for future delivery.

The DOE National Training Center will become the distribution center for the DOE complex for Safety Basis Academy courses.

Phase 2 of the Academy development, dealing with line manager training, has been completed through the design and competency development. Progress has been halted due to funding issues

Lessons Learned

- The SAWG and its supporting member companies should continue to consider increasing the priority of safety basis training.

- The SAWG needs to intentionally enlist, train, and mentor younger participants in WG activities.

- SAWG has benefited by working with other EFCOG working groups on several efforts this year. The integration of input from several technical disciplines from the various working groups has improved the quality and usefulness of the final products. In addition, the sharing of information among the working groups has promoted a better understanding for all members of the magnitude of issues confronting DOE contractors and has established new working relationships among EFCOG members.

Effectiveness Evaluation

The SAWG continues to be a very effective working group as evidenced by its widespread base of participation and its direct contributions in support of new DOE standards and guides on integration of safety into the design process, unreviewed safety questions, and safety and security integration during FY 2007.

Recommendations

The Safety Analysis Working Group should continue along with the Accident Analysis, Safety Basis, and the USQ Subgroup.

EFCOG SAWG
STEERING COMMITTEE & SUBGROUP CHAIRS

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