

# WORKING GROUP ANNUAL REPORT OUTLINE

## ENGINEERING PRACTICES WORKING GROUP 2008 ANNUAL REPORT TO THE DIRECTORS

By Ken Keith, B&W Y-12, Chair

### Introduction

Formed in mid-2003, the Engineering Practices Working Group (EPWOG) completed its fifth full year of enhancing engineering effectiveness in the DOE complex. EPWOG gained interest and energy quickly, and has had a positive impact during its first four years. During this time, the Working Group has grown and matured in both primary and subgroup membership, achieved recognition in efforts from both the Department and the Defense Nuclear Facilities Safety Board (DNFSB). Notable successes have been the EFCOG paper *Design Adequacy of Safety Systems*, development of DNFSB 2004-2 Confinement Ventilation Evaluation Guidelines and implementation strategies, approaches to integration of safety into the design process for DOE-STD-1189, and implementation activities associated with 10CFR851, Worker Health and Safety.

The purpose of the Engineering Practices Working Group is to promote engineering excellence in the execution of Department of Energy (DOE) missions by sharing best industrial practices, applying lessons learned and providing integrated recommendations to Department of Energy officials.

EPWOG facilitates the objectives of the Energy Facility Contractors Group (EFCOG) as it relates to Engineering Practices. EPWOG serves as the initiator and sponsor of various Subgroups and Task Groups that are formed from time to time for the purpose of addressing specialized subjects.

The Group's scope includes the areas of engineering practice that are associated with DOE facilities, programs, and capital acquisitions. This includes the application of engineering practices throughout the lifecycle of DOE facilities, including initial design and construction, commissioning, operation and maintenance, decommissioning, and closure. Engineering practice is the application of engineering disciplines and processes as governed by national codes and standards, recognized quality standards, and DOE orders and regulations.

### Membership

There are total of approximately 170 members in EPWOG, including 84 members of the Working Group, and an additional 113 members in the six Subgroups and Task Teams. Some EPWOG members also participate in one or more of the Subgroups. Several new members were added to the Group during this past year. Al Konetzni of WVES replaced Thomas Stevens of AREVA as the Working Group Sponsoring Director. Eleven separate DOE sponsors support the Working Group and Subgroups, and 44 companies are represented. Elections for officers are held each year.

### Leadership

**Working Group Officers:**

- Chair Ken Keith, BWXT Y-12
- Vice-Chair Charles Kronvall, Fluor Hanford
- Secretary Tobin Oruch, Los Alamos National Laboratory (LANS)

**Fire Protection Subgroup:**

- Chair Perry D'AntonioSandia, Sandia National Laboratory

**Configuration Management Subgroup:**

- Chair Cherri Defigh-Price, Parsons

**Engineering Standards Subgroup:**

- Chair Stan Palmer, Idaho Cleanup Project

**Pressure Safety Task Team:**

- Chair Tom Etheridge, Oak Ridge National Laboratory

**Value Management Subgroup:**

- Chair Richard Harrington, Washington Closure Hanford

**Testing and Commissioning Subgroup:**

- Chair Doug Messerli, BYW Y-12

**Non-Nuclear Focus Lead:**

- Tom Etheridge, Oak Ridge National Laboratory

**DOE Sponsors:**

- Suneel Kapur, DOE
- James McConnell, NNSA Office of Safety
- Chip Lagdon, DOE CNS
- Jay McDonald, NNSA (retired)
- James O'Brien, DOE HSS
- Mary Haughey, DOE HSS (CM Subgroup)
- Jim Bisker, DOE HSS (FP Subgroup)
- Dan Melamed, DOE (VM Subgroup)
- Kenneth Elder, DOE (VM Subgroup)
- Gerald Meyers, DOE (Pressure Safety Task Team)
- Earl Hughes, DOE (Testing Subgroup)

**EFCOG Sponsoring Director:**

- Al Konetzni, WVES

**Objectives and Achievements**

In the 2007-2008 reporting period, EPWOG continued to build on its successes and recognition as a group of substance with further requests from DOE/NNSA and EFCOG for support on several important initiatives. These included:

- Continued support in the development of DOE-STD-1189, *Integration of Safety into the Design Process*
- Review of Guides to replace DOE Manual 413.3
- Review of Fire Hazards Analysis and Documented Safety Analysis integration guide, and
- Support in development of a new safety instrumented system standard.

These initiatives were performed in close cooperation with other EFCOG groups, especially the Safety Analysis, Project Management, and Integrated Safety Management Working Groups. A new sub-group was formed and chartered to share lessons and experiences in the area of Testing and Commissioning.

The breadth and significance of the topics being addressed by Engineering Practices demonstrates that the group is making positive contributions through helping the DOE to establish complex-wide programs and practices, enhancing engineering effectiveness via subcommittee and task activities, and sharing of lessons learned and best practices between Member Companies.

EPWOG accomplishes most of its work through task teams that are formed to address specific focus areas that are routinely evaluated by the membership. Task teams are formed and led by volunteers from the membership. They meet separately and report back to the membership through quarterly meetings. In addition, topical areas are selected for breakout sessions to take advantage of the face-to-face meetings for more interactive working level sessions versus only presentation formats during the meeting. EPWOG meets four times per year, twice via nationwide teleconference, and twice in-person. At the meetings, task teams report on progress, new focus areas are discussed, new task teams are formed and pertinent lessons are shared.

#### **Four EPWOG meetings were held in 2008:**

- January 23: Nationwide Teleconference
- May 6-7: General Meeting at Hanford, Richland, Washington
- August 6: Nationwide Teleconference
- October 28-29: General Meeting at Savannah River Parsons Offices, Aiken, South Carolina

#### **Accomplishments in the EPWOG focus areas were:**

- **DOE-STD-1189, *Integration of Safety Into the Design Process*** – EPWOG continued to play significant role in support of the Department's important efforts to address Congressional and DNFSB concerns with major projects. The Standard's intent is to provide guidance and clarify expectations on the

integration of safety with the design process while describing the roles associated with this evolution. Most importantly, the Standard sets the expectations to establish key safety decisions early in the project evaluation process to avoid some of the well publicized DOE project failures of the past few years. In addition, guidance on documenting these decisions and obtaining concurrence with key stakeholders is provided through the Safety Design Strategy. With EPWOG directly supporting the writing team (primarily efforts of Richard Salizzoni (SRS) and Ken Keith (Y-12)), the Standard was issued in March 2008.

Following the release of the Standard, EPWOG, in conjunction with the Safety Analysis Working Group's (SAWG) May meeting hosted a one-day 1189 Workshop. Approximately 200 were in attendance to hear implementation lessons from several sites targeting different aspects of the Standard including Safety Design Integration Teams and the new seismic requirements, among other topics. DOE Sponsor Dr. James O'Brien attended and served to kick off the workshop.

- **Pressure Safety Task Team** – Following successful 10 CFR 851 implementation, members requested additional experience sharing in the area of pressure safety. Specifically, the team aims to develop a standard understanding of the requirements of an effective pressure safety program as required by the Worker Safety and Health Program, 10 CFR 851 Appendix A Section 4.0. Working with the ISM Working Group, two meetings and several organizing phone calls were held during the initial year of team existence. 32 members have been identified, and a pressure vessel SharePoint Site has been established. This team is working to raise awareness of pressure safety program aspects and quickly accelerate sites with relatively new programs to experienced, well based programs.
- **Safety Class and Safety Significant Instrumented Systems Standard** – EPWOG has supported HSS in the development of a new standard to provide guidance on design of safety instrumented systems. The Standard is drawing from ANSI/ISA 84.00.01-2004, *Functional Safety: Safety Instrumented Systems for the Process Industry Sector*. A draft of the standard has been developed and discussion continues with the SAWG to achieve consensus on a graded application of requirements.
- **Evaluate alternatives to IEEE for SC/SS Power Design** – The EPWOG previously agreed to evaluate development of a DOE specific standard for safety electrical power in lieu of commercial nuclear power IEEE standards. Early efforts resulted in the development of a preliminary scope plan for the effort. The task group subsequently developed a draft formal task plan for the effort. Loss of all key lead personnel on this effort to new company assignments and retirement has stalled the effort. With new, large nuclear facility design efforts underway, the manager of NNSA's Office of Safety reissued the challenge to address this topic. As a result, this activity will be one of the focus areas for 2009. This effort is judged to provide significant benefit in a more tailored and consistent set of requirements for safety systems power for the DOE complex.

- **HSS Assessment Findings Evaluation for EPWOG Actions** – In 2007, EPWOG identified areas generic to the complex appropriate for action from a review of Health, Safety and Security’s recommendations and opportunities for improvement from:
  - Essential System Functionality, January 2006
  - Safety System Engineer and Oversight Programs, March 2006

Actions under taken by the group to develop/compile best practice improvement recommendations and their status include:

- Engineering Calculations (e.g. depth and rigor or documentation, input and assumption identification, input and assumption management) – a Best Practice has been developed (Ken Keith, Y-12) and accepted by the group. The BP is currently in the process of being posted on the EFCOG web site.
- System Performance monitoring and Trending Programs (e.g. expectations for system engineers to monitor assigned systems, attributes to be monitored, methods to document, confirmation that system performance meets safety basis expectations) – a draft Best Practice has been developed (Bill Heineken, Y-12) based on input from several of the sites with existing programs. The draft identifies expectations for cognizant system engineers in monitoring the health and aging of their system. The BP is under review and expected to be posted in the coming calendar year.
- Safety equipment list – the CMWG has taken on the task of developing guidance on expectations for a safety equipment list. A Best Practice paper has been developed and is under review. (Cherri Defigh-Price (Parsons))

In 2008, the Group revisited more recent Health, Safety and Security assessments. Additional common issues were noted across the complex in the areas of engineering design and authorization basis, and safety system oversight (relates directly to system engineering program). The group is currently organizing a concerted effort to share site lessons in response to the system engineering program issues. EPWOG is also coordinating with DOE’s Safety System Oversight representatives through Dr. Jim O’Brien to share plans and identify common areas of focus. EPWOG has been invited to follow-up a presentation by the EPWOG chair at last year’s SSO meeting with full representation at their planned spring meeting. This topic is relevant also to DNFSB staff visits to several sites over the past year.

- **Non-nuclear Focus Group** – As many sites have limited nuclear related activities, there is a need to focus a portion of the EPWOG activities on non-nuclear items . In 2006, the Group agreed to establish a lead for this focus area initially with the possible growth to have the EPWOG leadership structure

modified to include an overall chair, and separate vice chairs for Nuclear and Non-Nuclear Activities. Tom Etheridge of Oak Ridge National Laboratory has served as the lead of the non-nuclear focus area. As all sites involve non-nuclear related engineering activities, sharing of lessons and experience to drive cost efficiencies approaching commercial practice is a continual theme. EPWOG includes discussion of this area in meetings to foster sharing. Many sites have graded approach practices that may be beneficial for other sites to implement to improve their overall effectiveness in this topical area. In addition, spin-off activities have been initiated within the CM sub-group to explore, develop, and publish best practices for configuration management of non-nuclear SSCs in nuclear facilities.

### ***Sub-Group Activities***

- **Fire Protection Subgroup (Perry D'Antonio):** The Fire Protection Subgroup continues to provide a forum for members to ask questions and to disseminate information. In the last year, the group has shifted focus from 10CFR851 implementation to supporting the DOE's response to DNFSB Recommendation 2008-1, Safety Classification of Fire Protection Systems. Several members are directly supporting activities to develop positions responsive to the recommendation. Activities include design expectations (e.g., single failure, NFPA requirements), quality requirements, and classification of system components or supporting systems. These activities are teamed with the Safety Analysis Working Group.

Another focus of the Group has been the development of leading indicators. Leading indicators are an important component of the Department's Contractor Assurance System and a focus of the EFCOG Contractor Assurance Working Group. A broad set of indicators, led by Sandia, is being reviewed by the group for broader application.

To support the efforts of the Subgroup monthly conference calls and one meeting were held. The meeting was held in conjunction with the DOE Fire Protection Workshop (May 2008) to best use limited resources.

- **Configuration Management Subgroup (Cherri DeFigh-Price):** The EPWOG Configuration Management (CM) Subgroup continued revitalization efforts to address mainstream CM issues. The group held a meeting May 7, 2008 in conjunction with the EPWOG meeting in Richland, WA. In addition phone conferences were held during in January and October..

Current activities in the CM subgroup include the following three areas:

- Safety Equipment List (SEL) development, maintenance and control. The Subgroup has submitted a Best Practice to the EPWOG for approval.

- A need was identified for development of a recommended minimum set of documents needed for a Category II nuclear facility. Data collected from the sites was generally consistent. Agreement was reached that this was ready to develop into a draft white paper. We all agreed we should collect as much data from the A/E for new facilities as possible, but that much of that was for the record and did not require a formal update schedule.
- Software Configuration Management. This best practice (R Scott Spencer-CHPRC) provides a simplified method for qualifying and managing Commercial Off-the-Shelf (COTS) engineering design and analysis software applications to comply with DOE Software QA requirements. The BP is currently under review by EPWOG for approval.
- The subgroup completed a survey of software systems used at nine different DOE sites for configuration management. As part of this survey, the subgroup included points of contact for each area and software to facilitate sharing successes and information. Several members are upgrading or replacing their electronic systems and have found the information useful.
- Rosters for the subgroup as well as subject matter expert rosters for CM (total of 3 separate listings) were updated.

Other best practices are under consideration including definition of “as-built” drawings, change control during major project design, and configuration management during Deactivation and Decommissioning, among others.

**Engineering Standards Subgroup (Stan Palmer – Idaho Closure Project (ICP)):**

Engineering Standards was largely inactive in the past year. Based on the decreased focus and attention in this area, the Working Group agreed to eliminate this subgroup. If items arise in the future of a similar nature, focused groups will be organized to address specific items.

**Value Management Subgroup (Richard Harrington):** The DOE VMSG 2008 annual meeting was conducted on June 11, 2008, during the Society of American Value Engineers (SAVE) International Conference in Reno, Nevada, at the Silver Legacy Resort. The meeting was well attended with representatives from Hanford, Yucca Mountain, INL, the U.S. Department of State, and Army Corps of Engineers. Updates were given from each site on 2007 VM studies completed and current 2008 VM plans.

The DOE Annual 2007 Value Management/Value Engineering (VM/VE) Report has been formatted and is awaiting authorization from Brian Kong, DOE-HQ Office of Engineering and Construction Management (OECM). Excluding any objections from OECM, this report will be posted on the EPWOG Value Management Subgroup web page. The 2007 report identified 15 VM studies completed with a potential of nearly \$128M in cost savings/avoidance. OECM may use this report to fulfill the annual VE progress report as required by DOE Policy 413.2, OMB Circular A-131, and Public Law 104-106.

The EPWOG VM web page will be getting a significant update in November; including Richard's new contact information with the CH2M HILL Plateau Remediation Contract (CHPRC).

Currently, Richard is on assignment completing a series of VM/VE workshops for the DOE-HQ EM-21 with multi-site laboratory and engineering personnel involved with Tank Waste Retrieval and Closure Projects.

**Pressure Safety Task Team – (Tom Etheridge):** The Pressure Safety Team initiated in 2007 has quickly grown and attracted a diverse group of DOE sites, contractors, and others including Jefferson Labs and the Stanford Linear Accelerator. Two meetings were held during the year – one in Las Vegas in March, and a second in conjunction with the EPWOG fall meeting in Aiken, South Carolina. Both meetings were well attended ((~25 each meeting). The group has fostered significant sharing of programs, procedures, and practices. Several of the members are also members of ASME Boiler and Pressure Vessel code committees. These affiliations and stature of the group members provides real time resources for questions associated with ASME B&PV code interpretation.

The Chairman of the DOE-HQ Pressure Safety Committee has requested the Pressure Safety Task Team to become actively involved in recommending pressure safety policy and practices within DOE and to work closely with the DOE Pressure Safety Committee. Most DOE site representatives on the DOE Pressure Safety Committee are actively participating in the Pressure Safety Task Team including the DOE-HQ Chairman as the DOE representative.

Based on the group activities to date and membership, discussions are underway with the ASME High Pressure Systems Code committee for the group to support maintaining criteria for barrier design of pressure systems.

**Testing and Commissioning Subgroup – (Doug Messerli):** A new sub-group was proposed and organized in the last year. The Testing and Commissioning subgroup was established to promote excellence in Department of Energy (DOE) Testing and Commissioning programs through sharing information, resources, knowledge, talents, applying lessons learned, and providing integrated recommendations for improving performance to the Department. A charter for the new group has been developed and approved by the group and EPWOG. An initial organizing meeting will be held at Y-12 in December. Earl Hughes, HS-21, has agreed to sponsor the subgroup. The group presently has 14 members.

### **Planning for the Year Ahead**

EPWOG has the following initiatives in progress, and planned for 2009:

- Follow-up activities related the Health and Safety assessments discussed previously will be a key focus area for the group. Best practices in the areas noted will be compiled and disseminated to the member companies to enhance

performance in the areas noted. The actions and practices will be developed in concert with the HSS and Safety System Oversight to achieve common expectations for system engineering programs. This will continue the theme of teaming with the Department of Energy to improve engineering effectiveness in the complex. In addition, interaction with the Safety Analysis Working Group is expected where best practices may relate to safety basis management.

- Continue support to HSS for development of safety instrumented system Standard. It is anticipated that the draft standard will be released in REVCOM in the coming year.
- Re-organize effort to develop DOE standards in lieu of IEEE standards for electrical power safety systems.
- Support DOE in the implementation of DOE Standard 1189 in conjunction with the Safety Analysis and Project Management Working Groups. This will include developing best practices on application and supporting a revision of the System Design Description Standard to address use in the integration of safety and design during project implementation.
- Based on a request from Jim McConnell, NNSA Office of Safety, support NNSA and DOE on the development of a technical position to address actions appropriate for potential significant HEPA filter loadings under fire scenarios.
- The Fire Protection Subgroup plans for the upcoming year include:
  - Developing a consensus position proposal for applicability of DOE O420.1B to leased facilities;
  - benchmarking site Authority Having Jurisdiction (AHJ) programs, particularly looking at roles, responsibilities, authorities and accountabilities;
  - Benchmarking fire barrier penetration seal configuration management practices;
  - Benchmarking of site fire protection design criteria (international codes vs. NFPA);
  - Develop and post Fire Hazards Analysis Tool Box; and,
  - Develop updated fire protection system and equipment inspection, testing and maintenance recommended frequencies.

Configuration Management Subgroup intends to accomplish the following: Meetings and/or phone conferences are planned for early 92009. Focus will be to update/adjust goals from 2008. Goals previously established and plans for the upcoming year include:

- Develop and Issue CM Best Practices (ALL MEMBERS). Minimum of 2, aiming for 3-5. Specific assignments have been made for nine specific subjects, with drafts due by mid-January 2009 to support the next scheduled teleconference. These include:
  - “Maintaining CM in Work packages during D&D”

- Version and formal change control during Design
- Design Deliverables at 30-60-90-100% *[what elements or deliverables should be provided at each level. For example, P&IDs may need to be close to 100% final at 30%. When do the SDDs need to be generated and reviewed. When is the MEL needing to be final.]*
- FDDs and SDDs as design tools first, then deliverables
- “As Building”: definition (versus ‘as found’) – who is responsible, graded approach, confidence level
- Title III services by original AE
- Software CM
- Vendor Information (formats, control, cataloging)
- Major Modifications to operating facilities – special considerations

Value Management will continue to be promoted or demonstrated across the complex. During the coming year, it is planned to collect and summarize VM/VE efforts from 2008.

Pressure Safety Subgroup plans for 2009 are:

- to continue interaction and information sharing; organize support for criteria for barrier design of pressure systems.;
- Seek DOE-HSS resolution of ASME B&PV Code dates associated with 10 CFR 851

### **EPWOG Meetings planned for 2009**

- January 28, 2009 Nationwide Teleconference
- Week of April 21 2009 General Meeting in Washington, DC DC hosted by LANL
- May12-14, 2009, EPWOG will provide representation at the SSO National Meeting in Las Vegas.
- July 29, 2009 Nationwide Teleconference
- Week of October 21, 2009 General Meeting at TBD

### **EP Working Group Interactions with Other Working Groups**

The Engineering Practices Working Group recognizes a close relationship with activities in the Project Management, Infrastructure Management, Engineering Efficiency, Integrated Safety Management and its Quality Assurance subgroup, and the Safety Analysis Working Groups. EPWOG has invited the chairs or representatives of those groups to speak at or attend EPWOG meetings to improve communication and awareness and sent representatives to other working group meetings. For example, Frank Denny, Y-12, has been identified as the QA subgroup liason to EPWOG and attended the October general meeting. Conversely, Ken Keith attended the QA meeting in November. EPWOG also has participated in the prioritization of issues with EPWOG as well as coordinating activities. This practice will be continued and encouraged. As

previously noted, other noted examples of interactions between EPWOG and other working groups include:

- DOE Standard 1189 development and implementation (Project Management and SAWG)
- Safety instrumented systems design standard (SAWG)
- Alternatives to IEEE standards for safety related electrical designs (SAWG)
- Supplier evaluations and graded approach (QA)
- Pressure safety implementation (ISM)
- Subsurface investigations (related to excavations/penetrations) (ES&H),
- 10CFR851 codes/standards dating (ES&H)

### **Lessons Learned**

A positive aspect of the Working Group and its Subgroups this year has been the continuation of increased communication among members, as noted last year. Members of EPWOG are now routinely communicating, using the Working Group as a sounding forum, on issues that arise in their locations. In the Fire Protection Subgroup, communication within the DOE Fire Protection community has substantially increased, resulting to very positive response to the Subgroup and its activities. A challenging aspect of the Working Group and its Subgroups is the great diversity among the various members in how Engineering, Configuration Management, and Fire Protection activities are organized and executed at their sites. Working Groups need to keep this in mind, to ensure value is maintained for all its members. The Working Group website and in particular the very strong meeting minutes developed and distributed are a very positive communication tool used to distribute lessons learned and best practices at member facilities.

In addition, communication and teamwork with other working groups is improving. Several cross working group items of importance to the Department and contractors are currently working. These afford opportunities to coordinate positions and develop strong teams within EFCOG.

As in most volunteer groups, it is difficult at times to get full participation in the group. All members are engaged in significant roles in their companies and additional time to support working group activities can represent personal time commitment.

### **Effectiveness Evaluation**

The EPWOG has been effective during the past year most notably in supporting the DOE in several major initiatives for the complex. The EPWOG has been positively recognized by the DOE customers in these activities, demonstrating the benefit of the EFCOG and Working Group's close interaction with the DOE. DOE recognition is reflected in the request for group support on new initiatives. This interaction is

increasing performance and effectiveness across the complex. The tasks being worked on by the group are issues that are significant and the output of the Working Group is being used by member companies to enhance engineering effectiveness. Strong cross Working Group interaction was evidenced throughout the year on numerous initiatives previously discussed. The adjustment of the face to face meetings to include more interactive sessions versus presentations and the focus lead on nonnuclear activities are key examples of this. The year saw continued improvement in all subgroup interactions and activities. In summary, the EPWOG activities and contributions in 2008 covered a broad spectrum of activities and the results were positively recognized by the DOE. Members are enthusiastic with respect to the 2009 planned activities and significant contributions will be expected of EPWOG.

### **Recommendations**

It is recommended that the Engineering Practices Working Group and its five Subgroups continue their activities in support of DOE and the common interest of the contractor community in accordance with the 2009 plans. The Engineering Practices Working Group is available to help support other critical initiatives of the EFCOG Executive Directors and DOE that may be identified during the upcoming year. To accomplish all tasks noted, robust member company interaction and involvement on major activities and effective integration among various working groups will be required.