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REPORT ON THE PWR-RADIATION PROTECTION/ ALARA COMMITTEE

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ABSTRACT

In 1992, representatives from several utilities with operational Pressurized Water Reactors (PWR) formed the PWR-Radiation Protection/ALARA Committee. The mission of the Committee is to facilitate open communications between member utilities relative to radiation protection and ALARA issues such that cost effective dose reduction and radiation protection measures may be instituted. While industry deregulation appears inevitable and inter-utility competition is on the rise, Committee members are fully committed to sharing both positive and negative experiences for the benefit of the health and safety of the radiation worker. Committee meetings provide current operational experiences through members providing Plant status reports, and information relative to programmatic improvements through member presentations and topic specific workshops. The most recent Committee workshop was facilitated to provide members with defined experiences that provide cost effective ALARA performance.

INTRODUCTION

Although there are many forums for information exchange amid the nuclear utility industry, these forums typically take the form of written responses to specific questions, symposiums with a variety of topics on a defined subject or generic high level seminars. While all of these forums provide a specific benefit, none of them provided for a face-to-face verbal exchange dictated by the specific interests of the parties involved. The inception of such a forum was derived from a presentation by the U.S. Boiling Water Reactor (BWR) Owners' Group at the Radiation Exposure Management Seminar sponsored by Westinghouse in 1992. This presentation detailed the formation of a working group devoted to information exchange by utility representatives from BWRs on the subject of maintaining personnel exposure ALARA. Following this seminar, staff members of several utilities with operational PWRs gathered to form the PWR-Radiation Protection/ALARA Committee.

ADMINISTRATION OF THE PWR-RADIATION PROTECTION/ALARA COMMITTEE

Formation of the Committee

The need for a working group with the expressed mission of facilitating inter-utility information exchange relative to the promotion of maintaining the exposure of utility workers ALARA was validated by utility staff of PWR in the fall of 1922. Once the need was validated, an ad-hoc committee set out to identify the mission, principles, scope, and administration of the Committee.

The mission of the Committee was defined as:

"The PWR-Radiation Protection/ALARA Committee is committed to continual improvement in radiation protection standards and performance at our utilities".

The principles of the Committee were defined as:

a. The reduction of radiation dose to the workers of our plants, both utility employees and contractor personnel is a key measure of our success as a committee.

b. The free exchange of pertinent information, data, and lessons learned will be pursued in a constructive dialogue and atmosphere of mutual respect.

c. The Committee strives to provide a high quality product in the most cost-effective manner.

d. The Committee will develop and implement an integrated and consistent information exchange process by which issues are effectively identified, prioritized, analyzed, and communicated in a timely manner.

e. The Committee supports effective outage work planning, develops information exchange, and communicates lessons learned in support of short-term (outage-to-outage) dose reduction.

f. The Committee strives to identify, evaluate, and endorse recommendations for long-term source term reduction design change activities such as cobalt reduction, recognizing this as one of the most effective dose-management techniques.

g. The Committee continually evaluates industry products and services with exposure impacts and shares experiences: e.g., shutdown chemistry, operating chemistry, chemical decontamination, zinc injection, microfiltration, and mechanical decontamination of equipment to effectively manage our individual utility resources.

With the mission and principles identified, the Committee identified its scope as both, the maintenance of exposure ALARA and inherently sound radiation protection. The inclusion of the daily radiation protection aspect was identified to be necessary based on recognition that the most effective ALARA program available is predicated by thorough job planning.

To administer the Committee, an organization composed of chairperson, vice-chairperson and six steering committee members was set in-place. The chairperson would serve a one-year term. The vice-chairperson would serve a one-year term, become the chairperson-elect, and would serve as chairperson of the steering committee. The number of steering committee members were selected to allow a mix of plant and corporate staff to serve in setting direction for the Committee. All members of the administration would be elected by the full membership.

Beyond the direct benefit gained by the interaction from the activities of the Committee meetings, a deliverable product in the form of detailed meeting minutes would be provided. These minutes would be produced by the committee secretary. In order to reduce administrative burden on utility members, the committee secretary has been a staff member from one of the three primary PWR architect/engineering firms of Babcock and Wilcox, Westinghouse, and Combustion Engineering.

In recognition of the fact that plant programs are often influenced by outside agencies, Committee meeting attendance from utility and architect/engineering firm staff is often enhanced by representation from the U.S. Nuclear Regulatory Commission, the Institute of Nuclear Power Operations, and occasionally, the firm of the American Nuclear Insurers.

Committee Meeting Structure

As one of the primary functions of the Committee is the face-to-face sharing of positive and negative experiences, each member utility prepares a written Plant Status Report for each of its operating plants. Information presented on these reports includes:

a. Exposure summaries for power operational periods and outages, along with the respective goals and average daily exposure accrual.

b. Examples of significant contributors to personnel dose (including major outage experiences).

c. Regulatory concerns, including examples of recent violations, findings, open issues, or items identified by utility self-assessment.

d. Recent significant health physics experiences such as; unplanned exposures, near misses, and general lessons learned since the last meeting.

e. ALARA good practices in the areas of; source term reduction, shutdown chemistry practices, and specialized tooling.

As these reports are summarized for entire membership, other members have the opportunity to inquire further on unclear information or simply identify a specific contact for a future time.

Following the presentation of the Plant Status Reports, Committee members will either make formal presentations on defined high interest topics or workshops will be initiated. Specific topics will be covered in presentations by a minimum of two Committee members. This provides for a minimum of redundancy in presentation, yet often provides a totally different approach to solving a like issue. Topics covered by member presentation have included:

a. Source term reduction programs.

b. Exposure reduction programs.

c. Radiation Work Permit program.

d. Expert system technology application.

e. Radiation work practice compliance and enhancement.

f. Steam generator nozzle dam installation robotics.

g. Sub-system chemical decontaminations.

To date, only one workshop forum has been utilized for the Committee meeting. This forum proved to be successful with the general consensus indicating it to be a preferred format. The preference for this type of forum appears to stem from the fact that member participation is increased, and the deliverable product to the utility is more conducive to direct application. The topic for this workshop forum was Cost Effective Radiation Protection/ALARA Programs. Over the years, most utilities have instituted the large payback items such as:

a. Refueling machine overhauls and enhancements,

b. Steam generator inspection robotics and manway door shields,

c. Reactor cavity decontamination systems, and

d. Reactor head shielding.

Having completed these items, dose reductions must now be realized from programs and techniques that are less visible and take longer to provide payback. The intent of this workshop was to facilitate group interaction to highlight smaller scale, cost-effective techniques for dose reduction. From these efforts Committee members identified several categories, under which techniques would be listed and categorized as having high/low payoff, and if the technique was or would be "easy" or "hard" to implement. Tables 1 through 3 provide sample deliverables from this process. After completion of this data gathering session, techniques which were believed to have merit, were listed and attribute plans developed. These plans, samples of which are provided in Figure 1, incorporated the positive and negative experiences of the Committee, as members often times had undertaken similar techniques.

The workshop concluded with a discussion on current topics in radiation protection such as; implementation of the revised 10CFR20, ultra-filtration and hot spot flushing.

Future meetings of the Committee will occur semi-annually. The next meeting is scheduled to occur in conjunction with the BWR Owner Group meeting in Denver, Colorado, July 26-29. The success of this Committee depends on the participation and ownership of its members. Information is the key to success. Members are encouraged to share it and then implement what they have learned.

Author Biography

Daniel Malone is the Radiological Services Superintendent and Acting Radiological Service Department Manager for Consumers Power Company's, Palisades Nuclear Plant. Additionally, he is currently the Chairman of the PWR Radiation Protection/ALARA Commmittee. Prior to these positions, he served as the Palisades plant ALARA Supervisor and Health Physics Instrumentation Supervisor for several years. Beyond his radiation protection activities, he has served as Mechnanical Engineering Section Head, Project Manager for the Safety Related Piping Reverification Program and as the Senior Nuclear Licensing Analyst for the Plant. He has a B.Sc in Environmental Health, with a major in Health Physics from Purdue University.

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Table 1. **JOB PLANNING**

HIGH PAYOFF EASY TO IMPLEMENT	HIGH PAYOFF HARD TO IMPLEMENT
Ensure planning and revisions are done by people doing work (RP ALARA) QA oversight, engineers, contractors, etc. Develop job scope by instilling a questioning attitude, doing cost benefit analysis, considering ALARA goals. Include specific details in job plan (photos, walk-down information, special tools & tooling, probe pusher location, use of mockups, dose reduction evaluation, etc.). Assign responsibility for project work to a designated person to achieve more ownership, accountability. Designate a field coordinator for complex jobs/multi involvement jobs to ensure good handoffs, establishment of time line and working the plan. Minimize impact of radiological conditions and workability on other jobs by proper scheduling, and grouping jobs by location. Strive for off-the-shelf work packages. Ensure planning includes post-job critiques, peer experiences, historical data, past job experiences and assignments. Define the decision tree for contingencies and resolution of emergent issues to achieve consistent assessment and evaluate impact on ALARA goals.	
LOW PAYOFF EASY TO IMPLEMENT	**LOW PAYOFF HARD TO IMPLEMENT**

Table 2. HIGH TECH APPLICATIONS

HIGH PAYOFF EASY TO IMPLEMENT	HIGH PAYOFF HARD TO IMPLEMENT
Elmer's Glue/NODAC in H_20 for contamination control. ALARA scheduling program. Modular shielding program. H_20_2 shock of tanks for decontamination. Penetration Modifications for services (if spare exists). Electronic teledosimetry. Camera surveillance. Integration camera/teledosimetry/communication. Bar coding/scanning technology.	Chemical decontamination of systems. Broadband cable applications. Electronic dosimetry trending. ALARA electronic dosimetry. Surrogate tours. Digital Imaging. Robotics Seismic analysis. Computerized access/RWPs.
LOW PAYOFF EASY TO IMPLEMENT	**LOW PAYOFF HARD TO IMPLEMENT**
Motion detector. Electronic access to vendor dosimetry data.	Multi-media briefs/training. Transmitting CAMs.

Table 3. **PLANT MODIFICATIONS**

HIGH PAYOFF EASY TO IMPLEMENT	HIGH PAYOFF HARD TO IMPLEMENT
Permanent storage of scaffolding and/or shielding. Insulation modification to blanket. Permanent temporary shield supports. Incorporate RP costs in modifications project. Permanent tool room in containment. Fuel transfer system blind flange modification. Quick disconnect fitting in lieu of hard pipe fittings. Change from bolts to studs with SG manways. ALARA design reviews by design engineers.	RTD bypass elimination. Stellite reduction. Piping & test connect modifications in HRA. ie, test connect in lieu of blank flange for ILRT. Modifications for quick install/reserve of NIs access plates. Cavity seal (permanent). Permanent Rx head shield. Permanent platform modifications. Penetration modifications for servers access to containment.
LOW PAYOFF EASY TO IMPLEMENT	**LOW PAYOFF HARD TO IMPLEMENT**
Eliminate filters if possible.	Increase use of "live load" packed valves.

Item 1:

1. **Description of Recommended Practice:**

   Work Planning and Scheduling

2. **Program Category:**

   Do more with less

3. **Intended Goal and Benefit to Plant:**

   Goal: Reduce rework, optimize work schedule

   Benefit: Improved use of resources
   Better unit availability
   Improve moral of workers

4. **Recommended dos and don'ts for implementation:**

   Do: Accurately schedule time and utilization of manpower
   Develop integrated schedule
   Work system windows
   Open communications between all work groups
   Management commitment
   Control emergent work and update schedule

5. **Advice on presenting or selling the practice to management:**

   Reduced exposure/costs
   Outage criteria path control

6. **Contact person for information/support (and phone no.):**

   Ted Bast 805-545-4588
   Dave Ethridge 717-948-8011
   Pat Burke 203-447-1291

Figure 1. Attribute Plan

Item 2:

1. **Description of Recommended Practice:**

Enhance management oversight
-Plant walkdowns
-Coach workers

2. **Program Category:**

Do more with less

3. **Intended Goal and Benefit to Plant:**

Goal: Coaching for quality
Improve radiation worker practices

Benefit: Reduce exposure and cost
Improved productivity, ALARA awareness

4. **Recommended do's and don'ts for implementation:**

Do: Have written objectives
Lead by example and coach
Correct on spot and follow-up

Don't: Use as discipline unless repetitive problem

5. **Advice on presenting or selling the practice to management:**

Builds teamwork
INPO/NRC relations
Very low cost

6. **Contact person for information/support (and phone no.):**

Ted Bast 805-545-4588
Dave Ethridge 717-948-8011
Bruce Watson 410-586-2200

Figure 1. Attribute Plan

Item 3:

1. **Description of Recommended Practice:**

   Designate a field coordinator for complex jobs/multi involvement jobs to ensure good hand offs, establishment of time lines and working the plan.

2. **Program Category:**

   Job planning.

3. **Intended Goal and Benefit to Plant:**

   Reduce delays
   Increased efficiency
   Reduce outage length
   Resolve conflicts quickly

4. **Recommended do's and don'ts for implementation:**

   Don't assign to inexperienced person
   Do use experienced person
   Do clearly define responsibilities and authority

5. **Advice on presenting or selling the practice to management:**

   Save time, dose, money
   Provides continuity

6. **Contact person for information/support (and phone no.):**

   Chris Hubbard ANO 501-964-5070
   Gary Sturm, Palisades 616-764-8913

Figure 1. Attribute Plan