

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

**Radiation Protection EFCOG Meeting Minutes
October 18-19, 2011
Oak Ridge, TN**

Attendees:

Benda, Gary - Bartlett	Oliver, Bobby - B&W Y-12
Corredor, Carlos - DOE HQ	Owens, Phillip – SRS
Duffy, William – WRPS - Hanford	Oxley, Laura – B&W Y-12
Giltz, Ted - Hanford	Padezanin, Pat
Hayes, William – B&W Pantex	Quillin, Gordin - SRS/SRNS
Hoover, Paul S. - LANL	Raabe, Rebecca
Kestell, David - LBNL	Redding, Phil – 3M
Ledoux, Mark R. – Energy Solutions	Ryan, Dennis - BNL
Le, Quang - LBNL	Schofield, Wayne - Hanford, MSA
Matheny, Michael D - SR	Shingleton, Kathleen L. – LLNL
McBride, Douglas H. - NTS	Sitsler, Rob – PNNL
McLain, Ken - Hanford	Stroud, Robert – DOE/FR ETTP
Minnick, Sheri	Tunno, Greg - SRS/SRNS
Miltenberger, Bob - SNL	Torres, Marcia M - SLAC
Nesshoefer, Craig – ICP/INEL	Wilson, W. Scott – B&W Pantex
O’Connell, Peter - DOE-HQ	Zeman, Gary - ANL

In Attendance – 31 (29 in person and 2 by phone)

Absent - 33

Day 1 - Tuesday, October 18, 2011

7:30 – 8:00

Registration

8:00 – 8:30

Welcome, Introduction, Facilities, Safety and Approval of Minutes

Mark Ledoux, Energy Solutions

- Next meeting is **March 13-15, 2012 in the Forrestal Building (RP will meet March 14-15)**
- March 2011 Meeting minutes approved.
- Would like to review candidates for a new chairperson at the end of the meeting
- Prior meeting action items also need to be reviewed
- Dennis Ryan would like to address the group about the recent contamination incident at BNL

8:30 - 9:00

Industry Updates (NRC updates)

Mark Ledoux, Energy Solutions

- ICRP Publication 103
 - o General support for updating numerical values and scientific base
 - o Little support to change annual dose limits and use of the term “constraints”.

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

- NRC considering change Lens of the eye dose to 2 rem
- Disposal of depleted Uranium
 - Clive plant being evaluated for ability to accept DU.
- NRC branch technical position on concentration averaging and encapsulation published
- NRC encouraging manufacturers to do a better job of encapsulating Cs-137 Chloride (See BNL contamination presentation for example of why this is important)
- NRC residual radioactivity (when to clean up facility e.g. can you wait 50 years or should you clean up now) is about to be published
- Safety Culture at DOE
 - Safety culture is the current buzz word
 - Secretary Chu wrote letter to DNFSB about stifling safety culture
- EM has been absorbed within NNSA
 - Some potential impacts due to conflicting organizational documents. For example - lis calibration of radiation protection instruments MTE or not
 - Guide is that radiation protection instruments are not MTE
- TLD/OSL RFQ for Energy Solutions
 - Landauer or Mirion (OSL vs. TLD) only vendors
 - Fundamentally, the competition was about whether to use OSL or TLD technology and inherent efficiencies from standardized dosimetry program. TLD technology selected
 - Company went to quarterly processing from monthly

9:00 – 9:30

Update on Pu-238 Puncture Wound Uptake

Gordon Quillin, SRNS

- June 14, 2010 is date of event.
- DTPA started within 83 minutes
- First core tissue punch 2 hrs 20 minute after event
- Initial dose estimates were 15 to 45 rem CED.
- 9.5 nCi of Pu-238 removed by excision
- 71 DTPA treatments over 317 days
- Conservative estimate was over 25 nCi “removed” via DTPA from activity in the collected urine (not all urine collected (only 2 liters and later 1 liter per week)
- 82 samples (1.5 liter) collected over 317 days.
- Rapid analysis method used for analysis. For more information about this method, please see last meeting minutes.
- 34 wound counts to date. Wound counts are stable indicating little migration.
- Process of information control critical: worker always knew first. This contributed to trust of work regarding dose received.
- Process of monitoring elbow and other parts of the body discontinued when no activity detected
- Mold of hand very useful to reposition hand for wound monitoring

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

- Type B investigation report issued September 2010. Concern expressed due to difficulty in predicting dose which confounded decision of Type B or Type A investigation
- Site medical and Radiological Protection Staff had just retrained and practiced (exercised) on how to handle this type of event (REAC/TS) type event.
- DOE issued civil penalty of \$243,750. This amount was the reduced fine with credit given for excellent handling of the event once it happened.
- Contractor support related to the event investigation is non-reimbursable.
- Excellent wound healing with no loss of motor or sensory functions
- No adverse health effects associated with DTPA therapy or intake.
- Long-term monitoring looks like quarterly urine samples
- Focus of investigation was conduct of operations (work planning and control) and not radiological controls.
 - o Secondary issue was evaluating employee skill mix and experience (was correct personnel assigned to this high hazard job)
- Final Reported dose:
 - o Committed effective dose: 31.6 rem
 - o Organ dose:
 - Bone surfaces 1043 rem
 - Liver 220 rem
 - RBM 52 rem
 - Gonads 14 rem
- Estimated mitigation through tissue excision and DTPA therapy
 - o Tissue Excision : 15.5 rem CED
 - o DTPA Therapy: minimum 41 rem CED
 - o Overall effectiveness of mitigation strategy believed to have led to a dose reduction of about 70%

9:30 – 10:00

Break

10:00 – 10:30

Logic for Use of Radiological Protection Technician as Posting and Barricade for Contamination Areas

Gordon Quillin, SRNS

Purpose of presentation is discussion among attendees about a practice SRNS uses for dose rates between 100 mrem/hr and 1 rem/hr and its applicability beyond 1 rem/hr.:

Background:

- TRU containers require “mining” (sorting because they are not currently palletized the way they have to be configured for shipment to WIPP)
- The issue being addressed is ORPS reportability
- WIPP makes up the manifest so current storage configuration is not related how WIPP wants to receive the waste causing lots of pallets and containers to be handled and moved
- **The area is a Radiological Buffer Area (Buffer Area for the purposes of exposure and the absence of contamination is confirmed. Drums and boxes are believed to be clean)**

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

- Drums can read as much as 5 mrem/hr on contact but Radiation or High Rad Areas can exist via hot spots or due to reconfiguration of drums.
- Maximum dose and low dose areas can change daily.
- The “miners” (people who do the reconfigurations) receive most of the dose
- Forklifts are used to move pallets that contain drums.
- **DOE STD 1128-2008 has an MDA for large area wipes (SRS interpretation)**
- There are two questions:
 - o can the RCT act as the posting for contamination while determining if the area is contaminated. If yes what are the controls?
 - o Can the large area wipe be used because field counting can be used to define if the area is “contaminated”.
- Some sites have received findings for using LAWs to meet Appendix D values.
- The ensuing discussion resulted in the following conclusions:
 - o If LAWs were used and no activity detected with a detection limit of 20 dpm per 100 cm² then it could be used for meeting Appendix D.
 - o IF LAWs used with higher MDA, then practice is not allowed.
 - o General consensus of the group was to make field decision based on LAWs but make confirmatory swipe.

10:15 – 11:00

Leading Indicators

Ted Giltz, HAMMER

- EFCOG would like the RP working group to examine our metrics and see if there was a common indicator that we could find that might be useful for EFCOG member to evaluate use to assist in identifying complex wide issues.
- October 2010 – EFCOG issued **draft** Guidance Document “Development and Using Leading Indicators” (found on EFCOG Web page) for Working Groups to use in determining what a metric might be
- Identifying what we do as leading indicator is the key (e.g. change in work document reviews [RWPs] v.s. work document violations)
- Look at establishing non-reportable events as leading indicators
- Leading indicators should have cause and effect relationship to lagging indicators
- Look at trends and not a single event (plotting data is useful here)
- Focus on things that we already do
- Examples of RP Leading Indicators
 - o Track procedure work packages revisions
 - o Cycle time for procedure/package revisions
 - o Number of late /missed surveys
 - o Jobs shut down due to lack of RCTs or number of open RCT/professional staff positions not filled with qualified individuals
 - o Training of people doing jobs
 - o Number of out of service instruments per unit time
 - o Job delays due to failure to provide equipment
 - o Amount of involvement of RP in work reviews
- Not practical to provide a working group consensus of what to report to EFCOG.

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

ACTION ITEM 1: TED TO EXAMINE ORPS DATA TO SEE IF THERE ARE ANY INDICATORS THAT MIGHT BE USEFUL TO BENCHMARK AND PRESENT RESULTS AT THE NEXT MEETING. INITIAL PULL WILL BE SKIN/CLOTHING EVENTS AS A LEADING INDICATOR FOR POTENTIAL SIGNIFICANT UPTACK EVENT.

11:00 – 11:45

ORPS Revisions (Effective January 1, 2012)

Paul Hoover, LANL

The following is a brief summary of the changes that impact radiation protection Group 6 subgroup A: Loss of control or RAM

- Criteria apply to bulk RAM, RSS, property containing RAM, discovered legacy RAM
 - o Offsite RAM > “applicable” limits in O458.1
 - o Loss or unexpected discovery of RAM >100x 835 Appendix E (excluding consumer products if handled iaw manufacturer’s instructions) or loss of accountability for >24hrs.
 - 24 hrs starts at discovery and includes 1 business day
 - o Loss or unexpected discovery of RAM >1x835 Appendix E or loss of accountability for 24 hrs.
 - o Legacy RAM can be reported in quarterly short form report
- Group 6 subgroup B spread of radioactive Contamination
 - o Offsite contamination > 1x authorized limits or >1x total values in 835 appendix D
 - o Onsite contamination > 100x 835 Appendix D excluding footnote 3, outside the following
 - Areas routinely posted and controlled for contamination
 - Ares controlled per 835.1102(c)
 - Non-posted areas under observation and control
 - Also exempt: authorized limits, legacy contamination
 - Explanation of RBA exclusion
 - May be operational emergency
 - o Onsite contamination > 10x 835 Appendix D excluding footnote 3
 - o Onsite legacy contamination >10x 835 appendix D excluding footnote 3
 - Legacy contamination can be reported in quarterly short form report.
- Group 6 subgroup C Radiation Exposure
 - o Dose > any limit in 835 or 458.1
 - o No monitoring for dose > thresholds in 835.402(a) or (c)
 - o Single occupational dose attributable to an identified event that exceeds an expected dose by 500 mrem CED or the greater of 10% or 100 mrem ED from external exposure
 - o Radiological releases per 458.1 or 40CFR61.92
 - For all of subgroup C, reportability should be determined promptly following an event, using field indicators when dosimetry results are not available. Quantitative results should only be reported using the site’s established dosimetry, dose assessment, and modeling processes.

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

Resulting confirmed dose estimates may overturn initial reportability determinations.

- Group 6 subgroup D Personnel Contamination
 - o Offsite medical assistance for contaminated personnel
 - Transport to offsite facility, contaminated personnel or clothing > 1x 835 Appendix D total values
 - Offsite medical personnel brought onsite for response
 - o Offsite personnel/clothing contamination > 1x 835 Appendix D (tritium 1x removable value)
 - o Onsite personnel clothing contamination (excluding anti-Cs provided for radiological protection) > 10x 835 Appendix D; n/a for tritium.
- Conclusions
 - o Some relief in reporting
 - Excepted: areas routinely controlled and monitored for contamination
 - Excepted: areas under continual observation and control
 - Short form report for legacy issues
 - Unexpected exposures attributable to an identified event
 - o Some clarifying language rejected – confusing language remains
 - o Some new reporting challenges
 - Unexpected discovery of RAM
 - Coordinated with operational emergencies
 - Excluding footnote 3 for contamination reporting
 - Coordination with environmental releases
 - o Fruitful collaboration and contribution from EFCOG/RP

11:45 - 1:00

Lunch

1:00 – 1:30

DOE Policy Updates

Pete O’Connell, HQ

Regulatory Updates

- April 11, 2011 amendment to 10CFR835
 - o Corrects submersion dose DACs in Appendix C
 - o Published Q&A
<http://www.hss.doe.healthsafey/WSHP/radiation/tpp.html>
- Fall 2011
 - o Modify Appendix D for surface contamination values (waiting on O 458.1)
 - o Determine if 835 tables can be moved from 835 into a guide thus making it easier to change the tables.
- RadCon technical Positions:
 - o Working with DOE General Counsel on need for a NRC license for work not on federal owned or controlled property by GoCo or their contractors. Note: 10CFR31.12 already states that if you bring material into another jurisdiction that you inform the jurisdiction

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

with what you are bringing, where (location) and dates present/departure.

- Monitoring for eye dose
 - NRC published in Federal Register proposed change to eye dose – average 2 rem per year; maximum 5 rem per year; and, no more than 10 rem in 5 years. Impact might be to lower whole body dose limit.
 - Comments due to NRC October 31.
 - In DOE complex, only 5 instances where dose different than deep dose or skin dose implying not many sites actually monitor the eye.
 - **DOE is likely to send out a questionnaire regarding how the sites monitor eye dose.**
 - The impact to the sites could be a change in how we monitor for eye dose
- ORPS (see Paul Hoover Discussion above)
- Accident Investigation Order changed – good support from RP EFCOG
- General responses about questions received since last meeting:
 - Sr-90/Y-90 lower contamination limit applies when Sr-90 composes at least 90% of the material composition
 - Area Postings: Must post all conditions or be nested(e.g. Controlled Area – Radioactive Material or an RMA is within the already posted Controlled Area)
 - Some DOT contamination levels (e.g. enriched uranium) more stringent than DOE
 - Loss of control of commercially manufactured material can have ORPS reportability
 - Use of LAWS for contamination 835 control limits (see above discussion)

ACTION ITEM 2: TED GLITZ TO POST PRESENTATIONS ON WEBSITE.

1:30 - 2:00

Update on N 234.1, Reporting of Radioactive Sealed Sources

Melanie May, DOE HQ

- Sealed source reporting now covered in DOE O231.1B ESH Reporting
- Document approved June 27, 2011
- Items addressing radioactive sealed source reporting can be found in each section of DOE O 231.1B (as transitioned from DOE N 234.1)
- Summary of Changes
 - Attachment 5 covers Radioactive Sealed Source Information (requirements found in old 234.1)
 - Driver is still security but it is a joint security and health and safety issue
 - No new requirements
 - Distinguishes between federal-only (main body of Order) vs. federal and contractor elements (CDR and Attachment 5)
 - Required fields for reporting to the DOE RSRT are specified in one location - Attachment 5, appendix B table

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

- Streamlines responsibilities
- Specific Changes
 - Deleted consideration of “in-growth” in transaction reporting
 - Extends transaction reporting timeframe to 5 days
 - Clarifies definition for “transaction”
 - Introduces a definition for “regenerated” (sealed sources)
 - Updated References
 - Melanie recommends comparison of old 234.1 and 231.1B
- Exceptions now covered in Applicability and Equivalency/Exemptions
- Reporting of Sealed Sources addresses DOE to NRC NSTS.
- Attachment 5 lists required data fields for baseline inventory and transaction reporting and the type of reporting that requires the field.
- Scope (baseline inventory reporting):
 - 10CFRpart 835 subpart M and Appendix E sealed sources
 - 10CFR835 Appendix E sources that have been identified for disposal but not yet disposed
 - RTGsAbove must report its initial inventory if inventory was not already reported with baseline inventory in 2008. Annual verification of the baseline inventory is also required.
- Scope (transaction) reporting:
 - IAEA Category 1 and 2 sources identified in Attachment 5 Appendix A.
- Regenerated means source has same id number with higher activity.
- The RSRT web site for on-line reporting is not active yet. The site is in beta test. Site link is: <http://www.hsss.doe.gov/Infomgt/> Your input during the beta test is encouraged. Please contact Bob McMorland, DOE RSRT Manager at 202-586-0057 or Robert.Mcmorland@hq.doe.gov.

Several clarifying questions asked:

1. Is a Weapons grade Pu-239 source a neutron source? No. When answering question is source a neutron source the response needs to be based on how the radiation from the source is used. Therefore if the source produces neutrons and we use it for the neutron production then answer the question yes. If we have transuranic sources that we use for the alpha, beta or x-ray radiation answer question no.
2. If you download site information from the DOE site and you upload report form in excel format. The differences are highlighted.

To get Joint DOE/DHS/NRC Classification Guide for Radiological; Dispersal Devices and Radiation Exposure Devices (u), September 2009 contact your classification expert.

IAEA Nuclear Series guidance documents includes “Security of Radioactive Materials Implementing Guide”.

2:00 – 2:30

Physical Control Application for Short Term High Radiation Areas
Gordon Quillin, SRNS

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

Purpose of presentation is discussion among attendees about a practice SRNS employed to provide security of a radiological area.

Background:

- SRS used a 4 foot snow fence with wire wrap to secure an area at a disposal site to prevent inadvertent entry into the radiological area while the waste cell was being constructed. (<1 rem/hr at 30 cm.)
- A regulator contended that because most people had tools with them (a knife) that could defeat the control that more robust controls were needed.
- During transitional state do all the controls need to apply? What about a graded approach?

Discussion:

- At LANL, which had a similar situation, the process has changed over time. Earlier, local DOE drove for prevention of intentional entry but has evolved to prevention of inadvertent entry by a reasonable person.
-
- The general view about the SRS experience was that the need for a tool to undo the tie-wrap prevented inadvertent exposure and the control was adequate.

2:30 – 3:00

Radiation Instrumentation Joint Technical Specification

Robert Miltenberger, SNL

General Question does anyone want to join SNL in a review of instruments to replace the Thermo E-600? The following sites/individuals expressed interest

- Doug McBride (NTS)
- Bill Carl (LNL)
- Gary Zeman (ANL)
- Paul Hoover (LANL)
- John Stephens (PNNL)

Note 1: Sites commented that the Ludlum Priscilla is a good alternative to the REM ball but has a high temperature (~100 degree F) sensitivity.

Note 2: There was concern that the HPIC wasn't looking at this.

3:00 – 3:15

Break

3:15 – 4:00

DOE Order 458.1

Carlos Corredor, DOE HQ

Why the change from DOE 5400.5

- Consistency with 835 to reflect current radiation protection concepts and tech standards and practices:
- Deleted items:
 - o Chapter 1 (policy found in DOE P 441.1)
 - o Background information
 - o Interim management and storage of U/Th Wastes
 - o Chapter III DCGs moved to DOE STD-1196 -2011 Derived Technical Concentration Standards
 - o References to out of date compliance tools e.g. AIRDOSE/RADRISK

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

- Soil column guidance
- Dose Regulations:
 - TED - 100 mrem
 - Lens of Eye - 1500 mrem
 - Skin or Extremities 5000 mrem
 - No change to Radon or Occupational Doses
- Demonstrating compliance
 - TED to members of the public from all pathways
 - Calculate dose to representative person OR the maximally exposed individual as alternative benchmark
 - MEI must include members of the public both on DOE sites outside of controlled areas and off DOE sites
 - If any dose in DOE O 458.1 or dose to public exceeds 25 mrem/yr then must calculate dose to lens of eye and extremities
 - Use Cap-88 or another EPA approved model or method to evaluate dose from airborne effluents.
 - Temporary Dose Limits limited to no more than 500 mrem TED provided that the average TED over any 5 contiguous years does not exceed 100 mrem per year
 - ALARA must be documented
 - Detailed requirements and guidance were deleted but overarching ALARA requirements were retained.
 - environmental radiological protection program established
 - Composite of plans, procedures and other documents describing the methods used to achieve compliance
 - Biota Protection
 - Aquatic Animals 1 Rad/d
 - Terrestrial Plants 1 Rad/d
 - Terrestrial Animals 0.1 Rad /d
 - Air pathway – no change
 - Drinking water and Ground Water
 - DOE drinking water systems must meet public system concentrations limits
 - DOE discharges must not cause public systems to exceed 4 mrem/year limits.
 - Groundwater protection is covered
 - Release and Clearance of Property
 - Emphasis on process knowledge
 - Added specificity to monitoring and surveys can meet objectives of MARSSIM or MARSAME or equivalent
 - Specific dose constraints included
 - Real Property TED 25 mrem/yr
 - Personal Property: TED 1 mrem/yr
 - Independent verification program described
 - Interface with CERCLA specified
 - Use current pre-approved limits until revised
 - Options for updating surface contamination guidelines

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

- Issue guidance or technical standard, or
- Adopt revised ANSI 13.12
- Use old DOE 5400.5 table;
- Can use DOE Guide 441.xx (DRAFT). This document be found on SESS
- Public notification program required
- Clarifies that use of restrictions and institutional controls can be
- Prior to clearance or disposal of metals must evaluate DOE reuse or recycle
- Action memo approved September 28, 2011
 - Undersecretaries have been delegated authority for clearance
 - Undersecretary authority could be exercised only after the site has implemented recommendations contained in the report “radiological clearance of scrap and personal property” at NNSA Sites: Evaluation of Current Practices and Recommendations for Improvement” dated May 2010
 - Public needs to be involved
 - Perform Environmental Assessment at DOE level EA allows :
 - Open dialogue with Public about DOE’s intent to clear property
 - Proper implementation of DOE O 458.41
- Liquid discharges
 - Requirement for Best Available Technology removed.
 - specified in DOE STD-1196 -2011 Derived Technical Concentration Standards
 - Disposition of Non-process water and consideration of storm water runoff as potential pathway of exposure
 - Uses ICRP 60 dose methodologies
- ASER is only compliance reporting mechanism
- Lessons Learned:
 - Skyshine for accelerators: models do not need HSS approval
 - Public dose apply if not under 10CFR835
 - May need clarification that DOE O 458.1 does not apply to waste disposed in commercial facilities licensed by the NRC or states.
- Next Steps:
 - Revision to DOE-0173T Environmental Regulatory Guide radioactive Effluent Monitoring and Environmental Surveillance Standard
 - Revision of Surface Contamination Guidelines
 - 12 month review of DOE O 458.1 early 2012

2011 EFCOG/DOE Electrical Safety Workshop Hosted by Y-12 National Security Complex EFCOG Radiation Protection Subgroup

If you have suggestions or questions that you would like addressed, please contact Carlos E. Corredor (email: carlos.corredor@hq.doe.gov) or phone (202-586-8915).

4:30 – 5:00

HSS Support to Fukushima Incident

Carlos Corredor, DOE HQ

- Federal Response Group (FRG) created at request of the White House
- NNSA lead for DOE Response
- Documents used for Guidance:
 - o Preliminary Report on Operational Guidelines
 - o RESRAD-RDD
 - Products available from OGT Web Site
<http://ogcmc.energy.gov>
 - o Annual effective dose was 500 mrem or 5000 mrem for organ/tissue
 - o Question was could you plant rice within weeks of the accident then harvest/sell.
 - Consumption assumed was about 170 g per day
 - Decided that Cs-137 and strontium could be planted if areal concentration was less than Planning Values (same as Derived Intervention Levels)
 - Planning Values assume Doses of:
 - Annual effective dose = 500 mrem
 - Committed Effective Dose = 5000 mrem to an organ or tissue.
 - o Rice could be planted and consumed if following areal concentrations were met:
 - Cs-137 1.45 E7 pCi/m²
 - Sr-90 6.76 E6 pCi/m²
 - o Question of seafood consumption was examined
 - ¹³¹I nuclide of concern
 - No decay adjustments for ¹³¹I in seafood
 - Equilibrium release rate for ¹³¹I assumed
 - If concentration was 2000 Bq/kg then adult dose would be about 200 mrem.
 - o Train Ride (Tokyo to Sendai)
 - o Trip takes 2.5 hours
 - o Round trip dose is about 0.12 mrem
 - o U.S. State Department web site has guidance for current travel to Japan.

Californium Update: ORNL will still sell Californium sources to DOE sites. Contact Brad Patton or Julie Ezold for more information.

4:00 - 5:00

Rad Protection Subgroup Meeting Wrap-up

Mark Ledoux, Energy Solutions

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

Action Item Summary for Day 1:

ACTION ITEM 1: TED TO EXAMINE ORPS DATA TO SEE IF THERE ARE ANY INDICATORS THAT MIGHT BE USEFUL TO BENCHMARK AND PRESENT RESULTS AT THE NEXT MEETING. INITIAL PULL WILL BE SKIN/CLOTHING EVENTS AS A LEADING INDICATOR FOR POTENTIAL SIGNIFICANT UPTACK EVENT.

ACTION ITEM 2: TED GLITZ TO POST PRESENTATIONS ON WEBSITE.

5:00 – 7:30

Vendor Exhibit and ES&H Reception (New Hope)

Call- in Numbers:

- Tuesday, October 18, 2011: 8:30 AM – 11:30 AM, 202-287-6279, confirmation # 354708
 - Tuesday, October 18, 2011: 1:00 PM – 4:00 PM, 301-903-0688, confirmation # 354709
- 10 Lines available

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

Day 2 - Wednesday, October 19, 2011

8:00 – 11:30

General Session *All*

8:15 – 09:00

William C Ostendorff (NRC Commissioner)

- The NRC mission is to:
 - o Regulates 104 commercial reactors and 32 research reactors
 - o Regulates 22,000 sources
 - o Regulates Nuclear Waste
- NRC does not make or build things like DOE.
- NRC is open and transparent
 - o Engages in extensive public and external groups
 - o Works with but not part of INPO
- License applications currently in progress (2 reactors at Vogtle and Summer: each 1000 MWT Westinghouse design)
 - o What is adequate protection depends on what is the risk and what are the consequences
 - o Adequate protection does not mean zero risk
- NRC uses the following principles:
 - o Independence
 - o Openness
 - o Efficiency
 - o Clarity
 - o Reliability
- Public's assessment of can nuclear power be operated safely is directly related to the public's trust and confidence of the regulatory community
- Field inspection is critical for the regulator to have credibility.
- Fukushima Daiichi Event
 - o Units 1,2,3 operating
 - o Unit 4 just shut down
 - o 1300 fuel bundles in spent fuel of Unit 4
 - o Units 5 and 6 were shut down
 - o NRC believes that there was a 1 in 1,000 chance of the tsunami that hit. NRC would require 1 in 1,000,000 design.
 - o 11 of 12 diesel generators flooded out
 - o No off-site power.
 - o Batteries only provided DC control power to cooling pumps.
 - o Today, all reactors (units 1,2,3) below 100 degrees Celsius
 - o Unit 1 has a temporary cover
 - o Clean-up of ~100000 gallons of contaminated sea water is very hard. Two cesium clean-up systems in place to process the water. This is a curium cesium removal process with zeolite (Areva and Shaw group are the technical support)
- NRC post Fukushima Daiichi Event
 - o Chartered task force to look at events of Fukushima event and review regulations.
 - Similar sequence of events unlikely

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

- Examine seismic, flooding and tornado hazards at U.S. nuclear power plants
- Industry looking at how to handle “station blackout “ conditions.
- How does one provide additional spent fuel water level monitoring
- Look at emergency planning zones
- NRC has ordered fence for GE MARK I and MARK II reactors
- Future actions will be disciplined and follow regulatory principles

9:15 – 09:45

Pat Worthington - Safety Culture Impact on Workers and Mission

- Over a 1,000 people interviewed (historic Manhattan Project era) and most said that they worked in a safe manner to produce a product to protect the nation.
- Encouraged all to attend National Day of Remembrance next week (October 24)
- Current Safety Culture Journey
 - ISM,HRO, VPP and HPI are tools that should not impact mission
 - Managers should have the best safety record understanding the pressures of the mission
 - Safety culture requires clear management direction, employee engagement and organizational learning
 - DOE Guide identifies attributes that supports a good safety culture
 - Sites and contractors need to evaluate progress on developing safety culture.

09:45 – 10:00

Break

10:15 – 11:15

Pat Padezanin (New Executive Director) – Success of EFCOG Subgroups and Plans for the Future were presented by the chairs of each subgroup

- Environmental (David Folse):
 - Undated charter and focus on customer DOE needs.
 - Published Lessons Learned
- Chemical Safety and Life Cycle Management (Steve Harris):
 - Co-sponsor Forrestal Meeting in March
- Industrial Safety/Industrial Hygiene (Dina Siegel):
 - Develop metrics for leading indicators and ways to use the information
 - Database management tool to evaluate exposure evaluations
 - Expand VPP to include HPI causal factors
- Radiation Protection (Mark Ledoux)
 - 63 members with 30-40 routine attendees
 - Great relationship with Pete O’Connell at DOE HQ
 - Greatest Accomplishments:
 - Set-up Template for Pu-241 exemption
 - Working group on Neutron Calibration Factor
 - Benchmarking activities

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

- Leading indicators are the next future activity
- Occupational Medicine (James Stalker)
 - Benchmarking what each site considers important parameters that define good worker health
 - What is important in Pre-placement exams
- Electrical Safety (Jackie MacAlhaney)
 - Video tape on lock-out-tag-out (LOTO).
 - Developed Electrical month idea and handouts for each week.
 - Bring in outside professionals for info on current standards and measuring tools.
 - Participated in NFPA-70 technical standard development
 - Works with IEEE on arc flash physics
 - Demonstrated field use of equipment
 - Develop gap analysis for new standard
- Laser Safety Group
 - Focus on recent revision to ANSI Standards

11:30 - 1:00

Lunch

1:00 – 1:50

Radiation Protection Medical Information

Dr. Doran Christensen, Associate Director & Staff Physician, REAC/TS

- Staff size of about 8
- REAC/TS is part of National Security & Emergency Management Program (NSEMP)
- Supported by NNSA
- Mission is 24/7 medical advice and consultation, dose reconstruction and health assessment and training people on treating radiation injured people
 - Courses are open to the public and the course schedule can be found on the REAC/TS home page
- Maintain the Radiation accident registry for radiation Medicine research
- Maintain registry of DTPA and Prussian Blue Therapies
- Manage DTPA and Prussian Blue drug application
- Have provided medical support to 31 countries outside the USA plus support within the USA.
- Use Cytogenetic dose assessment to determine radiation dose
 - Uses lymphocytes in peripheral blood
 - Minimum Detectable dose is about 12 rad
- Looking at infrared and thermography as early tools to determine dose and if body has incurred injury by exposure to radiation. These are techniques under development.
- Several commercial incidents reviewed (2 fluoroscopy and 1 large gamma sources not being handled correctly).
 - Each event was described and pictures of injury displayed
 - Treatment provided discussed
 - Impacts of failure to treat correctly also discussed
- The question of when to administer DTPA was discussed. DTPA is most effective if administered before or within 1-2 hours after incident. Also

2011 EFCOG/DOE Electrical Safety Workshop Hosted by Y-12 National Security Complex EFCOG Radiation Protection Subgroup

DTPA can be used to irrigate during punch surgery thus providing localized benefit..

2:00 – 2:30

RadCon Command Center

Phil Owens, SRR

Tool to aid people covering high risk jobs

- Process currently in use at the East Tank Farm
- Attempt is to control hazard at point of origin.
- Created portable command trailers
 - o Cost of trailer and supplies is ~\$20K
 - o Interior converted to hold the following material
 - o teledosimetry (remote readout) for dose, CAMs etc.
 - o Uses VSDS to create survey results
 - o Wireless feature allows instant review of radiological conditions
 - o Video and audio links to allow observance of work, determination if work is following work plan and dose reduction since observers are outside the radiological area
 - o Cuts time to do work because results are instant
 - o Uses video recording for job reconstruction and future training
 - o Does local meteorological monitoring for when crane or temporary containment is used.
 - o Aids in the conduct of work (faster completion, protection of worker, public and environment, lower dose to those who can now stay outside the radiological area

2:30 – 3:00`

Extremity Exposure Control for Beta Contaminated Equipment

Mike Matheny, SRR

- Two jobs in the past 5 years where workers received over 10 rem extremity dose on a single job. Dose exceeded predicted (factor of two on a monthly read of dosimeters)
- First incident involved sampling from the tank farm. Problems encountered:
 - o Field changed happened so that 6 half liter bottles instead of 1, 3 liter bottle were used (operators did not have specified bottles at the work site so they used what they had which resulted in more handling of the material.
 - o Material was sludge and not liquid so it stayed on the side of the bottle and on their gloved hands which handled the bottles (workers did not recognize that the type of material handled required more frequent change of gloves)
 - o Estimated dose inside containment (glove bag)not well characterized
 - o Accumulated material on gloves and extra handling resulted in increased dose.
- Second incident involved repair of pump inside a glove bag. The significant issues in this job were:
 - o Dose to extremities inside the glove bag with workers wearing tungsten gloves not well characterized

**2011 EFCOG/DOE Electrical Safety Workshop
 Hosted by Y-12 National Security Complex
 EFCOG Radiation Protection Subgroup**

- Decision path of fix or replace not completely evaluated
- Lessons Learned from both events
 - Watch for field changes that impact dose
 - Avoid putting hands on sample
 - Change gloves frequently if hand contact is required
 - Use remote readout of dose monitors (Siemens EPD Mark 2) as predictor of extremity dose
 - Use of Robots or extended tools
 - Develop decision path for replace rather than repair
 - Beta dose lots bigger than the gamma (WB dose only 20 mrem while extremity dose was ~ 13 rem) and can be the limiting condition
 - Flush or wash container
 - Have a method to predict dose when shielding (multiple layers of gloves are present recognizing that multiple layers means less dexterity and possible more time is required to handle the material. SRS developed a rubber glove correction factor for finger rings

▪ Pairs of Gloves	Multiplier/correction factor
0	6
1	5
2	4
3	3
4	2
5	2
6	1
- Multiplier to convert field measurement (RO-20 or Mark 2) to finger ring dose at SRS. Numbers based on SRY-90 source and number of latex gloves worn
- Tungsten gloves reduces dose beta dose by 25-45% for CsSr betas and are equivalent to about 2 pairs of regular dose.
- Limiting dose factor – SRS divides limiting dose by 7 to determine skin dose alarm for EPD
- For high extremity dose rates (> 30 rem/hr), also use time keeping (monitor hands-on time)
- Track accumulated extremity dose against a dose target for month or quarter.
 Note: Special read extremity dose readout processing is a within 24 hours.

3:00 – 3:15

Break

3:00 – 3:30

BNL Cesium Sealed Source Leak

Dennis Ryan

- Source did not have a good pedigree
- Source not made at BNL
- Source was about 265 microCuries and 25 years old.
- Source construction appears to be CsCl mixed with resin
- Source used to do performance check on area radiation monitors (ARMs)

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

- Was not leaking at last source leak test check (7/22/11). Source most likely began leaking between August 31 and September 13 (area monitors checked before August 31 and after July 22) were not contaminated. No sources checked between August 31 and September 13. ARMs checked after September 13 had spots of contamination.
- Incident happened late September
- Source was used to check area radiation monitors. In the morning during the routine checking of these devices, source holder tipped over. Top of pig slightly slipped off from bottom (top of lead pig slid over the bottom and source was at the end of ~0.5 inch brass pipe that protruded from the center of the pig). Tech picked up carrier and top of pig slid back down reseating itself but resulted in contamination being pushed through opening for source in the lid.
- After source checking the radiation monitors, the RCT went to lunch as a passenger in another car. This personal vehicle (passenger side had spots of contamination). No other "off-site" contamination found.
- RCT personnel clothes (shirt and shoes) contaminated.
- Government vehicle was later discovered to have general contamination levels on driver's side floor of 500,000 dpm with a few small spots as high as ~2E6 dpm. The steering wheel and driver's side door panel also showed elevated levels of contamination
- Worst case internal and skin dose determined to be 0.68 mrem (based on system MDS) and 3.6 mrem (VARSKIN calculation) respectively
- Stand-down of work with sealed sources implemented by management
- All sealed sources in excess of 10% of Appendix E checked for contamination.
- As of this time, no additional corrective actions have been implemented but BNL is seeking a graded approach for implementing additional actions. To this end, BNL is seeking to know how other sites handle sealed sources.

Action Item 3: BNL requests that sites provide BNL with what method their site uses for transporting radiological sealed sources and management of radioactive sealed sources.

3:30 – 3:45 Operational Radiation Safety Articles
Robert Miltenberger, SNL

The editor of the Health Physics Journal has asked if EFCOG members would be interested in providing articles that would be published as a special issue in either the HPJ or Operational Health Physics

Action Item 4: Bob Miltenberger to send poll to members soliciting interest in participation in this project. Request should include ABHP credits available for writing a paper and due dates for draft articles.

3:45 – 4:30

Miscellaneous end of meeting short topics:

- a. **Indicators:** Ted to look at ORPS and other metrics reported in prior meetings and have a suggestion for the Mach 2012 meeting (See Action Item 1)

2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup

b. March Action Item Status

1. Neutron Paper - Mike Methany to contact Ken Crase about when neutron paper will be available
2. Benchmarking – only 3 historical items came from historical records of Jim Stafford. Generators of benchmark questions will need to send their summaries of the results to Bob Miltenberger to work on consolidation. (See action item below)

c. Partial Body Entry Procedure:

There was limited discussion regarding who each sites allow partial body entry into radiological areas (e.g. reaching hand into a radiological area to turn a valve). CHPRC at Hanford is looking for ideas on this. (see action item below)

d. Benchmark Results Since Last Meeting:

1. ICRP eye dose- Most people aren't getting over 2 rem. Reducing eye dose to 2 rem necessitates dropping Whole Body dose limit. Contractors might have to monitor eye dose differently. Currently, the monitoring method for eye dose by the contractors is summarized as: Some use skin or shallow dose and some are use deep dose. Only 5 instances of specific lens of eye dose methods. If monitoring required at 10% of limit, the need to do specific eye dose monitoring likely to increase to several thousand from the current 10s to a few hundred and specific methods will need to be developed.
2. Large area smears vs. Swipes: Contractors reported how LAWs are used.
3. RCTs doing IH surveys – mixed bag of responses. Some sites don't use RCTs for this purpose; some sites do. 3 of 4 sites who do use RCTs for IH surveys integrate these responsibilities; 1 of 4 separates these responsibilities (SR RCTs only do RCT or IH activities at any given time).
4. RWP Limiting conditions: The question was did SRS's use of the word limiting condition to specify upper limit of radiological conditions when work could be performed. The issue was could the action levels to suspend work be lots larger than the expected conditions. Short answer was yes. Suspension guides set when controls no longer adequate for the hazard. The terms used to describe this condition varied from site to site but the concept was the same regardless of the words used.
5. What do sites use for monitoring I-125 and I-129. Two sites do this monitoring and use lab grade sodium iodide for I-125.
6. Reciprocity Assist or benchmarking visits Action Item. Question raised do sites want to participate in a reciprocity type third party assist visit (Contractor A sends person to site B for assist visit then process reversed. Expenses paid by visited site but labor covered by sending sit). Many sites interested Bob to send question and consolidate results. See action Item below.

4:30 – 5:00

Rad Protection Subgroup Meeting Wrap-up

Mark Ledoux, Energy Solutions

- Next meeting is in Washington D.C. the week of March `2 with RP EFCOG meeting March 14 and 15.
- Proposed slate of candidates for next two years of RP EFCOG leadership:
 - o Proposed Chair: Ted Glitz – all voted yes
 - o Vice-Chair: Quang Le – all voted yes
 - o Secretary: Bob Miltenberger – all vote Yes

**2011 EFCOG/DOE Electrical Safety Workshop
Hosted by Y-12 National Security Complex
EFCOG Radiation Protection Subgroup**

“proposed” officers will report back in March if they can fulfill the expectations of the office

Day 2 Action Items:

Action Item 3: BNL requests that sites provide BNL with what method their site uses for transporting radiological sealed sources and management of radioactive sealed sources.

Action Item 4: Bob Miltenberger to send poll to members soliciting interest in participation in this project. Request should include ABHP credits available for writing a paper and due dates for draft articles.

Action Item 5: Mike Methany to contact Ken Crase regarding the status of the neutron paper – Completed 10/26/2011 Ken said that he has not done much on this project.

Action Item 6: Bob Miltenberger to send out questionnaire regarding each site’s willingness to conduct assist visits.

Action Item 7 Ken McLain (CHPRC) to send benchmark question regarding partial body entry into radiological areas and consolidate results.

NOTE: Note sure if Action Item 7 is assigned to the correct site.

Call-in number:

- October 19, 2011: 1:00 PM-4:00 PM, 301-903-0692, confirmation # 354841 (10 Lines)

Corrections Received from:

- **Gary Zeman**
- **Ted Glitz**
- **Ken McLain**
- **Rob Sitsler**
- **Gordon Quillin**
- **Dennis Ryan**
- **Melanie May**
- **Carolos Corredor**
- **Paul Hoover**
- **Rebecca Raabe**