

FINAL PROGRAM



57th Annual Meeting of the
Health Physics Society
(American Conference of Radiological Safety)
23rd Biennial Campus Radiation Safety
Officers Meeting (CRSO)



22-26 July 2012
Sacramento Convention Center
Sacramento, California

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Registration Hours and Location

Registration at the Sacramento Convention Center

Saturday, 21 July.....	2:00 - 5:00 pm
Sunday, 22 July.....	7:30 am - 5:00 pm
Monday, 23 July.....	7:30 am - 4:00 pm
Tuesday, 24 July.....	7:30 am - 4:00 pm
Wednesday, 25 July.....	8:00 am - 4:00 pm
Thursday, 26 July.....	8:00 - 11:00 am

Future Midyear Topical Meetings

46th	27-30 January 2013	Scottsdale, AZ
47th	9-12 February 2014	Baton Rouge, LA

Future Annual Meetings

58th	7-11 July 2013	Madison, WI
59th	12-17 July 2014	Baltimore, MD

*Look online for future meeting details
hps.org/meetings*

Officers

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Barbara L. Hamrick, Secretary
John P. Hageman, Treasurer
Nancy M. Daugherty, Treasurer-Elect
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Dawn Banghart
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Jennifer Granger
Linda Kroger
Penny Leinwander
Lynn Raabe
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Program Committee

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Robin Hill
Beth Kay
Lyndsey Kelly
Tim Kirkham
Jack Kraus
Bryan Lemieux
Tony Mason
Tom Mohaupt
Michael Noska
Dennis Reisenweaver
Chris Shaw
Tim Taulbee
Latha Vasudevan

2012 Task Force - Sacramento

Matthew McFee, Program Committee Chair
Bryan Lemieux, Task Force Chair
Robin Hill
Tim Kirkham
Tony Mason
Tom Mohaupt
Mike Noska
Otto Raabe
Chris Shaw
Tim Taulbee

Headquarters Hotels

Hyatt Regency Sacramento

1209 L Street, Sacramento, CA 95814
916-443-1234

Sheraton Grand Sacramento

1230 J Street, Sacramento, CA 95814
916-447-1700

Speaker Ready Room

Sacramento Convention Center, 301

Sunday 2:00-5:00 pm
Monday-Wednesday 8:00-11:00 am; 2:00-5:00 pm
Thursday 8:00-10:00 am

You must check in at the Ready Room
(even if you have already submitted your presentation).

See **Page 8** for more information.

**Posters must be put up for display between
8:00 - 10:00 am on Monday, and
removed on Wednesday by 11:00 am**

Meeting Sponsor

Thank you to the following meeting sponsor

Dan Caulk Memorial Fund

HPS Secretariat

1313 Dolley Madison Blvd.
Suite 402

McLean, VA 22101

(703) 790-1745; FAX: (703) 790-2672

Email: hps@burkinc.com; Website: www.hps.org

Tuesday Evening Awards Reception & Banquet

Join your peers in honoring the following awardees while enjoying a delicious meal. Brief award presentations will immediately follow the dinner.

All attendees are strongly encouraged to stay and show support for the award recipients. This event will take place in the Hyatt Hotel Ballroom, on Tuesday, 24 July from 7:00 - 10:00 pm.

The following awards are to be presented:

Distinguished Public Service Award

Paul L. Ziemer

Elda E. Anderson Award

Jason Harris

Founders Awards

Leo G. Faust

Edward J. Vallario (Memorialization)

Distinguished Scientific Achievement Award

Antone Brooks

Honor Roll Award

Syd Porter, Jr.

Fellows

Wesley Bolch

Eric Goldin

Michael P. Grissom

Gary Kramer

James W. Neton

David R. Simpson

Tuesday Evening Awards Menu

Heirloom Tomato Caprese with Fresh Mozzarella and Basil Oil, Grass-Fed Beef Short Ribs on Potato Risotto, Seasonal Vegetables; Dessert Duo Chocolate Truffle Torte and Mini Summer Fruit Tart, Fresh Rolls, Coffee, Teas.

G. William Morgan Trust Fund

When G. William Morgan died in 1984, he bequeathed a substantial fund to the Health Physics Society. The will requires that the fund's interest be used to have internationally known experts present papers at the Society's meetings. Michael C. O'Riordan of the United Kingdom's National Radiation Protection Board was the first international expert to be supported by the Society through the Morgan Fund. O'Riordan's presentation "Radon in Albion" was part of the Indoor Radon Session at the 1989 Albuquerque meeting.

G. William Morgan was a Charter member of the Society and during the Society's early years a very active mem-

ber. Bill began his health physics career at Oak Ridge National Laboratory as part of the Manhattan Project. He later joined the Atomic Energy Commission and was instrumental in the development of the initial regulations that became part of 10 CFR Part 20. He was a great champion of education and helped establish the AEC Health Physics Fellowship Program. Bill later became very successful in the real estate business, but always retained his interest in the health physics profession. The Society's Presidents Emeritus Committee has responsibility for the selection of the international experts who will be supported by the G. William Morgan Trust Fund.

Registration Fees:

	Pre	On-Site
HPS Member	\$430	\$530
HPS Member with '12 DUES	\$580	\$680
Non-Member	\$535*	\$635*
Student	\$ 70	\$ 70
CRSO (CRSO Events Only)	\$100	\$115
HPS Memb/CRSO	\$505	\$605
HPS Memb + Dues/CRSO Reg	\$655	\$755
HPS NonMemb/CRSO	\$610	\$710
Emeritus Member	\$215	\$265
One-Day Registration	\$275	\$300
HPS PEP Lecturer	\$130	\$230
HPS CEL Lecturer	\$280	\$380
Companion	\$110	\$110
Emeritus Companion	\$ 55	\$ 55
Exhibition ONLY	\$ 40	\$ 40

Badge Color Code:

White=HPS Member, NonMember,
Student

Blue=Companion

Green=Exhibition Only

Salmon=Exhibitor

Yellow=CRSO

Session Location

All sessions will take place in the Sacramento Convention Center unless noted otherwise.

LAC Room

Sunday-Thursday 302
Sacramento Convention Center

Activities and Tours

Note: Tickets still available for sale; they can be purchased at the HPS Registration Desk.

Saturday 21 July

River Cats Baseball 6:30 pm

Monday 23 July

Walking Tour, Central City & Railroad Museum 9:30 am-4:30 pm

Bus Tour Lake Tahoe 9 am-5 pm

Open Mic Night (no fee) 8 pm

Ballroom, Hyatt Regency Sacramento

Tuesday 24 July

Walking Tour, Crocker Museum and State Capital 9:30 am-4:30 pm

Wednesday 25 July

5K Run/2K Walk 6:30-8:30 am

Walking Tour, Sutter's Fort, Indian Museum 9:30 am-4:30 pm

Night Out, Hornblower 6:15 pm

Pub Crawl 7 pm

Thursday 26 July

Tech Tour, LLNL 8:30 am-2 pm

OPEN MIC NIGHT

The 2012 (7th Annual) HPS Open Mic Night will be held on Monday, 23 July in the Hyatt Regency Sacramento Ballroom – featuring the popular local band “The Special Guests.” The doors open at 8:00 PM.

A special thanks to the Sponsors of this event:

Chase Environmental Group, Inc.

GEL Laboratories LLC

Mirion-HP Division

Mirion-Dosimetry Division

Radiation Safety and Control Services, Inc.

SE International, Inc.

Tidewater Inc

We hope to see you all there. The event will be limited to ages 21 and older.

Photo identification will be required.

Speaker Information

Technical Sessions

Speaker Instructions

You are allotted a total of 12 minutes of speaking time unless you have been notified otherwise.

The Ready Room (301, Sacramento Convention Center) will be open Sunday from 2-5 pm, Monday through Wednesday from 8-11 am and 2-5 pm, and Thursday 8-10 am. You must check in at the Ready Room (even if you have already submitted your presentation) no later than the following times:

Presentation Time Check-In Deadline

Monday am	5 pm	Sunday
Monday pm	11 am	Monday
Tuesday am	5 pm	Monday
Tuesday pm	11 am	Tuesday
Wednesday am	5 pm	Tuesday
Wednesday pm	11 am	Wednesday
Thursday am	5 pm	Wednesday

Please report to your session room 10 minutes prior to the Session start to let your session chair(s) know that you are there.

PEP/CEL Courses

The PEP Ready Room (303) in the Convention Center will have hours posted on the door Saturday-Thursday.

Resumes/Job Postings

Find a job or post a job at Booth 127 in the Exhibit Hall.

Companion Hospitality Program

New this year for Registered Companions

*There will not be a
Hospitality Room this year*

Companion Registration includes Monday-Thursday breakfast poolside at the Hyatt and the Welcome Reception at the Hyatt, Sunday 22 July, from 6:00-7:00 pm in the Grand Ballroom.

Themed breakfasts have been planned for your enjoyment to highlight the many cultures of California. If you are registered as a companion, you are encouraged to attend each special breakfast served only from 8:00-9:00 am, poolside at the Hyatt. Then choose from the tours offered daily (see page 7 for details) or explore the area on your own.

Hospitality Breakfast for Registered Companions Monday-Thursday

8:00-9:00 am, Hyatt Poolside

Special HPS Thanks to:

Stan Skubic & AAPM

for their sponsorship and support of this year's Ge(Li) Buster 5k.

Stan Skubic generously devoted his time to assisting in organizing the event and coordinating volunteers from the local AAPM for the event.



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Health Physics Society Committee Meetings

Sacramento Convention Center (CC); Hyatt Hotel (H)

Saturday, 21 July 2012

ABMP

8:00 am-Noon Trinity (H)

FINANCE COMMITTEE

8:00 am-Noon Sequoia Board Room (H)

ABHP BOARD MEETING

8:30 am-5:00 pm Carmel A/B (H)

WEB OPERATIONS

9:00 am-Noon Big Sur A (H)

NRRT

9:00 am-4:00 pm Tahoe (H)

HPS EXECUTIVE COMMITTEE

1:00-4:00 pm President's Suite (H)

HP JOURNAL

3:00-6:00 pm Big Sur A/B (H)

TITLE PROTECTION/PROFESSIONAL RECOGNITION

4:00-5:00 pm Trinity (H)

PUBLIC INFORMATION COMMITTEE

Noon-2:00 pm 304 (CC)

NOMINATING COMMITTEE

Noon-3:00 pm Big Sur A/B (H)

AAHP NOMINATING COMMITTEE

1:00-2:30 pm 305 (CC)

CHAPTER COUNCIL MEETING

1:00-2:30 pm 311 (CC)

ANSI N320

1:00-4:00 pm 317 (CC)

INTERSOCIETY RELATIONS

COMMITTEE

1:30-2:30 pm 318 (CC)

SECTION COUNCIL MEETING

2:30-3:30 pm 312 (CC)

GOAL 4 COMMITTEE

4:00-5:00 pm 304 (CC)

Tuesday, 24 July 2012

PURDUE ALUMNI BREAKFAST

7:00-9:00 am Carmel A/B (H)

COMMITTEE CHAIR BREAKFAST

7:30-8:30 am Ventura (H)

SOUTH TEXAS CHAPTER

BREAKFAST

7:30-9:00 am Capitol View (H)

ANSI 42.17A AND C

8:00 am-Noon 317 (CC)

LAAC/LAPC

8:00 am-Noon Big Sur A (H)

HISTORY COMMITTEE

8:30-9:30 am Big Sur B (H)

NRRT

9:00 am-4:00 pm Tahoe (H)

INTERNATIONAL COLLABORATION COMMITTEE

10:00 am-Noon 305 (CC)

AEC/PROGRAM DIRECTORS

MEETING

Noon-1:00 pm 304 (CC)

Sunday, 22 July 2012

ABMP

8:00 am-Noon Trinity (H)

AAHP EXECUTIVE COMMITTEE MEETING

8:30 am-5:00 pm Carmel A/B (H)

NRRT

9:00 am-4:00 pm Tahoe (H)

PROGRAM COMMITTEE

11:00 am-2:00 pm 301 (CC)

ACCELERATOR SECTION AWARDS MEETING

4:30-6:30 pm 311 (CC)

Monday, 23 July 2012

ELDA ANDERSON BREAKFAST

7:00-8:15 am Ventura (H)

ACCELERATOR SECTION BOARD MEETING

7:30-8:45 am Big Sur A/B (H)

NRRT

9:00 am-4:00 pm Tahoe (H)

**DECOMMISSIONING SECTION
BOARD MEETING**

Noon-1:00 pm 318 (CC)

STUDENT SUPPORT COMMITTEE

1:00-2:00 pm 305 (CC)

ANSI N13.3 CRITICALITY DOSIMETRY

1:00-5:00 pm 317 (CC)

NCRP OFFICERS MEETING

1:00-6:00 pm 304 (CC)

ANSI N42.58

1:30-4:30 pm 318 (CC)

**PDS/PROFESSIONAL DEVELOPMENT
SCHOOL COMMITTEE**

2:00-4:00 pm Big Sur A (H)

HOMELAND SECURITY SECTION

4:30-6:00 pm Big Sur B (H)

CSU RECEPTION - ALL ARE

WELCOME

5:30-7:00 pm Ballroom Foyer (H)

Wednesday, 25 July 2012

EXHIBITOR BREAKFAST

7:30-8:30 am Capitol View (H)

STANDARDS COMMITTEE

8:00-11:00 am Capitol Board Room (H)

DOE A-BOMB DOSIMETRY

WORKING GROUP

9:00 am-5:00 pm Big Sur A/B (H)

AEC/STUDENT BRANCH MEETING

Noon-1:00 pm 304 (CC)

SCIENCE SUPPORT COMMITTEE

Noon-2:00 pm 305 (CC)

SOCIETY SUPPORT COMMITTEE

Noon-2:00 pm Capitol Board Room (H)

MEMBERSHIP COMMITTEE

12:30-2:30 pm 317 (CC)

**CONTINUING EDUCATION
COMMITTEE MEETING**

12:30-3:00 pm 303 (CC)

**AEC/ACADEMIC EDUCATION
MEETING**

1:00-3:00 pm 304 (CC)

ANSI 42.54 COMMITTEE MEETING

1:00-5:00 pm 318 (CC)

**AAHP PROFESSIONAL STANDARDS
& ETHICS COMMITTEE**

2:30-4:30 pm 305 (CC)

**SCIENTIFIC & PUBLIC ISSUES
COMMITTEE**

2:30-4:30 pm 317 (CC)

HPS ANNUAL BUSINESS MEETING

5:15-6:15 pm 308 (CC)

Thursday, 26 July 2012

**LOCAL ARRANGEMENTS
COMMITTEE**

7:30-9:30 am 302 (CC)

**HPS JOINT FINANCE AND EXECU-
TIVE COMMITTEE**

8:00-9:30 am Golden State A/B (H)

**HPS BOARD OF DIRECTORS
MEETING**

10:00 am-5:00 pm Golden State A/B (H)

PROGRAM COMMITTEE

12:30-3:00 pm 305 (CC)

ANSI/HPS N13.1 WORKING GROUP

1:00-5:00 pm Sequoia Board Room (H)

Friday, 27 July 2012

ANSI/HPS N13.1 WORKING GROUP

9:00 am-4:00 pm Sequoia Board Room (H)

57th Annual Meeting of the Health Physics Society Sacramento, CA, 22-26 July 2012, Final Scientific Program

Presenter's name is asterisked (*) if other than first author.

MONDAY

7:00-8:00 AM 309

CEL-1 Dose in Cardiac Radiology
Waller, E.
University of Ontario Institute of Technology

7:00-8:00 AM 310

CEL-2 The Vulnerability of the Embryo/Fetus to the Oncogenic Effects of Ionizing Radiation. ("The Canary in the Mine is Not Dead")
Brent, R.L.
DuPont Hospital for Children

8:15 AM-Noon Hall D

MAM-A: Plenary Session

Chair: Kathy Pryor

8:15 AM

Opening Remarks
Kathy Pryor; President, HPS

8:30 am MAM-A.1

Why This Is the Right Time to Adopt ICRP 103
Valentin, J. (G. William Morgan Lecturer)
ICRP

9:00 am MAM-A.2

Worldwide Harmonized Radiation Protection Standards - An Essential Asset for Safety
Czarwinski, R. (Robert Landauer Lecturer)
IRPA, Section Head Federal Office for Radiation Protection Germany

9:30 am MAM-A.3

NCRP and International Consistency in Radiation Protection Standards
Boice, J. (Dade Moeller Lecturer)
NCRP

10:00 am BREAK

10:30 am MAM-A.4

NRC Activities to Examine Increasing Alignment with International Radiation Protection Standards
Satorius, M.
US NRC

11:00 am MAM-A.5

ICRP Recommendations and US Standards for Radiation Protection - How We Got Out of Step
Boyd, M.
U.S. Environmental Protection Agency

11:30 am MAM-A.6

Consistency in Regulations: Sources, Obstacles and Resistance in the User Community
Hamrick, B.
University of California, Irvine Medical Center

Noon-1:30 PM Exhibit Hall

Complimentary Lunch in Exhibit Hall for all Registrants and Opening of Exhibits

1:30-3:00 PM Exhibit Hall

P: Poster Session

Biokinetics/Bioeffects

P.1 Protective Effect of HydroFer-rate Fluid, MRN-100, on Survival and Hematopoietic Cell Recovery in Gamma-Radiated *Tilapia Nilotica*
Ghoenum, M., Elbaghdady, H., El-Shebly, A., Pan, D.
Charles Drew University of Medicine and Science, University of Mansoura, Egypt, National Institute of Oceanography and Fisheries, Egypt

Environmental

P.3 Survey of Pre- and Post- Fukushima Honey for Cesium-134 and Cesium-137

*Schierman, R., Dunker, R., Harris, J.
Idaho State University*

P.4 Assessment of Residential and Workplace Exposure to Radon: A Case Study

*Paudel, K., Dunker, R., Poudel, D.
Idaho State University*

P.5 Zooplankton of Reservoirs for Storing Liquid Medium-Level Waste

Osipov, D.I., Stukalov, P.M., Ivanov, I.A., Pryachin, E.A.

Urals Research Center for Radiation Medicine, Russia, Mayak Production Association, Russia

P.6 Use of GIS Software to Map Contaminant Distributions and Determine Integrated Dose for Purposes of Assessing Impact to Biota

*Myers, M., Higley, K.
US Army, Oregon State University*

P.7 Sources and General Dependencies in the Behavior of Radionuclides in Water of the Techa River

Melnikov, V., Konovalov, K., Kost-yuchenko, V.

Urals Research Center For Radiation Medicine

P.8 Correlation between the Radon Concentration and the Atmospheric Turbulence, Stability and Inversion

*Mehdizadeh Naderi, S., Faghihi, R.
Radiation Reseach Center, Shiraz University, Iran*

P.9 Foliar Translocation & Root Uptake of Cesium in Tea Plants (*camellia sinensis*)

*Houser, E., Bytwerk, D., Leonard, M., Higley, K.
Oregon State University*

P.10 Occupational Exposure of Dentists to Electromagnetic Fields Produced by Magnetostrictive Cavitrons Alters Serum Cortisol Level

Vazifehdoost, S., Mortazavi, S.M.J., Mehdizadeh Naderi, S.

Vali Asr Clinic, Iran, Shiraz University of Medical Sciences, Shiraz University, Iran, Radiation Research Center

P.11 Radiological Modeling Software as a Learning Tool

*Leonard, M., Higley, K.
Oregon State University*

P.12 Stable and Radioactive Metal Contamination in Bangs Lake, Grand Bay National Estuarine Research Reserve

Kurgatt, S., Johnson, E., Essien, F., Glasgow, D.C.

Florida A&M University, Oak Ridge National Laboratory

P.13 Unattached Fraction of Indoor Radon Progeny and Its Dose Contribution

*Guo, Q., Zhang, L., Guo, L.
Peking University, Solid Dosimetric Detector and Method Laboratory*

P.14 A GIS Based Platform of Atmospheric Dispersion Evaluation for Communication and Validation

*Fang, H., Chang, B., Yang, Y.
Institute of Nuclear Energy Research, Taiwan*

P.15 Radionuclide Concentrations in Wild Edible Food Plants Collected at the Pueblo de San Ildefonso and Los Alamos National Laboratory Boundary

Fresquez, P., Eisele, W., Whicker, J.
Los Alamos National Laboratory*

P.16 Radiation Dose Due to Inhalation of TENORM Airborne Particles

*Choi, W., Lim, H., Park, Y., Kim, K.
Korea Institute of Nuclear Safety, Kyung Hee University*

P.17 Evaluation of Natural Radioactivity Levels and Estimation of Gamma Dose from Bricks Manufactured in a Local Brick Facility

Osei, G., Williams, T., Jacobs, K., White, A., Billa, J., Han, F., Aceil, S., Adzanu, S., Rice, J.

Alcorn State University, Jackson State University

P.18 Radiological Assessment of Water, Sediment, and Fish Samples Collected from Alcorn State University Research Pond

Tsorxe, I., Walton, J., Cooper, C., Billa, J., Nwaneri, S., Han, F., Aceil, S., Adzanu, S., Shaw, K.

Alcorn State University, Jackson State University

P.19 Radioactivity Studies on Locally Raised Chicken and Chicken Feed

Gidi, M., Dordor, M., Franklin, C., Billa, J., Han, F., Aceil, S., Adzanu, S., Goldsberry, Y.

Alcorn State University, Jackson State University

P.20 Radiometric Analysis of Milk Samples Collected from Dairy Farms Located in the Vicinity of a Nuclear Power Plant

White, D., Carradine, M., Shaw, E., Billa, J., Han, F., Green, I., Aceil, S., Adzanu, S.

Alcorn State University, Jackson State University

P.21 Qualitative Analysis of Isotopic Concentration in Sludge Samples Collected from a Waste Water Treatment Facility

Agordzo, H., Heard, J., Billa, J., Han, F., Winding, K., Aceil, S., Adzanu, S.

Alcorn State University, Jackson State University

P.21A (Formerly THAM-D.2) Radiation Monitoring at Texas Municipal Solid Waste Type 1 Landfills

Strickland, P., Hurst, V., Pustejovski, K.
Texas State Technical College Waco

External Dosimetry

P.22 Selection of an Appropriate Air Kerma Rate Constant for Volumetric Se-75 Sources

Currier, B., Munro, J., Medich, D.
University of Massachusetts, Lowell, Montrose Technology, Inc.

P.23 Accuracy of Effective Dose Estimation in Personal Dosimetry: Comparison between Single-Badge Method and MOSFET Method

Januzis, N., Nguyen, G., Toncheva, G., Lowry, C., Yoshizumi, T.
Duke University

P.24 ThermoLuminescent Neutron Dosimeter Correction Factor Evaluation at Savannah River Site

Sexton, J.L., Sullivan, T.R., Moxley, S.J., Wagoner, D.A., Hogue, M.G., Farrell, W.E., Bolen, A.E.

Savannah River Nuclear Solutions

P.25 Designing a Novel Device for Withdrawal of Radiopharmaceuticals in Nuclear Medicine to Reduce the Dose to the Radiation Workers

*Nazififard, Mehdizadeh Naderi, S.**

Soleimani Meigooni, A., Alavi, M.
Shiraz University, Iran, Comprehensive Cancer Center of Nevada, Las Vegas, Namazi Hospital, Shiraz University of Medical Sciences, Iran

P.26 New Version of External Personnel Dosimetry Performance Test in Taiwan

Chen, C., Fang, H.
Government Officer, Taiwan

P.27 External Photon Dose Coefficients from Air Submersion, Ground Contamination and Water Immersion Based on the New Dosimetric Setting
Yoo, S., Jang, H., Noh, S., Lee, J., Cho, G.

Korea Advanced Institute of Science and Technology (KAIST), Korea Institute of Nuclear Safety (KINS), Daejeon, Korea Radioisotope Association, Seoul, Hanyang University, Seoul

Homeland Security

P.28 Gamma Radiation Detection from a Spreader Bar Crane at the Port of Tacoma

Grypp, M., Marianno, C.
Texas A&M University

P.29 Radiation Dosimetry In and Around High-Energy Cargo and Vehicle Screening Systems

Bergstrom, P.
National Institute of Standards and Technology

Instrumentation

P.30 On-line Delivery of Radiation Detection Lab Instruction Using LabVIEW

Trogstad, R.R., DeVol, T.A.
Clemson University

P.31 Sensitivity of a Portal Monitor to Internally and Externally Deposited Radionuclides

Carey, M., Tries, M.
University of Massachusetts, Lowell, Radiation Safety and Control Services

Internal Dosimetry and Bioassay

P.32 A Comparison Between ICRP 78 Transfer Rates for Am-241 Biokinetics and the Transfer Rates Obtained using IMBA Software

Alomairy, N.
Idaho State University, Pocatello

P.33 Dynamics of Accumulation of Am in Skeleton Based on Autopsy Data of Radiochemical Plant Workers
*Suslova, K., Khokhryakov, V., Burikova, E. *, Sokolova, A.*

Southern Urals Biophysics Institute

P.34 Am-241 Whole Body Counting Efficiency Dependence on Bone Density Variation

Tabatadze, G., Brey, R.
Idaho State University, Pocatello ID

P.35 Comparing National Council on Radiation Protection & Measurements 156 Biokinetic Wound Model Predictions for Am-241 with Simulation, Analysis and Modeling using Intermuscular Injected Monkey Data

Hirayama, T., Brey, R.R., Guilmette, R.A.

Idaho State University, Lovelace Respiratory Research Institute

P.36 Application of National Council on Radiation Protection and Measurements Report No. 156 Wound Model for the Behavior of Pu-238 Contaminated Wounds in Monkeys

Poudel, D., Brey, R., Guilmette, R., Poudel, D.

Idaho State University, Pocatello

P.37 Comparing National Council on Radiation Protection Report 156 Wound Model Biokinetic Predictions for 90Sr in Simulated Wounds in Non-human Primates

Allen, M.B., Brey, R.R., Guilmette, R.A.
Idaho State University, Lovelace Respiratory Research Institute

P.38 Biokinetics of Pu-238 Injected in Nonhuman Primates

Chelidze, N., Brey, R., Guilmette, R.
Idaho State University, Lovelace Respiratory Research Institute

P.39 A New Leg Voxel Model in Two Different Positions for Simulation of the Non-Uniform Distribution of Am-241 in Leg Bones

Khalaf, M., Bery, R., Tolmachev, S. Idaho State University, Washington State University

P.40 Assessment of Radiological Consequence of Gaseous Tritium Light Source

Choi, M., Cho, D., Han, S., Lee, B., Kim, K.

Kyung Hee University, Korea Institute of Nuclear Safety

P.41 Uncertainty in Evaluation of Internal Dose in the Tooth Enamel from Incorporated ⁹⁰Sr: Effect of Variation in Tooth Geometry

Volchkova, A. Yu., Shishkina, E.A. Urals Research Center for Radiation Medicine

P.42 Alpha and Beta Emitters Dose to Bone and Marrow Using a Dynamic Trabecular Bone Model for All Ages

Dant, J., Richardson, R., Nie, L. Purdue University, Atomic Energy of Canada Limited, Canada

P.43 Application of the UF Series of Hybrid Computational Fetal Phantoms to Techa River Internal Dosimetry

Maynard, M., Geyer, J., Aris, J., Shifrin, R., Bolch, W.

University of Florida, Gainesville

Medical Health Physics

P.44 Monte Carlo Simulation of Ambient Dose Equivalent Rates from Patients Administered with Radioiodine Using an MIRD Phantom

Alotaibi, E., Jeong, K., Kim, C., Jung, J.

East Carolina University, Korea Institute of Nuclear Safety

P.45 I-131's Leading 73 at 73: A Bibliometric Analysis of Citation Classics
Sayed, M., Mayhoub, F. KFSH&RC

P.46 Calibration of Optically Stimulated Luminescent Dosimeters at Mammographic Energies

Brown, K., King, S., Chetlun, A., Lorah, B., Tuzzato, S., Schetter, S., Mack, J., Kasales, C., Rambler, S.

Milton S. Hershey Medical Center, Penn State College of Medicine

P.47 Mammography Scatter Dose - A Phantom Study

King, S., Brown, K., Chetlun, A., Tuzzato, S., Lorah, B., Schetter, S., Mack, J., Kasales, C., Rambler, S.

Milton S. Hershey Medical Center, Penn State College of Medicine

P.48 Review of Computed Tomography Dosimetry Programs

Park, I., Yeo, H., Lee, J., Kim, K. Kyung Hee University, Hanshin University, Korea Institute of Nuclear Safety

P.49 Medical Health Physicians and Living without Medical Health Physics

Abdollahi, H., Teymuri, M. Health Physicist, Kerman University of Medical Sciences, Iran, Ilam University of Medical Sciences, Iran

P.50 Estimation of Current Source Activity of a Cs-137 Irradiator by a Combination of Monte Carlo Simulation and Ion Chamber Measurement

Wang, C., Nguyen, G., Gunasingha, R., Dewhirst, M., Yoshizumi, T.

Duke University Medical Centre

P.51 Integration of Physicist Testing with the Equipment Management Program at a Large Health System

Schultz, C., Leger, C., Robertson, S. Beaumont Health System

Operational Health Physics

P.53 Analysis of Occupational Exposure in Korea

Lee, S., Seo, G., Park, I., Lee, C., Choi, M., Kim, K.*

Korea Institute of Nuclear Safety, Kyung Hee University

P.54 Evaluation of the Emergency Planning Zone for Lungmen Nuclear Power Plant in Taiwan

Wang, Z., Chang, S., Wu, J., Yang, Y., Chang, B.

China Medical University, Taiwan, ROC

P.55 The Reasonable Method for Estimating the Limited Low Population Zone in Case of Design Basis Loss of Coolant Accident

Lin, C., Chang, S., Chang, B.

Institute of Nuclear Energy Research, Taiwan, ROC

P.56 Confirmation of Dosimetric Material to Be Used in Tissue-Phantoms for Radiological Diagnosis

Mann, K.S., Sidhu, G.S.

Dravidian University, India, Govt. S.S.School., Jodhpur-Romana, India

P.57 Two Computer Codes for Measurements in Radioactivity that Yield Bounds for the Precision of Measurements at Specified Confidence Levels

Potter, W., Strzelczyk, J.

Consultant, University of Colorado Hospital

P.58 Contamination Analysis of Radioactive Samples in Focused Ion Beam Instruments

Evelan, A., Brey, R.

Idaho State University

P.59 Health Physics Applications for Mobile Devices - Development of a Customizable Photon Shielding Calculator

Conner, J., Patel, P., Brookins, D., Jokisch, D.

Francis Marion University

Regulatory/Legal Issues

P.60 Health Physics Applications for Mobile Devices - Development of a Radiation Protection Regulations Application

Patel, P., Brookins, D., Conner, J., Jokisch, D.

Francis Marion University

P.61 US Nuclear Regulatory Commission's Safety Culture Policy Statement

Flannery, C.

US Nuclear Regulatory Commission

Risk Analysis

P.62 Incidence of Chronic Bronchitis in the Mayak Workers Cohort

Bannokova, M.V., Azizova, T.V., Zhuntova, G.V., Belyaeva, Z.D., Mo-

seeva, M.B., Grigoryeva, E.S., Krupenina, L.N., Bragin, E.V.

Southern Urals Biophysics Institute, Ozyorsk, Russia

P.64 Relative Risk of Thyroid Cancer Incidence for Residents of Two Districts of Ozersk

Martinenko, I.A., Sokolnikov, M.E.

Southern Urals Biophysics Institute

P.65 Aviation Safety and Radiation Safety Parallels

Wisne, R.

American Airlines, Retired

P.66 Solid Cancer Incidence Risk for Mayak Production Association Workers Preliminary Results

Kuznetsova, I.S., Labutina, E.V.

Southern Urals Biophysics Institute, Ozersk, Russia

P.67 Assessment of Feasibility to Analyze Risk of Cataract in Mayak Workers Cohort

Bragin, E.V., Azizova, T.V., Bannikova, M.V.

Southern Urals Biophysics Institute, Russia

Training and Education

P.68 A New Graduate Certificate Program in Radiation Protection being Developed at Washington State University Tri-Cities

Stansbury, P., Pratt, J.

Dade Moeller & Associates, Washington State University Tri-Cities

Works-In-Progress

P.69 Thermal Investigation of EBT2 GafChromic Dye Films

Aydarous, A., Abdullah, S.

Taif University-Al-Hawiah, Saudi Arabia

P.70 Measurement and Comparison of Surface Dose Distribution for 6 MV Photon Beams using Conformal and IMRT Techniques

Al-Omari, E., Aydarous, A., Elsahragati, A., Saoudi, A.

Taif University, Al Hada Armed Hospital, King Abdullah International Medical Research Center

P.71 Analysis of Physical and Chemical Properties of Industrial Alpha-Emitting Aerosols

Sypko, S.A., Khokhryakov, V.V.

Southern Urals Biophysics Institute, Russia

P.72 Radiosensitivity and Adaptive Response of Blood Lymphocytes in the First-Generation Offspring of Fathers Chronically Exposed to Radiation

Akhmadullina, Yu., Akleyev, A.

Urals Research Center For Radiation Medicine, Russia

P.73 Occupational Safety and Health Administration Renews its Alliance with the Laser Institute of America; What Can You Do as a Health Physicist to Promote Laser Safety?

Haes, D.L., Sams, B.

BAE Systems, Laser Institute of America

P.74 Surveillance for Radiation Exposures Using the National Poison Data System

Chang, A., Law, R., Martin, C., Schier, J. Centers for Disease Control and Prevention, Atlanta GA

P.75 Environmental Dose Assessment for the Maralinga Nuclear Test Site

Kaspar, M.J., Johansen, M., Brandl, A.

Colorado State University

3:00-5:00 PM

Room 314

MPM-A: Risk Analysis

Co-Chairs: Marvin Goldman, Steven Simon

3:00 pm

MPM-A.1

Cancer Risk from Medical Exposures to Ionizing Radiation

Raabe, O.G.

University of California, Davis

3:15 pm

MPM-A.2

Risk of Thyroid Cancer after Adult Radiation Exposure: Time to Reassess?

Simon, S., Mabuchi, K.

National Cancer Institute

3:30 pm

MPM-A.3

Best Estimate Radiation Health Risk in Operational Decision Making

Daxon, E., Cezeaux, J.

Battelle Memorial Institute, US School of Aerospace Medicine

3:45 pm

MPM-A.4

Potential Biomedical and Environmental Health Risks From Plutonium-238 Accidents during Launch of the Nuclear Powered Martian Rover.

Goldman, M., Anspaugh, L., Nelson, R., Poppell, S., Scott, R., Tupin, E. University of California, Davis, University of Utah, US Department of Energy, US EPA, NASA

4:00 pm

MPM-A.5

Reconstruction of Occupational Exposure from Historical Nuclear Medicine Procedures

Drozdovitch, V., Lee, C., Bouville, A., Linet, M.S., Melo, D.R., Simon, S.L. National Cancer Institute, National Institutes of Health, National Cancer Institute (retired), Institute of Radiation Protection and Dosimetry, Brazil

4:15 pm

MPM-A.6

Contemporary Building Shielding Factors for Level Three Probabilistic Risk Assessments

Dickson, E., Hamby, D. Oregon State University

4:30 pm

MPM-A.7

Preventing Catastrophic Incidents by Predicting Where They are Most Likely to Occur and Why

Caldwell, C., Larmey, C. Pacific Northwest National Laboratory

4:45 pm

MPM-A.8

Health Physics Applications for Mobile Devices - Development of a Personal Radiation Dose Calculator

Brookins, D., Conner, J., Patel, P., Jokisch, D. Francis Marion University

3:00-4:45 PM

Room 315

MPM-B: Decommissioning I

Co-Chairs: Ryan Ford, Greg Bright

3:00 pm

MPM-B.1

Using Direct H-3 and C-14 Measurements as an Economical and Regulatory-Compliant Tool for Final Status Surveys at a Defense Research Laboratory

Wiblin, C., Barbour, E., Reyes, A., Davidson, M.

Tidewater, Inc., USACE

3:15 pm

MPM-B.2

Remediation Survey in a Desert Environment

Cehn, J.

Applied Sciences Co.

3:30 pm

MPM-B.3

Decommissioning Cost Estimation Process for a 10 MW Reactor

Mason, T., Hay, S., Honerlah, H.

Cabrera Services, USACE

3:45 pm

MPM-B.4

Characterization of the Neely Research Center

Hansen, T., Bailey, E., Vitkus, T., Zakir, N.

Ameriphysics, ORAU, Georgia Institute of Technology

4:00 pm

MPM-B.5

A Case Study Assessing Variability in Background Radioactivity for Building Materials

Hay, S., Mason, T., Winters, M., Racino, R.

Cabrera Services

4:15 pm

MPM-B.6

Practical Considerations for the Disposal of a Teletherapy Cobalt-60 Source Utilizing Off-Site Source Recovery Program (OSRP)

Haynes, T., Vasudevan, L., Menchaca, D.

Texas A&M University

4:30 pm **MPM-B.7**
Stanford Linear Accelerator Center
(SLAC) Disassembly and Disposition:
Material Release Program
*Ford, R.M., Rokni, S.H., Liu, J.C., Frey,
W., Allan, J.*
SLAC

3:00-4:00 PM **Room 306**

MPM-C: Modular Reactors

Chair: Patricia Milligan

3:00 pm **MPM-C.1**
Small Modular Reactors- What Are
They?
Staff
USNRC, Office of New Reactors

3:30 pm **MPM-C.2**
Emergency Preparedness and Other
Licensing Issues for Small Modular
Reactors
Milligan, P.
USNRC

3:00-4:15 PM **Room 307**

**MPM-D: Operational Health
Physics & Training, Part 1**

*Co-Chairs: Derek Jokisch, Drake
Brookins*

3:00 pm **MPM-D.1**
Utilizing Apple iPad Technology in
Operational Radiation Safety Appli-
cations
*Linsley, M.E., Houser, M.L., Phillips,
A.M.**
Penn State University

3:15 pm **MPM-D.2**
Health Physics Applications for Mobile
Devices - Overview of the Develop-
ment Process and Features of Three
Applications
*Jokisch, D., Brookins, D., Conner, J.,
Patel, P.*
Francis Marion University

3:30 pm **MPM-D.3**
Lessons Learned by Academic-Indus-
try Cooperation in Workforce Develop-
ment In Health Physics
Aceil, S.M., Billa, J.
Alcorn State University

3:45 pm **MPM-D.4**
The Radiological Health Handbook: A
Brief History of a Useful Document
Mannis, D., Johnson, T.E.
Colorado State University

4:00 pm **MPM-D.5**
A Risk-Based Radiation Safety Pro-
gram for Radiation-Generating Devi-
ces (RGDs)*
*Shingleton, K.L., Sundsmo, T.B., Bas-
tian, C.T.*
*Lawrence Livermore National Labora-
tory (LLNL)*

3:00-5:00 PM **Room 308**

MPM-E: Homeland Security

Chair: Scott Kirk

3:00 pm **MPM-E.1**
The International Nuclear Security Ed-
ucation Network (INSEN)
*Harris, J., Braunegger-Guelich, A.,
Duncan, C., Heyes, A., Majeed, T.,
Nikonov, D.*
*Idaho State University, International
Atomic Energy Agency, US Depart-
ment of Energy, King's College, Paki-
stan of Engineering and Applied Sci-
ence, University of Georgia*

3:15 pm **MPM-E.2**
The Mississippi Radiation Response
Volunteer Corps Trains Non-Radiation
Professionals to Respond During A
Radiation Emergency
Stringfellow, S.
Mississippi State Department of Health

3:30 pm **MPM-E.3**
Optimizing Local, National and Global Nuclear Emergency Response with Connected and Situationally Aware Instrumentation
Mazur, V.
Mazur Instruments

3:45 pm **MPM-E.4**
RAP Region 4 Informal Testing on Search Equipment
Beekman, M., Hayes, R.
URS/WTS Division

4:00 pm **MPM-E.5**
Population Protection and Monitoring in Response to Radiological Incident
Lee, E.K., Pietz, F.H.
Georgia Institute of Technology, Centers for Disease Control and Prevention

5:00 pm **Homeland Security Business Meeting**

3:00-5:00 PM **Room 313**

MPM-F: Special Session: Emerging Issues for Radiation Protection and Nanotechnology

Chair: Lorraine Day

Emerging Issues for Radiation Protection and Nanotechnology

Marceau-Day, M.L., Cash, L.J., Hoover, M.D., Walker, L.S.

LSU, LANL, NIOSH/CDC, BNL

3:00-5:00 PM **Room 311**

MPM-G: Movies

Again this Year!

Tuesday, 10:00-11:30 am, Convention Center Room 311

Workshop: Publishing in Health Physics and Operational Radiation Safety

Speakers: Mike Ryan, Deanna Baker, Craig Little, MaryGene Ryan

A workshop geared towards first-time authors who are interested in publishing but are uncertain of the process. There will be a tutorial as well as presentations from both Editors-in-Chief. This workshop will answer many questions regarding the flow of a manuscript from submission to publication. This is also a good refresher for authors who have already published with HPJ or ORS but would like to have a better understanding of the process.

TUESDAY

7:00-8:00 AM **310**
CEL-4 ANSI N43.1 Radiation Safety for the Design and Operation of Particle Accelerators
Walker, L.S.
Los Alamos National Laboratory

7:00-8:00 AM **312**
CEL-5 Nanoparticle-Based Radiation Detectors and the Use of Radiation for Nanoparticle Detection
Marceau-Day, L., Madsen, L.
CMAD/LSU

7:00-8:00 AM **319**
CEL-6 Comparison of Best Estimate Radiation Health Risk with Compliance-Based Health Risk Assessment - Part 1
Daxon, E.G., Cezeaux, J.

8:30 AM-Noon **Room 314**

TAM-A: Homeland Security and Decommissioning Section Joint Special Session I
Co-Chairs: Wayne Glines, Debra McBaugh

8:30 am **TAM-A.1**
The Radiological Cleanup of Enwetak Atoll
Tupin, E.
US Environmental Protection Agency

9:00 am **TAM-A.2**
Risk Assessment and Socio-Economic Considerations for Recovery Following Radiological Contamination Events
Tupin, E., Boyd, M., Mosser, J., Cardarelli, J.
US Environmental Protection Agency

10:00 am **BREAK**

10:30 am **TAM-A.3**
Emergency Response Lessons Learned from the Fukushima Daiichi Reactor Accidents
Kennedy, W., Moeller, M.
Dade Moeller

11:00 am **TAM-A.4**
Decontamination Demonstration in Japan: An Overview of Field Experience
Engelhard, S., Bahl, C., Schofield, W., Herrington, III, W.
Dade Moeller

11:30 am **Panel Discussion**

8:15 AM-Noon **Room 315**

TAM-B: Special Session: AAHP I: Overview of the National Ignition Facility
Co-Chairs: Kathy Shingleton, Rick Thacker

8:15 AM
Introduction/Welcome

8:20 am **TAM-B.1**
Overview of the National Ignition Facility
Brereton, S.J., Papp, F.A.
Lawrence Livermore National Laboratory (LLNL)

9:00 am **TAM-B.2**
Radiological Design Aspects of the National Ignition Facility
Kohut, T.R., Brereton, S.J., Khater, H.Y.
Lawrence Livermore National Laboratory (LLNL)

9:30 am **TAM-B.3**
Safety Systems and Access Controls in the National Ignition Facility
Reed, R.K., Bell, J.C., King, J.J., Thacker, R.L.
Lawrence Livermore National Laboratory (LLNL)

10:00 am	BREAK	8:30 am	TAM-C.2
10:30 am	TAM-B.4		
Tritium and Ignition Target Management at the National Ignition Facility <i>Draggou, V.G., Brereton, S.J., Kohut, T.R., Parham, T.G.</i> Lawrence Livermore National Laboratory (LLNL)		Radiation Protection Aspects Concerning Operation of the 40 MeV Telescope Array-Linear Accelerator in the Western Utah Desert <i>Beitollahi, M., Matthews, J.N., Langley, K., Shibata, T., Fukushima, M.</i> University of Utah, University of Tokyo, Chiba, Japan	
11:00 am	TAM-B.5	8:45 am	TAM-C.3
Estimation of Decay Dose Rates and Dose Management in the National Ignition Facility <i>Khater, H.Y., Beale, R.M., Dillon, J.T., Epperson, P.M., Kasper, K.M., Kohut, T.R., Thacker, R.L.</i> Lawrence Livermore National Laboratory (LLNL)		Planning for Cyclotron Decommissioning <i>Mohaupt, T., Snyder, S.</i> St. Jude Children's Research Hospital	
11:30 am	TAM-B.6	9:00 am	TAM-C.4
Managing NIF Safety Equipment in a High Neutron and Gamma Radiation Environment <i>Datte, P.S., Eckart, M.J., Jackson, M.C., Khater, H.Y., Newton, M.A.</i> Lawrence Livermore National Laboratory (LLNL)		Assessing Radiation Safety Requirements for a New Insertion Device <i>Marceau-Day, M.L.</i> LSU	
		9:15 am	TAM-C.5
		Radiological Controls and Dose Estimates at the Facility for Advanced Accelerator Experimental Tests (FACET) <i>Frey, W.D., Allan, J., Clarke, C.</i> SLAC National Accelerator Facility	
Noon-2:00 PM		9:30 am	TAM-C.6
Room 202		Demolition of the Bevatron, A Look at the Health Physics Challenges <i>Fairchild, R.</i> Lawrence Berkeley National Laboratory	
AAHP Awards Luncheon			
Tickets available at the HPS Registration Desk			
8:15 AM-Noon		9:45 am	BREAK
Room 306		10:15 am	TAM-C.7
TAM-C: Accelerator		Approved Method to Estimate Radionuclide Emissions from an Open Installation Accelerator <i>Sandvig, M.</i> Idaho National Laboratory	
Co-Chairs: Marcia Torres, Lorraine Day			
8:15 am	TAM-C.1		
Measurements of Ionizing Radiation Created by High-Intensity Lasers <i>Bauer, J., Liu, J., Prinz, A., Rokni, S., Tran, H., Xia, Z.</i> SLAC National Accelerator Laboratory			

10:30 am TAM-C.8

Review of the Radioactive Material Experiments (RAM) at Stanford Synchrotron Radiation Lightsource (SSRL) at SLAC National Accelerator Laboratory
Torres, M.

SLAC National Accelerator Laboratory

10:45 am TAM-C.9

ANSI Standard N43.1 (2011): "Radiation Safety for the Design and Operation of Particle Accelerators"

Liu, J., Walker, L.

SLAC, BNL

11:00 am TAM-C.10

Prospective Determination of Sample Handling Requirements

Schwahn, S.

Oak Ridge National Laboratory

11:15 am TAM-C.11

Application of the FLUKA Monte-Carlo Code at Jefferson Lab

Kharashvili, G., Fasso, A., Degtiarenko, P.

Jefferson Lab

11:30 am TAM-C.12

Radiation Safety for Photon Beamlines at LCLS

Prinz, A.A., Bauer, J.M., Liu, J.C., Qui, R., Rokni, S.H., Xia, Z.*

SLAC National Accelerator Center, Tsinghua University, Beijing

11:45 am TAM-C.13

NSLS-II Accelerator Readiness Review and Commissioning

Walker, L.S., Zafonte, F., Casey, R., Job, P.K., Filler, R.

Brookhaven National Laboratory

Noon Accelerator Section Business Meeting

8:15 AM - Noon Room 307

TAM-D: Department of Energy Special Session on Atomic Bomb Survivor Dosimetry - Residual Radiation Exposure

Co-Chairs: Harry Cullings, Tetsuji Imanaka

8:15 am TAM-D.1

Importance of Atomic Bomb Survivors Data

Boice, J. (Dade Moeller Lecturer)

National Council on Radiation Protection and Measurements

8:30 am TAM-D.2

Residual Radiation Exposure at Hiroshima and Nagasaki - A Historical Perspective

Kerr, G.

Kerr Consulting, Oak Ridge Associated Universities

8:45 am TAM-D.3

Our Radiation Dosimetry Study in Hiroshima

Hoshi, M.

Research Institute for Radiation Biology and Medicine, Hiroshima University, Japan

9:00 am TAM-D.4

Review of Residual Radiation Survey During the Early Stage after the Hiroshima Bombing

Imanaka, T.

Research Reactor Institute, Kyoto University, Japan

9:15 am TAM-D.5

Fallout Deposition in Hiroshima Where Gamma-Ray Thermoluminescence Measurements Exceed the Dosimetry System (DS02) Doses

Egbert, S., Kerr, G.

Science Applications International Corporation, Kerr Consulting

- 9:30 am** **TAM-D.6**
Some Nuclear Fallout Characteristics of the Hiroshima Detonation
Spriggs, G.
LLNL
- 9:45 am** **BREAK**
- 10:15 am** **TAM-D.7**
Activation Analysis for Soils of Hiroshima City and Estimation of Gamma-Ray Dose Due to Neutron-Induced Activated Soil by Hiroshima Atom Bomb
Endo, S.
Graduate School of Engineering, Hiroshima University, Japan
- 10:30 am** **TAM-D.8**
Survey of Beta-Dose Assessment Methodologies Applicable to Hiroshima
Weitz, R.L.
Science Applications International Corporation (SAIC)
- 10:45 am** **TAM-D.9**
Preliminary Results of Uranium-236, Plutonium-239, 240 and Cesium-137 Measurements in Samples Related With 'Black Rain' after the Hiroshima Atomic Bomb
Sakaguchi, A.
Graduate School of Science, Hiroshima University, Japan
- 11:00 am** **TAM-D.11**
Reconstruction of Spatial-Time Distribution of 'Black Rain' In Hiroshima Based on Statistical Analysis of Survey of Atomic Bomb Survivors
Ohtaki, M.
Research Institute for Radiation Biology and Medicine, Hiroshima University, Japan
- 11:15 am** **TAM-D.12**
Investigation on Circular Asymmetry of Geographical Distribution of Mortality Risk in Hiroshima Atomic Bomb Survivors
Tonda, T.
Research Institute for Radiation Biology and Medicine, Hiroshima University, Japan
- 11:30 am** **TAM-D.13**
Doses Received by Atomic-Bomb Survivors in the Life-Span Study Cohort from Known Residual Radiation Sources in Hiroshima and Nagasaki
Cullings, H.
Radiation Effects Research Foundation
- 11:45 am** **Discussion**
- 8:15-11:30 AM** **Room 308**
- TAM-E: Environmental Section
Special Session: Tritium in the Environment**
Co-Chairs: Jeff Whicker, Mark Miller
- 8:15 am** **TAM-E.1**
Tritium Oxide Deposition Velocity for Use at the Savannah River Site
Lee, P., Murphy, C., Viner, B., Hunter, C., Moore, M.
Savannah River National Laboratory, Savannah River Nuclear Solutions
- 8:30 am** **TAM-E.2**
Tritium in Drinking Water - Science, Regulation and Society
Chambers, D.B.
SENES Consultants Limited
- 9:00 am** **TAM-E.3**
Tritium Releases from Nuclear Power Plants
Harris, J.
Idaho State University
- 9:30 am** **BREAK**

- 10:00 am** **TAM-E.4**
 A Microdosimetric Study on Radiation Quality of Tritium
Chen, J.
Health Canada
- 10:30 am** **TAM-E.5**
 Research and Development of Environmental Tritium Modelling, an Update
Galeriu, D.C., Melintescu, A.M.
Horia Hulubei National Institute of Physics and Nuclear Engineering
- 11:00 am** **TAM-E.6**
 Corrections for Measurements of Tritium in Subterranean Vapor using Silica Gel
Whicker, J., Dewart, J., Allen, S., Eisele, W., McNaughton, M., Green, A.
Los Alamos National Laboratory
- 11:15 am** **TAM-E.7**
 Tritium Uncertainty Analysis for Surface Water Samples at the Savannah River Site
Atkinson, R., Eddy, T., Kuhne, W., Janik, T., Brandl, A.
Colorado State University Department of Environmental & Radiological Health Sciences, Savannah River Nuclear Solutions, Savannah River National Laboratory
- 11:30 am** **Environmental Section Business Meeting**
- 8:15-11:45 AM** **Room 313**
TAM-F: Medical Section Special Session: Patient Release
Co-Chairs: Vicki Morris, Steve King
- 8:15 am** **TAM-F.1**
 Radionuclide Therapy Patient Release: An Overview
Siegel, J.A.
Nuclear Physics Enterprises
- 9:00 am** **TAM-F.2**
 Radioactive Patient Release - Calculational Aspects
Stabin, M., Siegel, J.
Vanderbilt University, Nuclear Physics Enterprises
- 9:15 am** **TAM-F.4**
 An RSO Perspective on I-131 Patient Release Criteria and Patient Recommendations
Nelson, K.
Mayo Clinic Florida
- 9:30 am** **BREAK**
- 10:00 am** **TAM-F.5**
 The Release of Patients Treated with I-131A Regulator's Perspective
Luehman, J.G., Fuller, M.L. (presented by Daibes, S.)
US NRC
- 10:15 am** **TAM-F.6**
 Developing a Health Physics Society Position Statement on Patient Release
Langhorst, S.M.
Washington University in St. Louis
- 10:45 am** **TAM-F.7**
 Dose Estimates to Hotel Workers from Thyroid Cancer Patients treated with I-131
Lambert, K.
Drexel University
- 11:00 am** **Panel Discussion**
- 11:45 am** **Medical Section Business Meeting**

2:30-4:30 PM Room 314

TPM-A: Homeland Security and Decommissioning Section

Joint Special Session II

*Co-Chairs: Wayne Glines,
Debra McBaugh*

2:30 pm TPM-A.1

Short And Long-term Considerations For Food Interdiction Following Radiological Emergencies

Noska, M.A., Hansen, P.A., Cunningham, W.C.

US Food and Drug Administration

3:00 pm TPM-A.2

Fukushima and the Future of Population Monitoring

Whitcomb, Jr., R., Miller, C., Ansari, A.

Centers for Disease Control and Prevention

3:30 pm BREAK

4:00 pm TPM-A.3

A Rapid Method for Determining Radiation Exposure Based on Gene Expression Profiling

Terbrueggen, R., Abedi, M., Jacobs, A., Gerstner, A., Coty, W., Chute, J., Dressman, H., Lucas, J., Ross, J.

DxTerity Diagnostics, Duke University

4:30 pm Decommissioning Section Business Meeting

2:15-5:00 PM Room 315

TPM-B: Special Session: AAHP II: Overview of the National Ignition Facility

*Co-Chairs: Kathy Shingleton,
Tom Kohut*

2:15 pm TPM-B.1

Assuring Operational Readiness of the National Ignition Facility

Brereton, S.J., Papp, F.A.

Lawrence Livermore National Laboratory (LLNL)

2:30 pm TPM-B.2

Standing Up the Radiation Protection Program at the National Ignition Facility

Kohut, T.R., Beale, R.M., Dillon, J.T., Thacker, R.L.

Lawrence Livermore National Laboratory (LLNL)

3:00 pm BREAK

3:30 pm TPM-B.3

Experiences in Managing Radioactive Material at the National Ignition Facility

Thacker, R.L., Beale, R.M., Dillon, J.T., Epperson, P.M., Kasper, K.M., Kohut, T.R.

Lawrence Livermore National Laboratory (LLNL)

4:30 pm Roundtable

5:00 PM AAHP Open Meeting

2:30-5:30 PM Room 306

TPM-C: Special Session: Integration of Local Radiation Experts in Emergency Response Paradigms

*Co-Chairs: Tom Mohaupt,
Rob Forrest*

2:30 pm TPM-C.1

Curious Disintegration

Fung, S.

FBI

3:30 pm BREAK

4:00 pm TPM-C.2

Partnerships for Improved Radiological Response

Forrest, R., Mahoney, A., Fink, M., Baldini, E.

University of Pennsylvania, Philadelphia Police Department

4:30 pm **TPM-C.3**

Radiological Disaster Preparedness in Memphis

Mohaupt, T., Lemieux, B., Hassell, T., Vanzandt, S., Howell, A., McEwen, P., Thuo, K., Maquire, W.

St. Jude Children's Research Hospital, University of Tennessee, Memphis, Federal Bureau of Investigation, Memphis Police Department, Shelby County Health Department, Shelby County Sheriff's Office, Methodist Hospital Memphis

5:00 pm **Discussion**

2:30-5:15 PM **Room 307**

TPM-D: NESHAPS Special Session: Radioactive Air Annual Meeting

Co-Chairs: Gustavo Vázquez, Matthew Barnett

2:30 pm **TPM-D.1**

Introduction

Barnett, M.

Pacific Northwest National Laboratory

2:45 pm **TPM-D.2**

DOE-HQ: Subpart H Report

Vázquez, G.

US Department of Energy-HS

3:00 pm **TPM-D.3**

Standards Directives and Guides

Glissmeyer, J.

Pacific Northwest National Laboratory

3:30 pm **BREAK**

4:00 pm **TPM-D.4**

EPA-HQ: Regulatory Oversight

Rosnick, R.

US Environmental Protection Agency

4:30 pm **TPM-D.5**

Technical Forum

Barnett, M.

Pacific Northwest National Laboratory

2:30-5:15 PM **Room 308**

TPM-E: External Dosimetry

Co-Chairs: Matt Smith, Ryan Manger

2:30 pm **TPM-E.1**

Dosimetric Implications of the New ICRP 103 Recommendations on Radiation Protection Regulation in the US

*Bollinger, B., Su, L., Caracappa, P., Xu, X., Rhodes, A.**

Rensselaer Polytechnic Institute

2:45 pm **TPM-E.2**

A Database for Effective Doses and Dosimeter Responses from External Photon Exposures Using Voxel Phantoms and ICRP 103 Recommendations

Su, L., Xu, X.G.

Rensselaer Polytechnic Institute

3:00 pm **TPM-E.3**

A Deformable Computational Human Phantom for Animated Radiation Dosimetry Simulation Using Motion-Capture Data

Vazquez, J., Ding, A., Caracappa, P., Xu, X.

Rensselaer Polytechnic Institute

3:15 pm **TPM-E.4**

Age-Dependent Organ Dose from a Monoenergetic Semi-Infinite Cloud Source of Gammas

Manger, R., Eckerman, K.

Oak Ridge National Laboratory

3:30 pm **BREAK**

4:00 pm **TPM-E.5**

Comparison between Double-Badge and Single-Badge Personal Dosimetry

Januzis, N., Daigle, L., Miller, M., Yoshizumi, T.

Duke University

4:15 pm **TPM-E.6**
High Dose Response of the Navy's Dt-702 Thermoluminescent Dosimeter
Timberlake, M., Nelson, M., Sucheta, A., Murray, M.
US Naval Academy, Naval Dosimetry Center

4:30 pm **TPM-E.7**
Estimating the Effective Dose Equivalent During Transport Radioactive Material Using the Two Dosimeter Approach
Alghamdi, A.S.
National Center for Mathematics and Physics, KACST

4:45 pm **TPM-E.8**
Beta Dose to Skin as Function of Height
Moussa, H., Manger, R., Eckerman, K.
University of Tennessee, Oak Ridge National Laboratory

5:00 pm **TPM-E.9**
Determination of Beta Dose-Point-Kernels for High Z Sources in Non-Homogeneous Geometries
Mangini, C.D., Caffrey, J.A., Hamby, D.M.
Oregon State University, Department of Nuclear Engineering and Radiation Health Physics

2:30-5:15 PM **Room 313**

TPM-F: Regulatory Issues

Co-Chairs: Edward Maher, Levan Tkavadze

2:30 pm **TPM-F.1**
Recent Developments in Environmental Radiation Protection in the UK
Englefield, C. (G. William Morgan Lecturer)
Radioactive Substances Regulation, Environment Agency

3:30 pm **TPM-F.2**
Program Update - Part B under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA)
*Moeller, M., Maher, E. *, Kimpan, P.*
Dade Moeller

3:45 pm **BREAK**
4:15 pm **TPM-F.3**
Moving Radiation Protection to a More Science-Based Foundation:A Call to Action!
Miller, M., Meyer, H., Johnson, J.
Sandia National Laboratories, Keystone Scientific, Sopris Environmental

4:30 pm **TPM-F.4**
International Initiatives on the Control of Radioactive Material in Scrap Metal
Reber, E.
International Atomic Energy Agency

4:45 pm **TPM-F.5**
Cross-Check Programs - Ways to Operational Excellence for Nuclear Power Industry
Tkavadze, L.
Eckert & Ziegler Analytics

5:00 pm **TPM-F.6**
Russian-Norwegian Cooperation in Regulation of the Radiation Protection in the Northwest Russia
*Shandala, N.K., Seregin, V.A. *, Sneve, M.K.*
Federal Medical Biophysical Centre, Russia, Moscow, Norwegian Radiation Protection Authority, Norway, Oslo

2:30-5:00 PM **Room 311**

TPM-G: Movies

7:00-10:00 PM Hyatt Hotel Ballroom

HPS Awards Banquet

WEDNESDAY

7:00-8:00 AM **309**

CEL-7 Safety (Mis)Communications – Say What You Mean and Mean What You Say

Tarpinian, J.

SLAC National Accelerator Laboratory

7:00-8:00 AM **310**

CEL-8 Calculating External Beta-Ray Dose

Bauhs, J.A.

3M Corporation

7:00-8:00 AM **312**

CEL-9 Statistical Sampling and Analysis Approaches for Waste Disposal and Decommissioning Projects

Rucker, T.L.

SAIC

7:00-8:00 AM **319**

CEL-10 Comparison of Best Estimate Radiation Health Risk with Compliance-Based Health Risk Assessment - Part 2

Daxon, E.G., Cezeaux, J.

8:30-11:45 AM **Room 314**

WAM-A: Environmental I

*Co-Chairs: James Reese,
Mike Winters*

8:30 am **WAM-A.1**

Long Term Measurement of the Unattached Fraction of ²²²Rn Decay Products Using ²¹⁰Pb/²¹⁰Po

Harley, N., Chittaporn, P.

New York University School of Medicine

8:45 am **WAM-A.2**

Radon In Natural Gas from Marcellus Shale

Resnikoff, M.

RWMA

9:00 am **WAM-A.3**

Correlation of Sensitive Gamma Scanning Data with Soil Gamma Spectrometry Results

Thompson, S., Lit, P., Billock, P., Dempsey, G.

HydroGeoLogic, Inc. (HGL), United States Environmental Protection Agency

9:15 am **WAM-A.4**

Comparing Clean Up Criteria for Natural Uranium at a Former Uranium Recovery Site in the State of Texas to the Radium Benchmark Approach

Manglass, L.

SENES Consultants, Ltd

9:30 am **WAM-A.5**

Radiological Environmental Protection Program at Stanford Linear Accelerator Center (SLAC)

Chan, I.

Stanford Linear Accelerator Center (SLAC)

9:45 am **WAM-A.6**

Approved Alternative Method for Stack Sampling at the Idaho National Laboratory

Glissmeyer, J., Flaherty, J., Solle, T.

Pacific Northwest National Laboratory, Idaho National Laboratory

10:00 am **BREAK**

10:30 am **WAM-A.7**

Oregon State University's Radiological Support for a Woods Hole Oceanographic Institute Research Cruise near Fukushima Dai'ichi

Caffrey, J., Higley, K., Farsoni, A., Smith, S., Menn, S.

Oregon State University

10:45 am **WAM-A.8**
Improving the Dosimetric Model of the International Commission on Radiological Protection's Reference Crab
Caffrey, E., Higley, K.
Oregon State University

11:00 am **WAM-A.9**
Bioturbation by *Lumbricus terrestris* in Soil Contaminated with Cs-134
Whitlow, J., Higley, K., Bytwerk, D., Reese, S., Robertson, A.
Oregon State University

11:15 am **WAM-A.10**
Idaho Environmental Samples Demonstrating Penetration Depth of Iodine from the Fukushima Daiichi Reactors
Jensen, A.
Idaho State University

11:30 am **WAM-A.11**
Establishment of Concentration Ratios for Riparian and Shrub Steppe Areas of the Eastern Washington Columbia Basin
Napier, J., Higley, K., Houser, E., Bytwerk, D., Minc, L.
Oregon State University

8:15 AM-Noon **Room 315**

WAM-B: CRSO

Chair: Marcum Martz

8:15 am **WAM-B.1**
Status of NRC Brachytherapy Medical Event Definition
Daides, S.
NRC

8:45 am **WAM-B.2**
Auditing Brachytherapy Written Directives/Treatment
Pickering, C. (Presented by Jacobs, N.)
City of Hope Cancer Center

9:15 am **Current Issues in Brachytherapy**

10:15 am **BREAK**

10:45 am **WAM-B.3**
Super-Luminescent Diode IR Non-Laser Hazards
Martz, M.
Jet Propulsion Lab

11:15 am **Medical Laser Discussion**

Noon **RSO Section Meeting**

8:15-11:45 AM **Room 306**

WAM-C: Medical Health Physics I

Co-Chairs: Orhan Suleman, John Jacobus

8:15 am **WAM-C.1**
Direct Analytical Equation for Entrance Skin Dose Calculation from X-ray Beam Variables
Soares, F., Costa, M., Borba, A.
IF-SC/Brazil

8:30 am **WAM-C.2**
Estimating Pediatric CT Doses using Anthropomorphic Phantoms
Kost, S.D., Price, R., Stabin, M.G., Pickens, D.R., Clark, J.H.D., Carver, D.E.
Vanderbilt University

8:45 am **WAM-C.3**
Monte Carlo Simulations of Adult and Pediatric Computed Tomography Exams: Validation Studies of Organ Doses with Physical Phantoms
Long, D., Lee, C., Tien, C., Fisher, R., Hintenlang, D., Bolch, W.
University of Florida, National Cancer Institute

9:00 am **WAM-C.4**
Development of a Computed Tomography as Low as Reasonably Achievable Program at a Large Medical Institution
Johnson, P., Dong, F., Hulme, K.
Cleveland Clinic

- 9:15 am** **WAM-C.5**
Position Sensitivity of Calculated Dose-Length-Product-to-Effective-Dose Conversion Factors in Computed Tomography Examination
Gao, Y., Ding, A., Caracappa, P., Xu, X.
Rensselaer Polytechnic Institute
- 9:30 am** **WAM-C.6**
Task Specific Quantification of Positron Emission Tomography Technologist Exposure Components Using In-Clinic History from Personal Radiation Detectors
Scott, A., Yoshizumi, T., Turkington, T., Nguyen, G.*
Duke University
- 9:45 am** **WAM-C.7**
CDC's Radiological Assessment Activities in the Cardiogen-82 Breakthrough Investigation
Whitcomb, R., Ansari, A., Buzzell, J., Evans, L., Kazzi, Z., Lewis, L., Chang, A., Pillai, S., Jones, R., Saunders, D.
CDC
- 10:00 am** **WAM-C.8**
The Joint Commission: Elements of Performance in Nuclear Medicine
Kroger, L.
University of California, Davis Health System
- 10:15 am** **BREAK**
- 10:45 am** **WAM-C.10**
Calculations of the Therapeutic Absorbed Dose and Secondary Neutron Production in Proton Therapy Using the Geant4 Monte Carlo Toolkit
Harvey, M.C., Avery, S.A., Gueye, P.L.
Texas Southern University, University of Pennsylvania, Hampton University
- 11:00 am** **WAM-C.11**
Shielding Measurements for a Proton Therapy Facility
Risolo, K.P., Avery, S., Bartels, M., Maughan, R.
University of Pennsylvania
- 11:15 am** **WAM-C.12**
GPU/CUDA-Based Monte Carlo Methods for Radiation Protection Dose Calculations Involving X-Ray and Proton Sources
Su, L., Liu, T., Ding, A., Xu, X.G.
Rensselaer Polytechnic Institute
- 11:30 am** **WAM-C.13**
Calibration of the Gantry Angle of Linear Accelerators Using X-ray Produced Images
Higgins, K.J., Treas, J.B., Jones, A.O., Fallahian, N., Simpson, D.R.
Bloomsburg University, Geisinger Medical Center
- 8:30-11:15 AM** **Room 307**
- WAM-D: Internal Dosimetry I**
Co-Chairs: Cheryl Antonio, J. Gordon Quillin
- 8:30 am** **WAM-D.1**
The Implication to Bioassay Protocols for Workers Receiving Chelation Therapy Due to Intakes of Plutonium Mixtures
Antonio, C., Timm, R., MacLellan, J.
PNNL, GEL Laboratories, LLC
- 8:45 am** **WAM-D.2**
Biokinetic Modeling of Chelation Therapy for Am-241 - USTUR Case 0846
Breustedt, B., McCord, S., Tolmachev, S.
KIT-INE, Karlsruhe Institut for Technology, Institute for Nuclear Waste Disposal, United States Transuranium and Uranium Registries, College of Pharmacy, Washington State University

9:00 am **WAM-D.3**
Maximum Likelihood Analysis of Bioassay Data from Long-term Follow-up of Two Refractory PuO₂ Inhalation Cases
Avtandilashvili, M., Brey, R., James, A. Washington State University, Richland, Idaho State University, Pocatello

9:15 am **WAM-D.4**
Savannah River Site Pu-238 Puncture Wound Response, Mitigation, and Dose Determination Lessons Learned
Quillin, J.G., Findley, W.M. Savannah River Nuclear Solutions, LLC

9:30 am **WAM-D.5**
Health Physics and Medical Management of a 238Pu Contaminated Wound
Findley, W.M., Gause, S.M., Quillin, J.G. Savannah River Nuclear Solutions, LLC

9:45 am **BREAK**

10:15 am **WAM-D.6**
Determination of 235U/238U Ratio in Urine By Inductively Coupled Plasma - Mass Spectrometer
Wong, C.T., Than, C., Collins, L.J., Gobaleza, A., Langston, R., Radev, R., Wood-Zika, A. LLNL*

10:30 am **WAM-D.7**
A Comparison of ICRP 67/78 Biokinetic Model Prediction and Non-Human Primate Bioassay Studies for Pu-238
Liu, J., Brey, R., Guilmette, R. Idaho State University, Lovelace Respiratory Research Institute

10:45 am **WAM-D.8**
The HML's New Voxel Phantoms: Two Human Males, One Human Female, and Two Male Canines
Kramer, G., Capello, K., Bearrs, B., Leung, K., Martinez, N., Strocchi, S. Health Canada, Colorado State University, A.O. Ospedale di Circolo e Fondazione Macchi

11:00 am **WAM-D.9**
Effect of Respiratory Motion on Lung Counting Efficiency using a 4D NURBS-Based Cardiac-Torso (NCAT) Phantom
Kramer, G., Capello, K., Trembaly, M., Segars, P. Health Canada, Duke University Medical Center

8:30-10:30 AM **Room 308**

WAM-E: Military Section Special Session I

Chair: John Cardarelli

8:30 am **WAM-E.1**
Licensing Legacy Davy Crockett Depleted Uranium
Cherry, R., Komp, G. US Army

9:00 am **WAM-E.3**
Location Identification Considerations for Operation TOMODACHI Personnel Radiation Dose Assessments
Alleman, L., Cassata, J., Falo, G., Rosser, C., Dunavant, J., Case, D., Rademacher, S., Blake, P. Armed Forces Radiobiology Research Institute, Uniformed Services University of the Health Sciences, Army Institute of Public Health, Science Applications International Corporation, Air Force Safety Office, Defense Threat Reduction Agency

9:30 am **BREAK**

10:00 am **WAM-E.4**
 Radiation Personnel Monitoring and Upper Bound Dose Calculations Used for US Department of Defense Personnel and their Dependents in Japan between 12 March and 11 May 2011
Cassata, J.R., Falo, G.A., Rademacher, S.E., Alleman, L.A., Rosser, C., Dunavant, J.D., Blake, P.K.
Uniformed Services University of Health Sciences, US Army Institute of Public Health, US Air Force Safety Center, Armed Forces Radiobiology Research Institute, Science Applications International Corporation, Defense Threat Reduction Agency

10:30 am **Military Section Business Meeting**

8:15-10:45 AM **Room 313**

WAM-F: Power Reactor Section Special Session
Chair: Eric Goldin

8:15 am **WAM-F.1**
 Response to the Fukushima Daiichi Nuclear Plant In March 2011
Jackson, T.
NRC

8:30 am **WAM-F.2**
 NRC Protective Measures Team Fukushima Challenges; RASCAL 4.2 Update
Brandon, L.
NRC

8:45 am **WAM-F.3**
 Radiological Aspects of Fukushima
Connelly, C.
Institute of Nuclear Power Operations

9:00 am **WAM-F.4**
 Radiation Protection and Emergency Preparedness Aspects of the U.S. Nuclear Energy Industry Response to the Fukushima-Daiichi Accident
Andersen, R.
Nuclear Energy Institute

9:15 am **WAM-F.5**
 Fukushima Daiichi Accident Recovery: Dose Considerations Based on the Three Mile Island Unit 2 Accident Experience
*Shaw, R.P., Ethridge, D.W.**
Shaw Partners LLC

9:30 am **WAM-F.6**
 A Review of Emergency Response Activities Following the Magnitude 5.8 Seismic Event at North Anna Power Station
Olin, M., Tarantino, C.
Dominion North Anna Power Station

9:45 am **BREAK**

10:15 am **WAM-F.7**
 Power Reactor Radiological Safety Performance Trends
Connelly, C.
Institute of Nuclear Power Operations

10:30 am **WAM-F.9**
 Contamination Events are Becoming a Thing of the Past : The New Industry Paradigm in Worker Protection
Steward, J.B.
CHP

10:45 am **Power Reactor Section Business Meeting**

9:00-10:30 AM Room 311

WAM-G: The Name of our Society - Is it Finally Time to Consider Changing It?

*Presenter: Armin Ansari,
HPS President-Elect*

2:45-3:30 PM Room 314

WPM-A1: Environmental II

*Co-Chairs: James Reese,
Mike Winters*

2:30 pm

WPM-A1.1

Uranium Uptake in Capsicum Annuum for Various Growing Conditions

Parson, J., Houser, E., Bytwerk, D., Higley, K. (Presented by Napier, J., and Caffrey, E.)

Oregon State University

2:45 pm

WPM-A1.2

Analysis of Naturally Occurring Radionuclides in Fly Ash and Gypsum Samples

Roper, A., Stabin, M., Kosson, D., Delapp, R., Kost, S.

Vanderbilt University

3:00 pm

WPM-A1.3

Contribution of Fauna to Technogenic Radiation Exposure of the Population

Nevolina, I.V., Dmitrieva, A.V., Smagin, A.I., Suslova, K.G., Vostrotin, V.V. SUBI

3:15 pm

WPM-A1.4

An Evaluation of the Equivalent Dose Due to Natural Radioactivity in the Soil around the Consolidated Tin Mine in Bukuru-Jos, Plateau State of Nigeria

*Ajayi, I.
Adekunle Ajasin University, Nigeria*

3:30 pm

BREAK

4:00-4:45 PM Room 314

WPM-A2: Biokinetics/Bioeffects

Co-Chairs: Brandt Ulsh, Tom Johnson

4:00 pm

WPM-A2.1

C. Elegans Model for Bystander Effects Research

Feng, S., Braby, L.

Texas A&M University

4:15 pm

WPM-A2.2

Radiation-Induced Bystander Effects in HT-29 Cell Culture

Pafford, J.B., Freeman, M.L., Stabin, M.G.

Vanderbilt University

4:30 pm

WPM-A2.3

Expression Changes and Mechanisms of AP1S1 in Human Lymphocytoblast Bystander Cells Induced by 60Co γ -ray

*Sun, S., Xiao, X., Han, H.**

Second Military Medical University

2:15-4:00 PM Room 315

WPM-B: CRSO

Chair: Marcum Martz

2:15 pm

WPM-B.1

California Senate Bill 1237: Implementation and Implications

Kroger, L.

University of California, Davis Health System

2:45 pm

WPM-B.2

Radiation Safety with Mobile CT

Jacob, N.

Lifespan

3:15 pm Medical X-Ray Discussion

4:00 pm CRSO Business Meeting

2:30-5:00 PM Room 306

WPM-C: Medical Health Physics II

*Co-Chairs: Michael Stabin,
Glenn Sturchio*

2:30 pm WPM-C.1

Quick Radiation Dose Resource for Patients
*Weltz, A.
Rensselaer Polytechnic Institute*

2:45 pm WPM-C.2

Dose Estimates for Radiopharmaceuticals and CT Exams using New Generation Phantoms
*Stabin, M., Kost, S.
Vanderbilt University*

3:00 pm WPM-C.3

Patient Radiation Safety in Medicine - A Systems Approach
*Leuenberger, R.
Plenary Member*

3:15 pm WPM-C.4

CT Dose Reporting with the Virtual-Dose Software: Database and Software Testing for Clinical Users
*Ding, A., Gao, Y., Caracappa, P., Xu, X.G.
Rensselaer Polytechnic Institute*

3:30 pm BREAK

4:00 pm WPM-C.5

Development of a Series of Reference Pregnant Female Hybrid Computational Models
*Long, N., Maynard, M., Shifrin, R., Bolch, W.
University of Florida*

4:15 pm WPM-C.6

Health Effects of Radiation to the Gamete, Embryo, Fetus, and Nursing Infant
Brent, R., Bushberg, J., Frush, D., Harms, R., Linet, M., Mulvihill, J., Gorson, R., Kroger, L., Maidment, A., Ziskin, M.

Thomas Jefferson University, University of California, Davis Health System, Duke University Medical Center, Mayo Clinic, National Cancer Institute, University of Oklahoma, Columbia, South Carolina, University of Pennsylvania, Temple University

4:30 pm WPM-C.7

Lens Dose Equivalent Evaluation in Interventional Radiology
Tannahill, G., Schueler, B., Magnuson, D., Sturchio, G.
Mayo Clinic*

4:45 pm WPM-C.8

Radioactive Drug Research Committee Information System
*Sturchio, G., Miller, J., Braun, J., Brunette, J.
Mayo Clinic*

2:30-3:30 PM Room 307

WPM-D1: Internal Dosimetry II

Co-Chairs: Cheryl Antonio, Megan Lobaugh

2:30 pm WPM-D1.1

Detection Efficiency for Measuring Am-241 in Axillary Lymph Nodes Using Different Types and Sizes of Detectors
*Lobaugh, M., Spitz, H., Glover, S.
University of Cincinnati*

2:45 pm **WPM-D1.2**
Long-Term Monitoring of 90Sr Body Burden in Urals Residents
Tolstykh, E., Shagina, N., Degteva, M., Shishkina, E., Krivoshchapov, V., Bougrov, N., Anspaugh, L., Napier, B.
Urals Research Center for Radiation Medicine, Chelyabinsk, Russian Federation, University of Utah Salt Lake City, Pacific Northwest National Laboratory Richland

3:00 pm **WPM-D1.3**
Functional State of Neutrophils in Individuals Diagnosed with Chronic Radiation Syndrome (CRS)
Akleyev, A.A., Dolgushin, I.I., Grebenyuk, A.N.
Chelyabinsk State Medical Academy, S.M. Kirov Military-Medical Academy, St. Petersburg

3:15 pm **WPM-D1.4**
Re-Evaluation of Radionuclide Intakes for Techa River Residents on the Basis of Revised Source-Term Parameters
Shagina, N., Tolstykh, E., Degteva, M., Vorobiova, M., Anspaugh, L., Napier, B.
Urals Research Center for Radiation Medicine, Russian Federation, University of Utah, Salt Lake City, Pacific Northwest National Laboratory

3:30 pm **BREAK**

4:00-5:00 PM **Room 307**

WPM-D2: Non-Ionizing Radiation

Co-Chairs: Ronald Reif, Jeremy Krampert

4:00 pm **WPM-D2.1**
Laser Safety Program at Woods Hole Oceanographic Institution: Increasing Ownership of Safety and Compliance
Reif, R.
Woods Hole Oceanographic Institution

4:15 pm **WPM-D2.2**
Implementing a Strong Magnetic Field Access Control Program
Krampert, J., Williams, V., Albanese, M.
Merck Sharpe & Dohme Corp.

4:30 pm **WPM-D2.3**
Thresholds of Sensation and Selective Activation of Nociceptors in the Healthy Human Foot
Scott, E.L., Johnson, T.
Colorado State University

4:45 pm **WPM-D2.4**
City of Toronto Requirements for an EMF Management Plan
Walsh, M.L., Agnew, D., Donnelly, K.
W&W Radiological and Environmental Consultant Services Inc.

2:30-5:15 PM **Room 308**

WPM-E: Military Section Special Session II

Chair: John Cardarelli

2:30 pm **WPM-E.1**
Population Parameters Used to Assess the Radiation Dose to US Department of Defense Personnel and their Dependents in Japan between 12 March and 11 May 2011
Falo, G.A., Cassata, J.R., Rademacher, S.E., Alleman, L.A., Rosser, C., Dunavant, J.D., Case, D.R., Blake, P.K.
US Army Institute of Public Health, Uniformed Services University of Health Sciences, US Air Force Safety Center, Armed Forces Radiobiology Research Institute, Science Applications International Corporation, Defense Threat Reduction Agency

3:00 pm WPM-E.2

Ionizing Radiation Exposure Associated with U.S. Coast Guard Long Range Navigation Vacuum Tube Transmitter Units

Blake, P., Hall, J., Severance, C., Rusiecki, J.

Defense Threat Reduction Agency, U.S. Coast Guard

3:30 pm BREAK

4:00 pm WPM-E.3

Understanding the Dose Characteristics of Leakage Radiation Emitted from Ground-Level Detonations in Urban Environments of Different Types of Nuclear Devices

Kramer, K.M., Blake, P.K., Li, A.O., Millage, K.K.

Applied Research Associates, Inc., Defense Threat Reduction Agency

4:30 pm WPM-E.4

EPA ASPECT Program and its potential uses for Civil Support Team Deployments

Cardarelli, J.J., Thomas, M.J., Curry, T.J., Kudarauskas, P.G.

US Environmental Protection Agency

5:00 pm Roundtable

WPM-G.2

Emergency Response Respiratory Air Monitoring by the Radiological Assistance Program (RAP), Region 4

Hayes, R.

Waste Isolation Pilot Plant

WPM-G.3

Radiochemical Sequence and Location of Radionuclides Released at Fukushima

Cox, M.

Consultant, Ohio

WPM-G.4

The Waste Isolation Pilot Plant (WIPP), an Overview and Update

Hayes, R.

Waste Isolation Pilot Plant

WPM-G.5

Autonomous Radon Monitoring System

Desrosiers, A.

Safety and Ecology Corporation

WPM-G.6

Critical Importance of Recently Revised and Combined Standard ANSI N323AB

Walker, E.

Consultant, Tennessee

2:30-5:00 PM Room 311

WPM-F: Movies

5:15 PM Room 308

HPS Business Meeting

6:00-8:00 PM 309

WPM-G: Aerosol Measurements

Chair: Morgan Cox

WPM-G.1

Sample Flow Rate Effects on the Transuranic to Radon Signal to Noise Ratio

Baltz, D.

Bladewerx

THURSDAY

7:00-8:00 AM

309

CEL-11 How Do We Make Decisions for Radiation Safety?

Johnson, R.

Radiation Safety Counseling Institute

8:15-11:30 AM

Room 314

THAM-A: Emergency Planning & Response

Co-Chairs: Craig M. Marianno, Ed Waller

8:15 am

THAM-A.1

The Use of Pedestrian Portal Monitors to Detect Contamination on Livestock Following a Large Scale Radiological Incident

Marianno, C., Erchinger, J., Herring, A. Texas A&M University

8:30 am

THAM-A.2

Emergency Response Plans for Animals and Livestock

Erchinger, J., Marianno, C. Texas A&M University

8:45 am

THAM-A.3

Considerations for Management of Radioactively Contaminated Livestock

McMillan, D., Johnson, T., Brandl, A. Colorado State University*

9:00 am

THAM-A.4

The Impact of Crowd Inspection on Emergency Planning and Response

Cardoso, G., Turqueti, M. Creative Electron, Inc.

9:15 am

THAM-A.5

Experiments in Support of Determining Orofacial-to-Lung Ratio (OLR) for Radiological Dispersal Device Events

Waller, E., Shew, C., Perera, S. University of Ontario Institute of Technology

9:30 am

THAM-A.6

Nuclear Measurement Technologies & Solutions Implemented During Fukushima Nuclear Accident

Morichi, M., Bronson, F., Venkataraman, R., Toubon, H.

CANBERRA

9:45 am

THAM-A.7

EPA's Lessons Learned and After Action Recommendations for the Fukushima Nuclear Incident

Mosser, J., Tupin, E., Blizzard, J., Snead, K., Boyd, M.

US Environmental Protection Agency (US EPA)

10:00 am

BREAK

10:30 am

THAM-A.8

Animated Accident Simulation and Dose Reconstruction Using Motion-Capture Data to Simulate Worker Movement

Vazquez, J., Ding, A., Caracappa, P., Xu, X.

Rensselaer Polytechnic Institute

10:45 am

THAM-A.9

Protection of the Public in the Event of a Severe Nuclear Power Plant or Spent Fuel Emergency

Dodd, B., McKenna, T., Buglova, E.

BDConsulting, Las Vegas, International Atomic Energy Agency, Vienna

11:00 am

THAM-A.10

Contamination Effects to the Public from Direct and Indirect Pathways of a Simulated Radiological Dispersal Device Event Near the Canada-US Border

Hall, C.N., Waller, E.

University of Ontario Institute of Technology

11:15 am **THAM-A.11**
Architecture of a Computer Program
for Fast Dose Calculation in Real Ge-
ometries Using Monte Carlo Simula-
tion
Konstantin, C., Ilya, K.
*Burnasyan Federal Medical Biophysi-
cal Center of Federal Medical Biologi-
cal Agency, Moscow, Russia*

8:15-10:15 AM **Room 315**

THAM-B: CRSO

Chair: Marcum Martz

8:15 am **THAM-B.1**
A Safety Culture By Any Other Name
*Masih, S.T., Sturgis, T.F., McCall, J.D.,
Massoth, R.J.*
*University of Missouri-Kansas City,
MedXray*

8:45 am **THAM-B.2**
Part 37 - Current Status
Daides, S.
NRC

9:15 am **Regulatory Discussion**

8:15-11:30 AM **Room 306**

THAM-C: Instrumentation

*Co-Chairs: Frazier Bronson,
Mark Hogue*

8:15 am **THAM-C.1**
Development of a Transportable Neu-
tron Activation Analysis System to
Quantify Manganese in Bone In Vivo
- Feasibility and Methodology
Liu, Y., Koltick, D., Zheng, W., Nie, L.
Purdue University

8:30 am **THAM-C.2**
Development of a Counting Geometry
for the FastScan Whole Body Counter
That is Relatively Independent of Sub-
ject Size for Subjects from Small Chil-
dren to Large Adults
Bronson, F.L., Oginni, B.
Canberra

8:45 am **THAM-C.3**
Proposed Method for Field Calibration
of NaI(Tl) Detector Using K-40 Source
and High-Z Targets
*Rogers, J., Marianno, C., Kallenbach,
G.*
*Texas A&M University, Sandia Nation-
al Laboratory*

9:00 am **THAM-C.4**
Verification of Cosmic Ray Rejection
on a Liquid Scintillation Counter
Magenis, M.A.
Colorado State University

9:15 am **THAM-C.5**
Upgrade of the HPI-2080 Pulsed Neu-
tron Rem Meter
Justus, A., McLean, T., Walker, S.,
Duran, M.*
LANL, BNL

9:30 am **THAM-C.6**
SLAC National Accelerator Facility In-
strumentation Support of Material Re-
lease Program
*Frey, W.D., Ford, R.M., Rokni, S.R.,
Liu, J., Allan, J.*
SLAC National Accelerator Facility

9:45 am **BREAK**

10:15 am **THAM-C.7**
Neutron Dosimeter with Effective
Gamma Discrimination Using (Inor-
ganic/Organic) Composite Scintillators
*Slaughter, D., Klaass, R., Stuart, C.,
Mendoza, M., Merrill, D.*
*Washington State University, Photo-
genics, Brigham Young University*

10:30 am **THAM-C.8**
Innovative Gamma Ray Spectrometer
Detection Systems for Conducting
Ground Surface Scanning Investiga-
tions
*Dempsey, G., Shura, R., Palladino,
C. *, Mason, B., Klemovich, R., Lappin,
R., Engle, M., Birney, M., LeVangie, J.,
Thompson, S.*
*US Environmental Protection Agency,
The Palladino Company, Inc., Hydro-
GeoLogic, Inc.*

11:00 am **THAM-C.10**
Monte Carlo Modeling Versus Ion
Chamber Measurements of Beta Ra-
diation
Hogue, M.
*Savannah River Nuclear Solutions,
LLC*

11:15 am **THAM-C.11**
A Sample Assay Geometry that can
be Used for a Wide Range of Sample
Types and Volumes with a Single Ef-
ficiency Calibration, and Still Achieve
Reasonable Accuracy
Bronson, F.L.
Canberra

8:30-9:45 AM **Room 307**

THAM-D: Waste Management

Co-Chairs: Emily Rostel, Scott Kirk

8:30 am **THAM-D.1**
The Report of the Blue Ribbon Com-
mission on America's Nuclear Future:
Description and Possible Implementa-
tion of Key Elements
*McBaugh, D., Moeller, M., Glines, W.,
Conca, J.*
Dade Moeller, RJLee

Moved to Poster P.21A **THAM-D.2**

8:45 am **THAM-D.3**
Incorporating Actinide Sorption to
Graphite in Evaluating the Prefor-
mance of TRISO Fuel in a Repository
Environment
Keith, C.C., Cerefice, G.
University of Nevada, Las Vegas

9:00 am **THAM-D.4**
A Strategy for Management of O-18
Enriched Water
Rostel, E., Shen, B., Banghart, D.
Stanford University

9:15 am **THAM-D.5**
Status of Low-Level Radioactive
Waste Disposal in Texas
*Evans, K., Jablonski, S. *, Broussard,
B., Porras, A., Council, L.*
*Texas Commission on Environmental
Quality*

9:30 am **THAM-D.6**
Performance Assessment of Texas
Low-Level Radioactive Waste Dispos-
al Facility
*Evans, K., Jablonski, S. *, Broussard,
B., Porras, A., Council, L.*
*Texas Commission on Environmental
Quality*

8:15-11:15 AM **Room 308**

**THAM-E: Operational Health
Physics and Training, Part 2**

*Co-Chairs: Andy Miller,
Victor Anderson*

8:15 am **THAM-E.1**
Full-Power, In-Containment Neutron
Dose Rates at Kewaunee Nuclear
Plant
*Liang, T., Hertel, N., Cahill, T., Blay-
lock, D., Kulp, W.D., Olson, C., Ad-
ams, R.*
*Georgia Tech, Dominion Energy Ke-
waunee Power Station*

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| <p>8:30 am
Neutron Doses at the Transuranic Waste Processing Center
<i>Hertel, N., Liang, T.*, Cahill, T., Littleton, M., Byers, S., Burgett, E.</i>
<i>Georgia Tech, Wastren Advantage, Inc, Idaho State University</i></p> <p>8:45 am
Investigation of the use of Chitosan for Radionuclide Sorption And Decontamination
<i>Holfeltz, V., Paulenova, A.</i>
<i>Oregon State University</i></p> <p>9:00 am
Improving Radiological Safety in a Nuclear Facility Using Statistical Process Control (SPC)
<i>Costigan, S.</i>
<i>Los Alamos National Laboratory</i></p> <p>9:15 am
Developing an Animal Decontamination Protocol
<i>Sprenger, P., McMillan, D., Gillis, J., Johnson, T.</i>
<i>Colorado State University</i></p> | <p>THAM-E.2</p> <p>THAM-E.3</p> <p>THAM-E.4</p> <p>THAM-E.5</p> | <p>9:30 am
Exposure in Transit - Bad for Badges
<i>Miller, M.A.</i>
<i>VAMC Nashville</i></p> <p>9:45 am</p> <p>10:15 am
Shielding Design for Cyclotron Facilities
<i>Gillenwalters, E.</i>
<i>Ameriphysics</i></p> <p>10:30 am
The Fourth Protocol: Contamination Control
<i>Anderson, V.E.</i></p> <p>10:45 am
Importance of Retaining 'Traditional' SI Radiation Units
<i>Brodsky, A.</i>
<i>Georgetown University</i></p> <p>11:00 am
How Do We Make Decisions for Radiation Safety?
<i>Johnson, R.H.</i>
<i>Radiation Safety Counseling Institute</i></p> | <p>THAM-E.6</p> <p>BREAK</p> <p>THAM-E.7</p> <p>THAM-E.8</p> <p>THAM-E.9</p> <p>THAM-E.10</p> |
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Make Plans to Attend the
2013 Midyear Meeting and
Professional Development School Midyear Meeting
Sunday 27 January-Wednesday 30 January
Midyear Topic: "Medical and Accelerator Dosimetry"

PDS: Wednesday 30 January-Friday 1 February
PDS Topic: "Lessons We are Learning from Fukushima"

DoubleTree Paradise Valley, Scottsdale, AZ
www.hps.org

AAHP Courses

Saturday 21 July 2012 - 8 AM-5 PM - Hyatt Hotel

AAHP 1 Response to Radiological Weapons

Victor Anderson, CHP

Radiological Weapons is an eight hour class on the use of radioactive materials as weapons and how to respond to attacks with these weapons. This class will provide attendees with a systematic method for assessing the effects of the use of radioactive materials as a weapon. Attendees will learn a classification system. Scenarios will be presented as tools for learning about various response issues. Emergency response concepts will be reviewed. Radiation injury effects and their effect on emergency response will be discussed.

This is an interactive class where attendees will be asked to solve problems and present their opinions and solutions to various scenarios. Perspective students are encouraged to bring their laptop computer with the NARAC HOTSPOT program loaded on the machine (Available at <https://narac.llnl.gov/HotSpot/HotSpot.html> at no cost). Attendees will be given a DVD with all slides and reference materials.

AAHP 2 Non-ionizing Radiation

Scott Nichelson, CHP

Non-ionizing radiation sources, especially laser and radiofrequency based devices, are becoming much more ubiquitous in today's society. It is critical that health physicists understand their basic operations, the biological effects, and how to perform appropriate risk assessments. This course examines the regulatory and

scientific consensus standards for non-ionizing radiation and associated non-ionizing radiation producing devices. Examples of these devices include: tanning beds; lasers used in entertainment, medicine and industry; and radiofrequency (RF) radiation sources such as cell phones, industrial heat sealers, and potential military applications. This course is designed for health physics personnel who have little or no experience in evaluating these hazards, and will provide background on how these devices work, the associated biological effects and the basics of protection of workers and the general public.

Personnel who complete this course should be able to: determine the applicable standard/guidance document that is appropriate for the particular non-ionizing radiation source, and how to determine an appropriate exposure limit. In addition, they should be able to perform relevant calculations and determine an appropriate measuring device (if applicable). Finally they should be able to discuss intelligently the relevant bioeffects for the particular region of interest in the non-ionizing radiation spectrum, as well as recommending appropriate control measures.

AAHP 3 Responses to Fukushima

Patricia Milligan, Ed Tupin, Michael Boyd, Stephen Becker, Kenji Tateiwa USNRC, USEPA, University of Alabama, The Tokyo Electric Power Company, Inc.

On March 11, 2011, northern Japan suffered first a magnitude 9.0 earthquake centered ~208 km off the eastern coast and then an ensuing tsunami. These natural events caused widespread death and destruction in Japan. There were three nuclear reactor sites that were impacted by this event. One, the Fukushima Daiichi Nuclear Reactor Complex suffered the greatest damage. The damage and destruction at this site initiated a cascade of events that led to multiple reactors overheating, core meltdown, and radionuclide releases causing widespread radioactive contamination of residential areas, agricultural land, and coastal waters. As the radionuclide releases from the Fukushima Daiichi Nuclear Reactor escaped into the atmosphere and the ocean, the impact of this event was felt around the world. The effects are still being felt.

In this session we will have speakers from: 1) TEPCO who will discuss what happened at the Fukushima Dai'ichi complex from the reactor perspective as well as the Dai'ini complex- which was impacted by the earthquake but didn't feel the same effects from the tsunami, 2) the Government of Japan who will discuss the challenges facing the Japanese government and the public on the long term cleanup and recovery of the contaminated areas of Japan; 3) Dr. Steven Becker who will share with us lessons learned for public health response efforts; Mike Boyd, CHP and Ed Tupin, CHP, senior scientists from EPA who will discuss the Federal response and lessons learned for improved response to international/ domestic events and 4) a representative from the NRC who will talk about the impact of the Fukushima event on NRC licensees – lessons learned, orders issued, impact on new reactors

Professional Enrichment Program (PEP)

Sunday 22 July through Wednesday 25 July

The Professional Enrichment Program (PEP) provides a continuing education opportunity for those attending the Health Physics Society Annual Meeting. The two hours allotted each course ensure that the subjects can be discussed in greater depth than is possible in the shorter programs offered elsewhere in the meeting.

On Sunday 22 July, a series of 20 courses will be offered between 8:00 am - 4:30 pm.

In addition to the above-mentioned sessions for Sunday, five PEP lectures are scheduled on Monday - Wednesday afternoons from 12:15 - 2:15 pm. Registration for each two-hour course is \$90 and is limited to 60 attendees on a first-come, first-served basis. Those whose registrations are received before the preregistration deadline will be sent confirmation of their PEP course registration.

Students with a current ID card will be admitted free of charge to any sessions which still have space available after the

waiting list has been admitted. Student admission will be on a first-come, first-served basis and will only begin 15 minutes after the start of the session to allow for completion of ticket processing.

Please Note!!

Please be on time for your sessions. The lecturer will begin promptly at the scheduled time. Please allow time for check-in. The HPS reserves the right to schedule a substitute speaker or cancel a session in case the scheduled speaker is unavailable.

Attendees not present at the starting time of the session cannot be guaranteed a space, as empty spaces will be filled from the wait list at that time. Spaces left after the wait list has been admitted may be filled with students. If your duties at the meeting cause you to be late for your lecture (e.g., chairing a session), contact the PEP registration desk so that your name can be placed on the waiver list and your space held.

Sunday - 8:00 - 10:00 am

PEP 1-A EH&S “Boot Camp” for Radiation Safety Professionals - Part I

Robert Emery, Janet Gutierrez
University of Texas Health Science Center at Houston

It is currently quite rare for organizations to maintain stand-alone radiation safety programs. Resource constraints and workplace complexities have served as a catalyst for the creation of comprehensive environmental health & safety (EH&S) or risk management (RM) programs, which include, among other health and safety aspects, radiation safety programs. But many of these consolidations were not inclusive of staff training to

instill an understanding of the areas now aligned with the radiation safety function. This situation is unfortunate because when armed with a basic understanding of the other safety programs, the radiation safety staff can provide improved customer service and address many simple issues before they become major problems. This unique Professional Enrichment Program (PEP) series is designed to address this shortcoming by providing an overview of a number of key aspects of EH&S and RM programs from the perspective of practicing radiation safety professionals who now are involved in a broader set of health and safety issues. The PEP series will consist of three 2 hour segments:

The risk management & insurance portion of the session will address the issues of retrained risks (those which are not covered by insurance) and transferred risks (those covered by a financial vehicle), and how these aspects impact EH&S and RM operations. Included in the fire & life safety segment will be a discussion on the basic elements of the life safety code and the fire detection and suppression systems. The requirements for means of egress will also be discussed

PEP 1-B Training Emergency Responders; Materials, Tools, and Methods for Health Physicists - Part I – TEPP TtT session 1 of 2

*Brooke Buddemeier, Tom Clawson
Lawrence Livermore National Laboratory, Technical Resources Group, Inc.*

In addition to certifications in the training programs below (3 CDs full movies and training materials), information will be provided on how to interface with emergency responders and national programs that are available to help Health Physicists who are interested in getting engaged in preparing and responding to radiological and nuclear terrorism.

Excellent training materials exist for training first responders (firefighters, law enforcements, EMT), but you can't just download all them off the internet. Students who successfully complete PEP 1-B and 2-B sessions will be certified instructors for the TEPP program. Over 20 hours of "Train the Trainer" coursework has been compressed into this PEP class designed for the radiation safety professional. The Modular Emergency Response Radiological Transporta-

tion Training (MERRTT) offers over 16 modules of multimedia rich training material including presentations, student & instructor guides, tests, practical exercises, and regionally available training aids. (You will need to complete both session 1-B and 2-B to receive your certification and CD)

PEP 1-C Status of ANSI N42 Standards for Health Physics Instrumentation - Part I (Radiation Protection Instrumentation)

Morgan Cox

Co-chair ANSI N42.RPI/ANSI N42H-SI

This PEP course includes the discussion of some eighteen ANSI N42 standards for Radiation Protection Instrumentation (RPI) in effect, being revised or being combined, including those for performance & testing requirements for portable radiation detectors, ANSI N42.17A for normal environmental conditions and ANSI N42.17C for extreme environmental conditions and ANSI N42.323A and B, both being combined, for calibration of portable instruments over the entire range of concern, i.e., in the normal range and for near background measurements; alarming personnel monitors in ANSI N42.20; airborne radioactivity monitors in ANSI N42.30 for tritium, ANSI N42.17B for workplace airborne monitoring, ANSI N42.18 for airborne and liquid effluent on-site monitoring, and ANSI N323C for test and calibration of airborne radioactive monitoring; instrument communication protocols in ANSI N42.36; in-plant plutonium monitoring in ANSI N317; reactor emergency monitoring in ANSI N320; carbon fiber personnel dosimeters in ANSI N322; installed

radiation detectors in ANSI N323D; ANSI N42.26 for personnel warning devices; radon progeny monitoring in ANSI N42.50; and radon monitoring in ANSI N42.51.

The new ANSI N42.54 is intended to combine the salient materials in ANSI N42.17B, ANSI N42.18, ANSI 323C and ANSI N42.30, with a comprehensive title of "Instrumentation and systems for monitoring airborne radioactivity." Audience participation is important to the success of these presentations.

PEP 1-D HPS Laboratory Accreditation Program - Overview

Tom Voss

Chair HPS Laboratory Accreditation Assessment Committee

The objective of this professional enrichment program topic is to provide an overview of the HPS Laboratory Accreditation Program and a framework around which the participant can help laboratories being assessed to improve through the process of technical assessment. Technical assessing requires that an assessor know what is important in the health physics field and where to help the laboratory being assessed focus resources for optimization of their process. The philosophy of the training is that compliance and conformance form the bedrock upon which a business can improve and optimize operations. The "why" is the most important part in helping the laboratory being assessed to understand the "how" of improvement. Techniques will be presented to assist assessors communicate with the assessment team and the laboratory being assessed. This course provides infor-

mation to individuals interested in the HPS accreditation program, and is part of a course for certifying individuals to assess laboratories for HPS accreditation.

PEP 1-E Operational Accelerator Health Physics I

L. Scott Walker

Los Alamos National Laboratory

The Operational Accelerator Health Physics I class covers an overview of medium and high energy accelerators, Electron accelerators configuration, Electron Accelerator radiation production, electron accelerator shielding, electron accelerator radioactive material production, and Electron accelerator environmental impacts. The class then begins to focus on proton accelerator configuration, proton accelerator radiation production, accelerator produced isotopes, accelerator interlock systems, general health physics practices at accelerators, general accelerator health physics rules of thumb, high energy radiation physics for the health physicist, and useful references.

PEP 1-F RGD and Accelerator Pulsed Field Measurements for the Health Physicist: Characteristics and Limitations Of Mean-Level Ionization Chamber Instrumentation In Pulsed Radiation Fields - Part I

Alan Justus

Los Alamos National Laboratory

Detection and measurement concepts and details are discussed for pulsed field measurements by mean-level systems as they relate to various measurement purposes. The focus is on mean-level health-physics ionization chamber based systems, but also addressed, ever so briefly

however, is the use of GM and NaI(Tl) detection systems as well as standard TLD systems. Discussed are complications due to the pulsed nature of a radiation field, its energy and intensity, as well as chamber sensitivity, CPE, general recombination, effective center, and the need for audible assist. Examples involving the use of actual commercially-available models are presented as they relate to the various measurement purposes.

Sunday - 10:30 am-12:30 pm

PEP 2-A EH&S “Boot Camp” for Radiation Safety Professionals - Part II

*Robert Emery, Janet Gutierrez
University of Texas Health Science Center at Houston*

See description for PEP 1-A. Part 2 will examine “Security 101 for Radiation Safety Professionals” and “The Basics of Biological & Chemical Safety.” The first part of this session will focus on security as it is applied in the institutional settings. Various strategies employed to improve security controls will be presented. The second part of the session will address the classification of infectious agents and the various assigned biosafety levels. Aspects of chemical exposures, exposure limits, monitoring and control strategies will also be discussed.

PEP 2-B Training Emergency Responders; Materials, Tools, and Methods for Health Physicists - Part II – TEPP TtT session 2 of 2

*Brooke Buddemeier, Tom Clawson
Lawrence Livermore National Laboratory, Technical Resources Group, Inc.*

See description for PEP 1-B. This session is the second half of the training provided in session #1 and the required competency testing for those who wish to become certified trainers.

PEP 2-C Status of ANSI N42 Standards for Health Physics Instrumentation - Part II (Homeland Security Instrumentation)

*Morgan Cox
Co-chair ANSI N42.RPI/ANSI N42H-SI*

This PEP course includes the discussion of twenty ANSI N42 standards recently developed or being developed, for Homeland Security Instrumentation (HSI), including those for personal radiation detectors in ANSI N42.32; portable radiation detectors in ANSI N42.33; portable detection and identification of radionuclides in ANSI N42.34; all types of portal radiation monitors in ANSI N42.35; for training requirements for homeland security personnel in ANSI N42.37; spectroscopy-based portal monitors in ANSI N42.38; performance criteria for neutron detectors in ANSI N42.39; neutron detectors for detection of contraband in ANSI N42.40; active interrogation systems in ANSI N42.41; data formatting in ANSI N42.42; mobile portal monitors in ANSI N42.43; checkpoint calibration of image-screening systems in ANSI N42.44; criteria for evaluating

x-ray computer tomography security screening in ANSI N42.45; performance of imaging x-ray and gamma ray systems for cargo and vehicles in ANSI N42.46; measuring the imaging performance of x-ray and gamma ray systems for security screening of humans in ANSI N42.47; spectroscopic personal detectors in ANSI N42.48; personal emergency radiation detectors (PERDs) in ANSI N42.49A for alarming detectors and in ANSI N42.49B for non-alarming detectors; backpack-based radiation detection systems used for Homeland Security in ANSI N42.53; and portable contamination detectors for emergency response in ANSI N42.58.

Audience participation is important to the success of these presentations.

PEP 2-D HPS Laboratory Accreditation Program - Assessor Training

Tom Voss

Chair HPS Laboratory Accreditation Assessment Committee

The objective of this professional enrichment program topic is to familiarize HPS Laboratory Accreditation Program assessors and others with the requirements of the assessment program. The training will describe the program documentation, incorporated elements of ISO/IEC 17025, the accreditation process, and will specifically address technical requirements for radiation instrument calibration and radioactive source manufacturing/calibration laboratories. The training is required for all members of the HPS Laboratory Accreditation Assessment Committee and is recommended for laboratories and others interested in accreditation. The HPS Laboratory

Accreditation Program Overview and Introduction to Uncertainty Calculations presentations should also be attended. The HPS program is similar to other ISO/IEC 17025 based accreditation programs and the training will be useful for anyone interested in the accreditation process

PEP 2-E Operational Accelerator Health Physics II

L. Scott Walker

Los Alamos National Laboratory

See description for PEP 1-E. Operational Accelerator Health Physics II focuses on specific medium and high energy accelerator related design, control and health physics problems. The topics include: Spallation targets, handling high dose rate targets, beam dump design, isotope production, cooling water systems, shutters, radiation detection instrumentation, personnel dosimetry, high dose dosimetry (measuring radiation damage to equipment), high energy neutron spectroscopy, skyshine, releases of airborne radionuclides accelerator related electrical hazards, and the accelerator health physics program.

PEP 2-F RGD and Accelerator Pulsed Field Measurements for the Health Physicist: Characteristics and Limitations of Mean-Level Ionization Chamber Instrumentation in Pulsed Radiation Fields - Part II

Alan Justus, Los Alamos National Laboratory

See description for PEP 1-F

PEP 2-G Fundamentals of Gamma Spectroscopy

Ken Embury

ORTEC/Advanced Measurement Technology, Inc.

This course offers a fast-paced review of the basic principles of gamma spectroscopic analysis. The course includes a review of the nature and origins of gamma-emitting radioactivity, basic physics of gamma interaction with matter, consequences of gamma interactions on gamma spectra, gamma spectroscopy system components and calibrations, gamma spectroscopy analysis methods, and interpretation of gamma spectroscopy data. The course is two hours in duration and the American Academy of Health Physics will grant 4 Continuing Education Credits for completion.

Sunday - 2:00-4:00 pm

PEP 3-A EH&S “Boot Camp” for Radiation Safety Professionals - Part III

Robert Emery, Janet Gutierrez

University of Texas Health Science Center at Houston

See description for PEP 1-A. Part 3 will focus on “Measuring and Displaying Radiation Protection Program Metrics That Matter to Management.” Radiation protection programs typically accumulate data and documentation so that regulatory officials can assess compliance with established regulations. The implicit logic associated with this activity is that compliance equates to safety. But in this era of constricted resources, mere regulatory compliance is no longer sufficient to justify all necessary programmatic resources. Radiation pro-

tection programs are now expected to readily demonstrate how they add tangible value to the core missions of an organization. The demonstration of this value is expected to be in the form of some sort of performance metrics, but this is an area in which many radiation safety professionals have not been trained. The issue is further compounded by the need to display the metrics in manners that are succinct and compelling, yet another area where formal training is often lacking. This session will first describe a variety of possible radiation protection program performance measures and metrics, and then will focus on the display of the information in ways that clearly convey the intended message. Actual before and after data display “make-overs” will be presented, and ample time will be provided for questions, answers, and discussion.

PEP 3-B Training Emergency Responders; Materials, Tools, and Methods for Health Physicists - Part III – Radiological and Nuclear Terrorism Responder Training

Brooke Buddemeier, Tom Clawson

Lawrence Livermore National Laboratory, Technical Resources Group, Inc.

This Session can be taken separately from PEP 1-B and 2-B, but will build off earlier information. In support of the Federal Emergency Management Agency (FEMA) and the National Nuclear Security Administration, Lawrence Livermore National Laboratory (LLNL) has developed modular training materials that are easily understood by response personnel that describe the possible effects from an improvised nuclear device (IND) in a

major metropolitan area and the actions that the public and responder community could take to save and sustain life. The result is a suite of multimedia-rich training modules with instructor and student guides that uses non-scientific language to explain the dynamic nature of such an event. The instructor guides provide a suggested narrative and emphasis for each slide; the student guides provide a reference for students. Also included are radiological-response training materials developed to improve responder awareness of important issues regarding the response to radiological terrorism.

PEP 3-C Nanotechnology: What It Is and Why It Might Be Important

*Lorraine Marceau-Day
CMAD/LSU*

This PEP will introduce the participant to the unique properties of Nanoparticles and Nanotechnology. It will describe the novel characteristics of nanoparticles and how they differ from their bulk counterparts. Emphasis will be concentrated on the myriad applications of nanotechnology, the potential risks and hazards of engineered nanoparticles. As with any emerging technology, the responsible parties must assure that risk/benefit ratios remain in line with those developed for other technologies. Health Physicists have experience in determining risk. Unfortunately, issues such as safety, concentration and limits are frequently addressed only after a new material has been shown to be harmful following its release into common use. Two classical examples are asbestos and the wide-spread use of X-rays by physicians without protec-

tion at the beginning of the last century. Nanoparticles are similar to radiation in that you can't see [at least not individually], taste, feel or touch them. The ability to create accurate and repeatable measurements at the nanoscale level is critical to researchers and engineers who seek to develop the next generation of materials. The nature of nanotech materials requires some novel testing techniques. The atomic and molecular dimensions of these materials, means that quantum mechanics comes into play. Especially at the nano-level, there is the potential for multiple measurement errors, including but not limited to, leakage currents, grounding and shielding, noise, background, settling time and extraneous current. Measurements are also required to uncover the characteristics unique to nanoscale structures. Nanomaterials differ from their bulk counterparts in both chemical and electronic signatures. This PEP is aimed at individuals who would like to understand more about nanotechnology and how it might influence their daily work activities as a Health Physics professional.

PEP 3-D HPS Laboratory Accreditation Program - Introduction to Uncertainty Calculations

*Daniel VanDalsem, Jay Tarzia
Isotope Products Laboratories, Radiation Safety & Control Services, Inc*

The objective of this professional enrichment program topic is to familiarize HPS Laboratory Accreditation Program assessors and others with the requirements of the assessment program. Because of the importance of uncertainty calculations in Laboratory Accreditation this course will

concentrate on the corresponding technical issues involving laboratory quality assurance, the estimation of uncertainty, and limits of detection. An important element in the activities of health physicists who are responsible for the safety of personnel and the general public is the measurement of radiation from various sources, including reactors, radiation-generating machines and radioactive sources used in industry and in the medical diagnosis and treatment of patients. To be meaningful, these measurements must be performed using instruments and sources that are not only traceable to a national standards laboratory (e.g., NIST) but also must be performed by competent personnel using appropriate technical standards and procedures designed to ensure that calibration results meet required uncertainty. The definition of traceability that has achieved global acceptance in the metrology community is contained in the International Vocabulary of Basic and General Terms in Metrology (VIM; 1993): "...the property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, all having stated uncertainties." Internationally recognized standards from ISO GUM and their NIST counterparts will be explained using examples.

PEP 3-E ABHP Part III, Accelerator Health Physics Problems

L. Scott Walker

Los Alamos National Laboratory

This class does an overview of past and future ABHP accelerator health physics problems and proposed solutions. Problems are drawn from past ABHP exams and include several problems completed by Ken Skrable in the HPS News Letter. The author has also added several practical problems he has encountered during his career in accelerator health physics. It is the intent that those taking the class obtain a copy of the problems covered in the class at the time they sign up for the class so that they can prepare their own approach to solving the problems. There is ample time to discuss problem solutions during the class but not much time to allow class participants to solve the problems during the two hour session. Generally, accelerator health physics problems encountered on the ABHP Part II exam are simple and can be solved with a basic background. The difficult problems take much more time than the exam would allow.

PEP 3-F Characterization Decommissioning Surveys: Objectives, Methods, and Optimization

Tom Hansen

Ameriphysics, LLC

Decommissioning radiological surveys are described in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Specifically, MARSSIM describes a radiation survey and site investigation (RSSI) process that is comprised of a number of surveys, each with its own goals and objectives: scoping,

characterization, remedial control, and final status. The term “characterization” is often used to summarize all of the survey activities that are not considered final status. Historical site assessments usually get folded into the characterization effort as well. The focus of MARSSIM is final status surveys; however, and in lieu of strong guidance to the contrary, the other essential surveys are often planned poorly or given little consideration. This practice is promulgated by language in MARSSIM that suggests data from other surveys can be used to reflect final status, which is sometimes mistaken to mean that if the survey methodology described for final status is followed during characterization, additional investigations are not required. This presentation will provide an overview of the RSSI process and the activities and surveys that are typically deemed “characterization.” The differences between characterization and final status objectives will be emphasized, and the decision making process outlined in ANSI/HPS N13.59-2008, Characterization in Support of Decommissioning Using the Data Quality Objectives Process, will be discussed. The presentation will include a detailed description of radiological and non-radiological characterization tools and techniques and an overview of how to appropriately optimize survey design by ensuring characterization surveys simultaneously fulfill characterization and final status needs.

PEP 3-G Fundamentals of Alpha Spectroscopy

David Pan

ORTEC/Advanced Measurement Technology, Inc.

This course offers a fast-paced review of the basic principles of alpha spectroscopic analysis. The course includes a review of the nature and origins of alpha-particle emitting radioactivity, basic physics of alpha particle interaction with matter, considerations and consequences of sample preparation for alpha spectroscopy, alpha spectroscopy system components and calibrations, and a primer on interpretation of alpha spectroscopy data. The course is two hours in duration and the American Academy of Health Physics will grant 4 Continuing Education Credits for completion.

Monday - 12:15-2:15 pm

PEP M-1 Understanding and Responding to Radiation Fears – Part I

Ray Johnson

Radiation Safety Counseling Institute

A university RSO recently told of a researcher who found out that another nearby researcher was using C-14 and threatened to call the university provost and his congressman to express his concerns for exposure to radiation. How can you understand the basis for such fears and how can you best respond? Is the best response a matter of explaining the health risks of C-14? Will a technical answer change the person’s fears? Recent studies in neurosciences are showing that fears originate in our subconscious mind as a natural mechanism for our protection. Fear is actually a good thing. The author,

Gavin DeBecker, says fear is a gift for our safety. We have learned to survive over the ages by paying attention to our fears. Some fears are programmed into our subconscious from birth, including fear of the dark, snakes, spiders, heights, closed spaces, and submersion. Other fears include the fear of public speaking, fear of intimacy, and fear of failure or social rejection. Our brains are programmed to protect us in many different ways. However, the processes for instinctive reactions to avoid imminent dangers of snakes or spiders are not appropriate for dealing with dangers of radiation. Radiation effects are not usually imminent, but matters of future random chance. Because most people have been hearing about “deadly radiation” for their whole lifetimes, most have come to conclude that the dangers of radiation are imminent or at least a surety. Most have little idea that the type of radiation or quantity makes any difference. Thus, people are as afraid of C-14 or backscatter x-ray machines at the airport as they would be for high energy sources of radiation. Because instinctive reactions for safety come from the subconscious mind, they are based on imagined unacceptable consequences and not on reality as we would understand the technology. If a fearful person is asked about why they are afraid, they may rationalize an answer that makes no sense because the subconscious origin of their fear is out of their awareness. Consequently, even the best rational technical response may not allay the person’s fears. Trying to tell the fearful person that they do not need

to be afraid, may also not be helpful. Understanding the basis for radiation fears can provide insights on a number of more helpful responses which will be explored in Part II of this series.

PEP M-2 Calculating Required Measurement Uncertainty for Field Measurements using MARSAME Guidance and GUMCALC

Scott Hay, Cabrera Services, Inc

The Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME) supplement to the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) was released in 2009. Including Measurement Quality Objectives (MQOs) in MARSAME to support survey design and selection of measurement methods marks a major step forward from MARSSIM. The required measurement uncertainty is a critical MQO that is used to support a priori selection of measurement methods, validation of new measurement methods, and a posteriori assessment of measurement methods. The calculation of the required measurement uncertainty presents a problem for many MARSAME users. This course defines required measurement uncertainty and discusses the role of MQOs in survey design using MARSAME, specifically related to selection of appropriate measurement methods. Attendees will be provided with a copy of GUMCALC software for calculating uncertainty and will be instructed in the use of this software. Example problems will be provided and attendees will have an opportunity to select appropriate inputs for a specific situation and to calculate required measurement un-

certainties using GUMCALC. The results of the example problems will be discussed and compared with field applications. Attendees will need to bring a computer to the course to participate in the exercises; they must have administrator privileges to install new software or have the GUMCALC software installed before arriving at the course. The 2009-09-06 version of the GUMCALC software can be downloaded from the Internet for free at <http://www.mccroan.com/gumcalc.htm>.

PEP M-3 The Impact of BWR Plant Water Chemistry on Refueling Outage Dose Rates and Fuel Failure Rates

*Joshua Vajda
PSEG Nuclear, LLC*

Improper water chemistry can pose detrimental effects to the safe operation of a nuclear power plant, including reduced plant efficiency because of corrosion products on fuel surfaces, to a catastrophic failure of primary piping and release of fission products to the environment. This presentation covers important aspects of maintaining chemistry systems in Light Water Reactors, which can mitigate fuel failures in the reactor core. These failures can lead to gross contamination and elevated dose rates in the reactor and turbine buildings of nuclear power plants. The costs associated with improper chemistry can be far reaching. Not only are replacement costs for materials and labor increasing, but replacement power and radwaste costs need to be factored into the equation too. In the age of deregulation, utilities are asking themselves if they

can afford to continue to operate with such huge capital expenditures, and several have answered the question with "NO." As you can see, improper chemistry could mean more than a little plant efficiency or some minor increases in radiation dose rates, it ultimately could mean your job!

PEP M-4 Fukushima Disaster Overview

*Mark L. Miller
Sandia National Laboratories*

This presentation will provide a personal overview and commentary on the sequence of events that led to the unprecedented disaster at the Fukushima Nuclear facility, beginning 3/11/11. This information is gleaned from the stream of information available on the Internet, contacts intimately associated with some of the emergency response organizations and his personal experience of working at a GE Mark-I BWR (the identical design/vintage of one of the Fukushima reactors) in Monticello, MN from 1982-1987. It will document the chronology of events since the accident and discuss radiation exposures to workers and the public as well as explore the innumerable challenges facing the Japanese, not only related to Fukushima itself but for nuclear energy's future in Japan.

PEP M-5 Medical Laser Safety Program Development and Improvement

*Deirdre Elder
University of Colorado Hospital*

Medical laser systems are used in many clinical settings, including ophthalmology and dermatology clinics, interventional radiology and cardiology and the operating room.

Whether it is a small clinic or a large academic medical center, a health care facility with laser applications should have a program in place to ensure the safety of patients and personnel. Regulatory requirements for laser safety in general and medical laser safety in particular vary widely across the country, but medical facilities in every state face accreditation inspections by The Joint Commission or similar organizations. Compliance with the ANSI standards is an expectation of accreditation organizations and the American National Standard for Safe Use of Lasers in Health Care (ANSI Z136.3) was revised in 2011. Many of the modifications to ANSI Z136.3 will give laser safety officers justification for improvements in management of the program. The elements of a medical laser safety program and the changes that may be needed to conform to the revised ANSI standards will be discussed.

Tuesday - 12:15-2:15 pm

PEP T-1 Tools and Strategies for Modeling Radionuclides in the Environment

Edward Waller

University of Ontario Institute of Technology

Environmental modeling is important for a variety of reasons, including establishing baselines, determining transport and effects radionuclide releases during both accident and non-accident conditions, and demonstrating compliance with local, state and federal regulations. In addition, increased emphasis is being placed on effects to non-human biota, and therefore standard environmental

models are being modified to accommodate these receptors. This PEP may be regarded as a basic introduction to environmental modeling, and is not oriented towards the professional that routinely utilizes these tools. It will introduce the participant to tools that are readily available for this mission. This PEP will focus on: (a) Introduction to environmental modeling, (b) Basic equations and references - where to find them and when to use them, (c) Overview of common tools used in environmental modeling studies, (for example, Spreadsheets, RESRAD, HOTSPOT, ERICA, and Commercial/Limited distribution software such as AMBER, GOLDSIM, STELLA, HPAC.) Students are encouraged to bring their laptops to follow along with the instructor. Students will be provided with materials, links and information to enable them to rapidly utilize some of the tools at their immediate disposal.

PEP T-2 Training First Responders on Radiological Dispersal Devices (RDDs) and Improvised Nuclear Devices (INDs) Events

K.L. "Ken" Groves

President, S2-Sevorg Services, LLC

This PEP will present an overview of the current training the author is presenting to First Responders (firefighters, emergency medical technicians, law enforcement and others) who may encounter either a Radiological Dispersal Device (RDD or Dirty Bomb) or an Improvised Nuclear Device (IND) as a part of their Emergency Response activities. The emphasis of the training is putting the radiological/nuclear material in perspective as compared with

other Weapons of Mass Destruction (WMD) materials such as chemical and/or biological weapon agents. A goal of the training is to help this First Responder Community understand that under almost all conditions, they can perform their primary mission of “putting out fires, rescuing and treating injured persons, and chasing bad guys” even in the presence of relatively large amounts of radiological/nuclear contamination. The rare cases of high activity unshielded sources will be reviewed and explained. Current National/International guidance on dose “limits” will be discussed. The use of information contained in the NCRP Report No. 165 entitled, “Response to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers,” NCRP Commentary No. 19, “Key Elements of Preparing Emergency Responder for Nuclear and Radiological Terrorism,” and the CRCPD “First Responders Handbook” will be used extensively in the presentation. A discussion of the use of Time, Distance and Shielding as well as appropriate Personal Protective Clothing and how it will provide the needed protection while immediate actions take place early in an RDD/IND event will be reviewed. The use of appropriate radiation detection instrumentation, documented Standard Operating Procedures along with realistic training, drills and exercises are the key to a successful response to an RDD/IND event for this community of critical emergency responders.

PEP T-3 Nanoparticle Characterization and Control Fundamentals: A Graded Approach

Mark D. Hoover

National Institute for Occupational Safety and Health

Given the considerable current interest in characterizing and controlling risks to worker health from potential exposures to engineered nanoparticles, this course will present an update on existing and emerging national and international information resources and a graded approach to sampling, characterization, and control of nanoparticles in the workplace. The graded approach begins with process knowledge, particle counting, and microscopy assessments for level 1 for initial screening; a level 2 for comprehensive characterization of detailed composition, size, concentration, and biophysical property assessments; and (ideally) an economical and efficient level 3 routine monitoring and control step involving a necessary and sufficient subset of level 1 and 2 methods for the material and situation of interest. The graded approach enables appropriate selection of handling and containment practices to match material properties and amounts. Sampling by filtration is an especially important method for collecting and evaluating any type of airborne material, including nanoparticles and other ultrafine aerosols such as radon decay products. Fundamentals will be presented for inertia (efficient collection for large particles) and diffusion (efficient collection for very small particles) that affect the efficiency and most penetrating particle size (MPPS) of filters;

efficiency and MPPS for the various filter types that can be used for collection of nanoparticles; and issues for selection of filters with appropriate collection efficiency, MPPS, durability, pressure drop, and surface characteristics. Examples and nanoinformatics safety and health resources are provided.

PEP T-4 Radon Progeny Doses and Risks Related to Consumer Use of Marcellus Shale Natural Gas

*Ralph H. Johnson, Lynn McKay
King & Spalding*

Recent reports, e.g., "Radon in Natural Gas from Marcellus Shale," by M. Resnikoff (See, <http://www.nirs.org/radiation/radonmarcellus.pdf>), assert that up to 30,000 excess lung cancer deaths could occur in New York State from consumer use of Marcellus Shale natural gas. This course will examine: (1) the derivation by modeling of wellhead radon levels from shale uranium concentrations; (2) reliance upon gamma ray well logs to derive wellhead radon levels; (3) the verification of wellhead radon modeling by comparison with actual measurements; (4) the potential dose to natural gas consumers by accounting for radon decay that occurs during gas transport, processing, and storage; (5) the effects of residence type (i.e., high-rise apartment vs. single family dwelling), residence volume, air change rate, stove and heater venting, occupancy time, and inhalation rate on a consumer's lung dose from radon progeny; (6) recent changes and reconciliations of the dose and risk coefficients published by the National Council on Radiation Protection and Measurements, the International

Commission on Radiological Protection, the United Nations Scientific Committee on the Effects of Atomic Radiation, and the U.S. Environmental Protection Agency. The course will be presented from the perspective of a trial attorney who has specialized in radiation litigation for over 30 years, but all scientific statements will be reviewed by at least 2 certified health physicists with substantial radon training and experience.

PEP T-5 Understanding the Many-Dimensioned Implications of the Fukushima Radiological Disaster

Eva K. Lee

Georgia Institute of Technology

The Tohoku earthquake, tsunami, and subsequent radiological incidents offer a first glimpse of the devastating impacts of cascading failures and a catastrophic event in an advanced industrialized society. This is the largest-ever release of radiation isotopes to the oceans. The cause was not a single event, but rather a cascading failure; and the release persisted for a sustained period. It was estimated that more than three-quarters of the radioactivity fell on the ocean. Although the levels of radioactivity up to 400 miles offshore were found by some marine radioactivity experts to be well below biological thresholds of concern to the small fish and plankton, levels of radioactivity found in fish are not decreasing after a year and there appear to be hot spots on the seafloor that are not well mapped. In Japan, while citizens have been educated about evacuation and response for earthquakes and tsunamis, there is a serious lack of knowledge about strategies and

emergency guidelines for radiological emergencies, including rapid screening and decontamination, even for those living close to nuclear plants. In the first part of this talk, we will share our on-the-ground experience regarding the Japanese families who lived within 20 kilometres from the failed nuclear plants. The discussion will be based on data collected regarding timelines for evacuation, screening, health status, radiological awareness and sociological information of the local population and workers, and subsequent psychological and medical impacts. Strategic planning and operations capabilities for emergency response and medical preparedness for radiological incidents is one of the critical cornerstones for US Homeland Security, along with biological and chemical incidents. The Japan incident underscores the paramount importance of these activities. The needs are widespread, as many nations use nuclear plants for energy generation. In the second part, we will describe a real-time information – decision support system that is designed for effective disaster mitigation and response efforts. The system offers operations capability to i) rapidly set-up shelters to house the displaced/at-risk population, ii) determine optimal resource allocation and operations for rapid screening and decontamination; iii) recommend and facilitate practical steps to minimize exposure risk; iv) perform effective population registry for long-term health monitoring; and v) service the displaced population on day-to-day needs. Application and training of the systems usage on the ground in Japan post-Fukushima will

be discussed. The system has real-time computation capability and can be used by emergency management administrators for actual strategic and operational planning and execution; to educate and train current and future personnel on decision making under uncertainties; and to simulate responses to catastrophic events through systematic analysis of numerous scenarios, including worst-case, to learn of erratic as well as efficient response strategies. Real-time data-feeds allow re-configuration on-the-fly as the event unfolds.

Wednesday - 12:15-2:15 pm

PEP W-1 Understanding and Responding to Radiation Fears – Part II

Ray Johnson

Radiation Safety Counseling Institute

How can you best respond to a person fearful of radiation? Psychologists know that attempts to confront fears directly may not be helpful. Since fears come from the subconscious mind, this means the basis of the fear is not in a person's awareness. Thus, our conscious mind does not know why we are afraid. Our subconscious mind is programmed to ever be on the alert for any signals of danger. Sensory signals flow through our spinal cord to the midbrain where the information is screened by the thalamus and the amygdala. In particular the amygdala recognizes signals of danger and immediately mobilizes automatic responses for protection. Before our conscious mind is even aware of any danger, the amygdala has directed our body to react without the benefit of a slow rational analysis. If a snake is about to strike us, we do

not want to take the time to process the degree of danger before deciding to jump back. The amygdala not only responds to explicit signals of danger, but also to implicit memories of danger. Since radiation does not give any sensory (explicit) warnings, our reactions to radiation have to come from memories of what we have always heard about radiation. Since most of what people have heard about radiation is mythology, instinctive reactions against radiation do not seem to have any rational technical basis. Efforts to rationally discuss a person's fears of radiation, when they are in their automatic response mode, will likely result in frustration for both parties. However, there are ways to explore the basis of fears when a person has moved beyond their immediate fear response. The question to uncover the underlying images of fearful consequences for specific circumstances is to ask, "What's so bad about that?" This question should be posed very gently and may need to be repeated several times to peel away several layers to get down to the real underlying image that drives the fear. Underlying bases for fear may include dying, loss of control, loss of health, loss of family, loss of income, etc. Another tool for response to a fearful person is called "Active Listening." With this approach we respond to the apparent feeling conveyed along with a brief statement of the content. Since technical people often have difficulty identifying the feeling part of a message, it might be helpful to note that all feelings can be captured by one of the following words, "Mad, Sad, Glad, and Afraid." There are also five key responses that can be used "when

you do not know what to say" which are not confrontive or defensive.

PEP W-2 So Now You're the RSO: Elements of an Effective Radiation Safety Program

*Thomas L Morgan
Columbia University*

Designation as a Radiation Safety Officer brings with it unique opportunities and challenges. The author will offer insights on how to manage a radiation safety program from his 16 years experience as a RSO at medical, university, and industrial facilities. Regardless of the type of facility, number of radiation workers, or scope, an effective radiation safety program must be driven from the top down. Senior management must embrace the goals of the program. The RSO must have the trust of senior management as well as a good working relationship with line managers and workers. These relationships are built on the integrity, knowledge, experience, and accessibility of the RSO. This talk will focus on the role of the RSO in achieving and maintaining an effective program.

PEP W-3 Uses and Misuses of Dosimetric Terms in Patient Radiation Protection

*Cari Borrás
Radiological Physics and Health Services Consultant*

In March 2007, the International Commission on Radiological Protection (ICRP) approved a new set of fundamental recommendations on radiological protection. The dosimetric terms to be used are equivalent dose, effective dose, committed dose and collective effective dose, all based on mean absorbed dose with its dis-

tributions in time and in linear energy transfer. While their definition did not change from the 1990 Recommendations, some of the factors that convert absorbed dose to equivalent dose and effective dose, w_R and w_T , did. Most significantly, the w_T value for the gonads decreased from 0.20 to 0.08 and the w_T for the breast increased from 0.05 to 0.12. Since both equivalent dose and effective dose cannot be measured directly, to determine external exposure, the ICRP relies on the operational quantities, defined by the International Commission on Radiation Units and Measurements, Inc. (ICRU): Ambient dose equivalent, $H^*(10)$, and directional dose equivalent, $H'(0.07, \Omega)$, are for area monitoring, and personal dose equivalent, $H_p(d)$, is for individual monitoring. Compliance with dose limits can be ascertained with the use of properly worn dosimeters. To link the protection and operational quantities to physical quantities that characterize the radiation field (such as tissue absorbed dose, air kerma free-in-air and particle fluence), the ICRU computed conversion coefficients. To assess internal exposure, the ICRP recommends the use of activity quantities in combination with dose coefficients based on physiological models and 4-D computations. The unit for all the ICRP and ICRU quantities listed above is the sievert (Sv). Effective dose should be used only for occupationally exposed workers and members of the public, where doses are assumed to be low, well below 100 mSv, and thus, only stochastic effects are considered. At doses above about 0.5-1 Sv, where tissue reactions (deterministic effects) may occur, the dosimetric quantity to

use is the absorbed dose in the irradiated tissue modified by the radiobiological effectiveness of the radiation for the biological endpoint of concern. The unit is the gray (Gy). Effective dose should not be used for retrospective evaluation of exposed populations or to assess individual risks, as is the case in medical exposures, which are not subject to dose limitations. Exposures in radiotherapy are clearly expressed in absorbed dose to the irradiated tissue. Since both the irradiation conditions and the exposed group of patients are known, exposures to individual patients from medical imaging, even those at low levels, should also be expressed as absorbed doses to the irradiated organs, as the ICRU recommends. The methods of organ dose calculations include placing external dosimeters such as TLD or OSL on the patient's skin, making measurements in physical phantoms that simulate patients and performing Monte Carlo radiation transport calculations on mathematical phantoms. BEIR VII has calculated stochastic risks for many organs/tissues exposed to low doses of low LET radiations. ICRP has just published new threshold dose values for tissue reactions. With these values, patient risks can be estimated. However, if the goal is not to assess risk, but to reduce patient exposure, diagnostic reference levels can be easily determined, as they are always expressed in machine parameters, such as incident air-kerma for radiography/fluoroscopy and CT air-kerma index and air-kerma length-product for CT.

PEP W-4 Emerging Interactions Between Health Physics and Nanotechnology

Lorraine Marceau-Day
CMAD/LSU

Having gained a fundamental understanding of Nanotechnology [see PEP 3-C entitled Nanotechnology: What It Is and Why It Might Be Important] the student will now be encouraged to understand how radiation protection and nanotechnology may be interconnected. Since nanotechnology is now part of mainstream science, and since it represents a paradigm shift in many aspects of science, technology and safety, future educational goals of Health Physics Professionals as well as future academic curricula for HP students should include the study and understanding of transport phenomena, dosimetry, and implementation of suitable practices for the safe handling of radioactive

nanoparticles. As the radiation protection professional, it will also fall to the Health Physicist to assist in helping to formulate new standards of radiation protection practices to deal with this technology. Whether you work in fields as fundamentally different as accelerators or decommissioning, you will be exposed to this new technology and its interactions within the profession of health physics. From joint radiation and nanoparticulates cancer therapy to military and homeland security applications, you will see and maybe even use nanotechnology. This PEP will examine such interactions as nanotechnology-based radiation detectors, regulatory issues, risk assessment strategies, decommissioning, military, medical health physics and accelerator related interactions of Nanotechnology for the radiation protection professional.

PEP W-5 CANCELLED

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Continuing Education Lectures (CEL)

Monday 23 July through Thursday 26 July

Monday 7:00-8:00 AM

CEL-1 Dose in Cardiac Radiology

Edward Waller, University of Ontario Institute of Technology

Dose is an important factor in cardiac radiology, both to patients and to radiologists. Numerous procedures, especially for interventional cardiology, involve dose levels that approach those in which deterministic effects may be observed. This CEL will discuss; (a) basics of cardiac and interventional radiology procedures, (b) expected dose to both patients and physicians, (c) risk issues related to cardiac radiology procedures, and (d) risk communication issues related to these procedures.

CEL-2 The Vulnerability of the Embryo/Fetus to the Oncogenic Effects of Ionizing Radiation. ("The Canary in the Mine Is Not Dead")

Robert L. Brent, DuPont Hospital for Children

The RERF studies clearly indicate that in utero radiation exposures above 0.2 Gy are oncogenic. The controversy is what is the oncogenic risk of radiation from diagnostic radiology studies? In 1956 and 1958 Dr. Alice Stewart and colleagues published articles based on data obtained from the Oxford Cancer Study that indicated that exposures of pregnant women to diagnostic radiological studies was associated with a 40 to 50% increase in the risk of leukemia in the offspring. By the 1970's the Stewart group was convinced that this was a causal association. Kneale and Stewart (1976, 1977) in a letter to the *Lancet* criti-

cized Dr. Mole's suggestion that the fetus is not much more sensitive to the carcinogenic effects of low level radiation during the early stages of development than during later stages. Kneale and Stewart criticized the conclusion of Dr. Mole based on the OCSS data and based on the cases exposed in the first trimester, Kneale and Stewart concluded that first trimester exposures are "Probably 16 times as dangerous as third trimester exposures." Stewart reminded Dr. Mole, "Not to forget that as a result 10% of viable fetuses were involved in these examinations between 1953 and 1970." This resulted in a 5% addition to the number of children who died from malignant diseases. There are over 35 case control studies (CC) (and 17 cohort studies (CS) that will be discussed. The RR of the CC studies averaged 1.3 to 1.4, but 30% were not significant. All of the CS were negative but the numbers of exposures were small in the majority of the studies. A most important publication by Preston et al was published in 2008 and the authors concluded, "The in utero exposed population was much less sensitive to the oncogenic effects of radiation than the children that were exposed to the A-bomb (RERF 2006)" Preston et al reported, "Lifetime risks following in utero exposure may be considerably lower but further follow-up is needed." Some animal studies and basic science studies would have predicted these findings. Finally, there will be a critical evaluation of the scientists who predict the risk of cancer from one diagnostic study that fright-

ens the public and especially pregnant women.

Tuesday 7:00-8:00 AM

CEL-3 CANCELLED

CEL-4 ANSI N43.1 Radiation Safety for the Design and Operation of Particle Accelerators

L. Scott Walker, Los Alamos National Laboratory

The CEL for ANSI N43.1 is an overview of the recently approved Accelerator Safety document that replaces the 1985 version of the standard. Each section of the new standard is highlighted as well as the five Appendixes. Several new sections were added that were not included in the old standard. These include: Radiation Safety Program, Radiation Safety System, Access Control System, Radiation Control System and Accelerator Operations. The Appendixes address: Development of Safety Assessment Document (SAD), Interlocked-Type Access Control Systems, Decommissioning Program, Measurements of Radiation and Radioactivity, and Safety Standards for Commercially Available and/or Production-Type Accelerators. The last appendix is normative (not optional) and was written to summarize the requirements for small industrial accelerators.

CEL-5 Nanoparticle-based Radiation Detectors and the Use of Radiation for Nanoparticle Detection

Lorraine Marceau-Day, Lee Madsen; CMAD/LSU

There is a continual need for cheap, reliable and sensitive radiation detectors. In particular, new and specific detectors are sought for home-

land security applications. Such detectors need to be able to distinguish potentially hazardous materials from background radiation. In order to improve the operational range of such hardware, the new generation of detectors should also be small, discrete, self-powered, easily transported and easily installed. These new detectors rely on new materials including composite and intercalated polymeric scintillators which are designed to take advantage of the unique properties of nano particles. Since these new detectors will demonstrate improved specificity, they will readily find wide-spread application and use in the national security sector. The unique properties of nanomaterials can also be used to generate spectrometric data that can easily differentiate fissile materials from medical or industrial use radio-isotopes, as a consequence of their unique spectrographic signatures. The techniques used to detect radiation are usually exclusive to those used to characterize nanoparticulates. However, we will discuss the potential of nano-characterization using radiation (the converse) wherein, radiation may be used to detect the size of nanoparticles. These two divergent applications of detection for both radiation and nanoparticles inextricably tie these two technologies together. This talk will focus on some of the state-of-the-art of these emerging technologies.

CEL-6 Comparison of Best Estimate Radiation Health Risk with Compliance-Based Health Risk Assessment - Part 1

Eric G. Daxon, Jason Cezeaux

The lethality of the ambient environments for serious nuclear accidents, terrorist attacks and military operations in nuclear environments requires the ability to accurately assess health risk. The current safety system was not designed for radiological emergencies, but for use in an integrated system of policies, procedures, and standards that have very effectively protected both people and the environment while allowing the beneficial use of ionizing radiation. The procedures currently used for assessing external and internal dose are not optimized for health risk but for a compliance system. The primary objective of this two part continuing education session is to highlight the differences between the compliance system and the procedures and processes needed to come up with “best-estimate” radiation health risk assessments suitable for these lethal environments. Part I focuses on “best-estimate” dose methodologies. Part II presents a novel strategy for incorporating “best-estimate” into decision-making.

Wednesday 7:00-8:00 AM

CEL-7 Safety (Mis)Communications – Say What You Mean and Mean What You Say

James Tarpinian, SLAC National Accelerator Laboratory

This presentation explains why traditional approaches to safety communications actually work AGAINST our efforts to create a healthy nuclear

safety culture. One of the key objectives of effective communication is to avoid being misunderstood as well as to be understood. Often, as safety professionals or managers, we seek to motivate employees to work safely by communicating our key messages briefly and simply so that there is no room for confusion. However, despite our best efforts and intentions we don't get the results we were expecting – why? In order to avoid being misunderstood, we must understand the three perspectives of what we say, what we mean when we say it, and what the intended audience actually hears. For example, a phrase that is commonly used is “Safety is a condition of employment.” This over-used phrase is brief and to the point but it is absolutely the wrong thing to say and almost always said at the wrong time, generally in a memo that management issues following a serious accident. This message fails because it yields exactly the opposite of what is intended. It results in a disenchanted workforce where safety is equated with punishment, rules are not respected (and, likely not questioned) and ideas for safety improvements are suppressed or not even offered. This interactive discussion will help you avoid the pitfalls “safety sound bytes” and will significantly increase your ability to create positive, sustainable changes in safety culture by learning how to send the right message.

CEL-8 Calculating External Beta-Ray Dose

John A. Bauhs, 3M Corporation

This course presents a review of methods of computing beta-ray

external dose with a focus on calculator and spreadsheet calculations of skin dose that result from a variety of beta-source geometries. The source configurations include immersion in a cloud; point sources on the skin and at a distance; skin surface area contamination; and external plane sources. The presentation will show the scientific basis and evolution of the equations and methods used for beta dose computation. Dosimetry results will be put into the perspective of regulatory requirements for skin dose-volume averaging. The use of dose calculation software such as Varskin and Monte Carlo codes will be briefly discussed. The participant will leave with an in-depth working knowledge of beta dose computation with an understanding of options for employing more computer-intense dosimetry calculation methods.

CEL-9 Statistical Sampling and Analysis Approaches for Waste Disposal and Decommissioning Projects

Thomas L. Rucker, SAIC

It has been said that you can prove anything with statistics. However, the “proof is in the pudding” and valid proofs depend on valid application of statistical principles and assumptions. The use of MARSSIM (Multi-Agency Radiation Survey and Site Investigation Manual) guidance and its supplement MARSAME (Multi-Agency Radiation Survey and Assessment of Material and Equipment Manual) have provided a statistical framework for sampling and analysis of characterization data for both site decommissioning and waste management projects based on a standard data life

cycle and on meeting developed data quality objectives. However, statistical assumptions are often not verified to be applicable to the material in question. Furthermore, misunderstanding of how to apply statistical principles and methods to radiological data can lead to erroneous conclusions. Some examples of misapplication of statistics include out of scope application of guidance, misapplication of statistics across multiple populations for statistical sampling based on poor or missing historical process knowledge or scoping data; poor or unverified assumptions underlying the evaluation method or statistical tests; improper basis for statistical sampling design by applying area based to methods to discrete populations or by applying decisions based on means of populations without evaluation of hot spots; and, improper application of statistical methods for “undetected” versus “detected” data. Some available statistical methods and software packages lend themselves to misapplication in these ways, especially for the unwary and uninitiated. Examples from some actual site decommissioning and waste management projects using various statistical methods and available statistical software packages will demonstrate the misapplication and proper application of statistical principles.

CEL-10 Comparison of Best Estimate Radiation Health Risk with Compliance-Based Health Risk Assessment - Part 2

Eric G. Daxon, Jason Cezeaux

See CEL-6 for information.

CEL-11 How Do We Make Decisions for Radiation Safety?

Ray Johnson, Radiation Safety Counseling Institute

Have you found yourself puzzled by people's decisions and reactions about radiation? Have you felt that their decisions were not rational or based on any real understanding of radiation risks? How much do workers or the public really know about radiation risks when they express concerns for radiation safety? Are you willing to accept that radiation fears are OK, when the basis of those fears seems to be mythology which is not technically defensible? Psychologists tell us that all feelings (fears) are OK. We have survived as a species by paying attention to our fears. While our subconscious minds are programmed from birth for certain universal fears, such as fear of the dark, heights, snakes, spiders, closed spaces, and submersion, we are not naturally programmed for fear of radiation. However, we now seem to be in an era where radiation fears are instinctive. Perhaps hearing repeatedly about "deadly radiation" our subconscious minds have included radiation along with snakes and spiders. Our

programmed response to imminent physical dangers is to fear first and think second. While an instinctive immediate reaction is appropriate to avoid a striking snake, this response mechanism does not do well for issues such as radiation safety. However, studies in neurosciences are showing that we have learned how to make decisions and cope with dangers for which we have little understanding. The author, David Ropeik, describes Bounded Rationality as our approach to making decisions when we do not have all the data, time to acquire more data, or the intellectual ability to process the data. Ropeik shows that we are constantly making judgments without perfect knowledge, but doing the best that we can at the time. We process, sort, compare, categorize, and analyze information in relation to our immediate circumstances, experiences, and life factors, such as health, wealth, traditions, and lifestyles. With all these inputs we can come up with instant judgments. Such quick judgments are crucial to our survival. However, because they are based on limited information, these decisions may not always be best for us in the long run.

2012 Exhibit Hall Floor Plan

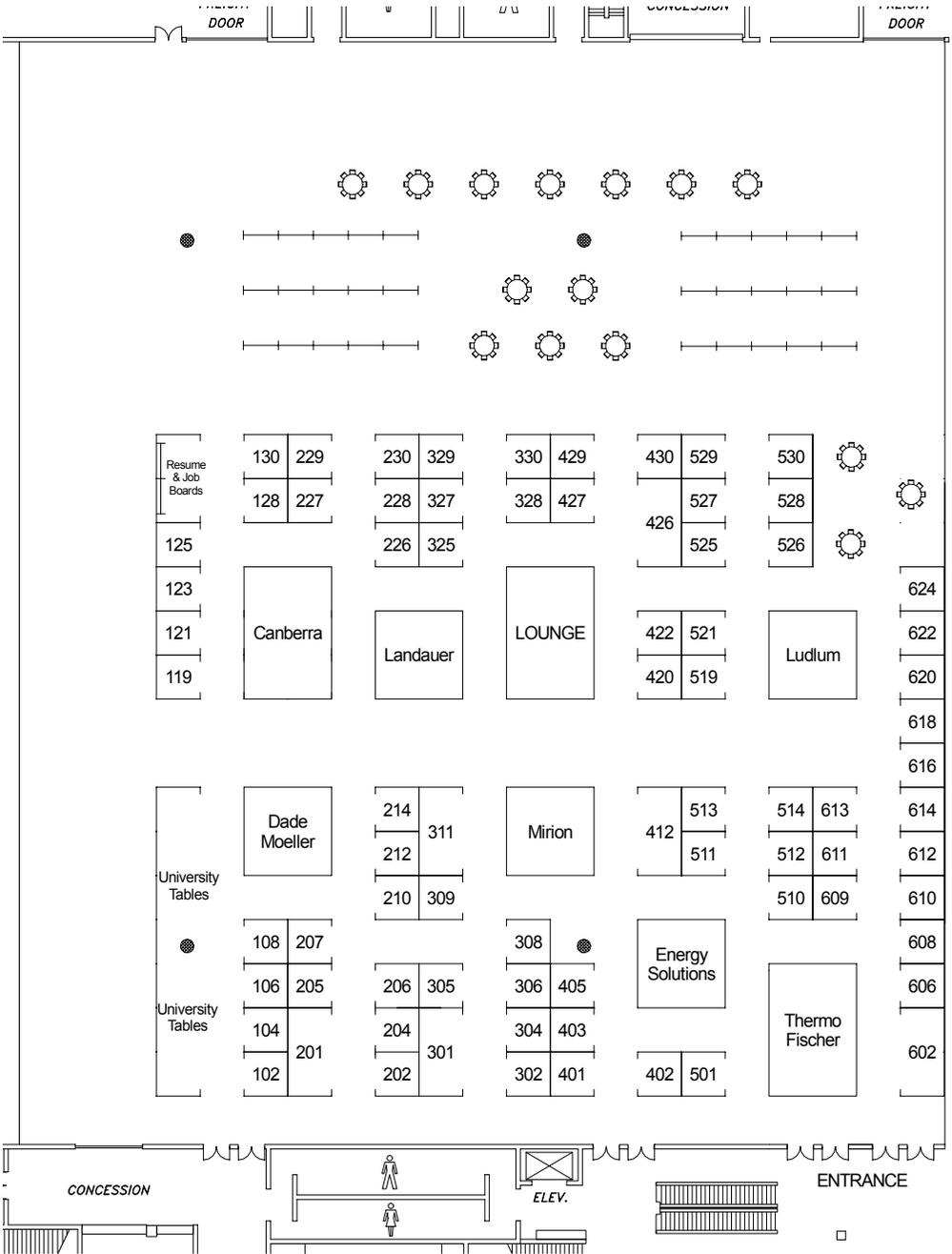


Exhibit Hall Hours	
Monday	Noon - 5:00 pm
Tuesday	9:30 am - 5:30 pm
Wednesday	9:30 am - Noon

2012 Exhibitors

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2013 Midyear Meeting Booth: 528

AAHP/ABHP Booth: 228

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Works-In-Progress Abstracts

P.69 Thermal Investigation of EBT2 GafChromic Dye Films

Aydarous, A., Abdullah, S.; Taif University

Radiochromic Dye films (RDF) are effective for many qualitative and quantitative applications due to their unique dosimetric characteristics over other dosimetric techniques such as ionization chambers and Thermoluminescence Dosimetry (TLD). These unique characteristics include high spatial distribution, wide dose range, equivalent response to photons and electrons, dose rate independence and insensitivity to room light. The parameter used to quantify the dose is the color change of the active layer of the irradiated film. There are presently very few studies on the physical changes or parameters that occur in the irradiated films. In this study, the thermal diffusivity α ($m^2 s^{-1}$) of the irradiated EBT2 GafChromic films (doses range from 5 cGy to 1000 cGy) has been investigated using the photoacoustic spectroscopy technique (PA). The results show clear dependence of thermal diffusivity α of the irradiated films on the gamma doses. The thermal diffusivity was calculated from the characteristic frequency at which the film goes from the thermally thick region to the thermally thin region. The measured thermophysical parameter carries information on how effectively phonons transfer heat through the EBT2 film. This thermal investigation is the first of its kind and may provide some information that could be valuable in dosimetric applications. The Photoacoustic spectroscopy technique (PA) proved to be a powerful tool in

studying such parameters in a non-destructive manner without particular sample treatment.

P.70 Measurement and Comparison of Surface Dose Distribution for 6 MV Photon Beams using Conformal and IMRT Techniques

*Al-Omari, E., Aydarous, A. *, Elshahragti, A., Saoudi, A.; Taif University, Al Hada Armed Hospital, King Abdullah International Medical Research Center*

The accurate measurement and calculation of dose buildup at near surface depths is still a major challenge in radiotherapy treatment planning. This is due to the inability of the treatment planning system (TPS) to accurately model skin dose and the difficulty to account for electron contamination from accelerator head and air volume. The purpose of this study is to investigate the dose in the build-up region using conformal and IMRT techniques. The depth dose measurements were conducted using EBT2 GafChromic films, Roos chamber and diode dosimetry. The work also focuses on measuring the surface dose distribution using EBT2 films on a Rando phantom. The EBT2 films offer excellent spatial and dose resolution over the other dosimetric techniques. The measured isodose distributions from 6 MV photon beams at 0° incidence and 30 x 30 cm² field size were compared against the predicted values from the TPS. The depth dose profile at the buildup region varies from one dosimetric technique to another and from one treatment techniques to another. The evaluation of the accuracy between measurements and calculations for conformal

and IMRT techniques are discussed and some recommendations are suggested.

P.71 Analysis of Physical and Chemical Properties of Industrial Alpha-Emitting Aerosols

Sypko, S.A., Khokhryakov, V.V.; Southern Urals Biophysics Institute, Russia

Measurement of Am and Pu content in air samples resulted in quantitative characteristics of nuclide composition and physical-chemical properties of the nuclides in alpha-active aerosols at different production areas of main plants of Mayak PA. Studies of particle-size composition of alpha-emitting aerosols show that in the radiochemical plant samples AMAD varied in a wide range from 2.1 to 7.33 μm (in rooms after gas purification) and from 4.8 to 8.3 μm (in rooms before gas purification). In different areas of the plutonium plant particle size varied from 3.3 to 7.2 μm (mechanical and form preparation departments) and from 3.7 to 6.2 μm (foundry department). Analysis of physical-chemical properties of Am and Pu in alpha-active aerosols found a direct relationship of activity level of the radionuclides in aerosols with size of aerosol particles: the greater AMAD, the greater fraction of Pu or Am activity from total nuclide activity on impactor cascade. We found a steady trend to increase of activity of ^{41}Am and ^{239}Pu in transportable state, with decrease of AMAD of aerosol particles sampled on radiochemical and plutonium plants. Kinetics of dialysis of industrial alpha-emitting aerosols with nanometer range was studied. The results show that in dialysis kinetics characterized by two fractions the fast fraction share had values which differed within 23%

- 36%. Share of fast fraction of kinetics of submicron aerosols dialysis exceeded the values characteristic for aerosols of micron range by more than an order of magnitude. Analysis of the experimental data will help to develop scientific approaches for metabolism and dosimetry of actinides entering human body through inhalation of industrial alpha-emitting aerosols.

P.72 Radiosensitivity and Adaptive Response of Blood Lymphocytes in the First-Generation Offspring of Fathers Chronically Exposed to Radiation

Akhmadullina, Yu., Akleyev, A.; Urals Research Center For Radiation Medicine

The purpose of this study was to estimate the initial damage to T-lymphocytes and the capacity for adaptive response in exposed fathers and their unexposed first-generation offspring. The group of fathers included 17 persons who had been chronically exposed to radiation as a result of the activities of the Mayak Nuclear Facility. The average dose to gonads in the year of conception was 0.12 ± 0.02 Gy. The group of offspring was composed of 28 own children of the fathers, while mothers were not exposed. A group of 49 unexposed subjects served as a control group for the offspring group of matching sex, age and ethnicity and who lived in comparable socio-economic conditions. The original damage and the capacity for adaptive response were studied using the micronucleus assay based on the cytokinesis-block with cytochalasin-B. After 24 hours of culturing, the cells were irradiated at the phase of G1-cycle at an adaptive dose of 0.05 Gy, and then 5 hours later

at a resolution dose of 1 Gy. In parallel, a portion of samples which were not irradiated was used to assess the original damage, and one more portion of samples was irradiated at a dose of 1 Gy. The offspring group demonstrated a statistically significant increase in the number of micronuclei in lymphocytes after irradiation in vitro at a dose of 1 Gy, compared with the father group. Also, members of the offspring group showed a statistically significant decrease in the number of micronuclei in lymphocytes after irradiation in vitro at a dose of 1 Gy, compared with the control group. There were no statistically significant differences in the original frequency of micronuclei in lymphocytes donated by both the fathers and the offspring. There were no statistically significant differences in the pattern of response to adaptive doses among the father and the offspring groups. There were no statistically significant differences in the baseline frequency of micronuclei in lymphocytes of the offspring, compared to the control group. No statistically significant differences were observed in the pattern of response to adaptive doses among the offspring group and the controls.

P.73 Occupational Safety and Health Administration Renews Its Alliance with the Laser Institute of America; What Can You Do As a Health Physicist to Promote Laser Safety?

Haes, D.L., Sams, B.; BAE Systems, Laser Institute of America

May 9, 2012, the Occupational Safety and Health Administration (OSHA) renewed its alliance with the Laser Institute of America (LIA). The purpose of the alliance is “to reduce

and prevent worker exposure to laser beam and non-beam hazards in industrial, research, and medical workplaces.” Through the alliance OSHA will, among other programs, share information on laser regulations and standards and laser safety program administration. Currently published OSHA laser standards are out-dated and reliance upon them as our only source of information does not foster a “best practice” of laser safety. The Z136 series of consensus standards published by the LIA are constantly evolving and are increasing in scope and number (there will soon be 10). Embracing them into our workplace is a start to enhancing laser safety. We can’t rely on others, or the Health Physics Society (HPS) to effectively promote this type of radiation safety. There is much we can and MUST do as health physicists to get involved in laser safety. We must develop our own skills. For those that have gained expertise in the in the field of laser safety, the next step is to achieve and maintain professional certification. Currently, the only professional laser safety certification available in the United States is through LIA’s affiliate, the Board of Laser Safety (BLS). Lastly, we need to volunteer our time and efforts to promote laser safety in all venues.

P.74 Surveillance for Radiation Exposures Using the National Poison Data System

Chang, A., Law, R., Martin, C., Schier, J.; Centers for Disease Control and Prevention, Atlanta GA

Since 2010, the Centers for Disease Control and Prevention (CDC) and the American Association of Poison Control Centers (AAPCC) have conducted surveillance for exposures

to radiation and radioactive materials reported from all 57 US Poison Centers (PCs) using the National Poison Data System (NPDS). CDC, AAPCC and Poisindex®, Thomson Reuters Healthcare, recently developed and implemented improvements to the NPDS radiation coding structure to enhance and optimize NPDS's public health radiation surveillance utility. Our objective is to describe results from this surveillance including the number of reported exposures and associated radiation incidents during a one-year period. We analyzed PC calls from 1 September 2010 – 1 September 2011 that involved exposure to radiation or radioactive materials. Using NPDS data, CDC and AAPCC staff reviewed and confirmed each reported exposure. When surveillance detected multiple exposures clustered in space and time, news stories in the public media were also monitored for corresponding radiation incidents. For our results, a total of 186 calls were identified. 51 of these (27%) were associated with 3 radiological incidents reported in the public media and one regional anti-terrorism exercise. The incidents included exposure to x-ray radiation from industrial radiography which led to the temporary closure of a hospital (n=4; 8%), a transportation accident involving potential contamination with radioactive material and exposure to several medical personnel (n=11; 22%), the Fukushima Daiichi Japan nuclear reactor disaster (n=10; 20%) and a regional radiation anti-terrorism exercise involving a cesium radiological dispersal device (n=26; 50%). The remaining 135 calls did not involve multiple exposures with clustering and were not followed

by the regional PC. We conclude that during a one-year period, our surveillance detected 51 calls associated with 4 radiation incidents. These incidents were of potential public health significance because they involved multiple persons and had the possibility to cause widespread public concern. Similar surveillance strategies for detecting and tracking future radiological incidents using NPDS may be useful for public health.

P.75 Environmental Dose Assessment for the Maralinga Nuclear Test Site

Kaspar, M.J., Johansen, M., Brandl, A.;
Colorado State University

There are few locations throughout the world, like the Maralinga nuclear test site located in south western Australia, where sufficient plutonium contaminate concentration levels exist that is available for accumulation studies from soil to plants and plants to animals. The information obtained will be useful for the potential human users of the site, located on Aborigine land, by providing insight to the resulting dose rates while keeping with international efforts to better understand doses to biota. In particular, the research will focus primarily on the rabbit population located within the site. Our approach is similar to providing the same protection allotted to humans to the environment as we have come to rely on a series of simplifying assumptions on biota, their geometry in particular. Computer codes such as ERICA, rely on dose conversion factors (DCF's) defined as the dose rate per unit of activity concentration. Currently, these DCF's for internal exposure were derived assuming an ellipsoidal representation of the

biological organism having the same mass and volume. This simplifying geometry assumes a homogeneous representation of all animal tissues. In collaborative efforts with Dr. Mathew Johansen at the Australian Nuclear Science and Technology Organisation (ANSTO) we will expand this idea were radionuclides accumulate in specific organs, causing organ-specific dose rates, such as Pu accumulating in bone. Organ-specific dose models have been developed for humans, however, little has been developed for the dose assessment to biota, specifically rabbits. Primarily in the past, organ radionuclide concentrations have focused on the human consumption pathway, rather than assessing dose to non-human biota.

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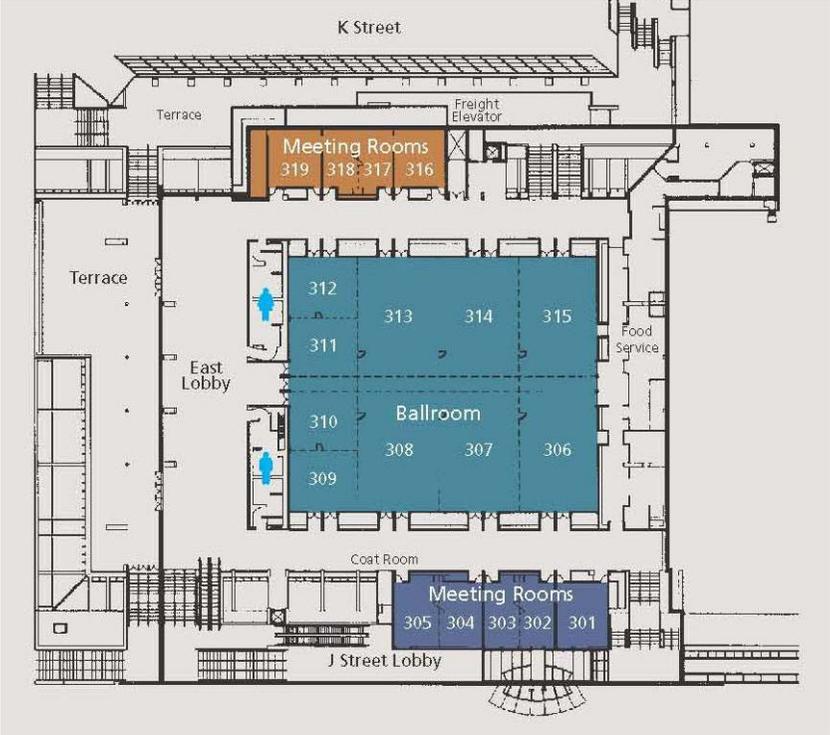
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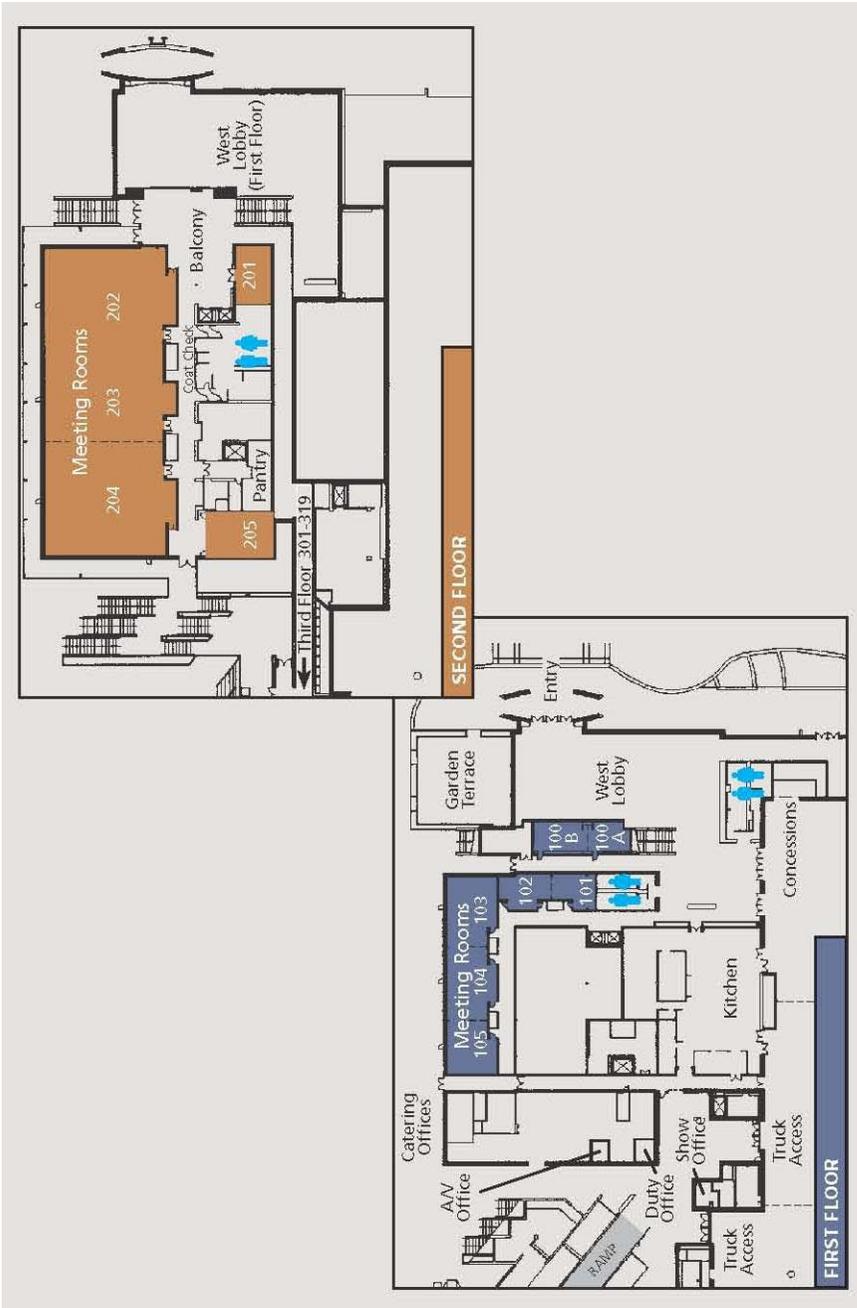
Notes

Sacramento Convention Center



Ballroom Level

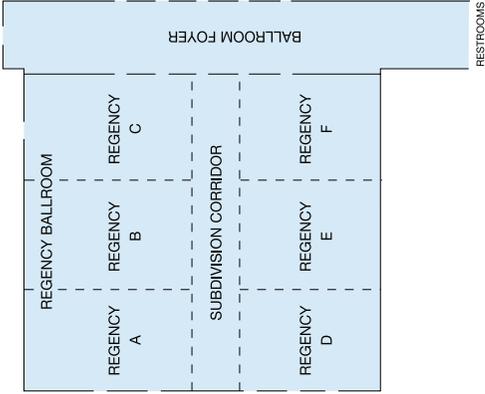
Sacramento Convention Center



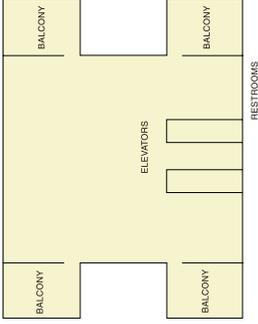
Meeting Room Level, Floor 1 and Floor 2

Hyatt Regency Sacramento

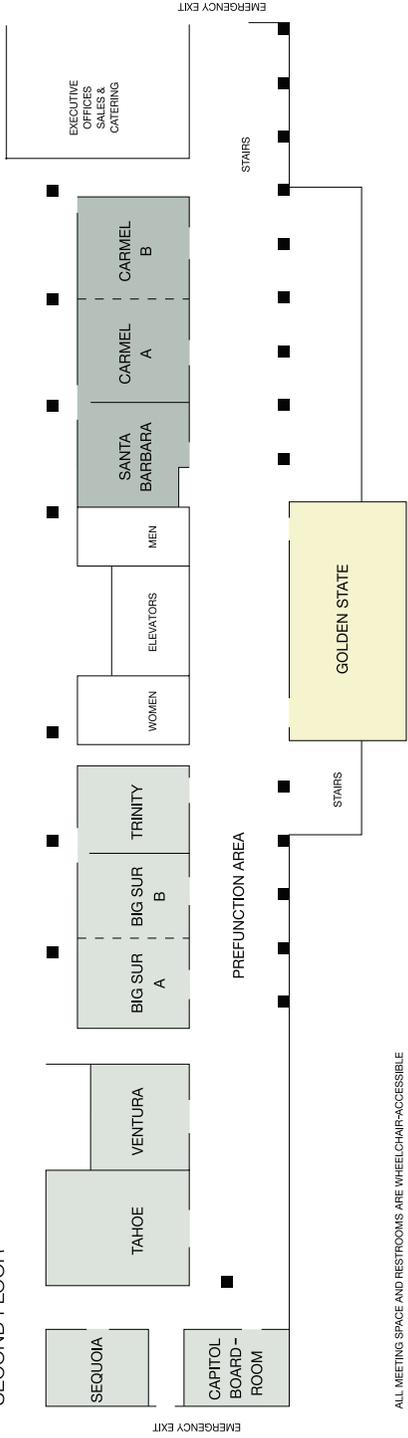
FIRST FLOOR



CAPITOL VIEW 15TH FLOOR



SECOND FLOOR



ALL MEETING SPACE AND RESTROOMS ARE WHEELCHAIR-ACCESSIBLE

Saturday, 21 July

AAHP 1 Response to Radiological Weapons	
8:00 AM-5:00 PM	Hyatt D
AAHP 2 Non-Ionizing Radiation	
8:00 AM-5:00 PM	Hyatt E
AAHP 3 Responses to Fukushima	
8:00 AM-5:00 PM	Hyatt F

Sunday, 22 July

PEP 1-A thru 1-F	
8:00-10:00 AM	
PEP 2-A thru 2-G	
10:30 AM-12:30 PM	
PEP 3-A thru 3-G	
2:00-4:00 PM	
Welcome Reception	
6:00-7:00 PM	
Grand Ballroom,	
Hyatt Sacramento	
PEP Rooms:	
All PEPs take place in the Sacramento Convention Center	
1A/2A/3A - 309	
1B/2B/3B - 310	
1C/2C/3C - 311	
1D/2D/3D - 312	
1E/2E/3E - 316	
1F/2F/3F - 317/318	
2G/3G - 319	

Saturday AAHP courses will take place in the Hyatt Sacramento.

Sunday - Thursday All Sessions, CELs and PEPs take place in the Sacramento Convention Center

Monday, 23 July

CEL1 Dose in Cardiac Radiology	
7:00-8:00 AM	309
CEL2 The Vulnerability of the Embryo/Fetus to the Oncogenic Effects of Ionizing Radiation. ("The Canary in the Mine is Not Dead")	
7:00-8:00 AM	310
ABHP Exam - Part 1	
8:00-11:00 AM	Hyatt E/F
MAM-A Plenary	
8:15 AM-Noon	Hall D
Complimentary Lunch in Exhibit Hall for all Registrants and Opening of Exhibits	
Noon-1:30 PM	Exhibit Hall
PEP Program - 12:15-2:15 PM	
PEP M1 Understanding and Responding to Radiation Fears – Part I	309
PEP M2 Calculating Required Measurement Uncertainty for Field Measurements using MARSAME Guidance and GUMCALC	310
PEP M3 The Impact of BWR Plant Water Chemistry on Refueling Outage Dose Rates and Fuel Failure Rates	316
PEP M4 Fukushima Disaster Overview	312
PEP M5 Medical Laser Safety Program Development and Improvement	319
ABHP Exam - Part II	
12:30-6:30 PM	Hyatt E/F
Poster Session	
1:30-3:00 PM	Exhibit Hall
MPM-A Risk Analysis	
3:00-5:00 PM	314
MPM-B Decommissioning I	
3:00-4:45 PM	315
MPM-C Modular Reactors	
3:00-4:00 PM	306
MPM-D Operational Health Physics & Training, Part 1	
3:00-4:15 PM	307
MPM-E Homeland Security	
3:00-4:00 PM	308
MPM-F Special Session: Emerging Issues for Radiation Protection and Nanotechnology	
3:00-5:00 PM	313
MPM-G Movies	
3:00-5:00 PM	311
Homeland Security Section Bus Mtg	
4:00 PM	308
Student/Mentor Reception	
5:30-6:30 PM	305
Student Reception	
6:30-7:30 PM	305

Tuesday, 24 July

CEL4 ANSI N43.1 Radiation Safety for the Design and Operation of Particle...	
7:00-8:00 AM	310
CEL5 Nanoparticle-Based Radiation Detectors and the Use of Radiation...	
7:00-8:00 AM	316
CEL6 Comparison of Best Estimate Radiation Health Risk with Compliance...	
7:00-8:00 AM	319
TAM-A Homeland Security and Decommissioning Section Joint Special Session 1	
8:30 AM-Noon	314
TAM-B Special Session: AAHP I: Overview of the National Ignition Facility	
8:15 AM-Noon	315
TAM-C Accelerator	
8:15 AM-Noon	306
TAM-D Department of Energy Special Session: Atomic Bomb Survivor Dosimetry	
8:15 AM-Noon	307
TAM-E Environmental Section Special Session: Tritium in the Environment	
8:15-11:30 AM	308
TAM-F Medical Section Special Session: Patient Release	
8:15 AM-Noon	313
Editorial Workshop	
10:00-11:30 AM	311
Environmental Section Bus Mtg	
11:30 AM	308
Medical Section Bus Mtg	
11:45 AM	313
AAHP Awards Luncheon	
Noon-2:00 PM	202
Accelerator Section Bus Mtg	
Noon	306
PEP Program - 12:15-2:15 PM	
PEP T1 Tools and Strategies for Modeling Radionuclides in the Environment	309
PEP T2 Training First Responders on Radiological Dispersal Devices (RDDs)...	319
PEP T3 Nanoparticle Char. & Control Fundamentals: A Graded Approach	316
PEP T4 Radon Progeny Doses & Risks Related to Consumer Use of Marcellus...	312
PEP T5 Understanding the Many-Dimensioned Implications of the Fukushima...	310
TPM-A Homeland Security and Decommissioning Section Joint Special Sess II	
2:30-4:30 PM	314
TPM-B Special Session: AAHP II: Overview of the National Ignition Facility	
2:15-5:00 PM	315
TPM-C Special Session: Integration of Local Radiation Experts in Emergency...	
2:30-5:30 PM	306
TPM-D NESHAPS Special Session: Radioactive Air Annual Meeting	
2:30 - 5:15 PM	307
TPM-E External Dosimetry	
2:30-5:15 PM	308
TPM-F Regulatory Issues	
2:30 - 5:15 PM	313
TPM-G Movies	
2:30 - 5:00 PM	311
Decommissioning Section Bus Mtg	
4:30 PM	314
AAHP Open Meeting	
5:30 PM	315
HPS Awards Banquet	
7:00-10:00 PM	Hyatt Grand Ballroom

CEL7 Safety (Mis)Communications-Say What you Mean and Mean What you Say 7:00-8:00 AM	309
CEL8 Calculating External Beta-Ray Dose 7:00-8:00 AM	310
CEL9 Statistical Sampling and Analysis Approaches for Waste Disposal... 7:00-8:00 AM	316
CEL10 Comparison of Best Estimate Radiation Health Risk... 7:00-8:00 AM	312
WAM-A Environmental I 8:30-11:45 AM	314
WAM-B CRSO 8:15 AM-Noon	315
WAM-C Medical Health Physics I 8:15-11:45 AM	306
WAM-D Internal Dosimetry I 8:30-11:15 AM	307
WAM-E Military Section Special Session I 8:30-10:30 AM	308
WAM-F Power Reactor Section Special Session 8:15-10:45 AM	313
WAM-G The Name of our Society-Is It Finally Time to Consider Changing It? 9:00-10:30 AM	311

PEP Program - 12:15-2:15 PM

PEP W1 Understanding & Responding to Radiation Fears Part II	309
PEP W2 So Now You're the RSO: Elements of an Effective Radiation...	310
PEP W3 Uses & Misues of Dosimetric Terms in Patient Rad Protection	316
PEP W4 Emerging Interactions Between HP and Nanotechnology	312
PEP W5 Cancelled	

WPM-A1 Environmental II 2:45-3:30 PM	314
WPM-A2 Biokinetics/Bioeffects 4:00-4:45 PM	314
WPM-B CRSO 2:30-4:00 PM	315
WPM-C Medical Health Physics II 2:30-5:00 PM	306
WPM-D1 Internal Dosimetry II 2:30-3:30 PM	307
WPM-D2 Non-Ionizing Radiation 4:00-5:00 PM	307
WPM-E Military Section Special Session II 2:30-5:15 PM	308
WPM-F Movies 2:30-5:00 PM	311
WPM-G Aerosol Measurements 6:00-8:00 PM	309

CRSO Bus Mtg

4:00 PM	314
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HPS Business Meeting

5:15 PM	308
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CEL11 How Do We Make Decisions for Radiation Safety? 7:00-8:00 AM	309
THAM-A Emergency Planning and Response 8:15-11:30 AM	314
THAM-B CRSO 8:15-10:15 AM	315
THAM-C Instrumentation 8:15-11:30 AM	306
THAM-D Waste Management 8:30-10:00 AM	307
THAM-E Operational Health Physics and Training, Part 2 8:15-11:15 AM	308

Registration at the Sacramento Convention Center Exhibit Hall A Foyer	
Saturday	2:00 - 5:00 PM
Sunday	7:30 AM - 5:00 PM
Monday	7:30 AM - 4:00 PM
Tuesday	7:30 AM - 4:00 PM
Wednesday	8:00 AM - 4:00 PM
Thursday	8:00 - 11:00 AM

Exhibit Hall Hours

Exhibit Hall A	
Monday	Noon - 5:00 PM
Tuesday	9:30 AM - 5:30 PM
Wednesday	9:30 AM - Noon

KEY
MAM Monday AM Session
MPM Monday PM Session
TAM Tuesday AM Session
TPM Tuesday PM Session
WAM Wednesday AM Session
WPM Wednesday PM Session
THAM Thursday AM Session

NOTE FOR CHPs

The American Academy of Health Physics has approved the following meeting-related activities for Continuing Education Credits for CHPs:

- * Meeting attendance is granted 2 CECs per half day of attendance, up to 12 CECs;
- * AAHP 8 hour courses are granted 16 CECs each;
- * HPS 2 PEP courses are granted 4 CECs each;
- * HPS 1 hour CELs are granted 2 CECs each.