FINAL PROGRAM

56th Annual Meeting of the Health Physics Society

(American Conference of Radiological Safety)

26-30 June 2011

Palm Beach County Convention Center

West Palm Beach, Florida

Headquarters Hotel

West Palm Beach Marriott
1001 Okeechobee Boulevard
West Palm Beach, FL 33401
Telephone: 561-833-1234
Fax: 561-833-4689

Speaker Ready Room

Palm Beach County Convention Center, Room 1G

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 9** for more information.

Meeting Sponsors

Thank you to the following meeting sponsors

Safety & Ecology Corporation = Silver
Supertech, Inc = Bronze

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

Table of Contents

Registration Hours and Location

Registration at the Palm Beach County Convention Center
Exhibit Hall A Foyer

Saturday, 25 June	2:00 - 5:00 pm
Sunday, 26 June	10:00 am - 5:00 pm
Monday, 27 June	8:00 am - 4:00 pm
Tuesday, 28 June	8:00 am - 4:00 pm
Wednesday, 29 June	8:00 am - 4:00 pm
Thursday, 30 June	8:00 - 11:00 am

Future Midyear Topical Meeting

45th	5-8 February 2012	Dallas, TX
46th	27-30 January 2013	Scottsdale, AZ

Future Annual Meetings

57th	21-26 July 2012	Sacramento, CA
58th	7-11 July 2013	Madison, WI

Look online for future meeting details
hps.org/meetings

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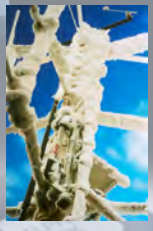

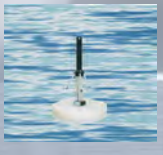

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Susan Stanford
George Snyder
Kathy Thomas

Important Events

Welcome Reception

Please plan on stopping in at the Palm Beach Convention Center, in the Grand Ballroom Foyer, Sunday, 26 June, from 6:00-7:00 pm. There will be an opportunity to meet friends to start your evening in Palm Beach. Cash bar and light snacks will be available.

Exhibits

Free Lunch! Free Lunch! – Noon, Monday, 27 June. All registered attendees are invited to attend a complimentary lunch in the exhibit hall.

Breaks Monday Afternoon-Wednesday Morning – Featuring morning continental breakfasts and afternoon refreshments such as fruit, ice cream and cookies. Be sure to stop by and visit with the exhibitors while enjoying your refreshments!

Sessions and Course Locations

AAHP Courses on Saturday, PEPs, CELs and all sessions Sunday through Thursday will take place at the Palm Beach Convention Center.

AAHP Awards Luncheon

Convention Center, Grand Ballroom
Tuesday 28 June
Noon-2:15 pm

HPS Awards Banquet

Convention Center, Grand Ballroom,
An enjoyable evening spent with members of the Health Physics Society. This event will be held on Tuesday, 28 June, and is an excellent opportunity to show your support for the award recipients as well as the Society. The awards will be presented after the dinner and the event will last from 7:00-10:00 pm. Included in Registration.

Different this YEAR!

PEP Courses will have presentations posted online for those who have signed up for them prior to the meeting. There will be no hard copy handouts. See page 47 for Course information

Things to Remember!

All Speakers are required to check in at the Speaker Ready Room at least one session prior to their assigned session.

All posters up Monday–Wednesday in Exhibit Hall
Poster Session featured Monday, 1:00-3:00 pm – No other sessions at that time

AAHP Awards Luncheon

The AAHP is sponsoring an Awards Luncheon on Tuesday, 28 June, Noon-2:15 pm, in the Palm Beach Convention Center, Grand Ballroom. You may purchase tickets on site at the Registration Desk.

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 Grand Ballroom, Convention Center on Tuesday, 28 June from 7:00 - 10:00 pm. The following awards are to be presented:

Distinguished Public Service Award
Genevieve Roessler

Elda E. Anderson Award
Sarah Roberts

Founders Award
Ralph Thomas

Geoffrey G. Eichholz Outstanding Science Teacher Award
Richard Cole

Honor Roll Awards
Thomas Gerusky
James E. Johnson

Fellows

Ken L. Groves
Eva E. Hickey
Daniel S. Mantooth
Charles W. Miller
Carl J. Paperiello
William G. Rhodes

Tuesday Evening Awards Menu

Gorgonzola salad, duet plate of chicken breast and crabcake, Israel roasted vegetable couscous, asparagus and baby carrots, chocolate lava cake and key lime cheesecake tart, lemonade, coffee, tea and decaf

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 member. 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	$525
HPS Member with '11 DUES	$565	$660
Non-Member	$535*	$635*
Student	$ 70	$ 70
Emeritus Member	$215	$262
One-Day Registration	$275	$275
HPS PEP Lecturer	$130	$225
HPS CEL Lecturer	$280	$375
Companion	$ 70	$ 70
Emeritus Companion	$ 35	$ 35
Exhibition ONLY	$ 40	$ 40

Badge Color Code:

White=HPS Member, NonMember, Student
Blue=Companion
Green=Exhibition Only
Salmon=Exhibitor

Session Location

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

LAC Room

Sunday-Thursday 1H
Palm Beach Convention Center

Activities and Tours

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

Monday 27 June

Open Mic Night (no fee) 8:30 PM
Ballroom, West Palm Beach Marriott

Tuesday 28 June

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

Wednesday 29 June

Night Out 6:00 PM
Old Key Lime House Restaurant

Pub Crawl 6:30 PM
Establishments in CityPlace

OPEN MIC NIGHT

The 2011 (6th Annual) HPS Open Mic Night will be held on Monday, 27 June in the West Palm Beach Marriott Ballroom – featuring the popular local band Sekond Nature. The doors open at 8:30 PM.

A special thanks to the Exhibitors who are sponsoring this event:
Chase Environmental Group
GEL Engineering LLC
Radiation Safety and Control Services
SEI
Radiation Safety Associates
Tidewater Inc
We hope to see you all there. The event will be limited to 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 (Room 1G, Palm Beach 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 (1J) 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 525 in the Exhibit Hall.

Companion Hospitality Room

The Hospitality Room is in Room 1I in the Palm Beach Convention Center. Come meet with friends and learn about the available attractions in Palm Beach. Local HPS members will be on hand to help with planning day trips and restaurant recommendations. On Monday morning from 8 to 9 am, we invite all registered companions to an official welcome from a local representative who will provide an orientation to Palm Beach and answer any questions you might have. The Monday breakfast will take place in Room 1L in the West Palm Convention Center.

Continental breakfast will be available Sunday through Wednesday mornings for registered companions.

The Palm Beach Convention Center staff members will be on site Sunday through Wednesday mornings to provide local attraction information.

Hospitality Room
for Registered Companions
in the West Palm Beach
Convention Center
Room 1I

Monday Welcome Breakfast
8:00-9:00 am, Room 1I

Days/Hours
Room 1I

Sunday-Wednesday
7:30 - 11:00 AM

Health Physics Society Committee Meetings

Marriott (M); Palm Beach Convention Center (CC)

Saturday, 25 June 2011

FINANCE COMMITTEE
8:00 am-Noon *Gallery C (M)*

ABHP BOARD MEETING
8:30 am-5:00 pm *Salons BC (M)*

WEB OPERATIONS
9:00 am-Noon *Polo D (M)*

HPS EXECUTIVE COMMITTEE
1:00-4:00 pm *Pres. Suite (M)*

HP JOURNAL
3:00-6:00 pm *1F (CC)*

Sunday, 26 June 2011

HPS BOARD OF DIRECTORS
7:30 am-5:00 pm *1L (CC)*

AAHP EXECUTIVE COMMITTEE MEETING
8:30 am-5:00 pm *Salons BC (M)*

PROGRAM COMMITTEE
11:00 am-1:00 pm *1G (CC)*

ACCELERATOR SECTION BOARD MEETING
4:15-5:45 pm *Gallery A (M)*

Monday, 27 June 2011

ELDA ANDERSON BREAKFAST
7:00 am *2F (CC)*

HISTORY COMMITTEE
Noon-2:00 pm *Gallery A (M)*

PUBLIC INFORMATION COMMITTEE
Noon-2:00 pm *Gallery B (M)*

NOMINATING COMMITTEE
Noon-3:00 pm *Gallery C (M)*

CHAPTER COUNCIL MEETING
1:00-2:00 pm *2A (CC)*

CHAPTER LEADERSHIP MEETING
2:00-2:30 pm *2A (CC)*

HPS N13.3 DOSIMETRY FOR CRITICALITY ACCIDENTS
1:00-5:00 pm *Polo D (M)*

AD HOC STUDENT SUPPORT
1:30-2:30 pm *1K (CC)*

HPS GOAL 4 COMMITTEE CHAIRS
2:30-4:00 pm *2F (CC)*

S&PIC COMMITTEE
3:30-4:30 pm *Pres. Suite (M)*

Tuesday, 28 June 2011

COMMITTEE CHAIR BREAKFAST
7:30-8:30 am *2F (CC)*

ANSI N13.1
9:00 am-12:00 pm *Gallery C (M)*

LAAC/LAPC
10:00 am-2:00 pm *1L (CC)*

RULES COMMITTEE
11:00 am-Noon *1K (CC)*

HP PROGRAM DIRECTORS ORGANIZATION
Noon-1:00 pm *2F (CC)*

SECTION COUNCIL
1:00-2:00 pm *2A (CC)*

CSU RECEPTION - ALL ARE WELCOME
6:00-7:00 pm *Grand Ballrm Foyer (CC)*

Wednesday, 29 June 2011

DECONTAMINATION & DECOMMISSIONING SECTION BOARD MEETING
7:00-8:00 am *Polo D (M)*

STUDENT BRANCH MEETING
Noon-1:00 pm *2F (CC)*

INTERNATIONAL COLLABORATION COMMITTEE
Noon-1:30 pm *Boardroom (M)*

GOVERNMENT RELATIONS MEETING
Noon-2:00 pm *1K (CC)*

SCIENCE SUPPORT COMMITTEE
Noon-2:00 pm *Sanibel II (M)*

SOCIETY SUPPORT COMMITTEE
Noon-2:00 pm *Polo D (M)*

MEMBERSHIP COMMITTEE
12:30-2:30 pm *Polo E (M)*

CONTINUING EDUCATION COMMITTEE
1:00-3:00 pm *1J (CC)*

STANDARDS MEETING
1:00-4:00 pm *1L (CC)*

ANSI 42.54 COMMITTEE MEETING
1:00-5:00 pm *Sanibel I (M)*

AAHP NOMINATING COMMITTEE
2:00-3:00 pm *Gallery C (M)*

ACADEMIC EDUCATION COMMITTEE
2:00-4:00 pm *2F (CC)*

ANSI N13.1
2:00-5:00 pm *Polo F (M)*

HOMELAND SECURITY COMMITTEE
4:30-6:00 pm *1K (CC)*

HPS ANNUAL BUSINESS MEETING
5:30-6:30 pm *Ballroom B (CC)*

Thursday, 30 June 2011

PROFESSIONAL DEVELOPMENT SCHOOL COMMITTEE
8:00-9:00 am *1K (CC)*

HPS BOARD OF DIRECTORS MEETING
11:00 am-5:00 pm *1L (CC)*

PROGRAM COMMITTEE
12:30-3:00 pm *Gallery C (M)*

56th Annual Meeting of the Health Physics Society

West Palm Beach, Florida, 26-30 June 2011

Scientific Program

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

MONDAY

7:00-8:00 AM **1D**

CEL1 Nanoparticle-Based Radiation Detectors and the Use of Radiation for Nanoparticle Detection

M.L. Marceau-Day, L. Madsen

Center for Advanced Microstructures and Devices, Audubon Sugar Institute, Louisiana State University, Baton Rouge

7:00-8:00 AM **1E**

CEL2 Integration of Radiation Safety into Environmental Health and Safety: The Columbia Experience

Thomas L. Morgan, Kathleen Crowley

Environmental Health and Safety, Columbia University

7:00-8:00 AM **1F**

CEL3 Laser Safety Program Development at an Academic Medical Center

Deirdre Elder

University of Colorado Hospital

8:30 AM - NOON Grand Ballroom

MAM-A: Plenary - Creating a Radiation Safety Culture in the Workplace

Chair: Edward F. Maher

8:30 AM

Opening Remarks

Edward Maher; President, HPS

8:40 AM **PL.1**

Moving Forward on Safety Culture

Weber, M.

US Nuclear Regulatory Commission

9:15 AM **PL.2**

IRPA Initiative on Radiation Protection Culture

Le Guen, B. **(Landauer Lecture)**

International Radiation Protection Association

9:50 AM **PL.3**

Fostering a Radiation Safety Culture in Nuclear Power

Andersen, R.

Nuclear Power Institute

10:20 AM **BREAK**

10:45 AM **PL.4**

Radiation Safety Culture: Challenges in the Medical Professions

Applegate, K. **(Dade Moeller Lecture)**

Image Lightly Alliance, Emory University School of Medicine

11:20 AM **PL.5**

Safety Culture: Agreement States' Perspective

Cox, L.

Organization of Agreement States

Noon-1:00 PM **Exhibit Hall A**

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

1:00 - 3:00 PM Exhibit Hall A

P: Poster Session

Accelerator

P.1 Dose Profile Studies for Protection of Undulators in Linac Coherent Light Source
Mao, S.X., Nuhn, H., Field, R. C., Tran, H., Liu, J.C.
SLAC National Accelerator Laboratory, LAC National Accelerator Laboratory

P.2 Estimating the Secondary Particle Source Radius, and Coalescence Radius, in Heavy Ion Collisions
PourArsalan, M., Townsend, M.L., Heilbronn, L.H., Bahta, S., Delauder, N.P.
University of Tennessee

Bioeffects/Radiation Biology

P.3 Analysis of Genomic Transmission in Families of Mayak Nuclear Workers Using a Minisatellite CEB1
Glazkova, I.V., Rusinova, G.G.
Southern Urals Biophysics Institute (SUBI)

P.4 Assessment of Systemic and Bronchopulmonary Immune Resistance in Nuclear Industry Workers at Prolonged Combined Exposure
Pavlova, O.
Southern Urals Biophysics Institute

P.5 Assessment of Molecular Damage in TP53 in Normal and Transformed Lung Tissues of Nuclear Workers at the Mayak Production Association
Vyazovskaya, N.S., Guryanov, M.Y., Belosokhov, M.V., Kartashova, M.V., Kiseleva, O.I., Azizova, T.V.
Southern Urals Biophysics Institute (SUBI)

P.6 Comparison of 137Cs Irradiators and X-ray Irradiators for Research Use
Rossman, J.A., Fernandes, J.A., Demirci, G.*
BIDMC/UMass Lowell, BIDMC

Contemporary Topics in Health Physics

P.7 Efficacy of Personal Air Samplers (PAS) for the Timely Assessment of Occupational Exposures to Long Lived Alpha Emitters in the Presence of Radon Progeny
Skrable, K., French, C., Tries, M., Darois, E., Tarzia, J., Straccia, F.
University of Massachusetts Lowell, Radiation Safety and Control Services

P.8 The Association of the Symptom Forgetfulness to Cellular Phone Users: Health Perspective
Kumar, N., Khan, R., Sharma, V.
Babasaheb Bhimrao Ambedkar University (Central University), India, Indian Institute of Toxicology Research, India

P.9 Occupational Radiation Exposure in Korea
Choi, W., Lee, S., Lee, S., Seo, G., Choi, M., Lim, G., Lee, J., Kim, K.
Korea Institute of Nuclear Safety, Kyung Hee University

P.10 Development of a Health Physics Laboratory for Research and Education at the Center for Advanced Energy Studies
*Harris, J., Jensen, J.**
Idaho State University

Emergency Planning/Response

P.11 Health Effects Following a Radiological Emergency in First Responders
Heard, J., Shaw, E., Tenner, A., Tsorxe, I., Agordzo, H., Carradine, M.
Alcorn State University

P.12 Improving the Emergency Response Ability by Using Web GIS and Google Earth
Fang, H., Lu, C., Chang, B., Yang, Y.
Institute of Nuclear Energy Research, Taiwan

Environmental

P.13 Radionuclides in Crayfish from the Rio Grande Upstream and Downstream of Los Alamos National Laboratory
Fresquez, P.R., Eisele, W.F.
Los Alamos National Laboratory

P.14 Ecological Assessment of Reservoirs used as Liquid Radioactive Waste Storages of Mayakö Production Association
Andreev, S.S., Tryapitsyna, G.A., Deryabina, L.V., Dukhovnaya, N.I., Osipov, D.I., Styazhkina, E.V., Obvintseva, N.A., Stukalov, P.M., Pryakhin, E.A.
Urals Research Center for Radiation Medicine, Chelyabinsk

P.15 Qualitative Assessment of Sources of Strontium-90 Seepage into the Techa River
Melnikov, V.S., Kostyuchenko, V.A.
Urals Research Center for Radiation Medicine (URCRM)

P.16 Quantification of Anthropogenic Radionuclides in a Naturally-Shed Reindeer Antler found in Arctic Sweden
Houser, E., Bytwerk, D., Higley, K.
Oregon State University

P.17 Measurement and Verification of Indoor Radon Concentration In Taiwan
Lin, C.F., Wang, J.J., Lee, H.W., Fang, H.F.*
Institute of Nuclear Energy Research, Atomic Energy Council

P.18 Radon Risk Maps in Western Iberia: Geological Constraints
*Pereira, A.S., Neves, L.F.**
IMAR, Department of Earth Sciences, University of Coimbra, Portugal

P.19 Uncertainty Analysis for Surface Water Sampling to Measure the Tritium Concentration at the Savannah River Site
Atkinson, R.
Colorado State University

P.20 The Concentration Ratio of 36Cl in Artemia Salina
*Tissot, C., Paine, J., Shaw, C., Bytwerk, D., Higley, K., Whitlow, J.**
Oregon State University

P.21 Radioactivity Studies in Oil Samples Collected from Various Locations in Louisiana, Mississippi, and Alabama Coasts
Billa, J., Cooper, C., Aceil, S., Adzanu, S.*
Alcorn State University

P.22 Measurement of Radionuclide Concentration in Commonly Used Fertilizers in the Delta Region of Mississippi State
Osei, G., Williams, T., Gidi, M., Singelton, K., Franklin, C., Wilson, J., Walton, J.
Alcorn State University

P.23 National Center for Radioecology (NCoRE) at Savannah River National Laboratory: A Network of Excellence for Environmental Radiation Risk Reduction and Remediation
Kuhne, W., Jannik, G., Farfan, E., Mayer, J.
Savannah River National Laboratory

External Dosimetry

P.24 Patient Dose Estimation in Megavoltage Computed Tomography Imaging on Prostate Cancer Patients
Lee, K.-W., Wu, J.-K., Wu, J., Yang, Y.-M., Chang, S.-J., Cheng, J.C.-H.
Institute of Nuclear Energy Research, National Taiwan University Hospital

P.25 Effect of Inefficient Showering on Radiation Doses to Skin from Dermal Contamination
*Apostoaei, A.I., Kocher, D.C.**
SENES Oak Ridge, Inc.

Instrumentation

P.26 Installation of a 6800 Curie Cobalt-60 Source into the Gamma Beam Irradiator
Holman-Abbott, M.
SRNS

Internal

P.27 Results of Monitoring for Am-241 Body Burden in Nuclear Workers at the Mayak PA
Efimov, A., Khokhryakov, V.
Southern Urals Biophysics Institute

P.29 Monte Carlo Simulation of In vivo Measurement of the Most Suitable Position of the Knee for the Most Accurate Measurement of the Activity
Khalaf, M., Brey, R., James, A.
Idaho State University, Washington State University

P.30 In-Vivo Measurement of Lung A[illegible] Simulation **CANCELLED**
Acha, R., Brey, R., James, A., Capello, K.
Idaho State University, USTUR, HML

P.31 Validation of Proposed Revisions to ICRP Human Respiratory Tract Model Using Bioassay Data Associated with an Acute Inhalation of Refractory PuO2
Avtandilashvili, M., Brey, R., James, A.
Idaho State University, Washington State University

P.32 Modeling Am-241 Distribution in Bones of the USTUR Case 0102 Human Leg Phantom
Tabatadze, G., Brey, R., James, A.
Idaho State University, Washington State University

Medical Health Physics

P.33 Patient Radiation Dose from Radiographic Examinations in Korea
*Kim, G., Lee, J., Kim, H., Sung, D., Kim, Y., Lee, K., Kim, K.**
Kyung Hee University, National Institute of Food and Drug Safety Evaluation, Kyung Hee University Medical Center, Chonnam National University Hospital, Dong-A University Medical Center

P.34 Prediction of Caregiver or Family Dose Due to the Discharged 131i Administrated Patient from the Hospital
Jeong, K., Jung, J., Lee, H., Lee, J.
Korea Institute of Nuclear Safety, East Carolina University, Eulji Medical Center, Hanyang University

P.35 Assessment of Radioactivity Excretion during F-18- fuorodeoxy-glucose PET/CT
Yang, S., Jang, D., Lee, S., Choi, H., Son, J., Yoon, C.
Asia Cancer Center(DIRAMS)

P.36 Determination of Dose and Fragmentation in a Water Phantom for Ions Relevent to Hadrontherapy using PHITS Transportation Code
Butkus, M.
Texas A&M

Operational Health Physics

P.37 Effectiveness of Safety Glass[illegible]Beta-Radiation[illegible]
CANCELLED
Belooussova, O., Gonzalez, D.
Los Alamos National Laboratory

P.38 Making Sense of Negative Counting Results in a Population
Strom, D., Joyce, K., MacLellan, J., Watson, D., Lynch, T., Antonio, C., Birchall, A., Anderson, K., Zharov, P.
Pacific Northwest National Laboratory, UK Health Protection Agency, Mayak Production Association

International

P.39 Noise Reduction in Brain CT Employing Wavelet Filters
Pita-Machado, R., Perez-Diaz, M., Bravo-Pino, R., Lorenzo-Ginori, J.V.
Center of Clinical Engineering and Electromedicine, Cuba, Central University of Las Villas, Cuba

P.40 Comparison of Soil-To-Plant Transfer Factors of Naturally Existing Elements for Rice and Wheat
Uchida, S., Tagami, K.
National Institute of Radiological Sciences, Japan

P.41 ^{40}K Sources to Determine the Total Amount of K by Measuring the 1.46 MeV Photon
Escareño-Juarez, E., Vega-Carrillo, H.R.
Unidad Académica de Estudios Nucleares, Universidad Autónoma de Zacatecas, Mexico

P.42 Neutron Absorbed Dose in a CMOS
Borja-Hernández, C.G., Guzmán-García, K.A., Valero-Luna, C., Paredes-Gutiérrez, L., Hernández-Dávila, V.M., Vega-Carrillo, H.R.*
Unidad Académica de Estudios Nucleares, Universidad Autónoma de Zacatecas, Mexico

P.43 Fixation of Radioiodine and Stable Iodine in Soil
Tsukada, H., Takeda, A., Nakao, A., Hisamatsu, S.
Institute for Environmental Sciences, Japan

P.44 Estimation of JPEG 2000 Compression Bounds for Leukocytes Images Employing Objective Quality Measures, Segmentation Algorithms and Subjective Experiments
Paz-Viera, J.E., Falcón-Ruiz, A., Taboada-Crispí, A., Sahli, H.
Universidad Central Marta Abreu de Las Villas, Cuba, Vrije Universiteit Brussel, Belgium

P.45 Smart Thorium and Uranium Determination Exploiting Renewable Solid Phase Extraction Applied to Environmental Samples in a Wide Concentration Range
Avivar, J., Ferrer, L., Casas, M., Cerdö, V.
University of the Balearic Islands, Spain

P.46 Response of a Passive Neutron Monitor Area
Valero-Luna, C., Guzmán-García, K.A., Borja-Hernández, C.G., Hernández-Dávila, V.M., Vega-Carrillo, H.R.
Unidad Académica de Estudios Nucleares, Universidad Autónoma de Zacatecas, Mexico

P.47 Radionuclide Dose Factors in Voxel Geometries for ^{131}I, ^{90}Y, ^{177}LU, ^{153}SM, ^{186}RE and ^{188}RE Evaluated with Geant4 Monte Carlo
Amato, E., Minutoli, F., Campennì, A., Baldari, S.
University of Messina, Italy

P.48 The Didactic Value of Monte Carlo Simulation in Health Physics
Amato, E., Minutoli, F., Lizio, D., Baldari, S.
University of Messina, Italy, Institute of Radiological Protection, Research Center of Saluggia, Italy

P.49 Neutron Spectra and H*(10) of Photoneutrons Inside the Vault Room of an 18 MV Linac
Bañuelos-Frías, A.; Borja-Hernández, C.G., Guzmán-García, K.A., Valero-Luna, C., Hernández-Dávila, V.M., Vega-Carrillo, H.R.
Unidad Académica de Estudios Nucleares, Universidad Autónoma de Zacatecas, Mexico

P.50 Behavior of ^{14}C-Organic Materials in Japanese Paddy Fields
Ishii, N., Tagami, K., Ogiyama, S., Sakurai, S., Uchida, S.
National Institute of Radiological Sciences (NIRS), Japan

P.51 Studying the Compton Scattering by Means of a Gamma Camera: A Didactic Experiment
Amato, E., Cardile, D., Cucinotta, M., Gangemi, V., Nania, R., Quartuccio, N., Sindoni, A., Vigneri, C., Baldari, S.
University of Messina, Italy

P.52 Passive Neutron Monitor Area with TLDs Pairs
Guzmán-García, K.A., Borja-Hernández, C.G., Valero-Luna, C., Hernández-Dávila, V.M., Vega-Carrillo, H.R.
Unidad Académica de Estudios Nucleares, Universidad Autónoma de Zacatecas, Mexico

P.53 Reduction of Radioactivity Concentrations in Edible Wild Plants by Food Processing-Field Observation Results on Iodine-131, Cesium-134 and Cesium-137 Released by Fukushima Daiichi Nuclear Power Plant Accident
Tagami, K., Uchida, S., Ishii, N.
National Institute of Radiological Sciences, Japan

Works-In-Progress

P.54 Modeling Aeolian Transport of Contaminants for Long-Term Risk Assessment: Sensitivities to Succession, Disturbance and Future Climate
Whicker, J. Kirchner, T.B., Breshears, D.D., Field, J.P.
Los Alamos National Laboratory, New Mexico State University, University of Arizona

P.55 Botanical Extracts as Medical Countermeasures for Radiation Induced Damage
Kennedy, E.K., Prud'homme Lalonde, L., Lui, R., Foster, B.C., Boulay Greene H., Wilkinson, D.
Defence Research and Development Canada – Ottawa, University of Ottawa, Health Canada/University of Ottawa

P.56 Finding ALARA in PET/CT
Perham, C.
University of Virginia

P.57 The Detection of Airborne Fission Products Stemming from the Fukushima Nuclear Accident
Chang, Z., McCullough, K., Moore, W.S.
South Carolina State University, University of South Carolina

P.58 Radiological Safety of Medical Caregivers Providing Humanitarian Relief in Japan
Mahathy, M., Gerber, F., Guszcza, G., Gunter, R., Kreider, J.
Oak Ridge, TN, Project HOPE, CHP Consultants

P.59 CUSUM Analysis of Time-Interval Information for Radiation Monitoring
Luo, P., DeVol, T., Sharp, J.
Clemson University

P.60 The NRC and the ADR Process Learning Experiences
Perez-Monte, J.
Puerto Rico

P.61 Environmental Protection Agency's Radioanalytical Response after a Homeland Security Event
Hall, K.M., Griggs, J.G., Fitz-James, M.C.
US Environmental Protection Agency

P.62 Radiological Assessment for the Japanese Nuclear Incident Regarding Planting of Rice
Yu, C., Cheng, J.-J., Corredor, C., Noska, M., Regnier, E., Wallo, A.
Argonne National Laboratory, US Department of Energy, US Food and Drug Administration

P.63 Adapting the Canberra LYNX Spectroscopy System in a Teaching Environment
Fulmer, P.C., Jokisch, D.W., Peterson, D.M.
Francis Marion University

P.64 Novel Mobile Radiation Monitoring Systems for In-situ Surface and Liquid Contamination Measurements
Fallu-Labruyere, A., Schulcz, F., Fellinger, J.
Mirion Technologies (MGPI) SA, France

P.65 Sensitivity Analyses of Environmental Dose Modeling with RESRAD and RESRAD-OFFSITE-An Investigation on the Influence of Input Distribution Functions
Cheng, J.-J., Yu, C., Williams, W.A., Maldonado, D., Hansen, T., Volpe, J.
Argonne National Laboratory, US Department of Energy, Oak Ridge Institute for Science and Education, Ameriphysics, LLC, Performance Results Corporation

P.66 Products Created in the Japan Response
Pemberton, W., Mena, R.
Contractor to the United States Department of Energy

P.67 Spanish Moss as a Bio-indicator for the Natural and Artificial Airborne Radionuclides
Ojukwu, E., Odehge, E., Jasmine, C., Oliver, J., Chang, Z.
South Carolina State University

3:00 - 3:30 PM Ballroom A

MPM-A1: Internal I

Co-Chairs: Jay MacLellan, Gary Kramer

3:00 PM MPM-A1.1
Distribution of Terminal Lung and Liver Dose Rates in United States Transuranium and Uranium Registries Registrants
McCord, S.L., James, A.C., Tolmachev, S.Y.
United States Transuranium and Uranium Registries

3:15 PM MPM-A1.2
A Monte Carlo Evaluation of an Unusual Contamination Incident
Kramer, G., Capello, K., Kedzior, S.
Health Canada

3:30 - 4:15 PM Ballroom A

MPM-A2: Biokinetics

Co-Chairs: Jay MacLellan, Gary Kramer

3:30 PM MPM-A2.1
A Generic Biokinetic Model for Carbon-14
Manger, R.
Oak Ridge National Laboratory

3:45 PM MPM-A2.2
Biokinetics of Pu-238 Injected in Nonhuman Primates
Chelidze, N., Brey, R.R., Guilmette, R.A.
Idaho State University, Lovelace Respiratory Research Institute

4:00 PM MPM-A2.3
A Model of Plutonium Metabolism in Human with Ca-DTPA
Schadilov, A.E., Erykalov, A.V., Khokhryakov, V.F.
Southern Urals Biophysics Institute

3:00 - 4:00 PM Ballroom B

MPM-B: Instrumentation I

Co-Chairs: Steve Farmer, Frazier Bronson

3:00 PM MPM-B.1
Automating Neutron Solid State Track Detector Measurements
Fairchild, R., Tjong, L., Wright, T.
Nebraska Wesleyan University, Australian Radiation Protection and Nuclear Safety Agency

3:15 PM MPM-B.2
In-situ Radiation Monitoring with Spectrometric Capabilities: Implementation of LaBr3 Spectrometers on Environmental Continuous Air Monitor
Geryes, D., Manificat, D., Debayle, M.
IRSN

3:30 PM MPM-B.3
Wipe Absorption in Gas Proportional Count
CANCELLED
Zhu, S., Sedrick, C.
Army Radiation Standards Laboratory

3:30 PM MPM-B.4
Field Evaluation of Portable Neutron Survey Instrumentation
*Barcal, K.K., Walter, J.F., Farmer, S.**
Sandia National Labs

3:45 PM **MPM-B.5**
Initial Tests of Advanced Efficiency Calibration Algorithms that Allow Multiple Complex Objects to be Superimposed in the Same Measurement Geometry
Bronson, F.L., Atrashkevich, V.
Canberra, Consultant

3:00 - 5:00 PM **Ballroom C**

MPM-C: Decontamination and Decommissioning

Co-Chairs: Tom Hansen, Ken Kasper

3:00 PM **MPM-C.1**
Decommissioning Composite Sampling and Regulatory Guidance
Watson, B., Clements, J., Vitkus, T.
US Nuclear Regulatory Commission, ORISE

3:15 PM **MPM-C.2**
Understanding EPA's PRG Calculator
Terry, R.
US Environmental Protection Agency Region 9

3:30 PM **MPM-C.3**
Minimizing Pitfalls of Varying Characterization Approaches by Bridging the Gap Between Data Quality Objectives
Harpenau, E.M., Vitkus, T.J.
Oak Ridge Associated Universities

3:45 PM **MPM-C.4**
Conservatism and the Translation of Release Criteria
Hansen, T.
Ameriphysics, LLC

4:00 PM **MPM-C.5**
The Final Demise of East Tennessee Technology Park Building K-33
King, D.
Oak Ridge Associated Universities

4:15 PM **MPM-C.6**
Process Knowledge Data Gathering and Reporting in Support of Decommissioning
King, D.
Oak Ridge Associated Universities

4:30 PM **MPM-C.7**
Characterization of Contaminated Areas Using GrayQb
*Coleman, J., Farfan, E.**
Savannah River National Laboratory

4:45 PM **MPM-C.8**
Film-Based Radionuclide Identification Technology for Characterization of Contaminated Areas
Coleman, J., Farfan, E.
Savannah River National Laboratory

3:00 - 4:00 PM **2A**

MPM-D: Bioeffect/Radiobiology

Chair: Brant Ulsh

3:00 PM **MPM-D.1**
Uniform Radiation Irradiation for Cell Exposure in an Incubator
Jung, J., Smith, G., Guilmette, R., Schoep, D.
East Carolina University, New Mexico State University, Lovelace Respiratory Research Institute

3:15 PM **MPM-D.2**
Involvement of Different Mechanisms in Heavy Ion and Gamma Ray Induced Hepatocellular Carcinoma of Mice
Liu, X., Bedford, J., Ray, F., Genik, P., Fallgren, C., Battaglia, Ullrich, R., Johnson, T., Weil, M.
Colorado State University, University of Texas Medical Branch at Galveston

3:30 PM **MPM-D.3**
Mechanism of Nuclear Transmutations in the Biological Culture
Moawad, E.
A Member of the Korean Society of Nuclear Medicine

3:45 PM **MPM-D.4**
Apoptosis of Blood Lymphocytes at Late Time After Chronic Radiation Exposure in Humans
Blinova, E.A., Veremeyeva, G.A., Akleyev, A.V.
URCRM, Chelyabinsk

3:00 - 3:45 PM **2 B&C**

MPM-E: Waste Management

Co-Chairs: Robert Hayes, Jack Kraus

3:00 PM **MPM-E.2**
What is the Waste Isolation Pilot Plant? A Genuine American Treasure!
Hayes, R.
WIPP

3:15 PM **MPM-E.3**
Recent Challenges and Accomplishments in Characterizing Sealed Sources for Disposition to the Waste Isolation Pilot Plant
Witkowski, I., Feldman, A., Pearson, M.W.
Los Alamos National Laboratory

3:30 PM **MPM-E.4**
Biodegradable Protective Clothing for a Nuclear Facility
*Cournoyer, M.E., George, G.L., Blask, C.L., Wannigman, D.L.**
Los Alamos National Laboratory

3:00-4:30 PM **2 D&E**

MPM-F: Special Session: The Fukushima Incident

Co-Chairs: Eric Golden, Seth Kanter

3:00 PM **MPM-F.1**
The Fukushima Accident and Recovery: Challenges Ahead
Barrett, L.
Barrett Consulting, LLC

4:00 PM **MPM-F.2**
Radiological Releases From Major Nuclear Reactor Accidents: Three Mile Island, Chernobyl, and Fukushima
Simpkins, A.A., Kennedy, Jr., W.E.
Dade Moeller

4:15 PM **MPM-F.3**
Risk Analysis Implications of the Fukushima Reactor Accidents
Kennedy, Jr., W.E., Moeller, M.P.
Dade Moeller

TUESDAY

7:00-8:00 AM **1E**

CEL4 Nobody Notices a Clean Window: A History of Successes in Radiation Protection

Daniel J. Strom

Pacific Northwest National Laboratory

7:00-8:00 AM **1F**

CEL5 ANSI N43.1 Standard Draft: Radiation Safety for the Design and Operation of Particle Accelerators

James C. Liu, Lawrence S. Walker

Radiation Protection Department, SLAC, LANSCE, Los Alamos National Laboratory, Los Alamos, NM

8:15 AM - Noon **Ballroom A**

TAM-A: Medical Health Physics

Co-Chairs: Victoria Morris, Mary Ellen Jafari

8:15 AM **TAM-A.1**

What Dose and Where Does It Come From?

Morris, V., Lemen, L., Gelfand, M.

University of Cincinnati, Cincinnati Children's Hospital

8:30 AM **TAM-A.2**

A SmartPhone APP for Tracking Medical CT Doses

Schulte, N., Ding, A., Xu, W., Caracappa, P., Xu, X.

Rensselaer Polytechnic Institute

8:45 AM **TAM-A.3**

To Shield or Not to Shield CT Patients?

Johnson, P., Dong, F., Davros, W.

Cleveland Clinic

9:00 AM **TAM-A.4**

Reducing CT Radiation Dose; A Community Hospital's Experience

Jafari, M.

Gundersen Lutheran Health System

9:15 AM **TAM-A.5**

Federal Guidance for Diagnostic and Interventional X-Ray Procedures

Keith, L., Boyd, M., Sears, S., Miller, D., Leidholdt, E., Hill, D., Winston, J.

US Environmental Protection Agency, US Navy, Food and Drug Administration, Department of Veterans Affairs, Department of Labor, Occupational Safety and Health Administration, Commonwealth of Pennsylvania

9:30 AM **TAM-A.6**

Heart Shift and Reduction in Heart Dose to Left-Breast Cancer Patients Using the Deep Inspiration Breath Hold Technique

Vognetz, J.A., Fallahian, N., Jones, A.O., Gergel, T.J., Veale, C.J., Treas, J.B., Simpson, D.R.

Bloomsburg University of Pennsylvania, Geisinger Medical Center

9:45 AM **BREAK in Exhibit Hall**

10:15 AM **TAM-A.7**

Sestamibi Redistribution Measurement Defines Ischemic Coronary Artery Lumen Disease

Fleming, R., Harrington, G.

Cardiovascular Consulting, UNI

10:30 AM **TAM-A.8**

Use of Hybrid Phantoms for Individualized Dose Monitoring in Interventional Fluoroscopy

Bolch, W., Johnson, P., Borrego, D., Johnson, K., Siragusa, D.

University of Florida

10:45 AM **TAM-A.9**
Radiopharmaceutical Dose Estimates Reflecting Recent Model Changes
Stabin, M.
Vanderbilt University

11:00 AM **TAM-A.10**
The UF Family of Pediatric Patient-Dependent Phantoms for Medical Dose Reconstruction
Dziadon, A., Geyer, A., Lee, C., Johnson, P., Wayson, M., Bolch, W.
University of Florida, National Cancer Institute

11:15 AM **TAM-A.11**
The Effect of Patient Obesity on PET/CT Imaging Dose Using a Phantom with a Body Mass Index of 45
Mille, M., Ding, A., Liu, T., Na, Y., Caracappa, P., Xu, X.
Rensselaer Polytechnic Institute

11:30 AM **TAM-A.12**
Statistical and Dose Trend Analysis of Occupational Doses: A 20-Year Review
Al-Haj, A.N., Al-Gain, I., Lobriguito, A.M.
King Faisal Specialist Hospital & Research Centre, Saudi Arabia

11:45 AM **TAM-A.13**
PET/CT Patient Doses and Staff Exposures: Is There a Need for Optimization?
Al-Haj, A.N., Lobriguito, A.M., Arafah, A., Parker, R.
King Faisal Specialist Hospital & Research Centre, Saudi Arabia

8:30 - 11:45 AM **Ballroom B**

TAM-B: Internal II

Co-Chairs: Jay MacLellan, Naomi Harley

8:30 AM **TAM-B.1**
Comparison of Two Leg Phantoms Containing Am-241 in Bone
Kramer, G., Hauck, B., Capello, K., Rühm, W., Broggio, D., Franck, D., Lopez, M., Navarro, T., Navarro, J., Tolmachev, S.
Health Canada, Helmholtz Zentrum München, Institut de Radioprotection et de Sûreté Nucléaire, Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, US Transuranium & Uranium Registries

8:45 AM **TAM-B.2**
Design and Implementation of an Internal Monitoring Program at a Low-Level Radioactive Waste Processing and Storage Facility
Shaw, C., Kraus, J., Kirk, S.
WCS

9:00 AM **TAM-B.3**
Age Dependence in Dose Rates in the Enamel of Incisors Contaminated by 90Sr
Volchkova, A., Shishkina, E.
URCRM, Chelyabinsk

9:15 AM **TAM-B.4**
Modeling of Obese Individuals using Automatic Deformation of Mesh-Based Computational Phantoms
Liu, T., Ding, A., Caracappa, P., Xu, X.
Rensselaer Polytechnic Institute

9:30 AM TAM-B.5
Enchantment of Bioassay Software Application
Eckerman, K.F., Killough, G.G., Ward, R.C., Lee, L.E.
Oak Ridge National Laboratory, Hendecagon Corp., University of Tennessee

9:45 AM TAM-B.6
Measurement of the Indoor/Outdoor Radon Decay Product Equilibrium Factor (Feq) Using 210Pb/Po
Harley, N., Chittaporn, P.
NYU School of Medicine

10:00 AM BREAK in Exhibit Hall

10:30 AM TAM-B.7
Linear Dimensions and Volumes of Human Lungs Obtained from CT Images
Kramer, G., Capello, K., Bearrs, B., Lauzon, A., Normandeau, L.
Health Canada, Centre Hospitalier de l'Université de Montréal

10:45 AM TAM-B.8
A Bayesian Method for Identifying Contaminated Detectors in Low-Level Alpha Spectrometers
MacLellan, J., Strom, D., Joyce, K.
Pacific Northwest National Laboratory

11:00 AM TAM-B.9
Doses Due to "Other" Excretion Pathways in Biokinetic Models - Sweat
Breustedt, B., Blanchardon, E., Castellani, C., Giussani, A., Li, W., Marsh, J., Nosske, D., Oeh, U., Lopez, M.
Karlsruhe Institute of Technology (KIT), Germany, Institut de Radioprotection et de Surete Nucleaire (IRSN), France, ENEA, Radiation Protection Institute, Italy, BfS, Federal Office for Radiation Protection, Oberschleißheim, Germany, HMGU, Helmholtz Zentrum Muenchen, Germany, HPA, Radiation Protection Division, UK, CIEMAT, Departamento de Medio Ambiente, Spain

11:15 AM TAM-B.10
Calibration & Use of a Capintec Captus 3000 Portable Thyroid Uptake System for Iodine-125 Bioassay Measurements Supporting Personnel Dosimetry
Baker, T., Baehr, W.
US Environmental Protection Agency, Francis Marion University

11:30 AM TAM-B.11
Delta Ray Production from Galactic Cosmic Rays Traversing Water Target
Cox, B.
Texas A&M University

9:00 AM - Noon Ballroom C

TAM-C: Environmental/ Radon Section Special Session: Radioactivity in the Aquatic Environment

Co-Chairs: Tim Jannik, Michael Boyd

9:00 AM TAM-C.1

How Much Refinement is Possible for Ecological Risk Assessment of Uranium in Freshwaters?

Beaugelin-Seiller, K., Garnier-Laplace, J., Gilbin, R., Fevrier, L.

Institut de Radioprotection et de Sûreté Nucléaire, France

9:30 AM TAM-C.2

Doses to Marine Biota Arising from Radioactive Discharges from Cap de La Hague

Chambers, D.B.

SENES Consultants Limited

10:00 AM BREAK in Exhibit Hall

10:30 AM TAM-C.4

Development of Dual-Functionality Media for the Simultaneous Concentration and Detection of Non-Gamma-Ray Emitting Radionuclides in Water

DeVol, T.A., Grogan, K.P., Seliman, A.F.

Clemson University, Egyptian Atomic Energy Authority

10:45 AM TAM-C.5

The Transfer of Cs Through Aquatic Trophic Levels Following Releases into Experimental Ponds

Martinez, N., Johnson, T., Hinton, T., Whicker, W., Pinder, J.

Colorado State University, Institue for Radiation Protection and Nuclear Safety

11:00 AM TAM-C.6

The Dnieper River Aquatic System Radioactive Contamination: Twenty Five Years of Natural Attenuation and Remediation

Voitsekhovych, O., Kanivets, V., Laptev, G., Bugay, D., Kireev, S.

Meteorological Institute - Ukraine

11:30 AM TAM-C.7

Overview of the Issues Concerning the Natural Drawdown of the Chernobyl Nuclear Power Plant Cooling Pond

Oskolkov, B., Bondarkov, M., Maksymenko, A., Maksymenko, V., Martynenko, V., Farfan, E., Jannik, G., Marra, J.*

Chernobyl Center for Nuclear Safety Radioactive Waste and Radioecology, International Radioecology Laboratory, Ukraine, Savannah River National Laboratory

11:45 AM TAM-C.8

Radiation Dose Assessment for the Biota of Ecosystems in the Shoreline Zone of the Chernobyl Nuclear Power Plant Cooling Pond

Oskolkov, B.Ya, Bondarkov, M.D., Gashchak, S.P., Maksimenko, A.V., Hinton, T.G., Jannik, G.T., Farfan, E.B.*

International Radioecology Laboratory, Chernobyl Center for Nuclear Safety, Ukraine, Institute for Radioprotection and Nuclear Safety (IRSN), France, Savannah River National Laboratory

Noon-12:45 PM Environmental/ Radon Section Business Meeting

8:30 AM - Noon **2A**

TAM-D: External Dosimetry

Chair: Tim Taulbee

8:30 AM **TAM-D.1**

Development of a Dose Algorithm for Measuring Hp(10), Hp(3) and Hp(0.07) with the Harshaw 8825 BGN Thermoluminescent Dosimeter Based on ANSI/HPS N13.11-2009

Rathbone, B.A.

Pacific Northwest National Laboratory

8:45 AM **TAM-D.2**

The Assessment of Effective Dose from Personnel Dosimeter Readings Using Latest Voxel Phantoms and ICRP 103 Recommendations

Su, L., Xu, X.G.

Rensselaer Polytechnic Institute

9:00 AM **TAM-D.3**

Comparison on Characteristics of Optically Stimulated Luminescent Dosemeters and Thermoluminescent Dosimeters

Yeh, S.H., Kao, T.L.

Tzu Chi College of Technology

9:15 AM **TAM-D.4**

MCNP Simulating OSL Ring Response Matrix for X-Ray Spectrums

Xia, Z., Salasky, M., Yahnke, C.

SLAC National Accelerator Center, Landauer INC

9:30 AM **TAM-D.5**

Stability of DXRAD Extremity Dosimeters

Romanyukha, A., Voss, S.P.

Naval Dosimetry Center

9:45 AM **BREAK in Exhibit Hall**

10:15 AM **TAM-D.6**

Radiation Doses to Skin from Dermal Contamination

Apostoaei, A.I., Kocher, D.C.

SENES Oak Ridge, Inc.

10:30 AM **TAM-D.7**

Contact Dose Rates from Encapsulated Sources

Waller, E., Cleary, J., Goans, R.

UOIT, MJW/REAC/TS

10:45 AM **TAM-D.8**

Dose Estimates for the CRaTER Instrument on LRO using HETC-HEDS

Anderson, J.A., Townsend, L.W.

University of Tennessee, Knoxville

11:00 AM **TAM-D.9**

Improvement of Algorithm for Evaluation of Uncertainties for Electron Paramagnetic Resonance Dosimetry on Tooth Enamel

Timofeev, Y.S., Shishkina, E.A., Ivanov, D.V., Zalyapin, V.I.

South Ural State University, Urals Research Center for Radiation Medicine, Institute of Metal Physics, Russian Academy of Sciences

11:15 AM **TAM-D.10**

Use of Simple Equations to Determine Air Kerma from X-Ray Beam of a Radiographic Tube

Soares, F., Costa, M.

IF-SC / Brasil

11:30 AM **TAM-D.11**

Federal Databank of Individual Dose Estimates of the Public and the Workers within the Jurisdiction of the Federal Medical Biological Agency of Russia

Semenova, Y.V., Kosterev, V.V., Tsovyanov, A.G.

Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency of Russia, Moscow, National Research Nuclear University Moscow Engineering Physics Institute, Moscow

11:45 AM **TAM-D.12**
Occupational Radiation Exposure to Personnel in Veterinary Positron Emission Tomography
Martinez, N.E., Kraft, S.L., Ryan, S.D., Johnson, T.E.
Colorado State University

8:15 AM - Noon **2 B&C**

TAM-E: AAHP Special Session: Radiation Protection: How Did We Get Here; Where Should We Have Gone?

Co-Chairs: Paul Stansbury, Rich Vetter

8:15 AM **Introductory Remarks**
Paul Stansbury

8:30 AM **TAM-E.1**
How We Formed Our Profession - The Psychology of Radiation Safety
Johnson, R.H.
Dade Moeller Radiation Safety Academy

9:00 AM **TAM-E.2**
The Role of IRPA in Improving Radiation Protection
Toohey, R.E.
ORAU

9:30 AM **BREAK in Exhibit Hall**

10:00 AM **TAM-E.3**
Evolution of HPS Influence in Public Policy
Vetter, R.
Health Physics Society

10:30 AM **TAM-E.4**
US Customs and Border Protection's Approach to Radiation Protection
Whitman, R.
Indiana University, Purdue University

11:00 AM **TAM-E.5**
A Short History of Radiation Protection at the U.S. Environmental Protection Agency
Boyd, M.
US Environmental Protection Agency

11:30 AM **TAM-E.6**
The Development of Radiation Dose Limits for Astronauts
Van Baalen, M.G., Semones, E.J.
NASA

8:15 AM - Noon **2 D&E**

TAM-F: Special Session: Engaging Science Teachers in the 21st Century - More Than Science Teacher Workshops

Co-Chairs: Mike Lewandowski, Thomas Johnston

8:15 AM **TAM-F.1**
Reflections of the 2010 Eichholz Outstanding Science Teacher
Hudson, S.
Tuttle Middle School, Indiana

8:30 AM **TAM-F.2**
Opportunities for Engagement: Presenting to Science Teachers and Students
Johnston, T.
National Institute of Standards and Technology

8:45 AM **TAM-F.3**
Chapter Experience with Science Teachers' Workshops
Evans, A.
HPS South Texas Chapter

9:00 AM **TAM-F.4**
Radioactivity and Radiation: Atlanta Chapter's Experience with Aligning Science Teacher Workshops Material with Georgia's Educational Objectives
Nichols, M., Shonka, J., Collins, D., Pepper, A., Hardeman, Jr, J., Philpotts, D.
Analytical Uncertainty LLC, Shonka Research Associates, US Nuclear Regulatory Commission, Georgia Perimeter College, Georgia Department of Natural Resources, Georgia Power Company

9:15 AM **TAM-F.5**
Recipe for Successful Science Teacher Workshops
Tarantino, C.A.
Dominion Generation

9:30 AM **TAM-F.6**
Building Relationships with Teachers: The ANS Approach
Vincent, C.
American Nuclear Society

9:45 AM **BREAK in Exhibit Hall**

10:15 AM **TAM-F.7**
Connecting with Teachers: Reflections on Three Years at the Hoosier Association of Science Teachers, Inc. (HASTI) Conference
Mays, T., Kay, S.
Eli Lilly

10:30 AM **TAM-F.8**
Simple, Inexpensive Nuclear Instrumentation for Elementary and Secondary Teachers
Lewandowski, M.A.
North Central Chapter HPS

10:45 AM **TAM-F.9**
Working with Non-Nuclear Partners in Science Teacher Support Activities
Masih, S., Donahue, M., Barrera, E., Lewandowski, M.
University of Missouri Kansas City, US Army, 3M Corporation

11:00 AM **Roundtable**

11:45 AM **Working Session**

2:30 - 4:00 PM **Ballroom A**

TPM-A: Instrumentation II

Co-Chairs: Frazier Bronson, Glenn Roberts

2:30 PM **TPM-A.1**
A Study on the Detection Efficiency of Ra-223 in the RaDeCC System
Chang, Z., Moore, W.S., Boaz, B.K., James, U.A.
SC State University, University of South Carolina

2:45 PM **TPM-A.2**
The Use of the ISOCS Mathematical Efficiency Calibration Software to Design a Versatile Sample Assay Geometry and Compute the Efficiency Assay Uncertainty
Bronson, F.L.
Canberra

3:00 PM **TPM-A.3**
Nuclear Spectroscopy with Nanophosphor in Glass
*Kang, Z., Rosson, R., Barta, B., Nadler, J., Wagner, B., Kahn, B.**
Georgia Tech

3:15 PM **TPM-A.4**
Comparison of Background Performance of High Purity Germanium Detectors in Shielded Environments
Morris, K., Bronson, F., Hau, I., Mueller, W.
Canberra Industries

3:30 PM **TPM-A.5**
The Benefits of Innovative Automated Radiological Monitoring
Roberts, G.
UniTech Services Group, Inc.

3:45 PM **TPM-A.6**
Gamma Detection Sensitivities for Mobile Ground Scanning Systems
Thompson, S.
HyroGeoLogic, Inc. (HGL)

4:00 PM BREAK in Exhibit Hall

2:15 - 5:30 PM Ballroom B

TPM-B: Special Session: ANSI-HPS Consensus Standards Process for N13 and N43

Co-Chairs: Tracy Ikenberry, William Morris

2:15 PM **TPM-B.1**
N13 and HPS - Developing Consensus Standards for Radiation Protection
Ikenberry, T., Johnson, M., Johnson, N., Forrest, R., Potter, C., Lynch, T.
Dade Moeller, PNNL, Burk, Inc., UPenn, SNL

2:30 PM **TPM-B.2**
Pending Revision of HPS/ANSI N13.30 Performance Criteria for Radiobioassay
MacLellan, J.
Pacific Northwest National Laboratory

2:45 PM **TPM-B.3**
Revision of ANSI HPS N13.14 Bioassay Programs for Tritium
Potter, C.A., Carbaugh, E.H., Cheng, Y.S., Hill, R.L., Kramer, G.H., Waters, T.L., Wolodarsky, W.H.
Sandia National Laboratories, Pacific Northwest National Laboratory, Lovelace Respiratory Research Institute, Health Canada, Los Alamos National Laboratory

3:00 PM **TPM-B.4**
ANSI/HPS N13.8 Update: An Opportunity to Advance Radioactive Air Sampling Methods for Radiation Protection in Uranium Mines
Hoover, M.
NIOSH

3:15 PM **TPM-B.5**
Surface and Volume Clearance Standard ANSI/HPS N13.12: Current Status
Kennedy, Jr., W.E.
Dade Moeller & Associates

3:30 PM **TPM-B.6**
The Revision of the 1999 Version of ANSI/HPS N13.1
Glissmeyer, J.
Pacific Northwest National Laboratory

3:45 PM **TPM-B.7**
ANSI/HPS Consensus Standard N13.3: Dosimetry for Criticality Accidents
Ward, D.C.
Sandia National Laboratories

4:00 PM BREAK in Exhibit Hall

4:30 PM **TPM-B.8**
N43 Accredited Standard Committee on Equipment for Non-medical Radiation Applications: Scope of Current Activities with Brief History
Morris, W. J.
Consultant

4:45 PM **TPM-B.9**
ANSI N43.1 Standard Draft: Radiation Safety for the Design and Operation of Particle Accelerators
Walker, L., Liu, J.
Los Alamos National Lab, Stanford Linear Accelerator Center

5:00 PM **TPM-B.10**
Radiation Safety for Active Interrogation Systems
Khan, S.M.
DHS/CBP

5:15 PM **TPM-B.11**
Status of ANSI N42 Standards for Health Physics Instrumentation
Cox, M.
N42

2:30 - 5:15 PM **Ballroom C**

TPM-C: Special Session: NESHAPs Radioactive Air Meeting

Co-Chairs: Matthew Barnett, Gustavo Vazquez

2:30 - 5:15 PM **2A**

TPM-D: Risk Analysis

Co-Chairs: Steve Simon, Otto Raabe

2:30 PM **TPM-D.1**
A New Look at Radiation Carcinogenesis
Raabe, O.G.
University of California, Davis

2:45 PM **TPM-D.2**
BEIR VII Models and Updates for Calculating Radiogenic Cancer Incidence and Mortality Risk
Abadia, A., Bolch, W., Pawel, D.
University of Florida, US Environmental Protection Agency, Washington DC

3:00 PM **TPM-D.3**
Demonstration of a Dose Estimation and Risk Analysis Method for Complex Radiation Dose Reconstructions
Simon, S.L., Kwon, D., Weinstock, R., Hoffman, F.
National Cancer Institute, National Institutes of Health, SENES Oak Ridge

3:15 PM **TPM-D.4**
Evaluating Uncertainty in Dose and Dose-Rate Effectiveness Factors for Low-LET Radiation for Use in Risk Estimation
Trabalka, J.R., Apostoaei, A.I., Hoffman, F.O., Kocher, D.C., Thomas, B.A.*
SENES Oak Ridge, Inc.

3:30 PM **TPM-D.5**
A Biophysical Model for Estimating the Relative Biological Effectiveness of Photons and Electrons
Bellamy, M., Eckerman, K., Hertel, N.
Oak Ridge National Lab, Georgia Institute of Technology

3:45 PM **BREAK in Exhibit Hall**

4:15 PM **TPM-D.6**
Reference Radiation for Cosmic Rays in RBE Research
Feng, S.
Texas A&M University

4:30 PM **TPM-D.7**
Influence of Bystander and Adaptive Response Non-Linear Effects on Radon Case-Control Studies
Leonard, B.E.
International Academy of Hi-Tech Services Inc.

4:45 PM **TPM-D.8**
Radiation Risk of Lung Cancer Incidence with Regard to the Histological Tumor Type
Labutina, E., Kuznetsova, I.
Southern Urals Biophysics Institute (SUBI)

5:00 PM **TPM-D.9**
Assessment of Radiogenic Risk of Mortaility from Ischemic Heart Disease for Members of the Techa River Cohort
Silkin, S.S., Krestinina, L.Y.
Urals Research Center for Radiation Medicine

2:30 - 5:30 PM **2 B&C**

TPM-E: AAHP Special Session: Radiation Protection: How Did We Get Here; Where Should We Have Gone?

Co-Chairs: Paul Stansbury, Dan Strom

2:30 PM **TPM-E.1**
Radiation Protection at the Department of Energy: Politics and Science - A Historical Perspective
Jones, R.
Executive Consultant

3:00 PM **TPM-E.2**
Hijacked by Politics? Science, Policy, and the Nuclear Regulatory Commission
Wellock, T., Jones, C.
USNRC

3:30 PM **BREAK in Exhibit Hall**

4:00 PM **TPM-E.3**
The Evolution of Military Health Physics: Lessons Learned and Future Directions
Melanson, M.
AFRRI

4:30 PM **TPM-E.4**
The Rise and Fall of Paternalism in Radiation Protection
Strom, D.
Pacific Northwest National Laboratory

5:00 PM **Open Discussion**
Stansbury, P.

5:30 PM **AAHP Business Meeting**

2:30 - 5:45 PM **2 D&E**

TPM-F: IRPA Input Special Session - Sharing HPS Perspectives with the International Community

Co-Chairs: Barbara Hamrick, Kelly Classic

2:30 PM **TPM-F.1**
New Build Reactors: Current HPS Thinking; Introduction to the IRPA Input Session
Classic, K., Hamrick, B.L.
Mayo Clinic, University of California, Irvine Medical Center

2:45 PM **TPM-F.2**
The Nuclear Renaissance - Illusion or Reality?
Goldin, E.
Southern California Edison

3:00 PM **TPM-F.3**
Recent Developments in Low-Level Radioactive Waste Rules and Policy: A New Site Under Construction May Provide a National Solution
Kirk, J.S.
Waste Control Specialists LLC

3:30 PM **Discussion**

3:45 PM **BREAK in Exhibit Hall**

4:10 PM **TPM-F.4**

Managing Medical Exposures: Current HPS Thinking

Classic, K.

Mayo Clinic

4:15 PM **TPM-F.5**

"Image Gently" Our Future Generations

Lanza, J.

Florida Department of Health

4:30 PM **TPM-F.6**

Managing Medical Exposures: Response to Therapy Events

Classic, K.

Mayo Clinic

4:45 PM **Discussion**

4:55 **TPM-F.7**

HPS Views on the Adoption of ICRP Guidelines

Hamrick, B.L.

University of California, Irvine Medical Center

5:00 PM **TPM-F.8**

Options to Revise the United States Nuclear Regulatory Commission's Radiation Protection Regulations

Morgan-Butler, K., Cool, D.

United States Nuclear Regulatory Commission

5:30 PM **Facilitated Discussion**

Don't forget the **Awards Banquet**
7:00-10:00 pm, Palm Beach Convention Center Grand Ballroom

Wear your badge for admission!

WEDNESDAY

7:00-8:00 AM **1D**

CEL6 ABHP Exam Fundamentals – Tips for Successfully Completing the Certification Process

Charles (Gus) Potter, Kent Lambert
Sandia National Laboratories, Drexel University

7:00-8:00 AM **1E**

CEL7 Diagnostic Reference Levels for CT Scanners

Ed Waller
University of Ontario Institute of Technology

7:00-8:00 AM **1F**

CEL8 Innovative Approaches to Molybdenum-99 Production (that May or May Not Work)

Darrell R. Fisher
Isotope Sciences Program, Pacific Northwest National Laboratory

8:15 - 10:15 AM **Ballroom A**

WAM-A1: Emergency Planning/Response

Co-Chairs: Ed Waller, Craig Marianno

8:15 AM **WAM-A1.1**

Management of Victims with Embedded High Dose Rate Shrapnel Wounds from the Detonation of a Radiological Dispersal Device (“Dirty Bomb”) - an Update

Bushberg, J.T., Case, J.P.
University of California, Davis Medical Center

8:30 AM **WAM-A1.2**

PDA Software for Radiological Triage of Internal Gamma-Emitting Radionuclide Contamination using Standard Portable Survey Instrumentation

Juneja, B., Kannan, S., Bolch, W.
University of Florida

8:45 AM **WAM-A1.3**

Operational Experience with Radiological Triage and Treatment Tools

Waller, E., Österreicher, J., Souková, J.
UOIT, Czech Military

9:00 AM **WAM-A1.4**

Communicating with the Public Following Detonation of an Improvised Nuclear Device

Miller, C., McCurley, C.
Centers for Disease Control & Prevention

9:15 AM **WAM-A1.5**

Application of the Oak Ridge Isotope Generation Code and the Defense Land Fallout Interpretive Code to National Technical Nuclear Forensics

Jodoin, V., Lee, R., Peplow, D., Lefebvre, J.
Oak Ridge National Laboratory

9:30 AM **WAM-A1.6**

Radiation Transport Simulation Studies using MCNP for a Cow Phantom to Determine an Optimal Detector Configuration for New Livestock Portal

Justina, J., Marianno, C., Chirayath, S.*
Texas A&M University

9:45 AM **WAM-A1.7**
The Research on Low Altitude Measurement Technique for Nuclear Terrorism Emergency: A Case Study on the Detonation of Radiological Dispersal Device
Liu, R., Xiao, X., Luo, Z.
China Institute of Atomic Energy

10:00 AM **WAM-A1.8**
A Decision Tool for Population Screening and Protection in Response to Radiological Events
Lee, E., Ansari, A., Casper, K.
Georgia Institute of Technology, Centers for Disease Control and Prevention

10:15 AM BREAK in Exhibit Hall

11:00 - 11:45 AM **Ballroom A**

WAM-A2: Homeland Security

Co-Chairs: Rick Whitman, Wayne Gaul

11:00 AM **WAM-A2.2**
Integration of Human Models with a Virtual Cityscape Model for Use in Radiation-Related Event Simulation
Vazquez, J., Ding, A., Caracappa, P., Xu, X.
Rensselaer Polytechnic Institute

11:15 AM **WAM-A2.3**
A Review of Neutron Detection Methods in the Age of the 3He Shortage
Rogers, J., Marianno, C.
Texas A&M University

11:30 AM **WAM-A2.4**
Design of a Virtual Model of a Hand-Held Germanium Detector and a Voxelized ICRP Whole Body Phantom: A Monte Carlo Study
Ahmed, A., Kramer, G., Kennedy, B., Keyser, R.
National Internal Radiation Assessment Section, Radiation Protection Bureau, Health Canada, NIRAS, RPB, HC, ORTEC, Oak Ridge

8:30 AM - Noon **Ballroom B**

WAM-B: Operational Health Physics

Co-Chairs: Robert Hayes, Dennis Hadlock

8:30 AM **WAM-B.1**
Efficacy of Coffee Makers at Removing Contaminants
Nguyen, V., Johnson, T., Brattin, B., Dooley, G., Ramsdell, H.
Colorado State University, Fort Collins

8:45 AM **WAM-B.2**
Empirical Comparison of Neutron Activation Sample Analysis Methods
Gillenwalters, E., Johnson, T., Pinder, J., Kearney, P.
Colorado State University, Fort Collins

9:00 AM **WAM-B.3**
Analysis of Extremity Exposure at the Idaho National Laboratory's Health Physics Instrumentation Laboratory
Rynders, D., Christiansen, B., Butikofer, T., Burke, L.
Idaho National Laboratory

9:15 AM **WAM-B.4**
Medical X-Ray Record Management System at a Large Academic Medical Center: An Overview
Krieman, C.
Duke University Health System

9:30 AM **WAM-B.5**
Two Years of Experience of Teaching Health Physics Online
Gregory, W.D.
West Kentucky Community and Technical College

9:45 AM **BREAK in Exhibit Hall**

10:15 AM **WAM-B.6**
Health Physics Challenges Encountered When Opening a New Radiological Facility
Worley, P., Kasper, K., Njoku, E.
Lawrence Livermore National Security, LLC, Livermore Site Office (DOE)

10:30 AM **WAM-B.7**
The Psychology of Radiation Safety - How to Answer Questions
Johnson, R.H.
Dade Moeller Radiation Safety Academy

10:45 AM **WAM-B.8**
A Comparison of MCNP Modeling against Empirical Data for the Measurement of the Effectiveness of Lead Apron Shielding
Adams, D., Lee, M., George, G., Brandl, A., Johnson, T.
Colorado State University, LANL

11:00 AM **WAM-B.9**
Practical Application of Monte Carlo Simulation at Duke Free Electron Laser Laboratory (DFELL)
Woehr, W., Gunasingha, R.
Duke University Health Systems

11:15 AM **WAM-B.10**
Use of a Portable HPGe for Counting Smears and Air Filters
Hayes, R.
WIPP

11:30 AM **WAM-B.11**
Temporary Accommodation of Thyroid Cancer Patients to Reduce Public Dose Due to Iodine-131
Pickering, C.A., Williams, L.E., Dykes, J.N., Tejada, M.S., Yamauchi, D.M., Patricko, J.J.
City of Hope National Medical Center

11:45 AM **WAM-B.12**
MILDOS Models for Modern In-Situ Recovery Facilities and the Identification of the Maximally Exposed Member of the Public
Manglass, L., Brown, S.
SENES Consultants, Ltd

8:30 AM - Noon **Ballroom C**

WAM-C: Special Session: Characterization of the Fukushima Radiologial Releases

Co-Chairs: Armin Ansari, William Rhodes

8:30 AM **WAM-C.1**
The DOE Response: FRMAC without the “F”
Bowman, D.
US Department of Energy, NNSA

8:45 AM **WAM-C.2**
The Challenges of the DOE Home Team’s Response
Beal, W
US Department of Energy, NNSA

9:00 AM **WAM-C.3**
Flying the ‘Real’ Thing
Lyons, C.
US Department of Energy, Remote Sensing Laboratory

9:15 AM WAM-C.4
The Challenges of AMS Data Analysis During the Japan Response
M Reed
US Department of Energy, Remote Sensing Laboratory

9:30 AM WAM-C.5
Challenges in Determining the Isotopic Mix from the Fukushima Daiichi Accident
Shanks, A.
Sandia National Laboratory

9:45 AM WAM-C.6
Gamma Spectral Measurements Performed Near Fukushima Daiichi Nuclear Power Plant
Smith, R.J.
Savannah River Nuclear Solutions

10:00 AM BREAK in Exhibit Hall

10:30 AM WAM-C.7
Atmospheric Plume Modeling Challenges of the Japanese Response
*Nasstrom, J., Sugiyama, G.**
Lawrence Livermore National Lab

10:45 AM WAM-C.8
Environmental Assessment in an Emergency - This is not a Drill
Musolino, S.
Brookhaven National Laboratory

11:00 AM WAM-C.9
Response of the U.S. Department of Health and Human Services in Protecting Americans in Japan During the Fukushima Nuclear Crisis
Coleman, C.N., Simon, S.L., Noska, M.A., Telfer, J.N., Bowman, T.*
ASPR/Health and Human Services & National Cancer Institute, Food and Drug Administration, Centers for Disease Control

11:15 AM WAM-C.10
EPA Response to the Fukushima Daiichi Reactors Incident
Tupin, E.A., Boyd, M.A., DeCair, S.D., Schultheisz, D.J.
US Environmental Protection Agency

11:30 AM WAM-C.11
US EPA RadNet Data from Fukushima
Fraass, R.G. (Presented by Tupin, E.A.)
US Environmental Protection Agency

11:45 AM WAM-C.12
Fukushima Disaster Response: The States Perspective
Fordham, E
CRCPD

8:30 AM - Noon 2A

WAM-D: Accelerator Section Special Session: Neutrons from Accelerators

Co-Chairs: Mike Grissom, Rich Brey

8:30 AM WAM-D.1
Chadwick's Neutron and the Role of New Particles in Accelerator Health Physics
Cossairt, J. **(G. William Morgan Lecture)**
Fermi National Accelerator Laboratory

9:30 AM WAM-D.2
Results from a High-Energy Neutron Dosimeter Inter-comparison Exercise
*Walker, L.S., McLean, T.D.**
Los Alamos National Laboratory

9:45 AM **WAM-D.3**
Calculated Neutron Skyshine Spectra and Dosimetric Implications as a Function of Distance and Source Shielding
Schwahn, S.O.
Oak Ridge National Laboratory

10:00 AM BREAK in Exhibit Hall

10:30 AM **WAM-D.4**
High Energy Neutrons: Past, Present and Future - Dosimetry, Measurement and Spectroscopy
Walker, L.S. **(G. William Morgan Lecture)**
Los Alamos National Laboratory

11:30 AM **WAM-D.5**
Analysis of Raw Dosimetry Results to Identify Impact of Neutron Skyshine
Schwahn, S.O., McMahan, K.L.
Oak Ridge National Laboratory

11:45 AM **WAM-D.6**
Benchmarking Heavy Ion Transport Codes
Ronningen, R.M., Kostin, M.A., Roberts, R.R., Tsang, M.Y.B., Remec, I., Heilbronn, L.H., Gabriel, T.A., Iwamoto, I.
Oak Ridge National Laboratory, University of Tennessee, Knoxville, Scientific Investigation and Development, Japan Atomic Energy Agency

8:30 AM - Noon **2 B&C**

WAM-E: Military Health Physics Special Session

Co-Chairs: Mark Melanson, Bill Hoak

8:30 AM **WAM-E.1**
AFRRI MRAT and NUWAIX 11
Woodruff, C.R.
Armed Forces Radiobiology Research Institute

9:00 AM **WAM-E.2**
Department of Defense's Support of Veteran Radiogenic Disease Compensation
Blake, P.
Defense Threat Reduction Agency

9:30 AM **WAM-E.3**
The Effects of the Urban Environment on the Propagation of Prompt Radiation Emitted from an Improvised Nuclear Device
Bergman, J., Kramer, K., Sanchez, B., Madrigal, J., Millage, K., Blake, P.
ARA, Inc., Defense Threat Reduction Agency

10:00 AM BREAK in Exhibit Hall

10:30 AM **WAM-E.4**
The Role of the Army Nuclear Medical Science Officer in the Global War on Terrorism
Melanson, M., Bower, M.
Armed Forces Radiobiology Research Institute, Brooke Army Medical Center

11:00 AM **WAM-E.5**
Dosimetry Support during Military Operations
Harris, W., Melanson, M.
US Army

11:30 AM **WAM-E.6**
Cf-252 Storage Mishap Leads to Dose Estimation for a Non-Radiation Worker
Thompson, A.
20th SUPCOM, US Army

8:30 AM - Noon 2 D&E

WAM-F: Decommissioning Section Special Session: Field Implementation of Clearance Standards, Including Methods, Models and the Anticipated Impact from Changes in Regulations and Guidance

Co-Chairs: Dave Ottley, Wayne Glines

8:30 AM WAM-F.1
Clearance of Real and Personal Property Under New DOE Radiation Protection Directive
Vazquez, G., Corredor, C., Regnier, E., Wallo, A., Ostrowski, C.
US Department of Energy

9:00 AM WAM-F.2
Decommissioning Experience in the Field Implementation of Release of Materials and Equipment and Future Regulatory Guidance
Watson, B.A.
US Nuclear Regulatory Commission, Washington, DC

9:30 AM WAM-F.3
Treasure Island - A Tale of the Value of Independent Verification at a Site of Historical Significance
Egidi, P.
Colorado Department of Public Health & Environment/Conference of Radiation Control Program Directors

10:00 AM BREAK in Exhibit Hall

10:30 AM WAM-F.4
New IAEA Guidance Pertaining to Monitoring for Compliance with Exemption and Clearance Levels
*Rowat, J.H., Ljubenov, V., Draper, D.**
International Atomic Energy Agency, Vienna, ES&H Professional Services

11:00 AM WAM-F.5
Examples of the Impact of Standards on Innovation in Survey Instrumentation
Shonka, J.J.
SRA

11:30 AM WAM-F.6
Addressing Hot Spots at Hazardous Waste Sites
Abelquist, E., King, D., Viars, J., Miller, L.
ORAU, University of Tennessee

2:30 - 5:00 PM Ballroom A

WPM-A: Movies

2:30 - 5:00 PM Ballroom B

WPM-B: Contemporary Topics in Health Physics

Chair: Latha Vasudevan

2:30 PM WPM-B.1
Dosimetry of Wild Animals Where Radioisotopes Are Used in Their Natural Surrounding
Jo, M., McCarthy, W. B.
University of Nevada, Reno, Massachusetts Institute of Technology

2:45 PM WPM-B.2
Laser Damage Thresholds of Ex-Vivo Pig and Rabbit Corneas at 2500 and 2700 nm with 8 ns Laser Pulse Duration
Guo, Y., Johnson, T.
Colorado State University

3:00 PM WPM-B.3
Dose Reduction via Effective Scaffold Program Management
Hiatt, J., Elkins, J.
BHI Energy, Inc., TeamOne

3:15 PM **WPM-B.4**
Probabilistic Distribution of Background Cancer Risk Estimated using Cancer Incidence Data in United States
Hattori, T.
Central Research Institute of Electric Power Industry

3:30 PM **WPM-B.5**
Coordinated Efforts in Developing the Radiation Detection and Instrumentation Laboratory at Prairie View A&M University
Vasudevan, L., Aghara, S.
Prairie View A&M University

3:45 PM **BREAK**

4:15 PM **WPM-B.6**
Center for Radiation Protection Knowledge
Eckerman, K.F., Leggett, R.W., Manger, R.P., Bellamy, M.B.
Oak Ridge National Laboratory

4:30 PM **WPM-B.7**
That Law Makes No Sense
Hamrick, B.L.
University of California, Irvine

4:45 PM **WPM-B.8**
Public Release Limits for Uranium Contaminate from Uranium Mining: Historical, Legal, Scientific and Practical Basis
Miaullis, A.
Colorado State University

2:30 - 3:30 PM **Ballroom C**

WPM-C1: Special Session: Consequences of the Fukushima Radiological Releases

Co-Chairs: Ed Tupin, Bruce Napier

2:30 PM **WPM-C1.1**
Screening Food Products in Japan
Westmoreland, JB, Moreland, SC
GEL Laboratories, LLC

2:45 PM **WPM-C1.2**
Radiological Situation in the Fukushima Daiichi Exclusion Zone and the Disposition of Livestock, Poultry and Pets Abandoned There
Cleveland, G.S.
US Department of Agriculture

3:00 PM **WPM-C1.3**
Monitoring Potentially-Contaminated Cargo from Japan: When is a Dose of “Public Health Concern?”
Miller, C.W., Whitcomb, R.C., Smith, J.M.
Centers for Disease Control,Scimetrika, LLC

3:15 PM **WPM-C1.4**
Collaborative Effort to Develop Practical Radiation Screening Protocols for Travelers Returning from Japan after the Fukushima Incident
Ansari, A., Chang, A., Martin, C., Nemhauser, J., McBurney, R., Salame-Alfie, A., Fisher-Tyler, F.
Centers for Disease Control and Prevention, Conference of Radiation Control Program Directors, New York State Department of Health, Delaware Division of Public Health

3:30 PM **BREAK**

4:00-5:15 PM **Ballroom C**

WPM-C2: Fukushima Public Information

Chair: Cyndi Jones

4:00 PM **WPM-C2.1**

Japan Nuclear Fears - Real and Perceived Dangers

Johnson, R.H.

Radiation Safety Counseling Institute

4:15 PM **WPM-C2.2**

Observations and Lessons from a Radiological Emergency Assistance Mission after the March 2011 Disaster in Japan

Karam, P.A., Uraneck, K., Becker, S.M.

Karam Consulting LLC, University of Alabama Birmingham

4:30 PM **WPM-C2.3**

What Do All These Numbers Mean? And What are These Crazy Units?

Watson, D.J., Strom, D.J., Seiple, T.E.

Pacific Northwest National Laboratory

4:45 PM **WPM-C2.4**

Fukushima Daiichi: Answering the Real Questions with Real Answers

Reed, A.

Remote Sensing Laboratory, DOE

5:00 PM **WPM-C2.5**

Continuity of Commerce in the Aftermath of Fukushima

Fellman, A.L.

Dade Moeller

2:30 - 5:00 PM **2A**

WPM-D: Accelerator

Co-Chairs: Jason Harris, Lorraine Day

2:30 PM **WPM-D.1**

Characterization of Faraday Cup Response in a Broad High-Energy Electron Beam

Harris, J., Altic, N., Wells, D.*

Idaho State University

2:45 PM **WPM-D.2**

Estimates of Secondary Neutron Cross-Sections from Heavy Ion Reactions at High Energies Using HETC-HEDS

Bhatt, S., Townsend, L., Heilbronn, L.

The University of Tennessee

3:00 PM **WPM-D.3**

Shielding of RF Penetrations at Jefferson Lab

Kharashvili, G., Fassò, A., Degtiarenko, P., Vylet, V., Welch, K.B.

Jefferson Lab

3:15 PM **WPM-D.4**

Neutron Diffraction Experiment Hazard Rating

Walker, L., Duran, M., Lovato, L.

Los Alamos National Laboratory

3:30 PM **WPM-D.5**

Investigation of Real-Time Gamma Dosimetry

Mestari, M., Wells, D.

Idaho Accelerator Center

3:45 PM **BREAK**

4:15 PM **WPM-D.6**

Nuclear Activation Study of 32.8 MeV Linear Accelerator

Bragg, P.B.

Bechtel Marine Propulsion Corporation

4:30 PM **WPM-D.7**
Health Physics Considerations of Upgrades Planned for the CAMD Storage Ring
Marceau-Day, M.L.
LSU

4:45 PM **WPM-D.8**
Preliminary Radiation Hazard Analysis of X-ray Generated by High Intensity Laser Systems
*Qiu, R., Liu, J., Prinz, A., Rokni, S., Woods, M., Xia, Z.**
SLAC National Accelerator Center

2:30 - 5:15 PM **2 B&C**

WPM-E: Military Health Physics Special Session

Co-Chairs: Mark Melanson, Bill Hoak

2:30 PM **WPM-E.1**
Using OSL Dosimeters to Evaluate Potential Doses to Operators of Whole-Body Security Screening Systems
Szrom, F., Jones, C.
Army Institute of Public Health

3:00 PM **WPM-E.2**
Planning and Preparing a Military Radiological Training Exercise
Myers, M.C.
Oregon State University, US Army

3:30 PM **WPM-E.3**
The Navy Radiological Affairs Support Program (RASP)
Cassata, J.
US Navy

4:00 PM **BREAK**

4:15 PM **WPM-E.4**
Roles and Issues of the Navy Radiation Health Offer in Navy Medicine
Selwyn, R.
US Navy

4:30 PM **WPM-E.5**
USMC Radiation Safety Program
Sorcic, J.
US Navy

6:00 - 8:00 PM **2D&E**

WPM-F: Aerosol Measurements Session

Chair: Morgan Cox

6:00 PM **WPM-F.1**
Latest Developments at the Waste Isolation Pilot Plant (WIPP) Site
Hayes, R.
Westinghouse Electric Corp

6:15 PM **WPM-F.2**
Development of a Compact ANSI N13.1 Compliant Aerosol Monitor for HEPA Carts
Desrosiers, A.
Safety and Ecology Corp

6:30 PM **WPM-F.3**
Chronology and Development of a Most Important Airborne Radioactivity Monitoring Standard- IEC 60761 (2002)
Cox, M.
Consultant

6:45 PM **WPM-F.4**
An Alpha Spectroscopy Alternative to the Tsivoglou, EC, and Kuznetz, HL, Method of Grab-Sampling
Baltz, D.
Bladewerx, LLC

7:00 PM **WPM-F.5**
The Use of Air Sampling Plans at the Savannah River Site
Hadlock, D.
Savannah River Site

7:15 PM **WPM-F.6**
Status of ANSI N42.50 for Radon Progeny Monitoring Instrumentation
Hayes, R.
Westinghouse Electric Corp

THURSDAY

7:00-8:00 AM Ballroom A

CEL9 The Psychology of Radiation Safety – Simple Tools for Health Physicists

Ray Johnson

Dade Moeller & Associates

7:00-8:00 AM Ballroom B

CEL10 US Ecology Low-Level Radioactive Waste Disposal Site - Its History, Operations and the Agony of Closure

Earl Fordham

Office of Radiation Protection, Washington State Department of Health

8:30 - 11:45 AM Ballroom A

THAM-A: Environmental

Co-Chairs: Wayne Gaul, Matthew Barnett

8:30 AM THAM-A.1

Details for Good Control Charts

Gaul, W.C.

Tidewater Environmental

8:45 AM THAM-A.2

Spatial Variability of Uranium and Radium in Groundwater and Interwell versus Intrawell

Matthews, T., Kirk, M., Holzmer, J.

Waste Control Specialists LLC

9:00 AM THAM-A.3

Assessment of the Relationship of Mass Loading to Self Absorption on Stack Sample Filters

Smith, B., Barnett, J., Ballinger, M.*

Gonzaga University, Pacific Northwest National Laboratory

9:15 AM THAM-A.4

Residential Radon Exposure and Multiple Sclerosis: A Pilot Study

Neuberger, J., Nazir, N., Keighley, J., Lynch, S.

University of Kansas School of Medicine

9:30 AM THAM-A.5

Review of Depleted Uranium Soil Conta[CANCELLED]rt Studies fr[CANCELLED]

Parkhurst, M., Cantrell, K.

Battelle, Pacific Northwest Division

9:30 AM THAM-A.6

Experimental Techniques for Quantifying Foliar Interception and Translocation

Bytwerk, D., Higley, K.

Oregon State University

9:45 AM BREAK

10:15 AM THAM-A.7

Analysis of Simulated Radioactive Petroleum Waste Uptake in Radishes

*Al-Zahrani, A., Bytwerk, D., Higley, K., Napier, J.**

Oregon State University

10:30 AM THAM-A.8

Transfer Factors for Contaminant Uptake by Tree Fruits

Napier, B., Fellows, R., Minc, L.

Pacific Northwest National Laboratory, Oregon State University

10:45 AM THAM-A.9

Background Radioactivity in the Sediments of Some Rivers and Streams in Akoko, Southwestern, Nigeria and their Radiological Effects.

Ajayi, I.R

Adekunle Ajasin University, Nigeria

11:00 AM **THAM-A.10**
Natural Radionuclides and Trace Metals in Thermal Spring, Al-Lith Region, Saudi Arabia
Khater, A., Hussein, M.
King Saud University

11:15 AM **THAM-A.11**
Natural Radionuclides and Heavy Metals Partitioning during Water Treatment Processes including Reverse Osmosis
Khater, A.
King Saud University

11:30 AM **THAM-A.12**
Distribution Pattern of NORM on Red Sea Shore Sediments in Relation to Non-Nuclear Industries
Khater, A.
King Saud University

8:30-11:45 AM **Ballroom B**

THAM-B: Special Session: NCRP Report Review of Report No. 165 - Responding to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers

Co-Chairs: Bill Rhodes, Ken Groves

8:30 AM **THAM-B.1**
Introduction
Poston, J.
Texas A&M University

8:45 AM **THAM-B.2**
Nuclear Terrorism Incident
Taylor, T.
Los Alamos National Laboratory

9:15 AM **THAM-B.3**
Key Radiation Protection Principles
McBaugh, D.
Dade Moeller and Associates, Inc.

9:45 AM **BREAK**

10:15 AM **THAM-B.4**
Strategies for Protective Actions
Musolino, S.
Brookhaven National Laboratory

10:45 AM **THAM-B.5**
Emergency Preparedness: Development and Implementation of Response Plans
Jones, C.
US Nuclear Regulatory Commission

11:15 AM **THAM-B.6**
Preparing the Public Health and Medical System Response
Lanza, J.
Florida Department of Health

8:30 - 10:00 AM **Ballroom C**

THAM-C: Special Session: Emerging Opportunities for the Interaction(s) of Nanotechnology and Radiation Protection

Co-Chairs: Lorraine Marceau-Day; Mark Hoover; Scott Walker

8:30 - 9:30 AM **2 D&E**

THAM-E: Military Health Physics

Chair: Greg Komp

8:30 AM **THAM-E.1**
The International Science and Politics of Depleted Uranium
Melanson, M.
AFRRI

8:45 AM **THAM-E.2**
Overview of the DOD Transmitted Electromagnetic Radiation Protection (TERP) Working Group
*Mikulski, H.T., Komp, G.R.**
US Army

9:00 AM **THAM-E.3**

US Army Institute of Public Health - Health Physics Program

Argo, W.

US Army

9:15 AM **THAM-E.4**

Using OSL Dosimeters to Evaluate Potential Doses to Individuals Screened by Whole-Body Security Screening Systems

Jones, C., Szrom, F.

Army Institute of Public Health

AAHP Courses
Saturday 25 June 2011 - 8 AM-5 PM

AAHP1 Simple Tools for Counseling Radiation Workers and the Public

Ray Johnson; Dade Moeller & Associates

Part I - Understanding the Basis for Upset and Fears

What is the greatest challenge in the course of your work in radiation safety – technical issues or people issues? For those of you that may answer the latter, this class will provide insights on how to better understand and be more successful with people issues. Are you stressed when confronted by emotional issues at work? Do you know how to provide a helpful response for an upset or fearful person, or would you rather avoid these people? Do you find yourself perplexed about people who are afraid of radiation? Thus, fear of radiation is a common denominator for everyone, although the extent of such fears appears to be related to technical understanding of radiation. Without special training in radiation safety most peoples' understanding is based on radiation mythology which is not supported by good science. Radiation fears are driven at a subconscious level often related to mythical beliefs and images of terrible consequences that may result from radiation exposure. Often people make assumptions about radiation effects without understanding that there are a series of steps for answering the question, "Is it safe?" Fears are always based on what we imagine and not on reality. The basis of what we imagine can be identified by asking the question "What's so bad about that?" By repeating this question we can move down through layers of images to the real motivation for upset and fear. When we understand what drives upset and fears, we can then offer the most helpful responses. Attendees should write down and bring to the class one or more specific scenarios where they would like to apply the insights from this class.

Part II - Tools for Effective Counseling and Risk Communication

Understanding the basis for worker upsets or fears can be helpful, but may not be enough without effective tools for risk communication. The most powerful tool for worker counseling is to hear, identify, and reflect their feelings (Active Listening). One of the reasons that worker upsets or fears escalate is because no one really hears them. Perhaps this should not be surprising because most health physicists are not trained to hear feelings. This class will show how this tool can be acquired and implemented in a short time. There are two keys to listening: 1) feelings are more important than what is said, and 2) listening is more important than solving problems. We will explore whether our role in radiation safety is to be the "giver of answers" or to be a resource for assisting others in deriving their own answers. We will also consider a number of barriers to effective com-

munication, including perceptions, images, feelings, resistance, values, social roles, decision preferences, and defensiveness. Insights on dealing with each of these barriers will be presented with applications to specific radiation scenarios provided by attendees. We will look at a sorting system for feelings and how to best respond to concerns and questions about radiation. This class will conclude with a list of things you can always say when you do not know what to say. We will practice these tools on communication scenarios which each attendee is invited to write down and bring with them.

AAHP2 Statistical Issues in Health Physics

Daniel J. Strom, Tom Johnson; Pacific Northwest National Laboraty, Colorado State Universtiy

This class covers all the basics, and lead up to more advanced topics. It begins with a review of radiological quantities, and SI and traditional units. Next comes a definition of probability and probability distributions, followed by metrological and statistical terminology as outlined in the ISO Guide to the Expression of Uncertainty in Measurement (the "GUM"), including the concept of the measurand. MARSSIM & MARLAP terminology are introduced, including a discussion of what we measure and what we want to know. An explanation of variability, uncertainty, bias, error, and blunder follows, with presentations on classical (measurement) versus Berkson (grouping) errors in populations, shared versus unshared errors in populations, and autocorrelation within individuals over time. The dos and don'ts of presenting results are covered, including non-detects, censoring, and a discussion of who the audience is (management, public, scientists, or archives) and how that affects presentation of results.

Decision making under uncertainty requires answers to questions such as "Is anything there?" and "What can I promise to detect?" Model uncertainty is often overlooked, and is considered. The benefits of averaging and weighted averaging are presented. Statistical methods such as frequentist, maximum likelihood, and Bayesian methods are introduced, with a focus on the latter. Use and abuse of regression analysis is discussed. Managing uncertainty is presented, along with new methods developed at PNNL for making sense out of noisy, low-level data. Freeware web resources are used wherever possible.

AAHP3 Introduction to MARSAME

Richard Toohey, Alex Boerner; Oak Ridge Associated Universities

MARSAME is an acronym for "Multi-Agency Radiation Survey and Assessment of Materials and Equipment." Published in January 2009, MARSAME was a joint effort between the DOE, DoD, EPA, and the NRC to aid sites in the clearance of materials and equipment (M&E). The MARSAME manual supplements the Multi-Agency Radiation Survey and Site Investigation Manual ("MARSSIM").

To enhance the skill set of professionals in this topical area, the instructors will introduce several MARSAME technical topics, including (but not necessarily limited to!) Initial Assessments (IA), Measurement Quality Objectives (MQOs), Survey Approaches and Considerations, Survey Plans, and Survey Implementation Approaches and Considerations. Course presentations will be supported with examples, exercises, and problem sessions. The instructors will encourage and facilitate discussions addressing practical M&E property clearance issues.

At the conclusion of this course, participants will have acquired practical, technical information to begin applying the flexibility inherent in the MARSAME manual in support of M&E property clearance programs.

Prerequisites and Materials: Participants should have a familiarity with the MARSSIM methodology and basic statistical concepts. And…..Please bring a calculator with you!

Professional Enrichment Program (PEP)
Sunday 26 June through Thursday 30 June

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 26 June, a series of 18 courses will be offered between 8:00 am - 4:00 pm.

In addition to the above-mentioned sessions for Sunday, five PEP lectures are scheduled on Monday, and six each on Tuesday and 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 Technical Auditing for Health Physicists

Jeffrey Guenther; HPS Laboratory Accrediation Policy Committee

The objective of this professional enrichment program topic is to provide a framework around which the participant can help customers (assessees) improve through the process of technical assessment. Technical assessing requires an assessor to know what's important in an industry and where to help the assessee focus resources for optimization of the production process. The philosophy espoused during the training is that compliance and conformance form the bedrock from which a business can improve and optimize operations. The "why" is the most important part in helping the assessee understand the "how" of improvement. The process is presented around the Plan-Do-Study-Act model. Techniques will be presented to assist assessors communicate with the team, the customer, interviewees and the sponsoring organization. The presentation is general enough to apply to all health physics areas.

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

PEP 1-B EH&S "Boot Camp" for Radiation Safety Professionals: Part 1 - "The Basics of Risk Management & Insurance" and "The Basics of Fire & Life Safety"

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-C Accelerator Physics for ES&H Professionals Part 1

J. Donald Cossairt; Fermi National Accelerator Laboratory

This is Part 1 of a two-part PEP Course. The participants will maximize the benefits of their participation by attending both Parts. The acceleration and transport of particle beams constitutes a fascinating subject that merits understanding by accelerator health physicists and other environment, safety, and health professionals. Particle accelerators continue to grow in importance of course in medicine but also in many other areas that now reach deeply into many facets of everyday life. Members of the public now commonly encounter man-made radiation from accelerators. The goal of this course is to improve the ES&H professional's knowledge of accelerator physics and its connection with unique radiation protection and other hazards. This should lead to more effective

working relationships with those responsible for accelerator operation in common efforts to address important ES&H issues. In Part 1 of this course basic electromagnetic theory, relativistic relationships, charged particle optics, and electrostatic accelerators will be reviewed along with their association with unique hazards. While equations will be used, the presentation will be semi-qualitative in nature. Attendance at Part 1 is nearly essential to effective participation in Part 2.

*(Operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the United States Department of Energy.)

PEP 1-D Operational Accelerator Health Physics I

L. Scott Walker, Robert May; Los Alamos National Laboratory, Thomas Jefferson National Accelerator Facility

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-E Status of ANSI N42 Standards for Health Physics Instrumentation

Morgan Cox, Co-chair ANSI N42. RPI

This report covers the current status of American National Standards Institute (ANSI) N42 standards for health physics instrumentation.

This presentation 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 requirements for portable radiation detectors; ANSI N42.17A for normal environmental conditions and ANSI N42.17C for extreme environmental conditions; ANSI N42.323A and B being combined for calibration of portable instruments over the entire range of concern, i.e., in the normal range and for near background measurements; performance criteria for 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 effluent, airborne and liquid monitoring on site, 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 standard is intended to combine the salient materials in 42.17B, 42.18, 323C and 42.30, with a comprehensive title of "Instrumentation and systems for monitoring airborne radioactivity."

Audience participation is important to the success of this presentation.

PEP 1-F Using the RESRAD Family of Codes to Develop Clean-up Criteria and Dose Estimates

Tom Hansen, Delis Maldonado; Ameriphysics, LLC, Oak Ridge Associated Universities

The RESRAD family of computer modeling codes are used to estimate radiation doses and risks from residual radioactive materials. RESRAD was developed by Argonne National Laboratory (ANL); code and version control are currently maintained by the Department of Energy (DOE) through ANL. These codes are available free for download and, as a result, are likely the most extensively used and tested dose modeling codes in the world.

Three codes will be discussed and demonstrated. RESRAD and RESRAD-OFFSITE are used for assessing radiation dose and risk from soil containing residual radioactive material; RESRAD-BUILD provides a means for analyzing the radiological doses resulting from occupancy of buildings contaminated with radioactive material.

This course will contain an overview of the codes, but will consist primarily of real-time demonstrations using the codes to 1) translate dose-based release (cleanup) criteria into measureable, derived concentration guideline levels and 2) perform post-cleanup dose estimates. A variety of scenarios typically encountered by the presenters will be examined.

An overview of the tools for sensitivity and uncertainty analyses is provided, as are demonstrations using these tools.

Sunday - 10:30 am - 12:30

PEP 2-A HPS Laboratory Accreditation Program Assessor Training

Jeff Guenther; HPS Laboratory Accrediation Policy Committee

The objective of this professional enrichment program topic is to familiarize HPS Laboratory Accreditation Program technical 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 instrument calibration and source manufacturing laboratories. The training is required for all members of the HPS Laboratory Accreditation Assessment Committee and is recommended for facilities interested in accreditation. 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. The program will also provide an opportunity for the student to practice identification of non-compliant items.

This course provides information to individuals interested in the HPS accreditation program, and is also part of a course for certifying individuals to assess laboratories for HPS accreditation

PEP 2-B EH&S "Boot Camp" for Radiation Safety Professionals: Part 2 - "Security 101 for Radiation Safety Professionals" and "The Basics of Biological & Chemical Safety"

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

See PEP 1-B for details.

PEP 2-C Accelerator Physics for ES&H Professionals Part 2

J. Donald Cossairt; Fermi National Accelerator Laboratory

This is Part 2 of a two-part PEP Course and will be most beneficial if preceded by participation in Part 1. The acceleration and transport of particle beams constitutes a fascinating subject that merits understanding by accelerator health physicists and other environment, safety, and health professionals. Particle accelerators continue to grow in importance of course in medicine but also in many other areas that now reach deeply into many facets of everyday life. Members of the public now commonly encounter man-made radiation from accelerators. The goal of this course is to improve the ES&H professional's knowledge of accelerator physics and its connection with unique radiation protection and other hazards. This should lead to more effective working relationships with those responsible for accelerator operation in common efforts to address important ES&H issues. Building upon the foundation of Part 1, particle acceleration using radio-frequency electromagnetic waves will be covered beginning with linear accelerators and radio-frequency quadrupoles (RFQs). Circular machines such as cyclotrons, betatrons, synchrotrons, and high energy colliding beam accelerators will complete the presentation. While equations will be used, the presentation will be semi-qualitative in nature.

*(Operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the United States Department of Energy.)

PEP 2-D Nanotechnology: What's All the Fuss About?

Lorraine Marceau-Day; Louisiana State University

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 after its release into com-

mon use. Two classical examples are asbestos and the wide-spread use of X-rays by physicians without protection 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 nano-scale 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 2-E Status of ANSI N42 Standards for Health Physics Instrumentation

Morgan Cox, Co-chair ANSI N42. HSI

This report covers the current status of American National Standards Institute (ANSI) N42 standards for health physics instrumentation.

This presentation includes the discussion of nineteen ANSI N42 standards recently developed or being developed, or not yet completed, for performance requirements and testing requirements 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; and backpack-based radiation detection systems used for Homeland Security in ANSI N42.53.

Audience participation is important to the success of this presentation.

PEP 2-F An Introduction to the Project Management Professional Certification for Health Physicists
Tom Hansen, Art Palmer; Ameriphysics, LLC, EnergySolutions

The halo effect is a cognitive bias whereby the perception of one trait (i.e. a characteristic of a person) is influenced by the perception of another trait (or traits) of that person. As a health physicist, you likely stand out from the crowd in terms of intelligence, initiative, and integrity. Due to the halo effect, you may find yourself promoted to a management position – perceived as an excellent manager - even though you've had no formal management training. So where does a health-physicist go to get the management training necessary to be a successful manager? Pursuing an MBA is one option, but that can be a costly, time consuming route, and an MBA is not for everyone. Another reasonable approach may be the Project Management Professional (PMP) credential, which recognizes competence in leading and directing project teams.

This course will provide attendees an introduction to the Project Management Institute's (PMI) process framework upon which the PMP credential is tested. This framework is comprised of forty-four project management processes that are organized into nine knowledge areas and five foundational process groups: initiating, planning, executing, monitoring and controlling, and closing.

Topics will include scope control, the triple constraint, time management and critical path analysis, cost estimating and earned value management, contracting mechanisms, risk assessment, and a review of typical PMP examination questions and answers.

This course is co-presented by CHP/PMPs who are currently executive-level managers and possess more than forty years combined health-physics project management experience.

Sunday - 2:00 - 4:00 pm

PEP 3-A Introduction to Uncertainty Calculation
Daniel Van Dalsem, James Tarzia; Eckert & Ziegler Isotope Products, Radiation Safety & Control Services

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 made 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 the 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."

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. Internationally recognized standards from ISO GUM and their NIST counterparts will be explained using examples. Software developed for implementing these standards will be demonstrated.

PEP 3-B EH&S "Boot Camp" for Radiation Safety Professionals: Part 3 - "Measuring and Displaying Radiation Protection Program Metrics That Matter to Management."

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

See PEP 1-B for details.

PEP 3-C Training First Responders on Radiological Dispersal Devices (RDDs) and Improvised Nuclear Devices (INDs) Incidents

K.L. "Ken" Groves; 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 amount 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 New NCRP report 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.

KEYWORDS: First Responders, RDDs, INDs, Training

PEP 3-D Operational Accelerator Health Physics II

L. Scott Walker, Robert May; Los Alamos National Laboratory, Thomas Jefferson National Accelerator Facility

See PEP 1-D for details.

PEP 3-E Health Physics/Nanotechnology Interactions

Lorraine Marceau-Day; Louisiana State University

Once one has acquired a fundamental understanding of Nanotechnology [see PEP 2-D entitled Nanotechnology: What's all the Fuss About?]; it is time 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 with accelerators or in 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 focus on 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 3-F Going Public: Case Study of a 238Pu Contamination Spread to the Public Domain

Robert Jones, Pacific Northwest National Laboratory

In June, 2007, a 238Pu source was discovered to be leaking, spreading contamination in two buildings and staff members' cars. Contamination spread was also possible in public areas. This event challenged several aspects of the Radiation Protection Program including contamination response,

internal dosimetry scenarios, regulatory interpretation, and media, public and worker relations. How the event was managed and improvements to the Radiation Protection Program will be discussed. Internal dosimetry considerations for immediate staff, ancillary staff, and members of the public will also be discussed.

Monday - 12:15 - 2:15 pm

PEP M-1 Part II Accelerator Health Physics ABHP Exam Problems

L. Scott Walker; Los Alamos National Laboratory

Health Physics examinees normally stay away from Accelerator Health Physics problems on the ABHP Part II exam. For some reason accelerator health physics is seen as an obtuse field for most personnel who take the exam. With some basic knowledge, most Part II accelerator based problems are not that difficult. More complex problems take computer assistance and usually involve more than an hour of effort. Thus, ABHP Part II accelerator based exam problems are normally straight forward. The ABHP Part II problems PEP class will focus on simple problems necessary to support the operation of an accelerator and solving those problems given on the exam. Those completing this class will be provided with the necessary background to process these problems in a straight forward manner. This class will include problems at both proton and electron accelerators and includes high energy physics issues that impact health physics management and are associated with accelerator operation.

PEP M-2 Medical Internal Dose Calculations – A New Generation Arrives

Michael Stabin; Vanderbilt University

Traditional mathematical model-based anatomical models have been replaced with more realistic standardized anatomical models based on patient image data. Other recent model changes that will affect standardized dose estimates for radiopharmaceuticals include replacement of the traditional ICRP 30 GI tract model with the ICRP human alimentary tract (HAT) model and use of updated tissue weighting factors for calculation of effective dose. Calculation of internal dose estimates from animal or human data sets requires knowledge of a number of important principles and relationships in kinetic analysis and dose assessment, and knowledgeable use of available software tools. Adjustments to traditional dose calculations based on patient-specific measurements are routinely needed, especially in therapy calculations, for marrow activity (based on measured blood parameters), organ mass (based on volumes measured by ultrasound or Computed Tomography (CT)), and other variables. This program will give an overview of standard calculation techniques and models, and demonstrate how new models have introduced changes to standard calculations, with practical examples worked out in several important areas of application. A brief

discussion will be included of current issues in radiation biology that are pertinent to the interpretation of calculated dose estimates.

PEP M-3 Fundamentals of Gamma Spectroscopy – Part I

Doug Van Cleef; 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.

Objective: Upon completion of this course, student will have a working knowledge of radioactive decay schemes, radiation emissions, gamma radiation detection, and the principles of the laboratory gamma spectroscopy process.

PEP M-4 Role of the Health Physicist in Radiation Accident Management

Richard Toohey, REAC/TS, Oak Ridge Associated Universities

As an emergency response asset of the Department of Energy, the Radiation Emergency Assistance Center/Training Site (REAC/TS) is charged with providing support, advice, and training on the medical management of radiation accident victims. When a radiation accident occurs, close coordination is required between medical and health physics personnel; however, unless extraction of a victim from a very high radiation field is required, medical care always takes priority over radiological considerations. Health physicists must be familiar not only with the application of radiation protection principles to accident management, but also with medical terminology and procedures, and both on-scene and in-hospital emergency medical care. Challenges include interaction with medical personnel, dose assessment, public information, and post-accident interactions with managers and investigators, and possibly attorneys. Medical personnel must be taught basic radiological terminology, the difference between irradiation and contamination, radiological triage, contamination control procedures during evacuation and treatment, methods for patient decontamination, possible therapies (e.g., administration of DTPA), waste management, and preservation of evidence. Dose estimation includes radionuclide identification; intake estimation; deep, shallow and lens dose measurement or estimation; accident reconstruction; and use of opportunistic dosimeters and/or biological dosimetry. Public information concerns include patient privacy, release of facts vs. assumptions, determinations of the effectiveness of plans and procedures, and transmitting technical information to a lay audience. Post-accident interactions include refinements or revisions of dose estimates, stochastic risk estimates, review of operations, review of emergency plans

and procedures, and development of lessons learned, as well as potential involvement in litigation. Some actual experiences in radiation accident management will be used to illustrate these points.

PEP M-5 The Basics of Magnetic Resonance Imaging and Spectroscopy

Amir Huda; California State University

Health Physicists and other personnel working in the world of ionizing radiation are often asked about Magnetic Resonance Imaging (MRI) and the lesser known Magnetic Resonance Spectroscopy (MRS) procedures and whether they are safer than the other competing modalities of imaging. The actual functionality of these devices, quite often remains a "black box" for many health physicists. This program will explain in detail the use of radio waves, magnetic fields, and gradients to generate an image and also look at cerebral metabolites in the brain. The use of animation and slides from various sources will make the topic comprehensible without a detailed background in quantum mechanics. The workshop will cover the history, current status, and future of various off-shoots of the field including functional MRI (fMRI), diffusion-weighted or diffusion-tensor imaging (DWI/DTI), etc. It will also give a flavor of safety issues dealing with these devices and a brief overview of accidents involving some of the MR scanners.

The speaker has been in the field for over 20 years doing research in MRS and teaching the subject for the last 11 years. He is a member of the American Board of Health Physics.

PEP M-6 Updates on Laser & Optical Radiation Safety Standards

D.H. Sliney; Consulting Medical Physicist (US Army Medical Department—retired)

CANCELLED

Tuesday - 12:15 - 2:15 pm

PEP T-1 A Decision Tool for Population Screening and Protection in Response to Radiological Events

Eva K. Lee; Georgia Institute of Technology

Population monitoring is a process that begins soon after a radiation incident is reported and continues until all potentially affected people have been monitored and evaluated for: 1) needed medical treatment, 2) the presence of radioactive contamination on the body or clothing, 3) the intake of radioactive materials into the body, 4) the removal of external or internal contamination (decontamination), 5) the radiation dose received and the immediate health risk from the exposure, and 6) long-term health effects. Population monitoring (including people and their pets) is accomplished locally and is the responsibility of state, local, and tribal governments.

The challenges of population monitoring especially in the first few days after a radiation incident are daunting. They are compounded by the fact that many critical com-

ponents of monitoring should be put in place in the first few hours, before the arrival of federal assets that might be used to assist in the monitoring efforts. In this talk, we will discuss practical considerations for operating a community reception center, and a decision-support software system that can be used for optimizing design of community reception centers, building on the established infrastructure and planning of state and local public health departments throughout the country. The system allows the determination of appropriate layout of screening centers, estimates and optimizes the necessary staffing needs, and provides insight on process flows and optimal throughput that the operations can support. It optimizes the operations efficiency and throughput under limited resources (labor and time). And it allows users users to analyze the risks of radiation contamination spread and determine mitigation strategies. This work is joint with CDC NCEH/EHHE/ Radiation Studies Branch Dr. Armin Ansari and Kevin Casper.

PEP T-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 mangers 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 T-3 Fundamentals of Gamma Spectroscopy – Part II

Doug Van Cleef; ORTEC/Advanced Measurement Technology, Inc.

See PEP M-3 for description.

PEP T-4 Skin Dose, Effects and Experiences in Fluoroscopy

Chris Martel; Brigham and Women's Hospital, Harvard Medical School

Recent media attention has focused on patient injuries from radiation generating devices such as brain perfusion studies using CT scanners, cancer treatment using linear accelerators, and interventional procedures using fluoroscopy devices. As a result, hospitals are seeking to manage patient radiation doses more closely than ever. In many states, institutions are required to monitor fluoroscopy dose to patients, and follow up is required for patients likely receive a skin injury. Patient doses exceeding the deterministic threshold for skin injury (i.e., 2 Gray) are a common occur-

rence. However, skin injuries such as erythema are rarely seen. Is the deterministic threshold for skin injury really 2 Gray? This course will examine the structure of skin, historical and current evidence of radiation interaction and damage to skin, and measurement of skin dose. The course will explore whether 2 Gray is an appropriate threshold for skin injury or is simply too low.

PEP T-5 Legal Considerations for Radiation Risk and Dose Reconstruction used in Compensation Program Decisions and Civil Litigation

Lynn McKay, Ralph Johnson; Johnson & McKay, PLLC

This course will acquaint health physicists with current attempts to use radiation dose and risk calculations performed for compensation programs such as EEOICPA in personal injury civil litigation. The course will examine the reasons why the EEOICPA requires use of certain assumptions in assessing radiation dose and risk to those who apply for compensation pursuant to this program. Course participants will gain an understanding of applicable burdens of proof and evidentiary standards in dose and risk calculations to prove negligence and causation in state and federal court litigation. The course will compare methods used in dose and risk assessments performed for compensation programs such as EEOICPA with those used in civil litigation to establish that a claimant's radiation dose is an actual and proximate cause of his or her cancer.

PEP T-6 Use of Portable Survey Meters and Portal Monitors for Radiological Triage

Nolan Hertel, Wesley Bolch; Georgia Institute of Technology, University of Florida

After a radiological event, such as a radiological dispersion device, improvised nuclear device, or a nuclear reactor accident, there could be large numbers of potentially contaminated individuals. Although the decontamination of externally contaminated individuals is rather straightforward, the screening of persons for internal contamination requires an analysis of the level of radioactive material incorporated in the body. If the level for an individual is sufficiently high based on the count rates obtained with the screening instrument, such that the committed effective dose will likely exceed a clinical decision guideline, the individual will be sent for further evaluation and possibly decorporation treatment. The initial screening can be performed with a variety of handheld detectors or portal monitors and represents the first-cut at identifying persons whose internal committed dose equivalent may be of concern. The presentation will review work performed for the CDC Radiation Studies Branch by the University of Florida and Georgia Tech to obtain the count rates from various instruments which would indicate a level of internal contamination of concern. Computer simulations were employed to determine the internal distribution of the isotopes considered in the body and then compute the count rates that

would be observed using different sized phantoms to represent the human body. Procedure sheets on the use of the instruments as well as the count rate thresholds of concern for up to 30 days after the intake will be presented. In addition, software developed at the University of Florida that can be used in the field to assist in performing the initial triage will be covered.

Wednesday - 12:15 - 2:15 pm

PEP W-1 An Overview of Ionizing Radiation Carcinogenesis

Otto G. Raabe; University of California, Davis

Excessive exposure to ionizing radiation may lead to the development of cancer by promotion of ongoing carcinogenic biological processes or by independent cancer induction. Radiation induced cancer is a complex and not completely understood process involving multiple events including but not limited to cellular DNA damage, up and down regulation of genes, intercellular communication, tissue and organ responses, clonal expansion of altered cell lines, and possibly eventual malignancy. The current understanding of radiation carcinogenesis is informed by epidemiological studies of human populations exposed to elevated levels of ionizing radiation and controlled studies utilizing laboratory animals. Studies of the atomic bomb survivors indicate a linear no-threshold dose-response relationship. Studies of the radium dial painters and internal emitter studies in animals have displayed threshold relationships. This review of the major studies provides perspective and suggestions for understanding these seemingly diverse cancer risk phenomena. The conclusions have important implications with respect to ionizing radiation safety standards.

PEP W-2 NUCL5470G Nuclear Forensic Analysis

Ed Waller; University of Ontario Institute of Technology

This PEP wil consider elements of nuclear forensic analysis as related to nuclear security, current threats, analytical techniques, nuclear weapons and attribution and forensic dosimetry. There are many techniques available to forensic investigators to investigate suspect criminal activity. In addition, there are many times when forensic techniques are required to investigate nuclear-related events. This course will explore nuclear and chemical techniques related to the nuclear forensics. Both radiation and analytical chemistry techniques will be introduced. Risks and hazards associated with nuclear forensic investigations will be reviewed, and mitigation strategies developed. Data integrity and communication of results will be emphasized.

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

Mark D. Hoover; Centers for Disease Control and Prevention

Given the considerable current interest in characterizing and controlling risks to worker health from potential exposures to engineered nanoparticles, this course will pres-

ent 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 W-4 OSL Applied Concepts Training

Chris Passmore; Landauer, Inc

Bench top InLight and microStar analytical systems were designed for personal dosimetry and as a tool for assessing patient dose using optical stimulated luminescence (OSL) techniques. InLight and microStar systems were designed to bring OSL technology to laboratories wanting to perform their own personnel dosimetry or hospitals for assessing patient dose using the microStar reader and nanoDot dosimeter. These systems allow OSL measurements to be made with very little depletion of signal from the radiation dosimeter. OSL leads to many fundamental shifts in patient monitoring and external dosimetry paradigm. In this course, students will explore fundamental properties of OSL and how these concepts can change the way health and medical physicist approach radiation dosimetry. The training will be a mixture of lecture and laboratory with a heavy focus on applied concepts. Health and Medical Physicists will perform hands on testing of OSL properties including re-readability, annealing, and depletion. In addition, health and medical physicists will perform reader intercomparison testing and study OSL radiation response matrix to determine the radiation field used to dose the dosimeter.

PEP W-5 New CT Dose Phantom: Motivation and Discussion

Donovan Bakalyar; Henry Ford Hospital

Over the past several years the now universally utilized CT dose indices, CTDIvol and DLP, have come under close scrutiny, motivated in large part by the advent of cone beam and very wide fan beam CT machines. This led to the formation of AAPM Task Group 111 (TG111) which thoroughly examined the CTDI family of dose indices and having done so, formulated a set of recommendations which were included in their report. AAPM Task Group 200 (TG200) has been created to implement these recommendations and as a result a phantom has been designed, built and tested that will address some of the limitations of the current dose index system. In addition, methods of measurement and options for assurance of performance are being developed with an eye toward fealty toward sound physical concepts as well as practical means for the performance and analysis of these measurements. In light of some of the confusion regarding the current CTDI indices, a further objective is to clearly distinguish phantom dose measurements from patient dose estimates. This talk will introduce and discuss several new suggested indices.

PEP W-6 Fluoroscopic Safety Management System

Ray Dielman; St Anthony's Medical System

St Anthony's Health Care is a typical acute general hospital, and satellite facilities, with an active and growing use of fluoroscopy and other imaging modalities. The regulatory and risk culture, growing use, users, patient and team member doses mandated a safety management system. The Joint Commission established a sentinel event category - radiation overdose - in 2005 requiring proactivity on the part of accredited institutions using fluoroscopy (and therapy). St Anthony's created and adopted a two part system to address the issue. Part one - safety -- is underway; part two - credentialing - is being tested. The system parameters and results to date will be presented.

Continuing Education Lectures (CEL)
Monday 27 June through Thursday 30 June

Monday 7:00-8:00 AM

CEL1 Nanoparticle-Based Radiation Detectors and the Use of Radiation for Nanoparticle Detection

M.L. Marceau-Day, L. Madsen; Center for Advanced Microstructures and Devices, Audubon Sugar Institute, Louisiana State University, Baton Rouge

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

CEL2 Integration of Radiation Safety into Environmental Health and Safety: The Columbia Experience

Thomas L. Morgan, Kathleen Crowley, Environmental Health and Safety, Columbia University

Columbia University's Environmental Health and Safety and Radiation Safety programs have been separate and distinct entities. Collectively, these programs are responsible for five campuses, two independent hospitals and a state-sponsored research institute spread across three counties. To achieve better coordination of activities, more efficient use of resources, and consistency in procedures, a decision was made over time, to merge all programs in to one department. An innovative model for operations has been adopted. For example, individuals known as research safety specialists conduct routine laboratory surveys for biological and chemical safety as well as radiation safety. Also, one

program handles all hazardous material wastes, including radioactive waste. This talk will discuss some of the challenges and successes of this integration.

CEL3 Laser Safety Program Development at an Academic Medical Center

Deirdre Elder; University of Colorado Hospital

Laser safety is an important, but often overlooked issue in medical settings. The primary reason for developing an effective laser safety program is to provide a safe environment for patients and staff. Other compelling reasons include preventing large fines under the OSHA general duty clause for failing to maintain a safe work environment and preventing or minimizing malpractice litigation. In addition, The Joint Commission reviews the structure of medical laser safety programs for compliance with ANSI standards. Unfortunately, in many medical facilities, the laser safety program is assigned to a nurse or another individual with many competing priorities and narrow focus. This may work in smaller facilities with laser use confined to one location. In large medical centers with laser use spread over multiple locations, a more extensive laser safety program is necessary. At the University of Colorado Hospital, the laser safety program is being reinvented. A new laser safety policy that is workable and enforceable outside of operating rooms has been written and an appropriate training program is being developed. The process taken and the lessons learned will be shared.

Tuesday 7:00-8:00 AM

CEL4 Nobody Notices a Clean Window: A History of Successes in Radiation Protection

Daniel J. Strom; Pacific Northwest National Laboratory

A sign on my office wall reads, "I reserve the right to get smarter." Looking back over the 115 years since Röntgen discovered x-rays, there have been many opportunities to get smarter in the profession of radiation protection. Also known as "health physics" in the USA, radiation protection is the profession concerned with protecting humankind and the environment from the harmful effects of radiation. Because technologies that produce radiation have significant benefits, protection must be provided without "just saying no." Twenty years ago, Dade Moeller wrote of "the ages of radiation protection." In each age, radiation protection philosophy and goals evolved as we learned of additional deleterious effects of ionizing radiation on human health. These changes were followed by evolving radiation protection methods, and radiation protection regulations adopted lower dose limits, at least in developed nations. Radiation protection philosophy has come to be based on 3 principles, known as "justification," "optimization," and "limitation." Radiation protection practice is based on 10 principles, whose execution can be summarized in 10 actions or commandments. These principles are time, distance, dispersal, source reduction, source barrier, personal barrier, decorporation, effect mitigation, optimal technology,

and limitation of other exposures. The commandments, in their familiar form, are hurry (but don't be hasty); stay away from it, or upwind of it; disperse it and dilute it; make and use as little as possible; keep it in; keep it out; get it out of you and off of you; limit the damage; choose best technology; don't compound risks (don't smoke). Examples of "getting smarter" leading to successes in radiation protection are presented for each principle and commandment. If one's job is to ensure that nothing bad happens, perfect success can be indicated only by the absence of failure. Past failures of radiation protection are the dirty window; the current successes are the clean window that nobody notices. Radiation protection in the USA has evolved to the point where being taken for granted may endanger continued success.

CEL5 ANSI N43.1 Standard Draft: Radiation Safety for the Design and Operation of Particle Accelerators

James C. Liu, Lawrence S. Walker; Radiation Protection Department, SLAC, LANSCE, Los Alamos National Laboratory, Los Alamos, NM

The latest development and status of the ANSI N43.1 Standard "Radiation Safety for the Design and Operation of Particle Accelerators" are presented. The Standard sets forth the requirements and recommendations for accelerator facilities to provide adequate radiation protection for the workers, the public and the environment. The Standard applies to the design, installation, commissioning, operation, maintenance, upgrades and decommissioning of accelerator facilities, i.e., the complete life cycle of a facility. The Standard specifies the requirements and recommendations for both the management and the technical aspects of the radiation safety program, graded to the complexity and hazard levels of the facility. This Standard is applicable to all accelerator facilities, except facilities utilizing accelerators solely for medical applications (human or veterinary).

Chapter 2 of the Standard provides the definitions of common terms. Chapter 3 specifies the radiation safety programs for the accelerator facilities. Chapter 4 provides details of the requirements and recommendations for the Radiation Safety System(s) (RSS) which are used to control prompt radiation hazards. The RSS includes the Access Control System (ACS) and Radiation Control System (RCS). Chapter 5 describes the details of the ACS, while Chapter 6 describes the details of the RCS. Chapter 7 covers the accelerator operations. The Operational Radiation Safety program is described in Chapter 8. Chapter 9 covers the personnel training. There are five appendices to provide detailed guidance and resources in addressing the five key issues: 1) development of the Safety Assessment Document, 2) design and implementation of the interlocked-type ACS systems, 3) decommissioning program, 4) measurements of radiation and radioactivity, and 5) safety standards for commercially available and/or production-type accelerators.

* Work supported by Department of Energy contract DE-AC03-76SF00515

Wednesday 7:00-8:00 AM

CEL6 ABHP Exam Fundamentals – Tips for Successfully Completing the Certification Process

Charles (Gus) Potter, Kent Lambert; Sandia National Laboratories, Drexel University

The process for achieving ABHP certification – beginning with the application submission through the completion of the examination to certification – will be presented. Tips for navigating certification throughout the process will be discussed. Topics will include:

* What are qualifying academic requirements?

* Why require a degree?

* What is meant by "professional level" experience?

* How are Part I and Part II of the exam prepared?

* How is the passing point determined?

* What are the keys to good performance on the exam?

* What pitfalls exist that detract from good exam performance?

This presentation will help persons interested in certification prepare an application that will accurately reflect the applicant's education and experience. It will also provide tips for preparing to take the exam and answering questions on Part II of the exam in a manner that promotes maximizing scores. Persons who are already certified may gain insight into the process and identify areas where they would be willing to assist in certification process. The material presented consolidates pertinent exam policy/procedure into an easily digestible format, offering real world examples of good and poor responses.

CEL7 Diagnostic Reference Levels for CT Scanners

Ed Waller; University of Ontario Institute of Technology

The diagnostic reference level (DRL) is an increasingly important quantity used for optimization of radiation dose to both adult and pediatric patients undergoing CT scans. This CEL discusses the background behinds CT dose, the scientific foundations for calculation of CT dose and DRL, CT dose optimization and consideration of cancer risk with respect to CT dose.

CEL8 Innovative Approaches to Molybdenum-99 Production (that May or May Not Work)

Darrell R. Fisher; Isotope Sciences Program, Pacific Northwest National Laboratory

Current producers of molybdenum-99 for technetium-99m generators used in nuclear medicine rely on research reactors and dedicated isotope production reactors in Canada, Netherlands, Belgium, France, South Africa, Argentina, Australia, Poland, and Russia. Although the United States is the largest consumer, our country lacks a domestic supply of 99Mo. Recent reactor shutdowns for repair and maintenance interrupted international supplies and confirmed U.S. vulnerability to reliance on foreign producers. Further,

science policy in the U.S. under the Energy Policy Act of 2005 mandates the shift in medical isotope production using highly enriched uranium to low-enriched (less than 20 percent) uranium-235 (fuels and targets) and reduces the future U.S. commitment to supply highly enriched uranium to foreign 99Mo producers. This mandate and the need for an enhanced 99Mo supply have spawned proposals for alternative production strategies using nuclear reactors, solution reactors, subcritical solutions, cyclotrons, alpha-particle accelerators, and linear accelerator-driven systems. These alternatives to standard nuclear reactor production of 99Mo will be discussed, highlighting and comparing the advantages and disadvantages of each.

Thursday 7:00-8:00 AM

CEL9 The Psychology of Radiation Safety – Simple Tools for Health Physicists

Ray Johnson; Dade Moeller & Associates

You do not have to be a trained psychologist to use a few simple counseling tools for helpful responses to radiation workers or members of the public. The first thing to remember is that all fears are OK. Our role in radiation safety is not to change people's fears, at least not directly. Telling people, "You do not need to be afraid," may not be the most helpful approach. A better approach may be to provide good information or evidence (hands-on is best) as a basis for people to change their own views. Before a fearful person is ready to hear our best information, however, we need to let them know that their fears are OK and we understand their feelings. We can do this by an easily learned tool called "Active Listening." We will practice this tool. Another useful tool is to ask, "What do you think will happen to you, if you are exposed to radiation?" The answers to this question will help identify the underlying images that are driving a person's fears. Behind all anger or fear there is a powerful image of unacceptable consequences. Remember not to laugh or offer a judging response to whatever people may say. Their images are based on their imagination or perceptions and may have no connection to reality as we know it or believe. Keep in mind that each person's perception is truth to them. Fearful radiation images may also be identified by responses to the question, "What's so bad about that?" This question has to be used gently and is not appropriate when a person is in the midst of their anger or fear. The answers to this question are at a subconscious level and not accessible at the time of strong emotion. We also cannot answer this question by ourselves. When we attempt to answer this question, we will likely stop when the answers become difficult. You may have to raise this question repeatedly to peel away the layers (like an onion) to get to the primary underlying image. Another tool for persons asking about safety is to help them answer the question for themselves by guiding them through the eight steps from radiation cause to effects. To get the most value from this CEL, attendees should bring real scenarios for practice of counseling tools.

CEL10 US Ecology Low-Level Radioactive Waste Disposal site - Its History, Operations and the Agony of Closure

Earl Fordham; Office of Radiation Protection, Washington State Department of Health

The US Ecology Low-Level Radioactive Waste Disposal site is located within the Hanford Reservation northwest of Richland, Washington. Since operations commenced in 1965 the site has accepted over 4 million curies in over 13 million cubic feet of waste, including material from Three Mile Island, Fort St. Vrain and the Trojan plant. Waste is disposed in trenches about 300 – 700 feet long, 80 feet wide and 50 feet deep. While most disposed waste is Class A, several specialized trenches have been constructed for high activity (reactor) waste streams. Site environmental monitoring began in 1966 and in 1987 increased monitoring locations and drilled 5 onsite groundwater wells. The limiting post closure dose scenario is a local Native American, conducting normal activities on/around the closed site, receiving 22 mrem in the period of 1,000 – 10,000 years post cover. Situated at the center of the Hanford Reservation, the commercial disposal site is leading the charge for closure of disposal sites on Hanford.

2011 Exhibit Hall Floor Plan

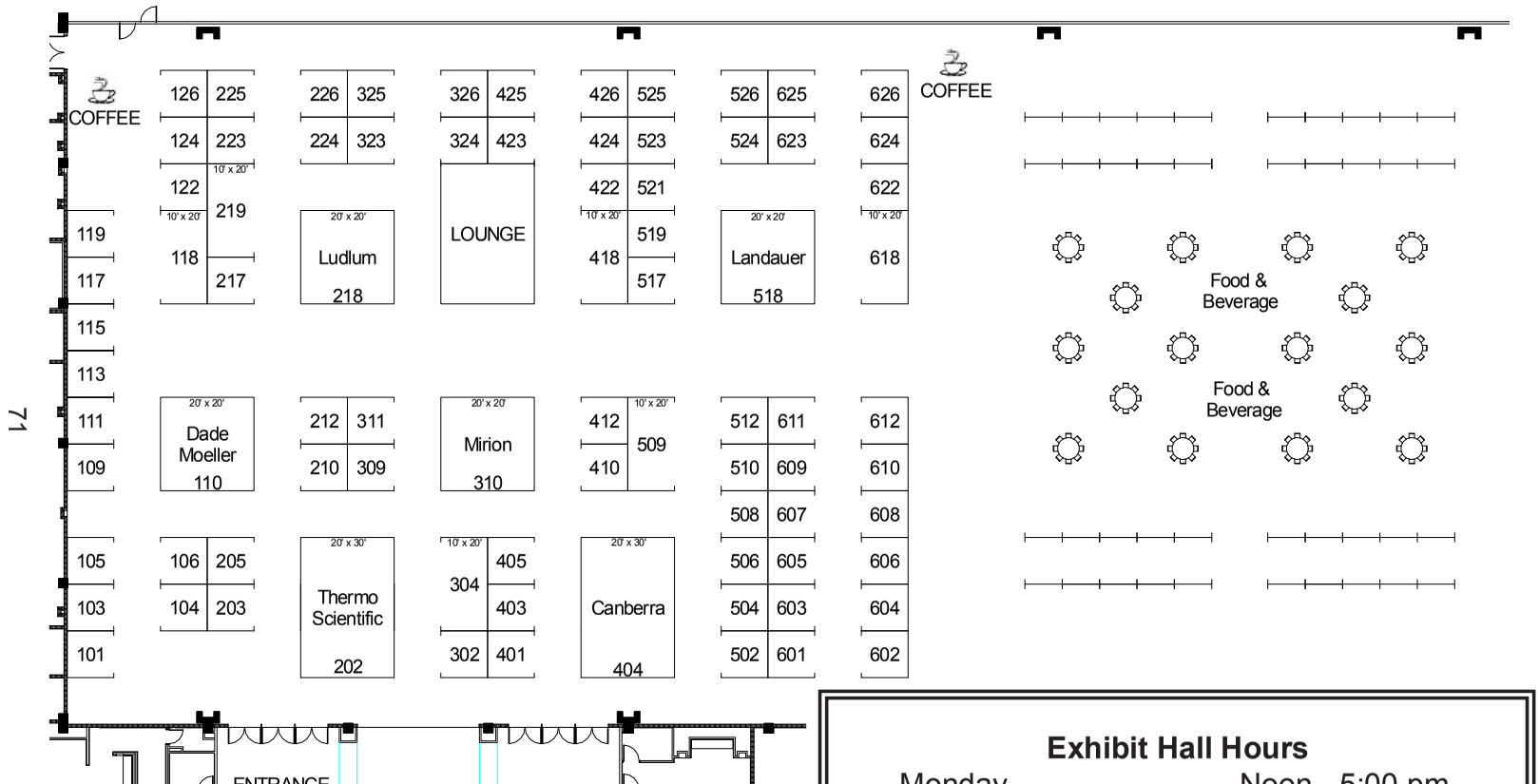

Exhibit Hall Hours

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

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The Centers for Disease Control and Prevention, Radiation Studies Branch, presents the Radiological Emergency Toolkit for Public Health Officials. Please stop by booth 526 to request a free toolkit, or send an email with your name and shipping address to cdcinfo.cdc.gov.

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CURE Foundation is a non-profit healthcare organization founded in 2007 by scientist and entrepreneur Krishnan Suthanthiran. Resources include experienced physicists and others on

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Works-In-Progress Abstracts

P.54 Modeling Aeolian Transport of Contaminants for Long-Term Risk Assessment: Sensitivities to Succession, Disturbance and Future Climate

Whicker, J. Kirchner, T.B., Breshears, D.D., Field, J.P.
Los Alamos National Laboratory, New Mexico State University, University of Arizona

Aeolian processes dominant redistribution of contaminated soil from protected, nonpublic areas to non-protected, public areas in semi-arid sites. Wind transport rates are controlled by vegetation cover, yet long-term changes in vegetation associated with cycles of disturbance and succession is ignored by current models. An empirically-based wind transport model (VMTran-Vegetation Moderated Transport) was developed to predict contaminant transport over 1000-year regulatory periods. VMTran simulates transport considering vegetation succession and ecosystem disturbances of three types (surface fire, crown fire, and drought-induced plant mortality) using disturbance rates for current and projected future climate. Results for a Los Alamos National Laboratory landfill show about 20% of surface contamination was transported offsite without considering disturbances whereas disturbances raised the amount eroded to about 80% of original concentration. More than 90% was eroded offsite under predicted future climate changes. Thus, consideration of vegetation succession and ecosystem disturbance is critical when evaluating public risk for long-term stewardship.

P.55 Botanical Extracts as Medical Countermeasures for Radiation Induced Damage

Kennedy, E.K., Prud'homme Lalonde, L., Lui, R., Foster, B.C., Boulay Greene H., Wilkinson, D.
Defence Research and Development Canada – Ottawa, University of Ottawa, Health Canada/University of Ottawa

This study aims to provide information regarding readily available botanicals which can be both prophylactic and therapeutic protectants from health effects of radiation exposure. Initial botanicals tested were dried Labrador tea leaves and commercially available grape seed extract supplements. A novel comparative assay was established to assess DNA damage in human peripheral blood lymphocytes, permitting comparison between DNA damage in cellular and acellular environments. Samples were exposed ex vivo to 1, 2, or 4 Gy 60Co gamma rays at room temperature at a dose rate of 11 Gy/hr at 1 m. Radioprotectant potential was assessed using the acellular and standard comet assays, relative Trolox® equivalents (known antioxidant), and cytochrome P450 3A4 inhibition. Data show that at 2 Gy, 10% DMSO (control) decreased DNA damage 60% in both environments, 4.3% glycerol (control) decreased DNA damage 38% in the cellular

but only 16% in the acellular environment, and 2% ethanol (solvent control) resulted in a 35% decrease in DNA damage in the acellular but only a 22% decrease in the cellular environment. Labrador tea leaves and commercial grape seed extract supplements were measured to contain 0.26 mM and 0.45 mM Trolox®-equivalents antioxidant potential respectively. At 2 Gy, neither Labrador tea nor grape seed extract protected against DNA damage in the cellular environment but increased damage by 70% and 50% respectively in the acellular environment. This increase in DNA damage has been previously observed resulting from high concentrations of ascorbic acid and beta-carotene; indicating a need for concentration optimization. Both botanical compounds were tested for potential drug and metabolism interactions using the 3A4 assay which showed 60% inhibition by Labrador tea and 95% inhibition by grape seed extract. Future work will focus on determining optimal concentrations and screening additional botanicals for potential in radiation caused DNA damage protection.

P.56 Finding ALARA in PET/CT

Perham, C.
University of Virginia

Positron Emission Tomography (PET) personnel exposures, in particular extremity or hand dose, have the potential to be higher than in standard Nuclear Medicine settings. Doses can be minimized by time, distance, and shielding measures. Special administrative and engineering actions can further reduce dose. While UVA Nuclear Medicine technologists did not exceed exposure limits, some were reaching ALARA level I extremity doses, and receiving the dreaded ALARA letter. The first dose reduction method instituted was personnel rotation. The second was implementing the use of an infusion system.

P.57 The Detection of Airborne Fission Products Stemming from the Fukushima Nuclear Accident

Chang, Z., McCullough, K., Moore, W.S.
South Carolina State University, University of South Carolina

We have successively detected the radioactive fallout stemming from the Fukushima Nuclear accident triggered by the earthquake on March 11, 2011. The air samples were collected on the campus of South Carolina State University, Orangeburg, South Carolina. A Canberra HPGe detector was used to count the samples. Three radionuclides, I-131, Cs-134, and Cs-137, were identified in the air samples. Radiocesium was found to be attached to the particulates and aerosols in the air. However, radioiodine was found existing in gaseous form as well as particulae form. The activity ratio of radioiodine in gaseous and particulate forms ranges from 2-7 when the radioactive pollution at its highest level in Orangeburg. The highest radioactivity concentration of I-131 was 10 mBq/M3. The nuclear fallout from Fukushima roughly lasted 20 days before it disappeared in the region.

P.58 Radiological Safety of Medical Caregivers Providing Humanitarian Relief in Japan

Mahathy, M., Gerber, F., Guszcza, G., Gunter, R., Kreider, J.
Oak Ridge, TN, Project HOPE, CHP Consultants

Project HOPE, a humanitarian relief organization, set up a relief effort to provide care to individuals and families in communities needing medical assistance in the aftermath of the earthquake and tsunami that struck the country's northeastern coast in March (http://www.projecthope.org/where-we-work/humanitarian-missions/japan.html). Much of the relief effort is being performed in the Miyagi Perfecture, just north of Fukishima Perfecture; much of Miyagi was devastated by the earthquake and resulting tsunami on March 11, 2011. In order to ensure the radiological safety of its volunteers Project HOPE and volunteer health physicists assessed the changing radiological conditions in the areas for relief work, acquired monitoring equipment, took radiological readings in Japan, developed an operating guide, and implemented external dosimetry for Project HOPE volunteers. Project HOPE staff in Japan administer the monitoring effort daily with support from health physicists in the United States who send a daily status on radiological conditions and dose rates using up to date monitoring data supplied by Japanese prefecture governments and the Ministry of Education, Culture, Sports, Science and Technology in Japan. This poster presentation presents background on the relief effort, detailed information on survey equipment and dosimeters used for monitoring, an outline presentation of the operating guide and a discussion of observed dose rates versus reported dose rates over time and average and maximum measured whole body dose.

P.59 CUSUM Analysis of Time-Interval Information for Radiation Monitoring

Luo, P., DeVol, T., Sharp, J.
Clemson University

Three statistical control charts were investigated to determine the method with the highest detection probability and the best average run length (ARL). The three control charts include: Cumulative Sum (CUSUM) analysis of time-interval (time difference between two consecutive radiation pulses) data (time-interval CUSUM), CUSUM analysis of count data (Poisson CUSUM) and the Shewhart control chart of count data. The time-interval CUSUM control chart was compared with the Poisson CUSUM control chart and the Shewhart control chart with experimental and simulated data. The experimental data were acquired with a DGF-4C (XIA, Inc) system in list mode. Simulated data were obtained by using Monte Carlo techniques to obtain a random sampling of a Poisson process. All statistical algorithms were developed using R (R Core Development Team, 2010). Detection probabilities and ARLs for the three methods were compared. The time-interval CUSUM control chart resulted in a similar detection probability as that of the Pois-

son CUSUM control chart, but had the shortest ARL at relatively higher radiation levels, e.g., about 40% shorter than the Poisson CUSUM at 10.0cps. Both types of CUSUM control charts resulted in a higher detection probability than that of the Shewhart control chart, e.g., 100% greater than the Shewhart control method at 4.0cps. In addition, when time-interval information was used, the robust CUSUM control chart coupled with a modified runs rule showed the ability to further reduce the time needed to response to changes in radiation levels, and keep the false positive rate at a required level.

P.60 The NRC and the ADR Process Learning Experiences

Perez-Monte, J.
Puerto Rico

In this poster we will discuss the regulations and requirements of the Nuclear Regulatory Commission pertaining to the practice of nuclear medicine. Among the regulations and requirements to be discussed include the recordkeeping requirements and the information to be made available to the NRC regularly and during inspections. We will also examine the tools and methods that NRC has made available to resolve any discrepancies with licensees. Lastly we will look at the Alternate Dispute Resolution (ADR) process and methods that the NRC provides to solve any disputes between it and licensees.

P.61 Environmental Protection Agency's Radioanalytical Response after a Homeland Security Event

Hall, K.M., Griggs, J.G., Fitz-James, M.C.
US Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is responsible for the decontamination of structures, water infrastructure, and environmental media impacted by chemical, biological, or radiological (CBR) nationally significant incidents. The National Homeland Security Research Center (NHSRC) is EPA's primary organization for conducting research to facilitate site characterization and clean up of contamination resulting from a homeland security event. One of NHSRC's research areas focuses on effective, validated technologies, methods, and guidance to enhance the agency's ability to detect CBR contamination after an attack. NSHRC has teamed with EPA's Office of Radiation and Indoor Air (ORIA), Office of Emergency Management (OEM), and Office of Water (OW) to perform research in support of EPA's Environmental Response Laboratory Network (ERLN) and the ongoing development and refinement of the . The SAM program uses teams of subject matter experts to select methods to be used for sample analysis after a homeland security incident. This document supports the mission of the ERLN's national network of laboratories. The ERLN is designed to be ramped up as needed to support large scale environmental responses by providing consistent analytical

capabilities, capacities, and quality data in a systematic, coordinated approach. In addition to the SAM effort, NHSRC has been collaborating with ORIA to develop rapid radioanalytical methods to decrease sample analysis turn-around times during a homeland security event as a means of enhancing laboratory capacity. The development work is focused on select alpha emitting radionuclides and Sr-90. A variety of environmental media are being used including water, air particulate filters, swipes, and soils. Research and development work is also underway to develop validated methods for detection of radioactive contamination in urban materials. The research and development highlighted on this poster directly supports the Homeland Security Presidential Directives and Presidential Policy Directives which have helped to define EPA's homeland security role.

P.62 Radiological Assessment for the Japanese Nuclear Incident Regarding Planting of Rice

Yu, C., Cheng, J.-J., Corredor, C., Noska, M., Regnier, E., Wallo, A.
Argonne National Laboratory, US Department of Energy, Food and Drug Administration

The recent Japanese Fukushima Daiichi nuclear power plant incident raised many questions regarding the potential for radiological exposure and dose from ingestion of contaminated food. This paper presents the results of a radiological assessment that was conducted to answer the question whether rice could be grown safely for human consumption in Japanese soil contaminated with Cs 137 and Sr 90. The RESRAD-RDD code developed by Argonne National Laboratory (www.evs.anl.gov/resrad) was used for this assessment. Based on a literature review, the root uptake transfer factors for rice used in this analysis are 0.6 and 0.1 (dimensionless) for Cs 137 and Sr 90, respectively. The rice consumption rate for the Japanese population is estimated to be 66.2 kg per year. This is a conservative (high) estimate of the intake rate based on Japanese national data collected in 2006. International Commission on Radiological Protection (ICRP) 72 age-dependent dose conversion factors were used for dose calculations. Argonne National Laboratory's RESRAD-RDD code Group G subgroup 3 uses Planning Values (PVs) to calculate operational guidelines, which are measurable quantities such as areal soil deposition or soil concentration that can be related to a protective action guide (dose). The PVs are derived on the basis of an annual dose of either 5 mSv effective dose or 50 mSv committed dose to an organ or tissue, whichever is more limiting. The PVs are essentially the same as the Derived Intervention Levels (DILs) developed by the U.S. Food and Drug Administration, but calculated using the updated (ICRP 72) dose conversion factors. The operational guidelines calculated for Cs 137 and Sr 90 for planting/growing rice are 5.4×105 Bq/m2 and 2.5×105 Bq/m2, respectively. This implies that if the surface soil concentrations are lower than these operational guidelines,

the potential dose from eating rice grown in the contaminated soil will most likely be less than 5 mSv per year effective dose and 50 mSv per year committed dose to any organ or tissue.

* Argonne National Laboratory's work was supported by the U.S. Department of Energy, Office of Health, Safety and Security, under contract DE-AC02-06CH11357.

P.63 Adapting the Canberra LYNX Spectroscopy System in a Teaching Environment

Fulmer, P.C., Jokisch, D.W., Peterson, D.M.
Francis Marion University

During the Fall 2010 semester, the nuclear physics laboratory at Francis Marion University (FMU) was outfitted with a Canberra LYNX spectroscopy system. This system is fully networked and allows total control of a detector system entirely through software parameters. The system has built in high voltage supply and digital processing of detector signals.

Traditionally, FMU has maintained separate workstations for students in the laboratory sessions associated with the health physics-related courses. Also, several different detector types are used throughout a given semester so that students can learn the setup and operation of each detector type. The Canberra LYNX, while compact and powerful, provided some challenges to be implemented in a student environment. The typical setup of a LYNX system in a workplace environment does not provide the ideal learning experience for a student environment.

This presentation shows the methodology employed by FMU faculty to identify workable settings for several detector types used at FMU. It was discovered that for a new detector type, using an external pulser and oscilloscope is an excellent first step in selecting the proper gain and amplifier settings. Once the gain has been selected, then the digital signals can be optimized to give the best possible resolution for the given detector.

This presentation also shows a novel method for allowing software control of the LYNX system to be passed from workstation to workstation so that all students can have the experience of collecting and analyzing data. This permits the sharing of data and ensures that students will learn how the system operates and be exposed to the principles of spectrum collection and analysis.

P.64 Novel Mobile Radiation Monitoring Systems for In-situ Surface and Liquid Contamination Measurements

Fallu-Labruyere, A., Schulcz, F., Fellinger, J.
Mirion Technologies (MGPI) SA, France

Following the nuclear accident and subsequent environment contamination, radiation dose assessment is needed for immediate people protection. Regular radiation monitoring and measurement is later needed to provide radiation safety information over time and location. We present in this paper the design

approach of novel mobile radiation monitoring systems meant for in-situ and sample contamination measurements. Respective Minimum Detectable Activities (MDA) are provided based on a test campaign performed during day 62 following the nuclear accident of Fukushima.

The Mobile system comprises a two liter NaI(Tl) detector read out by a photomultiplier tube (PMT). Spectra are built and analyzed in real time for isotope identification, and photon flux to radiation dose rate (H*(10)) computation. Isotope sensitivities are modeled using MCNPX for various distances to the soil, typically tens of centimeters when used in a vehicle, and tens of meters when used in a flight mode configuration. Dedicated software displays in real time dose rate versus geographical position data. Comprehensive radiation level mapping can later be interpolated, provided sufficient meshing of the measurement tracks.

The sample quantification system comprises a three inch NaI(Tl) detector crystal surrounded by a standard one or two liter Marinelli beaker and read out by a PMT. The assembly is enclosed in a two centimeter lead shield. Quantification is performed using SIA, a proprietary software computing background subtracted spectrum net peak areas. Sensitivity coefficients are computed using MCNPX calculations, and further validated using point sources.

Surface contamination measurements resulted in dose rate measurements ranging from 150nSv/h in the Tokyo area up to 111 μSv/h in the hills North West of Fukushima. Those levels are consistent with those reported by the nuclear related agencies and institutes (NNSA, IRSN). Preliminary radiation contamination in the water samples of 500mL were measured as 18 Bq/L +/- 15 Bq/L of Cs-137 and 30 Bq/L +/- 20 Bq/L of Cs-134. MDA in low radiation background environment (38nSv/h +/- 10nsV/h) were preliminarily estimated to 15 Bq/L +/- 10 Bq/L and 80Bq/L +/- 20 Bq/L of Cs-134 for 4 hour and 10 minutes measurements respectively.

P.65 Sensitivity Analyses of Environmental Dose Modeling with RESRAD and RESRAD-OFFSITE-An Investigation on the Influence of Input Distribution Functions

Cheng, J.-J., Yu, C., Williams, W.A., Maldonado, D., Hansen, T., Volpe, J. Argonne National Laboratory, US Department of Energy, Oak Ridge Institute for Science and Education, Ameriphysics, LLC, Performance Results Corporation

Sensitivity analyses are often conducted in environmental dose modeling to identify critical input parameters, which, with variation in their values, could produce significant changes in the dose results. The examination of sensitivities of input parameters can be carried out with a probabilistic approach. A probabilistic sensitivity analysis allows simultaneous study of multiple input parameters with their correlations considered; however, it requires specification of the distribution function of each studied parameter, which, in many cases,

cannot be developed fully without sufficient measurement data. Nevertheless, because of the generation of distribution information on the dose results, which manifests the uncertainty associated with those results perceivably, implementation of probabilistic sensitivity analysis to identify critical input parameters is on the rise. This paper investigates the influence of the specified parameter distribution functions on the sensitivity analysis outcomes. The RESRAD and RESRAD-OFFSITE computer codes developed by Argonne National Laboratory for environmental dose modeling were used for this investigation. Two radiation exposure scenarios concerning an onsite and an offsite resident farmer after closure of a landfill used for disposal of wastes contaminated with Tc-99 were assumed. Six input files containing different sets of distribution functions for multiple input parameters were developed, three for RESRAD and three for RESRAD-OFFSITE. The parameters selected for sensitivity analyses in the three input files for RESRAD and RESRAD-OFFSITE, respectively, were the same, but with different distribution functions. The different distribution functions for the same input parameter were bounded by the same minimum and maximum values. The distributions of the resulting peak doses as well as the input-output correlation coefficients used as indicators for parameter sensitivities calculated by RESRAD/RESRAD-OFFSITE were compared. The comparisons are discussed and suggestions concerning probabilistic sensitivity analyses drawn from these comparisons are provided in this paper.

*Argonne National Laboratory's work was supported by the U.S. Department of Energy, Office of Health, Safety and Security, under contract DE-AC02-06CH11357.

P.66 Products Created in the Japanese Response

Pemberton, W., Mena, R.
Contractor to the United States Department of Energy

The Department of Energy's Japan response teams developed a host of products to answer questions for multiple interests. Data from multiple sources were utilized to create maps as well as written reports to assist with assessment of evacuation, re-entry, transit across the exclusion zone, and assessment of the extent of contamination. Both the Consequence Management Home Team (CMHT) as well as the field team in Japan contributed to providing this valuable information

to multiple agencies. A sampling of these products will be presented on this poster.

P.67 Spanish Moss as a Bio-indicator for the Natural and Artificial Airborne Radionuclides

Ojukwu, E., Odehge, E., Jasmine, C., Oliver, J., Chang, Z.
South Carolina State University

The Spanish moss samples have been collected in Orangeburg, SC. During the period of field sampling, the Nuclear Accident occurred at Fukushima Daiichi Nuclear Power Plant, Japan. This provide us a good chance to observe the absorption of Fukushima nuclear fallout by Spanish moss. Artificial Cs-137 together with natural radionuclides such as K-40 and Bi-214 were observed in the moss samples. It is interesting to find that I-131 was not absorbed by the samples, though the concentration of I-131 is over 15 time as high as the Cs isotopes according to the filter samples we collected in the same area. This indicates that Spanish Moss does not scavenge the airborne chemical species, but absorbs elements selectively. More work is in progress to determine the different concentrations of radionuclides absorbed in the moss samples with different ages.

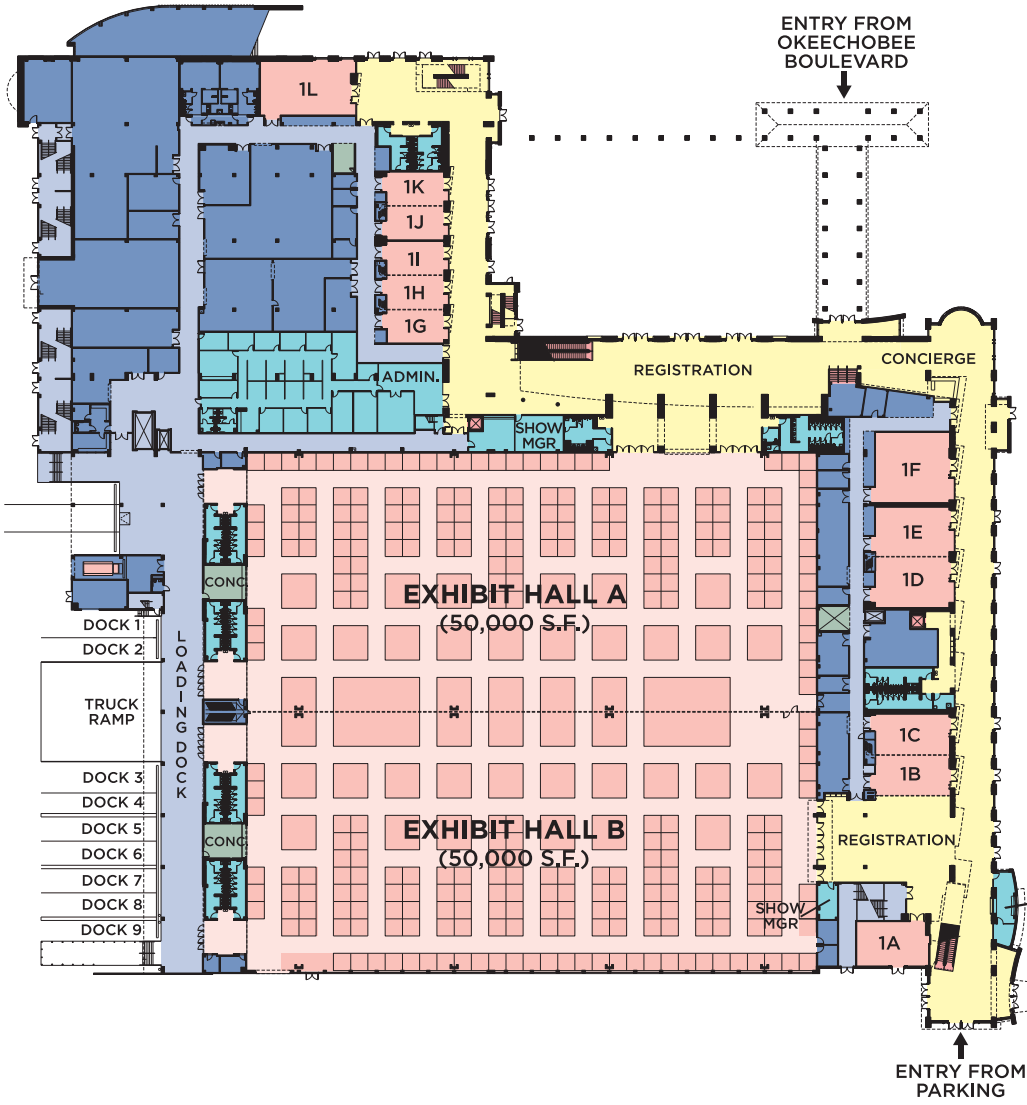
Author Index

-D-

-E-

-F-

Palm Beach Convention Center



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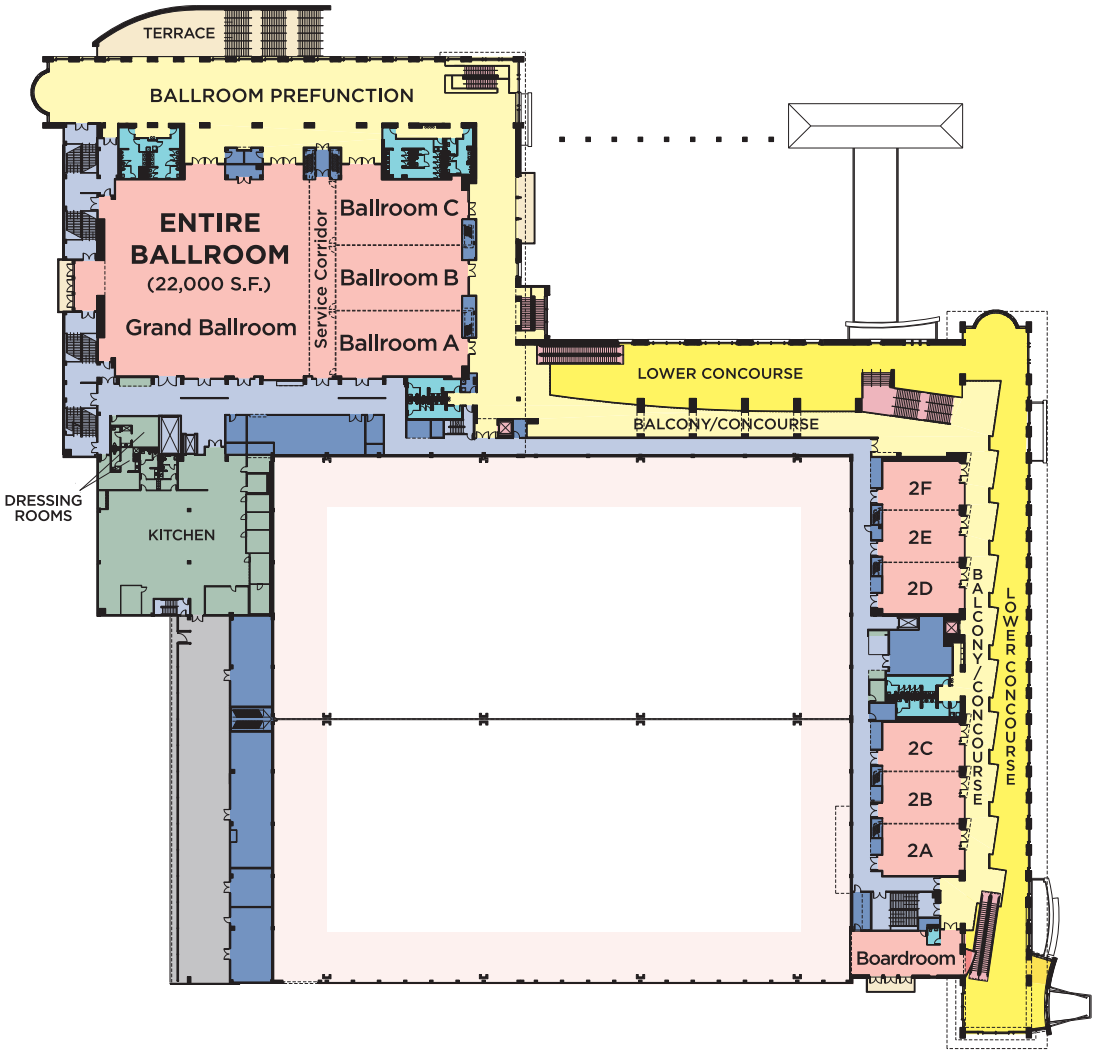

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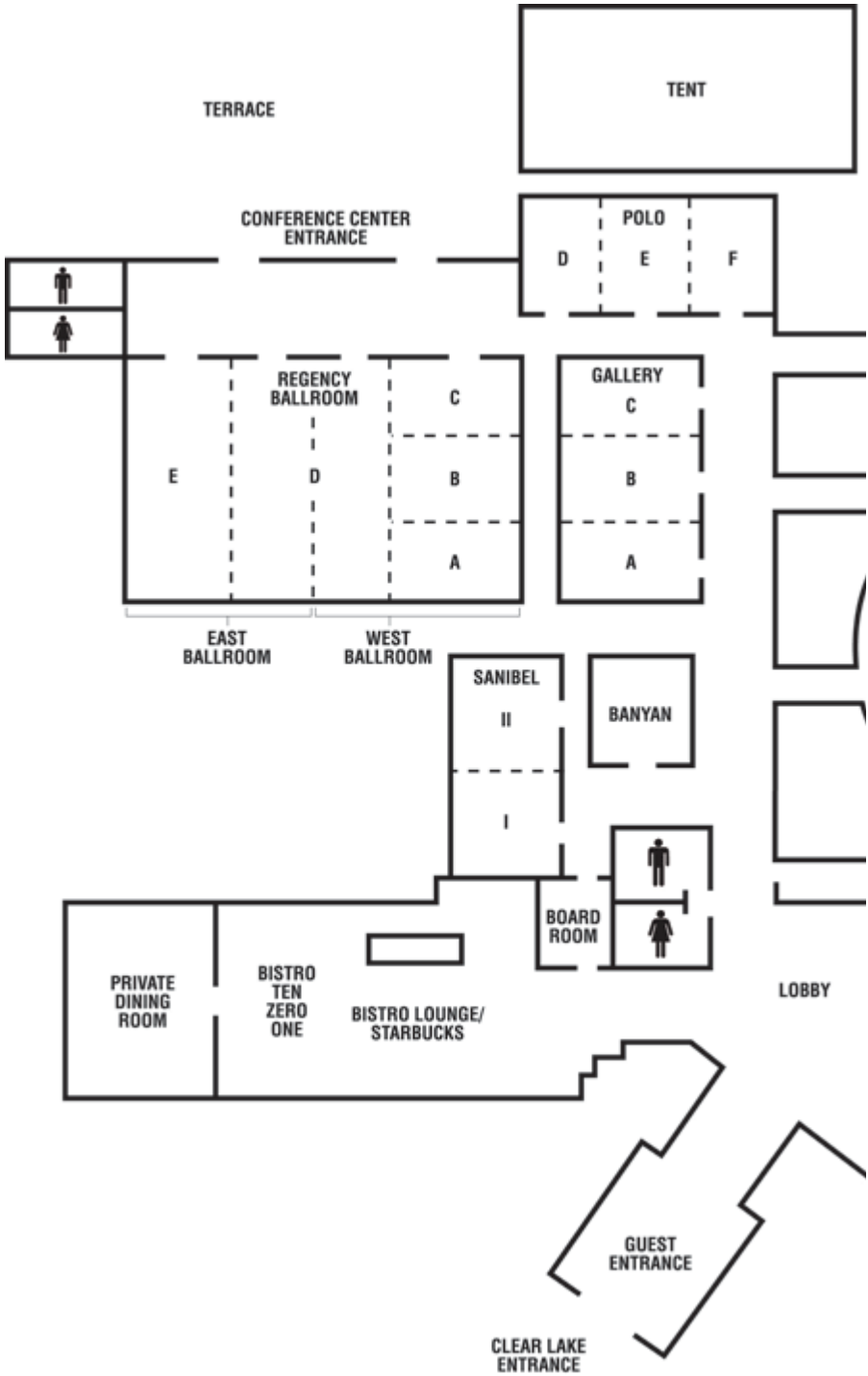

Saturday, 25 June

AAHP 1 Simple Tools for Counseling Radiation Workers and the Public
8:00 AM-5:00 PM 2A

AAHP 2 Statistical Issues in Health Physics
8:00 AM-5:00 PM 2B

AAHP 3 Introduction to MARSAME
8:00 AM-5:00 PM 2C

Sunday, 26 June

PEP 1-A thru 1-F
8:00-10:00 AM

PEP 2-A thru 2-F
10:30 AM-12:30 PM

PEP 3-A thru 3-F
2:00-4:00 PM

PEP Rooms:
1A/2A/3A - 1A
1B/2B/3B - 1B
1C/2C/3C - 1C
1D/2D/3D - 1D
1E/2E/3E - 1E
1F/2F/3F - 1F

Welcome Reception
6:00-7:00 PM
Grand Ballroom Foyer,
Palm Beach Convention Center

Saturday AAHP courses will take place in the Palm Beach Convention Center

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

Monday, 27 June

CEL1 Nanoparticle-Based Radiation Detectors and the Use of Radiation for Nanoparticle Detection
7:00-8:00 AM 1D

CEL2 Integration of Radiation Safety into Environmental Health and Safety: The Columbia Experience
7:00-8:00 AM 1E

CEL3 Laser Safety Program Development at an Academic Medical Center
7:00-8:00 AM 1F

ABHP Exam - Part 1
8:00-11:00 AM Marriott West Ballroom

MAM-A Plenary: Creating a Radiation Safety Culture in the Workplace
8:30 AM-Noon Grand Ballroom

Complimentary Lunch in Exhibit Hall for all Registrants and Opening of Exhibits
Noon-1:00 PM Exhibit Hall A

PEP Program
12:15-2:15 PM

PEP M1 Part II Accelerator Health Physics ABHP Exam Problems 1A

PEP M2 Med Internal Dose Calculations – A New Generation Arrives 1B

PEP M3 Fundamentals of Gamma Spectroscopy – Part I 1C

PEP M4 Role of the HP in Radiation Accident Management 1F

PEP M5 The Basics of Magnetic Resonance Imaging & Spectroscopy 1E

ABHP Exam - Part II
12:30-6:30 PM Marriott West Ballroom

HPS Chapter Council
1:00-2:00 PM 2A

Poster Session
1:00-3:00 PM Exhibit Hall A

MPM-A1 Internal I
3:00-3:30 PM Ballroom A

MPM-A2 Biokinetics
3:30-4:15 PM Ballroom A

MPM-B Instrumentation I
3:00-4:15 PM Ballroom B

MPM-C Decontamination and Decommissioning
3:00-5:00 PM Ballroom C

MPM-D Bioeffect/Radiobiology
3:00-4:00 PM 2A

MPM-E Waste Management
3:00-3:45 PM 2B&C

MPM-F Special Sess: The Fukushima Incident
3:00-4:30 PM 2D&E

Student Reception
5:30-6:30 PM 1L

Tuesday, 28 June

CEL 4 Nobody Notices a Clean Window: A History of Successes...
7:00-8:00 AM 1E

CEL5 ANSI N43.1 Standard Draft: Rad Safety for the Design & Operation...
7:00-8:00 AM 1F

TAM-A Medical Health Physics
8:15 AM-Noon Ballroom A

TAM-B Internal II
8:30-11:45 AM Ballroom B

TAM-C Environ/Radon Special Sess: Radioactivity in the Aquatic Environment
9:00 AM-Noon Ballroom C

TAM-D External Dosimetry
8:30 AM-Noon 2A

TAM-E AAHP Special Session: Radiation Protection...
8:15 AM-Noon 2B&C

TAM-F Special Session: Engaging Science Teachers in the 21st Century...
8:15 AM-Noon 2D&E

Editorial Workshop
10:00-11:30 AM 1F

Environ/Radon Section Bus Mtg
Noon-12:45 PM Ballroom C

AAHP Awards Luncheon
Noon-2:15 PM Grand Ballroom

PEP Program
12:15-2:15 PM

PEP T1 A Decision Tool for Population Screening & Protection in Response...1A

PEP T2 So Now You're the RSO: Elements - Effective Rad Safety Program 1B

PEP T3 Fundamentals of Gamma Spectroscopy – Part II 1C

PEP T4 Skin Dose, Effects and Experiences in Fluoroscopy 1D

PEP T5 Legal Considerations for Rad Risk and Dose Reconstruction... 1E

PEP T6 Use of Portable Survey Meters and Portal Monitors for Rad Triage 1F

TPM-A Instrumentation II
2:30-4:00 PM Ballroom A

TPM-B Special Sess: ANSI-HPS Consensus Stds Process for N13 & N43
2:15-5:30 PM Ballroom B

TPM-C Special Session: NESHAPs Radioactive Air Meeting
2:30-5:15 PM Ballroom C

TPM-D Risk Analysis
2:30 - 5:15 PM 2A

TPM-E AAHP Special Sess: Radiation Protection...
2:30-5:30 PM 2B&C

TPM-F IRPA Input Special Sess-Sharing HPS Perspectives with International Community
2:30 - 5:45 PM 2D&E

AAHP Open Meeting
5:30 PM 2B&C

HPS Awards Banquet
7:00-9:00 PM Grand Ballroom

Wednesday, 29 June

CEL6 ABHP Exam Fundamentals – Tips for Successfully Completing the Certification Process
7:00-8:00 AM 1D

CEL7 Diagnostic Reference Levels for CT Scanners
7:00-8:00 AM 1E

CEL8 Innovative Approaches to Molybdenum-99 Production (that May or May Not Work)
7:00-8:00 AM 1F

WAM-A1 Emer Planning/Response
8:15-10:15 AM Ballroom A

WAM-A2 Homeland Security
11:00-11:45 AM Ballroom A

WAM-B Operational Health Physics
8:30 AM-Noon Ballroom B

WAM-C Special Sess: Characterization of the Fukushima Rad Releases
8:30 AM-Noon Ballroom C

WAM-D Accelerator Section Special Session: Neutrons from Accelerators
8:30 AM-Noon 2A

WAM-E Military Health Physics Special Session
8:30 AM-Noon 2B&C

WAM-F Decommissioning Section Special Sess: Field Implementation of Clearance Standards...
8:30 AM-Noon 2D&E

PEP Program
12:15-2:15 PM

PEP W1 An Overview of Ionizing Radiation Carcinogenesis 1F

PEP W2 NUCL5470G Nuclear Forensic Analysis 1B

PEP W3 Nanoparticle Char. & Control Fundamentals: A Graded Approach 1C

PEP W4 OSL Applied Concepts Training 1D

PEP W5 New CT Dose Phantom: Motivation and Discussion 1E

PEP W6 Fluoroscopic Safety Management System 1A

WPM-A Movies
2:30-5:00 PM Ballroom A

WPM-B Contemporary Topics in HP
2:30-5:00 PM Ballroom B

WPM-C1 Special Sess: Consequences of Fukushima Radiological Releases
2:30-3:30 PM Ballroom C

WPM-C2 Special Sess: Fukushima Public Information
4:00-5:00 PM Ballroom C

WPM-D Accelerator
2:30-5:00 PM 2A

WPM-E Military HP Special Session
2:30-5:15 PM 2B&C

WPM-F Adjunct Technical Session: Aerosol Measurements
6:00-8:00 PM 2D&E

HPS Business Meeting
5:30-6:30 PM Ballroom B

Thursday, 30 June

CEL9 The Psychology of Radiation Safety – Simple Tools for Health Physicists
7:00-8:00 AM Ballroom A

CEL10 Ecology Low-Level Radioactive Waste Disposal Site - Its History, Operations and the Agony of Closure
7:00-8:00 AM Ballroom B

THAM-A Environmental
8:30-11:45 AM Ballroom A

THAM-B Special Session: NCRP Report Review of Report No. 165 - Responding to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers
8:30-11:45 AM Ballroom B

THAM-C Special Session: Emerging Opportunities for the Interaction(s) of Nanotechnology and Radiation Protection
8:30-10:00 AM Ballroom C

THAM-E Military Health Physics
8:30-9:30 AM 2D&E

Registration Hours

Registration at the Palm Beach Convention Center
Exhibit Hall A Foyer

Saturday	2:00 - 5:00 PM
Sunday	7:00 AM - 6:00 PM
Monday	8:00 AM - 4:00 PM
Tuesday	8:00 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 hour PEP courses are granted 4 CECs each;
* HPS 1 hour CELs are granted 2 CECs each.