Final Program

American Radiation Safety Conference and Exposition

(Health Physics Society's 45th Annual Meeting)

June 25-29, 2000
Denver Convention Center
Denver, Colorado

Headquarters Hotel:
Adam's Mark: (303) 893-3333
Guest FAX: (303) 626-2543

Exhibit Location:
Colorado Convention Center

HPS Secretariat
1313 Dolley Madison Blvd.
Suite 402
McLean, VA 22101
(703) 790-1745
FAX: (703) 790-2672
Email: HPS@BurkInc.com
Web Site: http://www.hps.org

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Registration Hours

Saturday, June 24 ..... 2:00 - 5:00 pm (Adam's Mark)
Sunday, June 25 ..... 7:00 am - 7:00 pm (Adam's Mark)
Monday, June 26 ..... 8:00 am - Noon (Adam's Mark)
Monday, June 26 ..... 2:00-4:00 pm (Conv. Center)
Tuesday, June 27 ..... 8:00 am - 4:00 pm (Conv. Center)
Wednesday, June 28 ..... 8:00 am - 4:00 pm (Conv. Center)
Thursday, June 29 ..... 8:00 am - Noon (Adam's Mark)

2000 Program Committee

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Wil Zurliene, *Technical Tours*
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Gary Guinn, *Social Pub Crawl*
Gordon Quillin, *Social Pub Crawl*
Michelle Barry, *Treasurer*
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Keith Anderson, *Welcome Reception*

Registration Fees

Class	Pre-Reg.	On-Site
◆Member	$265	$340
◆Non-Member**	$315	$390
♋Student	$ 55	$ 55
♓Companion	$ 50	$ 50
Exhibits only	$ 25	$ 25
Exhibitor (2/Booth)	No Fee	No Fee
●Member, 1 Day	n/a	$195
●Non-Member, 1 Day	n/a	$195
●Student, 1 Day	n/a	$ 30
Add'l. Awards Luncheon Tickets	$ 30	$ 30

◆ Includes Sunday Reception, Monday Lunch and Tuesday Luncheon Awards Banquet
♋ Includes Sunday and Student Receptions, Monday Lunch and Tuesday Luncheon Awards Banquet
♓ Includes Sunday Reception, Monday Hospitality Mixer Breakfast, Monday Lunch
● Includes Sessions and Exhibitions **ONLY**
** Includes Associate Membership for year 2000.

Registration Hours

Saturday, 6/25 ..... 2–5 PM
Sunday, 6/25 ..... 7 AM–7 PM
Monday, 6/26 ..... 8 AM–4 PM
Tuesday, 6/27 ..... 8 AM–4 PM
Wednesday, 6/28 ..... 8 AM–4 PM
Thursday, 6/29 ..... 8 AM–Noon

Future Annual Meetings

46th	6/10-14, 2001	Cleveland, OH
47th	6/16-20, 2002	Tampa, FL

Future Midyear Topical Meetings

34th	2/4-7, '00	Anaheim, CA

Information

Speaker Instructions

You will be allotted a total of 12 minutes unless you have been notified otherwise.

The **Ready Room** Sunday, 3-5 pm and Monday 7-11 am (Plaza Court 1, Adam's Mark).Starting Monday afternoon the Ready Room (111) in the Convention Center will be open Monday from 1–4 pm, Tuesday from 8–10 am and 1–4 pm and Wednesday from 8–10:30 am and 1–3:30 pm. Slides are to be brought to the designated ready room for loading and previewing no later than the time indicated below:

Present. Time	Delivery Deadline
Monday pm	7–11am Monday
Tuesday am	1–4 pm Monday
Tuesday pm	8–10:30 am Tues.
Wednesday am	1–4 pm Tues.
Wednesday pm	8–10:30 am Wed.
Thursday am	1–3:30 pm Wed.

Please meet with your session chairs in the meeting room where your paper will be presented 15 minutes before the beginning of the Session.

Placement Service

Placement Service listings will be posted in Director's Row H (Adam's Mark), with hours from 8:00 am to 5:00 pm, Monday through Wednesday. Interviews may be conducted in the designated areas of the Placement Center.

Business Meeting

The **HPS Annual Business Meeting** will be convened at 5:30 pm on Wednesday, June 28, in Room 104/106 (Convention Center).

Luncheon Awards Banquet

The **Awards Banquet** will be held at the Adam's Mark on Tuesday, June 27 at Noon in the Adam's Mark Plaza Ballroom. The following awards are to be presented:

Robley D. Evans Commerative Medal

Robert L. Brent

Founders Award

Roger J. Cloutier

Distinguished Scientific Achievement Award

George Voelz

Elda E. Anderson Award

James M. Hylko

Outstanding Science Teacher Award

Mary F. Hobbs

Fellow Class Awards

Howard W. Dickson
Isabel Fisenne
John R. Frazier
Thomas F. Gesell
Raymond H. Johnson, Jr.
Nancy P. Kirner
H. David Maillie
Richard E. Toohey
John D. Zimbrick

The following menu has been selected for the **Awards Banquet:**

Boston Bibb Salad
Venetian Chicken
Orzo Pasta
Sun Dried Tomato Coulis
Broccoli, Carrots, Red Bell Pepper
Key Lime Pie
Bread
Coffee, Tea, Decaffeinated Coffee

Companion Hospitality Suite

The Hospitality Room, Governor's Square 14, Adam's Mark is a wonderful place to meet and visit with friends and to relax. Information for exploring the Denver area and other do-on-your-own activities will be available. The Hospitality Room will provide refreshments for registered companions from Monday morning through Wednesday.

On Monday morning from 8:00 to 9:00 a.m., we invite all registered companions to an official welcome and complimentary continental breakfast in Windows, Adam's Mark. The breakfast will be available on a cash basis for those who are not registered companions. A representative from Around and About Tours will introduce you to Denver with a presentation and question and answer session. City safety practices will also be discussed.

Activities and Tours

NOTE: Tickets still available for sale can be purchased at the HPS Registration Desk.

Saturday, June 24

City Tour	Noon-5 PM

Sunday, June 25

Riding the Rails	9:30 AM-5 PM
Opening Reception	6-7:30 PM

Monday, June 26

Hospitality Ste. Mixer	8 AM
Parks & Museums	9:30 AM-3:30 PM
Gold Mines & Gambling	6-11:30 PM
LoDo Pub Crawl	6 PM

Tuesday, June 27

5K Run/Health Walk	6:30 AM
Awards Luncheon	Noon-2 PM
Night Out	5:45-10 PM

Wednesday, June 28

Golf Tournament	7 AM
Estes Park	8:30 AM-4:30 PM
Rocky Flats	7:30 AM-5:30 PM

Thursday, June 29

Earth, Wind & NIST	9 AM-4 PM

Child Care

Child care during the Annual Meeting may be arranged with the following organizations or you may wish to find another child care service:

The Granny Nanny

(303) 369-6374 or (303) 363-9784

$7/hr, $2/hr for each additional child, 4 children max per family

Rent-A-Mom (a.k.a. Premier Nannies)

(303) 322-1399

$8/hr for 1-2 children, $0.50/hr each additional child

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.

Important Events!

Welcome Reception

The Welcome Reception will be held Sunday, June 25 from 6–7:30 pm at the Adam's Mark Hotel, Plaza Ballroom A/B/C.

Sessions

Saturday – AAHP Courses will be held in the Adam's Mark Hotel.

Sunday – PEP Sessions will be held in the Adam's Mark Hotel.

Monday – Plenary Session will be held in the Adam's Mark Hotel.

Monday afternoon–Wednesday – Sessions and PEPs will be held at the Denver Convention Center.

Thursday – Sessions and PEPs will be held at the Adam's Mark Hotel

Exhibits

Free Lunch! Free Lunch! – Noon, Monday, June 26. All registered attendees are invited to attend a complimentary lunch in the exhibit hall immediately following the Plenary Session.

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

Things to Remember!

All posters up Monday–Wednesday in Exhibit Hall

Poster Session featured Monday, 1:30-3:00 pm
No other sessions at that time

No computer projection available for technical sessions

AAHP Awards Luncheon and Business Meeting

The AAHP Awards Luncheon on Wednesday, June 28, from Noon-2:30 pm in the Convention Center Ballroom.

The following rate structure will apply:

1) Persons certified in 1999	Free
2) CHPs other than #1	$10.00
3) Guests and others wishing to attend	$15.00

To sign up for the Luncheon, stop by the HPS registration desk.

RADIATION SAFETY CONFERENCE NIGHT OUT AT COLORADO'S OCEAN JOURNEY!

Tuesday, June 27 – 6-10 PM

The Central Rocky Mountain Chapter of the Health Physics Society in conjunction with the National Health Physics Society and American Radiation Safety Conference and Exposition is proud to be hosting this unique evening social event. Join us for an exciting evening out with family, friends, and colleagues at one of Denver's newest and most interesting attractions - Colorado Ocean Journey!

YOUR EVENING OUT WILL FEATURE:

- Transportation to and from the Adam's Mark Hotel and Ocean Journey (periodic shuttle)
- Western all-you-can-eat BBQ dinner including beef, pork, and chicken
- Complementary beer, wine and soft drinks
- Dessert as you stroll amongst the many unique exhibits
- Admission to Colorado's Ocean Journey exhibits

LET THE JOURNEY BEGIN...at the headwaters of the Continental Divide... or the Basarian Mountains on the Isle of Sumatra...

TRAVEL along the natural wonders of the Colorado River in its 1500 mile journey from the Continental Divide to the Sea of Cortez...

EXPERIENCE the sheer power of a desert canyon flash flood...

TREK through the rain forests, cascading waterfalls, and limestone caves along the 300 mile Kampar River of Indonesia...

VIEW the endangered Sumatran Tigers, sharks, stingrays and the other 300 species of fish, mammals, and invertebrates...

WATCH the playful antics of river and sea otters...

LEARN about the fish and mammals that inhabit the ecosystems of our world...

PLEASE JOIN US FOR THIS EXCITING EVENING OUT EVENT!

NOTE - The Ocean Journey facility is wheelchair and handicapped accessible. Wheelchairs are available through Ocean Journey. For the convenience of our participants, shuttle buses will periodically circulate between Ocean Journey and the Adam's Mark Hotel (approximately 15-20 minute ride) from 5:45 to 10 PM.

***Preregistration** $49 ADULTS/**Onsite** $54*

***Preregistration** $39 CHILDREN **(3-12 Years)/Onsite** $44*

(Children under 3 are free)

HPS Committee Meetings

AM=Adam's Mark, CC= Convention Center

Friday, June 23, 2000

ABHP BOARD MEETING
9 am-5 pm Director's Row F (AM)

Saturday, June 24, 2000

FINANCE COMMITTEE
8 am-Noon Plaza Court 4 (AM)

RULES COMMITTEE
9 am-Noon Plaza Court 5 (AM)

ABHP BOARD MEETING
9 am-Noon Director's Row J (AM)

CONTINUING EDUCATION COMMITTEE
Noon-6 pm Plaza Court 3 (AM)

AAHP EXECUTIVE COMMITTEE
1-??? pm Director's Row J (AM)

HPS EXECUTIVE COMMITTEE
1-5 pm President's Suite (AM)

SYMPOSIA COMMITTEE
1-5 pm Plaza Court 4 (AM)

HP PROGRAM DIRECTORS
3-5 pm Plaza Court 1 (AM)

HPJ EDITORIAL BOARD
3-6 pm Governor's Square 16 (AM)

Sunday, June 25, 2000

VENUES COMMITTEE
8 am-2 pm Plaza Court 5 (AM)

HPS BOARD OF DIRECTORS
8 am-5 pm Tower Court B (AM)

PROGRAM COMMITTEE
1 pm Plaza Court 1 (AM)

ANSI N43.1 COMMITTEE
1-6 pm Governor's Square 9 (AM)

STUDENT BRANCH COUNCIL
4-6 pm Plaza Court 5 (AM)

Monday, June 26, 2000

PUBLICATIONS COMMITTEE
Noon-2 pm 206 (CC)

CHAPTER COUNCIL MEETING
1-2:30 pm 201 (CC)

MEMBERSHIP COMMITTEE MTG.
1-2:30 pm Director's Row F (AM)

ANSI N13.53 COMMITTEE
1-5 pm 210 (CC)

INTERNATIONAL RELATIONS COMMITTEE
1:30-3 pm Director's Row J (AM)

HISTORY COMMITTEE
1:30-3:30 pm Plaza Court 5 (AM)

LIAISON COMMITTEE
2-3:30 pm Director's Row E (AM)

SPI COMMITTEE
2-4 pm 206 (CC)

PUBLIC EDUCATION COMMITTEE
2:30-4:30 pm Plaza Court 3 (AM)

Tuesday, June 27, 2000

COMMITTEE CHAIR BREAKFAST
7:30-9:30 am Plaza Court 1 (AM)

N13.59 COMMITTEE
11:15 am-Noon Plaza Court 4 (AM)

Wednesday, June 28, 2000

AFFILIATES COMMITTEE
7:30-9:30 am Governor's Square 11 (AM)

AAHP CONTINUING EDUCATION COMMITTEE
8 am-Noon Plaza Court 3 (AM)

ANSI 13.62 COMMITTEE
8:30 am-6 pm Plaza Court 4 (AM)

ANSI N13.49 COMMITTEE
11:15 am-Noon 206 (CC)

SUMMER SCHOOL COMMITTEE
Noon-2 pm 208 (CC)

LEGISLATION & REGULATION COMMITTEE
Noon-2 pm 206 (CC)

STRATEGIC PLANNING COMMITTEE
Noon-2 pm Plaza Court 1 (AM)

NOMINATING COMMITTEE
Noon-3 pm 210(CC)

ACADEMIC EDUCATION COMMITTEE
2-4 pm 208 (CC)

Thursday, June 29, 2000

LOCAL ARRANGEMENTS COMMITTEE
7:30-9:30 am Plaza Court 2 (AM)

STANDARDS COMMITTEE
8 am-Noon Plaza Court 3 (AM)

HPS BOARD OF DIRECTORS
8 am-Noon President's Suite (AM)

PROGRAM COMMITTEE
Noon-2 pm Plaza Court 4 (AM)

American Radiation Safety Conference and Exp...
Denver, Colorado – June 25-29 – *Final Scientific Program*

Monday Plenary at Adam's Mark Hotel
Monday Afternoon-Wednesday Sessions at Denver Convention Center
Thursday Sessions at Adam's Mark Hotel
NOTE: If a paper is going to be presented by other than the first author, the presenter's name is underlined.

Monday

7:15-8:15 AM **Adam's Mark; Plaza Ballroom D**

CEL-1 Ionizing Radiation Quantities and Units: ICRU 51 and 60. *D. Strom; Pacific Northwest National Laboratory*

7:15-8:15 AM **Adam's Mark; Plaza Ballroom E**

CEL-2 Managing Industrial Radiation Safety Programs. *René Michel; University of California, San Diego*

8:30 AM-Noon **Adam's Mark Plaza Ballroom A/B/C**

Plenary Session
(Oral Session)

Chair: HPS President Raymond H. Johnson, Jr.

8:30 Introduction and Welcome. *Local Committee and Raymond H. Johnson, Jr.*

8:45 Introduction of G. William Morgan and Robert S. Landauer Sr. Lecturers. *Ken Mossman, Chair, Presidents-Emeritus Committee*

9:00 **MAM-A.1**
Radiation Safety in the Dawn of the 21st Century: Challenges and Opportunities. ***(G. William Morgan Lecture)*** *A. Gonzalez; IAEA, Vienna, Austria*

9:30 **MAM-A.2**
The Shape of Things to Come. ***(Robert S. Landauer, Sr. Lecture)*** *J. Valentin; ICRP, Stockholm, Sweden*

10:00 **Break**

10:30 **MAM-A.3**
Scientists, Policy Makers, and the Public: A Needed Dialogue. *J. F. Ahearne; Sigma Xi*

11:00 **MAM-A.4**
Control of Low-Level Radiation Exposure: What is the Problem and How Can it Be Solved. *R. H. Clarke; International Commission on Radiological Protection, UK*

Noon-1:30 pm ***Exhibit Hall C***

Lunch in Exhibit Hall for all Registrants and Opening of Exhibits

12:15-2:15 PM ***PEP Program***

1:30-3:00 PM ***Exhibit Hall C***

P: Poster Session

ACCELERATOR

P.1 Development of Cabinet-Safe Accelerator Technology. *D. P. Wells, J. L. Jones, F. Harmon; Idaho State University, Bechtel BWXT Idaho, Inc.*

DECOMMISSIONING

P.2 Moved to MPM-A.9

P.3 Size Reduction of Gloveboxes at the Rocky Flats Environmental Technology Site. *C. J. Bianconi; Rocky Mountain Remediation Services*

P.4 The Utilization of Hydrolazing Technology for the Decontamination and Decommissioning of a Major Plutonium Processing Facility. *E. D. McKamey, R.*

Monday

Neveau, S. Roberts; Arcadia Consulting, Inc.

P.5 The Interference of Polonium-210 in Measuring Alpha Surface Contamination. *E. Abelquist, J. Guido, S. Roberts; ORISE, BWO-Mound, Arcadia Consulting, Inc.*

P.6 Staff Responses to Frequently Asked Questions Concerning Decommissioning of Nuclear Power Reactors. *J. L. Minns, M. Masnik; U.S. Nuclear Regulatory Commission, MD*

P.7 Establishment of the Background for Surface Contamination Measurements from the Area Surveyed. *J. J. Shonka; Shonka Research Associates*

P.8 Using the Internet to Support Collaboration and Communication in Environmental Cleanup. *D. J. LePoire, R. L. Johnson, P. Richmond, L. Durham, H. Avci, C. Yu, D. Pflug, T. Sydelko, D. Miller; Argonne National Laboratory*

P.9 Evaluation of E-Permâ Alpha Surface Monitors at the Savannah River Site. *S. R. Salaymeh, V. R. Casella, C. G. May, L. R. Stieff, P. Kotrappa; Westinghouse Savannah River Company, Rad Elec, Inc.*

ENVIRONMENTAL

P.10 Radionuclides in Pinon Pine (Pinus edulis) Tree Shoots and Nuts from Los Alamos National Laboratory Lands. *P. R. Fresquez, J. D. Huchton, M. A. Mullen, L. Naranjo, Jr.; Los Alamos National Laboratory*

P.11 Barn Swallow Problems? *R. W. Warren; Environmental Science and Research Foundation*

P.12 An Allometric (Scaling) Approach to Predicting Cross-Species Uptake and Elimination Factors for Uranium. *S. C. Moss, K. A. Higley; Oregon State University*

P.13 A Semi-Automated Methodology for Determining Compliance with Biota Dose Limits. *K. A. Higley, E. Antonio, S. L. Domotor; Oregon State University, Pacific Northwest National Laboratory, U.S. Department of Energy*

P.14 1998 Public Radiation Dose Assessment for the Rocky Flats Environmental Technology Site. *R. S. Roberts, L. Dunstan, S. Nesta; Rocky Mountain Remediation Services, Kaiser-Hill*

P.15 Site-Specific Calibration of Generic Models Using Bayesian Monte-Carlo Techniques. *D. Burmistrov, I. Linkov; Menzie-Cura and Associates, Inc.*

P.16 Determination of Optimum Counting Geometries and Detection Efficiencies for Low Energy Hot Particles. *S. A. Menn, K. A. Higley; Oregon State University*

P.17 Study of Particles of Actinides in Soil Samples Using Nuclear Track Detectors. *O. G. Povetko, K. A. Higley; Oregon State University*

P.18 Investigation of a Prototype Radiocolloid System. *D. K. Garretson, R. R. Brey, T. F. Gesell; Idaho State University*

P.19 Photon Activation Analysis of Iodine-129. *J. C. Seeber, R. R. Brey, J. F. Harmon, T. F. Gesell; Idaho State University*

P.20 A Compilation of Ambient Air Monitoring Parameters at DOE Facilities. *A. R. Baumann; Los Alamos National Laboratory*

P.21 Tritium Concentrations Near an Accelerator Experiment at the Brookhaven National Laboratory's (BNL) Alternating Gradient Synchrotron

Monday

(AGS). *S. Layendecker, R. Miltenberger, D. Paquette, C. Schaefer; BNL Radiological Control Division*

P.22 A Comparison of Desiccant Materials Used for Monitoring Atmospheric Tritium Concentrations at the Idaho National Engineering and Environmental Laboratory. *K. C. Thompson, L. R. Paulus, D. W. Walker; INEEL Oversight Program*

P.23 The Areal Distribution and Environmental Inventory of ^{129}I on the Idaho National Engineering and Environmental Laboratory. *R. C. Morris, C. Soto; Environmental Science and Research Foundation*

P.24 Gamma Background Measurements On and Around the Idaho National Engineering and Environmental Laboratory Using Electret Ionization Chambers. *L. Paulus, D. Walker, K. Moser, E. Roethlisberger; State of Idaho, INEEL Oversight Program*

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P.25 Spectroscopic Radiation Field Mapping from an Airborne Platform. *D. S. Haslip, T. Cousins, P. Bouteilloux, E. T. H. Clifford, J. Dhermain, H. Ing, T. A. Jones; Defence Research Establishment Ottawa, Canada, DGA/DCE, France, Bubble Technology Industries, Inc., Canada*

P.26 A Reliability Assessment of the WIPP During Postulated Accident Scenarios. *D. F. Rucker; Environmental Evaluation Group*

P.27 A Level 1 Assessment - An Excerpt of Technical Guide (TG) 236 Field Guide for Unit Radiological Dose Estimation. *G. Falo, R. Reyes, A. Scott, J. Mullikin, J. Collins, F. Szrom; US Army Center for Health Promotion and Preventive Medicine*

P.28 Computer Simulation to Determine the Effectiveness of Gamma Irradiation for the Treatment of Aqueous Hazardous Wastes. *M. S. Taylor, O. Gandou, B. Aydogen, D. E. Hintenlang; University of Florida*

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P.29 Evaluation of Radionuclides in HEPA Filters and Other Waste Containers. *D. P. Hickman, S. G. Homann, D. E. Hankins; Lawrence Livermore National Laboratory*

P.30 US EPA Project XL Proposal - Catalytic Oxidation Process for Mixed Waste. *T. W. LaVake, L. E. Weaner, D. C. Hoerr, M. R. Esposito; Johnson and Johnson, The R. W. Johnson Pharmaceutical Research Institute, Ortho-McNeil Pharmaceutical*

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P.32 Development of a MCNP Model for the Neutron Response of a Special Area Monitor. *M. C. Parrella, M. E. Nelson, J. R. Cassata, G. K. Riel; University of Maryland, U.S. Naval Academy, Naval Dosimetry Center, Naval Surface Warfare Center Carderock Division*

P.33 Modeling Wall Effects in a Tissue Equivalent Proportional Counter Using MCNP. *J. L. Parsons, L. W. Townsend; University of Tennessee*

P.34 Investigation of Photon Spectra, Light Efficiency and Copper Dopant in a LiF TLD. *T. W. Haire, M. E. Nelson, J. R. Cassata, G. K. Riel; U.S. Naval Academy, Naval Dosimetry Center, Naval Surface Warfare Center Carderock Division*

Monday

P.35 Assessment of Fluence-to-Organ Dose Conversion Coefficients for Neutrons and Protons Calculated from Image-Based VIP-Man Anatomical Model. *A. Bozkurt, T. C. Chao, X. G. Xu; Rensselaer Polytechnic Institute*

P.36 Beta Skin Dose Measurements with the Microspec-2 System. *J. L. Parsons, H-H. Hsu; University of Tennessee, Los Alamos National Laboratory*

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P.39 Portable Survey Instrument Calibration Uncertainties. *B. L. Rich, B. P. Smith, R. Morris; Alpha Idaho*

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P.41 Monte Carlo Simulation of Beta Particle Detection by Gas Flow Proportional Counter. *M. C. Nichols, B. Kahn; Georgia Power Company, Georgia Institute of Technology*

P.42 Investigation of Possible Correlations Between Rn-222 Concentrations and Gas Proportional Counter Background Counting Rate. *K. Christensen, S. Thiemann, R. E. Dunker, R. R. Brey, T. F. Gesell; Idaho State University*

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P.45 A Device for Quantitatively Determining Scanning Efficiency for Mobile Radiation Detectors. *C. M. Marianno, K. A. Higley, D. Hunter; Oregon State University, Rio-Grande Radiological Physics Group*

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P.48 Retention of an Industrial Intake of Cs-137. *B. Murray, L. Michel, G. Holeman; Brookhaven National Laboratory*

P.49 Calculation of Specific Absorbed Fractions Using Image-Based VIP-Man Anatomical Model and Monte Carlo Method for Internal Photon and Electron Emitters. *T. C. Chao, A. Bozkurt, X. G. Xu; Rensselaer Polytechnic Institute*

P.50 ICRP-66 Respiratory Tract Model: Uncertainties in the Deposition Model. *E. Farfan, C. H. Huh, T. E. Huston, W. E. Bolch; University of Florida*

P.51 ICRP-66 Respiratory Tract Model: Uncertainties in the Clearance Model. *C. H. Huh, E. Farfan, T. E. Huston, W. E. Bolch; University of Florida*

Monday

P.52 Modern Plutonium Urine Data from Former Workers at Rocky Flats with Long-Term Plutonium Systemic Depositions. *R. B. Falk, N. M. Daugherty, J. M. Aldrich, D. E. Hilmas; Oak Ridge Associated Universities*

MEDICAL

P.53 Plain Film X-Ray Examinations of a Newborn Dose Phantom. *J. N. Roshau, M. Tressler, D. E. Hintenlang; University of Florida*

P.54 Breast Dosimetry Using Phantom Models. *W. P. Argo, D. Hintenlang; University of Florida*

P.55 Development and Application of VIP-Man, an Image-Based Anatomical Model, for Health and Medical Physics Dosimetry. *X. G. Xu, T. C. Chao, A. Bozkurt, P. F. Caracappa, R. M. Ryan, N. Sahoo, D. Chen; Rensselaer Polytechnic Institute, Albany Medical College*

P.56 Introduction of Marrow Cellularity in 3D Electron Simulations in Trabecular Bone. *P. W. Patton, D. W. Jokisch, D. A. Rajon, A. Shah, W. E. Bolch; University of Florida*

P.57 Geometrical Distribution of Adiposites Within Normal Bone Marrow: Considerations for 3D Skeletal Dosimetry Models. *A. P. Shah, P. W. Patton, D. W. Jokisch, D. A. Rajon, W. E. Bolch; University of Florida*

P.58 A Collaborative Approach to Restructuring an Academic Radiation Safety Program. *T. Yoshizumi, G. Holeman, P. O'Shea, K. Emenheiser, B. Pulliam, R. Reiman, V. Vylet, W. Thomann, R. Clapp, K. Lyles; Duke University Medical Center, Brookhaven National Laboratory, University of Maryland, Temple University*

P.59 Building a Center for Positron Emission Tomography: A Focus on Facilities. *T. L. Mays; Mayo Clinic*

P.60 Applying Patient-Specific Factors when Calculating the Total Dose Equivalent to Another Individual from a Patient Administered a Therapeutic Dose of Iodine-131. *D. M. De Santis, G. E. Chabot; Beth Israel Deaconess Medical Center/University of Massachusetts Lowell*

P.60A (formerly THAM-C.1) Development and Implementation of New Radiation Safety Oversight for an 8800-Curie Cesium-137 Irradiator. *T. Yoshizumi, V. Vylet, R. Reiman, M. Dewhirst, B. Pulliam, W. Thomann, R. Clapp, K. Lyles; Duke University Medical Center*

OPERATIONAL HEALTH PHYSICS

P.61 Exact Solutions for Paired Counting. *W. E. Potter; Consultant, Sacramento, CA*

P.62 A Reusable Web-Based Training Application for Radiation Safety Training. *M. Bernstein, E. A. Wurtz; Merck Research Laboratories*

P.63 So You..Pamphlets, An Informal Approach to Informing People of the Consequences of Radiological Issues or Mishaps. *B. Rees, P. Hoover; Los Alamos National Laboratory*

P.64 Poor Design of Local Exhaust Hood Leads to Radioactive Release in the Work Area. *R. Reif; DOE Brookhaven Group*

P.65 Shielding Improvements for a Plutonium-Beryllium Source. *V. Vylet, B. Pulliam, W. Thomann, W. Tornow, T. Yoshizumi; Duke University*

Monday

P.66 Usefulness of Radiological Incident Reports in Preventing Radiological Occurrences. *B. B. Bates, Jr.; Los Alamos National Laboratory*

P.67 Application of the Integrated Compliance Management System (ICMS™) in a DOE Health Physics Instrumentation Function. *J. G. Quillin, B. P. Smith, G. D. Guinn, T. L. Vaughn; The Alpha Group & Associates, LLC., Rocky Mountain Remediation Service, Inc.*

RADON

P.68 Assay of ^{222}Rn in Potable Water from Some Wells in Makkah Al-Mukarama Region of Saudi Arabia. *W. H. Abulfaraj, A. M. Mamoon; King Abdulaziz University, Saudi Arabia, Cairo, Egypt*

P.69 Assay of ^{222}Rn in Water from Wells and Hot Springs in Gizan Region of Saudi Arabia. *A. M. Mamoon, W. H. Abulfaraj; Cairo, Egypt, King Abdulaziz University, Saudi Arabia*

P.70 Design of a Radon Control System for a Large, Intense Radon Source. *J. B. Martin, K. J. Eger, K. D. Rickett, R. D. Daniels; Battelle, Pacific Northwest National Laboratory, Foster Wheeler Environmental Corporation, Fluor Fernald*

RISK ANALYSIS

P.71 Derivation of Parameter Distributions for the RESRAD and RESRAD-BUILD Computer Codes Using Bayesian Techniques. *J. J. Arnish, B. M. Biwer, J. -J. Cheng, S. Kamboj, D. L. LePoire, C. Yu, S. Y. Chen; Argonne National Laboratory*

P.72 Selection of RESRAD and RESRAD-BUILD Input Paramaters for Detailed Probabilistic Distribution Analysis. *J. -J. Cheng, S. Kamboj, C. Yu, B. M. Biwer, J. Arnish, D. LePoire, E. Gnanapragasam, S. Y. Chen, T. Mo, T. J. Nicholson, P. R. Reed, R. Abu-Eid, M. Thaggard, T. E. Harris, D. W. Schmidt; Argonne National Laboratory, U.S. Nuclear Regulatory Commission, DC*

RSO SECTION

P.73 A Revolutionary Information Management System for a Radiation Safety Office. *J. Strydom, E. Jawdeh, R. Gallaghar; Georgia Institute of Technology, Applied Health Physics, Inc.*

P.74 Computer Data Management in Support of the Radiation Safety Program at the University of Missouri-Columbia. *S. M. Langhorst; University of Missouri-Columbia*

WORKS IN PROGRESS

P.75 Evaluations of Inhalation Intakes of Poorly Transported Plutonium. *W. M. Findley, T. R. La Bone; Westinghouse Savannah River Company*

P.76 MARSSIMPower 2000. *C. V. Gogolak; US Department of Energy, New York*

P.77 Biodosimetry Assessment Tool: A Postexposure Software Program for Management of Radiation Accidents. *R. C. Sine, I. H. Levine, W. E. Jackson, A. L. Hawley, P. G. S. Prasanna, M. B. Grace, R.. Greenhill, W. F. Blakely; Armed Forces Radiobiology Research Institute*

P.78 Future Directions for Radiation Measurements in the Field. *J. T. Voss; Los Alamos National Laboratory*

P.79 Optimization of CAM (Continuous Air Monitor) Settings. *C. L. Olson, J. T. Voss; University of California, Los Alamos National Laboratory*

Monday

P.80 Developing a Criteria for the Traceability of Environmental Level Instrument Calibrations. *T. W. Slowey; K&S Associates, Inc.*

P.81 Development of a Digital Alpha/Beta Pulse Shape Discrimination System Utilizing CSI(TL)/Photodiode. *H. Tan, T. A. DeVol; Clemson University*

P.82 Pre-Decommissioning Planning for Almost Everyone, What You Can Do Now That Could Save You Millions Later. *D. Quinn, L. Dauer; DAQ, Inc.*

P.83 Cancelled

P.84 Estimating EDEs During Fluoroscopy and Interventional Radiography with a Single Dosimeter. *R. Michel, S. C. Perle; University of California, San Diego and ICN Dosimetry*

P.85 The RERF Dosimetry Measurements Database and the Identification of Patterns in Measured vs. DS86 Calculated Values. *H. M. Cullings, D. L. Preston; RERF, Japan*

P.86 The Relationship Between Pocket Gophers (*Thomomys Bottae*) and the Distribution of Buried Radioactive Waste at the Los Alamos National Laboratory. *G. J. Gonzales, R. L. Budd, P. R. Fresquez, R. J. Wechsler; Los Alamos National Laboratory and Colorado State University*

P.87 Monitoring of Radioactive and Inorganic Aerosols in Exhaust Air Released From the Waste Isolation Pilot Plant. *D. A. Schoep, J. L. Webb, R. Arimoto, T. B. Kirchner, S. B. Webb, P. M. Wathall; New Mexico State University*

P.88 Development of a General Methodology Using New FDA Guidance to Analyze the Ingestion Pathway Consequences of Postulated Accidents at the Savannah River Site. *J. M. Thompson, E. A. Thompson; Westinghouse Safety Management Solutions*

P.89 The Interplay Between Changing Atmospheric Oxygen Levels, Radiogenic Mutations, and Early Life on Earth. *P. A. Karam, S. A. Leslie, A. Anbar; University of Rochester and University of Arkansas*

P.90 Radium and Thorium Deposition in Pulp Mills. *A. G. Scott; Ontario Ministry of Labour, Canada*

P.91 Strategy for Release Measurements in Nuclear Power Facilities. *B. Krebs, M. Franz, J. Stickelmann; Consultant, RADOS Technology GmbH, Germany and PreussenElektra Kernkraft GmbH, Germany*

P.92 Remote Monitoring Systems. *S. Robinson; Innovative Industrial Solutions Inc.*

P.93 Rutgers University Case Study: A Guide to Non-Routine High Dose Rate Procedures. *P. J. McDermott; Rutgers Environmental Health & Safety*

P.94 Occupational Static Magnetic Field Exposures at a Magnetic Resonance Imaging Facility at Duke University Medical Center. *M. R. Sarder, F. Porter, M. Beautz, V. Vylet, T. T Yoshizumi; Duke University*

P.95 Development of a Centralized Radioactive Ordering System. *B. Aaron, C. Faulkner, R. Reiman, V. Vylet, T. T. Yoshizumi; Duke University*

Monday

P.96 Safety Consideration for the Implementation of Clean Areas in the Research Laboratory. *C. Nusenow, R. Michel; Isis Pharmaceuticals, Inc. and University of California, San Diego*

P.97 Radiation Protection Considerations in Industrial Radiography. *R. Michel, S. A. Simpson; University of California, San Diego and Iowa State University*

P.98 Operational Difficulties with Specific Regulatory Requirements. *K. W. Crase; Westinghouse Savannah River Company*

P.99 Accessible HP Education Program. *D. G. Gossen; Lakeshore Technical College*

P.100 Changing Demographics in the Undergraduate Health Physics Program at Francis Marion University. *D. M. Peterson; Francis Marion University*

P.101 Determining the Source of ^{90}Sr Detected in Sewage Compost at a Publicly Owned Treatment Works. *J. R. Laferriere, J-F. Josaphat, D. N. Gattenby; DuPont Pharmaceuticals Company*

P.102 Off-site Source Recovery (OSR) Project. J. *A. Tompkins. L. Leonard, S. Leonard, M. W. Pearson, C. Grigsby; Los Alamos National Laboratory*

3:00-5:15 PM Room: 207/209

MPM-A: Decommissioning
(Oral Session)

Co-Chairs: Eric Abelquist and Joe Shonka

3:00 MPM-A.1
Past and Present Decontamination and Decommissioning Activities in Pennsylvania. R. C. Maiers, *D. J. Allard; Commonwealth of Pennsylvania*

3:15 MPM-A.2
An Update of the Quehanna Hot Cell Decommissioning Project. *K. M. Kasper, M. V. Taylor; SCIENTECH NES, Inc.*

3:30 MPM-A.3
Evaluation and Demonstration of the LRAD Technology at the Savannah River Site. *S. R. Salaymeh, C. May, G. Luff; Westinghouse Savannah River Company, BNFL Instruments, Inc., UK*

3:45 MPM-A.4
Accelerated Decommissioning and Closure of Rocky Flats by 2006. *T. L. Vaughn; Kaiser-Hill*

4:00 MPM-A.5
Final Survey of the First Major U.S. Plutonium Processing Facility. *J. B. Barroso, M. L. Grube, S. J. Roberts; Rocky Mountain Remediation Services, LLC, Engineering Consultants, LLC, Arcadia Consulting, Inc.*

4:15 MPM-A.6
Deriving Concentration Guidelines for Soil Deposition in Relation to License Termination of San Onofre Nuclear Generating Station Unit 1 Reactor. *S. P. Voss, E. J. Goldin, M. Russel, P. J. Papin; San Diego State University, SONGS, San Onofre*

4:30 MPM-A.7
Decommissioning of a Subcritical Reactor Assembly at the University of Nebraska-Lincoln. *T. S. M. Young, D. R. Simpson; University of Nebraska*

4:45 MPM-A.8
Research Reactor D&D Dose Uncertainties. *S. I. Baker; Argonne National Laboratory*

5:00 (formerly P.2) MPM-A.9
License Termination of RAMP Industries Site. *E. Waterman, K. D. Anderson; U.S. Environmental Protection Agency, CO, Environmental Chemical Corporation*

Monday

3:00-5:00 PM *Room: 205*

MPM-B: Radon Section Session: Perspectives for the 21st Century
(Oral Session)

Chair: Arthur Scott and Jan Johnson

3:00 **MPM-B.1**
Particle Size Measurements at Fernald. *N. H. Harley, P. Chittaporn, M. Heikkinen, R. Medora, D. Daniels, R. Merrill; New York University School of Medicine, Fluor Fernald Radiation Control Section*

3:15 **MPM-B.2**
Personal ^{222}Rn and ^{220}Rn (Radon/Thoron) Assessment at Fernald. *P. Chittaporn, N. H. Harley, R. Medora, R. Merrill; New York University School of Medicine, Fluor Fernald Radiation Control Section*

3:30 **MPM-B.3**
What Have Radon Lung Cancer Case-Control Studies Revealed? *D. J. Steck; St. John's University*

3:45 **Panel Discussion**

What Have We Learned About Radon Risk?

How Accurate and Useful are Our Measurements?

Where Do We Go From Here (Public Policy)?

Panelists:

John Neuberger; University of Kansas

Naomi Harley; New York University

Marjorie Walle; Manager, Illinois Radon Program and Chair of CRCPD Committee on Radon

5:00 Radon Section Business Meeting

3:00-4:30 PM *Room: 201*

MPM-C: Medical Section Session: Intravascular Brachytherapy
(Oral Session)

Co-Chairs: Jean St. Germain and Kelly Classic

3:00 **MPM-C.1**
Introduction to the Issues: Search for the Perfect Source, Turf Wars and Economics. *J. St. Germain; Memorial Sloan-Kettering Cancer Center*

3:15 **MPM-C.2**
Regulatory Issues. *R. Ayres; U. S. Nuclear Regulatory Commission*

3:30 **MPM-C.3**
Clinical Experience with Intravascular Brachytherapy. *S. Balter; Lenox Hill Hospital*

3:45 **MPM-C.4**
Dosimetry Issues in Intravascular Brachytherapy. *M. Stabin; Oak Ridge National Laboratory*

4:00 **MPM-C.5**
A Comparative Study of Radiochromic Film Measurements and MCNP Simulations of Dose Rates Surrounding an Iridium-192 Brachytherapy Sourcewire. *J. S. Stratford, P. D. Pater, P. J. Papin; San Diego State University*

4:15 **MPM-C.6**
Radiation Safety Issues Associated with a Plastic Encapsulated Intravascular Brachytherapy Source. *G. Strathearn, D. R. Fisher, S. Rege; Radiance Medical Systems, Battelle Pacific Northwest Division, Tri-Cities Cancer Center*

4:30 Medical Section Business Meeting

Tuesday

7:00-8:00 AM **Room: 201**

CEL-3 Historical Perspectives of Environmental, Medical, and Nuclear Waste Measurements. *Mary White; Cedar Crest, NM*

7:00-8:00 AM **Room: 104/106**

CEL-4 Food Irradiation: An Old Process for the New Millennium. *Gregg Claycamp; University of Pittsburgh*

8:15-11:00 AM ***Room: 207/209***

TAM-A: Decommissioning Section Session: D&D Dose Modeling
(Oral Session)

Co-Chairs: S. Y. Chen and D. Fauver

8:15 **TAM-A.1**
The NRC Decommissioning Toolbox. *C. A. Trottier; U.S. Nuclear Regulatory Commission, DC*

8:30 **TAM-A.2**
D&D V2.0: Development of Parameter Distributions for Generic Screening and Use of the Monte Carlo Shell. *C. Daily, W. E. Beyeler; U.S. Nuclear Regulatory Commission, DC, Sandia National Laboratories*

9:00 **TAM-A.3**
Modeling for Environmental Dose Assessment and Regulatory Compliance at DOE. *H. T. Peterson, Jr., A. Wallo III; U.S. Department of Energy, DC*

9:30 Break

10:00 **TAM-A.4**
Development of RESRAD Computer Codes for Federal D&D Applications. *C. Yu, S. Y. Chen, A. Wallo, A. Williams, H. Peterson, C. A. Trottier, T. Mo; Argonne National Laboratory, U.S. Department of Energy, DC, U.S. Nuclear Regulatory Commission, DC*

10:30 TAM-A.5 (formerly TPM-A.4)
Site-Specific Dose Modeling for Concrete Debris at Maine Yankee Atomic Power Company Decommissioning Project. *D. N. Fauver; Radiological Services, Inc.*

11:00 Decommissioning Section Business Meeting

8:15-11:30 AM ***Room: 205***

TAM-B: Internal Dosimetry
(Oral Session)

Co-Chairs: Joel Webb and Keith Eckerman

8:15 **TAM-B.1**
Algorithm for Determination of Need for Dosimetry Monitoring. *T. T. Little, B. Bates; Los Alamos National Laboratory*

8:30 **TAM-B.2**
The Relative Performance of Intake Estimators. *R. J. Traub; Pacific Northwest National Laboratory*

8:45 **TAM-B.3**
Calculating Intakes and Doses Using ICRP-68 Dose Coefficients and Referenced Biokinetic Models. *C. A. Potter; Sandia National Laboratory*

9:00 **TAM-B.4**
The Effect of the Nasal Vestibule Size (ET1) and Shape on the Electron Absorbed Fraction. *H. M. Moussa, K. F. Eckerman, L. W. Townsend; University of Tennessee*

9:15 **TAM-B.5**
Experimental Approaches for Studying Variability in Nasal Airway Aerosol Deposition - A Determinant of Uncertainty in Respiratory Tract Dosimetry. *R. A. Guilmette, G. Zwartz; Lovelace Respiratory Research Institute*

Tuesday

9:30 Break

10:00 **TAM-B.6**
Uncertainty of the Inhalation Model. *R. P. Harvey, D. M. Hamby; University of Michigan, Oregon State University*

10:15 **TAM-B.7**
Uncertainty and Variability in Reconstruction of the Internal Exposure for Nuclear Power Plant Workers Using Air Concentration Measurements. *I. Linkov, D. Burmistrov; Menzie-Cura and Associates, Inc.*

10:30 **TAM-B.8**
DOE Laboratory Accreditation Program for Radiobioassay Multi-Use Counting Fixture. *T. M. Jue, F. Cummings, D. Deatherage, G. Grothaus, T. Taylor; Department of Energy, ID*

10:45 **TAM-B.9**
An Evaluation of Germanium Detectors Employed for the Measurement of Radionuclides Deposited in Lungs Using an Experimental and Monte Carlo Approach. *J. L. Webb, G. H. Kramer; New Mexico State University*

11:00 **TAM-B.10**
Use of BEGe Detectors in an Accuscan-II Counting System for Measuring Low-Energy Photon Emitters in the Lungs. *D. W. Groff, T. A. Perkins; Canberra Industries*

11:15 **TAM-B.11**
Determination of Natural Dietary Uranium Levels in Fecal Samples for Y-12 Plant Workers. *L. M. Snapp, K. F. Eckerman; Radiological Control Organization, Y-12 Plant, Oak Ridge National Laboratory*

8:15-10:45 AM ***Room: 201***

TAM-C: Medical
(Oral Session)

Co-Chairs: David Hintenlang and George Snyder

8:15 **TAM-C.1**
Radiation Safety Experience During Brachytherapy of Resected Brain Tumors Using an Inflatable Balloon Catheter and Liquid I-125 Source. *A. F. deGuzman, S. Danak, R. Lieto, A. Jackson, C. Shriver, S. Wilson, N. Detorie, S. Grossman; Wake Forest University Baptist Medical Center*

8:30 **TAM-C.2**
Beta Particle Dosimetry of Radium Nasopharyngeal Applicators. *C. G. Soares, E. H. Donnelly; National Institute of Standards and Technology*

8:45 **TAM-C.3**
Patient Skin Dose Assessment from Body Interventional Procedures by Dose-Area Product (DAP) and Thermoluminescent Dosimeters (TLD). *D. D. Busick, L. J. Phillips, S. M. Slonim; Stanford University, Stanford University Medical Center, Palo Alto VA Health Care System*

9:00 **TAM-C.4**
Radiation Safety Considerations in Computed Tomography (CT) Fluoroscopy-Guided Interventional Procedures. *K. L. Classic, S. K. Carlson, F. E. Zink, C. E. Bender; Mayo Clinic Rochester*

9:15 **TAM-C.5**
Determination of Patient Dose from Computed Tomography Examination. *P. F. Caracappa, R. M. Ryan, X. G. Xu; Rensselaer Polytechnic Institute*

9:30 Break

Tuesday

10:00 **TAM-C.6**
Comparison of Measurement and Simulation in Tissue-Equivalent Phantoms. *K. A. Johnson, D. E. Hintenlang; University of Florida*

10:15 **TAM-C.7**
The Effects of the Bone-Marrow Interface in Trabecular Bone Dosimetry of Beta-Particles Utilizing Voxel-Based Transport. *D. W. Jokisch, P. W. Patton, D. A. Rajon, A. Shah, W. E. Bolch; Francis Marion University, University of Florida*

10:30 **TAM-C.8**
Surface Error Effects of 3D NMR Images on Monte Carlo Trabecular Bone Dosimetry Calculations. *D. A. Rajon, P. W. Patton, A. Shah, W. E. Bolch; University of Florida*

11:00 ***Room: 201***

Government Section Business Meeting and Committee Reports Including the Non Ionizing Committee Report

8:15-11:30 AM ***Room: 104/106***

TAM-D: Accelerator Section Session
(Oral Session)

Co-Chairs: James Liu and Joe McDonald

8:15 **TAM-D.1**
European Research for Radiation Protection Dosimetry. *H. -G. Menzel; CERN, Switzerland* **(G. William Morgan Lecture)**

8:45 **TAM-D.2**
Inherent Design Characteristics as Hazard Mitigation Features. *R. May; Thomas Jefferson National Accelerator Facility*

9:00 **TAM-D.3**
The Active Beam Shutdown System at TRIUMF. *J. Drozdoff, F. Mammarella, L. Moritz; TRIUMF, Canada*

9:15 **TAM-D.4**
Prompt Radiation Protection Program at the Los Alamos Neutron Science Center. *J. S. Bull; Los Alamos National Laboratory*

9:30 **TAM-D.5**
Safety Systems at Duke Accelerator Facilities. *V. Vylet, P. H. Morcombe, C. R. Westerfeldt; Duke University*

9:45 **TAM-D.6**
Policy and Design for Prompt Radiation Protection at the Alternating Gradient Syncrotrin and the Relativistic Heavy Ion Collider. *S. Musolino, H. Kahnhauser; Brookhaven National Laboratory*

10:00 Break

10:30 **TAM-D.7**
Policies and Practices for the Radiation Containment System at the Stanford Linear Accelerator Center. *J. C. Liu, S. H. Rokni; Stanford Linear Accelerator Center*

10:45 **TAM-D.8**
Evaluation of the Soil and Ground Water Activation for the Next Linear Collider. *S. H. Rokni, J. C. Liu, S. Roesler; Stanford Linear Accelerator Center*

11:00 **TAM-D.9**
High-Energy Neutron Depth Dose Experiment. *M. R. Sutton, N. E. Hertel, L. S. Waters; Georgia Institute of Technology*

11:15 **TAM-D.10**
Positron Target/Girder Changeout at SLAC. *S. R. Frey; Stanford Linear Accelerator Center*

11:30 Accelerator Section Business Meeting

Tuesday

Noon-2:00 PM Adam's Mark

Awards Luncheon

2:30-5:00 PM Room: 207/209

TPM-A: Special Session:Development of Clearance Standards
(Oral Session)

Co-Chairs: Mary Birch and Lynne Fairobent

2:30 TPM-A.1
Radiation Protection Framework for Clearance of Materials from Regulatory Confines. *S. Y. Chen, A. LaMastra, J. O. Lubenau, H. R. Meyer, C. D. Massey, D. W. Moeller, M. T. Ryan, D. J. Strom, J. G. Yusko; Argonne National Laboratory, Health Physics Associates, Consultant, PA, Keystone Associates, Sandia National Laboratories, Dade Moeller and Associates, University of South Carolina, Pacific Northwest National Laboratory, Pennsylvania Department of Environmental Protection*

2:45 TPM-A.2
National and International Status of Clearance. *R. A. Meck; U.S. Nuclear Regulatory Commission, DC*

3:00 TPM-A.3
Answers to the Questions Most Often Asked about ANSI N13.12. *W. E. Kennedy, Jr.; Dade Moeller & Associates, Inc.*

TPM-A.4 Moved to TAM-A.5

3:15 Break

3:45 Panel Discussion
S. Y. Chen, W. Kennedy, Jr., R. Meck, A. LaMastra, J. Yusko

2:30-5:15 PM Room: 205

TPM-B: Bioeffects/Biokinetics
(Oral Session)

Co-Chairs: Mike Stabin and Gus Potter

2:30 TPM-B.1
Evidence Against the Linear No-Threshold Theory (LNT) of Radiation Carcinogenesis. *O. G. Raabe; University of California, Davis*

2:45 TPM-B.2
Beyond Dose and Response: Relating Radiation and Detriment. *D. J. Strom; Pacific Northwest National Laboratory*

3:00 TPM-B.3
A Neural Networks and CART Approach to Dose-Response Modeling in Radiation-Exposed Populations. *H. G. Claycamp, N. B. Sussman, N. D. Okladnikova, V. S. Pesternikova, T. V. Azizova, M. V. Sumina; University of Pittsburgh*

3:15 TPM-B.4
Determination of Tissue Specific Kinetics to Improve Boron Neutron Capture Therapy. *L. F. Miller, G. Kabalka, M. Khan, A. Rahim, T. Nichols, J. Thiel, G. Smith; University of Tennessee*

3:30 Break

4:00 TPM-B.5
A New Model for Near-Approach Attack to DNA by Free Radicals. *B. Aydogan, W. E. Bolch, D. T. Marshall, B. J. Morabito, K. E. Wilson; University of Florida*

4:15 TPM-B.6
Risks of Exposure from 1540 nm "Eye-Safe" Lasers. *T. E. Johnson, W. P. Roach; Uniformed Services University of the Health Sciences*

Tuesday

4:30 **TPM-B.7**
Toxicity of Depleted Uranium Fragments in Wistar Rats. *F. F. Hahn, R. A. Guilmette, M. D. Hoover; Lovelace Respiratory Research Institute*

4:45 **TPM-B.8**
Uranium Deposition and Retention in a Whole Body Donation to the USTUR. *J. J. Russell, R. L. Kathren; Washington State University*

5:00 **TPM-B.9**
Biokinetics and Distribution of Inhaled Tritiated Pump Oils. *A. Trivedi; Atomic Energy of Canada Limited*

2:30-5:00 PM ***Room: 201***

TPM-C: RSO Section Session
(Oral Session)

Chair: Sean Austin

2:30 **TPM-C.1**
Ten Strategic Adjustments for Institutional Radiation Safety Programs. *R. J. Emery, M. A. Charlton; University of Texas-Houston Health Science Center*

3:00 **TPM-C.2**
Radiological Safety Audits During Reactor Decommissioning. *E. Jawdeh, J. Strydom, R. D. Ice; Georgia Institute of Technology*

3:15 **TPM-C.3**
Inspection of Lead Aprons: Criteria for Rejection. *K. N. Lambert, T. McKeon; MCP Hahnemann University*

3:30 Break

4:00 **TPM-C.4**
Radiation Safety Surveys at the National Institutes of Health. *S. Austin, D. Case; National Institutes of Health*

4:15 **TPM-C.5**
Managing Long Term, Low Dose Exposure. *W. Gaul; Chem-Nuclear Systems LLC*

4:30 **TPM-C.6**
Security of Radioactive Materials - Program Impacts and Improvements. *W. A. Lorenzen; Children's Hospital, Boston*

4:45 **TPM-C.7**
Radiation Protection Program Outcomes as Indicated by Overexposure and Badge Overexposure Incidents in Texas from 1988 to 1997. *M. A. Charlton, R. J. Emery; University of Texas Health Science Center at San Antonio and Houston*

5:00RSO Section Business Meeting

2:30-4:45 PM ***Room: 104/106***

TPM-D: External Dosimetry
(Oral Session)

Co-Chairs: Sandy Perle and Gregory Jones

2:30 **TPM-D.1**
Angular Dependent Neutron Dosimeter Designs for Estimating Effective-Dose-Equivalent and Operational Quantities. *K. G. Veinot, N. E. Hertel; Lockheed Martin Energy Systems Y-12 Plant, Georgia Institute of Technology*

2:45 **TPM-D.2**
VARSKIN Mod 2 - Anomalies and Remedies. *W. J. Chase, S. Davis, B. Plain, J. S. Durham; Ontario Power Generation, Canada, Colorado State University*

3:00 **TPM-D.3**
Algebraic Expressions for the Bremssthahlung Energy Distributions from Beta Radiation Incident on Thick Targets. *G. E. Chabot, C. Roldan; University of Massachusetts Lowell*

Tuesday

3:15 **TPM-D.4**
The Effects of Beam Quality on Radiation-Induced DNA Breaks. *B. J. Morabito, W. E. Bolch, D. T. Marshall, B. Aydogan, K. E. Wilson; University of Florida*

3:30 Break

Cancelled **TPM-D.5**

4:00 **TPM-D.6**
Derivation of External Gamma Geometry Factors for a Monitored Geologic Repository. *E. R. Faillace, Y. Yuan, M. N. Haas; Morrison Knudsen Corporation*

4:15 **TPM-D.7**
A Review of Cavity Theories and a Proposal for a Microdosimetric Interpretation of TLD's Cavities for the Case of Electron Fields. *C. Frujinoiu, T. F. Gesell, R. R. Brey; Idaho State University*

4:30 **TPM-D.8**
Tooth Enamel as a Retrospective Radiation Biodosimeter: Electron Spin Resonance Response to 1 MeV Neutrons and 2 MeV Protons. *J. F. Katanic, J. D. Zimbrick; Purdue University*

Wednesday

7:00-8:00 AM **Room: 201**
CEL-5 Integrated Safety Management at a DOE Accelerator Facility. *Michael Grissom; SLAC*

7:00-8:00 AM **Room: 104/106**
CEL-6 Intravascular Brachytherapy: Health Physics Implications. *Michael Bohan; Yale-New Haven Hospital*

8:15-11:15 AM Room: 205/207/209

WAM-A: Government Section Plenary
Session: Workshop on Harmonization of Government and Private Sector Roles in Radiation Safety Regulation
(Oral Session)

Chair: Paul Ziemer

8:15 **WAM-A.1**
The Challenge: Harmonizing Government and Industry Roles and Rules for Radiation Safety. *A. Brodsky; Science Applications International Corporation*

8:30 **WAM-A.2**
Harmonization of Radiation Safety Standards Between Nations. *A. Gonzalez; IAEA, Vienna, Austria*

8:45 **WAM-A.3**
EPA Perspective on Radiation Standards Harmonization. *M. A. Boyd; U.S. Environmental Protection Agency, DC*

9:00 **WAM-A.4**
NRC Perpective on Radiation Standards Harmonization. *C. Papperillo; U.S. Nuclear Regulatory Commission*

9:15 **WAM-A.5**
DOE Perspective on Radiation Standards Harmonization. *J. Fitzgerald; U.S. Department of Energy, DC*

9:30 **WAM-A.6**
Defining and Harmonzing Roles from an Agreement State Perspective. *E. D. Bailey; California Radiologic Health Branch*

9:45 Break

10:15 **WAM-A.7**
Harmonization Among Local, State, and Federal Programs in a Non-Agreement State. *J. G. Yusko; Pennsylvania Department of Environmental Protection*

10:30 **WAM-A.8**
Harmonizing Nuclear Regulation and the Public Interest. *J. A. Ransohoff; Neutron Products, Inc.*

10:45 **WAM-A.9**
Harmonization: How We Can All Get Along. *R. L. Kathren; Washington State University*

11:00 **WAM-A.10**
Congressional Activities Relating to Radiation Safety Standards and Regulations. *W. A. Mills; Consultant, Olney, MD*

12:15-2:15 PM PEP Program

2:30-5:30 PM Room: 205/207/209

WPM-A: AAHP Special Session: Airlie Revisited: Bridging Radiation Policy and Science
(Oral Session)

2:30 **WPM-A.1**
Conference Overview. *K. Mossman; Arizona State University*

2:45 **WPM-A.2**
Philosophical Overview. *G. de Planque; International Nuclear Societies Council*

3:00 **WPM-A.3**
Science Issues. *J. Valentin; International Commission on Radiation Protection, Sweden*

Wednesday

3:15 **WPM-A.4**
Factors Influencing Public Policy. *R. Jones; U. S. Department of Energy, Maryland*

3:30 **Break**

3:45 **WPM-A.5**
International Organizations and Policymaking. *A. Gonzalez; IAEA, Austria*

4:00 **WPM-A.6**
National/Regional Overviews. *K. Kase; Stanford Linear Accelerator Center*

4:15 **WPM-A.7**
From Science to Policy to Regulation. *G. Roessler; University of Florida (retired)*

4:30 **WPM-A.8**
Problems and Options. *R. Clarke; National Radiation Protection Board, UK*

4:45 **WPM-A.9**
Conclusions and Recommendations. *S. Magnusson; Icelandic Radiation Protection Institute*

5:00 **Questions and Discussion**

2:30-5:30 PM **Room: 201**

WPM-B: Environmental
(Oral Session)

Co-Chairs: Tom Gesell and Noel Savignac

2:30 **WPM-B.1**
ANSI/HPS N13.53 TENORM Standard - Update of Development Activities. *J-C. Dehmel; S. Cohen and Associates, Inc.*

2:45 **WPM-B.2**
DOE/AL Procedure for the Release of Real Property Containing Residual Radioactive Material. *R. J. Borders, A. Wallo III, M. L. Miller, R. L. Beethe; U.S. Department of Energy, NM and DC, Roy F. Weston, Inc., R. L. Beethe and Associates*

3:00 **WPM-B.3**
An Investigation of the Origin of Eu-152 in Columbia River Sediment. *G. Gibbons, D. Wells, V. Johnson, T. Gesell; Idaho State University, Battelle Pacific Northwest National Laboratory*

3:15 **WPM-B.4**
Radiological Impact from Atmospheric Releases of ^{238}U and ^{226}Ra from Phosphate Rock Processing Plants. *C. Papastefanou; Aristotle University of Thessaloniki, Greece*

3:30 **WPM-B.5**
Use of the ICRP-66 Lung Model to Study the Potential Health Risks Associated with ^{210}Po Effluent at a Southeastern Idaho Elemental Phosphorus Facility. *J. J. Helms, T. F. Gesell, R. R. Brey; Idaho State University*

3:45 **Break**

4:15 **WPM-B.6**
New Site Selection for the Ontario Routine Air Monitoring Program. *A. G. Scott; Ontario Ministry of Labour, Canada*

4:30 **WPM-B.7**
Sensitivity of the Guassian Atmospheric Transport Model to Parametric Variability. *D. M. Hamby; Oregon State University*

4:45 **WPM-B.8**
Investigation of In-Situ Gamma Spectroscopy for Routine Environmental Surveillance at the INEEL. *D. W. Walker, C. T. Briggs, K. C. Thompson, R. E. Dunker, T. F. Gesell, D. P. Wells; State of Idaho INEEL Oversight Program, Idaho State University*

Wednesday

5:00 **WPM-B.9**
An Airborne Gamma Ray Survey of the Darlington and Pickering Nuclear Generating Stations. *R. L. Grasty, S. Santaguida, L. Sander, T. Le; GAMMA-BOB, Inc., Sander Geophysics, Ontario Power Generation Company, Canada*

5:15 **WPM-B.10**
Integrating the Biological Control of Radioactive Contamination and Other Biological Control Programs at the Hanford Site. *A. R. Johnson, T. A. Ikenberry, G. D. Perkins; Fluor Hanford, Dade Moeller & Associates*

2:30-5:15 PM Room: 104/106

WPM-C: Special Session:Current Issues in Health Physics Instrumentation
(Oral Session)

Chair: Morgan Cox

2:30 **WPM-C.1**
Review and Summary of the Proceedings of the Health Physics Instrument Committee (HPIC) Meeting of November 1999. *D. Snowder, M. Cox; Alpha Group-Idaho, Lovelace Respiratory Research Institute*

2:45 **WPM-C.2**
Review and Summary of the Proceedings of the Air Monitoring Users Group (AMUG) Meeting of March 2000. *G. Ceffalo, M. Johnson, M. Hoover; Bechtel-Hanford, Battelle-Pacific Northwest National Laboratory, Lovelace Respiratory Research Institute*

3:00 **WPM-C.3**
Development and Status of ANSI Standard N323D-Test and Calibration of Fixed Radiation Monitors. *P. Chiaro; Oak Ridge National Laboratory*

3:15 **WPM-C.4**
Revision and Status of ANSI Standard N42.17A-Performance Specifications for Health Physics Instrumentation, Portable Survey Meters Under Normal Environmental Conditions. *M. Johnson; Battelle-Pacific Northwest National Laboratory*

3:30 Break

4:00 **WPM-C.5**
Performance of Several Radiation Dosimeters and Dose Rate Meters at Airliner Altitudes. *M. Cox; Lovelace Respiratory Research Institute*

4:15 **WPM-C.6**
Use of the Eberline Alpha-6S Continuous Air Monitor at the Oak Ridge Y-12 Plant. *J. M. Thomas, P. D. Pruitt, C. W. Smith; Lockheed Martin Energy Systems, Inc.*

4:30 **WPM-C.7**
An Overview of Qualification Testing of Alpha Continuous Air Monitors. *M. Hoover; Lovelace Respiratory Research Institute*

4:45 **WPM-C.8**
Use of the NE/Bicron IPM-9 Personnel Contamination Monitor as a Substitute Whole Body Counter to Eliminate Annual Bioassays. *D. Snowder; Alpha Group-Idaho*

5:00 **WPM-C.9**
Sampling Duration, Counting Schedules and the Indicated Natural Gross Background in Air. *H. M. Prichard, J. L. Alvarez; Auxier and Associates*

Wednesday

6:00-8:15 PM Room: Governor's Square 15, Adam's Mark Hotel

WPM-D: Aerosol Measurements
(Oral Session)

Chair: Morgan Cox

6:00 **WPM-D.1**
Development and Status of ANSI Standard N323C-Test and Calibration of Aerosol Monitoring and Measuring Instruments. *M. Hoover, M. Johnson; Lovelace Respiratory Research Institute, Battelle-Pacific Northwest National Laboratory*

6:15 **WPM-D.2**
Development and Status of ANSI Standard N42.29-Test and Calibration of Tritium Monitoring and Measuring Instruments. *P. Chiaro; Oak Ridge National Laboratory*

6:30 **WPM-D.3**
An Update on DOE Work Group for Workplace Monitoring of Stable Tritiated Compounds. *D. Minnema; U.S. Department of Energy*

6:45 **WPM-D.4**
A Review of Current WIPP Radiation Air Effluent Monitoring Practices. *B. Bartlett; Environmental Ecology Group*

7:00 **WPM-D.5**
An Update of Radiological Aerosol Sampling and Monitoring at the Waste Isolation Pilot Plant. *R. Farrell; U.S. Department of Energy, NM*

7:15 **WPM-D.6**
Some Practical Aspects of Alpha Continuous Air Monitor (CAM) Usage. *J. T. Voss; Los Alamos National Laboratory*

7:30 **WPM-D.7**
Comparison of PAM Results with Bioassay Results at an Enriched Uranium Casting Facility. *C. A. England, J. M. Thomas, P. B. Lowe; Lockheed Martin Energy Systems*

7:45 **WPM-D.8**
Airflow as Influenced by Room Configuration and Ventilation Design: When is a Reevaluation of Continuous Air Monitor Placement Needed? *J. J. Whicker, P. T. Wasiolek, J. C. Rodgers, S. Konecni, L. Parietti, C. Ammerman, R. Martin; Los Alamos National Laboratory*

8:00 **WPM-D.9**
Performance of the Eberline Radial Inlet Sampling Head in High Velocity Airstreams. *M. Hoover; Lovelace Respiratory Research Institute*

7:00-10:00 PM Governor's Square 10, Adam's Mark Hotel

STC WORKSHOP ON HOW TO PRESENT HPS SCIENCE TEACHER WORKSHOPS

Hosting a Science Teacher Workshop may seem like a daunting task. The South Texas Chapter (STC), in conjunction with members of the Public Education Committee, is going to put on a workshop focused on "teaching the teachers," a special training session for prospective workshop presenters. Topics include sources of funding, logistics, how to announce your workshop - what works and what doesn't, defining the target group (how to figure out if you are reaching the right people), and distribution of topical modules that STC has used to conduct four workshops in fifteen months (all the things you need to do your own teacher workshops).

Thursday

7:15-8:15 AM **Room: Plaza Ballroom D**

CEL-7 Paleo-Health Physics: Changes in Earth's Radiation Environment Over Geologic Time. *Andrew Karam; University of Rochester*

7:15-8:15 AM **Room: Plaza Ballroom E**

CEL-8 Radiation Accident History. *Richard Toohey; Radiation Emergency Assistance Center/Training Site*

8:30-9:45 AM ***Room: Director's Row H***

THAM-A: Dose Modeling
(Oral Session)

Co-Chairs: Charlie Yu and Dave Bernhardt

8:30 **THAM-A.1**
Shielding Evaluation of Transporting Spent Nuclear Fuel in an Underground Repository. *A. Nielsen, S. Su, M. N. Haas (presented by E.R. Faillace); Morrison-Knudsen Corporation*

8:45 **THAM-A.2**
Determining Site-Specific Parameters for Environmental Pathways Radiation Risk Assessments for Uranium: Focus on Kd's. *D. E. Bernhardt; Consultant, UT*

9:00 **THAM-A.3**
Uncertainty Analysis Module for RESRAD and RESRAD-BUILD Radiological Dose Assessment Software Packages. *D. J. LePoire, E. Gnanapragasam, J. Arnish, B. A. Biwer, J. -J. Cheng, S. Kamboj, C. Yu, S. Y. Chen, A. Wallo, A. Williams, H. Peterson, T. Mo, T. J. Nicholson, R. Abu-Eid, M. Thaggard, T. E. Harris, R. B. Codell, D. W. Schmidt, J. Danna; Argonne National Laboratory, U.S. Department of Energy, DC, U.S. Nuclear Regulatory Commission, DC*

9:15 **THAM-A.4**
Input Parameter Probability Distribution Assignments for Uncertainty Analysis Using the RESRAD and RESRAD-BUILD Radiological Dose Assessment Software Packages. *B. M. Biwer, S. Kamboj, J.-J. Cheng, E. Gnanapragasam, J. Arnish, D. LePoire, C. Yu, S. Y. Chen, T. Mo, T. J. Nicholson, R. Abu-Eid, M. Thaggard, T. E. Harris, R. B. Codell, D. W. Schmidt, J. Denna; Argonne National Laboratory, U.S. Nuclear Regulatory Commission, DC*

9:30 **THAM-A.5**
Effects of Parameter Distributions on the Estimated Doses for the Residential Scenario in RESRAD and Building Occupancy Scenario in RESRAD-BUILD. *S. Kamboj, D. LePoire, E. Gnanapragasam, B. M. Biwer, J.-J. Cheng, J. Arnish, C. Yu, S. Y. Chen, T. Mo, T. J. Nicholson, R. Abu-Eid, M. Thaggard, R. B. Codell, T. E. Harris, D. W. Schmidt, J. Danna; Argonne National Laboratory, U.S. Nuclear Regulatory Commission, DC*

8:30-9:45 AM ***Room: Plaza Ballroom F***

THAM-B: Emergency Planning
(Oral Session)

Chair: Travis Beard and David Miller

8:30 **THAM-B.1**
The New NRC Oversight Program in EP. *R. Sullivan; US Nuclear Regulatory Commission, DC*

Thursday

9:00 **THAM-B.2**
Independent Spent Fuel Storage Installations (ISFSI) in NRC Region IV - Problems Identified During Inspections. *D. L. Rice, J. V. Everett; U.S. Nuclear Regulatory Commission, TX*

9:15 **THAM-B.3**
Development of a Health And Safety Manual for Emergency Response Operations. *C. A. Riland, S. S. Junio; Bechtel Nevada*

9:30 **THAM-B.4**
New Mexico Particle Accelerator Incident. *S. Fitch, W. Floyd; New Mexico Environment Department*

8:30-11:15 AM ***Room: Plaza Ballroom D***

THAM-C: Operational HP
(Oral Session)

Co-Chairs: Victoria Morris and Glenn Sturchio

THAM-C.1 **Moved to P.60A**

8:30 **THAM-C.2**
Development of a Quality-Based Radiation Protection Program for a New High Grade Uranium Mill. *S. St. Pierre, D. M. Huffman; COGEMA Resources, Inc., Canada*

8:45 **THAM-C.3**
Radiation Protection for the B1/B2 Beams Repair Works at the Chernobyl Unit 4 Shelter. *R. A. Hoover, A. A. Korneev, A. Sukhoruchkin, G. J. Vargo; Battelle Memorial Institute, Chernobyl and WA, Chernobyl Nuclear Power Plant, Ukraine*

9:00 **THAM-C.4**
Managing an Operational ALARA Program at a DOE Deactivation, Decontamination and Decommissioning Site. *R. G. Johnson, J. S. Jarvis; Rocky Mountain Remediation Services, LLC.*

9:15 **THAM-C.5**
ALARA on a Budget. *P. K. McGinley, J. C. Smith, J. A. Todaro; Rocky Flats Environmental Technology Site*

9:30 Break

10:00 **THAM-C.6**
Changing the Radiation Protection Culture at Brookhaven National Laboratory (BNL). *H. Kahnhauser, S. Layendecker, R. Miltenberger, S. Musolino; Brookhaven National Laboratory*

10:15 **THAM-C.7**
Multi-Disciplinary Laboratory Audits. *S. Simpson, J. Beckel; Iowa State University*

10:30 **THAM-C.8**
Technical Basis Development for Justification of Radiological Protection Instrumentation at Rocky Flats Environmental Technology Site. *E. D. Lesses; Rocky Mountain Remediation Services, LLC.*

10:45 **THAM-C.9**
Proposed Acceptance Criteria for Receipt of Highly Enriched Uranium Volumetrically Contaminated with Weapons Grade Plutonium at the Oak Ridge Y-12 Plant. *J. M. Thomas, R. W. Oliver; Lockheed Martin Energy Systems, Inc.*

11:00 **THAM-C.10**
Interdiction of Special Nuclear Materials and Marijuana at Border Crossings. *D. E. Hankins, D. P. Hickman, S. G. Homann; Lawrence Livermore National Laboratory*

Thursday

8:30-11:30 AM **Room: Plaza Ballroom E**

THAM-D: Special Session: Radiochemistry
(Oral Session)

Chair: C. F. Wu

8:30 **THAM-D.1**
Sequential Isotopic Determination of Strontium, Thorium, Plutonium, Uranium, and Americium in Bioassay Samples. *Y. K. Lee, S. N. Bakhtiar, M. Akbarzadeh, J. S. Lee; Bechtel Nevada, Waste Management Hanford, Westinghouse Electric Corp., University of Nevada*

9:00 **THAM-D.2**
The Importance of Having All Data Users Know the Analytical Data Quality Objectives: Lessons Learned. *D. H. MacQueen; Lawrence Livermore National Laboratory*

9:30 **THAM-D.3**
Lessons Learned from the Determination of Fixed Contamination on Surface Metal. *H. K. Meznarich, R. L. Hill, R. L. Hobart, S. N. Bakhtiar, M. F. Marcus; Fluor Hanford, Inc.*

10:00 Break

10:30 **THAM-D.4**
Perpetually Self-Cleaning Uranium-232 Tracer Solution. *M. Akbarzadeh, Y. K. Lee, A. Mohagheghi; Waste Isolation Pilot Plant Laboratories*

11:00 **THAM-D.5**
Evaluation of the 3M Empore Tc Rad Disk. *S. R. Salaymeh, R. A. Dewberry; Westinghouse Savannah River Company*

8:30-11:30 AM **Room: Grand Ballroom 1**

THAM-E: Special Session: Contaminant Transport in Semiarid Ecosystems
(Oral Session)

Co-Chairs: David Breshears and Jeffrey Whicker

8:30 **THAM-E.1**
Cross-Cutting Themes for Contaminant Transport in Semiarid Ecosystems. *D. D. Breshears; Los Alamos National Laboratory*

8:45 **THAM-E.2**
Predicting Surface Water Impacts and Cleanup Levels for Actinides in Surface Soils. *F. Winchester Chromec, G. A. Wetherbee, C. Dayton, J. Meyers, I. Paton, K. Spitze; Rocky Mountain Remediation Services*

9:00 **THAM-E.3**
Actinide Mobilization by Surface Water Erosion at Department of Energy Sites. *M. P. Johansen, T. E. Hakonson, F. W. Whicker; Colorado State University*

9:15 **THAM-E.4**
A Comparison of Dustborne Radiocontaminant Fluxes from Tonopah, Nevada, Palomares, Spain, and Maralinga, South Australia. *J. H. Shinn; Lawrence Livermore National Laboratory*

9:30 **THAM-E.5**
Effects of Episodic High-Wind Events and Fire on Resuspension Rates: Measurements Near the Waste Isolation Pilot Plant. *J. J. Whicker, D. D. Breshears, P. T. Wasiolek, R. Tavani, D. Schoep, T. B. Kirchner, J. C. Rodgers; Los Alamos National Laboratory, Carlsbad Environmental Monitoring and Research Center*

9:45 Break

Thursday

10:15 **THAM-E.6**
Vertical Migration of ^{239}PU in Soils from WIPP and Rocky Flats. *R. D. Whicker, S. A. Ibrahim, F. W. Whicker; Colorado State University*

10:30 **THAM-E.7**
Plutonium Contamination: Isotopics and Composition as Tracers. *D. R. Janecky, D. W. Efurd, J. P. Kaszuba; Los Alamos National Laboratory*

10:45 **THAM-E.8**
Multi-Pathway, Multi-Site Contaminant Transport: Assessing Vertical Migration, Wind Erosion and Water Erosion at Semiarid DOE Sites. *S. R. Johnson, D. D. Breshears, T. B. Kirchner; Los Alamos National Laboratory, New Mexico State University*

11:00 **THAM-E.9**
Coupling Wind and Water Erosion Models. *C. R. Meyer; U.S. Department of Agriculture, ARS*

11:15 **THAM-E.10**
Biologically-Mediated Mechanisms of Actinide Migration. F. W. Whicker; Colorado State University

12:15-2:15 PM ***PEP Program***

AAHP Courses

Saturday, June 24, 2000, 8:00 am-5:00 pm

AAHP COURSE 1
INTRODUCTION TO PHYSICAL AGENTS: RECOMMENDATIONS OF THE ACGIH. *Dr. Maurice Bitran; Ontario, Ministry of Energy and Matthew Smith; Battelle*

Physical Agents are an area of industrial hygiene, which has received increase emphasis by regulatory agencies in recent years. This 8-hour course will introduce the current exposure criteria recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) for the following physical agents:

- Noise (including Infrasound and Low Frequency Sound)
- Heat and Cold Stress
- Static and Sub-Radiofrequency Electric and Magnetic Fields
- Radiofrequency Electromagnetic Radiation
- Lasers and Non-coherent Optical Radiation
- Ergonomics

OSHA and other worldwide regulations on physical agents, and how they relate to the ACGIH recommendations will also be discussed. Participants will be able to use the knowledge gained in this course and apply it to their workplace situations. Dr. Maurice Bitran and Matthew Smith will teach the course. Dr. Bitran is a member of the ACGIH Physical Agents Committee. Mr. Smith has extensive experience performing physical agent hazard assessments.

AAHP COURSE 2
BASIC DOT/NRC NUCLEAR TRANSPORTATION REGULATIONS. *Al Grella; Grella Consulting, Inc., Locust Grove, VA*

This course is intended to provide a comprehensive review of the basic regulations of the USA for the safe transportation of radioactive materials. The regulations discussed are those of the two major regulators in the U.S., e.g. the DOT and NRC. The course includes consideration of the revisions brought about by the rulemaking actions to conform to IAEA Safety Series No. 6, 1985/1990 Edition, completed by those two agencies on Sept. 28, 1995, for which mandatory compliance was effective on April 1, 1996. Some of the anticipated future amendments to DOT/NRC regulations will also be mentioned. These future amendments will be based on U.S. adoption of latest IAEA Standards in "ST-1" (The successor to IAEA Safety Series No. 6, which was published in 1997). During 2001-2002, ST-1 is being adopted as the basis for most national and international regulations. Whether experienced in nuclear transportation activities, or just a beginner, successful completion of this course will provide the attendee with a firm basis of technical knowledge and understanding of the current DOT/NRC regulations. The course is also designed to be a positive factor which a "Hazmat Employer" might choose to consider in his triennial recertification of his "Hazmat Employee's" training pursuant to the DOT/NRC requirements for training found in 49 CFR 172, Subpart H. A "self-test" and answer key will be provided to each student. The course

manual has been carefully designed to serve as a comprehensive and useful information resource which can be of invaluable assistance to a student for future reference in applying the regulations in practice. As a supplement to the Course Manual, each attendee is also provided a copy of the "Radioactive Materials Regulations Review", RAMREG-001-98, issued in 1998 by DOT as a training aid on the DOT regulations for transport of radioactive materials.

AAHP COURSE 3

TRANSURANIC METABOLISM, TOXICOLOGY AND BIOASSAY. ***Ray Guilmette, Patricia Durbin, and Henry Spitz; Lovelace Respiratory Research Institute, Lawrence Radiation Laboratory, and University of Cincinnati***

This state of the art class is presented by 3 of the best researchers and teachers in the field today. They are presenting cutting edge information concerning transuranics. The emphasis will be on metabolism of systemic (blood-bourne) transuranics, as well as their long term fate and chronic toxicity. Most of the data presented will concern Pu, with less Am information, and even less on Np. The inhalation aspects of Transuranics will be presented.along with the evolution of systemic actinide metabolic models. The always difficult correlation of animal data to human models will be discussed.

Note: This abstract was written by the AAHP Continuing Education Committee. Please check the AAHP webpage, www.aahp-abhp.org for additional course information.

Professional Enrichment Program

Sunday, June 25 through Thursday, June 29, 2000

The Professional Enrichment Program (PEP) provides a continuing education opportunity for those attending the Health Physics Society Annual Meeting. The topics for the PEP are specifically chosen to cover a broad range of subjects. Some of the sessions are popular repeats from last year and the rest are completely new lectures in response to your suggestions. 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. The class size is limited to allow for interaction between the lecturer and the students.

The speakers, course titles, and the times for each presentation are listed on the following pages. On Sunday, June 25, the day before the Annual Meeting, a series of 40 courses will be offered. The Sunday sessions begin early to allow for 4 sections that day. The program begins at 8:00 am and finishes at 6:00 pm. The Welcome Reception begins at 6:00 pm.

In addition to the above-mentioned sessions for Sunday, six PEP lectures are scheduled on Monday and Wednesday, and five lectures on Thursday afternoons. Routine PEP attendees should note that the times of the mid-week sessions are 12:15 - 2:15 p.m. again this year, to be consistent with the scheduling of the Annual Meeting.

Registration for each two-hour course is $40 and is limited to 60 attendees on a first-come, first-served basis. Those whose registrations are received before the pre-registration deadline will be sent confirmation of their PEP course registration.

In order to further the Society's commitment to the next generation of Health Physicists, 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.

Continuing Education Credits from the American Academy of Health Physics have been granted for the PEP. The PEP lecture registration fees should be included with registration fees for the Annual Meeting. The PEP registration is included on the Annual Meeting Pre-registration form.

Please Note!!

Please remember to 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. We understand that there are circumstances that will prevent you from being on time, but we do not want to tum people away and have empty seats due to no-shows.

Note: Each course is two (2) hours in length and will earn four (4) continuing education credits.

Sunday, June 25 - 8:00-10:00 AM

1-A An Overview of Radiation Litigation. ***D. Weidis; Jose & Weidis***

PART I: BASIC LEGAL CONCEPTS and LEGAL ISSUES AND DEVELOPMENTS IN RADIATION LITIGATION

This course begins with a discussion of basic legal concepts which are fundamental to understanding radiation litigation. Among the topics covered are the Price Anderson Amendments Act, historic development of radiation injury cases, how lawyers investigate a radiation case, how the case proceeds from the incident through the discovery process, preparation for trial and trial and Plaintiffs' and Defendants' strategies used during trial. Major issues currently being litigated in this field include: what is the standard of care required of a utility, the role of the federal dose standards, the role of ALARA, radiation protection and the fetus, the role of dosimetry, the impact of new part 20 on radiation litigation, what constitutes compensable injury, what is adequate proof of causation, the role of the NIH probability of causation and the role of linear non-threshold hypothesis. Practical examples from cases will include strategy developed for depositions and trial.

PART II: THE ROLE OF THE HP IN RADIATION LITIGATION AND THE PROBLEM OF "JUNK SCIENCE"

The role of the HP in radiation will be discussed in depth. These include the HP liaison, consultant, fact/expert witness etc. Honest vs. Unethical experts — what should be done? The problem of "junk science," the Supreme Court's recent Daubert decision, and a case study using the latest decisions on expert testimony will be examined. This session includes role playing by members of the audience, and excerpts from cross examination of expert witnesses.

1-B Part I Certification Preparation. ***C. French; University of Massachusetts, Lowell***

This course is intended for individuals who are planning to take Part I of the ABHP certification examination. A brief review will be given of techniques/ methods for preparing for the examination and strategies for taking the examination. Most of the session will be devoted to discussions of questions similar to those on the ABHP examination and to consideration and discussion of specific questions from course participants. A handout will include practice questions similar to those on the ABHP examination.

1-C Food Irradiation:A Health Physicist's Primer. ***G. Claycamp; University of Pittsburgh***

Food irradiation has been used for decades to preserve foods, inhibit sprouting in roots, and to reduce or eliminate contamination by harmful bacteria, yeasts and molds. While the safety of irradiated food for human consumption is grounded in peer-reviewed research spanning nearly a century, the public has been slow to accept ionizing radiation in routine food processing. Nevertheless, recent outbreaks food-borne illness have rekindled industry and regulatory interests, in turn suggesting that a significant expansion of food irradiation is on the horizon. The overall objective of the course is to provide health physicists with background and resource material on food irradiation. The course will review fundamental radiobiology of microbes and radiation biochemistry in irradiated animal tissues. These topics will be followed by an examination of the efficacy of ionizing radiation in inactivating pathogens and the likelihood that toxicants could be formed as unwanted by-products of irradiation. The benefits and risks from food irradiation will be presented in the final portion of the course, including consideration of both real and perceived health risks to the public and to radiation workers. Finally, the regulatory status of food irradiation is reviewed.

1-D RF - The Good, The Bad, and The Ugly. ***J. DeFrank; USACHPPM***

Facts about wireless communication systems. Recent public policy decisions regarding human exposure to radiofrequency radiation from wireless communication devices to include recent FCC regulations. Controversial studies and media hype associated with these studies. Possible responses when confronted with a

concerned public. Cellular phone towers, the Not In My Backyard phenomenon. Recent legal action to regulate the placement of towers.

1-E Extremely Low Frequency (ELF) Electric and Magnetic Fields. ***M. Bitran; Ministry of Energy, Science and Technology, Ontario, Canada***

This course will provide a review of the controversy surrounding the potential health effects of power-frequency fields. Starting with a review of the physical characteristics of these fields and common sources of exposure in work environments, the discussion will continue with an overview of some of the health effects that have been linked to the exposure to ELF fields. In the area of health effects, the information obtained from epidemiological and laboratory studies will be reviewed. The session will continue with a discussion on instrumentation, measurement and exposure assessment issues and the application of exposure limits.

1-F Origin and Distribution of NORM and TENORM. ***C. Hull; University of Nevada***

NORM (Naturally Occurring Radioactive Material) is disseminated throughout the planet and atmosphere. TENORM (Technologically Enhanced Naturally Occurring Radioactive Material) is comprised of naturally occurring radionuclides, but specific activities in TENORM-bearing materials are usually elevated. This is because ^{238}U and ^{232}Th decay chain nuclides are redistributed and often concentrated during industrial or chemical processing of bulk materials that contain NORM. TENORM is prevalent in industrial societies and is becoming more common throughout the world as a variety of products such as chemical fertilizers; some petroleum products and mine tailings; rare earth and zircon sands; metals produced from certain types of ores, etc. are processed and distributed. TENORM is not only distributed in products, but is also contained in many by-products of manufacturing and chemical processing. TENORM may be significantly elevated in areas that are used to stockpile some manufacturing by-products.

This PEP course is one of two courses on NORM/TENORM that will be presented at the HPS 2000 Annual Meeting. This first course provides definitions and examples of NORM and TENORM, descriptions of natural NORM-bearing matrices, the origins of and how and why these natural matrices contain particular radionuclides, and an overview and some specific examples of industrial processes that redistribute and concentrate TENORM. The second of these NORM/TENORM PEP Courses will be presented by Philip V. Egidi and focuses on suggested and proposed regulations for the control and release of TENORM.

1-G Calibration and Control of Air Sampling Flowrates. ***M. Hoover; LLRI***

This course will present the theory and practical application of primary and secondary devices for air flow calibration and control. Common errors will be described, along with strategies for auditing, managing, and conducting the flow control portions of a technically defensible air sampling program. The presentation format will be a series of both word and numerical questions and answers. Of particular interest will be an improved method for making temperature, pressure, and gas density corrections for rotameters. Other devices that will be covered include bubble flowmeters, piston flowmeters, orifice meters, critical flow venturi meters, hot wire anemometers, and pressure feedback valves.

1-H Computerization of MARSSIM for Planning and Assessing Site Surveys. ***E. Abelquist; ORISE***

The MultiAgency Radiation Survey and Site Investigation Manual (MARSSIM) is a consensus document prepared by the EPA, DOE, NRC and DOD to provide consistent methods for conducting final status surveys at potentially contaminated sites. The final status survey demonstrates that release criteria for cleanups of radiologically contaminated lands and structures have been satisfied. To facilitate the implementation of MARSSIM survey strategies, as well as to enhance the MARSSIM learning experience, ORISE has developed a

MARSSIM software package. The Computerization Of MARSSIM for Planning and Assessing Site Surveys (COMPASS) software was developed to supplement the MARSSIM training course by helping the user with implementation of the MARSSIM approach, such as providing better illustration of the utility of prospective power curves in survey design.

COMPASS consists of several modules linked together to provide computerization of the MARSSIM survey and investigation process, including functions for 1) survey design for multiple contaminants using the unity rule, surrogate approach and gross derived concentration guideline levels (DCGLs); 2) selection of an appropriate number of measurements and samples needed by the nonparametric statistical tests and the elevated measurement comparison (EMC) test. The application includes a database for the selection of survey instrumentation and use of prospective power curves to demonstrate the attributes of each MARSSIM survey unit design; and 3) determination of whether the residual radioactivity levels meet the release criteria, using a statistically based decision rule—data quality assessment (DQA) process to interpret the survey data and make decisions using statistical hypothesis testing. The objective of the course is to familiarize the student with the operation of COMPASS for survey design and data evaluation. Several examples will be used to demonstrate the implementation of MARSSIM at different facility types, including a power reactor, research laboratory and uranium facility. It is expected that the COMPASS software will be available in May 2000 as free-ware to those interested.

1-I Radiation Dosimetry Management: Dosimeter Characteristics, Quality Assurance, and Investigations. ***S. Perle; ICN Dosimetry Division***

In a litigation-prone society, it is prudent for any business to evaluate its potential exposure to legal action, initiated by either an employee or a member of the general public. This potential is exacerbated when the phobia of radiation exposure and radioactive materials is interjected into the equation. This phobia is fuelled by the perceived risks of radiation exposure, be they fact or fantasy. With the current cancer incidence rate being approximately 1 in every 2.5 individuals (for all types of cancer), it is imperative that all facilities take a proactive look at their business vulnerability. When radiation exposure is the issue, records documentation is a critical factor, and a significant amount of effort should be expended to implement a comprehensive records management system. A comprehensive Radiation Dosimetry Management Program is essential if a business is going to mitigate any regulatory or legal intervention. This PEP session will focus on the basic configuration of various types of dosimeters, i.e., TLD, film, CR39 and criticality accident dosimetry, and the appropriate applications for which each should be selected for personnel use. Also addressed will be the appropriate Quality Assurance activities focused for each type of dosimeter, and, the appropriate requirements for investigations of dosimetry results.

1-J What's "Down the Pike" in Nuclear Transport Regulations? ***A. Grella; Grella Consulting***

The current nuclear transport regulations of the U.S. are based essentially on the international standards promulgated by the International Atomic Energy Agency (IAEA) in its Safety Series No. 6, "Regulations For The Safe Transport of Radioactive Materials, 1985 Edition, As Revised 1990 (SS6-85/90)." Amendments to conform to those standards in the U.S. were published in September 1995 and became effective for mandatory compliance on April 1, 1996. Right after that, however, the IAEA promulgated its latest overall revision of the international standards, in the form of the 1996 Edition of "Regulations For the Safe Transport of Radioactive Material," which is now referred to as document "ST-1" rather than Safety Series No. 6. IAEA has recommended that member countries and International Transport Organizations, e.g. ICAO, IATA, IMO, etc., adopt appropriate amendments by 2001 to conform to ST-1.

On December 28, 1999 the U.S. DOT published an Advance Notice of

Proposed Rulemaking: "Hazardous Materials Regulations: Compatibility With the Regulations of the International Atomic Energy Agency" (Docket No. RSPA-99-6283, HM-230). In that notice, DOT requested comments concerning the scope of a planned Notice of Proposed Rulemaking and the extent to which differences between the DOT regulations and ST-1 should be considered in proposing changes to DOT regulations. In the advanced notice DOT included a partial list of requirements which are under consideration for incorporation as a result of ST-1.

A copy of the formal Notice of Proposed Rulemaking will be included with the course notes if the Notice has been issued prior to June 25, 2000. The major features of ST-1 will be discussed and emerging issues relating to their possible adoption by the U.S. will be identified, as will the impacts on the regulated transportation community.

Persons planning to attend this PEP Course are encouraged to obtain and review ST-1 which can be purchased from the U.S. distributor:, Bernan Associates, 4611-F Assembly Drive, Lanham, MD. 20706-4391, Telephone 301-459-7666.

Sunday, June 25 - 10:30 AM-12:30 PM

2-A Avoiding Litigation and the Importance Of Record. ***D. Weidis; Jose & Weidis***

Keeping the emphasis of this course on avoiding lawsuits in the future and increasing your chances of winning if you are sued. The course examines Plaintiffs' strategies, defense counter-strategies, the importance of record keeping, the impact of settlements, aggressive vs. passive philosophy of litigation, and common mistakes HPs make which invite litigation

2-B Part II Certification Preparation. ***G. Chabot; University of Massachusetts, Lowell***

This course is intended for individuals who are considering or planning to take Part 2 of the ABHP certification examination. Some time will be spent in a quick review of techniques for preparing for and taking the examination and considerations of weaknesses in past examinations, but most of the time will be devoted to a review of the concepts and technical approaches involved in the solutions of typical examination questions. A handout will include a summary of selected equations and concepts that have appeared in the solutions of specific categories of questions. Representative questions from recent examinations will be reviewed and solutions demonstrated. Solutions to the 1999 Part 2 Examination will be made available to participants.

2-C New Technologies in Project Planning and Execution - Geographic Information System (GIS). ***D. Wells; High Hazards Services***

This course will present an informational overview of the GIS and its capabilities today. It is a computer system that records, stores, and analyzes information about the features that make up the earth's surface. A GIS can generate two- or three- dimensional images of an area, showing natural features such as hills and rivers with artificial features such as roads and power lines. Scientists use GIS images as models, making measurements, gathering data, and testing ideas. GIS is a strong tool which can make project planning much easier for all professionals. Cost preparations can be pinpointed by eliminating unknowns from the project makeup. Presentation of materials in both proposal and final drafts of reports can be enhanced by GIS. GIS technology can be used for scientific investigations, resource management, and development planning. For example, a GIS might be used to find wetlands that need protection from pollution, or calculate the probable contamination flowpath based on actual geographic representation. The future of a GIS in characterization, remediation, and decommissioning is offered for group discussion.

Many GIS databases consist of sets of information called layers. Each layer represents a particular type of geographic data. The GIS combines these layers into one image, showing how various types of data relate to one another. A GIS accepts geographic data from a variety of sources, including maps, satellite photographs, and printed text and statistics. Operators program the GIS to process the

information and to produce the images or information they need.

2-D Radio Frequency Calculations and Survey Methodology. *M. Smith; Battelle Northwest National Laboratory*

This course assumes that the student has a basic understanding of RF safety issues. Previous attendance at the PEP course "Introduction to Non-ionizing Radiation" is recommended. Basic calculations for performing RF safety calculations will be introduced along with examples of software that can be used to assist evaluations. Guidelines for RF survey methodologies contained in IEEE C95.1 IEEE Standard for Safety Levels With Respect to Human Exposure to Radiofrequency Electromagnetic Fields and IEEE C95.3, Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave, will be covered. Finally, an introduction to a variety of instruments used in RF safety measurements will be given. Illustrative examples of all the above will be presented. Participants are asked to bring a scientific calculator with them to the class.

2-E Ultraviolet Radiation Protection. *T. Hitchcock; IBM*

Ultraviolet (UV) radiation is a type of non-ionizing radiation that is both naturally-occurring and man-made, and has been shown to be the causal agent in a number of acute and chronic health effects. This course will provide an overview of ultraviolet (UV) radiation protection. This will include information on applicable characteristics and nomenclature, sources and uses, interaction mechanisms, health effects, exposure guidelines, control measures, and instrumentation and measurement.

Following completion of this brief overview, the student will be able to:

1. Recognize and define important terms.

2. Understand the biological basis of the UV exposure guidelines.

3. Describe elementary control measures.

2-F TENORM Regulations. *P. Egidi; ORNL*

Regulation for control and disposal of technologically enhanced naturally occurring radioactive material (TENORM) in the U.S. is primarily a state issue. Eight states have specific regulations pertaining to TENORM predicated on addressing oil field-related wastes. These regulations are primarily based on uranium mill tailings criteria and U.S. Nuclear Regulatory Commission (NRC) guidance. Oregon also has NORM regulations to control the mineral sands industry, but the regulations apply to all forms of TENORM in the State. Michigan allows for disposal of some TENORM in industrial landfills. Guidance is now being developed that would use dose- or risk-based approaches to regulating TENORM. New Jersey is proposing TENORM dose-based cleanup standards based on background. Attention is also being directed towards harmonization with international regulations. This is partly due to the fact that there is growing international commerce in TENORM.

Disposal options for TENORM wastes will be reviewed, including land spreading, mixing of TENORM wastes, and down-hole disposal. Positions taken by the NRC concerning authority over pre-1978 byproduct material may create an opportunity for changes in the law that could allow for disposal of some TENORM wastes in uranium mill tailings piles or in hazardous waste landfills. Reprocessing of some TENORM wastes for recovery of uranium with subsequent disposal in uranium mill tailings piles may also be possible. A summary of guidance documents from various organizations will also be discussed, including: pending implementation of the recommendations of the International Commission on Radiation Protection (ICRP); International Atomic Energy Association Safety Series and European Commission proposals; the Council of Radiation Control Program Directors' suggested State regulations for control and release of TENORM; current draft of the basis for proposed standards by the American National Standards Institute (ANSI)/Health Physics Society Working Group on NORM; and ANSI N13.12 standards for release of volumetrically contaminated material in the United States.

2-G Calculating and Reporting Fetal Radiation Exposure From Diagnostic Medical Procedures. ***A. Karam; University of Rochester***

On occasion, pregnant women receive diagnostic medical procedures using radiation or radioactivity. This may occur because they are unconscious from trauma and are not visibly pregnant or because they discover their pregnancy after the procedures. In such cases, medical health physicists should be called upon to calculate a fetal radiation dose and to report this to the woman's physicians. However, dose information alone is not sufficient because many physicians are not familiar with the fetal effects of ionizing radiation. It is essential to present supporting information to the woman's obstetrician so both doctor and patient can make a reasonable decision based on facts and not on fears. It is also important to remember that, as health physicists, we cannot make medical recommendations; we can only calculate the dose and provide references to the medical literature.

This PEP will discuss some standard methodologies for calculating fetal radiation exposure, the current medical guidelines based on the exposure and gestational age, and how this information can be presented. In addition, some legal aspects of these reports will be discussed.

2-H Development and Impact of the Amendment to 10 CFR 835. ***J. Maisler; Enercon Services, Inc.***

This course will provide information on the basis for the Department of Energy's comprehensive amendment to its occupational radiation protection regulations, 10 CFR 835. Provisions that will have a significant impact on operational radiation protection programs will be discussed. These provisions include: sealed radioactive source accountability and control, written procedures, individual qualifications and training, radiation safety training, posting and labeling, DOELAP for bioassay, and air monitoring. Specific implementation issues will be reviewed.

2-I Public Health Advisories, the NPL, and Radioactive-Waste Sites. ***P. Charp; ATSDR***

The Agency for Toxic Substances and Disease Registry (ATSDR) was established in the 1980s to be the primary federal public health agency to deal with the human health effects related to releases of hazardous waste in the United States. Among the many products produced by the agency is the public health advisory. One little known aspect of a public health advisory is its influence in determining whether a site is placed on the Environmental Protection Agency (EPA) National Priorities List for Uncontrolled Hazardous Waste Sites (referred to as NPL sites or Superfund sites). Once ATSDR issues a public health advisory recommending removal of persons from a site containing uncontrolled hazardous substances with the potential to harm human health, EPA must consider that site for inclusion on the NPL. Although thousands of documents have been produced by ATSDR throughout its history, less than 30 of them have been health advisories. Of these, five have dealt with sites contaminated with radioactive wastes. This presentation will describe the circumstances that require a health advisory, explain the role of the health advisory in the Superfund process, and discuss those five radioactively contaminated sites, their history, and final disposition.

2-J Use of Applied ALARA Techniques for Reducing Dose. ***L. Waggoner; Hanford Nuclear Reservation***

Work on radiological systems and components needs to be accomplished using techniques that minimize radiation dose to workers, limit contamination spread, and minimize radioactive waste. ALARA (As Low As Reasonably Achievable) programs at nuclear facilities emphasize the use of engineered controls to accomplish radioactive work. During this two-hour class, emphasis will be placed on the tools, equipment and work practices that are used to reduce radiation dose to workers. Discussions and demonstrations will include time-proven techniques, as well as the latest engineered controls and technology used

to reduce time in radiation areas, increase distance and install new types of temporary shielding.

Sunday, June 25 - 1:30-3:30 PM

3-A Radiation Litigation Deposition Workshop: What You Should Know if Your Deposition is Taken in a Radiation Exposure Case. ***D. Weidis; Jose & Weidis***

This workshop will address the legal and practical issues that are involved when the health physicist is required to testify in a deposition or at trial. The importance of the HP's testimony in relation to the specific case as well as the potential for setting legal precedent that can affect the outcome of cases that are litigated in the future will be discussed. The workshop will address practical "do's and don'ts" when testifying, and will discuss proper deposition preparation, how to answer certain types of questions, and avoiding potential "landmines" and typical lawyer "traps." We will use actual case studies and will do role playing with audience participation.

3-B We Are Not Cops - The Science and Art of Performing Audits. ***E. Hochheiser; University of Arizona***

Auditing laboratories is one of the best methods for developing and maintaining an effective working relationship with the researchers. Audits are conducted to insure regulatory compliance, but focusing on regulatory compliance is missing an important opportunity. The audit program increases your knowledge of what is going on in all of the laboratories, not just the ones that may have problems. At a university, audits are an important mechanism for observing the safe uses of radioactive material, radiation producing machines and lasers. It is also an opportunity to train and educate our varied population to demonstrate support and especially to enhance and improve our mutual communication with them. At the same time it is important that we work with our researchers, each with their own unique methods of using radioactive material.

This PEP will discuss when, how and what needs to be included in an effective audit program at large research university.

3-C Neutron-Sensitive Scintillating Glass Fiber Sensors for Plutonium Monitoring and Analysis. ***R. S. Seymour and C. D. Hull; Oxford Instruments Nuclear Measurements Group***

Researchers at Pacific Northwest National Laboratory (PNNL) have developed a glass fiber technology for neutron detection. Cerium-activated, lithium-silicate glass fibers respond to thermal neutrons and gamma rays and signals produced by each can be differentiated and quantified. This glass fiber technology has been refined and applied for the detection and measurement of thermal neutron and gamma ray fluxes. These commercially available detectors and detector systems are referred to as PUMA, an acronym for plutonium (Pu) Monitoring and Analysis. PUMA detectors generally have neutron detection efficiencies that are comparable or superior to ^3He and BF_3 gas tubes, but are more robust and safer. Since bundles of neutron glass fibers are flexible, detector geometries can be optimized for specific applications, thus increasing the intrinsic efficiencies of PUMA detectors. Neutron glass fiber sensors offer large active areas, significant improvements in sensitivity versus costs, a wide dynamic counting range, fast response time, and lower microphonic susceptibility than conventional neutron sensors.

This PEP course provides a background and review of the basic nuclear and optical principles of neutron glass fibers. PUMA detector panels and systems will be described in detail. First principles involved in MCNP models, detection and decision limits for neutron detection, and results of empirical testing will be discussed. Various applications for PUMA neutron and gamma ray detection systems for portal, freight, and vehicle monitoring will be presented.

3-D Introduction to Physical Agents. ***M. Smith; Battelle Northwest National Laboratory***

Physical Agents are an area of industrial hygiene, which has received increase emphasis by regulatory agencies in recent years. This 2-hour course will introduce the current exposure criteria recommended by the American

Conference of Governmental Industrial Hygienists (ACGIH) for the following physical agents:

- Noise (including Infrasound and Low Frequency Sound)
- Heat and Cold Stress
- Static and Sub-Radiofrequency Electric and Magnetic Fields
- Radiofrequency Electromagnetic Radiation
- Lasers and Non-coherent Optical Radiation
- Ergonomics

OSHA and other worldwide regulations on physical agents, and how they relate to the ACGIH recommendations will also be discussed. Participants will be able to use the knowledge gained in this course and apply it to their workplace situations.

3-E Current Issues and Developments in Portable HP Instruments. ***D. Snowder; Alpha-Idaho, L.L.C.***

A presentation on numerous issues regarding health physics instruments and their programs, including; compliance to the new ANSI N323.1997 standard and 10 CFR 835, instrument acceptance testing, ANSI N42.17 instrument testing results, modifications to instruments, performance versus cost, standardization of instrument models - good or bad?, QA requirements for HP instruments, What's next in high tech improvements?

3-F Back to Nature: Sources of NORM. ***A. Karam; University of Rochester***

We all know that NORM stands for Naturally Occurring Radioactive Materials. What is not as well-known is where in nature NORM originates. Some mineral deposits are enriched in NORM while others are not, and processing NORM-enriched rocks and minerals can lead to subsequent regulatory concerns.

This PEP will review the sources of NORM in the environment, paying special attention to those sources that are commercially important or that have the potential to affect radiation dose to the population.

3-G New In Situ Gamma Spectroscopy Computational Method. ***A. Proctor; Constellation Technology Corporation***

CTC has developed a new in situ gamma spectroscopy computational method.

In situ gamma spectroscopy is used to determine radionuclide levels for dispersed contamination. Typical sites include former DOE weapons complex sites, uranium mining and processing sites, and former manufacturing sites which processed radium, for example. In situ determinations are preferred over direct sampling because they are cost effective relative to sampling and laboratory analysis, are capable of examining large areas, and do not require disturbing and handling contaminated material. In situ spectroscopic methods are well established. Field instrumentation for in situ spectroscopy consists of a high-resolution gamma detector suspended at a fixed height (1 m) above the ground. Data is acquired using a portable multichannel analyzer. Analysis of the spectra to yield concentrations of contaminants in soil has been done using various computational procedures. Initially, spectral data are analyzed to calculate gamma photopeak areas (counts per second) and the peak areas assigned to specific radionuclides. Accurate determination of peak areas, including areas for "very small" peaks is half of the needed analysis. Peak areas (rates) are converted to activities, using normalizations based on the ratio of the ratio of disintegrations in the soil and the gammas reaching the detector. In most cases, there is no means to validate the normalizations against realistic sources. Furthermore, all normalizations make an a priori assumption concerning the distribution of contamination vs. soil depth. An order of magnitude in calculated total soil activity is not unusual for different assumed distributions vs. depth. CTC has developed a computational procedure for calculating normalizations for various depths that have been validated using data from pads at Grand Junction, CO with good agreement. The normalizations yield disintegrations/sec for contamination in soil vs. photopeak counts/sec at the detector. In addition, the

spectroscopy analysis code, RobWin, independently generates a relative efficiency curve that can be used to confirm the normalization, that is, confirm that the assumed contamination vs. depth in soil is reasonable. RobWin also provides superior capabilities for finding very small photopeaks. Use of validated normalizations and state-of-the-art spectroscopy tools can greatly improve the "confidence level" of in situ gamma spectroscopy.

3-H MARSSIM Overview. ***P. Walton; Rogers & Associates Engineering Unit***

The Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) provides the basis and methodology for planning, conducting, evaluating and documenting final status surveys. MARSSIM provides a consistent approach generally approved by both sponsor and regulatory agencies, including the Department of Defense (DOD, Environmental Protection Agency (EPA), Nuclear Regulatory Commission (NRC) and Agreement States. MARSSIM is readily becoming the nationally accepted standard for federal and state regulated decommissioning projects and the release of radioactively-contaminated sites and facilities.

This PEP will include a brief introduction of MARSSIM to provide an overall understanding of the guidance and how it may apply to decommissioning and final release of sites or facilities. The general overview will include discussions of: MARSSIM overview and background, the data life cycle, data quality objectives, the derived concentration guideline levels (DCGLs), area classification, identification of survey units, statistical design and statistical evaluation. Insights based upon actual application of the MARSSIM to real sites will be woven into the discussions.

3-I Winning With the Media. ***S. Folsom; PowerCom***

Those of us in the radiation sciences fume about the unfair and sensational coverage that our issues receive in the press. We simply want to educate the public, sure in our hearts that if the public knew what we know, they would believe what we believe. When we present data proving that a controversial radioactive materials shipment, food irradiation proposal or waste handling facility (to name just a few) is safe, we cannot understand why the public rejects our findings. Some of us secretly resent the public for being ignorant.

This presentation explores the root causes for these communications breakdowns, and offers more effective techniques to successfully connect with the community and influence public opinion through the media.

3-J Use of Contamination Control Techniques. ***J. Eby; Fluor Hanford Company***

Controlling the spread of radioactive material during work on nuclear systems is one of the tougher jobs we face as radiation safety specialists. With increased emphasis on getting jobs done faster, safer and better, we need to look at innovative ways to control the spread of radioactive contamination. This class will show the student the latest techniques in confining the spread of radioactive contamination to the environment and improved methods to reduce the number of skin and clothing contaminations that can occur. Discussions and demonstrations will provide the student with the information needed to make informed choices concerning work practices and products that confine the spread of contamination.

Sunday, June 25 - 4:00-6:00 PM

4-A Basic Aspects of Radiation Risk Assessment. ***F. Seiler; Sigma Five Consulting***

Risk assessment essentially takes information from past events and uses these data to project risks that need to be calculated in the future. This task involves a number of assumptions that need to be made in order to result in a scientifically defensible risk projection. We shall examine a number of the more important assumptions and their influence on risk estimates. Also, the use of epidemiological data will be analyzed in detail and its range of applicability evaluated. Risk assessment produces the kind of information which risk

management needs to manage radiation health risks. In addition, risk management requires risk control and we shall therefore investigate the limits of risk control and their consequences for remediation efforts and management concepts such as ALARA. Finally we shall discuss some ethical aspects of radiation risk assessment.

4-B Radiological Engineering in Decommissioning. ***T. Goff; Westinghouse***

Some of the greatest opportunities in Health Physics today are in the decommissioning of nuclear plants and weapons complex facilities. While opportunities abound, the need for professional level health physics personnel may not be obvious to the appropriate decision makers and organizational planners. This presentation will focus on opportunities for radiological engineering and the ways for health physicists to show their worth to their current and future organizations.

An opportunity is defined as a circumstance where health physicists can demonstrate their value to an organization. Health physics professionals should not depend on regulations or procedures to guarantee their positions in organizations. If professional health physics personnel are not considered as assets to the project organizations, which are assembled for decommissioning, they may simply not be included.

This presentation will concentrate on opportunities in five areas of decommissioning: ALARA, waste management, dosimetry, final survey planning, and air monitoring. Each area will be reviewed for potential needs and appropriate references that can be used and the path for the HP to prove their worth. In addition, means to determine how and where the HP should fit into the decision process will be discussed.

Using their training and experience, professional health physicists can look ahead at upcoming work to identify potential issues and problems. By teaming with others in their organization, the health physicist can bring together differing perspectives and philosophies and find innovative ways of staying ahead of these identified issues. This will not only show the value of professional health physics to organizations but also open additional opportunities for the HP.

While the primary emphasis of the presentation is on radiological engineering for decommissioning, these concepts and methods will be useful in most other areas of operational health physics.

4-C Optically Stimulated Luminescence Dosimetry. ***C. Yoder; R. S. Landauer, Inc.***

During the past several years, scientists have reported about several variations of optically stimulated luminescence (OSL) dosimetry methods. During the development of Landauer's Luxel system, research examined several methods and materials leading to the selection of a pulsed optically stimulated luminescence method using aluminum oxide powder for commercialization. The session will contain technical descriptions of cooled OSL, delayed OSL, pulsed OSL and coincident stimulation and luminescence. Performance, in terms of sensitivity, energy dependence, re-analysis ability and imaging, for each method can be adjusted by changing the stimulation conditions, detector material properties and dosimeter construction. The Luxel dosimetry system will be used to demonstrate the different technical attributes of OSL with aluminum oxide.

4-D Volunteered for Laser Safety Officer? ***J. Greco; Eastman Kodak Company***

Have you been tasked with laser safety responsibilities at your facility? Do you want to enhance your current laser safety program? In this PEP, a laser safety officer with experience in industrial, manufacturing, and R&D laser environments will discuss successful approaches to situations that may be commonly encountered. Topics of discussions will include: elements of a laser safety program, current standards and regulations, training for LSOs and laser users, medical surveillance requirements, approaches to laser inspections, eyewear selection, laser pointers, "tools of the trade," web sites of interest, and others. The new ANSI Standard (Z136.1-1999) will also be discussed. Attendees are encouraged to bring their questions to class for group discussion.

4-E Environmental Control by Ventilation. *H. Cember, CHP; Purdue University*

Environmental control of airborne contaminants in the workplace is maintained by one of two general methods: 1. General dilution ventilation, where concentration of the noxious contaminant is reduced by ventilation to acceptable level, or 2. Local exhaust ventilation, where the noxious agent is captured at the source before it can escape into the environment. The design basis for each control method will will be illustrated with examples of system design.

4-F Performance-Based Assessment of Radiological Protection Programs. *L. McKay; US DOE*

The objectives of this session are to discuss methods for effectively planning, conducting, reporting, and performing follow-up actions for performance-based assessments of radiological protection programs. The session is intentionally designed to be generic in nature (to apply to programs in all working environments). However, to illustrate critical points, specific examples will be included from various nuclear facilities and operations. In addition, the instructor will include personal suggestions, derived from almost 25 years of assessment experience, for making this process work more smoothly.

To derive maximum benefit from the session, the participant should have a working knowledge of applied health physics, a general understanding of assessment methods, and occupy a position responsible for conducting or managing assessments of an operational radiological protection program.

4-G Using Violation Outcome Data for the Purposes of Education and Prevention. *B. Emery; University of Texas, Houston*

When compared to other potential occupational hazards, work with radiation sources seldom results in readily-observable injuries or illnesses. So upper management must rely on a different set of indicators to assess the relative performance of their institution's radiation safety program. In many cases, the number of regulatory violations issued as the result of compliance inspections is used as the basis for this assessment. But as with the number of reported injuries and illnesses, the number of violations recorded provides only a crude indication of a program's overall effectiveness. Even though this shortcoming exists and is generally acknowledged, radiation safety professionals should nonetheless recognize that such tangible program outcome measures often dictate important management decisions. Prudent practitioners should be cognizant of violation trend data so that more informed comparisons can be made and sound preventive strategies put into place. In this presentation, data describing the inspection process and outcomes of the principle health and safety-related regulatory agencies will be presented, with special emphasis on the attributes of radiation-related compliance activities. Other methods available for measuring program performance will also be evaluated, and some simple preventive strategies introduced.

4-H Putting MARSSIM to Work. *K. Kasper; Scientech NES*

Application of the methodology prescribed by the MARSSIM process can be a daunting task. During this course, Scientech NES, a leading radiological decommissioning and remediation firm, will discuss the practical application of MARSSIM. The MARSSIM process will be evaluated in regards to both structures and land areas. The session is intended to provide attendees with overview information that will help them map and effectively use MARSSIM at their site.

4-I Cancelled

4-J How to Have Fun Teaching Kids and Adults about Radiation. *Carolyn Owen and Kathy Shingleton; Lawrence Livermore National Laboratory*

Teaching children and adults about radiation is both fun and challenging. This course demonstrates two different 1-hour presentations (with demonstrations and experiments) suitable for all ages. Come get ideas and handouts you can use for enjoyable presentations to schools, science fairs, career days, or other public

education forums. These presentations have been well tested and received by a wide variety of audiences. Learn how to make this topic fun for both you and your audience.

Monday, June 26 - 12:15-2:15 PM

M-1 Using the MIRD System Effectively for Medical Internal Dose Calculations.
D. Fisher; Pacific Northwest National Laboratory

Anyone can look up a dose conversion factor or run a simple computer program to calculate internal dose. However, the real key to effective use of the medical internal radiation dose (MIRD) system is to understand how it works and what the essential data input requirements are. The fundamental data are acquired from medical imaging. Image interpretation involves 1) collecting data to determine the source-organ activities, 2) plotting the source-organ time-activity curves, 3) integrating the time activity curves for an estimate of the MIRD residence time, and 4) applying the residence time values (for each important source organ) within the MIRD system to calculate the tissue absorbed dose to target organs and tumors of interest. This course will also describe selection of sampling times, integration techniques, customizing a dose assessment for a patient who doesn't resemble the MIRD phantom. Sample dose assessments will be presented, together with common mistakes to avoid. With the increased use of radiopharmaceuticals for cancer therapy, this course is essential for persons who desire better understanding of medical internal dose for treatment planning and follow-up evaluations.

M-2 Cancelled

M-3 Introduction to Non-Ionizing Radiation Safety: Practical Strategies.
J. Greco; Eastman Kodak Company

Health Physicists are increasingly requested to assess the potential hazards of non-ionizing radiation sources, and provide control strategies that are effective as well as meet requirements of applicable exposure guidelines. To accomplish this, the assessor should have a basic knowledge of proper measurement techniques and the various exposure guidelines. In this introductory PEP, an overview will be provided which addresses common sources of NIR [ultraviolet, radiofrequency/microwave, power frequency (60 Hz) and static magnetic fields], biological effects, instrumentation, exposure guidelines, and control strategies. In addition, special circumstances will be discussed, such as magnetic field effects on implanted medical devices, and ozone production from UV sources. A listing of references and useful websites will also be provided. (Please note that lasers will not be addressed during this PEP session.)

M-4 The History of Release Criteria: From de minimis to BRC, to Clearance.
W. E. Kennedy, Jr.; Dade Moeller & Associates, Inc.

Over the past forty years, attempts have been made by several organizations to develop and define a lower level for radiation protection dealing with trace amounts of either surface or bulk radioactive contamination. Release criteria are important both in terms of metal recycle from nuclear facilities, and for establishing general criteria for the release of materials from radiological control. Early attempts included those of the Atomic Energy Commission (AEC) to develop Regulatory Guide 1.86 and the early efforts of the Health Physics Society, with the American National Standards Institute (ANSI) to develop early drafts of ANSI Standard N13.12. On the international front, early efforts included those of the International Atomic Energy Agency (IAEA) to develop de minimis concentrations, first for ocean disposal, then later for disposal of material to municipal landfills. More recent efforts include the U.S. Nuclear Regulatory Commission's attempts to develop a "Below Regulatory Concern" policy, the IAEA's program on Clearance, and the final ANSI Standard N13.12 on "Surface and Volume Radioactivity Standards for Clearance." The purpose of this course is to provide an historical overview of the evolution of release criteria, both in the United States and abroad, as applied to surface and volume radioactive contamination.

M-5 Recent Radiation Accidents: Japan, Peru, Estonia. ***R. E. Toohey, PhD, CHP; REAC/TS***

This presentation will discuss several recent radiation accidents, including the criticality accident at Tokai-mura, Japan in September, 1999; the exposure to a lost radiography source in Peru in February, 1999; the theft and subsequent exposure to a high-level Cs-137 source in Estonia in November, 1994; and (if data are available), the misappropriation and rupture of a Co-60 teletherapy source in Thailand in February, 2000. The root cause of the criticality accident was the failure to follow approved operating procedures, while in the other three cases, there was inadequate control of high-activity sources. Dose estimates and clinical pathologies observed in exposed persons will be presented.

M-6 Chronic Beryllium Disease Update on Medical Aspects and Relation to Exposure. ***L. S. Newman, MD, MA, National Jewish Medical and Research Center, University of Colorado Health Sciences Center***

Beryllium has found extensive application in high-technology applications ranging from nuclear weapons to aerospace, ceramics, computers, and electronics industries. With the shrinking of the weapons industry, it has found application in the form of alloys broadly in modern industry. Unfortunately, beryllium continues to cause chronic beryllium disease (CBD) in 2% to 16% of exposed workers. Certain beryllium industrial processes and job tasks increase the risk of developing an immune response to beryllium (called beryllium sensitization) and chronic beryllium disease itself. Advances in the immunology and in beryllium epidemiologic studies have helped revolutionize the approach to beryllium disease screening and surveillance in industry. While the current OSHA standard may help prevent most cases of acute beryllium pneumonitis, adherence to the standard does not prevent CBD. Studies from the 1970s in Japan and as early as the 1940s studies in Ohio have documented cases of CBD occurring below the 2 m g/m3 threshold limit value. The best hope for prevention of beryllium disease is to substitute safer materials, limit the number of beryllium-exposed workers, introduce tighter engineering controls over beryllium processes, especially to control small particle size exposures, and to provide a safety net for workers, using medical screening programs for early detection of beryllium sensitization and early detection of CBD. Workers should be thoroughly informed of beryllium-related health hazards through workplace education programs.

Wednesday, June 28 - 12:15-2:15 PM

W-1 Biological Defense Mechanisms Induced by Low Doses of Ionizing Radiation. ***D. Boreham; AECL, Chalk River Laboratories***

Radiation protection practices are in place because exposure to large doses of ionizing radiation is known to cause harm to living organisms. Radiation can alter the genetic program contained within the DNA of living cells and if the genetic information is damaged or altered, the cell may become cancerous. However, cells have evolved efficient mechanisms that protect their DNA and repair damaged DNA or eliminate cells that contain abnormal DNA.

The presentation will focus on two of these cellular protective mechanisms: the adaptive response and apoptosis. The adaptive response has been well characterized in many organisms including humans. When cells are exposed to small doses of radiation, they can subsequently undergo an adaptive response and increase their ability to repair carcinogenic damage. This transient cellular state of resistance is believed by some scientists to reduce the health risks associated with radiation exposure. Apoptosis, another cellular mechanism that is responsive to low doses of radiation, can also function to alter the biological outcome of radiation exposure. It is a genetically programmed form of cell death or cell suicide that can selectively remove damaged cells from the population and therefore eliminate them as a potential cancer risk to the organism.

The implications of the above studies in radiation protection at low doses and dose-rates, near background radiation levels, will be discussed; particularly, the challenges that such studies pose to current radiation protection practices based on the Linear No-Threshhold (LNT) hypothesis.

W-2 Basic Laser Safety Calculations. ***T. Johnson, W. Roach; USUHS/PMB***

This course will review the basics on calculating the hazards due to VIS and IR lasers for persons who have little or no prior laser calculation experience. The required equations and terms used are initially presented. After presenting the terminology, an explanation on how to use the equations, as well as detailed examples of calculations of computing NOHD as well as OD for safety glasses will be presented. The class will use ANSI Z136.1 as a reference for all of the calculations. An ordinary calculator capable of performing square roots and exponentials (such as t^0.75) should be brought by each student so that they may follow along. The calculations in this presentation require only a knowledge of simple algebra and an interest in lasers.

W-3 Crafting a Defensible Dose Assessment. ***K. Kasper, R. Racino; Scientech NES, Inc.***

Conducting a dose assessment using available modeling codes is often a complex undertaking. Simply using default parameters often leads to unrealistic conclusions. Adjusting default values can lead to suspicion by regulators. Scientech NES, a leading radiological decommissioning and remediation firm, will discuss lessons learned from developing dose assessments for ongoing projects including experience with regulators. We will examine what parameters significantly affect the bottom line and where to find the data you need. The session is intended to provide attendees with information that will help them prepare their own justifiable and realistic dose assessment.

W-4 Oxidative Stress and Chemoprevention in Radiation Health. ***G. Claycamp; University of Pittsburgh***

Chemoprevention is the prevention of disease through dietary or pharmaceutical means relying on a diverse group of natural and synthetic agents that often includes vitamin C, tocopherol, ß-carotene and phytochemicals. At the cellular level in tissues, most chemopreventive strategies focus on either preventing oxidative stress—an imbalance between pro-oxidant and anti-oxidant conditions in body tissues or cells. Oxidative damage that results from oxidative stress is associated with a host of diseases including cancer and cardiovascular disease; and, cumulative oxidative damage is an important contributor to the aging process. Chemoprevention directly prevents oxidative stress in the short term or enhances the body's antioxidant reserves against future or chronic episodes of oxidative stress. This course will (1) introduce the health physicist to basic mechanisms of oxidative stress and chemoprevention; (2) review the mechanisms and impact of oxidative stress initiated by ionizing radiation; (3) discuss the role of chemoprevention in low-dose radiation effects including cancer; and (4) discuss the potential impact of chemoprevention in preventing radiation-induced cancer. Finally, this course will discuss the broader implications of chemoprevention on radiation risk management and health protection models.

W-5 Cancelled

W-6 Measuring External Dose in the Environment - Part I, Definitions. ***J. Alvarez; Auxier & Associates***

The measurement of external dose can be critical in D&D, dose reconstruction, and litigation. In many circumstances, employing the appropriate definition of dose is an important aspect of meeting program requirements. Distinctions between exposure rate, shallow dose, deep dose, and effective dose assume particular importance when measured values approach program or regulatory limits. In such cases, it is necessary to understand precisely the

Thursday, June 29 - 12:15-2:15 PM

TH-1 Air Sampling Environmental Radioactivity. ***E. Maher; Duke University***

Collecting, analyzing, and interpreting environmental air samples around nuclear facilities are linchpins of regulatory compliance, public confidence, and data defensibility. This overview course will provide useful and practical information on environmental air sampling such as: developing a sampling strategy, selecting the appropriate collection media and equipment, minimizing sampling line losses, and obtaining representative air samples. The course, designed for the health physicist and environmental scientist, will provide specific and directly applicable guidance for the selection of air sampling methods for the more common radionuclides, calibration of air sampling equipment, isokinetic sampling, minimum detectable activity considerations, selection of filter media, and measurement of the aerosol activity size distribution.

TH-2 Criticality Accidents: A History and Health Physics Perspective. ***D. Simpson; University of Nebraska***

The 1999 criticality accident in Tokaimura, Japan demonstrated that criticality accidents can happen in facilities that are not prepared for such events; and can involve workers, emergency response personnel, hospital care providers and others who are unfamiliar with necessary safety precautions. Health physicists from nearby facilities or agencies may find themselves called upon to assist in the response to such events even if their routine assignments do not involve the potential for criticality accidents. This lecture is designed for health physicists who do not have an extensive background in criticality safety, but who have an interest in criticality accidents and/or who might become involved, directly or indirectly in the response to a criticality accident.

An overview of the basics of criticality will be provided, including the fundamentals of criticality safety, how a criticality accident can occur, what the likely health physics consequences are, and what actions may be needed to recover from a criticality accident and assist the accident victims. The majority of the time will be spent reviewing several previous criticality accidents, and examining the health physics issues that arose from them. Factors involved in these accidents, such as dosimetry methods, dose relationships with distance, visual and other physical indications of a criticality, immediate and long-term treatment of victims, and considerations for reentry and recovery from the accident will be discussed. The lessons that were learned from these events, as well as some lessons that were not initially learned, will also be reviewed.

TH-3 Introduction to Counting Statistics. ***H. Cember, CHP; Purdue University***

The basic principles of statistics will be presented in the context of radiometric analysis. Binomial, Gaussian, and Poisson distributions will be introduced as the basis for descriptive and inferential statistics. Concepts of confidence intervals, types of errors, hypothesis testing, and minimum detectable activity (MDA) will be developed and illustrated with counting data.

TH-4 Waste Management Regulations and Repository Status. ***C. Wu; WIPP***

Since its discovery about half a century ago, nuclear energy has played an essential role in meeting the modern society's needs for electrical power, medicine, agriculture, industry, and security. The United States, as well as other industrialized countries, had long realized that proper management of the back-end of the nuclear energy cycle is important and challenging. The U.S. federal government, states, and the industry have made significant efforts in identifying nuclear waste handling, storage, and disposal options that are acceptable socially, economically, and politically. Regulations governing waste management activities have been carefully established and are continuously being improved upon. The Nuclear Waste Policy Act of 1982 (and as amended in 1987) assigned the U.S. Department of Energy the responsibility of spent nuclear fuel, high-level, and transuranic (TRU) wastes disposal. Individual states are responsible for managing low-level radioactive wastes, while any state may join force with other

states to establish a compact disposal facility. This course describes the key elements of major U.S. waste management regulations such as the Nuclear Waste Policy Act; the Resource Conservation & Recovery Act; 40 CFR 264,"Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities;" 40 CFR 268, "Land Disposal Restrictions;" the National Environmental Policy Act; 10 CFR 71, "Packaging and Transportation of Radioactive Material;" the Waste Isolation Pilot Plant (WIPP) Land Withdrawal Act; 40 CFR 191, "Environmental Radiation Protection for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Wastes;" 40 CFR 194, "Criteria for the Certification and Recertification of the WIPP Compliance with 40CFR 191;" 10 CFR 60, "Disposal of High-Level Radioactive Waste in Geologic Repositories;" and 10CFR 960, "General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories." The course also provides an overview of the licensing experience and the current status of the world's only operating geologic repository for TRU waste, the WIPP. In addition, it discusses the progress at the candidate repository for spent fuel and high-level wastes, the Yucca Mountain Project; and low-level waste disposal sites. (Work sponsored by the U.S. Department of Energy under DOE Contract No. DE-AC04-86AI31950.)

TH-5 Measuring External Dose in the Environment - Part II, Applications. ***H. Prichard; Auxier & Associates***

The measurement of external dose can be critical in D&D, dose reconstruction, and litigation. In many circumstances, employing the appropriate definition of dose is an important aspect of meeting program requirements. Distinctions between exposure rate, shallow dose, deep dose, and effective dose assume particular importance when measured values approach program or regulatory limits. In such cases, it is necessary to understand precisely the quantity required, what an instrument or dosimeter is actually measuring, and how to convert from one to the other. This course will discuss the definitions of dose-related quantities and the response characteristics of a number of common instruments and dosimeters, particularly with regard to spectral and directional dependence.

The course will be taught in two lectures. The first will cover the definitions, requirements and results of the definitions as defined in ICRP 60 and expanded in ICRU 57. The second will cover practical applications and approaches to meeting the definitions.

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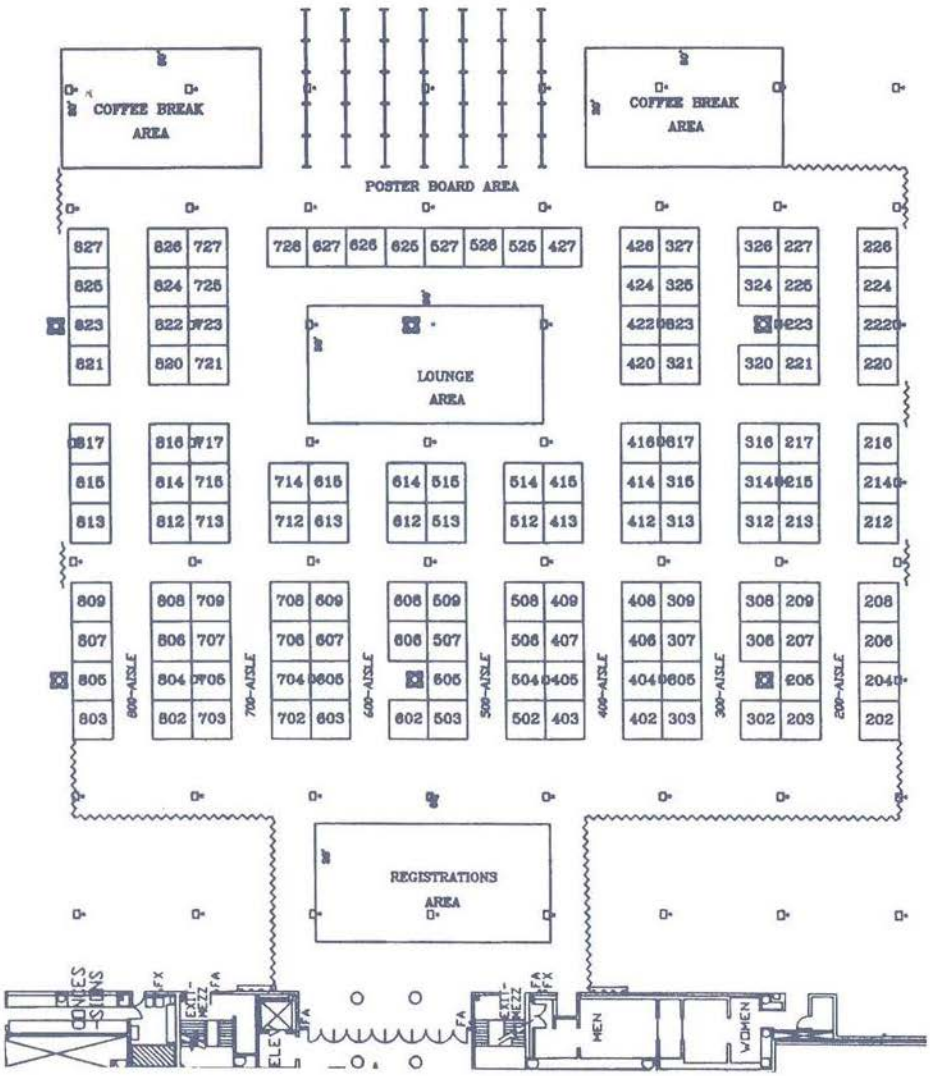

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Air monitoring equipment and supplies for radiation protection, industrial hygiene and environmental monitoring applications.

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ICN Dosimetry Service offers a full range of services for radiation monitoring, primarily through film, thermoluminescent, and track edge badges.

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Premier manufacturer of complete control instrumentation for nuclear power plants and light water reactor power plants. Leading designer and manufacturer of all health physics instruments, failed fuel location system, tritium-in-breath monitors, etc.

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Gamma, beta and neutron instrument calibration and dosimeter irradiation facilities, gamma research irradiators, process irradiators, and blood component irradiators. Source/device decommissioning.

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Landauer is the nation's leading provider of personnel radiation dosimetry services. New OSL technology, Luxel® dosimeter, measures x-ray, beta and gamma radiation along with neutron

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Laser Institute of America is the professional society dedicated to fostering lasers, laser applications and laser safety worldwide. For three decades, LIA has served the laser community through conferences, symposia, publications and courses. TheLIA is the secretariat and publisher of the ANSI Z126 series of laser safety standards.

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Designers and manufacturers of Nuclear Radiation Detectors including: GM tubes, ionization chambers, beryllium window proportional counters, flow counters, HE3 and BF3 neutron detectors. Will build to suit or choose from thousands of standards.

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Handling of Radioactive, mixed and hazardous wastes to include: Processing & Disposal of LSVs; distillation; bulking of organics for incineration; Research & Development of disposal options for "orphaned" wastes; site remediation; decay-in-storage and analytical services.

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Complete line of systems for NaI, Gamma and X-ray Spectroscopy applications.

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Protean Instrument specializes in a complete line of alpha/beta counting instruments featuring thin window and windowless gas-flow proportional detectors. Products include low-background models with automatic planchet sample changers, manual single-drawer/single-detector models and multiple-drawer/multiple-detector models. In addition, Protean Instrument offers the TRAC air sample system providing a seamless trail from sample collection to sample reporting.

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Reliable Dosimetry at a Cost you can afford. Reliable Data and personable Customer service. Radiation Detection Company, serving the Health Physics industry since 1949.

RADIATION SAFETY ASSOCIATES ***Booth 204***

Radiation consulting services, radiochemical analysis/lab services, instrument calibration and repair, decontamination and decommissioning, publications (journals and reference books) for health physicists.

RADOS TECHNOLOGY, INC. ***Booths 525, 526***

RADOS Technology will be featuring the RAM Aerosol Monitor and the DIS, an Electronic Legal Dosimetry System using the patented Direct Ion Storage principle.

ROCKY MOUNTAIN REMEDIATION SERVICES ***Booth 709***

Proven safe performance in decontamination and decommissioning, waste management and environmental remediation.

S. E. INTERNATIONAL, INC. ***Booth 305***

Manufacturer of Radiation Alert® products-handheld ionizing radiation detectors for alpha, beta, gamma and x-rays. Instruments for surface and air contamination, dosimeters, etc.

SAIC ***Booth 702***

When it comes to detecting, measuring and monitoring radiation, no one gives you more capability than SAIC. Providing state of the art dosimeters, dose management systems, area and personal monitoring systems, and a complete line of air sampling and air monitoring equipment-all built in the USA and all backed with over 25 years of experience.

SANDER GEOPHYSICS ***Booth 605***

SCIENTECH NES INC. ***Booth 208***

Full Scope Health Physics/Radiation Protection Services; Turnkey Decommissioning Services; License Termination Services

SHEPHERD MILLER, INC. ***Booth 209***

Shepherd Miller, Inc. offers a wide range of services which include environmental engineering, geochemistry, hydrology, environmental investigation and remediation, ecological risk assessment, ecological systems modeling, human health risk assessment, and radiological site characterization.

SIEMENS POWER CORPORATION ***Booth 714***

Siemens Power Corporation - Environmental Systems Division, is a worldwide leader in Personal Electronic Dosimetry devices, wireless telemetry systems and complete software monitoring packages. Sophisticated detector design(s) allow for the monitoring of the complete Radiation Energy spectrum.

STL RICHLAND ***Booth 205***

Analytical laboratory specializing in radiochemistry of bioassay and environmental matrices.

TECHNICAL ASSOCIATES ***Booth 827***
Recent additions to TA's Health Physics instrument line include smarter, more sensitive and more rugged contamination monitors including pipe and plume monitors and iodine and tritium detection systems.

TELETRIX CORPORATION ***Booth 212***
Teletrix is the country's leading supplier of Simulated Radiation Meters for radiation training programs and emergency drills. All the realism of a radioactive environment is produced without the hazard of radioactive materials being present. SimTracker places the simulators under automatic GPS control.

THERMO RETEC NUCLEAR SERVICES ***Booth 216***
Thermo Retec Corp., one of the Nation's foremost providers of nuclear services offers broad capabilities in waste management, radiological characterization and analysis and facility environmental, safety and health management.

THOMAS GRAY & ASSOCIATES, INC. ***Booth 704***
Processing and disposal of LLRW, mixed waste, sealed sources, NORM & NARM waste, decay in storage, transportation and health physics services.

UNITECH SERVICES GRP (FORMERLY INS) ***Booth 427***
Protective Wear Programs - Radioactive Laundry - Automated Laundry Monitors - Sales - Lease and service programs provided from 10 US plants and 1 European operation.

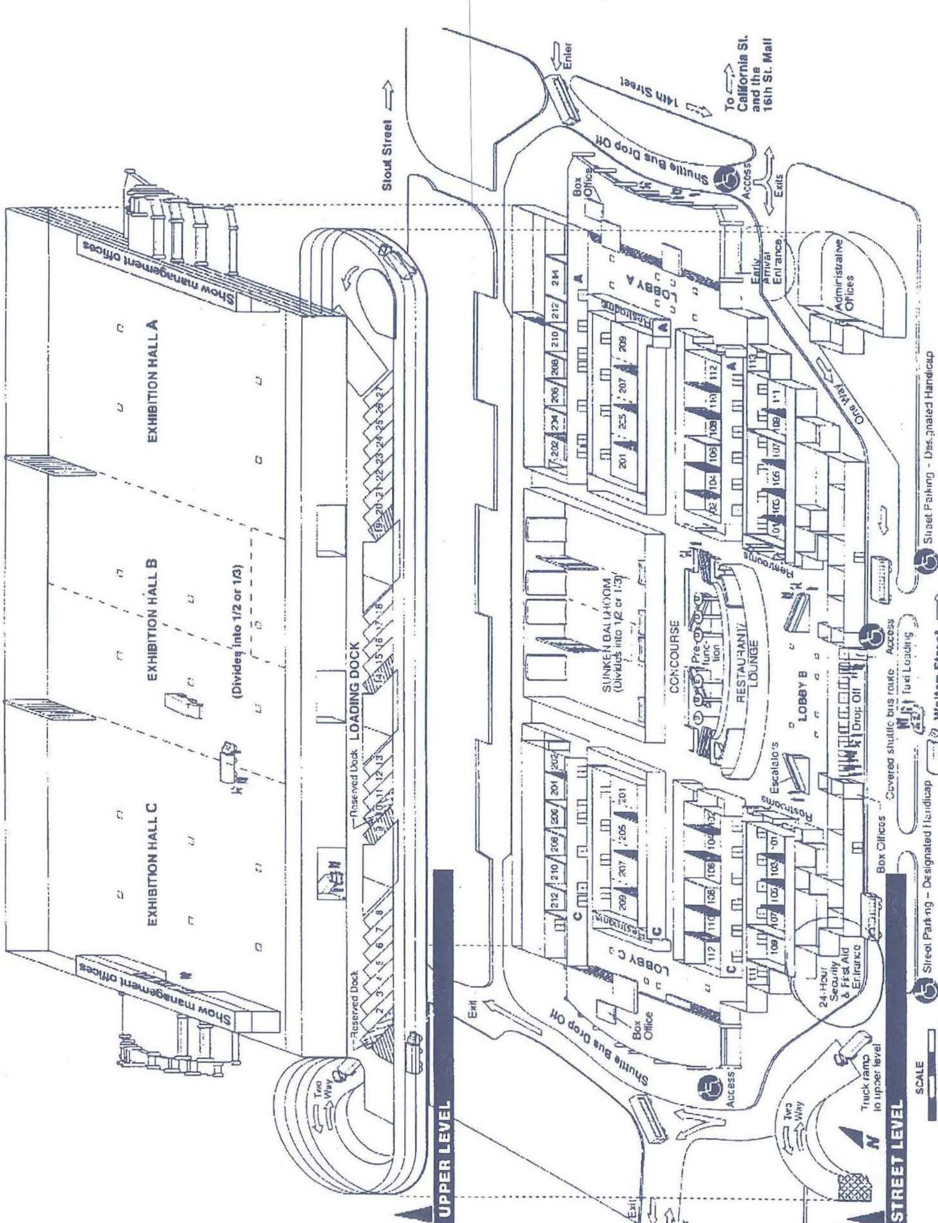
US ECOLOGY NMMC ***Booth 606***
Complete brokerage services including multiple processing and disposal options for LLRW, NORM/NARM and mixed waste. Also provide comprehensive field services including remediation and survey.

US NUCLEAR REGULATORY COMMISSION ***Booth 227***
The mission of the US Nuclear Regulatory Commission is to ensure adequate protection of the public health and safety, the common defense and security, and the environment in the use of nuclear materials in the United States.

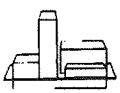
XRF CORPORATION ***Booth 825***
Radiation monitoring instrumentation.

Author Index

Denver Convention Center

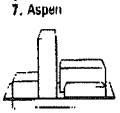


Adam's Mark



Mezzanine Level

1. Colorado
2. Silver
3. Gold
4. Century
5. Spruce
6. Denver
7. Aspen



Second Level

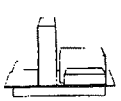
Grand Ballroom
Tower Court A–D
Windows

Buildings connect on Second Level (2)

Street Level

Directors Row E–J

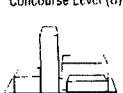
Escalator to Terrace and Majestic Levels



Concourse Level

Plaza Ballroom
Governor's Square 9–17
Plaza Court 1–8

Buildings connect underground on Concourse Level (C)

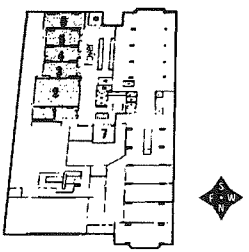


Terrace and Majestic Levels

TOWER BUILDING

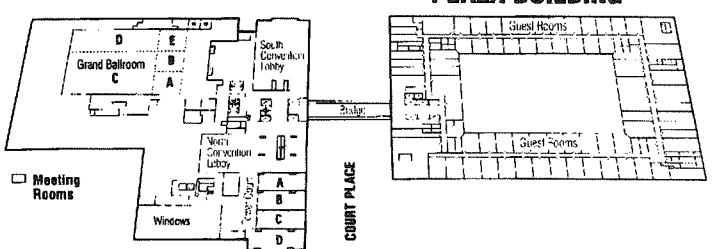
- Elevators
- Freight Elevators
- Handicapped Elevators
- Restrooms
- Stairwell
- Escalators

Meeting rooms

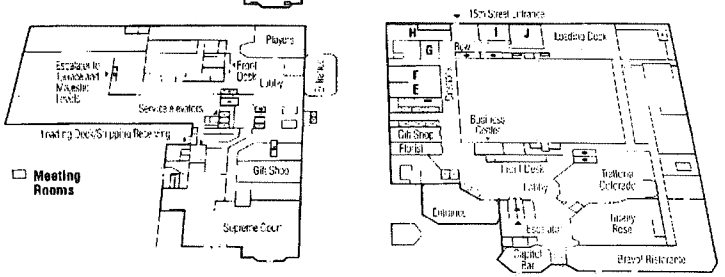


adam's mark denver

PLAZA BUILDING



Meeting Rooms



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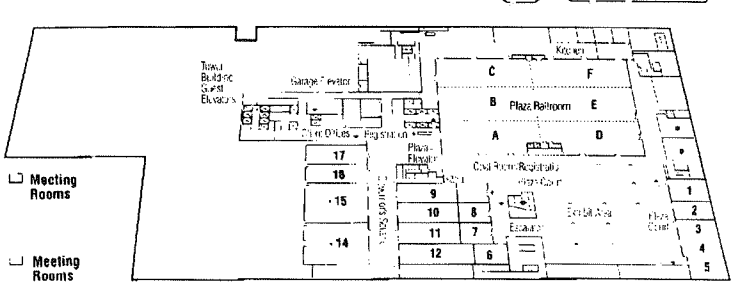

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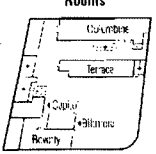
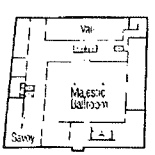


Terrace



Majestic

Terrace Level
Beverly
Biltmore
Capitol
Columbine
Terrace

Majestic Level
Majestic Ballroom
Savoy
Vail

Saturday, June 24

AAHP 1 Introduction to Physical Agents: Recommendations of the ACGIH
8 am-5 pm Governor's Square 10

AAHP 2 Basic DOT/NRC Nuclear Transportation Regulations
8 am-5 pm Governor's Square 11

AAHP 3 Transuranic Metabolism, Toxicology and Bioassay
8 am-5 pm Governor's Square 12

ALL AAHP COURSES TAKE PLACE AT THE ADAM'S MARK

Sunday, June 25

PEP 1-A thru 1-J
8-10 am Adam's Mark

PEP 2-A thru 2-J
10:30 am-12:30 pm Adam's Mark

PEP 3-A thru 3-J
1:30-3:30 pm Adam's Mark

PEP 4-A thru 4-J
4-6 pm Adam's Mark

Welcome Reception
6-7:30 pm Adam's Mark

Monday Plenary at Adam's Mark Hotel

Monday Afternoon-Wednesday Sessions at Denver Convention Center

Thursday Sessions at Adam's Mark Hotel

Monday, June 26

AM=Adam's Mark

CEL-1 Ionizing Radiation Quantities and...
7:15-8:1 5 am Plaza Ballroom D, AM

CEL-2 Managing Industrial Radiation Safety Programs
7:15-8:15 am Plaza Ballroom E, AM

ABHP Exam - Part 1
8-11 am Grand Ballroom I, AM

MAM-A Plenary Session
8:30 am-Noon Plaza Ballroom A/B/C, AM

Lunch in Exhibit Hall for all Registrants and Opening of Exhibits
Noon-1:30 pm Exhibit Hall C

PEP Program
12:15-2:15 pm

M-1 Using the MIRD System Effectively ... (202/204)

M-2 Cancelled

M-3 Introduction to Non-Ionizing Radiation ... (105/107)

M-4 The History of Release Criteria: From ...(110/112)

M-5 Recent Radiation Accidents: Japan, ... (108)

M-6 Chronic Beryllium Disease Update on ... (109)

ABHP Exam - Part 2
12:30-6:30 pm Grand Ballroom I, AM

HPS Chapter Council
1:00-2:30 pm 201

Poster/WIP Session
1:30-3:00 pm Exhibit Hall C

MPM-A Decommissioning
3:00-5:15 pm 207/209

MPM-B Radon Section Session: Perspectives for ...
3:00-5:00 pm 205

MPM-C Medical Section Session: Intravascular...
3:00-4:30 pm 201

Medical Section Business Mtg.
4:30 pm 201

Radon Section Business Meeting
5:00 pm 205

Student Reception
5:30-6:30 pm Windows, AM

Tuesday, June 27

CEL-3 Historical Perspectives of...
7:00-8:00 am 201

CEL-4 Food Irradiation: An Old Process for the New...
7:00-8:00 am 104/106

TAM-A Decommissioning Section Session: D&D Dose Modeling
8:15-10:45 am 207/209

TAM-B Internal Dosimetry
8:15-11:30 am 205

TAM-C Medical
8:15-10:45 am 201

TAM-D Accelerator Section Session
8:15-11:30 am 104/106

Decommissioning Section Business Meeting
10:45 am 207/209

Government Section Business Meeting
11:00 am 201

Accelerator Section Business Meeting
11:30 am 104/106

HPS Awards Luncheon
Noon-2:00 pm Plaza Ballroom, AM

TPM-A Special Session: Develop-ment of Clearance Standards
2:30-5:00 pm 207/209

TPM-B Bioeffects/ Biokinetics
2:30-5:15 pm 205

TPM-C RSO Section Session
2:30-5:00 pm 201

TPM-D External Dosimetry
2:30-4:45 pm 104/106

RSO Section Business Meeting
5:00 pm 201

Wednesday, June 28
AM=Adam's Mark

CEL-5 Integrated Safety Manage-ment at a DOE...
7:00-8:00 am 201

CEL-6 Intravascular Brachytherapy: Health Physics...
7:00-8:00 am 104/106

WAM-A Government Section Plenary Session: Workshop on Hamonization of Government and Private Sector...
8:15-11:15 am 205/207/209

AAHP Awards Luncheon
followed by Business Meeting
Noon-2:30 pm Ballroom, Convention Center

PEP Program
12:15-2:15 pm

W-1 Biological Defense Mech-anisms Induced..(202/204)

W-2 Basic Laser Safety Calculations (101/103)

W-3 Crafting a Defensible Dose Assessment (105/107)

W-4 Oxidative Stress and Chemoprevention... (110/112)

W-5 Cancelled

W-6 Measuring External Dose in the Environment... (109)

WPM-A AAHP
2:30-5:30 pm 205/207/209

WPM-B Environmental
2:30-5:30 pm 201

WPM-C Special Session: Current Issues in Health Physics Instrumentation
2:30-5:15 pm 104/106

WPM-D Aerosol Measurements
6:00-8:15 pm Governor's Square 15, AM

HPS Business Meeting
5:30 pm 104/106

STC Workshop on How to Present HPS Science Teacher Workshop
7:00-10:00 pm Governor's Square 10

Thursday, June 29

CEL-7 Paleo-Health Physics: Changes in Earth's Radiation Environment Over Geologic Time.
7:15-8:15 am Plaza Ballroom D

CEL-8 Radiation Accident History.
7:15-8:15 am Plaza Ballroom E

THAM-A Dose Modeling
8:30-9:45 am Director's Row H

THAM-B Emergency Planning
8:30-9:45 am Plaza Ballroom F

THAM-C Operational HP
8:30-11:15 am Plaza Ballroom D

THAM-D Special Session: Radio-chemistry
8:30-11:30 am Plaza Ballroom E

THAM-E Special Session: Contaminant Transport in Semiarid Ecosystems
8:30-11:30 am Grand Ballroom 1

PEP Program
12:15-2:15 pm

TH-1 Air Sampling Environ-mental ... Plaza Ballroom A

TH-2 Criticality Accidents: A History and Health Physics Perspective Plaza Ballroom D

TH-3 Introduction to Counting Statistics Plaza Ballroom E

TH-4 Waste Management Regulations and ...Plaza Ballroom F

TH-5 Measuring External Dose in the Environment - Part II, Applications Director's Row H

All Thursday Events Take Place at the Adam's Mark

Registration Hours

Saturday	2-5 pm *Adam's Mark*
Sunday	7 am-7pm *Adam's Mark*
Monday	8 am-Noon *Adam's Mark*
Monday	2-4 pm *Convention Center*
Tuesday	8 am-4 pm *Convention Center*
Wednesday	8 am-4 pm *Convention Center*
Thursday	8 am-Noon *Adam's Mark*

Exhibit Hall Hours

Convention Center

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

Breaks Monday PM-Wednesday AM

Featuring morning continental breakfasts and afternoon refreshments. Be sure to stop by and visit with the exhibitors while enjoying your refreshments!