FINAL PROGRAM

50th Annual Meeting of the Health Physics Society

(American Conference of Radiological Safety)

July 10-14, 2005

Spokane Convention Center

Spokane, Washington

Table of Contents

Registration Hours

Registration will take place at the
Spokane Convention Center Lobby

Saturday, July 9 . . . . . .2:00 - 5:00 pm
Sunday, July 10 . . . . . .7:00 am - 7:00 pm
Monday, July 11 . . . . . .8:00 am - 4:00 pm
Tuesday, July 12 . . . . . .8:00 am - 4:00 pm
Wednesday, July 13 . . . . . .8:00 am - 4:00 pm
Thursday, July 14 . . . . . .8:00 - 10:00 am

Officers

RAYMOND A. GUILMETTE, *President*
Ruth E. McBurney, *President Elect*
Edward F. Maher, *Secretary*
Richard R. Brey, *Secretary Elect*
Richard E. Toohey, *Treasurer*
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Kathryn Brock
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Gene Carbaugh, *Treasurer*
James D. Jamison, *Annual/Mid Yr Publicity (booth) and Packets Subcommittee*
Cindy Caldwell, *Publicity & Local Information*
Susan H Pearce, *Receptions Subcommittee*
Kathy Pryor, *Intramural Subcommittee*
Pam Tranbarger, *Technical Tours*
Tracy Ikenberry, *Night Out*
Mickey Hunacek, *Web Master*
Clyde Makinson, *Affiliates*
Terri Aldridge, *LAC Room*
Bobby Rittman, *Revenue Subcommittee (CCHPS function at the mtg)*
Terri Aldridge, *Facilities Liaison*
Dan Mantooth, *Floor Manager Chair*
Ellen Messer-Wright, *PEP Liaison*
Sharon Dossett, *AAHP Liaison*
Bryan Oldfield, *Hospitality Sub-committee*
Sharon Dossett, *Social Tours Sub-committee*

Summer School

David Waite, *Academic Dean*
Nancy Kirner, *Administrative Dean*

Important Events!

Welcome Reception

The Welcome Reception will be held Sunday, July 10, from 5:30-6:30 pm at the Spokane Convention Center.

Exhibits

Free Lunch! Free Lunch! Noon, Monday, July 11. All registered attendees are invited to attend a complimentary lunch in the exhibit hall.

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

Sessions

All Technical Sessions will be held at the Spokane Convention Center.

AAHP Awards Luncheon

Salon V, Doubletree Hotel
Tuesday, July 12
12:15 pm

HPS Awards Reception

Tuesday Evening Reception
Exhibit Hall
6:30 - 7:30 pm

HPS Awards Banquet

Tuesday Evening Awards Banquet
Bays 1 & 2 at the Spokane Convention Center
7:30 - 10:00 pm

Different this Year!

The **Welcome Reception** will be a celebration of the Health Physics Society's 50 years.

Please join us for refreshments including a 50th anniversary "cupcake" cake.

Special Plenary Session on Wednesday, 8:30 - 10:00 am, featuring Pulitzer Prize-winning author Richard Rhodes

Things to Remember!

All sessions have computer projection as the format.

No slide presentations.

All posters up Monday - Wednesday in Exhibit Hall

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

AAHP Awards Luncheon

The AAHP is sponsoring an Awards Luncheon on Tuesday, July 12, at 12:15 pm, in Salon V, Doubletree Hotel. You may purchase tickets on site at the Registration Desk.

Tuesday Evening Awards Reception & Banquet

Join your peers in honoring the following awardees while enjoying a delicious meal. Brief award presentations will immediately follow the dinner. All attendees are strongly encouraged to stay and show support for the award recipients. This event will take place in the Spokane Convention Center, Bays 1 and 2 on Tuesday, July 13 from 7:30 - 10:00 pm. The following awards are to be presented:

Robley D. Evans Commemorative Medal
John W. Poston, Sr.

Distinguished Scientific Achievement Award
Eric J. Hall

Elda E. Anderson Award
Lawrence T. Dauer

Founders Award
Charles B. Meinhold

Outstanding Science Teacher Award
Donna Armani

Fellow Award

Mary L. Birch
Bruce B. Dicey
Robert A. Fjeld
Nolan E. Hertel
David C. Kocher
John A. Leonowich
Richard V. Osborne
Roy A. Parker
Vern C. Rogers*
Lawrence N. Rothenberg
Michael T. Ryan
Casper Sun
Chuan-Fu Wu

*Posthumous

Menu

Buffalo Mozzarella Salad
with Sliced Roma Tomatoes
topped with Basil and Extra Virgin Olive Oil, Balsamic Vinegar and
Roasted Pine Nuts,
Chicken Breast with Carmelized Onions and
Salmon with Huckleberry Sauce (dual entree),
Broccoli and Shredded Carrots,
Confetti Rice,
Huckleberry Tart,
Coffee, Tea (iced or hot)

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.

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Spokane Convention Center

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Wednesday, July 13 .8:00 am-4:00 pm
Thursday, July 14 . . . .8:00 - 10:00 am

Registration Fees:

Class	Pre-Reg	On-Site
♦HPS Member	$340	$415
♦Non-Member**	$410	$485
❖Student	$ 60	$ 60
●Companion	$ 55	$ 55
Exhibition ONLY	$ 25	$ 25
Exhibitor (2/booth)	No Fee	No Fee
Add'l Awards Dinner	$ 60	$ 60
AAHP Awards New CHP	Free	Free
AAHP Awards (CHP)	$ 10	$ 10
AHHP Awards Guest	$ 15	$ 15
■Member, 1 Day	$225	$225
■Non-Member 1 Day	$225	$225
■Student, 1 Day	n/a	$ 30

♦ Includes Sunday Reception, Monday Lunch and Tuesday Awards Dinner

❖ Includes Sunday and Student Receptions, Monday Lunch and Tuesday Awards Dinner

● Includes Sunday Reception, Monday-Wednesday Continental Breakfast and afternoon snacks

■ Includes Sessions and Exhibition ONLY

** Includes Associate Membership for year 2005.

LAC Room

Saturday-Thursday . . . . .Room next to Bay 1, Spokane Convention Center

Information

Speaker Instructions

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

The **Ready Room** (Big Bend Room, Spokane Convention Center) will be open Sunday from 2-5 pm, Monday through Wednesday from 8-11 am and 2-5 pm, and Thursday from 7:30-8:30 am. You must check in at the Ready Room no later than the following times:

Present Time	**Delivery Deadline**
Monday am	2-5 pm Sunday
Monday pm	8-11 am Monday
Tuesday am	2-5 pm Monday
Tuesday pm	8-11 am Tuesday
Wednesday am	2-5 pm Tuesday
Wednesday pm	8-11 am Wednesday
Thursday am	2-5 pm Wednesday

Please meet with your session chairs in the meeting room where your paper will be presented 10 minutes before the beginning of the Session.

Placement Service

Placement Service listings will be posted in the Yakima A Room, with hours from 8:00 am-5:00 pm, Monday through Wednesday and Thursday from 8:00 am-Noon. Interviews may be conducted in the designated areas of the Placement Room.

Business Meeting

The **HPS Annual Business Meeting** will be convened at 5:30 pm on Wednesday, July 13, in the Conference Theatre, Spokane Convention Center.

Badge Color Code

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

Companion/Hospitality Room

The Hospitality Room is in the Doubletree Hotel in the Shades Room on the lobby level. Come meet with friends and learn about the available attractions in Spokane. Local HPS members will be on hand to help with planning day trips and restaurant recommendations. On Monday morning from 8 to 9 am, we invite all registered companions to an official welcome from a local representative who will provide an orientation to Spokane and answer any questions you might have.

Continental breakfast will be available Monday through Wednesday mornings for registered companions, as will afternoon refreshments if attendance warrants.

Activities and Tours

Note: Tickets still availabe for sale can be purchased at the HPS Registration Desk.

Sunday, July 10

Historic Spokane	9 am-Noon
River Rafting	1:30-5:30 pm

Monday, July 11

Historic Spokane	9 am-1:30 pm
Medical Facilities	9:30 am-3 pm
Pub Crawl	7-10 pm

Tuesday, July 12

HPS Golf Tournament	Cancelled
5K Walk/Fun Run	7-8 am
Dawn Mining Co Tour	9 am-3 pm
Spokane Winery Tour	1-4:30 pm
Recep Exhibit Hall	6:30-7:30 pm
Awards Dinner	7:30-10 pm

Wednesday, July 13

Cruise, Coeur d'Alene	11 am-5 pm
Night Out	6:30-10:30 pm

Thursday, July 14

Hanford Tour	7 am-6 pm
Silver Valley/Wallace	9:30 am-4:30 pm

Hospitality Room

for Registered Companions

Monday Welcome/Orientation
8:00 - 9:00 am
Salons I/II, DoubleTree Hotel

Hours/Days
Shades Conference Room
Lobby Level, DoubleTree Hotel

Sunday . . . . . 8 am - 3 pm
Monday . . . . . 9 am - 3 pm
Tuesday . . . . . 8 am - 3 pm
Wednesday . . . . . 8 am - 3 pm

Health Physics Society Committee Meetings

CC = Convention Center
DT = DoubleTree Hotel

Friday, July 8, 2005

ABHP BOARD MEETING
9:00 am - 5:00 pm Suite C/D (DT)

Saturday, July 9, 2005

FINANCE COMMITTEE
8:00 am - Noon Evergreen (DT)

ABHP BOARD MEETING
9:00 am - Noon Suite C/D (DT)

CONTINUING EDUCATION COMMITTEE
Noon - 5:00 pm Boardroom (DT)

AAHP EXECUTIVE COMMITTEE
1:00 - 5:00 pm Suite C/D (DT)

HPS EXECUTIVE COMMITTEE
1:00 - 5:00 pm President's Suite (DT)

HPS JOURNAL EDITORS MEETING
3:00 - 6:00 pm Suite B (DT)

Sunday, July 10, 2005

HPS BOARD OF DIRECTORS
8:00 am - 5:00 pm Salon IV (DT)

VENUES COMMITTEE
8:30 am - 4:30 pm Salon III (DT)

AAHP EXECUTIVE COMMITTEE
9:00 am - Noon Suite C/D (DT)

PROGRAM COMMITTEE
11:00 am - 2:00 pm Big Bend Rm (CC)

Monday, July 11, 2005

MEMBERSHIP COMMITTEE
Noon - 2:00 pm Exec Conference (CC)

SYMPOSIA COMMITTEE
12:30 - 4:30 pm Palouse Room (CC)

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

AAHP CONTINUING EDUCATION COMMITTEE
1:00 - 2:00 pm Suite D (DT)

ABET EVALUATORS
1:00 - 5:00 pm Boardroom (DT)

HISTORY COMMITTEE
3:00 - 5:00 pm Executive Conf (CC)

Tuesday, July 12, 2005

ABET EVALUATORS
8:00 am - Noon Boardroom (DT)

HP PROGRAM DIRECTORS ORGANIZATION
Noon - 2:00 pm Salon I (DT)

SCIENCE TEACHER WORKSHOP COMM.
Noon - 2:00 pm Okanogan C (CC)

NOMINATING COMMITTEE
Noon - 3:00 pm Palouse (CC)

LEGISLATION AND REGULATION COMMITTEE
1:00 - 3:00 pm Salon II (DT)

SCIENTIFIC AND PUBLIC ISSUES COMMITTEE
3:45 - 5:00 pm President's Suite (DT)

AAHP PROF DEVELOPMENT COMMITTEE
4:00 - 5:00 pm Okanogan C (CC)

AWARDS COMMITTEE
5:00 - 5:30 pm President's Suite (DT)

Wednesday, July 13, 2005

INTERNATIONAL RELATIONS COMMITTEE
9:00 am - Noon Palouse (CC)

AEC ACCREDITATION SUBCOMMITTEE
10:00 am - Noon Exec Conference (CC)

PUBLIC EDUCATION COMMITTEE
10:30 am - Noon Boardroom (DT)

LABORATORY ACCREDITATION POLICY
10:00 am - Noon Okanogan C (CC)

LABORATORY ACCREDITATION ASSESSMENT
Noon - 2:00 pm Okanogan C (CC)

SUMMER SCHOOL COMMITTEE
Noon - 2:00 pm Suite A (DT)

STUDENT BRANCHES
1:00 - 2:00 pm Salon I (DT)

ACADEMIC EDUCATION COMMITTEE
2:00 - 4:00 pm Salon II (DT)

Thursday, July 14, 2005

LOCAL ARRANGEMENTS COMMITTEE
7:30 - 9:30 am Palouse (CC)

HPSSC MEETING
8:00 am - Noon Salon I (DT)

PROGRAM COMMITTEE
Noon - 2:30 pm Suite B (DT)

HPS BOARD OF DIRECTORS
1:00 - 5:00 pm Salon II/III (DT)

50th Annual Meeting of the Health Physics Society

Spokane, WA, July 10-14, 2005 - Final Scientific Program

Presenter's name is underlined if other than first author.

Monday

7:00 - 8:00 AM **Bay 3**

CEL-1 Status of the Use of Internal Emitters in Medical Therapy
M. Stabin, Vanderbilt University

7:00 - 8:00 AM **Bay 4**

CEL-2 Energy Windowing Algorithms for Border Security Applications
J. Ely; Pacific Northwest National Laboratory

8:15 am-Noon **Bay 1/2/3**

PL1: Plenary Session 1

Chair: Raymond Guilmette

8:15 AM
Welcome to Spokane. *Raymond Guilmette; President, Health Physics Society; and Deputy Mayor, Jack Lynch*

8:30 AM **PL.1**
Future Nuclear Energy Systems: Generation IV
Kevan Weaver; Idaho National Laboratory

9:30 AM **BREAK**

10:00 AM **PL.2**
Low Doses of Ionizing Radiation: The Relationship Between Damage Induction and Biological Benefit Contradicts Validity of the LNT-Hypothesis
Ludwig Feinendegen; Heinrich-Heine-University Düsseldorf, Germany, Brookhaven National Laboratory ***(G. William Morgan Lecture)***

11:00 AM **PL.3**
Early Radiation Effects in Laboratory Animals - Vital Resources for Homeland Preparedness
Bruce Boecker; Lovelace Respiratory Resarch Institute ***(Robert S. Landauer, Sr. Lecture)***

Noon-1:30PM **Exhibit Hall**

Lunch in Exhibit Hall for all Registrants and Opening of Exhibits

1:30-3:00 pm **Exhibit Hall**

P: Poster Session

DECOMMISSIONING

P.1 Radionuclide Biological Remediation Resource Guide
L.W. Jensen, V.M. Ibeanusi, D.A. Grab; US Environmental Protection Agency, Spelman College, University of California, Berkeley

P.2 A GPS-Based System for Radium Contamination Gamma Scanning
R. Meyer, C. Little, M. Shields, S. Green, J. Johnson, M. Vidyasagar; MFG Inc.

EMERGENCY PLANNING/RESPONSE

P.3 An American Health Physicist in Iraq
B.L. Baumann; Fluor Federal Services

P.4 Ontario Nuclear Emergency Field Sampling Exercise
A.G. Scott; Ontario Ministry of Labour

P.5 US Nuclear Regulatory Commission Emergency Preparedness and Emergency Response
K.M. Brock, A.C. McMurtray; US Nuclear Regulatory Commission

P.6 Implications of Coming Changes in the RASCAL Atmospheric Dispersion Algorithms
J.V. Ramsdell, Jr, G.F. Athey, S.A. McGuire; Pacific Northwest National Laboratory, Athey Consulting, US Nuclear Regulatory Commission

Monday

ENVIRONMENTAL

P.7 Radiological Studies in the Hot Spring Region of Mahallat, Central Iran
M. Beitollahi, M. Ghiassi-Nejad, A. Esmaeli, R. Dunker; Idaho State University, Tarbiat Modaress University, Iran, EMC Laboratory, Harbin Institute of Technology, China

P.8 Human Health Impact Evaluation Methods for a Multiple Source Analysis using the Multimedia Pollutant Assessment System (MEPAS)
D.L. Strenge, M.A. Pelton; Pacific Northwest National Laboratory

P.9 Tritium Concentrations in Vegetation as a Function of Distance from a Low-Level Radioactive Waste Site at Los Alamos National Laboratory
P.R. Fresquez, L.M. Vasquez-Tator, E.A. Lopez; Los Alamos National Laboratory

P.10 Environmental Monitoring of External Radiation Levels at Brookhaven National Laboratory
S. Sengupta, G.R. Holeman, B. Hooda, R.N. Recieniello, H.F. Kahnhauser; Brookhaven National Laboratory, Holeman Consultants, Inc.

P.11 Inhalation Exposure from Tritium for Intrusion Scenarios at Low Level Waste Disposal Sites
P.D. Rittmann; Fluor Government Group, Inc.

P.12 Enhanced Capabilities of RESRAD-BIOTA: A Computer Program Providing a Graded Approach for Assessing Radiological Impact to Nonhuman Biota
S.L. Domotor, K.A. Higley, C. Yu, D. LePoire, T. Klett, S. Kamboj; US Department of Energy, Oregon State University, Argonne National Laboratory

P.13 Adaptation of the Features, Events, and Processes (FEP) Methodology to Environmental Restoration
G.V. Last, B.A. Napier; Pacific Northwest National Laboratory

P.14 Characterization of Surface Soils at a Former Uranium Mill
J.A. Johnson, H.R. Meyer, M. Vidyasagar, C.A. Little; MFG, Inc.

EXTERNAL DOSIMETRY

P.15 Quality Assurance and Quality Control Studies on TLD Based Dosimetry Services by the University Radiation Safety Committee of King Abdulaziz University
W.H. Abulfaraj, S.I. Bhuiyan, T.M. Ahmed, E. Elmohr; King Abdulaziz University

P.16 A System Utilizing Monte Carlo Calculation Method for Precise Assessment of Dose Distribution in Human Body in Radiation Accidents
F. Takahashi, A. Endo, Y. Yamaguchi; The Japan Atomic Energy Research Institute (JAERI)

P.17 Measurements of Field Size and Angular Dependence of Absorbed Dose Rate in Beta Particle Reference Radiation Fields with TLDs and Radiochromic Film
C.G. Soares, F. Ingellis, R. Ward, V. Pagonis; National Institute of Standards and Technology, McDaniel College

P.18 An Affordable Optically Stimulated Luminescent Dosimeter Reader
W.G. West, K.J. Kearfott, A.F. Kalchik; The University of Michigan

P.19 Temporal Sensitivity Changes and Signal Fading of LiF: Tl, Mg Under Controlled Environmental Conditions
M.L. Rodrigues, S.-H. Hsu, K.J. Kearfott, J.E. Schlicht, M.T. Sami, T.A. Lebeis; University of Michigan

Monday

P.20 The Effect of the Time-Temperature Heating Profile Design on the Precision and Accuracy of Thermoluminescent (TL) Glow Curve Peak Areas for LiF: Mg, Ti
M.L. Rodrigues, K.J. Kearfott, S.-H. Hsu, J.E. Schlicht, L.W. Parker, L.R. Baumgarten; University of Michigan

P.21 Experimental Verification of a Method for Obtaining Temporal Dose Information from Thermoluminescent Dosimeters (TLDs) Using a Simple Collimator with a Mechanical Rotating Mechanism
R.B. Gunnett, K.J. Kearfott, J.E. Schlicht; University of Michigan

P.22 Los Alamos National Laboratory Neutron Reference Field Characterization Studies
M.S. Gadd, T.D. McLean, D.T. Seagraves, R.H. Olsher, M.W. Mallett; Los Alamos National Laboratory

INSTRUMENTATION

P.23 A New Laboratory Course in Applied Radiological Measurements
K.J. Kearfott, J.A. Harvey, S.C. Dewey, M.L. Rodrigues, R.B. Gunnett, A.L. Lehnert; University of Michigan

P.24 Improving the Numerical Stability of an In-Situ Gamma Ray Spectroscopy Method using Multiple Measurements for the Determination of Activity Concentration as a Function of Depth
S.C. Dewey, K.J. Kearfott; University of Michigan

P.25 Developing a New Default Characterization Method for In Situ Gamma-Ray Spectrometry
L. Tkavadze, R. Dunker, R.R. Brey, T.F. Gesell; Idaho State University

P.26 Evaluation of Health Physics Instruments Model 2080 Pulse Neutron Survey Meter, Model 6030 Ion Chamber, and Model 1030 Pulse Survey Meter in a Linear Accelerator Produced Neutron Field
E. Anderson, K. Claver, B. Schrader, R.R. Brey; Idaho State University

P.27 Are There Large Variations in Low-Energy Response Between Your Bicron Micro-Rem Survey Meters?
M.K. Murphy, G.L. Carter, A.A. Kriss, P.J. Smith, R.K. Berg; Battelle-Pacific Northwest National Laboratory

P.28 Practical Software for Automatic Uncertainty Propagation
K.D. McCroan, C.V. Gogolak; US Environmental Protection Agency National Air and Radiation Environmental Laboratory, DHS Environmental Measurements Laboratory

INTERNAL DOSIMETRY AND BIOASSAY

P.29 In Vitro Dissolution Rates of Radionuclides in Aerosol Particles from the Florida Phosphate Industry
K.P. Kim, W.E. Bolch, C.Y. Wu, B.K. Birky; University of Florida, Florida Institute of Phosphate Research

P.30 Statistical Analysis of Dose Assignments Resulting from Plutonium Bioassays for the Mayak Cohort
M.P. Krahenbuhl, J.D. Bess, J.L. Wilde, V.V. Vostrotin, K.G. Suslova, V.F. Khokhryakov; University of Utah, Southern Urals Biophysics Institute

P.31 Investigation of Indirect Radiation Effects in the Model Archaeon Halobacterium sp. NRC-1
P.C. Retka, J.R. Smith, L.C. DeVeaux; Idaho State University, University of Maryland

Monday

P.32 Investigating Radiation By-stander Effects in the Single-Celled Organism S. pombe
N. Chelidze, L.C. DeVeaux, D.P. Wells; Idaho State University

MEDICAL HEALTH PHYSICS

P.33 Streamlining Nuclear Medicine Department Contamination Response
G.M. Sturchio, T.B. Valley; Mayo Clinic in Rochester

OPERATIONAL HEALTH PHYSICS

P.34 Introduction of an Electronic Van Module for Use in MCNP
R.J. McConn Jr, E.R. Siciliano, J.E. Schweppe; Pacific Northwest National Laboratory

P.35 Computer Codes for Exact Decision Levels and Errors of the First Kind When the Blank Count Time Is an Integer in [1, 20] Times Greater than the Sample Count Time
W.E. Potter; Consultant

P.36 Rapid Method of Gross Alpha/Beta Analysis Using Liquid Scintillation Counter for Radiological Screening and Contamination Control Survey
Y.D. Pan, R.M. Davis; Perma-Fix Environmental Services, Inc.

P.37 A Radiation Safety Computer System
C.B. Smith, R.H. Johnson; Radiation Safety Academy, Radiation Safety Academy

P.38 Neutron Measurements for Thermoluminescence Dosimeter and Electronic Personal Dosimeter Algorithms at Primary Shield Penetration of Unit 1 Pressure Water Reactor at South Texas Project Nuclear Operating Company
R.A. Aguilera, W.T. Bullard, L.M. Earls, J.A. Myers, L. Stoicescu, G.E. Williams; South Texas Project Nuclear Operating Company

P.39 Integrated Radiological Laboratory Inspection Process
C.W. Smock, T.W. LaVake, J.T. Kwiatkowski; Johnson & Johnson

P.40 Computerized System for Control and Management of Radioactive Materials: Web Based Applications in Radiation Safety
L. Zhang, D. Bandyopadhyay, S. Hoory; Mount Sinai Medical Center

P.41 How One Chapter Offers a Successful Health Physics Review Course
P.S. Stansbury, D.J. Strom; Pacific Northwest National Laboratory

P.42 A 10-Year Prospectus of Radiation Safety Program Operations at the University of Texas Southwestern Medical Center at Dallas
S. Revell, A. Tull, J.C. White, J.A. Lopez; UTSWMC

RADON

P.43 Possible Underlying Physics behind Pain Relief Received in Radon Health Spas
G.I. Lykken, B. Momcilovic, T.W. Ward; University of North Dakota, Grand Forks, Institute of Medical Research & Occupational Health, Croatia, Techsource Inc.

P.44 Laboratory Scale Investigation of Some Factors Affecting Radon-222 Air Concentrations
A.M. Mamoon; Egyptian Atomic Energy Authority

P.45 Environmental Factors Influencing Temporal Indoor Radon Concentration
M.S. Jawad, D.K. Worthy, L.R. Baumgarten, J.A. Moore, K.J. Kearfott; University of Michigan

P.46 A Simple Radon Chamber for Educational Usage
J.A. Moore, A.L. Lehnert, S.-H. Hsu, K.J. Kearfott; University of Michigan

Monday

REGULATORY/LEGAL ISSUES

P.47 The Regulatory Control System of Sealed Sources in Taiwan
H.-L. Yin, J.-Y. Huang, J. Lee; Atomic Energy Council, Taiwan

P.48 New Radiation Warning Sign
C.J. MacKenzie; International Atomic Energy Agency

MISCELLANEOUS

P.49 Cincinnati Radiation Society: "Atoms For Peace" to "Homeland Security." Fostering Knowledge of Radiation in Cincinnati Since 1952
H. Spitz; University of Cincinnati

P.50 Radiation Measurement Standards Needs
A.J. Berejka, K.L. Swinth, C.V. Gogolak, K.G.W. Inn, R.C. Yoder; Ionicorp, Swinth Associates, Environmental Measurements Laboratory, National Institute of Standards and Technology, Landauer, Inc.

WORKS-IN-PROGRESS

P.51 Inter-Comparison of Liquid Scintillation Fluor from Different Vendors
D.A. Barnes, R. Metcalf, I.B. Trujillo; Los Alamos National Laboratory

P.52 Assessing the Benefit of Radiological Source Remediation Efforts in terms of Groundwater Plume Attenuation
R.W. Falta; Clemson University

P.53 Co-60 Source Recycling at the International Isotopes Inc. Facility
J.J. Miller; International Isotopes Inc.

P.54 Sensitivity Analysis of Uranium Speciation Modeling in Several Aquifers of Interest
A.L. Scott, T.A. DeVol, R.A. Fjeld; US Army, Clemson University

P.55 Evaluating Radiation Safety Instructions To Patients Following Prostate Brachytherapy
M. Williamson, L.T. Dauer, M. Zelefsky, C. Horan, J. St. Germain; Memorial Sloan-Kettering Cancer Center

P.56 Evaluating a Radiation Safety Training Intervention For Registered Nurses in Oncology
L.T. Dauer, J. Kelvin, C. Horan, M. Williamson, J. St. Germain; Memorial Sloan-Kettering Cancer Center

P.57 The Atomic Bomb Fragment: An Experience in Explaining Nuclear Science to the Popular Media
D.W. Jokisch; Francis Marion University

P.58 Neutron Coincidence Counting for Rapid Detection and Determination of Recovered, Undetonated Weapons and RDDs
D.L. Haggard, J.E. Tanner, J.M. Tingey, A.V. Mozhayev; Pacific Northwest Laboratory

3:00-5:00 pm Bay 1

MPM-A: Internal Dosimetry, Bioassay, Biokinetics, and Risk

Co-Chairs: Patricia Lee and Pam Tranbarger

3:00 PM MPM-A.1
A Skeletal Reference Dosimetry Model for the Adult Female
K.N. Kielar, D.J. Hasenauer, A.A. Shah, W.E. Bolch; University of Florida

3:15 PM MPM-A.2
Monte Carlo Simulations of Photon Emissions from the Lungs of NORMAN Voxel Phantom Help to Certify Calibration Phantom Lungs
R.J. Traub, J.C. McDonald, T.P. Lynch; Pacific Northwest National Laboratory

3:30 PM MPM-A.3
Technical Justification for Using the Presence of Cs-137 Identified in Whole Body Counts as a Flag for Undertaking In Vitro Analysis of Sr-90/Y-90 at the INL
S. McCord, B. Anderson, P. Ruhter, R.R. Brey; Idaho State University, Idaho National Laboratory

3:45 PM **MPM-A.4**
Review of Two Recent Transuranic Intake Events at the Oak Ridge National Laboratory
D.A. McLaughlin; Oak Ridge National Laboratory

4:00 PM **MPM-A.5**
Uptake and Retention of Tritiated Pump Oil in Rats Following Intratracheal Instillation
S.M. Carlisle, P.A. Burchart; AECL, Canada, AECL

4:15 PM **MPM-A.6**
Radium-226 and the Thyroid Gland: Maybe We Know Less than We Thought
S.L. Simon, S.A. Ibrahim, L. VanMiddlesworth, R.E. Filipy, A. Bouville; National Institutes of Health, Colorado State University, University of Tennessee School of Medicine, US Transuranium and Uranium Registries, Washington State University

4:30 PM **MPM-A.7**
Predicting Human Cancer Risk for Internally Deposited Ra-226
O.G. Raabe; University of California, Davis

4:45 PM **MPM-A.8**
Carcinogenic Risks Associated with Ingesting Naturally Occurring Radionuclides in Drinking Water, including the Contribution to Overall Risk from Radon-222
D.A. Falta, T.A. DeVol, R.A. Fjeld; Clemson University

3:00-5:00 pm **Bay 2**

MPM-B: Consequence Management of RDD Incidents

Co-Chairs: Stephen Domotor and Brooke Buddemeier

3:00 PM **MPM-B.2**
Operational Guidelines and Their Application within a Framework for Consequence Management of a Radiological Dispersal Device Incident
W.C. Conklin, S.L. Domotor, A. Wallo; US Department of Homeland Security, US Department of Energy

3:30 PM **MPM-B.1**
Early-Phase Emergency-Worker-Protection Stay Time Tables for Responders with a Variety of Health Physics Information and Personal Protective Equipment
P.D. Bailey, C. Yu, S. Kamboj, J.-J. Cheng; US Department of Homeland Security, Environmental Measurements Laboratory, Argonne National Laboratory

3:45 PM **MPM-B.3**
Modeling of RDD Scenarios and Derivation of Operational Guidelines for RDD Consequence Management
C. Yu, J. Cheng, S. Kamboj, A. Miron, D. LePoire, B. Biwer, C.R. Yuen, T. Klett, S.Y. Chen, S. Domotor, A. Wallo III; Argonne National Laboratory, Department of Energy

4:15 PM **MPM-B.4**
Homeland Security - What Steps Are Being Taken by States to Prepare for a Radiological Terrorist Incident?
D. McBaugh; Washington State Department of Health and CRCPD

Monday

4:30 PM **MPM-B.5**
Operational Guidelines for Food Products Potentially Contaminated from a Radiological Dispersal Device Incident
M.A. Noska, W.C. Cunningham, C. Yu, J.-J. Cheng, S. Kamboj, S. Domotor, A. Wallo III; US Food and Drug Administration, US Department of Energy, Argonne National Laboratory

4:45 PM **MPM-B.6**
RDD Emergency Response Decision Support
T.P. Taylor, B.A. Simpson, D.E. Dale; Los Alamos National Laboratory

3:00-5:00 pm **Bay 3**

MPM-C: External Dosimetry I

Co-Chairs: Chris Martel and Tracy Ikenberry

3:00 PM **MPM-C.1**
DOE Mayak Worker Study Occupational Dose Characteristics
I. Teplyakov, M.V. Gorelov, E.K. Vasilenko, O. Alexandrova, J.J. Fix, R.I. Scherpelz; Mayak Production Association, University of Ekaterinberg, Pacific Northwest National Laboratory

3:15 PM **MPM-C.2**
Calculation of Organ Doses from External Radiation for Mayak Worker Dose Reconstruction
R.I. Scherpelz, D.O. Choe, M. Smetanin, R.J. Traub, K.F. Eckerman, E. Vasilenko; Pacific Northwest National Laboratory, University of Utah, Mayak Production Association, Oak Ridge National Laboratory

3:30 PM **MPM-C.3**
The Response of Personnel Dosimeters Worn by Workers at Mayak Production Association Facilities
M. Smetanin, V. Knyasev, R.I. Scherpelz, E. Vasilenko, J.J. Fix, M. Gorelov; Mayak Production Association, Pacific Northwest National Laboratory

3:45 PM **MPM-C.4**
A Method for Comparing and Combining Distance Dependent Calculated and Measured Values of the DS02 Dosimetry System for Japanese Atomic Bomb Survivors
H.M. Cullings, D.L. Preston, M. Hoshi, S. Fujita; Radiation Effects Research Foundation, Hirosoft International Corp., Hiroshima University

4:00 PM **MPM-C.5**
Recent Results of Passive Dosimetry Measurements on the International Space Station
E. Semones, M. Weyland, T. Shelfer, A. Johnson, E. Zapp; Lockheed Martin, NASA

4:15 PM **MPM-C.6**
Assessment of Hand Exposures from Nuclear Pharmacy Operations Using Multi-Element OSL Dosimeter Gloves
D.J. Krueger, J.L. Coffey, W. Regits, C.T. Walters, J. Gray; PETNET Pharmaceuticals, Inc., Cardinal Health, Inc., Landauer, Inc.

4:30 PM **MPM-C.7**
Assessing and Evaluating the Self-Indicating Instant Radiation Alert Dosimeter (SIRAD)
A.K. Bak, H.M. Stewart, K.A. Higley; Oregon State University

4:45 PM **MPM-C.8**
Results of Recent Phantom Backscatter Studies
S.O. Schwahn; US Department of Energy

3:00-4:45 pm **Bay 4**

MPM-D: Instrumentation

Co-Chairs: Mark Hoover and Matt McFee

3:00 PM **MPM-D.1**
Derivation of Beta/Alpha Ratios for Predicting Radon/Thoron Progeny Interference with Radiation Monitors
L.A. Rathbun; Fluor Hanford, Inc.

Monday

3:15 PM **MPM-D.2**
Experimental Investigation of the Use of Solid State Detectors in Radiation Portal Monitors
R.M. Garcia, F. Stong, R. Graff; Tetra Tech EC, Inc., SCM Consultants, Inc.

3:30 PM **MPM-D.3**
Investigation of the Response Characteristics of a Portable Portal Monitor
M. Balzer, R.R. Brey, A. Hunt, T.F. Gesell; Idaho State University

3:45 PM **MPM-D.4**
High Speed LASER Spectroscopy to Study Radiolytic Byproducts Soon After Generation
R. Ngazimbi, B. Mincher, R. Rodriguez, B.J. Phillips, R.V. Fox, R.R. Brey; Idaho State University

4:00 PM **MPM-D.5**
Phenomenon Involving the Change in Neutron Survey Meter Efficiency Versus Accumulated Dose
R.K. Piper, M.K. Murphy, A.K. Thompson; Battelle-Pacific Northwest National Laboratory, NIST

4:15 PM **MPM-D.6**
Airborne 210Pb Particle Size Measurements During and After the WTC Collapse
N.H Harley, P. Chittaporn, A. Kong, I.M. Fisenne; New York University School of Medicine, USDHS, Environmental Measurements Laboratory

4:30 PM **MPM-D.8**
A Senior Design Project to Combine Computer Aided Design (CAD) and the MCNP Code
M. Furler, J. Leone, S. May, P. Caracappa, X.G. Xu; Rensselaer Polytechnic Institut

3:00-5:00 pm Conference Theater

MPM-E: Science Teacher Workshop

Chair: Kenneth Krieger

How to Hold a Science Teacher Workshop
STC HPS; South Texas Chapter

Tuesday

7:00 - 8:00 AM **Bay 3**

CEL-3 Quehanna Facility D&D Project – "the Rest of the Story"

D.J. Allard, CHP; Bureau of Radiation Protection

7:00 - 8:00 AM **Bay 4**

CEL-4 Top Ten Reasons Why Health Physicists Might Fail As Expert Witnesses - A CEL Primer for Expert Witnesses and Potential Expert Witnesses

R. Johnson, Schmeltzer, Aptaker & Shepard, P.C.

8:30 am-Noon **Bay 1**

TAM-A: AAHP Session: BEIR VII and Radiation Risk

Co-Chairs: Thomas Buhl and Evan Douple

8:30 AM

Welcome and Opening Remarks

T. Buhl

8:45 AM **TAM-A.1**

Contributions to Radiation Risk Assessment by the Committee on Biological Effects of Ionizing Radiation (BEIR VII)

E.B. Douple, R. Jostes; The National Academies

9:30 AM **BREAK**

10:00 AM **TAM-A.2**

Biology and Genetics in the Biological Effects of Ionizing Radiation (BEIR VII) Report

J.E. Cleaver; University of California, San Francisco

11:00 AM **TAM-A.3**

The Biological Effects of Ionizing Radiation (BEIR VII) Report's Models for Estimating Cancer Risks

E.S. Gilbert; National Cancer Institute ***(G. William Morgan Lecture)***

12:15 pm Salon V DoubleTree Hotel

AAHP Luncheon

8:15-11:45 am **Bay 2**

TAM-B: Accelerator Section Session

Co-Chairs: Sayed Rokni and Lorraine Day

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

Accelerator Shielding Design: From Protons to Electrons, from America to Europe and Back

A. Fasso; Stanford Linear Accelerator Center ***(G. William Morgan Lecture)***

9:00 AM **TAM-B.2**

Updating the Department of Energy Accelerator Safety Order and Guide

D.R. Nelson, D.C. Parzyck; US Department of Enerty, Fermilab Site Office

9:15 AM **TAM-B.3**

Comparison of Shielding Design and Operational Radiation Safety Issues for Synchrotron Radiation Facilities

J.C. Liu, S.H. Rokni, Y. Asano, W.R. Casey, R.J. Donahue, P.K. Job; Stanford Linear Accelerator Center, Synchrotron Radiation Research Center, Japan, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, Argonne National Laboratory

9:30 AM **TAM-B.4**

Shielding Cask for a 252Cf Ion Source

S.I. Baker, E.F. Moore, R.C. Pardo, G. Savard; Argonne National Laboratory

9:45 AM **TAM-B.5**

Numi Work-Cell Shielding Design

K.V. Vaziri; Fermi National Accelerator Laboratory

Tuesday

10:00 AM **TAM-B.6**
High Energy Neutron Spectral Unfolding Using Activation Foils
L.S. Walker, R.H. Olsher, J. Oostens, M. James; Los Alamos National Laboratory, Campbellsville University, Kentucky

10:15 AM **BREAK**

10:45 AM **TAM-B.7**
Angular Distribution of X-Ray Differential Flux, Ambient and Effective Dose Intensity from 1 to 20 Mev Electron Accelerators
M.S. Singh, K.L. Shingleton; Lawrence Livermore National Laboratory

11:00 AM **TAM-B.8**
A Safety Analysis of a Reconfigurable Linac Target
P.F. Caracappa, R.C. Block; Rensselaer Polytechnic Institute

11:15 AM **TAM-B.9**
Cabinet-Safe Challenges for Portable Accelerator Operation
J.K. Billa, D.P. Wells, J.F. Harmon; Idaho State University

11:30 AM **TAM-B.10**
Radiation Dosimeter System for a 20 MeV Pulsed Linear Accelerator Beam at High Dose Rates for Radiobiological Applications
M.A. Mestari, J. Case, T. Webb, L.C. DeVeaux, D.P. Wells; Idaho State University

11:45 AM **Accelerator Section Business Meeting**

8:15-11:45 am **Bay 3**

TAM-C: Government Section Session

Co-Chairs: John Leonowich and Tom Bell

8:15 AM **TAM-C.1**
The Birth and Control of X-Ray Products
S.L.B. Kent, M.A. Odlaug; Food and Drug Administration, Washington Department of Health

8:45 AM **TAM-C.2**
Genesis of Radiation Control Legislation for Electronic Products
F.J. Bradley; Health Physics Consultant, NY

9:15 AM **TAM-C.3**
FDA's Pioneering Role in Laser Safety Regulations
S.L.B. Kent, J.E. Dennis; Food and Drug Administration

9:45 AM **BREAK**

10:15 AM **TAM-C.4**
Z136.1 Laser Standard Update
J.A. Leonowich; Pacific Northwest National Laboratory

10:45 AM **TAM-C.5**
The History of State and Federal Nonionizing Radiation Control Programs
S.L.B. Kent, P. O'Kelley; Food and Drug Adminstration, South Carolina Bureau of Radiological Health Department of Health & Env. Control

11:15 AM **TAM-C.6**
Update on Radio Frequency Radiation; Standards and Homeland Security
J.A. Leonowich; Pacific Northwest National Laboratory

11:45 AM **Government Section Business Meeting**

Tuesday

8:15-10:00 am Bay 4

TAM-D1: NESHAPS Special Session

Co-Chairs: Matthew Barnett and Theresa Aldridge

8:15 AM TAM-D1.1
CAP88-PC Version 3 Update
B. Shroff, R. Wood, D. Williams; US Environmental Protection Agency, Trinity Engineering Associates

8:30 AM TAM-D1.2
LANL's Approach to Meeting Rad-NESHAP External Audit Requirements
D.P. Fuehne, E.J. Hamilton; Los Alamos National Laboratory, Meteorology & Air Quality Group, Hamilton Quality Consulting

8:45 AM TAM-D1.3
Co-Locating Air Sampling Probes and Flow Sensors
J. Glissmeyer; Battelle Pacific Northwest Laboratory

9:00 AM TAM-D1.4
ANSI 1999 Compliance Testing at ORNL
L.L. Smith, J.L. Alvarez; Rad NESHAP Program Manager, Oak Ridge National Laboratory, Contractor, Auxier & Associates, Inc.

9:15 AM TAM-D1.5
Computational Modeling of a Stack Sampling Location for Radioactive Air Emissions
J.M. Barnett, M.Y. Ballinger, K.P. Recknagle, S.T. Yokuda; Pacific Northwest National Laboratory

9:30 AM TAM-D1.6
Determination of Background Radioactivity at the WIPP and Comparison with Operational Data
H.C. Chiou, C.C. Jierree; Washington TRU Solutions L.L.C.

9:45 AM TAM-D1.7
Comparison of Measured and Modeled Radionuclide Air Concentrations in the Environment Following Emissions from the Hanford Site
K. Rhoads, B.G. Fritz, L.H. Staven, L.P. Diediker, D.L. Dyekman; Pacific Northwest National Laboratory, Duratek Federal Services Hanford, Fluor Hanford, Inc.

10:00 AM BREAK

10:30-11:45 am Bay 4

TAM-D2: Environmental

Co-Chairs: Theresa Aldridge and Matthew Barnett

10:30 AM TAM-D2.1
How to Chew Gum (Using the ISO Guide to Expression of Uncertainty in Measurement)
C.V. Gogolak, K.D. McCroan; DHS Environmental Measurements Laboratory, US Environmental Protection Agency National Air and Radiation Environmental Laboratory

10:45 AM TAM-D2.2
Collective Dose to Minority and Low-Income Populations from Radionuclide Air Emissions at the Hanford Site
E.J. Antonio, K. Rhoads; Pacific Northwest National Laboratory

11:00 AM TAM-D2.4
Land Area Surveys Using High Resolution Scintillator (NaI) Detector Arrays
C. Stephan, J. Gonsky, E. Eloskof, M. Wendling, C. Domingo, T. Macchiarella; Tetra Tech FW, Inc., Eberline Service, Base Realignment and Closure, Program Management Office, West

11:15 AM TAM-D2.5
Characterizing Uranium in Environmental Media Using a Combination of Radiochemistry and Metals Analysis (ICP/MS) Methods
H.T. Downey; MACTEC

Tuesday

11:30 AM **TAM-D2.6**
An Overview of a Public Hearing Process Conducted in New Mexico Regarding the Fate of a Former Landfill at Sandia National Laboratories
M.L. Miller, R.E. Fate, J.L. Peace, M.D. Nagy, T.L. Goering; Sandia National Laboratories, Shaw Environmental, Inc., GRAM, Inc.

8:30-11:30 am Conference Theater

TAM-E: Laboratory Accreditation

Co-Chairs: Sam Keith and Chuan Fu Wu

8:30 AM **TAM-E.1**
The HPS Laboratory Accreditation Program
L.S. Keith, C.-F. Wu; CDC, US Department of Energy

8:45 AM **TAM-E.2**
The HPS Laboratory Accreditation Program
F.M. Cummings; Idaho National Laboratory

9:00 AM **TAM-E.3**
Evolution of the HPS Laboratory Accreditation Program
K.L. Swinth; Consultant

9:30 AM **TAM-E.4**
Technical Aspects of the NIST Proficiency Tests during the Accreditation Process
R.M. Minniti; NIST

9:45 AM **BREAK**

10:15 AM **TAM-E.5.**
HPS Accreditation from the Instrument Calibration Laboratory's Prospective
T.S. Slowey; K&S Associates

10:30 AM **TAM-E.6.**
Technical Aspects of the NIST Proficiency Tests for Source Manufacturer Accreditation
J.C. Cessna; NIST

10:45 AM **TAM-E.7.**
Value of HPS Accreditation to Providers and Users of NIST-Traceable Radioactivity Sources
D.M. Montgomery; Analytics, Inc.

11:00 AM **TAM-E.8**
The Value of NACLA Recognition to HPS and Other Accrediting Bodies
J.O. O'Neil; National Cooperation for Laboratory Accreditation (NACLA)

2:30-5:00 pm Bay 1

TPM-A: AAHP Session: BEIR VII and Radiation Risk

Co-Chairs: Tom Buhl and Evan Douple

2:30 PM **TPM-A.1**
Estimating Risks of Environmental Radionuclides Using GENII Version 2
B.A. Napier; Pacific Northwest National Laboratory

3:00 PM **TPM-A.2**
Health Effects of Alpha Emitters (Mechanistic Basis)
A.L. Brooks; Washington State University Tri-Cities

3:30 PM **BREAK**

4:00 PM **TPM-A.3**
BEIR VII Impact on EPA Risk Estimates and Radiation Protection Standards and Guidelines
J.S. Puskin; US Environmental Protection Agency

4:30 PM **TPM-A.4**
Radiation, Risk, and RECA - Equitable Compensation for Uranium Mining and Milling Workers, NTS Downwinders, and On-Site Test Participants
T. Buhl; Los Alamos National Laboratory

5:00 PM **AAHP Open Meeting**

Tuesday

2:30-5:30 pm Bay 2

TPM-B: Emergency Planning/Response

Co-Chairs: Kathryn Brock and Michael Noska

2:30 PM TPM-B.1
The State of Florida's Radiological Emergency Preparedness and Response Program
J.J. Lanza, H.W. Keaton; Florida Department of Health

2:45 PM TPM-B.2
Canadian Preparedness for Radiological Emergencies
T. Segura, E.J. Thorleifson, D. Mullins, L. Prud'homme-Lalonde, S. Lachapelle, S. Qutob, S. Miller, D. Morrison, D. Boreham, D. Wilkinson; Defence R&D Canada - Ottawa, Consumer and Clinical Radiation Protection Bureau, Atomic Energy of Canada Limited, McMaster Institute of Applied Radiation Sciences

3:00 PM TPM-B.3
Emergency Preparedness in the News
K.M. Brock, A.C. McMurtray; US Nuclear Regulatory Commission

3:15 PM TPM-B.4
Effective Cooperation with Emergency Response Organizations: Lessons from Fourteen Years at an Industrial Broad-Scope Licensee
R.W. Edwards; The Boeing Company

3:30 PM TPM-B.5
Radiation Awareness Training for University First Responder Personnel
P.F. Caracappa; Rensselaer Polytechnic Institute

3:45 PM BREAK

4:15 PM TPM-B.6
Emergency Radiological Response for Hospitals in Light of the Realities of Multiple Casualty Events
J.C. Keklak, L.J. Martino, A.R. Patel; Thomas Jefferson University Hospital

4:30 PM TPM-B.7
Communication of Source Appropriate Hazard and Hazard Mitigation Information to Emergency Responders
H. Wallace; Boeing

4:45 PM TPM-B.8
Using Existing Field Radiological Instrumentation to Influence Emergency Response Decisions
D.J. Van Cleef, D.M. Beals; ORTEC/ Advanced Measurement Technol-ogy, Inc., Savannah River National Lab

5:00 PM TPM-B.9
Follow-Up and Medical Treatment of Radiation Accident Victims of the 1997 Lilo Accident: Implications for Radiation Accident Medical Management
H.D. Dorr, T.M. Fliedner, V. Meineke; Institute of Radiobiology, German Armed Forces, Munich, Germany, Radiation Medicine Research Group, University of Ulm, Germany, Institute of Radiobiology German Armed Forces, Munich, Germany

5:15 PM TPM-B.10
Criticality Accidents from the Victims' Perspectives
D.M. Minnema, V.L. Putman; National Nuclear Security Administration, US Department of Energy, Idaho National Laboratory

Tuesday

2:15-5:30 pm Bay 3

TPM-C: Dose Reconstruction Special Session

Co-Chairs: Judson Kenoyer and Edward Maher

2:15 PM TPM-C.1
Update on Subtitle B of the Energy Employee Occupational Illness Compensation Program Act (EEOICPA)
D.W. Moeller, R.E. Toohey, M.P. Moeller, D.A. Dooley; Dade Moeller & Associates, Oak Ridge Associated Universities, MJW Corporation

2:30 PM TPM-C.2
Responsibilities and Activities of the US Advisory Board on Radiation and Worker Health
P.L. Ziemer; Purdue University

2:45 PM TPM-C.3
Development of DOE and AWE Site Profiles to Support Dose Reconstruction
J.L. Kenoyer, E.D. Scalsky; Dade Moeller & Associates, Advanced Technology Laboratory

3:00 PM TPM-C.4
ORAU Team Worker Outreach Program for NIOSH
W.E. Murray; Oak Ridge Associated Universities

3:15 PM TPM-C.5
ORAU Team Worker Outreach Program's Use of TopHat to Address Worker and Stakeholder Concerns
M. Fish, W. Murray; Oak Ridge Associated Universities

3:30 PM TPM-C.6
Coworker Dosimetry Distributions Used in Dose Reconstructions for the Energy Employees Occupational Illness Compensation Program Act (EEOICPA)
D.W. Hearnsberger, E.M. Brackett, S.E. Merwin, D.L. Cragle, J.L. Kenoyer; Dade Moeller and Associates, MJW Corporation, Oak Ridge Associated Universities

3:45 PM TPM-C.7
Estimation of Organ Doses from Diagnostic X-Rays for Dose Reconstruction
G.R. Davidson, R.L. Kathren, V.E. Shockley, E.M. Thomas; GRD Analytics, Inc., Washington State University, Dade Moeller & Associates, Inc., Oak Ridge Associated Universities

4:00 PM BREAK

4:30 PM TPM-C.8
Evaluating Uncertainty in Dose and Dose-Rate Effectiveness Factors for Low-LET Radiation for Use in Risk Estimation
J.R. Trabalka, A.I. Apostoaei, F.O. Hoffman, D.C. Kocher, B.A. Thomas; SENES Oak Ridge, Inc.

4:45 PM TPM-C.9
Methodology for Estimating Electron Doses to Skin of Atomic Veterans rrom Dermal Contamination
A.I. Apostoaei, D.C. Kocher; SENES Oak Ridge, Inc.

5:00 PM TPM-C.10
Development of Improved Methods of Dose Reconstruction for Atomic Veterans
D.C. Kocher, A.I. Apostoaei, J.R. Trabalka; SENES Oak Ridge, Inc.

Tuesday

5:15 PM **TPM-C.11**
Target Organ Selection Issues for Dose Reconstruction Under the Energy Employees Occupational Illness Compensation Program Act
B.A. Ulsh, R.W. Henshaw, T.D. Taulbee, D.E. Allen; National Institute for Occupational Safety and Health, National Institute for Occupational Safety and Health

2:15-4:45 pm **Bay 4**

TPM-D: Medical Health Physics

Co-Chairs: Gary Sayed and Mike Stabin

2:15 PM **TPM-D.1**
External Dosimetry of Medical Workers
R.J. Gunter; CHP Consultants

2:30 PM **TPM-D.2**
Metastatic Liver Carcinoma Therapy with SIR-Spheres: Radiation Safety Considerations for Patients and Personnel
J. Strzelczyk, T.K. Johnson; University of Colorado at Denver, University of Colorado

2:45 PM **TPM-D.3**
Radiation Dose to the Skin from Common Nuclear Medicine Radionuclides
G.M. Sturchio; Mayo Clinic in Rochester, Minnesota

3:00 PM **TPM-D.4**
Nurse Magnetic Field Exposure During Magnetic Resonance Imaging (MRI) Procedures
G.M. Sturchio, B.H. Bushman, K.J. Roebuck; Mayo Clinic in Rochester, Minnesota

3:15 PM **BREAK**

3:45 PM **TPM-D.5**
Doses Received by Pediatric Patients from Interventional Fluoroscopy Procedures
I. Thierry-Chef, S.L. Simon, D.L. Miller; National Cancer Institute - Radiation Epidemiology Branch

4:00 PM **TPM-D.6**
Skeletal Reference Models for Pediatric Patients
D. Hasenauer, C. Watchman, A. Shah, W. Bolch; University of Florida

4:15 PM **TPM-D.7**
A Case Study on NCRP 147 Implementation
V. Manickam, T.F. Gesell, R.R. Brey; Idaho State University

4:30 PM **TPM-D.8**
A Practical Way to Assess the Effectiveness of the Existing Vault Shielding for IMRT
J.B. Wojcicka, J.A. Gresick-Schugsta, J.R. Nace; York Cancer Center, WellSpan Health

4:45 PM **Medical Section Business Meeting**

2:30-5:00 pm **Conference Theater**

TPM-E: Laboratory Accreditation

Co-Chairs: Sam Keith and Chuan Fu Wu

2:30 PM **TPM-E.1**
DOELAP Experiences in Accreditation
S.O. Schwahn; US Department of Energy

2:45 PM **TPM-E.2**
National Laboratory Accreditation Program- NIST
B. Belzer; NIST/NVLAP

3:00 PM **TPM-E.3**
Accreditation for Homeland Security
G.G. Gillerman; National Institute of Standards and Technology (NIST)

Tuesday

3:30 PM **BREAK**

4:00 PM **TPM-E.4**

The Impact of the Department of Homeland Security (DHS) on Radiation Detection Instrumentation

M.C. Cox; DHS Consultant

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

Can the Health Physics Society Accredit Radiation Detection Instruments for DHS?

F.M. Cummings, C.F. Wu; Idaho National Laboratory, US Department of Energy

4:45 PM **Panel Discussion**

Wednesday

7:00 - 8:00 AM **Bay 3**

CEL-5 Employer Strategies and the Employee Performance Review
J.M. Hylko; WESKEM, LLC

7:00 - 8:00 AM **Bay 4**

CEL-6 Extreme Uncertainty: When Dose Reconstruction Becomes Doswaggery
D.Strom; Pacific Northwest National Laboratory

8:30-10:00 am **Bay 1/2/3**

PL2: Plenary Session 2: HPS History

Co-Chairs: Ronald L. Kathren and James D. Jamison

8:30 AM **PL2.1**

The Unmaking of the Nuclear Arms Race
R. Rhodes; Invited Speaker

10:00 AM **BREAK**

10:30 am-Noon **Bay 1**

WAM-A: History Session

Co-Chairs: Ronald L. Kathren and James D. Jamison

10:30 AM **WAM-A.1**

Preserving Our Atomic Past: The Cold War as History
V. Scott; Atomic Testing Museum

11:00 AM **WAM-A.2**

Highlights of the First Fifty Years of the Health Physics Society
A.J. Boerner; Oak Ridge Associated Universities

11:30 AM **WAM-A.3**

Herbert M. Parker, a Health Physics Legend
W.J. Bair; Pacific Northwest National Laboratory

10:30 am-Noon **Bay 4**

WAM-D: ANSI

Chair: Joseph P. Ring

10:30 AM **WAM-D.1**

Revisions to N3.11 "Criteria for Testing Personnel Dosimetry Performance"
C. Soares; National Institute of Standards and Technology

10:45 AM **WAM-D.2**

Background of Working Group Draft of the ANSI N13.44 Thyroid Phantom Standard
P.C. Fulmer; Francis Marion University

11:00 AM **WAM-D.3**

Status of ANSI N42 And Related Standards
M. Cox; DHS Consultant

11:15 AM **WAM-D.4**

Status of the Development of ANSI N13.38, "Selection and Use of Neutron Radiation Detection Instrumentation for Dose Equivalent Determination."
T. Voss; Los Alamos National Laboratory

11:30 AM **WAM-D.5**

ANSI N13.14 "Internal Dosimetry Programs for Tritium Exposure - Minimum Requirements"
G. Potter; Sandia National Laboratory

11:45 AM **WAM-D.6**

HPS/ANSI N13.30 Performance Criteria for Radiobioassay - Considered Modifications
J. MacLellan; Pacific Northwest National Laboratory

Wednesday

11:00 am-Noon Conference Theater

WAM-E: NIOSH/HERB Special Session Occupational Radioepidemiology Part I

Co-Chairs: David Nestle and Jeri Anderson

11:00 AM WAM-E.1
An Overview of the NIOSH Health-Related Energy Research Branch Occupational Radioepidemiology Program
S.H. Ahrenholz; National Institute for Occupational Safety and Health

11:30 AM WAM-E.2
Radiation Exposure Assessment for Epidemiologic Studies
R.D. Daniels; National Institute for Occupational Safety and Health

2:30-5:30 pm Bay 1

WPM-A: Homeland Security

Co-Chairs: David Dooley and James Griffin

2:30 PM WPM-A.1
Radiological Theft and Diversion Incidents: Analysis of World-Wide Events Occurring in Calendar Year 2003
R. Sullivan, F. Monette, R. Johnson, R. Lindley, J. Adduci, D. LePoire; Argonne National Laboratory

2:45 PM WPM-A.2
Dose-Rate Dependence of High-Dose Health Effects in Humans from Photon Radiation with Application to Radiological Terrorism
D.J. Strom; Pacific Northwest National Laboratory

3:00 PM WPM-A.3
Population Monitoring Activities Associated with the National Response Plan
R.C. Whitcomb, Jr., C.W. Miller; Centers for Disease Control and Prevention

3:15 PM WPM-A.4
Strengthening National Regulatory Infrastructures for the Security of Radioactive Sources: The US Department of Energy International Radiological Threat Reduction Program Regulatory Infrastructure Support Project
F. Morris, R. Rawl, B. Dodd; Pacific Northwest National Laboratory, Oak Ridge National Laboratory, Consultant

3:30 PM WPM-A.5
Calculated Response Functions for a Fiber Optic Neutron Spectrometer
R.J. McConn Jr, M. Bliss, R.I. Scherpelz, D.V. Jordan, D.S. Barnett; Pacific Northwest National Laboratory

3:45 PM WPM-A.6
RISK-RDD, a Radiological Incident Risk Management Tool
B.M. Biwer, D.J. LePoire, M.A. Lazaro, T. Allison, S. Kamboj, S.Y. Chen; Argonne National Laboratory

4:00 PM BREAK

4:30 PM WPM-A.7
Internal Dosimetry Protocols Following a RDD/WMD Terrorist Event
D.A. Dooley, R.E. Goans, E.M. Brackett, J.P. Griffin, G.J. Vargo, L.G. Henry; MJW Corporation

4:45 PM WPM-A.8
Radiation Portal Monitor Calibration and Startup
J.R. Hoyt, D.B. Shipler, K.R. Ames, R.B. Sitsler, R.A. Jones, E.J. Antonio, B.C. Gibson; Pacific Northwest National Laboratory

5:00 PM WPM-A.9
A New Portable Whole Body Counter for Use Following an RDD or IND Event
G.H. Kramer, B.M. Hauck; Human Monitoring Laboratory, Health Canada

Wednesday

5:15 PM **WPM-A.10**
Computed Tomography (CT) for Detecting and Imaging Fissionable Material
S. Naeem, D.P. Wells, T. White, T. Roney; Idaho State University, Idaho National Laboratory

2:30-5:15 pm **Bay 2**

WPM-B: External Dosimetry II

Co-Chairs: Greg Komp and Ed Tupin

2:30 PM **WPM-B.1**
An Integrated Photon, Neutron and Beta Calibration Phantom and Storage System for Thermoluminescent Detectors (TLDs)
K.J. Kearfott, L.W. Parker, D.A. Cusumano; University of Michigan, Advance Group, LLC

2:45 PM **WPM-B.2**
Quality Issues in Outsourcing Dosimetry
N. Stanford; Stanford Dosimetry, LLC

3:00 PM **WPM-B.3**
Adding Radionuclides to the Varskin 3 Library Correctly
J.S. Durham; Colorado State University

3:15 PM **WPM-B.4**
A GEM-Based TEPC for Neutron Protection Dosimetry
C.K. Wang, M. Seidaliev; Georgia Institute of Technology, Georgia Institute of Technology

3:30 PM **BREAK**

4:00 PM **WPM-B.5**
Correcting Neutron Dosimetry Records for Epidemiology. Part I: Determining a Bias Factor
R.I. Scherpelz, J.J. Fix, D.J. Strom, R.J. Traub; Pacific Northwest National Laboratory

4:15 PM **WPM-B.6**
Correcting Neutron Dosimetry Records for Epidemiology. Part II: Dose Imputation and Uncertainty
D.J. Strom, R.I. Scherpelz, J.J. Fix, R.J. Traub; Pacific Northwest National Laboratory

4:30 PM **WPM-B.7**
Doses Delivered to Thermoluminescence Detectors (TLDs) Due to Radon Gas
L.W. Parker, J.A. Moore, S.-H. Hsu, A.L. Lehnert, M.L. Rodrigues, K.J. Kearfott; University of Michigan

4:45 PM **WPM-B.8**
Calibration and Response of Neutron Bubble Dosimeters from Thermal Energies to 60 MeV
T.D. McLean, L.L. Romero, D.T. Seagraves, R.H. Olsher, R.T. Devine; Los Alamos National Laboratory

5:00 PM **WPM-B.9**
The Thermoluminescent Properties of G-200 Feldspar in a Pressed Potassium Bromide (KBr) Matrix
T.A. Lebeis, W.G. West, M.L. Rodrigues, A.F. Kalchik, K.J. Kearfott; University of Michigan

2:30-5:30 pm **Bay 3**

WPM-C: Decommissioning

Co-Chairs: Kenneth Krieger and David Ottley

2:30 PM **WPM-C.1**
Radiological Challenges Associated with Decontamination and Demolition of Two Highly Contaminated Outdoor Carbon Steel Ancillary Facilities at Hanford's N-Reactor Complex
G.J. Gibbons; Bechtel Hanford, Inc.

2:45 PM **WPM-C.2**
Dawn Mining Company Millsite Soil Characterization
M. Vidyasagar, J.A. Johnson, H.R. Meyer, C.A. Little; MFG, Inc.

Wednesday

3:00 PM **WPM-C.3**
Evaluating Atmospheric Release Fractions from Water Jet Waste Retrieval
J.A. Bamberger, L.L. Penn, J.A. Glissmeyer; Pacific Northwest National Laboratory, CH2M Hill Hanford Group

3:15 PM **WPM-C.4**
Effects of Surface Paint Coatings on 232Th Surface Contamination Detection
J.S. Bland, A. Reyes, J.K. Doan; Chesapeake Nuclear Services, Inc.

3:30 PM **WPM-C.5**
Characterization of Surface Contamination in 56 Rooms of a Decommissioned Radiological Laboratory
K.E. Meyer; Canberra Oak Ridge, LLC

3:45 PM **BREAK**

4:00 PM **WPM-C.6**
Locating Radiation Survey Locations with RF and Ultrasound
C.M. Wiblin, B.D. Wiblin; RadSurvey Systems LLC

4:15 PM **WPM-C.7**
Proposal for Risk Informed Removable Contamination Limits
K.N. Lambert; Drexel University

4:30 PM **WPM-C.8**
Regulatory Harmony and the License Termination Process
H.J. Newman; NEXTEP Environmental, Inc.

4:45 PM **WPM-C.9**
Multidisciplinary Approach to Achievement of Risk-Based End-States for Facility Decom-missioning at the Savannah River Site
P.L. Lee, G.T. Jannik, E.P. Shine, K.L. Dixon, J.L. Roach, Jr., T.O. Oliver, R.C. Tuckfield, V.R. Fricke; Savannah River National Laboratory, Westinghouse Savannah River Company

5:00 PM **WPM-C.10**
Modifying the MDA Calculation to Include Anticipated Residual Contamination
A.E. Desrosiers; Bartlett Services, Inc.

5:15 PM **WPM-C.11**
The Impact of False-Negative Assessments in the Accelerated Clean-Up Era: Corporate Profits/Incentive Awards Versus Undefined Health Effects
W.H. Knox; Hi Tech Solutions

2:30-5:30 pm **Bay 4**

WPM-D: Operational Health Physics

Co-Chairs: Dave Medich and Jay Maisler

2:30 PM **WPM-D.1**
The OPEX Program at Bruce Power
L.D. Romanowich; Bruce Power

2:45 PM **WPM-D.2**
Minimizing Cost and Radwaste with Protective Clothing
J.M. Price; Southern California Edison

3:00 PM **WPM-D.3**
EPRI ALARA Assessments at Nuclear Power Plants: Results Update
S. Bushart, P. Saunders, D. Quinn; Electric Power Research Institute, Suncoast Solutions, Inc., DAQ, Inc.

3:15 PM **WPM-D.4**
Public Doses Resulting from Nuclear Power Plant Emissions
J.T. Harris; Purdue University

3:30 PM **WPM-D.5**
Dose Mapping for the Uranium-233 Disposition and Medical Isotope Production Project at Oak Ridge, Tennessee
D.E. Gergely, W.P. Riley, T.R. Butz; Nuclear Fuel Services, Inc., Duratek, Inc.

3:45 PM **BREAK**

Wednesday

4:15 PM **WPM-D.6**
Characterization of the Neutron Spectra in Various Oregon State University TRIGA(r) Reactor Irradiation Facilities
E.D. Ashbaker, S.R. Reese, L.R. Greenwood; Oregon State University, Pacific Northwest National Laboratory

4:30 PM **WPM-D.7**
Experience of Planning and Implementing of a MicroPET Scanning Facility
D.J. Sherman; SUNY Buffalo, Environment Health and Safety

4:45 PM **WPM-D.8**
Brain-Based Learning - New Approaches for Effective Radiation Safety Training
R.H. Johnson; Radiation Safety Academy

5:00 PM **WPM-D.9**
Radiation Protection in Former Yugoslavia and Serbia and Montenegro and Health Physics Society
M.M. Ninkovic; Institute of Nuclear Sciences - Vinca, Belgrade, Serbia and Montenegro

5:15 PM **WPM-D.10**
Well Logging Using Radioactive Sources
D.D. Brown; Halliburton Energy Services

2:30-4:30 pm Conference Theater

WPM-E: NIOSH/HERB Special Session Occupational Radioepidemiology Part II

Co-Chairs: David Nestle and Jeri Anderson

2:30 PM **WPM-E.1**
The Importance of Industrial Hygiene Exposure Assessment in Radioepidemiology
D.D. Zaebst; National Institute for Occupational Safety and Health

3:00 PM **WPM-E.2**
A Nested Case-Control Study of Leukemia and Ionizing Radiation at the Portsmouth Naval Shipyard
T.L. Kubale, R.D. Daniels, J.H. Yiin, G.M. Kinnis, J.R. Couch, M.K. Schubauer-Berigan, S.R. Silver, S.J. Nowlin, P. Chen; National Institute for Occupational Safety and Health, Westat Inc.

3:30 PM **WPM-E.3**
Non-Hodgkin Lymphoma & Hematopoietic Cancer Mortality Among Idaho National Engineering and Environmental Laboratory Workers
M.K. Schubauer-Berigan, G.V. Macievic, D.F. Utterback, C.-Y. Tseng; National Institute for Occupational Safety and Health

4:00 PM **Discussion**

5:30 - 6:30 pm Conference Theatre

HPS Business Meeting

Wednesday
ADJUNCT TECHNICAL SESSION

6:00-8:00 pm Salons I/II, DoubleTree Hotel

AEROSOL MEASUREMENTS

(All presentations are 15 minutes)

Chair: Morgan Cox

A Summary of the 2005 Air Monitoring Users Group meeting" (sponsored by Los Alamos National Laboratory)
M. Cox; DHS Consultant

Occupational Experience with the Eberline Alpha-7L at LANL
D. Wannigman, T. Voss; Los Alamos National Laboratory

Estimates of Increased Exposure to Contamination Dust Following Forest Disturbance
J.J. Whicker, J.E. Pinder, D.D. Brashears, C.F. Eberhart; Los Alamos National Laboratory, Colorado State University, University of Arizona

Recent Developments in Detectors for Air Monitoring
T. McLean; Los Alamos National Laboratory

The Current Status of Radioactive Air Monitoring Standards: American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC)
M. Cox; DHS Consultant

An Update on Collaboration to Creating a New Handbook on Radioactive Aerosol Sampling Methods
M.D. Hoover; NIOSH-Morgantown

Planning for the Next Decade of NORA: Partnering Opportunities to Translate Research into Practice Through the National Occupational Research Agenda
M.D. Hoover; NIOSH-Morgantown

Changes to EPA Radiological Stack Monitoring Requirements and Ramifications on LANL Operations
D. Fuehne; Los Alamos National Laboratory

A Discussion of Aerosol Measurements Issues
Leaders: D. Hadlock, T. Voss; Savannah River Site, Los Alamos National Laboratory

Thursday

7:00 - 8:00 AM **Bay 3**

CEL-7 The Natural Nuclear Reactor at Oklo: How it Works and What it Means

A. Karam; Rochester Institute of Technology

7:00 - 8:00 AM **Bay 4**

CEL-8 Workplace Investigation of Cause: A Case Study

R. Jones; Pacific Northwest National Laboratory

8:30 am-Noon **Bay 1**

THAM-A: Low Dose Radiation Responses: Impact on Risk

Co-Chairs: William Morgan and Antone Brooks

8:30 AM **THAM-A.1**

Low Dose/Low Dose Rate Radiation-Induced Genomic Instability:

W.F. Morgan; University of Maryland, Baltimore

9:00 AM **THAM-A.2**

Molecular Switches and Dose-Response Relationships

A.L. Brooks; Washington State University Tri-Cities

9:30 AM **THAM-A.3**

A Call for Reality in Routine Radiation Protection Practices

V.P. Bond; Washington State University Tri-Cities

10:00 AM **BREAK**

10:30 AM **THAM-A.4**

Computational Model for Radiation Effects at Low Doses in the Developing Neocortex

W.C. Griffith, N.M. DeFrank, J.M. Gohlke, E.J. Gribble, E.M. Faustman; Institute for Risk Analysis and Risk Communication

11:00 AM **THAM-A.5**

Health Effects of Radiation Exposure Due to the Chernobyl Accident: Learning from Experience

E. Buglova; International Atomic Energy Agency, Vienna, Austria ***(G. William Morgan Lecture)***

8:30-11:30 am **Bay 2**

THAM-B: RSO Section

Co-Chairs: Bob Gallaghar and Glenn Sturchio

8:30 AM **THAM-B.1**

So You Are RSO!

C.J. Paperiello; United States Nuclear Regulatory Commission

9:00 AM **THAM-B.2**

Radiation Measurements and Standards Needs for Radiation Protection

R.C. Yoder; Landauer Inc.

9:15 AM **THAM-B.3**

Radiation & Regulations in 2055

E.W. Fordham; CRCPD

9:30 AM **THAM-B.4**

Health Physics - Education Is Fundamental in the Next 50 Years

D.J. Allard; Pennsylvania Department Bureau of Radiation Protection

9:45 AM **THAM-B.5**

Developments in Radiation Protection Recommendations

D.A. Cool; US Nuclear Regulatory Commission

10:15 AM **BREAK**

10:45 AM **THAM-B.6**

Results of 55 Years as a Professional Health Phyicist

R.G. Gallaghar; Applied Health Physics, Inc.

11:00 AM **Roundtable: Charting our Course Toward 2005**

11:30 AM **RSO Section Business Meeting**

Thursday

8:30-10:30 am Bay 3

THAM-C: Regulatory Issues and Waste Management

Chair: John Hageman

8:30 AM THAM-C.1
Some Absurdities of the 2005 Recommendations of the ICRP: Exclusion Levels
G.H. Kramer; Human Monitoring Laboratory, Health Canada

8:45 AM THAM-C.2
Development of Regional and International Solutions for Low Level Radioactive Waste
K.D. Anderson, S. Zoller; Environmental Chemical Corporation, Environmental Chemical Corporation

9:00 AM THAM-C.3
Analyses of Internal Doses Received by Department of Energy Workers
J.L. Rabovsky, P.F. Wambach, N. Rao; US Department of Energy

9:15 AM THAM-C.4
Development of Authorized Limits for the Radiological Release of Portions of the Hanford Reach National Monument
B.A. Napier, W.M. Glines; Pacific Northwest National Laboratory, US Department of Energy - Richland Operations Office

9:30 AM THAM-C.5
Soil Sampling to Demonstrate Compliance with Department of Energy (DOE) Authorized Limits for the Radiological Release of Hanford Reach National Monument Lands in Accordance with DOE Order 5400.5 Requirements
B.G. Fritz, R.L. Dirkes, W.M. Glines; Pacific Northwest National Laboratory, US Department of Energy - Richland Operations Office

9:45 AM THAM-C.6
NORM Contamination: Alpha/Beta but Little Gamma Radiation
K.V. Krieger; Earth Tech Inc.

10:00 AM THAM-C.7
Evaluation of Hazardous Waste Disposal Criteria for NORM/TENORM Waste
W.E. Kennedy, Jr., P.G. Retallick; Dade Moeller & Associates, Inc., Clean Harbors Environmental Services

10:15 AM THAM-C.8
New Radiation Warning Sign
C.J. MacKenzie; International Atomic Energy Agency

8:30 am-Noon Bay 4

THAM-D: Decommissioning Section Session

Co-Chairs: Kenneth Krieger and David Ottley

8:30 AM THAM-D.1
Approaches to Risk Management in Remediation of Radioactively Contaminated Sites
D.J. Strom, L.R. Anspaugh, J. Flynn, F.O. Hoffman, D.C. Kocher, P.A. Locke, P.J. Merges, B.A. Napier, E.I. White; Pacific Northwest National Laboratory, University of Utah, Decision Research, SENES Oak Ridge, Inc., Johns Hopkins Bloomberg School of Public Health, Environment and Radiation Specialists, Inc., National Council on Radiation Protection and Measurements

8:45 AM THAM-D.2
Superfund Program Radiation Lead
S.A. Walker; US Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation

9:00 AM THAM-D.3
CRCPD position on control of solid materials
D. McBaugh; State of Washington, Dept. of Health

Thursday

9:15 AM **THAM-D.4**
State Perspectives on Decommissioning Issues
B.L. Hamrick; California Department of Health Services

9:30 AM **THAM-D.5**
Controlling the Release of Potentially Clearable Soils - An Overview of NRC Staff Analysis
J-C. Dehmel, A. Schwartzman, D. Lewis; US Nuclear Regulatory Commission

9:45 AM **THAM-D.6**
EPRI Study on the Disposition of Solid Material: Comparative Review of Three Published Clearance Guides
S.P. Bushart; Electric Power Research Institute

10:00 AM **THAM-D.7**
Radiological Remediation at the Department of Energy's Energy Technology Engineering Center
P.D. Rutherford, M.E. Lee, R.A. Marshall, E.R. McGinnis, B.D. Sujata, D.M. Trippeda; Rocketdyne Propulsion & Power, The Boeing Company

10:15 AM **BREAK**

10:45 AM **THAM-D.8**
MARSSIM (?) Final Status Survey Approach for Soils at the Rocky Flats Closure Project
E.W. Abelquist; Oak Ridge Associated Universities

11:00 AM **THAM-D.9**
Successful Acceleration of Decommissioning at the Columbus Closure Project
K.D. Anderson; Environmental Chemical Corporation (Presented by S. Zoller)

11:15 AM **THAM-D.10**
Establishing & Demonstrating Compliance with Derived Concentration Guideline Levels (DCGLs) for Subsurface Soil
J.W. Lively, J.S. Kirk; MACTEC, Inc., Nuclear Fuels Services, Inc.

11:30 AM **THAM-D.11**
Deriving Site-Specific DCGLs: One Approach to Regulatory Acceptance
H.T. Downey, J.W. Lively; MACTEC

11:45 AM **THAM-D.12**
Radiological Monitoring and Control During the Quehanna Decommissioning Project
K.M. Kasper; Scientech, LLC

Noon **Decommissioning Section Business Meeting**

8:30 am-Noon Conference Theater

THAM-E: Special Session of the Homeland Security Committee

Co-Chairs: Marcia Hartman and Daniel Blumenthal

8:30 AM **THAM-E.1**
Call to Action-Duties & Responsibilities of HPs
J.G. Barnes; Rocketdyne/Boeing

8:45 AM **THAM-E.2**
Police Experiences with TOPOFF 2
M.K. Meehan; Seattle Police Department

9:15 AM **THAM-E.3**
Working with the First Responder, Challenges for the HP
S.C. Moss; US Army

9:30 AM **THAM-E.4**
WMD Training Materials for HP and the Responder
B.B. Buddemeier; Department of Homeland Security

Thursday

9:45 AM **THAM-E.5**
Practical Experiences in Developing Nuclear/Radiological Incident Awareness and Response Training
J.J. Lanza; Florida Department of Health

10:00 AM **BREAK**

10:30 AM **THAM-E.6**
Public Health Response to a Nuclear/Radiological Emergency
J.J. Lanza; Florida Department of Health

10:45 AM **THAM-E.7**
Spies, Lies, and Nuclear Threats: Radiation Detection at Borders
R.T. Kouzes, J.H. Ely; Pacific Northwest National Laboratory, Pacific Northwest National Laboratory

11:00 AM **THAM-E.8**
Nuclear and Radiological Threats
R.W. Allen, W.F. Buckley; Lawrence Livermore National Laboratory

11:15 AM **THAM-E.9**
National Plans and Activities of the Department of Homeland Security
B.B. Buddemeier; Department of Homeland Security

11:30 AM **Panel Discussion**

NOTE FOR CHPs

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

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

AAHP Courses

Saturday, July 9, 2005

AAHP 1
Identification and Control of Electromagnetic Fields (0 – 300 GHz)

J. Leonowich; Pacific Northwest National Laboratory

Since the beginning of the 20th century, there has been marked development and increased utilization of equipment and devices for medical, industrial, telecommunications, consumer use, and military applications that emit one or more types of non-ionizing (NIR) radiant energy in the microwave, radiofrequency (RF), and extremely low frequency (ELF) portions of the electromagnetic spectrum (i.e., 0 - 300 GHz). Concomitant with this increased usage, there is growing concern in government agencies, industry, and professional societies as well as among the public regarding the possible health hazards associated with the development, manufacture, and operation of devices that emit NIR radiant energies in the frequency range from 0 to 300 GHz. To address these concerns, private scientific organizations and government agencies have developed exposure guidance or standards to protect workers and the public against possible hazards. This course will review safety issues associated with this extremely broad portion of the electromagnetic spectrum, which covers everything from "batteries" to "heat lamps", or "DC to daylight".

These fields are alleged to have number of long term health effects, including cancer. This 8 hour introductory course will cover low frequency (0 - 3 kHz) electric and magnetic fields and radio frequency/microwave radiation (3 kHz - 300 GHz). Exposure criteria of the Institute of Electrical and Electronic Engineers (IEEE), the American Conference of Governmental Industrial Hygienists (ACGIH), as well as the International Commission for Non-ionizing Radiation Protection (ICNIRP) will be reviewed. There will be extensive discussion on how to establish appropriate control measures for each type of electromagnetic field, based on calculations and field measurements. At the end of the course, the student will understand the proven health risks associated with this portion of the electromagnetic spectrum, as well as be able to explain these risks to the concerned layman. Particular emphasis will be placed on field sources which have recently sparked controversy, such as the ubiquitous 50/60 Hz ELF fields which form the basis of power generation and transmission; and the portions of the spectrum used for wireless communication. Case studies will be presented, and important new topics such as induced and contact currents and electromagnetic interference effects will be reviewed. Multimedia presentations, class discussions and equipment demonstrations will be used to present the material.

AAHP 2
Low Dose Effects of Ionizing Radiation

D. Boreham; McMaster University, Canada

This course is designed to update participants on the current state of knowledge regarding three general areas of radiation biology: 1) cellular and molecular mechanisms that modify responses to radiation such as adaptive responses, bystander effects, and genomic instability, 2) genetic and environmental factors that alter mechanisms and consequently alter effects, and 3) modern techniques in biological dosimetry to measure genetic damage for emergency dosimetry of long term risk estimation in human and non-human biota. The course will begin with a review of health concerns associated with exposure to high doses of ionizing radia-

tion. In humans, these concerns include: 1) immediate death (hours to months) due to acute radiation syndromes (ARS) of the central nervous system, gastrointestinal system or hematopoietic system; 2) later somatic effects such as cancer induction due to transformation of normal cells; and 3) reproductive effects such as fetal malformation or mutations in germ-line cells (reproductive tissue) that could be inherited in the next generation of irradiated offspring. It is difficult to predict the final outcome of any exposure but genetically controlled biological processes and environmental stimuli exist that can modulate the consequences of these exposures and change the probability of a biological effect. This presentation will introduce the audience to the biological effects of radiation and explain the consequences to a cell and whole organisms related to these exposures. New information regarding how low doses can be used to induce mechanisms to modulate disease progression will be discussed and important topics such as the adaptive response, by-stander effects, and genomic instability will be presented. The modern tools used in molecular biology to measure biological and genetic changes associated with radiation exposure will be described and a new approach for emergency biological dosimetry in response to accidental or deliberate over-exposure will be addressed. The overall goal will be to educate the audience on the current state of knowledge related to radiation exposures at low doses and show that radiation risk assessment is complicated and depends largely on biology and not the actual dose.

AAHP 3

Training Emergency Responders; Materials, Tools, and Methods for Health Physicists

B. Buddemeier, J. DiLorenzo; US Department of Homeland Security, US Department of Energy, Nevada

Excellent training materials exist for training first responders (firefighters, law enforcements, EMT) , but you can't just download all them off the internet. Students who successfully complete this AAHP class will become certified trainers in at least 2 responder training programs. Over 20 hours of Train the Trainer coursework has been compressed into this 8 hour class designed for the radiation safety professional. The Modular Emergency Response Radiological Transportation Training (MERRTT) offers over 16 modules of multimedia rich training material including presentations, student & instructor guides, tests, practical exercises, and regionally available training aids. This program was updated in 2004 and provides the successful student with 2 CDs full of movies and training materials that were developed with help of the first responder community. The Department of Energy s WMD Radiological/Nuclear Awareness Train-The-Trainer Course will build on the MERRTT training to prepare Health Physics professionals to deliver a six-hour Radiation Awareness Course, using a prepared lesson plan. An additional CD with subjects including Introduction to Radiation, Health and Medical Effects, Recognition and Notification, and Rad/Nuclear Terrorism Overview will be provided to those who attend the entire session. In addition to certifications in the programs above, information will be provided on the how to interface with emergency responders and national programs that are available to fund and equip local responders.

Professional Enrichment Program

Sunday, July 10 through Wednesday, July 13, 2005

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

On Sunday, July 10, a series of 24 courses will be offered between 8:00 am - 4:00 pm.

In addition to the above-mentioned sessions for Sunday, five PEP lectures are scheduled on Monday, Tuesday, and Wednesday afternoons from 12:15 - 2:15 pm.

Registration for each two-hour course is $60 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.

Students with a current ID card will be admitted free of charge to any sessions which still have space available after the waiting list has been admitted. Student admission will be on a first-come, first-served basis and will only begin 15 minutes after the start of the session to allow for completion of ticket processing.

Please Note!!

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

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

SUNDAY - 8:00-10:00 AM

1A Critical Decisions for First-Time and Experienced Managers

J.M. Hylko; WESKEM, LLC

Following graduation from a health physics program or related technical field, an individual's training and career development activities typically focus on acquiring additional work experience and enhancing technical problem-solving skills. However, as health physicists advance throughout their careers, managerial duties, such as supervising employees and overseeing projects, result either through professional advancement or staffing changes within a company. Therefore, as health physicists gain additional experience and years in the profession, they may be required to accept and adapt to the role of a manager. This new role typically requires supervising, guiding and influencing the direction of a department and its employees. Having worked for a variety of managers throughout his career and now supervising an Environmental, Safety and Health (ES&H) Department across three separate projects, the instructor presents first-hand experiences related to the successes and pitfalls serving as a department manager. Discussion topics and real-life examples will cover defining roles and responsibilities, motivation, communication, reasons for effective leadership, supporting employees during a crisis, as well as allocating resources and budgets. In addition, enhancing your own department's productivity can be achieved with

support from other internal organizations (e.g., quality assurance and human resources). Both aspiring and experienced managers will acquire useful information that can be applied immediately in their current work location.

1B Fundamentals of Medical Internal Radiation Dosimetry: What You Need to Know as a Health Physicist

D.R. Fisher; Pacific Northwest National Laboratory

The use of radionuclides in nuclear medicine for diagnosis and treatment of disease is increasing. Two new radiopharmaceuticals have been approved in the U.S. for high-dose radioimmunotherapy of non-Hodgkin's lymphoma, and many other are in various stages of research, preclinical, and clinical testing. It is essential for every health physicist to understand basic principles and approaches to the dosimetry of administered radiopharmaceuticals. Others working in a hospital environment may desire a more in-depth understanding the mechanics of medical internal dosimetry, including approaches to data acquisition, determining the number of nuclear transformation is an organ or tissue, methods of dose calculation, and use of the computer software tools that are available. This course will also describe the use of internal dosimetry for retrospective dose assessment, prospective treatment planning, and risk analysis. In addition to practicing medical physicists, the course is also recommended for regulators and administrators with responsibility for the medical use of internally administered radionuclides.

1C Operational Accelerator Health Physics

S. Walker; Los Alamos National Laboratory

This class will address general accelerator health physics. Accelerators offer unique and challenging problems for the Health Physicist. Newer and more powerful accelerators are constantly being developed. Monte Carlo codes and other tools are used to predict the outcome of high energy subatomic particles that are accelerated to very high energies. This course will give a broad overview of the various types of accelerators, such as electron, proton and spallation sources, their uniqueness, and the special health physics challenges of working with accelerators. Specific topics to be addressed include accelerator interlock systems, proton accelerators, electron accelerators, spallation targets, ancillary X-ray hazards, prompt and residual radiation hazards, isotope production expectations, rules of thumb for dose expectation, radiation measurements, neutron hazards, dosimetry considerations, beam stop design, radiation measurements inside beam tunnels, and handling of high dose rate targets. The course is directed at the CHP but would also serve as an excellent basis for those studying for the CHP who wish to obtain an overview of accelerator health physics.

1D Army's Capstone and Operation Iraqi Freedom Depleted Uranium Programs

F. Szrom; U.S. Army Center for Health Promotion & Preventive Medicine

The U.S. Center for Health Promotion and Preventive Medicine is the Army's focal point for two programs involving depleted uranium (DU) - The Capstone DU Program and the Operation Iraqi Freedom (OIF) DU Bioassay Screening Program. Overviews of the programs will be provided.

The Capstone Depleted Uranium (DU) Program was sponsored by the U.S. Army and the Department of Defense (DOD) Deployment Health Support Directorate (formerly the DOD Office of the Special Assistant for Gulf War Illness). The purpose of the Capstone Program was to provide a peer-reviewed, rigorous

scientific estimate of health risks from inhalation of DU aerosols to personnel in armored vehicles that are perforated by large-caliber DU munitions. The Capstone DU Program had two major components - an aerosol characterization component and a human health risk assessment (HHRA) component. DU aerosols generated by the perforation of armored vehicles were collected and characterized. Characterizations included in vitro lung fluid solubility studies and time dependent uranium concentration and particle size distribution profiles. The results of the DU aerosol characterizations were combined with exposure scenarios, based on events from Operation Desert Storm, to model radiological doses and chemical concentrations in the body. These estimates of radiological doses and chemical concentrations were translated into potential health risks. The HHRA concluded that long-term adverse health effects are not likely for the modeled exposure scenarios. The entire report is over 1100 pages and was released by DOD in October 2004. The report conclusions, the types of data in the report and where to find the various data in the report will be presented and described.

DOD policies for OIF require (1) all personnel in, on or near a combat vehicle at the time it was struck by DU munitions, (2) all personnel who entered immediately after it was struck and (3) personnel with specific military occupational specialties that are required to enter multiple damaged vehicles be tested for potential exposure to DU. Urine uranium bioassays are performed to determine potential exposures to DU. Inductively Coupled Plasma - Mass Spectrometry (ICP-MS) analytical techniques are used to determine the uranium-238 concentration and the uranium-235/uranium-238 ratio in urine specimens. The results of screening over 1600 Soldiers for potential DU exposure and the technical basis for results' interpretation will be presented and described.

1E Training First Responders on RDDs and INDs—an Approach used by DOE Region 4 Radiological Assistance Program

K. Groves; DOE-National Nuclear Security Administration

Post 9/11, the Department of Energy Radiological Assistance Program (DOE RAP) has expanded the scope of its support to State, Local, and Tribal jurisdictions. A number of new and/or expanded support activities have been assigned to the eight DOE RAP Regions and a new National Capital Region has been added. The expanded activities include: more capable teams (expanded from seven person teams to eleven person teams) - each region has a minimum of three teams; more sophisticated radiological detection and radioisotope identification instrumentation, and enhanced access to other DOE Emergency Response Assets. The new activities include: a real-time search capability for radiological/nuclear devices, access to the DOE Triage System to assist in the identification of radiological spectral data collected on-scene, and a Maritime Response Management Plan to support the US Coast Guard in both off-shore and on-shore radiological incidents. In addition to the new and expanded DOE RAP Programs, additional training requirements have been added to the DOE Federal and Contractor employees who support the program. The DOE RAP remains (through a MOU with the Department of Homeland Security) one of the nations first lines of defense in the case of Radiological Dispersal Devices or Improvised Nuclear Devices. The assistance is available around the clock (at no cost) with most responses providing on-

scene support to the local Incident Commander within 2 to 6 hours.

1F An Introduction to Microshield
B. Brown, R. Pierson; CH2MHill Hanford Group, Pacific Northwest National Laboratory

MicroShield(tm) is a powerful program used to analyze shielding configurations and estimate radiation exposures from gamma-emitting radioisotopes. This session provides an introduction to MicroShield(tm) and is intended for the new user or the casual user of earlier program versions and assumes attendees have a fundamental Health Physics background. This session will focus on a basic understanding of the different models, entering source term/shielding configurations, understanding the effects of buildup, and navigation within the software to generate user friendly results. Upon completion, a user will be able to operate MicroShield(tm), generate simple models, and interpret the results. MicroShield is a registered trademark of Grove Engineering, Inc.

Attendees are required to bring a lap top computer. Copies of the Software will be available for use at the session.

1G Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers
M. Stabin; Vanderbilt University

Harmony in Concepts and Units Internal dose calculations for nuclear medicine applications or for protection of radiation workers are based on the same fundamental concepts and units. The various systems developed to provide a basis for the needed calculations (e.g. ICRP 30/60, MIRD, RADAR) use equations that appear to be different, but are in fact identical when carefully studied. A current effort is underway to harmonize the defining equations and units employed to provide quantitative analysis for these two general problem areas. This program will show, from a theoretical standpoint, how all of these systems are identical in concept, and will then show, using practical examples, how each is applied to solve different problems. For nuclear medicine, an overview will be given of the current state of the art and promise for future improvements to provide more patient specificity in calculations and better ability to predict biological effects from calculated doses. For occupational applications of internal dosimetry, an overview will be given of currently applicable models and methods for bioassay analysis and dose assessment, showing a few practical examples.

1H Laser Safety Audits
T. Johnson; Uniformed Services University of the Health Sciences

This class assumes attendees have a working knowledge of laser terminology and the ANSI Z136 standards. This class will give a brief overview and discussion of auditing techniques for labs using lasers. Attendees will be presented with specific conditions and situations that will be discussed. Each attendee will need a calculator, capable of performing power calculations (t^0.75).

Class objectives: Recognize non-beam hazards Determine NHZ Examine direct and indirect exposure hazards Recognize factors that influence protective eyewear selection

SUNDAY - 10:30 AM-12:30 PM

2A Radiation Detection and Radiation Dosimetry for Homeland Security
J.C. McDonald; Pacific Northwest National Laboratory

Concerns about the illicit movement of radionuclides across country borders have heightened the degree of protection instituted in the U.S. Border protection involves the screening of large numbers

of people, conveyances and vehicles at the border crossings or ports of entry. Each day, U.S. ports of entry see more than 300,000 vehicles, approximately 2,500 aircraft, and nearly 600 ships. There are more than 600 border sites to protect, and screening for illicit radioactive material on this large a scale requires a careful balance of high throughput and high search efficiency. Four basic types of instruments are used for the detection and identification of radioactive material that may be present in a number of situations. Personal radiation detectors are small, highly sensitive instruments that alert the user to the presence of radioactive material. Survey meters, similar to those used in nuclear power plants to measure exposure, or dose equivalent, rates are used to search for radioactive material. They may also be used for post-event measurements of radioactive contamination or dose equivalent rates. Radionuclide identifier devices are battery powered and are similar in size to hand-held survey meters. These devices analyze the pulse-height spectra produced by a sodium iodide crystal and perform an analysis to identify the radionuclides present. The fourth and largest detector type is the radiation portal monitor through which trucks and automobiles may pass. These devices are in use at many US border crossings. This class will describe the operation of the instruments and discuss some of the performance tests that have been carried out for the Department of Homeland Security.

2B Ground Rules for Experts: A PEP Course for Expert Witnesses and Potential Expert Witnesses

Lynn McKay; Schmeltzer, Aptaker & Shepard, P.C.

Health physicists and radiation professionals involved in consulting, particularly those who appear as expert witnesses in litigation, must apply rigorous, and well-accepted scientific methods to often novel situations. The work and opinions of expert witnesses must withstand the scrutiny of their peers, and meet myriad legal criteria. Expert witnesses must present their complex work and opinions in a way that a jury of lay people can understand, so that they can make determinations about technical aspects a case. Success as an expert witness often depends on a sound working knowledge of the rules that apply to expert evidence, the litigation process, relevant points of law, and conflicts that can arise when scientific knowledge informs legal understanding.

This course identifies various roles that health physicists and radiation professionals play in radiation litigation, including implementing field studies, performing dose assessments, preparing recommendations regarding site use and remediation, analyzing dosimetric data, and interpreting the positions of various scientific bodies. Course participants will learn the relevant professional, scientific, and legal standards applicable to these tasks. The course reviews common challenges and unique problems associated with conducting relatively routine professional tasks in a litigation setting. To aid understanding of performing health physics jobs in a litigation setting, the course includes an explanation of the types of claims that are typically made in litigation involving injuries associated with radioactive materials, and the requisite proof for those claims. The course gives examples of effective ways to convey complex technical information and analyses so that it can be understood by attorneys, judges, and jurors who, in most cases, lack substantial knowledge of radiation and health physics concepts.

Finally, the course describes the work of radiation expert witnesses in a number of cases, and invites the audience to examine this work in the context

of the technical and legal requirements that apply to such work.

2C Accelerators 2

S. Walker; Los Alamos National Laboratory

This course is a continuation of PEP 1C, Operational Accelerator Health Physics. See PEP 1C for futher description.

2D Brain-Based Learning - New Approaches for Effective Radiation Safety Training

R.H. Johnson, Jr.; Radiation Safety Academy

Studies in brain-based or brain-compatible learning over the past ten years have shown that the traditional "stand-and-deliver" approach to teaching may not be the best model for optimum learning. As we seek to train more and more first responders and security personnel about radiation perhaps we should consider whether we are as effective as we could be. The challenge for teaching first responders is not just about teaching the technology of radiation sciences, but how to provide a basis for understanding radiation such that they will not revert to an automatic stress response when they encounter radiation in a real incident. How can we best prepare these people to make appropriate decisions for protection of themselves, the public, and property during a nuclear emergency? While knowledge of radiation is vital, successful handling of a nuclear incident will be more a matter of behavioral responses. Will our best radiation safety training provide responders with adequate tools and skills for coping with stress and fears of radiation?

Studies in neurosciences show that learning results from the formation of pathways and interconnections among nerve cells called neurons. Stimulation of multiple pathways and patterns increases the potential for optimum learning. The best learning occurs when the brain is provided with cognitive (thinking), affective (feeling), and psychomotor (physical) information at the same time. People learn better through creative acts that include thought, feeling, and physical action. Memory is enhanced when new information is related to relevant mental, emotional, and physical experience.

Effective radiation safety training with the brain in mind will consider: 1) How the brain learns; 2) How to get students ready to learn; 3) How to enrich the learning environment; 4) How to get the brain's attention; 5) How threats and stress affect learning; 6) How to enhance learning by motivation and rewards; 7) How emotions affect learning; 8) How the mind and body are linked for learning; 9) How the brain derives meaning; 10) How to enhance memory and recall

2E Fundamentals of Alpha Spectroscopy

C. Maddigan, D. Van Cleef; ORTEC/ Advanced Measurement Technology, Inc., Oak Ridge, TN

This course offers a fast-paced review of the basic principles of alpha spectroscopic analysis. The course includes a review of the nature and origins of alpha-particle emitting radioactivity, basic physics of alpha particle interaction with matter, considerations and consequences of sample preparation for alpha spectroscopy, alpha spectroscopy system components and calibrations, and a primer on interpretation of alpha spectroscopy data.

2F Practical Applications of Microshield

B. Brown, R. Pierson; CH2MHill Hanford Group, Pacific Northwest National Laboratory

Specific uses of MicroShield(tm) include designing shields and containers, assessing radiation exposure to people and materials, selecting temporary shielding for maintenance tasks, inferring

source strength from radiation measurements for waste disposal, minimizing exposure to people, and teaching principles of radiation and shielding. These features along with the generation of custom materials and sources require a more in depth understanding of Health Physics and the MicroShield(tm) program to be applied correctly.

This session will focus on more complex modeling, custom source/shielding materials, and the process of executing multiple runs with common detection points to provide for more complex analysis and modeling. This data can also be exported to common spreadsheet software for more extensive applications and presentation. Additionally the application of custom source materials as a means of simulating Bremsstrahlung contributions will be addressed. Upon completion of this session the user will be more familiar with the expanded capabilities of the software and be better prepared to tackle more complex applications.

MicroShield is a registered trademark of Grove Engineering, Inc. Attendees are required to bring a laptop computer. Copies of the Software will be available for use at the session.

2G Security 101 for Radiation Safety Professionals

B. Emery; University of Texas Health Science Center

The tragic events of 9/11 have significantly impacted the radiation safety profession. Issues related to security have become a preeminent concern for employees and management alike, potentially overshadowing the importance of previously identified safety concerns. The traditional lines that separated security functions and safety functions have become blurred. Workplace evaluations that previously considered the possible safety and health implications of the actions of well-intended individuals are now are expected to include consideration of actions with sinister intent as well.

In recognition of these changes, it is imperative that radiation safety professionals become familiar with the basics of security to ensure that issues are adequately addressed within the context of this new paradigm. This presentation will provide an overview of the security profession from the perspective of a radiation safety professional, specifically addressing: the essential differences between safety & security and security & public safety (police); the areas where safety and security intersect, especially post 9/11; areas of cooperation, optimization, and synergy, with specific emphasis on some basic security issues that can be incorporated into routine safety considerations; the professional organization that represents the security industry and the associated professional certification in the field; and examples of useful references used in the profession.

Ample time will be allotted for questions, answers, and discussion.

2H Transportation Regulations 1

R. Parker; Roy Parker and Associates Inc.

This is a four hour PEP course. The morning and afternoon sessions are contiguous and not duplicate sessions.

Health Physicists are frequently involved in shipping radioactive materials or supervising those who do. Current U.S. Department of Transportation Hazardous Material Regulations, 49 CFR Parts 171 - 185, require hazmat employees to have documented training specified in 49 CFR 171 Subpart H. A hazmat employee is defined as an individual who: (1) loads, unloads or handles hazardous material; (2) manufactures, tests, reconditions, repairs, modifies, marks or otherwise represents containers, drums or packagings as qualified for use in the transportation of hazardous materials; (3) prepares hazardous materials for trans-

portation; (4) is responsible for safety of transporting hazardous materials; or (5) operates a vehicle used to transport hazardous materials. Recurrent training is required at least once every three years. (The IATA specified two year training interval is not applicable and is generally misunderstood.) FAA has escalated inspection and enforcement. Facilities that ship radioactive materials, return radioactive materials or radioactive sources have been cited and fined by the FAA for failure to provide and document this training.

The course will cover typical shipments by air and highway, and the relationship between Title 49, ICAO and IATA requirements. Items such as fissile materials, highway route controlled quantities, rail shipments, vessel shipments and such will be omitted, although specific questions may be addressed. A major objective of the course is to provide the process of shipping radioactive material in a sequential and logical fashion. Radioactive material shipments of excepted packages and Type A packages will be emphasized. The new exempt material activity concentrations and exempt consignment activity limits will be presented, as well as the new international proper shipping names and UN numbers which became mandatory on October 1, 2004.

The program is designed to meet the DOT training requirements, but it is the hazmat employer's responsibility to ensure that each hazmat employee is properly trained. It is the hazmat employer's responsibility to determine the degree to which this course meets the employer's requirements, including contents of the course and the examination. Participants will gain sufficient knowledge to prepare training programs for others in their institutions. Handouts will summarize the course. A feature handout is a composite table which provides A1, A2, RQ, Exempt Concentration, and Exempt Consignment values in a single table in both Becquerel and Curie units. The examination at the conclusion will be self graded in the course and retained by the participant to form part of his training documentation. Certification of course attendance will be provided.

SUNDAY - 2:00-4:00 PM

3A Biomedical Ethics of Human Subject Research for the HP

L. Coronado; National Institutes of Health

What makes clinical research ethical? What is the difference between clinical care versus clinical research? What regulations, principles, and guidelines apply to human subject research? What defines research? Who is a research subject? Who are considered vulnerable populations that require extra protections? What are these extra protections? What criteria are used in assessing the risk and benefits of a clinical study? How about when the study involves ionizing radiation administered solely for research purposes and not for the prospect of direct benefit of the subject? What are the considerations in exposing healthy individuals to ionizing radiation for research objectives? Are there any dose limits? What constitutes true informed consent? What is the purpose and function of the Institutional Review Boards (IRBs)? What role does the Health Physicist (HP), the Radiation Safety Officer (RSO), the Radioactive Drug Research Committee (RDRC) and Radiation Safety Committee (RSC) play in the arena of clinical research? This PEP course will provide an overview of the historical perspectives, regulatory framework and current challenges of clinical research, tailored for the Health Physicist.

3B Uncertainty Assessment in Atmospheric Dispersion Computations

E. Sajo; Louisiana State University

Atmospheric dispersion models based on elementary statistical theory (such as the Gaussian plume model) compute time-averaged concentrations at fixed points downwind. It is well-known that the model predictions are loaded with uncertainties. Most often, this is expressed in terms of factor of validity, but it may also be shown as a spatial uncertainty interval about the location of the computed mean. Most of the computer models, however, including all widely used NRC and EPA regulatory models, do not incorporate any type of uncertainty handling, and in most cases they do not warn the user of the fluctuations in the predicted values of dose or local concentration. In 40 CFR 51 EPA recognizes the importance of estimating the prediction uncertainties, and it makes it the modeler's responsibility to advise the decision maker of this fact, and to provide an assessment of these uncertainties, both in space and in magnitude, and their impact on the evaluation of hazard zones. Because EPA does not give guidance on specific methods of implementation, and because most regulatory, emergency, and release reconstruction models do not sanction any uncertainty handling, it is a serious challenge to meet the spirit of the regulations. This lecture will give an overview of the fundamentals in uncertainty estimation both in magnitude and in spatial location of the predicted mean concentration. Application of a computer code that addresses some of the uncertainties will be shown. Practical methods will be given to assess the uncertainties even when the computer model does not provide this information explicitly.

3C Tritium - Benign Uses for the Only Radioactive Isotope of Hydrogen

D.J. O'Dou; RAD*Ware, Inc., Thomas O'Dou; University of Nevada Las Vegas

If you're not part of the STAR (Safety and Tritium Applied Research) program at INEEL (Idaho National Engineering and Environmental Laboratory) or one of several other DOE (Department of Energy) programs involved in research and development for the fusion community, what would you do with several thousand Curies of Tritium? You could 'bag' an elk or a mule deer in Colorado or find an exit in a dark theatre. In the quieter, non-research community, tritium illuminates the targeting devices on personal weapons, helps us find our way out in dark environments, and other similar uses. While most of these uses are well known, the ramifications of working with multiple Curies of tritium are not necessarily well understood, especially by those doing the day-to-day handling. As with most organizations that handle radioactive materials, a knowledgeable RSO (Radiation Safety Officer) is the key to a good Radiation Protection program. What happens to such a program when inadequate attention has been provided for the programmatic health physics aspects? Proper controls are required for a safe operational environment for all personnel. In examining one such program, we look at the procedures required, the level of training, how to make individuals aware of the reality of radiation safety and their part in it, and the necessity of bioassay when dealing with tritium.

3D Radiation Dose-Response Relationships and Risk Assessment

D. Strom; Pacific Northwest National Laboratory

The notion of a dose-response relationship was probably invented shortly after the discovery of poisons, the inven-

tion of alcoholic beverages, and the bringing of fire into a confined space in the forgotten depths of ancient prehistory. The amount of poison or medicine ingested can easily be observed to affect the behavior, health, or sickness outcome. Threshold effects, such as death, could be easily understood for intoxicants, medicine, and poisons. Perhaps less obvious is the fact that implicit in such dose-response relationships is also the notion of dose rate. Usually, the dose is administered fairly acutely, in a single injection, pill, or swallow; a few puffs on a pipe; or a meal of eating or drinking. The same amount of intoxicants, medicine, or poisons administered over a week or month might have little or no observable effect. Thus, before the discovery of ionizing radiation in the late 19th century, toxicology ("the science of poisons") and pharmacology had deeply ingrained notions of dose-response relationships. This presentation demonstrates that the notion of a dose-response relationship for ionizing radiation is hopelessly simplistic from a scientific standpoint. While useful from a policy or regulatory standpoint, dose-response relationships cannot possibly convey enough information to describe the problem from a quantitative view of radiation biology, nor can they address societal values. The presentation begins with the concepts, observations, and theories that contribute to the scientific input to the practice of managing risks from exposure to ionizing radiation. This if followed with a discussion of irradiation regimes, followed by responses to high and low doses of ionizing radiation, and a discussion of how all of this can inform radiation risk management. The knowledge that is really needed for prediction of individual risk is presented. The presentation ends with conclusions and recommendations.

3E Fundamentals of Gamma Spectroscopy

D. Upp, D. Van Cleef; ORTEC/ Advanced Measurement Technology, Inc., Oak Ridge, TN

This course offers a fast-paced review of the basic principles of gamma spectroscopic analysis. The course includes a review of the nature and origins of gamma-emitting radioactivity, basic physics of gamma interaction with matter, consequences of gamma interactions on gamma spectra, gamma spectroscopy system components and calibrations, gamma spectroscopy analysis methods, and interpretation of gamma spectroscopy data.

3F The Gift of Fear and Survival Skills in a Time of Nuclear Terrorism

R.H. Johnson, Jr.; Radiation Safety Academy

Can we learn to fear less as we enter a new era of awareness for terrorism? The answer is an emphatic, "YES!" We can learn how from best selling author Gavin De Becker's book, "Fear Less - the Real Truth about Risk, Safety, and Security in a Time of Terrorism." Before 9/11, Americans may have had the illusion that we were completely safe from foreign enemies. While we now know that is not true, neither are we completely vulnerable or powerless. There is much that an average citizen can do to thwart terrorism. Long before detection by authorities, ordinary American citizens may see something suspicious, listen to their intuition, and risk being wrong by notifying authorities. We can influence our own safety, help protect our country, and manage our own fears.

Violence and fear have always been part of our world and will continue. True fear is a gift to warn us of the presence of danger. On the other hand, worries and anxieties are unwarranted fears manufactured from our memory or our imagina-

tion. Worry is a way of rehearsing dreaded outcomes. Opposite to true fear it delays and discourages constructive action. Rather than worrying about, "Could this happen?" we should ask ourselves "Will this happen?" or "Is this happening?" We can reduce unwarranted fears by 1) when we feel fear or other intuitive signal, listen to it. 2) When we do not feel fear, do not manufacture it. And 3) if we find ourselves worrying, explore and discover why. We can learn to cope as we learn to trust our intuition of true fear and do not waste our fears on manufactured worries.

The most effective way to detect and deter terrorism is for each of us to become an "All Eyes" approach to security. All violent acts have pre-incident indicators (warning signs) that any of us could observe if we trust our intuition to signal when something is questionable or does not seem right. Messengers of intuition include, nagging feelings, persistent thoughts, humor, wonder, anxiety, curiosity, hunches, gut feelings, doubt, hesitation, suspicion, apprehension, and fear. Intuition is knowing without knowing why. The opposite is denial which is choosing not to know something even when the evidence is obvious. Denial is choosing to ignore survival signals by rationalization, justification, minimization, excuse making, and refusal. We may not be able to stop terrorism, but we can certainly learn how to stop the terror.

3G Psychological Effects of WMD

J. Barnes; The Boeing Company,Santa Susana Field Laboratory

The psychological impact of a terrorist attack using a nuclear or radiological device is acknowledged to be a major effect of such an attack. Such impacts would form a major consideration in an attack strategy. To understand this impact, the course will provide a rapid review of various psychological and physiological studies addressing factors in these fear reactions. The review is not intended to provide an indepth study in psychology; rather it is to make health physicists and other technical professional more conversant in the forces that shape the psychological impact of such weapons. Following this review, the course will then explore strategies (e.g., training, public relations, outreach activites, etc.) that provide ways to mitigate or even eliminate a number of the impacts, particularly as they apply to counterproductive activities that a frightened public might be prone to engage in.

3H Transportation Regulations 2

R. Parker; Roy Parker and Associates Inc

See PEP 2H for course information.

MONDAY - 12:15-2:15 PM

M1 New Homeland Security Instrument Performance Standards

M. Johnson; Pacific Northwest National Lab

During this course, participants will become familiar with instrument performance standards recently developed to address performance requirements for instrumentation used by Department of Homeland Security. Two of the four standards recently developed will be discussed: ANSI N42.32, American National Standard Performance Criteria for Alarming Personal Radiation Detectors for Homeland Security and ANSI N42.33, American National Standard for Portable Radiation Detection Instrumentation for Homeland Security. The presenter will spend time discussing test methods used to evaluate an instrument performance against the criteria in the standards. Individuals interested in developing a deeper understanding of the requirements in these standards and in instruments are evaluated will benefit from attending the course.

M2 Advanced MARSSIM Topics

E.W. Abelquist; Oak Ridge Institute for Science and Education

Since its publication more than 7 years ago, the MultiAgency Radiation Survey and Site Investigation Manual (MARSSIM) approach has been used at a number of D&D sites for designing final status surveys in support of decommissioning. While a number of these MARSSIM applications have been relatively straightforward, some have challenged the MARSSIM user to seek solutions beyond the simple examples illustrated in the MARSSIM manual. This course will describe the nature of some practical final status survey examples and will offer possible solutions within the MARSSIM framework.

The final status survey design discussion in this course will include examples of how multiple radionuclide contaminants are handled for both building surfaces and land areas. The strategies for designing surveys when multiple radionuclides are present employ the use of surrogate radionuclides, determination of gross activity DCGLs, and application of the unity rule. One of the more challenging aspects of MARSSIM survey design arises when multiple radionuclides are present in Class 1 survey units. In this situation, the MARSSIM user must assess both the instrument scan MDC and DCGLEMC for the multiple radionuclides present. Final status survey strategies for determining the need for additional soil samples in Class 1 survey units when multiple radionuclides are present will be discussed.

Additional topics in this course will include 1) double sampling-collecting additional samples from the survey unit after the survey unit fails to pass the statistical test, and 2) survey strategies for alpha and beta contamination on building surfaces. The COMPASS code (MARSSIM software) will be used to illustrate the survey designs for these examples.

M3 Implementing a Comprehensive Survey Program for a Biomedical Research Facility

B. Smith; Radiation Safety Academy

A biomedical research facility can require security, contamination, and exposure surveys of the following areas: Research laboratories; Corridors; Hot Laboratories; X-ray Machines; Cyclotrons; Irradiators; Material Receipt Areas; Waste Handling Areas.

The surveys can include comprehensive laboratory surveys, security checking, inventory tracking, air sampling, and a bioassay program.

The comprehensive laboratory survey includes monitoring laboratories for adequate radioactive material management, security, signage, personnel monitoring, adequate shielding, proper protective clothing/equipment, record keeping, contamination, adequate survey monitors available, training, adequate fume hood air flow and the proper use of contamination control procedures. Corridors, cyclotrons, irradiators and x-ray machines require surveys specific to these facilities. Hot labs require surveys that are more involved than the typical comprehensive laboratory surveys such as air sampling and a bioassay program. Security surveys require day time, night time and weekend inspection. These surveys check for security of equipment, radioactive materials and waste and facilities.

This presentation will discuss all aspects of a well designed comprehensive program with special emphasis on the more prevalent problems that have been encountered at a biomedical research facility. It will include many real life scenarios and steps to resolve any problems.

M4 Dose Reconstruction under EEOICPA

R. Toohey; Oak Ridge Associated Universities

Congress passed the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) in 2000, and in September, 2002, NIOSH awarded a five-year contract to the ORAU Team to perform radiation dose reconstructions to determine compensability for claimants with cancer. As of last Spring, the Team had completed dose reconstructions for approximately half of the 18,500 cases referred to NIOSH, and developed site profiles for

14 of the major DOE sites and 8 of the Atomic Weapon Employer sites, covering about 75% of the cases. The presentation will give an overview of the Act and the dose reconstruction process in the first hour, and then present detailed examples of dose reconstructions in the second.

M5 Introduction to MARLAP: Part I

C.V. Gogolak; USDHS/EML

The MARLAP Manual, now finalized, is a multi-agency consensus guidance document intended for project planners, managers, and laboratory personnel to ensure that radioanalytical laboratory data will meet a project's or a program's data requirements. The manual offers a framework for a performance-based approach to achieving data requirements that is both scientifically rigorous and flexible enough to be applied to diverse projects and programs. MARLAP is organized into two parts. Part I, the subject of this session, provides the basic framework of the directed planning process as it applies to projects requiring radioanalytical data for decision making. Part II provides guidance and information on the activities performed at radioanalytical laboratories, including sample preparation, sample dissolution, chemical separations, preparing sources for counting, nuclear counting, and the determination of and reporting of measurement uncertainties.

The MARLAP process starts with a directed planning process, such as the Data Quality Objectives (DQO) process. Within a directed planning process, key analytical issues based on the project's particular analytical processes are discussed and resolved. MARLAP uses the term "analytical protocol specifications" (APSs) to refer to the output of a directed planning process that contains the project's analytical data requirements in an organized, concise form. The resolution of these key analytical issues produces the APSs, which include the measurement quality objectives (MQOs). The APSs are documented in project plan documents (e.g., Quality Assurance Project Plans, Sampling and Analysis Plans). These requirements are then used as criteria for the selection, development and evaluation of analytical protocols, and also for the evaluation of the resulting laboratory data. A statement of work (SOW) is then developed that contains the APSs. The laboratories receiving the SOW respond with proposed analytical protocols based on the requirements of the APSs and provide evidence that the proposed protocols meet the performance criteria in the APSs. The proposed analytical protocols are initially evaluated by the project manager or designee to determine if they will meet the requirements in the APSs. If the proposed analytical protocols are accepted, the project plan documents are updated by the inclusion or referencing of the actual analytical protocols to be used. During analyses, resulting sample and QC data will be evaluated primarily using MQOs from the respective APSs. Once the analyses are completed, an evaluation of the data will be conducted, including data verification, data validation, and data quality assessment with the respective MQOs

serving as criteria for evaluation. The role of the APSs (particularly the MQOs, which make up an essential part of the APSs) in the selection, development, and evaluation of the analytical protocols and the laboratory data is to provide a critical link between the three phases of the data life cycle of a project. This linkage helps to ensure that radioanalytical laboratory data will meet a project's data requirements, and that the data are of known quality appropriate for their intended use.

This course will emphasize the overall MARLAP project planning process, the linkage of Data Quality Objective to Measurement Quality Objectives, and in particular how the required method uncertainty can be used to implement the MARLAP process.

TUESDAY - 12:15-2:15 PM

T1 Red Bead Experiment

S. Prevette; Fluor Hanford, Inc.

The "Red Bead Experiment" was an interactive teaching tool that Dr. Deming made use of in his four-day seminars. In the experiment, a corporation is formed from "willing workers", quality control personnel, a data recorder, and a foreman. The corporation's product is white beads, which are produced by dipping a paddle into a supply of beads. The paddle has 50 holes in it, and each hole will hold one bead. Unfortunately, there are not only white beads in the bead supply, but some defective red beads. The production of the beads is strictly controlled by an approved procedure. Various techniques are used to ensure a quality (no red bead) product. There are quality control inspectors, feedback to the workers, merit pay for superior performance, performance appraisals, procedure compliance, posters and quality programs. The foreman, quality control, and the workers all put forth their best efforts to produce a quality product. The experiment allows the demonstration of the effectiveness (or ineffectiveness) of the various methods. Some humor is also included along the way. Describing the Red Bead Experiment has all the dangers of writing a good movie review. One does not want to give out the complete plot line in the description. Suffice it to say that at the end of the experiment, a Statistical Process Control chart is utilized to examine the results of the experiment. What is discovered is that several of the actions taken (which are commonly seen every day in the workplace) were detrimental to the employees and the workplace, and had no improving effect on the process. The concluding comments point out the hazards of misuse of performance data, and how to properly use performance data in a quality environment in order to achieve continual improvement. At Department of Energy presentations, the Red Bead experience is reviewed in the context of the Guiding Principles and Core Functions of the Integrated Environment, Safety and Health Management System (ISMS).

T2 Impact of Cellular and Molecular Responses to Low Doses of Ionizing Radiation on Radiation Risk

A. Brooks; Washington State University Tri-Cities

Radiation risk estimates are based on the linear-no-threshold hypothesis (LNTH). Basic to this hypothesis is that the response for radiation-induced damage is the same per unit of exposure regardless of the total radiation dose. This suggests that the mechanisms of action to induce these responses are the same at high and low radiation doses. New cellular and molecular biological research has indicated that there are unique responses to both high and low doses of radiation. For example, it is possible to detect changes in gene regulation that vary as a function of dose. One set

of genes responds to low doses of radiation and a different set to high doses. These different sets of genes are both up- and down-regulated by the radiation exposure. It has also been demonstrated that following low doses of radiation there are persistent changes in the oxidative status of cells. These oxidative changes determine differentiation outcome and phenotypic expression. Cell/cell and cell/matrix communication can also control the fate of the cells. Such changes suggest that cellular alterations and potential risk may not be completely dependent on mutations or chromosome damage. These molecular observations form the basis for studying phenotypic changes observed at low doses such as "bystander effects", "adaptive responses" and genomic instability". Understanding these phenotypic changes are the first steps in making predictions concerning radiation risk as a function of radiation dose and dose-rate. Molecular switches involved in many of these processes are activated at low doses, become dose-independent at intermediate doses and may be inactivated at high doses. Such studies result in observation of unique non-linear responses and suggest that the LNTH is not an adequate hypothesis for explaining the relationship between the biological changes, the radiation dose and the risk associated with that radiation.
This research was supported by the Office of Science (BER), U. S. Department of Energy, through Grant No. DE-FG04-99ER62787 to Washington State University Tri-Cities.

T3 How to Develop a Radiation Safety Computer System

B. Smith; Radiation Safety Academy

If you were designing a radiation safety database for a large or small facility, where would you start? What would you include in the design? What would be its purpose or purposes? Many aspects of system design are the same at any facility. Therefore, I will discuss the design, development, and deployment of a radiation safety computer system that primarily is useful for a large biomedical research facility, but could be adapted to smaller facilities. The application includes screens for entering and viewing data, generation of a variety of reports, and an extensive database. The application has an Oracle backend database and uses Oracle Forms and Oracle Reports to display and print data. These forms and reports can be accessed via an internal intranet and the internet using virtual private network.

The development of a radiation safety computer system must go through the following stages: Write a Design/Management Plan; Develop an entity/relationship diagram; Identify screen layouts and reports; Chose an Operating System & Database Software; Develop a Database System; Validate the System; Deploy the System; Develop a Quality Control Approach;

The database can include all or part of the following radiation safety functions, such as: Personnel information for radioactive material users, authorized users, nurses, animal handlers, x-ray technicians, etc.; Training of personnel; Laboratory status, assignments, and survey schedule; Survey results for laboratories; Radioactive material inventory and disposition; Sealed source status and surveys; Radiation meter location, status, and calibration; Air sample collections; Bioassays requests and results; Hot laboratory usage; Protocol applications; Radioactive waste processing; X-ray unit calibrations; Enforcement tracking; Laboratory security checks.

This presentation discusses the capability of the computer system to monitor, track, and schedule all aspects of radiation safety procedures at a large or small facility. The application should also

be flexible enough to be modified when needed to include any new radiation safety requirements or changes to current requirements. The discussion also includes special emphasis regarding easy to use data entry techniques and development of useful reports.

T4 Introduction to MARLAP: Part 2
C.V. Gogolak; USDHS/EML

MARLAP is divided into two main parts. Part I provides guidance on implementing the MARLAP process as described in the abstract to the Introduction to MARLAP: Part I course. That part of the manual focuses on the sequence of steps involved when using a performance-based approach for projects requiring radioanalytical laboratory work starting with a directed planning process and ending with DQA. Part II of the manual provides information on the laboratory analysis of radionuclides to support a performance-based approach. Part II provides guidance and information on the various activities performed at radioanalytical laboratories, such as sample preparation, sample dissolution, chemical separations, preparing sources for counting, nuclear counting, etc. The primary audience for Part II is expected to be technical laboratory personnel. Using the overall framework provided in Part I, the material in Part II can be used to assist project planners, managers, and laboratory personnel in the selection, development, evaluation, and implementation of analytical protocols for a particular project or program. The interaction of the project manager and the laboratory can be facilitated by a mutual understanding of the key MARLAP terms and processes described in Part I.

Because of its length, the printed version of MARLAP is bound in three volumes. Volume I (Chapters 1 through 9 and Appendices A through E) contains Part I. Part II is split between Volumes II and III. Volume II (Chapters 10 through 17 and Appendix F) covers most of the activities performed at radioanalytical laboratories, from field and sampling issues that affect laboratory measurements through waste management. Volume III (Chapters 18 through 20 and Appendix G) covers laboratory quality control, measurement uncertainty and detection and quantification capability. Each volume includes a table of contents, list of acronyms and abbreviations, and a complete glossary of terms.

Because of the emphasis on MQOs and method uncertainty in Part I, this course will concentrate on the corresponding technical issues involving laboratory quality assurance, the estimation of uncertainty, and limits of detection. Internationally recognized standards from ISO GUM and their NIST counterparts will be explained using examples. Software developed for implementing these standards will be demonstrated. This Material is primarily contained in Volume III of MARLAP

T5 ICRP 60 Lung Model
H. Cember

WEDNESDAY - 12:15-2:15 PM

W1 Emerging Issues Related to Radiation Litigation
D. Poland; LaFollette Godfrey & Kahn

The class will discuss recent cases and judicial opinions involving allegations of physical injury or damage to property caused by releases of radioactive materials to the environment. Tthe issues and judicial opinions that will be covered include the legal standards for determining whether any particular exposure was the cause of a particular injury; the differences between state and federal law (through the Price-Anderson Act) on causation issues; the type of proof that courts permit in determining causation (e.g., epidemiology versus “differential diagnosis”);

and whether courts will permit recovery for plaintiffs who claim exposure but have not yet manifested any disease (so-called "medical monitoring" claims). The course will cover three or four different recent lawsuits and discuss issues addressed in each.

W2 Pharmaceutical Radiation Countermeasures

A. Ansari; Centers for Disease Control and Prevention, Atlanta, GA

A number of pharmaceuticals have received approval from the Food and Drug Administration (FDA) for use in response to nuclear or radiological events. These pharmaceuticals are now part of the Strategic National Stockpile (SNS) and include potassium iodide (KI), diethylenetriaminepentaacetate (DTPA) and Prussian blue. A number of other products have also made the news as "anti-radiation" drugs. It is important for health physicists to be familiar with these current FDA approved drugs and other radiation countermeasures that have recently received some publicity. This course will provide an overview of potential benefits and limitations of these pharmaceuticals in the context of response to nuclear or radiological events.

W3 NORM: Geologic Origins and Some Case Studies

A. Karam; Rochester Institute of Technology

We all know that NORM can be a problem, and we even have a reasonable idea that NORM is often associated with particular industries - titanium, coal, petroleum, and others. However, most health physicists are not as aware of the geologic origins of NORM, so we often lack an understanding of why some minerals (or other geologic materials) are more likely to cause NORM problems than others. In this PEP, we will discuss the geological and geochemical properties of the most common NORM elements (U, Th, K) and, with this knowledge, we will discover how, and why certain minerals and regions are richer in NORM than others. Finally, we will examine a few particularly instructive case studies involving NORM.

W4 Leading with Leading Indicators

S. Prevette; Fluor Hanford, Inc.

This paper documents Fluor Hanford's application of Leading Indicators, management leadership, and statistical methodology in planning and decision making. These methods have improved safe performance of D&D work at the Hanford site. These safety improvements were achieved during a period of transition to D&D.

Leadership, Leading Indicators, statistical methodology, and worker-supervisor teaming are playing a key role in safety and quality at what has been called the world's largest environmental cleanup project. The U.S. Department of Energy's (DOE) Hanford Site played a pivotal role in the nation's defense beginning in the 1940s when it was established as part of the Manhattan Project. After more than 50 years of producing nuclear weapons Hanford, which covers 580 square miles in southeastern Washington state, is now focused on three outcomes:

1. Restoring the Columbia River corridor for multiple uses.

2. Transitioning the central plateau to support long-term waste management.

3. Putting DOE assets to work for the future.

The integration of data, leadership, and teamwork pays off with more efficient cleanup, better safety performance and higher credibility with the customer. Specific management theories covering Systems Thinking from Deming, Senge, and Ackoff have been applied to Fluor Hanford's operations. The U.S. OSHA Voluntary Protection Program has been

an effective method to focus management leadership and employee involvement in the D&D effort. The use of Statistical Process Control, Pareto Charts, and Systems Thinking and their effect on management decisions and employee involvement are discussed. Included are practical examples of choosing leading indicators and how they apply to risk reduction. A new, statistically based color-coded dashboard presentation system methodology is provided. This new dashboard methodology provides strong benefits over traditional "rainbow" charts while maintaining the direct and simple message of red, yellow, and green color codes. These tools, management theories and methods, coupled with involved leadership and employee efforts, directly led to significant improvements in worker safety and health, and environmental protection and restoration at one of the nation's largest nuclear cleanup sites.

W5 Selection, Use, And Calibration of Portable Survey Instruments

G. Komp; US Army

This course is will practical training for personnel on the selection and use of portable survey instrumentation. This course will discuss the basic types of portable survey instrumentation with the emphasis on selecting the correct instrument for the type of survey being performed. Strengths and weaknesses of various survey instrumentation will be discussed. This course will also discuss ANSI Standards such as N323, N42-17, and the new ANSI standards for Homeland Security. Discussion will include applicability of these standards and how they can be used to enhance the accuracy of the radiation survey being performed.

Continuing Education Lectures
Monday, July 11 through Thursday, July 14, 2005 - 7:00-8:00 AM
Included in Registration Fee

CEL1 Status of the Use of Internal Emitters in Medical Therapy

M. Stabin, Vanderbilt University

Nuclear medicine therapy is used increasingly in the treatment of cancer, including thyroid cancer, leukemia and lymphoma with radioimmunotherapy (RIT), primary and secondary bone malignancies, and neuroblastomas. The use of internal emitters, specifically targeted to diseased tissues, is resulting in significant benefits in the treatment of many diseases. Both electron and alpha emitters are being used in a variety of new approaches to the fight against cancer, and positive responses have been recorded in many patient populations, resulting in the commercial development of new approved agents and techniques. The highest rates of success are seen with traditional NaI therapy against hyperthroidism and thyroid cancer, but significant gains are being seen in the treatment of bone and marrow cancers, and some novel targeting strategies and radionuclides are being proposed for other cancers. The use of high LET emitters, including alpha and Auger electron emitters, is also on the increase in newly proposed regimens. A general overview of a number of these promising technologies and some results will be given, with emphasis on the radiation dose calculations needed to ensure their safe use.

CEL2 Energy Windowing Algorithms for Border Security Applications

J. Ely; Pacific Northwest National Laboratory

Radiation portal monitors are being used in homeland security applications to screen vehicles for illicit movement of radioactive material. Plastic scintillator material is typically used for the gamma detector material due to the relatively good detection efficiency per unit cost compared to other materials. Compton scattering is the primary interaction mechanism in plastic scintillator material, resulting in a lack of full-energy peaks in the spectra. Radiation responses from plastic scintillator material are therefore typically used in a gross-counting mode, where the responses are not binned by energy but simply summed up.

In vehicle screening there can be gross-count alarms due to legitimate shipments. These can be often categorized as either naturally occurring radioactive materials (NORM) or medical sources. Energy windowing is a technique to utilize the limited energy information from the Compton continuum to reject NORM and reduce these nuisance type alarms. With energy windowing, the detector pulses produced from incident radiation interactions are binned in several energy bins or windows. Issues relating to energy windowing such as the optimal numbers and limits of the energy windows have been investigated. Several different metrics of the energy windowing algorithm have been compared as well as the effects on the detection efficiency of the system. Background suppression issues with vehicle portal monitoring have been quantified in the energy windowing method.

Other applications of this technique would be useful in any search scenario where NORM material may result in an increase in the total radiation signature, but are not the isotopes targeted in the search. For example a handheld instrument with background calibration outside a building will register an increase of count rate upon entering the building due to building materials, and this increase may be discriminated against using the energy windowing method.

An overview of energy windowing, its applications, and the results of the energy windowing studies will be discussed.

CEL3 Quehanna Facility D&D Project – "the Rest of the Story"

D.J. Allard, CHP; Bureau of Radiation Protection

The Pennsylvania Department of Environmental Protection (DEP) Bureau of Radiation Protection (BRP) has provided management and technical support to several other state agencies for the decommissioning and decontamination (D&D) of the Quehanna research reactor and hot cell facilities since the late 1960s, when Penn State University donated the facility to the Commonwealth. The Quehanna facility D&D was an extremely challenging cleanup project, with numerous impediments to overcome and lessons learned. The facility is located in the Quehanna Wild Area near State College, and was initially constructed by Curtis-Wright (C-W) for nucleonics research in 1955. C-W had a pool-type research reactor and "service area" with six hot cells for various R&D work. The federal government supported research programs at this facility for advanced jet engines and a nuclear powered aircraft. C-W shut down their R&D operations circa 1960 and donated the facility to Penn State, which was beginning their own nuclear engineering program. However, decisions were made to defuel the reactor in the early 1960s, and the service area was rented to Martin-Marietta (M-M), who had a contract with the Atomic Energy Commission (AEC) for space nuclear auxiliary power (SNAP) generator production. The M-M AEC license for the SNAP generator work included a possession limit for six million curies of strontium-90. As a result, the service area hot cell portion of the facility was contaminated with Sr-90, and in particular, a large internal steel process box with several contaminated tanks and a maze of piping was left inside hot cell 4. In 1999, the radiological conditions inside hot cell 4 were found to be excessive, with a high potential for an airborne release of Sr-90 during any dismantlement. In the late 1960s the facility was rented to Atlantic Richfield Co. (ARCO) who installed a large cobalt-60 irradiator in the empty reactor pool, and soon began to perform gamma irradiation work. A spin off company in the late 1970s acquired the ARCO assets and commercialized an irradiated wood product, while occupying the facility as a tenant until late 2002, when they declared bankruptcy and abandoned the 90,000 curie Co-60 irradiator. In the late 1980s NRC required the facility cleanup, characterization began in the early 1990s, state funds were budgeted, and a contractor (NES, now Scientech) was tasked with onsite D&D work. That work begun in 1998. The Quehanna project is now nearly complete, and has involved: removal of 2,000 Ci of Co-60 pellets and sources of unknown origin from two hot cells; underground tank and soil removal; overhead hot cell containment construction; development and deployment of a $1 million advanced robot to dismantle the confined interior of hot cell 4; an emergency removal of 90,000 Ci of Co-60 by EPA; decontamination and removal of the hot cell shielding and building structures; extensive facility decon and survey work; and, packaging and shipment of significant volumes of low-level radioactive waste. The objective was to clean up the legacy Sr-90 radioactive material contamination at the Quehanna facility to "unrestricted release" levels so the license can be terminated and buildings safely dismantled. Total cleanup cost was over $25 million of dollars. This presentation reviews a very complicated D&D project, the obstacles that were dealt with, and provides several key lessons learned.

CEL4 Top Ten Reasons Why Health Physicists Might Fail As Expert Witnesses - A CEL Primer for Expert Witnesses and Potential Expert Witnesses

R. Johnson, Schmeltzer, Aptaker & Shepard, P.C.

Health physicists and radiation professionals must apply rigorous and well-accept-

ed scientific methods to often novel situations. Their work and opinions must withstand the scrutiny of their peers, and often, of regulatory bodies. The work done by health physicists who participate in litigation or regulatory proceedings as expert witnesses must also meet these same professional standards. Further, expert witness health physicists must also be able to present their complex work and opinions to lay people in easy-to-understand terms, helping them to understand some technical aspect of a case. All of this must be accomplished often on an expedited basis, and in some instances, without the resources and information necessary for the job, all the while negotiating a process that is foreign to the expert witness' usual scientific process. This presentation examines the work of several radiation expert witnesses in a number of cases, and discusses this work in the context of the technical and legal requirements that apply to such work. These real-life examples of methods and techniques used by expert witnesses should help other health physicists and radiation professionals appreciate how scientific expertise is needed and used in the courtroom, and also make them effective expert witnesses should they have the opportunity.

CEL5 Employer Strategies and the Employee Performance Review

J.M. Hylko; WESKEM, LLC

An employee performance review (PR) can be short or long, complicated or simple, top-down or horizontal and encompass 360 degrees of feedback. But are PRs performed or even effective? Performance reviews are strongly related to developing a system of accountability for both employer and employee. The PR system succeeds when this accountability is shared, such that the employer's strategic business plan is in alignment with the employee's goals. As a result, communication between employer and employee becomes crucial for establishing and maintaining a PR system. An employer should identify and thoroughly understand how its strategic goals are tied to essential employee job functions. Then, each individual function should be analyzed to ensure that the employee understands, rather than assumes, the processes and quantitative measurement targets corresponding to that function. The following elements are key PR features that will be covered in this class:

* When PRs work and do not work.
* Efficient collection of information to report necessary feedback.
* Formulating essential aspects of the job description.
* Establishing goals set for the period being reviewed.
* Providing for flexibly with issues beyond the job description.
* Penalties for not achieving agreed-upon goals.
* Providing a time period for change.
* Setting goals for the coming period.

This analysis ensures that the PR accurately covers all of the essential job functions being performed that are important to the employer and employee.

CEL6 Extreme Uncertainty: When Dose Reconstruction Becomes Doswaggery

D.Strom; Pacific Northwest National Laboratory

Health physicists often use the term "dosimetry" for any process that produces a number in dose-like units such as roentgens, rads, rems, coulombs per kilogram, grays, or sieverts. Not all such "doses" are created equal in terms of representativeness of deposition of ionizing radiation energy in living tissue. Nor are such doses created equal in terms of uncertainty. This presentation delineates the various measurements that can be made and used as inputs to dosimetry. Such measurements include observation of biological response (e.g., erythema, chromo-

some aberrations), calorimetry, cloud chambers, film blackening, appearance or sound of bubbles in superheated liquids, analysis of activation or fission product yield, scintillations Cerenkov radiation (light), thermoluminescence (TL) or optically stimulated luminescence (OSL), observation of radiation damage (e.g., chemically etching damage in film, radiochromic changes, thermal and electrical conductivity changes), chemical changes as quantitated by light absorption or nuclear magnetic resonance, measurement of electric charge or current in solids (Ge and Si), liquids, or gases such as xenon, P10, or air. Often other measurements are used, such as kilovoltage, tube current, and exposure time in x-ray exposures, or radioactive source strength, distance, and time in area. This presentation explores uncertainty associated with the inference of doses from measurements. The terms "dosimetry," "dosinference," and "doswaggery" in the interest of separating real measurements of dose from those dominated by assumptions or even scientific guesses.

CEL7 The Natural Nuclear Reactor at Oklo: How it Works and What it Means

A. Karam; Rochester Institute of Technology

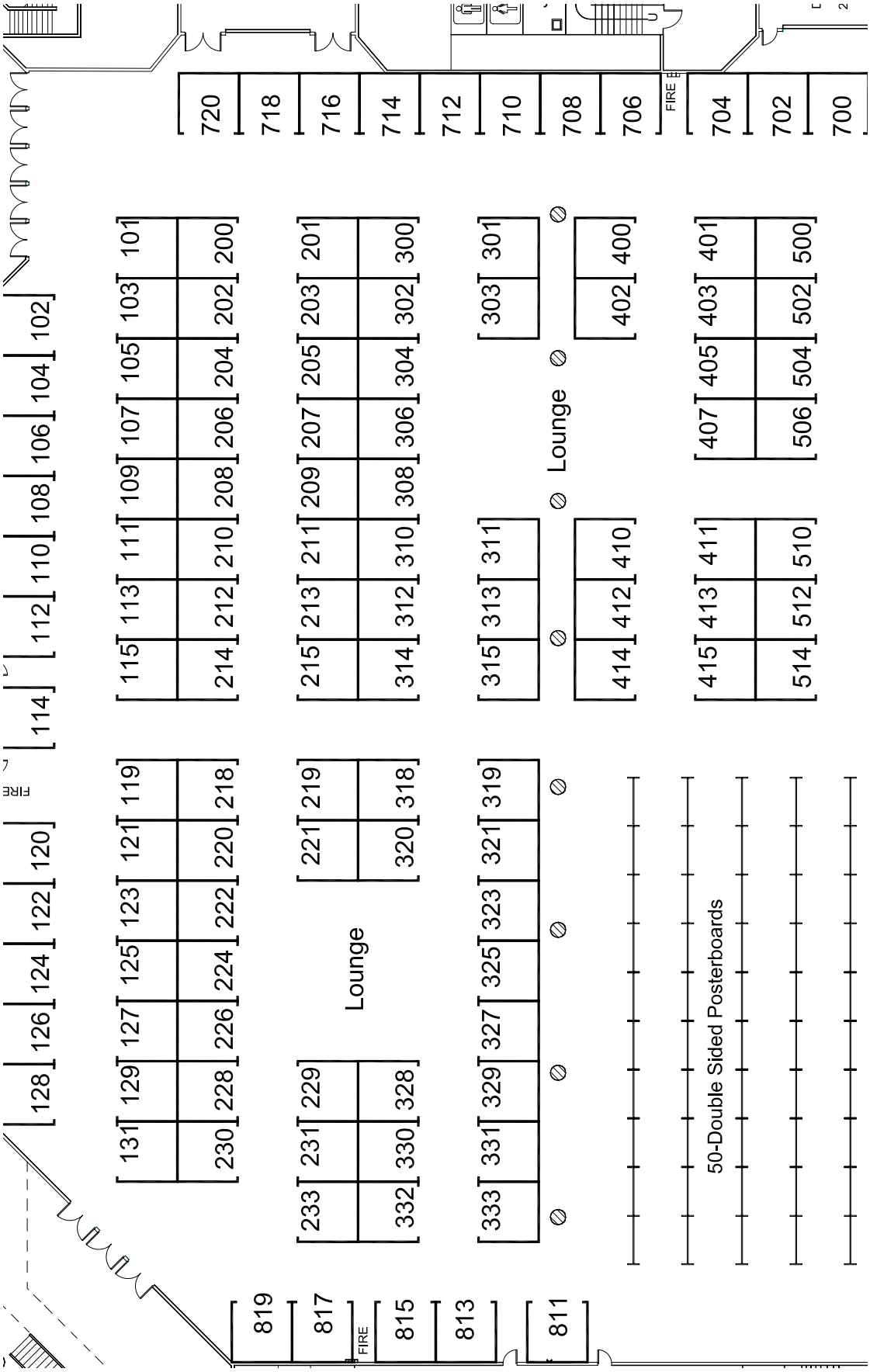
About 2 billion years ago, geology formed a natural nuclear reactor in what is now the nation of Gabon, in West Africa. The Oklo reactor seems to have operated for hundreds of thousands of years, producing enough heat to boil water and intermittently shutting the reactor down. Recent studies have helped to understand how the reactor was formed, how it operated, and how much power it produced. They have also shown that the fission products have remained in place for nearly two billion years, in spite of the nearly constant presence of water and heavily fractured sandstone surrounding the deposit. The implications of these findings on long-term radioactive waste disposal will be discussed as well as the geology and physics behind the Oklo reactor.

CEL8 Workplace Investigation of Cause: A Case Study

R. Jones; Pacific Northwest National Laboratory

A workplace investigation of cause was initiated after uranium was detected in a worker's routine urinalysis. This presentation is a case study, stepping the audience through the actual investigation. In the process, a bit of science and art are discovered. Audience participation is encouraged.

2005 Exhibit Hall Floorplan



2005 Exhibitors

2006 ANNUAL MEETING ***BOOTH: 109***
PROVIDENCE, RI

2006 MIDYEAR MEETING ***BOOTH: 111***
SCOTTSDALE, AZ

AAHP/ABHP ***BOOTH: 121***

AEA TECHNOLOGY ***BOOTHS: 308, 310***
QSA, INC.

AEA Technology QSA offers high quality products for the calibration of radiation measurement instruments used in medical and industrial applications. The Isotrak product includes: Gd-153 line sources for SPECT, Ge-68 Sources for PET, C-Trak Gamma Probe for SNL Diagnostics. Co-57 sources for Gamma Camera checking. Custom made sources. State of the art electronic personal dosimeter DoseGuard, AktivLab set for basic training on radioactivity.

ALPHA SPECTRA, INC. ***BOOTH: 209***

Alpha Spectra, Inc. manufactures gamma-ray detectors for health physics, academic, industrial, medical and exploration applications. Scintillation materials used include most of the common phosphors e.g. NaI(T1), BGO, plastic, etc.

AMERICAN NUCLEAR SOCIETY ***BOOTH: 230***

"The whole is greater than the sum of its parts." By becoming a member of ANS, you advance the nuclear cause. ANS' 10,500 members together represent a strong, unified voice in the support of nuclear science and technology. Complete information on ANS activities and benefits can be found on the ANS web site: www.ans.org.

ANALYTICS, INC. ***BOOTH: 210***

Analytics provides custom NIST-traceable radioactivity standards for calibration of alpha, beta, x-ray and gamma-ray counting systems. Radiochemical performance evaluation samples are provided quarterly for effluent and environmental monitoring programs.

ARROW-TECH INC. ***BOOTH: 313***

BERKELEY NUCLEONICS CORP. **BOOTH: 103**

Berkeley Nucleonics Corporation (BNC) is a leading manufacturer of precision electronic instrumentation for test, measurement and nuclear research since 1963. BNC's flagship product for the Health Physics community is the Model 935 SAM, the latest in portable gamma spectroscopy, providing laboratory style qualitative measurements in-situ.

BNC has also recently introduced a suite of belt clipped radiation meters for first responders. The palmRAD & nukeALERT meters are small, rugged, and the most sensitive in the marketplace.

BERTHOLD TECHNOLOGIES ***BOOTH: 407***

Berthold Technologies offers a variety of instruments for radiation protection applications including: contamination monitors, does rate monitors, various air (gas and particulate) and liquid monitors.

CANBERRA ***BOOTHS: 229, 231, 233, 328, 330, 332***

Canberra is the world's leading supplier of analytical instruments, systems and services for radiation measurement. Applications for Canberra offerings include health physics, nuclear power operations, Radiation Monitoring Systems (RMS), nuclear safeguards, nuclear waste management, environmental radiochemistry and other areas.

The new Canberra has the broadest array of Health Physics capabilities in the industry. HP related products include a full range of gamma and alpha spectroscopy equipment, personnel contamination monitors, hand held survey instruments for alpha, beta, gamma and neutron measurement, whole body counters and area monitors. The company also offers a full range of services including repair and maintenance, training and expert data review.

CHASE ENVIRONMENTAL GROUP INC. ***BOOTH: 306***

Radioactive and mixed waste brokerage, processing and disposal. Radioactive and chemical hazard remediation and decomissioning. Sealed source recovery/ recycle service available.

CLEAN HARBORS ENVIRONMENTAL SERVICES, INC ***BOOTH: 712***

Clean Harbors, Inc. is North America's leading provider of environmental and hazardous waste management services. Clean Harbors owns and operates 48 waste management facilities, including 9 landfills, 5 incineration facilites, and 7 waste water treatment centers. The company provides services to 45,000 customers, including the majority of fortune 500 companies and numerous government agencies.

DADE MOELLER & ASSOCIATES ***BOOTH: 228***

Dade Moeller & Associates is an award-winning, employee-owned small business specializing in occupational and environmental health sciences. We provide professional consulting services for assessing, preventing, and controlling harmful exposures from radiation and hazardous substances that affect workers, the public and the environment.

DURATEK, INC. ***BOOTH: 329***

D&D of facilities, characterization, waste processing, HP support, training, waste transportation, emergency response, radiation instruments.

EBERLINE SERVICES ***BOOTH: 331***

Radiological services including radiochemistry and mixed waste analyses; radiological control; radiological survey and mapping; characterization and waste management.

F&J SPECIALTY PRODUCTS, INC. ***BOOTH: 205***

IS0 9001: 2000 certified manufacturer of microprocessor controlled air sampling and airflow calibration systems as well as consumables, accessories and calibration services.

FEMTO-TECH, INC. ***BOOTH: 700***

Manufacturer of continuous air and process radiation instrumentation.

FLUKE BIOMEDICAL ***BOOTHS: 220, 222***

Victoreen, Nuclear Associates and Global Calibration Laboratory are all included in the Syncor Radiation Management Organization and are committed to continue to design, manufacture and distribute electronic instrumentation for the detection and measurement of ionizing radiation. Survey meters include alpha, beta, gamma and neutron along with Area and Process monitors and the popular Universal Digital Ratemeter for nuclear power and environmental monitoring. Featured new products include the colorful Model 451 series of ion chambers with Excel software application. The new Model 990 will be introduced at this show. The Global Calibration Laboratory offers an industry-first 24X7 same day turnaround.

FOSS THERAPY SERVICES, INC. ***BOOTH: 412***

FTS began operations in 1988. Our capabilities now include installation, servicing and decommissioning of research and blood irradiators, as well as source calibration facilities. New systems also available. We also provide source/device recycling.

FRAMEWORK SCIENTIFIC ***BOOTH: 716***

Framework Scientific is a highly dynamic company involved in the development of advanced cutting edge scientific instrumentation and software, with an emphasis on radiation measurements.

We are pleased to introduce our Acoustical Bubble Counter ABC 1260, a state of the art neutron detector designed for the superheated drop (bubble) detector technology pioneered at Yale University. The unit offers: High Neutron sensitivity; Dose equiv-

alent response; Photon discrimination; Digital Active counting; Standard PC interface; Optional High Z kit for enhanced high-energy response to several hundred MeV; Programmable dose rate alarms; Network connectivity. Web Site: www.framesci.com

GAMMA PRODUCTS, INC. ***BOOTH: 207***

Mini T counting system.

GENERAL ATOMICS ELEC. SYSTEMS ***BOOTH: 718***

GENERAL ENGINEERING LABS, LLC ***BOOTH: 312***

GEL provides the nuclear industry with radiochemistry and analytical chemistry. Our major programs include, Bioassey, REMP-RETS, 10CFR61, RERA-ENVIRACORE, and environmental analysis.

GLOBAL DOSIMETRY SOLUTIONS, INC ***BOOTHS: 219, 221***

Global Dosimetry Solutions, Inc. offers a wide range of services for measuring ionizing radiation. GDS utilizes film, thermoluminescient, and track etch technologies. GDS is accredited NVLAP in the US and is an approved dosimetry service in Canada and the UK.

HEALTH PHYSICS INSTRUMENTS ***BOOTH: 215***

Health Physics Instruments manufactures instruments and devices that measure gamma, neutron, beta, and alpha radiation. The line includes portable Geiger-counters through sophisticated fixed monitors, Rem meters, and multichannel analyzers. HPI has been serving the Health Physics community for over 30 years.

HI-Q ENVIRONMENTAL PRODUCTS CO. ***BOOTH: 319***

Hi-Q Environmental Products Company has been a leading Manufacturer of Air Sampling Equipment, Systems & Accessories since 1973. Our product line includes: Continuous duty high & low volume air samplers, air flow calibrators, radioiodine sampling cartridges, collection filter paper, combination filter holders, and complete stack/fume hood sampling systems including the Shrouded Probe designed per ANSI N13.1 1999.

HOPEWELL DESIGNS, INC. ***BOOTH: 304***

Hopewell Designs, Inc. manufactures irradiator calibration systems for radiation detection instruments and personnel dosimetry. Systems may be manual, or automated depending on the customers requirements. Our product line also encompasses x-ray inspection systems, lead shielding, and mechanical positioning systems.

HPS HISTORY COMMITTEE ***BOOTH: 125***

IHPS PUBLICATIONS/ STANDARDS ***LOBBY, CONVENTION CENTER***

ILLINOIS INSTITUTE OF TECHNOLOGY ***BOOTH: 501***

Illinois Institute of Technology offers an internet program leading to Master's Degree in Health Physics. No thesis required.

ISA CORPORATION ***BOOTH: 414***

Gloves, Shoecovers

ISOTOPE PRODUCTS LABORATORIES ***BOOTH: 410***

Isotope Products Laboratories is a NIST traceable laboratory supplying radioactive standards, sources and nuclides for counting room use, instrument calibration and environmental monitoring, specializing in custom requirements.

J. L. SHEPHERD & ASSOCIATES ***BOOTH: 224***

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

K & S ASSOCIATES ***BOOTH: 401***

K & S is an accredited calibration laboratory for survey instruments, dosimetry, brachy therapy, diagnostic instruments and patient dose management software.

LAB IMPEX SYSTEMS LTD. ***BOOTH: 204***

Stack and area monitoring systems for aerosol, gas and liquid effluent measurement applications.

LANCS INDUSTRIES ***BOOTHS: 105,107***

Lancs Industries manufactures containments, tents, glovebags, protective clothing and lead shielding. Lancs specializes in fabricating custom designed items to prevent contamination in radiological work environments.

LANDAUER INC ***BOOTHS: 411, 413, 415, 510, 512, 514***

Landauer is the nation's leading provider of personnel radiation dosimetry services. New OSL technology, Luxel(r) dosimeter, measures x-ray, beta and gamma radiation along with neutron detection capabilities. NVLAP accredited. Landauer offers a full range of reports, ALARA aids, interactive computer systems, dosimetry management PC software and other related services. Aurion operational dosimetry service combines the Internet and cutting edge DIS technology to help control exposure.

LUDLUM MEASUREMENTS, INC. ***BOOTHS: 201, 203***

Ludlum, a manufacturer, will be displaying portable and laboratory instrumentation used to detect and measure nuclear radiation.

MACTEC ***BOOTH: 131***

MACTEC - protecting the workforce, the public, and the environment from the harmful effects of ionizing and non-ionizing radiation; meeting federal and/or state regulatory requirements; and minimizing the risk of liability demands through use of our NRC license and planning/implementation of a compliant and comprehensive radiation protection program.

MGP INSTRUMENTS ***BOOTHS: 318, 320***

MGP Instruments designs, develops, markets and supports operational survey equipment and measurement systems in order to protect people, facilites and the environment against technological hazards and threats.

MJW CORPORATION INC. ***BOOTH: 120***

MJW Corporation Inc. provides a variety of radiological consulting services as well as innovative software solutions for health physics and other technical industries. MJW's software line brings state-of-the-art applications to health physics, nuclear related fields, and all aspects of emergency preparedness, disaster recovery, asset management and pre-risk mitigation. The Radiological Division of MJW is a professional consulting firm specializing in radiological and health physics services for private industry and government agencies. Collaboration between the multimedia and radiological divisions keeps MJW on the front line of flourishing technological progress. Check out our updated product page at http://www.mjw-corp.com or call us toll-free at 1-888-MJW-CORP for more information.

NEXTEP ENVIRONMENTAL, INC. ***BOOTH: 129***

NEXTEP Environmental, Inc. (NEXTEP) was founded in 1996 by principals with extensive experience working in the nuclear industry to provide strategic planning, project management, and technical support services for the highly regulated nuclear industry. NEXTEP offers a team of qualified personnel with a proven record of success and excellent working relationships with the NRC and state radiological agencies and their licensees. NEXTEP has developed sophisticated database and dose mod-

eling systems to support our clients. Active projects emphasize a unified approach to all radiological survey data collected at the site integrated with the latest in GIS mapping technology and automated waste manifesting and reporting modules.

NRRPT ***BOOTH: 123***

NSSI ***BOOTH: 321***

Radioactive, hazardous, and mixed waste treatment. Tritium recovery. Treatment of high hazard chemicals, gases, and radioactives.

NUCLEAR ENERGY INSTITUTE ***BOOTH: 706***

NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues.

OAK RIDGE ASSOCIATED UNIVERSITIES ***BOOTH: 323***

ORAU provides a variety of services in the radiological sciences: Training, environmental surveys, decommissioning, epidemiology and, emergency response.

ON SITE SYSTEMS, INC. ***BOOTH: 315***

Developers of the SQL client server based Environmental Health & Safety Assistant software program. The EH&S Assistant is a centralized database and safety management system providing summary-level inventory of Radiological, High consequence Biological Agents and Toxins or Chemicals used or stored within the facility or campus. The client based program features high performance 32bit optimization, email capabilities and security at both the application and the application function level. Better organization allows for the selection of appropriate control measures, allowing for improved regulatory compliance and enhanced safety procedures. Comprehensive compliance documentation is the key, for with it negligence is assumed.

ORTEC ***BOOTHS: 301, 303, 400, 402***

ORTEC is a global supplier and world leader in the design and manufacture of nuclear detection instrumentation including the latest in mechanical cooling technologies for Germanium gamma-ray detectors. Stop by our booth to see the latest in solutions for Homeland Security including an LN2-free portable detector as well as an array of systems for radiochemistry laboratory applications.

OSHA - HPS ALLIANCE ***BOOTH: 714***

The OSHA - HPS Alliance focuses on enhancing workplace health and safety and assisting employees in developing a preventive focus for radiological safety and health issues in workplace environments.

OVERHOFF TECHNOLOGY CORPORATION ***BOOTHS: 200, 202***

Design and Manufacture of Electronic Instrumentation for Measurement of Radiation.

PACIFIC ECOSOLUTIONS, INC. ***BOOTH: 208***

Full service radioactive waste treatment facility located in Richland, WA near the Hanford Reservation. PELOS offers thermal and nonthermal treatment options for both lowlevel and mixed radioactive waste.

PACIFIC NORTHWEST NATIONAL LABORATORY ***BOOTH: 515***

Pacific Northwest National Laboratory (PNNL) offers radiological calibration and testing services. Dosimeter irradiations, instrument repair, calibration, type testing, and alpha/beta source recertification. Visit us at www.pnl.gov/eshs/cap/rcif.

PERMA-FIX ENVIRONMENTAL SERVICES, INC. ***BOOTH: 213***

Perma-Fix Environmental Services provides turnkey hazardous, low level radioactive, and mixed waste treatment services at our fully licensed and permitted facilities. These services offer our customers with the most comprehensive hazardous, radioactive and mixed waste treatment services capabilities in the U.S.

PHILOTECHNICS, LTD. ***BOOTH: 218***

LLRW and Mixed Waste brokerage services, HP services including D&D, license terminations, etc., and industrial hygiene services.

PROTEAN INSTRUMENT CORPORATION ***BOOTH: 720***

Protean Instrument Corp. is the leading supplier of high performance alpha/beta counting systems, and the only company 100% dedicated to the manufacture of these systems. We manufacture a range of 7 models, including automatic, manual, single detector, multi-detector, windowed and windowless. We deliver twice the performance!

QAL-TEK ASSOCIATES ***BOOTH: 211***

Radiological support services. Qal-Tek Associates offers experienced capabilities in the areas of: Instrument Calibration/Repair, Radioactive Source disposal, consulting, training, and all other forms of RadSupport services.

RADIATION SAFETY & CONTROL SERVICES INC. ***BOOTH: 314***

RSCS provides quality radiological products and services for small and large radioactive material users. These include consulting, training, specialty databases/software, lead tests, instrument calibrations/repair, measurements and evaluations, and instrument sales.

RADIATION SAFETY ACADEMY ***BOOTH: 300***

For those who want the best understanding and assurance of radiation safety. We have four Certified Healt Physicists with over 75 years of combined experience. We provide training in all aspects of radiation safety from Radiation Awareness, Instruments, Regulations, Transportation, Radiation Safety Officer, to CHP Exam Preparation and others. We offer the best source of online training (www.RadTrainONline.com) and will even design courses specifically to meet your company's needs. Our CHPs can provide consultation for all types of radiation safety needs including; license application and amendments, sealed source and device registrations, on-site audits, radiation safety program development, effective safety communications, and expert witnesses. Partner with the Radiation Safety for success and receive your free radiation safety program review.

RADIATION SAFETY ASSOCIATES, INC. ***BOOTH: 405***

Radiation consulting services, radiochemical analysis/lab services, instrument calibration & repair, decontamination & decommissioning, publications (journals & reference books) and software/instruments (URSA-2) for HPs.

RSO, INC. ***BOOTH: 101***

Celebrating 30 years of Health Physics Products and Services 1974-2004. ROS, Inc thanks the Health Physics Society for being a part of our continued success.

S. E. INTERNATIONAL, INC. ***BOOTH: 403***

The Radiation Alert® product line offers handheld ionizing radiation detection instruments including Geiger counters, dosimeters, and multi-channel analyzers for surface and air contamination. Proven reliable in environmental, industrial, laboratory, research, Health Physics, Hazmat and educational fields.

SAINT-GOBAIN CRYSTALS, SCINTILLATION PRODUCTS ***BOOTH: 302***

Gas-filled radiation detectors; Scintillation crystals and detectors (ask about our new exclusive BrilLanCe™ series crystals); Cast plastic and liquid scintillators; Plastic scintillating fibers.

SCIENTECH, LLC ***BOOTH: 226***

Scientech provides expert radiological technical services to commercial firms, academia and government agencies across the US. Scientech specializes in decommissioning services and over the past thirty years has successfully completed hundreds of projects. Contact Barbara Bastenbech at (860) 210-3007.

SCIONIX ***BOOTH: 333***

Scionix produces custom made detectors employing Scintillation Crystals and Materials. Our key themes are a quick interaction on new scientific developments regarding materials and detection techniques with a close collaboration with the end users.

SPECTRUM TECHNIQUES ***BOOTH: 325***

Radioisotope check sources, GM counting equipment, scintillation spectrometers.

TECHNICAL ASSOCIATES ***BOOTHS: 102, 104***

Recent additions to TA's Health Physics instrument line include air and area monitors, which are smarter, more sensitive and more rugged than previously available, in addition to pipe and plume and the latest advances in portables.

TELETRIX ***BOOTH: 114***

TELETRIX provides radiation training equipment that supports training programs in all radiation related fields. Simulated version of meters and probe inputs provide a "train like you work" atmosphere.

THERMO ELECTRON CORPORATION ***BOOTHS: 113, 115, 212, 214***

Thermo Electron Corporation, Eniviromental Instruments, manufactures air quality instruments for enviromental compliance and water analysis products to radiation instrumentation systems for nuclear and homeland security markets.

THOMAS GRAY & ASSOCIATES, INC. ***BOOTH: 206***

Thomas Gray & Associates, Inc., also representing Environmental Management and Controls, Inc., (EMC) and RWM-Utah, Inc., offers a full line of Health Physics services, including LLRW disposal, consolidation, transportation, site remediation, & HP services.

TSA SYSTEMS, LTD. ***BOOTH: 506***

TSA manufactures a complete line of Radiation Detection Systems.

U.S. NUCLEAR REGULATORY COMMISSION ***BOOTH: 500***

The mission of the U.S. Nuclear Regulatory Commission is to regulate the civilian use of nuclear power and nuclear materials to protect the health and safety of the public, the environment, and the nation. NRC monitors, enforces and protects nuclear power plants that generate electricity as well as universities and hospitals that use nuclear materials.

XRF CORPORATION ***BOOTH: 311***

XRF Corporation designs, manufactures, sells and supports radionuclide identification systems. Offerings include the ICS-4000 hand-held radionuclide identifier, submersable probes and monitors, real time air filter monitors and un-manned robots for dirty bomb identification and disposal.

CURRENT EVENTS/ WORKS-IN-PROGRESS

P.51 Inter-Comparison of Liquid Scintillation Fluor from Different Vendors

D.A. Barnes, R. Metcalf, I.B. Trujillo; Los Alamos National Laboratory

The Health Physics Analysis Laboratory (HPAL) at Los Alamos National Laboratory (LANL) performs approximately 30,000 liquid scintillation analyses each year. Typical samples include: nasal swipes, tritium swipes, waters, oils, and glycol. We do not use chemistry on the samples and we do not perform low level counting. Counting times are typically ten minutes or less. HPAL has used one particular type of fluor for all samples for many years. There are at least 25 other fluors commercially available (at least 8 for general purpose use) from 6 different vendors. HPAL would like to know if these fluors are suitable for our needs and different sample types, and how comparable they are to our current fluor. To determine the differences between different fluors we have obtained several different fluors and are performing inter-comparisons for our different samples types. We are also counting the samples on liquid scintillation detectors from two different vendors. Currently have 5 different types of fluors and hope to obtain samples of others. We anticipate that this inter-comparison will allow HPAL to be able to choose which fluor is best for our use based on efficiency, price, and availability.

P.52 Assessing the Benefit of Radiological Source Remediation Efforts in terms of Groundwater Plume Attenuation

R.W. Falta; Clemson University

Subsurface contamination by mobile radionuclides is often characterized by a concentrated source zone that discharges into a much larger but less concentrated groundwater plume. At many sites, it may be possible to reduce the radiological inventory in the source zone through site remediation efforts, but it is not obvious what effect this may have on concentrations in the plume. By assuming that the contaminant discharge from the source area is a power function of the source inventory, it is possible to develop analytical solutions to describe the transient plume response to reductions in the source inventory. These inventory reductions may occur by natural (radioactive decay and advective flushing) and manmade (source remediation) processes. In almost all instances, source remediation leads to corresponding reductions in the total activity in the plume over time. However, it can be shown that in some cases, source remediation will have only limited effects on the plume length or longevity, while in other cases, source remediation can have major effects on the plume behavior. In addition to the radioactive decay rate, the plume response to source remediation depends on the nature of the source (initial inventory, initial contaminant discharge, and power function exponent), and on the nature of groundwater transport and the plume definition (groundwater velocity, radionuclide retardation factor, and regulatory concentration limits).

P.53 Co-60 Source Recycling at the International Isotopes Inc. Facility

J.J. Miller; International Isotopes Inc.

International Isotopes Inc. (I3) under a license issued by the US Nuclear Regulatory Commission has begun Co-60 Source Recycling Activities. I3 has been supplying high specific activity (>250 Ci/g) Co-60 to

the manufacturer of the ELEKTA gamma knife. When the Co-60 decays below 150 Ci/g it is no longer useful in the gamma knife. However if recovered this Co-60 could be utilized in other sources such as irradiators and teletherapy sources which may be high in activity but not necessarily require high specific activities.

This poster summarizes the Gamma Knife life cycle and describes the unique facility requirements, specialized equipment and radiological engineering controls necessary to recover and reutilize Co-60 from Gamma Knife Source Sets. These facility resources may be utilized to recover Co-60 from sources other than the gamma knife with little or no modification.

P.54 Sensitivity Analysis of Uranium Speciation Modeling in Several Aquifers of Interest

A.L. Scott, T.A. DeVol, R.A. Fjeld; US Army, Clemson University

A sensitivity analysis of uranium speciation using Geochemist's Workbench^{TM} (GWB) was utilized to better understand the effects of inorganic solution chemistry on the speciation of uranium in ground water. Uranium speciation is critical in determining the uranium oxidation state and mobility in the environment. This is due to the tendency of U(IV) species to exist in the fairly immobile solid phase and U(VI) species tending to be in the relatively mobile aqueous phase. GWB is a suite of modeling tools developed for equilibrium speciation modeling, including graphical presentation of the output. Since selection of the thermodynamic database has been shown to be critical in determining equilibrium speciation, the most up-to-date, consistent, peer reviewed thermodynamic data are used. Modeling results for uranium speciation in several aquifers, including Yucca Mountain (NV), WIPP (NM), Simpsonville (SC), Finland, and Kosovo, are presented. Results are also presented for sensitivity analyses performed by varying multiple ground water constituents and properties, with correlations between ground water composition and uranium concentration being identified.

P.55 Evaluating Radiation Safety Instructions To Patients Following Prostate Brachytherapy

M. Williamson, L.T. Dauer, M. Zelefsky, C. Horan, J. St. Germain; Memorial Sloan-Kettering Cancer Center

Dose rate measurements were made in the immediate post-operative period on 636 patients with stage T1-T2 prostate cancer who underwent transperineal I-125 or Pd-103 seed implantation from August 1995-January 2003. The mean radiation dose rate at the anterior skin surface was 37 µSv/hr for I-125 and 8 µSv/hr for Pd-103. The mean dose rate at 30 cm was 6 µSv/hr for I-125 and 3 µSv/hr for Pd-103. At one meter the dose rates from both types of implants were reduced to less than 1 µSv/hr. Dose rate measurements made on both lateral skin surfaces were less than 16.8 µSv/hr. Assuming a 33% occupancy factor and utilizing the mean measured dose rate for I-125, the time required to reach an effective dose equivalent limit of 5 mSv for caregivers was estimated to be 19 days on contact with the skin surface. The lifetime doses for I-125 at a distance of 30 cm from the anterior skin surface, as well as the lifetime doses for Pd-103 on contact with the skin surface and at 30 cm from the anterior skin surface were less than 5 mSv. I-125 prostate seed patients should be provided with instructions to increase distance when sleeping next to a care-

giver, but that the distance need not be more than 30 cm. While the lifetime doses for Pd-103 at 30 cm are approximately 3 times less than those at contact, both are less than 5 mSv. Therefore, special instructions to increase distance or reduce time for close contact with caregivers is not a regulatory requirement for Pd-103 patients, but may be considered prudent to maintain doses ALARA. Radiation safety instructions to patients following permanent prostate brachytherapy should include: avoiding close contact (within 30 cm), with others for extended periods of time and avoiding sleeping in the "spoon" position (in contact) with the primary caregiver. Patients treated with either isotope do not represent a radiation risk to members of the public.

P.56 Evaluating a Radiation Safety Training Intervention For Registered Nurses in Oncology

L.T. Dauer, J. Kelvin, C. Horan, M. Williamson, J. St. Germain; Memorial Sloan-Kettering Cancer Center

60% of cancer patients receive radiation therapy (RT) during their cancer treatment, so most oncology (cancer care) nurses will care for patients receiving RT at some time. However, misconceptions about radiation are common, causing undue fears and concerns that may negatively impact patient care. Effectively educating nurses to overcome these misconceptions is a challenge. A new radiation safety training intervention was developed. A multifaceted approach to educating staff was implemented, incorporating current adult education principles. All nursing radiation policies and procedures were revised. An award-winning (Videographer Award of Excellence) 12-minute video was developed to provide core content. Door signs and chart labels were revised. Interactive problem-solving sessions for nurse leaders reviewed modality-specific precautions. Unit-based inservices focused on common treatments. Online presentations were developed for specific treatments. 15% of the 750 registered nurses were randomly chosen to complete a pretest and a posttest instrument to assess knowledge and attitudes. The nurses showed statistically significant improvement in cognitive knowledge and demonstrated a more positive attitude toward radiation and the radiation safety program after the training intervention. Well-designed educational initiatives that include stakeholder involvement can be effective in overcoming misconceptions and fears related to radiation and can enhance knowledge and attitudes while ensuring regulatory compliance.

P.57 The Atomic Bomb Fragment: An Experience in Explaining Nuclear Science to the Popular Media

D.W. Jokisch; Francis Marion University

On March 11, 1958 a B-47 strategic bomber on a training mission accidentally dropped a Mark 6 nuclear bomb over rural South Carolina. The bomb, which did not contain the fissionable core, detonated on a lot in Mars Bluff, SC, less than a mile from the current campus of Francis Marion University (FMU). Though the accounts of this event have been written several times, the most extensive account was recently published in the May 2005 issue of Esquire magazine. The author of the Esquire article contacted health physics faculty at FMU in February of 2005 after finding a local resident that claimed to have a fragment of the bomb. In attempting to authenticate the fragment, the author was surprised to measure radioactivity with a Geiger counter. He asked if

FMU had the equipment necessary to determine the source of the activity. We spent one afternoon with the author while acquiring a gamma-ray spectrum from the fragment. In addition to presenting the brief scientific analysis, this poster will describe the communication with the author of the article and the subsequent interpretation presented in the publication.

P.58 Neutron Coincidence Counting for Rapid Detection and Determination of Recovered, Undetonated Weapons and RDDs

D.L. Haggard, J.E. Tanner, J.M. Tingey, A.V. Mozhayev; Pacific Northwest Laboratory

Neutron coincidence counting provides a unique method of quantifying the numbers of time correlated neutrons being emitted from a sample. This is facilitated by using shift register electronics and selected gating parameters. Since the neutrons emitted from plutonium are mostly from spontaneous fission (~2.16 neutrons per fission) they are time correlated and are detected in pairs (doubles) within a given time or gate. Other sources of neutrons, singles, are created from alpha-neutron reactions originating from low z impurities. A nuclear device or WMD would be metal and not contaminated by low z materials. Its neutron signature would have a low number of "single neutrons" from alpha-neutron low z interactions while having a large number of time correlated neutrons. The ratio of totals (singles plus doubles) to time correlated neutrons (doubles) would be low. The ratio of totals to doubles would be high in the case of an RDD due to alpha - neutron reactions on oxygen, chlorine, etc. It is the large difference between the totals/doubles ratio in a short counting time that provides the rapid determination between WMD and RDD items. Data is presented showing results of this technique.

Health Physics Society 2005 Author Index