PRELIMINARY PROGRAM

50th Annual Meeting of the Health Physics Society

(American Conference of Radiological Safety)

July 10-14, 2005

Spokane Convention Center

Spokane, Washington

Health Physics Society Committee Meetings

Friday, July 8, 2005

ABHP BOARD MEETING
9:00 am - 5:00 pm

Saturday, July 9, 2005

FINANCE COMMITTEE
8:00 am - Noon

ABHP BOARD MEETING
9:00 am - Noon

CONTINUING EDUCATION COMMITTEE
Noon - 5:00 pm

AAHP EXECUTIVE COMMITTEE
1:00 - 5:00 pm

HPS EXECUTIVE COMMITTEE
1:00 - 5:00 pm

HPS JOURNAL EDITORS MEETING
3:00 - 6:00 pm

Sunday, July 10, 2005

HPS BOARD OF DIRECTORS
8:00 am - 5:00 pm

VENUES COMMITTEE
8:30 am - 4:30 pm

AAHP EXECUTIVE COMMITTEE
9:00 am - Noon

PROGRAM COMMITTEE
11:00 am - 2:00 pm

Monday, July 11, 2005

MEMBERSHIP COMMITTEE
Noon - 2:00 pm

SYMPOSIA COMMITTEE
12:30 - 4:30 pm

CHAPTER COUNCIL MEETING
1:00 - 2:00 pm

ABET EVALUATORS
1:00 - 5:00 pm

HISTORY COMMITTEE
3:00 - 5:00 pm

Tuesday, July 12, 2005

ABET EVALUATORS
8:00 am - Noon

SCIENTIFIC AND PUBLIC ISSUES COMMITTEE
11:30 am - 1:00 pm

HP PROGRAM DIRECTORS ORGANIZATION
Noon - 2:00 pm

SCIENCE TEACHER WORKSHOP COMM.
Noon - 2:00 pm

NOMINATING COMMITTEE
Noon - 3:00 pm

AWARDS COMMITTEE
1:00 - 2:00 pm

LEGISLATION AND REGULATION COMMITTEE
1:00 - 3:00 pm

Wednesday, July 13, 2005

INTERNATIONAL RELATIONS COMMITTEE
9:00 am - Noon

AEC ACCREDITATION SUBCOMMITTEE
10:00 am - Noon

LABORATORY ACCREDITATION POLICY
10:00 am - Noon

LABORATORY ACCRED. ASSESSMENT
Noon - 2:00 pm

SUMMER SCHOOL COMMITTEE
Noon - 2:00 pm

STUDENT BRANCHES
1:00 - 2:00 pm

ACADEMIC EDUCATION COMMITTEE
2:00 - 4:00 pm

Thursday, July 14, 2005

LOCAL ARRANGEMENTS COMMITTEE
7:30 - 9:30 am

HPSSC MEETING
8:00 am - Noon

PROGRAM COMMITTEE
Noon - 2:30 pm

HPS BOARD OF DIRECTORS
1:00 - 5:00 pm

Key Dates

Current Events/Works-In-Progress Deadline . . . . . .May 27
Hotel Registration Deadline . . . . . .June 13
Social/Technical Preregistration Deadline . . . . . .June 13
HPS Annual Meeting Preregistration Deadline . . . . . .June 13
PEP Preregistration Deadline . . . . . .June 13
Summer School Registration Deadline . . . . . .June 15
AAHP Courses . . . . . .July 9
Professional Enrichment Program . . . . . .June 10-13
HPS 50th Annual Meeting . . . . . .July 10-14
American Board of Health Physics Written Exam . . . . . .July 11

Registration Hours

Registration will take place at the Spokane Convention Center:

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 am - Noon

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

Table of Contents

CURRENT EVENTS/WORKS-IN-PROGRESS

The submission form for the Current Events/Works-in-Progress poster session is on the Health Physics Society web site at http://hps.org/newsandevents/works.cfm. The deadline for submissions is Friday, May 27, 2005. All presentations will take place as posters on Monday, July 11, between 1:30-3 pm. Individuals will be notified of acceptance of their WIP submissions in June.

For questions regarding WIP submissions, contact Sue Burk or Lori Strong at the HPS Secretariat at 703-790-1745 or sburk@burkinc.com/lstrong@burkinc.com.

NOTE FOR CHPs

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

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

Saturday

8:00 AM-5:00 PM	AAHP 1, AAHP 2, AAHP 3
2:00-5:00 PM	Registration

Sunday

7:00 AM-7:00 PM	Registration
PEPs	1A -1H: 8-10 am; 2A-2H: 10:30 am-12:30 pm; 3A-3H: 2-4 pm
5:30-6:30 PM	Welcome Reception

Monday

7:00-8:00 AM	CEL 1, CEL 2
8:00 AM-4:00 PM	Registration
8:30 AM-NOON	Plenary Session
Noon-5:00 PM	Exhibits Open (Opening Lunch)
12:15-2:15 PM	PEP Classes M1-M5
1:30-3:00 PM	Poster Session

Rooms	Bay 1	Bay 2	Bay 3	Bay 4	Conf. Theater
Sessions *3:00-5:15 PM*	MPM-A: Internal Dosimetry	MPM-B: Consequence Management	MPM-C: External Dosimetry 1	MPM-D: Instrumentation	MPM-E: Science Teacher Workshop

Tuesday

7:00-8:00 AM	CEL 3, CEL 4
8:00 AM-4:00 PM	Registration
9:30 AM-4:15 PM; 6:30-7:30 PM	Exhibits Open
NOON-2:15 PM	AAHP Luncheon
12:15-2:15 PM	PEP Classes T1-T5
6:30-7:30 PM	Reception in Exhibit Hall
7:30-10:30 PM	Awards Banquet

Rooms	Bay 1	Bay 2	Bay 3	Bay 4	Conf. Theater
8:15 AM-NOON	TAM-A: AAHP (BEIR VII)	TAM-B: Accelerator	TAM-C: Government	TAM-D1: NESHAPs TAM-D2: Environmental	TAM-E: Lab Accreditation
Sessions *2:15-5:45 PM*	TPM-A: AAHP (BEIR VII) 5:00 PM - AAHP Open Meeting	TPM-B: Emergency Planning	TPM-C: Dose Reconstruction	TPM-D: Medical HP	TPM-E: Lab Accreditation

Wednesday

7:00-8:00 AM	CEL 5, CEL 6
8:00 AM-4:00 PM	Registration
9:30 AM-NOON	Exhibits Open
8:30-10:00 AM	Plenary Session
12:15-2:15 PM	PEP Classes W1-W5
5:30 PM	HPS Business Meeting
6:00 PM	Aerosol Measurements Adjunct Session
6:30 PM	Night Out

Rooms	Bay 1	Bay 2	Bay 3	Bay 4	Conf. Theater
8:30 AM-NOON Sessions	WAM-A: History			WAM-D: ANSI	WAM-E: Occ Radioepi 1
3:00-5:30 PM	WPM-A: Homeland Security	WPM-B: External Dosimetry 2	WPM-C: Decommissioning	WPM-D: Operational	WPM-E: Occ Radioepi 2

Thursday

7:00-8:00 AM	CEL 7, CEL 8
8:00 AM-NOON	Registration

Rooms	Bay 1	Bay 2	Bay 3	Bay 4	Conf. Theater
Sessions *8:30 AM-NOON*	THAM-A: Low Dose Radiation	THAM-B: RSO Section	THAM-C: Regulatory/Legal	THAM-D: Decommissioning Section	THAM-E: Special Sess of Homeland Security Committee

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 Afternoon – 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 Courses and Sessions will be held at the Spokane Convention Center.

AAHP Awards Luncheon

Tuesday July 12
Noon-2:00 pm

HPS Awards Banquet

Tuesday Evening Reception in Exhibit Hall
6:30-7:30 pm
Tuesday Evening Awards Banquet
7:30-10:00 pm

Again this Year!

Reception in the Exhibit Hall prior to the Awards Dinner on Tuesday July 12, 6:30-7:30 pm

Things to Remember!

All sessions have **computer projection** as the preferred format for presentation. No slide presentations.

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

All posters up Monday–Wednesday in Exhibit Hall
Poster Session featured Monday, 1:30-3:00 pm – No other sessions at that time

PEP Refund Policy – See page 14

Registration Policy: Unless payment accompanies your form, you will NOT be considered preregistered.

Meeting Refund Policy: Request for refunds will be honored if received in writing by June 13. All refunds will be issued AFTER the meeting and will be subject to a $50.00 processing fee. NO REFUNDS WILL BE ISSUED AT THE MEETING. Refunds will not be issued to no-shows.

Travel Arrangements

Car Rental Information

Avis is providing meeting attendees with the following discounted group rates, available from June 28-July 21, 2005.

	Per day	*Per week*	*Weekend*
Sub Compact-A	$40.99	$167.99	$25.99
Compact-B	$44.99	$179.99	$26.99
Intermediate-C	$48.99	$195.99	$28.99
Full size (2dr)-D	$49.99	$207.99	$29.99
Full size (4dr)-E	$52.99	$219.99	$30.99
Premium-G	$56.99	$230.99	$35.99
Luxury-H	$69.99	$278.99	$68.99
Minivan-V	$69.99	$278.99	$68.99
SUV-W	$69.99	$278.99	$68.99

To book a car call Avis at 1-800-331-1600 or online at www.avis.com. Request Meeting AWD#**J953510** for special rates.

Airline Information

United Airlines is the official airline of the *HEALTH PHYSICS SOCIETY.* If you or your travel agent call United's toll-free number **1-800-521-4041** to book your reservations, you will receive a 5% discount off the lowest applicable discount fare, including First Class, or a 10% discount off mid-week coach fares, purchased 7 days in advance. An Additional 5% discount will apply when tickets are purchased at least 30 days in advance of your travel date. Discounts also apply on United Express. Call United's Meeting desk at **1-800-521-4041** to obtain the best fares and schedule information. Make sure you refer to **Meeting ID Number 537GN**. Dedicated reservationists are on duty 7 days a week from 8 AM to 10 PM EDT.

50th Annual Meeting, Spokane, Washington
July 10-14, 2005

WELCOME

As we begin our Health Physic Society's 50th year celebration the Columbia Chapter of the Health Physics Society (CCHPS) welcomes you to Spokane Washington in the beautiful Pacific Northwest. We are excited to be your hosts for the 50th Annual Meeting of the Health Physics Society. CCHPS is honored to host the kick off for the Society's 50 year celebration and have invited a host of special guests including Richard Rhodes author of *The Making of the Atomic Bomb* and *Dark Sun,* the follow-up book on the development of the hydrogen bomb. Please come and join us for an outstanding technical meeting as well as the adventure and discovery of the wonders of our Evergreen State.

TRANSPORTATION

Spokane Airport (GEG) is approximately 7 miles from the downtown Convention Center area. Taxi fare is approximately $16 one way to the Courtyard and Fairfield Inn hotels. Both the DoubleTree and the Red Lion Inn at the Park offer complimentary transportation to and from the airport. Use the programmed phones in the baggage area of the airport, call them, and the shuttle will pick you up just outside.

LODGING

The 2005 Annual Meeting will be held in the Spokane Convention Center. The Convention Center is adjacent to the Doubletree Hotel Spokane-City Center which is the headquarters hotel. The Doubletree hotel features free internet access, as well as brand new Sweet Dreams beds in all guestrooms. The hotel is ideally located in the heart of downtown Spokane by Riverfront Park overlooking the Spokane River, adjacent to the Opera House and Convention Center and is only 10 minutes from Spokane International Airport.

The HPS also has rooms blocked for the meeting at the several overflow hotels listed below. For a printable map showing the location of these hotels, as well as the Convention Center, go to http://tourmap.com/spk_full.html Panels 4 and 7 show the location of the Convention Center and the hotels with HPS room block

MAKING RESERVATIONS FOR THE MEETING

Doubletree Hotel Spokane-City Center, 322 N. Spokane Falls Court, Spokane WA
Hotel website: http://...hocn=SPCC-DT
Rates: $115 single/d... continental breakfast and evening hors d'oeuvres in the private concierge...
HPS reservation link..._groups/spcc_hps/index.jhtml to make your reservation online. Or you m...0 direct and request the Health Physics Society special conference rates.

Hotel is full, contact one of the others.

Red Lion Hotel at the Park, 303 N. River Drive, Spokane, WA
Hotel website: http://www.westcoasthotels.com/WHC/hotels/ShowHotel.asp?ID=42
Rates: $105 Single/Double, $115 Triple/Quad.
For Reservations call 1-800-325-4000 and request the Health Physics Society special conference rates.

Spokane Courtyard by Marriott, 401 N. Riverpoint Boulevard, Spokane, WA
Hotel website: http://marriott.com/property/propertypage.mi?marshaCode=gegch
Rates: $94 Single/Double/Triple/Quad.
For Reservations call 1-800-321-2211 or 509-456-7600 and request the Health Physics Society special conference rates.

Fairfield Inn, 311 N Riverpoint Boulevard Spokane, WA
Hotel website: http://marriott.com/property/propertypage.mi?marshaCode=GEGFI
Rates: $74 Single/Double.
For Reservations call 1-800-228-2800 or 509-747-9131 and request the Health Physics Society special conference rates.

HOSPITALITY SUITE

A Hospitality Suite will be available in the Shades Conference Room on the Main Level of the DoubleTree Hotel. Come meet with friends and relax and learn about the available attractions in the Spokane area. Columbia Chapter HPS members will be on hand to help with planning day trips, restaurant recommendations, and navigating Spokane's roadways. On Monday morning from 8 to 9 am, we invite all registered companions to an official welcome. We will provide an orientation to Spokane and answer any questions you might have.

Continental Breakfast and pm snacks will be available during all days that the Hospitality Suite is open.

Hospitality Suite
Shades Conference Room, Lobby Level
DoubleTree Hotel
For Registered Companions

Monday Welcome . . . . . .8 - 9 am

Days/Hours

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

Job Placement Information

Lets face it, everyone is looking for a job at one time or another. But during the Meeting, the job placement center might not be the best way to advertise your résumé, especially if your supervisor is attending the meeting. Also, not all members can make it to the meeting to post their résumé. Therefore, for those of you interested in seeking employment during the meeting, but not brave enough to post your résumé, this form is for you! You don't even have to be present at the meeting to participate.

Every attendee who is interested in seeking employment (and who doesn't want to take advantage of the prepared résumé form), is encouraged to bring his or her résumé to the Placement Center. If you are taking advantage of the prepared form, you should not also post your own résumé.

If you cannot make it to Spokane, WA, you can still use either your résumé form or your personal résumé, and we will post it for you. Your résumé form should indicate that you are not at the meeting, so if a company is interested in you, they will call or email Mike Johnson (see contact information) and he will then contact you. If you are interested in the company, it will be up to you to contact the company. In addition to the résumé form, you can always place an advertisement in the Newsletter under the Health Physicists Seeking Employment section.

For a résumé form, contact:
Mike Johnson, HPS Headquarters
1313 Dolley Madison Blvd., Suite 402, McLean VA, 22101
Email: MJohnson@BurkInc.com

These forms must be sent no later than June 10, 2005. Once these forms are received, a résumé number will be issued and inserted on side one and two. By July 5, 2005, a résumé number will be assigned to all résumé forms and a photocopy of side two (with the résumé number) will be sent back to you. Please remember what résumé number has been assigned to you. A photocopy of side one will be posted at the meeting. The original résumé form will be kept in a book, strictly confidential, for six months after the meeting and then destroyed.

All completed résumé forms (side one)will be posted at the same time and will be up for the duration of the meeting. If an interested company wants more information, such as a more extensive résumé or an on-site interview, they will write a note on the message board in the placement center room. An example would be: "Résumé Numbers 12, 17 and 56 please leave your résumé at the Hotel front desk to the attention of D. A. Smith, XYZ Company," or "Company QRS would like to interview Résumé Numbers 19 and 23, please call J.D. Jones to set up appointment during meeting."

Sign up early for tours!

If tours are not full by the deadline of June 13, there is a chance that they will be cancelled.
Don't get to the meeting and find that the tour you kept meaning to sign up for is now cancelled due to undersubscription.

SOCIAL TOURS

Sunday, July 10th

Historic Spokane's "Age of Elegance"

9:00 am - 12:00 pm **Preregistration $16/Onsite $21**

Enjoy a tour of the rich history, historic homes and attractions of Spokane. Learn about where the city began as we travel along the Spokane River where the grounds of the former Expo '74 site are located. The Falls on the River are the centerfold of this site, now the popular Riverfront Park. Then, ascend up "The Hill" with views of the city and stunning mansions. Tour inside the majestic Saint John's Cathedral. Discover Manito Park while strolling through the formal sunken gardens, Joel Ferris Perennial Gardens authentic Japanese Gardens and flower-filled Conservatory. See the historic area of Browne's Addition where many of the old mansions are being restored to their original splendor. Tour the Crosbyanna Room at Gonzaga University to see Bing Crosby memorabilia.

River Rafting - A Float Trip on the Spokane River

1:30 - 5:30 pm **Preregistration $60/Onsite $65**

A short drive from downtown is the put-in on the Spokane River where we'll climb in the rafts for a float trip down the scenic river. We'll go through 6 to 8 fun, but moderate, rapids. The river is unrated and usually if you get wet, it is because of water fights between the rafts. This is a float trip, fun for all ages (must be 4 years old).
Please wear shoes or sandals with heel strap that can get wet (no flip flops).

Monday, July 11th

Historic Spokane's "Age of Elegance" and Lunch at the Steam Plant

9:00 am - 1:30 pm **Preregistration $33/Onsite $38**

See Sunday's description for the Spokane Tour. Lunch will be at the historic Steam Plant Grill. Constructed in 1915, it provided steam heat and electric power for downtown Spokane until 1986. Its twin 225' smoke stacks were hand formed, using 333,340 bricks. Take a tour of the plant after lunch. All the original pipes and workings are still there for you to see. It is a very unique setting for a restaurant.

Pub Crawl

7:00 - 10:00 ? pm **Preregistration $20/Onsite $25**

Tour the eclectic assortment of pubs in downtown Spokane. From the Irish pub to a typical Pacific Northwest tavern to the 100-year-old steamplant microbrewery (and more), all are within easy walking distance. Sample the impressive taps with beers of Northwest micro- and not-so-micro northwest breweries. In the words of one of our featured pubs, "No crap on tap." Meet at the entrance to the DoubleTree Hotel at 7 pm, be quaffing brew at 7:05. Price includes a map, tavern descriptions, t-shirt, and crawling coupons.

Tuesday, July 12

HPS Golf Tournament

6:30 am - 3:00 pm **Preregistration $55/Onsite $65**

The HPS Annual Meeting Golf Tournament will be held at the Indian Canyon Golf Course (http://www.spokaneparks.org/golf/ic/). Tee times will start in the cool of the morning at 7 am. Prizes will be awarded for various displays of golfing prowess, such as longest drive and closest to the pin. Indian Canyon is a hilly course, so your registration fee will include the use of a cart. The format is two person best ball. Following the tournament, we will enjoy lunch at the golf course. Sign up as a team or we can pair you with someone. You may sign up using the Registration form in this brochure or directly with Michelle Johnson (michelle.johnson@pnl.gov)

5K Fun Run and Walk

7:00 am - 8:00 am **Preregistration $12/Onsite $12**

Spokane is a runner's city and is home to the famous Lilac Bloomsday Run, a world class race that draws up to 60,000 runners. Join your fellow walkers, runners and racers for an invigorating morning run or walk on the Centennial Trail in Spokane. This beautiful trail runs along the Spokane River all the way from the Idaho border to Nine Mile Falls (37 miles!), but we'll stick with 5K. Our course will run from the DoubleTree Hotel, through the campus of Gonzaga University to Mission Park and back. The Mead girls cross country team will be hosting our race, and the Washington State Parks Department is a sponsor. Unique Northwest prizes will be given to the top male and female finishers. The price includes a T-shirt and refreshments.

Tours...Events...Tours...Events...Tours...Events...Tours...Events...Tours

Spokane Winery Tour

1:00 - 4:30 pm **Preregistration $27/Onsite $32**

Washington is the second largest wine producing state in the country and today you'll have the opportunity to sample some of their award winning wines. First stop is Latah Creek, heralded by Wine Spectator Magazine as one of the top producers of Merlot in Washington State. Tour the winery, taste and shop in their extensive gift shop. Next, off to the Cliff House, once owned by an inventor, now the home of Arbor Crest Winery. This national historic landmark is perched on a rock 450 feet above the Spokane River and gives a panoramic view of the countryside and is a perfect setting for tasting some excellent wine. Our last stop is Mountain Dome, Washington's premier sparkling winery, located in the foothills of Mt. Spokane. Learn the secret of Methode Champenoise and put a sparkle in your day.

Reception in the Exhibit Hall

6:30 - 7:30 pm **Included in Registration Fee**

Again this year! Come support the exhibitors prior to the Awards Dinner while enjoying a drink from the cash bar.

Tuesday Evening Awards Banquet

7:30 - 10:30 pm **Included in Registration Fee**

An annual tradition that should not be missed. Enjoy dinner followed by the award presentation. All Attendees are encouraged to attend this event and to show your support for the award recipients. This event will take place in the Spokane Convention Center.

Wednesday, July 13th

Cruise on Lake Coeur d'Alene

11:00 am - 5:00 pm **Preregistration adults $42/Onsite $47**

Travel to Idaho where we'll start with shopping and lunch on your own in one of the many quaint shops and restaurants in this resort town. Next, board the cruise boat for a 90 minute cruise on Lake Coeur d'Alene. National Geographic reports this as one of the most beautiful lakes in the world. Along the way, pass by the now famous floating green at the Coeur d'Alene Resort Golf Course.

Night Out - Rockin' B Ranch

6:30 - 10:30 pm **Preregistration adults $33/Onsite $40**

Children 10 and under: Preregistration $16.50/Onsite $20

Visit the best cowboy supper club in the Pacific Northwest for an evening of side-splittin' theatrics and musical entertainment that is great for adults and kids! See an Old West robbery and shoot out, and a hilarious posse chase, complete with audience interaction. The finale is western musical entertainment in the tradition of the Sons of the Pioneers. The Riders of the Rockin' B are dedicated to the heritage and memories of the American Cowboy way of life. Filled with live Western music, lots of knee-slappin' comedy, storytelling, cowboy poetry and audience participation, the musical review hits all the cowboy highlights. Follow them down the Chisolm Trail and experience a time in American History gone by. It's just after the Civil War, late 1800's and the cattle drives are just beginning to head out. Join the Riders as they re-create the Old West legends with you in the final ride of the evening. Even if you think you don't like Western music, you'll love this show. The Chuckwagon supper is chicken and beef BBQ with complete fixin's. Buses leave from the Spokane Convention Center.

Thursday, July 14th

The Silver Valley and Historic Wallace

9:30 am - 4:30 pm **Preregistration adults $53/Onsite $58**

Get a realistic glimpse of the old mining days on the way to the world's richest Silver Mining District. Stop at Cataldo Mission, the oldest building in the State of Idaho, built by the Coeur d'Alene Indian Tribe and Jesuit Missionaries in 1853. Then to Wallace, the Silver Capital of the world. Ride the trolley up to the Sierra Silver Mine where you'll put on your hard hat, go into the mine, see the veins of ore and learn how the miners worked. Lunch is at the beautifully restored historic Jameson Hotel. After lunch, tour the Bordello Museum, an actual old Bordello to see what really made Wallace famous! There's time to look through the silver shops before returning to Spokane.

Technical Tours...Technical Tours...Technical Tours...Technical Tours

Monday, July 11

Medical Facilities

12:00 pm or 2:30 pm **Preregistration $10/Onsite $15**

Visit some premier medical facilities in the Spokane area. You can visit one, two or all three on Monday at the designated times.

· **Sacred Heart Hospital *(Noon)*** - A large hospital with a radiology, oncology and cancer treatment area that offers some of the best, most comprehensive cancer services in the Inland Northwest. It is the only cancer center in Eastern Washington with state-of-the-art services from prevention and screening to the end of treatment and recovery, and is recognized as a Center of Cancer Excellence by the American College of Surgeons.

· **Cardinal Health *(2:30 PM)***- A radiopharmaceutical company with several rooms; for mixing the cocktails, a shipment area which transports items by truck daily to Montana, northern Idaho and much of the area from her to the west side of the mountains in Washington. This tour includes some of the production areas in hot labs and hot cells as well as the materials packaging and shipping area and waste control area.

Tuesday, July 12

Dawn Mining Company Mill Site Tour

9:00 am - 3:00 pm **Preregistration $25/Onsite $30**

Dawn Mining Company (DMC) and MFG, Inc., in cooperation with the Washington Department of Health, invite you to tour the DMC millsite northwest of Spokane. From the mid-fifties to 1982, DMC operated a mill near Ford, Washington to process uranium ore from the Midnite Mine (on the Spokane Indian Reservation). The mill was re-activated for a brief period of time in the late 1990s to process water treatment sludge from the Midnite Mine Water Treatment Plant. The millsite is currently being reclaimed under plans approved by Washington Department of Health. The mill building was demolished in 2003 and the site soils were characterized for soil cleanup in 2004. The activities taking place on the site in the summer of 2005 include soil cleanup and on-site disposal, and verification of residual soil radionuclide concentrations. The tour will include a brief orientation to the site, a description of current cleanup activities, a guided tour, and a demonstration of the automated GPS/gamma scan data collection methods used to identify areas for soil cleanup and verify the adequacy of the remedial action. A box lunch will be included in this tour.

Thursday, July 14

Hanford Tour

7:00 am - 6:00 pm **Preregistration $70/Onsite $75**

This tour begins at 7:00 am. We know this is early but you will be glad you took time to experience Hanford history. During your trip to the Hanford site, learn about the geology of Washington state, the floods that caused the terrain, the cascade volcanic activity and its relationship to the Northwest junction of the continental and oceanic plates.

The Hanford site began as part of the Manhattan Project to research, test and build atomic weapons during World War II. Experience this history during a tour of the B Reactor and the Columbia River Exhibition of History, Science and Technology (CREHST).

B Reactor - B Reactor was a first one-of-its-kind engineering structure, built and fully functional in only 13 months. The reactor was shut down in 1958 and in 2001 was provided ten years of public access. Escorted access through the reactor includes the reactor front face, accumulators, control room, fuel basin viewing, valve pit, fan rooms and instrument shops

Columbia River Exhibition of History, Science and Technology - Enjoy the exhibits of the CREHST museum which includes the history of a large, secret project creating a new element to help win WWII. Continued production through the Cold War era is presented with displays and hand-on experiences operating tools used in the production of plutonium. Current and future efforts to clean up the legacy of plutonium production demonstrate the high price to both our pocketbooks and our environment that we paid for victory.

The history of Hanford is depicted in several exhibits, including:

· the "Three Faces of Richland"; Day's Pay, the B-17 donated by Hanford workers to the War effort; guard shack security point; an early engineering office; single- and double-shell waste tanks; hot cell; remote manipulator (a hands-on exhibit); models of early reactors; historical signs dating back to the Atomic age. A box lunch will be included in this tour.

ADJUNCT TECHNICAL SESSION

AEROSOL MEASUREMENTS

WEDNESDAY, 13 JULY 2005; 6-8 PM

1) A Summary of the 2005 Air Monitoring Users Group meeting (sponsored by Los Alamos National Laboratory). *Morgan Cox, DHS Consultant*

2) Occupational Experience with the Eberline Alpha-7L at LANL. *David Wannigman and Tom Voss, Los Alamos National Laboratory*

3) Estimates of Increased Exposure to Contamination Dust Following Forest Disturbance. *JJ Whicker[1], JE Pinder[2], DD Brashears[3], and CF Eberhart1; 1- LANL, 2- Colorado State University and 3- University of Arizona*

4) Recent Developments in Detectors for Air Monitoring. *Tom McLean, LANL*

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

6) An Update on Collaboration to Creating a New Handbook on Radioactive Aerosol Sampling Methods. *Mark D Hoover, NIOSH-Morgantown*

7) Planning for the Next Decade of NORA: Partnering Opportunities to Translate Research into Practice Through the National Occupational Research Agenda. *Mark D Hoover, NIOSH-Morgantown*

8) Changes to EPA Radiological Stack Monitoring Requirements and Ramifications on LANL Operations. *Dave Fuehne, LANL*

9) A Discussion of Aerosol Measurements Issues. *Leaders- Dennis Hadlock, Savannah River Site and Tom Voss, LANL*

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 radiation. In humans, these concerns include: 1) immediate death (hours to months) due to acute radiation syndromes (ARS) of the central nervous system, gastro-intestinal 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.

Refund policy

Requests for PEP refunds will be honored if received in writing by June 13. All refunds will be issued AFTER the meeting. Exceptions will be handled on a case by case basis.

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 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 transportation; (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 invention 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 imagination. 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 de-fuel 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 facil-

ity 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-accepted 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, chromosome 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.

Meeting Refund & Registration Policies on page 6.

Health Physics Society's 50th Annual Meeting
July 10-14, 2005 Spokane, WA

CHP? ❑ Yes ❑ No
NRRPT? ❑ Yes ❑ No

HPS Member Number: hps ___ ___ ___ ___ ___

Name for badge: (First)_____(Last) _____(Nickname)_____

Affiliation (for badge) (limit to 18 characters and spaces): _____

Address (for confirmation):_____

City: _____State: _____ Zip/Postal Code: _____

Phone: _____FAX:_____

Email: _____If Registering - Companion Name: _____

Preregistration Deadline is June 13

REGISTRATION FEES: (Mark Appropriate Boxes)	**Preregistration Fees**	**On-Site Fees**
❑ HPS Member (Sun. Reception, Mon. Lunch, Tues. Awards Dinner)	$340	$415
❑ Non-Member (Sun. Reception, Mon. Lunch, Tues. Awards Dinner)	$410*	$485*
❑ Student (Sun./Student Receptions, Mon. Lunch, Tues. Awards Dinner)	$ 60	$ 60
❑ One-Day Registration ❑ Mon/ ❑ Tues/ ❑ Wed/ ❑ Thurs	$225	$225
❑ HPS Emeritus Member (Sun. Reception, Mon. lunch, Tues. Awards Dinner)	No Fee	No Fee
❑ Companion (Sun. Reception, Mon.-Wed. Continental Breakfast & pm snacks)	$ 55	$ 55
❑ Exhibition ONLY (Exhibit Hall Badge)	$ 25	$ 25
❑ Exhibitor (Two Per Booth)	No Fee	No Fee
❑ Additional Tues. Awards Dinner Ticket(s) # of Tickets _____	$ 60	$ 60
❑ AAHP Awards Lunch Ticket(s) (Tues.) '04 NEW CHP Check if attending	Free	Free
❑ AAHP Awards Lunch Ticket(s) (Tues.) CHP other than above	$ 10	$ 10
❑ AAHP Awards Lunch Ticket(s) (Tues.) Guest	$ 15	$ 15

*Includes Associate Membership for year 2005 - *FIRST TIME MEMBERS ONLY*

Would you like your name included on the Attendee List? ❑ Yes ❑ No

SOCIAL PROGRAM:	Preregistration Fees	On-Site Fees	Total
❑ Historic Spokane's "Age of Elegance" (Sunday, 7/10)	# of Tickets____X $16	# of Tickets____X $21	_____
❑ River Rafting on Spokane River (Sunday, 7/10)	# of Tickets____X $60	# of Tickets____X $65	_____
❑ "Age of Elegance" & Steam Plant Lunch (Monday, 7/11)	# of Tickets____X $33	# of Tickets____X $38	_____
❑ Pub Crawl (Monday 7/11) Shirt Size: S❑ M❑ L❑ XL❑	# of Tickets____X $20	# of Tickets____X $25	_____
❑ HPS Golf Tour (Tuesday 7/12) Shirt Size: S❑ M❑ L❑ XL❑	# of Tickets____X $55	# of Tickets____X $65	_____
❑ 5K Fun Run/Walk (Tuesday 7/12) Shirt Size: S❑ M❑ L❑ XL❑	# of Tickets____X $12	# of Tickets____X $12	_____
❑ Spokane Winery Tour (Tuesday 7/12)	# of Tickets____X $27	# of Tickets____X $32	_____
❑ Cruise on Lake Couer D'Alene (Wednesday 7/13)	# of Tickets____X $42	# of Tickets____X $47	_____
❑ Adult-Night Out - Rockin' B Ranch (Wednesday 7/13)	# of Tickets____X $33	# of Tickets____X $40	_____
❑ Child *(10 & Under)* Night Out - Rockin' B Ranch (Wednesday 7/13)	# of Tickets____X $16.50	# of Tickets____X $20	_____
❑ Silver Valley & Historic Wallace (Thursday 7/14)	# of Tickets____X $53	# of Tickets____X $58	_____
TECHNICAL TOURS:			
❑ Medical Facilities (Monday, 7/11), 12pm❑ 2:30pm❑	# of Tickets____X $10	# of Tickets____X $15	_____
❑ Dawn Mining Company Mill Site Tour (Tuesday 7/12)	# of Tickets____X $25	# of Tickets____X $30	_____
❑ Hanford Tour (Thursday 7/14)	# of Tickets____X $70	# of Tickets____X $75	_____

PAYMENT INFORMATION - ***Government Requisitions are accepted for registration, however Purchase Orders are NOT accepted for PEP, AAHP, Social/Technical Tour Registration.*** **HPS TAX ID # 04-6050367**

Check Payment: Health Physics Society, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101

❑ VISA ❑ MasterCard ❑ American Express ❑ Discover

Card Number: _____Exp. Date:_____

Credit Card Billing Address: _____

Cardholder Name: _____Signature: _____

Please see AAHP/PEP Registration form and Disabilities information on following page

Registration Section Total	$_____
Social Program/Technical Tours Total	$_____
AAHP/PEP Total (From Back of Form)	$_____
TOTAL FEES ENCLOSED	**$**_____

Are you interested in being a Mentor at the meeting? ❑ Yes ❑ No
Are you interested in working with a Mentor at the meeting? ❑ Yes ❑ No

Your Housing while in Spokane:_____Name:_____

DISABILITIES: The Annual Meeting is accessible to persons with disabilities. Please specify assistance required and a HPS representative will contact you._____

AAHP COURSES: Saturday, 7/9 - 8:00 AM - 5:00 PM

❑ Course 1 - Identification and Control of Electromagnetic Fields (0 – 300 GHz). *J. Leonowich* $175.00
❑ Course 2 - Low Dose Effects of Ionizing Radiation. *D. Boreham* $175.00
❑ Course 3 - Training Emergency Responders; Materials, Tools... *B. Buddemeier, J. DiLorenzo* $175.00

PROFESSIONAL ENRICHMENT PROGRAM:

Sunday, 7/10 8:00 - 10:00 AM

1-A Critical Decisions for First-Time and Experienced Managers. *J.M. Hylko*
1-B Fundamentals of Medical Internal Radiation Dosimetry: What You Need to Know... *D.R. Fisher*
1-C Operational Accelerator Health Physics. *S. Walker*
1-D Army's Capstone and Operation Iraqi Freedom depleted uranium programs. *F. Szrom*
1-E Training First Responders on RDDs and INDs—an approach used by DOE... *K. Groves*
1-F An Introduction to Microshield. *B. Brown, R. Pierson*
1-G Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine... *Mike Stabin*
1-H Laser Safety Audits. *T. Johnson*

Sunday, 8:00-10:00 AM
___/ ___/ ___ = $60.00
1st 2nd 3rd
Yes, stand by list

Sunday, 7/10 10:30 AM - 12:30 PM

2-A Radiation Detection and Radiation Dosimetry for Homeland Security. *J.C. McDonald*
2-B Ground Rules for Experts: A PEP Course for Expert Witnesses and Potential Expert... *L. McKay*
2-C Accelerators 2. *S. Walker*
2-D Brain-Based Learning - New Approaches for Effective Radiation Safety Training. *R.H. Johnson, Jr.*
2-E Fundamentals of Alpha Spectroscopy. *C. Maddigan, D. Van Cleef*
2-F Practical Applications of Microshield. *B. Brown, R. Pierson*
2-G Security 101 for Radiation Safety Professionals. *B. Emery*
2-H Transportation Regulations 1. *R. Parker*

Sunday, 10:30 AM-12:30 PM
___/ ___/ ___ = $60.00
1st 2nd 3rd
Yes, stand by list

Sunday, 7/10 2:00 - 4:00 PM

3-A Biomedical Ethics of Human Subject Research for the HP. *L. Coronado*
3-B Uncertainty Assessment in Atmospheric Dispersion Computations. *E. Sajo*
3-C Tritium - Benign Uses for the Only Radioactive Isotope of Hydrogen. *D.J O'Dou, T. O'Dou*
3-D Radiation Dose-Response Relationships and Risk Assessment. D. Strom
3-E Fundamentals of Gamma Spectroscopy. *D. Upp, D. Van Cleef*
3-F The Gift of Fear and Survival Skills in a Time of Nuclear Terrorism. *R.H. Johnson, Jr.*
3-G Psychological Effects of WMD. *J. Barnes*
3-H Transportation Regulations 2. *R. Parker*

Sunday, 2:00-4:00 PM
___/ ___/ ___ = $60.00
1st 2nd 3rd
Yes, stand by list

Monday, 7/11 12:15 - 2:15 PM

M-1 New Homeland Security Instrument Performance Standards. *M. Johnson*
M-2 Advanced MARSSIM Topics. *E.W. Abelquist*
M-3 Implementing a Comprehensive Survey Program for a Biomedical Research Facility. *B. Smith*
M-4 Dose Reconstruction under EEOICPA. *R. Toohey*
M-5 Introduction to MARLAP: Part I. *C. Gogolak*

Monday, 12:15-2:15 PM
___/ ___/ ___ = $60.00
1st 2nd 3rd
Yes, stand by list

Tuesday, 7/12 12:15 - 2:15 PM

T-1 Red Bead Experiment. *S. Prevette*
T-2 Impact of Cellular and Molecular Responses to Low Doses of Ionizing Radiation... *A. Brooks*
T-3 How to Develop a Radiation Safety Computer System. *B. Smith*
T-4 Introduction to MARLAP: Part 2. *C. Gogolak*
T-5 ICRP 60 Lung Model; *H. Cember*

Tuesday, 12:15-2:15 PM
___/ ___/ ___ = $60.00
1st 2nd 3rd
Yes, stand by list

Wednesday, 7/13 12:15 - 2:15 PM

W-1 Emerging Issues Related to Radiation Litigation. *D. Poland*
W-2 Pharmaceutical Radiation Countermeasures. *A. Ansari*
W-3 NORM: Geologic Origins and Some Case Studies. *A. Karam*
W-4 Leading with Leading Indicators. *S. Prevette*
W-5 Selection, Use, and Calibration of Portable Survey Instruments; *G. Komp*

Wednesday, 12:15-2:15 PM
___/ ___/ ___ = $60.00
1st 2nd 3rd
Yes, stand by list

HPS TAX ID # 04-6050367

If FAXing registration form, **(703) 790-2672** please do not mail the original.

AAHP Total $ _____
PEP Total $ _____
AAHP/PEP Total $ _____
(Transfer this total to previous page)