MIDWEST CHAPTER

THE SPECTRUM

NEWSLETTER OF THE HEALTH PHYSICS SOCIETY'S MIDWEST CHAPTER
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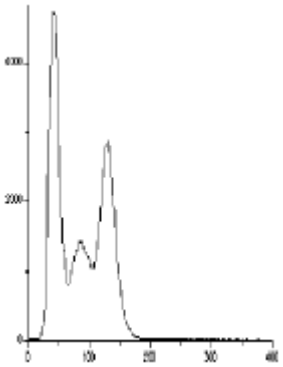

September Meeting
September 19, 2007

Why No One Believes Us: Cognitive Neuroscience and Radiation Risk

R. E. Toohey, Ph.D., CHP
President-Elect, Health Physics Society
Oak Ridge Associated Universities
Oak Ridge, Tennessee, U.S.A. 37831-0117

Public perception of radiation risks and their acceptability remains far from the consensus of radiation protection specialists, despite decades of individual and organizational efforts at risk communication. We have eagerly adopted the guidance of risk communication specialists, and presented the facts in a non-threatening and understandable fashion. Nevertheless we continue to encounter intense opposition to the development of nuclear power plants, waste storage sites, food irradiation facilities, and other applications of radiation and radioactive materials. We have been told such opposition is an emotional reaction that we must allow to be expressed, and then calmly and coolly respond with our understandable facts. One understandable fact is that what we have been doing simply doesn't work. The rapid development of the cognitive neurosciences, particularly evolutionary psychology, over the past twenty years or so has provided remarkable insights into this situation. Human brains come into the world with certain genetically determined methods of classifying sensory inputs called "memes," a term adopted from cultural anthropology. The "contagion" meme is a key player in response to radiological issues, as are the "justice" and "pattern-seeking" memes. Furthermore, the human decision-making faculty does not exist in Descartes' *res cogitans*, but in a hard-wired network of literal gut feelings and other body states we call emotions. Understanding and implementing these findings may lead us to more effective communication efforts, but also warn us that effecting significant behavioral changes will be a Sisyphean task.

Dick Toohey received his Ph.D. in physics from the University of Cincinnati in 1973. He spent the first part of his career at Argonne National Laboratory in both research and operational health physics. He has been at ORAU since 1994, where he has served as director of the Radiation Internal Dose Information Center, as Sr. Health Physicist for REAC/TS, and is currently the Director of dose reconstruction programs. He is certified in comprehensive practice by the ABHP, is a member of the National Council for Radiation Protection and Measurements, and has served as a Director, Secretary, and Treasurer of HPS. Dick has 130 publications in the open literature, and is a retired Lt. Col., US Army Reserve. He and his wife Beverly live in Oak Ridge, where they provide staff services to the resident cat.

President's Message

Our chapter seeks to support its members in the practice of their profession. For our dinner meetings, we strive for programs that will help us keep up with the advances, controversies and changes in our field.

We know many of you have difficulty attending dinner meetings. We are looking at other ways to help you out. We are considering a one-day technical meeting in the spring. We could meet on a Saturday to explore a variety of issues. Some presentations might focus on changes—e.g., the nuclear power renaissance, the significance of medical exposures now exceeding background radiation, the new NRC requirements for increased control of radioactive materials in "quantities of concern." Other presentations might help us learn more about what our colleagues do—we could have talks on some of the different environments in which health physics is practiced (e.g., hospital, power plant, industry, university and research).

We are also considering reviving our study group for certification in health physics. Past efforts have helped many of us advance professionally by becoming CHPs. The chapter has assembled textbooks, course material and study guides to aid members of the study group. For information, contact John Schrage at john.schrage@exeloncorp.com, 630-435-9430 (home) or 630-657-2821 (office).

I need your input on these ideas and on your suggestions for other activities. Please send me your thoughts.

Gerry Davidson (gdavidson@anl.gov)

P.S. The Chapter is seeking to revive its Public Relations and Information Committee. If you are interested in working on improving public understanding of radiation protection issues, please contact me.

LEGISLATIVE AND REGULATORY NEWS (Submitted by Darrel Wiedeman)

NRC REGULATORY ISSUE SUMMARY (RIS) 2007-14: FINGERPRINTING REQUIREMENTS FOR LICENSEES IMPLEMENTING THE INCREASED CONTROL (IC) ORDER (June 5, 2007)

INTENT

The NRC is issuing this RIS to inform addressees that in Fall 2007, the NRC will issue additional Orders to licensees that have received the IC requirements. The Orders will require fingerprinting and a Federal Bureau of Investigation (FBI) identification and criminal history records check for individuals that have or will have unescorted access to radioactive material in quantities of concern. (Editor''s Note: Quantities of concern include **Cs-137**, 27 Ci; **Co-60**, 8.1 Ci; **Ir-192**; 22 Ci, **Am:Be**, 16 Ci, **Pu:Be**, 16 Ci.) No specific action or written response is required at this time.

Agreement States will be taking similar actions through the issuance of Orders or other legally binding requirements to their IC licensees.

BACKGROUND

Prior to the terrorist attacks of September 11, 2001 (9/11), several national and international efforts were underway to address the potentially significant health and safety hazards posed by uncontrolled sources. Following 9/11, it was recognized that these efforts should focus on efforts to deter unauthorized access to radioactive material for the purpose of malicious acts.

In 2005, NRC and the Agreement States issued IC Orders or other legally binding requirements to licensees [70 Federal Register 72128, December 1, 2005]. The purpose of the ICs for radioactive sources is to enhance control of certain radioactive material in quantities of concern to reduce the risk of unauthorized use, in order to prevent unintended radiation exposure and to prevent malicious acts that would be detrimental to public health and safety.

On March 12, 2007, the Commission directed staff to develop a plan to require fingerprinting for IC licensees under the NRC's authority to protect the public health and safety.

IC 1 of the IC Orders requires each licensee ensure the safe handling, use, and control of material by controlling access at all times to radioactive material quantities of concern and by limiting access to such materials to only approved individuals who require access to perform their duties. Under the IC's, licensees approved individuals for unescorted access to radioactive material quantities of concern using a trustworthiness and reliability review process. As part of this process, licensees were required to document the basis for approving individuals who required unescorted access to materials.

For individuals employed by the licensee for three years or less, IC 1.b. requires trustworthiness and reliability to be determined, at a minimum, by verifying employment history, education, and personal references. For individuals employed by the licensee for longer than three years, trustworthiness and reliability is determined, at a minimum, by a review of the employees' employment history with the licensee.

On August 8, 2005, the Energy Policy Act of 2005 (EPAct) was enacted. Section 652 of the EPAct amended Section 149 of the Atomic Energy Act (AEA) to require fingerprinting and an FBI identification and criminal history records check of any person who is permitted unescorted access to radioactive materials subject to regulation by the Commission, and which the Commission determines to be significant to the public health and safety as to warrant fingerprinting and background checks.

SUMMARY OF ISSUE

In accordance with Section 149 of the AEA, as amended by the EPAct, the NRC and Agreement States will impose additional requirements for unescorted access to material in quantities of concern, so that affected licensees can obtain and grant unescorted access to radioactive materials. Orders or other legally binding requirements will be issued in the near future requiring that the results of an FBI criminal history records check, based on fingerprints, are used in conjunction with IC trustworthy and reliability criteria to make determinations for individuals granted unescorted access to radioactive materials in quantities of concern. All NRC and Agreement State licensees that are required to implement the IC requirements will be required to fingerprint and make a trustworthiness and reliability determination for individuals granted unescorted access to radioactive material in quantities of concern.

A joint NRC and Agreement State working group has been formed to address issues associated with the implementation of the fingerprinting requirements of the EPAct for IC licensees. The working group will be responsible for the development of a plan and implementing guidance for the fingerprinting of IC licensees. It is anticipated that fingerprinting Orders or other legally binding requirements will be issued in Fall 2007.

NRC and the Agreement States have recently issued a RIS to non-manufacturer and distributor (non-M&D) service providers. NRC and the Agreement States will offer the opportunity for non-M&D service providers to receive an Order or other legally binding requirements imposing trustworthy and reliability and fingerprinting requirements that manufacturer and distributor (M&D) service provider licensees must currently meet for unescorted access to radioactive material quantities of concern. IC 1.c. requires that all service providers be escorted unless determined to be trustworthy and reliable by an NRC required background investigation as an employee of a M&D licensee.

Once a non-M&D service provider has received and implemented all the trustworthy and reliability and fingerprint requirements, they may provide service without an escort at a IC licensee's facility, if the IC licensee chooses to allow them to have unescorted access.

Reflections on Our Profession

by John Schrage, Midwest Chapter President-Elect

There seem to be moments in my life when the people that I have met, and the experiences that they have related, have somehow led to a level of personal introspection and insight on seemingly unrelated matters. I think that the term for this is "serendipitous."

One such experience occurred to me this summer on a train from Havre, Montana to Chicago. I was returning from a two-week, service trip, and thinking of all the professional matters that I had put into the recesses of my mind for two weeks, including my to-do list for the Midwest Chapter. As so often happens at the end of a vacation, I abandoned my professional thoughts for a conversation with another passenger, in this case, an elderly lady from Seattle.

Our conversation started with Chicago and quickly led to her experiences during the 1940s and 1950s. These experiences began at the University of Chicago. Her father had been a metallurgist with DuPont, working on the Manhattan Project during WWII, and in weapons research following the war. She talked about her experiences as a girl, growing up in New Mexico, the Oak Ridge area, and finally settling in Hanford. Her father's work was a mystery to her, but she did remember that her father was always in good health, with the exception that while working at Hanford, he became inflicted with chronic blisters on his hands. As a result, he had to wear cotton gloves, until he passed away. While she did not know the cause of those blisters, she was concerned with the potential impact that living in, and growing up in the Hanford area could have had on her father, as well as herself, and even her children.

At this point, the woman excused herself. As she left for the dining car with her husband, I couldn't help but think of the far-reaching impact of our profession. A chance meeting on a train highlighted to me that the efforts of each and every one of us, as health physics professionals, will affect many others for years to come as we deal with the future HP issues and challenges.

In the August 2007 *Health Physics News*, Mark Maiello captured this thought in his good-natured editorial reprinted below with the consent of Mr. Maiello. As you read it, try to imagine the health physics opportunities and challenges that we will all face in the future.

*Five Things about Health Physics and Nuclear Engineering that You Wouldn't Have Believed Would Happen In Your Lifetime**

by Mark L. Maiello

1. That Someone Would Be Poisoned by Po-210

RSOs: you now have a much more interesting story to tell in your Intro to Radiation Safety training classes than those dusty, old tales about P-32 in the watercooler. You have to admit, this sad tale was at first glance pretty far-fetched. When the story about Alexander Litvinenko being poisoned by Po-210 hit the news (see for example Finn 2007), your first inclination was that the media had made a tremendous mistake. The facts had to be wrong. And if radioactivity was involved, it had to be plutonium, not Po-210. Well, it turned out that the alpha-emitter that can be legally purchased without a specific radioactive materials license when used in static eliminators was recruited to be the agent of death in an alleged revenge killing after Litvinenko, a former Russian internal security agent, blamed Russian President Putin for a laundry list of illegal behavior. This pulp-fiction novella read like it had been written on an old Smith-Corona typewriter under a hot bulb in a smoke-filled lower eastside apartment at 2 a.m. Even the "who-done-it?“ ending was classic detective story fluff as Russia and Britain squabbled about the investigation and left many of the details unresolved.

2. That Nuclear Power Would Stage a Comeback

As improbable as the Po-210 story was, this one is nearly as unlikely. The arguments about acid rain weren‘t enough. Claims about reducing America‘s dependence on foreign oil couldn‘t hold up. No, it took an increase in the Earth‘s mean temperature to raise the profile of nuclear power. Then, as if the planet‘s magnetic field suddenly reversed itself, Greenpeace cofounder Patrick Moore went pronuke (Moore2006). Climate change changed more than the temperature; it changed the temperament of Greenpeace. The greenhouse gases of such concern to environmentalists but so absent from nuclear power operations aced this decision. It‘s better to keep our aging fleet of reactors going even without a permanent spent fuel repository than to build new atmospheric fouling fossil fuel plants. And let‘s not forget that developing nations like China and maybe India are actually going to build new nuclear power plants–not just talk about them. Nuclear power won‘t solve climate change and it still has unresolved issues regarding security, waste, and in some cases, local contamination of groundwater, but it sure is alive and kicking. Can you say "renaissance?“

3. That "Sources of Concern" Would Really Become Sources of Concern

If you have a 2,000 Ci Cs-137 irradiator at your facility, you always felt it was something you should be worried about but you never were. Well-shielded, relatively easy to use, insanely heavy, and difficult to disassemble without raising hell, you never lost a wink of sleep over it. The Nuclear Regulatory Commission (NRC) changed all that in 2005 and 2006. Now these "sources of concern" must be secured with alarms and the users, some of whom are your trusted and reliable colleagues, must have their backgrounds checked to "prove" their trust and reliability. This year, the NRC wants to collect their fingerprints and have the FBI conduct further background checks (NRC2007). Alarms on the doors, background checks on the users, fingerprinting, and now the FBI wants to collect more information. Yep, I'm concerned now.

4. That the Collective Dose from Medical Uses of Radiation Would Go Up, Not Down[†]

ALARA is our mantra. Its diligent application keeps mean occupational doses in check. The nuclear power industry strives to meet the holy ALARA grail and openly publishes its progress (ISOE2007). But in the medical world, the diagnostic uses of radiation have driven collective dose in the opposite direction. More diagnostic radiological exams are being ordered than ever before due to technological improvements and probably because we're getting sick as we live a bit longer (maybe we should redefine ALARA to mean "As Lean As Reasonably Achievable"–all those cheeseburgers, baby-backribs, ice cream, and lemon meringue pies have had a very unreasonable effect on our bodies). As quick on the draw as ever, we are injecting isotopes and firing x and gamma rays into our fellow humans faster than Han Solo and Luke Skywalker can unholster their blasters. From1980 to 2006, the per capita dose from clinical imaging exams increased 600 percent in the United States. About 12 million CT scans, delivering about 50 percent of the U.S. collective radiation dose, were conducted in 2006 compared to 3 million in 1980. Diagnostic imaging exams now deliver more dose to the average American than did the previous record holder: natural background radiation (Rabin2007). With collective medical doses on the rise, who says there's no future for health physicists?

5. That We Would Burn Uranium from Russian Nuclear Weapons in U.S. Reactors

The 1993 U.S.-Russian Highly Enriched Uranium Agreement made it possible for the United States to make reactor fuel from Russian nuclear weapons. By 2013 we will have obtained 500 tons of highly enriched uranium, blended it down to reactor fuel, and produced useful electricity. Amazingly, about 50 percent of our nuclear fuel comes from Russia. A rough calculation shows that one out of every 10 American light bulbs is powered by material that was part of a warhead pointed at American cities and towns where all those lightbulbs are now burning – a wonderful and remarkable achievement (Nunn2007). One question: does that include the lightbulbs in the refrigerators where those lemon meringue pies are hiding? Swords to kilowatts to calories – who would have believed it?

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*If you're at least as old as I am. [†]Special thanks to my wife Jenny May – Maiello for bringing this information to my attention.

September Meeting

Why No One Believes Us: Cognitive Neuroscience and Radiation Risk

R. E. Toohey, Ph.D., CHP, President-Elect, Health Physics Society

Date:	**Wednesday, September 19, 2007**
Time:	**6:00 PM Social Hour** **7:00 PM Dinner** **8:00 PM Featured Speaker**
Location:	**Bohemian Crystal Restaurant** **630 N. Blackhawk Drive** **Westmont, IL 60559** **630-789-1981**
Cost:	**$17 per person (member & spouse)** **$20 per person (others)**

Menu

Family Style Dinner (all you can eat)
Homemade Rye Bread & Rolls; Beef Noodle Soup
Four different entrees:

- Roast Spring Chicken
- Roast Tip of Sirloin
- Breaded Cod
- Vegetable & Cheese Pierogies

Sauerkraut, Sweet & Sour Cabbage, Dumplings, Mashed Potatoes, Fresh Vegetable of the Day, Coffee, and Mixed Dessert Platter

The restaurant is located on Blackhawk Drive, one block north of Ogden Avenue, about 1 mile west of Route 83 or two stoplights east of Cass Avenue. Landmark: There is a Chipotle Grill at the corner of Blackhawk Drive & Ogden. Website: www.bohemiancrystal.net

Reservations: **Phone or e-mail your reservation to John Schrage, our Program Chair, at (630) 657-2821 or John.Schrage@exeloncorp.com by 4 pm Monday September 17.**

Midwest Chapter Health Physics Society
P.O. Box 513
Westmont, Illinois 60559