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August 30, 2001

Kathleen Schneider,
Office of State and Tribal Programs
U.S. Nuclear Regulatory Commission
M/S O-3C10
11555 Rockville Pike
Rockville, MD 20852-2738

Dear ~~Ms.~~ ^{Kathy} Schneider:

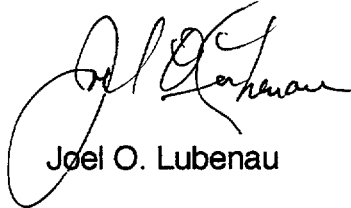
It was great to hear from you. Needless to say, I'm delighted to be asked to be considered for the John C. Villforth lecture. John and I go back to 1961. He had recently transferred from the USAF to the USPHS and I was a newly minted USPHS officer. Much of my early career was spent with the Pennsylvania radiation control program, not unfamiliar territory for John if one recalls his involvement in the travails of decontaminating the infamous Lansdown, PA radium house. It's quite an honor to be considered for the lecture given John's monumental contributions to the health physics profession and his commitment to fostering Federal-State relations and support for the CRCPD.

I've enclosed a one page resume to serve as a background reference. Also attached is a 3 page supplement providing details such as publications (including the toy train articles, let's not forget those!).

For the lecture topic, I propose to speak about "orphan sources," a matter of worldwide concern with which the CRCPD has been much involved. The September 2001 issue of the Health Physics Society's Newsletter contains a summary of a paper on the subject that I presented at the annual Health Physics Society meeting with an interesting introduction by Chuck Roessler (enclosed).

Hope to see you next month when Jack Hornor and I swing by. Please say hello to the gang.

With best regards,


Joel O. Lubenau

Encl: As stated

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Nomination Form for the John C. Villforth Lecture Series

For Criteria and Details, refer to the John C. Villforth Lecture Series Fact Sheet.

Nominee: (Provide name, address, phone, fax, E-mail)	Joel D. Lubenau, CHP 89 S. Heck Rd Lititz, PA 17543-8560 Tel 717-625-4854 Fax 717-625-0436 email lubenau@supernet.com	
Nominee's background:	see attached resume.	
Nominee's proposed lecture topic:	"Orphan Sources"	
Nomination submitted by:	(Provide contact information if nomination is submitted by someone other than the nominee.)	
Submit nomination form and abstract of proposed lecture topic to: Ms. Patricia Gorman, Deputy Director Conference of Radiation Control Program Directors, Inc. 205 Capital Avenue Frankfort, KY 40601 Tele: 502/227-4543, Ext. 2227 Fax: 502/227-7862 E-mail: pgorman@crcpd.org		Submission deadline: Submit nomination information no later than <u>August 15</u> of the current year for the next year's Annual Meeting.

New and Changing Paradigms in Radiation Safety

Last month we introduced what is to be a series of articles based on the 13 June American Academy of Health Physics session at the 2001 American Radiation Safety Conference and Exposition. Last month's article, contributed by Roger Clarke, was based on the opening paper at the session and reported on the thoughts of the International Commission on Radiological Protection, and some of Roger's vision, about recommendations for protection in the new millennium. This month we move several presentations ahead in the session program and look at possible changes to deal with specific source problems. Joel Lubenau summarizes his thoughts on changes that might mitigate some of the problems being introduced by "orphan" radioactive sources—including one potentially controversial and some benign recommendations.

Charles Roessler, AAHP Past President and Session Organizer

New Paradigms for Radioactive Sources

Joel O. Lubenau, CHP

Summary of paper: Following a short review of current U.S. and international initiatives to address the orphan source problem, the question was asked whether additional measures were needed—new paradigms for radioactive sources? There appear to be two promising possibilities. The first deals with the question of whether current uses of radioactive sources meet the principle of justification especially as developed by the International Commission on Radiological Protection (ICRP). The second deals with whether current provisions for low-level radioactive waste disposal exacerbate the orphan source problem and need to be changed.

Although the term is relatively new, the concept of justification can be traced to the 1960 Federal Radiation Council guidance of "balancing the biological risks and benefits from radiation use." ICRP recommendations call for assessments of justification not only for new practices using radiation but also for existing practices when there is new information about their efficacy and consequences. Assessments should also consider the management and disposal of radioactive wastes resulting from a practice. In the United States, there are ample historical examples of practices using radiation that were discontinued because of new information about their efficacy or consequences, for example, discouraging the use of radium solution medicines, developing alternatives to radium sources for medical applications, and eliminating the use of shoe-fitting fluoroscopes (which at one time numbered about 10,000 in the United States).

It is possible that some current uses of radioactive sources could be similarly treated. For example, orphan ^{241}Am nuclear gauges are frequently found in scrap metal intended for recycling. Nuclear gauges are commonly used in the food and beverage industries to measure the fill content of containers (estimated to number about 10,000 in the United States). However, alternative technologies are available for this purpose. One gauge manufacturer offers to replace

^{241}Am sources in its gauges with x-ray sources. An international beverage company limits its use of nuclear fill-level gauges to products packaged in cans and is encouraging the conversion of nuclear gauges to x-ray gauges. Optic technology is used for products in bottles.

Limiting the number of radioactive sources to those which are justified would limit the number of potential orphan sources.

Presently, there are in the United States as many as one-half million unwanted radioactive sources, each representing a potential orphan source. For persons possessing unwanted radioactive sources, the present system for providing for the disposal of radioactive sources is not well known, especially to general licensees and persons who unexpectedly find themselves in possession of a source (such as scrap metal users). Further, the system is complex, not easily understood, and unexpectedly expensive. Not surprisingly, in many cases, unwanted sources are placed into extended storage where they become vulnerable to loss, theft, and abandonment. A new approach is needed that encourages prompt transfer of unwanted sources to safe, secure storage sites pending final disposition.

To help develop new approaches, communication is essential. For example, alternative technologies that could be used to replace radioactive sources are not well known to users or regulators. There is a need for alternatives for dispositioning unwanted sources and for improved communication of such information to persons needing to know. The time is ripe to organize a symposium as a means to exchange information on these points. Such a symposium would be an important first step towards developing new paradigms for radioactive sources that are needed to solve the orphan source problem.

Note: The complete paper is scheduled for publication in the January 2002 issue of *Operational Radiation Safety*.

be only the first of several meetings to deal with these issues. In particular, it was broadly recognized that risk communication with the public is still ineffectively done by most scientists, and that we need to find better ways. Although there are clear national differences in the ways that scientific information is received by the public, and either trusted or not, there was a feeling among the participants that common approaches to communication might be delineated—the subject of a potential future meeting.

Undercurrents and Changes

There were several not-necessarily-science issues that were brought out in this meeting. The first issue was how the press is changing how science is done. The Priest work was funded by the press, in large part designed by the press, and reported by the press prior to any of the normal, scientific, peer-review processes that are a part of journal publication. While there are many examples of the press prematurely publishing results before the results have been validated (cold-fusion is the best example), this is the first time we are aware of a news organization designing, funding, and publishing a study such as this.

The second issue is journalistic epidemiology. The need for this meeting was stimulated at least partially by press reports of veterans' groups who were reporting an increased incidence of leukemia in soldiers returning from Balkans peacekeeping duties. These reports began in the European press in the December 1999–January 2001 time frame and were picked up in the press as "Italy is reporting" when in fact the Italian government's study, initiated after the press interest, showed normal incidence levels. The political impact of these press reports was significant because of the intense public concern, which led to governmental responses, which, when viewed with the "cold eye" of science, were not commensurate with the estimates of health or environmental risks. The responses were, however, in line with the level of public concern generated by the press articles. If press articles were your only source of information on this issue, your concern level would also be very high.

A mismatch between actual risk and public concern is significant because health policy and health spending is based in large part on public concern and not on health risk. Our system of government is designed to respond to public concern to the point that when the mismatch between risk and public concern is large, bad health policy usually results.

Science is partly responsible for this mismatch. The path to public policy for scientific issues used to be predominantly through consensus committees. Research would be conducted and reported in the peer-reviewed open literature. Disputes would be settled by consensus committees or organizations which would then make recommendations that formed the basis for policy decisions concerning health and what further

research was needed to settle the most important unresolved issues. The press would become engaged, for the most part at the point the policy decisions were made.

This process has changed. In many instances results are published in the press prior to any sort of peer review and, in at least one instance, a study was partially designed by a news organization. We have not adjusted to this short-circuiting of the scientific process where individual papers are reported in the press. Several accepted scientific practices unintentionally raise public concern. Such apparently innocuous statements as "More research is required" generate public concern when printed in a press article that does not report a complete picture of what is actually known. Our collective reluctance to use the word "safe," the difficulty in proving that a substance has no health effects, and our inability to draw any scientific conclusion with 100% certainty all contribute to public concern.

References

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 - The Royal Society. The health hazards of depleted uranium munitions. Part 1. Policy Document 6/01, published May 2001.
 - World Health Organization. Depleted uranium. Sources, exposure and health effects. Document No. WHO/SDE/PHE/01.1, April 2001.
 - U. S. Army Center for Health Promotion and Preventive Medicine. DEPLETED URANIUM - Human Exposure Assessment in Support of the Environmental Exposure Report "Depleted Uranium in the Gulf" of the Office of the Special Assistant to the Secretary of Defense for Gulf War Illnesses, Medical Readiness and Military Deployments (OSAGWT). Health Risk Consultation No. 26-MF-7555-00D, 2000.
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Colonel Daxon has been involved in the health physics field since 1977. He has served the Army in several health physics positions with much of his work focusing on DU. He served as a Department Chair and as the team leader for the depleted U research team at the Armed Forces Radiobiology Research Institute. He currently is the Depleted Uranium Consultant to the Army Surgeon General and is the DOD's principal spokesperson for DU health issues. Daxon earned his BS from the U.S. Military Academy, his MS in nuclear engineering from MIT, and his PhD in radiological hygiene from the University of Pittsburgh.

Dr. Guilmette has been a researcher in internal dosimetry and radiation toxicology for over 30 years, focusing in the area of inhaled radioactive aerosols. During his 23-year stint at the Lovelace Respiratory Research Institute, he studied the effects of inhaled plutonium aerosols in experimental animals and currently is involved with the Capstone DU aerosol project as well as studying the carcinogenicity of implanted DU fragments in animals. Currently he is Team Leader, Radiation Dose Assessments, at Los Alamos National Laboratory and continues to participate in several committees and task groups of NCRP and ICRP. He received a BS in nuclear engineering from Rensselaer Polytechnic Institute and an MS and a PhD in radiological health from New York University. ■

Professional Publications (Author, co-author, or editor)

"Survey of Radium Sources in Offices of Private Physicians," *Public Health Reports* 80:1 (1965).

"Results of the Pennsylvania Department of Health Dental X-Ray Survey Program," *Health Physics* 14:151-155 (1968).

"Analytical X-Ray Hazards: A Continuing Problem," *Health Physics* 16:739-746 (1969).

"Radiation Control," *Pennsylvania's Health* 31:3 (1970).

"Advanced Dosimetry and Exposure Evaluation," *Radiation Safety in X-Ray Diffraction and Spectroscopy*, DHEW Publication No. (FDA) 72-8009, BRH/DEP 72-3. USGPO (1971).

"Radiation Incidents Registry - Pennsylvania Experience," *Health Physics* 21:605-607 (1971).

"Nationwide Evaluation of X-Ray Trends," *Proceedings of the 3rd International Congress of the International Radiation Protection Association, September 9-14, 1973*, USAEC Publication No. CONF-73097-P2 (1974).

"A Survey of Accelerator Radiation Safety Systems," *Health Physics* 30:306-308 (1976).

"A Possible Hazard: Pressure Build-up in Sealed Ampoules of radionuclides in Aqueous Solutions," (letter) *Health Physics* 51:147-148.

"Performance Characteristics of Selected Integrating Ion Chambers," *Health Physics*, 33:199-203 (1977).

Regulation of Naturally Occurring and Accelerator-Produced Radioactive Materials, U.S. Nuclear Regulatory Commission, Publication No. NUREG-0301. National Technical Information Service, Springfield, Virginia 22161 (1977).

Final Task Force Report on the Agreement States Program, U.S. Nuclear Regulatory Commission, Publication No. NUREG-0388. National Technical Information Service, Springfield, Virginia 22161 (1977).

Impacts of NRC Programs on State and Local Governments, U.S. Nuclear Regulatory Commission, Publication No. NUREG-1041 (Co-editor). National Technical Information Service, Springfield, Virginia 22161 (1983).

"NRC Responses to the NGA Study of the Agreement State Program," *Proceedings of the 15th Annual Conference on Radiation Control*, May 16-19, 1983. Conference of Radiation Control Program Directors, Inc., Frankfort, Kentucky 40601 (1984).

Regulation of Naturally Occurring and Accelerator-Produced Radioactive Materials - An Update, U.S. Nuclear Regulatory Commission, Publication No. NUREG-0976. National Technical Information Center, Springfield, Virginia 22161 (1984).

Workshop on Large Irradiator Radiation Safety, U.S. Nuclear Regulatory Commission, Publication No. NUREG/CP-0073, National Technical Information Service, Springfield, Virginia 22161 (1985).

"Radioactive Contamination of Manufactured Products," *Health Physics*, 51:409-425 (October 1986)

"Radioactive Contamination of Steel," *Radiation Protection Practice: 7th International Congress of the International Radiation Protection Association*, Pergamon Press (1988).

"Radioactive Contamination of Metal Products: A Continuing Problem," *Proceedings of the 20th Annual Conference on Radiation Control*, May 15-19, 1988. CRCPD Publication 88-6, Frankfort, Kentucky 40601 (1988).

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1311, National Technical Information Service, Springfield, Virginia 22161 (1988).

Leakage of an Irradiator Source - the June 1988 Georgia RSI Incident, U.S. Nuclear Regulatory Commission, Publication No. NUREG-1392, National Technical Information Service, Springfield, Virginia 22161 (1990).

"Discoveries of Radioactive Materials in Metal Scrap," *Newsletter of the Conference of Radiation Control Program Directors, Inc.*, Summer 1990, Frankfort, Kentucky.

"A Radiation Protection Primer," *Scrap Processing & Recycling*, 48:2 (March/April 1991).

"Radioactive Materials in Recycled Metals," *Health Physics*, 68:440-451 (April 1995).

"Radioactive Contamination of Recycled Metals," *Proceedings of the 1996 International Congress on Radiation Protection*, International Radiation Protection Association, Seibersdorf, Austria (1996).

"The Continuing Problem of Radioactive Metal Scrap," *Proceedings of the 27th National Conference of Radiation Control*, CRCPD Publication 95-4, Frankfort, Kentucky 40601 (1997).

"Problems in the United States With Control of Radioactive Sources," *Proceedings of the International Conference on the Radiological Accident with Cs-137 in Goiania - 10 Years Later, October 26-31, 1997*, International Atomic Energy Agency, Vienna, Austria (December 1998).

"Radioactive Materials in Recycled Metals - An Update," *Health Physics* 74:293-299 (March 1998).

"Spanish Steel Mill Melts Large Cesium Source," *Health Physics Society Newsletter* (September 1998).

"Optimizing the Radiation Monitoring of Recycled Metals," *Proceedings of the 1998 Midyear Topical Meeting of the Health Physics Society*. Republished in *Good Practices in Health Physics*, G.R. Komp & M.A. Thompson, editors, pp 55-58, Medical Physics Publishing, Madison, WI (1998).

"Learning From Operational Experience: Safety of Radiation Sources in the United States in the Twentieth Century," *Proceedings of the International Conference on Safety of Radiation Sources and Security of Radioactive Materials, Dijon, France, 14-18 September 1998*, International Atomic Energy Agency.

"Unwanted Radioactive Sources in the Public Domain: An Historical Perspective," *Operational Radiation Safety*, a supplement to *Health Physics* v. 76, no.2 (February 1999).

"A Century's Challenges: Historical Overview of Radiation Sources in the United States," *IAEA Bulletin* 41/3/1999 (September 1999).

"Status on the Safe Management of Disused Radioactive Sources," *Safety of Radioactive Waste Management, Proceedings of an International Conference, Cordoba, Spain, 13-17 March 2000*; International Atomic Energy Agency, Vienna, Austria, STI/PUB/1094, 2000.

"International Agencies Act on Disused Source Problem," *Health Physics Society Newsletter* (May 2000).

"A Historical Overview of Orphan Sources and Radioactivity in Scrap Metals," *Proceedings of the 10th Annual International Radiation Protection Congress, Hiroshima, Japan, May 2000*.

"Spent/Disused/Orphan Sources: Action is Needed," (Editorial) *Health Physics Society Newsletter* (July 2000).

"Orphan Source Overview," *Proceedings of the 34th Midyear Topical Meeting, Radiation Safety and ALARA Considerations for the 21st Century, February 4-7 2001, Anaheim, CA*, pp 131-136, Medical Physics Publishing, Madison, WI.

"New Paradigms for Radioactive Sources & Radioactive Scrap," invited presentation for American Academy of Health Physics special session, *New and Changing Paradigms for Radiation Safety as We Enter the 21st Century*,

46th Annual Meeting of the Health Physics Society, June 10-14, 2001, Cleveland, OH. A summary of this paper was published in the *Health Physics Society's Newsletter* XXIX:9, p18. The complete paper will be published in *Operational Radiation Safety*, January 2002 supplement to *Health Physics* under the title, "Too Many Notes?"

Other Publications

"Toy Trains for Health Physicists," *Health Physics Society Newsletter* (December 1997)

"Toy Trains for Health Physicists: Kusan's Atomic Train," *Health Physics Society Newsletter* (March 1998)

"Toy Trains Used by Health Physicists," *Health Physics Society Newsletter* (June 1998)

"Toy Trains for Health Physicists: Three Mile Island Cars," *Health Physics Society Newsletter* (July 1998).

"Atomic Toy Trains," *Train Collectors Quarterly* (July 1999).

Recent Speaking Experience

Recent invited presentations include International Conferences on Safety of Radiation Sources and Security of Radioactive Materials (Rapporteur), September 14-18, 1998, Dijon, France and on Safety of Radioactive Waste Management, 13-17 March 2000, Cordoba, Spain (Keynote Speaker); Institute of Scrap Recycling Industries seminar, June 28, 1998, Orlando, FL; Health Physics Society Topical Meeting (Session Chair and Overview Statement), Anaheim, CA, February 4-7, 2001; and American Academy of Health Physics special session, New and Changing Paradigms for Radiation Safety as We Enter the 21st Century, 46th Annual Meeting of the Health Physics Society, June 10-14, 2001, Cleveland, OH.

Lecturer and discussion leader, NRC Technical Training Center, 1981-1998.

Harvard School of Public Health Continuing Professional Education lecturer, 1993-1998

Health Physics Society Professional Enrichment Program Lecturer, 1996, 1997.

Panelist, "Safety of Large Radiation Sources," and Refresher Course Lecturer, 1996 International Congress on Radiation Safety, Vienna, Austria, April, 1996.

Speaking experience also includes representing the NRC at State legislative hearings, industry, professional, and public meetings and as chairperson, instructor, course coordinator, and guest speaker at other professional training courses and meetings.

National Council on Radiation Protection and Measurements

Adjunct Member

Advisor, Scientific Subcommittee 87-4, Management of Waste Metals Containing Radioactivity

Member, Scientific Committee 46, Operational Radiation Safety