RP 443.09
October 9, 2009

Mr. James Shaffner
Project Manager, Low-Level Waste Branch
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Rockville, MD 20852

Dear Mr. Shaffner:

Radioactive material is an integral tool in biomedical research and medical treatment, and great strides have been made by the research community to minimize the amount of activity used in this important work. The University's use of radioactive materials is as a proven in basic science research in such areas as stem cell biology, immunology, public health, the study of disease and techniques to diagnose and treat disease.

Unfortunately, there is not sufficient capacity for reliable and cost effective waste disposal for radioactive waste generated as a result of research. Suitable options are not currently available to address the broad range of radionuclides and physical forms that are used in research. As research diversifies from the standard biomedical radionuclides with longer halflives or becomes more chemically complex, disposal options decrease. Often these research projects involve organic chemistry labeled with radioactive materials. The resulting wastes are difficult to find a suitable disposal outlet to safely manage the waste. As a result of these concern, projects are deferred until a proper disposal outlet is identified or the researcher switches to an alternate technique that involve fewer regulatory and disposal complications.

Harvard is committed to minimizing radioactive material use and waste disposal, yet we are concerned about the lack of disposal outlets and capacity among the waste vendors. In response to these limitations, the University's Radiation Safety Committee only authorizes research projects with a viable and established disposal option. The Radiation Safety Committee's policy denies research approval until waste disposal routes are identified or issues a provisional approval based on confirmed disposal capacity. In the past few years, this has been a consideration in at least two projects that used ^{36}Cl and ^{3}H. These experiments were ultimately approved, with a provision for discontinuance, after intensive work between the research scientists, health physicists and radioactive waste brokers to create a specific waste form with an available disposal option. An examples of impacted projects include studies of the biological mechanisms of chloride (^{36}Cl) incorporation into natural products[1,2]. Another problem area is

[1] Vaillancourt, F.H., J. Yin, and C.T. Walsh, *SyrB2 in syringomycin E biosynthesis is a nonheme Fe^{II} α-ketoglutarate- and O_2-dependent halogenase.* PNAS, 2005. 102(29): p. 10111-6
[2] Yeh, E., S. Garneau, and C.T. Walsh, *Robust in vitro activity of RebF and RebH, a two-component reductase/halogenase, generating 7-chlorotryptophan during rebeccamycin biosynthesis.* PNAS, 2005. 102(11): p. 3960-5

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the lack of disposal options for disused sealed sources such as ^{226}Ra or ^{137}Cs from decommissioned liquid scintillation counters. These and other sealed sources that reach the end of their service life are placed in interim storage. However, the most appropriate option would be proper disposition of these sources in a licensed facility designed for the safe management of such materials.

To minimize the impact on research due to limited disposal options, the University has been actively involved in managing the radioactive waste generated in its academic research program and from medical administrations at affiliated hospitals. The University's Radiation Protection Office (RPO) has been working for decades to minimize the impact of limited disposal site availability on research and medical treatment. Since the mid-1960's, the RPO has managed costs and access to reliable radioactive waste disposal options by operating a decay-in-storage program (DIS) for short-lived wastes. Over the years, the scope of this operation increased so that 65% of the average annual radioactive waste volume is managed in the DIS program and is removed from the national radioactive waste disposal stream. The RPO has worked with researchers to convert to non-hazardous liquid scintillation material so this waste stream, which accounts for 10% by volume, has a reliable outlet. The RPO has also amended the Radioactive Materials License to accommodate interim storage should disposal not be available for the remaining 25% of the annual radioactive waste volume that can not be managed by alternate techniques. We have worked intensively with our radioactive waste vendors and a cooperative research staff to modify experiments such that the waste may be disposed of in an environmentally proper and cost effective manner.

We urge the Nuclear Regulatory Commission to promote solutions to the limited radioactive waste disposal options, to encourage market competition and eliminate barriers to interstate commerce in the radioactive waste management and disposal industry.

Sincerely,

Joseph P. Ring, Ph.D., CHP
Radiation Safety Officer

cc: Radiation Safety Committee, December 2009 Meeting Package
J. Griffin
A. Jones
T. Vautin
K. Casey