Stakeholders Comments related to Impacts of Lack of Low-Level Radioactive Waste (LLRW) Disposal Access on Academic and Medical Research using Radioactive Sources

Responses from Stakeholders

During the information collection process, staff obtained a variety of perspectives on the level and nature of impacts on the lack of disposal access on medical and academic research. While these impacts do not rise to the level of a crisis, they represent a gradual decline in the ability of the medical and research community to conduct some research using long-lived radiochemical compounds. According to respondents, this decline in research has a number of components that can be associated with Low-Level Radioactive Waste (LLRW) management. These include the high cost of LLRW disposal, lack of access for LLRW disposal, lack of availability of some research compounds due to waste disposal challenges associated with their manufacture and use, and the cost and inconvenience of storage of LLRW by institutions that are not fully equipped to do so.

A representative of the University of Missouri Research Reactor facility cited the importance of that facility, not only for conducting research, but also in the production of medical isotopes. While the isotopes themselves are short-lived, their production results in the creation of some Class B and C LLRW. Lack of disposal access for this waste has created the need to convert portions of the physical plant that would have otherwise been earmarked for research into LLRW storage areas. This has had a two-fold impact on research: 1) diversion of funds otherwise available for research, and 2) limitations in space available for research.

The Council on Radionuclides and Radiopharmaceuticals (CORAR) is a trade association representing 16 radiochemical manufacturers in the United States and Canada. Its member companies produce most of the radiochemicals used in research. A representative of CORAR discussed the challenges faced in research due to curtailment of production of large numbers of radiochemicals. Because of LLRW disposal challenges both associated with the production and use of these compounds, production of over 100 catalogue products have been discontinued. Catalogue products contribute to the efficiency of research because they are relatively inexpensive and ultimately produce less LLRW than custom produced radiochemicals. The CORAR representative provided a list of these discontinued radiochemical catalogue products and gave examples of their use in research. They include such products as:

- amino acids used in metabolic studies;
- eicosatetraenoic acids used for testing receptor centers;
- retinoic acid used for neurochemical binding studies;
- radiochemical steroids used to study steroid receptors;
- dinitroflourobenzene used for photochemical experiments;
- benzopyrene used to test mechanisms for tumor formation;

- radioligands used for the study of neuron receptors and cardiovascular receptors; and

- zolpidem used to induce relaxation.

A representative of the Campus Radiation Safety Officers (CRSOs) provided examples of the impacts on academic research that had been provided by members of his organization. These include:

- molecular biology research that has been affected by the unavailability of compounds containing tritium and carbon-14;

- fossil fuel dilution studies that are negatively affected by the inability to obtain tritiated benzopyrene; and

- nutritional studies that have been negatively affected by unavailability of C-14 labeled fatty acids.

A retired physician from University of California, UCLA Harbor Medical Center provided additional insight into the impacts on metabolic research discussed above. She noted that carbon-14 and tritium compounds were formerly the "workhorses" in metabolic research. They produced quality research results at modest cost. Because of recent disposal challenges, researchers are abandoning the use of these compounds in favor of short half-life or non-radioactive compounds. This has had an impact on the nature of the research that is being accomplished. According to the physician, metabolic research using radioactive tracers, such as H-3 and C-14, used to be relatively inexpensive and yielded much useful metabolic information. Productivity of this research is now being hampered by the expense of acquiring these radioactive tracers or the inability to dispose of the resultant LLRW.

A representative of Harvard University noted challenges associated with chlorine-36 used in research related to the biological mechanisms of chloride incorporation into natural products.

A number of respondents cited LLRW management issues as the determining factors in awarding or denying research grants. These factors include high LLRW disposal costs, high costs of other aspects of research as a result of disposal costs (e.g. disposal costs accrued by radiochemical producer that must be passed on to the consumer), or disposal uncertainties that cannot be adequately addressed in grant proposals.

Certainly not all research is negatively affected by waste disposal challenges. For instance, a respondent from the University of Virginia said that the university's researchers discontinued the use of radioactive labels because non-radioactive alternatives are cheaper and not as highly regulated.

Stakeholder dialogue also included input from several public interest groups. Their input seems to suggest that the use of radioisotopes in medical and academic research, and by extension resultant LLRW, is perceived in a more positive light than other aspects of production and utilization of radioactive material by some segments of the public.