



# HEALTH PHYSICS SOCIETY

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*“Specialists in Radiation Safety”*

February 28, 2005

Dr. Thomas Laetz, Senior Policy Analyst  
United States General Accountability Office  
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Denver, CO. 80204

**RAYMOND A. GUILMETTE, President**

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Dear Dr. Laetz:

I am pleased to forward information prepared by the Health Physics Society (HPS) to support the United States General Accountability Office’s (GAO) work to report to the Senate Energy and Natural Resources Committee (the “Committee”) on low-level radioactive waste (LLRW) issues.

On January 19, 2005, I met with you, Mr. Brown and Ms. Pollock of the GAO staff at Los Alamos National Laboratory, Los Alamos, New Mexico to share the HPS’s views on questions you had provided in Document #84675 dated 1/05/05. In addition to our discussion on LLRW issues in that meeting, I also committed to submit written responses to your questions.

Therefore, please find enclosed HPS’s written responses and information that have been prepared to support the GAO task of preparing a report on LLRW for the Committee. We feel that this information supports our positions, which were submitted as public witness testimony to the Committee in a hearing held on September 30, 2004 (the “hearing”) and those I related to you in our meeting in January.

The enclosed statement contains details and justifications for a number of HPS positions and recommendations for Congressional action that is needed to address LLRW issues. These positions and recommendations are summarized as follows.

- We believe that Congressional action is needed that would grant access for waste disposal to all 50 States, the District of Columbia and Puerto Rico. We encourage Congress to act expeditiously since it appears likely that 36 states that do not belong to the Atlantic Compact will not have access to a facility for disposal of Class B and C LLRW after 2008.

To this end, we have proposed several alternatives that would provide access to Compact and Non-Compact States alike for disposal of LLRW.

One alternative would allow waste generators access for disposal of LLRW at a facility controlled by the Department of Energy (DOE). We believe that this approach is workable since the DOE is authorized to dispose of LLRW at several facilities in the United States.

Another alternative is to allow commercial development and licensing to provide access to new disposal capacity, including the use of federally-owned land if necessary.

We have reported to the Committee several alternatives that are currently proposed or under consideration by the Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA), which would create new disposal capacities for a variety of waste streams. One such approach involves liberalization of the NRC policy controlling disposal of radioactive materials that pose a lesser hazard than the waste currently authorized to be disposed in the uranium mill tailing impoundments.

- We encourage Congress to seek out stakeholder information on ways in which the regulation of radioactive wastes could be reclassified, based not on its origins but on the level of risk posed to public health.
- We recommended that Congress continue to appropriate funding to the NRC, States, and DOE to maintain the existing orphan source recovery programs.
- In a joint effort between the HPS and the Organization of Agreement States we have recommended that Congress pass legislation regarding uniform control for the security and safety of certain radioactive materials that are not covered under the Atomic Energy Act of 1954 (AEA).

We believe that Congressional action is needed to include “discrete” sources of natural and accelerator-produced radioactive materials under the jurisdiction of the NRC. This action is required not only to fulfill our international obligations for controlling the import and export of high-risk sources not covered under the AEA, but also to establish uniform regulations for protecting public health and safety from these materials, including disposal options.

- We recommend Congressional action to allow for the permanent disposal of greater than class C (GTCC) waste at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, dependent on appropriate stakeholder involvement in the decision-making process.

We agree with GAO statements to the Committee at the hearing in September 2004 that if GTCC sources fell into the hands of terrorists, they could be used in a simple and crude, but potentially dangerous, radiological weapon. We believe, given the existing regulatory framework and environmental reviews governing use of WIPP for disposal of certain transuranic wastes, disposal of GTCC sources at WIPP should be strongly contemplated.

- As presented in our public witness testimony to the Committee in September 2004, we believe that the high cost of waste disposal is impeding the use of nuclear technologies that enrich the quality of life in our society.

Our responses and supporting documentation contained herein support our positions on this matter. We support your statements at the hearing in September 2004 that the high costs of waste management and disposal are adversely impacting the biomedical community. In fact, much of the focus of our earlier testimony was geared toward this subject. We feel the alternatives currently under consideration by the NRC and EPA will not only provide new disposal capacities, as cited above, but will also make these alternatives available at a reasonable cost.

I sincerely appreciated the opportunity to have met with you and your colleagues on January 19, 2005. I hope GAO will continue to rely on our expertise in radiation safety and that the enclosed information is valuable as you move forward on this important work for Congress. Please contact me if you have any further questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ray A. Guilmette', written in a cursive style.

Raymond A. Guilmette

Enclosure

cc: Ms. Robin Nazzaro, Director, Natural Resources and Environment, GAO (without enclosure)



# HEALTH PHYSICS SOCIETY

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*Specialists in Radiation Safety*

**HEALTH PHYSICS SOCIETY**

**RESPONSE TO THE**

**GENERAL ACCOUNTABILITY OFFICE**

**REQUEST FOR INPUT ON SECURITY OF ON-SITE STORAGE OF**

**LOW-LEVEL RADIOACTIVE WASTE**

**February 28, 2005**

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## EXECUTIVE SUMMARY:

The U.S. Government Accountability Office (GAO) is gathering information on the security of stored class B, C and Greater-Than-Class-C (GTCC) low-level radioactive wastes (LLRW). As part of this research effort, the GAO was interested in getting input from the Health Physics Society (HPS) on these issues. On January 19, 2005, three GAO staff members met with the HPS President, Dr. Raymond A. Guilmette, at the Los Alamos National Laboratory, Los Alamos, New Mexico to get the HPS response to eight questions that had previously been provided to Dr. Guilmette. In addition to providing verbal responses to the questions and discussing LLRW issues in that meeting, Dr. Guilmette also committed to submitting written responses to the GAO questions for the record. This document provides the responses to the GAO questions.

**General Principles:** The detailed responses to the questions are provided in the context of seven general principles related to LLRW issues. These general principles are:

1. Waste classification and disposal requirements for any type of radioactive waste should be based on its potential risk to public health and safety, not on its origin or legislative stature.
2. Risk informed waste disposal requirements for radioactive materials should be consistent and integrated with waste disposal for non-radioactive hazardous waste.
3. Principles 1. and 2. lead us to endorse the approach for a waste disposal classification system proposed by the National Council on Radiation Protection and Measurements (NCRP) Report 139, "Risk-based Classification of Radioactive and Hazardous Chemical Wastes."
4. Waste disposal options based on the material's risk support disposal options other than the existing federally legislated alternatives – what we refer to as "alternative options."
5. Security for radioactive materials that are "waste", "unused in storage", "non wanted", or whatever they are called is tied to disposal by the overriding principle that materials disposed of in an appropriate managed disposal facility is more secure, while being more cost efficient, than "storage."
6. Any "orphan source", i.e., a source that should be regulated and controlled that is outside the regulatory system, regardless of activity is a public health and safety concern – even if it isn't a likely candidate for a "dirty bomb."
7. Orphan sources are tied to waste disposal when the availability or cost of disposal inhibits proper disposal. Therefore, cost considerations are as important as capacity availability.

**Positions and Recommendations:** The answers to the GAO questions contain details and justification for a number of HPS positions and recommendations for Congressional action that is needed to address LLRW issues. These position and recommendations are:

1. We believe that Congressional action is needed to grant access for waste disposal to all 50 States, the District of Columbia and Puerto Rico. We encourage Congress to act expeditiously since it appears likely that 36 states that do not belong to the Atlantic Compact will not have access to a facility for disposal of Class B and C LLRW after 2008. To this end, we propose several alternatives that would provide access to Compact and Non-Compact States alike for disposal of LLRW, such as:
  - a. access for disposal of LLRW at a facility controlled by the Department of Energy (DOE).
  - b. commercial development and licensing to provide access to new disposal capacity, including licensing of a new disposal facility constructed on federally owned land.
  - c. alternatives that are currently proposed or under consideration by the Nuclear Regulatory Commission (NRC) and Environmental Protection Agency (EPA), which would create new disposal capacities for a variety of waste streams, including liberalization of the NRC policy controlling disposal of radioactive materials that pose a lesser hazard than the waste currently authorized to be disposed in the uranium mill tailing impoundments.
2. We encourage Congress to seek out stakeholder information on ways in which the regulation of radioactive wastes could be reclassified, based not on its origins but on the level of risk posed to public health.
3. We recommend that Congress continue to appropriate funding to the NRC, States, and DOE to maintain the existing orphan source recovery programs.
4. In a joint effort between the HPS and the Organization of Agreement States we recommend that Congress pass legislation regarding uniform control for the security and safety of certain radioactive materials that are not covered under the Atomic Energy Act of 1954 (AEA).
5. We recommend Congressional action to allow for the permanent disposal of greater than class C (GTCC) waste at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.
6. We believe that the high cost of waste disposal is impeding the use of nuclear technologies that enrich the quality of life in our society.

## **BACKGROUND:**

The U.S. Government Accountability Office (GAO), a research arm of the Congress, is gathering information on the security of stored class B, C and Greater-Than-Class-C (GTCC) low-level radioactive wastes. They are interested in learning about who generates this waste, what is its makeup, and where it is stored. In addition, they would like to learn about current waste management practices, and how these practices might change in the future if South Carolina follows through with its plans to restrict disposal access to Barnwell.

On September 29, 2004, the Health Physics Society (HPS) submitted a “Public Witness Testimony for the Record,” for a U.S. Senate Committee on Energy and Natural Resources (the “Committee”) hearing on Low-Level Radioactive Waste Oversight, held on September 30, 2004. The hearing centered on the results of a June 2004 GAO report to this committee, viz., *Low-Level Radioactive Waste: Disposal Availability Adequate in the Short Term, but Oversight Needed to Identify Any Future Shortfalls*.

The present research effort is a follow up to the work GAO did for the June 2004 report. While GAO had been asked by the Committee to examine the availability of disposal for low-level radioactive waste, which was addressed in the HPS testimony, the Committee is presently interested in the safety and security implications of keeping waste in storage if there are future gaps in disposal availability.

As part of the present research effort, the GAO was interested in getting further input from the HPS on these issues. On January 19, 2005, three GAO staff members met with the HPS President, Dr. Raymond A. Guilmette, at the Los Alamos National Laboratory, Los Alamos, New Mexico to get the HPS response to eight questions that had been provided to Dr. Guilmette on January 5, 2005. In addition to providing verbal responses to the questions and discussing LLRW issues in that meeting, Dr. Guilmette also committed to submitting written responses to the GAO questions for the record.

## **QUESTIONS AND RESPONSES:**

***Question # 1: Your statement to the hearing record indicates that the Health Physics Society agreed with the majority of the contents in the June 2004 GAO report; however, we could not find in your statement areas of disagreement.***

- a. Are there specific points of disagreement with the report’s findings and, if so, what are they?***

**HPS Response:** The HPS does not disagree with the content of the GAO report regarding Class B and C LLRW, but believe that, due to the limited scope of the report as it relates to Class A waste, it does not address the whole range of waste disposal concerns. Specifically, we envisioned that the scope of the GAO report would have more fully addressed the high waste disposal costs and more fully explored potential alternative waste disposal options that may have been useful to the Committee.

These points are underscored by the fact that the Envirocare of Utah (EOU) facility in Clive, Utah is the site where most of the nation's Class A LLRW is disposed due principally to its lower cost and greater availability. Although the Chem-Nuclear Systems, LLC, site in Barnwell, South Carolina (CNS) also accepts commercial Class A LLRW, the cost of disposal there is generally much higher than at EOU. Our testimony to the Committee was intended to point out the need to more fully consider the adverse impact due to the high cost of disposal of Class A LLRW. Furthermore, our testimony explained, in greater detail than that described in the GAO report, current rulemaking initiatives that if promulgated would increase the number of disposal sites across the country. In fact, we believe that garnering the political resolve to move the rulemakings to completion would promote competition in the market place by increasing the number of available disposal sites, thus lowering waste disposal costs, and encouraging the use of nuclear technologies that benefit the quality of life in our society.

As noted by the GAO, the information related to the cost charged by EOU to waste generators is protected as proprietary information and not subject to public disclosure. However, we are aware that waste disposal costs related to government contracts held by the DOE and the Army Corps of Engineers are approximately \$5 per ft<sup>3</sup> for disposal of Class A LLRW at EOU. For waste generators that do not have access to these government contracts, waste disposal costs often exceed \$200 per ft<sup>3</sup> for Class A LLRW. In addition, the report does not address the high costs for disposal of mixed waste (i.e., regulated for both its radioactive and hazardous chemical constituents) and radioactively contaminated biological waste. The cost for treatment and disposal of mixed waste from biomedical research activities typically ranges from \$150 to \$1500 per gallon and can be >\$10,000 per gallon. The cost for treatment and disposal of biological waste from biomedical research without radioactive contamination typically ranges from \$1 to \$20 per pound. In addition, the GAO report does not address the lack of availability of treatment and disposal facilities for subcategories of mixed and biological wastes now being generated. This subject will be addressed further in the HPS response to Question #4.

In our testimony, we also informed the Committee of a recent report issued by the National Council on Radiation Protection and Measurements (NCRP). NCRP Report No. 139, *Risk-Based Classification of Radioactive and Hazardous Chemical Wastes*, issued December 31, 2002 provides a risk-based framework for revising the manner in which radioactive and hazardous materials are classified. We strongly believe that the current system of classifying waste based on its origin, as defined in statutes, needs to be revised and that waste streams should be classified commensurate with the risk posed to health and safety. While the GAO report referenced the NCRP efforts to move in this manner, we believe that the Committee should be more fully briefed on this NCRP report. Notwithstanding these differences in scope, we commend the GAO for addressing the impact of disposal of Class B and C LLRW should Barnwell prohibit access to waste generators in 36 states located outside of the Atlantic Compact after CY 2008.

**Question #2:** *Your statement to the hearing record appears to support NRC’s claim that its waste management oversight practices, and those of the Agreement States, will continue to assure protection of public health and the environment from stored class B and C wastes. However, the Society later states that the lack of disposal options for sealed sources may lead to an increase in the number of orphan sources. There appears to be a conflict in your statement.*

**a.** *What additional actions should regulators take to mitigate the risks of increasing numbers of orphan sources?*

**HPS Response:** By way of clarification, our testimony stated, “No significant health and safety impacts are expected to arise in the near-term as a result of limited availability or shutdown of disposal options for Class B and C wastes.” (HPS Testimony page 3, 3<sup>rd</sup> paragraph). While onsite storage of Class B and C waste will adequately protect health and safety for the short-term, we believe disposal options for these wastes are needed as a permanent solution.

As noted in the GAO report, the majority of Class B and C LLRW is generated by commercial nuclear power plants located across the United States. We believe that recent security upgrades completed at commercial nuclear power facilities, as required by Confirmatory Orders issued by the NRC, will ensure that waste stored on-site are adequately safeguarded, and thus protective of health and safety. Even though interim storage of Class B and C waste, whether on-site or in “assured isolation facilities,” will adequately protect health and safety for the short-term, we believe the disposal options for these wastes are needed as a permanent solution.

The HPS believes that the following six specific actions will serve to mitigate the risks of increasing the numbers of orphan sources.

1. We believe that high-risk sources exceeding the thresholds listed in the International Atomic Energy Agency’s (IAEA) *Code of Conduct* should require additional import and export controls. We support the NRC’s proposed rulemaking (10 CFR Part 110) to require further international controls for high-risk sources listed in the *IAEA Code of Conduct*.
2. We believe that the current statutory and regulatory framework for regulating radioactive materials that are not currently subject to the Atomic Energy Act of 1954, as amended, (AEA) needs to be changed. Specifically, we believe that Congress should empower the NRC to regulate “discrete” sources of natural and accelerator produced radioactive materials (NARM) under its jurisdiction over by-product materials. In support of this, the HPS and Organization of Agreement States (OAS) have jointly issued

a position statement and proposed legislative language that would amend the AEA to extend NRC authority to discrete sources of NARM<sup>1</sup>.

In fact, one such high-risk source of NARM, radium-226, is listed in the IAEA Code of Conduct. However, since it is not covered under the AEA, NRC has no statutory authority to regulate the importation of discrete radium sources. As such, NRC needs to be empowered to ensure its authority over these radiological sources. However, it is important to note that the States have been successfully regulating non-AEA materials to ensure public health and safety. Yet at present, this state-by-state regulatory framework is incomplete and inconsistencies in state regulations of non-AEA materials still exist. Therefore, we believe that this Congressional action is needed to promote uniformity of regulations of all radioactive material based on their respective levels of risk to national security and public health.

3. We believe Congressional action is needed to evaluate the acceptability for using the Waste Isolation Pilot Plant (WIPP) located in Carlsbad, New Mexico for disposal of GTCC sources. Moreover, we believe that the lack of economical and accessible disposal options is a major contributor to the generation of orphan sources. Our position further underscores the need for an approved disposal site for the permanent disposal of GTCC and other high-risk sources that could undermine national security and public health. Many of these sources are currently being maintained under the orphan source recovery programs (OSRP) conducted by the States and federal agencies and are securely stored at a variety of locations until a permanent disposal pathway is identified. (*See also subparagraph 6. below*).

We believe that use of WIPP should be more fully considered for disposal of GTCC waste because extensive environmental reviews for disposal of candidate chemical hazardous and transuranic waste streams have already been conducted for this facility in support of rulemakings. As such, we believe the geologic features and regulatory controls currently governing the use of this facility would adequately protect public health and safety for disposal of GTCC sources. More importantly, given the political uncertainty of licensing the federal repository at Yucca Mountain, authorization to dispose of GTCC sources at WIPP is an alternative that should be fully explored by the Committee. While we believe that the Committee should fully explore this alternative needed to address national security matters, we strongly recommend stakeholder involvement in the decision-making process to consider allowing disposal of waste streams not originally destined for WIPP under the National Environmental Policy Act of 1969.

4. We believe that there is a pressing need to explore all alternatives that would allow for the disposal of sources that pose a public health and security risk to our society. One such alternative should include use of the Waste Control Specialist site in Andrews, Texas, which is scheduled to be licensed to accept Class B and C LLRW in 2007. It is

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<sup>1</sup> Position Statement of the Health Physics Society and Organization of Agreement States, *Congressional Action is Needed to Ensure Uniform Safety and Security Regulations for Certain Radioactive Sources*, issued January 2005. <http://hps.org/>

recognized that the use of this site for disposal of any waste generated outside of the Texas-Vermont Compact region would require approval by the Compact Commission and State of Texas. Given the recent actions by the Utah Legislature and statement by the governor of Utah in denying licensing of the EOU facility to receive Class B and C waste, one should not expect an easy approval process for wastes to be accepted for disposal in Texas.

As stated in our testimony to the Committee, we believe that the lack of disposal of GTCC and all other sealed sources that pose security and public health concerns will continue to increase the number of orphan sources. Our position is most relevant since EOU prohibits disposal of sealed sources at their facility in Clive, Utah. As such, radioactive material licensees in the 36 states that do not belong to the Atlantic Compact will no longer have a pathway for disposal of sealed sources. We believe that this situation warrants action to prevent generation of orphan sources for licensees located in these 36 states.

We encourage the Committee to evaluate a variety of alternatives that would allow the permanent disposal of sealed sources should the Barnwell facility prohibit access to non-compact member states. If access to the WCS facility in Andrews, Texas is expeditiously licensed and available to all non-compact member states, congressional action may not be needed to assure the disposition of sealed sources. However, should Texas be unwilling to shoulder the burden of allowing LLRW to be disposed of within its borders, other alternatives will need to be considered. Alternatives that warrant strong consideration are to authorize:

- a. Access to both compact and non-compact states for disposal of LLRW at a facility operated by the DOE, or
- b. Commercial construction and operation of a LLRW disposal facility, including construction on land owned by the Federal government if privately owned sites can not be identified or approved by the States. Under this approach, congressional action may be necessary to construct a facility that could be operated by private industry<sup>2</sup> and licensed by the NRC.

Under either of these approaches, Congressional action may well be needed to remove statutory impediments prohibiting access for disposal of LLRW to compact and non-compact states alike.

5. We believe that the actions recommended in our position statement, “*State and Federal Action is Needed for Better Control of Orphan Sources*,”<sup>3</sup> are needed to protect health and safety from sealed sources that may not exceed the *IAEA Code of Conduct* thresholds. As noted in this position statement, we believe that the current system for

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<sup>2</sup> Such a concept is currently being implemented for disposition of surplus weapons-grade plutonium at the Savannah River Site located near Aiken, SC.

<sup>3</sup> Position of the Health Physics Society, *State and Federal Action is Needed for Better Control of Orphan Sources*, issued April 2002. <http://hps.org/>

controlling/licensing of sealed sources needs to be restructured. We are pleased to report that many of our initial recommendations cited in the Position Statement have been implemented on a national level. While progress has been made in these areas, we believe that additional action is still needed in the following areas:

- a. Regulatory agencies should require licensees to justify the need for possessing new sealed sources consistent with recommendations proposed by the International Commission on Radiological Protection (ICRP) and NCRP that would: (1) ensure that such possession results in a net benefit to society, and (2) ensure that there are no reasonable alternatives to using such sources of radioactivity. The NRC has repeatedly gone on record as having no authority under the current AEA to endorse this principle.
  - b. Regulatory agencies should issue and enforce license conditions for the possession, use and disposal of sealed sources.
  - c. Regulatory agencies should require licensees to provide financial surety that will guarantee funds for subsequent disposal [licensees, not the taxpayers, must be financially responsible for sealed sources disposal cost].
  - d. Regulatory agencies should work with other international organizations to promote the harmonized adoption of these recommendations.
6. We believe that Congress should appropriate the funding needed to administer the various Orphan Source Recovery Programs (OSRP) to mitigate the risks of increasing the number the orphan sources. *(See also item 3 in question 3 below)*

Federal funding is needed to maintain the OSRP as administered by the Department of Homeland Security, Environmental Protection Agency (EPA), DOE, and NRC to mitigate the risk of increasing the number of orphan sources. While the NRC recovers 90% of its operating cost from charges to the license community with the remaining 10% provided by Congress, the same is not the case for Agreement States. Most Agreement States rely heavily on funding provided by the Federal government or from sources provided by their own state legislatures. Since the cost for maintaining the OSRP is unrelated to the regulatory license fees paid by individual licensees to NRC and the States, the future of this program as administered by DOE will rely on revenues provided from funds appropriated from Congress. In a similar manner, Congressional appropriation will need to be provided to Agreement State programs if they are to successfully participate in this important program.

***Question #3: Your statement to the hearing record calls for the Senate Energy and Natural Resources Committee to seek additional information to ensure that the existing federal programs for safeguarding high-risk sealed sources are able to carry out their oversight missions.***

- a. ***What additional information would be helpful and why?***

**HPS Response:** In addition to our response to Question #2, we believe the Committee should seek information to determine if the list of sources included in the IAEA Code of Conduct is inclusive of all the types of radioactive materials that could be used to threaten national security and compromise public health and safety. Our position is based on the fact that the list of high-risk sources identified in the *IAEA Code of Conduct* is limited exclusively to sealed sources. However, other radioactive materials present in forms other than sealed sources could potentially cause similar risk to national security and public health and safety. Although the HPS does not have examples to illustrate the types of sources that may fall in this category, we encourage an analysis and evaluation by the NRC to identify if such sources exist. In addition, the Committee should seek information on implementation from the federal community to ensure the security of radioactive sources that are not subject to the AEA (e.g., NARM).

In addition to information contained in our testimony to the Committee, we wish to share the following information, which pertains to protecting high-risk sealed-sources.

1. The Committee should seek information to see if the Vulnerability Assessments and Design Basis Threats being used by radiological emergency response planners are adequately inclusive.

a. Design Basis Threats (DBTs):

*Does the DBT used by radiological emergency response planners incorporate the “insider” threat?* There have been instances in the U.S. of “insiders” using their knowledge to illegally obtain radioactive material. One individual, who had been a medical school and university RSO and agreement state license reviewer was found guilty of one felony count and sentenced to five years imprisonment but his name was never shared by the NRC with the agreement states. Another individual who used the license of a former employee to illegally obtain sources has been banned from NRC licensed activities for five years. Yet, this person could relocate to an agreement state and get a license. NRC does not have in place regulations and procedures that track known wrongdoers and provide for reciprocity when wrongdoers are subject to penalties. NRC should be asked (1) why information on known wrongdoers is not exchanged between NRC and the states; (2) whether such information is shared with law enforcement agencies; and (3) why it has not taken action to provide that criminal or administrative penalties against wrongdoers issued by one jurisdiction apply in all, and (4) is additional authority needed?

*Does NRC plan to expand the basis used to identify high-risk sources to include economic and psycho-social consequences?* The initial DOE/NRC system to identify high risk sources and the IAEA categorization system that the United States Government has agreed to use are both based on the potential to cause deterministic health effects, that is, radiation injuries and deaths within a short period following exposure. But, it is universally agreed that, in contrast to a

nuclear attack, these are unlikely to be the major consequence of an RDD attack. Rather, it will be psycho-social and economic harm (see NCRP Report 138). The economic consequences may be extraordinarily large because of public fear of radiation.

b. Vulnerability Assessments:

An integral part of developing a security plan is a vulnerability assessment (see GAO testimony GAO-02-150T). In May 2003, the joint NRC-DOE working group tasked with identifying high-risk sources issued its report. The report's conclusions notes that vulnerability assessments for the different types of radioactive material are needed to determine protective measures. Radioactive sources identical in radionuclide, quantity and form may not be identical in terms of risk to theft or diversion when their status or circumstance of use is considered. In September 2003, LANL published a report of a risk analysis of large sources that could be useful for an RDD (LA-UR-03-6664). While this study was limited by fiscal constraints, it provided insights into high-risk practices. Those that were identified included sources that are unwanted or orphaned and identified the sales and re-sales of sources.

*Questions for the NRC:* (1) Has NRC performed vulnerability assessments to take this into consideration? (2) If so, did the assessments refute the LANL findings that unwanted and orphan sources and the sale and re-sale of sources are among the high-risk practices for large sources? (3) If vulnerability assessments were not performed, why not? (4) If performed and they supported the LANL conclusions, what steps does NRC plan to reduce the higher risks associated with unwanted and orphan sources and the sale and re-sale of sources? (5) What other activities were found to be at highest risk?

**2. The Committee should seek additional information to determine if the funding levels needed by the family of federal agencies that participate in maintaining the OSRP are adequate. (See also item 6 in question 2 above).** This information should be inclusive of funding research needed to determine the physical/chemical forms of radioactive materials that could pose a similar threat to those listed in the *IAEA Code of Conduct*. Moreover, information is needed to assess the necessary funding levels that would allow expansion of the OSRP to accommodate additional sources, their storage and subsequent disposal and maintaining the existing database for tracking these sources.

***Question #4: Your statement to the hearing record points out that excessive costs resulting from the limited disposal options have impeded the use of nuclear technologies that provide significant benefits to society. However, our survey of Health Physics Society members did not uncover any evidence to support this claim. Further, GAO noted that a 2001 National Research Council report concluded that it would take 10 to 20 years before a lack of disposal option might have an adverse effect on biomedical research or medical care.***

- a. *Can you share with us the evidence that the cost of disposal has impeded the use of nuclear technologies and that this has led to adverse effects on society?*

**HPS Response:** In our testimony we stated that although long-term disposal options for Class A wastes are available, lack of competition results in excessively high costs to waste generators. We also stated excessive costs resulting from the limited disposal options have impeded the use of nuclear technologies that provide significant benefits to society. These technologies include those used to diagnose medical illnesses without the need for invasive surgeries, treat cancers, conduct research, develop new kinds of pharmaceuticals, preserve our food supply, and generate over 20 percent of our nation's electricity from commercial nuclear power plants, as noted in the opening remarks of our testimony. We believe that if the price of waste disposal were reduced, more research would be conducted in ways that could lead to new and more innovative/efficient uses of technologies that could vastly improve the quality of life of our society. However, these beneficial technologies (such as those discovered by biomedical research) have been impeded by the high cost of radioactive waste disposal.

We based our position on the following points:

**1. A National Research Council report of 2001<sup>4</sup> strongly supports the main concern raised by the HPS regarding the costs of waste disposal.** The HPS acknowledges that the referenced report published in 2001 by the National Research Council concluded that the disposal capacity at sites regulated by the NRC were sufficient for biomedical needs for the next several decades. However, this report concluded that the central issue in biomedical research is the cost of managing LLRW. While they noted the impacts of LLRW management varied depending on the local demographics and size of the research institution, the National Research Council further concluded that cost was an important issue to virtually all research institutions.

**2. In the public comments submitted to the EPA in response to their Advance Notice of Proposed Rulemaking titled, *Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule*<sup>5</sup>, several stakeholders, including the University of California, the National Institutes of Health, the University of Nebraska, the University of Michigan, the Council on Radionuclides and Radiopharmaceuticals (CORAR), the Health Physics Society, and the State of Nebraska cited examples that support this position.** These comments underscore the economic impacts due to the high costs of waste disposal. In fact, CORAR agreed with EPA's concern that the high cost of waste disposal resulted in less than optimal health care practices. Moreover, they noted that the referenced report by the National Research Council published in 2001 indicated that EPA

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<sup>4</sup> National Research Council report, *The Impact of Low-Level Radioactive Waste Management Policy on Biomedical Research in the United States*, Commission on Life Sciences, the National Academies Press, 2001

<sup>5</sup> Federal Register, Volume 68, Number 222, published on November 18, 2003.

regulations of mixed waste have already caused the elimination of some biomedical research and have increased the cost of research and health care<sup>6</sup>.

The Pharmaceutical Research and Manufacturers of America (PhRMA) stated the pharmaceutical and biotechnology industry invests over \$32 billion annually in discovering and developing new medicines. They also offered strong support encouraging EPA and NRC to work concurrently to allow disposal of low-activity mixed waste (LAMW) and low-activity radioactive waste (LARW) at RCRA Subtitle C and RCRA Subtitle D sites. They provided a comparison of waste disposal costs. This comparison concluded that disposal of radioactive materials at sites other than a LLRW facility was 100-fold less expensive<sup>7</sup>.

The University of Nebraska (U of N) cited similar observations involving the high cost of waste disposal. U of N stated that the disposal costs for a 30-gallon drum of non-scintillation LAMW at an NRC licensed facility was 4450 percent higher than management of a similar non-radioactive waste stream at a RCRA Subtitle C facility.

The University of California (UC) offered comments on behalf of three National Laboratories that it operates for the DOE. UC attested to the fact that the high cost and difficulty of disposing of LAMW discourages those types of research conducted at their facilities. UC has adopted a general policy that no research may be carried out that generates wastes for which there is no disposal route. They also supported EPA efforts to allow more disposal options as a means to alleviate such constraints on their research activities<sup>8</sup>. Several UC campuses and private biomedical research centers are no longer conducting research using large animals or long-lived radioactive materials due to the unavailability of licensed treatment/disposal facilities and/or the high costs for disposal of radioactively contaminated biological waste and mixed waste. The following specific examples were previously provided to the GAO by Cedars-Sinai Medical Center:

*Animal studies at our institution are required to pay the expense of disposal out of their own grant funds. The institution does not cover the cost of this type of disposal.*

- 1. Historically our institution Cardiology research programs have used large animals such as dogs, pigs, etc. These programs have been suspended for years. Experiments utilizing radioactive compounds have proven to be too expensive for grants to pay for the disposal. One animal fills an entire 30-gallon drum.*

*Cardiology research at our institution has generated breakthrough technology such as the Swan-Ganz Catheter.” Drs. Swan and Ganz developed this catheter using large animals and radioactive tracers at our institution.*

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<sup>6</sup> See letter from CORAR to EPA, *Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule*, Comment 6, page 4, dated May 14, 2004.

<sup>7</sup> See letter from PhRMA to EPA, *Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule*, dated May 17, 2004.

<sup>8</sup> See Letter from University of California to EPA, *Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule*, dated May 17, 2004.

*The use of sealed sources to treat the plaque on cardiac vessels was also research that was carried out with members of our cardiology staff.” Over the years, sealed sources from iodine-125, to vanadium, strontium and phosphorous were all explored.*

- 2. Currently our Neuroscience Institute is conducting research on blood brain barrier utilizing rats. For a 200 gm rat only 20 microcuries of tritium or carbon 14 are utilized. The program has had to slow their research production of animals due to the costs of disposal. Each group of 60 rats requires disposal in a 30-gallon drum. Each drum costs approximately \$5,000 for 1.2 millicuries of radioactive waste. Typically, this research generates approximately 60 drums per month.*

*This research on blood brain barrier is to discover a way to directly target and treat life-altering and life-ending brain tumors. These tumors are very resilient and most often recur after surgical resection. When they recur, they are more aggressive than initially presented and a treatment like Radiation Therapy or Gamma knife, etc. has even less efficacy. The life-span of these patients is usually measured in months.”*

*Recently the research program was brought back on track due to the implementation of some very expensive imaging technology. This technology has assisted the program with the reduction of the amount of radioactive materials used per animal experiment.”*

A colleague at Harbor-UCLA Medical Center offered the following amplification on this point. “Research using C-14 and H-3 labeled materials is nearly dead. People are using mass spectrometry techniques with C-13 and H-2 (stable nuclides) instead, even though they are less sensitive and more expensive.”

The State of Nebraska, Nebraska Health and Human Services submitted comments to EPA regarding the economic impacts associated with disposal of waste generated by treatment of drinking water wastes at local municipalities. These wastes, which contain low levels of naturally occurring radioactive materials, are generated by countless water treatment facilities across our country. The State of Nebraska supported the EPA proposed approach to allow use of RCRA facilities for disposal of LAMW and LLRW as a means to reduce the economic burden of waste disposal<sup>9</sup>.

**3. We encourage GAO to investigate the economic impacts that occurred after the Barnwell facility prohibited access to waste generators located outside of the Southeast compact in July 1994.** To assist in your efforts to conduct this investigative research for the Committee, we reference several reports<sup>10</sup> prepared by the Organizations

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<sup>9</sup> See letter from State of Nebraska to EPA, *Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule*, dated May 17, 2004.

<sup>10</sup> Lessons Learned from the Barnwell Closure to 31 States, Reports from 680 Companies and Institutions That Use Radioactive Materials, Report Prepared by the Research Division of the Nuclear Energy Institute for Organizations United, dated January 1996.

United, which provide valuable information regarding the cost impacts that occurred after the closing of the Barnwell facility.

We acknowledge that the situation in July 1994 differs from that of today, due mainly to general access at EOU for disposal of Class A LLRW and with on-site storage of Class B and C LLRW generated by commercial nuclear reactors. However, some of the observations made by the Organizations United may be of value to the GAO, *particularly as it applies to biological tissue waste disposal.*

***Question #5: In the June 2004 GAO report, we indicated that our survey of Health Physics Society members was a nonscientific sample survey of self-selected respondents from a non probability sample of a largely unknown list of people. Obviously, this is a major caveat in our use of the survey results. Nevertheless, we were hopeful that we might at least uncover some evidence of concern from vocal critics of the current disposal system, which we did not.***

***a. In your opinion, why did we not uncover such concern, if in fact it does exist and can be supported?***

**HPS Response:** The manner of soliciting information from the HPS members did not constitute a “survey” of its members. Specifically:

1. The request in the member’s newsletter was inconspicuous except to the most careful readers in that it was a single paragraph placed in the NOTES section, not the NEWS section. In addition, an HPS member from the University of Texas, not the GAO, placed the notice. This notice stated the results would be shared with the GAO but did not give any indication this was being conducted at the request of the GAO.
2. Society leadership had no idea the GAO desired to have its members surveyed and, therefore, there was not an endorsement of the survey request by HPS.
3. The survey was not placed on the “Members Only” area of the HPS Web site where the Society-conducted member surveys normally appear.

Additionally, while many of our members may have direct responsibilities in radioactive waste management, most would likely not be in a position to provide the types of information that would be of assistance to GAO on this topic. Our membership is diverse and focuses on the science and practice of radiation safety. We have approximately 6,000 members who are scientists, physicians, engineers, lawyers, and other professionals representing academia, industry, government, national laboratories, the Department of Defense, and other organizations. Due to this diversity, the number of members in a position to provide the pertinent information, which is more of an organizational than individual issue, is hard to know, but is certainly a relatively small percentage of the total membership.

It should also be noted by GAO that much of the cost information associated with waste disposal is considered proprietary information. As such, waste generators will not provide much of the information pertaining to the cost of waste disposal to third parties, absent the signing of a nondisclosure agreement.

***Question #6: Your statement to the hearing record contains a recommendation that the Senate Committee on Energy and Natural Resources continue to receive information and ideas on how the Low-Level Radioactive Waste Policy Act might be more effectively implemented, or amended or replaced, to improve access to existing facilities and develop new waste disposal options.***

***a. What suggestions does the Health Physics Society have in this regard?***

**HPS Response:** The HPS has the following suggestions for improving access to existing facilities and developing new waste disposal options.

1. The Committee should follow the siting process of the WCS site in Andrews, Texas to determine if congressional action is needed to mitigate significant adverse consequences to generators of Class B and C wastes.
2. The State of South Carolina and the Atlantic Compact should be encouraged to allow continued disposal of Class B and C LLRW from non-compact states after 2008. If the WCS site in Texas is licensed for disposal of LLRW, the State of Texas and the Texas-Vermont Compact Commission should be encouraged to accept LLRW from non-compact states. If access is not provided for disposal of LLRW at state-licensed facilities (e.g., in South Carolina, Utah and Texas), then Congress should authorize disposal of the non-DOE generated orphan LLRW at existing DOE disposal facilities.
3. We believe that use of the WCS site in Texas offers the potential for disposal of Class B and C LLRW should Barnwell prohibit access to its site to non-member states after 2008. It is our understanding that the Texas legislature has the political resolve to assist state government responsible for licensing this facility to completion. Moreover, the local community in areas surrounding Andrews, Texas is firmly supportive of opening this site in large part due the economic benefits that this facility will bring forward. However, use of WCS to non-compact members is contingent upon the Texas Compact shouldering the burden of allowing access to the WCS site for disposal of Class B and C LLRW. For this approach to be successful, bilateral agreements between Texas (as the host state of the Compact) and any one or more of the remaining states, District or Columbia, and Puerto Rico may be needed. Should Texas opt to prohibit access to the WCS site to any non-member state as allowed under the LLWPAA, then Congressional action may be necessary to mitigate significant adverse consequences to generators of Class B and C wastes, as well as the biomedical community for disposal of tissue wastes containing radioactive material.

4. We believe that the information contained in our testimony regarding the potential opportunities that currently exist to increase the number of waste disposal sites should be carefully examined as practical solutions to the high cost of waste disposal in the United States. In addition to emphasizing the impact of high waste disposal cost, we also stated in our testimony that significant opportunities currently exist to increase the number of waste disposal sites to safely dispose of a variety of radioactive and mixed wastes.

5. We also shared information with the Committee regarding new approaches that should be considered for classifying radioactive and hazardous chemical wastes that are commensurate with the risk that these materials pose to human health and the environment. We believe that the current framework, which classifies waste based on its origin and statutory definition, needs to be overhauled. We believe that radioactive and hazardous chemical waste should be classified in accordance with the risk it poses to public health and the environment as noted in NCRP Report 139. We believe that the framework laid out in NCRP Report 139 should replace classifying radioactive waste based on its origins without regard to the risks they present to national security and public health and safety.

6. We strongly support EPA efforts to move forward with a rulemaking to promulgate regulations that would allow disposal of LARW and LAMW at RCRA Subtitle C sites. The regulatory control required under RCRA would provide equivalent levels of protection as those afforded for radioactive waste disposals at sites regulated under 10 CFR Part 61. We strongly encouraged EPA, NRC and State agencies to work closely together to move this rulemaking forward in a coordinated manner.

7. We also offered suggestions that would allow NRC to defer transferring its authority to EPA for LAMW, should EPA elect not to move forward with a rulemaking as noted in the referenced ANPR. This recommendation is not intended to undermine our support of EPA's rulemaking, but offers a workable alternative should EPA elect not to proceed with rulemaking to allow disposal of LARW and LAMW at RCRA Subtitle C sites.

8. We also wish to emphasize that RCRA does not prohibit disposal of radioactive materials at RCRA Subtitle C or D sites. In fact, disposal of low-level radioactive materials have long been safely disposed on a case-by-case basis at RCRA Subtitle C and D sites, as authorized under 10 CFR 20.2002, *Methods for Obtaining Approval of Proposed Disposal Procedures*. While NRC and Agreement States have approved this disposal option, we believe that this alternative should be authorized generically and as part of EPA's contemplated rulemaking.

9. In our testimony, we stated that the Committee should be aware that use of RCRA Subtitle C sites could be authorized by NRC under its rulemaking that would allow "conditional release" of certain levels of radioactivity. We noted that NRC sought comments on this provision under the scope of the rulemaking for *Controlling the Disposition of Solid Materials*. We stated that NRC could authorize such disposals at RCRA Subtitle C sites. The rulemaking that would allow "conditional release" of low levels of radioactive materials would need to be followed by a Memorandum of

Understanding between the two agencies agreeing to defer NRC's authority to EPA under such circumstances. We noted in our testimony that EPA and NRC have successfully used this approach on matters of mutual importance.

10. Our record to the Senate has been clear that we support "unconditional release" of inherently safe sources of radioactivity. In our most recent testimony, we supported NRC's efforts to proceed with such a rulemaking titled *Controlling the Disposition of Solid Materials* that would allow unrestricted use of radioactive sources that would result in an annual effective dose of one millirem. We stated that this level of dose is inherently safe and does not warrant further regulatory controls. We believe that this rulemaking is needed to ensure the unimpeded transport of inherently safe sources of radioactive materials across international boundaries in a manner that is consistent with those used by the European Community.

11. In our testimony, we informed the Senate of a non regulatory approach that would allow disposal of low levels of candidate materials at uranium mill tailings sites regulated under the Uranium Mill Tailing Radiation Control Act (UMTRCA). We referenced efforts that have been taken by the National Mining Association (NMA) and the Fuel Cycle Facility Forum (FCFF) to explore another option that should be considered to ease the nation's low-level waste disposal capacity problem. NRC has existing policy guidance<sup>11</sup> regarding the direct disposal of certain radioactive materials at uranium mill tailings facilities. These facilities normally contain 11e.(2) byproduct material<sup>12</sup>, (also known as "mill tailings") which are wastes generated from the processing of ores principally for their source material content. NMA and FCFF believe that the existing policy that severely restricts non 11e.(2) material from being disposed of in mill tailing piles needs amending. These two groups are proposing that NRC liberalize its criteria for determining what types of non 11e.(2) materials could be appropriately disposed in licensed uranium mill tailings impoundments by developing generic waste acceptance criteria for such materials. This generic waste acceptance criteria would be based on the same safety acceptance criteria as used to demonstrate that 11e.(2) materials (tailings) could be safely disposed in a mill tailings impoundment, and would serve as the basis for disposal of non 11e.(2) candidate waste streams that are chemically, physically, and radiologically similar to 11e.(2) materials, which are covered under UMTRCA.

The current restrictions on disposal of non 11e.(2) byproduct in UMTRCA licensed facilities is another manifestation of waste management based on the origin of the waste and not the relative risk it presents to human health, the environment, or national security. Uranium mill tailings, for example, possess many chemical, physical and radiological similarities to LARW and LAMW generated by a variety of non-uranium milling processes. Yet, despite being virtually identical to 11(e).2 byproduct, differences in origin of LARW and LAMW can result in denial of a vast, under-utilized disposal

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<sup>11</sup> See SECY-99-012 titled, *Use of Uranium Mill Tailings Impoundments for the Disposal of Waste Other Than 11e.(2) Byproduct Material and Reviews of Applications to Process Material Other Than Natural Uranium Ores*, issued April 8, 1999.

<sup>12</sup> So called because it is defined in Section 11(e).2 of the AEA.

resource otherwise available to many licensees throughout the U.S. for non-11(e).2 byproduct materials.

A further advantage to be realized from the liberalization of 11(e).2 disposal in UMTRCA facilities would be creating an alternative disposal outlet for vast quantities of Class A LLRW discussed in Question 1. In decommissioning uranium fuel cycle facilities to levels that will allow unrestricted release under NRC's license termination rule (LTR)<sup>13</sup>, large volumes of LLRW typically containing low-levels of uranium/thorium-bearing materials are generated. The large volumes of wastes generated at these facilities are the result of efforts to comply with the LTR that leads to remediation at levels that are approximately the same concentrations as measured in the natural environment. Since the uranium/thorium-bearing waste streams generated at uranium fuel cycle facilities and many DOE sites are less hazardous than those present in the tailings impoundment, these solid materials would be ideally suited for disposal in UMTRCA facilities.

There are significant advantages to disposing of more types of wastes at UMTRCA facilities. First, by statute, these facilities must be turned over to the government (DOE) for long-term custodial care in perpetuity. In addition, NRC regulations require that all mill tailings must be protected for a period of 200-1,000 years with no active maintenance and only passive controls, providing greater protection than that offered by RCRA and at disposal sites regulated under 10 CFR Part 61. We believe that this alternative fits well within the context of a non-regulatory alternative<sup>14</sup> for disposal of potentially large volumes of decommissioning wastes that are similar in nature and pose less hazard than those wastes presently contained in uranium mill tailing facilities. Therefore, we strongly recommend the 11(e).2 disposal option be explored in greater detail. The existing disposal capacity at a single uranium mill tailings can easily exceed 20-40 million metric tons. We further recommend that the Committee seek additional information regarding the level of funding that may be required in the development of generic waste disposal criteria in order to expedite the classification and disposal of these radioactive wastes based on their risk and not their origin.

12. We recommend the Committee receive information to determine if the LLRWA should be amended to permit commercial development of new waste disposal sites. As such, we present the HPS position statement, "LOW LEVEL RADIOACTIVE WASTE,"<sup>15</sup> which states "*The LLRW Policy Act now unnecessarily restricts access to available disposal sites and impedes open commercial development of additional facilities*" and recommends that "*The orderly, safe, and efficient disposal of radioactive waste can be facilitated by using all available options, including private commercial facilities. In view of these considerations, the LLRW Policy Act should be amended or*

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<sup>13</sup> See 10 CFR 20, Subpart E.

<sup>14</sup> Non-regulatory approaches should be viewed as statutory actions that exist within the scope of an existing framework. Non-regulatory approaches should not be viewed as removal of such wastes from regulatory control or deregulation of LLRW. Moreover, this term was used to specifically address information requested by EPA under its ANPR, titled, *Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule*, dated May 17, 2004.

<sup>15</sup> Position of the Health Physics Society, *Low Level Radioactive Waste*, updated July 1999. <http://hps.org/>

*replaced to allow existing facilities and commercial development to provide access to existing and new waste disposal capacity.” (See also the response to Question #2).*

One such approach would guarantee access to a facility operated by the DOE for disposal of LLRW. We believe that this approach is workable since similar waste streams generated by DOE have been safely dispositioned on federal lands for decades. Given the failure to develop a single new facility for disposal of LLRW since the LLWPA was enacted, the Committee should consider actions that would authorize construction and licensing of a new facility, under the authority of the NRC, on land owned by the Federal government. While private industry has successfully licensed a disposal facility in Clive, Utah, waste disposals are limited only to Class A LLRW. Moreover, states located in the Northwest Compact are prohibited by the Regional Compact to dispose of LLRW. Considering the recent actions by the Utah Legislature banning disposal of Class B and C LLRW, and the prohibition for disposal of sealed sources and radioactive biomedical waste streams, Congressional actions is urgently needed.

We strongly encourage the Committee to consider our recommendations to amend the LLWPA to grant access for disposal of LLRW at either a facility currently operated by DOE or by private industry on land owned by the Federal government.

***Question #7: One of the issues that GAO did not address in its June 2004 report was mixed hazardous and radioactive waste. We have been told that the Envirocare facility is not allowed to accept biological tissue waste, which could pose a problem if Barnwell terminates access to waste generators in 36 states.***

***a. What are the issues with mixed waste disposal and would there be similar orphan waste concerns about these wastes because of the high cost of disposal or future lack of disposal options?***

**HPS Response:** Mixed and biological waste disposal issues do involve high cost. Approaches to these issues are covered by previous responses related to the EPA ANPR initiative and lessons learned from closing Barnwell in 1994.

Since the promulgation of 10 CFR 61 (>20 years ago), untreated radioactively contaminated biological waste has not been disposed of at shallow land burial facilities. Such waste containing either low concentrations of C-14 and H-3, or short-lived radionuclides stored for decay to background radiation levels, have been incinerated. Biomedical research uses of radioactive materials that generated biological waste containing higher concentrations of C-14 and H-3, or many other long-lived radionuclides, are no longer being conducted. The loss of this research tool has unquantifiable detriments to society. It would be very difficult for anyone to assess the value of biotechnology never developed. (Also see response to Questions 1 & 4).

***b. Do these wastes present similar security concerns?***

**HPS Response:** The answer to this would lie in a vulnerability assessment of these wastes, which we believe has not been done. (See item 2 under question 3 above).

**Question #8:** *GAO has found that sealed sources in storage for future use and disused sources in storage at a licensee facility are essentially regulated the same from the standpoint of health, safety and security. In fact, it appears that disused sealed sources and unneeded class B and C radioactive materials are typically not identified as waste by the licensee until they are packaged and ready for shipment to a disposal facility. We have been told that this is a common practice because once identified as “waste,” this material cannot be shipped across state lines unless it is going to disposal. In addition, identifying the material as “waste” alerts inspectors that the licensee is accumulating unused materials at the facility.*

- a. *In your opinion, does it make sense to focus specific attention on the tracking and storage of class B, C and GTCC radioactive waste and why or why not?*

**HPS Response:** The HPS’s position is that there should be a confidential national tracking system for licensed sources. This would include Class B and C LLRW and GTCC sources when generated, whether classified as “waste,” “in storage,” or any other use description. Legislation and regulations should support the tracking of such sources at time of generation without artificial penalties due to how they are named<sup>16</sup>.

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<sup>16</sup> See HPS position statement, *STATE AND FEDERAL ACTION IS NEEDED FOR BETTER CONTROL OF ORPHAN SOURCES*, paragraph 2, bullet 4.