May 1, 2003

Mr. Bob Robinson
Managing Director, Natural Resources and Environment
United States General Accounting Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Robinson:

I would like to thank you for the opportunity to review and submit comments on the draft report, "NUCLEAR NONPROLIFERATION: U.S. and International Assistance Efforts to Control Sealed Radioactive Sources Need Strengthening" (GAO-03-638). The U.S. Nuclear Regulatory Commission (NRC) appreciates the time and effort that you and your staff have taken to review this important topic.

Overall, this report contains a wealth of information, however, it should have focused more on high-risk radioactive sources, rather than on all radioactive sources. It is important to note that the vast majority of radioactive sources in use in the U.S. and abroad are not useful to a terrorist. Additional security measures are not needed for such sources. Too often in the report very large numbers are used, for example, the number of sources lost in a year or the total number of sources in use in the U.S. or in Europe. Although these numbers are accurate, they can be misleading without the proper context.

The NRC, Department of Energy (DOE), and the International Atomic Energy Agency (IAEA) all recognize the need to focus security efforts on the sources of highest risk, those that would be most useful to a terrorist. In this regard, the NRC and DOE have recently identified the handful of radionuclides that are of greatest concern for potential misuse by terrorists and have identified action levels (activity thresholds) for these radionuclides. The NRC and DOE intend to apply additional security measures, such as national inventory controls and export/import controls, to those high-risk sources above the action thresholds. The NRC and DOE also continue to work aggressively with the IAEA in finalizing the IAEA's revised Code of Conduct on Safety and Security of Radioactive Sources and revised Categorization of Sources (TECDOC-1344). The Commission believes that Category I and Category II sources need to be the focus of additional security measures internationally. The report should make it clear that very few of the sources which are lost or stolen in the U.S. are high-risk sources. A large majority of those reported lost or stolen involve small or short-lived radioactive sources which are not useful as a radiological dispersal device (RDD). In the U.S., only one high-risk source has been lost and not recovered in the last 5 years. However, this source (Iridium-192) would no longer be considered a high-risk source because much of the radioactivity has decayed away since it was reported stolen in 1999. In fact, the combined total of all unrecovered sources over a 5-year time span would barely reach the NRC/DOE threshold for one high-risk radioactive source.

We believe that the report should also note that NRC is continuing to move ahead with activities to increase the security of high-risk radioactive sources. For example, on March 17, 2003, as part of Operation Liberty Shield the NRC, with full coordination with the Department of Homeland Security, the Homeland Security Council, and other agencies, sent an advisory to all NRC and Agreement State licensees who were authorized to possess radionuclides of concern above the action levels. This advisory contained additional security measures which these licensees should implement to further protect the high-risk material at their facilities. NRC will soon issue an Order to large panoramic irradiators requiring additional security measures at those facilities. The NRC and Department of Transportation are working together to develop security measures for the transportation of large quantities of radioactive material and**,** as mentioned above, the NRC and the DOE are working in conjunction with the IAEA to finalize the Code of Conduct and Categorization of Sources documents.

We would also like to note that the report is written retrospectively, and although the recommendations presumably apply to future actions, there is no reference to the need for coordination with the Department of Homeland Security regarding future international activities. We believe that such coordination is important and recommend that the GAO consider integrating this into the report section on Recommendations for Executive Action. The enclosure provides additional specific comments on areas of the report we feel should receive clarification.

Should you have any questions or about the NRC's comments, please contact either Mr. William Dean, at (301) 415-1703, or Ms. Melinda Malloy, at (301) 415-1785, of my staff.

Sincerely,

/RA/

William D. Travers
Executive Director
for Operations

Enclosure: Specific Comments on Draft Report GAO-03-638

cc: Glen Levis, GAO

SPECIFIC COMMENTS ON DRAFT REPORT GAO-03-638

The NRC staff suggests that the following changes be included into the report for factual accuracy and/or clarification:

1. The Highlights page, 3rd paragraph under "What GAO Found," indicates that the Department of Energy (DOE) has not coordinated its efforts to improve controls over sealed sources with NRC and the Department of State (DOS). The DOE has begun coordination, so we recommend revising the 4th sentence to read: "However, the department ~~**has not coordinated**~~ **is only beginning to coordinate** its efforts with NRC..."

2. Pages 4-5 under "Results in Brief" and Page 35 (1st full paragraph) under "DOE Efforts Have Not Been Well Planned and Coordinated With Other U.S. Agencies"

   The draft report states that the DOE did not adequately consult with the NRC and the DOS in its international source security and control efforts. While the report indicates why the NRC and DOS officials stated their input was necessary, the report does not provide discussion of the scope of the concerns expressed. For example, the basis for the conclusion near the top of page 5 and in the middle of page 35 that "DOE has not systematically undertaken the kind of comprehensive planning that would foster better coordination with the other agencies..." is not clear, nor is it clear whether this conclusion is a GAO finding or is being attributed to the NRC and/or the DOS. We recommend that the report include clarification in this area to avoid the potential for misinterpretation of the concerns, which could be counterproductive to increasing the cooperation between the agencies.

3. On pages 4-5, the sentence starting at the end of page 4 lists activities NRC and the Department of State (DOS) believe the DOE needs to do to ensure a comprehensive government-wide strategy to secure sealed sources. We recommend an addition to this list of activities as follows:

   "In their view, DOE needs their input to ensure that a comprehensive governmentwide strategy is taken to, among other things, leverage program resources, maximize available expertise, ~~**and**~~ avoid possible duplication of effort**, and assure long-term success**."

4. Page 6, Background

   - We suggest clarifying the 2nd sentence by revising it to read: "The greater the activity level...the more radiation emitted, which increases the potential risk to public health and safety **if improperly used or controlled**."

   - We suggest revising the 3rdth sentence to read: "~~**Radioactive materials never stop emitting radiation, but their**~~ **The** intensity **of radioactive materials** decays over time at various rates."

Enclosure

- 2nd paragraph, suggest clarifying the 2nd sentence by revising it to read: "Because of the varied characteristics of the radioactive material—physical structure..., activity level, half-life, and type of ~~**particle**~~ **radiation** emitted~~**;—**~~some materials pose a greater risk to people, property, and the environment than others **if improperly used or controlled**."

- 2nd paragraph, suggest modifying the last two sentences to read:

  > "For example, radioactive materials used for certain medical diagnostic purposes...do not present a~~**n obvious**~~ **significant** safety and security ~~**threat**~~ **risk**. However, powerful sealed sources, such as those used in radiotherapy...that use cobalt-60 or ~~**strontium-90**~~ **iridium-192**, could pose a greater ~~**threat**~~ **risk** to the public and the environment and would also pose a potentially more significant security ~~**threat**~~ **risk**, particularly if acquired for the purpose of producing a dirty bomb **or RED**."

  We believe that the use of the term "risk," in lieu of "threat," is more appropriate in this discussion. Also we are not aware of any applications of large/powerful strontium-90 sources for cancer treatment. These sources are generally limited to use in a Radioisotope Thermal Generators. The primary powerful sources used in cancer treatment are cobalt-60 and iridium-192, and to a lesser extent cesium-137. Cesium-137 use in cancer treatment declined significantly after the Goiania, Brazil accident.

5. Section entitled "The Number of Sealed Sources in Use and Lost, Stolen, or Abandoned Worldwide Is Unknown," under "The Number of Sealed Sources Worldwide Is Unknown Because Countries Do Not Systematically Account For Them"

   - Page 7, 1st sentence should be clarified by inserting "worldwide" as follows: "The precise number of sealed sources that are in **worldwide** use today is unknown..."

   - Page 8, 1st paragraph, 3rd sentence should be clarified as follows: "For example, approximately 2 million **licensed** sealed sources **containing AEA material** are in use in the United States, according to the Nuclear Regulatory Commission (NRC)."

   - Page 8, Table 1, "Regional Distribution of Sealed Sources in Countries Responding to GAO Survey on Security of Radioactive Sealed Sources," does not include cobalt-60. There are about 2000 teletherapy machines containing cobalt-60 around the world, with about 300 in the U.S. Furthermore, large panoramic irradiators use Cobalt-60 at levels in the order of a million curies. Americium-241 sources used in smoke detectors generally contain only about one microcurie. Collectively, cobalt-60 and cesium-137 are the most significant isotopes in sealed sources. We recommend that Table 1 be revised to include this information.

   - Pages 9-10, the last sentence beginning on page 9 should be clarified as follows: "This means that sources may be exported without the filing of an application **with the government** or the issuance of a specific license,..."

- On page 11, 1st full paragraph, there is reference to "dangerous sources" in the description of GAO's discussions with IAEA officials to characterize the security risk of the sealed sources IAEA provided to developing member states since 1996. It is not clear whether GAO's intent is to use this phrase as defined in the revised draft of the IAEA categorization of sources. If not, we suggest the use of alternative wording to avoid potential reader confusion.

6. Section entitled "The Number of Sealed Sources in Use and Lost, Stolen, or Abandoned Worldwide Is Unknown," under "Limited Information Exists about the Number of Lost, Stolen, or Abandoned Sealed Sources

   On page 12, the last paragraph lists number of sources which are considered lost in the European Union (EU) and in the U.S. We would like to point out that the EU definition of a source for tracking is at a substantially higher threshold of activity than in the U.S., therefore, the number of sources considered as lost or orphaned in the EU cannot be compared directly with the U.S. numbers. In addition, the value reported for the U.S. includes stolen sources, whereas the EU values are indicated to only include lost sources. These distinctions may not be noticed by readers unfamiliar with the subtle differences. We recommend that the values be put into appropriate context so as to avoid possible misinterpretation of the information by the reader.

   The report states on pages 2 and 12 that the number of lost and stolen sources in the U.S. is 375 each year, which we believe is not representative of recent data. The NRC assesses the number of losses of control of licensed material each year against its performance goal, which for Fiscal Year 2002 was no more than 300 such losses (for both sealed and unsealed radioactive materials). Data for the last 4 years indicates that between 244-266 such losses have occurred each year. In addition, we suggest that the statement about how many sealed sources or devices are lost or stolen in the U.S. each year be followed with information about recovery.

7. Page 15, Table 3, Estimated Number of Radiothermal Generators in the Former Soviet Union: Armenia should be added to the list of countries of the former Soviet Union.

8. On page 31, the 1st full paragraph describes various NRC activities to strengthen other countries' controls over sealed sources. We recommend that a penultimate statement be added at the end of this paragraph as follows: "**NRC, together with DOE, is considering several proposals made in March 2003 by the Russian regulator**."

9. On page 35, the 2nd sentence of the 1st full paragraph lists activities NRC and the DOS believe the DOE needs to do to ensure a comprehensive government-wide strategy to secure sealed sources. We recommend an addition to this list of activities as follows:

   "These officials told us that DOE needs their input to ensure that a comprehensive governmentwide strategy is taken to, among other things, leverage program resources, maximize available expertise, ~~**and**~~ avoid possible duplication of effort**, and assure long-term success**."

10. On page 36, 1st full paragraph discusses non-DOE agency officials' opinions about the DOE's approach to physical security upgrades for sealed sources in host countries. We suggest revising the last sentence to read: "These officials also said that a coordinated, targeted effort to identify and secure the most vulnerable and high-risk sealed sources...would **significantly** improve the safety and security of sealed sources."

11. On page 55, 2nd paragraph, the quantity of radium-226 that was reported in a car in Estonia could not possibly be correct. Other reported quantities in the other event reports should be checked to verify that they are accurate.

12. Appendix VII, The Nuclear Regulatory Commission's Policy on Exports of Sealed Sources

- On page 71, the 1st sentence should be clarified by revising it as follows: "In most cases, the...NRC...grants a general license for the export of sealed sources **containing byproduct material** to all countries except..."

- On page 71, 1st paragraph, we note that the list omits Iraq. (We understand that there are Administration efforts to remove Iraq from the proscribed list, but currently, Iraq is still on it).

- On page 71, the 4th sentence discusses reasons for which NRC has placed most sealed sources for export under a general license. This discussion should recognize that within U.S. territory, safe use and control of radioactive materials may be under the regulatory oversight of Agreement States. This may be accomplished, for example, by revising the sentence as follows:

  > "NRC has placed most sealed sources for export under a general license for several reasons, including the following: (1) subject to NRC **or Agreement State** regulatory oversight, the United States is only responsible for ensuring the safe use and control of radioactive materials within U.S. territory;..."

- On page 71, the 2nd paragraph discusses what is required of NRC officials with respect to maintenance of a database of exports of sealed sources. We suggest that the first sentence be modified to discuss "exports of concern" in lieu of "exports of *high security* concern."

- On page 72, the 1st paragraph discusses that there have been thousands of exports from the U.S. of material in forms or quantities that pose minimal safety or health risks. We suggest that you add a clarification to the end of the 2nd sentence as follows: "...there have been thousands of...exports, most of which...pose minimal safety or health risks **if properly used and controlled**."

- On page 73, 1st full sentence, please indicate that the changes under consideration are expected to be implemented first in fiscal year 2004, in lieu of fiscal year 2003.

- On page 73, we suggest you insert the following just prior to the last sentence: "**The United States is coordinating these controls with other exporting nations to ensure consistent, adequate controls.**"

- On page 73, addition of the following sentence at the end of the paragraph would bring the information up to date: "**In conjunction with the increase of the National Threat Level to Orange in March 2003, the NRC issued a security advisory to licensees concerning certain quantities of certain radionuclides of concern (high-risk sources), which included exports and imports.**"

13. Page 77-78, Appendix IX, Information on IAEA's Revised Categorization of Radioactive Sources. It is not clear what are the basis and/or criteria for statements about the potential for Category 1 and Category 2 sources to contaminate a public water supply "to dangerous levels." If such information is available from IAEA's draft document, we suggest that an explanation be included in this report appendix to provide context for the definitions of the categories.