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NUCLEAR SECURITY

Actions Taken by NRC to Strengthen Its Licensing Process for Sealed Radioactive Sources Are Not Effective

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Highlights

Highlights of [GAO-07-1038T](#), a testimony before the Permanent Subcommittee on Investigations, Committee on Homeland Security and Governmental Affairs, U.S. Senate

Why GAO Did This Study

The Nuclear Regulatory Commission (NRC) regulates domestic medical, industrial, and research uses of sealed radioactive sources. Organizations or individuals attempting to purchase a sealed source must apply for a license and gain the approval of either NRC or an “agreement state.” To become an agreement state, a state must demonstrate to NRC that its regulatory program is compatible with NRC regulations and is effective in protecting public health and safety. NRC then transfers portions of its authority to the agreement state.

In 2003, GAO reported that weaknesses in NRC’s licensing program could allow terrorists to obtain radioactive materials. NRC took some steps to respond to the GAO report, including issuing guidance to license examiners. To determine whether NRC actions to address GAO recommendations were sufficient, the Subcommittee asked GAO to test the licensing program using covert investigative methods.

What GAO Recommends

GAO recommends that NRC develop improved screening criteria to evaluate new license applications, conduct periodic reviews of license examiners to ensure the criteria are properly applied, and explore options to prevent license counterfeiting.

www.gao.gov/cgi-bin/getrpt?GAO-07-1038T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gregory D. Kutz at (202) 512-7455 or kutzg@gao.gov or Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

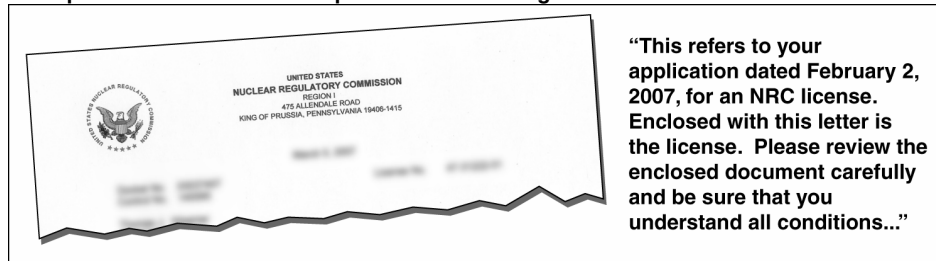
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What GAO Found

By using the name of a bogus business that existed only on paper, GAO investigators were able to obtain a genuine radioactive materials license from NRC. Aside from traveling to a non-agreement state to pick up and send mail, GAO investigators did not need to leave their office in Washington, D.C., to obtain the license from NRC. Further, other than obtaining radiation safety officer training, investigators gathered all the information they needed for the license from the NRC Web site.

Excerpt from NRC License Acceptance Letter for Bogus Business



Source: GAO.

After obtaining a license from NRC, GAO investigators altered the license so it appeared that the bogus company could purchase an unrestricted quantity of radioactive sealed sources rather than the maximum listed on the approved license. GAO then sought to purchase, from two U.S. suppliers, machines containing sealed radioactive material. Letters of intent to purchase, which included the altered NRC license as an attachment, were accepted by the two suppliers. These suppliers gave GAO price quotes and commitments to ship the machines containing radioactive materials. The amount of radioactive material we could have acquired from these two suppliers was sufficient to reach the International Atomic Energy Agency’s (IAEA) definition of category 3. According to IAEA, category 3 sources are dangerous if not safely managed or securely protected. Importantly, with patience and the proper financial resources, we could have accumulated substantially more radioactive source material.

GAO also attempted to obtain a license from an agreement state, but withdrew the application after state license examiners indicated they would visit the bogus company office before granting the license. An official with the licensing program told GAO that conducting a site visit is a standard required procedure before radioactive materials license applications are approved in that state.

As a result of this investigation, NRC suspended its licensing program until it could determine what corrective actions were necessary to resolve the weaknesses GAO identified. On June 12, 2007, NRC issued supplemental interim guidance with additional screening criteria. These criteria are intended to help a license examiner determine whether a site visit or face-to-face meeting with new license applicants is required.

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to discuss our covert testing of the Nuclear Regulatory Commission's (NRC) licensing process for sealed radioactive sources. Under the Atomic Energy Act of 1954, NRC regulates domestic medical, industrial, and research uses of sealed radioactive sources through a combination of regulatory requirements, licensing, inspection, and enforcement. Organizations or individuals attempting to purchase a sealed source must apply for a license and gain the approval of either NRC or an "agreement state." To become an agreement state, a state must first demonstrate to NRC that its regulatory program is compatible with NRC regulations and is effective in protecting public health and safety. Through an agreement between NRC and the state governor, NRC then transfers portions of its regulatory and licensing authority to the state. According to NRC, there are approximately 22,000 licenses in the United States—NRC administers about 4,400 licenses, and the rest are administered by regulatory authorities in the 34 agreement states.

Given that terrorists have expressed an interest in obtaining nuclear material, the Congress and the American people expect licensing programs for these materials to be secure. However, in 2003, we reported that weaknesses in the licensing program could allow terrorists to obtain radioactive materials. We recommended that NRC close this vulnerability by modifying its licensing process.¹ Among other things, we recommended that "NRC modify its process for issuing specific licenses to ensure that sealed radioactive sources cannot be purchased before NRC's verification—through inspection or other means—that the materials will be used as intended." NRC agreed with this recommendation and referred the issue to a working group composed of NRC and state representatives to coordinate NRC's response. In December 2005, the working group delivered its recommendations to NRC senior management. In December 2006, NRC issued new guidance to agreement states and NRC regional offices meant to strengthen the radioactive materials licensing process.² Although these are important steps forward, the Subcommittee remained concerned about whether, almost 6 years after September 11, 2001,

¹GAO, *Nuclear Security: Federal and State Action Needed to Improve Security of Sealed Radioactive Sources*, [GAO-03-804](#) (Washington, D.C.: Aug. 6, 2003).

²The guidance was also sent to officials in New Jersey, Pennsylvania, and Virginia—states that are not yet agreement states but have filed statements of intent with NRC to achieve agreement state status.

terrorists could still exploit weaknesses in the government's licensing process and obtain radioactive material. To determine whether NRC actions to address our 2003 recommendations were sufficient, the Subcommittee asked us to use covert investigative methods to test the licensing program.

To perform this investigation, we incorporated two bogus businesses—one in a non-agreement state and one in an agreement state. We selected these two states based on their proximity to the Washington, D.C., metro area. Using the names of the bogus businesses, we then prepared and submitted one application for a byproduct materials license to NRC and a second application to the department of the environment of the agreement state. In creating these applications, we only used publicly available information. Our investigators did not actually purchase radioactive materials for several reasons—first, the primary intent of our work was to test the licensing process rather than the purchasing process; second, we did not think the cost borne by the government would be necessary to prove the point of our work; and third, we did not have the proper facilities to safely store the radioactive materials. In performing research for this work, we reviewed our previous reports on nuclear security and learned about the licensing process from NRC's Web site. We altered the license we received from NRC, which enabled us to obtain agreements to purchase more radioactive material than the original license permitted. We conducted our investigative work from October 2006 through June 2007 in accordance with standards prescribed by the President's Council on Integrity and Efficiency.

In summary, we found the following:

- The license application we submitted to NRC was approved. We received a license in the mail from NRC about 4 weeks after submitting the application. Aside from traveling to a non-agreement state to pick up and send mail, our investigators did not need to leave their office in Washington, D.C., to obtain the license from NRC. Further, other than obtaining radiation safety officer training, investigators gathered all the information they needed for the license from the NRC Web site.
- After obtaining a license from NRC, we sought to purchase, from two U.S. suppliers, machines containing sealed radioactive material. Our letters of intent to purchase, which included an altered version of the NRC license as an attachment, were accepted by the suppliers. These suppliers gave us price quotes and commitments to ship the machines containing radioactive materials. The amount of radioactive material

we could have acquired from these two suppliers was sufficient to reach the International Atomic Energy Agency's (IAEA) definition of category 3. According to IAEA, category 3 sources are dangerous if not safely managed or securely protected and "could cause permanent injury to a person who handled them, or was otherwise in contact with them, for some hours. It could possibly—although it is unlikely—be fatal to be close to this amount of unshielded radioactive material for a period of days to weeks."³ Importantly, with patience and the proper financial resources, we could have accumulated from other suppliers substantially more radioactive source material than what the two suppliers initially agreed to ship to us.

- We withdrew our second application from the agreement state department of the environment after license examiners indicated they would visit our company office before granting the license. Since we did not have a company office or the proper storage equipment, we asked the state to withdraw our application to obtain a license in this state. According to an official with the licensing program for this state, the completion of a site visit is a standard procedure before the state department of the environment approves a radioactive materials license application.

Background

Since the September 11, 2001, terrorist attacks there has been concern that certain radioactive material could be used in the construction of a radiological dispersion device (RDD). An RDD disperses radioactive material over a particular target area, which could be accomplished using explosives or by other means.⁴ The major purpose of an RDD would be to create terror and disruption, not death or destruction. Depending on the type, form, amount, and concentration of radioactive material used, direct radiation exposure from an RDD could cause health effects to individuals in proximity to the material for an extended time; for those exposed for shorter periods and at lower levels, it could potentially increase the long-

³International Atomic Energy Agency, *Code of Conduct on the Safety and Security of Radioactive Sources* (Vienna, Austria: 2004).

⁴According to NRC, a dirty bomb is one type of RDD that combines a conventional explosive, such as dynamite, with radioactive material. The terms dirty bomb and RDD are often used interchangeably in the media. Most RDDs would not release enough radiation to kill people or cause severe illness—the conventional explosive itself could be more harmful to individuals than the radioactive material. However, depending on the scenario, an RDD explosion could create fear and panic, contaminate property, and require potentially costly cleanup.

term risks of cancer. In addition, the evacuation and cleanup of contaminated areas after dispersal could lead to panic and serious economic costs on the affected population. In 2003, a joint NRC/Department of Energy (DOE) interagency working group identified several radioactive materials (including Americium-241 and Cesium-137) as materials at higher risk of being used in an RDD, describing these as “materials of greatest concern.”⁵

In its risk-based approach to securing radioactive sources, NRC has made a commitment to work toward implementing the provisions of IAEA’s Code of Conduct. This document provides a framework that categorizes the relative risk associated with radioactive sources.⁶ While NRC has recently focused on upgrading its capacity to track, monitor, and secure category 1 and 2 sources, which are considered high risk, category 3 sources are not a primary focus of NRC regulatory efforts. Category 3 sources include byproduct material, which is radioactive material generated by a nuclear reactor, and can be found in equipment that has medical, academic, and industrial applications. For example, a standard type of moisture gauge used by many construction companies contains small amounts of Americium-241 and Cesium-137. According to NRC, it would take 16 curies of Americium-241 to constitute a high-risk category 2 quantity, and 1.6 curies of Americium-241 is considered a category 3 quantity.

Results of Investigation

In October and November 2006, using fictitious names, our investigators created two bogus companies—one in an agreement state and one in a non-agreement state. After the bogus businesses were incorporated, our investigators prepared and submitted applications for a byproduct materials license to both NRC and the department of the environment for the selected agreement state. The applications, mailed in February 2007,

⁵The DOE/NRC Interagency Working Group on Radiological Dispersal Devices, *Radiological Dispersal Devices: An Initial Study to Identify Radioactive Materials of Greatest Concern and Approaches to Their Tracking, Tagging, and Disposition* (Washington, D.C.: 2003).

⁶NRC has endorsed the IAEA *Code of Conduct* and is working toward the implementation of its various provisions. On November 8, 2006, NRC issued a rule to require licensees to report information on the manufacture, transfer, receipt, disassembly, and disposal of all category 1 and 2 sources throughout their entire life cycle in the National Source Tracking System (NSTS). NRC’s latest estimate is that the NSTS will be operational in May 2008. NRC told us that it has plans to consider including category 3 sources in the NSTS after the system becomes operational.

were identical except for minor differences resulting from variations in the application forms. Using fictitious identities, one investigator represented himself as the company president in the applications, and another investigator represented himself as the radiation safety officer. The license applications stated that our company intended to purchase machines with sealed radioactive sources.

According to NRC guidance finalized in November 2006 and sent to agreement states in December 2006, both NRC and agreement state license examiners should consider 12 screening criteria to verify that radioactive materials will be used as intended by a new applicant.⁷ For example, one criterion suggests that the license examiner perform an Internet search using common search engines to confirm that an applicant company appears to be a legitimate business that would require a specific license. Another screening technique calls for the license examiner to contact a state agency to confirm that the applicant has been registered as a legitimate business entity in that state. If the examiner believes there is no reason to be suspicious, he or she is not required to take the steps suggested in the screening criteria and may indicate “no” or “not applicable” for each criteria. If the license examiner takes additional steps to evaluate a criterion, he or she should indicate what publicly available information was considered. If there is concern for a potential security risk, the guidance instructs license examiners to note the basis for that concern.

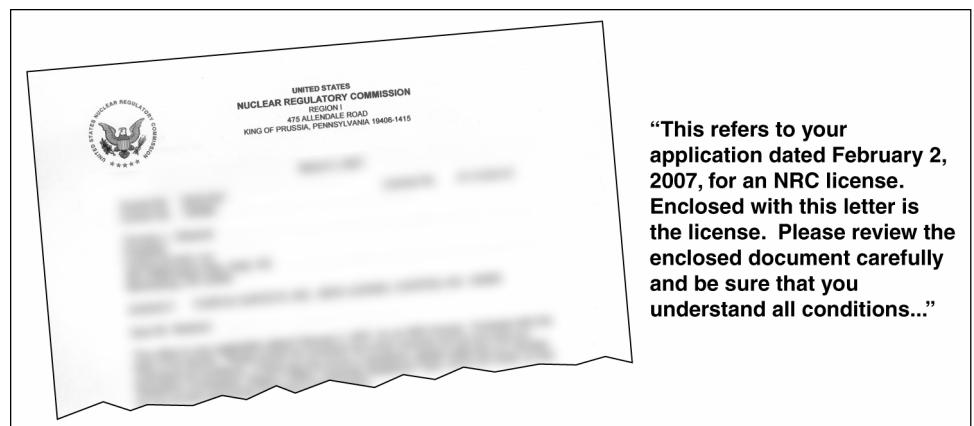
Application to NRC

Nine days after mailing their application form to NRC, our investigators received a call from an NRC license examiner. The NRC license examiner stated that the application was deficient in some areas and explained the necessary corrections. For example, the license examiner asked our investigators to certify that the machines containing sealed radioactive source material, which are typically used at construction sites, would be returned to the company office before being transported to a new construction site. The license examiner explained that this was a standard security precaution. Even though we did not have a company office or a construction site, our investigators nevertheless certified their intent to bring the machines back to their office before sending them to a new location. They made this certification via a letter faxed to NRC. Four days

⁷Nuclear Regulatory Commission, *Checklist to Ensure that Radioactive Materials Will Be Used As Intended*, NUREG-1556, Vol. 20, C (Washington, D.C.: Nov. 2006).

after our final correction to the license application, NRC approved our application and mailed the license to the bogus business in the non-agreement state. It took a total of 4 weeks to obtain the license. See figure 1 for the first page of the transmittal letter we received from NRC with our license.

Figure 1: Excerpt from NRC License Acceptance Letter for Bogus Business



Source: GAO.

The NRC license is printed on standard 8-1/2 x 11 inch paper and contains a color NRC seal for a watermark. It does not appear to have any features that would prevent physical counterfeiting. We therefore concluded that we could alter the license without raising the suspicion of a supplier. We altered the license so that it appeared our bogus company could purchase an unrestricted quantity of sealed source materials rather than the small amounts of Americium-241 and Cesium-137 listed on the original license. We determined the proper language for the license by reviewing publicly available information.

Next, we contacted two U.S. suppliers of the machines specified in our license. We requested price quotes and faxed the altered license to the suppliers as proof that we were certified to purchase the machines. Both suppliers offered to sell us the machines and provided us price quotes. One of these suppliers offered to provide twice as many machines as we requested and offered a discount for volume purchases. In a later telephone call to one of the suppliers, a representative of the supplier told us that his company does not check with NRC to confirm the terms listed on the licenses that potential customers fax them. He said that his company checks to see whether a copy of the front page of the license is faxed with the intent to purchase and whether the requested order

exceeds the maximum allowable quantity a licensee is allowed to possess at any one time.

Although we had no legitimate use for the machines, our investigators received, within days of obtaining a license from NRC, price quotes and terms of payment that would have allowed us to purchase numerous machines containing sealed radioactive source materials. These purchases would have substantially exceeded the limit that NRC approved for our bogus company. If these radioactive materials were unsealed and aggregated together, the machines would yield an amount of Americium-241 that exceeds the threshold for category 3 materials.

As discussed previously, according to IAEA, category 3 sources are dangerous if not safely managed or securely protected and “could cause permanent injury to a person who handled them, or was otherwise in contact with them, for some hours. It could possibly—although it is unlikely—be fatal to be close to this amount of unshielded radioactive material for a period of days to weeks.” Importantly, with patience and the proper financial resources, we could have accumulated, from other suppliers, substantially more radioactive source material than what the two suppliers initially agreed to ship to us—potentially enough to reach category 2. According to IAEA, category 2 sources, if not safely managed or securely protected, “could cause permanent injury to a person for a short time (minutes to hours), and it could possibly be fatal to be close to this amount of unshielded material for a period of hours to days.”

Application to the Agreement State

Ten days after mailing their application form to the agreement state’s department of environment, our investigators received a call from a department license examiner. The license examiner stated that the application was deficient in some areas and said that she would send us a letter outlining what additional information the state required before approving the license. The examiner further stated that before the license was granted, she would conduct a site visit to inspect the company office and storage facilities cited in our application. Our investigators subsequently decided not to pursue the license in this state and requested that their application be withdrawn. According to an official in the department of environment for this state, the license examiner followed the required state procedure in requesting a site visit. The official told us that as a matter of long-standing state policy, license examiners in this state conduct site visits and interview company management (especially radiation safety officers) before granting new licenses for radioactive materials. This state policy is more stringent than the guidance NRC

provided agreement states in December 2006. The NRC guidance identified a site visit as one possible screening criterion to use in evaluating a new license application, but, as discussed above, a site visit is not required under the NRC guidance.

Corrective Action Briefing

On June 1, 2007, we contacted NRC and discussed the results of our work. An NRC official indicated that NRC would take immediate action to address the weaknesses we identified. After this meeting, we learned that NRC suspended its licensing program for specific licenses until it could determine what corrective actions were necessary to resolve the weaknesses. NRC also held a teleconference with a majority of the 34 agreement states to discuss our work. On June 12, 2007, NRC issued supplemental interim guidance with additional screening criteria. These criteria are intended to help a license examiner determine whether a site visit or face-to-face meeting with new license applicants is required. NRC told us that it planned to convene a working group to develop improved guidance addressing the weaknesses we identified.

Conclusions and Recommendations for Executive Action

NRC's goal is to provide licenses to only those entities that can demonstrate that they have legitimate uses for radioactive materials. However, our work shows that there continues to be weaknesses in the process NRC uses to approve license applications. In our view, a routine visit by NRC staff to the site of our bogus business would have been enough to reveal our lack of facilities and equipment. Furthermore, if NRC license examiners had conducted even a minimal amount of screening—such as performing common Web searches or making telephone calls to local government or business offices—they would have developed serious doubts about our application. Once we received our license, the ease with which we were able to alter the license and obtain price quotes and commitments to ship from suppliers of radioactive materials is also cause for concern. Accordingly, we are making the following three recommendations to the Chairman of the NRC:

- First, to avoid inadvertently allowing a malevolent individual or group to obtain a license for radioactive materials, NRC should develop improved guidance for examining NRC license applications. In developing improved screening criteria, NRC should consider whether site visits to new licensees should be mandatory. These improved screening criteria will allow NRC to provide reasonable assurance that licenses for radioactive materials will only be issued to those with legitimate uses.

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- Second, NRC should conduct periodic oversight of license application examiners so that NRC will be assured that any new guidance is being appropriately applied.
 - Third, NRC should explore options to prevent individuals from counterfeiting NRC licenses, especially if this allows the purchase of more radioactive materials than they are approved for under the terms of the original license.

Mr. Chairman, this concludes our statement. We would be pleased to answer any questions that you or other Members of the Subcommittee may have at this time.

Contacts and Acknowledgments

For further information about this testimony, please contact Gregory D. Kutz at (202) 512-7455 or kutzg@gao.gov or Gene Aloise at (202) 512-3841 or aloisee@gao.gov. Contacts points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this testimony.

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