UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CHAIRMAN

February 19, 2002

The Honorable Edward J. Markey
United States House of Representatives
Washington, D.C. 20515-2107

Dear Congressman Markey:

I am responding, on behalf of the Commission, to your letter of January 16, 2002, regarding the regulations and requirements used by the Nuclear Regulatory Commission (NRC) to ensure that radioactive materials are properly and legally shipped into the U.S. from abroad. The questions you raise relate to a recent incident involving an international shipment of radioactive material by Federal Express from Sweden to Louisiana.

In responding to the Louisiana incident, we are continuing to work closely with all the involved parties to ensure that issues associated with the incident are safely resolved and to assess what lessons can be learned from this event and what regulatory changes may be necessary. Moreover, transportation is one of the elements included in NRC's ongoing post-September 11, 2001, security requirements review. In conducting these reviews and identifying opportunities for improvements, we are coordinating with the Department of Transportation (DOT), U.S. Customs Service, the States, and other responsible agencies.

Our responses to your specific questions regarding these matters are enclosed. If you have further questions, please contact me.

Sincerely,

Richard A. Meserve

Enclosure: Responses to Questions

Responses to Questions

Question 1: Are exporters of radioactive materials seeking to make a shipment to the U.S. required to ensure that the recipient is licensed by the NRC to possess the material being requested? If so, please fully describe how this requirement is met and who at the NRC and/or U.S. Customs ensures that it is being done consistently and accurately. If not, then how do you know that Al Qaeda members, other terrorist organizations, or citizens of hostile foreign nations have not already imported radioactive materials from abroad for use in future terrorist attacks in the U.S.?

Response:

NRC regulations require importers of radioactive material to be licensed, but NRC's regulatory authority does not extend to exporters in foreign countries. Safety standards for the transport of radioactive material from foreign countries are generally governed by requirements compatible with International Atomic Energy Agency (IAEA) requirements. See International Atomic Energy Agency "Regulations for the Safe Transport of Radioactive Material," TS-R-1, 1996 Edition. For large sources, IAEA requirements specify that "...the consignor shall notify the competent authority of each country (DOT for the U.S.) through or into which the consignment is to be transported." Id. at 65. In the aftermath of the September 11, 2001 events, the NRC now receives periodic updates concerning the transport of these large sources. For smaller sources, such as the Iridium-192 source involved in the recent incident in Louisiana, there are no IAEA requirements for notification of the competent authority in recipient countries. The U.S. Customs Service (USCS) verifies license authorizations for some packages, but not for all packages. Because not all incoming packages are screened, it is not possible to rule out unauthorized imports. The need for additional security requirements is being considered as part of NRC's security review.

Question 2: Please describe the process by which packages entering the U.S. are screened for radioactive materials.

Question 2a: Please fully describe the regulations and requirements for ensuring that packages labeled as containing radioactive materials are not leaking radiation.

Response:

For air shipments, the International Civil Aviation Organization (ICAO) Technical Instructions may be applied, as permitted by the U.S. Department of Transportation (DOT) under 49 CFR 171.11. The ICAO requirements are compatible with IAEA requirements for transport of radioactive material and require that before each shipment of any package: (1) compliance with the regulations (including package and vehicle radiation and contamination levels) be ensured; and (2) inspection and/or tests of all closures, valves, and other openings of the containment system be performed (see International Atomic Energy Agency "Regulations for the Safe Transport of Radioactive Material," TS-R-1, ST-1, 1996 Edition at 43, 44). For shipments by water, the International Maritime Organization's (IMO) International Maritime Dangerous Goods Code may be applied, as permitted by DOT under 49 CFR 171.12 (b) and (d). The IMO requirements are also consistent with the IAEA requirements, including those for

package and vehicle radiation and contamination level limits and those for inspection and test of closures.

Domestically, the U.S. Department of Transportation (DOT) regulations establish radiological safety requirements for radioactive material in commerce. Specifically, 49 CFR 173.475, "Quality control requirements prior to each shipment of Class 7 (radioactive materials)," requires that before each shipment of any Class 7 (radioactive) materials package, "the offeror must ensure, by examination or appropriate tests, that -- . . . (i) [e]xternal radiation and contamination levels are within the allowable limits specified in this subchapter." NRC requires its licensees that transport radioactive material subject to 10 CFR Part 71 to comply with 10 CFR 71.87, "Routine determinations," by determining, among other things, that "[e]xternal radiation levels around the package and around the vehicle, if applicable, will not exceed the limits specified in § 71.47 at any time during transportation." NRC also requires its licensees to comply with DOT regulations (see 10 CFR 71.5).

Question 2a - i: the numbers of radiation detectors required at each port of entry to the U.S.

Response:

There are no NRC or DOT requirements for radiation detectors at ports of entry. More than four thousand USCS officers currently use personal radiation detection monitors. USCS has informed the NRC staff that it is in the process of obtaining these monitors for all inspection officers. USCS does operate radiation monitors at some high risk ports of entry, but not for all ports or all packages. In view of the pre-shipment radiation controls described in the response to Question 2a, the NRC and DOT do not have any in transit measurement requirements.

Question 2a - ii: the paperwork and other reporting requirements for cases where a package is found to be leaking (including reporting the incident to the country of origin and/or the shipper of the material.)

Response:

If it is evident or suspected that a package is damaged or leaking, the IAEA regulations (see International Atomic Energy Agency "Regulations for the Safe Transport of Radioactive Material," TS-R-1, ST-1, 1996 Edition at 45) and similar modal or national regulations stipulate that access be immediately restricted and the package surveyed for radiation levels and contamination. Reporting requirements are established by each national authority. DOT regulations in 49 CFR 171.15, "Immediate notice of certain hazardous materials incidents," contain requirements for incident notification, including incidents in which fire, breakage, spillage, or suspected contamination occurs involving shipments of radioactive material. Additional DOT requirements in 49 CFR 171.16, "Detailed hazardous materials incident reports," contain requirements on the content and submission of incident reports.

NRC regulations in 10 CFR Part 20 require licensees to immediately notify the final delivery carrier and the NRC Operations Center by telephone when there is removable radioactive surface contamination or external radiation levels exceeding specified limits.

Notification to the country of origin is performed by the "national competent authority." In the U.S., the designated competent authority is DOT.

Question 2a - iii: procedures for handling packages found to be leaking radiation to minimize adverse consequences to public health

Response:

NRC regulations in 10 CFR Part 20, and conforming Agreement State regulations, require licensees to establish, maintain, and retain written procedures for safely opening packages in which radioactive material is received, and to ensure that the procedures are followed and due consideration is given to special instructions for the type of package being opened. The procedures required by 10 CFR Part 20 also include the handling of leaking packages, and requirements for adequate surveys.

When leaking packages are discovered in transit domestically, local and state authorities provide immediate health and safety response to minimize the spread of contamination and reduce elevated dose rates, until the licensee (shipper or receiver) can respond in accordance with their procedures.

Question 2a - iv: the role played by NRC personnel to ensure that these regulations are being followed.

Response:

NRC and Agreement State personnel ensure that regulations pertaining to the transportation of packages containing radioactive material are followed by conducting inspections of licensees to verify that licensees' radiation protection programs have incorporated elements to demonstrate compliance with transportation regulations. In cases where violations of requirements have been identified, NRC's enforcement policy is applied to ensure that licensees take prompt and appropriate corrective actions to avoid recurrence.

Question 2b: Please describe how and when the authorities in Sweden and France (through which the iridium container was transshipped) were notified of this incident by the U.S., what the roles of the NRC Office of International Programs and Department of Transportation was in such notification. Additionally, how, when, and by whom was the International Atomic Energy Agency notified?

Response:

DOT informed the Swedish Radiation Protection Authority (SSI) on January 3, 2002 and DOT informed authorities in France on January 4, 2002. On January 6, 2002, the Swedish Nuclear Power Inspectorate (SKI) rated the event on the International Nuclear Event Scale (INES) and transmitted the report to the International Atomic Energy Agency (IAEA). SKI is the Swedish authority responsible for reporting INES events to IAEA. NRC's Office of International Programs, although monitoring the situation, did not play a role in the notification.

Question 2c: Were all regulations and requirements for ensuring that packages labeled as containing radioactive materials are not leaking radiation followed for the shipment of

radioactive iridium? Please describe which requirements were met and when, and provide copies of all documentation. Please also describe which requirements, if any, were not met, and what penalties will be imposed for failing to meet them.

Response:

The regulatory authorities in Sweden and France will determine whether the appropriate regulations and requirements were followed for the shipment while it was in their respective countries. While in the U.S., the shipment was subject to the regulatory requirements of DOT while in transit, and the regulatory requirements of the State of Louisiana, an NRC Agreement State, when it was picked-up by Source Production and Equipment Company (SPEC), which is licensed by Louisiana. It is our understanding that DOT and Louisiana have not yet determined the violations or penalties for the incident, pending further investigation. The DOT and State of Louisiana, being the responsible regulatory parties, would have the relevant documentation on which requirements were met and when, while the package was in the U.S.

Question 2d: Please fully describe the regulations and requirements for ensuring that packages not labeled as containing radioactive materials are not leaking radiation, including the numbers of radiation detectors required at each port of entry to the U.S., the paperwork and other reporting requirements for cases where a package is found to be leaking, procedures for handling unlabeled packages found to be leaking radiation to minimize adverse consequences to public health, and the role played by NRC personnel to ensure that the regulations are being followed.

Response:

There are no NRC requirements, and we are not aware of other requirements, to check for radiation from packages that are not known to contain radioactive materials or identified (e.g., by labels) as containing radioactive materials. A customs officer's personal radiation detection monitor (see response to Question 2a-i) may identify such packages. As described in the response to Question 2a-iii, at the point of receipt, consignees are required to monitor certain labeled or damaged radioactive materials packages for radiation and contamination levels. Unlabeled radioactive materials packages are limited by DOT regulation 49 CFR 173.403 to quantities deemed not to pose a health and safety risk. In cases where an unlabeled package is discovered to be leaking, the same reporting and event response processes are followed by licensees and NRC as those used when labeled packages are discovered to be leaking.

Question 2e: Is every package entering the U.S. required to be screened using a radiation detector? If not, then how do you know that Al Qaeda members, other terrorist organizations, or citizens of hostile foreign nations have not already imported radioactive materials from abroad for use in future terrorist attacks in the U.S.?

Response:

No, not all packages are currently monitored for radiation. As our response to question 2a-i indicates, the need for additional security requirements is being considered as part of NRC's security review.

Question 3: Please describe how and when the NRC, both in headquarters and in Region IV, learned of the incident, with a specific description of the role of the NRC's Incident Response Center and the U.S. Government's National Response Center in such notification.

Response:

On January 2, 2002, SPEC (the receiver of the package) notified the National Response Center of the discovery of high radiation levels measured on a package containing Ir-192 which was received by the licensee at approximately 3:00 p.m. (CST) on January 2, 2002. NRC Operations Center received notification of this occurrence from the National Response Center at 4:48 p.m. (EST) on January 2, 2002. Immediately after receiving notification, the NRC Operations Center notified the responsible NRC officials in Headquarters and Region IV.

Question 4: It is my understanding that the IAEA designated this incident a Level 3 on the IAEA's International Nuclear Event Scale (INES), which is the most serious nuclear incident classification. What was the basis for making this determination? How many other Level 3 incidents have there been in the U.S.? For each such incident, please fully describe the circumstances.

Response:

The incident received a provisional rating of Level 3 on the INES by SSI and SKI. IAEA subsequently notified member States of the incident by transmitting Sweden's rating of the event. INES is a seven level scale with level 7 representing the most serious accidents. Sweden followed the guidance issued by IAEA. The rating of level 3 was assigned based on the criteria of "no safety provisions remaining" for a package not involved in an accident transporting an activity of material greater than $100A_2$, where A_2 is the maximum nuclide specific radioactive contents allowed in a Type A package when the material is in other than special form. In the past, the NRC has not rated these types of events against the INES criteria.

Question 5: How much radiation exposure was potentially received by personnel along the shipping route and what steps are being taken to determine actual exposure and treatment of exposed individuals?

Response:

The dosimetry badges worn by the two pilots who flew the package from Paris, France, to Memphis, Tennessee, (approximately 11 hours) were processed and indicated that the pilots received 0.75 millisievert (mSv) (75 mrem), and 0.05 mSv (5 mrem) for the 3-month monitoring period. A consultant for Federal Express (FedEx) indicated that these readings were within the range routinely observed for these pilots. Based upon information obtained thus far, including the radiation exposure profile, interviews with workers, and time and motion studies, the consultant to FedEx believes that the maximally exposed individuals were the FedEx package handlers in New Orleans who likely received a dose of no more than 20 mSv (2 rem). The FedEx driver who drove the shipment from Memphis to the FedEx facility in New Orleans is estimated to have received a dose of approximately 5.87 mSv (587 mrem). The SPEC employee that retrieved the package from FedEx in New Orleans is estimated to have received 3.60 mSv (360 mrem). In all cases, the FedEx's consultant believes that no one received

doses up to or exceeding 50 mSv (5 rem) (NRC's occupational annual dose limit). FedEx's consultant continues to assess the event and plans to perform additional dose assessments for individuals throughout FedEx's system.

Question 6: Please describe how the package in question is being handled and processed, including a description of the role of the NRC, foreign entities, and the Source Production and Equipment Company, the receiver of the package.

Response:

The package was maintained in a shielded configuration at SPEC in St. Rose, Louisiana, until it could be opened in a safe and controlled manner. The package was opened on February 7, 2001, under the regulatory oversight of the State of Louisiana, Department of Environmental Quality. Representatives of NRC, DOT, the Swedish shipper, and the Swedish regulator were present when the package was opened. Two shielded caps were observed to be present, but not in the correct position to retain the iridium wafers. Assessment of the event is still underway by the involved regulatory authorities. The Department of Transportation has made plans to send the shipping package to Oak Ridge National Laboratories for evaluation once the package has been released.

France and Sweden are investigating and assessing the incident while the package was in their respective countries. All countries involved continue to coordinate and share information to determine the radiological consequences and the root cause of the incident.