

**DRAFT ENVIRONMENTAL ASSESSMENT  
FOR AN EXEMPTION FROM REQUIREMENT OF 10 CFR 71.5  
FOR THE NATIONAL INSTITUTES OF HEALTH**

**Docket No. 30-08478**

**Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission**

**February 2018**

## 1. INTRODUCTION

On January 19, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17306A532), as supplemented on September 11, 2017 (ADAMS Accession No. ML17306A533), November 1, 2017 (ADAMS Accession No. ML17319A116), and November 15, 2017 (ADAMS Accession No. ML17320A867) the National Institutes of Health (NIH) submitted a request to the U.S. Nuclear Regulatory Commission (NRC), in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 71.12, for exemption from the U. S. Department of Transportation (DOT) regulations incorporated into the NRC transportation requirements in 10 CFR 71.5. This exemption is necessary for NIH to obtain NRC approval, via NIH's specific license, to perform a one-time movement of an irradiator. NIH proposes to move the irradiator in its current configuration (i.e., without disassembling the irradiator) 0.3 miles from one NIH building through an NIH parking lot, across a public road, and through another NIH parking lot to another NIH building. This environmental assessment (EA) is only evaluating the environmental impacts of the exemption.

Since the one-time movement by NIH will be accomplished using a motor vehicle operated by a Federal government employee solely for noncommercial Federal government purposes, according to Title 49 of the *Code of Federal Regulations* (49 CFR) 171.1(d)(5), the activity is not subject to the DOT's hazardous material regulations. However, since NIH holds an NRC license and will be moving licensed material, NIH is subject to 10 CFR 71.5, "Transportation of licensed material."

The regulations in 10 CFR 71.5(a) require an NRC licensee "who transports licensed material outside the site of usage, as specified in the NRC license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport." In addition, 10 CFR 71.5(b) states that "If DOT regulations are not applicable to a shipment of licensed material, the licensee shall conform to the standards and requirements of the DOT specified in paragraph (a) of this section to the same extent as if the shipment or transportation were subject to DOT regulations."

While the exemption would exempt NIH from all DOT regulations incorporated in 10 CFR 71.5, the following regulations would apply to the move and therefore are the ones addressed in this EA: packaging (49 CFR Part 173: Subparts A, B, and I), marking and labeling (49 CFR Part 172: Subpart D; and Subpart E , specifically, 49 CFR 172.400 through 172.407 and 49 CFR 172.436 through 172.441), placarding (49 CFR Part 172: Subpart F, especially 49 CFR 172.500 through 172.519 and 172.556; and appendices B and C), accident reporting (49 CFR Part 171, specifically 49 CFR 171.15 and 171.16), shipping papers and emergency information (49 CFR Part 172: Subparts C and G), hazardous material employee training (49 CFR Part 172: Subpart H), security plans (49 CFR Part 172: Subpart I), hazardous material shipper/carrier registration (49 CFR Part 107: Subpart G), and requirements for transport on a public highway (49 CFR Part 177 and Parts 390 through 397).

The DOT regulations in 49 CFR 173.413 that are included in 10 CFR 71.5 also require the use of a Type B package for shipments of radioactive materials that exceed specified values. Shipments of radioactive materials that do not exceed those values may be made in a Type A package. Because the material that would be moved by NIH would require a Type B package the exemption would apply to that/those regulation[s].

The NRC staff performs both a safety evaluation and an environmental review for any exemption request. The NRC staff will prepare a separate safety evaluation report to document its safety review. The NRC's safety review will evaluate NIH's assessment of the impacts of the exemption requested for this movement to determine whether to authorize the exemption under 10 CFR 71.12.

The environmental review documented in this EA was developed by the NRC staff in accordance with the requirements of 10 CFR 51.21 and 51.30(a). Additionally, development of this EA was coordinated with the development of the safety evaluation report. This EA defines the NRC's proposed action (Section 2); the purpose and need for the proposed action (Section 3); evaluates the potential environmental impacts of the proposed action (Section 4); and considers alternatives to the proposed action (Section 5). Alternatives to the proposed action that are considered in this EA if the exemption is not granted are: movement in accordance with all DOT requirements; utilizing another route that does not cross a public road; and changing the destination of the irradiator.

The NRC's decision whether to grant the exemption will be based on the results of the NRC staff's review as documented in this EA and in the safety evaluation report.

## **2. PROPOSED ACTION**

The proposed action is for the NRC to grant an exemption to NIH from the DOT requirements incorporated into 10 CFR 71.5 to allow a one-time move of an irradiator in its current configuration. The exemption will allow NIH to move the irradiator 0.3 miles from one NIH building through an NIH parking lot, across a public road, and through another NIH parking lot to another NIH building. Except for the requirements in 10 CFR 71.5, NIH will have to follow all other NRC requirements that are applicable to the one-time movement, including security requirements in 10 CFR Part 37.

## **3. PURPOSE AND NEED FOR THE PROPOSED ACTION**

The purpose of the proposed action is to allow NIH to move its irradiator in its existing configuration from one NIH building, across a public road, to another NIH building on its campus that is listed in the license. This would allow NIH to expedite the move from a building in which its lease will expire at the end of 2017.

## **4. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION**

This EA evaluates the potential environmental impacts of granting an exemption from the DOT requirements incorporated in 10 CFR 71.5. The potential impacts from granting the exemption would involve radiological releases resulting from a safety or security incident caused by the exemption. Any non-radiological impacts (direct, indirect, or cumulative)—such as impacts to noise, visual/scenic, or socioeconomic environment—would be no different than those for the one-time movement of the irradiator if it were accomplished in accordance with the DOT regulations.

### **4.1 Irradiator Description**

The irradiator that NIH proposes to move is a Mark – 1 Series self-shielded irradiator used to irradiate biological, horticultural, and chemical samples in a laboratory environment. The

Mark – 1 Series Irradiators consist essentially of an irradiation chamber with a door on the front side; one or two cylindrical sealed source attached to the end of source rod, which can be moved vertically (in the highest position it is located at the back of the irradiation chamber; in the lowest position the irradiation chamber is shielded from the sources) and shielding around the sources and irradiation chamber, including walls and door of the irradiation chamber. If the exemption is granted, the irradiator will be moved as-is with its shielded housing intact and the source rods will be secured in place to prevent the sources from relocating during the one-time movement. Each unit contains more than 5 inches of lead shielding on all sides and is designed so that radiation levels cannot exceed 0.2 mR/h at 1 meter from the surface of the device for each 1,000 curies of Cs-137 installed in the device. The safety evaluation of the device is documented in the Registry of Radioactive Sealed Sources and Devices, No. CA0598D104S.

The irradiator is designed to meet the specifications for a DOT Specification 7A packaging requirements (see 49 CFR 173.350), which means it is designed to retain the integrity of containment and shielding under conditions of normal transport as demonstrated by the Type A packaging tests set forth in 49 CFR 173.465. These tests include a water spray test that simulates exposure to rainfall of 2 inches per hour for 1 hour; a free drop test with a distance of 4 feet; a stacking test which subjects the package to a compressive load equivalent to 5 times the mass of the actual package; and a penetration test directed to the weakest part of the package.

NIH stated that the conditions encountered during the irradiator movement will be bounded by the packaging tests set forth in 49 CFR 173.465. Therefore, they have asserted that the device will retain the integrity of containment and shielding under the conditions of transport outlined in the NIH irradiator relocation plan, submitted with its September 11, 2017, response to NRC's request for additional information.

NIH also provided information which demonstrates that the shielding of the irradiator, as it is currently configured, provides similar protection to that which would be provided if the sources were placed into a Type B package and evaluated for normal conditions of transport, as specified in 10 CFR 71.71. NIH measured the radiation dose rates around the irradiator with the sources in the secured position, as it will be during the one-time movement. The maximum dose rate on contact at the rear base of the housing is <0.1 mrem/hr, which is much less than the dose rate requirement in 10 CFR 71.47(a) of 200 mrem/hr on the external surface of a package for Type B packages. NIH also stated that the sources meet the additional testing requirements in 10 CFR 71.75 for special form sources, thus providing additional assurance that no radiological release would occur in the event of an accident. As defined in 10 CFR Part 71, a special form source is one that is "either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule." The special form source tests required by NRC and DOT regulations (49 CFR 173.469) are designed to ensure, in the event of an accident, the source will not break open, shatter, melt or disperse.

#### 4.2 Environmental Assessment

The requirements in 49 CFR part 172 lists and classifies those materials which the DOT has designated as hazardous materials, and prescribes the requirements for shipping papers, package marking, labeling, transport vehicle placarding, hazardous material employee training, emergency response information, and security planning applicable to the shipment and transportation of those hazardous materials. Radioactive material (Class 7 in DOT

regulations) is just one of the classes of hazardous materials to which these regulations are applicable.

In its [“Radioactive Material Regulations Review,”](#) (also known as the RAMREG), the DOT states that the requirements in 49 CFR Part 172 pertaining to shipments of hazardous material are communication requirements that are designed to complement the basic safety requirements for package activity limits and package integrity. By using items such as shipping papers, package marking, labeling, and vehicle placarding, the appropriate information is communicated between the shipper, carrier, and the consignor, as well as emergency responders in the event of an accident or unanticipated occurrence. This one-time movement of radioactive material will involve movement by a forklift only a short distance on a public road (approximately 60 feet). During the movement, the road will be closed to traffic by the Montgomery County Police Department (MCPD). Given that NIH will be the shipper, carrier, and consignor for this movement, and the MCPD will be present for the shipment, sufficient information will be known by all parties involved about the movement, including first responders. Therefore, during the movement of the irradiator, the absence of shipping papers, package marking, labeling and vehicle placarding would not result in any increased risk of environmental impacts.

The DOT regulations for hazardous material employee training in 49 CFR 172, Subpart H, “Training,” ensure that individuals are provided with a program to familiarize the workers with the general provisions of 49 CFR Part 172; including identification and recognition of hazardous materials; knowledge of specific requirements of 49 CFR Part 172 which are applicable to the workers’ functions; knowledge of emergency response information; self-protection measures; and accident prevention methods and procedures. NIH has said that the workers involved in the movement of the irradiator have attended multiple sessions of a training course on irradiator security emergency response, sponsored by the National Nuclear Security Agency. Additionally, Radiation Safety health physicists have conducted many joint training exercises with MCPD on radiological security using actual radioactive sources. Since the NRC action is to exempt the NIH from the DOT requirements, and the movement will occur with trained health physicists, who are also familiar with the emergency response actions needed for the irradiator, exempting NIH from the DOT training requirements would not result in any increased risk of environmental impacts.

The DOT also imposes mode-specific requirements for transportation of radioactive material on a public highway in 49 CFR part 177 and in the Federal Motor Carrier Safety Administration (FMCSA) requirements on the carrier (49 CFR parts 390 through 397). The requirements in 49 CFR Part 177 impose requirements for compliance with the FMCSA requirements, traveling through tunnels, driver training, shipping papers, movement of vehicles in emergency situations, and specific requirements for radioactive material (Class 7) shipments. The Federal Motor Carrier Safety Administration requirements are not applicable to this movement because the load limit requirements applies to transport of items weighing greater than 10,000 pounds or highway route controlled quantities (as defined in 49 CFR 173.403). The forklift operator will be current in his/her training and will have specific instructions for this movement. Many of the requirements for radioactive materials in 49 CFR 177.842 are not applicable to this movement since there is only a single item being moved and the dose rates are sufficiently low that the movement would not require a “RADIOACTIVE YELLOW-II” or “RADIOACTIVE YELLOW-III” label. NIH has demonstrated that the irradiator will not shift during shipment, once it is secured to the forklift. The remaining requirements in 49 CFR 177.842 are for transport of fissile

material and exclusive use transport, which are not applicable to this movement. Exempting NIH from these requirements in DOT regulations would not increase the risk of an environmental impact.

Absent the exemption, the material in the irradiator would be required to be transported in a Type B package under DOT regulations in 49 CFR Subpart I (§173.416). NIH has proposed moving the irradiator in its existing configuration which, as NIH has demonstrated, provides similar protection to that which would be provided if the sources were placed into a Type B package. NIH has also proposed a number of measures to ensure that the package would not be dropped during the move. These include securing the irradiator to a forklift using two ratchet straps rated at 5,000 lbs each. The NIH evaluation shows that, given the load of the irradiator, the forklift will have a safety factor of 2 for lifting the vertical load, and each of the ratchet straps have a safety factor of 2.5 against failure. NIH evaluated the forklift's load rating in accordance with American National Standards Institute/Industrial Truck Standards Development Foundation B56.1, "Safety Standard for Low Lift and High Lift Trucks." NIH used the U.S. Department of Labor, Occupational Safety and Health Administration guide on "Powered Industrial Trucks (Forklift) Load Composition" to determine that the 10,000 lb forklift is sufficient to lift and move the irradiator.

NIH stated that since the forklift has a load center of 24 inches and the radius of the irradiator is 16 inches, when moving the irradiator, the forklift cannot tip over and the irradiator cannot fall, thus eliminating the need to evaluate impact on the irradiator.

The NIH employee using the forklift will have a valid forklift driver's license and have up-to-date forklift training. Also, in order to minimize the potential for inadvertent activation of the lifting mechanism, once the irradiator is secured and lifted, NIH stated that the lifting actuation mechanism will have caution tape over it and the driver will be specifically instructed not to use it until the forklift is across the public road. The combination of measures listed are sufficient to ensure that risk of an accident is reduced so that the risk to public health will be no greater than if a Type B package is used for the movement.

Absent the exemption, NIH would be required to comply with DOT regulations requiring shipping papers and emergency information in the event of an accident or incident during shipment. These measures are imposed to ensure that emergency responders are notified when appropriate and are able to identify the contents of the package and provide appropriate response for a given shipment of radioactive material. In lieu of those requirements, NIH proposed the following measures to inform emergency responders what is being moved and how to respond. NIH has proposed the following controls during the one-time movement:

- NIH Radiation Safety personnel and armed MCPD Special Operations Division Officers will escort the irradiator with a leading and trailing vehicle during the one-time movement, will maintain constant surveillance, and have direct line-of-sight of the irradiator from the time the irradiator is moved out of the current building until the irradiator is in its destination;
- The irradiator housing will be stamped with a "USA 7A Type A Radioactive Material" marking and a "RADIOACTIVE WHITE-I" label;
- A United Nations Committee of Experts on the Transport of Dangerous Goods (UN) identification number "3332" will be affixed to the irradiator housing during the one-time movement; and

- A transfer document, including emergency response information, will be present during the one-time movement and will be maintained by a MCPD officer. The emergency response information will include Guide number 164 from the 2016 Emergency Response Guidebook, which is for UN3332 material.

These proposed controls are sufficient to ensure that, in the event of an emergency, first responders will have basic information available to aid them as they assess how to respond. Therefore, these measures are sufficient to protect public health in the event of an emergency.

The exemption also would exempt NIH from having a security plan as required by DOT regulations. Imposing security requirements in 10 CFR Part 37 Subpart D requires compliance with requirements for: personnel security, controlled access, and personnel access authorization. NIH has stated that it will meet the appropriate NRC security requirements in 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material," for this shipment. Security during the movement shall be maintained as described in 10 CFR 37.79 "Requirements for physical protection of category 1 and category 2 quantities of radioactive material during shipment." The preplanning requirements in DOT regulations at 49 CFR 172.802(b) and (c) are addressed in 10 CFR 37.75, "Preplanning and coordination of shipment of category 1 or category 2 quantities of radioactive material." The NRC security requirements in 10 CFR Part 37 meet or exceed those in DOT regulations. Therefore, the exemption from the DOT security requirements will not result in any increase to the risk to public health or safety.

For the reasons discussed above, the environmental impacts of exempting NIH from the DOT regulations incorporated in 10 CFR 71.5 for the move of the irradiator will be no greater than if the one-time movement was accomplished in accordance with those regulations. Given the extremely low potential for environmental contamination and the fact that the measured dose rates around the irradiator are well below the maximum dose rates required for package approval in 10 CFR Part 71, the environmental impacts of exempting NIH from DOT regulations, as specified in 10 CFR 71.5, is no greater than if the one-time movement was subject to DOT regulations.

## **5. ALTERNATIVES TO THE PROPOSED ACTION**

The following alternatives to the proposed action were considered: the no-action alternative (i.e., not granting the requested exemption); utilizing another route that does not cross a public road; and changing the destination of the irradiator. These alternatives have been eliminated from further consideration in this EA for reasons discussed below.

### **5.1 No-Action Alternative**

Under the no-action alternative, the NRC would not grant NIH's exemption request and, as a result, the irradiator would have to be transported in accordance with all DOT requirements applicable to the one-time movement. NIH is losing its lease on the building currently housing the irradiator, therefore the irradiator must be moved.

If NIH were to follow all DOT regulations, including placing the irradiator (or sources) in an NRC-approved package, there is no guarantee that the one-time movement could occur prior to the lease being terminated. According to NIH, there is only one Type B package design approved for domestic transport that can accommodate the activity currently in the irradiator and it would

take more than 6 months to secure this Type B package for the move. The Type B container available will not hold this model of irradiator with the in-device delay hardening in place, which means the in-device delay device will have to be removed before the irradiator will fit in the container. In addition to removing the in-device delay hardening, the manufacturer of the irradiator performed a detailed engineering review on the source configuration and determined the existing source configuration is too long to meet this package's operating requirement. In order for the sources to fit into the package, a portable hot cell would need to be brought to NIH to disassemble the current source configuration (remove tungsten shielding on the top section of the sources which permits a safe source transfer operation) to permit shipment in the Type B package. This procedure takes approximately 8 to 10 hours for each operation, which means that this would turn into a 16 to 20 hour operation (and the same amount of time is needed to replace the sources once the irradiator is across the street) with the sources in the public domain in parking lots or adjacent to loading docks for that amount of time. A 16 to 20 hour work day is not sustainable for one crew, so the irradiator manufacturer would have to switch out teams or secure the sources in the public domain overnight.

Given the extremely low potential for environmental contamination and the low dose rates around the irradiator, removing and modifying the sources to fit into a Type B package would cause unnecessary exposure and would not be in accordance with NRC policy of keeping doses as low as reasonably achievable. Therefore, because there are no packages currently available that are of sufficient size to hold the irradiator as assembled, and the sources would have to be modified to fit into a Type B package, this alternative does not meet the purpose and need of the proposed action and thus is not considered further.

## 5.2 Change the Movement Route

There is no paved route between the two buildings that can avoid crossing the public road. It is not feasible to drive the forklift, or any motor vehicle, around the end of the street and over grass to connect to the other side; plus there is a hill and rocky ground at the dead end portion of the street. Since this alternative is not feasible, it is not considered further.

## 5.3 Change the Destination of the Irradiator

The NIH irradiator must be moved to an NIH-controlled building that is specified on its NRC license. Other than the building where it is currently located, the only other authorized building in the vicinity is the building where NIH intends to move and house the irradiator. NIH researchers who will use the irradiator will also be relocated to this building. Since there is no other building on the NIH license to house the irradiator, this alternative is not considered further.

## 5.4 Summary

None of the alternatives are preferable to the proposed action because either the impacts are greater than the proposed action or they do not meet the purpose and need of the proposed action. Therefore, the proposed action is the preferred alternative.

## **6. AGENCIES CONTACTED**

The NRC provided the State of Maryland and the DOT a draft copy of this EA for review. The State of Maryland did not respond and NRC did not receive any comments from the DOT.

The NRC staff has determined that the exemption would have no impact on ecological resources or historic and cultural resources and, therefore, no consultations are necessary under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act, respectively.

## **7. CONCLUSION**

The environmental impacts of the proposed action—an exemption from DOT regulation 49 CFR 173.416, which is incorporated into the NRC transportation requirements in 10 CFR 71.5 for a one-time movement of an irradiator have been reviewed under the requirements in 10 CFR Part 51. In this EA, NRC has determined that the environmental impacts from exempting NIH will be no greater than those for a transport of the irradiator if it were accomplished in accordance with the DOT regulations. The NRC concludes that this exemption will not have a significant effect on the human environment. Accordingly, NRC has determined that a Finding of No Significant Impact (FONSI) is appropriate and an environmental impact statement is not warranted. The NRC will publish the FONSI in the *Federal Register*.