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NUCLEAR ENERGY INSTITUTE

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DEPARTMENT OF TRANSPORTATION  
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**SUBJECT: Petition for Rulemaking - To Rescind the Public Radiation Measurement Requirement in 49 C.F.R. 172.803(b)(2)**

Administrator:

Pursuant to 49 C.F.R. § 106.31, the Nuclear Energy Institute ("NEI")<sup>1</sup> hereby submits a petition for rulemaking on behalf of the nuclear energy industry. NEI's petition requests that the Department of Transportation Research and Special Programs Administration ("RSPA") rescind the Public Radiation Measurement Requirement in 49 C.F.R. §172.803(b)(2).<sup>2</sup> In the alternative NEI requests that the Department of Transportation ("DOT") stay implementation of the Public Radiation Measurement Requirement pending reconsideration of the need for such a regulation, the feasibility of demonstrating compliance with the regulation, and the potential cost and safety implication to the public resulting from the regulation's implementation.

Although NEI recognizes that this regulation is not scheduled to go into effect until October 1, 1997, affected shippers will need to take action several months in advance in order to ensure compliance with the rule by its effective date. For this reason, NEI requests that DOT act expeditiously on this petition.

Before summarizing the bases for NEI's petition, NEI would like to emphasize that it generally supports the Petition for Rulemaking submitted on June 6, 1996, by the

<sup>1</sup> NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

<sup>2</sup> The public radiation measurement was adopted in 1995 (60 Fed. Reg. 50,292).

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Radiopharmaceutical Shippers and Carriers Conference ("RSCC"). That petition, among other things, requests that 49 C.F.R. § 172.803(b) be amended by limiting the application of the public dose rate limit to areas within and adjacent to fixed facilities. As support for this proposed limitation, RSCC states that "the numerous regulations already in existence for transport of radioactive materials . . . are successful in limiting doses to the public" and that "compliance with this regulation [as adopted] cannot be practically demonstrated." RSCC Petition at 3. NEI fully agrees. However, based upon our analysis of RSCC's proposed modifications, NEI has concluded that demonstrating compliance with the Public Radiation Measurement Requirement as amended by the modifications requested by RSCC will be similarly infeasible. Moreover, RSCC's proposed amendment does not address NEI's principal objection to the Public Radiation Measurement Requirement—that a regulation such as this should not be adopted unless it has a sound, technically-based safety justification.

As is evident from the attached petition for rulemaking, we believe that implementation of the new Public Radiation Measurement Requirement undermines the successful regulatory regime currently in place and is likely to have cost impacts not justified by a commensurate increase in safety. The Public Radiation Measurement Requirement would impose a new, lower limit on radiation exposure to members of the general public resulting from transportation activities but assumes an individual climbs on or near a radioactive material transportation package. 49 C.F.R. § 172.803(b)(2) (1995); 60 Fed. Reg. 50,292 (1995). Persons who offer for transportation, accept for transportation, or transport radioactive material will be required to include this new limit in their overall written radiation protection program required under 49 C.F.R. § 172.803. The regulation further requires that if any particular member of the general public actually receives a dose equal to or greater than 2 mrem in one hour, then the overall radiation protection program must provide specific limits that will prevent that same individual from receiving cumulative doses of 100 mrem in any one week or 500 mrem in any 12-month period. Id.

The Public Radiation Measurement Requirement (49 C.F.R. § 172.803(b)(2)) states:

*Radiation exposures to members of the general public must be less than 0.02 mSv (2 mrem) per hour. This level will be measured as if an individual were present for an hour in any area where the general public could be exposed to radiation during the course of transportation, except that, if there is an occurrence where the dose to a member of the general public equals or exceeds 0.02 mSv (2 mrem) in one hour, the program must provide limits that will prevent an individual from receiving cumulative doses totaling 1.0*

*mSv (100 mrem) in any week or 5.0 mSv (500 mrem) in any twelve-month period.*

Although the regulation does not explicitly require the use of measurements, there is no practical way to know when there is an "occurrence where the dose to a member of the general public equals or exceeds 0.02 mSv (2 mrem) in one hour," other than to measure actual radiation exposure to members of the general public. The Public Radiation Measurement Requirement thus requires: first, an evaluation of radiation exposure to a hypothetical member of the general public who climbs as close as possible on or near a transportation package and remains there for one full hour; and second, actual measurements of the radiation exposure imparted to all members of the general public in the local area of a transportation package.

There are four primary bases for NEI's petition seeking rescission of the Public Radiation Measurement Requirement in its entirety. Each of these bases, summarized below, is discussed in detail in the attached petition.

1. Existing regulations governing the transportation of radioactive materials, promulgated and enforced by DOT and the NRC, have been proven to provide an extremely high level of protection to the public. DOT has failed to establish, or even identify, a safety justification to amend the existing regulatory regime through the adoption of the Public Radiation Measurement Requirement.
2. The approach to regulation incorporated in the Public Radiation Measurement Requirement, and the numerical limits contained therein, are inconsistent with the regulations of the NRC and the International Atomic Energy Agency ("IAEA"), and are internally inconsistent with other DOT regulations.
3. Given the characteristics of transportation activities as opposed to those of a fixed facility, it will be extremely difficult, if not infeasible, for shippers and transporters to demonstrate compliance with the Public Radiation Measurement Requirement.
4. Compliance with the new, lower limits of the Public Radiation Measurement Requirement will increase in the number of shipments necessary to transport the same amount of radioactive material, and will therefore increase costs and potentially adversely affect public health and safety.

For these reasons, and as is more fully articulated in the attached petition for rulemaking, we urge RSPA immediately to rescind the Department of Transportation's Public Radiation Measurement Requirement. In the alternative, we request that DOT stay its implementation pending reconsideration of the need

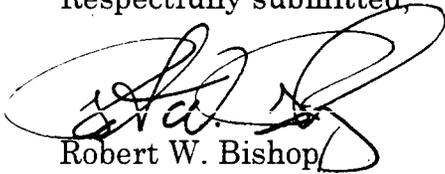
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for such regulations, the feasibility of compliance, and related cost and safety implications. We also reiterate our concern regarding the need for DOT to act expeditiously on the petition in order to provide affected shippers with adequate time to take action necessary to ensure compliance with the rule by its effective date.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "R. W. Bishop", is written over a large, stylized circular flourish.

Robert W. Bishop

**PETITION FOR RULEMAKING TO RESCIND THE DOT PUBLIC  
RADIATION MEASUREMENT REQUIREMENT IN 49 C.F.R § 172.803(b)(2)  
ADOPTED IN 60 FED. REG: 50,292 (1995)**

Submitted by the Nuclear Energy Institute

**I. ISSUE**

Pursuant to 49 C.F.R. § 106.31, the Nuclear Energy Institute ("NEI"), on behalf of its members, requests the U.S. Department of Transportation ("DOT") Research and Special Programs Administration ("RSPA") to rescind 49 C.F.R. § 172.803(b)(2) (referred to hereinafter as "Public Radiation Measurement Requirement") in its entirety. In the alternative, NEI requests that DOT stay implementation of the Public Radiation Measurement Requirement pending reconsideration of the need for such regulations, the feasibility of demonstrating compliance with the regulations, and the related costs and safety implications to the public resulting from the regulation's implementation.

**II. INTEREST OF PETITIONER IN AMENDMENT**

NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

NEI's member organizations depend on stable and consistent regulations to engage in the safe, efficient and economic transportation of radioactive materials. NEI believes that changes to an established successful regulatory regime should be made only on the basis of clear benefits. Certainly changes to regulations should not result in inefficiency, inconsistency or confusion or otherwise negatively impact safety. NEI's member organizations believe the current DOT regulatory regime,<sup>1</sup> (without the newly added Public Radiation Measurement Requirement), together with the U.S. Nuclear Regulatory Commission ("NRC") regulations controlling exposure rates from transportation packages, have successfully protected the public for many years and can continue to successfully protect the public in the future.

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<sup>1</sup> The term "DOT regulatory regime," as used in this petition, refers specifically to the regulation of public radiation exposure, not the entire DOT regulatory program.

### III. BASES FOR PETITION

#### A. DOT HAS NOT ESTABLISHED A SAFETY JUSTIFICATION FOR THE PUBLIC RADIATION MEASUREMENT REQUIREMENT, NOR A NEED TO DEPART FROM THE EXISTING REGULATORY REGIME

In the Federal Register notice announcing the promulgation of the Public Radiation Measurement Requirement, DOT fails to establish or even identify any safety justification for the new regulation. The overall rulemaking simply refers generally to the stated goal of the entire rulemaking proceeding—to amend the DOT's regulations to be consistent with the International Atomic Energy Agency ("IAEA") Safety Series No. 6—and, with respect to radiation protection programs, to be "consistent with the intent of the requirements issued by EPA" in the "document entitled 'Radiation Protection Guidance to Federal Agencies for Occupational Exposure: Recommendations Approved by the President.'" 60 Fed. Reg. at 50,292. Because the Public Radiation Measurement Requirement is not consistent with the IAEA regulations (as the DOT regulations apply to public, not occupational, radiation exposure),<sup>2</sup> neither of DOT's goals adequately justifies adoption of the Public Radiation Measurement Requirement.

NEI strongly believes that regulations should not be adopted unless they have a sound technical basis. The need for this justification is particularly important where the new regulations potentially undermine an effective existing regulatory regime. DOT (see 49 C.F.R. § 173.441), NRC (see 10 C.F.R. § 71.47), and IAEA (see IAEA Safety Series No. 6 §§ 433, 469, 470), have promulgated regulations that protect the public from radiation exposure from transportation by limiting the exposure rate from a radioactive materials package on a transport vehicle (hereinafter, "Public Radiation Exposure Rate Requirements"). Significantly, DOT's and NRC's regulations have been in place for many years.

No evidence has been put forth to show that the current regulatory approach is insufficient to protect the public from radiation exposure during transportation activities. To the contrary, analyses undertaken by the NRC in support of NUREG-0170 show that the long-standing regulatory regime, including the DOT, NRC, and IAEA Public Radiation Exposure Rate Requirements will keep exposures to the general public to negligible levels. Nuclear Regulatory Commission, Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes, 4-17 to 18, 4-24, 4-48, NUREG-0170 (1977). In NUREG-0170, the NRC concluded that the long-standing regulatory regime would keep the maximum annual exposures to members of the general public below:

- 1.9 mrem per year for an individual sharing the roadway with a truck.

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<sup>2</sup> The EPA guidance document referenced in the final rulemaking addresses only "the protection of workers exposed to ionizing radiation," and not the protection of the general public. 52 Fed. Reg. 2,822, 2,822 (1987).

- 0.009 mrem per year for an individual living adjacent to a truck transportation route.
- 1.3 mrem per year for a bystander individual "investigating" one truck shipment per year.
- 0.017 mrem per year for a railway station employee.
- 1.65 mrem per year for a bystander railroad employee servicing the train while it is stopped.
- Essentially none per year to railroad passengers.

Id. This analysis shows that the existing regulatory regime already results in public radiation exposure far below DOT's proposed 2 mrem per hour, 100 mrem per week, and 500 mrem per year limits contained in the new DOT Public Radiation Measurement Requirement.

DOT provides no justification based on safety for the new Public Radiation Measurement Requirement. This is particularly significant because analyses of the existing regulatory regime show it to be more than adequate from the perspective of public health and safety. The DOT Public Radiation Measurement Requirement in 49 C.F.R. § 172.803(b)(2) should be rescinded until analysis or other evidence demonstrates a need for additional regulation.

## **B. THE PUBLIC RADIATION MEASUREMENT REQUIREMENT IS INCONSISTENT WITH AND WILL UNDERMINE THE EXISTING REGULATORY REGIME**

Not only is there no demonstrated safety justification for adoption of the Public Radiation Measurement Requirement, but the regulatory approach reflected in the requirement is inconsistent with and will undermine the approach taken by the existing regulatory regime. As explained below, DOT and NRC regulations, as well as IAEA regulations, all are in accord and internally consistent in their approach to protecting the public from radiation exposure resulting from transportation activities. All three protect the general public from radiation exposure in transportation by limiting the exposure rates at specific distances from the transportation package and the vehicle. The Public Radiation Measurement Requirement establishes an inconsistent package dose rate limit, and an inconsistent compliance approach seems to require measurement of members of the general public, rather than measurement of the package.

### **1. DOT Regulations**

As noted above, DOT's long-standing Public Radiation Exposure Rate Requirements, which will continue in force in parallel with the conflicting Public Radiation Measurement Requirement, expressly limit the exposure rates from radioactive material transportation packages and the vehicles transporting such packages. The DOT regulation states:

49 C.F.R. § 173.441 Radiation level limitations

*(a) Except as provided in paragraph (b) of this section, each package of Class 7 (radioactive) materials offered for transportation must be designed and prepared for shipment, so that under conditions normally incident to transportation, the radiation level does not exceed 2 mSv/hour (200 mrem/hour) at any point on the external surface of the package, and the transport index does not exceed 10.*

*(b) A package which exceeds the radiation level limits specified in paragraph (a) of this section must be transported by exclusive use shipment, and the radiation levels for such shipment may not exceed the following during transportation:*

*(1) 2 mSv/h (200 mrem/h) on the external surface of the package . . .*

*(2) 2 mSv/h (200 mrem/h) at any point on the outer surface of the vehicle, including the top and underside of the vehicle; or in the case of a flat-bed style vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load or enclosure if used, and on the lower external surface of the vehicle; and*

*(3) 0.1 mSv (10 mrem/h) at any point 2 meters (6.6 feet) from the outer lateral surfaces of the vehicle (excluding the top and underside of the vehicle); or in the case of a flat-bed style vehicle, at any point 2 meters (6.6 feet) from the vertical planes projected by the outer edges of the vehicle (excluding the top and underside of the vehicle); and*

*(4) 0.02 mSv/h (2 mrem/h) in any normally occupied space, except that this provision does not apply to private carriers, if exposed personnel under their control wear radiation dosimetry devices as part of a radiation protection program that satisfies the requirements of subpart I of part 172 of this subchapter.*

49 C.F.R. § 173.441 (emphasis added).

This long-standing DOT regulation addresses the same goal as the new DOT Public Radiation Measurement Requirement. The original regulation uses a different regulatory approach that focuses the transporter's requirements on the exposure rate from the source (e.g., a radioactive materials transportation package) rather than focusing on measuring the exposure that an individual already has received. The regulation thus limits the exposure rate from a radioactive materials package to 200 mrem per hour on the package surface, 200 mrem per hour at the

outer surface of the vehicle, 10 mrem per hour at 2 meters from the outer lateral surfaces of the vehicle, and 2 mrem per hour for positions in the vehicle, such as the driver's cab, that are normally occupied during transportation. The existing DOT regulation, which addresses the source of the exposure rather than the recipient, has been shown to be effective at protecting both the general public and occupational workers.

## 2. NRC Regulations

The NRC transportation exposure rate regulations are essentially identical to DOT's existing Public Radiation Exposure Rate Requirements. The NRC regulations protect both the general public and occupational workers by limiting the radiation exposure rate at the surface of a radioactive material transportation package and at specific distances from the package and accompanying vehicle. The NRC regulation states:

10 C.F.R. § 71.47 -- External radiation standards for all packages

*(a) Except as provided in paragraph (b) of this section, each package of radioactive materials offered for transportation must be designed and prepared for shipment so that under conditions normally incident to transportation the radiation level does not exceed 2 mSv/h (200 mrem/h) at any point on the external surface of the package, and the transport index does not exceed 10.*

*(b) A package that exceeds the radiation level limits specified in paragraph (a) of this section must be transported by exclusive use shipment only, and the radiation levels for such shipment must not exceed the following during transportation:*

*(1) 2 mSv/h (200 mrem/h) on the external surface of the package . . .*

*(2) 2 mSv/h (200 mrem/h) at any point on the outer surface of the vehicle, including the top and underside of the vehicle; or in the case of a flat-bed style vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load or enclosure, if used, and on the lower external surface of the vehicle; and*

*(3) 0.1 mSv (10 mrem/h) at any point 2 meters (80 in) from the outer lateral surfaces of the vehicle (excluding the top and underside of the vehicle); or in the case of a flat-bed style vehicle, at any point 2 meters (6.6 feet) from the vertical planes projected by the outer edges of the vehicle (excluding the top and underside of the vehicle); and*

*(4) 0.02 mSv/h (2 mrem/h) in any normally occupied space, except that this provision does not apply to private carriers, if exposed personnel under their control wear radiation dosimetry devices in conformance with 10 CFR 20.1502.*

10 C.F.R. § 71.47 (1996) (emphasis added).

### **3. International Atomic Energy Agency Regulations**

The IAEA also has a Public Radiation Exposure Rate Requirement that is essentially identical to the existing DOT and NRC regulations. The IAEA regulation is consistent with the existing DOT and NRC regulations in protecting both the general public and occupational workers by limiting the radiation exposure at the surface of a package and at specific distances from the package as prepared for transportation. The IAEA regulation is not consistent with the new DOT Public Radiation Measurement Requirement of 2 mrem per hour.

The IAEA public radiation exposure rate requirements state:

*433. Except for packages or overpacks transported under exclusive use by rail or by road under the conditions specified in subpara.469(a), . . . the maximum radiation level at any point on any external surface of a package or overpack shall not exceed 2 mSv/h (200 mrem/h).*

*. . .*  
*469. For consignments under exclusive use, the radiation level shall not exceed:*

*. . .*  
*(b) 2 mSv/h (200 mrem/h) at any point on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface or the vehicle; and*

*(c) 0.1 mSv/h (10 mrem/h) at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle, or, if the load is transported in an open vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.*

*. . .*  
*470. In the case of road vehicles:*

*. . .*  
*(b) The radiation level at any normally occupied position shall not exceed 0.02 mSv/h (2 mrem/h) unless the*

*persons occupying such positions are provided with personal monitoring devices.*

International Atomic Energy Agency, Regulations for the Safe Transport of Radioactive Material 56-57, Safety Series No. 6 (1985 ed.) (hereinafter, "IAEA Safety Series No. 6") (emphasis added).

The IAEA regulations also do not provide a specific limit on exposure from transportation to members of the general public analogous to the 2 mrem per hour limit requirement in the new DOT Public Radiation Measurement Requirement. Furthermore, the IAEA established its regulations for exposure to the general public on the basis of exposure in a given year, not per hour as the DOT Public Radiation Measurement Requirement has done. The IAEA regulation on radiation exposure to members of the general public states:

*Radioactive material shall be segregated sufficiently from transport workers and from members of the public. For the purposes of calculating segregation distances or dose rate in regularly occupied areas, different limiting values for dose shall be required:*

*...  
(b) For members of the public, in the determination of segregation distances or dose rates in regularly occupied public areas or in areas where the public has regular access, a dose level of not more than 1 mSv (100 mrem) per year to the critical group shall be used as the limiting value. This value should be used together with hypothetical but realistic models and parameters to determine segregation distances or dose rates for members of the public, with the objective of providing reasonable assurance that actual doses from transport of radioactive material will not exceed small fractions of the appropriate dose limits.*

IAEA Safety Series No. 6 at 14 (emphasis added). The IAEA regulation thus recommends 100 mrem per year as the limiting value for public radiation exposure, not 2 mrem per hour, and states that "hypothetical but realistic" models, not actual measurement, should be used to develop dose rate limits for members of the general public. Thus, the new DOT Public Radiation Measurement Requirement are inconsistent with the IAEA regulations in both substance and approach.

The inconsistency with IAEA regulations is particularly significant because it undermines DOT's stated purpose of "amend[ing] the Hazardous Materials Regulations pertaining to the transportation of radioactive materials to harmonize them with those of the International Atomic Energy Agency (IAEA)." 60 Fed. Reg. 50,292, 50,292 (DOT final rulemaking implementing, *inter alia*, 49 C.F.R. § 172.803(b)(2)). The IAEA regulations contain no requirements to limit the exposure

rate in areas potentially accessible to the general public to 2 mrem/hr and no requirement to measure actual doses to members of the public. In fact, the DOT Public Radiation Measurement Requirement should be rescinded, in order to "harmonize the [DOT regulations] with those of the International Atomic Energy Agency."

In summary, the new DOT Public Radiation Measurement Requirement is inconsistent in both substance and compliance procedure with the entire set of existing DOT, NRC, and IAEA regulations. Thus, if implemented, the DOT Public Radiation Measurement Requirement will undermine the existing regulatory regime.

### C. IMPLEMENTATION OF THE PUBLIC RADIATION MEASUREMENT REQUIREMENT IS INFEASIBLE

Measuring all members of the general public, as obviously is required by the new DOT Public Radiation Measurement Requirement, would be difficult, if not impossible. Although the Public Radiation Measurement Requirement does not explicitly require measurements, there is no practical way to determine whether there has been an "occurrence where the dose to a member of the general public equals or exceeds 0.02 mSv (2 mrem) in one hour," other than to measure radiation exposure to members of the general public. Other federal agencies, including the U.S. Environmental Protection Agency ("EPA"), have concluded that attempting to measure actual doses to all members of the general public is a requirement that is both inappropriate and infeasible.

The EPA has issued proposed "Federal Radiation Protection Guidance for Exposure of the General Public" that includes the "transportation of radioactive materials." 59 Fed. Reg. 66,414, 66,414-15 (1994). EPA provides guidance on the implementation of such public radiation exposure requirements. The EPA guidance rejects as "neither appropriate nor feasible" the measurement approach taken by DOT in the Public Radiation Measurement Requirement. Instead, EPA's proposed guidance endorses maintaining the long-standing and successful regulatory regime of DOT, NRC, and IAEA with no changes.

The EPA guidance states:

*Control of exposure of the public is normally ensured through analysis of releases from sources and modeling of environmental transport to hypothetical "critical groups: of the general public assumed to receive the greatest exposure. Unlike the situation for workers exposed occupationally, it is usually neither appropriate nor feasible to physically monitor doses to individual members of the public. . . . [I]n some cases (notably in the regulation of exposure of the public from the transportation of radioactive materials)*

conformance to existing guidance is based upon the "reasonably foreseeable" scenarios for the spatial and temporal relationship between radioactive materials and members of the public, and that because of this assurance the [recommended limits] will never be exceeded cannot be given with absolute certainty. *These recommendations do not propose any changes in this regard, and EPA expects that in such cases [as transportation] the same approach to protection would continue to be employed to achieve conformance with these new recommendations.*

Id. at 66,425 (emphasis added).

The regulation of public exposure from transportation is significantly different in kind from the regulation of exposure related to radioactive materials at fixed facilities. Unlike the situation at a fixed facility, where the existing population proximate to the facility can be identified, it would be extremely difficult to identify either the population exposed to radiation throughout a transportation shipment route or the duration of the exposure. Moreover, these factors will vary significantly with the timing, speed, weather, and other variables associated with any given trip.<sup>3</sup>

In short, transportation issues must be treated differently than those related to a fixed facility. The population that is exposed to the package during shipment and the length of the exposure are both unknown to the shipper. To comply with the Public Radiation Measurement Requirement and ensure that there is no occurrence where the dose to a member of the general public equals or exceeds 0.02 mSv (2 mrem) in one hour, the shipper would be required to measure the actual exposure to all members of the general public along the transportation route. There simply is no feasible way to comply with this requirement. See RSCC Petition at 3. That is precisely why the existing regulatory regime of DOT, NRC, and IAEA imposes limits on the exposure rate from the package, and not on the dose received.

#### **D. IMPLEMENTATION OF PUBLIC RADIATION MEASUREMENT REQUIREMENT WILL INCREASE COSTS**

As explained above, NEI believes that DOT has not provided an adequate safety justification for implementation of the Public Radiation Protection

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<sup>3</sup> These variables are explained in the following excerpt from a study of radiological risk associated with the transportation of radioactive materials: "In most cases, exposures are for a relative short duration, but the number of persons who can be exposed may become very large during a trip of considerable distance. Exposure can result from stops for meals, crew rest, repair, and refueling, since access to the area around the vehicle during stops is usually not limited. Occupants of vehicles caught in slow traffic next to the vehicle carrying radioactive material may also sustain relatively long exposure." Ruth F. Weiner et al., An Approach to Assessing the Impacts of Incident-Free Transportation of Radioactive Materials: II. Highway Transportation, 11 Risk Analysis 661, 662 (1991).

Measurement Requirement. That alone is a sufficient basis to rescind the regulation. The need to rescind or reconsider the regulation is even more compelling, however, given the practical inability to comply, and the likely costs of its implementation.

The effect of implementing the Public Radiation Measurement Requirement would be to increase the number of radioactive material shipments on the road by a factor of five or more. The new dose rate of the Public Radiation Measurement Requirement is a factor of five or more lower than those of the existing DOT, NRC, and IAEA regulatory regime: 2 mrem per hour where a member of the public can gain access (including, hypothetically climbing onto the package) versus 200 mrem per hour at the package surface or 10 mrem per hour at a distance of 2 meters. The new DOT Public Radiation Measurement Requirement could result in up to 40 times as many radioactive material shipments on the road. To comply with the new dose rate, shippers will need to ship less radioactive material per package or, if it even can be done and at a cost that is not prohibitive, completely redesign the existing packages to meet this new limit. The result will be more shipments for a given amount of material.

It is incumbent on DOT to perform the appropriate cost/benefit analyses prior to implementing the Public Radiation Measurement Requirement.

#### **E. IMPLEMENTATION OF THE PUBLIC RADIATION MEASUREMENT REQUIREMENT COULD DEPRIVE THE PUBLIC OF VALUABLE GOODS AND SERVICES**

The increased number of shipments could deprive the public of valuable good and services. First, more shipments to move the same amount of material means more costs. Second, most common carriers already refuse to accept radioactive materials, even under the existing regulations. Hazardous materials are a small part of common carriers' businesses. The complexities inherent in complying with hazardous materials requirements make transportation of hazardous materials not cost-effective for many of these carriers. Transportation of radioactive materials, as a subset of hazardous materials, adds additional complexities for carriers. So the universe of common carriers willing to accept radioactive materials already is very small. Implementing the new DOT Public Radiation Measurement Requirement may eliminate the few remaining common carriers willing to accept radioactive materials, thereby eliminating services to radioactive materials shippers.

This impact will be the greatest for small industrial and medical shippers, whose businesses depend on distributing their products to a wide cross section of society. In fact, small industrial and medical shippers together are responsible for the vast majority of highway shipments of radioactive materials. See Weiner, *supra*, at 663. The DOT Public Radiation Measurement Requirement should be rescinded until these economic and societal impacts can be evaluated and DOT can demonstrate with supportable data that these regulations will not have a negative societal and economic impact.

#### IV. CONCLUSION

For the foregoing reasons, DOT should rescind the Public Radiation Measurement Requirement in 49 C.F.R. § 172.803(b)(2). In the alternative, DOT should stay implementation of the Public Radiation Measurement Requirement pending reconsideration of the need for such regulations, the feasibility of demonstrating compliance with the regulations, and the potential costs to the public resulting from implementation.