1999
RATIONALE FOR REVISIONS

PART T
TRANSPORTATION OF RADIOACTIVE MATERIAL

Introduction

Any person who transports radioactive material or delivers radioactive material to a carrier for transport is subject to the requirements for packaging, preparation for shipment and care during shipment which are found in this Part T of the *Suggested State Regulations for Control of Radiation* (SSRCR) of the Conference of Radiation Control Program Directors (CRCPD). Since 1988 the requirements for transportation have been located separate from Part C (Licensing of Radioactive Material) in this Part T.

This 1999 revision of Part T incorporates provisions of the US Department of Transportation and US Nuclear Regulatory Commission which were published September 28, 1995 and became effective April 1, 1996. This revision of Part T also includes corrections published by the US Department of Transportation on May 8, 1996. These revisions made United States regulations compatible with the domestic regulations of most of the international community by bringing United States regulations into accord with relevant portions of the International Atomic Energy Agency design and performance requirements to the extent considered feasible. The US Department of Transportation revisions to Title 49 of the Code of Federal Regulations (CFR) Part 171 begin at 60 Federal Register (FR) 50292. The Nuclear Regulatory Commission changes to 10 CFR Part 71 begin at 60 FR 50248. The May 1996 corrections are at 61 Federal Register 20747-20753.

The Nuclear Regulatory Commission considers the adoption of a regulation equivalent to 10 CFR Part 71 a matter of compatibility for an Agreement State. The various provisions of the 10 CFR Part 71 regulation are assigned different compatibility and health and safety categories. Definitions of each category and the specific category assigned to each provision of 10 CFR Part 71 are set out in US Nuclear Regulatory Commission, Office of State Programs Internal Procedure B.7, Compatibility Categories and Health and Safety Identification for NRC Regulations and Other Program Elements. They reflect the new adequacy and compatibility policy statement approved by the Commission by Staff Requirements Memorandum dated June 30, 1997 (see also 62 FR46517). CRCPD considers regulation of transport of radioactive material essential to a Naturally Occurring and Accelerator Produced Radioactive Material (NARM) Licensing State.

Changes in the federal regulations to achieve compatibility with International Atomic Energy Agency regulations include revisions to the table that establishes the quantities of radioactive material that can be transported in packages not designed to withstand a severe transportation accident. The adopted International Atomic Energy Agency changes increase the number of radionuclides listed in the table from 284 to 378 (so that packaging requirements are more easily determined) and revise the allowable quantities

of certain radionuclides already listed (some allowable quantities were decreased and others were increased).

The International Atomic Energy Agency-related changes simplify the rules for shipment of fissile material (radioactive material that could sustain a chain reaction) by combining the three existing fissile classes into one. The revisions also affect the transportation of "low specific activity" radioactive materials such as uranium ores. Unlimited quantities of these materials can be transported in a Type A package (the radiation level permitted outside the transportation package has been and will continue to be limited). The revised regulations limit the quantity of certain of these materials that can be transported in a Type A package. The restrictions apply, for example, to contaminated resin beads that have been used in nuclear reactors to clean up water that cooled the reactor fuel.

The federal changes involving packages that may be used to transport plutonium by air added approval criteria previously developed. Public Law 94-79 (also know as the Scheuer Amendment, August 9, 1975) prohibited the Nuclear Regulatory Commission from licensing the air shipment of plutonium in any form until Nuclear Regulatory Commission certified to Congress that a safe container had been developed. The Nuclear Regulatory Commission subsequently developed and published the criteria in January 1978 and certified the criteria to Congress. Part T mirrors these provisions in T.16.

Key definitions are added to Sec. T.2, or modified, including exclusive use, fissile material, fissile material package, low specific activity material, low toxicity alpha emitters, natural thorium, nuclear waste, surface contaminated object, transport index, Type A package, and uranium-natural, depleted, enriched. A surface contaminated object is not itself classed as radioactive material, but has non-fixed (removable) or fixed radioactive material, or both, on accessible surfaces or possibly on inaccessible surfaces.

The exemption previously in Sec. T.4.c. of the 1988 Part T (brought into Part T from 10 CFR 71.10(b) based on a federal US Department of Transportation-Nuclear Regulatory Commission memorandum of understanding is deleted. An Agreement State or Licensing State would thus retain the full and appropriate authority to oversee shipment or carriage of all packages, including those containing no more than Type A quantities such as low specific activity material or surface contaminated objects.

Sec. T.5 makes more explicit within Part T the parts of the US Department of Transportation requirements which a radiation control program will oversee.

Editorial improvements are made in the general licenses found in Sec. T.6 through Sec. T.12.

International system units are incorporated into Sec. T.15 and TABLE III.

A narrative explanation of the revised A_1 and A_2 values and the values themselves are found in TABLE IV, which refers to TABLES V and VI.

Specific Provisions

Sec. T.1 - Purpose and Scope. The Purpose and Scope was not narrowed by language such as from 10 CFR §71.0(c), since the requirement for a license is in Sec. T.3. This provides broader coverage, recognizes that some states are required to remove the purpose section of the Suggested State Regulations, and avoids putting prohibitions in a statement of scope or purpose.

Part T uses "delivers radioactive material to a carrier for transport," which varies slightly from US Department of Transportation's "offering to," then signing for and "accepting for" transport.

Sec. T.2 - Definitions. Definitions which are not unique or integral to Part T and are already included in Part A (12/95) were not included in Part T. Examples are:

a. $A_{1;}$

b. A_2 (which will be modified slightly in Part A);

c. licensed material; and

d. package.

One definition is in Part A (12/95) but is added to Part T because it is commonly used and needed for comparison to normal form radioactive material: "special form radioactive material," which now includes the second continued use clause: "A special form encapsulation designed in accordance with the Nuclear Regulatory Commission requirements in effect on March 31, 1996, and constructed prior to April 1, 1998, may continue to be used." The definition of normal form is modified by adding "and other form" in accord with 49 CFR 173.425 Table 7 usage.

One definition present in Part A is expanded in Part T: "uranium - natural, depleted, enriched" (only depleted uranium is defined in Part A).

Former footnote 2 becomes footnote 1 and is slightly modified. This is pursuant to §51 of the Atomic Energy Act, as reflected in the 1983 model state radiation control statute. Part A contains definitions of "special nuclear material" and "special nuclear material in quantities not sufficient to form a critical mass."

Definitions which were present in the 1988 Part T and which were not changed by Part 71 remain in 1998 Part T. For example:

a. carrier;

b. closed transport vehicle;

c. specific activity;

d. Type A quantity;

e. Type B quantity;

f. Type B package. The 10 CFR 71 definition is complex, referring to §71.13 (previously approved packages), Subpart E, and §71.73. Renumber Type B package footnote 2 and leave as is, since this fits the 71.4 definition (found under package); and

g. Type B packaging.

Some definitions which were present in the 1988 Part T and were modified by the US Department of Transportation or the Nuclear Regulatory Commission remain in 1998 Part T:

a. Exclusive use--note slight editorial change from the federal word order to read “by a consignor of a conveyance” so that the referent is “conveyance for which...”;

b. Fissile material (delete "Fissile Class I" and "II" and note that Fissile Class III was not put in Part T previously, based on jurisdiction);

c. Low specific activity--note slight condensation of first sentence, inclusion of the May 1996 (61 FR 20750) change (from the September 1995 wording) to “distributed throughout” in LSA-II(ii) and LSA-III(i), and that the US Department of Transportation examples are included as foot notes.

d. Packaging, adding explicit reference to 49 CFR 173, Subpart I;

e. Regulations of the US Department of Transportation, with the added reference to 49 CFR Parts 390-397; and

f. Transport index (TI), in which "first decimal place" is replaced with "next tenth"; this makes it clear that the TI has only a tenth place in it.

Some definitions are added to 1998 Part T:

a. Low toxicity alpha emitters;

b. Fissile material package, found in 71.4 under package;

c. Natural thorium, since this definition isn't in Part A;

d. Normal form radioactive material (not in Part A), for comparison to special form radioactive material definition (in Part A);

e. Nuclear waste, based on the definition provided by Committee E-26;

f. Surface contaminated object (SCO). Note addition of a comma after beta instead of “and” in a.i., a.ii., a.iii., b.i., b.ii., b.iii; and

g. Type A package, including an explicit reference to the appropriate tests.

Some definitions in 10 CFR Part 71 were not included in Part T:

a. Certificate holder;

b. Close reflection by water, since this relates to criticality, which is the Nuclear Regulatory Commission's jurisdiction;

c. Containment system, since this relates to evaluation of a package, not to the use of the package;

d. Conveyance;

e. Consignee, consignment, consignor;

f. Hypothetical accident conditions, since a definition would require paraphrasing 10 CFR §71.73. The phrase is only used in Part T in the definition of “Type B packaging”;

g. Industrial packaging, because a word search of Part T yielded no use of the 49 CFR term;

h. Maximum normal operating pressure;

i. Normal conditions of transport, since a definition would require paraphrasing 10 CFR §71.71. The phrase is only used in Part T in the definitions of “Type A package” and “Type B packaging”; and

j. Optimum interspersed hydrogenous moderation.

Part T does not include from §71.4 "certain exclusions from fissile material controls are provided in §71.53" (see definition of special nuclear material), or from §173.403 “Certain additional exceptions are provided in §173.453."

Sec. T.4 - Exemptions. Sec. T.4.a. is retained in the 1998 Part T, with the term "warehousemen" changed to "warehouse workers."

In the Sec. T.4.b., exemption for low-level materials, "70" Bq/g is used. Note that the obsolete US unit for specific activity is retained in parentheses as 0.002 microcurie per gram, which is widely known as 2 nanocuries per gram.

Sec. T.4.c. and Sec. T.4.d. are omitted. CRCPD Committees SR-1 and E-26 (Radioactive Materials Transportation) agreed with Department of Transportation reviewers of Part T that Sec. T.4.c. is not

needed. The Department of Transportation encourages states to implement all of 49 CFR. To not include this exemption preserves a state radiation control program's ability to inspect Type A quantity transport.

The 1988 Part T exemption language could be retained at a state's option. Committee SR-1 consciously choose not to include it in brackets. Note that this would require the addition of low specific activity and surface contaminated object wording from the federal rules. If it can be obtained, the redline-strikeout version provided to the CRCPD Board of Directors shows the appropriate phrasing.

Part T does not include in Sec. T.4 language paraphrasing old 10 CFR §71.9 entitled "Exemption of Physicians."

a. The Nuclear Regulatory Commission has had this provision for many years.

b. Many states haven't been sure about the advisability of having it.

c. Physicians in earlier days needed to take material between hospitals.

d. New types of material are being transported by doctors now.

e. The exemption applied to direct possession by the physician.

f. Health and safety considerations (communication in case of an accident) mitigate against adding this exemption.

g. Little need exists for the exemption, which is likely to apply or be needed in very few situations.

h. This is better handled as an authorized user on a specific radioactive material license.

i. Physicians need to comply with the same transportation regulations as anyone else.

Sec. T.5 - Transportation of Licensed Material. Sec. T.5 incorporates slightly revised wording from 10 CFR §71.5, adding "particularly" to T.5.a.i, reference to 49 CFR 172 Subpart H regarding hazardous material employee training, and citing D.906e in T.5.a.iii.

For Sec. T.5.b, the Department of Transportation authority under the federal hazardous materials transportation law is limited to transportation of hazardous materials in commerce. Transport by government agencies, in their own vehicles, using government agency drivers and not involved in commercial activities, is not subject to the 49 CFR. Also, at present, intrastate and non-placardable loads are exempt from 49 CFR. By citing 49 CFR 170-189, Committee SR-1 makes explicit the Nuclear Regulatory Commission's reference to §71.5(a) and limits the appearance of saying "if the regulations don't apply, they do apply." The E-26 Committee agreed that this provision be retained to regulate (in accord with 49 CFR Parts 170 through 189) the DOE shipments not subject to all of 49 CFR.

Sec. T.6 - General Licenses for Carriers. Regarding footnote 3, Committee SR-1 concurs with the wording recommended by Committee E-26: "Notification of incidents shall be filed with, or made to, the Agency as prescribed in 49 CFR, regardless of and in addition to notification made to the US Department of Transportation or other agencies."

Sec. T.7 - General License: Nuclear Commission-Approved Packages. T.7 is modified by adding "Nuclear Regulatory Commission-" to the title, deleting "of the Agency," retaining the former Part T lead-in phase "Has a copy of the specific license, ...", and replacing the 1988 T.7.d. with §71.12(e) language, including the April 1, 1996 date.

Sec. T.8 - General License. Sec. T.8 is modified by changing the title, because T.8.b. is about low specific activity, inserting "identification number of the Nuclear Regulatory Commission" before "Certificate," explicitly citing §71.85(c), changing T.8.a.ii. to match §71.13(a)(2), adding §71.13(a)(3), with commas around "and legibly and durably marked on," and adding §71.13(b) as T.8.b.

Sec. T.9 - General License: US Department of Transportation Specification Container. Sec. T.9 is modified by adding "US Department of Transportation" to the title and "for fissile material" after "specification container."

Sec. T.10 - General License: Use of Foreign Approved Package. Sec. T.10 is modified by deleting from T.10.a. "of the Agency," deleting "which has been" and adding "and," adding a comma after word "revalidation" in T.10.c.ii., adding "Has a quality assurance program approved by the Nuclear Regulatory Commission." as §71.10c.iii.

Sec. T.11 - General License: Fissile Material, Limited Quantity Per Package. The title of Sec. T.11 is modified, "in accordance with this Section" is added to Sec. T.11.a., ".4x" is revised to .40x" and in Sec. T.11.c.i., the equation is corrected to "15/(x+y+z)"--the published equation was incorrect (60 FR 50269), and T.11.c.i., ii., and iii. are reformatted.

Sec. T.12 - General License: Fissile Material, Limited Moderator Per Package. The title of Sec. T.12 is changed to match §71.20, and "in accordance with this Section" is added to Sec. T.12.a. In Sec. T.12.b.iii., "150" is corrected to "7.7", and "for example certain hydrocarbon oils" is added to Sec. T.12.b.iv. Phrases conforming to §71.20(c)(6) & (7) were added to Sec. T.12.b.vi. & vii.

Sec. T.13 - Assumptions as to Unknown Properties of Fissile Material. Minor editorial changes are made in Sec. T.13. "Fissile Material" is retained in the title for clarity. The "Applicability" section of 10 CFR 71 Subpart G "Operating Controls and Procedures" is omitted from Sec. T.13, since some states cannot have such a section.

Sec. T.14 - Preliminary Determinations. In Sec. T.14.b., "34.3" is changed to "35" and "psi" is changed to "foot pounds per square inch," not "lbf/in^2" as is found in the federal rule. In T.14.d., "serial number" is added.

Sec. T.15 - Routine Determinations. SR-1 explicitly decided not to add §71.87(g). This was in the former Part 71 and left out on purpose from the former Part T. Sec. T.15.g. cites §71.45 explicitly. In Sec. T.15.h., the previous Table 3 was modified by adding a Bq/cm^2 column, retained instead of citing US Department of Transportation 49 CFR §173.443. Sec. T.15.h.i. is reformatted. In Sec. T.15.j.ii., "is in place" is added to the footnote and the last "the" was replaced by "any accessible." The term "non-fixed" has replaced the older term, "removable".

Sec. T.16 - Air Transport of Plutonium. In T.16.b., "74 Bq/g" is changed to "70" as in §71.88(a)(2), with the English units in parentheses. A phrase from §71.88(c) is added to T.16.d.

Sec. T.17 - Shipment Records. Sec. T17 is changed in accord with §71.91(a) by revising "two" years to "3." In T.17.a. "serial number" is added. T.17.b. is edited in accord with §71.91(a)(2), modified to reflect the past tense.

Part T does not include in Sec.T.17 the language from §71.91(a)(5) & (7), nor is the §71.91(b) language about maintaining records available for inspection needed in Part T. §71.91(c) isn't applicable.

Sec. T.18 - Reports. The title to Sec. T.18 does not include "-shipper." In Sec. T.18.a., "approved Type B or fissile" is added before "packaging." "Type B or fissile" is added to Sec.T.18.b. All of §71.95(c) is added to T.18.c.

Sec. T.19 - Advance Notification of Transport of Nuclear Waste. In T.19, the title "Advance Notification of Transport of Nuclear Waste" is retained. The wording of footnote 4 is modified slightly. The wording of T.19.b.ii. is modified to read "into, within or through a state en route." The 1988 Sec. T.19.b.iii. is replaced with §71.97(b)(3). In T.19.f., "identifying the advance notification that is being canceled" is added after "notice."

Sec. T.20 - Quality Assurance Requirements. In Sec. T.20.a., CRCPD Committees E-26 and SR-1 decided to add the phrase "Unless otherwise authorized by the Agency" to give flexibility to states with regard to the requirements for quality assurance. Sec. T.20.e. now requires that quality assurance records be kept three years.

Appendix A The tables are renumbered TABLE IV, TABLE V, and TABLE VI and so referenced in the initial narrative explanation and in the citation to T.6 in TABLE IV related to uranium.

Table IV The May 1996 editorial corrections published by the US Department of Transportation changes in A_1 and A_2 values are included.

Table V Only two significant figures are appropriate in Table V.

Matters for Future Consideration

1. In Sec. T.2 some additional definitions may warrant inclusion in Part T:

a. conveyance

b. consignee, consignment, consignor

c. highway route controlled quantity

d. hypothetical accident

e. normal conditions of transport

f. personnel barrier, in relation to the footnote in Sec. T.15.j..ii.

2. Revision of the definition of nuclear waste in Sec. T.2, as it is intended to be used in Sec. T.19.b.i. Part A contains no definition of nuclear waste or nuclear materials (DOE Order 5660.1B itemizes nuclear materials). Spent Nuclear Fuel is not classified as waste. Two alternatives to the definition included in this Part T for consideration are 'radioactive waste in a Type B package' or "radioactive material in a Type B package'.

3. Also in Sec. T.2. the part of the definition of surface contaminated object regarding total (fixed plus non-fixed) contamination on an inaccessible surface begs for an answer to the question of how such activity is to be determined.

4. Sec. T.4.a. may warrant modification depending on changes to Part C. Even though the Nuclear Regulatory Commission defers to the US Department of Transportation within the framework of their existing Memorandum of Understanding, the states are not so obligated.

5. A few instances are known in which agency emergency response personnel have needed to transport a radiological hazard into suitable storage. The US Department of Transportation is on record that federal hazardous material transportation law is limited to transportation of hazardous material in commerce (February 22, 1988 letter from D. Billings to C.R. Meyer, Texas Dep. of Health). "It is our opinion that transportation of hazardous materials by government agencies, in their own vehicles, using government agency drivers and not involved in commercial activities, is not subject to the US Department of Transportation's Hazardous Materials Regulations." Committee SR-1 rejected inclusion of a special exemption for agency personnel in this revision of Part T, in part because so few instances are known to have occurred and in part believing that state agency staff should adhere to the same requirements that any other transporter must adhere to. If enough instances warrant, such an exemption could be a matter for future consideration.

6. A provision, for example, a specific exemption from placarding requirements for transport, could be added to Sec. T.4 related to ^{3}H and ^{14}C quantities, since 10 CFR 20.2005 and Part D.1005 treat <0.005 microcuries as if not radioactive.

7. More specific time frames for notification of incidents from 49 CFR could be added to footnote 3.

8. Consider adding text to Sec. T.11.c.i which provides a narrative version of the equation and states what relation is intended.

9. Consider Li and Be as well as Be and ^{2}H to Sec. T.12.

10. Consider explicitly providing the alternative for a state to apply Sec. T.19 to all highway route controlled quantities, not just highway route controlled quantities of radioactive waste.

11. Part T could include more specific provision from 10 CFR 71 Subpart H reflecting quality assurance requirements in Sec. T.20.