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Exemptions From Licensing, General Licenses, and Distribution of Byproduct Material: Licensing and Reporting Requirements 10 CFR Parts 30, 31, 32, and 150
(72 FR 58473) RATS ID # 2007-2 Effective date 12/17/07
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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§30.14	Exempt Concentrations	64E-5.203(1)(a)2. = 30.14(c) 64E-5.203(1)(b) = 30.14(d)	B	**In Sec. 30.14, paragraphs (c) and (d) are revised to read as follows:** (c) A manufacturer, processor, or producer of a product or material is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in this part and parts 31 through 36 and 39 of this chapter to the extent that this person transfers byproduct material contained in a product or material in concentrations not in excess of those specified in §30.70 and introduced into the product or material by a licensee holding a specific license issued by the Commission expressly authorizing such introduction. This exemption does not apply to the transfer of byproduct material contained in any food, beverage, cosmetic, drug, or	no	No	

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				other commodity or product designed for ingestion or inhalation by, or application to, a human being. (d) No person may introduce byproduct material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under this section or equivalent regulations of an Agreement State, except in accordance with a license issued under § 32.11 of this chapter.			

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§30.15	Certain items containing byproduct material	64E-5.203(3) = 30.15 Multiple 64E-5.203(3)(a)2. = Deleted 30.15(a)(2) 64E-5.203(3)(a)3. = Modified 30.15(a)(3) 64E-5.203(3)(a)4. = Deleted = 30.15(a)(4) 64E-5.203(3)(a)5. = Modified 30.15(a)(5) 64E-5.203(3)(a)6. = Deleted 30.15(a)(6) 64E-5.203(3)(a)9. = Deleted 30.15(a)(10) 64E-5.203(3)(a)10. = New 30.15(a)(7)	B	**In Sec. 30.15, paragraphs (a)(2), (a)(4), (a)(6), and (a)(10) are removed and reserved, paragraphs (a)(3) and (a)(5) are revised, and paragraph (a)(7) is added to read as follows:** (a)*** (2) [Reserved] (3) Balances of precision containing not more than 1 millicurie of tritium per balance or not more than 0.5 millicurie of tritium per balance part manufactured before December 17, 2007. (4) [Reserved] (5) Marine compasses containing not more than 750 millicuries of tritium gas and other marine navigational instruments containing not	No	No	

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				more than 250 millicuries of tritium gas manufactured before December 17, 2007. (6) [Reserved] (7) Ionization chamber smoke detectors containing not more than 1 microcurie (μCi) of americium-241 per detector in the form of a foil and designed to protect life and property from fires.*** (10) [Reserved]			
§30.16	Resins containing scandium-46 and designed for sand consolidation in oil wells	64E-5.203(3)(d) = 30.16	B	[Removed]	No	No	

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§30.18	Exempt quantities	64E-5.203(2)(a) = 30.18(a) 64E-5.203(2)(d) = 30.18(e)	B	**In Sec. 30.18 paragraph (a) is revised and paragraph (e) is added to read as follows:** (a) Except as provided in paragraphs (c) through (e) of this section, any person is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in part 30 through 34, 36 and 39 of this chapter to the extent that such person receives, posses, uses, transfers, owns, or acquires byproduct material in individual quantities, each of which does not exceed the applicable quantity set forth in §30.71, Schedule B. (e) No person may, for purposes of producing an increased radiation level, combine quantities of byproduct material covered by this	No	No	

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				exemption so that the aggregate quantity exceeds the limits set forth in § 30.71, Schedule B, except for byproduct material combined within a device placed in use before May 3, 1999, or as otherwise permitted by the regulations in this part.			
§31.5		New Comp C designation specified in SRM dated 12/2/2010 and SECY-10-0105. 64-5.206(4)(c)7.= 31.8(c)(8)(ii) 64-5.206(4)(c)10.= 1st part of 31.5(c)(8)(iii) 64-5.206(4)(c)10 last	~~B~~ C	**In Sec. 31.5, paragraph (c)(8)(ii) introductory text and paragraph (c)(8)(iii) are revised to read as follows:** (c)*** (8)*** (ii) Shall within 30 days after the transfer of a device to a specific licensee or export, furnish a report to the Director of the Office of Federal and State Materials and Environmental Management Programs by an appropriate method listed in §30.6(a) of this chapter,	Yes	NO	FL Rule registers all GL devices except H-3 exit signs.

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		sentence a.-d. added for 2nd part of SL 31.5(c)(8)(iii)(A) – (D)		including in the address: ATTN: Document Control Desk/ GLTS. The report must contain- *** (iii) Shall obtain written NRC approval before transferring the device to any other specific licensee not specifically identified in paragraph (c)(8)(I) of this section; however a holder of a specific license may transfer a device for possession and use under its own specific license without prior approval, if, the holder: (A) Verifies that the specific license authorizes the possession and use, or applies for and obtains an amendment to the license authorizing the possession and use; (B) Removes, alters, covers, or clearly and unambiguously augments the existing label (otherwise required by (c)(1) of this section) so that the device			

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				is labeled in compliance with §20.1904 of this chapter; however the manufacturer, model number, and serial number must be retained; (C) Obtains manufacturer's or initial transferor's information concerning maintenance that would be applicable under the specific license (such as leak testing procedures); and (D) Reports the transfer under paragraph (c)(8)(ii) of this section.			
§32.8	Information collection requirements: OMB approval		D	N/A	N/A		
§32.11	Introduction of byproduct material in exempt concentrations into products or materials,	64E-5.210(1) changed to require NRC license to distribute	NRC*** **(***please note all of 10 CFR 32.11 has been changed from a Compatibility**	**In Sec. 32.11, paragraph (a) is revised to read as follows:** (a) Satisfies the general requirements specified in § 30.33(a)(2) and (3) do not apply to an application for a license to	no	No	

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	and transfer of ownership or possession: Requirements for license.		**Category C/B to a Compatibility Category NRC)**	introduce byproduct material into a product or material owned by or in the possession of the license or another and the transfer of ownership or possession of the product or material containing byproduct material, if the possession and use of the byproduct material to be introduced is authorized by a license issued by an Agreement State;			
§32.12	Same: Records and material transfer reports	64E-5.210(1)(b) and 64E-5.210(2)(c) deleted	NRC*** **(***please note 10 CFR 32.12 has been changed from a Compatibility Category C to a Compatibility Category NRC)**	**Sec. 32.12 is revised to read as follows:** (a) Each person licensed under §32.11 shall maintain records of transfer of byproduct material and file a report with the Director of the Office of Federal and State Materials and Environmental Management Programs by an appropriate method listed in §30.6(a) of this	no	No	

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				chapter, including in the address: ATTN: Document Control Desk/ Exempt Distribution. (1) The report must clearly identify the specific licensee submitting the report and include the license number of the specific licensee. (2) The report must indicate that the byproduct material is transferred for use under §30.14 of this chapter or equivalent regulations of an Agreement State. (b) The report must identify the: (1) Type and quantity of each product or material into which byproduct material has been introduced during the reporting period; (2) Name and address of the person who owned or possessed the product or material into which byproduct			

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				material has been introduced, at the time of the introduction; (3) The type and quantity of radionuclide introduced into each product or material; and (4) The initial concentrations of the radionuclide in the product or material at the time of transfer to the byproduct material by the licensee. (c)(1) The licensee shall file the report, covering the preceding calendar year, on or before January 31 of each year. In its first report after December 17, 2007, the licensee shall separately include data for transfers in prior years not previously reported to the Commission or to an Agreement State. (2) Licensees who permanently discontinue activities authorized by the license issued under §32.11 shall file a report for the			

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				current calendar year within 30 days after ceasing distribution. (d) if no transfers of byproduct material have been made under §32.11 during the reporting period, the report must so indicate. (e)The license shall maintain the record of a transfer for one year after the transfer is included in a report to the Commission.			
§32.13	Same: Prohibition of introduction	64E-5.210(1) 64E-5.210(2) 64E-5.210(3) Changed	C	**Sec. 32.13 is revised to read as follows:** No person may introduce byproduct material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under §30.14 of this chapter or equivalent regulations of an Agreement State, except in accordance	No	No	

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				with a license issued under §32.11.			
§32.14	Certain items containing byproduct material; Requirements for license to apply or initially transfer	NA	NRC	**Sec. 32.14 paragraph (d) is revised to read as follows:** d) The Commission determines that the byproduct material is properly contained in the product under the most severe conditions that are likely to be encountered in normal use and handling.			
§32.15	Same: Quality assurance prohibition of transfer, and labeling	NA	NRC	**Sec. 32.15, paragraph (d) is revised to read as follows:** * * * * (d)(1) Label or mark each unit, except timepieces or hands or dials containing tritium or promethium-147, and its container so that the manufacturer or initial transferor of the product and the byproduct material in the product can be identified.			

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				(2) For ionization chamber smoke detectors, label or mark each detector and its point-of-sale package so that: (i) Each detector has a durable, legible, readily visible label or marking on the external surface of the detector containing: (A) The following statement: ‘‘CONTAINS RADIOACTIVE MATERIAL’’; (B) The name of the radionuclide (‘‘americium-241’’ or ‘‘Am-241’’) and the quantity of activity; and (C) An identification of the person licensed under § 32.14 to transfer the detector for use under § 30.15(a)(7) of this chapter or equivalent regulations of an Agreement State. (ii) The labeling or marking			

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				specified in paragraph (d)(2)(I) of this section is located where it will be readily visible when the detector is removed from its mounting. (iii) The external surface of the point of sale package has a legible, readily visible label or marking containing: (A) The name of the radionuclide and quantity of activity; (B) An identification of the person licensed under § 32.14 to transfer the detector for use under § 30.15(a)(7) or equivalent regulations of an Agreement State; and (C) The following or a substantially similar statement: "THIS DETECTOR CONTAINS RADIOACTIVE MATERIAL. THE PURCHASER IS EXEMPT FROM ANY REGULATORY			

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				REQUIREMENTS.'' (iv) Each detector and point-of-sale package is provided with such other information as may be required by the Commission.			
§32.16	Certain items containing byproduct material: Records and reports of transfer	NA	NRC	**Section 32.16 is revised to read as follows:** (a) Each person licensed under § 32.14 shall maintain records of all transfers of byproduct material and file a report with the Director of the Office of Federal and State Material and Environmental Management Programs by an appropriate method listed in § 30.6(a) of this chapter, including in the address: ATTN: Document Control Desk/Exempt Distribution. (1) The report must clearly identify the specific licensee submitting the report and include the license number of the specific			

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				licensee. (2) The report must indicate that the products are transferred for use under § 30.15 of this chapter, giving the specific paragraph designation, or equivalent regulations of an Agreement State. (b) The report must include the following information on products transferred to other persons for use under § 30.15 or equivalent regulations of an Agreement State: (1) A description or identification of the type of each product and the model number(s), if applicable; (2) For each radionuclide in each type of product and each model number, if applicable, the total quantity of the radionuclide; and (3) The number of units of each			

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				type of product transferred during the reporting period by model number, if applicable. (c)(1) The licensee shall file the report, covering the preceding calendar year, on or before January 31 of each year. In its first report after December 17, 2007, the licensee shall separately include data for transfers in prior years not previously reported to the Commission. (2) Licensees who permanently discontinue activities authorized by the license issued under § 32.14 shall file a report for the current calendar year within 30 days after ceasing distribution. (d) If no transfers of byproduct material have been made under § 32.14 during the reporting period, the report must so indicate. (e) The licensee shall maintain the			

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				record of a transfer for one year after the transfer is included in a report to the Commission.			
§32.17	Resins containing scandium-46 and designed for sand-consolidation NOin oil wells: requirements for license to manufacture, or initially transfer for sale or distribution.	64E-5.210 does not have an equivalent reference to remove.	B	**[Removed]**	NO	NO	
§32.20	Same: Records and material transfer reports	NA	NRC	**Section 32.20 is revised to read as follows:** (a) Each person licensed under § 32.18 shall maintain records of transfer of material identifying, by name and address, each person to whom byproduct material is			

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				transferred for use under § 30.18 of this chapter or the equivalent regulations of an Agreement State and stating the kinds, quantities, and physical form of byproduct material transferred. (b) The licensee shall file a summary report with the Director of the Office of Federal and State Materials and Environmental Management Programs by an appropriate method listed in § 30.6(a) of this chapter, including in the address: ATTN: Document Control Desk/Exempt Distribution. (1) The report must clearly identify the specific licensee submitting the report and include the license number of the specific licensee. (2) The report must indicate that the materials are			

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				transferred for use under § 30.18 or equivalent regulations of an Agreement State. (c) For each radionuclide in each physical form, the report shall indicate the total quantity of each radionuclide and the physical form, transferred under the specific license. (d)(1) The licensee shall file the report, covering the preceding calendar year, on or before January 31 of each year. In its first report after December 17, 2007, the licensee shall separately include the total quantity of each radionuclide transferred for transfers in prior years not previously reported to the Commission. (2) Licensees who permanently discontinue activities authorized by the license issued under § 32.18 shall file a report for the current calendar year within 30			

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				days after ceasing distribution. (e) If no transfers of byproduct material have been made under § 32.18 during the reporting period, the report must so indicate. (f) The licensee shall maintain the record of a transfer for one year after the transfer is included in a summary report to the Commission.			
§32.25	Conditions of licenses issued under §32.22: Quality control, labeling, and reports of transfer	NA	NRC	**Sec. 32.25, paragraph (c) is revised to read as follows:** (c) Maintain records of all transfers and file a report with the Director of the Office of Federal and State Materials and Environmental Management Programs by an appropriate method listed in § 30.6(a) of this chapter, including in the address: ATTN: Document Control Desk/Exempt Distribution.			

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				(1) The report must clearly identify the specific licensee submitting the report and include the license number of the specific licensee. (2) The report must indicate that the products are transferred for use under § 30.19 of this chapter or equivalent regulations of an Agreement State. (3) The report must include the following information on products transferred to other persons for use under § 30.19 or equivalent regulations of an Agreement State: (i) A description or identification of the type of each product and the model number(s); (ii) For each radionuclide in each type of product and each model number, the total quantity of the radionuclide;			

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				(iii) The number of units of each type of product transferred during the reporting period by model number. (4)(i) The licensee shall file the report, covering the preceding calendar year, on or before January 31 of each year. In its first report after December 17, 2007, the licensee shall separately include data for transfers in prior years not previously reported to the Commission. (ii) Licensees who permanently discontinue activities authorized by the license issued under § 32.22 shall file a report for the current calendar year within 30 days after ceasing distribution. (5) If no transfers of byproduct material have been made under § 32.22 during the reporting period, the report must so indicate. (6) The licensee shall maintain			

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				the record of a transfer for one year after the transfer is included in a report to the Commission.			
§32.29	Conditions of licenses issued under §32.26: Quality control, labeling, and reports of transfer	NA	NRC	**Sec. 32.26: Quality control, labeling, and reports of transfer.** (c) Maintain records of all transfers and file a report with the Director of the Office of Federal and State Materials and Environmental Management Programs by an appropriate method listed in § 30.6(a) of this chapter, including in the address: ATTN: Document Control Desk/Exempt Distribution. (1) The report must clearly identify the specific licensee submitting the report and include the license number of the specific			

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				licensee. (2) The report must indicate that the products are transferred for use under § 30.20 of this chapter or equivalent regulations of an Agreement State. (3) The report must include the following information on products transferred to other persons for use under § 30.20 or equivalent regulations of an Agreement State: (i) A description or identification of the type of each product and the model number(s); (ii) For each radionuclide in each type of product and each model number, the total quantity of the radionuclide; (iii) The number of units of each type of product transferred during the reporting period by model number.			

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				(4)(i) The licensee shall file the report, covering the preceding calendar year, on or before January 31 of each year. In its first report after December 17, 2007, the licensee shall separately include data for transfers in prior years not previously reported to the Commission. (ii) Licensees who permanently discontinue activities authorized by the license issued under § 32.26 shall file a report for the current calendar year within 30 days after ceasing distribution. (5) If no transfers of byproduct material have been made under § 32.26 during the reporting period, the report must so indicate. (6) The licensee shall maintain the record of a transfer for one year after the transfer is included in a report to the Commission.			

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Exemptions From Licensing, General Licenses, and Distribution of Byproduct Material: Licensing and Reporting Requirements 10 CFR Parts 30, 31, 32, and 150
(72 FR 58473) RATS ID # 2007-2 Effective date 12/17/07
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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§32.40	Schedule A--prototype tests for automobile lock illuminators.	NA	NRC	[Removed]			
§150.20	Recognition of Agreement State licenses.	64E-5.216(1) is the introductory paragraph of 150.20(b) 64E-5.216(1)(d)2. is the removed portion of 150.20(b)(3)	C	**In Sec. 150.20 paragraph (b) introductory text, and paragraph (b)(3) are revised to read as follows:** (b) Not withstanding any provision to the contrary in any specific license issued by an Agreement State to a person engaging in activities in a non-Agreement State, or in offshore waters under the general license provided in this section, the general licenses provided in this section are subject to all provisions of the Act, now or hereafter in effect, and to all applicable rules, regulations, and orders of the Commission including provisions of	No	No	

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Exemptions From Licensing, General Licenses, and Distribution of Byproduct Material: Licensing and Reporting Requirements 10 CFR Parts 30, 31, 32, and 150
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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				§§30.7(a) through (f), 30.9, 30.10, 30.34, 30.41, and 30.51 through 30.63 of this chapter; §§40.7(a) through (f), 40.9, 40.10, 40.41, 40.51, 40.61 through 40.63, 40.71, and 40.81 of this chapter; §§70.7(a) through (f), 70.9 70.10, 70.32, 7042, 70.52, 70.55, 70.56, 70.60 through 70.62 of this chapter; §§74.11, 74.15, and 74.19 of this chapter; and to the provisions of 10 CFR parts 19, 20 and 71 and subparts C through H of part 34, §§39.15 and 39.31 through39.77 of this chapter. In addition, any person engaging in activities in non-Agreement States, in areas of exclusive Federal jurisdiction within Agreement States, or in offshore waters under the general licenses provided in this section: *** (3) Shall not, in any non-			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				Agreement State, in an area of exclusive Federal jurisdiction within an Agreement State, or in offshore waters, transfer or dispose of radioactive material possessed or used under the general licenses provided in this section, except by transfer to a person who is specifically licensed by the Commission to receive this material.			

Requirements for Expanded Definition of Byproduct Material 10 CFR Parts 20, 30, 31, 32, 33, 35, 50, 61, 62, 72, 110, 150, 170, and 171
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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§20.1003	Definition: Accelerator-produced radioactive material	64E-5-101(4) Also Inclusive in the statutory definition of "Radioactive Material" 404.031(13), FS 404.031(13) "Radioactive material" means any solid, liquid, or gas which emits ionizing radiation spontaneously; however, this definition does not include radioactive wastes regulated pursuant to the hazardous waste management sections of the federal Resource Conservation and Recovery Act of 1976 or the Department of Environmental Protection's assumption of that program.	H&S	**In § 20.1003, the definition of *Accelerator-produced radioactive material,* is added to read as follows:** *Accelerator-produced radioactive material* means any material made radioactive by a particle accelerator.	Yes	No	Florida definition uses the term "Accelerator Produced Material" while NRC uses the term "Accelerator Produced Radioactive Material". FL definition is also used in Machine Registration Program and is more inclusive to pertain to linear accelerators, cyclotrons, that require registration and inspection.

Requirements for Expanded Definition of Byproduct Material 10 CFR Parts 20, 30, 31, 32, 33, 35, 50, 61, 62, 72, 110, 150, 170, and 171
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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
							The wording of the term is identical to NRC definition.
§20.1003	Definition: Byproduct Material	See 64E-5.101(21) proposed language. Until this is completed compliance with the compatibility requirements FL rules uses the term "Radioactive Materials" instead of Byproduct materials to represent our jurisdiction to regulate NARM/NORM including discrete sources of radium. Florida Statutes	[H&S]*** **(***please note 10 CFR 20.1003 Definition of Byproduct Material was changed from a Compatibility Category A to a Compatibility Category H&S)**	**In § 20.1003, the definition of *Byproduct material* is revised to read as follows:** *Byproduct material* means— (1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material; (2) The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium	No	no	Florida rules use the term radioactive materials to include the subset of materials NRC defines as "Byproduct Material". Governors Certification Letter accepted by NRC, specifies that we will regulate this material the same way. Current statutory definition satisfies the

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
		404.031(13) "Radioactive material" means any solid, liquid, or gas which emits ionizing radiation spontaneously; however, this definition does not include radioactive wastes regulated pursuant to the hazardous waste management sections of the federal Resource Conservation and Recovery Act of 1976 or the Department of Environmental Protection's assumption of that program. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.		solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute ''byproduct material'' within this definition; (3)(i) Any discrete source of radium-226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or (ii) Any material that— (A) Has been made radioactive by use of a particle accelerator; and (B) Is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; and			H&S designation.

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				(4) Any discrete source of naturally occurring radioactive material, other than source material, that— (i) The Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and security; and (ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity. * * * *			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§20.1003	Definition: Discrete Source	This definition is a subset of the definition of sealed source (64E-5.101(129) and we consider it to be inclusive with which meets the condition of H&S with the Governors certification letter. To avoid confusion with the language NRC uses under it's jurisdiction (exemptions) we will add this to our rule (64E-5.101(193-new) proposed language	H&S	**In § 20.1003, the definition of *Discrete source* is added to read as follows:** *Discrete source* means a radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or research activities.	Yes	No	This definition is a subset of the definition of sealed source 64E-5.101(129) and we consider it to be inclusive with which meets the condition of H&S with the Governors certification letter. To avoid confusion with the language NRC uses under it's jurisdiction (exemptions) we will add this to our rule 64E-5.101(193-new) proposed language.

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§20.1003	Definition: Particle Accelerator	64E-5.101(98)	H&S	**In § 20.1003, the definition of *Particle accelerator* is added to read as follows:** *Particle accelerator* means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 megaelectron volt. For purposes of this definition, ‘‘accelerator’’ is an equivalent term.	Yes	no	Florida definition does not add the sentence “For Purposes of this definition “accelerator” is an equivalent term”. The term accelerator is also used in our Machine registration rules and it is not appropriate say they are equivalent. For the purposes of the radioactive materials rules we always use the term “particle accelerator”.

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
20.1003	Definition: Waste	Subsection 404.031(14)(b), Florida Statute In addition, the Governors Certification Letter accepted by NRC, we will regulate this material the same way.	B	**In § 20.1003, the definition of *Waste* is added to read as follows:** *Waste* means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in paragraphs (2), (3), and (4) of the definition of Byproduct material set forth in this section.	Yes	No	Florida statutes define "radioactive waste" instead of "waste". The statutory definition of radioactive waste. 404.031(14)(b) is equivalent to the 20.1003 definition. In addition, the Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§20.1009	List of OMB approved information collections		D	N/A	N/A		
§20.2001 (a)(4)	General requirements	64E-5.328(1)(d) See links to referenced sections. 20.2003 = 64E-5.330 20.2004 = 64E-5.329 20.2005 = 64E-5.331 20.2008 = proposed 64E-5.331(1)(d)	C	**In § 20.2001, paragraph (a)(4) is revised to read as follows:** a) * * * (4) As authorized under §§20.2002, 20.2003, 20.2004, 20.2005, or 20.2008.	Yes	No	Florida rule generically says to "as authorized in this subpart instead of listing every section.
§20.2006 (e)	Transfer for disposal and manifests	64E-5.332 64E-5.332(2) includes all radioactive materials including NRC new jurisdiction under the Energy Policy Act. Does not contain (e) statement because FL has always had the regulatory authority to	B	**In § 20.2006, paragraph (e) is added to read as follows:** (e) Any licensee shipping byproduct material as defined in paragraphs (3) and (4) of the definition of *Byproduct material* set forth in § 20.1003 intended for ultimate disposal at a land disposal facility	Yes	No	Florida rules uses the term "radioactive waste" and "radioactive material" which already includes NRC term "Byproduct

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
		regulate discrete radium and NARM which is inclusive in our definition of radioactive material.		licensed under part 61 of this chapter must document the information required on the NRC's Uniform Low- Level Radioactive Waste Manifest and transfer this recorded manifest information to the intended consignee in accordance with appendix G to this part.			materials" No change needed to pick up NRC's additional regulatory authority for NARM and discrete radium where FL has always had that authority and is included in existing definitions. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.

Requirements for Expanded Definition of Byproduct Material 10 CFR Parts 20, 30, 31, 32, 33, 35, 50, 61, 62, 72, 110, 150, 170, and 171
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§20.2008	Disposal of 11e.(3) and 11e.(4) byproduct material	Proposed 64E-5.331(1)(d) Until proposed rule is completed the Governors Certification Letter to regulate the same as other radioactive materials. .	B	**Section 20.2008 is added to read as follows:** (a) Licensed material as defined in paragraphs (3) and (4) of the definition of *Byproduct material* set forth in §20.1003 may be disposed of in accordance with part 61 of this chapter, even though it is not defined as low level radioactive waste. Therefore, any licensed byproduct material being disposed of at a facility, or transferred for ultimate disposal at a facility licensed under part 61 of this chapter, must meet the requirements of §20.2006. (b) A licensee may dispose of byproduct material, as defined in paragraphs (3) and (4) of the definition of *Byproduct material* set forth in §20.1003,	no	no	

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				at a disposal facility authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law, including the Solid Waste Disposal Act, as authorized under the Energy Policy Act of 2005.			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
Part 20 Appendix B	Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage	SEE State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 below. Nitrogen-List of Elements Oxygen-List of Elements Nitrogen-Page 1 Tables 1,2,3 Oxygen-Page 1 Tables 1,2,3 64E-5.101(10) New ALI Ref 64E-5.101(14) New ALI Ref 64E-5.101(37) New ALI Ref 64E-5.1115(3)(a) & (b) New ALI Ref 64E-5.1317(2) New ALI Ref **NO NRC Equivalent** 64E-5.1419(5) New ALI Ref 64E-5.1420(4) New ALI Ref 64E-5.304(4) & (5) New ALI Ref 64E-5.306(1) New ALI Ref 64E-5.307(3)(c) & (5)(a) & (8)(b) New ALI Ref 64E-5.313(2)(b)1. & (3) New ALI Ref. 64E-5.315(2)(a) New ALI Ref 64E-5.326(2) New ALI Ref 64E-5.330(1)(b) & (c)1. New ALI Ref 64E-5.344(7)(a)2. & (d)1. New ALI Ref 64E-5.629(1) & (4) New ALI Ref **NO NRC Equivalent** 64E-5.810(1)& (2) New ALI Ref X-Ray **No NRC equivalent**	A	**In Appendix B to part 20, the List of Elements table is amended by adding Nitrogen and Oxygen in alphabetical order, and page 1 of Tables 1, 2, and 3 following the List of Elements is revised to read as follows:** See tables at the end of the document.	No	No	Needed to amend multiple references to new values incorporated by reference. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§30.3(a)	Activities requiring license	64E-5.201 Does not contain rule language because FL has always had the regulatory authority to regulate discrete radium and NARM which is inclusive in our definition of radioactive material. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.	C	**Section 30.3(a) is revised to read as follows:** (a) Except as provided in paragraphs (b)(2), (b)(3), (c)(2), and (c)(3) of this section and for persons exempt as provided in this part and part 150 of this chapter, no person shall manufacture, produce, transfer, receive, acquire, own, possess, or use byproduct material except as authorized in a specific or general license issued in accordance with the regulations in this chapter.	Yes	No	This section was added for NRC to regulate NARM and discrete radium. Florida has always had the authority to regulate these materials under it's definition of radioactive materials. No change is required to comply with the new NRC authority. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.

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§30.3(b)(1), (2), & (3)	Activities requiring license		NRC	**Section 30.3(b)(1), (2), & (3) is revised to read as follows:** (b)(1) The requirements, including provisions that are specific to licensees, in this part and parts 19, 20, 21, and 71 of this chapter, as well as the additional requirements for specific broad scope, industrial radiography, irradiator, or well logging uses in 10 CFR parts 33, 34, 36, or 39, respectively, shall apply to Government agencies or Federally recognized Indian Tribes on November 30, 2007, when conducting activities under the authority provided by paragraphs (b)(2) and (b)(3) of this section.			

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				(2) A specifically licensed Government agency or Federally recognized Indian Tribe that possesses and uses accelerator-produced radioactive material or discrete sources of radium-226 for which a license amendment is required to authorize the activities in paragraph (a) of this section, may continue to use these materials for uses permitted under this part until the date of the NRC's final licensing determination, provided that the licensee submits an amendment application on or before June 2, 2008. (3) A Government agency or Federally recognized Indian Tribe that possesses and uses accelerator-produced			

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				radioactive material or discrete sources of radium-226 for which a specific license is required in paragraph (a) of this section, may continue to use such material for uses permitted under this part until the date of the NRC's final licensing determination provided that the agency or Indian Tribe submits an application for a license authorizing activities involving these materials on or before December 1, 2008.			
§30.3(c) (1), (2), (3), & (d)	Activities requiring license	64E-5.201	D	N/A	N/A		
§30.4	Definition: Accelerator produced radioactive material	64E-5-101(4) Also Inclusive in the statutory definition of "Radioactive Material" 404.031(13), FS Governors Certification Letter accepted by NRC specifies that we will	H&S	**In § 30.4, the definition of *Accelerator-produced radioactive material,* is added to read as follows:** *Accelerator-produced radioactive material* means	Yes	No	See reply to 20.1003 definition and comments Governors Certification Letter accepted by NRC

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		regulate this material the same way.		any material made radioactive by a particle accelerator.			specifies that we will regulate this material the same way.
§30.4	Definition: Byproduct material	See 64E-5.101(21) proposed language. Until this is completed compliance with the compatibility requirements FL rules uses the term "Radioactive Materials" instead of Byproduct materials to represent our jurisdiction to regulate NARM/NORM including discrete sources of radium. Florida Statutes 404.031(13) "Radioactive material"	[H&S]*** **(***please note 10 CFR 30.4 Definition of Byproduct Material was changed from a Compatibility Category A to a Compatibility Category H&S)**	**In § 30.4, the definition of *Byproduct material* is revised, to read as follows:** *Byproduct material* means— (1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material; (2)(i) Any discrete source of radium-226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or	No	NO	SEE reply to 20.1003 definition and comments above.

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		means any solid, liquid, or gas which emits ionizing radiation spontaneously; however, this definition does not include radioactive wastes regulated pursuant to the hazardous waste management sections of the federal Resource Conservation and Recovery Act of 1976 or the Department of Environmental Protection's assumption of that program. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.		(ii) Any material that (A) Has been made radioactive by use of a particle accelerator; and (B) Is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; and (3) Any discrete source of naturally occurring radioactive material, other than source material, that— (i) The Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				posed by a discrete source of radium-226 to the public health and safety or the common defense and security; and (ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.			
§30.4	Definition: Consortium	See proposed rule text in 64E-5.101(195-New) Existing Florida statutes allow for any associations to be defined as a person and we only issue license to "persons",. 404.031(10), Florida Statutes Defines a Person: "Person" means any individual, corporation, partnership, firm, association, trust, estate, public or private institution,	C	**In § 30.4, the definition of *Consortium,* is added to read as follows:** *Consortium* means an association of medical use licensees and a PET radionuclide production facility in the same geographical area that jointly own or share in the operation and maintenance cost of the PET radionuclide production facility that produces PET radionuclides for use in	no	no	Florida rules already recognize the term "consortium" as an association as defined as a "person" .

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		group, agency, political subdivision of this state, any other state, or political subdivision or agency thereof, and any legal successor, representative, agent, or agency of the foregoing, other than the United States Nuclear Regulatory Commission, or any successor thereto, and other than Federal Government agencies licensed by the United States Nuclear Regulatory Commission, or any successors thereto.		producing radioactive drugs within the consortium for noncommercial distributions among its associated members for medical use. The PET radionuclide production facility within the consortium must be located at an educational institution or a Federal facility or a medical facility.			
§30.4	Definition: Cyclotron	Not added	D	N/A	N/A		
§30.4	Definition: Discrete Source	See proposed rule text 64E-5.101(193-new)	H&S	**In § 30.4, the definition of *Discrete source*, is added to read as follows:** *Discrete source* means a radionuclide that has been processed so that its	no	no	

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				concentration within a material has been purposely increased for use for commercial, medical, or research activities.			
§30.4	Definition: Particle accelerator	See reply to 20.1003 definition and comments above. 64E-5.101(98)	H&S	**In § 30.4, the definition of *Particle accelerator* is added to read as follows:** *Particle accelerator* means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 megaelectron volt. For purposes of this definition, accelerator is an equivalent term.	Yes	No	Florida definition does not add the sentence "For Purposes of this definition "accelerator" is an equivalent term". The term accelerator is also used in our Machine registration rules and it is not appropriate say they are equivalent. For the purposes of the radioactive materials rules we always use the term

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§30.15 (a)(1)(viii)	Certain items containing byproduct material	See proposed rule text 64E-5.203(3)(a)1.h. r	B	In § 30.15, paragraph (a)(1)(viii) is added to read as follows: (a) * * * (1) * * * (viii) 0.037 megabecquerel (1 microcurie) of radium-226 per timepiece in intact timepieces manufactured prior to November 30, 2007.	No	No	
§30.18 (b)	Exempt quantities	See proposed rule text 64E-5.203(2)(e-new) Need to reference a general license that was in effect “A general license is hereby issued to transfer, receive, acquire, own, possess, use, and import the quantities of byproduct materials listed in	B	In § 30.18, paragraph (b) is revised to read as follows: (b) Any person, who possesses byproduct material received or acquired before September 25, 1971, under the general license then provided in § 31.4 of this chapter or similar general license of a State, is exempt from the requirements for a license set forth in	Yes	No	Proposed text needed to list the old 31.100 Appendix A.

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		Section 10CFR 31.100, Schedule A, = Section 10CFR 31.100, Schedule A, = 64E-5.203(2)(e)2-new) provided that no person shall at any tone time possess or use, pursuant to the general licensing provisions of this section, no more than a total of ten such schedule quantities." that was in effect prior to 9/25/1975 as		section 81 of the Act and from the regulations in parts 30 through 34, 36 and 39 of this chapter to the extent that this person possesses, uses, transfers, or owns byproduct material.			
§30.20(a)	Gas and aerosol detectors containing byproduct material	See proposed rule text 64E-5.203(3)(c)1 and 2.	B	**In § 30.20, paragraph (a) is revised to read as follows:** (a) Except for persons who manufacture, process, produce, or initially transfer for sale or distribution gas and aerosol detectors containing byproduct material, any person is exempt from the	No	no	

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				requirements for a license set forth in section 81 of the Act and from the regulations in parts 19, 20, and 30 through 36, and 39 of this chapter to the extent that the person receives, possesses, uses, transfers, owns, or acquires byproduct material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards, and manufactured, processed, produced, or initially transferred in accordance with a specific license issued under § 32.26 of this chapter, which license authorizes the initial transfer of the product for use under this section. This exemption also covers gas and aerosol detectors manufactured or distributed			

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				before November 30, 2007 in accordance with a specific license issued by a State under comparable provisions to § 32.26 of this chapter authorizing distribution to persons exempt from regulatory requirements.			
§30.32(g)	Application for specific licenses	The proposed addition to 64E-5.213(8)(g)	C	**In § 30.32, paragraphs (g)(1) and (g)(2) are revised and paragraphs (g)(3) are added to read as follows:** (g) * * * (1) Identify the source or device by manufacturer and model number as registered with the Commission under § 32.210 of this chapter, with an Agreement State, or for a source or a device containing radium-226 or accelerator-produced radioactive material	Yes	No	NRC NARM/NORM text is included in our term to radioactive materials. The requirements regarding the SSR in 30.32(g)(1) is added.

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				with a State under provisions comparable to § 32.210 of this chapter; or (2) Contain the information identified in § 32.210(c) of this chapter; or (3) For sources or devices containing naturally occurring or accelerator produced radioactive material manufactured prior to November 30, 2007 that are not registered with the Commission under § 32.210 of this chapter or with an Agreement State, and for which the applicant is unable to provide all categories of information specified in §32.210(c) of this chapter, the applicant must provide: (i) All available information identified in § 32.210(c) of			

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				this chapter concerning the source, and, if applicable, the device; and (ii) Sufficient additional information to demonstrate that there is reasonable assurance that the radiation safety properties of the source or device are adequate to protect health and minimize danger to life and property. Such information must include a description of the source or device, a description of radiation safety features, the intended use and associated operating experience, and the results of a recent leak test.			

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§30.32(j)	Application for specific licenses	See proposed rule text 64E-5.210(10)(f) specific to the consortium issue. 64E-5.210(10)(a)(b)1.&2. = 32.32(j)(1) & (2) 64E-5.210(10)(b)3. = 32.32(j)((3) 64E-5.210(10)(c) =30.32(j)(4) reference to 32.72(a)(3) FL has always had the regulatory authority to regulate discrete radium and NARM which is inclusive in our definition of radioactive material. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.	B	**In § 30.32, paragraph (j) is added to read as follows:** (j) An application from a medical facility, educational institution, or Federal facility to produce Positron Emission Tomography (PET) radioactive drugs for noncommercial transfer to licensees in its consortium authorized for medical use under part 35 of this chapter or equivalent Agreement State requirements shall include: (1) A request for authorization for the production of PET radionuclides or evidence of an existing license issued under part 30 of this chapter or Agreement State requirements for a PET radionuclide production	Yes	No	Concept of consortium added to rule.

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				facility within its consortium from which it receives PET radionuclides. (2) Evidence that the applicant is qualified to produce radioactive drugs for medical use by meeting one of the criteria in § 32.72(a)(2) of this chapter. (3) Identification of individual(s) authorized to prepare the PET radioactive drugs if the applicant is a pharmacy, and documentation that each individual meets the requirements of an authorized nuclear pharmacist as specified in § 32.72(b)(2) of this chapter.			

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				(4) Information identified in § 32.72 (a)(3) of this chapter on the PET drugs to be noncommercially transferred to members of its consortium.			
§30.34 (g)	Terms and conditions of licenses	64E-5.628(1) and (2)	H&S*** **(***please note 10 CFR 30.34(g) Terms and Conditions of Licenses was changed from a Compatibility Category D to a Compatibility Category H&S)**	**In § 30.34, paragraph (g) is revised to read as follows:** (g) Each licensee preparing technetium-99m radiopharmaceuticals from molybdenum-99/technetium-99m generators or rubidium-82 from strontium-82/rubidium-82 generators shall test the generator eluates for molybdenum-99 breakthrough or strontium-82 and strontium-85 contamination, respectively, in accordance with § 35.204 of this chapter. The licensee shall record the results of each test and retain each record for 3 years after the record is made.	Yes	No	Florida rules have added additional language to address any parent/daughter generator via license amendment. See 64E-5.628(3)

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§30.34(j)	Terms and conditions of licenses	See proposed rule text 64E-5.210(10)(f) specific to the consortium issue. 404.171, F.S., = 34(j)(1) "Construction. – This chapter is cumulative and is intended to supplement existing laws, and no part shall be construed t o repeal any existing law, specifically enacted for the protection of public health and safety, with the exception of those section included in this chapter" FL has always had the regulatory authority to regulate discrete radium and NARM which is inclusive in our definition of radioactive	B	**In § 30.34, paragraph (j) is added to read as follows:** (j)(1) Authorization under § 30.32(j) to produce Positron Emission Tomography (PET) radioactive drugs for noncommercial transfer to medical use licensees in its consortium does not relieve the licensee from complying with applicable FDA, other Federal, and State requirements governing radioactive drugs. (2) Each licensee authorized under § 30.32(j) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium shall: (i) Satisfy the labeling requirements in § 32.72(a)(4) of this chapter for each PET radioactive drug transport	Yes	No	Does not contain NRC rule language specific to PET because FL has always had the regulatory authority to regulate discrete radium and NARM which is inclusive in our definition of radioactive material. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.

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		material. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way. 64E-5.210(10)(d) &(e) = 32.34(j)(2)(i) & (ii) & 64E-5.210(10)(b)3. = 32.34(j)(3)		radiation shield and each syringe, vial, or other container used to hold a PET radioactive drug intended for noncommercial distribution to members of its consortium. (ii) Possess and use instrumentation to measure the radioactivity of the PET radioactive drugs intended for noncommercial distribution to members of its consortium and meet the procedural, radioactivity measurement, instrument test, instrument check, and instrument adjustment requirements in § 32.72(c) of this chapter. (3) A licensee that is a pharmacy authorized under § 30.32(j) to produce PET radioactive drugs for noncommercial transfer to			The requirements regarding the commercial and noncommercial distribution or radioactive drugs still requires a nuclear pharmacy license by the Board of Pharmacy or a Drug Manufacturer license by the Department of Health Drug, Devices and Cosmetics program.

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				medical use licensees in its consortium shall require that any individual that prepares PET radioactive drugs shall be: (i) an authorized nuclear pharmacist that meets the requirements in § 32.72(b)(2) of this chapter, or (ii) an individual under the supervision of an authorized nuclear pharmacist as specified in § 35.27 of this chapter. (4) A pharmacy, authorized under § 30.32(j) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium that allows an individual to work as an authorized nuclear pharmacist, shall meet the requirements of § 32.72(b)(5) of this chapter.			

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§30.71	Schedule B	Part III Schedule B Exempt Quantities The isotopes are bolded and shaded to help find the ones NRC has added. Cesium 129 (Cs 129) Cobalt 57 (Co 57) Gallium 67 (Ga 67) Germanium 68 (Ge 68) Gold 195 (Au 195) Indium 111 (In 111) Iodine 123 (I 123) Iron 52n (Fe 52) Potassium 43 (K 43) Rubidium 81 (Rb 81) Sodium 22 (Na 22) Yttrium 87 (Y 87) Yttrium 88 (Y 88)	B	**Section 30.71 is amended by adding Cesium 129 (Cs 129), Cobalt 57 (Co 57), Gallium 67 (Ga 67), Germanium 68 (Ge 68), Gold 195 (Au 195), Indium 111 (In 111), Iodine 123 (I 123), Iron 52n (Fe 52), Potassium 43 (K 43), Rubidium 81 (Rb 81), Sodium 22 (Na 22), Yttrium 87 (Y 87), and Yttrium 88 (Y 88) in alphabetical order by element as follows:** See table at end of document.	No	No	These isotopes are currently listed with the specified activities in 30.71 Schedule B.

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§30.72	Schedule C – Quantities of radioactive material requiring consideration of the need for an emergency plan for responding to a release	64E-5.220(1) Radium is bolded and shaded.	H&S	**Section 30.72 is amended by adding radium-226 in alphabetical order to read as follows:** See table at end of document.	No	No	Radium 228 is currently listed as amended 30.72 Schedule C
§31.4	List of OMB approved Information collections		D	N/A	N/A		
§31.5 (b)(1) & (c)(13)	Certain detecting, measuring, gauging, or controlling devices and/or an ionizing atmosphere	64E-5.206(4)(b)1. =31.5(b)(1) 64E-5.206(4)(c)12.a. = 31.5(c)(13)(i) New Comp C designation specified in SRM dated 12/2/2010 and SECY-10-0105.	B C	**In § 31.5, paragraphs (b)(1)(i), (b)(1)(ii), and (c)(13)(i) are revised and paragraph (b)(1)(iii) is added to read as follows:** (b)(1) * * * (i) A specific license issued under § 32.51 of this chapter; or	Yes	Yes	31.5(c)(13)(i) changed to add Ra-226 to the list of isotopes that require GL registration. The Compatibility designation has been changed to C. Florida

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				(ii) An equivalent specific license issued by an Agreement State; or (iii) An equivalent specific license issued by a State with provisions comparable to § 32.51 of this chapter. * * * * * (c) * * * (13)(i) Shall register, in accordance with paragraphs (c)(13)(ii) and (iii) of this section, devices containing at least 370 megabecquerels (10 millicuries) of cesium-137, 3.7 megabecquerels (0.1 millicurie) of strontium-90, 37 megabecquerels (1 millicurie) of cobalt-60, 3.7 megabecquerels (0.1 millicurie) of radium-226, or 37 megabecquerels (1 millicurie) of americium-241			rules register all GL devices except for tritium exit signs. This is no change from our current text.

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				or any other transuranic (i.e., element with atomic number greater than uranium (92)), based on the activity indicated on the label. Each address for a location of use, as described under paragraph (c)(13)(iii)(D) of this section, represents a separate general licensee and requires a separate registration and fee.			
§31.8	Americium-241 in the form of calibration and reference sources		D	N/A	N/A		
§31.11	General license for use of byproduct material for certain in vivo clinical and		D	N/A	N/A		

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	laboratory testing						
§31.12	General license for certain items and self-luminous products containing radium-226	See proposed rule text 64E-5.206(11) Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.	C	**Sections 31.12, 31.13, and 31.14 are redesignated as § 31.21, § 31.22, and § 31.23, respectively, §§31.13 through 31.20 are reserved, and a new § 31.12 is added to read as follows:** (a) A general license is hereby issued to any person to acquire, receive, possess, use, or transfer, in accordance with the provisions of paragraphs (b), (c), and (d) of this section, radium-226 contained in the following products manufac-tured prior to November 30, 2007. (1) Antiquities originally intended for use by the general public. For the	No	No	Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.

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				purposes of this paragraph, antiquities mean products originally intended for use by the general public and distributed in the late 19th and early 20th centuries, such as radium emanator jars, revigators, radium water jars, radon generators, refrigerator cards, radium bath salts, and healing pads. (2) Intact timepieces containing greater than 0.037 megabecquerel (1 microcurie), nonintact timepieces, and timepiece hands and dials no longer installed in timepieces. (3) Luminous items installed in air, marine, or land vehicles. (4) All other luminous products, provided that no more than 100 items are used or stored at the same location at any one time.			

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				(5) Small radium sources containing no more than 0.037 megabecquerel (1 microcurie) of radium-226. For the purposes of this paragraph, ‘‘small radium sources’’ means discrete survey instrument check sources, sources contained in radiation measuring instruments, sources used in educational demonstrations (such as cloud chambers and spinthariscopes), electron tubes, lightning rods, ionization sources, static eliminators, or as designated by the NRC. (b) Persons who acquire, receive, possess, use, or transfer byproduct material under the general license issued in paragraph (a) of this section are exempt from the			

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				provisions of 10 CFR parts 19, 20, and 21, and § 30.50 and 30.51 of this chapter, to the extent that the receipt, possession, use, or transfer of byproduct material is within the terms of the general license; provided, however, that this exemption shall not be deemed to apply to any such person specifically licensed under this chapter. (c) Any person who acquires, receives, possesses, uses, or transfers byproduct material in accordance with the general license in paragraph (a) of this section: (1) Shall notify the NRC should there be any indication of possible damage to the product so that it appears it could result in a loss of the radioactive material. A report containing a brief description of the event, and the remedial			

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				action taken, must be furnished to the Director of the Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001 within 30 days. (2) Shall not abandon products containing radium-226. The product, and any radioactive material from the product, may only be disposed of according to § 20.2008 of this chapter or by transfer to a person authorized by a specific license to receive the radium-226 in the product or as otherwise approved by the NRC. (3) Shall not export products containing radium-226 except in accordance with part 110 of this chapter.			

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				(4) Shall dispose of products containing radium-226 at a disposal facility authorized to dispose of radioactive material in accordance with any Federal or State solid or hazardous waste law, including the Solid Waste Disposal Act, as authorized under the Energy Policy Act of 2005, by transfer to a person authorized to receive radium-226 by a specific license issued under part 30 of this chapter, or equivalent regulations of an Agreement State, or as otherwise approved by the NRC. (5) Shall respond to written requests from the NRC to provide information relating to the general license within 30 calendar days of the date of the request, or other time specified in the request. If the general licensee cannot			

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				provide the requested information within the allotted time, it shall, within that same time period, request a longer period to supply the information by providing the Director of the Office of Federal and State Materials and Environmental Management Programs, by an appropriate method listed in § 30.6(a) of this chapter, a written justification for the request. (d) The general license in paragraph (a) of this section does not authorize the manufacture, assembly, disassembly, repair, or import of products containing radium-226, except that timepieces may be disassembled and repaired.			
~~§32.1~~	~~Purpose and~~		~~NRC~~	**In § 32.1, paragraph (c) is**			

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(c)(1)	scope			**added to read as follows:** (c)(1) The requirements in this part, including provisions that are specific to licensees, shall apply to Government agencies and Federally recognized Indian Tribes with respect to accelerator-produced radioactive material or discrete sources of radium-226 on November 30, 2007 except that the agency or tribe may continue to manufacture or initially transfer items containing accelerator-produced radioactive material or discrete sources of radium-226 for sale or distribution to persons exempted from the licensing requirements of part 30 of this chapter, and to persons generally licensed under part 31 of this chapter, and			

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				radioactive drugs and sources and devices to medical use licensees, until the date of the NRC's final licensing determination, provided that the agency or tribe submits a new license application for these activities on or before December 1, 2008 or an amendment application for these activities on or before June 2, 2008.			
§32.1 (c)(2)	Purpose and scope		D	N/A	N/A		
§32.57	Calibration or reference sources containing americium-241 or radium- 226: Requirements for license to manufacture or initially transfer	64E-5.210(6) Lists NRC Rules by reference.	B	**In § 32.57, the heading and the introductory text are revised to read as follows:** An application for a specific license to manufacture or initially transfer calibration or reference sources containing americium-241 or radium-	Yes	No	Florid Rule text already includes radium 226. NRC rule text requirements listed by reference.

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				226, for distribution to persons generally licensed under § 31.8 of this chapter, will be approved if: (a) The applicant satisfies the general requirements of § 30.33 of this chapter; (b) The applicant submits sufficient information regarding each type of calibration or reference source pertinent to evaluation of the potential radiation exposure, including: (1) Chemical and physical form and maximum quantity of americium 241 or radium-226 in the source; (2) Details of construction and design; (3) Details of the method of incorporation and binding of			

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				the americium-241 or radium-226 in the source; (4) Procedures for and results of prototype testing of sources, which are designed to contain more than 0.005 microcurie of americium-241 or radium-226, to demonstrate that the americium-241 or radium-226 contained in each source will not be released or be removed from the source under normal conditions of use; (5) Details of quality control procedures to be followed in manufacture of the source; (6) Description of labeling to be affixed to the source or the storage container for the source; (7) Any additional information,			

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				including experimental studies and tests, required by the Commission to facilitate a determination of the safety of the source. (c) Each source will contain no more than 5 microcuries of americium-241 or radium-226. (d) The Commission determines, with respect to any type of source containing more than 0.005 microcurie of americium-241 or radium-226, that: (1) The method of incorporation and binding of the americium-241 or radium-226 in the source is such that the americium-241 will not be released or be removed from the source under normal conditions of use and handling of the source; and			

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				(2) The source has been subjected to and has satisfactorily passed the prototype tests prescribed by § 32.102, Schedule C, of this part.			
§32.58	Same: labeling of devices	64E-5.210(6) Lists NRC Rules by reference.	B	**Section 32.58 is revised to read as follows:** Each person licensed under § 32.57 shall affix to each source, or storage container for the source, a label which shall contain sufficient information relative to safe use and storage of the source and shall include the following statement or a substantially similar statement which contains the information called for in the following statement: The receipt, possession, use,	Yes	No	Florid Rule text already includes radium 226. NRC rule text requirements listed by reference.

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				and transfer of this source, Model , Serial No., are subject to a general license and the regulations of the United States Nuclear Regulatory Commission or of a State with which the Commission has entered into an agreement for the exercise of regulatory authority. Do not remove this label. CAUTION-RADIOACTIVE MATERIAL–THIS SOURCE CONTAINS AMERICIUM-241 (or RADIUM-226). DO NOT TOUCH RADIOACTIVE PORTION OF THIS SOURCE _____ (Name of manufacturer or initial transferor)			

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§32.59	Same: Leak testing of each source	64E-5.210(6) Lists NRC Rules by reference.	B	**Section 32.59 is revised to read as follows:** Each person licensed under § 32.57 shall perform a dry wipe test upon each source containing more than 3.7 kilobecquerels (0.1 microcurie) of americium-241 or radium-226 before transferring the source to a general licensee under § 31.8 of this chapter. This test shall be performed by wiping the entire radioactive surface of the source with a filter paper with the application of moderate finger pressure. The radioactivity on the paper shall be measured by using radiation detection instrumentation capable of detecting 0.185 kilobecquerel (0.005 microcurie) of americium-241 or radium-226. If this test discloses	Yes	No	Florid Rule text already includes radium 226. NRC rule text requirements listed by reference.

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				more than 0.185 kilobecquerel (0.005 microcurie) of radioactive material, the source shall be deemed to be leaking or losing americium-241 or radium-226 and shall not be transferred to a general licensee under § 31.8 of this chapter or equivalent regulations of an Agreement State.			
§32.71 (b)(8) & (c)(1)	Manufacture and distribution of byproduct material for certain in vitro clinical or laboratory testing under general license	64E-5.210(8)(b)2 = 32.71 (b)(8) 64E-5.210(8)(c)1 = 32.71 (c)(1)	B	**In § 32.71, paragraph (b)(8) is added, and paragraph (c)(1) is revised to read as follows:** (b) * * * (8) Cobalt-57 in units not exceeding 0.37 megabecquerel (10 microcuries) each. (c) * * *	No	No	Florida rule text already has Co-57 rule text.

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				(1) Identifying the radioactive contents as to chemical form and radionuclide, and indicating that the amount of radioactivity does not exceed 0.37 megabecquerel (10 microcuries) of iodine-131, iodine-125, selenium-75, or carbon-14; 1.85 megabecquerels (50 microcuries) of hydrogen-3 (tritium); or 0.74 megabecquerel (20 microcuries) of iron-59; or Mock Iodine-125 in units not exceeding 1.85 kilobecquerels (0.05 microcurie) of iodine-129 and 0.185 kilobecquerel (0.005 microcurie) of americium-241 each; or cobalt-57 in units not exceeding 0.37 megabecquerel (10 microcuries); and			

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§32.72 (a)(2)(i), (iii), (iv), (v), & (b)	Manufacture, preparation, or transfer for commercial distribution of radioactive drugs, containing byproduct material for certain in vitro clinical or laboratory testing under general license	Any radioactive drug must be prepared by someone registered by FDA, a drug manufacturer or an authorized nuclear pharmacist. See proposed rule text 64E-5.210(8)(f) 64E-5.210(10)(b)1.&2. = 32.72(a)(2)(i)(ii)(iii)(iv)(v) 64E-4.210(10)(b)3.	B	**In § 32.72, paragraphs (a)(2)(i), (a)(2)(iii), (a)(2)(iv), (b)(2)(ii), (b)(4), and (b)(5) are revised, and a new paragraph (a)(2)(v) is added to read as follows:** (a) * * * (2) * * * (i) Registered with the U.S. Food and Drug Administration (FDA) as the owner or operator of a drug establishment that engages in the manufacture, preparation, propagation, compounding, or processing of a drug under 21 CFR 207.20(a); * * * * * (iii) Licensed as a pharmacy by a State Board of Pharmacy; (iv) Operating as a nuclear pharmacy within a Federal	Yes	No	Our rules require PET facilities to meet the same requirements as drug manufacturer or nuclear pharmacy. PET facilities must comply with existing state laws.

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				medical institution; or (v) A Positron Emission Tomography (PET) drug production facility registered with a State agency. * * * * * (b) * * * (2) * * * (ii) This individual meets the requirements specified in § 35.55(b) and 35.59 of this chapter, and the licensee has received an approved license amendment identifying this individual as an authorized nuclear pharmacist; or * * * * * (4) May designate a pharmacist (as defined in § 35.2 of this chapter) as an authorized nuclear pharmacist if: (i) The individual was a nuclear pharmacist preparing only radioactive drugs containing			

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				accelerator-produced radioactive material, and (ii) The individual practiced at a pharmacy at a Government agency or Federally recognized Indian Tribe before November 30, 2007 or at all other pharmacies before August 8, 2009, or an earlier date as noticed by the NRC. (5) Shall provide to the Commission: (i) A copy of each individual's certification by a specialty board whose certification process has been recognized by the Commission or an Agreement State as specified in § 35.55(a) of this chapter with the written attestation signed by a preceptor as required by § 35.55(b)(2) of this chapter; or			

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				(ii) The Commission or Agreement State license, or (iii) Commission master materials licensee permit, or (iv) The permit issued by a licensee or Commission master materials permittee of broad scope or the authorization from a commercial nuclear pharmacy authorized to list its own authorized nuclear pharmacist, or (v) Documentation that only accelerator-produced radioactive materials were used in the practice of nuclear pharmacy at a Government agency or Federally recognized Indian Tribe before November 30, 2007 or at all other locations of use before August 8,			

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				2009, or an earlier date as noticed by the NRC; and (vi) A copy of the State pharmacy licensure or registration, no later than 30 days after the date that the licensee allows, under paragraphs (b)(2)(i) and (b)(2)(iii) of this section, the individual to work as an authorized nuclear pharmacist.			
§32.102	Schedule-C prototype tests for calibration or reference sources containing americium-241	64E-5.210(6) NRC rules text is listed by reference.	B	**In § 32.102, the heading and the introductory paragraph are revised to read as follows:** An applicant for a license under § 32.57 shall, for any type of source which is designed to contain more than 0.185 kilobecquerel (0.005 microcurie) of americium-241 or radium-	Yes	No	Florid Rule text already includes radium 226. NRC rule text requirements listed by reference.

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				226, conduct prototype tests, in the order listed, on each of five prototypes of the source, which contains more than 0.185 kilobecquerel (0.005 microcurie) of americium-241 or radium-226, as follows:			
§33.100	Schedule A		D	N/A	N/A		
§35.2	Definition: Cyclotron		D	N/A	N/A		
§35.2	Definition: Positron Emission Tomography (PET) radionuclide production facility	See proposed rule text 64E-5.101(194-new)	H&S	**In § 35.2, new definition for *Positron Emission Tomography (PET) radionuclide production facility* is added to read as follows:** *Positron Emission Tomography (PET) radionuclide production*	no	No	

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				facility is defined as a facility operating a cyclotron or accelerator for the purpose of producing PET radionuclides.			
§35.10(a)& (g)	Implementation		D	N/A	N/A		
§35.11(a)	License required	64E-5.601(1) and 64E-5.601(4)	C	**In § 35.11, paragraph (a) is revised to read as follows:** (a) A person may manufacture, produce, acquire, receive, possess, prepare, use, or transfer byproduct material for medical use only in accordance with a specific license issued by the Commission or an Agreement State, or as allowed in paragraph (b) or (c) of this section.	Yes	NO	Florida rule, by the definition of radioactive materials, already authorize the use of NARM and discrete radium for medical use.
§35.11 (c)(1)	License required		NRC	**In § 35.11 paragraph (c) is added to read as follows:**			

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				(c)(1) A Government agency or a Federally recognized Indian Tribe, that possesses and uses accelerator-produced radioactive material or discrete sources of radium-226 for which a specific medical use license is required in paragraph (a) of this section, may continue to use such materials for medical uses until the date of the NRC's final licensing determination, provided that the person submits a medical use license application on or before December 1, 2008.			
§35.11 (c)(2)	License required		D	N/A	N/A		

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§35.13 (a)(1)	License amendments		NRC	**In § 35.13, paragraphs (a)(1) is revised to read as follows:** (a) Before it receives, prepares, or uses byproduct material for a type of use that is permitted under this part, but is not authorized on the licensee's current license issued under this part; except that— (1) A Government agency or a Federally recognized Indian Tribe licensee who possesses and uses accelerator-produced radioactive material or discrete sources of radium-226 may continue to use such material for medical uses permitted under this part until the date of the			

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				NRC's final licensing determination, provided that the licensee submits an amendment application on or before June 2, 2008.			
§35.13 (a)(2), (b)(5), (e),	License amendments		D	N/A	N/A		
§35.14 (a) & (b)(5)	Notifications		D	N/A	N/A		
§35.15 (f)	Exemptions regarding Type A specific licenses of broad scope		D	N/A	N/A		
§35.57 (a)(3) & (b)(3)	Training for experienced Radiation Safety Officer, teletherapy or medical physicist, authorized user, and nuclear pharmacist		D	N/A	N/A		

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§35.63 (b)(2)(ii), (b)(2)(iii), & (c)(3)	Determination of dosages of unsealed byproduct material for medical use	64E-5.616 FL requires direct measurement of all doses including unit dose and does not allow decay corrections based on activity, concentrations or volumetric measurements or mathematical calculations described in 35.62(b)(2)(ii)&(iii) & (c)(3) We do not specifically reference PET drugs because it is inclusive in our definition of radioactive materials.	H&S	**In § 35.63, paragraphs (b)(2)(ii) and (c)(3) are revised, and paragraph (b)(2)(iii) is added to read as follows:** (b) * * * (2) * * * (ii) An NRC or Agreement State licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an Investigational New Drug (IND) protocol accepted by FDA; or (iii) A PET radioactive drug producer licensed under § 30.32(j) of this chapter or equivalent Agreement State requirements. (c) * * * (3) Combination of volumetric measurements and	Yes	Yes	Florida rules requires direct measurement of all doses including unit dose,.

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				mathematical calculations, based on the measurement made by: (i) A manufacturer or preparer licensed under § 32.72 of this chapter or equivalent Agreement State requirements; or (ii) A PET radioactive drug producer licensed under § 30.32(j) of this chapter or equivalent Agreement State requirements.			
§35.100 (a) & (b)	Use of unsealed byproduct material for uptake, dilution, and excretion studies for which a written directive is not required	64E-5.626(1) Florida has always regulated PET/NARM isotopes as radioactive materials and required PET producers to obtain a radiopharmacy license to distribute any radioactive drugs.	H&S	**In § 35.100, paragraph (a) and the introductory text of paragraph (b) are revised to read as follows:** (a) Obtained from: (1) A manufacturer or preparer licensed under § 32.72 of this chapter or equivalent Agreement State requirements; or	Yes	No	Florida has always regulated PET/NARM isotopes as radioactive materials and required PET producers to obtain a radiopharmacy license to

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				(2) A PET radioactive drug producer licensed under § 30.32(j) of this chapter or equivalent Agreement State requirements; or (b) Excluding production of PET radionuclides, prepared by:			distribute any radioactive drugs.
§35.200 (a) & (b)	Use of unsealed byproduct material for imaging and localization studies for which a written directive is not required.	64E-5.627(1) Florida has always regulated PET/NARM isotopes as radioactive materials and required PET producers to obtain an radiopharmacy license to distribute any radioactive drugs	H&S	**In § 35.200, paragraph (a) and the introductory text of paragraph (b) are revised to read as follows:** (a) Obtained from: (1) A manufacturer or preparer licensed under § 32.72 of this chapter or equivalent Agreement State requirements; or (2) A PET radioactive drug producer licensed under § 30.32(j) of this chapter or equivalent Agreement State	Yes	No	Florida has always regulated PET/NARM isotopes as radioactive materials and required PET producers to obtain an radiopharmacy license to distribute any radioactive drugs.

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				requirements; or (b) Excluding production of PET radionuclides, prepared by:			
§35.204 (a)	Permissible molybdenum-99 concentrations	64E-5.628(2) 64E-5.628(1)	H&S	**In § 35.204, the heading and paragraph (a) are revised to read as follows:** (a) A licensee may not administer to humans a radiopharmaceutical that contains: (1) More than 0.15 kilobecquerel of molybdenum-99 per megabecquerel of technetium-99m (0.15 microcurie of molybdenum-99 per millicurie of technetium-99m); or (2) More than 0.02 kilobecquerel of strontium-82 per megabecquerel of rubidium-82 chloride injection	no	no	

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				(0.02 microcurie of strontium-82 per millicurie of rubidium-82 chloride); or more than 0.2 kilobecquerel of strontium-85 per megabecquerel of rubidium-82 chloride injection (0.2 microcurie of strontium-85 per millicurie of rubidium-82).			
§35.204 (c) & (d)	Permissible molybdenum-99 concentrations	64E-5.628(1)	D	N/A	N/A		
§ 35.300 (a) & (b)	Use of unsealed byproduct material for which a written directive is required	64E-5.626(2), 64E-5.627(2)&(3), 64E-5.630(1) (2) (3) (4) Florida has always regulated PET/NARM isotopes as radioactive materials and required PET producers to obtain an radiopharmacy license to distribute any radioactive drugs	H&S	**In § 35.300, paragraph (a) and the introductory text of paragraph (b) are revised to read as follows:** (a) Obtained from: (1) A manufacturer or preparer licensed under § 32.72 of this chapter or equivalent Agreement State requirements; or	Yes	no	Florida has always regulated PET/NARM isotopes as radioactive materials and required PET producers to obtain an radiopharmacy license to

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				(2) A PET radioactive drug producer licensed under § 30.32(j) of this chapter or equivalent Agreement State requirements; or (b) Excluding production of PET radionuclides, prepared by:			distribute any radioactive drugs
§35.2204	Records of molybdenum-99 concentrations	64E-5.628(1)(c)	D	N/A	N/A		

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§50.2	Definition: Byproduct Material		NRC	**In § 50.2, the definition of *Byproduct material* is revised to read as follows:** *Byproduct material* means— (1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material; (2)(i) Any discrete source of radium- 226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or (ii) Any material that— (A) Has been made radioactive by use of a particle accelerator; and (B) Is produced, extracted, or			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; and (3) Any discrete source of naturally occurring radioactive material, other than source material, that— (i) The Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and			

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				security; and (ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.			
§61.2	Definition: Waste	NO PART 61 equivalent	B	**In § 61.2, the definition for *Waste* is revised to read as follows:** *Waste* means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in paragraphs (2), (3), and (4) of the definition of *Byproduct material* set forth in § 20.1003 of this chapter.			
§ 62.2	Definition: Low-Level radioactive waste		NRC	**In § 62.2, the definition for *Low-level radioactive waste (LLW)* is revised to read as follows:** *Low-level radioactive waste (LLW)* means radioactive material that— (1) Is not high-level radioactive waste, spent nuclear fuel, or byproduct material (as defined in paragraphs (2), (3), and (4) of the definition of *Byproduct*			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				Material set forth in § 20.1003 of this chapter); and (2) The NRC, consistent with existing law and in accordance with paragraph (1) of this definition, classifies as low level radioactive waste.			
§ 72.3	Definition: Byproduct Material		NRC	**In § 72.3, the definition for *Byproduct material* is revised to read as follows:** *Byproduct material* means— (1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material; (2)(i) Any discrete source of radium- 226 that is produced, extracted, or converted after extraction, before, on, or after			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				August 8, 2005, for use for a commercial, medical, or research activity; or (ii) Any material that— (A) Has been made radioactive by use of a particle accelerator; and (B) Is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; and (3) Any discrete source of naturally occurring radioactive material, other than source material, that— (i) The Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any			

Requirements for Expanded Definition of Byproduct Material 10 CFR Parts 20, 30, 31, 32, 33, 35, 50, 61, 62, 72, 110, 150, 170, and 171
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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and security; and (ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.			
§110.2	Definition: Accelerator produced radioactive material		NRC	**In § 110.2, definition of *Accelerator-produced radioactive material* is added to read as follows:** *Accelerator-produced radioactive material* means any material made radioactive by a particle accelerator.			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§110.2	Definition: Discrete Source		NRC	In § 110.2, definition of *Discrete source* is added to read as follows: *Discrete source* means a radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or research activities.			
§110.2	Definition: Particle accelerator		NRC	**In § 110.2, definition of *Particle accelerator* is added to read as follows:** *Particle accelerator* means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium			

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				at energies usually in excess of 1 megaelectron volt. For purposes of this definition, ''accelerator'' is an equivalent term.			
§150.3	Definition: Byproduct material	See 64E-5.101(21) proposed language. Until this is completed compliance with the compatibility requirements FL rules uses the term "Radioactive Materials" instead of Byproduct materials to represent our jurisdiction to regulate NARM/NORM including discrete sources of radium. Florida Statutes	H&S*** **(***please note 10 CFR 150.3 Definition of Byproduct Material was changed from a Compatibility Category A to a Compatibility Category H&S)**	**no**	no	no	

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
		404.031(13) "Radioactive material" means any solid, liquid, or gas which emits ionizing radiation spontaneously; however, this definition does not include radioactive wastes regulated pursuant to the hazardous waste management sections of the federal Resource Conservation and Recovery Act of 1976 or the Department of Environmental Protection's assumption of that program. Governors Certification Letter accepted by NRC specifies that we will regulate this material the same way.					

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§150.3	Definition: Discrete source	See proposed rule text 64E-5.101(193-new)	H&S	**In § 150.3, the definition of *Discrete source* is added to read as follows:** *Discrete source* means a radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or research activities.	yes	no	See discussion in 20.1003 above.

Appendix B

List of Elements ALI/DAC NEED to ADD N and O

Name	Atomic	
	Symbol	No.
*****	**	**
Nitrogen	N	7
******	**	**
Oxygen	O	8
******	**	**

			Table 1 Occupational Values			Table 2 Effluent Concentration		Table 3 Releases to Sewers
			Col 1	Col 2	Col 3	Col 1	Col. 2	
			Oral Ingestion	Inhalation				
Atomic No.	Radionuclide	Class	ALI (μCi)	ALI (μCi/ml)	DAC (μCi/ml)	Air (μCi/ml)	Water (μCi/ml)	Monthly Average Concentration (μCi/ml)
1	Hydrogen-3	Water, DAC includes skin absorption	8E+4	8E+4	2E-5	1E-7	1E-3	1E-2
		Gas (HT or T_2) Submersion[1] Use above values as HT and T_2 oxidize in air and in the body to HTO						
4	Beryllium-7	W, all compounds except those given for Y	4E+4	2E+4	9E-6	3E-8	6E-4	6E-3
		Y, oxides, halides, and nitrates	-	2E+4	8E-6	3E-8	-	-
4	Beryllium-10	W, see ^{7}Be	1E+3 LLI wall	2E+2	6E-8	2E-10	-	-
			(1E+3)	-	-	-	2E-5	2E-4
		Y, see ^{7}Be	-	1E+1	6E-9	2E-11	-	-
6	Carbon-11[2]	Monoxide	-	1E+6	5E-4	2E-6	-	-
		Dioxide	-	6E+5	3E-4	9E-7	-	-
		Compounds	4E+5	4E+5	2E-4	6E-7	6E-3	6E-2
6	Carbon-14	Monoxide	-	2E+6	7E-4	2E-6	-	-
		Dioxide	-	2E+5	9E-5	3E-7	-	-
		Compounds	2E+3	2E+3	1E-6	3E-9	3E-5	3E-4
7	Nitrogen-13[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
8	Oxygen-15[2]	Submersion[1]	-	-	4E-6	2E-8	-	-
9	Fluorine-18[2]	D, fluorides of H, Li, Na, K, Rb, Cs, and Fr	5e+4 St wall	7E+4	3E-5	1E-7	-	-
			(5E+4)	-	-	-	7E-4	7E3
		W, fluorides of Be, Mg Ca, Sr, Ba, Ra, Al, Ga, In, Ti, As, Sb, Bi, Fe, Ru, Os, Co, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, V, Nb, Ta, Nm, Tc, and Re	-	9e+4	4e-5	1e-7	-	-
		y, LANTHANUM FLUORIDE	-	8e+4	3e-5	1e-7	-	-
11	Sodium-22	D, all compounds	4E+2	6E+2	3E-7	9E-10	6E-6	6E-5
11	Sodium-24	D, all compounds	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
12	Magnesium-28	D, all compounds except those given for W	7E+2	2E+3	7E-7	2E-9	9E-6	9E-5
		W, oxides, hydroxides, carbides, halides, and nitrates	-	1E+3	5E-7	2E-9	-	-
13	Aluminum-26	D, all compounds except those given for W	4E+2	6E+1	3E-8	9E-11	6E-6	6E-5
		W, oxides, hydroxides, carbides,	-	9E+1	4E-8	1E-10	-	-

Footnotes

1 ‘‘Submersion’’ means that values given are for submersion in a hemispherical semi-infinite cloud of airborne material.
2 These radionuclides have radiological half-lives of less than 2 hours. The total effective dose equivalent received during operations with these radionuclides might include a significant contribution from external exposure. The DAC values for all radionuclides, other than those designated Class ‘‘Submersion,’’ are based upon the committed effective dose equivalent due to the intake of the radionuclide into the body and do not include potentially significant contributions to dose equivalent from external exposures. The licensee may substitute 1E–7 µCi/ml for the listed DAC to account for the submersion dose prospectively, but should use individual monitoring devices or other radiation measuring instruments that measure external exposure to demonstrate compliance with the limits. (See § 20.1203.)
* * * * *

30.71 Schedule B = 64E-5 Schedule B

Byproduct material	Microcuries
* * * * *	
Cesium 129 (Cs 129)	100
* * * * *	
Cobalt 57 (Co 57)	100
* * * * *	
Gallium 67 (Ga 67)	100
* * * * *	
Germanium 68 (Ge 68)	10
* * * * *	
Gold 195 (Au 195)	10
* * * * *	
Indium 111 (In 111)	100
* * * * *	
Iodine 123 (I 123)	100
* * * * *	
Iron 52 (Fe 52)	10
* * * * *	
Potassium 43 (K 43)	10
* * * * *	
Rubidium 81 (Rb 81)	10
* * * * *	
Sodium 22 (Na 22)	10
* * * * *	
Yttrium 87 (Y 87)	10
Yttrium 88 (Y 88)	10
* * * * *	

30.72 Schedule C=64E-5.220(1)

Radioactive material 1 (curies)	Release fraction	Quantity
* *	* *	* *
Radium-226	0.001	100
* *	* *	* *

Occupational Dose Records, Labeling Containers, and the Total Effective Dose Equivalent Parts – 19 and 20
(72 FR 68043) RATS ID # 2008-1 Effective date 02/15/08
Date Due for State Adoption 02/15/11

Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§19.13	Notification and reports to individuals	**NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.** NOT Changed 64E-5.903(2) = 10 CFR 19.13(b) & 64E-5.903(4) = 10 CFR 19.13(d) SEE ATTACHED RULE BELOW	C	**In § 19.13, paragraphs (b) and (d) are revised to read as follows:** (b) Each licensee shall make dose information available to workers as shown in records maintained by the licensee under the provisions of 10 CFR 20.2106. The licensee shall provide an annual report to each individual monitored under 10 CFR 20.1502 of the dose received in that monitoring year if: (1) The individual's occupational dose exceeds 1 mSv (100 mrem) TEDE or 1 mSv (100 mrem) to any individual organ or tissue; or (2) The individual requests his or her annual dose report. * * * * * (d) When a licensee is required by §§ 20.2202, 20.2203 or 20.2204 of this chapter to report to the Commission any exposure of an individual to radiation or radioactive material, the licensee shall also provide the individual a report on his or her exposure data included in the report to the Commission. This report must be transmitted no later than the transmittal to the Commission.	Y	N	**NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.** Florida's existing rules 64E-5.903(2) is currently more restrictive than NRC's 10 CFR 19.13(b) Florida's rules require annual reporting to individuals regardless of the dose. This is allowed under the compatibility C designation

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§20.1003	Definition: Total Effective Dose Equivalent (TEDE)	Already submitted to NRC 3/31/11 for review. **NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.** The proposed rule text 64E-5.101(151)	A	**In § 20.1003, the definition of *Total Effective Dose Equivalent (TEDE)* is revised to read as follows:** *Total Effective Dose Equivalent* (TEDE) means the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).	N	N	**NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.**
§20.1201	Occupational Dose Limits for Adults	Already submitted to NRC 3/31/11 for review.	A	**In § 20.1201, paragraph (c) is revised to read as follows:** (c) When the external exposure is	N	N	**NRC has already reviewed RATS 2008-1 and repeated here provided only in context**

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
		NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language. The proposed rule text 64E-5.304(3)		determined by measurement with an external personal monitoring device, the deep-dose equivalent must be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the NRC. The assigned deep-dose equivalent must be for the part of the body receiving the highest exposure. The assigned shallow-dose equivalent must be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure. The deep-dose equivalent, lens dose equivalent, and shallow-dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable.			**to the proposed rule language.**
§20.1905 (g)	Exemptions to Labeling Requirements	No Change- New 20.1905(g) addition is NRC Only	NRC (***please note Part	**In § 20.1905 paragraph (g) is added to read as follows:** (g) Containers holding licensed	NA	NA	**NRC has already reviewed RATS 2008-1 and repeated here provided only in context**

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
		NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.	**20.1905 (a) – (f) still remains a Compatibility Category A only the newly added paragraph (g) is a Compatibility Category NRC)**	material (other than sealed sources that are either specifically or generally licensed) at a facility licensed under Parts 50 or 52 of this chapter, not including non-power reactors, that are within an area posted under the requirements in § 20.1902 if the containers are: (1) Conspicuously marked (such as by providing a system of color coding of containers) commensurate with the radiological hazard; (2) Accessible only to individuals who have sufficient instruction to minimize radiation exposure while handling or working in the vicinity of the containers; and (3) Subject to plant procedures to ensure they are appropriately labeled, as specified at § 20.1904 before being removed from the posted area.			**to the proposed rule language.**
§20.2104	Determination of Prior Occupational Dose	Already submitted to NRC 3/31/11 for review.	D	N/A	N	N	Compatibility designation D

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Change to NRC Section	Title	State Section (Ctrl + Click to follow links)	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
		Listed here for completeness only Rule ext not relisted in this package 64E-5.308 Not Changed					
§20.2205	Reports to Individuals of Exceeding Dose Limits	Already submitted to NRC 3/31/11 for review. **NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.** Rule text not relisted in this package 64E-5.347 Not Changed	C	**Section 20.2205 is revised to read as follows:** When a licensee is required by §§ 20.2203 or 20.2204 to report to the Commission any exposure of an identified occupationally exposed individual, or an identified member of the public, to radiation or radioactive material, the licensee shall also provide the individual a report on his or her exposure data included in the report to Commission. This report must be transmitted no later than the transmittal to the Commission.	N	N	**NRC has already reviewed RATS 2008-1 and repeated here provided only in context to the proposed rule language.**

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
1	64E-5.6011(2)	35.2	2002-2 2006-1	B	**Definitions: Authorized user** Florida's definition of authorized user only refers to a physician. The NRC definition includes dentist and podiatrist. Florida needs to include dentist and podiatrist in its definition of authorized user. There are also two incorrect references. The equivalent to 35.190(a) should be 64E-5.649(1) and not 64E-5.549(1) and the equivalent of 35.290(a) should be 64E-5.650(1) and not 64E-5.550(1). Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to the 10 CFR 35.2 definition Authorized user.	Agree with omission of dentist and podiatrist and the cross reference errors. See proposed rule text.	64E-5.6011(2)
2	64E-5.605(1), 64E-5.607(1)	35.24(b) & (g)	2002-2	H&S	**Authority and responsibilities for the radiation protection program** Florida regulations in 64E-5.607(1) do not provide for Radiation Safety Officer's authority to "Stop unsafe operations" as provided in 10 CFR 35.24(g)(3). Florida needs to make the above change in order to meet Compatibility Category H&S designation assigned to the 10 CFR 35.24(g)(3).	Agree. See proposed rule text	64E-5.607(1)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
3	64E-4.648(4)	35.50(d)	2005-2	B	**Training for Radiation Safety Officer** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor Radiation Safety Officer who meets the requirements specified in 10 CFR 35.50(d). This option needs to be deleted. Florida needs to replace the language "has demonstrated the ability to function independently as a RSO to fulfill the radiation safety related duties for a medical use license." with "has achieved a level of radiation safety knowledge sufficient to function independently as a Radiation Safety Officer for a medical use licensee". Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.50(d).	We acknowledge this rule does not meet NRC compatibility B designation as identified in our 9/7/2010 letter. This text was modeled after NRC Commissioners SRM dated 1/16/2009 approving the recommendations for amending the preceptor attestation requirements specified in SECY 08-0179 and directing NRC Staff to work with NRC ACMUI and Agreement States to develop a proposed rule language for alternative pathway attestation. (SEE Attached SRM). Our rule has adopted SECY 08-0179 recommendations number 2 and 3. The attached proposed rule will adopt recommendation number 1 which	64E-5.648(1)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
						eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	
4	64E-5.656(2)(b)	35.51(b)(2)	2002-2 2005-2 2006-1 2009-1	B	**Training for an authorized medical physicist** Florida's regulation allows the option for the written attestation to be signed	Agree see 64E-5.656(2)(b) proposed rule text where "NRC" is added	64E-5.656(2)(b) 64E-5.656(1)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized medical physicist who meets the requirements specified in 10 CFR 35.51(b). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized medical physicist to fulfill the radiation safety related duties for each type" with "has achieved a level of competency sufficient to function independently as an authorized medical physicist for each type". Florida regulations, while allowing equivalent agreement state requirements do not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.51(b)(2).	The attached 64E-5.656(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
5	64E-5.659(2)(b)	35.55	2002-2 2005-2	B	**Training for an authorized nuclear pharmacist** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized nuclear pharmacist who meets the requirements specified in 10 CFR 35.55(b). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized nuclear pharmacist to fulfill the radiation safety related duties for a medical use license" with "has achieved a level of competency sufficient to function independently as an authorized nuclear pharmacist". Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.55(b)(2).	The attached 64E-5.659(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	64E-5.659(1)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
6	64E-5.626(1)(d)	35.100(b)	2002-2 2005-2 2006-1	H&S	**Use of unsealed byproduct material for uptake, dilution, and excretion studies for which a written directive is not required** Florida's 64E-5.626(1)(d)3 references incorrect sections as to who is authorized do the supervision. This section should parallel the equivalent references in 10 CFR 35.100(b)(3). Florida needs to make the above change in order to meet Compatibility Category H&S designation assigned to 10 CFR 35.100(b)(3).	Agree. See proposed 64E-5.626(1)(d)3. rule text that also requires supervising AU to be qualified under 64E-5.626(1)(d)2. which is H&S parallel to 35.100(b)(3)	64E-5.626(1)(d)3.
7	64E-5.649(2)	35.190(b)	2002-2 2006-1	B	**Training for uptake, dilution and excretion studies** Florida regulation, 64E-5.649(2) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.190(b).	Agree. See proposed 64E-5.649(2) rule text.	64E-5.649(2)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
8	64E-5.649(3)(a)	35.190(c)(1)	2002-2 2006-1 2009-1	B	**Training for uptake, dilution and excretion studies** Florida's 64E-5.649(3)(a)(1) omitted 35.190(c)(1)(i)(E) which includes Radiation Biology as one of the areas of training. Florida regulation, 64E-5.649(3)(a)(2) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.190(c)(1).	Agree. See 64E-5.649(3)(a) proposed rule text. Agree. See 64E-5.649(3)(a)(2) proposed rule text.	64E-5.649(3)(a)1.e. 64E-5.649(3)(a)(2)
9	64E-5.649(3)(b)	35.190(c)(2)	2002-2 2006-1 2009-1	B	**Training for uptake, dilution and excretion studies** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.190(c)(2). This option needs to be deleted. Florida needs to replace the language	The proposed 64E-5.649(3)(b) rule text adds "NRC" The attached 64E-5.649(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board	64E-5.649(1) 64E-5.649(3)(b)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					"has demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for medical uses" with "has achieved a level of competency sufficient to function independently as an authorized user for the medical uses". Florida regulation, 64E-5.649(3)(b) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.190(c)(2).	certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	
10	64E-5.627(1)(d)	35.200(b)	2002-2 2005-2 2006-1	H&S	**Use of unsealed byproduct material for imaging and localization for which a written directive is not required** Florida's 64E-5.627(1)(d)(3) references incorrect sections as to who is authorized do the supervision. This section should parallel the equivalent references in 10 CFR	Agree. See proposed 64E-5.627(1)(d)3. rule text that also requires supervising AU to be qualified under 64E-5.627(1)(d)2. which is H&S parallel to 35.200(b)(3)	64E-5.627(1)(d)3.

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					35.200(b)(3). Florida needs to make the above change in order to meet Compatibility Category H&S designation assigned to 10 CFR 35.200(b)(3).		
11	64E-5.650(2)	35.290(b)	2002-2 2005-2 2006-1	B	**Training for imaging and localization studies** Florida regulation, 64E-5.650(2) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert “Nuclear Regulatory Commission” before “or equivalent agreement state requirements…” 64E-5.650(2) need to delete the reference to paragraph 64E-5.650(3)(a). Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.290(b).	Agree. See 64E-5.650(2) proposed rule text.	64E-5.650(2)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
12	64E-5.650(3)(a)	35.290(c)(1)	2002-2 2005-2 2006-1 2009-1	B	**Training for imaging and localization studies** 64E-5.650(3)(a)2 reverses the order of the and/or references "or sub-subparagraph 64E-5.650(3)(a)2.g., and Rule 64E-5.660," should be "or Rule 64E-5.660 and sub-subparagraph 64E-5.650(3)(a)2.g.," Florida regulation, 64E-5.650(3)(a)2 while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.290(c)(1).	Agree. See proposed rule text.	64E-5.650(3)(a)2.
13	64E-5.650(3)(b)	35.290(c)(2)	2002-2 2005-2 2006-1 2009-1	B	**Training for imaging and localization studies** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.290(c)(2). This option needs to be deleted.	The proposed 64E-5.650(3)(b) rule text adds "NRC" The extra text repeated text 64E-5.650(3)(a) indentified in 64E-5.650(3)(b) has been identified and fixed as technical change. The rule text is attached	64E-5.650(1) 64E-5.650(3)(b)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					Florida needs to replace the language "has demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.650(3)(b) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" The references 64E-5.650(3)(a) is listed twice, remove the second "or 64E-5.650(3)(a)…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.290(c)(2).	The attached 64E-5.650(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
14	64E-5.626(2)(d) 64E-5.627(2)(d) 64E-5.627(3)(d) 64E-5.630(1)(d) 64E-5.630(2)(d) 64E-5.630(3)(d) 64E-5.630(4)(d)	35.300(b)	2002-2 2006-1	B	**Use of unsealed byproduct material for which a written directive is required** As written 64E-5.626(2)(d)2. and 64E-5.627(2)(d)2 only apply to uses of NaI-131 >30 microcuries and do not include other radioactive materials. The phrase "for sodium iodide I-131 in quantities greater than 30 microcuries (1.11 MBq)" should be deleted. Florida's 64E-5.627(1)(d)(3) references incorrect sections as to who is authorized do the supervision. This section should parallel the equivalent references in 10 CFR 35.300(b)(3). The same incorrect references are in 64E-5.627(2)(d)3, 64E-5.627(3)(d)3., 64E-5.630(1)(d)3., 64E-5.630(2)(d)3., 64E-5.630(3)(d)3., and 64E-5.630(4)(d)3.. Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.300(b).	Agreed with 64E-5.626(2)(d)2. and 64E-5.627(2)(d)2. Agree. See proposed 64E-5.626(2)(d)3. (Not identified by NRC but is same as below), 64E-5.627(2)(d)3., 64E-5.627(3)(d)3., 64E-5.630(1)(d)3., 64E-5.630(2)(d)3., 64E-5.630(3)(d)3., 64E-5.630(4)(d)3. rule text that also requires supervising AU to be qualified under 64E-5.627(3)(d)2., 64E-5.630(1)(d)2, 64E-5.630(2)(d)2., 64E-5.630(3)(d)2., 64E-5.630(4)(d)2. which is H&S parallel to 35.300(b)(3) See other changes identified as O3 below	64E-5.626(2)(d)2. 64E-5.626(2)(d)3. 64E-5.627(2)(d)2. 64E-5.627(2)(d)3. 64E-5.627(3)(d)3. 64E-5.630(1)(d)3. 64E-5.630(2)(d)3. 64E-5.630(3)(d)3. 64E-5.630(4)(d)3. Link to Other O3 below
15	64E-5.660(2)(a)	35.390(b)(1)	2002-2 2005-1 2006-1 2009-1	B	**Training for use of unsealed by-product material for which a written directive is required** Florida regulation, 64E-5.660(2)(a)2 while allowing equivalent agreement	Agreed. See proposed rule text	64E-5.660(2)(a)2.

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.390(b)(1).		
16	64E-5.660(2)(b)	35.390(b)(2)	2002-2 2005-2 2006-1 2009-1	B	**Training for use of unsealed by-product material for which a written directive is required** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.390(b)(2). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.660(2)(b)	The proposed 64E-5.660(2)(b) rule text adds "NRC" The attached 64E-5.650(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting	64E-5.660(1) 64E-5.660(2)(b)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.390(b)(2).	Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	
17	64E-5.661(2)	35.392(b)	2002-2 2006-1	B	**Training for the oral administration of sodium iodide I-131 requiring a written directive in quantities less than or equal to 1.22 Gigabecquerels (33 millicuries)** Florida regulation, 64E-5.661(2) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.392(b).	Agreed. See proposed rule text	64E-5.661(2)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
18	64E-5.661(3)(a) – (b)	35.392(c)(1) – (2)	2002-2 2005-2 2006-1 2009-1	B	**Training for the oral administration of sodium iodide I-131 requiring a written directive in quantities less than or equal to 1.22 Gigabecquerels (33 millicuries)** Florida regulation, 64E-5.661(3)(b) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.392(c)(2).	Agreed. See proposed rule text	64E-5.661(3)(b)
19	64E-5.661(3)(c)	35.392(c)(3)	2002-2 2005-2 2006-1 2009-1	B	**Training for the oral administration of sodium iodide I-131 requiring a written directive in quantities less than or equal to 1.22 Gigabecquerels (33 millicuries)** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.392(c)(3). This option needs to be deleted.	The proposed 64E-5.661(3)(c) rule text adds "NRC" The attached 64E-5.661(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways.	64E-5.661(1) 64E-5.661(3)(c)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					Florida needs to replace the language "have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.661(3)(c) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.392(c)(3).	Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	
20	64E-5.662(2)	35.394(b)	2002-2 2006-1	B	**Training for the oral administration of sodium iodide I-131 requiring a written directive in quantities greater than 1.22 Gigabecquerels (33 millicuries)** Florida regulation, 64E-5.662(2) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or	Agreed. See proposed rule text	64E-5.662(2)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.394(b).		
21	64E-5.662(3)(b)	35.394(c)(2)	2002-2 2005-2 2006-1 2009-1	B	**Training for the oral administration of sodium iodide I-131 requiring a written directive in quantities greater than 1.22 Gigabecquerels (33 millicuries)** Florida regulation, 64E-5.662(3)(b) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.394(c)(2).	Agreed. See proposed rule text	64E-5.662(3)(b)
22	64E-5.662(3)(c)	35.394(c)(3)	2002-2 2005-2 2006-1 2009-1	B	**Training for the oral administration of sodium iodide I-131 requiring a written directive in quantities greater than 1.22 Gigabecquerels (33 millicuries)** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency	The proposed 64E-5.662(3)(c) rule text adds "NRC" The attached 64E-5.662(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the	64E-5.662(1) 64E-5.662(3)(c)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.394(c)(3). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.662(3)(c) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.394(c)(3).	attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	

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23	64E-5.663(2)	35.396(b)	2005-2 2006-1	B	**Training for the parenteral administration of unsealed byproduct material requiring a written directive** Florida regulation, 64E-5.663(2) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.396(b).	Agreed. See proposed rule text Note: 64E-5.663(1) also is missing "NRC" which has been added.	64E-5.663(1) and 64E-5.663(2)
24	64E-5.663(4)(b)	35.396(d)(2)	2005-2 2006-1 2009-1	B	**Training for the parenteral administration of unsealed byproduct material requiring a written directive** Florida regulation, 64E-5.663(4)(b) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.396(d)(2).	Agreed. See proposed rule text	64E-5.663(4)(b)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
25	64E-5.663(4)(c)	35.396(d)(3)	2005-2 2006-1 2009-1	B	**Training for the parenteral administration of unsealed byproduct material requiring a written directive** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.396(d)(3). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.663(4)(c) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.396(d)(3).	The proposed 64E-5.663(4)(c) rule text adds "NRC" The attached 64E-5.663(3) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	64E-5.663(3) 64E-5.663(4)(c)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
26	64E-5.633(1)	35.406(a) & (b)	2002-2	H&S	**Brachytherapy sources accountability** Florida's 64E-5.633(1) as written, does not address the essential objective of returning the brachytherapy sources to a secure storage area as soon as possible after removing sources from the patient or human research subject in 10 CFR 35.406(b). Florida needs to make the above change in order to meet Compatibility Category H&S designation assigned to 35.406(b).	Agreed. See proposed rule text 64E-5.633(1)(b)	64E-5.633(1)(b)
27	64E-5.652(2)(a)2	35.490(b)(1)(ii)	2002-2 2006-1 2009-1	B	**Training for use of manual brachytherapy sources** Florida regulation, 64E-5.652(2)(a)2 while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.490(b)(1)(ii).	Agreed. See proposed 64E-5.652(2)(a)2. rule text. This correction is also made in the proposed rule text 64E-5.652(2)(b)	64E-5.652(2)(a)2 64E-5.652(2)(b)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
28	64E-5.652(2)(c)	35.490(b)(3)	2002-2 2005-2 2006-1 2009-1	B	**Training for use of manual brachytherapy sources** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.490(b)(3). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.652(2)(c) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 35.490(b)(3).	The proposed 64E-5.652(2)(c) rule text adds "NRC" The attached 64E-5.652(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	64E-5.652(2)(c) 64E-5.652(1)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
29	64E-5.653(1)	35.491(a)	2002-2 2006-1	B	**Training for ophthalmic use of strontium-90** Florida regulation, 64E-5.653(1) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.491(a).	Agee. See proposed 64E-5.653(1) rule text.	64E-5.653(1)
30	64E-5.653(2)(a)1.	35.491(b)(1)(i)	2002-2	B	**Training for ophthalmic use of strontium-90** In 64E-5.653(2)(a)1 replace "Radiation Protection and instrumentation" with "Radiation physics and Instrumentation". Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 35.491(b)(1)(i).	Our original submitted text contained a typo. See attached rule text that lists "Radiation physics and instrumentation" as required.	64E-5.653(2)(a)1.
31	64E-5.653(2)(c)	35.491(b)(3)	2002-2 2005-2 2006-1 2009-1	B	**Training for ophthalmic use of strontium-90** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the	The proposed 64E-5.653(2)(c) rule text adds "NRC". The current rule adopts SECY 08-0179 recommendations number 2 & 3. Also	64E-5.653(2)(c)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.491(b)(3). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for…." with "has achieved a level of competency sufficient to function independently as an authorized user for ..." Florida regulation, 64E-5.653(2)(c) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.491(b)(3).	note that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	
32	64E-5.654	35.590	2002-2	B	**Training for use of sealed sources for diagnosis** Florida's 64E-5.654 does not address "physician, dentist or podiatrist" as "authorized users". Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.590.	Agree. See 64E-5.654 proposed rule text.	64E-5.654

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
33	64E-5.6412(2)	35.635(b)	2002-2	H&S	**Full calibration measurements on gamma stereotactic radiosurgery units** In 64E-5.6412(2), replace "On-off timers" with "On-off errors". Florida needs to make the above change in order to meet Compatibility Category H&S designation assigned to 35.635(b)(5).	Agree. See 64E-5.6412(2)(e) proposed rule text.	64E-5.6412(2)(e)
34	64E-5.643(1)(a) 64E-5.643(1)(b) 64E-5.644(1)	35.652(a)	2002-2	H&S	**Radiation surveys** 64E-5.643(1) should be revised to include surveys after repair as required by 10 CFR 35.652(b). Florida needs to make the above change in order to meet Compatibility Category H&S designation assigned to 10 CFR 35.652(a).	Agree with Teletherapy surveys missing "after repair" see proposed 64E-5.643(1) rule text.	64E-5.643(1)
35	64E-5.655(2)(a)2	35.690(b)(1)(ii)	2002-2 2006-1 2009-1	B	**Training for use of remote afterloader units, teletherapy units, and gamma stereotactic radiosurgery units** Florida has omitted the equivalent requirements to 10 CFR 35.690(b)(1)(ii). Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.690(b)(1)(ii).	Agree See 64E-5.655(2)(a)2 proposed rule text.	64E-5.655(2)(a)2

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
36	64E-5.655(2)(b)	35.690(b)(2)	2002-2 2006-1 2009-1	B	**Training for use of remote afterloader units, teletherapy units, and gamma stereotactic radiosurgery units** Florida regulation, 64E-5.655(2)(b) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert "Nuclear Regulatory Commission" before "or equivalent agreement state requirements…" Florida needs to make the above change in order to meet Compatibility Category B designation assigned to 10 CFR 35.690(b)(2).	Agree. See proposed 64E-5.655(2)(b) rule text.	64E-5.655(2)(b)
37	64E-5.655(2)(c)	35.690(b)(3)	2002-2	B	**Training for use of remote afterloader units, teletherapy units, and gamma stereotactic radiosurgery units** Florida's regulation allows the option for the written attestation to be signed by a residency program director who represents a consensus of residency program faculties in addition to the written attestation signed by a preceptor authorized user who meets the requirements specified in 10 CFR 35.690(b)(3). This option needs to be deleted. Florida needs to replace the language "have demonstrated the ability to	The proposed 64E-5.655(2)(c) rule text adds NRC. The attached 64E-5.655(1) proposed rule will adopt SECY 08-0179 recommendation number 1 which eliminates the attestation requirement for individuals seeking authorized status via the board certification pathways. Also note	64E-5.655(2)(c) 64E-5.655(1)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
					function independently as an authorized user to fulfill the radiation safety related duties for….” with “has achieved a level of competency sufficient to function independently as an authorized user for ...” Florida regulation, 64E-5.655(2)(c) while allowing equivalent agreement state requirements does not provide for equivalent NRC requirements. Florida needs to insert “Nuclear Regulatory Commission” before “or equivalent agreement state requirements…” Florida needs to make the above changes in order to meet Compatibility Category B designation assigned to 10 CFR 35.690(b)(3).	that during the ACMUI April 12, 2011 meeting, the ACMUI unanimously voted to adopt the SRM (see Summary of ACMUI Meeting Agenda topic 12 ML11109A011). Until NRC adopts similar rule making (which is not identified to begin until 2013) we will remain in disagreement with this rule. This issue is of high importance to medical authorized users in Florida and has the support of our Medical Advisory Council.	
38	64E-5.101(85)(a)12. 64E-5.101(85)(b)2.g 64E-5.345(b)	35.3045(b)	2002-2	C	**Report and notification of a medical event** Florida’s definition for a medical event requires a dose criteria to be met for non-written directives procedures which is less restrictive than requirements in 35.3045(b). Florida needs to make the above change in order to meet Compatibility Category C designation assigned to 10CFR 35.3045(b).	Agree that 64E-5.101(85)(b)2.g (non-written directives) needs to be removed from also meeting the dose criteria. Also deleted 64E-5.101(85)(b)2.f which only applies to written directives and is included in 64E-5.101(85)(a)11.	64E-5.101(85)

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
O1	64E-5.632	35.400	?	H&S		Florida inadvertently left the comma and word “diagnostic” where obviously these procedures are for therapy only.	64E-5.632
O2	64E-5.627(3)	35.300	?	H&S		The proposed 64E-5.627(3) rule text deletes the word “Only” to remove conflicts with issued license documents that lists 64E-5.627(1) which is inclusive of 64E-5.627(3). This still meets the H&S designation of 35.300	64E-5.627(3)
O3	64E-5.630	35.300	?	H&S		The proposed 64E-5.630(2), 64E-5.630(3), 64E-5.630(4), rule text deletes the word “Only” to remove conflicts with issued license documents that lists 64E-5.630(1) which is inclusive of 64E-5.630(2)(3)(&(4) This still meets the H&S designation of 35.300	64E-5.630(2), 64E-5.630(3), 64E-5.630(4), Link to Item 14 above

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
O4	64E-5.6422	35.645(c)	?	H&S		Changes spot checks to be performed monthly and not at all the times specified in 64E-5.6422(1)	64E-5.6422(2)
O5	64E-5.609	None	?			Change word perspective to respective (or delete word)	64E-5.609(6)
O6	64E-5.614	None	?	D		Provides the option to also record the name on the individual instead of the initials	64E-5.614(2)(g)
O7	64E-5.101(39)	20.1003	?	A	**Definition of "Dose"**	Florida definition is missing CEDE requirement. Self Identified.	64E-5.101(39)
O8	64E-5.6251	35.457	?	H&S	**Therapy related computer systems for 35.400 procedures**	Changes title to "Manual " Therapy related computer systems so not to be confused with section 64E-5.645 with same title but for HDR/GK/Tele	64E-5.6251
O9	64E-5.645	35.657(a) – (e)	?	H&S	**Therapy related computer systems for 35.600 procedures.**	Changes title to "Remoter Afterloader, GK, Tele Therapy Related computer systems to not be confused with section 64E-5.6251 with same title for 35.400 materials.	64E-5.645 Record Keeping Addition

	STATE SECTION	NRC SECTION	RATS ID	CAT	NRC SUBJECT and COMMENTS 11/8/2010 letter	FL Response	Proposed FL Rule with Link (Ctrl + Click to follow)
						Also adds a record keeping requirement that NRC does not have.	
O10	64E-5.204	NA	?	?	**License category descriptions for fees**	In 2/08 HDR was defined to include High, Medium, low or pulsed dose rate remote afterloaders. Language updates this change	64E-5.204(2)(e)5.a.(II) &(III) and 64E-5.204(2)f.(II)
O11	64E-5.210(4)	No	?	?	**Typo**	Typo left word "if" out	64E-5.210(4)(d)1.
O12	64E-5.1501(2)	Part 71	?	?		Removes date limitation for determining A1 and A2 values	64E-5.1501(2)
O13	64E-5.1502(2)(a)	Part 71	?	?		Removes date limitations for transportation of radioactive materials	64E-5.1502(2)(a)

ATTACHED RULES LISTED ABOVE IN SUPPORT OF RATS 2007-2 and 2007-3 (EPA)

64E-5.101 Definitions

(4) "Accelerator-produced material" means any material made radioactive by a particle accelerator. Ctrl + Click Here to Return to RATS 2007-3 20.1003 Def AccProdRam Ctrl + Click Here to Return to RATS 2007-3 30.4 Def AccProdRam

(10) “Airborne radioactivity area” means a room, enclosure or operating area in which airborne radioactive materials exist in concentrations:

(a) In excess of the derived air concentrations (DACs) specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, which is herein incorporated by reference and which is available from the department, or Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(b) To such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours.

(14) “Annual limit on intake” (ALI) means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by Reference Man that would result in a committed effective dose equivalent of 5 rem (0.05 sievert) or a committed dose equivalent of 50 rem (0.5 sievert) to any individual organ or tissue. ALI values for intake by ingestion and by inhalation of selected radionuclides are given in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I, Columns 1 and 2. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(21) “Byproduct material” means:

(a) Any radioactive material, except special nuclear material, yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material; and

(b) The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface waste resulting from uranium or thorium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute byproduct material within this definition.

(c)1. Any discrete source of radium-226 that is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; or

2. Any material that meets the following:

a. Has been made radioactive by use of a particle accelerator; and

b. Is produced, extracted, or converted after extraction, before, on, or after August 8, 2005, for use for a commercial, medical, or research activity; and

(d) Any discrete source of naturally occurring radioactive material, other than source material, that meets the following:

a. The U.S. Nuclear Regulatory Commission, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, the Secretary of Homeland Security, and the head of any other appropriate Federal agency, determines would pose a threat similar to the threat posed by a discrete source of radium-226 to the public health and safety or the common defense and security; and

b. Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity. Ctrl + Click Here to Return to RATS 2007-3 20.1003_ByproductMaterial Ctrl + Click Here to Return to RATS 2007-3 30.4_ByproductMaterial Ctrl + Click Here to Return to RATS 2007-3 150.3_ByproductMaterial

(37) “Derived air concentration” (DAC) means the concentration of a given radionuclide in air which, if breathed by Reference Man for a working year of 2,000 hours under conditions of light work, results in an intake of one ALI. For purposes of these rules, the condition of light work is an inhalation rate of 1.2 cubic

meters of air per hour for 2,000 hours in a year. DAC values are given in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I, Column 3. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(39) "Dose" is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent. For the purposes of these rules, "radiation dose" is an equivalent term. **Self Identified equivalent to 20.1003** Ctrl + Click Here to Return to Other O7

(85) "Medical event" means the administration of:

(a) Radioactive materials or radiation from radioactive materials requiring a written directive that results in the following:

1. A dose that differs from the prescribed dose or dose that would have resulted from the prescribed dosage by more than 0.05 Sv (5 rem) effective dose equivalent, 0.5 Sv (50 rem) to an organ or tissue, or 0.5 Sv (50 rem) shallow dose equivalent to the skin;

2. When the total dose delivered differs from the prescribed dose by 20 percent or more;

3. The total dosage delivered differs from the prescribed dosage by 20 percent or more or falls outside the prescribed dosage range;

4. The fractionated dose delivered differs from the prescribed dose, for a single fraction, by 50 percent or more;

5. A dose that exceeds 0.05 Sv (5 rem) effective dose equivalent, 0.5 Sv (50 rem) to an organ or tissue, or 0.5 Sv (50 rem) shallow dose equivalent to the skin;

6. An administration of a wrong radioactive drug containing radioactive material;

7. An administration of a radioactive drug containing radioactive material by the wrong route of administration;

8. An administration of a dose or dosage to the wrong individual or human research subject;

9. An administration of a dose or dosage delivered by the wrong mode of treatment;

10. A leaking sealed source where the patient or human research subject is contaminated;

11. A dose to the skin or an organ or tissue other than the treatment site that exceeds by 0.5 Sv (50 rem) to an organ or tissue and 50 percent or more of the dose expected from the administration defined in the written directive (excluding, for permanent implants, seeds that were implanted in the correct site but migrated outside the treatment site); or

12. Any medical use that results or will result in unintended permanent functional damage to an individual's organ or a physiological system, as determined by a physician.

(b) Radioactive materials or radiation from radioactive materials not requiring a written directive that result in either of the following:

1. A dose that differs from the prescribed dose or dose that would have resulted from the prescribed dosage by more than 0.05 Sv (5 rem) effective dose equivalent, 0.5 Sv (50 rem) to an organ or tissue, or 0.5 Sv (50 rem) shallow dose equivalent to the skin; and

a. When the total dose delivered differs from the prescribed dose by 20 percent or more;

b. The total dosage delivered differs from the prescribed dosage by 20 percent or more or falls outside the prescribed dosage range;

c. The fractionated dose delivered differs from the prescribed dose, for a single fraction, by 50 percent or more; or

2. A dose that exceeds 0.05 Sv (5 rem) effective dose equivalent, 0.5 Sv (50 rem) to an organ or tissue, or 0.5 Sv (50 rem) shallow dose equivalent to the skin; and

a. An administration of a wrong radioactive drug containing radioactive material;

b. An administration of a radioactive drug containing radioactive material by the wrong route of administration;

c. An administration of a dose or dosage to the wrong individual or human research subject;

d. An administration of a dose or dosage delivered by the wrong mode of treatment; or

e. A leaking sealed source where the patient or human research subject is contaminated.; ~~f. A dose to the skin or an organ or tissue other than the treatment site that exceeds by 0.5 Sv (50 rem) to an organ or tissue and 50 percent or more of the dose expected from the administration defined in the written directive (excluding, for permanent implants, seeds that were implanted in the correct site but migrated outside the treatment site); or~~

3. ~~g.~~ Any medical use that results or will result in unintended permanent functional damage to an individual's organ or a physiological system, as determined by a physician. Ctrl + Click Here to GO Back to Item 38 NRC 11-8-2010 Ltr

(c) Radiation from a therapeutic x-ray machine or particle accelerator that result in any of the following:

1. Any medical use that results or will result in unintended permanent functional damage to an individual's organ or a physiological system, as determined by a physician;

2. An administration of a dose to the wrong individual or human research subject;

3. An administration of a dose delivered by the wrong mode of treatment, wrong treatment, or wrong treatment site;

4. When treatment consists of three or fewer fractions and the calculated total administered dose differs from the total prescribed dose by more than 10 percent of the total prescribed dose;

5. When the calculated weekly administered dose is 30 percent greater than the weekly prescribed dose; or

6. When the calculated total administered dose differs from the total prescribed dose by more than 20 percent of the total prescribed dose.

(98) "Particle accelerator" means any machine capable of accelerating electrons, protons, deuterons, or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 MeV. Ctrl + Click Here to Return to RATS 2007-3 20.1003_Particle Accelerator Ctrl + Click Here to Return to RATS 2007-3 30.4_Particle Accelerator

(129) "Sealed source" means radioactive material that is encased in a capsule designed to prevent release or escape of the radioactive material. (Pursuant to 120.54(6) Florida Statutes, 64E-5.101(133) is substantively identical to 10 CFR 30.4 published on 01/01/2007.) Ctrl + Click Here to Return to RATS 2007-3 20.1003_DiscreteSource

(151) "Total effective dose equivalent (TEDE)" means the sum of the effective ~~deep~~ dose equivalent for external exposures and the committed effective dose equivalent for internal exposures. Ctrl + Click Here to Return to RATS 2008-1 20.1003 TEDE (Previously submitted)

(193-New) "Discrete source" means a radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or research activities. Ctrl + Click Here to Return to RATS 2007-3 30.4 Def Discrete Source Ctrl + Click Here to Return to RATS 2007-3 30.4 Def Discrete Source Ctrl + Click Here to Return to RATS 2007-3 150.3 Def Discrete Source

(194-NEW) "Positron Emission Tomography (PET) radionuclide production facility" means a facility operating a cyclotron or accelerator for the purpose of producing PET radionuclides. Ctrl + Click Here to Return to RATS 2007-3 35.2 Def PET Facility

(195-NEW) "*Consortium"* means an association of medical use licensees and a PET radionuclide production facility in the same geographical area that jointly own or share in the operation and maintenance cost of the PET radionuclide production facility that produces PET radionuclides for use in producing radioactive drugs within the consortium for noncommercial distributions among its associated members for medical use. The PET radionuclide production facility within the consortium must be located at an educational institution or a Federal facility or a medical facility. Ctrl + Click Here to Return to RATS 2007-3 30.4 Def Consortium

64E-5.201 Licensing of Radioactive Material. Ctrl + Click Here to Return to RATS 2007-3 30.3(a) Ctrl + Click Here to Return to RATS 2007-3 30.3c)&(d)

(1) This part provides for the licensing of radioactive material. No person shall receive, possess, use, transfer, own or acquire radioactive material except as authorized in a specific or general license issued pursuant to this part or as otherwise provided in this part. Unless otherwise specified in the license or these rules, no licensee shall use radioactive materials:

(a) In or on human beings;

(b) In field applications where radioactive material is released to the environment;

(c) In products distributed to the public;

(d) In animals, plants, or their products which will be used for human consumption; or

(e) In plants or animals where their products are released to the environment.

(2) In addition to the requirements of this part, all licensees are subject to the requirements of Parts I, III, IX and XV. Licensees engaged in industrial radiographic operations are also subject to the requirements of Part IV, licensees using radionuclides in the healing arts are subject to the requirements of Part VI and licensees engaged in wireline and subsurface tracer studies are subject to the requirements of Part XI.

(3) The Procedures for Radioactive Materials Enforcement Actions, May 2000, which is available from the department and which is herein incorporated by reference, will be used to determine enforcement actions to be taken.

(4) Any license may be revoked, suspended or modified, in whole or in part, for any material false statement in the application or any statement of fact required under provisions of the law, or because of conditions revealed by such application or statement of fact on any report, record or inspection or other means which would warrant the Department to refuse to grant a license on an original application, or for violation of, or failure to observe any of the terms and conditions of the law or of the license, a rule, or an order of the Department.

64E-5.203 Radioactive Material Other Than Source Material - Exemptions.

(1) Exempt Concentrations.

(a) 1. Except as provided in this section, any person is exempt from this part to the extent that such person receives, possesses, uses, transfers, owns or acquires products containing radioactive material introduced in concentrations not in excess of those listed in Schedule A.

2. A manufacturer, processor, or producer of a product or material is exempt from the requirements for a license to the extent that this person transfers radioactive material contained in a product or material in concentrations not in excess of those specified in Schedule A and introduced into the product or material by a licensee holding a specific license issued by the U.S. Nuclear Regulatory Commission expressly authorizing such introduction. This exemption does not apply to the transfer of radioactive material contained in any food, beverage, cosmetic, drug, or other commodity or product designed for ingestion or inhalation by, or application to, a human being. Ctrl + Click Here to Return to RATS 2007-2 §30.14

(b) No person may introduce radioactive material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under (1)(a), above, or equivalent regulations of the U.S. Nuclear Regulatory Commission, an agreement state or Licensing State, except in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.11~~64E-5.210 or the general license provided in 64E-5.216~~. Ctrl + Click Here to Return to RATS 2007-2 §30.14

(2) Exempt Quantities.

(a) Except as provided in (2)(b) through (e) ~~and (c)~~, below, any person is exempt from these regulations to the extent that such person receives, possesses, uses, transfers, owns or acquires radioactive material in individual quantities each of which does not exceed the applicable quantity set forth in Schedule B. Ctrl + Click Here to Return to RATS 2007-2 §30.18

(b) This paragraph does not authorize the production, packaging or repackaging of radioactive material for purposes of commercial distribution, or the incorporation of radioactive material into products intended for commercial distribution.

(c) No person may, for purposes of commercial distribution, transfer radioactive material in the individual quantities set forth in Schedule B, knowing or having reason to believe that such quantities of radioactive material will be transferred to persons exempt under this section or equivalent regulations of the

U.S. Nuclear Regulatory Commission, an agreement state or Licensing State, except in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission, pursuant to Section 32.18 of 10 CFR Part 32, or by the department, pursuant to 64E-5.210(2), which license states that the radioactive material may be transferred by the licensee to persons exempt under this subsection or the equivalent regulations of the U.S. Nuclear Regulatory Commission, an agreement state or Licensing State. Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing by-product material whose subsequent possession, use, transfer, and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C., 20555.

(d) No person may, for purposes of producing an increased radiation level, combine quantities of byproduct material covered by this exemption so that the aggregate quantity exceeds the limits set forth in Schedule B, except for radioactive material combined within a device placed in use before May 3, 1999, or as otherwise permitted by the regulations in this part. Ctrl + Click Here to Return to RATS 2007-2 §30.18

(e) 1. Any person, who possesses radioactive material received or acquired before September 25, 1971, under the then existing general license issued to transfer, receive, acquire, own, possess, use and import quantities of radioactive materials listed in Subparagraph 64E-5.203(2)(e)2. Table of General Licensed Quantities prior to September 25, 1971 below, provided that no person shall at any one time possess or use, pursuant to the general license provisions of this section, more than a total of ten such quantities. Ctrl + Click Here to Return to RATS 2007-3 §30.18

2. Below is the Table of General Licensed Quantities prior to September 25, 1971:

	Radioactive material	Column No. I Not as a sealed source (microcuries)	Column No. III As a sealed source (microcuries)
a	Antimony (Sb 124)	1	10
b	Arsenic 76 (As 76)	10	10
c	Arsenic 77 (As 77)	10	10
d	Barium 140 – Lanthanum 140 (Ba La 140)	1	10
e	Beryllium 7 (Be 7)	50	50
f	Cadmium 109 – Silver 109 (Cd Ag 109)	10	10
g	Calcium 45 (Ca 45)	10	10
h	Carbon 14 (C 14)	50	50
i	Cerium 144 – Praseodymium (Ce Pr 144)	1	10
j	Cesium – Barium 137 (Cs Ba 137)	1	10
k	Chlorine 36 (Cl 36)	1	10
l	Chromium 51 (Cr 51)	50	50
m	Cobalt 60 (Co 60)	1	10
n	Copper 64 (Cu 64)	50	50
o	Europium 154 (Eu 154)	1	10
p	Fluorine 18 (F 18)	50	50
q	Gallium 72 (Ga 72)	10	10
r	Germanium 71 (Ge 71)	50	50
s	Gold 198 (Au 198)	10	10
t	Gold 199 (Au 199)	10	10
u	Hydrogen 3 (Tritium) (H 3)	250	250
v	Indium 114 (In 114)	1	10
w	Iodine 131 (I-131)	10	10
x	Iridium 192 (Ir 192)	10	10
y	Iron 55 (Fe 55)	50	50

z	Iron 59 (Fe 59)	1	10
aa	Lanthanum 140 (La 140)	10	10
bb	Manganese 52 (Mn 52)	1	10
cc	Manganese 56 (Mn 56)	50	50
dd	Molybdenum 99 (Mo 99)	10	10
ee	Nickel 59 (Ni 59)	1	10
ff	Nickel 63 (Ni 63)	1	10
gg	Niobium 95 (Nb 95)	10	10
hh	Palladium 109 (Pd 109)	10	10
ii	Palladium 103 – Rhodium 103 (Pd-Rh 103)	50	50
jj	Phosphorus 32 (P 32)	10	10
kk	Polonium 210 (Po 210)	0.1	1
ll	Potassium 42 (K 42)	10	10
mm	Praseodymium 143 (Pr 143)	10	10
nn	Promethium 147 (Pm 147)	10	10
oo	Rhenium 186 (Re 186)	10	10
pp	Rhodium 105 (Rh 105)	10	10
qq	Rubidium 86 (Rb 86)	10	10
rr	Ruthenium 106 – Rhodium 106 (Ru Rh 106)	1	10
ss	Samarium 153 (Sm 153)	10	10
tt	Scandium 46 (Sc 46)	1	10
uu	Silver 105 (Ag 105)	1	10
vv	Silver 111 (Ag 111)	10	10
ww	Sodium 22 (Na 22)	10	10
xx	Sodium 24 (Na 24)	10	10
yy	Strontium 89 (Sr 89)	1	10
zz	Strontium 89 – Yttrium 90 (Sr Y 90)	0.1	1
aaa	Sulfur 35 (S 35)	50	50
bbb	Tantalum 182 (Ta 182)	10	10
ccc	Technetium 96 (Tc 96)	1	10
ddd	Technetium 99 (Tc 99)	1	10
eee	Tellurium 127 (Te 127)	10	10
fff	Tellurium 129 (Te 129)	1	10
ggg	Thallium 204 (Tl 204)	50	50
hhh	Tin 112 (Sn 113)	10	10
iii	Tungsten 185 (W 185)	10	10
jjj	Vanadium 48 (V 48)	1	10
kkk	Yttrium 90 (Y 90)	1	10
lll	Yttrium 91 (Y 91)	1	10
mmm	Zinc 65 (Zn 65)	10	10
nnn	Beta or Gamma emitting radioactive material not listed above	1	10

Ctrl + Click Here to Return to RATS 2007-3 §30.18

(3) Exempt Items.

(a) Certain Items Containing Radioactive Material. Except for persons who apply radioactive material to, or persons who incorporate radioactive material into, the following products, any person is exempt from these regulations to the extent that he receives, possesses, uses, transfers, owns or acquires the following products. Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing by-product material whose subsequent

possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C., 20555:

1. Timepieces, hands or dials containing not more than the following specified quantities of radioactive material and not exceeding the following specified amount of radioactive material or dose rate, as applicable:

b. Five millicuries (185 MBq) of tritium per hand;

c. Fifteen millicuries (555 MBq) of tritium per dial; bezels when used shall be considered as part of the dial;

d. One hundred microcuries (3.7 MBq) of promethium 147 per watch or two hundred microcuries (7.4 MBq) of promethium 147 per any other timepiece;

e. Twenty microcuries (0.74 MBq) of promethium 147 per watch hand or 40 microcuries (1.48 MBq) of promethium 147 per other timepiece hand;

f. Sixty microcuries (2.22 MBq) of promethium 147 per watch dial or 120 microcuries (4.44 MBq) of promethium 147 per other timepiece dial; bezels, when used, shall be considered as part of the dial; and

g. The radiation dose rate from hands and dials containing promethium 147 or radium 226 will not exceed, when measured through 50 milligrams per square centimeter of absorber:

(I) For wrist watches, 0.1 millirad (1 µGy) per hour at
10 centimeters from any surface;

(II) For pocket watches, 0.1 millirad (1 µGy) per hour at
1 centimeter from any surface. Radium shall not be used for pocket watches; and

(III) For any other timepiece, 0.2 millirad (2 µGy) per hour at 10 centimeters from any surface.

h. One microcurie (37 kBg) of radium 226 per timepiece in intact timepieces manufactured ~~acquired~~ prior to November 30, 2007. ~~January 1, 1989.~~ Ctrl + Click Here to Return to RATS 2007-3 §30.15

~~2. Lock illuminators containing not more than 15 millicuries (555 MBq) of tritium or not more than 2 millicuries (74 MBq) of promethium 147 installed in automobile locks. The radiation dose rate from each lock illuminator containing promethium 147 will not exceed 1 millirad (10 µGy) per hour at 1 centimeter from any surface when measured through 50 milligrams per square centimeter of absorber.~~ DELETE = 30.15(a)(2) Ctrl + Click Here to Return to RATS 2007-2 §30.15

3. Precision balances containing not more than 1 millicurie (37 MBq) of tritium per balance or not more than 0.5 millicurie (18.5 MBq) of tritium per balance part manufactured before December 12, 2007. MODIFIED = 30.15(a)(3) Ctrl + Click Here to Return to RATS 2007-2 §30.15

~~4. Automobile shift quadrants containing not more than 25 millicuries (925 MBq) of tritium.~~ DELETE = 30.15(a)(4) Ctrl + Click Here to Return to RATS 2007-2 §30.15

5. Marine compasses containing not more than 750 millicuries
(27.8 GBq) of tritium gas and other marine navigational instruments containing not more than 250 millicuries (9.25 GBq) of tritium gas manufactured before December 12, 2007 . MODIFIED = 30.15(a)(5) Ctrl + Click Here to Return to RATS 2007-2 §30.15

~~6. Thermostat dials and pointers containing not more than
25 millicuries (925 MBq) of tritium per thermostat.~~ DELETE = 30.15(a)(6) Ctrl + Click Here to Return to RATS 2007-2 §30.15

7. Electron tubes, including spark gap tubes, power tubes, gas tubes including glow lamps, receiving tubes, microwave tubes, indicator tubes, pick-up tubes, radiation detection tubes and any other completely sealed tube that is designed to conduct or control electrical currents; provided, that the radiation dose rate from each electron tube containing radioactive material shall not exceed 1 millirad (10 µGy) per hour at 1 centimeter from any surface when measured through 7 milligrams per square centimeter of absorber, and that each tube does not contain more than one of the following specified quantities of radioactive material:

a. One hundred fifty millicuries (5.55 GBq) of tritium per microwave receiver protector tube or 10 millicuries
(370 MBq) of tritium per any other electron tube.

b. One microcurie (37 kBq) of cobalt 60.

c. Five microcuries (185 kBq) of nickel 63.
d. Thirty microcuries (1.11 MBq) of krypton 85.
e. Five microcuries (185 kBq) of cesium 137.
f. Thirty microcuries (1.11 MBq) of promethium 147.

8. Ionizing radiation measuring instruments containing, for purposes of internal calibration or standardization, one or more sources of radioactive material, provided that:

b. Each instrument contains no more than 10 exempt quantities. For purposes of this requirement, an instrument's source may contain either one or different types of radionuclides and an individual exempt quantity may be composed of fractional parts of one or more of the exempt quantities in Schedule B, provided that the sum of such fractions shall not exceed unity.

c. For americium 241, 0.05 microcurie (1.85 kBq) is considered an exempt quantity under this subparagraph.

~~9. Spark gap irradiators containing not more than 1 microcurie (37 kBq) of cobalt 60 per spark gap irradiator for use in electrically ignited fuel oil burners having a firing rate of at least 3 gallons (11.4 l) per hour.~~ DELETE = 30.15(a)(10) Ctrl + Click Here to Return to RATS 2007-2 §30.15

10. Ionization chamber smoke detectors containing not more than 1 microcurie (µCi) of americium-241 per detector in the form of a foil and designed to protect life and property from fires. ADDED NEW 30.15(a)(7) Ctrl + Click Here to Return to RATS 2007-2 §30.15

(b) Self-Luminous Products Containing Radioactive Material.

1. Tritium, Krypton 85 or Promethium 147. Except for persons who manufacture, process or produce self-luminous products containing tritium, krypton 85 or promethium 147, any person is exempt from these regulations to the extent that such person receives, possesses, uses, transfers, owns or acquires tritium, krypton 85 or promethium 147 in self-luminous products manufactured, or processed, produced, imported or transferred in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to Section 32.22 of 10 CFR Part 32, which license authorizes the transfer of the product to persons who are exempt from regulatory requirements. The exemption in this paragraph does not apply to tritium, krypton 85 or promethium 147 used in products for frivolous purposes or in toys or adornments.

2. Radium 226. Any person is exempt from these regulations to the extent that such person receives, possesses, uses, transfers or owns articles containing less than 0.1 microcurie (3.7 kBq) of radium 226 which were acquired prior to December 1980.

(c) Gas and Aerosol Detectors Containing Radioactive Material.

1. Except for persons who manufacture, process, or produce gas and aerosol detectors containing radioactive material, any person is exempt from these regulations to the extent that such person receives, possesses, uses, transfers, owns or acquires radioactive material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards, provided that detectors containing radioactive material shall have been manufactured, imported or transferred in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to Section 32.26 of 10 CFR, Part 32~~; or a Licensing State pursuant to 64E-5.210(3), which authorizes the transfer of the detectors to persons who are exempt from regulatory requirements.~~ Authority to transfer possession or control by the manufacturer, processor or producer of any equipment, device, commodity or other product containing by-product material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Ctrl + Click Here to Return to RATS 2007-3 §30.20

2. This exemption also covers gas and aerosol detectors manufactured or distributed before November 30, 2007 in accordance with a specific license issued by a State under comparable Section 32.26 of 10 CFR, Part 32 authorizing distribution to persons exempt from regulatory requirements. ~~Gas and aerosol detectors previously manufactured and distributed to general licensees in accordance with a specific license issued by an agreement state shall be considered exempt under (3)(c)1., above, provided that the device is labeled in accordance with the specific license authorizing distribution of devices under a~~

~~general license, and provided further that they meet the requirements of 64E-5.210 (3).~~ Ctrl + Click Here to Return to RATS 2007-3 §30.20

~~3. Gas and aerosol detectors containing NARM previously manufactured and distributed in accordance with a specific license issued by a Licensing State shall be considered exempt under (3)(c)1., above, provided that the device is labeled in accordance with the specific license authorizing distribution, and provided further that they meet the requirements of 64E-5.210 (3).~~ Ctrl + Click Here to Return to RATS 2007-3 §30.20

~~(d) Resins Containing Scandium 46 and Designed for Sand Consolidation in Oil Wells. Any person is exempt from these regulations to the extent that such person receives, possesses, uses, transfers, owns or acquires synthetic plastic resins containing scandium 46 which are designed for sand consolidation in oil wells. Such resins shall have been manufactured or imported in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission, or shall have been manufactured in accordance with the specifications contained in a specific license issued by the department or any agreement state to the manufacturer of such resins pursuant to licensing requirements equivalent to those in Sections 32.16 and 32.17 of 10 CFR, Part 32. This exemption does not authorize the manufacture of any resins containing scandium 46.~~ Ctrl + Click Here to Return to RATS 2007-2 §30.16

64E-5.204 Types of Licenses

(2) Specific licenses require the submission of an application to the department and the issuance of a licensing document by the department. The licensee is subject to all applicable portions of these regulations as well as any limitations specified in the licensing document. The licensee is subject to the payment of fees as authorized under Section 404.131, F.S., and as outlined below:

(e) Below is the schedule of fees for specific radioactive materials licenses:

5. Medical use: Ctrl + Click Here to Return to Other O10		
a.(II) High, medium, low or pulsed dose rate remote afterloader ~~afterloading~~ devices;	$1,697	$1,654
(III) High, medium, low or pulsed dose rate remote afterloader ~~afterloading~~ devices and gamma stereotactic radiosurgery including gamma knife devices or teletherapy devices;	$1,838	$1,791
f.(I) Mobile nuclear medicine services.	$1,697	$1,950
(II) Mobile high, medium, low or pulsed dose rate remote afterloader ~~afterloading therapy~~ device when the treatment is only performed on the mobile vehicle.	$2,970	$3,308

64E-5.206 General Licenses – Radioactive Material Other Than Source Material

(1) Certain Devices and Equipment. A general license is hereby issued to transfer, receive, acquire, own, possess and use radioactive material incorporated in the following devices or equipment which have been manufactured, tested and labeled by the manufacturer in accordance with a specific license issued to the manufacturer by the U.S. Nuclear Regulatory Commission for use pursuant to Section 31.3 of 10 C.F.R. Part 31. This general license is subject to the provisions of Rules 64E-5.103 through 64E-5.104, paragraph 64E-5.203(1)(b), Rules 64E-5.213, 64E-5.215, Part III, Part IX and Part XV, F.A.C.

(a) Static Elimination Devices. Devices designed for use as static eliminators which contain, as a sealed source or sources, radioactive material consisting of a total of not more than 500 microcuries (18.5 MBq) of polonium 210 per device; and

(b) Ion Generating Tubes. Devices designed for ionization of air which contain, as a sealed source or sources, radioactive material consisting of a total of not more than 500 microcuries (18.5 MBq) of polonium 210 per device or a total of not more than 50 millicuries (1.85 GBq) of tritium per device.

(2) Reserved.

(3) Reserved.

(4) Certain Measuring, Gauging and Controlling Devices.

(a) A general license is hereby issued to commercial and industrial firms and to research, educational and medical institutions, individuals in the conduct of their businesses, and state or local government agencies to own, receive, acquire, possess, use or transfer in accordance with the provisions of paragraphs (4)(b), (c) and (d), below, radioactive material, excluding special nuclear material, contained in devices designed and manufactured for the purpose of detecting, measuring, gauging or controlling thickness, density, level, interface location, radiation, leakage, or qualitative or quantitative chemical composition, or for producing light or an ionized atmosphere.

(b)1. The general license in paragraph (4)(a), above, applies only to radioactive material contained in devices which have been manufactured or initially transferred and labeled in accordance with the specifications contained in a specific license issued by the Department pursuant to subsection 64E-5.210(4), F.A.C., or in accordance with the specifications contained in a specific license issued by the NRC, or an Agreement State, which authorizes distribution of devices to persons granted a general license by the NRC, or an Agreement State. Regulations under the Federal Food, Drug, and Cosmetic Act authorizing the use of radioactive control devices in food production require certain additional labeling thereon which is found in Section 179.21 of 21 C.F.R. Part 179. (Pursuant to Section 120.54(6), F.S., subparagraph 64E-5.206(4)(b)1., F.A.C., is substantively identical to 10 CFR 31.5(b)(1) published on 01/01/2007.) Ctrl + Click Here to Return to RATS 2007-3 §31.5

2. The devices must have been received from one of the specific licenses described in subparagraph (b)1., above or through a transfer made under subparagraph 64E-5.206(4)(c)8., F.A.C.

(c) Any person who owns, receives, acquires, possess, uses, or transfers radioactive materials in a device pursuant to the general license in (4)(a) above:

1. Shall assure that all labels affixed to the device at the time of receipt, and bearing a statement that removal of the label is prohibited, are maintained thereon and shall comply with all instructions and precautions provided by such labels;

2. Shall assure that the device is tested for leakage of radioactive material and proper operation of the on-off mechanism and indicator, if any, at no longer than 6-month intervals or at such other intervals as are specified in the label. However,

a. Devices containing only krypton need not be tested for leakage of radioactive material; and

b. Devices containing only tritium or not more than 100 microcuries (3.7 MBq) of other beta- or gamma-emitting material or 10 microcuries (0.37 MBq) of alpha-emitting material and devices held in storage in the original shipping container prior to initial installation need not be tested for any purpose;

3. Shall assure that other testing, installation, servicing and removal from installation involving the radioactive material, its shielding or containment, are performed:

a. In accordance with the instructions provided by the labels, or

b. By a person holding an applicable specific license from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to perform such activities;

4. Shall maintain records showing compliance with the requirements of subparagraphs (4)(c)2. and 3., above. The records shall show the results of tests. The records also shall show the dates of performance of, and the names of persons performing testing, installation, servicing and removal from installation concerning the radioactive material, its shielding or containment. Records of tests for leakage of radioactive material required by subparagraph (4)(c)2., above, shall be maintained for at least three years after the next required leak test is performed or until the transfer or disposal of the sealed source. Records of tests of the on-off mechanism and indicator required by subparagraph (4)(c)2., above, shall be maintained for at least three years after the next required test of the on-off mechanism and indicator is performed or until the sealed source is transferred or disposed. Records which are required by subparagraph (4)(c)3., above, shall be maintained for a period of at least 3 years from the date of the recorded event or until the transfer or disposal of the device; (Pursuant to Section 120.54(6), F.S., subparagraph 64E-5.206(4)(c)4., F.A.C., is substantively identical to 10 CFR 31.5(c)(4)i published on 01/01/2007.)

5. Upon the occurrence of a failure of or damage to, or any indication of a possible failure of or damage to, the shielding of the radioactive material or the on-off mechanism or indicator, or upon the detection of 0.005 microcurie (185 Bq) or more removable radioactive material, shall immediately suspend operation of the device until it has

been repaired by the manufacturer or other person holding an applicable specific license from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to repair such devices, or disposed of by transfer to a person authorized by an applicable specific license to receive the radioactive material contained in the device and, within 30 days, furnish to the Department a report containing a brief description of the event and the remedial action taken; and in the case of removable radioactive materials or failure of or damage to a source likely to result in contamination of the premises or the environment, a plan for ensuring the premises and environment are acceptable for unrestricted use using the criteria described in Rule 64E-5.222, F.A.C.

6. Shall not abandon the device containing radioactive material;

7. Except as provided in subparagraph (4)(c)8., below, shall transfer or dispose of the device containing radioactive material only by export as provided by paragraph 15 below, transfer to a specific licensee of the Department, the NRC, or an Agreement State, whose specific license authorizes him to receive the device, and within 30 days after transfer of a device to a specific licensee, shall furnish to the Department a report containing identification of the device by manufacturer's or initial transferor's name and model number and serial number, the name, address, license number, where applicable, of the person receiving the device, and the date of the transfer; Ctrl + Click Here to Return to RATS 2007-2 §31.5

8. Shall transfer the device by export as provided by paragraph 15 below, or to another general licensee only:

a. Where the device remains in use at a particular location. In such case the transferor shall give the transferee a copy of this section, a copy of Rules 64E-5.103, 64E-5.343, and 64E-5.344, F.A.C., and any safety documents identified in the label on the device and within 30 days of the transfer, report to the Department the manufacturer's or initial transferor's name and model number and serial number of device transferred, the transferor's name and mailing address for the location of use, and the name, title and phone number of the responsible individual identified by the transferee in accordance with subparagraph 64E-5.206(4)(c)11., F.A.C., to have knowledge of and authority to take actions to ensure compliance with these regulations; or

b. Where the device is held in storage in the original shipping container at its intended location of use prior to initial use by a general licensee; and

9. Shall comply with the provisions of Rules 64E-5.343 and 64E-5.344, F.A.C., for reporting radiation incidents, theft or loss of licensed material, but shall be exempt from the other requirements of Parts III and IX.

10. Shall be required to obtain written Department authorization before transferring the device to any other specific license not specifically identified in subparagraph 64E-5.206(4)(c)7., F.A.C. A holder of a specific license may transfer a device for possession and use under its own specific license without prior approval if the specific license holder satisfies the following requirements: ~~The Department authorization is granted provided the specific license identifies the device.~~

a. Verifies that the specific license authorizes the possession and use, or applies for and obtains an amendment to the license authorizing the possession and use;

b. Removes, alters, covers, or clearly and unambiguously augments the existing label otherwise required by subparagraph 64E-5.206(4)(c)1. , F.A.C., so that the device is labeled in compliance with .Rule 64E-5.325, F.A.C., provided the manufacturer, model number, and serial number is retained;

c. Obtains manufacturer's or initial transferor's information concerning maintenance that would be applicable under the specific license such as leak testing procedures;

d. Reports the transfer under subparagraph 64E-5.206(4)(c)7, F.A.C. Ctrl + Click Here to Return to RATS 2007-2 §31.5

11. Shall appoint an individual responsible for having knowledge of the appropriate regulations and requirements and the authority for taking required actions to comply with appropriate regulations and requirements. The general licensee, through this individual, shall ensure the day-to-day compliance with the appropriate regulations and requirements. This appointment does not relieve the general licensee of any of its responsibility in the regard.

12.a. Shall register, in accordance with sub-subparagraphs 64E-5.206(4)(c)12.b. and 64E-5.206(4)(c)12.c., F.A.C., all devices except exit signs containing tritium. Each address for a location of use as described in sub-sub-subparagraph 64E-5.206(4)(c)12.c.(IV), F.A.C., represents a separate general license and requires a separate

registration. Ctrl + Click Here to Return to RATS 2007-3 §31.5

b. Shall annually register with the Department the possession of a device meeting the criteria in sub-subparagraph 64E-5.206(4)(c)12.a., F.A.C. Registration must be done by verifying, correcting or adding to the information provided in a request for registration received from the Department. The registration information must be submitted to the Department within 30 days of the date of the request for registration or as otherwise indicated in the request. In addition, the general licensee holding devices that meet the criteria of sub-subparagraph 64E-5.206(4)(c)12.a., F.A.C., is subject to the bankruptcy notification requirements in subsection 64E-5.213(3), F.A.C.

c. Shall provide the following information and any other information requested by the Department:

(I) Name and mailing address of the general licensee;

(II) For each device, the manufacturer's name or initial transferor name, model number, serial number, the radioisotope and activity as identified on the label;

(III) Name, title, and telephone number of the responsible person designated a representative of the general licensee under subparagraph 64E-5.206(4)(c)11., F.A.C.;

(IV) Address or location at which the device(s) are used or stored. For portable devices, the address of the primary place of storage;

(V) Certification by the responsible representative of the general licensee that the information concerning the devices(s) has been verified through a physical inventory and checking the label information; and

(VI) Certification by the responsible representative of the general licensee that they are aware of the requirements of the general license.

d. Persons generally licensed by other Agreement States, Licensing States, or the U.S. Nuclear Regulatory Commission with respect to devices meeting the criteria in 10 CFR 31.5(c)(13)(i) are not subject to registration requirements if the devices are used in areas subject to the Department jurisdiction for less than 180 days in any calendar year. The Department will not request registration from such licensees.

13. Shall report to the Department changes in the general licensee name and the mailing address for each location of use within 30 days of the effective date of the change. For a portable device, a report of address change is required for a change in the device's primary place of storage.

14. Shall not hold devices that are not in use longer than 2 years. If the devices with shutters are not being used, the shutters must be locked in the closed position. The testing required by subparagraph 64E-5.206(4)(c)2., F.A.C., need not be performed during the period of storage only. However, when devices are put back into service or transferred to another person, and have not been tested within the required test interval, they must be tested for leakage before use or transfer and the shutter trested before use. Devices kept in standby for future use are excluded from the two year time limit if the general licensee performs physical inventories at intervals not to exceed three months while they are in standby. (Pursuant to Section 120.54(6), Florida Statutes, subparagraph 64E-5.206(4)(c)14., F.A.C., is substantively identical to 10 CFR 31.5(c)(15) published on 01/01/2007.)

15. Shall not export the device containing radioactive material except in accordance with 10 C.F.R. Part 110;

16. Shall respond to written requests from the Department to provide information relating to the general license within 30 calendar days of the date of the request, or other time specified in the request. If the general licensee cannot provide the requested information within the allotted time, it shall, within that same time period, request a longer period to supply the information by providing the Department, a written justification for the request for extension of time. (Pursuant to Section 120.54(6), Florida Statutes, subparagraph 64E-5.206(4)(c)16., F.A.C., is substantively identical to 10 CFR 31.5(c)(11) published on 01/01/2007.)

(d) The general license in paragraph (4)(a), above, does not authorize the manufacture of devices containing radioactive material.

(e) The general license provided in paragraph (4)(a), above, is subject to the provisions of Rules 64E-5.103 through 64E-5.104, 64E-5.213, 64E-5.215, and Part XV, F.A.C.

(5) Luminous Safety Devices for Aircraft.

(a) A general license is hereby issued to own, receive, acquire, possess and use tritium or promethium 147 contained in luminous safety devices for use in aircraft, provided:

1. Each device contains not more than 10 curies (370 GBq) of tritium or 300 millicuries (11.1 GBq) of promethium 147; and

2. Each device has been manufactured, assembled or imported in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission, or each device has been manufactured or assembled in accordance with the specifications contained in a specific license issued by the Department or any Agreement State to the manufacturer or assembler of such device pursuant to licensing requirements equivalent to those in Section 32.53 of 10 C.F.R. Part 32.

(b) Persons who own, receive, acquire, possess or use luminous safety devices pursuant to the general license in paragraph (5)(a), above, are exempt from the requirements of Parts III and IX except that they shall comply with the provisions of Rules 64E-5.343 and 64E-5.344, F.A.C.

(c) This general license does not authorize the manufacture, assembly or repair of luminous safety devices containing tritium or promethium 147.

(d) This general license does not authorize the ownership, receipt, acquisition, possession or use of promethium 147 contained in instrument dials.

(e) This general license is subject to the provisions of Rules 64E-5.103 through 64E-5.104, 64E-5.213, 64E-5.215, and Part XV, F.A.C.

(6) Calibration and Reference Sources.

(a) A general license is hereby issued to those persons listed below to own, receive, acquire, possess, use and transfer, in accordance with the provisions of paragraphs (6)(d) and (e), below, americium 241 in the form of calibration or reference sources:

1. Any person who holds a specific license issued by the Department which authorizes him to receive, possess, use and transfer radioactive material; and

2. Any person who holds a specific license issued by the U.S. Nuclear Regulatory Commission which authorizes him to receive, possess, use and transfer special nuclear material.

(b) A general license is hereby issued to own, receive, possess, use and transfer plutonium in the form of calibration or reference sources in accordance with the provisions of paragraphs (6)(d) and (e), below, to any person who holds a specific license issued by the Department which authorizes him to receive, possess, use and transfer radioactive material.

(c) A general license is hereby issued to own, receive, possess, use and transfer radium 226 in the form of calibration or reference sources in accordance with the provisions of paragraphs (6)(d) and (e), below, to any person who holds a specific license issued by the Department which authorizes him to receive, possess, use and transfer radioactive material.

(d) The general licenses in paragraph (6)(a), (b) and (c), above, apply only to calibration or reference sources which have been manufactured in accordance with the specifications contained in a specific license issued to the manufacturer or importer of the sources by the U.S. Nuclear Regulatory Commission pursuant to Section 32.57 of 10 C.F.R. Part 32 or Section 70.39 of 10 C.F.R. Part 70 or which have been manufactured in accordance with the specifications contained in a specific license issued to the manufacturer by the Department, an Agreement State or Licensing State pursuant to licensing requirements equivalent to those contained in Section 32.57 of 10 C.F.R. Part 32 or Section 70.39 of 10 C.F.R. Part 70.

(e) The general licenses provided in paragraphs (6)(a), (b) and (c), above, are subject to the provisions of Rules 64E-5.103 through 64E-5.104, 64E-5.213, 64E-5.215, Parts III, IX and XV, F.A.C. In addition, persons who own, receive, acquire, possess, use or transfer one or more calibration or reference sources pursuant to these general licenses:

1. Shall not possess at any given time, at any single location of storage or use, more than 5 microcuries (185 kBq) of americium 241, 5 microcuries (185 kBq) of plutonium, or 5 microcuries (185 kBq) of radium 226 in such sources;

2. Shall not receive, possess, use or transfer such source unless the source, or the storage container, bears a label which includes one of the following statements, as appropriate, or a substantially similar statement which contains the information called for in one of the following statements, as appropriate:

a. The receipt, possession, use and transfer of this source, model ___, serial no. ___, are subject to a general license and the regulations of the U.S. Nuclear Regulatory Commission or of a state with which the Commission has entered into an agreement for the exercise of regulatory authority. Do not remove this label.

CAUTION – RADIOACTIVE MATERIAL – THIS SOURCE CONTAINS (AMERICIUM 241) (PLUTONIUM). DO NOT TOUCH RADIOACTIVE PORTION OF THIS SOURCE.

_____
Name of manufacturer or importer

b. The receipt, possession, use and transfer of this source, model ___, serial no. ___, are subject to a general license and the regulations of a Licensing State. Do not remove this label.

CAUTION – RADIOACTIVE MATERIAL – THIS SOURCE CONTAINS RADIUM 226. DO NOT TOUCH RADIOACTIVE PORTION OF THIS SOURCE.

_____
Name of manufacturer or importer

3. Shall not transfer, abandon or dispose of such source except by transfer to a person authorized by a license from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to receive the source;

4. Shall store such source, except when the source is being used, in a closed container adequately designed and constructed to contain americium 241, plutonium or radium 226, which might otherwise escape during storage; and

5. Shall not use such source for any purpose other than the calibration of radiation detectors or the standardization of other sources.

(f) These general licenses do not authorize the manufacture of calibration or reference sources containing americium 241, plutonium or radium 226.

(7) Medical Diagnostic Uses.

(a) A general license shall be issued to any physician to receive, possess, transfer or use radioactive material set forth below for the stated diagnostic uses, provided, however, that the use is in accordance with the provision of (7)(b), (c) and (d), below, the radioactive material is in the form of capsules, disposable syringes or other prepackaged individual doses; and the radioactive material has been manufactured in accordance with a specific license issued by the Department pursuant to subsection 64E-5.210(7), F.A.C., or by the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State pursuant to equivalent regulations authorizing distribution to persons under a general license pursuant to this subsection or its equivalent:

1. Chromium 51 as sodium radiochromate for determination of red blood cell volumes and studies of red blood cell survival time;

2. Cobalt 57 for the measurement of intestinal absorption of cyanocobalamin;

3. Cobalt 58 for the measurement of intestinal absorption of cyanocobalamin;

4. Cobalt 60 for the measurement of intestinal absorption of cyanocobalamin;

5. Iodine 125 as iodinated human serum albumin (IHSA) for determinations of blood and blood plasma volume;

6. Iodine 131 as sodium iodide for measurement of thyroid uptake; and

7. Iodine 131 as iodinated human serum albumin (IHSA) for determinations of blood and blood plasma volume.

(b) No physician shall receive, possess, use or transfer radioactive material pursuant to the general license established by paragraph (7)(a), above, until he has submitted the information requested on DOH Form 361, entitled “Certificate – Medical Use of Radioactive Material under General License”, which is herein incorporated by reference effective 7-17-85, with the Department and received from the Department a validated copy of this form with certification number assigned.

(c) A physician who receives, possesses or uses a pharmaceutical containing radioactive material pursuant to the general license established by paragraph (7)(a), above, shall comply with the following:

1. The physician shall not possess at any given time, pursuant to the general license in paragraph (7)(a), above, more than

a. Two hundred microcuries (7.4 MBq) of iodine 131,

b. Two hundred microcuries (7.4 MBq) of iodine 125,

c. Five microcuries (185 kBq) of cobalt 57,

d. Five microcuries (185 kBq) of cobalt 58,

e. Five microcuries (185 kBq) of cobalt 60,

f. Two hundred microcuries (7.4 MBq) of chromium 51;

2. The physician shall store the pharmaceutical in the original shipping container until administered, or in a container providing equivalent radiation protection;

3. The physician shall use the pharmaceutical only for the uses authorized by paragraph (7)(a), above;

4. The physician shall not transfer the radioactive material to a person who is not authorized to receive it pursuant to a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or Licensing State, or in any manner other than in the unopened, labeled shipping container as received from the supplier, except by administering it to a patient.

(d) The general licensed physician possessing or using radioactive material under the general license of paragraph (7)(a), above, shall report in duplicate to the Department any changes in the information furnished by him on Form 361. The report shall be submitted within 30 days after the effective date of such change.

(e) Any person using radioactive material pursuant to the general license of paragraph (7)(a), above, is exempt from the requirements of Parts III and IX with respect to the radioactive material covered by the general license.

(f) Manufacturers of radiopharmaceuticals which are under the general license in this subsection are required to affix a certain identifying label to the container, and in the leaflet or brochure which accompanies the radiopharmaceutical, pursuant to subsection 64E-5.210(7), F.A.C.

(8) General License for Use of Radioactive Material for Certain In Vitro Clinical or Laboratory Testing.

(a) A general license is hereby issued to any physician, veterinarian, clinical laboratory or hospital to receive, acquire, possess, transfer or use, for any of the following stated tests, in accordance with the provisions of paragraphs (8)(b), (c), (d), (e) and (f), below, the following radioactive materials in prepackaged units for use in in vitro clinical or laboratory tests not involving internal or external administration of radioactive material, or the radiation therefrom, to human beings or animals:

1. Carbon 14, in units not exceeding 10 microcuries (370 kBq) each.

2. Cobalt 57, in units not exceeding 10 microcuries (370 kBq) each.

3. Hydrogen 3 (tritium), in units not exceeding 50 microcuries (1.85 MBq) each.

4. Iodine 125, in units not exceeding 10 microcuries (370 kBq) each.

5. Mock Iodine 125 reference or calibration sources, in units not exceeding 0.05 microcuries (1.85 kBq) of iodine 129 and 0.005 microcuries (0.185 kBq) of americium 241 each.

6. Iodine 131, in units not exceeding 10 microcuries (370 kBq) each.

7. Iron 59, in units not exceeding 20 microcuries (740 kBq) each.

8. Selenium 75, in units not exceeding 10 microcuries (370 kBq) each.

(b) No person shall receive, acquire, possess, use or transfer radioactive material pursuant to the general license established by (8)(a), above, until he has submitted, in triplicate, the information requested on DOH Form 360, entitled “Certificate – In Vitro Testing with Radioactive Material under General License”, which is herein incorporated by reference effective 7-17-85, with the Department and received from the Department a validated copy of the “Certificate – In Vitro Testing with Radioactive Material under General License” with a certification number assigned.

(c) A person who receives, acquires, possesses or uses radioactive material pursuant to the general license established by paragraph (8)(a), above, shall comply with the following:

1. The general licensee shall not possess at any given time, pursuant to the general license in paragraph (8)(a), above, at any single location of storage or use, a combined total amount of iodine 125, iodine 131, selenium 75, iron 59 or cobalt 57 in excess of 200 microcuries (7.4 MBq).

2. The general licensee shall store the radioactive material, until used, in the original shipping container or in a container providing equivalent radiation protection.

3. The general licensee shall use the radioactive material only for the uses authorized by paragraph (8)(a), above.

4. The general licensee shall not transfer the radioactive material to a person who is not authorized to receive it pursuant to a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or Licensing State, nor transfer the radioactive material in any manner other than in the unopened, labeled shipping container as received from the supplier.

5. The general licensee shall dispose of the mock iodine 125 reference or calibration sources described in paragraph (8)(a), above, as required by Rule 64E-5.328, F.A.C.

(d) The general licensee shall not receive, acquire, possess or use radioactive material pursuant to paragraph (8)(a), above:

1. Except as prepackaged units which are labeled in accordance with the provisions of an applicable specific license issued pursuant to subsection 64E-5.210(8), F.A.C., or in accordance with the provisions of a specific license issued by the U.S. Nuclear Regulatory Commission, an Agreement State or Licensing State which authorizes the manufacture and distribution of iodine 125, iodine 131, carbon 14, hydrogen 3 (tritium), iron 59, selenium 75, cobalt 57 or mock iodine 125 to persons under a general license described in this subsection or its equivalent, and

2. Unless one of the following statements, as appropriate or a substantially similar statement which contains the information called for in one of the following statements, appears on a label affixed to each prepackaged unit or appears in a leaflet or brochure which accompanies the package:

a. This radioactive material shall be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of the U.S. Nuclear Regulatory Commission or of a state with which the U.S. Nuclear Regulatory Commission has entered into an agreement for the exercise of regulatory authority.

_____

Name of manufacturer

b. This radioactive material shall be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of a Licensing State.

_____

Name of manufacturer

(e) The physician, veterinarian, clinical laboratory or hospital possessing or using radioactive material under the general license of paragraph (8)(a), above, shall report in writing to the Department any changes in the information furnished by him in the “Certificate – In Vitro Testing with Radioactive Material Under General License”. The report shall be furnished within 30 days after the effective date of such change.

(f) Any person using radioactive material pursuant to the general license of paragraph (8)(a), above, is exempt from the requirements of Parts III and IX with respect to radioactive material covered by that general license, except that such persons using the mock iodine 125 described in subparagraph (8)(a)5., above, shall comply with the provisions of Rules 64E-5.328, 64E-5.343, and 64E-5.344, F.A.C.

(g) The New Drug provisions of the Federal Food, Drug and Cosmetic Act also govern the availability and use of any specific diagnostic drugs in interstate commerce.

(9) Ice Detection Devices.

(a) A general license is hereby issued to own, receive, acquire, possess, use and transfer strontium 90 contained in ice detection devices, provided each device contains not more than 50 microcuries (1.85 MBq) of strontium 90 and each device has been manufactured or imported in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission or each device has been manufactured in accordance with the specifications contained in a specific license issued by the Department or an Agreement State to the manufacturer of such device pursuant to licensing requirements equivalent to those in Section 32.61 of 10 C.F.R. Part 32.

(b) Persons who own, receive, acquire, possess, use or transfer strontium 90 contained in ice detection devices pursuant to the general license in paragraph (9)(a), above:

1. Shall, upon occurrence of visually observable damage, such as a bend or crack or discoloration from overheating to the device, discontinue use of the device until it has been inspected, tested for leakage and repaired by a person holding a specific license from the U.S. Nuclear Regulatory Commission or an Agreement State to manufacture or service such devices; or shall dispose of the device pursuant to the provisions of Rule 64E-5.328, F.A.C.;

2. Shall assure that all labels affixed to the device at the time of receipt, and which bear a statement which prohibits removal of the labels, are maintained thereon; and

3. Are exempt from the requirements of Parts III and IX except that such persons shall comply with the provisions of Rules 64E-5.328, 64E-5.343 and 64E-5.344, F.A.C.

(c) This general license does not authorize the manufacture, assembly, disassembly or repair of strontium 90 in ice detection devices.

(d) This general license is subject to the provisions of Rules 64E-5.103 through 64E-5.104, 64E-5.213, 64E-5.215 and Part XV, F.A.C.

(10) Ownership of Radioactive Material. A general license is hereby issued to own radioactive material without regard to quantity. Notwithstanding any other provisions of this part, this general license does not authorize the manufacture, production, transfer, receipt, possession or use of radioactive material.

(11) Certain items and self-luminous products containing radium-226.

(a) A general license is hereby issued to any person to acquire, receive, possess, use, or transfer, in accordance with the provisions of subsections 64E-5.206(11)(b), (c), and (d), F.A.C., radium-226 contained in the following products manufactured prior to November 30, 2007.

1. Antiquities originally intended for use by the general public. For the purposes of this paragraph, antiquities mean products originally intended for use by the general public and distributed in the late 19th and early 20th centuries, such as radium emanator jars, revigators, radium water jars, radon generators, refrigerator cards, radium bath salts, and healing pads.

2. Intact timepieces containing greater than 0.037 megabecquerel (1 microcurie), nonintact timepieces, and timepiece hands and dials no longer installed in timepieces.

3. Luminous items installed in air, marine, or land vehicles.

4. All other luminous products, provided that no more than 100 items are used or stored at the same location at any one time.

5. Small radium sources containing no more than 0.037 megabecquerel (1 microcurie) of radium-226. For the purposes of this paragraph, ‘‘small radium sources’’ means discrete survey instrument check sources, sources contained in radiation measuring instruments, sources used in educational demonstrations (such as cloud chambers and spinthariscopes), electron tubes, lightning rods, ionization sources, static eliminators, or as designated by the NRC.

(b) Persons who acquire, receive, possess, use, or transfer byproduct material under the general license issued in subsection 64E-5.206(11)(a) of this section are exempt from the provisions of Parts III and IX, to the extent that the receipt, possession, use, or transfer of radioactive materials is within the terms of the general license. This exemption shall not apply to any such person specifically licensed under Chapter 64E-5, F.A.C.

(c) Any person who acquires, receives, possesses, uses, or transfers byproduct material in accordance with the general license in subsection 64E-5.206(11)(a), F.A.C. must also comply with the following requirements:

1. Shall notify the Department should there be any indication of possible damage to the product so that it appears it could result in a loss of the radioactive material. A report containing a brief description of the event, and the remedial action taken, must be furnished to the Department within 30 days;

2. Shall not abandon products containing radium-226. The product, and any radioactive material from the product, may only be disposed of according to Rule 64E-5.328, F.A.C., or by transfer to a person authorized by a specific license to receive the radium- 226 in the product or as otherwise approved by the Department;

3. Shall not export products containing radium-226 except in accordance with 10 C.F. R. Part 110;

4. Shall dispose of products containing radium-226 at a disposal facility authorized to dispose of radioactive material in accordance with any Federal or State solid or hazardous waste law, including the Solid

Waste Disposal Act, as authorized under the Energy Policy Act of 2005, by transfer to a person authorized to receive radium-226 by a specific license issued under Part III, or equivalent regulations of an Agreement State or the NRC, as otherwise approved by the Department.

5. Shall respond to written requests from the Department to provide information relating to the general license within 30 calendar days of the date of the request, or other time specified in the request. If the general licensee cannot provide the requested information within the allotted time, it shall, within that same time period, request a longer period to supply the information by providing the Department a written justification for the request.

(d) Except for disassembly and repair of timepieces described in paragraph 64E-5.206(11)(a)2., F.A.C., the general license in subsection 64E-5.206(11)(a), F.A. C., does not authorize the manufacture, assembly, disassembly, repair, or import of products containing radium-226. Ctrl + Click Here to Return to RATS 2007-3 §31.12

64E-5.210 Special Requirements for a Specific License to Manufacture, Assemble, Repair or Distribute Commodities, Products or Devices Which Contain Radioactive Material. Ctrl + Click Here to Return to RATS 2007-2 §32.17

(1) Licensing the Distribution of Radioactive Material in Exempt Concentrations. Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity or other product containing by-product material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. No person may introduce radioactive materials into a product or material knowing or having reason to believe that it will be transferred to persons exempt under subsection 64E-5.203(1), F.A.C., NRC or equivalent regulations of an Agreement State, except in accordance with a license issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.11. ~~Licensing the Introduction of Radioactive Material into Products in Exempt Concentrations.~~ Ctrl + Click Here to Return to RATS 2007-2 §32.11 or Ctrl + Click Here to Return to RATS 2007-2 §32.13

(a) ~~In addition to the requirements set forth in Rule 64E-5.208, F.A.C., a specific license authorizing the introduction of radioactive material into a product or material owned by or in the possession of the licensee or another to be transferred to persons exempt under paragraph 64E-5.203(1)(a), F.A.C., will be issued if:~~

~~1. The applicant submits a description of the product or material into which the radioactive material will be introduced, intended use of the radioactive material and the product or material into which it is introduced, method of introduction, initial concentration of the radioactive material in the product or material, control methods to assure that no more than the specified concentration is introduced into the product or material, estimated time interval between introduction and transfer of the product or material, and estimated concentration of the radioactive material in the product or material at the time of transfer; and~~

~~2. The applicant provides reasonable assurance that the concentrations of radioactive material at the time of transfer will not exceed the concentrations in Schedule A of this part, that reconcentration of the radioactive material in concentrations exceeding those in Schedule A is not likely, that use of lower concentrations is not feasible, and that the product or material is not likely to be incorporated in any food, beverage, cosmetic, drug or other commodity or product designed for ingestion or inhalation by, or application to, a human being.~~

(b) ~~Each person licensed under this subsection shall file an annual report with the Department which shall identify the type and quantity of each product or material into which radioactive material has been introduced during the reporting period; name and address of the person who owned or possessed the product or material, into which radioactive material has been introduced, at the time of introduction; the type and quantity of radionuclide introduced into each such product or material; and the initial concentrations of the radionuclide in the product or material at time of transfer of the radioactive material by the licensee. If no transfers of radioactive material have been made pursuant to this subsection during the reporting period, the report shall so indicate. The report shall cover the year ending June 30, and shall be filed within 30 days thereafter.~~ Ctrl + Click Here to Return to RATS 2007-2 §32.12

(2) Licensing the Distribution of Radioactive Material in Exempt Quantities. Authority to transfer

possession or control by the manufacturer, processor, or producer of any equipment, device, commodity or other product containing by-product material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. No person may introduce radioactive materials into a product or material knowing or having reason to believe that it will be transferred to persons exempt under subsection 64E-5.203(1), F.A.C., NRC or equivalent regulations of an Agreement State, except in accordance with a license issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.11. Ctrl + Click Here to Return to RATS 2007-2 §32.13

~~(a) An application for a specific license to distribute NARM to persons exempted from these regulations pursuant to subsection 64E-5.203(2), F.A.C., will be approved if:~~

~~1. The radioactive material is not contained in any food, beverage, cosmetic, drug, or other commodity designed for ingestion or inhalation by, or application to, a human being;~~

~~2. The radioactive material is in the form of processed chemical elements, compounds, or mixtures, tissue samples, bioassay samples, counting standards, plated or encapsulated sources, or similar substances, identified as radioactive and to be used for its radioactive properties, but is not incorporated into any manufactured or assembled commodity, product, or device intended for commercial distribution; and~~

~~3. The applicant submits copies of prototype labels and brochures and the Department approves such labels and brochures, subject to the provisions of subparagraph (2)(b)3., below, and requirements herein.~~

~~(b) The license issued under paragraph (2)(a), above, is subject to the following conditions:~~

~~1. No more than 10 exempt quantities shall be sold or transferred in any single transaction. However, an exempt quantity may be composed of fractional parts of one or more of the exempt quantity provided the sum of the fractions shall not exceed unity.~~

~~2. Each exempt quantity shall be separately and individually packaged. No more than 10 such packaged exempt quantities shall be contained in any outer package for transfer to persons exempt pursuant to subsection 64E-5.203(2), F.A.C. The outer package shall be such that the dose rate at the external surface of the package does not exceed 0.5 millirem (5 μSv) per hour.~~

~~3. The immediate container of each quantity or separately packaged fractional quantity of radioactive material shall bear a durable, legible label which:~~

~~a. Identifies the radionuclide and the quantity of radioactivity, and~~

~~b. Bears the words "Radioactive Material".~~

~~4. In addition to the labeling information required by subparagraph (2)(b)3., above, the label affixed to the immediate container, or accompanying brochure, shall:~~

~~a. State that the contents are exempt from Licensing State requirements,~~

~~b. Bear the words "Radioactive Material – Not for Human Use – Introduction into Foods, Beverages, Cosmetics, Drugs or Medicinals, or into Products Manufactured for Commercial Distribution is Prohibited – Exempt Quantities Should Not Be Combined," and~~

~~c. Set forth appropriate additional radiation safety precautions and instructions relating to the handling, use, storage and disposal of the radioactive material.~~

~~(c) Each person licensed under subsection (2), above, shall maintain records identifying, by name and address, each person to whom radioactive material is transferred for use under subsection 64E-5.204(2), F.A.C., or the equivalent regulations of a Licensing State, and stating the kinds and quantities of radioactive material transferred. An annual summary report stating the total quantity of each radionuclide transferred under the specific license shall be filed with the Department. Each report shall cover the year ending June 30, and shall be filed within 30 days thereafter. If no transfers of radioactive material have been made pursuant to (2), above, during the reporting period, the report shall so indicate.~~ Ctrl + Click Here to Return to RATS 2007-2 §32.12

(3) Licensing the Distribution of Radioactive Material in Exempt Items. Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity or other product containing by-product material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. No person may introduce radioactive materials into a product or

material knowing or having reason to believe that it will be transferred to persons exempt under subsection 64E-5.203(1), F.A.C., NRC or equivalent regulations of an Agreement State, except in accordance with a license issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.11. ~~Licensing the Incorporation of Naturally Occurring and Accelerator-Produced Radioactive Material (NARM) into Gas and Aerosol Detectors. An application for a specific license authorizing the incorporation of NARM into gas or aerosol detectors to be distributed to persons exempt under paragraph 64E-5.203(3)(c) F.A.C., will be approved if the application satisfies the requirements of this part and Parts I, III, IX and XV. The maximum quantity of radium-226 in each device shall not exceed 0.1 microcurie (3.7 kBq).~~ Ctrl + Click Here to Return to RATS 2007-2 §32.13

(4)-(7) No change.

(4) Licensing the Manufacture and Distribution of Devices to General Licensees Under subsection 64E-5.206(4), F.A.C.

(a) An application for a specific license to manufacture or distribute devices containing radioactive material, excluding special nuclear material, to persons possessing a general license under subsection 64E-5.206(4), F.A.C., or equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State will be approved if:

1. The applicant satisfies the general requirements of Rule 64E-5.208, F.A.C.;

2. The applicant submits sufficient information relating to the design, manufacture, prototype testing, quality control, labels, proposed uses, installation, servicing, leak testing, operating and safety instructions, and potential hazards of the device to provide reasonable assurance that:

a. The device can be safely operated by persons not having training in radiological protection,

b. Under ordinary conditions of handling, storage and use of the device, the radioactive material contained in the device will not be released or inadvertently removed from the device, and it is unlikely that any person will receive a dose in excess of 10 percent of the limits specified in Rule 64E-5.304, F.A.C., and

c. Under accident conditions such as fire and explosion associated with handling, storage and use of the device, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the following organ doses:

(I) Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye – 15 rems (150 mSv)

(II) Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter – 200 rems (2 Sv)

(III) Other organs – 50 rems (500 mSv); and

3. Each device bears a durable, legible, clearly visible label or labels approved by the Department which contain in a clearly identified and separate statement:

a. Instructions and precautions necessary to assure safe installation, operation and servicing of the device; documents such as operating and service manuals may be identified in the label and used to provide this information.

b. The requirement, or lack of requirement, for leak testing, or for testing any on-off mechanism and indicator, including the maximum time interval for such testing, and the identification of radioactive material by isotope, quantity of radioactivity, and date of determination of the quantity, and

c. The information called for in one of the following statements, as appropriate, in the same or substantially similar form. The model, serial number, and name of the manufacturer or distributor may be omitted from this label provided the information is elsewhere specified in labeling affixed to the device:

(I) The receipt, possession, use and transfer of this device, model ___, serial no. ___, are subject to a general license or the equivalent and the regulations of the U.S. Nuclear Regulatory Commission or a state with which the U.S. Nuclear Regulatory Commission has entered into an agreement for the exercise of regulatory authority. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

CAUTION – RADIOACTIVE MATERIAL

_____

Name of manufacturer or distributor

(II) The receipt, possession, use and transfer of this device, model ___, serial no. ___, are subject to a general

license or the equivalent, and the regulations of a Licensing State. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

CAUTION – RADIOACTIVE MATERIAL

_____

Name of manufacturer or distributor

4. Each device having a separable source housing that provides the primary shielding for the source also bears, on the source housing, a durable label containing the device model number and serial number, the radioisotope and quantity, the words “Caution Radioactive Materials,” the radiation symbol described in Rule 64E-5.322, F.A.C., the name of the manufacturer or initial distributor.

5. Each device containing at least 10 millicuries (370 MBq) of cesium-137, 0.1 millicuries (3.7 MBq) of strontium-90, 1 millicurie (37 MBq) of cobalt-60, or 1 millicurie (37 MBq) of americium-241 or any other element with atomic numbers greater than 92, based on the activity indicated on the label, must bear a permanent label affixed to the source housing if separable, or the device if the source housing is not separable, that includes the words “Caution Radioactive Materials,” and if practical, the radiation symbol described in Rule 64E-5.322, F.A.C. Example of a permanent label include labels that are embossed, etched, stamped or engraved to the source housing or device as applicable.

(b) In the event the applicant desires that the device be required to be tested at intervals longer than 6 months, either for proper operation of the on-off mechanism and indicator, if any, or for leakage of radioactive material or for both, the applicant shall include in the application sufficient information to demonstrate that such longer interval is justified by performance characteristics of the device or similar devices and by design features which have a significant bearing on the probability or consequences of leakage of radioactive material from the device or failure of the on-off mechanism and indicator. In determining the acceptable interval for the test for leakage of radioactive material, the Department will consider the following information:

1. Primary containment or source capsule;
2. Protection of primary containment;
3. Method of sealing containment;
4. Containment construction material;
5. Form of contained radioactive material;
6. Maximum temperature withstood during prototype tests;
7. Maximum pressure withstood during prototype tests;
8. Maximum quantity of contained radioactive material;
9. Radiotoxicity of contained radioactive material; and
10. Operating experience with identical devices or similarly designed and constructed devices.

(c) In the event the applicant desires that the general licensee under Rule 64E-5.206, F.A.C., or under equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State be authorized to install the device, collect the sample to be analyzed by a specific licensee for leakage of radioactive material, service the device, test the on-off mechanism and indicator, or remove the device from installation, the applicant shall include in the application written instructions to be followed by the general licensee, estimated calendar quarter doses associated with such activity or activities, and bases for such estimates. The submitted information shall demonstrate that performance of such activity or activities by an individual untrained in radiological protection, in addition to other handling, storage, and use of devices under the general license, is unlikely to cause that individual to receive a dose in excess of 10 percent of the limits specified in Rule 64E-5.304, F.A.C.

(d) If a device containing radioactive material is transferred for use under the general license described in subsection 64E-5.206(4), F.A.C., each person that is licensed under subsection 64E-5.210(4), F.A.C., shall provide the information specified in this section to each person to whom a device is to be transferred. This information must be provided before the device may be transferred. In the case of a transfer through an intermediate person, the information must also be provided to the intended user prior to the initial transfer to the intermediate person. The required information includes the following:

1. A copy of the general license contained in subsection 64E-5.206(4); if subparagraphs 64E-5.206(4)(c)2., 3.,

and 4. or subparagraph 64E-5.206(4)(c)12., F.A.C., do not apply to the particular device, those paragraphs may be omitted; Ctrl + Click Here to Return to Other O11

2. A copy of Rules 64E-5.103, 64E-5.343, and 64E-5.344, F.A.C.;

3. A list of services that can only be performed by a specific licensee;

4. Information on acceptable disposal options including costs of disposal; and

5. An indication that department policy is to issue high civil penalties for improper disposal.

(e) If a device containing radioactive material is transferred for use under an equivalent general license of an Agreement State or the NRC, each person that is licensed under subsection 64E-5.210(4), F.A.C., shall provide the information specified in this section to each person to whom a device is to be transferred. This information must be provided before the device may be transferred. In the case of a transfer through an intermediate person, the information must also be provided to the intended user prior to the initial transfer to the intermediate person. The required information includes the following:

1. A copy of the Agreement State or NRC equivalent to Rules 64E-5.103, 64E-5.343, and 64E-5.344, F.A.C. If a copy of the NRC regulations is provided to a prospective general licensee in lieu of the Agreement State's regulations, it shall be accompanied by a note explaining that the use of the device is regulated by the Agreement State. If certain parts of the regulations do not apply to the particular device, those regulations may be omitted;

2. A list of services that can only be performed by a specific licensee;

3. Information on acceptable disposal options including costs of disposal; and

4. The name or title, address, and phone number of the contact at the Agreement State regulatory agency or U.S. Nuclear Regulatory Commission, as applicable, from which additional information may be obtained.

(f) Each device that is transferred must meet the labeling requirements in subparagraphs 64E-5.210(4)(d)3. through 5., F.A.C.

(g) If a notification of bankruptcy has been made under subsection 64E-5.213(3), F.A.C., or the license is to be terminated, each person licensed under subsection 64E-5.210(4), F.A.C., shall provide, upon request, to the department, U.S. Nuclear Regulatory Commission and to any appropriate Agreement State, records of final disposition required under paragraph 64E-5.210(4)(j), F.A.C.

(h) Each person licensed under subsection 64E-5.210(4), F.A.C., shall comply with the following reporting and record keeping requirements.

1. Report all transfers of devices to persons for use under the general license described in subsection 64E-5.206(4), F.A.C., and all receipts of devices from persons licensed under subsection 64E-5.206(4), F.A.C., to the department. This report must be submitted at intervals not to exceed 3 months and contain all of the information described in "Transfers of Industrial Devices Report 04/2007" herein incorporated by reference and is available at the address listed in paragraph 64E-5.204(2)(b), F.A.C., or at http://www.doh.state.fl.us/environment/radiation/.

2. This report must be clear and legible and contain the following data:

a. The identity of each general licensee by name and mailing address for the location of use; if no mailing address for the location of use, an alternative address for the general licensee shall be submitted along with information on the actual location of use;

b. The name, title, and phone number of the person identified by the general licensee as having knowledge of and authority to take required actions to ensure compliance with the appropriate regulations and requirements;

c. The date of transfer;

d. The type, model number, and serial number of the device transferred; and

e. The quantity and type of radioactive materials contained in the device.

3. If one or more intermediate persons will temporarily possess the device at the intended place of use before its possession by the user, the report must include the same information for both the intended user and each intermediate person and clearly designate the intermediate person(s).

4. For devices received from a subsection 64E-5.206(4), F.A.C., general licensee, the report must include the identity of the general licensee by name and address, the type, model number, and serial number of the device received, the date of receipt, and, in the case of devices not initially transferred by the reporting licensee, the name of the manufacturer or initial transferor.

5. If the licensee makes changes to the device possessed by a subsection 64E-5.206(4), F.A.C., general

licensee, such that the label must be changed to update required information, this report must identify the general licensee, the device, and the changes to information on the device label.

6. The report must clearly identify the specific licensee submitting the report and include the licenses number of the specific licensee.

7. If no transfers have been made to or from persons generally licensed under subsection 64E-5.206(4), F.A.C., during the reporting period, the report must so indicate.

(i) Each person licensed under subsection 64E-5.210(4), F.A.C., shall comply with the following additional reporting and record keeping requirements for transfers and receipt of devices to Agreement States or the NRC.

1. Report all transfers of devices to persons for use under the general license in an Agreement State or the NRC, that are equivalent to subsection 64E-5.206(4), F.A.C., and all receipts of devices from persons licensed under a general license in Agreement State or the NRC jurisdiction to the responsible Agreement State or the NRC agency. This report must contain all of the information described in "Transfers of Industrial Devices Report 04/2007."

2. The report must be clear and legible and contain the following data:

a. The identity of each general licensee by name and mailing address for the location of use; if no mailing address for the location of use, an alternative address for the general licensee shall be submitted along with information on the actual location of use;

b. The name, title, and phone number of the person identified by the general licensee as having knowledge of and authority to take required actions to ensure compliance with the appropriate regulations and requirements;

c. The date of transfer;

d. The type, model number, and serial number of the device transferred; and

e. The quantity and type of radioactive materials contained in the device.

3. If one or more intermediate persons will temporarily possess the device at the intended place of use before its possession by the user, the report must include the same information for both the intended user and each intermediate person and clearly designate the intermediate person(s).

4. For devices received from a general licensee, the report must include the identity of the general licensee by name and address, the type, model number, and serial number of the device received, the date of receipt, and, in the case of devices not initially transferred by the reporting licensee, the name of the manufacturer or initial transferor.

5. If the licensee makes changes to the device possessed by a general licensee, such that the label must be changed to update required information, this report must identify the general licensee, the device, and the changes to information on the device label.

6. The report must clearly identify the specific licensee submitting the report and include the license number of the specific licensee.

7. If no transfers have been made to or from a particular Agreement State or the NRC during the reporting period, this information shall be reported to the responsible Agreement State or the NRC agency upon request of the agency.

8. The report must cover each calendar quarter and must be filed within 30 days of the end of the calendar quarter and must clearly indicate the period covered by the report.

(j) The persons shall maintain all information concerning transfers and receipts of devices that supports the reports required by subsection 64E-5.210(4), F.A.C. Records and reports described in subsection 64E-5.210(4), F.A.C., shall be maintained for inspection by the department for a period of 3 years following the date of the recorded event.

(5) Special Requirements for the Manufacture, Assembly or Repair of Luminous Safety Devices for Use in Aircraft. An application for a specific license to manufacture, assemble or repair luminous safety devices containing tritium or promethium 147 for use in aircraft, for distribution to general licensees under subsection 64E-5.206(5), F.A.C., will be approved if the requirements of Sections 32.53, 32.54, 32.55, 32.56 and 32.101 of 10 C.F.R., Part 32, or their equivalent and the general requirements specified in Rule 64E-5.208, F.A.C., are satisfied.

(6) Special Requirements for License to Manufacture Calibration Sources Containing Americium 241, Plutonium or Radium 226 for Distribution to Persons Generally Licensed Under subsection 64E-5.206(6), F.A.C. An

application for a specific license to manufacture calibration and reference sources containing americium 241, plutonium or radium 226 to general licensees under subsection 64E-5.206(6), F.A.C., will be approved if the requirements of Sections 32.57, 32.58, 32.59 and 32.102 of 10 C.F.R., Part 32 and Section 70.39 of 10 C.F.R., Part 70, or their equivalent and the general requirements of Rule 64E-5.208, F.A.C., are satisfied.
Ctrl + Click Here to Return to RATS 2007-3 §32.57
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Ctrl + Click Here to Return to RATS 2007-3 §32.102

(7) Manufacture and Distribution of Radioactive Material for Medical Use Under General License. In addition to requirements set forth in Rule 64E-5.208, F.A.C., a specific license authorizing the distribution of radioactive material for use by physicians under the general license in subsection 64E-5.206(7), F.A.C., will be issued if:

(a) The applicant submits evidence that the radioactive material is to be manufactured, labeled and packaged in accordance with a new drug application which the Commissioner of Food and Drugs, Food and Drug Administration, has approved, or in accordance with a license for a biological product issued by the Secretary, U.S. Department of Health and Human Services; and

(b) One of the following statements, as appropriate, or a substantially similar statement which contains the information called for in one of the following statements, appears on the label affixed to the container or appears in the leaflet or brochure which accompanies the package:

1. This radioactive drug may be received, possessed and used only by physicians licensed by the State of Florida to dispense drugs in the practice of medicine. Its receipt, possession, use and transfer are subject to the regulations and a general license or its equivalent of the U.S. Nuclear Regulatory Commission or of a state with which the Commission has entered into an agreement for the exercise of regulatory authority.

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Name of Manufacturer

2. This radioactive drug may be received, possessed and used only by physicians licensed by the State of Florida to dispense drugs in the practice of medicine. Its receipt, possession, use and transfer are subject to the regulations and a general license or its equivalent of a Licensing State.

(8) Manufacture and Distribution of Radioactive Material for Certain In Vitro Clinical or Laboratory Testing Under General License. An application for a specific license to manufacture or distribute radioactive material for use under the general license of subsection 64E-5.206(8), F.A.C., will be approved if:

(a)-(e) No Change.

(a) The applicant satisfies the general requirements specified in Rule 64E-5.208, F.A.C.

(b) The radioactive material is to be prepared for distribution in prepackaged units of:

1. Carbon 14 in units not exceeding 10 microcuries (370 kBq) each.

2. Cobalt 57 in units not exceeding 10 microcuries (370 kBq) each. Ctrl + Click Here to Return to RATS 2007-3 §32.71

3. Hydrogen 3 (tritium) in units not exceeding 50 microcuries (1.85 MBq) each.

4. Iodine 125 in units not exceeding 10 microcuries (370 kBq) each.

5. Mock iodine 125 in units not exceeding 0.05 microcurie (1.85 kBq) of iodine 129 and 0.005 microcurie (185 Bq) of americium 241 each.

6. Iodine 131 in units not exceeding 10 microcuries (370 kBq) each.

7. Iron 59 in units not exceeding 20 microcuries (740 kBq) each.

8. Selenium 75 in units not exceeding 10 microcuries (370 kBq) each.

(c) Each prepackaged unit bears a durable, clearly visible label:

1. Identifying the radioactive contents as to chemical form and radionuclide, and indicating that the amount of radioactivity does not exceed 10 microcuries (370 kBq) of iodine 125, iodine 131, carbon 14, cobalt 57 or selenium 75; 50 microcuries (1.85 MBq) of hydrogen 3 (tritium); 20 microcuries (740 kBq) of iron 59; or mock iodine 125 in units not exceeding 0.05 microcurie (1.85 kBq) of iodine 129 and 0.005 microcurie (185 Bq) of americium 241 each; and Ctrl + Click Here to Return to RATS 2007-3 §32.71

2. Displaying the radiation caution symbol described in subsection 64E-5.322(1), F.A.C., and the words,

“CAUTION, RADIOACTIVE MATERIAL”, and “Not for Internal or External Use in Humans or Animals”.

(d) One of the following statements, as appropriate, or a substantially similar statement which contains the information called for in one of the following statements, appears on a label affixed to each prepackaged unit or appears in a leaflet or brochure which accompanies the package:

1. This radioactive material may be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of the U.S. Nuclear Regulatory Commission or of a state with which the Commission has entered into an agreement for the exercise of regulatory authority.

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Name of manufacturer

2. This radioactive material may be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of a Licensing State.

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Name of manufacturer

(e) The label affixed to the unit, or the leaflet or brochure which accompanies the package, contains adequate information as to the precautions to be observed in handling and storing such radioactive material. In the case of the mock iodine 125 reference or calibration source, the information accompanying the source must also contain directions to the licensee regarding the waste disposal requirements set out in Part III.

(f) The applicant satisfies the requirements specified in 64E-5.210(10)(b). Ctrl + Click Here to Return to RATS 2007-3 §32.72

(9) Licensing the Manufacture and Distribution of Ice Detection Devices. An application for a specific license to manufacture and distribute ice detection devices to general licensees under subsection 64E-5.206(9), F.A.C., will be approved if:

(a) The applicant satisfies the general requirements of Rule 64E-5.208, F.A.C.; and

(b) The criteria of Sections 32.61, 32.62, and 32.103 of 10 C.F.R., Part 32, are met.

(10) Manufacture and Distribution of Radiopharmaceuticals Containing Radioactive Material for Medical Use. An application for a specific license to manufacture and distribute radiopharmaceuticals containing radioactive material for use by persons licensed pursuant to Part VI for the uses listed in Rules 64E-5.626, 64E-5.627, 64E-5.630 and 64E-5.664, F.A.C., will be approved if:

(a) The applicant satisfies the general requirements specified in Rule 64E-5.208, F.A.C.;

(b) The applicant submits evidence that:

1. The applicant is registered or licensed with the U.S. Food and Drug Administration as a drug manufacturer; or

2. The applicant is registered or licensed as a drug manufacturer as specified in Chapter 499, Florida Statutes; or Ctrl + Click Here to Return to RATS 2007-3 §30.32(j)

3. The applicant has a nuclear pharmacy permit and only authorized nuclear pharmacists compound or dispense radiopharmaceuticals as specified in Section 465.0193, Florida Statutes. Ctrl + Click Here to Return to RATS 2007-3 §30.32(j) Ctrl + Click Here to Return to RATS 2007-3 §30.34(j) Ctrl + Click Here to Return to RATS 2007-3 §33.72

(c) The applicant submits information on the radionuclide, chemical and physical form, packaging including maximum activity per package, and shielding provided by the packaging of the radioactive material which is appropriate for safe handling and storage of radiopharmaceuticals by medical use licensees; Ctrl + Click Here to Return to RATS 2007-3 §30.32(j)

(d) The applicant satisfies the following labeling requirements:

1. The label affixed to each transport radiation shield of any material of a radioactive drug transferred for commercial distribution includes the radiation symbol and the words “Caution, Radioactive Material” or

“Danger, Radioactive Material”; the name of the radioactive drug or its abbreviation; and the quantity of the radioactive material at a specified date and time. The time can be omitted for radioactive drugs with a half life greater than 100 days.

2. A label affixed to each syringe, vial, or other container used to hold a radioactive drug transferred for commercial distribution includes the words “Caution, Radioactive Material” or “Danger, Radioactive Material” and an identifier that correlates the syringe, vial, or other container with the information on the transport radiation shield label; and

(e) A licensee shall possess and use instruments to measure the radioactivity of radioactive drugs. The licensee shall have procedures for use of the instruments. The licensee shall measure by direct measurements or by combination of measurements and calculations the amount of radioactivity in doses of alpha-emitting, beta-emitting, or photon-emitting radioactive drugs before transfer for commercial distribution. In addition, the licensee shall:

1. Perform tests before initial use, periodically, and following repair on each instrument for accuracy, linearity, and geometry dependence appropriate for the use of the instrument and make adjustments when needed; and Ctrl + Click Here to Return to RATS 2007-3 §30.34(j)

2. Check each instrument for constancy and proper operation at the beginning of each day of use.

(f) An application from a medical facility, education institution, or Federal facility to produce Positron Emission Tomography (PET) radiopharmaceuticals containing for noncommercial transfer to licensees in its consortium licensed for medical pursuant to Part VI, or equivalent Agreement State, or U.S. Nuclear Regulatory Commission rules will be approved if:

1. The requirements of 64E-5.210(10)(a), (b), and (e) are satasfied;

2. The information required of 64E-5.210(10)(c) and (d) indicates the PET drugs to be noncommercially transferred to members of its consortium. Ctrl + Click Here to Return to RATS 2007-3 §30.32(j) **RATS 2007-3 30.32(j) and 30.34(j)** Ctrl + Click Here to Return to RATS 2007-3 §30.34(j)

(11) –(14) No change.

(11) Manufacture and Distribution of Generators or Reagent Kits for Preparation of Radiopharmaceuticals Containing Radioactive Material. An application for a specific license to manufacture and distribute generators or reagent kits containing radioactive material for preparation of radiopharmaceuticals by persons licensed pursuant to Part VI for the uses listed in Rule 64E-5.627 or 64E-5.664, F.A.C., will be approved if:

(a) The applicant satisfies the general requirements specified in Rule 64E-5.208, F.A.C.;

(b) The applicant submits evidence that:

1. The generator or reagent kit is to be manufactured, labeled and packaged in accordance with the Federal Food, Drug and Cosmetic Act or the Public Health Service Act, such as a new drug application (NDA) approved by the Food and Drug Administration (FDA), or a “Notice of Claimed Investigational Exemption for a New Drug” (IND) that has been accepted by the FDA; or

2. The manufacture and distribution of the generator or reagent kit are not subject to the Federal Food, Drug and Cosmetic Act and the Public Health Service Act;

(c) The applicant submits information on the radionuclide, chemical and physical form, packaging including maximum activity per package, and shielding provided by the packaging of the radioactive material contained in the generator or reagent kit;

(d) The label affixed to the generator or reagent kit contains information on the radionuclide, quantity and date of assay; and

(e) The label affixed to the generator or reagent kit, or the leaflet or brochure which accompanies the generator or reagent kit, contains:

1. Adequate information pertaining to radiation safety on the procedures to be followed and the equipment and shielding to be used in eluting the generator or processing radioactive material with the reagent kit, and

2. A statement that this generator or reagent kit, as appropriate, is approved for use by persons licensed by the department pursuant to Part VI for uses listed in Rule 64E-5.627, F.A.C., or under equivalent licenses of the U.S. Nuclear Regulatory Commission, an agreement state or a licensing state. The labels, leaflets, or brochures required by this section are in addition to the labeling required by the Food and Drug Administration

(FDA) and they may be separate from or, with the approval of FDA, may be combined with the labeling required by FDA.

(12) Manufacture and Distribution of Sources or Devices Containing Radioactive Material for Medical Use.

(a) An application for a specific license to manufacture and distribute sources and devices containing radioactive material to persons licensed pursuant to Part VI for use as a calibration, transmission or reference source or for the uses listed in Rule 64E-5.631, 64E-5.634, 64E-5.664 or 64E-5.632, F.A.C., will be approved if:

1. The applicant satisfies the general requirements in Rule 64E-5.208, F.A.C.;

2. The applicant submits sufficient information regarding each type of source or device pertinent to an evaluation of its radiation safety, including:

a. The radioactive material contained, its chemical and physical form, and amount,

b. Details of design and construction of the source or device,

c. Procedures for, and results of, prototype tests to demonstrate that the source or device will maintain its integrity under stresses likely to be encountered in normal use and accidents,

d. For devices containing radioactive material, the radiation profile of a prototype device,

e. Details of quality control procedures to assure that production sources and devices meet the standards of the design and prototype tests,

f. Procedures and standards for calibrating sources and devices,

g. Legend and methods for labeling sources and devices as to their radioactive content, and

h. Instructions pertaining to radiation safety for handling and storing the source or device; these instructions are to be included on a durable label attached to the source or device or attached to a permanent storage container for the source or device; provided, that instructions which are too lengthy for such label may be summarized on the label and printed in detail on a brochure which is referenced on the label;

3. The label affixed to the source or device, or to the permanent storage container for the source or device, contains information on the radionuclide, quantity, date of assay, and a statement that the name of source or device is licensed by the department for distribution to persons licensed pursuant to Part VI or under equivalent licenses of the U.S. Nuclear Regulatory Commission, an agreement state or a licensing state, provided, that such labeling for sources which do not require long term storage may be on a leaflet or brochure which accompanies the source;

(b) In the event the applicant desires that the source or device be required to be tested for leakage of radioactive material at intervals longer than 6 months, he shall include in his application sufficient information to demonstrate that such longer interval is justified by performance characteristics of the source or device or similar sources or devices and by design features that have a significant bearing on the probability or consequences of leakage of radioactive material from the source; and

(c) In determining the acceptable interval for test of leakage of radioactive material, the Department will consider the following information:

1. Primary containment or source capsule,

2. Protection of primary containment,

3. Method of sealing containment,

4. Containment construction materials,

5. Form of contained radioactive material,

6. Maximum temperature withstood during prototype tests,

7. Maximum pressure withstood during prototype tests,

8. Maximum quantity of contained radioactive material,

9. Radiotoxicity of contained radioactive material, and

10. Operating experience with identical sources or devices or similarly designed and constructed sources or devices.

(13) Requirements for License to Manufacture and Distribute Industrial Products Containing Depleted Uranium for Mass-Volume Applications.

(a) An application for a specific license to manufacture industrial products and devices containing depleted uranium for use pursuant to subsection 64E-5.205(4), F.A.C., or equivalent regulations of the U.S. Nuclear Regulatory Commission or an Agreement State will be approved if:

1. The applicant satisfies the general requirements specified in Rule 64E-5.208, F.A.C.;

2. The applicant submits sufficient information relating to the design, manufacture, prototype testing, quality control procedures, labeling or marking, proposed uses, and potential hazards of the industrial product or device to provide reasonable assurance that possession, use or transfer of the depleted uranium in the product or device is not likely to cause any individual to receive in any period of 1 calendar quarter a radiation dose in excess of 10 percent of the limits specified in Subpart III A of these rules; and

3. The applicant submits sufficient information regarding the industrial product or device and the presence of depleted uranium for a mass-volume application in the product or device to provide reasonable assurance that unique benefits will accrue to the public because of the usefulness of the product or device.

(b) In the case of an industrial product or device whose unique benefits have not been demonstrated, the Department will approve an application for a specific license under this subsection only if the product or device is found to combine a high degree of utility and low probability of uncontrolled disposal and dispersal of significant quantities of depleted uranium into the environment.

(c) Each person licensed pursuant to paragraph (13)(a), above, shall:

1. Maintain the level of quality control required by the license in the manufacture of the industrial product or device and in the installation of the depleted uranium into the product or device;

2. Label or mark each unit to:

a. Identify the manufacturer of the product or device and the number of the license under which the product or device was manufactured, the fact that the product or device contains depleted uranium and the quantity of depleted uranium in each product or device; and

b. State that receipt, possession, use and transfer of the product or device are subject to a general license or the equivalent and the regulations of the U.S. Nuclear Regulatory Commission or an Agreement State;

3. Assure that the depleted uranium before being installed in each product or device has been impressed with the following legend clearly legible through any plating or other covering: “Depleted Uranium”;

4.a. Furnish a copy of the general license described in subsection 64E-5.205(4), F.A.C., to each person to whom he transfers depleted uranium in a product or device for use pursuant to the general license described in subsection 64E-5.205(4), F.A.C., or

b. Furnish a copy of the general license certificate of the U.S. Nuclear Regulatory Commission’s or an Agreement State’s, or alternatively, furnish a copy of the general license described in subsection 64E-5.205(4), F.A.C., to each person to whom he transfers depleted uranium in a product or device for use pursuant to the general license of the U.S. Nuclear Regulatory Commission or an Agreement State, with a note explaining that use of the product or device is regulated by the U.S. Nuclear Regulatory Commission or an Agreement State under requirements substantially the same as those in subsection 64E-5.205(4), F.A.C.;

5. Report to the Department all transfers of industrial products or devices to persons for use under the general license described in subsection 64E-5.205(4), F.A.C. Such report shall identify each general licensee by name and address, an individual by name or position who may constitute a point of contact between the Department and the general licensee, the type and model number of device transferred, and the quantity of depleted uranium contained in the product or device. The report shall be submitted within 30 days after the end of each calendar quarter in which such a product or device is transferred to the general licensee. If no transfers have been made to general licensees under subsection 64E-5.205(4), F.A.C., during the reporting period, the report shall so indicate;

6.a. Report to the U.S. Nuclear Regulatory Commission all transfers of industrial products or devices to persons for use under the U.S. Nuclear Regulatory Commission general license in Section 40.25 of 10 C.F.R., Part 40,

b. Report to the responsible state agency all transfers of devices manufactured and distributed pursuant to subsection 64E-5.210(3), F.A.C., for use under a general license in that state’s rules equivalent to subsection 64E-5.205(4), F.A.C.,

c. Such report shall identify each general licensee by name and address, an individual by name or position who may constitute a point of contact between the agency and the general licensee, the type and model number of the device transferred, and the quantity of depleted uranium contained in the product or device. The report shall be submitted within 30 days after the end of each calendar quarter in which such product or device is transferred to the general licensee.

d. If no transfers have been made to U.S. Nuclear Regulatory Commission licensees during the reporting period, this information shall be reported to the U.S. Nuclear Regulatory Commission, and

e. If no transfers have been made to general licensees within a particular Agreement State during the reporting period, this information shall be reported to the responsible Agreement State agency upon the request of that agency; and

7. Keep records showing the name, address and point of contact for each general licensee to whom he transfers depleted uranium in industrial products or devices for use pursuant to the general license provided in subsection 64E-5.205(4), F.A.C., or equivalent regulations of the U.S. Nuclear Regulatory Commission or an Agreement State. The records shall be maintained for a period of 2 years and shall show the date of each transfer, the quantity of depleted uranium in each product or device transferred and compliance with the report requirements of this section.

(14) A licensee, manufacturer or an initial distributor of a sealed source or device containing a sealed source whose product contains exempt NARM or is intended for use under a general or specific license must submit a request for an evaluation of the sealed source or device containing a sealed source and obtain a registration from the department.

(a) The request for review of a sealed source or device must be made in triplicate and include information about the design, manufacture, prototype testing, quality control and assurance program, labeling, leak testing and proposed uses. The licensee shall inform customers of current reasonable disposal options for the radioactive material.

(b) The request for review of a device must include information about installation, service and maintenance, operating and safety instructions, and its potential hazards. The information shall provide reasonable assurance that the radiation safety properties of the source or device are adequate to protect public health, safety and property.

(c) The department shall use criteria and standards sufficient to ensure that the radiation safety properties of the sealed source or device are adequate to protect public health, safety and property. Criteria and standards used by the department in evaluating a sealed source or device include:

1. U.S. Department of Health and Human Services Publication FDA 81-8025 June 1981, Guides for Naturally Occurring and Accelerator-Produced Radioactive Materials (NARM), which is herein incorporated by reference and which is available from the department.

2. U.S. Nuclear Regulatory Commission Regulatory Guide 10.10 March 1987, Guide for the Preparation of Applications for Radiation Safety Evaluations and Registration of Devices Containing Byproduct Material, which is herein incorporated by reference and which is available from the department.

3. U.S. Nuclear Regulatory Commission Regulatory Guide 10.11 June 1987, Guide for the Preparation of Applications for Radiation Safety Evaluations of Sealed Sources Containing Byproduct Material, which is herein incorporated by reference and which is available from the department.

4. American National Standards Institute Standard N538, Classification of Industrial Ionizing Radiation Gauging Devices October 1979, which is herein incorporated by reference and which is available from the department.

5. American National Standards Institute Standard N540, Classification of Radioactive Self-Luminous Light Sources January 1976, which is herein incorporated by reference and which is available from the department.

6. American National Standards Institute Standard N432, Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography January 1980, which is herein incorporated by reference and which is available from the department.

7. American National Standards Institute Standard N542, Sealed Radioactive Sources Classification July 1978, which is herein incorporated by reference and which is available from the department.

(d) The licensee or applicant shall not distribute devices or products containing sealed sources unless the devices or sealed sources are manufactured and distributed in accordance with the registration and as authorized by a specific radioactive materials license issued by the department for such manufacture or distribution.

(e) The department shall not perform registration of devices or products containing sealed sources for persons outside the state.

(15) Each licensee who manufactures a nationally tracked source after February 6, 2007 shall assign a unique serial number to each nationally tracked source. Serial numbers must be composed only of alpha-numeric characters. (Pursuant to Section 120.54(6), F.S., subsection 64E-5.210(15), F.A.C., is substantively identical to 10 CFR 32.201 published on 01/01/2007.)

64E-5.213 Specific Terms and Conditions of License. (For 30.32(g) RATS 2007-3

(1) Each license issued pursuant to this part shall be subject to all the provisions of the applicable laws, now or hereafter in effect, and to all rules of the Department.

(2) No license issued or granted under this part and no right to possess or utilize radioactive material granted by any license issued pursuant to this part shall be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control to any person unless the Department, after securing a completed specific license application and application fee from the transferee, has issued a proper license in accordance with the provisions of the Act.

(3)(a) Each specific or general licensee shall notify the Department in writing immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 (Bankruptcy) of the United States Code (U.S.C.) by or against:

1. The licensee;

2. An entity, as that term is defined in 11 U.S.C. 101(14), controlling the licensee or listing the license or licensee as property of the estate; or

3. An affiliate, as that term is defined in 11 U.S.C. 101(2), of the licensee.

(b) This notification shall indicate the bankruptcy court in which the petition for bankruptcy was filed and the date of the filing of the petition for bankruptcy.

(4) Each person licensed by the Department pursuant to this part shall confine use and possession of the material licensed to the locations and purposes authorized in the license.

(5) A separate license is required for the following:

(a) Each activity as designated by license category in paragraph 64E-5.204(2)(e), F.A.C.

(b) Facilities for which one or more of the following applies:

1. The facilities are not contiguous;

2. The facilities are not under a single radiation safety program; or

3. The facilities are not under the same management.

4. Temporary job sites lasting more than two years.

(c) Each facility operated by an out-of-state licensee under reciprocity as specified in Rule 64E-5.216, F.A.C., and does not meet the definition of a temporary job site.

(d) Each large irradiator as defined in Rule 64E-5.101, F.A.C.

(6) A separate license is not required for temporary job sites lasting less than two years or for each facility that is authorized under a broad scope license.

(7) A licensee shall notify the department in writing within 30 days after a radiation safety officer permanently discontinues performance of radiation safety officer duties.

(8) A licensee shall apply and receive a license amendment or department approval:

(a) Before using radioactive material for a method or type or use not permitted by the license;

(b) Before permitting anyone to use radioactive material as an authorized user as authorized by the license;

(c) Before changing a radiation safety officer;

(d) Before ordering or receiving radioactive material in excess of the amount authorized on the license;

(e) Before adding to or changing the areas of use or address or addresses of use identified in the application or on the license; and

(f) Before changing statements, representations, and procedures which are incorporated into the license.

(g) Identifying all sources or devices by manufacturer and model number as registered by the sealed source and device registry or for sources or devices not registered by the sealed source and device registry provide the information subsection 64E-5.210(14), F.A.C. Ctrl + Click Here to Return to RATS 2007-3 §30.32(g)

64E-5.216 Reciprocal Recognition of Licenses for By-product, Source, Naturally Occurring and Accelerator Produced Radioactive Material, and Special Nuclear Material in Quantities Not Sufficient to Form a Critical Mass.

(1) Subject to these regulations, any person who holds a specific license from the NRC, or an agreement state and issued by the agency having jurisdiction where the licensee maintains an office for directing the licensed activity and at which radiation safety records are normally maintained, will be granted a general license by the department to conduct the activities authorized in such licensing document within the State of Florida, except for areas of exclusive federal jurisdiction, for a period not in excess of 365 consecutive days provided that: Ctrl + Click Here to Return to RATS 2007-2 §150.20

(a) The out-of-state license document does not limit the performance of the function authorized by such document to specified installations or locations;

(b) The out-of-state licensee notifies the department in writing at least 3 days prior to engaging in such activity. Such notification shall indicate the location, period and type of proposed possession and use within the State, and shall be accompanied by a copy of the pertinent licensing document. If, for a specific case, the 3-day period would impose an undue hardship on the out-of-state licensee, the licensee may, upon application to the department, obtain permission to proceed sooner.

(c) The out-of-state licensee complies with these applicable regulations and with all the terms and conditions of the licensing document, except any such terms and conditions that are inconsistent with these applicable regulations; and

(d) The out-of-state licensee shall not transfer or dispose of radioactive material possessed or used under the general license provided in this section except by transfer to a person who is specifically licensed by the department, by the U.S. Nuclear Regulatory Commission, an agreement state or a Licensing State to receive such material. :Ctrl + Click Here to Return to RATS 2007-2 §150.20

~~1. Specifically licensed by the department, by the U.S. Nuclear Regulatory Commission, an agreement state or a Licensing State to receive such material, or~~

~~2. Exempt from the requirements for a license for such material under Rule 64E-5.203(1)(a), F.A.C.~~

64E-5.220 Radioactive Quantities.

(1) Listed below are the quantities of radioactive materials requiring consideration of the need for an emergency plan for responding to a release as required in 64E-5.219:

Ctrl + Click Here to Return to RATS 2007-3 30.72ScheduleC

Material	Release Fraction	Curies
Actinium 228	0.001	4,000
Americium 241	0.001	2
Americium 242	0.001	2
Americium 243	0.001	2
Antimony 124	0.01	4,000
Antimony 126	0.01	6,000
Barium 133	0.01	10,000
Barium 140	0.01	30,000
Bismuth 207	0.01	5,000
Bismuth 210	0.01	600
Cadmium 109	0.01	1,000
Cadmium 113	0.01	80

Material	Release Fraction	Curies
Calcium 45	0.01	20,000
Californium 252	0.001	9
Carbon 14	0.01 (non CO_2)	50,000
Cerium 141	0.01	10,000
Cerium 144	0.01	300
Cesium 134	0.01	2,000
Cesium 137	0.01	3,000
Chlorine 36	0.5	100
Chromium 51	0.01	300,000
Cobalt 60	0.001	5,000
Copper 64	0.01	200,000
Curium 242	0.001	60
Curium 243	0.001	3
Curium 244	0.001	4
Curium 245	0.001	2
Europium 152	0.01	500
Europium 154	0.01	400
Europium 155	0.01	3,000
Gadolinium 153	0.01	5,000
Germanium 68	0.01	2,000
Gold 198	0.01	30,000
Hafnium 172	0.01	400
Hafnium 181	0.01	7,000
Holmium 166m	0.01	100
Hydrogen 3	0.5	20,000
Iodine 125	0.5	10
Iodine 131	0.5	10
Indium 114m	0.01	1,000
Iridium 192	0.001	40,000
Iron 55	0.01	40,000
Iron 59	0.01	7,000
Krypton 85	1.0	6,000,000
Lead 210	0.01	8
Manganese 56	0.01	60,000
Mercury 203	0.01	10,000
Molybdenum 99	0.01	30,000
Neptunium 237	0.001	2
Nickel 63	0.01	20,000
Niobium 94	0.01	300

Material	Release Fraction	Curies
Phosphorus 32	0.5	100
Phosphorus 33	0.5	1,000
Polonium 210	0.01	10
Potassium 42	0.01	9,000
Promethium 145	0.01	4,000
Promethium 147	0.01	4,000
Radium 226	**0.001**	**100**
Ruthenium 106	0.01	200
Samarium 151	0.01	4,000
Scandium 46	0.01	3,000
Selenium 75	0.01	10,000
Silver 110m	0.01	1,000
Sodium 22	0.01	9,000
Sodium 24	0.01	10,000
Strontium 89	0.01	3,000
Strontium 90	0.01	90
Sulfur 35	0.5	900
Technetium 99	0.01	10,000
Technetium 99m	0.01	400,000
Tellurium 127m	0.01	5,000
Tellurium 129m	0.01	5,000
Terbium 160	0.01	4,000
Thulium 170	0.01	4,000
Tin 113	0.01	10,000
Tin 123	0.01	3,000
Tin 126	0.01	1,000
Titanium 44	0.01	100
Vanadium 48	0.01	7,000
Xenon 133	1.0	900,000
Yttrium 91	0.01	2,000
Zinc 65	0.01	5,000
Zirconium 93	0.01	400
Zirconium 95	0.01	5,000
Any other beta-gamma emitter	0.01	10,000

Material	Release Fraction	Curies
Mixed fission products	0.01	1,000
Mixed corrosion products	0.01	10,000
Contaminated equipment beta-gamma	0.001	10,000
Irradiated material, any form other than solid noncombustible	0.01	1,000
Irradiated material solid noncombustible	0.001	10,000
Mixed radiological waste, beta-gamma	0.01	1,000
Packaged mixed waste, beta-gamma	0.001	10,000
Any other alpha emitter	0.001	2
Contaminated equipment alpha	0.0001	20
Package waste, alpha	0.0001	20

Ctrl + Click Here to Return to RATS 2007-3 30.72ScheduleC

64E-5.304 Occupational Dose Limits for Adults.

(1) The licensee or registrant shall control the occupational dose to individual adults, except for planned special exposures as specified in Rule 64E-5.309, F.A.C., to the following dose limits:

(a) An annual limit, which is the more limiting of:

1. The total effective dose equivalent equal to 5 rem (0.05 sievert); or

2. The sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye equal to 50 rem (0.5 sievert).

(b) The annual limits to the lens of the eye, to the skin of the whole body, and to the skin of the extremities which are:

1. A lens dose equivalent of 15 rem (0.15 sievert), and

2. A shallow dose equivalent of 50 rem (0.5 sievert) to the skin of the whole body or to skin of any extremity.

(2) Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, shall be subtracted from the limits for planned special exposures that the individual could receive during the current year and during the individual's lifetime as specified in paragraphs 64E-5.309(5)(a) and (b), F.A.C.

(3) When the external exposure is determined by measurement with an external personal monitoring device, the deep-dose equivalent must be used in place of the effective dose equivalent, unless the effective dose equivalent is determined by a dosimetry method approved by the department. The assigned deep dose equivalent must be for the part of the body receiving the highest exposure. The assigned shallow dose equivalent must be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure. The deep dose equivalent, lens dose equivalent and shallow dose equivalent may be assessed from surveys or other radiation measurements to demonstrate compliance with the occupational dose limits if the individual monitoring device was not in the region of highest potential exposure or the results of individual monitoring are unavailable. Ctrl + Click Here to Return to RATS 2008-1 20.1201 (Previously submitted)

(4) Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in State of Florida

Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993, Table I, and can be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits. See Rule 64E-5.339, F.A.C.

(4) Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I, and can be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits. See Rule 64E-5.339, F.A.C.

(5) In addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity. See footnote 3 of State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

64E-5.306 Determination of External Dose from Airborne Radioactive Material. RATS 2007-3

(1) Licensees shall include the contribution to the deep dose equivalent, eye dose equivalent, and shallow dose equivalent from external exposure to the radioactive cloud when determining the dose from airborne radioactive material. See State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, footnotes 1 and 2. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(2) Airborne radioactivity measurements and DAC values shall not be used as the primary means to assess the deep dose equivalent when the airborne radioactive material includes radionuclides other than noble gases or if the cloud of airborne radioactive material is not relatively uniform. The determination of the deep dose equivalent to an individual shall be based upon measurements using instruments or individual monitoring devices.

64E-5.307 Determination of Internal Exposure. RATS 2007-3

(1) To assess dose used to determine compliance with occupational dose equivalent limits when required as specified in Rule 64E-5.315, F.A.C., the licensee shall take suitable and timely measurements of:

(a) Concentrations of radioactive materials in air in work areas;

(b) Quantities of radionuclides in the body;

(c) Quantities of radionuclides excreted from the body; or

(d) Combinations of these measurements.

(2) Unless respiratory protective equipment is used as specified in Rule 64E-5.319, F.A.C., or the assessment of intake is based on bioassays, the licensee shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.

(3) When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior of the material in an individual is known, the licensee is permitted to:

(a) Use that information to calculate the committed effective dose equivalent, and, if used, the licensee shall document that information in the individual's record;

(b) Upon prior approval of the department, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material, for example, aerosol size distribution or density; and

(c) Separately assess the contribution of fractional intakes of Class D, W, or Y compounds of a given radionuclide to the committed effective dose equivalent. See State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~.

(4) If the licensee chooses to assess intakes of Class Y material using the measurements given in paragraph 64E-5.307(1)(b) or (c), F.A.C., the licensee can delay the recording and reporting of the assessments for periods up to 7 months, unless otherwise required by Rule 64E-5.344 or 64E-5.345, F.A.C. This delay permits the licensee to make additional measurements basic to the assessments.

(5) If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours shall be either:

(a) The sum of the ratios of the concentration to the appropriate DAC value, that is D, W, or Y, from State of

Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~ for each radionuclide in the mixture; or

(b) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.

(6) If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.

(7) When a mixture of radionuclides in air exists, a licensee is permitted to disregard certain radionuclides in the mixture if:

(a) The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in Rule 64E-5.304, F.A.C., and in complying with the monitoring requirements in subsection 64E-5.315(2), F.A.C.;

(b) The concentration of any radionuclide disregarded is less than 10 percent of its DAC; and

(c) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent.

(8) When determining the committed effective dose equivalent, the following information can be considered:

(a) To calculate the committed effective dose equivalent, the licensee can assume that the inhalation of one ALI or an exposure of 2,000 DAC-hours results in a committed effective dose equivalent of 5 rem (0.05 sievert) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.

(b) For an ALI and the associated DAC determined by the nonstochastic organ dose limit of 50 rem (0.5 sievert), the intake of radionuclides that would result in a committed effective dose equivalent of 5 rem (0.05 sievert), that is, the stochastic ALI, as listed in parentheses in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I. The licensee can use the stochastic ALI to determine committed effective dose equivalent as a simplifying assumption. However, if the licensee uses the stochastic ALI, the licensee shall also demonstrate that the limit in subparagraph 64E-5.304(1)(a)2., F.A.C., is met. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

64E-5.313 Compliance with Dose Limits for Individual Members of the Public. RATS 2007-3

(1) The licensee or registrant shall make or cause to be made surveys of radiation levels in unrestricted areas and radioactive materials in effluents released to unrestricted areas to demonstrate compliance with the dose limits for individual members of the public in Rule 64E-5.312, F.A.C.

(2) A licensee or registrant shall show compliance with the annual dose limit in Rule 64E-5.312, F.A.C., by:

(a) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual who is likely to receive the highest dose from the licensed or registered operation does not exceed the annual dose limit; or

(b) Demonstrating that:

1. The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table II; and

2. The dose from external sources would not exceed 0.002 rem (0.02 millisievert) in an hour and 0.05 rem (0.5 millisievert) in a year if an individual were continually present in an unrestricted area.

(3) Upon approval from the department, the licensee can adjust the effluent concentration values in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~ for members of the public to take into account the actual physical and chemical characteristics of the effluents, such as aerosol size distribution, solubility, density, radioactive decay equilibrium, and chemical form.

(4) Dental and podiatry registrants are exempt from (1), (2), and (3), above.

(5) Each licensee or registrant shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public until the department terminates each pertinent license or registration requiring

the record. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

64E-5.315 Conditions Requiring Individual Monitoring of External and Internal Occupational Dose. RATS 2007-3

Each licensee or registrant shall monitor exposures from sources of radiation at levels sufficient to demonstrate compliance with the occupational dose limits of this part. As a minimum:

(1) Each licensee or registrant shall monitor occupational exposure to radiation and shall supply and require the use of individual monitoring devices by:

(a) Adults likely to receive in 1 year from sources external to the body a dose in excess of 10 percent of the limits in subsection 64E-5.304(1), F.A.C.;

(b) Minors likely to receive in 1 year from radiation sources external to the body a deep dose equivalent in excess of 0.1 rem (1 mSv), a lens dose equivalent in excess of 0.15 rem (1.5 mSv) or a shallow dose equivalent to the skin or to the extremities in excess of 0.5 rem (5 mSv);

(c) Declared pregnant women likely to receive during the entire pregnancy from radiation sources external to the body a deep dose equivalent in excess of 0.1 rem (1 mSv); and

(d) Individuals entering a high or very high radiation area.

(2) Each licensee shall monitor to determine compliance with Rule 64E-5.307, F.A.C., the occupational intake of radioactive material by and assess the committed effective dose equivalent to:

(a) Adults likely to receive in 1 year an intake in excess of 10 percent of the applicable ALI in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~ Table I, Columns 1 and 2; and Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(b) Minors likely to receive in 1 year a committed effective dose equivalent in excess of 0.1 rem (1.0 millisievert); and

(c) Declared pregnant women likely to receive during the entire pregnancy a committed effective dose equivalent in excess of 0.1 rem (1 mSv).

64E-5.326 Exemptions to Labeling Requirements. RATS 2007-3

A licensee is not required to label:

(1) Containers holding licensed material in quantities less than the quantities listed in State of Florida Bureau of Radiation Control Radioactive Material Requiring Labeling, May 2000;

(2) Containers holding licensed material in concentrations less than those specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table III; Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(3) Containers attended by an individual who takes the precautions necessary to prevent the exposure of individuals in excess of the limits established by this part;

(4) Containers when they are in transport and packaged and labeled as specified by the rules of the U.S. Department of Transportation;

(5) Containers that are accessible only to individuals authorized to handle or use them or to work in the vicinity of the containers if the contents are identified to these individuals by a readily available written record. Examples of containers of this type are containers in locations such as water-filled canals, storage vaults, or hot cells. The record shall be retained as long as the containers are in use for the purpose indicated on the record; or

(6) Installed manufacturing or process equipment, such as piping and tanks.

64E-5.328 General Requirements.

(1) Unless otherwise exempted, a licensee shall transfer waste for disposal, discharge, or decay licensed material only:

(a) By transfer to an authorized recipient as specified in Rule 64E-5.332, F.A.C., or in Part II of these regulations or to the U.S. Department of Energy;
(b) By decay in storage;
(c) By release in effluents within the limits in Rule 64E-5.312, F.A.C.; or
(d) As authorized in this subpart. Ctrl + Click Here to Return to RATS 2007-3 20.2001l
(2) A person shall be specifically licensed to receive waste containing licensed material from other persons for:
(a) Treatment prior to disposal;
(b) Treatment by incineration;
(c) Decay in storage;
(d) Disposal at a licensed land disposal facility; or
(e) Storage until transferred to a storage or disposal facility authorized to receive the waste.

64E-5.329 Method of Obtaining Approval of Proposed Disposal Procedures. Ctrl + Click Here to Return to RATS 2007-3 20.2001l

(1) A person can apply to the department for approval of proposed procedures to dispose of radioactive material in a manner not otherwise authorized in this part. Each application shall include a description of the radioactive material, including the quantities and kinds of radioactive material and levels of radioactivity involved, and the proposed manner and conditions of disposal. The application where appropriate should also include an analysis and evaluation of pertinent information of the nature of the environment, including topographical, geological, meteorological, and hydrological characteristics; usage of ground and surface waters in the general area; the nature and location of other potentially affected facilities; and procedures to be observed to minimize the risk of unexpected or hazardous exposure.

(2) The department will not approve any application for a licensee to receive radioactive material from other persons for disposal on land not owned by a state or the federal government.

64E-5.330 Discharge by Release into Sanitary Sewerage. RATS 2007-3 Ctrl + Click Here to Return to RATS 2007-3 20.2001l

(1) A licensee can discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:

(a) The material is readily soluble or is readily dispersible biological material in water;

(b) The quantity of licensed radioactive material that the licensee releases into the sewer in 1 month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table III;

(c) If more than one radionuclide is released, the following conditions must also be satisfied;

1. The licensee shall determine the fraction of the limit in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table III represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table III; and Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

2. The sum of the fractions for each radionuclide required by subparagraph 64E-5.330(1)(c)1., F.A.C., does not exceed unity; and

(d) The total quantity of licensed radioactive material that the licensee releases into the sanitary sewerage in a year does not exceed 5 curies (185 gigabecquerels) of hydrogen 3, 1 curie (37 gigabecquerels) of carbon 14, and 1 curie (37 gigabecquerels) of all other radioactive materials combined.

(2) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in subsection 64E-5.330(1), F.A.C.

64E-5.331 Disposal of Specific Wastes. RATS 2007-3 Ctrl + Click Here to Return to RATS 2007-3 20.2001l

(1) A licensee can dispose of the following licensed material without regard to its radioactivity:

(a) 0.05 microcurie (1.85 kBq) or less of hydrogen 3 or carbon 14 per gram of medium used for liquid scintillation counting;

(b) 0.05 microcurie (1.85 kBq) or less of hydrogen 3 or carbon 14 per gram of animal tissue, averaged over the weight of the entire animal.

(c) Any radioactive material which is not a sealed source with a physical half-life of less than 120 days if all of the following are met:

1. Radioactive material to be disposed is held for decay in storage a minimum of 10 half-lives;

2. The radioactive material is monitored at the container surface before disposal as ordinary trash and its radioactivity cannot be distinguished from the background radiation level in a low background radiation area with an appropriate radiation survey instrument set on its most sensitive scale and with no interposed shielding;

3. All radiation labels are removed or obliterated, unless specifically authorized in writing or license condition by the department;

4. Each generator column is separated and monitored individually with all radiation shielding removed to ensure that its contents have decayed to background levels before disposal; and

5. The licensee shall retain a record of each disposal for 3 years. The record shall include:

a. The date of the disposal;

b. The date on which the radioactive material was placed in storage;

c. The radionuclides disposed;

d. The model and serial number of the radiation survey instrument used;

e. The background dose rate;

f. The radiation dose rate measured at the surface of each container; and

g. The name of the individual who performed the disposal.

(d) Licensed material as defined in Paragraphs 64E-5.101(21)(c) and (d), F.A. C., may be disposed of at a licensed low-level radioactive waste disposal facility, even though it is not defined as low-level radioactive waste provided the requirements of Rule 64E-5.332, F.A.C., are satisfied or at a disposal facility authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law, including the Solid Waste Disposal Act, as authorized under the Energy Policy Act of 2005. Ctrl + Click Here to Return to RATS 2007-3 20.2001l and Ctrl + Click Here to Return to RATS 2007-3 20.2008

(2) A licensee shall not dispose of tissue as specified in subsection 64E-5.331(1), F.A.C., in a manner that would permit its use either as food for humans or as animal feed.

(3) The licensee shall maintain records as specified in Rule 64E-5.340, F.A.C.

64E-5.332 Transfer for Disposal and Manifests.

(1) The requirements of this section, Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifest, July 1997, hereafter referred to as “Requirements for Low-Level Radioactive Waste Disposal,” which is herein incorporated by reference and which is available from the department, and Part XV are designed to control transfers of low-level radioactive waste by any waste generator, waste collector, or waste processor licensee, as defined in Requirements for Low-Level Radioactive Waste Disposal, who ships low-level waste directly or indirectly through a waste collector or waste processor to a licensed low-level waste land disposal facility as defined in Requirements for Low-Level Radioactive Waste Disposal, establish a manifest tracking system, and supplement existing requirements concerning transfers and recordkeeping for those wastes. Requirements for Low-Level Radioactive Waste Disposal incoporates NRC Form 540 (3-95), Uniform Low-Level Radioactive Waste Manifest – Shipping Paper; NRC Form 541 (11-96), Uniform Low-Level Radioactive Waste Manifest – Container and Waste Description; and NRC Form 542 (3-95), Uniform Low-Level Radioactive Waste Manifest – Manifest Index and Regional Compact Tabulation.

(2) Prior to March 1, 1998, each shipment of radioactive waste designated for disposal at a licensed low-level

radioactive waste disposal facility shall be accompanied by a shipment manifest as specified in subsection 64E-5.333(12), F.A.C. Beginning March 1, 1998, any licensee shipping radioactive waste intended for ultimate disposal at a licensed land disposal facility shall document the information required on forms specified in Requirements for Low-Level Radioactive Waste Disposal and transfer this recorded information to the intended consignee as specified in Requirements for Low-Level Radioactive Waste Disposal. Ctrl + Click Here to Return to RATS 2007-3 20.2008

(3) Prior to March 1, 1998, each shipment manifest shall include a certification by the waste generator as specified in subsection 64E-5.333(12), F.A.C. Beginning March 1, 1998, each shipment manifest shall include a certification by the waste generator as specified in Requirements for Low-Level Radioactive Waste Disposal.

(4) Prior to March 1, 1998, each person involved in the transfer of waste for disposal, including the waste generator, waste collector, waste processor and disposal facility operator, shall comply with the requirements specified in subsection 64E-5.333(12), F.A.C. Beginning March 1, 1998, each person participating in the transfer of waste for disposal, including the waste generator, waste collector, waste processor and disposal facility operator, shall comply with the requirements specified in Requirements for Low-Level Radioactive Waste Disposal.

64E-5.344 Notification of Incidents. RATS 2007-3

(1) Immediate Notification. Regardless of other requirements for notification, each licensee or registrant shall immediately report each event involving a source of radiation possessed by the licensee or registrant that might have caused or threatens to cause any of the following conditions:

(a) An individual to receive:

1. A total effective dose equivalent of 25 rem (0.25 sievert) or more;

2. A lens dose equivalent of 75 rem (0.75 sievert) or more; or

3. A shallow dose equivalent to the skin or extremities or a total organ dose equivalent of 250 rad (2.5 gray) or more; or

(b) The release of radioactive material inside or outside of a restricted area so that if an individual had been present for 24 hours, the individual could have received an intake five times the occupational ALI. This provision does not apply to locations where personnel are not normally stationed during routine operations, such as hot-cells or process enclosures.

(2) Twenty-Four Hour Notification. Each licensee or registrant shall report to the department within 24 hours of discovery of the event each event involving loss of control of a licensed or registered source of radiation possessed by the licensee or registrant that might have caused or threatens to cause any of the following conditions:

(a) An individual to receive in a period of 24 hours:

1. A total effective dose equivalent exceeding 5 rem (0.05 sievert);

2. A lens dose equivalent exceeding 15 rem (0.15 sievert); or

3. A shallow dose equivalent to the skin or extremities or a total organ dose equivalent exceeding 50 rem (0.5 sievert); or

(b) The release of radioactive material inside or outside of a restricted area so that if an individual had been present for 24 hours, the individual could have received an intake in excess of one occupational ALI. This provision does not apply to locations where personnel are not normally stationed during routine operations such as hot-cells or process enclosures.

(3) The licensee or registrant shall prepare each report filed with the department as specified Rule 64E-5.344, F.A.C., so that names of individuals who have received exposure to sources of radiation are stated in a separate and detachable portion of the report.

(4) Licensees or registrants shall make the reports required by subsections 64E-5.344(1) and (2), F.A.C., to the department by telephone, telegram, mailgram, or facsimile to the department.

(5) The provisions of Rule 64E-5.344, F.A.C., do not apply to doses that result from planned special exposures if such doses are within the limits for planned special exposures and are reported as specified in Rule 64E-5.346, F.A.C.

(6) Immediate notification. In addition to the other reporting requirements in these regulations, each licensee shall notify the department as soon as possible but not later than 4 hours after the discovery of an event, such as a

fire, explosion, or toxic gas release, that prevents immediate protective actions necessary to avoid exposure to radiation or radioactive materials that could exceed regulatory limits or to avoid releases of licensed material that could exceed regulatory limits.

(7) Twenty-four hour report. Each licensee shall notify the department within 24 hours after the discovery of any of the following events involving licensed material:

(a) An unplanned contamination event that:

1. Requires access to the contaminated area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area;

2. Involves a quantity of material greater than five times the lowest annual limit on intake of materials as specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, July 1993; and

3. Has access to the area restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination.

(b) An event in which equipment is disabled or fails to function as designed when:

1. The equipment is required by regulation or license condition to prevent releases exceeding regulatory limits, to prevent exposure to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident;

2. The equipment is required to be available and operable when it is disabled or fails to function; and

3. No redundant equipment is available and operable to perform the required safety function.

(c) An event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body;

(d) An unplanned fire or explosion damaging any licensed material or any device, container, or equipment containing licensed materials when:

1. The quantity of material involved is five times the lowest annual limit on intake for material specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, July 1993; and

2. The damage affects the integrity of the licensed material or its container. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(e) Dose to an embryo/fetus that is greater than 50 mSv (5 rem) dose equivalent that is a result of an administration of radioactive material or radiation from radioactive material to a pregnant individual unless the dose to the embryo/fetus was specifically approved, in advance, by the authorized user as defined in Rule 64E-5.6011, F.A.C.

(f) Dose to a nursing child that is a result of an administration of radioactive material to a breast-feeding individual that meets one of the following:

1. Greater than 50 mSv (5 rem) total effective dose equivalent; or

2. Has resulted in unintended permanent functional damage to an organ or a physiological system of the child, as determined by a physician.

(8) Preparation and submission of reports. Reports made by licensees in response to the requirements of this section must be made as follows:

(a) Licensees shall make reports required by subsections 64E-5.344(6) and (7), F.A.C., by telephone to the department. If the information is available at the time of notification, the information provided in these reports must include:

1. The caller's name and call back telephone number;

2. A description of the event, including date and time;

3. The exact location of the event;

4. The isotopes, quantities, and chemical and physical forms of the licensed material involved; and

5. Any personnel radiation exposure data available.

(b) Written report. Each licensee who makes a report required by subsections 64E-5.344(6) and (7), F.A.C., shall submit a written follow-up report within 30 days of the initial report. Written reports prepared as required by other regulations may be submitted to fulfill this requirement if the reports contain all of the necessary information.

The reports must include the following:

1. A description of the event, including the probable cause and the manufacturer and model number of any equipment that failed or malfunctioned;

2. The exact location of the event;

3. The isotopes, quantities, and chemical and physical form of the licensed material involved;

4. Date and time of the event;

5. Corrective actions taken or planned and the results of any evaluations or assessments; and

6. The extent of exposure of individuals to radiation or to radioactive materials without identification of the individuals by name.

64E-5.601 License Required.

(1) Radioactive materials shall not be manufactured, produced, acquired, received, possessed, prepared, used, or transferred for medical use except as provided in a specific license.

(2) Any licensee who is licensed for one or more of the medical uses in Rule 64E-5.626, 64E-5.627, 64E-5.630, or 64E-5.632, F.A.C., also is authorized to use radioactive material under a general license in subsection 64E-5.206(8), F.A.C., for specified in vitro uses without filing the certificate required by paragraph 64E-5.206(8)(b), F.A.C., but is subject to the other provisions of subsection 64E-5.206(8), F.A.C.

(3)(a) Unless prohibited by license condition, a physician, in training may receive, possess, acquire, prepare, use, or transfer radioactive materials as provided in these regulations under the supervision of an authorized user as provided in subsections 64E-5.608(1) and 64E-5.608(3), F.A.C.

(b) Current and active certified radiologic technologists as authorized in Part IV Chapter 468, F.S., may receive, possess, acquire, prepare, use, or transfer radioactive materials as provided in these regulations under the supervision of an authorized user as provided in paragraph 64E-5.607(3)(e) and subsection 64E-5.608(3), F.A.C.

(c) Unless prohibited by license condition, a medical physicist in training may receive, acquire, prepare, use, possess, or transfer radioactive materials as provided in these regulations under the supervision of an authorized medical physicist as provided in subsections 64E-5.608(2) and 64E-5.608(3), F.A.C.

(4) Unless authorized by the department, no individual shall manufacture, produce, acquire, receive, possess, prepare, use, or transfer radioactive materials for medical use unless:

(a) That individual is listed on the licensee's specific license as an authorized user, authorized medical physicist, or an authorized nuclear pharmacist;

(c) Authorized by subsection 64E-5.601(2), F.A.C., with approval of the radiation safety committee at medical institutions or by management for licensees that are not medical institutions; or

(d) That individual is in training, authorized by subsection 64E-5.601(3), F.A.C., and subpart I of Part VI.

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64E-5.6011 Definitions

(2) “Authorized user” means:

(a) A physician, dentist, or podiatrist who meets the requirements in Rule 64E-5.658 and subsection 64E-5.649(1) ~~64E-5.549(1)~~, 64E-5.650(1) ~~64E-5.550(1)~~, 64E-5.660(1), 64E-5.661(1), 64E-5.662(1), 64E-5.652(1), 64E-5.654(1) or 64E-5.655(1), F.A.C.; or Ctrl + Click Here to GO Back to Item 1 NRC11-18-2010 Ltr

(b) An individual identified for medical use of radioactive materials on:

1. A NRC or agreement state license that authorizes the medical use of radioactive material;

2. A permit issued by a NRC master material licensee that is authorized to permit the medical use of radioactive material;

3. A permit issued by a NRC or agreement state specific licensee of broad scope that is authorized to permit the medical use of radioactive material; or

4. A permit issued by a NRC master material license broad scope permittee that is authorized to permit the medical use of radioactive material.

64E-5.607 Authority and Responsibilities.

(1) A licensee shall provide sufficient authority and organizational freedom to the radiation safety officer and the radiation safety committee to:

(a) Identify radiation safety problems;

(b) Initiate, recommend, or provide solutions; ~~and~~

(c) Require and verify implementation of corrective actions; and~~.~~

(d) Stop unsafe operations.

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64E-5.609 Visiting Authorized User, Visiting Authorized Medical Physicist, or Visiting RSO.

(1) A licensee may permit any visiting authorized user to use licensed material for medical use under the terms of the licensee's license for 60 days each year if:

(a) The licensee has a copy of a license issued by the department, the NRC, or an agreement state that identifies the visiting authorized user by name as an authorized user for medical use; and

(b) The visiting authorized user performs only those procedures for which he is specifically authorized by the license described in paragraph 64E-5.609(1)(a), F.A.C., above.

(2) For up to 60 days each year, a licensee may permit an authorized medical physicist or an individual qualified under Rules 64E-5.656 and 64E-5.658, F.A.C., to function as a visiting authorized medical physicist as authorized by the license.

(3) For up to 60 days each year, a licensee may permit an authorized user or an individual qualified to be a RSO, under Rules 64E-5.648 and 64E-5.658, F.A.C., to function as a visiting RSO and to perform the functions of a RSO, as provided in Rule 64E-5.605 and subsection 64E-5.607(1), F.A.C.

(4) A license amendment is not needed to permit a visiting authorized user, visiting authorized medical physicist, or visiting RSO to use licensed material or perform functions in accordance with this section.

(5) The visiting authorized user, visiting authorized medical physicist, or visiting RSO shall have the prior written permission of the licensee's management and, if the use or function occurs on behalf of a medical institution, the institution's radiation safety committee.

(6) Licensee records shall include a copy of the record described in Rule 64E-5.657, F.A.C., or some other form of documentation that verifies the individual has met the respective ~~perspective~~ training and experience requirements listed in Subpart I. A licensee shall retain copies of the records specified in Rule 64E-5.609, F.A.C., for 3 years after the last visit. Ctrl + Click Here to GO Back to Other 5

64E-5.614 Possession, Use, Calibration, and Check of Dose Calibrators in the Use of Unsealed Radiopharmaceuticals.

(1) A medical use licensee authorized to administer radiopharmaceuticals shall possess a dose calibrator and use it to measure the amount of activity administered to each patient or human research subject.

(2) A licensee shall check each dose calibrator before use each day of use, or during an assigned shift for facilities operating continuously, for constancy with a dedicated check source. The check shall be performed on a frequently used setting with a sealed source of not less than 10 microcuries (370 kBq) of radium 226 or 50 microcuries (1.85 MBq) of any other photon-emitting radionuclide with a half-life greater than 90 days. A record shall be made of each check, which shall include:

(a) The model and serial number of the dose calibrator;

(b) The identity and decay corrected activity of the radionuclide contained in the check source;

(c) The date of the check;

(d) The activity measured;

(e) The percent error;

(f) The instrument settings; and

(g) The name or initials of the individual ~~who~~ performing ~~performed~~ the check. Ctrl + Click Here to GO Back to Other 6

(3) The licensee shall test each dose calibrator for accuracy at the time of installation and at least every 12 months. The test shall be completed by assaying at least two sealed sources containing different

radionuclides, the activity of which has been determined by the National Institute of Standards and Technology (NIST) or by the manufacturer who has compared their source to a source calibrated by the NIST. The sources shall have a minimum activity of 10 microcuries (370 kBq) for radium 226 and 50 microcuries (1.85 MBq) for any other photon-emitting radionuclide. At least one of the sources shall have a principal photon energy between 100 kiloelectron volts and 500 kiloelectron volts. A record shall be made of each test, which shall include:

(a) The model and serial number of the dose calibrator;

(b) The model and serial number of each source used and the identity of the radionuclide contained in the source and its activity;

(c) The date of the test;

(d) The results of the test;

(e) The instrument settings; and

(f) The name of the individual performing this test.

(4) The licensee shall test each dose calibrator for linearity at the time of installation and at least every 3 months over the range of use between 10 microcuries (370 kBq) and the highest dosage that will be administered. A record shall be made of each test, which shall include:

(a) The model and serial number of the dose calibrator;

(b) The calculated activities;

(c) The measured activities;

(d) The date of the test; and

(e) The name of the individual performing this test.

(5) The licensee shall test each dose calibrator for geometry dependence at the time of installation over the range of volumes and volume configurations for which it will be used. The licensee shall keep a record of this test for the duration of the use of the dose calibrator. A record shall be made of each test, which shall include:

(a) The model and serial number of the dose calibrator;

(b) The configuration of the source measured;

(c) The activity measured and the instrument setting for each volume measured;

(d) The date of the test; and

(e) The name of the individual performing this test.

(6) A licensee shall correct mathematically dosage readings for any geometry or linearity error that exceeds 10 percent if the dosage is greater than 10 microcuries (370 kBq) and shall repair or replace the dose calibrator if the accuracy or constancy error exceeds 10 percent.

(7) A licensee shall also perform checks and tests required by Rule 64E-5.614, F.A.C., following adjustment or repair of the dose calibrator.

(8) A licensee shall retain a record of each check and test required by Rule 64E-5.614, F.A.C., for 3 years.

(9) A licensee may calibrate instrumentation used in Rule 64E-5.614, F.A.C., using nationally recognized standards or the manufacturer's instructions. The standards or instructions used by the licensee must be available for inspection by the department.

64E-5.6251 Manual Brachytherapy Therapy Related Computer Systems

The licensee shall perform acceptance testing on the treatment planning system of manual brachytherapy therapy-related computer systems in accordance with published protocols accepted by nationally recognized bodies. At a minimum, the acceptance testing must include, as applicable, verification of: Ctrl + Click Here to Return to Other 8

(1) The source-specific input parameters required by the dose calculation algorithm;

(2) The accuracy of dose, dwell time, and treatment time calculations at representative points;

(3) The accuracy of isodose plots and graphic displays; and

(4) The accuracy of the software used to determine sealed source positions from radiographic images.

The licensee shall maintain records of this acceptance testing and protocols used in performing these tests for inspection by the department.

64E-5.616 Determination of Dosages of Unsealed Radioactive Material for Medical Use. Ctrl + Click Here to Return to RATS 2007-3 35.63

(1) The licensee shall determine by assay or direct measurement within 30 minutes before each radiopharmaceutical dosage and record the activity of each dosage before medical use. A record of the assay shall be made which shall include:

(a) The generic name, trade name, or abbreviation of the radiopharmaceutical; its lot number; expiration date; and the radionuclide;

(b) The patient's or human research subject's name or identification number if one has been assigned;

(c) The prescribed dosage and activity of the dosage at the time of assay or a notation that the total activity assayed is less than 10 microcuries (370 kBq);

(d) The date and time of the assay and administration; and

(e) The name of the individual who performed the assay.

(2) Unless directed by the authorized user, a licensee may not use a dosage if the dosage does not fall within the prescribed dosage range or if the dosage differs from the prescribed dosage by more than 20 percent.

(3) A licensee shall retain a record of the assays listed in Rule 64E-5.616, F.A.C., for 3 years.

64E-5.626 Use of Radiopharmaceuticals for Uptake, Dilution, or Excretion Studies.

A licensee is allowed to use any unsealed radioactive material in a radiopharmaceutical for a diagnostic use involving measurements of uptake, dilution, or excretion for medical use under the following conditions:

(1) When a written directive is not required by subsection 64E-5.607(3), F.A.C., the licensee must satisfy the following:

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by a NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol, or a Notice of Claimed Investigational Exemption for a New Drug (IND) protocol accepted by U.S. Food and Drug Administration (FDA); or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application, or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. Except for sodium iodide I-131 in quantities greater than 30 microcuries (1.11 MBq), a physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, and sub-subparagraph 64E-5.650(3)(a)2.g., F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.626(1)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 6 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the training and experience specified in Rule 64E-5.649 or 64E-5.657, F.A.C. Ctrl + Click Here to Return to RATS 2007-3 35.100

(2) When a written directive is required by subsection 64E-5.607(3), F.A.C., the licensee must satisfy the following: Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by an NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application, or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. A ~~For sodium iodide I-131 in quantities greater than 30 microcuries (1.11 MBq), a~~ physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.626(2)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the applicable training and experience specified in Rule 64E-5.657, 64E-5.660, 64E-5.661, 64E-5.662 or 64E-5.663, F.A.C.

64E-5.627 Use of Unsealed Radiopharmaceuticals, Generators, and Reagent Kits for Imaging and Localization Studies.

A licensee is allowed to use any radioactive material in a diagnostic radiopharmaceutical, or any generator, or reagent kit, for preparation and diagnostic use of a radiopharmaceutical containing radioactive material for medical use under the following conditions:

(1) When a written directive is not required by subsection 64E-5.607(3), F.A.C., the licensee must satisfy the following:

(a) Obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent U.S. Nuclear Regulatory Commission or Agreement State regulations; or

(b) Radioactive material is obtained from and prepared by a NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. Except for sodium iodide I-131 in quantities greater than 30 microcuries (1.11 MBq), a physician who is an authorized user and meets the training requirements specified in Rules 64E-5.650 or~~,~~ 64E-5.660 and sub-subparagraph 64E-5.650(3)(a)2.g., F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.627(1)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 10 NRC 11-8-2010 Ltr and Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the training and experience specified in Rule 64E-5.650 or 64E-5.657, F.A.C. Ctrl + Click Here to Return to RATS 2007-3 35.200

(2) When a written directive is required by subsection 64E-5.607(3), F.A.C., the licensee must satisfy the following: Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by an NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. A ~~For sodium iodide I-131 in quantities greater than 30 microcuries (1.11 MBq), a~~ physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.627(2)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the applicable training and experience specified in Rules 64E-

5.657, 64E-5.660, 64E-5.661, 64E-5.662 or 64E-5.663, F.A.C.

(3) For ~~Only for~~ oral administration of sodium iodide I-131 in quantities less than or equal to 33 millicuries (1.22 gigabecquerels) and when a written directive is required by subsection 64E-5.607(3), F.A.C., the licensee must satisfy the following: Ctrl + Click Here to GO Back to Other 2 Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by a NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. For sodium iodide I-131 in quantities greater than 30 microcuries (1.11 MBq), a physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.627(3)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the applicable training and experience specified in Rules 64E-5.657, 64E-5.660 or 64E-5.661, F.A.C.

(4) A licensee shall use radioactive aerosols or gases only if application on DH Form 1322 12/09 is made to and approved by the department and the requirements of Rule 64E-5.629, F.A.C., are met.

64E-5.628 Generators.

(1) Permissible Molybdenum/Technetium Concentration. Ctrl + Click Here to Return to RATS 2007-3 35.204(c)&(d)

(a) A licensee shall not administer a radiopharmaceutical containing more than 0.15 microcurie of molybdenum 99 per millicurie of technetium 99m (5.55 kilo-becquerel of molybdenum 99 per 37 megabecquerel of technetium 99m). Ctrl + Click Here to Return to RATS 2007-3 35.204(a)

(b) A licensee preparing technetium 99m radiopharmaceuticals from molybdenum 99/technetium 99m generators shall measure the molybdenum 99 concentration in each eluate or extract.

(c) A licensee who is required to measure molybdenum concentrations shall retain a record of each measurement for 3 years. The record shall include for each elution or extraction of technetium 99m:

1. The measured activity of the technetium expressed in millicuries (megabecquerels);

2. The measured activity of molybdenum expressed in microcuries (kilobecquerels);

3. The ratio of the measures expressed as microcuries of molybdenum per millicurie of technetium (kilobecquerels of molybdenum per megabecquerel of technetium);

4. The date of the test; and

5. The initials of the individual who performed the test. Ctrl + Click Here to Return to RATS 2007-3 35.2204

(d) A licensee shall report immediately to the department each occurrence of molybdenum 99 concentration exceeding the limits specified in subsection 64E-5.628(1), F.A.C. Ctrl + Click Here to Return to RATS 2007-3 35.204(a)

(2) Permissible Strontium/Rubidium Concentration.

(a) A licensee shall not administer a radiopharmaceutical containing more than 0.02 microcurie of strontium 82 per millicurie of rubidium 82 (0.74 kilobecquerel of strontium 82 per 37 megabecquerel of rubidium 82) or more than 0.2 microcurie of strontium 85 per millicurie of rubidium 82 (7.4 kilobecquerel of strontium 85 per 37 megabecquerel of rubidium 82).

(b) A licensee preparing rubidium 82 radiopharmaceuticals from strontium 82/rubidium 82 generators shall measure and calculate the strontium 82 and strontium 85 concentration on each day of use prior to the use of

rubidium chloride for injection.

(c) A licensee who is required to measure strontium 82 and strontium 85 concentrations shall retain a record of each measurement for 3 years. The record shall include for each day of use assay:

1. The measured activity of the rubidium 82 expressed in millicuries (megabecquerels);

2. The measured activity of strontium 82 expressed in microcuries (kilobecquerels);

3. The calculated activity of strontium 85 expressed in microcuries (kilobecquerels);

4. The ratio of the measures expressed as microcuries of strontium 82 per millicurie of rubidium 82 (kilobecquerels of strontium 82 per megabecquerel of rubidium 82) and the ratio of the measures expressed as microcuries of strontium 85 per millicurie of rubidium 82 (kilobecquerels of strontium 85 per megabecquerel of rubidium 82);

5. The date of the test; and

6. The initials of the individual who performed the test.

(d) A licensee shall report immediately to the department each occurrence of strontium 82 or strontium 85 concentrations exceeding the limits specified in subsection 64E-5.628(2), F.A.C. Ctrl + Click Here to Return to RATS 2007-3 30.34(g)

(3) Other Permissible Parent/Daughter Concentration.

(a) If a licensee seeks to utilize a Parent/Daughter concentration other than those listed in subsection (1) or (2) above, the licensee must submit a license amendment to the department for review and approval of the maximum parent isotope or other contaminate concentrations breakthrough per daughter isotope concentration allowed for administration to patients or human research subjects, and the instrumentation and procedures used in determining parent isotope or other contaminate breakthrough concentrations;

(b) Each license must perform the determination listed in paragraph (3)(a), above, on each day of use prior to the administration to patients or human research subjects;

(c) Retain a record of each measurement for 3 years. The record shall include for each day of use assay:

1. The measured activity of the daughter isotope expressed in millicuries (megabecquerels);

2. The measured activity of parent isotope(s) and other contaminates expressed in microcuries (kilobecquerels);

3. The calculated activity of parent isotope(s) and other contaminates expressed in microcuries (kilobecquerels) as applicable;

4. The ratio of the measures expressed as microcuries of parent isotope(s) and other contaminates per millicurie of daughter isotope (kilobecquerels of parent isotope(s) per megabecquerel of daughter isotope);

5. The date of the test; and

6. The initials of the individual who performed the test.

(d) A licensee shall report immediately to the department each occurrence of parent isotope(s) or other contaminates concentrations exceeding the limits specified in paragraph 64E-5.628(3)(a), F.A.C.

64E-5.629 Control of Aerosols and Gases. RATS 2007-3

(1) A licensee shall only administer radioactive aerosols or gases when airborne concentrations are within the limits prescribed by State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I, Column 3, and Table II.

(2) The system shall either be directly vented to the atmosphere through an air exhaust or provide for collection and decay or disposal of the aerosol or gas in a shielded container.

(3) A 1icensee shall only administer radioactive gases in rooms that are at negative pressure compared to surrounding rooms.

(4) Before receiving, using, or storing radioactive gas, the licensee shall calculate the time needed after a release to reduce the concentration in the area of use to the occupational limit listed in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~. The calculation shall be based on the highest activity of gas

handled in a single container and the measured available air exhaust rate. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(5) A licensee shall post the time calculated in subsection 64E-5.629(4), F.A.C., at the area of use and require that individuals evacuate the room until the posted time has elapsed if a gas spill occurs.

(6) A licensee shall check the operation of collection systems prior to use each month of use and measure the ventilation rates in areas of use every 6 months. Records of these checks and measurements shall be maintained for 3 years.

(7) A copy of the calculations required in subsection 64E-5.629(4), F.A.C., shall be recorded and retained for the duration of the license.

64E-5.630 Use of Radiopharmaceuticals for Therapy.

A licensee is allowed to use any unsealed radioactive material in a radiopharmaceutical that requires a written directive as described in subsection 64E-5.607(3), F.A.C., and for a therapeutic medical use provided the following is met:

(1) For any unsealed radiopharmaceutical including parenteral use listed in subsection 64E-5.630(4), F.A.C., and sodium iodide I-131 use listed in subsections 64E-5.630(2) and (3), F.A.C., the licensee must satisfy the following: Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by an NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. A physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.630(1)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the applicable training and experience specified in Rule 64E-5.660 or 64E-5.657, F.A.C.

(2) For ~~Only for~~ oral administration of sodium iodide I-131 in quantities less than or equal to 33 millicuries (1.22 gigabecquerels) the licensee must satisfy the following: Ctrl + Click Here to GO Back to Other 3 Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by an NRC or agreement state licensee use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. A physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.630(2)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the training and experience specified in Rule 64E-5.661 or 64E-5.657, F.A.C.

(3) For ~~Only for~~ oral administration of sodium iodide I-131 in quantities greater than 33 millicuries (1.22 gigabecquerels) the licensee must satisfy the following: Ctrl + Click Here to GO Back to Other 3 Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by an NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. A physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.630(3)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the training and experience specified in Rule 64E-5.662 or 64E-5.657, F.A.C.

(4) For ~~Only for~~ parenteral use of radioactive materials the licensee must satisfy the following: Ctrl + Click Here to GO Back to Other 3 Ctrl + Click Here to Return to RATS 2007-3 35.300

(a) Radioactive material is obtained from a manufacturer or pharmacy licensed as specified in subsection 64E-5.210(10), F.A.C., or in equivalent NRC or agreement state regulations; or

(b) Radioactive material is obtained from and prepared by an NRC or agreement state licensee for use in research in accordance with a Radioactive Drug Research Committee-approved protocol or an IND protocol accepted by FDA; or

(c) Radioactive material is prepared by the licensee for use in research in accordance with a Radioactive Drug Research Committee-approved application or an IND protocol accepted by FDA; or

(d) Radioactive material is prepared by:

1. An authorized nuclear pharmacist;

2. A physician who is an authorized user and meets the training requirements specified in Rule 64E-5.650 or 64E-5.660, F.A.C.; or

3. An individual under the supervision of physician who is an authorized user under subparagraph 64E-5.630(4)(d)2., F.A.C., and as specified in paragraphs 64E-5.601(3)(a) and (b), 64E-5.607(3)(e), or subsection 64E-5.608(1), F.A.C., or; Ctrl + Click Here to GO Back to Item 14 NRC 11-8-2010 Ltr

(e) The authorized user must satisfy the training and experience specified in Rule 64E-5.663 or 64E-5.657, F.A.C.

64E-5.633 Manual Brachytherapy Sources Inventory and Surveys.

(1) The licensee shall maintain accountability at all times for all manual brachytherapy sources in storage or use. ~~As soon as possible each time brachytherapy sources are returned to an area of storage from an area of use, the licensee shall immediately count or otherwise verify the number returned to ensure that all sources taken from the storage area have been returned.~~

(a) As soon as possible each time brachytherapy sources are returned to an area of storage from an area of use, the licensee shall immediately count or otherwise verify the number returned to ensure that all sources taken from the storage area have been returned; and

(b) As soon as possible after removing the sources from a patient or a human research subject, the licensee shall immediately count or otherwise verify the number of sources and return them to a secure storage area. Ctrl + Click Here to GO Back to Item 26 NRC 11-8-2010 Ltr

64E-5.632 Use of Sources for Manual Brachytherapy.

The licensee is allowed to use the brachytherapy sources listed below, provided they are approved by and used as specified in, the Sealed Source and Device Registry~~,~~ for ~~diagnostic~~ medical uses, or in research in accordance with an active IDE application accepted by the FDA and the requirements of Rule 64E-5.612, F.A.C., are met.
Ctrl + Click Here to GO Back to OTHER O1

64E-5.6412 Full Calibration Measurements on Gamma Stereotactic Radiosurgery Units.

(1) A licensee authorized to use a gamma stereotactic radiosurgery unit for medical use shall perform full calibration measurements on each gamma stereotactic radiosurgery:

(a) Before the first medical use of the unit;

(b)1. Before medical use whenever spot-check measurements indicate that the output differs by more than 5 percent from the output obtained at the last full calibration corrected mathematically for radioactive decay;

2. Before medical use following replacement of the source or following reinstallation of the gamma stereotactic radiosurgery unit in a new location;

3. Following any repair of the gamma stereotactic radiosurgery unit that includes removal of the sources or major repair of the components associated with the source assembly; and

(c) At intervals not exceeding 1 year, with the exception that relative helmet factors need only be determined before the first medical use of a helmet and following any damage to a helmet.

(2) Full calibration measurements of the gamma stereotactic radiosurgery unit shall include the determination of:

(a) The output within 3 percent;

(b) Relative helmet factors;

(c) Isocenter coincidence;

(d) Timer constancy and linearity over the range of use;

(e) On-off errors ~~timers~~; Ctrl + Click Here to GO Back to Item 33 NRC 11-8-2010 Ltr

(f) Trunnion centricity;

(g) Treatment table retraction mechanism, using backup battery power or hydraulic backups with the unit off;

(h) Helmet microswitches;

(i) Emergency timing circuits; and

(j) Stereotactic frames and localizing devices (trunnions).

(3) A licensee shall use the dosimetry system described in Rule 64E-5.640, F.A.C., to measure the output for one set of exposure conditions. The remaining radiation measurements required in paragraph 64E-5.6412(2)(a), F.A.C., may be made using a dosimetry system that indicates relative dose rates.

(4) A licensee shall make full calibration measurements required by subsection 64E-5.6412(1), F.A.C., in accordance with published protocols accepted by nationally recognized bodies.

(5) A licensee shall correct mathematically the outputs determined in paragraph 64E-5.6412(2)(a), F.A.C., at intervals not exceeding 1 month for cobalt-60 and at intervals consistent with 1 percent physical decay for all other radionuclides.

(6) Full calibration measurements required by subsection 64E-5.6412(1), F.A.C., and physical decay corrections required by subsection 64E-5.6412(5), F.A.C., shall be performed by the authorized medical physicist.

(7) A licensee shall maintain a record of each gamma stereotactic radiosurgery unit calibration for three years. The record shall include:

(a) The date of the calibration;

(b) The manufacturer's name, model number, and serial number for both the gamma stereotactic radiosurgery unit and the source;

(c) The model numbers and serial numbers of the instruments used to calibrate the gamma stereotactic radiosurgery unit;

(d) The results and an assessment of the full calibrations; and

(e) The signature of the authorized medical physicist.

64E-5.6422 Periodic Spot-Checks for Gamma Stereotactic Radiosurgery Units.

(1) A licensee authorized to use a gamma stereotactic radiosurgery unit for medical use shall perform the following spot-checks:

(a) Monthly:

(b) Before the first use of the unit on a given day; and

(c) After each source installation.

(2) To satisfy the requirements of paragraph 64E-5.6422(1)(a), F.A.C., spot-checks ~~Spot-checks~~ shall include the determination of: Ctrl + Click Here to GO Back to Other Item 4

(a) Assure the proper operation of the:

1. Treatment table retraction mechanism, using backup battery power or hydraulic backups with the unit off;

2. Helmet microswitches;

3. Emergency timing circuits; and

4. Stereotactic frames and localizing devices (trunnions).

(b) Determine the following elements:

1. The output for one typical set of operating conditions measured with the dosimetry system described in subsection 64E-5.640(2), F.A.C.;

2. The difference between the measurement made in subparagraph 64E-5.6422(2)(b)1., F.A.C., and the anticipated output, expressed as a percentage of the anticipated output value obtained at last full calibration corrected mathematically for physical decay;

3. Source output against computer calculation;

4. Timer accuracy and linearity over the range of use;

5. On-off error; and

6. Trunnion centricity.

(3) A licensee shall perform spot-checks required by subsection 64E-5.6422(1), F.A.C., following procedures established by the authorized medical physicist.

(4) A licensee shall have the authorized medical physicist review the results of each spot-check within 15 days and promptly notify the licensee in writing of the results of each spot-check. The licensee shall keep a copy of each written notification for 3 years.

(5) To satisfy the requirements of paragraphs 64E-5.6422(1)(b) and (c), F.A.C., the licensee's spot-checks must assure proper operation of the following:

(a) Electrical interlocks at each gamma stereotactic radiosurgery room entrance;

(b) Source exposure indicator lights on the gamma stereotactic radiosurgery unit, on the control console, and in the facility;

(c) Viewing and intercom systems;

(d) Timer termination;

(e) Radiation monitors used to indicate room exposures; and

(f) Emergency off buttons.

(6) If the results of the checks required in subsection 64E-5.6422(5), F.A.C., of this section indicate the malfunction of any system, a licensee shall lock the control console in the off position and not use the unit except as may be necessary to repair, replace, or check the malfunctioning system.

(7) A licensee shall arrange for the repair of any system identified in subsection 64E-5.6422(2), F.A.C., that is not operating properly as soon as possible.

(8) A licensee shall maintain a record of each spot-check required by subsections 64E-5.6422(2) and (5), F.A.C., for 3 years and a copy of the procedures required in subsections 64E-5.6422(2) and (3), F.A.C., until the licensee no longer possesses the gamma stereotactic radiosurgery unit. The record shall include:

(a) The date of the spot-check;

(b) The manufacturer's name, model number, and serial number for the gamma stereotactic radiosurgery unit;

(c) The manufacturer's name, model number and serial number of the instrument used to measure the

output of the gamma stereotactic radiosurgery unit;

(d) The timer linearity and constancy;

(e) The calculated on-off error;

(f) A determination of trunnion centricity;

(g) The difference between the anticipated output and the measured output;

(h) An assessment of source output against computer calculations;

(i) Notations indicating the operability of radiation monitors, helmet microswitches, emergency timing circuits, emergency off buttons, electrical interlocks, source exposure indicator lights, viewing and intercom systems, timer termination, treatment table retraction mechanism, and stereotactic frames and localizing devices (trunnions); and

(j) The name of the individual who performed the periodic spot-check and the signature of the authorized medical physicist who reviewed the record of the spot-check.

64E-5.643 Radiation Surveys for Teletherapy Facilities.

(1) The licensee shall perform radiation surveys with an operable radiation survey instrument calibrated as provided in Rule 64E-5.615, F.A.C., before medical use~~,~~; after each installation of a teletherapy source~~,~~; following repairs to the source(s) driving unit, or other electronic or mechanical component that could expose the source, reduce shielding around the source(s), or compromise the radiation safety of the unit or the source(s); and after making any change for which an amendment is required by Rule 64E-5.636, F.A.C. Ctrl + Click Here to GO Back to Item 34 NRC 11-8-2010 Ltr

(a) The maximum and average radiation levels from the surface of the main source safe with the source(s) in the shielded position do not exceed the levels stated in the Sealed Source and Device Registry ~~at 1 meter from the teletherapy source with the source in the off position and the collimators set for a normal treatment field shall not exceed 10 millirems (100 μSv) per hour and 2 millirems (20 μSv) per hour~~.

(b) With the teletherapy source in the on position with the largest clinically available treatment field and with a scattering phantom in the primary beam of radiation, radiation levels in restricted areas shall be unlikely to cause any occupationally exposed individuals to receive a dose in excess of the limits specified in Rule 64E-5.304, F.A.C.; and radiation dose rates of any individual member of the public in unrestricted areas shall not exceed the limits specified in paragraph 64E-5.312(1)(c), F.A.C.

(2) If the results of the surveys required in subsection 64E-5.643(1), F.A.C., indicate any radiation levels in excess of the limits specified, the licensee shall lock the control in the off position and shall not use the unit:

(a) Except to repair, replace, or test the teletherapy unit, the teletherapy unit shielding, or the treatment room shielding; or

(b) Until the licensee has received a specific exemption from the department.

(3) A licensee shall maintain a record of the radiation measurements made following installation of a source for the duration of the license. The record shall include:

(a) The date of the measurements;

(b) The reason the survey is required;

(c) The manufacturer's name, model number and serial number of the teletherapy unit, the source, and the instrument used to measure radiation levels;

(d) Each dose rate measured around the teletherapy source while in the off position and the average of all measurements;

(e) A plan of the areas surrounding the treatment room that were surveyed;

(f) The measured dose rate at several points in each area expressed in millirems (microsieverts) per hour;

(g) The calculated maximum level of radiation over a period of 1 week for each restricted and unrestricted area; and

(h) The signature of the RSO or the authorized medical physicist.

64E-5.645 Remote Afterloader, Gamma Stereotactic, and Teletherapy Therapy-Related Computer

Systems.
The licensee shall perform acceptance testing on the treatment planning system of high, medium, low, pulsed dose-rate remote afterloaders, gamma stereotactic, and teletherapy therapy-related computer systems in accordance with published protocols accepted by nationally recognized bodies. An example of a nationally recognized body is the American Association of Physicists in Medicine. At a minimum, the acceptance testing must include, as applicable, verification of the following:

(1) The source-specific input parameters required by the dose calculation algorithm;

(2) The accuracy of dose, dwell time, and treatment time calculations at representative points;

(3) The accuracy of isodose plots and graphic displays;

(4) The accuracy of the software used to determine sealed source positions from radiographic images; and

(5) The accuracy of electronic transfer of the treatment delivery parameters to the treatment delivery unit from the treatment planning system.

The licensee shall maintain records of this acceptance testing and protocols used in performing these tests for inspection by the department. Ctrl + Click Here to Return to Other 9

64E-5.648 Training for a Radiation Safety Officer.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the RSO as provided in Rule 64E-5.605, F.A.C., to be an individual who:

(1) Is certified by a specialty board whose certification process has been recognized by the NRC or an agreement state and who meets the requirements in ~~subsections 64E-5.648(4) and (5), F.A.C.~~ subsection 64E-5.648(5), of this section. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/ med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 3 NRC11-8-2010 Ltr

(a)1. Hold a bachelor's or graduate degree from an accredited college or university in physical science or engineering or biological science with a minimum of 20 college credits in physical science;

2. Have 5 or more years of professional experience in health physics (graduate training may be substituted for no more than 2 years of the required experience) including at least 3 years in applied health physics; and

3. Pass an examination administered by diplomates of the specialty board, which evaluates knowledge and competence in radiation physics and instrumentation, radiation protection, mathematics pertaining to the use and measurement of radioactivity, radiation biology, and radiation dosimetry; or

(b)1. Hold a master's or doctor's degree in physics, medical physics, other physical science, engineering, or applied mathematics from an accredited college or university;

2. Have 2 years of full-time practical training and/or supervised experience in medical physics either:

a. Under the supervision of a medical physicist who is certified in medical physics by a specialty board recognized by the NRC or an agreement state; or

b. In clinical nuclear medicine facilities providing diagnostic or therapeutic services under the direction of physicians who meet the requirements for authorized users in Rule 64E-5.657, 64E-5.650 or 64E-5.660, F.A.C.;

3. Pass an examination, administered by diplomates of the specialty board, that assesses knowledge and competence in clinical diagnostic radiological or nuclear medicine physics and in radiation safety; or

(2) Have completed a structured educational program consisting of both:

(a) 200 hours of classroom and laboratory training in the following areas:

1. Radiation physics and instrumentation;

2. Radiation protection;

3. Mathematics pertaining to the use and measurement of radioactivity;

4. Radiation biology; and

5. Radiation dosimetry.

(b) One year of full-time radiation safety experience under the supervision of the individual identified as

the RSO on a NRC or agreement state license or permit issued by a NRC master material licensee that authorizes similar type(s) of use(s) of radioactive material involving the following:

1. Shipping, receiving, and performing related radiation surveys;

2. Using and performing checks for proper operation of instruments used to determine the activity of dosages, survey meters, and instruments used to measure radionuclides;

3. Securing and controlling radioactive material;

4. Using administrative controls to avoid mistakes in the administration of radioactive material;

5. Using procedures to prevent or minimize radioactive contamination and using proper decontamination procedures;

6. Using emergency procedures to control radioactive material; and

7. Disposing of radioactive material; or

(3)(a) Is a medical physicist who has been certified by a specialty board whose certification process has been recognized by the NRC or an agreement state under subsection 64E-5.656(1), F.A.C., and has experience in radiation safety for similar types of use of radioactive material for which the licensee is seeking the approval of the individual as RSO and who meets the requirements in subsections 64E-5.648(4) and (5), F.A.C., of this section; or

(b) Is an authorized user, authorized medical physicist, or authorized nuclear pharmacist identified on the licensee's license and has experience with the radiation safety aspects of similar types of use of radioactive material for which the individual has RSO responsibilities; and

(4) Have obtained written attestation, signed by a preceptor RSO, or residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category as designated by the applicant seeking authorized status) who meets the requirements in subsection 64E-5.648(5) and in subparagraphs 64E-5.648(1)(a)1., and 64E-5.648(1)(a)2., or 64E-5.648(1)(b)1., and 64E-5.648(1)(b)2., or subsection 64E-5.648(2) or paragraph 64E-5.648(3)(a), F.A.C., of this section, and has demonstrated the ability to function independently as a RSO to fulfill the radiation safety related duties for a medical use licensee; and

(5) Has training in the radiation safety, regulatory issues, and emergency procedures for the types of use for which a licensee seeks approval. This training requirement may be satisfied by completing training that is supervised by a RSO, authorized medical physicist, authorized nuclear pharmacist, or authorized user, as appropriate, who is authorized for the type(s) of use for which the licensee is seeking approval.

64E-5.649 Training for Uptake, Dilution, or Excretion Studies.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user of a radiopharmaceutical listed in subsection 64E-5.626(1), F.A.C., to:

(1) Be certified by a medical specialty board whose certification process has been recognized by the NRC or an agreement state ~~and who meets the requirements in paragraph 64E-5.649(3)(b), F.A.C., of this section~~. Ctrl + Click Here to GO Back to Item 9 NRC 11-8-2010 Ltr (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/ materials/miau/med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to:

(a) Complete 60 hours of training and experience in basic radionuclide handling techniques and radiation safety applicable to the medical use of unsealed radioactive material for uptake, dilution, and excretion studies that includes the topics listed in paragraph 64E-5.649(3)(a) and subparagraph 64E-5.649(3)(a)2., F.A.C., of this section; and

(b) Pass an examination, administered by diplomates of the specialty board, that assesses knowledge and competence in radiation safety, radionuclide handling, and quality control; or

(2) Be an authorized user under Rule 64E-5.650 or 64E-5.660, F.A.C., or equivalent NRC or agreement state requirements; or Ctrl + Click Here to GO Back to Item 7 NRC 11-8-2010 Ltr

(3)(a) Have completed 60 hours of training and experience, including a minimum of 8 hours of classroom and laboratory training, in basic radionuclide handling techniques applicable to the medical use of unsealed radioactive material for uptake, dilution, and excretion studies. The training and experience must include the following:

1. Classroom and laboratory training in the following areas:
a. Radiation physics and instrumentation;
b. Radiation protection;
c. Mathematics pertaining to the use and measurement of radioactivity;
d. Chemistry of radioactive material for medical use; ~~and~~
e. Radiation biology; and Ctrl + Click Here to GO Back to Item 8 NRC 11-8-2010 Ltr
2. Work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657, 64E-5.649, 64E-5.650 or 64E-5.660, F.A.C., NRC or equivalent agreement state requirements, involving the following: Ctrl + Click Here to GO Back to Item 8 NRC 11-8-2010 Ltr
a. Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;
b. Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters;
c. Calculating, measuring, and safely preparing patient or human research subject dosages;
d. Using administrative controls to prevent a medical event involving the use of unsealed radioactive material;
e. Using procedures to contain spilled radioactive material safely and using proper decontamination procedures; and
f. Administering dosages of radioactive drugs to patients or human research subjects.
(b) Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657, 64E-5.649, 64E-5.650 or 64E-5.660, F.A.C., NRC or equivalent agreement state requirements, that the individual has satisfactorily completed the requirements in paragraph 64E-5.649(1)(a) or 64E-5.649(3)(a), F.A.C., of this section and has demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for medical uses authorized under subsection 64E-5.626(1), F.A.C. Ctrl + Click Here to GO Back to Item 9 NRC 11-8-2010 Ltr

64E-5.650 Training for Imaging and Localization Studies for Which a Written Directive Is Not Required.
Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user specified in subsection 64E-5.627(1), F.A.C., to:
(1) Be certified by a medical specialty board whose certification process has been recognized by the NRC or an agreement state ~~and who meets the requirements in paragraph 64E-5.650(3)(b), F.A.C., of this section~~. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/ materials/miau/med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 13 NRC 11-8-2010 Ltr
(a) Complete 700 hours of training and experience in basic radionuclide handling techniques and radiation safety applicable to the medical use of unsealed radioactive material for imaging and localization studies that includes the topics listed in subparagraphs 64E-5.650(3)(a)1. and 64E-5.650(3)(a)2., F.A.C., of this section; and
(b) Pass an examination, administered by diplomates of the specialty board, which assesses knowledge and competence in radiation safety, radionuclide handling, and quality control; or
(2) Be an authorized user under Rule 64E-5.660, F.A.C., and meet the requirements in sub-subparagraph 64E-5.650(3)(a)2.g., F.A.C., NRC or equivalent agreement state requirements; or ~~paragraph 64E-5.650(3)(a), F.A.C.; or~~ Ctrl + Click Here to GO Back to Item 11 NRC 11-8-2010 Ltr
(3)(a) Have completed 700 hours of training and experience, including a minimum of 80 hours of classroom and laboratory training, in basic radionuclide handling techniques applicable to the medical use of unsealed radioactive material for imaging and localization studies. The training and experience must include, at a minimum the following:

1. Classroom and laboratory training in the following areas:

a. Radiation physics and instrumentation;

b. Radiation protection;

c. Mathematics pertaining to the use and measurement of radioactivity;

d. Chemistry of radioactive material for medical use;

e. Radiation biology; and

2. Work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657, 64E-5.650 or Rule 64E-5.660, and sub-subparagraph 64E-5.650(3)(a)2.g.~~, and Rule 64E-5.660~~, F.A.C., NRC or equivalent agreement state requirements, involving the following: Ctrl + Click Here to GO Back to Item 12 NRC 11-8-2010 Ltr

a. Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;

b. Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters;

c. Calculating, measuring, and safely preparing patient or human research subject dosages;

d. Using administrative controls to prevent a medical event involving the use of unsealed radioactive material;

e. Using procedures to safely contain spilled radioactive material and using proper decontamination procedures;

f. Administering dosages of radioactive drugs to patients or human research subjects; and

g. Eluting generator systems appropriate for preparation of radioactive drugs for imaging and localization studies, measuring and testing the eluate for radionuclide purity, and processing the eluate with reagent kits to prepare labeled radioactive drugs; and

(b) Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rules 64E-5.657, 64E-5.650, 64E-5.660, and sub-subparagraph 64E-5.650(3)(a)2.g., F.A.C., NRC or equivalent agreement state requirements, that the individual has satisfactorily completed the requirements in paragraph 64E-5.650(1)(a) or 64E-5.650(3)(a), F.A.C., of this section and has demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for medical uses authorized under subsections 64E-5.626(1) and 64E-5.627(1), F.A.C. Ctrl + Click Here to GO Back to Item 13 NRC 11-8-2010 Ltr

64E-5.652 Training for Use of Manual Brachytherapy Sources.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user of a brachytherapy source specified in Rule 64E-5.632, F.A.C., to:

(1) Be certified by a medical specialty board whose certification process has been recognized by the NRC or an agreement state~~, and who meets the requirements in paragraph 64E-5.652(2)(c), F.A.C., of this section~~. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/ miau/med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 28 NRC 11-8-2010 Ltr

(a) Successfully complete a minimum of 3 years of residency training in a radiation oncology program approved by the Residency Review Committee of the Accreditation Council for Graduate Medical Education or the Royal College of Physicians and Surgeons of Canada or the Committee on Post-Graduate Training of the American Osteopathic Association; and

(b) Pass an examination, administered by diplomates of the specialty board, that tests knowledge and competence in radiation safety, radionuclide handling, treatment planning, quality assurance, and clinical use of manual brachytherapy; or

(2)(a) Have completed a structured educational program in basic radionuclide handling techniques applicable to the use of manual brachytherapy sources that includes:

1. 200 hours of classroom and laboratory training in the following areas:

a. Radiation physics and instrumentation;
b. Radiation protection;
c. Mathematics pertaining to the use and measurement of radioactivity; and
d. Radiation biology; and
2. 500 hours of work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657 or 64E-5.652, F.A.C., NRC or equivalent agreement state requirements at a medical institution, clinic, or private practice facility, involving the following: Ctrl + Click Here to GO Back to Item 27
a. Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;
b. Checking survey meters for proper operation;
c. Preparing, implanting, and removing brachytherapy sources;
d. Maintaining running inventories of material on hand;
e. Using administrative controls to prevent a medical event involving the use of radioactive material;
f. Using emergency procedures to control radioactive material; and
(b) Have completed 3 years of supervised clinical experience in radiation oncology, under an authorized user who meets the requirements in Rule 64E-5.657 or 64E-5.652, F.A.C., NRC or equivalent agreement state requirements, as part of a formal training program approved by the Residency Review Committee for Radiation Oncology of the Accreditation Council for Graduate Medical Education or the Royal College of Physicians and Surgeons of Canada or the Committee on Postdoctoral Training of the American Osteopathic Association. This experience may be obtained concurrently with the supervised work experience required by subparagraph 64E-5.652(2)(a)2., F.A.C., of this section; and Ctrl + Click Here to GO Back to Item 27 NRC 11-8-2010 Ltr
(c) Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657 or 64E-5.652, F.A.C., NRC or equivalent agreement state requirements, that the individual has satisfactorily completed the requirements in paragraph 64E-5.652(1)(a) or 64E-5.652(2)(a) and 64E-5.652(2)(b), F.A.C., of this section and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for medical uses of manual brachytherapy sources authorized under Rule 64E-5.632, F.A.C. Ctrl + Click Here to GO Back to Item 28 NRC 11-8-2010 Ltr

64E-5.653 Training for Ophthalmic Use of Strontium 90.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user of only strontium 90 for ophthalmic radiotherapy to:
(1) Be authorized user under Rule 64E-5.652, F.A.C., NRC or equivalent agreement state requirements; or Ctrl + Click Here to GO Back to Item 29 NRC 11-8-2010 Ltr
(2)(a) Have completed 24 hours of classroom and laboratory training applicable to the medical use of strontium-90 for ophthalmic radiotherapy. The training must include the following:
1. Radiation physics and instrumentation: Ctrl + Click Here to GO Back to Item 30 NRC 11-8-2010 Ltr
2. Radiation protection;
3. Mathematics pertaining to the use and measurement of radioactivity; and
4. Radiation biology; and
(b) Have supervised clinical training in ophthalmic radiotherapy under the supervision of an authorized user at a medical institution, clinic, or private practice that includes the use of strontium-90 for the ophthalmic treatment of five individuals. This supervised clinical training must involve the following:
1. Examination of each individual to be treated;
2. Calculation of the dose to be administered;
3. Administration of the dose; and
4. Follow-up and review of each individual's case history; and
(c) Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the

residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657, 64E-5.652 or 64E-5.653, F.A.C., NRC or equivalent agreement state requirements, that the individual has satisfactorily completed the requirements in paragraphs 64E-5.653(2)(a) and 64E-5.653(2)(b), F.A.C., of this section and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for a medical use licensee authorized for strontium-90 for ophthalmic use. Ctrl + Click Here to GO Back to Item 31 NRC 11-8-2010 Ltr

64E-5.654 Training for Use of Sealed Sources for Diagnosis.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user of a sealed source in a device specified in Rule 64E-5.631, F.A.C., to be a physician, dentist, or podiatrist: Ctrl + Click Here to GO Back to Item 32 NRC 11-8-2010 Ltr

(1) Be certified by a specialty board whose certification process includes all of the requirements in subsections 64E-5.654(2) and (3), F.A.C., of this section and whose certification has been recognized by the NRC or an agreement state. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.); or

(2) Have completed 8 hours of classroom and laboratory training in basic radionuclide handling techniques specifically applicable to the use of the device. The training must include the following:

(a) Radiation physics and instrumentation;

(b) Radiation protection;

(c) Mathematics pertaining to the use and measurement of radioactivity; and

(d) Radiation biology; and

(3) Have completed training in the use of the device for the uses requested.

64E-5.655 Training for Use of Remote Afterloader Units, Teletherapy Units, and Gamma Stereotactic Radiosurgery Units.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user of a sealed source specified in Rule 64E-5.634, F.A.C., to:

(1) Be certified by a medical specialty board whose certification process has been recognized by the NRC or an agreement state and who meets the requirements in ~~paragraph 64E-5.655(2)(c) and~~ subsection 64E-5.655(3), F.A.C., of this section. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 37 NRC 11-8-2010 Ltr

(a) Successfully complete a minimum of 3 years of residency training in a radiation therapy program approved by the Residency Review Committee of the Accreditation Council for Graduate Medical Education or the Royal College of Physicians and Surgeons of Canada or the Committee on Post-Graduate Training of the American Osteopathic Association; and

(b) Pass an examination, administered by diplomates of the specialty board, which tests knowledge and competence in radiation safety, radionuclide handling, treatment planning, quality assurance, and clinical use of stereotactic radiosurgery, remote afterloaders and external beam therapy; or

(2)(a) Have completed a structured educational program in basic radionuclide techniques applicable to the use of a sealed source in a therapeutic medical unit that includes the following:

1. 200 hours of classroom and laboratory training in the following areas:

a. Radiation physics and instrumentation;

b. Radiation protection;

c. Mathematics pertaining to the use and measurement of radioactivity; and

d. Radiation biology; and

2. 500 hours of work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657 or 64E-5.655, F.A.C., NRC or equivalent agreement state requirements at a

medical institution, clinic, or private practice facility, involving the following: Ctrl + Click Here to GO Back to Item 35 NRC 11-8-2010 Ltr

a. Reviewing full calibration measurements and periodic spot-checks;

b. Preparing treatment plans and calculating treatment doses and times;

c. Using administrative controls to prevent a medical event involving the use of radioactive material;

d. Implementing emergency procedures to be followed in the event of the abnormal operation of the medical unit or console;

e. Checking and using survey meters;

f. Selecting the proper dose and how it is to be administered; and

(b) Have completed 3 years of supervised clinical experience in radiation therapy, under an authorized user who meets the requirements in Rule 64E-5.657 or 64E-5.655, F.A.C., NRC or equivalent agreement state requirements as part of a formal training program approved by the Residency Review Committee for Radiation Oncology of the Accreditation Council for Graduate Medical Education or the Royal College of Physicians and Surgeons of Canada or the Committee on Postdoctoral Training of the American Osteopathic Association. This experience may be obtained concurrently with the supervised work experience required by subparagraph 64E-5.655(2)(a)2., F.A.C., of this section; and Ctrl + Click Here to GO Back to Item 36 NRC 11-8-2010 Ltr

(c) Have obtained written attestation that the individual has satisfactorily completed the requirements in paragraph 64E-5.655(1)(a) or 64E-5.655(2)(a) and 64E-5.655(2)(b) and subsection 64E-5.655(3), F.A.C., of this section, and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for a medical use licensee for each type of therapeutic medical unit for which the individual is requesting authorized user status. The written attestation must be signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657 or 64E-5.655, F.A.C., NRC or equivalent agreement state requirements for an authorized user for each type of therapeutic medical unit for which the individual is requesting authorized user status; and Ctrl + Click Here to GO Back to Item 37 NRC 11-8-2010 Ltr

(3) Have received training in device operation, safety procedures, and clinical use for the type(s) of use for which authorization is sought. This training requirement may be satisfied by satisfactory completion of a training program provided by the vendor for new users or by receiving training supervised by an authorized user or authorized medical physicist, as appropriate, who is authorized for the type(s) of use for which the individual is seeking authorization.

64E-5.656 Training for an Authorized Medical Physicist.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized medical physicist to:

(1) Be certified by a specialty board whose certification process has been recognized by the NRC or an agreement state and who meets the requirements in ~~paragraph 64E-5.656(2)(b) and~~ subsection 64E-5.656(3), F.A.C., of this section. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 4 NRC 11-8-2010 Ltr

(a) Hold a master's or doctor's degree in physics, medical physics, other physical science, engineering, or applied mathematics from an accredited college or university;

(b) Have 2 years of full-time practical training and/or supervised experience in medical physics:

1. Under the supervision of a medical physicist who is certified in medical physics by a specialty board recognized by the NRC or an agreement state; or

2. In clinical radiation facilities providing high-energy, external beam therapy (photons and electrons

with energies greater than or equal to 1 million electron volts) and brachytherapy services under the direction of physicians who meet the requirements for authorized users in Rule 64E-5.657, 64E-5.652 or 64E-5.655, F.A.C.; and

(c) Pass an examination, administered by diplomates of the specialty board, that assesses knowledge and competence in clinical radiation therapy, radiation safety, calibration, quality assurance, and treatment planning for external beam therapy, brachytherapy, and stereotactic radiosurgery; or

(2)(a) Hold a master's or doctor's degree in physics, medical physics, other physical science, engineering, or applied mathematics from an accredited college or university; and has completed 1 year of full-time training in medical physics and an additional year of full-time work experience under the supervision of an individual who meets the requirements for an authorized medical physicist for the type(s) of use for which the individual is seeking authorization. This training and work experience must be conducted in clinical radiation facilities that provide high-energy, external beam therapy (photons and electrons with energies greater than or equal to 1 million electron volts) and brachytherapy services and must include:

1. Performing sealed source leak tests and inventories;

2. Performing decay corrections;

3. Performing full calibration and periodic spot checks of external beam treatment units, stereotactic radiosurgery units, and remote afterloading units as applicable; and

4. Conducting radiation surveys around external beam treatment units, stereotactic radiosurgery units, and remote afterloading units as applicable; and

(b) Have obtained written attestation that the individual has satisfactorily completed the requirements in subsection 64E-5.656(3) and paragraphs 64E-5.656(1)(a) and (b) or 64E-5.656(2)(a) and subsection 64E-5.656(3), F.A.C., of this section, and have demonstrated the ability to function independently as an authorized medical physicist to fulfill the radiation safety related duties for each type of therapeutic medical unit for which the individual is requesting authorized medical physicist status. The written attestation must be signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.656 or 64E-5.657, F.A.C., NRC or equivalent agreement state requirements, for an authorized medical physicist for each type of therapeutic medical unit for which the individual is requesting authorized medical physicist status; and Ctrl + Click Here to GO Back to Item 4 NRC 11-8-2010 Ltr

(3) Have training for the type(s) of use for which authorization is sought that includes hands-on device operation, safety procedures, clinical use, and the operation of a treatment planning system. This training requirement may be satisfied by satisfactorily completing either a training program provided by the vendor or by training supervised by an authorized medical physicist authorized for the type(s) of use for which the individual is seeking authorization.

64E-5.659 Training for an Authorized Nuclear Pharmacist.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized nuclear pharmacist to:

(1) Be certified by a specialty board whose certification process has been recognized by the NRC or an agreement state ~~and who meets the requirements in paragraph 64E-5.659(2)(b), F.A.C., of this section~~. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.) To have its certification process recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 5 NRC 11-8-2010 Ltr

(a) Have graduated from a pharmacy program accredited by the American Council on Pharmaceutical Education (ACPE) or have passed the Foreign Pharmacy Graduate Examination Committee (FPGEC) examination;

(b) Hold a current, active license to practice pharmacy;

(c) Provide evidence of having acquired at least 4000 hours of training/experience in nuclear pharmacy practice. Academic training may be substituted for no more than 2000 hours of the required training and experience; and

(d) Pass an examination in nuclear pharmacy administered by diplomats of the specialty board, that assess knowledge and competency in procurement, compounding, quality assurance, dispensing, distribution, health and safety, radiation safety, provision of information and consultation, monitoring patient outcomes, research and development; or

(2)(a) Have completed 700 hours in a structured educational program consisting of both:

1. 200 hours of classroom and laboratory training in the following areas:

a. Radiation physics and instrumentation;

b. Radiation protection;

c. Mathematics pertaining to the use and measurement of radioactivity;

d. Chemistry of radioactive material for medical use; and

e. Radiation biology; and

2. Supervised practical experience in a nuclear pharmacy involving:

a. Shipping, receiving, and performing related radiation surveys;

b. Using and performing checks for proper operation of instruments used to determine the activity of dosages, survey meters, and, if appropriate, instruments used to measure alpha or beta-emitting radionuclides;

c. Calculating, assaying, and safely preparing dosages for patients or human research subjects;

d. Using administrative controls to avoid medical events in the administration of radioactive material; and

e. Using procedures to prevent or minimize radioactive contamination and using proper decontamination procedures; and

(b) Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in paragraphs 64E-5.659(1)(a), 64E-5.659(1)(b) and 64E-5.659(1)(c) or 64E-5.659(2)(a), F.A.C., of this section and have demonstrated the ability to function independently as an authorized nuclear pharmacist to fulfill the radiation safety related duties for a medical use licensee.

64E-5.660 Training for Use of Unsealed Radioactive Material for Which a Written Directive Is Required in Rule 64E-5.626, 64E-5.627 or 64E-5.630, F.A.C.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require the authorized user of unsealed radioactive materials specified in Rule 64E-5.626, 64E-5.627 or 64E-5.630, F.A.C., which require a written directive to:

(1) Be certified by a medical specialty board whose certification process has been recognized by the NRC or an agreement state and who meets the requirements in sub-subparagraphs 64E-5.660(2)(a)2.g. ~~and paragraph 64E-5.660(2)(b),~~ F.A.C., of this section. (Specialty boards whose certification processes have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.) To be recognized, a specialty board shall require all candidates for certification to: Ctrl + Click Here to GO Back to Item 16 NRC 11-8-2010 Ltr

(a) Successfully complete residency training in a radiation therapy or nuclear medicine training program or a program in a related medical specialty. These residency training programs must include 700 hours of training and experience as described in subparagraph 64E-5.660(2)(a)1. through sub-subparagraph 64E-5.660(2)(a)2.e., F.A.C., of this section. Eligible training programs must be approved by the Residency Review Committee of the Accreditation Council for Graduate Medical Education, the Royal College of Physicians and Surgeons of Canada, or the Committee on Post-Graduate Training of the American Osteopathic Association; and

(b) Pass an examination, administered by diplomats of the specialty board, which tests knowledge and competence in radiation safety, radionuclide handling, quality assurance, and clinical use of unsealed radioactive material for which a written directive is required; or

(2)(a) Have completed 700 hours of training and experience, including a minimum of 200 hours of classroom and laboratory training, in basic radionuclide handling techniques applicable to the medical use of

unsealed radioactive material requiring a written directive. The training and experience must include the following:

1. Classroom and laboratory training in the following areas:

a. Radiation physics and instrumentation;

b. Radiation protection;

c. Mathematics pertaining to the use and measurement of radioactivity;

d. Chemistry of radioactive material for medical use; and

e. Radiation biology; and

2. Work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657 or 4E-5.660, F.A.C., NRC or equivalent agreement state requirements. A supervising authorized user, who meets the requirements in subsection 64E-5.660(2), F.A.C., must also have experience in administering dosages in the same dosage category or categories (i.e., sub-subparagraph 64E-5.660(2)(a)2.g., F.A.C.,) as the individual requesting authorized user status. The work experience must involve the following: Ctrl + Click Here to GO Back to Item 15 NRC 11-8-2010 Ltr

a. Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;

b. Performing quality control procedures on instruments used to determine the activity of dosages, and performing checks for proper operation of survey meters;

c. Calculating, measuring, and safely preparing patient or human research subject dosages;

d. Using administrative controls to prevent a medical event involving the use of unsealed radioactive material;

e. Using procedures to contain spilled radioactive material safely and using proper decontamination procedures;

f. Performing checks for proper operation of survey meters; and

g. Administering dosages of radioactive drugs to patients or human research subjects involving a minimum of three cases in each of the following categories for which the individual is requesting authorized user status as listed below:

(I) Oral administration of less than or equal to 1.22 gigabecquerels (33 millicuries) of sodium iodide I-131, for which a written directive is required or sub-sub-subparagraph 64E-5.660(2)(a)2.g.(II), F.A.C.;

(II) Oral administration of greater than 1.22 gigabecquerels (33 millicuries) of sodium iodide I-131;

(III) Parenteral administration of any beta emitter, or a photon-emitting radionuclide with a photon energy less than 150 keV, for which a written directive is required; and/or

(IV) Parenteral administration of any other radionuclide, for which a written directive is required; and

(b) Have obtained written attestation that the individual has satisfactorily completed the requirements in paragraph 64E-5.660(1)(a), sub-subparagraph 64E-5.660(2)(a)2.g. or paragraph 64E-5.660(2)(a), F.A.C., of this section, and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for a medical use licensee authorized under Rule 64E-5.626, 64E-5.627 or 64E-5.630, F.A.C., that require a written directive. Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657 or 64E-5.660, F.A.C., NRC or equivalent agreement state requirements. The preceptor authorized user, who meets the requirements in subsection 64E-5.660(2), F.A.C., must have experience in administering dosages in the same dosage category or categories specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(II), F.A.C., as the individual requesting authorized user status. Ctrl + Click Here to GO Back to Item 16 NRC 11-8-2010 Ltr

64E-5.661 Training for the Oral Administration of Sodium Iodide I-131 Requiring a Written Directive in Quantities Less Than or Equal to 1.22 Gigabecquerels (33 Millicuries).

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require an authorized user for the oral administration of sodium iodide I-131 requiring a written directive in quantities less than or equal to 1.22 Gigabecquerels (33 millicuries), to:

(1) Be certified by a medical specialty board whose certification process includes all of the requirements in paragraphs 64E-5.661(3)(a) and 64E-5.661(3)(b), F.A.C., of this section and whose certification process has been recognized by the NRC or an agreement state ~~and who meets the requirements in paragraph 64E-5.661(3)(c), F.A.C., of this section~~. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.); or Ctrl + Click Here to GO Back to Item 19 NRC 11-8-2010 Ltr

(2) Be an authorized user under Rule 64E-5.660, F.A.C., or uses listed in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(I) or 64E-5.660(2)(a)2.g.(II), Rule 64E-5.662, F.A.C., NRC or equivalent agreement state requirements; or Ctrl + Click Here to GO Back to Item 17 NRC 11-8-2010 Ltr

(3)(a) Has successfully completed 80 hours of classroom and laboratory training, applicable to the medical use of sodium iodide I-131 for procedures requiring a written directive. The training must include the following:

1. Radiation physics and instrumentation;
2. Radiation protection;
3. Mathematics pertaining to the use and measurement of radioactivity;
4. Chemistry of radioactive material for medical use; and
5. Radiation biology; and

(b) Have work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657, 64E-5.660, 64E-5.661 or 64E-5.662, F.A.C., NRC or equivalent agreement state requirements. A supervising authorized user who meets the requirements in subsection 64E-5.660(2), F.A.C., must also have experience in administering dosages as specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(I) or 64E-5.660(2)(a)2.g.(II), F.A.C. The work experience must involve the following: Ctrl + Click Here to GO Back to Item 18 NRC 11-8-2010 Ltr

1. Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;
2. Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters;
3. Calculating, measuring, and safely preparing patient or human research subject dosages;
4. Using administrative controls to prevent a medical event involving the use of radioactive material;
5. Using procedures to contain spilled radioactive material safely and using proper decontamination procedures; and
6. Administering dosages to patients or human research subjects, that includes at least 3 cases involving the oral administration of less than or equal to 1.22 gigabecquerels (33 millicuries) of sodium iodide I-131; and

(c) Have obtained written attestation that the individual has satisfactorily completed the requirements in paragraphs 64E-5.661(3)(a) and 64E-5.661(3)(b), F.A.C., of this section, and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for a medical use licensee that required a written directive under Rule 64E-5.626, 64E-5.627 or 64E-5.630, F.A.C. Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657, 64E-5.660, 64E-5.661 or 64E-5.662, F.A.C., NRC or equivalent agreement state requirements. A preceptor authorized user, who meets the requirement in subsection 64E-5.660(2), F.A.C., must also have experience in administering dosages as specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(I) or 64E-5.660(2)(a)2.g.(II), F.A.C. Ctrl + Click Here to GO Back to Item 19 NRC 11-8-2010 Ltr

64E-5.662 Training for the Oral Administration of Sodium Iodide I-131 Requiring a Written Directive in Quantities Greater Than 1.22 Gigabecquerels (33 Millicuries).

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require an authorized user for the oral administration of sodium iodide I-131 requiring a written directive in quantities greater than 1.22

Gigabecquerels (33 millicuries), to:

(1) Be certified by a medical specialty board whose certification process includes all of the requirements in paragraphs 64E-5.662(3)(a) and 64E-5.662(3)(b), F.A.C., of this section, and whose certification has been recognized by the NRC or an agreement state~~, and who meets the requirements in paragraph 64E-5.662(3)(c), F.A.C., of this section~~. (The names of board certifications which have been recognized by the NRC or an agreement state will be posted on the NRC's Web page at http://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html.); or Ctrl + Click Here to GO Back to Item 22 NRC 11-8-2010 Ltr

(2) Be an authorized user under Rule 64E-5.660, F.A.C., for uses listed in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(II), F.A.C., NRC or equivalent agreement state requirements; or Ctrl + Click Here to GO Back to Item 20 NRC 11-8-2010 Ltr

(3)(a) Have successfully completed 80 hours of classroom and laboratory training, applicable to the medical use of sodium iodide I-131 for procedures requiring a written directive. The training must include:

1. Radiation physics and instrumentation;
2. Radiation protection;
3. Mathematics pertaining to the use and measurement of radioactivity;
4. Chemistry of radioactive material for medical use; and
5. Radiation biology; and

(b) Have work experience, under the supervision of an authorized user who meets the requirements in Rules 64E-5.657, 64E-5.660 or 64E-5.662, F.A.C., NRC or equivalent agreement state requirements. A supervising authorized user, who meets the requirements in subsection 64E-5.660(2), F.A.C., must also have experience in administering dosages as specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(II), F.A.C. The work experience must involve the following: Ctrl + Click Here to GO Back to Item 21 NRC 11-8-2010 Ltr

1. Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys;
2. Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters;
3. Calculating, measuring, and safely preparing patient or human research subject dosages;
4. Using administrative controls to prevent a medical event involving the use of radioactive material;
5. Using procedures to contain spilled radioactive material safely and using proper decontamination procedures; and
6. Administering dosages to patients or human research subjects, that includes at least 3 cases involving the oral administration of greater than 1.22 gigabecquerels (33 millicuries) of sodium iodide I-131; and

(c) Have obtained written attestation that the individual has satisfactorily completed the requirements in paragraphs 64E-5.662(3)(a) and 64E-5.662(3)(b), F.A.C., of this section, and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for a medical use licensee authorized under Rule 64E-5.626, 64E-5.627 or 64E-5.630, F.A.C., that require written directives. Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657, 64E-5.660 or 64E-5.662, F.A.C., NRC or equivalent agreement state requirements. A preceptor authorized user, who meets the requirements in subsection 64E-5.660(2), F.A.C., must also have experience in administering dosages as specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(II), F.A.C. Ctrl + Click Here to GO Back to Item 22 NRC 11-8-2010 Ltr

64E-5.663 Training for the Parenteral Administration of Unsealed Radioactive Material Requiring a Written Directive.

Except as provided in Rule 64E-5.657, F.A.C., the licensee shall require an authorized user for the parenteral administration requiring a written directive, to:

(1) Be an authorized user under Rule 64E-5.660, F.A.C., for uses listed in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(III) or 64E-5.660(2)(a)2.g.(IV), F.A.C., NRC or equivalent agreement state requirements; or Ctrl

+ Click Here to GO Back to Item 23 NRC 11-8-2010 Ltr

(2) Be an authorized user under Rule 64E-5.652 or 64E-5.655, F.A.C., NRC or equivalent agreement state requirements and who meets the requirements in subsection 64E-5.663(4), F.A.C. of this section; or Ctrl + Click Here to GO Back to Item 23 NRC 11-8-2010 Ltr

(3) Be certified by a medical specialty board whose certification process has been recognized by the NRC or an agreement state under Rule 64E-5.652 or 64E-5.655, F.A.C., and who meets the requirements in paragraphs 64E-5.663(4)(a) and (b) ~~subsection 64E-5.663(4)~~, F.A.C., of this section. Ctrl + Click Here to GO Back to Item 25 NRC 11-8-2010 Ltr

(4)(a) Have successfully completed 80 hours of classroom and laboratory training, applicable to parenteral administrations, for which a written directive is required, of any beta emitter, or any photon-emitting radionuclide with a photon energy less than 150 keV, and/or parenteral administration of any other radionuclide for which a written directive is required. The training must include the following:

1. Radiation physics and instrumentation;
2. Radiation protection;
3. Mathematics pertaining to the use and measurement of radioactivity;
4. Chemistry of radioactive material for medical use; and
5. Radiation biology; and

(b) Have work experience, under the supervision of an authorized user who meets the requirements in Rule 64E-5.657, 64E-5.660 or 64E-5.663, F.A.C., NRC or equivalent agreement state requirements, in the parenteral administration, for which a written directive is required, of any beta emitter, or any photon-emitting radionuclide with a photon energy less than 150 keV, and/or parenteral administration of any other radionuclide for which a written directive is required. A supervising authorized user who meets the requirements in Rule 64E-5.660, F.A.C., NRC or equivalent agreement state requirements, must have experience in administering dosages as specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(III) or 64E-5.660(2)(a)2.g.(IV), F.A.C., NRC or equivalent agreement state requirements. The work experience must involve the following: Ctrl + Click Here to GO Back to Item 24 NRC 11-8-2010 Ltr

1. Ordering, receiving, and unpacking radioactive materials safely, and performing the related radiation surveys;
2. Performing quality control procedures on instruments used to determine the activity of dosages, and performing checks for proper operation of survey meters;
3. Calculating, measuring, and safely preparing patient or human research subject dosages;
4. Using administrative controls to prevent a medical event involving the use of unsealed radioactive material;
5. Using procedures to contain spilled radioactive material safely, and using proper decontamination procedures; and
6. Administering dosages to patients or human research subjects, that include at least 3 cases involving the parenteral administration, for which a written directive is required, of any beta emitter, or any photon-emitting radionuclide with a photon energy less than 150 keV and/or at least 3 cases involving the parenteral administration of any other radionuclide, for which a written directive is required; and

(c) Have obtained written attestation that the individual has satisfactorily completed the requirements in subsection 64E-5.663(2) or 64E-5.663(3), F.A.C., of this section, and have demonstrated the ability to function independently as an authorized user to fulfill the radiation safety related duties for a medical use licensee authorized for the parenteral administration of unsealed radioactive material requiring a written directive. Have obtained written attestation, signed by a preceptor authorized user or a residency program director who represents a consensus of residency program faculties (as long as at least one member of the residency program faculty is an authorized individual in the same category designated by the applicant seeking authorized status) who meets the requirements in Rule 64E-5.657, 64E-5.660 or 64E-5.663, F.A.C., NRC or equivalent agreement state requirements. A preceptor authorized user, who meets the requirements in Rule 64E-5.660, F.A.C., must have experience in administering dosages as specified in sub-sub-subparagraph 64E-5.660(2)(a)2.g.(III) or 64E-5.660(2)(a)2.g.(IV), F.A.C. Ctrl + Click Here to GO Back to Item 25 NRC 11-8-2010 Ltr

64E-5.810 Ventilation Systems.

(1) Means shall be provided to ensure that personnel entering any area where airborne radioactivity may be produced will not be exposed to concentrations in excess of the limits specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I, Column 3. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(2) A registrant shall not vent, release or otherwise discharge airborne radioactive material to an uncontrolled area in concentrations which exceed the limits specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table II, Column 1, except as authorized pursuant to Rule 64E-5.329, F.A.C. For purposes of this paragraph, concentrations may be averaged over a period not greater than 1 year. Every reasonable effort should be made to maintain releases of radioactive material to uncontrolled areas as far below these limits as reasonably achievable.

64E-5.1115 Subsurface Tracer Studies. RATS 2007-3

(1) Protective gloves and other appropriate protective clothing and equipment shall be used by all personnel handling radioactive material. Precautions shall be taken to avoid ingestion or inhalation of radioactive material.

(2) No licensee shall intentionally inject radioactive material into any fresh water aquifers unless the Department of Health and the Department of Environmental Protection determine that such injection will not endanger the public health, safety and welfare.

(3) No licensee shall inject radioactive material into any well unless it can be demonstrated to the Department that the procedure will not result in any liquids or gases distributed to the public exceeding the following criteria:

(a) For gases, the air concentration State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table II, Column 1, shall apply.

(b) For liquids, the water concentration values in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table II, Column 2, shall apply. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

64E-5.1317 Storage and Control of Volatiles and Gases. RATS 2007-3

(1) A licensee shall store volatile radioactive materials and radioactive gases in the shippers' radiation shield and container or an equivalent shield and container.

(2) Unless otherwise specified in the license, a licensee shall store and use radioactive volatiles and gases in a properly functioning glove box or fume hood that will maintain airborne concentrations within the limits prescribed by State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table I, Column 2, and Table II, Column 1. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(3) Unless otherwise specified in the license, the glove box or fume hood shall either be directly vented to the atmosphere through an air exhaust or provide for collection and decay or disposal of the volatile or gas.

64E-5.1419 Radiation Surveys. RATS 2007-3

(1) Before the facility starts operation, the following radiation surveys must be performed:

(a) A radiation survey of the area above the pool after the sources are loaded and in the shielded position; and

(b) A survey of the area outside the shielding of the radiation room of a panoramic irradiator with the sources in the exposed position.

(2) If the surveys indicate that radiation levels specified in Rule 64E-5.1407, F.A.C., are exceeded, the shielding must be repaired to comply with the dose rate requirement in Rule 64E-5.1407, F.A.C., before operation of the

facility can start.

(3) Radiation surveys described in (1) above must be performed after new sources are loaded and after any modifications which might increase dose rates are made to the radiation room, shielding or structure and at intervals not to exceed 3 years.

(4) Portable radiation survey meters used to meet the requirements of subsections (1) and (3) of this section and the requirements of subsections 64E-5.1413(3) and 64E-5.1424(1), F.A.C., must be calibrated at least annually to an accuracy of 20 percent for the gamma energy of the sources in use. The calibration must be done at two points on each scale or, for digital instruments, at one point per decade over the range that will be used. Portable radiation survey meters must be of a type that does not saturate and read zero at high radiation dose rates.

(5) Water from the irradiator pool or other potentially contaminated liquids and sediments from pool vacuuming must be monitored for radioactive contamination before release to unrestricted areas. Radioactive concentrations must not exceed those specified in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table II, Column 2, or Table III, as applicable. The lower limit of detection for the measurements must be below those concentrations. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

(6) Resins to be released for unrestricted use must be monitored before release in an area with a background level less than 0.05 millirem (0.0005 millisievert) per hour. The resins can be released only if the survey does not detect radiation levels above background radiation levels. The survey meter must be capable of detecting radiation levels of 0.05 millirem (0.0005 millisievert) per hour.

64E-5.1420 Detection of Leaking or Contaminated Sources. RATS 2007-3

(1) Each dry-source-storage sealed source must be tested for leakage at least every 6 months using a leak test kit or a method approved by the department, U.S. Nuclear Regulatory Commission, agreement state or licensing state. The analysis must be capable of detecting the presence of 0.005 microcurie (185 becquerels) of radioactive material and must be performed by a person approved by the department, U.S. Nuclear Regulatory Commission, agreement state or licensing state to perform the analysis.

(2) For pool irradiators, the pool water must be checked for contamination each day the irradiator operates. The check must be done by using an on-line radiation monitor on a pool water circulating system as described in subsection 64E-5.1410(2), F.A.C., or by analysis of pool water. If a check for contamination is done by analysis of pool water, the results of the analysis must be available within 24 hours. If the licensee uses a radiation monitor on a pool water circulating system, the detection above normal radiation levels must activate an alarm. The alarm set-point must be set as low as practical but high enough to avoid false alarms. The licensee can reset the alarm set-point to a higher level if necessary to operate the pool water purification system to clean up contamination in the pool if specifically provided for in written emergency procedures.

(3) The licensee shall have written procedures and equipment available for the detection, isolation and removal of leaking sources.

(4) If a leaking source is detected, the licensee shall remove the leaking source from service and have it decontaminated, repaired, or disposed of by a licensee of the department, U.S. Nuclear Regulatory Commission, agreement state or licensing state authorized to perform these functions. The licensee shall check its personnel, equipment, facilities, and irradiated product promptly for radioactive contamination. No product shall be shipped until the product has been checked and found free of contamination. If a product has been shipped that could have been contaminated inadvertently, the licensee shall arrange to locate and survey that product for contamination. If any personnel are contaminated, decontamination must be performed promptly. If contaminated equipment, facilities, or products are found, the licensee shall have them decontaminated or disposed of by a licensee of the department, U.S. Nuclear Regulatory Commission, agreement state or licensing state authorized to perform these functions. If the pool water is contaminated, the licensee shall clean the pool water until the contamination levels do not exceed the appropriate concentration in State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, March 2011 ~~Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993~~, Table II, Column 2. Ctrl + Click Here to Return to RATS 2007-3 AppB ALI DAC

64E-5.1501 Purpose and Scope. Self Identified Other 12

(1) The packaging and transportation of radioactive material are also subject to the requirements of other agencies such as the U.S. Department of Transportation, the U.S. Nuclear Regulatory Commission and the U.S. Postal Service. The requirements of this part are in addition to, and not in substitution for, other requirements.

(2) Determinations and listings of A1 and A2 values are found in 10 C.F.R., Part 71, Appendix A~~, as published on 01/01/2007~~. Ctrl + Click Here to Return to Other 12

(3) The regulations in this part apply to any licensee authorized by specific or general license issued by the department to receive, possess, use, or transfer licensed material, if the licensee delivers that material to a carrier for transport, transports the material outside the site of usage as specified in the license, or transports that material on public highways. No provision of this part authorizes possession of licensed material.

(4) Definition of terms used in this part are those listed in Rule 64E-5.1502, F.A.C., as described in 49 C.F.R. and 10 C.F.R. 71.4, except that whenever a definition refers to evaluation or approval by the U.S. Department of Transportation or NRC, and such evaluation or approval is within the jurisdiction of the State of Florida as an Agreement State, the Department shall perform the evaluation or approval.

64E-5.1502 Transportation of Radioactive Material. Self Identified Other 13

(1) No person shall deliver radioactive material to a carrier for transport or transport radioactive material except as authorized in a general license or specific license issued by the Department or as exempted in Rule 64E-5.1503, F.A.C.

(2) Each licensee who transports radioactive material outside of the confines of his facility or other place of use, or who offers radioactive material to a carrier for transport shall:

(a) Comply with the current applicable requirements, appropriate to the mode of transport, of 49 C.F.R. Parts 107, 171-180, 383, 390-397~~ published on 10/01/2007,~~ and 10 C.F.R. Part 71~~ published on 01/01/2007~~. Ctrl + Click Here to Return to Other 13

(b) Establish procedures for safely opening and closing packages in which radioactive material is transported and to assure that, prior to the delivery to a carrier for transport, each package is properly closed for transport; and

(c) Assure that any special instructions needed to safely open the package are sent to or have been made available to the consignee.

(d) The licensee shall comply with U.S. Department of Transportation and NRC regulations in the following areas:

1. Packaging, 49 C.F.R. part 173, subparts A, B, and I;
2. Marking and labeling, 49 C.F.R. part 172, subpart D, §§172.400 through 172.407, §§172.436 through 172.441 of subpart E;
3. Placarding, 49 C.F.R. part 172, subpart F, especially §§172.500 through 172.519 and 172.556, and appendices B and C;
4. Accident reporting, 49 C.F.R. part 171, §§171.15 and 171.16;
5. Shipping papers and emergency information, 49 C.F.R. part 172, subparts C and G;
6. Hazardous material employee training, 49 C.F.R. part 172, subpart H;
7. Security plans, 49 C.F.R. part 172, subpart I;
8. Hazardous material shipper/carrier registration, 49 C.F.R. part 107, subpart G;
9. Definitions, 10 C.F.R. 71.4;
10. Transportation of licensed material, 10 C.F.R. 71.5;
11. Exemptions for low level material, 10 C.F.R. 71.14(a);
12. General license, NRC-approved package, 10 C.F.R. 71.17;
13. Previously approved package, 10 C.F.R. 71.19(a) and (b);
14. General license, U.S. Department of Transportation specification container material, 10 C.F.R. 71.20;
15. General license, Use of foreign approved package, 10 C.F.R. 71.21;
16. General license, Fissile material, 10 C.F.R. 71.22;

17. External radiation standards for all packages, 10 C.F.R. 71.47;
18. Assumptions as to unknown properties, 10 C.F.R. 71.83;
19. Preliminary determinations, 10 C.F.R. 71.85;
20. Routine determinations, 10 C.F.R. 71.87;
21. Air transportation of plutonium, 10 C.F.R. 71.88;
22. Opening instructions, 10 C.F.R. 71.89;
23. Advance notification of shipment of irradiated reactor fuel and nuclear waste, 10 C.F.R. 71.97;
24. Quality assurance requirements, 10 C.F.R. 71.101(a), (b), (c), (f) and (g);
25. Quality assurance organization, 10 C.F.R. 71.103;
26. Quality assurance program, 10 C.F.R. 71.105;
27. Exemption of physicians, 10 C.F.R. 71.13;
28. Handling storage and shipping control, 10 C.F.R. 71.127;
29. Inspection tests and operating status, 10 C.F.R. 71.129;
30. Nonconforming materials parts or components, 10 C.F.R. 71.131;
31. Corrective action, 10 C.F.R. 71.13;
32. Quality assurances records, 10 C.F.R. 71.135;
33. Audits, 10 C.F.R. 71.137;
34. Appendix A to Part 71; and
35. General license plutonium beryllium special form material.

(e) The licensee shall also comply with U.S. Department of Transportation regulations pertaining to the following modes of transportation:

1. Rail, 49 C.F.R. part 174, subparts A through D and K;
2. Air, 49 C.F.R. part 175;
3. Vessel, 49 C.F.R. part 176, subparts A through F and M; and
4. Public Highway, 49 C.F.R. part 177 and parts 390 through 397.

(3) If U.S. Department of Transportation regulations are not applicable to a shipment of licensed material, the licensee shall conform to the standards and requirements of the U.S. Department of Transportation specified in subsection (2) of this section to the same extent as if the shipment or transportation were subject to U.S. Department of Transportation regulations. A request for modification, waiver, or exemption from those requirements, and any notification referred to in those requirements, must be filed with, or made to, the Department.

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PART III
SCHEDULE B
EXEMPT QUANTITIES

Radioactive Material (Symbol)	Microcuries
Antimony 122 (Sb 122)	100
Antimony 124 (Sb 124)	10
Antimony 125 (Sb 125)	10
Arsenic 73 (As 73)	100
Arsenic 74 (As 74)	10
Arsenic 76 (As 76)	10
Arsenic 77 (As 77)	100
Barium 131 (Ba 131)	10
Barium 133 (Ba 133)	10

Radioactive Material (Symbol)	Microcuries
Barium 140 (Ba 140)	10
Bismuth 210 (Bi 210)	1
Bromine 82 (Br 82)	10
Cadmium 109 (Cd 109)	10
Cadmium 115m (Cd 115m)	10
Cadmium 115 (Cd 115)	100
Calcium 45 (Ca 45)	10
Calcium 47 (Ca 47)	10
Carbon 14 (C 14)	100
Cerium 141 (Ce 141)	100
Cerium 143 (Ce 143)	100
Cerium 144 (Ce 144)	1
Cesium 129 (Cs 129)	**100**
Cesium 131 (Cs 131)	1,000
Cesium 134m (Cs 134m)	100
Cesium 134 (Cs 134)	1
Cesium 135 (Cs 135)	10
Cesium 136 (Cs 136)	10
Cesium 137 (Cs 137)	10
Chlorine 36 (Cl 36)	10
Chlorine 38 (Cl 38)	10
Chromium 51 (Cr 51)	1,000
Cobalt 57 (Co 57)	**100**
Cobalt 58m (Co 58m)	10
Cobalt 58 (Co 58)	10
Cobalt 60 (Co 60)	1
Copper 64 (Cu 64)	100
Dysprosium 165 (Dy 165)	10
Dysprosium 166 (Dy 166)	100
Erbium 169 (Er 169)	100
Erbium 171 (Er 171)	100
Europium 152 (Eu 152) (9.2 hr)	100
Europium 152 (Eu 152) (13 yr)	1
Europium 154 (Eu 154)	1
Europium 155 (Eu 155)	10
Fluorine 18 (F 18)	1,000
Gadolinium 153 (Gd 153)	10
Gadolinium 159 (Gd 159)	100
Gallium 67 (Ga 67)	**100**
Gallium 72 (Ga 72)	10
Germanium 68 (Ge 68)	**10**
Germanium 71 (Ge 71)	100
Gold 195 (Au 195)	**10**

Radioactive Material (Symbol)	Microcuries
Gold 198 (Au 198)	100
Gold 199 (Au 199)	100
Hafnium 181 (Hf 181)	10
Holmium 166 (Ho 166)	100
Hydrogen 3 (H 3)	1,000
Indium 111 (In 111)	**100**
Indium 113m (In 113m)	100
Indium 114m (In 114m)	10
Indium 115m (In 115m)	100
Indium 115 (In 115)	10
Iodine 123 (I 123)	**100**
Iodine 125 (I 125)	1
Iodine 126 (I 126)	1
Iodine 129 (I 129)	0.1
Iodine 131 (I 131)	1
Iodine 132 (I 132)	10
Iodine 133 (I 133)	1
Iodine 134 (I 134)	10
Iodine 135 (I 135)	10
Iridium 192 (Ir 192)	10
Iridium 194 (Ir 194)	100
Iron 52 (Fe 52)	**10**
Iron 55 (Fe 55)	100
Iron 59 (Fe 59)	10
Krypton 85 (Kr 85)	100
Krypton 87 (Kr 87)	10
Lanthanum 140 (La 140)	10
Lutetium 177 (Lu 177)	100
Manganese 52 (Mn 52)	10
Manganese 54 (Mn 54)	10
Manganese 56 (Mn 56)	10
Mercury 197m (Hg 197m)	100
Mercury 197 (Hg 197)	100
Mercury 203 (Hg 203)	10
Molybdenum 99 (Mo 99)	100
Neodymium 147 (Nd 147)	100
Neodymium 149 (Nd 149)	100
Nickel 59 (Ni 59)	100
Nickel 63 (Ni 63)	10
Nickel 65 (Ni 65)	100
Niobium 93m (Nb 93m)	10
Niobium 95 (Nb 95)	10
Niobium 97 (Nb 97)	10
Osmium 185 (Os 185)	10
Osmium 191m (Os 191m)	100

Radioactive Material (Symbol)	Microcuries
Osmium 191 (os 191)	100
Osmium 193 (Os 193)	100
Palladium 103 (Pd 103)	100
Palladium 109 (Pd 109)	100
Phosphorus 32 (P 32)	10
Platinum 191 (Pt 191)	100
Platinum 193m (Pt 193m)	100
Platinum 193 (Pt 193)	100
Platinum 197m (Pt 197m)	100
Platinum 197 (Pt 197)	100
Polonium 210 (Po 210)	0.1
Potassium 42 (K 42)	10
Potassium 43 (K 43)	**10**
Praseodymium 142 (Pr 142)	100
Praseodymium 143 (Pr 143)	100
Promethium 147 (Pm 147)	10
Promethium 149 (Pm 149)	10
Rhenium 186 (Re 186)	100
Rhenium 188 (Re 188)	100
Rhodium 103m (Rh 103m)	100
Rhodium 105 (Rh 105)	100
Rubidium 81 (Rb 81)	**10**
Rubidium 86 (Rb 86)	10
Rubidium 87 (Rb 87)	10
Ruthenium 97 (Ru 97)	100
Ruthenium 103 (Ru 103)	10
Ruthenium 105 (Ru 105)	10
Ruthenium 106 (Ru 106)	1
Samarium 151 (Sm 151)	10
Samarium 153 (Sm 153)	100
Scandium 46 (Sc 46)	10
Scandium 47 (Sc 47)	100
Scandium 48 (Sc 48)	10
Selenium 75 (Se 75)	10
Silicon 31 (Si 31)	100
Silver 105 (Ag 105)	10
Silver 110m (Ag 110m)	1
Silver 111 (Ag 111)	100
Sodium 22 (Na 22)	**10**
Sodium 24 (Na 24)	10
Strontium 85 (Sr 85)	10
Strontium 89 (Sr 89)	1
Strontium 90 (Sr 90)	0.1
Strontium 91 (Sr 91)	10
Strontium 92 (Sr 92)	10

Radioactive Material (Symbol)	Microcuries
Sulphur 35 (S 35)	100
Tantalum 182 (Ta 182)	10
Technetium 96 (Tc 96)	10
Technetium 97m (Tc 97m)	100
Technetium 97 (Tc 97)	100
Technetium 99m (Tc 99m)	100
Technetium 99 (Tc 99)	10
Tellurium 125m (Te 125m)	10
Tellurium 127m (Te 127m)	10
Tellurium 127 (Te 127)	100
Tellurium 129m (Te 129m)	10
Tellurium 129 (Te 129)	100
Tellurium 131m (Te 131m)	10
Tellurium 132 (Te 132)	10
Terbium 160 (Tb 160)	10
Thallium 200 (Tl 200)	100
Thallium 201 (Tl 201)	100
Thallium 202 (Tl 202)	100
Thallium 204 (Tl 204)	10
Thulium 170 (Tm 170)	10
Thulium 171 (Tm 171)	10
Tin 113 (Sn 113)	10
Tin 125 (Sn 156)	10
Tungsten 181 (W 181)	10
Tungsten 185 (W 185)	10
Tungsten 187 (W 187)	100
Vanadium 48 (V 48)	10
Xenon 131m (Xe 131m)	1,000
Xenon 133 (Xe 133)	100
Xenon 135 (Xe 135)	100
Ytterbium 175 (Yb 175)	100
Yttrium 87 (Y 87)	**10**
Yttrium 88 (Y 88)	**10**
Yttrium 90 (Y 90)	10
Yttrium 91 (Y 91)	10
Yttrium 92 (Y 92)	100
Yttrium 93 (Y 93)	100
Zinc 65 (Zn 65)	10
Zinc 69m (Zn 69m)	100
Zinc 69 (Zn 69)	1,000
Zirconium 93 (Zr 93)	10
Zirconium 95 (Zr 95)	10
Zirconium 97 (Zr 97)	10
Any radioactive material not listed above other than alpha emitting radioactive material	0.1

Radioactive Material (Symbol)	Microcuries
Any alpha emitting radioactive material not listed above other than transuranic radioactive material	0.01

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Section 404.031, Florida Statutes
404.031 Definitions. – As used in this chapter, unless the content clearly indicates otherwise, the term:

(13) "Radioactive material" means any solid, liquid, or gas which emits ionizing radiation spontaneously; however, this definition does not include radioactive wastes regulated pursuant to the hazardous waste management sections of the federal Resource Conservation and Recovery Act of 1976 or the Department of Environmental Protection's assumption of that program.~~:~~ Ctrl + Click Here to Return to RATS 2007-3 20.1003 Def ByproductMaterial Ctrl + Click Here to Return to RATS 2007-3 20.1003 Def AcceleratorProducedMaterial Ctrl + Click Here to Return to RATS 2007-3 30.4 Def ByproductMaterial Ctrl + Click Here to Return to RATS 2007-3 30.4 Def AcceleratorProducedMaterial Ctrl + Click Here to Return to RATS 2007-3 150.3 ByproductMaterial

(14) "Radioactive waste" means any equipment or materials which are radioactive or have radioactive contamination and which are required pursuant to any governing laws, regulations, or licenses to be stored, treated, or disposed of as radioactive waste. The term "radioactive waste" is further defined as follows:
(a) "High-level waste" means irradiated reactor fuel, liquid wastes from reprocessing irradiated reactor fuel, and solids into which such liquid wastes have been converted.
(b) "Low-level waste" means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in s. 11(e)(2) of the Atomic Energy Act of 1954.
(c) "Transuranic waste" means waste material containing transuranic elements with contamination levels greater than 10 nanocuries per gram of waste. Ctrl + Click Here to Return to RATS 2007-3 20.1003 Waste

404.171, F.S. Construction. This chapter is cumulative and is intended to supplement existing laws, and no part shall be construed t o repeal any existing law, specifically enacted for the protection of public health and safety, with the exception of those section included in this chapter. Ctrl + Click Here to Return to RATS 2007-3 30.34(j) **RATS 2007-3 34(J)(1)**

STATE OF FLORIDA

BUREAU OF RADIATION CONTROL

ALIs, DACs AND EFFLUENT CONCENTRATIONS

March 2011 Back2RATS2007-3AppB_ALI_DAC

ATTACHMENT 1

ANNUAL LIMITS ON INTAKE (ALI) AND DERIVED AIR CONCENTRATIONS (DAC) OF RADIONUCLIDES FOR OCCUPATIONAL EXPOSURE; EFFLUENT CONCENTRATIONS; CONCENTRATIONS FOR RELEASE TO SANITARY SEWERAGE

Introduction

For each radionuclide, Table I indicates the chemical form which is to be used for selecting the appropriate ALI or DAC value. The ALIs and DACs for inhalation are given for an aerosol with an activity medial aerodynamic diameter (AMAD) if 1 μm, micron, and for three classes (D,W,Y) of radioactive material, which refer to their retention (approximately days, weeks or years) in the pulmonary region of the lung. This classification applies to a range of clearance half-times for D if less than 10 days, for W from 10 to 100 days, and for Y greater than 100 days. Table II provides concentration limits for airborne and liquid effluents released to the general environment. Table III provides concentration limits for discharges to sanitary sewerage.

Note:

The values in Tables I, II, and III are presented in the computer "E" notation. In this notation a value of 6E-02 represents a value of 6×10^{-2} or 0.06, 6E+2 represents 6×10^{2} or 600, and 6E+0 represents 6×10^{0} or 6.

Table I "Occupational Values"

Note that the columns in Table I captioned "Oral Ingestion ALI, "Inhalation ALI," and "DAC," are applicable to occupational exposure to radioactive material.

The ALIs are the annual intakes of given radionuclide by "Reference Man" which would result in either (1) a committed effective dose equivalent of 5 rem (0.05 sievert), stochastic ALI, or (2) a committed dose equivalent of 50 rem (0.5 sievert) to an organ or tissue, non-stochastic ALI. The stochastic ALIs were derived to result in a risk, due to irradiation of organs and tissues, comparable to the risk associated with deep dose equivalent to the whole body to 5 rem (0.05 sievert). The derivation includes multiplying the committed dose equivalent to an organ or tissue by a weighting factor W_T. This weighting factor is the proportion of the risk of stochastic effects resulting from irradiation of the organ or tissue, T, to the total risk of stochastic effects when the whole body is irradiated uniformly. The values of W_T are listed under the definition of "weighting factor" in 64E-5.101. The non-stochastic ALIs were derived to avoid non-stochastic effects, such as prompt damage to tissue or reduction in organ function.

A value of $W_T = 0.06$ is applicable to each of the five organs or tissues in the "remainder" category receiving the highest dose equivalents, and the dose equivalents of all other remaining tissues may be disregarded. The following portions of the GI track --stomach, small intestine, upper large intestine, and lower large intestine -- are to be treated as four separate organs.

Note that the dose equivalents for an extremity, skin and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to the limits that must be met separately.

When an ALI is defined by the stochastic dose limit, this value alone is given. When an ALI is determined by the non-stochastic dose limit to an organ, the organ or tissue to which the limit applies is shown, and the ALI for the stochastic limit is shown in parenthesis. Abbreviated organ or tissue designations are used:

LLI wall = lower large intestine wall;
St. wall = stomach wall;
Blad wall = bladder wall; and
Bone surf = bone surface.

The use of the ALIs listed first, the more limiting of the stochastic and non-stochastic ALIs, will ensure that non-stochastic effects are avoided and that the risk of stochastic effects is limited to an acceptably low value. If, in a particular situation involving a radionuclide for which the non-stochastic ALI is limiting, use of the non-stochastic ALI is considered unduly conservative, the licensee may use the stochastic ALI to determine the committed effective dose equivalent. However, the licensee shall also ensure that the 50 rem (0.5 sievert) dose equivalent limit for any organ or tissue is not exceeded by the sum of the external deep dose equivalent plus the internal committed dose equivalent to that organ, not the effective dose. For the case where there is no external dose contribution, this would be demonstrated if the sum of the fractions of the non-stochastic ALIs (ALI_{ns}) that contributed to the committed dose equivalent to the organ receiving the highest dose does not exceed unity, that is the sum of (intake (in μCi) of each radionuclide/ALI_{ns}) $\leq$ 1.0. If there is an external deep dose contribution of H_d, then this sum must be less than 1 - (H_d/50), instead of $\leq$ 1.0.

Note that the dose equivalents for an extremity, skin, and lens of the eye are not considered in computing the committed effective dose equivalent, but are subject to limits that must be met separately.

The derived air concentrations (DAC) values are derived limits intended to control chronic occupational exposures. The relationship between the DAC and the ALI is given by:

DAC = ALI(in μCi)/(2000 hours per working year x 60 minutes/hour x 2 x 10^4 ml per minute)
= [ALI/2.4 x 10^9) μCi/ml,

where 2 x 10^4 milliliters is the volume of air breathed per minute at work by Reference Man under working conditions or light work.

The DAC values relate to one of two modes of exposure: either external submersion or the internal committed dose equivalents resulting from inhalation of radioactive materials. DACs based upon submersion are for immersion in a semi-infinite cloud of uniform concentration and apply to each radionuclide separately.

The ALI and DAC values include contributions to exposure by the single radionuclide named and any in-growth of daughter radionuclides produced in the body by decay of the parent. However, intakes that include both the parent and daughter radionuclides should be treated by the general method appropriate for mixtures.

The values of ALI and DAC do not apply when the individual both ingest and inhales a radionuclide, when the individual is exposed to a mixture of radionuclieds by either inhalation or ingestion or both, or when the individual is exposed to both internal and external irradiation. See 64E-5.219. When an individual is exposed to radioactive materials which fall under several of the translocation classifications of the same radionuclide, such as, Class D, Class W or Class Y, the exposure may be evaluated as if it were a mixture or different radionuclides.

It should be noted that the classification of a compound as Class D, W, or Y is based on the chemical form of the compound and does not take into account the radiological half-life of different radionuclides. For this reason, values are given for Class D, W, and Y compounds, even for very short-lived radionuclides.

Table II "Effluent Concentrations"

The columns in Table II captioned "Effluents," "Air" and "Water" are applicable to the assessment and control of dose to the public, particularly in the implementation of the provisions of 64E-5.312. The concentration values given in Columns 1 and 2 of Table II are equivalent to the radionuclide concentrations which, if inhaled or ingested continuously over the course of a year, would produce a total effective dose equivalent of 0.05 rem (0.5 millisievert).

Consideration of non-stochastic limits has not been included in deriving the air and water effluent concentrations limits because non-stochastic effects are presumed not to occur at or below the dose levels established for individual members of the public.

For radionuclides, where the non-stochastic limit was governing in deriving the occupational DAC, the stochastic ALI was used in deriving the corresponding airborne effluent limit in Table II. For this reason, the DAC and airborne effluent limits are not always proportional as they were in 10D-91.429.

The air concentrations values listed in Table II, Column 1 were derived by one of two methods. For those radionuclides for which the stochastic limit is governing, the occupational stochastic inhalation ALI was divided by 2.4×10^9, relating the inhalation ALI to the DAC, as explained above, and then divided by a factor of 300. The factor 300 includes the following components: a factor of 50 to relate to the 5 rem (0.05 sievert) annual occupational dose limit of 0.1 rem limit for members of the public; and a factor of 3 to adjust for the difference in exposure time and the inhalation rate for a worker and that for members of the public; and a factor of 2 to adjust the occupational values, derived for adults, so that they are applicable to other age groups.

For those radionuclides for which submersion, that is external dose , is limiting, the occupational DAC in Table I, Column 3 was divided by 219. The factor 219 is composed of a factor of 50, as described above, and a factor of 4.38 relating occupational exposure for 2,000 hours per year to full-time exposure (8,760 hours per year). Note that an additional factor of 2 for age consideration is not warranted in the submersion case.

The water concentrations were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^7. The factor of 7.3×10^7 (ml) includes the following components: the factor of 50 and 2 described above and a factor of 7.3×10^5 (ml) which is the annual water intake of "Reference Man".

Note 2 provides groupings of radionuclides which are applicable to unknown mixtures of radionuclides. These groupings, including occupational inhalation ALIs and DACs, air and water effluent concentrations and releases to sewer, require demonstrating that the most limiting radionculedes in successive classes are absent. The limit for the unknown mixture is defined when the presence of one of the listed radionuclides cannot be definitely excluded as being present either from knowledge of the radionuclide composition of the source or from actual measurements.

Table III "Release to Sewers"

The monthly average concentrations for release to sanitary sewerage are applicable to the provisions in 64E-5.330. The concentration values were derived by taking the most restrictive occupational stochastic oral ingestion ALI and dividing by 7.3×10^6 (ml). The factor of 7.3×10^6 (ml) is composed of a factor of 7.3×10^5 (ml), the annual water intake by "Reference Man," and a factor of 10, such that the concentrations, if the sewage released by the licensee were the only source of water ingested by a "Reference Man" during a year, would result in a committed effective dose equivalent of 0.5 rem (5 millisievert).

LIST OF ELEMENTS Back2RATS2007-3AppB_ALI_DAC

Name	Symbol	Atomic Number	Name	Symbol	Atomic Number
Actinium	Ac	89	Molybdenum	Mo	42
Aluminum	Al	13	Neodymium	Nd	60
Americium	Am	95	Neptunium	Np	93
Antimony	Sb	51	Nickel	Ni	28
Argon	Ar	18	Niobium	Nb	41
Arsenic	As	33	Nitrogen	N	7
Astatine	At	85	Osmium	Os	76
Barium	Ba	56	Oxygen	O	8
Berkelium	Bk	97	Palladium	Pd	46
Beryllium	Be	4	Phosphorus	P	15
Bismuth	Bi	83	Platinum	Pt	78
Bromine	Br	35	Plutonium	Pu	94
Cadmium	Cd	48	Polonium	Po	84
Calcium	Ca	20	Potassium	K	19
Californium	Cf	98	Praseodymium	Pr	59
Carbon	C	6	Promethium	Pm	61
Cerium	Ce	58	Protactinium	Pa	91
Cesium	Cs	55	Radium	Ra	88
Chlorine	Cl	17	Radon	Rn	86
Chromium	Cr	24	Rhenium	Re	75
Cobalt	Co	27	Rhodium	Rh	45
Copper	Cu	29	Rubidium	Rb	37
Curium	Cm	96	Ruthenium	Ru	44
Dysprosium	Dy	66	Samarium	Sm	62
Einsteinium	Es	99	Scandium	Sc	21
Erbium	Er	68	Selenium	Se	34
Europium	Eu	63	Silicon	Si	14
Fermium	Fm	100	Silver	Ag	47
Fluorine	F	9	Sodium	Na	11
Francium	Fr	87	Strontium	Sr	38
Gadolinium	Gd	64	Sulfur	S	16
Gallium	Ga	31	Tantalum	Ta	73
Germanium	Ge	32	Technetium	Tc	43
Gold	Au	79	Tellurium	Te	52
Hafnium	Hf	72	Terbium	Tb	65
Holmium	Ho	67	Thallium	Tl	81
Hydrogen	H	1	Thorium	Th	90
Indium	In	49	Thulium	Tm	69
Iodine	I	53	Tin	Sn	50
Iridium	Ir	77	Titanium	Ti	22
Iron	Fe	26	Tungsten	W	74
Krypton	Kr	36	Uranium	U	92
Lanthanum	La	57	Vanadium	V	23
Lead	Pb	82	Xenon	Xe	54
Lutetium	Lu	71	Ytterbium	Yb	70
Magnesium	Mg	12	Yttrium	Y	39
Manganese	Mn	25	Zinc	Zn	30
Mendelevium	Md	101	Zirconium	Zr	40
Mercury	Hg	80			

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			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
1	H-3	Water, DAC includes skin absorption	8E+4	8E+4	2E-5	1E-7	1E-3	1E-2
	H-3	Gas (HT or T2) Submersion[1]: Use above values as HT and T2 oxidize in air and in the body to HTO						
1	Be-7	W: all compounds except those given for Y	4E+4	2E+4	9E-6	3E-8	6E-4	6E-3
4	Be-7	Y: oxides, halides, and nitrates	0	2E+4	8E-6	3E-8	0	0
4	Be-10	W: see Be-7	1E+3 LLI wall (1E+3)	2E+2 0	6E-8 0	2E-10 0	0 2E-5	0 2E-4
4	Be-10	Y: see Be-7	0	1E+1	6E-9	2E-11	0	0
6	C-11[2]	Monoxide	0	1E+6	5E-4	2E-6	0	0
6	C-11[2]	Dioxide	0	6E+5	3E-4	9E-7	0	0
6	C-11[2]	Compounds	4E+5	4E+5	2E-4	6E-7	6E-3	6E-2
6	C-14	Monoxide	0	2E+6	7E-4	2E-6	0	0
6	C-14	Dioxide	0	2E+5	9E-5	3E-7	0	0
6	C-14	Compounds	2E+3	2E+3	1E-6	3E-9	3E-5	3E-4
7	N-13[2]	Submersion[1]	Back2RATS2007-3AppB_ALI_DAC		4E-6	2E-8		
8	O-15[2]	Submersion[1]			4E-6	1E-7		
9	F-18[2]	D: fluorides of H, Li, Na, K, Rb, Cs, and Fr	5E+4 St. wall (5E+4)	7E+4 0	3E-5 0	1E-7 0	0 7E-4	0 7E-3
9	F-18[2]	W: fluorides of Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, As, Sb, Bi, Fe, Ru, Os, Co, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, V, Nb, Ta, Mn, Tc, and Re	0	9E+4	4E-5	1E-7	0	0
9	F-18[2]	Y: lanthanum fluoride	0	8E+4	3E-5	1E-7	0	0
11	Na-22	D: all compounds	4E+2	6E+2	3E-7	9E-10	6E-6	6E-5
11	Na-24	D: all compounds	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
12	Mg-28	D: all compounds except those given for W	7E+2	2E+3	7E-7	2E-9	9E-6	9E-5

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
12	Mg-28	W: oxides, hydroxides, carbides, halides, and nitrates	0	1E+3	5E-7	2E-9	0	0
13	Al-26	D: all compounds except those given for W	4E+2	6E+1	3E-8	9E-11	6E-6	6E-5
13	Al-26	W: oxides, hydroxides, carbides, halides, and nitrates	0	9E+1	4E-8	1E-10	0	0
14	Si-31	D: all compounds except those given for W, Y	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
14	Si-31	W: oxides, carbides, hydroxides, and nitrates	0	3E+4	1E-5	5E-8	0	0
14	Si-31	Y: alumosilicate glass	0	3E+4	1E-5	4E-8	0	0
14	Si-32	D: see Si-31	2E+3 LLI wall (3E+3)	2E+2 0	1E-7 0	3E-10 0	0 4E-5	0 4E-4
14	Si-32	W: see Si-31	0	1E+2	5E-8	2E-10	0	0
14	Si-32	Y: see Si-31	0	5E+0	2E-9	7E-12	0	0
15	P-32	D: all compounds except those given for W	6E+2	9E+2	4E-7	1E-9	9E-6	9E-5
15	P-32	W: phosphates of Zn^{2+}, S^{3+}, Mg^{2+}, Fe^{3+}, Bi^{3+}, and lanthanides	0	4E+2	2E-7	5E-10	0	0
15	P-33	D: see P-32	6E+3	8E+3	4E-6	1E-8	8E-5	8E-4
15	P-33	W: see P-32	0	3E+3	1E-6	4E-9	0	0
16	S-35	Vapor		1E+4	6E-6	2E-8	0	0
16	S-35	D: sulfides and sulfates except those given for W	1E+4 LLI wall (8E+3)	2E+4 0	7E-6 0	2E-8 0	0 1E-4	0 1E-3
16	S-35	W: elemental sulfur, sulfides of Sr, Ba, Ge, Sn, Pb, As, Sb, Bi, Cu, Ag, Au, Zn, Cd, Hg, W, and Mo. Sulfates of Ca, Sr, Ba, Ra, As,	0	2E+3	9E-7	3E-9	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
		Sb, and Bi						
17	Cl-36	D: chlorides of H, Li, Na, K, Rb, Cs, and Fr	2E+3	2E+3	1E-6	3E-9	2E-5	2E-4
17	Cl-36	W: chlorides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Tc, and Re	0	2E+2	1E-7	3E-10	0	0
17	Cl-38[2]	D: see Cl-36	2E+4 St. wall (3E+4)	4E+4 0	2E-5 0	6E-8 0	0 3E-4	0 3E-3
17	Cl-38[2]	W: see Cl-36	0	5E+4	2E-5	6E-8	0	0
17	Cl-39[2]	D: see Cl-36	2E+4 St. wall (4E+4)	5E+4 0	2E-5 0	7E-8 0	0 5E-4	0 5E-3
17	Cl-39[2]	W: see Cl-36	0	6E+4	2E-5	8E-8	0	0
18	Ar-37	Submersion[1]	0	0	1E+0	6E-3	0	0
18	Ar-39	Submersion[1]	0	0	2E-4	8E-7	0	0
18	Ar-41	Submersion[1]	0	0	3E-6	1E-8	0	0
19	K-40	D: all compounds	3E+2	4E+2	2E-7	6E-10	4E-6	4E-5
19	K-42	D: all compounds	5E+3	5E+3	2E-6	7E-9	6E-5	6E-4
19	K-43	D: all compounds	6E+3	9E+3	4E-6	1E-8	9E-5	9E-4
19	K-44[2]	D: all compounds	2E+4 St. wall (4E+4)	7E+4 0	3E-5 0	9E-8 0	0 5E-4	0 5E-3
19	K-45[2]	D: all compounds	3E+4 St. wall (5E+4)	1E+5 0	5E-5 0	2E-7 0	7E-4	0 7E-3
20	Ca-41	W: all compounds	3E+3 Bone Surf (4E+3)	4E+3 Bone Surf (4E+3)	2E-6 0	0 5E-9	0 6E-5	0 6E-4
20	Ca-45	W: all compounds	2E+3	8E+2	4E-7	1E-9	2E-5	2E-4
20	Ca-47	W: all compounds	8E+2	9E+2	4E-7	1E-9	1E-5	1E-4
20	Sc-43	Y: all compounds	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
21	Sc-44m	Y: all compounds	5E+2	7E+2	3E-7	1E-9	7E-6	7E-5

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
21	Sc-44	Y: all compounds	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
21	Sc-46	Y: all compounds	9E+2	2E+2	1E-7	3E-10	1E-5	1E-4
21	Sc-47	Y: all compounds	2E+3 LLI Wall (3E+3)	3E+3 0	1E-6 0	4E-9 0	0 4E-5	0 4E-4
21	Sc-48	Y: all compounds	8E+2	1E+3	6E-7	2E-9	1E-5	1E-4
21	Sc-49[2]	Y: all compounds	2E+4	5E+4	2E-5	8E-8	3E-4	3E-3
22	Ti-44	D: all compounds except those given for W, Y	3E+2	1E+1	5E-9	2E-11	4E-6	4E-5
22	Ti-44	W: oxides, carbides, halides, nitrates, and hydroxides	0	3E+1	1E-8	4E-11	0	0
22	Ti-44	Y: SrTiO	0	6E+0	2E-9	8E-12	0	0
22	Ti-45	D: see Ti-44	9E+3	3E+4	1E-5	3E-8	1E-4	1E-3
22	Ti-45	W: see Ti-44	0	4E+4	1E-5	5E-8	0	0
22	Ti-45	Y: see Ti-44	0	3E+4	1E-5	4E-8	0	0
23	V-47[2]	D: all compounds except those given for W	3E+4 St. wall (3E+4)	8E+4 0	3E-5 0	1E-7 0	0 4E-4	4E-3
23	V-47	W: oxides, carbides, hydroxides, and halides	0	1E+5	4E-5	1E-7	0	0
23	V-48	D: see V-47	6E+2	1E+3	5E-7	2E-9	9E-6	9E-5
23	V-48	W: see V-47	0	6E+2	3E-7	9E-10	0	0
23	V-49	D: see V-47	7E+4 LLI wall (9E+4)	3E+4 Bone Surf (3E+4)	1E-5 0	0 5E-8	0 1E-3	1E-2
23	V-49	W: see V-47	0	2E+4	8E-6	2E-8	0	0
24	Cr-48	D: all compounds except those given for W, Y	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
24	Cr-48	W: halides and nitrates	0	7E+3	3E-6	1E-8	0	0
24	Cr-48	Y: oxides and hydroxides	0	7E+3	3E-6	1E-8	0	0
24	Cr-49[2]	D: see Cr-48	3E+4	8E+4	4E-5	1E-7	4E-4	4E-3
24	Cr-49[2]	W: see Cr-48	0	1E+5	4E-5	1E-7	0	0
24	Cr-49[2]	Y: see Cr-48	0	9E+4	4E-5	1E-7	0	0
24	Cr-51	D: see Cr-48	4E+4	5E+4	2E-5	6E-8	5E-4	5E-3
24	Cr-51	W: see Cr-48	0	2E+4	1E-5	3E-8	0	0
24	Cr-51	Y: see Cr-48	0	2E+4	8E-6	3E-8	0	0
25	Mn-51[2]	D: all compounds except those given for W	2E+4	5E+4	2E-5	7E-8	3E-4	3E-3

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
25	Mn-51[2]	W: oxides, halides, hydroxides, and nitrates	0	6E+4	3E-5	8E-8	0	0
25	Mn-52m[2]	D: see Mn-51	3E+4 St. wall (4E+4)	9E+4 0	4E-5 0	1E-7 0	0 5E-4	0 5E-3
25	Mn-52m[2]	W: see Mn-51	0	1E+5	4E-5	1E-7	0	0
25	Mn-52	D: see Mn-51	7E+2	1E+3	5E-7	2E-9	1E-5	1E-4
25	Mn-52	W: see Mn-51	0	9E+2	4E-7	1E-9	0	0
25	Mn-53	D: see Mn-51	5E+4 0	1E+4 Bone Surf (2E+4)	5E-6 0	0 3E-8	7E-4 0	7E-3 0
25	Mn-53	W: see Mn-51	0	1E+4	5E-6	2E-8	0	0
25	Mn-54	D: see Mn-51	2E+3	9E+2	4E-7	1E-9	3E-5	3E-4
25	Mn-54	W: see Mn-51	0	8E+2	3E-7	1E-9	0	0
25	Mn-56	D: see Mn-51	5E+3	2E+4	6E-6	2E-8	7E-5	7E-4
25	Mn-56	W: see Mn-51	0	2E+4	9E-6	3E-8	0	0
26	Fe-52	D: all compounds except those given for W	9E+2	3E+3	1E-6	4E-9	1E-5	1E-4
26	Fe-52	W: oxides, halides, and hydroxides	0	2E+3	1E-6	3E-9	0	0
26	Fe-55	D: see Fe-52	9E+3	2E+3	8E-7	3E-9	1E-4	1E-3
26	Fe-55	W: see Fe-52	0	4E+3	2E-6	6E-9	0	0
26	Fe-59	D: see Fe-52	8E+2	3E+2	1E-7	5E-10	1E-5	1E-4
26	Fe-59	W: see Fe-52	0	5E+2	2E-7	7E-10	0	0
26	Fe-60	D: see Fe-52	3E+1	6E+0	3E-9	9E-12	4E-7	4E-6
26	Fe-60	W: see Fe-52	0	2E+1	8E-9	3E-11	0	0
27	Co-55	W: all compounds except those given for Y	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
27	Co-55	Y: oxides, halides, hydroxides, and nitrates	0	3E+3	1E-6	4E-9	0	0
27	Co-56	W: see Co-55	5E+2	3E+2	1E-7	4E-10	6E-6	6E-5
27	Co-56	Y: see Co-55	4E+2	2E+2	8E-8	3E-10	0	0
27	Co-57	W: see Co-55	8E+3	3E+3	1E-6	4E-9	6E-5	6E-4
27	Co-57	Y: see Co-55	4E+3	7E+2	3E-7	9E-10	0	0
27	Co-58m	W: see Co-55	6E+4	9E+4	4E-5	1E-7	8E-4	8E-3
27	Co-58m	Y: see Co-55	0	6E+4	3E-5	9E-8	0	0
27	Co-58	W: see Co-55	2E+3	1E+3	5E-7	2E-9	2E-5	2E-4
27	Co-58	Y: see Co-55	1E+3	7E+2	3E-7	1E-9	0	0
27	Co-60m[2]	W: see Co-55	1E+6 St. wall (1E+6)	4E+6 0	2E-3 0	6E-6 0	0 2E-2	0 2E-1
27	Co-60m[2]	Y: see Co-55	0	3E+6	1E-3	4E-6	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
27	Co-60	W: see Co-55	5E+2	2E+2	7E-8	2E-10	3E-6	3E-5
27	Co-60	Y: see Co-55	2E+2	3E+1	1E-8	5E-11	0	0
27	Co-61[2]	W: see Co-55	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
27	Co-61[2]	Y: see Co-55	2E+4	6E+4	2E-5	8E-8	0	0
27	Co-62m[2]	W: see Co-55	4E+4 St. wall (5E+4)	2E+5 0	7E-5 0	2E-7 0	0 7E-4	0 7E-3
27	Co-62m[2]	Y: see Co-55	0	2E+5	6E-5	2E-7	0	0
28	Ni-56	D: all compounds except those given for W	1E+3	2E+3	8E-7	3E-9	2E-5	2E-4
28	Ni-56	W: oxides, carbides, and hydroxides	0	1E+3	5E-7	2E-9	0	0
28	Ni-56	Vapor	0	1E+3	5E-7	2E-9	0	0
28	Ni-57	D: see Ni-56	2E+3	5E+3	2E-6	7E-9	2E-5	2E-4
28	Ni-57	W: see Ni-56	0	3E+3	1E-6	4E-9	0	0
28	Ni-57	Vapor	0	6E+3	3E-6	9E-9	0	0
28	Ni-59	D: see Ni-56	2E+4	4E+3	2E-6	5E-9	3E-4	3E-3
28	Ni-59	W: see Ni-56	0	7E+3	3E-6	1E-8	0	0
28	Ni-59	Vapor	0	2E+3	8E-7	3E-9	0	0
28	Ni-63	D: see Ni-56	9E+3	2E+3	7E-7	2E-9	1E-4	1E-3
28	Ni-63	W: see Ni-56	0	3E+3	1E-6	4E-9	0	0
28	Ni-63	Vapor	0	8E+2	3E-7	1E-9	0	0
28	Ni-65	D: see Ni-56	8E+3	2E+4	1E-5	3E-8	1E-4	1E-3
28	Ni-65	W: see Ni-56	0	3E+4	1E-5	4E-8	0	0
28	Ni-65	Vapor	0	2E+4	7E-6	2E-8	0	0
28	Ni-66	D: see Ni-56	4E+2 LLI wall (5E+2)	2E+3 0	7E-7 0	2E-9 0	0 6E-6	0 6E-5
28	Ni-66	W: see Ni-56	0	6E+2	3E-7	9E-10	0	0
28	Ni-66	Vapor	0	3E+3	1E-6	4E-9	0	0
29	Cu-60[2]	D: all compounds except those given for W, Y	3E+4 St. wall (3E+4)	9E+4 0	4E-5 0	1E-7 0	0 4E-4	0 4E-3
29	Cu-60[2]	W: sulfides, halides, and nitrates	0	1E+5	5E-5	2E-7	0	0
29	Cu-60[2]	Y: oxides and hydroxides	0	1E+5	4E-5	1E-7	0	0
29	Cu-61	D: see Cu-60	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
29	Cu-61	W: see Cu-60	0	4E+4	2E-5	6E-8	0	0
29	Cu-61	Y: see Cu-60	0	4E+4	1E-5	5E-8	0	0
29	Cu-64	D: see Cu-60	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
29	Cu-64	W: see Cu-60	0	2E+4	1E-5	3E-8	0	0
29	Cu-64	Y: see Cu-60	0	2E+4	9E-6	3E-8	0	0
29	Cu-67	D: see Cu-60	5E+3	8E+3	3E-6	1E-8	6E-5	6E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
29	Cu-67	W: see Cu-60	0	5E+3	2E-6	7E-9	0	0
29	Cu-67	Y: see Cu-60	0	5E+3	2E-6	6E-9	0	0
30	Zn-62	Y: all compounds	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
30	Zn-63[2]	Y: all compounds	2E+4 St. wall (3E+4)	7E+4 0	3E-5 0	9E-8 0	0 3E-4	0 3E-3
30	Zn-65	Y: all compounds	4E+2	3E+2	1E-7	4E-10	5E-6	5E-5
30	Zn-69m	Y: all compounds	4E+3	7E+3	3E-6	1E-8	6E-5	6E-4
30	Zn-69[2]	Y: all compounds	6E+4	1E+5	6E-5	2E-7	8E-4	8E-3
30	Zn-71m	Y: all compounds	6E+3	2E+4	7E-6	2E-8	8E-5	8E-4
30	Zn-72	Y: all compounds	1E+3	1E+3	5E-7	2E-9	1E-5	1E-4
31	Ga-65[2]	D: all compounds except those given for W	5E+4 St. wall (6E+4)	2E+5 0	7E-5 0	2E-7 0	0 9E-4	0 9E-3
31	Ga-65[2]	W: oxides, carbides, halides, nitrates, and hydroxides	0	2E+5	8E-5	3E-7	0	0
31	Ga-66	D: see Ga-65	1E+3	4E+3	1E-6	5E-9	1E-4	1E-3
31	Ga-66	W: see Ga-65	0	3E+3	1E-6	4E-9	0	0
31	Ga-67	D: see Ga-65	7E+3	1E+4	6E-6	2E-8	2E-4	2E-3
31	Ga-67	W: see Ga-65	0	1E+4	4E-6	1E-8	0	0
31	Ga-68[2]	D: see Ga-65	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
31	Ga-68[2]	W: see Ga-65	0	5E+4	2E-5	7E-8	0	0
31	Ga-70[2]	D: see Ga-65	5E+4 St. wall (7E+4)	2E+5 0	7E-5 0	2E-7 0	0 1E-3	0 1E-2
31	Ga-70[2]	W: see Ga-65	0	2E+5	8E-5	3E-7	0	0
31	Ga-72	D: see Ga-65	1E+3	4E+3	1E-6	5E-9	2E-5	2E-4
31	Ga-72	W: see Ga-65	0	3E+3	1E-6	4E-9	0	0
31	Ga-73	D: see Ga-65	5E+3	2E+4	6E-6	2E-8	7E-5	7E-4
31	Ga-73	W: see Ga-65	0	2E+4	6E-6	2E-8	0	0
32	Ge-66	D: all compounds except those given for W	2E+4	3E+4	1E-5	4E-8	3E-4	3E-3
32	Ge-66	W: oxides, sulfides, and halides	0	2E+4	8E-6	3E-8	0	0
32	Ge-67[2]	D: see Ge-66	4E+4 St. wall (3E+4)	9E+4 0	4E-5 0	1E-7 0	0 6E-4	0 6E-3
32	Ge-67[2]	W: see Ge-66	0	1E+5	4E-5	1E-7	0	0
32	Ge-68	D: see Ge-66	5E+3	4E+3	2E-6	5E-9	6E-5	6E-4
32	Ge-68	W: see Ge-66	0	1E+2	4E-8	1E-10	0	0
32	Ge-69	D: see Ge-66	1E+4	2E+4	6E-6	2E-8	2E-4	2E-3
32	Ge-69	W: see Ge-66	0	8E+3	3E-6	1E-8	0	0
32	Ge-71	D: see Ge-66	5E+5	4E+5	2E-4	6E-7	7E-3	7E-2

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
32	Ge-71	W: see Ge-66	0	4E+4	2E-5	6E-8	0	0
32	Ge-75[2]	D: see Ge-66	4E+4 St. wall (7E+4)	8E+4 0	3E-5 0	1E-7 0	0 9E-4	0 9E-3
32	Ge-75[2]	W: see Ge-66	0	8E+4	4E-5	1E-7	0	0
32	Ge-77	D: see Ge-66	9E+3	1E+4	4E-6	1E-8	1E-4	1E-3
32	Ge-77	W: see Ge-66	0	6E+3	2E-6	8E-9	0	0
32	Ge-78[2]	D: see Ge-66	2E+4 St. Wall (2E+4)	2E+4 0	9E-6 0	3E-8 0	0 3E-4	0 3E-3
32	Ge-78[2]	W: see Ge-66	0	2E+4	9E-6	3E-8	0	0
33	As-69[2]	W: all compounds	3E+4 St. Wall (4E.04)	1E+5 0	5E-5 0	2E-7 0	0 6E-4	0 6E-3
33	As-70[2]	W: all compounds	1E+4	5E+4	2E-5	7E-8	2E-4	2E-3
33	As-71	W: all compounds	4E+3	5E+3	2E-6	6E-9	5E-5	5E-4
33	As-72	W: all compounds	9E+2	1E+3	6E-7	2E-9	1E-5	1E-4
33	As-73	W: all compounds	8E+3	2E+3	7E-7	2E-9	1E-4	1E-3
33	As-74	W: all compounds	1E+3	8E+2	3E-7	1E-9	2E-5	2E-4
33	As-76	W: all compounds	1E+3	1E+3	6E-7	2E-9	1E-5	1E-4
33	As-77	W: all compounds	4E+3 LLI wall (5E+3)	5E+3 0	2E-6 0	7E-9 0	0 6E-5	0 6E-4
33	As-78[2]	W: all compounds	8E+3	2E+4	9E-6	3E-8	1E-4	1E-3
34	Se-70[2]	D: all compounds except those given for W	2E+4	4E+4	2E-5	5E-8	1E-4	1E-3
34	Se-70[2]	W: oxides, carbides, hydroxides, and elemental Se	1E+4	4E+4	2E-5	6E-8	0	0
34	Se-73m[2]	D: see Se-70	6E+4	2E+5	6E-5	2E-7	4E-4	4E-3
34	Se-73m[2]	W: see Se-70	3E+4	1E+5	6E-5	2E-7	0	0
34	Se-73	D: see Se-70	3E+3	1E+4	5E-6	2E-8	4E-5	4E-4
34	Se-73	W: see Se-70	0	2E+4	7E-6	2E-8	0	0
34	Se-75	D: see Se-70	5E+2	7E+2	3E-7	1E-9	7E-6	7E-5
34	Se-75	W: see Se-70	0	6E+2	3E-7	8E-10	0	0
34	Se-79	D: see Se-70	6E+2	8E+2	3E-7	1E-9	8E-6	8E-5
34	Se-79	W: see Se-70	0	6E+2	2E-7	8E-10	0	0
34	Se-81m[2]	D: see Se-70	4E+4	7E+4	3E-5	9E-8	3E-4	3E-3
34	Se-81m[2]	W: see Se-70	2E+4	7E+4	3E-5	1E-7	0	0
34	Se-81[2]	D: see Se-70	6E+4 St. wall (8E+4)	2E+5 0	9E-5 0	3E-7 0	0 1E-3	0 1E-2
34	Se-81[2]	W: see Se-70	0	2E+5	1E-4	3E-7	0	0
34	Se-83[2]	D: see Se-70	4E+4	1E+5	5E-5	2E-7	4E-4	4E-3
34	Se-83[2]	W: see Se-70	3E+4	1E+5	5E-5	2E-7	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
35	Br-74m[2]	D: bromides of H, Li, Na, K, Rb, Cs, and Fr	1E+4 St. Wall (2E+4)	4E+4 0	2E-5 0	5E-8 0	0 3E-4	0 3E-3
35	Br-74m[2]	W: bromides of lanthanides, Be, Mg, Ca, Sr, Ba, Ra, Al, Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, Sc, Y, Ti, Zr, Hf, V, Nb, Ta, Mn, Tc, and Re	0	4E+4	2E-5	6E-8	0	0
35	Br-74[2]	D: see Br-74m	2E+4 St. wall (4E+4)	7E+4 0	3E-5 0	1E-7 0	0 5E-4	0 5E-3
35	Br-74[2]	W: see Br-74m	0	8E+4	4E-5	1E-7	0	0
35	Br-75[2]	D: see Br-74m	3E+4 St. wall (4E+4)	5E+4 0	2E-5 0	7E-8 0	0 5E-4	0 5E-3
35	Br-75[2]	W: see Br-74m	0	5E+4	2E-5	7E-8	0	0
35	Br-76	D: see Br-74m	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4
35	Br-76	W: see Br-74m	0	4E+3	2E-6	6E-9	0	0
35	Br-77	D: see Br-74m	2E+4	2E+4	1E-5	3E-8	2E-4	2E-3
35	Br-77	W: see Br-74m	0	2E+4	8E-6	3E-8	0	0
35	Br-80m	D: see Br-74m	2E+4	2E+4	7E-6	2E-8	3E-4	3E-3
35	Br-80m	W: see Br-74m	0	1E+4	6E-6	2E-8	0	0
35	Br-80[2]	D: see Br-74m	5E+4 St. wall (9E+4)	2E+5 0	8E-5 0	3E-7 0	0 1E-3	0 1E-2
35	Br-80[2]	W: see Br-74m	0	2E+5	9E-5	3E-7	0	0
35	Br-82	D: see Br-74m	3E+3	4E+3	2E-6	6E-9	4E-5	4E-4
35	Br-82	W: see Br-74m	0	4E+3	2E-6	5E-9	0	0
35	Br-83	D: see Br-74m	5E+4 St. wall (7E+4)	6E+4 0	3E-5 0	9E-8 0	0 9E-4	0 9E-3
35	Br-83	W: see Br-74m	0	6E+4	3E-5	9E-8	0	0
35	Br-84[2]	D: see Br-74m	2E+4 St. wall (3E+4)	6E+4 0	2E-5 0	8E-8 0	0 4E-4	0 4E-3
35	Br-84[2]	W: see Br-74m	0	6E+4	3E-5	9E-8	0	0
36	Kr-74[2]	Submersion[1]	0	0	3E-6	1E-8	0	0
36	Kr-76	Submersion[1]	0	0	9E-6	4E-8	0	0
36	Kr-77[2]	Submersion[1]	0	0	4E-6	2E-8	0	0
36	Kr-79	Submersion[1]	0	0	2E-5	7E-8	0	0
	Kr-81	Submersion1	0	0	7E-4	3E-6	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
36	Kr-83m[2]	Submersion[1]	0	0	1E-2	5E-5	0	0
36	Kr-85m	Submersion[1]	0	0	2E-5	1E-7	0	0
36	Kr-85	Submersion[1]	0	0	1E-4	7E-7	0	0
36	Kr-87	Submersion1	0	0	5E-6	2E-8	0	0
36	Kr-88	Submersion[1]	0	0	2E-6	9E-9	0	0
37	Rb-79[2]	D: all compounds	4E+4 St. wall (6E+4)	1E+5 0	5E-5 0	2E-7 0	0 8E-4	0 8E-3
37	Rb-81m[2]	D: all compounds	2E+5 St. wall (3E+5)	3E+5 0	1E-4 0	5E-7 0	0 4E-3	0 4E-2
37	Rb-81	D: all compounds	4E+4	5E+4	2E-5	7E-8	5E-4	5E-3
37	Rb-82m	D: all compounds	1E+4	2E+4	7E-6	2E-8	2E-4	2E-3
37	Rb-83	D: all compounds	6E+2	1E+3	4E-7	1E-9	9E-6	9E-5
37	Rb-84	D: all compounds	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5
37	Rb-86	D: all compounds	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5
37	Rb-87	D: all compounds	1E+3	2E+3	6E-7	2E-9	1E-5	1E-4
37	Rb-88[2]	D: all compounds	2E+4 St. wall (3E+4)	6E+4 0	3E-5 0	9E-8 0	0 4E-4	0 4E-3
37	Rb-89[2]	D: all compounds	4E+4 St. wall (6E+4)	1E+5 0	6E-5 0	2E-7 0	0 9E-4	0 9E-3
38	Sr-80[2]	D: all soluble compounds except SrTiO	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4
38	Sr-80[2]	Y: all insoluble compounds and SrTi0	0	1E+4	5E-6	2E-8	0	0
38	Sr-81[2]	D: see Sr-80	3E+4	8E+4	3E-5		3E-4	3E-3
38	Sr-81[2]	Y: see Sr-80	2E+4	8E+4	3E-5		0	0
38	Sr-82	D: see Sr-80	3E+2 LLI wall (2E+2)	4E+2 0	2E-7 0	6E-10 0	0 3E-6	0 3E-5
38	Sr-82	Y: see Sr-80	2E+2	9E+1	4E-8	1E-8	0	0
38	Sr-83	D: see Sr-80	3E+3	7E+3	3E-6	5E-9	3E-5	3E-4
38	Sr-83	Y: see Sr-80	2E+3	4E+3	1E-6	5E-9	0	0
38	Sr-85m[2]	D: see Sr-80	2E+5	6E+5	3E-4	9E-7	3E-3	3E-2
38	Sr-85m[2]	Y: see Sr-80	0	8E+5	4E-4	1E-6	0	0
38	Sr-85	D: see Sr-80	3E+3	3E+3	1E-6	4E-9	4E-5	4E-4
38	Sr-85	Y: see Sr-80	0	2E+3	6E-7	2E-9	0	0
38	Sr-87m	D: see Sr-80	5E+4	1E+5	5E-5	2E-7	6E-4	6E-3
38	Sr-87m	Y: see Sr-80	4E+4	2E+5	6E-5	2E-7	0	0
38	Sr-89	D: see Sr-80	6E+2 LLI wall (6E+2)	8E+2 0	4E-7 0	1E-9 0	0 8E-6	0 5E-5

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
38	Sr-89	Y: see Sr-80	5E+2	1E+2	6E-8	2E-10	0	0
38	Sr-90	D: see Sr-80	3E+1 Bone surf (4E+1)	2E+1 Bone Surf (2E+1)	8E-9 0	0 3E-11	0 5E-7	0 5E-6
38	Sr-90	Y: see Sr-80	0	4E+0	2E-9	6E-12	0	0
38	Sr-91	D: see Sr-80	2E+3	6E+3	2E-6	8E-9	2E-5	2E-4
38	Sr-91	Y: see Sr-80	0	4E+3	1E-6	5E-9	0	0
38	Sr-92	D: see Sr-80	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
38	Sr-92	Y: see Sr-80	0	7E+3	3E-6	9E-9	0	0
39	Y-86m[2]	W: all compounds except those given for Y	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
39	Y-86m[2]	Y: oxides and hydroxides	0	5E+4	2E-5	8E-8	0	0
39	Y-86	W: see Y-86m	1E+3	3E+3	1E-6	5E-9	2E-5	2E-4
39	Y-86	Y: see Y-86m	0	3E+3	1E-6	5E-9	0	0
39	Y-87	W: see Y-86m	2E+3	3E+3	1E-6	5E-9	3E-5	3E-4
39	Y-87	Y: see Y-86m	0	3E+3	1E-6	5E-9	0	0
39	Y-88	W: see Y-86m	1E+3	3E+2	1E-7	3E-10	1E-5	1E-4
39	Y-88	Y: see Y-86m	0	2E+2	1E-7	3E-10	0	0
39	Y-90m	W: see Y-86m	8E+3	1E+4	5E-6	2E-8	1E-4	1E-3
39	Y-90m	Y: see Y-86m	0	1E+4	5E-6	2E-8	0	0
39	Y-90	W: see Y-86m	4E+2 LLI wall (5E+2)	7E+2 0	3E-7 0	9E-10 0	0 7E-6	0 7E-5
39	Y-90	Y: see Y-86m	0	6E+2	3E-7	9E-10	0	0
39	Y-91m[2]	W: see Y-86m	1E+5	2E+5	1E-4	3E-7	2E-3	2E-2
39	Y-91m[2]	Y: see Y-86m	0	2E+5	7E-5	2E-7	0	0
39	Y-91	W: see Y-86m	5E+2 LLI wall (6E+2)	2E+2 0	7E-8 0	2E-10 0	0 8E-6	0 8E-5
39	Y-91	Y: see Y-86m	0	1E+2	5E-8	2E-10	0	0
39	Y-92	W: see Y-86m	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
39	Y-92	Y: see Y-86m	0	8E+3	3E-6	1E-8	0	0
39	Y-93	W: see Y-86m	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
39	Y-93	Y: see Y-86m	0	2E+3	1E-6	3E-9	0	0
39	Y-94[2]	W: see Y-86m	2E+4 St. wall (3E+4)	8E+4 0	3E-5 0	1E-7 0	0 4E-4	0 4E-3
39	Y-94[2]	Y: see Y-86m	0	8E+4	3E-5	1E-7	0	0
39	Y-95[2]	W: see Y-86m	4E+4 St. wall (5E+4)	2E+5 0	6E-6 0	2E-7 0	0 7E-4	0 7E-3
39	Y-95[2]	Y: see Y-86m	0	1E+5	6E-5	2E-7	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
40	Zr-86	D: all compounds except those given for W, Y	1E+3	4E+3	2E-6	6E-9	2E-5	2E-4
40	Zr-86	W: oxides, halides, nitrates, and hydroxides	0	3E+3	1E-6	4E-9	0	0
40	Zr-86	Y: carbide	0	2E+3	1E-6	3E-9	0	0
40	Zr-88	D: see Zr-86	4E+3	2E+2	9E-8	3E-10	5E-5	5E-4
40	Zr-88	W: see Zr-86	0	5E+2	2E-7	7E-10	0	0
40	Zr-88	Y: see Zr-86	0	3E+2	1E-7	4E-10	0	0
40	Zr-89	D: see Zr-86	2E+3	4E+3	1E-6	5E-9	2E-5	2E-4
40	Zr-89	W: see Zr-86	0	2E+3	1E-6	5E-9	0	0
40	Zr-89	Y: see Zr-86	0	2E+3	1E-6	3E-9	0	0
40	Zr-93	D: see Zr-86	1E+3 Bone surf (3E+3)	6E+0 Bone Surf (2E+1)	3E-9 0	0 2E-11	0 4E-5	0 4E-4
40	Zr-93	W: see Zr-86	0	2E+1 Bone Surf (6E+1)	1E-8 0	0 9E-11	0 0	0 0
40	Zr-93	Y: see Zr-86	0	6E+1 Bone Surf (7E+1)	2E-8 0	0 9E-11	0 0	0 0
40	Zr-95	D: see Zr-86	1E+3 0	1E+2 Bone Surf (3E+2)	5E-8 0	0 4E-10	2E-5 0	2E-4 0
40	Zr-95	W: see Zr-86	0	4E+2	2E-7	5E-10	0	0
40	Zr-95	Y: see Zr-86	0	3E+2	1E-7	4E-10	0	0
40	Zr-97	D: see Zr-86	6E+2	2E+3	8E-7	3E-9	9E-6	9E-5
40	Zr-97	W: see Zr-86	0	1E+3	6E-7	2E-9	0	0
40	Zr-97	Y: see Zr-86	0	1E+3	5E-7	2E-9	0	0
41	Nb-88[2]	W: all compounds except those given for Y	5E+4 St. wall (7E+4)	2E+5 0	9E-5 0	3E-7 0	0 1E-3	0 1E-2
41	Nb-88[2]	Y: oxides and hydroxides	0	2E+5	9E-5	3E-7	0	0
41	Nb-89[2] (66 m)	W: see Nb-88	1E+4	4E+4	2E-5	6E-8	1E-3	1E-2
41	Nb-89[2] (66 m)	Y: see Nb-88	0	4E+4	2E-5	5E-8	0	0
41	Nb-89 (122 m)	W: see Nb-88	5E+3	2E+4	8E-6	3E-8	7E-5	7E-4
41	Nb-89 (122 m)	Y: see Nb-88	0	2E+4	6E-6	2E-8	0	0
41	Nb-90	W: see Nb-88	1E+3	3E+3	1E-6	4E-9	1E-5	1E-4
41	Nb-90	Y: see Nb-88	0	2E+3	1E-6	3E-9	0	0
41	Nb-93m	W: see Nb-88	9E+3 LLI wall (1E+1)	2E+3 0	8E-7 0	3E-9 0	0 2E-4	0 2E-3
41	Nb-93m	Y: see Nb-88	0	2E+2	7E-8	2E-10	0	0
41	Nb-94	W: see Nb-88	9E+2	2E+2	8E-8	3E-10	1E-5	1E-4
41	Nb-94	Y: see Nb-88	0	2E+1	6E-9	2E-11	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
41	Nb-95m	W: see Nb-88	2E+3 LLI wall (2E+3)	3E+3 0	1E-6 0	4E-9 0	0 3E-5	0 3E-4
41	Nb-95m	Y: see Nb-88	0	2E+3	9E-7	3E-9	0	0
41	Nb-95	W: see Nb-88	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
41	Nb-95	Y: see Nb-88	0	1E+3	5E-7	2E-9	0	0
41	Nb-96	W: see Nb-88	1E+3	3E+3	1E-6	4E-9	2E-5	2E-4
41	Nb-96	Y: see Nb-88	0	2E+3	1E-6	3E-9	0	0
41	Nb-97[2]	W: see Nb-88	2E+4	8E+4	3E-5	1E-7	3E-4	3E-3
41	Nb-97[2]	Y: see Nb-88	0	7E+4	3E-5	1E-7	0	0
41	Nb-98[2]	W: see Nb-88	1E+4	5E+4	2E-5	8E-8	2E-4	2E-3
41	Nb-98[2]	Y: see Nb-88	0	5E+4	2E-5	7E-8	0	0
42	Mo-90	D: all compounds except those given for Y	4E+3	7E+3	3E-6	1E-8	3E-5	3E-4
42	Mo-90	Y: oxides, MoS, and hydroxides	2E+3	5E+3	2E-6	6E-9	0	0
42	Mo-93m	D: see Mo-90	9E+3	2E+4	7E-6	2E-8	6E-5	6E-4
42	Mo-93m	Y: see Mo-90	4E+3	1E+4	6E-6	2E-8	0	0
42	Mo-93	D: see Mo-90	4E+3	5E+3	2E-6	2E-9	5E-5	5E-4
424 2	Mo-93	Y: see Mo-90	2E+4	2E+2	8E-8	2E-10	0	0
42	Mo-99	D: see Mo-90	2E+3 LLI wall (1E+3)	3E+3 0	1E-6 0	4E-9 0	0 2E-5	0 2E-4
42	Mo-99	Y: see Mo-90	1E+3	1E+3	6E-7	2E-9	0	0
42	Mo-101[2]	D: see Mo-90	4E+4 St. wall (5E+4)	1E+5 0	6E-5 0	2E-7 0	0 7E-4	0 7E-3
42	Mo-101[2]	Y: see Mo-90	0	1E+5	6E-5	2E-7	0	0
43	Tc-93m[2]	D: all compounds except those given for W	7E+4	2E+5	6E-5	2E-7	1E-3	1E-2
43	Tc-93m[2]	W: oxides, halides, hydroxides, and nitrates	0	3E+5	1E-4	4E-7	0	0
43	Tc-93	D: see Tc-93m	3E+4	7E+4	3E-5	1E-7	4E-4	4E-3
43	Tc-93	W: see Tc-93m	0	1E+5	4E-5	1E-7	0	0
43	Tc-94m[2]	D: see Tc-93m	2E+4	4E+4	2E-5	6E-8	3E-4	3E-3
43	Tc-94m[2]	W: see Tc-93m	0	6E+4	2E-5	8E-8	0	0
43	Tc-94	D: see Tc-93m	9E+3	2E+4	8E-6	3E-8	1E-4	1E-3
43	Tc-94	W: see Tc-93m	0	2E+4	1E-5	3E-8	0	0
43	Tc-95m	D: see Tc-93m	4E+3	5E+3	2E-6	8E-9	5E-5	5E-4
43	Tc-95m	W: see Tc-93m	0	2E+3	8E-7	3E-9	0	0
43	Tc-95	D: see Tc-93m	1E+4	2E+4	9E-6	3E-8	1E-4	1E-3
43	Tc-95	W: see Tc-93m	0	2E+4	8E-6	3E-8	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
43	Tc-96m[2]	D: see Tc-93m	2E+5	3E+5	1E-4	4E-7	2E-3	2E-2
43	Tc-96m[2]	W: see Tc-93m	0	2E+5	1E-4	3E-7	0	0
43	Tc-96	D: see Tc-93m	2E+3	3E+3	1E-6	5E-9	3E-5	3E-4
43	Tc-96	W: see Tc-93m	0	2E+3	9E-7	5E-9	0	0
43	Tc-97m	D: see Tc-93m	5E+3 0	7E+3 St wall (7E+3)	3E-6 0	0 1E-8	6E-5 0	6E-4 0
43	Tc-97m	W: see Tc-93m	0	1E+3	5E-7	2E-9	0	0
43	Tc-97	D: see Tc-93m	4E+4	5E+4	2E-5	7E-8	5E-4	5E-3
43	Tc-97	W: see Tc-93m	0	6E+3	2E-6	8E-9	0	0
43	Tc-98	D: see Tc-93m	1E+3	2E+3	7E-7	2E-9	1E-5	1E-4
43	Tc-98	W: see Tc-93m	0	3E+2	1E-7	4E-10	0	0
43	Tc-99m	D: see Tc-93m	8E+4	2E+5	6E-5	2E-7	1E-3	1E-2
43	Tc-99m	W: see Tc-93m	0	2E+5	1E-4	3E-7	0	0
43	Tc-99	D: see Tc-93m	4E+3 0	5E+3 St wall (6E+3)	2E-6 0	0 8E-9	6E-5 0	6E-4 0
43	Tc-99	W: see Tc-93m	0	7E+2	3E-7	9E-10	0	0
43	Tc-101[2]	D: see Tc-93m	9E+4 St. wall (1E+5)	3E+5 0	1E-4 0	5E-7 0	0 2E-3	0 2E-2
43	Tc-101[2]	W: see Tc-93m	0	4E+5	2E-4	5E-7	0	0
43	Tc-104[2]	D: see Tc-93m	2E+4 St. wall (3E+4)	7E+4 0	3E-5 0	1E-7 0	0 4E-4	0 4E-3
43	Tc-104[2]	W: see Tc-93m	0	9E+4	4E-5	1E-7	0	0
44	Ru-94[2]	D: all compounds except those given for W, Y	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
44	Ru-94[2]	W: halides	0	6E+4	3E-5	9E-8	0	0
44	Ru-94[2]	Y: oxides and hydroxides	0	6E+4	2E-5	8E-8	0	0
44	Ru-97	D: see Ru-94	8E+3	2E+4	8E-6	3E-8	1E-4	1E-3
44	Ru-97	W: see Ru-94	0	1E+4	5E-6	2E-8	0	0
44	Ru-97	Y: see Ru-94	0	1E+4	5E-6	2E-8	0	0
44	Ru-103	D: see Ru-94	2E+3	2E+3	7E-7	2E-9	3E-5	3E-4
44	Ru-103	W: see Ru-94	0	1E+3	4E-7	1E-9	0	0
44	Ru-103	Y: see Ru-94	0	6E+2	3E-7	9E-10	0	0
44	Ru-105	D: see Ru-94	5E+3	1E+4	6E-6	2E-8	7E-5	7E-4
44	Ru-105	W: see Ru-94	0	1E+4	6E-6	2E-8	0	0
44	Ru-105	Y: see Ru-94	0	1E+4	5E-6	2E-8	0	0
44	Ru-106	D: see Ru-94	2E+2 LLI wall (2E+2)	9E+1 0	4E-8 0	1E-10 0	0 3E-6	0 3E-5
44	Ru-106	W: see Ru-94	0	5E+1	2E-8	8E-11	0	0
44	Ru-106	Y: see Ru-94	0	1E+1	5E-9	2E-11	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
44	Rh-99m	D: all compounds except those given for W, Y	2E+4	6E+4	2E-5	8E-8	2E-4	2E-3
45	Rh-99m	W: halides	0	8E+4	3E-5	1E-7	0	0
	Rh-99m	Y: oxides and hydroxides	0	7E+4	3E-5	9E-8	0	0
45	Rh-99	D: see Rh-99m	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
45	Rh-99	W: see Rh-99m	0	2E+3	9E-7	3E-9	0	0
45	Rh-99	Y: see Rh-99m	0	2E+3	8E-7	3E-9	0	0
45	Rh-100	D: see Rh-99m	2E+3	5E+3	2E-6	7E-9	2E-5	2E-4
45	Rh-100	W: see Rh-99m	0	4E+3	2E-6	6E-9	0	0
45	Rh-100	Y: see Rh-99m	0	4E+3	2E-6	5E-9	0	0
45	Rh-101m	D: see Rh-99m	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
45	Rh-101m	W: see Rh-99m	0	8E+3	4E-6	1E-8	0	0
45	Rh-101m	Y: see Rh-99m	0	8E+3	3E-6	1E-8	0	0
45	Rh-101	D: see Rh-99m	2E+3	5E+2	2E-7	7E-10	3E-5	3E-4
45	Rh-101	W: see Rh-99m	0	8E+2	3E-7	1E-9	0	0
45	Rh-101	Y: see Rh-99m	0	2E+2	6E-8	2E-10	0	0
45	Rh-102m	D: see Rh-99m	1E+3 LLI wall (1E+3)	5E+2 0	2E-7 0	7E-10 0	0 2E-5	0 2E-4
45	Rh-102m	W: see Rh-99m	0	4E+2	2E-7	5E-10	0	0
45	Rh-102m	Y: see Rh-99m	0	1E+2	5E-8	5E-10	0	0
45	Rh-102	D: see Rh-99m	6E+2	9E+1	4E-8	1E-10	8E-6	8E-5
45	Rh-102	W: see Rh-99m	0	2E+2	7E-8	2E-10	0	0
45	Rh-102	Y: see Rh-99m	0	6E+1	2E-8	8E-11	0	0
45	Rh-103m[2]	D: see Rh-99m	4E+5	1E+6	5E-4	2E-6	6E-6	6E-5
45	Rh-103m[2]	W: see Rh-99m	0	1E+6	5E-4	2E-6	0	0
45	Rh-103m[2]	Y: see Rh-99m	0	1E+6	5E-4	2E-6	0	0
45	Rh-105	D: see Rh-99m	4E+3 LLI wall (4E+3)	1E+4 0	5E-6 0	2E-8 0	0 5E-5	0 5E-4
45	Rh-105	W: see Rh-99m	0	6E+3	3E-6	9E-9	0	0
45	Rh-105	Y: see Rh-99m	0	6E+3	2E-6	8E-9	0	0
45	Rh-106m	D: see Rh-99m	8E+3	3E+4	1E-5	4E-8	1E-4	1E-3
45	Rh-106m	W: see Rh-99m	0	4E+4	2E-5	5E-8	0	0
45	Rh-106m	Y: see Rh-99m	0	4E+4	1E-5	5E-8	0	0
45	Rh-107[2]	D: see Rh-99m	7E+4 St. wall (9E+4)	2E+5 0	1E-4 0	3E-7 0	0 1E-3	0 1E-2
45	Rh-107[2]	W: see Rh-99m	0	3E+5	1E-4	4E-7	0	0
45	Rh-107[2]	Y: see Rh-99m	0	3E+5	1E-4	3E-7	0	0
46	Pd-100	D: all compounds except those given for W, Y	1E+3	1E+3	6E-7	2E-9	2E-5	2E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
	Pd-100	W: nitrates	0	1E+3	5E-7	2E-9	0	0
46	Pd-100	Y: oxides and hydroxides	0	1E+3	6E-7	2E-9	0	0
46	Pd-101	D: see Pd-100	1E+4	3E+4	1E-5	5E-8	2E-4	2E-3
46	Pd-101	W: see Pd-100	0	3E+4	1E-5	5E-8	0	0
46	Pd-101	Y: see Pd-100	0	3E+4	1E-5	4E-8	0	0
46	Pd-103	D: see Pd-100	6E+3 LLI wall (7E+3)	6E+3 0	3E-6 0	9E-9 0	0 1E-4	0 1E-3
46	Pd-103	W: see Pd-100	0	4E+3	2E-6	6E-9	0	0
46	Pd-103	Y: see Pd-100	0	4E+3	1E-6	5E-9	0	0
46	Pd-107	D: see Pd-100	3E+4 LLI wall (4E+4)	2E+4 Kidneys (2E+4)	9E-6 0	0 3E-8	0 5E-4	0 5E-3
46	Pd-107	W: see Pd-100	0	7E+3	3E-6	1E-8	0	0
46	Pd-107	Y: see Pd-100	0	4E+2	2E-7	6E-10	0	0
46	Pd-109	D: see Pd-100	2E+3	6E+3	3E-6	9E-9	3E-5	3E-4
46	Pd-109	W: see Pd-100	0	5E+3	2E-6	8E-9	0	0
46	Pd-109	Y: see Pd-100	0	5E+3	2E-6	6E-9	0	0
47	Ag-102[2]	D: all compounds except those given for W, Y	5E+4 St. wall (6E+4)	2E+5 0	8E-5 0	2E-7 0	0 9E-4	0 9E-3
	Ag-102[22]	W: nitrates and sulfides	0	2E+5	9E-5	3E-7	0	0
47	Ag-102[2]	Y: oxides and hydroxides	0	2E+5	8E-5	3E-7	0	0
47	Ag-103[2]	D: see Ag-102	4E+4	1E+5	4E-5	1E-7	5E-4	5E-3
47	Ag-103[2]	W: see Ag-102	0	1E+5	5E-5	2E-7	0	0
47	Ag-103[2]	Y: see Ag-102	0	1E+5	5E-5	2E-7	0	0
47	Ag-104m[2]	D: see Ag-102	3E+4	9E+4	4E-5	1E-7	4E-4	4E-3
47	Ag-104m[2]	W: see Ag-102	0	1E+5	5E-5	2E-7	0	0
47	Ag-104m[2]	Y: see Ag-102	0	1E+5	5E-5	2E-7	0	0
47	Ag-104[2]	D: see Ag-102	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
47	Ag-104[2]	W: see Ag-102	0	1E+5	6E-5	2E-7	0	0
47	Ag-104[2]	Y: see Ag-102	0	1E+5	6E-5	2E-7	0	0
47	Ag-105	D: see Ag-102	3E+3	1E+3	4E-7	1E-9	4E-5	4E-4
47	Ag-105	W: see Ag-102	0	2E+3	7E-7	2E-9	0	0
47	Ag-105	Y: see Ag-102	0	2E+3	7E-7	2E-9	0	0
47	Ag-106m	D: see Ag-102	8E+2	7E+2	3E-7	1E-9	1E-5	1E-4
47	Ag-106m	W: see Ag-102	0	9E+2	4E-7	1E-9	0	0
47	Ag-106m	Y: see Ag-102	0	9E+2	4E-7	1E-9	0	0
47	Ag-106[2]	D: see Ag-102	6E+4 St. wall (6E+4)	2E+5 0	8E-5 0	3E-7 0	0 9E-4	0 9E-3
47	Ag-106[2]	W: see Ag-102	0	2E+5	9E-5	3E-7	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
47	Ag-106[2]	Y: see Ag-102	0	2E+5	8E-5	3E-7	0	0
47	Ag-108m	D: see Ag-102	6E+2	2E+2	8E-8	3E-10	9E-6	9E-5
47	Ag-108m	W: see Ag-102	0	3E+2	1E-7	4E-10	0	0
47	Ag-108m	Y: see Ag-102	0	2E+1	1E-8	3E-11	0	0
47	Ag-110m	D: see Ag-102	5E+2	1E+2	5E-8	2E-10	6E-6	6E-5
47	Ag-110m	W: see Ag-102	0	2E+2	8E-8	3E-10	0	0
47	Ag-110m	Y: see Ag-102	0	9E+1	4E-8	1E-10	0	0
47	Ag-111	D: see Ag-102	9E+2 LLI wall (1E+3)	2E+3 Liver (2E+3)	6E-7 0	0 2E-9	0 2E-5	0 2E-4
47	Ag-111	W: see Ag-102	0	9E+2	4E-7	1E-9	0	0
47	Ag-111	Y: see Ag-102	0	9E+2	4E-7	1E-9	0	0
47	Ag-112	D: see Ag-102	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
47	Ag-112	W: see Ag-102	0	1E+4	4E-6	1E-8	0	0
47	Ag-112	Y: see Ag-102	0	9E+3	4E-6	1E-8	0	0
47	Ag-115[2]	D: see Ag-102	3E+4 St. wall (3E+4)	9E+4 0	4E-5 0	1E-7 0	0 4E-4	0 4E-3
47	Ag-115[2]	W: see Ag-102	0	9E+4	43E-5	1E-7	0	0
47	Ag-115[2]	Y: see Ag-102	0	8E+4	3E-5	1E-7	0	0
48	Cd-104[2]	D: all compounds except those given for W, Y	2E+4	7E+4	5E-5	9E-8	3E-4	3E-3
48	Cd-104[2]	W: sulfides, halides, and nitrates	0	1E+5	5E-5	2E-7	0	0
48	Cd-104[2]	Y: oxides and hydroxides	0	1E+5	5E-5	2E-7	0	0
48	Cd-107	D: see Cd-104	2E+4	5E+4	2E-5	8E-8	3E-4	3E-3
48	Cd-107	W: see Cd-104	0	6E+4	2E-5	8E-8	0	0
48	Cd-107	Y: see Cd-104	0	5E+4	2E-5	7E-8	0	0
48	Cd-109	D: see Cd-104	2E+2 Kidneys (4E+2)	5E+1 Kidney (5E+1)	1E-8 0	0 7E-11	0 6E-6	0 6E-5
48	Cd-109	W: see Cd-104	0 0	1E+2 Kidney (1E+2)	5E-8 0	0 2E-10	0 0	0 0
48	Cd-109	Y: see Cd-104	0	1E+2	5E-8	2E-10	0	0
48	Cd-113m	D: see Cd-104	2E+1 Kidneys (4E+1)	2E+0 Kidney (4E+0)	1E-9 0	0 5E-12	0 5E-7	0 5E-6
48	Cd-113m	W: see Cd-104	0 0	8E+0 Kidney (1E+0)	4E-9 0	0 2E-11	0 0	0 0
48	Cd-113m	Y: see Cd-104	0	1E+1	5E-9	2E-11	0	0
48	Cd-113	D: see Cd-104	2E+1 Kidneys (3E+1)	2E+0 Kidney (3E+0)	9E-10	0 5E-12	0 4E-7	0 4E-6

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
48	Cd-113	W: see Cd-104	0 0	8E+0 Kidney (8E+0)	3E-9 0	0 2E-11	0 0	0 0
48	Cd-113	Y: see Cd-104	0	1E+1	6E-9	2E-11	0	0
48	Cd-115m	D: see Cd-104	3E+2 0	5E+1 Kidney (8E+1)	2E-8 0	0 1E-10	4E-6 0	4E-5 0
48	Cd-115m	W: see Cd-104	0	1E+2	5E-8	2E-10	0	0
48	Cd-115m	Y: see Cd-104	0	1E+2	6E-8	2E-10	0	0
48	Cd-115	D: see Cd-104	9E+2 LLI Wall (1E+3)	1E+3 0	6E-7 0	2E-9 0	0 1E-5	0 1E-4
48	Cd-115	W: see Cd-104	0	1E+3	5E-7	2E-9	0	0
48	Cd-115	Y: see Cd-104	0	1E+3	6E-7	2E-9	0	0
48	Cd-117m	D: see Cd-104	5E+3	1E+4	5E-6	2E-8	6E-5	6E-4
48	Cd-117m	W: see Cd-104	0	2E+4	7E-6	2E-8	0	0
48	Cd-117m	Y: see Cd-104	0	1E+4	6E-6	2E-8	0	0
48	Cd-117	D: see Cd-104	5E+3	1E+4	5E-6	2E-8	3E-4	3E-3
48	Cd-117	W: see Cd-104	0	2E+4	7E-6	2E-8	0	0
48	Cd-117	Y: see Cd-104	0	1E+4	6E-6	2E-8	0	0
49	In-109	D: all compounds except those given for W	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
49	In-109	W: oxides, halides, hydroxides, and nitrates	0	6E+4	3E-5	9E-8	0	0
49	In-110[2] (69.1 m)	D: see In-109	2E+4	4E+4	2E-5	6E-8	0	0
49	In-110[2] (69.1 m)	W: see In-109	0	6E+4	2E-5	8E-8	7E-3	7E-4
49	In-110 (4.9 h)	D: see In-109	5E+3	2E+4	7E-6	2E-8	0	0
49	In-110 (4.9 h)	W: see In-109	0	2E+4	8E-6	3E-8	0	0
49	In-111	D: see In-109	4E+3	6E+3	3E-6	9E-9	6E-3	6E-4
49	In-111	W: see In-109	0	6E+3	3E-6	9E-7	0	0
49	In-112[2]	D: see In-109	2E+5	6E+5	3E-4	9E-7	2E-3	2E-2
49	In-112[2]	W: see In-109	0	7E+5	3E-4	1E-6	0	0
49	In-113m[2]	D: see In-109	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3
49	In-113m[2]	W: see In-109	0	2E+5	8E-5	3E-7	0	0
49	In-114m	D: see In-109	3E+2 LLI Wall (4E+2)	6E+1 0	3E-8 0	9E-11 0	0 5E-6	0 5E-5
49	In-114m	W: see In-109	0	1E+2	4E-8	1E-10	0	0
49	In-115m	D: see In-109	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
49	In-115m	W: see In-109	0	5E+4	2E-5	7E-8	0	0
49	In-115	D: see In-109	4E+1	1E+0	6E-10	2E-12	5E-7	5E-6
49	In-115	W: see In-109	0	5E+0	2E-9	8E-12	0	0
49	In-116m[2]	D: see In-109	2E+4	8E+4	3E-5	1E-7	3E-4	3E-3
49	In-116m[2]	W: see In-109	0	1E+5	3E-5	2E-7	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
49	In-117m[2]	D: see In-109	1E+4	3E+4	1E-5	5E-8	2E-4	3E-3
49	In-117m[2]	W: see In-109	0	4E+4	2E-5	6E-8	0	0
49	In-117[2]	D: see In-109	6E+4	2E+5	7E-5	2E-7	8E-4	8E-3
49	In-117m[2]	W: see In-109	0	2E+5	9E-5	3E-7	0	0
4949	In-119m[2]	D: see In-109	4E+4 St Wall (5E+4)	1E+5 0	5E-5 0	2E-7 0	0 7E-4	0 7E-3
49	In-119m[2]	W: see In-109	0	1E+5	6E-5	2E-7	0	0
50	Sn-110	D: all compounds except those given for W	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4
	Sn-110	W: sulfides, oxides, hydroxides, halides, nitrates, and stannic phosphate	0	1E+4	5E-6	2E-8	0	0
50	Sn-111[2]	D: see Sn-110	7E+4	2E+5	9E-5	3E-7	1E-3	1E-2
50	Sn-111[2]	W: see Sn-110	0	3E+5	1E-4	4E-7	0	0
50	Sn-113	D: see Sn-110	2E+3 LLI Wall (2E+3)	1E+3 0	5E-7 0	2E-9 0	0 3E-5	0 3E-4
50	Sn-113	W: see Sn-110	0	5E+2	2E-7	8E-10	0	0
50	Sn-117m	D: see Sn-110	2E+3 LLI Wall (2E+)	1E+3 Bone surf (2E+3)	5E-7 0	0 3E-9	0 3E-5	0 3E-4
50	Sn-117m	W: see Sn-110	0	1E+3	6E-7	2E-9	0	0
50	Sn-119m	D: see Sn-110	3E+3 LLI Wall (4E+3)	2E+3 0	1E-6 0	3E-9 0	0 6E-5	0 6E-4
50	Sn-119m	W: see Sn-110	0	1E+3	4E-7	1E-9	0	0
50	Sn-121m	D: see Sn-110	3E+3 LLI Wall (4E+3)	9E+2 0	4E-7 0	1E-9 0	0 5E-5	0 5E-4
50	Sn-121m	W: see Sn-110	0	5E+2	2E-7	8E-10	0	0
50	Sn-121	D: see Sn-110	6E+3 LLI Wall (6E+3)	2E+4 0	6E-6 0	2E-8 0	0 8E-5	0 8E-4
50	Sn-121	W: see Sn-110	0	1E+4	5E-6	2E-8	0	0
50	Sn-123m[2]	D: see Sn-110	5E+4	1E+5	5E-5	2E-7	7E-4	7E-3
50	Sn-123m[2]	W: see Sn-110	0	1E+5	6E-5	2E-7	0	0
50	Sn-123	D: see Sn-110	5E+2 LLI Wall (6E+2)	6E+2 0	3E-7 0	9E-10 0	0 9E-6	0 9E-5
50	Sn-123	W: see Sn-110	0	2E+2	7E-8	2E-10	0	0
50	Sn-125	D: see Sn-110	4E+2 LLI Wall (5E+2)	9E+2 0	4E-7 0	1E-9 0	0 6E-6	0 6E-5

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
50	Sn-125	W: see Sn-110	0	4E+2	1E-7	5E-10	0	0
50	Sn-126	D: see Sn-110	3E+2	6E+1	2E-8	8E-11	4E-6	4E-5
50	Sn-126	W: see Sn-110	0	7E+1	3E-8	9E-11	0	0
50	Sn-127	D: see Sn-110	7E+3	2E+4	8E-6	3E-8	9E-4	9E-4
50	Sn-127	W: see Sn-110	0	2E+4	8E-6	3E-8	0	0
50	Sn-128[2]	D: see Sn-110	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
50	Sn-128[2]	W: see Sn-110	0	4E+4	1E-5	5E-8	0	0
51	Sb-115[2]	D: all compounds except those given for W	8E+4	2E+5	1E-4	3E-7	1E-3	1E-2
51	Sb-115[2]	W: oxides, halides, sulfides, sulfates, nitrates, and hydroxides,	0	3E+5	1E-4	4E-7	0	0
51	Sb-116m[2]	D: see Sb-115	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
51	Sb-116m[2]	W: see Sb-115	0	1E+5	6E-5	2E-7	0	0
51	Sb-116[2]	D: see Sb-115	7E+4 St Wall (9E+4)	3E+5 0	1E-4 0	4E-7 0	0 3E-4	0 3E-3
51	Sb-116[2]	W: see Sb-115	0	3E+5	1E-4	5E-7	0	0
51	Sb-117	D: see Sb-115	7E+4	2E+5	9E-5	3E-7	9E-4	9E-3
51	Sb-117	W: see Sb-115	0	3E+5	1E-4	4E-7	0	0
51	Sb-118m[2]	D: see Sb-115	6E+3	2E+4	8E-6	3E-8	7E-5	7E-4
51	Sb-118m[2]	W: see Sb-115	5E+3	2E+4	9E-6	3E-8	0	0
51	Sb-119	D: see Sb-115	2E+4	5E+4	2E-5	6E-8	2E-4	2E-3
51	Sb-119	W: see Sb-115	2E+4	3E+4	1E-5	4E-8	0	0
51	Sb-120[2] (16 m)	D: see Sb-115	1E+5 St Wall (2E+5)	4E+5 0	2E-4 0	6E-7 0	0 2E-3	0 2E-2
51	Sb-120[2] (16 m)	W: see Sb-115	0	5E+5	2E-4	7E-7	0	0
51	Sb-120 (5.76 d)	D: see Sb-115	1E+3	2E+3	9E-7	3E-9	1E-5	1E-4
51	Sb-120 (5.76 d)	W: see Sb-115	9E+2	1E+3	5E-7	2E-9	0	0
51	Sb-122	D: see Sb-115	8E+2 LLI Wall (8E+2)	2E+3 0	1E-6 0	3E-9 0	0 1E-5	0 1E-4
51	Sb-122	W: see Sb-115	7E+2	1E+3	4E-7	2E-9	0	0
51	Sb-124m[2]	D: see Sb-115	3E+5	8E+5	2E-4	1E-6	3E-3	2E-2
51	Sb-124m[2]	W: see Sb-115	2E+5	6E+5	4E-4	8E-7	0	0
51	Sb-124	D: see Sb-115	6E+2	9E+2	4E-7	1E-9	7E-6	7E-5
51	Sb-124	W: see Sb-115	5E+2	2E+2	1E-7	3E-10	0	0
51	Sb-125	D: see Sb-115	2E+3	2E+3	1E-6	3E-9	3E-5	3E-4
51	Sb-125	W: see Sb-115	0	5E+2	2E-7	7E-10	0	0
51	Sb-126m[2]	D: see Sb-115	5E+4 St Wall (7E+4)	2E+5 0	8E-5 0	3E-7 0	0 9E-4	0 9E-3
51	Sb-126m[2]	W: see Sb-115	0	2E+5	8E-5	3E-7	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
51	Sb-126	D: see Sb-115	6E+2	1E+3	5E-7	2E-9	7E-6	7E-5
51	Sb-126	W: see Sb-115	5E+2	5E+2	2E-7	7E-10	0	0
51	Sb-127	D: see Sb-115	8E+2 LLI Wall (8E+2)	2E+3 0	9E-7 0	3E-9 0	0 1E-5	0 1E-4
51	Sb-127	W: see Sb-115	7E+2	9E+2	4E-7	1E-9	0	0
51	Sb-128[2] (10.4 m)	D: see Sb-115	8E+4 St Wall (1E+5)	4E+5 0	2E-4 0	5E-7 0	0 1E-3	0 1E-2
51	Sb-128[2] (10.4 m)	W: see Sb-115	0	4E+5	2E-4	6E-7	0	0
51	Sb-128 (9.01 h)	D: see Sb-115	1E+3	4E+3	2E-6	6E-9	2E-5	2E-4
51	Sb-128 (9.01 h)	W: see Sb-115	0	3E+3	1E-6	5E-9	0	0
51	Sb-129	D: see Sb-115	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
51	Sb-129	W: see Sb-115	0	9E+3	4E-6	1E-8	0	0
51	Sb-130[2]	D: see Sb-115	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
51	Sb-130[2]	W: see Sb-115	0	8E+4	3E-5	1E-7	0	0
51	Sb-131[2]	D: see Sb-115	1E+4 Thyroid (2E+4)	2E+4 Thyroid (4E+4)	1E-5	0 6E-8	0 2E-4	0 2E-3
51	Sb-131[2]	W: see Sb-115	0 0	2E+4 Thyroid (4E+4)	1E-5 0	0 6E-8	0 0	0 0
52	Te-116	D: all compounds except those given for W	8E+3	2E+4	9E-6	3E-8	1E-4	1E-3
52	Te-116	W: oxides, nitrates, and hydroxides	0	3E+4	1E-5	4E-8	0	0
52	Te-121m	D: see Te-116	5E+2 Bone Surf (7E+2)	2E+2 Bone surf (4E+2)	8E-8 0	0 5E-10	0 1E-5	0 1E-4
52	Te-121m	W: see Te-116	0	4E+2	2E-7	6E-10	0	0
52	Te-121	D: see Te-116	3E+3	4E+3	2E-6	6E-9	4E-5	4E-4
52	Te-121	W: see Te-116	0	3E+3	1E-6	4E-9	0	0
52	Te-123m	D: see Te-116	6E+2 Bone Surf (1E+3)	2E+2 Bone surf (5E+2)	9E-8 0	0 8E-10	0 1E-5	0 1E-4
52	Te-123m	W: see Te-116	0	2E+2	2E-7	8E-10	0	0
52	Te-123	D: see Te-116	5E+2 Bone Surf (1E+3)	2E+2 Bone surf (5E+2)	8E-8	0 7E-10	0 2E-5	0 2E-4
52	Te-123	W: see Te-116	0 0	4E+2 Bone surf (1E+3)	2E-7 0	0 2E-9	0 0	0 0
52	Te-125m	D: see Te-116	1E+3 Bone Surf (1E+3)	4E+2 Bone surf (1E+3)	2E-7 0	0 1E-9	2E-5 0	2E-4 0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
52	Te-125m	W: see Te-116	0	7E+2	3E-7	1E-9	0	0
52	Te-127m	D: see Te-116	6E+2 0	3E+2 Bone surf (4E+2)	1E-7 0	0 6E-10	9E-6 0	9E-5 0
52	Te-127m	W: see Te-116	0	3E+2	1E-7	4E-10	0	0
52	Te-127	D: see Te-116	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
52	Te-127	W: see Te-116	0	2E+4	7E-6	2E-8	0	0
52	Te-129m	D: see Te-116	5E+2	6E+2	3E-7	9E-10	7E-6	7E-6
52	Te-129m	W: see Te-116	0	2E+2	1E-7	3E-10	0	0
52	Te-129[2]	D: see Te-116	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
52	Te-129[2]	W: see Te-116	0	7E+4	3E-5	1E-7	0	0
52	Te-131m	D: see Te-116	3E+2 Thyroid (6E+2)	4E+2 Thyroid (1E+3)	2E-7 0	0 2E-9	0 8E-6	0 8E-5
52	Te-131m	W: see Te-116	0 0	4E+2 Thyroid (9E+2)	2E-7 0	0 1E-9	0 0	0 0
52	Te-131[2]	D: see Te-116	3E+3 Thyroid (6E+3)	5E+3 Thyroid (1E+4)	2E-6 0	0 2E-8	0 8E-5	0 8E-4
52	Te-131[2]	W: see Te-116	0 0	5E+3 Thyroid (1E+4)	2E-6 0	0 2E-8	0 0	0 0
52	Te-132	D: see Te-116	2E+2 Thyroid (7E+2)	2E+2 Thyroid (2E+2)	9E-8 0	0 1E-9	0 9E-6	0 9E-5
52	Te-132	W: see Te-116	0 0	2E+2 Thyroid (6E+2)	9E-8 0	0 9E-10	0 0	0 0
52	Te-133m[2]	D: see Te-116	3E+3 Thyroid (6E+3)	5E+3 Thyroid (1E+4)	2E-6 0	0 2E-8	0 9E-3	0 9E-4
52	Te-133m[2]	W: see Te-116	0 0	5E+3 Thyroid (1E+4)	2E-6 0	0 2E-8	0 0	0 0
52	Te-133[2]	D: see Te-116	1E+4 Thyroid (3E+4)	2E+4 Thyroid (6E+4)	9E-6	0 8E-8	0 4E-4	0 4E-3
52	Te-133[2]	W: see Te-116	0 0	2E+4 Thyroid (6E+4)	9E-6 0	0 8E-8	0 0	0 0
52	Te-134[2]	D: see Te-116	2E+4 Thyroid (2E+4)	2E+4 Thyroid (5E+4)	1E-5	0 7E-8	0 3E-4	0 3E-3
52	Te-134[2]	W: see Te-116	0 0	2E+4 Thyroid (5E+4)	1E-5 0	0 7E-8	0 0	0 0
53	I-120m[2]	D: all compounds	1E+4 Thyroid	2E+4	9E-6	3E-8	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
			(1E+4)	0	0	0	2E-4	2E-3
53	I-120[2]	D: all compounds	4E+3 Thyroid (8E+3	9E+3 Thyroid (1E+4)	4E-6 0	0 2E-8	0 1E-4	0 1E-3
53	I-121	D: all compounds	1E+4 Thyroid (3E+4)	2E+4 Thyroid (5E+4)	8E-6 0	0 7E-8	0 4E-4	0 4E-3
53	I-123	D: all compounds	3E+3 Thyroid (1E+4)	6E+3 Thyroid (2E+4)	3E-6 0	0 2E-8	0 1E-4	0 1E-3
53	I-124	D: all compounds	5E+1 Thyroid (2E+2)	8E+1 Thyroid (3E+2)	3E-8 0	0 4E-10	0 2E-6	0 2E-5
53	I-125	D: all compounds	4E+1 Thyroid (1E+2)	6E+1 Thyroid (2E+2)	3E-8 0	0 3E-10	0 2E-6	0 2E-5
53	I-126	D: all compounds	2E+1 Thyroid (7E+1)	4E+1 Thyroid (1E+2)	1E-8 0	0 2E-10	0 1E-6	0 1E-5
53	I-128[2]	D: all compounds	4E+4 St Wall (6E+4)	1E+5 0	5E-5 0	2E-7 0	0 8E-4	0 8E-3
53	I-129	D: all compounds	5E+0 Thyroid (2E+1)	9E+0 Thyroid (3E+1)	4E-9 0	0 4E-11	0 2E-7	0 2E-6
53	I-130	D: all compounds	4E+2 Thyroid (1E+3)	7E+2 Thyroid (7E+2)	3E-7 0	0 3E-9	0 2E-5	0 2E-4
53	I-131	D: all compounds	3E+1 Thyroid (9E+1)	5E+1 Thyroid (2E+2)	2E-8 0	0 2E-9	0 1E-6	0 1E-5
53	I-132m[2]	D: all compounds	4E+3 Thyroid (1E+4)	8E+3 Thyroid (2E+4)	4E-6 0	0 3E-8	0 1E-4	0 1E-3
53	I-132	D: all compounds	4E+3 Thyroid (9E+3)	8E+3 Thyroid (1E+4)	3E-6 0	0 2E-8	0 1E-4	0 1E-3
53	I-133	D: all compounds	1E+2 Thyroid (5E+2)	3E+2 Thyroid (9E+2)	1E-7 0	0 1E-9	0 7E-6	0 7E-5
53	I-134[2]	D: all compounds	2E+4 Thyroid (3E+4)	5E+4 0	2E-5	6E-8 0	0 4E-4	0 4E-3
53	I-135	D: all compounds	8E+2 Thyroid (3E+3)	2E+3 Thyroid (4E+3)	7E-7 0	0 6E-9	0 3E-5	0 3E-4
54	Xe-120[2]	Submersion1	0	0	1E-5	4E-8	0	0
54	Xe-121[2]	Submersion1	0	0	2E-6	1E-8	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
54	Xe-122	Submersion1	0	0	7E-5	3E-7	0	0
54	Xe-123	Submersion1	0	0	6E-6	3E-8	0	0
54	Xe-125	Submersion1	0	0	2E-5	7E-8	0	0
54	Xe-127	Submersion1	0	0	1E-5	6E-8	0	0
54	Xe-129m	Submersion1	0	0	2E-4	9E-7	0	0
54	Xe-131m	Submersion1	0	0	4E-4	2E-6	0	0
54	Xe-133m	Submersion1	0	0	1E-4	6E-7	0	0
54	Xe-133	Submersion1	0	0	1E-4	5E-7	0	0
54	Xe-135m[2]	Submersion1	0	0	9E-6	4E-8	0	0
54	Xe-135	Submersion1	0	0	1E-5	7E-8	0	0
54	Xe-138[2]	Submersion1	0	0	4E-6	2E-8	0	0
55	Cs-125[2]	D: all compounds	5E+4 St Wall (9E+4)	1E+5	6E-5	2E-7 0	0 1E-3	0 1E-2
55	Cs-127	D: all compounds	6E+4	9E+4	4E-5	1E-7	9E-4	9E-3
55	Cs-129	D: all compounds	2E+4	3E+4	1E-5	5E-8	3E-4	3E-3
55	Cs-130[2]	D: all compounds	6E+4 St Wall (1E+5)	2E+5 0	8E-5 0	3E-7 0	0 1E-3	0 1E-2
55	Cs-131	D: all compounds	2E+4	3E+4	1E-5	4E-8	3E-4	3E-3
55	Cs-132	D: all compounds	3E+3	4E+3	2E-6	6E-9	4E-5	4E-4
55	Cs-134m	D: all compounds	1E+5 St Wall (1E+5)	1E+5 0	6E-5 0	2E-7 0	0 2E-3	0 2E-2
55	Cs-134	D: all compounds	7E+1	1E+2	4E-8	2E-10	9E-7	9E-6
55	Cs-135m[2]	D: all compounds	1E+5	2E+5	8E-5	3E-7	1E-3	1E-2
55	Cs-135	D: all compounds	7E+2	1E+3	5E-7	2E-9	1E-5	1E-4
55	Cs-136	D: all compounds	4E+2	7E+2	3E-7	9E-10	6E-6	6E-5
55	Cs-137	D: all compounds	1E+2	2E+2	6E-8	2E-10	1E-6	1E-5
55	Cs-138[2]	D: all compounds	2E+4 St Wall (3E+4)	6E+4 0	2E-5 0	8E-8 0	0 4E-4	0 4E-3
56	Ba-126[2]	D: all compounds	6E+3	2E+4	6E-6	2E-8	8E-5	8E-4
56	Ba-128	D: all compounds	5E+2	2E+3	7E-7	2E-9	7E-6	7E-5
56	Ba-131m[2]	D: all compounds	4E+5 St Wall (5E+5)	1E+6 0	6E-4 0	2E-6 0	0 7E-3	0 7E-2
56	Ba-131	D: all compounds	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
56	Ba-133m	D: all compounds	2E+3 LLI Wall (3E+3)	9E+3 0	4E-6 0	1E-8 0	0 4E-5	0 4E-4
56	Ba-133	D: all compounds	2E+3	7E+2	3E-7	9E-10	2E-5	2E-4
56	Ba-135m	D: all compounds	3E+3	1E+4	5E-6	2E-8	4E-5	4E-4
56	Ba-139[2]	D: all compounds	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
56	Ba-140	D: all compounds	5E+2 LLI Wall	1E+3	6E-7	2E-9	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
			(6E+2)	0	0	0	8E-6	8E-5
56	Ba-141[2]	D: all compounds	2E+4	7E+4	3E-5	1E-7	4E-4	4E-3
56	Ba-142[2]	D: all compounds	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3
57	La-131[2]	D: all compounds except those given for W	5E+4	1E+5	5E-5	2E-7	6E-4	6E-3
	La-131[2]	W: oxides and hydroxides	0	2E+5	7E-5	2E-7	0	0
57	La-132	D: see La-131	3E+3	1E+4	4E-6	1E-8	4E-5	4E-4
57	La-132	W: see La-131	0	1E+4	5E-6	2E-8	0	0
57	La-135	D: see La-131	4E+4	1E+5	4E-5	1E-7	5E-4	5E-3
57	La-135	W: see La-131	0	9E+4	4E-5	1E-7	0	0
57	La-137	D: see La-131	1E+4 0	6E+1 Liver (7E+1)	3E-8 0	0 1E-10	2E-4 0	2E-3 0
57	La-137	W: see La-131	0	3E+2 Liver (3E+2)	1E-7 0	0 4E-10	0 0	0 0
57	La-138	D: see La-131	9E+2	4E+0	1E-9	5E-12	1E-5	1E-4
57	La-138	W: see La-131	0	1E+1	6E-9	2E-11	0	0
57	La-140	D: see La-131	6E+2	1E+3	6E-7	2E-9	9E-6	9E-5
57	La-140	W: see La-131	0	1E+3	5E-7	2E-9	0	0
57	La-141	D: see La-131	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
57	La-141	W: see La-131	0	1E+4	5E-6	2E-8	0	0
57	La-142[2]	D: see La-131	8E+3	2E+4	9E-6	3E-8	1E-4	1E-3
57	La-142[2]	W: see La-131	0	3E+4	1E-5	5E-8	0	0
57	La-143[2]	D: see La-131	4E+4 St Wall (4E+4)	1E+5 0	4E-5 0	1E-7 0	0 5E-4	0 5E-3
57	La-143[2]	W: see La-131	0	9E+4	4E-5	1E-7	0	0
58	Ce-134	W: all compounds except those given for Y	5E+2 LLI Wall (6E+2)	7E+2 0	3E-7 0	1E-9 0	0 5E-4	0 5E-3
58	Ce-134	Y: fluorides, oxides, and hydroxides	0	7E+2	3E-7	9E-10	0	0
58	Ce-135	W: see Ce-134	2E+3	4E+3	2E-6	5E-9	2E-5	2E-4
58	Ce-135	Y: see Ce-134	0	4E+3	1E-6	5E-9	0	0
58	Ce-137m	W: see Ce-134	2E+3 LLI Wall (2E+3)	4E+3 0	2E-6 0	6E-9 0	0 3E-5	0 3E-4
58	Ce-137m	Y: see Ce-134	0	4E+3	2E-6	5E-9	0	0
58	Ce-137	W: see Ce-134	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3
58	Ce-137	Y: see Ce-134	0	1E+5	5E-5	2E-7	0	0
58	Ce-139	W: see Ce-134	5E+3	8E+2	3E-7	1E-9	7E-5	7E-4
58	Ce-139	Y: see Ce-134	0	7E+2	3E-7	9E-10	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
58	Ce-141	W: see Ce-134	2E+3 LLI Wall (2E+3)	7E+2 0	3E-7 0	1E-9 0	0 3E-5	0 3E-4
58	Ce-141	Y: see Ce-134	0	6E+2	2E-7	8E-10	0	0
58	Ce-143	W: see Ce-134	1E+3 LLI Wall (1E+3)	2E+3 0	8E-7 0	3E-9 0	0 2E-5	0 2E-4
58	Ce-143	Y: see Ce-134	0	2E+3	7E-7	2E-9	0	0
58	Ce-144	W: see Ce-134	2E+2 LLI Wall (3E+2)	3E+1 0	1E-8 0	4E-11 0	0 3E-6	0 3E-5
58	Ce-144	Y: see Ce-134	0	1E+1	6E-9	2E-11	0	0
59	Pr-136[2]	W: all compounds except those given for Y	5E+4 St Wall (7E+4)	2E+5 0	1E-4 0	3E-7 0	0 1E-3	0 1E-2
59	Pr-136[2]	Y: carbides, oxides, hydroxides, and fluorides	0	2E+5	9E-5	3E-7	0	0
59	Pr-137[2]	W: see Pr-136	4E+4	2E+5	6E-5	2E-7	5E-4	5E-3
59	Pr-137[2]	Y: see Pr-136	0	1E+5	6E-5	2E-7	0	0
59	Pr-138m	W: see Pr-136	1E+4	5E+4	2E-5	8E-8	1E-4	1E-3
59	Pr-138m	Y: see Pr-136	0	4E+4	2E-5	6E-8	0	0
59	Pr-139	W: see Pr-136	4E+4	1E+5	5E-5	2E-7	6E-4	6E-3
59	Pr-139	Y: see Pr-136	0	1E+5	5E-5	2E-7	0	0
59	Pr-142m[2]	W: see Pr-136	8E+4	2E+5	7E-5	2E-7	1E-3	1E-2
59	Pr-142m[2]	Y: see Pr-136	0	1E+5	5E-5	2E-7	0	0
59	Pr-142	W: see Pr-136	1E+3	2E+3	9E-7	3E-9	1E-5	1E-5
59	Pr-142	Y: see Pr-136	0	2E+3	8E-7	3E-9	0	0
59	Pr-143	W: see Pr-136	9E+2 LLI Wall (1E+3)	8E+2 0	3E-7 0	1E-9 0	0 2E-5	0 2E-4
59	Pr-143	Y: see Pr-136	0	7E+2	3E-7	9E-10	0	0
59	Pr-144	W: see Pr-136	3E+4 St Wall (4E+4)	1E+5 0	5E-5 0	2E-7 0	0 6E-4	0 6E-3
59	Pr-144	Y: see Pr-136	0	1E+5	5E-5	2E-7	0	0
59	Pr-145	W: see Pr-136	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
59	Pr-145	Y: see Pr-136	0	8E+3	3E-6	1E-8	0	0
59	Pr-147[2]	W: see Pr-136	5E+4 St Wall (8E+4)	2E+5 0	8E-5 0	3E-7 0	0 1E-3	0 1E-2
59	Pr-147[2]	Y: see Pr-136	0	2E+5	8E-5	3E-7	0	0
60	Nd-136[2]	W: all compounds except those given for Y	1E+4	6E+4	2E-5	8E-8	2E-4	2E-3

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
60	Nd-136[2]	Y: oxides, carbides, hydroxides, and fluorides	0	5E+4	2E-5	8E-8	0	0
60	Nd-138	W: see Nd-136	2E+3	6E+3	3E-6	9E-9	3E-5	3E-4
60	Nd-138	Y: see Nd-136	0	5E+3	2E-6	7E-9	0	0
60	Nd-139m[2]	W: see Nd-136	5E+3	2E+4	7E-6	2E-8	7E-5	7E-4
60	Nd-139m[2]	Y: see Nd-136	0	1E+4	6E-6	2E-8	0	0
60	Nd-139	W: see Nd-136	9E+4	3E+5	1E-4	5E-7	1E-3	1E-2
60	Nd-139	Y: see Nd-136	0	3E+5	1E-4	4E-7	0	0
60	Nd-141	W: see Nd-136	2E+5	7E+5	3E-4	1E-6	2E-3	2E-2
60	Nd-141	Y: see Nd-136	0	6E+5	3E-4	9E-7	0	0
60	Nd-147	W: see Nd-136	1E+3 LLI Wall (1E+3)	9E+2 0	4E-7 0	1E-9 0	0 2E-5	0 2E-4
60	Nd-147	Y: see Nd-136	0	8E+2	4E-7	1E-9	0	0
60	Nd-149[2]	W: see Nd-136	1E+4	3E+4	1E-5	4E-8	1E-4	1E-3
60	Nd-149[2]	Y: see Nd-136	0	2E+4	1E-5	3E-8	0	0
60	Nd-151[2]	W: see Nd-136	7E+4	2E+5	8E-5	3E-7	9E-4	9E-3
60	Nd-151[2]	Y: see Nd-136	0	2E+5	8E-5	3E-7	0	0
61	Pm-141[2]	W: all compounds except those given for Y	5E+4 St Wall (6E+4)	2E+5 0	8E-5 0	3E-7 0	0 8E-4	0 8E-3
61	Pm-141[2]	Y: carbides, oxides, fluorides, and hydroxides,	0	2E+5	7E-5	2E-7	0	0
61	Pm-143	W: see Pm-141	5E+3	6E+2	2E-7	8E-10	7E-5	7E-4
61	Pm-143	Y: see Pm-141	0	7E+2	3E-7	1E-9	0	0
61	Pm-144	W: see Pm-141	1E+3	1E+2	5E-8	2E-10	2E-5	2E-4
61	Pm-144	Y: see Pm-141	0	1E+2	5E-8	2E-10	0	0
61	Pm-145	W: see Pm-141	1E+4 0	2E+2 Bone surf (2E+2)	7E-8 0	0 3E-10	1E-4 0	1E-3 0
61	Pm-145	Y: see Pm-141	0	2E+2	8E-8	3E-10	0	0
61	Pm-146	W: see Pm-141	2E+3	5E+1	2E-8	7E-11	2E-5	2E-4
61	Pm-146	Y: see Pm-141	0	4E+1	2E-8	6E-11	0	0
61	Pm-147	W: see Pm-141	4E+3 LLI Wall (5E+3)	1E+2 Bone surf (2E+2)	5E-8 0	0 3E-10	0 7E-5	0 7E-4
61	Pm-147	Y: see Pm-141	0	1E+2	6E-8	2E-10	0	0
61	Pm-148m	W: see Pm-141	7E+2	3E+2	1E-7	4E-10	1E-5	1E-4
61	Pm-148m	Y: see Pm-141	0	3E+2	1E-7	5E-10	0	0
61	Pm-148	W: see Pm-141	4E+2 LLI Wall (5E+2)	5E+2 0	2E-7 0	8E-10 0	0 7E-6	0 7E-5
61	Pm-148	Y: see Pm-141	0	5E+2	2E-7	7E-10	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
61	Pm-149	W: see Pm-141	1E+3 LLI Wall (1E+3)	2E+3 0	8E-7 0	3E-9 0	0 2E-5	0 2E-4
61	Pm-149	Y: see Pm-141	0	2E+3	8E-7	2E-9	0	0
61	Pm-150	W: see Pm-141	5E+3	2E+4	8E-6	3E-8	7E-5	7E-4
61	Pm-150	Y: see Pm-141	0	2E+4	7E-6	2E-8	0	0
61	Pm-151	W: see Pm-141	2E+3	4E+3	1E-6	5E-9	2E-5	2E-4
61	Pm-151	Y: see Pm-141	0	3E+3	1E-6	4E-9	0	0
62	Sm-141m[2]	W: all compounds	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
62	Sm-141[2]	W: all compounds	5E+4 St Wall (6E+4)	2E+5 0	8E-5 0	2E-7 0	0 8E-4	0 8E-3
62	Sm-142[2]	W: all compounds	8E+3	3E+4	1E-5	4E-8	1E-4	1E-3
62	Sm-145	W: all compounds	6E+3	5E+2	2E-7	7E-10	8E-5	8E-4
62	Sm-146	W: all compounds	1E+1 Bone Surf (3E+1)	4E+2 Bone surf (6E-2)	1E-11 0	0 9E-14	0 3E-7	0 3E-6
62	Sm-147	W: all compounds	2E+1 Bone Surf (3E+1)	4E+2 Bone surf (7E-2)	2E-11 0	0 1E-13	0 4E-7	0 4E-6
62	Sm-151	W: all compounds	1E+4 LLI Wall (1E+4)	1E+2 Bone surf (7E+2)	4E-8 0	0 2E-10	0 2E-4	0 2E-3
62	Sm-153	W: all compounds	2E+3 LLI Wall (2E+3)	3E+3 0	1E-6 0	4E-9 0	0 3E-5	0 3E-4
62	Sm-155[2]	W: all compounds	6E+4 St Wall (8E+4)	2E+5	9E-5	3E-7 0	0 1E-3	0 1E-2
62	Sm-156	W: all compounds	5E+3	9E+3	4E-6	1E-8	7E-5	7E-4
63	Eu-145	W: all compounds	2E+3	2E+3	8E-7	3E-9	2E-5	2E-4
63	Eu-146	W: all compounds	1E+3	1E+3	5E-7	2E-9	1E-5	1E-4
63	Eu-147	W: all compounds	3E+3	2E+3	7E-7	2E-9	4E-5	4E-4
63	Eu-148	W: all compounds	1E+3	4E+2	1E-7	5E-10	1E-5	1E-4
63	Eu-149	W: all compounds	1E+4	3E+3	1E-6	4E-9	2E-4	2E-3
63	Eu-150 (12.62 h)	W: all compounds	3E+3	8E+3	4E-6	1E-8	4E-5	4E-4
63	Eu-150 (34.2 y)	W: all compounds	8E+2	2E+1	8E-9	3E-11	1E-5	1E-4
63	Eu-152m	W: all compounds	3E+3	6E+3	3E-6	9E-9	4E-5	4E-4
63	Eu-152	W: all compounds	8E+2	2E+1	1E-8	3E-11	1E-5	1E-4
63	Eu-154	W: all compounds	5E+2	2E+1	8E-9	3E-11	7E-6	7E-5
63	Eu-155	W: all compounds	4E+3 0	9E+1 Bone surf (1E+2)	4E-8 0	0 2E-10	5E-5 0	5E-4 0
63	Eu-156	W: all compounds	6E+2	5E+2	2E-7	6E-10	0	0
63	Eu-157	W: all compounds	2E+3	5E+3	2E-6	7E-9	8E-6	8E-5
63	Eu-158[2]	W: all compounds	2E+4	6E+4	2E-5	8E-8	3E-5	3E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
64	Gd-145	D: all compounds except those given for W	5E+4 St Wall (5E+4)	2E+5 0	6E-5 0	2E-7 0	3E-4 0	3E-3 0
64	Gd-145	W: fluorides, oxides, and hydroxides	0	2E+5	7E-5	2E-7	0	0
64	Gd-146	D: see Gd-145	1E+3	1E+2	5E-8	2E-10	2E-5	2E-4
64	Gd-146	W: see Gd-145	0	3E+2	1E-7	4E-10	0	0
64	Gd-147	D: see Gd-145	2E+3	4E+3	2E-6	6E-9	3E-5	3E-4
64	Gd-147	W: see Gd-145	0	4E+3	1E-6	5E-9	0	0
64	Gd-148	D: see Gd-145	1E+1 Bone Surf (2E+1)	8E+3 Bone surf (2E-2)	3E-12 0	0 2E-14	0 3E-7	0 3E-6
64	Gd-148	W: see Gd-145	0 0	3E-2 Bone surf (6E-2)	1E-11 0	0 8E-14	0 0	0 0
64	Gd-149	D: see Gd-145	3E+3	2E+3	9E-7	3E-9	4E-5	4E-4
64	Gd-149	W: see Gd-145	0	2E+3	1E-6	3E-9	0	0
64	Gd-151	D: see Gd-145	6E+3 0	4E+2 Bone surf (6E+2)	2E-7 0	0 9E-10	9E-5 0	9E-4 0
64	Gd-151	W: see Gd-145	0	1E+3	5E-7	2E-9	0	0
64	Gd-152	D: see Gd-145	2E+1 Bone Surf (3E+1)	1E-2 Bone surf (2E-2)	4E-12	0 3E-14	0 4E-7	0 4E-6
64	Gd-152	W: see Gd-145	0 0	4E-2 Bone surf (1E+2)	2E-11 0	0 1E-13	0 0	0 0
64	Gd-153	D: see Gd-145	5E+3 Bone Surf (2E+2)	1E+2 0	6E-8 0	0 3E-10	6E-5 0	6E-4 0
64	Gd-153	W: see Gd-145	0	6E+2	2E-7	8E-10	0	0
64	Gd-159	D: see Gd-145	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
64	Gd-159	W: see Gd-145	0	6E+3	2E-6	8E-9	0	0
65	Tb-147[2]	W: all compounds	9E+3	3E+4	1E-5	5E-8	1E-4	1E-3
64	Tb-149	W: all compounds	5E+3	7E+2	3E-7	1E-9	7E-5	7E-4
65	Tb-150	W: all compounds	5E+3	2E+4	9E-6	3E-8	7E-5	7E-4
65	Tb-151	W: all compounds	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
65	Tb-153	W: all compounds	5E+3	7E+3	3E-6	1E-8	7E-5	7E-4
65	Tb-154	W: all compounds	2E+3	4E+3	2E-6	6E-9	2E-5	2E-4
65	Tb-155	W: all compounds	6E+3	8E+3	3E-6	1E-8	8E-5	8E-4
65	Tb-156m (5.0 h)	W: all compounds	2E+4	3E+4	1E-5	4E-8	2E-4	2E-3
65	Tb-156m (24.4 h)	W: all compounds	7E+3	8E+3	3E-6	1E-8	1E-4	1E-3
65	Tb-156	W: all compounds	1E+3	1E+3	6E-7	2E-9	1E-5	1E-4
65	Tb-157	W: all compounds	5E+4 LLI Wall (5E+4)	3E+2 Bone surf (6E+2)	1E-7 0	0 8E-10	0 7E-4	0 7E-3
65	Tb-158	W: all compounds	1E+3	2E+1	8E-9	3E-11	2E-5	2E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
65	Tb-160	W: all compounds	8E+2	2E+2	9E-8	3E-10	1E-5	1E-4
65	Tb-161	W: all compounds	2E+3 LLI Wall (2E+3)	2E+3 0	7E-7 0	2E-9 0	0 3E-5	0 3E-4
66	Dy-155	W: all compounds	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
66	Dy-157	W: all compounds	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
66	Dy-159	W: all compounds	1E+4	2E+3	1E-6	3E-9	2E-4	2E-3
66	Dy-165	W: all compounds	1E+4	5E+4	2E-5	6E-8	2E-4	2E-3
66	Dy-166	W: all compounds	6E+2 LLI Wall (8E+2)	7E+2 0	3E-7 0	1E-9 0	0 1E-5	0 1E-4
67	Ho-155[2]	W: all compounds	4E+4	2E+5	6E-5	2E-7	6E-4	6E-3
67	Ho-157[2]	W: all compounds	3E+5	1E+6	6E-4	2E-6	4E-3	4E-2
67	Ho-159[2]	W: all compounds	2E+5	1E+6	4E-4	1E-6	3E-3	3E-2
67	Ho-161	W: all compounds	1E+5	4E+5	2E-4	6E-7	1E-3	1E-2
67	Ho-162m[2]	W: all compounds	5E+4	3E+5	1E-4	4E-7	7E-4	7E-3
67	Ho-162[2]	W: all compounds	5E+5 St Wall (1E+5)	2E+6 0	1E-3 0	3E-6 0	0 1E-2	0 1E-1
67	Ho-164m[2]	W: all compounds	1E+5	3E+5	1E-4	4E-7	1E-3	1E-2
67	Ho-164[2]	W: all compounds	2E+5 St Wall (2E+5)	6E+5 0	3E-4 0	9E-7 0	0 3E-3	0 3E-2
67	Ho-166m	W: all compounds	6E+2	7E+0	3E-9	9E-12	9E-6	9E-5
67	Ho-166	W: all compounds	9E+2 LLI Wall (9E+2)	2E+3 0	7E-7 0	2E-9 0	0 1E-5	0 1E-4
67	Ho-167	W: all compounds	2E+4	6E+4	2E-5	8E-8	2E-4	2E-3
68	Er-161	W: all compounds	2E+4	6E+4	3E-5	9E-8	2E-4	2E-3
68	Er-165	W: all compounds	6E+4	2E+5	8E-5	3E-7	9E-4	9E-3
68	Er-169	W: all compounds	3E+3 LLI Wall (4E+3)	3E+3 0	1E-6 0	4E-9 0	0 5E-5	0 5E-4
68	Er-171	W: all compounds	4E+3	1E+4	4E-6	1E-8	5E-5	5E-4
68	Er-172	W: all compounds	1E+3 LLI Wall (1E+3)	1E+3 0	6E-7 0	2E-9 0	0 2E-5	0 2E-4
69	Tm-162[2]	W: all compounds	7E+4 St Wall (7E+4)	3E+5 0	1E-4 0	4E-7 0	0 1E-3	0 1E-2
69	Tm-166	W: all compounds	4E+3	1E+4	6E-6	2E-8	6E-5	6E-4
69	Tm-167	W: all compounds	2E+3 LLI Wall (2E+3)	2E+3 0	8E-7 0	3E-9 0	0 3E-5	0 3E-4
69	Tm-170	W: all compounds	8E+2 LLI Wall (1E+3)	2E+2 0	9E-8 0	3E-10 0	0 1E-5	0 1E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
69	Tm-171	W: all compounds	1E+4 LLI Wall (1E+4)	3E+2 Bone surf (6E+2)	1E-7 0	0 8E-10	0 2E-4	0 2E-3
69	Tm-172	W: all compounds	7E+2 LLI Wall (8E+2)	1E+3 0	5E-7 0	2E-9 0	0 1E-5	0 1E-4
69	Tm-173	W: all compounds	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4
69	Tm-175[2]	W: all compounds	7E+4 St Wall (9E+4)	3E+5 0	1E-4 0	4E-7 0	0 1E-3	0 1E-2
70	Yb-162[2]	W: all compounds except those given for Y	7E+4	3E+5	1E-4	4E-7	1E-3	1E-2
70	Yb-162[2]	Y: fluorides, oxides, and hydroxides	0	3E+5	1E-4	4E-7	0	0
70	Yb-166	W: see Yb-162	1E+3	2E+3	8E-7	3E-9	2E-5	2E-4
70	Yb-166	Y: see Yb-162	0	2E+3	8E-7	3E-9	0	0
70	Yb-167[2]	W: see Yb-162	3E+5	8E+5	3E-4	1E-6	4E-3	4E-2
70	Yb-167[2]	Y: see Yb-162	0	7E+5	3E-4	1E-6	0	0
70	Yb-169	W: see Yb-162	2E+3	8E+2	4E-7	1E-9	2E-5	2E-4
70	Yb-169	Y: see Yb-162	0	7E+2	3E-7	1E-9	0	0
70	Yb-175	W: see Yb-162	3E+3 LLI Wall (3E+3)	4E+3 0	1E-6 0	5E-9 0	0 4E-5	0 4E-4
70	Yb-175	Y: see Yb-162	0	3E+3	1E-6	5E-9	0	0
70	Yb-177[2]	W: see Yb-162	2E+4	5E+4	2E-5	7E-8	2E-4	2E-3
70	Yb-177[2]	Y: see Yb-162	0	5E+4	2E-5	6E-8	0	0
70	Yb-178[2]	W: see Yb-162	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
70	Yb-178[2]	Y: see Yb-162	0	4E+4	2E-5	5E-8	0	0
71	Lu-169	W: all compounds except those given for Y	3E+3	4E+3	2E-6	6E-9	3E-5	3E-4
71	Lu-169	Y: fluorides, oxides, and hydroxides	0	4E+3	2E-6	6E-9	0	0
71	Lu-170	W: see Lu-169	1E+3	2E+3	9E-7	3E-9	2E-5	2E-4
71	Lu-170	Y: see Lu-169	0	2E+3	8E-7	3E-9	0	0
71	Lu-171	W: see Lu-169	2E+3	2E+3	8E-7	3E-9	3E-5	3E-4
71	Lu-171	Y: see Lu-169	0	2E+3	8E-7	3E-9	0	0
71	Lu-172	W: see Lu-169	1E+3	1E+3	5E-7	2E-9	1E-5	1E-4
71	Lu-172	Y: see Lu-169	0	1E+3	5E-7	2E-9	0	0
71	Lu-173	W: see Lu-169	5E+3 0	3E+2 Bone surf (5E+2)	1E-7 0	0 6E-10	7E-5 0	7E-4 0
71	Lu-173	Y: see Lu-169	0	3E+2	1E-7	4E-10	0	0
71	Lu-174m	W: see Lu-169	2E+3 LLI Wall (3E+3)	2E+2 Bone surf (3E+2)	1E-7 0	0 5E-10	0 4E-5	0 4E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
71	Lu-174m	Y: see Lu-169	0	2E+2	9E-8	3E-10	0	0
71	Lu-174	W: see Lu-169	5E+3	1E+2 Bone surf (2E+2)	5E-8 0	0 3E-10	7E-5 0	7E-4 0
71	Lu-174	Y: see Lu-169	0	2E+2	6E-8	2E-10	0	0
71	Lu-176m	W: see Lu-169	8E+3	3E+4	1E-5	3E-8	1E-4	1E-3
71	Lu-176m	Y: see Lu-169	0	2E+4	9E-6	3E-8	0	0
71	Lu-176	W: see Lu-169	7E+2 0	5E+0 Bone surf (1E+1	2E-9 0	0 2E-11	1E-5 0	1E-4 0
71	Lu-176	Y: see Lu-169	0	8E+0	3E-9	1E-11	0	0
71	Lu-177m	W: see Lu-169	7E+2 0	1E+2 Bone surf (1E+2)	5E-8 0	0 2E-10	1E-5 0	1E-4
71	Lu-177m	Y: see Lu-169	0	8E+1	3E-8	1E-10	0 0	0
71	Lu-177	W: see Lu-169	2E+3 LLI Wall (3E+3)	2E+3 0	9E-7 0	3E-9 0	4E-5 0	4E-4 0
71	Lu-177	Y: see Lu-169	0	2E+3	9E-7	3E-9	0	0
71	Lu-178m[2]	W: see Lu-169	5E+4 St Wall (6E+4)	2E+5 0	8E-5 0	3E-7 0	0 8E-4	0 8E-3
71	Lu-178m[2]	Y: see Lu-169	0	2E+5	7E-5	2E-7	0	0
71	Lu-178[2]	W: see Lu-169	4E+4 St Wall (4E+4)	1E+5 0	5E-5 0	2E-7 0	0 6E-4	0 6E-3
71	Lu-178[2]	Y: see Lu-169	0	1E+5	5E-5	2E-7	0	0
71	Lu-179	W: see Lu-169	6E+3	2E+4	8E-6	3E-8	9E-5	9E-4
71	Lu-179	Y: see Lu-169	0	2E+4	6E-6	3E-8	0	0
72	Hf-170	D: all compounds except those given for W	3E+3	6E+3	2E-6	8E-9	4E-5	4E-4
72	Hf-170	W: nitrates, oxides, hydroxides, and carbides	0	5E+3	2E-6	6E-9	0	0
72	Hf-172	D: see Hf-170	1E+3	9E+0 Bone surf (2E+1)	4E-9 0	0 3E-11	2E-5 0	2E-4 0
72	Hf-172	W: see Hf-170	0 0	4E+1 Bone surf (6E+1	2E-8 0	0 8E-11	0 0	0 0
72	Hf-173	D: see Hf-170	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
72	Hf-173	W: see Hf-170	0	1E+4	5E-6	2E-8	0	0
72	Hf-175	D: see Hf-170	3E+3 0	9E+2 Bone surf (1E+3)	4E-7 0	0 1E-9	4E-5 0	4E-4 0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
72	Hf-175	W: see Hf-170	0	1E+3	5E-7	2E-9	0	0
72	Hf-177m[2]	D: see Hf-170	2E+4	6E+4	2E-5	8E-8	3E-4	3E-4
72	Hf-177m[2]	W: see Hf-170	0	9E+4	4E-5	1E-7	0	0
72	Hf-178m	D: see Hf-170	3E+2 0	1E+0 Bone surf (2E+0)	5E-10 0	0 3E-12	3E-6 0	3E-5 0
72	Hf-178m	W: see Hf-170	0 0	5E+0 Bone surf (9E+0)	2E-9 0	0 1E-11	0 0	0 0
72	Hf-179m	D: see Hf-170	1E+3	3E+2 Bone surf (6E+2)	1E-7 0	0 8E-10	1E-5 0	1E-4 0
72	Hf-179m	W: see Hf-170	0	6E+2	3E-7	8E-10	0	0
72	Hf-180m	D: see Hf-170	7E+3	2E+4	9E-6	3E-8	1E-4	1E-3
72	Hf-180m	W: see Hf-170	0	3E+4	1E-5	4E-8	0	0
72	Hf-181	D: see Hf-170	1E+3 0	2E+2 Bone surf (4E+2)	7E-8 0	0 6E-10	2E-5 0	2E-4 0
72	Hf-181	W: see Hf-170	0	4E+2	2E-7	6E-10	0	0
72	Hf-182m[2]	D: see Hf-170	4E+4	9E+4	4E-5	1E-7	5E-4	5E-3
72	Hf-182m[2]	W: see Hf-170	0	1E+5	6E-5	2E-7	0	0
72	Hf-182	D: see Hf-170	2E+2 Bone Surf (4E+2)	8E-1 Bone surf (2E+0)	3E-10 0	0 2E-12	0 5E-6	0 5E-5
72	Hf-182	W: see Hf-170	0 0	3E+0 Bone surf (7E+0)	1E-9 0	0 1E-11	0 0	0 0
72	Hf-183[2]	D: see Hf-170	2E+4	5E+4	2E-5	6E-8	3E-4	3E-3
72	Hf-183[2]	W: see Hf-170	0	6E+4	2E-5	8E-8	0	0
72	Hf-184	D: see Hf-170	2E+3	8E+3	3E-6	1E-8	3E-5	3E-4
72	Hf-184	W: see Hf-170	0	6E+3	3E-6	9E-9	0	0
73	Ta-172[2]	W: all compounds except those given for Y	4E+4	1E+5	5E-5	2E-7	5E-4	5E-3
73	Ta-172[2]	Y: elemental Ta, halides, oxides, hydroxides, carbides, nitrates, and nitrides	0	1E+5	4E-5	1E-7	0	0
73	Ta-173	W: see Ta-172	7E+3	2E+4	8E-6	3E-8	9E-5	9E-4
73	Ta-173	Y: see Ta-172	0	2E+4	7E-6	2E-8	0	0
73	Ta-174[2]	W: see Ta-172	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
73	Ta-174[2]	Y: see Ta-172	0	9E+4	4E-5	1E-7	0	0
73	Ta-175	W: see Ta-172	6E+3	2E+4	7E-6	2E-8	8E-5	8E-4
73	Ta-175	Y: see Ta-172	0	1E+4	6E-6	2E-8	0	0
73	Ta-176	W: see Ta-172	4E+3	1E+4	5E-6	2E-8	5E-5	5E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
73	Ta-176	Y: see Ta-172	0	1E+4	5E-6	2E-8	0	0
73	Ta-177	W: see Ta-172	1E+4	2E+4	8E-6	3E-8	2E-4	2E-3
73	Ta-177	Y: see Ta-172	0	2E+4	7E-6	2E-8	0	0
73	Ta-178	W: see Ta-172	2E+4	9E+4	4E-5	1E-7	2E-4	2E-3
73	Ta-178	Y: see Ta-172	0	7E+4	3E-5	1E-7	0	0
73	Ta-179	W: see Ta-172	2E+4	5E+3	2E-6	8E-9	3E-4	3E-3
73	Ta-179	Y: see Ta-172	0	9E+2	4E-7	1E-9	0	0
73	Ta-180m	W: see Ta-172	2E+4	7E+4	3E-5	9E-8	3E-4	3E-3
73	Ta-180m	Y: see Ta-172	0	6E+4	2E-5	8E-8	0	0
73	Ta-180	W: see Ta-172	1E+3	4E+2	2E-7	6E-10	2E-5	2E-4
73	Ta-180	Y: see Ta-172	0	2E+1	1E-8	3E-11	0	0
73	Ta-182m[2]	W: see Ta-172	2E+5 St Wall (2E+5)	5E+5 0	2E-4 0	8E-7 0	0 3E-3	0 3E-2
73	Ta-182m[2]	Y: see Ta-172	0	4E+5	2E-4	6E-7	0	0
73	Ta-182	W: see Ta-172	8E+2	3E+2	1E-7	5E-10	1E-5	1E-4
73	Ta-182	Y: see Ta-172	0	1E+2	6E-8	2E-10	0	0
73	Ta-183	W: see Ta-172	9E+2 LLI Wall (1E+3)	1E+3 0	5E-7 0	2E-9 0	0 2E-5	0 2E-4
73	Ta-183	Y: see Ta-172	0	1E+3	4E-7	1E-9	0	0
73	Ta-184	W: see Ta-172	2E+3	5E+3	2E-6	8E-9	3E-5	3E-4
73	Ta-184	Y: see Ta-172	0	5E+3	2E-6	7E-9	0	0
73	Ta-185[2]	W: see Ta-172	3E+4	7E+4	3E-5	1E-7	4E-4	4E-3
73	Ta-185[2]	Y: see Ta-172	0	6E+4	3E-5	9E-8	0	0
73	Ta-186[2]	W: see Ta-172	5E+4 (St Wall (7E+4)	2E+5 0	1E-4 0	3E-7 0	0 1E-3	0 1E-2
73	Ta-186[2]	Y: see Ta-172	0	2E+5	9E-5	3E-7	0	0
74	W-176	D: all compounds	1E+4	5E+4	2E-5	7E-8	1E-4	1E-3
74	W-177	D: all compounds	2E+4	9E+4	4E-5	1E-7	3E-4	3E-3
74	W-178	D: all compounds	5E+3	2E+4	8E-6	3E-8	7E-5	7E-4
74	W-179[2]	D: all compounds	5E+5	2E+6	7E-4	2E-6	7E-3	7E-2
74	W-181	D: all compounds	2E+4	3E+4	1E-5	5E-8	2E-4	2E-3
74	W-185	D: all compounds	2E+3 LLI Wall (3E+3)	7E+3 0	3E-6 0	9E-9 0	0 4E-5	0 4E-4
74	W-187	D: all compounds	2E+3	9E+3	4E-6	1E-8	3E-5	3E-4
74	W-188	D: all compounds	4E+2 LLI Wall (5E+2)	1E+3 0	5E-7 0	2E-9 0	0 6E-6	0 6E-5
75	Re-177[2]	D: all compounds except those given for W	9E+4 St Wall (1E+5)	3E+5 0	1E-4 0	4E-7 0	0 2E-3	0 2E-2
75	Re-177[2]	W: nitrates, oxides, and hydroxides	0	4E+5	1E-4	5E-7	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
75	Re-178[2]	D: see Re-177	7E+4 St Wall (1E+5)	3E+5 0	1E-4 0	4E-7 0	0 1E-3	0 1E-2
75	Re-178[2]	W: see Re-177	0	3E+5	1E-4	4E-7	0	0
75	Re-181	D: see Re-177	5E+3	9E+3	4E-6	1E-8	7E-5	7E-4
75	Re-181	W: see Re-177	0	9E+3	4E-6	1E-8	0	0
75	Re-182 (12.7 h)	D: see Re-177	7E+3	1E+4	5E-6	2E-8	9E-5	9E-4
75	Re-182 (12.7 h)	W: see Re-177	0	2E+4	6E-6	2E-8	0	0
75	Re-182 (64.0 h)	D: see Re-177	1E+3	2E+3	1E-6	3E-9	2E-5	2E-4
75	Re-182 (64.0 h)	W: see Re-177	0	2E+3	9E-7	3E-9	0	0
75	Re-184m	D: see Re-177	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
75	Re-184m	W: see Re-177	0	4E+2	2E-7	6E-10	0	0
75	Re-184	D: see Re-177	2E+3	4E+3	1E-6	5E-9	3E-5	3E-4
75	Re-184	W: see Re-177	0	1E+3	6E-7	2E-9	0	0
75	Re-186m	D: see Re-177	1E+3 St Wall (2E+3)	2E+3 St wall (2E+3)	7E-7 0	0 3E-9	0 2E-5	0 2E-4
75	Re-186m	W: see Re-177	0	2E+2	6E-8	2E-10	0	0
75	Re-186	D: see Re-177	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
75	Re-186	W: see Re-177	0	2E+3	7E-7	2E-9	0	0
75	Re-187	D: see Re-177	6E+5 0	8E+5 St wall (9E+5)	4E-4 0	0 1E-6	8E-3 0	8E-2 0
75	Re-187	W: see Re-177	0	1E+5	4E-5	1E-7	0	0
75	Re-188m[2]	D: see Re-177	8E+4	1E+5	6E-5	2E-7	1E-3	1E-2
75	Re-188m[2]	W: see Re-177	0	1E+5	6E-5	2E-7	0	0
75	Re-188	D: see Re-177	2E+3	3E+3	1E-6	4E-9	2E-5	2E-4
75	Re-188	W: see Re-177	0	3E+3	1E-6	4E-9	0	0
75	Re-189	D: see Re-177	3E+3	5E+3	2E-6	7E-9	4E-5	4E-4
75	Re-189	W: see Re-177	0	4E+3	2E-6	6E-9	0	0
76	Os-180[2]	D: all compounds except those given for W, Y	1E+5	4E+5	2E-4	5E-7	1E-3	1E-2
76	Os-180[2]	W: halides and nitrates	0	5E+5	2E-4	7E-7	0	0
76	Os-180[2]	Y: oxides and hydroxides	0	5E+5	2E-4	6E-7	0	0
76	Os-181[2]	D: see Os-180	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
76	Os-181[2]	W: see Os-180	0	5E+4	2E-5	6E-8	0	0
76	Os-181[2]	Y: see Os-180	0	4E+4	2E-5	6E-8	0	0
76	Os-182	D: see Os-180	2E+3	6E+3	2E-6	8E-9	3E-5	3E-4
76	Os-182	W: see Os-180	0	4E+3	2E-6	6E-9	0	0
76	Os-182	Y: see Os-180	0	4E+3	2E-6	6E-9	0	0
76	Os-185	D: see Os-180	2E+3	5E+2	2E-7	7E-10	3E-5	3E-4
76	Os-185	W: see Os-180	0	8E+2	3E-7	1E-9	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
76	Os-185	Y: see Os-180	0	8E+2	3E-7	1E-9	0	0
76	Os-189m	D: see Os-180	8E+4	2E+5	1E-4	3E-7	1E-3	1E-2
76	Os-189m	W: see Os-180	0	2E+5	9E-5	3E-7	0	0
76	Os-189m	Y: see Os-180	0	2E+5	7E-5	2E-7	0	0
76	Os-191m	D: see Os-180	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
76	Os-191m	W: see Os-180	0	2E+4	8E-6	3E-8	0	0
76	Os-191m	Y: see Os-180	0	2E+4	7E-6	2E-8	0	0
76	Os-191	D: see Os-180	2E+3 LLI Wall (3E+3)	2E+3 0	9E-7 0	3E-9 0	0 3E-5	0 3E-4
76	Os-191	W: see Os-180	0	2E+3	7E-7	2E-9	0	0
76	Os-191	Y: see Os-180	0	1E+3	6E-7	2E-9	0	0
76	Os-193	D: see Os-180	2E+3 LLI Wall (2E+3)	5E+3 0	2E-6 0	6E-9 0	0 2E-5	0 2E-4
76	Os-193	W: see Os-180	0	3E+3	1E-6	4E-9	0	0
76	Os-193	Y: see Os-180	0	3E+3	1E-6	4E-9	0	0
76	Os-194	D: see Os-180	4E+2 LLI Wall (6E+2)	4E+1 0	2E-8 0	6E-11 0	0 8E-6	0 8E-5
76	Os-194	W: see Os-180	0	6E+1	2E-8	6E-11	0	0
76	Os-194	Y: see Os-180	0	8E+0	3E-9	1E-11	0	0
77	Ir-182[2]	D: all compounds except those given for W, Y	4E+4 St Wall (4E+4)	1E+5 0	6E-5 0	2E-7 0	0 6E-4	0 6E-3
77	Ir-182[2]	W: halides, nitrates, and metallic Ir	0	2E+5	6E-5	2E-7	0	0
77	Ir-182[2]	Y: oxides and hydroxides	0	1E+5	5E-5	2E-7	0	0
77	Ir-184	D: see Ir-182	8E+3	2E+4	1E-5	3E-8	1E-4	1E-3
77	Ir-184	W: see Ir-182	0	3E+4	1E-5	5E-8	0	0
77	Ir-184	Y: see Ir-182	0	3E+4	1E-5	4E-8	0	0
77	Ir-185	D: see Ir-182	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
77	Ir-185	W: see Ir-182	0	1E+4	5E-6	2E-8	0	0
77	Ir-185	Y: see Ir-182	0	1E+4	4E-6	1E-8	0	0
77	Ir-186	D: see Ir-182	2E+3	8E+3	3E-6	1E-8	3E-5	3E-5
77	Ir-186	W: see Ir-182	0	6E+3	3E-6	9E-9	0	0
77	Ir-186	Y: see Ir-182	0	6E+3	2E-6	8E-9	0	0
77	Ir-187	D: see Ir-182	1E+4	3E+4	1E-5	5E-8	1E-4	1E-3
77	Ir-187	W: see Ir-182	0	3E+4	1E-5	4E-8	0	0
77	Ir-187	Y: see Ir-182	0	3E+4	1E-5	4E-8	0	0
77	Ir-188	D: see Ir-182	2E+3	5E+3	2E-6	6E-9	3E-5	3E-4
77	Ir-188	W: see Ir-182	0	4E+3	1E-6	5E-9	0	0
77	Ir-188	Y: see Ir-182	0	3E+3	1E-6	5E-9	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
77	Ir-189	D: see Ir-182	5E+3 LLI Wall (5E+3)	5E+3 0	2E-6 0	7E-9 0	0 7E-5	0 7E-4
77	Ir-189	W: see Ir-182	0	4E+3	2E-6	5E-9	0	0
77	Ir-189	Y: see Ir-182	0	4E+3	1E-6	5E-9	0	0
77	Ir-190m[2]	D: see Ir-182	2E+5	2E+5	8E-5	3E-7	2E-3	2E-2
77	Ir-190m[2]	W: see Ir-182	0	2E+5	9E-5	3E-7	0	0
77	Ir-190m[2]	Y: see Ir-182	0	2E+5	8E-5	3E-7	0	0
77	Ir-190	D: see Ir-182	1E+3	9E+2	4E-7	1E-9	1E-5	1E-4
77	Ir-190	W: see Ir-182	0	1E+3	4E-7	1E-9	0	0
77	Ir-190	Y: see Ir-182	0	9E+2	4E-7	1E-9	0	0
77	Ir-192m	D: see Ir-182	3E+3	9E+1	4E-8	1E-10	4E-5	4E-4
77	Ir-192m	W: see Ir-182	0	2E+2	9E-8	3E-10	0	0
77	Ir-192m	Y: see Ir-182	0	2E+1	6E-9	2E-11	0	0
77	Ir-192	D: see Ir-182	9E+2	3E+2	1E-7	4E-10	1E-5	1E-4
77	Ir-192	W: see Ir-182	0	4E+2	2E-7	6E-10	0	0
77	Ir-192	Y: see Ir-182	0	2E+2	9E-8	3E-10	0	0
77	Ir-194m	D: see Ir-182	6E+2	9E+1	4E-8	1E-10	9E-6	9E-5
77	Ir-194m	W: see Ir-182	0	2E+2	7E-8	2E-10	0	0
77	Ir-194m	Y: see Ir-182	0	1E+2	4E-8	1E-10	0	0
77	Ir-194	D: see Ir-182	1E+3	3E+3	1E-6	4E-9	1E-5	1E-4
77	Ir-194	W: see Ir-182	0	2E+3	9E-7	3E-9	0	0
77	Ir-194	Y: see Ir-182	0	2E+3	8E-7	3E-9	0	0
77	Ir-195m	D: see Ir-182	8E+3	2E+4	1E-5	3E-8	1E-4	1E-3
77	Ir-195m	W: see Ir-182	0	3E+4	1E-5	4E-8	0	0
77	Ir-195m	Y: see Ir-182	0	2E+4	9E-6	3E-8	0	0
77	Ir-195	D: see Ir-182	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
77	Ir-195	W: see Ir-182	0	5E+4	2E-5	7E-8	0	0
77	Ir-195	Y: see Ir-182	0	4E+4	2E-5	6E-8	0	0
78	Pt-186	D: all compounds	1E+4	4E+4	2E-5	5E-8	2E-4	2E-3
78	Pt-188	D: all compounds	2E+3	2E+3	7E-7	2E-9	2E-5	0
78	Pt-189	D: all compounds	1E+4	3E+4	1E-5	4E-8	1E-4	0
78	Pt-191	D: all compounds	4E+3	8E+3	4E-6	1E-8	5E-5	5E-4
78	Pt-193m	D: all compounds	3E+3 LLI Wall (3E+4)	6E+3 0	3E-6 0	8E-9 0	0 4E-5	0 4E-4
78	Pt-193	D: all compounds	4E+4 LLI Wall (5E+4)	2E+4 0	1E-5 0	3E-8 0	0 6E-4	0 6E-3
78	Pt-195m	D: all compounds	2E+3 LLI Wall (2E+3)	4E+3 0	2E-6 0	6E-9 0	0 3E-5	0 3E-4
78	Pt-197m[2]	D: all compounds	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3
78	Pt-197	D: all compounds	3E+3	1E+4	4E-6	1E-8	4E-5	4E-4
78	Pt-199[2]	D: all compounds	5E+4	1E+5	6E-5	2E-7	7E-4	7E-3

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
78	Pt-200	D: all compounds	1E+3	3E+3	1E-6	5E-9	2E-5	2E-4
79	Au-193	D: all compounds except those given for W, Y	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
79	Au-193	W: halides and nitrates	0	2E+4	9E-6	3E-8	0	0
79	Au-193	Y: oxides and hydroxides	0	2E+4	8E-6	3E-8	0	0
79	Au-194	D: see Au-193	3E+3	8E+3	3E-6	1E-8	4E-5	4E-4
79	Au-194	W: see Au-193	0	5E+3	2E-6	8E-9	0	0
79	Au-194	Y: see Au-193	0	5E+3	2E-6	7E-9	0	0
79	Au-195	D: see Au-193	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
79	Au-195	W: see Au-193	0	1E+3	6E-7	2E-9	0	0
79	Au-195	Y: see Au-193	0	4E+2	2E-7	6E-10	0	0
79	Au-198m	D: see Au-193	1E+3	3E+3	1E-6	4E-9	1E-5	1E-4
79	Au-198m	W: see Au-193	0	1E+3	5E-7	2E-9	0	0
79	Au-198m	Y: see Au-193	0	1E+3	5E-7	2E-9	0	0
79	Au-198	D: see Au-193	1E+3	4E+3	2E-6	5E-9	2E-5	2E-4
79	Au-198	W: see Au-193	0	2E+3	8E-7	3E-9	0	0
79	Au-198	Y: see Au-193	0	2E+3	7E-7	2E-9	0	0
79	Au-199	D: see Au-193	3E+3 LLI Wall (3E+3)	9E+3 0	4E-6 0	1E-8 0	0 4E-5	0 4E-4
79	Au-199	W: see Au-193	0	4E+3	2E-6	6E-9	0	0
79	Au-199	Y: see Au-193	0	4E+3	2E-6	5E-9	0	0
79	Au-200m	D: see Au-193	1E+3	4E+3	1E-6	5E-9	2E-5	2E-4
79	Au-200m	W: see Au-193	0	3E+3	1E-6	4E-9	0	0
79	Au-200m	Y: see Au-193	0	2E+4	1E-6	3E-9	0	0
79	Au-200[2]	D: see Au-193	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
79	Au-200[2]	W: see Au-193	0	8E+4	3E-5	1E-7	0	0
79	Au-200[2]	Y: see Au-193	0	7E+4	3E-5	1E-7	0	0
79	Au-201[2]	D: see Au-193	7E+4 St Wall (9E+4)	2E+5 0	9E-5 0	3E-7 0	0 1E-3	0 1E-2
79	Au-201[2]	W: see Au-193	0	2E+5	1E-4	3E-7	0	0
79	Au-201[2]	Y: see Au-193	0	2E+5	9E-5	3E-7	0	0
80	Hg-193m	Vapor	0	8E+3	4E-6	1E-8	0	0
80	Hg-193m	Organic D	4E+3	1E+4	5E-6	2E-8	6E-5	6E-4
80	Hg-193m	D: sulfates	3E+3	9E+3	4E-6	1E-8	4E-5	4E-4
80	Hg-193m	W: halides, nitrates, sulfides, oxides, and hydroxides	0	8E+3	3E-6	1E-8	0	0
80	Hg-193	Vapor	0	3E+4	1E-5	4E-8	0	0
80	Hg-193	Organic D	2E+4	6E+4	3E-5	9E-8	3E-4	3E-3
80	Hg-193	D: see Hg-193m	2E+4	4E+4	2E-5	6E-8	2E-4	2E-3

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
80	Hg-193	W: see Hg-193m	0	4E+4	2E-5	6E-8	0	0
80	Hg-194	Vapor	0	3E+1	1E-8	4E-11	0	0
80	Hg-194	Organic D	2E+1	3E+1	1E-8	4E-11	2E-7	2E-6
80	Hg-194	D: see Hg-193m	8E+2	4E+1	2E-8	6E-11	1E-5	1E-4
80	Hg-194	W: see Hg-193m	0	1E+2	5E-8	2E-10	0	0
80	Hg-195m	Vapor	0	4E+3	2E-6	6E-9	0	0
80	Hg-195m	Organic D	3E+3	6E+3	3E-6	8E-9	4E-5	4E-4
80	Hg-195m	D: see Hg-193m	2E+3	5E+3	2E-6	7E-9	3E-5	3E-4
80	Hg-195m	W: see Hg-193m	0	4E+3	2E-6	5E-9	0	0
80	Hg-195	Vapor	0	3E+4	1E-5	4E-8	0	0
80	Hg-195	Organic D	2E+4	5E+4	2E-5	6E-8	2E-4	2E-3
80	Hg-195	D: see Hg-193m	1E+4	4E+4	1E-5	5E-8	2E-4	2E-3
80	Hg-195	W: see Hg-193m	0	3E+4	1E-5	5E-8	0	0
80	Hg-197m	Vapor	0	5E+3	2E-6	7E-9	0	0
80	Hg-197m	Organic D	4E+3	9E+3	4E-6	1E-8	5E-5	5E-4
80	Hg-197m	D: see Hg-193m	3E+3	7E+3	3E-6	1E-8	4E-5	4E-4
80	Hg-197m	W: see Hg-193m	0	5E+3	2E-6	7E-9	0	0
80	Hg-197	Vapor	0	8E+3	4E-6	1E-8	0	0
80	Hg-197	Organic D	7E+3	1E+4	6E-6	2E-8	9E-5	9E-4
80	Hg-197	D: see Hg-193m	6E+3	1E+4	5E-6	2E-8	8E-5	8E-4
80	Hg-197	W: see Hg-193m	0	9E+3	4E-6	1E-8	0	0
80	Hg-199m[2]	Vapor	0	8E+4	3E-5	1E-7	0	0
80	Hg-199m[2]	Organic D	6E+4 St Wall (1E+5)	2E+5 0	7E-5 0	1E-7 0	0 1E-3	0 1E-2
80	Hg-199m[2]	D: see Hg-193m	6E+4	1E+5	6E-5	2E-7	8E-4	8E-3
80	Hg-199m[2]	W: see Hg-193m	0	2E+5	7E-5	2E-7	0	0
80	Hg-203	Vapor	0	8E+2	4E-7	1E-9	0	0
80	Hg-203	Organic D	5E+2	8E+2	3E-7	1E-9	7E-6	7E-5
80	Hg-203	D: see Hg-193m	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
80	Hg-203	W: see Hg-193m	0	1E+3	5E-7	2E-9	0	0
81	Tl-194m[2]	D: all compounds	5E+4 St Wall (7E+4)	2E+5 0	6E-5 0	2E-7 0	0 1E-3	0 1E-2
81	Tl-194[2]	D: all compounds	3E+5 St Wall (3E+5)	6E+5 0	2E-4 0	8E-7 0	0 4E-2	0 4E-1
81	Tl-195[2]	D: all compounds	6E+4	1E+5	5E-5	2E-7	9E-4	9E-3
81	Tl-197	D: all compounds	7E+4	1E+5	5E-5	2E-7	1E-3	1E-2
81	Tl-198m[2]	D: all compounds	3E+4	5E+4	2E-5	8E-8	4E-4	4E-3
81	Tl-198	D: all compounds	2E+4	3E+4	1E-5	5E-8	3E-4	3E-3
81	Tl-199	D: all compounds	6E+4	8E+4	4E-5	1E-7	9E-4	9E-3
81	Tl-200	D: all compounds	8E+3	1E+4	5E-6	2E-8	1E-4	1E-3
81	Tl-201	D: all compounds	2E+4	2E+4	9E-6	3E-8	2E-4	2E-3
81	Tl-202	D: all compounds	4E+3	5E+3	2E-6	7E-9	5E-5	5E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
81	Tl-204	D: all compounds	2E+3	2E+3	9E-7	3E-9	2E-5	2E-4
82	Pb-195m[2]	D: all compounds	6E+4	2E+5	8E-5	3E-7	8E-4	8E-3
82	Pb-198	D: all compounds	3E+4	6E+4	3E-5	9E-8	4E-4	4E-3
82	Pb-199[2]	D: all compounds	2E+4	7E+4	3E-5	1E-7	3E-4	3E-3
82	Pb-200	D: all compounds	3E+3	6E+3	3E-6	9E-9	4E-5	4E-4
82	Pb-201	D: all compounds	7E+3	2E+4	8E-6	3E-8	1E-4	1E-3
82	Pb-202m	D: all compounds	9E+3	3E+4	1E-5	4E-8	1E-4	1E-3
82	Pb-202	D: all compounds	1E+2	5E+1	2E-8	7E-11	2E-6	2E-5
82	Pb-203	D: all compounds	5E+3	9E+3	4E-6	1E-8	7E-5	7E-4
82	Pb-205	D: all compounds	4E+3	1E+3	6E-7	2E-9	5E-5	5E-4
82	Pb-209	D: all compounds	2E+4	6E+4	2E-5	8E-8	3E-4	3E-3
82	Pb-210	D: all compounds	6E-1 Bone Surf (1E+0)	2E+1 Bone surf (4E-1)	1E-10 0	0 6E-13	0 1E-8	0 1E-7
82	Pb-211[2]	D: all compounds	1E+4	6E+2	3E-7	9E-10	2E-4	2E-3
82	Pb-212	D: all compounds	8E+1 Bone Surf (1E+2)	3E+1 0	1E-8 0	5E-11 0	0 2E-6	0 2E-5
82	Pb-214[2]	D: all compounds	9E+3	8E+2	3E-7	1E-9	1E-4	1E-3
83	Bi-200[2]	D: nitrates	3E+4	8E+4	4E-5	1E-7	4E-4	4E-3
83	Bi-200[2]	W: all other compounds	0	1E+5	4E-5	1E-7	0	0
83	Bi-201[2]	D: see Bi-200	1E+4	3E+4	1E-5	4E-8	2E-4	2E-3
83	Bi-201[2]	W: see Bi-200	0	4E+4	2E-5	5E-8	0	0
83	Bi-202[2]	D: see Bi-200	1E+4	4E+4	2E-5	6E-8	2E-4	2E-3
83	Bi-202[2]	W: see Bi-200	0	8E+4	3E-5	1E-7	0	0
83	Bi-203	D: see Bi-200	2E+3	7E+3	3E-6	9E-9	3E-5	3E-4
83	Bi-203	W: see Bi-200	0	6E+3	3E-6	9E-9	0	0
83	Bi-205	D: see Bi-200	1E+3	3E+3	1E-6	3E-9	2E-5	2E-4
83	Bi-205	W: see Bi-200	0	1E+3	5E-7	2E-9	0	0
83	Bi-206	D: see Bi-200	6E+2	1E+3	6E-7	2E-9	9E-6	9E-5
83	Bi-206	W: see Bi-200	0	9E+2	4E-7	1E-9	0	0
83	Bi-207	D: see Bi-200	1E+3	2E+3	7E-7	2E-9	1E-5	1E-4
83	Bi-207	W: see Bi-200	0	4E+2	1E-7	5E-10	0	0
83	Bi-210m	D: see Bi-200	4E+1 Kidneys (6E+1)	5E+0 Kidney (6E+0)	2E-9 0	0 9E-12	0 8E-7	0 8E-6
83	Bi-210m	W: see Bi-200	0	7E-1	3E-10	9E-13	0	0
83	Bi-210	D: see Bi-200	8E+2 0	2E+2 Kidney (4E+2)	1E-7 0	0 5E-10	1E-5 0	1E-4 0
83	Bi-210	W: see Bi-200	0	3E+1	1E-8	4E-11	0	0
83	Bi-212[2]	D: see Bi-200	5E+3	2E+2	1E-7	3E-10	7E-5	7E-4
83	Bi-212[2]	W: see Bi-200	0	3E+2	1E-7	4E-10	0	0
83	Bi-213[2]	D: see Bi-200	7E+3	3E+2	1E-7	4E-10	1E-4	1E-3

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
83	Bi-213[2]	W: see Bi-200	0	4E+2	1E-7	5E-10	0	0
83	Bi-214[2]	D: see Bi-200	2E+4 St Wall (2E+4)	8E+2 0	3E-7 0	1E-9 0	0 3E-4	0 3E-3
83	Bi-214[2]	W: see Bi-200	0	9E-2	4E-7	1E-9	0	0
84	Po-203[2]	D: all compounds except those given for W	3E+4	6E+4	3E-5	9E-8	3E-4	3E-3
84	Po-203[2]	W: nitrates, oxides, and hydroxides	0	9E+4	4E-5	1E-7	0	0
84	Po-205[2]	D: see Po-203	2E+4	4E+4	2E-5	5E-8	3E-4	3E-3
84	Po-205[2]	W: see Po-203	0	7E+4	3E-5	1E-7	0	0
84	Po-207	D: see Po-203	8E+3	3E+4	1E-5	3E-8	1E-4	1E-4
84	Po-207	W: see Po-203	0	3E+4	1E-5	4E-8	0	0
84	Po-210	D: see Po-203	3E+0	6E-1	3E-10	9E-13	4E-8	4E-7
84	Po-210	W: see Po-203	0	6E-1	3E-10	9E-13	0	0
85	At-207[2]	D: halides	6E+3	3E+3	1E-6	4E-9	8E-5	8E-4
85	At-207[2]	W: all compounds except those given in D	0	2E+3	9E-7	3E-9	0	0
85	At-211	D: halides	1E+2	8E+1	3E-8	1E-10	2E-6	2E-5
85	At-211	W: all compounds except those given in D	0	5E+1	2E-8	8E-11	0	0
86	Rn-220	With daughters removed	0	2E+4	7E-6	2E-8	0	0
86	Rn-220	With daughters present	0	2E+1 (or 12 working level months)	9E-9	3E-11 (or 1.0 working level)	0	0
86	Rn-222	With daughters removed	0	1E+4	4E-6	1E-8	0	0
86	Rn-222	With daughters present	0	1E+2 (or 12 working level months)	3E-8	1E-10 (or 0.33 working level)	0	0
87	Fr-222[2]	D: all compounds	2E+3	5E+2	2E-7	6E-10	3E-5	3E-4
87	Fr-232[2]	D: all compounds	6E+2	8E+2	3E-7	1E-9	8E-6	8E-5
88	Ra-223	W: all compounds	5E+0 Bone Surf (9E+0)	7E-1 0	3E-10 0	9E-13 0	0 1E-7	0 1E-6
88	Ra-224	W: all compounds	8E+0 Bone Surf (2E+1)	2E+0 0	7E-10 0	2E-12 0	0 2E-7	0 2E-6
88	Ra-225	W: all compounds	8E+0 Bone Surf	7E-1	3E-10	9E-13	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
			(2E+1)	0	0	0	2E-7	2E-6
88	Ra-226	W: all compounds	2E+0 Bone Surf (5E+0)	6E-1	3E-10 0	9E-13 0	0 6E-8	0 6E-7
88	Ra-227[2]	W: all compounds	2E+4 Bone Surf (2E+4)	1E+4 Bone surf (2E+4)	6E-6 0	0 3E-8	0 3E-4	0 3E-3
88	Ra-228	W: all compounds	2E+0 Bone Surf (4E+0)	1E+0 0	5E-10 0	2E-12 0	0 6E-8	0 6E-7
89	Ac-224	D: all compounds except those given for W, Y	2E+3 LLI Wall 2E+3	3E+1 Bone surf (4E+1)	1E-8 0	0 5E-11	0 3E-5	0 3E-4
89	Ac-224	W: halides and nitrates	0	5E+1	2E-8	7E-11	0	0
89	Ac-224	Y: oxides and hydroxides	0	5E+1	2E-8	6E-11	0	0
89	Ac-225	D: see Ac-224	5E+1 LLI Wall (5E+)	3E-1 Bone surf (5E-1)	1E-10 0	0 7E-13	0 7E-7	0 7E-6
89	Ac-225	W: see Ac-224	0	6E-1	3E-10	9E-13	0	0
89	Ac-225	Y: see Ac-224	0	6E-1	3E-10	9E-13	0	0
89	Ac-225	D: see Ac-224	1E+2 LLI Wall (1E+2)	3E+0 Bone surf (4E+0)	1E-9 0	0 5E-12	0 2E-6	0 2E-5
89	Ac-225	W: see Ac-224	0	5E+0	2E-9	7E-12	0	0
89	Ac-225	Y: see Ac-224	0	5E+0	2E-9	6E-12	0	0
89	Ac-227	D: see Ac-224	2E-1 Bone Surf (4E-1)	4E-4 Bone surf (8E-4)	2E-13 0	0 1E-15	0 5E-9	0 5E-8
89	Ac-227	W: see Ac-224	0 0	2E-3 Bone surf (3E-3)	7E-13 0	0 4E-15	0 0	0 0
89	Ac-227	Y: see Ac-224	0	4E-3	2E-12	6E-15	0	0
89	Ac-228	D: see Ac-224	2E+3 0	9E+0 Bone surf (4E+1)	4E-9 0	0 2E-11	3E-5 0	3E-4 0
89	Ac-228	W: see Ac-224	0 0	4E+1 Bone surf (6E+1)	2E-8 0	0 8E-11	0 0	0 0
89	Ac-228	Y: see Ac-224	0	4E+1	2E-8	6E-11	0	0
90	Th-226	W: all compounds except those given for Y	5E+3 St Wall (5E+3)	2E+2 0	6E-8 0	2E-10 0	0 7E-5	0 7E-4
90	Th-226[2]	Y: oxides and hydroxides	0	1E+2	6E-8	2E-10	0	0
90	Th-227	W: see Th-226	1E+2	3E-1	1E-10	5E-13	2E-6	2E-5

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
90	Th-227	Y: see Th-226	0	3E-1	1E-10	5E-13	0	0
90	Th-228	W: see Th-226	6E+0 Bone Surf (1E+1)	1E-2 Bone surf (2E-2)	4E-12 0	0 3E-14	0 2E-7	0 2E-6
90	Th-228	Y: see Th-226	0	2E-2	7E-12	2E-14	0	0
90	Th-229	W: see Th-226	6E-1 Bone Surf (1E+0)	9E-4 Bone surf (2E-3)	4E-13 0	0 3E-15	0 2E-8	0 2E-7
90	Th-229	Y: see Th-226	0 0	2E-3 Bone surf (3E-3)	1E-12 0	0 4E-15	0 0	0 0
90	Th-230	W: see Th-226	4E+0 Bone Surf (9E+0)	6E-3 Bone surf (2E-2)	3E-12 0	0 2E-14	0 1E-7	0 1E-6
90	Th-230	Y: see Th-226	0 0	2E-2 Bone surf (2E-2)	6E-12	0 3E-14	0 0	0 0
90	Th-231	W: see Th-226	4E+3	6E+3	3E-6	9E-9	5E-5	5E-4
90	Th-231	Y: see Th-226	0	6E+3	3E-6	9E-9	0	0
90	Th-232	W: see Th-226	7E-1 Bone Surf (2E+0)	1E-3 Bone surf (3E-3)	5E-13 0	0 4E-15	0 3E-8	0 3E-7
90	Th-232	Y: see Th-226	0	3E-3 Bone surf (4E-3)	1E-12	0 6E-15	0 0	0 0
90	Th-234	W: see Th-226	3E+2 LLI Wall (4E+2)	2E+2 0	8E-8 0	3E-10 0	0 5E-6	0 5E-5
90	Th-234	Y: see Th-226	0	2E+2	6E-8	2E-10	0	0
91	Pa-227[2]	W: all compounds except those given for Y	4E+3	1E+2	5E-8	2E-10	5E-5	5E-4
91	Pa-227[2]	Y: oxides and hydroxides	0	1E+2	4E-8	1E-10	0	0
91	Pa-228	W: see Pa-227	1E+3 0	1E+1 Bone surf (2E+1)	5E-9 0	0 3E-11	2E-5 0	2E-4 0
91	Pa-228	Y: see Pa-227	0	1E+1	5E-9	2E-11	0	0
91	Pa-230	W: see Pa-227	6E+2 Bone Surf (9E+2)	5E+0 0	2E-9 0	7E-12 0	0 1E-5	0 1E-4
91	Pa-230	Y: see Pa-227	0	4E+0	1E-9	5E-12	0	0
91	Pa-231	W: see Pa-227	2E-1 Bone Surf (5E-1)	3E-3 Bone surf (4E-3)	6E-13 0	0 6E-15	0 6E-9	0 6E-8
91	Pa-231	Y: see Pa-227	0 0	4E-3 Bone surf (6E-3)	2E-12 0	0 8E-15	0 0	0 0
91	Pa-232	W: see Pa-227	1E+3	2E+1	9E-9	0	2E-5	2E-4

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
			0	Bone surf (6E+1)	0	8E-11	0	0
91	Pa-232	Y: see Pa-227	0 0	6E+1 Bone surf (7E+0)	2E-8 0	0 1E-10	0 0	0 0
91	Pa-233	W: see Pa-227	1E+3 LLI Wall (2E+3)	7E+2 0	2E-7 0	1E-9 0	0 2E-5	0 2E-4
91	Pa-233	Y: see Pa-227	0	6E+2	3E-7	8E-10	0	0
91	Pa-234	W: see Pa-227	2E+3	8E+3	3E-6	1E-8	3E-5	3E-4
91	Pa-234	Y: see Pa-227	0	7E+3	3E-6	9E-9	0	0
92	U-230	D: UF_6, UO_2F_2, $UO_2(NO_3)_2$	4E+0 Bone Surf (6E+0)	4E-1 Bone surf (6E-1)	2E-10 0	0 8E-13	0 8E-8	0 8E-7
92	U-230	W: UO_3, UF_4, UCl_4	0	4E-1	1E-10	5E-13	0	0
92	U-230	Y: UO_2, U_3O_8	0	3E-1	1E-10	4E-13	0	0
92	U-231	D: see U-230	5E+3 LLI Wall (4E+3)	8E+3 0	3E-6 0	1E-8 0	0 6E-5	0 6E-4
92	U-231	W: see U-230	0	6E+3	2E-6	8E-9	0	0
92	U-231	Y: see U-230	0	5E+3	2E-6	6E-9	0	0
92	U-232	D: see U-230	2E+0 Bone Surf (4E+0)	2E-1 Bone surf (4E-1)	9E-11 0	0 6E-13	0 6E-8	0 6E-7
92	U-232	W: see U-230	0	4E-1	2E-10	5E-13	0	0
92	U-232	Y: see U-230	0	8E-3	3E-12	1E-14	0	0
92	U-233	D: see U-230	1E+1 Bone Surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10 0	0 3E-12	0 3E-7	0 3E-6
92	U-233	W: see U-230	0	7E-1	3E-10	1E-12	0	0
92	U-233	Y: see U-230	0	4E-2	2E-11	5E-14	0	0
92	U-234[3]	D: see U-230	1E+1 Bone Surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10 0	0 3E-12	0 3E-7	0 3E-6
92	U-234[3]	W: see U-230	0	7E-1	3E-10	1E-12	0	0
92	U-234[3]	Y: see U-230	0	4E-2	2E-11	5E-14	0	0
92	U-235[3]	D: see U-230	1E+1 Bone Surf (2E+1)	1E+0 Bone surf (2E+0)	6E-10 0	0 3E-12	0 3E-7	0 3E-7
92	U-235[3]	W: see U-230	0	8E-1	3E-10	1E-12	0	0
92	U-235[3]	Y: see U-230	0	4E-2	2E-11	6E-14	0	0
92	U-236	D: see U-230	1E+1 Bone Surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10 0	0 3E-12	0 3E-7	0 3E-6
92	U-236	W: see U-230	0	8E-1	3E-10	1E-12	0	0
92	U-236	Y: see U-230	0	4E-2	2E-11	6E-14	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
92	U-237	D: see U-230	2E+3 LLI Wall (2E+3)	3E+3 0	1E-6 0	4E-9 0	0 3E-5	0 3E-4
92	U-237	W: see U-230	0	2E+3	7E-7	2E-9	0	0
92	U-237	Y: see U-230	0	2E+3	6E-7	2E-9	0	0
92	U-238[3]	D: see U-230	1E+1 Bone Surf (2E+1)	1E+0 Bone surf (2E+0)	6E-10 0	0 3E-12	0 3E-7	0 3E-6
92	U-237	W: see U-230	0	8E-1	3E-10	1E-12	0	0
92	U-237	Y: see U-230	0	4E-2	2E-11	6E-14	0	0
92	U-239[2]	D: see U-230	7E+4	2E+5	8E-5	3E-7	9E-4	9E-3
92	U-239[2]	W: see U-230	0	2E+5	7E-5	2E-7	0	0
92	U-239[2]	Y: see U-230	0	2E+5	6E-5	2E-7	0	0
92	U-240	D: see U-230	1E+3	4E+3	2E-6	5E-9	2E-5	2E-4
92	U-240	W: see U-230	0	3E+3	1E-6	4E-9	0	0
92	U-240	Y: see U-230	0	2E+3	1E-6	3E-9	0	0
92	U-Nat[3]	D: see U-230	1E+1 Bone Surf (2E+1)	1E+0 Bone surf (2E+0)	5E-10 0	0 3E-12	0 3E-7	0 3E-6
92	U-Nat[3]	W: see U-230	0	8E-1	3E-10	9E-13	0	0
92	U-Nat[3]	Y: see U-230	0	5E-2	2E-11	9E-14	0	0
93	Np-232[2]	W: all compounds	1E+5 0	2E+3 Bone surf (5E+2)	7E-7 0	0 6E-9	2E-3 0	2E-2 0
93	Np-233[2]	W: all compounds	8E+5	3E+6	1E-3	4E-6	1E-2	1E-1
93	Np-234	W: all compounds	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
93	Np-235	W: all compounds	2E+4 LLI Wall 2E+4	8E+2 Bone surf (1E+3)	3E-7 0	0 2E-9	0 3E-4	0 3E-3
93	Np-236 (1E+5 y)	W: all compounds	3E+0 Bone Surf (6E+0)	2E-2 Bone surf (5E-2)	9E-12 0	0 8E-14	0 9E-8	0 9E-7
93	Np-236: (22.5 h)	W: all compounds	3E+3 Bone Surf (4E+3)	3E+1 Bone surf (7E+1)	1E-8 0	0 1E-10	0 5E-5	0 5E-4
93	Np-237	W: all compounds	5E-1 Bone Surf (1E+0)	4E-3 Bone surf (1E-2)	2E-12 0	0 1E-14	0 2E-8	0 2E-7
93	Np-238	W: all compounds	1E+3	6E+1 Bone surf (2E+2)	3E-8 0	0 2E-10	2E-5 0	2E-4 0
93	Np-239	W: all compounds	2E+3 LLI Wall (2E+3)	2E+3 0	9E-7 0	3E-9 0	0 2E-5	0 2E-4
93	Np-240[2]	W: all compounds	2E+4	8E+4	3E-5	1E-7	3E-4	3E-3
94	Pu-234	W: all compounds except PuO_2	8E+3	2E+2	9E-8	3E-10	1E-4	1E-3

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
94	Pu-234	Y: PuO_2	0	2E+2	8E-8	3E-10	0	0
94	Pu-235[2]	W: see Pu-234	9E+5	3E+6	1E-3	4E-6	1E-2	1E-1
94	Pu-235	Y: see Pu-234	0	3E+6	1E-3	3E-6	0	0
94	Pu-236	W: see Pu-234	2E+0 Bone Surf (4E+0)	2E-2 Bone surf (4E-2)	8E-12	0 5E-14	0 6E-8	0 6E-7
94	Pu-236	Y: see Pu-234	0	4E-2	2E-11	6E-14	0	0
94	Pu-237	W: see Pu-234	1E+4	3E+3	1E-6	5E-9	2E-4	2E-3
94	Pu-237	Y: see Pu-234	0	3E+3	1E-6	4E-9	0	0
94	Pu-238	W: see Pu-234	9E-1 Bone Surf (2E+0)	7E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
94	Pu-238	Y: see Pu-234	0	2E-2	8E-12	2E-14	0	0
94	Pu-239	W: see Pu-234	8E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
94	Pu-239	Y: see Pu-234	0 0	2E-2 Bone surf (2E-2)	7E-12 0	0 2E-14	0 0	0 0
94	Pu-240	W: see Pu-234	8E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	0 2E-14	0 2E-8	0 2E-7
94	Pu-240	Y: see Pu-234	0 0	2E-2 Bone surf (2E-2)	7E-12 0	0 2E-14	0 0	0 0
94	Pu-241	W: see Pu-234	4E+1 Bone Surf (7E+1)	3E-1 Bone surf (6E-1)	1E-10 0	0 8E-13	0 2E-6	0 2E-5
94	Pu-241	Y: see Pu-234	0 0	8E-1 Bone surf (1E+0)	3E-10 0	0 1E-12	0 0	0 0
94	Pu-242	W: see Pu-234	8E-1 Bone Surf (1E+0)	7E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
94	Pu-242	Y: see Pu-234	0 0	2E-2 Bone surf (2E-2)	7E-12 0	0 2E-14	0 0	0 0
94	Pu-243	W: see Pu-234	2E+4	4E+4	2E-5	5E-8	2E-4	2E-3
94	Pu-243	Y: see Pu-234	0	4E+4	2E-5	5E-8	0	0
94	Pu-244	W: see Pu-234	8E-1 Bone Surf (2E+0)	7E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
94	Pu-244	Y: see Pu-234	0	2E-2 Bone surf (2E-2)	7E-12 0	0 2E-14	0 0	0 0
94	Pu-245	W: see Pu-234	2E+3	5E+3	2E-6	6E-9	3E-5	3E-4
94	Pu-245	Y: see Pu-234	0	4E+3	2E-6	6E-9	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
94	Pu-246	W: see Pu-234	4E+2 LLI Wall (4E+2)	3E+2 0	1E-7 0	4E-10 0	0 6E-6	0 6E-5
94	Pu-246	Y: see Pu-234	0	3E+2	1E-7	4E-10	0	0
95	Am-237[2]	W: all compounds	8E+4	3E+5	1E-4	4E-7	1E-3	1E-2
95	Am-238[2]	W: all compounds	4E+4	3E+3 Bone surf (6E+3)	1E-6 0	0 9E-9	5E-4 0	5E-3 0
95	Am-239	W: all compounds	5E+3	1E+4	5E-6	2E-8	7E-5	7E-4
95	Am-240	W: all compounds	2E+3	3E+3	1E-6	4E-9	3E-5	3E-4
95	Am-241	W: all compounds	8E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
95	Am-242m	W: all compounds	8E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
95	Am-242	W: all compounds	4E+3	8E+1 Bone surf (9E+1)	4E-8 0	0 1E-10	5E-5 0	5E-4 0
95	Am-243	W: all compounds	8E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
95	Am-244m[2]	W: all compounds	6E+4 St Wall (8E+4)	4E+3 Bone surf (7E+3)	2E-6 0	0 1E-8	0 1E-3	0 1E-2
95	Am-244	W: all compounds	3E+3 0	2E+2 Bone surf (3E+2)	8E-8 0	0 4E-10	4E-5 0	4E-4 0
95	Am-245	W: all compounds	3E+4	8E+4	3E-5	1E-7	4E-4	4E-3
95	Am-246m[2]	W: all compounds	5E+4 St Wall (6E+4)	2E+5 0	8E-5 0	3E-7 0	0 8E-4	0 8E-3
95	Am-246[2]	W: all compounds	3E+4	1E+5	4E-5	1E-7	4E-4	4E-3
96	Cm-238	W: all compounds	2E+4	1E+3	5E-7	2E-9	2E-4	2E-3
96	Cm-240	W: all compounds	6E+1 Bone Surf (8E+1)	6E- Bone surf (6E-1)	2E-10 0	0 9E-13	0 1E-6	0 1E-5
96	Cm-241	W: all compounds	1E+3 0	3E+1 Bone surf (4E+1)	1E-8 0	0 5E-11	2E-5 0	2E-4 0
96	Cm-242	W: all compounds	3E+1 Bone Surf (5E+1)	3E-1 Bone surf (3E-1)	1E-10 0	0 4E-13	0 7E-7	0 7E-6
96	Cm-243	W: all compounds	1E+0 Bone Surf (2E+0)	9E-3 Bone surf (2E-2)	4E-12 0	0 2E-14	0 3E-8	0 3E-7

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
96	Cm-244	W: all compounds	1E+0 Bone Surf (2E+0)	1E-2 Bone surf (2E-2)	5E-12 0	0 3E-14	0 3E-8	0 3E-7
96	Cm-245	W: all compounds	7E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12 0	0 2E-14	0 2E-8	0 2E-7
96	Cm-246	W: all compounds	7E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-12	0 2E-14	0 2E-8	0 2E-7
96	Cm-247	W: all compounds	8E-1 Bone Surf (1E+0)	6E-3 Bone surf (1E-2)	3E-102 0	0 2E-14	0 2E-8	0 2E-7
96	Cm-248	W: all compounds	2E-1 Bone Surf (4E-1)	2E-3 Bone surf (3E-3)	7E-13 0	0 4E-15	0 5E-9	0 5E-8
96	Cm-249[2]	W: all compounds	5E+4 0	2E+4 Bone surf (3E+4)	7E-6 0	0 4E-8	7E-4 0	7E-3 0
96	Cm-250	W: all compounds	4E-2 Bone Surf (6E-2)	3E-4 Bone surf (5E-4)	1E-13	0 8E-16	0 9E-10	0 9E-9
97	Bk-245	W: all compounds	2E+3	1E+3	5E-7	2E-9	3E-5	3E-4
97	Bk-246	W: all compounds	3E+3	3E+3	1E-6	4E-9	4E-5	4E-4
97	Bk-247	W: all compounds	5E-1 Bone Surf (1E+0)	4E-3 Bone surf (9E-3)	2E-12 0	0 1E-14	0 2E-8	0 2E-7
97	Bk-249	W: all compounds	2E+2 Bone Surf (5E+2)	2E+0 Bone surf (4E+0)	7E-10 0	0 5E-12	0 6E-6	0 6E-5
97	Bk-250	W: all compounds	9E+3 0	3E+2 Bone surf (7E+2)	1E-7 0	0 1E-9	1E-4 0	1E-3 0
98	Cf-244[2]	W: all compounds except those given for Y	3E+4 St Wall (3E+4)	6E+2 0	2E-7 0	8E-10	0 4E-4	0 4E-3
98	Cf-244[2]	Y: oxides and hydroxides	0	6E+2	2E-7	8E-10	0	0
98	Cf-246	W: see Cf-244	4E+2	9E+0	4E-9	1E-11	5E-6	5E-5
98	Cf-246	Y: see Cf-244	0	9E+0	4E-9	1E-11	0	0
98	Cf-248	W: see Cf-244	8E+0 Bone Surf (2E+1)	6E-2 Bone surf (1E-1)	3E-11 0	0 2E-13	0 2E-7	0 2E-6
98	Cf-248	Y: see Cf-244	0	1E-1	4E-11	1E-13	0	0
98	Cf-249	W: see Cf-244	5E-1 Bone Surf (1E+0)	4E-3 Bone surf (9E-3)	2E-12 0	0 1E-14	0 2E-8	0 2E-7

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
98	Cf-249	Y: see Cf-244	0 0	1E-2 Bone surf (1E-2)	4E-12 0	0 2E-14	0 0	0 0
98	Cf-250	W: see Cf-244	1E+0 Bone Surf (2E+0)	9E-3 Bone surf (2E-2)	4E-12 0	0 3E-14	0 3E-8	0 3E-8
98	Cf-250	Y: see Cf-244	0	3E-2	1E-11	4E-14	0	0
98	Cf-251	W: see Cf-244	5E-1 Bone Surf (1E+0)	4E-3 Bone surf (9E-3)	2E-12	0 1E-14	0 2E-8	0 2E-7
98	Cf-251	Y: see Cf-244	0 0	1E-2 Bone surf (1E-2)	4E-12 0	0 2E-14	0 0	0 0
98	Cf-252	W: see Cf-244	2E+0 Bone Surf (5E+0)	2E-2 Bone surf (4E-2)	8E-12 0	0 5E-14	0 7E-8	0 7E-7
98	Cf-252	Y: see Cf-244	0	3E-2	1E-11	5E-14	0	0
98	Cf-253	W: see Cf-244	2E+2 Bone Surf (4E+2)	2E+0 0	8E-10 0	2E-12 0	0 5E-6	0 5E-4
98	Cf-253	Y: see Cf-244	0	2E+0	7E-10	2E-12	0	0
98	Cf-254	W: see Cf-244	2E+0	2E-2	9E-12	3E-14	3E-8	3E-7
98	Cf-254	Y: see Cf-244	0	2E-2	7E-12	2E-14	0	0
99	Es-250	W: all compounds	4E+4 0	5E+2 Bone surf (12E+3)	2E-7 0	0 2E-9	0 0	0 0
99	Es-251	W: all compounds	7E+3 0	9E+2 Bone surf (1E+3)	4E-7 0	0 2E-9	1E-4 0	1E-3 0
99	Es-253	W: all compounds	2E+2	1E+0	6E-10	2E-12	2E-6	2E-5
99	Es-254m	W: all compounds	3E+2 LLI Wall (3E+2)	1E+1 0	4E-9 0	1E-11 0	0 4E-6	0 4E-5
99	Es-254	W: all compounds	8E+0 Bone Surf (2E+1)	7E-2 Bone surf (1E-1)	3E-11 0	0 2E-13	0 2E-7	0 2E-6
100	Fm-252	W: all compounds	5E+2	1E+1	5E-9	2E-11	6E-6	6E-5
100	Fm-253	W: all compounds	1E+3	1E+1	4E-9	1E-11	1E-5	1E-4
100	Fm-254	W: all compounds	3E+3	9E+1	4E-8	1E-10	4E-5	4E-4
100	Fm-255	W: all compounds	5E+2	2E+1	9E-9	3E-11	7E-6	7E-5
100	Fm-257	W: all compounds	2E+1 Bone Surf (4E+1)	2E-1 Bone surf (2E-1)	7E-11 0	0 3E-13	0 5E-7	0 5E-6
101	Md-257	W: all compounds	7E+3 0	8E+1 Bone surf (9E+1)	4E-8 0	0 1E-10	1E-4 0	1E-3 0
101	Md-258	W: all compounds	3E+1 Bone Surf	2E-1 Bone surf	1E-10	0	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
			(5E+1)	(3E-1)	0	5E-13	6E-7	6E-6
---	Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours	SUBMERSION[1]	0	2E+2	1E-7	1E-9	0	0
---	Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours		0	2E-1	1E-10	1E-12	1E-8	1E-7
---	Any single radionuclide not listed above that decays by alpha emission or spontaneous fission, or any mixture for which either the identity or the concentration of any radionuclide in the mixture is not known		0	4E-4	2E-13	1E-15	2E-9	2E-8
	If it is known that Ac-227-D and Cm-250-W are not present		0	7E-4	3E-13	0	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
	If, in addition, it is known that Ac-227-W,Y, Th-229-W,Y, Th-230-W,Y, Pa-231-W,Y, Np-237-W, Pu-239-W, Pu-242-W, Am-241-W, Am-242m-W, Am-243-W, Cm-245-W, Cm-246-W, Cm-247-W, Cm-248-W, Bk-247-W, Cf-249-W, and Cf-251-W are not present		0	7E-3	3E-12	0	0	0
	If, in addition, it is known that Sm-146-W, Sm-147-W, Gd-148-D,W, Gd-152-D,W, Th-228,-W,Y, Th-230-Y, U-233-Y, U-235-Y, U-236-Y, U-238-Y, Np-236-W, Pu-236-W,Y, Pu-238-W,Y, Pu-239-Y, Pu-240-Y, Pu-242-Y, Pu-244-W,Y, Cm-243-W, Cm-244-W, Cf-248-W, Cf-249-Y, Cf-250-W,Y, Cf-251-Y, Cf-252-W,Y, and Cf-252-W,Y, are not present		0	7E-2	3E-11	0	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
	If, in addition, it is known that Pb-210-D, Bi-210m-W, Po-210-D,W Ra-223-W, Ra-226-W, Ac-225-D,W,Y, Th-227-W,Y, U-230-D,W,Y, C-232-D,W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-Y, Es-254-W, Fm-257-W, and Md-258-W are not present		0	7E-1	3E-10	0	0	0
	If, in addition, it is known that Si-32-Y, Ti-44-Y, Fe-60-D, Sr-90-Y, Zr-93-D, Cd-113m-D, Cd-113-D, In-115-D,W, La-138-D, Lu-176-W, Hf-178m-D,W, Bi-210m-D, Ra-224-W, Ra-228-W, Ac-226-D,W,Y, Pa-230-W,Y, u-233-D,W, U-234-D,W, U-235-D,W, U-236-D,W, U-238-D,W, Pu-241-Y, Bk-249-W, Cf-253-W,Y, and Es-253-W are not present		0	7E+0	3E-9	0	0	0
	If it is known that Ac-227-D,W,Y, Th-229-W,Y, Th-232-W,Y, Pa-231-W,Y, Cm-248-W, and Cm-250-W are not present		0	0	0	1E-14	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
	If, in addition , it is known that Sm-146-W, Gd-148-D, Gd-152-D, Th-228-W,Y, Th-230-W,Y, U-232-Y, U-2333-Y, U-234-Y, U-235-Y, U-236-Y, U-238-Y, U-Nat-Y, Np-236-W, Np-237-W, Pu-236-,Y, Pu-238-W,Y, Pu-239-W,Y, Pu-240-W,Y, Pu-242-W,Y, Pu-244-W,Y, Am-241-W, Am-242m-W, Am-243-W, Cm-243-W, Cm-244-W, Cm-245-W, Cm-246-W, Cm-247-W, Bk-247-2, Cf-249-W,Y, Cf-250-W,Y, Cf-251-W,Y, Cf-252-W,Y, and Cf-254-W,Y are not present		0	0	0	1E-13	0	0
	If , in addition, it is known that Sm-147-W, Gd-152-W, Pb-210-D, Bi-210m-W, Po-210-D-W, Ra-223-W, Ra-225-W, Ra-226-W, Ac-225-D,W,Y, Th-227-W,Y, U-230-D,W,Y, U-232-D,W, U-Nat-W, Pu-241-W, Cm-240-W, Cm-242-W, Cf-248-W,Y, Es-254-W, Fm-257-W, and Md-258-W are not present		0	0	0	1E-12	0	0

			TABLE I Occupational Values			TABLE II Effluent Concentrations		TABLE III Release to Sewers
At. No.	Radionuclide	Class	COL. 1 Oral Ingestion ALI (µCi)	COL. 2 Inhalation ALI (µCi)	COL. 3 Inhalation DAC (µCi/ml)	COL. 1 Air (µCi/ml)	COL. 2 Water (µCi/ml)	Monthly Average Concen-tration (µCi/ml)
	If, in addition it is known that Fe-60, Sr-90, Cd-113m, Cd-113, In-115, I-129, Cs-134, Sm-145, Gd-148, Gd-152, Hg-194 (organic), Bi-210m, Ra-223, Ra-224, Ra-225, Ac-225, Th-228, Th-230, U-233, U-234, U-235, U-236, U-238, U-Nat, Cm-242, Cf-248, Ex-254, Fm-257, and Md-258 are not present		0	0	0	0	1E-6	1E-5

FOOTNOTES:

[1] ”Submersion” means that values given are for submersion in a hemispherical semi-infinite cloud of airborne material.

[2] These radionuclieds have radiological half-lives of less than 2 hours. The total effective dose equivalent received during operations with these radionuclides might include a significant contribution from external exposure. The DAC values for all radionuclides, other than those designated Class “Submersion,” are based upon the committed effective dose equivalent due to the intake of the radionuclide into the body and do NOT include potentially significant contributions to dose equivalent from external exposures. The licensee may substitute 1E-7 µCi/ml for the listed DAC to account for the submersion dose prospectively, but should use individual monitoring devices or other measuring instruments that measure external exposure to demonstrate compliance with the limits.

[3] For soluble mixtures, of U-238, U-234, and U-235 in air, chemical toxicity may be the limiting factor. If the percent by weight)enrichment) or U-235 is not greater than 5, the concentration value for a 40-hour workweek is 0.2 milligrams uranium per cubic meter of air average. for any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8E-3 (SA) µCi-hr/ml, where SA is the specific activity of the uranium inhaled. The specific activity for natural uranium is 6.77E-7 curies per gram U. The specific activity for other mixtures of U-238, U-235, and U-234, if not known , shall be:

SA = 3.6E-7 curies/gram U U-depleted

SA = $[0.4 + 0.38(\text{enrichment})^2] E-6$, enrichment ≥ 0.72

Where enrichment is the percentage by weight of U-235, expressed as percent

NOTE:

1. If the identify of each radionuclide in a mixture is known but the concentration of one or more or the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.

2. If the identity of each radionuclide in the mixture is not known, but it is known that certain radionuclieds specified in this appendix are not present in the mixture, the inhalation ALI, DAC, and effluent and sewage concentrations for the mixture are the lowest values specified in this appendix for any radionuclide that is not known to be present from the mixture; or

3. If the mixture of radionuclieds consists of uranium and its daughters in ore dust (10 μm AMAD particle distribution assumed) prior to chemical separation of the uranium from the ore, the following values may be used for the DAC of the mixture: 6E-11 μCi of gross alpha activity from uranium 238, uranium 234, thorium 230, and radium 226 per milliliter of air; 3E-11 μCi of natural uranium of air; or 45 micrograms or natural uranium per cubic meter of air.

4. If the identity and concentration of each radionuclide in a mixture are known, the limiting values should be derived as follows: determine, for each radionuclide in the mixture, the ration between the concentration present in the mixture and the concentration otherwise established State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations, July 1993 for the specific radionuclide when not in a mixture. The sum of such ratios for all of the radionuclides in the mixture may not exceed “1” (i.e., unity)

   Example: If radionuclides “A”, “B”, and “C” are present in concentrations C_A, C_B, and C_C, and if the applicable DACs are DAC_A, DAC_B, and DAC_C, respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_A}{DAC_A} + \frac{C_B}{DAC_B} + \frac{C_C}{DAC_C} \leq 1$$