

**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
(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07
Date Due for State Adoption 11/30/10**

Change to NRC Section	Title	State Section	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	Section 100.02 Page 1	H&S	<p>In § 20.1003, the definition of <i>Accelerator-produced radioactive material</i>, is added to read as follows:</p> <p><i>Accelerator-produced radioactive material</i> means any material made radioactive by a particle accelerator.</p>	No		
§20.1003	Definition: Byproduct Material	Section 100.02 Page 3	<p>[H&S]** *</p> <p>(**please note 10 CFR 20.1003 Definition of Byproduct Material was changed from a Compa</p>	<p>In § 20.1003, the definition of <i>Byproduct material</i> is revised to read as follows:</p> <p><i>Byproduct material</i> means—</p> <p>(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;</p> <p>(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</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
			Compatibility Category A to a Compatibility Category H&S)	<p>solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition;</p> <p>(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</p> <p>(ii) Any material that—</p> <p>(A) Has been made radioactive by use of a particle accelerator; and</p> <p>(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</p> <p>(4) Any discrete source of naturally occurring radioactive material, other than source material, that—</p> <p>(i) The Commission, in consultation with the Administrator</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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</p> <p>(ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.</p> <p>****</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

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§20.1003	Definition: Discrete Source	Section 100.02 Page 5	H&S	In § 20.1003, the definition of <i>Discrete source</i> is added to read as follows: <i>Discrete source</i> 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.	No		
§20.1003	Definition: Particle Accelerator	Section 100.02 Page 9	H&S	In § 20.1003, the definition of <i>Particle accelerator</i> is added to read as follows: <i>Particle accelerator</i> 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.	No		
§20.1003	Definition: Waste	Section 100.02 Page 15	B	In § 20.1003, the definition of <i>Waste</i> is added to read as	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

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				<p>follows:</p> <p><i>Waste</i> 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.</p>			
§20.1009	List of OMB approved information collections		D	N/A	N/A		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

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§20.2001 (a)(4)	General requirements	Section 400.35 Page 33	C	<p>In § 20.2001, paragraph (a)(4) is revised to read as follows:</p> <p>a) * * *</p> <p>(4) As authorized under §§20.2002, 20.2003, 20.2004, 20.2005, or 20.2008.</p>	No		
§20.2006 (e)	Transfer for disposal and manifests	Section 400.40 Page 35	B	<p>In § 20.2006, paragraph (e) is added to read as follows:</p> <p>(e) Any licensee shipping byproduct material as defined in paragraphs (3) and (4) of the definition of <i>Byproduct material</i> set forth in § 20.1003 intended for ultimate disposal at a land disposal facility 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.</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§20.2008	Disposal of 11e.(3) and 11e.(4) byproduct material	Section 400.42 Pages 35-36	B	<p>Section 20.2008 is added to read as follows:</p> <p>(a) Licensed material as defined in paragraphs (3) and (4) of the definition of <i>Byproduct material</i> 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.</p> <p>(b) A licensee may dispose of byproduct material, as defined in paragraphs (3) and (4) of the definition of <i>Byproduct material</i> set forth in §20.1003, at a disposal facility authorized to dispose of such material in accordance with any Federal or State solid or hazardous waste law, including</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				the Solid Waste Disposal Act, as authorized under the Energy Policy Act of 2005.			
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	Appendix B- List of Elements Page 62	A	<p>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:</p> <p>See tables at the end of the document.</p>	No		
§30.3(a)	Activities requiring license	Section 300.01(1) Page 1	C	<p>Section 30.3(a) is revised to read as follows:</p> <p>(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,</p>	Yes	No	

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

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				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.			
§30.3(b)(1), (2), & (3)	Activities requiring license		NRC	<p>Section 30.3(b)(1), (2), & (3) is revised to read as follows:</p> <p>(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.</p> <p>(2) A specifically licensed</p>	N/A		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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.</p>			
				<p>(3) A Government agency or Federally recognized Indian Tribe that possesses and uses accelerator-produced 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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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		D	N/A	N/A		
§30.4	Definition: Accelerator produced radioactive material	Section 100.02 Page 1	H&S	In § 30.4, the definition of <i>Accelerator-produced radioactive material</i>, is added to read as follows: <i>Accelerator-produced radioactive material</i> means any material made radioactive by a particle accelerator.	No		
§30.4	Definition: Byproduct material	Section 100.02 Page 3	[H&S]** * (***please note 10 CFR	In § 30.4, the definition of <i>Byproduct material</i> is revised, to read as follows: <i>Byproduct material</i> means— (1) Any radioactive material (except special nuclear material)	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
			<p>30.4 Definition of Byproduct Material was changed from a Compatibility Category A to a Compatibility Category H&S)</p>	<p>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 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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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</p> <p>(ii) Before, on, or after August 8, 2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.</p>			
§30.4	Definition: Consortium	Section 100.02 Page 4 Previously adopted	C	<p>In § 30.4, the definition of <i>Consortium</i>, is added to read as follows:</p> <p><i>Consortium</i> 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</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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		D	N/A	N/A		
§30.4	Definition: Discrete Source	Section 100.02 Page 5	H&S	In § 30.4, the definition of <i>Discrete source</i>, is added to read as follows: <i>Discrete source</i> 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.	No		
§30.4	Definition: Particle accelerator	Section 100.02 Page 9 Previously adopted	H&S	In § 30.4, the definition of <i>Particle accelerator</i> is added to read as follows: <i>Particle accelerator</i> means any	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

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				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.			
§30.15 (a)(1)(viii)	Certain items containing byproduct material	Section 300.03(3)(a)(i)(viii) Page 7 Previously adopted	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		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§30.18 (b)	Exempt quantities	Section 300.03(2)(b) Page 5 Previously adopted Same as SSRs	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 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.	yes	No	
§30.20(a)	Gas and aerosol detectors containing byproduct material	Section 300.03(3)(c) Page 9	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 requirements for a license set forth in section 81 of	Yes	No	

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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 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.</p>			
§30.32(g)	Application for	Section 300.08(7)	C	In § 30.32, paragraphs (g)(1) and	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	specific licenses	Pages 30-31		<p>(g)(2) are revised and paragraphs (g)(3) are added to read as follows:</p> <p>(g) * * *</p> <p>(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 with a State under provisions comparable to § 32.210 of this chapter; or</p> <p>(2) Contain the information identified in § 32.210(c) of this chapter; or</p> <p>(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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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:</p> <p>(i) All available information identified in § 32.210(c) of this chapter concerning the source, and, if applicable, the device; and</p> <p>(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.</p>			
§30.32(j)	Application for specific	Section 300.08(9) Page 34	B	In § 30.32, paragraph (j) is added to read as follows:	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	licenses	Previously adopted		<p>(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:</p> <p>(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 facility within its consortium from which it receives PET radionuclides.</p> <p>(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.</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>(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.</p> <p>(4) Information identified in § 32.72 (a)(3) of this chapter on the PET drugs to be noncommercially transferred to members of its consortium.</p>			
§30.34 (g)	Terms and conditions of licenses	Section 300.15(8) Page 67	H&S*** (***please note 10 CFR 30.34(g) Terms and Conditions of	<p>In § 30.34, paragraph (g) is revised to read as follows:</p> <p>(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</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
			Licenses was changed from a Compatibility Category D to a Compatibility Category H&S)	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.			
§30.34(j)	Terms and conditions of licenses	Section 300.15(9) Page 67	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	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>radioactive drugs.</p> <p>(2) Each licensee authorized under § 30.32(j) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium shall:</p> <p>(i) Satisfy the labeling requirements in § 32.72(a)(4) of this chapter for each PET radioactive drug transport 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.</p> <p>(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.</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>(3) A licensee that is a pharmacy authorized under § 30.32(j) to produce PET radioactive drugs for noncommercial transfer to medical use licensees in its consortium shall require that any individual that prepares PET radioactive drugs shall be:</p> <ul style="list-style-type: none"> (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. <p>(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.</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§30.71	Schedule B	Section 300 Appendix B Page 82-85 Previously adopted	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		
§30.72	Schedule C – Quantities of radioactive material requiring consideration of the need for an emergency plan for responding to	Section 300 Appendix C Page 88	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		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	a release						
§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	<p>Section 300.06(4)(b) Pages 14-15</p> <p>Section 300.06(4)(c)(xiii)(i) Page 19</p>	B	<p>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:</p> <p>(b)(1) * * *</p> <p>(i) A specific license issued under § 32.51 of this chapter; or</p> <p>(ii) An equivalent specific license issued by an Agreement State; or</p> <p>(iii) An equivalent specific license issued by a State with provisions comparable to § 32.51 of this chapter.</p> <p>* * * * *</p> <p>(c) * * *</p> <p>(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</p>	<p>No</p> <p>YES</p>	<p>YES</p>	<p>Mississippi more restrictive. See comments from previous amended regulation submittal.</p>

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				megabecquerels (1 millicurie) of cobalt-60, 3.7 megabecquerels (0.1 millicurie) of radium-226, or 37 megabecquerels (1 millicurie) of americium-241 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		D	N/A	N/A		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	certain in vivo clinical and laboratory testing						
§31.12	General license for certain items and self-luminous products containing radium-226	Section 300.06(11) Page 28-30	C	<p>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:</p> <p>(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 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</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>emanator jars, revigators, radium water jars, radon generators, refrigerator cards, radium bath salts, and healing pads.</p> <p>(2) Intact timepieces containing greater than 0.037 megabecquerel (1 microcurie), nonintact timepieces, and timepiece hands and dials no longer installed in timepieces.</p> <p>(3) Luminous items installed in air, marine, or land vehicles.</p> <p>(4) All other luminous products, provided that no more than 100 items are used or stored at the same location at any one time.</p> <p>(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,</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>lightning rods, ionization sources, static eliminators, or as designated by the NRC.</p> <p>(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 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.</p> <p>(c) Any person who acquires, receives, possesses, uses, or transfers byproduct material in accordance with the general license in paragraph (a) of this section:</p> <p>(1) Shall notify the NRC should</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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 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.</p> <p>(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.</p> <p>(3) Shall not export products containing radium-226 except in accordance with part 110 of this chapter.</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>(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.</p> <p>(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 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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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.</p> <p>(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.</p>			
§32.1 (c)(1)	Purpose and scope		NRC	<p>In § 32.1, paragraph (c) is added to read as follows:</p> <p>(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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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 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	Section 300.12(6) Page 54 Previously added	B	In § 32.57, the heading and the introductory text are revised to read as follows:	yes	No	By reference to NRC regulations

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	containing americium-241 or radium- 226: Requirements for license to manufacture or initially transfer			<p>An application for a specific license to manufacture or initially transfer calibration or reference sources containing americium-241 or radium-226, for distribution to persons generally licensed under § 31.8 of this chapter, will be approved if:</p> <p>(a) The applicant satisfies the general requirements of § 30.33 of this chapter;</p> <p>(b) The applicant submits sufficient information regarding each type of calibration or reference source pertinent to evaluation of the potential radiation exposure, including:</p> <p>(1) Chemical and physical form and maximum quantity of americium 241 or radium-226 in the source;</p> <p>(2) Details of construction and design;</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>(3) Details of the method of incorporation and binding of the americium-241 or radium-226 in the source;</p> <p>(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;</p> <p>(5) Details of quality control procedures to be followed in manufacture of the source;</p> <p>(6) Description of labeling to be affixed to the source or the storage container for the source;</p> <p>(7) Any additional information, including experimental studies and tests, required by the Commission to facilitate a determination of the</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>safety of the source.</p> <p>(c) Each source will contain no more than 5 microcuries of americium-241 or radium-226.</p> <p>(d) The Commission determines, with respect to any type of source containing more than 0.005 microcurie of americium-241 or radium-226, that:</p> <p>(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</p> <p>(2) The source has been subjected to and has satisfactorily passed the prototype tests prescribed by § 32.102, Schedule C, of this part.</p>			
§32.58	Same: labeling of	Section 300.12(6) Page 54	B	Section 32.58 is revised to read as follows:	Yes	no	By reference to NRC regulations

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	devices	Previously added		<p>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:</p> <p>The receipt, possession, use, 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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>THIS SOURCE</p> <hr/> <p>(Name of manufacturer or initial transferor)</p>			
§32.59	Same: Leak testing of each source	Section 300.12(6) Page 54 Previously added	B	<p>Section 32.59 is revised to read as follows:</p> <p>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 more than 0.185 kilobecquerel (0.005 microcurie) of</p>	Yes	No	By reference to NRC regulations

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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	Section 300.12(8) Pages 54-55 Previously added	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) * * * (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	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				(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			
§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	Section 300.12(10) Pages 56-60 Previously added	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); * * * * *	No		Parts were previously adopted.

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>(iii) Licensed as a pharmacy by a State Board of Pharmacy; (iv) Operating as a nuclear pharmacy within a Federal medical institution; or (v) A Positron Emission Tomography (PET) drug production facility registered with a State agency. * * * * *</p> <p>(b) * * * (2) * * *</p> <p>(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 * * * * *</p> <p>(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 accelerator-produced</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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 (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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>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, 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.</p>			
§32.102	Schedule-C prototype tests for calibration or reference	Section 300.12(6)(b) Page 54	B	<p>In § 32.102, the heading and the introductory paragraph are revised to read as follows:</p> <p>An applicant for a license under</p>	yes	no	By reference to NRC regulations

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	sources containing americium-241			§ 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-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	Section 700.02 Page 4 Previously added	H&S	In § 35.2, new definition for <i>Positron Emission Tomography (PET) radionuclide production facility</i> is added to read as follows: <i>Positron Emission Tomography (PET) radionuclide production facility</i> is defined as a facility operating a cyclotron or	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				accelerator for the purpose of producing PET radionuclides.			
§35.10(a) & (g)	Implementation		D	N/A	N/A		
§35.11(a)	License required	Section 700.07(1) Page 8 Previously added	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.			
§35.11 (c)(1)	License required		NRC	In § 35.11 paragraph (c) is added to read as follows: (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			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

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Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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		
§35.13 (a)(1)	License amendments		NRC	<p>In § 35.13, paragraphs (a)(1) is revised to read as follows:</p> <p>(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—</p> <p>(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</p>			

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	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				such material for medical 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.			
§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		D	N/A	N/A		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
§35.63 (b)(2)(ii), (b)(2)(iii), & (c)(3)	pharmacist Determination of dosages of unsealed byproduct material for medical use	Section 700.27(2)(b)(ii) & (iii) Pages 25-26 Previously added	H&S	<p>In § 35.63, paragraphs (b)(2)(ii) and (c)(3) are revised, and paragraph (b)(2)(iii) is added to read as follows:</p> <p>(b) * * *</p> <p>(2) * * *</p> <p>(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</p> <p>(iii) A PET radioactive drug producer licensed under § 30.32(j) of this chapter or equivalent Agreement State requirements.</p> <p>(c) * * *</p> <p>(3) Combination of volumetric measurements and mathematical calculations, based on the measurement made by:</p> <p>(i) A manufacturer or preparer licensed under § 32.72 of this chapter or equivalent Agreement</p>	no		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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	Section 700.37(1)(a)&(b) Page 34 Previously added	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 (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:	No		
§35.200 (a) & (b)	Use of unsealed byproduct material for	Section 700.40(1)(a)&(b) & (iii) Pages 31-32	H&S	In § 35.200, paragraph (a) and the introductory text of paragraph (b) are revised to read as follows:			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	imaging and localization studies for which a written directive is not required.	Previously added		(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 requirements; or (b) Excluding production of PET radionuclides, prepared by:			
§35.204 (a)	Permissible molybdenum-99 concentrations	Section 700.41(1) Pages 35 Previously added	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			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				of strontium-82 per megabecquerel of rubidium-82 chloride injection (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		D	N/A	N/A		
§ 35.300 (a) & (b)	Use of unsealed byproduct material for which a written directive is required	Section 700.44 Pages 38 Previously added	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 (2) A PET radioactive drug producer licensed under § 30.32(j)			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				of this chapter or equivalent Agreement State requirements; or (b) Excluding production of PET radionuclides, prepared by:			
§35.2204	Records of molybdenum-99 concentrations		D	N/A	N/A		
§50.2	Definition: Byproduct Material		NRC	In § 50.2, the definition of <i>Byproduct material</i> is revised to read as follows: <i>Byproduct material</i> 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			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>commercial, medical, or research activity; or</p> <p>(ii) Any material that—</p> <p>(A) Has been made radioactive by use of a particle accelerator; and</p> <p>(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</p> <p>(3) Any discrete source of naturally occurring radioactive material, other than source material, that—</p> <p>(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</p> <p>(ii) Before, on, or after August 8,</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				2005, is extracted or converted after extraction for use in a commercial, medical, or research activity.			
§61.2	Definition: Waste	Section 100.02 Page 9	B	<p>In § 61.2, the definition for Waste is revised to read as follows:</p> <p><i>Waste</i> 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 <i>Byproduct material</i> set forth in § 20.1003 of this chapter.</p>	No		
§ 62.2	Definition: Low- Level		NRC	<p>In § 62.2, the definition for <i>Low-level radioactive waste (LLW)</i> is</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
	radioactive waste			<p>revised to read as follows:</p> <p><i>Low-level radioactive waste (LLW)</i> means radioactive material that—</p> <p>(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 <i>Byproduct Material</i> set forth in § 20.1003 of this chapter); and</p> <p>(2) The NRC, consistent with existing law and in accordance with paragraph (1) of this definition, classifies as low level radioactive waste.</p>			
§ 72.3	Definition: Byproduct Material		NRC	<p>In § 72.3, the definition for <i>Byproduct material</i> is revised to read as follows:</p> <p><i>Byproduct material</i> means—</p> <p>(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;</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>(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</p> <p>(ii) Any material that—</p> <p>(A) Has been made radioactive by use of a particle accelerator; and</p> <p>(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</p> <p>(3) Any discrete source of naturally occurring radioactive material, other than source material, that—</p> <p>(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</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				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 <i>Accelerator-produced radioactive material</i> is added to read as follows: <i>Accelerator-produced radioactive material</i> means any material made radioactive by a particle accelerator.			
§110.2	Definition: Discrete Source		NRC	In § 110.2, definition of <i>Discrete source</i> is added to read as follows: <i>Discrete source</i> means a radionuclide that has been processed so that its concentration within a material has been purposely increased for use for commercial, medical, or			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				research activities.			
§110.2	Definition: Particle accelerator		NRC	<p>In § 110.2, definition of <i>Particle accelerator</i> is added to read as follows:</p> <p><i>Particle accelerator</i> 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.</p>			
§150.3	Definition: Byproduct material	Section 100.02 Page 3	H&S*** (**please note 10 CFR 150.3 Definition of Byproduct	<p>In § 150.3, the definition of <i>Byproduct material</i> is revised to read as follows:</p> <p><i>Byproduct material</i> means—</p> <p>(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</p>	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
			<p>Material was changed from a Compatibility Category A to a Compatibility Category H&S)</p>	<p>using special nuclear material;</p> <p>(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 solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition;</p> <p>(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</p> <p>(ii) Any material that—</p> <p>(A) Has been made radioactive by use of a particle accelerator; and</p> <p>(B) Is produced, extracted, or converted after extraction, before,</p>			

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<p>on, or after August 8, 2005, for use for a commercial, medical, or research activity; and (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.</p>			
§150.3	Definition: Discrete source	Section 100.02 Page 3	H&S	In § 150.3, the definition of <i>Discrete source</i> is added to read as follows:	No		

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

(72 FR 55864, 73 FR 42671) RATS ID # 2007-3 Effective date 11/30/07

Date Due for State Adoption 11/30/10

Change to NRC Section	Title	State Section	Compatibility Category	Summary of Change to CFR	Difference Yes/No	Significant Yes/No	If Difference, Why or Why Not Was a Comment Generated
				<i>Discrete source</i> 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.			

Appendix B

List of Elements

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	
Atomic No.	Radionuclide	Class	Oral Ingestion	Inhalation		Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)	Monthly Average Concentration ($\mu\text{Ci/ml}$)
			ALI (μCi)	ALI ($\mu\text{Ci/ml}$)	DAC ($\mu\text{Ci/ml}$)			
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, Tl, 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, halides, and nitrates	-	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 $1\text{E}-7$ $\mu\text{Ci}/\text{ml}$ 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

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

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