

**Colorado Radiation Advisory Committee (RAC)
August 6, 2015 Meeting Minutes**

I. CALL TO ORDER	RAC Chair Tom Johnson called the regular meeting to order on August 6, 2015 at 1:05p.m., Building C, Conference Room C1A, at the Colorado Department of Public Health and Environment (CDPHE) main campus.
Agenda	The agenda sent July 24, 2015 was used.
Introductions	<p>Radiation Advisory Committee (RAC) members and Radiation Control Program staff introduced themselves.</p> <p>RAC members in attendance: Ted Borst, Tom Johnson, Frank Judson, Phillip Koo, Vinod Ravindran, and Jennifer Stickel.</p> <p>The members present constituted a quorum.</p> <p>RAC member(s) absent: Riad Safadi, Craig Little, Jim Burkhart.</p> <p>Radiation Program staff in attendance: Jim Grice, James Jarvis, Chrys Kelley, Jennifer Opila, Brian Vamvakias.</p>

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II. Program Updates	
A. Radiation Program update	<p>Jennifer Opila provided updates on the Radiation Program and Radioactive Materials Unit activities.</p> <p>The update included: Follow up information regarding the crushed car incident in Grand Junction (discussed at the June RAC meeting) was reviewed:</p> <ul style="list-style-type: none">- Following initial surveys by Department Grand Junction staff and follow up surveys by staff from the main radiation program office, it was determined that additional survey support was needed to determine the location and isotope present in a crushed vehicle that had been rejected by a local recycling facility. Jennifer Opila and Jim Grice met with members of the Civil Support Team (CST) based at Buckley Air Force Base to discuss possible support from their team. The CST agreed to provide survey support for the incident and the CST was dispatched to Grand Junction. Following surveys by the CST (with CDPHE staff present), the material of concern was identified as non-discrete Ra226 (Naturally Occurring Radioactive Material) NORM in the form of “scale” type material embedded on a couple pieces of scrap metal. The Department is working with the current owner of the contaminated scrap items to disposition the material.- The Department hopes to work with the CST on such events in the future as this type of radiological response was determined to be beneficial for both the CST and the Department as it provides “real life” survey and response experience to team members and provides additional field support to the Department at no cost. <p>Information regarding the proposed Black Range Minerals (BRM) project involving “ablation” was provided:</p> <ul style="list-style-type: none">- Jennifer Opila indicated that BRM submitted a white paper describing their proposed process. The program is currently reviewing the paper and it is likely that additional information will be needed. It is expected once all of the needed information is obtained that the Department will begin some type of stakeholder process. <p>No written program update was available for the meeting.</p>

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<p>B. Radioactive Materials (RAM) Unit update</p>	<p>Jim Grice was not available for this RAC meeting. The RAM Unit update was provided by Jennifer Opila as part of the Radiation Program update (above).</p>
<p>C. X-Ray Certification Unit update</p>	<p>Brian Vamvakias presented on the activities of the X-Ray Certification Unit (XRCU).</p> <p>The updates included the following: Staff continue to work through the billing and registration process for x-ray machines initiated in the spring. At this time, it is estimated that the majority of facilities have paid the new annual registration fee (~4,000 of the ~5,000 facilities); but completion of the facility registration process has lagged, with an estimated ~1,000 (of ~5,000) facilities completing the needed registration documentation. There are plans to reach out to various professional organizations to help facilitate and remind facilities of the need to register. As a last resort, consideration is being given to mail postcards to facilities who have not yet registered.</p> <p><i>RAC Member Tom Johnson inquired as to whether there are any additional ideas for improving response from the registrants?</i></p> <p><i>RAC Member Frank Judson inquired as to whether there are ways to contact registrants electronically so the low response is not repeated (during the next cycle of billing)?</i></p> <ul style="list-style-type: none"> - Brian indicated that one of the pitfalls of the current database of X-Ray registrants is that it is not capable of retaining email addresses. The new database under development will however keep this and other information. Unit staff continue to work with the Office of Information Technology (OIT) staff in developing the new database. <p><i>RAC Member Vinod Ravindran inquired as to whether there will be e-payment capability?</i></p> <p>Brian indicated that the new database will have a web based interface that will allow electronic payment capability.</p> <p>No written unit update was available for the meeting.</p>

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D. Radon Program Update	<p>Chrys Kelley provided an update and summary on the activities and status of the Radon program activities.</p> <p>The updates included:</p> <ul style="list-style-type: none">- The U.S. Environmental Protection Agency (EPA) Region 8 radon conference was attended by 100+ individuals and received high marks for its content; <p><i>RAC Member Ted Borst inquired as to the makeup/composition of attendees at the conference?</i></p> <p>Chrys indicated that about 90 % of the attendees were Colorado based with the majority representing radon mitigation contractors. The remaining attendees were from other states.</p> <p>Chrys continued with her update:</p> <ul style="list-style-type: none">- The federal SIRG (State Indoor Radon Grants) funding is still up in the air with the federal budget not yet approved. A continuing resolution from Congress is expected;- The Colorado radon program is holding off on new grant applications until the federal budget issues are resolved;- The program continues to send out quarterly radon reports;- The Centers for Disease Control (CDC) 2016 national behavior (phone) survey will include a radon question. Radon questions were part of the 2009, and 2013 surveys. The survey will be paid for by the public health side of CDPHE;- Boulder County applied for a CCPD (Cancer, Cardiovascular Disease and Pulmonary Disease committee) grant and is working with other counties to achieve policy changes regarding (radon resistant) new construction, and radon testing for realty transactions. The county was awarded \$250K per year for a 3 year period. Boulder County is currently sending out surveys as the initial step in the project;- The state school inspection regulations are being revised with the intent to incorporate radon testing requirements for daycare facilities. (The requirement would exclude single family daycares in homes);- The Colorado Cancer Plan has enhanced the sections relating to radon;- A recent joint study by Colorado State University (CSU) and the City of Fort Collins on human behavior and
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	<p>health yielded interesting results;</p> <ul style="list-style-type: none"> - The HSRF (Hazardous Substance Site Response Fund) fund has some surplus monies which will be used to provide radon mitigation grants; - There was discussion regarding a potential legislative initiative to fund the Radon program. The initiative will have to be approved by the Governor's office to move forward. <p><i>RAC Member Phillip Koo inquired as to whether the EPA (Environmental Protection Agency) would restrict its funding to the radon program as a result of any legislative initiative?</i></p> <p>Chrys indicated that the current proposal would not generate regulatory based funding (e.g., registration fees) but was not sure what would occur.</p> <p>No written radon program update was available for the meeting.</p>
<p>E. Regulations / Special Projects update</p>	<p>James Jarvis provided an update and summary on the activities and status on regulations / special projects.</p> <p>The primary focus was a walkthrough and review of the proposed rule changes for Parts 3, and 18. (The Part 1 draft was reviewed and an overview discussion was held regarding the Part 3 and Part 18 changes during the prior RAC meeting on June 30).</p> <p>Refer to the attachment /presentation for the Regulations/Special Projects update.</p>
<p>F. Adjourn</p>	<p>The meeting adjourned at approximately 2:30p.m.</p>
<p>Next RAC Meetings:</p>	<p>Remaining 2015 Meetings:</p> <ul style="list-style-type: none"> - October 8 - December 3

Attachments:

1. Colorado Radiation Advisory Committee Agenda as sent July 24, 2015 (1 page)
2. Regulations and Special Projects update and presentation (7 pages)
 - Draft A, Part 3, dated 07/16/15 (64 pages)
 - Draft A, Part 18, dated 07/16/15 (50 pages)

The Radiation Advisory Committee meeting minutes for August 6, 2015, were approved by a quorum of RAC members via email October 7-14.



COLORADO

Department of Public
Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

COLORADO RADIATION ADVISORY COMMITTEE MEETING AGENDA

Thursday, August 6, 2015
1:00 P.M., CDPHE - Building C, Conference Room C1A

REGULAR MEETING

	I. CALL TO ORDER, INTRODUCTIONS, AGENDA ADDITIONS / CHANGES
1:00 PM	
	II. PROGRAM UPDATES
1:05 PM	A. Radiation Program update - Jennifer Opila (20 minutes)
1:25 PM	B. Radioactive Materials Unit update - Jim Grice (20 minutes)
1:50 PM	C. X-Ray Certification Unit - Brian Vamvakias (20 minutes)
2:10 PM	D. Radon Program - Chrys Kelley (20 minutes)
2:30 PM	E. Regulations/Special Projects - James Jarvis (60 minutes) 1. Parts 3, 18 - review and discussion of proposed rule drafts/changes
3:30 PM	F. Subjects for future discussion
~3:35 PM	G. ADJOURN
	2015 RAC Meetings: Thursday, October 8, 2015 Thursday, December 3, 2015

NOTE: all times/dates are approximate and are subject to change



Regulations Part 3 “Licensing of Radioactive Material” - Highlights of proposed changes

- 2014 and 2015 statutory (RCA) driven changes:
 - Elimination of references to “Classified material”
 - Change long-term care warranty assumed interest rate to 1%

Regulations Part 3 (continued)

- Federal rule driven changes (NRC):
 - Add specificity to limits for **source material** (SM) under a general license (dispersible forms; annual amounts; drinking water residuals; laboratory samples);
 - Restrictions on abandonment of **source material**;
 - Permits 1.1 lb (0.5 kg) of SM to be transferred for disposal - recipient is exempt from licensing
 - Adds licensing requirements for initial transfer/distribution of **source material** (excluding labs returning samples);
 - Adds clarity for transfer of GL devices (by GL's) to SL's;
 - Add exemption provision for licenses for “carriers” (e.g., u.s. postal service, contract carriers; freight forwarders);
 - Add criteria for when modifications to a decommissioning warranty is required (facility modifications; spill producing additional contamination; changes in possession limits; etc.;

Federal rule driven Part 3 changes (continued)

- Add requirements for registration in SSD registry by manufacturers of GL devices (multiple loc's in Part 3);
- Add process for registration/inactivation of SSD evaluations;
- Add section on SL requirements for initial transfer of source material under “small quantities” general license (e.g., container labeling; records; reporting, etc.);
- Clarify requirements & add (% U/Th by weight) limits pertaining to “unimportant quantities of source material”/exempt items in the end products;
 - Glassware (no more than 2% SM by weight > 8/2013)
 - In or on optical lenses and mirrors
- Adds licensing requirement for initial distribution of **exempt** items containing **SM**
- Add/expand (end user) exemptions for (low risk) static elimination devices, ion generating tubes, gas and aerosol detectors, and certain industrial devices

Regulations Part 3 (continued)

- NRC requested / other changes
 - Adds/clarifies surety liability requirements consistent with 10 CFR 40 (~surety retained until final compliance with reclamation plan; acceptable forms of surety)

Regulations Part 18 “Requirements for Licensing of Uranium and Thorium Processing Facilities” - Highlights of proposed changes

- Recent Federal rule driven changes (NRC): None
- 2014 and 2015 statutory (RCA) driven changes:
 - Elimination of term “Classified material” (multiple locs);
 - Align rule with RCA timelines for meetings;
 - Align rule with RCA final public process;
 - Add language to clarify alternate GW standards require NRC approval;

Regulations Part 18 changes (continued)

- NRC requested changes:

- Clarify that Dept. of Natural Resources is not implementing AEA requirements;
- Add definitions for type 2 byproduct material (~tailings/wastes produced by extraction/concentration of U/Th from ores); “Residual radioactive material”; “Uranium milling”
- Delete definitions for “Long-term care”, “Post closure”, and “Surveillance”;
- Add financial surety section consistent with NRC rules;

- Other changes

- Revise/clarify sections on application process consistent with RCA changes
- Deferral to APA for hearing process;

- Proposed timeline (for 1+3+18 rule pkg):
 - Draft for public comment ~July 16 (through ~September 16)
 - Stakeholder meetings on:
 - August 5 (@ CDPHE)
 - August 18 (Montrose, CO)
 - August 19 (Canon City, CO)
 - Request for rulemaking October 21
 - Rulemaking hearing December 16

1 DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

2 Hazardous Materials and Waste Management Division

3 RADIATION CONTROL - LICENSING OF RADIOACTIVE MATERIAL

4 6 CCR 1007-1 PART 03

5 [Editor's Notes follow the text of the rules at the end of this CCR Document.]

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7 Adopted by the Board of Health on December 16, 2015.

8 LICENSING OF RADIOACTIVE MATERIAL

9 3.1 Purpose and Scope

10 3.1.1 Authority.

11 3.1.1.1 Rules and regulations set forth herein are adopted pursuant to the provisions of sections
12 25 1 108, 25 1.5 101(1)(k) and (1)(l), and 25 11 104, CRS.

13 3.1.2 Basis and Purpose.

14 3.1.2.1 A statement of basis and purpose of these regulations is incorporated as part of these
15 regulations; a copy may be obtained from the Department.

16 3.1.3 Scope.

17 3.1.3.1 This part, and Parts 5, 7, 14, 16, 17, 18, and 19 of these regulations, provide for the
18 licensing of radioactive material.

19 3.1.3.2 No person shall receive, possess, own, acquire, process, use, store, transfer, or dispose
20 radioactive material except as authorized pursuant to this part or Parts 5, 7, 14, 17, 18, or
21 19 of these regulations, or as otherwise provided in these parts.

22 3.1.4 Applicability.

23 3.1.4.1 In addition to the requirements of this part, all licensees are subject to the requirements
24 of Parts 1, 4, 10, 12 and 17.

25 3.1.4.2 Furthermore:

26 (1) Licensees engaged in industrial radiographic operations are subject to the
27 requirements of Part 5.

28 (2) Licensees using radionuclides in the healing arts are subject to the requirements
29 of Part 7.

30 (3) Licensees engaged in land disposal of radioactive material are subject to the
31 requirements of either Part 14 or Part 18, as appropriate.

32 (4) Licensees engaged in source material milling are subject to the requirements of
33 Part 18.

Comment [JJ1]:
EDITORIAL NOTE 1: ALL COMMENTS (SUCH AS THIS ONE) SHOWN IN THE RIGHT SIDE MARGIN OF THIS DOCUMENT ARE FOR INFORMATION PURPOSES ONLY TO PROVIDE ADDITIONAL INFORMATION AND TO AID THE READER IN UNDERSTANDING THE PROPOSED RULE DURING THE DRAFT REVIEW PROCESS.

THESE COMMENTS ARE **NOT** PART OF THE RULE AND ALL COMMENTS WILL BE DELETED PRIOR TO FINAL SUBMISSION.

EDITORIAL NOTE 2: THE ACRONYM "CRCPD" IN THE SIDE MARGIN NOTES REFERS TO THE CONFERENCE OF RADIATION CONTROL PROGRAM DIRECTORS (CRCPD), INC., WHICH DEVELOPS SUGGESTED STATE REGULATIONS FOR CONTROL OF RADIATION (KNOWN AS SSRCR'S). UNLESS OTHERWISE DETERMINED BY THE BOARD OF HEALTH, COLORADO'S RULES ARE TO BE CONSISTENT WITH NRC REGULATIONS AND THE SSRCR REGULATIONS. THE SSRCRS MAY BE FOUND ONLINE AT: <http://www.crcpd.org/ssrcrs/default.aspx>

THIS PROPOSED AMENDMENT IS IN PART BASED ON THE CRCPD SSRCR PART C DATED MARCH 2010 AND THE NRC REGULATIONS THAT HAVE BEEN UPDATED SINCE PART C WAS LAST AMENDED.

COMPATIBILITY WITH FEDERAL U.S. NUCLEAR REGULATORY COMMISSION REGULATIONS IS REQUIRED TO MAINTAIN AGREEMENT STATE STATUS.

INFORMATION ON NRC COMPATIBILITY CATEGORIES MAY BE FOUND AT: <https://scp.nrc.gov/regresources.html>

EDITORIAL NOTE 3: INFORMATION ON THE NRC REGULATORY ACTION TRACKING SYSTEM (RATS) MAY BE FOUND AT: https://scp.nrc.gov/rss_reqamendments.html

EDITORIAL NOTE 4: SOME UNAFFECTED SECTIONS OF THE RULE HAVE BEEN OMITTED. SUCH SECTIONS ARE DELINIATED BY " * * * ".

Comment [JJ2]: This reflects the date of anticipated approval by the Colorado Board of Health. The effective date is typically 60 days beyond this date.

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34 (5) Licensees engaged in wireline and subsurface tracer studies are subject to the
35 requirements of Part 16.

36 (6) Panoramic or underwater irradiator licensees are subject to the requirements of
37 Part 19.

38 3.1.5 Definitions

39 3.1.5.1 Definitions of general applicability to these regulations are in Part 1, Section 1.2.

40 3.1.5.2 As used in Part 3, each term below has the definition set forth.

41 "Consortium" means an association of medical use licensees and a Positron Emission Tomography (PET)
42 radionuclide production facility in the same geographical area that jointly own or share in the operation
43 and maintenance cost of the PET radionuclide production facility that produces PET radionuclides for use
44 in producing radioactive drugs within the consortium for noncommercial distributions among its
45 associated members for medical use. The PET radionuclide production facility within the consortium must
46 be located at an educational institution or a Federal facility or a medical facility.

47 3.1.6 The Department may engage the services of qualified persons in order to assist the Department
48 in meeting the requirements of these regulations, including, but not limited to, evaluating information that
49 may be required under 3.8.8.

50 3.1.6.1 Fees for these services may be charged by the Department as a part of fees charged for
51 radiation control services under Part 12.

52 **EXEMPTIONS FROM THE REGULATORY REQUIREMENTS**

53 **3.2 Exemption Of Source Material**

54 3.2.1 Any person is exempt from this part to the extent that such person receives, possesses, uses,
55 owns, or transfers source material in any chemical mixture, compound, solution, or alloy in which
56 the source material is by weight less than 1/20th of 1 percent (0.05 percent) of the mixture,
57 compound, solution, or alloy.

58 3.2.2 Any person is exempt from this part to the extent that such person receives, possesses, uses, or
59 transfers unrefined and unprocessed ore containing source material; provided that, except as
60 authorized in a specific license, such person shall not refine or process such ore.

61 3.2.3 Any person is exempt from this part to the extent that such person receives, possesses, uses, or
62 transfers an item containing uranium or thorium listed in Schedule 3C, Sections 3C.1 through
63 ~~3C.10, 3C.2, 3C.3, 3C.4, 3C.5, 3C.6, 3C.7, 3C.8 or 3C.9.~~

Comment [JJ3]: Language is updated and simplified, consistent with the addition of 3C.10.

64 3.2.3.1 The exemptions listed in Schedule 3C do not authorize the manufacture of any of the
65 products described.

66 **3.3 Exemption Of Radioactive Material Other Than Source Material.**

67 3.3.1 Exempt Concentrations.

68 3.3.1.1 Except as provided in 3.3.1.2, any person is exempt from this part to the extent that such
69 person receives, possesses, uses, transfers, or acquires products containing radioactive
70 material introduced in concentrations not in excess of those listed in Schedule 3A.

71 (1) A **manufacturers**, processor, or producer that transfers a product or material is
72 exempt so long as concentrations less than those listed in schedule 3A were
73 introduced under an NRC license so authorizing.

Comment [JJ4]: Correction of typographical error.

74 (2) Transfer of radioactive material contained in any food, beverage, cosmetic, drug,
75 or other commodity or product designed for ingestion or inhalation by, or
76 application to, a human being, is not exempt under 3.3.1.1(1).

77 3.3.1.2 No person may introduce radioactive material into a product or material knowing or
78 having reason to believe that it will be transferred to persons exempt under 3.3.1.1 or
79 equivalent regulations of NRC or any Agreement State, except in accordance with a
80 specific license issued consistent with 3.12.1 or the general license provided in 3.24.

81 3.3.2 Exempt Quantities.

82 3.3.2.1 Except as provided in 3.3.2.3 and 3.3.2.4, any person is exempt from these regulations to
83 the extent that such person receives, possesses, uses, transfers, owns, or acquires
84 radioactive material in individual quantities each of which does not exceed the applicable
85 quantity set forth in Schedule 3B.

86 3.3.2.2 Any person who possesses radioactive material received or acquired under the general
87 license formerly provided under 10 CFR 31.4 before September 25, 1971 is exempt from
88 the requirements for a license set forth in this part to the extent that such person
89 possesses, uses, transfers or owns such radioactive material.

90 3.3.2.3 Section 3.3.2 does not authorize the production, packaging or repackaging of radioactive
91 material for purposes of commercial distribution, or the incorporation of radioactive
92 material into products intended for commercial distribution.

93 3.3.2.4 No person may, for purposes of commercial distribution, transfer radioactive material in
94 the individual quantities set forth in Schedule 3B, knowing or having reason to believe
95 that such quantities of radioactive material will be transferred to persons exempt under
96 3.3.2 or equivalent regulations of NRC or any Agreement State except in accordance with
97 a specific license issued by NRC pursuant to Section 32.18 of 10 CFR Part 32 (January
98 1, 2015), which license states that the radioactive material may be transferred by the
99 licensee to persons exempt under 3.3.2 or the equivalent regulations of NRC or an
100 Agreement State.¹

101 ¹ Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or
102 other product containing byproduct material whose subsequent possession, use, transfer, and disposal by all other persons are
103 exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C.
104 20555.

105 3.3.2.5 No person may, for purposes of producing an increased radiation level, combine
106 quantities of radioactive material covered by this exemption so that the aggregate
107 quantity exceeds the limits set forth in Schedule 3B, except for a device placed in use
108 before May 3, 1999, or as otherwise permitted by these regulations.

109 3.3.3 Exempt Items.

110 3.3.3.1 Any person is exempt from this part to the extent that such person receives, possesses,
111 uses, or transfers an item containing radioactive material which is listed in Schedule 3C,
112 Sections ~~3C.10, 3C.11 through, 3C.12, OR~~ 3C.1314.

Comment [JJ5]: Renumbered due to renumbering of Schedule 3C.

113 **LICENSES**

114 **3.4 Types of Licenses.**

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- 115 Licenses for radioactive materials are of two types: general and specific.
- 116 3.4.1 A general license is provided by regulation and grants authority to a person for certain activities
- 117 involving radioactive material.
- 118 3.4.1.1 A general license is effective without the filing of an application with the Department or
- 119 the issuance of a licensing document to a particular person.
- 120 3.4.1.2 However, registration or filing of a certificate with the Department may be required by the
- 121 particular general license.
- 122 3.4.1.3 The general licensee is subject to all other applicable portions of these regulations and
- 123 any limitations of the general license.
- 124 3.4.2 A specific license requires the submission of an application to the Department and the issuance
- 125 of a licensing document by the Department.
- 126 3.4.2.1 The licensee is subject to all applicable portions of these regulations as well as any
- 127 limitations specified in the licensing document.

GENERAL LICENSES

3.5 General Licenses — Small Quantities Of Source Material.

3.5.1 A general license is hereby issued authorizing commercial and industrial firms; research, educational and medical institutions; and State and local government agencies to **receive, possess, use and transfer uranium and thorium, in their natural isotopic concentrations and in the form of depleted uranium, not more than 6.82 kg (15 pounds) of source material at any one time** for research, development, educational, commercial, or operational purposes **in the following forms and quantities:**

3.5.1.1 No more than 1.5 kg (3.3 lb) of uranium and thorium in dispersible forms (e.g., gaseous, liquid, powder, etc.) at any one time. Any material processed by the general licensee that alters the chemical or physical form of the material containing source material must be accounted for as a dispersible form. A person authorized to possess, use, and transfer source material under 3.5.1 may not receive more than a total of 7 kg (15.4 lb) of uranium and thorium in any one calendar year. Persons possessing source material in excess of these limits as of August 27, 2016, may continue to possess up to 7 kg (15.4 lb) of uranium and thorium at any one time for one year beyond this date, or until the Department takes final action on a pending application submitted on or before August 27, 2017, for a specific license for such material; and receive up to 70 kg (154 lb) of uranium or thorium in any one calendar year until December 31, 2017, or until the Department takes final action on a pending application submitted on or before August 27, 2017, for a specific license for such material; and

3.5.1.2 No more than a total of 7 kg (15.4 lb) of uranium and thorium at any one time. A person authorized to possess, use, and transfer source material under this paragraph may not receive more than a total of 70 kg (154 lb) of uranium and thorium in any one calendar year. A person may not alter the chemical or physical form of the source material possessed under this paragraph unless it is accounted for under the limits of 3.5.1.1; or

Comment [JJ6]:
The added language, consistent with federal rule of 10 CFR 40.22(a), places limits upon the form and quantities of source material that can be possessed by a general license.

The Part 3 rule as currently written does not specify a limit on the form/isotopic abundance of material. A lack of such limits has been determined by NRC to present additional security and health and safety concerns as certain isotopes such as Th228 in larger quantities present higher potential for radiation doses and risk if they are not properly controlled. Quantities above those specified in the proposed rule changes would require a specific license.

This provision is required for compatibility with NRC requirements.

NRC Compatibility = B
NRC RATS = 2013-2

Comment [JJ7]:
Language added in 3.5.1 is added consistent with 10 CFR 40.22(a)(1) through 40.22(a)(4).

3.5.1.1 places additional limits on the amount of dispersible source material that entities may possess and use under a general license. Source material is defined in Part 1 of the Colorado regulations.

This provision is required for compatibility with NRC requirements. The dates are consistent with the 3 year timeframe allotted for implementation of agreement state rules.

NRC Compatibility = B
NRC RATS = 2013-2

Comment [JJ8]:
This provision places a broad and annual limit on the amount of source material that entities may possess and use under a general license.

The annual receipt amount is approximately the same as under current rule (see prior 3.5.1.1 below). The total possession limit is reduced from the current amount for security and health and safety reasons.

Possession and use of quantities greater than this would require a specific radioactive materials license.

This provision is required for compatibility with NRC requirements and is equivalent to that found in 10 CFR 40.22(a)(2).

NRC Compatibility = B
NRC RATS = 2013-2

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3.5.1.3 No more than 7 kg (15.4 lb) of uranium, removed during the treatment of drinking water, at any one time. A person may not remove more than 70 kg (154 lb) of uranium from drinking water during a calendar year under 3.5.1.3; or

Comment [JJ9]: This provision is required for compatibility with NRC requirements and is equivalent to that found in 10 CFR 40.22(a)(3).

NRC Compatibility = B
NRC RATS = 2013-2

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3.5.1.4 No more than 7 kg (15.4 lb) of uranium and thorium at laboratories for the purpose of determining the concentration of uranium and thorium contained within the material being analyzed at any one time. A person authorized to possess, use, and transfer source material under this paragraph may not receive more than a total of 70 kg (154 lb) of source material in any one calendar year.

Comment [JJ10]: This provision in Colorado rule is deleted consistent with the elimination of an equivalent provision/requirement in 10 CFR 40.22(a).

The more specific and limiting provisions of new 3.5.1.1 , etc. (above) replace this provision.

NRC Compatibility = B
NRC RATS = 2013-2

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~~3.5.1.4 A person authorized to use or transfer source material, pursuant to this general license, may not receive more than a total of 68.2 kg (150 pounds) of source material in any one calendar year.~~

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~~3.5.1.22 Any Ppersons who receives, possesses, uses or transfers source material in accordance with pursuant to the general license in 3.5.1: are prohibited from administering source material, or the radiation therefrom, either externally or internally, to human beings except as may be authorized in a specific license.~~

Comment [JJ11]: Language is added consistent with 10 CFR 40.22(b).

NRC Compatibility = B
NRC RATS = 2013-2

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3.5.2.1 Is prohibited from administering source material, or the radiation therefrom, either externally or internally, to human beings except as may be authorized by the NRC in a specific license.

Comment [JJ12]: Language in 3.5.2.1 through 3.5.2.3 is added consistent with the language and requirements of 10 CFR 40.22(b)(1) through (b)(3).

These provisions are new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

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3.5.2.2 Shall not abandon such source material. Source material may be disposed of as follows:

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(1) A cumulative total of 0.5 kg (1.1 lb) of source material in a solid, non-dispersible form may be transferred each calendar year, by a person authorized to receive, possess, use, and transfer source material under this general license to persons receiving the material for permanent disposal. The recipient of source material transferred under the provisions of this paragraph is exempt from the requirements to obtain a license under this part to the extent the source material is permanently disposed. This provision does not apply to any person who is in possession of source material under a specific license issued under this chapter; or

Comment [JJ13]: The mass limit applies to the mass of the U or Th only and not the material that contains the source material.

Comment [JJ14]: This is provision is added for consistency with NRC requirements in 10 CFR 40.22(b)(4) and program needs but is compatibility "D" and is not required for compatibility.

185

(2) In accordance with 4.33.

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3.5.2.3 Is subject to the provisions in 3.1, 3.14.2, 3.15.1 through 3.15.3, 3.15.2.1, 3.15.4.2, through 3.15.4.4, 3.22, 3.23, 4.40, 4.50, 4.52, and 10.5.1.

Comment [JJ15]: Language in 3.5.4 is added consistent with the language and requirements of 10 CFR 40.22(b)(5).

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

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

Comment [JJ16]: Language in 3.5.3 is added consistent with the language and requirements of 10 CFR 40.22(c).

The proposed requirements place requirements on the general licensee to ensure that they minimize contamination, and that where contamination is present following cessation of operations, they notify the Department.

NRC Compatibility = C
NRC RATS = 2013-2

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195

3.5.2.5 Shall not export such source material except in accordance with a license issued by NRC pursuant to 10 CFR Part 110.

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3.5.3 Any person who receives, possesses, uses, or transfers source material in accordance with 3.5.1 shall conduct activities so as to minimize contamination of the facility and the environment. When activities involving such source material are permanently ceased at any site, if evidence of significant contamination is identified, the general licensee shall

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200 notify the Department about such contamination and may consult with the Department as
201 to the appropriateness of sampling and restoration activities to ensure that any
202 contamination or residual source material remaining at the site where source material was
203 used under this general license is not likely to result in exposures that exceed the limits in
204 4.61.2.

205 ~~3.5.24~~ Any Ppersons who receives, possesses, uses, or transfers source material in accordance with
206 pursuant to the general license granted issued in 3.5.1 areis exempt from the provisions of Parts
207 4 and 10 to the extent that such receipt, possession, use, and~~er~~ transfer areis within the terms of
208 such general license, except that such person shall comply with the provisions of 4.61.2
209 and 4.33; to the extent necessary to meet the provisions of 3.5.2.2 and 3.5.3 provided,
210 however, that this exemption shall not be deemed to apply to any such person who is also in
211 possession of source material under a specific license issued pursuant to this part. However, this
212 exemption does not apply to any person who also holds a specific license issued under
213 Part 3.

Comment [JJ17]:
Language in 3.5.4 is added consistent with the language and requirements of 10 CFR 40.22(d).

This provision is new to federal rule changes in 10 CFR 40 which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

214 ~~3.5.5~~ No person may initially transfer or distribute source material to persons generally licensed
215 under 3.5.1.1 or 3.5.1.2, or equivalent regulations of an Agreement State or NRC, unless
216 authorized by a specific license issued in accordance with 3.22.6 or equivalent provisions
217 of an Agreement State or NRC. This prohibition does not apply to analytical laboratories
218 returning processed samples to the client who initially provided the sample. Initial
219 distribution of source material to persons generally licensed under 3.5.1 before August 27,
220 2016, without specific authorization may continue for 1 year beyond this date. Distribution
221 may also be continued until the Department takes final action on a pending application for
222 license or license amendment to specifically authorize distribution submitted on or before
223 August 27, 2017.

Comment [JJ18]: Language in 3.5.5 is added consistent with the language and requirements of 10 CFR 40.22(e).

This provision is new to federal rule changes in 10 CFR 40 which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

224 3.5.36 A general license is hereby issued authorizing the receipt of title to source material without regard
225 to quantity.

226 3.5.36.1 ~~————~~ This general license does not authorize any person to receive, possess, use, or
227 transfer source material.

228 3.5.47 A general license is hereby issued authorizing the possession of source material involved in
229 mining operations provided such operations meet the regulatory requirements of the Division of
230 Reclamation, Mining and Safety, Colorado Department of Natural Resources, or any successor
231 thereto, and, except as authorized in a specific license, such mining operations shall not refine or
232 process such ore.

233 3.5.58 Depleted Uranium in Industrial Products and Devices.

234 3.5.58.1 ~~————~~ A general license is hereby issued to receive, acquire, possess, use, or transfer,
235 in accordance with the provisions of 3.5.58.2, 3.5.58.3, and 3.5.58.4, ~~and 3.5.5.5,~~
236 depleted uranium contained in industrial products or devices for the purpose of providing
237 a concentrated mass in a small volume of the product or device.

238 3.5.58.2 ~~————~~ The general license in 3.5.58.1 applies only to industrial products or devices
239 which have been manufactured either in accordance with a specific license issued to the
240 manufacturer of the products or devices pursuant to 3.12.13 or in accordance with a
241 specific license issued to the manufacturer by NRC or an Agreement State which
242 authorizes manufacture of the products or devices for distribution to persons generally
243 licensed by NRC or an Agreement State.

244 (1) Persons who receive, acquire, possess, or use depleted uranium pursuant to the
245 general license established by 3.5.58.1 shall file Department Form R-52,

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- 246 "Registration Certificate - Use of Depleted Uranium Under General License", with
247 the Department.
- 248 (a) The form shall be submitted within 30 days after the first receipt or
249 acquisition of such depleted uranium.
- 250 (b) The general licensee shall furnish on Department Form R-52 the
251 following information and such other information as may be required by
252 that form:
- 253 (i) Name and address of the general licensee;
- 254 (ii) A statement that the general licensee has developed and will
255 maintain procedures designed to establish physical control over
256 the depleted uranium described in 3.5.58.1 and designed to
257 prevent transfer of such depleted uranium in any form, including
258 metal scrap, to persons not authorized to receive the depleted
259 uranium; and
- 260 (iii) Name and title, address, and telephone number of the individual
261 duly authorized to act for and on behalf of the general licensee in
262 supervising the procedures identified in 3.5.58.32(1)(b)(ii).
- 263 (2) The general licensee possessing or using depleted uranium under the general
264 license established by 3.5.58.1 shall report in writing to the Department any
265 changes in information furnished by him in Department Form R-52, "Registration
266 Certificate - Use of Depleted Uranium Under General License". The report shall
267 be submitted within 30 days after the effective date of such change.
- 268 **3.5.85.43** A person who receives, acquires, possesses, or uses depleted uranium pursuant
269 to the general license established by 3.5.58.1:
- 270 (1) Shall not introduce such depleted uranium, in any form, into a chemical, physical,
271 or metallurgical treatment or process, except a treatment or process for repair or
272 restoration of any plating or other covering of the depleted uranium;
- 273 (2) Shall not abandon such depleted uranium;
- 274 (3) Shall transfer or dispose of such depleted uranium only by transfer in accordance
275 with the provisions of 3.22.
- 276 (a) In the case where the transferee receives the depleted uranium pursuant
277 to the general license established by 3.5.58.1, the transferor shall furnish
278 the transferee a copy of this regulation and a copy of Department Form
279 R-52.
- 280 (b) In the case where the transferee receives the depleted uranium pursuant
281 to a general license contained in NRC's or Agreement State's regulation
282 equivalent to 3.5.58.1, the transferor shall furnish the transferee a copy
283 of this regulation and a copy of Department Form R-52 accompanied by
284 a note explaining that use of the product or device is regulated by NRC
285 or Agreement State under requirements substantially the same as those
286 in this regulation;

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287 (4) Within 30 days of any transfer, shall report in writing to the Department the name
288 and address of the person receiving the depleted uranium pursuant to such
289 transfer, and

290 (5) Shall not export such depleted uranium except in accordance with a license
291 issued by NRC pursuant to 10 CFR Part 110 (January 1, 2013~~15~~).

292 3.5.58.54 Any person receiving, acquiring, possessing, using, or transferring depleted uranium
293 pursuant to the general license established by 3.5.58.1 is exempt from the
294 requirements of Parts 4 and 10 with respect to the depleted uranium covered by that
295 general license.

296 **3.6 General Licenses² - Radioactive Material Other Than Source Material.**

297 ² Different general licenses are issued in this section, each of which has its own specific conditions and requirements.

298 3.6.1 ~~Certain Devices and Equipment~~ Reserved.

299 ~~3.6.1.1 A general license is hereby issued to transfer, receive, acquire, own, possess, and use
300 radioactive material incorporated in the following devices or equipment which have been
301 manufactured, tested and labeled by the manufacturer in accordance with a specific
302 license issued to the manufacturer by NRC for use pursuant to Section 31.3 of 10 CFR
303 Part 31 (January 1, 2013).~~

304 ~~(1) Devices designed for use as static eliminators which contain, as a sealed source
305 or sources, radioactive material consisting of a total of not more than 18.5 MBq
306 (500 µCi) of polonium-210 per device.~~

307 ~~(2) Devices designed for ionization of air which contain, as a sealed source or
308 sources, radioactive material consisting of a total of not more than 18.5 MBq (500
309 µCi) of polonium-210 per device or a total of not more than 1.85 GBq (50 mCi) of
310 hydrogen-3 (tritium) per device.~~

311 ~~3.6.1.2 This general license is subject to the provisions of 1.4 through 1.9, 3.3.1.2, 3.15, 3.22,
312 and 3.23, part 4³, part 10 and part 17.~~

313 ³ Attention is directed particularly to the provisions of Part 4 which relate to the labeling of containers. Reserved

314 3.6.2 Reserved.

315 3.6.3 Reserved.

316 3.6.4 Certain Measuring, Gauging or Controlling Devices.

317 3.6.4.1 A general license is hereby issued to commercial and industrial firms and to research,
318 educational and medical institutions, individuals in the conduct of their business, and
319 State or local government agencies to receive, acquire, possess, use or transfer, in
320 accordance with the provisions of 3.6.4.2, 3.6.4.3, and 3.6.4.4, radioactive material,
321 excluding special nuclear material, contained in devices designed and manufactured for
322 the purpose of detecting, measuring, gauging or controlling thickness, density, level,
323 interface location, radiation, leakage, or qualitative or quantitative chemical composition,
324 or for producing light or an ionized atmosphere.

325 3.6.4.2 The general license in 3.6.4.1 applies only to radioactive material contained in devices
326 which have been:

Comment [JJ19]:
Section 3.6.1 is removed and reserved,
consistent with the deletion of an equivalent
provision from 10 CFR 31.3.

NRC Compatibility = B

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- 327 (1) Manufactured or initially transferred and labeled for distribution to persons
328 generally licensed in accordance with the specifications contained in a specific
329 license issued by:
- 330 (a) The Department pursuant to 3.12.4 or
- 331 (b) By NRC or an Agreement State ⁴
- 332 4 Regulations under the Federal Food, Drug, and Cosmetic Act authorizing the use of radioactive control devices in food production
333 require certain additional labeling thereon which is found in 21 CFR 179.21 (April 1, 2012).
- 334 (2) Received from one of the specific licensees described in 3.6.4.2(1) or through a
335 transfer made under 3.6.4.3(8).
- 336 3.6.4.3 Any person who owns, receives, acquires, possesses, uses, owns, or transfers
337 radioactive material in a device pursuant to the general license in 3.6.4.1:
- 338 (1) Shall assure that all labels affixed to the device at the time of receipt, and bearing
339 a statement that removal of the label is prohibited, are maintained thereon and
340 shall comply with all instructions and precautions provided by such labels;
- 341 (2) Shall assure that the device is tested for leakage of radioactive material and
342 proper operation of the "on-off" mechanism and indicator, if any, at no longer
343 than 6-month intervals or at such other intervals as are specified in the label,
344 however;
- 345 (a) Devices containing only krypton need not be tested for leakage of
346 radioactive material; and
- 347 (b) Devices containing only tritium or not more than 3.7 MBq (100 µCi) of
348 other beta- and/or gamma-emitting material or 0.37 MBq (10 µCi) of
349 alpha-emitting material and devices held in storage in the original
350 shipping container prior to initial installation need not be tested for any
351 purpose.
- 352 (3) Shall assure that the tests required by 3.6.4.3(2) of this section and other testing,
353 installation, servicing, and removal from installation involving the radioactive
354 material, its shielding or containment, are performed:
- 355 (a) In accordance with the instructions provided by the labels; or
- 356 (b) By a person holding an applicable specific license from the Department,
357 NRC or an Agreement State to perform such activities;
- 358 (4) Shall maintain records showing compliance with the requirements of 3.6.4.3(2)
359 and 3.6.4.3(3).
- 360 (a) The records shall show the results of tests.
- 361 (b) The records also shall show the dates of performance of, and the names
362 of persons performing, testing, installation, servicing, and removal from
363 installation concerning the radioactive material, its shielding or
364 containment.

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- 365 (c) Records of tests for leakage of radioactive material required by 3.6.4.3(2)
366 shall be maintained for 3 years after the next required leak test is
367 performed or until the sealed source is transferred or disposed of.
- 368 (d) Records of tests of the "on-off" mechanism and indicator required by
369 3.6.4.3(2) shall be maintained for 3 years after the next required test of
370 the "on-off" mechanism and indicator is performed or until the sealed
371 source is transferred or disposed of.
- 372 (e) Records which are required by 3.6.4.3(3) shall be maintained for a period
373 of 3 years from the date of the recorded event or until the device is
374 transferred or disposed of;
- 375 (5) Upon the occurrence of a failure of or damage to, or any indication of a possible
376 failure of or damage to, the shielding of the radioactive material or the "on-off"
377 mechanism or indicator, or upon the detection of 185 Bq (0.005 µCi) or more
378 removable radioactive material, shall immediately suspend operation of the
379 device and shall:
- 380 (a) Not operate the device until it has been repaired by the manufacturer or
381 other person holding an applicable specific license from the Department,
382 NRC or an Agreement State to repair such devices;
- 383 (b) Ensure that, if dispositioned, the device and any radioactive material
384 from the device is disposed of by transfer to a person authorized by an
385 applicable specific license to receive the radioactive material contained
386 in the device;
- 387 (c) Within 30 days, furnish to the Department a report containing a brief
388 description of the event and the remedial action taken; and
- 389 (d) In the case of detection of 185 Bq (0.005 microcurie) or more removable
390 radioactive material or failure of or damage to a source likely to result in
391 contamination of the premises or the environs, furnish to the Director of
392 the Hazardous Materials And Waste Management Division, within 30
393 days, a plan for ensuring that the premises and environs are acceptable
394 for unrestricted use.
- 395 (i) Under these circumstances, the criteria set out in 4.61.2,
396 "Radiological Criteria For Unrestricted Use," may be applicable,
397 as determined by the division on a case by case basis;
- 398 (6) Shall not abandon the device containing radioactive material;
- 399 (7) Shall not export the device except in accordance with 10 CFR Part 110 (January
400 1, 2015) and shall obtain written approval from NRC before transferring the
401 device to any other specific licensee not specifically identified in 3.6.4.3(8);
- 402 (8) Except as provided in 3.6.4.3(9), shall transfer or dispose of the device
403 containing radioactive material:
- 404 (a) Only by transfer to a specific licensee of the Department, NRC or an
405 Agreement State whose specific license authorizes receipt of the device;
406 and

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- 407 (b) Within 30 days after transfer or export, shall furnish to the Department a
408 report containing:
- 409 (i) Identification of the device by manufacturer's (or initial
410 transferor's) name, model number and serial number;
- 411 (ii) The name, address and license number of the person receiving
412 the device;
- 413 (iii) The date of the transfer;
- 414 (iv) The identity of the radionuclide(s) present and activity present,
415 by assay or calculation;
- 416 (c) ~~Comply with 10 CFR 31.5(c)(8)(iii), as applicable~~ **Shall obtain written
417 Department approval before transferring the device to any other
418 specific licensee not specifically identified in 3.6.4.3(8). However, a
419 holder of a specific license may transfer a device for possession
420 and use under its own specific license without prior approval, if, the
421 holder.:**
- 422 (i) **Verifies that the specific license authorizes the possession
423 and use, or applies for and obtains an amendment to the
424 license authorizing the possession and use;**
- 425 (ii) **Removes, alters, covers, or clearly and unambiguously
426 augments the existing label (otherwise required by 3.6.4.3(1)
427 of this part) so that the device is labeled in compliance with
428 Part 4, Section 4.30; however the manufacturer, model
429 number, and serial number must be retained;**
- 430 (iii) **Obtains the manufacturer's or initial transferor's information
431 concerning maintenance that would be applicable under the
432 specific license (such as leak testing procedures); and**
- 433 (iv) **Reports the transfer under 3.6.4.3(8)(b).**
- 434 (9) Shall transfer the device to another general licensee only:
- 435 (a) Where the device remains in use at a particular location.
- 436 In such case the transferor shall give the transferee a copy of this
437 regulation and any safety documents identified in the label on the device
438 and within 30 days of the transfer, report to the Department the
439 manufacturer's (or initial transferor's) name and model number and serial
440 number of device transferred, the identity of the radionuclide(s) present
441 and assayed or calculated activity present, the transferee's name and
442 mailing address for the location of use, and the name title, and phone
443 number of the responsible individual identified by the transferee in
444 accordance with 3.6.4.3(12) to have knowledge of and authority to take
445 actions to ensure compliance with the appropriate regulations and
446 requirements; or

Comment [JJ20]:

This is not a new provision and there are no changes to the requirements. This provision has been in place for a number of years through incorporation by reference to the federal rule.

For ease of use and in lieu of cross-reference to the federal rule (e.g., incorporation by reference), the full language of 10 CFR 31.5(c)(8)(iii) is added into the Part 3 rule.

SSRCR Cross Reference = C.22d.iii(8)(c) [2010]
NRC Cross Reference = 10 CFR 31.5(c)(8)(iii)
NRC Compatibility = C

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- 447 (b) Where the device is held in storage by an intermediate person in the
448 original shipping container at its intended location of use prior to initial
449 use by a general licensee; and
- 450 (10) Shall comply with the provisions of 4.51 and 4.52 for reporting radiation incidents,
451 theft, or loss of licensed material, but shall be exempt from the other
452 requirements of Parts 4 and 10;
- 453 (11) Shall respond to written requests from the Department to provide information
454 relating to the general license within 30 calendar days of the date of the request,
455 or other time specified in the request.
- 456 (a) If the general licensee cannot provide the requested information within
457 the allotted time, it shall, within that same time period, request a longer
458 period to supply the information by providing the director of the
459 Hazardous Materials and Waste Management Division a written
460 justification for the request;
- 461 (12) Shall appoint an individual responsible for having knowledge of the appropriate
462 regulations and requirements and the authority for taking required actions to
463 comply with appropriate regulations and requirements.
- 464 (a) The general licensee, through this individual, shall ensure the day-to-day
465 compliance with appropriate regulations and requirements; this
466 appointment does not relieve the general licensee of any of its
467 responsibility in this regard;
- 468 (13) Shall register each device annually in accordance with 3.6.4.3(13)(a) and
469 3.6.4.3(13)(b), and shall pay the fee required by Part 12, if in possession of a
470 device containing at least 370 MBq (10 mCi) of cesium-137, 3.7 MBq (0.1 mCi) of
471 strontium-90, 37 MBq (1 mCi) of cobalt-60, 3.7 MBq (0.1 mCi) of radium-226, or
472 37 MBq (1 mCi) of americium 241 or any other transuranic (i.e., element with
473 atomic number greater than uranium (92)), based on the activity indicated on the
474 label. Each address for a location of use, as described in 3.6.4.3(13)(b)(iv) of this
475 section, represents a separate general licensee and requires a separate
476 registration and fee.
- 477 (a) Registration must be done by verifying, correcting, and/or adding to the
478 information provided in a request for registration received from the
479 Department.
- 480 (i) The registration information must be submitted to the
481 Department within 30 days of the date of the request for
482 registration or as otherwise indicated in the request.
- 483 (b) In registering devices, the general licensee shall furnish the following
484 information and any other information specifically requested by the
485 Department:
- 486 (i) Name and mailing address of the general licensee;
- 487 (ii) Information about each device: the manufacturer (or initial
488 transferor), model number, serial number, the radioisotope and
489 activity (as indicated on the label);

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- 490 (iii) Name, title, and telephone number of the responsible person
491 designated as a representative of the general licensee under
492 3.6.4.3(12);
- 493 (iv) Address or location at which the device(s) are used and/or
494 stored; for portable devices, the address of the primary place of
495 storage;
- 496 (v) Certification by the responsible representative of the general
497 licensee that the information concerning the device(s) has been
498 verified through a physical inventory and checking of label
499 information; and
- 500 (vi) Certification by the responsible representative of the general
501 licensee that they are aware of the requirements of the general
502 license.
- 503 (c) A general licensee holding devices meeting the criteria of 3.6.4.3(13) is
504 subject to the bankruptcy notification requirement in 3.15.5.
- 505 (d) Persons generally licensed by an Agreement State with respect to
506 devices meeting the criteria in paragraph 3.6.4.3(13) are not subject to
507 U.S. Nuclear Regulatory Commission registration requirements if the
508 devices are used in areas subject to NRC jurisdiction for a period less
509 than 180 days in any calendar year. The Commission will not request
510 registration information from such licensees.
- 511 (14) Shall report changes to the mailing address for the location of use (including
512 change in name of general licensee) to the director of the hazardous materials
513 and waste management division within 30 days of the effective date of the
514 change.
- 515 (a) For a portable device, a report of address change is only required for a
516 change in the device's primary place of storage.
- 517 (15) May not hold a device that is not in use for longer than 2 years.
- 518 (a) If a device with shutters is not being used, the shutter must be locked in
519 the closed position.
- 520 (b) The testing required by 3.6.4.3(2) need not be performed during the
521 period of storage only.
- 522 (c) However, when a device is put back into service or transferred to another
523 person, and has not been tested within the required test interval, the
524 device must be tested for leakage before use or transfer and the shutter
525 tested before use.
- 526 (d) A device kept in standby for future use is excluded from the two-year
527 time limit if the general licensee performs quarterly physical inventories
528 of the device while the device is in standby.
- 529 3.6.4.4 The general license in 3.6.4.1 does not authorize the manufacture of devices containing
530 radioactive material.

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- 531 3.6.4.5 The general license provided in 3.6.4.1 is subject to the provisions of 1.4 through 1.9,
532 3.15, 3.22, 3.23 and Part 17.
- 533 3.6.5 Luminous Safety Devices for Aircraft.
- 534 3.6.5.1 A general license is hereby issued to receive, acquire, possess, and use tritium or
535 promethium-147 contained in luminous safety devices for use in aircraft, provided:
- 536 (1) Each device contains not more than 370 GBq (10 Ci) of tritium or 11.1 GBq (300
537 mCi) of promethium-147; and
- 538 (2) Each device has been manufactured, assembled or imported in accordance with
539 a specific license issued by NRC or each device has been manufactured or
540 assembled in accordance with the specifications contained in a specific license
541 issued by the Department or any Agreement State to the manufacturer or
542 assembler of such device pursuant to licensing requirements equivalent to those
543 in Section 32.53 of 10 CFR Part 32 (January 1, 20~~13~~15).
- 544 3.6.5.2 Persons who own, receive, acquire, possess, or use luminous safety devices pursuant to
545 the general license in 3.6.5.1 are exempt from the requirements of Parts 4 and 10 except
546 that they shall comply with the provisions of 4.51 and 4.52.
- 547 3.6.5.3 This general license does not authorize the manufacture, assembly, or repair of luminous
548 safety devices containing tritium or promethium-147.
- 549 3.6.5.4 This general license does not authorize the ownership, receipt, acquisition, possession or
550 use of promethium-147 contained in instrument dials.
- 551 3.6.5.5 This general license is subject to the provisions of 1.4 through 1.9, 3.15, 3.22, 3.23, and
552 Part 17.
- 553 3.6.6 Ownership of Radioactive Material.
- 554 3.6.6.1 A general license is hereby issued to own radioactive material without regard to quantity.
- 555 3.6.6.2 Notwithstanding any other provisions of this part, this general license does not authorize
556 the manufacture, production, transfer, receipt, possession or use of radioactive material.
- 557 3.6.7 Calibration and Reference Sources.
- 558 3.6.7.1 A general license is hereby issued to those persons listed below to own, receive, acquire,
559 possess, use, and transfer, in accordance with the provisions of 3.6.7.4 and 3.6.7.5,
560 americium-241 in the form of calibration or reference sources:
- 561 (1) Any person who holds a specific license issued by the Department which
562 authorizes him to receive, possess, use, and transfer radioactive material; and
- 563 (2) Any person who holds a specific license issued by NRC which authorizes him to
564 receive, possess, use, and transfer special nuclear material.
- 565 3.6.7.2 A general license is hereby issued to receive, possess, use, and transfer plutonium in the
566 form of calibration or reference sources in accordance with the provisions of 3.6.7.4 and
567 3.6.7.5 to any person who holds a specific license issued by the Department which
568 authorizes him to receive, possess, use, and transfer radioactive material.

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569 3.6.7.3 A general license is hereby issued to own, receive, possess, use, and transfer radium
570 226 in the form of calibration or reference sources in accordance with the provisions of
571 3.6.7.4 and 3.6.7.5 to any person who holds a specific license issued by the Department
572 which authorizes him to receive, possess, use, and transfer radioactive material.

573 3.6.7.4 The general licenses in 3.6.7.1, 3.6.7.2, and 3.6.7.3 apply only to calibration or reference
574 sources which have been manufactured in accordance with the specifications contained
575 in a specific license issued to the manufacturer or importer of the sources by NRC
576 pursuant to Section 32.57 of 10 CFR Part 32 or Section 70.39 of 10 CFR Part 70
577 (January 1, 2013~~15~~) or which have been manufactured in accordance with the
578 specifications contained in a specific license issued to the manufacturer by the
579 Department or any Agreement State pursuant to licensing requirements equivalent to
580 those contained in Section 32.57 of 10 CFR Part 32 or Section 70.39 of 10 CFR Part 70
581 (January 1, 2013~~15~~).

582 3.6.7.5 The general licenses provided in 3.6.7.1, 3.6.7.2, and 3.6.7.3 are subject to the
583 provisions of 1.4 through 1.9, 3.15, 3.22, 3.23 and 3.24, and Parts 4 and 10. In addition,
584 persons who own, receive, acquire, possess, use, or transfer one or more calibration or
585 reference sources pursuant to these general licenses, shall:

586 (1) Not possess at any one time, at any one location of storage or use, more than
587 185 kBq (5 µCi) of americium-241, 185 kBq (5 µCi) of plutonium, or 185 kBq
588 (5 µCi) of radium-226 in such sources;

589 (2) Not receive, possess, use, or transfer such source unless the source, or the
590 storage container, bears a label which includes one of the following statements,
591 as appropriate, or a substantially similar statement which contains the
592 information called for in one of the following statements, as appropriate:

593 (a) The receipt, possession, use and transfer of this source, Model ____,
594 Serial No. ____, are subject to a general license and the regulations of the
595 U.S. Nuclear Regulatory Commission or an Agreement State. Do not
596 remove this label.

597 CAUTION - RADIOACTIVE MATERIAL - THIS SOURCE CONTAINS
598 (AMERICIUM-241) (PLUTONIUM) (RADIUM-226). ⁵ DO NOT TOUCH
599 RADIOACTIVE PORTION OF THIS SOURCE.

600

Name of manufacturer or importer

601

602 ⁵ Showing only the name of the appropriate material.

603 (3) Not transfer, abandon, or dispose of such source except by transfer to a person
604 authorized by a license from the Department, NRC or an Agreement State to
605 receive the source;

606 (4) Store such source, except when the source is being used, in a closed container
607 adequately designed and constructed to contain americium-241, plutonium, or
608 radium-226 which might otherwise escape during storage; and

609 (5) Not use such source for any purpose other than the calibration of radiation
610 detectors or the standardization of other sources.

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- 611 3.6.7.6 These general licenses do not authorize the manufacture of calibration or reference
612 sources containing americium-241, plutonium or radium-226.
- 613 3.6.8 Reserved.
- 614 3.6.9 General License for Use of Radioactive Material for Certain *In Vitro* Clinical or Laboratory Testing.
615 ⁶
- 616 ⁶ The New Drug provisions of the Federal Food, Drug, and Cosmetic Act also govern the availability and use of any specific
617 diagnostic drugs in interstate commerce.
- 618 3.6.9.1 A general license is hereby issued to any physician, veterinarian, clinical laboratory or
619 hospital to receive, acquire, possess, transfer or use, for any of the following stated tests,
620 in accordance with the provisions of 3.6.9.2, 3.6.9.3, 3.6.9.4, 3.6.9.5, and 3.6.9.6, the
621 following radioactive materials in prepackaged units for use in *in vitro* clinical or
622 laboratory tests not involving internal or external administration of radioactive material, or
623 the radiation therefrom, to human beings or animals:
- 624 (1) Carbon-14, in units not exceeding 370 kBq (10 µCi) each;
 - 625 (2) Cobalt-57, in units not exceeding 370 kBq (10 µCi) each;
 - 626 (3) Hydrogen-3 (tritium), in units not exceeding 1.85 MBq (50 µCi) each;
 - 627 (4) Iodine-125, in units not exceeding 370 kBq (10 µCi) each;
 - 628 (5) Mock Iodine-125 reference or calibration sources, in units not exceeding 1.85
629 kBq (0.05 µCi) of iodine-129 and 185 Bq (0.005 µCi) of americium-241 each;
 - 630 (6) Iodine-131, in units not exceeding 370 kBq (10 µCi) each;
 - 631 (7) Iron-59, in units not exceeding 740 kBq (20 µCi) each; or
 - 632 (8) Selenium-75, in units not exceeding 370 kBq (10 µCi) each.
- 633 3.6.9.2 No person shall receive, acquire, possess, use or transfer radioactive material pursuant
634 to the general license established by 3.6.9.1 until the person has filed Department Form
635 R-27, "Certificate - *In Vitro* Testing with Radioactive Material Under General License",
636 with the Department and received from the Department a validated copy of Department
637 Form R-27 with certification number assigned. The physician, veterinarian, clinical
638 laboratory or hospital shall furnish on Department Form R-27 the following information
639 and such other information as may be required by that form:
- 640 (1) Name and address of the physician, veterinarian, clinical laboratory or hospital;
 - 641 (2) The location of use; and
 - 642 (3) A statement that the physician, veterinarian, clinical laboratory or hospital has
643 appropriate radiation measuring instruments to carry out *in vitro* clinical or
644 laboratory tests with radioactive material as authorized under the general license
645 in 3.6.9.1 and that such tests will be performed only by personnel competent in
646 the use of such instruments and in the handling of the radioactive material.
- 647 3.6.9.3 A person who receives, acquires, possesses or uses radioactive material pursuant to the
648 general license established by 3.6.9.1 shall comply with the following requirements.

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- 649 (1) The general licensee shall not possess at any one time, pursuant to the general
650 license in 3.6.9.1, at any one location of storage or use, a total amount of iodine
651 125, iodine 131, selenium 75, iron 59, and/or cobalt 57 in excess of 7.4 MBq (200
652 μ Ci).
- 653 (2) The general licensee shall store the radioactive material, until used, in the
654 original shipping container or in a container providing equivalent radiation
655 protection.
- 656 (3) The general licensee shall use the radioactive material only for the uses
657 authorized by 3.6.9.1.
- 658 (4) The general licensee shall not transfer the radioactive material to a person who is
659 not authorized to receive it pursuant to a license issued by the Department, NRC
660 or any Agreement State nor transfer the radioactive material in any manner other
661 than in the unopened, labeled shipping container as received from the supplier.
- 662 (5) The general licensee shall dispose of the Mock Iodine 125 reference or
663 calibration sources described in 3.6.9.1(5) as required by 4.33.

664 3.6.9.4 The general licensee shall not receive, acquire, possess, or use radioactive material
665 pursuant to 3.6.9.1:

- 666 (1) Except as prepackaged units which are labeled in accordance with the provisions
667 of an applicable specific license issued pursuant to 3.12.8 or in accordance with
668 the provisions of a specific license issued by NRC or any Agreement State which
669 authorizes the manufacture and distribution of iodine-125, iodine-131, carbon-14,
670 hydrogen-3 (tritium), iron-59, selenium-75, cobalt-57, or Mock Iodine-125 to
671 persons generally licensed under 3.6.9 or its equivalent; and
- 672 (2) Unless one of the following statements, as appropriate, or a substantially similar
673 statement which contains the information called for in one of the following
674 statements, appears on a label affixed to each prepackaged unit or appears in a
675 leaflet or brochure which accompanies the package:
- 676 (a) This radioactive material shall be received, acquired, possessed, and
677 used only by physicians, veterinarians, clinical laboratories or hospitals
678 and only for *in vitro* clinical or laboratory tests not involving internal or
679 external administration of the material, or the radiation therefrom, to
680 human beings or animals. Its receipt, acquisition, possession, use, and
681 transfer are subject to the regulations and a general license of the U.S.
682 Nuclear Regulatory Commission or an Agreement State.

683 _____

684 Name of manufacturer

685 3.6.9.5 The physician, veterinarian, clinical laboratory or hospital possessing or using radioactive
686 material under the general license of 3.6.9.1 shall report in writing to the Department, any
687 changes in the information furnished by him in the "Certificate - *In Vitro* Testing with
688 Radioactive Material Under General License", Department Form R-27. The report shall
689 be furnished within 30 days after the effective date of such change.

690 3.6.9.6 Any person using radioactive material pursuant to the general license of 3.6.9.1 is
691 exempt from the requirements of Part 4 and 10 with respect to radioactive material

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692 covered by that general license, except that such persons using the Mock Iodine-125
693 described in 3.6.9.1(5) shall comply with the provisions of 4.33, 4.51 and 4.52.

694 3.6.10 Ice Detection Devices.

695 3.6.10.1 A general license is hereby issued to receive, acquire, possess, use, and transfer
696 strontium-90 contained in ice detection devices, provided each device contains not more
697 than 1.85 MBq (50 µCi) of strontium-90 and each device has been manufactured or
698 imported in accordance with a specific license issued by NRC or each device has been
699 manufactured in accordance with the specifications contained in a specific license issued
700 by the Department or an Agreement State to the manufacturer of such device pursuant to
701 licensing requirements equivalent to those in Section 32.61 of 10 CFR Part 32 (January
702 1, 2013~~15~~).

703 3.6.10.2 Persons who own, receive, acquire, possess, use, or transfer strontium-90
704 contained in ice detection devices pursuant to the general license in 3.6.10.1:

705 (1) Shall, upon occurrence of visually observable damage, such as a bend or crack
706 or discoloration from overheating to the device, discontinue use of the device
707 until it has been inspected, tested for leakage and repaired by a person holding a
708 specific license from NRC or an Agreement State to manufacture or service such
709 devices; or shall dispose of the device pursuant to the provisions of 4.33;

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

713 (3) Are exempt from the requirements of Parts 4 and 10 except that such persons
714 shall comply with the provisions of 4.33, 4.51, and 4.52.

715 3.6.10.3 This general license does not authorize the manufacture, assembly, disassembly
716 or repair of strontium-90 in ice detection devices.

717 3.6.10.4 This general license is subject to the provisions of 1.4 through 1.9, 3.15, 3.22,
718 3.23 and Part 17.

719 **ADDITIONAL EXEMPTIONS**

720 **3.7 Reserved-Carriers**

721 **Common and contract carriers, freight forwarders, warehousemen, and the U.S. Postal**
722 **Service are exempt from the regulations in this Part and Parts 5, 7, 16, 19, and 22 and the**
723 **requirements for a license set forth in section 81 of the Atomic Energy Act to the extent**
724 **that they transport or store radioactive material in the regular course of carriage for**
725 **another or storage incident thereto.**

726 **SPECIFIC LICENSES**

727 **3.8 Filing An Application for A Specific License.**

728 3.8.1 Applications for specific licenses shall be filed on a form prescribed by the Department.

729 3.8.2 The Department may at any time after the filing of the original application, and before the
730 expiration of the license, require further statements in order to enable the Department to

Comment [JJ21]:
This exemption provision was inadvertently excluded from Colorado regulations sometime in the past, and is required for compatibility with federal rule. The federal rule language in 10 CFR 30.13 was updated in 2013 concurrent with the issuance of the new rule in 10 CFR Part 37. (Colorado's equivalent to 10 CFR 37 is Part 22 became effective July 15, 2015.)

SSRCR Cross-reference: C.2 [2010]
NRC RATS: 2013-1
NRC Cross-reference: 10 CFR 30.13
NRC Compatibility = B
NRC Correspondence dated 4/13/15

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- 731 determine whether the application should be granted or denied or whether a license should be
732 modified or revoked.
- 733 3.8.3 Each application shall be signed by the applicant or licensee or a person duly authorized to act
734 for and on the applicant's or licensee's behalf.
- 735 3.8.4 An application for a license may include a request for a license authorizing one or more activities.
- 736 3.8.5 In the application, the applicant may incorporate by reference information contained in previous
737 applications, statements, or reports filed with the Department provided such references are clear
738 and specific.
- 739 3.8.6 Applications and documents submitted to the Department may be made available for public
740 inspection except that the Department may withhold any document or part thereof from public
741 inspection pursuant to 24-72-204, CRS.
- 742 3.8.7 Pre-licensing Construction
- 743 3.8.7.1 An application for a license, or to amend or renew an existing license, for (1) source
744 material milling, (2) commercial waste storage, treatment or disposal by incineration, (3)
745 transfer for disposal of wastes from treatment or incineration, (4) commercial waste
746 disposal by land burial or by underground injection, or the (5) conduct of any other activity
747 within the licensing authority of the Department which the Department determines will
748 significantly affect the radiological quality of the human environment, shall be filed with
749 the Department at least nine (9) months prior to the anticipated commencement of
750 construction of the plant or facility in which the activity will be conducted or in accordance
751 with the requirements of Part 18 if applicable, and shall be accompanied by the
752 environmental ~~report~~assessment required by 3.8.8, unless an exemption from the
753 requirement of furnishing such ~~a report~~assessment has been obtained from the
754 Department.
- 755 3.8.7.2 No construction shall be commenced until the license has been issued.
- 756 3.8.7.3 For the purpose of 3.8.7 the terms "construction" and "commencement of
757 construction", ~~are defined in Part 1, 1.2. means any clearing of land, excavation or other
758 substantial action related to a proposed activity for specific licensing that would adversely
759 affect the natural environment of a site; this term does not include changes desirable for
760 the temporary use of the land for public recreational uses, limited borings to determine
761 site characteristics as necessary for environmental assessment of other pre-construction
762 monitoring to establish background information related to the suitability of a site, or to the
763 protection of environmental values.~~
- 764 3.8.8 Environmental ~~Impact~~Assessment.
- 765 3.8.8.1 In the case of an application for a license, or to amend or renew an existing license, for
766 (1) source material milling, (2) commercial waste storage, treatment or disposal by
767 incineration, (3) transfer for disposal of waste from incineration, (4) commercial waste
768 disposal by land burial or by underground injection, or for (5) the conduct of any other
769 activity which will affect the quality of the human environment by reason of exposure to
770 radiation, before "commencement of construction", as defined in 3.8.7.3, of the plant or
771 facility in or at which the activity will be conducted, or in case of a renewal of such a
772 license, the applicant shall submit all information required under these regulations and
773 such other material as the Department may deem necessary.

Comment [JJ22]:
Language is modified to defer to the proposed definitions for "construction" and "commencement of construction" in Part 1 which are consistent with the language of 10 CFR Part 150.31 (and other federal rule parts).

Comment [JJ23]: Wording is modified, consistent with the language used in the Colorado Radiation Control Act for the document(s) submitted by the applicant which pertains to environmental concerns. This section pertains to the assessment generated by the licensee/applicant.

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- 774 (1) Such information shall include the environmental ~~report~~assessment and other
775 information required by 3.8.8.2 to be submitted to assist the Department in the
776 evaluation of the short-term and long-range environmental impact of the project
777 and activity so that the Department may weigh environmental, economic,
778 technical, and other benefits against environmental costs, while considering
779 available alternatives.
- 780 (2) In the event that an environmental ~~report~~assessment acceptable to the
781 Department is on file with the Department in regard to the specific licensed
782 activity authorized under an existing license, and upon request of the applicant to
783 amend or renew an existing license or at the initiation of the Department, the
784 Department may grant an exemption of the requirement to submit an additional
785 environmental ~~report~~assessment or require such amendment of the existing
786 environmental ~~report~~assessment as will demonstrate the environmental impact
787 to result from the proposed activity.
- 788 (3) The request for exemption shall provide the Department with such information as
789 the Department requires of the applicant to demonstrate that no significant
790 environmental impact will result from the licensed activity.
- 791 3.8.8.2 An environmental ~~report~~assessment shall be required of the applicant and shall contain
792 all information deemed necessary by the Department as required by the Act.
- 793 (1) Upon receipt of the environmental ~~report~~assessment or any amendment
794 thereto, and of any other documents required, the Department shall determine
795 the necessity to transmit and, if appropriate, shall transmit the same for review
796 and comment to Federal, State, and local agencies having expertise in and
797 jurisdiction over the proposed project and activity.
- 798 (2) Written comments and reports of reviewing agencies shall be considered by the
799 Department in its decision-making review process on the license application
800 request.
- 801 (3) If an environmental impact statement (EIS) is required of a Federal agency
802 pursuant to the National Environment Policy Act of 1969 (NEPA) and is provided
803 by such Federal agency, it shall be used by the Department in its decision-
804 making review process on the license application request.
- 805 (4) The Department shall consider applicable regulations of Federal, State, and local
806 regulatory agencies and permit requirements thereof.
- 807 3.8.9 ~~Except as provided in 3.8.9.3, 3.8.9.4, and 3.8.9.5, An~~ application for a specific license to use
808 radioactive material in the form of a sealed source or in a device that contains the sealed source
809 ~~shall~~must either:
- 810 3.8.9.1 Identify the source or device by manufacturer and model number as registered with the
811 NRC under 10 CFR 32.210 or with an Agreement State, or for a source or a device
812 containing radium-226 or accelerator produced radioactive material with an Agreement
813 State under provisions comparable to 10 CFR 32.210; or
- 814 3.8.9.2 Contain the information ~~contained~~identified in ~~10 CFR 32.210(e)~~3.12.14.3; or
- 815 3.8.9.3 For sources or devices ~~containing naturally occurring or accelerator produced radioactive~~
816 ~~material~~ manufactured ~~before prior to November 30, 2007~~ **October 23, 2012** that are not
817 registered with the NRC under 10 CFR 32.210 or with an Agreement State, and for which

Comment [JJ24]: Wording is modified here and in later sections of draft part 3 consistent with the language used in the Colorado Radiation Control Act for the document(s) submitted by the applicant which pertaining to their environmental evaluation document(s).

Comment [JJ25]:
The language of 3.8.9 and subsections is modified and updated for consistency with 10 CFR 30.32(g).
NRC RATS = 2012-4
NRC Compatibility = C

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818 the applicant is unable to provide all categories of information specified in ~~40-CFR~~
819 ~~32.210(e)~~**3.12.14.3**, the **applicant application** must **provideinclude**:

820 (1) All available information identified in ~~40-CFR-32.210(e)~~**3.12.14.3** concerning the
821 source, and, if applicable, the device; and

822 (2) Sufficient additional information to demonstrate that there is reasonable
823 assurance that the radiation safety properties of the source or device are
824 adequate to protect health and minimize danger to life and property. Such
825 information must include a description of the source or device, a description of
826 radiation safety features, the intended use and associated operating experience,
827 and the results of a recent leak test.

828 **3.8.9.4 For sealed sources and devices allowed to be distributed without registration of**
829 **safety information in accordance with 3.12.14.7(1), the applicant may supply only**
830 **the manufacturer, model number, and radionuclide and quantity.**

831 **3.8.9.5 If it is not feasible to identify each sealed source and device individually, the**
832 **applicant may propose constraints on the number and type of sealed sources and**
833 **devices to be used and the conditions under which they will be used, in lieu of**
834 **identifying each sealed source and device.**

835 3.8.10 An application from a medical facility, educational institution, or Federal facility to produce
836 Positron Emission Tomography (PET) radioactive drugs for noncommercial transfer to licensees
837 in its consortium authorized for medical use under Part 7 of these regulations or equivalent
838 Agreement State requirements shall include:

839 3.8.10.1 A request for authorization for the production of PET radionuclides or evidence of
840 an existing license issued under this Part or Agreement State requirements for a PET
841 radionuclide production facility within its consortium from which it receives PET
842 radionuclides.

843 3.8.10.2 Evidence that the applicant is qualified to produce radioactive drugs for medical
844 use by meeting one of the criteria in 3.12.10.1(2).

845 3.8.10.3 Identification of individual(s) authorized to prepare the PET radioactive drugs if
846 the applicant is a pharmacy, and documentation that each individual meets the
847 requirements of an authorized nuclear pharmacist as specified in 3.12.10.2(2).

848 3.8.10.4 Information identified in 3.12.10.1(3) on the PET drugs to be noncommercially
849 transferred to members of its consortium.

850 **3.9 General Requirements for the Issuance of Specific Licenses.**

851 A license application **for a specific license** will be approved if the Department determines that:

Comment [JJ26]: Language added for clarity.

852 3.9.1 The applicant is qualified by reason of training and experience to use the material in question for
853 the purpose requested in accordance with these regulations in such a manner as to minimize
854 danger to public health and safety or property;

855 3.9.2 The applicant's proposed equipment, facilities, and procedures are adequate to minimize danger
856 to public health and safety or property and the applicant's facilities are permanently located in
857 Colorado;

858 3.9.3 The issuance of the license will not be inimical to the health and safety of the public;

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859 3.9.4 The applicant satisfies any applicable special requirements in 3.10, 3.11, or 3.12 parts 3, 5, 7, 16,
860 19, and 22; and

Comment [JJ27]:
Update language for consistency with 10 CFR 30.33(a)(4).

861 3.9.5 The applicant has established Department-approved financial assurance warranties in
862 accordance with the following requirements.

863 3.9.5.1 A signed executed original copy of each warranty required by this part shall be furnished
864 to and approved by the Department prior to the issuance of a new license, or any
865 amendment or renewal of an existing license.

866 **DECOMMISSIONING WARRANTY**

867 3.9.5.2 The Department may require any licensee to furnish a decommissioning warranty in a
868 dollar amount determined by the agency as necessary to protect public health and safety,
869 to ensure corrective action during operation, to ensure decontamination and
870 decommissioning of a facility and disposal of radioactive materials in the event of
871 abandonment, default or inability of the licensee to meet the requirements of the Act,
872 these regulations, or the license.

873 3.9.5.3 The following specific licensees are required to furnish decommissioning warranties:

874 (1) Each licensee authorized to possess and use greater than 370 MBq (10 mCi) of
875 source material in a readily dispersible form; and

876 (2) Each licensee authorized to possess and use radioactive material with a half-life
877 greater than 120 days, in quantities:

878 (a) Greater than 10^{-3} times the applicable quantity of Schedule 3B in
879 unsealed form. For a combination of isotopes if R divided by 10^{-3} is
880 greater than 1 (unity rule), where R is defined here as the sum of the
881 ratios of the quantity of each isotope to the applicable value in Schedule
882 3B.

883 (b) Greater than 10^{-10} times the applicable quantity of Schedule 3B in sealed
884 sources or plated foils. For a combination of isotopes if R divided by 10^{-10}
885 is greater than 1 (unity rule), where R is defined in 3.9.5.3(2)(a).

886 (c) 370 Bq (0.01 μ Ci) shall be used as the Schedule 3B value for any alpha
887 emitting radionuclide not listed in Schedule 3B, or mixtures of alpha
888 emitters of unknown composition, for the purpose of determining if the
889 quantity of licensed radioactive material requires a decommissioning
890 warranty or a decommissioning funding plan as defined in 3.9.6.

891 (3) Former U.S. Atomic Energy Commission or NRC licensed facilities;

892 (4) Radioactive waste collection and/or processing licensees;

893 (5) Radioactive waste disposal licensees;

894 (6) Source material milling licensees;

895 (7) Ore refineries; and

896 (8) Other persons with, or applicants for, a specific license as determined by the
897 agency.

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- 898 3.9.5.4 Acceptable Financial Assurance Methods.
- 899 (1) Financial assurance warranties shall contain provisions which are acceptable to
900 the Department for:
- 901 (a) Defining the amount and term of the warranty;
- 902 (b) Providing written notification to the Department by the warrantor at least
903 ninety (90) days prior to cancellation, termination, or revocation of the
904 warranty; and
- 905 (c) Converting the warranty into cash upon forfeiture of the warranty, and
- 906 (2) Financial assurance warranties shall be in the form of a cash deposit,
907 prepayment of a trust, escrow account, government fund, certificate of deposit, or
908 deposit of government securities.
- 909 (a) Prepayment is the deposit prior to the start of operation into an account
910 segregated from licensee assets and outside the licensee's
911 administrative control of cash or liquid assets such that the amount of
912 funds would be sufficient to pay decommissioning costs; or
- 913 (3) Financial assurance warranties which involve a guarantee method to ensure that
914 costs will be paid should the licensee default shall be in a form as described
915 below:
- 916 (a) A bond issued by a fidelity or surety company consistent with the
917 provisions of Section 25-11-110(6)(b)(l), CRS;
- 918 (b) An irrevocable "letter of credit" or "line of credit" issued by a recognized
919 financial institution whose financial condition and commitment are
920 established to the satisfaction of the Department;
- 921 (c) For a decommissioning warranty, a guarantee of funds by the applicant,
922 licensee, or parent company which satisfies the requirements listed
923 below. However, this self-guarantee shall not apply to uranium or thorium
924 milling licensees.
- 925 (i) The Department may accept a parent company guarantee of
926 funds for decommissioning costs based upon a financial test of
927 the parent company and a written guarantee as contained in
928 Appendix 3F.
- 929 (ii) The Department may accept an applicant or licensee guarantee
930 of funds for decommissioning costs based upon a financial test
931 of the applicant or licensee and a written guarantee as contained
932 in Appendix 3G.
- 933 (iii) A guarantee by the applicant, licensee, or parent company may
934 not be used in combination with other financial methods to
935 satisfy the requirements of this section.
- 936 (iv) A guarantee by the applicant or licensee may not be used in any
937 situation where the applicant or licensee has a parent company
938 holding majority control of the voting stock of the company; or

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- 939 (4) Financial assurance warranties which involve an external sinking fund shall be in
940 a form in which deposits are made at least annually, coupled with a surety
941 method or insurance, the value of which may decrease by the amount being
942 accumulated in the sinking fund.
- 943 (a) An external sinking fund is a fund established and maintained by setting
944 aside funds periodically in an account segregated from licensee assets
945 and outside the licensee's administrative control in which the total
946 amount of funds would be sufficient to pay decommissioning costs at the
947 time termination of operation is expected.
- 948 (b) An external sinking fund may be in the form of a trust, escrow account,
949 government fund, certificate of deposit, or deposit of government
950 securities; or
- 951 (5) Financial assurance warranties previously provided to any State, Federal and/or
952 local governing bodies concerning activities subject to license under these
953 regulations, where the amount, terms, and conditions of such financial assurance
954 warranties have been established to the satisfaction of the Department and in
955 accordance with the requirements of 3.9.5; or
- 956 (6) Except for the guarantee of funds noted in 3.9.5.4(3), combinations of the above
957 may be used to establish an acceptable financial assurance warranty.
- 958 (7) The term of the financial assurance warranty shall be open-ended or shall have
959 provisions for automatic renewal until termination of the license by the
960 Department, unless it can be demonstrated that another arrangement would
961 provide an equivalent level of assurance.
- 962 (8) The value of the financial assurance warranty must not be dependent upon the
963 success, profitability, or continued operation of the licensed business or
964 operation.
- 965 3.9.5.5 The amount of funds to be provided by such decommissioning warranties shall be based
966 on Department-approved cost estimates and shall
- 967 (1) Include the disposal of radioactive materials;
- 968 (2) Include decontamination and decommissioning of buildings, facilities and the site
969 to levels which would allow unrestricted use of these areas upon
970 decommissioning;
- 971 (3) Include the reclamation of tailings and/or waste disposal areas in accordance
972 with technical criteria delineated in Parts 3, 4 and/or 18, as appropriate;
- 973 (4) Take into account total costs that would be incurred if an independent contractor
974 were hired to dispose of radioactive materials and perform decontamination,
975 decommissioning, and reclamation work, including:
- 976 (a) The cost of removal and/or disposal of radioactive material, or a
977 radioactivity-inducing machine, which is or would be generated, stored,
978 processed or otherwise present at the facility or site; and

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979 (b) The probable extent of contamination through the possession or use of
980 radioactive material, at or adjacent to the facility or site, and the probable
981 cost of removal of such contamination; and

982 (5) Include reasonable administrative costs, including indirect costs, incurred by the
983 Department in conducting or overseeing the decontamination, decommissioning,
984 and disposal activities, and to cover the Department's reasonable attorney costs
985 that may be incurred in successfully revoking, foreclosing, or realizing the
986 decommissioning warranties established by the licensee in accordance with Part
987 3.

988 3.9.5.6 The licensee shall provide in writing to the Department, no later than June 30th of each
989 calendar year, an annual report demonstrating proof of the value of existing financial
990 warranties and any licensee-proposed changes to the financial assurance warranties,
991 including updated decommissioning funding plans, cost estimates, or the type of
992 warranty. The annual report shall describe any changes in operations, estimated costs, or
993 any other circumstances that may affect the amount of the required financial assurance
994 warranties, including any increased or decreased costs attributable to inflation.

995 3.9.5.7 Each licensee's financial assurance warranties shall be subject to review annually by the
996 Department to assure the continued adequacy of each warranty. Public notice of the
997 submittal of the licensee's annual report shall be posted on the Department's web site
998 and published by the licensee in the local paper of general circulation. Any person may
999 submit written comments to the Department concerning the adequacy of any financial
1000 assurance warranties. The act of submitting such comments does not provide a right to
1001 administrative appeal concerning the financial assurance warranties.

1002 3.9.5.8 The Department will determine if the licensee must adjust the amount of the warranty to
1003 account for increases or decreases in cost estimates resulting from:

1004 (1) ~~i~~Inflation or deflation;

1005 (2) ~~e~~Changes in engineering plans,;

1006 (3) ~~a~~Activities performed,;

1007 (4) **Spills, leakage or migration of radioactive material producing additional**
1008 **contamination in onsite subsurface material that must be remediated to meet**
1009 **applicable remediation criteria;**

1010 (5) **Waste inventory increasing above the amount previously estimated;**

1011 (6) **Waste disposal costs increasing above the amount previously estimated;**

1012 (7) **Facility modifications;**

1013 (8) **Changes in authorized ~~quantities of radioactive material~~possession limits;~~or~~**

1014 (9) **Actual remediation costs that exceed the previous cost estimate;**

1015 (10) **Onsite disposal; and**

1016 (11) ~~e~~Changes in any other conditions affecting disposal, decontamination, and
1017 decommissioning costs.

Comment [JJ28]: Changes to this section necessary for compatibility with 10 CFR Part 40, Appendix A, Criterion 9 (e), and Criterion 9(f)(1) through (f)(11).

<http://www.nrc.gov/reading-rm/doc-collections/cfr/part040/part040-appa.html>

NRC Compatibility = C
NRC Ltr dated 11/19/14.

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3.9.5.9 Regardless of whether reclamation (disposal, decontamination and decommissioning) is phased through the life of the licensed operations or takes place at the end of operations, an appropriate portion of surety liability must be retained until final compliance with the reclamation plan is determined by the Department.

Comment [JJ29]: The original language has been relocated from original section 3.9.5.9 and modified (at the request of NRC) for consistency with 10 CFR Part 40, Appendix A, Criterion 9(g).

NRC Ltr dated 11/19/14
NRC Compatibility = C

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3.9.5.10 The appropriate portion of surety liability retained until final compliance with the reclamation plan is determined will be at least sufficient at all times to cover the costs of decommissioning and reclamation of the areas that are expected to be disturbed before the next license renewal. The term of the surety mechanism must be open ended, unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance would be provided with a surety instrument which is written for a specified time (e.g., 5 years) and which must be automatically renewed unless the surety notifies the beneficiary (the NRC or the Department) and the principal (the licensee) with reasonable time (e.g., 90 days) before the renewal date of their intention not to renew. In such a situation the surety requirement still exists and the licensee would be required to submit an acceptable replacement surety within a brief time to allow at least 60 days for the regulatory agency to collect.

Comment [JJ30]: Provision added at the request of NRC for consistency with 10 CFR Part 40, Appendix A, Criterion 9(h).

NRC Ltr dated 11/19/14
NRC Compatibility = C

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3.9.5.11 Proof of forfeiture must not be necessary to collect the surety. In the event the licensee can not provide an acceptable replacement surety within the required time, the surety shall be automatically collected before its expiration. The surety instrument must provide for collection of the full face amount immediately on demand without reduction for any reason, except for trustee fees and expenses provided for in a trust agreement, and that the surety will not refuse to make full payment. The conditions described previously would have to be clearly stated on any surety instrument which is not open ended, and must be agreed to by all parties. Financial surety arrangements generally acceptable to the Department are:

Comment [JJ31]: Provision added at the request of NRC for consistency with 10 CFR Part 40, Appendix A, Criterion 9(i).

NRC Ltr dated 11/19/14
NRC Compatibility = C

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(1) Trust funds;

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(2) Surety bonds;

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(3) Irrevocable letters of credit; and

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(4) Combinations of the financial surety arrangements or other types of arrangements as may be approved by the Department. If a trust is not used, then a standby trust must be set up to receive funds in the event the NRC or Department exercises its right to collect the surety. The surety arrangement and the surety or trustee, as applicable, must be acceptable to the Department. Self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract with a State or Federal agency), will not satisfy the surety requirement because this provides no additional assurance other than that which already exists through license requirements.

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3.9.5.12(1) — With the approval of the Department, a licensee may reduce the amount of a decommissioning warranty as decommissioning activities are completed in accordance with an approved decommissioning plan and/or to reflect current site conditions and license authorizations.

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3.9.5.13(2) — The licensee shall have sixty days after the date of written notification by the Department of a required adjustment to establish a warranty fulfilling all new requirements unless granted an extension by the Department. If the licensee disputes the

1065 amount of the required financial assurance warranties, the licensee may request a
1066 hearing to be conducted in accordance with section 24-4-105, CRS.

1067 ~~3.9.5.14(3)~~ If the licensee requests a hearing, no new ~~classified material, as that term is~~
1068 ~~defined in 1.2.2, ore or other radioactive material~~ may be brought on site **for**
1069 **processing or disposal** and no ~~classified new radioactive~~ material may be processed
1070 until the licensee's dispute over the financial assurance warranty is resolved, unless the
1071 licensee posts a bond in a form approved by the Department equal to the amount in
1072 dispute.

Comment [JJ32]: Language is modified here for consistency with 2015 statutory (Radiation Control Act) changes via House Bill 15-1145.
RCA: 25-11-110(5)(e)

1073 ~~3.9.5.9~~ ~~Regardless of whether the disposal, decontamination and decommissioning work is~~
1074 ~~phased through the life of the licensed operations or takes place at the end of the~~
1075 ~~operation, an appropriate and adequate decommissioning warranty shall be maintained~~
1076 ~~in good standing by the licensee until termination of the license or as otherwise~~
1077 ~~authorized by the Department.~~

Comment [JJ33]: The original language has been modified and relocated (above) to (new) 3.9.5.9 for consistency and alignment with 10 CFR Part 40, Criterion 9.

1078 **LONG-TERM CARE WARRANTY**

Comment [JJ34]:
Header added for clarity.

1079 3.9.5.105 In addition to the decommissioning warranty required by 3.9.5.2, the Department
1080 may require any licensee to provide a long-term care warranty if the licensed facility will
1081 remain a disposal site for radioactive materials subsequent to the termination of the
1082 license, or the license will be terminated using criteria in 4.61.3 or 4.61.4.

1083 (1) Except as provided in 3.9.5.150(2), the following specific licensees are required
1084 to provide long-term care warranties:

- 1085 (a) Radioactive waste disposal licensees;
- 1086 (b) Commercial radioactive waste handling and/or packaging licensees;
- 1087 (c) Source material milling licensees; and
- 1088 (d) Formerly U.S. Atomic Energy Commission or U.S. Nuclear Regulatory
1089 Commission-licensed facilities;

1090 (2) A long-term care warranty is not required for a licensee identified in 3.9.5.150(1)
1091 if the disposition of radioactive materials by the licensee is made in such a
1092 manner as the Department determines does not require long-term monitoring
1093 and maintenance of the site.

1094 (3) The long-term care warranty shall be in a form as described in 3.9.5.4.

1095 (4) The amount of funds to be provided by such long-term care warranties shall be
1096 based on Department-approved cost estimates and ~~shall~~**must** be enough that
1097 with an assumed ~~six~~**one** percent annual real interest rate, the annual interest
1098 earnings will be sufficient to cover the annual costs of site surveillance, including
1099 reasonable administrative costs incurred, in perpetuity, subsequent to the
1100 termination of the license.

Comment [JJ35]: Consistent with statutory changes (Radiation Control Act 2015 via House Bill 15-1145) and 10 CFR Part 40, Appendix A, Criterion 10, the assumed interest rate is adjusted to one percent. The adjusted assumed interest rate will help ensure that adequate funds are available for long-term care activities once a site is closed and decommissioned.

1101 (a) For each source material mill licensee, the long-term care warranty must
1102 have a minimum value equivalent to \$250,000 in 1978 dollars.

1103 (i) The value of the long-term care warranty shall be adjusted
1104 annually to recognize inflation.

NRC Compatibility = C
NRC Letter dated 11/19/14
RCA: 25-11-110(4)(d)

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- 1105 (ii) The inflation rate to be used for this adjustment is that indicated
1106 by the change in the consumer price index published by the U.S.
1107 Department of Labor, Bureau of Labor Statistics.
- 1108 (iii) The Department may use other indicators of the inflation rate if
1109 reasonable; provided, however, that the license shall not
1110 terminate unless the amount of the long-term care warranty is
1111 acceptable to the licensing agency and site caretaker.
- 1112 (b) Cost estimates for facilities and sites requiring long-term care
1113 subsequent to license termination are to be based on the final disposition
1114 of wastes such that ongoing active maintenance is not necessary to
1115 preserve isolation.
- 1116 (i) It is expected that, as a minimum, annual site inspections shall
1117 be conducted to confirm the integrity of the stabilized waste
1118 systems and to determine the need, if any, for maintenance
1119 and/or monitoring.
- 1120 (ii) Cost estimates shall be adjusted if more frequent site inspections
1121 are required based on an evaluation of a particular site.
- 1122 (c) For sites decommissioned in accordance with the provisions of 4.61.3 or
1123 4.61.4, cost estimates for long-term care subsequent to license
1124 termination must be sufficient to enable the Department, a responsible
1125 government agency, or an independent third party to:
- 1126 (i) Perform periodic site inspections no less frequently than each
1127 five years;
- 1128 (ii) Assure the continuation of institutional controls; and
- 1129 (iii) Assume responsibilities and carry out any necessary control and
1130 maintenance of the site. Cost estimates shall be adjusted if more
1131 frequent site inspections are required based on an evaluation of
1132 a particular site and the institutional controls established for that
1133 site.
- 1134 (5) Whenever the Department determines that a licensee's disposal,
1135 decommissioning and decontamination requirements have been satisfied,
1136 provisions shall be made for transferring custody of the site and the long-term
1137 care warranty funds for that license in accordance with the act.
- 1138 (a) If the value of the long-term care warranty funds exceeds the amount
1139 required by the government agency overseeing the long-term care of the
1140 site, then all such excess amounts shall be returned to the licensee.

1141 3.9.6 Decommissioning Funding Plan Required.

- 1142 3.9.6.1 Each applicant for and holder of a license authorizing the possession and use unsealed
1143 radioactive materials with half-life greater than 120 days and in quantities greater than 10
1144 ⁵ times the applicable quantity of Schedule 3B, shall establish a Department-approved
1145 decommissioning funding plan to assure the availability of funds for decommissioning
1146 activities conducted over the life of the licensed facility-. 370 Bq (0.01 µCi) shall be used
1147 as the Schedule 3B value for any alpha emitting radionuclide not listed in Schedule 3B, or

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- 1148 mixtures of alpha emitters of unknown composition. A decommissioning funding plan is
1149 also required for licensees authorized a combination of isotopes if R divided by 10^{-5} is
1150 greater than 1 (unity rule), where R is defined in 3.9.5.3(2)(a).
- 1151 3.9.6.2 Each holder of, or applicant for, any specific license authorizing the possession and use
1152 of sealed sources or plated foils of half-life greater than 120 days and in quantities
1153 greater than 10^{12} times the applicable quantity in Schedule 3B shall establish a
1154 Department-approved decommissioning funding plan to assure the availability of funds
1155 for decommissioning activities conducted over the life of the licensed facility. 370 Bq
1156 (0.01 μ Ci) shall be used as the Schedule 3B value for any alpha emitting radionuclide not
1157 listed in Schedule 3B, or mixtures of alpha emitters of unknown composition. The
1158 decommissioning funding plan is also required for licensees authorized for a combination
1159 of isotopes if R divided by 10^{12} is greater than 1 (unity rule), where R is defined as in
1160 3.9.5.3(2)(a).
- 1161 3.9.6.3 Waste collectors and waste processors, as defined in Part 4, Appendix D, shall establish
1162 an agency-approved decommissioning funding plan to assure the availability of funds for
1163 decommissioning activities conducted over the life of the licensed facility.
- 1164 (1) The decommissioning funding plan must include the cost of disposal of the
1165 maximum radioactivity (becquerel or curie) of radioactive material permitted by
1166 the license, and the cost of disposal of the maximum quantity, by volume, of
1167 radioactive material that could be present at the licensee's facility at any time, in
1168 addition to the cost to remediate the licensee's site to meet the license
1169 termination criteria of Part 4.
- 1170 3.9.6.4 Each decommissioning funding plan must be submitted for review and approval by the
1171 Department and must contain:
- 1172 (1) A detailed cost estimate for decommissioning, in an amount reflecting:
- 1173 (a) The cost of an independent contractor to perform all decommissioning
1174 activities;
- 1175 (b) The cost of meeting the 4.61.2 criteria for unrestricted use, provided that,
1176 if the applicant or licensee can demonstrate its ability to meet the
1177 provisions of 4.61.3 for restricted use, the cost estimate may be based
1178 on meeting the 4.61.3 restricted use criteria;
- 1179 (c) The volume of onsite subsurface material containing residual
1180 radioactivity that will require remediation to meet the criteria for license
1181 termination; and
- 1182 (d) An adequate contingency factor.
- 1183 (i) Identification of and justification for using the key assumptions
1184 contained in the detailed cost estimate;
- 1185 (ii) A description of the method of assuring funds for
1186 decommissioning as required in this section, including means for
1187 adjusting cost estimates and associated funding levels
1188 periodically over the life of the facility.

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- 1189 (iii) A certification by the licensee that financial assurance for
1190 decommissioning has been provided in the amount of the cost
1191 estimate for decommissioning; and
- 1192 (iv) A signed original, or if permitted, a copy, of the financial
1193 instrument obtained to satisfy the requirements of this section
1194 (unless a previously submitted and accepted financial instrument
1195 continues to cover the cost estimate for decommissioning).

1196 3.9.6.5 At the time of license renewal and at intervals not to exceed three years, the
1197 decommissioning funding plan must be resubmitted with adjustments as necessary to
1198 account for changes in costs and the extent of contamination. If the amount of financial
1199 assurance will be adjusted downward, this can not be done until the updated
1200 decommissioning funding plan is approved. The decommissioning funding plan must
1201 update the information submitted with the original or prior approved plan, and must
1202 specifically consider the effect of the following events on decommissioning costs:

- 1203 (1) Spills of radioactive material producing additional residual radioactivity in onsite
1204 subsurface material;
- 1205 (2) Waste inventory increasing above the amount previously estimated;
- 1206 (3) Waste disposal costs increasing above the amount previously estimated;
- 1207 (4) Facility modifications;
- 1208 (5) Changes in authorized possession limits;
- 1209 (6) Actual remediation costs that exceed the previous cost estimate;
- 1210 (7) Onsite disposal; and
- 1211 (8) Use of a settling pond.

1212 3.9.6.6 The decommissioning funding plan must also include a certification by the licensee that
1213 funding for decommissioning activities has been provided for in the amount of the cost
1214 estimate for decommissioning.

- 1215 (1) For an applicant, this certification may state that the appropriate assurance will
1216 be obtained after the application has been approved and the license issued, but
1217 prior to the receipt or possession of radioactive material.
- 1218 (2) A signed original of the financial instrument shall be submitted to the Department.

1219 3.9.7 In the case of an application for a license for (1) source material milling, (2) commercial waste
1220 storage, treatment or disposal by incineration, (3) transfer for disposal of waste from incineration,
1221 (4) commercial waste disposal by land burial or by underground injection, or for (5) the conduct of
1222 any other activity which the Department determines will significantly affect the quality of the
1223 human environment, the Department has concluded that the action called for is the issuance of
1224 the proposed license with any appropriate conditions to protect environmental values.

1225 3.9.7.1 Such determination shall be made before commencement of construction of the plant or
1226 facility in which the activity will be conducted and based on information filed and
1227 evaluation made pursuant to 3.8.8.

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- 1228 3.9.8 Commencement of construction prior to the issuance of a license, or of an amendment or renewal
1229 thereof, or of an exemption under the requirements of 3.8.7, may be grounds for denial of such
1230 license, amendment or renewal. ~~and~~
- 1231 3.9.9 Reserved.
- 1232 3.9.10 License Hearings.
- 1233 3.9.10.1 There shall be an opportunity for public hearings to be held in the following
1234 circumstances in accordance with the procedures in 24-4-104 and -105, CRS. and this
1235 paragraph:
- 1236 (1) Prior to the licensing or leasing of state-owned property for the concentration,
1237 storage or permanent disposal of radioactive materials.
- 1238 (2) For each proposed license, five-year license renewal, or license amendment
1239 pertaining to a uranium recovery facility's receipt of ~~classified~~-material as
1240 specified in Part 18 of these regulations.
- 1241 3.9.11 Contingency Plans
- 1242 3.9.11.1 Each application to possess radioactive materials in unsealed form, on foils or
1243 plated sources, or sealed in glass in excess of the quantities in Schedule 3E - "Quantities
1244 of Radioactive Materials Requiring Consideration of the Need for an Emergency Plan for
1245 Responding to a Release", must contain either:
- 1246 (1) An evaluation, as described in 3.9.11.2, showing that the projected dose to a
1247 person offsite due to a release of radioactive materials would not exceed 0.01 Sv
1248 (1 rem) effective dose equivalent or 0.05 Sv (5 rem) to the thyroid; or
- 1249 (2) A contingency plan for responding to a release of radioactive material.
- 1250 3.9.11.2 In evaluating the total effective dose equivalent to an individual pursuant to
1251 3.9.11.1(1):
- 1252 (1) The radioactive material is physically separated so that only a portion could be
1253 involved in an accident;
- 1254 (2) All or part of the radioactive material is not subject to release during an accident
1255 because of the way it is stored or packaged;
- 1256 (3) The release fraction in the respirable size range is predicted to be lower than the
1257 release fraction shown in Schedule 3E due to the chemical or physical form of
1258 the material;
- 1259 (4) The solubility of the radioactive material would reduce the dose received;
- 1260 (5) Facility design or engineered safety features in the facility would cause the
1261 release fraction to be lower than shown in Schedule 3E.
- 1262 (6) Operating restrictions or procedures would prevent a release fraction as large as
1263 that shown in Schedule 3E.

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- 1264 3.9.11.3 A contingency plan for responding to a release of radioactive material submitted
1265 under 3.9.11.1(2) must include the following information, in separate sections having
1266 each page numbered and labeled with a revision date and revision number:
- 1267 (1) Facility description - a brief description of the licensee's facility and surroundings.
- 1268 (2) Types of accidents - a n identification of each type of accident involving
1269 radioactive material for which actions by licensee staff or offsite response
1270 organizations will be needed to protect members of the public.
- 1271 (3) Classification of accidents - a method for classifying and declaring each alert or
1272 site area emergency, as defined in Part 1.
- 1273 (4) Detection of accidents - identification of the means of detecting each type of
1274 accident in a timely manner.
- 1275 (5) Mitigation of consequences - a brief description of the means and equipment for
1276 mitigating the consequences of each type of accident, including those provided to
1277 protect workers onsite, and a description of the program for maintaining the
1278 equipment.
- 1279 (6) Assessment of releases - a brief description of the methods and equipment to
1280 assess releases of radioactive materials.
- 1281 (7) Responsibilities - a brief description of the responsibilities of licensee personnel
1282 should an accident occur, including identification of personnel responsible for
1283 promptly notifying offsite response organizations and the Department; also
1284 responsibilities for developing, maintaining, and updating the plan.
- 1285 (8) Notification and coordination.
- 1286 (a) A commitment to and a brief description of the means to promptly notify
1287 offsite response organizations and request offsite assistance, including
1288 medical assistance for the treatment of contaminated injured onsite
1289 workers when appropriate.
- 1290 (b) A control point must be established.
- 1291 (c) The notification and coordination must be planned so that unavailability
1292 of some personnel, parts of the facility, and some equipment will not
1293 prevent the notification and coordination.
- 1294 (d) The licensee shall also commit to notify the Department immediately
1295 after notification of the appropriate offsite response organizations and not
1296 later than one hour after the licensee declares an emergency.
- 1297 (9) Information to be communicated - a brief description of the types of information
1298 on facility status, radioactive releases, and recommended protective actions, if
1299 necessary, to be given to offsite response organizations and to the Department.
- 1300 (10) Training.
- 1301 (a) A brief description of the frequency, performance objectives and plans
1302 for the training that the licensee will provide workers on how to respond
1303 to an emergency including any special instructions and orientation tours

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- 1304 the licensee would offer to fire, police, medical and other emergency
1305 personnel.
- 1306 (b) The training shall familiarize personnel with site-specific emergency
1307 procedures.
- 1308 (c) Also, the training shall thoroughly prepare site personnel for their
1309 responsibilities in the event of accident scenarios postulated as most
1310 probable for the specific site, including the use of team training for such
1311 scenarios.
- 1312 (11) Safe shutdown - a brief description of the means of restoring the facility to a safe
1313 condition after an accident.
- 1314 (12) Exercises.
- 1315 (a) Provisions for conducting quarterly communications checks with offsite
1316 response organizations and biennial onsite exercises to test response to
1317 simulated emergencies.
- 1318 (b) Quarterly communications checks with offsite response organizations
1319 must include the check and update of all necessary telephone numbers.
- 1320 (c) The licensee shall invite offsite response organizations to participate in
1321 the biennial exercises.
- 1322 (d) Participation of offsite response organizations in biennial exercises
1323 although recommended is not required.
- 1324 (e) Exercises must use accident scenarios postulated as most probable for
1325 the specific site and the scenarios shall not be known to most exercise
1326 participants.
- 1327 (f) The licensee shall critique each exercise using individuals not having
1328 direct implementation responsibility for the plan.
- 1329 (g) Critiques of exercises must evaluate the appropriateness of the plan,
1330 emergency procedures, facilities, equipment, training of personnel, and
1331 overall effectiveness of the response.
- 1332 (h) Deficiencies found by the critiques must be corrected.
- 1333 (13) Hazardous chemicals - a certification that the applicant has met its
1334 responsibilities under the Emergency Planning and Community Right-To-Know
1335 Act of 1986, Title III, Pub. L. 99-499, if applicable to the applicant's activities at
1336 the proposed place of use of the radioactive material.
- 1337 3.9.11.4 The licensee shall allow the offsite response organizations expected to respond
1338 in case of an accident 60 days to comment on the licensee's emergency plan before
1339 submitting it to the Department.
- 1340 (1) The licensee shall provide any comments received within 60 days to the
1341 Department with the emergency plan.
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- 1343 **3.10 Additional Requirements for Issuance of Specific Licenses for Use of Unsealed**
1344 **Radioactive Material.**
1345
1346 3.10.1 In addition to the requirements set forth in 3.9, applicants for licenses authorizing the possession
1347 and use of unsealed radioactive materials shall include in the application a description of the
1348 facility and procedures for operation which
- 1349 3.10.1.1 Minimize to the extent practicable, contamination of the facility and environment;
1350 3.10.1.2 Facilitate eventual decommissioning; and
1351 3.10.1.3 Minimize, to the extent practicable, the generation of radioactive waste.
- 1352 3.10.2 Licensees shall, to the extent practical, conduct operations to minimize the introduction of
1353 residual radioactivity into the site, including the subsurface, in accordance with the existing
1354 radiation protection requirements in Part 4, Section 4.5 and radiological criteria for license
1355 termination in Part 4, Section 4.61 of the regulations.
- 1356 **3.11 Special Requirements for Specific Licenses of Broad Scope.**
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1358 [* * * = Indicates omission of unaffected rule sections]
1359
- 1360 **3.12 Special Requirements for a Specific License to Manufacture, Assemble, Repair, or**
1361 **Distribute Commodities, Products, or Devices which Contain Radioactive Material.**
- 1362 3.12.1 A licensee authorized to introduce radioactive material into a product or material owned by or in
1363 the possession of the licensee or another to be transferred to persons exempt under 3.3.1.1 shall
1364 meet the requirements of 10 CFR 32.11 and any other applicable NRC requirement.
- 1365 3.12.2 No person may introduce byproduct material into a product or material knowing or having reason
1366 to believe that it will be transferred to persons exempted pursuant to 3.3.2, under 10 CFR 30.14
1367 or equivalent regulations of an Agreement State, except in accordance with a license issued
1368 under 10 CFR 32.⁸
- 1369 ⁸ Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or
1370 other product containing byproduct material whose subsequent possession, use, transfer, and disposal by all other persons are
1371 exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C.
1372 20555.
- 1373 3.12.2.3 Each person licensed under 3.12.2 shall maintain records identifying, by name
1374 and address, each person to whom radioactive material is transferred for use under
1375 3.3.2, and stating the kinds and quantities of radioactive material transferred. An annual
1376 summary report stating the total quantity of each radionuclide transferred under the
1377 specific license shall be filed with the Department. Each report shall cover the year
1378 ending June 30, and shall be filed within 30 days thereafter. If no transfers of radioactive
1379 material have been made pursuant to 3.12.2 during the reporting period, the report shall
1380 so indicate.
- 1381 3.12.3 RESERVED.

Comment [JJ36]: The language in brackets and subsequent "****" marks are not part of the final rule and will be deleted prior to final submission.

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1382 3.12.4 Licensing the Manufacture and Distribution of Devices to Persons Generally Licensed Under
1383 3.6.4.

1384 3.12.4.1 An application for a specific license to manufacture, or **initially transfer** distribute
1385 devices containing radioactive material, excluding special nuclear material, to persons
1386 generally licensed under 3.6.4 or equivalent regulations of NRC or an Agreement State
1387 will be approved if:

Comment [JJ37]: Language updated consistent with 10 CFR 32.51(a).

1388 (1) The applicant satisfies the general requirements of 3.9;

1389 (2) The applicant submits sufficient information relating to the design, manufacture,
1390 prototype testing, quality control, labels, proposed uses, installation, servicing,
1391 leak testing, operating and safety instructions, and potential hazards of the
1392 device to provide reasonable assurance that:

1393 (a) The device can be safely operated by persons not having training in
1394 radiological protection;

1395 (b) Under ordinary conditions of handling, storage, and use of the device,
1396 the radioactive material contained in the device will not be released or
1397 inadvertently removed from the device, and it is unlikely that any person
1398 will receive in any period of 1 calendar quarter a dose in excess of 10
1399 percent of the limits specified in 4.6.1; and

1400 (c) Under accident conditions such as fire and explosion associated with
1401 handling, storage, and use of the device, it is unlikely that any person
1402 would receive an external radiation dose or dose commitment in excess
1403 of the following organ doses:

1404 (i) Whole body; head and trunk; active blood-forming organs;
1405 gonads; or lens of eye: 150 mSv (15 rem)

1406 (ii) Hands and forearms; feet and ankles; localized areas of skin
1407 averaged over areas no larger than 1 square centimeter: 2 Sv
1408 (200 rem)

1409 (iii) Other organs: 500 mSv (50 rem); and

1410 (3) Each device bears a durable, legible, clearly visible label or labels approved by
1411 the Department, which contain in a clearly identified and separate statement:

1412 (a) Instructions and precautions necessary to assure safe installation,
1413 operation, and servicing of the device; documents such as operating and
1414 service manuals may be identified in the label and used to provide this
1415 information;

1416 (b) The requirement, or lack of requirement, for leak testing, or for testing
1417 any "on-off" mechanism and indicator, including the maximum time
1418 interval for such testing, and the identification of radioactive material by
1419 isotope, quantity of radioactivity, and date of determination of the
1420 quantity; and

1421 (c) The information called for in one of the following statements, as
1422 appropriate, in the same or substantially similar form:

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1423 (i) The receipt, possession, use, and transfer of this device, Model
1424 ____, Serial No. ____⁹, are subject to a general license or the
1425 equivalent and the regulations of the U.S. Nuclear Regulatory
1426 Commission or an Agreement State. This label shall be
1427 maintained on the device in a legible condition. Removal of this
1428 label is prohibited.

1429 CAUTION - RADIOACTIVE MATERIAL

1430 _____

1431 Name of manufacturer or distributor

1432 ⁹ The model, serial number, and name of the manufacturer or distributor may be omitted from this label provided the information is
1433 elsewhere specified in labeling affixed to the device.

1434 (ii) The receipt, possession, use, and transfer of this device,
1435 Model ____, Serial No. ____¹⁰, are subject to a general license or
1436 the equivalent, and the radiation regulations. This label shall be
1437 maintained on the device in a legible condition. Removal of this
1438 label is prohibited.

1439 CAUTION - RADIOACTIVE MATERIAL

1440 _____

1441 Name of manufacturer or distributor

1442 ¹⁰ The model, serial number, and name of the manufacturer or distributor may be omitted from this label provided the information is
1443 elsewhere specified in labeling affixed to the device.

1444 (4) Each device having a separable source housing that provides the primary
1445 shielding for the source also bears, on the source housing, a durable label
1446 containing the device model number and serial number, the isotope and quantity,
1447 the words, "Caution-Radioactive Material," the radiation symbol prescribed in
1448 4.27 and the name of the manufacturer or initial distributor.

1449 (5) **The device has been registered in the Sealed Source and Device Registry.**

1450 3.12.4.2 In the event the applicant desires that the device be required to be tested at
1451 intervals longer than 6 months, either for proper operation of the "on-off" mechanism and
1452 indicator, if any, or for leakage of radioactive material or for both, the applicant shall
1453 include in the application sufficient information to demonstrate that such longer interval is
1454 justified by performance characteristics of the device or similar devices and by design
1455 features which have a significant bearing on the probability or consequences of leakage
1456 of radioactive material from the device or failure of the "on-off" mechanism and indicator.

1457 3.12.4.3 In determining the acceptable interval for the test for leakage of radioactive
1458 material, the Department will consider information which includes, but is not limited to:

- 1459 (1) Primary containment or source capsule;
- 1460 (2) Protection of primary containment;
- 1461 (3) Method of sealing containment;
- 1462 (4) Containment construction materials;

Comment [JJ38]:
Provision added consistent with 10 CFR 32.51(a)(6).

The sealed source and device registry or SSD registry is a database maintained by the Nuclear Regulatory Commission to help ensure that all devices containing radioactive materials and sold in the U.S. have been evaluated for safety and use considerations. Refer to Part 1 of the Colorado regulations for a definition for sealed source and device registry.

NRC Compatibility = B
NRC RATS = 2012-4

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- 1463 (5) Form of contained radioactive material;
- 1464 (6) Maximum temperature withstood during prototype tests;
- 1465 (7) Maximum pressure withstood during prototype tests;
- 1466 (8) Maximum quantity of contained radioactive material;
- 1467 (9) Radiotoxicity of contained radioactive material; and
- 1468 (10) Operating experience with identical devices or similarly designed and
1469 constructed devices.
- 1470 3.12.4.4 — In the event the applicant desires that the general licensee under 3.6.4, or under
1471 equivalent regulations of NRC or an Agreement State, be authorized to install the device,
1472 collect the sample to be analyzed by a specific licensee for leakage of radioactive
1473 material, service the device, test the "on-off" mechanism and indicator, or remove the
1474 device from installation, the applicant shall include in the application written instructions
1475 to be followed by the general licensee, estimated calendar quarter doses associated with
1476 such activity or activities, and bases for such estimates.
- 1477 (1) The submitted information shall demonstrate that performance of such activity or
1478 activities by an individual untrained in radiological protection, in addition to other
1479 handling, storage, and use of devices under the general license, is unlikely to
1480 cause that individual to receive a calendar quarter dose in excess of 10 percent
1481 of the limits specified in 4.6.1.
- 1482 3.12.4.5 — Each person licensed under 3.12.4 to distribute devices to generally licensed
1483 persons shall:
- 1484 (1) Before a device is transferred, furnish information specified in this paragraph to
1485 each person to whom a device is to be transferred, or in the case of a transfer
1486 through an intermediate person, to the intended user prior to initial transfer to the
1487 intermediate person, including:
- 1488 (a) A copy of the general license contained in 3.6.4 and a copy of the
1489 general license contained in the NRC or Agreement State regulation
1490 equivalent to 3.6.4;
- 1491 (b) A copy of sections 3.6 and 4.40 through 4.52;
- 1492 (c) A list of the services that can only be performed by a specific licensee;
- 1493 (d) Information on acceptable disposal options including estimated costs of
1494 disposal;
- 1495 (e) An indication that federal policy is to issue high civil penalties for
1496 improper disposal; and
- 1497 (f) The name or title, address, and phone number of the contact at the
1498 transferee's NRC or Agreement State location.
- 1499 (2) Report to the Department all transfers of such devices to persons for use under
1500 the general license in 3.6.4 and all receipts of such devices.

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- 1501 (a) Such a report to the Department shall include:
- 1502 (i) The identity of each general licensee by name and mailing
1503 address for the location of use; if there is no mailing address for
1504 the location of use, an alternate address for the general licensee
1505 shall be submitted along with information on the actual location
1506 of use;
- 1507 (ii) The name, title, and phone number of the person identified by
1508 the general licensee as having knowledge of and authority to
1509 take required actions to ensure compliance with the appropriate
1510 regulations and requirements;
- 1511 (iii) The date of transfer;
- 1512 (iv) The type, model number, and serial number of the device
1513 transferred; and
- 1514 (v) The quantity and type of radioactive material contained in the
1515 device.
- 1516 (b) If one or more intermediate persons will temporarily possess the device
1517 at the intended place of use before its possession by the user, the report
1518 must include the same information for both the intended user and each
1519 intermediate person, and clearly designate the intermediate person(s).
- 1520 (c) For devices received from a 3.6.4 general licensee, the report must
1521 include the identity of the general licensee by name and address, the
1522 type, model number, and serial number of the device received, the date
1523 of receipt, and, in the case of devices not initially transferred by the
1524 reporting licensee, the name of the manufacturer or initial transferor.
- 1525 (d) If the licensee makes changes to a device possessed by a 3.6.4 general
1526 licensee, such that the label must be changed to update required
1527 information, the report must identify the general licensee, the device, and
1528 the changes to information on the device label.
- 1529 (e) The report must cover each calendar quarter, must be filed within 30
1530 days of the end of the calendar quarter, and must clearly indicate the
1531 period covered by the report.
- 1532 (f) The report must clearly identify the specific licensee submitting the report
1533 and include the license number of the specific licensee.
- 1534 (g) If no transfers have been made to or from persons generally licensed
1535 under 3.6.4 during the reporting period, the report must so indicate.
- 1536 (3) Furnish clear and legible reports to other agencies, containing all of the data
1537 required by Form 653, "Transfers of Industrial Devices Report", including:
- 1538 (a) Report the information specified in 3.12.4.5(2) to NRC for all transfers of
1539 such devices to persons for use under NRC general license in Section
1540 31.5 of 10 CFR Part 31 (January 1, 20~~15~~¹⁵).

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1541 (b) Report the information specified in 3.12.4.5 (2) to the responsible State
1542 agency for all transfers of devices manufactured and distributed pursuant
1543 to 3.12.4 for use under a general license in that State's regulations
1544 equivalent to 3.6.4.

1545 (4) Maintain all information concerning transfers and receipts of devices that
1546 supports the reports required by this section for a period of 3 years following the
1547 date of the recorded event.

1548 3.12.5 Special Requirements for the Manufacture, Assembly, ~~or Repair~~ **or Initial Transfer** of Luminous
1549 Safety Devices for Use in Aircraft.

1550 3.12.5.1 An application for a specific license to manufacture, assemble, ~~or repair~~ **or**
1551 **initially transfer** luminous safety devices containing tritium or promethium-147 for use in
1552 aircraft, for distribution to persons generally licensed under 3.6.5 will be approved if:

1553 (1) The applicant satisfies the general requirements specified in 3.9; and

1554 (2) The applicant satisfies the requirements of Sections 32.53, 32.54, 32.55, **and**
1555 32.56, ~~and 32.404~~ of 10 CFR Part 32 (January 1, 20**13**15), or their equivalent.

1556 (3) **The device has been registered in the Sealed Source and Device Registry.**

1557 3.12.6 Special Requirements for License to Manufacture **or initially transfer** Calibration Sources
1558 Containing Americium-241, Plutonium or Radium-226 for Distribution to Persons Generally
1559 Licensed Under 3.6.7.

1560 3.12.6.1 An application for a specific license to manufacture calibration and reference sources
1561 containing americium-241, plutonium or radium-226 to persons generally licensed
1562 under 3.6.7 will be approved if:

1563 (1) The applicant satisfies the general requirement of 3.9; and

1564 (2) The applicant satisfies the requirements of Sections 32.57, 32.58, **and 32.59;**
1565 ~~and 32.402~~ of 10 CFR Part 32 and Section 70.39 of 10 CFR Part 70 (January 1,
1566 20**13**15) or their equivalent.

1567 3.12.7 Reserved.

1568 3.12.8 Manufacture and Distribution of Radioactive Material for Certain In Vitro Clinical or Laboratory
1569 Testing Under General License.

1570 * * *

1571 3.12.9 Licensing the Manufacture **or initial transfer and Distribution** of Ice Detection Devices.

1572 3.12.9.1 An application for a specific license to manufacture and distribute ice detection
1573 devices to persons generally licensed under 3.6.10 will be approved if:

1574 (1) The applicant satisfies the general requirements of 3.9; and

1575 (2) The criteria of Sections 32.61, **and 32.62;** ~~and 32.403~~ of 10 CFR Part 32
1576 (January 1, 20**13**15) are met.

1577 (3) **The device has been registered in the Sealed Source and Device Registry.**

Comment [JJ39]:
10 CFR 32.101 (pertaining to prototype testing criteria for luminous safety devices used in aircraft) was deleted from federal rule in 2012 and therefore the reference in Part 3 is deleted.
NRC Compatibility = B
RATS 2012-4

Comment [JJ40]:
Language is added consistent with federal rule in 10 CFR 32.53(f). Although the requirement is currently in place through reference to 32.53 in 3.12.5.1(2), the Radiation Program believes the added language will help clarify the requirements for the regulated community.
Colorado does not currently have any specific licensees who manufacture, assemble, repair or initially transfer luminous safety devices for use in aircraft.
NRC Cross-reference = 10 CFR Part 32.53(f)
NRC Compatibility = B

Comment [JJ41]:
10 CFR 32.102 (pertaining to prototype testing criteria for calibration/reference sources using Am241 or Ra226) was deleted from federal rule in 2012 and therefore the reference in Part 3 is deleted.
NRC Compatibility = B
RATS 2012-4

Comment [JJ42]:
10 CFR 32.103 (pertaining to prototype testing criteria for calibration/reference sources using Am241 or Ra226) was deleted from federal rule in 2012 and therefore the reference in Part 3 is deleted.
NRC Compatibility = B
RATS 2012-4

Comment [JJ43]:
Language is added consistent with federal rule in 10 CFR 32.61(f). Although the requirement is currently in place through reference to 32.61 in 3.12.9.1(2), the Radiation Program believes the added language will help clarify the requirements for the regulated community.
Colorado is not aware of any specific licensees who manufacture, or initially transfer ice detection devices within the state.
NRC Cross-reference = 10 CFR Part 32.61(f)
NRC Compatibility = B

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1578 3.12.10 Manufacture, Preparation, or Transfer for Commercial Distribution of Radioactive Drugs for
1579 Medical Use.

1580 * * *

1581 3.12.11 Reserved.

1582 3.12.12 Manufacture and Distribution of Sources or Devices Containing Radioactive Material for Medical
1583 Use.

1584 3.12.12.1 An application for a specific license to manufacture and distribute sources and
1585 devices containing radioactive material to persons licensed pursuant to Part 7 for use as
1586 a calibration, transmission, or reference source or for the uses listed in 7.19, 7.40, 7.42,
1587 7.48 and 7.62 will be approved if:

1588 (1) The applicant satisfies the general requirements in 3.9 of this part;

1589 (2) The applicant submits sufficient information regarding each type of source or
1590 device pertinent to an evaluation of its radiation safety, including:

1591 (a) The radioactive material contained, its chemical and physical form, and
1592 amount,

1593 (b) Details of design and construction of the source or device,

1594 (c) Procedures for, and results of, prototype tests to demonstrate that the
1595 source or device will maintain its integrity under stresses likely to be
1596 encountered in normal use and accidents,

1597 (d) For devices containing radioactive material, the radiation profile of a
1598 prototype device,

1599 (e) Details of quality control procedures to assure that production sources
1600 and devices meet the standards of the design and prototype tests,

1601 (f) Procedures and standards for calibrating sources and devices,

1602 (g) Legend and methods for labeling sources and devices as to their
1603 radioactive content, and

1604 (h) Instructions for handling and storing the source or device from the
1605 radiation safety standpoint; these instructions are to be included on a
1606 durable label attached to the source or device or attached to a
1607 permanent storage container for the source or device; provided, that
1608 instructions which are too lengthy for such label may be summarized on
1609 the label and printed in detail on a brochure which is referenced on the
1610 label;

1611 (3) The label affixed to the source or device, or to the permanent storage container
1612 for the source or device, contains information on the radionuclide, quantity, and
1613 date of assay, and a statement that the source or device is licensed by the
1614 Department for distribution to persons licensed pursuant to 7.40 and 7.42 or
1615 under equivalent licenses of NRC or an Agreement State, provided that such
1616 labeling for sources which do not require long term storage may be on a leaflet or
1617 brochure which accompanies the source;

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(4) **The source or device has been registered in the Sealed Source and Device Registry.**

Comment [JJ44]:
Language is added consistent with federal rule in 10 CFR 32.74(a)(4).
NRC Cross-reference = 10 CFR Part 2.74(a)(4)
NRC Compatibility = B

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3.12.12.2 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, the applicant shall include in the 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

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3.12.12.3 In determining the acceptable interval for test of leakage of radioactive material, the Department will consider information that includes, but is not limited to:

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- (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.

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

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3.12.14 Registration of Product Information.

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3.12.14.1 Any manufacturer or initial distributor of a sealed source; or ~~of a device containing a sealed source, whose product is intended for use under a specific license~~ may submit a request to the Department for evaluation of radiation safety information about ~~its~~ **the** product and for the product registration.

Comment [JJ45]: Language updated, consistent with federal rule 10 CFR 32.210(a).
Compatibility = B
NRC RATS 2012-4

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3.12.14.2 The request for review must be ~~made in duplicate and~~ sent to the **Radiation Program Manager** Director, Hazardous Materials ~~And~~ Waste Management Division, Colorado Department of Public Health and Environment, 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530.

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1653 3.12.14.3 The request for review of a sealed source or device must include sufficient information
1654 about the design, manufacture, prototype testing, quality control program, labeling,
1655 proposed uses and leak testing and, for a device, the request must also include
1656 sufficient information about installation, service and maintenance, operating and safety
1657 instructions, and its potential hazards, to provide reasonable assurance that the
1658 radiation safety properties of the source or device are adequate to protect health and
1659 minimize danger to life and property.

1660 3.12.14.4 The Department normally evaluates a sealed source or device using radiation safety
1661 criteria in accepted industry standards.

1662 (1) If these standards and criteria do not readily apply to a particular case, the
1663 Department formulates reasonable standards and criteria with the help of the
1664 manufacturer or distributor.

1665 (2) The Department shall use criteria and standards sufficient to ensure that the
1666 radiation safety properties of the device or sealed source are adequate to protect
1667 health and minimize danger to life and property. **Subpart A of 10 CFR Part 32**
1668 **includes specific criteria that apply to certain exempt products and 3.12.4,**
1669 **3.12.5, 3.12.6, 3.12.8, and 3.12.9 of this part includes specific criteria**
1670 **applicable to certain generally licensed devices. Sections 3.12.10 and**
1671 **3.12.12 include specific provisions that apply to certain specifically**
1672 **licensed items.**

Comment [JJ46]: Language updated,
consistent with federal rule 10 CFR 32.210(d).

Note that certain federal rule provisions are
addressed through incorporation by reference in
some of the sections referenced.

Compatibility = B
NRC RATS 2012-4

1673 3.12.14.5 After completion of the evaluation, the Department issues a certificate of
1674 registration to the person making the request. The certificate of registration
1675 acknowledges the availability of the submitted information for inclusion in an application
1676 for specific license proposing use of the product **or concerning use under an**
1677 **exemption from licensing or general license as applicable for the category of**
1678 **certificate.**

Comment [JJ47]:
Language updated, consistent with federal rule
10 CFR 32.210(e).

NRC RATS 2012-4
Compatibility = B

1679 3.12.14.6 The person submitting the request for evaluation and registration of safety
1680 information about the product shall manufacture and distribute the product in accordance
1681 with:

1682 (1) The statements and representations, including quality control program, contained
1683 in the request; and

1684 (2) The provisions of the certificate of registration.

1685 3.12.14.7 **Authority to manufacture or initially distribute a sealed source or device to**
1686 **specific licensees may be provided in the license without the issuance of a certificate of**
1687 **registration in the following cases:**

Comment [JJ48]: New provision 3.12.14.7 is
added consistent with the 2012 amendments to
10 CFR Part 32.210(g).

The new provision provides some relief from
requiring a sealed source and device evaluation
for some types of low activity sources, sources
having unique specifications, and under other
specific circumstances where the recipient has
demonstrated adequate training and
experience.

NRC RATS 2012-4
Compatibility = B

(1) **Calibration and reference sources containing no more than:**

(a) **37 MBq (1 mCi), for beta and/or gamma emitting radionuclides; or**

(b) **0.37 MBq (10 µCi), for alpha emitting radionuclides; or**

(2) **The intended recipients are qualified by training and experience and have**
sufficient facilities and equipment to safely use and handle the requested
quantity of radioactive material in any form in the case of unregistered sources
or, for registered sealed sources contained in unregistered devices, are
qualified by training and experience and have sufficient facilities and

1697 equipment to safely use and handle the requested quantity of radioactive
1698 material in unshielded form, as specified in their licenses; and

1699 (a) The intended recipients are licensed under 3.11 or comparable
1700 provisions of NRC or an Agreement State; or

1701 (b) The recipients are authorized for research and development; or

1702 (c) The sources and devices are to be built to the unique specifications of
1703 the particular recipient and contain no more than 740 GBq (20 Ci) of
1704 tritium or 7.4 GBq (200 mCi) of any other radionuclide.

1705 **3.12.14.8** After the certificate is issued, the Department may conduct an additional review
1706 as it determines is necessary to ensure compliance with current regulatory
1707 standards. In conducting its review, the Department will complete its evaluation
1708 in accordance with criteria specified in this section. The Department may request
1709 such additional information as it considers necessary to conduct its review and
1710 the certificate holder shall provide the information as requested.

Comment [JJ49]: New provision 3.12.14.8 is added consistent with the 2012 amendments to 10 CFR Part 32.210(h).

The new provision allows for the review of additional information as needed following issuance of the certificate, and the licensee must provide the requested information.

NRC RATS 2012-4
Compatibility = C

1711 **3.12.15** Inactivation of certificates of registration of sealed sources and devices

1712 **3.12.15.1** A certificate holder who no longer manufactures or initially transfers any of the
1713 sealed source(s) or device(s) covered by a particular certificate issued by the
1714 Department shall request inactivation of the registration certificate. Such a
1715 request must be made to the Department and must normally be made no later
1716 than two years after initial distribution of all of the source(s) or device(s)
1717 covered by the certificate has ceased. However, if the certificate holder
1718 determines that an initial transfer was in fact the last initial transfer more than
1719 two years after that transfer, the certificate holder shall request inactivation of
1720 the certificate within 90 days of this determination and briefly describe the
1721 circumstances of the delay.

Comment [JJ50]: New provision 3.12.15 is added consistent with the 2012 amendments to 10 CFR Part 32.211.

The provision outlines the process for inactivation of a sealed source and device registration, license termination, and servicing devices previously distributed under a previous active registration.

NRC RATS 2012-4
Compatibility = B

1722 **3.12.15.2** If a distribution license is to be terminated in accordance with 3.16 the licensee
1723 shall request inactivation of its registration certificates associated with that
1724 distribution license before the Department will terminate the license. Such a
1725 request for inactivation of certificate(s) must indicate that the license is being
1726 terminated and include the associated specific license number.

1727 **3.12.15.3** A specific license to manufacture or initially transfer a source or device covered
1728 only by an inactivated certificate no longer authorizes the licensee to initially
1729 transfer such sources or devices for use. Servicing of devices must be in
1730 accordance with any conditions in the certificate, including in the case of an
1731 inactive certificate.

1732 **3.13** Third-Party Method.

1733 * * *

1734 **3.14** Issuance of a Specific License.

1735 * * *

1736 **3.15** Specific Terms and Conditions of License.

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1737 3.15.1 Each license issued pursuant to this part shall be subject to all the provisions of the Act, now or
1738 hereafter in effect, and to all rules, regulations, and orders of the Department.

1739 3.15.2 Inalienability of Licenses.

1740 3.15.2.1 No license issued or granted under this part and no right to possess or utilize
1741 radioactive material granted by any license issued pursuant to this part shall be
1742 transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily,
1743 directly or indirectly, through transfer of control of any license to any person unless the
1744 Department shall, after securing full information, find that the transfer is in accordance
1745 with the provisions of the Act, now or hereafter in effect, and to all valid rules, regulations,
1746 and orders of the Department, and shall give its consent in writing.

1747 3.15.2.2 An application for transfer of license must include:

1748 (1) The identity, technical and financial qualifications of the proposed transferee;

1749 (2) Financial assurance for decommissioning information required by 3.9.6;

1750 (3) A description of the acquisition or proposed transfer including dates;

1751 (4) An updated organizational chart including the proposed transferee's
1752 management structure for the licensed activities;

1753 (5) Documentation of registration with the Colorado Secretary of State for the
1754 proposed transferee;

1755 (6) A statement from the proposed transferee's management that they will conduct
1756 business in accord with all of the commitments previously submitted by the
1757 current licensee;

1758 (7) A statement from the proposed transferee's management accepting liability for all
1759 licensed materials that are and have been possessed under the license; and

1760 (8) A copy of the appropriate radioactive materials license application signed by the
1761 RSO and the proposed transferee's management.

1762 3.15.3 Each person licensed by the Department pursuant to this part shall confine use and possession
1763 of the material licensed to the locations and purposes authorized in the license. **Except as**
1764 **otherwise provided in the license, a license issued pursuant to Part 3 shall carry with it the**
1765 **right to receive, possess, and use source or byproduct material. Preparation for shipment**
1766 **and transport of source or radioactive material shall be in accordance with the provisions**
1767 **of Part 17.**

Comment [JJ51]:
Language added consistent with 40.41(c).
NRC Compatibility = C

1768 3.15.4 Notice and Disposition of Records Prior to License Termination.

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1771 **3.16 Expiration, Decommissioning and Termination of Licenses.**

1772 3.16.1 Definition of "principal activity".

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- 1773 3.16.1.1 As used in this regulation, "principal activity" means an activity authorized by the
1774 license which is essential to achieving the purpose(s) for which the license was issued
1775 or amended.
- 1776 3.16.1.2 Not included as principal activities are:
- 1777 (1) Radioactive material storage while no licensed material is accessed for use or
1778 disposal; and
- 1779 (2) Any activity incidental to decontamination or decommissioning.
- 1780 3.16.2 Expiration.
- 1781 3.16.2.1 Except as provided in 3.17.2, each specific license shall expire at the end of the
1782 specified day in the month and year stated therein.
- 1783 3.16.2.2 Each specific license revoked by the Department expires at the end of the day on
1784 the date of final determination to revoke the license, or on the expiration date stated in
1785 the determination, or as otherwise provided by order.
- 1786 3.16.2.3 With respect to possession of radioactive material and residual radioactive
1787 contamination, each specific license continues in effect beyond the expiration date until
1788 the Department notifies the licensee in writing that the license is terminated, even if:
- 1789 (1) The licensee decides not to renew the license;
- 1790 (2) No application for license renewal is submitted;
- 1791 (3) An application for renewal is denied; or
- 1792 (4) The Department modifies or suspends a license.
- 1793 3.16.2.4 No less than 30 days before the expiration date specified in the license, the
1794 licensee shall either:
- 1795 (1) Submit an application for license renewal under 3.17; or
- 1796 (2) Notify the Department, in writing, that the licensee has decided not to renew the
1797 license.
- 1798 3.16.2.5 If a licensee does not submit an application for license renewal under 3.17, the
1799 licensee shall, on or before the expiration date specified in the license:
- 1800 (1) Terminate use of radioactive material;
- 1801 (2) Transfer radioactive materials to an authorized recipient and/or properly dispose
1802 of radioactive material;
- 1803 (3) Reduce residual radioactive contamination to levels which are as low as
1804 reasonably achievable (ALARA); and
- 1805 (4) Submit a completed Department Form R-23, *Request for Termination of a*
1806 *Radioactive Materials License*, or equivalent information requesting license
1807 termination, including survey results, leak tests, disposal records, and/or other

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- 1808 documentation which demonstrates acceptable conditions for license termination
1809 as specified in 3.16.6.
- 1810 3.16.2.6 Each licensee who possesses radioactive material, including residual radioactive
1811 contamination attributable to licensed activities, following the expiration date specified in
1812 the license shall:
- 1813 (1) Limit actions involving radioactive material to those related to decontamination
1814 and other activities related to preparation for release for unrestricted use; and
- 1815 (2) Continue to control entry to restricted areas until they are suitable for release for
1816 unrestricted use or the Department notifies the licensee in writing that the license
1817 is terminated.
- 1818 3.16.2.7 Each licensee or person responsible for a facility or site which includes a non-
1819 exempt source of radiation or which may be contaminated by residual radioactivity shall,
1820 no less than 30 days before vacating or relinquishing possession or control of the facility
1821 or site, notify the agency, in writing, of the intent to vacate.
- 1822 3.16.3 Timely Decommissioning.
- 1823 3.16.3.1 Each licensee or person in possession of a non-exempt source of radiation who
1824 decides to terminate all activities involving that source of radiation shall notify the
1825 hazardous materials and waste management division immediately, in writing.
- 1826 3.16.3.2 The licensee shall notify the Hazardous Materials And Waste Management
1827 Division in writing within 60 days of the occurrence of any of the following:
- 1828 (1) The licensee has decided to permanently cease principal activities, as defined in
1829 this part, at the entire site or in any separate building or outdoor area that
1830 contains residual radioactivity such that the building or outdoor area is unsuitable
1831 for unrestricted use in accordance with 4.61; or
- 1832 (2) No principal activities under the license have been conducted for a period of 24
1833 months; or
- 1834 (3) No principal activities have been conducted for a period of 24 months in any
1835 separate building or outdoor area that contains residual radioactivity such that
1836 the building or outdoor area is unsuitable for unrestricted use in accordance with
1837 these regulations.
- 1838 3.16.3.3 Concurrent with the notification of the Hazardous Materials And Waste
1839 Management Division required in 3.16.3.1 and 3.16.3.2, the licensee shall either:
- 1840 (1) Begin decommissioning activities; or,
- 1841 (2) Within 12 months of notification, submit a decommissioning plan if required by
1842 3.16.4, and begin decommissioning upon approval of that plan.
- 1843 3.16.3.4 Licensees shall complete decommissioning of the site or separate building or
1844 outdoor area as soon as practicable but no later than 24 months following the initiation of
1845 decommissioning, unless an alternate schedule addressing the factors in 3.16.4 is
1846 requested and approved by the Department.

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- 1847 3.16.3.5 When decommissioning involves the entire site, the licensee shall request
1848 license termination upon completion of decommissioning activities.
- 1849 3.16.3.6 The Department may approve alternate schedules for the submission of plans
1850 and for the completion of decommissioning as required pursuant to 3.16.3.3 and 3.16.3.4
1851 if the Department determines that the alternate schedule:
- 1852 (1) Is necessary to effectively conduct decommissioning;
- 1853 (2) Presents no undue risks to public health and safety; and
- 1854 (3) Is otherwise in the public interest.
- 1855
- 1856 3.16.4 Decommissioning Plan.
- 1857 3.16.4.1 A licensee must submit a decommissioning plan:
- 1858 (1) If the licensee intends to terminate the license using radiological criteria specified
1859 in 4.61.3 or 4.61.4 (the exemption of 4.61.1.1 applies);
- 1860 (2) If required otherwise by these regulations;
- 1861 (3) If required by license condition; or
- 1862 (4) If the procedures and activities necessary to carry out decommissioning of the
1863 site or separate building or outdoor area have not been previously approved by
1864 the Department and these procedures could increase potential health and safety
1865 impacts to workers or to the public, such as in any of the following cases:
- 1866 (a) Procedures would involve techniques not applied routinely during
1867 cleanup or maintenance operations;
- 1868 (b) Workers would be entering areas not normally occupied where surface
1869 contamination and radiation levels are significantly higher than routinely
1870 encountered during operation;
- 1871 (c) Procedures could result in significantly greater airborne concentrations of
1872 radioactive materials than are present during operation; or
- 1873 (d) Procedures could result in significantly greater releases of radioactive
1874 material to the environment than those associated with operation.
- 1875 3.16.4.2 Procedures such as those listed in 3.16.4.1 of this section with potential health
1876 and safety impacts may not be carried out prior to Department approval of the
1877 decommissioning plan.
- 1878 3.16.4.3 The decommissioning plan for the site or separate building or outdoor area must
1879 include:
- 1880 (1) A description of the conditions of the site, separate buildings, and/or outdoor
1881 areas sufficient to evaluate the acceptability of the plan;

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- 1882 (2) A description of planned decommissioning activities and a schedule for
1883 completion;
- 1884 (3) A description of methods used to ensure protection of workers and the
1885 environment against radiation hazards during decommissioning;
- 1886 (4) A description of the planned final radiation survey;
- 1887 (5) A current detailed cost estimate for decommissioning, comparison of that
1888 estimate with present funds set aside for decommissioning, and a plan for
1889 assuring the availability of adequate funds for completion of decommissioning;
1890 and
- 1891 (6) A description of the intended final condition of the site, separate buildings, and/or
1892 outdoor areas upon completion of decommissioning activities.
- 1893 (7) Decommissioning plans proposing the use of radiological criteria specified in
1894 4.61.3 or 4.61.4, must also include:
- 1895 (a) An analysis demonstrating that reductions in residual radioactivity
1896 necessary to comply with the provisions of 4.61.2 would result in net
1897 public or environmental harm or were not being made because the
1898 residual levels of contamination associated with restricted conditions are
1899 ALARA.
- 1900 (i) Determination of dose and residual radioactivity levels which are
1901 ALARA must take into account consideration of any detriments,
1902 such as deaths from transportation accidents, expected to
1903 potentially result from decontamination and waste disposal;
- 1904 (b) A description of the institutional controls necessary to satisfy the
1905 requirements of 4.61.3.2, including a description of how the controls will
1906 be enforced and an analysis showing that the controls will not impose
1907 undue burdens on the local community or other affected parties;
- 1908 (c) An analysis demonstrating that if institutional controls were no longer in
1909 effect then the dose criteria of 4.61.3.4 will be met;
- 1910 (d) A detailed cost estimate for a long-term care warranty, and a plan for
1911 establishing a Department approved warranty prior to completion of
1912 decommissioning activities;
- 1913 (e) A description of how the licensee will seek advice from representatives of
1914 a broad cross section of community interests who may be affected by the
1915 decommissioning and how the licensee will provide participants an
1916 opportunity for a comprehensive, collective discussion on key
1917 decommissioning issues, including: the adequacy and enforceability of
1918 institutional controls, burdens/impacts to local communities and affected
1919 parties, and the adequacy of financial assurance; and
- 1920 (f) A description of how the licensee will make publicly available a summary
1921 of the results of all such discussions, including: a description of the
1922 individual viewpoints of the participants on the issues, the extent of
1923 agreement and disagreement among the participants on the issues, and

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1924 a description of how key issues in disagreement will be addressed during
1925 decommissioning.

1926 3.16.4.4 For decommissioning plans calling for completion of decommissioning later than
1927 24 months after plan approval, the plan shall include a justification for the
1928 decommissioning schedule which addresses the following:

1929 (1) Whether it is technically feasible to complete decommissioning within a 24-month
1930 period;

1931 (2) Whether sufficient waste disposal capacity is available to allow completion of
1932 decommissioning with a 24-month period;

1933 (3) Whether a significant volume reduction in wastes requiring disposal will be
1934 achieved by allowing short-lived radionuclides to decay;

1935 (4) Whether a significant reduction in radiation exposure to workers can be achieved
1936 by allowing short-lived radionuclides to decay; and

1937 (5) Other site-specific factors which the Department may consider appropriate on a
1938 case-by-case basis, such as the regulatory requirements of other government
1939 agencies, lawsuits, ground-water treatment activities, monitored natural ground-
1940 water restoration, actions that could result in more environmental harm than
1941 deferred cleanup, and other factors beyond the control of the licensee.

1942 3.16.4.5 Upon the receipt of a decommissioning plan or proposal by the licensee for
1943 release of a site pursuant to 4.61.3 or 4.61.4, or whenever the Department deems such
1944 notice to be in the public interest, the Department shall:

1945 (1) Notify and solicit comments from:

1946 (a) Local and state governments in the vicinity of the site and any Indian
1947 nation or other indigenous people that have treaty or statutory rights that
1948 could be affected by the decommissioning; and

1949 (b) The environmental protection agency for cases where the licensee
1950 proposes to release a site pursuant to 4.61.4.

1951 (2) Publish a notice in a forum, such as local newspapers, letters to state or local
1952 organizations, or other appropriate forum, that is readily accessible to individuals
1953 in the vicinity of the site, and solicit comments from affected parties.

1954 3.16.4.6 The proposed decommissioning plan will be approved by the Department if the
1955 information therein demonstrates that the decommissioning will be in accordance with the
1956 requirements of 3.9.5.105, 3.16, and 4.61 (the exemption of 4.61.1.1 applies), completed
1957 as soon as practicable, and that the health and safety of workers and the public will be
1958 adequately protected.

1959 3.16.5 Decommissioning Record Keeping.

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1962 3.16.6 Demonstrating Acceptable Conditions for License Termination.

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1965 3.16.7 License Termination.

1966 3.16.7.1 Specific licenses, including expired licenses, will be terminated by written notice
1967 to the licensee when the Department determines that:

1968 (1) Radioactive materials have been properly disposed and records of disposal
1969 required by 4.48 to be maintained and retained have been forwarded to the
1970 Department as required by 3.15.4;

1971 (2) **Reasonable effort has been made to eliminate residual radioactive**
1972 **contamination, if present;**

Comment [JJ52]: Provision added consistent with 10 CFR 40.42(k)(2).

1973 (3) The licensee has demonstrated, by radiation survey results and/or other
1974 appropriate methods, that the license termination will be in compliance with these
1975 regulations;

1976 (34) The licensee has established a Department approved long term care warranty, if
1977 required;

1978 (45) Department approved institutional controls have been implemented to limit public
1979 doses, if required; and

1980 (56) All records required by 3.16.5 have been transferred to the Department.

1981 3.16.8 Additional Cleanup.

1982 3.16.8.1 Except for facilities exempted under 4.61.1.1, after a site has been
1983 decommissioned and the license terminated in accordance with 3.16 and 4.61, the
1984 Department may reinstate the terminated license or issue a new license and require
1985 additional cleanup only if, based on new or previously unknown information, it determines
1986 that the criteria of 4.61 were not met and residual radioactivity remaining at the site could
1987 result in significant threat to public health and safety.

1988 3.17 Renewal of Licenses.

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1990 3.18 Amendment of Licenses at Request of Licensee.

1991 * * *

1992 3.19 Agency Action on Applications to Renew and Amend.

1993 * * *

1994 3.20 Reserved.

1995 3.21 Reserved.

1996 TRANSFER OF MATERIALS

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1997 3.22 Transfer of Material.

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1999 REQUIREMENTS FOR LICENSE TO INITIALLY TRANSFER SOURCE MATERIAL FOR USE UNDER
2000 THE SMALL QUANTITIES OF SOURCE MATERIAL GENERAL LICENSE

Comment [JJ53]: Section title added consistent with 10 CFR 40.54.

2001 3.22.6 An application for a specific license to initially transfer source material for use under
2002 3.5.1, or equivalent regulations of the NRC or an Agreement State, will be approved if:

Comment [JJ54]:
Provision in 3.22.6 is added consistent with the language and requirements of 10 CFR 40.54.

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

2003 3.22.6.1 The applicant satisfies the general requirements specified in 3.9; and

2004 3.22.6.2 The applicant submits adequate information on, and the Department approves the
2005 methods to be used for quality control, labeling, and providing safety instructions
2006 to recipients.

2007 3.22.7 License Conditions for Initial Transfer of Source Material Conditions of licenses to initially
2008 transfer source material for use under the 'small quantities of source material' general license:
2009 Quality control, labeling, safety instructions, and records and reports.

Comment [JJ55]:
Section title in 3.22.7, and language in 3.22.7.1 is added consistent with the language and requirements of 10 CFR 40.55(a).

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

2010 3.22.7.1 Each person licensed under 3.22.6 shall label the immediate container of each
2011 quantity of source material with the type of source material and quantity of
2012 material and the words, "radioactive material."

2013 3.22.7.2 Each person licensed under 3.22.6 shall ensure that the quantities and
2014 concentrations of source material are as labeled and indicated in any transfer
2015 records.

Comment [JJ56]:
Provision in 3.22.7.2 is added consistent with the language and requirements of 10 CFR 40.55(b).

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

2016 3.22.7.3 Each person licensed under 3.22.6 shall provide the information specified in 3.22.7
2017 to each person to whom source material is transferred for use under 3.5.1 or
2018 equivalent provisions in NRC or Agreement State regulations. This information
2019 must be transferred before the source material is transferred for the first time in
2020 each calendar year to the particular recipient. The required information includes:

Comment [JJ57]:
Provision in 3.22.7.3 is added consistent with the language and requirements of 10 CFR 40.55(c).

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

2021 (1) A copy of 3.5.1 and 3.22, or relevant equivalent regulations of the NRC or an
2022 Agreement State.

2023 (2) Appropriate radiation safety precautions and instructions relating to handling,
2024 use, storage, and disposal of the material.

2025 3.22.7.4 Each person licensed under 3.22.6 shall report transfers as follows:

Comment [JJ58]: Provision in 3.22.7.4 is added consistent with the language and requirements of 10 CFR 40.55(d).

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = B
NRC RATS = 2013-2

2026 (1) File a report with the Department. The report shall include the following
2027 information:

2028 (a) The name, address, and license number of the person who transferred
2029 the source material;

2030 (b) For each general licensee under 3.5.1 or equivalent NRC or Agreement
2031 State provisions to whom greater than 50 grams (0.11 lb) of source material
2032 has been transferred in a single calendar quarter, the name and address of
2033 the general licensee to whom source material is distributed; a responsible
2034 agent, by name and/or position and phone number, of the general licensee
2035 to whom the material was sent; and the type, physical form, and quantity of
2036 source material transferred; and

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(c) The total quantity of each type and physical form of source material transferred in the reporting period to all such generally licensed recipients.

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(2) File a report with the NRC and each responsible Agreement State agency that identifies all persons, operating under provisions equivalent to 3.5.1, to whom greater than 50 grams (0.11 lb) of source material has been transferred within a single calendar quarter. The report shall include the following information specific to those transfers made to the NRC or Agreement State being reported to:

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(a) The name, address, and license number of the person who transferred the source material; and

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(b) The name and address of the general licensee to whom source material was distributed; a responsible agent, by name and/or position and phone number, of the general licensee to whom the material was sent; and the type, physical form, and quantity of source material transferred.

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(c) The total quantity of each type and physical form of source material transferred in the reporting period to all such generally licensed recipients within the Agreement State or under NRC jurisdiction, as appropriate.

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(3) Submit each report by January 31 of each year covering all transfers for the previous calendar year. If no transfers were made to persons generally licensed under 3.5.1 or equivalent NRC or Agreement State provisions during the current period, a report shall be submitted to the Department indicating so. If no transfers have been made to general licensees under NRC jurisdiction or in a particular Agreement State during the reporting period, this information shall be reported to the NRC or the responsible Agreement State agency upon request of the agency.

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3.22.7.5 Each person licensed under 3.22.6 shall maintain all information that supports the reports required by this section concerning each transfer to a general licensee for a period of 1 year after the event is included in a report to the Department, an Agreement State agency, or the NRC.

Comment [JJ59]: Provision in 3.22.7.5 is added consistent with the language and requirements of 10 CFR 40.55(e).

This provision is new to the federal rule which became effective August 27, 2013.

NRC Compatibility = C
NRC RATS = 2013-2

2066 **MODIFICATION AND REVOCATION OF LICENSES**

2067 **3.23 Modification and Revocation of Licenses.**

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2069 * * *

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2071 **3.24 Reciprocal Recognition of Licenses.**

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2074 **PART 3, SCHEDULE 3A: EXEMPT CONCENTRATIONS (3.3.1)**

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Comment [JJ60]: Page break inserted for formatting purposes to ensure Schedule 3A begins at the top of the page.

There are no changes to the content of Schedule 3A.

2079 **PART 3, SCHEDULE 3B: EXEMPT QUANTITIES (3.3.2)**

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Comment [JJ61]:
Page break inserted for formatting purposes to ensure Schedule 3B begins at the top of the page.

There are no changes to the content of Schedule 3B.

2083 **PART 3, SCHEDULE 3C: UNIMPORTANT QUANTITIES OF SOURCE MATERIAL AND EXEMPT**
2084 **ITEMS (3.2.3-AND-3.3-3)**

2085 **3C Any person is exempt from the requirements for a license set forth in section 62 of the**
2086 **Atomic Energy Act and from the regulations in this part 3, and parts 4 and 10, to the**
2087 **extent that such person receives, possesses, uses, or transfers an item listed below:**

2088 3C.1 Any quantities of thorium contained in:

2089 3C.1.1 Incandescent gas mantles;

2090 3C.1.2 Vacuum tubes;

2091 3C.1.3 Welding rods;

2092 3C.1.4 Electric lamps for illuminating purposes provided that each lamp does not contain more
2093 than 50 milligrams of thorium;

2094 3C.1.5 Germicidal lamps, sunlamps, and lamps for outdoors or industrial lighting provided that
2095 each lamp does not contain more than 2 grams of thorium;

2096 3C.1.6 Rare earth metals and compounds, mixtures, and products containing not more than 0.25
2097 percent by weight thorium, uranium, or any combination of these; or

2098 3C.1.7 Personnel neutron dosimeters provided that each dosimeter does not contain more than
2099 50 milligrams of thorium.

2100 3C.2 Source material contained in the following products:

2101 3C.2.1 Glazed ceramic tableware **manufactured before August 27, 2013**, provided that the
2102 glaze contains not more than 20 percent by weight source material;

2103 3C.2.2 Glassware containing not more than **2 percent by weight source material or, for**
2104 **glassware manufactured before August 27, 2013**, 10 percent by weight source
2105 material, but not including commercially manufactured glass brick, pane glass, ceramic
2106 tile or other glass or ceramic used in construction;

2107 3C.2.3 Glass enamel or glass enamel frit containing not more than 10 percent by weight source
2108 material imported or ordered for importation into the United States, or initially distributed
2109 by manufacturers in the United States, before July 25, 1983; or

2110 3C.2.4 Piezoelectric ceramic containing not more than 2 percent by weight source material.

2111 3C.3 Photographic film, negatives, and prints containing uranium or thorium.

2112 3C.4 Any finished product or part fabricated of, or containing, tungsten-thorium or magnesium-thorium
2113 alloys, provided that the thorium content of the alloy does not exceed 4 percent by weight and
2114 that this exemption shall not be deemed to authorize the chemical, physical, or metallurgical
2115 treatment or processing of any such product or part.

2116 3C.5 Uranium contained in counterweights installed in aircraft, rockets, projectiles, and missiles, or
2117 stored or handled in connection with installation or removal of such counterweights, provided that:

Comment [JJ62]:
For formatting purposes, a page break is inserted such that Schedule 3C begins at the top of the page.

Comment [JJ63]:
The title section language is added, for consistency with the language in 10 CFR Part 40.13.

Comment [JJ64]:
Language is added, consistent with the language in 10 CFR Part 40.13(c).

NRC RATS 2013-2
Compatibility = B

Comment [JJ65]:
Language added for consistency with 10 CFR 40.13(c)(2)(i). The added date is consistent with the date shown in 10 CFR Part 40.13.

The exempt distribution date of August 27, 2013 is reserved to NRC jurisdiction.

NRC Compatibility = B
RATS = 2013-2

Comment [JJ66]:
Language added for consistency with 10 CFR 40.13(c)(2)(iii). The added date is consistent with the date shown in 10 CFR Part 40.13.

The exempt distribution date of August 27, 2013 is reserved to NRC jurisdiction.

NRC Compatibility = B
RATS = 2013-2

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2118 ~~3C.5.1 The counterweights are manufactured in accordance with a specific license issued by~~
2119 ~~NRC, authorizing distribution by the licensee pursuant to 10 CFR Part 40 (January 1,~~
2120 ~~2010);~~

Comment [JJ67]:
The provision in 10 CFR Part 40 (40.13(c)(5)(i)) was deleted during the August 27, 2013 amendments to 10 CFR Part 40. The equivalent provision in Colorado rule is therefore deleted.

NRC Cross-reference = 10 CFR 40.13(c)(5)(i)
NRC Compatibility = B
RATS = 2013-2

2121 3C.5.21 Each counterweight has been impressed with the following legend clearly legible through
2122 any plating or other covering: "Depleted Uranium";¹⁴

2123 ¹⁴ The requirement specified in 3C.5.12 need not be met by counterweights manufactured prior to December 31, 1969; provided,
2124 that such counterweights were manufactured under a specific license issued by the Atomic Energy Commission and ~~were~~
2125 impressed with the legend, "CAUTION – RADIOACTIVE MATERIAL – URANIUM", as previously required by the regulations.

Comment [JJ68]:
Language is added to footnote 14 consistent with the revisions to equivalent to footnotes for 10 CFR Part 40.13(c)(5)(i), and (ii).

NRC Compatibility = B
RATS = 2013-2

2126 3C.5.32 Each counterweight is durably and legibly labeled or marked with the identification of the
2127 manufacturer and the statement: "Unauthorized Alterations Prohibited"¹⁵; and

2128 ¹⁵ The requirement specified in 3C.5.23 need not be met by counterweights manufactured prior to December 31, 1969; provided,
2129 that such counterweights were manufactured under a specific license issued by the Atomic Energy Commission and ~~were~~
2130 impressed with the legend, "CAUTION – RADIOACTIVE MATERIAL – URANIUM", as previously required by the regulations.

Comment [JJ69]:
Language is added to footnote 15, consistent with the revisions to equivalent to footnotes for 10 CFR Part 40.13(c)(5)(i), and (ii).

NRC Compatibility = B
RATS = 2013-2

2131 3C.5.43 This exemption shall not be deemed to authorize the chemical, physical, or metallurgical
2132 treatment or processing of any such counterweights other than repair or restoration of
2133 any plating or other covering.

2134 3C.6 Natural or depleted uranium used as shielding constituting part of any shipping container,
2135 provided that:

2136 3C.6.1 The shipping container is conspicuously and legibly impressed with the legend "Caution -
2137 Radioactive Shielding - Uranium"; and

2138 3C.6.2 The uranium metal is encased in mild steel or equally fire resistant metal of minimum wall
2139 thickness of 1/8 inch (3.2 mm).

2140 ~~3C.7 Thorium or uranium contained in or on finished optical lenses and mirrors, provided that each~~
2141 ~~lens or mirror does not contain more than 10 percent by weight thorium or uranium or, for~~
2142 ~~lenses manufactured before August 27, 2013, 30 percent by weight of thorium;~~ and that
2143 ~~the~~ ~~this~~ exemption contained in 3C.7 shall not be deemed to authorize either:

Comment [JJ70]:
Language is added to section 3C.7, 3C.7.1, and 3C.7.2 for consistency with 10 CFR 40.13(c)(7). The "grandfathering" date is maintained consistent with the date in 10 CFR Part 40.13 as exempt distribution remains under exclusive NRC jurisdiction.

Based upon industry information obtained during NRC analysis (for Part 40 revisions), there has been a manufacturing shift to coating lenses (on the surface) versus incorporating the material into the lenses. Therefore, language is added to clarify that the exemptions apply to materials contained within and coated on lenses and mirrors.

NRC Compatibility = B
RATS = 2013-2

2144 3C.7.1 The shaping, grinding, or polishing of such lens or manufacturing processes other than
2145 the assembly of such lens or mirror into optical systems and devices without any
2146 alteration of the lens or mirror; or

2147 3C.7.2 The receipt, possession, use, or transfer of uranium or thorium contained in contact
2148 lenses, or in spectacles, or in eyepieces in binoculars or other optical instruments.

2149 3C.8 ~~Uranium contained in detector heads for use in fire detection units, provided that each detector~~
2150 ~~head contains not more than 185 Bq (0.005 μCi) of uranium;~~ ~~or~~ **Reserved**

Comment [JJ71]: This section is deleted, consistent with deletion from federal rule in 10 CFR Part 40.13(d). The NRC determined that this provision was obsolete as fire detection units containing source material have never been manufactured for commercial use. The section is made "reserved" to retain subsequent numbering and cross-references.

2151 3C.9 Thorium contained in any finished aircraft engine part containing nickel-thoria alloy, provided that

2152 3C.9.1 The thorium is dispersed in the nickel-thoria alloy in the form of finely divided thoria
2153 (thorium dioxide); and

2154 3C.9.2 The thorium content in the nickel-thoria alloy does not exceed 4 percent by weight.

2155 **3C.10 No person may initially transfer for sale or distribution a product containing source**
2156 **material to persons exempt under 3C.1 through 3C.10, or equivalent regulations of the**
2157 **NRC or an Agreement State, unless authorized by a license issued by NRC under 10 CFR**
2158 **Part 40.52 to initially transfer such products for sale or distribution.**

[Ref: 78 FR 32319; May 29, 2013]
NRC Compatibility = B
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3C.10.1 Persons authorized to manufacture, process, or produce these materials or products containing source material by an Agreement State, and persons who import finished products or parts, for sale or distribution are exempt from the requirements of parts 4, and 10, and 3.9.1 and 3.9.2.

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3C.1140 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 the person receives, possesses, uses, transfers, owns, or acquires the following products ¹⁶ :

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¹⁶ Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing byproduct 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.

Comment [JJ72]: Section 3C.10 and 3C.10.1 is added for consistency with an equivalent paragraph added to 10 CFR Part 40 in 40.13(c)(10) and (c)(10)(ii).

[NOTE: A provision equivalent to 40.13(c)(10)(i) – not shown - is excluded from Colorado rule as the date specified in the federal rule provision has passed and is therefore the provision is obsolete and no longer applicable.]

NRC Compatibility = B
RATS = 2013-2

2171
2172
2173

3C.4011.1 Timepieces or hands or dials containing not more than the following specified quantities of radioactive material and not exceeding the following specified radiation dose rate:

2174

3C.1140.1.1 925 MBq (25 mCi) of tritium per timepiece.

2175

3C.1140.1.2 185 MBq (5 mCi) of tritium per hand.

2176
2177

3C.4011.1.3 555 MBq (15 mCi) of tritium per dial (bezels when used shall be considered as part of the dial).

2178
2179

3C.40-11.1.4 3.7 MBq (100 µCi) of promethium-147 per watch or 7.4 MBq (200 µCi) of promethium-147 per any other timepiece.

2180
2181

3C.40-11.1.5 0.74 MBq (20 µCi) of promethium-147 per watch hand or 1.48 MBq (40 µCi) of promethium-147 per other timepiece hand.

2182
2183
2184

3C.40-11.1.6 2.22 MBq (60 µCi) of promethium-147 per watch dial or 4.44 MBq (120 µCi) of promethium-147 per other timepiece dial (bezels when used shall be considered as part of the dial).

2185
2186
2187

3C.40-11.1.7 The radiation dose rate from hands and dials containing promethium-147 will not exceed, when measured through 50 milligrams per square centimeter of absorber:

2188
2189

(1) For wristwatches, 1 µGy (0.1 mrad) per hour at 10 centimeters from any surface.

2190
2191

(2) For pocket watches, 1 µGy (0.1 mrad) per hour at 1 centimeter from any surface.

2192
2193

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

2194
2195

3C.40-11.1.8 37 kBq (1 µCi) of radium-226 per timepiece in timepieces acquired prior to the effective date of this regulation;

2196

3C.40-11.2 **Static elimination devices and Ion generating tubes**

Comment [JJ73]: The requirements for (end use) static eliminators and ion generating devices were for the most part, regulated as "generally licensed" devices for many years. Due to their inherent low risk (to end users) the added language puts these items (within the activity levels specified) under an "exempt" material category.

This provision is added consistent with the language of 10 CFR 30.15(a)(2) which became effective in federal rule in October 2012.

NRC Compatibility = B
NRC RATS = 2012-4

DRAFT A 07/16/15

- 2197
2198
2199
- 3C.11.2.1** Static elimination devices which contain, as a sealed source or sources, byproduct material consisting of a total of not more than 18.5 MBq (500 uCi) of polonium-210 per device.
- 2200
2201
2202
2203
2204
- 3C.11.2.2** Ion generating tubes designed for ionization of air that contain, as a sealed source or sources, byproduct material consisting of a total of not more than 18.5 MBq (500 uCi) of polonium-210 per device or of a total of not more than 1.85 GBq (50 mCi) of hydrogen-3 (tritium) per device.
- 2205
2206
2207
2208
2209
- 3C.11.2.3** Such devices authorized before October 23, 2012 for use under the general license then provided in 3.6 and equivalent regulations of the NRC and Agreement States and manufactured, tested, and labeled by the manufacturer in accordance with the specifications contained in a specific license issued by the NRC.
- 2210
2211
2212
- 3C.11.3** Precision balances containing not more than 37 MBq (1 mCi) of tritium per balance or not more than 18.5 MBq (0.5 mCi) of tritium per balance part manufactured before December 17, 2007;
- 2213
2214
2215
- ~~3C.1140.34~~ Marine compasses containing not more than 27.8 GBq (750 mCi) of tritium gas and other marine navigational instruments manufactured before December 17, 2007 containing not more than 9.25 GBq (250 mCi) of tritium gas;
- 2216
2217
2218
- ~~3C.1140.45~~ 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.
- 2219
- ~~3C.1140.56~~ Electron tubes, provided that:
- 2220
2221
- ~~3C.1140.56.1~~ Each tube does not contain more than one of the following specified quantities of radioactive material:
- 2222
2223
- ~~a.(1)~~ 0.55 GBq (150 mCi) of tritium per microwave receiver protector tube or 370 MBq (10 mCi) of tritium per any other electron tube;
- 2224
- (2) 37 kBq (1 µCi) of cobalt-60;
- 2225
- (3) 185 kBq (5 µCi) of nickel-63;
- 2226
- (4) 1.11 MBq (30 µCi) of krypton-85;
- 2227
- (5) 185 kBq (5 µCi) of cesium-137;
- 2228
- (6) 1.11 MBq (30 µCi) of promethium-147; and further
- 2229
2230
2231
2232
- ~~3C.1140.56.2~~ The radiation dose rate from each electron tube containing radioactive material will not exceed 10 µGy (1 mrad) per hour at 1 centimeter from any surface when measured through 7 milligrams per square centimeter of absorber;¹⁷
- 2233
2234
2235
- ¹⁷ For purposes of ~~3C.4011.56~~, "electron tubes" include 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.
- 2236
2237
- ~~3C.4011.67~~ Ionizing radiation measuring instruments containing, for purposes of internal calibration or standardization, one or more sources of radioactive material, provided that:

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- 2238 | 3C.~~4011.67~~.1 Each source contains no more than one exempt quantity set forth in
2239 | Schedule 3B of this part; and
- 2240 | 3C.~~4011.67~~.2 Each instrument contains no more than 10 exempt quantities. For
2241 | purposes of this requirement, an instrument's source(s) may contain either one or
2242 | different types of radionuclides and an individual exempt quantity may be
2243 | composed of fractional parts of one or more of the exempt quantities in Schedule
2244 | 3B of this part, provided that the sum of such fractions shall not exceed unity.
- 2245 | 3C.~~4011.67~~.3 For americium-241, 1.85 kBq (0.05 µCi) is considered an exempt
2246 | quantity under 3C.~~4011.67~~;
- 2247 | 3C.~~4412~~ Self-luminous products containing radioactive material containing tritium, krypton-85, or
2248 | promethium-147.
- 2249 | 3C.~~4412~~.1 Except for persons who manufacture, process, or produce self-luminous products
2250 | containing tritium, krypton-85, or promethium-147, any person is exempt from these
2251 | regulations to the extent that such person receives, possesses, uses, transfers, owns, or
2252 | acquires tritium, krypton-85 or promethium-147 in self-luminous products manufactured,
2253 | processed, produced, imported, or transferred in accordance with a specific license
2254 | issued by NRC pursuant to section 32.22 of 10 CFR Part 32 (January 1, 20~~13~~~~15~~), which
2255 | license authorizes the transfer of the product to persons who are exempt from regulatory
2256 | requirements.
- 2257 | ~~3C.12.2~~ Any person who desires to manufacture, process, or produce, or initially transfer
2258 | for sale or distribution self-luminous products containing tritium, krypton-85, or
2259 | promethium-147 for use under 3C.12.1, should apply for a license under 32.22 of 10
2260 | CFR Part 32 and for a certificate of registration in accordance with 32.210 of 10
2261 | CFR Part 32.
- 2262 | 3C.~~4412.23~~ — The exemption in this section does not apply to tritium, krypton-85, or
2263 | promethium-147 used in products for frivolous purposes or in toys or adornments.
- 2264 | ~~3C.4213~~ Gas and aerosol detectors containing radioactive material.
- 2265 | 3C.~~4213~~.1 Except for persons who manufacture, process, ~~or produce, or initially transfer~~
2266 | ~~for sale or distribution~~ gas and aerosol detectors containing radioactive material, any
2267 | person is exempt from ~~the requirements for a license set forth in the Act and from~~
2268 | ~~these regulations in 3, 4, 5, 7, 10, 16, and 19~~ to the extent that such person receives,
2269 | possesses, uses, transfers, owns, or acquires radioactive material in gas and aerosol
2270 | detectors designed to protect ~~health, lifesafety, or property from fires and airborne~~
2271 | ~~hazards provided that detectors containing radioactive material shall have been and~~
2272 | ~~manufactured, processed, produced, imported, or initially~~ transferred in accordance
2273 | with a specific license issued by NRC ¹⁸ pursuant to section 32.26 of 10 CFR Part 32
2274 | (January 1, 20~~15~~~~13~~); ~~or pursuant to 3.12.3~~, which ~~license~~ authorizes the ~~initial~~ transfer
2275 | of the detectors to persons who are exempt from regulatory requirements. ~~This~~
2276 | ~~exemption also covers gas and aerosol detectors manufactured or distributed~~
2277 | ~~before November 30, 2007, in accordance with a specific license issued by NRC or~~
2278 | ~~an Agreement State under comparable provisions to 10 CFR Part 32.26 authorizing~~
2279 | ~~distribution to persons exempt from regulatory requirements.~~

2280 | 18 Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or
2281 | other product containing byproduct material whose subsequent possession, use, transfer, and disposal by all other persons are
2282 | exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C.
2283 | 20555.

Comment [JJ74]:

This provision is added consistent with the language of 10 CFR 30.19(b) which became effective in federal rule in October 2012.

The provision clarifies that applicants under 10 CFR 32.22 (include those who initially distribute the specified devices) should also apply for a registration certificate. Colorado does not currently have any licensees who manufacture such luminous devices.

NRC Compatibility = B
NRC RATS = 2012-4
NRC Cross-reference = 10 CFR 30.19(b)

Comment [JJ75]:

Language in 3C.13 (and subparagraphs) is added for consistency with federal rule in 10 CFR 30.20. The provision expands the class of products exempted from licensing; clarifies that applicants under 10 CFR 32.26 should also apply for a registration certificate; updates the parts of the regulations from which persons are exempt to include 10 CFR part 19.

NRC Compatibility = B
NRC RATS = 2012-4
NRC Cross-reference = 10 CFR 30.20

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2284 **3C.13.2 Any person who desires to manufacture, process, or produce gas and aerosol**
2285 **detectors containing byproduct material, or to initially transfer such products for**
2286 **use under 3C.13.1, should apply for a license under paragraph 32.26 of 10 CFR**
2287 **Part 32 and for a certificate of registration in accordance with 32.210 of 10 CFR**
2288 **Part 32.**

2289 3C.~~4213~~.23 Gas and aerosol detectors previously manufactured and distributed to general
2290 licensees in accordance with a specific license issued by a state shall be considered
2291 exempt under 3C.~~4213~~.1, provided that the device is labeled in accordance with the
2292 specific license authorizing distribution of the generally licensed device, and provided
2293 further that they meet the requirements of 3.12.~~34~~.

2294 3C.~~4314~~ Radioactive drug capsules containing carbon-14 urea for "in vivo" diagnostic use for
2295 humans.

2296 3C.~~4314~~.1 Except as provided in paragraphs 3C.~~4314~~.2 and 3C.~~4314~~.3 , any person is
2297 exempt from the regulations in this part provided that such person receives, possesses,
2298 uses, transfers, owns, or acquires capsules containing 37 kBq (1 µCi) carbon-14 urea
2299 (allowing for nominal variation that may occur during the manufacturing process) each,
2300 for "in vivo" diagnostic use for humans.

2301 3C.~~4314~~.2 Any person who desires to use the capsules for research involving human
2302 subjects shall apply for and receive a specific license pursuant to Part 7.

2303 3C.~~4314~~.3 Nothing in this section relieves persons from complying with applicable FDA,
2304 federal, and state requirements governing receipt, administration, and use of drugs.

2305 **3C.15 Certain industrial devices**

2306 **3C.15.1 Except for persons who manufacture, process, produce, or initially transfer for**
2307 **sale or distribution industrial devices containing byproduct material designed and**
2308 **manufactured for the purpose of detecting, measuring, gauging or controlling**
2309 **thickness, density, level, interface location, radiation, leakage, or qualitative or**
2310 **quantitative chemical composition, or for producing an ionized atmosphere, any**
2311 **person is exempt from the requirements for a license set forth in the Act and from**
2312 **the regulations in parts 3, 4, 5, 7, 10, 16, and 19 to the extent that such person**
2313 **receives, possesses, uses, transfers, owns, or acquires byproduct material, in**
2314 **these certain detecting, measuring, gauging, or controlling devices and certain**
2315 **devices for producing an ionized atmosphere, and manufactured, processed,**
2316 **produced, or initially transferred in accordance with a specific license issued by**
2317 **NRC under 10 CFR 32.30, which license authorizes the initial transfer of the device**
2318 **for use under this section. This exemption does not cover sources not**
2319 **incorporated into a device, such as calibration and reference sources.**

2320 **3C.15.2 Any person who desires to manufacture, process, produce, or initially transfer for**
2321 **sale or distribution industrial devices containing byproduct material for use under**
2322 **3C.15.1, should apply for an NRC license under 10 CFR 32.30 and for a certificate**
2323 **of registration in accordance with 10 CFR 32.210.**

2324

2325

2326

Comment [JJ76]:
This provision is added consistent with the language of 10 CFR 30.22 which became effective in federal rule in October 2012.

NRC Compatibility = B
NRC RATS = 2012-4
NRC Cross-reference = 10 CFR 30.22

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2327 **PART 3, SCHEDULE 3D: LIMITS FOR BROAD LICENSES (3.11)**

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2329

2330

* * *

Comment [JJ77]:
Page break inserted for formatting purposes to ensure Schedule 3D begins at the top of the page.

There are no changes to the content of Schedule 3D.

DRAFT A 07/16/15

2331 **PART 3, SCHEDULE 3E: QUANTITIES OF RADIOACTIVE MATERIALS REQUIRING**
2332 **CONSIDERATION OF THE NEED FOR AN EMERGENCY PLAN FOR RESPONDING TO A RELEASE**
2333 **(3.9.11)**

2334
2335

* * *

Comment [JJ78]:
Page break inserted for formatting purposes to ensure Schedule 3E begins at the top of the page.

There are no changes to the content of Schedule 3E.

DRAFT A 07/16/15

2336 **PART 3, APPENDIX 3F: CRITERIA RELATING TO USE OF FINANCIAL TESTS AND PARENT**
2337 **COMPANY GUARANTEES FOR PROVIDING REASONABLE ASSURANCE OF FUNDS FOR**
2338 **DECOMMISSIONING**

2339
2340

* * *

Comment [JJ79]:
Page break inserted for formatting purposes to ensure Appendix 3F begins at the top of the page.

There are no changes to the content of Appendix 3F.

DRAFT A 07/16/15

2341 **PART 3, APPENDIX 3G: CRITERIA RELATING TO USE OF FINANCIAL TESTS AND SELF-**
2342 **GUARANTEES FOR PROVIDING REASONABLE ASSURANCE OF FUNDS FOR**
2343 **DECOMMISSIONING**

2344 * * *

2345 _____

2346 **EDITOR'S NOTES**

2347 6 CCR 1007-1 has been divided into smaller sections for ease of use. Versions prior to 4/1/07 and rule
2348 history are located in the first section, 6 CCR 1007-1. Prior versions can be accessed from the History link
2349 that appears above the text in 6 CCR 1007-1. To view versions effective on or after 4/1/07, Select the
2350 desired part of the rule, for example 6 CCR 1007-1 Part 1 or 6 CCR 1007-1 Parts 8 - 10.

2351 **History**

2352 *[For history of this section, see Editor's Notes in the first section, 6 CCR 1007-1]*

Comment [JJ80]:
Page break inserted for formatting purposes to ensure Appendix 3G begins at the top of the page.

There are no changes to the content of Appendix 3G.

1 DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
2 Hazardous Materials and Waste Management Division
3 RADIATION CONTROL - LICENSING REQUIREMENTS FOR URANIUM AND THORIUM
4 PROCESSING

5 **6 CCR 1007-1 Part 18**

6 **Adopted by the Board of Health December 16, 2015**

7 *[Editor's Notes follow the text of the rules at the end of this CCR Document.]*

9 **PART 18: LICENSING REQUIREMENTS FOR URANIUM AND THORIUM PROCESSING**

10 **18.1 Purpose and Scope.**

11 18.1.1 The regulations in this part establish criteria, terms and conditions upon which the Department
12 issues licenses to receive title to, receive, possess, use, transfer, or deliver source and byproduct
13 materials **as defined in this part**, to operate uranium and thorium processing facilities and for the
14 disposition of the resulting byproduct material. The requirements of this part are in addition to,
15 and not in substitution for, other applicable requirements of these regulations.

16 18.1.2 This part establishes performance objectives and procedural requirements applicable to any
17 uranium or thorium material processing operation, to waste systems for byproduct material **as**
18 **defined in this part** ~~as in definition (2) of 1.2.2~~, and to related activities concerning uranium-
19 bearing and thorium-bearing materials. It establishes specific technical and financial requirements
20 for ~~siting~~siting, construction, operation, and decontamination, reclamation and ultimate
21 stabilization, as well as requirements for license transfer and termination, long-term site
22 monitoring and surveillance, and ownership and ultimate custody of source material milling
23 facilities and byproduct material impoundments.

24 18.1.3 The requirements of this part apply to byproduct material **as defined in this part**, that is located
25 at a site where milling operations are no longer active, if such site is not covered by the remedial
26 action program of Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA) OF 1978
27 (92 STAT. 3021; 42 U.S.C. 7901). The regulations in this part do not establish procedures and
28 criteria for the issuance of licenses for materials covered under Title I of the Uranium Mill Tailings
29 Radiation Control Act of 1978 (92 Stat. 3021) ~~unless that program fails to accomplish remedial~~
30 ~~action~~. Disposal at a uranium or thorium processing site of radioactive material which is not type 2
31 byproduct material must not inhibit reclamation of the tailings impoundment or the ability of the
32 U.S. Government to take title to the impoundment as long-term custodian.

33 **18.1.4** Nothing in this Part ~~applies~~shall apply to, **includes, or affects** the following naturally occurring
34 radioactive materials (NORM) or technologically enhanced naturally occurring radioactive
35 materials (TENORM):

36 18.1.4.1 ~~Residuals or sludges from the treatment of drinking water by aluminum, ferric chloride,~~
37 ~~or similar processes; except that the material may not contain hazardous substances~~
38 ~~that otherwise would preclude receipt;~~

39 18.1.4.2 Sludges, soils, or pipe scale in or on equipment from oil and gas exploration, production,
40 or development operations or drinking water or wastewater treatment operations; except

Comment [JJ1]: EDITORIAL NOTE 1: ALL COMMENTS (SUCH AS THIS ONE) SHOWN IN THE RIGHT SIDE MARGIN OF THIS DOCUMENT ARE FOR INFORMATION PURPOSES ONLY TO PROVIDE ADDITIONAL INFORMATION AND TO AID THE READER IN UNDERSTANDING THE PROPOSED RULE DURING THE DRAFT REVIEW PROCESS.

THESE COMMENTS ARE **NOT** PART OF THE RULE AND ALL COMMENTS WILL BE DELETED PRIOR TO FINAL SUBMISSION.

Comment [JJ2]: This reflects the date of anticipated approval by the Colorado Board of Health. The effective date is approximately 60 days beyond this date, pending additional review and approvals.

This date is subject to change as determined by the Board of Health. Changes to this date will be properly reflected in the rule, as applicable.

Comment [JJ3]: Due to the added definition for "byproduct material" in 18.2 appearing subsequently in the rule, the wording here is clarified.

Similar changes are made in the rule up to the definition section 18.2.

Comment [JJ4]: This and three additional occurrences of this spelling error are corrected in the rule.

Comment [JJ5]: Proposed change deletes requirements which are no longer applicable. Based on Nuclear Regulatory Commission (NRC) comments - under the 274b Agreement, the State of Colorado does not have jurisdiction over Title I facilities.

Discussion with CDPHE remediation program staff indicated that this may have been initiated in the past due to uncertainty with UMTRCA process at the time.

Change made based on NRC letter dated 10/13/11 (# 18).

10 CFR 40.2a(b)
[Compatibility=A]
NRC Compatibility information can be found at:
<https://scp.nrc.gov/resources.html>

Comment [JJ6]: Language modified for consistency with 2015 statutory changes (Colorado Radiation Control Act) via House Bill 15-1145.

41 that the material may not contain hazardous substances that otherwise would preclude
42 receipt;

43 18.1.4.3 Materials from or activities related to construction material mining regulated under article
44 32.5 of title 34, CRS.

45 18.1.4.4 The treatment, storage, management, processing, or disposal of solid waste, which may
46 include NORM and TENORM, either pursuant to issuance of a certificate of designation
47 or considered approved or otherwise deemed to satisfy the requirement for a certificate of
48 designation.

49 18.1.5 The regulation of uranium in situ leach mining (in situ recovery), as defined in Section 34-32-103,
50 CRS., involves the Department of Natural Resources, Division of Reclamation, Mining and Safety
51 or their successor. The requirements of that agency may, due to the use of terms-of-art and other
52 technical words, phrases and definitions, be interpreted inconsistently or be held in conflict with
53 the Department's requirements. The Department will coordinate with that agency to the maximum
54 extent practicable to resolve any such conflicts or inconsistencies. An applicant or licensee that
55 identifies such inconsistency or conflict shall provide that information to both agencies for
56 resolution. **The Department of Natural Resources, Division of Reclamation, Mining and
57 Safety or their successor, is not implementing any Atomic Energy Act regulatory authority
58 under the Articles of Agreement, Section 274, of the Atomic Energy Act of 1954, as
59 amended.**

60

61 **18.1.6** License amendments for the receipt of **classified-radioactive** material at a facility are subject to
62 sections 18.3 and 18.4 except when the material is from an approved source and **suchthe**
63 amendment would not result in a change in ownership, design, or operation of the facility. License
64 amendments not subject to 18.3 and 18.4 of this part are subject to 18.5 of this section.

65 **18.2 As used in this regulation:**

66 "Active maintenance" means any significant activity needed during the period of long term care including
67 ongoing activities such as the pumping and treatment of water from a site or one-time measures such as
68 replacement of a disposal site's cover. Active maintenance does not include custodial activities such as
69 repair of fencing, repair or replacement of monitoring equipment, revegetation, minor additions to soil
70 cover, minor repair of disposal site cover, and general disposal site upkeep such as mowing grass.

71 "Aquifer" means a geologic formation, group of formations, or part of a formation capable of yielding a
72 significant amount of ground water to wells or springs. Any saturated zone created by uranium or thorium
73 operations would not be considered an aquifer unless the zone is or potentially is:

- 74 (1) hydraulically interconnected to a natural aquifer;
- 75 (2) capable of discharge to surface water; or
- 76 (3) reasonably accessible because of migration beyond the vertical projection of the
77 boundary of the land transferred for long-term government ownership and care in
78 accordance with Criterion 9 of Appendix A to this Part 18.

79 "As expeditiously as practicable considering technological feasibility", for the purposes of Criterion 6A,
80 means as quickly as possible considering: the physical characteristics of the tailings and the site; the
81 limits of available technology; the need for consistency with mandatory requirements of other regulatory
82 programs; and factors beyond the control of the licensee. The phrase permits consideration of the cost of
83 compliance only to the extent specifically provided for by use of the term available technology.

Comment [JJ7]:
Statement is added to clarify that the Department of Natural Resources (DNR) does not have regulatory authority over radioactive materials under the Atomic Energy Act and the Articles of Agreement between the Atomic Energy Commission (now NRC) and the State of Colorado Radiation Program.

In a letter dated October 13, 2011 (Item 17), and as reaffirmed in a letter dated June 28, 2012 (item 17), the U.S. Nuclear Regulatory Commission (NRC) requested that the regulatory authority in relation to the Atomic Energy Act be clarified.

10 CFR 40.2
NRC Regulations can be found at:
<http://www.nrc.gov/reading-rm/doc-collections/cfr/>

Comment [JJ8]: Wording change consistent with 2015 statutory Radiation Control Act (RCA) changes via House Bill 15-1145.

CRS 25-11-203(1)(b)(III)

84 "Available ~~radon barrier technology~~" means technologies and methods for emplacing a final radon barrier
85 on uranium mill tailings piles or impoundments. This term shall not be construed to include extraordinary
86 measures or techniques that would impose costs that are grossly excessive as measured by practice
87 within the industry (or one that is reasonably analogous), (such as, by way of illustration only,
88 unreasonable overtime, staffing, or transportation requirements, etc., considering normal practice in the
89 industry; laser fusion of soils, etc.), provided there is reasonable progress toward emplacement of the
90 final radon barrier. To determine grossly excessive costs, the relevant baseline against which cost shall
91 be compared is the cost estimate for tailings impoundment closure contained in the licensee's approved
92 reclamation plan, but costs beyond these estimates shall not automatically be considered grossly
93 excessive.

Comment [JJ9]:

The words "radon barrier" is deleted from this definition to be consistent with Appendix A of 10 CFR Part 40 wording. The original full definition language (including the words "radon barrier") are not used in Part 18, so no additional changes are necessary. The revised definition is currently used in Part 18 and those uses are consistent with 10 CFR Part 40.

NRC Compatibility = A
NRC letters dated 06/28/12 (#26); 10/13/11 (#26).

94 **"Byproduct Material" is the same as in definition (2) of 1.2.2 and means the tailings or wastes**
95 **produced by the extraction or concentration of uranium or thorium from any ore processed**
96 **primarily for its source material content, including discrete surface wastes resulting from uranium**
97 **solution extraction processes. Underground ore bodies depleted by such solution extraction**
98 **operations do not constitute "byproduct material" within this definition.**

Comment [JJ10]:

Consistent with the approach used in 10 CFR Part 40, the definition for byproduct material is added. This approach eliminates the need to refer back to Part 1 for the definition throughout Part 18. As a result of this added definition, some current references to the Part 1 definition will be deleted.

The specific sub-definition of byproduct material is appropriate for uranium and thorium processing facilities regulated under Part 18.

NRC Compatibility = C
NRC Letter 01/14/14

99 "Certificate of designation" means the approval pursuant to article 20 of title 30, CRS., or section 25-15-
100 204 (6).

101 "Closure" means the activities following operations to decontaminate and decommission the buildings and
102 site used to produce byproduct materials and reclaim the tailings and/or waste disposal area.

103 "Closure plan" means the Department approved plan to accomplish closure.

104 "Compliance period" begins when the Department sets secondary ground-water protection standards and
105 ends when the owner or operator's license is terminated and the site is transferred to the State or Federal
106 agency for long-term care.

107 "Dike" means an embankment or ridge of either natural or man-made materials used to prevent the
108 movement of liquids, sludges, solids, or other materials.

109 "Disposal area" means the area containing byproduct materials to which the requirements of Criterion 6 of
110 Appendix A to this Part 18 apply.

111 "Disposal site" means all land that is subject to transfer to a government agency after termination of the
112 license.

113 "Existing portion" means that land surface area of an existing surface impoundment on which significant
114 quantities of uranium or thorium byproduct materials had been placed prior to September 30, 1983.

115 "Facility" in this part means the physical location at one site or address and under the same administrative
116 control at which:

117 (1) the possession, use, processing or storage of uranium-bearing and thorium-bearing
118 radioactive material is or was authorized by license pursuant to this part; or

119 (2) uranium and thorium is milled, or otherwise processed and the resulting byproduct
120 material is dispositioned.

121 "Factors beyond the control of the licensee" means factors proximately causing delay in meeting the
122 schedule in the applicable reclamation plan for the timely emplacement of the final radon barrier
123 notwithstanding the good faith efforts of the licensee to complete the barrier in compliance with paragraph
124 (1) of Criterion 6A. These factors may include, but are not limited to:

- 125 (1) physical conditions at the site;
- 126 (2) inclement weather or climatic conditions;
- 127 (3) an act of god;
- 128 (4) an act of war;
- 129 (5) a judicial or administrative order or decision, or change to the statutory, regulatory, or
130 other legal requirements applicable to the licensee's facility that would preclude or delay
131 the performance of activities required for compliance;
- 132 (6) labor disturbances;
- 133 (7) any modifications, cessation or delay ordered by state, federal, or local agencies;
- 134
- 135 (8) delays beyond the time reasonably required in obtaining necessary government permits,
136 licenses, approvals, or consent for activities described in the reclamation plan proposed
137 by the licensee that result from agency failure to take final action after the licensee has
138 made a good faith, timely effort to submit legally sufficient applications, responses to
139 requests (including relevant data requested by the agencies), or other information,
140 including approval of the reclamation plan; and
- 141 (9) an act or omission of any third party over whom the licensee has no control.
- 142 "Final radon barrier" means the earthen cover (or approved alternative cover) over tailings or waste
143 constructed to comply with Criterion 6 of this Appendix (excluding erosion protection features).
- 144 "Ground water" means water below the land surface in a zone of saturation. For purposes of Appendix A
145 to this Part 18, ground water is the water contained within an aquifer as defined above.
- 146 "Leachate" means any liquid, including any suspended or dissolved components in the liquid that has
147 percolated through or drained from the byproduct material.
- 148 "Licensed site" means the area contained within the boundary of a location under the control of persons
149 generating or storing radioactive materials under a Department license.
- 150 "Liner" means a continuous layer of natural or man-made materials, beneath or on the sides of a surface
151 impoundment, which restricts the downward or lateral escape of byproduct material, hazardous
152 constituents, or leachate.
- 153 ~~"Long term care" means the observation and maintenance of a site following the post-closure period and~~
154 ~~termination of the license.~~
- 155 "Milestone" means an action or event that is required to occur by an enforceable date.
- 156 "Monitoring" means observing and making measurements to provide data to evaluate the performance
157 and characteristics of a site.
- 158 "Operation" means that a uranium or thorium mill tailings pile or impoundment is being used for the
159 continued placement of byproduct material or is in standby status for such placement. A pile or
160 impoundment is in operation from the day that byproduct material is first placed in the pile or
161 impoundment until the day final closure begins.

Comment [JJ11]:

NRC has requested this definition be deleted from Part 18. Although the term is used in 10 CFR Part 40, NRC does not define the term. Retaining the definition in Colorado rules may result in non-compatibility with NRC requirements.

This term is used in 18.2, 18.6.1.2, and Criterion 6 of Part 18.

[NOTE: Although not defined in 10 CFR Part 40, the words "long term care" are used multiple times in 10 CFR 40 in 40.1, 40.2a, 40.3, 40.20, 40.27, 40.28, and Appendix A.]

NRC letters dated 06/28/12 (#20); 10/13/11 (#20).
10 CFR 40.4

162 "Point of compliance" is the site specific location in the uppermost aquifer where the ground-water
163 protection standard must be met.

164 ~~"Post closure" means the period of time from completion of the site closure plan for decontamination,
165 reclamation, and stabilization of the site and disposal area and prior to the termination of the license.~~

166 "Reclamation plan", for the purposes of Criterion 6A of Appendix A of this Part 18, means the plan
167 detailing activities to accomplish reclamation of the tailings or waste disposal area in accordance with the
168 technical criteria of Appendix A of this Part. The reclamation plan must include a schedule for reclamation
169 milestones that are key to the completion of the final radon barrier including as appropriate, but not limited to,
170 windblown tailings retrieval and placement on the pile, interim stabilization (including dewatering or the
171 removal of freestanding liquids and recontouring), and final radon barrier construction. (Reclamation of
172 tailings must also be addressed in the closure plan; the detailed reclamation plan may be incorporated
173 into the closure plan.)

174 **"Residual radioactive material" means:**

175 **(1) Waste (which the Secretary of Energy determines to be radioactive) in the form of**
176 **tailings resulting from the processing of ores for the extraction of uranium and other**
177 **valuable constituents of the ores; and**

178 **(2) Other waste (which the Secretary of Energy determines to be radioactive) at a**
179 **processing site which relates to such processing, including any residual stock of**
180 **unprocessed ores or low-grade materials.**

181 **The term residual radioactive material is used only with respect to materials at sites**
182 **subject to remediation under title I of the Uranium Mill Tailings Radiation control Act of**
183 **1978, as amended.**

184 "Surface impoundment" means a natural topographic depression, man-made excavation, or diked area,
185 which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is
186 not an injection well.

187

188

189 ~~"Surveillance" means the observation of the site for the purposes of visual detection of the need for~~
190 ~~maintenance, custodial care, evidence of unauthorized access, and compliance with other license and~~
191 ~~regulatory requirements.~~

192 "Third-party contractor" or "Third-party agreement" means a legal or contractual mechanism whereby an
193 applicant or licensee voluntarily agrees to pay for the services, solely selected and supervised by the
194 Department, of qualified persons not Department staff nor under contract directly to the Department.

195 "Uppermost aquifer" means the geologic formation nearest the natural ground surface that is an aquifer,
196 as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property
197 boundary.

198 **"Uranium milling" means any activity that results in the production of byproduct material as**
199 **defined in Part 18.**

200

201

Comment [JJ12]:
NRC has requested that the definition "post closure" be deleted from Part 18 since it is not defined in NRC's equivalent part (10 CFR 40). According to NRC, retaining the definition may result in conflicts with 10 CFR Part 40.

[NOTE: The term is used in Appendix A to 10 CFR Part 40 in Criterion 6 (7), but does not define it.]

Part 18 uses this term in Criterion 6(7) in a manner equivalent to Appendix A of 10 CFR Part 40.

NRC letter dated 06/28/12 (#21); 10/13/11 (#21).

10 CFR 40.

Comment [JJ13]:
NRC has commented that the definition for "residual radioactive material" was omitted from Part 18 of the regulations. Continued omission of the definition may result in incompatibility with NRC regulations.

[The term is used in Part 3, 3.16.2.6 in a manner similar to use in the Conference of Radiation Control Program Directors (CRCPD) Suggested State Regulations for Radiation Control (SSRCR) Part C.32. The term is not currently used/found in Part 1 or in Part 18.]

NRC letter dated 06/28/12 (#22); 10/13/11 (#22)
[Compatibility = A]

Comment [JJ14]:
At the request of NRC, the specific definition for surveillance is deleted. NRC has stated that the Colorado definition is too narrow as it implies only "visual" types of surveillance. [The word is used in 18.1.2; Appendix A-criterion 2, 9C, and 9F].

The word "surveillance" is not defined in 10 CFR Part 40, although the word is used in several areas of Part 40 in a broad sense. NRC has stated that surveillance may include other activities besides visual observation, including monitoring and sampling.

NRC letters 06/28/12 (#23); 10/13/11 (#23).

Comment [JJ15]:
As required by NRC for compatibility, a definition for "uranium milling" is added. The definition is based on that found in 10 CFR Part 40.4.

NRC letters: 01/14/14 (#3); 06/28/2012 (#24); 10/13/11 (#24)

Compatibility = A

202 **18.3 Special Requirements for Issuance of Specific Licenses For Source Material Milling.**

203 In addition to the requirements set forth in 3.8 and 3.9, a specific license for source material milling will be
204 issued if the applicant submits to the Department a complete and accurate **written** application that clearly
205 demonstrates how objectives and requirements of this Part are met. Failure to clearly so demonstrate
206 shall be grounds for refusing to accept an application. Any person desiring to have a facility or site
207 referred to in this Part shall apply to the Department for approval of such facility or site. The application
208 shall contain such information as the Department requires and shall be accompanied by an application
209 fee determined by the Board pursuant to the provisions of Part 12 of these regulations.

210 18.3.1 An application for a license or to amend or renew an existing license to receive, possess, and use
211 source material for milling or byproduct material ~~as in definition (2) of 1-2.2~~ shall include all
212 information required under these regulations and such other information as the Department may
213 deem necessary, and shall address the following:

214 18.3.1.1 Description of the proposed project or action;

215 18.3.1.2 Area/site characteristics including geology, topography, hydrology and
216 meteorology;

217 18.3.1.3 Radiological and nonradiological impacts of the proposed project or action,
218 including waterway and groundwater impacts;

219 18.3.1.4 Environmental effects of accidents;

220 18.3.1.5 Tailings disposal and decommissioning;

221 18.3.1.6 Site and project alternatives.

222 18.3.2 The applicant shall provide procedures describing the means employed to meet the following
223 requirements during the operational phase of any project.

224 18.3.2.1 Milling operations shall be conducted so that all releases are reduced to as low
225 as is reasonably achievable below the limits of Part 4.

226 18.3.2.2 The mill operator shall conduct at least daily inspection of any tailings or waste
227 retention systems. The inspection shall be performed by a person who is
228 qualified and approved by the Department. Records of such inspections shall be
229 maintained for review by the Department.

230 18.3.2.3 The mill operator shall immediately notify the Department of the following:

231 18.3.2.3.1 Any failure in a tailings or waste retention system which results in a
232 release of tailings or waste into uncontrolled areas; and

233 18.3.2.3.2 Any unusual conditions which are not contemplated in the design of the
234 retention system and which if not corrected could lead to failure of the
235 system and result in a release of tailings or waste into uncontrolled
236 areas.

237 18.3.3 During any one full year prior to submittal of a new application or amendment expanding the
238 facility the applicant/licensee shall conduct a preoperational monitoring program to provide
239 complete baseline data on a milling site and its environs. Throughout the construction and
240 operating phases of the mill, the applicant/licensee shall conduct an operational monitoring
241 program to measure or evaluate compliance with applicable standards and regulations, to

242 evaluate performance of control systems and procedures, to evaluate environmental impacts of
243 operation, and to detect potential long-term effects.

244 18.3.4 The environmental ~~report~~assessment required by 3.8.8 shall contain all information deemed
245 necessary by the agency to assist the agency in the evaluation of the short-term and long-range
246 environmental impact of the project and activity so that the agency may weigh environmental,
247 economic, technical, and other benefits against environmental costs, while considering available
248 alternatives. The environmental ~~report~~assessment shall be submitted with the license application
249 or amendment request, unless an exemption as provided by 3.8.7.1 has been obtained from the
250 Department.

Comment [JJ16]: Wording is modified, consistent with the language used in the Colorado Radiation Control Act for the document(s) submitted by the applicant which pertains to environmental concerns.

251 18.3.5 The following types of actions require an applicant's environmental ~~report~~assessment:

252 18.3.5.1 Issuance ~~of a new or~~ renewal ~~of a~~ source material milling license;

Comment [JJ17]: Language modified for clarity.

253 **18.3.5.2 Each new, renewal or amendment application pertaining to the facility's receipt of**
254 **material;**

Comment [JJ18]:
This requirement has been relocated from 18.3.9, and 18.3.9.2 and language merged.

255 18.3.5.32 Issuance of an amendment that would authorize or result in:

- 256 (1) A significant expansion of a site;
- 257 (2) A significant change in the types of releases;
- 258 (3) A significant increase in the amounts of releases;
- 259 (4) A significant increase in individual or cumulative occupational radiation exposure;
260 or
- 261 (5) A significant increase in the potential for or consequences from radiological
262 accidents.

263 18.3.5.43. ~~The~~ environmental ~~assessment~~report shall contain all information deemed
264 necessary by the department, and shall include, at a minimum:

Comment [JJ19]:
For consistency within this subsection, the term environmental assessment is changed to environmental report. The environmental report is the document submitted by the applicant or licensee.

- 265 (1) The identification of the types of ~~classified~~ material to be received, stored,
266 processed, or disposed of;
- 267 (2) A representative presentation of the physical, chemical, and radiological
268 properties of the type of ~~classified~~ material to be received, stored, processed, or
269 disposed of;
- 270 (3) An evaluation of the short-term and long-range environmental impacts of such
271 receipt, storage, processing, or disposal;
- 272 (4) An assessment of the radiological and nonradiological impacts to the public
273 health from the proposed activities;
- 274 (5) Any facility-related impact on any waterway and ground water from the proposed
275 activities;
- 276 (6) An analysis of the environmental, economic, social, technical, and other benefits
277 of the proposed activities against environmental costs and social effects while
278 considering available alternatives;

- 279 (7) ~~A~~a list of all material violations of local, state, or federal law at the facility since
280 the submittal date of the previous license application or license renewal
281 application;
- 282 (8) ~~F~~for an application for a license or license amendment pertaining to the facility's
283 receipt of ~~classified~~ material for storage, processing, or disposal at the facility, a
284 demonstration that:
- 285 (a) ~~T~~here are no outstanding material violations of any state or federal
286 statutes, compliance orders, or court orders applicable to the facility, and
287 any releases giving rise to any such violation have been remediated;
- 288 (b) ~~T~~he operator, after a good faith review of the facility and its operations,
289 is not aware of any current license violation at the facility;
- 290 (c) ~~T~~here are no current releases to the air, ground, surface water, or
291 groundwater that exceed permitted limits; and
- 292 (d) ~~N~~o conditions exist at the facility that would prevent the Department of
293 Energy's receipt of title to the facility pursuant to the federal "Atomic
294 Energy Act of 1954", 42 U.S.C. sec. 2113;
- 295 (9) ~~A~~a list of all necessary permits and any changes to local land use ordinances
296 that are needed to construct or operate the facility; and
- 297 (10) ~~F~~or sites or facilities placed on the National Priority List pursuant to the federal
298 "Comprehensive Environmental Response, Compensation, and Liability Act", 42
299 U.S.C. sec. 9605, a copy of the most recent five-year review and any associated
300 updates that have been issued by the United States Environmental Protection
301 Agency.

302 18.3.6 An application for a license to receive, possess and use source material for milling or byproduct
303 material ~~as in definition (2) of 1.2.2~~ shall contain proposed specifications relating to the milling
304 operations and the disposition of tailings or wastes resulting from such milling activities to achieve
305 the requirements and objectives set forth in the criteria listed in Appendix A to this Part 18. Each
306 application for a new license or for license renewal must clearly demonstrate how the
307 requirements and objectives set forth in Appendix A to this Part 18 have been addressed. Failure
308 to clearly demonstrate how the requirements and objectives in Appendix A to this Part 18 have
309 been addressed shall be grounds for refusing to accept an application.

310 **A facility shall not dispose of or receive for storage incident to disposal or processing at**
311 **the facility radioactive material, except for nonprocessing operational purposes such as**
312 **radioactive standards, samples for analysis, or materials contained in fixed or portable**
313 **gauges, unless the facility has received a license, a five-year license renewal, or license**
314 **amendment pertaining to the facilities receipt of radioactive material, in accordance with**
315 **the Administrative Procedures Act, for such receipt, storage, processing, or disposal of**
316 **radioactive material and the license, license renewal, or license amendment approves the**
317 **type of activity.**

318 18.3.7 Nothing in ~~section 18.3~~ shall ~~apply~~ **applies** to a contract for the storage, processing, or disposal
319 of less than the sum of one hundred ten ~~(110)~~ tons of ~~classified~~ **radioactive** material per source
320 or to a contract for a bench-scale or a pilot-scale testing project or a contract for less than a de
321 minimis amount of ~~classified-radioactive~~ material as determined by the department for storage,
322 processing, or disposal.

Comment [JJ20]: Paragraph added consistent with the 2015 changes to the RCA. The provision allows for a facility to receive nonprocessing related radioactive materials provided the license authorizes the material and activity.

RCA: 25-11-203(1)(b)(I)

Comment [JJ21]: Wording change consistent with 2015 statutory (RCA) changes via House Bill 15-1145.

C.R.S. 25-11(1)(b)(II)

Comment [JJ22]: Editorial adjustment - number is added for clarity/consistency with other formatting in Part 18.

Comment [JJ23]: Wording change to "radioactive" consistent with 2015 statutory (RCA) changes via House Bill 15-1145.

323 ~~18.3.8~~ Upon receipt of an application or notice as provided in ~~this section 18.3~~, the Department shall
324 notify the public and forward a copy of the application or notice to the Governor and the General
325 Assembly, as appropriate. ~~The Department will take no further formal action on notices that~~
326 ~~are not accompanied by the proper application and application fee.~~

Comment [JJ24]:
Throughout section 18.3.8 and subsections, language is reworded with the intent of improving the clarity, understanding and flow of the rule.

327 ~~18.3.8.1~~ ~~the Department shall publish a determination as to whether an application submitted~~
328 ~~pursuant to paragraph (b) of subsection (2) of this section is substantially complete within~~
329 ~~forty-five days after receipt of the application. Within forty-five (45) days after receipt of~~
330 ~~an application, the Department shall publish a determination as to whether the~~
331 ~~application submitted is substantially complete.~~

Comment [JJ25]:
The original language of 18.3.8.1 (shown in ~~strikeout~~) makes reference to "paragraph (b) of subsection (2)". Paragraph (b) of subsection (2) does not currently exist within Part 18. During a prior revision to Part 18, this reference was incorporated in Part 18 in error. The "paragraph (b)" phrase refers to a section in the Colorado Radiation Control Act (2010) (rather than Part 18).

332 18.3.8.2 ~~an initial public meeting or hearing shall be convened within forty-five days after~~
333 ~~publication of the determination that the application is substantially complete. A second~~
334 ~~such public meeting shall be convened within thirty days after the first public meeting.~~
335 ~~Within forty-five (45) days after publication its determination that the application~~
336 ~~required by 18.3.8.1 is substantially complete, an initial public meeting shall be~~
337 ~~convened. The meeting shall, at a minimum require:~~

Comment [JJ26]:
This paragraph incorporates the requirements of 18.3.9.1 relating to the application being substantially complete prior to holding an initial meeting.

338 ~~(1) At least two weeks' written notice before the meeting;~~
339 ~~(2) The meeting to be hosted and presided over by a person selected upon~~
340 ~~agreement by the Department, the local Board of County Commissioners and the~~
341 ~~applicant;~~

Comment [JJ27]:
Relocated from 18.3.9.1(1).

342 ~~(3) The licensee or applicant to provide a summary of the facility's application to~~
343 ~~receive, store, process, or dispose of material and the nature of the material;~~

Comment [JJ28]:
Relocated from 18.3.9.1.

344 ~~(4) An opportunity for the public to comment and be heard;~~

Comment [JJ29]: Relocated from 18.3.9.1(2).

345 ~~(5) The licensee or applicant to provide transcripts of the meeting, which:~~

Comment [JJ30]: Relocated from 18.3.9.1(2).

346 ~~(a) Allows the public to make copies of a transcript of the meeting; and~~

Comment [JJ31]: Relocated from 18.3.9.1(3).

347 ~~(b) Shall be provided to the Department in an electronic format in a manner~~
348 ~~that allows posting on the Department's website within ten (10) days~~
349 ~~after receipt from the transcription service.~~

350 ~~18.3.8.3~~ ~~the Department shall approve, approve with conditions, or deny the application within~~
351 ~~three hundred sixty days after the second public meeting.~~

Comment [JJ32]: This paragraph is removed/deleted as it is replaced by 18.3.8.4.

352 18.3.8.3 Within ninety (90) days of the initial public meeting required by 18.3.8.2, a
353 response, if any, written by the local Board of County Commissioners to the
354 applicant's environmental assessment is to be provided to the applicant.

Comment [JJ33]: The requirements of 18.3.9.3 have been incorporated here.

355 Upon request of and documentation of the expenditure by such Board, the
356 applicant shall provide the Board with up to fifty thousand dollars, as adjusted for
357 inflation since 2003, which is available to assist the Board in responding to the
358 application, including an independent environmental analysis and identification of
359 any substantial adverse impact upon the safety or maintenance of transportation
360 infrastructure or transportation facilities within the county.

Comment [JJ34]: The phrase "as adjusted for inflation..." is included, consistent with the 2014 RCA changes.

Senate Bill 14-192

Comment [JJ35]: Language is added consistent with the 2014 RCA changes

361 ~~18.3.8.4~~ Upon completion of the Department's review of the application, the Department
362 shall provide notice to the public of issuance of an initial draft decision where the
363 license application is approved, approved with conditions, or is denied.

NOTE: The 360 day time period specified in the current rule (in 18.3.8.3) is deleted, consistent with the 2014 RCA changes (via SB 14-192).

RCA: 25-11-203 (3)(c)(V)(C).
Senate Bill (SB) 14-192

- 364
365 (1) The initial draft decision shall be posted on the Department's website at the
time of notice and shall include:
- 366 (a) A decision analysis;
- 367 (b) The final technical and environmental impact analysis conducted by the
368 Department as specified in 18.4;
- 369 (c) All requests from the Department seeking information from the
370 applicant and all of the applicant's responses;
- 371 (d) All public comments;
- 372 (e) Any additional information that may assist the public review of the
373 Department's draft decision; and
- 374 (f) A draft license for any proposed approval.
- 375 (2) Upon issuance of the initial draft decision in 18.3.8.4, the Department shall
376 initiate a final public comment process which shall include:
- 377 (a) A public comment period that shall be noticed at the time the initial
378 draft decision is published; and
- 379 (b) A public meeting, held within thirty (30) days after giving public notice
380 of the initial draft decision. Such meeting shall, at a minimum require:
- 381 (i) At least two weeks' written notice before the meeting;
- 382 (ii) The meeting to be hosted and presided over by a person
383 selected upon agreement by the Department, the local Board of
384 County Commissioners and the applicant;
- 385 (iii) The summary of the facilities' license to receive, store, process,
386 or dispose of radioactive material and the nature of the
387 radioactive material;
- 388 (iv) The opportunity for cross-examination;
- 389 (v) An opportunity for the public to comment and be heard;
- 390 (vi) The licensee or applicant to provide transcripts of the meeting,
391 which:
- 392 (a) Allows the public access to make copies of a transcript of
393 the meeting; and
- 394 (b) Shall be provided to the Department in an electronic format
395 in a manner that allows posting on the Department's
396 website within ten (10) days after receipt from the
397 transcription service.
- 398 (3) For applications which are denied, the Department shall issue a decision
399 document summarizing the basis for denial.

Comment [JJ36]:
The requirement for a public meeting to be held within 30 days of providing notice of the initial draft decision, is specified by the RCA.

Comment [JJ37]: The opportunity for cross-examination was requested by NRC in correspondence dated January 14, 2014 and is necessary for compatibility with federal rule in 10 CFR 150.31.

NRC Compatibility = C

400 18.3.8.5 The expense of public notice, public comment periods, or public meetings
401 required by Section 18.3 shall be at the expense of the applicant or licensee.

402 18.3.8.6 Following the public comment period specified in 18.3.8.4(2), the Department
403 shall:

404 (1) After review of all final public comments, issue a final draft decision; and

405 (2) Provide affected parties, including the applicant in the case of approval with
406 conditions or denial, an opportunity to request an adjudicatory hearing in
407 accordance with 24-4-105, C.R.S.

408 ~~18.3.8.7~~ If none of the parties specified in 18.3.8.6(2) seeks an adjudicatory hearing, the
409 final draft decision becomes final agency action.

Comment [JJ38]: Provisions 18.3.8.7, 18.3.8.8, 18.3.8.9 and 18.3.8.10 originate from RCA provision (3)(c)(D)(V)(D)

410 18.3.8.8 If any party specified in 18.3.8.6(2) seeks an adjudicatory hearing, resolution of all
411 material issues of fact, law, or discretion presented by the record and the
412 appropriate order, sanction, relief, or denial of the material issues must be through
413 an initial decision of a hearing officer or administrative law judge.

414 18.3.8.9 Upon issuance of the initial decision of the hearing officer or administrative law
415 judge, and after any allowable appeal to the executive director of the Department,
416 the Department shall issue within a reasonable time a final decision to approve,
417 approve with conditions, or deny the application.

418 18.3.8.10 The final decision in 18.3.8.9 is subject to judicial review pursuant to section 24-
419 4-106, C.R.S.

420 18.3.8.11 The applicant shall pay all reasonable, necessary, and documented expenses of
421 the hearing held in accordance with 18.3.8.8.

422 ~~18.3.9~~ In addition to the requirements of section 18.3 and 18.4, each new, renewal or amendment
423 application pertaining to the facility's receipt of classified material shall include a written
424 application to the Department and information relevant to the pending application, including:

Comment [JJ39]: Applicable elements of this requirement exist in the "preamble" language to 18.3, and in 18.3.5.4

425 ~~18.3.9.1~~ transcripts of two public meetings hosted and presided over by a person selected upon
426 agreement by the Department, the local Board of County Commissioners, and the
427 applicant. One or both of the meetings shall be a hearing conducted to comply with
428 section 24-4-104 or 24-4-105, CRS. The expense of the meetings or hearing shall be
429 paid by the facility. ~~Such meetings shall not be held until the Department determines that~~
430 ~~the application is substantially complete. The facility shall provide the public with:~~

Comment [JJ40]: The requirements of this section have been incorporated into 18.3.8.2 and 18.3.8.4

Comment [JJ41]: The requirement relating to expenses have been incorporated into 18.3.8.5, 18.3.8.11

431 ~~(1)~~ at least two weeks' written notice before the first meeting and an additional two
432 weeks' written notice before the second meeting;

Comment [JJ42]: The requirement of this section has been incorporated into 18.3.8.2, and 18.3.8.4

433 ~~(2)~~ At both meetings, summaries of the facility's license to receive, store, process, or
434 dispose of classified material and the nature of the classified material, and an
435 opportunity to be heard; and

Comment [JJ43]: The requirements of this section have been relocated to 18.3.8.2(3), and 18.3.8.4(2)(b)

436 ~~(3)~~ access to make copies of a transcript of the meetings, and shall provide an
437 electronic copy to the Department in a manner that allows posting on the
438 department's web site within ten days after receipt from the transcription service.

Comment [JJ44]: The requirements of this section have been relocated to 18.3.8.2(5), 18.3.8.4(2)(b)

439 ~~18.3.9.2~~ an environmental assessment as defined in 18.3.5;

Comment [JJ45]: The requirements of this section have been relocated to (new) Section 18.3.5.2

440 ~~18.3.9.3~~ a response, if any, to the environmental assessment written by the Board of County
441 Commissioners provided to the facility within ninety days after the first public meeting.
442 Upon request of and documentation of the expenditure by such Board, the applicant shall
443 provide the Board with up to fifty thousand dollars, which shall be available to assist the
444 Board in responding to the application, including an independent environmental analysis
445 and identification of any substantial adverse impact upon the safety or maintenance of
446 transportation infrastructure or transportation facilities within the county.

Comment [JJ46]: The requirements of this section have been relocated to (new) Section 18.3.8.3

447 **18.4 Department Environmental Impact Analysis**

Comment [JJ47]: The word "Department" added for clarity.

448 **18.4.1 The Department shall prepare a written Environmental Impact Analysis (EIA) of the impact**
449 **of the licensed activity on the environment** For each license application or application to
450 amend or renew an existing license to receive, possess, or use source material for uranium or
451 thorium milling or byproduct material ~~as in definition (2) of 1-2-2~~ which will have a significant
452 impact on the environment., the Department shall prepare a written analysis of the impact of the
453 licensed activity on the environment, which **The written EIA** shall be **made available for review** to
454 **by** the public and ~~for review by~~ the NRC at the time of public notice ~~in 18.3.8.5 of hearing.~~ **The**
455 **EIA** which analysis shall include:

Comment [JJ48]: The wording of this section is modified for clarity and understanding.

456 18.4.1.1 An assessment of the radiological and nonradiological impacts to the public health;

457 18.4.1.2 An assessment of any impact on any waterway and ground water;

458 18.4.1.3 Consideration of alternatives to the activities to be conducted; and

459 18.4.1.4 Consideration of the long-term impacts of the licensed activities.

460 18.4.2 In preparing the ~~EIA environmental impact analysis~~, the Department may use and incorporate by
461 reference the environmental ~~report assessment~~ prepared by the applicant and environmental
462 ~~assessments analysis~~ prepared by Federal, State or local agencies.

463 18.4.3 The ~~EIA environmental impact analysis~~, or any part thereof, shall be prepared directly by the
464 Department or the Department shall utilize the third party method set forth in 3.13.

465 **18.5 Notices Requirements Pertaining to Materials Not Subject to 18.3 and 18.4 and Financial**
466 **Assurance**

467 **18.5.1** At least ninety **(90)** days before a facility proposes to receive, store, process, or dispose of
468 **classified-radioactive** material in a license application or amendment that is not subject to 18.3
469 and 18.4, **and for which a material acceptance report has not already been filed with the**
470 **Department**, the facility shall notify the Department **in writing**, and the Department shall notify
471 the public and the board of county commissioners of the county in which the facility is located, of
472 the specific **classified-radioactive** material to be received, stored, processed, or disposed of. The
473 notice ~~shall~~ **must** include:

Comment [JJ49]: The requirements of this provision originate from RCA requirements in 25-11-203(4)(a) and updated in 2015.

The phrase "in writing" is added for clarity.

474 18.5.1.1 **Aa** representative analysis of the physical, chemical, and radiological properties of the
475 **classified-radioactive** material;

476 18.5.1.2 **T**he material acceptance report that demonstrates that the **classified-radioactive**
477 material does not contain hazardous waste characteristics not found in uranium ore;

478 18.5.1.3 **Aa** detailed plan for transport, acceptance, storage, handling, processing, and disposal
479 of the material;

480 18.5.1.4 ~~Aa~~ demonstration that the material contains technically and economically recoverable
481 uranium, without taking into account its value as disposal material;

482 18.5.1.5 ~~T~~the existing location of the ~~classified-radioactive~~ material;

483 18.5.1.6 ~~T~~the history of the ~~classified-radioactive~~ material;

484 18.5.1.7 ~~Aa~~ written statement by the applicant describing any pre-existing regulatory
485 classification of the ~~classified-wasteradioactive material~~ in the state of origin that
486 describes all steps taken by the applicant to identify ~~such-the~~ classification;

487 18.5.1.8 ~~Aa~~ written statement from the United States Department of Energy or successor agency
488 that the receipt, storage, processing, or disposal of the ~~classified-radioactive~~ material at
489 the facility will not adversely affect the Department of Energy's receipt of title to the facility
490 pursuant to the federal "Atomic Energy Act of 1954", 42 U.S.C. Sec. 2113;

491 18.5.1.9 ~~D~~ocumentation showing any necessary approvals of the ~~u~~nited ~~s~~tates
492 ~~e~~nvironmental ~~p~~rotection ~~a~~gency; and

493 18.5.1.10 ~~Aa~~ an environmental assessment **containing the information required by 18.3.5.4as**
494 **defined in section 18.4 and 18.5 of this section, and** which may incorporate by reference
495 relevant information contained in an environmental assessment previously submitted for
496 the facility.

497 18.5.2 Within thirty **(30)** days after the department's receipt of notice pursuant to 18.5.1, the Department
498 shall determine whether the notice is complete.

499 18.5.3 ~~O~~nce the department determines that the notice pursuant to 18.5.1 is complete, the Department
500 shall:

501 **18.5.3.1 Publish the notice of the specific material to be received, stored, processed, or**
502 **disposed of, to:**

503 **(1) The public, through publishing on the Department's web site; and**

504 **(2) The county commissioners of the county in which the facility is located.**

505 ~~publish the notice on its web site and~~

506 **18.5.3.2 The notice required in 18.5.3.1 shall include the information contained in 18.5.1.1**
507 **through 18.5.1.10.**

508 **18.5.3.3** ~~p~~rovide a sixty **(60)** -day public comment period for the receipt of written comments
509 concerning the notice. ~~Aa~~ public hearing may be held, at the Department's discretion, at the
510 operator's expense.

511 18.5.4 ~~W~~ithin thirty **(30)** days after the close of the written public comment period held pursuant to
512 18.5.3, the Department shall approve, approve with conditions, or deny the receipt, storage,
513 processing, or disposal as described in the notice based on whether the material proposed for
514 receipt, storage, processing, or disposal complies with the facility's license and:

515 18.5.4.1 Be conducted such that the exposures to workers and the public are within the dose
516 limits of part 4 of the department's rules pertaining to radiation control for workers and the
517 public;

Comment [JJ50]: The specific reference to the contents of the environmental assessment are referenced for clarity.

Comment [JJ51]: Sub-section 18.5.3 is revised to incorporate language similar to that found in 18.5.1. This provision is intended to improve the clarity and flow of this subsection.

Comment [JJ52]: Section added consistent with the 2014 RCA changes.
25-11-203(4)(a)(II)(c)

518 18.5.4.2 Not cause releases to the air, ground, or surface or ground water that exceed permitted
519 limits; and

520 18.5.4.3 Not prevent transfer of the facility to the United States in accordance with 42 U.S.C. sec.
521 2113 upon completion of decontamination, decommissioning, and reclamation of the
522 facility.

523 **18.6 Financial Assurance**

524 **18.6.15.5** — Prior to issuance of the license, the applicant shall:

525 **18.6.1.1(1) e** Establish financial assurance arrangements, as provided by 3.9.5, to ensure
526 decontamination and decommissioning of the facility; and

527 **18.6.1.2(2) p** Provide a fund adequate to cover the payment of the cost for long-term care and
528 monitoring as provided by 3.9.5. ~~4015.~~

529 (1) Such fund shall be sufficient to meet the requirements of 3.9.5. ~~4015.4.~~

530 (2) The Department will consider proposals to combine the two types of financial
531 assurance.

532 (3) Financial assurance shall be provided prior to commencement of construction or
533 operation.

534 **18.6.2 Financial surety arrangements must be established by each mill operator before the**
535 **commencement of operations to assure that sufficient funds will be available to carry out**
536 **the decontamination and decommissioning of the mill and site and for the reclamation of**
537 **any tailings or waste disposal areas. The amount of funds to be ensured by such surety**
538 **arrangements must be based on Department-approved cost estimates in a Department-**
539 **approved plan, or a proposed revision to the plan submitted to the Department for**
540 **approval, if the proposed revision contains a higher cost estimate for:**

541 **18.6.2.1 Decontamination and decommissioning of mill buildings and the milling site to**
542 **levels which allow unrestricted use of these areas upon decommissioning, and**

543 **18.6.2.2 The reclamation of tailings and/or waste areas in accordance with technical**
544 **criteria delineated in Criterion 1 through 8 of Appendix A.**

545 **18.6.3 To avoid unnecessary duplication and expense, the Department may accept financial**
546 **sureties that have been consolidated with financial or surety arrangements established to**
547 **meet requirements of other Federal or state agencies and/or local governing bodies for**
548 **decommissioning, decontamination, reclamation, and long-term site surveillance and**
549 **control, provided such arrangements are considered adequate to satisfy these**
550 **requirements and that the portion of the surety which covers the decommissioning and**
551 **reclamation of the mill, mill tailings site and associated areas, and the long-term funding**
552 **charge is clearly identified and committed for use in accomplishing these activities.**

553 **18.6 License Hearings**

554 ~~18.6.1 There shall be an opportunity for public hearings to be held in accordance with the procedures in~~
555 ~~24-4-104 and 24-4-105, CRS., and 18.6, prior to the granting, denial or renewal of a specific~~
556 ~~license permitting the receipt, possession or use of source material for milling or byproduct~~
557 ~~material as in definition (2) of 1.2.2.~~

Comment [JJ53]:
The previous section (18.5) is divided into two sections (18.5, and 18.6) to enhance functionality and flow.

Comment [JJ54]: As requested by NRC, this provision is added for compatibility with 10 CFR Part 40, Appendix A, Criterion 9(a)(1), and (2).
<http://www.nrc.gov/reading-rm/doc-collections/cfr/part040/part040-appa.html>
Compatibility = C
NRC RATS = 2011-1
NRC Letter 11/19/14

Comment [JJ55]: As requested by NRC, this provision added for compatibility with 10 CFR Part 40, Appendix A, Criterion 9(d).
NRC Compatibility = C
NRC Letter 11/19/14

Comment [JJ56]: Sections 18.6.1 through 18.6.7 are deleted. Hearing processes will defer to the requirements of the Administrative Procedures Act and in order to avoid conflicts with administrative court rules.

558 ~~18.6.2 – Notice of Hearing~~

559 ~~18.6.2.1 All hearings shall be preceded by written notice containing:~~

560 ~~18.6.2.1.1 The nature of the hearing and its time and place;~~

561 ~~18.6.2.1.2 The legal authority and jurisdiction under which the hearing is to be held;~~

562 ~~18.6.2.1.3 The matters of fact and law asserted or to be considered;~~

563 ~~18.6.2.1.4 A description of the proposed licensing action and a statement of the~~
564 ~~availability of its text from the Department;~~

565 ~~18.6.2.1.5 A description of the right of any interested person to make written comments~~
566 ~~to the Department or present oral comments at the hearing;~~

567 ~~18.6.2.1.6 The procedure for applying to become a party to the hearing; and~~

568 ~~18.6.2.1.7 A description of the procedures to be followed at the hearing and at a~~
569 ~~prehearing conference if required.~~

570 ~~18.6.2.2 The notice of the hearing shall be mailed by the Department to the licensee or applicant~~
571 ~~and to each person who has filed a written request to receive notice of such proceedings.~~
572 ~~The licensee or applicant shall cause the notice to be published for three (3) days in a~~
573 ~~newspaper of statewide circulation and in local newspapers designated by the~~
574 ~~Department in the area to be affected by the proposed action. The notice shall be mailed~~
575 ~~and published not less than ninety (90) days prior to the hearing.~~

576 ~~18.6.2.3 The time and place of hearing will be fixed with due regard for the convenience of the~~
577 ~~parties or their representatives, and the public interest. The hearing will be held in the~~
578 ~~locale of the site to be licensed.~~

579 ~~18.6.2.4 The cost of any licensing action hearing shall be at the expense of the applicant. These~~
580 ~~costs shall include, but not be limited to, the hearing officer, the meeting room, the court~~
581 ~~reporter and transcript copies, and the required notices. The costs shall not include the~~
582 ~~expenses of other parties to the hearing.~~

583 ~~18.6.3 – Party Status~~

584 ~~18.6.3.1 A person who may be affected or aggrieved by Department action may apply for party~~
585 ~~status not less than twenty (20) days prior to the hearing. Thereafter, application to be~~
586 ~~made a party shall not be considered except upon motion for good cause shown.~~

587 ~~18.6.3.2 Application for party status must identify the individual or group applying, including the~~
588 ~~address or phone number where they may be contacted, state the nature of their~~
589 ~~interest in the hearing and the specific ground on which they claim to be affected or~~
590 ~~aggrieved, and the specific aspects of the hearing which they wish to address.~~

591 ~~18.6.3.3 The Department, or the hearing officer, will grant or deny party status within five (5)~~
592 ~~days after receipt of the request for party status based on the nature and extent of the~~
593 ~~person's property, financial or other interest in the hearing and the possible effect of~~
594 ~~any order which may be entered as a result of the hearing on the person's interest. Any~~
595 ~~person applying for or granted party status may, by motion to the hearing officer or~~
596 ~~Department, as appropriate, challenge the right of any other person to be a party.~~

- 597 ~~18.6.3.4 Parties shall have the right to initiate discovery. Parties shall have the right to make~~
598 ~~motions or objections, present evidence, cross-examine witnesses, and appeal from~~
599 ~~the decision of the hearing as provided by the Colorado Administrative Procedures Act,~~
600 ~~24-4-101 et seq., CRS.~~
- 601 ~~18.6.3.5 A person who is not a party will be permitted to submit written comments to the~~
602 ~~Department and may be permitted to make an oral presentation at the hearing, but will~~
603 ~~not have the other rights of a party.~~
- 604 ~~18.6.4 Prehearing Conference~~
- 605 ~~18.6.4.1 The Department or hearing officer, on its own motion or at the request of any party or~~
606 ~~any person who has applied to become a party, may direct the parties to appear at a~~
607 ~~specific time and place for a conference to consider:~~
- 608 ~~18.6.4.1.1 The simplification and clarification of the issues;~~
- 609 ~~18.6.4.1.2 The obtaining of stipulations and admissions of fact and of the contents and~~
610 ~~authenticity of documents to avoid unnecessary proof;~~
- 611 ~~18.6.4.1.3 Identification of witnesses and the limitation of the number of expert~~
612 ~~witnesses, and other steps to expedite the presentation of evidence;~~
- 613 ~~18.6.4.1.4 The setting of a hearing schedule;~~
- 614 ~~18.6.4.1.5 Granting or denying requests for party status, if such decisions have not~~
615 ~~previously been made;~~
- 616 ~~18.6.4.1.6 Such other matters as may aid in the orderly disposition of the hearing.~~
- 617 ~~18.6.4.2 At such conference each party or person who has applied to become a party shall~~
618 ~~present to every other person, party, and the Department a prehearing statement~~
619 ~~containing the following:~~
- 620 ~~18.6.4.2.1 A brief summary of the nature of the claim of the party and the basis therefore;~~
- 621 ~~18.6.4.2.2 A copy of all exhibits proposed to be introduced; and~~
- 622 ~~18.6.4.2.3 A list of all witnesses who may be called and a brief description of their~~
623 ~~testimony.~~
- 624 ~~18.6.4.3 Except for good cause shown or for evidence or testimony accepted as rebuttal, no~~
625 ~~witness may testify nor may any exhibits be introduced on behalf of a party who had~~
626 ~~notice of the prehearing conference unless such witness has been previously listed~~
627 ~~and/or his written testimony and related exhibits have been presented to opposing~~
628 ~~parties at the prehearing conference.~~
- 629 ~~18.6.4.4 The Department or hearing officer shall issue a written summary of the action taken at~~
630 ~~the conference and agreements by the parties, which limits the issues or defines the~~
631 ~~matters in controversy to be determined in the hearing.~~
- 632 ~~18.6.5 Discovery~~
- 633 ~~18.6.5.1 Any party may initiate discovery in the form of interrogatories to another party, requests~~
634 ~~for admission to another party, requests for production of documents to another party, or~~

635 ~~depositions of any persons, or any combination thereof. The Colorado Rules of Civil~~
636 ~~Procedure, to the extent not inconsistent with the Colorado Administrative Procedure~~
637 ~~Act, shall apply. Such discovery may be modified by a motion for protective order filed~~
638 ~~with the Department or hearing officer within seven (7) days of receipt of the notice or~~
639 ~~request for discovery. Motions for protective order shall set forth the grounds in support~~
640 ~~thereof and shall be ruled upon immediately. Discovery shall be completed no later than~~
641 ~~ten (10) days preceding the hearing date, except as otherwise ordered by the~~
642 ~~Department or hearing officer.~~

643 ~~18.6.6 – Conduct of Hearings~~

644 ~~18.6.6.1 Hearing presentations will proceed in the following order unless otherwise directed by~~
645 ~~the Department or hearing officer.~~

646 ~~18.6.6.1.1 Call to order, introductory remarks, and action on applications for party status,~~
647 ~~if not already decided.~~

648 ~~18.6.6.1.2 Presentation of any stipulations or agreements of the parties, and any other~~
649 ~~matters which were required to be dealt with at the prehearing conference, if~~
650 ~~held.~~

651 ~~18.6.6.1.3 Opening statement by the party upon whom the burden of proof rests.~~

652 ~~18.6.6.1.4 Opening statements by all other parties.~~

653 ~~18.6.6.1.5 Presentation of case by party upon whom burden of proof rests.~~

654 ~~18.6.6.1.6 Presentation by all other persons wishing to offer evidence in the order to be~~
655 ~~determined by the Department or hearing officer.~~

656 ~~18.6.6.1.7 Rebuttal by the party upon whom the burden of proof rests, followed by~~
657 ~~rebuttal of other parties.~~

658 ~~18.6.6.1.8 Closing statements by party upon whom the burden of proof rests, followed by~~
659 ~~closing statements of all other parties.~~

660 ~~18.6.6.2 Public participation as provided for in these rules shall be allowed at that time or times~~
661 ~~during the hearing as determined by the Department or hearing officer in their discretion~~
662 ~~to be appropriate.~~

663 ~~18.6.6.3 At the conclusion of any witness's testimony, or at the conclusion of the party's entire~~
664 ~~presentation, as may be determined by the Department or hearing officer, all parties~~
665 ~~may then cross-examine such witness or witnesses. The Department or hearing officer~~
666 ~~may examine and cross-examine any witness. A person who is not a party shall not~~
667 ~~have the right to cross-examine.~~

668 ~~18.6.6.4 Any person, not a party to the proceeding, wishing to present testimony may do so by~~
669 ~~indicating his desire in writing. A form will be available prior to and during the hearing.~~
670 ~~This form will request the person's name, address, whom he represents, the general~~
671 ~~nature of his testimony, and the time required for his presentation. This form is to be~~
672 ~~presented to a representative of the Department during the hearing. Voluntary testimony~~
673 ~~not specifically requested on or by the written form may also be allowed. Any person~~
674 ~~presenting testimony shall be under oath and be subject to cross-examination.~~

675 ~~18.6.6.5 The proponent of any motion, order, or license issuance bears the burden of proof.~~

676 ~~18.6.6.6 No interested person, party, or applicant for party status outside the Department will~~
677 ~~have any oral or written communication with any Department personnel or hearing~~
678 ~~officer relevant to the merits of a hearing pending before the Department unless~~
679 ~~reasonable prior notice is given to all participants in the hearing. This prohibition shall~~
680 ~~apply after the hearing is noticed. Any Department employee or hearing officer who is~~
681 ~~involved in such a prohibited communication shall make a written record of it and~~
682 ~~transmit it to all the parties to the hearing.~~

683 ~~18.6.7 Department Decision~~

684 ~~18.6.7.1 Any party to a hearing may, or if so directed by the Department or the hearing officer~~
685 ~~shall, file proposed findings of fact and conclusions of law and a proposed form of order~~
686 ~~or decision within twenty (20) days after the record is closed. A party who has the~~
687 ~~burden of proof may reply within ten (10) days after service of proposed findings of fact~~
688 ~~and conclusions of law.~~

689 ~~18.6.7.2 After due consideration of the hearing record, the Department or hearing officer shall~~
690 ~~issue its findings of fact, conclusions of law, and decision and order.~~

691 **18.78 Operational Requirements.**

692 Each licensee authorized to receive, possess or use source material for milling or byproduct material ~~as in~~
693 ~~definition (2) of 1.2.2~~ shall:

694 18.78.1 Operate in accordance with the requirements of this Part 18, in particular the procedures required
695 by 18.3.2, monitoring required by 18.3.3, and the requirements and objectives of Appendix A to
696 this Part 18.

697 18.78.2 Submit a report to the Department within **sixty (60)** days after January 1 and July 1 of each year,
698 specifying the quantity of each of the radioactive materials released to unrestricted areas in liquid
699 and in gaseous effluents during the previous six months of operation, and such other information
700 as the Department may require to estimate maximum potential annual radiation doses to the
701 public resulting from effluent releases. If quantities of radioactive materials released during the
702 reporting period are significantly above the licensee's design objectives previously reviewed as
703 part of the licensing action, the report shall cover this specifically. On the basis of such reports
704 and any additional information the Department may obtain from the licensee or others, the
705 Department may from time to time require the licensee to take such action as the Department
706 deems appropriate.

707

708

709 18.78.3 For any licensed site or facility determined by the Department to have caused a release to the
710 groundwater that exceeds the basic standards for groundwater as established by the water
711 quality control commission, until remediation has been completed, the licensee shall provide
712 annual written notice of the status of the release and any remediation activities associated with
713 the release, by certified or registered mail, return receipt requested, to the current address for
714 each registered groundwater well within one mile of the release as identified in the corrective
715 action monitoring program, ~~unless the licensee demonstrates that a distance less than one mile is~~
716 ~~warranted~~. Documentation of this activity will be retained and made available to the Department
717 upon request.

718 **18.8.3.1 Under no circumstances shall remediation be deemed complete until all**
719 **groundwater wells affected by any release associated with the site or facility are**

Comment [JJ57]: Phrase removed, consistent with 2014 RCA changes.

Comment [JJ58]: This provision is added consistent with the 2014 changes to the Colorado Radiation Control Act.

SENATE BILL 14-192
RCA: 25-11-107(5)(j)

720 restored to at least the numeric groundwater standards as established by the
721 water quality control commission that apply to the historic uses of the wells.
722 The licensee shall remediate any release affecting groundwater wells in the
723 most expedited manner reasonably possible using best available active
724 restoration and groundwater monitoring technologies.

725 **18.8.3.2** Prior to the application of any numeric groundwater standard different from the
726 baseline standard contained in 10 CFR Part 40, the standard must have been
727 approved by the United States Nuclear Regulatory Commission in accordance
728 with section 274o of the federal "Atomic Energy Act of 1954", 42 U.S.C. sec
729 2021(o).

Comment [JJ59]: This provision is added consistent with the 2015 changes to the Colorado Radiation Control Act.

HOUSE BILL 15-1145
RCA: 25-11-107(5)(j)

730 **18.8.4** For any facility licensed under Part 18, in addition to any reporting requirements provided
731 in the license or rules, the license shall provide notice to the Department as soon as
732 practicable upon discovery of any spill or release involving toxic or radioactive materials
733 and shall provide an initial written report within seven (7) days after any discovery. The
734 department shall post all such written reports on the Department's web site as soon as
735 practicable, and in no case later than seven (7) days after receipt by the Department.

Comment [JJ60]: This provision is added consistent with the 2014 changes to the Colorado Radiation Control Act.

SENATE BILL 14-192
RCA: 25-11-107(5)(k)

736 **18.89 Decommissioning Requirements.**

737 **18.89.1** In addition to the information required under 3.16, each licensee authorized to receive, possess
738 or use source material for milling or byproduct material ~~as in definition (2) of 1.2.2~~ shall submit a
739 plan for completion of decommissioning if the procedures necessary to carry out
740 decommissioning:

741 **18.89.1.1** — Have not been previously approved by the Department; and

742 **18.89.1.2** — Could increase potential health and safety impacts to workers or to the public,
743 such as in any of the following cases:

744 **18.89.1.2.1** — Procedures would involve techniques not applied routinely during
745 cleanup or maintenance operations; or

746 **18.89.1.2.2** — Workers would be entering areas not normally occupied where surface
747 contamination and radiation levels are significantly higher than routinely
748 encountered; or

749 **18.89.1.2.3** — Procedures could result in significantly greater airborne concentrations
750 of radioactive materials than are present during operation; or

751 **18.89.1.2.4** — Procedures could result in significantly greater releases of radioactive
752 material to the environment than those associated with operation.

753 **18.89.2** Procedures with potential health and safety impacts may not be carried out prior to approval of the
754 decommissioning plan.

755 **18.89.3** The proposed decommissioning plan, if required by 18.89.1 or by license condition, must include:

756 **18.89.3.1** — Description of planned decommissioning activities;

757 **18.89.3.2** — Description of methods used to assure protection of workers and the environment
758 against radiation hazards during decommissioning;

759 **18.89.3.3** A description of the planned final radiation survey; and

- 760 | 18.89.3.4 ~~————~~ An updated detailed cost estimate for decommissioning, comparison of that
761 | estimate with present funds set aside for decommissioning, and plan for assuring the
762 | availability of adequate funds for completion of decommissioning.
- 763 | 18.89.4 The proposed decommissioning plan will be approved by the Department if the information
764 | therein demonstrates that the decommissioning will be completed as soon as is reasonable and
765 | that the health and safety of workers and the public will be adequately protected.
- 766 | 18.89.5 Upon approval of the decommissioning plan by the Department, the licensee shall complete
767 | decommissioning in accordance with the approved plan. As a final step in decommissioning, the
768 | licensee shall submit the information required in 3.16.4.1.5 and shall certify the disposition of
769 | accumulated wastes from decommissioning.
- 770 | 18.89.6 If the information submitted under 3.16.4.1.5 or 18.8 does not adequately demonstrate that the
771 | premises are suitable for release for unrestricted use, the Department will inform the licensee of
772 | the appropriate further actions required for termination of license.
773 |

774 **PART 18, APPENDIX A — CRITERIA RELATING TO THE OPERATION OF MILLS AND THE**
775 **DISPOSITION OF THE TAILINGS OR WASTES FROM THESE OPERATIONS**

776 Introduction: Every applicant for a license to possess and use radioactive material in conjunction with
777 uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required
778 by the provisions of 18.3 to include in a license application proposed specifications relating to milling
779 operations and the disposition of tailings or wastes resulting from such milling activities. This appendix
780 establishes technical, ownership, and long-term site surveillance criteria relating to the siting, operation,
781 decontamination, decommissioning, and reclamation of mills and tailings or waste systems and sites at
782 which such mills and systems are located.

783 As used in this appendix, the term "as low as is reasonably achievable" has the same meaning as in
784 1.2.2.

785 In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal
786 program on a site-specific basis. However, in such cases the objectives, technical alternatives and
787 concerns which must be taken into account in developing a tailings program are identified. As provided by
788 the provisions of 18.3, applications for licenses must clearly demonstrate how the criteria have been
789 addressed.

790 The specifications shall be developed considering the expected full capacity of tailings or waste systems
791 and the lifetime of mill operations. Where later expansions of systems or operations may be likely (for
792 example, where large quantities of ore now marginally uneconomical may be stockpiled), the amenability
793 of the disposal system to accommodate increased capacities without degradation in long-term stability
794 and other performance factors shall be evaluated.

795 Licensees or applicants may propose to the Department alternatives to meet the specific requirements in
796 this Appendix. The alternative proposals may take into account local or regional conditions, including
797 geology, topography, hydrology, and meteorology. The Department may find that the proposed
798 alternatives meet the Department's requirements if the alternatives will achieve a level of stabilization and
799 containment of the sites concerned and a level of protection for public health, safety, and the environment
800 from radiological and nonradiological hazards associated with the site, which is equivalent to, to the
801 extent practicable, or more stringent than the level which would be achieved by the requirements of this
802 Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR Part 192,
803 Subparts D and E. Proposed alternatives to specific regulations in this Part 18 require notice and
804 opportunity for hearing before the NRC.

805 All site-specific licensing decisions based on the criteria in this Appendix or alternatives proposed by
806 licensees or applicants will take into account the risk to the public health and safety and the environment
807 with due consideration to the economic costs involved and any other factors the Department determines
808 to be appropriate. In implementing this Appendix, the Department will consider "practicable" and
809 "reasonably achievable" as equivalent terms. Decisions involving these terms will take into account the
810 state of technology, and the economics of improvements in relation to benefits to the public health and
811 safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic
812 energy in the public interest.

813 **Criterion 1.**

814 Criterion 1A. The general goal or broad objective in **sitting-siting** and design decisions is permanent
815 isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural
816 forces, and to do so without ongoing maintenance. For practical reasons, specific **sitting-siting** decisions
817 and design standards must involve finite times (e.g., the longevity design standard in Criterion 6). The
818 following site features which will contribute to such a goal or objective must be considered in selecting
819 among alternative tailings disposal sites or judging the adequacy of existing tailings sites:

- 820 (1) Remoteness from populated areas;
- 821 (2) Hydrologic and other natural conditions as they contribute to continued immobilization and
822 isolation of contaminants from ground-water sources; and
- 823 (3) Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long-term.
- 824 Criterion 1B. The site selection process must be an optimization to the maximum extent reasonably
825 achievable in terms of the features in Criterion 1A.
- 826 Criterion 1C. In the selection of disposal sites, primary emphasis must be given to isolation of tailings or
827 wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience
828 or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will
829 be a function of both site and engineering design, overriding consideration must be given to ~~siting~~-siting
830 features given the long-term nature of the tailings hazards.
- 831 Criterion 1D. Tailings should be disposed of in a manner that no active maintenance is required to
832 preserve conditions of the site.
- 833 **Criterion 2.**
- 834 To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations,
835 byproduct material ~~as in definition (2) of 1.2.2~~, from in situ extraction operations, such as residues from
836 solution evaporation or contaminated control processes, and wastes from small remote above ground
837 extraction operations shall be disposed of at existing large mill tailings disposal sites; unless considering
838 the nature of the wastes, such as their volume and specific activity and the costs and environmental
839 impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be
840 impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual
841 surveillance obligations.
- 842 **Criterion 3.**
- 843 The "prime option" for disposal of tailings is placement below grade, either in mines or specially
844 excavated pits (that is, where the need for any specially constructed retention structure is eliminated).
845 The evaluation of alternative sites and disposal methods performed by mill operators in support of their
846 proposed tailings disposal program (provided in applicants' environmental ~~reports~~assessment) must
847 reflect serious consideration of this disposal mode. In some instances, below grade disposal may not be
848 the most environmentally sound approach, such as might be the case if a ground-water formation is
849 relatively close to the surface or not very well isolated by overlying soils and rock. Also, geologic and
850 topographic conditions might make full below grade burial impracticable: For example, bedrock may be
851 sufficiently near the surface that blasting would be required to excavate a disposal pit at excessive cost,
852 and more suitable alternative sites are not available. Where full below grade burial is not practicable, the
853 size of retention structures, and size and steepness of slopes associated with exposed embankments
854 must be minimized by excavation to the maximum extent reasonably achievable or appropriate given the
855 geologic and hydrologic conditions at a site. In these cases, it must be demonstrated that an above grade
856 disposal program will provide reasonably equivalent isolation of the tailings from natural erosional forces.
- 857 **Criterion 4.**
- 858 The following site and design criteria must be adhered to whether tailings or wastes are disposed of
859 above or below grade.
- 860 Criterion 4A. Upstream rainfall catchment areas must be minimized to decrease erosion potential and the
861 size of the floods, which could erode or wash out sections of the tailings disposal area.

862 Criterion 4B. Topographic features should provide good wind protection.

863 Criterion 4C. Embankment and cover slopes must be relatively flat after final stabilization to minimize
864 erosion potential and to provide conservative factors of safety assuring long-term stability. The broad
865 objective should be to contour final slopes to grades which are as close as possible to those which would
866 be provided if tailings were disposed of below grade: this could, for example, lead to slopes of about 10
867 horizontal to 1 vertical (10h:1v) or less steep. In general, slopes should not be steeper than about 5h:1v.
868 Where steeper slopes are proposed, reasons why a slope less steep than 5h:1v would be impracticable
869 should be provided and compensating factors and conditions, which make such slopes acceptable,
870 should be identified.

871 Criterion 4D. A full self-sustaining vegetative cover must be established or rock cover employed to reduce
872 wind and water erosion to negligible levels.

873 (1) Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions,
874 such as in semi-arid and arid regions, rock cover must be employed on slopes of the
875 impoundment system. The Department will consider relaxing this requirement for extremely
876 gentle slopes such as those, which may exist on the top of the pile.

877 (2) The following factors must be considered in establishing the final rock cover design to avoid
878 displacement of rock particles by human and animal traffic or by natural process, and to preclude
879 undercutting and piping:

880 (a) Shape, size, composition, and gradation of rock particles (excepting bedding material
881 average particles size must be at least cobble size or greater);

882 (b) Rock cover thickness and zoning of particles by size; and

883 (c) Steepness of underlying slopes.

884 (3) Individual rock fragments must be dense, sound, and resistant to abrasion, and must be free from
885 cracks, seams, and other defects that would tend to unduly increase their destruction by water
886 and frost actions. Weak, friable, or laminated aggregate may not be used.

887 (4) Rock covering of slopes may be unnecessary where top covers are very thick (on the order of
888 10m or greater); impoundment slopes are very gentle (on the order of 10h:1v or less); bulk cover
889 materials have inherently favorable erosion resistance characteristics; and, there is negligible
890 drainage catchment area upstream of the pile and good wind protection as described in Criteria
891 4A and 4B.

892 (5) Furthermore, all impoundment surfaces must be contoured to avoid areas of concentrated
893 surface runoff or abrupt or sharp changes in slope gradient. In addition to rock cover on slopes,
894 areas toward which surface runoff might be directed must be well protected with substantial rock
895 cover (rip rap). In addition to providing for stability of the impoundment system itself, overall
896 stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to
897 assure that there are not ongoing or potential processes, such as gully erosion, which would lead
898 to impoundment instability.

899 Criterion 4E. The impoundment may not be located near a capable fault that could cause a maximum
900 credible earthquake larger than that which the impoundment could reasonably be expected to withstand.
901 As used in this criterion, the term "capable fault" has the same meaning as defined in section III(g) of
902 Appendix A of 10 CFR Part 100. The term "maximum credible earthquake" means that earthquake which
903 would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential
904 considering the regional and local geology and seismology and specific characteristics of local subsurface
905 material.

906 Criterion 4F. The impoundment, where feasible, should be designed to incorporate features, which will
907 promote deposition. For example, design features, which promote deposition of sediment suspended in
908 any runoff, which flows into the impoundment area, might be utilized; the object of such a design feature
909 would be to enhance the thickness of cover over time.

910 **Criterion 5.**

911 Criteria 5A-5D and Criterion 10 incorporate the basic ground-water protection standards imposed by the
912 Environmental Protection Agency in 40 CFR Part 192, Subparts D and E (48 FR 45926; October 7, 1983)
913 which apply during operations and prior to the end of closure. Groundwater monitoring to comply with
914 these standards is required by Criterion 7A.

915 Criterion 5A.

916 (1) The primary ground-water protection standard is a design standard for surface impoundments
917 used to manage byproduct material. Unless exempted under paragraph 5A(3) of this criterion,
918 surface impoundments (except for an existing portion) shall have a liner that is designed,
919 constructed, and installed to prevent any migration of wastes out of the impoundment to the
920 adjacent subsurface soil, ground water, or surface water at any time during the active life
921 (including the closure period) of the impoundment. The liner may be constructed of materials that
922 may allow wastes to migrate into the liner (but not into the adjacent subsurface soil, ground water,
923 or surface water) during the active life of the facility, provided that impoundment closure includes
924 removal or decontamination of all waste residues, contaminated containment system components
925 (liners, etc.) contaminated subsoils, and structures and equipment contaminated with waste and
926 leachate. For impoundments that will be closed with the liner material left in place, the liner must
927 be constructed of materials that can prevent wastes from migrating into the liner during the active
928 life of the facility.

929 (2) The liner required by paragraph 5A(1) above shall be:

930 (a) Constructed of materials that have appropriate chemical properties and sufficient strength
931 and thickness to prevent failure due to pressure gradients (including static head and
932 external hydrogeologic forces), physical contact with the waste or leachate to which they
933 are exposed, climatic conditions, the stress of installation, and the stress of daily
934 operation;

935 (b) Placed upon a foundation or base capable of providing support to the liner and resistance
936 to pressure gradients above and below the liner to prevent failure of the liner due to
937 settlement, compression, or uplift; and

938 (c) Installed to cover all surrounding earth likely to be in contact with the wastes or leachate.

939 (3) The applicant or licensee will be exempted from the requirements of paragraph 5A(1) of this
940 criterion if the Department finds, based on a demonstration by the applicant or licensee, that
941 alternate design and operating practices, including the closure plan, together with site
942 characteristics will prevent the migration of any hazardous constituents into ground water or
943 surface water at any future time.

944 In deciding whether to grant an exemption, the Department will consider:

945 (a) The nature and quantity of the wastes;

946 (b) The proposed alternate design and operation;

Comment [JJ61]: Cross-reference error
correction – reference should be to Criterion 7 and
not Criterion 7A. Criterion 7A does not exist.

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- 947 (c) The hydrogeologic setting of the facility, including the attenuative capacity and thickness
948 of the liners and soils present between the impoundment and ground water or surface
949 water; and
- 950 (d) All other factors which would influence the quality and mobility of the leachate produced
951 and the potential for it to migrate to ground water or surface water.
- 952 (4) A surface impoundment must be designed, constructed, maintained, and operated to prevent
953 overtopping resulting from normal or abnormal operations, overfilling, wind and wave actions,
954 rainfall, or run-on; from malfunctions of level controllers, alarms, and other equipment; and from
955 human error.
- 956 (5) When dikes are used to form the surface impoundment, the dikes must be designed, constructed,
957 and maintained with sufficient structural integrity to prevent massive failure of the dikes. In
958 ensuring structural integrity, it must not be presumed that the liner system will function without
959 leakage during the active life of the impoundment.

960 Criterion 5B.

- 961 (1) Uranium and thorium byproduct material ~~in definition (2) of 1.2.2~~ shall be managed to conform to
962 the following secondary ground-water protection standard: hazardous constituents entering the
963 ground water from a licensed site must not exceed the specified concentration limits in the
964 uppermost aquifer beyond the point of compliance during the compliance period. Hazardous
965 constituents are those constituents identified by the Department pursuant to paragraph 5B(2) of
966 this criterion. Specified concentration limits are those limits established by the Department as
967 indicated in paragraph 5B(5) of this criterion. The Department will also establish the point of
968 compliance and compliance period on a site-specific basis through license conditions and orders.
969 The objective in selecting the point of compliance is to provide the earliest practicable warning
970 that the impoundment is releasing hazardous constituents to the ground water. The point of
971 compliance must be selected to provide prompt indication of ground-water contamination on the
972 hydraulically downgradient edge of the disposal area. The Department shall identify hazardous
973 constituents, establish concentration limits, set the compliance period, and may adjust the point of
974 compliance if needed to accord with developed data and site information as to the flow of ground
975 water or contaminants, when the detection monitoring established under Criterion ~~7A~~ indicates
976 leakage of hazardous constituents from the disposal area.
- 977 (2) A constituent becomes a hazardous constituent subject to paragraph 5B(5) only when the
978 constituent meets all three of the following tests:
- 979 (a) The constituent is reasonably expected to be in or derived from the uranium and thorium
980 byproduct material in the disposal area;
- 981 (b) The constituent has been detected in the ground water in the uppermost aquifer; and
- 982 (c) The constituent is listed in Criterion 10 of this appendix.
- 983
- 984 (3) Even when constituents meet all three tests in paragraph 5B(2) of this criterion, the Department
985 may exclude a detected constituent from the set of hazardous constituents on a site-specific
986 basis if it finds that the constituent is not capable of posing a substantial present or potential
987 hazard to human health or the environment. In deciding whether to exclude constituents, the
988 Department will consider the following:
- 989 (a) Potential adverse effects on ground-water quality, considering

Comment [JJ62]: Cross-reference error correction – reference should be to Criterion 7 and not Criterion 7A. Criterion 7A does not exist.
NRC Compatibility = C
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-
- 990 (i) The physical and chemical characteristics of the waste in the licensed site,
991 including its potential for migration;
- 992 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 993 (iii) The quantity of ground water and the direction of ground water flow;
- 994 (iv) The proximity and withdrawal rates of ground-water users;
- 995 (v) The current and future uses of ground water in the area;
- 996 (vi) The existing quality of ground water, including other sources of contamination
997 and their cumulative impact on the ground water quality;
- 998 (vii) The potential for health risks caused by human exposure to waste constituents;
- 999 (viii) The potential damage to wildlife, crops, vegetation, and physical structures
1000 caused by exposure to waste constituents;
- 1001 (ix) The persistence and permanence of the potential adverse effects.
- 1002 (b) Potential adverse effects on hydraulically-connected surface water quality, considering
- 1003 (i) The volume and physical and chemical characteristics of the waste in the
1004 licensed site;
- 1005 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 1006 (iii) The quantity and quality of ground water and the direction of ground water flow;
- 1007 (iv) The patterns of rainfall in the region;
- 1008 (v) The proximity of the licensed site to surface waters;
- 1009 (vi) The current and future uses of surface waters in the area and any water quality
1010 standards established for those surface waters;
- 1011 (vii) The existing quality of surface water, including other sources of contamination
1012 and the cumulative impact on surface water quality;
- 1013 (viii) The potential for health risks caused by human exposure to waste constituents;
- 1014 (ix) The potential damage to wildlife, crops, vegetation, and physical structures
1015 caused by exposure to waste constituents; and
- 1016 (x) The persistence and permanence of the potential adverse effects.
- 1017 (4) In making any determinations under paragraphs 5B(3) and 5B(6) of this criterion about the use of
1018 ground water in the area around the facility, the Department will consider any identification of
1019 underground sources of drinking water and exempted aquifers made by the Colorado Water
1020 Quality Control Commission, as in 5 CCR 1002-8, or other agency having jurisdiction.
- 1021 (5) At the point of compliance, the concentration of a hazardous constituent must not exceed:

- 1022 (a) The Department-approved background concentration of that constituent in the ground
1023 water;
- 1024 (b) The respective value given in the table in paragraph 5C if the constituent is listed in the
1025 table and if the background level of the constituent is below the value listed; or
- 1026 (c) An alternate concentration limit established by the Department.
- 1027 (6) Conceptually, background concentrations pose no incremental hazards and the drinking water
1028 limits in Criterion 5C state acceptable hazards but these two options may not be practically
1029 achievable at a specific site. Alternate concentration limits that present no significant hazard may
1030 be proposed by licensees for Department consideration. Licensees must provide the basis for any
1031 proposed limits including consideration of practicable corrective actions, that limits are as low as
1032 reasonably achievable, and information on the factors the Department must consider. The
1033 Department will establish a site specific alternate concentration limit for a hazardous constituent
1034 as provided in paragraph 5B(5) of this criterion if it finds that the proposed limit is as low as
1035 reasonably achievable after considering practicable corrective actions, and that the constituent
1036 will not pose a substantial present or potential hazard to human health or the environment as long
1037 as the alternate concentration limit is not exceeded. In making the present and potential hazard
1038 finding, the Department will consider the following factors:
- 1039 (a) Potential adverse effects on ground water quality, considering:
- 1040 (i) The physical and chemical characteristics of the waste in the licensed site
1041 including its potential for migration;
- 1042 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 1043 (iii) The quantity of ground water and the direction of ground water flow;
- 1044 (iv) The proximity and withdrawal rates of ground water users;
- 1045 (v) The current and future uses of ground water in the area;
- 1046 (vi) The existing quality of ground water, including other sources of contamination
1047 and their cumulative impact on the ground water quality;
- 1048 (vii) The potential for health risks caused by human exposure to waste constituents;
- 1049 (viii) The potential damage to wildlife, crops, vegetation, and physical structures
1050 caused by exposure to waste constituents;
- 1051 (ix) The persistence and permanence of the potential adverse effects.
- 1052 (b) Potential adverse effects on hydraulically-connected surface water quality, considering:
- 1053 (i) The volume and physical and chemical characteristics of the waste in the
1054 licensed site;
- 1055 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 1056 (iii) The quantity and quality of ground water, and the direction of ground water flow;
- 1057 (iv) The patterns of rainfall in the region;

- 1058 (v) The proximity of the licensed site to surface waters;
- 1059 (vi) The current and future uses of surface waters in the area and any water quality
- 1060 standards established for those surface waters;
- 1061 (vii) The existing quality of surface water including other sources of contamination
- 1062 and the cumulative impact on surface water quality;
- 1063 (viii) The potential for health risks caused by human exposure to waste constituents;
- 1064 (ix) The potential damage to wildlife, crops, vegetations, and physical structures
- 1065 caused by exposure to waste constituents; and
- 1066 (x) The persistence and permanence of the potential adverse effects.

1067 Criterion 5C.

1068 **Maximum Values for Ground Water Protection**

Constituent or property	Maximum Concentration (Milligrams per liter):
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Endrin (1,2,3,4,10, 10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8, 9a-octahydro-1, 4-endo, endo-5, 8-dimethano naphthalene)	0.0002
Lindane (1,2,3,4,5,6-hexachloro-cyclohexane, gamma isomer)	0.004
Methoxychlor (1,1,1-Trichloro-2, 2-bis, p-methoxyphenylethane)	0.1
Toxaphene (C 10 H 10 Cl 6 , Technical chlorinated camphene, 67–69 percent chlorine)	0.005
2,4-D (2,4-Dichlorophenoxyacetic acid)	0.1
2,4,5-TP Silvex (2,4,5-Trichloro-phenoxypropionic acid)	0.01

1069

	Becquerels per liter	PicoCuries per liter
Combined radium-226 and radium-228	0.185	5
Gross alpha-particle activity (excluding radon and uranium when producing uranium byproduct material or radon and thorium when producing thorium byproduct material)	0.555	15

1070

1071 Criterion 5D. If the ground water protection standards established under paragraph 5B(1) of this criterion
 1072 are exceeded at a licensed site, a corrective action program must be put into operation as soon as is
 1073 practicable, and in no event later than eighteen (18) months after the Department finds that the standards
 1074 have been exceeded. The licensee shall submit the proposed corrective action program and supporting
 1075 rationale for Department approval prior to putting the program into operation, unless otherwise directed by
 1076 the Department. The objective of the program is to return hazardous constituent concentration levels in
 1077 ground water to the concentration limits set as standards. The licensee's proposed program shall address

1078 removing the hazardous constituents that have entered the ground water at the point of compliance or
1079 treating then in place. The program shall also address removing or treating in place any hazardous
1080 constituents that exceed concentration limits in ground water between the point of compliance and the
1081 down gradient facility property boundary. The licensee shall continue corrective action measures to the
1082 extent necessary to achieve and maintain compliance with the ground water protection standard. The
1083 Department will determine when the licensee may terminate corrective action measures based on data
1084 from the ground water monitoring program and other information that provide reasonable assurance that
1085 the ground water protection standard will not be exceeded.

1086 Criterion 5E. In developing and conducting ground water protection programs, applicants and licensees
1087 shall also consider the following:

1088 (1) Installation of bottom liners (Where synthetic liners are used, a leakage detection system must be
1089 installed immediately below the liner to ensure major failures are detected if they occur. This is in
1090 addition to the ground water monitoring program conducted as provided in ~~Criterion 718.3.3~~.
1091 Where clay liners are proposed or relatively thin, in situ clay soils are to be relied upon for
1092 seepage control, tests must be conducted with representative tailings solutions and clay materials
1093 to confirm that no significant deterioration of permeability or stability properties will occur with
1094 continuous exposure of clay to tailings solutions. Tests must be run for a sufficient period of time
1095 to reveal any effects if they are going to occur (in some cases deterioration has been observed to
1096 occur rather rapidly after about nine months of exposure)).

Comment [JJ63]: Cross-reference error
correction – reference should be to 18.3.3 and not
Criterion 7, consistent with 10 CFR 40 Appendix A,
I (Technical Criteria).

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1097 (2) Mill process designs which provide the maximum practicable recycle of solutions and
1098 conservation of water to reduce the net input of liquid to the tailings impoundment.

1099 (3) Dewatering of tailings by process devices and/or in situ drainage systems (At new sites, tailings
1100 must be dewatered by a drainage system installed at the bottom of the impoundment to lower the
1101 phreatic surface and reduce the driving head of seepage, unless tests show tailings are not
1102 amenable to such a system. Where in situ dewatering is to be conducted, the impoundment
1103 bottom must be graded to assure that the drains are at a low point. The drains must be protected
1104 by suitable filter materials to assure that drains remain free running. The drainage system must
1105 also be adequately sized to assure good drainage).

1106 (4) Neutralization to promote immobilization of hazardous constituents.

1107 Criterion 5F. Where ground water impacts are occurring at an existing site due to seepage, action must
1108 be taken to alleviate conditions that lead to excessive seepage impacts and restore ground water quality.
1109 The specific seepage control and ground water protection method, or combination of methods, to be used
1110 must be worked out on a site-specific basis. Technical specifications must be prepared to control
1111 installation of seepage control systems. A quality assurance, testing, and inspection program, which
1112 includes supervision by a qualified engineer or scientist, must be established to assure the specifications
1113 are met.

1114 Criterion 5G. In support of a tailings disposal system proposal, the applicant/operator shall supply
1115 information concerning the following:

1116 (1) The chemical and radioactive characteristics of the waste solutions.

1117 (2) The characteristics of the underlying soil and geologic formations particularly as they will control
1118 transport of contaminants and solutions. This includes detailed information concerning extent,
1119 thickness, uniformity, shape, and orientation of underlying strata. Hydraulic gradients and
1120 conductivities of the various formations must be determined. This information must be gathered
1121 from borings and field survey methods taken within the proposed impoundment area and in
1122 surrounding areas where contaminants might migrate to ground water. The information gathered
1123 on boreholes must include both geological and geophysical logs in sufficient number and degree

1124 of sophistication to allow determining significant discontinuities, fractures, and channeled deposits
1125 of high hydraulic conductivity. If field survey methods are used, they should be in addition to and
1126 calibrated with borehole logging. Hydrologic parameters such as permeability may not be
1127 determined on the basis of laboratory analysis of samples alone; a sufficient amount of field
1128 testing (e.g., pump tests) must be conducted to assure actual field properties are adequately
1129 understood. Testing must be conducted to allow estimating chemi-sorption attenuation properties
1130 of underlying soil and rock.

1131 (3) Location, extent, quality, capacity and current uses of any ground water at and near the site.

1132 Criterion 5H. Steps must be taken during stockpiling of ore to minimize penetration of radionuclides into
1133 underlying soils; suitable methods include lining and/or compaction of ore storage areas.

1134 **Criterion 6.**

1135 (1) In disposing of waste byproduct material, licensees shall place an earthen cover (or approved
1136 alternative) over tailings or wastes at the end of milling operations and shall close the waste
1137 disposal area in accordance with a design¹ which provides reasonable assurance of control of
1138 radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and,
1139 in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct
1140 materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to
1141 exceed an average² release rate of 0.74 Becquerel per square meter per second (Bq/m² s), or 20
1142 picocuries per square meter per second (pCi/m² s), to the extent practicable throughout the
1143 effective design life determined pursuant to (1)(i) of this criterion. In computing required tailings
1144 cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar
1145 circumstances may not be considered. Direct gamma exposure from the tailings or wastes should
1146 be reduced to background levels. The effects of any thin synthetic layer may not be taken into
1147 account in determining the calculated radon exhalation level. If non-soil materials are proposed
1148 as cover materials, it must be demonstrated that these materials will not crack or degrade by
1149 differential settlement, weathering, or other mechanism, over long-term intervals.

1150 ¹ In the case of thorium byproduct materials, the standard applies only to design. Monitoring for radon emissions from thorium
1151 byproduct materials after installation of an appropriately designed cover is not required.

1152 ² This average applies to the entire surface of each disposal area over a period of a least one year, but a period short compared to
1153 100 years. Radon will come from both byproduct materials and from covering materials. Radon emissions from covering materials
1154 should be estimated as part of developing a closure plan for each site. The standard, however, applies only to the emissions from
1155 byproduct materials to the atmosphere.

1156 (2) As soon as reasonably achievable after emplacement of the final cover to limit releases of radon-
1157 222 from uranium byproduct material and prior to placement of erosion protection barriers or
1158 other features necessary for long-term control of the tailings, the licensee shall verify through
1159 appropriate testing and analysis that the design and construction of the final radon barrier is
1160 effective in limiting releases of radon-222 to a level not exceeding 0.74 Bq/m² s (20 pCi/m² s)
1161 averaged over the entire pile or impoundment using the procedures described in 40 CFR Part 61,
1162 Appendix B, Method 115, or another method of verification approved by the Department as being
1163 at least as effective in demonstrating the effectiveness of the final radon barrier.

1164

1165 (3) When phased emplacement of the final radon barrier is included in the applicable reclamation
1166 plan, the verification of radon-222 release rates required in paragraph (2) of this Criterion must be
1167 conducted for each portion of the pile or impoundment as the final radon barrier for that portion is
1168 emplaced.

1169 (4) Within ninety days of the completion of all testing and analysis relevant to the required verification
1170 in paragraphs (2) and (3) of this Criterion, the uranium mill licensee shall report to the Department
1171 the results detailing the actions taken to verify that levels of release of radon-222 do not exceed

1172 0.74 Bq/m² s (20 pCi/m² s) when averaged over the entire pile or impoundment. The licensee
1173 shall maintain records until termination of the license documenting the source of input parameters
1174 including the results of all measurements on which they are based, the calculations and/or
1175 analytical methods used to derive values for input parameters, and the procedure used to
1176 determine compliance. These records shall be kept in a form suitable for transfer to the custodial
1177 agency at the time of transfer of the site to the U.S. Department of Energy or State for long-term
1178 care if requested.

1179 (5) Near surface cover materials, i.e., within the top three meters (10 feet), may not include waste or
1180 rock that contains elevated levels of radium; soils used for near surface cover must be essentially
1181 the same, as far as radioactivity is concerned, as that of surrounding surface soils. This is to
1182 ensure that surface radon exhalation is not significantly above background because of the cover
1183 material itself.

1184 (6) The design requirements in this Criterion for longevity and control of radon releases apply to any
1185 portion of a licensed and/or disposal site unless such portion contains a concentration of radium
1186 in land, averaged over areas of 100 square meters, which as a result of byproduct material, does
1187 not exceed the background level by more than: (i) 0.18 Becquerels (5 picocuries) per gram of
1188 radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15
1189 centimeters (cm) below the surface, and (ii) 0.56 Becquerels (15 pCi) of radium-226, or, in the
1190 case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15
1191 cm below the surface.

1192 Byproduct material containing concentrations of radionuclides other than radium in soil, and surface
1193 activity on remaining structures, must not result in a total effective dose equivalent (TEDE) exceeding the
1194 dose from cleanup of radium contaminated soil to the above standard (benchmark dose), and must be at
1195 levels which are as low as is reasonably achievable. If more than one residual radionuclide is present in the
1196 same 100 square-meter area, the sum of the ratios for each radionuclide of concentration present to the
1197 concentration limit will not exceed "1" (unity). A calculation of the potential peak annual TEDE within 1000
1198 years to the average member of the critical group that would result from applying the radium standard
1199 (not including radon) on the site must be submitted for approval. The use of decommissioning plans with
1200 benchmark doses which exceed 1 millisievert per year (100 mrem/year), before application of ALARA,
1201 requires the approval of the Department. This requirement for dose criteria does not apply to sites that
1202 have decommissioning plans for soil and structures approved before the effective date of this Criterion
1203 6(6).

1204 (7) The licensee shall also address the nonradiological hazards associated with the wastes in
1205 planning and implementing closure. The licensee shall ensure that disposal areas are closed in a
1206 manner that minimizes the need for further maintenance. To the extent necessary to prevent
1207 threats to human health and the environment, the licensee shall control, minimize, or eliminate
1208 post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater,
1209 or waste decomposition products to the ground or surface waters or to the atmosphere.

Comment [JJ64]:
Editorial change: comma added based on editorial
comment made by NRC in letter dated 11/10/2004.

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1213 Criterion 6A.

1214 (1) For impoundments containing uranium byproduct materials, the final radon barrier must be
1215 completed as expeditiously as practicable considering technological feasibility after the pile or
1216 impoundment ceases operation in accordance with a written, Department-approved reclamation
1217 plan. (The term as expeditiously as practicable considering technological feasibility as specifically

1218 | defined in **section** 18.2 includes factors beyond the control of the licensee). Deadlines for
1219 | completion of the final radon barrier and, if applicable, the following interim milestones must be
1220 | established as a condition of the individual license: windblown tailings retrieval and placement on
1221 | the pile and interim stabilization including dewatering or the removal of freestanding liquids and
1222 | recontouring. The placement of erosion protection barriers or other feature necessary for long-
1223 | term control of the tailings must also be completed in a timely manner in accordance with a
1224 | written, Department-approved reclamation plan.

1225 | (2) The Department may approve a licensee's request to extend the time for performance of
1226 | milestones related to emplacement of the final radon barrier if, after providing an opportunity for
1227 | public participation, the Department finds that the licensee has adequately demonstrated in the
1228 | manner required in paragraph (2) of Criterion 6 that releases of radon-222 do not exceed an
1229 | average of 0.74 Becquerel/m² s (20 pCi/m² s). If the delay is approved on the basis that the radon
1230 | releases do not exceed 0.74 Becquerel/m² s (20 pCi/m² s), a verification of radon levels, as
1231 | required by paragraph (2) of Criterion 6, must be made annually during the period of delay. In
1232 | addition, once the Department has established the date in the reclamation plan for the milestone
1233 | for completion of the final radon barrier, the Department may extend that date based on cost if
1234 | after providing an opportunity for public participation, the Department finds that the licensee is
1235 | making good faith efforts to emplace the final radon barrier, the delay is consistent with the
1236 | definition of available technology, and the radon releases caused by the delay will not result in a
1237 | significant incremental risk to the public health.

1238 | (3) The Department may authorize by license amendment, upon licensee **report request**, a portion of
1239 | the impoundment to accept uranium byproduct material or such materials that are similar in
1240 | physical, chemical, and radiological characteristics to the uranium mill tailings and associated
1241 | wastes already in the pile or impoundment from other sources, during the closure process. No
1242 | such authorization will be made if it results in a delay or impediment to emplacement of the final
1243 | radon barrier over the remainder of the impoundment in a manner that will achieve levels of
1244 | radon-222 releases not exceeding 0.74 Becquerel/m² s (20 pCi/m² s) averaged over the entire
1245 | impoundment. The verification required in paragraph (2) of Criterion 6 may be completed with a
1246 | portion of the impoundment being used for further disposal if the Department makes a final
1247 | finding that the impoundment will continue to achieve a level of radon-222 release not exceeding
1248 | 0.74 Becquerel/m² s (20 pCi/m² s) averaged over the entire impoundment. In this case, after the
1249 | final radon barrier is complete except for the continuing disposal area, (a) only byproduct material
1250 | will be authorized for disposal, (b) the disposal will be limited to the specified existing disposal
1251 | area, and (c) this authorization will only be made after providing opportunity for public
1252 | participation. Reclamation of the disposal area, as appropriate, must be completed in a timely
1253 | manner after disposal operations cease in accordance with paragraph (1) of Criterion 6; however,
1254 | these actions are not required to be complete as part of meeting the deadline for final radon
1255 | barrier construction.

Comment [JJ65]: Change in wording based on editorial comment made by NRC in letter dated 11/10/2004.

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1261 | **Criterion 7.**

1262 | The licensee shall establish a detection monitoring program needed for the Department to set the site-
1263 | specific ground water protection standards in paragraph 5B(1) of this appendix. For all monitoring under

1264 this paragraph, the licensee or applicant will propose for Department approval as license conditions which
1265 constituents are to be monitored on a site-specific basis. A detection monitoring program has two
1266 purposes. The initial purpose of the program is to detect leakage of hazardous constituents from the
1267 disposal area so that the need to set ground water protection standards is monitored. If leakage is
1268 detected, the second purpose of the program is to generate data and information needed for the
1269 Department to establish the standards under Criterion 5B. The data and information must provide a
1270 sufficient basis to identify those hazardous constituents which require concentration limit standards and to
1271 enable the Department to set the limits for those constituents and the compliance period. They may also
1272 need to provide the basis for adjustments to the point of compliance. The detection monitoring programs
1273 must be in place when specified by the Department in orders or license conditions. Once ground water
1274 protection standards have been established pursuant to paragraph 5B(1), the licensee shall establish and
1275 implement a compliance monitoring program. The purpose of the compliance monitoring program is to
1276 determine that the hazardous constituent concentrations in ground water continue to comply with the
1277 standards set by the Department. In conjunction with a corrective action program, the licensee shall
1278 establish and implement a corrective action monitoring program. The purpose of the corrective action
1279 monitoring program is to demonstrate the effectiveness of the corrective actions. Any monitoring program
1280 required by this paragraph may be based on existing monitoring programs to the extent the existing
1281 programs can meet the stated objective for the program.

1282 **Criterion 8.**

1283 Milling operations must be conducted so that all airborne effluent releases are reduced to levels as low as
1284 is reasonably achievable. The primary means of accomplishing this must be by means of emission
1285 controls. Institutional controls, such as extending the site boundary and exclusion area, may be employed
1286 to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to
1287 control emissions at the source. Notwithstanding the existence of individual dose standards, strict control
1288 of emissions is necessary to assure that population exposures are reduced to the maximum extent
1289 reasonably achievable and to avoid site contamination. The greatest potential sources of offsite radiation
1290 exposure (aside from radon exposure) are dusting from dry surfaces of the tailings disposal area not
1291 covered by tailings solution and emissions from yellowcake drying and packaging operations. During
1292 operations and prior to closure, radiation doses from radon emissions from surface impoundments of
1293 uranium or thorium byproduct materials must be kept as low as is reasonably achievable.

1294 Checks must be made and logged hourly for all parameters (e.g., differential pressures and scrubber
1295 water flow rates) that determine the efficiency of yellowcake stack emission control equipment operation.
1296 The licensee shall retain each log as a record for three years after the last entry in the log is made. It
1297 must be determined whether or not conditions are within a range prescribed to ensure that the equipment
1298 is operating consistently near peak efficiency; corrective action must be taken when performance is
1299 outside of prescribed ranges. Effluent control devices must be operative at all times during drying and
1300 packaging operations and whenever air is exhausting from the yellowcake stack. Drying and packaging
1301 operations must terminate when controls are inoperative. When checks indicate the equipment is not
1302 operating within the range prescribed for peak efficiency, actions must be taken to restore parameters to
1303 the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging
1304 operations must cease as soon as practicable. Operations may not be restarted after cessation due to off-
1305 normal performance until needed corrective actions have been identified and implemented. All these
1306 cessations, corrective actions, and restarts must be reported to the Department as indicated in Criterion
1307 8A, in writing, within ten days of the subsequent restart.

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1310 To control dusting from tailings, that portion not covered by standing liquids must be wetted or chemically
1311 stabilized to prevent or minimize blowing and dusting to the maximum extent reasonably achievable. This
1312 requirement may be relaxed if tailings are effectively sheltered from wind, such as may be the case where
1313 they are disposed of below grade and the tailings surface is not exposed to wind. Consideration must be

1314 given in planning tailings disposal programs to methods which would allow phased covering and
1315 reclamation of tailings impoundments because this will help in controlling particulate and radon emissions
1316 during operation. To control dusting from diffuse sources, such as tailings and ore pads where automatic
1317 controls do not apply, operators shall develop written operating procedures specifying the methods of
1318 control which will be utilized.

1319 Milling operations producing or involving uranium and thorium byproduct materials must be conducted in
1320 such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 0.25
1321 millisievert (25 millirem) to the whole body, 0.75 millisievert (75 millirem) to the thyroid, and 0.25
1322 millisievert (25 millirem) to any other organ of any member of the public as a result of exposures to the
1323 planned discharge of radioactive material, radon and its progeny excepted, to the general environment.

1324 Uranium and thorium byproduct materials must be managed so as to conform to the applicable provisions
1325 of Title 40 of the *Code of Federal Regulations*, Part 440, "Ore Mining and Dressing Point Source
1326 Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium,
1327 Radium, and Vanadium Ores Subcategory", as codified on January 1, 1983.

1328 Criterion 8A. Inspections of tailings or waste retention systems must be conducted daily during
1329 operations, or at an alternate frequency approved by the Department for other conditions. Such
1330 inspections shall be conducted by, or under the supervision of, a qualified engineer or scientist, and
1331 documented. The licensee shall retain the documentation for each inspection as a record for three years
1332 after the documentation is made. The Department must be immediately notified of any failure in a tailings
1333 or waste retention system that results in a release of tailings or waste into unrestricted areas, or any
1334 unusual conditions (conditions not contemplated in the design of the retention system) that if not
1335 corrected could indicate the potential or lead to failure of the system and result in a release of tailings or
1336 waste into unrestricted areas.

1337 **Criterion 9.**

1338 Criterion 9A. These criteria relating to ownership of tailings and their disposal sites became effective on
1339 November 8, 1981, and apply to all licenses terminated, issued, or renewed after that date.

1340 Criterion 9B. Any uranium or thorium milling license or tailings license must contain such terms and
1341 conditions as the NRC and Department determine necessary to assure that prior to termination of the
1342 license, the licensee will comply with ownership requirements of this criterion for sites used for tailings
1343 disposal.

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1351 Criterion 9C. Title to the byproduct material licensed under this Part 18 and land, including any interests
1352 therein (other than land owned by the United States or by the State), which is used for the disposal of any
1353 such byproduct material, or is essential to ensure the long-term stability of such disposal site, must be
1354 transferred to the United States or the State in which such land is located, at the option of such State. In

1355 view of the fact that physical isolation must be the primary means of long-term control, and Government
1356 land ownership is a desirable supplementary measure, ownership of certain severable subsurface
1357 interests (for example, mineral rights) may be determined to be unnecessary to protect the public health
1358 and safety and the environment. In any case, however, the applicant/operator must demonstrate a
1359 serious effort to obtain such subsurface rights, and must in the event that certain rights cannot be
1360 obtained, provide notification in local public land records of the fact that the land is being used for the
1361 disposal of radioactive material and is subject to either an NRC or Department general or specific license
1362 prohibiting the disruption and disturbance of the tailings. In some rare cases, such as may occur with
1363 deep burial where no ongoing site surveillance will be required, surface land ownership transfer
1364 requirements may be waived with the approval of the Department and NRC. For licenses issued before
1365 November 8, 1981, the Department and NRC may take into account the status of the ownership of such
1366 land, and interests therein, and the ability of a licensee to transfer title and custody thereof to the United
1367 States or the State.

1368 Criterion 9D. If the NRC, or the Department if title is held by the State, subsequent to title transfer
1369 determines that use of the surface or subsurface estates, or both, of the land transferred to the United
1370 States or to a State will not endanger the public health, safety, welfare, or environment, the NRC, or the
1371 Department if title is held by the State, may shall permit the use of the surface or subsurface estates, or
1372 both, of such land and in a manner consistent with the provisions provided in these criteria. If the NRC, or
1373 the Department if title is held by the state, permits such use of such land, it will provide the person who
1374 transferred such land with the right of first refusal with respect to such use of such land.

1375 Criterion 9E. Material and land transferred to the United States or the State in accordance with this
1376 Criterion 9 must be transferred to the United States or the State without cost other than administrative or
1377 legal costs incurred in carrying out such transfer.

1378 Criterion 9F. The provisions of this part respecting transfer of title and custody to land and tailings and
1379 wastes do not apply in the case of lands held in trust by the United States for any Indian tribe or lands
1380 owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the
1381 case of such lands which are used for the disposal of uranium or thorium byproduct material, as defined
1382 in this Part 4, the licensee shall enter into arrangements with the NRC as may be appropriate to assure
1383 the long-term surveillance of such lands by the United States.

1384 **Criterion 10.**

1385 Secondary ground-water protection standards required by Criterion 5 of this Appendix are concentration
1386 limits for individual hazardous constituents. The following list of constituents identifies the constituents for
1387 which standards must be set and complied with if the specific constituent is reasonably expected to be in
1388 or derived from the radioactive material and has been detected in ground water. For purposes of this
1389 Appendix, the property of gross alpha activity will be treated as if it is a hazardous constituent. Thus,
1390 when setting standards under paragraph 5B(5) of Criterion 5, the Department will also set a limit for gross
1391 alpha activity. The Department does not consider the following list imposed by 40 CFR Part 192 to be
1392 exhaustive and may determine other constituents to be hazardous on a case-by-case basis, independent
1393 of those specified by the U.S. Environmental Protection Agency in Part 192.

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Comment [JJ66]:
In order to meet the compatibility for the equivalent section in 10 CFR 40, Criterion 11, NRC requires that references to the Department (CDPHE) be deleted since NRC has regulatory jurisdiction for the matters discussed in Criterion 9C, and 9D.

NRC Ltr dated 06/28/12 (#28)

10 CFR 40.2a; 10 CFR Part 40, Appendix A.
Compatibility = NRC

Comment [JJ67]:
The changes in Criterion 9C, and 9D are a result of comments from the NRC in correspondence dated March 28, 2002.

The basis for the comment is that the NRC retains regulatory jurisdiction in the matters described in Criterion 9C and 9D.

NRC Ltr dated 03/28/02

10 CFR 40.2a; 10 CFR Part 40, Appendix A.

Comment [JJ68]: Consistent with the addition of a definition for type 2 byproduct material in 18.2, the language is modified here.

1398 **PART 18 - CRITERION 10 HAZARDOUS CONSTITUENTS**

- 1399 - Acetonitrile (Ethanenitrile)
- 1400 - Acetophenone (Ethanone, 1-phenyl)
- 1401 - 3-(alpha-Acetylbenzyl)-4-hydroxycoumarin and salts (Warfarin)
- 1402 - 2-Acetylaminofluorene (Acetamide, N-(9H- fluoren-2-yl)-)
- 1403 - Acetyl chloride (Ethanoyl chloride)
- 1404 - 1-Acetyl-2-thiourea (Acetamide, N- (aminothioxomethyl)-)
- 1405 - Acrolein (2-Propenal)
- 1406 - Acrylamide (2-Propenamide)
- 1407 - Acrylonitrile (2-Propenenitrile)
- 1408 - Aflatoxins
- 1409 - Aldrin (1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a,8b-hexahydro-endo,exo-1,4:5,8-
1410 Dimethanonaphthalene)
- 1411 - Allyl alcohol (2-Propen-1-ol)
- 1412 - Aluminum phosphide
- 1413 - 4-Aminobiphenyl ([1,1-Biphenyl])-4-amine)
- 1414 - 6-Amino-1,1a,2,8,8a,8b-hexahydro-8-(hydroxymethyl)-8a-methoxy-5-methyl-carbamate
1415 azirino(2,3:3,4)pyrrolo(1,2-a]indole-4,7-dione,(ester) (Mitomycin C) (Azirino[2,3:3,4]pyrrolo(1,2-
1416 a]indole-4,7-dione,6-amino-8-[(amino-cabonyl)oxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a
1417 methoxy-5-methyl-)
- 1418 - 5-(Aminomethyl)-3-isoxazolol (3(2H)-Isoxazolone, 5-(aminomethyl)-4-Aminopyridine (4-
1419 Pyridinamine)
- 1420 - Amitrole (1H-1,2,4-Triazol-3-amine)
- 1421 - Aniline (Benzenamine)
- 1422 - Antimony and compounds, N.O.S.³
- 1423 - Aramite (Sulfurous acid,2-chloroethyl-,2-(4-(1,1-dimethylethyl)phenoxy)-1-methylethyl ester)
- 1424 - Arsenic and compounds, N.O.S.³
- 1425 - Arsenic acid (Orthoarsenic acid)
- 1426 - Arsenic pentoxide (Arsenic (V) oxide)
- 1427 - Arsenic trioxide (Arsenic (III) oxide)

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- 1428 - Auramine (Benzenamine,4,4-carbonimidoylbis (N,N-Dimethyl-,monohydrochloride)
 - 1429 - Azaserine (L-Serine, diazoacetate (ester))
 - 1430 - Barium and compounds, N.O.S.³
 - 1431 - Barium cyanide
 - 1432 - Benz(c)acridine (3,4-Benzacridine)
 - 1433 - Benz(a)anthracene (1,2-Benzanthracene)
 - 1434 - Benzene (Cyclohexatriene)
 - 1435 - Benzenearsonic acid (Arsonic acid, phenyl-)
 - 1436 - Benzene, dichloromethyl-(Benzal chloride)
 - 1437 - Benzenethiol (Thiophenol)
 - 1438 - Benzidine ([1,1-Biphenyl]-4,4 diamine)
 - 1439 - Benzo(b)fluoranthene (2,3-Benzofluoranthene)
 - 1440 - Benzo(j)fluoranthene (7,8-Benzofluoranthene)
 - 1441 - Benzo(a)pyrene (3,4-Benzopyrene)
 - 1442 - p-Benzoquinone (1,4-Cyclohexadienedione)
 - 1443 - Benzotrichloride (Benzene, Trichloromethyl)
 - 1444 - Benzyl chloride (Benzene, (chloromethyl)-)
 - 1445 - Beryllium and compounds, N.O.S.³
 - 1446 - Bis(2-chloroethoxy)methane (Ethane,1,1-(methylenebis(oxy))bis[2-chloro-])
 - 1447 - Bis(2-chloroethyl) ether (Ethane, 1,1-oxybis (2-chloro-))
 - 1448 - N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)
 - 1449 - Bis(2-Chloroisopropyl) ether (Propane, 2,2-oxybis[2-chloro-])
 - 1450 - Bis(chloromethyl) ether (methane,oxybis[chloro-])
 - 1451 - Bis(2-ethylhexyl) phthalate (1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester)
 - 1452 - Bromoacetone (2-Propanone, 1-bromo-)
 - 1453 - Bromomethane (Methyl bromide)
 - 1454 - 4-Bromophenyl phenyl ether (Benzene, 1-bromo-4-phenoxy-)
 - 1455 - Brucine (Strychnidin-10-one, 2,3-dimethoxy-)

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- 1456 - 2-Butanone peroxide (Methyl ethyl ketone,peroxide)
 - 1457 - Butyl benzyl phthalate (1,2-Benzenedicarboxylic acid, butylphenylmethyl ester)
 - 1458 - 2-sec-Butyl-4,6-dinitrophenol (DNBP) (Phenol,2,4-dinitro-6-(1-methylpropyl)-)
 - 1459 - Cadmium and compounds, N.O.S.³
 - 1460 - Calcium chromate (Chromic acid, calcium salt)
 - 1461 - Calcium cyanide
 - 1462 - Carbon disulfide (Carbon bisulfide)
 - 1463 - Carbon oxyfluoride (Carbonyl fluoride)
 - 1464 - Chloral (Acetaldehyde, trichloro-)
 - 1465 - Chlorambucil (Butanoic acid, 4-(bis(2-chloroethyl)amino)benzene-)
 - 1466 - Chlordane (alpha and gamma isomers)4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3,4,7,7a-
1467 tetrahydro-) (alpha and gamma isomers)
 - 1468 - Chlorinated benzenes, N.O.S.³
 - 1469 - Chlorinated ethane, N.O.S.³
 - 1470 - Chlorinated fluorocarbons, N.O.S.³
 - 1471 - Chlorinated naphthalene, N.O.S.³
 - 1472 - Chlorinated phenol, N.O.S.³
 - 1473 - Chloroacetaldehyde (Acetaldehyde, chloro-)
 - 1474 - Chloroalkyl ethers N.O.S.³
 - 1475 - p-Chloroaniline (Benzenamine, 4-chloro-)
 - 1476 - Chlorobenzene (Benzene, chloro-)
 - 1477 - Chlorobenzilate (Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-,ethyl ester)
 - 1478 - p-Chloro-m-cresol (Phenol, 4-chloro-3-methyl)
 - 1479 - 1-Chloro-2,3-epoxypropane (Oxirane, 2-(chloromethyl)-)
 - 1480 - 2-Chloroethyl vinyl ether (Ethene, (2-chloroethoxy)-)
 - 1481 - Chloroform (Methane, trichloro-)
 - 1482 - Chloromethane (Methyl chloride)
 - 1483 - Chloromethyl methyl ether (Methane,chloromethoxy-)

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- 1484 - 2-Chloronaphthalene (Naphthalene,betachloro-)
 - 1485 - 2-Chlorophenol (Phenol, o-chloro-)
 - 1486 - 1-(o-Chlorophenyl) thiourea (Thiourea, (2-chlorophenyl)-)
 - 1487 - 3-Chloropropionitrile (Propanenitrile, 3-chloro-)
 - 1488 - Chromium and compounds, N.O.S.³
 - 1489 - Chrysene (1,2-Benzphenanthrene)
 - 1490 - Citrus red No. 2 (2-Naphthol, 1-((2,5-dimethoxyphenyl)azo)-)
 - 1491 - Coal tars
 - 1492 - Copper cyanide
 - 1493 - Creosote (Creosote, wood)
 - 1494 - Cresols (Cresylic acid) (Phenol, methyl-)
 - 1495 - Crotonaldehyde (2-Butenal)
 - 1496 - Cyanides (soluble salts and complexes),N.O.S.³
 - 1497 - Cyanogen (Ethanedinitrile)
 - 1498 - Cyanogen bromide (Bromine cyanide)
 - 1499 - Cyanogen chloride (Chlorine cyanide)
 - 1500 - Cycasin (beta-D-Glucopyranoside, (methyl-ONN-azoxy)methyl-)
 - 1501 - 2-Cyclohexyl-4,6-dinitrophenol (phenol, 2-cyclohexyl-4,6-dinitro-)
 - 1502 - Cyclophosphamide (2H-1,3,2-Oxazaphosphorine (bis(2-chloroethyl)amino)-tetrahydro-,2-oxide)
 - 1503 - Daunomycin (5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-((3-amino-2,3,6-trideoxy)-alpha-L-
1504 lyxo-hexopyranosyl)oxy)7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-)
 - 1505 - DDD (Dichlorodiphenyldichloroethane)(Ethane, 1,1-dichloro-2,2-bis(p-chlorophenyl)-)
 - 1506 - DDE (Ethylene, 1,1-dichloro-2,2-bis(4-chlorophenyl)-)
 - 1507 - DDT (Dichlorodiphenyltrichloroethane) (Ethane, 1,1,1-trichloro-2,2-bis (p-chlorophenyl)-)
 - 1508 - Diallate (S-(2,3-dichloroallyl)diisopropylthiocarbamate)
 - 1509 - Dibenz(a,h)acridine(1,2,5,6-Dibenzacridine)
 - 1510 - Dibenz(a,j)acridine(1,2,7,8-Dibenzacridine)
 - 1511 - Dibenz(a,h)anthracene (1,2,5,6-Dibenzanthracene)

- 1512 - 7H-Dibenzo(c,g)carbazole (3,4,5,6-Dibenzcarbazole)
- 1513 - Dibenzo(a,e)pyrene(1,2,4,5-Dibenzpyrene)
- 1514 - Dibenzo(a,h)pyrene(1,2,5,6-Dibenzpyrene)
- 1515 - Dibenzo(a,i)pyrene(1,2,7,8-Dibenzpyrene)
- 1516 - 1,2-Dibromo-3-chloropropane (Propane, 1,2-dibromo-3-chloro-)
- 1517 - 1,2 Dibromoethane (Ethylene dibromide)
- 1518 - Dibromomethane (Methylene bromide)
- 1519 - Di-n-butyl phthalate (1,2-Benzenedicarboxylic acid, dibutyl ester)
- 1520 - o-Dichlorobenzene (Benzene, 1,2-dichloro-)
- 1521 - m-Dichlorobenzene (Benzene, 1,3-dichloro-)
- 1522 - p-Dichlorobenzene (Benzene, 1,4-dichloro-)
- 1523 - Dichlorobenzene, N.O.S.³ (Benzene, dichloro-N.O.S.³)
- 1524 - 3,3-Dichlorobenzidine ([1,1, Biphenyl]-4,4-diamine, 3,3-dichloro-)
- 1525 - 1,4-Dichloro-2-butene (2-Butene, 1,4-dichloro-)
- 1526 - Dichlorodifluoromethane (Methane, dichlorodifluoro-)
- 1527 - 1,1 Dichloroethane (Ethylidene dichloride)
- 1528 - 1,2 Dichloroethane (Ethylene dichloride)
- 1529 - trans-1,2-Dichloroethene (1,2-Dichloroethylene)
- 1530 - Dichloroethylene, N.O.S.³ (Ethene, dichloro-N.O.S.³)
- 1531 - 1,1-Dichloroethylene (Ethene, 1,1-dichloro-)
- 1532 - Dichloromethane (Methylene chloride)
- 1533 - 2,4-Dichlorophenol (Phenol, 2,4-dichloro-)
- 1534 - 2,6-Dichlorophenol (Phenol, 2,6-dichloro-)
- 1535 - 2,4-Dichlorophenoxyacetic acid (2,4-D), salts and esters (Acetic acid, 2,4-dichlorophenoxy-, salts
1536 and esters)
- 1537 - Dichlorophenylarsine (Phenyl dichloroarsine)
- 1538 - Dichloropropane, N.O.S.³ (Propane, dichloro-N.O.S.³)
- 1539 - 1,2-Dichloropropane (Propylene dichloride)

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- 1540 - Dichloropropanol, N.O.S.³ (Propanol, dichloro-N.O.S.³)
- 1541 - Dichloropropene, N.O.S.³ (Propene, dichloro-N.O.S.³)
- 1542 - 1,3-Dichloropropene (1-Propene, 1,3-dichloro-)
- 1543 - Dieldin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octa-hydro-endo,exo-1,4:5,8-
- 1544 - Dimethanonaphthalene)
- 1545 - 1,2:3,4-Diepoxybutane (2,2,-Bioxirane)
- 1546 - Diethylarsine (Arsine, diethyl-)
- 1547 - N,N-Diethylhydrazine (Hydrazine, 1,2-diethyl)
- 1548 - O,O-Diethyl S-methyl ester of phosphorodithioic acid (Phosphorodithioic acid, O,O-diethyl S-
- 1549 - methyl ester)
- 1550 - O,O-Diethylphosphoric acid, O-p-nitrophenyl ester (Phosphoric acid, diethyl p-nitrophenyl ester)
- 1551 - Diethyl phthalate (1,2-Benzenedicarboxylic acid, diethyl ester)
- 1552 - O,O-Diethyl O-2-pyrazinyl phosphorothioate (Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester)
- 1553 - Diethylstilbesterol (4,4-Stilbenediol, alpha, alpha-diethyl, bis(dihydrogen phosphate, (E)-)
- 1554 - Dihydrosafrole (Benzene, 1,2-methylenedioxy-4-propyl-)
- 1555 - 3,4-Dihydroxy-alpha-(methylamino)methylbenzyl alcohol (1,2-Benzenediol, 4-(1-hydroxy-2-
- 1556 - (methylamino)ethyl))
- 1557 - Dilsopropylfluorophosphate (DFP) (Phosphorofluoridic acid, bis(1-methylethyl) ester)
- 1558 - Dimethoate (Phosphorodithioic acid, O,O-dimethyl S-(2-(methylamino)-2-oxoethyl) ester)
- 1559 - 3,3,-Dimethoxybenzidine ((1,1,-Biphenyl)-4,4,-diamine, 3-3,-dimethoxy-)
- 1560 - p-Dimethylaminoazobenzene (Benzenamine, N,N-dimethyl-4-(phenylazo)-)
- 1561 - 7,12-Dimethylbenz(a)anthracene(1,2-Benzathracene, 7,12-dimethyl-)
- 1562 - 3,3-Dimethylbenzidine (1,1-Biphenyl)-4,4,diamine, 3,3-dimethyl-)
- 1563 - Dimethylcarbamoyl chloride (Carbamoyl chloride, dimethyl)
- 1564 - 1,1 Dimethylhydrazine (Hydrazine, 1,1-dimethyl-)
- 1565 - 1,2-Dimethylhydrazine (Hydrazine, 1,2-dimethyl-)
- 1566 - 3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino) carbonyl] oxime (Thiofanox)
- 1567 - alpha,alpha-Dimethylphenethylamine (Ethanamine, 1,1-dimethyl-2-phenyl-)
- 1568 - 2,4-Dimethylphenol (Phenol, 2,4-dimethyl-)

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- 1569 - Dimethyl phthalate (1,2-Benzenedicarboxylic acid, dimethyl ester)
 - 1570 - Dimethyl sulfate (Sulfuric acid, dimethyl ester)
 - 1571 - Dinitrobenzene, N.O.S.³ (Benzene, dinitro-N.O.S.³)
 - 1572 - 4,6-Dinitro-o-cresol and salts (Phenol, 2,4-dinitro-6-methyl-, and salts)
 - 1573 - 2,4-Dinitrophenol (Phenol, 2,4-dinitro-)
 - 1574 - 2,4-Dinitrotoluene (Benzene, 1-methyl-2,4-dinitro-)
 - 1575 - 2,6-Dinitrotoluene (Benzene, 1-methyl 2,6-dinitro-)
 - 1576 - Di-n-octyl phthalate (1,2-Benzenedicarboxylic acid, dioctyl ester)
 - 1577 - 1,4-Dioxane (1,4-Diethylene oxide)
 - 1578 - Diphenylamine (Benzenamine, N-phenyl-)
 - 1579 - 1,2-Diphenylhydrazine (Hydrazine, 1,2-diphenyl-)
 - 1580 - Di-n-propylnitrosamine (N-Nitroso-di-n-propylamine)
 - 1581 - Disulfoton (O,O-diethyl S-(2-(ethylthio)ethyl) phosphorodithioate)
 - 1582 - 2,4-Dithiobiuret (Thiomidodicarbonic diamide)
 - 1583 - Endosulfan (5-Norbomene, 2,3-dimethanol,1,4,5,6,7,7-hexachloro-cyclic sulfite)
 - 1584 - Endrin and metabolites (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,
1585 endo-1,4,5,8-dimethanonaphthalene, and metabolites)
 - 1586 - Ethyl carbamate (Urethan) (Carbamic acid, ethyl ester)
 - 1587 - Ethyl cyanide (Propanenitrile)
 - 1588 - Ethylenebisdithiocarbamic acid, salts, and esters (1,2-Ethanediy-biscarbamodithioic acid, salts
1589 and esters)
 - 1590 - Ethyleneimine (Aziridine)
 - 1591 - Ethylene oxide (Oxirane)
 - 1592 - Ethylenethiourea (2-Imidazolidinethione)
 - 1593 - Ethyl methacrylate (2-Propenoic acid, 2-methyl-, ethyl ester)
 - 1594 - Ethyl methanesulfonate (Methanesulfonic acid, ethyl ester)
 - 1595 - Fluoranthene (Benzo[j,k]fluorene)
 - 1596 - Fluorine
 - 1597 - 2-Fluoroacetamide (Acetamide, 2-fluoro-)

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- 1598 - Fluoroacetic acid, sodium salt (Acetic acid, fluoro-sodium salt)
 - 1599 - Formaldehyde (Methylene oxide)
 - 1600 - Formic acid (Methanoic acid)
 - 1601 - Glycidylaldehyde (1-Propanol-2,3 epoxy)
 - 1602 - Halomethane, N.O.S. ³
 - 1603 - Heptachlor (4,7-Methano-1H-indene.1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-)
 - 1604 - Heptachlor epoxide (alpha, beta, and gamma isomers) (4,7-Methano-1H-indene, 1,4,5,6,7,8,8-
1605 heptachloro-2,3-epoxy-3a,4,7,7-tetrahydro-,alpha, beta, and gamma isomers)
 - 1606 - Hexachlorobenzene (Benzene, hexachloro-)
 - 1607 - Hexachlorobutadiene (1,3-Butadiene, 1,1,2,3,4,4-hexachloro-)
 - 1608 - Hexachlorocyclohexane (all isomers) (Lindane and isomers)
 - 1609 - Hexachlorocyclopentadiene (1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-)
 - 1610 - Hexachloroethane (Ethane, 1,1,1,2,2,2-hexachloro-)
 - 1611 - 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,endo-dimethanonaphthalene
1612 (Hexachlorohexa-hydro-endo,endo-dimethanonaphthalene)
 - 1613 - Hexachlorophene (2,2,-Methylenebis(3,4,6-trichlorophenol)
 - 1614 - Hexachloropropene (1-Propene, 1,1,2,3,3,3-hexachloro-)
 - 1615 - Hexaethyl tetraphosphate (Tetraphosphoric acid, hexaethyl ester)
 - 1616 - Hydrazine (Diamine)
 - 1617 - Hydrocyanic acid (Hydrogen cyanide)
 - 1618 - Hydrofluoric acid (Hydrogen fluoride)
 - 1619 - Hydrogen sulfide (Sulfur hydride)
 - 1620 - Hydroxydimethylarsine oxide (Cacodylic acid)
 - 1621 - Indeno (1,2,3-cd)pyrene(1,10-(1,2-phenylene)pyrene)
 - 1622 - Iodomethane (Methyl iodide)
 - 1623 - Iron dextran (Ferric dextran)
 - 1624 - Isocyanic acid, methyl ester (Methyl isocyanate)
 - 1625 - Isobutyl alcohol (1-Propanol, 2-methyl-)
 - 1626 - Isosafrole (Benzene, 1,2-methylenedioxy-4-allyl-)

- 1627 - Kepone (decachlorooctahydro-1,3,4-Methano-2H-cyclobuta[cd]pentalen-2-one)
- 1628 - Lasiocarpine (2-Butenoic acid, 2-methyl-,7-[(2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy) methyl]2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl-ester)
- 1629
- 1630 - Lead and compounds, N.O.S.³
- 1631 - Lead acetate (Acetic acid, lead salt)
- 1632 - Lead phosphate (Phosphoric acid, lead salt)
- 1633 - Lead subacetate (Lead, bis(acetato-O)tetrahydroxytri-)
- 1634 - Maleic anhydride (2,5-Furandione)
- 1635 - Maleic hydrazide (1,2-Dihydro-3,6-pyridazinedione)
- 1636 - Malononitrile (Propanedinitrile)
- 1637 - Melphalan (Alanine, 3-(p-bis(2-chloroethyl)amino)phenyl-L)- Mercury fulminate (Fulminic acid, mercury salt)
- 1638
- 1639 - Mercury and compounds, N.O.S.³
- 1640 - Methacrylonitrile (2-Propenenitrile,2-methyl-)
- 1641 - Methanethiol (Thiomethanol)
- 1642 - Methapyrilene (Pyridine, 2-[(2-dimethylamino)ethyl]-2-thenylamino-)
- 1643 - Metholmyl (Acetimidic acid, N-[(methylcarbamoyl)oxy] thio-,methyl ester)
- 1644 - Methoxychlor (Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)-)
- 1645 - 2-Methylaziridine (1,2-Propylenimine)
- 1646 - 3-Methylcholanthrene (Benz[*a*]aceanthrylene,1,2-dihydro-3-methyl-)
- 1647 - Methyl chlorcarbonate (Carbonochloridicacid, methyl ester)
- 1648 - 4,4'-Methylenebis (2-chloroaniline) Benzenamine, 4,4'-methylenebis-(2-chloro-)
- 1649 - Methyl ethyl ketone (MEK) (2-Butanone)
- 1650 - Methyl hydrazine (Hydrazine methyl-)
- 1651 - 2-Methylactonitrile (Propanenitrile 2-hydroxy-2-methyl-)
- 1652 - Methyl methacrylate (2-Propenoic acid, 2-methyl-, methyl ester)
- 1653 - Methyl methanesulfonate Methanesulfonicacid, methyl ester)
- 1654 - 2-Methyl-2-(methylthio)propionaldehyde-o-(methylcarbonyl) oxime (Propanal,2-methyl-
- 1655 2(methylthio-0-[(methylamino)carbonyl]oxime)

Comment [JJ69]: Technical formula correction are made in this list, consistent with comments made by NRC to the Conference of Radiation Control Program Directors, Inc. (CRCPD) regarding the Part U regulation.

The correction adds a "prime" (') symbol to the formula.

NRC Letter to CRCPD dated 12/23/13.
http://www.crcpd.org/SSRCRs/nrc_Part-U_letter_12-23-2013.pdf

Comment [JJ70]: Technical formula correction similar to that above.

- 1656 - ~~N~~-Methyl-N',-nitro-N-nitrosoguanidine (Guanidine, N-nitroso-N-methyl-N',-nitro-)
- 1657 - Methyl parathion (0,0-dimethyl 0-(40 nitrophenyl) phosphorothioate)
- 1658 - Methylthiouracil (4-IH-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-)
- 1659 - Molybdenum and compounds, N.O.S.³
- 1660 - Mustard gas (Sulfide, bis(2-chloroethyl)-)
- 1661 - Naphthalene
- 1662 - 1,4-Naphthoquinone (1,4-Naphthalenedione)
- 1663 - 1-Naphthylamine (alpha-Naphthylamine)
- 1664 - 2-Naphthylamine (beta-Naphthylamine)
- 1665 - 1-Naphthyl-2-thiourea (Thiourea, 1-naphthalenyl-)
- 1666 - Nickel and compounds, N.O.S.³
- 1667 - Nickel carbonyl (Nickel tetracarbonyl)
- 1668 - Nickel cyanide (Nickel (II) cyanide)
- 1669 - Nicotine and salts (Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts)
- 1670 - Nitric oxide (Nitrogen (II) oxide)
- 1671 - p-Nitroaniline (Benzenamine, 4-nitro-)
- 1672 - Nitrobenzene (Benzene, nitro-)
- 1673 - Nitrogen dioxide (Nitrogen (IV) oxide)
- 1674 - Nitrogen mustard and hydrochloride salt (Ethanamine, 2-chloro-,N-(2-chloroethyl)-N-methyl-, and hydrochloride salt)
- 1675
- 1676 - Nitrogen mustard N-Oxide and hydrochloride salt (Ethanamine, 2-chloro,N-(2-chloroethyl)-N-methyl-and hydrochloride salt)
- 1677
- 1678 - Nitroglycerine (1,2,3-Propanetriol, trinitrate)
- 1679 - 4-Nitrophenol (Phenol, 4-nitro)
- 1680 - 4-Nitroquinoline-1-oxide (Quinoline,4-nitro-1-oxide-)
- 1681 - Nitrosamine, N.O.S.³
- 1682 - N-Nitrosodi-n-butylamine (1-Butanamine,N-butyl-N-nitroso-)
- 1683 - ~~N~~-Nitrosodiethanolamine (Ethanol, 2,2'-(nitrosoimino)bis-)
- 1684 - N-Nitrosodiethylamine (Ethanamine, N-ethyl-N-nitroso-)

Comment [JJ71]: Technical formula correction similar to that above.

Comment [JJ72]: Technical formula correction similar to that above.

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- 1685 - N-Nitrosodimethylamine (Dimethylnitrosamine)
 - 1686 - N-Nitroso-N-ethylurea (Carbamide, N-ethyl-N-nitroso-)
 - 1687 - N-Nitrosomethylethylamine (Ethanamine, N-methyl-N-nitroso-)
 - 1688 - N-Nitroso-N-methylurea (Carbamide, N-methyl-N-nitroso-)
 - 1689 - N-Nitroso-N-methylurethane (Carbamic acid, methylnitroso-, ethyl ester)
 - 1690 - N-Nitrosomethylvinylamine (Ethenamine, N-methyl-N-nitroso-)
 - 1691 - N-Nitrosomorpholine (Morpholine, -N-nitroso-)
 - 1692 - N-Nitrosomicotine (Nornicotine, -N-nitroso-)
 - 1693 - N-Nitrosopiperidine (Pyridine, hexahydro-, -N-nitroso-)
 - 1694 - Nitrosopyrrolidine (Pyrrole, tetrahydro-N-nitroso-)
 - 1695 - N-Nitrososarcosine (Sarcosine, -N-nitroso-)
 - 1696 - 5-Nitro-o-toluidine (Benzenamine, 2-methyl-5-nitro-)
 - 1697 - Octamethylpyrophosphoramidate (Diphosphoramidate, octamethyl-)
 - 1698 - Osmium tetroxide (Osmium(VIII)oxide)
 - 1699 - 7-Oxabicyclo(2,2,1)heptane-2,3-dicarboxylic acid (Endothal)
 - 1700 - Paraldehyde (1,3,5-Trioxane, 2,4,6-trimethyl-)
 - 1701 - Parathion (Phosphorothioic acid O,O-diethylO-(p-nitrophenyl) ester)
 - 1702 - Pentachlorobenzene (Benzene, pentachloro-)
 - 1703 - Pentachloroethane (Ethane, pentachloro-)
 - 1704 - Pentachloronitrobenzene (PCNB) (Benzene, Pentachloronitro-)
 - 1705 - Pentachlorophenol (Phenol, pentachloro-)
 - 1706 - Phenacetin (Acetamide, N-(4-ethoxyphenyl)-)
 - 1707 - Phenol (Benzene, hydroxy-)
 - 1708 - Phenylenediamine (Benzenediamine)
 - 1709 - Phenylmercury acetate (Mercury acetatophenyl-)
 - 1710 - N-Phenylthiourea (Thiourea, phenyl-)
 - 1711 - Phosgene (Carbonyl chloride)
 - 1712 - Phosphine (Hydrogen phosphide)

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- 1713 - Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl]ester (Phorate)
 - 1714 - Phosphorothioic acid, O,O-dimethyl O-(p-[(dimethylamino)sulfonyl]phenyl)ester (Famphur)
 - 1715 - Phthalic acid esters, N.O.S.³ (Benzene, 1,2-dicarboxylic acid, esters, N.O.S.³)
 - 1716 - Phthalic anhydride (1,2-Benzenedicarboxylic acid anhydride)
 - 1717 - 2-Picoline (Pyridine, 2-methyl-)
 - 1718 - Polychlorinated biphenyl, N.O.S.³
 - 1719 - Potassium cyanide
 - 1720 - Potassium silver cyanide (Argentate(1-),dicyano-,potassium)
 - 1721 - Pronamide (3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide)
 - 1722 - 1,3 Propane sultone (1,2-Oxathiolane, 2,2-dioxide)
 - 1723 - n-Propylamine (1-Propanamine)
 - 1724 - Propylthiouracil (Undecamethylenediamine,N,N-bis(2-chlorobenzyl-),dihydrochloride)
 - 1725 - 2-Propyn-1-ol (Propargyl alcohol)
 - 1726 - Pyridine
 - 1727 - Radium-226 and -228
 - 1728 - Reserpine (Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[3,4,5-trimethoxybenzoyl]oxy)-,
1729 methyl ester)
 - 1730 - Resorcinol (1,3-Benzenediol)
 - 1731 - Saccharin and salts (1,2-Benzoisothiazolin-3-one, 1,1-dioxide, and salts)
 - 1732 - Safrole (Benzene, 1,2-methylenedioxy-4-allyl-)
 - 1733 - Selenious acid (Selenium dioxide)
 - 1734 - Selenium and compounds, N.O.S.³
 - 1735 - Selenium sulfide (Sulfur selenide)
 - 1736 - Selenourea (Carbamimidoseleonic acid)
 - 1737 - Silver and compounds, N.O.S.³
 - 1738 - Silver cyanide
 - 1739 - Sodium cyanide
 - 1740 - Streptozotocin (D-Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-)

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- 1741 - Strontium sulfide
 - 1742 - Strychnine and salts (Strychnidin-10-one, and salts)
 - 1743 - 1,2,4,5-Tetrachlorobenzene (Benzene,1,2,4,5-tetrachloro-)
 - 1744 - 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (Dibenzo-p-dioxin, 2,3,7,8-tetrachloro-)
 - 1745 - Tetrachloroethane, N.O.S.³ (Ethane, tetrachloro-N.O.S.³)
 - 1746 - 1,1,1,2-Tetrachlorethane (Ethane, 1,1,1,2-tetrachloro-)
 - 1747 - 1,1,2,2-Tetrachlorethane (Ethane 1,1,2,2-tetrachloro-)
 - 1748 - Tetrachlorethane (Ethene, 1,1,2,2-tetrachloro-)
 - 1749 - Tetrachloromethane (Carbon tetrachloride)
 - 1750 - 2,3,4,6-Tetrachlorophenol (Phenol 2,3,4,6-tetrachloro-)
 - 1751 - Tetraethyldithiopyrophosphate (Dithiopyrophosphoric acid, tetraethyl-ester)
 - 1752 - Tetraethyl lead (Plumbane, tetraethyl-)
 - 1753 - Tetraethylpyrophosphate (Pyrophosphoricacide, tetraethyl ester)
 - 1754 - Tetranitromethane (Methane, tetranitro-)
 - 1755 - Thallium and compounds, N.O.S.³
 - 1756 - Thallic oxide (Thallium (III) oxide)
 - 1757 - Thallium (I) acetate (Acetic acid, thallium (I) salt)
 - 1758 - Thallium (I) carbonate (Carbonic acid dithallium (I) salt)
 - 1759 - Thallium (I) chloride
 - 1760 - Thallium (I) nitrate (Nitric acid, thallium (I) salt)
 - 1761 - Thallium selenite
 - 1762 - Thallium (I) sulfate (Sulfuric acid, thallium (I) salt)
 - 1763 - Thioacetamide (Ethanethioamide)
 - 1764 - Thiosemicarbazide (Hydrazinecarbothioamide)
 - 1765 - Thiourea (Carbamide thio-)
 - 1766 - Thiuram (Bis(dimethylthiocarbamoyl) disulfide)
 - 1767 - Thorium and compounds, N.O.S.³ when producing thorium byproduct material
 - 1768 - Toluene (Benzene, methyl-)

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- 1769 - Toluenediamine (Diaminotoluene)
 - 1770 - o-Toluidine hydrochloride (Benzenamine, 2-methyl-,hydrochloride)
 - 1771 - Tolylene diisocyanate (Benzene, 1,3-diiisocyanatomethyl-)
 - 1772 - Toxaphene (Camphene, octachloro-)
 - 1773 - Tribromomethane (Bromoform)
 - 1774 - 1,2,4-Trichlorobenzene (Benzene, 1,2,4-trichloro-)
 - 1775 - 1,1,1-Trichloroethane (Methyl chloroform)
 - 1776 - 1,1,2-Trichloroethane (Ethane, 1,1,2-trichloro-)
 - 1777 - Trichloroethene (Trichloroethylene)
 - 1778 - Trichloromethanethiol (Methanethiol, trichloro-)
 - 1779 - Trichloromonofluoromethane (Methane, trichlorofluoro-)
 - 1780 - 2,4,5-Trichlorophenol (Phenol, 2,4,5-trichloro-)
 - 1781 - 2,4,6-Trichlorophenol (Phenol, 2,4,6-trichloro-)
 - 1782 - 2,4,5-Trichlorophenoxyacetic acid (2,4,5-T) (Acetic acid, 2,4,5-trichlorophenoxy-)
 - 1783 - 2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP) (Silvex) (Propionic acid, 2-(2,4,5-
1784 trichlorophenoxy)-)
 - 1785 - Trichloropropane, N.O.S.³ (Propane, trichloro-, N.O.S.³)
 - 1786 - 1,2,3-Trichloropropane (Propane, 1,2,3-trichloro-)
 - 1787 - O,O,O-Triethyl phosphorothioate (Phosphorothioic acid, O,O,O-triethyl ester)
 - 1788 - sym-Trinitrobenzene (Benzene, 1,3,5-trinitro-)
 - 1789 - Tris(1-aziridinyl) phosphine sulfide (Phosphine sulfide, tris(1-aziridinyl-)
 - 1790 - Tris(2,3-dibromopropyl) phosphate (1-Propanol, 2,3-dibromo-, phosphate)
 - 1791 - Trypan blue (2,7-Naphthalenedisulfonic acid, 3,3,-((3,3,-dimethyl (1,1,-biphenyl)-
1792 4,4,diyl)bis(azo))bis(5-amino-4-hydroxy-tetrasodium salt)
 - 1793 - Uracil mustard (Uracil-5-[bis(2-chloroethyl)amino]-)
 - 1794 - Uranium and compounds, N.O.S.³
 - 1795 - Vanadic acid, ammonium salt (ammonium vanadate)
 - 1796 - Vanadium pentoxide (Vanadium (V) oxide)
 - 1797 - Vinyl chloride (Ethene, chloro-)

1798 - Zinc cyanide

1799 - Zinc phosphide

1800 3 The abbreviation N.O.S. (not otherwise specified) signifies those members of the general class not specifically listed by name in
1801 this list.

1802 _____

1803 **EDITOR'S NOTES**

1804 6 CCR 1007-1 has been divided into separate parts for ease of use. Versions prior to 04/01/2007 are
1805 located in the first section, 6 CCR 1007-1. Prior versions can be accessed from the All Versions list on the
1806 rule's current version page. To view versions effective on or after 04/01/2007, select the desired part of
1807 the rule, for example 6 CCR 1007-1 Part 01 or 6 CCR 1007-1 Part 10.

1808 **History**

1809 Part 18, Rules 8.1 – Appendix A, Criterion 9 eff. 04/30/2011.