

STATE OF COLORADO

John W. Hickenlooper, Governor
Larry Wolk, MD, MSPH
Executive Director and Chief Medical Officer

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

4300 Cherry Creek Dr. S. Laboratory Services Division
Denver, Colorado 80246-1530 8100 Lowry Blvd.
Phone (303) 692-2000 Denver, Colorado 80230-6928
Located in Glendale, Colorado (303) 692-3090
www.colorado.gov/cdphe



Colorado Department
of Public Health
and Environment

November 6, 2013

Pamela J. Henderson, Deputy Director
Division of Materials Safety and State Agreements
Office of Federal and State Materials and
Environmental Management Programs
U.S. Nuclear Regulatory Commission
T8-E24
Washington, D.C. 20555-0001

Dear Ms. Henderson:

Enclosed is a copy of draft proposed revisions to the Colorado *Rules and Regulations Pertaining to Radiation Control*, 6 CCR 1007-1, Part 18, *Licensing Requirements for Uranium and Thorium Processing*. The proposed revisions were made available to the public on October 24, 2013 with a request for comments by January 7, 2014. In addition to the public comment period, the Radiation Program is holding a series of public meetings in November and December to discuss the proposed changes with the public. We request that NRC review Part 18 and provide comments by January 7, 2014.

The proposed regulations are identified by line-out text for deletions, and bold text for added, revised, new or relocated text. In part, the proposed changes address comments made by NRC in its letters to the Colorado Radiation Program dated October 13, 2011 and June 28, 2012 and are identified in Table 1 of Attachment 1. Table 2 of Attachment 1 identifies Regulatory Action Tracking System (RATS) items that we believe are already addressed in Part 18. Other changes are being proposed to add clarity and improve the understanding related to the public involvement process.

We believe that final adoption of these revisions satisfies the compatibility and health and safety categories established in the Office of Federal and State Materials and Environmental Management Programs (FSME) Procedure SA-200.

Pamela J. Henderson, Deputy Director
U.S. Nuclear Regulatory Commission
November 6, 2013
Page 2 of 2

The NRC Regulatory Action Tracking System (RATS) items 2011-1, 2011-2, and 2013-2 identifies several changes that are tied to NRC's 10 CFR Part 40 and which are not due for adoption at this time. As required by the Colorado Radiation Control Act, Colorado's regulatory structure is modeled after that of the Suggested State Regulations for Radiation Control (SSRCR), promulgated by the Conference of Radiation Control Program Directors, Inc. (CRCPD) and which differs from that of NRC. Colorado intends to implement the 2011 and 2013 Part 40 RATS related items in a future rulemaking. We believe that these items will be best addressed through changes to Colorado's Parts 1, and 3. We are therefore not proposing any RATS related changes to Part 18 at this time. We request that during its review of the proposed Part 18, that NRC identify any 10 CFR Part 40 RATS items which could not be reasonably implemented through other (non-Part 18) changes.

If you have any questions, please feel free to contact me at 303/692-3423 or James Jarvis of my staff at 303/692-3454 or james.jarvis@state.co.us.

Sincerely,



Stephen F. Tarlton, Manager
Radiation Program
Hazardous Materials and Waste Management Division

Enclosures: Attachment 1; and Colorado Part 18 proposed rule (Draft A, dated 10/23/2013).

Cc: Kathleen Schneider, Senior Project Manager, Office of Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, T8-E24, Washington, D.C. 20555-0001 (via email only on November 6, 2013)

Table 1. Changes addressing NRC comments in letters dated October 13, 2011 and June 28, 2012.

CFR Cross-reference	State Section	Description/purpose of proposed change
§40.2	Part 18, Section 18.1.5	The proposed draft contains added language to clarify that the Department of Natural Resources, Division of Reclamation, Mining and Safety is not implementing requirements of the Atomic Energy Act.
§40.2a(b)	Part 18, Section 18.1.3	The proposed draft deletes the phrase “unless that program fails to accomplish remedial action” to ensure consistency with the 274b agreement.
§40.4, Appendix A	Part 18, Section 18.2	<p>The proposed draft deletes the <u>definition</u> for “long-term care” in section 18.2. However, the use of the term is retained in other areas of Part 18 consistent with use in 10 CFR Part 40.</p> <p>NRC recommended in its letter dated 06/28/13 to delete the use of “long-term care” in Criterion 6 of Appendix A of Part 18. The use of this term in Colorado rule is similar to that found in Criterion 6(4) of Appendix A of Part 40 and is therefore not deleted or modified.</p>
§40.4; Appendix A	Part 18, Section 18.2;	The proposed draft deletes the definition for “post-closure” from Section 18.2. However, the use of the term is retained in other areas of Part 18 consistent with its use in 10 CFR Part 40.
§40.4	Part 18, Section 18.2	The proposed draft adds a definition for “residual radioactive material” consistent with that found in 10 CFR Part 40.
§40, Appendix A	Part 18, Section 18.2	The proposed draft deletes the definition for “surveillance” from Section 18.2.
§40.4	Part 18, Section 18.2	The proposed draft incorporates a definition for “uranium milling” equivalent to that of 10 CFR Part 40.4.

§40, Appendix A	Part 18, Section 18.2	The proposed draft modifies the definition in 18.2 from “available radon barrier technology” to “available technology”. With this change, the definition is equivalent to that found in 10 CFR Part 40, Appendix A.
§40, Appendix A, Criterion 11	Part 18, Appendix A, Criterion 9	The proposed draft deletes references to the “Department” in Criterion 9 of Appendix A, consistent with 10 CFR Part 40, Criterion 11.

Table 2. NRC Regulatory Action Tracking System (RATS) Items currently addressed.

RATs ID	CFR Title	State Section
	2012-3 RATS ITEM(S)	
2012-3	10 CFR Part 40, Appendix A, Section I, Criterion 4(d)	Part 18, Appendix A, Criterion 4D <i>This RATS item appears to be a correction of an error in NRC regulations which did not occur in Colorado regulation. Colorado regulation appears to meet this RATS item without further change.</i>
2012-3	10 CFR Part 40, Appendix A, Section I, Criterion 8A	Part 18, Appendix A, Criterion 8A <i>This RATS item appears to be a correction of an error in NRC regulations which did not occur in Colorado regulation. Colorado regulation appears to meet this RATS item without further change.</i>

DRAFT A – 10/23/2013



Colorado Department
of Public Health
and Environment

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Hazardous Materials and Waste Management Division

6 CCR 1007-1

State Board of Health

RULES AND REGULATIONS PERTAINING TO RADIATION CONTROL

PART 18: Licensing Requirements for Uranium and Thorium Processing

Last amended 03/16/11, effective 04/30/2011

DRAFT A – 10/23/2013

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Hazardous Materials and Waste Management Division

RADIATION CONTROL - RADIATION SAFETY REQUIREMENTS FOR WIRELINE SERVICE OPERATIONS AND SUBSURFACE TRACER STUDIES; TRANSPORTATION OF RADIOACTIVE MATERIAL; LICENSING REQUIREMENTS FOR URANIUM AND THORIUM PROCESSING; LICENSES AND RADIATION SAFETY REQUIREMENTS FOR IRRADIATORS; RESERVED

6 CCR 1007-1 Part 18

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

PART 18: LICENSING REQUIREMENTS FOR URANIUM AND THORIUM PROCESSING

LICENSING REQUIREMENTS FOR URANIUM AND THORIUM PROCESSING

18.1 Purpose and Scope.

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

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

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

18.1.4 Nothing in this Part shall apply to the following naturally occurring radioactive materials (NORM) or technologically enhanced naturally occurring radioactive materials (TENORM):

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

18.1.4.2 Sludges, soils, or pipe scale in or on equipment from oil and gas exploration, production, or development operations or drinking water or wastewater treatment operations; except that the material may not contain hazardous substances that otherwise would preclude receipt;

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

THESE MARGIN COMMENTS ARE **NOT** PART OF THE RULE AND ALL COMMENTS WILL BE DELETED PRIOR TO FINAL SUBMISSION TO THE COLORADO SECRETARY OF STATE'S OFFICE FOR FINAL PUBLISHING IN THE COLORADO CODE OF REGULATIONS.

Comment [JJ2]: EDITORIAL NOTE: DUE TO THE FORMAT OF CERTAIN REGULATORY SECTIONS OBTAINED FROM THE COLORADO SECRETARY OF STATE USED AS THE BASIS AND STARTING POINT FOR THIS REGULATORY AMENDMENT, SOME REGULATORY PARTS ARE GROUPED INTO ONE DOCUMENT. ALTHOUGH MULTIPLE REGULATORY PARTS MAY BE GROUPED ON THE SECRETARY OF STATES WEBSITE, ONLY PART 18 IS BEING AMENDED.

Comment [JJ3]: 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]

DRAFT A – 10/23/2013

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

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

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

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

18.2 As used in this regulation:

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

"APA 105 hearing" means a formal adjudicatory hearing conducted in response to a request for a hearing on action by the Department granting or denying an application for a license or license amendment and held in accordance with the Colorado Administrative Procedure Act (APA), 24-4-105, CRS.

"APA 106 review" means an action for judicial review of final agency action by the Department in accordance with the Colorado Administrative Procedure Act (APA), 24-4-106, CRS.

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

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

"As expeditiously as practicable considering technological feasibility", for the purposes of Criterion 6A, means as quickly as possible considering: the physical characteristics of the tailings and the site; the

Comment [JJ4]: Statement is added to clarify that 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

Comment [JJ5]: This is a new definition added to clarify the hearing process as not all hearing processes have equivalent requirements.

Comment [JJ6]: This is a new definition added to clarify the judicial review requirements under the Colorado Administrative Procedure Act.

DRAFT A – 10/23/2013

limits of available technology; the need for consistency with mandatory requirements of other regulatory programs; and factors beyond the control of the licensee. The phrase permits consideration of the cost of compliance only to the extent specifically provided for by use of the term available technology.

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

Comment [JJ7]: The language "radon barrier" is deleted from this definition to be consistent with Appendix A of 10 CFR Part 40. 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.

This change in definition is not expected to have a significant impact.

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

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

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

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

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

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

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

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

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

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

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

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

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

(1) physical conditions at the site;

DRAFT A – 10/23/2013

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

Comment [JJ8]: NRC has requested this definition be deleted from Part 18. Although the term is used in 10 CFR Part 40, NRC does not define it. Retaining the definition in Colorado rules may result in non-compatibility with NRC requirements.

This term is used in 18.5.5, 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 letter dated 10/13/11 (#20).
10 CFR 40.

DRAFT A – 10/23/2013

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

"RCA 203 hearing" means a formal process conducted in response to a license application for amendment received by the Department, and held to meet the intent of and in accordance with the Colorado Radiation Control Act (RCA), Section 25-11-203, CRS.

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

"Residual radioactive material" means:

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

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

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

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

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

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

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

"Uranium milling" means any activity that results in the production of byproduct material as defined in Part 1 of these regulations.

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

There shall be an opportunity for a public meeting and hearing, prior to the granting, denial or renewal of a specific license permitting the receipt, possession or use of source material for

Comment [JJ9]: NRC has requested this 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 the definition "long term care" for which deletion is proposed. It is also used 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 [JJ10]: This is a new definition added to clarify subsequent references to the various hearing processes as not all hearing processes have equivalent requirements.

Comment [JJ11]: 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 10/13/11 (#22); 06/28/12 (#22)
[Compatibility = A]

Comment [JJ12]: 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 more 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.

Deletion of this definition is not expected to result in any significant issues.

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

Comment [JJ13]: 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 letter 06/28/2012 (#24); 10/13/11 (#24)
Compatibility = A

DRAFT A – 10/23/2013

milling or byproduct material as in definition (2) of 1.2.2. The hearing process for APA hearings shall follow the requirements of Section 18.7 unless otherwise required by statute. The Department may require one or more public meeting(s) beyond those specifically identified in Part 18. Such public meetings are not considered hearings, but may, in some instances, contain certain elements that may be found in a statutory hearing.

Comment [JJ14]: For clarity and flow, the language here is relocated from original Section 18.6 (now 18.7), since hearing processes may be required at various stages of the application or review cycle.

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

Comment [JJ15]: This is a new proposed provision added to clarify that the Department may require additional meetings beyond those specifically identified in Part 18.

18.3.1 An application for a new license, or to amend or renew an existing license to receive, possess, and use source material for milling or byproduct material as in definition (2) of 1.2.2 shall include all information required under these regulations and such other information as the Department may deem necessary, and shall address the following:

Comment [JJ16]: The word “new” is added for clarity.

18.3.1.1 Description of the proposed project or action;

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

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

18.3.1.4 Environmental effects of accidents;

18.3.1.5 Tailings disposal and decommissioning;

18.3.1.6 Site and project alternatives.

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

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

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

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

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

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

18.3.3 During any one full year prior to submittal of a new application or amendment expanding the facility the applicant/licensee shall conduct a preoperational monitoring program to provide complete baseline data on a milling site and its environs. Throughout the construction and

DRAFT A – 10/23/2013

operating phases of the mill, the applicant/licensee shall conduct an operational monitoring program to measure or evaluate compliance with applicable standards and regulations, to evaluate performance of control systems and procedures, to evaluate environmental impacts of operation, and to detect potential long-term effects.

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

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

18.3.5.1 Issuance or renewal of a source material milling license;

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

Comment [JJ17]: This requirement relocated from 18.3.9, and 18.3.9.2.

18.3.5.3 Issuance of an amendment that would authorize or result in:

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

18.3.5.4 ~~T~~he environmental assessment shall contain all information deemed necessary by the department, and shall include, at a minimum:

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

DRAFT A – 10/23/2013

(7) **Aa** list of all material violations of local, state, or federal law at the facility since the submittal date of the previous license application or license renewal application;

(8) **F**or an application for a license or license amendment pertaining to the facility's receipt of classified material for storage, processing, or disposal at the facility, a demonstration that:

(a) **T**here are no outstanding material violations of any state or federal statutes, compliance orders, or court orders applicable to the facility, and any releases giving rise to any such violation have been remediated;

(b) **T**he operator, after a good faith review of the facility and its operations, is not aware of any current license violation at the facility;

(c) **T**here are no current releases to the air, ground, surface water, or groundwater that exceed permitted limits; and

(d) **N**o conditions exist at the facility that would prevent the Department of Energy's receipt of title to the facility pursuant to the federal "Atomic Energy Act of 1954", 42U.S.C. sec. 2113;

(9) **Aa** list of all necessary permits and any changes to local land use ordinances that are needed to construct or operate the facility; and

(10) **F**or sites or facilities placed on the National Priority List pursuant to the federal "Comprehensive Environmental Response, Compensation, and Liability Act", 42 U.S.C. sec. 9605, a copy of the most recent five-year review and any associated updates that have been issued by the United States Environmental Protection Agency.

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

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

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

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

Comment [JJ18]: Number is added for clarity/consistency with other formatting.

Comment [JJ19]: Throughout section 18.3.8 and subsections:
-Language is reworded to improve the clarity, understanding and flow.

Comment [JJ20]:
As originally written, paragraph (b) of subsection (2) does not exist within Part 18. The original reference was included in Part 18 in error and incorrectly refers to a section in the Colorado Radiation Control Act (2010) rather than Part 18.

DRAFT A – 10/23/2013

18.3.8.2 ~~an initial public meeting or hearing shall be convened within forty-five days after publication of the determination that the application is substantially complete. Within forty-five (45) days after publication of the determination that the application required by 18.3.8.1 is substantially complete, an initial public meeting shall be convened in accordance with the Colorado Radiation Control Act (RCA), 25-11-203, CRS. Such meeting shall, at a minimum require:~~

Comment [JJ21]: This paragraph incorporates the requirements of 18.3.9.1 relating to the application being substantially complete prior to holding an initial meeting.

(1) At least two weeks' written notice before the meeting;

Comment [JJ22]: Relocated from 18.3.9.1(1).

(2) The meeting be hosted and presided over by a person selected upon agreement by the Department, the local Board of County Commissioners and the applicant;

Comment [JJ23]: Relocated from 18.3.9.1.

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

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

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

(a) allows the public to make copies of a transcript of the meeting; and

Comment [JJ24]: Relocated from 18.3.9.1.

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

Comment [JJ25]: Relocated from 18.3.9.1(3).

18.3.8.3 ~~a second such public meeting shall be convened within thirty days after the first public meeting. Within thirty (30) days after the public meeting required by 18.3.8.2, an RCA 203 hearing shall be convened in accordance with the Colorado Radiation Control Act (RCA), 25-11-203, CRS. Such hearing shall, at a minimum require:~~

(1) At least two weeks' written notice before the hearing;

(2) The hearing to be hosted and presided over by a person selected upon agreement by the Department, the local Board of County Commissioners and the applicant;

(3) The licensee or applicant to provide a summary of the facilities' application to receive, store, process, or dispose of classified material and the nature of the classified material;

(4) Cross-examination of the applicant by interested persons;

(5) An opportunity for the public to comment and be heard;

(6) The licensee or applicant to provide transcripts of the hearing, which:

(a) allows the public to make copies of a transcript of the hearing; and

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

DRAFT A – 10/23/2013

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

Comment [JJ26]: The requirements of 18.3.9.3 have been incorporated here.

Upon request of and documentation of the expenditure by such Board, the applicant shall provide the Board with up to fifty thousand dollars, which shall be available to assist the Board in responding to the application, including an independent environmental analysis and identification of any substantial adverse impact upon the safety or maintenance of transportation infrastructure or transportation facilities within the county.

18.3.8.5 Within three hundred sixty (360) days after the hearing required by 18.3.8.3, the Department shall provide notice of:

(1) Issuance of a decision document where the license application is approved, or is approved with conditions. The decision document shall include:

- (a) A decision analysis;
- (b) An environmental impact analysis; and
- (c) A draft license;

or

(2) Denial of the application, and shall issue a decision document summarizing the basis for denial. Denial of the application shall be considered the final agency action, subject to appeal in accordance with 18.3.8.9.

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

Comment [JJ27]: This paragraph is removed/deleted as it is addressed in 18.3.8.4.

18.3.8.6 Upon issuance of the decision document required by 18.3.8.5(1), and prior to issuance of a final license, the Department shall:

- (1) Begin a forty-five (45) day public comment period that shall be noticed at the time the decision analysis document is published; and
- (2) Hold at least one public comment meeting within the forty-five (45) day comment period.

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

18.3.8.8 Within thirty (30) days following the public comment period and public comment meeting required by 18.3.8.6, the Department shall:

- (1) issue a response summary document outlining the information received and evaluated during the public comment period and public comment meeting; and
- (2) evaluate the information received during the public comment period which shall be considered in writing the final license.
- (3) Issue the final license which shall be the final agency action.

DRAFT A – 10/23/2013

18.3.8.9 In accordance with the requirements of the Colorado APA, 24-4-105, CRS, any person affected or aggrieved by agency action may request an APA 105 hearing. If an APA 105 hearing is requested, the Department will follow the general requirements of Section 18.7.3, as applicable, for providing notice, determining party status, prehearing conference, discovery, and conduct of hearings, unless such requirements otherwise conflict with APA requirements.

18.3.8.10 Following an APA 105 hearing process in 18.3.8.9, any person affected or aggrieved by agency action may, and in accordance with the requirements of the Colorado APA, 24-4-106, CRS, request an APA 106 review.

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

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

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

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

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

~~18.3.9.2~~ ~~An environmental assessment as defined in 18.3.5; and~~

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

18.4 Department Environmental Impact Analysis

18.4.1 ~~The~~ **The Department shall prepare a written Environmental Impact Analysis (EIA) of the impact of the licensed activity on the environment** For each license application or application to amend or renew an existing license to receive, possess, or use source material for uranium or thorium milling or byproduct material as in definition (2) of 1.2.2 which will have a significant impact on the environment, ~~the Department shall prepare a written analysis of the impact of the licensed activity on the environment.~~ **The written EIA** which shall be **made** available **for review** to **by** the public and **for review by** the NRC at the time of public notice **in 18.3.8.5 of hearing.**, which **The EIA** analysis shall include:

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

Comment [JJ28]: Portions of this section have been relocated to new section 18.3.5.2

Comment [JJ29]: The requirements of this section have been incorporated into 18.3.8.2(5)

Comment [JJ30]: The requirement relating to expenses have been incorporated into 18.3.8.7

Comment [JJ31]: The requirement of this section has been incorporated into 18.3.8.2, and 18.3.8.3

Comment [JJ32]: The requirements of this section have been incorporated into 18.3.8.2(1), and 18.3.8.3(1)

Comment [JJ33]: The requirements of this section have been relocated to 18.3.8.2(3), and 18.3.8.3(3)

Comment [JJ34]: The requirements of this section have been relocated to 18.3.8.2(5), 18.3.8.3(6)

Comment [JJ35]: The requirements of this section have been relocated to (new) Section 18.3.5.2

Comment [JJ36]: The requirements of this section have been relocated to (new) Section 18.3.8.4

Comment [JJ37]: The word "Department" added for clarity.

Comment [JJ38]: The wording of this section is modified for clarity and understanding.

DRAFT A – 10/23/2013

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

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

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

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

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

18.5 ~~Notices-Requirements Pertaining to Materials Not Subject to 18.3 and 18.4~~and Financial Assurance

18.5.1 At least ninety (90) days before a facility proposes to receive, store, process, or dispose of classified material in a license application or amendment that is not subject to 18.3 and 18.4, the facility shall notify the Department ~~in writing~~, and the Department shall notify the public and the board of county commissioners of the county in which the facility is located, of the specific classified material to be received, stored, processed, or disposed of. The notice shall include:

Comment [JJ39]: The phrase "in writing" is added for clarity.

18.5.1.1 ~~A-a~~ representative analysis of the physical, chemical, and radiological properties of the classified material;

18.5.1.2 ~~T-the~~ material acceptance report that demonstrates that the classified material does not contain hazardous waste characteristics not found in uranium ore;

18.5.1.3 ~~A-a~~ detailed plan for transport, acceptance, storage, handling, processing, and disposal of the material;

18.5.1.4 ~~A-a~~ demonstration that the material contains technically and economically recoverable uranium, without taking into account its value as disposal material;

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

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

18.5.1.7 ~~A-a~~ written statement by the applicant describing any pre-existing regulatory classification of the classified waste in the state of origin that describes all steps taken by the applicant to identify such classification;

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

18.5.1.9 ~~D-d~~documentation showing any necessary approvals of the ~~U~~nited ~~S~~tates ~~E~~nvironmental ~~P~~rotection ~~A~~gency; and

18.5.1.10 ~~A-a~~n environmental assessment **containing the information required by 18.3.5.4as defined in section 18.4 and 18.5 of this section**, and which may incorporate by reference relevant information contained in an environmental assessment previously submitted for the facility.

Comment [JJ40]: The specific reference to the contents of the environmental assessment are referenced for clarity.

DRAFT A – 10/23/2013

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

18.5.3 Once the Department determines that the notice pursuant to 18.5.1 is complete, the Department shall:

18.5.3.1 Provide notice, of the specific material to be received, stored, processed, or disposed of, to:

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

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

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

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

18.5.3.3 ~~P~~Provide a sixty (60)- day public comment period for the receipt of written comments concerning the notice.

Aa public hearing ~~or public comment meeting~~ may be held, at the Department's discretion, at the operator's expense.

18.5.4 ~~W~~Within thirty (30) days after the close of the written public comment period held pursuant to 18.5.3.3, the Department shall approve, approve with conditions, or deny the receipt, storage, processing, or disposal as described in the notice based on whether the material proposed for receipt, storage, processing, or disposal complies with the facility's license and:

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

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

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

18.6 Financial Assurance

~~18.65-5~~ Prior to issuance of the license, the applicant shall:

~~18.65.5.1(4)~~ **E**establish financial assurance arrangements, as provided by 3.9.5, to ensure decontamination and decommissioning of the facility; ~~and~~

~~18.65.5.2(2)~~ **P**provide a fund adequate to cover the payment of the cost for long-term care and monitoring as provided by 3.9.5.10.

(1) Such fund shall be sufficient to meet the requirements of 3.9.5.10.4.

(2) The Department will consider proposals to combine the two types of financial assurance; ~~and~~

Comment [JJ41]: 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 [JJ42]: Consistent with certain other sections of Part 18, the Department may determine that a public comment meeting is sufficient.

Comment [JJ43]: The previous section (18.5) is divided into two sections (18.5, and 18.6) to enhance functionality and flow.

This section applies to all types of license actions regardless of whether it is source material or other material being proposed/processed.

DRAFT A – 10/23/2013

18.65.5.3 Provide financial assurance ~~shall be provided~~ prior to commencement of construction or operation.

18.76 Requirements for License Hearings

~~18.6.7.1 There shall be an opportunity for public hearings to be held in accordance with the procedures in 24-4-104 and 24-4-105, CRS., and 18.6, prior to the granting, denial or renewal of a specific license permitting the receipt, possession or use of source material for milling or byproduct material as in definition (2) of 1.2.2. The requirements of Section 18.7 apply to those license hearings conducted to meet the requirements of the Colorado Administrative Procedure Act 24-4-101, et seq., CRS, and shall not explicitly apply to non-APA hearings or other public meetings. As determined by the Department, certain requirements of Section 18.7 may be applied to non-APA hearings or other public meetings for consistency.~~

Comment [JJ44]: The language of this section has been removed from (original section) 18.6 and relocated to Section 18.3, since it contains broad language that may apply to multiple sections found throughout Part 18.

Comment [JJ45]: The added statement clarifies the applicability and intent of section 18.7.

As originally written, certain requirements and timelines specified in 18.7 (originally 18.6) are not applicable or cannot be met due to potentially conflicting statutory language contained in the APA and the Colorado Radiation Control Act.

~~18.6.7.2~~ Notice of Hearing

~~18.6.7.2.1~~ All hearings shall be preceded by written notice containing:

~~18.6.7.2.1.1~~ The nature of the hearing and its time and place;

~~18.6.7.2.1.2~~ The legal authority and jurisdiction under which the hearing is to be held;

~~18.6.7.2.1.3~~ The matters of fact and law asserted or to be considered;

~~18.6.7.2.1.4~~ A description of the proposed licensing action and a statement of the availability of its text from the Department;

~~18.6.7.2.1.5~~ A description of the right of any interested person to make written comments to the Department or present oral comments at the hearing;

~~18.6.7.2.1.6~~ The procedure for applying to become a party to the hearing; and

~~18.6.7.2.1.7~~ A description of the procedures to be followed at the hearing and at a prehearing conference if required.

~~18.6.7.2.2~~ The notice of the hearing shall be mailed **or sent electronically** by the Department to the licensee or applicant and to each person who has filed a written request to receive notice of such proceedings. The licensee or applicant shall cause the notice to be published for three (3) days in a newspaper of statewide circulation and in local newspapers designated by the Department in the area to be affected by the proposed action. The notice shall be mailed **(or sent electronically)** and published **in a timely manner not less than ninety (90) days** prior to the hearing.

~~18.6.7.2.3~~ The time and place of hearing will be fixed with due regard for the convenience of the parties or their representatives, and the public interest. The hearing will be held in the locale of the site to be licensed.

~~18.6.7.2.4~~ The cost of any licensing action hearing shall be at the expense of the applicant. These costs shall include, but not be limited to, the hearing officer, the meeting room, the court reporter and transcript copies, and the required notices. The costs shall not include the expenses of other parties to the hearing.

~~18.6.7.3~~ Party Status

DRAFT A – 10/23/2013

18-6.7.3.1 A person who may be affected or aggrieved by Department action may apply for party status not less than twenty (20) days prior to the hearing. Thereafter, application to be made a party shall not be considered except upon motion for good cause shown.

18-6.7.3.2 Application for party status must identify the individual or group applying, including the address or phone number where they may be contacted, state the nature of their interest in the hearing and the specific ground on which they claim to be affected or aggrieved, and the specific aspects of the hearing which they wish to address.

18-6.7.3.3 The Department, or the hearing officer, will grant or deny party status within five (5) days after receipt of the request for party status based on the nature and extent of the person's property, financial or other interest in the hearing and the possible effect of any order which may be entered as a result of the hearing on the person's interest. Any person applying for or granted party status may, by motion to the hearing officer or Department, as appropriate, challenge the right of any other person to be a party.

18-6.7.3.4 Parties shall have the right to initiate discovery. Parties shall have the right to make motions or objections, present evidence, cross-examine witnesses, and appeal from the decision of the hearing as provided by the Colorado Administrative Procedure Act, 24-4-101 et seq., CRS.

18-6.7.3.5 A person who is not a party will be permitted to submit written comments to the Department and may be permitted to make an oral presentation at the hearing, but will not have the other rights of a party.

18-6.7.4 Prehearing Conference

18-6.7.4.1 The Department or hearing officer, on its own motion or at the request of any party or any person who has applied to become a party, may direct the parties to appear at a specific time and place for a conference to consider:

18-6.7.4.1.1 The simplification and clarification of the issues;

18-6.7.4.1.2 The obtaining of stipulations and admissions of fact and of the contents and authenticity of documents to avoid unnecessary proof;

18-6.7.4.1.3 Identification of witnesses and the limitation of the number of expert witnesses, and other steps to expedite the presentation of evidence;

18-6.7.4.1.4 The setting of a hearing schedule;

18-6.7.4.1.5 Granting or denying requests for party status, if such decisions have not previously been made;

18-6.7.4.1.6 Such other matters as may aid in the orderly disposition of the hearing.

18-6.7.4.2 At such conference each party or person who has applied to become a party shall present to every other person, party, and the Department a prehearing statement containing the following:

18-6.7.4.2.1 A brief summary of the nature of the claim of the party and the basis therefore;

18-6.7.4.2.2 A copy of all exhibits proposed to be introduced; and

DRAFT A – 10/23/2013

18-6.7.4.2.3 A list of all witnesses who may be called and a brief description of their testimony.

18-6.7.4.3 Except for good cause shown or for evidence or testimony accepted as rebuttal, no witness may testify nor may any exhibits be introduced on behalf of a party who had notice of the prehearing conference unless such witness has been previously listed and/or his written testimony and related exhibits have been presented to opposing parties at the prehearing conference.

18-6.7.4.4 The Department or hearing officer shall issue a written summary of the action taken at the conference and agreements by the parties, which limits the issues or defines the matters in controversy to be determined in the hearing.

18-6.7.5 Discovery

18-6.7.5.1 Any party may initiate discovery in the form of interrogatories to another party, requests for admission to another party, requests for production of documents to another party, or depositions of any persons, or any combination thereof. The Colorado Rules of Civil Procedure, to the extent not inconsistent with the Colorado Administrative Procedure Act, shall apply. Such discovery may be modified by a motion for protective order filed with the Department or hearing officer within seven (7) days of receipt of the notice or request for discovery. Motions for protective order shall set forth the grounds in support thereof and shall be ruled upon immediately. Discovery shall be completed no later than ten (10) days preceding the hearing date, except as otherwise ordered by the Department or hearing officer.

18-6.7.6 Conduct of **Administrative Procedure Act** Hearings

18-6.7.6.1 Hearing presentations will proceed in the following order unless otherwise directed by the Department or hearing officer.

18-6.7.6.1.1 Call to order, introductory remarks, and action on applications for party status, if not already decided.

18-6.7.6.1.2 Presentation of any stipulations or agreements of the parties, and any other matters which were required to be dealt with at the prehearing conference, if held.

18-6.7.6.1.3 Opening statement by the party upon whom the burden of proof rests.

18-6.7.6.1.4 Opening statements by all other parties.

18-6.7.6.1.5 Presentation of case by party upon whom burden of proof rests.

18-6.7.6.1.6 Presentation by all other persons wishing to offer evidence in the order to be determined by the Department or hearing officer.

18-6.7.6.1.7 Rebuttal by the party upon whom the burden of proof rests, followed by rebuttal of other parties.

18-6.7.6.1.8 Closing statements by party upon whom the burden of proof rests, followed by closing statements of all other parties.

DRAFT A – 10/23/2013

18-6.7.6.2 Public participation as provided for in these rules shall be allowed at that time or times during the hearing as determined by the Department or hearing officer in their discretion to be appropriate.

18-6.7.6.3 At the conclusion of any witness's testimony, or at the conclusion of the party's entire presentation, as may be determined by the Department or hearing officer, all parties may then cross-examine such witness or witnesses. The Department or hearing officer may examine and cross-examine any witness. A person who is not a party shall not have the right to cross-examine.

18-6.7.6.4 Any person, not a party to the proceeding, wishing to present testimony may do so by indicating his desire in writing. A form will be available prior to and during the hearing. This form will request the person's name, address, whom he represents, the general nature of his testimony, and the time required for his presentation. This form is to be presented to a representative of the Department during the hearing. Voluntary testimony not specifically requested on or by the written form may also be allowed. Any person presenting testimony shall be under oath and be subject to cross examination.

18-6.7.6.5 The proponent of any motion, order, or license issuance bears the burden of proof.

18-6.7.6.6 No interested person, party, or applicant for party status outside the Department will have any oral or written communication with any Department personnel or hearing officer relevant to the merits of a hearing pending before the Department unless reasonable prior notice is given to all participants in the hearing. This prohibition shall apply after the hearing is noticed. Any Department employee or hearing officer who is involved in such a prohibited communication shall make a written record of it and transmit it to all the parties to the hearing.

18-6.7.7 Department Decision

18-6.7.7.1 Any party to a hearing may, or if so directed by the Department or the hearing officer shall, file proposed findings of fact and conclusions of law and a proposed form of order or decision within twenty (20) days after the record is closed. A party who has the burden of proof may reply within ten (10) days after service of proposed findings of fact and conclusions of law.

18-6.7.7.2 After due consideration of the hearing record, the Department or hearing officer shall issue its findings of fact, conclusions of law, and decision and order.

18.7.8 Operational Requirements.

Each licensee authorized to receive, possess or use source material for milling or byproduct material as in definition (2) of 1.2.2 shall:

18-7.8.1 Operate in accordance with the requirements of this Part 18, in particular the procedures required by 18.3.2, monitoring required by 18.3.3, and the requirements and objectives of Appendix A to this Part 18.

18-7.8.2 Submit a report to the Department within ~~sixty~~ (60) days after January 1 and July 1 of each year, specifying the quantity of each of the radioactive materials released to unrestricted areas in liquid and in gaseous effluents during the previous six months of operation, and such other information as the Department may require to estimate maximum potential annual radiation doses to the public resulting from effluent releases. If quantities of radioactive materials released during the reporting period are significantly above the licensee's design objectives previously reviewed as part of the licensing action, the report shall cover this specifically. On the basis of such reports

Comment [JJ46]: Formatted for consistency within regulatory part.

DRAFT A – 10/23/2013

and any additional information the Department may obtain from the licensee or others, the Department may from time to time require the licensee to take such action as the Department deems appropriate.

18-7.8.3 For any licensed site or facility determined by the Department to have caused a release to the groundwater that exceeds the basic standards for groundwater as established by the water quality control commission, until remediation has been completed, the licensee shall provide annual written notice of the status of the release and any remediation activities associated with the release, by certified or registered mail, return receipt requested, to the current address for each registered groundwater well within one mile of the release as identified in the corrective action monitoring program, unless the licensee demonstrates that a distance less than one mile is warranted. Documentation of this activity will be retained and made available to the Department upon request.

18-8.9 Decommissioning Requirements.

18-8.9.1 In addition to the information required under 3.16, each licensee authorized to receive, possess or use source material for milling or byproduct material as in definition (2) of 1.2.2 shall submit a plan for completion of decommissioning if the procedures necessary to carry out decommissioning:

18-8.9.1.1 Have not been previously approved by the Department; and

18-8.9.1.2 Could increase potential health and safety impacts to workers or to the public, such as in any of the following cases:

18-8.9.1.2.1 Procedures would involve techniques not applied routinely during cleanup or maintenance operations; or

18-8.9.1.2.2 Workers would be entering areas not normally occupied where surface contamination and radiation levels are significantly higher than routinely encountered; or

18-8.9.1.2.3 Procedures could result in significantly greater airborne concentrations of radioactive materials than are present during operation; or

18-8.9.1.2.4 Procedures could result in significantly greater releases of radioactive material to the environment than those associated with operation.

18-8.9.2 Procedures with potential health and safety impacts may not be carried out prior to approval of the decommissioning plan.

18-8.9.3 The proposed decommissioning plan, if required by 18-8.9.1 or by license condition, must include:

18-8.9.3.1 Description of planned decommissioning activities;

18-8.9.3.2 Description of methods used to assure protection of workers and the environment against radiation hazards during decommissioning;

18-8.9.3.3 A description of the planned final radiation survey; and

18-8.9.3.4 An updated detailed cost estimate for decommissioning, comparison of that estimate with present funds set aside for decommissioning, and plan for assuring the availability of adequate funds for completion of decommissioning.

Comment [JJ47]: Typo correction – remove unneeded spaces.

DRAFT A – 10/23/2013

18.8.9.4 The proposed decommissioning plan will be approved by the Department if the information therein demonstrates that the decommissioning will be completed as soon as is reasonable and that the health and safety of workers and the public will be adequately protected.

18.8.9.5 Upon approval of the decommissioning plan by the Department, the licensee shall complete decommissioning in accordance with the approved plan. As a final step in decommissioning, the licensee shall submit the information required in 3.16.4.1.5 and shall certify the disposition of accumulated wastes from decommissioning.

18.8.9.6 If the information submitted under 3.16.4.1.5 or 18.8.9 does not adequately demonstrate that the premises are suitable for release for unrestricted use, the Department will inform the licensee of the appropriate further actions required for termination of license.

PART 18, APPENDIX A CRITERIA RELATING TO THE OPERATION OF MILLS AND THE DISPOSITION OF THE TAILINGS OR WASTES FROM THESE OPERATIONS

Introduction: Every applicant for a license to possess and use radioactive material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required by the provisions of 18.3 to include in a license application proposed specifications relating to milling operations and the disposition of tailings or wastes resulting from such milling activities. This appendix establishes technical, ownership, and long-term site surveillance criteria relating to the siting, operation, decontamination, decommissioning, and reclamation of mills and tailings or waste systems and sites at which such mills and systems are located.

As used in this appendix, the term "as low as is reasonably achievable" has the same meaning as in 1.2.2.

In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal program on a site-specific basis. However, in such cases the objectives, technical alternatives and concerns which must be taken into account in developing a tailings program are identified. As provided by the provisions of 18.3, applications for licenses must clearly demonstrate how the criteria have been addressed.

The specifications shall be developed considering the expected full capacity of tailings or waste systems and the lifetime of mill operations. Where later expansions of systems or operations may be likely (for example, where large quantities of ore now marginally uneconomical may be stockpiled), the amenability of the disposal system to accommodate increased capacities without degradation in long-term stability and other performance factors shall be evaluated.

Licensees or applicants may propose to the Department alternatives to meet the specific requirements in this Appendix. The alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The Department may find that the proposed alternatives meet the Department's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with the site, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR Part 192, Subparts D and E. Proposed alternatives to specific regulations in this Part 18 require notice and opportunity for hearing before the NRC.

All site-specific licensing decisions based on the criteria in this Appendix or alternatives proposed by licensees or applicants will take into account the risk to the public health and safety and the environment with due consideration to the economic costs involved and any other factors the Department determines to be appropriate. In implementing this Appendix, the Department will consider "practicable" and "reasonably achievable" as equivalent terms. Decisions involving these terms will take into account the

DRAFT A – 10/23/2013

state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.

Comment [JJ48]: Removed unnecessary punctuation (period).

Criterion 1.

Criterion 1A. The general goal or broad objective in siting and design decisions is permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance. For practical reasons, specific siting decisions and design standards must involve finite times (e.g., the longevity design standard in Criterion 6). The following site features which will contribute to such a goal or objective must be considered in selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites:

(1) Remoteness from populated areas;

(2) Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from ground-water sources; and

(3) Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long-term.

Criterion 1B. The site selection process must be an optimization to the maximum extent reasonably achievable in terms of the features in Criterion 1A.

Criterion 1C. In the selection of disposal sites, primary emphasis must be given to isolation of tailings or wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will be a function of both site and engineering design, overriding consideration must be given to siting features given the long-term nature of the tailings hazards.

Criterion 1D. Tailings should be disposed of in a manner that no active maintenance is required to preserve conditions of the site.

Criterion 2.

To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material as in definition (2) of 1.2.2, from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations shall be disposed of at existing large mill tailings disposal sites; unless considering the nature of the wastes, such as their volume and specific activity and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations.

Criterion 3.

The "prime option" for disposal of tailings is placement below grade, either in mines or specially excavated pits (that is, where the need for any specially constructed retention structure is eliminated). The evaluation of alternative sites and disposal methods performed by mill operators in support of their proposed tailings disposal program (provided in applicants' environmental reports) must reflect serious consideration of this disposal mode. In some instances, below grade disposal may not be the most environmentally sound approach, such as might be the case if a ground-water formation is relatively close to the surface or not very well isolated by overlying soils and rock. Also, geologic and topographic conditions might make full below grade burial impracticable: For example, bedrock may be sufficiently near the surface that blasting would be required to excavate a disposal pit at excessive cost, and more suitable alternative sites are not available. Where full below grade burial is not practicable, the size of

DRAFT A – 10/23/2013

828 retention structures, and size and steepness of slopes associated with exposed embankments must be
829 minimized by excavation to the maximum extent reasonably achievable or appropriate given the geologic
830 and hydrologic conditions at a site. In these cases, it must be demonstrated that an above grade disposal
831 program will provide reasonably equivalent isolation of the tailings from natural erosional forces.

832 **Criterion 4.**

833 The following site and design criteria must be adhered to whether tailings or wastes are disposed of
834 above or below grade.

835 Criterion 4A. Upstream rainfall catchment areas must be minimized to decrease erosion potential and
836 the size of the floods, which could erode or wash out sections of the tailings disposal area.

837 Criterion 4B. Topographic features should provide good wind protection.

838 Criterion 4C. Embankment and cover slopes must be relatively flat after final stabilization to minimize
839 erosion potential and to provide conservative factors of safety assuring long-term stability. The broad
840 objective should be to contour final slopes to grades which are as close as possible to those which would
841 be provided if tailings were disposed of below grade: this could, for example, lead to slopes of about 10
842 horizontal to 1 vertical (10h:1v) or less steep. In general, slopes should not be steeper than about 5h:1v.
843 Where steeper slopes are proposed, reasons why a slope less steep than 5h:1v would be impracticable
844 should be provided and compensating factors and conditions, which make such slopes acceptable,
845 should be identified.

846 Criterion 4D. A full self-sustaining vegetative cover must be established or rock cover employed to
847 reduce wind and water erosion to negligible levels.

848 (1) Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions,
849 such as in semi-arid and arid regions, rock cover must be employed on slopes of the
850 impoundment system. The Department will consider relaxing this requirement for extremely
851 gentle slopes such as those, which may exist on the top of the pile.

852 (2) The following factors must be considered in establishing the final rock cover design to avoid
853 displacement of rock particles by human and animal traffic or by natural process, and to preclude
854 undercutting and piping:

855 (a) Shape, size, composition, and gradation of rock particles (excepting bedding material
856 average particles size must be at least cobble size or greater);

857 (b) Rock cover thickness and zoning of particles by size; and

858 (c) Steepness of underlying slopes.

859 (3) Individual rock fragments must be dense, sound, and resistant to abrasion, and must be free from
860 cracks, seams, and other defects that would tend to unduly increase their destruction by water
861 and frost actions. Weak, friable, or laminated aggregate may not be used.

862 (4) Rock covering of slopes may be unnecessary where top covers are very thick (on the order of 10m or
863 greater); impoundment slopes are very gentle (on the order of 10h:1v or less); bulk cover
864 materials have inherently favorable erosion resistance characteristics; and, there is negligible
865 drainage catchment area upstream of the pile and good wind protection as described in Criteria
866 4A and 4B.

867 (5) Furthermore, all impoundment surfaces must be contoured to avoid areas of concentrated surface
868 runoff or abrupt or sharp changes in slope gradient. In addition to rock cover on slopes, areas

DRAFT A – 10/23/2013

toward which surface runoff might be directed must be well protected with substantial rock cover (rip rap). In addition to providing for stability of the impoundment system itself, overall stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to impoundment instability.

Criterion 4E. The impoundment may not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand. As used in this criterion, the term "capable fault" has the same meaning as defined in section III(g) of Appendix A of 10 CFR Part 100. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material.

Criterion 4F. The impoundment, where feasible, should be designed to incorporate features, which will promote deposition. For example, design features, which promote deposition of sediment suspended in any runoff, which flows into the impoundment area, might be utilized; the object of such a design feature would be to enhance the thickness of cover over time.

Criterion 5.

Criteria 5A-5D and Criterion 10 incorporate the basic ground-water protection standards imposed by the Environmental Protection Agency in 40 CFR Part 192, Subparts D and E (48 FR 45926; October 7, 1983) which apply during operations and prior to the end of closure. Groundwater monitoring to comply with these standards is required by Criterion 7A.

Criterion 5A.

(1) The primary ground-water protection standard is a design standard for surface impoundments used to manage byproduct material. Unless exempted under paragraph 5A(3) of this criterion, surface impoundments (except for an existing portion) shall have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, ground water, or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that may allow wastes to migrate into the liner (but not into the adjacent subsurface soil, ground water, or surface water) during the active life of the facility, provided that impoundment closure includes removal or decontamination of all waste residues, contaminated containment system components (liners, etc.) contaminated subsoils, and structures and equipment contaminated with waste and leachate. For impoundments that will be closed with the liner material left in place, the liner must be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility.

(2) The liner required by paragraph 5A(1) above shall be:

- (a) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;
- (b) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and
- (c) Installed to cover all surrounding earth likely to be in contact with the wastes or leachate.

DRAFT A – 10/23/2013

914 (3) The applicant or licensee will be exempted from the requirements of paragraph 5A(1) of this criterion
915 if the Department finds, based on a demonstration by the applicant or licensee, that alternate
916 design and operating practices, including the closure plan, together with site characteristics will
917 prevent the migration of any hazardous constituents into ground water or surface water at any
918 future time.

919 In deciding whether to grant an exemption, the Department will consider:

920 (a) The nature and quantity of the wastes;

921 (b) The proposed alternate design and operation;

922 (c) The hydrogeologic setting of the facility, including the attenuative capacity and thickness of
923 the liners and soils present between the impoundment and ground water or surface
924 water; and

925 (d) All other factors which would influence the quality and mobility of the leachate produced and
926 the potential for it to migrate to ground water or surface water.

927 (4) A surface impoundment must be designed, constructed, maintained, and operated to prevent
928 overtopping resulting from normal or abnormal operations, overfilling, wind and wave actions,
929 rainfall, or run-on; from malfunctions of level controllers, alarms, and other equipment; and from
930 human error.

931 (5) When dikes are used to form the surface impoundment, the dikes must be designed, constructed,
932 and maintained with sufficient structural integrity to prevent massive failure of the dikes. In
933 ensuring structural integrity, it must not be presumed that the liner system will function without
934 leakage during the active life of the impoundment.

935 Criterion 5B.

936 (1) Uranium and thorium byproduct material in definition (2) of 1.2.2 shall be managed to conform to the
937 following secondary ground-water protection standard: hazardous constituents entering the
938 ground water from a licensed site must not exceed the specified concentration limits in the
939 uppermost aquifer beyond the point of compliance during the compliance period. Hazardous
940 constituents are those constituents identified by the Department pursuant to paragraph 5B(2) of
941 this criterion. Specified concentration limits are those limits established by the Department as
942 indicated in paragraph 5B(5) of this criterion. The Department will also establish the point of
943 compliance and compliance period on a site-specific basis through license conditions and orders.
944 The objective in selecting the point of compliance is to provide the earliest practicable warning
945 that the impoundment is releasing hazardous constituents to the ground water. The point of
946 compliance must be selected to provide prompt indication of ground-water contamination on the
947 hydraulically downgradient edge of the disposal area. The Department shall identify hazardous
948 constituents, establish concentration limits, set the compliance period, and may adjust the point of
949 compliance if needed to accord with developed data and site information as to the flow of ground
950 water or contaminants, when the detection monitoring established under Criterion 7A indicates
951 leakage of hazardous constituents from the disposal area.

952 (2) A constituent becomes a hazardous constituent subject to paragraph 5B(5) only when the constituent
953 meets all three of the following tests:

954 (a) The constituent is reasonably expected to be in or derived from the uranium and thorium
955 byproduct material in the disposal area;

956 (b) The constituent has been detected in the ground water in the uppermost aquifer; and

DRAFT A – 10/23/2013

- 957 (c) The constituent is listed in Criterion 10 of this appendix.
- 958 (3) Even when constituents meet all three tests in paragraph 5B(2) of this criterion, the Department may
959 exclude a detected constituent from the set of hazardous constituents on a site-specific basis if it
960 finds that the constituent is not capable of posing a substantial present or potential hazard to
961 human health or the environment. In deciding whether to exclude constituents, the Department
962 will consider the following:
- 963 (a) Potential adverse effects on ground-water quality, considering
- 964 (i) The physical and chemical characteristics of the waste in the licensed site, including
965 its potential for migration;
- 966 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 967 (iii) The quantity of ground water and the direction of ground water flow;
- 968 (iv) The proximity and withdrawal rates of ground-water users;
- 969 (v) The current and future uses of ground water in the area;
- 970 (vi) The existing quality of ground water, including other sources of contamination and
971 their cumulative impact on the ground water quality;
- 972 (vii) The potential for health risks caused by human exposure to waste constituents;
- 973 (viii) The potential damage to wildlife, crops, vegetation, and physical structures caused
974 by exposure to waste constituents;
- 975 (ix) The persistence and permanence of the potential adverse effects.
- 976 (b) Potential adverse effects on hydraulically-connected surface water quality, considering
- 977 (i) The volume and physical and chemical characteristics of the waste in the licensed
978 site;
- 979 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 980 (iii) The quantity and quality of ground water and the direction of ground water flow;
- 981 (iv) The patterns of rainfall in the region;
- 982 (v) The proximity of the licensed site to surface waters;
- 983 (vi) The current and future uses of surface waters in the area and any water quality
984 standards established for those surface waters;
- 985 (vii) The existing quality of surface water, including other sources of contamination and
986 the cumulative impact on surface water quality;
- 987 (viii) The potential for health risks caused by human exposure to waste constituents;
- 988 (ix) The potential damage to wildlife, crops, vegetation, and physical structures caused
989 by exposure to waste constituents; and

DRAFT A – 10/23/2013

- 990 (x) The persistence and permanence of the potential adverse effects.
- 991 (4) In making any determinations under paragraphs 5B(3) and 5B(6) of this criterion about the use of
992 ground water in the area around the facility, the Department will consider any identification of
993 underground sources of drinking water and exempted aquifers made by the Colorado Water
994 Quality Control Commission, as in 5 CCR 1002-8, or other agency having jurisdiction.
- 995 (5) At the point of compliance, the concentration of a hazardous constituent must not exceed:
- 996 (a) The Department-approved background concentration of that constituent in the ground water;
- 997 (b) The respective value given in the table in paragraph 5C if the constituent is listed in the table
998 and if the background level of the constituent is below the value listed; or
- 999 (c) An alternate concentration limit established by the Department.
- 1000 (6) Conceptually, background concentrations pose no incremental hazards and the drinking water limits
1001 in Criterion 5C state acceptable hazards but these two options may not be practically achievable
1002 at a specific site. Alternate concentration limits that present no significant hazard may be
1003 proposed by licensees for Department consideration. Licensees must provide the basis for any
1004 proposed limits including consideration of practicable corrective actions, that limits are as low as
1005 reasonably achievable, and information on the factors the Department must consider. The
1006 Department will establish a site specific alternate concentration limit for a hazardous constituent
1007 as provided in paragraph 5B(5) of this criterion if it finds that the proposed limit is as low as
1008 reasonably achievable after considering practicable corrective actions, and that the constituent
1009 will not pose a substantial present or potential hazard to human health or the environment as long
1010 as the alternate concentration limit is not exceeded. In making the present and potential hazard
1011 finding, the Department will consider the following factors:
- 1012 (a) Potential adverse effects on ground water quality, considering:
- 1013 (i) The physical and chemical characteristics of the waste in the licensed site including its
1014 potential for migration;
- 1015 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 1016 (iii) The quantity of ground water and the direction of ground water flow;
- 1017 (iv) The proximity and withdrawal rates of ground water users;
- 1018 (v) The current and future uses of ground water in the area;
- 1019 (vi) The existing quality of ground water, including other sources of contamination and
1020 their cumulative impact on the ground water quality;
- 1021 (vii) The potential for health risks caused by human exposure to waste constituents;
- 1022 (viii) The potential damage to wildlife, crops, vegetation, and physical structures caused
1023 by exposure to waste constituents;
- 1024 (ix) The persistence and permanence of the potential adverse effects.
- 1025 (b) Potential adverse effects on hydraulically-connected surface water quality, considering:

DRAFT A – 10/23/2013

- 1026 (i) The volume and physical and chemical characteristics of the waste in the licensed
1027 site;
- 1028 (ii) The hydrogeological characteristics of the facility and surrounding land;
- 1029 (iii) The quantity and quality of ground water, and the direction of ground water flow;
- 1030 (iv) The patterns of rainfall in the region;
- 1031 (v) The proximity of the licensed site to surface waters;
- 1032 (vi) The current and future uses of surface waters in the area and any water quality
1033 standards established for those surface waters;
- 1034 (vii) The existing quality of surface water including other sources of contamination and
1035 the cumulative impact on surface water quality;
- 1036 (viii) The potential for health risks caused by human exposure to waste constituents;
- 1037 (ix) The potential damage to wildlife, crops, vegetations, and physical structures caused
1038 by exposure to waste constituents; and
- 1039 (x) The persistence and permanence of the potential adverse effects.

1040 Criterion 5C.

1041 **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-expoxy- 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-	0.1

DRAFT A – 10/23/2013

methoxyphenylethane)	
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-Trichlorophenoxypropionic acid)	0.01

	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

Criterion 5D. If the ground water protection standards established under paragraph 5B(1) of this criterion are exceeded at a licensed site, a corrective action program must be put into operation as soon as is practicable, and in no event later than eighteen (18) months after the Department finds that the standards have been exceeded. The licensee shall submit the proposed corrective action program and supporting rationale for Department approval prior to putting the program into operation, unless otherwise directed by the Department. The objective of the program is to return hazardous constituent concentration levels in ground water to the concentration limits set as standards. The licensee's proposed program shall address removing the hazardous constituents that have entered the ground water at the point of compliance or treating them in place. The program shall also address removing or treating in place any hazardous constituents that exceed concentration limits in ground water between the point of compliance and the down gradient facility property boundary. The licensee shall continue corrective action measures to the extent necessary to achieve and maintain compliance with the ground water protection standard. The Department will determine when the licensee may terminate corrective action measures based on data from the ground water monitoring program and other information that provide reasonable assurance that the ground water protection standard will not be exceeded.

Criterion 5E. In developing and conducting ground water protection programs, applicants and licensees shall also consider the following:

- (1) Installation of bottom liners (Where synthetic liners are used, a leakage detection system must be installed immediately below the liner to ensure major failures are detected if they occur. This is in addition to the ground water monitoring program conducted as provided in Criterion 7. Where clay liners are proposed or relatively thin, in situ clay soils are to be relied upon for seepage control,

DRAFT A – 10/23/2013

1066 tests must be conducted with representative tailings solutions and clay materials to confirm that
1067 no significant deterioration of permeability or stability properties will occur with continuous
1068 exposure of clay to tailings solutions. Tests must be run for a sufficient period of time to reveal
1069 any effects if they are going to occur (in some cases deterioration has been observed to occur
1070 rather rapidly after about nine months of exposure)).

1071 (2) Mill process designs which provide the maximum practicable recycle of solutions and conservation of
1072 water to reduce the net input of liquid to the tailings impoundment.

1073 (3) Dewatering of tailings by process devices and/or in situ drainage systems (At new sites, tailings must
1074 be dewatered by a drainage system installed at the bottom of the impoundment to lower the
1075 phreatic surface and reduce the driving head of seepage, unless tests show tailings are not
1076 amenable to such a system. Where in situ dewatering is to be conducted, the impoundment
1077 bottom must be graded to assure that the drains are at a low point. The drains must be protected
1078 by suitable filter materials to assure that drains remain free running. The drainage system must
1079 also be adequately sized to assure good drainage).

1080 (4) Neutralization to promote immobilization of hazardous constituents.

1081 Criterion 5E. Where ground water impacts are occurring at an existing site due to seepage, action must
1082 be taken to alleviate conditions that lead to excessive seepage impacts and restore ground water quality.
1083 The specific seepage control and ground water protection method, or combination of methods, to be used
1084 must be worked out on a site-specific basis. Technical specifications must be prepared to control
1085 installation of seepage control systems. A quality assurance, testing, and inspection program, which
1086 includes supervision by a qualified engineer or scientist, must be established to assure the specifications
1087 are met.

1088 Criterion 5G. In support of a tailings disposal system proposal, the applicant/operator shall supply
1089 information concerning the following:

1090 (1) The chemical and radioactive characteristics of the waste solutions.

1091 (2) The characteristics of the underlying soil and geologic formations particularly as they will control
1092 transport of contaminants and solutions. This includes detailed information concerning extent,
1093 thickness, uniformity, shape, and orientation of underlying strata. Hydraulic gradients and
1094 conductivities of the various formations must be determined. This information must be gathered
1095 from borings and field survey methods taken within the proposed impoundment area and in
1096 surrounding areas where contaminants might migrate to ground water. The information gathered
1097 on boreholes must include both geological and geophysical logs in sufficient number and degree
1098 of sophistication to allow determining significant discontinuities, fractures, and channeled deposits
1099 of high hydraulic conductivity. If field survey methods are used, they should be in addition to and
1100 calibrated with borehole logging. Hydrologic parameters such as permeability may not be
1101 determined on the basis of laboratory analysis of samples alone; a sufficient amount of field
1102 testing (e.g., pump tests) must be conducted to assure actual field properties are adequately
1103 understood. Testing must be conducted to allow estimating chemi-sorption attenuation properties
1104 of underlying soil and rock.

1105 (3) Location, extent, quality, capacity and current uses of any ground water at and near the site.

1106 Criterion 5H. Steps must be taken during stockpiling of ore to minimize penetration of radionuclides into
1107 underlying soils; suitable methods include lining and/or compaction of ore storage areas.

1108 **Criterion 6.**

DRAFT A – 10/23/2013

(1) In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design¹ which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average² release rate of 0.74 Becquerel per square meter per second ($\text{Bq/m}^2 \text{ s}$), or 20 picocuries per square meter per second ($\text{pCi/m}^2 \text{ s}$), to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this criterion. In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances may not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer may not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed as cover materials, it must be demonstrated that these materials will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term intervals.

¹ In the case of thorium byproduct materials, the standard applies only to design. Monitoring for radon emissions from thorium byproduct materials after installation of an appropriately designed cover is not required.

² This average applies to the entire surface of each disposal area over a period of at least one year, but a period short compared to 100 years. Radon will come from both byproduct materials and from covering materials. Radon emissions from covering materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to the emissions from byproduct materials to the atmosphere.

(2) As soon as reasonably achievable after emplacement of the final cover to limit releases of radon-222 from uranium byproduct material and prior to placement of erosion protection barriers or other features necessary for long-term control of the tailings, the licensee shall verify through appropriate testing and analysis that the design and construction of the final radon barrier is effective in limiting releases of radon-222 to a level not exceeding $0.74 \text{ Bq/m}^2 \text{ s}$ ($20 \text{ pCi/m}^2 \text{ s}$) averaged over the entire pile or impoundment using the procedures described in 40 CFR Part 61, Appendix B, Method 115, or another method of verification approved by the Department as being at least as effective in demonstrating the effectiveness of the final radon barrier.

(3) When phased emplacement of the final radon barrier is included in the applicable reclamation plan, the verification of radon-222 release rates required in paragraph (2) of this Criterion must be conducted for each portion of the pile or impoundment as the final radon barrier for that portion is emplaced.

(4) Within ninety days of the completion of all testing and analysis relevant to the required verification in paragraphs (2) and (3) of this Criterion, the uranium mill licensee shall report to the Department the results detailing the actions taken to verify that levels of release of radon-222 do not exceed $0.74 \text{ Bq/m}^2 \text{ s}$ ($20 \text{ pCi/m}^2 \text{ s}$) when averaged over the entire pile or impoundment. The licensee shall maintain records until termination of the license documenting the source of input parameters including the results of all measurements on which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine compliance. These records shall be kept in a form suitable for transfer to the custodial agency at the time of transfer of the site to the U.S. Department of Energy or State for long-term care if requested.

(5) Near surface cover materials, i.e., within the top three meters (10 feet), may not include waste or rock that contains elevated levels of radium; soils used for near surface cover must be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils. This is to ensure that surface radon exhalation is not significantly above background because of the cover material itself.

(6) The design requirements in this Criterion for longevity and control of radon releases apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which as a result of byproduct material, does

DRAFT A – 10/23/2013

not exceed the background level by more than: (i) 0.18 Becquerels (5 picocuries) per gram of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 0.56 Becquerels (15 pCi) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface.

Byproduct material containing concentrations of radionuclides other than radium in soil, and surface activity on remaining structures, must not result in a total effective dose equivalent (TEDE) exceeding the dose from cleanup of radium contaminated soil to the above standard (benchmark dose), and must be at levels which are as low as is reasonably achievable. If more than one residual radionuclide is present in the same 100 square-meter area, the sum of the ratios for each radionuclide of concentration present to the concentration limit will not exceed "1" (unity). A calculation of the potential peak annual TEDE within 1000 years to the average member of the critical group that would result from applying the radium standard (not including radon) on the site must be submitted for approval. The use of decommissioning plans with benchmark doses which exceed 1 millisievert per year (100 mrem/year), before application of ALARA, requires the approval of the Department. This requirement for dose criteria does not apply to sites that have decommissioning plans for soil and structures approved before the effective date of this Criterion 6(6).

(7) The licensee shall also address the nonradiological hazards associated with the wastes in planning and implementing closure. The licensee shall ensure that disposal areas are closed in a manner that minimizes the need for further maintenance. To the extent necessary to prevent threats to human health and the environment, the licensee shall control, minimize, or eliminate post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere.

Comment [JJ49]: Comma added based on editorial comment made by NRC in letter dated 11/10/2004.

Criterion 6A.

(1) For impoundments containing uranium byproduct materials, the final radon barrier must be completed as expeditiously as practicable considering technological feasibility after the pile or impoundment ceases operation in accordance with a written, Department-approved reclamation plan. (The term as expeditiously as practicable considering technological feasibility as specifically defined in 18.2 includes factors beyond the control of the licensee). Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization including dewatering or the removal of freestanding liquids and recontouring. The placement of erosion protection barriers or other feature necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Department-approved reclamation plan.

(2) The Department may approve a licensee's request to extend the time for performance of milestones related to emplacement of the final radon barrier if, after providing an opportunity for public participation, the Department finds that the licensee has adequately demonstrated in the manner required in paragraph (2) of Criterion 6 that releases of radon-222 do not exceed an average of $0.74 \text{ Becquerel/m}^2 \text{ s}$ ($20 \text{ pCi/m}^2 \text{ s}$). If the delay is approved on the basis that the radon releases do not exceed $0.74 \text{ Becquerel/m}^2 \text{ s}$ ($20 \text{ pCi/m}^2 \text{ s}$), a verification of radon levels, as required by paragraph (2) of Criterion 6, must be made annually during the period of delay. In addition, once the Department has established the date in the reclamation plan for the milestone for completion of the final radon barrier, the Department may extend that date based on cost if after providing an opportunity for public participation, the Department finds that the licensee is making good faith efforts to emplace the final radon barrier, the delay is consistent with the definition of available technology, and the radon releases caused by the delay will not result in a significant incremental risk to the public health.

(3) The Department may authorize by license amendment, upon licensee request, a portion of the impoundment to accept uranium byproduct material or such materials that are similar in physical,

Comment [JJ50]: Change in wording based on editorial comment made by NRC in letter dated 11/10/2004.

DRAFT A – 10/23/2013

chemical, and radiological characteristics to the uranium mill tailings and associated wastes already in the pile or impoundment from other sources, during the closure process. No such authorization will be made if it results in a delay or impediment to emplacement of the final radon barrier over the remainder of the impoundment in a manner that will achieve levels of radon-222 releases not exceeding $0.74 \text{ Becquerel/m}^2 \text{ s}$ ($20 \text{ pCi/m}^2 \text{ s}$) averaged over the entire impoundment. The verification required in paragraph (2) of Criterion 6 may be completed with a portion of the impoundment being used for further disposal if the Department makes a final finding that the impoundment will continue to achieve a level of radon-222 release not exceeding $0.74 \text{ Becquerel/m}^2 \text{ s}$ ($20 \text{ pCi/m}^2 \text{ s}$) averaged over the entire impoundment. In this case, after the final radon barrier is complete except for the continuing disposal area, (a) only byproduct material will be authorized for disposal, (b) the disposal will be limited to the specified existing disposal area, and (c) this authorization will only be made after providing opportunity for public participation. Reclamation of the disposal area, as appropriate, must be completed in a timely manner after disposal operations cease in accordance with paragraph (1) of Criterion 6; however, these actions are not required to be complete as part of meeting the deadline for final radon barrier construction.

Criterion 7.

The licensee shall establish a detection monitoring program needed for the Department to set the site-specific ground water protection standards in paragraph 5B(1) of this appendix. For all monitoring under this paragraph, the licensee or applicant will propose for Department approval as license conditions which constituents are to be monitored on a site-specific basis. A detection monitoring program has two purposes. The initial purpose of the program is to detect leakage of hazardous constituents from the disposal area so that the need to set ground water protection standards is monitored. If leakage is detected, the second purpose of the program is to generate data and information needed for the Department to establish the standards under Criterion 5B. The data and information must provide a sufficient basis to identify those hazardous constituents which require concentration limit standards and to enable the Department to set the limits for those constituents and the compliance period. They may also need to provide the basis for adjustments to the point of compliance. The detection monitoring programs must be in place when specified by the Department in orders or license conditions. Once ground water protection standards have been established pursuant to paragraph 5B(1), the licensee shall establish and implement a compliance monitoring program. The purpose of the compliance monitoring program is to determine that the hazardous constituent concentrations in ground water continue to comply with the standards set by the Department. In conjunction with a corrective action program, the licensee shall establish and implement a corrective action monitoring program. The purpose of the corrective action monitoring program is to demonstrate the effectiveness of the corrective actions. Any monitoring program required by this paragraph may be based on existing monitoring programs to the extent the existing programs can meet the stated objective for the program.

Criterion 8.

Milling operations must be conducted so that all airborne effluent releases are reduced to levels as low as is reasonably achievable. The primary means of accomplishing this must be by means of emission controls. Institutional controls, such as extending the site boundary and exclusion area, may be employed to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to control emissions at the source. Notwithstanding the existence of individual dose standards, strict control of emissions is necessary to assure that population exposures are reduced to the maximum extent reasonably achievable and to avoid site contamination. The greatest potential sources of offsite radiation exposure (aside from radon exposure) are dusting from dry surfaces of the tailings disposal area not covered by tailings solution and emissions from yellowcake drying and packaging operations. During operations and prior to closure, radiation doses from radon emissions from surface impoundments of uranium or thorium byproduct materials must be kept as low as is reasonably achievable.

Checks must be made and logged hourly for all parameters (e.g., differential pressures and scrubber water flow rates) that determine the efficiency of yellowcake stack emission control equipment operation.

DRAFT A – 10/23/2013

1261 The licensee shall retain each log as a record for three years after the last entry in the log is made. It
1262 must be determined whether or not conditions are within a range prescribed to ensure that the equipment
1263 is operating consistently near peak efficiency; corrective action must be taken when performance is
1264 outside of prescribed ranges. Effluent control devices must be operative at all times during drying and
1265 packaging operations and whenever air is exhausting from the yellowcake stack. Drying and packaging
1266 operations must terminate when controls are inoperative. When checks indicate the equipment is not
1267 operating within the range prescribed for peak efficiency, actions must be taken to restore parameters to
1268 the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging
1269 operations must cease as soon as practicable. Operations may not be restarted after cessation due to off-
1270 normal performance until needed corrective actions have been identified and implemented. All these
1271 cessations, corrective actions, and restarts must be reported to the Department as indicated in Criterion
1272 8A, in writing, within ten days of the subsequent restart.

1273 To control dusting from tailings, that portion not covered by standing liquids must be wetted or chemically
1274 stabilized to prevent or minimize blowing and dusting to the maximum extent reasonably achievable. This
1275 requirement may be relaxed if tailings are effectively sheltered from wind, such as may be the case where
1276 they are disposed of below grade and the tailings surface is not exposed to wind. Consideration must be
1277 given in planning tailings disposal programs to methods which would allow phased covering and
1278 reclamation of tailings impoundments because this will help in controlling particulate and radon emissions
1279 during operation. To control dusting from diffuse sources, such as tailings and ore pads where automatic
1280 controls do not apply, operators shall develop written operating procedures specifying the methods of
1281 control which will be utilized.

1282 Milling operations producing or involving uranium and thorium byproduct materials must be conducted in
1283 such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 0.25
1284 millisievert (25 millirem) to the whole body, 0.75 millisievert (75 millirem) to the thyroid, and 0.25
1285 millisievert (25 millirem) to any other organ of any member of the public as a result of exposures to the
1286 planned discharge of radioactive material, radon and its progeny excepted, to the general environment.

1287 Uranium and thorium byproduct materials must be managed so as to conform to the applicable provisions
1288 of Title 40 of the *Code of Federal Regulations*, Part 440, "Ore Mining and Dressing Point Source
1289 Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium,
1290 Radium, and Vanadium Ores Subcategory", as codified on January 1, 1983.

1291 Criterion 8A. Inspections of tailings or waste retention systems must be conducted daily during
1292 operations, or at an alternate frequency approved by the Department for other conditions. Such
1293 inspections shall be conducted by, or under the supervision of, a qualified engineer or scientist, and
1294 documented. The licensee shall retain the documentation for each inspection as a record for three years
1295 after the documentation is made. The Department must be immediately notified of any failure in a tailings
1296 or waste retention system that results in a release of tailings or waste into unrestricted areas, or any
1297 unusual conditions (conditions not contemplated in the design of the retention system) that if not
1298 corrected could indicate the potential or lead to failure of the system and result in a release of tailings or
1299 waste into unrestricted areas.

1300 **Criterion 9.**

1301 Criterion 9A. These criteria relating to ownership of tailings and their disposal sites became effective on
1302 November 8, 1981, and apply to all licenses terminated, issued, or renewed after that date.

1303 Criterion 9B. Any uranium or thorium milling license or tailings license must contain such terms and
1304 conditions as the NRC and Department determine necessary to assure that prior to termination of the
1305 license, the licensee will comply with ownership requirements of this criterion for sites used for tailings
1306 disposal.

1307 Criterion 9C. Title to the byproduct material licensed under this Part 18 and land, including any interests
1308 therein (other than land owned by the United States or by the State), which is used for the disposal of any

DRAFT A – 10/23/2013

such byproduct material, or is essential to ensure the long-term stability of such disposal site, must be transferred to the United States or the State in which such land is located, at the option of such State. In view of the fact that physical isolation must be the primary means of long-term control, and Government land ownership is a desirable supplementary measure, ownership of certain severable subsurface interests (for example, mineral rights) may be determined to be unnecessary to protect the public health and safety and the environment. In any case, however, the applicant/operator must demonstrate a serious effort to obtain such subsurface rights, and must in the event that certain rights cannot be obtained, provide notification in local public land records of the fact that the land is being used for the disposal of radioactive material and is subject to ~~either an NRC or Department~~ general or specific license prohibiting the disruption and disturbance of the tailings. In some rare cases, such as may occur with deep burial where no ongoing site surveillance will be required, surface land ownership transfer requirements may be waived with the approval of the ~~Department and~~ NRC. For licenses issued before November 8, 1981, the ~~Department and~~ NRC may take into account the status of the ownership of such land, and interests therein, and the ability of a licensee to transfer title and custody thereof to the United States or the State.

Criterion 9D. If the NRC, ~~or the Department if title is held by the State,~~ subsequent to title transfer determines that use of the surface or subsurface estates, or both, of the land transferred to the United States or to a State will not endanger the public health, safety, welfare, or environment, the NRC, ~~or the Department if title is held by the State, may shall~~ permit the use of the surface or subsurface estates, or both, of such ~~land and~~ in a manner consistent with the provisions provided in these criteria. If the NRC, ~~or the Department if title is held by the state,~~ permits such use of such land, it will provide the person who transferred such land with the right of first refusal with respect to such use of such land.

Criterion 9E. Material and land transferred to the United States or the State in accordance with this Criterion 9 must be transferred to the United States or the State without cost other than administrative or legal costs incurred in carrying out such transfer.

Criterion 9F. The provisions of this part respecting transfer of title and custody to land and tailings and wastes do not apply in the case of lands held in trust by the United States for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the case of such lands which are used for the disposal of uranium or thorium byproduct material, as defined in Part 1, the licensee shall enter into arrangements with the NRC as may be appropriate to assure the long-term surveillance of such lands by the United States.

Criterion 10.

Secondary ground-water protection standards required by Criterion 5 of this Appendix are concentration limits for individual hazardous constituents. The following list of constituents identifies the constituents for which standards must be set and complied with if the specific constituent is reasonably expected to be in or derived from the radioactive material and has been detected in ground water. For purposes of this Appendix, the property of gross alpha activity will be treated as if it is a hazardous constituent. Thus, when setting standards under paragraph 5B(5) of Criterion 5, the Department will also set a limit for gross alpha activity. The Department does not consider the following list imposed by 40 CFR Part 192 to be exhaustive and may determine other constituents to be hazardous on a case-by-case basis, independent of those specified by the U.S. Environmental Protection Agency in Part 192.

PART 18 - CRITERION 10 HAZARDOUS CONSTITUENTS

- Acetonitrile (Ethanenitrile)
- Acetophenone (Ethanone, 1-phenyl)
- 3-(alpha-Acetylnylbenzyl)-4-hydroxycoumarin and salts (Warfarin)

Comment [JJ51]: 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

10 CFR 40.2a; 10 CFR Part 40, Appendix A.
Compatibility = NRC

Comment [JJ52]: 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 comments is that the NRC retains regulatory jurisdiction in the matters described in Criterion 9C and 9D.

10 CFR 40.2a; 10 CFR Part 40, Appendix A.

DRAFT A – 10/23/2013

- 1354 - 2-Acetylaminofluorene (Acetamide, N-(9H-fluoren-2-yl)-)
- 1355 - Acetyl chloride (Ethanoyl chloride)
- 1356 - 1-Acetyl-2-thiourea (Acetamide, N-(aminothioxomethyl)-)
- 1357 - Acrolein (2-Propenal)
- 1358 - Acrylamide (2-Propenamide)
- 1359 - Acrylonitrile (2-Propenenitrile)
- 1360 - Aflatoxins
- 1361 - Aldrin (1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a,8b-hexahydro-endo,exo-1,4:5,8-Dimethanonaphthalene)
- 1362 - Allyl alcohol (2-Propen-1-ol)
- 1363 - Aluminum phosphide
- 1364 - 4-Aminobiphenyl ([1,1'-Biphenyl])-4-amine)
- 1365 - 6-Amino-1,1a,2,8,8a,8b-hexahydro-8-(hydroxymethyl)-8a-methoxy-5-methyl-carbamate
1366 azirino(2,3:3,4)pyrrolo(1,2-a)indole-4,7-dione,(ester) (Mitomycin C) (Azirino[2,3:3,4]pyrrolo(1,2-
1367 a)indole-4,7-dione,6-amino-8-(((amino-carbonyl)oxy)methyl)-1,1a,2,8,8a,8b-hexahydro-8a
1368 methoxy-5-methyl-)
- 1369 - 5-(Aminomethyl)-3-isoxazolol (3(2H)-Isoxazolone, 5-(aminomethyl)-)4-Aminopyridine (4-Pyridinamine)
- 1370 - Amitrole (1H-1,2,4-Triazol-3-amine)
- 1371 - Aniline (Benzenamine)
- 1372 - Antimony and compounds, N.O.S. ³
- 1373 - Aramite (Sulfurous acid,2-chloroethyl-,2-(4-(1,1-dimethylethyl)phenoxy)-1-methylethyl ester)
- 1374 - Arsenic and compounds, N.O.S. ³
- 1375 - Arsenic acid (Orthoarsenic acid)
- 1376 - Arsenic pentoxide (Arsenic (V) oxide)
- 1377 - Arsenic trioxide (Arsenic (III) oxide)
- 1378 - Auramine (Benzenamine,4,4-carbonimidoylbis (N,N-Dimethyl-,monohydrochloride)
- 1379 - Azaserine (L-Serine, diazoacetate (ester))
- 1380 - Barium and compounds, N.O.S. ³
- 1381 - Barium cyanide
- 1382 - Benz(c)acridine (3,4-Benzacridine)

DRAFT A – 10/23/2013

- 1383 - Benz(a)anthracene (1,2-Benzanthracene)
- 1384 - Benzene (Cyclohexatriene)
- 1385 - Benzenearsonic acid (Arsonic acid, phenyl-)
- 1386 - Benzene, dichloromethyl-(Benzal chloride)
- 1387 - Benzenethiol (Thiophenol)
- 1388 - Benzidine ([1,1-Biphenyl]-4,4 diamine)
- 1389 - Benzo(b)fluoranthene (2,3-Benzofluoranthene)
- 1390 - Benzo(j)fluoranthene (7,8-Benzofluoranthene)
- 1391 - Benzo(a)pyrene (3,4-Benzopyrene)
- 1392 - p-Benzoquinone (1,4-Cyclohexadienedione)
- 1393 - Benzotrichloride (Benzene, Trichloromethyl)
- 1394 - Benzyl chloride (Benzene, (chloromethyl)-)
- 1395 - Beryllium and compounds, N.O.S. ³
- 1396 - Bis(2-chloroethoxy)methane (Ethane, 1,1-(methylenebis(oxy))bis[2-chloro-])
- 1397 - Bis(2-chloroethyl) ether (Ethane, 1,1-oxybis (2-chloro-))
- 1398 - N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)
- 1399 - Bis(2-Chloroisopropyl) ether (Propane, 2,2-oxybis[2-chloro-])
- 1400 - Bis(chloromethyl) ether (methane,oxybis[chloro-])
- 1401 - Bis(2-ethylhexyl) phthalate (1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester)
- 1402 - Bromoacetone (2-Propanone, 1-bromo-)
- 1403 - Bromomethane (Methyl bromide)
- 1404 - 4-Bromophenyl phenyl ether (Benzene, 1-bromo-4-phenoxy-)
- 1405 - Brucine (Strychnidin-10-one, 2,3-dimethoxy-)
- 1406 - 2-Butanone peroxide (Methyl ethyl ketone,peroxide)
- 1407 - Butyl benzyl phthalate (1,2-Benzenedicarboxylic acid, butylphenylmethyl ester)
- 1408 - 2-sec-Butyl-4,6-dinitrophenol (DNBP) (Phenol,2,4-dinitro-6-(1-methylpropyl)-)
- 1409 - Cadmium and compounds, N.O.S. ³
- 1410 - Calcium chromate (Chromic acid, calcium salt)

DRAFT A – 10/23/2013

- 1411 - Calcium cyanide
- 1412 - Carbon disulfide (Carbon bisulfide)
- 1413 - Carbon oxyfluoride (Carbonyl fluoride)
- 1414 - Chloral (Acetaldehyde, trichloro-)
- 1415 - Chlorambucil (Butanoic acid, 4-(bis(2-chloroethyl)amino)benzene-)
- 1416 - Chlordane (alpha and gamma isomers)4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3,4,7,7a-
- 1417 tetrahydro-) (alpha and gamma isomers)
- 1418 - Chlorinated benzenes, N.O.S. ³
- 1419 - Chlorinated ethane, N.O.S. ³
- 1420 - Chlorinated fluorocarbons, N.O.S. ³
- 1421 - Chlorinated naphthalene, N.O.S. ³
- 1422 - Chlorinated phenol, N.O.S. ³
- 1423 - Chloroacetaldehyde (Acetaldehyde, chloro-)
- 1424 - Chloroalkyl ethers N.O.S. ³
- 1425 - p-Chloroaniline (Benzenamine, 4-chloro-)
- 1426 - Chlorobenzene (Benzene, chloro-)
- 1427 - Chlorobenzilate (Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-,ethyl ester)
- 1428 - p-Chloro-m-cresol (Phenol, 4-chloro-3-methyl)
- 1429 - 1-Chloro-2,3-epoxypropane (Oxirane, 2-(chloromethyl)-)
- 1430 - 2-Chloroethyl vinyl ether (Ethene, (2-chloroethoxy)-)
- 1431 - Chloroform (Methane, trichloro-)
- 1432 - Chloromethane (Methyl chloride)
- 1433 - Chloromethyl methyl ether (Methane, chloromethoxy-)
- 1434 - 2-Chloronaphthalene (Naphthalene, betachloro-)
- 1435 - 2-Chlorophenol (Phenol, o-chloro-)
- 1436 - 1-(o-Chlorophenyl) thiourea (Thiourea, (2-chlorophenyl)-)
- 1437 - 3-Chloropropionitrile (Propanenitrile, 3-chloro-)
- 1438 - Chromium and compounds, N.O.S. ³

DRAFT A – 10/23/2013

- 1439 - Chrysene (1,2-Benzphenanthrene)
- 1440 - Citrus red No. 2 (2-Naphthol, 1-((2,5-dimethoxyphenyl)azo)-)
- 1441 - Coal tars
- 1442 - Copper cyanide
- 1443 - Creosote (Creosote, wood)
- 1444 - Cresols (Cresylic acid) (Phenol, methyl-)
- 1445 - Crotonaldehyde (2-Butenal)
- 1446 - Cyanides (soluble salts and complexes), N.O.S. ³
- 1447 - Cyanogen (Ethanedinitrile)
- 1448 - Cyanogen bromide (Bromine cyanide)
- 1449 - Cyanogen chloride (Chlorine cyanide)
- 1450 - Cycasin (beta-D-Glucopyranoside, (methyl-ONN-azoxy)methyl-)
- 1451 - 2-Cyclohexyl-4,6-dinitrophenol (phenol, 2-cyclohexyl-4,6-dinitro-)
- 1452 - Cyclophosphamide (2H-1,3,2-Oxazaphosphorine (bis(2-chloroethyl)amino)-tetrahydro-,2-oxide)
- 1453 - Daunomycin (5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-((3-amino-2,3,6-trideoxy)-alpha-L-lyxo-
1454 hexopyranosyl)oxy)7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-)
- 1455 - DDD (Dichlorodiphenyldichloroethane)(Ethane, 1,1-dichloro-2,2-bis(p-chlorophenyl)-)
- 1456 - DDE (Ethylene, 1,1-dichloro-2,2-bis(4-chlorophenyl)-)
- 1457 - DDT (Dichlorodiphenyltrichloroethane) (Ethane, 1,1,1-trichloro-2,2-bis (p-chlorophenyl)-)
- 1458 - Diallate (S-(2,3-dichloroallyl)diisopropylthiocarbamate)
- 1459 - Dibenzo(a,h)acridine(1,2,5,6-Dibenzacridine)
- 1460 - Dibenzo(a,j)acridine(1,2,7,8-Dibenzacridine)
- 1461 - Dibenzo(a,h)anthracene (1,2,5,6-Dibenzanthracene)
- 1462 - 7H-Dibenzo(c,g)carbazole (3,4,5,6-Dibenzcarbazole)
- 1463 - Dibenzo(a,e)pyrene(1,2,4,5-Dibenzpyrene)
- 1464 - Dibenzo(a,h)pyrene(1,2,5,6-Dibenzpyrene)
- 1465 - Dibenzo(a,i)pyrene(1,2,7,8-Dibenzpyrene)
- 1466 - 1,2-Dibromo-3-chloropropane (Propane, 1,2-dibromo-3-chloro-)

DRAFT A – 10/23/2013

- 1467 - 1,2 Dibromoethane (Ethylene dibromide)
- 1468 - Dibromomethane (Methylene bromide)
- 1469 - Di-n-butyl phthalate (1,2-Benzenedicarboxylic acid, dibutyl ester)
- 1470 - o-Dichlorobenzene (Benzene, 1,2-dichloro-)
- 1471 - m-Dichlorobenzene (Benzene, 1,3-dichloro-)
- 1472 - p-Dichlorobenzene (Benzene, 1,4-dichloro-)
- 1473 - Dichlorobenzene, N.O.S.³ (Benzene, dichloro-N.O.S.³)
- 1474 - 3,3-Dichlorobenzidine ([1,1, Biphenyl]-4,4-diamine, 3,3-dichloro-)
- 1475 - 1,4-Dichloro-2-butene (2-Butene, 1,4-dichloro-)
- 1476 - Dichlorodifluoromethane (Methane, dichlorodifluoro-)
- 1477 - 1,1 Dichloroethane (Ethylidene dichloride)
- 1478 - 1,2 Dichloroethane (Ethylene dichloride)
- 1479 - trans-1,2-Dichloroethene (1,2-Dichloroethylene)
- 1480 - Dichloroethylene, N.O.S.³ (Ethene, dichloro-N.O.S.³)
- 1481 - 1,1-Dichloroethylene (Ethene, 1,1-dichloro-)
- 1482 - Dichloromethane (Methylene chloride)
- 1483 - 2,4-Dichlorophenol (Phenol, 2,4-dichloro-)
- 1484 - 2,6-Dichlorophenol (Phenol, 2,6-dichloro-)
- 1485 - 2,4-Dichlorophenoxyacetic acid (2,4-D), salts and esters (Acetic acid, 2,4-dichlorophenoxy-, salts and esters)
- 1486
- 1487 - Dichlorophenylarsine (Phenyl dichloroarsine)
- 1488 - Dichloropropane, N.O.S.³ (Propane, dichloro-N.O.S.³)
- 1489 - 1,2-Dichloropropane (Propylene dichloride)
- 1490 - Dichloropropanol, N.O.S.³ (Propanol, dichloro-N.O.S.³)
- 1491 - Dichloropropene, N.O.S.³ (Propene, dichloro-N.O.S.³)
- 1492 - 1,3-Dichloropropene (1-Propene, 1,3-dichloro-)
- 1493 - 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-
- 1494 Dimethanonaphthalene)
- 1495 - 1,2:3,4-Diepoxybutane (2,2,-Bioxirane)

DRAFT A – 10/23/2013

- 1496 - Diethylarsine (Arsine, diethyl-)
- 1497 - N,N-Diethylhydrazine (Hydrazine, 1,2-diethyl)
- 1498 - O,O-Diethyl S-methyl ester of phosphorodithioic acid (Phosphorodithioic acid, O,O-diethyl S-methyl
1499 ester)
- 1500 - O,O-Diethylphosphoric acid, O-p-nitrophenyl ester (Phosphoric acid, diethyl p-nitrophenyl ester)
- 1501 - Diethyl phthalate (1,2-Benzenedicarboxylic acid, diethyl ester)
- 1502 - O,O-Diethyl O-2-pyrazinyl phosphorothioate (Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester)
- 1503 - Diethylstilbesterol (4,4-Stilbenediol, alpha, alpha-diethyl, bis(dihydrogen phosphate, (E)-)
- 1504 - Dihydrosafrole (Benzene, 1,2-methylenedioxy-4-propyl-)
- 1505 - 3,4-Dihydroxy-alpha-(methylamino)methylbenzyl alcohol (1,2-Benzenediol, 4-(1-hydroxy-2
1506 (methylamino)ethyl))
- 1507 - Diisopropylfluorophosphate (DFP) (Phosphorofluoridic acid, bis(1-methylethyl) ester)
- 1508 - Dimethoate (Phosphorodithioic acid, O,O-dimethyl S-(2-(methylamino)-2-oxoethyl) ester)
- 1509 - 3,3-Dimethoxybenzidine ((1,1-Biphenyl)-4,4,-diamine, 3,3,-dimethoxy-)
- 1510 - p-Dimethylaminoazobenzene (Benzenamine, N,N-dimethyl-4-(phenylazo)-)
- 1511 - 7,12-Dimethylbenz(a)anthracene(1,2-Benzanthracene, 7,12-dimethyl-)
- 1512 - 3,3-Dimethylbenzidine (1,1-Biphenyl)-4,4,diamine, 3,3-dimethyl-)
- 1513 - Dimethylcarbamoyl chloride (Carbamoyl chloride, dimethyl)
- 1514 - 1,1 Dimethylhydrazine (Hydrazine, 1,1-dimethyl-)
- 1515 - 1,2-Dimethylhydrazine (Hydrazine, 1,2-dimethyl-)
- 1516 - 3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino) carbonyl] oxime (Thiofanox)
- 1517 - alpha,alpha-Dimethylphenethylamine (Ethanamine, 1,1-dimethyl-2-phenyl-)
- 1518 - 2,4-Dimethylphenol (Phenol, 2,4-dimethyl-)
- 1519 - Dimethyl phthalate (1,2-Benzenedicarboxylic acid, dimethyl ester)
- 1520 - Dimethyl sulfate (Sulfuric acid, dimethyl ester)
- 1521 - Dinitrobenzene, N.O.S. ³ (Benzene, dinitro-N.O.S. ³)
- 1522 - 4,6-Dinitro-o-cresol and salts (Phenol, 2,4-dinitro-6-methyl-, and salts)
- 1523 - 2,4-Dinitrophenol (Phenol, 2,4-dinitro-)
- 1524 - 2,4-Dinitrotoluene (Benzene, 1-methyl-2,4-dinitro-)

DRAFT A – 10/23/2013

- 1525 - 2,6-Dinitrotoluene (Benzene, 1-methyl 2,6-dinitro-)
- 1526 - Di-n-octyl phthalate (1,2-Benzenedicarboxylic acid, dioctyl ester)
- 1527 - 1,4-Dioxane (1,4-Diethylene oxide)
- 1528 - Diphenylamine (Benzenamine, N-phenyl-)
- 1529 - 1,2-Diphenylhydrazine (Hydrazine, 1,2-diphenyl-)
- 1530 - Di-n-propylnitrosamine (N-Nitroso-di-n-propylamine)
- 1531 - Disulfoton (O,O-diethyl S-(2-(ethylthio)ethyl) phosphorodithioate)
- 1532 - 2,4-Dithiobiuret (Thiomidodicarbonic diamide)
- 1533 - Endosulfan (5-Norbornene, 2,3-dimethanol,1,4,5,6,7,7-hexachloro-cyclic sulfite)
- 1534 - Endrin and metabolites (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo, endo-
1535 1,4,5,8-dimethanonaphthalene, and metabolites)
- 1536 - Ethyl carbamate (Urethan) (Carbamic acid, ethyl ester)
- 1537 - Ethyl cyanide (Propanenitrile)
- 1538 - Ethylenebisdithiocarbamic acid, salts, and esters (1,2-Ethanediy-biscarbamodithioic acid, salts and
1539 esters)
- 1540 - Ethyleneimine (Aziridine)
- 1541 - Ethylene oxide (Oxirane)
- 1542 - Ethylenethiourea (2-Imidazolidinethione)
- 1543 - Ethyl methacrylate (2-Propenoic acid, 2-methyl-, ethyl ester)
- 1544 - Ethyl methanesulfonate (Methanesulfonic acid, ethyl ester)
- 1545 - Fluoranthene (Benzo[j,k]fluorene)
- 1546 - Fluorine
- 1547 - 2-Fluoroacetamide (Acetamide, 2-fluoro-)
- 1548 - Fluoroacetic acid, sodium salt (Acetic acid, fluoro-sodium salt)
- 1549 - Formaldehyde (Methylene oxide)
- 1550 - Formic acid (Methanoic acid)
- 1551 - Glycidylaldehyde (1-Propanol-2,3 epoxy)
- 1552 - Halomethane, N.O.S. ³
- 1553 - Heptachlor (4,7-Methano-1H-indene.1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-)

DRAFT A – 10/23/2013

- 1554 - Heptachlor epoxide (alpha, beta, and gamma isomers) (4,7-Methano-1H-indene, 1,4,5,6,7,8,8-
1555 heptachloro-2,3-epoxy-3a,4,7,7-tetrahydro-,alpha, beta, and gamma isomers)
- 1556 - Hexachlorobenzene (Benzene, hexachloro-)
- 1557 - Hexachlorobutadiene (1,3-Butadiene, 1,1,2,3,4,4-hexachloro-)
- 1558 - Hexachlorocyclohexane (all isomers) (Lindane and isomers)
- 1559 - Hexachlorocyclopentadiene (1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-)
- 1560 - Hexachloroethane (Ethane, 1,1,1,2,2,2-hexachloro-)
- 1561 - 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,endo-dimethanonaphthalene
1562 (Hexachlorohexa-hydro-endo,endo-dimethanonaphthalene)
- 1563 - Hexachlorophene (2,2,-Methylenebis(3,4,6-trichlorophenol)
- 1564 - Hexachloropropene (1-Propene, 1,1,2,3,3,3-hexachloro-)
- 1565 - Hexaethyl tetraphosphate (Tetraphosphoric acid, hexaethyl ester)
- 1566 - Hydrazine (Diamine)
- 1567 - Hydrocyanic acid (Hydrogen cyanide)
- 1568 - Hydrofluoric acid (Hydrogen fluoride)
- 1569 - Hydrogen sulfide (Sulfur hydride)
- 1570 - Hydroxydimethylarsine oxide (Cacodylic acid)
- 1571 - Indeno (1,2,3-cd)pyrene(1,10-(1,2-phenylene)pyrene)
- 1572 - Iodomethane (Methyl iodide)
- 1573 - Iron dextran (Ferric dextran)
- 1574 - Isocyanic acid, methyl ester (Methyl isocyanate)
- 1575 - Isobutyl alcohol (1-Propanol, 2-methyl-)
- 1576 - Isosafrole (Benzene, 1,2-methylenedioxy-4-allyl-)
- 1577 - Kepone (decachlorooctahydro-1,3,4-Methano-2H-cyclobuta[cd]pentalen-2-one)
- 1578 - Lasiocarpine (2-Butenoic acid, 2-methyl-,7-[(2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy)
1579 methyl]2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl-ester)
- 1580 - Lead and compounds, N.O.S. ³
- 1581 - Lead acetate (Acetic acid, lead salt)
- 1582 - Lead phosphate (Phosphoric acid, lead salt)

DRAFT A – 10/23/2013

- 1583 - Lead subacetate (Lead, bis(acetato-O)tetrahydroxytri-)
- 1584 - Maleic anhydride (2,5-Furandione)
- 1585 - Maleic hydrazide (1,2-Dihydro-3,6-pyridazinedione)
- 1586 - Malononitrile (Propanedinitrile)
- 1587 - Melphalan (Alanine, 3-(p-bis(2-chloroethyl)amino)phenyl-L-)- Mercury fulminate (Fulminic acid, mercury
1588 salt)
- 1589 - Mercury and compounds, N.O.S. ³
- 1590 - Methacrylonitrile (2-Propenenitrile,2-methyl-)
- 1591 - Methanethiol (Thiomethanol)
- 1592 - Methapyrilene (Pyridine, 2-[(2-dimethylamino)ethyl])-2-thenylamino-)
- 1593 - Metholmyl (Acetimidic acid, N-[(methylcarbamoyl)oxy] thio-,methyl ester)
- 1594 - Methoxychlor (Ethane, 1,1,1-trichloro-2,2,-bis(p-methoxyphenyl)-)
- 1595 - 2-Methylaziridine (1,2-Propylenimine)
- 1596 - 3-Methylcholanthrene (Benz[j]aceanthrylene,1,2-dihydro-3-methyl-)
- 1597 - Methyl chlorcarbonate (Carbonochloridicacid, methyl ester)
- 1598 - 4,4-Methylenebis (2-chloroaniline) Benzenamine, 4,4-methylenebis-(2-chloro-)
- 1599 - Methyl ethyl ketone (MEK) (2-Butanone)
- 1600 - Methyl hydrazine (Hydrazine methyl-)
- 1601 - 2-Methylactonitrile (Propanenitrile 2-hydroxy-2-methyl-)
- 1602 - Methyl methacrylate (2-Propenoic acid, 2-methyl-, methyl ester)
- 1603 - Methyl methanesulfonate Methanesulfonicacid, methyl ester)
- 1604 - 2-Methyl-2-(methylthio)propionaldehyde-o-(methylcarbonyl) oxime (Propanal,2-methyl-2(methylthio-0-
1605 [(methylamino)carbonyl]oxime)
- 1606 - N-Methyl-N,-nitro-N-nitrosoguanidine (Guanidine, N-nitroso-N-methyl-N,-nitro-)
- 1607 - Methyl parathion (0,0-dimethyl 0-(40 nitrophenyl) phosphorothioate)
- 1608 - Methylthiouracil (4-IH-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-)
- 1609 - Molybdenum and compounds, N.O.S. ³
- 1610 - Mustard gas (Sulfide, bis(2-chloroethyl)-)
- 1611 - Naphthalene

DRAFT A – 10/23/2013

- 1612 - 1,4-Naphthoquinone (1,4-Naphthalenedione)
- 1613 - 1-Naphthylamine (alpha-Naphthylamine)
- 1614 - 2-Naphthylamine (beta-Naphthylamine)
- 1615 - 1-Naphthyl-2-thiourea (Thiourea, 1-naphthalenyl-)
- 1616 - Nickel and compounds, N.O.S. ³
- 1617 - Nickel carbonyl (Nickel tetracarbonyl)
- 1618 - Nickel cyanide (Nickel (II) cyanide)
- 1619 - Nicotine and salts (Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts)
- 1620 - Nitric oxide (Nitrogen (II) oxide)
- 1621 - p-Nitroaniline (Benzenamine, 4-nitro-)
- 1622 - Nitrobenzene (Benzene, nitro-)
- 1623 - Nitrogen dioxide (Nitrogen (IV) oxide)
- 1624 - Nitrogen mustard and hydrochloride salt (Ethanamine, 2-chloro-,N-(2-chloroethyl)-N-methyl-, and
1625 hydrochloride salt)
- 1626 - Nitrogen mustard N-Oxide and hydrochloride salt (Ethanamine, 2-chloro-,N-(2-chloroethyl)-N-methyl-and
1627 hydrochloride salt)
- 1628 - Nitroglycerine (1,2,3-Propanetriol, trinitrate)
- 1629 - 4-Nitrophenol (Phenol, 4-nitro)
- 1630 - 4-Nitroquinoline-1-oxide (Quinoline,4-nitro-1-oxide-)
- 1631 - Nitrosamine, N.O.S. ³
- 1632 - N-Nitrosodi-n-butylamine (1-Butanamine,N-butyl-N-nitroso-)
- 1633 - N-Nitrosodiethanolamine (Ethanol, 2,2-(nitrosoimino)bis-)
- 1634 - N-Nitrosodiethylamine (Ethanamine, N-ethyl-N-nitroso-)
- 1635 - N-Nitrosodimethylamine (Dimethylnitrosamine)
- 1636 - N-Nitroso-N-ethylurea (Carbamide, N-ethyl-N-nitroso-)
- 1637 - N-Nitrosomethylethylamine (Ethanamine, N-methyl-N-nitroso-)
- 1638 - N-Nitroso-N-methylurea (Carbamide, N-methyl-N-nitroso-)
- 1639 - N-Nitroso-N-methylurethane (Carbamic acid, methylnitroso-, ethyl ester)
- 1640 - N-Nitrosomethylvinylamine (Ethenamine,N-methyl-N-nitroso-)

DRAFT A – 10/23/2013

- 1641 - N-Nitrosomorpholine (Morpholine,-N-nitroso-)
- 1642 - N-Nitrosonomicotine (Nornicotine,-N-nitroso-)
- 1643 - N-Nitrosopiperidine (Pyridine, hexahydro-,N-nitroso-)
- 1644 - Nitrosopyrrolidine (Pyrrole, tetrahydro-N-nitroso-)
- 1645 - N-Nitrososarcosine (Sarcosine,-N-nitroso-)
- 1646 - 5-Nitro-o-toluidine (Benzenamine, 2-methyl-5-nitro-)
- 1647 - Octamethylpyrophosphoramidate (Diphosphoramidate, octamethyl-)
- 1648 - Osmium tetroxide (Osmium(VIII)oxide)
- 1649 - 7-Oxabicyclo(2,2,1)heptane-2,3-dicarboxylic acid (Endothal)
- 1650 - Paraldehyde (1,3,5-Trioxane, 2,4,6-trimethyl-)
- 1651 - Parathion (Phosphorothioic acid O,O-diethylO-(p-nitrophenyl) ester)
- 1652 - Pentachlorobenzene (Benzene, pentachloro-)
- 1653 - Pentachloroethane (Ethane, pentachloro-)
- 1654 - Pentachloronitrobenzene (PCNB) (Benzene, Pentachloronitro-)
- 1655 - Pentachlorophenol (Phenol, pentachloro-)
- 1656 - Phenacetin (Acetamide, N-(4-ethoxyphenyl)-)
- 1657 - Phenol (Benzene, hydroxy-)
- 1658 - Phenylenediamine (Benzenediamine)
- 1659 - Phenylmercury acetate (Mercury acetatophenyl-)
- 1660 - N-Phenylthiourea (Thiourea, phenyl-)
- 1661 - Phosgene (Carbonyl chloride)
- 1662 - Phosphine (Hydrogen phosphide)
- 1663 - Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl]ester (Phorate)
- 1664 - Phosphorothioic acid, O,O-dimethyl O-(p-[(dimethylamino)sulfonyl]phenyl)ester (Famphur)
- 1665 - Phthalic acid esters, N.O.S. ³ (Benzene, 1,2-dicarboxylic acid, esters, N.O.S. ³)
- 1666 - Phthalic anhydride (1,2-Benzenedicarboxylic acid anhydride)
- 1667 - 2-Picoline (Pyridine, 2-methyl-)
- 1668 - Polychlorinated biphenyl, N.O.S. ³

DRAFT A – 10/23/2013

- 1669 - Potassium cyanide
- 1670 - Potassium silver cyanide (Argentate(1-), dicyano-, potassium)
- 1671 - Pronamide (3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide)
- 1672 - 1,3 Propane sultone (1,2-Oxathiolane, 2,2-dioxide)
- 1673 - n-Propylamine (1-Propanamine)
- 1674 - Propylthiouracil (Undecamethylenediamine, N,N-bis(2-chlorobenzyl-), dihydrochloride)
- 1675 - 2-Propyn-1-ol (Propargyl alcohol)
- 1676 - Pyridine
- 1677 - Radium-226 and -228
- 1678 - Reserpine (Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[3,4,5-trimethoxybenzoyl]oxy]-, methyl
1679 ester)
- 1680 - Resorcinol (1,3-Benzenediol)
- 1681 - Saccharin and salts (1,2-Benzisothiazolin-3-one, 1,1-dioxide, and salts)
- 1682 - Safrole (Benzene, 1,2-methylenedioxy-4-allyl-)
- 1683 - Selenious acid (Selenium dioxide)
- 1684 - Selenium and compounds, N.O.S.³
- 1685 - Selenium sulfide (Sulfur selenide)
- 1686 - Selenourea (Carbamimidoseleonic acid)
- 1687 - Silver and compounds, N.O.S.³
- 1688 - Silver cyanide
- 1689 - Sodium cyanide
- 1690 - Streptozotocin (D-Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-)
- 1691 - Strontium sulfide
- 1692 - Strychnine and salts (Strychnidin-10-one, and salts)
- 1693 - 1,2,4,5-Tetrachlorobenzene (Benzene, 1,2,4,5-tetrachloro-)
- 1694 - 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (Dibenzo-p-dioxin, 2,3,7,8-tetrachloro-)
- 1695 - Tetrachloroethane, N.O.S.³ (Ethane, tetrachloro-N.O.S.³)
- 1696 - 1,1,1,2-Tetrachlorethane (Ethane, 1,1,1,2-tetrachloro-)

DRAFT A – 10/23/2013

- 1697 - 1,1,2,2-Tetrachlorethane (Ethane 1,1,2,2-tetrachloro-)
- 1698 - Tetrachlorethane (Ethene, 1,1,2,2-tetrachloro-)
- 1699 - Tetrachloromethane (Carbon tetrachloride)
- 1700 - 2,3,4,6-Tetrachlorophenol (Phenol 2,3,4,6-tetrachloro-)
- 1701 - Tetraethyldithiopyrophosphate (Dithiopyrophosphoric acid, tetraethyl-ester)
- 1702 - Tetraethyl lead (Plumbane, tetraethyl-)
- 1703 - Tetraethylpyrophosphate (Pyrophosphoricacide, tetraethyl ester)
- 1704 - Tetranitromethane (Methane, tetranitro-)
- 1705 - Thallium and compounds, N.O.S. ³
- 1706 - Thallic oxide (Thallium (III) oxide)
- 1707 - Thallium (I) acetate (Acetic acid, thallium (I) salt)
- 1708 - Thallium (I) carbonate (Carbonic acid dithallium (I) salt)
- 1709 - Thallium (I) chloride
- 1710 - Thallium (I) nitrate (Nitric acid, thallium (I) salt)
- 1711 - Thallium selenite
- 1712 - Thallium (I) sulfate (Sulfuric acid, thallium (I) salt)
- 1713 - Thioacetamide (Ethanethioamide)
- 1714 - Thiosemicarbazide (Hydrazinecarbothioamide)
- 1715 - Thiourea (Carbamide thio-)
- 1716 - Thiuram (Bis(dimethylthiocarbamoyl) disulfide)
- 1717 - Thorium and compounds, N.O.S. ³ when producing thorium byproduct material
- 1718 - Toluene (Benzene, methyl-)
- 1719 - Toluenediamine (Diaminotoluene)
- 1720 - o-Toluidine hydrochloride (Benzenamine, 2-methyl-,hydrochloride)
- 1721 - Tolyene diisocyanate (Benzene, 1,3-diisocyanatomethyl-)
- 1722 - Toxaphene (Camphene, octachloro-)
- 1723 - Tribromomethane (Bromoform)
- 1724 - 1,2,4-Trichlorobenzene (Benzene, 1,2,4-trichloro-)

DRAFT A – 10/23/2013

- 1725 - 1,1,1-Trichloroethane (Methyl chloroform)
- 1726 - 1,1,2-Trichloroethane (Ethane, 1,1,2-trichloro-)
- 1727 - Trichloroethene (Trichloroethylene)
- 1728 - Trichloromethanethiol (Methanethiol, trichloro-)
- 1729 - Trichloromonofluoromethane (Methane, trichlorofluoro-)
- 1730 - 2,4,5-Trichlorophenol (Phenol, 2,4,5-trichloro-)
- 1731 - 2,4,6-Trichlorophenol (Phenol, 2,4,6-trichloro-)
- 1732 - 2,4,5-Trichlorophenoxyacetic acid (2,4,5-T) (Acetic acid, 2,4,5-trichlorophenoxy-)
- 1733 - 2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP) (Silvex) (Propionic acid, 2-(2,4,5-trichlorophenoxy)-)
- 1734 - Trichloropropane, N.O.S. ³ (Propane, trichloro-, N.O.S. ³)
- 1735 - 1,2,3-Trichloropropane (Propane, 1,2,3-trichloro-)
- 1736 - O,O,O-Triethyl phosphorothioate (Phosphorothioic acid, O,O,O-triethyl ester)
- 1737 - sym-Trinitrobenzene (Benzene, 1,3,5-trinitro-)
- 1738 - Tris(1-aziridinyl) phosphine sulfide (Phosphine sulfide, tris(1-aziridinyl-))
- 1739 - Tris(2,3-dibromopropyl) phosphate (1-Propanol, 2,3-dibromo-, phosphate)
- 1740 - Trypan blue (2,7-Naphthalenedisulfonic acid, 3,3,-((3,3,-dimethyl (1,1,-biphenyl)-4,4,diyl)bis(azo))bis(5-
- 1741 amino-4-hydroxy-tetrasodium salt)
- 1742 - Uracil mustard (Uracil-5-[bis(2-chloroethyl)amino]-)
- 1743 - Uranium and compounds, N.O.S. ³
- 1744 - Vanadic acid, ammonium salt (ammonium vanadate)
- 1745 - Vanadium pentoxide (Vanadium (V) oxide)
- 1746 - Vinyl chloride (Ethene, chloro-)
- 1747 - Zinc cyanide
- 1748 - Zinc phosphide
- 1749 ³ The abbreviation N.O.S. (not otherwise specified) signifies those members of the general class not specifically listed by name in
- 1750 this list.

1751 _____

EDITOR'S NOTES

- 1753 6 CCR 1007-1 has been divided into smaller sections for ease of use. Versions prior to 4/1/07 and rule
- 1754 history are located in the first section, 6 CCR 1007-1. Prior versions can be accessed from the History link

DRAFT A – 10/23/2013

1755 that appears above the text in 6 CCR 1007-1. To view versions effective on or after 4/1/07, Select the
1756 desired part of the rule, for example 6 CCR 1007-1 Part 1 or 6 CCR 1007-1 Parts 8 - 10.

1757 **History**

1758 *[For history of this section, see Editor's Notes in the first section, 6 CCR 1007-1]*