

3701:1-38-14 Survey and monitoring requirements.

- (A) Each licensee or registrant shall:
- (1) Make, or cause to be made, surveys of areas, including the subsurface, that are:
 - (a) Necessary to comply with this chapter: and
 - (b) Reasonable under the circumstances to evaluate:
 - (i) Radiation levels;
 - (ii) Concentrations or quantities of residual radioactivity; and
 - (iii) The potential radiological hazards of the radiation levels and residual radioactivity detected.
 - (2) Notwithstanding paragraph (C) of rule 3701:1-38-20 of the Administrative Code, records from surveys describing the location and amount of subsurface residual radioactivity identified at the site must be kept with records important for decommissioning, and such records must be retained in accordance with paragraph (I) of rule 3701:1-40-17, paragraph (F) of rule 3701:1-44-18, and paragraph (D) of rule 3701:1-56-19 of the Administrative Code, as applicable.
 - (3) Ensure that instruments and equipment used for quantitative radiation measurements, such as dose rate and effluent monitoring, are calibrated annually for the radiation measured, except as otherwise specified in Chapter 3748. of the Revised Code, rules adopted thereunder, or a license condition.
 - (4) Ensure that all personnel dosimeters, except for direct and indirect reading dosimeters used to measure the dose to any extremity, that require processing to determine the radiation dose and that are used to comply with paragraph (A) of rule 3701:1-38-12 of the Administrative Code, with other applicable provisions of these regulations, or with conditions specified in a license or registration shall be processed and evaluated by a dosimetry processor that:
 - (a) Holds a current personnel dosimetry accreditation from the national voluntary laboratory accreditation program of the national institute of standards and technology; and
 - (b) Is approved in this accreditation process for the type of radiation or radiations included in the national voluntary laboratory accreditation program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored; and
 - (5) Have procedures in place to minimize the likelihood of a deceptive exposure of an individual monitoring device, and in the event of a suspected deceptive exposure, an investigation should be conducted by the radiation safety officer which will lead to corrective action as necessary.
- (B) Conditions requiring individual monitoring of external and internal occupational dose are as follows:
- (1) Each licensee or registrant shall monitor exposures from sources of radiation at

levels sufficient to demonstrate compliance with the occupational dose limits of rule 3701:1-38-12 of the Administrative Code. Each licensee or registrant shall monitor occupational exposure to radiation from sources of radiation under the control of the licensee or registrant and shall supply and require the use of individual monitoring devices by:

- (a) Adults likely to receive, in one year from sources of radiation external to the body, a dose in excess of ten per cent of the limits in paragraph (A) of rule 3701:1-38-12 of the Administrative Code;
 - (b) Minors likely to receive, in one year, from radiation sources external to the body, a deep dose equivalent in excess of one millisievert (0.1 rem), a lens dose equivalent in excess of 1.5 millisievert (0.15 rem), or a shallow dose equivalent to the skin or to the extremities in excess of five millisievert (0.5 rem);
 - (c) Declared pregnant women likely to receive during the entire pregnancy, from radiation sources external to the body, a deep dose equivalent in excess of one millisievert (0.1 rem); and
 - (d) Individuals entering a high or very high radiation area.
- (2) To determine compliance with paragraph (D) of rule 3701:1-38-12 of the Administrative Code, each licensee shall monitor the occupational intake of radioactive material by and assess the committed effective dose equivalent to:
- (a) Adults likely to receive, in one year, an intake in excess of ten per cent of the applicable ALI in appendix C to rule 3701:1-38-12 of the Administrative Code;
 - (b) Minors likely to receive, in one year, a committed effective dose equivalent in excess of one millisievert (0.1 rem); and
 - (c) Declared pregnant women likely to receive, during the entire pregnancy, a committed effective dose equivalent in excess of one millisievert (0.1 rem).
- (C) Each licensee or registrant shall ensure that any individual who is required to monitor occupational doses in accordance with paragraph (B)(1) of this rule wears an individual monitoring device as follows:
- (1) An individual monitoring device, used for monitoring the dose to the whole body, shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck.
 - (2) An individual monitoring device, used for monitoring the dose to an embryo or fetus of a declared pregnant woman pursuant to paragraph (H) of rule 3701:1-38-12 of the Administrative Code, shall be located at the waist under any protective apron being worn by the woman.
 - (3) An individual monitoring device, used for monitoring the lens dose equivalent, to demonstrate compliance with paragraph (A) of rule 3701:1-38-12 of the Administrative Code, shall be located at the neck outside any protective apron being worn by the monitored individual, or at an unshielded location close to the eye.

- (4) An individual monitoring device, used for monitoring the dose to the extremities, to demonstrate compliance with paragraph (A)(2) of rule 3701:1-38-12 of the Administrative Code, shall be worn on the extremity likely to receive the highest exposure. Each individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored.
- (5) When only one individual monitoring device is used to determine the effective dose equivalent for external radiation pursuant to paragraph (A)(4)(b) of rule 3701:1-38-12 of the Administrative Code, it shall be located at the neck outside the protective apron. When a second individual monitoring device is used for the same purpose, it shall be located under the protective apron at the waist. The second individual monitoring device is required for a declared pregnant woman.

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3701:1-38-22 Decommissioning.

- (A) This rule applies to the decommissioning of facilities licensed under Chapter 3748. of the Revised Code. For low-level waste disposal facilities, this rule applies only to ancillary surface facilities that support radioactive waste disposal activities. This rule does not apply to uranium and thorium recovery facilities already subject to source material licensing requirements in Chapter 3701:1-44 of the Administrative Code or to uranium solution extraction facilities.
- (B) Decommissioning with license termination shall be limited to sites considered acceptable for unrestricted release where the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 0.25 millisievert (twenty-five millirem) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal.
- (C) After a facility has been decommissioned and the license terminated in accordance with the criteria in this rule, the director will require additional cleanup only if, based on new information, it is determined that the criteria of this rule were not met and residual radioactivity remaining at the site could result in a significant threat to public health and safety. When calculating TEDE to the average member of the critical group the licensee shall determine the peak annual TEDE dose expected within the first one thousand years after decommissioning.
- (D) A licensee may decommission a facility and maintain a decommissioning possession only license using alternate criteria greater than the dose criterion specified in paragraph (B) of this rule, provided that the licensee:
 - (1) Provides assurance that public health and safety would continue to be protected, and that it is unlikely that the dose from all man-made sources combined, other than medical, would be more than the one millisievert (one hundred millirem) per year limit set forth in this chapter, by submitting an analysis of possible sources of exposure;
 - (2) Has employed, to the extent practicable, restrictions on site use in minimizing exposures at the site;
 - (3) Reduces doses to ALARA levels, taking into consideration any detriments, such as traffic accidents expected to potentially result from decontamination and waste disposal; and
 - (4) Has submitted a decommissioning plan or license termination plan (LTP) to the director indicating the licensee's intent to decommission in accordance with rule 3701:1-40-18 of the Administrative Code, and specifying that the licensee proposes to decommission by restricting use of the site. The licensee shall document in the decommissioning plan or LTP how the advice of individuals and institutions in the community who may be affected by the decommissioning has been sought and incorporated, as appropriate, following analysis of that advice. In seeking such advice, the licensee shall provide for:

- (a) Participation by representatives of a broad cross section of community interests who may be affected by the decommissioning;
 - (b) An opportunity for a comprehensive, collective discussion on the issues by the participants represented; and
 - (c) A publicly available summary of the results of all such discussions, including a description of the individual viewpoints of the participants on the issues and the extent of agreement and disagreement among the participants on the issues.
- (5) Has provided sufficient financial assurance in the form of a trust fund to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site.
- (E) When a decommissioning with restrictions is proposed by a licensee, a decommissioning possession only license is required to assure that the provisions of the decommissioning plan as approved by the director remain effective. The license will contain a condition that the director will not require further cleanup unless he or she determines that the criteria of this rule or terms of the license were not met or that residual radioactivity at the site could result in a significant threat to public health and safety.
- (F) Any facility that has been decommissioned and has had the United States nuclear regulatory commission license terminated in accordance with a plan approved by the commission on or before August 31, 1999, will not be required to obtain a license or conduct further cleanup unless the director determines that residual radioactivity at the site could result in a significant threat to the public health and safety.
- (G) Applicants for licenses, other than renewals, shall describe in the application how facility design and procedures for operation will minimize, to the extent practical, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practical, the generation of radioactive waste.
- (H) Licensees shall, to the extent practical, conduct operations to minimize the introduction of residual radioactivity into the site, including the subsurface, in accordance with the existing radiation protection requirements in rule 3701:1-38-11 of the Administrative Code and radiological criteria for license termination in accordance with this rule.

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3701:1-40-17 Financial assurance and record keeping for decommissioning.

- (A) Prior to the director issuing a radioactive materials license:
 - (1) Each applicant for a specific license or license renewal authorizing the possession and use of unsealed radioactive material of half-life greater than one hundred twenty days and in quantities exceeding ten thousand times the applicable quantities set forth in appendix A to this rule shall submit a decommissioning funding plan as described in paragraph (D) of this rule. The decommissioning funding plan must also be submitted when a combination of radionuclides is involved if R divided by ten thousand is greater than one, where R is defined here as the sum of the ratios of the quantity of each radionuclide to the applicable value in appendix A to this rule.
 - (2) Each applicant for a specific license or license renewal authorizing the possession and use of sealed sources or plated foils of half-life greater than one hundred twenty days and in quantities exceeding one trillion times the applicable quantities of appendix A to this rule, shall submit a decommissioning funding plan as described in paragraph (D) of this rule. The decommissioning funding plan must also be submitted when a combination of radionuclides is involved if R divided by one trillion is greater than one, where R is defined here as the sum of the ratios of the quantity of each radionuclide to the applicable value in appendix A to this rule.
- (B) Prior to the director issuing a radioactive materials license, each applicant for a specific license or license renewal authorizing possession and use of radioactive material of half-life greater than one hundred twenty days and in quantities specified in paragraph (C) of this rule shall either:
 - (1) Submit a decommissioning funding plan as described in paragraph (D) of this rule; or
 - (2) Submit a certification that financial assurance for decommissioning has been provided in the amount prescribed by paragraph (C) of this rule using one of the methods described in paragraph (E) of this rule. The applicant shall submit to the director, as part of the certification, a signed original of the financial instrument obtained to satisfy the requirements of paragraph (E) of this rule.
- (C) Prior to the director issuing a radioactive materials license, an applicant providing certification of financial assurance for decommissioning as specified in paragraph (B)(2) of this rule shall provide the certification in a monetary amount based upon the quantity of licensed material specified as follows:
 - (1) Greater than one thousand but less than or equal to ten thousand times the applicable quantities of appendix A to this rule in unsealed form. For a combination of radionuclides, if R , as defined in paragraph (A) of this rule, divided by one thousand is greater than one but R divided by ten thousand is less than or equal to one, the sum of three hundred thousand dollars.
 - (2) Greater than ten billion but less than one trillion times the applicable quantities of appendix A to this rule in sealed sources or plated foils. For a combination of radionuclides, if R , as defined in paragraph (A) of this rule, divided by ten billion

is greater than one but R divided by one trillion is less than or equal to one, the sum of one hundred fifty thousand dollars.

(D) .

- (1) Each decommissioning funding plan must be submitted for review and approval and must contain:
 - (a) A detailed cost estimate for decommissioning, in an amount reflecting:
 - (i) The cost of an independent contractor to perform all decommissioning activities;
 - (ii) The cost of meeting the criteria specified in paragraph (B) of rule 3701:1-38-22 of the Administrative Code for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of paragraph (D) of rule 3701:1-38-22 of the Administrative Code, the cost estimate may be based on meeting this criteria;
 - (iii) The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination; and
 - (iv) An adequate contingency factor.
 - (b) Identification of and justification for using the key assumptions contained in the decommissioning cost estimate;
 - (c) A description of the method of assuring funds for decommissioning from paragraph (E) of this rule, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility;
 - (d) A certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning; and
 - (e) A signed original of the financial instrument obtained to satisfy the requirements of paragraph (E) of this rule (unless a previously submitted and accepted financial instrument continues to cover the cost estimate for decommissioning).
- (2) At the time of license renewal and at intervals not to exceed three years, the decommissioning funding plan must be resubmitted with adjustments as necessary to account for the changes in costs and the extent of contamination. If the amount of financial assurance will be adjusted downward, this cannot be done until the updated decommissioning funding plan is approved. The decommissioning funding plan must update the information submitted with the original or prior approved plan, and must specifically consider the effect of the following events on decommissioning costs:
 - (a) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material;
 - (b) Waste inventory increasing above the amount previously estimated;

- (c) Waste disposal costs increasing above the amount previously estimated;
 - (d) Facility modifications;
 - (e) Changes in authorized possession limits;
 - (f) Actual remediation costs that exceed the previous cost estimate;
 - (g) Onsite disposal; and
 - (h) Use of a settling pond.
- (E) Financial assurance for decommissioning, either by a decommissioning funding plan or certification of financial assurance, shall be provided by the licensee and approved by the director prior to the issuance of the license and shall be provided by one or more of the following methods:
- (1) Prepayment by depositing into an account segregated from licensee assets and outside the licensee's administrative control, cash or liquid assets such that the amount of funds will be sufficient to pay decommissioning costs. Prepayment may be in the form of a trust, escrow account, government fund, certificate of deposit, or deposit of government securities.
 - (2) Surety, insurance, or other method in accordance with paragraph (F) of this rule, that guarantees that decommissioning costs will be paid. A surety method may be in the form of a surety bond, letter of credit, or line of credit. A guarantee by the applicant or licensee may not be used in combination with any other financial methods used to satisfy the requirements of this paragraph or in any situation where the applicant or licensee has a parent company holding majority control of the voting stock of the company.
 - (3) A parent company guarantee of funds for decommissioning costs based on a financial test may be used provided that the parent company meets the requirements specified in appendix B of this rule. A parent company guarantee may not be used in combination with other financial methods to satisfy the requirements of this rule.
 - (4) For commercial corporations that issue bonds, a guarantee of funds by the applicant or licensee for decommissioning costs based on a financial test may be used provided that the guarantee meets the requirements of appendix C to this rule.
 - (5) For commercial companies that do not issue bonds, a guarantee of funds for decommissioning costs may be used provided that the guarantee meets the requirements of appendix D to this rule.
 - (6) For nonprofit colleges, universities, hospitals, or research and development entities, a guarantee of funds for decommissioning costs may be used provided that the guarantee meets the requirements of appendix E to this rule. The director may require proof of nonprofit status.
 - (7) An external sinking fund in which deposits are made at least annually, coupled with a surety method or insurance, the value of which may decrease by the amount being accumulated in the sinking fund. An external sinking fund is a fund established and maintained by setting aside funds periodically in an

account segregated from licensee assets and outside the licensee's administrative control in which the total amount of funds would be sufficient to pay decommissioning costs at the time termination of operation is expected. An external sinking fund may be in the form of a trust, escrow account, government fund, certificate of deposit, or deposit of government securities. The surety or insurance provisions must be as stated in paragraph (E)(2) of this rule.

- (8) In the case of state or local government licensee, a statement of intent containing a cost estimate for decommissioning or an amount specified in paragraphs (C)(1) to (C)(3) of this rule, and indicating that funds for decommissioning will be obtained when necessary. As used in this rule, "state or local government licensee" does not include government owned or assisted colleges, universities or hospitals.
- (F) Any surety method or insurance used to provide financial assurance for decommissioning shall be in the form of instruments that contain language as provided in appendix F to this rule, and shall contain the following conditions:
- (1) The surety method or insurance must be open-ended or, if written for a specified term, such as five years, must be renewed automatically unless ninety days or more prior to the renewal date, the issuer notifies the director, the beneficiary, and the licensee of its intention not to renew. The surety method or insurance must also provide that the full face amount be paid to the beneficiary automatically prior to the expiration without proof of forfeiture if the licensee fails to provide a replacement acceptable to the director within thirty days after receipt of notification of cancellation.
 - (2) The surety method or insurance must be payable to a trust established for decommissioning costs. The trustee and trust must be acceptable to the director. An acceptable trustee includes an appropriate state or federal government agency or an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency.
 - (3) The surety method or insurance must remain in effect until the director has terminated the license.
 - (4) The surety company issuing the bond must, at a minimum, be among those listed as acceptable in the most recent version of "Circular 570" of the United States department of the treasury.
- (G) A licensee must notify the director by certified mail within ten business days of the commencement of a voluntary or involuntary bankruptcy proceeding under Title 11 of the United States Code. A licensee who fulfills the financial assurance requirements by obtaining a trust fund, surety bond, or other acceptable financial assurance will be deemed to be without the required financial assurance or liability coverage in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution issuing the instrument. The licensee shall establish other financial assurance within sixty days after such an event.
- (H) Financial assurance for decommissioning, either by a decommissioning funding plan or certification of financial assurance, that is provided by a contract of insurance

shall not include any arrangement that constitutes self-insurance. As used in this rule:

- (1) "Insurance" means a contract issued or underwritten by an insurance company, insurance service, or insurance organization which is licensed to engage in the business of insurance in Ohio, that binds the insurer to indemnify another against a specified loss in return for premiums paid.
 - (2) "Self insurance" means a contract of insurance issued either by the licensee or by an insurer affiliated with or an affiliate of the licensee.
 - (3) "Affiliate of" or "affiliated with" means that the licensee, either directly or indirectly, through one or more intermediaries or subsidiaries, controls, is controlled by, or is under common control with the insurer.
 - (4) "Control", including "controlled by", and "under common control with" means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a person, whether through the ownership of voting securities, by contract, proxy, membership on the board, or otherwise.
- (I) Each person licensed under this chapter, and rule 3701:1-38-02 of the Administrative Code as well as chapters containing rules regarding manufacturing and distribution (Chapter 3701:1-46 of the Administrative Code), industrial radiography (Chapter 3701:1-48 of the Administrative Code), well logging Chapter 3701:1-49 of the Administrative Code), irradiators (Chapter 3701:1-52 of the Administrative Code), and medical use (Chapter 3701:1-58 of the Administrative Code) promulgated pursuant to Chapter 3748. of the Revised Code shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. Before licensed activities are transferred or assigned in accordance with paragraph (B) of rule 3701:1-40-20 of the Administrative Code, a licensee shall transfer all records described in this paragraph to the new licensee, which will be responsible for maintaining these records until the license is terminated. If records important to the decommissioning of a facility are kept for other purposes, reference to these records and their locations may be used. As used in this rule, "information important to the decommissioning of a facility" includes the following:
- (1) Records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. These records may be limited to instances when contamination remains after any cleanup procedures or when there is reasonable likelihood that contaminants may have spread to inaccessible areas as in the case of possible seepage into porous materials such as concrete. These records must include any known information on identification of involved radionuclides, quantities, forms, and concentrations.
 - (2) As-built drawings and modifications of structures and equipment in restricted areas where radioactive materials are used or stored, and of locations of possible inaccessible contamination such as buried pipes which may be subject to contamination. If required drawings are referenced, each relevant document need not be indexed individually. If drawings are not available, the licensee shall substitute appropriate records of available information concerning these areas and locations.
 - (3) Except in the case of an area that contains only a sealed source, provided the

source has not leaked or no contamination remains after any leak, or in the case of a byproduct or accelerator produced material having only a half-life of less than sixty-five days, a list contained in a single document and updated every two years, of the following:

- (a) All areas designated and formerly designated restricted areas as defined in rule 3701:1-38-01 of the Administrative Code.
 - (b) All areas outside of restricted areas that require documentation under paragraph (I)(1) of this rule.
 - (c) All areas outside of restricted areas where current and previous wastes have been buried as documented under rule 3701:1-38-20 of the Administrative Code; and
 - (d) All areas outside of restricted areas that contain material such that, if the license expired, the licensee would be required to either decontaminate the area to meet the criteria for decommissioning in rule 3701:1-38-22 of the Administrative Code, or apply for approval for disposal under rule 3701:1-38-19 of the Administrative Code.
- (4) Records of the cost estimate performed for the decommissioning funding plan or of the amount certified for decommissioning, and records of the funding method used for assuring funds if either a funding plan or certification is used.

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APPENDIX A

Radionuclide	Kilobecquerel	Microcuries
Americium-241	0.37	0.01
Antimony-122	3700	100
Antimony-124	370	10
Antimony-125	370	10
Arsenic-73	3700	100
Arsenic-74	370	10
Arsenic-76	370	10
Arsenic-77	3700	100
Barium-131	370	10
Barium-133	370	10
Barium-140	370	10
Bismuth-210	37	1
Bromine-82	370	10
Cadmium-109	370	10
Cadmium-115m	370	10
Cadmium-115	3700	100
Calcium-45	370	10
Calcium-47	370	10
Carbon-14	3700	100
Cerium-141	3700	100
Cerium-143	3700	100
Cerium-144	37	1
Cesium-131	37,000	1,000
Cesium-134m	3700	100
Cesium-134	37	1
Cesium-135	370	10
Cesium-136	370	10
Cesium-137	370	10
Chlorine-36	370	10
Chlorine-38	370	10
Chromium-51	37,000	1,000
Cobalt-57	370	10

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Radionuclide	Kilobecquerel	Microcuries
Cobalt-58m	370	10
Cobalt-58	370	10
Cobalt-60	37	1
Copper-64	3700	100
Dysprosium-165	370	10
Dysprosium-166	3700	100
Erbium-169	3700	100
Erbium-171	3700	100
Europium-152 9.2h	3700	100
Europium-152 13 yr	37	1
Europium-154	37	1
Europium-155	370	10
Fluorine-18	37,000	1,000
Gadolinium-153	370	10
Gadolinium-159	3700	100
Gallium-72	370	10
Germanium-71	3700	100
Gold-198	3700	100
Gold-199	3700	100
Hafnium-181	370	10
Holmium-166	3700	100
Hydrogen-3	37,000	1,000
Indium-113m	3700	100
Indium-114m	370	10
Indium-115m	3700	100
Indium-115	370	10
Iodine-125	37	1
Iodine-126	37	1
Iodine-129	3.7	0.1
Iodine-131	37	1
Iodine-132	370	10
Iodine-133	37	1

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Radionuclide	Kilobecquerel	Microcuries
Iodine-134	370	10
Iodine-135	370	10
Iridium-192	370	10
Iridium-194	3700	100
Iron-55	3700	100
Iron-59	370	10
Krypton-85	3700	100
Krypton-87	370	10
Lanthanum-140	370	10
Lutetium-177	3700	100
Manganese-52	370	10
Manganese-54	370	10
Manganese-56	370	10
Mercury-197m	3700	100
Mercury-197	3700	100
Mercury-203	370	10
Molybdenum-99	3700	100
Neodymium-147	3700	100
Neodymium-149	3700	100
Nickel-59	3700	100
Nickel-63	370	10
Nickel-65	3700	100
Niobium-93m	370	10
Niobium-95	370	10
Niobium-97	370	10
Osmium-185	370	10
Osmium-191m	3700	100
Osmium-191	3700	100
Osmium-193	3700	100
Palladium-103	3700	100
Palladium-109	3700	100
Phosphorus-32	370	10

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Radionuclide	Kilobecquerel	Microcuries
Platinum-191	3700	100
Platinum-193m	3700	100
Platinum-193	3700	100
Platinum-197m	3700	100
Platinum-197	3700	100
Plutonium-239	0.37	0.01
Polonium-210	3.7	0.1
Potassium-42	370	10
Praseodymium-142	3700	100
Praseodymium-143	3700	100
Promethium-147	370	10
Promethium-149	370	10
Radium-226	0.37	0.01
Rhenium-186	3700	100
Rhenium-188	3700	100
Rhodium-103m	3700	100
Rhodium-105	3700	100
Rubidium-86	370	10
Rubidium-87	370	10
Ruthenium-97	3700	100
Ruthenium-103	370	10
Ruthenium-105	370	10
Ruthenium-106	37	1
Samarium-151	370	10
Samarium-153	3700	100
Scandium-46	370	10
Scandium-47	3700	100
Scandium-48	370	10
Selenium-75	370	10
Silicon-31	3700	100
Silver-105	370	10
Silver-110m	37	1

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Radionuclide	Kilobecquerel	Microcuries
Silver-111	3700	100
Sodium-24	370	10
Strontium-85	370	10
Strontium-89	37	1
Strontium-90	4.44	0.12
Strontium-91	370	10
Strontium-92	370	10
Sulphur-35	3700	100
Tantalum-182	370	10
Technetium-96	370	10
Technetium-97m	3700	100
Technetium-97	3700	100
Technetium-99m	3700	100
Technetium-99	370	10
Tellurium-125m	370	10
Tellurium127m	370	10
Tellurium-127	3700	100
Tellurium129m	370	10
Tellurium-129	3700	100
Tellurium-131m	370	10
Tellurium-132	370	10
Terbium-160	370	10
Thallium-200	3700	100
Thallium-201	3700	100
Thallium-202	3700	100
Thallium-204	370	10
Thorium (natural) ¹	3700	100
Thulium-170	370	10
Thulium-171	370	10
Tin-113	370	10
Tin-125	370	10
Tungsten-181	370	10

APPENDIX A

Radionuclide	Kilobecquerel	Microcuries
Tungsten-185	370	10
Tungsten-187	3700	100
Uranium (natural) ²	3700	100
Uranium-233	0.37	0.01
Uranium-234--Uranium-235	0.37	0.01
Vanadium-48	370	10
Xenon-131m	37,000	1,000
Xenon-133	3700	100
Xenon-135	3700	100
Ytterbium-175	3700	100
Yttrium-90	370	10
Yttrium-91	370	10
Yttrium-92	3700	100
Yttrium-93	3700	100
Zinc-65	370	10
Zinc-69m	3700	100
Zinc-69	37,000	1,000
Zirconium-93	370	10
Zirconium-95	370	10
Zirconium-97	370	10
Any alpha emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition	0.37	0.01
Any radionuclide other than alpha emitting radionuclides, not listed above or mixtures of beta emitters of unknown composition	3.7	0.1

¹Based on alpha disintegration rate of Th-232, Th-230 and their progeny.

²Based on alpha disintegration rate of U-238, U-234, and U-235.

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APPENDIX B

Criteria relating to use of financial tests and parent company guarantees for providing reasonable assurance of funds for decommissioning.

I. Introduction

An applicant or licensee may provide reasonable assurance of the availability of funds for decommissioning based on obtaining a parent company guarantee that funds will be available for decommissioning costs and on a demonstration that the parent company passes a financial test. This appendix establishes criteria for passing the financial test and for obtaining the parent company guarantee.

II. Financial test

- (A) To pass the financial test, the parent company must meet the criteria of either paragraph (A)(1) or (A)(2) of this section:
 - (1) The parent company must have:
 - (a) Two of the following three ratios: a ratio of total liabilities to net worth less than 2.0; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; and a ratio of current assets to current liabilities greater than 1.5; and
 - (b) Net working capital and tangible net worth each at least six times the current decommissioning cost estimates (or prescribed amount if a certification is used); and
 - (c) Tangible net worth of at least ten million dollars; and
 - (d) Assets located in the United States amounting to at least ninety percent of total assets or at least six times the current decommissioning cost estimates (or prescribed amount if a certification is used).
 - (2) The parent company must have:
 - (a) A current rating for its most recent bond issuance of AAA, AA, A, or BBB as issued by Standard and Poor's or Aaa, Aa, A, or Baa as issued by Moody's; and
 - (b) Tangible net worth at least six times the current decommissioning cost estimate (or prescribed amount if a certification is used); and
 - (c) Tangible net worth of at least ten million dollars; and

- (d) Assets located in the United States amounting to at least ninety percent of total assets or at least six times the current decommissioning cost estimates (or prescribed amount if certification is used).
- (B) The parent company's independent certified public accountant must have compared the data used by the parent company in the financial test, which is derived from the independently audited, year end financial statements for the latest fiscal year, with the amounts in such financial statement. In connection with that procedure the licensee shall inform the director within ninety days of any matters coming to the auditor's attention which cause the auditor to believe that the data specified in the financial test should be adjusted and that the company no longer passes the test.
- (C)
 - (1) After the initial financial test, the parent company must repeat the passage of the test within ninety days after the close of each succeeding fiscal year.
 - (2) If the parent company no longer meets the requirements of paragraph (A) of this section, the licensee must send notice to the director of intent to establish alternate financial assurance as specified in the regulations. The notice must be sent by certified mail within ninety days after the end of the fiscal year for which the year end financial data show that the parent company no longer meets the financial test requirements. The licensee must provide alternate financial assurance within one hundred twenty days after the end of such fiscal year.

III. Parent company guarantee

The terms of a parent company guarantee which an applicant or licensee obtains must provide that:

- (A) The parent company guarantee will remain in force unless the guarantor sends notice of cancellation by certified mail to the licensee and the director. Cancellation may not occur, however, during the one hundred twenty days beginning on the date of receipt of the notice of cancellation by both the licensee and the director as evidenced by the return receipts.
- (B) If the licensee fails to provide alternate financial assurance as specified in the regulations within ninety days after receipt by the licensee and director of a notice of cancellation of the parent company guarantee from the guarantor, the guarantor will provide such alternative financial assurance in the name of the licensee.
- (C) The parent company guarantee and financial test provisions must remain in effect until the director has terminated the license.
- (D) If a trust is established for decommissioning costs, the trustee and trust must be acceptable to the director. An acceptable trustee includes an appropriate state or federal government agency or an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a

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federal or state agency.

APPENDIX C

Criteria relating to use of financial tests and self guarantees for providing reasonable assurance of funds for decommissioning by companies that issue bonds.

I. Introduction

An applicant or licensee may provide reasonable assurance of the availability of funds for decommissioning based on furnishing its own guarantee that funds will be available for decommissioning costs and on a demonstration that the company passes the financial test of Section II of this appendix. The terms of the self-guarantee are in Section III of this appendix. This appendix establishes criteria for passing the financial test for the self guarantee and establishes the terms for a self-guarantee.

II. Financial test

- (A) To pass the financial test, a company must meet all of the following criteria:
 - (1) Tangible net worth at least ten times the total current decommissioning cost estimate for the total of all facilities or parts thereof (or the current amount required if certification is used).
 - (2) Assets located in the United States amounting to at least ninety percent of total assets or at least ten times the total current decommissioning cost estimate for the total of all facilities or parts thereof (or the current amount required if certification is used).
 - (3) A current rating for its most recent bond issuance of AAA, AA, or a as issued by Standard and Poors (S&P), or Aaa, Aa, or A as issued by Moodys.
- (B) To pass the financial test, a company must meet all of the following additional requirements:
 - (1) The company must have at least one class of equity securities registered under the federal Securities Exchange Act of 1934.
 - (2) The company's independent certified public accountant must have compared the data used by the company in the financial test which is derived from the independently audited, yearend financial statements for the latest fiscal year, with the amounts in such financial statement. In connection with that procedure, the licensee shall inform the director within ninety days of any matters coming to the attention of the auditor that cause the auditor to believe that the data specified in the financial test should be adjusted and that the company no longer passes the test.
 - (3) After the initial financial test, the company must repeat passage of the test within ninety days after the close of each succeeding fiscal year.
- (C) If the licensee no longer meets the requirements of section II paragraph (A) of this appendix, the licensee must send immediate notice to the director of its intent to establish alternate financial assurance as specified in the rules within one hundred twenty days of such notice.

III. Company self-guarantee

The terms of a self-guarantee which an applicant or licensee furnishes must provide that:

- (A) The guarantee will remain in force unless the licensee sends notice of cancellation by certified mail to the director. Cancellation may not occur, however, during the one hundred twenty days beginning on the date of receipt of the notice of cancellation by the director, as evidenced by the return receipt.
- (B) The licensee shall provide alternative financial assurance as specified in the rules within ninety days following receipt by the director of a notice of cancellation of the guarantee.
- (C) The guarantee and financial test provisions must remain in effect until the director has terminated the license or until another financial assurance method acceptable to the director has been put in effect by the licensee.
- (D) The licensee will promptly forward to the director and the licensee's independent auditor all reports covering the latest fiscal year filed by the licensee with the securities and exchange commission pursuant to the requirements of section 13 of the federal Securities and Exchange Act of 1934.
- (E) If, at any time, the licensee's most recent bond issuance ceases to be rated in any category of "A" or above by either Standard and Poors or Moodys, the licensee will provide notice in writing of such fact to the director within twenty days after publication of the change by the rating service. If the licensee's most recent bond issuance ceases to be rated in any category of A or above by both Standard and Poors and Moodys, the licensee no longer meets the requirements of section II paragraph (A) of this appendix.
- (F) The applicant or licensee must provide to the director a written guarantee (a written commitment by a corporate officer) which states that the licensee will fund and carry out the required decommissioning activities or, upon issuance of an order by the director, the licensee will set up and fund a trust in the amount of the current cost estimates for decommissioning.

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APPENDIX D

Criteria relating to use of financial tests and self-guarantee for providing reasonable assurance of funds for decommissioning by commercial companies that have no outstanding rated bonds

I. Introduction

An applicant or licensee may provide reasonable assurance of the availability of funds for decommissioning based on furnishing its own guarantee that funds will be available for decommissioning costs and on a demonstration that the company passes the financial test of section II of this appendix. The terms of the self-guarantee are in section III of this appendix. This appendix establishes criteria for passing the financial test for the self-guarantee and establishes the terms for a self-guarantee.

II. Financial test

- (A) To pass the financial test a company must meet the following criteria:
- (1) Tangible net worth greater than ten million dollars, or at least ten times the total current decommissioning cost estimate (or the current amount required if certification is used), whichever is greater, for all decommissioning activities for which the company is responsible as self-guaranteeing licensee and as parent-guarantor.
 - (2) Assets located in the United States amounting to at least ninety percent of total assets or at least ten times the total current decommissioning cost estimate (or the current amount required if certification is used) for all decommissioning activities for which the company is responsible as self-guaranteeing licensee and as parent-guarantor.
 - (3) A ratio of cash flow divided by total liabilities greater than 0.15 and a ratio of total liabilities divided by net worth less than 1.5.
- (B) In addition, to pass the financial test, a company must meet all of the following requirements:
- (1) The company's independent certified public accountant must have compared the data used by the company in the financial test, which is required to be derived from the independently audited year end financial statement based on United States generally accepted accounting practices for the latest fiscal year, with the amounts in such financial statement. In connection with that procedure, the licensee shall inform the director within ninety days of any matters that may cause the auditor to believe that the data specified in the financial test should be adjusted and that the company no longer passes the test.
 - (2) After the initial financial test, the company must repeat passage of the test within ninety days after the close of each succeeding fiscal year.
 - (3) If the licensee no longer meets the requirements of section II,

paragraph (A) of this appendix, the licensee must send notice to the director of intent to establish alternative financial assurance as specified in rule 3701:1-40-17 of the Administrative Code. The notice must be sent by certified mail, return receipt requested, within ninety days after the end of the fiscal year for which the year end financial data show that the licensee no longer meets the financial test requirements. The licensee must provide alternative financial assurance within one hundred twenty days after the end of such fiscal year.

III. Company self-guarantee

The terms of a self-guarantee which an applicant or licensee furnishes must provide that:

- (A) The guarantee shall remain in force unless the licensee sends notice of cancellation by certified mail, return receipt requested, to the director. Cancellation may not occur until an alternative financial assurance mechanism is in place.
- (B) The licensee shall provide alternative financial assurance as specified in the regulations within ninety days following receipt by the director of a notice of cancellation of the guarantee.
- (C) The guarantee and financial test provisions must remain in effect until the director has terminated the license or until another financial assurance method acceptable to the director has been put in effect by the licensee.
- (D) The applicant or licensee must provide to the director a written guarantee (a written commitment by a corporate officer) which states that the licensee will fund and carry out the required decommissioning activities or, upon issuance of an order by the director, the licensee will set up and fund a trust in the amount of the current cost estimates for decommissioning.

APPENDIX E

Criteria relating to use of financial tests and self-guarantee for providing reasonable assurance of funds for decommissioning by nonprofit colleges, universities, hospitals or nonprofit research and development entities.

I. Introduction

An applicant or licensee may provide reasonable assurance of the availability of funds for decommissioning based on furnishing its own guarantee that funds will be available for decommissioning costs and on a demonstration that the applicant or licensee passes the financial test of section II of this appendix. The terms of the self-guarantee are in section III of this appendix. This appendix establishes criteria for passing the financial test for the self-guarantee and establishes the terms for a self-guarantee.

II. Financial test

- (A) For colleges and universities, to pass the financial test a college or university must meet either the criteria in section II, paragraph (A)(1) or the criteria in section II, paragraph (A)(2) of this appendix.
 - (1) For applicants or licensees that issue bonds, a current rating for its most recent bond issuance of AAA, AA, or A as issued by Standard and Poors (S&P) or Aaa, Aa, or A as issued by Moodys.
 - (2) For applicants or licensees that do not issue bonds, endowment consisting of assets located in the United States of at least fifty million dollars, or at least thirty times the total current decommissioning cost estimate (or the current amount required if certification is used), whichever is greater, for all decommissioning activities for which the college or university is responsible as a self-guaranteeing licensee.
- (B) For hospitals or nonprofit research and development entities, to pass the financial test a hospital or nonprofit research and development entity must meet either the criteria in section II, paragraph (B)(1) or the criteria in section II, paragraph (B)(2) of this appendix:
 - (1) For applicants or licensees that issue bonds, a current rating for its most recent bond issuance of AAA, AA, or A as issued by Standard and Poors (S&P) or Aaa, Aa, or A as issued by Moodys.
 - (2) For applicants or licensees that do not issue bonds, all the following tests must be met:
 - (a) (Total revenues less total expenditures) divided by total revenues must be equal to or greater than 0.04.
 - (b) Long term debt divided by net fixed assets must be less than or equal to 0.67.

- (c) (Current assets and depreciation fund) divided by current liabilities must be greater than or equal to 2.55.
 - (d) Operating revenues must be at least one hundred times the total current decommissioning cost estimate (or the current amount required if certification is used) for all decommissioning activities for which the hospital or nonprofit research and development entity is responsible as a self-guaranteeing license.
- (C) In addition, to pass the financial test, a licensee must meet all the following requirements:
- (1) The licensee's independent certified public accountant must have compared the data used by the licensee in the financial test, which is required to be derived from the independently audited year end financial statements, based on United States generally accepted accounting practices, for the latest fiscal year, with the amounts in such financial statement. In connection with that procedure, the licensee shall inform the director within ninety days of any matters coming to the attention of the auditor that cause the auditor to believe that the data specified in the financial test should be adjusted and that the licensee no longer passes the test.
 - (2) After the initial financial test, the licensee must repeat passage of the test within ninety days after the close of each succeeding fiscal year.
 - (3) If the licensee no longer meets the requirements of section I of this appendix, the licensee must send notice to the director of its intent to establish alternative financial assurance. The notice must be sent by certified mail, return receipt requested, within ninety days after the end of the fiscal year for which the year end financial data show that the licensee no longer meets the financial test requirements. The licensee must provide alternate financial assurance within one hundred twenty days after the end of such fiscal year.

III. Self-guarantee

The terms of a self-guarantee which an applicant or licensee furnishes must provide that:

- (A) The guarantee shall remain in force unless the licensee sends notice of cancellation by certified mail, and/or return receipt requested, to the director. Cancellation may not occur unless an alternative financial assurance mechanism is in place.
- (B) The licensee shall provide alternative financial assurance as specified in the rules within ninety days following receipt by the director of a notice of cancellation of the guarantee.
- (C) The guarantee and financial test provisions must remain in effect until the director has terminated the license or until another financial assurance method acceptable to the director has been put in effect by the licensee.

- (D) The applicant or licensee must provide to the director a written guarantee (a written commitment by a corporate officer or officer of the Institution) which states that the licensee will fund and carry out the required decommissioning activities or, upon issuance of an order by the director, the licensee will set up and fund a trust in the amount of the current cost estimates for decommissioning.
- (E) If, at any time, the licensee's most recent bond issuance ceases to be rated in any category of Aa" or above by either Standard and Poors or Moodys, the licensee shall provide notice in writing of such fact to the director within twenty days after publication of the change by the rating service.

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APPENDIX F

Wording for an escrow agreement

Escrow number _____

Paragraph 1. Establishment of escrow account

It is agreed between the parties that [insert name of licensee], licensee, has elected to establish an escrow account with [insert name, address, and position of escrow agent] to provide financial assurance for decommissioning of the facility(ies) in the amounts shown below:

[For each facility for which financial assurance is provided by the escrow agreement, list facility name, address, and license number, corresponding estimated or certified decommissioning costs, and indicate amount of financial assurance provided by the escrow account.]

Paragraph 2. Description of property in escrow account

It is hereby acknowledged by the parties that [list the assets that have been delivered to the escrow agent and indicate the value of each item] has (have) been delivered to escrow and will remain in the escrow account created by this agreement until one of the two conditions stated in paragraph 3 of this agreement has been satisfied.

[Insert name of licensee] warrants to and agrees with [insert name of escrow agent] that, unless otherwise expressly set forth in this agreement: there is no security interest in the property in the escrow account or any part thereof; no financing statement under the uniform commercial code is on file in any jurisdiction claiming a security interest in or describing (whether specifically or generally) the escrow account or any part thereof; and the escrow agent shall have no responsibility at any time to ascertain whether or not any security interest exists or to file any financing statement under the uniform commercial code with respect to the escrow account or any part thereof.

PARAGRAPH 3. Conditions of escrow agreement

The property described in paragraph 2, above, will remain in the escrow account created by this agreement until one of the two following conditions has been satisfied:

- (1) The decommissioning activities required by Chapter 3748. Of the Revised Code and rules promulgated thereunder have been completed, the license has been terminated, the facility site is available for unrestricted use for any public or private purpose, and the escrow account has been terminated by joint notice, in writing, from [insert name of licensee] and the state of Ohio or
- (2) The escrow agent, [insert name of the escrow agent], has been notified by the state of Ohio, in writing, that the licensee [insert name of licensee], has defaulted on the agreed obligation to carry out the decommissioning for the above listed facility(ies).

Paragraph 4. Disbursement of property in escrow account

The [insert name of escrow agent] shall make payments from the escrow account upon the presentation of a certificate duly executed by the secretary of the [insert name of licensee] attesting to the occurrence of the events, and in the form set forth in the attached specimen certificate, and upon presentation of a certification attesting to the following conditions:

- (1) That decommissioning is proceeding pursuant to a state of Ohio approved plan,
- (2) That the funds withdrawn will be expended for activities undertaken pursuant to that plan, and
- (3) That the state of Ohio has been given thirty days prior notice of [insert name of licensee]'s intent to withdraw funds from the escrow account.

No withdrawal from the account can exceed ten percent of the outstanding balance of the escrow account or _____dollars, whichever is greater, unless state of Ohio approval is attached.

Or upon [insert name of escrow agent] receiving written notification of licensee's default from the state of Ohio, [insert name of escrow agent] shall make payments from the escrow account as the state of Ohio shall direct, in writing, to provide for the payment of the costs of the required decommissioning activities covered by this agreement. The escrow agent shall reimburse the licensee or other persons as specified by the state of Ohio from the escrow account for expenses for required activities in such amounts as the state of Ohio shall direct in writing. In addition, the escrow agent shall refund to [insert name of licensee] such amounts as the state of Ohio specifies, in writing. Upon refund, such funds shall no longer constitute part of the escrow account as described in paragraph 2., above.

Paragraph 5. Irrevocability

It is also agreed between the parties that this escrow became irrevocable upon delivery to [insert name of escrow agent], the escrow agent, and will remain irrevocable and in full force and effect until the occurrence of one of the conditions described in paragraph 3., above.

Paragraph 6. Powers of the escrow agent

The only powers and duties of the escrow agent shall be to hold the escrow property and to invest and dispose of it in accordance with the terms of this agreement.

Escrow account management

The escrow agent shall invest and reinvest the principal and income of the escrow account and keep the escrow account invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the [insert name of licensee] may communicate in writing to the escrow agent from time to time, subject, however, to the provisions of the escrow account; the escrow agent shall discharge

its duties with respect to the escrow account solely in the interest of the state of Ohio and with the care, skill, prudence, and diligence, under the circumstances then prevailing, that persons of prudence, acting in like capacity and familiar with such matters, would use in the conduct of an enterprise of like character and with like aims; except that:

- (A) Securities or other obligations of the licensee, or any other owner or operator of the licensed facility(ies), or any of their affiliates as defined in the federal Investment Company Act of 1940, as amended (15 U.S.C. 80A-2(A)), shall not be acquired or held, unless they are securities or other obligations of the federal government;
- (B) The escrow agent is authorized to invest the escrow account in time or demand deposits to the extent insured by an agency of the federal government; and
- (C) The escrow agent is authorized to hold cash, awaiting investment or distribution uninvested, for a reasonable time and without liability for the payment of interest thereon.

Express power of the escrow agent

Without in any way limiting the powers and discretion conferred upon the escrow agent by other provisions of this agreement or by law, the escrow agent is expressly authorized and empowered:

- (A) To register any securities held in the escrow account in its own name and to hold any security in bearer form or in book entry, or to deposit or arrange for the deposit of any securities issued by the U.S. government, or any agency or instrumentality thereof, with a federal reserve bank, but the books and records of the escrow agent shall at all times show that all such securities are part of the escrow account;
- (B) To deposit any cash in the escrow account in interest-bearing accounts or savings certificates to the extent insured by an agency of the federal government;
- (C) To pay taxes, from the account, of any kind that may be assessed or levied against the escrow account and all brokerage commissions incurred by the escrow account.

Paragraph 7. Annual valuation

After delivery has been made into this escrow account, the escrow agent shall annually, at least thirty days before the anniversary date of receipt of the property into the escrow account, furnish to the licensee and to the state of Ohio a statement confirming the value of the escrow account. Any securities in the account shall be valued at market value as of no more than sixty days before the anniversary date of the establishment of the escrow account. The failure of the licensee to object in writing to the escrow agent within ninety days after the statement has been furnished to the licensee shall constitute a conclusively binding assent by the licensee, barring the licensee from asserting any claim or liability against the escrow agent with respect to the matters disclosed in the statement.

Paragraph 8. Successor escrow agent

Upon ninety days prior notice to the state of Ohio and the licensee, [insert name of licensee], the escrow agent may resign; upon ninety days notice to the state of Ohio and the escrow agent, the licensee, [insert name of licensee], may replace the escrow agent upon thirty days prior notice to the state of Ohio; provided that such resignation or replacement is not effective until the escrow agent has appointed a successor escrow agent and this successor accepts the appointment. The successor escrow agent shall have the same powers and duties as those conferred upon the escrow agent under this agreement. Upon the successor's acceptance of the appointment, the escrow agent shall assign, transfer, and pay over to the successor the funds and properties then constituting the escrow account. If for any reason the licensee cannot or does not act in the event of the resignation of the escrow agent, the escrow agent may apply to a court of competent jurisdiction for the appointment of a successor, or for instructions. The successor escrow agent shall specify the date on which it assumes administration of the escrow account in a writing sent to the licensee, state of Ohio, and the current escrow agent by certified mail ten days before the change becomes effective. Any expenses incurred by the escrow agent as a result of any of the acts contemplated by this paragraph shall be paid as provided in paragraph ten of this agreement.

Paragraph 9. Instructions to the escrow agent

All orders, requests, and instructions from the licensee to the escrow agent shall be in writing, signed by such persons as are signatories to this agreement, or such other designees as the licensee or state of Ohio may designate in writing. All orders, requests, and instructions from the state of Ohio shall be in writing, signed by the designees of the state of Ohio. The escrow agent shall be fully protected in acting in accordance with such orders, requests, and instructions. The escrow agent shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the licensee or state of Ohio under this agreement has occurred. The escrow agent shall have no duty to act in the absence of such orders, requests, and instructions from the licensee and/or state of Ohio, except as provided in this agreement.

Paragraph 10. Compensation and expenses of the escrow agent

The fee of the escrow agent for its services in establishing the escrow account shall be \$ _____, payable at the time of the execution of this agreement, to be borne by [insert the name of the licensee], licensee.

Expenses of the escrow agent for the administration of the escrow account, the compensation of the escrow agent for services subsequent to the establishing of the escrow account to the extent not paid directly by the licensee, and all other proper charges and disbursements shall be paid from the escrow account.

Paragraph 11. Amendment to this agreement

This agreement may be amended by an instrument in writing executed by the licensee and the escrow agent provided that the licensee has given thirty days prior notice to state of Ohio.

Paragraph 12. Termination

This agreement can be terminated by written notice of termination to the escrow agent signed by [insert the name of licensee], licensee, and the state of Ohio or by the state of Ohio alone, if the licensee has ceased to exist.

Paragraph 13. Interpretation

This escrow agreement constitutes the entire agreement between [insert the name of licensee] and [insert the name of the escrow agent]. The escrow agent shall not be bound by any other agreement or contract entered into by [insert name of licensee] and the only document that may be referenced in case of ambiguity in this escrow agreement is the licensing agreement between [insert name of licensee] and the state of Ohio.

Paragraph 14. Acceptance of appointment by escrow agent

[insert name, address, and position of escrow agent] does hereby acknowledge its appointment by [insert name of licensee], the licensee, to serve as escrow agent for the escrow account created under this agreement and agrees to carry out its obligations and duties as stated in this escrow agreement.

Paragraph 15. Severability

If any part of this agreement is invalid, it shall not affect the remaining provisions that will remain valid and enforceable.

Paragraph 16.

This agreement shall not become effective and the escrow agent shall have no responsibility hereunder except to return the escrow property to the [insert name of licensee] until the escrow agent shall have received the following and shall have advised [insert name of licensee] in writing that the same are in form and substance satisfactory to the escrow agent:

Certified resolution of its board of directors authorizing the making and performance of this agreement;

Certificate as to the names and specimen signatures of its officers or representative authorized to sign this agreement and notices, instructions and other communications hereunder.

[signatures and positions of the designees of the licensee and the escrow agent.]

[insert name of escrow agent]

[insert name of licensee]

BY _____

BY _____

NAME _____

NAME _____

TITLE _____

TITLE _____

DATE.

WITNESS BY NOTARY PUBLIC.

ESCROW CERTIFICATE OF RESOLUTION

I _____, do hereby certify that I am secretary of [insert name of licensee], a [insert name of incorporation] corporation, and that the resolution listed below was duly adopted at a meeting of this corporation's board of directors on _____, 20__.

In witness whereof, I have hereunto signed my name and affixed the seal of this corporation this _____ day of _____, 20__.

Secretary of [insert name of licensee]

Resolved, that this board of directors hereby authorizes the president, or such other employee of the company as he may designate [insert, as appropriate, "to enter into an escrow agreement" or "to commence decommissioning activities at (name of facility))], with the [insert name of escrow agent] in accordance with the terms and conditions described to this board of directors at this meeting and with such other terms and conditions as the president shall approved with and upon the advice of counsel.

ESCROW CERTIFICATE OF EVENTS

[insert name and address of escrow agent]

Attention: Escrow division

Gentlemen:

In accordance with the terms of the agreement with you dated _____ I, _____
_____, secretary of [insert name of licensee], hereby certify that the following
events have occurred:

1. [insert name of licensee] is required to commence the decommissioning of its facilities located at [insert location of facility] (hereinafter called the decommissioning).
2. The plans and procedures for the commencement and conduct of the decommissioning have been approved by the state of Ohio, on _____ (copy of approval attached).
3. The board of directors of [insert name of licensee] has adopted the attached resolution authorizing the commencing of the decommissioning.

Secretary of [insert name of licensee]

Date

CERTIFICATES OF DEPOSIT

Draft negotiable certificate of deposit payable at the expiration of a specified time

_____ BANK OF

 PLACE _____
 NO. _____

 (DATE)

[Insert name of licensee or applicant] has deposited not subject to check
 _____ dollars (\$ _____) payable to the order of the holder in current
 funds (not less than thirty days) days after date, upon surrender of this certificate properly
 endorsed, with interest at the rate of _____ percent per annum from date to maturity only.
 The rate of interest payable hereunder is subject to change by the bank to such extent as
 may be necessary to comply with requirements of the federal reserve board made from time
 to time pursuant to the federal reserve act.

These funds are deposited for the purpose of providing financial assurance for the cost of
 decommissioning activities as required under Chapter 3748. Of the Revised Code and rules
 promulgated thereunder. Accordingly, this certificate will be renewed automatically unless
 written notice of (1) the default of the [insert name of licensee or applicant] on these
 obligations; (2) the termination of the facility license; or (3) the substitution of another
 financial assurance mechanism is received from [the name of licensee or applicant].

 CASHIER

Certificates of deposit

Draft negotiable certificate of deposit payable on a certain date

Certificate of deposit

Certificate of deposit _____, 20__.

[Insert name of licensee or applicant] has deposited in the bank the sum of _____ dollars (\$____) payable to the state of Ohio, trustee of standby trust, or escrow agent], _____ months after date, with interest thereon at the rate of _____ percent per annum from date, upon presentation of this certificate properly endorsed. These funds are deposited for the purpose of providing financial assurance for the cost of decommissioning activities as required under Chapter 3748. Of the Revised Code and rules promulgated thereunder. Accordingly, this certificate will be renewed automatically unless written notice of (1) the default of the [insert name of licensee or applicant] on these obligations; (2) the termination of the facility license; or (3) the substitution of another financial assurance mechanism is received from [the name of the licensee or applicant].

The deposit documented in this certificate is insured by the federal deposit insurance corporation.

CASHIER

Wording for trust fund

Trust agreement

Trust agreement, the agreement entered into as of [date] by and between [name of licensee], a [name of state] [insert "corporation," "partnership," "association," or "proprietorship"], herein referred to as the "grantor," and [name and address of a national bank or other trustee acceptable to the state of Ohio], the "trustee."

Whereas, the state of Ohio, has promulgated regulations pursuant to Chapter 3748. Of the Revised Code. These regulations, applicable to the grantor, require that a holder of, or an applicant for, a radioactive material license provide assurance that funds will be available when needed for required decommissioning activities.

Whereas, the grantor has elected to use a trust fund to provide [insert "all" or part"] of such financial assurance for the facilities identified herein;

Whereas, the grantor, acting through its duly authorized officers, has selected the trustee to be the trustee under this agreement, and the trustee is willing to act as trustee,

Now, therefore, the grantor and the trustee agree as follows:

Section 1. Definitions. As used in this agreement:

- (A) The term "grantor" means the state of Ohio licensee who enters into this agreement and any successors or assigns of the grantor.
- (B) The term "trustee" means the trustee who enters into this agreement and any successor trustee.

Section 2. Costs of decommissioning. This agreement pertains to the costs of decommissioning the materials and activities identified in license number [insert license number] issued pursuant to rule 3701-38-02.1 of the Administrative Code as shown in Schedule A (This schedule is contained in the Trust Agreement Schedule following the Standby Trust Agreement).

Section 3. Establishment of fund. The grantor and the trustee hereby establish a trust fund (the fund) for the benefit of state of Ohio. The grantor and the trustee intend that no third party shall have access to the fund except as provided herein.

Section 4. Payments constituting the fund. Payments made to the trustee for the fund shall consist of cash, securities, or other liquid assets acceptable to the trustee. The fund is established initially as consisting of the property, which is acceptable to the trustee, described in schedule B (This schedule is contained in the Trust Agreement Schedule following the Standby Trust Agreement) attached hereto. Such property and any other property subsequently transferred to the trustee are referred to as the "fund," together with all earnings and profits thereon, less any payments or distributions made by the trustee pursuant to this agreement. The fund shall be held by the trustee, in trust, as hereinafter provided. The trustee shall not be responsible nor shall it undertake any responsibility for

the amount of, or adequacy of the fund, nor any duty to collect from the grantor, any payments necessary to discharge any liabilities of the grantor established by the state of Ohio.

Section 5. Payment for required activities specified in the plan. The trustee shall make payments from the fund to the grantor upon presentation to the trustee of the following:

- (A) A certificate duly executed by the secretary of the depositor attesting to the occurrence of the events, and in the form set forth in the attached specimen certificate (see sample certificate following standby trust), and
- (B) A certificate attesting to the following conditions:
 - (1) That decommissioning is proceeding pursuant to a state of Ohio approved plan.
 - (2) That the funds withdrawn will be expended for activities undertaken pursuant to that plan, and
 - (3) That the state of Ohio has been given thirty days' prior notice of [insert name of licensee]'s intent to withdraw funds from the escrow fund.

No withdrawal from the fund can exceed ten percent of the outstanding balance of the fund or _____ dollars, whichever is greater, unless state of Ohio approval is attached.

In the event of the grantor's default or inability to direct decommissioning activities, the trustee shall make payments from the fund as the state of Ohio shall direct, in writing, to provide for the payment of the costs of required activities covered by this agreement. The trustee shall reimburse the grantor or other persons as specified by the state of Ohio from the fund for expenditures for required activities in such amounts as the state of Ohio shall direct in writing. In addition, the trustee shall refund to the grantor such amounts as the state of Ohio specifies in writing. Upon refund, such funds shall no longer constitute part of the fund as defined herein.

Section 6. Trust management. The trustee shall invest and reinvest the principal and income of the fund and keep the fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the grantor may communicate in writing to the trustee from time to time, subject, however, to the provisions of this section. In investing, reinvesting, exchanging, selling, and managing the fund, the trustee shall discharge its duties with respect to the fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims; except that:

- (A) Securities or other obligations of the grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the federal Investment Company Act of 1940, as amended (15 U.S.C. 80A-2(A)), shall not be acquired or held, unless they are securities or other obligations of the federal or a state government;
- (B) The trustee is authorized to invest the fund in time or demand deposits of the

trustee, to the extent insured by an agency of the federal government; and

- (C) For a reasonable time, not to exceed sixty days, the trustee is authorized to hold uninvested cash, awaiting investment or distribution, without liability for the payment of interest thereon.

Section 7. Commingling and investment. The trustee is expressly authorized in its discretion:

- (A) To transfer from time to time any or all of the assets of the fund to any common, commingled, or collective trust fund created by the trustee in which the fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and
- (B) To purchase shares in any investment company registered under the Investment company act of 1940 (15 U.S.C. 80A-I ET SEQ.), including one that may be created, managed, underwritten, or to which investment advice is rendered, or the shares of which are sold by the trustee. the trustee may vote such shares in its discretion.

Section 8. Express powers of trustee. Without in any way limiting the powers and discretion conferred upon the trustee by the other provisions of this agreement or by law, the trustee is expressly authorized and empowered:

- (A) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale, as necessary for prudent management of the fund;
- (B) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;
- (C) To register any securities held in the fund in its own name, or in the name of a nominee, and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the trustee in other fiduciary capacities, to reinvest interest payments and funds from matured and redeemed instruments, to file proper forms concerning securities held in the fund in a timely fashion with appropriate government agencies, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee or such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the U.S. government, or any agency or instrumentality thereof, with a federal reserve bank, but the books and records of the trustee shall at all times show that all such securities are part of the fund;
- (D) To deposit any cash in the fund in interest-bearing accounts maintained or savings certificates issued by the trustee, in its separate corporate capacity, or in any other banking institution affiliated with the trustee, to the extent insured by an agency of the federal government; and
- (E) To compromise or otherwise adjust all claims in favor of or against the fund.

Section 9. Taxes and expenses. All taxes of any kind that may be assessed or levied against or in respect of the fund and all brokerage commissions incurred by the fund shall be paid from the fund. All other expenses incurred by the trustee in connection with the administration of this trust, including fees for legal services rendered to the trustee, the compensation of the trustee to the extent not paid directly by the grantor, and all other proper charges and disbursements of the trustee shall be paid from the fund.

Section 10. Annual valuation. After payment has been made into this trust fund, the trustee shall annually, at least thirty days before the anniversary date of receipt of payment into the trust fund, furnish to the grantor and to the state of Ohio a statement confirming the value of the trust. Any securities in the fund shall be valued at market value as of no more than sixty days before the anniversary date of the establishment of the fund. The failure of the grantor to object in writing to the trustee within ninety days after the statement has been furnished to the grantor and the state of Ohio shall constitute a conclusively binding assent by the grantor, barring the grantor from asserting any claim or liability against the trustee with respect to the matters disclosed in the statement.

Section 11. Advice of counsel. The trustee may from time to time consult with counsel with respect to any question arising as to the construction of this agreement or any action to be taken hereunder. The trustee shall be fully protected, to the extent permitted by law, in acting on the advice of counsel.

Section 12. Trustee compensation. The trustee shall be entitled to reasonable compensation for its services as agreed upon in writing with the grantor. (see Schedule C of the Trust Agreement Schedule following the Standby Trust Agreement.)

Section 13. Successor trustee. Upon ninety days notice to the state of Ohio, the trustee may resign; upon ninety days notice to state of Ohio and the trustee, the grantor may replace the trustee; but such resignation or replacement shall not be effective until the grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the trustee hereunder. Upon the successor trustee's acceptance of the appointment, the trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the fund. If for any reason the grantor cannot or does not act in the event of the resignation of the trustee, the trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the grantor, the state of Ohio, and the present trustee by certified mail ten days before such change becomes effective. Any expenses incurred by the trustee as a result of any of the acts contemplated by this section shall be paid as provided in Section 9.

Section 14. Instructions to the trustee. All orders, requests, and instructions by the grantor to the trustee shall be in writing, signed by such persons as are signatories to this agreement or such other designees as the grantor may designate in writing. The trustee shall be fully protected in acting without inquiry in accordance with the grantor's orders, requests, and instructions. If the state of Ohio issues orders, requests, or instructions to the trustee these shall be in writing, signed by the state of Ohio or their designees, and the trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the

authority of any person to act on behalf of the grantor, the state of Ohio hereunder has occurred. The trustee shall have no duty to act in the absence of such orders, requests, and instructions from the grantor and/or the state of Ohio except as provided for herein.

Section 15. Amendment of agreement. This agreement may be amended by an instrument in writing executed by the grantor and the trustee. All amendments shall meet the relevant regulatory requirements of the state of Ohio.

Section 16. Irrevocability and termination. Subject to the right of the parties to amend this agreement as provided in Section 15, this trust shall be irrevocable and shall continue until terminated at the written agreement of the grantor, the trustee, and the NRC or state agency, or by the trustee and the state of Ohio, if the grantor ceases to exist. Upon termination of the trust, all remaining trust property, less final trust administration expenses, shall be delivered to the grantor or its successor.

Section 17. Immunity and indemnification. The trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this trust, or in carrying out any directions by the grantor, the state of Ohio issued in accordance with this agreement. The trustee shall be indemnified and saved harmless by the grantor or from the trust fund, or both, from and against any personal liability to which the trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the grantor fails to provide such defense.

Section 18. This agreement shall be administered, construed, and enforced according to the laws of the state of Ohio.

Section 19. Interpretation and severability. As used in this agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each section of this agreement shall not affect the interpretation or the legal efficacy of this agreement. If any part of this agreement is invalid, it shall not affect the remaining -provisions which will remain valid and enforceable.

In witness whereof the parties have caused this agreement to be executed by the respective officers duly authorized and the incorporate seals to be hereunto affixed and attested as of the date first written above.

Attest:(insert name of licensee (grantor)) [signature of representative of grantor]

[Title]

[Title]
[Seal]

[Insert name of trustee]

3701:1-40-17

16

[Signature of representative of trustee]
[Title]

Attest:

[Title]
[Seal]

Wording for standby trust agreement

Standby trust agreement

Trust agreement, the agreement entered into as of [date] by and between [name of licensee], a [name of state] [insert "corporation," "partnership," "association," or "proprietorship"], herein referred to as the "grantor," and [name and address of a national bank or other trustee acceptable to the commission or state regulatory agency], the "trustee."

Whereas, the state of Ohio, has promulgated regulations pursuant Chapter 3748. of the Revised Code. These regulations, applicable to the grantor, require that a holder of, or an applicant for, a radioactive material license provide assurance that funds will be available when needed for required decommissioning activities.

Whereas, the grantor has elected to use a [insert "letter of credit," "line of credit," "surety bond," "insurance policy," "parent guarantee," "certificate of deposit," or "deposit of government securities"] to provide [insert "all" or "part"] of such financial assurance for the facilities identified herein; and

Whereas, when payment is made under a [insert "letter of credit," "line of credit," "surety bond," "insurance policy, certificate(s) of deposit," "deposit of government securities," or "parent guarantee"], this standby trust shall be used for the receipt of such payment; and

Whereas, the grantor, acting through its duly authorized officers, has selected the trustee to be the trustee under this agreement, and the trustee is willing to act as trustee,

Now, therefore, the grantor and the trustee agree as follows:

Section 1. Definitions. As used in this agreement:

- (A) The term "grantor" means the state of Ohio licensee who enters into this agreement and any successors or assigns of the grantor.
- (B) The term "trustee" means the trustee who enters into this agreement and any successor trustee.

Section 2. Costs of decommissioning. This agreement pertains to the costs of decommissioning the materials and activities identified in license number [insert license number] issued pursuant to rule 3701-38-02.1 of the Administrative Code as shown in Schedule A.

Section 3. Establishment of fund. The grantor and the trustee hereby establish a standby trust fund (the fund) for the benefit of the state of Ohio. The grantor and the trustee intend that no third party have access to the fund except as provided herein.

Section 4. Payments constituting the fund. Payments made to the trustee for the fund shall consist of cash, securities, or other liquid assets acceptable to the trustee. The fund is established initially as consisting of the property, which is acceptable to the trustee, described in schedule b attached hereto. Such property and any other property

subsequently transferred to the trustee are referred to as the "fund," together with all earnings and profits thereon, less any payments or distributions made by the trustee pursuant to this agreement. The fund shall be held by the trustee, in trust, as hereinafter provided. The trustee shall not be responsible nor shall it undertake any responsibility for the amount of, or adequacy of the fund, nor any duty to collect from the grantor, any payments necessary to discharge any liabilities of the grantor established by the state of Ohio.

Section 5. Payment for required activities specified in the plan. The trustee shall make payments from the fund to the grantor upon presentation to the trustee of the following:

- (A) A certificate duly executed by the secretary of the depositor attesting to the occurrence of the events, and in the form set forth in the attached specimen certificate, and
- (B) A certificate attesting to the following conditions;
 - (1) That decommissioning is proceeding pursuant to an state of Ohio approved plan.
 - (2) That the funds withdrawn will be expended for activities undertaken pursuant to that plan, and
 - (3) That the state of Ohio has been given 30 days' prior notice of [insert name of licensee]'s intent to withdraw funds from the escrow fund.

No withdrawal from the fund can exceed ten percent of the outstanding balance of the fund or ___ dollars, whichever is greater, unless state of Ohio approval is attached.

In the event of the grantor's default or inability to direct decommissioning activities, the trustee shall make payments from the fund as the state of Ohio shall direct, in writing, to provide for the payment of the costs of required activities covered by this agreement. The trustee shall reimburse the grantor or other persons as specified by the state of Ohio from the fund for expenditures for required activities in such amounts as the state of Ohio shall direct in writing. In addition, the trustee shall refund to the grantor such amounts as the state of Ohio specifies in writing. Upon refund, such funds shall no longer constitute part of the fund as defined herein.

Section 6. Trust management. The trustee shall invest and reinvest the principal and income of the fund and keep the fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the grantor may communicate in writing to the trustee from time to time, subject, however, to the provisions of this section. In investing, reinvesting, exchanging, selling, and managing the fund, the trustee shall discharge its duties with respect to the fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims; except that:

- (A) Securities or other obligations of the grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the federal Investment Company Act of 1940, as amended (15 U.S.C. 80A-2(A)), shall not be acquired or held, unless

they are securities or other obligations of the federal or a state government;

- (B) The trustee is authorized to invest the fund in time or demand deposits of the trustee, to the extent insured by an agency of the federal government, and in obligations of the federal government such as GNMA, FNMA, and FHLM bonds and certificates or state and municipal bonds rated BBB or higher by Standard and Poors or BAA or higher by Moody's investment services; and
- (C) For a reasonable time, not to exceed sixty days, the trustee is authorized to hold uninvested cash, awaiting investment or distribution, without liability for the payment of interest thereon.

Section 7. Commingling and investment. The trustee is expressly authorized in its discretion:

- (A) To transfer from time to time any or all of the assets of the fund to any common, commingled, or collective trust fund created by the trustee in which the fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and
- (B) To purchase shares in any investment company registered under the federal Investment Company Act of 1940 (15 U.S.C. 80A-I ET SEQ.), including one that may be created, managed, underwritten, or to which investment advice is rendered, or the shares of which are sold by the trustee. The trustee may vote such shares in its discretion.

Section 8. Express powers of trustee. Without in any way limiting the powers and discretion conferred upon the trustee by the other provisions of this agreement or by law, the trustee is expressly authorized and empowered:

- (A) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale, as necessary to allow duly authorized withdrawals at the joint request of the grantor and the state of Ohio or to reinvest in securities at the direction of the grantor;
- (B) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;
- (C) To register any securities held in the fund in its own name, or in the name of a nominee, and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the trustee in other fiduciary capacities, to reinvest interest payments and funds from matured and redeemed instruments, to file proper forms concerning securities held in the fund in a timely fashion with appropriate government agencies, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee or such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the U.S. government, or any agency or instrumentality thereof, with a federal reserve bank, but the books and records of the trustee shall at all times show that all

such securities are part of the fund;

- (D) To deposit any cash in the fund in interest-bearing accounts maintained or savings certificates issued by the trustee, in its separate corporate capacity, or in any other banking institution affiliated with the trustee, to the extent insured by an agency of the federal government; and
- (E) To compromise or otherwise adjust all claims in favor of or against the fund.

Section 9. Taxes and expenses. All taxes of any kind that may be assessed or levied again or in respect of the fund and all brokerage commissions incurred by the fund shall be paid from the fund. All other expenses incurred by the trustee in connection with the administration of this trust, including fees for legal services rendered to the trustee, the compensation of the trustee to the extent not paid directly by the grantor, and all other proper charges and disbursements of the trustee shall be paid from the fund.

Section 10. Annual valuation. After payment has been made into this standby trust fund, the trustee shall annually, at least thirty days before the anniversary date of receipt of payment into the standby trust fund, furnish to the grantor and to the state of Ohio a statement confirming the value of the trust. Any securities in the fund shall be valued at market value as of no more than sixty days before the anniversary date of the establishment of the fund. The failure of the grantor to object in writing to the trustee within ninety days after the statement has been furnished to the grantor and the state of Ohio shall constitute a conclusively binding assent by the grantor, barring the grantor from asserting any claim or liability against the trustee with respect to the matters disclosed in the statement.

Section 11. Advice of counsel. The trustee may from time to time consult with counsel with respect to any question arising as to the construction of this agreement or any action to be taken hereunder. The trustee shall be fully protected, to the extent permitted by law, in acting on the advice of counsel.

Section 12. Trustee compensation. The trustee shall be entitled to reasonable compensation for its services as agreed upon in writing with the grantor. (see Schedule C of the Trust Agreement Schedule following this agreement.)

Section 13. Successor trustee. Upon ninety days notice to the state of Ohio, the trustee may resign; upon ninety days notice to state of Ohio and the trustee, the grantor may replace the trustee; but such resignation or replacement shall not be effective until the grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the trustee hereunder. Upon the successor trustee's acceptance of the appointment, the trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the fund. If for any reason the grantor cannot or does not act in the event of the resignation of the trustee, the trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the grantor, the state of Ohio, and the present trustee by certified mail ten days before such change becomes effective. Any expenses incurred by the trustee as a result of any of the acts contemplated by this section shall be paid as provided in Section 9.

Section 14. Instructions to the trustee. All orders, requests, and instructions by the grantor to the trustee shall be in writing, signed by such persons as are signatories to this agreement or such other designees as the grantor may designate in writing. The trustee shall be fully protected in acting without inquiry in accordance with the grantor's orders, requests, and instructions. If the state of Ohio issues orders, requests, or instructions to the trustee these shall be in writing, signed by the state of Ohio or their designees, and the trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the grantor, the state of Ohio hereunder has occurred. The trustee shall have no duty to act in the absence of such orders, requests, and instruction from the grantor and/or the state of Ohio except as provided for herein.

Section 15. Amendment of agreement. This agreement may be amended by an instrument in-writing executed by the grantor, the trustee and the state of Ohio or by the trustee and the state of Ohio if the grantor ceases to exist.

Section 16. Irrevocability and termination. Subject to the right of the parties to amend this agreement as provided in Section 15, this trust shall be irrevocable and shall continue until terminated at the written agreement of the grantor, the trustee, and the state of Ohio, or by the trustee and the state of Ohio, if the grantor ceases to exist. Upon termination of the trust, all remaining trust property, less final trust administration expense, shall be delivered to the grantor or its successor.

Section 17. Immunity and indemnification. The trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this trust, or in carrying out any directions by the grantor, the state of Ohio issued in accordance with this agreement. The trustee shall be indemnified and saved harmless by the grantor or from the trust fund, or both, from and against any personal liability to which the trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the grantor fails to provide such defense.

Section 18. This agreement shall be administered, construed, and enforced according to the laws of the state of Ohio.

Section 19. Interpretation and severability. As used in this agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each section of this agreement shall not affect the interpretation or the legal efficacy of this agreement. If any part of this agreement is invalid, it shall not affect the remaining provisions which will remain valid and enforceable.

In witness whereof the parties have caused this agreement to be executed by the respective officers duly authorized and the incorporate seals to be hereunto affixed and attested as of the date first written above.

Attest:[insert name of licensee (grantor)][signature of representative of grantor]

[Title]

[Title]
[Seal]

[Insert name of trustee)
[Signature of representative
of trustee]
[Title]

Attest:

[Title]
[Seal]

TRUST CERTIFICATE OF EVENTS

[Insert name and address of trustee]

Attention: Trust division

Gentlemen:

In accordance with the terms of the agreement with you dated _____, I, secretary of [insert name of licensee], hereby certify that the following events have occurred:

1. [Insert name of licensee] is required to commence the decommissioning of its facility located at [insert location of facility] (hereinafter called the decommissioning).
2. The plans and procedures for the commencement and conduct of the decommissioning have been approved by the state of Ohio on _____ (copy of approval attached).
3. The board of directors of [insert name of licensee] has adopted the attached resolution authorizing the commencement of the decommissioning.

Secretary of [insert name of licensee]

Date

Trust certificate of resolution

I, _____ do hereby certify that I am secretary of [insert name of licensee], a [insert state of incorporation] corporation, and that the resolution listed below was duly adopted at a meeting of this corporation's board of directors on, _____, 20__.

In witness whereof, I have hereunto signed my name and affixed the seal of this corporation this _____ day of 20__.

Secretary

Resolved, that this board of directors hereby authorizes the president, or such other employee of the company as he may designate, to commence decommissioning activities at [insert name of facility] in accordance with the terms and conditions described to this board of directors at this meeting and with such other terms and conditions as the president shall approve with and upon the advice of counsel.

TRUST AGREEMENT SCHEDULE

Sample Schedule A

This agreement demonstrates financial assurance for the following cost estimates for the following licensed activities:

Ohio Department of Health license number	Name and address of licensee	Address of licensed activity	Cost estimates for regulatory assurances demonstrated by this agreement
--	------------------------------	------------------------------	---

The cost estimates listed here were last adjusted and approved by the state of Ohio on [date].

Sample Schedule B

Amount _____

As evidenced by _____

Sample Schedule C

_____, Trustee's fees shall be \$ _____

TRUST ACKNOWLEDGEMENT

[The following is an example of the acknowledgement that must accompany the trust agreement for a standby trust fund or trust fund.]

State of _____

To wit: _____

City of _____

On this _____ day of _____, before me, a notary public in and for the city and state aforesaid, personally appeared _____, and she/he did depose and say that she/he is the [title], of [_____], national banking association, trustee, which executed the above instrument, that she/he knows the seal of said association; that the seal affixed to such instrument is such corporate seal; that it was so affixed by order of the association; and that she/he signed her/his name thereto by like order.

[Signature of notary public]

My commission expires: _____

[Date]

WORDING FOR PAYMENT SURETY BOND

Payment surety bond

Date bond executed: _____

Effective date: _____

Principal: [legal name and business address of licensee or applicant]

Type of organization: [insert "proprietorship," "joint venture," "partnership" or "corporation"]

State of incorporation: _____ (if applicable)

Ohio radioactive material license number, name and address of facility, and amount(s) for decommissioning activity guaranteed by this bond: _____

Surety(ies) [name(s) and business address(es)]

Type of organization: [insert "proprietorship," "joint venture," "partnership" or "corporation"]

State of incorporation: _____ (if applicable)

Surety's qualification in jurisdiction where licensed facility(ies) is (are) located.

Surety's bond number: _____

Total penal sum of bond: \$ _____

Know all persons by these presents, that we, the principal and surety(ies) hereto, are firmly bound to the state of Ohio in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally; provided that, where the sureties are corporations acting as co-sureties, we, the sureties, bind ourselves in such sum "jointly and severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each surety binds itself, jointly and severally with the principal, for the payment of such sum only as is set forth opposite the name of such surety; but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

Whereas, the state of Ohio, has promulgated regulations pursuant to Chapter 3748. Of the Revised Code. These regulations, applicable to the grantor, require that a holder of, or an applicant for, a radioactive material license provide assurance that funds will be available when needed for required decommissioning activities;

Now, therefore, the conditions of the obligation are such that if the principal shall faithfully, before the beginning of decommissioning of each facility identified above, fund the standby trust fund in the amount(s) identified above for the facility;

Or, if the principal shall fund the standby trust fund in such amount(s) after an order to begin facility decommissioning is issued by the state of Ohio or a United States district court

or other court of competent jurisdiction;

Or, if the principal shall provide alternative financial assurance and obtain the written approval of the state of Ohio of such assurance, within thirty days after the date a notice of cancellation from the surety(ies) is received by both the principal and the state of Ohio, then this obligation shall be null and void; otherwise it is to remain in full force and effect.

The surety(ies) shall become liable on this bond obligation only when the principal has failed to fulfill the conditions described above. Upon notification by the state of Ohio that the principal has failed to perform as guaranteed by this bond, the surety(ies) shall place funds in the amount guaranteed for the facility(ies) into the standby trust fund.

The liability of the surety(ies) shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligation of the surety(ies) hereunder exceed the amount of said penal sum.

The surety(ies) may cancel the bond by sending notice of cancellation by certified mail to the principal and to the state of Ohio provided, however, that cancellation shall not occur during the ninety days beginning on the date of receipt of the notice of cancellation by both the principal and the state of Ohio, as evidenced by the return receipts.

The principal may terminate this bond by sending written notice to the state of Ohio and to surety(ies) ninety days prior to the proposed date of termination, provided, however, that no such notice shall become effective until the surety(ies) receive(s) written authorization for termination of the bond from the state of Ohio.

The principal and surety(ies) hereby agree to adjust the penal sum of the bond yearly so that it guarantees a new amount, provided that the penal sum does not increase by more than twenty percent in any one year, and no decrease in the penal sum takes place without the written permission of the state of Ohio.

If any part of this agreement is invalid, it shall not affect the remaining provisions which will remain valid and enforceable.

In witness whereof, the principal and surety(ies) have executed this financial Guarantee bond and have affixed their seals on the date set forth above.

The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the principal and surety(ies).

Principal

[Signature(s)]

(Name(s))

[Title(s)]

3701:1-40-17

29

[Corporate seal]

Corporate surety(ies)

[Name and address]

State of incorporation: _____

Liability limit: \$ _____

[Signature(s)]

[Name(s) and title(s)]

[Corporate seal]

[For every co-surety, provide signatures, corporate seal, and other information in the same manner as for surety(ies) above.]

Bond premium: \$ _____

WORDING FOR IRREVOCABLE STANDBY LETTER OF CREDIT

Irrevocable standby letter of credit no. [insert no.]

This credit expires [insert date]

Issued to: Ohio Department of Health, Bureau of Radiation Protection
35 East Chestnut Street, Seventh Floor
Columbus, Ohio 43216-0118

Dear Sir or Madam:

We hereby establish our irrevocable standby letter of credit no. _____ in your favor, at the request and for the account of [applicant's name and address] up to the aggregate amount of [in words], U. S. Dollars \$ _____, Available upon presentation of:

- (1) Your sight draft, bearing reference to this letter of credit no. _____, and
- (2) Your signed statement reading as follows: "I certify that the amount of the draft is payable pursuant to regulations issued under authority of the state of Ohio.

This letter of credit is issued in accordance with regulations issued under the authority of the state of Ohio. Chapter 3748. of the Revised Code and rules promulgated thereunder require that a holder of, or an applicant for, a license issued under rule 3701-38-02.1 of the Administrative Code provide assurance that funds will be available when needed for decommissioning.

This letter of credit is effective as of [date] and shall expire on [date at least 1 year later], but such expiration date shall be automatically extended for a period of [at least 1 year] on [date] and on each successive expiration date, unless, at least ninety days before the current expiration date, we notify both you and [licensee's name], by certified mail, as shown on the signed return receipts. If [licensee's name] is unable to secure alternative financial assurance to replace this letter of credit within thirty days of notification of cancellation the director may draw upon the full value of this letter of credit prior to cancellation. The financial institution shall give immediate notice to the applicant and the state of Ohio of any notice received or action filed alleging (1) the insolvency or bankruptcy of the financial institution or (2) any violations of regulatory requirements that could result in suspension or revocation of the financial institution's charter or license to do business. The financial institution also shall give immediate notice if the financial institution, for any reason, becomes unable to fulfill its obligation under the letter of credit.

Whenever this letter of credit is drawn on under and in compliance with the terms of this letter of credit, we shall duly honor such draft upon its presentation to us within 30 days, and we shall deposit the amount of the draft directly into the standby trust fund of [licensee's name] in accordance with your instructions.

Each draft must bear on its face the clause: "drawn under letter of credit no. _____. Dated _____, and the total of this draft and all other drafts previously drawn under this letter of credit does not exceed [fill in amount]."

[Signature(s) and title(s) of officials of issuing institution]

[Date]

This credit is subject to [insert "the most recent edition of the uniform customs and practice for documentary credits. Published by the international chamber of commerce," or "the uniform commercial code"].

WORDING FOR DOCUMENTS RECOMMENDED TO SUPPORT CORPORATE GUARANTEE

Wording for letter from chief executive officer of applicant or licensee, certifying that applicant or licensee is a going concern with positive tangible net worth

(Address to Ohio Department of Health)

I am the chief executive officer of [name and address of firm], a (insert "proprietorship," "joint venture," "partnership," or "corporation"). This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in Chapter 3748. of the Revised Code and rules promulgated thereunder.

I hereby certify that [name of firm] is currently a going concern, and that it possesses positive tangible net worth in the amount of _____.

This firm [insert "is required" or "is not required"] to file a form 10k with the U.S. securities and exchange commission for the latest fiscal year. This fiscal year of this firm ends on [month, day].

I hereby certify that the content of this letter is true and correct to the best of my knowledge.

[Signature]

[Name]

[Title]

[Date]

**WORDING FOR LETTER FROM CHIEF FINANCIAL OFFICER OF CORPORATE PARENT,
INCLUDING COST ESTIMATES AND DATA FROM AUDITED FINANCIAL STATEMENTS**

(Address to Ohio Department of Health)

I am the chief financial officer of [name and address of firm], a [insert "proprietorship," "joint venture," "partnership," or "corporation"]. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in Chapter 3748. of the Revised Code and rules promulgated thereunder.

[Complete the following paragraph regarding facility(ies) and associated cost estimates or certified amounts. For each facility, include its license number, name, address, and current cost estimates for the specified activities.]

This firm guarantees, through the parent company guarantee submitted to demonstrate compliance pursuant to Chapter 3748. of the Revised Code and rules promulgated thereunder, the decommissioning of the following facility(ies) owned or operated by subsidiary(ies) of this firm. The current cost estimates or certified amounts for decommissioning, so guaranteed, are shown for each facility:

<u>NAME OF FACILITY</u>	<u>LOCATION OF FACILITY</u>	<u>CERTIFIED AMOUNT OR CURRENT COST ESTIMATES</u>
-------------------------	-----------------------------	---

This firm [insert "is required" or "is not required"] to file a form 10k with the U.S. securities and exchange commission for the latest fiscal year.

This fiscal year of this firm ends on [month, day]. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements and footnotes for the latest completed fiscal year, ended [date].

[Insert completed alternative I or alternative II.]

I hereby certify that the content of this letter is true and correct to the best of my knowledge.

[Signature]

[Name]

[Title]

[Date]

FINANCIAL TEST: ALTERNATIVE I

- 1 Decommissioning cost estimates or certified amounts for facility [insert license number] (total of all cost estimates or certified amounts shown in paragraphs above) \$ _____
- *2 Total liabilities (if any portion of the cost estimates for decommissioning is included in total liabilities on your firm's financial statement, deduct the amount of that portion from this line and add that amount to lines 3 and 4) \$ _____
- 3 TANGIBLE NET WORTH** \$ _____
- *4 NET WORTH \$ _____
- *5 CURRENT ASSETS \$ _____
- *6 CURRENT LIABILITIES \$ _____
- *7 NET WORKING CAPITAL (LINE 5 MINUS LINE 6) \$ _____
- *8 THE SUM OF NET INCOME PLUS DEPRECIATION, DEPLETION, AND AMORTIZATION \$ _____
- *9 TOTAL ASSETS IN UNITED STATES (REQUIRED ONLY IF LESS THAN NINETY PERCENT OF FIRM'S ASSETS ARE LOCATED IN THE UNITED STATES) \$ _____

		YES	NO
10	IS LINE 3 AT LEAST TEN MILLION DOLLARS?		
11	IS LINE 3 AT LEAST 6 TIMES LINE 1?		
12	IS LINE 7 AT LEAST 6 TIMES LINE 1?		
13	ARE AT LEAST NINETY PERCENT OF FIRM'S ASSETS LOCATED IN THE UNITED STATES? IF NOT, COMPLETE LINE 14.		
14	IS LINE 9 AT LEAST 6 TIMES LINE 1? (GUARANTOR MUST MEET TWO OF THE FOLLOWING THREE RATIOS)		
15	IS LINE 2 DIVIDED BY LINE 4 LESS THAN 2.0?		
16	IS LINE 8 DIVIDED BY LINE 2 GREATER THAN 0.1?		
17	IS LINE 5 DIVIDED BY LINE 6 GREATER THAN 1.5?		

*Denotes figures derived from financial statements.

**Tangible net worth is defined as net worth minus goodwill, patents, trade marks, and copyrights.

FINANCIAL TEST: ALTERNATIVE II

- 1 Decommissioning cost estimates or certified amounts for facility [insert license number] (total of all cost estimates or certified amounts shown in paragraphs above) \$ _____
 - 2 Current bond rating of most recent issuance of this firm and name of rating service \$ _____
 - 3 Date of issuance of bond \$ _____
 - 4 Date of maturity of bond \$ _____
 - *5 Tangible net worth** (if any portion of estimates for decommissioning is included in total liabilities on your firm's financial statements, add the amount of that portion to this line.) \$ _____
 - *6 Total assets in united states (required only if less than ninety percent of firm's assets are located in the United States) \$ _____
- | | YES | NO |
|---|-------|-------|
| 7 Is line 5 at least ten million dollars? | _____ | _____ |
| 8 Is line 5 at least 6 times line 1? | _____ | _____ |
| *9 Are at least ninety percent of firm's assets located in the United States? If not, complete line 10. | _____ | _____ |
| 10 Is line 6 at least six times line 1? | _____ | _____ |

 *Denotes figures derived from financial statements.
 **Tangible net worth is defined as net worth minus goodwill, patents, trademarks, and copyrights.

WORDING FOR AUDITOR'S SPECIAL REPORT BY CERTIFIED PUBLIC ACCOUNTANT

Confirmation of chief financial officer's letter

We have examined the financial statements of [company name] for the year ended [date], and have issued our report thereon dated [date]. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary.

The [company name] has prepared documents to demonstrate its financial responsibility under the state of Ohio's financial assurance regulations, Chapter 3748. of the Revised Code and rules promulgated thereunder. This letter is furnished to assist the licensee [insert license number and name] in complying with these regulations and should not be used for other purposes.

The attached schedule reconciles the specified information furnished in the chief financial officer's (CFO's) letter in response to the regulations with the company's financial statements. In connection therewith, we have

1. Confirmed that the amounts in the column "per financial statements" agree with amounts contained in the company's financial statements for the year ended [date];
2. Confirmed that the amounts in the column "per CFO's letter" agree with the letter prepared in response to the NRC's request;
3. Confirmed that the amounts in the column "reconciling items" agree with analyses prepared by the company setting forth the indicated items; and
4. Recomputed the totals and percentages.

Because the procedures in 1-4 above do not constitute a full examination made in accordance with generally accepted auditing standards, we do not express an opinion on the manner in which the amounts were derived in the items referred to above. In connection with the procedures referred to above, no matters came to our attention that cause us to believe that the chief financial officer's letter and supporting information should be adjusted.

Signature

Date

Sample schedule reconciling amounts contained in

chief financial officer's letter with amounts in financial statements
XYZ COMPANY
YEAR ENDED DECEMBER 31, 20XX

LINE NUMBER		PER FINANCIAL STATEMENTS	RECONCILING ITEMS	PER CFO'S LETTER
	IN			
	<u>CFO'S LETTER</u>			
6	TOTAL CURRENT LIABILITIES	X		
	LONG TERM DEBT	X		
	DEFERRED INCOME TAXES	X		
		XX		
	ACCRUED DECOMMISSIONING COSTS INCLUDED IN CURRENT LIABILITIES		X	
	TOTAL LIABILITIES (LESS ACCRUED DECOMMISSIONING COSTS)			X
4	NET WORTH	XX		
	LESS: COST IN EXCESS OF VALUE OF TANGIBLE ASSETS ACQUIRED			
		X		
		XX		
	ACCRUED DECOMMISSIONING COSTS INCLUDED IN CURRENT LIABILITIES		X	
	TANGIBLE NET WORTH (PLUS DECOMMISSIONING COSTS)			XX

(BALANCE OF SCHEDULE IS NOT ILLUSTRATED.)

This illustrates the form of schedule that is contemplated. Details and reconciling items will differ in specific situations.

WORDING FOR PARENT COMPANY GUARANTEE

Parent company guarantee

Guarantee made this [date] by (name of guaranteeing entity), a [insert "proprietorship," "joint venture," "partnership," or "corporation"] organized under the laws of the state of [insert name of state], herein referred to as "guarantor," to the state of Ohio, obligee, on behalf of our subsidiary [licensee] of [business address].

Recitals

1. The guarantor has full authority and capacity to enter into this guarantee [if guarantor is a corporation, add the following phrase "under its bylaws, articles of incorporation, and the laws of the state of [insert guarantor's state of incorporation], its state of incorporation."] [if the guarantor has a board of directors, insert the following: "guarantor has approval from its board of directors to enter into this guarantee."]
2. This guarantee is being issued to comply with regulations issued by the state of Ohio, pursuant to Chapter 3748. of the Revised Code and rules promulgated thereunder. These rules require that a holder of, or an applicant for, a materials license issued pursuant to rule 3701-38-02.1 of the Administrative Code provide assurance that funds will be available when needed for required decommissioning activities.
3. The guarantee is issued to provide financial assurance for decommissioning activities for [identify licensed facility(ies)] as required by Chapter 3748. of the Revised Code and rules promulgated thereunder. The decommissioning costs for which are as follows: [insert amount of decommissioning cost guaranteed for each identified facility].
4. The guarantor meets or exceeds the following financial test criteria [insert statement indicating which financial test is being used] and agrees to comply with all notification requirements as specified in Chapter 3748. of the Revised Code and rules promulgated thereunder.

The guarantor shall meet one of the following two financial tests:

- (A) (I) A current rating of its most recent bond issuance of AAA, AA, A or BBB as issued by Standard and Poor's, or Aaa, Aa, A or Baa as rated by Moody's; and
- (II) Tangible net worth is at least ten million dollars and at least six times the current decommissioning cost estimate (or prescribed amount if a certification is used); and
- (III) Assets located in the United States amounting to at least ninety

percent of its total assets or at least six times the current decommissioning cost (or prescribed amount if certification is used).

or

- (B)(I) Net working capital and tangible net worth each at least six times the current decommissioning cost estimates (or amount if certification is used); and
 - (II) Assets located in the United States amounting to at least ninety percent of its total assets or at least six times the amount of the current decommissioning cost estimates (or prescribed amount if certification is used); and
 - (III) Meets two of the following three ratios: a ratio of total liabilities to net worth less than 2.0; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities that is greater than 0.1; and a ratio of current assets to current liabilities that is greater than 1.5; and
 - (IV) Tangible net worth of at least ten million dollars.
5. The guarantor has majority control of the voting stock for the following licensee(s) covered by this guarantee: (list for each licensee: name, address, the facility(ies) owned or operated by each licensee, and the corresponding license number(s)).
 6. Decommissioning activities as used below refers to the activities required by Chapter 3748. of the Revised Code and rules promulgated thereunder for decommissioning of facility(ies) identified above.
 7. For value received from [licensees], (if the guarantor is a corporation, add "and pursuant to the authority conferred upon the guarantor by ("the unanimous resolution of its directors" or "the majority vote of its shareholders"), [a certified copy of which is attached,"] the guarantor guarantees to the state of Ohio that if the licensee fails to perform the required decommissioning activities, as required by license no. [insert license number], the guarantor shall
 - (A) Carry out the required activities, or
 - (B) Set up a trust fund in favor of the above identified beneficiary in the amount of these current cost estimates for these activities.
 8. The guarantor agrees to submit revised financial statements, financial test data, and a special auditor's report and reconciling schedule annually within ninety days of the close of the parent guarantor's fiscal year.

9. The guarantor agrees that if, at the end of any fiscal year before termination of this guarantee, it fails to meet the financial test criteria, the licensee shall send within ninety days of the end of the fiscal year, by certified mail, notice to the state of Ohio that the licensee intends to provide alternative financial assurance as specified in Chapter 3748. of the Revised Code and rules promulgated thereunder. Within one hundred twenty days after the end of the fiscal year, the guarantor shall establish such financial assurance if the [licensee] has not done so.
10. The guarantor also agrees to notify the beneficiary promptly if the ownership of the licensee or the parent firm is transferred and to maintain this guarantee until the new parent firm or the licensee provides alternative financial assurance acceptable to the beneficiary.
11. The guarantor agrees that within thirty days after it determines that it no longer meets the financial test criteria or it is disallowed from continuing as a guarantor for the facility under license no. [insert license number], it shall establish an alternative financial assurance as specified in Chapter 3748. of the Revised Code and rules promulgated thereunder, in the name of (licensee] unless [licensee] has done so.
12. The guarantor as well as its successors and assigns agree to remain bound jointly and severally under this guarantee notwithstanding any or all of the following: amendment or modification of license or state of Ohio approved decommissioning funding plan for that facility, the extension or reduction of the time of performance of required activities, or any other modification or alteration of an obligation of the licensee pursuant to Chapter 3748. of the Revised Code and rules promulgated thereunder.
13. The guarantor agrees that all bound parties shall be jointly and severally liable for all litigation costs incurred by the beneficiary [insert name] in any successful effort to enforce the agreement against the guarantor.
14. The guarantor agrees to remain bound under this guarantee for as long as [licensee] must comply with the applicable financial assurance requirements Chapter 3748. of the Revised Code and rules promulgated thereunder, for the previously listed facility(ies), except that the guarantor may cancel this guarantee by sending notice by certified mail to the [insert "NRC" or the name of the state agency] and to [licensee], such cancellation to become effective no earlier than one hundred twenty days after receipt of such notice by both the state of Ohio and [licensee] as evidenced by the return receipts.
15. The guarantor agrees that if [licensee] fails to provide alternative financial assurance as specified in Chapter 3748. of the Revised Code and rules promulgated thereunder, as applicable, and obtain written approval of such assurance from the state of Ohio within ninety days after a notice of cancellation by the guarantor is received by both the state of Ohio and [licensee] from the guarantor, the guarantor shall provide such alternative financial assurance in the name of [licensee] or make full payment under

the guarantee.

16. The guarantor expressly waives notice of acceptance of this guarantee by the state of Ohio or by [licensee]. The guarantor also expressly waives notice of amendments or modification of the decommissioning requirements and of amendments or modifications of the license.
17. If the guarantor files financial reports with the U. S. securities and exchange commission, then it shall promptly submit them to the state of Ohio during each year in which this guarantee is in effect.

I hereby certify that this guarantee is true and correct to the best of my knowledge.

Effective date: _____

[Name of guarantor]

[Authorized signature for guarantor]

[Name of person signing]

[Title of person signing]

Signature of witness or notary: _____

3701:1-44-14 Application for specific licenses.

- (A) A person may file an application for specific license in accordance with the instructions in rule 3701:1-44-05 of the Administrative Code. Information contained in previous applications, statements or reports filed with the director may be incorporated by reference provided that the reference is clear and specific.
- (B) The director may at any time after the filing of the original application, and before the expiration of the license, require further statements in order to enable the director to determine whether the application should be granted or denied or whether a license should be modified or revoked. All applications and statements shall be signed by the applicant or licensee or a person duly authorized to act for and on his behalf.
- (C) An application for a license filed pursuant to the requirements in Chapter 3701:1-44 of the Administrative Code will be considered also as an application for licenses authorizing other activities for which licenses are required by Chapter 3748. of the Revised Code and the rules promulgated thereunder, provided that the application specifies the additional activities for which licenses are requested and complies with requirements of the director as to applications for such licenses.
- (D) Each application for a source material license shall be accompanied by the fee prescribed in rule 3701:1-38-02 of the Administrative Code.
- (E) An application for a license to possess and use source material for uranium milling, production of uranium hexafluoride, or for the conduct of any other activity which the director has determined will significantly affect the quality of the environment shall be filed at least nine months prior to commencement of construction of the plant or facility in which the activity will be conducted and shall be accompanied by any environmental report required pursuant to rule 3701:1-40-36 of the Administrative Code.
- (F) An application for a license to receive, possess, and use source material for uranium or thorium milling or byproduct material, as defined in rule 3701:1-44-01 of the Administrative Code, at sites formerly associated with such milling shall contain proposed written specifications relating to milling operations and the disposition of the byproduct material to achieve the requirements and objectives set forth in the appendix to rule 3701:1-44-14 of the Administrative Code. Each application must clearly demonstrate how the requirements and objectives set forth in the appendix to rule 3701:1-44-14 of the Administrative Code have been addressed. Failure to clearly demonstrate how the requirements and objectives in the appendix to rule 3701:1-44-14 of the Administrative Code have been addressed shall be grounds for refusing to accept an application.
- (G) As provided by rule 3701:1-44-18 of the Administrative Code, certain applications for specific licenses filed under Chapter 3701:1-44 of the Administrative Code must contain a proposed decommissioning funding plan or a certification of financial assurance for decommissioning.

Effective: 11/22/2013

R.C. 119.032 review dates: 09/03/2013 and 08/30/2015

CERTIFIED ELECTRONICALLY
Certification

11/12/2013
Date

Promulgated Under: 119.03
Statutory Authority: 3748.04
Rule Amplifies: 3748.04
Prior Effective Dates: 2/6/2006

APPENDIX

Criteria Relating To The Operation Of Uranium Mills And The Disposition Of Tailings Or Wastes Produced By The Extraction Or Concentration Of Source Material From Ores Processed Primarily For Their Source Material Content.

Every applicant for a license to possess and use source material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required by the provisions of paragraph (F) of rule 3701:1-44-14 of this chapter 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, financial, 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 rule 3701:1-38-01 of the Administrative Code.

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 paragraph (F) of rule 3701:1-44-14 of this chapter, applications for licenses must clearly demonstrate how the criteria have been addressed.

The specifications must 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 must be evaluated.

Licensees or applicants may propose alternatives to the specific requirements in this appendix. The alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The director may find that the proposed alternatives meet the director’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 sites, 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 United States environmental protection agency in 40 C.F.R. 192, subparts D and E.

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 director will consider “practicable” and “reasonably achievable” as equivalent terms. Decisions involving these terms will take into account the 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.

The following definitions apply to the specified terms as used in this appendix:

“Aquifer” means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs. Any saturated zone created by uranium or thorium recovery 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 11 in the appendix to 10 C.F.R. 40.

“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 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 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.

A “capable fault” is a fault which has exhibited one or more of the following characteristics:

- (1) Movement at or near the ground surface at least once within the past thirty-five thousand years or movement of a recurring nature within the past five hundred thousand years.
- (2) Macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault.
- (3) A structural relationship to a capable fault according to characteristics (1) or (2) of this paragraph such that movement on one could be reasonably expected to be accompanied by movement on the other.

In some cases, the geologic evidence of past activity at or near the ground surface along a particular fault may be obscured at a particular site. This might occur, for example, at a site having a deep overburden. For these cases, evidence may exist elsewhere along the fault from which an evaluation of its characteristics in the vicinity of the site can be reasonably based. Such evidence shall be used in determining whether the fault is a capable fault within this definition.

Notwithstanding the foregoing characteristics (1), (2) and (3), structural association of a fault with geologic structural features which are geologically old (at least pre-Quaternary) such as many of those found in the eastern region of the United States shall, in the absence of conflicting evidence, demonstrate that the fault is not a capable fault within this definition.

“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 director approved plan to accomplish closure.

“Compliance period” begins when the director sets secondary groundwater 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 apply.

“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.

“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: relevant data requested by the agencies, or other information, including approval of the reclamation plan; and

- (1) Physical conditions at the site;
- (2) Inclement weather or climatic conditions;
- (3) An act of God;
- (4) An act of war;
- (5) A judicial or administrative order or decision, or change to the statutory, regulatory, or other legal requirements applicable to the licensee's facility that would preclude or delay the performance of activities required for compliance;
- (6) Labor disturbances;
- (7) Any modifications, cessation or delay ordered by state, federal, or local agencies;
- (8) Delays beyond the time reasonably required in obtaining necessary government permits, licenses, approvals, or consent for activities described in the reclamation plan proposed by the licensee that result from agency failure to take final action after the licensee has made a good faith, timely effort to submit legally sufficient applications, responses to requests (including relevant data requested by the agencies), or other information, including approval or the reclamation plan; and
- (9) An act or omission of any third party over whom the licensee has no control.

“Final radon barrier” means the earthen cover (or approved alternative cover) over tailings or waste constructed to comply with Criterion 6 of this appendix (excluding erosion protection features).

“Groundwater” means water below the land surface in a zone of saturation. For purposes of this appendix, groundwater is the water contained within an aquifer as defined above.

“Leachate” means any liquid, including any suspended or dissolved components in the liquid that has percolated through or drained from the byproduct material.

“Licensed site” means the area contained within the boundary of a location under the control of persons generating or storing byproduct materials under a director license.

“Liner” means a continuous layer of natural or man-made materials, beneath or on the sides of a surface impoundment which restricts the downward or lateral escape of byproduct material, hazardous constituents, or leachate.

“Milestone” means an action or event that is required to occur by an enforceable date.

“Operation” means that a uranium or thorium mill tailings pile or impoundment is being used for the continued placement of byproduct material or is in standby status for such placement. A pile or impoundment is in operation from the day that byproduct material is first placed in the pile or impoundment until the day final closure begins.

“Point of compliance” is the site specific location in the uppermost aquifer where the groundwater protection standard must be met.

“Reclamation plan,” for the purposes of Criterion 6A, means the plan detailing activities to accomplish reclamation of the tailings or waste disposal area in accordance with the technical criteria of this appendix. 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, wind blown 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.)

“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.

“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.

I. Technical Criteria

Criterion 1 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:

- Remoteness from populated areas;
- Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from groundwater sources; and
- Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long term.

The site selection process must be an optimization to the maximum extent reasonably achievable in terms of these features.

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.

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 from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations must 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 groundwater 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 retention structures, and size and steepness of slopes associated exposed embankments must be minimized by excavation to the maximum extent reasonably achievable or appropriate given the geologic and hydrologic conditions at a site. In these cases, it must be demonstrated that an above grade disposal program will provide reasonably equivalent isolation of the tailings from natural erosional forces.

- Criterion 4** The following site and design criteria must be adhered to whether tailings or wastes are disposed of above or below grade.
- (a) Upstream rainfall catchment areas must be minimized to decrease erosion potential and the size of the floods which could erode or wash out sections of the tailings disposal area.
 - (b) Topographic features should provide good wind protection.
 - (c) Embankment and cover slopes must be relatively flat after final stabilization to minimize erosion potential and to provide conservative factors of safety assuring long-term stability. The broad objective should be to contour final slopes to grades which are as close as possible to those which would be provided if tailings were disposed of below grade; this could, for example, lead to slopes of about ten horizontal to one vertical or less steep. In general, slopes should not be steeper than about five horizontal to one vertical. Where steeper slopes are proposed, reasons why a slope less steep than five horizontal to one vertical would be impracticable should be provided, and compensating factors and conditions which make such slopes acceptable should be identified.
 - (d) A full self-sustaining vegetative cover must be established or rock cover employed to reduce wind and water erosion to negligible levels.

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

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

- Shape, size, composition, and gradation of rock particles (excepting bedding material average particles size must be at least cobble size or greater);
- Rock cover thickness and zoning of particles by size; and
- Steepness of underlying slopes.

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

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

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

- (e) 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. 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.
- (f) 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 11 incorporate the basic groundwater protection standards imposed by the United States environmental protection agency in 40 C.F.R. 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.

5A(1) The primary groundwater protection standard is a design standard for surface impoundments used to manage uranium and thorium byproduct material. Unless exempted under paragraph 5A(3) of this Criterion, surface impoundments (except for an existing portion) must have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, groundwater, 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, groundwater, 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.

5A(2) The liner required by paragraph 5A(1) above must 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.
- 5A(3) The applicant or licensee will be exempted from the requirements of paragraph 5A(1) of this Criterion if the director finds, based on a demonstration by the applicant or licensee, that alternate design and operating practices, including the closure plan, together with site characteristics will prevent the migration of any hazardous constituents into groundwater or surface water at any future time. In deciding whether to grant an exemption, the director will consider:
- (a) The nature and quantity of the wastes;
 - (b) The proposed alternate design and operation;
 - (c) The hydrogeologic setting of the facility, including the attenuative capacity and thickness of the liners and soils present between the impoundment and groundwater or surface water; and
 - (d) All other factors which would influence the quality and mobility of the leachate produced and the potential for it to migrate to groundwater or surface water.
- 5A(4) A surface impoundment must be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations, overfilling, wind and wave actions, rainfall, or run-on; from malfunctions of level controllers, alarms, and other equipment; and from human error.
- 5A(5) When dikes are used to form the surface impoundment, the dikes must be designed, constructed, and maintained with sufficient structural integrity to

prevent massive failure of the dikes. In ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the impoundment.

- 5B(1) Uranium and thorium byproduct materials must be managed to conform to the following secondary groundwater protection standard:

Hazardous constituents entering the groundwater from a licensed site must not exceed the specified concentration limits in the uppermost aquifer beyond the point of compliance during the compliance period. Hazardous constituents are those constituents identified by the director pursuant to paragraph 5B(2) of this Criterion. Specified concentration limits are those limits established by the director as indicated in paragraph 5B(5) of this Criterion. The director will also establish the point of compliance and compliance period on a site specific basis through license conditions and orders. The objective in selecting the point of compliance is to provide the earliest practicable warning that the impoundment is releasing hazardous constituents to the groundwater. The point of compliance must be selected to provide prompt indication of groundwater contamination on the hydraulically downgradient edge of the disposal area. The director shall identify hazardous constituents, establish concentration limits, set the compliance period, and may adjust the point of compliance if needed to accord with developed data and site information as to the flow of groundwater or contaminants, when the detection monitoring established under Criterion 7A indicates leakage of hazardous constituents from the disposal area.

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

- (a) The constituent is reasonably expected to be in or derived from the byproduct material in the disposal area;
- (b) The constituent has been detected in the groundwater in the uppermost aquifer; and
- (c) The constituent is listed in Criterion 11 of this appendix.

- 5B(3) Even when constituents meet all three tests in paragraph 5B(2) of this Criterion, the director may exclude a detected constituent from the set of hazardous constituents on a site specific basis if it finds that the constituent is not capable of posing a substantial present or potential hazard to human

health or the environment. In deciding whether to exclude constituents, the director will consider the following:

- (a) Potential adverse effects on groundwater quality, considering:
 - (i) The physical and chemical characteristics of the waste in the licensed site, including its potential for migration;
 - (ii) The hydrogeological characteristics of the facility and surrounding land;
 - (iii) The quantity of groundwater and the direction of groundwater flow;
 - (iv) The proximity and withdrawal rates of groundwater users;
 - (v) The current and future uses of groundwater in the area;
 - (vi) The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater quality;
 - (vii) The potential for health risks caused by human exposure to waste constituents;
 - (viii) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;
 - (ix) The persistence and permanence of the potential adverse effects.

- (b) Potential adverse effects on hydraulically-connected surface water quality, considering:
 - (i) The volume and physical and chemical characteristics of the waste in the licensed site;
 - (ii) The hydrogeological characteristics of the facility and surrounding land;
 - (iii) The quantity and quality of groundwater, and the direction of groundwater flow;

- (iv) The patterns of rainfall in the region;
- (v) The proximity of the licensed site to surface waters;
- (vi) The current and future uses of surface waters in the area and any water quality standards established for those surface waters;
- (vii) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality;
- (viii) The potential for health risks caused by human exposure to waste constituents;
- (ix) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- (x) The persistence and permanence of the potential adverse effects.

5B(4) In making any determinations under paragraphs 5B(3) and 5B(6) of this Criterion about the use of groundwater in the area around the facility, the director will consider any identification of underground sources of drinking water and exempted aquifers made by the United States environmental protection agency.

5B(5) At the point of compliance, the concentration of a hazardous constituent must not exceed:

- (a) The director approved background concentration of that constituent in the groundwater;
- (b) The respective value given in the table in paragraph 5C if the constituent is listed in the table and if the background level of the constituent is below the value listed; or
- (c) An alternate concentration limit established by the director.

5B(6) Conceptually, background concentrations pose no incremental hazards and the drinking water limits in paragraph 5C state acceptable hazards but these two options may not be practically achievable at a specific site. Alternate

concentration limits that present no significant hazard may be proposed by licensees for director consideration. Licensees must provide the basis for any proposed limits including consideration of practicable corrective actions that limits are as low as reasonably achievable, and information on the factors the director must consider. The director will establish a site specific alternate concentration limit for a hazardous constituent as provided in paragraph 5B(5) of this Criterion if it finds that the proposed limit is as low as reasonably achievable, after considering practicable corrective actions, and that the constituent will not pose a substantial present or potential hazard to human health or the environment as long as the alternate concentration limit is not exceeded. In making the present and potential hazard finding, the director will consider the following factors:

- (a) Potential adverse effects on groundwater quality, considering:
 - (i) The physical and chemical characteristics of the waste in the licensed site including its potential for migration;
 - (ii) The hydrogeological characteristics of the facility and surrounding land;
 - (iii) The quantity of groundwater and the direction of groundwater flow;
 - (iv) The proximity and withdrawal rates of groundwater users;
 - (v) The current and future uses of groundwater in the area;
 - (vi) The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater quality;
 - (vii) The potential for health risks caused by human exposure to waste constituents;
 - (viii) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;
 - (ix) The persistence and permanence of the potential adverse effects.
- (b) Potential adverse effects on hydraulically-connected surface water quality, considering:

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

5C Maximum Values for Groundwater Protection

Constituent or property	Maximum concentration
Milligrams per liter:	
Arsenic	0.05
Barium	1.0
Cadmium	0.01

Constituent or property	Maximum concentration
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Endrin (1,2,3,4,10,10-hexachloro-1,7 -epoxy-1,4,4a,5,6,7,8,9a-octahydro-1, 4-endo, endo-5, 8-dimethano naphthalene)	0.0002
Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer)	0.004
Methoxychlor (1,1,1-Trichloro-2,2-bis (p-methoxyphenylethane)	0.1
Toxaphene (C ₁₀ H ₁₀ Cl ₆ , Technical chlorinated camphene, 67-69 percent chlorine)	0.005
2, 4-D(2,4-Dichlorophenoxyacetic acid)	0.1
2, 4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid)	0.01
Picocuries per liter:	
Combined radium-226 and radium-228	5
Gross alpha-particle activity (excluding radon and uranium when producing uranium byproduct material or radon and thorium when producing thorium byproduct material)	15

- 5D If the groundwater 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 months after the director finds that the standards have been exceeded. The licensee shall submit the proposed corrective action program and supporting rationale for director approval prior to putting the program into operation, unless otherwise directed by the director. The objective of the program is to return hazardous constituent concentration levels in groundwater to the concentration limits set as standards. The licensee's proposed program must address removing the hazardous constituents that have entered the groundwater at the point of compliance or treating them in place. The program must also address removing or treating in place any hazardous constituents that exceed concentration limits in groundwater between the point of compliance and the downgradient facility property boundary. The licensee shall continue corrective action measures to the extent necessary to achieve and maintain compliance with the groundwater

protection standard. The director will determine when the licensee may terminate corrective action measures based on data from the groundwater monitoring program and other information that provide reasonable assurance that the groundwater protection standard will not be exceeded.

5E In developing and conducting groundwater 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 groundwater 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. Tests must be conducted with representative tailings solutions and clay materials to confirm that no significant deterioration of permeability or stability properties will occur with continuous exposure of clay to tailings solutions. Tests must be run for a sufficient period of time to reveal any effects if they are going to occur (in some cases deterioration has been observed to occur rather rapidly after about nine months of exposure)).
- (2) Mill process designs which provide the maximum practicable recycle of solutions and conservation of water to reduce the net input of liquid to the tailings impoundment.
- (3) Dewatering of tailings by process devices and/or in-situ drainage systems (At new sites, tailings must be dewatered by a drainage system installed at the bottom of the impoundment to lower the phreatic surface and reduce the driving head of seepage, unless tests show tailings are not amenable to such a system. Where in-situ dewatering is to be conducted, the impoundment bottom must be graded to assure that the drains are at a low point. The drains must be protected by suitable filter materials to assure that drains remain free running. The drainage system must also be adequately sized to assure good drainage).
- (4) Neutralization to promote immobilization of hazardous constituents.

5F Where groundwater impacts are occurring at an existing site due to seepage, action must be taken to alleviate conditions that lead to excessive seepage impacts and restore groundwater quality. The specific seepage control and groundwater protection method, or combination of methods, to be used must

be worked out on a site-specific basis. Technical specifications must be prepared to control installation of seepage control systems. A quality assurance, testing, and inspection program, which includes supervision by a qualified engineer or scientist, must be established to assure the specifications are met.

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

- (1) The chemical and radioactive characteristics of the waste solutions.
- (2) The characteristics of the underlying soil and geologic formations particularly as they will control transport of contaminants and solutions. This includes detailed information concerning extent, thickness, uniformity, shape, and orientation of underlying strata. Hydraulic gradients and conductivities of the various formations must be determined. This information must be gathered from borings and field survey methods taken within the proposed impoundment area and in surrounding areas where contaminants might migrate to groundwater. The information gathered on boreholes must include both geologic and geophysical logs in sufficient number and degree of sophistication to allow determining significant discontinuities, fractures, and channeled deposits of high hydraulic conductivity. If field survey methods are used, they should be in addition to and calibrated with borehole logging. Hydrologic parameters such as permeability may not be determined on the basis of laboratory analysis of samples alone; a sufficient amount of field testing (e.g., pump tests) must be conducted to assure actual field properties are adequately understood. Testing must be conducted to allow estimating chemi-sorption attenuation properties of underlying soil and rock.
- (3) Location, extent, quality, capacity and current uses of any groundwater at and near the site.

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

Criterion 6 (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 one thousand years, to the extent reasonably achievable, and, in any case, for at least two hundred 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 becquerels per square meter per second (twenty picocuries per square meter per second) 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 a 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 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 becquerels per square meter per second (twenty picocuries per square meter per second) averaged over the entire pile or impoundment using the procedures described in 40 C.F.R. 61, appendix B, Method 115, or another method of verification approved by the director 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 director the results detailing the actions taken to verify that levels of release of radon-222 do not exceed 0.74 becquerels per square meter per second (twenty picocuries per square meter per second) 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 United States department of energy or state for long-term care if requested.
- (5) Near surface cover materials (i.e., within the top three meters) 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 one hundred square meters, which, as a result of byproduct material, does not exceed the background level by more than:
 - (i) 0.185 becquerels per gram (five picocuries per gram) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first fifteen centimeters below the surface, and

- (ii) 0.555 becquerels per gram (fifteen picocuries per gram) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over fifteen cm thick layers more than fifteen 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 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 one hundred square meter area, the sum of the ratios for each radionuclide of concentration present to the concentration limit will not exceed "one" (unity). A calculation of the potential peak annual total effective dose equivalent within one thousand 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 one hundred millirem per year, before application of ALARA, requires the approval of the director.

- (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.

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, director-approved reclamation plan. (The term as expeditiously as practicable considering technological feasibility as specifically defined in the introduction of this appendix 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 features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, director-approved reclamation plan.

- (2) The director 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 becquerels per square meter per second (twenty picocuries per square meter per second). If the delay is approved on the basis that the radon releases do not exceed 0.74 becquerels per square meter per second (twenty picocuries per square meter per second), 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 director has established the date in the reclamation plan for the milestone for completion of the final radon barrier, the director may extend that date based on cost if, after providing an opportunity for public participation, the director 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 director 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, 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 becquerels per square meter per second (twenty picocuries per square meter per second) 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 director makes a final finding that the impoundment will continue to achieve a level of radon-222 releases not exceeding

0.74 becquerels per square meter per second (twenty picocuries per square meter per second) 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 At least one full year prior to any major site construction, a preoperational monitoring program must be conducted to provide complete baseline data on a milling site and its environs. Throughout the construction and operating phases of the mill, an operational monitoring program must be conducted 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.

Criterion 7A The licensee shall establish a detection monitoring program needed for the director to set the site-specific groundwater protection standards in paragraph 5B(1) of this appendix. For all monitoring under this paragraph the licensee or applicant will propose for director 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 groundwater protection standards is monitored. If leakage is detected, the second purpose of the program is to generate data and information needed for the director 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 director 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 director in orders or license conditions. Once groundwater 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 groundwater continue to comply with the standards set by the director. 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 of all parameters (e.g., differential pressures and scrubber water flow rates) that determine the efficiency of yellowcake stack emission control equipment operation. The licensee shall retain each log as a record for three years after the last entry in the log is made. It must be determined whether or not conditions are within a range prescribed to ensure that the equipment is operating consistently near peak efficiency; corrective action must be taken when performance is outside of prescribed ranges. Effluent control devices must be operative at all times during drying and packaging operations and whenever air is exhausting from the yellowcake stack. Drying and packaging operations must terminate when controls are inoperative. When checks indicate the equipment is not operating within the range prescribed for peak efficiency, actions must be taken to restore parameters to the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging operations must cease as soon as practicable. Operations may not be restarted after cessation due to off-normal performance until needed corrective actions have been identified and implemented. All these cessations, corrective actions, and

restarts must be reported to the director as indicated in Criterion 8A, in writing, within ten days of the subsequent restart.

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

Milling operations producing or involving thorium byproduct material must be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 0.25 millisievert (twenty-five millirem) to the whole body, 0.75 millisievert (seventy-five millirem) to the thyroid, and 0.25 millisievert (twenty-five millirem) to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its progeny excepted, to the general environment.

Uranium and thorium byproduct materials must be managed so as to conform to the applicable provisions of 40 CFR 440 "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983.

Criterion 8A Daily inspections of tailings or waste retention systems must be conducted by a qualified engineer or scientist and documented. The licensee shall retain the documentation for each daily inspection as a record for three years after the documentation is made. The director must be immediately notified of any failure in a tailings or waste retention system that results in a release of tailings or waste into unrestricted areas, or of any unusual conditions (conditions not contemplated in the design of the retention system) that if not corrected could indicate the potential or lead to failure of the system and result in a release of tailings or waste into unrestricted areas.

II. Financial Criteria

Criterion 9 (a) Financial surety arrangements must be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements must be based on director-approved cost estimates in a director-approved plan, or a proposed revision to the plan submitted to the director for approval, if the proposed revision contains a higher cost estimate, for

(1) Decontamination and decommissioning of mill buildings and the milling site to levels which allow unrestricted use of these areas upon decommissioning, and

(2) The reclamation of in tailings and/or waste areas in accordance with technical criteria delineated Criterion 1 to 8A of this appendix.

(B) Each cost estimate must contain :

(1) A detailed cost estimate for decontamination, decommissioning, and reclamation, in an amount reflecting:

(i) The cost of an independent contractor to perform the decontamination, decommissioning and reclamation activities; and

(ii) An adequate contingency factor;

(2) An estimate of the amount of radioactive contamination in onsite subsurface material;

(3) Identification of and justification for using the key assumptions contained in the Decommissioning Cost Estimate; and

(4) A description of the method of assuring funds for decontamination, decommissioning, and reclamation.

(C) The licensee shall submit this plan in conjunction with an environmental report that addresses the expected environmental impacts of the milling operation, decommissioning and tailings reclamation, and evaluates alternatives for mitigating these impacts. The plan must include a signed original of the financial instrument obtained to satisfy the surety arrangement requirements of this criterion (unless a previously submitted and approved financial instrument continues to cover the cost estimate for decommissioning). The surety arrangement must also cover the cost

estimate and the payment of the charge for long-term surveillance and control required by Criterion 10 of this section.

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

(E) The licensee's surety mechanism will be reviewed annually by the director to assure, that sufficient funds would be available for completion of the reclamation plan if the work had to be performed by an independent contractor.

(F) The amount of surety liability should be adjusted to recognize any increases or decreases resulting from:

- (1) Inflation;
- (2) Changes in engineering plans;
- (3) Activities performed;
- (4) Spills, leakage or migration of radioactive material producing additional contamination in onsite subsurface material that must be remediated to meet applicable remediation criteria;
- (5) Waste inventory increasing above the amount previously estimated;
- (6) Waste disposal costs increasing above the amount previously estimated;
- (7) Facility modifications;
- (8) Changes in authorized possession limits;
- (9) Actual remediation costs that exceed the previous cost estimate;
- (10) Onsite disposal; and

(11) Any other conditions affecting costs.

(G) Regardless of whether reclamation is phased through the life of the operation or takes place at the end of operations, an appropriate portion of surety liability must be retained until final compliance with the reclamation plan is determined.

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

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

(1) Trust funds;

(2) Surety bonds;

(3) Irrevocable letters of credit; and

(4) Combinations of the financial surety arrangements or other types of arrangements as may be approved by the director. If a trust is not used, then a standby trust must be set up to receive funds in the event the Commission or State regulatory agency exercises its

right to collect the surety. The surety arrangement and the surety or trustee, as applicable, must be acceptable to the director. Self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract with a State or Federal agency), will not satisfy the surety requirement because this provides no additional assurance other than that which already exists through license requirements.

Criterion 10 The licensee shall provide financial assurances for long-term surveillance as recorded below.

- (1) Prior to the issuance of the license, the applicant shall provide for director approval a decommissioning funding plan that ensures that sufficient funds will be available to cover the costs of monitoring and any required maintenance during the period of long term surveillance. The decommissioning funding plan shall be reviewed every five years by the director to ensure that changes in inflation, technology, and facility operations are reflected in the arrangements.
- (2) Subsequent changes to the decommissioning funding plan specified in paragraph (1) of this Criterion relevant to long term surveillance shall be submitted to the director for prior approval.
- (3) For the purposes of the decommissioning funding plan required in paragraph (1) of this Criterion, the types of acceptable financial guaranties shall include bonds issued by fidelity or surety companies authorized to do business in the state, certificates of deposit, deposits of government securities, irrevocable letters or lines of credit, trust funds, escrow accounts, or similar types of arrangements, but shall not include any arrangements that constitute self-insurance.
- (4) Financial or surety arrangements shall satisfy the requirements identified in rule 3701:1-40-17 of the Administrative Code.

III. Hazardous Constituents

Criterion 11 Secondary groundwater 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 byproduct material and has been

detected in groundwater. 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 director will also set a limit for gross alpha activity. The director does not consider the following list imposed by 40 C.F.R. 192 to be exhaustive and may determine other constituents to be hazardous on a case-by-case basis, independent of those specified by the United States environmental protection agency in 40 C.F.R. 192.

Hazardous Constituents

Acetonitrile (Ethanenitrile)

Acetophenone (Ethanone, 1-phenyl)

3-(alpha-Acetylbenzyl)-4-hydroxycoumarin and salts (Warfarin)

2-Acetylaminofluorene (Acetamide, N-(9H-fluoren-2-yl)-)

Acetyl chloride (Ethanoyl chloride)

1-Acetyl-2-thiourea (Acetamide, N-(aminothioxomethyl)-)

Acrolein (2-Propenal)

Acrylamide (2-Propenamide)

Acrylonitrile (2-Propenenitrile)

Aflatoxins

Aldrin (1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a,8b-hexahydro-endo, exo-1,4:5,8-Dimethanonaphthalene)

Allyl alcohol (2-Propen-1-ol)

Aluminum phosphide

4-Aminobiphenyl ([1,1'-Biphenyl]-4-amine)

6-Amino-1,1a,2,8,8a,8b-hexahydro-8-(hydroxymethyl)-8a-methoxy-5-methyl-carbamate azirino[2',3'3,4]pyrrolo[1,2-a]indole-4,7-dione, (ester) (Mitomycin C)

(Azirino[2'3'3,4]pyrrolo(1,2-a)indole-4,7-dione, 6-amino-8-(((amino-cabonyl)oxy)methyl)-1,1a,2,8,8a,8b-hexa-hydro-8a methoxy-5-methy-)

5-(Aminomethyl)-3-isoxazolol (3(2H)-Isoxazolone, 5-(aminomethyl)-) 4-Aminopyridine (4-Pyridinamine)

Amitrole (1H-1,2,4-Triazol-3-amine)

Aniline (Benzenamine)

Antimony and compounds, N.O.S.⁽³⁾

Aramite (Sulfurous acid, 2-chloroethyl-, 2-[4-(1,1-dimethylethyl) phenoxy]-1-methylethyl ester)

Arsenic and compounds, N.O.S.³

Arsenic acid (Orthoarsenic acid)

Arsenic pentoxide (Arsenic (V) oxide)

Arsenic trioxide (Arsenic (III) oxide)

Auramine (Benzenamine, 4,4'-carbonimidoylbis[N,N-Dimethyl-, monohydrochloride)

Azaserine (L-Serine, diazoacetate (ester))

Barium and compounds, N.O.S.³

Barium cyanide

Benz[c]acridine (3,4-Benzacridine)

Benz[a]anthracene (1,2-Benzanthracene)

Benzene (Cyclohexatriene)

Benzeneearsonic acid (Arsonic acid, phenyl-)

Benzene, dichloromethyl- (Benzal chloride)

Benzenethiol (Thiophenol)

Benzidine ([1,1'-Biphenyl]-4,4'diamine)

Benzo[b]fluoranthene (2,3-Benzofluoranthene)

Benzo[j]fluoranthene (7,8-Benzofluoranthene)

Benzo[a]pyrene (3,4-Benzopyrene)

p-Benzoquinone (1,4-Cyclohexadienedione)

Benzotrichloride (Benzene, trichloromethyl)

Benzyl chloride (Benzene, (chloromethyl)-)

Beryllium and compounds, N.O.S.³

Bis(2-chloroethoxy)methane (Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-])

Bis(2-chloroethyl) ether (Ethane, 1,1'-oxybis[2-chloro-])

N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)

Bis(2-chloroisopropyl) ether (Propane, 2,2'-oxybis[2-chloro-])

Bis(chloromethyl) ether (Methane, oxybis[chloro-])

Bis(2-ethylhexyl) phthalate (1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester)

Bromoacetone (2-Propanone, 1-bromo-)

Bromomethane (Methyl bromide)

4-Bromophenyl phenyl ether (Benzene, 1-bromo-4-phenoxy-)

Brucine (Strychnidin-10-one, 2,3-dimethoxy-)

2-Butanone peroxide (Methyl ethyl ketone, peroxide)

Butyl benzyl phthalate (1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester)

2-sec-Butyl-4,6-dinitrophenol (DNBP) (Phenol, 2,4-dinitro-6-(1-methylpropyl)-)

Cadmium and compounds, N.O.S.³

Calcium chromate (Chromic acid, calcium salt)

Calcium cyanide

Carbon disulfide (Carbon bisulfide)

Carbon oxyfluoride (Carbonyl fluoride)

Chloral (Acetaldehyde, trichloro-)

Chlorambucil (Butanoic acid, 4-[bis(2-chloroethyl)amino]benzene-)

Chlordane (alpha and gamma isomers) (4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3,4,7,7a-tetrahydro-) (alpha and gamma isomers)

Chlorinated benzenes, N.O.S.³

Chlorinated ethane, N.O.S.³

Chlorinated fluorocarbons, N.O.S.³

Chlorinated naphthalene, N.O.S.³

Chlorinated phenol, N.O.S.³

Chloroacetaldehyde (Acetaldehyde, chloro-)

Chloroalkyl ethers, N.O.S.³

p-Chloroaniline (Benzenamine, 4-chloro-)

Chlorobenzene (Benzene, chloro-)

Chlorobenzilate (Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-,ethyl ester)

p-Chloro-m-cresol (Phenol, 4-chloro-3-methyl)

1-Chloro-2,3-epoxypropane (Oxirane, 2-(chloromethyl)-)

2-Chloroethyl vinyl ether (Ethene, (2-chloroethoxy)-)

Chloroform (Methane, trichloro-)

Chloromethane (Methyl chloride)

Chloromethyl methyl ether (Methane, chloromethoxy-)

2-Chloronaphthalene (Naphthalene, betachloro-)

2-Chlorophenol (Phenol, o-chloro-)

1-(o-Chlorophenyl)thiourea (Thiourea, (2-chlorophenyl)-)

3-Chloropropionitrile (Propanenitrile, 3-chloro-)

Chromium and compounds, N.O.S.³

Chrysene (1,2-Benzphenanthrene)

Citrus red No. 2 (2-Naphthol, 1-[(2,5-dimethoxyphenyl)azo]-)

Coal tars

Copper cyanide

Creosote (Creosote, wood)

Cresols (Cresylic acid) (Phenol, methyl-)

Crotonaldehyde (2-Butenal)

Cyanides (soluble salts and complexes), N.O.S.³

Cyanogen (Ethanedinitrile)

Cyanogen bromide (Bromine cyanide)

Cyanogen chloride (Chlorine cyanide)

Cycasin (beta-D-Glucopyranoside, (methyl-ONN-azoxy)methyl-)

2-Cyclohexyl-4,6-dinitrophenol (Phenol, 2-cyclohexyl-4,6-dinitro-)

Cyclophosphamide (2H-1,3,2,-Oxazaphosphorine, [bis(2-chloroethyl) amino]-tetrahydro-,2-oxide)

Daunomycin (5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-)

DDD (Dichlorodiphenyldichloroethane) (Ethane, 1,1-dichloro-2,2-bis(p-chlorophenyl)-)

DDE (Ethylene, 1,1-dichloro-2,2-bis(4-chlorophenyl)-)

DDT (Dichlorodiphenyltrichloroethane) (Ethane, 1,1,1-trichloro-2,2-bis (p-chlorophenyl)-)

Diallate (S-(2,3-dichloroallyl) diisopropylthiocarbamate)

Dibenz[a,h]acridine (1,2,5,6-Dibenzacridine)

Dibenz[a,j]acridine (1,2,7,8-Dibenzacridine)

Dibenz[a,h]anthracene (1,2,5,6-Dibenzanthracene)

7H-Dibenzo[c,g]carbazole (3,4,5,6-Dibenzcarbazole)

Dibenzo[a,e]pyrene (1,2,4,5-Dibenzpyrene)

Dibenzo[a,h]pyrene (1,2,5,6-Dibenzpyrene)

Dibenzo[a,i]pyrene (1,2,7,8-Dibenzpyrene)

1,2-Dibromo-3-chloropropane (Propane, 1,2-dibromo-3-chloro-)

1,2-Dibromoethane (Ethylene dibromide)

Dibromomethane (Methylene bromide)

Di-n-butyl phthalate (1,2-Benzenedicarboxylic acid, dibutyl ester)

o-Dichlorobenzene (Benzene, 1,2-dichloro-)

m-Dichlorobenzene (Benzene, 1,3-dichloro-)

p-Dichlorobenzene (Benzene, 1,4-dichloro-)

Dichlorobenzene, N.O.S.³ (Benzene, dichloro-, N.O.S.³)

3,3'-Dichlorobenzidine ([1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-)

1,4-Dichloro-2-butene (2-Butene, 1,4-dichloro-)

Dichlorodifluoromethane (Methane, dichlorodifluoro-)

1,1-Dichloroethane (Ethylidene dichloride)

1,2-Dichloroethane (Ethylene dichloride)

trans-1,2-Dichloroethene (1,2-Dichloroethylene)

Dichloroethylene, N.O.S.³ (Ethene, dichloro-, N.O.S.³)

1,1-Dichloroethylene (Ethene, 1,1-dichloro-)

Dichloromethane (Methylene chloride)

2,4-Dichlorophenol (Phenol, 2,4-dichloro-)

2,6-Dichlorophenol (Phenol, 2,6-dichloro-)

2,4-Dichlorophenoxyacetic acid (2,4-D), salts and esters (Acetic acid, 2,4-dichlorophenoxy-, salts and esters)

Dichlorophenylarsine (Phenyl dichloroarsine)

Dichloropropane, N.O.S.³ (Propane, dichloro-, N.O.S.³)

1,2-Dichloropropane (Propylene dichloride)

Dichloropropanol, N.O.S.³ (Propanol, dichloro-, N.O.S.³)

Dichloropropene, N.O.S.³ (Propene, dichloro-, N.O.S.³)

1,3-Dichloropropene (1-Propene, 1,3-dichloro-)

Dieldrin (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-Dimethanonaphthalene)

1,2:3,4-Diepoxybutane (2,2'-Bioxirane)

Diethylarsine (Arsine, diethyl-)

N,N-Diethylhydrazine (Hydrazine, 1,2-diethyl)

O,O-Diethyl S-methyl ester of phosphorodithioic acid (Phosphorodithioic acid, O,O-diethyl S-methyl ester)

O,O-Diethylphosphoric acid, O-p-nitrophenyl ester (Phosphoric acid, diethyl p-nitrophenyl ester)

Diethyl phthalate (1,2-Benzenedicarboxylic acid, diethyl ester)

O,O-Diethyl O-2-pyrazinyl phosphorothioate (Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester)

Diethylstilbesterol (4,4'-Stilbenediol, alpha, alpha-diethyl, bis(dihydrogen phosphate, (E)-)

Dihydrosafrole (Benzene, 1,2-methylenedioxy-4-propyl-)

3,4-Dihydroxy-alpha-(methylamino)methyl benzyl alcohol (1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-)

Dilsopropylfluorophosphate (DFP) (Phosphorofluoridic acid, bis(1-methylethyl) ester)

Dimethoate (Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester)

3,3'-Dimethoxybenzidine ([1,1'-Biphenyl]- 4,4'-diamine, 3-3'-dimethoxy-)

p-Dimethylaminoazobenzene (Benzenamine, N,N-dimethyl-4-(phenylazo)-)

7,12-Dimethylbenz[a]anthracene (1,2-Benzanthracene, 7,12-dimethyl-)

3,3'-Dimethylbenzidine ([1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-)

Dimethylcarbamoyl chloride (Carbamoyl chloride, dimethyl-)

1,1-Dimethylhydrazine (Hydrazine, 1,1-dimethyl-)

1,2-Dimethylhydrazine (Hydrazine, 1,2-dimethyl-)

3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino) carbonyl] oxime (Thiofanox)

alpha, alpha-Dimethylphenethylamine (Ethanamine, 1,1-dimethyl-2-phenyl-)

2,4-Dimethylphenol (Phenol, 2,4-dimethyl-)

Dimethyl phthalate (1,2-Benzenedicarboxylic acid, dimethyl ester)

Dimethyl sulfate (Sulfuric acid, dimethyl ester)

Dinitrobenzene, N.O.S.³ (Benzene, dinitro-, N.O.S.³)

4,6-Dinitro-o-cresol and salts (Phenol, 2,4-dinitro-6-methyl-, and salts)

2,4-Dinitrophenol (Phenol, 2,4-dinitro-)

2,4-Dinitrotoluene (Benzene, 1-methyl-2,4-dinitro-)

2,6-Dinitrotoluene (Benzene, 1-methyl-2,6-dinitro-)

Di-n-octyl phthalate (1,2-Benzenedicarboxylic acid, dioctyl ester)

1,4-Dioxane (1,4-Diethylene oxide)

Diphenylamine (Benzenamine, N-phenyl-)

1,2-Diphenylhydrazine (Hydrazine, 1,2-diphenyl-)

Di-n-propylnitrosamine (N-Nitroso-di-n-propylamine)

Disulfoton (O,O-diethyl S-[2-(ethylthio)ethyl] phosphorodithioate)

2,4-Dithiobiuret (Thioimidodicarbonic diamide)

Endosulfan (5-Norbornene, 2,3-dimethanol, 1,4,5,6,7,7-hexachloro-, cyclic sulfite)

Endrin and metabolites (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-1,4:5,8-dimethanonaphthalene, and metabolites)

Ethyl carbamate (Urethan) (Carbamic acid, ethyl ester)

Ethyl cyanide (propanenitrile)

Ethylenebisdithiocarbamic acid, salts and esters (1,2-Ethanediy-biscarbamodithioic acid, salts and esters)

Ethyleneimine (Aziridine)

Ethylene oxide (Oxirane)

Ethylenethiourea (2-Imidazolidinethione)

Ethyl methacrylate (2-Propenoic acid, 2-methyl-, ethyl ester)

Ethyl methanesulfonate (Methanesulfonic acid, ethyl ester)

Fluoranthene (Benzo[j,k]fluorene)

Fluorine

2-Fluoroacetamide (Acetamide, 2-fluoro-)

Fluoroacetic acid, sodium salt (Acetic acid, fluoro-, sodium salt)

Formaldehyde (Methylene oxide)

Formic acid (Methanoic acid)

Glycidylaldehyde (1-Propanol-2,3-epoxy)

Halomethane, N.O.S.³

Heptachlor (4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-)

Heptachlor epoxide (alpha, beta, and gamma isomers) (4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-2,3-epoxy-3a,4,7,7-tetrahydro-, alpha, beta, and gamma isomers)

Hexachlorobenzene (Benzene, hexachloro-)

Hexachlorobutadiene (1,3-Butadiene, 1,1,2,3,4,4-hexachloro-)

Hexachlorocyclohexane (all isomers) (Lindane and isomers)

Hexachlorocyclopentadiene (1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-)

Hexachloroethane (Ethane, 1,1,1,2,2,2-hexachloro-)

1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo,endo-dimethanonaphthalene (Hexachlorohexa-hydro-endo,endo-dimethanonaphthalene)

Hexachlorophene (2,2'-Methylenebis(3,4,6-trichlorophenol))

Hexachloropropene (1-Propene, 1,1,2,3,3,3-hexachloro-)

Hexaethyl tetraphosphate (Tetraphosphoric acid, hexaethyl ester)

Hydrazine (Diamine)

Hydrocyanic acid (Hydrogen cyanide)

Hydrofluoric acid (Hydrogen fluoride)

Hydrogen sulfide (Sulfur hydride)

Hydroxydimethylarsine oxide (Cacodylic acid)

Indeno (1,2,3-cd)pyrene (1,10-(1,2-phenylene)pyrene)

Iodomethane (Methyl iodide)

Iron dextran (Ferric dextran)

Isocyanic acid, methyl ester (Methyl isocyanate)

Isobutyl alcohol (1-Propanol, 2-methyl-)

Isosafrole (Benzene, 1,2-methylenedioxy-4-allyl-)

Kepone (Decachlorooctahydro-1,3,4-Methano-2H-cyclobuta[cd]pentalen-2-one)

Lasiocarpine (2-Butenoic acid, 2-methyl-, 7-[(2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy)methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester)

Lead and compounds, N.O.S.³

Lead acetate (Acetic acid, lead salt)

Lead phosphate (Phosphoric acid, lead salt)

Lead subacetate (Lead, bis(acetato-0)tetrahydroxytri-)

Maleic anhydride (2,5-Furandione)

Maleic hydrazide (1,2-Dihydro-3,6-pyridazinedione)

Malononitrile (Propanedinitrile)

Melphalan (Alanine, 3-[p-bis(2-chloroethyl)amino]phenyl-,L-)

Mercury fulminate (Fulminic acid, mercury salt)

Mercury and compounds, N.O.S.³

Methacrylonitrile (2-Propenenitrile, 2-methyl-)

Methanethiol (Thiomethanol)

Methapyrilene (Pyridine, 2-[(2-dimethylamino)ethyl]-2-thenylamino-)

Metholmyl (Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-, methyl ester)

Methoxychlor (Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)-)

2-Methylaziridine (1,2-Propylenimine)

3-Methylcholanthrene (Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-)

Methyl chlorocarbonate (Carbonochloridic acid, methyl ester)

4,4-Methylenebis(2-chloroaniline) (Benzenamine, 4,4-methylenebis- (2-chloro-)

Methyl ethyl ketone (MEK) (2-Butanone)

Methyl hydrazine (Hydrazine, methyl-)

2-Methylactonitrile (Propanenitrile, 2-hydroxy-2-methyl-)

Methyl methacrylate (2-Propenoic acid, 2-methyl-, methyl ester)

Methyl methanesulfonate (Methanesulfonic acid, methyl ester)

2-Methyl-2-(methylthio)propionaldehyde-o-(methylcarbonyl) oxime (Propanal, 2-methyl-2-(methylthio)-, 0-[(methylamino)carbonyl]oxime)

N-Methyl-N-nitro-N-nitrosoguanidine (Guanidine, N-nitroso-N-methyl-N- nitro-)

Methyl parathion (0,0-dimethyl 0-(4-nitrophenyl) phosphorothioate)

Methylthiouracil (4-IH-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-)

Molybdenum and compounds, N.O.S.³

Mustard gas (Sulfide, bis(2-chloroethyl)-)

Naphthalene

1,4-Naphthoquinone (1,4-Naphthalenedione)

1-Naphthylamine (alpha-Naphthylamine)

2-Naphthylamine (beta-Naphthylamine)

1-Naphthyl-2-thiourea (Thiourea, 1-naphthalenyl-)

Nickel and compounds, N.O.S.³

Nickel carbonyl (Nickel tetracarbonyl)

Nickel cyanide (Nickel (II) cyanide)

Nicotine and salts (Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts)

Nitric oxide (Nitrogen (II) oxide)

p-Nitroaniline (Benzenamine, 4-nitro-)

Nitrobenzine (Benzene, nitro-)

Nitrogen dioxide (Nitrogen (IV) oxide)

Nitrogen mustard and hydrochloride salt (Ethanamine, 2-chloro-, N-(2-chloroethyl)- N-methyl-, and hydrochloride salt)

Nitrogen mustard N-Oxide and hydrochloride salt (Ethanamine, 2-chloro-, N-(2-chloroethyl)-N-methyl-, and hydrochloride salt)

Nitroglycerine (1,2,3-Propanetriol, trinitrate)

4-Nitrophenol (Phenol, 4-nitro-)

4-Nitroquinoline-1-oxide (Quinoline, 4-nitro-1-oxide-)

Nitrosamine, N.O.S.³

N-Nitrosodi-n-butylamine (1-Butanamine, N-butyl-N-nitroso-)

N-Nitrosodiethanolamine (Ethanol, 2,2-(nitrosoimino)bis-)

N-Nitrosodiethylamine (Ethanamine, N-ethyl-N-nitroso-)

N-Nitrosodimethylamine (Dimethylnitrosamine)

N-Nitroso-N-ethylurea (Carbamide, N-ethyl-N-nitroso-)

N-Nitrosomethylethylamine (Ethanamine, N-methyl-N-nitroso-)

N-Nitroso-N-methylurea (Carbamide, N-methyl-N-nitroso-)

N-Nitroso-N-methylurethane (Carbamic acid, methylnitroso-, ethyl ester)

N-Nitrosomethylvinylamine (Ethenamine, N-methyl-N-nitroso-)

N-Nitrosomorpholine (Morpholine, N-nitroso-)

N-Nitrosornicotine (Nornicotine, N-nitroso-)

N-Nitrosopiperidine (Pyridine, hexahydro-, N-nitroso-)

Nitrosopyrrolidine (Pyrrole, tetrahydro-, N-nitroso-)

N-Nitrososarcosine (Sarcosine, N-nitroso-)

5-Nitro-o-toluidine (Benzenamine, 2-methyl-5-nitro-)

Octamethylpyrophosphoramidate (Diphosphoramidate, octamethyl-)

Osmium tetroxide (Osmium (VIII) oxide)

7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid (Endothal)

Paraldehyde (1,3,5-Trioxane, 2,4,6-trimethyl-)

Parathion (Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl)ester)

Pentachlorobenzene (Benzene, pentachloro-)

Pentachloroethane (Ethane, pentachloro-)

Pentachloronitrobenzene (PCNB) (Benzene, pentachloronitro-)

Pentachlorophenol (Phenol, pentachloro-)

Phenacetin (Acetamide, N-(4-ethoxyphenyl)-)

Phenol (Benzene, hydroxy-)

Phenylenediamine (Benzenediamine)

Phenylmercury acetate (Mercury, acetatophenyl-)

N-Phenylthiourea (Thiourea, phenyl-)

Phosgene (Carbonyl chloride)

Phosphine (Hydrogen phosphide)

Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester (Phorate)

Phosphorothioic acid, O,O-dimethyl O-[p-((dimethylamino)sulfonyl)phenyl] ester (Famphur)

Phthalic acid esters, N.O.S.³ (Benzene, 1,2-dicarboxylic acid, esters, N.O.S.³)

Phthalic anhydride (1,2-Benzenedicarboxylic acid anhydride)

2-Picoline (Pyridine, 2-methyl-)

Polychlorinated biphenyl, N.O.S.³

Potassium cyanide

Potassium silver cyanide (Argentate(1-), dicyano-, potassium)

Pronamide (3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide)

1,3-Propane sultone (1,2-Oxathiolane, 2,2-dioxide)

n-Propylamine (1-Propanamine)

Propylthiouracil (Undecamethylenediamine, N,N'-bis(2-chlorobenzyl-), dihydrochloride)

2-Propyn-1-ol (Propargyl alcohol)

Pyridine

Radium -226 and -228

Reserpine (Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[3,4,5-trimethoxybenzoyl]oxy]-, methyl ester)

Resorcinol (1,3-Benzenediol)

Saccharin and salts (1,2-Benzoisothiazolin-3-one, 1,1-dioxide, and salts)

Safrole (Benzene, 1,2-methylenedioxy-4-allyl-)

Selenious acid (Selenium dioxide)

Selenium and compounds, N.O.S.³

Selenium sulfide (Sulfur selenide)

Selenourea (Carbamimidoseleonic acid)

Silver and compounds, N.O.S.³

Silver cyanide

Sodium cyanide

Streptozotocin (D-Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-)

Strontium sulfide

Strychnine and salts (Strychnidin-10-one, and salts)

1,2,4,5-Tetrachlorobenzene (Benzene, 1,2,4,5-tetrachloro-)

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (Dibenzo-p-dioxin, 2,3,7,8-tetrachloro-)

Tetrachloroethane, N.O.S.³ (Ethane, tetrachloro-, N.O.S.³)

1,1,1,2-Tetrachlorethane (Ethane, 1,1,1,2-tetrachloro-)

1,1,2,2-Tetrachlorethane (Ethane, 1,1,2,2-tetrachloro-)

Tetrachloroethane (Ethene, 1,1,2,2-tetrachloro-)

Tetrachloromethane (Carbon tetrachloride)

2,3,4,6,-Tetrachlorophenol (Phenol, 2,3,4,6-tetrachloro-)

Tetraethyldithiopyrophosphate (Dithiopyrophosphoric acid, tetraethyl-ester)

Tetraethyl lead (Plumbane, tetraethyl-)

Tetraethylpyrophosphate (Pyrophosphoric acide, tetraethyl ester)

Tetranitromethane (Methane, tetranitro-)

Thallium and compounds, N.O.S.³

Thallic oxide (Thallium (III) oxide)

Thallium (I) acetate (Acetic acid, thallium (I) salt)

Thallium (I) carbonate (Carbonic acid, dithallium (I) salt)

Thallium (I) chloride

Thallium (I) nitrate (Nitric acid, thallium (I) salt)

Thallium selenite

Thallium (I) sulfate (Sulfuric acid, thallium (I) salt)

Thioacetamide (Ethanethioamide)

Thiosemicarbazide (Hydrazinecarbothioamide)

Thiourea (Carbamide thio-)

Thiuram (Bis(dimethylthiocarbamoyl) disulfide)

Thorium and compounds, N.O.S.,³ when producing thorium byproduct material

Toluene (Benzene, methyl-)

Toluenediamine (Diaminotoluene)

o-Toluidine hydrochloride (Benzenamine, 2-methyl-, hydrochloride)

Tolylene diisocyanate (Benzene, 1,3-diisocyanatomethyl-)

Toxaphene (Camphene, octachloro-)

Tribromomethane (Bromoform)

1,2,4-Trichlorobenzene (Benzene, 1,2,4-trichloro-)

1,1,1-Trichloroethane (Methyl chloroform)

1,1,2-Trichloroethane (Ethane, 1,1,2-trichloro-)

Trichloroethene (Trichloroethylene)

Trichloromethanethiol (Methanethiol, trichloro-)

Trichloromonofluoromethane (Methane, trichlorofluoro-)

2,4,5-Trichlorophenol (Phenol, 2,4,5-trichloro-)

2,4,6-Trichlorophenol (Phenol, 2,4,6-trichloro-)

2,4,5-Trichlorophenoxyacetic acid (2,4,5-T) (Acetic acid, 2,4,5-trichlorophenoxy-)

2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP) (Silvex) (Propionic acid, 2-(2,4,5-trichlorophenoxy)-)

Trichloropropane, N.O.S.³ (Propane, trichloro-, N.O.S.³)

1,2,3-Trichloropropane (Propane, 1,2,3-trichloro-)

O,O,O-Triethyl phosphorothioate (Phosphorothioic acid, O,O,O-triethyl ester)

sym-Trinitrobenzene (Benzene, 1,3,5-trinitro-)

Tris(1-aziridinyl) phosphine sulfide (Phosphine sulfide, tris(1-aziridinyl-)

Tris(2,3-dibromopropyl) phosphate (1-Propanol, 2,3-dibromo-, phosphate)

Trypan blue (2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl (1,1'-biphenyl)- 4,4'-diyl)bis(azo)]bis(5-amino-4-hydroxy-, tetrasodium salt)

Uracil mustard (Uracil 5-[bis(2-chloroethyl)amino]-)

Uranium and compounds, N.O.S.³

Vanadic acid, ammonium salt (ammonium vanadate)

Vanadium pentoxide (Vanadium (V) oxide)

Vinyl chloride (Ethene, chloro-)

Zinc cyanide

Zinc phosphide

³The abbreviation N.O.S. (not otherwise specified) signifies those members of the general class not specifically listed by name in this list.

3701:1-56-18 Requirements for the approval of applications.

An application for a specific license will be approved if:

- (A) The application is for a purpose authorized by Chapter 3748. of the Revised Code and the rules promulgated thereunder;
- (B) The applicant is qualified by reason of training and experience to use the material for the purpose requested in accordance with the rules in this chapter;
- (C) The applicant's proposed equipment and facilities are adequate to protect health and minimize danger to life or property;
- (D) The applicant's proposed procedures to protect health and to minimize danger to life or property are adequate; and
- (E) Where the nature of the proposed activities is such as to require consideration by the director, the applicant is financially qualified to engage in the proposed activities in accordance with the rules in this chapter.

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CERTIFIED ELECTRONICALLY
Certification

08/16/2012
Date

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3701:1-56-19 Financial assurance and recordkeeping for decommissioning.

- (A) Each applicant for a specific license authorizing possession and use of unsealed special nuclear material in quantities specified in paragraph (B) of this rule shall either:
- (1) Submit a decommissioning funding plan as described in paragraph (C) of this rule; or
 - (2) Submit a certification that financial assurance for decommissioning has been provided in the amount prescribed by paragraph (B) of this rule using one of the methods described in rule 3701:1-40-17 of the Administrative Code. For an applicant, this certification may state that the appropriate assurance will be obtained after the application has been approved and the license issued but before the receipt of licensed material. If the applicant defers execution of the financial instrument until after the license has been issued, a signed original of the financial instrument obtained to satisfy the requirements of rule 3701:1-40-17 of the Administrative Code must be submitted to the director prior to receipt of licensed material. If the applicant does not defer execution of the financial instrument, the applicant shall submit to the director, as part of the certification, a signed original of the financial instrument obtained to satisfy the requirements of rule 3701:1-40-17 of the Administrative Code.
- (B) Prior to the director issuing a radioactive materials license, an applicant providing certification of financial assurance for decommissioning as specified in paragraph (A)(1) of this rule shall provide the certification in a monetary amount based upon the quantity of licensed material specified as follows:
- (1) Greater than ten thousand but less than or equal to one hundred thousand times the applicable quantities in appendix A to rule 3701:1-40-17 of the Administrative Code. For a combination of radionuclides if R , where R is defined as the sum of the ratios of the quantity of each radionuclide to the applicable value in appendix A to rule 3701:1-40-17 of the Administrative Code, divided by ten thousand is greater than one but R divided by one hundred thousand is less than or equal to one, the sum of one million one hundred twenty-five thousand dollars.
 - (2) Greater than one thousand but less than or equal to ten thousand times the applicable quantities of appendix A to rule 3701:1-40-17 of the Administrative Code. For a combination of radionuclides, if R , where R is defined as the sum of the ratios of the quantity of each radionuclide to the applicable value in appendix A to rule 3701:1-40-17 of the Administrative Code, divided by one thousand is greater than one but R divided by ten thousand is less than or equal to one, the sum of two hundred twenty-five thousand dollars.
- (C) Each decommissioning funding plan must be submitted for review and approval and must contain:
- (1) A detailed cost estimate for decommissioning, in an amount reflecting:
 - (a) The cost of an independent contractor to perform all decommissioning activities;
 - (b) The cost of meeting the criteria specified in paragraph (B) of rule

3701:1-38-22 of the Administrative Code for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of paragraph (D) of rule 3701:1-38-22 of the Administrative Code, the cost estimate may be based on meeting this criteria;

- (c) The volume of onsite subsurface material containing residual radioactivity that will require remediation; and
 - (d) An adequate contingency factor.
- (2) Identification of and justification for using the key assumptions contained in the decommissioning cost estimate;
 - (3) A description of the method of assuring funds for decommissioning in accordance with rule 3701:1-40-17 of the Administrative Code, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility;
 - (4) A certification by the licensee that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning; and
 - (5) A signed original of the financial instrument obtained to satisfy the requirements of rule 3701:1-40-17 of the Administrative Code (unless a previously submitted and accepted financial instrument continues to cover the cost estimate for decommissioning).
- (D) At the time of license renewal and at intervals not to exceed three years, the decommissioning funding plan must be resubmitted with adjustments as necessary to account for the changes in costs and the extent of contamination. If the amount of financial assurance will be adjusted downward, this cannot be done until the updated decommissioning funding plan is approved. The decommissioning funding plan must update the information submitted with the original or prior approved plan, and must specifically consider the effect of the following events on decommissioning costs:
- (1) Spills of radioactive material producing additional residual radioactivity in onsite subsurface material;
 - (2) Waste inventory increasing above the amount previously estimated;
 - (3) Waste disposal costs increasing above the amount previously estimated;
 - (4) Facility modifications;
 - (5) Changes in authorized possession limits;
 - (6) Actual remediation costs that exceed the previous estimate;
 - (7) Onsite disposal; and
 - (8) Use of a settling pond.
- (E) Each person licensed under Chapter 3701:1-56 of the Administrative Code shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. If records important to the decommissioning of a facility are kept for other purposes, reference to these

records and their locations may be used. Information the director considers important to decommissioning consists of:

- (1) Records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. These records may be limited to instances when contamination remains after any cleanup procedures or when there is reasonable likelihood that contaminants may have spread to inaccessible areas as in the case of possible seepage into porous materials such as concrete. These records must include any known information on identification of involved nuclides, quantities, forms, and concentrations.
- (2) As-built drawings and modifications of structures and equipment in restricted areas where radioactive materials are used and/or stored, and of locations of possible inaccessible contamination such as buried pipes which may be subject to contamination. If required drawings are referenced, each relevant document need not be indexed individually. If drawings are not available, the licensee shall substitute appropriate records of available information concerning these areas and locations.
- (3) Except for areas containing only sealed sources (provided the sources have not leaked or no contamination remains after cleanup of any leak), a list contained in a single document and updated every two years, of the following:
 - (a) All areas designated and formerly designated as restricted areas as defined in rule 3701:1-38-01 of the Administrative Code;
 - (b) All areas outside of restricted areas that require documentation under paragraph (D)(1) of this rule;
 - (c) All areas outside of restricted areas where current and previous wastes have been buried as documented under paragraph (K) of rule 3701:1-38-20 of the Administrative Code; and
 - (d) All areas outside of restricted areas that contain material such that, if the license expired, the licensee would be required to either decontaminate the area to meet the criteria for decommissioning in rule 3701:1-38-22 of the Administrative Code, or apply for approval for disposal under paragraph (C) of rule 3701:1-38-19 of the Administrative Code.
- (4) Records of the cost estimate performed for the decommissioning funding plan or of the amount certified for decommissioning, and records of the funding method used for assuring funds if either a funding plan or certification is used.

Replaces: 3701:1-56-19

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