

**SUBCHAPTER A: GENERAL PROVISIONS**

**§§336.1 - 336.6, 336.9**

**Effective February 28, 2008**

**§336.1. Scope and General Provisions.**

(a) Except as otherwise specifically provided, the rules in this chapter apply to all persons who dispose of radioactive substances; all persons who recover or process source material; and all persons who receive radioactive substances from other persons for storage or processing.

(1) However, nothing in these rules shall apply to any person to the extent that person is subject to regulation by the United States Nuclear Regulatory Commission (NRC) or to radioactive material in the possession of federal agencies.

(2) Any United States Department of Energy contractor or subcontractor or any NRC contractor or subcontractor of the following categories operating within the state, is exempt from the rules in this chapter, with the exception of any applicable fee set forth in Subchapter B of this chapter, to the extent that such contractor or subcontractor under his contract receives, possesses, uses, transfers, or acquires sources of radiation:

(A) prime contractors performing work for the United States Department of Energy at a United States government-owned or controlled site, including the transportation of radioactive material to or from the site and the performance of contract services during temporary interruptions of transportation;

(B) prime contractors of the United States Department of Energy performing research in or development, manufacture, storage, testing, or transportation of atomic weapons or components thereof;

(C) prime contractors of the United States Department of Energy using or operating nuclear reactors or other nuclear devices in a United States government-owned vehicle or vessel; and

(D) any other prime contractor or subcontractor of the United States Department of Energy or the NRC when the state and the NRC jointly determine that:

(i) the exemption of the prime contractor or subcontractor is authorized by law; and

(ii) under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety or the environment.

(3) Radioactive material that is physically received from the federal government by a non-federal facility is subject to state jurisdiction except as provided in paragraph (2) of this subsection.

(4) The rules of this chapter do not apply to transportation of radioactive materials. This provision does not exempt a transporter from other applicable requirements.

(5) The rules in this chapter do not apply to the disposal of radiation machines as defined in this subchapter or electronic devices that produce non-ionizing radiation.

(b) Regulation by the State of Texas of source material, by-product material, and special nuclear material in quantities not sufficient to form a critical mass is subject to the provisions of the agreement between the State of Texas and the NRC and to 10 Code of Federal Regulations Part 150 (10 CFR Part 150) (Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters Under Section 274). (A copy of the Texas agreement, "Articles of Agreement between the United States Nuclear Regulatory Commission and the State of Texas for Discontinuance of Certain Commission Regulatory Authority and Responsibility Within the State Pursuant to Section 274 of the Atomic Energy Act of 1954, as Amended" (Agreement), may be obtained from this commission.) Under the Agreement and 10 CFR Part 150, the NRC retains certain regulatory authorities over source material, by-product material, and special nuclear material in the State of Texas. Persons in the State of Texas are not exempt from the regulatory requirements of the NRC with respect to these retained authorities.

(c) No person may receive, possess, use, transfer, or dispose of radioactive material, which is subject to the rules in this chapter, in such a manner that the standards for protection against radiation prescribed in these rules are exceeded.

(d) Each person licensed by the commission under this chapter shall confine possession, use, and disposal of licensed radioactive material to the locations and purposes authorized in the license.

(e) No person may cause or allow the release of radioactive material, which is subject to the rules in this chapter, to the environment in violation of this chapter or of any rule, license, or order of the Texas Commission on Environmental Quality (commission).

(f) No person shall:

(1) dispose of low-level radioactive waste on site, except as authorized under §336.501(b) of this title (relating to Scope and General Provisions);

(2) receive low-level radioactive waste from other persons for the purpose of disposal, except for a person specifically licensed for the disposal of low-level radioactive waste;

(3) dispose of radioactive materials other than low-level radioactive waste, except for diffuse naturally occurring radioactive material waste having concentrations of less than 2000 pCi/g radium-226 or radium-228;

(4) dispose of radioactive materials from other persons other than low-level radioactive waste, except for naturally occurring radioactive material waste in accordance with Subchapter K of this chapter (relating to Commercial Disposal of Naturally Occurring Radioactive Material Waste from Public Water Systems);

(5) recover or process source material, except in accordance with Subchapter L of this chapter (relating to Licensing of Source Material Recovery and By-Product Material Disposal Facilities);

(6) store, process, or dispose of by-product material, except in accordance with Subchapter L of this chapter; or

(7) receive radioactive substances from other persons for storage or processing, except in accordance with Subchapter M of this chapter (relating to Licensing of Radioactive Substances Processing and Storage Facilities).

(g) For the purpose of this chapter, any time the term "low-level radioactive waste" is used, the provision also applies to accelerator-produced radioactive material.

Adopted January 30, 2008

Effective February 28, 2008

### §336.2. Definitions.

The following words and terms, when used in this chapter, shall have the following meanings, or as described in Chapter 3 of this title (relating to Definitions), unless the context clearly indicates otherwise. Additional definitions used only in a certain subchapter will be found in that subchapter.

(1) **Absorbed dose** - The energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the rad and the gray (Gy).

(2) **Accelerator-produced radioactive material** - Any material made radioactive by exposing it to the radiation from a particle accelerator.

(3) **Activity** - The rate of disintegration (transformation) or decay of radioactive material. The units of activity are the curie (Ci) and the becquerel (Bq).

(4) **Adult** - An individual 18 or more years of age.

(5) **Agreement state** - Any state with which the United States Nuclear Regulatory Commission (NRC) or the Atomic Energy Commission has entered into an effective agreement under the Atomic Energy Act of 1954, §274b, as amended through October 24, 1992 (Public Law 102-486).

(6) **Airborne radioactive material** - Any radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.

(7) **Airborne radioactivity area** - A room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations:

(A) in excess of the derived air concentrations (DACs) specified in §336.359, Appendix B, Table I, Column 1, of this title (relating to Annual Limits on Intake (ALI) and Derived Air Concentrations (DAC) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sanitary Sewerage); or

(B) to a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6% of the ALI or 12 DAC-hours.

(8) **Air-purifying respirator** - A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

(9) **Annual limit on intake (ALI)** - The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the "reference man" that would result in a committed effective dose equivalent of 5 rems (0.05 sievert) or a committed dose equivalent of 50 rems (0.5 sievert) to any individual organ or tissue. ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table I, Columns 1 and 2, of §336.359, Appendix B, of this title.

(10) **As low as is reasonably achievable (ALARA)** - Making every reasonable effort to maintain exposures to radiation as far below the dose limits in this chapter as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of ionizing radiation and licensed radioactive materials in the public interest.

(11) **Assigned protection factor (APF)** - The expected workplace level of respiratory protection that would be provided by a properly functioning respirator or a class of respirators to properly fitted and trained users. Operationally, the inhaled concentration can be estimated by dividing the ambient airborne concentration by the APF.

(12) **Atmosphere-supplying respirator** - A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

(13) **Background radiation** - Radiation from cosmic sources; non-technologically enhanced naturally-occurring radioactive material, including radon (except as a decay product of source or special nuclear material) and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation and are not under the control of the licensee. "Background radiation" does not include radiation from radioactive materials regulated by the commission, Texas Department of Health, NRC, or an Agreement State.

(14) **Becquerel (Bq)** - See §336.4 of this title (relating to Units of Radioactivity).

(15) **Bioassay** - The determination of kinds, quantities, or concentrations, and, in some cases, the locations of radioactive material in the human body, whether by direct measurement (in vivo counting) or by analysis and evaluation of materials excreted or removed from the human body. For purposes of the rules in this chapter, "radiobioassay" is an equivalent term.

(16) **Byproduct material** -

(A) A radioactive material, other than special nuclear material, that is produced in or made radioactive by exposure to radiation incident to the process of producing or using special nuclear material; or

(B) The tailings or wastes produced by or resulting from the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes, and other tailings having similar radiological characteristics. Underground ore bodies depleted by these solution extraction processes do not constitute "byproduct material" within this definition.

(17) **CFR** - Code of Federal Regulations.

(18) **Class** - A classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W, or Y, which applies to a range of clearance half-times: for Class D (Days) of less than ten days, for Class W (Weeks) from 10 to 100 days, and for Class Y (Years) of greater than 100 days. For purposes of the rules in this chapter, "lung class" and "inhalation class" are equivalent terms.

(19) **Collective dose** - The sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.

(20) **Committed dose equivalent ( $H_{T,50}$ ) (CDE)** - The dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

(21) **Committed effective dose equivalent ( $H_{E,50}$ ) (CEDE)** - The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues.

(22) **Compact** - The Texas Low-Level Radioactive Waste Disposal Compact established under Texas Health and Safety Code, §403.006 and Texas Low-Level Radioactive Waste Disposal Compact Consent Act, Public Law Number 105 - 236 (1998).

(23) **Compact waste** - Low-level radioactive waste that:

(A) is generated in a host state or a party state; or

(B) is not generated in a host state or a party state, but has been approved for importation to this state by the compact commission under §3.05 of the compact established under Texas Health and Safety Code, §403.006.

(24) **Compact waste disposal facility** - The low-level radioactive waste land disposal facility licensed by the commission under Subchapter H of this chapter (relating to Licensing

Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste) for the disposal of compact waste.

(25) **Constraint (dose constraint)** - A value above which specified licensee actions are required.

(26) **Critical group** - The group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances.

(27) **Curie (Ci)** - See §336.4 of this title.

(28) **Declared pregnant woman** - A woman who has voluntarily informed the licensee, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant.

(29) **Decommission** - To remove (as a facility) safely from service and reduce residual radioactivity to a level that permits:

(A) release of the property for unrestricted use and termination of license; or

(B) release of the property under restricted conditions and termination of the license.

(30) **Deep-dose equivalent ( $H_d$ ) (which applies to external whole-body exposure)** - The dose equivalent at a tissue depth of one centimeter (1,000 milligrams/square centimeter).

(31) **Demand respirator** - An atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

(32) **Depleted uranium** - The source material uranium in which the isotope uranium-235 is less than 0.711%, by weight, of the total uranium present. Depleted uranium does not include special nuclear material.

(33) **Derived air concentration (DAC)** - The concentration of a given radionuclide in air which, if breathed by the "reference man" for a working year of 2,000 hours under conditions of light work (inhalation rate of 1.2 cubic meters of air/hour), results in an intake of one ALI. DAC values are given in Table I, Column 3, of §336.359, Appendix B, of this title.

(34) **Derived air concentration-hour (DAC-hour)** - The product of the concentration of radioactive material in air (expressed as a fraction or multiple of the derived air concentration for each radionuclide) and the time of exposure to that radionuclide, in hours. A licensee shall take 2,000 DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of 5 rems (0.05 sievert).

(35) **Disposal** - With regard to low-level radioactive waste, the isolation or removal of low-level radioactive waste from mankind and mankind's environment without intent to retrieve that low-level radioactive waste later.

(36) **Disposable respirator** - A respirator for which maintenance is not intended and that is designed to be discarded after excessive breathing resistance, sorbent exhaustion, physical damage, or end-of-service-life renders it unsuitable for use. Examples of this type of respirator are a disposable half-mask respirator or a disposable escape-only self-contained breathing apparatus (SCBA).

(37) **Distinguishable from background** - The detectable concentration of a radionuclide is statistically different from the background concentration of that radionuclide in the vicinity of the site or, in the case of structures, in similar materials using adequate measurement technology, survey, and statistical techniques.

(38) **Dose** - A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, total organ dose equivalent, or total effective dose equivalent. For purposes of the rules in this chapter, "radiation dose" is an equivalent term.

(39) **Dose equivalent ( $H_T$ )** - The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The units of dose equivalent are the rem and sievert (Sv).

(40) **Dose limits** - The permissible upper bounds of radiation doses established in accordance with the rules in this chapter. For purposes of the rules in this chapter, "limits" is an equivalent term.

(41) **Dosimetry processor** - An individual or organization that processes and evaluates individual monitoring devices in order to determine the radiation dose delivered to the monitoring devices.

(42) **Effective dose equivalent ( $H_E$ )** - The sum of the products of the dose equivalent to each organ or tissue ( $H_T$ ) and the weighting factor ( $w_T$ ) applicable to each of the body organs or tissues that are irradiated.

(43) **Embryo/fetus** - The developing human organism from conception until the time of birth.

(44) **Entrance or access point** - Any opening through which an individual or extremity of an individual could gain access to radiation areas or to licensed radioactive materials. This includes portals of sufficient size to permit human access, irrespective of their intended use.

(45) **Exposure** - Being exposed to ionizing radiation or to radioactive material.

(46) **Exposure rate** - The exposure per unit of time.

(47) **External dose** - That portion of the dose equivalent received from any source of radiation outside the body.

(48) **Extremity** - Hand, elbow, arm below the elbow, foot, knee, and leg below the knee. The arm above the elbow and the leg above the knee are considered part of the whole body.

(49) **Federal facility waste** - Low-level radioactive waste that is the responsibility of the federal government under the Low-Level Radioactive Waste Policy Act, as amended by the Low-Level Radioactive Waste Policy Amendments Act of 1985 (42 United States Code, §2021b - 2021j). Excluded from this definition is low-level radioactive waste that is classified as greater than Class C in §336.362 of this title (relating to Appendix E. Classification and Characteristics of Low-Level Radioactive Waste).

(50) **Federal facility waste disposal facility** - A low-level radioactive waste land disposal facility for the disposal of federal facility waste licensed under Subchapters H and J of this chapter.

(51) **Filtering facepiece (dust mask)** - A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium, not equipped with elastomeric sealing surfaces and adjustable straps.

(52) **Fit factor** - A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

(53) **Fit test** - The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

(54) **General license** - An authorization granted by an agency under its rules which is effective without the filing of an application with that agency or the issuance of a licensing document to the particular person.

(55) **Generally applicable environmental radiation standards** - Standards issued by the EPA under the authority of the Atomic Energy Act of 1954, as amended through October 4, 1996, that impose limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material.

(56) **Gray (Gy)** - See §336.3 of this title (relating to Units of Radiation Exposure and Dose).

(57) **Hazardous waste** - Hazardous waste as defined in §335.1 of this title (relating to Definitions).

(58) **Helmet** - A rigid respiratory inlet covering that also provides head protection against impact and penetration.

(59) **High radiation area** - An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in



excess of 0.1 rem (1 millisievert) in one hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates.

(60) **Hood** - A respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

(61) **Host state** - A party state in which a compact facility is located or is being developed. The State of Texas is the host state under the Texas Low-Level Radioactive Waste Disposal Compact, §2.01, established under Texas Health and Safety Code, §403.006.

(62) **Individual** - Any human being.

(63) **Individual monitoring** - The assessment of:

(A) dose equivalent by the use of individual monitoring devices; or

(B) committed effective dose equivalent by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed, that is, DAC-hours; or

(C) dose equivalent by the use of survey data.

(64) **Individual monitoring devices** - Devices designed to be worn by a single individual for the assessment of dose equivalent such as film badges, thermoluminescence dosimeters (TLDs), pocket ionization chambers, and personal ("lapel") air sampling devices.

(65) **Inhalation class** - See "Class."

(66) **Inspection** - An official examination and/or observation including, but not limited to, records, tests, surveys, and monitoring to determine compliance with the Texas Radiation Control Act (TRCA) and rules, orders, and license conditions of the commission.

(67) **Internal dose** - That portion of the dose equivalent received from radioactive material taken into the body.

(68) **Land disposal facility** - The land, buildings and structures, and equipment which are intended to be used for the disposal of low-level radioactive wastes into the subsurface of the land. For purposes of this chapter, a "geologic repository" as defined in 10 CFR §60.2 as amended through October 27, 1988 (53 FR 43421) (relating to Definitions - high-level radioactive wastes in geologic repositories) is not considered a "land disposal facility."

(69) **Lens dose equivalent (LDE)** - The external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeter (300 mg/cm<sup>2</sup>).

(70) **License** - See "Specific license."

(71) **Licensed material** - Radioactive material received, possessed, used, processed, transferred, or disposed of under a license issued by the commission.

(72) **Licensee** - Any person who holds a license issued by the commission in accordance with the Texas Health and Safety Code, Chapter 401 (Radioactive Materials and Other Sources of Radiation) and the rules in this chapter. For purposes of the rules in this chapter, "radioactive material licensee" is an equivalent term. Unless stated otherwise, "licensee" as used in the rules of this chapter means the holder of a "specific license."

(73) **Licensing state** - Any state with rules equivalent to the Suggested State Regulations for Control of Radiation relating to, and having an effective program for, the regulatory control of naturally occurring or accelerator-produced radioactive material (NARM) and which has been designated as such by the Conference of Radiation Control Program Directors, Inc.

(74) **Loose-fitting facepiece** - A respiratory inlet covering that is designed to form a partial seal with the face.

(75) **Lost or missing licensed radioactive material** - Licensed material whose location is unknown. This definition includes material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system.

(76) **Low-level radioactive waste** -

(A) Except as provided by subparagraph (B) of this paragraph, low-level radioactive waste means radioactive material that:

(i) is discarded or unwanted and is not exempt by a Texas Department of Health rule adopted under the Texas Health and Safety Code, §401.106;

(ii) is waste, as that term is defined by 10 CFR §61.2; and

(iii) is subject to:

(I) concentration limits established under this chapter; and

(II) disposal criteria established under this chapter.

(B) Low-level radioactive waste does not include:

(i) high-level radioactive waste defined by 10 CFR §60.2;

(ii) spent nuclear fuel as defined by 10 CFR §72.3;

(iii) transuranic waste as defined in this section;

(iv) byproduct material as defined by paragraph (16)(B) of this section;

(v) naturally occurring radioactive material (NORM) waste; or

(vi) oil and gas NORM waste.

(C) When used in this section, the references to 10 CFR sections mean those CFR sections as they existed on September 1, 1999, as required by Texas Health and Safety Code, §401.005.

(77) **Lung class** - See "Class."

(78) **Member of the public** - Any individual except when that individual is receiving an occupational dose.

(79) **Minor** - An individual less than 18 years of age.

(80) **Mixed waste** - A combination of hazardous waste, as defined in 30 TAC §335.1 of this title (relating to Definitions) and low-level radioactive waste. The term includes compact waste and federal facility waste containing hazardous waste.

(81) **Monitoring** - The measurement of radiation levels, radioactive material concentrations, surface area activities, or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses. For purposes of the rules in this chapter, "radiation monitoring" and "radiation protection monitoring" are equivalent terms.

(82) **Naturally occurring or accelerator-produced radioactive material (NARM)** - Any naturally occurring or accelerator-produced radioactive material except source material or special nuclear material.

(83) **Naturally occurring radioactive material (NORM) waste** - Solid, liquid, or gaseous material or combination of materials, excluding source material, special nuclear material, and byproduct material, that:

(A) in its natural physical state spontaneously emits radiation;

(B) is discarded or unwanted; and

(C) is not exempt under rules of the Texas Department of Health adopted under Texas Health and Safety Code, §401.106.

(84) **Near-surface disposal facility** - A land disposal facility in which low-level radioactive waste is disposed of in or within the upper 30 meters of the earth's surface.

(85) **Negative pressure respirator (tight fitting)** - A respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

(86) **Nonstochastic effect** - A health effect, the severity of which varies with the dose and for which a threshold is believed to exist. Radiation-induced cataract formation is an example of a nonstochastic effect. For purposes of the rules in this chapter, "deterministic effect" is an equivalent term.

(87) **Occupational dose** - The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation and/or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research programs, or as a member of the public.

(88) **Oil and gas naturally occurring radioactive material (NORM) waste** - Naturally occurring radioactive material (NORM) waste that constitutes, is contained in, or has contaminated oil and gas waste as that term is defined in the Texas Natural Resources Code, §91.1011.

(89) **On-site** - The same or geographically contiguous property that may be divided by public or private rights-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing, as opposed to going along, the right-of-way. Noncontiguous properties owned by the same person but connected by a right-of-way that the property owner controls and to which the public does not have access, is also considered on-site property.

(90) **Party state** - Any state that has become a party to the compact in accordance with Article VII of the Texas Low-Level Radioactive Waste Disposal Compact, established under Texas Health and Safety Code, §403.006.

(91) **Perpetual care account** - The radiation and perpetual care account as defined in this section.

(92) **Personnel monitoring equipment** - See "Individual monitoring devices."

(93) **Planned special exposure** - An infrequent exposure to radiation, separate from and in addition to the annual occupational dose limits.

(94) **Positive pressure respirator** - A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

(95) **Powered air-purifying respirator (PAPR)** - An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

(96) **Pressure demand respirator** - A positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

(97) **Principal activities** - Activities authorized by the license which are essential to achieving the purpose(s) for which the license is issued or amended. Storage during which no licensed

material is accessed for use or disposal and activities incidental to decontamination or decommissioning are not principal activities.

(98) **Public dose** - The dose received by a member of the public from exposure to radiation and/or radioactive material released by a licensee, or to any other source of radiation under the control of the licensee. It does not include occupational dose or doses received from background radiation, as a patient from medical practices, or from voluntary participation in medical research programs.

(99) **Qualitative fit test (QLFT)** - A pass/fail test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

(100) **Quality factor (Q)** - The modifying factor listed in Table I or II of §336.3 of this title that is used to derive dose equivalent from absorbed dose.

(101) **Quantitative fit test (QNFT)** - An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

(102) **Quarter (Calendar quarter)** - A period of time equal to one-fourth of the year observed by the licensee (approximately 13 consecutive weeks), providing that the beginning of the first quarter in a year coincides with the starting date of the year and that no day is omitted or duplicated in consecutive quarters.

(103) **Rad** - See §336.3 of this title.

(104) **Radiation** - Alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. For purposes of the rules in this chapter, "ionizing radiation" is an equivalent term. Radiation, as used in this chapter, does not include non-ionizing radiation, such as radio- or microwaves or visible, infrared, or ultraviolet light.

(105) **Radiation and Perpetual Care Account** - An account in the general revenue fund established for the purposes specified in the Texas Health and Safety Code, §401.305.

(106) **Radiation area** - Any area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem (0.05 millisievert) in one hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.

(107) **Radiation machine** - Any device capable of producing ionizing radiation except those devices with radioactive material as the only source of radiation.

(108) **Radioactive material** - A naturally-occurring or artificially-produced solid, liquid, or gas that emits radiation spontaneously.

(109) **Radioactive substance** - Includes byproduct material, radioactive material, low-level radioactive waste, source material, special nuclear material, source of radiation, and NORM waste, excluding oil and gas NORM waste.

(110) **Radioactivity** - The disintegration of unstable atomic nuclei with the emission of radiation.

(111) **Radiobioassay** - See "Bioassay."

(112) **Reference man** - A hypothetical aggregation of human physical and physiological characteristics determined by international consensus. These characteristics shall be used by researchers and public health workers to standardize results of experiments and to relate biological insult to a common base. A description of "reference man" is contained in the International Commission on Radiological Protection report, ICRP Publication 23, "Report of the Task Group on Reference Man."

(113) **Rem** - See §336.3 of this title.

(114) **Residual radioactivity** - Radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the licensee's control. This includes radioactivity from all licensed and unlicensed sources used by the licensee, but excludes background radiation. It also includes radioactive materials remaining at the site as a result of routine or accidental releases of radioactive material at the site and previous burials at the site, even if those burials were made in accordance with the provisions of 10 CFR Part 20.

(115) **Respiratory protection equipment** - An apparatus, such as a respirator, used to reduce an individual's intake of airborne radioactive materials. For purposes of the rules in this chapter, "respiratory protective device" is an equivalent term.

(116) **Restricted area** - An area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building shall be set apart as a restricted area.

(117) **Roentgen (R)** - See §336.3 of this title.

(118) **Sanitary sewerage** - A system of public sewers for carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks, and leach fields owned or operated by the licensee.

(119) **Sealed source** - Radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions that are likely to be encountered in normal use and handling.

(120) **Self-contained breathing apparatus (SCBA)** - An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

(121) **Shallow-dose equivalent ( $H_s$ ) (which applies to the external exposure of the skin of the whole body or the skin of an extremity)** - The dose equivalent at a tissue depth of 0.007 centimeter (seven milligrams/square centimeter).

(122) **SI** - The abbreviation for the International System of Units.

(123) **Sievert (Sv)** - See §336.3 of this title.

(124) **Site boundary** - That line beyond which the land or property is not owned, leased, or otherwise controlled by the licensee.

(125) **Source material** -

(A) Uranium or thorium, or any combination thereof, in any physical or chemical form; or

(B) ores that contain, by weight, 0.05% or more of uranium, thorium, or any combination thereof. Source material does not include special nuclear material.

(126) **Special form radioactive material** - Radioactive material which is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule and which has at least one dimension not less than five millimeters and which satisfies the test requirements of 10 CFR §71.75 as amended through September 28, 1995 (60 FR 50264) (Transportation of License Material).

(127) **Special nuclear material** -

(A) Plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the NRC, under the provisions of the Atomic Energy Act of 1954, §51, as amended through November 2, 1994 (Public Law 103 - 437), determines to be special nuclear material, but does not include source material; or

(B) any material artificially enriched by any of the foregoing, but does not include source material.

(128) **Special nuclear material in quantities not sufficient to form a critical mass** - Uranium enriched in the isotope 235 in quantities not exceeding 350 grams of contained uranium-235; uranium-233 in quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of these in accordance with the following formula: For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of such ratios for all of the kinds of special nuclear material in combination shall not exceed 1. For example, the following quantities in combination would not exceed the limitation: (175 grams contained U-235/350 grams) + (50 grams U-233/200 grams) + (50 grams Pu/200 grams) = 1.

(129) **Specific license** - A licensing document issued by an agency upon an application filed under its rules. For purposes of the rules in this chapter, "radioactive material license" is an equivalent term. Unless stated otherwise, "license" as used in this chapter means a "specific license."

(130) **State** - The State of Texas.

(131) **Stochastic effect** - A health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects. For purposes of the rules in this chapter, "probabilistic effect" is an equivalent term.

(132) **Supplied-air respirator (SAR) or airline respirator** - An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

(133) **Survey** - An evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, and/or presence of radioactive materials or other sources of radiation. When appropriate, this evaluation includes, but is not limited to, physical examination of the location of radioactive material and measurements or calculations of levels of radiation or concentrations or quantities of radioactive material present.

(134) **Termination** - As applied to a license, a release by the commission of the obligations and authorizations of the licensee under the terms of the license. It does not relieve a person of duties and responsibilities imposed by law.

(135) **Tight-fitting facepiece** - A respiratory inlet covering that forms a complete seal with the face.

(136) **Total effective dose equivalent (TEDE)** - The sum of the deep-dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

(137) **Total organ dose equivalent (TODE)** - The sum of the deep-dose equivalent and the committed dose equivalent to the organ receiving the highest dose as described in §336.346(a)(6) of this title (relating to Records of Individual Monitoring Results).

(138) **Transuranic waste** - For the purposes of this chapter, wastes containing alpha emitting transuranic radionuclides with a half-life greater than five years at concentrations greater than 100 nanocuries/gram.

(139) **Type A quantity (for packaging)** - A quantity of radioactive material, the aggregate radioactivity of which does not exceed  $A_1$  for special form radioactive material or  $A_2$  for normal form radioactive material, where  $A_1$  and  $A_2$  are given in or shall be determined by procedures in Appendix A to 10 CFR Part 71 as amended through September 28, 1995 (60 FR 50264) (Packaging and Transportation of Radioactive Material).

(140) **Type B quantity (for packaging)** - A quantity of radioactive material greater than a Type A quantity.

(141) **Unrefined and unprocessed ore** - Ore in its natural form before any processing, such as grinding, roasting, beneficiating, or refining.



(142) **Unrestricted area** - Any area that is not a restricted area.

(143) **User seal check (fit check)** - An action conducted by the respirator user to determine if the respirator is properly seated to the face. Examples include negative pressure check, positive pressure check, irritant smoke check, or isoamyl acetate check.

(144) **Very high radiation area** - An area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads (five grays) in one hour at one meter from a source of radiation or one meter from any surface that the radiation penetrates.

(145) **Violation** - An infringement of any provision of the Texas Radiation Control Act (TRCA) or of any rule, order, or license condition of the commission issued under the TRCA or this chapter.

(146) **Week** - Seven consecutive days starting on Sunday.

(147) **Weighting factor ( $w_T$ ) for an organ or tissue (T)** - The proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of  $w_T$  are:

**Organ Dose Weighting Factors**

Organ or Tissue	$W_T$
Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone surfaces	0.03
Remainder	0.30 <sup>1</sup>
Whole body	1.00 <sup>2</sup>

1. The value 0.30 results from 0.06 for each of five remainder organs, excluding the skin and the lens of the eye, that receive the highest doses.

2. For the purpose of weighting the external whole body dose (for adding it to the internal dose) a single weighting factor,  $w_T=1.0$ , has been specified. The use of other weighting factors for external exposure will be approved on a case-by-case basis until such time as specific guidance is issued.

(148) **Whole body** - For purposes of external exposure, head, trunk including male gonads, arms above the elbow, or legs above the knee.

(149) **Worker** - An individual engaged in activities under a license issued by the commission and controlled by a licensee, but does not include the licensee.

(150) **Working level (WL)** - Any combination of short-lived radon daughters in one liter of air that will result in the ultimate emission of  $1.3 \times 10^5$  million electron volts (MeV) of potential alpha particle energy. The short-lived radon daughters are: for radon-222: polonium-218, lead-214, bismuth-214, and polonium-214; and for radon-220: polonium-216, lead-212, bismuth-212, and polonium-212.

(151) **Working level month (WLM)** - An exposure to one working level for 170 hours (2,000 working hours per year divided by 12 months per year is approximately equal to 170 hours per month).

(152) **Year** - The period of time beginning in January used to determine compliance with the provisions of the rules in this chapter. The licensee shall change the starting date of the year used to determine compliance by the licensee provided that the change is made at the beginning of the year and that no day is omitted or duplicated in consecutive years.

Adopted December 17, 2003

Effective January 8, 2004

### **§336.3. Units of Radiation Exposure and Dose.**

(a) As used in the rules in this chapter, the International System of Units (SI) unit of exposure is the coulomb/kilogram (C/kg) of air. The special unit of exposure is the roentgen. One roentgen equals  $2.58 \times 10^{-4}$  coulomb/kilogram of air.

(b) As used in the rules in this chapter, the units of radiation dose are as follows:

(1) Rad is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram or 0.01 joule/kilogram (0.01 gray).

(2) Gray (Gy) is the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule/kilogram (100 rads).

(3) Rem is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 sievert).

(4) Sievert (Sv) is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor (1 sievert = 100 rems).

(c) As used in the rules in this chapter, the quality factors for converting absorbed dose to dose equivalent are shown in Table I.

Table I  
 Quality Factors and Absorbed Dose Equivalencies

Type of Radiation	Quality Factor (Q)	Absorbed Dose Equal to a Unit Dose Equivalent <sup>1</sup>
Gamma, beta, or x-ray	1	1
Alpha particles, multiple-charged particles, fission fragments, and heavy particles of unknown charge	20	0.05
Neutrons of unknown energy	10	0.1
High-energy protons	10	0.1

1. Absorbed dose in rad equal to 1 rem or the absorbed dose in gray equal to 1 sievert.

(d) If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in rem/hour or sievert/hour, as provided in subsection (c) of this section, 1 rem (0.01 sievert) of neutron radiation of unknown energies may, for purposes of the rules in this chapter, be assumed to result from a total fluence of 25 million neutrons/square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the licensee may use the fluence rate per unit dose equivalent or the appropriate Q value from Table II to convert a measured tissue dose in rad (gray) to dose equivalent in rem (sievert)

Table II  
 Mean Quality Factors, Q, and Fluence per Unit Dose  
 Equivalent for Monoenergetic Neutrons

	Neutron Energy (MeV)	Quality Factor <sup>1</sup> (Q)	Fluence per Unit Dose Equivalent <sup>2</sup> (neutrons cm <sup>-2</sup> rem <sup>-1</sup> )	Fluence per Unit Dose Equivalent <sup>2</sup> (neutrons cm <sup>-2</sup> Sv <sup>-1</sup> )
(thermal)...	2.5 x 10 <sup>-8</sup>	2	980 x 10 <sup>6</sup>	980 x 10 <sup>8</sup>
	1 x 10 <sup>-7</sup>	2	980 x 10 <sup>6</sup>	980 x 10 <sup>8</sup>
	1 x 10 <sup>-6</sup>	2	810 x 10 <sup>6</sup>	810 x 10 <sup>8</sup>
	1 x 10 <sup>-5</sup>	2	810 x 10 <sup>6</sup>	810 x 10 <sup>8</sup>
	1 x 10 <sup>-4</sup>	2	840 x 10 <sup>6</sup>	840 x 10 <sup>8</sup>
	1 x 10 <sup>-3</sup>	2	980 x 10 <sup>6</sup>	980 x 10 <sup>8</sup>
	1 x 10 <sup>-2</sup>	2.5	1,010 x 10 <sup>6</sup>	1,010 x 10 <sup>8</sup>
	1 x 10 <sup>-1</sup>	7.5	170 x 10 <sup>6</sup>	170 x 10 <sup>8</sup>
	5 x 10 <sup>-1</sup>	11	39 x 10 <sup>6</sup>	39 x 10 <sup>8</sup>
	1	11	27 x 10 <sup>6</sup>	27 x 10 <sup>8</sup>
	2.5	9	29 x 10 <sup>6</sup>	29 x 10 <sup>8</sup>
	5	8	23 x 10 <sup>6</sup>	23 x 10 <sup>8</sup>
	7	7	24 x 10 <sup>6</sup>	24 x 10 <sup>8</sup>
	10	6.5	24 x 10 <sup>6</sup>	24 x 10 <sup>8</sup>
	14	7.5	17 x 10 <sup>6</sup>	17 x 10 <sup>8</sup>
	20	8	16 x 10 <sup>6</sup>	16 x 10 <sup>8</sup>
	40	7	14 x 10 <sup>6</sup>	14 x 10 <sup>8</sup>
	60	5.5	16 x 10 <sup>6</sup>	16 x 10 <sup>8</sup>
	1 x 10 <sup>2</sup>	4	20 x 10 <sup>6</sup>	20 x 10 <sup>8</sup>
	2 x 10 <sup>2</sup>	3.5	19 x 10 <sup>6</sup>	19 x 10 <sup>8</sup>
	3 x 10 <sup>2</sup>	3.5	16 x 10 <sup>6</sup>	16 x 10 <sup>8</sup>
	4 x 10 <sup>2</sup>	3.5	14 x 10 <sup>6</sup>	14 x 10 <sup>8</sup>

1. Value of quality factor (Q) at the point where the dose equivalent is maximum in a 30-centimeter (cm) diameter cylinder tissue-equivalent phantom.
2. Monoenergetic neutrons incident normally on a 30-cm diameter cylinder tissue-equivalent phantom.

#### **§336.4. Units of Radioactivity.**

For purposes of the rules in this chapter, activity is expressed in the special unit of curie (Ci) or in the International System of Units unit of becquerel (Bq), or its multiples, or disintegrations (transformations) per unit of time, as follows:

(1) One curie (Ci) =  $3.7 \times 10^{10}$  disintegrations or transformations/second (dps or tps) =  $3.7 \times 10^{10}$  becquerel (Bq) =  $2.22 \times 10^{12}$  disintegrations or transformations/minute (dpm or tpm). Commonly used submultiples of the curie are as follows. One millicurie (mCi) =  $1 \times 10^{-3}$  Ci =  $3.7 \times 10^7$  dps. One microcurie (microCi) =  $1 \times 10^{-6}$  Ci =  $3.7 \times 10^4$  dps. One nanocurie (nCi) =  $1 \times 10^{-9}$  Ci =  $3.7 \times 10$  dps. One picocurie (pCi) =  $1 \times 10^{-12}$  Ci =  $3.7 \times 10^{-2}$  dps.

(2) One becquerel (Bq) = 1 disintegration or transformation/second (dps or tps).

Adopted May 14, 1997

Effective June 5, 1997

#### **§336.5. Exemptions.**

(a) The commission may exempt a source of radiation or a kind of use or user from the application of a rule in this chapter if it determines that the exemption is not prohibited by law and will not result in a significant risk to public health and safety or the environment. Persons requesting an exemption shall submit an application to the agency using the process in Chapter 90 of this title (relating to Regulatory Flexibility), including the submittal of any fees and which includes:

- (1) the nature of the request;
- (2) a legal analysis to demonstrate that the exemption is not prohibited by law;
- (3) a technical analysis to demonstrate that the exemption will not result in a significant risk to public health and safety or the environment; and
- (4) a detailed explanation, including a demonstration as appropriate, that the proposed exemption is:

(A) not prohibited by law, including any requirement for a federally approved or authorized program; and

(B) at least as protective of the environment and the public health as the method or standard prescribed by the commission rule that would otherwise apply.

(b) A person who is subject to an order issued under Texas Health and Safety Code, §361.188 or §361.272, for sites subject to Texas Health and Safety Code, Subchapter F, Chapter 361, or an agreement entered into under Texas Health and Safety Code, §361.606, is exempt from the requirement to obtain a license or other authorization from the commission. This provision does not exempt the person from

complying with technical standards under this chapter. The exemption applies only to the assessment and remediation of the contamination at the site.

(c) Waste, that is exempted from licensing requirements under Texas Health and Safety Code, §401.106(a), is exempted from the requirements of this chapter.

(d) Any material exempted from licensing requirements for disposal by the Texas Department of State Health Services under 25 TAC §289.251 and §289.259 prior to June 18, 2007 is exempted from the requirements of this chapter.

Adopted January 30, 2008

Effective February 28, 2008

### **§336.6. Additional Requirements.**

The commission may, by rule, order, or condition of license, impose upon any licensee such requirements in addition to those established in the rules in this chapter as it deems appropriate or necessary under the Texas Radiation Control Act to minimize danger to public health and safety or property or the environment.

Adopted May 14, 1997

Effective June 5, 1997

### **§336.9. Deliberate Misconduct.**

(a) Any licensee, applicant for a license, employer of a licensee or applicant, or any contractor (including a supplier or consultant), subcontractor, employee of a contractor, or subcontractor of any licensee or applicant for a license, who knowingly provides to any licensee, applicant, contractor, or subcontractor, any components, equipment, materials, or other goods or services that relate to a licensee's or applicant's activities in this chapter, may not:

(1) engage in deliberate misconduct that causes or would have caused if not detected, a licensee or applicant to be in violation of any rule, regulation, or order, or any term, condition, or limitation of any license issued by the commission; or

(2) deliberately submit to the commission, a licensee, an applicant, or a licensee's or applicant's contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the commission.

(b) A person who violates subsection (a)(1) or (2) of this section may be subject to enforcement action under Texas Health and Safety Code, §401.393 and Texas Water Code, Chapter 7.

(c) For the purposes of subsection (a)(1) of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) would cause a licensee or applicant to be in violation of any rule, regulation, or order; or any term, condition, or limitation of any license issued by the commission; or

(2) constitutes a violation of a requirement, procedure, instruction, contract, purchase order, or policy of a licensee, applicant, contractor, or subcontractor.

Adopted December 17, 2003

Effective January 8, 2004

**SUBCHAPTER B: RADIOACTIVE SUBSTANCE FEES**  
**§§336.101 - 336.103, 336.105 - 336.107, 336.109 - 336.113**  
**Effective February 28, 2008**

**§336.101. Purpose and Scope.**

(a) This subchapter establishes fees for licensing, emergency response activities including training, and other regulatory services and provides for their payment.

(b) Except as otherwise specifically provided, this subchapter applies to any person who is:

(1) an applicant for or holder of a radioactive material license issued under this chapter;  
or

(2) the holder of a fixed nuclear facility construction permit or operating license issued by the United States Nuclear Regulatory Commission under 10 CFR Part 50 (relating to Domestic Licensing of Production and Utilization Facilities); or

(3) the operator of any other fixed nuclear facility.

Adopted July 29, 1998

Effective September 3, 1998

**§336.102. Definitions.**

Terms used in this subchapter are defined in §336.2 of this title (relating to Definitions). Additional terms used in this subchapter have the following definitions:

(1) **Emergency response** - The application of those capabilities necessary for the protection of the public and the environment from the effects of an accidental or uncontrolled release of radioactive materials, including the equipping, training, and periodic retraining of response personnel.

(2) **Fixed nuclear facility** -

(A) Any nuclear reactor(s) at a single site;

(B) Any facility designed or used for the assembly or disassembly of nuclear weapons; or

(C) Any other facility using special nuclear material for which emergency response activities, including training, are conducted to protect the public health and safety or the environment.

Adopted July 29, 1998

Effective September 3, 1998

**§336.103. Schedule of Fees for Subchapter H Licenses.**



(a) An application for a low-level radioactive waste disposal site license under Subchapter H of this chapter (relating to Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste) shall be accompanied by a nonrefundable application processing fee of \$500,000. If the commission's costs in processing an application under Subchapter H of this chapter (relating to Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste) exceed the \$500,000 application processing fee, the commission may assess and collect additional fees from the applicant to recover the costs. Recoverable costs include costs incurred by the commission for administrative review, technical review, and hearings associated with the application.

(b) An applicant shall submit an annual fee for the actual costs incurred by the commission for hearings associated with an application for a low-level radioactive waste disposal site under Subchapter H of this chapter. The executive director shall send an invoice for the amount of the costs incurred during the period September 1 through August 31 of each year. Payment shall be made within 30 days following the date of the invoice.

(c) A holder of a license for a low-level radioactive waste disposal site issued under Subchapter H of this chapter shall submit an annual license fee for the services received. This fee shall recover for the state the actual expenses arising from the regulatory activities associated with the license. This fee shall include reimbursement for the salary and other expenses of the resident inspectors as provided by §336.743 of this title (relating to Resident Inspector). The executive director shall send an invoice for the amount of the costs incurred during the period September 1 through August 31 of each year. Payment shall be made within 30 days following the date of the invoice.

Adopted December 17, 2003

Effective January 8, 2004

### **§336.105. Schedule of Fees for Other Licenses.**

(a) Each application for a license under Subchapter F of this chapter (relating to Licensing of Alternative Methods of Disposal of Radioactive Material), Subchapter G of this chapter (relating to Decommissioning Standards), Subchapter K of this chapter (relating to Commercial Disposal of Naturally Occurring Radioactive Material Waste from Public Water Systems), Subchapter L of this chapter (relating to Licensing of Source Material Recovery and By-product Material Disposal Facilities), or Subchapter M of this chapter (relating to Licensing of Radioactive Substances Processing and Storage Facilities) must be accompanied by an application fee as follows:

(1) facilities regulated under Subchapter F of this chapter: \$50,000;

(2) facilities regulated under Subchapter G of this chapter: \$10,000;

(3) facilities regulated under Subchapter K of this chapter: \$50,000;

(4) facilities regulated under Subchapter L of this chapter: \$463,096 for conventional mining; \$322,633 for in situ mining; \$325,910 for heap leach; and \$374,729 for disposal only; or

(5) facilities regulated under Subchapter M of this chapter: \$3,830 for Waste Processing - Class I Exempt; \$39,959 for Waste Processing - Class I; \$94,661 for Waste Processing - Class II; and \$273,800 for Waste Processing - Class III.

(b) An annual license fee shall be paid for each license issued under Subchapter F, Subchapter G, Subchapter K, Subchapter L, and Subchapter M of this chapter. The amount of each annual fee is as follows:

- (1) facilities regulated under Subchapter F of this chapter: \$25,000;
- (2) facilities regulated under Subchapter G of this chapter: \$8,400;
- (3) facilities regulated under Subchapter K of this chapter: \$25,000;
- (4) facilities regulated under Subchapter L of this chapter that are operational:  
\$60,929.50;
- (5) facilities regulated under Subchapter L of this chapter that are in closure: \$60,929.50;
- (6) facilities regulated under Subchapter L of this chapter that are in post-closure:  
\$52,011.50 for conventional mining; \$26,006 for in situ mining; and \$52,011.50 for disposal only;
- (7) facilities regulated under Subchapter L of this chapter, if additional noncontiguous source material recovery facility sites are authorized under the same license, the annual fee shall be increased by 25% for each additional site and 50% for sites in closure;
- (8) facilities regulated under Subchapter L of this chapter, if an authorization for disposal of by-product material is added to a license, the annual fee shall be increased by 25%;
- (9) facilities regulated under Subchapter L of this chapter, the following one-time fees apply if added after an environmental assessment has been completed on a facility:
  - (A) \$28,658 for in situ wellfield on noncontiguous property;
  - (B) \$71,651 for in situ satellite;
  - (C) \$11,235 for wellfield on contiguous property;
  - (D) \$50,756 for non-vacuum dryer; or
  - (E) \$71, 651 for disposal (including processing, if applicable) of by-product material; or
- (10) facilities regulated under Subchapter M of this chapter: \$3,830 for Waste Processing - Class I Exempt; \$39,959 for Waste Processing-Class I; \$94,661 for Waste Processing-Class II; and \$273,800 for Waste Processing-Class III.

(c) An application for a major amendment of a license issued under Subchapter F, Subchapter G, or Subchapter K of this chapter must be accompanied by an application fee of \$10,000.

(d) An application for renewal of a license issued under Subchapter F or Subchapter K of this chapter must be accompanied by an application fee of \$35,000.

(e) Upon permanent cessation of all disposal activities and approval of the final decommissioning plan, holders of licenses issued under Subchapter F or Subchapter K of this chapter shall use the applicable fee schedule for subsections (b) and (c) of this section.

(f) For an application to dispose of by-product material that was filed with the Texas Department of State Health Services on or before January 1, 2007, the commission may assess and collect additional fees from the applicant to recover costs. Recoverable costs include costs incurred by the commission for administrative review, technical review, and hearings associated with the application. The executive director shall send an invoice for the amount of the costs incurred during the period September 1 through August 31 of each year. Payment shall be made within 30 days following the date of the invoice.

(g) If a licensee remitted a biennial licensing fee to the Texas Department of State Health Services during the one year period prior to June 17, 2007, the licensee is not subject to an annual fee under subsection (b) of this section until the expiration of the second year for which the biennial fee was paid.

Adopted January 30, 2008

Effective February 28, 2008

**§336.106. Annual Fees for Emergency Response Activities, including Training.**

Each holder of a fixed nuclear facility construction permit or operating license issued by the United States Nuclear Regulatory Commission or an operator of any other fixed nuclear facility shall submit an annual fee for the services received. This fee shall recover for the State the actual expenses arising from emergency response activities, including training. Costs of activities benefiting more than one facility shall be prorated. The executive director shall send an invoice after completion of emergency response activities held before August 31 of each year. Payment shall be made within 30 days following the date of the invoice.

Adopted May 14, 1997

Effective June 5, 1997

**§336.107. Annual License Fee Due Date and Period Covered.**

(a) Payment for annual fees set forth in §336.105(b) of this title (relating to Schedule of Fees for Other Licenses) shall be due in full each year on or before the last day of the expiration month of the license. As an example, if the license expires on May 31, 1999, annual fees are due on or before May 31 of each year.

(b) The period covered by each annual fee set forth in §336.105(b) of this title shall be the 12 months preceding the fee payment due date.

Adopted August 23, 2000

Effective September 14, 2000

**§336.109. Fees after Request for Termination of License.**

(a) If a licensee requests termination of a license, the amount of the annual fee due on the next fee payment due date may be prorated based on the number of months completed through the month of the termination request out of the 12-month period covered by the annual fee. As an example, if a licensee requests termination of a license on August 20 and the next annual fee is due on or before November 30, the annual fee for that year may be prorated as 9/12 of the applicable fee amount. After the next annual fee due date, the annual fee may be waived pending the final determination on the termination request. The annual fee may be prorated or waived as provided in this subsection if the executive director has reasonable basis to find, from information provided by the licensee, that the licensee has satisfied the applicable requirements for decommissioning and closure. If the executive director has insufficient information or finds that the licensee has not satisfied the requirements for decommissioning and closure, the annual fee shall not be prorated or waived and shall be the full amount.

(b) If an annual fee has been prorated or waived under subsection (a) of this section and the executive director later determines, before making the final determination on the request for termination, that the licensee has not met the decommissioning and closure requirements, then any amount of annual fees not paid due to proration or waiving shall be payable immediately upon notice to the licensee.

(c) The commission may not terminate a license for which the licensee has not paid any outstanding fees prescribed by this subchapter until the fees are paid.

Adopted May 14, 1997

Effective June 5, 1997

**§336.110. Nonrefundable Fees.**

(a) Fee payments set forth in this subchapter are not refundable, except as provided in subsection (b) of this section. Fee payments for applications or amendment applications as set forth in this subchapter shall be charged irrespective of the commission's disposition of the application or a withdrawal of the application by the applicant.

(b) If the executive director determines that a license application or an amendment application is not administratively complete, the application and any accompanying application fee may be returned to the applicant.

Adopted May 14, 1997

Effective June 5, 1997

**§336.111. Method of Payment of Fees.**

Fee payments prescribed by this subchapter shall be made in cash or by check or money order made payable to the Texas Commission on Environmental Quality. The payments may be made by personal delivery to the Financial Administration Cashier Office, Texas Commission on Environmental

Quality, in Austin, Texas, or mailed to the Texas Commission on Environmental Quality, Cashier's Office, MC 214, P.O. Box 13088, Austin, Texas 78711-3088.

Adopted December 17, 2003

Effective January 8, 2004

**§336.112. Failure to Pay Prescribed Application Fees.**

In any case where an applicant for a license or a license amendment has failed to pay the application fee or amendment application fee prescribed in this subchapter, the executive director shall not process that application until this fee is paid in full. If the applicable fee is not paid in full, the executive director may find that the application or amendment application is not administratively complete and may return the application to the applicant.

Adopted May 14, 1997

Effective June 5, 1997

**§336.113. Failure to Pay Prescribed Annual Fees.**

(a) A licensee failing to make payment of the fees when due under this chapter shall be assessed penalties and interest in accordance with Chapter 12 of this title (relating to Payment of Fees).

(b) In any case where the executive director finds that a licensee has failed to pay a fee prescribed by this subchapter by the due date, the executive director may implement compliance procedures.

(c) In any case where the executive director finds that a fixed nuclear facility has failed to pay fees for emergency response activities, including training, within 90 days following the date of the invoice, the executive director may recommend and the commission may issue an order to show cause why those services should not be terminated.

Adopted December 17, 2003

Effective January 8, 2004

**SUBCHAPTER C: GENERAL LICENSING REQUIREMENTS**

**§§336.201, 336.203, 336.205, 336.207, 336.209, 336.211, 336.213, 336.215, 336.217, 336.219, 336.221,  
336.223, 336.225, 336.229  
Effective February 28, 2008**

**§336.201. Purpose and Scope.**

This subchapter establishes general licensing requirements for all radioactive materials, except oil and gas naturally occurring radioactive material waste.

Adopted January 30, 2008

Effective February 28, 2008

**§336.203. License Required.**

No person shall dispose of radioactive material unless that person has a license from the Texas Commission on Environmental Quality, or an exemption under Texas Health and Safety Code, §401.106(a).

Adopted January 30, 2008

Effective February 28, 2008

**§336.205. Application Requirements.**

(a) Applications shall be submitted according to the requirements of Chapter 305 of this title (relating to Consolidated Permits), unless otherwise indicated.

(b) An application for a license, or amendment of a license shall be accompanied by the appropriate fee, specified in Subchapter B of this chapter (relating to Radioactive Substance Fees).

Adopted August 23, 2000

Effective September 14, 2000

**§336.207. General Requirements for Issuance of a License.**

An application may be approved if the commission determines that the requirements set forth in the applicable subchapter of this chapter and Chapter 305, Subchapter C of this title (relating to Application for Permit) have been met and that:

(1) the applicant is qualified by training and experience to conduct the proposed radioactive material activities in accordance with the rules in this chapter in such a manner as to protect and minimize danger to the public health and safety and the environment;

(2) the applicant's proposed equipment, facilities, and procedures are adequate to protect and minimize danger to the public health and safety and the environment;

(3) the issuance of the license will not be inimical to public health and safety nor have a long-term detrimental impact on the environment.

(4) the applicant for a license issued under Subchapter H of this chapter (relating to Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste) has acquired the title to and any interest in land and buildings, including the surface and mineral estates, on which the facility or facilities are to be located by either having acquired:

(A) an undivided ownership of the buildings, surface estate, and mineral estate in fee simple through purchase or completed condemnation; or

(B) an undivided ownership of the buildings and surface estate, along with an exemption, granted by the commission in accordance with federal law for use of a surface use agreement, in lieu of acquiring fee simple title to the mineral estate; and

(5) if applicable, the applicant has demonstrated financial capability to conduct the proposed activity, including all costs associated with decommissioning, decontamination, disposal, reclamation, and any long-term care and surveillance.

Adopted January 30, 2008

Effective February 28, 2008

**§336.209. Issuance of License.**

Upon a determination that an application meets the requirements of the Texas Health and Safety Code, Chapter 401 and the commission rules relating to radioactive material licensing, the commission may issue a license authorizing the proposed activity.

Adopted December 17, 2003

Effective January 8, 2004

**§336.211. General Requirements for Radioactive Material Disposal.**

(a) Unless otherwise exempted, a licensee may dispose of licensed material, as appropriate to the type of licensed material, only:

(1) by transfer to an authorized recipient as provided in §336.331(g) and (h) of this title (relating to Transfer of Radioactive Material), Subchapter H of this chapter (relating to Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste), or in Subchapter L of this chapter (relating to Licensing of Source Material Recovery and By-product Material Disposal Facilities);

(2) by transfer to a recipient authorized in another state by license issued by the United States Nuclear Regulatory Commission or an Agreement State or to the United States Department of Energy;

(3) by decay in storage as authorized by law;

(4) by release in effluents within the limits specified in §336.313 of this title (relating to Dose Limits for Individual Members of the Public);

(5) as authorized under §336.213 of this title (relating to Method of Obtaining Approval of Proposed Disposal Procedures);

(6) as authorized under §336.215 of this title (relating to Disposal by Release into Sanitary Sewerage);

(7) as authorized under §336.223 of this title (relating to Disposal in Underground Injection Control Class I Injection Wells);

(8) as authorized under §336.225 of this title (relating to Disposal of Specific Wastes); or

(9) as specifically authorized by commission license issued under this chapter.

(b) A person must be specifically licensed to receive waste containing licensed material from other persons for:

(1) treatment prior to disposal;

(2) treatment by incineration;

(3) decay in storage;

(4) disposal at a land disposal facility; or

(5) disposal by injection in an underground injection control Class I injection well.

(c) Except as provided in subsection (d) of this section, the processing and storage of radioactive material received from other persons is subject to Subchapter M of this chapter (relating to Licensing of Radioactive Substances Processing and Storage Facilities).

(d) The receipt, storage, and/or processing of radioactive materials received at a licensed commercial radioactive material disposal facility for the explicit purpose of disposal at that facility shall be regulated in accordance with the license authorizing disposal under this chapter.

(e) The on-site disposal of low-level radioactive waste is prohibited, except as provided by this section. The commission may, on request or its own initiative, authorize on-site disposal of low-level radioactive waste on a specific basis at any facility at which licensed low-level radioactive waste disposal operations began before September 1, 1989, if, after evaluation of the specific characteristics of the waste, the disposal site, and the method of disposal, the commission finds that the continuation of the disposal activity will not constitute a significant risk to public health and safety and to the environment. Persons subject to this subsection shall be licensed under Subchapter F of this chapter (relating to Licensing of Alternative Methods of Disposal of Radioactive Material).



(f) The disposal of low-level radioactive waste received from other persons is prohibited, except by a person who is specifically licensed under Subchapter H of this chapter.

Adopted January 30, 2008

Effective February 28, 2008

**§336.213. Method of Obtaining Approval of Proposed Activities.**

(a) A person who plans to dispose of radioactive material; store or process radioactive substances from other persons; or recover or process source material shall submit an application for a license according to Chapter 305 of this title (relating to Consolidated Permits) and the applicable subchapter in this chapter.

(b) A person holding a license issued under this chapter shall request changes to the license by requesting a license amendment, according to Chapter 305, Subchapter D of this title (relating to Amendments, Renewals, Transfers, Corrections, Revocation, and Suspension of Permits).

(c) If this chapter does not specifically authorize a proposed disposal procedure, a person shall file an application for a license or license amendment under Subchapter F of this chapter (relating to Licensing of Alternative Methods of Disposal of Radioactive Material) for approval of on-site disposal of radioactive material generated in the person's activities.

Adopted January 30, 2008

Effective February 28, 2008

**§336.215. Disposal by Release into Sanitary Sewerage.**

A licensee may discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:

(1) the material is readily soluble in water, or is readily dispersible biological material;

(2) the quantity of licensed or other radioactive material that the licensee releases into the sewer in one month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in Table III of §336.359 of this title (relating to Appendix B, Annual Limits on Intake (ALI) and Derived Air Concentrations (DAC) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sanitary Sewerage);

(3) if more than one radionuclide is released, the licensee shall determine the fraction of the limit in Table III of §336.359 of this title represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in Table III of §336.359 of this title; the sum of the fractions for all of the radionuclides released shall not exceed one; and

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

Adopted August 23, 2000

Effective September 14, 2000

**§336.217. Disposal by Burial in Soil.**

No licensee shall dispose of radioactive material by burial in soil except as provided by:

- (1) §336.225 of this title (relating to Disposal of Specific Wastes);
- (2) specific license issued under the applicable subchapter of this chapter; or
- (3) an exemption issued under §336.5(a) of this title (relating to Exemptions).

Adopted August 23, 2000

Effective September 14, 2000

**§336.219. Disposal by Release into Septic Tanks.**

No licensee shall discharge radioactive material into a septic tank system except by specific license issued by the commission under Subchapter F of this chapter (relating to Alternative Methods of Disposal of Radioactive Material).

Adopted August 23, 2000

Effective September 14, 2000

**§336.221. Treatment or Disposal by Incineration.**

(a) Treatment of radioactive material by incineration, except in a form and concentration specified by §336.225 of this title (relating to Disposal of Specific Wastes), shall be subject to applicable rules of the Texas Department of Health.

(b) Ash residue waste containing radioactive material shall be disposed of in accordance with §336.211 of this title (relating to General Requirements for Radioactive Material Waste Disposal).

Adopted August 23, 2000

Effective September 14, 2000

**§336.223. Disposal in Underground Injection Control Class I Injection Wells.**

A person shall dispose of radioactive material by injection, only into an underground injection control Class I injection well that is:

- (1) permitted under Chapter 331 of this title (relating to Underground Injection Control);
- and

(2) specifically licensed under this chapter for radioactive material waste disposal.

Adopted August 23, 2000

Effective September 14, 2000

**§336.225. Disposal of Specific Wastes.**

(a) A licensee may dispose of the following licensed material as if it were not radioactive:

(1) 0.05 microcurie (1.85 kilobecquerels), or less, of hydrogen-3, carbon-14, or iodine-125 per gram of medium used for liquid scintillation counting or in vitro clinical or in vitro laboratory testing; and

(2) 0.05 microcurie (1.85 kilobecquerels), or less, of hydrogen-3, carbon-14, or iodine-125 per gram of animal tissue, averaged over the weight of the entire animal.

(b) A licensee shall not dispose of tissue under subsection (a)(2) of this section in a manner that would permit its use either as food for humans or as animal feed.

(c) A licensee may, upon commission approval under subsection (d) of this section, dispose of licensed material listed in §336.365 of this title (relating to Appendix H. Radionuclide Concentration and Annual Activity Limits for Disposal in a Type I Municipal Solid Waste Facility or a Hazardous Waste Facility), provided that the licensed material does not exceed the specified concentration and annual activity limits, in a Type I municipal solid waste facility as defined in the commission's rules in Chapter 330 of this title (relating to Municipal Solid Waste), unless the licensed material is hazardous waste, or is combined with hazardous waste, as defined in Chapter 330 of this title. Licensed material listed in §336.365 of this title which does not exceed the specified concentration and annual activity limits and which is hazardous waste, or is combined with hazardous waste, shall be disposed of at a hazardous waste disposal facility in accordance with the commission's rules in Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste). Disposals at a Type I municipal solid waste facility or a hazardous waste disposal facility must comply with other requirements for those facilities as set forth in Chapters 330 or 335 of this title, respectively.

(d) A licensee shall apply for commission authorization, by license amendment, for the disposal of licensed material under subsection (c) of this section by submitting procedures for the following to the agency:

(1) physical delivery of the material to the disposal facility;

(2) surveys to be performed for compliance with subsection (e)(1) of this section;

(3) maintaining secure packaging during transportation to the site; and

(4) maintaining records of any disposals made under this subsection.

(e) Each licensee who disposes of licensed material under subsections (a) - (d) of this section shall:

(1) make surveys adequate to assure that the limits specified in subsection (a) or (c) of this section are not exceeded; and

(2) remove or otherwise obliterate or obscure all labels, tags, or other markings which would indicate that the material or contents is radioactive.

(f) Each licensee who disposes of licensed material under subsections (a) - (d) of this section shall maintain records in accordance with §336.338 of this title (relating to General Recordkeeping Requirements for Disposal).

(g) Material disposed of under this section is exempt from the requirements of §336.332 of this title (relating to Preparation of Radioactive Material for Transport).

Adopted August 23, 2000

Effective September 14, 2000

**§336.229. Prohibition of Dilution.**

No person shall reduce the concentration of radioactive constituents by dilution to meet exemption levels established under the Texas Health and Safety Code, Chapter 401, §401.106, or change the waste's classification or disposal requirements. Radioactive material that has been diluted as a result of stabilization, mixing, or treatment, including, but not limited to, Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions (LDR) treatment, or for any other reason, shall be subject to the disposal regulations it would have been subject to prior to dilution.

Adopted August 23, 2000

Effective September 14, 2000

**SUBCHAPTER G: DECOMMISSIONING STANDARDS**

**§§336.601 - 336.603, 336.605, 336.607, 336.609, 336.611, 336.613, 336.615, 336.617, 336.619, 336.621, 336.623, 336.625, 336.627**  
**Effective February 28, 2008**

**§336.601. Applicability.**

(a) The criteria in this subchapter apply to the decommissioning of facilities regulated under Subchapter F of this chapter (relating to Licensing of Alternative Methods of Disposal of Radioactive Material), the inactive disposal sites regulated under this subchapter, the ancillary surface facilities that support low-level radioactive waste disposal activities at facilities licensed under Subchapter H of this chapter (relating to Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste), naturally occurring radioactive material waste disposal facilities licensed under Subchapter K of this chapter (relating to Commercial Disposal of Naturally Occurring Radioactive Material Waste from Public Water Systems), and to radioactive substances processing and storage facilities licensed under Subchapter M of this chapter (relating to Licensing of Radioactive Substances Processing and Storage Facilities).

(b) This subchapter also establishes the criteria under which a facility may be licensed for decommissioning.

(c) After a site has been decommissioned and the license terminated in accordance with the criteria in this subchapter, the commission may require additional cleanup only if, based on new information, it determines that the criteria of this subchapter have not been met and residual radioactivity remaining at the site could result in significant threat to public health and safety.

(d) When calculating the total effective dose equivalent (TEDE) to the average member of the critical group, the licensee shall determine the peak annual TEDE expected within the first 1,000 years after decommissioning.

Adopted January 30, 2008

Effective February 28, 2008

**§336.602. Definitions.**

General agency terms used in several chapters are defined in Chapter 3 of this title (relating to Definitions). Terms used in this chapter are defined in §336.2 of this title (relating to Definitions). Additional terms used in this subchapter have the following definitions.

(1) **Control and maintenance** - Only for licenses that have been terminated under restricted conditions, control and maintenance is the period of time, and the activities that occur within that period of time, that begins upon license termination and continues until the level of contamination at the site reaches the level required under §336.603(a) of this title (relating to Radiological Criteria for Unrestricted Use) for unrestricted use without institutional controls.

(2) **Inactive disposal site** - A site or facility that:

(A) contains radioactive material disposed of below the surface, or soils or structures contaminated with radioactive material; and

(B) no longer disposes or will dispose of, or accepts or will accept for the purpose of disposal, additional radioactive material.

(3) **Institutional control** - Restrictions placed upon a facility or site that are:

(A) proprietary institutional controls which are put in place by the property owner, such as deed restrictions;

(B) governmental institutional controls, which are based on a government's sovereign or police powers, such as zoning, water well-use restrictions, and building permit requirements; and

(C) physical controls such as fences, markers, earthen covers, and radiological monitoring and maintenance for those controls. Physical controls must be used in combination with some type of legal instrument.

(4) **Funding plan** - A plan, equivalent to the decommissioning funding plan of 10 Code of Federal Regulations §30.35 (Financial Assurance and Recordkeeping for Decommissioning) and §40.36 (Financial Assurance and Recordkeeping for Decommissioning), submitted by the holder of an existing license before the development of a detailed decommissioning plan. The funding plan includes:

(A) an initial cost estimate for decommissioning;

(B) a description of the financial mechanism(s) utilized; and

(C) a certification by the licensee that a signed original of the financial assurance mechanism for decommissioning was submitted to the executive director.

Adopted August 23, 2000

Effective September 14, 2000

**§336.603. Radiological Criteria for Unrestricted Use.**

(a) A site will be considered acceptable for unrestricted use if 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 25 mrem (0.25 mSv) per year (excluding radium and its decay products), 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). The concentration for radium in soil shall be equivalent to or below the limits set forth in §336.356(a) of this title (relating to Soil and Vegetation Contamination Limits).

(b) Determination of the levels which are ALARA must take into account consideration of any detriments expected to potentially result from decontamination and waste disposal (e.g. deaths from transportation accidents).

(c) The licensee shall conduct all necessary radiation surveys and modeling, and shall provide reports and documentation to demonstrate that the requirements for release for unrestricted use have been met.

Adopted July 29, 1998

Effective September 3, 1998

**§336.605. Surface Contamination Limits for Facilities, Equipment, and Materials.**

(a) Before vacating any facility or releasing any facility, equipment, or materials for unrestricted use, each licensee shall ensure that radioactive contamination has been removed to levels as low as is reasonably achievable.

(b) No licensee may vacate a facility or release a facility, equipment, or materials for unrestricted use until radioactive surface contamination levels are below the limits specified in §336.364, Appendix G, of this title (relating to Acceptable Surface Contamination Levels). The licensee shall conduct radiation surveys and provide reports and documentation to demonstrate that the requirements for release have been met. The executive director may also require the licensee to provide other information as may be necessary to demonstrate that the facilities and equipment are suitable for release.

(c) In addition to meeting the surface contamination limits of subsection (b) of this section, porous materials (e.g., concrete), which are to be released for unrestricted use, shall be evaluated to determine whether radioactive materials have penetrated to the interior of the material. If radioactive contamination has penetrated into the material, analysis of the average concentration, in picocuries per gram, shall be made. The material may be released for unrestricted use if the radionuclide concentrations do not exceed the limits specified for soil in §336.356(a) of this title (relating to Soil and Vegetation Contamination Limits) and §336.603 of this title (relating to Radiological Criteria for Unrestricted Use).

Adopted July 29, 1998

Effective September 3, 1998

**§336.607. Criteria for License Termination under Restricted Conditions.**

A site will be considered acceptable for license termination under restricted conditions if all of the following conditions are met:

(1) The licensee can demonstrate that further reductions in residual radioactivity would result in net public or environmental harm or were not being made because the residual levels associated with restricted conditions are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of any detriments expected to potentially result from decontamination and waste disposal (e.g. traffic accidents);

(2) The licensee has made provisions for legally enforceable institutional controls that provide reasonable assurance that the total effective dose equivalent (TEDE) from residual radioactivity

distinguishable from background to the average member of the critical group will not exceed 25 mrem (0.25mSv) per year;

(3) The licensee has provided sufficient financial assurance 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. Acceptable financial assurance mechanisms are those in Chapter 37, Subchapter S of this title (relating to Financial Assurance for Radioactive Material), or Chapter 37, Subchapter T of this title (relating to Financial Assurance for Near-Surface Land Disposal of Low-Level Radioactive Waste);

(4) The licensee has submitted a decommissioning plan to the commission indicating the licensee's intent to decommission and specifying that the licensee intends to decommission by restricting use of the site. The licensee shall document in the decommissioning plan 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.

(A) Licensees proposing to decommission by restricting use of the site shall seek advice from affected parties regarding the following matters concerning the proposed decommissioning.

(i) Whether provisions for institutional controls proposed by the licensee:

(I) will provide reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem (0.25 mSv) TEDE per year;

(II) will be enforceable; and

(III) will not impose undue burdens on the local community or other affected parties.

(ii) Whether the licensee has provided sufficient financial assurance to enable an independent third party, including a governmental custodian of a site, to assume control and maintenance of the site.

(B) In seeking advice on the issues identified in subparagraph (A) of this paragraph, the licensee shall provide for:

(i) participation by representatives of a broad cross section of community interests who may be affected by the decommissioning;

(ii) an opportunity for a comprehensive, collective discussion on the issues by the participants represented; and

(iii) a publicly available summary of the results of all 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; and



(5) Residual radioactivity at the site has been reduced so that if the institution controls were no longer in effect, there is reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group is ALARA and would not exceed either:

(A) 100 mrem (1 mSv) per year; or

(B) 500 mrem (5 mSv) per year provided the licensee:

(i) demonstrates that further reductions in residual radioactivity necessary to comply with the 100 mrem/y (1 mSv/y) value of subparagraph (A) of this paragraph are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm;

(ii) makes provisions for durable institutional controls; and

(iii) provides sufficient financial assurance to enable a responsible government entity or independent third party, including a governmental custodian of a site, both to carry out periodic rechecks of the site no less frequently than every five years to assure that the criteria of §336.603(a) of this title (relating to Radiological Criteria for Unrestricted Use) are met and to assume and carry out responsibilities for any necessary control and maintenance of those controls. Acceptable financial assurance mechanisms are those in Chapter 37, Subchapter S of this title, or Chapter 37, Subchapter T of this title.

Adopted August 23, 2000

Effective September 14, 2000

**§336.609. Alternate Criteria for License Termination.**

(a) The commission may terminate a license using alternate criteria greater than the dose criterion of §336.603 of this title (relating to Radiological Criteria for Unrestricted Use) and §336.607(2) and (4)(A)(i)(I) of this title (relating to Criteria for License Termination under Restricted Conditions), if 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 manmade sources combined, other than medical, would be more than the 1 mSv/y (100 mrem/y) limit of §§336.314-336.315 of this title (relating to Compliance with Dose Limits for Individual Members of the Public and General Requirements for Surveys and Monitoring, respectively), by submitting an analysis of possible sources of exposure;

(2) has employed, to the extent practical, restrictions on site use according to the provisions of §336.607 of this title 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 to the commission indicating the licensee's intent to decommission the facility, and specifying that the licensee proposes to decommission by use of alternate criteria. The licensee shall document in the decommissioning plan how the advice of individuals and institutions in the community who may be affected by the decommissioning has been sought and addressed, 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 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.

(b) The use of alternate criteria to terminate a license requires approval of the commission after consideration of the executive director's recommendations that will address any comments provided by the Environmental Protection Agency and any other public comments submitted under §336.611 of this title (relating to Public Notification and Public Participation).

Adopted July 29, 1998

Effective September 3, 1998

**§336.611. Public Notification and Public Participation.**

Upon the receipt of a decommissioning plan from the licensee, or a proposal by the licensee for release of a site under §336.607 of this title (relating to Criteria for License Termination under Restricted Conditions) or §336.609 of this title (relating to Alternate Criteria for License Termination), or whenever the commission deems notice to be in the public interest, the commission shall publish notice in accordance with §39.713 of this title (relating to Public Notification and Public Participation).

Adopted August 8, 2001

Effective August 30, 2001

**§336.613. Additional Requirements.**

(a) The requirements of this section do not apply to licenses issued under Subchapter H of this chapter (relating to Licensing Requirements for Near-Surface Land Disposal of Low-Level Radioactive Waste).

(b) A decommissioning plan shall be submitted with the license application required by §336.615 of this title (relating to Inactive Disposal Sites) and §336.1211 of this title (relating to Filing Application for a Special License). Holders of licenses of inactive disposal sites shall submit a decommissioning plan with the renewal application. Holders of licenses of active disposal sites shall submit a decommissioning plan no later than the date specified in §336.625(e)(2) of this title (relating to Expiration and Termination of Licenses).

(c) The executive director may approve an alternate schedule for submittal of a decommissioning plan required under §336.625(e)(2) of this title if the executive director determines that:

(1) the alternative schedule is necessary for the effective conduct of decommissioning operations; and

(2) presents no undue risk from radiation to the public health and safety and is otherwise in the public interest.

(d) A licensee shall request a license amendment to amend a decommissioning plan if revised procedures could increase potential health and safety impacts to workers or to the public. Examples of procedures that require a license amendment include, but are not limited to:

(1) procedures that involve techniques not applied routinely during cleanup or maintenance operations;

(2) workers entering areas not normally occupied where surface contamination and radiation levels are significantly higher than routinely encountered during operation;

(3) procedures that could result in significantly greater airborne concentrations of radioactive materials than are present during operation; or

(4) procedures that could result in significantly greater releases of radioactive material to the environment than those associated with operation.

(e) Procedures with potential health and safety impacts, such as those listed in subsection (d) of this section, may not be carried out prior to approval by the commission of the decommissioning plan.

(f) The proposed decommissioning plan for the site or separate building or outdoor area shall include:

(1) a description of the conditions of the site or separate building or outdoor area sufficient to evaluate the acceptability of the plan;

(2) a description of planned decommissioning activities;

(3) a description of methods used to ensure protection of workers and the environment against radiation hazards during decommissioning;

(4) a description of the planned final radiation survey;

(5) an updated detailed cost estimate for decommissioning, comparison of that estimate with present funds set aside for decommissioning, and a plan for assuring the availability of adequate funds for completion of decommissioning;

(6) for decommissioning plans calling for completion of decommissioning later than 24 months after plan approval, a justification for the delay based on the criteria in subsection (h) of this section; and

(7) a description of the quality assurance/quality control program.

(g) The proposed decommissioning plan may be approved by the commission by license amendment if the information demonstrates that the decommissioning will be completed as soon as practicable and that the health and safety of workers and the public will be protected.

(h) Except as provided in subsection (j) of this section, the licensee shall complete decommissioning of the site or separate building or outdoor area as soon as practicable but no later than 24 months following the initiation of decommissioning.

(i) Except as provided in subsection (j) of this section, when decommissioning involves the entire site, the licensee shall request license termination as the final step in decommissioning, which shall be as soon as practicable but no later than 24 months following the initiation of decommissioning.

(j) The commission may approve by license amendment a request for an alternate schedule for completion of decommissioning of the site or separate building or outdoor area, and license termination if appropriate, if the commission determines that the alternative is warranted by consideration of the following:

(1) whether it is technically feasible to complete decommissioning within the allotted 24-month period;

(2) whether sufficient waste disposal capacity is available to allow completion of decommissioning within the allotted 24-month period;

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

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

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

(k) As the final steps in decommissioning, the licensee shall:

(1) certify the disposition of all licensed material, including accumulated wastes;

(2) conduct a radiation survey of the premises where the licensed activities were carried out and submit a report of the results of this survey unless the licensee demonstrates that the premises are suitable for release in some other commission approved manner. The licensee shall, as appropriate:

(A) report levels of gamma radiation in units of microroentgens (millisieverts) per hour at 1 meter from surfaces, and report levels of radioactivity (removable and fixed), including alpha and beta, in units of disintegrations per minute or microcuries (megabecquerels) per 100 square centimeters for surfaces, microcuries (megabecquerels) per milliliter for water, and picocuries (becquerels) per gram for solids such as soils or concrete; and

(B) specify the survey instrument(s) used and certify that each instrument is properly calibrated and tested; and

(3) submit a request for license termination, which includes, but is not limited to, the information required by paragraphs (1) and (2) of this subsection.

(l) The executive director may require the licensee to provide any other information necessary to demonstrate that the facilities and land are suitable for release.

Adopted January 30, 2008

Effective February 28, 2008

#### **§336.615. Inactive Disposal Sites.**

Any person who owns, operates, controls, or possesses an inactive disposal site and who does not hold a current radioactive material license for the inactive disposal site shall apply for a license to decommission by January 1, 2000. This subchapter does not apply to diffuse naturally occurring radioactive material (NORM) waste having concentrations of radium-226 or radium-228 of less than 2,000 pCi/g. Any decommissioning performed to fulfill this provision shall be performed by an individual who is qualified and licensed to perform the activities, ensuring that all appropriate radiation protection standards for workers and the public are met, including the maintenance of records.

(1) If the site meets the requirements for unrestricted use of §336.603 of this title, (relating to Radiological Criteria for Unrestricted Use), the owner shall submit to the executive director the information required by §336.603(c) of this title before January 1, 2000. Once the executive director verifies that the criteria have been met, the executive director will certify in writing that the owner is in compliance with the regulations and will not require any further cleanup, unless there is new evidence that the decommissioning standards for unrestricted use were not met and that residual radioactivity remaining at the site could result in significant threat to public health and safety.

(2) If a site is decommissioned for unrestricted use under §336.603 of this title before January 1, 2000, a license is not required. If decommissioning is completed before January 1, 2000, proof of decommissioning must be submitted to the agency before January 1, 2000, or the owner shall submit an application for license by that date. Once the executive director verifies that the criteria have been met, the executive director will certify in writing that the owner is in compliance with the regulations and will not require any further cleanup, unless there is new evidence that the decommissioning standards for unrestricted use were not met and that residual radioactivity remaining at the site could result in significant threat to public health and safety.

(3) If a site does not meet the requirements for unrestricted use and the owner does not decommission before January 1, 2000, or if the owner plans to decommission under §336.607 of this title (relating to Criteria for License Termination under Restricted Conditions) or §336.609 of this title (relating to Alternate Criteria for License Termination), the owner shall apply for a license to decommission by January 1, 2000. The applicant shall provide the information required by this subchapter using a form provided by the agency.

Adopted August 23, 2000

Effective September 14, 2000

**§336.617. Technical Requirements for Inactive Disposal Sites.**

(a) Content of license application. An applicant for a license to authorize possession of disposed radioactive material and subsequent decommissioning of an inactive disposal site shall submit the information required in Chapter 305 of this title (relating to Consolidated Permits), and the following, using the application form provided by the agency:

(1) information on the concentration and total activity of each radionuclide disposed of, packaging of the wastes, the characteristics of the disposal site (e.g., geological, hydrological, and topographical), as-built disposal trench or landfill construction, final cover construction, and depth of burial of wastes. This information shall be as complete and accurate as possible based on the full extent of information available to the applicant about the previous disposal activities;

(2) a description of any radiological monitoring performed at the site and the resulting data;

(3) the technical qualifications and identity of personnel responsible for radiation safety functions at the site;

(4) a description of the methods of restricting access to the site (e.g., fencing) and any permanent site markers;

(5) information on land ownership and any covenants on land use imposed by recorded title documents;

(6) a decommissioning plan that meets the standards in this subchapter including an evaluation of the alternative of disposing of the radioactive material at a licensed disposal facility;

(7) information regarding financial assurance for decommissioning as provided for in §336.619 of this title (relating to Financial Assurance for Decommissioning); and

(8) for license applications other than renewals, a description of how facility design and procedures for operation minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive wastes.

(b) Content of application for renewal of license.

(1) An applicant for renewal of a license authorizing possession of disposed radioactive material in an inactive disposal site or to decommission an inactive disposal site shall submit information using the application form provided by the agency on:

(A) the current conditions of the site (e.g., site stability and any maintenance performed at the site);

(B) any radiological monitoring performed at the site by the licensee and the resulting data;

(C) the methods of restricting access to the site;

(D) any changes in or additions to the procedures or information contained in previous applications;

(E) the technical qualifications and identity of personnel responsible for radiation safety functions at the site;

(F) a decommissioning plan that meets the standards in this subchapter, if not previously submitted, including an evaluation of the alternative of disposing of the radioactive material at a licensed disposal facility; and

(G) financial assurance for decommissioning as provided for in §336.619 of this title.

(2) The executive director may request additional information, such as that required by subsection (a) of this section, if this information was not previously provided for the site or is not current.

(c) Performance objectives. The applicant's submittal shall include sufficient information to enable the executive director to assess the potential hazard to public health and safety and to determine whether the disposal site will have a significant impact on the environment. The executive director shall evaluate existing inactive disposal sites on a case-by-case basis and shall consider the following general criteria and performance objectives in making the evaluation.

(1) Radiation exposure and release of radioactive materials from a disposal site shall be maintained as low as is reasonably achievable. Reasonable assurance must be provided that the potential dose to an individual on or near the site will be within acceptable limits. The estimated committed effective dose equivalent resulting from a radiological assessment of a site will usually be the determining factor in the granting of authorization for a disposal site. If the projected dose to a member of the public exceeds 25 millirems per year, the executive director shall consider other factors in determining whether to grant authorization for the site, including, but not limited to, the use of institutional controls to restrict access for a specified period of time.

(2) The location and characteristics of a site shall be such as to preclude potential offsite migration or transport of radioactive materials or ready access to critical exposure pathways.

(3) The general topography of the disposal site shall be compatible with its use for waste burial. As an example, surface features shall direct surface water drainage away from the disposal site. Wastes must not be buried in locations which, once covered, would tend to collect surface water. The characteristics of the site shall minimize, to the extent practicable, the potential for erosion and contact of percolating or standing water with wastes.

(4) Water-bearing strata shall be a minimum of ten feet below the depth at which waste is buried.

(5) Waste shall be emplaced in a manner that minimizes the void spaces between packages and permits the void spaces to be filled.

(6) Void spaces between waste packages shall be filled with earth or other material to reduce future subsidence within the fill.

(7) Cover design shall minimize water infiltration to the extent practicable, direct percolating or surface water away from the disposed waste, and resist degradation by surface geologic processes and biotic activity.

(8) In general, a site authorized under this subchapter shall be located, designed, operated, and closed so that long-term isolation and custodial care for long-term stability would not be required beyond the time the licensee can reasonably be expected to occupy the site. If a site does not meet this objective, requirements for long-term care shall be evaluated.

(9) The location of a disposal site shall be compatible with the uses of surrounding environs (both the applicant's and adjacent properties).

Adopted August 23, 2000

Effective September 14, 2000

**§336.619. Financial Assurance for Decommissioning.**

(a) A financial assurance mechanism or combination of mechanisms in accordance with Chapter 37 of this title (relating to Financial Assurance) is required for all entities currently licensed or proposed to be licensed, except that licenses and applicants under Subchapter M are subject to the financial assurance requirements of §336.1235 of this title (relating to Financial Assurance for Storage and Processing Facilities).

(b) Applicants for a new license to decommission an inactive disposal site and applicants for a license under Subchapters K of this chapter (relating to Commercial Disposal of Naturally Occurring Radioactive Material Waste from Public Water Systems) shall submit with the application a signed statement regarding how the applicant will provide financial assurance for decommissioning using one or more of the mechanisms specified in Chapter 37 of this title. The amount of financial assurance shall be based upon the detailed cost estimate included in the decommissioning plan submitted with the application.



(c) Holders of licenses for inactive disposal sites issued before January 1, 1998 shall submit a funding plan before January 1, 1998. Each funding plan must contain:

(1) a cost estimate for decommissioning;

(A) Each holder of a license authorizing the disposal of unsealed radioactive material with a half-life greater than 120 days and in quantities exceeding 105 times the applicable quantities set forth in §336.627 of this title (relating to Radionuclide Quantities for Use in Determining Financial Assurance for Decommissioning) or when a combination of isotopes is involved if  $R$  divided by 105 is greater than 1 (unity rule), where  $R$  is defined as the sum of the ratios of the quantity of each isotope to the applicable value in §336.627 of this title, shall submit a certification of financial assurance for decommissioning in an amount at least equal to \$750,000, in accordance with the criteria set forth in this subchapter and Chapter 37 of this title; or

(B) Each holder of a license authorizing disposal of radioactive material with a half-life greater than 120 days shall provide certification of financial assurance for decommissioning based on the quantity of material as follows:

(i) \$750,000--greater than 104 but less than or equal to 105 times the applicable quantities in §336.627 of this title, in unsealed form. (For a combination of isotopes, if  $R$ , as defined in subparagraph (A) of this paragraph, divided by 104 is greater than 1 but  $R$  divided by 105 is less than or equal to 1.); or

(ii) \$150,000--greater than 103 but less than or equal to 104 times the applicable quantities in §336.627 of this title in unsealed form. (For a combination of isotopes, if  $R$ , as defined in subparagraph (A) of this paragraph, divided by 103 is greater than 1 but  $R$  divided by 104 is less than or equal to 1.).

(C) Notwithstanding the requirements of subparagraphs (A) and (B) of this paragraph:

(i) each holder for a license authorizing the disposal of more than 100 millicuries of source material in a readily dispersible form shall submit certification that financial assurance has been provided in the amount of \$750,000;

(ii) each holder for a license authorizing the disposal of quantities of source material greater than ten millicuries but less than or equal to 100 millicuries in a readily dispersible form shall submit certification that financial assurance has been provided in the amount of \$150,000;

(2) a description of the financial assurance mechanism of assuring funds for decommissioning as specified in Chapter 37 of this title, including means for adjusting cost estimates and associated funding levels annually over the life of the facility; and

(3) a certification by the licensee that a signed original of the financial assurance mechanism for decommissioning, in accordance with criteria set forth in this section and Chapter 37 of this title, has been submitted to and approved by the executive director in the amount specified in paragraph (1) of this subsection.

(d) Holders of existing licenses for inactive disposal sites shall, as part of the license renewal process, submit a signed statement adjusting the amount of financial assurance based upon the detailed cost estimate included in the decommissioning plan submitted with the renewal application. The adjusted amount of financial assurance for decommissioning shall be effective upon license renewal.

(e) Holders of licenses for active disposal sites shall submit a signed statement adjusting the amount of financial assurance based upon the detailed cost estimate included in the decommissioning plan submitted no later than the date specified in §336.625(e) of this title (relating to Expiration and Termination of Licenses).

Adopted January 30, 2008

Effective February 28, 2008

### **§336.621. Recordkeeping for Decommissioning.**

Each person licensed under this subchapter shall keep records of information important to the safe and effective decommissioning of the facility in an identified location until the license is terminated by the commission. If records of relevant information are kept for other purposes, reference to these records and their locations may be used. Information important to decommissioning consists of:

(1) records of spills or other unusual occurrences involving the spread of contamination in and around the disposal 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 disposed of and of locations of possible inaccessible contamination (e.g., buried pipes) that 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 radioactive materials having half-lives of less than 65 days, a list contained in a single document and updated every two years of the following:

(A) all areas designated as restricted areas, as defined in §336.2 of this title (relating to Definitions), and all areas formerly designated as restricted areas under rules in effect before January 1, 1994;

(B) all areas outside of restricted areas that require documentation under paragraph (1) of this section;

(C) all areas outside of restricted areas where current and previous wastes have been buried as documented under §336.338 of this title (relating to General Recordkeeping Requirements for Disposal); and

(D) all areas outside of restricted areas which contain material such that, if the license expired, the licensee must be required to decontaminate the area to unrestricted release levels; and

(4) records of the cost estimate performed for the funding plan or of the amount certified for decommissioning, and records of the financial assurance mechanism used for assuring funds.

Adopted August 23, 2000

Effective September 14, 2000

**§336.623. Financial Assurance for Control and Maintenance.**

(a) An applicant or licensee required to demonstrate financial assurance for control and maintenance of a site shall maintain financial assurance for control and maintenance upon license issuance and during the decommissioning period. The applicant or licensee shall provide sufficient financial assurance 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. The financial assurance mechanism(s) for control and maintenance shall comply with Chapter 37 of this title (relating to Financial Assurance) including increasing annually the financial assurance amount for inflation or whenever modifications to the control and maintenance activities or changes to the amount being demonstrated causes the amounts for control and maintenance to increase.

(b) Prior to license termination, the licensee shall deposit a sum of cash acceptable to the executive director into the Texas Treasury Safekeeping Control and Maintenance account to assume and carry out responsibilities for any necessary surveillance, monitoring, control, maintenance, and other care of the decommissioned disposal site on a continual basis during the institutional control period. Upon receipt of the deposit, the executive director shall release the existing financial assurance mechanism(s) for control and maintenance. If a deposit is not made into the Control and Maintenance account, the executive director shall draw on the existing financial assurance mechanism(s) and deposit the cash into the Texas Safekeeping Treasury Control and Maintenance account.

Adopted August 23, 2000

Effective September 14, 2000

**§336.625. Expiration and Termination of Licenses.**

(a) Each license expires at the end of the day on the expiration date stated in the license unless the licensee has filed an application for renewal not less than 30 days before the expiration date stated in the existing license. If an application for renewal in proper form has been filed at least 30 days before the expiration date stated in the existing license, the existing license shall not expire until the application has been finally determined by the commission. For the purposes of this section, "proper form" shall mean that the application includes the information required by §336.617 of this title (relating to Technical Requirements for Inactive Disposal Sites) or §336.513 of this title (relating to Technical Requirements for Active Disposal Sites). The existing license expires at the end of the day on which the commission makes a final determination to deny the renewal application or, if the determination states an expiration date, the expiration date stated in the determination.

(b) Each license revoked by the commission expires at the end of the day on the date of the commission's final determination to revoke the license, or on the expiration date stated in the determination, or as otherwise provided by commission order.

(c) Each license continues in effect, beyond the expiration date if necessary, with respect to possession of source material, byproduct material, or other radioactive material until the commission notifies the licensee in writing that the license is terminated. During this time, the licensee shall:

(1) limit actions involving source material, byproduct material, or other radioactive material to those related to decommissioning; and

(2) continue to control entry to restricted areas until they are suitable for release in accordance with commission requirements.

(d) Within 60 days of the occurrence of any of the following, each licensee of an active disposal site shall provide written notification to the executive director:

(1) the license has expired under subsection (a) or (b) of this section; or

(2) the licensee has decided to permanently cease principal activities at the entire site or in any separate building or outdoor area that contains residual radioactivity such that the building or outdoor area is unsuitable for unrestricted release in accordance with commission requirements; or

(3) no principal activities under the license have been conducted for a period of 24 months; or

(4) no principal activities have been conducted for a period of 24 months in any separate building or outdoor area that contains residual radioactivity such that the building or outdoor area is unsuitable for release in accordance with commission requirements.

(e) The licensee of an active disposal site shall either:

(1) within 60 days of the occurrence for which notification is required by subsection (d) of this section, begin decommissioning its site or any separate building or outdoor area that contains residual radioactivity, according to an approved decommissioning plan, so that the building or outdoor area is suitable for release in accordance with commission requirements; or

(2) if no decommissioning plan has been submitted, submit a decommissioning plan to the executive director, including a signed statement adjusting the amount of financial assurance based upon the detailed cost estimate included in the decommissioning plan, within 12 months of the notification required by subsection (d) of this section and request an amendment of the license to incorporate the plan into the license; and

(3) begin decommissioning within 60 days of the approval of that plan by the commission.

(f) The licensee of an inactive disposal site licensed under §336.615 of this title (relating to Inactive Disposal Sites), shall provide notice of and begin decommissioning within 90 days of license renewal. The owner or operator of an unlicensed inactive disposal site must apply for a license to decommission the site and begin decommissioning within 90 days of license approval.

(g) All licensees shall follow a commission-approved closure plan for decontamination, decommissioning, restoration, and reclamation of buildings and the site.

(1) Coincident with the notification required by subsections (d) or (f) of this section, the licensee shall continue to maintain in effect all decommissioning financial assurance until the license is terminated by the commission.

(2) The amount of the financial assurance must be increased, or may be decreased, as appropriate, to cover the detailed cost estimate for decommissioning established under §336.613(f)(5) of this title (relating to Additional Requirements).

(3) Any licensee who has not provided financial assurance to cover the detailed cost estimate submitted with the decommissioning plan shall do so on or before January 1, 1998.

(4) Following approval of the decommissioning plan, with the approval of the executive director, a licensee may reduce the amount of the financial assurance as decommissioning proceeds and radiological contamination is reduced at the site.

(h) The executive director may grant in writing a request to extend the time periods established in subsections (d), (e), or (f) of this section, or to delay or postpone the decommissioning process, if the executive director determines that this relief is not detrimental to the public health and safety and is otherwise in the public interest. The request must be submitted in writing no later than 30 days before notification under subsection (d) or (f) of this section. The schedule for decommissioning set forth in subsection (e) or (f) of this section may not commence until the executive director has made a determination on the request.

(i) Licenses, including expired licenses, will be terminated by the commission by written notice to the licensee when the executive director determines that:

(1) source material, byproduct material, and other radioactive material has been properly disposed;

(2) reasonable effort has been made to eliminate residual radioactive contamination, if present;

(3) the site is suitable for release;

(A) a radiation survey has been performed which demonstrates that the premises are suitable for release in accordance with commission requirements; or

(B) other information submitted by the licensee is sufficient to demonstrate that the premises are suitable for release in accordance with commission requirements;

(4) the licensee has paid any outstanding fees required by Subchapter B of this chapter (relating to Radioactive Substance Fees) and has resolved any outstanding notice(s) of violation issued to the licensee; and

(5) the licensee has complied with all other applicable decommissioning criteria required by this subchapter.

(j) A licensee may request that a subsite or a portion of a licensed area be released for unrestricted use before full license termination as long as release of the area of concern will not adversely impact the remaining unaffected areas and will not be recontaminated by ongoing authorized activities. When the licensee is confident that the area of concern will be acceptable to the state for release for unrestricted use, a written request for release for unrestricted use and agency confirmation of close-out work performed must be submitted to the executive director. The request should include a comprehensive report, accompanied by survey and sample results which show contamination is less than the limits specified in §336.603 of this title (relating to Radiological Criteria for Unrestricted Use), and an explanation of how ongoing authorized activities will not adversely affect the area proposed to be released. Upon confirmation by the executive director that the area of concern is indeed releasable for unrestricted use, the licensee may apply for a license amendment, if required.

Adopted August 23, 2000

Effective September 14, 2000

**§336.627. Appendix A. Radionuclide Quantities for Use in Determining Financial Assurance for Decommissioning.**

The following table is to be used in the calculation of financial assurance for decommissioning.

Radionuclide Quantities  
for Use in Determining Financial  
Assurance for Decommissioning

Radioactive Material	Microcuries
Americium-241	0.01
Antimony-122	100
Antimony-124	10
Antimony-125	10
Arsenic-73	100
Arsenic-74	10
Arsenic-76	10
Arsenic-77	100
Barium-131	10
Barium-133	10
Barium-140	10
Bismuth-210	1

Bromine-82	10
Cadmium-109	10
Cadmium-115m	10
Cadmium-115	100
Calcium-45	10
Calcium-47	10
Carbon-14	100
Cerium-141	100
Cerium-143	100
Cerium-144	1
Cesium-131	1,000
Cesium-134m	100
Cesium-134	1
Cesium-135	10
Cesium-136	10
Cesium-137	10
Chlorine-36	10
Chlorine-38	10
Chromium-51	1,000
Cobalt-58m	10
Cobalt-58	10
Cobalt-60	1
Copper-64	100
Dysprosium-165	10
Dysprosium-166	100
Erbium-169	100
Erbium-171	100
Europium-152 (9.2 hr)	100
Europium-152 (13 yr)	1
Europium-154	1
Europium-155	10
Fluorine-18	1,000
Gadolinium-153	10
Gadolinium-159	100
Gallium-72	10
Germanium-71	100
Gold-198	100
Gold-199	100

Hafnium-181	10
Holmium-166	100
Hydrogen-3	1,000
Indium-113m	100
Indium-114m	10
Indium-115m	100
Indium-115	10
Iodine-125	1
Iodine-126	1
Iodine-129	0.1
Iodine-131	1
Iodine-132	10
Iodine-133	1
Iodine-134	10
Iodine-135	10
Iridium-192	10
Iridium-194	100
Iron-55	100
Iron-59	10
Krypton-85	100
Krypton-87	10
Lanthanum-140	10
Lutetium-177	100
Manganese-52	10
Manganese-54	10
Manganese-56	10
Mercury-197m	100
Mercury-197	100
Mercury-203	10
Molybdenum-99	100
Neodymium-147	100
Neodymium-149	100
Nickel-59	100
Nickel-63	10
Nickel-65	100
Niobium-93m	10
Niobium-95	10
Niobium-97	10



Osmium-185	10
Osmium-191m	100
Osmium-191	100
Osmium-193	100
Palladium-103	100
Palladium-109	100
Phosphorus-32	10
Platinum-191	100
Platinum-193m	100
Platinum-193	100
Platinum-197m	100
Platinum-197	100
Plutonium-239	0.01
Polonium-210	0.01
Potassium-42	10
Praseodymium-142	100
Praseodymium-143	100
Promethium-147	10
Promethium-149	10
Radium-226	0.01
Rhenium-186	100
Rhenium-188	100
Rhodium-103m	100
Rhodium-105	100
Rubidium-86	10
Rubidium-87	10
Ruthenium-97	100
Ruthenium-103	10
Ruthenium-105	10
Ruthenium-106	1
Samarium-151	10
Samarium-153	100
Scandium-46	10
Scandium-47	100
Scandium-48	10
Selenium-75	10
Silicon-31	100
Silver-105	10

Silver-110m	1
Silver-111	100
Sodium-24	10
Strontium-85	10
Strontium-89	1
Strontium-90	0.1
Strontium-91	10
Strontium-92	10
Sulfur-35	100
Tantalum-182	10
Technetium-96	10
Technetium-97m	100
Technetium-97	100
Technetium-99m	100
Technetium-99	10
Tellurium-125m	10
Tellurium-127m	10
Tellurium-127	100
Tellurium-129m	10
Tellurium-129	100
Tellurium-131m	10
Tellurium-132	10
Terbium-160	10
Thallium-200	100
Thallium-201	100
Thallium-202	100
Thallium-204	10
Thorium (natural) <sup>1</sup>	100
Thulium-170	10
Thulium-171	10
Tin-113	10
Tin-125	10
Tungsten-181	10
Tungsten-185	10
Tungsten-187	100
Uranium (natural) <sup>2</sup>	100
Uranium-233	0.01
Uranium-234, uranium-235	0.01

Vanadium-48	10
Xenon-131m	1,000
Xenon-133	100
Xenon-135	100
Ytterbium-175	100
Yttrium-90	10
Yttrium-91	10
Yttrium-92	100
Yttrium-93	100
Zinc-65	10
Zinc-69m	100
Zinc-69	1,000
Zirconium-93	10
Zirconium-95	10
Zirconium-97	10
Any alpha-emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition	0.01
Any radionuclide other than alpha-emitting radionuclides not listed above or mixtures of beta emitters of unknown composition	0.1

Notes:

1. Based on alpha disintegration rate of thorium-232, thorium-230, and their daughter products.
2. Based on alpha disintegration rate of uranium-238, uranium-234, and uranium-235.

Adopted August 23, 2000

Effective September 14, 2000

**SUBCHAPTER L: LICENSING OF SOURCE MATERIAL RECOVERY AND BY-PRODUCT  
MATERIAL DISPOSAL FACILITIES**

**§§336.1101, 336.1103, 336.1105, 336.1107, 336.1109, 336.1111, 336.1113, 336.1115, 336.1117,  
336.1119, 336.1121, 336.1123, 336.1125, 336.1127, 336.1129, 336.1131, 336.1133, 336.1135  
Effective February 28, 2008**

**§336.1101. Purpose.**

This subchapter provides for the specific licensing of the receipt, possession, use, or disposal of radioactive material in source material recovery facilities and other operations that accept by-product material for disposal. No person may engage in such activities except as authorized in a specific license issued in accordance with this subchapter.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1103. Scope.**

In addition to the requirements of this subchapter, all licensees, unless otherwise specified, are subject to the requirements of Subchapters A - E of this chapter.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1105. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise.

(1) **Aquifer**--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:

(A) hydraulically interconnected to a natural aquifer;

(B) capable of discharge to surface water; or

(C) 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 §336.1131 of this title (relating to Land Ownership of By-Product Material Disposal Sites).

(2) **As expeditiously as practicable considering technological feasibility**--As quickly as possible considering the physical characteristics of the by-product material and the site, the limits of "available technology" (as defined in this section), the need for consistency with mandatory requirements of other regulatory programs, and "factors beyond the control of the licensee" (as defined in this section). The phrase permits consideration of the cost of compliance only to the extent specifically provided for by use of the term "Available technology."

(3) **Available technology**--Technologies and methods for emplacing a final radon barrier on by-product material piles or impoundments. This term must 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), (for example, 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 costs must 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.

(4) **By-product material**--Tailings or wastes produced by or resulting from the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute "by-product material" within this definition.

(5) **Capable fault**--As used in this section, "Capable fault" has the same meaning as defined in Section III(g) of Appendix A of Title 10 Code of Federal Regulations (CFR) Part 100.

(6) **Closure**--The post-operational activities to decontaminate and decommission the buildings and site used to produce by-product materials and reclaim the tailings or disposal area, including groundwater restoration, if needed.

(7) **Closure plan**--The plan approved by the agency to accomplish closure. The closure plan consists of a decommissioning plan and may also include a reclamation plan.

(8) **Commencement of construction**--Any clearing of land, excavation, or other substantial action that would adversely affect the environment of a site, but does not include changes desirable for the temporary use of the land for public recreational uses, necessary borings to determine site characteristics or other preconstruction monitoring to establish background information related to the suitability of a site, or to the protection of the environment.

(9) **Compliance period**--The period of time that begins when the agency 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 government for long-term care, if applicable.

(10) **Dike**--An embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

(11) **Disposal area**--The area containing by-product materials to which the requirements of §336.1129(p) - (aa) of this title (relating to Technical Requirements) apply.

(12) **Existing portion**--As used in §336.1129(i)(1) of this title, "existing portion" is that land surface area of an existing surface impoundment on which significant quantities of uranium or thorium by-product materials had been placed prior to September 30, 1983.

(13) **Factors beyond the control of the licensee**--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 §336.1129(x) of this title. These factors may include but are not limited to:

- (A) physical conditions at the site;
- (B) inclement weather or climatic conditions;
- (C) an act of God;
- (D) an act of war;
- (E) 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;
- (F) labor disturbances;
- (G) any modifications, cessation or delay ordered by state, federal, or local agencies;
- (H) 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 government 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 of the reclamation plan; and
- (I) an act or omission of any third party over whom the licensee has no control.

(14) **Final radon barrier**--The earthen cover (or approved alternative cover) over by-product material constructed to comply with §336.1129(p) - (aa) of this title (excluding erosion protection features).

(15) **Groundwater**--Water below the land surface in a zone of saturation. For purposes of this subchapter, groundwater is the water contained within an aquifer as defined in this section.

(16) **Hazardous constituent**--Subject to §336.1129(j)(5) of this title, "hazardous constituent" is a constituent that meets all three of the following tests:

- (A) the constituent is reasonably expected to be in or derived from the by-product 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 10 Code of Federal Regulations Part 40, Appendix A, Criterion 13.

(17) **Leachate**--Any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the by-product material.

(18) **Licensed site**--The area contained within the boundary of a location under the control of persons generating or storing by-product materials under a license.

(19) **Liner**--A continuous layer of natural or man-made materials, beneath or on the sides of a surface impoundment that restricts the downward or lateral escape of by-product material, hazardous constituents, or leachate.

(20) **Maximum credible earthquake**--That earthquake that 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.

(21) **Milestone**--An action or event that is required to occur by an enforceable date.

(22) **Operation**--The period of time during which a by-product material disposal area is being used for the continued placement of by-product material or is in standby status for such placement. A disposal area is in operation from the day that by-product material is first placed in it until the day final closure begins.

(23) **Point of compliance**--The site-specific location in the uppermost aquifer where the groundwater protection standard shall be met. The objective in selecting the point of compliance is to provide the earliest practicable warning that an impoundment is releasing hazardous constituents to the groundwater. The point of compliance is selected to provide prompt indication of groundwater contamination on the hydraulically downgradient edge of the disposal area.

(24) **Principal activities**--Activities authorized by the license that are essential to achieving the purpose(s) for which the license is issued or amended. Storage during which no licensed material is accessed for use or disposal and activities incidental to decontamination or decommissioning are not principal activities.

(25) **Reclamation plan**--For the purposes of §336.1129(p) - (aa) of this title, "reclamation plan" is the plan detailing activities to accomplish reclamation of the by-product material disposal area in accordance with the technical criteria of this section. The reclamation plan shall include a schedule for reclamation milestones that are key to the completion of the final radon barrier, including as appropriate, but not limited to, windblown tailings retrieval and placement on the pile, interim stabilization (including dewatering or the removal of freestanding liquids and recontouring), and final radon barrier construction. Reclamation of by-product material shall also be addressed in the closure plan. The detailed reclamation plan may be incorporated into the closure plan.

(26) **Security** --This term has the same meaning as financial assurance.

(27) **Surface impoundment**--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.

(28) **Unrefined and unprocessed ore**--Ore in its natural form before any processing, such as grinding, roasting, beneficiating, or refining.

(29) **Uppermost aquifer**--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.

(30) **Uranium recovery**--Any uranium extraction or concentration activity that results in the production of "by-product material" as it is defined in this chapter. As used in this definition, "Uranium recovery" has the same meaning as "uranium milling" in 10 Code of Federal Regulations §40.4.

Adopted January 30, 2008

Effective February 28, 2008

### **§336.1107. Filing Application for Specific Licenses.**

Unless otherwise specified, an applicant for a license is subject to the requirements in §336.205 of this title (relating to Application Requirements). The applicant shall also comply with the following additional filing requirements.

(1) Applications for specific licenses shall be filed in seven copies in a manner specified by the agency.

(2) Each applicant shall demonstrate to the agency that the applicant is financially qualified to conduct the licensed activity, including any required decontamination, decommissioning, reclamation, and disposal, before the agency issues or renews a license by posting security as required under §336.1125 of this title (relating to Financial Security Requirements).

(3) An application for a license shall contain written specifications relating to the source material recovery facility operations and the disposition of the by-product material.

(4) Each application shall clearly demonstrate how the requirements of §§336.1107, 336.1109, 336.1111, 336.1113, 336.1125, 336.1127, 336.1129, and 336.1131 of this title (relating to Filing Application for Specific Licenses; General Requirements for the Issuance of Specific Licenses; Special Requirements for a License Application for Source Material Recovery and By-Product Material Disposal Facilities; Specific Terms and Conditions of Licenses; Financial Security Requirements; Long-Term Care and Maintenance Requirements; Technical Requirements; and Land Ownership of By-Product Material Disposal Sites) have been addressed.

(5) Applications for new licenses shall be processed in accordance with Chapter 281 of this title (relating to Applications Processing).

Adopted January 30, 2008

Effective February 28, 2008



**§336.1109. General Requirements for the Issuance of Specific Licenses.**

A license application may be approved if the agency determines that the applicant has met the requirements of §336.207 of this title (relating to General Requirements for Issuance of a License) and the following:

(1) qualifications of the designated radiation safety officer (RSO) are adequate for the purpose requested in the application and include as a minimum:

(A) have earned at least a bachelor's degree in a physical or biological science, industrial hygiene, health physics, radiation protection, or engineering from an accredited college or university, or an equivalent combination of training and relevant experience, with two years of relevant experience equivalent to a year of academic study, from a uranium or mineral extraction/recovery, radioactive waste processing, or a radioactive waste or by-product material disposal facility;

(B) have at least one year of relevant experience, in addition to that used to meet the educational requirement, working under the direct supervision of the radiation safety officer at a uranium or mineral extraction/recovery, radioactive waste processing, or radioactive waste or by-product material disposal facility; and

(C) have at least four weeks of specialized training in health physics or radiation safety applicable to uranium or mineral extraction/recovery, radioactive waste processing, or radioactive waste or by-product material disposal operations from a course provider that has been evaluated and approved by the agency; and

(2) the applicant satisfies all applicable special requirements in this subchapter.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1111. Special Requirements for a License Application for Source Material Recovery and By-product Material Disposal Facilities.**

In addition to the requirements in §336.1109 of this title (relating to General Requirements for the Issuance of Specific Licenses), a license may be issued if the applicant submits the items in paragraph (1) of this section for agency approval and meets the conditions in paragraphs (2) and (3) of this section.

(1) An application for a license must include the following:

(A) for new licenses, an environmental report that includes the results of a one-year preoperational monitoring program and for renewal of licenses, an environmental report containing the results of the operational monitoring program. Both must also include the following:

(i) description of the proposed project or action;

(ii) area/site characteristics including ecology, geology, topography, hydrology, meteorology, historical and cultural landmarks, and archaeology;

(iii) radiological and nonradiological impacts of the proposed project or action, including waterway and groundwater impacts and any long-term impacts;

(iv) environmental effects of accidents;

(v) by-product material disposal, decommissioning, decontamination, and reclamation and impacts of these activities; and

(vi) site and project alternative;

(B) a closure plan for decontamination, decommissioning, restoration, and reclamation of buildings and the site to levels that would allow unrestricted use and for reclamation of the by-product material disposal areas in accordance with the technical requirements of §336.1129 of this title (relating to Technical Requirements);

(C) proposal of an acceptable form and amount of financial security consistent with the requirements of §336.1125 of this title (relating to Financial Security Requirements);

(D) procedures describing the means employed to meet the requirements of §336.1113(1) and (2) of this title (relating to Specific Terms and Conditions of Licenses) and §336.1129(o) of this title during the operational phase of any project;

(E) specifications for the emissions control and disposition of the by-product material; and

(F) for disposal of by-product material received from others, information on the chemical and radioactive characteristics of the wastes to be received, detailed procedures for receiving and documenting incoming waste shipments, and detailed waste acceptance criteria.

(G) an adequate operating, radiation safety, and emergency procedures manual; and

(H) a signed certification from the owner or owners of the real property on which radioactive substances are recovered, stored, processed, or disposed acknowledging that:

(i) radioactive substances are recovered, stored, processed or disposed on the property with the consent of the property owner or owners; and

(ii) decommissioning of the licensed site may be required even if the applicant or licensee is unable or fails to decommission the licensed site as required by a license, rule or order of the commission.

(2) Except as provided in this section, the applicant shall not commence construction at the site until the agency has issued the license. Commencement of construction prior to issuance of the license shall be grounds for denial of a license. For an application for a new license to dispose of by-product material that was filed with the Texas Department of State Health Services on or before January 1, 2007, the applicant may commence construction as provided in §336.1135 of this title (relating to

Construction Activities), at the applicant's own risk, upon the executive director's issuance of the Environmental Analysis provided under §281.21(f) of this title (relating to Draft Permit, Technical Summary, Fact Sheet, and Compliance History).

(3) An application for a license must be submitted according to the applicable requirements of the Texas Engineering Practice Act, the Texas Geoscience Practice Act, and the Professional Land Surveying Practices Act.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1113. Specific Terms and Conditions of Licenses.**

Unless otherwise specified, each license issued in accordance with this section is subject to the requirements of §305.125 of this title (relating to Standard Permit Conditions) and the following.

(1) Daily inspection of any by-product material retention systems shall be conducted by the licensee. General qualifications for individuals conducting inspections shall be approved by the agency. Records of the inspections shall be maintained for review by the agency.

(2) In addition to the applicable requirements of §336.350 and §336.352 of this title (relating to Reports of Stolen, Lost, or Missing Licensed Radioactive Material and Reports of Exposures, Radiation Levels, and Concentrations of Radioactive Material Exceeding the Limits), the licensee shall immediately notify the agency of the following:

(A) any failure in a by-product material retention system that results in a release of by-product material into unrestricted areas;

(B) any release of radioactive material that exceeds the concentrations for water listed in Table II, Column 2, of §336.359 of this title (relating to Appendix B. Annual Limits in Intake (ALI) and Derived Air Concentrations (DAC) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sanitary Sewerage) and that extends beyond the licensed boundary;

(C) any spill that exceeds 20,000 gallons and that exceeds the concentrations for water listed in Table II, Column 2, of §336.359 of this title; or

(D) any release of solids that exceeds the limits in §336.1115(e) of this title (relating to Expiration and Termination of Licenses; Decommissioning of Sites, Separate Buildings or Outdoor Areas) and that extends beyond the licensed boundary.

(3) In addition to the applicable requirements of Chapter 327 of this title (relating to Spill Prevention and Control) and §336.350 and §336.352 of this title, the licensee shall notify the agency within 24 hours of the following:

(A) any spill that extends:

(i) beyond the wellfield monitor well ring;

(ii) more than 400 feet from an injection or production well pipe artery to or from a recovery plant; or

(iii) more than 200 feet from a recovery plant; or

(B) any spill that exceeds 2,000 gallons and that exceeds the concentrations for water listed in Table II, Column 2, of §336.359 of this title.

(4) At any time before termination of the license, the licensee shall submit written statements under oath upon request of the commission or executive director to enable the commission to determine whether or not the license should be modified, suspended, or revoked.

(5) The licensee shall be subject to the applicable provisions of Texas Health and Safety Code, Chapter 401, also known as the Texas Radiation Control Act (TRCA) now or hereafter in effect and to applicable rules and orders of the commission. The terms and conditions of the license are subject to amendment, revision, or modification, by reason of amendments to TRCA or by reason of rules and orders issued in accordance with terms of TRCA.

(6) Any license may be revoked, suspended, or modified, in whole or in part, for any material false statement in the application or any statement of fact required under provisions of TRCA, or because of conditions revealed by any application or statement of fact or any report, record or inspection or other means that would warrant the commission to refuse to grant a license on the original application, or for failure to operate the facility in accordance with the terms of the license, or for any violation of or failure to observe any of the terms and conditions of TRCA or the license or of any rule or order of the commission.

(7) Each person licensed by the commission under this subchapter shall confine possession and use of radioactive materials to the locations and purposes authorized in the license.

(8) No by-product may be disposed of until the executive director has inspected the facility and has found it to be conformance with the description, design, and construction described in the application for a by-product disposal license. No by-product may be received for disposal at the facility until the executive director has approved financial assurance.

(9) The commission may incorporate in any license at the time of issuance, or thereafter, by appropriate rule or order, additional requirements or conditions with respect to the licensee's receipt, possession, or disposal of by-product as it deems appropriate or necessary in order to:

(A) protect the health and safety of the public and the environment; or

(B) require reports and recordkeeping and to provide for inspections of activities under the licenses that may be necessary or appropriate to effectuate the purposes of TRCA and rules thereunder.

**§336.1115. Expiration and Termination of Licenses; Decommissioning of Sites, Separate Buildings or Outdoor Areas.**

- (a) The term of the specific license is for a fixed term not to exceed ten years.
- (b) Expiration of the specific license does not relieve the licensee of the requirements of this chapter.
- (c) All license provisions continue in effect beyond the expiration date with respect to possession of radioactive material until the agency notifies the former licensee in writing that the provisions of the license are no longer binding. During this time, the former licensee must:
  - (1) be limited to actions involving radioactive material that are related to decommissioning; and
  - (2) continue to control entry to restricted areas until the location(s) is suitable for release for unrestricted use in accordance with the requirements of subsection (e) of this section.
- (d) Within 60 days of the occurrence of any of the following, each licensee must provide notification to the agency in writing and either begin decommissioning its site, or any separate buildings or outdoor areas that contain residual radioactivity in accordance with the closure plan in §336.1111(1)(B) of this title (relating to Special Requirements for a License Application for Source Material Recovery and By-Product Material Disposal Facilities), so that the buildings or outdoor areas are suitable for release in accordance with subsection (e) of this section if:
  - (1) the license has expired in accordance with subsection (a) of this section; or
  - (2) the licensee has decided to permanently cease principal activities, as defined in §336.1105(24) of this title (relating to Definitions), at the entire site or in any separate building or outdoor area; or
  - (3) no principal activities have been conducted for a period of 24 months in any building or outdoor area that contains residual radioactivity such that the building or outdoor area is unsuitable for release in accordance with agency requirements.
- (e) Outdoor areas are considered suitable for release for unrestricted use if the following limits are not exceeded:
  - (1) The concentration of radium-226 or radium-228 (in the case of thorium by-product material) in soil, averaged over any 100 square meters (m<sup>2</sup>), may not exceed the background level by more than:
    - (A) 5 picocuries per gram (pCi/g) (0.185 becquerel per gram (Bq/g)), averaged over the first 15 cm of soil below the surface; and
    - (B) 15 pCi/g (0.555 Bq/g), averaged over 15 cm thick layers of soil more than 15 cm below the surface.

(2) The contamination of vegetation may not exceed 5 pCi/g (0.185 Bq/g), based on dry weight, for radium-226 or radium-228.

(3) The concentration of natural uranium in soil, with no daughters present, averaged over any 100 m<sup>2</sup>, may not exceed the background level by more than:

(A) 30 pCi/g (1.11 Bq/g), averaged over the top 15 cm of soil below the surface;  
and

(B) 150 pCi/g (5.55 Bq/g), average concentration at depths greater than 15 centimeters below the surface ; and

(4) no individual member of the public will receive an effective dose equivalent in excess of 100 mrem (1 mSv) per year as calculated by the methodology provided in NUREG-1620, Appendix H - "Guidance to the U.S. Nuclear Regulatory Commission Staff on the Radium Dose Approach."

(f) Coincident with the notification required by subsection (c) of this section, the licensee shall maintain in effect all decommissioning financial security established by the licensee in accordance with §336.1125 of this title (relating to Financial Security Requirements) in conjunction with a license issuance or renewal or as required by this section. The amount of the financial security must be increased, or may be decreased, as appropriate, with agency approval, to cover the detailed cost estimate for decommissioning established in accordance with subsection (l)(5) of this section.

(g) In addition to the provisions of subsection (h) of this section, each licensee must submit an updated closure plan to the agency within 12 months of the notification required by subsection (d) of this section. The updated closure plan must meet the requirements of §336.1111(1)(B) and §336.1125 of this title. The updated closure plan must describe the actual conditions of the facilities and site and the proposed closure activities and procedures.

(h) The agency may grant a request to delay or postpone initiation of the decommissioning process if the agency determines that such relief is not detrimental to the occupational and public health and safety and is otherwise in the public interest. The request must be submitted no later than 30 days before notification in accordance with subsection (d) of this section. The schedule for decommissioning in subsection (d) of this section may not begin until the agency has made a determination on the request.

(i) A decommissioning plan must be submitted if required by license condition or if the procedures and activities necessary to carry out decommissioning of the site or separate building or outdoor area have not been previously approved by the agency and these procedures could increase potential health and safety impacts to workers or to the public, such as in any of the following cases:

(1) procedures would involve techniques not applied routinely during cleanup or maintenance operations;

(2) workers would be entering areas not normally occupied where surface contamination and radiation levels are significantly higher than routinely encountered during operation;

(3) procedures could result in significantly greater airborne concentrations of radioactive materials than are present during operation; or

(4) procedures could result in significantly greater releases of radioactive material to the environment than those associated with operation.

(j) The agency may approve an alternate schedule for submittal of a decommissioning plan required in accordance with subsection (d) of this section if the agency determines that the alternative schedule is necessary to the effective conduct of decommissioning operations and presents no undue risk from radiation to the occupational and public health and safety and is otherwise in the public interest.

(k) The procedures listed in subsection (i) of this section may not be carried out prior to approval of the decommissioning plan.

(l) The proposed decommissioning plan for the site or separate building or outdoor area must include:

(1) a description of the conditions of the site, separate buildings, or outdoor area sufficient to evaluate the acceptability of the plan;

(2) a description of planned decommissioning activities;

(3) a description of methods used to ensure protection of workers and the environment against radiation hazards during decommissioning;

(4) a description of the planned final radiation survey;

(5) an updated detailed cost estimate for decommissioning, comparison of that estimate with present funds set aside for decommissioning, and a plan for assuring the availability of adequate decommissioning; and

(6) for decommissioning plans calling for completion of decommissioning later than 24 months after plan approval, a justification for the delay based on the criteria in subsection (p) of this section.

(m) The proposed decommissioning plan may be approved by the agency if the information in the plan demonstrates that the decommissioning will be completed as soon as practicable and that the occupational health and safety of workers and the public will be adequately protected.

(n) Except as provided subsection (p) of this section, licensees shall complete decommissioning of the site or separate building or outdoor area as soon as practicable but no later than 24 months following the initiation of decommissioning.

(o) Except as provided in subsection (p) of this section, when decommissioning involves the entire site, the licensee must request license termination as soon as practicable but no later than 24 months following the initiation of decommissioning.

(p) The agency may approve a request for an alternate schedule for completion of decommissioning of the site or separate buildings or outdoor areas and the license termination if appropriate, if the agency determines that the alternative is warranted by the consideration of the following:

(1) whether it is technically feasible to complete decommissioning within the allotted 24-month period;

(2) whether sufficient waste disposal capacity is available to allow completion of decommissioning within the allotted 24-month period; and

(3) other site-specific factors that the agency may consider appropriate on a case-by-case basis, such as the regulatory requirements of other government agencies, lawsuits, groundwater treatment activities, monitored natural groundwater restoration, actions that could result in more environmental harm than deferred cleanup, and other factors beyond the control of the licensee.

(q) As the final step in decommissioning, the licensee must:

(1) certify the disposition of all radioactive material, including accumulated by-product material;

(2) conduct a radiation survey of the premises where the licensed activities were carried out and submit a report of the results of this survey unless the licensee demonstrates that the premises are suitable for release in accordance with subsection (e) of this section. The licensee shall, as appropriate:

(A) report the following levels:

(i) gamma radiation in units of microrentgen per hour ( $\mu\text{R/hr}$ ) (millisieverts per hour ( $\text{mSv/hr}$ )) at 1 meter (m) from surfaces;

(ii) radioactivity, including alpha and beta, in units of disintegrations per minute (dpm) or microcuries ( $\mu\text{Ci}$ ) (megabecquerels (MBq)) per 100 square centimeters ( $\text{cm}^2$ ) for surfaces;

(iii)  $\mu\text{Ci}$  (MBq) per milliliter for water; and

(iv) picocuries (pCi) (becquerels (Bq)) per gram (g) for solids such as soils or concrete; and

(B) specify the manufacturer's name, and model and serial number of survey instrument(s) used and certify that each instrument is properly calibrated and tested.

(r) The executive director will provide written notification to specific licensees, including former licensees with license provisions continued in effect beyond the expiration date in accordance with subsection (d) of this section, that the provisions of the license are no longer binding. The executive director will provide such notification when the executive director determines that:



- (1) radioactive material has been properly disposed;
- (2) reasonable effort has been made to eliminate residual radioactive contamination, if present;
- (3) a radiation survey has been performed that demonstrates that the premises are suitable for release in accordance with agency requirements;
- (4) other information submitted by the licensee is sufficient to demonstrate that the premises are suitable for release in accordance with the requirements of subsection (e) of this section;
- (5) all records required by §336.343 of this title (relating to Records of Surveys) have been submitted to the agency;
- (6) the licensee has paid any outstanding fees required by this chapter and has resolved any outstanding notice(s) of violation issued to the licensee;
- (7) the licensee has met the applicable technical and other requirements for closure and reclamation of a by-product material disposal site; and
- (8) the United States Nuclear Regulatory Commission (NRC) has made a determination that all applicable standards and requirements have been met.

(s) Licenses for source material recovery or by-product material disposal are exempt from subsections (d)(3), (g), and (h) of this section with respect to reclamation of by-product material impoundments or disposal areas. Timely reclamation plans for by-product material disposal areas must be submitted and approved in accordance with §336.1129(p) - (aa) of this title (relating to Technical Requirements).

(t) A licensee may request that a subsite or a portion of a licensed site be released for unrestricted use before full license termination as long as release of the area of concern will not adversely impact the remaining unaffected areas and will not be recontaminated by ongoing authorized activities. When the licensee is confident that the area of concern will be acceptable to the agency for release for unrestricted use, a written request for release for unrestricted use and agency confirmation of closeout work performed shall be submitted to the agency. The request should include a comprehensive report, accompanied by survey and sample results that show contamination is less than the limits specified in subsection (e) of this section and an explanation of how ongoing authorized activities will not adversely affect the area proposed to be released. Upon confirmation by the agency that the area of concern is releasable for unrestricted use, the licensee may apply for a license amendment, if required.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1117. Renewal of Licenses.**

(a) Application for a renewal of specific licenses must be filed in accordance with §336.1107 of this title (relating to Filing Application for Specific Licenses) and §336.1111(1) of this title (relating to Special Requirements for a License Application for Source Material Recovery and By-Product Material

Disposal Facilities). Application for a renewal of a specific license must be filed by the date specified in the license. If the licensee fails to apply for a renewal and fails to pay the fee required by Subchapter B of this chapter, the license expires and the licensee must comply with the requirements of §336.1115 of this title (relating to Expiration and Termination of Licenses; Decommissioning of Sites, Separate Buildings, or Outdoor Areas). In any application for renewal, the applicant may incorporate drawings by clear and specific reference (for example, title, date and unique number of drawing), if no modifications have been made since previously submitted.

(b) In any case in which a licensee, prior to expiration of the existing license, has filed a request in proper form for a renewal or for a new license authorizing the same activities, such existing license will not expire until the application has been finally determined by the agency. In any case in which a licensee, not more than 30 days after the expiration of an existing license, has filed an application for renewal or for a new license authorizing the same activities and paid the fee required by Subchapter B of this chapter, the agency may reinstate the license and extend the expiration until the request has been finally determined by the agency.

(c) An application for renewal of a license may be approved if the agency determines that the requirements of §336.1109 of this title (relating to General Requirements for the Issuance of Specific Licenses) have been satisfied.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1119. Amendment of Licenses at Request of Licensee.**

Requests for amendment of a license shall be filed in accordance with §336.1107 of this title (relating to Filing Application for Specific Licenses) and §336.205 of this title (relating to Application Requirements). Such requests shall be signed by the radiation safety officer and specify how the licensee desires the license to be amended and the basis for such amendment.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1121. Agency Action on Applications to Renew or Amend.**

In considering a request by a licensee to renew or amend a license, the agency will apply the appropriate criteria in §336.1109 of this title (relating to General Requirements for the Issuance of Specific Licenses) and §336.1111 of this title (relating to Special Requirements for a License Application for Source Material Recovery and By-Product Material Disposal Facilities).

Adopted January 30, 2008

Effective February 28, 2008

**§336.1123. Transfer of Material.**

(a) A licensee may not transfer radioactive material except as authorized in accordance with this chapter.

(b) Except as otherwise provided in a license and subject to the provisions of subsections (c) and (d) of this section, any licensee may transfer radioactive material:

(1) to the agency after receiving prior approval from the agency;

(2) to the United States Department of Energy;

(3) to any person exempt from the licensing requirements of the Texas Radiation Control Act and these requirements or exempt from the licensing requirements of the United States Nuclear Regulatory Commission (NRC) or an agreement state, to the extent permitted by these exemptions;

(4) to any person authorized to receive such material in accordance with terms of a general license or its equivalent, a specific license or equivalent licensing document issued by the agency, NRC, any agreement state, any licensing state, or to any person otherwise authorized to receive such material by the federal government or any agency of the federal government, or the agency;

(5) to any person abroad pursuant to an export license issued under Title 10, Chapter 1, Code of Federal Regulations Part 110; or

(6) as otherwise authorized by the agency in writing.

(c) Before transferring radioactive material to a specific licensee of the agency, NRC, an agreement state, a licensing state, or to a general licensee who is required to register with the agency, the licensee transferring the radioactive material shall verify that the transferee's license authorizes the receipt of the type, form, and quantity of radioactive material to be transferred.

(d) The following methods for the verification of subsection (c) of this section are acceptable:

(1) the transferor may possess and have read a current copy of the transferee's specific license or registration certificate;

(2) the transferor may possess a written certification by the transferee that the transferee is authorized by the license or certificate of registration to receive the type, form, and quantity of radioactive material to be transferred, specifying the license or registration certificate number, issuing agency, and expiration date;

(3) for emergency shipments, the transferor may accept oral certification by the transferee that the transferee is authorized by license or registration certificate to receive the type, form, and quantity of radioactive material to be transferred, specifying the license or registration certificate number, issuing agency, and expiration date, provided that the oral certification is confirmed in writing within ten days; or

(4) when none of the methods of verification described in paragraphs (1) - (3) of this subsection are readily available or when a transferor desires to verify that information received by one of these methods is correct or up-to-date, the transferor may obtain and record confirmation from the agency, or the NRC, that the transferee is licensed to receive the radioactive material.

(e) Preparation for shipment and transport of radioactive material shall be in accordance with the provisions of §336.332 of this title (relating to Preparation of Radioactive Material for Transport).

Adopted January 30, 2008

Effective February 28, 2008

**§336.1125. Financial Security Requirements.**

(a) Financial security for decontamination, decommissioning, reclamation, restoration, disposal, and any other requirements of the agency shall be established by each licensee 60 days prior to the receipt or possession of radioactive substances to assure that sufficient funds will be available to carry out the decontamination and decommissioning of buildings and the site and for the reclamation of any by-product material disposal areas. The amount of funds to be ensured by such security arrangements shall be based on agency-approved cost estimates in an agency-approved closure plan for:

(1) decontamination and decommissioning of buildings and the site to levels that allow unrestricted use of these areas upon decommissioning; and

(2) the reclamation of by-product material disposal areas in accordance with technical criteria delineated in §336.1129 of this title (relating to Technical Requirements).

(b) The licensee shall submit this closure plan in conjunction with an environmental report that addresses the expected environmental impacts of the licensee's operation, decommissioning and reclamation, and evaluates alternatives for mitigating these impacts.

(c) The security shall also cover the payment of the charge for long-term surveillance and control for by-product material disposal areas required by §336.1127(c) of this title (relating to Long-Term Care and Maintenance Requirements).

(d) A licensee or applicant must establish financial assurance under the requirements of 25 TAC Chapter 289 (relating to Radiation Control).

Adopted January 30, 2008

Effective February 28, 2008

**§336.1127. Long-term Care and Maintenance Requirements.**

(a) Unless otherwise provided by the agency, each licensee licensed in accordance with this part for disposal of by-product material shall make payments into the Perpetual Care Account in amounts specified by the agency. The agency shall make such determinations on a case-by-case basis.

(b) The final disposition of by-product material should be such that the need for ongoing active maintenance is eliminated to the maximum extent practicable.

(c) A minimum charge of \$250,000 (1978 dollars) or more, if determined by the agency, must be paid into the Perpetual Care Account to cover the costs of long-term care and maintenance. The total charge must be paid prior to the termination of a license. With agency approval, the charge may be paid in installments. The total or unpaid portion of the charge must be covered during the term of the license by additional security meeting the requirements of §336.1125 of this title (relating to Financial Security

Requirements). If site surveillance, control, or maintenance requirements at a particular site are determined, on the basis of a site-specific evaluation, to be significantly greater (for example, if fencing or monitoring is determined to be necessary), the agency may specify a higher charge. The total charge must be such that, with an assumed 2.0% annual real interest rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of site care, surveillance, and where necessary, maintenance. Prior to actual payment, the total charge will be adjusted annually for inflation. The inflation rate to be used is that indicated by the change in the Consumer Price Index published by the United States Department of Labor, Bureau of Labor Statistics.

(d) The requirements of this section apply only to those sites whose ownership is subject to being transferred to the state or the federal government. The total amount of funds collected by the agency in accordance with this section must be transferred to the federal government if title and custody of the by-product material disposal site is transferred to the federal government upon termination of the license.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1129. Technical Requirements.**

(a) By-product material handling and disposal systems must be designed to accommodate full-capacity production over the lifetime of the facility. When later expansion of systems or operations may be likely, capability of the disposal system to be modified to accommodate increased quantities without degradation in long-term stability and other performance factors must be evaluated.

(b) In selecting among alternative by-product material disposal sites or judging the adequacy of existing sites, the following site features which would assure meeting the broad objective of isolating the tailings and associated contaminants without ongoing active maintenance must be considered:

(1) remoteness from populated areas;

(2) hydrogeologic and other environmental conditions conducive to continued immobilization and isolation of contaminants from usable groundwater sources; and

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

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

(d) In the selection of disposal sites, primary emphasis must be given to isolation of the by-product material, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits (e.g., minimization of transportation or land acquisition costs). While isolation of by-product material will also be a function of both site and engineering design, overriding consideration must be given to siting features.

(e) By-product material should be disposed of in a manner such that no active maintenance is required to preserve conditions of the site.

(f) The applicant's environmental report must evaluate alternative sites and disposal methods and shall consider disposal of by-product material by placement below grade. Where full below grade burial is not practicable, the size of retention structures, and size and steepness of slopes associated with 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 by-product material from natural erosional forces.

(g) To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, by-product 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.

(h) The following site and design requirements must be adhered to whether by-product material is disposed of above or below grade:

(1) the upstream rainfall catchment areas must be minimized to decrease erosion potential by flooding that could erode or wash out sections of the by-product material disposal area;

(2) the topographic features must provide good wind protection;

(3) the 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 objective should be to contour final slopes to grades that are as close as possible to those that would be provided if by-product material was disposed of below grade. Slopes must not be steeper than 5 horizontal to 1 vertical (5h:1v), except as specifically authorized by the agency. Where steeper slopes are proposed, reasons why a slope steeper than 5h:1v would be as equally resistant to erosion shall be provided, and compensating factors and conditions that make such slopes acceptable shall be identified;

(4) a full self-sustaining vegetative cover must be established or rock cover employed to reduce wind and water erosion to negligible levels;

(5) where a full vegetative cover is not likely to be self-sustaining due to climatic conditions, such as in semi-arid and arid regions, rock cover shall be employed on slopes of the impoundment system. The agency may consider relaxing this requirement for extremely gentle slopes, such as those that may exist on the top of the pile;

(6) 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 processes, and to preclude undercutting and piping:

(A) shape, size, composition, gradation of rock particles (excepting bedding material, average particles size must be at least cobble size or greater);

(B) rock cover thickness and zoning of particles by size; and

(C) steepness of underlying slopes.

(7) individual rock fragments must be dense, sound, and resistant to abrasion, and shall be free from cracks, seams, and other defects that would tend to unduly increase their destruction by erosion and weathering action. Local rock materials are permissible provided the characteristics under local climatic conditions indicate similar long-term performance as a protective layer. Weak, friable, or laminated aggregate may not be used;

(8) rock covering of slopes may not be required where top covers are very thick (on the order of 10 m or greater); impoundment slopes are very gentle (on the order of 10h:1v or less); bulk cover materials have inherently favorable erosion resistance characteristics; there is negligible drainage catchment area upstream of the pile; and there is good wind protection;

(9) 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 (riprap). 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 no ongoing or potential processes, such as gully erosion, which would lead to impoundment instability;

(10) the impoundment must 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; and

(11) the impoundment should be designed to incorporate features that will promote deposition. Design features that 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.

(i) The following groundwater protection requirements and those in subsections (j) and (k) of this section and §336.1133 of this title (relating to Maximum Values for Use in Groundwater Protection) apply during operations and until closure is completed. Groundwater monitoring to comply with these standards is required by subsections (bb) and (cc) of this section.

(1) The primary groundwater protection standard is a design standard for surface impoundments used to manage uranium or thorium by-product material. Unless exempted under subsection (i)(3) of this section, 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. If the liner is constructed of materials that may allow wastes to migrate into the liner during the active life of the facility, impoundment closure shall include removal or decontamination of all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate. For

impoundments that will be closed with the liner material left in place, the liner must be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility.

(2) The liner required by paragraph (1) of this subsection 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.

(3) The applicant or licensee may be exempted from the requirements of paragraph (1) of this subsection if the agency 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 agency 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 that would influence the quality and mobility of the leachate produced and the potential for it to migrate to groundwater or surface water.

(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-off; from malfunctions of level controllers, alarms, and other equipment; and from human error.

(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.

(j) By-product materials must be managed to conform to the following secondary groundwater protection requirements.



(1) Hazardous constituents, as defined in §336.1105(16) of this title (relating to Definitions), 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.

(2) Specified concentration limits are those limits established by the agency as indicated in paragraph (7) of this subsection.

(3) The agency will also establish the point of compliance and compliance period on a site-specific basis through license conditions and orders.

(4) When the detection monitoring established under subsections (bb) and (cc) of this section indicates leakage of hazardous constituents from the disposal area, the agency will perform the following:

(A) identify hazardous constituents;

(B) establish concentration limits;

(C) set the compliance period; and

(D) may adjust the point of compliance if needed in accordance with developed data and site information regarding the flow of groundwater or contaminants.

(5) Even when constituents meet all three tests in the definition of hazardous constituent, the agency 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 agency will consider the following:

(A) potential adverse effects on groundwater quality, considering the following:

(i) physical and chemical characteristics of the waste in the licensed site, including its potential for migration;

(ii) hydrogeological characteristics of the licensed site and surrounding land;

(iii) quantity of groundwater and the direction of groundwater flow;

(iv) proximity of groundwater users and groundwater withdrawal rates;

(v) current and future uses of groundwater in the area;

(vi) existing quality of groundwater, including other sources of contamination and cumulative impact on the groundwater quality;

(vii) potential for human health risks caused by human exposure to waste constituents;

(viii) potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and

(ix) persistence and permanence of potential adverse effects; and

(B) potential adverse effects on quality of hydraulically-connected surface water, considering the:

(i) volume and physical and chemical characteristics of the by-product material in the licensed site;

(ii) hydrogeological characteristics of the licensed site and surrounding land;

(iii) quantity and quality of groundwater and the direction of groundwater flow;

(iv) patterns of rainfall in the region;

(v) proximity of the licensed site to surface waters;

(vi) current and future uses of surface waters in the area and any water quality standards established for those surface waters;

(vii) existing quality of surface water, including potential impacts from other sources of contamination and the cumulative impact on surface water quality;

(viii) potential for human health risks caused by human exposure to waste constituents;

(ix) potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and

(x) persistence and permanence of the potential adverse effects.

(6) In making any determinations under paragraphs (5) and (8) of this subsection about the use of groundwater in the area around the facility, the agency will consider any identification of underground sources of drinking water and exempted aquifers made by the United States Environmental Protection Agency (EPA) and the commission under Chapter 331 of this title.

(7) At the point of compliance, the concentration of a hazardous constituent may not exceed the following:

(A) the agency approved background concentration in the groundwater of the constituents listed in 10 Code of Federal Regulations (CFR) 40, Appendix A, Criterion 13;

(B) the respective value given in §336.1133 of this title 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 agency.

(8) Alternate concentration limits to background concentration or to the drinking water limits in §336.1133 of this title that present no significant hazard may be proposed by licensees for agency consideration. Licensees must provide the basis for any proposed limits including consideration of practicable corrective actions, evidence that limits are as low as reasonably achievable, and information on the factors the agency shall consider. The agency may establish a site-specific alternate concentration limit for a hazardous constituent, as provided in paragraph (7) of this subsection, 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 agency will consider the factors listed in paragraph (4) of this subsection.

(k) If the groundwater protection standards established under subsection (i) of this section 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 18 months after the agency finds that the standards have been exceeded. The licensee must submit the proposed corrective action program and supporting rationale for executive director approval prior to putting the program into operation, unless otherwise directed by the executive director. The licensee's proposed program must address removing or treating in place any hazardous constituents that exceed concentration limits in groundwater between the point of compliance and downgradient licensed site boundary. The licensee must continue corrective action measures to the extent necessary to achieve and maintain compliance with the groundwater protection standard. The executive director will determine when the licensee may terminate corrective action measures based on data from the groundwater monitoring program and other information that provides reasonable assurance that the groundwater protection standard will not be exceeded.

(l) In developing and conducting groundwater protection programs, applicants and licensees must 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 detection of any major failures. This is in addition to the groundwater monitoring program conducted as provided in subsection (cc) of this section. 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 by-product material solutions. Tests must be run for a sufficient period of time to reveal any effects that may occur;

(2) mill process designs that provide the maximum practicable recycle of solutions and conservation of water to reduce the net input of liquid to the by-product material impoundment;

(3) dewatering of by-product material solutions by process devices and/or in situ drainage systems. At new sites, by-product material solutions 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 by-product material solutions 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; and

(4) neutralization to promote immobilization of hazardous constituents.

(m) Technical specifications must be prepared for 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 that specifications are met. If adverse groundwater impacts or conditions conducive to adverse groundwater impacts occur due to seepage, action must be taken to alleviate the impacts or conditions and restore groundwater quality to levels consistent with those before operations began. The specific seepage control and groundwater protection method, or combination of methods, to be used must be worked out on a site-specific basis.

(n) In support of a by-product material disposal system proposal, the applicant/licensee must supply the following information:

(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 must include 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 by 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 must 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 make possible estimates of chemisorption attenuation properties of underlying soil and rock; and

(3) location, extent, quality, capacity, and current uses of any groundwater at and near the site.

(o) If ore is stockpiled, methods must be used to minimize penetration of radionuclides and other substances into underlying soils.

(p) In disposing of by-product material, licensees must place an earthen cover over the by-product material at the end of the facility's operations and shall close the waste disposal area in accordance with a design that provides reasonable assurance of control of radiological hazards to the following:

(1) be effective for 1,000 years to the extent reasonably achievable and, in any case, for at least 200 years; and

(2) limit releases of radon-222 from uranium by-product materials and radon-220 from thorium by-product materials to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second ( $\text{pCi}/\text{m}^2\text{s}$ ) to the extent practicable throughout the effective design life determined in accordance with paragraph (1) of this subsection. This average applies to the entire surface of each disposal area over a period of at least one year, but a short period compared to 100 years. Radon will come from both by-product materials and cover materials. Radon emissions from cover materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to emissions from by-product materials to the atmosphere.

(q) In computing required by-product material 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 by-product material 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. Cover may not include materials that contain 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. If non-soil materials are proposed as cover materials, the licensee must demonstrate that such materials will not crack or degrade by differential settlement, weathering, or other mechanisms over the long term.

(r) As soon as reasonably achievable after emplacement of the final cover to limit releases of radon-222 from uranium by-product material and prior to placement of erosion protection barriers of other features necessary for long-term control of the tailings, the licensee must 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  $20\text{pCi}/\text{m}^2\text{s}$  averaged over the entire pile or impoundment using the procedures described in Appendix B, method 115 of 40 CFR Part 61, or another method of verification approved by the agency as being at least as effective in demonstrating the effectiveness of the final radon barrier.

(s) When phased emplacement of the final radon barrier is included in the applicable reclamation plan, as defined in §336.1105(25) of this title, the verification of radon-222 release rates required in subsection (dd) of this section must be conducted for each portion of the pile or impoundment as the final radon barrier for that portion is emplaced.

(t) Within 90 days of the completion of all testing and analysis relevant to the required verification in subsection (dd)(3) and (dd)(4) of this section, the uranium recovery licensee must report to the agency the results detailing the actions taken to verify that levels of release of radon-222 do not exceed  $20\text{pCi}/\text{m}^2\text{s}$  when averaged over the entire pile or impoundment. The licensee must maintain records 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 must be maintained until termination of the license and shall be kept in a form suitable for transfer to the custodial agency at the time of transfer of the site to the state or federal government in accordance with §336.1131 of this title (relating to Land Ownership of By-Product Material Disposal Sites).

(u) Near-surface cover materials may not include waste, rock, or other materials that contain elevated levels of radium. Soils used for near-surface cover must be essentially the same, as far as radioactivity is concerned, as surrounding surface soils. This is to ensure that surface radon exhalation is not significantly above background because of the cover material itself.

(v) The design requirements for longevity and control of radon releases apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land averaged over areas of 100 square meters ( $m^2$ ), that, as a result of by-product material, does not exceed the background level by more than:

(1) 5 picocuries per gram (pCi/g) of radium-226, or in the case of thorium by-product material, radium-228, averaged over the first 15 centimeters (cm) below the surface; and

(2) 15 pCi/g of radium-226, or in the case of thorium by-product material, radium-228, averaged over 15-cm thick layers more than 15 cm below surface.

(w) The licensee must also address the nonradiological hazards associated with the waste in planning and implementing closure. The licensee must 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 groundwater or surface waters or to the atmosphere.

(x) For impoundments containing uranium by-product materials, the final radon barrier shall be completed as expeditiously as practicable considering technological feasibility after the pile or impoundment ceases operation in accordance with a written reclamation plan, as defined in §336.1105(25) of this title, approved by the agency, by license amendment. (The term "As expeditiously as practicable considering technological feasibility" includes "Factors beyond the control of the licensee.") Deadlines for completion of the final radon barrier and applicable interim milestones shall be established as license conditions. Applicable interim milestones may include, but are not limited to, the retrieval of windblown by-product material and placement on the pile and the interim stabilization of the by-product material (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 by-product material shall also be completed in a timely manner in accordance with a written reclamation plan approved by the agency by license amendment.

(y) The agency may approve by license amendment 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 agency finds that the licensee has adequately demonstrated in the manner required in subsection (r) of this section that releases of radon-222 do not exceed an average of 20 pCi/ $m^2$ s. If the delay is approved on the basis that the radon releases do not exceed 20 pCi/ $m^2$ s, a verification of radon levels, as required by subsection (r) of this section, shall be made annually during the period of delay. In addition, once the agency has established the date in the reclamation plan for the milestone for completion of the final radon barrier, the agency may by license amendment extend that date based on cost if, after providing an opportunity for public participation, the agency 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.

(z) The agency may authorize by license amendment, upon licensee request, a portion of the impoundment to accept uranium by-product 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 20 pCi/m<sup>2</sup>s averaged over the entire impoundment. The verification required in subsection (r) of this section may be completed with a portion of the impoundment being used for further disposal if the agency makes a final finding that the impoundment will continue to achieve a level of radon-222 release not exceeding 20 pCi/m<sup>2</sup>s averaged over the entire impoundment. After the final radon barrier is complete except for the continuing disposal area, only by-product material will be authorized for disposal, and the disposal will be limited to the specified existing disposal area. This authorization by license amendment 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 subsection (p) of this section. These actions are not required to be complete as part of meeting the deadline for final radon barrier construction.

(aa) The licensee's closure plan must provide reasonable assurance that institutional control will be provided for the length of time found necessary by the agency to ensure the requirements of subsection (p) of this section are met.

(bb) Prior to any major site construction, a preoperational monitoring program must be conducted for one full year to provide complete baseline data on the site and its environs. Throughout the construction and operating phases of the project, an operational monitoring program must be conducted to measure or evaluate compliance with applicable standards and rules; to evaluate performance of control systems and procedures; to evaluate environmental impacts of operation; and to detect potential long-term effects.

(cc) The licensee shall establish a detection monitoring program needed for the agency to set the site-specific groundwater protection standards in subsection (j)(4) of this section. For all monitoring under this paragraph, the licensee or applicant will propose, as license conditions for agency approval, which constituents are to be monitored on a site-specific basis. The data and information must provide a sufficient basis to identify those hazardous constituents that require concentration limit standards and to enable the agency to set the limits for those constituents and compliance period. They may provide the basis for adjustments to the point of compliance. The detection monitoring program must be in place when specified by the agency in orders or license conditions. Once groundwater protection standards have been established in accordance with subsection (j)(4) of this section, the licensee shall establish and implement a compliance monitoring program. In conjunction with a corrective action program, the licensee shall establish and implement a corrective action monitoring program to demonstrate the effectiveness of the corrective actions. Any monitoring program required by this subsection may be based on existing monitoring programs to the extent the existing programs can meet the stated objective for the program.

(dd) Systems must be designed and operated so that all airborne effluent releases are 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.

(1) During operations and prior to closure, radiation doses from radon emissions from surface impoundments of by-product materials must be kept as low as is reasonably achievable.

(2) Checks must be made and logged hourly of all parameters which determine the efficiency of emission control equipment operation. 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 uranium dryer 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 such cessations, corrective actions, and re-starts must be reported to the executive director in writing within ten days of the subsequent restart.

(3) To control dusting from by-product material, 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 by-product materials are effectively sheltered from wind, as in the case of below-grade disposal. Consideration must be given in planning by-product material disposal programs to methods for phased covering and reclamation of by-product material impoundments. To control dusting from diffuse sources, applicants/licensees must develop written operating procedures specifying the methods of control that will be utilized.

(4) Uranium recovery facility operations producing or involving thorium by-product material must be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems (mrem) to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials to the general environment, radon-220 and its daughters excepted.

(5) By-product materials must be managed so as to conform to the applicable provisions of 40 CFR Part 440, as codified on January 1, 1983.

(ee) Licensees/applicants may propose alternatives to the specific requirements in §336.1125 of this title (relating to Financial Security Requirements), §336.1127 of this title (relating to Long-Term Care and Maintenance Requirements), §336.1129 of this title (relating to Technical Requirements) and §336.1131 of this title (relating to Land Ownership of By-Product Material Disposal Sites). The alternative proposals may take into account local or regional conditions including geology, topography, hydrology, and meteorology.



(ff) The agency may find that the proposed alternatives meet the agency's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned and a level of protection for the public health and 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 that would be achieved by the requirements of §§336.1125, 336.1127, 336.1129 and 336.1131 of this title and the standards promulgated by EPA in 40 CFR Part 192, Subparts D and E.

(gg) All site-specific licensing decisions based on the criteria in §§336.1125, 336.1127, 336.1129 and 336.1131 of this title, or alternatives proposed by licensees or applicants must 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 agency determines to be appropriate.

(hh) Any proposed alternatives to the specific requirements in §§336.1125, 336.1127, 336.1129 and 336.1131 of this title must meet the requirements of 10 CFR §150.31(d).

(ii) No new site may be located in a 100-year floodplain or wetland as defined in "Floodplain Management Guidelines for Implementing Executive Order 11988."

Adopted January 30, 2008

Effective February 28, 2008

**§336.1131. Land Ownership of By-product Material Disposal Sites.**

(a) These criteria relating to ownership of by-product material and their disposal sites apply to all licenses terminated, issued, or renewed after November 8, 1981.

(b) Unless exempted by the United States Nuclear Regulatory Commission (NRC), title to land (including any affected interests therein) that is used for the disposal of by-product material or that is essential to ensure the long-term stability of the disposal site and title to the by-product material must be transferred to the State of Texas or the United States prior to the termination of the license. Material and land transferred must be transferred without cost to the State of Texas or the United States. In cases where no ongoing site surveillance will be required, surface land ownership transfer requirements may be waived. For licenses issued before November 8, 1981, NRC may take into account the status of the ownership of the land and interests therein, and the ability of a licensee to transfer title and custody thereof to the State.

(c) Any uranium recovery facility license must contain terms and conditions as the agency determines necessary to assure that, prior to termination of the license, the licensee will comply with ownership requirements of this section for sites used for tailings disposal.

(d) For surface impoundments only, the applicant/licensee shall demonstrate a serious effort to obtain severed mineral rights and shall, in the event that fee simple title including all mineral rights cannot be obtained, provide notification in local public land records of the fact that the land is being used for the disposal of radioactive material and is subject to an NRC license prohibiting the disruption and disturbance of the tailings.

(e) If NRC, subsequent to title transfer, determines that use of the surface or subsurface estates, or both, of the land transferred to the state or federal government will not endanger the public health and

safety or the environment, NRC may permit the use of the surface or subsurface estates, or both, of such land in a manner consistent with the provisions of this section. If NRC permits the use of such land, it will provide the person who transferred the land with the first refusal with respect to the use of such land.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1133. Maximum Values for Use in Groundwater Protection.**

The following is a list of the maximum concentration values to be used for groundwater protection.

Constituent or Property	Maximum (mg/l)	Concentration (pCi/l)
Arsenic	0.05	
Barium	1	
Cadmium	0.01	
Chromium	0.05	
Lead	0.05	
Mercury	0.002	
Selenium	0.01	
Silver	0.05	
Endrin 1,2,3,4,10,10-hexachloro-6, 7- expoxy-1,4,4a,5,6,7,8, 8a-octahydro-endo, endo-1,4:5,8-dimethanonaphthalene	0.0002	
Lindane 1,2,3,4,5, 6-hexachlorocyclohexane	0.004	
Methoxychlor 1,1,1-trichloro-2,2-bis- (p-methoxyphenyl) ethane	0.1	
Toxaphene Chlorinated camphene	0.005	
2,4-D (2,4, 5-Trichlorophenoxy) acetic acid	0.1	
Silvex 2-(2,4,5-Trichlorophenoxy) propionic acid	0.01	
Combined radium-226 and radium-228		5
Gross alpha-particle activity (excluding radon and uranium when producing uranium by-product material or radon and thorium when producing thorium by-product material)		15

Adopted January 30, 2008

Effective February 28, 2008

**§336.1135. Construction Activities.**

For an application for a new license to dispose of by-product material that was filed with the Texas Department of State Health Services on or before January 1, 2007, an applicant may commence construction activities before issuance of a license, at the applicant's own risk, under the following conditions:

(1) the applicant has completed preoperational monitoring provided under §336.1129(bb) of this title (relating to Technical Requirements);

(2) the executive director has issued an environmental analysis and final draft license with recommendation to approve the application under §281.21 of this title (relating to Draft Permit, Technical Summary, Fact Sheet, and Compliance History);

(3) the applicant may not receive, store, possess, receive or dispose of by-product material without a license from the commission authorizing the activity;

(4) the agency may inspect and observe the construction activities;

(5) the applicant must cease construction activities when directed by the executive director to do so; and

(6) the commencement of construction activities may not be considered as a factor in determining whether to issue a license.

Adopted January 30, 2008

Effective February 28, 2008

**SUBCHAPTER M: LICENSING OF RADIOACTIVE SUBSTANCES  
PROCESSING AND STORAGE FACILITIES**

**§§336.1201, 336.1203, 336.1205, 336.1207, 336.1209, 336.1211, 336.1213, 336.1215, 336.1217,  
336.1219, 336.1221, 336.1223, 336.1225, 336.1227, 336.1229, 336.1231, 336.1233, 336.1235  
Effective February 28, 2008**

**§336.1201. Purpose and Scope.**

(a) This section establishes the requirements for management of commercial radioactive substances processing and storage facilities, the procedures and criteria for the issuance of licenses to receive, possess, transport, store, and process radioactive substances from other persons, and the terms and conditions upon which the agency may issue such licenses.

(b) In addition to the requirements of this subchapter, all licensees, unless otherwise specified, are subject to the requirements of Subchapters A - E and G of this chapter (relating to General Provisions; Radioactive Substance Fees; General Disposal Requirements; Standards for Protection Against Radiation; Notices, Instructions, and Reports to Workers and Inspections; and Decommissioning Standards).

Adopted January 30, 2008

Effective February 28, 2008

**§336.1203. Definitions.**

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise.

(1) **Commencement of major construction**--Any major structural erection or major alterations to existing structures, or other substantial action that would change the facility design or site for the purpose of establishing a radioactive substances processing or storage facility. The term does not mean the acquisition of existing structures or minor changes thereto.

(2) **Decommissioning**--The final activities carried out at a radioactive substances processing or storage site after completion of processing operations to remove safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and/or termination of the license. Such activities must include:

(A) disposing of all radioactive substances at a licensed radioactive waste disposal site;

(B) dismantling or decontaminating site structures;

(C) decontaminating site surfaces and remaining equipment; and

(D) conducting final closure surveys, decontamination, and reclamation of the site.

(3) **Disposal**--Isolation or removal of radioactive substances from mankind and his environment. The term does not include emissions and discharges under rules of the agency.

(4) **Engineered barriers**--Man-made devices to contain or limit the potential movement of radioactive material, which might result from spills or other accidents.

(5) **Floodplain**--The lowland and relatively flat areas adjoining inland and coastal waters, including flood prone areas of off-shore islands.

(6) **Local government**--A county, an incorporated city or town, a special district, or other political subdivision of the state.

(7) **Major aquifer**--An aquifer that yields large quantities of water in a comparatively large area of the state. Major aquifers are located in the following formations: Ogallala, Alluvium and Bolson Deposits, Edwards-Trinity (Plateau), Edwards (Balcones Fault Zone - San Antonio Region), Edwards (Balcones Fault Zone - Austin Region), Trinity Group, Carrizo-Wilcox, and Gulf Coast.

(8) **Natural barriers**--The natural characteristics of a site or surface and subsurface composition that serves to impede the movement of radioactive material. Natural barriers may include, for example, the location of a facility remote from an aquifer, or the sorptive capability of the soil surrounding a facility.

(9) **Processing**--The storage, extraction of materials, transfer, volume reduction, compaction, incineration, solidification, or other separation and preparation of radioactive substances from other persons for reuse or disposal, including any treatment or activity that renders the waste less hazardous, safer for transport, or amenable to recovery, storage, or disposal.

(10) **Radioactive substances processing facility**--A facility where radioactive substances received from other persons are processed and/or repackaged according to United States Department of Transportation (DOT) regulations.

(11) **Radioactive substances storage facility**--A facility where radioactive substances received from other persons are stored while awaiting shipment to a licensed radioactive substances processing or disposal facility.

(12) **Reconnaissance level information**--Any information or analysis that can be retrieved or generated without the performance of new comprehensive site-specific investigations. Reconnaissance level information includes, but is not limited to, relevant published scientific literature; drilling records required by state agencies, such as the Railroad Commission of Texas, the Texas Commission on Environmental Quality, and the Texas Natural Resources Information System; and reports of governmental agencies.

(13) **Site**--The real property, including the buffer zone, on which a radioactive substances processing or storage facility may be located.

(14) **Site monitoring**--The procedures for the monitoring of the site and environment to assess quality of site operations and performance and to detect and quantify levels and types of

radioactivity and chemicals in the environment. It includes preoperational, operational, and license termination phases.

(15) **Site operations**--The routine day-to-day activities carried out at the site for the receipt, processing, and storage of radioactive substances.

(16) **Site suitability**--The capability of the various characteristics of a processing or storage facility or site to safely contain the radioactive substances expected to be present at the site.

(17) **Sole source aquifer**--The aquifer that is the sole or principal source of drinking water for an area designated under the Safe Drinking Water Act of 1974, 42 United States Code Annotated 300f, *et seq.*

(18) **Waste processing and storage categories**--Radionuclides classified as follows:

(A) any one of seven groups into which radionuclides in normal form are classified, according to their toxicity and their relative potential hazard in transport, as specified in §336.1231 of this title (relating to Radioactive Substances Processing and Storage Categories of Radionuclides); and

(B) any radionuclide not specifically listed in one of the categories in §336.1231 of this title shall be assigned to one of the categories in accordance with §336.1231(b) of this title.

(19) **Wetlands**--Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include playa lakes, swamps, marshes, bogs, and similar areas.

Adopted January 30, 2008

Effective February 28, 2008

#### **§336.1205. Activities Requiring License.**

Except for persons exempted by this subchapter, no person may receive, possess, store or process radioactive substances from another person except as authorized in a specific license issued in accordance with this subchapter.

Adopted January 30, 2008

Effective February 28, 2008

#### **§336.1207. Radioactive Substances Processing and Storage Facility Classification.**

(a) Radioactive substances processing and storage facilities are classified according to the radionuclides, other than sealed sources, received, possessed, or processed in each of the waste processing and storage categories, as defined in §336.1203 of this title (relating to Definitions) with all applicable provisions, except that, for the purposes of this section which apply to processing and storage of radioactive substances, Category IV must include waste processing and storage categories IV-VII. The total possession limit of each category of unsealed (dispersible) radionuclides for each class of facility is as follows:

	Category I	Category II	Category III	Category IV
Class I Storage or Processing Facility	10 mCi	100 mCi	1 Ci	10 Ci
Class II Storage Facility	2 Ci	20 Ci	200 Ci	2000 Ci
Class II Processing Facility	1 Ci	10 Ci	100 Ci	1000 Ci

(b) Class III storage facilities are those in which the applicable possession limit of radioactive substances exceeds any limit of Class II storage facilities.

(c) Class III processing facilities are those in which the applicable possession limit of radioactive substances exceeds any limit of Class II processing facilities.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1209. Exemptions.**

(a) Sealed sources. Persons who receive, possess, or process sealed sources of radioactive material as radioactive waste from other persons are exempt from this section, provided that:

(1) encapsulated sources are tested upon receipt and determined to have less than 0.005 microcurie of removable contamination; and

(2) sealed sources of radioactive material remain in sealed form after receipt.

(b) Unsealed sources.

(1) Persons who receive, possess, or process sources of radioactive material in unsealed form as radioactive waste from other persons are exempt from this section provided that:

(A) the total radioactivity of all radioactive waste possessed at any one time does not exceed the applicable limits for Class I processing or storage facilities as described in §336.1207 of this title (relating to Radioactive Substances Processing and Storage Facility Classification); and

(B) the total volume of radioactive waste processed in any one year does not exceed 50 cubic feet.

(2) Persons who receive, possess, and store radioactive material in unsealed form as radioactive substances from other persons are exempt from this section provided that:

(A) the radioactive substance consists only of radiopharmaceutical residues resulting from radiopharmaceuticals manufactured, compounded, and supplied by those persons receiving the radiopharmaceutical residues as radioactive waste;

(B) the radioactive substance is held in storage for decay to background radiation levels; and

(C) the radioactive substances is not shipped to a radioactive waste processing or disposal facility.

(c) Radioactive material. A person who receives, possesses, and stores radioactive material as waste from sites owned and controlled by that same person is not considered to have received waste from other persons.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1211. Filing Application for a Specific License.**

Unless otherwise specified, an applicant for a license to receive, possess, or process radioactive substances from other persons is subject to the requirements in §336.205 of this title (relating to Application Requirements). The applicant shall also comply with the following additional filing requirements.

(1) The applicant for a license to receive, possess, or process radioactive substances from other persons shall submit seven copies of each license application or application for amendment and any supporting documents in a manner specified by the agency. Applications for issuance of licenses must include all general and specific technical requirements, financial information, and environmental requirements, if applicable, described in this section.

(2) Each application must clearly demonstrate how the requirements of this section and §§336.1213, 336.1215, and 336.1217 of this title (relating to Additional Environmental Requirements for Class III Facilities, Issuance of Licenses, Commencement of Major Construction, respectively) have been addressed.

(3) Applications for licenses will be processed in accordance with the requirements of Chapter 281 of this title (relating to Applications Processing).

(4) An applicant for a license under this section must include the following additional information in the application:

(A) identity of the applicant including the full name, address, telephone number, and description of the business(es) or occupation(s) of the applicant;

(B) the organizational structure of the applicant, both off-site and on-site, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;

(C) a description of past operations that the applicant has been involved in including any license limitations, suspensions or revocations of such licenses, and any other information that will allow the agency to assess the applicant's past operating history;



(D) the technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities; and minimum training and experience requirements for personnel;

(E) a description of the personnel training and retraining program;

(F) a statement of need and a description of the proposed activities identifying:

(i) the location of the proposed site;

(ii) the character of the proposed activities;

(iii) the types, chemical and/or physical forms and quantities of radioactive substances to be received, possessed, and processed; and

(iv) the plans for use of the facility for purposes other than processing of radioactive substances;

(G) proposed time schedules for construction and receipt and processing of radioactive waste at the proposed facility;

(H) description of the site and accurate drawings of the facility including, but not limited to:

(i) construction;

(ii) foundation details;

(iii) ventilation;

(iv) plumbing and fire suppression systems;

(v) physical security system;

(vi) storage areas;

(vii) radioactive substances handling or processing areas;

(viii) proximity to creeks or culverts; and

(ix) soil types under the facility with respect to compatibility with foundation and structural design;

(I) a description that demonstrates that the site suitability characteristics will meet the following requirements:

(i) the overall hydrogeologic environment of the site, in combination with engineering design, must act to minimize and control potential migration of radioactive substances into surface water and groundwaters;

(ii) no new site may be located in a 100-year floodplain, as designated by the Commission, or a wetland; and

(iii) no new site may be located in the recharge area of a sole source aquifer or a major aquifer unless it can be demonstrated with reasonable assurance that the new site will be designed, constructed, operated, and closed without an unreasonable risk to the aquifer.

(J) minimum criteria for facility design and operation to include:

(i) the building used for processing radioactive wastes must have a minimum classification of Type II (111) in accordance with National Fire Protection Association 220 titled, "Standard Types of Building Construction;"

(I) buildings used for processing or storage of radioactive substances shall have ventilation and fire protection systems to minimize the release of radioactive materials into the soils, waters, and the atmosphere; and

(II) facilities and equipment for repackaging leaking and/or damaged containers must be provided.

(ii) the design and operation of the radioactive substances processing or storage facility must be such that:

(I) releases of non-radiological noxious materials from the facility are minimized; and

(II) radiation levels, concentrations, and potential exposures off-site due to airborne releases during operations are within the limits established in Subchapter D of this chapter and are maintained as low as reasonably achievable.

(iii) the design and operation of the radioactive substances processing or storage facility must be compatible with the objectives of the site closure and decommissioning plan;

(iv) the facility must be designed to confine spills. Independent and diverse engineered barriers must be provided, as necessary, to complement natural barriers in minimizing potential releases from the facility and in complying with this section;

(v) the location and construction of any new radioactive substances processing facility must have a buffer zone adequate to permit emergency measures to be implemented following accidents and to address airborne plume dispersions and, as a minimum, shall be such that:

(I) the active components of a Class II facility are located at least 30 meters from the nearest residence as of the date of the license application; and

(II) the active components of a Class III facility are located at least 30 meters from the nearest property not owned or occupied by the licensee.

(K) a flow diagram of radioactive substances processing operations;

(L) a description and accurate drawings of processing equipment and any required special handling techniques to be employed;

(M) a description of personnel monitoring methods, training, and procedures to be followed to keep employees from ingesting and inhaling radioactive materials, including a description of methods to keep the radiation exposure to levels as low as reasonably achievable;

(N) a description of the site monitoring program to include prelicense data and proposed operational monitoring programs for direct gamma radiation measurements and radioactive and chemical characteristics of the soils, groundwater, surface waters, and vegetation, as applicable;

(i) for radioactive substances storage facilities, the applicant shall address on-site air quality; and

(ii) for radioactive substances processing facilities, the applicant shall address on-site and off-site air quality;

(O) spill detection and cleanup plans for the licensed site and for associated transportation of radioactive material;

(P) an operating, safety, and emergency procedures manual that must provide detailed procedures for receiving, handling, storing, processing, and shipping radioactive substances;

(Q) for radioactive substances processing facilities, a description of the equipment to be installed to maintain control over maximum concentrations of radioactive materials in gaseous and liquid effluents produced during normal operations and the means to be employed for keeping levels of radioactive material in effluents to unrestricted areas as low as reasonably achievable and within the limits listed in Subchapter D of this chapter;

(R) methods of ultimate disposal and decommissioning; and

(S) the system for maintaining inventory of receipt, storage, and transfer of radioactive substances.

(T) an adequate operating, radiation safety, and emergency procedures manual;  
and

(U) a signed certification from the owner or owners of the real property on which radioactive substances are stored or processed acknowledging that:

(i) radioactive substances are stored or processed on the property with the consent of the property owner or owners; and

(ii) decommissioning of the site may be required even if the applicant or licensee is unable or fails to decommission the site as required by a license, rule or order of the commission.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1213. Additional Environmental Requirements .**

An application for a license for a processing or storage facility must include environmental information that may be based on reconnaissance level information when appropriate and addresses the following:

(1) description of present land uses and population distribution in the vicinity of the site:

(A) for radioactive substances storage facilities, the description must address properties adjacent to the site; and

(B) for radioactive substances processing facilities, the description must address properties adjacent to the site and shall include population distribution within a one-mile radius of the site;

(2) area/site suitability including geology, hydrology, and natural hazards. For radioactive substances processing facilities, area meteorology also must be addressed;

(3) site and project alternatives including alternative siting analysis;

(4) socioeconomic effects on surrounding communities of operation of the licensed activity and of associated transportation of radioactive material; and

(5) environmental effects of postulated accidents.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1215. Issuance of Licenses.**

(a) A license for a radioactive substances processing or storage facility may be issued if the agency finds reasonable assurance that:

(1) an application meets the requirements of the Texas Radiation Control Act and the rules of the agency;

(2) the proposed radioactive substances facility will be sited, designed, operated, decommissioned, and closed in accordance with this chapter;

(3) the issuance of the license will not be inimical to the health and safety of the public or the environment; and

(4) there is no reason to deny the license because of:

(A) any material false statement in the application or any statement of fact required under provisions of the Texas Radiation Control Act;

(B) conditions revealed by the application or statement of fact or any report, record, or inspection, or other means that would warrant the agency to refuse to grant a license on an application; or

(C) failure to clearly demonstrate how the requirements in this chapter have been addressed; and

(5) qualifications of the designated radiation safety officer (RSO) are adequate for the purpose requested in the application and include as a minimum:

(A) have earned at least a bachelor's degree in a physical or biological science, industrial hygiene, health physics, radiation protection, or engineering from an accredited college or university, or an equivalent combination of training and relevant experience, with two years of relevant experience equivalent to a year of academic study, from a uranium or mineral extraction/recovery, radioactive waste processing, or a radioactive waste or by-product material disposal facility;

(B) have at least one year of relevant experience, in addition to that used to meet the educational requirement, working under the direct supervision of the radiation safety officer at a uranium or mineral extraction/recovery, radioactive waste processing, or radioactive waste or by-product material disposal facility; and

(C) have at least four weeks of specialized training in health physics or radiation safety applicable to uranium or mineral extraction/recovery, radioactive waste processing, or radioactive waste or by-product material disposal operations from a course provider that has been evaluated and approved by the agency.

(b) The agency may request, and the licensee must provide, additional information after the license has been issued to enable the agency to determine whether the license should be modified, suspended, or revoked.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1217. Commencement of Major Construction.**

Commencement of major construction is prohibited until a license has been issued by the commission.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1219. Commencement of Operations.**

No licensee issued a license under this section may commence operations until the licensee has obtained licenses or permits from other agencies as required by law.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1221. Specific Terms and Conditions of Licenses.**

(a) Unless otherwise specified, each license issued in accordance with this subchapter is subject to the requirements in §305.125 of this title (relating to Standard Permit Conditions). A license issued under this subchapter must include license conditions derived from the evaluations of the application and analyses performed by the agency, including amendments and changes made before a license is issued. License conditions may include, but are not limited to, the following:

- (1) restrictions as to the total radioactive inventory of radioactive substances to be received;
- (2) restrictions as to size, shape, and materials and methods of construction of radioactive substances packaging and maximum number of package units stored, at any one time;
- (3) restrictions as to the physical and chemical form and radioisotopic content and concentration of radioactive substances;
- (4) controls to be applied to restrict access to the site;
- (5) controls to be applied to maintain and protect the health and safety of the public and site employees and the environment;
- (6) administrative controls, which are the provisions relating to organization, management, and operating procedures; record-keeping, review and audit; and reporting necessary to assure that activities at the facility are conducted in a safe manner and in conformity with agency rules and license conditions;
- (7) maximum retention time for radioactive substances received at the facility; and
- (8) term of the specific license for a fixed term not to exceed ten years.

(b) The commission may incorporate in any license at the time of issuance, or thereafter, by appropriate rule or order, additional requirements or conditions with respect to the licensee's receipt, possession, or transfer of radioactive substances as it deems appropriate or necessary in order to:

- (1) protect the health and safety of the public and the environment; or
- (2) require reports and recordkeeping and to provide for inspections of activities under the licenses that may be necessary or appropriate to effectuate the purposes of the Texas Radiation Control Act and rules thereunder.

(c) Each person licensed by the commission in accordance with this subchapter shall confine the use and possession of the radioactive substance licensed to the locations and purposes authorized in the license.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1223. Renewal of Licenses.**

(a) Renewal of licenses must be filed in accordance with §336.205 of this title (relating to Application Requirements) and §336.1211 of this title (relating to Filing Application for a Specific License).

(b) The licensee is responsible for decommissioning the facility and continued safe storage of any radioactive substances whether an application for continued receipt of radioactive substances is filed or not.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1225. Amendment of License at Request of Licensee.**

Applications for amendment of a license shall be filed in accordance with §336.1211 of this title (relating to Filing Application for a Specific License) and §336.205 of this title (relating to Application Requirements). Amendment applications must be signed by the RSO, specify the proposed amendment, and describe the basis for such amendment.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1227. Radioactive Substances Processing and Packaging Requirements.**

All processed radioactive substances offered for transport or disposal must meet:

(1) all applicable transportation requirements of the agency, the United States Nuclear Regulatory Commission, and of the DOT; and

(2) all applicable disposal facility license conditions.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1229. Environmental Assessment.**

A written analysis of the impact on the human environment will be prepared or secured by the agency for any license for a class III processing or storage facility in accordance with §281.21(f) of this title (relating to Draft Permit, Technical Summary, Fact Sheet, and Compliance History).

Adopted January 30, 2008

Effective February 28, 2008

**§336.1231. Radioactive Substances Processing and Storage Categories of Radionuclides.**

(a) The following table contains waste processing and storage categories of radionuclides.

Element*	Radionuclide**	Category
Actinium (89)	Ac-227	I
	Ac-228	I
Americium (95)	Am-241	I
	Am-243	I
Antimony (51)	Sb-122	IV
	Sb-124	III
	Sb-125	III
Argon (18)	Ar-37	VI
	Ar-41	II
	Ar-41 (uncompressed)†	V
Arsenic (33)	As-73	IV
	As-74	IV
	As-76	IV
	As-77	IV
Astatine (85)	At-211	III
Barium (56)	Ba-131	IV
	Ba-133	II
	Ba-140	III
Berkelium (97)	Bk-249	I
Beryllium (4)	Be-7	IV
Bismuth (83)	Bi-206	IV
	Bi-207	III
	Bi-210	II
	Bi-212	III
Bromine (35)	Br-82	IV
Cadmium (48)	Cd-109	IV
	Cd-115m	III
	Cd-115	IV
Calcium (20)	Ca-45	IV
	Ca-47	IV
Californium (98)	Cf-249	I
	Cf-250	I
	Cf-252	I
Carbon (6)	C-14	IV
Cerium (58)	Ce-141	IV
	Ce-143	IV



Element*	Radionuclide**	Category
	Ce-144	III
Cesium (55)	Cs-131	IV
	Cs-134mCs-134	IIIII
	Cs-135	IV
	Cs-136	IV
	Cs-137	III
Chlorine (17)	Cl-36	III
	Cl-38	IV
Chromium (24)	Cr-51	IV
Cobalt (27)	Co-56	III
	Co-57	IV
	Co-58m	IV
	Co-58	IV
	Co-60	III
Copper (29)	Cu-64	IV
Curium (96)	Cm-242	I
	Cm-243	I
	Cm-244	I
	Cm-245	I
	Cm-246	I
Dysprosium (66)	Dy-154	III
	Dy-165	IV
	Dy-166	IV
Erbium (68)	Er-169	IV
	Er-171	IV
Europium (63)	Eu-150Eu-152m	IIIV
	Eu-152	III
	Eu-154	II
	Eu-155	IV
Fluorine (9)	F-18	IV
Gadolinium (64)	Gd-153	IV
	Gd-159	IV
Galium (31)	Ga-67	III
	Ga-72	IV
Germanium (32)	Ge-71	IV
Gold (79)	Au-193	III
	Au-194	III
	Au-195	III
	Au-196	IV
	Au-198	IV

Element*	Radionuclide**	Category
	Au-199	IV
Hafnium (72)	Hf-181	IV
Holmium (67)	Ho-166	IV
Hydrogen (1)	H-3 (see tritium)	
Indium (49)	In-113m	IV
	In-114m	III
	In-115m	IV
	In-115	IV
Iodine (53)	I-124	III
	I-125I-126	IIIII
	I-129	III
	I-131	III
	I-132	IV
	I-133	III
	I-134	IV
	I-135	IV
Iridium (77)	Ir-190	IV
	Ir-192	III
	Ir-194	IV
Iron (26)	Fe-55	IV
	Fe-59	IV
Krypton (36)	Kr-85m	III
	Kr-85m (uncompressed)†	V
	Kr-85	III
	Kr-85 (uncompressed)†	VI
	Kr-87	II
	Kr-87 (uncompressed)†	V
Lanthanum (57)	La-140	IV
Lead (82)	Pb-203	IV
	Pb-210	II
	Pb-212	II
Lutetium (71)	Lu-172Lu-177	IIIV
Magnesium (12)	Mg-28	III
Manganese (25)	Mn-52	IV
	Mn-54	IV
	Mn-56	IV
Mercury (80)	Hg-197m	IV
	Hg-197	IV
	Hg-203	IV

Element*	Radionuclide**	Category
Mixed fission products (MFP)		II
Molybdenum (42)	Mo-99	IV
Neodymium (60)	Nd-147	IV
	Nd-149	IV
Neptunium (93)	Np-237	I
	Np-239	I
Nickel (28)	Ni-56	III
	Ni-59	IV
	Ni-63	IV
	Ni-65	IV
Niobium (41)	Nb-93m	IV
	Nb-95	IV
	Nb-97	IV
Osmium (76)	Os-185	IV
	Os-191m	IV
	Os-191Os-193	IVIV
Palladium (46)	Pd-103	IV
	Pd-109	IV
Phosphorus (15)	P-32	IV
Platinum (73)	Pt-191	IV
	Pt-193	IV
	Pt-193m	IV
	Pt-197m	IV
	Pt-197	IV
Plutonium (94)	Pu-238 F	I
	Pu-239 F	I
	Pu-240	I
	Pu-241 F	I
	Pu-242	I
Polonium (84)	Po-210	I
Potassium (19)	K-42	IV
	K-43	III
Praseodymium (59)	Pr-142	IV
	Pr-143	IV
Promethium (61)	Pm-147	IV
	Pm-149	IV
Protactinium (91)	Pa-230	I
	Pa-231	I

Element*	Radionuclide**	Category
	Pa-233	II
Radium (88)	Ra-223	II
	Ra-224	II
	Ra-226	I
	Ra-228	I
Radon (86)	Rn-220	IV
	Rn-222	II
Rhenium (75)	Re-183	IV
	Re-186	IV
	Re-187	IV
	Re-188	IV
	Re-Natural	IV
Rhodium (45)	Rh-103m	IV
	Rh-105	IV
Rubidium (37)	Rb-86	IV
	Rb-87	IV
	Rb-Natural	IV
Ruthenium (44)	Ru-97	IV
	Ru-103	IV
	Ru-105	IV
	Ru-106	III
Samarium (62)	Sm-145	III
	Sm-147	III
	Sm-151Sm-153	IVIV
Scandium (21)	Sc-46	III
	Sc-47	IV
	Sc-48	IV
Selenium (34)	Se-75	IV
Silicon (14)	Si-31	IV
Silver (47)	Ag-105	IV
	Ag-110m	III
	Ag-111	IV
Sodium (11)	Na-22	III
	Na-24	IV
Strontium (38)	Sr-85m	IV
	Sr-85	IV
	Sr-89	III
	Sr-90	II
	Sr-91	III
	Sr-92	IV

Element*	Radionuclide**	Category
Sulfur (16)	S-35	IV
Tantalum (73)	Ta-182	III
Technetium (43)	Tc-96m	IV
	Tc-96	IV
	Tc-97m	IV
	Tc-97	IV
	Tc-99mTc-99	IVIV
Tellurium (52)	Te-125m	IV
	Te-127m	IV
	Te-127	IV
	Te-129m	III
	Te-129	IV
	Te-131m	III
	Te-132	IV
Terbium (65)	Tb-160	III
Thallium (81)	Tl-200	IV
	Tl-201	IV
	Tl-202	IV
	Tl-204	III
Thorium (90)	Th-227	II
	Th-228	I
	Th-230	I
	Th-231	I
	Th-232	III
	Th-234	II
	Th-Natural	III
Thulium (69)	Tm-168	III
	Tm-170	III
	Tm-171	IV
Tin (50)	Sn-113	IV
	Sn-117m	III
	Sn-121	III
	Sn-125	IV
Tritium (1)	H-3	IV
	H-3 (as a gas, as luminous paint, or adsorbed on solid material.)	VII
Tungsten (74)	W-181	IV
	W-185	IV
	W-187	IV
Uranium (92)	U-230	II

Element*	Radionuclide**	Category
	U-232	I
	U-233 F	II
	U-234	II
	U-235 F	III
	U-236	II
	U-238	III
	U-Natural	III
	U-Enriched F	III
	U-Depleted	III
Vanadium (23)	V-48	IV
	V-49	III
Xenon (54)	Xe-125	III
	Xe-131m	III
	Xe-131m (uncompressed)†	V
	Xe-133	III
	Xe-133 (uncompressed)†	VI
	Xe-135	II
	Xe-135 (uncompressed)†	V
Ytterbium (70)	Yb-175	IV
Yttrium (39)	Y-88	III
	Y-90	IV
	Y-91m	III
	Y-91	III
	Y-92	IV
	Y-93	IV
Zinc (30)	Zn-65	IV
	Zn-69m	IV
	Zn-69	IV
Zirconium (40)	Zr-93	IV
	Zr-95	III
	Zr-97	IV

NOTE: For mixtures of radionuclides and for radionuclides not included in this subsection, see subsection (b) of this section, waste processing and storage categories.

\* Atomic number shown in parentheses.

\*\* Atomic mass number shown after the element symbol.

F Fissile material.

m Metastable state.

† Uncompressed means at a pressure not exceeding 1 atmosphere.

(b) Any radionuclide not specifically listed in subsection (a) of this section must be assigned to one of the categories in accordance with the following table.

Radionuclide Atomic No. 1-81 Atomic No. 82 and over	RADIOACTIVE HALF-LIFE		
	0 to 1000 days	1000 days to 10 <sup>6</sup> years	Over 10 <sup>6</sup> years
	Category III	Category II	Category III
	Category I	Category I	Category III

(c) For mixtures of radionuclides, the following must apply.

(1) If the identity and respective activity of each radionuclide are known, the permissible activity of each radionuclide shall be such that the sum, for all categories present, of the ratio between the total activity for each category to the permissible activity for each category will not be greater than unity.

(2) If the categories of the radionuclides are known but the amount in each category cannot be reasonably determined, the mixture must be assigned to the most restrictive category present.

(3) If the identity of all or some of the radionuclides cannot be reasonably determined, each of those unidentified radionuclides shall be considered as belonging to the most restrictive category that cannot be positively excluded.

(4) Mixtures consisting of a single radioactive decay chain where the radionuclides are in the naturally occurring proportions must be considered as consisting of a single radionuclide. The category and activity must be that of the first member present in the chain, except that if radionuclide "X" has a half-life longer than that of that first member and an activity greater than that of any other member, including the first, at any time during processing, the waste processing and storage category must be that of nuclide "X" and the activity of the mixture must be the maximum activity of nuclide "X" during processing.

Adopted January 30, 2008

Effective February 28, 2008

### **§336.1233. Radiation Safety Committee.**

The duties and responsibilities of the Radiation Safety Committee include but are not limited to the following:

- (1) meeting as often as necessary to conduct business but no less than three times a year;
- (2) reviewing summaries of the following information presented by the radiation safety officer:
  - (A) over-exposures;
  - (B) significant incidents, including spills, contamination, or medical events; and

(C) items of noncompliance following an inspection;

(3) reviewing the program for maintaining doses as low as reasonably achievable, and providing any necessary recommendations to ensure doses are as low as reasonably achievable;

(4) reviewing the overall compliance status for authorized users;

(5) sharing responsibility with the radiation safety officer to conduct periodic audits of the radiation safety program;

(6) reviewing the audit of the radiation safety program and acting upon the findings;

(7) developing criteria to evaluate training and experience of new authorized user applicants;

(8) evaluating and approving authorized user applicants who request authorization to use radioactive material at the facility;

(9) evaluating new uses of radioactive material; and

(10) reviewing and approving permitted program and procedural changes prior to implementation.

Adopted January 30, 2008

Effective February 28, 2008

**§336.1235. Financial Assurance for Storage and Processing.**

A licensee or applicant must establish financial assurance under the requirements of 25 TAC Chapter 289 (relating to Radiation Control).

Adopted January 30, 2008

Effective February 28, 2008