

Virginia Administrative Code
Title 12. Health
Agency 5. Department Of Health
Chapter 481. Virginia Radiation Protection Regulations

Part XI. Licensing Requirements for Land Disposal of Radioactive Waste

Article 1. Purpose and Scope

12VAC5-481-2330. Purpose and scope.

A. The regulations in this part establish procedures, criteria, and terms and conditions upon which the agency issues licenses for the land disposal of wastes received from other persons. The requirements of this part are in addition to, and not in substitution for, other applicable requirements of these regulations.

B. The regulations in this part do not apply to disposal of byproduct material as defined in the definition of "byproduct material" in these regulations in quantities greater than 10,000 kilograms containing more than 185 MBq (5 mCi) of radium-226 or disposal of radioactive material as provided for in Part IV (12VAC5-481-600 et seq.) of this chapter.

C. This part establishes procedural requirements and performance objectives applicable to any method of land disposal. It establishes specific technical requirements for near-surface disposal of radioactive waste that involves disposal in the uppermost portion of the earth.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

Article 2. General Regulatory Provisions

12VAC5-481-2340. License required.

A. No person may receive, possess, and dispose of waste received from other persons at a land disposal facility unless authorized by a license issued by the agency pursuant to this part and Part III (12VAC5-481-380 et seq.) of this chapter.

B. Each person shall file an application with the agency pursuant to 12VAC5-481-440 and obtain a license as provided in this part before commencement of construction of a land disposal facility. Failure to comply with this requirement may be grounds for denial of a license.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2350. Content of application.

In addition to the requirements set forth in 12VAC5-481-450, an application to receive from others, possess, and dispose of wastes shall consist of general information, specific technical information, institutional information, and financial information as set forth in 12VAC5-481-2360 through 12VAC5-481-2400.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2360. General information.

The general information shall include each of the following:

1. Identity of the applicant including:

- a. The full name, address, telephone number, and description of the business or occupation of the applicant;
- b. If the applicant is a partnership, the name and address of each partner and the principal location where the partnership does business;
- c. If the applicant is a corporation or an unincorporated association, (i) the state where it is incorporated or organized and the principal location where it does business, and (ii) the names and addresses of its directors and principal officers; and
- d. If the applicant is acting as an agent or representative of another person in filing the application, all information required under this subsection must be supplied with respect to the other person.

2. Qualifications of the applicant:

- a. The organizational structure of the applicant, both offsite and onsite, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;
- b. The technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities. Minimum training and experience requirements for personnel filling key positions described in subdivision 2 a of this section must be provided.
- c. A description of the applicant's personnel training program; and
- d. The plan to maintain an adequate complement of trained personnel to carry out waste receipt, handling, and disposal operations in a safe manner.

3. A description of:

- a. The location of the proposed disposal site;
- b. The general character of the proposed activities;
- c. The types and quantities of waste to be received, possessed, and disposed of;
- d. Plans for use of the land disposal facility for purposes other than disposal of wastes; and
- e. The proposed facilities and equipment.

4. Proposed schedules for construction, receipt of waste, and first emplacement of waste at the proposed land disposal facility.**Statutory Authority**

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2370. Specific technical information.

The specific technical information shall include the following information needed for demonstration that the performance objectives and the applicable technical requirements of this part will be met:

1. A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities. The description shall include geologic, geochemical, geotechnical, hydrologic, ecologic, archaeologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity.
2. A description of the design features of the land disposal facility and the disposal units. For near-surface disposal, the description shall include those design features related to infiltration of water; integrity of covers for disposal units; structural stability of backfill, wastes, and covers; contact of wastes with standing water; disposal site drainage; disposal site closure and stabilization; elimination to the extent practicable of long-term disposal site maintenance; inadvertent intrusion; occupational exposures; disposal site monitoring; and adequacy of the size of the buffer zone for monitoring and potential mitigative measures.
3. A description of the principal design criteria and their relationship to the performance objectives.
4. A description of the design basis natural events or phenomena and their relationship to the principal design criteria.
5. A description of codes and standards that the applicant has applied to the design and that will apply to construction of the land disposal facilities.
6. A description of the construction and operation of the land disposal facility. The description shall include as a minimum the methods of construction of disposal units; waste emplacement; the procedures for and areas of waste segregation; types of intruder barriers; onsite traffic and drainage systems; survey control program; methods and areas of waste storage; and methods to control surface water and groundwater access to the wastes. The description shall also include a description of the methods to be employed in the handling and disposal of wastes containing chelating agents or other nonradiological substances that might affect meeting the performance objectives of this part.
7. A description of the disposal site closure plan, including those design features that are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance.
8. An identification of the known natural resources at the disposal site, whose exploitation could result in inadvertent intrusion into the wastes after removal of active institutional control.
9. A description of the kind, amount, classification and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility.
10. A description of the quality control program for the determination of natural disposal site characteristics and for quality control during the design, construction, operation, and closure of the land disposal facility and the receipt, handling, and emplacement of waste. Audits and managerial controls must be included.
11. A description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in 12VAC5-481-2490 and occupational radiation exposure to ensure compliance with the requirements of Part IV (12VAC5-481-600 et seq.) of this chapter and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site. Both routine operations and accidents shall be addressed. The program description must include procedures, instrumentation, facilities, and equipment.
12. A description of the environmental monitoring program to provide data to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration is indicated.
13. A description of the administrative procedures that the applicant will apply to control activities at the land disposal facility.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2380. Technical analyses.

The specific technical information shall also include the following analyses needed to demonstrate that the performance objectives of this part will be met:

1. Pathways analyzed in demonstrating protection of the general population from releases of radioactivity shall include air, soil, groundwater, surface water, plant uptake, and exhumation by burrowing animals. The analyses shall clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes. The analyses shall clearly demonstrate that there is reasonable assurance that the exposures to humans from the release of radioactivity will not exceed the limits set forth in 12VAC5-481-2490.
2. Analyses of the protection of individuals from inadvertent intrusion shall include demonstration that there is reasonable assurance the waste classification and segregation requirements will be met and that adequate barriers to inadvertent intrusion will be provided.
3. Analyses of the protection of individuals during operations shall include assessments of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste. The analyses shall provide reasonable assurance that exposures will be controlled to meet the requirements of Part IV (12VAC5-481-600 et seq.) of this chapter.
4. Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure shall be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses shall provide reasonable assurance that there will not be a need for ongoing active maintenance of the disposal site following closure.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2390. Institutional information.

The institutional information submitted by the applicant shall include:

1. A certification by the federal or state agency that owns the disposal site that the federal or state agency is prepared to accept transfer of the license when the provisions of 12VAC5-481-2460 are met and will assume responsibility for institutional control after site closure and post-closure observation and maintenance.
2. Where the proposed disposal site is on land not owned by the federal or a state government, the applicant shall submit evidence that arrangements have been made for assumption of ownership in fee by the federal or a state agency before the agency issues a license.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2400. Financial information.

The financial information shall be sufficient to demonstrate that the financial qualifications of the applicant are adequate to carry out the activities for which the license is sought and meet other financial assurance requirements of this part.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2410. Requirements for issuance of a license.

A license for the receipt, possession, and disposal of waste containing or contaminated with radioactive material will be issued by the agency upon finding that:

1. The issuance of the license will not constitute an unreasonable risk to the health and safety of the public;
2. The applicant is qualified by reason of training and experience to carry out the disposal operations requested in a manner that protects health and minimizes danger to life or property;
3. The applicant's proposed disposal site, disposal design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and post-closure institutional control are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity as specified in the performance objective in 12VAC5-481-2490;
4. The applicant's proposed disposal site, disposal site design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and post-closure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected in accordance with the performance objective in 12VAC5-481-2520;
5. The applicant's proposed land disposal facility operations, including equipment, facilities, and procedures, are adequate to protect the public health and safety in that they will provide reasonable assurance that the standards for radiation protection set out in Part IV (12VAC5-481-600 et seq.) of this chapter will be met;
6. The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and post-closure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure;
7. The applicant's demonstration provides reasonable assurance that the applicable technical requirements of this part will be met;
8. The applicant's proposal for institutional control provides reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in subdivisions 3 through 6 of this section and that the institutional control meets the requirements of 12VAC5-481-2580; and
9. The financial or surety arrangements meet the requirements of this part.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2420. Conditions of licenses.

A. A license issued under this part, or any right thereunder, may be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of the license to any person, only if the agency finds, after securing full information, that the transfer is in accordance with the provisions of the Act and gives its consent in writing in the form of a license amendment.

B. The licensee shall submit written statements under oath upon request of the agency, at any time before termination of the license, to enable the agency to determine whether the license should be modified, suspended, or revoked.

C. The license will be terminated only on the full implementation of the final closure plan as approved by the agency, including post-closure observation and maintenance.

D. The licensee shall be subject to the provisions of the Act now or hereafter in effect, and to all rules, regulations, and orders of the agency. The terms and conditions of the license are subject to amendment, revision, or modification, by reason of amendments to, or by reason of rules, regulations, and orders issued in accordance with the terms of the Act.

E. Each person licensed by the agency pursuant to the regulations in this part shall confine possession and use of materials to the locations and purposes authorized in the license.

F. The licensee shall not dispose of waste until the agency has inspected the land disposal facility and has found it to be in conformance with the description, design, and construction described in the application for a license.

G. The agency may incorporate in any license at the time of issuance, or thereafter, by appropriate rule, regulation or order, additional requirements and conditions with respect to the licensee's receipt, possession, and disposal of waste as it deems appropriate or necessary in order to:

1. Protect health or to minimize danger to life or property;
2. Require reports and the keeping of records, and to provide for inspections of activities under the license that may be necessary or appropriate to effectuate the purposes of the Act and regulations thereunder.

H. The authority to dispose of wastes expires on the date stated in the license. Any expiration date on a license applies only to the above ground activities and to the authority to dispose of waste. Failure to renew the license shall not relieve the licensee of responsibility for implementing site closure, post-closure observation, and transfer of the license to the site owner.

I. Each licensee shall notify the agency in writing immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of Title 11 (Bankruptcy) of the United States Code by or against:

1. The licensee;
2. An entity (as that term is defined in 11 USC § 101(15)) controlling the licensee or listing the license or licensee as property of the estate; or
3. An affiliate (as that term is defined in 11 USC § 101(2)) of the licensee.

J. The notification specified in this section shall indicate the bankruptcy court in which the petition for bankruptcy was filed and the date of the filing of the petition.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2430. Application for renewal or closure.

A. An application for renewal or an application for closure under 12VAC5-481-2440 must be filed at least 90 days prior to license expiration.

B. Applications for renewal of a license must be filed in accordance with 12VAC5-481-2350 through 12VAC5-481-2400. Applications for closure must be filed in accordance with 12VAC5-481-2440.

C. In any case in which a licensee has filed an application in proper form for renewal of a license, the license does not expire until the agency has taken final action on the application for renewal.

D. In determining whether a license will be renewed, the agency will apply the criteria set forth in 12VAC5-481-2410.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2440. Contents of application for site closure and stabilization.

A. Prior to final closure of the disposal site, or as otherwise directed by the agency, the applicant shall submit an application to amend the license for closure. This closure application shall include a final revision and specific details of the disposal site closure plan included as part of the license application submitted under subdivision 7 of 12VAC5-481-2370 that includes each of the following:

1. Any additional geologic, hydrologic, or other data pertinent to the long-term containment of emplaced wastes obtained during the operational period.
2. The results of tests, experiments, or any other analyses relating to backfill of excavated areas, closure and sealing, waste migration and interaction with emplacement media, or any other tests, experiments, or analysis pertinent to the long-term containment of emplaced waste within the disposal site.
3. Any proposed revision of plans for:
 - a. Decontamination and/or dismantlement of surface facilities;
 - b. Backfilling of excavated areas; or
 - c. Stabilization of the disposal site for post-closure care.
4. Any significant new information regarding the environmental impact of closure activities and long-term performance of the disposal site.

B. Upon review and consideration of an application to amend the license for closure submitted in accordance with subsection A of this section, the agency shall issue an amendment authorizing closure if there is reasonable assurance that the long-term performance objectives of this part will be met.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2450. Post-closure observation and maintenance.

The licensee shall observe, monitor, and carry out necessary maintenance and repairs at the disposal site until the site closure is complete and the license is transferred by the agency in accordance with 12VAC5-481-2460. Responsibility for the disposal site must be maintained by the licensee for five years. A shorter or longer time period for post-closure observation and maintenance may be established and approved as part of the site closure plan, based on site-specific conditions.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2460. Transfer of license.

Following closure and the period of post-closure observation and maintenance, the licensee may apply for an amendment to transfer the license to the disposal site owner. The license shall be transferred when the agency finds:

1. That the closure of the disposal site has been made in conformance with the licensee's disposal site closure plan, as amended and approved as part of the license;
2. That reasonable assurance has been provided by the licensee that the performance objectives of this part are met;
3. That any funds and necessary records for care will be transferred to the disposal site owner;
4. That the post-closure monitoring program is operational for implementation by the disposal site owner; and
5. That the federal or state agency that will assume responsibility for institutional control of the disposal site is prepared to assume responsibility and ensure that the institutional requirements found necessary under subdivision 8 of 12VAC5-481-2410 will be met.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2470. Termination of license.

- A. Following any period of institutional control needed to meet the requirements found necessary under 12VAC5-481-2410, the licensee may apply for an amendment to terminate the license.
- B. This application will be reviewed in accordance with the provisions of 12VAC5-481-450.
- C. A license shall be terminated only when the agency finds:
 1. That the institutional control requirements found necessary under 12VAC5-481-2410 8 have been met;
 2. That any additional requirements resulting from new information developed during the institutional control period have been met; and
 3. That permanent monuments or markers warning against intrusion have been installed.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

Article 3. General Performance Objectives

12VAC5-481-2480. General requirement.

Land disposal facilities shall be sited, designed, operated, closed, and controlled after closure so that reasonable assurance exists that exposures to individuals are within the requirements established in the performance objectives in 12VAC5-481-2490 through 12VAC5-481-2520.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2490. Protection of the general population from releases of radioactivity.

Concentrations of radioactive material that may be released to the general environment in ground water, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 0.25 mSv (25 mrem) to the whole body, 0.75 mSv (75 mrem) to the thyroid, and 0.25 mSv (25 mrem) to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment ALARA.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2500. Protection of individuals from inadvertent intrusion.

Design, operation, and closure of the land disposal facility shall ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2510. Protection of individuals during operations.

Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection set out in Part IV (12VAC5-481-600 et seq.) of this chapter, except for releases of radioactivity in effluents from the land disposal facility, that shall be governed by 12VAC5-481-2490. Every reasonable effort should be made to maintain radiation exposures ALARA.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2520. Stability of the disposal site after closure.

The disposal facility shall be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate, to the extent practicable, the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

Article 4. Technical Requirements for Land Disposal Facilities

12VAC5-481-2530. Disposal site suitability requirements for land disposal.

Disposal site suitability for near-surface disposal. The primary emphasis in disposal site suitability is given to isolation of wastes and to disposal site features that ensure that the long-term performance objectives are met.

1. The disposal site shall be capable of being characterized, modeled, analyzed and monitored.
2. Within the region where the facility is to be located, a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives of this part.
3. Areas shall be avoided having known natural resources which, if exploited, would result in failure to meet the performance objectives of this part.
4. The disposal site shall be generally well drained and free of areas of flooding or frequent ponding. Waste disposal shall not take place in a 100-year flood plain, coastal high-hazard area or wetland, as defined in federal Executive Order 11988, "Floodplain Management Guidelines."
5. Upstream drainage areas shall be minimized to decrease the amount of runoff which could erode or inundate waste disposal units.
6. The disposal site shall provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur. The agency will consider an exception to this requirement to allow disposal below the water table if it can be conclusively shown that disposal site characteristics will result in molecular diffusion being the predominant means of radionuclide movement and the rate of movement will result in the performance objectives being met. In no case will waste disposal be permitted in the zone of fluctuation of the water table.
7. The hydrogeologic unit used for disposal shall not discharge ground water to the surface within the disposal site.
8. Areas shall be avoided where tectonic processes such as faulting, folding, seismic activity, or vulcanism may occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of this part or may preclude defensible modeling and prediction of long-term impacts.
9. Areas shall be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of this part, or may preclude defensible modeling and prediction of long-term impacts.
10. The disposal site must not be located where nearby facilities or activities could adversely impact the ability of the site to meet the performance objectives of this part or significantly mask the environmental monitoring program.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2540. Disposal site design for land disposal.

Disposal site design for near-surface disposal.

1. Site design features shall be directed toward long-term isolation and avoidance of the need for continuing active maintenance after site closure.
2. The disposal site design and operation shall be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that provides reasonable assurance that the performance objectives will be met.
3. The disposal site shall be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives will be met.
4. Covers shall be designed to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.

5. Surface features shall direct surface water drainage away from disposal units at velocities and gradients that will not result in erosion that will require ongoing active maintenance in the future.

6. The disposal site shall be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2550. Land disposal facility operation and disposal site closure.

Near-surface disposal facility operation and disposal site closure.

1. Wastes designated as Class A pursuant to these regulations shall be segregated from other wastes by placing in disposal units which are sufficiently separated from disposal units for the other waste classes so that any interaction between Class A wastes and other wastes will not result in the failure to meet the performance objectives of this part. This segregation is not necessary for Class A wastes if they meet the stability requirements of these regulations.

2. Wastes designated as Class C pursuant to these regulations shall be disposed of so that the top of the waste is a minimum of 5 meters below the top surface of the cover or must be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for at least 500 years.

3. Except as provided in subdivision 12 of this subsection, only waste classified as Class A, B, or C shall be acceptable for near-surface disposal. All waste shall be disposed of in accordance with requirements of 4 through 11 of this subsection.

4. Wastes shall be emplaced in a manner that maintains the package integrity during emplacement, minimizes the void spaces between packages, and permits the void spaces to be filled.

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

6. Waste shall be placed and covered in a manner that limits the radiation dose rate at the surface of the cover to levels that at a minimum will permit the licensee to comply with all provisions of 12VAC5-481-640 at the time the license is transferred pursuant to 12VAC5-481-2460.

7. The boundaries and locations of each disposal unit shall be accurately located and mapped by means of a land survey. Near-surface disposal units shall be marked in such a way that the boundaries of each unit can be easily defined. Three permanent survey marker control points, referenced to United States Geological Survey (USGS) or National Geodetic Survey (NGS) survey control stations, shall be established on the site to facilitate surveys. The USGS or NGS control stations shall provide horizontal and vertical controls as checked against USGS or NGS record files.

8. A buffer zone of land shall be maintained between any buried waste and the disposal site boundary and beneath the disposed waste. The buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in 12VAC5-481-2560 C and take mitigative measures if needed.

9. Closure and stabilization measures as set forth in the approved site closure plan shall be carried out as each disposal unit is filled and covered.

10. Active waste disposal operations shall not have an adverse effect on completed closure and stabilization measures.

11. Only wastes containing or contaminated with radioactive material shall be disposed of at the disposal site.

12. Proposals for disposal of waste that is not generally acceptable for near-surface disposal because the waste form and disposal methods must be different and, in general, more stringent than those specified for Class C waste, may be submitted to the agency for approval.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006; amended, Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2560. Environmental monitoring.

A. At the time a license application is submitted, the applicant shall have conducted a preoperational monitoring program to provide basic environmental data on the disposal site characteristics. The applicant shall obtain information about the ecology, meteorology, climate, hydrology, geology including geophysics and geotechnical engineering, geochemistry, and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a 12-month period.

B. During the land disposal facility site construction and operation, the licensee shall maintain an environmental monitoring program. Measurements and observations must be made and recorded to provide data to evaluate the potential health and environmental impacts during both the construction and the operation of the facility and to enable the evaluation of long-term effects and the need for mitigative measures. The monitoring system must be capable of providing early warning of releases of waste from the disposal site before they leave the site boundary.

C. After the disposal site is closed, the licensee responsible for post-operational surveillance of the disposal site shall maintain a monitoring system based on the operating history and the closure and stabilization of the disposal site. The monitoring system must be capable of providing early warning of releases of waste from the disposal site before they leave the site boundary.

D. The licensee shall have plans for taking corrective measures if the environmental monitoring program detects migration of waste which would indicate that the performance objectives may not be met.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2570. Alternative requirements for design and operations.

The agency may, upon request or on its own initiative, authorize provisions other than those set forth in 12VAC5-481-2540 through 12VAC5-481-2560 for the segregation and disposal of waste and for the design and operation of a land disposal facility on a specific basis, if it finds reasonable assurance of compliance with the performance objectives of this part.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2571. Waste classification.

A. Considerations. Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause

exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form, and disposal methods are effective.

B. Classes of waste.

1. Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in 12VAC5-481-2572 A. If Class A waste also meets the stability requirements set forth in 12VAC5-481-2572 B, it is not necessary to segregate the waste for disposal.

2. Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in 12VAC5-481-2572.

3. Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth 12VAC5-481-2572.

4. Waste that is not generally acceptable for near-surface disposal is waste for which form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in 10 CFR Part 60 or 63 unless proposals for disposal of such waste in a disposal site licensed pursuant to this part are approved by the agency.

C. Classification determined by long-lived radionuclides. If radioactive waste contains only radionuclides listed in Table 2, classification shall be determined as follows:

1. If the concentration does not exceed 0.1 times the value in Table 2, the waste is Class A.
2. If the concentration exceeds 0.1 times the value in Table 2 but does not exceed the value in Table 3, the waste is Class C.
3. If the concentration exceeds the value in Table 2, the waste is not generally acceptable for near-surface disposal.
4. For wastes containing mixtures of radionuclides listed in Table 2, the total concentration shall be determined by the sum of fractions rule described in subsection G of this section.

Table 2
Long Lived Radionuclides Waste Concentration

Radionuclide	Concentration curies per cubic meter
C-14	8
C-14 in activated metal	80
Ni-59 in activated metal	220
Nb-94 in activated metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting transuranic nuclides with half-life greater than 5 years	¹ 100
Pu-241	¹ 3,500
Cm-242	¹ 20,000

¹Units are nanocuries per gram.

D. Classification determined by short-lived radionuclides. If radioactive waste does not contain any of the radionuclides listed in Table 2, classification shall be determined based on the concentrations shown in Table 3. However, as specified in subsection F of this section, if radioactive waste does not contain any nuclides listed in either Table 2 or 3, it is Class A.

1. If the concentration does not exceed the value in Column 1, the waste is Class A.
2. If the concentration exceeds the value in Column 1, but does not exceed the value in Column 2, the waste is Class B.
3. If the concentration exceeds the value in Column 2, but does not exceed the value in Column 3, the waste is Class C.
4. If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.
5. For wastes containing mixtures of the nuclides listed in Table 3, the total concentration shall be determined by the sum of fractions rule described in subsection G of this section.

Table 3
Short Lived Radionuclide Waste Concentration

Radionuclide	Concentration, curies per cubic meter		
	Col. 1	Col. 2	Col. 3
Total of all nuclides with less than 5 year half-life	700	(1)	(1)
H-3	40	(1)	(1)
Co-60	700	(1)	(1)
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
Cs-137	1	44	4600

¹There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other nuclides in Table 3 determine the waste to the Class C independent of these nuclides.

E. Classification determined by both long- and short-lived radionuclides. If radioactive waste contains a mixture of radionuclides, some of which are listed in Table 2, and some of which are listed in Table 3, classification shall be determined as follows:

1. If the concentration of a nuclide listed in Table 2 does not exceed 0.1 times the value listed in Table 2, the class shall be that determined by the concentration of nuclides listed in Table 3.
2. If the concentration of a nuclide listed in Table 2 exceeds 0.1 times the value listed in Table 2 but does not exceed the value in Table 2, the waste shall be Class C, provided the concentration of nuclides listed in Table 3 does not exceed the value shown in Column 3 of Table 3.

F. Classification of wastes with radionuclides other than those listed in Tables 2 and 3. If radioactive waste does not contain any nuclides listed in either Table 2 or 3, it is Class A.

G. The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each nuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the

same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains Sr-90 in a concentration of 50 Ci/m³ and Cs-137 in a concentration of 22 Ci/m³. Since the concentrations both exceed the values in Column 1, Table 2, they must be compared to Column 2 values. For Sr-90 fraction 50/150=0.33; for Cs-137 fraction, 22/44=0.5; the sum of the fractions=0.83. Since the sum is less than 1.0, the waste is Class B.

H. Determination of concentrations in wastes. The concentration of a radionuclide may be determined by indirect methods such as use of scaling factors that relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nanocuries per gram.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2572. Waste characteristics.

A. The following requirements are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site.

1. Waste must not be packaged for disposal in cardboard or fiberboard boxes.
2. Liquid waste must be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.
3. Solid waste containing liquid shall contain as little freestanding and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1.0% of the volume.
4. Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.
5. Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with subdivision 7 of this subsection.
6. Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.
7. Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. Total activity must not exceed 100 curies per container.
8. Waste containing hazardous, biological, pathogenic, or infectious material must be treated to reduce to the maximum extent practicable the potential hazard from the nonradiological materials.

B. The requirements in this section are intended to provide stability of the waste. Stability is intended to ensure that the waste does not structurally degrade and affect overall stability of the site through slumping, collapse, or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent intruder, since it provides a recognizable and nondispersible waste.

1. Waste must have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions such as weight of overburden and compaction equipment, the presence of moisture, and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.

2. Notwithstanding the provisions in subdivision A 2 and A 3 of this section, liquid wastes, or wastes containing liquid, must be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1.0% of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.

3. Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2573. Labeling.

Each package of waste must be clearly labeled to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with 12VAC5-481-2571.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 24, Issue 18, eff. June 12, 2008.

12VAC5-481-2580. Institutional requirements.

A. Land ownership. Disposal of waste received from other persons may be permitted only on land owned in fee by the federal or a state government.

B. Institutional control. The land owner or custodial agency shall conduct an institutional control program to physically control access to the disposal site following transfer of control of the disposal site from the disposal site operator. The institutional control program shall also include, but not be limited to, conducting an environmental monitoring program at the disposal site, periodic surveillance, minor custodial care, and other requirements as determined by the agency; and administration of funds to cover the costs for these activities. The period of institutional controls will be determined by the agency, but institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2590. Alternative requirements for waste classification and characteristics.

The agency licensing a low-level disposal facility may, upon request or on its own initiative, authorize other provisions for the classification and characteristics of waste on a specific basis, if, after evaluation of the specific characteristics of the waste, disposal site, method of disposal, it finds reasonable assurance of compliance with the performance objectives specified in this part.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

Article 5. Financial Assurances

12VAC5-481-2600. Applicant qualifications and assurances.

Each applicant shall show that it either possesses the necessary funds or has reasonable assurance of obtaining the necessary funds, or by a combination of the two, to cover the estimated costs of conducting all licensed activities over the planned operating life of the project, including costs of construction and disposal.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2610. Funding for disposal site closure and stabilization.

A. The applicant shall provide assurances prior to the commencement of operations that sufficient funds will be available to carry out disposal site closure and stabilization, including: (i) decontamination or dismantlement of land disposal facility structures; and (ii) closure and stabilization of the disposal site so that following transfer of the disposal site to the site owner the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required. These assurances shall be based on agency-approved cost estimates reflecting the agency-approved plan for disposal site closure and stabilization. The applicant's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work.

B. In order to avoid unnecessary duplication and expense, the agency will accept financial sureties that have been consolidated with earmarked financial or surety arrangements established to meet requirements of federal or other state agencies (and/or local governmental bodies) for such decontamination, closure, and stabilization. The agency will accept these arrangements only if they are considered adequate to satisfy the requirements of this section and that the portion of the surety that covers the closure of the disposal site is clearly identified and committed for use in accomplishing these activities.

C. The licensee's financial or surety arrangement shall be submitted annually for review by the agency to assure that sufficient funds will be available for completion of the closure plan.

D. The amount of the licensee's financial or surety arrangement shall change in accordance with changes in the predicted costs of closure and stabilization. Factors affecting closure and stabilization cost estimates include inflation, increases in the amount of disturbed land, changes in engineering plans, closure and stabilization that has already been accomplished, and any other conditions affecting costs. The financial or surety arrangement shall be sufficient at all times to cover the costs of closure and stabilization of the disposal units that are expected to be used before the next license renewal.

E. The financial or surety arrangement shall be either open-ended or be written for a specified period of time and shall be automatically renewed unless the person who issues the surety notifies the agency, the beneficiary (the site owner), and the principal (the licensee) not less than 90 days prior to the renewal date of its intention not to renew. In such a situation, the licensee must submit a replacement surety within 30 days after notification of cancellation. If the licensee fails to provide a replacement surety acceptable to the agency, the beneficiary may collect on the original surety.

F. Proof of forfeiture shall not be necessary to collect the surety so that, in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above shall be clearly stated on any surety instrument.

G. Financial or surety arrangements generally acceptable to the agency include surety bonds, cash deposits, certificates of deposit, deposits of government securities, escrow accounts, irrevocable letters or lines of credit, trust funds, and combinations of the above or such other types of arrangements as may be approved by the agency. Self-insurance, or any arrangement that essentially constitutes self-insurance, will not satisfy the surety requirement for private sector applicants.

H. The licensee's financial or surety arrangement shall remain in effect until the closure and stabilization program has been completed and approved by the agency, and the license has been transferred to the site owner.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2620. Financial assurances for institutional controls.

A. Prior to the issuance of the license, the applicant shall provide for agency approval, a binding arrangement, between the applicant and the disposal site owner that ensures that sufficient funds will be available to cover the costs of monitoring and any required maintenance during the institutional control period. The binding arrangement shall be reviewed periodically by the agency to ensure that changes in inflation, technology, and disposal facility operations are reflected in the arrangements.

B. Subsequent changes to the binding arrangement specified in subsection A of this section relevant to institutional control shall be submitted to the agency for prior approval.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

Article 6. Records, Reports, Tests, and Inspections**12VAC5-481-2630. Maintenance of records, reports, and transfers.**

A. Each licensee shall maintain any records and make any reports in connection with the licensed activities as may be required by the conditions of the license or by the rules, regulations, and orders of the agency.

B. Records that are required by these regulations or by license conditions shall be maintained for a period specified by the appropriate regulations or by license condition. If a retention period is not otherwise specified, these records must be maintained and transferred to the officials specified in subsection D of this section as a condition of license termination unless the agency otherwise authorizes their disposition.

C. Records that shall be maintained pursuant to this part may be the original or a reproduced copy or microfilm if this reproduced copy or microfilm is capable of producing copy that is clear and legible at the end of the required retention period.

D. Notwithstanding subsections A through C of this section, copies of records of the location and the quantity of wastes contained in the disposal site must be transferred upon license termination to the chief executive of the nearest municipality, the chief executive of the county in which the facility is located, the county zoning board or land development and planning agency, the state governor, and other state, local and federal governmental agencies as designated by the agency at the time of license termination.

E. Following receipt and acceptance of a shipment of waste, the licensee shall record the date of disposal of the waste, the location in the disposal site, the condition of the waste packages as received, any discrepancies between materials listed on the manifest and those received, and any evidence of leaking or damaged packages or radiation or contamination levels in excess of limits specified in United States Department of Transportation and agency regulations. The licensee shall briefly describe any repackaging operations of any of the waste packages included in the shipment, plus any other information required by the agency as a license condition.

F. Each licensee authorized to dispose of waste received from other persons shall file a copy of its financial report or a certified financial statement annually with the agency in order to update the information base for determining financial qualifications.

G. Do the following:

1. Each licensee authorized to dispose of waste received from other persons, pursuant to this part, shall submit annual reports to the agency. Reports shall be submitted by the end of the first calendar quarter of each year for the preceding year.

2. The reports shall include:

a. Specification of the quantity of each of the principal contaminants released to unrestricted areas in liquid and in airborne effluents during the preceding year,

b. The results of the environmental monitoring program,

c. A summary of licensee disposal unit survey and maintenance activities,

d. A summary, by waste class, of activities and quantities of radionuclides disposed of,

e. Any instances in which observed site characteristics were significantly different from those described in the application for a license, and

f. Any other information the agency may require.

3. If the quantities of waste released during the reporting period, monitoring results, or maintenance performed are significantly different from those predicted, the report must cover this specifically.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2640. Tests on land disposal facilities.

Each licensee shall perform, or permit the agency to perform, any tests the agency deems appropriate or necessary for the administration of the regulations in this part, including, but not limited to, tests of:

1. Wastes;

2. Facilities used for the receipt, storage, treatment, handling or disposal of wastes;

3. Radiation detection and monitoring instruments;

4. Other equipment and devices used in connection with the receipt, possession, handling, treatment, storage, or disposal of waste; or

5. Environmental sampling or testing.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

12VAC5-481-2650. Agency inspections of land disposal facilities.

A. Each licensee shall afford to the agency at all reasonable times opportunity to inspect waste not yet disposed of, and the premises, equipment, operations, and facilities in which wastes are received, possessed, handled, treated, stored, or disposed of.

B. Each licensee shall make available to the agency for inspection, upon reasonable notice, records kept by it pursuant to these regulations. Authorized representatives of the agency may copy and take away copies of, for the agency's use, any record required to be kept pursuant to these regulations.

Statutory Authority

§ 32.1-229 of the Code of Virginia.

Historical Notes

Derived from Virginia Register Volume 22, Issue 25, eff. September 20, 2006.

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