6 CRR-NY IV B 363 Notes

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CHAPTER IV. QUALITY SERVICES

SUBCHAPTER B. SOLID WASTES

PART 363. LANDFILLS

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(Statutory authority: Environmental Conservation Law, §§ 1-0101, 3-0301, art. 17, titles 3, 5, 7, 8, §§ 19-0301, 19-0303, 19-0306, art. 27, titles 1, 3, 7, 9, 10, 13, 15, 18, 21, 25, 26, 29, §§ 27-1901, 27-1903, 27-1911, art. 70, title 1, art. 71, titles 27, 35, 40)

6 CRR-NY IV B 363 363-1 Notes

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SUBPART 363-1. APPLICABILITY

6 CRR-NY IV B 363 363-1 Notes

6 CRR-NY IV B 363 363-1 Notes

6 CRR-NY 363-1.1

6 CRR-NY 363-1.1

363-1.1 Applicability.

(a) In addition to the requirements contained in Part 360 of this Title, this Part applies to new landfills, existing landfills both active and inactive, lateral and vertical expansions of existing landfills, or landfills undergoing subsequent development. This Part also applies to disposal facilities required by section 363-3.1 of this Part to notify the department.

6 CRR-NY 363-1.1

6 CRR-NY IV B 363 363-2 Notes

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SUBPART 363-2. EXEMPT FACILITIES

6 CRR-NY IV B 363 363-2 Notes

6 CRR-NY IV B 363 363-2 Notes

6 CRR-NY 363-2.1

6 CRR-NY 363-2.1

363-2.1 Exempt facilities.

The following activities or facilities are exempt from this Subpart:

(a) the storage, processing, and disposal of solid waste generated by an owner-occupied single-family residence provided all activities occur on the property where the waste was generated, with the exception of the following wastes:

(1) manufactured homes being disposed of that are not the owner’s primary residence;

(2) friable asbestos-containing waste;

(3) waste tires;

(4) septage;

(5) raw sewage;

(6) syringes;

(7) pesticides and pesticide containers;

(8) electronic waste;

(9) mercury-added consumer products, including mercury thermostats;

(10) household hazardous wastes (HHW);

(11) rechargeable or lead-acid batteries;

(12) used oil; and

(13) antifreeze;

(b) the storage, processing, and disposal of solid waste generated from farm-related activities provided all storage, processing and disposal occurs on a farm, though not necessarily the generating farm, excluding construction and demolition (C&D) debris and wastes identified in subdivision (a) of this section;

(c) an individual grave, including one at a pet cemetery, for the burial of one animal carcass. Animal cremains may be buried or spread on the soil surface provided the ash amount does not represent more carcasses in a given area than would be allowed if the animals were buried in individual graves;

(d) a facility for the disposal of up to 10 road killed animals in the right-of-way of a public highway provided the facility is at least 200 feet from drinking water wells and 50 feet from any residence, surface water, or any other disposal area for road killed animals. The animals must be placed at least 2 feet above groundwater and must be covered with at least 3 feet of soil;

(e) a disposal facility for drill cuttings generated by air- or water-based drilling methods, overburden, tailings, and other similar mining and drilling waste when generation and disposal occur at the same mine or well location subject to regulation under Parts 420-425 and 550-559 of this Title;

(f) a disposal facility for the burial of no more than 10 cubic yards of religious items limited to paper, parchment, leather, and fabric in accordance with applicable religious practices and covered by at least 2 feet of soil from the same excavation.

(g) a tree debris disposal facility, except those located in Nassau or Suffolk counties, used for the disposal of tree debris provided the facility complies with the following conditions:

(1) no fee or other form of consideration is obtained for using the facility or for acceptance or placement of tree debris;

(2) the tree debris is only accepted during daylight hours between sunrise and sunset;

(3) no more than one acre of the facility is utilized for tree debris disposal during the lifetime of the facility; and

(4) tree debris is placed above the seasonal high groundwater table and no waste is placed in a surface water body;

(h) a facility, except those located in Nassau or Suffolk counties, where waste consisting only of recognizable, uncontaminated concrete or concrete products (including those that have embedded steel or fiberglass reinforcing rods), asphalt pavement, brick, glass, rock, and general fill from construction and demolition activities, is accepted for disposal, and which complies with the following conditions:

(1) no fee or other form of consideration is obtained for using the facility or for acceptance or placement of the waste;

(2) the waste is only accepted during daylight hours between sunrise and sunset;

(3) the waste does not include residues from C&D debris handling and recovery facilities;

(4) waste is placed above the seasonal high groundwater table and no waste is placed in a surface water body; and

(5) no more than a total of 5,000 cubic yards of waste is received during the lifetime of the facility;

(i) a facility except those located in Nassau or Suffolk counties, where waste generated by State or municipal highway projects and managed on highway rights-of-way or municipally owned properties is accepted, consisting only of recognizable, uncontaminated concrete or concrete products (including those that have embedded steel or fiberglass reinforcing rods), asphalt pavement, brick, glass, rock, general fill, and restricted-use fill from construction and demolition activities, and which complies with the following conditions:

(1) the waste does not include residues from C&D debris handling and recovery facilities; and

(2) waste is placed above the seasonal high groundwater table and no waste is placed in a surface water body.

6 CRR-NY 363-2.1

6 CRR-NY IV B 363 363-3 Notes

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SUBPART 363-3. INACTIVE DISPOSAL FACILITIES

6 CRR-NY IV B 363 363-3 Notes

6 CRR-NY IV B 363 363-3 Notes

6 CRR-NY 363-3.1

6 CRR-NY 363-3.1

363-3.1 Notifications for inactive disposal facilities.

The owner or operator of a disposal facility at which waste acceptance ceased prior to October 9, 1993 must notify the department in writing, of:

(a) any intent or plan to disturb such disposal area. Notification to the department must be made prior to disturbance of the disposal area or, if applicable, any landfill cap; or

(b) the discovery of any exposed waste, a surface discharge of leachate not permitted pursuant to a State Pollutant Discharge Elimination System permit, a contravention of groundwater quality standards promulgated by the department pursuant to Environment Conservation Law section 17-0301, migration of disposal facility gases beyond the perimeter of the disposal facility, vectors, subsidence or subsidence-induced ponding, slope failures, or any other significant adverse environmental impacts from the disposal facility.

6 CRR-NY 363-3.1

6 CRR-NY IV B 363 363-4 Notes

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SUBPART 363-4. PERMIT APPLICATION REQUIREMENTS

6 CRR-NY IV B 363 363-4 Notes

6 CRR-NY IV B 363 363-4 Notes

6 CRR-NY 363-4.1

6 CRR-NY 363-4.1

363-4.1 Landfill permit application requirements.

Unless otherwise exempt, the owner or operator of a landfill must obtain a permit from the department. In addition to the criteria found in section 360.16 of this Title, a permit application for a landfill must contain the information enumerated in this Subpart.

6 CRR-NY 363-4.1

6 CRR-NY 363-4.2

6 CRR-NY 363-4.2

363-4.2 Engineering drawings.

(a) Maps and drawings.

Maps and drawings using the following format and containing the following information must be submitted:

(1) a regional map that provides the location of the facility and the location of and distance to any airports located within six miles of the facility;

(2) a vicinity map that delineates zoning and land use, communities of disproportionate impact, residences, principal aquifers, primary aquifers, surface waters, access roads, and other existing and proposed features on the facility and within one mile of the facility; and a wind rose identifying the prevailing wind direction based on the nearest local source of meteorological data; and

(3) a site plan and drawings of the facility that show:

(i) property boundaries;

(ii) off-site and on-site utilities, including electric, gas, stormwater and sanitary systems;

(iii) right-of-way easements including noise easements;

(iv) the names and addresses of contiguous property owners;

(v) the location of soil borings, excavations, test pits, gas venting structures, wells, piezometers, environmental and facility monitoring points and devices, benchmarks and permanent survey markers. With the exception of benchmarks and permanent survey markers, each location must be identified in accordance with a numbering system acceptable to the department. All horizontal locations must be accurate to the nearest 10th of a foot and all vertical locations must be accurate to the nearest 100th of a foot as measured from the ground surface and top of well casing;

(vi) a delineation of the total facility area, including planned staged development of the landfill's construction and operation, and the lateral and vertical limits of previously filled areas (if applicable);

(vii) the location and identification of on-site sources of cover materials;

(viii) the location and identification of special waste (such as, alternative operating cover materials or select fill materials) handling areas;

(ix) on-site buildings, leachate storage and conveyance systems, landfill gas management system components, roads, and parking areas; and

(x) site topography with five-foot minimum contour intervals.

(b) Engineering drawings of the landfill in both plan and cross-sectional views, depicting: how the facility will be constructed, operated and closed; areas of potential environmental impact; and the ability of the design, construction, operation, and closure of the facility to comply with the applicable requirements of this Part. If the landfill is to be constructed in stages, the initial permit application must contain the conceptual design for the entire landfill and the detailed construction drawings for the initial stage to be constructed. The engineering drawings must include, at a minimum:

(1) the original undeveloped site topography before excavation or placement of waste, if available;

(2) the existing site topography (if different from the original undeveloped site topography) including the location and approximate thickness and nature of any existing waste;

(3) the elevations of the known or interpolated seasonal high groundwater table, and the wells from which data were taken to establish the seasonal high groundwater table, using a 100-foot square grid, including surface elevation, bedrock elevation, depth to bedrock, and groundwater flow direction at each well;

(4) the known and interpolated bedrock elevations, the upper and lower limits of any confining overburden deposits, and all boreholes, test pits, wells, and other points used to supply this information using a 100-foot square grid;

(5) the proposed limits of excavation delineating the base elevations of the liner and leachate collection and removal system and pore pressure relief system if present, using a 100 foot square grid;

(6) the details for all components of the final cover and the final cover elevations for each 100-foot square grid intersection;

(7) the details for all components of the liner system, anchor trenches and leachate collection and removal system, including all critical grades and elevations of collection pipe inverts and drainage envelopes, manholes, cleanouts, valves, sumps, leachate flow control and metering devices, and drainage blanket thicknesses;

(8) the berms, dikes, ditches, drainage swales, culverts, sedimentation ponds, recharge basins and other devices used to divert, collect or control surface water run-on or run-off;

(9) the groundwater dewatering systems;

(10) the landfill gas management system used for collecting, treating, venting and monitoring the decomposition gases generated within the landfill, including any active landfill gas collection system components, including the condensate conveyance lines and storage facilities. Detailed plans of any active gas collection system must adequately delineate, in plan and in cross-sectional views, the location and grades of all landfill gas collection lines and landfill gas control lines, locating and showing all critical elevations of the collection pipe inverts, cleanouts, condensate knockout sumps, and valves. Layout of the system structure must be included, showing equipment locations; sampling locations; on-site drainage structures; and extraction well location, depth of placement, and construction materials;

(11) the location of groundwater monitoring wells;

(12) the location of geophysical and geochemical monitoring devices or structures, if needed;

(13) the location of leachate storage, treatment and disposal system including the leachate conveyance network and secondary containment system required in section 363-6.20 of this Part; and

(14) the plans detailing the construction staging area if proposed, and facility entrance area including gates, fences and signs.

(c) Operational drawings for the facility depicted in plan and cross-sectional views, showing:

(1) generalized fill progression drawings depicting fill progression for the life of the facility, identifying the depth, location and sequence of fill progression, and including the elevation of the liners, leachate collection and removal system, landfill gas management system and projected final waste mass;

(2) detailed fill progression drawings depicting fill progression for the first operational phase, identifying the placement of waste including special waste areas, lift thickness, and compacted thickness of operating and final cover; landfill gas management system; and on-site roadways and traffic patterns; and

(3) a survey control drawing depicting a method of survey baseline and elevation control and identifying the location and description of a permanent surveying benchmark and other critical facility monitoring locations and appurtenances for each 25 acres of the developed facility.

6 CRR-NY 363-4.2

6 CRR-NY 363-4.3

6 CRR-NY 363-4.3

363-4.3 Engineering report.

The engineering report must contain, at a minimum:

(a) a site description and analysis of the proposed facility including the following:

(1) a brief description of the type and amount of waste, in tons, accepted by the facility, specifying the anticipated maximum amount of wastes to be accepted on a daily and annual basis, including those wastes anticipated to be accepted for use as alternative operating cover, the anticipated maximum in-place density of waste to be placed in the landfill, and the proposed maximum amount of waste and alternative operating cover that will be placed in the landfill;

(2) a description of the number, types and specifications of all machinery and equipment needed to effectively operate the facility at the proposed rate of waste acceptance, and all proposed structures and areas designated for unloading, processing, sorting, storage, and loading;

(3) a description of the materials and construction methods that demonstrate compliance with the requirements in Subpart 363-6 of this Part and are used for the placement of:

(i) each monitoring well pursuant to the requirements of section 363-4.4(k) of this Part;

(ii) the landfill gas management system;

(iii) the leachate conveyance, storage, treatment and disposal system;

(iv) the cover system; and

(v) the liner and leachate collection and removal system. The description must also include the precautions that will be taken to prevent frost action upon the composite liner system in areas where waste will not be placed within one year of department approval of construction certification;

(4) a description of post construction care measures to be taken to ensure that the construction materials noted in paragraph (3) of this subdivision meet the specifications and comply with the requirements of Subpart 363-6 of this Part from the time of construction completion to the beginning of landfill operation;

(5) a comprehensive and detailed description of each of the following features of the operation of the landfill gas management system:

(i) a year-by-year estimate of the quantities of landfill gas that will be generated during the active life and post-closure care period, including a year-by-year estimate of greenhouse gas emissions;

(ii) how landfill gas will be managed;

(iii) how any landfill gas condensate generation will be minimized, disposed, and/or recirculated into the landfill waste mass;

(iv) all machinery, equipment, and construction materials to be used at the facility, including the equipment design capacity;

(v) how the landfill gas management system will be designed, constructed and maintained so as not to interfere with the integrity of the proposed or existing landfill final cover system; and

(vi) a description of how the landfill gas management system will effectively control landfill decomposition gas-related odors;

(b) a landfill liner subbase settlement analysis that:

(1) predicts the total and differential settlement of the landfill subbase, liner, leachate collection and removal system, and other critical containment structure components of the landfill demonstrating that the liner system and leachate collection and removal system will maintain

their integrity and performance at the maximum predicted settlements. The calculated settlement should account for secondary consolidation for a period of 30 years after the estimated closure date of the facility;

(2) includes plan and cross-sectional views depicting the predicted maximum critical landfill subbase settlement elevations and the landfill liner and leachate collection and removal system elevations when the subbase settlement analysis predicts settlement exceeding one foot. In all cases, the slope must not be less than one percent for pipe valley areas and two percent for liner subbase areas; and

(3) includes a landfill settlement monitoring plan when the landfill subbase settlements are predicted to exceed one foot. The landfill settlement monitoring plan must be designed to demonstrate that the leachate collection and removal system is functioning as designed and to verify acceptable integrity of key leachate collection and removal system and conveyance appurtenances within the system;

(c) a structural integrity and overall slope stability analysis.

The analysis must demonstrate the structural integrity and overall stability of the landfill site, the subgrade, each component of the liner, leachate collection and removal system, and final cover system, and must include:

(1) an evaluation of the following failure modes:

(i) overall global stability of the waste mass and foundation soils;

(ii) local and deep stability along critical interfaces of the liner and final cover system, including veneer stability of the leachate drainage and protective cover soil layers above liners and along drainage soil layers and geosynthetic interfaces within the landfill final cover system for anticipated field conditions. The analysis must identify the shear strength properties necessary to meet the requirements of paragraph (3) of this subdivision; and

(iii) local and global stability of access routes, leachate storage tanks, landfill access ramps, retaining walls, and other applicable facility components critical to operation, closure and monitoring of the facility;

(2) an evaluation of site geometries, impacts of pore pressures and loading conditions:

(i) during construction of the liner and final cover system;

(ii) during filling or excavating of waste in the landfill, including the typical stockpiling of materials, overfilling and other interim conditions;

(iii) at full load conditions represented by attaining the landfill’s maximum design capacity; and

(iv) associated with leachate recirculation, if proposed;

(3) a demonstration that the design achieves the following factors of safety under static stability conditions:

(i) a minimum factor of safety of 2.00 for the subgrade soil-bearing capacity of any loaded structures or appurtenances (*e.g.*, tanks, manholes, retaining walls, etc.) associated with the landfill at full load conditions;

(a) if the factor of safety for the soil-bearing capacity is less than 3.00, it must be demonstrated that the structures or appurtenances can accommodate the anticipated settlements over the life of the facility:

(ii) a minimum factor of safety of 1.25 for the design of the facility liner and leachate collection and removal system components for short-term conditions considering the maximum anticipated construction and early landfill operational transient loads;

(iii) a minimum factor of safety of 1.50 for interim and final elevation of waste slopes that occur during operation and upon closure of a landfill cell; and

(iv) a minimum factor of safety of 1.50 for the final cover system considering seepage patterns that will typically develop assuming the saturated hydraulic conductivity of the barrier protection and topsoil layers during the wettest months of the year;

(d) a seismic stability analysis.

Any facility located in a seismic impact zone, must include a seismic stability analysis. The seismic stability analysis must address the serviceable life of the landfill, its internal components and its related appurtenances and must demonstrate that:

(1) all long-term containment structures, including liners, the leachate collection and removal system, and the surface water control system but excluding the cover system, are stable by utilizing either:

(i) a pseudo-dynamic analysis that demonstrates all long-term containment structures are designed to retain a minimum factor of safety of 1.0 using a seismic coefficient (expressed as a fraction of the acceleration of gravity) equal to one-half the free field peak ground acceleration at the site for the design earthquake (*i.e.*, the earthquake induced maximum horizontal acceleration of 0.01g in 250 years in the lithified earth from the latest USGS seismic hazard map or site specific seismic hazard study); or

(ii) a displacement analysis that limits the calculated permanent seismic deformations to less than six inches using a decoupled seismic response/deformation analysis, to resist the maximum horizontal acceleration for the site;

(2) the landfill’s long-term containment structures and any related appurtenances are not susceptible to damage from liquefaction when subjected to the maximum horizontal acceleration in lithified earth;

(e) a description and analysis of the leachate collection and removal system that includes:

(1) an evaluation of leachate generation data, including:

(i) an estimate of the leachate generation quantities for the landfill, based on the maximum hydraulic infiltration rate using a 24-hour 25-year storm, assuming little or no waste in place in the landfill;

(ii) an evaluation of impacts on the portion of the landfill's leachate collection and removal system, that does not have intermediate or final cover material placed, which would result from a 500-year storm and provide discussion of mitigating procedures to such impacts; and

(iii) for landfill expansions or landfills undergoing subsequent development, an analysis of the anticipated increase above the existing landfill's actual leachate generation as a result of the expansion and/or subsequent development;

(2) a description of how the components of the landfill liner and leachate collection and removal system will:

(i) withstand dynamic and static loading stresses anticipated during the construction, operation, closure, post-closure period of the facility, including subsequent permit modifications that involve changes in waste types and vertical expansion designs;

(ii) allow for effective monitoring of leachate flow and liner system performance; and

(iii) allow for effective access for routine maintenance;

(3) an estimate of the maximum daily volume of leachate generated, and a demonstration that the leachate head on the primary liner system will not exceed 12 inches per the provisions of section 363-6.6(a)(3) of this Part, and that the maximum daily volume of leachate that may infiltrate through the primary liner will not exceed the allowable primary liner leakage rate of 20 gallons per acre per day in accordance with provisions of section 363-7.1(f)(7) of this Part;

(f) design information for a stormwater/run-off conveyance system.

This information must demonstrate that the stormwater detention/retention basin system is designed to manage a 100-year, 24-hour design storm from the landfill site without sustaining damage. This must include an evaluation of impacts on the stormwater/run-off conveyance system which would be anticipated as from a 500-year storm to inform a contingency plan for such an event;

(g) a mined land use plan.

If the facility plans to use on-site excavation of operating cover material for the landfill, and construction of that landfill will not result in the reclamation of the area from which the operating cover material is to be removed, the facility must submit a mined land use plan with

information that demonstrates compliance with the applicable requirements of Part 422 of this Title. A mined land use plan is not required if the facility plans to perform on-site excavation of material to be used as operating cover for the landfill and the landfill will be situated upon and result in the reclamation of the area from which the operating cover material is to be removed. Operating cover material excavated on-site may not be used off-site unless the applicant has first obtained a mining permit pursuant to Part 422 of this Title;

(h) facility closure and post-closure design plan.

The facility's closure and post-closure design plan must include at a minimum:

(1) closure design;

(2) post-closure water quality monitoring program;

(3) an operation and closure plan for the leachate collection, treatment, and storage facilities;

(4) an operation and closure plan for the landfill gas management system; and

(5) any proposed and alternative end uses for the site.

6 CRR-NY 363-4.3

6 CRR-NY 363-4.4

6 CRR-NY 363-4.4

363-4.4 Hydrogeologic investigation report.

(a) A hydrogeologic investigation report is required and must contain the following:

(1) a description of the geology and hydrology of the existing or the facility in sufficient detail to determine the suitability of the site for the disposal of waste. The report must be submitted under the stamp and signature of a professional geologist or professional engineer licensed and currently registered to practice in the State of New York. The scope and extent of the hydrogeologic investigation must be based on the hydrogeologic complexity of the site and the ability of the site to restrict contaminant migration, and include:

(i) an understanding of groundwater and surface water flow and how it relates to local and regional patterns, including a groundwater table elevation map with groundwater flow direction calculated from hydraulic head measurements;

(ii) a definition of the critical stratigraphic section;

(iii) the establishment of an environmental monitoring system capable of readily detecting a contaminant release from the facility; and

(iv) a description of the engineering properties of the site, which provide the basis for the design and construction of the facility including contingency plans relating to groundwater or surface water contamination or gas migration;

(2) raw field data, analytical calculations, maps, flow nets, cross sections, interpretations (with alternative interpretations where applicable), and conclusions. All maps, drawings and diagrams must have a minimum scale of 1:24,000, unless otherwise approved by the department. The description must include:

(i) regional geology. A discussion of the regional geology demonstrating how the regional geology relates to the facility's geology and the location of nearby sensitive environments must include:

(a) bedrock stratigraphy and structural geology, including formation and member names, geologic ages, rock types, thicknesses, the units' mineralogical and geochemical compositions and variabilities, rock fabrics, porosities, bulk permeabilities, and other distinctive features;

(b) glacial geology, including a discussion of the formation, timing, stages, and distribution of glacial deposits, advances and retreats, and hydrologic characteristics of the surficial deposits, such as kames, eskers, outwash moraines, etc.;

(c) major topographic features, their origin and their influence upon drainage basin characteristics; and

(d) surface water and groundwater hydrologic features, including surface drainage patterns, recharge and discharge areas, wetlands and other sensitive environments, inferred regional groundwater flow directions, aquifers, aquitards and aquicludes, primary water supply and principal aquifers, public water supply wells, and private water supply wells identified in the water supply well survey; any known peculiarities in surface water and groundwater geochemistry; and any other relevant features;

(ii) facility geology. Hydrogeologic conditions at the facility in three dimensions and their relationship to the proposed facility. The report must:

(a) define site geology, surface water and groundwater flow, and must relate site specific conditions to the regional geology;

(b) describe the potential impact the facility may have on surface and groundwater resources and other receptors, including changes in hydrogeologic conditions that may occur with site development, and the potential for and effects of off site contaminant migration;

(c) describe hydrogeologic conditions in sufficient detail to construct a comprehensive understanding of groundwater flow that can be quantified and verified through hydrologic, geochemical, and geophysical measurements;

(d) provide sufficient data to specify the location and sampling frequency for environmental monitoring points, form the basis for contingency plans regarding groundwater and surface water contamination and explosive gas migration, and support the design of the facility;

(e) specifically discuss all units in the critical stratigraphic section. This evaluation must include maps, cross sections, other graphical representations, and a detailed written analysis of the following:

(1) all hydrogeologic units (*e.g.*, aquifers, aquitards and aquicludes), and how they relate to surface water and groundwater flow. This must include all hydrogeologic data collected during the site investigation and explain and evaluate the hydrologic and engineering properties of the site and each specific unit; and

(2) local groundwater recharge and discharge areas, high and low groundwater tables and potentiometric surfaces for each hydrogeologic unit, vertical and horizontal hydraulic gradients, groundwater flow directions and velocities, groundwater boundary conditions, surface water and groundwater interactions, and an evaluation of existing water quality.

(b) Any aspect of the site investigation that deviates from these requirements of this section must be identified and justified in the site investigation report and must be approved by the department.

(c) The applicant must employ current, standard, and generally accepted procedures in obtaining the required hydrogeologic information.

(1) The department may approve of alternative or innovative methods; however, the department may initially require redundant technologies to prove the reliability of a new method.

(2) A professional geologist licensed and currently registered to practice in the State of New York State, having experience in similar hydrogeologic investigations, must supervise all procedures in a manner that ensures the accuracy of the data and precludes environmental degradation.

(3) The location of all installations, geophysical and geochemical surveys, and seismic lines for the proposed investigation must be shown on a map with the same scale and coordinate grid system used in the application.

(d) Literature search.

A comprehensive search for pertinent and reliable information concerning regional and site-specific hydrogeologic conditions is required. The literature search must include, as available, records and reports of the Department of Health, the Department of Transportation, the U.S. Soil Conservation Service, and the New York State Geological Survey; basin planning reports, groundwater bulletins, water supply papers, professional papers and other open file reports of the U.S. Geological Survey; bulletins, circulars, map and chart series, memoirs and other publications of the New York State Geologic Survey; publications and bulletins of the

Geological Society of America and other professional organizations; publications of the EPA and the department; college and university reports; and aerial photography and remotely sensed imagery.

(e) Surficial geologic mapping.

The facility must be mapped to determine the distribution of surficial deposits on and surrounding the site based on information from the hydrogeologic investigation, field evaluations, and field confirmation of all interpretations made on the site itself. The surficial geological map must be submitted under the stamp and signature of a professional geologist or professional engineer licensed and currently registered to practice in the State of New York.

(f) Test pits.

Test pits may be used to determine shallow stratigraphy. The test pits must be logged by a professional geologist or engineer licensed to practice in the State of New York, and with experience in similar hydrogeologic investigations. Logs must be kept and include: elevations; surface features before excavation; depth of the test pit and of all relevant horizons or features; moisture content of units; standard soil classifications, stratigraphy, soil structure, bedrock lithology, and brittle or secondary structures in soil and bedrock; active seepage; and a sketch showing these features for each test pit. Test pits must be promptly backfilled and compacted with the excavated materials. The department may require that undisturbed soil samples be taken and tested in accordance with paragraph (l)(2) of this section.

(g) Water well surveys.

A survey of public and private water wells within one mile downgradient and one quarter mile upgradient of the facility must be conducted. Surveys must obtain, where available, the location of wells, which must be shown on a map with their approximate elevation and depth, name of owner, age and usage of the well; stratigraphic unit screened; well construction; static water levels; well yield; perceived water quality; and any other relevant data that can be obtained.

(h) Geophysical and geochemical surveys.

The department may require the use of geophysical and geochemical methods, such as electromagnetic, resistivity, seismic surveys, remote sensing surveys, downhole geophysics, isotope geochemistry, and soil gas analysis to justify the interpretations and conclusions of the site investigation report, to provide information between boreholes, and to aid in the siting of wells. The geophysical and geochemical surveys must be submitted under the stamp and signature of a professional geologist or professional engineer licensed and currently registered to practice in the State of New York.

(i) Tracer studies.

The department may require the use of tracer studies to aid in understanding groundwater flow, including:

(1) where a site overlies limestone or dolostone bedrock or karst environments. Tracer studies must identify areas of groundwater flow from the facility attributed to secondary permeability, any recharge or discharge areas on and surrounding the site, groundwater storage, and seasonal variations of water levels; and

(2) to monitor sites with existing contamination, in accordance with section 363-5.1(g)(2) of this Part.

(j) Site investigation work plan.

The site investigation work plan must clearly define the scope of the intended investigation, all methods used in investigating the hydrogeologic conditions of the site and any specific hydrogeologic questions to be addressed.

(k) Monitoring wells and piezometers.

(1) General requirements.

(i) Monitoring wells and piezometers must define the three dimensional flow system within the critical stratigraphic section.

(ii) Construction techniques must ensure that groundwater samples and water level measurements characterize discrete stratigraphic intervals, and prevent leakage of groundwater or contaminants along the well annulus. If leakage is detected, it must be corrected or the well properly sealed.

(iii) Monitoring wells and piezometers may be placed individually or as well clusters. Well clusters consist of individual wells at varying depths in close proximity, each installed in its own boring. Multiple wells placed into one large borehole are prohibited unless prior department approval in writing is obtained.

(iv) Soil borings, soil samples, and rock cores must characterize each stratigraphic unit within the critical stratigraphic section.

(v) Precautions must be taken during drilling and construction of monitoring wells to avoid introducing contaminants into a borehole. Only potable water of known chemistry may be used in drilling monitoring wells or piezometers unless otherwise approved by the department in writing.

(vi) All equipment placed into the boring must be properly decontaminated before use and between boreholes. The initial cleaning at the site must ensure that no contaminants from the last site drilled will be introduced into the borings. All equipment must be properly decontaminated between holes.

(vii) Where possible, upgradient wells should be drilled first.

(viii) The use of drilling mud must be avoided unless prior department approval is granted in writing. If drilling mud is used, the material used must avoid the introduction of contaminants. Drilling mud must not be used within 10 feet of the screened interval.

(ix) Air systems and drilling lubricants must not introduce contaminants into the borehole.

(x) Well borings must have a minimum diameter that is two inches larger than the outside diameter of the well screen and riser to ensure that a tremie pipe may be properly used.

(xi) Wells and well borings must not be placed through or into waste unless prior department approval has been granted in writing and sufficient safety precautions are employed. If waste is unexpectedly encountered during drilling, then drilling of that boring must cease, the hole must be properly sealed, cuttings properly disposed of and the department notified.

(2) Construction of monitoring wells and piezometers.

(i) Well screens and risers must be constructed of materials selected to last for the required monitoring period of the facility without contributing contaminants to, or removing contaminants from, the groundwater. All materials used are subject to department approval. Joints, caps, and end plugs are to be secured by either welds, threads with thread seal tape, or force fittings. Solvents and glues or other adhesives are prohibited. Caps must be vented to allow for proper pressure equalization. The inside diameter of each well screen or riser pipe must be nominally two inches in diameter and must allow for proper development and for surveying and sampling equipment to be used within the screen and casing. A permanent mark should be made at the top of the riser pipe to provide a datum for subsequent water level measurements.

(ii) Well screens are required for all wells and piezometers, unless otherwise approved by the department. All screens used must be factory-constructed non solvent welded/bonded continuous slot wire wrap screens of a material appropriate for long-term monitoring. The slot size of the screen must be compatible with the sand pack. Water table variations, site stratigraphy, expected contaminant behavior, and groundwater flow must be considered in determining the screen length, materials, and position. Where existing contamination is suspected or known, downhole geophysical techniques may be required by the department to aid in selecting well screen elevations.

(iii) The sand pack surrounding the well screen must consist of clean inert siliceous material. Grain size must be based on a representative sieve analysis of the zone to be screened. The sand pack must minimize the amount of fine materials entering the well and must not inhibit water inflow to the well. The sand pack must be placed in the annular space around the well screen and extend above the top of the screen by two feet or 20 percent of the screen length (whichever is greater). In addition, the sand pack must extend six inches below the bottom of the screen. The sand pack material must be placed using an appropriate method and must avoid bridging. Alternative methods of placing the sand pack must be approved by the department in writing. The sand pack must be checked for proper placement. A finer-grained sand pack material (100 percent passing the No. 30 sieve and less than two percent passing the No. 200 sieve) six inches thick must be placed at the top of the sand pack between the sand and the bentonite seal.

(iv) Bentonite must be placed above the sand pack using a tremie or other method approved by the department to form a seal at least three feet thick. A 6- to 12-inch fine-grained sand pack must be placed above the bentonite seal to minimize grout infiltration. If bentonite pellets or chips are used, full hydration of the bentonite is required prior to emplacement of overlying materials.

(v) Grout of cement/bentonite, bentonite, or other suitable, low-permeability material must completely fill the remaining annular space to the surface seal. The grout mixture must set-up without being diluted by formation water, and must displace water in the annular space to ensure a continuous seal. The grout mixture must be placed under pressure using a tremie or other method approved by the department. Auger flights or casing must be left in the hole before grouting to prevent caving. The cement used must be appropriate for the groundwater chemistry of the site.

(vi) A protective steel casing, nominally at least two inches larger in diameter than the well casing, must be placed over the well casing or riser pipe and secured in a surface well seal to adequately protect the well casing. A distinctive, readily visible marker must be permanently attached to or near the protective casing to identify the well and ensure visibility. A drain hole must be drilled at the base of the protective casing. A vent hole must be located near the top of the protective casing to prevent explosive gas build up and to allow water levels to respond naturally to barometric pressure changes. The annulus of the protective casing should be filled with gravel. A locking cap must be installed with a minimum of a one-inch clearance between the top of the well cap and the bottom of the locking cap when in the locked position. A weather-resistant padlock must be placed on the protective casing. Padlock keys must be maintained at the facility and provided to department staff upon request.

(vii) A concrete surface seal designed to last throughout the planned life of the monitoring well must be constructed. The surface seal must extend below the frost depth to prevent potential well damage. The seal must be designed to prevent surface run-off from entering the well casing. In areas where traffic may cause damage to the well, bollards or other suitable protection for the well are required. Any damaged or deteriorated surface seals must be reported to the department and repaired or replaced in an appropriate manner. The department may allow alternate designs when documentation is presented that demonstrates the intent of the regulations are met or exceeded.

(viii) Alternative construction methods for piezometers and wells that are not to be part of the environmental monitoring plan may be approved in writing by the department if those methods meet the requirements set forth in subparagraph (1)(ii) of this subdivision.

(3) Well and piezometer development. All wells and piezometers must be developed as soon as possible after installation, but not before the well seal and grout have set. Water must not be introduced into the well for development, except with written approval of the department. Any contaminated water withdrawn during development must be properly managed. Development must not disturb the sand pack or the strata above the water bearing zone or damage the well. The entire saturated screened interval must be developed. The department may require multiple attempts at well development to increase the likelihood of obtaining sediment free water.

Development methods must be appropriate for formation conditions. The selected method must minimize to the greatest extent possible the amount of turbidity in the well.

(4) Survey. The locations and elevations of all existing and abandoned test pits, soil borings, monitoring wells, and piezometers must be surveyed to obtain their precise location and plotted on a map in the site investigation report. The vertical location of the ground surface and the mark made on the top of the monitoring well and piezometer risers must be accurately measured to the nearest 100th foot.

(5) Well replacement. All wells must be properly protected to ensure their integrity throughout the active life, post-closure period, and custodial care period of the facility. If, in the opinion of the department, water quality or other data show that the integrity of a well is lost, the well must be replaced and sampled within a time period acceptable to the department (but not to exceed 120 days) after written notification by the department. The initial sample for the replacement well must be analyzed for baseline parameters in the Water Quality Analysis Tables in this Subpart.

(6) Well abandonment. All soil borings, rock cores or other abandoned wells that are not completed as monitoring wells or piezometers must be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the borehole. Generally, sealing must include:

(i) overboring or removal of the casing to the greatest extent possible, followed by perforation of any casing left in place. All casing and well installations in the upper five feet of the boring, or within five feet of the proposed level of excavation, must be removed;

(ii) sealing by pressure injection with cement bentonite grout, using a tremie or other method acceptable to the department. The cement must extend the entire length of the boring to no less than five feet below the ground surface or the proposed excavation level. The screened interval of the borehole must be sealed separately and tested to ensure its adequacy before sealing the remainder of the borehole. Where the surrounding geologic deposits are highly permeable, alternate methods of sealing may be required to prevent the migration of the grout into the surrounding geologic formation. The well must be backfilled to at least five feet below ground surface with appropriate native materials compacted to avoid settlement; and

(iii) the sealed site must be restored to a safe condition. The site must be inspected periodically after sealing for settlement or other conditions that may require remediation.

(7) Well extension. All well extensions must be constructed to ensure the future use of the well. The outer casing and the concrete pad must be removed prior to extending the well casing.

(l) Geologic sampling.

(1) All borings and rock cores must be sampled continuously to the base of the critical stratigraphic section. For well clusters, continuous samples must be collected from the surface to the base of the deepest well. Other wells in the cluster must be sampled at all stratigraphic

changes, and at the screened interval. At sites where the geology is not of a complex nature the department may allow a reduction in the number of wells requiring continuous sampling. Soil borings must be sampled using the split spoon method, or other approved methods such as continuous sonic core sampling, and bedrock or boulders must be sampled by coring with standard size NX or larger diameter core bits. Samples must be retained in labeled glass jars or wooden core boxes. All samples must be securely stored and accessible throughout the life of the facility. The location of the storage area must be designated in the facility manual.

(2) A representative number of undisturbed samples must be collected from test pits and borings using appropriate methods to identify the characteristics of all cohesive soil units. These samples must be analyzed in the laboratory for: Atterberg limits; gradation curves by sieve or hydrometer analysis or both; undisturbed permeabilities; and visual descriptions of undisturbed soil structures and lithologies. Laboratory analysis of non-cohesive soil units may also be required.

(m) Logs.

(1) Complete drilling logs must be provided to the department for all soil borings. These logs must provide detailed soil classification according to the Unified Soil Classification System (USCS). The USCS visual method must be used on all samples supplemented by the USCS laboratory tests on a representative number of samples from each stratigraphic unit and each screened interval. Logs also must contain a description of the matrix, clasts, mineralogy, roundness, color, appearance, odor, and behavior of materials using an appropriate descriptive system. A clear description of the system used must be included with the logs. All well logs must contain drilling information observed in the field including: moisture content, location of the water table during drilling, water loss during drilling, depth to significant changes in lithology, depth to bedrock, sample recovery (measured in tenths of a foot), hammer blow counts, the method of drilling, any anomalous features (*e.g.*, gas in the well), and the use and description of drilling fluids or additives, including the source, and calculated and actual amounts of materials used.

(2) Rock core logs must describe the lithology, mineralogy, degree of cementation, color, grain size, and any other physical characteristics of the rock; percent recovery and the rock quality designation (RQD); other primary and secondary features, and contain all drilling observations and appropriate details required for soil boring logs. A clear photograph of all labeled cores must also be taken and submitted with the logs.

(3) Well completion logs must contain a diagram of the installed well, all pertinent details on well construction, a description of the materials used, and elevations of all well features.

(4) Copies of original field logs must be submitted to the department upon request.

(n) In situ hydraulic conductivity testing.

In situ hydraulic conductivity testing must be done in all monitoring wells and piezometers, unless otherwise approved by the department. The testing method used must not introduce contaminants into the well. If contamination is known or suspected to exist, all water removed

must be properly managed. Hydraulic conductivities may be determined using pump tests, slug tests, packer tests, tracer studies, isotopic geochemistry, thermal detection, or other suitable methods.

6 CRR-NY 363-4.4

6 CRR-NY 363-4.5

6 CRR-NY 363-4.5

363-4.5 Construction quality assurance (CQA) and construction quality control (CQC) plan.

The CQA and CQC plan must address the observations and tests that will be used before, during, and upon completion of construction to ensure that the construction materials and activities meet the requirements of Subpart 363-6 of this Part. For each specified phase of construction, this plan must include:

(a) Delineation of responsibilities.

A delineation of the responsibilities of all personnel involved in implementing the CQA and CQC plan. A specific chain of command for both the CQA and CQC inspectors and the project engineer must be identified. The minimum number of CQA and CQC officers and supporting personnel to be provided must be described for each major phase of construction.

(b) Personnel qualifications.

A description of the required level of experience, training, and certification for the contractor, installation crew, and CQA and CQC officers and inspectors. In addition, a description of any professional, financial, or other relationships between the project engineer, the facility owner or operator, and the construction contractor(s), and a demonstration that they are capable of operating independently and without influence must be included.

(c) Inspection activities.

A description of all field observations, tests, equipment, and calibration procedures for field testing equipment that will be used.

(d) Sampling strategies.

A description of all construction material sampling protocols, including sample size, methods for determining sample locations and frequency of sampling.

(e) Documentation.

A description of the recordkeeping requirements for CQA and CQC activities. This must include daily summary reports, inspection data sheets, problem identification and corrective measures reports, acceptance reports, and final documentation.

(f) A certification that the CQA and CQC plan is referenced in appropriate construction contract documents.

6 CRR-NY 363-4.5

6 CRR-NY 363-4.6

6 CRR-NY 363-4.6

363-4.6 Facility manual.

The facility manual must: refer to engineering drawings and reports prepared in accordance with this Subpart as appropriate; describe the anticipated day-to-day facility operations throughout the active life of the landfill; address appropriate sequencing of all major landfilling activities; demonstrate how the landfill will meet the operating and reporting requirements enumerated in Subparts 363-7 and 363-8 of this Part; and include the following information:

(a) Sustainability plan.

The sustainability plan must describe how the landfill will be designed and operated in a manner that will conserve and sustain natural resources. The sustainability plan must describe how natural resources and airspace will be conserved through use of concepts such as front-end diversion of recyclables, reduced disposal of organic wastes, reduction in greenhouse gas emissions, utilization of alternative operating cover materials, alternative energy or materials resource production, promote rapid waste mass stabilization, utilize landfill reclamation, or other sustainable landfill management techniques. The sustainability plan must be updated and submitted to the department no less than every five years.

(b) Post-construction care plan.

The post-construction care plan must describe procedures to ensure that the post construction care requirements will be maintained prior to initial operation.

(c) Fill progression and placement plan.

The fill progression and placement plan must include:

(1) a description of the procedures and precautions to be taken during the placement of the first five-foot lift of select waste above the liner and leachate collection system describing the select waste, its placement, and operation of collection vehicles and compaction equipment to prevent damage to the liner system;

(2) a description of the landfill's fill progression, addressing and detailing typical daily cell progression and lift height, fill sequence, and provisions for subsequent development of the landfill, referring to engineering drawings and reports prepared in accordance with this Subpart;

(3) a description of a monitoring program that will ensure that the maximum in-place waste density as established in the application will not be exceeded;

(4) a daily log of wastes received at the landfill that includes the location of each day’s operation in accordance with the fill progression plan;

(5) a depiction of the final grades as described in the approved closure plan; and

(6) the location of vertical and horizontal gas collection lines.

(d) Waste control plan.

The waste control plan must include:

(1) a description of the landfill's receiving and monitoring process for waste;

(2) identification and handling procedures for wastes requiring special handling or treatment (*e.g.*, friable asbestos-containing waste, sludges, drill cuttings, etc.);

(3) procedures to identify wastes that have low-permeability or low shear-strength and a description of methods to be used to blend these wastes with other wastes to minimize waste mass instability and maximize leachate movement through the waste mass; and

(4) a program for detecting and preventing the disposal of unauthorized wastes at the facility. This program must include, but not be limited to:

(i) random inspections of incoming loads;

(ii) inspections of suspicious loads or drums;

(iii) records of inspections;

(iv) procedures for notifying the department if unauthorized waste is discovered in a load; and

(v) procedures for providing outreach to customers and transporters indicating that the facility is prohibited from accepting for disposal source-separated recyclables, source-separated electronic wastes, source-separated rechargeable batteries, source-separated mercury-containing products, and other source-separated items that are subject to legislatively enacted product stewardship programs, including procedures for monitoring and detecting incoming waste for these source separated recyclables.

(e) Cover material management plan.

The cover material management plan must include:

(1) material specifications for operating, intermediate, and final cover;

(2) identification of the quantities required for each type of cover material, and its on-site storage location; and

(3) the method of cover material placement, compaction, anticipated permeability and density.

(f) Environmental monitoring plan.

The environmental monitoring plan must include:

(1) a description of the critical stratigraphic section;

(2) a description of all proposed monitoring points, including leachate, underdrains, groundwater, surface water, and sediment;

(3) the analyses to be performed;

(4) a description of the statistical methods to be used;

(5) reporting requirements;

(6) a site plan with topographic contours which depicts the location of all proposed monitoring points in relation to facility boundaries, surface water bodies, and property boundaries; and

(7) an implementation plan that contains a sampling schedule, the sequence of landfill construction, a schedule for the construction of the groundwater monitoring wells, and a schedule for initiation of the existing water quality and operational water quality monitoring programs, and a contingency water quality monitoring plan which specifies trigger mechanisms for its initiation;

(8) sampling design requirements. The environmental monitoring plan must comply with the following:

(i) Groundwater sampling. Groundwater monitoring wells must be capable of detecting facility derived groundwater contamination within the critical stratigraphic section.

(a) Horizontal well spacing.

(1) Horizontal spacing of wells must be based upon-site specific conditions. These conditions may include groundwater flow rates, estimated longitudinal and transverse dispersivity rates, proximity to or presence of sensitive environments and groundwater users, the nature of contaminants disposed of at the site, and the proposed design and size of the facility.

(2) In the first water bearing unit of the critical stratigraphic section:

(i) monitoring well spacing along the downgradient perimeter of the facility must not exceed 500 feet. The department may require closer well spacing in sensitive or geologically complex environments;

(ii) monitoring well spacing along the upgradient or crossgradient perimeter of the facility must not exceed 1,500 feet. The department may require closer well spacing in sensitive environments or where upgradient sources of contamination are known to exist; and

(iii) in areas of poorly defined flow conditions, the number of monitoring wells and well spacing must be decided based on-site-specific hydrogeology, subject to approval by the department.

(3) The department may require the monitoring of water bearing units below the first water-bearing unit based on the potential for contaminant migration to those units. Well spacing in any subsequent water-bearing units must be decided based on-site-specific hydrogeology, subject to approval by the department.

(4) Sensitive environments or areas where public health concerns exist may be subject to more intensive groundwater monitoring requirements. In addition, the department may require the applicant to develop an acceptable computer model of contaminant plume behavior from hypothetical leaks in the liner system to assist in determining monitoring well placement.

(5) All downgradient monitoring wells must be located within 50 feet of or as close as possible to the waste boundary to ensure early detection of any contaminant plume, unless precluded by site conditions. All monitoring wells should avoid construction within structural berms wherever possible.

(6) All upgradient monitoring wells must be placed far enough from the waste boundary to avoid any facility-derived impacts.

(b) Well screen placement.

(1) Well screens must be located to readily detect groundwater contamination throughout the saturated thickness of the first water bearing unit, and must be installed at a representative number of points at each subsequent permeable unit throughout the critical stratigraphic section. Well screens must not act as conduits through impermeable layers. Wells monitoring the uppermost water bearing unit must be screened to ensure that the water table surface is within the screened interval at all times.

(2) Upgradient and crossgradient monitoring wells must monitor the same hydrologic units as the downgradient monitoring wells, whenever possible.

(3) Screen length. Well screens must not exceed 20 feet in length, unless otherwise approved by the department. The applicant must provide technical justification for the actual screen length chosen.

(c) Geophysical and geochemical techniques. The department may require the use of geophysical and geochemical techniques where existing contamination is suspected, to locate contaminated zones before selecting well locations and screen depths for environmental monitoring points.

(d) The department may require the monitoring of any groundwater suppression system built at a facility. Existing water quality monitoring at these points may not be required.

(ii) Surface water and sediment sampling. The environmental monitoring plan must include monitoring points for all surface water bodies that may be significantly affected by a contaminant release from the facility. Sampling activities at these monitoring points must include surface water, and may include sediment if determined necessary by the department.

(a) In bodies of standing water, these points must be located at the closest point to the facility and must be included in existing water quality monitoring.

(b) In streams, these points must include sufficient upgradient and downgradient locations to allow the facility's impact to be measured.

(c) Monitoring of any on-site spring, seep or groundwater discharge zone may be required if the flow rate is sufficient to permit collection of an adequate sample volume.

(d) Any iron floc deposits which form in springs, seeps or groundwater discharge zones downgradient of the facility must be described and sampled as part of the Site Investigation Report. These deposits may, at the discretion of the department, be included in the monitoring program.

(iii) Leachate sampling. The location of all leachate sampling points at the facility must be described.

(a) All sampling points should be located to minimize pumping of leachate before sampling. Sampling points in the primary and secondary leachate collection system should be adequate to sample liquids beneath each discrete leachate collection area or facility cell.

(b) Leachate in the primary leachate collection system of new cells must be analyzed semi-annually for expanded parameters for a minimum of five years after cell operation begins. After five years of cell operation, the department may consider a reduction to annual sampling if the owner or operator demonstrates that the concentrations of constituents have not changed significantly as supported by statistical analysis.

(c) Leachate in the secondary leachate collection system must be monitored semi-annually for baseline parameters. Sampling and analysis requirements may be increased if the allowable leakage rate, as defined in section 363-7.1(f)(7) of this Part, is exceeded. After five years of cell operation, the department may consider a reduction to annual sampling if the owner or operator demonstrates that the concentrations of constituents have not changed significantly as supported by statistical analysis.

(iv) Water supply well sampling. If sampling and analysis of water supply wells is to be performed, then the sampling frequency and analysis for water supply wells should be determined on a case-by-case basis in conjunction with the Department of Health and/or the local health department.

(9) Water Quality Monitoring Programs. A water quality monitoring program must be implemented for all environmental monitoring points specified in the environmental monitoring plan. As described in this subdivision, the water quality monitoring program must be tailored to the site to establish existing water quality prior to disposal of waste, operational water quality during operation of the site, the post-closure period, and the custodial care period, and, if contamination is detected at the site, contingency water quality.

(i) Existing water quality. The facility must establish an existing water quality database to characterize the site geochemistry.

(a) The permit application must include a preliminary evaluation of water quality consisting of two rounds of sampling and analyses for a representative number of monitoring points. The representative number of monitoring points must include upgradient and downgradient locations (if practical) in each water-bearing unit within the critical stratigraphic section.

(1) The first round of sampling must be analyzed for expanded parameters. The second round must be analyzed for baseline parameters plus any additional parameters which were detected in the initial expanded parameters analysis. These samples should be taken at the approximate periods of high and low groundwater flow.

(2) The department may require sampling and analysis of additional monitoring points to further define site geochemistry in support of the interpretations and conclusions of the site investigation report.

(b) The following must be completed before the facility becomes operational.

(1) All of the environmental monitoring points must be sampled and analyzed for four rounds. The first round must be analyzed for expanded parameters, followed by a minimum of three rounds of sampling and analysis for baseline parameters, plus any additional parameters which were detected in the initial expanded parameters analysis. Each of the four rounds must occur during a different quarter of the year. The department may approve phased sampling as facility cells are constructed. The sampling of these phased monitoring points should begin at least one year prior to waste deposition and must conform with the analytical requirements of this clause.

(2) A database of existing water quality must be established for each hydrogeologic flow regime being monitored at the site. The department may require collection of data subsequent to initial facility operation from upgradient monitoring points, or other monitoring points that have not been altered by landfill activities, in order to augment and refine the existing water quality database.

(3) The existing water quality at a facility may be determined using:

(i) an interwell analysis (*i.e.*, the pooling of all of the environmental monitoring points within a given hydrogeologic flow regime);

(ii) subsets of interwell analyses (*i.e.*, the pooling of environmental monitoring points into two or more subsets of environmental monitoring points within a given hydrogeologic flow regime); or

(iii) an intrawell analysis, where each individual monitoring point is monitored independently of all other wells within a given hydrogeologic flow regime. A minimum of eight quarters must be completed for each well that is to be evaluated on an intrawell basis.

(4) The existing water quality database must comply with the following requirements:

(i) the existing water quality database must include a separate data set for each parameter. Each data set must include one or more sampling events and one or more sampling points. Decisions regarding how to group data into data sets must be made in a manner that maximizes the extent to which variability within the data sets approximates a normal distribution;

(ii) for each data set, the mean (existing water quality value), standard deviation and coefficient of variation must be calculated. For the purpose of these regulations, data sets which have a coefficient of variation of 0.5 or less with less than 15 percent of the data being non detects will be considered suitable for use in setting "Type A" statistical trigger values. The “Type A” statistical trigger value for each data set is calculated by adding three standard deviations to the mean. In cases where the percentage of non detects exceeds 15 percent, the coefficient of variation is greater than 0.5, or there are other indications that the data set is not normally distributed, the existing water quality value is defined as the median of the data set and a "Type B" statistical trigger value corresponding to the 90th percentile of the data set must be used;

(iii) the following practices must be followed to minimize variability within data sets which are included in the existing water quality database:

(A) the size of data sets should be maximized by pooling data from different wells which are screened within the same hydrostratigraphic unit and show similar pre-operational water quality;

(B) monitoring points which exhibit significant differences in pre-operational water quality for a particular parameter should not be pooled within the same data set for that parameter. In cases where it is necessary to split data sets due to heterogeneity of data, it may be necessary to compensate for the reduced size of the data set by collecting additional rounds of pre-operational water quality data or by augmenting pre-operational data with upgradient operational data;

(C) non-detects with associated detection limits higher than applicable standards or higher than detected values within the same data set, must not be used as a basis for establishing existing water quality;

(D) for statistical calculations, except as allowed in subitem (*c*) of this item, non-detects will be assigned a value of one-half the detection limit; and

(E) steps must be taken to ensure that detection limits associated with non detected values in existing water quality data sets do not exceed the applicable groundwater quality standards or any of the detected values for other sampling points and/or rounds of sampling within the same data set. Non detects associated with elevated detection limits must be discarded and additional samples must be collected from the affected monitoring point in order to provide the minimum number of data points required for characterization of existing water quality;

(iv) if the department determines that the sampling results are not representative of existing water quality, or do not constitute a normal, uniform distribution, the department may specify additional sampling and/or analyses it considers necessary to establish existing water quality at the site;

(5) if elevated contaminant levels are detected and additional detailed information is needed to establish a complete existing water quality database, the department may require one or more rounds of routine, baseline or expanded parameter sampling and analysis in any sampling point;

(6) additional sampling and analysis beyond the site boundaries may be required to determine the nature and extent of contamination, as well as the source if possible. This evaluation may require the construction, sampling, and analysis of additional monitoring wells and/or surface water sampling points. Based upon the results of this additional data, the department may require analysis for any and all expanded parameters, to be included in quarterly or annual operational water quality sampling.

(ii) Operational water quality. The operational water quality monitoring is conducted during the operation, closure, and post-closure periods of the facility must be described. The operational water quality monitoring must be designed to distinguish facility derived contamination from the existing water quality at the site using the trigger values established pursuant to item (f)(9)(i)(*b*)(*4*)(*ii*) of this section. The minimum requirements for operational water quality monitoring are:

(a) sampling and analysis must be performed at least quarterly, once a year for baseline parameters and three times for routine parameters. The baseline sampling event must occur at the same time each year;

(b) the department may approve phased sampling as facility cells are constructed. The sampling of the phased monitoring points must begin at least one year prior to waste deposition in the newly constructed cells or as approved by the department;

(c) the department may allow a facility to reduce its monitoring from quarterly to semi-annually if the facility can meet the following conditions:

(1) the secondary leachate collection and removal system demonstrates conformance with the allowable leakage rate requirements of section 363-7.1(f)(7) of this Part;

(2) the facility has compiled at least five years of operational water quality data;

(3) the department is satisfied that the facility has not contaminated groundwater;

(4) the groundwater flow velocity is not excessive, flow direction has not changed significantly, and hydrogeologic conditions at the site support the operator's position that it can be adequately monitored; and

(5) the facility must monitor semi-annually for baseline parameters;

(d) the department may allow the omission of the winter sampling round once a complete understanding of water chemistry has been obtained and the facility demonstrates an acceptable liner performance to the department;

(e) operational water quality analysis must include at least those parameters specified in the Water Quality Analysis Tables in subdivision (h) of this section for routine and baseline parameters. The department may modify these tables before granting a permit for the facility, or during the duration of the permit, based on the leachate composition. If subsequent leachate compositions vary or if the waste disposed of at the facility changes, the department may adjust analytical requirements accordingly;

(f) within 90 days of completing the quarterly field sampling activities, the owner or operator must determine if a significant increase has occurred for any parameter at any monitoring well. A significant increase has occurred if the water quality result for a parameter exceeds the trigger value for that parameter established pursuant to item (f)(9)(i)(*b*)(*4*)(*ii*) of this section. For parameters which do not have a statistical trigger value because pre-operational and upgradient data are limited to non-detects, detection of the parameter for the first time in a monitoring point is considered a significant increase;

(g) if the owner or operator determines, pursuant to clause (*e*) of this subparagraph, at any monitoring well that there is a significant increase for one or more of the parameters during field sampling for the routine or baseline parameters, excluding the field parameters, the owner/operator:

(1) must, within 14 days of this finding, notify the department indicating which parameters have shown significant increases; and

(2) must sample and analyze all monitoring points, or an approved subset, for the baseline parameters during the next quarterly sampling event. Subsequent sampling and analysis for baseline parameters must be conducted at least semiannually until the significant increase is determined not to be facility derived or the department determines monitoring is not needed to protect public health and the environment; or

(3) may attempt to demonstrate to the department that a source other than the facility caused the contamination or that the significant increase resulted from error in sampling or analysis, or from natural variation in groundwater quality. This demonstration may include one or more verification samples, collected from the affected monitoring point and analyzed for the parameter in question. A narrative documenting this demonstration must be included with the quarterly

monitoring report, or separately submitted to the department for review and approval. If a successful demonstration is made, documented and approved by the department, the owner or operator may continue operational water quality monitoring as specified in this clause;

(h) if the owner or operator determines, pursuant to clause (*f*) of this subparagraph, that there is a significant increase for one or more of the parameters during two successive monitoring events at any monitoring well, the owner or operator:

(1) must, within 14 days of this finding, notify the department indicating which parameters have shown significant increases; and

(2) must implement a contingency monitoring program meeting the requirements of subparagraph (iii) of this paragraph within 90 days.

(iii) Contingency water quality. A contingency water quality monitoring, as described in this paragraph, which must be conducted when a significant increase over the existing water quality value has been detected pursuant to clause (f)(9)(ii)(*e*) of this section for one or more of the routine or baseline parameters listed in the Water Quality Analysis Tables in subdivision (h) of this section. All contingency water quality monitoring plans are subject to department approval, and must include the following:

(a) within 90 days of triggering a contingency water quality monitoring program, the owner or operator must sample and analyze the groundwater for the expanded parameters listed in the Water Quality Analysis Tables in subdivision (h) of this section. A minimum of one sample from each monitoring well (upgradient and downgradient), or a selected subset, must be collected and analyzed during this sampling. If any constituents are detected in the downgradient wells at concentrations exceeding the applicable trigger values as a result of the expanded parameter analysis, a minimum of two independent samples from each of the sample wells must be collected within 30 days of obtaining the results of the expanded parameter analysis and analyzed for the detected constituents. These samples must be collected within two weeks of each other and then compared to the existing water quality database established pursuant to subparagraph (f)(9)(i) of this section. If an increase in the existing water quality values in the upgradient wells is indicated by this comparison, the existing water quality values for these parameters must be revised to reflect the newly acquired upgradient contingency monitoring data within each hydrogeologic flow regime. The department may delete any of the expanded parameters if it can be shown that the removed parameters are not reasonably expected to be in, or derived from, the waste contained in the landfill based on the leachate sampling being performed pursuant to subparagraph (f)(8)(iii) of this section; and

(b) after obtaining the results from the initial or subsequent sampling required in subparagraph (i) of this paragraph, the owner or operator must:

(1) within 14 days, notify the department to identify the expanded parameters that have exhibited a significant increase from the existing water quality value;

(2) within 90 days, and on a quarterly basis thereafter, resample all wells, conduct analyses for all baseline parameters, and for those additional expanded parameters that exhibit significant increases. In addition, the owner or operator must sample and conduct analyses annually on all wells for the expanded parameters. At least one sample from each upgradient and downgradient well must be collected and analyzed during these sampling events. The department may reduce the requirements of this clause based on-site-specific conditions; and

(3) establish groundwater protection standards for all parameters that exceed trigger values calculated in accordance with item (f)(9)(i)(*b*)(*4*)(*i*) of this section. The groundwater protection standards must be established in accordance with clause (*f*) of this subparagraph;

(4) if the concentrations of any of the expanded parameters are shown to be at or below the applicable trigger values for two consecutive sampling events, the owner or operator must notify the department of this finding and, if approved by the department, may remove that parameter from the contingency water quality monitoring program. If the concentrations of all the parameters are shown to be below the applicable trigger values for two consecutive sampling events, then the owner or operator must notify the department and, if approved by the department, may return to operational water quality monitoring;

(5) if the concentrations of any expanded parameters are above the applicable trigger values, but all concentrations are below the groundwater protection standard established under subparagraph (vi) of this paragraph, the owner/operator must continue contingency monitoring;

(6) If one or more parameters are detected at levels above the groundwater protection standard established under clause (*f*) of this subparagraph in any sampling event, the owner or operator must notify the department within 24 hours to identify the expanded parameters that have exceeded the groundwater protection standard, and notify appropriate local government officials within seven days of detection. The owner or operator must also:

(i) characterize the nature and extent of the release by installing additional monitoring wells as necessary;

(ii) install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and establish the existing water quality for this well;

(iii) notify all persons who own land or reside on land that is directly over or within 500 feet downgradient of any part of the plume of contamination if contaminants have migrated off site as indicated by sampling of wells in accordance with subclause (*1*) of this clause; and

(iv) initiate an assessment of corrective measures pursuant to the provisions of Subpart 363-10 of this Part; or

(7) demonstrate that a source other than the facility caused the contamination, or that the significant increase resulted from error in sampling or analysis, or from natural variation in groundwater quality. This report must be submitted for approval by the department. If a successful demonstration is made, the owner or operator must continue monitoring in accordance

with the contingency water quality monitoring program pursuant to subparagraph (f)(9)(iii) of this section, and may return to operational monitoring if the expanded parameters are at or below the applicable trigger values established pursuant to item (f)(9)(ii)(*b*)(*4*)(*ii*) of this section. Unless and until a successful demonstration is made, the owner or operator must comply with clause (*e*) of this subparagraph, including initiating an assessment of corrective measures;

(c) the owner or operator must establish a groundwater protection standard for each parameter detected above its statistical trigger value in the groundwater. The groundwater protection standards are:

(1) for parameters for which a maximum contaminant level (MCL) has been established in 40 CFR Part 141, as incorporated by reference in section 360.3 of this Title, or for which a standard has been established pursuant to Part 701, 702, or 703 of this Title, the MCL or the standard established under this Title for that constituent, whichever is more stringent;

(2) for parameters for which MCLs or such standards have not been established, the trigger value for the parameter established from wells in accordance with item (f)(9)(ii)(*b*)(*4*)(*ii*) of this section; or

(3) for parameters for which the trigger value established pursuant to item (f)(9)(ii)(*b*)(*4*)(*ii*) of this section is higher than the MCL or such standard, the trigger value.

(10) Reporting requirements. Unless more rapid reporting is required to address an imminent environmental or public health concern, the owner or operator of the facility must report all water quality monitoring results to the department within 90 days of the conclusion of the sample collection. The report must include:

(i) a table showing the sample collection date, the analytical results (including all peaks even if below method detection limits [MDLs]), designation of upgradient wells and location number for each environmental monitoring point sampled, potentiometric data, applicable water quality standards, and groundwater protection standards if established, MDLs, and Chemical Abstracts Service (CAS) numbers for all parameters;

(ii) tables or graphical representations comparing current water quality with existing water quality and with upgradient water quality. These comparisons may include piper diagrams, stiff diagrams, tables, or other analyses;

(iii) a summary of the contraventions of State water quality standards, significant increases in concentrations above existing water quality, any exceedances of groundwater protection standards, discussion of results, and any proposed modifications to the sampling and analysis schedule necessary to meet the requirements of paragraph (3) of this subdivision;

(iv) all AQA/AQC documentation required pursuant to subdivision (g) of this section must be submitted to the department in a form acceptable to the department;

(v) the annual report must contain a summary of the water quality information presented in subparagraphs (ii) and (iii) of this paragraph with special note of any changes in water quality which have occurred throughout the year;

(vi) the data quality assessment report required pursuant to paragraph (g)(5) of this section;

(vii) an updated historical water quality monitoring table for each parameter that has been detected at least once at one or more monitoring points. Each table must include a column for each monitoring point, a row for each sampling date, detected concentrations, data qualifiers, detection limits associated with each non detect, and summary statistics including, but not limited to means, standard deviations, medians, 10th and 90th percentiles. Submission of this table may be limited to the annual monitoring report;

(viii) a graph showing time versus concentration for each parameter that has exceeded a groundwater quality standard or a trigger value at each affected monitoring point. Submission of these graphs may be limited to the annual monitoring report; and

(ix) updated groundwater contour maps and an evaluation of landfill operation impacts on groundwater elevations and flow patterns. Submission of these maps may be limited to the annual monitoring report, unless otherwise required by the department.

(g) Site analytical plan.

The site analytical plan must describe the method of sample collection and preservation, chain of custody documentation, analyses to be performed, analytical methods, data quality objectives, procedures for corrective actions, and procedures for data reduction, validation and reporting. The site analytical plan will pertain to existing water quality monitoring programs, operational water quality monitoring programs, and a contingency water quality monitoring program that specifies trigger mechanisms for its initiation. The site analytical plan must comply with the following:

(1) Data quality objectives.

(i) The data quality objectives for the data generation activity must be established prior to the initiation of any sampling.

(ii) The data quality objectives must define the goals of each phase of the water quality monitoring program, including, but not limited to, the following:

(a) reasons for the analytical program;

(b) identification of any regulatory programs and standards applicable to the analytical program; and

(c) minimum detection limits for each of the parameters listed in the Water Quality Analysis Tables.

(iii) The data quality objectives must be the basis for the development of all other portions of the site analytical plan.

(2) Analytic quality assurance (AQA)/analytic quality control (AQC). The site analytical plan must include a discussion of the AQA/AQC for the sampling program associated with the facility and must be sufficient to ensure that the data generated by the sampling and analysis activities are of a quality commensurate with their intended use and the requirements of the department. The discussion must detail the AQA/AQC goals and protocols for each type of environmental monitoring to be performed at the facility. Elements must include a discussion of the quality objectives of the project, enumeration of AQC procedures to be followed, and reference to the specific standard operating procedures that will be followed for all aspects of the environmental monitoring program.

(3) Field sampling procedures.

(i) All field sampling procedures must be described in detail in the site analytical plan. All field quality control procedures must be described including types and frequency of field quality control samples to be collected (*e.g.*, field blanks, trip blanks, field duplicates, reference materials and material blanks).

(ii) All samples must be collected and stored in the order of the parameter's volatilization sensitivity using methods, consistently applied, which ensure sample integrity.

(iii) All sampling equipment must be constructed of inert components designed to obtain samples with minimal agitation and contact with the atmosphere; be cleaned and protected during transport to avoid contamination; and checked before use. Dedicated equipment must be constructed of appropriate inert components and must be appropriate for the types of sampling to be performed.

(iv) Samples must be properly preserved and delivered to the laboratory with proper chain of custody within all appropriate holding times for the parameters to be analyzed.

(v) The sampling procedures and frequencies must be protective of public health and the environment.

(vi) Monitoring well sampling techniques must be consistently performed each time a well is sampled, and must comply with the following:

(a) In areas where the presence of explosive or organic vapors is suspected, ambient air in the well must be checked for their presence before the well is evacuated.

(b) For wells with documented contamination, where contamination by non aqueous phase liquids may be present, standing water in the well must be checked for immiscible layers or other contaminants that are lighter or heavier than water (floaters or sinkers). If present, floaters or sinkers must be sampled and analyzed separately by a method described in the site analytical plan.

(c) Evacuation of the well must replace stagnant water in the well and the sand pack with fresh water representative of the formation. Evacuation methods, including pumping rate, depth of pump intake, and method of determining sufficiency of evacuation must be consistently applied each time the well is sampled. Evacuation methods must create the least possible turbidity in the well. Where the static water level in the well is above the top of the sand pack, the water level should not be lowered below the top of the sand pack during purging whenever feasible. Evacuated water must be properly managed.

(d) The proposed evacuation methods to be used at the facility must be described in the environmental monitoring plan. All alternative evacuation techniques proposed for the facility wells must be identified for each well.

(e) After evacuation of the well, volatile organic samples must be collected.

(f) Field analysis must be performed after volatile organic samples have been collected, either within the borehole using a probe or from the next sample collected. All field test equipment must be calibrated at the beginning of each sampling day and checked and recalibrated according to the manufacturer's specifications. Calibration data must be reported with the analytical results.

(g) Groundwater samples must not be filtered, except when due to site specific conditions, sample turbidity cannot be reduced to 50 nephelometric turbidity units (NTUs) or less by good sampling technique or well redevelopment, the department may approve collection of both filtered and unfiltered samples for analyses of the inorganic parameters. All other required analyses will be on the unfiltered samples.

(vii) Surface water and sediment sampling techniques must be consistently applied to all samples, and must comply with the following:

(a) Surface water samples collected from shallow water should not include bottom sediment. In shallow moving water, downstream samples must be collected first to avoid disturbances from the bottom sediments.

(b) Each water body over three feet deep that is sampled must be checked for stratification, and each stratum must be checked for contamination using field parameters. Each stratum showing evidence of contamination must be separately analyzed. If no stratum shows evidence of contamination, a composite sample having equal parts of water from each stratum must be analyzed.

(c) Sediment samples may be taken at each location from which surface water samples are taken, and should consist of the upper five centimeters of sediment.

(viii) Water supply well sampling methods must be consistently applied each time a well is sampled and must comply with the following:

(a) If possible, samples should be collected directly from the well so as to yield water representative of the formations supplying the well. If this is not possible, samples must be collected as near to the well as possible and before the water is softened, filtered, or heated.

(b) If possible, samples should be collected before the water enters the pressure tank; otherwise the water must run long enough to flush water stored in the tank and pipes.

(c) Before sampling, water must be evacuated from the well to ensure a fresh sample of aquifer water.

(d) If samples are collected from a tap, aerators, filters, or other devices must be removed before sampling.

(ix) Corrective action. Standard operating procedures must be established describing the procedures used to identify and correct deficiencies in the sample collection process. The standard operating procedure must specify that each corrective action be documented in the sampling report submitted to the department, with a description of the deficiency, the corrective action taken, and the persons responsible for implementing the corrective action. Any alterations to the field sampling procedures must be included as an amendment to the site analytical plan.

(4) Laboratory procedures.

(i) Laboratory analyses must be performed by a laboratory currently certified under the appropriate approval categories by the New York State Department of Health's Environmental Laboratory Approval Program (ELAP).

(ii) The site analytical plan must contain the standard operating procedures of all laboratory activities related to the environmental monitoring plan. Any revisions to these standard operating procedures must be documented. Standard operating procedures must be available for the following, at a minimum:

(a) receipt, storage and handling of samples;

(b) sample scheduling to ensure that holding time requirements are met;

(c) reagent/standard preparation;

(d) general laboratory techniques (*e.g.*, glassware cleaning procedures, operation of analytical balances, pipetting techniques and use of volumetric glassware);

(e) description of how analytical methods are actually to be performed including precise reference to the analytical method used, and not a simple reference to standard methods;

(f) standard operating procedures for equipment calibration and maintenance to ensure that laboratory equipment and instrumentation are in working order, including, but not limited to

procedures and schedules for calibration and maintenance in accordance with manufacturer's specifications; and

(g) for a corrective action, standard operating procedures must be established for identifying and correcting deficiencies in the laboratory procedures. The standard operating procedure must specify that each corrective action be documented in the sampling event report submitted to the department with a description of the deficiency, the corrective action taken, and the person responsible for implementing the corrective action. Any alterations to the laboratory procedures must be included as an amendment to the site analytical plan.

(5) Data quality assessment. At the conclusion of each sampling event and analysis of the samples collected, data quality assessment must occur. A data quality assessment report must be submitted with the results from each sampling event. Data quality assessment must occur in two phases – data validation and data usability analysis.

(i) Data validation.

(a) For those sampling events for which only routine parameters are analyzed, the required data validation may be performed by the laboratory that performed the sample analyses.

(b) For those sampling events in which groundwater samples are analyzed for baseline or expanded parameters, the data validation must be performed by a person with experience with similar validation projects and who is not affiliated with the laboratory that performed the analyses and who is acceptable to the department.

(c) The data validation must be performed on all analytical data for the facility at a rate acceptable to the department, but not less than five percent of the data generated, and must consist, at a minimum, of the following:

(1) field records and analytical data are reviewed to determine whether the data are accurate and defensible. All AQA/AQC information must be reviewed along with any corrective actions taken during that sampling event; and

(2) all data summaries must be clearly marked to identify any data that are not representative of environmental conditions at the site, or that were not generated in accordance with the site analytical plan.

(ii) Data usability analysis.

(a) The data usability analysis must be performed on all analytical data generated by the requirements for this Part for the facility and must consist of the following:

(1) an assessment to determine if the data quality objectives were met;

(2) for consistency, comparison of the analytical data with the results from previous sampling events;

(3) evaluation of field duplicate results to indicate the samples are representative;

(4) comparison of the results of all field blanks, trip blanks, equipment rinstate blanks, and method blanks with full data sets to provide information concerning contaminants that may have been introduced during sampling, shipping, or analysis;

(5) evaluation of matrix effects to assess the performance of the analytical method with respect to the sample matrix, and determine whether the data have been biased high or low due to matrix effects;

(6) integration of the field and laboratory data with geological, hydrogeological, and meteorological data to provide information about the extent of contamination, if it occurs; and

(7) comparison of precision, accuracy, representativeness, comparability, completeness, and defensibility of the data generated with that required to meet the data quality objectives established in the site analytical plan.

(h) Water quality analysis tables.

The water quality analysis tables in this section list the routine, baseline, and expanded parameters for analysis of all monitoring samples. The department may modify the parameters for analysis based on the location of the landfill or site-specific characteristics of waste disposed at the landfill.

TABLE 1: ROUTINE PARAMETERS[1]

Common Name (and CAS number, as appropriate)[2]		
Field Parameters:	Leachate Indicators:	Inorganic Parameters (total):
Static water level (in wells and sumps)	Total Kjeldahl Nitrogen	Arsenic
Specific Conductance	Ammonia (7664-41-7)	Cadmium
Temperature	Nitrate	Calcium
Floaters or Sinkers[3]	Chemical Oxygen Demand	Iron
Temperature	Biochemical Oxygen Demand (BOD_5)	Lead
pH	Total Organic Carbon	Magnesium
Eh	Total Dissolved Solids	Manganese
Dissolved Oxygen[4]	Sulfate	Potassium
Field Observations[5]	Alkalinity	Sodium
Turbidity	Phenols (108-95-2)	
	Chloride	
	Bromide (24959-67-9)	
	Total hardness as $CaCO_3$	

TABLE 2A: BASELINE PARAMETERS: Field Parameters, Leachate Indicators, and Inorganic Parameters[6]

Common Name (and CAS number, as appropriate)[7]		
Field Parameters:	Leachate Indicators:	Inorganic Parameters (total unless otherwise noted):
Static water level (in wells and sumps)	Total Kjeldahl Nitrogen	Aluminum
Specific Conductance	Ammonia (7664-41-7)	Antimony
Temperature	Nitrate	Arsenic
Floaters or Sinkers[8]	Chemical Oxygen Demand	Barium
Temperature	Biochemical Oxygen Demand (BOD_5)	Beryllium
pH	Total Organic Carbon	Cadmium
Eh	Total Dissolved Solids	Calcium
Dissolved Oxygen[9]	Sulfate	Chromium
Field Observations[10]	Alkalinity	Chromium (Hexavalent)[11]
Turbidity	Phenols (108-95-2)	Cobalt
	Chloride	Copper
	Bromide (24959-67-9)	Cyanide
	Total hardness as $CaCO_3$	Iron
	Color	Lead
	Boron (7440-42-8)	Magnesium
		Manganese
		Mercury
		Nickel
		Potassium
		Selenium
		Silver
		Sodium
		Thallium
		Vanadium
		Zinc

TABLE 2B: BASELINE PARAMETERS: Organic Parameters[12]

Common Name (and CAS number, as appropriate)[13]		
Organic Parameters:		
Acetone (67-64-1)	1,1-Dichloroethane; Ethylidene chloride (75-34-3)	Styrene (100-42-5)

Acrylonitrile (107-13-1)	1,2-Dichloroethane; Ethylene dichloride (107-06-02)	1,1,1,2-Tetrachloroethane (630-20-6)
Benzene (71-43-2)	1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride (75-35-4)	1,1,2,2-Tetrachloroethane (79-34-5)
Bromochloromethane (74-97-5)	cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene (156-59-2)	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene (127-18-4)
Bromodichloromethane (75-27-4)	trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene (156-60-2)	Toluene (108-88-3)
Bromoform; Tribromomethane (75-25-2)	1,2-Dichloropropane; Propylene dichloride (78-87-5)	1,1,1-Trichloroethane; Methylchloroform (71-55-6)
Carbon disulfide (75-15-0)	cis-1,3-Dichloropropene (10061-01-5)	1,1,2-Trichloroethane (79-00-5)
Carbon tetrachloride (56-23-5)	trans-1,3-Dichloropropene (10061-02-6)	Trichloroethylene; Trichloroethene (79-01-6)
Chlorobenzene (108-90-7)	Ethylbenzene (100-41-4)	Trichlorofluoromethane; CFC-11 (75-69-4)
Chloroethane; Ethyl chloride (75-00-3)	2-Hexanone; Methyl butyl ketone (591-78-6)	1,2,3-Trichloropropane (96-18-4)
Chloroform; Trichloromethane (67-66-3)	Methyl bromide; Bromomethane (74-83-9)	Vinyl acetate (108-05-4)
Dibromochloromethane; Chlorodibromomethane (124-48-1)	Methyl chloride; Chloromethane (74-87-3)	Vinyl chloride; Chloroethene (75-01-4)
1,2-Dibromo-3-chloropropane; DBCP (96-12-8)	Methylene bromide; Dibro-momethane (74-95-3)	Xylenes (1330-20-7)
1,2-Dibromoethane; Ethylene dibromide; EDB (106-93-4)	Methylene chloride; Dichloromethane (75-09-2)	
o-Dichlorobenzene; 1,2-Dichlorobenzene (95-50-1)	Methyl ethyl ketone; MEK; 2-Butanone (78-93-3)	
p-Dichlorobenzene; 1,4-Dichlorobenzene (106-46-7)	Methyl Iodide; Iodomethane (74-88-4)	
trans-1,4-Dichloro-2-butene (110-57-6)	4-Methyl-2-pentanone; Methyl isobutyl ketone (108-10-1)	

TABLE 3A: EXPANDED PARAMETERS: Field Parameters, Leachate Indicators, Radionuclides, and Inorganic Parameters[14]

Common Name (and CAS number, as appropriate)[15]

Field Parameters:	Leachate Indicators:	Inorganic Parameters: (total unless otherwise noted):	Radionuclides[16]
Static water level (in wells and sumps)	Total Kjeldahl Nitrogen	Aluminum	Radium-226 per EPA 903.1
Specific Conductance	Ammonia (7664-41-7)	Antimony	Radium-228 per EPA 904.0
Temperature	Nitrate	Arsenic	Total Uranium per EPA 908.0
Floaters or Sinkers[17]	Chemical Oxygen Demand	Barium	
Temperature	Biochemical Oxygen Demand (BOD_5)	Beryllium	
pH	Total Organic Carbon	Cadmium	
Eh	Total Dissolved Solids	Calcium	
Dissolved Oxygen[18]	Sulfate	Chromium	
Field Observations[19]	Alkalinity	Chromium (Hexavalent)[20]	
Turbidity	Phenols (108-95-2)	Cobalt	
	Chloride	Copper	
	Bromide (24959-67-9)	Cyanide	
	Total hardness as $CaCO_3$	Iron	
	Color	Lead	
	Boron (7440-42-8)	Magnesium	
		Manganese	
		Mercury	
		Nickel	
		Potassium	
		Selenium	
		Silver	
		Sodium	
		Thallium	
		Tin	
		Vanadium	
		Zinc	

TABLE 3B: EXPANDED PARAMETERS: Organic Parameters[21]

Common Name (and CAS number, as appropriate)[22]

Organic Parameters:

Acenaphthene (83-32-9)	2,4-Dichlorophenol (120-83-2)	Naphthalene (91-20-3)
Acenaphthylene (208-96-8)	2,6-Dichlorophenol (87-65-0)	1,4-Naphthoquinone (130-15-4)
Acetone (67-64-1)	1,2-Dichloropropane; Propylene dichloride (78-87-5)	1-Naphthylamine (134-32-7)
Acetonitrile; Methyl cyanide (75-05-8)	1,3-Dichloropropane; Trimethylene dichloride (142-28-9)	2-Naphthylamine (91-59-8)
Acetophenone (98-86-2)	2,2-Dichloropropane; Isopropylidene chloride (594-20-7)	o-Nitroaniline; 2-Nitroaniline (88-74-4)
2-Acetylaminofluorene; 2-AAF (53-96-3)	1,1-Dichloropropene (563-58-6)	m-Nitroaniline; 3-Nitroaniline (99-09-2)
Acrolein (107-02-8)	cis-1,3-Dichloropropene (10061-01-5)	p-Nitroaniline; 4-Nitroaniline (100-01-6)
Acrylonitrile (107-13-1)	trans-1,3-Dichloropropene (10061-02-6)	Nitrobenzene (98-95-3)
Aldrin (309-00-2)	Dieldrin (60-57-1)	o-Nitrophenol 2-Nitrophenol (88-75-5)
Allyl chloride (107-05-1)	Diethyl phthalate (84-66-2)	p-Nitrophenol; 4-Nitrophenol (100-02-7)
4- aminobiphenyl (92-67-1)	0,0-Diethyl 0-2-pyrazinyl	N-Nitrosodi-n-butylamine (924-16-3)
Anthracene (120-12-7)	cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene (156-59-2)	
N-Nitrosodiethylamine (55-18-5)		
Benzene (71-43-2)	trans-1,2-Dichloroethylene (156-60-2)	N-Nitrosodimethylamine (62-75-9)
Benzo[a]anthracene; Benzanthracene (56-55-3)	Phosphorothioate; Thionazin (297-97-2)	N-Nitrosodiphenylamine (86-30-6)
Benzo[b]fluoranthene (205-99-2)	Dimethoate (60-51-5)	N-Nitrosodipropylamine; N-Nitroso-N-dipropyl-amine; Di-n-propylni-trosamine (621-64-7)
Benzo[k]fluoranthene (207-08-9)	p-(Dimethylamino)azobenzene (60-11-7)	N-Nitrosomethylethalamine (10595-95-6)
Benzo[ghi]perylene (191-24-2)	7,12-Dimethylbenz[a]anthracene (57-97-6)	N-Nitrosopiperidine (100-75-4)
Benzo[a]pyrene (50-32-8)	$3,3^{21}$-Dimethylbenzidine (119-93-7)	N-Nitrosopyrrolidine (930-55-2)
Benzyl alcohol (100-51-6)	2,4-Dimethylphenol; m-Xylenol (105-67-9)	5-Nitro-o-toluidine (99-55-8)

alpha-BHC (319-84-6)	Dimethyl phthalate (131-11-3)	Parathion (56-38-2)
beta-BHC (319-85-7)	m-Dinitrobenzene (99-65-0)	Pentachlorobenzene (608-93-5)
delta-BHC (319-86-8)	4,6-Dinitro-o-cresol 4,6- Dinitro-2-methylphenol (534-52-1)	Pentachloronitrobenzene (82-68-8)
gamma-BHC; Lindane (58-89-9)	2,4-Dinitrophenol (51-28-5)	Pentachlorophenol (87-86-5)
Bis(2-chloroethoxy)methane (111-91-1)	2,4-Dinitrotoluene (121-14-2)	Phenacetin (62-44-2)
Bis(2-chloroethyl) ether; Dichloroethyl ether (111-44-4)	2,6-Dinitrotoluene (606-20-2)	Phenanthrene (85-01-8)
Bis-(2-chloro-1-methyl-ethyl)ether; 2,2[21]-Dichlorodiisopropyl ether; DCIP[23]	Dinoseb; DNBP; 2-sec- Butyl-4,6-dinitrophenol (88-85-7)	Phenol (108-95-2)
Bis(2-ethylhexyl)phthalate (117-81-7)	Di-n-octyl phthalate (117-84-0)	p-Phenylenediamine (106-50-9)
Bromochloromethane (74-97-5)	Diphenylamine (122-39-4)	Phorate (298-02-2)
Bromodichloromethane (75-27-4)	Disulfoton (298-04-4)	Polychlorinated biphenyls; PCBs; Aroclors[24]
Bromoform (75-25-2)	Endosulfan I (959-98-8)	Polychlorinated dibenzo-p-dioxins; PCDDs[25]
4-Bromophenyl phenyl ether (101-55-3)	Endosulfan II (33213-65-9)	Polychlorinated dibenzo- furans; PCDFs[26]
Butyl benzyl phthalate; Benzyl butyl phthalate (117-81-7)	Endosulfan sulfate (1031-07-8)	Pronamide (23950-58-5)
Carbon disulfide (75-15-0)	Endrin (72-20-8)	Propionitrile; Ethyl cyanide (107-12-0)
Carbon tetrachloride (56-23-5)	Endrin aldehyde (7421-93-4)	Pyrene (129-00-0)
Chlordane[27]	Ethylbenzene (100-41-4)	Safrole (94-59-7)
p-Chloroaniline (106-47-8)	Ethyl methacrylate (97-63-2)	Silvex; 2,4,5-TP (93-72-1)
Chlorobenzene (108-90-7)	Ethyl methanesulfonate (62-50-0)	Styrene (100-42-5)
Chlorobenzilate (510-15-6)	Famphur (52-85-7)	2,4,5-T; 2,4,5-trichloro-phenoxyacetic acid (93-76-5)
p-Chloro-m-cresol; 4-Chloro-3- methylphenol (59-50-7)	Fluoranthene (206-44-0)	1,2,4,5-Tetrachlorobenzene (95-94-3)

Chloroethane; Ethyl chloride (75-00-3)	Fluorene (86-73-7)	2,3,7,8-Tetrachlorodi- benzo-p-dioxin; 2,3,7,8-TCDD (1746-01-6)
Chloroform; Trichloromethane (67-66-3)	Heptachlor (76-44-8)	1,1,1,2-Tetrachloroethane (630-20-6)
2-Chloronaphthalene (91-58-7)	Heptachlor epoxide (1024-57-3)	1,1,2,2-Tetrachloroethane (79-34-5)
2-Chlorophenol (95-57-8)	Hexachlorobenzene (118-74-1)	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene (127-18-4)
4-Chlorophenyl phenyl ether (7005-72-3)	Hexachlorobutadiene (87-68-3)	2,3,4,6-Tetrachlorophenol (58-90-2)
Chloroprene (126-99-8)	Hexachlorocyclopentadiene (77-47-4)	Toluene (108-88-3)
Chrysene (218-01-9)	Hexachloroethane (67-72-1)	o-Toluidine (95-53-4)
m-Cresol; 3-methylphenol (108-39-4)	Hexachloropropene (1888-71-7)	Toxaphene[28]
o-Cresol; 2-methylphenol (95-48-7)	2-Hexanone; Methyl butyl ketone (591-78-6)	1,2,4-Trichlorobenzene (120-82-1)
p-Cresol; 4-methylphenol (106-44-5)	Indeno(1,2,3-cd)pyrene (193-39-5)	1,1,1-Trichloroethane; Methylchloroform (71-55-6)
2,4-D; 2,4-Dichlorophen-oxyacetic acid (94-75-7)	Isobutyl alcohol (78-83-1)	1,1,2-Trichloroethane (79-00-5)
4,4[21]-DDD (72-54-8)	Isodrin (465-73-6)	Trichloroethylene; Trichloroethene (79-01-6)
4,4[21]-DDE (72-55-9)	Isophorone (78-59-1)	Trichlorofluoromethane; R-11 (75-69-4)
4,4[21]-DDT (50-29-3)	Isosafrole (120-58-1)	2,4,5-Trichlorophenol (95-95-4)
Diallate (2303-16-4)	Kepone (143-50-0)	2,4,6-Trichlorophenol (88-06-2)
Dibenz[a,h]anthracene (53-70-3)	Methacrylonitrile (126-98-7)	1,2,3-Trichloropropane (96-18-4)
Dibenzofuran (132-64-9)	Methapyrilene (91-80-5)	0,0,0-Triethyl phosphorothioate (126-68-1)
Dibromochloromethane; Chlorodibromomethane (124-48-1)	Methoxychlor (72-43-5)	sym-Trinitrobenzene (99-35-4)
1,2-Dibromo-3-chloro-propane; DBCP (96-12-8)	Methyl bromide; Bromomethane (74-83-9)	Vinyl acetate (108-05-4)
1,2-Dibromoethane; Ethylene dibromide; EDB (106-93-4)	Methyl chloride; Chloromethane (74-87-3)	Vinyl chloride; Chloroethene (75-01-4)

Di-n-butyl phthalate (84-74-2)	3-Methylcholanthrene (56-49-5)	Xylene (total)
o-Dichlorobenzene; 1,2-Dichlorobenzene (95-50-1)	Methyl ethyl ketone; MEK; 2-Butanone (78-93-3)	Per- and polyfluoroalkyl substances[29]
m-Dichlorobenzene; 1,3-Dichlorobenzene (541-73-1)	Methyl iodide; Iodomethane (74-88-4)	1,4-Dioxane (123-91-1)
p-Dichlorobenzene; 1,4-dichlorobenzene (106-46-7)	Methyl methacrylate (80-62-6)	
3,3[21]-Dichlorobenzidine (91-94-1)	Methyl methanesulfonate (66-27-3)	
trans-1,4-Dichloro- 2-butene (110-57-6)	2-Methylnaphthalene (91-57-6)	
Dichlorodifluoromethane; CFC 12 (75-71-8)	Methyl parathion; Parathion methyl (298-00-0)	
1,1-Dichloroethane; Ethyldidene chloride (75-34-3)	4-Methyl-2-pentanone; Methyl isobutyl ketone (108-10-1)	
1,2-Dichloroethane; Ethylene dichloride (107-06-2)	Methylene bromide; Dibromomethane (74-95-3)	
1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride (75-35-4)	Methylene chloride; Dichloromethane (75-09-2)	

(i) Leachate management plan.

The leachate management plan must include:

(1) a description of how the landfill will be constructed, operated, and closed in a manner that minimizes the generation of leachate, except in those cases where the department has approved the recirculation of leachate for waste mass stabilization enhancement, and how the migration of leachate into surface water or groundwater will be prevented;

(2) a description of operational methods to minimize the occurrence of perched leachate trapped above the leachate collection and removal system and surface seeps of leachate from above-grade landfill operations;

(3) a schedule for biennial video inspection and annual maintenance of the primary and secondary leachate collection and removal system;

(4) a schedule for the monitoring and recording of the secondary leachate collection and removal system flow data to determine the presence, quantity, nature and significance of any liquid detected;

(5) a discussion of the specific design and operational features related to the system, including leachate monitoring and sampling, locations of all leachate sampling points, alarm systems and maintenance, and any required back up equipment; and

(6) if leachate recirculation is proposed, the leachate management plan must include:

(i) a supporting geotechnical analysis evaluating the effect of leachate recirculation on the structural integrity and stability of the landfill's liner system, leachate collection and removal system, and waste mass;

(ii) a description of how increased landfill gas emissions and associated odors will be controlled;

(iii) a description of the methods and rate of leachate recirculation and addition;

(iv) procedures for recording the date and volume of recirculated leachate;

(v) a description of the operation, which addresses:

(a) the use of permeable operating cover or alternative operating cover to facilitate leachate distribution throughout the waste mass; and

(b) operational controls such as monitoring of surface seeps, liner system performance and excessive leachate head buildup, prevention of subsurface fires, odor control, and instruction for cessation of leachate recirculation and remediation of these conditions.

(j) Odor control plan.

The odor control plan must include:

(1) identification of all potential sources for odors and a description of the operational procedures and strategies to be followed to effectively control odors at the facility;

(2) procedures to be taken in the event of proposed waste volume increases or changes in waste characterization that may increase landfill gas emissions or odors;

(3) identification of the landfill personnel who would be responsible for implementation of the odor control plan; and

(4) operational and design-related recommendations that can be implemented upon detection of odor control problems, including impervious membranes and interim covers in conjunction with other landfill gas control methods. The odor control plan may include but not be limited to, gas control systems that are appropriately connected to the landfill liner system's primary leachate collection and removal system (including the drainage area on the landfill's side slopes), use of a horizontal gas collection lines, which may include rejection or mitigation of odiferous wastes that are determined to be contributing to off-site odors.

(k) Gas monitoring and emission control plan.

The gas monitoring and emission control plan must include:

(1) a description of the day-to-day operation of the landfill gas management system with respect to operation of odor and emission controls;

(2) a description of any air quality monitoring, including monitoring for fugitive landfill odor and air emissions; and

(3) for a landfill with an appurtenant landfill gas-to-energy facility or other landfill gas recovery facility, a discussion of how the landfill's odor and air emission controls are integrated with a recovery facility.

(l) Winter and inclement weather operation plan.

A description of how winter and inclement weather operations will be conducted, including identification of the specific actions to be taken to prevent frost action on the liner system in places where waste will not be placed within one year of construction certification approval.

(m) Residential drop-off operation plan.

A description of the operation of a residential drop-off area, if applicable, for non-commercial vehicles to unload waste and recyclables at an area other than the landfill working face.

(n) A radioactive waste detection plan.

The radioactive waste detection plan must include procedures for detecting radioactive material; operation and maintenance documents for radiation detectors which address proper equipment placement for effective operation and include setting of investigation alarm setpoint settings and calibration methods; and response procedures to be implemented if radioactive waste is detected.

(o) Emergency response plan.

An emergency response plan must include a description of, at a minimum, the actions to be taken in response to:

(1) uncontrolled explosive landfill gases detected on-site or beyond the property boundary;

(2) unexpected events during the construction and operation of the landfill gas management system, including the equipment to be utilized to maintain proper landfill gas venting and control when normal operations cease; and

(3) unexpected events during the subsequent construction and/or daily operation of the landfill's leachate collection and removal system.

(p) Conceptual closure, post-closure care, custodial care, and end use plan.

The conceptual closure, post-closure care, custodial care, and end use plan must include:

(1) a site plan that shows proposed final contours, property lines, storm water drainage system, streams and water courses, roads, structures and, if applicable, the groundwater and leachate treatment system, air pollution control system and any active landfill gas collection system;

(2) typical details of final cover system components and facility structures;

(3) a description of how the sequential closure of areas of the landfill is expected to progress in concert with the fill progression schedule, including effects of landfill reclamation activities if proposed;

(4) an estimate of the greatest number of landfill cells which, at any given point during the lifetime of the facility, will have received waste but not undergone final closure;

(5) an estimate of the maximum volume of waste and alternative operating cover that will be contained within the landfill;

(6) sufficient information upon which to estimate closure costs and post-closure and custodial care monitoring and maintenance costs. This information must be based upon the requirements of Subpart 363-9 of this Part, including a rolling 30-year post-closure care period, and must include estimates of:

(i) quantities and costs for each component of the final cover system, including related construction costs;

(ii) the anticipated length of the post-closure care period based on the types of wastes disposed and the criteria provided in section 363-9.6(a) of this Part;

(iii) post-closure operational, monitoring and maintenance costs including costs to replace system components based on predicted service life; and

(iv) custodial care monitoring and maintenance costs including costs to replace system components based on predicted service life; and

(7) a conceptual end use for the site, if proposed.

Footnotes

1

This list contains parameters for which possible analytical procedures are provided in: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846 (Third Edition, (November 1986), as amended by Updates I (July 1992), II (September 1994),

IIA (August 1993), IIB (January 1995), III (December 1996), IIIA (April 1998), document number 955-001-00000-1), incorporated by reference in section 360.3 of this Title. *Methods for Chemical Analysis of Water and Wastes*, USEPA-600/4-79-020, March, 1983, incorporated by reference in section 360.3 of this Title.

2

Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals. “Total” indicates all species in the groundwater that contain this element.

3

Any floaters or sinkers found must be analyzed separately for baseline parameters.

4

Surface water only.

5

Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

6

This list contains parameters for which possible analytical procedures are provided in: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846 (Third Edition, (November 1986), as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), IIB (January 1995), III (December 1996), IIIA (April 1998), document number 955-001-00000-1), incorporated by reference in section 360.3 of this Title. *Methods for Chemical Analysis of Water and Wastes*, USEPA-600/4-79-020, March, 1983, incorporated by reference in section 360.3 of this Title.

7

Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals. “Total” indicates all species in the groundwater that contain this element.

8

Any floaters or sinkers found must be analyzed separately for baseline parameters.

9

Surface water only.

10

Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

11

The department may waive the requirement to analyze hexavalent chromium provided that total and hexavalent and trivalent chromium values do not exceed 0.05 mg/l.

12

This list contains parameters for which possible analytical procedures are provided in: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846 (Third Edition, (November 1986), as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), IIB (January 1995), III (December 1996), and IIIA (April 1998) document number 955-001-00000-1), incorporated by reference in section 360.3 of this Title. *Methods for Chemical Analysis of Water and Wastes*, USEPA-600/4-79-020, March, 1983, incorporated by reference in 360.3 of this Title.

13

Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

14

This list contains parameters for which possible analytical procedures are provided in: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846 (Third Edition, (November 1986), as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), IIB (January 1995), III (December 1996), and IIIA (April 1998) document number 955-001-00000-1), incorporated by reference in section 360.3 of this Title. *Methods for Chemical Analysis of Water and Wastes*, USEPA-600/4-79-020, March 1983, incorporated by reference in 360.3 of this Title. *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, USEPA-600/4-80-032, August 1980, incorporated by reference in section 360.3 of this Title.

15

Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals. “Total” indicates all species in the groundwater that contain this element.

16

Two sets of samples must be collected: one filtered and one unfiltered. Filtered samples must be filtered using a 0.45 micron filter via standard techniques.

17

Any floaters or sinkers found must be analyzed separately for baseline parameters.

18

Surface water only.

19

Any unusual conditions (colors, odors, surface sheens, etc.) noticed during well development, purging, or sampling must be reported.

20

The department may waive the requirement to analyze hexavalent chromium provided that total and hexavalent and trivalent chromium values do not exceed 0.05 mg/l.

21

This list contains parameters for which possible analytical procedures are provided in: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA Publication SW-846 (Third Edition, (November 1986), as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), IIB (January 1995), III (December 1996), and IIIA (April 1998) document number 955-001-00000-1), incorporated by reference in section 360.3 of this Title. *Methods for Chemical Analysis of Water and Wastes*, USEPA-600/4-79-020, March 1983, incorporated by reference in section 360.3 of this Title.

22

Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

23

This substance is often called Bis(2-chloroisopropyl) ether, the name Chemical Abstracts Service applies to its noncommercial isomer, Propane, 2,2''-oxybis[2]-chloro- (CAS RN 39638-32-9).

24

Polychlorinated biphenyls (1336-36-3): This category contains congener chemicals, including constituents of Aroclor 1016 (12674-11-2), Aroclor 1221 (11104-28-2), Aroclor 1232 (11097-69-1), and Aroclor 1260 (11096-82-5).

25

Polychlorinated dibenzo-p-dioxins: This category contains congener chemicals, including tetrachlorodibenzo-p-dioxins, pentachlorodibenzo-p-dioxins, and hexachlorodibenzo-p-dioxins.

26

Polychlorinated dibenzofurans: This category includes congener chemicals, including tetrachlorodibenzofurans, pentachlorodibenzofurans, and hexachlorodibenzofurans.

27

Chlordane: This entry includes alpha-chlordane (5103-71-9), beta-chlordane (5103-74-2), gamma-chlordane (5566-34-7), and constituents of chlordane (57-74-9; 12789-03-6).

28

Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-2), *i.e.*, chlorinated camphene.

29

Per- and polyfluoroalkyl substances (PFAS): This category contains congener chemicals, including but not limited to perfluorooctanoic acid, perfluorooctanesulfonic acid, perfluorononanoic acid, perfluorohexanesulfonic acid, perfluoroheptanoic acid, perfluorobutanesulfonic acid.

6 CRR-NY 363-4.6

6 CRR-NY IV B 363 363-5 Notes

NY-CRR

OFFICIAL COMPILATION OF CODES, RULES AND REGULATIONS OF THE STATE OF NEW YORK

TITLE 6. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CHAPTER IV. QUALITY SERVICES

SUBCHAPTER B. SOLID WASTES

PART 363. LANDFILLS

SUBPART 363-5. SITING REQUIREMENTS

6 CRR-NY IV B 363 363-5 Notes

6 CRR-NY IV B 363 363-5 Notes

6 CRR-NY 363-5.1

6 CRR-NY 363-5.1

363-5.1 Siting requirements.

In addition to the requirements of section 360.8 of this Title, the following siting requirements apply to all new landfills and expansions of existing landfills regulated under this Part:

(a) Bedrock and unconsolidated deposits.

(1) Bedrock underlying the site must not be subject to rapid or unpredictable groundwater flow, unless it can be demonstrated to the department that a containment failure of the landfill would not result in contamination entering the bedrock system.

(2) Unconsolidated deposits: a minimum of 10 feet of unconsolidated deposits must exist beneath the proposed landfill site to minimize the migration of contaminants from the facility.

(i) At new landfill sites, these deposits must consist of low permeability soils with silty and clayey characteristics and with the ability to attenuate and absorb contaminants. Large-scale, permeable deposits, which could result in migration of contaminants off-site prior to detection and/or remediation, must not be present.

(ii) At existing landfill sites active on or after November 4, 1992 operating under and in compliance with a current permit or order on consent, there are no soil type restrictions provided the applicant demonstrates that the expansion-site will have no significant adverse impact on groundwater.

(b) The site must not be in proximity to any existing mines, caves or other anomalous features that may alter groundwater flow, unless it can be demonstrated to the department that a containment failure of the landfill would not result in contamination entering the features.

(c) Agricultural land.

(1) A new landfill or a lateral expansion of an existing landfill may not be located on property which:

(i) is taken through the exercise of eminent domain;

(ii) consists of more than 50 percent of agricultural soil group 1 or 2 (Land Classification System as certified by the New York State Commissioner of Agriculture and Markets); and

(iii) is within an agricultural district formed pursuant to the Agriculture and Markets Law, article 25-AA, sections 303 and 304.

(2) A new landfill or a lateral expansion of an existing landfill within an agricultural district may not be sited within an agricultural district unless compliance with the requirements of article 25-AA, section 305 of the Agriculture and Markets Law has been demonstrated.

(d) Primary water supply aquifers, principal aquifers, and public water supplies.

(1) No new landfill or lateral or vertical expansion of an existing landfill may be constructed over primary water supply aquifers, principal aquifers, within a public water supply stabilized cone of depression area, or within a minimum distance of 500 feet to surface waters that are actively used as sources of municipal drinking water supply. In Nassau and Suffolk county, no person may construct or operate a new landfill or an expansion of an existing landfill, unless the department has made an affirmative determination that it will not pose a threat to groundwater quality.

(2) The required horizontal separation between deposited waste and primary water supply aquifers, principal aquifers, capture zones of public water supply stabilized cone of depression areas or surface waters that are actively used as sources of municipal drinking water supply must be sufficient to preclude contravention of groundwater standards in the aquifer and surface water standards in waters that are currently used as a source of municipal drinking water supply. In Nassau or Suffolk county, no person may construct or operate a new landfill or an expansion of an existing landfill, unless the department has made an affirmative determination that it will not pose a threat to groundwater quality.

(e) Aircraft safety.

(1) A landfill into which putrescible waste is to be disposed must not be sited closer than 10,000 feet from any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of turbine-powered fixed-wing aircraft or 5,000 feet from any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of piston-powered fixed-wing aircraft.

(2) A landfill into which putrescible waste is to be disposed which is located within five miles of any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of aircraft must not, as determined by the Federal Aviation Administration, pose a potential bird or obstruction hazard to aircraft.

(3) The owner or operator of an existing landfill that is authorized to dispose of putrescible waste and that is located less than 10,000 feet from any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of turbine powered fixed-wing aircraft or less than 5,000 feet from any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of only piston powered fixed wing aircraft must provide in its permit renewal application documentation that the Federal Aviation Administration has determined that the facility does not pose a bird hazard to aircraft.

(4) A landfill containing only nonputrescible waste may be located less than 10,000 feet from any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of turbine-powered fixed-wing aircraft or less than 5,000 feet from any area of an airport used or intended to be used for landing, taking off, or surface maneuvering of only piston-powered fixed-wing aircraft, if the Federal Aviation Administration has determined that the landfill will not present a safety hazard to air traffic.

(5) The final elevation of a new landfill or expansion of an existing landfill must not extend more than 200 feet above the highest elevation of the land surface that existed prior to landfill development, unless the Federal Aviation Administration determines that the proposed fill height in excess of 200 feet will not present a safety hazard to air traffic.

(f) Unstable areas.

New landfills or expansions of existing landfills must not be located in unstable areas that are susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components designed to prevent releases from the landfill. These may include:

(1) areas having an active or substantial probability of mass movement where the movement of earth material at, beneath, or adjacent to the landfill may result in downslope transport of soil or rock by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides or flows, soil fluctuations, block sliding and rockfall; and

(2) areas where karst topography, with its characteristic surface and subterranean features, has developed as a result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terrain include, but are not limited to, sinkholes, sinking streams, caves, large springs, and blind valleys.

(g) Unmonitorable or unremediable areas.

New landfills must be located at sites that will allow environmental monitoring and site remediation to be conducted before off-site impacts occur.

(1) Identification of these sites must be based upon the ability to:

(i) sufficiently characterize groundwater and surface water flow to determine upgradient and downgradient directions;

(ii) install environmental monitoring points that will detect releases from the entire landfill;

(iii) characterize and define a release from the landfill; and

(iv) determine what corrective actions may be necessary to respond to a contaminant release, and carry out those corrective actions.

(2) Lateral expansions of existing landfills that are already contaminating groundwater may be allowed by the department if the proposed area can be constructed in compliance with the regulations. This may be demonstrated using remedial actions at the existing site resulting in a demonstrated improvement in groundwater quality, and any additional monitoring requirements needed to demonstrate the integrity of the expansion area such as leak detection lysimeters installed beneath the liner, statistical triggers of groundwater monitoring, tracers, additional monitoring wells surrounding the site, and any other monitoring methods required by the department.

(h) Fault areas.

New landfills and lateral expansions of existing landfills must not be located within 200 feet of a fault that has had displacement in holocene time unless the owner or operator demonstrates to the department that an alternative setback distance of less than 200 feet will not result in damage to the structural integrity of the landfill and will be protective of public health and the environment.

(i) Seismic impact zones.

New landfills and lateral expansions of existing landfills must not be located in seismic impact zones, unless the owner or operator demonstrates to the department that long-term containment structures, including liners, leachate collection and removal system, leachate storage system, and surface water control system, are designed pursuant to the requirements of section 363-4.3(d) of this Part.

6 CRR-NY 363-5.1

6 CRR-NY IV B 363 363-6 Notes

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TITLE 6. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CHAPTER IV. QUALITY SERVICES

SUBCHAPTER B. SOLID WASTES

PART 363. LANDFILLS

SUBPART 363-6. DESIGN, CONSTRUCTION AND CERTIFICATION REQUIREMENTS

6 CRR-NY IV B 363 363-6 Notes

6 CRR-NY IV B 363 363-6 Notes

6 CRR-NY 363-6.1

6 CRR-NY 363-6.1

363-6.1 General requirements.

(a) Applicability.

Except as described by the transition requirements of section 360.4 of this Title, all new landfills, lateral and vertical expansions of existing landfills, and subsequent development at existing landfills must conform to the requirements set forth in this Subpart.

(b) The owner or operator must submit engineering reports, design drawings, and specifications for all new construction of landfill components described in this Subpart prior to construction. Construction must not commence before written approval is received from the department.

(c) The landfill liner and leachate collection and removal system must be designed and constructed to effectively protect surface and groundwater resources from uncontrolled releases of landfill leachate. The components of the liner system must be placed to achieve a minimum slope of no less than two percent, except along leachate collection pipes, which must have a minimum slope of one percent.

(d) Any geomembrane, geosynthetic clay liner (GCL), geosynthetic drainage layer, geocushion or other geosynthetic material installed on landfill side slopes must be designed to minimize shear stresses and to withstand the calculated tensile forces acting upon the geosynthetic materials by the transfer of anticipated destabilizing forces to the landfill subgrade. At a minimum, the design must consider the maximum friction angle of any soil-geosynthetic or geosynthetic-geosynthetic interface, along with seepage forces expected in the side slope soil drainage layer in the primary leachate collection and removal system, to ensure that overall slope stability is maintained and to meet the factor-of-safety requirements specified in section 363-4.3(c)(3) of this Part.

(e) For lateral expansions adjacent to existing landfills that do not meet the liner system requirements of this Part (*i.e.*, the existing liner system is single composite and the expansion requires double composite), any encroachment on the existing landfill's side slope must be designed and constructed to meet the liner system requirements of this Part.

(f) Landfills must be designed to minimize the need to decommission existing monitoring wells and to install new monitoring wells as a result of progressive cell construction into areas where monitoring wells are located.

(g) A pre-construction meeting must be held prior to commencement of construction. This meeting must include, at a minimum:

(1) distribution to each involved entity of relevant CQA and CQC documents and supporting information;

(2) review the role of specific CQA and CQC requirements in demonstrating conformance with design criteria;

(3) review of responsibilities, authorities and lines of communication for each involved entity;

(4) review of established acceptance and rejection criteria as specified in CQA and CQC plan;

(5) review of methods for documenting and reporting all data;

(6) review of procedures for storage and protection of landfill construction materials on-site; and

(7) a site walk-around to identify project site layout and material and equipment storage locations.

(h) The owner or operator must notify the department at least seven days prior to each of the following activities:

(1) the pre-construction meeting;

(2) commencement of construction of the soil component of the secondary composite liner;

(3) commencement of placement of the primary and secondary geomembrane liner; and

(4) commencement of geomembrane liner integrity testing.

6 CRR-NY 363-6.1

6 CRR-NY 363-6.2

6 CRR-NY 363-6.2

363-6.2 Horizontal separation requirements.

The minimum horizontal separation between the edge of placed waste and the property line must be 100 feet for any landfill, except for landfills in Nassau and Suffolk counties where the minimum separation must be 50 feet.

6 CRR-NY 363-6.2

6 CRR-NY 363-6.3

6 CRR-NY 363-6.3

363-6.3 Groundwater separation.

In cases where the base of the constructed liner system is less than five feet above the seasonal high groundwater elevation, the department will require additional groundwater suppression systems to ensure that groundwater does not come in contact with the lowest portion of the landfill liner. At sites where perched water is encountered, the department will determine with respect to groundwater separation distances whether separation distances will be measured from the perched zone or the non-perched water table. The nature of the materials making up this separation, whether natural or backfilled, is subject to department approval. This minimum five feet separation requirement may be reduced or waived upon demonstration of selection of a suitable landfill site, as defined under section 363-5.1(a) of this Part and, that the proposed activity will have no significant adverse impact on the overall stability of the landfill, the environment, or natural resources and that the landfill's performance will be consistent with that which is expected from the application of this Part. In these cases, the department will require additional groundwater suppression systems to ensure that the seasonal high groundwater table does not come in contact with the lowermost portion of the landfill liner during construction, and until the hydrostatic pressures are equalized by weight of the liner system and/or waste.

6 CRR-NY 363-6.3

6 CRR-NY 363-6.4

6 CRR-NY 363-6.4

363-6.4 Bedrock separation.

A minimum of 10 feet of vertical separation is required between bedrock and the base of the constructed liner at all points along the liner system, except as provided in section 363-6.11(a)(4) of this Part. The material between the base of the constructed liner and bedrock, whether natural or backfilled and must consist of low permeability soils with silty and clayey characteristics and with the ability to attenuate and absorb contaminants and is subject to department approval.

6 CRR-NY 363-6.4

6 CRR-NY 363-6.5

6 CRR-NY 363-6.5

363-6.5 Landfill subgrade.

(a) The liner and leachate collection and removal system must be placed on a landfill subgrade that consists of an in-situ soil layer or select fill that is graded and prepared for landfill construction. A foundation-bearing capacity, stability and settlement analysis must be performed in accordance with section 363-4.3(b)-(d) of this Part.

(b) Materials required.

The landfill subgrade material must be free of visible organic material and consist of on-site soils, or select fill approved by the department. There must be a minimum thickness approved, pursuant to section 363-6.4 of this Part, below the landfill liner system consisting of low permeability soils with silty and clayey characteristics and which exhibit no large-scale, permeable deposits which could result in migration of contaminants off-site prior to detection and remediation.

(c) Construction requirements.

The subgrade must be sufficiently dry to allow for construction activities and structurally sound to ensure that the first lift and all succeeding lifts of soil placed over it can be adequately compacted to the design requirements and to ensure stability of the landfill.

(d) Certification requirements.

Before any material is placed over the landfill subgrade:

(1) the project engineer must inspect the exposed surface to evaluate the suitability of the subgrade and to ensure that the surface is properly compacted, smooth, and uniform, and must ensure that elevations are consistent with the department-approved drawings; and

(2) the subgrade must be tested for density and moisture content at a minimum frequency of nine tests per acre.

6 CRR-NY 363-6.5

6 CRR-NY 363-6.6

6 CRR-NY 363-6.6

363-6.6 Liner system and final cover requirements.

(a) Double composite liner system.

Except as otherwise described in this Part for monofills and C&D debris landfills, all landfills regulated under this Part must have a double composite liner system that consists of a primary leachate collection and removal system, a geocushion, a primary composite liner constructed of a geomembrane liner and a GCL, a secondary leachate collection and removal system, a geocushion, and a secondary composite liner system constructed of a geomembrane liner and two feet of low permeability soil. The landfill must be designed and constructed to meet or exceed the following liner system requirements:

(1) On slopes less than or equal to 10 percent, the liner system must consist of a double composite liner system which meets the following requirements:

(i) the primary composite liner must be comprised of a nominal 60 mil or thicker high density polyethylene (HDPE) geomembrane placed above and in direct and uniform contact with an appropriately specified GCL. In landfills located within the deep recharge area of Nassau or Suffolk county, the primary geomembrane must be a nominal 80 mil or thicker HDPE geomembrane; and

(ii) the secondary composite liner must be comprised of a nominal 60 mil or thicker HDPE geomembrane placed above and in direct and uniform contact with a minimum two-foot-thick low-permeability soil layer that has a remolded hydraulic conductivity of $1x10^{-7}$ centimeter per second or less.

(2) On slopes greater than 10 percent, the liner system must consist of a double liner system which meets the following requirements:

(i) from the toe of the slope to five vertical feet up the side slope, the primary liner must meet the double composite liner requirements of subparagraph (1)(i) of this subdivision. Above five vertical feet up the side slope, the primary liner may be constructed of a nominal 60 mil HDPE or thicker geomembrane. For landfills located within the deep recharge area of Nassau or Suffolk county, the primary geomembrane must be a nominal 80 mil or thicker HDPE geomembrane; and

(ii) the secondary composite liner must meet the requirements of subparagraph (1)(ii) of this subdivision.

(3) The liner system must include a primary leachate collection and removal system that is designed to maintain no more than 12 inches of leachate depth (head) above the primary liner, except during 24-hour, 25-year storm events and except in sump areas. The leachate collection and removal system must be designed to function with proper maintenance throughout the active life, post-closure period, and custodial care period of the landfill.

(i) The primary leachate collection and removal system must be a minimum of two feet thick.

(ii) On slopes less than or equal to 10 percent, the 24 inches of primary leachate collection and removal system must have a hydraulic conductivity of 1.0 centimeter per second or greater. Alternatively, the upper 12 inches of primary leachate collection and removal system may have a hydraulic conductivity of 0.1 centimeter per second or greater if the lower 12 inches has a hydraulic conductivity of 1 centimeter per second or greater.

(iii) On slopes greater than 10 percent, the entire 24 inch thickness of the primary leachate collection and removal system must have a hydraulic conductivity of 0.1 centimeter per second or greater.

(4) The liner system must include a secondary leachate collection and removal system placed between the primary and secondary liners with a design capacity of at least 1,000 gallons per acre per day and a maximum detection time of 24 hours using steady state flow calculations in a saturated medium.

(i) On slopes less than or equal to 10 percent, the secondary leachate collection and removal system must include a geosynthetic drainage layer and a minimum of 1 foot of soil drainage media with a hydraulic conductivity of 0.1 centimeter per second or greater, and a maximum leachate depth (head) of 1 inch.

(ii) On all slopes greater than 10 percent, the secondary leachate collection system may be constructed of a geosynthetic drainage layer system designed to meet the hydraulic and mechanical needs of the landfill with a head that does not exceed the thickness of the confined drainage layer.

(b) C&D debris landfills, papermill sludge monofills, and municipal waste combustor ash monofills.

Except in Nassau or Suffolk county, the minimum liner requirement for landfills used for the disposal of C&D debris, papermill sludge, or municipal waste combustor ash is a single composite liner comprised of a nominal 60 mil or thicker HDPE geomembrane placed above and in direct and uniform contact with a minimum two-foot-thick low permeability soil layer that has a remolded hydraulic conductivity of $1x10^{-7}$ centimeter per second or less.

Above the composite liner, a leachate collection and removal system is required that meets the requirements of paragraph (a)(3) of this section. The department may require additional liner components or other restrictions depending upon the waste to be disposed, monitorability of the site, or other site conditions.

(c) Other industrial waste monofills.

Except in Nassau or Suffolk county, monofills used solely for the disposal of solid waste resulting from industrial operations other than those described above are subject to the double composite liner requirements described in subdivision (a) of this section and section 363-6.7 of this Subpart, unless the applicant demonstrates that an alternative liner system is justified. The department may impose additional or less stringent requirements on these monofills based on the pollution potential of the waste. For those monofills where the applicant demonstrates that an alternative liner system is justified, the need for a formal variance is waived.

(1) Liner system designs for industrial waste monofills that do not meet the requirements of this section and section 363-6.7 of this Subpart must be demonstrated to adequately prevent a negative impact on groundwater quality. The demonstration must, at a minimum, address the following factors:

(i) climatological conditions in the vicinity of the proposed site;

(ii) hydrogeologic characteristics of the proposed site;

(iii) anticipated liner system leakage to the subsurface;

(iv) development of an accurate profile of leachate quality and production rates sufficient to be used in evaluating the fate and transport of leachate from the point of release to the first point of environmental monitoring in order to determine whether leachate constituents can be expected to exceed the State's groundwater quality standards;

(v) justification that the industrial wastes' chemical characterization was accurately defined and that there are no reasons to anticipate significant changes in the concentrations of compounds that could increase the wastes' pollution potential in the future;

(vi) presentation of data from chemical compatibility tests performed on the proposed liner and/or leachate collection and removal system materials with representative waste leachate, using an appropriate permeameter test to determine potential changes in the permeability of the proposed liner; and

(vii) modeling of contaminant transport to evaluate the impacts of the characterized leachate on groundwater quality at the closest environmental monitoring point based upon the liner system's calculated leakage rate and the site’s hydrogeologic conditions.

(2) A new demonstration must be performed in accordance with paragraph (1) of this subdivision whenever the characteristics of the received waste change.

(d) Final cover system.

Except as otherwise described in this Part, all landfills must have at a minimum a final cover system that consists of a composite barrier layer, barrier protection and drainage layer, and topsoil layer meeting the requirements of sections 363-6.15 through 363-6.18 of this Subpart and Subpart 363-10 of this Part. The final cover system must be designed to preclude precipitation from entering the landfill and be capable of preventing landfill gas migration to the atmosphere.

6 CRR-NY 363-6.6

6 CRR-NY 363-6.7

6 CRR-NY 363-6.7

363-6.7 Components of double composite liner system.

(a) Primary and secondary composite liners.

(1) Primary composite liner. The primary composite liner must be constructed using a GCL which restricts flow through the GCL equal to or better than a compacted soil liner with a hydraulic conductivity of $1x10^{-7}$ centimeters per second or less and which is constructed with bentonite demonstrating chemical and physical stability. The GCL must be placed below and in direct and uniform contact with the primary geomembrane liner. The carrier geotextile of the GCL must be a material that will inhibit the migration of bentonite into the secondary leachate collection and removal system.

(2) Secondary composite liner. The secondary composite liner must be constructed using a minimum two-foot-thick soil liner placed below and in direct and uniform contact with the secondary geomembrane liner. The soil component of the secondary composite liner must:

(i) be free from stones greater than one inch in diameter and stones having an angular surface;

(ii) be a total of at least 24 inches in compacted thickness;

(iii) have a remolded hydraulic conductivity of $1x10^{-7}$ centimeters per second or less throughout its thickness;

(iv) be constructed and maintained to minimize the presence of cracks and granular material as long as it is exposed, as specified in a department-approved CQA/CQC plan; and

(v) be overlain by and in direct and uniform contact with a geomembrane.

(b) Construction requirements.

The project engineer must ensure that the installation of the soil and/or GCL components of the liner system conforms to the following minimum requirements:

(1) GCL liner components.

(i) All GCLs must be placed in accordance with requirements specified in section 363-6.8(b)(2)-(4) of this Subpart and without damaging any component of the secondary leachate collection and removal system. The GCL must be placed at a slope of no less than two percent except for along the leachate collection pipes which must have slopes of no less than one percent. The GCL must be placed at a slope of no greater than 33 percent in any direction.

(ii) GCL field seams must be primarily oriented parallel to the line of maximum slope (*i.e.*, oriented along, not across the slope).

(iii) All GCL field seams must be made using bentonite and a minimum 12-inch overlap, and must be made in accordance with the manufacturer’s specifications as approved by the design engineer.

(iv) The GCL must not be installed during a precipitation event. Installed GCLs must be covered by the approved geomembrane by the end of the day they are installed and must be loaded with at least 1 foot of soil within 60 days of installation. Any GCL that becomes hydrated after it is installed and before it is covered with an approved geomembrane must be removed, unless the project engineer determines, and certifies in construction certification report, that the degree of hydration will allow the overlying geomembrane and soil material to be placed without affecting the performance of the installed GCL and that its properties are compliant with the approved specifications.

(2) Soil liner components.

(i) The soil component of the liner system must be placed at a slope of no less than two percent in directions perpendicular to leachate collection pipes, and no less than one percent in directions parallel to the leachate collection pipes. The soil component of the liner system must be placed at a slope of no greater than 33 percent in any direction.

(ii) During compaction, proper control of the moisture content, lift thickness, compactive energy/kneading action, placement operations and other details necessary to effectively destroy soil clods, eliminate lift interfaces and avoid mixing with subgrade soils must be maintained. The final compacted thickness of each lift must not exceed eight inches. Placement of the first lift of the soil component of the liner system must prevent mixing of the soil liner system materials and subgrade.

(iii) The moisture content and compacted density of the soil component of the liner system must be maintained at all times within the range identified in the moisture-density-permeability relation developed in accordance with subparagraph (c)(2)(v) of this section to ensure that the remolded lift hydraulic conductivity is less than or equal to $1x10^{-7}$ centimeters per second.

(c) Certification requirements.

(1) For GCLs, the project engineer must certify that:

(i) all GCL sheets used in liner system construction have been inspected by the manufacturer and at the job site for needles and sheet defects; and

(ii) all construction meets the requirements of (b)(1) of this section.

(2) For soil barrier components, the project engineer must certify the quality control testing of any soil liner materials, document that the specified material meets the approved engineering drawings, engineering report, CQA and CQC plan, and project specifications. The hydraulic conductivity requirement for the soil liner material must be less than or equal to $1x10^{-7}$ centimeters per second. Before and during construction of the soil component of the liner system, the results of the following testing at a minimum must be reviewed and accepted by the project engineer prior to placement:

(i) one analysis of soil particle size for every 2,500 cubic yards of material placed;

(ii) one Atterberg limits analysis of plastic and liquid limits and plasticity index for every 1,000 cubic yards of material placed;

(iii) one laboratory permeability test using a triaxial cell with back pressure for every 5,000 cubic yards of material placed;

(iv) one moisture content test for every 1,000 cubic yards of material placed; and

(v) a minimum of one comparison of the moisture-density-permeability relation for every 5,000 cubic yards of material placed.

(3) Quality assurance testing of soil components required under this paragraph must be compared to and evaluated against the quality control testing of paragraph (2) of this subdivision where applicable.

(i) Quality assurance testing locations must be evenly distributed across the side slopes and bottom area of the landfill and must include density and moisture content tests to be performed at a minimum of nine locations per acre per lift of soil material placed.

(ii) For each location, the density and moisture content must be compared to the appropriate moisture-density-permeability relation to determine the permeability at that location.

(iii) One shelby tube sample for laboratory permeability testing must be taken per acre per lift.

(iv) Any tests resulting in penetration of the soil liner must be repaired using bentonite or other means or material acceptable to the department.

(4) The certification report must address all measures taken to remedy GCL or soil liner damage that occurred during and after construction and any measures taken to prevent damage.

6 CRR-NY 363-6.7

6 CRR-NY 363-6.8

6 CRR-NY 363-6.8

363-6.8 Geomembrane liners.

(a) Materials required.

The geomembrane base liner material must be constructed of HDPE polymer that is acceptable to the department. Geomembrane base liners constructed of other polymers may be approved by the department based on the equivalent design requirements of section 363-6.21 of this Subpart if demonstrated to have equivalent chemical resistance, construction durability, and service life expectancy.

(b) Construction requirements.

(1) The geomembrane in both the primary and secondary composite liner systems must be installed in direct and uniform contact with the underlying low-permeability soil layer or GCL in a manner that eliminates waves and creases and must be field seamed to control fluid migration from the landfill.

(2) Geomembranes must be installed at a minimum slope of two percent, except slopes parallel to the leachate collection pipe must have a minimum slope of one percent.

(3) The surface of the supporting soil upon which the geomembrane will be installed must be free of stones, organic matter, cracks, irregularities, protrusions, loose soil, and any abrupt changes in grade.

(4) The anchoring system must be constructed as shown on the approved engineering drawings to eliminate potential liquid leakage into the secondary leachate collection and removal system by, at a minimum:

(i) diverting surface water run-off away from the anchoring system; and

(ii) seaming the primary and secondary geomembranes together.

(5) Field seams must be constructed in accordance with the following:

(i) field seams must be oriented parallel to the line of maximum slope (*i.e.*, oriented along, not across the slope). In corners and irregularly shaped locations, the number of field seams must be minimized. The number of horizontal seams must be minimized. Horizontal seams must be more than five feet from the toe of slope in either direction;

(ii) field seams must be primarily made by using a dual-track thermal fusion seaming method. Extrusion welding of field seams must be minimized to the extent practical;

(iii) the seam area must be free of moisture, dust, dirt, debris, and foreign material before seaming;

(iv) field seaming is prohibited when either ambient air or sheet temperature is below 32° F, when the sheet temperature exceeds 158° F, when the ambient air temperature is above 120° F, during periods of sustained winds in excess of 20 miles per hour, or during periods of precipitation; and

(v) the field crew foreman of the liner installer must have a documented minimum qualification of installing at least 50 acres of previous landfill or comparable geosynthetic systems, on a minimum of 5 different projects. Each welding machine must be operated by a welding technician who has been certified to operate the welder by a certification program acceptable to the department.

(c) Certification requirements.

(1) The project engineer must certify that the results of the quality control testing for all geomembranes meet the requirements of the approved engineering drawings, reports, and specifications before the installation of any geomembrane, including the following information:

(i) origin and identification of the raw materials used to manufacture the geosynthetic material;

(ii) copies of quality control certificates issued by the producer of the raw materials used to manufacture the geomembrane, which at a minimum must include the results of tests conducted

to verify material quality, specific gravity, melt flow index, percent carbon black, and carbon black dispersion using test methods acceptable to the department;

(iii) results of tests conducted at the factory to verify the quality of the geomembrane, including thickness, density, single-point stress crack resistance, tensile strength, tear and puncture resistance, elongation, carbon black content, carbon black dispersion, oxidation induction time, oven aging and UV resistance using test methods acceptable to the department; and

(iv) documentation that the geomembrane was fully inspected for uniformity, damage, imperfections, holes, cracks, thin spots, foreign materials, tears, punctures, and blisters and that any imperfections were immediately repaired and reinspected.

(2) The project engineer must review the appropriate documentation to certify that the quality control testing of any fabricated factory seams of geomembrane sheets took place at the factory in accordance with the following requirements:

(i) the geomembrane was fully inspected for uniformity, damage, imperfections, holes, cracks, thin spots, foreign materials, tears, punctures, and blisters. Any imperfections must be immediately repaired and reinspected;

(ii) nondestructive seam testing was performed on all fabricated seams over their full length using a test method acceptable to the department; and

(iii) destructive seam testing was performed on a minimum of two samples per factory fabricated geomembrane sheet. The samples must be taken from extra material at the beginning or end of sheet seams, so that the geomembrane sheet is not damaged and the sheet geometry is not altered. A laboratory acceptable to the department must have performed the required testing on the samples taken. If a sample fails a destructive test, the entire seam length must be reconstructed or repaired using a method acceptable to the department, and retested in accordance with subparagraph (ii) of this paragraph.

(3) The project engineer must certify that quality assurance testing was performed in the field during liner installation demonstrating that the liner conforms to the approved engineering drawings, reports, and specifications and the following requirements:

(i) For each lot number of geomembrane material that arrives at the site, a sample must be collected and archived.

(ii) All geomembrane must be visually inspected for uniformity, damage, imperfections, holes, cracks, thin spots, foreign materials, tears, punctures, and blisters. Any imperfections must be immediately repaired and reinspected.

(iii) The project engineer must ensure that trial seams are constructed and destructive seam tests are performed:

(a) at the start of each shift for every piece of seaming equipment and for each seaming crew;

(b) after every four hours of continuous seaming;

(c) every time seaming equipment is changed;

(d) whenever the project engineer requires; and

(e) as additionally required in the approved specifications.

(iv) The entire length of all field seams must be nondestructively tested in accordance with the procedures listed in this subparagraph using a test method acceptable to the department. The project engineer or designated representative must:

(a) monitor all nondestructive testing;

(b) record the location, date, name of tester, and results of all testing;

(c) inform the installer of any required repairs; and

(d) overlay all seams which cannot be nondestructively tested with the same geomembrane. The seaming and patching operation must be inspected by the project engineer for uniformity and quality.

(v) Destructive testing must be performed on the geomembrane liner seams in accordance with the following requirements using test methods acceptable to the department:

(a) Seam samples must be taken at a rate of 1 sample per 1,000 feet of seam length or 1 sample for each seaming machine operating on a given day, whichever is more frequent. All sample locations must be documented.

(b) The project engineer must approve the sample size, which must be large enough to perform the required testing.

(c) An independent laboratory acceptable to the department must perform the required testing, which must include testing for seam strength and adjacent geomembrane elongation, and peel adhesion (and separation in-plane for high density polyethylene) using testing procedures acceptable to the department.

(d) If a sample fails destructive testing, the seam must be reconstructed in each direction between the location of the sample that failed and the location of the next acceptable sample; alternatively, the welding path may be retraced to intermediate locations at least 10 feet in each direction from the location of the sample which failed the test, in which case a second sample must be taken for an additional field test at each of those locations. If these second samples pass, the seam must be patched or reconstructed between the locations of the second samples. If a second sample fails, this process must be repeated.

(e) All acceptable seams must lie between two locations where samples passed the test procedures found in clause (*d*) of this subparagraph.

(vi) Upon completion of geomembrane seaming, patching, or reconstruction, post-construction care of the installed geomembrane must commence and, at a minimum, include timely covering and temporary weighting using sandbags, as necessary, to prevent damage from wind uplift, construction, or other sources.

(vii) After placement of the soil drainage layer, an electrical resistivity leak location evaluation, and/or other geomembrane liner integrity evaluation approved by the department, must be conducted on areas of both the primary and secondary liners with slopes of 10 percent or less by a person independent of the geomembrane installer. All discovered liner defects must be repaired, and a written report of the findings and verification of repairs must be submitted to the department with the construction certification report required in section 363-6.19 of this Subpart.

6 CRR-NY 363-6.8

6 CRR-NY 363-6.9

6 CRR-NY 363-6.9

363-6.9 Geocushion material.

An appropriately designed and specified geocushion of sufficient weight to prevent deformation and damage must be placed above any geomembrane.

(a) Materials requirements.

Only needle-punched, nonwoven geocushion material may be used. Documentation must be provided by the manufacturer indicating that each roll has been inspected at the point of manufacturing for the presence of broken needles using an in-line metal detector. Every roll accepted at the site must be labeled with the manufacturer’s name, including geotextile style and type, lot and roll numbers, and roll dimensions (length, width, and gross weight). The geocushion material must be demonstrated to be chemically compatible with waste and leachate with which it will come in contact.

(b) Construction requirements.

(1) All rolls of geocushion materials received and stored at the landfill must be enclosed in protective wrapping that is opaque and waterproof. Outdoor storage of rolls must not exceed manufacturer’s recommendations or nine months, whichever is less. For storage periods longer than nine months, rolls must be stored off the ground under an additional cover or tarp beyond the manufacturer’s wrapping or be placed within an enclosure.

(2) During placement, stones, excessive dirt, or moisture must not be entrapped either within or beneath the geocushion materials.

(3) The geocushion materials must be placed with minimal wrinkles or folds.

(4) Geocushion materials must be connected or seamed together using methods approved by the department.

(c) Certification requirements.

The project engineer must provide:

(1) certification that all geocushion materials placed on the site have been inspected by the manufacturer and at the job site for needles and sheet defects;

(2) verification that the physical and mechanical properties of the designed geocushion material were supplied and installed per the project specifications; and

(3) certification that quality control testing was performed in accordance with the requirements of section 363-6.8(c)(1) of this Subpart for any geocushion materials

6 CRR-NY 363-6.9

6 CRR-NY 363-6.10

6 CRR-NY 363-6.10

363-6.10 Soil drainage layers.

In addition to the requirements of section 363-6.6(a) of this Subpart, all soil drainage material used in the primary and secondary leachate collection and removal systems of the landfill must conform to the following requirements.

(a) Materials required.

The soil drainage layer must be free of any organic material, have less than 5 percent by weight pass the No. 200 sieve after placement, and have no more than 15 percent calcium carbonate equivalent as determined by appropriate test methods using a solution with a pH representative of landfill leachate.

(b) Construction requirements.

(1) The soil drainage layer must be placed in a manner to minimize defects to the underlying geomembrane or other geosynthetic materials.

(2) The soil drainage layer must be placed in a manner to achieve a minimum slope of two percent.

(c) Certification requirements.

(1) The project engineer must approve the quality control testing results of any soil drainage materials and ensure that the materials meet the placement, hydraulic conductivity, and thickness requirements of section 363-6.6 of this Subpart and the requirements of subdivision (a) of this section.

(i) A particle size analysis of the soil drainage layer material must be submitted to the project engineer for approval for each borrow source prior to installation, and during installation at a frequency of at least 1 test for every 1,000 cubic yards of material placed.

(ii) A laboratory constant-head permeability test for a soil drainage layer sample must be submitted to the project engineer for approval for each borrow source prior to installation and at a frequency of at least 1 test for every 2,500 cubic yards of material delivered, and after placement at a frequency of at least 1 test for every 2,500 cubic yards of material placed.

(iii) The project engineer must certify that the requirements of section 363-6.6(a)(3) and (4) of this Subpart are met.

(2) The project engineer must certify that post-construction care procedures are carried out which, at a minimum, protect the soil drainage layers from fines related to water and wind-borne sedimentation.

(3) Quality assurance testing must ensure that the material is placed in accordance with the requirements of the engineering drawings, reports, and specifications.

6 CRR-NY 363-6.10

6 CRR-NY 363-6.11

6 CRR-NY 363-6.11

363-6.11 Leachate collection pipes.

(a) The following requirements apply to leachate collection pipes:

(1) The primary and secondary leachate collection and removal system and the gas collection condensate piping system must be designed and built to allow for representative sampling of leachate and condensate and to operate with proper maintenance without clogging during the landfill’s active life and post-closure care period. The primary collection pipe network must be sized for peak flow attributed to a 24-hour-25-year storm to be removed from the landfill cell within 7 days or less.

(2) All leachate collection pipe networks located in the primary and secondary leachate collection and removal systems must be designed to allow for accessibility of equipment for effective video monitoring, routine cleaning and maintenance of key collection lines in each separately operating cell.

(3) All leachate conveyance lines, gas condensate lines and appurtenances, including manholes, sumps, and metering pits located outside the liner system of the landfill must be designed to have double containment and must be constructed to provide for effective leak detection and collection.

(4) Leachate conveyance lines, gas condensate lines and appurtenances including manholes, sumps, and metering pits located outside the landfill liner system are not required to maintain the minimum separation of 5 feet from the seasonal high groundwater table, and are not required to maintain the minimum separation of 10 feet from bedrock.

(b) Materials required.

The leachate collection pipes must:

(1) be a minimum of eight inches in inside nominal diameter for primary pipes and six inches in inside nominal diameter for secondary pipes;

(2) have adequate structural strength to support the maximum static and dynamic loads and stresses that will be imposed by the overlying material, including the drainage layer, liners, waste material, and any equipment used in the construction and operation of the landfill; and

(3) be chemically compatible with leachate.

(c) Construction requirements.

Leachate collection pipes must be installed in accordance with the requirements of the approved engineering drawings, reports, and specifications and must be designed to have a minimum slope of one percent.

(d) Certification requirements.

The project engineer must certify that the requirements of paragraphs 363-6.6(a)(3) and (4) of this Subpart are met and that all leachate collection pipes are cleaned, debeaded and inspected upon completion of construction using video inspection equipment or other methods acceptable to the department to verify that the system is free of obstructions and construction-related debris.

6 CRR-NY 363-6.11

6 CRR-NY 363-6.12

6 CRR-NY 363-6.12

363-6.12 Geosynthetic drainage layers.

(a) Geosynthetic drainage layers must comply with the following:

(1) Any geosynthetic drainage layers designed for use in a groundwater suppression system or a leachate collection and removal system must meet the structural and hydraulic transmissivity design requirements using actual boundary conditions at the maximum adjusted design load for a minimum period of 100 hours, modified to take into consideration the long-term conditions for creep representative of site conditions, and other reduction factors.

(i) For hydraulic flow capacity calculations, the design engineer must use a factor of safety of at least three, and consider the reduction in transmissivity due to creep, biological clogging, and chemical clogging.

(ii) The chemical and physical resistance of the geosynthetic drainage material must be adequate so that its hydraulic transmissivity is not adversely affected by waste placement or leachate.

(2) Any geosynthetic drainage layers designed for use in a final cover system for either drainage or gas venting must meet the transmissivity design requirements using actual boundary conditions at the maximum adjusted design load for a minimum period of 100 hours, and appropriate reduction factors and must consider any proposed landfill end use structures.

(i) For hydraulic flow capacity calculations, the design engineer must use a factor safety of at least three.

(ii) The hydraulic design of the geosynthetic drainage layer should be performed using the saturated hydraulic conductivity of the barrier protection layer.

(b) Construction requirements.

(1) Geosynthetic drainage layers must not be seamed or fastened horizontally more than once per length of side slope. If horizontal seams are necessary, they must be staggered between adjacent rolls. The geosynthetic drainage layers must be seamed or fastened together in accordance with industry standards.

(2) The geosynthetic drainage layer must be installed in accordance with the procedures set forth in section 363-6.8(b)(2)-(4) and (5)(iii) of this Subpart.

(3) If a geosynthetic drainage layer is specified in the primary leachate collection and removal system, a 24-inch soil drainage layer is required which meets the minimum requirements of section 363-6.10 of this Subpart.

(4) If a geosynthetic drainage layer is specified in the secondary leachate collection and removal system, a 12-inch soil drainage layer which meets the requirements of section 363-6.10 of this Subpart is required in all areas where the liner slope is less than 10 percent.

(c) Certification requirements.

The project engineer must certify the following information as part of certification:

(1) results of applicable geosynthetic quality control testing required in paragraph 363-6.8(c)(1) of this Subpart;

(2) results of hydraulic transmissivity testing performed in a laboratory in accordance with subdivision (a) of this section including confirmation that the head within the leachate collection and removal layer will remain less than the thickness of that layer for the design flow of 1,000 gallons per acre per day in the secondary leachate collection and removal system is met;

(3) that the construction quality assurance staff have performed visual inspections for any depressions or irregularities on all installed products;

(4) that post-construction care procedures were carried out to protect the geosynthetic drainage layer from the intrusion of fines related to water-borne and wind-borne sedimentation.

6 CRR-NY 363-6.12

6 CRR-NY 363-6.13

6 CRR-NY 363-6.13

363-6.13 Filter layer criteria.

(a) If a filter layer is included, it must be designed to prevent the migration of fine soil particles into a coarser grained material, and to allow water or gases to freely enter a drainage structure (*e.g.*, pipe or drainage blanket) without clogging.

(b) Materials required.

(1) Graded cohesionless soil filters. Granular soil material used as a filter must have no more than 5 percent by weight passing the No. 200 sieve and no soil particles larger than 3 inches in any dimension.

(2) Geosynthetic filters. Geosynthetic filter material must demonstrate adequate permeability, soil particle retention, resistance to clogging, and chemical and physical resistance to adjacent materials so that it is not adversely affected by waste placement, overlying material or leachate generated at the landfill. Geosynthetic filter openings must be sized in accordance with the following criteria:

(i) permeability criteria: $k_f > 10k_s$ where:

(a) k_f is the geosynthetic filter permeability; and

(b) k_s is the overlying soil permeability;

(ii) retention criteria: O_{95} of the geosynthetic filter $< 3d_{85}$, where:

(a) O_{95} is the apparent opening size of the geosynthetic filter at which 95 percent of the soil particles will be retained; and

(b) d_{85} is the soil particle size at which 85 percent of the particles are finer.

(3) Clogging potential of soil or geosynthetic filter system must be assessed using a long-term permeameter test method or other methods acceptable to the department.

(c) Construction requirements.

Geosynthetic filters must not be damaged during installation and must be installed in a manner that does not reduce their ability to function as designed.

(d) Certification requirements.

For geosynthetic filters, the project engineer must assess the polymer type and density, ultraviolet stability, mechanical properties, weight, tensile strength, permittivity, apparent opening size, and puncture strength. The project engineer must certify that post-construction care procedures were implemented to protect the soil or geosynthetic filter from the intrusion of fines related to water-borne and wind-borne sediments.

6 CRR-NY 363-6.13

6 CRR-NY 363-6.14

6 CRR-NY 363-6.14

363-6.14 Intermediate cover.

An intermediate cover must be constructed of a geomembrane or soil layer which will inhibit precipitation from entering the waste mass, contain leachate outbreaks, and inhibit migration of decomposition gases.

(a) Materials required.

(1) If a geomembrane is utilized as intermediate cover, the geomembrane material must be chemically and physically resistant to materials it contacts, and be able to accommodate the expected forces and stresses such as those caused by settlement of waste and wind uplift.

(2) Soil utilized as intermediate cover must be a minimum thickness of 12 inches.

(b) Construction requirements.

Intermediate cover geomembranes must be seamed in accordance with the manufacturer’s recommendations, and must be installed on top of operating cover.

6 CRR-NY 363-6.14

6 CRR-NY 363-6.15

6 CRR-NY 363-6.15

363-6.15 Gas venting.

The project engineer must demonstrate that landfill gas will be adequately controlled and removed from the landfill in a manner to ensure the overall stability of the landfill and its final cover system, and to reduce the concentration and pressure gradient of explosive gases to control gas migration.

6 CRR-NY 363-6.15

6 CRR-NY 363-6.16

6 CRR-NY 363-6.16

363-6.16 Final cover — composite barrier layer.

(a) After a landfill ceases to accept waste as specified in section 363-10.3 of this Part, a final cover consisting of a composite barrier must be installed. The project engineer must consider the projected service life of the final cover system, settlement, erosion, and seepage forces in the overall stability of the final cover system.

(1) The composite barrier layer must consist of a GCL and a separate geomembrane.

(i) GCL. The GCL must be specified by the project engineer upon demonstrating both physical and chemical stability of the bentonite used in the GCL. The GCL component of the composite cover must meet the requirements of section 363-6.7(b)(1) and (c) of this Subpart.

(a) On slopes equal to or greater than 25 percent and for side slope terraces on those slopes, the GCL component of the composite barrier may be eliminated.

(ii) Geomembrane barrier layer of composite cover. The barrier layer must be constructed to limit precipitation migration into the landfill.

(a) The geomembrane material must be chemically and physically resistant to materials it contacts, and be able to accommodate the expected forces and stresses such as those caused by settlement of waste.

(b) A geomembrane comprised of linear low-density polyethylene polymer must have a nominal thickness of 40 mils or thicker. A geomembrane comprised of HDPE must have a nominal thickness of 60 mils or thicker.

(b) Construction requirements.

(1) GCL. GCLs must be constructed in accordance with section 363-6.7(b)(1) of this Subpart.

(2) Geomembrane barrier layer. Geomembrane barrier layers must be constructed in accordance with the requirements of section 363-6.8(b) of this Subpart with the following exceptions:

(i) the geomembrane must be placed between a 4 percent minimum slope and a 33 percent maximum slope; and

(ii) where GCL is used, the geomembrane must be placed in direct and uniform contact with the underlying GCL.

(c) Certification requirements.

Certification for the installation of a composite barrier layer must be conducted in accordance with the same conditions found in section 363-6.8(c) of this Subpart, except for the electrical resistivity testing provisions of section 363-6.8(c)(3)(vii) of this Subpart.

6 CRR-NY 363-6.16

6 CRR-NY 363-6.17

6 CRR-NY 363-6.17

363-6.17 Final cover — barrier protection and drainage layer.

A barrier protection layer must be constructed in accordance with the provisions of this section. The barrier protection layer must protect the geomembrane barrier layer from root penetration, be stable for the specified slopes and resist erosion.

(a) Construction requirements.

The barrier protection layer, including any drainage layer, must consist of a minimum of 12 inches of soil where cool season vegetation is specified or a minimum of 18 inches of soil where warm season vegetation is specified. One hundred percent of the soil used to construct the lower six inches of this layer must pass a two-inch sieve.

(b) A drainage layer constructed of either a soil layer or geosynthetic drainage layer must be installed between the barrier layer and the barrier protection layer unless stability analysis meeting the requirements of section 363-4.3(c)(3)(iv) of this Part indicates that a drainage layer is not required. If a geosynthetic drainage layer is utilized, it must be designed and constructed in accordance with the requirements in section 363-6.12 of this Subpart.

6 CRR-NY 363-6.17

6 CRR-NY 363-6.18

6 CRR-NY 363-6.18

363-6.18 Final cover — topsoil.

A topsoil layer must be designed and installed over the landfill, unless the department approves a geosynthetic designed to serve as the uppermost layer of the final cover system.

(a) Materials required.

The topsoil or alternative material layer must be suitable to maintain vegetative growth.

(b) Construction requirements.

The topsoil or alternative material layer must be at least six inches thick. A thicker layer will be required, if either of the following conditions exist:

(1) sufficient moisture retention cannot be maintained to sustain vegetative growth; or

(2) the proposed end uses of the site warrant a thicker layer.

6 CRR-NY 363-6.18

6 CRR-NY 363-6.19

6 CRR-NY 363-6.19

363-6.19 Construction certification.

The certification required in section 360.16(j) of this Title must include a report prepared by the project engineer which demonstrates that the landfill was constructed in accordance with the department-approved engineering design and permit requirements, and the report must include the following:

(a) at a minimum, all CQA and CQC testing as required in this Subpart. It must include documentation of any failed test results and results of all retesting performed, descriptions of procedures used to correct improperly installed, damaged, or irregular material, and electrical resistivity leak location survey data and reports;

(b) record drawings noting any deviation from the approved engineering plans;

(c) a comprehensive narrative including, but not limited to, daily reports from the project engineer and a series of color photographs of major project features;

(d) a certification that the primary liner system leakage rate was below 20 gallons per acre per day using a rolling average for 30 consecutive days:

(1) during the primary liner leakage rate evaluation period, at least one inch of rain or equivalent must be introduced into the cell. Data verifying acceptable primary liner performance, including precipitation or the introduction of water to the cell must be provided in the construction certification report; and

(2) the liner performance evaluation period may not be conducted under frozen ground conditions;

(e) certification that an electrical resistivity leak location evaluation, and/or other geomembrane liner integrity evaluation as approved by the department was conducted on both the primary and secondary liners in accordance with the provisions of section 363-6.8(c)(3)(vii) of this Subpart.

6 CRR-NY 363-6.19

6 CRR-NY 363-6.20

6 CRR-NY 363-6.20

363-6.20 Aboveground and on-ground leachate storage tank requirements.

(a) Except as described in the transition requirements in section 360.4 of this Title, only a storage tank system may be used to store leachate. The aboveground and on-ground leachate storage tank system must be capable of containing a minimum of three consecutive months combined primary and secondary leachate flow based on calculations required by section 363-4.3(e) of this Part unless an alternate storage and transport system is approved by the department, and must have a secondary containment system capable of retaining leachate in the event of a leachate spill.

(1) The design volume for the secondary containment system must be at least 110 percent of the volume of either the largest tank within the containment system or the total volume of all interconnected tanks, whichever is greater.

(2) The secondary containment system must be constructed of a one-foot layer of compacted soil with a hydraulic conductivity of $1x10^{-7}$ centimeters per second or less, a concrete pad of sufficient thickness to maintain integrity for the lifetime of the tank with a corrosion-resistant coating, or a geosynthetic liner of a minimum thickness equal to 60 mils. If a geomembrane is used, construction and certification must meet the requirements of section 363-6.8(b) and (c) of this Subpart, except for the electrical resistivity testing provisions of section 363-6.8(c)(3)(vii) of this Subpart.

(3) All aboveground and on-ground tanks must be equipped with an overfill prevention system.

(4) All uncovered tanks must maintain a minimum of two feet of freeboard.

(5) Appurtenances should be detailed illustrating the ability for filling and draining the containment system, including design details for draining uncontaminated precipitation from the secondary containment system.

6 CRR-NY 363-6.20

6 CRR-NY 363-6.21

6 CRR-NY 363-6.21

363-6.21 Equivalent design standards and use of waste as construction and operational material.

(a) An applicant may propose an equivalent design for any landfill component through the submission of documentation substantiating the alternative component's ability to perform in the same manner as the component specified in this Part. Equivalency determinations are not subject to the variance requirements of section 360.10 of this Title.

(b) When the equivalent design involves the substitution of waste for components of the facility's liner or final cover system, and where it can be demonstrated that these substitutions are below the uppermost barrier layer of the final cover and above the primary composite liner, equivalency determinations are not subject to the variance requirements of section 360.10 of this Title or beneficial use requirements of section 360.12 of this Title.

(1) Equivalent design applications for the use of waste tire-derived aggregate in a leachate collection and removal system or gas venting layer must:

(i) address procedures for receipt of waste tires or waste tire-derived aggregate and on-site processing or storage;

(ii) treat the waste tire-derived aggregate as conventional construction material and comply with the landfill’s design and the applicable soil drainage layer provisions of section 363-6.10 of this Subpart. This must include specifications for gradation analysis and permeability testing for both CQA and CQC;

(iii) specify that the waste tires or waste tire-derived aggregate are free of soil, petroleum products or other contaminants;

(iv) specify that waste tires must be processed in a manner to keep exposed wires to no more than three inches;

(v) specify that waste tires or waste tire-derived aggregate that were exposed to fire are not processed for use under this paragraph;

(vi) specify that the leachate collection and removal system or gas venting layer must incorporate an appropriately specified 12-inch layer of soil or stone between any geomembrane or GCL and a waste tire-derived aggregate layer; and

(vii) demonstrate that the final thickness of the waste tire-derived aggregate layer after compression will be a minimum of 24 inches.

(c) Use of waste as an alternative to operating cover.

(1) The department may approve the use of waste as an alternative operating cover (AOC) if the material is capable of meeting the performance criteria for operating cover as specified in section 363-7.1(b) of this Part.

(2) All wastes intended to be used as AOC must receive written department approval prior to their use. As a condition of approval, the department may require a sampling and analysis plan, including parameters to be tested, test methods, and frequency of testing to ensure compliance with paragraph (1) of this subdivision. Unless otherwise approved by the department, proposals to use AOC must meet the following requirements:

(i) All proposals to use automobile shredder residue as AOC must provide analytical data demonstrating that the automobile shredder residue does not contain total PCBs concentrations greater than 50 parts per million. The data must include quarterly analysis for PCB concentrations from each generator.

(ii) All proposals to use C&D debris residues as AOC must demonstrate that the concentration of sulfate does not exceed 0.5 percent by weight.

(d) Use of other materials as AOC.

The department may approve the use of materials as AOC upon demonstration that the materials meet the requirements of section 363-7.1(b) of this Part. Approval of these materials is not subject to the variance procedures of section 360.10 of this Title.

6 CRR-NY 363-6.21

6 CRR-NY 363-6.22

6 CRR-NY 363-6.22

363-6.22 Survey control and location coordinates.

(a) One permanent survey benchmark of known elevation measured from a United States geological survey (USGS) benchmark must be established and maintained for each 25 acres of developed landfill, or part thereof, at the site. This benchmark must be the reference point for establishing vertical elevation control.

(b) The New York transverse mercator (NYTM) coordinates for the landfill must be established. Horizontal control must be established and one of its points must be a benchmark established under subdivision (a) of this section.

6 CRR-NY 363-6.22

6 CRR-NY IV B 363 363-7 Notes

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OFFICIAL COMPILATION OF CODES, RULES AND REGULATIONS OF THE STATE OF NEW YORK

TITLE 6. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CHAPTER IV. QUALITY SERVICES

SUBCHAPTER B. SOLID WASTES

PART 363. LANDFILLS

SUBPART 363-7. OPERATING REQUIREMENTS

6 CRR-NY IV B 363 363-7 Notes

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6 CRR-NY 363-7.1

6 CRR-NY 363-7.1

363-7.1 Operating requirements.

In addition to the operating requirements set forth in section 360.19 of this Title, all landfills regulated under this Part must comply with this section.

(a) Waste control requirements.

(1) Final external slopes must not be greater than 33 percent, but interim external slopes may exceed 33 percent if the owner or operator demonstrates to the department’s satisfaction that a proposed greater slope is stable and the slope will settle to 33 percent or less prior to closure of the landfill cell.

(2) The first layer of waste placed above the primary leachate collection and removal system must be a minimum of five feet in compacted thickness, be of a select nature containing no large rigid objects, and be placed in a manner to avoid damage to the liner system.

(3) Drilling and production waste may not be placed within 6 feet of the leachate collection and removal system or within 10 feet of any final cover.

(4) Low-permeability or low shear-strength waste must be blended with other wastes to minimize waste mass instability and maximize leachate movement through the waste mass.

(5) Radioactive waste detection procedures and requirements.

(i) Landfills which accept MSW or drilling and production wastes must install and operate a fixed radiation detection unit at a location appropriate for the monitoring of all incoming waste.

(ii) The investigation alarm setpoint of the radiation detector must be set at least two times but no greater than five times site background radiation levels.

(iii) Background radiation readings at the facility must be measured and recorded at least daily.

(iv) Field checks of the radiation detector utilizing a known radiation source must be performed and recorded at least weekly.

(v) The radiation detector must be calibrated at least annually or more often as recommended by the manufacturer, and documentation describing the calibration must be maintained at the facility.

(vi) Each instance in which the radiation detector is triggered by a waste load must be documented and reported to the department within 24 hours. Recorded information must include the date the waste was received, transporter name, origin of the waste, truck number or other identifying marking, detector reading, disposition of the waste, and date of disposition.

(b) Operating cover.

Operating cover must be applied in accordance with the provisions of this subdivision and the cover material management plan.

(1) Operating cover or alternative operating cover must effectively control vectors, fires, odors, dust, and blowing litter.

(2) A minimum of six inches of compacted operating cover must be applied to all exposed waste at the close of each operating day, or at a more frequent interval if necessary, unless an alternative thickness or material is approved pursuant to section 363-6.21 of this Part.

(3) A minimum of 12 inches of compacted operating cover must be applied and maintained on all landfill surfaces where no additional waste has been or will be placed within 30 calendar days of the last placement of waste, unless an alternative thickness or material is approved pursuant to section 363-6.21 of this Part. If odor problems are not controlled, additional measures must be implemented.

(4) Alternative operating cover approved pursuant to section 363-6.21(c) of this Part must be identified in the facility’s permit as a separate annual tonnage and be reported to the department.

(5) Alternative operating cover material approved pursuant to section 363-6.21(c) of this Part must be stored over a lined area of the landfill and run-off from the material must be managed as leachate.

(c) Intermediate cover.

An intermediate cover must be applied and maintained on all external slopes for every 20 feet of vertical rise.

(d) Final cover.

The final cover system must be installed and maintained in accordance with the requirements of Subpart 363-9 of this Part.

(e) Decomposition gases generated within a landfill must be controlled to prevent safety issues and off-site odors. Measures to control decomposition gases must be undertaken in accordance with the following requirements:

(1) in landfills which receive putrescible waste, horizontal landfill gas lines must be installed in the waste mass at a horizontal spacing of not more than 100 feet and a vertical spacing of not more than 20 feet and shall terminate at least 100 feet from the exterior slope of the waste mass;

(2) the concentration of methane and other explosive gases must not exceed 25 percent of the lower explosive limit for gases:

(i) at or beyond the property boundary; or

(ii) within on-site structures excluding gas management or recovery system components;

(3) an ongoing gas monitoring program must be implemented throughout the active life, post-closure care period, and custodial care period to ensure that the requirements of paragraph (2) of this subdivision are met. The type and frequency of monitoring must be approved by the department and be based on the following factors: soil conditions; the hydrogeologic conditions surrounding the disposal area; the hydraulic conditions surrounding the disposal site; and the location of any man made structures and property boundaries. Monitoring must be conducted at least quarterly;

(4) monitoring must be performed at 100-foot maximum intervals where temporary sampling locations are used, or at 400-foot maximum intervals where permanent gas monitoring wells are constructed. Initial monitoring must be performed when atmospheric pressure and wind velocity are low and when the ground surface has been wet or frozen for several days. Monitoring must be done below the wet or frozen zone if present;

(5) upon detection of methane or other explosive gas levels exceeding the limits specified in paragraph (2) of this subdivision, the landfill operator must immediately take action to avoid hazards to public health and the environment, and must:

(i) within 24 hours of detection, notify the department;

(ii) within seven days of detection, submit to the department the methane or other explosive gas levels detected and provide a description of the steps taken to protect health, safety, and property; and

(iii) within 30 days of detection, submit a plan and a schedule to remediate any continuing methane or other explosive gas releases. The plan must describe the nature and extent of the problem and the proposed remedy, and be implemented upon department approval.

(f) Leachate management.

(1) Leachate must be managed in accordance with the department-approved leachate management plan.

(2) Leachate depth (head) above the primary liner system may not exceed 12 inches, except during and within a seven day period following storm events and in designed sump areas. Both the primary and secondary leachate collection and removal systems must be operated in a free-draining manner so as not to cause a leachate head buildup above the respective liner system.

(3) All run off which either emanates from active portions of the landfill disposal areas covered only with alternative operating cover which was generated from waste or has come into contact with waste or leachate must be considered leachate and be appropriately managed by the landfill's leachate collection and removal system.

(4) Leachate must be monitored as required by section 363-4.6(f)(8)(iii) of this Part.

(5) Stormwater within the secondary containment area of the leachate storage tank system must be removed so as to maintain a minimum of 100 percent containment capacity for the largest storage tank within the secondary containment area.

(6) Stormwater that collects within the secondary containment system of the leachate storage tank system must be controlled by a manually operated pump or a gravity drain pipe with a manually controlled valve. If a gravity drain pipe is used, all valves must be in a closed position and locked except when the operator is in the process of draining uncontaminated stormwater.

(7) Allowable leakage rate. If flow within the secondary leachate collection and removal system exceeds 20 gallons per acre per day (based on a rolling 30 day average), the owner or operator must implement the following procedures, at a minimum:

(i) notify the department within 72 hours from the time of the exceedance;

(ii) sample and analyze secondary leachate for baseline parameters;

(iii) submit a preliminary written assessment to the department within 14 days of the exceedance, which must include any short term actions that have either been taken or are planned, a

description of the amount of liquid observed, and the suspected cause of the excessive leakage rate exhibited, considering precipitation events and the possible location, size and cause of potential leaks;

(iv) investigate and determine, to the extent practicable, the location, size and cause of the leaks;

(v) determine whether waste receipt should cease or be curtailed, whether any waste should be removed from the cell for inspection, repairs, or controls, and whether the cell should be closed;

(vi) determine any other short term or long-term actions to be taken to reduce the leakage rate;

(vii) within 30 days after the notification that the allowable leakage rate has been exceeded, submit to the department the results of the determinations specified in subparagraphs (ii), (iv), (v), and (vi) of this paragraph, the results of the actions taken, and actions planned. Monthly thereafter, as long as the flow rate in the secondary leachate collection and removal system exceeds the allowable leakage rate, a report must be submitted to the department summarizing the results of any remedial actions taken and actions planned in order to reduce the leakage to an allowable level; and

(viii) take other measures as the department may require based on the significance of the leakage, including but not limited to cell or facility closure, if the leakage rate cannot be reduced to less than 20 gallons per acre per day within six months.

(g) Maintenance for primary and secondary leachate collection and removal systems.

(1) The primary leachate collection and removal system must be cleaned annually and maintained in good operating condition. The owner or operator may request that the department waive the cleaning requirement based on the results of the video inspection in paragraph (2) of this subdivision. The department will not grant waivers in consecutive years.

(2) Video inspection of any primary leachate collection and removal system and secondary leachate collection and removal system constructed in accordance with this Part must be performed at least biennially.

(3) Monitoring of secondary leachate collection and removal system flowrates must be conducted and recorded daily when the facility is operating.

(4) An operational log for recording monthly total leachate generation amounts and a maintenance log for documenting compliance with paragraphs (1)-(3) of this subdivision must be kept at the site and included in the landfill's annual report.

(h) Leachate recirculation.

(1) Leachate recirculation is only allowed in cells constructed with double composite liners and in which active gas collection and destruction is performed. If allowed, the following conditions must be met.

(i) A leachate recirculation system must terminate no closer than 100 feet from the exterior slope of the waste mass.

(ii) Leachate recirculation rates must be established and primary leachate flowrates must be monitored to ensure that the receiving waste mass does not become saturated.

(iii) The landfill must demonstrate that the allowable leakage rate measured in the secondary leachate collection and removal system has not been exceeded during the previous 12 months.

(2) During leachate recirculation, leachate must not be introduced directly onto operating cover.

(i) Moisture content of waste.

Wastes accepted for disposal must exhibit no free liquids and must contain a minimum of 20 percent solids. All dredged materials and sludges other than sewage sludge accepted for disposal must be dewatered to 20 percent or more solids and exhibit no free liquid as defined by SW-846 Method 9095 - Paint Filter Liquids Test, incorporated by reference in section 360.3 of this Title.

(j) Biosolids.

All biosolids accepted for disposal must be stabilized, dewatered to 20 percent solids, and exhibit no free liquid as defined by SW-846 Method 9095 - Paint Filter Liquids Test, incorporated by reference in section 360.3 of this Title. Biosolids that are disposed of must meet the following stabilization criteria, except if it can be demonstrated to the department’s satisfaction that the equivalent level of odor reduction can be achieved through alternative methods:

(1) The biosolids must be either digested or lime stabilized. If lime is used, sufficient lime must be added to raise the pH of the sludge to 12 for at least 30 minutes. The level of treatment must be adequate to reasonably prevent nuisance conditions.

(2) Biosolids cannot be accepted for disposal from a sewage treatment plant that has a biosolids treatment process other than digestion or lime stabilization unless one of the following criteria is satisfied:

(i) the mass of volatile solids in the biosolids has been reduced by a minimum of 38 percent;

(ii) tor biosolids treated in an aerobic process, the specific oxygen uptake rate (SOUR) is equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis), at a temperature of 20° C;

(iii) the biosolids are composted for a minimum of 14 days. Throughout that treatment time, the temperature of the biosolids must remain higher than 40° C, and the average temperature of the biosolids must be higher than 45° C;

(iv) the percent solids of the biosolids are equal to or greater than 75 percent.

(k) Friable asbestos-containing waste disposal.

Friable asbestos-containing waste or material contaminated with friable asbestos-containing waste may only be disposed of at a landfill if the following measures and precautions are taken:

(1) the landfill must have a protocol in place as part of their waste control plan describing procedures for receipt of friable asbestos-containing waste and placement in the landfill;

(2) the area designated for disposal of friable asbestos-containing waste must be recorded on an operations site plan so that precautions can be taken to properly handle the friable asbestos-containing waste in the event of future construction or regrading in this area;

(3) the friable asbestos-containing waste must either be placed into a pre-dug trench in the existing waste or at the bottom of the working face. The friable asbestos-containing waste must be backfilled or covered with at least 3 feet of waste or 18 inches of soil before compaction to isolate the friable asbestos-containing waste; and

(4) friable asbestos-containing waste must be prevented from becoming airborne or coming into contact with landfill equipment.

(l) Non-friable asbestos-containing waste disposal.

Non-friable asbestos-containing waste may be disposed of at a landfill, provided it is not reduced in size, crushed, or processed in any manner before being placed under operating cover or another lift of waste.

(m) Inspection for unauthorized waste.

At a minimum frequency of once per week, the owner or operator must select a waste collection vehicle at random and unload its waste for a detailed inspection for unauthorized wastes. A record of the results of this inspection must be kept on the premises and be available for department review.

(n) Weight scales.

Any landfill that accepts at least 20 tons of waste per day averaged over the operating days for a calendar year must install and utilize a scale. Landfills that accept less than 20 tons of waste per day must utilize a department-approved alternate means of quantifying the weight of waste received.

(o) Disposal prohibitions.

Disposal of the following is prohibited:

(1) waste tires, except solid rubber tires (non-pneumatic);

(2) lead acid batteries;

(3) source-separated recyclables, source-separated HHW, source-separated electronic waste, source-separated rechargeable batteries, source-separated mercury-containing products, and other source-separated items that are subject to legislatively enacted product stewardship programs in New York State;

(4) mercury-added consumer products as defined in ECL section 27-2101 or mercury-added thermostats as defined in ECL section 27-2901;

(5) bulk liquids. Liquid containers that are generated from households and that contain five gallons or less of liquids are not considered bulk liquids;

(6) hazardous waste as defined in Part 371 of this Title;

(7) low-level radioactive waste, processed and concentrated naturally occurring radioactive material (NORM) waste, or nuclear accelerator-produced radioactive material (NARM) waste as defined in Parts 380, 382, and 383 of this Title that are required by Parts 380 and 383 of this Title to be disposed of at a Part 383 of this Title permitted facility;

(8) wastes, excluding firebrick, which exhibits a concentration greater than 25 pCi/g of radium-226;

(9) fluids produced from an oil or gas production well, including flowback water and production brine; and

(10) any other materials prohibited by law.

(p) Industrial waste or drilling and production wastes, if accepted, must be included in the landfill's waste control plan, which must describe any special handling or disposal procedures associated with the waste.

(q) Training requirements.

(1) Landfill operations must be directed by a facility operator who has attended and successfully completed within 12 months of their date of employment, a landfill operations training course which is approved by the department. The operator must renew this training every five years. Proof of training must be kept on file at the facility.

(2) Training related to radiation detection system operating procedures and radiation investigation alarm response procedures must be conducted at least annually.

(r) All landfills must submit to the department a deed description within one year of the effective date of the permit. The deed description must include a discussion of the planned site life for the landfill operation with a general description of the types of waste received and description of the proposed landfill end use. Upon facility closure, an updated property deed description must be

submitted to the department. This updated deed description must indicate the period of time during which the property has been used as a landfill, describe the wastes contained within the landfill, and must note that records for this facility have been filed with the department. The deed description must include a survey and a map, all of which must be filed with the county clerk. The survey must clearly indicate the limits of the disposal areas within the property boundary. The deed description must indicate that the closed landfill is subject to a post-closure care plan and a custodial care plan filed with the department.

(s) The landfill must maintain financial assurance in an amount sufficient to cover the cost of closure, post-closure care, custodial care, and corrective measure, if required, as specified by this Subpart and section 360.22 of this Title.

6 CRR-NY 363-7.1

6 CRR-NY 363-7.2

6 CRR-NY 363-7.2

363-7.2 Additional operating requirements for landfills in Nassau or Suffolk county.

In addition to the requirements of section 360.19 of this Title and section 363-7.1 of this Subpart, landfills located in Nassau or Suffolk county must conform to the operating requirements of this section.

(a) Landfills located within the deep flow recharge area may only accept concrete, steel, wood, sand, dirt, soil, glass, C&D debris, and recognizable inert material designated by the department.

(b) In addition to wastes described in subdivision (a) of this section, landfills located outside the deep flow recharge area may accept bypass waste, untreatable waste, and waste that is the residue of processes that separate, extract, and recover useable materials, energy, or heat from waste.

(1) Bypass waste and untreatable waste may only be deposited in a special area that is located and constructed to physically segregate these wastes and minimize their effects on the environment.

(2) Not more than 10 percent of the annual rated capacity of a municipal waste combustor may be accepted for disposal as bypass waste per year. However, up to 10 percent of the annual rated capacity of more than one municipal waste combustor may be accepted for disposal at a single facility.

6 CRR-NY 363-7.2

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PART 363. LANDFILLS

SUBPART 363-8. RECORDKEEPING AND REPORTING

6 CRR-NY IV B 363 363-8 Notes

6 CRR-NY IV B 363 363-8 Notes

6 CRR-NY 363-8.1

6 CRR-NY 363-8.1

363-8.1 Recordkeeping.

(a) In addition to the recordkeeping requirements of section 360.19(k) of this Title, the owner or operator of a landfill must maintain:

(1) a daily log of wastes received at the landfill that identifies the location where the waste was placed;

(2) water quality records required by section 363-4.6 of this Part must be kept throughout the active life and post-closure period of the facility;

(3) the operational log recording monthly total leachate generation amounts and the maintenance log documenting compliance with this schedule required by section 363-4.6(f)(8)(iii) of this Part must be kept at the facility;

(4) records associated with the radioactive waste detection procedures required by section 363-7.1(a)(4) of this Part must be kept at the facility.

6 CRR-NY 363-8.1

6 CRR-NY 363-8.2

6 CRR-NY 363-8.2

363-8.2 Reporting.

The owner or operator of a facility regulated under this Part must submit an annual report on forms prescribed by the department as required in section 360.19(k)(3) of this Title, and must submit all water quality monitoring results as required by section 363-4.6(f)(10) of this Part.

6 CRR-NY 363-8.2

6 CRR-NY IV B 363 363-9 Notes

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PART 363. LANDFILLS

SUBPART 363-9. CLOSURE, POST-CLOSURE, AND CUSTODIAL CARE

6 CRR-NY IV B 363 363-9 Notes

6 CRR-NY IV B 363 363-9 Notes

6 CRR-NY 363-9.1

6 CRR-NY 363-9.1

363-9.1 Applicability.

All landfills subject to regulation under this Part must conform to the requirements for closure, post-closure care, and custodial care set forth in this Subpart. Closure and post-closure activities must be conducted under a permit issued in accordance with the permitting requirements of Part 360.16 of this Title.

6 CRR-NY 363-9.1

6 CRR-NY 363-9.2

6 CRR-NY 363-9.2

363-9.2 Closure site investigation.

(a) The nature and extent of any past, current and potential releases or migration of contaminants from the site must be defined to ensure that an adequate final closure plan is developed. For existing sites where information is known through previous monitoring of the facility during its operating life, some or all of the requirements of this section may be waived upon approval of the department. The minimum elements of a closure site investigation are as follows:

(1) a hydrogeologic investigation performed in accordance with section 363-4.4 of this Part that, at a minimum, must:

(i) define the geologic and hydrogeologic conditions of the uppermost aquifer and, as required by the department, any other units in the critical stratigraphic section that may be impacted by the facility;

(ii) establish a long-term monitoring well network in the uppermost aquifer and other units determined necessary by the department, to monitor potential environmental impacts from the landfill and the effects of closure or remediation; and

(iii) analyze the initial round of samples or existing sampling data for each monitoring well point for baseline parameters. If contamination is detected, the department may require additional sampling and analysis as specified in section 363-4.6 of this Part;

(2) an explosive gas investigation performed to determine whether the site meets the requirements of section 363-7.1(e) of this Part, which must:

(i) include at least three rounds of subsurface explosive gas monitoring performed along the perimeter outside the waste mass but within the property boundary. Monitoring must be performed at 100-foot maximum intervals where temporary sampling locations are used, or at 400-foot maximum intervals where permanent gas monitoring wells are constructed. Initial monitoring must be performed when atmospheric pressure and wind velocity are low and when the ground surface has been wet or frozen for several days. Monitoring must be done below the wet or frozen zone if present;

(ii) identify the presence and concentration of explosive gases at or near the facility, including at the property line, in all on-site structures, and in potentially impacted off site structures;

(iii) determine the extent of actual or potential gas migration off site; and

(iv) describe the soil stratigraphy beneath and around the facility in terms of its potential to allow gas migration;

(3) a surface leachate investigation. This investigation must be performed when groundwater levels are at seasonal high elevations or at other times as specified by the department and must:

(i) identify the presence of leachate seeps or other uncontrolled leachate at, or emanating from, the facility;

(ii) document any instances where fugitive leachate from the facility is discharging into surface waters; and

(iii) characterize the chemical constituents of surface leachate for baseline parameters;

(4) a vector investigation to identify the presence of any vectors at the facility. If a vector problem is identified an appropriate remediation plan must be implemented prior to cessation of waste acceptance at the facility.

(b) Upon completion of the closure site investigation, the data must be compiled and presented in a closure site investigation report. The closure site investigation report must be completed and submitted to the department for approval.

6 CRR-NY 363-9.2

6 CRR-NY 363-9.3

6 CRR-NY 363-9.3

363-9.3 Closure.

(a) A final cover system must be installed on any landfill cell that has achieved final grades in accordance with Subpart 363-6 of this Part within five years of attaining final grades, except as required by subdivision (b) of this section.

(b) The owner or operator must complete final closure of the landfill by completing installation of the final cover system within 365 days of final receipt of waste unless an extension is approved in the landfill’s closure plan.

(c) A facility closure plan must be submitted to the department at least 180 days before commencement of construction of final facility closure that:

(1) meets the requirements of this Subpart and section 363-4.6(n) of this Part;

(2) addresses unacceptable environmental impacts identified in the closure site investigation report required in section 363-9.2 of this Subpart;

(3) provides an estimate of the facility area to be covered;

(4) provides an estimate of the inventory of waste in the facility;

(5) provides a closure construction schedule; and

(6) provides amended closure, post-closure care, and custodial care cost estimates.

(d) Financial assurance for closure, post-closure care, and custodial care must be amended in accordance with section 360.22 of this Title.

6 CRR-NY 363-9.3

6 CRR-NY 363-9.4

6 CRR-NY 363-9.4

363-9.4 Closure construction certification.

The construction certification required in section 360.16(j) of this Title must include a report that includes the following:

(a) the results of all CQA and CQC testing required in section 363-4.5 and Subpart 363-6 of this Part. The report must include documentation of any failed tests and all retesting performed and descriptions of procedures used to correct the improperly installed, damaged, or irregular material;

(b) record drawings noting any deviation from the approved closure plans; and

(c) a comprehensive narrative including, but not limited to, daily reports from the project engineer and a series of color photographs of major project features.

6 CRR-NY 363-9.4

6 CRR-NY 363-9.5

6 CRR-NY 363-9.5

363-9.5 Gas control system.

Landfill gas management systems are required for all facilities upon closure, and must be designed and constructed in accordance with the requirements of Subpart 363-6 of this Part, as appropriate.

6 CRR-NY 363-9.5

6 CRR-NY 363-9.6

6 CRR-NY 363-9.6

363-9.6 Post-closure care and custodial care.

(a) Post-closure care.

A facility's post-closure care period continues until the owner or operator can demonstrate to the department's satisfaction that the threat to public health and the environment has been reduced to a level where environmental monitoring and maintenance can be reduced.

(1) Operating requirements. In lieu of the operating requirements set forth in section 360.19 of this Title, all closed landfills regulated under this Part which are within their post-closure care period must conform to the operation requirements in this section, unless otherwise approved by the department based on unique circumstances associated with the landfill.

(i) Maintenance of all slopes, vegetation, drainage structures, gas venting structures, access roads, fencing and gates is required.

(ii) Maintenance of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run on and run off from eroding or otherwise damaging the final cover.

(iii) Vegetative cover must be established on all final cover areas within four months after placement. If this cannot be achieved due to seasonal constraints, measures must be taken to ensure the integrity of the final cover system until the establishment of vegetative cover. Throughout the post-closure care period, the vegetative cover must be maintained and must be mowed at least once a year, unless otherwise approved by the department.

(iv) Environmental and facility monitoring points, including gas monitoring points, must be maintained and sampled. This must include:

(a) post-closure explosive gas monitoring to determine if the facility meets the requirements of section 363-7.1(e) of this Part at least quarterly for a minimum period of five years. After this five-year period, the permittee may request that the department modify the sampling and analysis requirements. If post-closure explosive gas monitoring indicates explosive gas levels exceed the requirements of section 363-7.1(e) of this Part, appropriate actions must be taken and the department must be notified within 24 hours;

(b) annual baseline and quarterly routine monitoring as described in section 363-4.6 of this Part must be performed on groundwater, surface water, and leachate samples for the duration of the post-closure period. The owner or operator may petition the department for a reduction in monitoring frequency after five years of post-closure monitoring; and

(c) a description of type and location of sampling, sample preservation methodology, a well condition survey, and recordkeeping and reporting requirements for all environmental monitoring activities.

(v) The leachate collection system must be maintained and operated in accordance with section 363-7.1(f) of this Part. Leachate management activities include proper maintenance of all leachate controls, recording of the total volume of leachate stored at and removed from the facility, evaluation of liner performance, and leachate sampling and analysis.

(vi) Any installed active landfill gas collection system must be maintained and operated. Landfill gas must be destroyed in a flare or equivalent equipment in accordance with Parts 201, 208 and 212 of this Title.

(vii) Quarterly inspections and inspections after seismic events of sufficient intensity which may adversely affect the integrity of the final cover system and major rainfall events (all 24-hour, five year storms) must be performed on all facility components during the post-closure care period.

(viii) Any end use of the property must not disturb the integrity of the final cover, liners, any other components of the containment system, or the function of the monitoring or environmental control systems.

(ix) An annual report must be submitted as required by section 360.19 of this Title, and must include the results of maintenance, monitoring, quarterly inspections, and major rainfall event inspections required in this subdivision.

(x) A report that includes all sampling and analysis results for all environmental and facility monitoring must be submitted at a frequency specified in subparagraph (iv) of this paragraph.

(2) Post-closure care plan. The owner or operator must submit a final post-closure care plan to the department for approval prior to the last receipt of waste and at least every five years during the post-closure care period. The plan must provide:

(i) a description of the actions to be taken to implement paragraph (1) of this subdivision as appropriate;

(ii) a description of resource requirements including:

(a) minimum number of personnel and required qualifications; and

(b) minimum equipment needs;

(iii) the name, address and telephone number of the person or office to contact regarding post-closure care, and corrective measures concerns during the post-closure period;

(iv) a summary of financial assurance criteria that must be addressed to remain in compliance with the provisions of section 360.22 of this Title;

(v) a description of the planned uses of the property during and after the post-closure period; and

(vi) a list of any changes to the approved post-closure plan by topic, author, date of submittal, and date approved by the department from the time of original closure plan approval.

(b) Custodial care.

A facility's custodial care period begins when the owner or operator demonstrates to the department's satisfaction that the facility poses a significantly reduced threat to public health and the environment and that environmental monitoring and maintenance can be reduced.

(1) Operating requirements. In lieu of the operating requirements set forth in section 360.19 of this Title, all closed landfills regulated under this Part, which are within their custodial care period, must conform to the operation requirements in this section, unless otherwise approved by the department based on unique circumstances associated with the landfill.

(i) Maintenance of all slopes, vegetation, drainage structures, gas venting structures, access roads, fencing and gates is required.

(ii) Maintenance of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run on and run off from eroding or otherwise damaging the final cover.

(iii) Vegetative cover must be maintained and must be mowed at least once a year, unless otherwise approved by the department.

(iv) Environmental and facility monitoring points must be maintained and sampled. This must include:

(a) baseline monitoring, as described in section 363-4.6 of this Part, which must be performed on groundwater, surface water, and leachate samples once every five years; and

(b) a description of type and location of sampling, sample preservation methodology, a well condition survey, and recordkeeping and reporting requirements for all environmental monitoring activities.

(v) The gas venting system must be maintained and operated. If odors constitute a nuisance as determined by the department, an active gas collection system must be operated.

(vi) Annual inspections and inspections after seismic events and major rainfall events (24-hour, five year storms) must be performed on all facility components.

(vii) An annual report must be submitted as required by section 360.19 of this Title, and must include the results of all maintenance, monitoring, and inspection activities as well as proposed changes to end use.

(2) Custodial care plan. The owner or operator must submit a final custodial care plan to the department upon determination that the landfill's post-closure period is complete. The custodial care plan at a minimum must provide:

(i) a description that documents actions to be taken to implement paragraph (1) of this subdivision assuring the effectiveness and reliability of the components of the landfill's waste

containment system and appurtenances and associated end use controls that have been determined necessary to protect public health and the environment;

(ii) a description of support requirements necessary to implement the custodial care plan, including:

(a) minimum number of personnel and required qualifications;

(b) minimum equipment needs;

(iii) the name, address and telephone number of the person or office to contact regarding custodial care, and corrective measures concerns during the custodial care period; and

(iv) a summary of financial assurance criteria that must be addressed to remain in compliance with the provisions of section 360.22 of this Title.

6 CRR-NY 363-9.6

6 CRR-NY 363-9.7

6 CRR-NY 363-9.7

363-9.7 End use.

(a) The owner or operator of a closed landfill where an end use is proposed, including landfills that were closed prior to the effective date of this Part or were not subject to closure, post-closure care, or custodial care requirements, must demonstrate that the proposed end use:

(1) will not adversely impact the final cover system and will not have a significant adverse impact on public health and the environment. The demonstration must consider migration of landfill gases and leachate, settlement or disturbance of waste, alteration of the final cover, soil, or other material that overlies the landfill or any other landfill components, and public access; and

(2) will not interfere with post-closure or custodial care monitoring and maintenance of the landfill, if applicable.

(b) No end use may be implemented without written department approval.

(c) Any buildings constructed on-site must be designed and constructed to prevent gas migration into the buildings and include:

(1) continuous methane gas sensors installed inside the building that will trigger an audible alarm and notification signal to emergency personnel when methane gas concentrations are detected;

(2) periodic methane gas and soil vapor monitoring inside all buildings and underground utilities; and

(3) a written certification by a professional engineer that engineering controls incorporated into the landfill closure design and/or the proposed structure are adequate to preclude any significant threat to public health and safety assuming normal occupation and use of the structure.

6 CRR-NY 363-9.7

6 CRR-NY IV B 363 363-10 Notes

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SUBPART 363-10. CORRECTIVE MEASURES

6 CRR-NY IV B 363 363-10 Notes

6 CRR-NY IV B 363 363-10 Notes

6 CRR-NY 363-10.1

6 CRR-NY 363-10.1

363-10.1 Corrective measures report.

The owner or operator of a landfill must complete a corrective measures report and implement a corrective measures program consistent with this Subpart if trigger values are exceeded as specified in section 363-4.6(f)(9)(iii) of this Part. The requirements of this section do not apply to landfills that stopped accepting solid waste prior to October 9, 1993, or to facilities subject to Part 375 of this Title.

(a) Corrective measures assessment.

(1) If any expanded parameter is detected at a level which exceeds the groundwater protection standards specified in section 363-4.6(f)(9)(iii) of this Part, then the owner or operator must

notify the department within 24 hours of detection, notify appropriate local government officials within seven days of detection, begin a corrective measures assessment within 30 days of detection, and complete the corrective measures assessment within a timeframe specified by the department. The facility owner or operator must continue to monitor the facility in accordance with section 363-4.6 of this Part.

(2) The corrective measures assessment must include a list of possible corrective measures including, but not limited to, closure in accordance with Subpart 363-9 of this Part and landfill reclamation in accordance with Subpart 363-11 of this Part, and an assessment of the effectiveness of each corrective measure. The assessment of each listed corrective measure must include, at a minimum:

(i) the corrective measure's performance, reliability and ease of implementation;

(ii) the corrective measure's potential impacts including safety effects, cross media effects and control of any probable residual contamination;

(iii) the time required to begin and complete each corrective measure;

(iv) the cost of each corrective measure; and

(v) an identification of any State and local permits or other public health or environmental requirements that may affect the corrective measure implementation.

(3) The facility owner or operator must discuss the corrective measures assessment in a public meeting and with the department before the selection of the corrective measure. A responsiveness summary, which addresses comments received at the public meeting, must be included with the corrective measures report submitted under subdivision (b) of this section. The public meeting must be noticed as follows:

(i) publication of the notice in a newspaper having general circulation in the area within which the facility is located, direct mailing of the notice to property owners within 1,000 feet of the landfill footprint, and publishing of the notice in the environmental notice bulletin;

(ii) the notice must be published and mailed not less than two weeks nor more than six weeks before the meeting; and

(iii) the notice must indicate the date, time, place and purpose of the meeting, and the name and address of the owner or the owner's representative.

(b) Corrective measure selection.

(1) The facility owner or operator must select a corrective measure based on the results of the corrective measures assessment conducted under subdivision (a) of this section. A corrective measures report must be submitted to the department for approval within 14 days after completion of the proposed corrective measures assessment. The report must address the

requirements of this subdivision and include the results of the corrective measures assessment, the proposed corrective measures, and a schedule for initiating and completing the corrective measures.

(2) The selected corrective measure must:

(i) protect public health and the environment;

(ii) attain the groundwater protection standard established pursuant to section 363-4.6 of this Part;

(iii) control the sources of releases to the maximum extent practical so as to reduce or eliminate further releases of the contaminants into the environment; and

(iv) comply with other applicable State and Federal requirements.

(3) The facility owner or operator, in selecting a corrective measure, must consider the following factors:

(i) the probable success of the corrective measure, including:

(a) the reduction of existing risks;

(b) the potential of residual risks due to waste remaining after implementation of the corrective measure;

(c) the type and extent of long-term management required, including monitoring, operation and maintenance;

(d) short term risks that might be posed to public health and the environment while implementing the corrective measure. This includes any potential impacts to public health and the environment that may be associated with excavation, transportation, and redisposal of wastes;

(e) time until full protection is achieved;

(f) the potential adverse impacts on public health and the environment resulting from exposure to remaining wastes compared to the potential of adverse impacts associated with further corrective measures;

(g) long-term reliability of the engineering and institutional controls;

(h) potential need to replace the corrective measure; and

(i) the compatibility of the corrective measure with department cleanup and pollution prevention initiatives for nonhazardous wastes;

(ii) the corrective measure's short-term and long-term effectiveness in preventing the release of additional contaminants. The probable effectiveness of the corrective measure should consider, at a minimum, the following:

(a) the extent to which containment practices will reduce further releases;

(b) the time period for reduction of any further releases; and

(c) the extent to which treatment technologies, including in situ treatment technologies, may be used;

(iii) the ease or difficulty of implementing a potential corrective measure, specifically considering the following:

(a) the difficulty of the construction;

(b) operational reliability of the technologies;

(c) the need to coordinate with and obtain necessary approvals and permits from other agencies;

(d) the availability of necessary equipment and specialists; and

(e) available capacity and location of needed treatment, storage, and disposal services;

(iv) the technical and economic resources available to the facility owner or operator;

(v) the degree to which community concerns are addressed by a potential corrective measure.

(4) Within 90 days after the selection of a department-approved corrective measure, the facility owner or operator must complete and submit to the department a corrective measures work plan that includes an implementation schedule. Any revisions to the work plan based on department comments must be submitted within 30 days. The owner or operator must consider the following factors in determining the schedule of corrective activities:

(i) the extent and nature of contamination and level of adverse impact to public health and the environment;

(ii) the objectives of the corrective measure and the practical capabilities of corrective technologies in remediating contamination and leading to compliance with the groundwater protection standards;

(iii) availability of treatment or disposal capacity for wastes managed during implementation of the corrective measure;

(iv) an evaluation of the use of experimental technologies that are not currently commercially available, which may offer significant advantages over already available technologies in terms of effectiveness, reliability, safety, or ability to achieve corrective objectives;

(v) potential risks to public health and the environment resulting from exposure to contamination prior to completion of the corrective measure;

(vi) resource value of the contaminated aquifer, including:

(a) whether the aquifer is a primary or principal aquifer or is within a public water supply stabilized cone of depression area or within a regulated wetland, special flood hazard area or other applicable prohibited or restricted siting area as defined in this Part;

(b) current and future uses;

(c) proximity and withdrawal rate of users;

(d) groundwater quantity and quality;

(e) potential damage to wildlife, crops, vegetation, and physical structures that may be caused by exposure to the waste constituent;

(f) hydrogeologic characteristics of the facility and surrounding land;

(g) groundwater removal and treatment costs; and

(h) cost and availability of alternative water supplies;

(vii) practical capability of the facility owner or operator;

(viii) an evaluation of any interim measures necessary to ensure the protection of public health and the environment. The interim measures must be consistent with the objectives of and contribute to the performance of any corrective measure that may be required under subdivision (b) of this section. The interim measures evaluation must be submitted to the department to determine if interim measures are needed. An interim measures evaluation must consider the following factors:

(a) time required to develop and implement a final corrective measure;

(b) actual or potential exposure of contaminants to nearby populations or environmental receptors;

(c) actual or potential contamination of drinking water supplies, primary or principal aquifers, or sensitive ecosystems or environments;

(d) further degradation of the groundwater that may occur if a corrective measure is not initiated expeditiously including, but not limited to, direction and rate of contaminant movement in the groundwater flow system;

(e) weather conditions that may cause contaminants to migrate or be released or otherwise aid in their transmission;

(f) risks of fire or explosion, or potential for exposure to contaminants as a result of an accident or failure of a container or handling system; and

(g) other situations that may pose threats to public health and the environment; and

(ix) other relevant factors.

(5) The department may determine that the proposed corrective measure for a contaminant parameter is not necessary if the facility owner or operator demonstrates to the satisfaction of the department that:

(i) the groundwater is additionally contaminated by substances that have originated from a source other than the landfill and that the concentrations of those substances are present at levels where implementation of the corrective measures would provide no significant reduction in risk to public health and the environment;

(ii) the remediation of the release is technically impractical; or

(iii) the remediation will result in unacceptable cross media impacts.

(6) A determination by the department under paragraph (5) of this subdivision does not affect the authority of the department to require the facility owner or operator to undertake source control measures or other measures that may be necessary to eliminate or minimize further contamination of groundwater or to mitigate the groundwater contamination to concentrations that are technically practical and significantly reduce threats to public health and the environment, nor does it diminish the department's authority to seek civil or criminal penalties or other damages or relief as part of an enforcement action under State or Federal law.

(c) Corrective measure implementation.

(1) Once the corrective measure work plan is approved by the department, the facility owner or operator must:

(i) establish and implement a corrective measure groundwater monitoring program, that:

(a) meets the requirements of section 363-4.6 of this Part and any additional condition imposed by the department as part of a permit, administrative order, or court order;

(b) indicates the effectiveness of the corrective measure; and

(c) evaluates compliance with the groundwater protection standard specified in section 363-4.6 of this Part;

(ii) implement the corrective measure selected under subdivision (b) of this section in accordance with the terms, conditions and schedule set forth in an approved corrective measures work plan; and

(iii) take any interim measures necessary to protect public health and the environment.

(2) The department may determine that compliance with paragraph (b)(2) of this section is not being achieved through the selected corrective measure. In these cases, the department may require the facility owner or operator to implement other methods or techniques that could achieve compliance with paragraph (b)(2) of this section, unless the department makes a determination under paragraph (3) of this subdivision.

(3) If the facility owner or operator determines that they cannot achieve the requirements of paragraph (b)(2) of this section with any currently available methods, then the owner or operator must:

(i) submit a justification for the department's approval, which indicates that the requirements under paragraph (b)(2) of this section cannot be achieved with any currently available methods;

(ii) implement alternate measures acceptable to the department, to control exposure to humans, wildlife, the environment or other receptors to residual contamination;

(iii) implement measures acceptable to the department, for control of the sources of contamination, or for removal or decontamination of equipment, units, devices, or structures that are consistent with the overall objective of the corrective measure; and

(iv) notify the department that the report justifying the alternative measures has been placed in the operating record. The department must be notified within 14 days prior to implementing the alternative measures.

(4) All wastes that are managed according to a corrective measure required under this section must be managed in a manner that:

(i) protects public health and the environment; and

(ii) complies with applicable State and Federal requirements.

(5) Corrective measures selected according to subdivision (b) of this section are considered complete when:

(i) the facility owner or operator complies, to the satisfaction of the department, with the groundwater protection standards specified in this section at all points within the plume of contamination. Compliance with the groundwater protection standards is demonstrated when

concentrations of contaminants required to be measured have not exceeded the groundwater protection standard for three consecutive years using the procedures and performance standards in the environmental monitoring plan under section 363-4.6 of this Part. The department may specify an alternative length of time during which the facility owner or operator must demonstrate that concentrations of baseline and expanded parameters have not exceeded groundwater protection standard(s) taking into consideration:

(a) extent and concentration of the release;

(b) behavior characteristics of the contaminants in the groundwater;

(c) accuracy of monitoring or modeling techniques, including any seasonal, meteorological, or other environmental variabilities that may affect the accuracy; and

(d) characteristics of the groundwater; and

(ii) all actions required to complete the corrective measure have been satisfied.

(6) The facility owner or operator must certify to the department that the corrective measure has been completed according to the requirements of paragraph (5) of this subdivision. The certification must be signed by the facility owner or operator and be approved by the department.

(7) When, upon review of the certification, the department determines that the corrective measure has been completed in accordance with the requirements under paragraph (5) of this subdivision, the facility owner or operator may be released from the requirements for financial assurance for corrective measures.

6 CRR-NY 363-10.1

6 CRR-NY IV B 363 363-11 Notes

NY-CRR

OFFICIAL COMPILATION OF CODES, RULES AND REGULATIONS OF THE STATE OF NEW YORK

TITLE 6. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CHAPTER IV. QUALITY SERVICES

SUBCHAPTER B. SOLID WASTES

PART 363. LANDFILLS

SUBPART 363-11. LANDFILL RECLAMATION

6 CRR-NY IV B 363 363-11 Notes

6 CRR-NY IV B 363 363-11 Notes

6 CRR-NY 363-11.1

6 CRR-NY 363-11.1

363-11.1 Applicability.

This Subpart applies to reclamation activities at landfills regulated pursuant to this Part. For purposes of this Subpart, *landfill reclamation* is defined as excavation of a portion or all of a landfill with the goal of reducing landfill volume through separation of materials into recyclable, reusable, and combustible components; reducing closure and post-closure costs by complete or partial removal of the landfill; creating capacity; or reducing environmental impacts.

6 CRR-NY 363-11.1

6 CRR-NY 363-11.2

6 CRR-NY 363-11.2

363-11.2 Registered facilities.

(a) An owner or operator of a landfill must not conduct reclamation of a landfill without a registration issued pursuant to this Subpart and section 360.15 of this Title. Facilities registered pursuant to this Part must comply with section 360.15 of this Title if not otherwise permitted under this Part.

(b) In lieu of the operating requirements described in section 360.19 of this Title, each facility registered pursuant to this Part must comply with the requirements specified in this Subpart, except that reclamation by owners or operators involving only re-contouring or reduction without waste processing of the existing waste mass in a disposal facility may comply with only section 363-11.5 of this Subpart.

6 CRR-NY 363-11.2

6 CRR-NY 363-11.3

6 CRR-NY 363-11.3

363-11.3 Feasibility study.

(a) A feasibility study must be conducted prior to any reclamation activities and in accordance with a department-approved work plan. Landfill reclamation feasibility study work plans must include:

(1) a preliminary site investigation, including:

(i) a description of the vertical and areal extent of the landfill;

(ii) a delineation of discrete or partially separated areas of the landfill, or special waste (*e.g.*, ash, biosolids, friable asbestos-containing waste, C&D debris, etc.) disposal areas;

(iii) a description of the age, type of waste and cover material, landfill operation method, and estimate of volume for each area of the landfill identified in subparagraph (ii) of this paragraph;

(iv) an estimate of the water table depth throughout the area to be reclaimed;

(v) an assessment of available work space for equipment staging, material storage, and other work areas;

(vi) an evaluation of the landfill's existing groundwater monitoring system, procedures, and most recent analytical data;

(vii) an assessment of the landfill gas generated by the landfill; and

(viii) a description of the regulatory history of the landfill (*e.g.*, results of department inspections, compliance history, permit status, etc.);

(2) a feasibility study field investigation work plan that describes all of the field work and laboratory analysis that is part of the feasibility study, including:

(i) all proposed work areas;

(ii) the number and location of all borings, trenches, and test pits and their estimated depth and volume;

(iii) a description of all excavation and material handling operations;

(iv) a description of all material quantification methods and laboratory analyses that will be used to characterize and estimate the quantities of recyclables, combustibles, reusable fill material, and other components;

(v) a delineation of project management responsibilities and a proposed work schedule; and

(vi) an emergency response plan as described in section 363-11.6 of this Subpart.

(b) Upon completion of the feasibility study, the data must be compiled and presented in a feasibility study report submitted to the department. The report must include:

(1) a description of sampling, analysis, test pits and test borings;

(2) the thickness of waste fill and depth to the water table;

(3) a characterization of excavated materials (*e.g.*, recyclables, combustibles, reusable fill material, and other components);

(4) analysis of reusable fill material component, if applicable;

(5) an evaluation of the suitability of the excavated material for reuse or recycling, the need for further processing, and the expected final disposition;

(6) an assessment of potential costs;

(7) an assessment of the benefits and impacts associated with landfill reclamation; and

(8) a determination as to whether landfill reclamation is feasible.

6 CRR-NY 363-11.3

6 CRR-NY 363-11.4

6 CRR-NY 363-11.4

363-11.4 Reclamation work plans.

(a) Drawings and work plans for demonstration projects or landfill reclamation must include the following:

(1) A vicinity map that shows the area within one mile of the boundaries of the landfill to be reclaimed; the existing and proposed zoning and land use within that area; and residences, access roads, and other existing and proposed artificial or natural features relating to the reclamation of the landfill.

(2) A site plan showing the landfill's property boundaries; the utilities including electric, gas, water, storm, and sanitary sewer systems and right-of-way easements; the names and addresses of abutting property owners; the location of the proposed reclamation; the landfill liner system and leachate collection, storage, treatment and pumping systems; the landfill gas management system, if any; on-site buildings and appurtenances, fences, gates, roads, parking areas, drainage culverts, and signs; a wind rose; and the site topography.

(3) Detail of the proposed reclamation area adequately delineating in plan and cross-sectional view, the depth of excavation, proximity to the liner and leachate collection and disposal system, if any, other landfill structures and equipment, and direction of progression.

(4) A description of procedures to excavate, process, store, transfer, use, and dispose of excavated material. The off site reuse of soil components or residues must be approved by the department in advance in accordance with section 360.11 of this Title.

(5) A stormwater and leachate management plan.

(6) The procedure for site clean-up and grading after reclamation described with detailed drawings showing original and final grades. Landfill footprint reduction must meet the requirements of section 363-11.5 of this Subpart.

6 CRR-NY 363-11.4

6 CRR-NY 363-11.5

6 CRR-NY 363-11.5

363-11.5 Landfill footprint reduction.

Footprint reduction areas must be cleaned by completely removing waste and contaminated subbase soil from below the reclaimed area. If landfill reclamation results in a reduction of the landfill footprint, the following requirements must be met.

(a) A petition for the exclusion of the reclaimed landfill area from the closure, post-closure and custodial care criteria described in Subpart 363-9 of this Part may be submitted for approval by the department. The footprint reduction petition must include the following:

(1) details of the footprint reduction area in plan and cross-sectional views; and

(2) an in-situ subbase soil sampling plan that describes the number of samples, the method of sampling, and the analytical parameters and methods, and an evaluation of the sampling and analysis results.

6 CRR-NY 363-11.5

6 CRR-NY 363-11.6

6 CRR-NY 363-11.6

363-11.6 Emergency response plans.

(a) Emergency response plans must be prepared in accordance with section 360.16(c)(4)(iv) of this Title.

(b) A site health and safety coordinator must be designated on a full-time basis during excavation. The site health and safety coordinator must be trained in hazardous waste and emergency response operations as referenced in 29 CFR part 1910.120, as incorporated by reference in section 360.3 of this Title.

6 CRR-NY 363-11.6