EXHIBIT A

98-453

Rule-Making Cover Sheet

TO: Secretary of State
ATTN: Administrative Procedure Officer
State House Station 101, Augusta, Maine 04333

1. **Agency:** Department of Environmental Protection

2. **Agency umbrella and unit number:** 06-096

3. **Title of rule:** Landfill Siting, Design and Operation

4. **Chapter number assigned to the rule:** 401

5. **Date(s)/method(s) of notice:**

   February 4, 1998 by notice published in newspaper

   January 23, 1998 - April 30, 1998 by mailing memoranda announcing the public hearing held on February 25, 1998, and the extension of period for public comments to April 30, 1998. Draft copies of Chapter 401 and/or other draft chapters of the Solid Waste Management Rules accompanied most of the mailed notices.

6. **Date(s)/place(s) of hearing(s): February 25, 1998 / Holiday Inn, Augusta, Maine**

7. **Type:** ☐ new rule ☐ partial amendment(s) of existing rule
   ☐ suspension of existing rule ☐ repeal of rule ☐ emergency rule
   ☒ **repeal and replace: complete replacement of existing chapter, with former version simultaneously repealed.**

8. **Name/phone of agency contact person: Clifton Eliason, 207-287-6115**

9. **Certification Statement:** I, Edward O. Sullivan, hereby certify that the attached is a true copy of the rule(s) described above and lawfully adopted by the Department of Environmental Protection on August 12, 1998.
   (name of agency) (date)

   Signature: _____
   (original signature, personally signed by the head of agency)

   Printed name & title: Edward O. Sullivan, Commissioner

10. Approved as to form and legality by the Attorney General on 9/18/25
(date)

Signature: _____
(original signature, personally signed by the head of agency)

Printed name & title: _____

MAPA-1 (3/94)

CHAPTER 401

LANDFILL SITING, DESIGN AND OPERATION

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Chapter 401: LANDFILL SITING, DESIGN, AND OPERATION

SUMMARY: This chapter establishes the requirements of the Department for siting, design, and operation of landfills for the disposal of municipal solid waste, special wastes, construction/demolition debris, land clearing debris, and wood wastes. Specific requirements for landfill location, design, construction, operations, closure, and post-closure care are established.

1. General Licensing Requirements

A. Applicability. This chapter applies to solid waste disposal facilities landfilling municipal solid waste, special waste, construction/demolition debris, land clearing debris, and wood wastes, and permit-by-rule facilities disposing of cull potatoes. A license is required to locate, establish, construct, and operate any new landfill facility site, or to alter an existing landfill facility site, pursuant to Chapter 400 and this Chapter.

Construction/demolition debris, land clearing debris, and wood waste landfills meeting the standards and requirements of section 7 need only meet and may be licensed under the requirements of section 7. Cull potato disposal facilities may be eligible for a permit-by-rule to the extent that the standards of section 8 are met. All other landfills are subject to the requirements of sections 1-6.

B. Two Stage Process for Licensing Landfills. The licensing of new landfills or expansions of existing landfills under the provisions of sections 1-6 of this chapter occurs in two stages: a "Preliminary Information Report" (PIR) and an application. This two-staged process allows the applicant and the Department to work interactively to ensure that the site assessment work is adequate to determine whether or not the facility will pose an unreasonable threat to ground and surface water or to public health and safety, and that the engineering design is developed based on the site characteristics identified during the site assessment. The PIR must demonstrate that prohibitive siting criteria are not violated in the area proposed for landfill development.

C. Performance Standards and Siting Criteria.

(1) Performance Standards. Applicants for new or expanded landfill licenses or amendments to an existing landfill license, must demonstrate that the landfill will be sited, designed, constructed, operated, and closed to meet the standards in Chapter 400, Section 4 and the following:

(a) Landfills may not contaminate ground water outside the solid waste boundary.

(b) Landfills with waste handling areas that are located within 10,000 feet of any airport runway used by turbojet aircraft or within 5000 feet of any airport runway used by piston-type aircraft only must demonstrate that the landfill will be designed and operated so that the landfill does not pose a bird hazard to aircraft.

(c) Time of travel to sensitive receptors from the bottom of the landfill and leachate pond liner systems must be greater than 6 years including any offsets gained through the use of improvement allowances pursuant to section 2.D(2). Time of travel to sensitive receptors from leachate storage structures and pump stations must be greater than 3 years.

(d) Contaminant releases from the area within the solid waste boundary must not pose an unreasonable threat to sensitive receptors.

(e) At facilities where ground water monitoring is anticipated or is being conducted, the disturbance of soil material must not affect the ability to monitor water quality at the facility site.

(2) Prohibitive Siting Criteria. To protect public health, safety, and the environment, the locations listed below are not suitable for siting new landfills or expansions of existing landfills. Variances from these siting prohibitions will not be granted.

(a) The waste handling area must not be located within 1000 feet of Class AA or Class SA waters, as defined in 38 MRSA §465 and 465-B.

(b) The area within the solid waste boundary must not lie over or be within 300 feet of a significant sand and gravel aquifer.

(c) The area within the solid waste boundary must not be located within 200 feet of a fault that has had displacement in Holocene time.

(d) The facility site must not be located in, on, or over a coastal sand dune system, coastal wetland, or fragile mountain area, as these terms are defined in 38 MRSA §480-B.

(3) Restrictive Siting Criteria. The siting criteria listed below apply to siting new landfills or expansions of existing landfills unless the applicant or licensee receives a variance in accordance with Chapter 400, Section 13.

(a) The following set-backs must be maintained:

(i) A minimum 300 foot set-back between the solid waste boundary and all public roads;

(ii) A minimum 300 foot set-back between the solid waste boundary and the property boundary;

(iii) A minimum 1000 foot set-back between the solid waste boundary and the nearest residence not owned by the applicant at the time the application is filed with the Department;

(iv) A minimum 100 foot setback between the solid waste boundary and stratified sand and gravel deposits that are capable of providing sufficient water for domestic use or are a contaminant migration pathway to a significant ground water aquifer, a significant sand and gravel aquifer, a fractured bedrock aquifer, or a surface water body;

(v) A minimum 100 foot setback between the waste handling area and classified surface water; and

(vi) A minimum 1000 foot setback between the solid waste boundary and any water supply spring at the time the Preliminary Information Report is filed with the Department.

(vii) A minimum 1000 foot setback between the solid waste boundary and any water supply well not owned by the applicant at the time the Preliminary Information Report is filed with the Department.

(b) The area within the solid waste boundary must be located on soils that contain sufficient fines and clay-size particles to minimize infiltration of leachate. The in-situ soils must have an undisturbed hydraulic conductivity less than or equal to 1×10^{-5} cm/sec.

(c) The landfill and leachate storage ponds must be located so that site characterization monitoring, detection monitoring, and assessment monitoring can be conducted. (See Chapter 405 for detailed monitoring requirements.)

(d) The waste handling area may not be located on a 100-year flood plain.

(e) A waste handling area may not overlie an unstable area.

(f) The facility site must not be located in, on, or over a significant wildlife habitat, as this term is defined in 38 MRSA §480-B.

D. General Requirements. The applicant must comply with the following requirements during the site investigation and licensing process.

(1) Monitoring wells, observation wells, piezometers, and borings shall be designed, constructed, and monitored in accordance with the procedures specified in Chapter 405.

(2) Wells and piezometers must be maintained in operating condition during the entire application and review process.

(3) The applicant must establish protected permanent benchmark(s) on the site for use in surveying the landfill, constructed to U.S. Coast and Geodetic Survey standards.

Horizontal and vertical control must be established for each benchmark. The benchmark(s) must be:

(a) Coordinated and reported according to National Geodetic Vertical Datum Standards, if readily available;

(b) Shown on all application drawings and record drawings, as applicable; and

(c) Clearly marked and labeled.

(4) Applicants must notify the affected airport and the Federal Aviation Administration (FAA) whenever a new landfill or expansion of an existing landfill is proposed within a five-mile radius of any airport runway.

(5) All construction associated with facility site development shall comply with the specific stormwater control standards contained in sections 3 and 4, including section 4.B, of Chapter 500 of the Department's rules.

E. Preliminary Information Reports and Other Pre-Application Requirements. Pre-application requirements are intended to screen out unsuitable sites and to identify unacceptable approaches to development of a landfill. Prior to preparation of an application for a license to develop a new or expanded landfill, and at least two months prior to the pre-application meeting, the applicant must develop and submit to the Department for review a complete Preliminary Information Report (PIR). The PIR will be the basis for discussion at the pre-application meeting. Subsequent to the pre-application meeting the Department will provide the applicant with written comments on the PIR. These comments will address the adequacy of the PIR in demonstrating that the landfill has been located so that none of the siting criteria in section 1(C)(2) will prohibit the proposed development. The applicant must also attend a pre-submission meeting with the Department and hold a public informational meeting in accordance with Chapter 2.

The purpose of the PIR is to demonstrate that the landfill has been located so that none of the siting criteria in section 1.C(2) will prohibit the proposed development, and to preliminarily identify restrictive siting criteria and any siting variances which may be requested. It must include an introduction, a summary of findings and conclusions, and the following information:

(1) Type of facility, such as municipal, construction/demolition debris, industrial, commercial;

(2) Surficial geologic map at a scale of 1:25,000 or larger;

(3) Medium intensity soils map;

(4) The most recent full-size U.S. Geological Survey topographic map of the area (7-1/2 minute series if printed), with the facility site and the property boundary clearly delineated;

(5) The most current available aquifer map from the Maine Geological Survey;

(6) Locations of mapped faults, and an earthquake epicenter map;

(7) Subsurface information adequate to demonstrate that in-situ soils meet the restrictive siting criteria in section 1.C(3)(b) and to identify any areas where the proposed development will disturb soils within five feet of the bedrock surface.

(8) Identification of all classified bodies of surface water within 1000 feet of the solid waste boundary;

(9) A map of any coastal sand dune systems, coastal wetlands, significant wildlife habitat, or fragile mountain areas located within 500 feet of the proposed facility site;

(10) Flood plain map showing the 100-year flood elevation, or, if a flood plain map is not available for the project area, a flood plain investigation adequate to determine whether the waste handling area will be located in the 100-year flood plain;

(11) A map showing the set-back distances for the proposed solid waste boundary and/or the waste handling area from the following:

(a) Public roads;

(b) Property boundaries;

(c) Residences;

(d) Known sensitive receptors;

(e) Water supply wells and water supply springs; and

(f) Airports.

(12) A synopsis of all the hydrogeologic, geologic and soils information that the applicant has researched and utilized; and

(13) A list of any variances that the applicant expects to apply for.

In addition to the PIR, an applicant may elect to submit to the Department a workplan for conducting further site investigations and for developing engineered designs, operating requirements, and monitoring programs. The submission of a workplan will allow the Department to provide the applicant with comments on the scope of the work proposed before the work is initiated. The workplan may include provisions for submitting to the Department for review and comment a conceptual design based on the findings of the Site Assessment Report as described in section 2.C. The workplan may also identify other points for submissions or meetings with the Department to review progress to date and to discuss any issues identified and any need to vary from the workplan.

2. **Application Requirements.** Landfill applications must include all information necessary to address the requirements of Chapter 400 and this Chapter. The applicant must receive a positive determination of public benefit, if subject to 38 MRSA section 1310-AA, and written comments on its PIR from the Department prior to submitting an application to license a landfill. The submission must include all pertinent data and calculations. An application will be accepted as complete for processing when the Department determines that the entire application fee has been received, that the application form is properly filled out, and that information is provided for each of the items required by the forms.

A. General Information

(1) Site and Surroundings Map. The application shall include a map, or series of maps, at a scale of 1 inch = 500 feet, or larger engineering scale, showing the facility site in relation to existing surrounding natural and man-made features. The maps must include the area within 2000 feet of the perimeter of the facility site, and must clearly show the location of the proposed solid waste boundary, waste handling areas, and the property boundary. It must also show all flood plain boundaries, lakes, ponds, springs, streams, surface water diversions, wells (differentiate between public water, domestic, industrial and other), utilities, public water supply watershed areas, wellhead protection areas, significant sand and gravel aquifers, federally-defined wetlands, 10 foot contour interval lines, existing buildings or structures, roads, recorded rights-of-way, conservation areas, unique areas, historic sites, and local zoning.

(a) Existing contour maps such as those prepared by the U.S. Geological Survey or provided from municipal government sources may be enlarged and utilized, if sufficiently accurate to clearly locate the features listed above.

(b) Ground-controlled photogrammetric maps are required to support ground water flow modeling used to evaluate ground water flow and contaminant transport analysis, as appropriate.

(2) Aerial Photographs. Aerial photos taken within the past year, giving complete stereo coverage of the area within 2000 feet of the perimeter of the facility site must be submitted. The scale of the photographs must be 1 inch equal to or less than 500 feet. The proposed facility site boundary and the property boundary must be clearly outlined on one photo.

B. Site-Specific Investigation. Each application for a landfill must include the results of an investigation to gather the information to complete the site assessment report as described in Section 2.C. The investigation, including surficial and bedrock geology, ground water flow conditions and ground water quality, must meet the requirements of this subsection and must provide sufficient data to simulate contaminant transport analysis as required in Section 2.G.

(1) Geological Investigations. Subsurface investigations are required in sufficient numbers and locations to properly describe the surficial stratigraphy and bedrock beneath and adjacent to the proposed solid waste boundary. This investigation must extend beyond the solid waste boundary and beneath the proposed facility site to

confirm that setbacks from any stratified sand and gravel deposits, significant sand and gravel aquifers, fractured bedrock aquifers, and other sensitive receptors will be attained as applicable.

(a) The bedrock investigation must be sufficient to describe at least the following:

(i) Bedrock lithology;

(ii) Structure, including the nature, degree and continuity of fracturing;

(iii) Aquifer characteristics; and

(iv) The degree of weathering.

(b) The applicant shall conduct hydraulic conductivity tests in all critical strata in a sufficient number of locations to adequately assess the variability of hydraulic conductivity. Pump tests must be conducted at selected locations as needed to evaluate aquifer yield and connectivity of bedrock fractures.

(c) Hydrogeological site conditions to be considered in selecting landfill design, including time of travel to sensitive receptors, must be identified.

(2) Ground and Surface Water Investigation. The following are required as part of the ground and surface water investigation.

(a) The installation of water table observation wells and open standpipe piezometers in numbers and locations sufficient to determine horizontal and vertical ground water flow gradients and for phreatic surface observations is required. These instruments must be read at a frequency sufficient to identify the seasonal extremes of groundwater fluctuations. Piezometers and water table observation wells must be installed at a sufficient number of locations to enable calculation of ground water time of travel to all identified sensitive receptors.

(b) For a new landfill, site characterization monitoring must be performed and reported in accordance with the requirements in Chapter 405 for ground water and surface water.

(c) For expansion of an existing landfill, the applicant must submit a summary and interpretation of all the ground and surface water quality data obtained to date.

(3) Geotechnical Investigation. The site investigation must gather sufficient corroborative field and laboratory data to support the stability assessment and the settlement assessment required under Section 2.F.

C. **Site Assessment Report.** The purpose of the site assessment report is to identify site characteristics and provide recommendations for landfill design and construction, identify all potentially impacted sensitive receptors, and assess ground water flow time of travel. The site assessment report for a landfill must include a narrative and all the information gained from the site-specific investigation program. It must integrate this information, focus on aspects of site suitability for landfill development, and must identify and evaluate all site limitations. This report shall also include supporting documentation and the following information:

(1) Maps, Drawings and Sections. Maps, drawings and sections all drawn to the same horizontal scale must be prepared and submitted according to the requirements of this paragraph. Unless otherwise specified, maps and drawings must be at a scale of one inch equals 100 feet or larger.

(a) A topographic base map must be used for all maps and drawings included in the site assessment report. Cross-section elevations must be drawn to the same elevation datum as the maps.

(b) A surficial geologic map must be submitted. Proposed locations of the solid waste boundary and leachate management system components must be shown on this map. Geologic contacts appearing on this map and all cross-sections shall be drawn as solid lines where observed and as dashed lines where inferred.

(c) Geologic cross-sections to describe the site geology must be submitted. Cross-sections, including one or more drawn parallel to the ground water flow direction, must show all hydrogeologic units, including bedrock, beneath the facility site. The vertical scale must be 1 inch = 5 feet or 1 inch = 10 feet for stratigraphic thicknesses of up to 50 feet, and 1 inch = 10 feet or 1 inch = 20 feet for stratigraphic thicknesses over 50 feet. The locations of the subsurface investigations used to construct these sections must be shown on the cross sections. The locations of nearby subsurface investigations along with their respective offset distances must be projected to these cross-sections. Preliminary locations of the solid waste boundary, leachate management system components, the existing base grade, the constructed base preparation grade, and the intersections of other cross-sections must be shown.

(d) An isopach map of surficial deposits must be submitted.

(e) A bedrock contour map must be submitted. Contour intervals of 10 feet for moderately sloping bedrock (greater than 5%) and 5 feet for gently sloping bedrock (less than or equal to 5%) must be used.

(f) At least two phreatic surface contour maps must be submitted to demonstrate seasonal high and low ground water conditions. Contour intervals of 5 feet for a water table slope greater than 5% and 2 feet for a water table slope less than 5% must be used. The data used to construct the maps must also be shown.

(g) The applicant must provide vertical flow nets, consisting of equipotential and flow lines as appropriate, for each cross section required by this subsection. Cross-sections and flow nets may be superimposed if clarity and legibility are maintained.

(h) A detailed drawing or drawings, clearly indicating:

(i) The existing grade of the site, as established by a topographic survey on the ground, and the proposed initial and final grades. For slopes of 5% or greater, 5 foot contour intervals may be used; 2 foot contour intervals are required if the slope is less than 5%.

(ii) The location of all test pits, borings, and other explorations.

(iii) The location and elevation of the permanent onsite surveying benchmark(s).

(iv) The property boundary when located within 500 feet of the facility site.

(v) The location of protected natural resources and drainageways when located within 500 feet of the facility site.

(vi) The location of existing and proposed water supply wells or water supply springs when located within 1000 feet of the solid waste boundary.

(vii) The location of existing and proposed access roads.

(viii) The location of all proposed surface and ground water quality monitoring points.

(ix) The location and identification of buffer zones and visual screening provisions.

(x) The location of the proposed solid waste boundary and all proposed waste handling area boundaries.

(2) Time of Travel Calculations. Piezometers and water table observation wells must be installed at a sufficient number of locations to enable a calculation of ground water time-of-travel from the bottom of the landfill and leachate pond liner systems to all identified sensitive receptors. Unless site-specific information or other pertinent data exists to establish a greater porosity, calculations must assume an effective porosity for flow of not greater than 0.1. The calculations must also assume that all soil is saturated. Information utilized for these calculations must include in-situ hydraulic conductivity test results. Imported soils used for base preparation below liner systems may be included in time of travel calculations for purposes of assessing the need for improvement allowances provided that: the imported soils are used in conjunction with at least one of the improvement allowances in Table 1 [see Section 2.D(2)], the imported soils have an hydraulic conductivity no greater than $1x10^{-5}$ cm/sec. and no less than $1x10^{-7}$ cm/sec., and the time of travel for the imported soil

is calculated assuming an effective porosity of 0.1 unless sufficient specific information exists to demonstrate a greater effective porosity.

(3) Geotechnical Results. The applicant must provide the results of the geotechnical investigation as required by Section 2.B(3). Analysis of the results must demonstrate that the field and laboratory data collected are corroborative and are sufficient to support the stability assessment and the settlement assessment required under sections 2.F(1) and 2.F(2).

D. Design Standards for Landfills. The engineering design for a proposed landfill must meet the following design standards as well as achieve the performance standards of Section 1.C. At facilities where ground water monitoring in bedrock is anticipated or is being conducted and disturbance of soil material within 5 feet of the bedrock surface is proposed, the applicant must demonstrate that such disturbance will be minimized to the greatest extent possible so that the long-term monitorability of the facility site is maintained. Alternatives to the design standards and requirements of this subsection may be proposed by the applicant. The applicant must make a demonstration of technical equivalency through the alternative design process of section 2.E of this chapter or through a request for a variance under the provisions of Chapter 400, section 13.

(1) Liner System Requirements. Landfill liner systems for landfills licensed under sections 1-6 of this chapter must meet the following requirements.

(a) Liner systems must include at least a composite liner consisting of a geomembrane and a barrier soil layer. The geomembrane must have a nominal thickness of 60 mils. The barrier soil layer must be a minimum of 24 inches of recompacted clay or well graded till containing a minimum of 35 percent fines. The barrier soil layer must meet the requirements of this subsection, and be placed in at least three lifts. Base preparation beneath the barrier soil layer must be adequate to provide a firm foundation for construction of the barrier soil layer in order that the requirements of this subsection can be met throughout the entire thickness of the barrier soil layer. A Geosynthetic Clay Liner (GCL) may substitute for up to 12 inches of the barrier soil layer component of the liner system. For GCL substitutions, the barrier soil layer must be placed in two lifts.

(b) Landfills sited where development within the solid waste boundary will disturb soil material within five feet of the bedrock surface in more than 5% of the disturbed area must also incorporate a single 40 mil HDPE liner and a leak detection system or a composite liner and a leak detection system into the liner system. These additional liner components may be credited as time of travel offsets in accordance with section 2.D(2).

(c) A leachate collection system must be incorporated in the design above the liner system.

(d) Each liner system component must have a hydraulic conductivity less than or equal to 1×10^{-7} cm/sec.

(e) Any geomembrane proposed for use in a landfill liner system must meet:

(i) GRI GM-13 standards, if available; and

(ii) Performance requirements for the proposed application.

(f) Any barrier soil layer proposed for use in a landfill liner system must have the following characteristics:

(i) A Liquid Limit greater than or equal to 20, and a Plasticity Index greater than or equal to 8 but less than or equal to 30. Glacial till soils do not need to meet these requirements;

(ii) A minimum fines content of 35%; and

(iii) A maximum particle size of less than or equal to 3 inches, except as noted in subparagraph (g)(v) below.

(g) Any barrier soil layer proposed for use in a landfill liner system must be designed to produce a homogeneous layer that eliminates soil clods and preferential flow paths, protect the geomembrane from puncture, and reduce hydraulic conductivity to the maximum extent practicable. To accomplish this the barrier soil layer must meet the following requirements:

(i) Have a minimum compacted thickness of 2 feet;

(ii) Have a minimum in-place density of 90% of the maximum dry density as measured by ASTM D-698 (Standard Proctor);

(iii) Be compacted using a kneading action to remold the soil within 0-4% above optimum moisture content as determined using ASTM D-698 (Standard Proctor);

(iv) Have a maximum compacted lift thickness of 9 inches and provide a means to ensure lift interface bonding; and

(v) Have a maximum stone size less than or equal to 1/2 inch in the surface layer that will be the prepared surface for a geomembrane, or 1 inch in the surface layer that will be the prepared surface for a GCL.

Applicants proposing test pad programs in accordance with the requirements of section 2.F(12) may propose alternative criteria to the Plasticity Index and minimum fines requirements of section 2.D(1)(f)(i) and (ii) and to the maximum dry density and the optimum moisture content requirements of subparagraphs (ii) and (iii) above in accordance with the results and conclusions of the test pad program. If the applicant proposes an alternative to the minimum in-place density, the applicant shall submit for review and approval a revised stability and settlement assessment performed in accordance with the requirements of section 2.F.

(2) Improvement Allowance System. An applicant may demonstrate that the intent of the 6 year ground water time of travel performance standard has been met for a new landfill or for an expansion of an existing landfill by incorporating design, monitoring or contingency planning improvements. The improvement allowance offsets in Table 1 may be added to the existing ground water time of travel to achieve the minimum 6 year time of travel to sensitive receptors.

The improvement allowances in Table 1 afford sufficient design, monitoring or management benefits to provide the equivalent time of travel offsets specified in the table. Other alternative improvement allowances may be considered by the Department if the applicant can demonstrate that the alternative allowance equals or exceeds the performance standard of the listed allowance. For the purposes of this subsection, one offset is equivalent to one year of ground water time of travel.

TABLE 1

Improvement Allowance Description		Offset
1.	Addition and monitoring of a leak detection system underlain by a 40 mil HDPE liner beneath the primary liner system	2
2.	Addition of composite liner(s) and a leak detection system	3
3.	Artificial creation and maintenance of ground water discharge conditions into the facility structures	1
4.	Creation of a contingency plan including necessary action trigger levels and remedial action funding mechanisms	2
5.	Creation of an innovative performance monitoring program and/or creation of an intensive environmental monitoring program exceeding the performance standards of Chapter 405.	To be determined, but no more than 2

The offset value for innovative performance monitoring and intensive environmental monitoring programs will be determined based on the proposed program. Offsets for this category may not exceed 2. The offset value will be determined by the Department based on the purpose and benefits of the proposed program.

(3) Base Preparation Below Liner Systems. Constructed base materials below liner systems are subject to the following requirements.

(a) The base material must have a minimum in-place density of 90% of the maximum dry density as determined by ASTM D-698 (Standard Proctor).

(b) The base material must be compacted within 0-4% above optimum moisture content as determined using ASTM D-698 (Standard Proctor);

(c) The base materials must be adequate to provide a firm foundation for construction of the liner system in order to ensure that the liner design standards can be achieved throughout the entire thickness of the liner system. Expansions that include a liner system over areas where waste has previously been disposed are required to provide reinforcement in the base material or liner system in order to protect the integrity of the engineered systems. This requirement

applies unless the applicant can demonstrate that reinforcement is not necessary to protect the integrity of the engineered systems.

(d) Base materials must contain sufficient fines to result in an hydraulic conductivity of less than or equal to 1 x 10^{-5} cm/sec. The applicant must submit and receive Department approval of plans, specifications, and construction quality assurance (CQA) measures for the placement of base materials. Plans, specifications, and CQA measures must minimize preferential flow paths within the base materials or at the base material and native soil interface.

(e) The maximum allowable compacted lift thickness is 9 inches.

(4) Leachate Conveyance System and Storage Structure Standards. Leachate conveyance systems and storage structures must be designed in accordance with the standards of this section, and include appropriate factors of safety where applicable.

(a) Leachate Conveyance Systems are subject to the following standards.

(i) The leachate collection system must be designed to convey the predicted leachate flow, using the peak monthly impingement rate onto the collection system over the life of the landfill cell, so that the leachate head on the primary liner does not exceed the thickness of the drainage media or 12 inches, whichever is less. Leachate head must be calculated for the most critical conditions over the life of the landfill cell after the placement of the first lift of waste has occurred in the cell. The leachate head criteria does not apply in sump areas. Leachate generation estimates must be based on a minimum 15 year climatic database and include the precipitation from a 25 year, 24 hour storm event occurring during a wet period in the analysis. Leachate generation estimates may be derived by modeling through a standard method such as "Hydrologic Evaluation of Landfill Performance (HELP) Model", (EPA/600/R-94/168a and EPA/600/R-94/168b), or may be based on actual leachate generation data from similarly designed, located, and operated landfills provided that a minimum of 15 years of data are available that either includes or simulates the precipitation from a 25 year, 24 hour storm event. Run-on/run-off control systems and consolidation water expelled from the waste must be considered in the analysis.

(ii) Leak detection systems must be designed to detect leaks from each cell's primary liner system within 30 days, and have sufficient hydraulic capacity to transmit the flow associated with the Action Leakage Rate for the facility. The sampling and monitoring locations and protocol must be designed to eliminate the need for confined space entry or to allow non-permit confined space entry in compliance with OSHA standards.

(iii) All components of the leachate collection and leak detection systems must be designed to withstand the stresses due to dynamic and static loading conditions and climatic effects expected over the life of the landfill.

(iv) The leachate collection system must be designed so that its performance can be monitored or evaluated to insure that it is operating as designed.

(v) The leachate collection and leak detection pipes must have a minimum diameter of six inches and be designed to allow equipment access for routine cleaning, inspection, and maintenance.

(vi) Geosynthetic and soil filters must be designed and located to minimize clogging of the collection and detection systems.

(vii) A protective system must be provided for the primary liner and the leachate collection system. Protective systems must consider freeze/thaw effects from liner and leachate collection system exposure to climatic effects, erosion, and puncture during repairs or waste placement. Protective systems during operations may consist of select waste such as paper mill sludge and tire chips, provided the select waste is permitted for acceptance at the landfill.

(viii) Leachate collection and leak detection system transport pipes may penetrate through the liner system below the level of waste when exiting a landfill only when the penetration area is designed with leak detection and has the practical capability of being repaired.

(ix) The leachate transport system must be designed to convey the design flows from the leachate collection and detection systems.

(x) All components of the leachate transport system must be designed to withstand the stresses due to dynamic and static loading conditions and effects of climatic changes expected over the life of the landfill.

(xi) The leachate transport system must be designed to provide for sampling and flow monitoring of the leachate before the leachate enters the storage structure. The sampling and monitoring location(s) and protocol must be designed to eliminate the need for confined space entry or to allow non-permit confined space entry in compliance with OSHA standards.

(xii) Leachate transport pipes must be designed to allow equipment access for routine cleaning, inspection, and maintenance.

(xiii) Leachate transport systems outside the solid waste boundary must be designed to allow leak testing and/or monitoring, inspection, and repair. Except for HDPE structures that are monolithic or constructed with thermal fusion joints, gravity systems hydraulically designed to be full of leachate under normal conditions, such as pipelines between storage structures and pump station wetwells, must have secondary containment to ensure rapid leak detection and collection.

(b) Leachate Storage Systems are subject to the following standards.

(i) The leachate storage design capacity must be based on the leachate quantity predicted to be generated under the most critical conditions anticipated over the life of the landfill. The design storage capacity must consider leachate management limitations relating to transportation and disposal, recirculation, and / or pretreatment, as applicable. Additional volume equal to two feet of freeboard or 25% of the design storage capacity, whichever is greater, must be provided. Leachate generation estimates must be based on the methods established in section 2.D(4)(a).

(ii) Storage structures must be designed to withstand the stresses due to dynamic and static loading conditions and the effects of climatic changes expected over the life of the landfill.

(iii) Storage structures must be designed to allow inspection and maintenance.

(iv) Overflow prevention measures and a means to monitor and measure leachate depth must be provided.

(v) Storage pond systems must have a liner system consisting of a geomembrane primary liner, a leak detection system, and a composite secondary liner. The primary and secondary liners must meet the requirements of section 2.D(1). The leak detection system must be designed to detect leaks from the primary liner system within 24 hours, and have sufficient hydraulic capacity to transmit the flow associated with the Action Leakage Rate for the facility. Leak detection system sampling and monitoring locations and protocol must be designed to eliminate the need for confined space entry or to allow non-permit confined space entry in accordance with the standards of 29 CFR 1910.146 (effective April 15, 1993.)

(vi) For storage tank systems:

a. The materials and construction procedures for tanks, tank support structures, and secondary containment structures must be in accordance with applicable industry standards and nationally accepted codes of practice. Surfaces vulnerable to corrosion must be protected. Interior surfaces must be compatible with the leachate being stored.

b. Above ground and on ground tanks must be designed with a means for rapid detection of leaks and a secondary containment structure. The secondary containment structure must be sufficiently impermeable to contain spilled leachate for a long enough period to allow detection and cleanup to take place. The volume available for containment must not be less than 110 percent of either the largest tank within the containment system or the total volume of all interconnected tanks, whichever is greater. Containment structures must be designed to manage and remove stormwater.

c. Underground tanks must be double-walled and be designed for interstitial monitoring.

(5) Landfills Located in a Seismic Impact Zone. Facility structures, including liners, leachate collection systems, and surface water control systems for new landfills and expansions of existing landfills must be designed to withstand the maximum horizontal acceleration in lithified earth material having a 90% probability of not being exceeded in 50 years and in 250 years. The 50 year analysis is to be applied to the construction and operation periods. The 250 year analysis is to be applied to the post-closure period.

(6) Phased Operations. The landfill must be designed for phased operations based on estimated waste acceptance rates to ensure coordination with the design performance of the engineered systems. Phased operations must: sequence waste and cover placement, control run-on and run-off in accordance with the facility's stormwater management plan, plan for leachate management, protect the liner system against freeze and thaw effects, and maintain stability.

E. Alternative Design Process. Alternatives to the minimum design standards and requirements of section 2.D may be proposed by the applicant. A variance request pursuant to the provisions of Chapter 400, section 13 is not required for proposals which meet the requirements of this paragraph. The applicant shall submit the following documentation to clearly and convincingly demonstrate technical equivalency of the proposed alternative:

(1) A discussion of the benefits of the proposed alternative technology.

(2) A discussion of the risks and drawbacks of the proposed alternative technology.

(3) An assessment of similar applications of the proposed alternative technology.

(4) A demonstration that the alternative technology will provide equal or superior performance to the component it is proposed to replace, or that its inclusion within a system will result in equal or superior performance of that system.

(5) An assessment of the feasibility of constructing the proposed alternative, including the ability to provide an adequate level of quality assurance and quality control. A demonstration of the feasibility of construction may be required.

(6) An assessment of the likelihood that the proposed alternative will perform as designed through landfill operations, closure, and post-closure periods.

F. Engineering Report for Landfills. The engineering report for landfills must present the basis for the engineering design and the proposed construction procedures. It must discuss site specific factors considered during design and address design selection for the liner system, the leak detection system, the leachate collection, transport and storage system, the gas management system, and operational and final cover systems, as applicable. The report must also include a narrative evaluating the potential modes and significance of failures in engineered systems. All calculations and assumptions used in the evaluation and design of the proposed facility site must be submitted, including data developed for the geotechnical analysis and information supporting geosynthetic design,

filter design, pipe designs, culvert sizes, dewatering rates and hydraulic conductivities. The report must include the following information:

(1) Stability Assessment Submission. A stability assessment for the landfill and leachate storage pond structures must be submitted. The stability assessment must include analysis of potential failure planes which pass through or along: the foundation soils, the waste mass, and/or the liner system components for both static and seismic conditions. The stability analyses must be supported by corroborative field and laboratory data that defines the site geology and hydrogeology, the geotechnical characteristics, the waste mass characteristics, and the geosynthetic characteristics, as applicable.

If approved by the Department, strength gain of the foundation soils may be taken into account when addressing the requirements of subparagraphs (a) and (b) below. The minimum factors of safety listed below may be modified by the Department, depending on site-specific risk factors and conditions.

(a) Static stability assessments are subject to the following requirements.

(i) The minimum factor of safety must be 1.3 during construction and operation periods, and 1.5 during the post closure period. For facilities that have been approved by the Department to use strength gain of the foundation soils in the stability assessment, the minimum factor of safety may be reduced from 1.5 to 1.3 during the first five years of the post closure period.

(b) Seismic stability assessments are subject to the following requirements.

(i) The minimum factor of safety must be 1.1 when designed to withstand the maximum horizontal acceleration in lithified earth material having a 90% probability of not being exceeded in 50 years. This requirement applies to the construction and operations periods.

(ii) The minimum factor of safety must be 1.0 when designed to withstand the maximum horizontal acceleration in lithified earth material having a 90% probability of not being exceeded in 250 years. This requirement applies to the post-closure period.

(iii) The maximum bedrock horizontal acceleration must be determined based on a seismic hazard map or a site-specific seismic risk assessment and must be modified to account for the influence of the site soils, engineered components, and the waste mass.

(iv) Unless otherwise approved by the Department, the seismic stability assessment must include an evaluation of permanent deformation, an evaluation of waste and soil strength loss due to cyclic loading, and an evaluation of liquefaction potential.

(2) Settlement Assessment Submission. An assessment must be made to predict total and differential settlement of landfill liners and leachate management structures. This assessment must include a demonstration that liners and leachate management structures will maintain their integrity and performance at maximum predicted settlements. A plan view showing settlement contours must be submitted when predicted landfill base settlements exceed two feet.

(3) Stability and Settlement Monitoring Plan. Unless otherwise approved by the Department, a stability and settlement monitoring plan, must be submitted for the construction and operations periods. Monitoring plans for modes of failure governed by foundation soils must include the use of instrumentation installed into the foundation soils. The monitoring plan must incorporate the conclusions, recommendations, and requirements of the stability assessment submitted under section 2.F(1)(a) and (b) and the settlement assessment submitted under section 2.F(2). The monitoring plan must include reporting requirements to the Department, including an interpretation of the monitoring results by qualified personnel.

(4) Water Balance Submission. An assessment must be made of the volume of leachate, including consolidation water, to be generated by the landfill during operations, closure, and post-closure periods. As determined by the Department, a standard method for determining leachate quantity must be used, such as "Hydrologic Evaluation of Landfill Performance (HELP) Model", (EPA/600/R-94/168a and EPA/600/R-94/168b).

(5) Leachate Management Submission. Leachate management methods include on-site leachate recirculation and/or pretreatment, treatment, discharge, and off-site transport to a licensed waste water treatment facility for treatment and disposal. On-site leachate recirculation must be done within lined landfill areas that have active leachate management, if applicable. Also if applicable, on-site treatment and discharge of leachate must be licensed in accordance with the provisions of 38 M.R.S.A. Section 413 et seq.

The following must be submitted as part of the engineering report:

(a) A description of the leachate management method selected.

(b) A complete design for the leachate conveyance and storage system in accordance with the requirements of section 2.D(4).

(c) As applicable, a complete design for on-site recirculation or ancillary facilities necessary to support treatment systems, and/or ancillary facilities necessary to support off-site treatment and disposal. The design for on-site treatment and/or pre-treatment systems must be sufficient to demonstrate that the containment design(s) are consistent with the conveyance, storage, and monitoring requirements for the rest of the facility. The discharge must be licensed in accordance with the provisions of 38 M.R.S.A. Section 413 et seq.

(d) An evaluation of expected leachate quality over the active life of the landfill to determine the need for pretreatment.

(e) A leachate management plan, including a narrative description and drawings of the leachate conveyance, storage, and pretreatment or treatment system. The plan must also include:

(i) A sewerage service or transport contract, or letter of intent to accept and treat the leachate except when leachate will be transported and treated by the facility owner.

(ii) An Action Leakage Rate (ALR) and a Response Action Plan (RAP) for facilities with a leak detection system in the landfill liner system and/or storage structure. The ALR is the basis for monitoring primary liner or storage structure performance during facility operations, closure, and post closure. The RAP must be developed for implementation in the event that the ALR is exceeded, and include provisions for Department notification.

(iii) A contingency and response plan for:

a. Significant failure modes identified in the leachate conveyance, storage, and on-site pretreatment and/or treatment systems. Significant failure modes are those that adversely impact the performance of the leachate management system in a manner that could rapidly result in a direct discharge of leachate to the environment.

b. Leachate disposal limitations at contracted treatment facilities.

As applicable, the plan must include a letter of intent or service contracts for proposed contingencies.

(iv) A proposal for monitoring leachate quality and quantity in accordance with the requirements of Chapter 405.

(v) A maintenance, inspections, and testing plan for the leachate conveyance, storage and pretreatment and/or treatment systems.

(vi) A proposal to monitor and/or evaluate the performance of the leachate collection and transport systems, including monitoring for leaks.

(vii) A proposal to monitor and control the depth of leachate in the storage structure, including identification for each season of the normal range of operating depth in the structure.

(6) Gas Management Submission

(a) An assessment of the gas management methods available and the method(s) chosen for use at the proposed landfill must be submitted. The assessment must include:

(i) An estimate of type, volume, and concentration of landfill gas or gases to be generated during operations, closure, and post-closure;

(ii) An evaluation of gas migration potential;

(iii) A gas monitoring program in conformance with the requirements of section 4.C(11); and

(iv) A detailed description of the methods to be used for installation of the gas collection or venting system, including a phasing plan, if applicable.

(b) The applicant shall also submit sufficient information to demonstrate conformance with the requirements of 40 CFR, Part 60, Subpart WWW (effective March 12, 1996).

(7) Cell Development Plan. The application must include a cell development plan for phased operations of the landfill to meet the design standard of Section 2.D(6). The plan must consist of a conceptual plan for the life of the landfill and a detailed plan for an initial two year period.

The conceptual plans must include narrative and drawings that address: layout of the cells, projected grades at key intervals, and approximate years for development of each cell. Detailed plans must include narrative and drawings that address: layout of cells, projected grades, location and timing of intermediate and/or final cover, location and construction of cell access, any relevant aspects of leachate and stormwater management measures, any relevant aspects of erosion and sedimentation control measures, and other pertinent facility-specific features.

The cell development plan may include a proposal for rapid waste mass stabilization through leachate recirculation and delayed placement of cover provided that there are sufficient funds to operate and maintain the facility until final closure occurs, including collection and treatment of all leachate prior to placement of permanent final cover. The intent of rapid waste mass stabilization is to minimize the long-term risk from the landfill by actively accelerating the process of leaching contaminants from the waste before the end of the post-closure period.

(8) Phased Final Cover System Proposal. An applicant may apply to construct a phased final cover system throughout the operational life of the landfill. To be considered for approval, the application must include all the applicable information required in sections 5.D, and 5.G through 5.M as well as information to address specific problems which may result from phased construction of a final cover system.

Application for final closure as required by Section 5 must still be made at least one year prior to the anticipated final closure of the landfill. A phased final cover system documented to have been constructed in accordance with the approved plans and specifications will be accepted as the cover system element of final closure provided that the facility is not posing an unreasonable risk to public health or the environment at the time of final closure, as documented in the Site Assessment Report of section 5.F.

(9) Waste Storage, Staging, and Burn Areas Design Submission. For facilities proposing waste storage and staging areas outside of the solid waste boundary, and/or a burn area for wood wastes and/or wood from construction/demolition debris as part of the facility site, a design and operating plan must be submitted. The storage and burn areas must be designed and operated in accordance with the storage and burn area requirements of Chapter 402 sections 2 and 4, and must be located at a distance from water quality monitoring points sufficient to avoid contamination. The plan must provide for controls to manage potentially contaminated run-off and prevent the discharge of contaminants to the environment.

(10) Waste Characterization and Design Compatibility Submission. The wastes proposed to be accepted at the landfill must be characterized to enable the Department to determine that the wastes to be landfilled are non-hazardous and suitable for disposal in accordance with the proposed design, and to support the analytical parameters proposed in the environmental monitoring plan. The applicant must provide the following information for each type of waste proposed to be accepted for disposal at the landfill.

(a) Physical Characteristics. A general description of each waste type to be disposed of, along with estimates of the unit weight, projected volume, and characteristics applicable to stability and landfill settlement must be submitted. The information must be supported by corroborative field and laboratory data as applicable.

(b) Chemical Characterization. The applicant shall submit an initial chemical characterization and a proposal for on-going characterization for each waste type to be accepted based on actual test results where available, on results for similar wastes from other facilities or as published in the technical literature. Municipal solid waste, wood waste, construction/demolition debris, and land clearing debris are exempt from this requirement. The initial chemical characterization and the proposal for on-going characterization must be in conformance with the requirements of Chapter 405.

(c) Assessment of Compatibility With Other Waste Types. Where more than one waste type is proposed for disposal at a landfill, the applicant must submit sufficient information to demonstrate compatibility of the different waste types. This assessment must include the following:

(i) Physical stability;

(ii) Chemical stability; and

(iii) Potential reaction products and consequences when wastes are mixed, including effects on leachate quality and volume.

(d) Assessment of Compatibility With Engineered Systems. The applicant shall provide the following information to determine whether the proposed waste types are compatible with landfill, storage and staging area components.

(i) Qualitative Evaluation of Compatibility. A qualitative evaluation of all landfill and waste storage and staging area components (liner materials, piping, geotextiles, etc.) and characteristics of the proposed waste types to determine compatibility must be submitted. This evaluation must include an up-to-date literature search and a synopsis of all information that the applicant used in making a determination of acceptable compatibility. Reference sources must be listed.

(ii) Existing Testing Data. When requested by the Department, available EPA method 9090 test results must be provided to ensure that the proposed landfill components are compatible with the expected leachate.

(iii) Testing of Components. When requested by the Department and when test data are not available, the applicant must provide for the testing of landfill components in accordance with EPA method 9090. Test results must be provided to the Department. Applicants for proposed special waste facilities that have not yet generated leachates should attempt to locate similar leachates for testing purposes. Testing in accordance with EPA Method 9100 may be required for landfill soil components on a case by case basis.

(11) Surface Water Control Plans. The applicant must submit two surface water control plans: an erosion and sedimentation control plan which meets the standards and submission requirements of Chapter 400, section 4.J and a stormwater management plan which meets the standards and submission requirements of Chapter 400, section 4.M.

(12) Test Pads Submission. Applicants may propose a barrier soil test pad program to demonstrate that the proposed barrier soil material and construction methods will result in a barrier soil meeting the standards of section 2.D(1). The test pad program must be approved by the Department prior to the start of the test pad construction. Demonstration of the success of the test pad program in consistently achieving the required standards may allow the applicant to reduce the reliance on in-place hydraulic conductivity testing. The program must:

(a) Specify the procedures to characterize the properties of the barrier soil at the borrow source;

(b) Specify the procedures to develop the construction methods to consistently achieve the required density, moisture content, and hydraulic conductivity;

(c) Specify the dimensions and the testing protocol for the test pad; and

(d) Specify the criteria that will be used to define a successful test pad program.

(13) Special Construction Requirements. At facilities where ground water monitoring in bedrock is anticipated or is being conducted, the applicant shall submit information on all measures to be taken to minimize the disturbance of soil material within five feet of the bedrock surface.

G. Contaminant Transport Analysis. The applicant shall provide a thorough analysis of the proposed site and the adjacent area that could be affected during operation and after closure of the landfill, in the event of releases of contaminants to groundwater beyond engineered systems. The purpose of this analysis is to assess the potential for an unreasonable threat to all identified sensitive receptors and to identify any operational or monitoring measures needed to ensure protection of the sensitive receptors. The potential for an unreasonable threat to a sensitive receptor is an arrival time of less than 6 years from the landfill or less than 3 years from leachate storage structures and pump stations of a concentration of a pollutant which would result in contamination of that sensitive receptor.

(1) Analysis. The contaminant transport analysis must be conducted using information obtained through the site specific investigation. For expansions of existing landfills, applicants must distinguish to the extent possible between any contaminant releases from the existing landfill and from the proposed expansion. Unless site-specific information or other pertinent data exists to establish a greater porosity, calculations must assume an effective porosity for flow of not greater than 0.1. Information utilized for these calculations must include in-situ hydraulic conductivity test results. A report must be submitted that addresses the area of the source, the initial concentration, mass transport and flow paths. It must project the extent and quality of plumes and the concentration of plumes and time of arrival at all identified sensitive receptors plotted in annual increments until steady state is approached, for the following scenarios:

(a) Contaminant transport from the landfill, leachate storage structures, and pump stations assuming maximum operational leachate generation rates, quantities, and concentrations, and that no engineered barriers to contaminant transport exist. The purpose of this analysis is to verify that all potentially affected sensitive receptors of contaminants have been identified and to simulate concentrations over time of contaminants at identified sensitive receptors.

(b) Contaminant transport from the landfill and leachate storage structures using the design leakage rates and quantities. The analysis must include the simulated concentration of contaminants at sensitive receptors and at the monitoring wells to assess the potential impact on ground and surface water quality in the event of discharge of pollutants outside engineered containment systems.

(2) Models. Complete documentation of the modeling effort must be included in the report. This documentation must address: the purpose of the modeling effort, the development of a conceptual model of the aquifer system, data collection, description of the contaminant transport model utilized, assignment of model

parameters, model calibration, sensitivity analysis, model validation, data preprocessing and post processing, predictive scenarios, model results, and model records.

H. Plan View and Profile View Drawings. The application must include drawings showing all of the information required by section 2.C(1) and the requirements listed below. Applicants may amend the application drawings prepared in accordance with the requirements of section 2.C(1)(h) to include the requirements of this subsection.

(1) Plan View Drawings The following must be included on the plan views. The plan views must be drawn to the same scale as required in section 2.C(1), and must show existing and proposed locations of:

(a) All utilities and structures on the site; a description of these utilities must also be included;

(b) All surface water management structures including ditches, culverts, diversion structures, detention basins, and sedimentation basins;

(c) Borrow pits, if applicable;

(d) Any areas for stumps/brush, white goods, tires, or hot loads;

(e) Any gas monitoring probes and gas vents outside the solid waste boundary, if applicable;

(f) Fencing and gates;

(g) Leachate management structures;

(h) Any waste storage or staging areas;

(i) Temporary and permanent soil stockpile areas; and

(j) Baseline for cross-section drawings of the site.

(2) Profile View Drawings. Detailed profile views of the area within the solid waste boundary must include the existing land surface, the base grade, proposed lifts, and the proposed final grade and final elevation of the completed disposal site. Profile views are required as follows:

(a) Cross-sections of the area within the solid waste boundary taken at 100-foot intervals from a baseline, to the same horizontal scale as the plan view in section 2.C(1) of this chapter.

(b) Longitudinal cross-sections of the area within the solid waste boundary, taken at 100-foot intervals from a baseline, to the same horizontal scale as the plan view in section 2.C(1) of this chapter.

(c) Typical cross-sections of the road and water drainage features.

The frequency of cross-sections in paragraphs (2)(a) and (2)(b) may be reduced if the applicant provides the Department with landfill capacity information in accordance with the filling sequence detailed in the cell development plan for the landfill. The resulting number of sections must be sufficient to illustrate the information described above.

I. **Quality Assurance Plan.** A Quality Assurance Plan (QAP) must be established and included with the application to assure that design specifications and performance requirements for all facility components are met during construction. The QAP must include, but is not limited to, the following:

(1) A description of the Construction Quality Assurance (CQA) measures to be implemented.

(2) A description of the relationship between the QAP, construction quality control, and the construction contract bid documents. The construction contract bid documents must also clearly define this relationship.

(3) A description of the responsibility and authority that organizations and/or personnel involved in permitting, designing, constructing, and certifying construction of the landfill will have. This must also include a description of a construction problem resolution process that incorporates the roles and responsibilities of all parties, including the owner, manufacturer, installer, designer, CQA personnel, contractor, and the Department;

(4) The required qualifications of the CQA personnel. Qualifications must meet the requirements of section 3(B), and must include certification by the National Institute for Certification in Engineering Technologies (NICET), where applicable;

(5) The inspections and tests to be performed to ensure that the construction and the materials conform to contractual and regulatory requirements for each landfill component. Appendix A of this chapter contains requirements for earthworks testing programs that do not utilize test pads in accordance with section 2.F(12).

(6) The sampling activities, sample size, methods for determining sample locations, frequency of sampling, acceptance and rejection criteria, and methods for ensuring that corrective measures are implemented;

(7) Record keeping and reporting requirements for CQA activities;

(8) A list and description of all items requiring CQA certifications, including identification of the engineer(s) responsible for these certifications.

NOTE: See EPA Technical Guidance Document # EPA/ R-93/182, dated September 1993, "Quality Assurance and Quality Control for Waste Containment Facilities", for guidance in developing a quality assurance plan and recommended implementation program for certified CQA personnel.

The applicant may propose basic standards and specifications to meet these requirements at the time the application is filed, and subsequently submit final detailed standards and specifications to the Department for review and approval on a schedule approved by the Department.

J. Construction Contract Bid Documents. The applicant must provide construction contract bid documents, including drawings, technical specifications, and the contract administrative documents. The applicant may provide draft construction contract bid documents at the time the application is filed, and subsequently submit final detailed construction contract bid documents to the Department for review and approval on a schedule approved by the Department.

K. Water Quality Report and Proposed Monitoring Program. The water quality report shall be prepared in accordance with the site characterization requirements of Chapter 405. This report shall include a proposed water quality monitoring program addressing the requirements of Section 2 of Chapter 405. Surface water monitoring is not required at those landfills for which the contaminant transport analysis indicates there is no potential for discharge to a surface water body.

L. Operations Manual. A copy of the operations manual must be submitted as part of the application. The operations manual must meet the requirements of section 4. The Department recognizes that certain information may not be available at the time of application. Information not available at the time of application must be included in a revised operations manual in accordance with the requirements of section 4.A(1).

3. Landfill Construction. Licensees must comply with the following requirements during construction:

A. Pre-Construction Conference. Unless waived by the Department, a pre-construction conference between the licensee and/or the agents of the licensee and Department staff is required. A licensee shall give the Department written notice of the pre-construction conference schedule at least 7 days prior to the conference unless a different time frame is approved by the Department.

B. Quality Assurance Plan. The Quality Assurance Plan (QAP) must be implemented at the beginning of construction. Construction Quality Assurance (CQA) shall include continuous site inspections by the CQA personnel. Geosynthetics and barrier soil layers must be inspected, tested, and certified by qualified CQA personnel separate from the owner/operator and contractor.

(1) For the purposes of this subsection, separate from the owner/operator means CQA personnel not in the direct employment of the owner/operator. Direct employment of the owner/operator does not include CQA personnel employed by a company under a contractual relationship with the owner/operator, provided that the CQA personnel are employed by a company that:

(a) offers and performs quality assurance services for other companies not affiliated with the owner/operator; and

(b) has a management structure that exists and operates separately from the owner/operator, such that the CQA personnel are not directly compensated by, and are completely free of any direct reporting obligation to, the owner/operator.

(2) For the purposes of this subsection, separate from the contractor means CQA personnel not in the direct employment of the contractor. Separate from the contractor also means CQA personnel not employed by a company under a contractual relationship with the contractor to perform services or provide materials unless the CQA personnel are employed by a company that:

(a) offers and performs quality assurance services for other companies not affiliated with the contractor, and;

(b) has a management structure that exists and operates separately from the contractor, such that the CQA personnel are not directly compensated by, and are completely free of any direct reporting obligation to, the contractor.

C. Liner Installation. Before installation of any type of liner, the licensee must evaluate the impacts of climatic conditions, proposed installation procedures, and the proposed installation schedule on liner integrity. If applicable, results and recommendations from the test pad program approved in accordance with paragraph 2.F(12), and the final construction documents and Quality Assurance Plan incorporating the recommendations from the test pad program, must be submitted to the Department for review and approval in accordance with a schedule approved by the Department. Liners are adversely affected by cold temperatures and may be installed only between April 15th and November 1st, and only when the ambient temperature exceeds 32 degrees Fahrenheit. The licensee must submit a specific cold weather installation plan for review and approval prior to construction at other times.

D. Changes from Approved Plans and Specifications. Prior to implementing any changes to the approved landfill design, the leachate management systems, or project specifications, the applicant must receive approval from the Department through an amendment or minor revision, or through a change order approval. The Department must issue a response to a change order request within five working days, or approval of the change order is automatically granted.

E. Weekly Inspection Reports. The CQA team responsible for construction inspection at the landfill shall keep daily and weekly construction inspection reports and provide a copy to the Department. The reports must be mailed to the Department within one week after the completion of each construction week. The weekly reports must summarize the daily reports and include information generated during the week. The following information is required as part of the weekly inspection reports.

(1) A statement prepared by the CQA personnel summarizing the test results;

(2) Submittals and action taken;

(3) Summary of work progress;

(4) Upcoming work items for the next two weeks or for an alternative time period as approved by the Department;

(5) Punch list items as applicable.

(6) Summary of significant problems encountered and how the problems were resolved;

(7) Change order status; and

(8) Construction stability monitoring results, if applicable.

F. Photographic Documentation. In the final construction report, the licensee shall provide the Department with representative photographic documentation of each stage of construction.

G. Record Drawings. The licensee shall provide record drawings, signed and stamped by a State of Maine Registered Professional Engineer, to the Department within 45 days after construction completion of each phase.

H. Final Construction Report and Commencement of Operations.

(1) Commencement of Operations. The licensee shall submit a written request that the Department conduct an inspection of the completed construction for a finding of compliance with the facility license. The licensee may commence operations of the landfill upon Departmental approval. Alternatively, the licensee may commence operations of the landfill ten working days after submitting the written certification, and after the Department conducts or waives the need for a final construction inspection. The Department may delay commencement of operations pending resolution of issues identified during its inspection and/or during review of the written certification. This written certification is required as part of the final construction report, but may be submitted prior to the final report in order to expedite approval for commencement of operations.

(2) Final Construction Report. The licensee shall submit a final construction report to the Department within 45 days following construction completion of each phase. The owner shall retain a copy of this report at the landfill site. The report must include:

(a) Written certification, signed and stamped by the engineer(s) supervising the project inspection, that the facility has been constructed in accordance with the approved plans and specifications. Certifications for different aspects of construction must be in accordance with the Quality Assurance Plan; and

(b) A narrative summary of the construction process. The summary must include supporting documentation, appropriately cross-referenced, sufficient for the Department to conclude that the facility has been constructed in accordance with the approved plans and specifications. The supporting documentation must include:

(i) a tabulation of all testing results;

(ii) a tabulation of all design modifications or modifications in construction approach;

(iii) the photographic documentation required by section 3.F above;

(iv) subgrade acceptance certifications;

(v) manufacturer's quality control certificates; and

(vi) quality assurance final reports for earthworks and geosynthetics.

4. Landfill Operations.

A. Operations Manual. The landfill operator shall prepare and maintain an operations manual of current policies and procedures for the landfill.

(1) Revised Operations Manual. Prior to commencement of operations of a new or expanded landfill, the operations manual provided with the application pursuant to section 2(L) must be revised to reflect any changes which occur during the landfill licensing and construction processes. All existing landfills, other than construction/demolition, landclearing debris and wood waste landfills less than 6 acres in size, must submit a revised operations manual in conformance with this section to the Department for review and approval as part of the annual report due in 1999. These facilities must comply with the operating requirements of this section no later than 90 days after receiving Departmental approval of the revised operations manual.

(2) Certified Copies. The landfill operator shall issue certified copies of the operations manual being used at the landfill to the Department and to key operating and management personnel of the landfill. In addition, a certified copy must be available for use at the facility at all times. The landfill operator is responsible for providing timely updates to all certified copies, distributing certified copies to individuals whose job assignments require them, and making and distributing changes to policies and procedures to the certified copies as they are implemented.

(3) Contents. The operations manual must include the information necessary to enable supervisory and operating personnel, and persons evaluating the operation of the landfill, to determine the sequence of operation, policies and procedures, and monitoring, maintenance, inspection, and legal requirements that must be followed for safe, orderly and environmentally sound operation on a daily, yearly, and life cycle basis. The operations manual must address each of the areas identified in this section. Legible copies of the record drawings must be included in the operations manual or must be readily accessible to operating personnel.

(4) Annual Review. The operations manual must be reviewed annually by the operator and updated as necessary.

(5) Training. The landfill operator shall familiarize operating personnel with relevant sections of the operations manual. For new landfills or expansions of existing landfills, the landfill owner or operator must demonstrate compliance with the training requirements in section 4.B prior to commencing landfill operations. For existing landfills, the landfill owner or operator must demonstrate compliance with the training provisions for key personnel within two years of the effective date of these rules.

B. Operator Training and Certification Program. At least two key personnel must be trained in the operation of, and regulatory requirements for, the landfill.

Key personnel must complete a training course, and must be familiar with State solid waste regulations and the site-specific operations manual. Landfill owner/operators may develop site-specific training programs for key personnel, or may gain certification through the Solid Waste Association of North America (SWANA) operator training certification program. Site specific training programs must be sufficient to demonstrate that key personnel have adequate knowledge to operate the landfill in accordance with the provisions of the site-specific operations manual, and must include provisions for 8 hours annually of refresher training. Landfill owner/operators must document training completed by their key personnel and keep this information on file for 5 years. SWANA certification is valid for a three year period. Key personnel must maintain a valid SWANA certification or maintain up-to-date site-specific training at all times.

C. Operating Requirements. Each landfill must be operated so that it does not contaminate ground or surface waters outside the solid waste boundary. Except for construction demolition, land-clearing debris, and wood waste landfills, all existing landfills must comply with the operating requirements of this subsection.

(1) Acceptable Solid Waste and Waste Characterization

(a) A landfill may accept only solid wastes or special wastes as allowed by the Department in the landfill's current license or as licensed under subparagraph (b) below. Special wastes must be handled as described in the landfill's approved operations manual. Landfills may not accept for disposal wastes that are determined to contain free liquids according to the Paint Filter Liquids Test (Method 9095 of E.P.A. SW-846, 3rd Edition).

(i) Municipal solid waste combustion ash may be co-disposed with municipal solid waste in landfills that meet the liner design standards of these rules provided that waste characterization is performed in accordance with section 2.F(10).

(ii) Dredge materials or contaminated soils with concentrations of contaminants that exceed regulatory limits for hazardous waste, or that have a concentration of 50 mg/kg or greater dry weight of PCBs, are considered a hazardous waste. Disposal of these and other hazardous wastes requires review and approval by the Department under 06-096 CMR 850-857.

(iii) All ash proposed for disposal at a landfill must be fully characterized at the source of generation, with statistical analysis performed in accordance with

the requirements of EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, Volume II, Chapter 9. This testing must occur when the ash is first proposed for disposal.

(iv) Solid wastes and special wastes permitted for acceptance as allowed by the landfill's current license must be characterized on an on-going basis in conformance with the characterization plan approved by the Department.

(b) Applications for the one-time or on-going acceptance of special waste at a landfill must conform to the applicable requirements of Chapter 400 of these rules and Chapter 2 of the Department's rules. The application must include the following:

(i) The name and address of the owner or operator and the generator of the waste;

(ii) A description of the facility processes that generated the waste, if applicable;

(iii) A description of the waste and an estimate of the volume of waste to be disposed;

(iv) The location of the site where the waste will be disposed; and

(v) Results of waste characterization performed in accordance with Chapter 405, Section 4.

(2) Access to Facility Sites. Access to a facility site must be controlled so that the public is not exposed to potential health and safety hazards. The operator shall provide suitable barriers, fencing and gates as needed to limit unauthorized persons from access. No access is permitted except when an attendant is on duty.

(a) The operator shall prominently post the hours of operation and other limitations and conditions of access at the entrance to the landfill.

(b) The operator shall provide well maintained access roads within the facility site. An access road into a cell of a landfill must be constructed and maintained to prevent the migration of leachate outside the cell.

(c) Landfills must implement a road maintenance program to prevent the accumulation of dust, mud or wastes from the facility on access, public or private roads. An approved tire washing facility may also be used at a landfill in addition to a road maintenance program.

(d) The operator shall post appropriate signs or other means to indicate clearly where solid waste is to be unloaded and where separate waste handling areas are located within the facility site.

(3) Open Burning of Brush and Wood from Demolition Debris. Open burning of solid waste other than wood waste and painted wood, is prohibited at all landfills. All burning must be confined to a burn area approved by the Department. Wood that has

been treated may not be burned. Other wastes, such as tires or waste oil, may not be used to start or maintain a burn. Burning must be done in conformance with the requirements of Chapter 402, Section 4.I.

(4) Hot Loads. The operator shall provide a separate area for the placement of hot loads. The hot load area must be located away from vegetation and not in a location previously or currently used for disposal. Hot loads must be extinguished immediately upon dumping or spread in a thin layer to cool. Once cooled, the waste must be placed in the active portion of the landfill. Hot loads must not be placed near monitoring wells or surface water monitoring points.

The operator of a landfill for the disposal of special wastes which may generate heat upon hydration shall place such wastes in an area within the active portion of the solid waste boundary, but discrete from the area where other wastes are currently being placed.

(5) Set-backs and Buffer Strips. The set-backs and buffer strips approved by the Department must be maintained.

(6) Cell Development Plan. Within the limitations of the approved design for each landfill, operations manuals must include a cell development plan to meet the design standard of section 2.D(6) and 2.F(7). The plan must consist of a conceptual plan for the life of the landfill and the detailed plan for the current two year period as approved as part of the application or most recent annual report, whichever is applicable.

(7) Compaction. For all landfills waste must be compacted once per operating day and more often as necessary unless otherwise approved by the Department. Waste must be compacted before the placement of cover material.

From December 16 through March 31 in the southern zone and from November 16 through April 30 in the northern zone, solid waste may be deposited at a landfill without compaction or cover if the total lift height during this period does not exceed 12 feet and the total horizontal area covered with waste does not exceed 30,000 square feet.

NOTE: Northern zone and southern zone are defined in Chapter 400, section 1 of these Rules.

(8) Cover. For all special waste and municipal solid waste landfills the cover material placement criteria are as follows:

(a) Daily cover is required, except that daily cover is not required to be placed on pulp and paper mill sludge. A coarse soil material, such as sand or gravel, for secure landfills and a soil material for non-secure landfills must be placed and compacted to a minimum depth of 6 inches in thickness over all exposed waste at the end of each day of operation to completely and effectively cover the solid waste. Other materials or wastes may be proposed as alternative daily cover by a landfill owner or operator for approval by the Department.

(b) Where final grade has been reached or on areas where disposal will not take place within the next 6 months, intermediate cover must be placed within 30 days after cessation of disposal, or as soon as weather conditions allow. Intermediate cover must remain in place in accordance with the requirements of the approved cell development plan. Intermediate cover must consist of 18" of soil or a geosynthetic cover material with a minimum thickness of 20 mils. The soil must be a clay or well-graded till with a minimum of 35% fines and no stones larger than 4 inches. It must be placed and compacted in at least two lifts. Other cover systems or wastes may be proposed by a landfill owner or operator for approval by the Department.

Intermediate cover must completely and effectively cover the solid waste and be graded to limit infiltration and promote runoff. If soil is used these areas must be seeded and mulched to prevent erosion. Within the limitations of the approved design for each landfill, surface water run-off must be directed off of the landfill site. The intermediate cover must be removed before any further landfilling may occur in areas where cover has previously been placed.

The soil component of the intermediate cover may be considered part of the final cover system if the soil and its placement meet the design standards and construction requirements of Section 5. Owner/operators must include these standards and requirements in the operations manual for installation of a phased final cover system as approved by the Department.

NOTE: Construction packages prepared to implement this requirement do not need to be included in the Operations Manual.

(c) For owners/operators approved to construct a phased final cover system throughout the operational life of the landfill, the phased final cover system must be constructed and documented in accordance with the approved plans and specifications. A phased final cover system documented to have been constructed in accordance with the approved plans and specifications will be accepted as the cover system element of final closure provided that the facility is not posing an unreasonable risk to public health or the environment at the time of final closure.

(9) Stormwater Management and Erosion Control. The operator shall provide for erosion and sedimentation control in compliance with an approved erosion and sedimentation control plan that meets the standards and submission requirements of Chapter 400, section 4.J. The operator shall also provide for stormwater management that is in compliance with an approved stormwater management plan that meets the standards and submission requirements of Chapter 400, section 4.M. Erosion and sedimentation control structures and stormwater management structures shall be maintained on a routine basis.

(10) Leachate Management. The operator must implement a leachate management plan in accordance with a Department approved plan or license, and must provide for

maintenance and monitoring of the leachate collection, transport and storage systems.

Contingency service contracts and/or letters of intent for leachate transport and disposal must be maintained throughout the operation and post-closure periods of each secure landfill. Contracts or letters of intent are not required when the leachate will be transported and treated by the facility owner.

For facilities that have a leak detection and removal system, action leakage rates and a response action plan must be incorporated into the operations plan. The response action plan must be implemented in the event that the action leakage rate(s) is/are exceeded.

(11) Landfill Gas.

(a) For a new landfill or an expansion to an existing landfill, the operator shall install, maintain, and monitor the gas collection or venting system for the landfill proposed in the Gas Management Assessment required in Section 2.F(6) of this chapter, and as approved by the Department. For an existing landfill, the operator shall maintain and monitor the gas collection or venting system approved in the landfill's current license, if applicable.

(b) The operator shall implement a quarterly methane gas monitoring program to verify the concentration of explosive gases generated by the landfill.

The monitoring program must be based upon the soil, waste characteristics, hydrogeologic and hydraulic conditions at and surrounding the landfill, and the location of facility site structures and property boundaries.

(c) Immediately upon detection of explosive gas levels exceeding twenty-five percent (25%) of the lower explosive limit for the gases in the landfill structures, (excluding the gas control or recovery system components) or one hundred percent (100%) of the lower explosive limit for the gases at the property boundary, the operator shall take all steps necessary to protect human health and shall notify the Department of the occurrence and the protective steps that were taken.

(i) The operator shall immediately record the methane levels, time of Department notification, and the protective steps that were taken.

(ii) Within 60 days of detection, the operator shall implement a remediation plan to control the release of gases. This plan must be submitted to the Department, and must describe the nature and extent of the problem and the proposed remedy. The plan must be included in the operating record for the landfill.

(d) The operator shall implement a gas monitoring program for gases other than methane as applicable to the facility depending upon the wastes being disposed of.

(12) Inspections. The operator must provide for facility inspections on a regular basis, document the results of the inspections using the forms in the operations manual, and include a summary of the inspection results in the annual report required by section 4.D. Items to be included in these inspections, an inspection schedule, and reporting forms must be provided in the operating manual. The inspection reports shall be kept on file at the landfill for a three year period and shall be available for Department inspection upon request. Provisions must be made in the inspection program to demonstrate that non-conforming inspection items have been brought into conformance with the applicable operating requirements, including documentation of repairs. As applicable, the inspection program must be sufficient to document:

(a) The liner system is performing as designed;

(b) The leachate management systems are performing as designed;

(c) The gas management system is performing as designed;

(d) The erosion and sedimentation control measures are performing as designed, and there is no noticeable erosion of the cover systems;

(e) The stormwater management system is performing as designed;

(f) The waste and cover system(s) grades and placement are in accordance with the approved cell development plan; and

(g) Any deviations from the approved plans and specifications.

Leachate collection, detection, and transport systems must be inspected on at least an annual basis. If select waste is used as a protective system, the leachate collection system must also be inspected after the first lift of select waste is placed on top of the collection system.

(13) Dust Control. The operator shall use suitable measures to control dust on the facility site.

(14) Equipment. The equipment in use at the landfill must be sufficient to meet the operating requirements of this section. The operator shall have a contingency plan for obtaining back-up equipment when needed.

(15) Fire Protection. The operator shall take suitable measures for the prevention and control of fires at the facility site by complying with at least the following requirements:

(a) Arrange for a nearby fire department to provide emergency service whenever called.

(b) Provide sufficient on-site equipment for minor fires such as detachable extinguishers, maintained in working order.

(c) Maintain a soil stockpile sufficient to suppress small fires.

(d) Observe the current applicable rules of the State of Maine Bureau of Forestry, Department of Conservation.

(16) Hazardous and Special Waste Handling and Exclusion Plan. The operator shall comply with all provisions of the Hazardous and Special Waste Handling and Exclusion plan prepared for the facility in accordance with Chapter 400, section 9.

(17) Litter Control. The operator shall provide for routine maintenance and general cleanliness of the entire facility site.

(18) Environmental Monitoring Program and Reporting Requirements. The operator shall implement monitoring programs at the facility as approved by the Department. These programs shall include a leachate and water quality monitoring program in accordance with Chapter 405 and may also include waste characterization, stability, settlement, and gas monitoring.

(19) Operational Records. The operator shall keep copies of the annual reports submitted to the Department throughout the active life of the landfill, and shall keep these reports on file during the operational and post-closure period.

(20) Maintenance of Waste Staging and Storage Areas. The operator shall provide for routine maintenance of waste staging and storage areas as applicable.

(21) Vector Control. The on-site population of disease vectors resulting from landfill operations must be minimized through techniques approved by the Department.

(22) Additional Requirements for Landfills that Accept Asbestos Waste for Disposal. Asbestos abatement and storage activities are governed by Chapter 425 of the Department's regulations (the "Asbestos Management Regulations" effective January 1, 1994). In order to accept friable asbestos waste for disposal, the owner/operator of a landfill must obtain a special waste permit from the Department. Also, to accept a load of friable asbestos waste, the owner/operator of the landfill shall, at the time of disposal, also obtain a copy of a properly executed waste shipment record as required by 40 CFR 61.150(d) (effective November 20, 1990).

In addition to the operational requirements listed in subsections 1 through 21 above, the following operational requirements apply to landfills that accept asbestos waste:

(a) Personnel Protection and Air Monitoring Requirements. During handling of friable asbestos waste, air monitoring, medical monitoring, and personal protective equipment requirements must be implemented in accordance with 29 CFR 1910.1001 (effective August 10, 1994).

(b) Exclusion of Personnel from the Work Area. Individuals not directly involved in the unloading or disposal of friable asbestos waste shall be at least 100 feet from the areas where unloading or disposal takes place.

(c) Warning signs. Warning signs, meeting the specifications set forth in 29 CFR 1910.1001(j)(3)(ii) (effective August 10, 1994) shall be posted at all points of access to the unloading or disposal area for friable asbestos.

(d) Delivery and Unloading of Asbestos Wastes. All asbestos wastes delivered to the landfill must be containerized in conformance with the requirements of 06-096 CMR 425.9(A)(2). All containers shall be labeled in accordance with the requirements of 29 CFR 1910.1001(j)(4)(ii) (effective August 10, 1994). Non-friable asbestos waste must not be subject to shredding, crushing, or any other form of volume reduction prior to placement in the landfill. Asbestos waste shall not be dropped or thrown more than 3 feet. Due care and caution must be utilized during asbestos waste handling to avoid damage to the packaging. Any asbestos waste found to be leaking or improperly packaged shall be immediately repackaged. Any dry asbestos must be immediately repackaged under controlled abatement conditions complete with negative ventilation by persons trained and equipped to do so.

(e) Record-keeping Requirements. A daily log of all asbestos waste disposal activities shall be maintained that records the following information for each load of friable asbestos waste delivered to the landfill: a copy of a properly executed EPA waste shipment record as applicable, the specific disposal location, the landfill personnel involved in unloading and disposal of the load, the air monitoring procedures used during the unloading and disposal of the load, and comments on the packaging and nature of the asbestos waste.

(f) Disposal Location(s). The exact asbestos disposal location(s) shall be recorded on a plan of the landfill, and maintained as part of the operational record for the facility. All friable asbestos waste shall be separated from other solid wastes, and disposed of in a properly constructed and clearly posted disposal area. Where friable asbestos waste is co-disposed with other solid waste, separation can be maintained through the use of tell-tale markers, such as scrap geonet, scrap landfill liner material, or paper machine felt placed over a thick layer of soil, to prevent the accidental excavation of the asbestos.

NOTE: Any non-friable asbestos which has deteriorated or has been cut, broken, abraded, weathered, or acted upon by any other means may be considered by the Department to be friable asbestos.

D. Annual Report. Pursuant to 38 MRSA §1310-N(6-D), an annual report and fee shall be submitted by the operator on a schedule consistent with the requirements of Chapter 400, section 3.E.

(1) General. The annual report must include:

(a) A summary of activity at the landfill during the past year. This shall include a narrative describing any factors, either at the landfill or elsewhere, that affected the operation, design or monitoring programs of the landfill.

(b) An evaluation of the landfill's operations to verify compliance with the approved operations manual, licenses, and regulatory requirements. This evaluation shall be performed either by qualified facility personnel or a qualified consultant.

(2) Operations. As part of the annual report, the following operational information is required.

(a) A summary of the type, quantity, and origin of waste received;

(b) Estimates of the capacity of the landfill used during the past year and of the landfill's remaining capacity;

(c) A description and estimate of the amount of cover material used in the past year;

(d) A summary of changes in the operations manual during the past year as submitted pursuant to section 4.A(2);

(e) Proposed changes to the operations manual or other aspect of the landfill's operations;

(f) A summary of responses to spills, fires, accidents, and unusual events that occurred at the landfill in the past year;

(g) Updated cell development plans, highlighting any changes to the approved plans and including detailed plans for the subsequent two year period. Approved plans need to be updated whenever variabilities in waste disposal rates and other operational factors cause development to vary more than 6 months from projected timelines. Detailed plans must include a narrative and drawings that address: layout of the cells, projected grades, location and timing of intermediate and/or final cover, location and construction of cell access, any relevant aspects of leachate and stormwater management measures, any relevant aspects of erosion and sedimentation control measures, and other pertinent facility-specific features.

(h) Copies of reports prepared in accordance with the landfill's Hazardous and Special Waste Handling and Exclusion Plan;

(i) A report on the results from the inspections and testing required by section 4.C(12), including a report stating the date and findings associated with the annual inspection and cleaning, if necessary, of the leachate collection, detection, and transport systems; and

(j) A description of system failures and documentation of repair measures to those systems.

(3) Facility Site Changes. The annual report must document minor changes to the facility site not requiring departmental approval that have occurred during the reporting year. Also, minor aspects of the facility site proposed to be changed in the current year may be described in the annual report. Changes handled in this manner

are those that do not require licensing under minor revision or amendment provisions of Chapter 400.

(4) Monitoring. The following monitoring information must be included in the annual report. If any of this information is submitted with the facility's periodic monitoring reports, only a summary of that information is required in the annual report. Evaluations must be done in accordance with all approved monitoring plans for the landfill.

(a) An evaluation of data gathered for each surface water and ground water monitoring point for the landfill, including a statistical analysis of the data where appropriate.

(b) An evaluation of the quantity and quality of leachate generated by the landfill during the past year, including a comparison of the past year's leachate monitoring results to previous years' results.

(c) An evaluation of the quantity and quality of liquid found in the leak deteetion and removal system during the past year, including a comparison of the past year's results to the previous years' results.

(d) An evaluation of the gas monitoring results for the past year, including a comparison of the past year's results to the previous years' results.

(e) An evaluation of the air monitoring results for the past year, including a comparison of the past year's results to the previous years' results.

(f) An evaluation of the condition of each monitoring well.

(g) Any changes to any aspect of the approved monitoring programs proposed in response to the changes in operation or design of the landfill, or environmental effects attributable to the landfill or its ancillary structures.

(h) An evaluation of the stability and settlement monitoring data collected at each monitoring point.

(5) Financial Assurance. The landfill owner or operator must submit an annual update on cost and documentation of any changes made to the financial assurance instrument in accordance with Chapter 400, section 11.

5. **Landfill Closure.** Any person proposing to close a landfill shall furnish the Department with a complete application addressing all applicable requirements of this section, section 6, and Chapter 400.

A. **Applicability**. This section applies to all existing landfills, including those landfills approved for phased cell closure during the life of the landfill, except for the following:

(1) Landfills which qualify for closure under the reduced closure procedure of 38 MRSA 1310-E-1(2) or the alternative closure procedure of 1310 E-1(3), or

(2) Landfills regulated under the provisions of section 7 of this Chapter.

B. General Requirements.

(1) Performance Standards. Applicants required to close a landfill under the requirements of this section shall demonstrate that the landfill closure will be designed, constructed, monitored, and maintained to:

(a) mitigate hazards posed by the landfill to public health or safety or to the environment;

(b) monitor the effectiveness of the closure system; and

(c) function with a minimum of maintenance.

(2) Closure Deadline. A landfill, or any portion of a landfill, must be closed in accordance with an approved closure plan within one year from the last date solid waste was received at the landfill, unless the Department orders an alternative deadline.

An applicant for closure of a secure landfill may propose rapid waste mass stabilization through leachate recirculation and delayed placement of permanent final cover provided that there are sufficient funds to operate and maintain the facility until final closure occurs, including collection and treatment of all leachate prior to placement of permanent final cover. The intent of rapid waste mass stabilization is to minimize the long-term risk from the landfill by actively accelerating the process of leaching contaminants from the waste before the end of the post-closure period. This alternative is only available to existing facilities that have a leak detection system, or new facilities permitted under these rules, that are documented as operating in substantial compliance with the Solid Waste Management Rules.

(3) Application Submittal Deadline. The applicant must submit a complete closure application at least one year before the anticipated closing date. The application must be approved by the Department before the start of closure construction and must address all the requirements of this section. For landfills at which a phased final cover system was constructed throughout operations as approved by the Department, application for final closure must also be made at least one year prior to the anticipated final closure of the landfill. Additional work on the final cover system and/or additional corrective action may be required as part of final closure based upon facility conditions as assessed through monitoring, inspections, and any further investigations required during operations.

(4) Permanent Record. Within 60 days of completion of final closure construction, the licensee shall prepare and record in the Registry of Deeds information and deed restrictions to provide notice to prospective purchasers and a public record of the location of landfills. The licensee shall provide a copy of the recorded information and deed restriction to the Department.

This information must include:

(a) The type of facility located on the parcel and the dates of its operation and closure.

(b) The location, composition, extent, and depth of waste deposited. If friable asbestos waste has been disposed at a landfill, the location coordinates must be identified.

(c) The location and identification number of monitoring wells on the property.

(d) A deed restriction stating and effectively providing that post-closure use of the property may not disturb the integrity of the final cover, liner system or other components of the containment system, or the functioning of the monitoring systems, without prior written approval of the Department.

(5) Proposed Final Use. The final use must be compatible with the cover system. The following activities are prohibited at any closed landfill.

(a) Establishment or construction of any structures or buildings, including transfer stations, on top of or within 100 feet of the solid waste boundary, except that roads and surface water management systems are allowed within 100 feet of the solid waste boundary; and

(b) The use of the site for agricultural purposes, except that the Department may allow haying on a site-specific basis.

C. Optional Workplan and Pre-Application Meeting. An applicant may elect to submit a workplan to the Department for conducting a site investigation, developing engineered designs, and developing post-closure monitoring and maintenance plans. A pre-application meeting may be held with the Department at the request of the applicant no sooner than one month after submittal of the workplan.

The purpose of the workplan is to allow the applicant to receive comments from the Department on the scope of work proposed before work is initiated. The workplan should include provisions for submitting to the Department for review and comment a conceptual design based on the findings of the site investigation, all monitoring to date, and operational history. The workplan may also identify other points for submissions to or meetings with the Department to review progress to date and to discuss any issues identified and any need to vary from the workplan.

D. Application Requirements. Applicants are required to submit an application addressing the requirements of this section, section 6, and the applicable requirements of Chapter 400: sections 3, 4.B; 4.C, 4.J, 4.M, 10, 11. The following information must be submitted:

(1) General Information

(a) A post-closure monitoring, inspection, and maintenance proposal, as specified in Section 6 of this Chapter;

(b) An estimate of closure construction and post-closure maintenance costs;

(c) A schedule for implementation of the closure plan; and

(d) A schedule for fire control measures, if applicable.

(2) Native Cover Source Permit. If the source of cover material is a borrow pit or other excavation that has not been permitted and is not exempt from permitting under 38 MRSA Section 481-490 (Site Location Of Development Law) and 38 M.R.S.A. §409-A et seq., the applicant shall obtain a permit for the cover source.

(3) Protected Permanent Benchmarks. The applicant must establish protected permanent benchmark(s) on the site for use in surveying the landfill, constructed to U.S. Coast and Geodetic Survey standards. Horizontal and vertical control must be established for each benchmark. The benchmark(s) must be:

(a) Coordinated and reported according to National Geodetic Vertical Datum Standards, if readily available;

(b) Shown on all application drawings and record drawings, as applicable; and

(c) Clearly marked and labeled.

(4) Application Drawings. The application shall include drawings showing the following items:

(a) The existing grade of the facility site, as established by a topographic survey on the ground, and the proposed initial and final grades of the landfill. For slopes of 5% or greater, 5 foot contour intervals may be used; 2 foot contour intervals are required if the slope is less than 5%.

(b) The location and elevation of the test pits and borings.

(c) The location and elevation of the permanent on-site surveying benchmark(s).

(d) All portions of the property boundary when located within 500 feet of the facility site.

(e) The location and description of all existing and proposed utilities and structures on the facility site.

(f) The location of protected natural resources and drainage ways when located within 500 feet of the facility site.

(g) The location of existing and proposed water supply wells when located within 1000 feet of the solid waste boundary.

(h) The location of existing and proposed access roads.

(i) The location of the proposed drainage diversion system including any siltation basins.

(j) The location of borrow pits, if applicable.

(k) The location of all proposed surface and ground water quality monitoring points.

(l) The location and identification of buffer zones and visual screening provisions.

(m) The location of baseline for cross-section drawings.

(n) The location of fencing and gates.

(o) The locations for storage and management of leachate.

E. Site Investigation for Closure. Each application for a landfill closure must include a site investigation to provide a basis for the closure design and to determine the nature and extent of any contaminant plumes at the site. Piezometers, monitoring wells and other observation instruments installed during this investigation shall be designed, constructed, and sampled according to the requirements in Chapter 405.

Facilities that have conducted a detailed site investigation in accordance with the requirements of section 2 of this chapter and that have conducted and are conducting a water quality monitoring program in accordance with the requirements of chapter 405 are exempt from the requirements of this subsection.

The site-specific investigation must be designed to describe the following:

(1) The site geology and aquifer characteristics in the vicinity of the landfill and its associated leachate management structures;

(2) Characterization of ground water and surface water quality in the vicinity of the landfill and its associated leachate management structures, including the magnitude and extent of any contaminant plume;

(3) An evaluation of expected leachate quality over the closure and post-closure period of the landfill.

(4) Landfill gas migration potential; and

(5) Geotechnical characteristics, including sufficient corroborative field and laboratory data to support the stability and settlement assessments, as applicable.

F. Site Assessment Report. The Site Assessment Report must contain all findings of the site investigation. Sites previously characterized and exempt from the site investigation requirements of section 5.E must submit copies of reports prepared in accordance with the requirements of section 2.C.

The Site Assessment Report must include a discussion of the information developed in accordance with the requirements of section 5.E or section 2.C, and must also include the following:

(1) Current phreatic surface maps and vertical flow nets, drawn to the same scale as those required in section 2.C of this chapter;

(2) Simulated changes in ground water flow conditions after closure;

(3) Tables of all ground water and surface water quality data over the life of the site, along with a discussion of water quality, including any trends or statistically significant changes;

(4) A narrative discussion of surficial and bedrock geology, aquifer characteristics, contaminant transport, including plume geometry, if applicable, waste types accepted, landfill gas migration potential, and interpretation of the above information as it pertains to landfill closure design;

(5) Recommendations for an engineering design for closure which will ensure that the performance standards of section 5.B(1) are met; and

(6) A post-closure monitoring and maintenance plan in accordance with the requirements of section 6.

G. Design Standards for Closure. The engineering design for a closure system must incorporate the recommendations from the site assessment report, achieve the performance standards of section 5.B(1), and meet the design standards. Alternatives to the design requirements of this subsection may be proposed by the applicant. The applicant must make a demonstration of technical equivalency through the alternative design process of section 5.H or through a request for a variance pursuant to the provisions of Chapter 400, section 13.

The design must minimize infiltration of precipitation into the landfill after closure. The cover system must operate with minimum maintenance, promote drainage from its surface while minimizing erosion, and provide protection against freeze and thaw effects. It also must be designed so that settling and subsidence are accommodated to minimize the potential for disruption of continuity and function.

(1) Extent. Final cover must be placed over all areas of the landfill where solid waste has been disposed, including any areas that were not previously and completely closed in accordance with Department rules applicable at the time of that closure, in accordance with a Department closure order, or as otherwise approved by the Department.

(2) Cover System Requirements. The following requirements apply to the cover system.

(a) Final cover for secure landfills must be a composite cover consisting of a geomembrane and a barrier soil layer. The geomembrane must have a nominal thickness of 40 mils. The barrier soil layer must be a minimum of 24 inches of

recompacted clay, or well graded till. A geosynthetic clay liner (GCL) may be substituted for up to 12 inches of the barrier soil layer provided the GCL is underlain by at least 12 inches of recompacted clay or well-graded till having a minimum hydraulic conductivity less than or equal to $1x10^{-5}$ cm/sec. The surface layer of the soil layer beneath the GCL must not contain stones larger than 1 inch. The barrier soil layer must be underlain by a 6 inch thick sand layer integrated into the gas management system. The barrier soil layer must meet the hydraulic conductivity requirements of this subsection and be placed in at least three lifts. The geomembrane must be covered with:

(i) 12 inches of sand covered by 12 inches of a medium suitable for growing grass and preventing damage to the barrier layer; or

(ii) A layer of geonet covered by 18 inches of a medium suitable for growing grass and preventing damage to the barrier and drainage layers.

(b) Unless the Department determines that the more protective cover system requirements of subparagraph (c) apply, final cover for non-secure landfills must meet the hydraulic conductivity requirements of subparagraph (d) and consist of:

(i) A barrier soil layer consisting of a minimum of 18 inches of recompacted clay, or well graded till placed in two lifts. The barrier soil layer must be underlain by a 6 inch layer of sand integrated into the gas management system and be covered with 6 inches of a medium suitable for growing grass and preventing damage to the barrier soil layer; or

(ii) A geomembrane with a nominal thickness of 40 mils. The geomembrane must be underlain by a 6 inch layer of sand integrated into the gas management system. The geomembrane must be covered with:

a. 12 inches of sand covered by 12 inches of a medium suitable for growing grass and preventing damage to the barrier layer; or

b. A layer of geonet covered by 18 inches of a medium suitable for growing grass and preventing damage to the barrier and drainage layers.

(c) Based on the site assessment report, or if the landfill collects leachate or ground water containing leachate, the Department may require that a non-secure landfill meet the following requirements to provide a more protective cover system.

Final cover must include a composite cover consisting of a geomembrane and a barrier soil layer. The geomembrane must have a nominal thickness of 40 mils. The barrier soil layer must be a minimum of 12 inches of recompacted clay, or well graded till. The barrier soil layer must be underlain by a 6 inch thick sand layer integrated into the gas management system. The barrier soil layer must be placed in at least 2 lifts and have a hydraulic conductivity less than or equal to $1x10^{-6}$ cm/sec. The geomembrane must be covered with:

(i) 12 inches of sand covered by 12 inches of a medium suitable for growing grass and preventing damage to the barrier layer; or

(ii) A layer of geonet covered by an 18 inch layer of a medium suitable for growing grass and preventing damage to the barrier and drainage layers.

(d) Unless otherwise approved, the following requirements apply for hydraulic conductivity of the cover system layers:

(i) Barrier layers for secure landfill disposal facilities must have a hydraulic conductivity less than or equal to the hydraulic conductivity of the primary liner system. The average hydraulic conductivity must be less than or equal to $1x10^{-7}$ cm/sec with a maximum hydraulic conductivity less than or equal to $1x10^{-6}$ cm/sec.

(ii) Barrier layers for non-secure landfills must have a maximum hydraulic conductivity less than or equal to $5x10^{-7}$ cm/sec, unless otherwise approved or required by the Department.

(iii) Drainage and gas transmission layers must have an hydraulic conductivity greater than or equal to $1x10^{-3}$ cm/sec. Hydraulic conductivity requirements for drainage layers must be sufficient to minimize infiltration through the cover system and to maintain stability.

(e) Any geomembrane proposed for use in a landfill cover system must meet:

(i) GRI GM-13 standards, if available; and

(ii) Performance requirements for the proposed application.

(f) Any barrier soil layer proposed for use in a landfill cover system must have the following characteristics:

(i) A Liquid Limit greater than or equal to 20 and a Plasticity Index greater than 8 and less than or equal to 30. Glacial till soils do not need to meet these requirements;

(ii) A minimum fines content of 35%; and

(iii) A maximum particle size of less than or equal to 3 inches, except as noted in subparagraph (g)(v) below.

(g) Any barrier soil layer proposed for use in a landfill cover system must be designed to produce a homogeneous layer that eliminates soil clods and preferential flow paths, protect the geomembrane or GCL from puncture, if applicable, and reduce hydraulic conductivity to the maximum extent practicable. To accomplish this the barrier soil layer must meet the following requirements:

(i) Have a minimum in-place density of 90% of the maximum dry density as measured by ASTM D698 (Standard Proctor);

(ii) Be compacted using a kneading action to remold the soil between 0- 4% above optimum moisture content as determined using ASTM D-698 (Standard Proctor);

(iii) Be constructed in lifts with a maximum compacted lift thickness of 9 inches;

(iv) Be constructed in a manner which provides for lift interface bonding; and

(v) Have a maximum stone size less than or equal to 1 inch in the surface layer of the final lift if the barrier soil layer is the prepared subgrade for the geomembrane.

Applicants proposing test pad programs in accordance with the requirements of section 5.J may propose alternative criteria to the requirements of section 5.G(2)(f) and (g) in accordance with the results and conclusions of the test pad program.

(3) Base Preparation Below Cover Systems. Base preparation must provide support that will facilitate construction of the cover system and minimize the potential for disruption of continuity and function of the final cover during post-closure. Applicants that propose to regrade waste or to bring in significant quantities of wastes to facilitate establishing post-consolidation slopes shall demonstrate that the base preparation is adequate for the proposed cover system.

(4) Allowable slopes. The minimum allowable post-consolidation slope is 5 percent. The maximum allowable post-consolidation slope is 33 percent unless otherwise approved by the Department. Slopes must be designed to promote run-off in a manner that will prevent erosion of the final cover.

(5) Vegetation. The final cover must be limed, fertilized, seeded, and mulched as soon as possible after the cover is installed to promote evapotranspiration and to stabilize against erosion. Other areas around the waste disposal area that present a potential for erosion must also be revegetated. The lime, fertilizer, seed and mulch specifications must meet or exceed standards as established by "The Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices" prepared by the Maine Soil and Water Conservation Commission, March, 1991.

Manufactured topsoil may be approved on a site-specific basis. When manufactured topsoil is proposed, the applicant must submit to the Department for review and approval a plan to correct any vegetative cover inadequacies resulting from the use of manufactured topsoil. The plan must identify the funding source for such potential corrective action work.

(6) Corrective Action Requirements. Owners of landfills with contamination of ground and/or surface water may be required to implement corrective action(s) to meet the performance standards of Section 5.B(1). For these landfills, the owner shall immediately implement any approved corrective action, and shall demonstrate that the corrective action will be successful prior to the end of the post-closure monitoring and maintenance period. Corrective action designs will be considered on a site-specific basis.

H. Alternative Design Process. Alternatives to the design standards and requirements of this section may be proposed by the applicant. A variance request pursuant to the provisions of Chapter 400, section 13 is not required for proposals which meet the requirements of this paragraph. The applicant shall submit the following documentation to clearly and convincingly demonstrate technical equivalency of the proposed alternative:

(1) A discussion of the benefits of the proposed alternative technology.

(2) A discussion of the risks and drawbacks of the proposed alternative technology.

(3) An assessment of similar applications of the proposed alternative technology.

(4) A demonstration that the alternative technology will provide equal or superior performance to the component it is proposed to replace or that its inclusion within a system will result in equal or superior performance of that system.

(5) An assessment of the feasibility of constructing the proposed alternative, including the ability to provide an adequate level of quality assurance and quality control. A demonstration of the feasibility of construction may be required.

(6) An assessment of the likelihood that the proposed alternative will perform as designed through landfill closure and post-closure periods.

I. Engineering Report for Landfill Closure. The engineering report for landfill closure must present the basis for the engineering design and the proposed construction procedures, along with all data and design calculations for components, including geosynthetics. The engineering report must document how the site-specific environmental conditions and factors are used as the basis of the proposed design. It must discuss site-specific factors considered during design and address design selection for the surface water control systems, the leachate management systems, the gas management system, and final cover systems, as applicable. The report must also include a narrative evaluating the potential modes and significance of failures in engineered systems. All calculations and assumptions used in the evaluation and design of the proposed facility site must be submitted. The report must include the following information:

(1) Stability Assessment.

(a) Landfills licensed under these rules must meet the following requirements:

A seismic and a static stability assessment for the landfill cover system must be submitted. The stability assessment must include analysis of potential failure planes which pass along or between the cover system components. The stability assessment must meet the requirements of section 2.F(1)(a) and (b).

A seismic and static stability assessment must be submitted for potential failure planes which pass through or along the foundation soils, the waste mass, and/or the liner system components, if either of the following apply:

(i) Foundation soils strength gain was assumed in the previous assessment(s). Supporting data that is collected during construction and operations must accompany the stability assessment to demonstrate that the strength gain of the soils has occurred and/or will occur as predicted and the requirements of section 2.F(1) will be met.

(ii) Condition(s) will exist during the closure and/or post closure periods that are more critical than what was assumed in the previous assessment(s). The stability assessment must meet the requirements of section 2.F(1).

(b) Landfills not licensed under these rules must meet the following requirements:

A static stability assessment for the landfill cover system must be submitted. The stability assessment must include analysis of potential failure planes which pass along or between the cover system components. The stability assessment must meet the requirements of section 2.F(1).

A static stability assessment must be submitted for potential failure planes which pass through or along: the foundation soils, the waste mass, and/or the liner system components, if any of the following apply:

(i) Foundation soils strength gain was assumed in the previous static assessment(s). Supporting data that is collected during construction and operations must accompany the stability assessment to demonstrate that the strength gain of the soils has occurred and/or will occur as predicted and the requirements of section 2.F(1) will be met.

(ii) Condition(s) will exist during the closure and/or post closure periods that are more critical than what was assumed in the previous static assessment(s). The stability assessment must meet the requirements of section 2.F(1).

(iii) The Department determines that a static stability assessment is necessary to protect public health, safety, and the environment. This requirement applies to solid waste facilities that have not had stability assessments previously performed in accordance with the standards of section 2.F(1).

A seismic stability assessment is not required for facilities not licensed under these rules.

(2) Settlement Assessment. An assessment must be made to predict total and differential settlement of the landfill cover system. This assessment must include a demonstration that the cover system will maintain its integrity and performance at maximum predicted settlements. Instrumentation may be required by the Department to monitor the cover system settlement during the closure and post-closure periods.

(3) Stability and Settlement Monitoring Plan. Unless otherwise approved by the Department, a stability and settlement monitoring plan must be submitted for construction and post closure periods. Where applicable, monitoring plans for modes of failure governed by foundation soils must include the use of instrumentation installed into the foundation soils. The monitoring plan must incorporate the conclusions, recommendations, and requirements of the stability assessment approved under section 5.I(1) and the settlement assessment approved under section 5.I(2). It must also include reporting requirements to the Department. Reporting must include an interpretation of the monitoring results by qualified personnel.

(4) Water Balance. An assessment must be made of the volume of leachate, including consolidation water, to be generated by the landfill during the closure and post-closure periods. As determined by the Department, a standard method for determining leachate quantity must be used, such as "Hydrologic Evaluation of Landfill Performance (HELP) Model", (EPA/600/R-94/168a and EPA/600/R-94/168b.

(5) Leachate Management Plan. Plans for leachate management for secure landfills or non-secure landfills that collect leachate or groundwater containing leachate must include provisions for the continuation or decommissioning of existing leachate management systems, detailed design of new leachate management systems, and development of a post-closure leachate management and monitoring and maintenance plan. Contingency service contracts and/or letters of intent for leachate transport and disposal must be maintained throughout the post-closure period. Contracts or letters of intent are not required when the leachate will be transported and treated by the facility owner. For facilities that have a leak detection system, a response action plan and action leakage rate(s) must be incorporated into the post-closure monitoring plan. The response action plan must be implemented in the event that the action leakage rate(s) is(are) exceeded.

(6) Gas Management Plan. A landfill gas management plan must be submitted that includes, but is not limited to, the following:

(a) A complete gas collection or venting system design, active or passive, including anticipated gas generation rates, and sizing and spacing calculations;

(b) A detailed description of the methods to be used for utilization and discharge of gases and management of condensate from an active collection system;

(c) If the calculated non-methane organic compound (NMOC) emission rate is equal to or greater than 50 megagrams per year, a detailed design of any additional gas control measures other than collection and venting systems; and

(d) A gas monitoring and detection plan in accordance with the requirements of section 4.C(11), as applicable.

(e) An assessment to determine the effects failure of the gas collection or venting system would have on the environment and the landfill;

(f) An evaluation of migration potential; and

(g) A detailed description of the methods to be used for installation of the gas collection or venting system, including a phasing plan if applicable.

(7) Surface Water Control Plans. Two surface water control plans must be submitted: an erosion and sedimentation control plan which meets the standards and submission requirements of Chapter 400, section 4.J, and a stormwater management plan which meets the standards and submission requirements of Chapter 400, section 4.M.

J. Test Pads. Applicants may propose a barrier soil test pad program to demonstrate that the proposed barrier soil material and construction methods will result in a barrier soil meeting the standards of section 5.G of this chapter. Demonstration of the success of the test pad program in consistently achieving the required standards may allow the applicant to reduce the reliance on in-place hydraulic conductivity testing. The test pad program must be approved by the Department prior to the start of the test pad construction. The program must:

(1) Specify the procedures to characterize the properties of the barrier soil at the borrow source;

(2) Specify the procedures to develop the construction methods to consistently achieve the required density, moisture content, and hydraulic conductivity;

(3) Specify the dimensions and the testing protocol for the test pad; and

(4) Specify the criteria that will be used to define a successful test pad program.

K. Quality Assurance Plan. A Quality Assurance Plan (QAP) must be established and included with the application to assure that design specifications and performance requirements for all facility components are met during cover system construction. The QAP must include the following:

(1) A description of the Construction Quality Assurance (CQA) measures to be implemented.

(2) A description of the relationship between the QAP, construction quality control, and the construction contract bid documents. The construction contract bid documents must also clearly define this relationship.

(3) A description of the responsibility and authority that organizations and/or personnel involved in permitting, designing, constructing and certifying the construction of the cover system will have during the construction phase. This must also include a description of a construction problem resolution process that incorporates the roles and responsibilities of all parties, including the owner, manufacturer, installer, designer, CQA personnel, contractor, and the Department;

(4) The qualifications of the CQA personnel. Qualifications must include certification by the National Institute for Certification in Engineering Technologies (NICET), where applicable:

(5) The inspections and tests to be performed to ensure that the construction and the materials conform to contractual and regulatory requirements for each cover system component. Appendix A to this chapter contains requirements for earthworks testing programs that do not utilize test pads in accordance with Section 2.F(12).

(6) The sampling activities, sample size, methods for determining sample locations, frequency of sampling, acceptance and rejection criteria, and methods for ensuring that corrective measures are implemented;

(7) Record keeping and reporting requirements for MQA/CQA activities;

(8) A list and description of CQA certifications, including identification of the engineer(s) responsible for these certifications.

NOTE: Reference EPA Technical Guidance Document # EPA/ R-93/182 dated September 1993, "Quality Assurance and Quality Control for Waste Containment Facilities" for guidance in developing a quality assurance plan and recommended implementation program for certified CQA personnel.

L. Construction Contract Bid Documents. The applicant shall provide construction contract bid documents, including drawings, technical specifications, and the contract administrative documents.

M. Requirements During Construction. Licensees shall comply with the following requirements during construction:

(1) Pre-Construction Conference. Unless waived by the Department, a pre-construction conference between the licensee or the agents of the licensee and Department staff is required. A licensee shall give the Department written notice of the pre-construction conference schedule at least 7 days prior to the pre-construction conference unless a different time frame is approved by the Department.

(2) Quality Assurance Plan. The Quality Assurance Plan (QAP) must be implemented at the beginning of construction. Construction Quality Assurance (CQA) shall include continuous site inspections by the CQA personnel. Geosynthetics and barrier soil layers must be inspected, tested, and certified by qualified CQA personnel separate from the owner/operator and contractor.

(a) For the purposes of this paragraph, separate from the owner/operator means CQA personnel not in the direct employment of the owner/operator. Direct employment of the owner/operator does not include CQA personnel employed by a company under a contractual relationship with the owner/operator, provided that the CQA personnel are employed by a company that:

(i) offers and performs quality assurance services for other companies not affiliated with the owner/operator; and

(ii) has a management structure that exists and operates separately from the owner/operator, such that the CQA personnel are not directly compensated by, and are completely free of any direct reporting obligation to, the owner/operator.

(b) For the purposes of this paragraph, separate from the contractor means CQA personnel not in the direct employment of the contractor. Separate from the contractor also means CQA personnel not employed by a company under a contractual relationship with the contractor to perform services or provide materials unless the CQA personnel are employed by a company that:

(i) offers and performs quality assurance services for other companies not affiliated with the contractor, and;

(ii) has a management structure that exists and operates separately from the contractor, such that the CQA personnel are not directly compensated by, and are completely free of any direct reporting obligation to, the contractor.

(3) Cover System Barrier Layer Installation. Before installation of any type of cover system barrier layer, the licensee must evaluate the impacts of climatic conditions, proposed installation procedures, and the proposed installation schedule on the cover system barrier layer integrity.

(a) Timing. The construction schedule and sequence of construction must minimize the amount of time from initial cover system barrier layer placement to completion, including protective systems above the cover system barrier layer. It must minimize the potential for desiccation, cracking and erosion of the low hydraulic conductivity soil barrier layers, protect the integrity and inspectability of the geosynthetic components, and ensure that design requirements and performance standards are met.

(b) Installation Limitations. Cover system barrier layers are adversely affected by cold temperatures and may only be installed between April 15th and November 1st, and only when the ambient temperature exceeds 32 degrees Fahrenheit. The licensee must submit a specific cold weather installation plan for review and approval prior to construction at other times.

(c) Test Pads. If applicable, results and recommendations from the test pad program approved in accordance with section 5.J, and the final construction specifications and Quality Assurance Plan incorporating the recommendations from the test pad program, must be submitted to the Department for review and approval prior to commencing barrier soil construction.

(4) Changes from Approved Drawings and Specifications. Prior to implementing any changes to the approved drawings and specifications, the applicant must receive approval from the Department through an amendment or minor revision, or through a change order approval. The Department shall issue a response to a change order request within five working days, or approval of the change order is automatically granted.

(5) Weekly Inspection Reports. The CQA team responsible for construction inspection at the landfill shall keep daily and weekly construction inspection reports and provide a copy to the Department. The reports must be mailed to the Department within one week after the completion of each construction week. The weekly reports must summarize the daily reports and include information generated during the week. The following information is required as part of the weekly inspection reports.

(a) A statement prepared by the CQA personnel summarizing the test results;

(b) Submittals and action taken;

(c) Summary of work progress;

(d) Upcoming work items for the next two weeks or an alternative time period as approved by the Department;

(e) Punch list items, as applicable;

(f) Summary of significant problems encountered and how the problems were resolved;

(g) Change order status; and

(h) Construction stability monitoring results, if applicable.

(6) Photographic Documentation. The licensee shall provide the Department with representative photographic documentation of each stage of construction.

(7) Inspection for Compliance. After the closure of the landfill is substantially complete, the owner or operator shall request in writing a Department inspection for compliance. Any deficiencies noted by the Department must be corrected within 30 days.

(8) Final Construction Report. The licensee must submit a final construction report to the Department within 45 days following construction completion. The report must include:

(a) Written certification, signed and stamped by the engineer supervising the project inspection, that the closure has been completed in accordance with the approved plans and specifications. Certifications for different aspects of closure construction must be in accordance with the Quality Assurance Plan.

(b) A narrative summary of the construction process. The summary must include supporting documentation sufficient for the Department to conclude that the closure has been constructed in accordance with the approved plans and specifications, including, but not limited to, the following:

(i) A tabulation and summary of all testing results;

(ii) A tabulation of all problems encountered during construction and a description of how those problems were resolved. The report must be appropriately cross-referenced;

(iii) The photographic documentation required in section 5.M(6);

(iv) Subgrade acceptance certification;

(v) Manufacturer's quality control certificates; and

(vi) Quality assurance final reports for earthworks and geosynthetics.

(9) Record Drawings. The licensee shall provide record drawings, signed and stamped by a State of Maine Registered Professional Engineer, to the Department within 45 days after construction completion.

6. Post-Closure Monitoring and Maintenance.

A. Post-closure Monitoring and Maintenance Plan. The licensee shall submit a post-closure monitoring and maintenance plan to the Department as part of the closure plan required in Section 5. The plan must cover a period of at least 30 years following closure unless extended by the Department due to identified threats to public health, safety, or the environment.. The plan must outline how the applicant will meet the requirements of this section, include a reporting format, and provide a detailed estimate of post-closure monitoring and maintenance costs. Monitoring and inspections must be performed in accordance with the plan. Changes to this plan must be approved by the Department.

B. Post-Closure Standards. The facility site may not contaminate ground water outside the solid waste boundary and may not discharge contaminants to surface water without a license pursuant to 38 M.R.S.A. Section 413. Facilities that have implemented or are required to implement corrective action(s) must demonstrate that successful corrective action will occur prior to the end of the post-closure period.

(1) Ground Water Monitoring. Ground water must be monitored after closure in accordance with Chapter 405.

(2) Surface Water Monitoring. Surface waters must be monitored after closure in accordance with Chapter 405.

(3) Gas Monitoring. Gas monitoring must be conducted in accordance with the gas management plan approved for the closure and post-closure period under the requirements of section 5.I(6) on a quarterly basis for the duration of post-closure care until the Department approves a decrease or cessation in monitoring frequency or parameters or both.

(4) Leachate Monitoring and Maintenance. Leachate and the leachate management system must be monitored in accordance with the leachate management plan for the closure and post-closure period approved under the requirements of section 5.I(5). Leachate collection and leak detection systems must be monitored every four months after closure for quality and flow rates until the Department approves a decrease or cessation in monitoring frequency or parameters or both. Provisions must be made for continued leachate removal and treatment until the Department approves a cessation in removal and treatment.

(5) Stability and Settlement Monitoring. Stability and settlement monitoring, as applicable, must continue, and the results be reported to the Department, during the post-closure period in accordance with the plan approved under the requirements of section 5.I(3) until the Department approves a cessation in monitoring. For facilities that have been approved by the Department in accordance with section 2.F(1) to use strength gain of the foundation soils in the stability assessment and the factor of safety at the time of closure has not yet reached 1.5, the monitoring plan must include provisions for the owner to demonstrate that the factor of safety has reached 1.5 before the end of the first five years of the post-closure period. If this demonstration cannot be made, a plan for corrective work must be submitted to the Department for approval so that a factor of safety of at least 1.5 is attained.

(6) Cover Monitoring and Maintenance. The final cover must be monitored and maintained to prevent ponding of water or erosion of cover materials and to otherwise maintain its integrity. Vegetative cover must be mowed annually to prevent the growth of deep rooted, woody plant species. Animal burrows into the cover must be eliminated and the cover repaired as needed.

(7) Restricted Access. Provisions must be made to prevent the disposal of solid waste on the site and to protect the integrity of the final cover system after closure.

(8) Inspections. The landfill must be inspected thirdly after closure following the approved plan until the Department approves a decrease in frequency or cessation of inspections. Deficiencies noted during inspections must be corrected as soon as weather conditions allow.

(9) Rapid Waste Mass Stabilization. Rapid waste mass stabilization approved as part of landfill closure must provide for monitoring, maintenance, and inspection of landfill facility components in accordance with the approved proposal.

C. Reporting Requirements. The licensee shall submit the results of the monitoring and inspection requirements of this section to the Department. For the first two years of post-closure, the results must be submitted after each inspection. After the first two years, the results must be submitted annually until the Department approves a decrease in reporting frequency. Submittals must include the monitoring results. Deficiencies noted during inspections must be summarized along with corrective measures taken or proposed.

D. Landfill Reclamation. An owner must obtain a license pursuant to Chapter 400 in order to conduct landfill reclamation activities at a closed landfill.

7. Special Requirements for Licensing of Small Construction/Demolition Debris, Land Clearing Debris, and Wood Waste Landfills.

A. Applicability. This Section applies to landfills that meet all of the following conditions:

(1) The landfill is operated solely for the disposal of construction/demolition debris, land clearing debris and/or wood waste, with incidental amounts of treatment plant grit, car wash basin grit, storm sewer grit, sediment materials removed from stormwater control structures, and ash from any permitted on-site burn pile.

(2) The area within the solid waste boundary is smaller than 6 acres;

(3) The landfill is located so that none of the siting criteria in Section 7.D(2) prohibit development; and

(4) The facility meets the general facility standards of this section.

If any one of these conditions is not met, review and approval under the previous sections of this chapter is required.

B. Exemptions. In addition to the facilities listed in Chapter 400, section2, the following solid waste disposal activities are exempt from the requirements of this Chapter.

(1) Disposal of construction/demolition debris, land clearing debris or wood wastes when:

(a) The solid waste boundary(ies) encloses an area of less than one acre;

(b) The disposal facility is located on the same parcel of land where the waste was generated;

(c) Only one exempt disposal facility is located on a single parcel of property, except that additional disposal facilities on the same parcel that are less than one acre size and that were in existence prior to May 6, 1991 do not require a license

under this chapter if no additional waste is disposed in those additional facilities after May 6, 1991; and

(2) The disposal of land clearing debris when:

(a) The solid waste boundary encloses an area of less than one acre;

(b) Written permission of the owner of the property has been obtained;

(c) The disposal location is not on a significant sand and gravel aquifer; and

(d) Only one exempt disposal facility is located on a single parcel of property.

(3) The even distribution of chipped wood or wood ash from land clearing activities provided that:

(a) The chips are spread over the ground in a manner that will not inhibit plant growth, or

(b) The ash is spread on the same parcel of land where generated and spread in a manner that would not inhibit plant growth.

(4) The disposal of inert fill, whether generated on-site or off-site.

(5) The extraction and reburial of tree stumps provided that the stumps are reburied in the same spot where extracted.

(6) The burial of land clearing debris associated with utilities rights of way or for the construction of logging roads, log landings, and wood yards when the waste is deposited on the same parcel of land where it is generated.

(7) The burial of land clearing debris associated with public works projects when the waste is deposited on the same parcel of land where it is generated.

These activities are not exempt from the Waste Discharge Law (38 M.R.S.A. Section 413) or other provisions of State Law.

C. Transition Provisions for Existing Construction/Demolition Debris, Land Clearing Debris and Wood Waste Landfills Less than 6 Acres in Size. All owners or operators of existing construction/demolition, landclearing debris and wood waste landfills less than 6 acres in size must submit a revised operations manual in conformance with this section to the Department for review and approval with the annual report due in 1999. These facilities must comply with the operating requirements of this section no later than 90 days after receiving Departmental approval of the revised operations manual.

D. General Requirements for Licensing Construction/Demolition Debris, Land Clearing Debris and Wood Waste Landfills under this Section.

(1) Performance Standards. Applicants proposing to site a new landfill or to expand an existing landfill under this section must demonstrate that the landfill will be sited,

designed, constructed, operated and closed to meet the standards of Chapter 400, section 4 and that the landfill will not contaminate ground or surface water outside the solid waste boundary.

(2) Prohibitive Siting Criteria. To protect public health, safety, and the environment, the locations listed below are not suitable for siting landfills subject to this section. Variances from these siting prohibitions may not be granted.

(a) The area within the solid waste boundary must not be located where the thickness of undisturbed soil material is less than five feet.

(b) The area within the solid waste boundary must not be located where the thickness of undisturbed soil material above the seasonal high water table is less than three feet.

(c) The waste handling area must not be located on a 100-year flood plain.

(d) The facility site must not overlie an unstable area as defined in Chapter 400,

(e) The area within the solid waste boundary must not be located within 200 feet of a fault that has had displacement in Holocene time.

(f) The facility site must not be located in, on, or over a coastal sand dune system, coastal wetland, or fragile mountain area, as these terms are defined in 38 MRSA §480-B.

(3) Restrictive Siting Criteria. The siting criteria listed below apply to siting landfills subject to this section unless the applicant receives a variance in accordance with the provisions of Chapter 400, section 13.

(a) The landfill waste handling area must not be located within 1000 feet of Class AA or Class SA waters, as defined in 38 MRSA §465 and 465-B.

(b) The area within the solid waste boundary must not lie over or be within 300 feet of a significant sand and gravel aquifer.

(c) The following set-backs must be maintained:

(i) A minimum 300-foot set-back between the waste handling area and all public roads;

(ii) A minimum 300-foot set-back between the solid waste boundary and the property boundary;

(iii) A minimum 1000-foot set-back between the solid waste boundary and the nearest residence not owned by the applicant at the time the application is filed with the Department; and

(iv) A minimum 100 foot setback to stratified sand and gravel deposits.

(v) A minimum 250 foot setback between the waste handling area and classified surface water; and

(vi) A minimum 1000 foot setback between the solid waste boundary and any water supply spring at the time the Preliminary Site Assessment Report is filed with the Department.

(vii) A minimum 1000 foot setback between the solid waste boundary and any water supply well not owned by the applicant at the time the Preliminary Site Assessment Report is filed with the Department.

(d) The area within the solid waste boundary shall be located on soils that contain less than 15% by volume of stones, cobbles, or boulders and the soils must contain a minimum 15% fines.

(e) The facility site must not be located in, on, or over a significant wildlife habitat, as this term is defined in 38 MRSA §480-B.

(4) General Facility Standards. The applicant must comply with the following requirements. Variances from these requirements may not be granted.

(a) The landfill size shall be designed to meet the applicant's disposal needs for no longer than 20 years;

(b) Special waste, putrescible waste, or any other unauthorized waste must not be disposed of in the landfill.

(c) The active area within the solid waste boundary must be covered with soil material or other approved cover so that no more than 1/2 acre remains uncovered at any time.

(d) The minimum allowable post-consolidation slope is 5 percent. The maximum allowable post-consolidation slope is 33 percent. Slopes must be designed to promote run-off in a manner that will prevent erosion of the final cover.

(5) General Licensing Requirements. The applicant must comply with the following requirements during the site investigation and licensing process:

(a) Borings shall be designed, constructed, and abandoned in accordance with the procedures specified in Chapter 405. Test pits must be backfilled to prevent surface water infiltration or the movement of ground water or surface water from one aquifer to another.

(b) The applicant must establish a protected permanent benchmark on the facility site for use in surveying the landfill, constructed to U.S. Coast and Geodetic Survey standards. Horizontal and vertical controls must be established for the benchmark. The benchmark must be:

(i) Coordinated and reported according to National Geodetic Vertical Datum Standards, if readily available;

(ii) Shown on all application drawings and record drawings, as applicable; and

(iii) Clearly marked and labeled.

E. Preliminary Site Assessment Report and other Pre-Application Requirements. Pre-application requirements are intended to screen out potentially unsuitable sites and to identify potentially unacceptable approaches to development of a landfill. Prior to submission of an application for a license to develop a new or expanded landfill, and at least two months prior to scheduling the pre-application meeting, the applicant must develop and submit to the Department for review a complete preliminary site assessment report. A pre-application meeting and a pre-submission meeting with the Department shall be held, unless waived pursuant to Chapter 2. The applicant shall hold a public informational meeting.

The preliminary site assessment report must contain an introduction, a summary of findings, and conclusions. It shall consist of the following information in sufficient detail to demonstrate that the landfill is located so that none of the siting criteria in Section 7.D(2) prohibit the proposed development, to identify any restrictive siting criteria, and to demonstrate that the general facility standards will be met. It may include workplans for completing the application requirements for Department review and comment.

The preliminary site assessment report must include the following:

(1) Medium intensity soils map, if available;

(2) The most recent full-size U.S. Geological Survey topographic map of the area (7-1/2 minute series if printed), with the facility site and the property boundary clearly delineated;

(3) The most current available aquifer map of the site, if available, from the Maine Geological Survey;

(4) An earthquake epicenter map;

(5) Subsurface information adequate to demonstrate that there are sufficient in-situ soils and depth to ground water to meet the prohibitive siting criteria in section 7.D(2);

(6) Identification of all classified bodies of water within 1000 feet of the solid waste boundary;

(7) A map of protected natural resources located within 500 feet of the proposed facility site;

(8) A determination that the waste handling area will not be located in the 100-year flood plain;

(9) A map showing the set-back distances for the proposed solid waste boundary and/or waste handling area from the following:

(a) Public roads;

(b) Residences;

(c) Water supply wells and water supply springs; and

(d) Property boundaries.

(10) A synopsis of all the hydrogeologic, geologic and soils information that the applicant has researched and utilized.

(11) Disposal area(s) size, capacity, and life expectancy.

F. Application Requirements. Landfills subject to this section shall provide application information demonstrating that the facility meets the performance standards, siting criteria, general facility standards and general licensing requirements of section 7.D, and the licensing requirements of Chapter 400. A proposed facility that meets the design, siting, and operational requirements of this section is presumed to meet the standards of Chapter 400, sections 4.E, 4.G, and 4.K because of the siting, design, and operational limitations placed upon it. The applicant shall submit to the Department, on forms provided by the Department, the following information:

(1) Site Investigation and Report.

(a) Site Investigation. Each application for a landfill must include the results of an investigation conducted to gather the information necessary to complete the site assessment report described below. The following hydrogeological investigations are required and must be conducted under the direction of a Maine Certified Geologist:

(i) Subsurface investigations are required in sufficient numbers and locations to properly describe and evaluate the surficial stratigraphy beneath and adjacent to the proposed area within the solid waste boundary. This investigation must be extended outside and beneath the proposed area within the solid waste boundary a distance sufficient to determine set-backs from any stratified sand and gravel deposits and significant sand and gravel aquifers, and depth to bedrock.

(ii) A sufficient number of test pits or borings must be sampled at maximum depth intervals of 5 feet, or more often if surficial material characteristics change, and be analyzed for the following:

a. Grain size distribution;

b. Porosity; and

c. Hydraulic conductivity;

(b) Site Assessment Report. A site assessment report shall be prepared by a Maine Certified Geologist. The report must include a narrative, maps, drawings, cross-sections, results of the subsurface investigation, and all supporting documentation developed through the site specific investigation. The narrative must include a discussion of all information obtained from the investigation, including the site characteristics and any engineering design and operational measures to be used to develop the facility in accordance with the rules. The results of the grain size distribution, porosity, and hydraulic conductivity analyses and the depth to high water and bedrock for the area within the solid waste boundary must also be included.

(c) Maps, Drawings and Sections. Maps, drawings and sections with the same horizontal scale must be prepared and submitted according to the requirements of this paragraph. Unless otherwise specified, maps must be drawn to a scale of one inch equals 100 feet or larger.

(i) A topographic base map must be used for all maps, cross-sections and drawings included in the site assessment report.

(ii) A surficial geologic map of the waste handling area must be submitted, based on the on-site investigation. The solid waste boundary and location of the leachate management system components, if applicable, for the proposed landfill must be shown on this map. Geologic contacts appearing on this map and all cross-sections must be drawn as solid lines where observed and as dashed lines where inferred.

(iii) Site Plan and Profile Drawings. Site plan and profile drawings must be provided to verify separation to ground water and for construction of the facility. Locations of test pits and surface water quality monitoring points, if applicable, must be shown on the plan. The drawings must be to the horizontal scale of 1 inch = 100 feet, or any larger engineering scale. The vertical exaggeration for the profiles must be no less than 1 inch = 5 feet. The solid waste boundary must be shown on the site plan.

(2) Design Requirements.

(a) Base Preparation. Base preparation must ensure that any constructed base materials have a hydraulic conductivity that is compatible with the in-situ soils.

(b) Cell Development Plan. The landfill must be designed for phased operation with each cell brought to grade and topped with operational cover or final cover as the next cell is started. The phased operation must minimize the quantity of leachate generated by the landfill.

The cell development plan must consist of a conceptual plan for phased operations for the life of the landfill and a detailed plan in six month increments for an initial two year period. Plans must include a narrative and drawings that

address: layout of the cells; projected grades; location and timing of intermediate and/or final cover; location and construction of cell access; any relevant aspects of leachate and stormwater management measures; any relevant aspects of erosion and sedimentation control measures; and other pertinent facility-specific features.

(c) Water Balance. An assessment must be performed of the volume of leachate to be generated by the landfill during operations, closure, and post-closure periods. As approved by the Department, a standard method for determining leachate quantity must be used, such as "Hydrologic Evaluation of Landfill Performance (HELP) Model", (EPA/600/R-94/168a and EPA/600/R-94/168b). This assessment must be performed using a minimum 5-year database for climatic input parameters, using site-specific soils data, and using site-specific design waste properties.

This assessment must demonstrate that the in-situ soils beneath the area within the solid waste boundary have the ability to infiltrate all of the potential leachate or be the basis for design of a leachate management plan.

(d) Leachate Management. Where on-site soils beneath the area within the solid waste boundary do not have the capability to infiltrate all of the potential leachate, a leachate management system is required. If a leachate management system is required, the following items must be addressed in the application:

(i) Selected leachate management options, including leachate collection, storage, treatment, transport to a treatment facility, and disposal.

(ii) A demonstration that leachate generation will be minimized. Operational controls must be proposed that will minimize leachate generation. Operational controls must be proposed as part of the Cell Development Plan required under section 7.F(2)(b).

(iii) Leachate management system design. The design must demonstrate that all potential leachate not capable of being infiltrated into the on-site soils will be managed in accordance with the standards of this section.

(iv) A Quality Assurance Plan must be included to assure that design specifications and performance requirements for all landfill components are met during construction.

(v) Construction Contract Bid Documents must be provided, including drawings, technical specifications, and the contract administrative documents.

(vi) The Department may require leachate monitoring if there is a leachate collection system.

(e) Waste Storage and Burn Areas Design Submission. For facilities proposing waste storage areas outside of the solid waste boundary, and/or a burn area for wood wastes and/or wood from construction/demolition debris as part of the

facility site, a design plan must be submitted. The storage and burn areas must be designed and operated in accordance with the storage and burn area requirements of Chapter 402 sections 2 and 4, and must be located at a distance from water quality monitoring points sufficient to avoid contamination. The plan must provide for controls to manage potentially contaminated run-off and prevent the discharge of contaminants to the environment.

(f) Surface Water Control Plans. The applicant must submit two surface water control plans: an erosion and sedimentation control plan which meets the standards and submission requirements of Chapter 400, section 4.J and a stormwater management plan which meets the standards and submission requirements of Chapter 400, section 4.M.

(g) Surface Water Monitoring Plan. A plan for monitoring surface water quality must be submitted for landfills located near classified surface waters. This plan must be in conformance with the surface water monitoring requirements of Chapter 405.

(3) Waste Management Plan. The applicant shall develop and implement a waste management plan. This plan must be utilized to minimize landfilling of wastes. It must include:

(a) A demonstration of the need for a facility of the requested size;

(b) Disposal area size, capacity and life expectancy;

(c) An identification of the construction/demolition debris, land clearing debris, and wood wastes that are reusable, recyclable, compostable, processable or otherwise useful;

(d) A waste separation plan that evaluates the feasibility of separating useful materials from wastes.

(e) A waste management plan that prioritizes in the following order:

(i) Reducing both the volume and toxicity of waste;

(ii) Reuse of wastes;

(iii) Recycling or reprocessing of waste and the creation of a new usable material;

(iv) Composting of biodegradable waste either at the facility, backyard or small scale community programs;

(v) Processing that reduces the volume of waste needing disposal, including incineration and waste-to-energy technology; and

(vi) Land disposal, including the evaluation of regional facilities.

(4) Operations Manual. A copy of the operations manual must be submitted as part of the application. The operations manual shall meet the requirements of section 7.H.

G. Landfill Construction.

(1) Changes from Approved Plans and Specifications. Prior to implementing any changes to the approved landfill design, the leachate management systems, or project specifications, the applicant must receive approval from the Department through an amendment or minor revision, or through a change order approval. The Department shall issue a response to a change order request within 5 working days, or approval of the change order is automatically granted.

(2) Quality Assurance Plan. The Quality Assurance Plan approved under section 7.F(2)(d)(iv) must be implemented at the beginning of construction.

(3) Photographic Documentation. The licensee shall provide the Department with representative photographic documentation of each stage of construction.

(4) Record Drawings. The licensee shall provide record drawings, signed and stamped by a State of Maine Registered Professional Engineer, to the Department within 45 days after construction completion for each phase.

(5) Final Construction Report and Commencement of Operations.

(a) Commencement of Operations. The licensee shall submit a written request that the Department conduct an inspection of the completed construction for a finding of compliance with the facility license. The licensee may not commence operation of the landfill until the Department conducts or waives the need for this inspection and approves the written certification and tabulation of all problems encountered during construction and a description of how those problems were resolved. This written certification and tabulation of problems is required as part of the final construction report, but may be submitted prior to the final report in order to expedite approval for commencement of operations.

(b) Final construction report. The licensee shall submit a final construction report to the Department within 45 days following construction completion of each phase. The owner shall retain a copy of this report at the landfill site. The report must include:

(i) Written certification, signed and stamped by the engineer(s) supervising the project inspection, that the facility has been constructed in accordance with the approved plans and specifications.

(ii) A narrative summary of the construction process. The summary must include supporting documentation, appropriately cross-referenced, sufficient for the Department to conclude that the facility has been constructed in accordance with the approved plans and specifications. The supporting documentation must include:

a. a tabulation and summary of all testing results, as applicable;

b. a tabulation of all problems encountered during construction and a description of how those problems were resolved;

c. the photographic documentation required by section 7.G(3) above; and

d. quality assurance reports for earthworks.

H. Operating Requirements. Any landfill subject to the requirements of this section must comply with the operating requirements of this subsection. Each landfill must be operated so that it does not contaminate ground or surface water outside the solid waste boundary.

The operations manual must include all the information necessary to enable supervisory and operating personnel, and persons evaluating the operation of the landfill, to determine the sequence of operation, policies and procedures, and monitoring, maintenance, inspection, and legal requirements that must be followed for safe, orderly and environmentally sound operation on a daily, yearly, and life cycle basis. The operator shall take whatever measures are necessary to familiarize all personnel responsible for operation of the facility with relevant sections of the operations manual.

The operations manual must address each of the areas identified below. The operating manual must include a format for, and items to be covered by, all reporting requirements, including the inspection and monitoring requirements and the annual report. The operations manual must be reviewed annually by the operator and updated as necessary. A current copy of the operating manual must be available for inspection and use at the landfill at all times.

(1) Acceptable Solid Waste. A landfill may accept only construction/demolition debris, land clearing debris and/or wood wastes, with incidental amounts of treatment plant grit, car wash basin grit, storm sewer grit, and sediment materials removed from stormwater control structures as allowed by the Department in the landfill's current license.

(2) Implementation of Waste Management Plan. The owner or operator shall implement the Waste Management Plan as approved by the Department.

(3) Hazardous and Special Waste Handling and Exclusion Plan. The operator shall comply with all provisions of the Hazardous and Special Waste Handling and Exclusion Plan prepared in accordance with Chapter 400, section 9.

(4) Access to Disposal Area. The owner or operator shall control access to the disposal area and shall prevent unapproved wastes from being disposed.

(5) Set-Backs and Buffer Strips. The set-backs and buffer strips approved by the Department must be maintained.

(6) Control of Litter. The operator shall provide for routine maintenance and general cleanliness of the entire facility site.

(7) Stormwater Management and Erosion Control. The operator shall provide for erosion and sedimentation control in compliance with the approved erosion and sedimentation control plan that meets the standards and submission requirements of Chapter 400, section 4.J. The operator shall also provide for stormwater management that is in compliance with the approved stormwater management plan which meets the standards and submission requirements of Chapter 400, section 4.M. Erosion and sedimentation control structures and stormwater management structures shall be maintained on a routine basis.

(8) Side Slopes. Side slopes of the disposal area shall not be steeper than 3 horizontal to 1 vertical.

(9) Compaction. Wastes shall be compacted on a weekly basis if the facility is operated less than 5 days per week and on a daily basis if operated for 5 or more days per week. From December 16 through March 31 in the southern zone and from November 16 through April 30 in the northern zone, solid waste may be deposited at the landfill without compaction or cover if the total lift height during this period does not exceed 12 feet and the total horizontal area covered with waste does not exceed 20,000 square feet.

(10) Cell Development Plan. All landfills must operate in accordance with the cell development plan submitted to and approved by the Department, as required by section 7.F(2)(b).

The active area shall be covered with soil or other approved material at a frequency so that no more than 1/2 acre remains uncovered at any time. Operational cover shall be placed and compacted to 6 inches thickness in such a manner that the waste is effectively covered. Cover shall be placed in accordance with the requirements of the approved cell development plan.

(11) Inspections. The operator shall provide for facility inspections on a regular basis, document the results of the inspections using the reporting format approved by the Department, and include a summary of the inspection results in the annual report required by section 7.H(21). Items to be included in these inspections, an inspection schedule, and reporting formats must be provided in the operating manual. The inspection reports must be kept on file at the landfill for a three year period, and shall be available for Department inspection upon request. Provisions must be made in the inspection program to demonstrate that non-conforming inspection items have been brought into conformance, including documentation of any repairs.

As applicable the inspection program must be sufficient to document:

(a) that the leachate management systems, the erosion and sedimentation control measures, and the stormwater management systems are performing as designed;

(b) that the waste and cover system grades and placement are in accordance with the approved cell development plan; and

(c) any deviations from the approved plans and specifications;

If the landfill has a leachate management system, the leachate collection, detection, and transport systems must be inspected at least annually. If select waste, such as wood chips, is used as a protective system, the leachate collection system must also be inspected after the first lift of select waste is placed on top of the collection system.

(12) Dust Control. The operator shall use suitable measures to control dust at the facility site.

(13) Equipment. The equipment in use at the landfill must be sufficient to meet the operating requirements of this section. The operator shall have a contingency plan for obtaining back-up equipment when needed.

(14) Fire Protection. The operator shall take suitable measures for the prevention and control of fires at the landfill site by complying with at least the following requirements:

(a) Arrange for a nearby fire department to provide emergency service whenever called;

(b) Provide sufficient on-site equipment for minor fires such as detachable extinguishers, maintained in working order.

(c) Maintain a soil stockpile sufficient to suppress fires.

(d) Observe the current applicable rules of the State of Maine Bureau of Forestry, Department of Conservation.

(e) Provide a mechanism at the facility site to communicate with the local fire department.

(15) Surface Water Monitoring Program. If applicable, the operator shall monitor environmental effects from the landfill in accordance with the most recent surface water monitoring plan approved by the Department.

(16) Operating Records. The operator shall keep a record of operational information for the active life of the landfill, and keep these records on file during the post-closure period. Operational records must include:

(a) The type, quantity and origin of waste received;

(b) The equipment, compaction methods, and cover used;

(c) The portion of the landfill used;

(d) Any deviations made from the approved plans and specifications;

(e) Reports from the monitoring program;

(f) Accident reports;

(g) Equipment breakdowns that caused significant operational problems;

(h) Inspection records; and

(i) Fires.

(17) Supervision of Operation. The operation of the landfill must be supervised and directed by key personnel qualified and experienced in disposal of construction/demolition debris, land clearing debris, and wood wastes disposal. An attendant must be on site during all operating hours.

(18) Waste Handling Area. The operator shall post appropriate signs or other means to indicate clearly where wastes are to be unloaded and where separate disposal and storage areas are located within the facility site.

(19) Open Burning of Brush and Wood from Demolition Debris. Open burning of solid waste other than wood waste and painted wood, is prohibited at all landfills.~ All burning must be confined to a burn area approved by the Department. Wood that has been treated may not be burned. Other wastes, such as tires or waste oil, may not be used to start or maintain a burn. Burning must be done in conformance with the requirements of Chapter 402, Section 4.I.

(20) Disposal of Non-Friable Asbestos. Disposal of Non-Friable Asbestos. The disposal of non-friable asbestos in products such as roofing, siding, and resilient floor coverings may occur without a special waste permit. Disposal of friable asbestos, such as pipe and boiler insulation, is prohibited at construction and demolition debris landfills.

All asbestos waste delivered to the landfill must be containerized in conformance with the requirements of 06-096 CMR 425.9(A)(2) (the "Asbestos Management Regulations" effective January 1, 1994). Non-friable asbestos waste must not be subject to shredding, crushing, or any other form of volume reduction prior to placement in the landfill. Asbestos waste shall not be dropped or thrown more than 3 feet. Due care and caution must be utilized during asbestos waste handling to avoid damage to the packaging. Any asbestos waste found to be leaking or improperly packaged shall be immediately repackaged. The non-friable asbestos waste must be covered by a minimum of 6 inches of cover by the end of the working day.

Cementitious asbestos piping (transite pipe) is exempt from the packaging requirements provided the waste is kept adequately wetted during loading, transport, and off-loading. Municipalities may request approval from the Department for an alternative disposal location for cementitious asbestos piping generated from the replacement of piping as part of public works projects. Cementitious asbestos piping which is no longer being used may be left in the trench and buried in place provided it remains intact and its location is noted in public works records.

NOTE: Any non-friable asbestos which has deteriorated or has been cut, broken, abraded, weathered, or acted upon by any other means may be considered by the Department to be friable asbestos.

(21) Annual Report. Pursuant to 38 MRSA §1310-N, (6-D), an annual report and fee shall be submitted by the operator on a schedule consistent with the requirements of Chapter 400, section 3.E. The format for this report must be contained in the operations manual for the landfill.

(a) General. The annual report must include:

(i) A summary of activity at the landfill during the past year. This shall include a narrative describing any factors, either at the landfill or elsewhere, that effected the operation, design or environmental monitoring program of the landfill.

(ii) An evaluation of the landfill's operations to verify compliance with the approved operations manual, licenses, and regulatory requirements. This evaluation shall be performed either by qualified facility personnel or a qualified consultant.

(b) Operations. As part of the annual report, the following operational information is required.

(i) An estimate of the capacity of the landfill used in the past year and an estimate of the landfill's remaining capacity.

(ii) A description and estimate of the amount of cover material used in the past year.

(iii) A description of changes in the operations manual during the past year.

(iv) Proposed changes to the operations manual, or any aspect of the landfill's operations.

(v) A summary of responses to spills, fire, accidents and unusual events that occurred at the landfill in the past year.

(vi) Updated cell development plans for subsequent two year periods, as needed, highlighting any changes to the approved plan.

(vii) Copies of reports prepared in accordance with the facility's Hazardous and Special Waste handling and Exclusion Plan.

(viii) A report on the results of the facility's inspection and monitoring programs.

(ix) If applicable, documentation of system failures and repair measures.

(c) Monitoring. The following monitoring information must be included in the annual report. All evaluations must be done in accordance with the landfill's approved surface water monitoring program.

(i) An evaluation of data gathered for each surface water monitoring point, if applicable, for the landfill, including a statistical analysis of the data where appropriate.

(ii) For facilities that have leachate collection, an evaluation of the quantity and quality of leachate generated by the landfill during the past year, if applicable, including a comparison of the past year's leachate monitoring results to previous years' results.

I. Closing Requirements.

(1) Cover Requirements. All landfills regulated by this section, including landfills operating under a schedule of compliance pursuant to 38 MRSA 1310-N (6-F), must be closed out in accordance with the requirements of this subsection within 180 days of the last receipt of waste and must be graded to a maximum side slope of 3 horizontal to 1 vertical and a minimum top slope of 5%. The final cover must consist of 18 inches of clay or well-graded till containing a minimum of 35% fines overlain by 6 inch soil layer suitable to grow vegetation. The vegetative layer must be seeded with an effective ground cover within one growing season of the completed disposal. Owners/operators must submit a written certification within 45 days of closure completion stating that the facility was closed in accordance with the requirements of this subsection. Final cover for landfills with leachate collection must have a cover system less permeable than the underlying soil and provisions must be made for on-going management of leachate.

(2) Permanent Record. Within 60 days of completion of final closure construction, the licensee shall prepare and record in the Registry of Deeds information and deed restrictions to provide notice to prospective purchasers and a public record of the location of the landfill. The licensee shall provide a copy of the recorded information and deed restriction to the Department.

(a) The information must include:

(i) The type of facility located on the parcel and the dates of its operation and closure.

(ii) A description of the location, composition, extent and depth of the waste deposited.

(iii) The location and identification number of monitoring wells on the property, if any.

(b) A deed restriction must be included. It must state and effectively provide that post-closure use of the property may not disturb the integrity of the final cover, liner system or other components of the containment system, or the functioning of the monitoring systems, without prior written approval of the Department.

J. Post-Closure Requirements. Landfills licensed under this section are subject to the following requirements for post-closure care for a period of 10 years following closure unless extended by the Department due to identified threats to public health, safety, or the environment.

(1) Surface Water Monitoring. If applicable, surface waters must be monitored semi-annually after closure until the Department approves a decrease or cessation in monitoring frequency or parameters or both.

(2) Cover Maintenance. The final cover must be maintained to protect its integrity and prevent ponding of water or erosion of cover materials. Vegetative cover must be mowed annually to prevent the growth of deep rooted, woody plant species. Animal burrows into the cover must be eliminated and the cover repaired as needed.

(3) Drainage. The closed landfill must be kept well drained.

(4) Restricted Access. Provisions mast be made to prevent the disposal of additional solid waste on the site and to protect the integrity of the final cover system.

(5) Leachate Monitoring and Maintenance. For facilities with leachate management systems, leachate and the leachate management system must be monitored after closure of the landfill. Leachate management systems must be monitored every four months for quality and flow rates until the Department approves a decrease or cessation in monitoring frequency or parameters or both. Provisions must be made for continued leachate removal and treatment until the Department approves a cessation in removal and treatment.

(6) Inspections. The landfill must be inspected semi-annually after closure in accordance with an approved plan until the Department approves a decrease in frequency or cessation of inspections. Deficiencies noted during inspections must be corrected as soon as weather conditions allow.

(7) Reporting Requirements. The licensee shall submit the results of the monitoring and inspection requirements of this section to the Department. For the first two years of post-closure, the results must be submitted after each inspection. After the first two years, the results must be submitted annually until the Department approves a decrease in reporting frequency. Submittals must include the monitoring results. Deficiencies noted during inspections must be summarized along with corrective measures taken or proposed.

(8) Landfill Reclamation. An owner shall obtain a license pursuant to Chapter 400 in order to conduct landfill reclamation activities at a closed landfill.

8. Permit-By-Rule For Cull Potato Disposal. The permit-by-rule provisions of this section shall apply to the disposal by burial of cull potatoes that meet all of the standards of this section. Any burial which does not conform to all of these standards, or which involves any waste other than cull potatoes or inert fill, will require formal application to the Department for a license to develop and operate a solid waste disposal facility under sections 1-6. The

Department assumes that the burial of cull potatoes in strict conformity with these permit-by-rule provisions will meet the standards of Chapter 400, section 4. The burial of cull potatoes licensed under this section is exempt from the requirements of Chapter 400, sections 6, 7, 9, 10, and 11. No variances to the requirements of this section may be granted.

A. Notification Requirements. At least 5 working days prior to initiating burial of cull potatoes, the applicant shall submit to the Department a permit-by-rule notification of the cull potato burial, on a form provided by the Department.

Between June 10 and October 1 of any year, the 5 working day notice requirement may be waived if the person responsible for the cull potato burial hand delivers a completed permit-by-rule notification to the Department, Division of Solid Waste, and staff determine that all the provisions of this section are met and authorize the burial.

The notification must include:

(1) A notice and statement of intent to dispose of cull potatoes on land either owned by the farmer who is responsible for growing the crop which produced the cull potatoes or owned by a person granting written permission for burial of cull potatoes. The notice and statement must give the name of the property owner, the road and map location of the proposed burial site, and, if the land is not owned by the farmer responsible for growing the cull potatoes, a statement signed by the property owner that no monetary remuneration will be received in exchange for permission to bury cull potatoes at the site.

(2) A statement signed by the person responsible for the burial of the cull potatoes that the burial of cull potatoes will conform with the requirements of this section.

NOTE: In an emergency, Department staff can be contacted on weekends and holidays through the spill response hotline - 1-800-482-0777.

B. Public Notice. Within 15 days prior to the burial of cull potatoes under the provisions of this section, the person responsible for the burial shall provide notice to all abutting property owners, to the town clerk or other appropriate municipal official, and to the Department (Division of Solid Waste). That notice must include:

(1) The name of the person or company responsible for the burial;

(2) The location, dates of burial, estimated volume or tonnage, and estimated area involved; and

(3) A statement that the burial will comply with all standards contained in these rules.

Public notice of the filing of this type of permit-by-rule in accordance with Chapter 400, section 3.B(1)(c) is not required.

C. Standards. To qualify for a "Permit by Rule" all of the following standards must be met. Failure to meet any of these standards will require formal application to the Department for a license to develop and operate a solid waste disposal facility.

(1) No wastes other than cull potatoes and inert fill shall be disposed at the site;

(2) Cull potatoes may be buried in an approved area only one (1) time, except that a new permit-by-rule application may be filed for an area where cull potatoes were previously buried after decomposition of the potatoes placed earlier is complete.

(3) Cull potatoes must be buried in a trench that does not exceed 12 feet in width and which is separated along its length from adjacent trenches by a minimum width of soil equal to the trench width. Cull potatoes must be placed in any trench such that:

(a) the thickness of the cull potatoes does not exceed 2 feet;

(b) the separation between cull potatoes and the seasonal high water table is at least 18 inches as determined by drainage mottles, or as created by the installation of a curtain drain or a drainage ditch; and

(c) the separation between cull potatoes and bedrock is at least 24 inches.

NOTE: Cull potato burial should be as shallow as is practical to take advantage of the more biologically active upper soil horizons, in order to facilitate tuber breakdown and the uptake of nutrients in the leachate.

(4) The depth to the seasonal high water table and to bedrock must be determined by a qualified Natural Resource Conservation Service of the United States Department of Agriculture ("NRCS") soil scientist, a State of Maine certified soil scientist, or a NRCS employee under the direction of a NRCS or Maine certified soil scientist. A report including the findings of the soil scientist or NRCS employee, and the burial plan prepared by a qualified professional must be included in the permit-by-rule application.

(5) Burial must not take place within a sand and gravel deposit; in, on or over a wetland, or on land adjacent to a wetland such that material or soil may be washed into it, without obtaining a permit pursuant to 38 M.R.S.A. Section 480-E.; on a 10 year flood plain; or on any area with a slope greater than 15%. Burial over a sand and gravel deposit is permitted provided that the cull potatoes are separated from the sand and gravel by a minimum of 24 inches of loamy sand or finer textured soils.

(6) No burial shall take place within 100 feet of a classified body of surface water.

(7) There must be a minimum 100 foot buffer between the burial area and all abutting property boundaries, unless written permission is obtained from all owners of abutting property closer than 100 feet.

(8) No burial shall take place within 100 feet of any neighboring residence.

(9) No burial shall take place within 300 feet of the nearest water supply well or water supply spring unless the resident owner of the property is notified and specifically waives this standard in writing.

(10) Immediately upon delivery of the cull potatoes to the burial site, the trenches must be prepared and potatoes placed in the trenches, and the potatoes covered with 18 inches of soil, the top 4 inches of which must be suitable for plant growth. Finished grade must be maintained between 2 and 30% and must be designed to avoid ponding and to promote runoff until the cull potatoes have completely decomposed. The site must be limed, fertilized, and seeded within 7 days of burial, if covered before September 15. If covered with soil after September 15, the soil cover must be mulched sufficiently to minimize erosion of the cover soil and must be limed, fertilized, and seeded before May 15th of the following year. Lime, fertilizer, and seed shall be applied as follows:

- apply 3 tons/acre of ground limestone
- apply 800 pounds/acre of 10-20-20 fertilizer, or equivalent
- apply 21 pounds/acre of the following seed mix by drilling or broadcasting followed by cultipacking
- 10 pounds/acre tall fescue
- 10 pounds/acre creeping red fescue
- 1 pound/acre redtop

Other seed mixtures or fertilizer amounts may be substituted if recommended by the local Soil and Water Conservation District.

(11) Cull potato burial sites shall be inspected periodically for problems with stabilization, erosion, leachate breakout, and volunteer sprouting. Any observed problems shall be corrected immediately.

(12) The applicant shall keep a record containing the following information for 10 years after burial of cull potatoes under this section, unless an employee of NRCS, the Maine Department or Agriculture, or the Maine Department of Environmental Protection approves a lesser time after a site investigation. This record shall be available for inspection by employees of the State of Maine or the NRCS upon request.

(i) A complete copy of the permit-by-rule application filed with the Department.

(ii) The location(s) cull potatoes were buried.

(iii) The volume of cull potatoes buried.

(iv) Information on trench width(s), length(s) and depth(s).

(v) Distances between areas where cull potatoes were buried and the permanent features listed in sections 8.C(5),(6), (7), (8), and (9).

(vi) The date(s) when cull potatoes were buried.

BASIS STATEMENT: This rule sets forth requirements pertaining to the location, design, operation, closure and post-closure care of solid waste landfills. As required by 38 M.R.S.A. 1304, this rule is "designed to minimize pollution of the State's air, land and surfaced and ground water resources, prevent the spread of disease or other health hazards, prevent contamination of drinking water supplies and protect public health and safety". The Landfill Siting, Design, and Operation rule was last revised in 1989. This rule revision incorporates changes in State and federal laws, and reflects changes in technology as well as experienced gained since 1989 by the Department in landfill siting, design and management.

In adopting this rule, the Department has considered all relevant information available to it and has sought, whenever possible, to reduce any economic burdens to small businesses. There are no new costs imposed on municipalities and counties for implementing or complying with this rule.

40 CFR Part 258 sets forth minimum federal criteria for the location, design, operation, closure and post-closure care of municipal solid waste landfills. This chapter is consistent with the applicable sections of 40 CFR Part 258.

In addition to this basis statement, the Department has filed with the Secretary of State its response to comments received during the comment period.

AUTHORITY:38 MRSA Section 1304

EFFECTIVE DATE: November 2, 1998

APPENDIX A. REQUIREMENTS FOR EARTHWORKS TESTING PROGRAMS

1. Earthworks Testing Document

A. Introduction. This document applies to new landfill, landfill expansion and landfill closure projects involving earthworks construction. Earthworks covered by this document include barrier layers, drainage layers, and gas transmission layers. The owner/designer should recognize that this document cannot account for all site and soils conditions and that site-specific factors may require this document to be modified for an individual project. Earthworks have been broken down into basic subject areas, and recommended ASTM test methods and associated testing frequencies have been indicated. In cases where a certain ASTM test method is generally recommended, the particular methodology has been highlighted with the symbol ☑. For barrier soil layers, the recommended tests are intended for both clay and till soils. Sampling of some till soils is difficult, therefore, the testing program may need to be modified accordingly. The intent of the testing program must remain intact.

This document is not directly applicable to earthworks projects utilizing test pads. Department staff should be consulted for applicable guidance on test pad construction projects. Table 1 is provided as a summary of the testing program contained in the narrative of this document.

B. Borrow Source Characterization. Borrow source characterization is performed on the material while it is still in place at the borrow site. The necessary samples are obtained by digging test pits and/or drilling borings. The samples must have appropriate horizontal and vertical distribution to ensure that representative data will be obtained. The soil samples are tested and analyzed in the laboratory to establish that the borrow source is capable of meeting the project specifications and that an adequate quantity of material exists.

(1) Barrier soil material

(a) moisture-density relationship frequency 1/2500 cubic yards
☑ASTM D 698-91 (Standard proctor)
ASTM D 1557-91 (Modified proctor)

(b) Atterburg limits frequency 1/2500 cubic yards
☑ASTM D 4318-93

(c) Remolded hydraulic conductivity testing frequency 1/5000 cubic yards
☑ASTM D 5084-90 (Flexible wall permeameter)

(d) Grain size analysis frequency 1/2500 cubic yards
ASTM D 422-63 (Hydrometer analysis)
ASTM D 1140-92 (Soil washing method)
ASTM D 421-85 (Dry preparation of soil samples)
ASTM D 2217-85 (Wet preparation of soil samples)

(e) Moisture content frequency 1/500 cubic yards

ASTM D 2216-92 (Oven dry method)
ASTM D 3017-88 (Nuclear method)
ASTM D 4643-93 (Microwave oven method)

(2) Drainage or gas layer material

(a) Moisture-density relationship* frequency 1/2500 cubic yards
☑ASTM D 698-91 (Standard proctor)
ASTM D 1557-91 (Modified proctor)

(b) Remolded hydraulic conductivity testing frequency 1/5000 cubic yards
☑ASTM D 2434-68 (Constant head permeameter)

(c) Grain size analysis frequency 1/2500 cubic yards
ASTM D 422-63 (Hydrometer analysis)
ASTM D 1140-92 (Soil washing method)
ASTM D 421-85 (Dry preparation of soil samples)
ASTM D 2217-85 (Wet preparation of soil samples)

(d) Moisture content* frequency 1/2500 cubic yards
ASTM D 2216-92 (Oven dry method)
ASTM D 3017-88 (Nuclear densometer method)
ASTM D 4643-93 (Microwave oven method)

C. Borrow Source Construction Testing. Borrow source construction testing is performed as the material is being excavated and transported to the project site during construction. This testing is performed in order to ensure the consistency of the borrow source material being excavated, and is intended to enhance and confirm testing performed earlier during the borrow source characterization.

(1) Barrier soil material

(a) Moisture-density relationship frequency 1/2500 cubic yards
☑ASTM D 698-91 (Standard proctor)
ASTM D 1557-91 (Modified proctor)

(b) Grain size analysis frequency 1/2500 cubic yards
ASTM D 422-63 (Hydrometer analysis)
ASTM D 1140-92 (Soil washing method)
ASTM D 421-85 (Dry preparation of soil samples)
ASTM D 2217-85 (Wet preparation of soil samples)

(c) Moisture content frequency 1/500 cubic yards
ASTM D 2216-92 (Oven dry method)
ASTM D 3017-88 (Nuclear method)
ASTM D 4643-93 (Microwave oven method)

(2) Drainage or gas layer material

(a) Moisture-density relationship* frequency 1/2500 cubic yards
☑ASTM D 698-91 (Standard proctor)
ASTM D 1557-91 (Modified proctor)

(b) Grain size analysis frequency 1/1000 cubic yards
ASTM D 422-63 (Hydrometer analysis)
ASTM D 1140-92 (Soil washing method)
ASTM D 421-85 (Dry preparation of soil samples)
ASTM D 2217-85 (Wet preparation of soil samples)

(c) Moisture Content* frequency 1/500 cubic yards
ASTM D 2216-92 (Oven dry method)
ASTM D 3017-88 (Nuclear method)
ASTM D 4643-93 (Microwave oven method)

D. In-place construction testing. This testing is intended to verify that the material that has been placed at the project site meets the applicable construction specifications. These tests demonstrate the success of the actual construction techniques and borrow source material utilized.

(1) Barrier soil material

(a) Density testing frequency 9/acre/lift (liner and cover)
ASTM D 1556-90 (Sand cone method)
ASTM D 2167-84 (Rubber balloon method)
☑ASTM D 2922-81 (Nuclear method)

(b) Moisture content frequency 9/acre/lift (liner and cover)
☑ASTM D 3017-88 (Nuclear method)
frequency 1 per 9 nuclear method tests
☑ASTM D 2216-92 (Laboratory Determination of Moisture Content)

(c) Undisturbed hydraulic conductivity frequency 5/acre/lift (liner); 3/acre/lift (cover)
☑ASTM D 5084-90 (Flexible wall permeameter)

(d) Thickness frequency 5/acre/lift
No applicable ASTM standard

(e) Lift interface bonding and soil remolding (clod breakup) frequency 5/acre/lift
No applicable ASTM standard

(2) Drainage or gas layer material

(a) Density testing* frequency 5/acre/lift
ASTM D 1556-90 (Sand cone method)
ASTM D 2167-84 (Rubber balloon method)

☑ASTM D 2922-81 (Nuclear method)

(b) Moisture content* frequency 5/acre/lift
☑ASTM D 3017-88 (Nuclear method)

(c) Remolded hydraulic conductivity frequency 5/acre/lift
☑ASTM D 2434-68 (Constant head permeameter)

(d) Thickness frequency 5/acre/lift
No applicable ASTM standard

*NOTE: Leachate collection and cover system drainage systems may not require moisture content and density testing. Typically a high degree of control over compaction is not a desired feature for these systems, therefore testing would not need to include moisture content and density tests. If compaction to a specified density is a required feature for these systems, then moisture content and density testing are required. Leak detection and cover system gas transmission systems generally require controlled compaction in order to provide a firm base to construct barrier soil systems on, therefore moisture content and density testing are required for these systems.

Table 2

Type of Testing	Test	Recommended ASTM Test Method	Frequency of Testing
1. Borrow Source Characterization			
A. Barrier Soil	Moisture-Density	D 698-91	1/2500 cubic yards
	Atterburg Limits	D 4318-93	1/2500 cubic yards
	Remolded Hydraulic Conductivity	D 5084-90	1/5000 cubic yards
	Grain Size Analysis		1/2500 cubic yards
	Moisture Content		1/500 cubic yards
B. Drainage or Gas Layer	Moisture-Density*	D 698-91	1/2500 cubic yards
	Remolded Hydraulic Conductivity	D 2434-68	1/5000 cubic yards
	Grain Size		1/2500 cubic yards
	Moisture Content*		1/2500 cubic yards
2. Borrow Source Construction Testing			
A. Barrier Soil	Moisture-Density	D 698-91	1/2500 cubic yards
	Grain Size		1/2500 cubic yards
	Moisture Content		1/500 cubic yards
B. Drainage or Gas Layer	Moisture-Density*	D 698-91	1/2500 cubic yards
	Grain Size		1/1000 cubic yards
	Moisture Content*		1/500 cubic yards
3. In-Place Construction Testing			
A. Barrier Soil	Density	D 2922-81	9/acre/lift
	Moisture Content	D 3017-88	9/acre/lift
	Moisture Content	D 2216-92	1/9 Nuclear Method tests
	Undisturbed Hydraulic Conductivity	D 5084-90	5/acre/lift (liner) and 3/acre/lift (cover)
	Thickness		5/acre/lift
	Lift Interface Bonding and Soil Remolding		5/acre/lift
B. Drainage or Gas Layer	Density*	D 2922-81	5/acre/lift
	Moisture Content*	D 3017-88	5/acre/lift
	Remolded Hydraulic conductivity	D 2434-68	5/acre/lift
	Thickness		5/acre/lift

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40 CFR Subpart Cc

Subpart WWW—Standards of Performance for Municipal Solid Waste Landfills

SOURCE: 61 FR 9919, Mar. 12, 1996, unless otherwise noted.

§ 60.750 Applicability, designation of affected facility, and delegation of authority.

(a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction or modification or began accepting waste on or after May 30, 1991. Physical or operational changes made to an existing MSW landfill solely to comply with Subpart Cc of this part are not considered construction, reconstruction, or modification for the purposes of this section.

(b) The following authorities shall be retained by the Administrator and not transferred to the State: None.

§ 60.751 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act or in subpart A of this part.

Active collection system means a gas collection system that uses gas mover equipment.

Active landfill means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed. A landfill is considered closed after meeting the criteria of § 258.60 of this title.

Closure means that point in time when a landfill becomes a closed landfill.

Commercial solid waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time either

(1) A notification of intent to install a collection and control system or

(2) A collection and control system design plan is submitted in compliance with § 60.752(b)(2)(i).

Design capacity means the maximum amount of solid waste a landfill can accept, as specified in the construction or operating permit issued by the State, local, or Tribal agency responsible for regulating the landfill.

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

Emission rate cutoff means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

Enclosed combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

Flare means an open combustor without enclosure or shroud.

Gas mover equipment means the equipment (i.e., fan, blower, compressor) used to transport landfill gas through the header system.

Household waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas).

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, parts 264 and 265 of this title. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Interior well means any well or similar collection component located inside the perimeter of the landfill. A perimeter well located outside the landfilled waste is not an interior well.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this title.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

Municipal solid waste landfill emissions or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

NMOC means nonmethane organic compounds, as measured according to the provisions of § 60.754.

Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

Sludge means any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility, exclusive of the treated effluent from a wastewater treatment plant.

Solid waste means any garbage, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under 33 U.S.C. 1342, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (42 U.S.C 2011 et seq.).

Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

Sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

§ 60.752 Standards for air emissions from municipal solid waste landfills.

(a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume shall submit an initial design capacity report to the Administrator as provided in § 60.757(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions shall be documented and submitted with the report. For purposes of part 70 permitting, a landfill with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters does not require an operating permit under part 70 of this chapter. Submittal of the initial design capacity report shall fulfill the requirements of this subpart except as provided for in paragraphs (a)(1) and (a)(2) of this section.

(1) The owner or operator shall submit to the Administrator an amended design capacity report, as provided for in § 60.757(a)(3), when there is any increase in the design capacity of a landfill subject to the provisions of this subpart, whether the increase results from an increase in the area or depth of the landfill, a change in the operating procedures of the landfill, or any other means.

(2) If any increase in the maximum design capacity of a landfill exempted from the provisions of § 60.752(b) through § 60.759 of this subpart on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, the owner or operator shall comply with the provision of paragraph (b) of this section.

(b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams or 2.5 million cubic meters, shall either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in § 60.754. The NMOC emission rate shall be recalculated annually, except as provided in § 60.757(b)(1)(ii) of this subpart. The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams or 2.5 million cubic meters is subject to part 70 permitting requirements. When a landfill is closed, and either never needed control or meets the conditions for control system removal specified in § 60.752(b)(2)(v) of this subpart, a part 70 operating permit is no longer required.

(1) If the calculated NMOC emission rate is less than 50 megagrams per year, the owner or operator shall:

(i) Submit an annual emission report to the Administrator, except as provided for in § 60.757(b)(1)(ii); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in § 60.754(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed.

(A) If the NMOC emission rate, upon recalculation required in paragraph (b)(1)(ii) of this section, is equal to or greater than 50 megagrams per year, the owner or operator shall install a collection and control system in compliance with paragraph (b)(2) of this section.

(B) If the landfill is permanently closed, a closure notification shall be submitted to the Administrator as provided for in § 60.757(d).

(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the owner or operator shall:

(i) Submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year:

(A) The collection and control system as described in the plan shall meet the design requirements of paragraph (b)(2)(ii) of this section.

(B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§ 60.753 through 60.758 proposed by the owner or operator.

(C) The collection and control system design plan shall either conform with specifications for active collection systems in § 60.759 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 60.759.

(D) The Administrator shall review the information submitted under paragraphs (b)(2)(i) (A),(B) and (C) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

(ii) Install a collection and control system within 18 months of the submittal of the design plan under paragraph (b)(2)(i) of this section that effectively captures the gas generated within the landfill.

(A) An active collection system shall:

(*1*) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;

(*2*) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of:

(*i*) 5 years or more if active; or

(*ii*) 2 years or more if closed or at final grade;

(*3*) Collect gas at a sufficient extraction rate;

(*4*) Be designed to minimize off-site migration of subsurface gas.

(B) A passive collection system shall:

(*1*) Comply with the provisions specified in paragraphs (b)(2)(ii), (A) (*1*), (*2*), and (*4*) of this section.

(*2*) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners shall be installed as required under § 258.40 of this title.

(iii) Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii) (A), (B) or (C) of this section.

(A) An open flare designed and operated in accordance with § 60.18;

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume shall be established by an initial performance test, required under § 60.8 using the test methods specified in § 60.754(d).

(*1*) If a boiler or process heater is used as the control device, the landfill gas stream shall be introduced into the flame zone.

(*2*) The control device shall be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.756;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. All emissions from any atmospheric vent from the gas treatment system shall be subject to the requirements of paragraph (b)(2)(iii) (A) or (B) of this section.

(iv) Operate the collection and control device installed to comply with this subpart in accordance with the provisions of §§ 60.753, 60.755 and 60.756.

(v) The collection and control system may be capped or removed provided that all the conditions of paragraphs (b)(2)(v) (A), (B), and (C) of this section are met:

(A) The landfill shall be no longer accepting solid waste and be permanently closed under the requirements of § 258.60 of this title. A closure report shall be submitted to the Administrator as provided in § 60.757(d);

(B) The collection and control system shall have been in operation a minimum of 15 years; and

(C) Following the procedures specified in § 60.754(b) of this subpart, the calculated NMOC gas produced by the landfill shall be less than 50 megagrams per year on three successive test dates. The test dates shall be no less than 90 days apart, and no more than 180 days apart.

§ 60.753 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill gas collection and control system used to comply with the provisions of § 60.752(b)(2)(ii) of this subpart shall:

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade;

(b) Operate the collection system with negative pressure at each wellhead except under the following conditions:

(1) A fire or increased well temperature. The owner or operator shall record instances when positive pressure occurs in efforts to avoid a fire. These records shall be submitted with the annual reports as provided in § 60.757(f)(1);

(2) Use of a geomembrane or synthetic cover. The owner or operator shall develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes shall be approved by the Administrator;

(c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 °C and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent. The owner or operator may establish a higher operating temperature, nitrogen, or oxygen value at a particular well. A higher operating value demonstration shall show supporting data that the elevated parameter does not cause fires or significantly inhibit anaerobic decomposition by killing methanogens.

(1) The nitrogen level shall be determined using Method 3C, unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart.

(2) Unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A except that:

(i) The span shall be set so that the regulatory limit is between 20 and 50 percent of the span;

(ii) A data recorder is not required;

(iii) Only two calibration gases are required, a zero and span, and ambient air may be used as the span;

(iv) A calibration error check is not required;

(v) The allowable sample bias, zero drift, and calibration drift are ±10 percent.

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator shall conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30 meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.752(b)(2)(iii). In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour; and

(f) Operate the control or treatment system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirement in paragraphs (b), (c), or (d) of this section are not met, corrective action shall be taken as specified in § 60.752(a) (3) through (5) or § 60.755(c) of this subpart. If corrective actions are taken as specified in § 60.755, the monitored exceedance is not a violation of the operational requirements in this section.

§ 60.754 Test methods and procedures.

(a)(1) The landfill owner or operator shall calculate the NMOC emission rate using either the equation provided in paragraph (a)(1)(i) of this section or the equation provided in paragraph (a)(1)(ii) of this section. The values to be used in both equations are 0.05 per year for k, 170 cubic meters per megagram for Lo, and 4,000 parts per million by volume as hexane for the C_{NMOC}.

(i) The following equation shall be used if the actual year-to-year solid waste acceptance rate is known.

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where,

M_{NMOC}=Total NMOC emission rate from the landfill, megagrams per year

k=methane generation rate constant, year^{-1}

L_o=methane generation potential, cubic meters per megagram solid waste

M_i=mass of solid waste in the i^{th} section, megagrams

t_i=age of the i^{th} section, years

C_{NMOC}=concentration of NMOC, parts per million by volume as hexane

3.6×10^{-9}=conversion factor

The mass of nondegradable solid waste may he subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if the documentation provisions of § 60.758(d)(2) are followed.

(ii) The following equation shall be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{NMOC}=2L_o R (e^{-kc} - e^{-kt}) (C_{NMOC}) (3.6 \times 10^{-9})$$

where,

M_{NMOC}=mass emission rate of NMOC, megagrams per year

L_o=methane generation potential, cubic meters per megagram solid waste

R=average annual acceptance rate, megagrams per year

k=methane generation rate constant, year^{-1}

t=age of landfill, years

C_{NMOC}=concentration of NMOC, parts per million by volume as hexane

c=time since closure, years. For active landfill c = O and e^{-kc}=1

3.6×10^{-9}=conversion factor

The mass of nondegradable solid waste may be subtracted from the average annual acceptance rate when calculating a value for R, if the documentation provisions of § 60.758(d)(2) are followed.

(2) *Tier 1.* The owner or operator shall compare the calculated NMOC mass emission rate to the standard of 50 megagrams per year.

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 50 megagrams per year, then the landfill owner shall submit an emission rate report as provided in § 60.757(b)(1), and shall recalculate the NMOC mass emission rate annually as required under § 60.752(b)(1).

(ii) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, then the landfill owner shall either comply with § 60.752(b)(2), or determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in paragraph (a)(3) of this section.

(3) *Tier 2.* The landfill owner or operator shall determine the NMOC concentration using the following sampling procedure. The landfill owner or operator shall install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25C of appendix A of this part or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42). If composite sampling is used, equal volumes shall be taken from each sample probe. If more than the required number of samples are taken, all samples shall be used in the analysis. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(i) The landfill owner or operator shall recalculate the NMOC mass emission rate using the equations provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using the average NMOC concentration from the collected samples instead of the default value in the equation provided in paragraph (a)(1) of this section.

(ii) If the resulting mass emission rate calculated using the site-specific NMOC concentration is equal to or greater than 50 megagrams per year, then the landfill owner or operator shall either comply with § 60.752(b)(2), or determine the site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the procedure specified in paragraph (a)(4) of this section.

(iii) If the resulting NMOC mass emission rate is less than 50 megagrams per year, the owner or operator shall submit a periodic estimate of the emission rate report as provided in § 60.757(b)(1) and retest the site-specific NMOC concentration every 5 years using the methods specified in this section.

(4) *Tier 3.* The site-specific methane generation rate constant shall be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator shall estimate the NMOC mass emission rate using equations in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using a site-specific methane generation rate constant k, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator shall compare the resulting NMOC

mass emission rate to the standard of 50 megagrams per year.

(i) If the NMOC mass emission rate as calculated using the site-specific methane generation rate and concentration of NMOC is equal to or greater than 50 megagrams per year, the owner or operator shall comply with § 60.752(b)(2).

(ii) If the NMOC mass emission rate is less than 50 megagrams per year, then the owner or operator shall submit a periodic emission rate report as provided in § 60.757(b)(1) and shall recalculate the NMOC mass emission rate annually, as provided in § 60.757(b)(1) using the equations in paragraph (a)(1) of this section and using the site-specific methane generation rate constant and NMOC concentration obtained in paragraph (a)(3) of this section. The calculation of the methane generation rate constant is performed only once, and the value obtained is used in all subsequent annual NMOC emission rate calculations.

(5) The owner or operator may use other methods to determine the NMOC concentration or a site-specific k as an alternative to the methods required in paragraphs (a)(3) and (a)(4) of this section if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).

(b) After the installation of a collection and control system in compliance with § 60.755, the owner or operator shall calculate the NMOC emission rate for purposes of determining when the system can be removed as provided in § 60.752(b)(2)(v), using the following equation:

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC}$$

where,

M_{NMOC} = mass emission rate of NMOC, megagrams per year

Q_{LFG} = flow rate of landfill gas, cubic meters per minute

C_{NMOC} = NMOC concentration, parts per million by volume as hexane

(1) The flow rate of landfill gas, Q_{LFG}, shall be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control device using a gas flow measuring device calibrated according to the provisions of section 4 of Method 2E of appendix A of this part.

(2) The average NMOC concentration, C_{NMOC}, shall be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in Method 25C or Method 18 of appendix A of this part. If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42). The sample location on the common header pipe shall be before any condensate removal or other gas refining units. The landfill owner or operator shall divide the NMOC concentration from Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator as provided in § 60.752(b)(2)(i)(B).

(c) The owner or operator of each MSW landfill subject to the provisions of this subpart shall estimate the NMOC emission rate for comparison to the PSD major source and significance levels in §§ 51.166 or 52.21 of this chapter using AP–42 or other approved measurement procedures. If a collection system, which complies with the provisions in § 60.752(b)(2) is already installed, the owner or operator shall estimate the NMOC emission rate using the procedures provided in paragraph (b) of this section.

(d) For the performance test required in § 60.752(b)(2)(iii)(B), Method 25 or Method 18 of appendix A of this part shall be used to determine compliance with 98 weight-percent efficiency or the 20 ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 60.752(b)(2)(i)(B). If using Method 18 of appendix A of this part, the minimum list of compounds to be tested shall be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42). The following equation shall be used to calculate efficiency:

$$\text{Control Efficiency} = (NMOC_{in} - NMOC_{out})/(NMOC_{in})$$

where,

$NMOC_{in}$ = mass of NMOC entering control device

$NMOC_{out}$ = mass of NMOC exiting control device

§ 60.755 Compliance provisions.

(a) Except as provided in § 60.752(b)(2)(i)(B), the specified methods in paragraphs (a)(1) through (a)(6) of this section shall be used to determine whether the gas collection system is in compliance with § 60.752(b)(2)(ii).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.752(b)(2)(ii)(A)(*1*), one of the following equations shall be used. The k and L_o kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP–42) or other site specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 60.754(a)(4), the value of k determined from the test shall be used. A value of no more than 15 years shall be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$Q_m = 2L_o R (e^{-kc} \cdot e^{-kt})$

where,

Q_m = maximum expected gas generation flow rate, cubic meters per year

L_o = methane generation potential, cubic meters per megagram solid waste

R = average annual acceptanee rate, megagrams per year

k = methane generation rate constant, $year^{-1}$

t = age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years

c = time since closure, years (for an active landfill c = O and $e^{-kc} = 1$)

(ii) For sites with known year-to-year solid waste acceptance rate:

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where,

Q_M=maximum expected gas generation flow rate, cubic meters per year

k=methane generation rate constant, $year^{-1}$

L_o=methane generation potential, cubic meters per megagram solid waste

M_i=mass of solid waste in the i^{th} section, megagrams

t_i=age of the i^{th} section, years

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, the equations in paragraphs (a)(1) (i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using the equations in paragraphs (a)(1) (i) or (ii) or other methods shall be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.752(b)(2)(ii)(A)(*2*), the owner or operator shall design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.752(b)(2)(ii)(A)(*3*), the owner or operator shall measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under § 60.753(b). If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

(4) Owners or operators are not required to install additional wells as required in paragraph (a)(3) of this section during the first 180 days after gas collection system start-up.

(5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator shall monitor each well monthly for temperature and nitrogen or oxygen as provided in § 60.753(c). If a well exceeds one of these operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards.

(6) An owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(ii)(A)(*4*) through the use of a collection system not conforming to the specifications provided in § 60.759 shall provide information satisfactory to the Administrator as specified in § 60.752(b)(2)(i)(C) demonstrating that off-site migration is being controlled.

(b) For purposes of compliance with § 60.753(a), each owner or operator of a controlled landfill shall place each well or design component as specified in the approved design plan as provided in § 60.752(b)(2)(i). Each well shall be installed within 60 days of the date in which the initial solid waste has been in place for a period of:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade.

(c) The following procedures shall be used for compliance with the surface methane operational standard as provided in § 60.753(d).

(1) After installation of the collection system, the owner or operator shall monitor surface concentrations of methane along the entire perimeter of the collection area and along a serpentine pattern spaced 30 meters apart (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.

(2) The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at

a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring shall be performed in accordance with section 4.3.1 of Method 21 of appendix A of this part, except that the probe inlet shall be placed within 5 to 10 centimeters of the ground. Monitoring shall be performed during typical meteorological conditions.

(4) Any reading of 500 parts per million or more above background at any location shall be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4) (i) through (v) of this section shall be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.753(d).

(i) The location of each monitored exceedance shall be marked and the location recorded.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section shall be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this section shall be re-monitored 1 month from the initial exceedance. If the 1-month remonitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) shall be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.

(5) The owner or operator shall implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section shall comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of appendix A of this part, except that "methane" shall replace all references to VOC.

(2) The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.

(3) To meet the performance evaluation requirements in section 3.1.3 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 4.4 of Method 21 of appendix A of this part shall be used.

(4) The calibration procedures provided in section 4.2 of Method 21 of appendix A of this part shall be followed immediately before commencing a surface monitoring survey.

(e) The provisions of this subpart apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems and shall not exceed 1 hour for treatment or control devices.

§ 60.756 Monitoring of operations.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator seeking to comply with § 60.752(b)(2)(ii)(A) for an active gas collection system shall install a sampling port and a thermometer or other temperature measuring device at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.755(a)(3); and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in § 60.755(a)(5); and

(3) Monitor temperature of the landfill gas on a monthly basis as provided in § 60.755(a)(5).

(b) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an enclosed combustor shall calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment.

(1) A temperature monitoring device equipped with a continuous recorder and having an accuracy of ±1 percent of the temperature being measured expressed in degrees Celsius or ±0.5 °C, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity greater than 44 megawatts.

(2) A gas flow rate measuring device that provides a measurement of gas flow to or bypass of the control device. The owner or operator shall either:

(i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(c) Each owner or operator seeking to comply with § 60.752(b)(2)(iii) using an open flare shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

(1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

(2) A device that records flow to or bypass of the flare. The owner or operator shall either:

(i) Install, calibrate, and maintain a gas flow rate measuring device that shall record the flow to the control device at least every 15 minutes; or

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism shall be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(d) Each owner or operator seeking to demonstrate compliance with § 60.752(b)(2)(iii) using a device other than an open flare or an enclosed combustor shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator shall review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 60.759 or seeking to monitor alternative parameters to those required by § 60.753 through § 60.756 shall provide information satisfactory to the Administrator as provided in § 60.752(b)(2)(i)(B) and (C) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with § 60.755(c), shall monitor surface concentrations of methane according to the instrument specifications and procedures provided in § 60.755(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

§ 60.757 Reporting requirements.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator subject to the requirements of this subpart shall submit an initial design capacity report to the Administrator.

(1) The initial design capacity report shall fulfill the requirements of the notification of the date construction is commenced as required under § 60.7(a)(1) and shall be submitted no later than the earliest day from the following:

(i) 90 days of the issuance of the State, Local, Tribal, or RCRA construction or operating permit; or

(ii) 30 days of the date of construction or reconstruction as defined under § 60.15; or

(iii) 30 days of the initial acceptance of solid waste.

(2) The initial design capacity report shall contain the following information:

(i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the provisions of the State, local, Tribal, or RCRA construction or operating permit;

(ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the State or local construction or RCRA permit, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity shall be calculated using good engineering practices. The calculations shall be provided, along with such parameters as depth of solid waste, solid waste acceptance rate, and compaction practices as part of the report. The State, Tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) An amended design capacity report shall be submitted to the Administrator providing notification of any increase in the design capacity of the landfill, whether the increase results from an in-

crease in the permitted area or depth of the landfill, a change in the operating proeedures, or any other means which results in an increase in the maximum design capacity of the landfill above 2.5 million megagrams or 2.5 million cubic meters. The amended design capacity report shall be submitted within 90 days of the issuance of an amended construction or operating permit, or the placement of waste in additional land, or the change in operating procedures which will result in an increase in maximum design capacity, whichever oceurs first.

(b) Each owner or operator subject to the requirements of this subpart shall submit an NMOC emission rate report to the Administrator initially and annually thereafter, except as provided for in paragraphs (b)(1)(ii) or (b)(3) of this section. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report shall contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 60.754(a) or (b), as applicable.

(i) The initial NMOC emission rate report shall be submitted within 90 days of the date waste acceptance commences and may be combined with the initial design capaeity report required in paragraph (a) of this section. Subsequent NMOC emission rate reports shall be submitted annually thereafter, except as provided for in paragraphs (b)(1)(ii) and (b)(3) of this section.

(ii) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 50 megagrams per year in eaeh of the next 5 consecutive years, the owner or operator may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based shall be provided to the Administrator. This estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to the Administrator. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(2) The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) Eaeh owner or operator subject to the requirements of this subpart is exempted from the requirements of paragraphs (b)(1) and (2) of this section, after the installation of a collection and control system in compliance with § 60.752(b)(2), during sueh time as the collection and control system is in operation and in compliance with § § 60.753 and 60.755.

(c) Each owner or operator subject to the provisions of § 60.752(b)(2)(i) shall submit a collection and control system design plan to the Administrator within 1 year of the first report, required under paragraph (b) of this section, in whieh the emission rate exceeds 50 megagrams per year, except as follows:

(1) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.754(a)(3) and the resulting rate is less than 50 megagrams per year, annual periodic reporting shall be resumed, using the Tier 2 determined site-speeifie NMOC concentration, until the caleulated emission rate is equal to or greater than 50 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emissiou rate based on NMOC sampling and analysis, shall be submitted within 180 days of the first calculated exceedance of 50 megagrams per year.

(2) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate coustant (k), as provided in Tier 3 in § 60.754(a)(4), and the resulting NMOC emission rate is less than 50 Mg/yr, annual periodic reporting shall be resumed. The resulting site-specific methane generation rate constant (k) shall be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.754(a)(4) and the resulting site-specific methane generation rate constant (k) shall be submitted to the Administrator within 1 year of the first calculated emission rate exceeding 50 megagrams per year.

(d) Each owner or operator of a controlled landfill shall submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4).

(e) Eaeh owner or operator of a controlled landfill shall submit an equipment removal report to

the Administrator 30 days prior to removal or cessation of operation of the control equipment.

(1) The equipment removal report shall contain all of the following items:

(i) A copy of the closure report submitted in accordance with paragraph (d) of this section;

(ii) A copy of the initial performance test report demonstrating that the 15 year minimum control period has expired; and

(iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 megagrams or greater of NMOC per year.

(2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 60.752(b)(2)(v) have been met.

(f) Each owner or operator of a landfill seeking to comply with § 60.752(b)(2) using an active collection system designed in accordance with § 60.752(b)(2)(ii) shall submit to the Administrator annual reports of the recorded information in (f)(1) through (f)(6) of this paragraph. The initial annual report shall be submitted within 180 days of installation and start-up of the collection and control system, and shall include the initial performance test report required under § 60.8. For enclosed combustion devices and flares, reportable exceedances are defined under § 60.758(c).

(1) Value and length of time for exceedance of applicable parameters monitored under § 60.756(a), (b), (c), and (d).

(2) Description and duration of all periods when the gas stream is diverted from the control device through a bypass line or the indication of bypass flow as specified under § 60.756.

(3) Description and duration of all periods when the control device was not operating for a period exceeding 1 hour and length of time the control device was not operating.

(4) All periods when the collection system was not operating in excess of 5 days.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.753(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month.

(6) The date of installation and the location of each well or collection system expansion added pursuant to paragraphs (a)(3), (b), and (c)(4) of § 60.755.

(g) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall include the following information with the initial performance test report required under § 60.8:

(1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

(2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

(3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;

(4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area; and

(5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

(6) The provisions for the control of off-site migration.

§ 60.758 Recordkeeping requirements.

Except as provided in § 60.752(b)(2)(i)(B),

(a) Each owner or operator of an MSW landfill subject to the provisions of § 60.752(b) shall keep for at least 5 years up-to-date, readily accessible, on-site records of the maximum design capacity, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Each owner or operator of a controlled landfill shall keep up-to-date, readily accessible records for the life of the control equipment of the data listed in paragraphs (b)(1) through (b)(4) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removal.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(ii):

(i) The maximum expected gas generation flow rate as calculated in § 60.755(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.759(a)(1).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity greater than 44 megawatts:

(i) The average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test.

(ii) The percent reduction of NMOC determined as specified in § 60.752(b)(2)(iii)(B) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(B)(*1*) through use of a boiler or process heater of any size: a description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.752(b)(2)(iii)(A) through use of an open flare, the flare type (i.e., steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.

(c) Each owner or operator of a controlled landfill subject to the provisions of this subpart shall keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.756 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that shall be recorded and reported under § 60.757(f):

(i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal unit per hour) or greater, all 3-hour periods of operation during which the average combustion temperature was more than 28 oC below the average combustion temperature during the most recent performance test at which compliance with § 60.752(b)(2)(iii) was determined.

(ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3)(i) of this section.

(2) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible continuous records of the indication of flow to the control device or the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 60.756.

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 60.752(b)(2)(iii) shall keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other State, local, Tribal, or Federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of an open flare shall keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 60.756(e), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(d) Each owner or operator subject to the provisions of this subpart shall keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.

(1) Each owner or operator subject to the provisions of this subpart shall keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.755(b).

(2) Each owner or operator subject to the provisions of this subpart shall keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.759(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.759(a)(3)(ii).

(e) Each owner or operator subject to the provisions of this subpart shall keep for at least 5 years up-to-date, readily accessible records of all collection and control system exceedances of the operational standards in § 60.753, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

§ 60.759 Specifications for active collection systems.

(a) Each owner or operator seeking to comply with § 60.752(b)(2)(i) shall site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the fol-

lowing procedures unless alternative procedures have been approved by the Administrator as provided in § 60.752(b)(2)(i)(C) and (D):

(1) The collection devices within the interior and along the perimeter areas shall be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues shall be addressed in the design: depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandibility, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, and resistance to the refuse decomposition heat.

(2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section shall address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.

(3) The placement of gas collection devices determined in paragraph (a)(1) of this section shall control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (a)(3)(ii) of this section.

(i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 60.758(d). The documentation shall provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and shall be provided to the Administrator upon request.

(ii) Any nonproductive area of the landfill may be exeluded from control, provided that the total of all exeluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material shall be documented and provided to the Administrator upon request. A separate NMOC emissions estimate shall be made for each section proposed for exclusion, and the sum of all such sections shall be compared to the NMOC emissions estimate for the entire landfill. Emissions from each section shall be computed using the following equation:

$$Q_i = 2\ k\ L_o\ M_i\ (e^{-kt_i})\ (C_{NM}OC)\ (3.6 \times 10^{-9})$$

where,

Q_i = NMOC emission rate from the i^{th} section, megagrams per year

k = methane generation rate constant, $year^{-1}$

L_o = methane generation potential, cubic meters per megagram solid waste

M_i = mass of the degradable solid waste in the i^{th} section, megagram

t_i = age of the solid waste in the i^{th} section, years

C_{NMOC} = concentration of nonmethane organic compounds, parts per million by volume

3.6×10^{-9} = conversion factor

(iii) The values for k, L_o, and $C_{NM}OC$ determined in field testing shall be used, if field testing has been performed in determining the NMOC emission rate or the radii of influence. If field testing has not been performed, the default values for k, L_o and $C_{NM}OC$ provided in § 60.754(a)(1) shall be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components shall be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system shall extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors shall be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations shall be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells shall be placed so as not to endanger underlying liners and shall address the occurrence of water within the landfill. Holes and trenches construeted for piped wells and horizontal collectors shall be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices shall be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(c) Each owner or operator seeking to comply with § 60.752(b)(2)(i)(A) shall convey the landfill gas to a control system in compliance with § 60.752(b)(2)(iii) through the collection header

pipe(s). The gas mover equipment shall be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(1) For existing collection systems, the flow data shall be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section shall be used.

(2) For new collection systems, the maximum flow rate shall be in accordance with § 60.755(a)(1).

29 CFR 1910.1001(j)

The employer shall ensure that lunchroom facilities have a positive pressure, filtered air supply, and are readily accessible to employees.

(i)(3)(iii)
The employer shall ensure that employees who work in areas where their airborne exposure is above the PEL and/or excursion limit wash their hands and faces prior to eating, drinking or smoking.

(i)(3)(iv)
The employer shall ensure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface asbestos fibers have been removed from the clothing or equipment by vacuuming or other method that removes dust without causing the asbestos to become airborne.

(i)(4)
Smoking in work areas. The employer shall ensure that employees do not smoke in work areas where they are occupationally exposed to asbestos because of activities in that work area.

..1910.1001(j)
(j)
Communication of hazards to employees -- Introduction. This section applies to the communication of information concerning asbestos hazards in general industry to facilitate compliance with this standard. Asbestos exposure in general industry occurs in a wide variety of industrial and commercial settings. Employees who manufacture asbestos-containing products may be exposed to asbestos fibers. Employees who repair and replace automotive brakes and clutches may be exposed to asbestos fibers. In addition, employees engaged in housekeeping activities in industrial facilities with asbestos product manufacturing operations, and in public and commercial buildings with installed asbestos containing materials may be exposed to asbestos fibers. Most of these workers are covered by this general industry standard, with the exception of state or local governmental employees in non-state plan states. It should be noted that employees who perform housekeeping activities during and after construction activities are covered by the asbestos construction standard, 29 CFR 1926.1101, formerly 1926.58. However, housekeeping employees, regardless of industry designation, should know whether building components they maintain may expose them to asbestos. The same hazard communication provisions will protect employees who perform housekeeping operations in all three asbestos standards; general industry, construction, and shipyard employment. As noted in the construction standard, building owners are often the only and/or best source of information concerning the presence of previously installed asbestos containing building materials. Therefore they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section.

(j)(1)
Installed Asbestos Containing Material. Employers and building owners are required to treat installed TSI and sprayed on and troweled-on surfacing materials as ACM in buildings constructed no later than 1980 for purposes of this standard. These materials are designated "presumed ACM or PACM", and are defined in paragraph (b) of this section. Asphalt and vinyl flooring material installed no later than 1980 also must be treated as asbestos-containing. The employer or building owner may demonstrate that PACM and flooring material do not contain asbestos by complying with paragraph (j)(8)(iii) of this section.

(j)(2)

Duties of employers and building and facility owners.

(j)(2)(i)
Building and facility owners shall determine the presence, location, and quantity of ACM and/or PACM at the work site. Employers and building and facility owners shall exercise due diligence in complying with these requirements to inform employers and employees about the presence and location of ACM and PACM.

..1910.1001(j)(2)(ii)
(j)(2)(ii)
Building and facility owners shall maintain records of all information required to be provided pursuant to this section and/or otherwise known to the building owner concerning the presence, location and quantity of ACM and PACM in the building/facility. Such records shall be kept for the duration of ownership and shall be transferred to successive owners.

(j)(2)(iii)
Building and facility owners shall inform employers of employees, and employers shall inform employees who will perform housekeeping activities in areas which contain ACM and/or PACM of the presence and location of ACM and/or PACM in such areas which may be contacted during such activities.

(j)(3)
Warning signs.

(j)(3)(i)
Posting. Warning signs shall be provided and displayed at each regulated area. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area.

(j)(3)(ii)
Sign specifications.

(j)(3)(ii)(A)
The warning signs required by paragraph (j)(3) of this section shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY

(j)(3)(ii)(B)
In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

RESPIRATORS AND PROTECTIVE
CLOTHING
ARE REQUIRED IN THIS AREA

(j)(3)(iii)
[Reserved]

..1910.1001(j)(3)(iv)
(j)(3)(iv)
The employer shall ensure that employees working in and contiguous to

regulated areas comprehend the warning signs required to be posted by paragraph (j)(3)(i) of this section. Means to ensure employee comprehension may include the use of foreign languages, pictographs and graphics.

(j)(3)(v)
At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain ACM and/or PACM, the building owner shall post signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

(j)(4)
Warning labels.

(j)(4)(i)
Labeling. Warning labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers. When a building owner or employer identifies previously installed ACM and/or PACM, labels or signs shall be affixed or posted so that employees will be notified of what materials contain ACM and/or PACM. The employer shall attach such labels in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical room/areas. Signs required by paragraph (j)(3) of this section may be posted in lieu of labels so long as they contain information required for labelling.

..1910.1001(j)(4)(ii)
(j)(4)(ii)
Label specifications. The labels shall comply with the requirements of 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard, and shall include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

(j)(5)
Material safety data sheets. Employers who are manufacturers or importers of asbestos or asbestos products shall comply with the requirements regarding development of material safety data sheets as specified in 29 CFR 1910.1200(g) of OSHA's Hazard Communication standard, except as provided by paragraph (j)(6) of this section.

(j)(6)
The provisions for labels required by paragraph (j)(4) of this section or for material safety data sheets required by paragraph (j)(5) of this section do not apply where:

(j)(6)(i)
Asbestos fibers have been modified by a bonding agent, coating, binder, or other material provided that the manufacturer can demonstrate that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of fibers of asbestos in excess of the TWA permissible exposure level and/or excursion limit will be released or

Blank

CHAPTER 401 - LANDFILL SITING, DESIGN, AND OPERATION

Comments were received from the following:

(BT)	Barry Timson, Timson & Associates, Inc.
(CES)	Shawn Small, Civil Engineering Services, Inc.
(CI)	Mark Draper, Champion International
(CPI)	Dana Fowler, City of Presque Isle
(DCP)	Ann Thayer, Dragon Cement Products
(DOA)	David Rocque, Maine Department of Agriculture
(DOT)	Robert Ballew, Maine Department of Transportation
(JC)	Jim Catlin, Town of Brownville
(JJ)	Jane Jones, Town of Milo
(MPPA)	Mic LeBel, Maine Pulp and Paper Association
(RD)	Robert Dunning, citizen
(REW)	Richard E. Wardwell, P.E.
(SGA)	Mark St. Germaine, St. Germaine Associates
(SLG)	Sandy L. Guay, citizen
(SME)	Peter Maher, Sevee & Maher Engineers
(TOJ)	Robert Farrell, Greg McVeigh, Linda R. Russell, and Mark Dawson; Town of Jay

Section 1. General Licensing Requirements

COMMENT: §1.C(1)(c) Time of travel to sensitive receptors includes two different standards (6 and 3 years). Why the difference for the same leachate? (TOJ)

RESPONSE: The time of travel standards are designed to afford a sufficient length of time to detect and remediate any migration of leachate away from the landfill and leachate management structures prior to reaching sensitive receptors. Much of the leachate management system is visible, and we are requiring annual inspection of the leachate management systems. We therefore expect a much shorter detection time for any migration from the leachate management system, and so are comfortable that a lesser standard is appropriate for this system than for the landfill. No change to the rule.

COMMENT: §1.C(1)(d). Delete the word "unreasonable" as there is no definition of what a "reasonable" threat to a sensitive receptor is. (TOJ)

RESPONSE: This wording reflects the statutory language in 38 MRSA §1310-N(1-A) and §1310-N(2-A & C). Specifically, the department is prohibited from issuing a license for a solid waste facility if the facility poses an unreasonable threat to the quality of a classified body of surface water, to a significant sand and gravel aquifer or to an underlying fractured bedrock aquifer. To demonstrate that this standard is met the rule requires the applicant to perform a thorough assessment

of ground water flow and contaminant transport into these aquifers and to surface water. To ensure that the rule is clear on this issue, we have added an operational performance standard to section 4 that operating landfills must not pose an unreasonable threat to sensitive receptors.

COMMENT: §1.C(2)(a). Change this prohibitive siting criteria to a minimum of 1,000 feet between the waste handling area and Class AA or Class SA waters; however this distance can increase after analysis of the site's geology, hydrology, and the nature of the waste. (TOJ)

RESPONSE: This criterion is a minimum. Based on the analysis of the site's geology, hydrology, and the nature of the waste, the Department has the authority to require additional measures to be taken to protect these high-quality surface waters if necessary to meet the performance standards in §1.C. No change to the rule.

COMMENT: §1.C(2)(a). Prohibitive siting criteria - Within 1000' of AA and SA waters too restrictive - recommend making this a "restrictive" siting criteria. (MPPA)

RESPONSE: These waters are the highest quality in the state and as such should be most highly protected. Very little area within the state is affected by this prohibition and it therefore should not cause problems in siting a landfill. No change to the rule.

COMMENT: §1.C.(2)(b). The prohibitive criterion 300 feet from a significant sand/gravel aquifer should be 300 feet from any significant aquifer. 300 feet should be a minimum, subject to site analysis. (TOJ)

RESPONSE: This criterion is a minimum. Significant sand and gravel aquifers are commonly and easily accessed for use as a drinking water supply. The sand and gravel aquifers in Maine have been mapped and encompass finite areas, so landfills can be sited to remain at least 300' away. Other significant aquifers (i.e. significant bedrock aquifers) will be identified during the site assessment and appropriate siting and engineering restrictions will be placed on the landfill development to ensure that the facility meets the performance standards. No change to the rule.

COMMENT: §1.C.(3)(a)(i)&(ii). It is not clear why 300 feet or 100 yards is necessary for public roads and property lines. Screening with fence, berm, buildings all could be equally effective. (TOJ)

RESPONSE: Screening is not the only potential issue posed by the development of a landfill in close proximity to public roads and property boundaries. This 300' setback allows room to implement a ground water monitoring program and to perform remediation if the need should arise. No change to the rule.

COMMENT: §1.C.(3)(a)(iv). Re: the restrictive siting criterion of 100 feet setback from sand/gravel deposits: this distance is not compatible with the way the definition of a sand/gravel deposit is written. Sand/gravel deposits are equated with

sand/gravel aquifers or recharge to these aquifers. Just being 100 feet from a sand/gravel deposit is irrelevant, what is important is that sand/gravel deposit is a significant aquifer or part of a recharge area to a significant aquifer. (TOJ)

RESPONSE: We agree. This concept appeared in the draft of Chapter 400 as a modifier to the definition of sand and gravel deposit. We realize from this comment that the concept was misplaced, so have removed it from Chapter 400. We are maintaining this setback as a restrictive criterion, and are clarifying the intent by including the modifier removed from the Chapter 400 definition. This clarifies that any sand and gravel deposit must be assessed to determine whether it is part of a significant sand and gravel aquifer or part of the recharge area to a significant sand and gravel aquifer.

COMMENT: §1.C(3)(a)(iv) & (v). Both the setback from stratified sand and gravel deposits and the setback between the waste handling area and classified surface water criteria have been revised from a setback of 300 feet, in the current rules, to 100 feet. Has the Department determined the 100 foot setback is sufficient to protect public health and the environment? (TOJ)

RESPONSE: In conjunction with decreasing the setbacks in relation to the 1989 rule, we have included performance standards that the facility must meet. These setbacks are included as restrictive criteria in order to flag potential problem areas for intensive study during the site assessment. Siting, design, and operational requirements can then be placed on the facility to sufficiently protect public health and the environment. No change to the rule.

COMMENT: §1.C(3)(a)(iv). What is the rationale for the 1000' setback between the solid waste boundary and any water supply wells or water supply springs? The setback from any pumping well necessary to protect the well from contamination is totally dependent on the geology or hydrogeology under the landfill over the long term. 10 feet may be sufficient in some cases and 10 miles would not be enough in others. (TOJ)

RESPONSE: This setback is a restrictive criterion rather than a prohibitive one specifically to accommodate those situations where, dependent on the site geology or hydrogeology a lesser standard may be appropriate. The performance standards will determine when a greater distance or additional engineering measures will be needed. No change to the rule.

COMMENT: §1.C(3)(a)(vi). A restrictive criterion requires 1000' between the solid waste boundary and water supply wells and springs at the time PIR is filed. Recommend modifying this with "not owned by the applicant" after the word "spring". (MPPA)

RESPONSE: We agree that this restriction is inappropriate for wells owned by the applicant, but believe that it is appropriate for springs, as springs are by definition waters of the state that are likely to cross property lines. We have changed the language to create a separate restrictive criterion for setbacks to wells that are not owned

by the applicant but retained the setback to springs even if they are on property owned by the applicant.

COMMENT: §1.C(3)(b). The siting criteria requiring the area within the solid waste boundary to be located on soils with an undisturbed hydraulic conductivity of less than or equal to $1X10^{-5}$ cm/sec. is a good one. This proposed hydraulic conductivity should not be restricted to just being under the waste, but should extend outward sufficient distances to include any time of travel requirements that are necessary to protect the environment. This should include natural attenuation zones, distances from significant acquires, pumping wells, springs and surface water. (TOJ)

RESPONSE: The characteristics of the soils around the solid waste disposal area must be sufficient to meet the performance standards in §1.C, including the time of travel requirements necessary to protect the environment. No change to the rule.

COMMENT: §1.C(3)(d). 100 year floodplain maps are often inaccurate due to changing climatic conditions, land use patterns, the dredging or siltation of streams, etc. For a land use change as permanent as the establishment of a landfill, some provision ought to be made to ensure the current accuracy and future likelihood of the 100 year floodplain determination. This would best be done early in the application procedure, long before public hearing. (RD)

RESPONSE: The 100-year floodplain maps are utilized during the initial phases of siting the landfill, i.e., as a part of the Preliminary Information Report. Much more extensive site work is then required during the site assessment that will reveal any inaccuracies in floodplain mapping. This information will then be used in determining any final footprint proposal and decision. No change to the rule.

COMMENT: §1.C.(3)(d)(e) & (g). These criteria meet the prohibitive siting criteria and as such should be part of C(2). (TOJ)

RESPONSE: Proximity to a 100-year floodplain, unstable area, or significant wildlife habitat is not addressed by the prohibitive criteria, which is why they are included here. No change to the rule.

COMMENT: §1.C(3)(f). Change the restrictive criterion from not located within 250' of lakes categorized as "outstanding quality", "Moderate/sensitive quality" or "poor/restorable quality" in conformance with the 1996 Water Quality Report to the Chapter 502 list of lakes "Most at Risk". (MPPA)

RESPONSE: This criterion was proposed prior to the adoption of Chapters 500 and 502 in order to address the issue of phosphorus control into lakes whose water quality is most likely to be compromised by phosphorus-laden runoff. To better achieve this goal, we have deleted this restrictive siting criteria and replaced it with a general requirement at §1.D(5) that any construction comply with the specific stormwater control quantity and quality standards in Chapter 500 of the Department's rules.

COMMENT: §1.C(3)(f). Landfilling within the shore land zone should be prohibited. This criteria is a buffer and should be part of C(3)(a). (TOJ)

RESPONSE: Appropriate activities within the shoreland zone are covered by state and local shoreland zoning rules and ordinances. No change to the rule.

COMMENT: §2, §3, §4, and §5. Almost 50 plans and programs to site, operate, and close a landfill - too many! Recommend plans be grouped into 3 categories: (a) operational issues, (b) construction issues, and (c) environmental monitoring issues. (MPPA, CI)

RESPONSE: The Department has carefully reviewed each plan that is required and the contents of those plans to ensure that the plans are essential to proper design, construction and operation of a landfill. The plans are logically grouped in design, construction, and operations. Even though siting, design, construction, and operation of a landfill is a very complex geologic and engineering project this chapter requires significantly less than "50 plans and programs". There are many instances a plan is called for in design, and then the same plan is referenced under construction and/or operations where it will be implemented. In Chapter 405 we have created an option that will reduce reporting requirements on routine water quality monitoring.

COMMENT: §1.D(2). Should also include something saying that the location of borings will be clearly marked in the field. Unconsolidated sediment samples, rock cores, and washed drilling samples should be maintained in an appropriate location at the site and other agreed locations so that they are available for review and evaluation, and are protected from deterioration. (TOJ)

RESPONSE: Chapter 405 requires that all boring locations be surveyed. The Department has found this information adequate to locate any borings as needed. The requirements for maintaining boring samples are contained in Chapter 405. No change to the rule.

COMMENT: §1.E(11)(d). PIR must include map showing setback distances from the solid waste boundary and/or waste handling area to *sensitive receptors*. It may not be possible to identify all sensitive receptors prior to conducting detailed hydrogeologic investigations which are part of the development of an application. Suggest language read "from...(d) *known* sensitive receptors." (MPPA)

RESPONSE: We have added the word "known" as suggested.

Section 2. Application Requirements

COMMENT: §2.A(1). All setbacks for siting criteria should be shown on the topographic site and surroundings map. (TOJ)

RESPONSE: The setbacks for siting criteria are required to be shown on the map submitted with the Preliminary Information Report and/or on the detailed drawings required in §2.C(1)(h). No change to the rule.

COMMENT: §2.A(2). Aerial photograph coverage should match mapping, i.e. coverage within 2,000 feet of the perimeter of the facility site. (TOJ)

RESPONSE: We agree. The coverage of the aerial photography has been changed to coordinate with the required mapping.

COMMENT: §2.A(2). The aerial photo requirement should include an historical photo review of the site. Site changes over time shown on these photos should be traced. Must include multiple stage photos or images that are available for the site so that changes through time for the proposed facility can be evaluated and traced. (TOJ)

RESPONSE: We disagree that an historical photo review will provide any information that will not be discovered by other site investigation requirements. A thorough site assessment is already required; any potential problems resulting from historic use of the site should be identified during that process. No change to the rule.

COMMENT: §2.B. The "Site -Specific Investigation" section is a good section. The following language should be inserted: that each site is unique and the site investigation has to be specifically structured to the geology and hydrology of that site, the waste(s) being disposed and the degree of engineering proposed.

All site investigations are conducted in phases with sufficient flexibility to change directions as data is collected and reviewed. The applicant needs to provide sufficient time to collect data, review data, discuss the data with DEP, conduct additional data collection, and repair the process as necessary. No simple investigation method or type of data fits all or any two sites no matter how similar their hydrology may appear.

The required information of this section is only the minimum data that is necessary to complete a site investigation. Extensive or complex sites may require much greater effort and different. (TOJ)

RESPONSE: The proposed additional language is non-regulatory in nature and reflects the standard practice of the professionals who are required to conduct this work. No change to the rule.

COMMENT: §2.B.(1)(b). Pump testing will also determine the amount of interconnection and anisotropy of the units being treated. (TOJ)

RESPONSE: We agree. However, it is unnecessary to add the language in this subparagraph as interconnection and anisotropy will be addressed by meeting the requirements of §2.B.(1)(a). No change to the rule.

COMMENT: §2.B.(2)(a). The ground water flow directions need to be determined. Since groundwater flow is a function of both directional permeability and the gradient both gradient and directional anisotropy need to be know in order to determine flow direction and migration flowpaths. (TOJ)

RESPONSE: We agree. Again, ground water flow direction will be addressed by meeting the requirements of §2.B.(1)(a). No change to the rule.

COMMENT: §2.C(1)(b). A surficial geologic map must be submitted which shows *preliminary* locations of solid waste boundary. At this point in process, solid waste boundary should be established, so perhaps the word *proposed* is more appropriate. (MPPA)

RESPONSE: We agree and have made the wording change.

COMMENT: §2.C.(2). Sufficient investigations should be required to determine an effective porosity for flow. A "standard" effective porosity for flow of not greater than 0.1 should not be used for landfill design. (TOJ)

RESPONSE: A "standard" effective porosity for flow of 0.1 is a very conservative number. The applicant has the option of conducting sufficient investigations to determine the site -specific effective porosity. No change to the rule.

COMMENT: §2.C(3). contains typo [says 2.F(2) and 2.F(2)]

RESPONSE: We agree and have changed the first reference to 2.F(1).

COMMENT: §2.D. We recommend that the chapter incorporate acknowledgment by the Department for unique conditions of single waste landfills and allow a mechanism for reduced procedure. (DCP)

RESPONSE: Criteria for reduced procedure applications have been included in these rules whenever there is a good basis of knowledge and evidence that the general facility standards in Chapter 400 can be met by a certain type of solid waste facility located to meet certain protective siting requirements. There is not enough information on single waste landfills to tailor such a reduced procedure into this rule, and the ability for any particular single waste landfill to meet the standards will vary according to the characteristics of each single waste. However, Chapter 400, section 13 allows any applicant to apply for a variance to the requirements of these rules (except for the prohibitive siting criteria for landfills). Therefore, under the variance provision, an applicant for a single-waste landfill has the opportunity to demonstrate that their "unique conditions" allow the landfill to meet the standards and that, given these conditions, certain standard submission requirements should be inapplicable. No change to the rule.

COMMENT: §2.D. Landfills should be required to encourage reuse and recycling of waste even after "disposal" occurs by: designing the facility to prevent commingling and degradation of wastes to encourage waste removal and reuse (e.g. separate

cells for different waste streams); and/or by designing roofed, above-ground facilities rather than shallow land burial. (RD)

RESPONSE: While intriguing to consider, it is currently technically unrealistic that design and operations could be shredded out this finely. Also, the use of roofed structures would be technically very difficult and unlikely to be economical. Landfill reclamation is an emerging activity, and we have included in the rule the ability for landfills to apply to do this. Currently, some facilities are for single waste streams (or at least the majority is one type of waste), so landfill reclamation is more feasible at these sites. No change to the rule.

COMMENT: §2.D. Why was 5 feet from bedrock surface selected? Is not the distance to ground water a more important issue than distance to bedrock? (TOJ)

RESPONSE: Both are important issues when examining potential for contaminant release to an aquifer and the ability to detect any such release. Any soil disturbance within 5 feet of the bedrock surface is likely to cause changes in the ground water quality. Landfills must be sited and constructed so that ground water quality monitorability is maintained. Too much "noise" from construction activities close to the bedrock surface could create conditions in which it would not be possible to detect adverse water quality changes due to the landfill. It is therefore important to address this monitorability issue when soil disturbance occurs close to the bedrock surface. No change to the rule.

COMMENT: §2.D(1)(f)(i) and §5.G(2)(f). Liquid Limit and Plasticity Index requirements are only for clay type barrier soil layers. (TOJ)

RESPONSE: We agree. Clay type barrier soil layers exhibit physical properties that are appropriately described through Atterberg Limit tests (LL and PI) whereas glacial till soils in Maine generally do not exhibit these properties, therefore the requirements are not applicable to them. No change to the rule.

COMMENT: §2.D(1)(g)(v). It is practically impossible to screen a glacial till soil in the field (i.e. at a construction site or in a borrow pit) so that the maximum particle size of usable materials is less than or equal to 1/2 inch. Screening of glacial till to 1/2 inch would create a tremendous amount of waste material and would ultimately require the taking of additional natural resources to compensate for the loss due to screening, thereby increasing the potential for impacts to wetlands and other protected natural resources. The removal of particles greater than 1/2 inch diameter from a glacial till soil would also reduce the shear strength of the soil to a point where subsequent construction above the liner would be impracticable and the overall stability of the liner system would be impacted. This requirement would for all practical purposes eliminate glacial till soils (one of the most common soils found in the State) from being used as part of a landfill's liner system. We recommend increasing the screening requirement to 2-inch diameter for the soil surface layer and require that the surface layer be proof rolled and angular stones greater than 1 inch diameter manually hand picked and removed. (SME)

RESPONSE: HDPE manufacturers will not uniformly warrant the functionality of their products when used in conjunction with soils containing stones greater than 1/2" in size. The rule as written requires that only the surface layer meet this stone size requirement. It does not specify the technique to accomplish this goal, therefore screening and hand-picking stones are both acceptable provided the performance criteria are satisfied. The Department's experience and photographic records of landfill construction show however that it is difficult at best to meet performance criteria through handpicking stones in that uppermost layer. No change to the rule.

COMMENT: §2.D(2). Change the criteria to require at least 5 feet of undisturbed natural sediments with hydraulic conductivity of 10^{-5} cm/sec or less under any landfill. This should be an absolute minimum condition of licensing any landfill and applied only to those wastes that have the least potential to be leachable and/or for toxic leachate. All other wastes to be landfilled should require larger thickness of undistributed natural sediments of 10^{-5} cm/sec hydraulic conductivity. This thickness should be applied from the base of any engineered structures (liner, membranes, drain pipes, etc.). and any disturbed sediments. (TOJ)

RESPONSE: We agree that clarifying language is needed to assure that the assumptions used to calculate time of travel through any imported soils are conservative. To achieve this we have added language to §2.C(2) restricting the applicant to using soil with an hydraulic conductivity of between $1x10^{-5}$ cm/sec. and $1x10^{-7}$ cm/sec., and assuming an effective porosity of 0.1 unless a greater effective porosity is affirmatively demonstrated when calculating time of travel for any depth of imported soils.

COMMENT: §2.D(4)(a)(i). The groundwater performance standards and the surface water control standards are not equally protective. It is generally agreed that water is the likeliest medium for contaminant transport away from the facility. §2.D(2) requires a 6 year minimum travel time to sensitive receptors to meet "intent" in a variety of ways. But surface runoff can move much larger quantities of contaminants much, much faster. The leachate collection and treatment system is the most dangerous individual system in this entire landfill package. It contains the largest fraction of transportable contaminants, both dissolved and in suspension in a physical form ready for rapid accidental releases from the facility in much higher concentration than the original waste , and with fewer barriers to slow accidental releases. And yet, this draft at §2.D(4)(a)(i) seems to require that the leachate system meet only a 25 year storm event. If the facility accepts waste for 25 years this maximum design event can be expected to occur. Is there, then, in the Department's opinion, no need to design leachate systems robust enough to meet more severe events? §2.D(5) requires most of the facility systems to withstand with 90% probability 50 year and 250 year seismic events. But unless accompanied by sufficient surface water from runoff or rain, little transport of contaminants would occur simply from:

* breach of the liner, or
* loss of contour of surface water control systems.

The first is protected by the 6 year groundwater travel time noted above allowing some considerable time for remediation. The second is easily and relatively quickly repaired. Should the leachate system be designed to need a 250 storm event, since such an event poses so much more likelihood of contaminant transport? The types of storm events that have occurred over the past few years demonstrate that designing for a 100-year flood and a 25-year storm event will not prevent landfill runoff from affecting surface waters. (RD)

RESPONSE: Designing for 25-year storm events is consistent with federal requirements. Along with the leachate collection system being designed to routinely handle a 25-year storm event, the applicant is also required to have a contingency and response plan for significant failure modes that would result in a direct discharge to leachate to the environment [see section 2.F(5)(c)(iii)]. Also, when designing for a 25-year storm event the applicant is required to make conservative assumptions, including designing for such a storm event during a wet period and adding in consolidation water from the waste. Finally, the impact from "overflow" of leachate into surface water during a storm event that exceeds design standards is very low; these acute situations do not have any known chronic effect due to the landfill. No change to the rule.

COMMENT: §2.D(4)(a)(vii). Frost penetration for many areas in the State of Maine can reach 4 to 5 feet in depth. It would be impossible to build a pulp and paper mill landfill cell (typically >5 acres in size) with all the engineered liner and leachate collection systems required by the Regulations, during the normal summer construction season (i.e. June-October) and place a 4 to 5 foot frost protection layer over the entire cell prior to freezing weather conditions. Not only would it be impossible to do, it would also be a waste of valuable landfill air space. Because the proposed Regulations require the use of geosynthetic components (i.e. geomembranes and GCLs) within the landfill liner systems, which are resistant to freeze/thaw effects, the placement of a freeze/thaw protection layer would have little effect on the overall performance of the composite liner systems and serve no practical purpose. We recommend striking freeze/thaw criteria from the Regulations. (SME)

RESPONSE: We agree that freeze/thaw effects are minimal on hydraulic performance of geosynthetic liner components, but are significant on barrier soils and may be significant on leachate collection system components. Freeze/thaw conditions also compromise the integrity of the geosynthetic/barrier soil interface. The Department's research work with the sealed double-ring infiltrometer (SDRI) shows 1-2 orders of magnitude increase in hydraulic conductivity of barrier soils that are subject to freeze/thaw action. Depth of frost varies by region of state, from approximately 2 feet in the southern part of the state to 4-5 feet in the most northern reaches. The rule does allow sand drainage layers and select waste to be part of the frost protection layer. Papermill sludge, tire chips, and wood chips have all been used successfully to provide frost protection at existing landfills.

This is a cost-effective option for papermill landfills. The frost protection layer also provides much needed winter and spring protection against erosion of leachate collection components as noted in section 2.D(4)(a)(vii). No change to the rule.

COMMENT: §2.D(4)(a)(viii). The requirement to have access for repair of leachate collection and leak detection transport pipe penetrations through a liner system is not necessary if the penetrations are properly designed, the right materials are used and a high level of construction quality control is implemented during construction. The Department will ultimately have a say in both the design and the level of construction quality control for these special design situations. The requirement to have access for repair of penetration will drastically limit the use of gravity flow systems at many landfill facilities where natural topography dictates the layout of leachate collection systems. In many cases, the leachate collection systems are in the middle of the landfill and do not have long-term access capabilities. We recommend removing the requirements to have long-term access for repair of liner penetrations. (SME)

RESPONSE: Penetrations are known to leak; quality control during construction is very difficult in penetration areas. A system for detecting leaks from penetrations within the landfill and the ability to access these areas to fix these leaks are necessary to ensure that these areas will not allow the release of contaminants to the environment. Most landfills will be designed with penetrations on the outside of the landfill, and therefore will be accessible. No change to the rule.

COMMENT: §2.D(4)(a)(xiii). HDPE structures should be tested before backfilling to ensure fuse joints and structures are watertight. (TOJ)

RESPONSE: This type of testing is part of normal QC/QA activities during construction that will be reveiwed and approved as part of the Quality Assurance Plan required by §2.I. No change to the rule.

COMMENT: §2.F(5)(d). The leachate management submittal must include an "Evaluation of expected leachate quality over the life of the landfill to determine the need for pretreatment." It isn't possible or necessary to perform such an evaluation "over the life of the landfill," which could be nearly 50 years (including post-closure). This provision should be deleted. (MPPA)

RESPONSE: We have modified the requirements to require a qualitative analysis of expected leachate quality for the operating life of the landfill during the initial facility application, and a qualitative analysis of expected leachate quality for the post-closure period as part of the closure application (see §5.E(3)).

COMMENT: §2.F(5)(e)(ii). Even if a double composite liner and leak detection system is required by Chapter 401, a major deficiency can still be found here--the "Action Leakage Rate (ALR). There are no performance standards specified in this section. What facilities usually submit for an ALR is either vague and unenforceable or uses unrealistically high numbers that delay or avoid corrective

action. There really needs to be some sort of statistical limit on interpreting the performance of a leak detection system. (TOJ)

RESPONSE: The Action Leakage Rate (ALR) is a good method of monitoring primary liner performance. The Department has gone through a learning curve in developing realistic ALR's in order to prevent false positive results. Flexibility is needed on a site by site basis to set appropriate numbers for triggering a response. Experience shows that facilities with ALRs have triggered response action plans (RAPs), and that these mechanisms have proven effective in detecting and remediating problems. No change to the rule.

COMMENT: §2(F)(7). Cell Development Plan: Of all the required plans, the cell development plan requirements are of the most concern. The level of detail required is excessive and the parameters for which the plan must be revised are much too narrow. A basic, conceptual development plan, coupled with the daily Operation Manual, is sufficient to operate a landfill without impacting the environment. Due to the limiting parameters of the plan, the variability of waste generation rates, weather conditions, and limits of available forecasting methōds, the plan would be under revision constantly. We do not believe this is what the Department intended, and suggest that the efforts of a landfill operator could be put to better use.

(CI) §2(F)(7) and §2(G). The amount and type of production-related residuals from the pulp and papermaking process vary over time and are subject to economic conditions unrelated to the operation of the landfill itself. Companies are also aggressively pursuing waste reduction and beneficial reuse opportunities. These opportunities may result in changes in landfill rates that, with the proposed regulation, would trigger the requirement to modify the cell development plan. In short, it is impossible to accurately predict the location and projected grades of wastes and the location and timing of cover materials at a pulp and paper landfill over an extended period of time. In addition, weather and climatic effects many times require adjustments as to how the waste is handled and placed at the landfill. The Regulations simply require too much detailed information regarding the operation of a landfill cell. Due to the variability of waste volume, waste type, variability of waste compaction, and weather conditions the operator will spend most of his time updating the detailed cell development plan to meet reporting requirements of the Regulations (i.e. "update development plan whenever variability in waste disposal rates and other operational factors cause development to vary more than 6 months from project timelines"). Recommendations: The information provided by conceptual development plans and by the general operating procedures described in current operations manuals have been sufficient for operators of pulp and paper mill landfills to date and have allowed the flexibility needed by the operators to perform their work properly. Detailed plans are a waste of time and money and are of little use to the people for whom they are intended to serve. Detailed cell development plans and the requirement to modify and resubmit plans when they fluctuate by more than 6 months will also serve as a deterrent to companies that

aggressively pursue waste reduction and beneficial reuse opportunities. Detailed cell development plans should be stricken from the Regulations. (SME)

RESPONSE: Cell development plans are a critical component of this revised regulation. It forms one of the cornerstones for reducing the minimum liner system requirements from those contained in the 1989 "Solid Waste Management Regulations" without compromising the level of protection for sensitive receptors. Contrary to the comment, many papermill landfills have not been run as well as suggested, and those that have adopted many of the procedures discussed in the cell development plan section are running much more efficiently and effectively. The variable quantity and nature of the waste streams suggested to exist support the necessity of a good cell development plan. Otherwise, we will return to the random procedures of the past that resulted in stability and leachate management problems. No change to the rule is needed. However, subsequent to adoption of this rule, the Department will create a guidance document with input from interested persons on the necessary content of a cell development plan to ensure that it is practicable and useful to facility owners/operators.

COMMENT: §2.F(10). The rule should require an assessment of the cumulative impacts of the disposal of low level "hazardous wastes" at regulated special waste landfills. (SLG)

RESPONSE: Hazardous waste may not be disposed of in special waste landfills. Prior to disposal in a solid waste landfill, all wastes are required to be adequately characterized to demonstrate that the waste is non-hazardous. The addition of more waste with a particular contaminant at a non-hazardous level does not result in an increase in the concentration of that contaminant in the landfill to the point that the landfill will contain a hazardous waste. No change to the rule.

COMMENT: §2.J. As part of the application process for a new landfill, the applicant must provide construction contract bid documents including drawings, technical specification and contract administrative documents. We question the need for the Department to review contract bids documents during the application process, especially the review of contract administrative documents. We recommend minimizing the amount of paperwork required during the application process and remove the requirement to provide contract administrative documents to the Department for review. (SME)

§3.D. Project specifications relating to general conditions of the contract should be exempt from Department review and should not require an amendment, minor revisions, or change order approval from the Department. We recommend removing the Department's regulatory review of the non-technical general conditions portion of contract construction documents. (SME)

RESPONSE: Administrative portions of specifications address procedural issues that influence project direction and modifications. It is important for the Department to review and approve these aspects of the specifications to ensure clear lines of

communication for approving project changes and decision-making during construction. If all parties do not have the same set of specifications in hand, confusion results, potentially leading to change orders, work delays, or incorrect decisions being made. It is especially important for the Department to be able to perform construction compliance oversight and provide timely review and approval assistance for any changes from approved the plans and specifications. In its review of contract bid documents, the Department exercises professional judgment in letting things go that are unimportant in ensuring construction in accordance with the approved plans and specifications, and only focuses on the critical issues. No change to the rule.

Section 3. Landfill Construction

COMMENT: §3.E. The following information is required as part of the weekly construction inspection reports: the weekly reports must summarize the daily reports and include a statement prepared by the CQA personnel summarizing test results; submittals and actions taken; summary of work progress; upcoming work items for the next two weeks or for an alternative time period as approved by the Department; punchlist items as applicable; summary of significant problems encountered and how the problems were resolved; change order status; and construction stability monitoring results, if applicable. The weekly submittal of the above information is excessive. Only significant matters such as change orders and/or submittal that require the Department review and approval should require reporting to the Department on a timely basis. We recommend simplifying the weekly construction reporting requirements. (SME)

RESPONSE: The Department has carefully reviewed all the reporting requirements during construction to ensure that only necessary items are requested in an appropriate timeframe to enable the Department to perform construction compliance oversight. The reporting items are the same as the 1989 rule except for the addition of change order status and construction stability monitoring results, if applicable. The second item won't be applicable on many jobs, so the only true addition is for change order status, which is necessary to track the standards which are being used to construct the facility. The status would be either 1) reviewed and accepted, 2) currently under review, or 3) reviewed and not accepted. This type of reporting is necessary for staff to track projects under construction due to limited staff resources. It helps us see which projects need additional attention and assists us in planning site visits based on problems encountered and upcoming work items. No change to the rule.

Section 4. Landfill Operations

COMMENT: §4.A(2). The requirement to issue "certified copies" of the Operations Manual to the Department and key operating personnel is confusing and unnecessary. The word "controlled copy" should suffice. (MPPA)

RESPONSE:

In a previous informal draft of the rule, we had used the wording "controlled copy". We received comments that this wording has specific meaning in the "ISO" process in which some papermills are involved. In this draft, we've eliminated the requirements for "controlled copies" and replaced it with "certified copies", which is defined in Chapter 400, section 1. No change to the rule.

COMMENT: §4.C. This section should include a waste management plan like the one included in §7.F(3) (RD)

RESPONSE: Chapter 400, section 6 requires that all solid waste disposal facilities reduce, to the maximum practical extent, the volume of the waste and the risks related to its handling and disposal by recycling and source reduction. This requirement achieves the desired minimization of wastes landfilled. No change to the rule.

COMMENT: §4.C(1)(a)(iii). Existing landfills must fully characterize any ash proposed to be disposed with statistical analysis performed in accordance with EPA-s SW-846 test method. Any generator-owned landfill that has already characterized its ash, submitted the results to DEP and has been disposing of this waste stream in its landfill should be exempt from this requirement. (MPPA)

RESPONSE: We agree. That is why this subparagraph says "This testing must occur when the ash is first proposed for disposal." Therefore, if the ash has already undergone initial characterization, there is no need to repeat it. No change to the rule.

COMMENT: §4.C(1)(a)(iv). This paragraph discusses the requirements for initial chemical characterization of wastes and a proposal for on-going characterization. On-going is not necessary if production processes and inputs don't change.

(MPPA) §4.C(1)(a)(iv). To be consistent with Chapter 405, §6.C(5), this Regulation should state that generator-owned landfills are not required to perform annual analysis provided the processes that create the waste streams or the composition of the waste streams accepted for disposal have not changed. (SME)

RESPONSE: The Department will approve characterization plans developed in accordance with the requirements of Chapter 405, including the allowance to forego annual analysis provided the processes creating the waste or the composition of the waste have not changed. It would be unnecessarily redundant to repeat that provision here. No change to the rule.

COMMENT: §4.C(6). This subsection requires a cell development plan for existing landfills. The plan must consist of a conceptual plan for the life of the landfill and a detailed plan for the current two-year period approved as part of the application or the most recent annual report, whichever is applicable. Existing landfills

already licensed or relicensed under the 1989 Rules should be exempt from this requirement. (MPPA)

RESPONSE: The cell development plan is an important tool to assist operating landfills in minimizing leachate generation and ensuring that the landfill cells are developed in accordance with the approved plans. It is especially important that landfills that are already licensed prepare and follow updated cell development plans to ensure that leachate and stormwater control structures are constructed in accordance with plans that were developed and approved several years ago. No change to the rule.

COMMENT: §4.C(8). We recommend that Board specify that daily cover is not required to be placed on agglomerated cement kiln dust similar to the exemption specified for paper mill sludge. (DCP)

RESPONSE: We disagree. Uncovered cement kiln dust is a suspected cause for lead poisoning in infants. It also poses an extreme nuisance to the public. No change to the rule.

COMMENT: §4.C(10). The proposed rule requiring contracts with 5 year terms for leachate disposal contingency plans is far too strict. The rule should simply state that there must be a contingency plan in place and not specify length of contracts. (CPI)

RESPONSE: We agree, and have changed the requirement as recommended.

COMMENT: §4.C(11)(b). An operator must implement a quarterly methane gas monitoring program to verify concentrations of explosive gases generated at the landfill. Upon detection of explosive gas levels exceeding 25% of the LEL or 100% of the LEL for gases at the property boundary, the operator must take all steps necessary to protect human health and shall notify the Department of the occurrence and the protective steps that were taken. EPA's Subtitle D landfill rules recognize that certain landfill structures, such as leachate collection manholes and pump stations, may contain elevated methane concentrations that may not trigger reporting or remediation. The DEP Rules should add these structures to those that are exempt from reporting requirements.

(MPPA) §4.C(11)(c). The U.S. EPA Subtitle D requirement for solid waste landfills recognizes that utilities associated with the landfill such as leachate collection manholes and pump stations may contain elevated methane concentrations that should not trigger reporting or remediation activities. The Department's Regulations should also recognize these structures, in addition to the noted gas control or recovery system components, as being exempt from the reporting requirements of this Regulation. (SME)

RESPONSE: Subtitle D only excludes gas control or recovery system components. It does not exclude leachate collection system components, pump stations, etc. In fact, Subtitle D references that monitoring methods may include "...sampling gases

from probes within the landfill unit or from within the leachate collection system." (ref. EPA Technical Guidance Document, Solid Waste Disposal Facility Criteria Technical Manual, November 1993, p. 90). Clearly the intent of EPA is to not exclude these components. No change to the rule.

COMMENT: §4.C(12)(a),(b),(c),(d) & (e). The term "performing as designed" is present in all these. Performing as designed cannot be the standard. It is not important how a system is designed, it is important how it is constructed and does that construction achieve the objects for which the system was designed. It is the performance of the system and the achievement of the design objects that are important. This provision should be reworded. (TOJ)

RESPONSE: The goal of construction is to build the system to meet the design. The design is based on standards that are measurable, inclusive of calculations, etc. that we can compare operational performance to. Being able to compare operational performance to design criteria gives us measurable objectives to determine facility compliance. No change to the rule.

COMMENT: §4.D(2)(g). An updated cell development plan for each two year period is excessive.

(MPPA) §4.D(2)(g). The detail required in the annual reports for updating cell development plans is excessive. If the landfill has several years of life left and is being filled in a consistent, methodical manner, it would seem appropriate to update cell development plans with a narrative, which would accomplish the same objective at far less cost. (CPI)

RESPONSE: The Department has pared the requirements for cell development plans down to the minimum necessary to ensure development of the landfill cells in accordance with the approved plans and specifications. By submitting an updated plan for two year intervals as part of the annual report, the facility operator will have the plans developed on a timely basis. This eliminates the development of plans more than two years in the future, when variable fill rates could have unpredictable effects on the planning process. No change to the rule.

Section 5. Landfill Closure

COMMENT: §5.G. The final cover system design must provide protection against freeze and thaw effects. It is excessive to require a 4-5 foot layer of material for frost protection of soil components. This provision should be deleted. (MPPA)

§5.G. Similar to the liner construction issues regarding freeze/thaw protection, the requirement to provide a 4 to 5 foot layer of materials for frost protection of the soil components of a composite cover system is excessive. We recommend removing freeze/thaw requirements from Regulations. (SME)

RESPONSE: Freeze/thaw effects are significant on barrier soils and may be significant on the cover system drainage layer components. Current EPA Region 1

recommendation is that frost protection be provided for cover system drainage layers above barrier layers as well. In all cases EPA Region 1 recommends frost protection for the barrier layer. Freeze/thaw conditions also compromise the integrity of the geosynthetic/barrier soil interface. The Department's research work with the sealed double-ring infiltrometer (SDRI) shows 1-2 orders of magnitude increase in hydraulic conductivity of barrier soils that are subject to freeze/thaw action. Depth of frost varies by region of state, from approximately 2 feet in the southern part of the state to 4-5 feet in the most northern reaches. A landfill cover system is extremely important in the long term protection of the environment. No change to the rule.

Section 6. Post-Closure Monitoring and Maintenance

COMMENT: §6.A. The draft rule calls for landfill groundwater monitoring for a period of 30 years. The scientific basis for the standard 30 year term is not clear. In fact, we have seen statistically valid monitoring data which suggests that, at certain landfills sites, a 30 year term is excessive. In these cases, the 30 year term cause sampling and administrative costs to far exceed what is necessary to determine impact to the environment. We recommend that performance standards be developed to determine when long term landfill monitoring can be discontinued. (SGA)

RESPONSE: This is consistent with EPA Part 258 and with the minimum thirty year post-closure monitoring and maintenance period for which financial assurance is specified under the provisions of 38 MRSA §1310-Y. Also, Chapter 405 §1.C(2)(h) allows for the reduction in frequency and parameters throughout the post-closure monitoring period based on the site-specific conditions and monitoring results. No change to the rule.

Section 7. Special Requirements for Licensing Construction/Demolition Debris, Land Clearing Debris, and Wood Waste Landfills

COMMENT: §7.A(1). The draft rule is ambiguous as to whether stormwater basin grit may continue to be disposed in a construction/demolition debris landfill that is operating under the terms of a consent agreement or schedule of compliance rather than under the terms of a license. (BT)

RESPONSE: The operating requirements of section 7 apply to landfills operating under the terms of a schedule of compliance or consent agreement unless specifically altered by the terms of the schedule of compliance or consent agreement. Section 7.H(1) specifically lists storm sewer grit as an acceptable solid waste at legally-operating construction/demolition debris landfills. No change to the rule.

COMMENT: §7.B(1)(d). The exemption for construction/demolition debris landfills and woodwaste landfills that are less than one acre in size and are located on the same parcel of land where the waste is generated has a new criterion in this proposal: It must not be located in a sand and gravel borrow pit. This is beyond

the standards set forth for the parallel exemption in the Solid Waste statute, 38 MRSA §1310-N(8), and thus this provision must be removed. (MPPA)

RESPONSE: We agree, and have deleted this provision.

COMMENT: §7.B(5). In the exemption for the "extraction and reburial of tree stumps provided that the stumps are reburied where extracted, the intent of "where extracted" is not clear; is it the exact location where the tree was growing, the same parcel of land, or something else? I would suggest that the reburial of the stumps should occur on the same parcel of land from which the stumps are extracted. (DOT)

RESPONSE: The intent is to allow reburial in the same spot from which the stump was extracted; we have added language to clarify this. It is our understanding that this is common practice in the development of woods roads and wood yards.

COMMENT: §7.C. Any existing construction/demolition debris, landclearing debris, and woodwaste landfills less than six acres in size must comply with the applicable operating requirements of Section 401 no less than 90 days after the effective date of the rules. Moreover, existing landfill license holders must submit to the Department for review and approval a revised operations manual in conformance with this section. This revised operations manual is due with the first annual report submitted by the facility after the compliance date. These time frames are too short. One year from the effective date of the new rules should be allowed to come into compliance with the new requirements. (MPPA)

RESPONSE: We have changed the rule to require that landfills come into compliance with the operating requirements of these rules once approval of the revised operations manual is received from the Department. We have not changed the timeframe for submittal of the annual report and the revised operations manual, as it is expected that the proposed requirement will give facility operators at least six months to develop this revised manual.

COMMENT: §7.D(2). Among the prohibitive siting criteria are the following for construction/demolition and woodwaste landfills of less than six acres:

- The solid waste boundary must not be located where the thickness of undisturbed soil is less than five feet.

- The area within the solid waste boundary must not be located where the thickness of undisturbed soil material above the seasonal high water table is less than three feet.

These should be restrictive, but not prohibitive, criteria for construction/demolition debris and woodwaste landfills. An applicant should be allowed through the variance process to show that its facility is distinctive in a way that allows for compliance with the intent of the rules. (MPPA)

The prohibitive siting criteria for construction/demolition debris landfills less than 6 acres in size are more rigorous than the criteria for other solid waste landfills. Specifically, construction/demolition debris landfills are prohibited from being sited in the following areas:

- soil is less than 5 feet thick
- soil above seasonal high groundwater is less than 3 feet
- 100-year flood plain
- unstable area

These prohibitive criteria were probably developed to allow small construction/demolition debris landfills to be sited without many engineering controls for minimizing impacts. However, these rigorous limitations may require some sites to be licensed as a regular landfill, even though the small facility will only be used for construction/demolition debris.

These areas are only restrictive criteria for any other type of landfill (401 section 1.C) and, as such, may be used with a variance in accordance with 400 section 13. Therefore, it seems reasonable to allow small construction/demolition debris landfills to be sited on these same locations if they can successfully meet variance standards. (REW)

RESPONSE: These specific provisions are designed to provide some level of protection to the state's groundwater resources from contaminated leachate from construction/demolition debris for landfill facilities without liners and leachate collection systems. This will allow small municipalities to develop these landfills without imposing a great financial burden. This is achieved by:

- Allowing development only on good sites (rigorous prohibitive siting criteria);
- Limiting the amount of waste disposed through general facility standards.
- Requiring waste management plan to minimize the need for disposal capacity by encouraging reuse and recycling.

The rule does not allow variances to the prohibitive siting criteria or general facility standards because to do so would compromise the limited protections that these criteria and standards provide to the waters of the state. This rule also allows landfills that meet the siting and design criteria of this section to forego groundwater monitoring. Facilities that do not meet these criteria can still be licensed and developed in accordance with sections 1-6. Protection of the environment and public health on these less ideal sites is then provided through engineering controls, including liners and leachate collection. No change to the rule.

COMMENT: §7.D(2)(a) and (b). These rules require new construction/demolition debris landfills to have a minimum depth of 5 feet of undisturbed soils above bedrock and a minimum of 3 feet of undisturbed soils above the seasonal high water

table. These two requirements will severely limit the ability of anyone to license a new construction/demolition debris landfill in Aroostook County. We recommend the deletion of the work "undisturbed" in these two rules.

(CPI)§7.D(2)(b); pg. 59. The prohibitive criteria requiring that the thickness of undisturbed soil above seasonal high water must be at least three feet should be changed. In northern Maine the seasonal high water table will usually be within 24" of the ground surface during mud season. The state plumbing code requires 16" to seasonal high water. It is suggested that the use of imported fill be allowed to meet this requirement as currently allowed in Chapter 404, section 4(D) or that this be a restrictive rather than prohibitive criterion. (SS, JC, JJ)

RESPONSE: The first "conceptual" redraft of this chapter proposed that all landfills, including construction/demolition debris and wood waste landfills, have liners, leachate collection and groundwater monitoring. We made this proposal based upon evidence that these landfills do generate leachate with significant concentrations of contaminants, and therefore have a likely potential to pollute. We received much feedback on this first proposal. The 1989 rule allows the licensing of ≤6 acre landfills without liners and leachate collection. We were told that requiring liners and leachate collection would put the ability to develop a construction/demolition debris or woodwaste landfill beyond the financial means of most municipalities. To respond to this concern, we created Section 7 to allow the development of small construction/demolition debris and woodwaste landfills without liners and leachate collection under very specific conditions.

These landfills can be successfully sited in northern Maine, even with a siting criterion prohibiting the disturbance of soil within 3 feet of seasonal high water. During the hearing we were told of a site that supposedly couldn't have been developed given this prohibition. The consultant on that particular project utilized methods for determining the seasonal high water that are normally used to site septic systems. Specifically, visual mottling was used to determine seasonal high water. The capillary effect causes mottling to occur above true seasonal high water, and this effect is magnified in tight soils. By using more sophisticated instruments (piezometers) to define seasonal high water, it is possible to find "good" sites for an unlined, unmonitored construction/demolition debris landfill. Imported fill does not generally provide the cation exchange capacity that undisturbed in situ soils provide (cation exchange capacity is the amount a soil will bind contaminants to attenuate any leachate discharges from the landfill). No change to the rule.

COMMENT: §7.D(2)(d). There should not be a prohibition from siting construction/demolition, wood waste, and land-clearing debris landfills within 200' of a fault that has displaced during Holocene times. These types of facilities are not high risk facilities. (SS)

RESPONSE: We disagree that these facilities are not high risk: these facilities do produce leachate that can contaminate ground and surface waters. However, there are no

known faults in Maine showing displacement during Holocene time, therefore, this should not be an issue in siting a landfill. No change to the rule.

COMMENT: §7.D(3)(a). The restrictive criteria include the following: the waste handling area must not be located within 1,000 feet of Class AA or SA waters. If landfills less than six acres can have this restrictive criterion, landfills greater than six acres should be allowed to have this as a restrictive criterion as well (rather than as a prohibitive one). (MPPA)

RESPONSE: There is much less soil disturbance and earthwork construction on small, unlined landfills, therefore these landfills may be able to demonstrate during the application process that construction will have no impact to a nearby AA surface water. Landfills greater than 6 acres require full 401 earthwork type construction, and therefore risk to AA waters from erosion and sedimentation during construction and operation is greater. No change to the rule.

COMMENT: §7.D(4)(a) and (d). The general facility standards requiring a maximum landfill depth of 20', including cover material and a minimum post-consolidation slope of 5% will result in an average depth on a six-acre square landfill of 10'. The most cost-effective way to construct a landfill with these restrictions will be long and thin ("spaghetti landfills"). We recommend that the height restriction be deleted, allowing the minimum post-consolidation slope of 5% and maximum post-consolidation slope of 33% to determine the final depth of the landfill. (SS, JC)

RESPONSE: We agree that the waste depth restriction of twenty feet is unworkable and should be removed. However, we do need a general facility standard that will serve to limit the amount of contamination that potentially may be released on one site from an unlined landfill. Therefore, we are replacing the height restriction with a demonstrated need for a certain size footprint to meet the municipality's solid waste needs for up to 20 years.

COMMENT: §7.D(3)(c)(vi). The minimum 1000' setback between the solid waste boundary and any water supply wells or water supply springs should not be prohibitive. (JC)

RESPONSE: We agree; this criterion is included as restrictive.

COMMENT: §7.F. All of the comments noted earlier for Chapter 401 secure landfills apply equally to construction/demolition debris, land clearing debris, and woodwaste landfills that would be regulated on these pages. Conforming changes should be made. (MPPA)

RESPONSE: There are vast siting, design, and operational differences between the secure landfills licensed in accordance with sections 1-6 and the non-secure landfills of limited size that can be licensed under section 7, so all comments cannot apply equally. Because this comment is non-specific, there are no changes to the rule that can be made to address it.

Section 8. Permit-By-Rule for Cull Potato Disposal

COMMENT: §8.C(5). Cull potato burial. What is a suitable soil? (TOJ)

RESPONSE: We have added language to define a suitable soil.

COMMENT: §8.C(6). Permit-by-rule for cull potato disposal the 100 foot setback from classified waterbodies and drainageways should read "classified waterbodies and *watercourses*". I consider the difference to be that a watercourse is a stream, and a drainageway is an area that runoff flows in only during heavy precipitation events but is otherwise dry. Many crop fields have numerous drainageways installed to divert surface water away from areas that might otherwise experience accelerated erosion. I recommend replacing waterways (sic) with watercourses, or defining waterways as streams (intermittent or otherwise). A 25 foot setback from waterways should be sufficient if you wish to list a setback to them in the rules. (DOA)

RESPONSE: We agree and have removed the phrase "or a drainageway".

COMMENT: Appendix A. "Requirements for Earthwork Testing Programs" This appendix sets for the requirements for earthworks testing programs for any new landfill, landfill expansion, and landfill closure project involving "earthworks construction". These requirements are more than twice as restrictive as the recommended minimum testing frequencies for investigating borrow source, as required by EPA Guidance (EPA/699/R93/182, Sept. 1993). (MPPA)

The Department borrow source characterization testing requirements are more than twice as restrictive (in some cases more than 5 times as restrictive) as the recommended minimum testing frequencies for investigating a borrow source as defined by the U.S. EPA in its Technical Guidance Document for Quality Assurance/Quality Control for Waste Containment Facilities (EPA/600/R-93/182, September 1993). For large construction projects, the proposed test frequencies will require a significant amount of tests that are redundant and serve no practical use. In addition, the material testing for earthwork construction at landfills should only include a characterization of the soils at the borrow source and in-place testing during and after material placement at the site to demonstrate the success of the construction techniques and borrow source materials utilized. Part C of Appendix A, which requires borrow source construction testing as the material is excavated and transported to the project site, provides useful information to the on-site quality assurance personnel and should be deleted from the Regulations for the following reasons:

- Contractors minimize the number of times they handle (i.e. load, unload, stockpile, reload, place) material to maximize efficiency and minimize costs. Therefore, most, if not all, contractors will haul material directly from a borrow source and place the material on site in one operation. The stockpiling of borrow source material on site simply is not done.

- Moisture density tests required by Appendix A Part C (1/2500 cy) would require a minimum of 3 days for transport of samples to the soils laboratory, performance of the test per ASTM standards, and documenting the results. This assumes the soils laboratory will immediately perform the test when the sample is delivered which is seldom the case during the height of the constructions season when landfill construction occurs. Obtaining laboratory results three days after the material has been placed provides no quality assurance or quality control benefits.

- If materials placed on-site do not meet the contract specifications, as determined by in-place quality control testing (Appendix A Part D), then the construction quality assurance agent has the authority to require additional rework of the soil material and/or removal of the material or placement of additional material that meets the specifications. There is no practical need for on-site borrow source testing as long as in-place construction testing is performed. (SME)

RESPONSE: The EPA QA document approaches the issue from the same perspective as this rule. It has a 3-step process for testing soil materials. Reference Table 2.3, p.65 "Recommended Minimum Testing Frequencies for Investigation of Borrow Source", Table 2.8, p.74, "Recommended Materials Tests for Soil Liner Materials Sampled after Placement in a Loose Lift (Just Before Compaction)", and Table 2.10, p.79, "Recommended Tests and Observations on Compacted Soil". The EPA manual also includes tests not required in this rule. The testing required by this rule is the culmination of a consensus effort (Landfill Construction Task Force, chaired by the Department) regarding barrier soil QA during 1993/94 that included MPPA's consultant, SME, as well as landfill owners, contractors, and other consultants. The Appendix A program has been in use on landfill projects since 1994 without problems. No change to the rule.

C-98-238

Rule Corrections and Amendments Approval Form

November 5, 1998

06-096 Ch. 401

to: Jim Dusch, Rules Contact
Department of Environmental Protection (06-096)

Please scrutinize the attached electronic version of your rule(s). Return this form to the **APA Office (101 State House Station)** within 30 days. If there are corrections, annotate a printed copy with a red pen and attach the corrected pages to the form. Thank you.

Don

Don Wismer
Administrative Rules Coordinator (287-6381)

Chapter(s) (in Microsoft Word for Windows 2.0 format):

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096C401  D01       263,168 11-05-98   4:56p
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Action taken:

Chapter 401 as amended.

Signature of agency representative:

We have reviewed the electronic version of the rule(s) described above and:

☒ Approve it.

☐ Approve it with the attached additional corrections.

Signature: _____ Date: 11/12/98

EXHIBIT B

HOUSEHOLD HAZARDOUS WASTE

Androscoggin Valley Council of Governments (AVCOG) collects Household Hazardous Waste at the Environmental Depot in Lewiston and at one-day collections throughout the Androscoggin, Franklin and Oxford counties region. Maine residents or property owners can bring Household Hazardous Waste to the Environmental Depot located at 424 River Road in Lewiston.

A total of **1,861 units** of household hazardous waste were recovered for the **2019** season. One unit equals 5 gallons of hazardous waste. The Environmental Depot collected **686 units** estimated at **3,430 gallons**; and **1,175 units** collected through one-day events, estimated at **5,875 gallons**.

We have completed all scheduled household hazardous waste collections for 2020. Thank you to all that participated, see you in 2021!

Non-Participating Municipalities: Residents from non-participating municipalities can bring HHW to the Western Maine Environment and will be charged $36 per unit, payable the day of drop-off by check or cash at the depot (a unit is 5 gallons of liquid or up to 20 pounds of dry waste).

Participating Municipalities: Residents from participating municipalities can bring HHW to the Western Maine Environmental Depot at no charge as long as residents do not exceed the units of HHW that the town has set. There is an additional $31 per unit charge if you go over the limit, payable the day of drop-off by check or cash at the depot.

Please check the list below for the Environmental Depot participation information received from municipalities. Please check frequently for updates:

Contact Us

Environmental Management

Physical Address
125 Manley Road
Auburn, ME 04210

Phone: (207) 783-9186
Fax: (207) 783-5211

Lisa Bonney
Executive Assistant
Email Lisa Bonney

EXHIBIT C

Geosyntec consultants

289 Great Road, Suite 202
Acton, Massachusetts 01720
PH 978.623.9588
www.geosyntec.com

Technical Memorandum

Date: 4 November 2020

To: Sherwood McKenney, District Engineer
Waste Management Disposal Services of Maine, Inc. (WMDSM)

From: Scott Luettich, P.E.
Geosyntec Consultants

Subject: Clarifying Information regarding
Thickness of Undisturbed Soil above Bedrock
Phase 14 – Solid Waste Permit Application
Crossroads Landfill, Norridgewock, Maine

This memorandum provides information about the thickness of undisturbed soil that will remain in place under the Phase 14 footprint. This information is being submitted pursuant to Maine Solid Waste Management Rule Chapter 401, Section 2.D(1)(b) which states: *Landfills sited where development within the solid waste boundary will disturb soil material within five feet of the bedrock surface in more than 5% of the disturbed area must also incorporate a single 40 mil HDPE liner and a leak detection system or a composite liner and a leak detection system into the liner system.*

The excavation grades for the Phase 14 landfill were shown on Sheet 4 of the Permit Drawings presented in the Landfill Engineering Report, Volume IV of the October 2019 Solid Waste Permit Application. The top of bedrock contours were shown on Figure 9 of the Hydrogeologic Assessment Report, Volume III of the October 2019 Solid Waste Permit Application. An isopach comparison of these two sets of contours, presented in the attached figure, shows that there will be no less than 7 ft of undisturbed soil above the bedrock surface under Phase 14. Therefore, the Chapter 401, Section 2.D(1)(b) requirement for a secondary liner and leak detection system do not apply to Phase 14.

* * * * *

LEGEND

- 340 — PROPOSED CELL FLOOR EXCAVATION ELEVATION CONTOUR (SEE DRAWING 4 OF OCTOBER 2019 PERMIT DRAWING SET)
- 260 — TOP OF BEDROCK ELEVATION CONTOUR (NOTE 1)
- 7.9 — THICKNESS OF UNDISTURBED SOIL (FT) BETWEEN BOTTOM OF EXCAVATION AND TOP BEDROCK
- 20 — ISOPACH CONTOUR OF THICKNESS BETWEEN BOTTOM OF EXCAVATION AND TOP OF BEDROCK
- PHASE 14 DESIGN LIMIT OF WASTE
- SUB CELL BOUNDARY

NOTE:

1. TOP OF BEDROCK CONTOURS OBTAINED FROM THE OCTOBER 2019 PHASE 14 SOLID WASTE PERMIT APPLICATION VOLUME III FIGURE 9 PREPARED BY GOLDER ASSOCIATES.

PH 14A
PH 14B
PH 14C
PH 14D
PH 14E

0 100'
SCALE IN FEET

(3in)
(2in)
(1in)
(1in) (2in) (3in) (4in)
SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE

I:\PROJECTS\...CADD\C\CROSSROADS LANDFILL\PHASE 14 EXPANSION\PERMIT\VOLUMES\VOLUME-PH 14 BOTTOM OF EXCAV VS TOP BEDROCK

THICKNESS OF UNDISTURBED SOIL BETWEEN BOTTOM OF EXCAVATION AND TOP OF BEDROCK CROSSROADS LANDFILL - PHASE 14 NORRIDGEWOCK, MAINE

Geosyntec consultants

Figure:

Acton, MA | NOVEMBER 2020

EXHIBIT D

TECHNICAL MEMORANDUM

DATE November 5, 2020

TO Sherwood McKenney, District Engineer
Waste Management Disposal Services of Maine, Inc. (WMDSM)

FROM Alistair P.T. Macdonald, CPG
Golder Associates Inc. (Golder)

RE: RESPONSE TO FOURTH PROCEDURAL ORDER – CLAY THICKNESS

This memorandum provides supporting information related to the clay thickness within the Phase 14 footprint.

Figure 1 illustrates the approximate area of clay thickness less than 5 feet (shaded in purple) within the Phase 14 footprint. This area represents approximately 5.9% of the Phase 14 footprint.

Figure 2 illustrates the area where silt-clay backfill will be placed, compacted and tested to demonstrate the soil material has a maximum vertical hydraulic conductivity of 1×10^{-5} cm/sec. Golder estimates that the area where the combined thickness of the in-situ clay and compacted silt-clay backfill is greater than 5 feet is more than 95% of the Phase 14 footprint (i.e., more than 95% of the Phase 14 footprint will be underlain by 5 or more feet of clay).

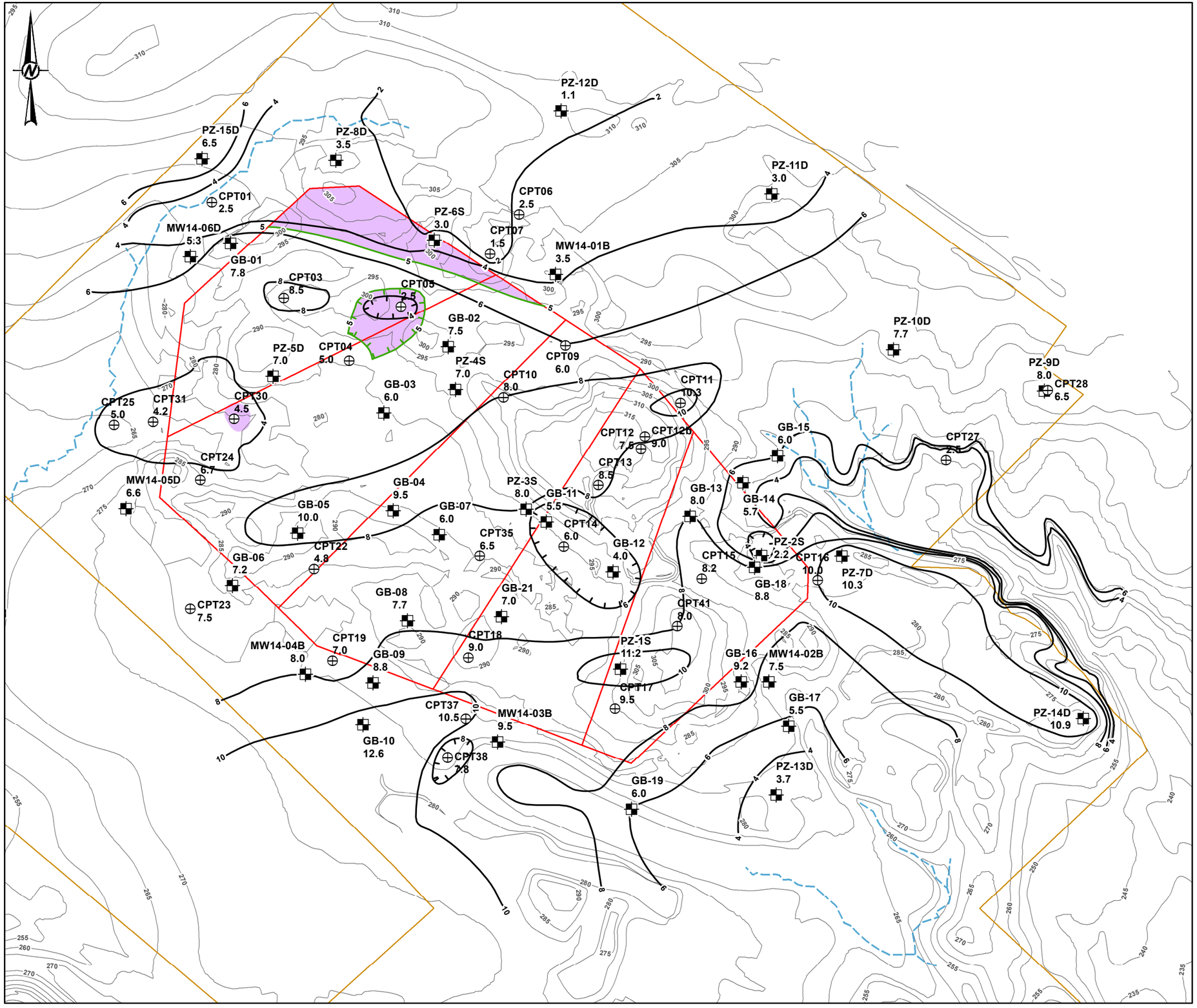
Golder Associates Inc.

Alistair P.T. Macdonald, CPG
Program Leader and Principal
BDL/APTM/jma

Distribution: Jeff McGown, WMDSM
Juliet T. Browne, Verrill Dana LLP
Scott Luettich, Geosyntec Consultants

Enclosures Figure 1: Approximate Area of Clay Thickness Less Than 5 Feet
Figure 2: Approximate Area of Imported Compacted Silt-Clay

Golder Associates Inc.
670 North Commercial Street, Suite 103, Manchester, NH 03101 T: +1 603 668-0880 F: +1 603 668-1199



LEGEND

- Geosyntec Cone Penetrometer (CPT) Test Location
- Soil Boring Location
- Interpreted Stiff Upper Presumpscot Clay 5-foot Thickness Contour in Areas not Underlain by Soft Lower Presumpscot Clay
- Interpreted Stiff Upper Presumpscot Clay 5-foot Thickness Depression Contour in Areas not Underlain by Soft Lower Presumpscot Clay
- Interpreted Stiff Upper Presumpscot Clay Thickness Contour (feet)
- Interpreted Stiff Upper Presumpscot Clay Thickness Depression Contour (feet)
- Proposed Phase 14 Waste Boundary
- Facility Site Boundary
- Ground Surface Topographic Contour
- Stream
- Approximate Area of Clay Thickness Less Than 5 Feet (See Note #1)

0 300 600

1 " = 300 feet Feet

NOTE(S)

1.THE APPROXIMATE AREA OF CLAY THICKNESS LESS THAN 5 FEET REPRESENTS APPROXIMATELY 5.9% OF THE PHASE 14 FOOTPRINT. THIS AREA IS NOT UNDERLAIN BY SOFT LOWER CLAY AND INCLUDES THE AREA AROUND CPT30.
2. THIS FIGURE ILLUSTRATES AN INTERPRETATION OF THE APPROXIMATE AREA WITHIN THE PHASE 14 BOUNDARY WHERE THE CLAY THICKNESS IS LESS THAN FIVE FEET THICK. PROFESSIONAL JUDGMENT HAS BEEN USED IN THE DEVELOPMENT OF THE AREA. THE ACTUAL AREA MAY BE MORE HETEROGENEOUS THAN SHOWN AND CONTOURS BETWEEN BORING LOCATIONS ARE INFERRED. ACTUAL CONDITIONS WILL VARY FROM THOSE ILLUSTRATED. OTHER INTERPRETATIONS ARE POSSIBLE

REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 STATEPLANE MAINE WEST FIPS 1802 FEET
2. PROPOSED PHASE 14 WASTE BOUNDARY PROVIDED BY GEOSYNTEC CONSULTANTS ON JULY 23, 2019.
3. FACILITY SITE BOUNDARY PROVIDED BY GEOSYNTEC CONSULTANTS ON JULY 25, 2019 AND UPDATED WITH DATA PROVIDED BY BOYNTON & PICKETT LLC ON OCTOBER 18, 2019.
4. STREAMS LAYER FROM SHAPEFILE RECEIVED FROM NORMANDEAU ENVIRONMENTAL CONSULTANTS (NORMANDEAU) DATED MAY 3, 2019 AND GEOSYNTEC CONSULTANTS ON JULY 25, 2019.
5. PIEZOMETER AND SOIL BORING LOCATIONS SURVEYED BY BOYNTON & PICKETT AND PROVIDED ON 25 SEPTEMBER 2017 ("SURVEY INFROMATION"), OCTOBER 2018 ("WM MW CROSSROADS PIEZOMETER LOCATION OCT.2018), 17 APRIL 2019 ("WM MW PHASE 14 PZ GB MW LOCTIONS 04.17.2019").
6. EXISTING GROUND SURFACE WITHIN PHASE 14 AREA FROM CAD FILE "WM MAINE WEST PHASE 14 TOPO NOV 2017 (DELIVERABLE (2))".DWG CREATED BY BOYNTON AND PICKETT, AS PROVIDED BY GEOSYNTEC DATED 7 SEPTEMBER 2018. EXISTING GROUND SURFACE SURROUNDING PHASE 14 AREA FROM CAD FILE "BE0232 TOPO 09-2016 (SP)".DWG CREATED BY AERIAL SURVEY & PHOTO INC. AND BOYNTON & PICKETT, AS PROVIDED BY GEOSYNTEC DATED 7 SEPTEMBER 2018. EXISTING GROUND SURFACE CONTOUR DATA WERE MERGED.

CLIENT

WASTE MANAGEMENT DISPOSAL SERVICES OF MAINE, CROSSROADS LANDFILL, NORRIDGEWOCK, ME

PROJECT

PHASE 14 LANDFILL - PERMIT APPLICATION

TITLE

APPROXIMATE AREA OF CLAY THICKNESS LESS THAN 5 FEET

CONSULTANT

GOLDER

YYYY-MM-DD	11/5/2020
DESIGNED	JMB
PREPARED	SHL
REVIEWED	BDL
APPROVED	APTM

PROJECT NO.	CONTROL	REV.	FIGURE
19119078.500	-	-	1

PZ-15D 6.5
PZ-8D 3.5
PZ-12D 1.1
PZ-11D 3.0
CPT01 2.5
CPT06 2.5
PZ-6S 3.0
CPT07 1.5
MW14-06D 5.3
GB-01 7.8
MW14-01B 3.5
CPT03 8.5
CPT05 2.5
GB-02 7.5
PZ-10D 7.7
PZ-5D 7.0
CPT04 5.0
CPT09 6.0
PZ-4S 7.0
CPT10 8.0
PZ-9D 8.0
CPT28 6.5
CPT11 10.3
GB-03 6.0
CPT25 5.0
CPT31 4.2
CPT30 4.5
CPT12 7.5
CPT12B 9.0
GB-15 6.0
CPT27 2.6
CPT24 6.7
CPT13 8.5
MW14-05D 6.6
GB-04 9.5
PZ-3S 8.0
GB-11 5.5
GB-13 8.0
GB-14 5.7
GB-05 10.0
GB-07 6.0
CPT14 6.0
CPT35 6.5
GB-12 4.0
PZ-2S 2.2
CPT15 8.2
CPT16 10.0
PZ-7D 10.3
CPT22 4.8
GB-06 7.2
GB-18 8.8
CPT23 7.5
GB-08 7.7
GB-21 7.0
CPT41 8.0
CPT19 7.0
CPT18 9.0
PZ-1S 11.2
MW14-04B 8.0
GB-09 8.8
GB-16 9.2
MW14-02B 7.5
CPT17 9.5
GB-17 5.5
PZ-14D 10.9
CPT37 10.5
MW14-03B 9.5
GB-10 12.6
CPT38 7.8
PZ-13D 3.7
GB-19 6.0

LEGEND

- Geosyntec Cone Penetrometer (CPT) Test Location
- Soil Boring Location
- Interpreted Stiff Upper Presumpscot Clay 5-foot Thickness Contour in Areas not Underlain by Soft Lower Presumpscot Clay
- Interpreted Stiff Upper Presumpscot Clay 5-foot Thickness Depression Contour in Areas not Underlain by Soft Lower Presumpscot Clay
- Interpreted Stiff Upper Presumpscot Clay Thickness Contour (feet)
- Interpreted Stiff Upper Presumpscot Clay Thickness Depression Contour (feet)
- Proposed Phase 14 Waste Boundary
- Facility Site Boundary
- Ground Surface Topographic Contour
- Stream
- Approximate Area of Clay Thickness Less Than 5 Feet (See Note #1)
- Approximate Extent of Area With No Soft Lower Clay
- Extent of Imported Silt-Clay Fill That Will Be Compacted and Tested (See Reference #7)

0 300 600

1 " = 300 feet Feet

NOTE(S)

1.THE APPROXIMATE AREA OF CLAY THICKNESS LESS THAN 5 FEET REPRESENTS APPROXIMATELY 5.9% OF THE PHASE 14 FOOTPRINT. THIS AREA IS NOT UNDERLAIN BY SOFT LOWER CLAY AND INCLUDES THE AREA AROUND CPT30.
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REFERENCE(S)

1. COORDINATE SYSTEM: NAD 1983 STATEPLANE MAINE WEST FIPS 1802 FEET
2. PROPOSED PHASE 14 WASTE BOUNDARY PROVIDED BY GEOSYNTEC CONSULTANTS ON JULY 23, 2019.
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7. EXTENT OF IMPORTED SILT-CLAY FILL THAT WILL BE COMPACTED AND TESTED OBTAINED FROM THE SEPTEMBER 23, 2020 SUPPLEMENTAL INFORMATION IN SUPPORT OF PHASE 14 SOLID WASTE PERMIT APPLICATION, ATTACHMENT B (VARIANCE) PREPARED BY GEOSYNTEC CONSULTANTS.

CLIENT

WASTE MANAGEMENT DISPOSAL SERVICES OF MAINE, CROSSROADS LANDFILL, NORRIDGEWOCK, ME

PROJECT

PHASE 14 LANDFILL - PERMIT APPLICATION

TITLE

APPROXIMATE AREA OF IMPORTED COMPACTED SILT-CLAY

CONSULTANT

GOLDER

YYYY-MM-DD	11/5/2020
DESIGNED	JMB
PREPARED	SHL
REVIEWED	BDL
APPROVED	APTM

PROJECT NO.	CONTROL	REV.	FIGURE
19119078.500	-	-	2

PATH: B:\Waste_Management\Norridgewock_Maine\99_PROJ\19119078_Crossroads\0002_SiteAssessmentRpt_DataAnalysis\40_PROD\19119078-0002HIS-0023.mxd PRINTED ON: 2020-11-05 AT: 11:18:24 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

EXHIBIT E

Geosyntec consultants

289 Great Road, Suite 202
Acton, Massachusetts 01720
PH 978.623.9588
www.geosyntec.com

Memorandum

Date: 31 October 2020

To: Sherwood McKenney, District Engineer
Waste Management Disposal Services of Maine, Inc. (WMDSM)

From: Scott Luettich, P.E.
Geosyntec Consultants

Subject: Response to Question about Mt. Tom asked during Public Hearing
Phase 14 – Solid Waste Permit Application
Crossroads Landfill, Norridgewock, Maine

This memorandum answers a question asked during the 1 October 2020 Phase 14 Public Hearing about whether the Phase 14 landfill will be visible from Mt. Tom, and whether Mt. Tom is used for public recreational purposes.

Response. Mt. Tom is located in Smithfield approximately 3½ miles south-southwest of the Crossroads facility. The peak of Mt. Tom is at elevation 732 ft msl. There are two hills, Wilder Hill and Ross Hill, with peaks at elevations of 459 ft msl and 430 ft msl, respectively, between Smithfield and the Crossroads facility that block much of the view from Mt. Tom to the north-northeast in the direction of Crossroads. Based on topography alone (i.e., if there were no trees or other vegetation) there could be a small possibility of seeing the upper part of Phase 14 (proposed final elevation of 468 ft msl) in a gap between the two hills, however, the ability to distinguish or recognize the Phase 14 feature in a gap between two other large landforms at a distance of over 3½ miles is unlikely. More importantly, aerial photographs of the area obtained from Google Earth images (see attached Figures 1, 2, and 3) show that the summit of Mt. Tom is covered with trees, with the exception of one small clearing for a fenced-in communications antenna tower on the top. There is a gated unpaved road from Route 139, with power lines and/or telephone lines following the alignment of the road to the antenna at the top. The stand of trees at the top is mature (see attached Figure 4) and there are no apparent wood-harvesting or tree-thinning patterns near the summit.

Maps of local hiking spots on *www.AllTrails.com* and personal reconnaissance conducted by WMDSM personnel indicate there are no public hiking trails or scenic overlooks on Mt. Tom. A marked snowmobile trail goes along the bottom of the mountain on the east, south, and west sides. But since Crossroads is to north, and since the trails are at relatively low topographic elevations and traverse through largely wooded areas, the trees and other hills or landforms block visibility of Crossroads from these trails.

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Figure 1. Google Earth Image of Mt. Tom and Crossroads Area

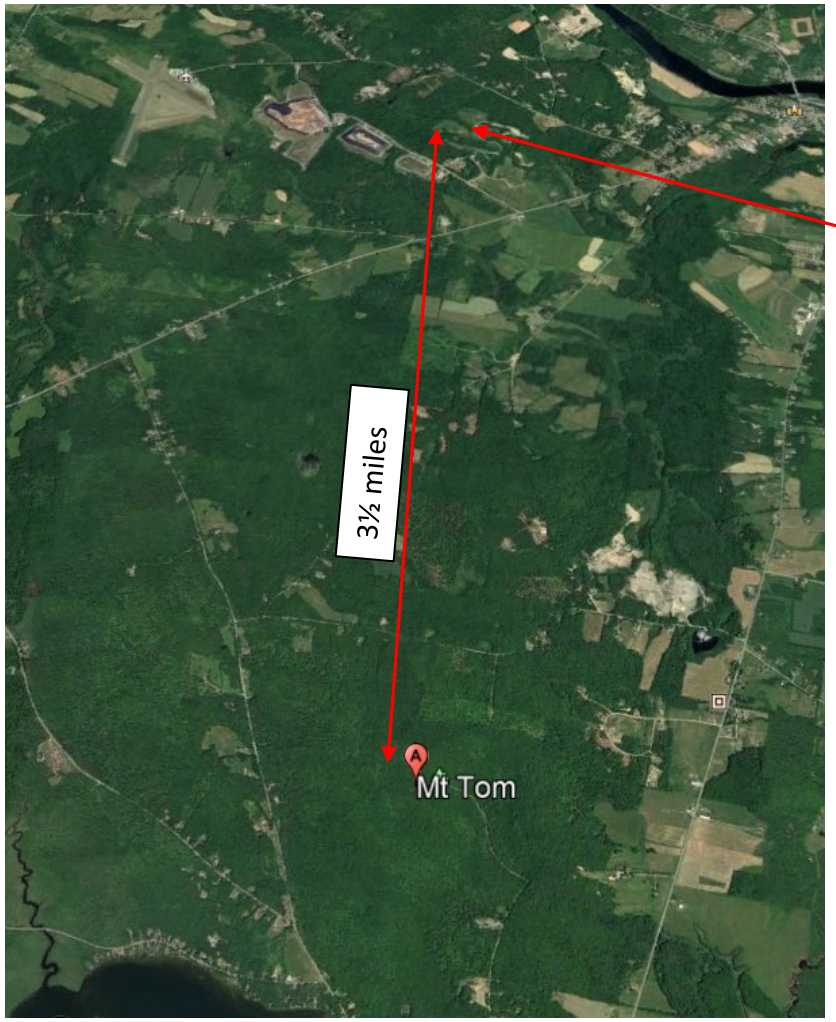

Figure 2. Google Earth Image of Unpaved Road to Mt. Tom Summit

Figure 3. Google Earth Image of Fenced-in Antenna Tower on Mt. Tom Summit

Figure 4. Photographs of View Looking North from Fenced Clearing for Antenna Tower on Mt. Tom Summit