

State of Oregon

## Department of Environmental Quality Memorandum

Date: June 8, 2012

**To: Municipal Solid Waste Landfill Permittees, Owners, and Operators**

**Through: DEQ Solid Waste Managers**

**From: DEQ Solid Waste Engineers and Hydrogeologists**

**Subject: Guidance for obtaining a Department RD&D Permit**

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### Introduction

In the March 22, 2004, Federal Register, the Environmental Protection Agency (EPA) added new provisions to the Criteria for Municipal Solid Waste Landfills (MSWLFs) under 40 CFR Part 258 allowing approved States to issue research, development, and demonstration (RD&D) permits. This new Federal Rule (Rule) will allow the Director of an approved state to issue permits waiving specific requirements of the MSWLF criteria in order to promote innovative and new landfill technologies and operating processes, provided that landfill operators demonstrate there will be no increased risk to human health or the environment. The scope of RD&D permits allowed under the Rule is currently limited to variances from run-on, liquids restrictions, and final cover criteria set forth in 40 CFR 258.26(a)(1), 40 CFR 258.28(a), and 40 CFR Subpart F, respectively. As described in 40 CFR 258.4(f), some small MSW landfills are not eligible to receive a RD&D permit.

States electing to implement the Rule are allowed to develop the process and methodology for issuing RD&D permits. This approach to Rule implementation will provide States with considerable flexibility in authorizing the allowed variances from the federal MSWLF criteria. ORS 183.560 and 183.562 require the Department to provide clear, understandable written information about what applicants have to do in order to get a Department permit or approval. To provide guidance that also allows the flexibility contemplated by the Rule, this memo :

- establishes goals to clarify DEQ's position on the federal RD&D Rule,
- describes the process for obtaining permit authorization to implement a RD&D project,
- describes the general information that should be included in all RD&D applications,
- describes specific information and criteria for RD&D applications proposing to add liquids to landfills, and

- describes specific information and criteria for RD&D applications proposing an alternative cover variance from Subpart F.

**Oregon RD&D Goals:**

"Oregon RD&D Goals" build upon and clarify relevant guidance already provided by EPA. To make efficient use of limited staff resources in implementing the unfunded RD&D Rule, the Department has established the following "Oregon RD&D Goals" to encourage promising technologies and discourage questionable technologies by streamlining approval of promising technologies and clarifying the types of RD&D projects the Department will permit:

- By authorizing RD&D projects, the Department seeks to promote promising innovative technologies for the design and operation of MSWLFs that may otherwise be at variance with MSWLF criteria.
- For an innovative technology to be eligible for consideration and permitting in Oregon, the proposed RD&D project must be an allowed variance under the Federal Rule and should: (1) have an identified potential environmental benefit over and above any environmental protection or benefit realized by implementing already approved plans and operations; (2) be based on sound technical theory that is supported by valid empirical evidence to confirm that the project goal(s) will likely be achieved by the proposed technology; and (3) demonstrate that it will pose no additional risk to human health and the environment beyond that which would result from a landfill operating under the criteria contained in the existing MSWLF permit and related plan approvals.
- RD&D projects should be limited to MSWLF units that are constructed with a Department-approved composite liner system to reduce the potential for increased risk to the environment. This goal is also consistent with OAR 340-040-0020(11) requiring ". . . *the highest and best practicable methods to prevent the movement of pollutants to groundwater.*"

### **RD&D Permit Application and Issuance Procedures:**

The RD&D permit application and issuance procedures generally follow the existing procedures for processing a permit-modification application under OAR 340-093-0070. In summary, a RD&D application to modify a solid waste permit:

- Must be submitted in triplicate on forms provided by the Department in accordance with OAR 340-093-0070 (3)(a), and include all applicable information required by OAR 340-093-0070(4), including written recommendations of the local government in accordance with OAR 340-093-0070(3)(b).
- Must be submitted at least 60 days before a proposed permit addendum is drafted for public notice in accordance with OAR 340-093-0070(1).
- In accordance with OAR 340-093-0070(2), the Department will conduct a preliminary review within 45 days after receipt. If the Department's preliminary review determines that the application does not satisfy Oregon's RD&D Goals then the Department may withdraw and return the application to the applicant.
- RD&D permit modifications are classified as a Category 2 permit action according to OAR 340-093-0105. However, the Department may use its discretion under OAR-093-0100(3) to initially treat RD&D proposals as Category 3 permit actions for purposes of public involvement.
- The Department will take final action on a RD&D permit modification within 45 days of the close of the comment period (OAR 340-093-0110 (1)).
- If approved, a RD&D proposal will become a 3-year addendum to the Solid Waste permit with the ability to be renewed for additional 3-year periods by letter approval from the Department. The total term of an RD&D permit, including renewals, will not exceed the maximum term of twelve years allowed by the Federal Rule.
- In addition to its authority to terminate or revoke a permit pursuant to OAR 340-093-0115 or 40 CFR 258.4(d), the Department may also effectively terminate a RD&D project by not renewing the RD&D permit addendum or by doing a Department initiated modification to the permit pursuant to OAR 340-093-0113 to remove the RD&D allowed activities and reporting requirements. Reasons for not renewing a RD&D project include:
  - noncompliance with relevant permit and/or plan approval conditions;
  - evidence that the project is creating or causing an increased risk to human health or the environment;
  - evidence that the project is not achieving the project/permit goals; and/or
  - failure to implement the project during the permit period.

### Information to be included in all RD&D Permit Applications:

Consistent with Oregon's RD&D Goals, applications for RD&D projects should include information about how a proposed technology will improve landfill operations and/or design in an environmentally beneficial way without increasing any risk to human health or the environment relative to plans and criteria approved under the existing MSWLF permit.

Consistent with OAR 340-093-0070(4), RD&D applications to modify a solid waste permit should, as applicable, include the following information:

- An updated Land Use Compatibility Statement (LUCS); or written recommendations of the local government in accordance with OAR 340-093-0070(3)(b).
- Clearly stated RD&D goals in objective, measurable terms where possible.  
[OAR 340-093-0070(3)(h)] [40 CFR 258.4]
- For RD&D goals based on technology other than the addition of nonhazardous aqueous liquids or use of alternate landfill cover the application should describe the proposed technology in detail, and document examples of where and how the technology has been successfully implemented.  
OAR 340-093-0070(3)(e) & OAR 340-093-0130(2)(e)]
- Explain how implementing the proposed technology will provide a potential environmental benefit over and above any environmental protection or benefit realized by implementing already approved plans and operations. In other words, explain how implementation of the RD&D project would provide an environmental advantage over the existing landfill design and/or operation. [OAR 340-093-0070(3)(h)]
- Define the RD&D project scope in terms of size, duration, types and quantities of wastes/liquids to be disposed. For new technology that is untested in the solid waste disposal industry, the initial project scope should be limited to a pilot demonstration.  
[OAR 340-093-0070(3)(e) & OAR 340-093-0130(2)]
- Detailed plans and specifications, including relevant engineering analyses and calculations prepared and stamped by a qualified registered professional engineer. Such analyses should include a comparative analysis to explain how the proposed RD&D project is at least as protective of human health and the environment as plans and criteria approved under the existing MSWLF permit.  
[OAR 340-093-0070(3)(f) & OAR 340-093-0140]
- An update to the facility Operations Plan that describes how the operator will implement the proposed RD&D project. [OAR 340-093-0070(3)(h)]
- An update to the facility Financial Assurance Plan to account for any increase in the financial assurance amount. [OAR 340-093-0070(3)(h)]
- An update to the facility Environmental Monitoring Plan that consists of a plan for site-specific RD&D-related monitoring, testing, and recordkeeping. The type and

frequency of data collection should be designed to both determine whether the RD&D goals are being achieved, and to confirm that there is no increased risk to human health or the environment. [OAR 340-093-0070(3)(h)] [40 CFR 258.4(c)]

- Criteria by which to evaluate collected data to determine RD&D performance in meeting the stated goals, and confirm that there is no increased risk to human health or the environment. [OAR 340-093-0070(3)(h)] [40 CFR 258.4(c)]
- Describe the information that will be summarized and evaluated in the annual report to the Department. [OAR 340-093-0070(3)(h)] [40 CFR 258.4(c)(4)]
- Describe how the resulting RD&D information will be transferred to EPA to assist in the development of national standards. For example, a copy of the annual report could be sent to the Director, Municipal and Industrial Solid Waste Division of the Office of Solid Waste (mail code 5306W), U.S. EPA, 1200 Pennsylvania Ave., NW., Washington, D.C. 20460. [OAR 340-093-0070(3)(h)]

### **Specific Information and Recommended Criteria Applicable to RD&D Applications Proposing to Add Liquids:**

All of the variances currently allowed under an RD&D permit (40 CFR 258.4), would add liquids to a landfill either from disposal of bulk liquid waste, storm water run-on, or increased infiltration through an alternative cover system. Consequently, the Department has focused its efforts on drafting the following specific guidance for such proposals in order to streamline our review by clarifying the Department's goal posts and expectations consistent with ORS 183.560 and 183.562. This guidance is also an effort by the Department to facilitate consistency in our reviews, so that a level playing field can be maintained for permitted landfills.

This guidance for design plans, operations, monitoring and reporting is intended to provide suggested ways for an applicant to address Department areas of interest based on applicable law in evaluating an RD&D permit application for adding liquids to a MSWLF. To the extent specific criteria or standards are provided, compliance with those standards or criteria will demonstrate to the Department that an area of interest is satisfied. However, because this Memorandum is guidance, an applicant may demonstrate in the application that a Department area of interest is satisfied by an alternative solution based on applicable law and showing that the alternative is at least functionally equivalent to the respective criteria or standard provided in the guidance.

#### **DESIGN PLANS and SPECIFICATIONS**

Detailed plans and specifications should show how a MSWLF unit is designed or retrofitted to add liquids in a manner that will both achieve RD&D project goals, and manage the increased leachate flux and gas production with no increased risk to human health or the environment.

<p><b>Stability</b></p>	<p>Addition of liquid into the waste to increase biological activity will increase the density and total weight of the waste mass and may cause an increase in internal pore pressure. Submit or update (if previously submitted) a geotechnical analysis to evaluate the effect of liquid addition on the structural integrity and stability of the landfill's foundation, liner system, leachate collection system, and waste mass.</p> <p>Use the geotechnical analysis, as applicable, to develop operational criteria for:</p> <ul style="list-style-type: none"> <li>• the rate and volume of liquids addition,</li> <li>• locating liquids addition relative to slopes, and</li> <li>• locating piezometers or implementing another methodology to monitor that fluid levels within the primary leachate collection layer and waste mass are maintained consistent with stable conditions.</li> </ul> <p><b>Other Relevant Criteria:</b></p> <ul style="list-style-type: none"> <li>• The geotechnical analysis should include or update the applicable stability analyses in Section 7.13 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>, including evaluation of the structural stability of leachate collection pipe, and the stability factor of safety for the condition of maximum expected head buildup in the primary leachate collection layer. To be most conservative consider using residual shear strength conditions; and</li> <li>• Consider suggested stability Factor of Safety guidance contained in Section 7.13 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>.</li> </ul>
<p><b>Containment System Compatibility with Liquids Addition</b></p>	<p>Submit or reference (if previously submitted) containment system design information, including as applicable:</p> <ul style="list-style-type: none"> <li>• Primary liner system design information consistent with Sections 7.2, 7.3, 7.4, and 7.13 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>;</li> <li>• Secondary leak detection/ leachate collection system design information consistent with Sections 7.6, and 7.13 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>; and</li> <li>• For an alternative composite liner design, either demonstrate that it's designed to leak at a rate less than the leakage predicted for a standard composite liner design as defined in 40 CFR 258.40(b), or conduct an alternative liner design demonstration in accordance with Section 5.4 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>.</li> </ul> <p><b>Other Relevant Criteria:</b>          Consistent with Oregon's RD&amp;D Goals, the Department's July 13, 2000, <u>Solid Waste Policy on Alternative Liner Design (ALD) Approval Without Conducting an ALD Demonstration</u>, and the Department's leachate recirculation guidance provided in a June 3, 1999 letter to Klamath County, the landfill containment system should be designed</p>

	<p>and constructed using:</p> <ul style="list-style-type: none"> <li>• A primary liner system consisting of either a standard composite liner design as defined in 40 CFR 258.40(b), or a Department-approved alternative composite liner design; and</li> <li>• A continuous secondary leak detection/leachate collection system, underlying the primary liner, at sites located where precipitation is greater than 15 inches per year and depth to groundwater is less than 100 feet; or</li> <li>• A partial secondary leak detection/leachate collection system, underlying the primary liner, at sites located where precipitation is less than or equal to 15 inches per year and depth to groundwater is 100 feet or more.</li> </ul>
<p><b>Leachate Collection System Compatibility with Liquids Addition</b></p>	<p>The primary leachate collection system should be designed and demonstrated to maintain adequate long-term permeability performance with the increased flux of liquid passing through the system. Submit or reference (if previously <i>submitted</i>) primary leachate collection system and operations layer design information consistent with Sections 7.5 and 7.13 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>. Include a liquids balance analysis using the latest version of U.S. EPA's <u>Hydrological Evaluation of Landfill Performance (HELP) Model</u> to estimate the peak daily leachate head build-up in the primary leachate collection layer.</p> <p>Submit a work plan to be implemented for the purpose of demonstrating, as part of each 3-year RD&amp;D permit renewal, that the primary leachate collection system remains functional and continues to perform compatibly with the increased flux of liquid passing through the system (i.e., demonstrate that clogging of the collection layer is not excessive, and that the system continues to effectively pass liquids without unacceptable build-up of leachate head). Possible work plan approaches include:</p> <ul style="list-style-type: none"> <li>• Conducting a pilot study concurrent with liquids addition operations such that collected leachate is passed through replicated cross-sections of the leachate collection system prior to being recirculated. One of the experimental cross-sections could then be removed and evaluated as part of the RD&amp;D renewal every three years.</li> <li>• Periodically exhuming waste to expose a portion of the leachate collection system for inspection and evaluation prior to RD&amp;D renewal.</li> <li>• Monitoring of leachate levels in the primary collection layer to verify that the system is performing adequately to prevent unacceptable build-up of leachate head.</li> </ul> <p><b>Other Relevant Criteria:</b></p> <ul style="list-style-type: none"> <li>• To prevent increased risk of groundwater impacts, the leachate collection system must be designed, constructed and operated to maintain &lt; 30 cm of leachate head on the liner per 40 CFR</li> </ul>

	<p>258.4(a); and</p> <ul style="list-style-type: none"> <li>• For new bioreactor or "wet" landfill units, the design criteria in Section 7.5 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u> should be expanded to:           <ul style="list-style-type: none"> <li>- use large holes in the leachate collection pipe (i.e., 0.5 in diameter);</li> <li>- use granular drainage gravel that is relatively uniform with an initial in-place hydraulic conductivity greater than 1 cm/sec;</li> <li>- design for area filtration/separation above the drainage layer in a broad blanket mode using an appropriate geotextile; and</li> <li>- complement the drainage layer's function with an overlying protective operations layer that has sufficient permittivity to pass liquids into the leachate collection system without leachate mounding.</li> </ul> </li> </ul>
<p><b>Gas Control System</b></p>	<p>Adding aqueous liquids will accelerate and increase the production of landfill gas. The landfill gas control system should be designed to control gas migration, odor and air emissions, and achieve applicable RD&amp;D goals (e.g., such as optimizing gas production for energy recovery). Submit landfill gas control system design plans and calculations in accordance with Sections 7.12 and 7.13 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>. Describe how the expected increase in gas emissions resulting from adding liquids to the waste mass will be initially controlled, and include a schedule for subsequently expanding gas control measures as needed to comply with applicable RD&amp;D goals, design criteria, and regulatory requirements, including applicable federal and state air emission limits.</p> <p><b>Other Relevant Criteria:</b></p> <ul style="list-style-type: none"> <li>• Increased gas emissions resulting from adding liquids to the waste mass should be controlled;</li> <li>• Landfill cover should be designed and constructed to facilitate landfill gas collection and control of emissions both during active operations and post-closure care; and</li> <li>• For active gas collection systems, the designer should consider the pressure buildup condition on slope stability and landfill cover when the collection system is shut down for any significant time.</li> </ul>
<p><b>Controlled Liquids Addition</b></p>	<p>Estimate design flow rates for liquid addition/recirculation and collection, and the liquid storage capacity available in the waste mass. Design and describe the system(s) for distributing moisture uniformly throughout the waste mass. Include the types of liquid to be added as well as operational specifications for the rate, volume, locations and methods of liquids addition designed to distribute fluids, and maintain uniform moisture content within the waste mass consistent with RD&amp;D goals for enhancing biostabilization and/or optimizing gas production.</p> <p><b>Other Relevant Criteria:</b></p>

- Controlled liquids addition should be designed and operated to both maintain < 30-cm of leachate head on the liner, and fluid levels within the waste mass that are consistent with stable conditions.

## OPERATIONS

The operations plan should describe how the bioreactor or "wet" landfill unit will be operated in a manner that will both achieve RD&D project goals, and control liquids and landfill gas with no increased risk to human health or the environment.

Based on the geotechnical analysis and relevant design criteria, update the facility operations plan to address controlled liquids addition and gas management. The update to the operations plan should include:

- A fill sequencing plan;
- A description of key operations staffs' experience and training related to operating a bioreactor type landfill;
- A description of operating practices that will:
  - maintain stable conditions;
  - manage the rate, volume, location and method of liquids addition to effectively distribute liquids uniformly throughout the waste mass in a manner that will both enhance biostabilization and/or optimize gas production, and minimize saturation zones within the waste mass that can lead to instability;
  - prevent the creation of continuous low permeability soil or waste layers that can trap and impede the flow/distribution of liquids, thereby creating stability concerns, dry pockets of waste, and potential leachate outbreaks;
  - minimize the potential occurrence of leachate seeps or breakouts, and prevent the possibility of such seeps to contaminate storm water runoff;
  - maintain < 30-cm of leachate head on the liner; and
  - control landfill gas production, collection, migration, and emissions.

### Other Relevant Criteria:

- Sequence filling to provide stability;
- Limit liquid waste addition to aqueous liquids that will support biostabilization processes;
- Liquids should only be added to landfill areas underlain by at least 20-feet of waste to reduce the amount of liquid that is short-circuited directly to the leachate collection system; and
- To facilitate landfill stability, operations should strive to minimize perched leachate zones, and keep liquids addition away from slopes (i.e., operate in middle of landfill unit away from slopes).

## MONITORING

Landfilled waste typically progresses through five phases of degradation (Reinhart and Townsend, 1998). This degradation process can collectively be considered as waste stabilization (i.e., biostabilization), with each phase (characterized by the quality and quantity of leachate and landfill gas produced) marking a change in the microbial

<p>processes within the landfill. Addition of aqueous liquids to the MSW mass will generally accelerate this biostabilization process, including increased landfill gas production. To evaluate the impact of liquids addition in terms of biostabilization and/or optimization of gas production requires an understanding of which phase of degradation a landfill unit is in. Therefore, the monitoring program for adding liquids should also include monitoring of leachate, landfill gas, and waste parameters that are critical to evaluating the performance of designed systems and operational practices so that they can be managed and, if necessary, improved.</p> <p>Update the facility Environmental Monitoring Plan to propose a monitoring program related to liquids addition, including QA/QC procedures developed in accordance with Sections 10.11 and 10.12 of the Department's September 1, 1996, <u>Solid Waste Landfill Guidance</u>. The following monitoring guidance emphasizes monitoring that is designed to demonstrate: (1) "no increased risk" to human health and the environment; and (2) evaluate the effectiveness of designed systems and operational practices to enhance biostabilization and/or optimize landfill gas production:</p>	
<p><b>Stability</b></p>	<p>Propose piezometer locations (e.g., such as near critical slopes or in areas of concentrated liquids addition), and a monitoring schedule or other acceptable methodology to ensure that liquid levels within the primary leachate collection layer and waste mass are maintained consistent with stable conditions, as identified by the geotechnical analysis.</p>
<p><b>Leachate Collection System Compatibility with Liquids Addition</b></p>	<p>Propose a program to monitor leachate collection system compatibility with liquids additions, including:</p> <ul style="list-style-type: none"> <li>• Evaluation of the potential for chemical or biological clogging of the leachate collection system by monitoring leachate quality parameters such as conductance, total dissolved solids, and biological oxygen demand;</li> <li>• Field verification that primary leachate collection pipes remain continuous and functional over time (e.g., periodically pull a ball or other uniform object through the pipes or conduct a camera inspection of the pipes); and</li> <li>• Field verification that clogging of the leachate collection layer is not excessive (i.e., that the layer retains adequate permeability to effectively pass liquids without unacceptable build-up of leachate head).</li> </ul>
<p><b>Gas Control System</b></p>	<p>Propose monitoring locations, parameters and schedule to measure landfill gas flow volume, composition, temperature, emissions, and energy recover. Landfill gas composition parameters should at a minimum include methane, carbon dioxide, oxygen, and nonmethane organic carbon (NMOC).</p> <p><b>Other Relevant Criteria</b></p> <ul style="list-style-type: none"> <li>• Landfills subject to NESHAPs should also conduct emissions monitoring in compliance with their Oregon Title V Operating Permit.</li> </ul>

<p><b>Controlled Liquids Addition</b></p>	<p>Propose a program to monitor controlled liquids addition, including:</p> <ul style="list-style-type: none"> <li>• Landfill liquids balance including measuring and recording:           <ul style="list-style-type: none"> <li>- rate and volume of liquids addition (including recirculation of leachate and gas condensate);</li> <li>- rate and volume of leachate collection and removal (including gas condensate);</li> <li>- precipitation; and</li> <li>- amount of moisture within the waste mass; and</li> </ul> </li> <li>• Measurement of leachate head on liner to demonstrate maintenance of &lt; 30-cm depth of leachate on the liner as required by 40 CFR 258.4.</li> </ul>
<p><b>Characterize Biostabilization</b></p>	<p>In addition to landfill gas parameters, propose leachate and waste monitoring locations, parameters, and schedule to measure and evaluate biostabilization and/or landfill gas optimization.</p> <p>Leachate parameters should at least include: chemical oxygen demand (COD); biochemical oxygen demand (BOD<sub>5</sub>); temperature; pH (field); volatile organic acids; and ammonia.</p> <p>Waste parameters should at least include: waste temperature; waste settlement; waste density; organic solids; moisture content; pH; and biochemical methane potential (BMP).</p>
<p><b>REPORTING</b></p> <p>Propose an organizational format and describe the content that will be included in an annual report to the Department. In accordance with 40 CFR 258.4(c)(4), the annual report content must include summaries and evaluation of all collected monitoring data, including monitoring of landfill stability, leachate collection system compatibility with liquids addition, the gas control system, controlled liquids addition, and biostabilization. Furthermore, the annual report must demonstrate whether the RD&amp;D project goals are being achieved at "no increased risk" to human health or the environment, based on monitoring data and operational observations.</p> <p>Every third year, prior to RD&amp;D permit renewal the annual report should also include evaluation of drainage layer performance according to a Department-approved work plan.</p>	

**Specific Information and Recommended Criteria Applicable to RD&D Applications Proposing An Alternative Cover Variance From Subpart F:**

In Oregon, the Governor's Advisory Group on Global Warming issued an October, 2004 draft report which included recommended measures to reduce greenhouse gas emissions. One of the proposed measures would require alternative MSWLF covers to control gas emissions comparable to a landfill cover constructed utilizing a

geomembrane barrier layer. If adopted and implemented, such a measure could affect alternative covers authorized under this guidance. If and when the Governor's Advisory Group and the Department develop a final policy on this measure, then this guidance will be updated accordingly with specific information requirements and recommended criteria for an alternative cover variance from Subpart F.

Until a respective policy has been finalized, RD&D applications proposing a variance from the final cover criteria of 40 CFR 258.60(a)(1), (a)(2) and (b)(1) should submit the applicable specific information required by pages 5-11 of this guidance, and must demonstrate the following per 40 CFR 258.4(b):

- Describe how increased infiltration through the alternative cover will maintain < 30-cm leachate depth on the liner; and
- Demonstrate that increased infiltration of liquid through an alternative landfill cover system will not cause contamination to groundwater or surface water.

Applications should also address the following:

- Consistent with the policy and goals section of this guidance, describe how gas emissions from increased precipitation infiltration and a more permeable final cover will be controlled; and
- Demonstrate that landfill gas emissions from a proposed alternative cover will comply with EPA's National Emission Standards for Hazardous Air Pollutants (NESHAPs) for MSWLS.