COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Solid Waste Guidance Memorandum

Subject: **Waste Guidance Memo No. 05-2009**
Research, Development, and Demonstration Plans

To: Regional Waste Program Managers
Regional Solid Waste Permit Writers

From: James J. Golden
Waste Division Director

Date: November 9. 2009

Copies: Regional Directors, Deputy Regional Directors, OWPC Director, OWPC Solid Waste Permit Coordinators

Summary:

This guidance provides solid waste permit writers with a list of documents and information to use when reviewing and processing Research, Development and Demonstration (RDD) Plan Applications.

Electronic Copy:

An electronic copy of this guidance is available on DEQ's website at http://www.deq.virginia.gov/waste/guidance.html.

Contact Information:

Please contact Rebecca Dietrich at (540) 562-6790 or Rebecca.Dietrich@deq.virginia.gov with any questions regarding the application of this guidance.

Disclaimer:

This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate any particular method nor does it prohibit any alternative method. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Research, Development, and Demonstration Plans

I. Introduction

Amendment 5 of the *Virginia Solid Waste Management Regulations* (VSWMR, §9 VAC 20-80-10 *et. seq.*) was promulgated November 1, 2008. This Amendment incorporated Research, Development, and Demonstration (RDD) Plans in §9VAC20-80-485.D. The purpose of this guidance document is to provide solid waste permit writers with a list of documents and information to use when reviewing and processing RDD Plan Applications.

II. Background

On April 21, 2004, EPA promulgated the Final Rule (Rule) for §40 CFR, Subpart A, Section 258.4, "Research, Development, and Demonstration Permits." The purpose of the Rule is to allow Directors of approved state programs to vary from existing requirements for run-on control systems, liquids restrictions, and the final cover requirements, provided that sanitary landfill owners/operators demonstrate that compliance with the RDD Plan will not increase risk to human health and the environment over compliance with a standard sanitary landfill permit. The Rule also provides authority for innovative or new technologies or methods beyond the authority that already exists in the sanitary landfill criteria.[1]

VSWMR, §9VAC20-80-485.D incorporated RDD Plans, as allowed by EPA November 1, 2008.

III. Authority

§10.1-1402 (1) and (11) of the Code of Virginia authorizes the Virginia Waste Management Board to issue regulations as may be necessary to carry out its powers and duties required by the *Virginia Waste Management Act.*

> "The Board shall carry out the purposes and provisions of this chapter and compatible provisions of federal acts and is authorized to:
>
> 1. Supervise and control waste management activities in the Commonwealth."
>
> ..."11. Promulgate and enforce regulations, and provide for reasonable variances and exemptions necessary to carry out its powers and duties and the intent of this chapter and the federal acts, except that a description of provisions of any proposed regulation which are more restrictive than applicable federal requirements, together with the reason why the more restrictive provisions are needed, shall be provided to the standing committee of each house of the General Assembly to which matters relating to the content of the regulation are most

properly referable."

IV. Definitions

The definitions in the *Virginia Waste Management Act* and VSWMR apply to the implementation of these procedures and are not included in the list below.

"**Interim cover systems**" are temporary cover systems applied to a landfill area when landfilling operations will be temporarily suspended for an extended period (typically, longer than 1 year). After a predetermined length of time, the interim cover system is removed and landfilling operations resume or final cover is installed.[2]

"**Bioreactor**" is a landfill or portion of a MSW landfill where any liquid other than leachate (leachate includes landfill gas condensate) is added in a controlled fashion into the waste mass (often in combination with recirculating leachate) to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic (without oxygen) biodegradation of the waste.[3]

V. Guidance Document

As previously mentioned, the intent of this guidance is to provide solid waste permit writers a list of documents and information to use when reviewing and processing RDD Plan Applications. The following provides a summary of the RDD Rule, RDD Plan contents, and processing guidelines.

V.A Overview

1) Applicability

In accordance with §9VAC20-80-485.D, RDD Plans may be submitted for new, existing, or expansion of existing sanitary landfills only. They may not be submitted for construction, demolition, debris landfills or industrial landfills.

The facility must have either a composite liner system (§9VAC20-80-250.B.9) or approved alternative liner system (§9VAC20-80-250.B.10). Provided that the sanitary landfill unit has a leachate collection system that is designed and constructed to maintain less than a 30-cm (12-inch) depth on the liner, in accordance with §9VAC20-80-485.D.1.c, RDD Plans may be submitted for the following processes:

- The addition of liquids, in addition to leachate and gas condensate from the same landfill, for accelerated decomposition of the waste mass, including other measures to enhance stabilization of the waste mass (Addition of Liquids)
- Allowing run-on water to flow into the landfill waste mass (Run-on Control Systems)
- Alternative cover systems and interim cover

Addition of Liquids and Run-on Control System

RDD Plans may be submitted for two operating criteria. The Addition of Liquids allows a waiver to the liquids restrictions of §9VAC20-80-250.C.17.a(1). Similarly, the Run-on Control Systems allows a waiver to §9VAC20-80-250.B.6.a for the prevention of stormwater flow onto the active portion of landfill. EPA determined that adequate flexibility exists with the alternative liner design authority currently provided in 40 CFR, Part 258, Subpart D, 258.4, (§9VAC20-80-780) and, therefore, the more appropriate action for the relaxation of the liquids restriction is to allow the waiver to these two operating criteria.[1]

In support of these waivers, EPA acknowledged that new or improved technologies for landfill operations and design have emerged since promulgation of the Subtitle D criteria in 1991. These technologies include:

1) Improvements in liner system design and materials
2) Improvements in the design of, and materials used in leachate drainage and recirculation systems
3) New processes, more rapid degradation of waste which require the addition of water or steam
4) New liquid distribution techniques
5) Improvements in various monitoring devices[1]

It is important to note that the underlying purpose of the liquids restrictions – protection of groundwater – must continue to be fulfilled. The RDD Rule is intended to provide the authority for approved states to allow the addition of liquids other than recirculated leachate/gas condensate, but only where the owner/operator adequately demonstrates that the alternative liner design, under conditions of added liquids, provides groundwater protection – and in general is as protective of human health and the environment as the currently required Subtitle D landfill liner design of §9VAC 20-80-250.B.9.[1]

Alternative Cover and Interim Cover

The RDD Rule also allows a waiver from the final cover requirements (§9VAC20-80-250.E.1.b(1)(a), §9VAC20-80-250.E.1.b(1)(b), and the alternate final cover allowed by §9VAC20-80-250.E.2.a) with respect to the infiltration and permeability layer. Alternative covers may not meet the infiltration performance standard in VSWMR. As long as the proposed cover system is at least as resistant to infiltration as the bottom liner system or no more permeable than 1×10^{-5} cm/s, whichever is less, an RDD Plan is not required.

One example of an alternative cover is a phytocover. Rather than serving as a complete physical barrier, phytocovers provide a totally different approach to controlling water infiltration to a landfill by using plants to remove moisture from the soil cover of the landfill and to control chemical or nutrient seepage on the surface of the landfill.[1]

The RDD Rule does not allow a waiver from final cover requirements with respect to the erosion layer since §9VAC20-80-250.E.2.b allows for an alternative cover design that provides equivalent protection from wind and water erosion as the erosion layer specified in §9VAC20-80-250.E.1.(2).[1]

In addition, RDD Plans may be submitted to allow the use of interim cover systems and/or alternative cover timelines, in accordance with §9VAC20-80-485.D.2.p and §9VAC20-80-485.D.1.k, respectively.

2) Facility Eligibility

In order for a facility to be eligible for an RDD permit, they must meet the following criteria:

a) Be a permitted, operating sanitary landfill (§9VAC20-80-485.D.1.b); and
b) Dispose of more than 20 tons/day, based on an annual average (§9VAC20-80-485.D.1.e).

§40 CFR, Subpart A, Section 258.1(f)(1) already exempts these small landfills from the design (Subpart D) and groundwater monitoring and corrective action requirements (Subpart E of Subtitle D) as long as there is no evidence of existing groundwater contamination from the sanitary landfill unit and the unit serves a community which meets certain criteria. EPA concluded that a waiver to add liquids to small landfills which do not have liners meeting the design requirements and/or are exempt from groundwater monitoring requirements would present a reasonable probability of adverse effects on human health or the environment and therefore would not meet the statutory standard for sanitary landfill under Section 4004(a) of RCRA.[1]

If the facility meets the above conditions but is currently in corrective action for groundwater or landfill gas migrations the following additional conditions apply:

a) Sanitary landfills that are in corrective action for groundwater or have exceeded groundwater protection standards at statistically significant levels as outlined in §9VAC20-80-300.B from any waste unit on-site shall have implemented a remedy in accordance with §9VAC20-80-310.C prior to RDD Plan submittal

b) Sanitary landfills that have had landfill gas migration beyond the facility boundary, shall have implemented a landfill gas control system, in accordance with §9 VAC 20-80-280, prior to RDD plan submittal.

Once a facility has been deemed eligible to participate in the RDD Program, determination of acceptance should be made on a case-by-case basis.

V.B Research, Development, and Demonstration Plan Contents

1) Requirements for All RDD Plans

The following information must be included in all RDD Plans.

a) §9VAC20-80-485.D.1.a The landfill owner/operator shall have approval by the Department through either a new permit or major permit amendment prior to commencing an RDD Plan.

b) §9VAC20-80-485.D.1.d *All sanitary landfill units with an approved RDD Plan shall have a leachate collection system designed and constructed to maintain less than 30-cm depth of leachate on the liner.* It is important to note the RDD Plan must show that the design and construction of the leachate collection system of the sanitary landfill units will account for the addition of recirculated liquids (i.e., impact of the saturated waste mass on the foundation and liner stability), as well as the leachate produced by the sanitary landfill units, and will maintain less than 30-cm (12-inch) depth of leachate on the liner.

c) §9VAC20-80-485.D.1.g All landfill units shall be designed with a bottom liner system as required by §9VAC20-80-250.B.9 (RCRA Subtitle D liner) or B.10 (alternate liner). The RDD Plan must demonstrate the effectiveness of the liner system and leachate collection system. In addition, the effectiveness of the leachate collection system at the end of the testing period shall be compared to its effectiveness at the beginning of the test period. The effectiveness of the leachate collection system may be determined by assessing the desired changes and end points that the process is intended to achieve, assessing the goals that were set at the beginning of the project and determine if they are being met, or other methods.

d) §9VAC20-80-485.D.1.h *RDD Plans may not include changes to the approved design and construction of subgrade preparation, liner system, leachate collection and removal systems, final cover system, gas and leachate systems outside the limits of waste, run-off controls, run-on controls, or environmental monitoring systems exterior to the waste mass.* Exceptions to this requirement may include changes to the leachate collection system to accommodate leachate recirculation, or other similar design and construction situations. These changes may be addressed by either a minor or major permit amendment, as required in §9VAC20-80-620.

e) §9VAC20-80-485.D.1.i Implementation of the RDD Plan must comply with specific conditions provided in the permit or permit amendment.

f) §9VAC20-80-485.D.1.j Facilities must remove structures and features exterior to the waste mass or waste final grades at the end of the testing period, unless otherwise approved by the Department in writing. For example, equipment that has dual purpose for the RDD process as well as continued operation of the sanitary landfill may remain until the end of the testing period.

g) §9VAC20-08-485.D.2.a Initial RDD Plan Applications must be approved prior to initiation of the process to be tested. General RDD Plan contents include:

(1) Process that will be tested
(2) Preparation and operation of process
(3) Waste types and characteristics that the process will affect
(4) Desired changes and end points that the process is intended to achieve effectiveness of the process
(6) Technical literature references and research that support use of the process
(7) Time period for which the process will be tested
(8) Additional information, operating experience, data generation, or technical developments that the process to be tested is expected to generate

h) §9VAC20-80-485.D.2.h Description of warning symptoms and failure thresholds

i) §9VAC20-80-485.D.2.i Assessment of the process on human health and the environment – both beneficial and deleterious effects

The RDD Plan must demonstrate that there is no increased risk to human health or the environment. EPA has determined that the requisite demonstration of no increased risk to human health and the environment cannot be made unless the sanitary landfill unit(s) to which RDD Plan applies is constructed with a leachate collection system designed to maintain no more than a 30-cm (12-in) depth of leachate on the liner.[1] As previously mentioned in Section V.B.1(b) above, it is important to note the RDD Plan must show that the design and construction of the leachate collection system of the sanitary landfill units will account for the addition of recirculated liquids, as well as the leachate produced by the sanitary landfill units, and will maintain less that 30-cm (12-inch) depth of leachate on the liner.

Additional human health and environmental concerns relating specifically to the RDD waivers are discussed in further detail in Sections V.B.2 and 3 below.

j) §9VAC20-80-485.D.2.j Geotechnical stability analysis of waste mass and assessment of changes that implementation of RDD Plan is expected to achieve

The geotechnical stability analysis and assessment shall be repeated at the end of the testing period, with modification as necessary to include parameters and values derived from field measurements. The RDD Plan shall define relevant parameters and methods for field measurement.

Geotechnical stability of the waste mass is a major concern. Additional discussions specifically related to the RDD waivers are provided in Section V.B.2 and 3 below.

k) §9VAC20-80-485.D.2.k Monitoring parameters, frequencies, test methods, instrumentation, recordkeeping, and reporting – track and verify goals of selected process

l) §9VAC20-80-485.D.2.l Monitoring techniques and instrumentation for potential movements and settlement of waste mass. Proposed time intervals and instrumentation pertinent to the selected process should be included.

m) §9VAC20-80-485.D.2.m Construction documentation, construction quality control and construction quality assurance measures, and recordkeeping for construction and equipment installation

n) §9VAC20-80-485.D.2.n Operating practices and controls, staffing, monitoring parameters, and equipment

o) §9VAC20-80-485.D.5 Certification

Each RDD Plan shall include the following certification, which shall be signed and dated by the facility owner/operator.

I certify that I acknowledge that the Research, Development, and Demonstration (RDD) program is optional. I am also aware that the Department may suspend or terminate the RDD program for any reasonable cause, without a public hearing. Notice of suspension or termination will be by letter for a cause related to a technical problem, nuisance problem, or for protection of human health or the environment as determined by the Department.

*Signed:*_____

Title: _____

Date: _____

p) §9VAC20-80-485.D.4 Termination – The RDD Plan should include the termination information.

The department may require modifications to or immediate termination of the process being tested if any of the following conditions occur:

1) Significant and persistent odors;

2). Significant leachate seeps or surface exposure of leachate;

3) Significant leachate head on the liner;

4) Excessively acidic leachate chemistry or gas production rates or other monitoring data indicate poor waste decomposition conditions;

5) Instability in the waste mass;

6) Other persistent and deleterious effects.
(i.e. inhibition of the gas collection system due to "drowning" of the gas collection wells or exposure of waste beyond the end of the working day, as allowed by §9VAC20-80-250.C.2.c)

As a point of clarification, §9VAC20-80-485.D.2 states, . . . *Processes other than adding liquids to the waste mass and leachate recirculation may be practiced in conjunction with the research, development and demonstration plan.* The permit writer must recognize that the term "other processes" is meant to be in accordance with applicable requirements of RCRA Subtitle D and shall not provide a mechanism for the facility to avoid any and all applicable requirements. The other processes referred to in this statement are those that may occur simultaneously with the RDD processes, such as active gas extraction or additional environmental monitoring or waste mass evaluations that may be necessary to support the RDD implementation.

2) Requirements for RDD Plans That Include Addition of Liquids (Including Aeration of Waste Mass) and/or Run-on System

a) §9VAC 20-80-485.D.2.e

In addition to leachate and gas condensate from the same landfill, for accelerated decomposition of the waste mass and/or for allowing run-on water to flow into the landfill waste mass shall demonstrate that there is no increased risk to human health and the environment. The following minimum performance criteria shall be demonstrated:

(1) Risk of contamination to groundwater and/or surface water will not be greater than the risk without an approved RDD plan.

(2) Stability analysis demonstrating the physical stability of the landfill.

(3) Landfill gas collection and control in accordance with applicable Clean Air Act requirements (i.e., Title V, NSPS or EG rule, etc.).

(4) For RDD plans that include the addition of off-site nonhazardous waste liquids to the landfill, the following information shall be submitted with the RDD plan:

(a) Demonstration of adequate facility liquid storage volume to receive the off-site liquid;

(b) A list of proposed characteristics for screening the accepted liquids is developed; and

(c) The quantity and quality of the liquids are compatible with the RDD plan.

If off-site nonhazardous liquids are certified by the off-site generator as storm water uncontaminated by solid waste, screening is not required for this liquid.

Any alternative liner included in an RDD Plan for the addition of liquids must have a leachate collection system. As previously discussed, an adequate leachate collection system is one that is designed to maintain no more than 30-cm (12-in) depth of leachate on the liner. Liquid addition and/or leachate recirculation on an alternative liner without a leachate collection system above the liner and/or excessive head on the liner should be considered an unacceptable risk to groundwater and potentially to surface water. Standards for groundwater protection requirements for alternative liner designs are included in §9VAC20-80-780. Risk analysis methods are available for sanitary landfills using EPA's MULTIMED and HELP Models. Additional information is available from the technical manual "Solid Waste Disposal Facility Criteria" and technical resource document "Assessment and Recommendations for Improving the Performance of Waste Containment Systems."[1]

A major concern with respect to the addition of water to a landfill is the geotechnical stability of waste. The addition of liquid can change both the strength and behavior of the waste. Therefore, the RDD Plan should include a stability analysis demonstrating the physical stability of the landfill prior to the commencement of the process. The RDD Plan should account for

waste movement and include in the demonstration a description of the methods for determining whether there is any actual or potential movement of the waste or liquid seepage from the landfill. The methods for determining geotechnical stability, as well as the results of monitoring, should be submitted in the annual report.[1]

The deposition of liquid nonhazardous waste should be compatible and suitable with the operation of the landfill, i.e., the waste will not inhibit the biodegradation process or cause operational problems for the landfill, including risks to human health or the environment.[1]

EPA Promulgated the National Emission Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR Part 63, subpart AAAA, Federal Register Volume 68 p. 2227 (http://www.epa.gov/fedrgstr/EPA-AIR/2003/January/Day-16/a088.htm) for municipal solid waste (sanitary) landfills. This rule applies to both major and area sources. The rule includes requirements for initiating landfill gas collection and control in bioreactor landfills. The NESHAPs rule defines bioreactor and that definition is included in Section IV of this guidance. Any landfill that meets the definition of a bioreactor and the size requirements as set forth in part 63, subpart AAAA would have to meet the bioreactor standards at a minimum.[3]

Solid Waste Permit Writers should coordinate with the Regional Air Permitting Program to ensure that the facility will be in compliance with all applicable air regulations at all critical phases of development (i.e., construction and operation) for the proposed or continued operation of the processes.

b) §9VAC20-80-485.D.2.g Addition of liquids - Measures to be integrated with any approved leachate recirculation plan and compliance with requirements for leachate recirculation

c) §9VAC20-80-485.D.2.o Aeration of waste mass:

(a) Temperature monitoring plan
(b) Fire drill and safety plan
(c) Instructions for use of liquids for control of temperature and fires in the waste mass
(d) Instructions for investigation and repair of damage to the liner and leachate collection system

3) Requirements For RDD Plans That Include Alternative Cover or Interim Cover

a) §9VAC20-80-485.D.2.f

RDD plans for testing of the construction and infiltration performance of alternative cover systems shall demonstrate that there is no increased risk to human health and the environment. The proposed final cover system shall be as protective as the final cover system required by 9VAC20-80-250 E. The following minimum performance criteria shall be demonstrated:

(1) No build-up of excess liquid in the waste and on the landfill liner;

(2) Stability analysis demonstrating the physical stability of the landfill;

(3) No moisture will escape from the landfill to the surface water and/or groundwater; and

(4) Sufficient reduction in infiltration so that there will be no leakage of leachate from the landfill.

To demonstrate that a proposed alternative cover will be as protective as a final cover, the RDD Plan must demonstrate that there will be no discharge of liquids from the landfill to the surrounding surface and groundwater.[1]

A major concern regarding final cover performance is prevention of the "bathtub effect," which is caused by water passing through the cover and filling up the liner. A demonstration for an RDD Plan for a waiver from the alternative cover criteria must demonstrate that there will not be a buildup of excess liquid in the waste on the landfill liner. A landfill constructed with a leachate collection system provides the best opportunity for determining the amount of liquid in the landfill system and if there is a buildup of excess liquid on the liner.

In addition, the physical stability of the landfill is a concern for an alternative cover that can have significant permeability and allows the waste to collect additional stormwater, even though there is little or no significant liquid on the liner. This is especially true for landfills that are not operated as bioreactors. The RDD Plan should consider this possibility when developing an alternative cover and ensure that water contacting the waste will not compromise the physical stability of the landfill.[1]

As previously stated, a proposed alternative cover may be more permeable and allow more stormwater into the waste than a final cover. Particular attention should be placed on the management and control of gas and non-methanogenic organic compounds. Solid waste permit writers should coordinate with the Regional Air Permitting Program to ensure that the facility will be in compliance with all applicable air regulations at all critical phases of development (i.e., construction and operation) for the proposed or continued operation of the processes.

Although there is no measurement specified, there is a requirement for a sufficient reduction in infiltration so that there will be no leakage of leachate from the landfill. In many cases, infiltration can be measured, in particular if the landfill has a leachate collection system. If measurement is not an option, alternative means of making a determination must be used. This does not necessarily require modeling, although modeling may be an appropriate means of demonstrating equivalence. Where models do not adequately account for the properties of a proposed alternative cover, the demonstration may be based on reasonable scientific facts and principles. In the case of phytocovers, for example, the demonstration could include the evapotranspiration rate of the cover, i.e., the extent to which the cover would be capable of preventing water from reaching the waste or landfill liner. Therefore, the infiltration rate of water to and through the waste over time could be considered as opposed to the degree of permeability of the cap alone.[1]

With regards to Financial Assurance (FA), the Facility must prepare a cost estimate (in accordance with §9VAC20-80-270-111) for the Subtitle D (or Alternate) Final Cap System that meets the requirements of §9VAC20-80-250.E.1.b or 2. The Facility must also prepare and submit to DEQ's Office of Financial Assurance a FA Mechanism, in accordance with §9VAC20-80-70-140. FA for the Subtitle D (or Alternate) Final Cap System shall remain in place during the test period(s). Once it has been determined that the RDD Final Cap System is a success and it becomes incorporated by EPA and Virginia DEQ, as discussed in Section V.C(2), the FA cost estimate and mechanism for the Facility may be updated to reflect the RDD Final Cap System.

b) §9VAC20-80-485.D.2.p Alternate Interim Cover

RDD plans may include an alternate interim cover system and final cover installation schedule. The interim cover system shall be designed to account for weather conditions, slope stability, and leachate and gas generation. The interim cover shall also control, at a minimum, disease vectors, fires, odors, blowing litter, and scavenging.

A checklist for review of RDD Plan Application has been prepared and is included as an attachment to this Guidance Memo.

V.C Processing

1) Initial Processing of an RDD Plan

As required by §9VAC20-80-485D.1.a, prior to commencement of a process or processes included in an RDD Plan, either a new permit (for a new sanitary landfill) or a major amendment (for existing sanitary landfills or expansions of existing sanitary landfills) must be approved by the Director. Major amendments for an RDD Plan that do not involve an increase in the landfill final grades or a lateral expansion of the footprint will not be subject to the landfill expansion criteria in §9VAC20-80-250 or §9VAC20-80-500. The permit writer is cautioned that this statement in no way releases the facility from the applicable siting, design, construction, operation, monitoring, or closure requirements contained in9VAC20-80-250 and 9VAC20-80-500.

Once the RDD Plan has been deemed technically adequate, the Permit Writer should follow the Permit Issuance (Section II.D) or Permit Amendment (Section III.A) processing guidelines set forth in the Solid Waste Permit Manual. Example Module I pages are attached to this Guidance Memo. They provide sample language for describing the RDD process under the Permit Highlights Section of the Permit Introduction as well as site-specific special conditions in Permit Module I (Section I.F.) that should be included when processing an RDD Plan.

2) Test Periods

§9VAC20-80-485.D.1.f	Test Period Approval
§9VAC20-08-485.D.2.b	Initial Test Period
§9VAC20-80-485.D.2.c and d	Renewal Test Periods
§9VAC20-485.D.3	Reporting and Minor Permit Amendment

The initial test period for implementation of the approved RDD Plan is limited to a maximum of three years. The testing period can be renewed for a maximum of three years. The maximum number of test period renewals is three. The total maximum number of years that an RDD Plan may be implemented is twelve.

EPA always intended the RDD Plan permits to be temporary, discrete approvals from which data could be used for future rulemakings. Therefore, the purpose of RDD permit authority is to allow innovation and experimentation under close state oversight for a limited period. It is not intended to allow permanent operation of a sanitary landfill using means outside the scope of the existing criteria.[1]

If an experiment is successful and the state or EPA wishes a project to continue operation under the RDD permit beyond the 12-year time frame, an amendment to 40 CFR Part 258 would be necessary. EPA anticipates that during the period of the final three year permit term, either the facility would seek a site-specific rule, or EPA would consider a general rulemaking to incorporate the general aspects of the project into the Part 258 criteria. At that time, the project would be evaluated by EPA, and if EPA agreed, the appropriate change, either on a site-specific or general basis, would be proposed. The subsequent EPA evaluation and rulemaking process, which will be similar to the Project XL rulemaking process, is expected to take another one to two years. EPA believes it has reached a balance between the need to support and encourage innovation and the prescriptiveness of the federal criteria.[1]

The facility must obtain written prior approval by the Department to implement an RDD Plan beyond any time limit placed in the initial plan or any renewal. Justification must be provided for renewal.

Test period renewals shall require Department review and approval of Final Reports of performance and progress on achievement of goals specified in the RDD Plan. A Final Report must be submitted at least 90 days prior to the end of each testing period for Department review. Minimum contents of the Final Report include:

1) Assess attainment of goals selected for testing
2) Recommend changes
3) Recommend additional work
4) Summarize problems and their resolution(s)
5) Summary of all monitoring data
6) Testing data and observations of process or effects
7) Recommendations for continuation or termination of the process selected for tested

Staff has **90 days** to review the Final Report as allowed by §9VAC20-80-485.D.3. If the Final Report indicates that the goals of the RDD Plan have been met, are reliable, and are predictable, a minor permit amendment must be processed to allow the continued operation of the process with appropriate monitoring. The RDD Plan approval date will be the Permit Amendment approval date. The minor permit amendment should be processed in accordance with Section III.A of the Solid Waste Permit Manual.

3) Reporting

§9VAC20-80-485 Annual Report

An Annual Report must be prepared and submitted for each year of the testing period. The Annual Report shall include, at a minimum, the same information as listed in Section V.C.2) above for the Final Report. The Annual Report must be submitted to the Department within three months after the anniversary date of the approved permit issuance or permit amendment.

4) CEDS Entries

1) Permit Issuances

Additional CEDS codes will be added for permit amendments, annual reports, and final reports. The permit writer should include a note in the general comments field of the Solid Waste Permit screen in CEDS that the Permit includes an RDD Plan and provide a brief description of the process.

2) Permit Amendments

Add two additional types of Amendment codes:

RDDMAJ	Research, Development, and Demonstration Major Amendment
RDDMIN	Research, Development, and Demonstration Minor Amendment

3) Annual Reports

To provide assistance in tracking the Annual Reports, the following Codes will be added to the Events Table of the Solid Waste Permit Screen:

RDDARPRCV	RDD Annual Report Received
RDDARPRV1	RDD Annual Report Review-1
RDDARPRV2	RDD Annual Report Review-2
RDDARPRV3	RDD Annual Report Review-3
RDDARPRRCV	RDD Annual Report Revision Received
RDDARPAPP	RDD Annual Report Approved

4) Final Reports

To provide assistance in tracking the Final Reports, the following Codes will be added to the Events Table of the Solid Waste Permit Screen:

RDDFRPRCV	RDD Final Report Received
RDDFRPRV1	RDD Final Report Review-1
RDDFRPRV2	RDD Final Report Review-2
RDDFRPRV3	RDD Final Report Review-3
RDDFRPRRCV	RDD Final Report Revision Received
RDDFRPAPP	RDD Annual Report Approved

VI. Collaboration Process

No project team was formed to develop this guidance. Rebecca Dietrich and Jason Williams developed this guidance which was peer reviewed by the Regional Waste Program Managers.

VII. References

1. EPA, 40 CFR Part 258, "Research, Development, and Demonstration Permits for Municipal Solid Waste Landfills – Final Rule"

2. Proposed Amendment 7 to *Virginia Solid Waste Management Regulations* (remunerated as §9VAC20-81-10, et al)

3. EPA 40 CFR Part 63, "National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills – Final Rule"

Technical Review - 1

Research, Development, and Demonstration Plan Application: *(Facility)*				Date RDD Plan Application Received:_____ Date RDD Plan Application Revision(s) Received: _____
I. FACILITY ELIGIBILITY				
	Yes	No		**Comments:**
A. Operating permitted sanitary landfills (SLF) (§ 9VAC20-80-485.D.1.b)				
A.1. Has the SLF exceeded GPS in accordance with §9VAC20-80-300.B from any waste unit on-site? (Y/N)				
If Yes, the SLF must implement a remedy in accordance with §9VAC20-80-310.C prior to RDD Plan Application submittal				
If No, the SLF may proceed to RDD Plan application submittal				
A.2 Has the SLF had exceedance in gas migration in accordance with §9VAC20-80-280? (Y/N)				
If Yes, the SLF must implement a gas control system in place per §9VAC20-80-280.B prior to RDD Plan Application Plan submittal				
If No, the SLF may proceed to RDD Plan application submittal				
B. Does SLF dispose 20 tpd or less of municipal solid waste? (§ 9VAC20-80-485.D.1.e) (Y/N)				
If Yes, the SLF may *not* submit an RDD Plan				
If No, the SLF may submit an RDD Plan				
II. RESEARCH, DEVELOPMENT, AND DEMONSTRATION PLAN CONTENTS	**Provided (y/n)**	**Complete (y/n)**	**Technically Adequate (y/n)**	**Comments:**
A. REQUIREMENTS FOR ALL RDD PLANS				
1. Department approval prior to commencing an RDD Plan - new permit or permit amendment (§9VAC20-80-485-D.1.a)				
2. RDD Plans may be submitted for the following processes (§9VAC20-80-485.1.c):				
2.a) Addition of liquids				
2.b) Run-on Control Systems				
2.c) Alternative Cover Systems and Interim Cover				

Technical Review - 1

II. RESEARCH, DEVELOPMENT, AND DEMONSTRATION PLAN CONTENTS	Provided (y/n)	Complete (y/n)	Technically Adequate (y/n)	Comments:
3. All SLF units with approved RDD Plan must have LCS designed and constructed to maintain less than 12-inch head of leachate on liner (§9VAC20-80-485.1.d)				
4. RDD Plans are restricted to SLF designed with a bottom liner system required by §9VAC20-80-250.B.9. (Subtitle D liner) or B.10. (alternative liner) Effectiveness of liner and leachate collection system (LCS) at end of testing period and compared to effectiveness at beginning of test period. (§9VAC20-80-485.1.g)				
5. Ensure RDD Plans may ***not*** include changes to approved design and construction of subgrade preparation, liner system, LCRS, final cover system, gas and leachate systems outside the limits of waste, run-on and run-off controls, or environmental monitoring systems exterior to the waste mass (§9VAC20-80-485.1.h)				
6. Implementation of RDD Plan must comply with specific conditions provided in the permit or permit amendment. (§9VAC20-80-485.D.1.i)				
7. Facility must remove structures and features exterior to the waste mass or waste final grades at the end of the testing period, unless otherwise approved by Department (§9VAC20-80-485.D.1.j.)				
8. General RDD Plan Contents (§9VAC20-80-485.D.2.a)				
8.a) Process that will be tested				
8.b) Preparation and operation of process				
8.c) Waste types and characteristics that the process will affect				
8.d) Desired changes and end points that the process is intended to achieve				
8.e) Testing methods and observations of the process or waste mass that are necessary to assess effectiveness of the process				
8.f) Technical literature references and research that support use of the process				
8.g) Time period for which the process will be tested				
8.h) Additional information, operating experience, data generation, or technical developments that the process to be tested is expected to generate				

Technical Review - 1

II. RESEARCH, DEVELOPMENT, AND DEMONSTRATION PLAN CONTENTS	Provided (y/n)	Complete (y/n)	Technically Adequate (y/n)	Comments:
9. Description of warning symptoms and failure thresholds that will be used to initiate investigation, stand-by, termination, and changes to the process and any other landfill systems that might be affected by the process, such as gas extraction and leachate recirculation. (§9VAC20-80-485.D.2.h)				
10. Assessment of the manner in which the process to be tested might alter the impact that the landfill may have on human health or environmental quality. The assessment shall include both beneficial and deleterious effects that could result from the process. (§9VAAC20-80-485.D.2.i)				
11. Geotechnical stability analysis of the waste mass and an assessment of the changes that the implementation of the plan is expected to achieve. The geotechnical stability analysis and assessment shall be repeated at the end of testing period, with alteration as needed to include parameters and parameter values derived from field measurements. The RDD Plan shall define relevant parameters and techniques for field measurement. (§9VAC20-80-485.D.2.j)				
12. Monitoring parameters, frequencies, test methods, instrumentation, record-keeping and reporting to the department for purposes of tracking and verifying goals of the process selected for testing. (§9VAC20-80-485.D.2.k)				
13. Monitoring techniques and instrumentation for potential movements of waste mass and settlement of waste mass, including proposed time intervals and instrumentation, pertinent to the process selected for testing. (§9VAC20-80-485.D.2.l)				
14. Construction documentation, construction quality control and construction quality assurance measures, and recordkeeping for construction and equipment installation that is part of the process selected for testing. §(9VAC20-80-485.D.2.m)				
15. Operating practices and controls, staffing, monitoring parameters and equipment needed to support operations of the process selected for testing. (§9VAC20-80-485.D.2.n)				
16. Certification (§9VAC20-80-485.D.5)				
17. Termination - The Department may require modification to or immediate termination of the process being tested if any of the following conditions occur: (§9VAC20-80-485.D.4)				
17.a) Significant and persistent odors				

Technical Review - 1

II. RESEARCH, DEVELOPMENT, AND DEMONSTRATION PLAN CONTENTS	Provided (y/n)	Complete (y/n)	Technically Adequate (y/n)	Comments:
17.b) Significant leachate seeps or surface exposure of leachate				
17.c) Significant leachate head on the liner				
17.d) Excessively acidic leachate chemistry or gas production rates or other monitoring data indicate poor waste decomposition conditions				
17.e) Instability in the waste mass				
17.f) Other persistent and deleterious effects (i.e. inhibition of the gas collection system due to "drowning" of the gas collection wells or exposure of waste beyond the end of the working day, as allowed by §9VAC20-80-250.C.2.c)				
B. REQUIREMENTS FOR RDD PLANS THAT INCLUDE ADDITION OF LIQUIDS (INCLUDING AERATION OF WASTE MASS) AND/OR RUN-ON SYSTEM				
1. Demonstrate the following minimum performance criteria to show that there is no increased risk to human health and the environment. (§9VAC20-80-485.D.2.e)				
1.a) Risk of contamination to groundwater and/or surface water will not be greater than the risk without an approved RDD plan.				
1.b) Stability analysis demonstrating the physical stability of the landfill.				
1.c) Landfill gas collection and control in accordance with applicable Clean Air Act requirements (i.e., Title V, NSPS or EG rule, etc.).				
1.d) For the addition of off-site nonhazardous waste liquids to the landfill, the following information shall be submitted with the RDD Plan:				
1.d)(1) Demonstration of adequate facility liquid storage volume to receive the off-site liquid				
1.d)(2) A list of proposed characteristics for screening the accepted liquids is developed				
1.d)(3) The quantity and quality of the liquids are compatible with the RDD plan				
If off-site nonhazardous liquids are certified by the off-site generator as storm water uncontaminated by solid waste, screening is not required for this liquid.				

Technical Review - 1

II. RESEARCH, DEVELOPMENT, AND DEMONSTRATION PLAN CONTENTS	Provided (y/n)	Complete (y/n)	Technically Adequate (y/n)	Comments:
2. Measures to be integrated with any approved leachate recirculation plan and compliance with requirements for leachate recirculation (§9VAC20-80-485.D.2.g)				
3. Aeration of Waste Mass (§9VAC20-80-485.D.2.o)				
3.a) Temperature monitoring plan				
3.b) Fire drill and safety plan				
3.c) Instructions for use of liquids for control of temperature and fires in the waste mass				
3.d) Instructions for investigation and repair of damage to the liner and leachate collection system				
C. REQUIREMENTS FOR RDD PLANS THAT INCLUDE ALTERNATIVE COVER OR INTERIM COVER				
1. For testing of the construction and infiltration performance of alternative cover systems shall demonstrate that there is no increased risk to human health and the environment. The proposed alternative cover system shall be as protective as the final cover system required by 9VAC20-80-250 E. The following minimum performance criteria shall be demonstrated: (§9VAC20-80-485.d.2.f)				
1.a) No build-up of excess liquid in the waste and on the landfill liner				
1.b) Stability analysis demonstrating the physical stability of the landfill				
1.c) No moisture will escape from the landfill to the surface water and/or groundwater				
1.d) Sufficient reduction in infiltration so that there will be no leakage of leachate from the landfill				
2. Alternate interim cover system - The interim cover system shall be designed to account for weather conditions, slope stability, and leachate and gas generation. The interim cover shall also control, at a minimum, disease vectors, fires, odors, blowing litter, and scavenging. (9VAC20-80-485.D.2.p)				

SOLID WASTE FACILITY PERMIT
PERMIT NUMBER __

[ON DEQ LETTERHEAD REMOVE "DRAFT" FROM HEADER FOR FINAL PERMIT DOCUMENT]

Facility Name:

Facility Type: **Latitude:** 39E08'22"

Site Location: **Longitude:** 78E05'59"

Location Description: The facility is located on

Background: The facility is to serve as a *sanitary landfill*, in compliance with 9 VAC 20-80-10 et seq. *Include the total acres of disposal area within the facility boundary, the acres of disposal acres that is new as a result of this permit. If the facility is a landfill, provide the total air capacity in cubic yards and the* ***approximate*** *design life of the facility. Site a reference to the approved waste list in the permit and any special waste considerations. Briefly describe the service area for the facility and a sentence description on the waste haulers using the landfill. Provide any special background information that might be needed.*

Permit Limits: The landfill's daily maximum disposal limit is tons/day. This limit is based on the design, infrastructure, equipment, and staffing maintained by this facility.

Permit Highlights: *This section should discuss design information specific to the facility. Examples include: number of cells/phases, liner design, cap design, leachate recirculation, leachate management, etc.*

Research, Development, and Demonstration Plan (RDD Plan):

In accordance with §9 VAC 20-80-485.D, _____ Landfill has an approved RDD Plan, which will allow addition of liquids in addition to leachate and gas condensate from the same landfill for accelerated decomposition of the waste mass/run-on water to flow into the landfill waste mass/alternate final cover/measures to enhance stabilization of waste mass. Provide a description of any previous history with this type of process at the facility (i.e., recirculation over a Subtitle D Liner system).

The facility is currently commencing the initial/first renewal/second renewal/final renewal three-year testing period. The initial test period for implementation of the approved RDD Plan is limited to a maximum of three years. The testing period can be renewed for a maximum of three years. The maximum number of test period renewals is three. The total maximum number of years that an RDD Plan may be implemented is twelve. It is anticipated describe process will occur only in location of the process. The major project goals for the describe process is: List goals

Provide a brief description of the selected process.

The RDD Plan is located in Permit Attachment III-?. Site-specific special conditions regarding the RDD Plan are located in Section I.F.2 of Permit Module I.

Permit Amendment: *If amendment, describe the specific permit modification involved.*

Permit Variance: *Discuss variances and when approved*

THIS IS TO CERTIFY THAT:

Permittee
Address

is hereby granted a permit to construct, operate, and maintain the facility as described in the attached Permit Modules *(Specify which permit modules were used. List the permit modules along with the corresponding attachments in the Reference List.)*. These Permit Modules and Permit Attachments are as referenced hereinafter and are incorporated into and become a part of this permit.

The herein described activity is to be established, modified, constructed, installed, operated, used, maintained, and closed in accordance with the terms and conditions of this permit and the plans, specifications, and reports submitted and cited in the permit. The facility shall comply with all regulations of the Virginia Waste Management Board. In accordance with Chapter 14, § 10.1 - 1408.1(D) of the Code of Virginia, prior to issuing this permit, any comments by the local government and general public have been investigated and evaluated and it has been determined that the *proposed* facility poses no substantial present or potential danger to human health or the environment. The permit contains such conditions and requirements as are deemed necessary to comply with the requirements of the Virginia Code, the regulations of the Board, and to prevent substantial or present danger to human health or the environment.

Failure to comply with the terms and conditions of this permit shall constitute grounds for the revocation or suspension of this permit and for the initiation of necessary enforcement actions.

The permit is issued in accordance with the provisions of § 10.1-1408.1.A, Chapter 14, Title 10.1, Code of Virginia (1950) as amended. *Provide any information regarding variances associated with the facility and the page of the permit where they are located.*

Issued: *Date of original permit issuance, only if this is an amendment*
Amendment(s): *Date of prior permit amendment(s), only if this is another amendment*

APPROVED:

_____
Regional Deputy Director
(or authorized signatory authority)

DATE:_____
Amended *only for amendments*

PERMIT MODULES AND PERMIT ATTACHMENTS[1]

REFERENCE LIST

PERMIT MODULE I – GENERAL PERMIT CONDITIONS
PERMIT ATTACHMENT I-1 – PERMIT RELATED APPROVAL LETTERS

PERMIT MODULE II[2] – OPERATIONS
PERMIT ATTACHMENT II-1 – OPERATIONS MANUAL
PERMIT ATTACHMENT II-2 – EMERGENCY/CONTINGENCY PLAN
PERMIT ATTACHMENT II-3 – LANDFILL GAS MANAGEMENT PLAN

PERMIT MODULE III – SANITARY LANDFILL
PERMIT ATTACHMENT III-1 – DESIGN PLANS
PERMIT ATTACHMENT III-2 – DESIGN REPORT
PERMIT ATTACHMENT III-3 – SPECIFICATIONS
PERMIT ATTACHMENT III-4 – CONSTRUCTION QUALITY ASSURANCE
PERMIT ATTACHMENT III-5 – RESEARCH, DEVELOPMENT, AND DEMONSTRATION PLAN

PERMIT MODULE X -- DETECTION GROUNDWATER MONITORING

PERMIT ATTACHMENT X-1 GROUNDWATER MONITORING WELL LOCATIONS
PERMIT ATTACHMENT X-2 GROUNDWATER MONITORING PLAN

PERMIT MODULE XI -- ASSESSMENT GROUNDWATER MONITORING

PERMIT ATTACHMENT XI-1 GROUNDWATER PROTECTION STANDARDS (RESERVED)

PERMIT MODULES XII[2] **AND XIII**[2]—CLOSURE AND POST CLOSURE CARE

PERMIT ATTACHMENT XII/XIII-1 CLOSURE /POST-CLOSURE CARE PLAN

NOTES:

1. Should information contained in any permit module that consists of documents submitted by the permittee, conflict with the any requirement or condition contained in the permit modules I, II, III, X, XII, XIII, or 9 VAC 20-80 *et seq.*, the regulatory/permit module requirement or condition shall prevail (unless an appropriate variance has been granted). The Department is not responsible for spelling, typographical, or syntax errors in modules based on information submitted by the permittee.

2. The Emergency/Contingency Plan (Permit Attachment II-2 of Permit Module II), or the Closure and Post-Closure Plan (Permit Modules XII and XIII) emergency contact lists, may be revised with Department approval.

PERMIT MODULE I

GENERAL PERMIT CONDITIONS

I.A. EFFECT OF PERMIT

The permittee is allowed to dispose solid waste on-site in accordance with the conditions of this permit. Any disposal of solid waste not authorized by this permit is prohibited. Compliance with the terms of this permit does not constitute a defense to any order issued or any action brought under Sections 10.1-1402(18), 10.1-1402(19), or 10.1-1402(21) of the Virginia Waste Management Act (Chapter 14, Title 10.1, Code of Virginia (1950), as amended); or any other law or regulation for protection of public health or the environment. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby. For purposes of this permit, terms used herein shall have the same meaning as those in the Virginia Waste Management Act, and Part I and other pertinent parts of the Virginia Solid Waste Management Regulations (VSWMR, 9 VAC 20-80, *et seq.*), unless this permit specifically provides otherwise; where terms are not defined in the regulations or the permit, the meaning associated with such terms shall be defined by the generally accepted scientific or industrial meaning of the term or a standard dictionary reference. "Director" means the Director of the Department of Environmental Quality, or his designated or authorized representative.

I.B. DUTIES AND REQUIREMENTS

The permittee shall comply with all conditions of this permit and 9 VAC 20-80-10, et seq. The effect of this permit is detailed in 9 VAC 20-80-550, and it shall be the duty of the permittee to insure the applicable requirements are met. Additionally, the permittee is subject to the recording and reporting requirements detailed in 9 VAC 20-80-570. The facility will be designed and constructed per the requirements of Permit Module III, operated and maintained per Permit Module II, closed and maintained in post-closure per Permit Module XII and XIII, and subject to a groundwater monitoring program per Permit Module X or XI and Permit Attachment X-1. In addition to these requirements, the following additional conditions are invoked per 9 VAC 20-80-490, and shall be complied with:

I.B.1. Noncompliance may be authorized by a schedule of compliance [9 VAC 20-80-550.C and 9 VAC 20-80-550.G]. Any other permit noncompliance constitutes a violation of Virginia Waste Management Act and is grounds for enforcement action, or for permit revocation, revocation and reissuance, or modification [9 VAC 20-80-600 and 9 VAC 20-80-620].

I.B.2 The permittee shall comply with the requirements of this permit and any provisions of RCRA Subtitle D (Title 40, Code of Federal Regulations, Section 258) requirements as they become applicable upon their effective date. This permit may not act as a shield against compliance with any part of RCRA or any other applicable federal regulation, state regulation or state law.

I.B.3. In an enforcement action, it shall not be a defense for the permittee that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

I.B.4. In the event of noncompliance with this permit, the permittee shall take all reasonable steps to minimize releases of solid wastes or waste constituents to the environment and shall carry out measures to prevent substantial adverse impacts on human health or the environment.

I.B.5. The permittee shall at all times properly operate and maintain all units (and related appurtenances) which are installed or used by the permittee to achieve compliance with the operations manual and the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing, and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary equipment only when necessary to achieve compliance with the conditions of this permit.

I.B.6. The permittee shall furnish to the Director, within a reasonable time, any relevant information that the Director may request to determine compliance with this permit, regulations or the Act. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit by the date specified in the request.

I.B.7. The permittee shall allow the Director, or an authorized representative, at a reasonable time, upon the presentation of appropriate credentials, to:

I.B.7.a. Enter the permitted facility where a regulated unit or activity is located or conducted, or where records must be kept under the conditions of this permit;

I.B.7.b. Have access to and copy any records that must be kept under the conditions of this permit;

I.B.7.c. Inspect any unit, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

I.B.7.d Sample or monitor, for the purposes of assuring permit compliance or as otherwise authorized by Virginia Waste Management Act, any substances or parameters at any location within his control.

I.B.8. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample to be analyzed must be the appropriate method from the latest edition of Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA Publication SW-846.

I.B.9. This permit is not transferable to any person, unless approved by the Director. The Director may require modification or revocation and reissuance of the permit pursuant to 9 VAC 20-80-550.F. Before transferring ownership or operation of the facility during its operational life, the permittee shall notify the new owner or operator in writing of the requirements of Parts V and VII, of the Virginia Solid Waste Management Regulations, the Financial Assurance Regulations, 9 VAC 20-70-10, et seq., and this permit.

I.B.10 In accordance with § 10.1-1408.2, all facilities must have a Certified Operator as required by the Board of Waste Management Facility Operators-Licensing Regulations, 18 VAC 155-20-10, et seq.

I.B.11 Specifications for all drainage media should specify that the material shall contain no greater than 15% calcium carbonate equivalent. Department literature regarding research on leachate collection media indicates that weight loss greater than 15% results in an unacceptable loss of performance. If a greater percentage is specified or allowed, a demonstration that performance is not adversely affected must be provided to the Department for review and approval.

I.B.13 Recirculation of collected leachate shall not be allowed, in accordance with 9 VAC 20-80-290 D 3, except when the area to be irrigated is underlain by a composite liner system. Furthermore, in accordance with 9 VAC 20-80-280 C 3 c, decomposition gas condensate may be recirculated into the landfill provided the facility complies with the composite liner requirement and the leachate control system requirements of Part V of VSWMR. A composite liner system is a system designed to meet the requirements of 9 VAC 20-80-250 B 9. [Note: This Special Condition should not be included if the facility is approved to recirculate liquids over an alternate liner through a Research, Development, and Demonstration Plan.]

I.B.14. The closure cost estimate must reflect the maximum cost of closure at all times. The owner has the responsibility to maintain the closure and post

closure cost estimate and associated financial assurance funding as conditions change.

I.C. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The permittee shall maintain the following documents at the facility, or another location approved by the director, until post-closure is complete and certified by a professional engineer, and shall maintain amendments, revisions, and modification to these documents:

I.C.1. Design Plans

I.C.2. Operations Manual

I.C.3. Gas Management Plan

I.C.4. Closure and Post-Closure Plan

I.C.5. Groundwater Monitoring Plan

I.C.6. Detailed, written estimate, in current dollars, of the cost of closing the facility, post-closure care and corrective action measures

I.C.7. All other documents/records required and applicable from the following:

I.C.7.a. Monitoring records from leachate, gas, and groundwater monitoring.

I.C.7.b. Inspection records as required from construction/installation, operational, closure, post-closure inspection requirements.

I.C.7.c. Personnel training records

I.C.7.d. Daily operational records (i.e., solid waste received and processed, fill area records, records of special wastes accepted, a logbook which is a daily narrative account of the activities at the landfill).

I.C.7.e. Construction quality assurance reports, record drawings and engineers certifications for all new liner and/or final cover construction

I.C.8 An approved copy of the complete Part A permit

I.C.9. Documentation of the authorization to discharge leachate into the publicly owned treatment works, leachate volumes sent to the POTW, and periodic leachate sampling analytical results

I.C,10. Research, Development, and Demonstration Plan and associated documentation and testing data

I.D. DOCUMENTS TO BE SUBMITTED

In addition to the documents/records/reports to be submitted per the requirements of this permit or 9 VAC 20-80-10, et seq., the permittee shall also submit the following documents to the Director according to indicated schedules:

I.D.1. Prior to expansion into each new phase, the permittee shall submit all required certification documents per 9 VAC 20-80-550.A, and:

I.D.1.a. Authorization from the [insert POTW name] publicly owned treatment works to discharge the increased volume of leachate and wastewater to the sewerage system and treatment works.

I.D.1.b. Report and supporting documents resulting from quality control/quality assurance activities performed during construction and installation of the liner/drainage systems, including the installation contractor's written acceptance of the surfaces to be lined, synthetic liner manufacturer and installer warranties, laboratory test results of the permeability of the clay liner and the drainage media overlying the liner, and representative copies (sufficient to demonstrate responsible control) of the accumulated inspection schedules resulting from the professional engineer's oversight of the construction.

I.D.2. In accordance with 9 VAC 20-80-550.A, certification from a design engineer, who must be a professional engineer licensed to practice in Virginia, that the construction of the facility has been completed in accordance with the permit, approved plans and specifications and is ready to begin operation. A certification will be required for each lined phase of development.

I.D.3. Certification (separate from I.D.2, above) from the Construction Quality Assurance (CQA) officer that the approved CQA plan has been successfully carried out and that the constructed unit meets all requirements of the permitted CQA plan, in accordance with 9 VAC 20-80-250.B.18. A certification will be required for each lined phase of development. The CQA officer must be a professional engineer licensed to practice in Virginia.

I.D.4. The as-built plans of all new groundwater and gas monitoring wells shall be submitted as these wells are installed. Information to be included on the as-built plans shall include, but is not limited to, the total depth of the well, the surveyed elevations of the top of casing and ground surface (or apron), and the length and location of the screened interval and annular space seal. All dimensions are to be shown on well construction schematics.

I.D.5. Not less than 180 days prior to the completion of the post-closure monitoring and maintenance period as prescribed by the Board's regulations or by the Director, the owner or operator shall submit to the Director a certificate, signed by a professional engineer licensed in Virginia, that post-closure monitoring and maintenance have been completed in accordance with the facility's Closure Plan, Permit Attachment XII-1.

I.D.5.a. The certificate submitted under I.D.5, shall be accompanied by an evaluation prepared by a professional engineer licensed in Virginia, and signed by the owner or operator, which assesses and evaluates the landfill's potential for harm to human health and the environment in the event that post-closure monitoring and maintenance are discontinued.

I.D.5.b. If the Director determines that continued post-closure monitoring or maintenance is necessary to prevent harm to human health or the environment, he shall extend the post-closure period for such additional time as the Director deems necessary to protect human health and the environment and shall direct the owner or operator to submit a revised post-closure plan and to continue post-closure monitoring and maintenance in accordance therewith. Requirements for financial assurance shall apply throughout such extended post-closure period.

I.E. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DIRECTOR

All reports, notifications, or other submissions which are required by this permit to be sent or given to the Director should be sent to:

Director
Virginia Department of Environmental Quality
Office of Solid Waste
P.O. Box 1105
Richmond, VA 22318

With a copy to:

Virginia Department of Environmental Quality
Solid Waste Permitting/Compliance
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060

I.F. SITE SPECIFIC CONDITIONS

I.F.1. The final permit is based on permit application submittals (drawings and reports) that contain the word "proposed" and similarly tentative language. The documents that are incorporated into Permit No. XXX, and the amendments thereof, have been evaluated for administrative and technical adequacy and have been approved as proposed. Therefore, any reference to a design, construction, operation monitoring or closure criteria are to be considered to be approved as proposed.

I.F.2. Research, Development, and Demonstration (RDD) Plan

In accordance with the VSWMR, §9 VAC 20-80-485.D and the RDD Plan located in Permit Attachment III-5, Owner/Operator may describe process in identify unit or portion of unit at the Facility Name. The facility shall meet following conditions.

I.F.2.a In accordance with §9 VAC 20-80-485.D.1.d,the facility shall have a leachate collection system designed and constructed to maintain no more than one foot head of leachate over the liner excluding manifold trenches and sumps.

I.F.2.b. In accordance with §9 VAC 20-80-485.D.2.b, the test period for the initial application shall be limited to a maximum of three years.

I.F.2.c. In accordance with §9 VAC 20-80-485.D.2.c, renewals of testing periods shall be limited to a maximum of three years each. The maximum number of renewals shall be limited to three.

I.F.2.d. In accordance with §9 VAC 20-80-485.D.1.f, no landfill owner or operator may continue to implement an RDD plan beyond any time limit placed in the initial plan approval or any renewal without issuance of written prior approval by the department.

I.F.2.e. In accordance §9 VAC 20-08-485.D.3, an annual report shall be prepared for each year of the testing period, including any renewal periods, and a final report shall be prepared for the end of the testing period. These reports shall assess the attainment of goals proposed for the process selected for testing, recommend changes, recommend further work, and summarize problems and their resolution. Annual reports shall be submitted to the department within three months after the anniversary date of the approved permit amendment. Final reports shall be submitted at least 90 days prior to the end of the testing period for evaluation by the department. If the department's evaluation indicates that the foals of the project have been met, are reliable and predictable, the department will provide a minor amendment to incorporate to incorporate the continued operation of the project with the appropriate monitoring.

I.F.2.f. In accordance with §9 VAC 20-80-485.D.4, the department may require modifications to or immediate termination of the process being tested if any of the following conditions occurs:

I.F.2.f.1) Significant and persistent odors;

I.F.2.f.2) Significant leachate seeps or surface exposure of leachate;

I.F.2.f.3) Significant leachate head on the liner;

I.F.2.f.4) Excessively acidic leachate chemistry or gas production rates or other monitoring data indicate poor waste decomposition conditions;

I.F.2.f.5) Instability in the waste mass;

I.F.2.f.6) Other persistent and deleterious effects

I.F.2.g. The test area for the RDD Plan shall be limited to describe test area location of the active/closed sanitary landfill Permit #XXXX.

I.F.2.h. The permittee shall comply with the regulations of the Air Pollution Control Board and with the New Source Performance Standard Subpart WWW for operations and monitoring. It is the facility's responsibility to comply will all current and future air permits.

I.F.2.i. In accordance with §9 VAC 20-80-560 A of the VSWMR (9 VAC 20-80), the Department must be notified of the intention to close any portion of the landfill recirculation area at least 180 days prior to the anticipated date of closing. (For addition of liquids or stormwater runoff).

I.G. PERMIT AMENDMENTS

I.G.1. Enter prior amendment details.