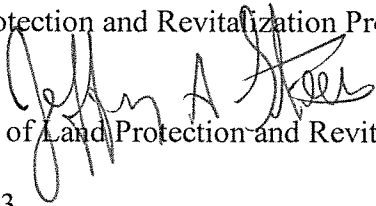


COMMONWEALTH OF VIRGINIA
Department of Environmental Quality

Subject: Division of Land Protection and Revitalization Guidance Memo
LPR-SW-SI-17
**SUBMISSION INSTRUCTION FOR GROUNDWATER CORRECTIVE
ACTION PLANS FOR SOLID WASTE LANDFILLS**

To: Regional Land Protection and Revitalization Program Managers

From: Jeffery A. Steers 
Director, Division of Land Protection and Revitalization

Date: December 11, 2013

Copies: Regional Directors

Summary

This guidance provides owner/operators of regulated solid waste management facilities with an overview of the information applicable to submittals of Corrective Action plans to address groundwater impacts above groundwater protection standards at solid waste facilities in accordance with 9 VAC 20-81-260.D of the Virginia Solid Waste Management Regulations (VSWMR).

Electronic Copy

An electronic copy of this guidance applicable to regulated solid waste sites is available on DEQ's website at <http://www.deq.virginia.gov/waste/guidance.html>.

Contact Information

Please contact the groundwater program coordinator, Mr. Geoff Christe at (804) 698-4283 or via email geoff.christe@deq.virginia.gov with any questions regarding the development or 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.



Submission
Instruction

Groundwater
Corrective Action
Plans for Solid Waste
Landfills

Virginia DEQ -
Division of Land
Protection &
Revitalization
629 East Main Street,
5th Floor
Richmond, VA 23219

APPLICABILITY

This Submission Instruction (SI) is applicable to all solid waste management facilities conducting groundwater monitoring under the requirements of the Virginia Solid Waste Management Regulations (VSWMR), originally promulgated by the Virginia Waste Management Board December 21st, 1988; as amended. These SI have been designed in a manner consistent with the regulatory language in Amendment 8 of the VSWMR, effective March 16th, 2011 and they supersede Corrective Action SI previously issued by the Department in July of 2003.

DEVELOPMENT

These SI have been developed to assist an owner/operator in the preparation of Solid Waste Corrective Action Plans to address groundwater impacts above regulatory standards. The SI reference technical information contained in several EPA guidance documents including: ***Corrective Measures for Releases to Groundwater from Solid Waste Management Units*** [EPA 530-SW-88-020]; ***Solid Waste Disposal Facility Criteria Technical Manual*** [EPA 530-R-93-107]; ***RCRA Corrective Action Plan Final*** [EPA 520-R-94-004]; ***Corrective Action: Technology and Applications*** [EPA 625-4-89-020], and ***Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action*** [EPA 530-R-04-030].

These SI provide an outline of the suggested minimum technical content that should be included within Corrective Action proposals submitted to DEQ. It is the responsibility of the Permittee to include all the data or information necessary to sufficiently support each of the conclusions presented in the submission.

These SI have not been developed as Department rule or policy. They have not gone through public comment. They do not supersede any regulatory requirements found in the VSWMR. Their use is not mandated under the current VSWMR. The Department recognizes that these SI may need to be altered to fit facility-specific geologic or hydrologic conditions that cannot be adequately accounted for in the SI. It is expected that the final content of any Corrective Action Plan submitted to the Department will likely include one or more site-specific considerations.

All SI are considered 'living' documents which will be updated or revised as needed. Comments or suggestions for future SI revisions can be submitted at any time to the attention of the Solid Waste *Groundwater Program Coordinator* at the address listed on the cover of this SI.

DISCLAIMER

These SI may contain references to EPA's commentary on groundwater remediation in its preamble to the Subtitle D regulations. EPA's preamble contains its expanded interpretation of the technical content in the 40 CFR 258 statute and addresses the response to public comment received during the draft regulation process. Although EPA's preamble language is referenced within the SI, preamble language is not a binding part of a law/statute and it can neither enlarge the scope of a statute's applicability nor confer powers to the regulatory authority not already expressly contained within the language of the statute. At the same time, if there is a question of the intent or meaning behind any portion of the Subtitle D statute text and the preamble addresses the question, the content of the preamble cannot be ignored if it addresses the ambiguity raised. The Subtitle D regulatory guidance developed by EPA expands further upon the content of the preamble, but has the same limitations in that guidance cannot be used to infer requirements that are not expressly part of the Subtitle D statute.

PURPOSE

The purpose behind the requirement to cleanup releases to groundwater is defined in EPA's ***Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action*** as:

"... prevent adverse affects to human health and the environment which includes protecting the integrity of the nation's groundwater resources, both now and in the future" ... and ...

"... avoid negative impacts to ecosystems such as those caused by contaminated groundwater flowing into surface waters."

The Commonwealth's goal of Corrective Action undertaken in the Solid Waste Program is generally similar to EPA's:

"The selected remedies to be included in the corrective action plan shall:

- Be protective of human health and the environment;*
- Attain the groundwater protection standard as specified pursuant to 9VAC20-81-250 A 6;*
- Control the sources of releases so as to reduce or eliminate, to the maximum extent practicable, further releases of solid waste constituents into the environment that may pose a threat to human health or the environment; and*
- Comply with standards for management of wastes"*

Facilities are required to evaluate groundwater plume extent and potential means of remediating impacted groundwater after they have recognized a statistically significant exceedance of a groundwater protection

standard (GPS) in any downgradient compliance well (9 VAC 20-81-260.A.1) if no alternate source (9 VAC 20-81-250.A.5) for the exceedance can be demonstrated and no other Regulatory measure to address the exceedance is available.

ALTERNATIVES TO CORRECTIVE ACTION PLAN DEVELOPMENT

Facilities may not be required to submit a Corrective Action Plan to the Department to address their GPS exceedance if they are able to make use of one of the below-described regulatory allowances. The Department strongly encourages all owner/operators to review whether or not these options may apply to their unique situation before proceeding with the development of a Corrective Action Plan.

Alternate Point of Compliance (9 VAC 20-81-740). In some cases, the Permittee may petition the Director via variance to extend the groundwater point-of-compliance up to 150 meters (~500 feet) away (in a downgradient direction) from the edge of waste. If the groundwater at the new Alternate Point of Compliance (APC) well(s) does not exceed GPS, and no other compliance well onsite exceeds GPS, then submission of a CAP would no longer be required until such time as the APC wells or other compliance wells displayed a statistically significant exceedance of GPS. EPA's conceptual basis for the use of an alternate point of compliance was described in its Subtitle D preamble [56 FR 51068]:

"... EPA expects that ... there will be very little potential for human exposure to contaminated groundwater that remains within the property line (and no more than 150 meters from the unit boundary) of a MSWLF. Most MSWLFs are owned by local governments, who should be able to control groundwater use within the facility boundary."

Owner/operators considering applying for an APC variance are referred to the Department's Submission Instruction on groundwater Alternate Point of Compliance (APC) variances and related Frequently Asked Questions (FAQ) for further information. Each of these documents is available online at <http://deq.virginia.gov>.

If a Permittee wishes to utilize the APC variance, they should do so prior to the deadline expiring for submittal of the CAP to remain within compliance of regulatory timeframes.

- **Presumptive Remedy (9 VAC 20-81-260.C.2).** Not every landfill in the Commonwealth is required to submit a Corrective Action plan. The VSWMR allow Presumptive Remedy implementation as the sole remedy to address groundwater plumes at sites which do not monitor groundwater under the Subtitle D equivalent program (9 VAC 20-81-250.B) but meet the criteria defined under 260.C.2.c and d with respect to plume location, risk assessment, trends in contaminant

concentrations, and length of time to achieve cleanup endpoint. While a facility's use of Presumptive Remedy eliminates the need for an assessment of remedial technologies during the Assessment of Corrective Measures process defined under 9 VAC 20-81-260.C.3, non-Subtitle D landfill sites applying presumptive remedy to groundwater plumes are not relieved of the requirement to meet the groundwater remediation goals defined for all solid waste landfill sites under 9 VAC 20-81-260.C.3.c.

- **No Further Action (NFA)** (9 VAC 20-81-260.D.2.d). The Director of an approved state program has the authority under Subtitle D to declare that remediation of the groundwater exceedance on site will not be required if any of the four following conditions are found to be applicable:
 - (1) groundwater is contaminated by substances that have originated from a source other than the landfill and those contaminants are present in concentrations within the aquifer such that cleanup of the release from the landfill would provide no significant reduction in risk to actual or potential receptors to aquifer contaminants;
 - (2) groundwater is not currently or reasonably expected to be a source of drinking water and is not hydraulically connected with surface waters toward which the GPS exceeding plume constituents are migrating, or are likely to migrate, in concentrations that would exceed the associated groundwater protection standards at the point of groundwater/surface water discharge;
 - (3) remediation of the release is technically impracticable using currently available methods; or
 - (4) remediation would result in unacceptable cross-media impacts.

If a Permittee wishes to pursue a determination of NFA, they should present the data supporting the applicable site condition(s) allowed (described above) under the regulation to the Director prior to the deadline expiring for submittal of the proposed CAP. It should be noted that the Commonwealth considers all groundwater to be potentially a source of drinking water.

The owner/operator should be cognizant that a determination of NFA by the director does not affect the authority of the state to require the owner or operator to: **a)** undertake source control measures or other measures that may be necessary to eliminate or minimize further landfill releases to the groundwater as a means of preventing potential exposure to the groundwater, or **b)** to remediate the groundwater to concentrations that are technically practicable (in doing so significantly reducing threats to human health or the environment).

TECHNICAL CONSIDERATIONS OF CORRECTIVE ACTION PLAN DEVELOPMENT

The following information deals with the most important discussion topics included in Corrective Action Plans.

Aquifer Description

The Corrective Action Plan must include a detailed description of the impacted aquifer on site that will be the target of the cleanup remedy to be implemented. The plan must at a minimum (260.D.1.b.(6)) must include a discussion of:

- The hydrological characteristics of the aquifer underlying the landfill and surrounding land;
- The current groundwater quality on site (including horizontal and vertical plume extent) and a discussion of the potential yield of the impacted aquifer;
- The resource value of the aquifer including current and future uses;
- The proximity to and withdrawal rates of any users of groundwater within one mile of the landfill's permitted facility boundary as well as a discussion of the cost of and/or availability of alternate water supplies to this area compared to the cost of groundwater extraction and treatment;
- Potential risks to human health and the environment from exposure to groundwater contamination prior to completion of the remedy; and
- Potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to the impacted groundwater.

Remedy Description

The Corrective Action Plan must include a detailed description of the remedy to be implemented on site to address the groundwater impact, and all its related components. The plan must demonstrate that the chosen remedy addresses the technical criteria defined under 260.D.1.a, including a discussion of:

- Practicable capability of the owner or operator, including a consideration of the technical and economic capability to implement the remedy considering capital costs, operation and maintenance, net present value of capital and operation and maintenance costs, and potential future remediation costs.
- The expected ease or difficulty of implementing the remedy based on whether construction will be required; coordination with other agencies in order to obtain necessary approvals and permits will be required; necessary equipment and specialists are available; and whether there is (or will be) the available capacity to handle needed treatment, storage, and disposal activities.
- The long-term and short-term effectiveness and protectiveness of the remedy.
- The owner/operator's certainty that the remedy will prove successful?
- The remedy's ability to control the source to reduce further releases, including a discussion of whether containment practices or treatment technologies may be used?
- What the expected long-term reliability of the engineering and institutional controls associated with the remedy is.

- Any unacceptable short-term risks that might be posed to the community, workers, or the environment during the remedy implementation phase, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal or containment?
- Demonstration that the remedy will manage all solid waste created while undergoing corrective action (or an interim measure) in a manner that is protective of human health and the environment; and complies with all applicable federal and Virginia requirements (including the Department's existing investigatively-derived waste policy).
- If the remedy cannot prevent future releases to groundwater, what is the potential exposure risk(s) due to waste remaining following implementation of the remedy?
- The length of time required before full protection is achieved (e.g. GPS met)?
- The degree to which community concerns raised as the result of the public meeting required by 260.C.4 are addressed by the remedy.
- The potential need for replacement of the remedy?

Implementation Schedule

The Corrective Action Plan must include a detailed timeline for remedy implementation (260.D.1.b). Implementation shall take place within a reasonable timeframe based on:

- The current nature of the exceeding constituents and the horizontal and lateral extent of groundwater contamination;
- The practical capabilities of the remedy and related technologies in achieving compliance with groundwater protection standards and other objectives of the remedy;
- The current availability of treatment or disposal capacity for wastes managed during implementation of the remedy;
- The potential desirability of utilizing technologies that are not currently available, but which may offer significant advantages over already available technologies in terms of effectiveness, reliability, safety, or ability to achieve remedial objectives; and
- The potential risks to human health and the environment from exposure to contamination prior to completion of the remedy

Monitoring Plan

The VSWMR require that the Corrective Action Plan include a detailed description of the monitoring program to be implemented to measure the success of the remedy in addressing the groundwater impact and all its related components. As defined under the technical criteria of 260.D.1.c, the monitoring program must:

- Demonstrate that the program at a minimum, meets the requirements of the applicable groundwater monitoring program described under 9 VAC 20-81-250.B.3 or C.3;

- Determine the horizontal and vertical extent of the plume of contamination for constituents at statistically significant levels exceeding GPS;
- Demonstrate the effectiveness of the implemented corrective action remedy and its related components; and
- Effectively demonstrate compliance with all applicable groundwater protection standards established under 9 VAC 20-81-250.A.6 which have been exceeded downgradient of the landfill.

The Department prefers that this information be submitted in a separate document titled the Corrective Action Monitoring Plan (CAMP), which, if necessary, would also include a surface water monitoring plan for those sites where the groundwater plumes are discharging or have the likely potential to discharge to state waters based on monitoring well sampling results.

Operations and Maintenance Program

The Corrective Action Plan must include a discussion of the long-term operations and management required of the remedy (and its components) during the life of the Corrective Action program.

Site Evaluation Reports

The Corrective Action Plan must include a schedule for the submission of detailed Corrective Action Site Evaluation (CASE) reports which describe the success of the remedy and its related components in addressing the groundwater impact. The CASE reports must at a minimum discuss the technical criteria defined under 260.D.1.b.(8/9), including:

- Progress of remedy implementation;
- Descriptions of remediation activities conducted during the review period;
- Results of monitoring and sampling activities conducted during the review period;
- Progress in meeting cleanup standards since remedy implementation;
- Discussion of any problems encountered during the reporting period and actions taken to resolve problems;
- Work planned for next review period;
- Copies of laboratory reports including drilling logs, QA/QC documentation, and field data related to actions completed during the review period; and
- Other relevant factors.

The owner/operator should utilize the Department's existing Submission Instructions for CASE reports (SI-25; SI-26), available on line, as additional guidance on this topic.

Notifications

The owner/operator must report any non-compliance or unusual condition that may endanger human health or the environment, or any instances of failure to submit relevant facts or submittal of incorrect information during the Corrective Action period as required under 9 VAC 20-81-530.C.3 and 530.E.

While in Corrective Action, all notifications and reporting otherwise required under 9 VAC 20-81-250 remain in effect.

REVIEW/APPROVAL PROCESS

The proposed corrective action plan shall be submitted to the director for review. The plan must be submitted within 180 days of the Department's approval of the Assessment of Corrective Measures (260.C.3.c). Prior to rendering final approval of the plan, the director may (260.D.2):

- Request the owner/operator to evaluate one or more alternative remedies not included in the plan as submitted;
- Request technical modification of the monitoring program to be implemented to assess the success of the chosen remedy;
- Request a change in the time schedule of remedy implementation or completion; or
- Determine that groundwater remediation is not necessary based on the applicable conditions required for No Further Action that are described in this SI.

CORRECTIVE ACTION PLAN FORMAT

CAPs are technical summaries that require conclusions supported by site-specific data obtained during the plume assessment and evaluation period. To minimize the content of the submission, there is no need to include a detailed description of a site's operational history, as this information is included each year in the Annual Report required under 9 VAC 20-81-250.E. Inclusion of a simplified summary of these topics is all that is required in the CAP.

For the sake of consistency and to ensure an expeditious review, the information (technical content) of the CAP and CAMP should be arranged in the order presented in sections (and example Table of Contents) below. The sections discussed herein shall be considered standard technical content. Report submissions that do not provide the standard technical content outlined herein are more likely to be found to be incomplete and requiring revision during the Department's technical review process. The Department also notes that there may be some site-specific instances where a facility's technical data may require additional or different information beyond that listed in these SI as a means of more fully characterizing the technical data available and conclusions derived thereof. These instructions set no limit on the number or content of additional report sections, as long as the information included directly pertains to that required of a CAP and CAMP.

Any owner/operator who chooses to implement a remedy described in their CAP must be fully cognizant that the results of the Corrective Action Site

Evaluation monitoring periods must demonstrate plume containment has been achieved, contaminant mass is being effectively destroyed or captured, and any post-treatment discharge has met all applicable Permit standards. If performance cannot be demonstrated, the need for an alternative remedy will be evaluated.

Due to the complex nature of many CAPs and CAMPs, as well as size of any electronic file, submittal of the document and its related plan sheets should be in hard copy format as well as on CD, at least during the technical review phase.

Upon Department approval, final versions of the CAP and CAMP may be submitted as a PDF document. If you have any questions on the submittal format preferred by your regional office, contact your regional groundwater staff.

Example Table of Contents for CAP, not including CAMP

(The Department prefers the CAMP to be a separate bound submission – see Example Table of Contents below.)

- **Signature-Seal Page**
- **Executive Summary**
- **Introduction**
 - .1 Physical Setting
 - .2 Land Use and Zoning
 - .3 Aquifer Description, Current Use, and Availability of Alternate Supply
 - .4 Plume Delineation and Groundwater Constituents of Concern
 - .5 Risk Receptor Summary
 - .6 Brief Description of Remedy
 - .7 Limitations/Definitions
- **Remedy**
 - .1 Current Institutional and/or Engineering Controls In-place
 - .2 Interim Measures Description (if applicable)
 - .3 Remedy Description (including all components)
 - .4 O&M Plan (brief description, full plan can be an Attachment)
 - .5 H&S Plan (brief description, full plan can be an Attachment)
 - .6 IDW Management/Handling
 - .7 Installation Phasing/Schedule
 - .8 Notification/Reporting Requirements
- **Alternate Remedy Description**
- **Remedy Evaluation**
 - .1 Evaluation Factors
 - .2 Performance Criteria Assessment
 - .3 CASE Report Submittals
 - .4 Alternate Remedy Triggers
- **Schedule**
 - .1 Anticipated Start Date
 - .2 Anticipated Completion Date
 - .3 Corrective Action Completion Documentation
- **Public Participation Plan**
 - .1 CASE Report Submission Timeframe
 - .2 CASE Report Holding Location
 - .3 Site Contact Information

Figures – Provide in the CAP, at a minimum, copies of the:

- USGS 7 1/2-minute topographic map - showing the site location.
- Recent aerial image covering the site and surrounding properties.
- Zoning Map of site and surrounding properties
- Site Plan - to include topographic contours, permanent structures, surface water features, a bar scale, north arrow, facility boundary, waste management unit boundary, and all monitoring wells or sampling points relevant to the submittal.
- Engineering drawings of any remedy components.
- Boring logs for any newly installed NES/CAP wells/borings.
- MSDS for any chemicals to be utilized as part of the CAP.
- Groundwater potentiometric map with plumes delineated.
- Constituent specific, groundwater trend graphics (if available).
- Optional figures - published geologic maps, USDA soils maps, etc.

Attachments (as needed)

Example Table of Contents for CAMP

- **Signature-Seal Page**
- **Well Network Description**
 - .1 Upgradient Well(s)
 - .2 Performance Well(s)
 - .3 Sentinel Well(s)
 - .4 Well O&M Program
- **Sampling Schedule/Frequency**
- **Sampling Parameter List**
- **Sampling Actions**
 - .1 Well Condition Assessment Prior to Sampling
 - .2 GW Elevation Measurement
 - .3 Purging Method
 - .4 Sampling Method
 - .5 Sampling Containers
 - .6 Well Sampling Order
 - .7 Verification Sampling Process
 - .8 IDW Management/Handling
 - .9 Field Data/Notebook Handling
 - .10 Chain of Custody Procedure
 - .11 Sample Shipment Method
- **Analytical Methods**
 - .1 Laboratory Name
 - .2 Laboratory Accreditation
 - .3 Methods Utilized
 - .4 Data Validation Process
 - .5 Record Keeping
- **Statistical Evaluation**
 - .1 Method Used
 - .2 Limitations
- **Reporting/Notifications**
 - .1 Data to be included in CASE Reports
 - .2 Notifications Regarding Non-performing Wells
 - .3 Notification of new GPS Exceedances in CAP Wells
 - .4 Site Contact Information

Figures – Provide in the CAMP, at a minimum, copies of the:

- USGS 7 1/2-minute topographic map - showing the site location.
- Recent aerial image covering the site and surrounding properties.
- Site Plan - to include topographic contours, permanent structures, surface water features, a bar scale, north arrow, facility boundary, waste management unit boundary, and all monitoring wells or sampling points relevant to the submittal.
- Optional figures - published geologic maps, USDA soils maps, etc.

Attachments (as needed)

- Boring logs for all CAP wells/borings.
- Well Certifications for all CAP wells/borings