


COMMONWEALTH OF VIRGINIA
Department of Environmental Quality

Subject: Division of Land Protection and Revitalization Guidance Memo
LPR-SW-SI-18
SUBMISSION INSTRUCTIONS FOR GROUNDWATER PRESUMPTIVE REMEDY
PROPOSALS AT SOLID WASTE LANDFILLS

To: Regional Land Protection and Revitalization Program Managers

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

Date: January 31, 2012

Copies: Regional Directors

Summary

This guidance provides owner/operators of regulated solid waste management facilities with an overview of the information applicable to proposals for use of Presumptive Remedies to address groundwater impacts above groundwater protection standards at solid waste facilities in accordance with 9 VAC 20-81-260.C.2 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

Proposals to use Presumptive Remedy for Groundwater at 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 7 of the VSWMR, effective March 16th 2011 and they supersede Presumptive Remedy SI previously issued by the Department in October of 2003 as SI#18.

DEVELOPMENT

These SI have been developed to assist an owner/operator in the preparation of Presumptive Remedy proposals to address groundwater impacts above regulatory standards. The SI reference technical information contained in several EPA guidance documents including the 1993 *Presumptive Remedy for CERCLA Municipal Landfill Sites* document [EPA 540-F-93-035] and the 1996 *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills* [EPA 540-F-96-020] document.

These SI provide an outline of the suggested minimum technical content that should be included within Presumptive Remedy 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 Presumptive Remedy 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.

LIMITATIONS/DISCLAIMER**Presumptive Remedy Definition**

Virginia adopted use of the term 'presumptive remedy' in Amendment 2 to the VSWMR effective April 23rd of 2001. EPA originally defined the term in its 1993 CERCLA municipal landfill site guidance, declaring presumptive remedies were:

"... preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation"

With respect to solid waste landfills, EPA established 'containment' as the presumptive remedy of choice. EPA took this action in conformance with Section 300.430.(a).(III).(B) of the National Contingency Plan (NCP) which noted that engineering controls (such as containment) could be used to remediate impacts derived from waste that poses a relatively low long-term threat but is impractical to treat in place. Landfill waste lends itself to containment technology application because the volume and heterogeneous nature of the buried waste makes in-situ treatment or source removal actions impractical.

In 1996, EPA extended use of presumptive remedies to military landfills noting in its 1996 guidance that:

"Although waste types may differ between municipal and military landfills, these differences do not preclude use of source containment as the primary remedy at appropriate military landfills."

With respect to its application in the Commonwealth, landfills can be considered for presumptive remedy application only when the application will include at least one of the allowances defined below. It is important to note that if any form of active groundwater remediation (including Monitored Natural Attenuation) is implemented in conjunction with a presumptive remedy, the landfill site is considered to be under the active remedy for programmatic reasons.

Limitations on the Application of Presumptive Remedy

The phrase 'presumptive remedy' does not appear in the Federal language of

EPA's 1991 Subtitle D solid waste regulations [*40 CFR 258*]. Consistent with EPA's Subtitle D groundwater monitoring requirements, the VSWMR only allow the application of Presumptive Remedy to address groundwater plumes at landfill sites which do not monitor groundwater under the Subtitle D equivalent program defined under *9 VAC 20-81-250.B*. This category of landfill sites includes those which ceased accepting waste prior to the Subtitle D groundwater monitoring trigger date.

It's important to note that EPA, in its 1993 CERCLA Presumptive Remedy guidance, warned that many landfill sites may have additional environmental conditions that will require additional characterization such as leachate discharge to wetlands or surface water, contaminated groundwater discharge to surface water, and groundwater plume expansion outside the limits of the waste mass. These types of environmental conditions require characterization ('nature and extent' study) and risk assessment prior to implementation of any presumptive remedy. The results of these characterization actions may prove that the site is not suitable for the sole application of presumptive remedy to address all known site environmental impacts.

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*, sites applying presumptive remedy are not relieved of the requirement to meet the groundwater remediation goals defined for all landfill sites under *9 VAC 20-81-260.C.3.c*.

Disclaimer

These SI may contain references to EPA's commentary on groundwater remediation in its preamble to the Subtitle D regulations and its 1993 Subtitle D regulation guidance. 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.

TECHNICAL CONSIDERATIONS RELATED TO PRESUMPTIVE REMEDY USE

Phase 1 – Plume Delineation

Use of presumptive remedy does not relieve the owner/operator from defining the horizontal and vertical extent of the groundwater contamination issuing from the landfill. In the Commonwealth, this action is referred to as the 'nature and extent study' [9 VAC 20-81-260.C.1.a] which requires an owner/operator define the lateral and vertical extent of the plume lying beyond the limits of the waste mass. If groundwater sampling data obtained during the plume delineation phase indicates contamination has already expanded beyond facility boundaries, further consideration of pursuing presumptive remedy application may not be warranted [9 VAC 20-81-260.C.2.c.(2)].

Because plume delineation plays a vital role in the decision on whether or not presumptive remedy may be implemented on site as a stand-alone remedy, the plume delineation conclusions presented must be supported by site-specific facts gathered as part of plume delineation actions. The results should not be conjectural or based on computer simulations of potential plume extent. In addition, while 9 VAC 20-81-260.C.1.a does not require an owner/operator obtain Department pre-approval before locating and installing plume delineation (NES) wells on site, it is strongly recommended that a Permittee meet with the Department to discuss the proposed work prior to undertaking such actions as a means of potentially reducing any unnecessary field cost associated with work which may not meet the criteria associated with plume delineation. If a work-plan meeting is to be held, please be aware that it will not affect the submittal date required under the VSWMR for presumptive remedy submissions.

The current VSWMR do not define whether the plume delineation results should be submitted as a separate document, or as part of the proposal for Presumptive Remedy. In those cases where the delineation results define the plume as remaining wholly within the permitted facility boundary (i.e., one of the requirements for Presumptive Remedy application), it is probably most efficient to include the plume delineation results as part of the Presumptive Remedy submission.

Phase 2 – Assess Trends in Groundwater Quality

The decision to implement a passive presumptive-type remedy to address groundwater impact, instead of a more aggressive active (or enhanced) approach will be partly based on the physical extent of the current groundwater impairment and trends in groundwater quality sampling data. As noted by EPA in its 1993 CERCLA presumptive remedy guidance:

“... if it determined that the release of contaminants is declining and concentrations of one or more groundwater contaminants are at or barely exceed ... standards, the Agency may decide not to implement an active response. Such a decision might be based on the understanding that the landfill is no longer acting as a source of groundwater contamination ...”

Thus, a stable or declining plume condition may lead to the successful application of Presumptive Remedy. Consistent with EPA's comment above, 9 VAC 20-81-260.C.2.d.(2) requires an owner/operator to conduct an evaluation of the current trends in groundwater quality data (compared to the applicable groundwater protection standard(s)) as part of the proposal to use presumptive remedy. The evaluation (i.e., statistically valid trend analysis), should include at least the last ten independent groundwater sampling events which, for facilities sampling groundwater on a semi-annual basis, would include at least the last five years of sampling data. There may be cases where the plume delineation study shows the plume currently remains within facility boundaries, but the groundwater trends for the contaminants of concern are upward, indicating the groundwater condition is worsening. Consistent with EPA's guidance, application of presumptive remedy as a sole remedy on site may not be warranted because the contamination problem is worsening and source containment (i.e., an impermeable cap), on its own, does not have the capability to address the groundwater impacts present beyond the waste mass boundary.

Phase 3 - Risk Assessment

Within the context of EPA's definition, presumptive remedies do not have the ability to address exposure pathways outside of the waste mass (which is the focus of the source containment action), nor do they address long-term groundwater monitoring response actions. EPA noted that:

“... groundwater contamination that has migrated away from the source, generally will require characterization and a more comprehensive risk assessment to determine whether action is warranted beyond the source area and, if so, the type of action that is appropriate.”

Consistent with EPA's position noted above, 9 VAC 20-81-260.C.2.d.(1) requires a risk assessment be performed to address potential on site exposure pathways which exist outside of the limits of the waste mass.

EPA's risk assessment requirement at presumptive remedy sites can be found in its 1993 CERCLA presumptive remedy guidance. Within the VSWMR, *9 VAC 20-81-260.C.2.d.(1)* notes the risk assessment should include an assessment at the waste unit boundary [*which means groundwater data obtained from the compliance well network*] and at the facility boundary [*data obtained from available 'nature and extent' wells*]. When performing the risk assessment, if the groundwater monitoring results at the compliance wells (waste unit boundary) currently exceed remediation standards, then the site will fail for risk at this boundary and performing further assessment of this condition would not be suggested. However, risk failure at the waste unit boundary exposure point may not preclude the application of presumptive remedy at the facility because EPA also allowed for an alternate groundwater compliance boundary to be established on the landfill site as long it was:

- no more than 150 meters (~500 feet) from the edge of the waste management unit boundary and
- was on land owned by the owner/operator.

EPA's conceptual basis for the use of an alternate point of compliance was described in its Subtitle D preamble [56 FR 51068] as:

"... 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 alternate point of groundwater compliance to potentially assist in an acceptable risk assessment are referred to the Department's Submission Instruction on groundwater Alternate Point of Compliance (APC) variances for further information..

Beyond the waste edge boundary, the VSWMR require a risk assessment take place at the property boundary. If an environmental receptor is located somewhere between the edge of the waste mass, and the facility boundary, the risk at the receptor will need to be addressed as well. Most commonly, this receptor is surface water. If landfill impacted groundwater is found to be discharging to surface water at concentrations which exceed, or could exceed, a groundwater protection standard, then an active remediation response may be required [see *9 VAC 20-81-*

260.D.2.d.(2)] and this would then make the site ineligible for the sole application of presumptive remedy.

If landfill constituents are discharging to surface water at quantifiable levels (i.e., above the corresponding LOQ) but still below their respective groundwater protection standard, there may still be a conflict with State Water Law, which prohibits any unpermitted discharge to state waters without a permit (and contains no allowance for the 'risk' posed by the discharging constituents).

Because a successful risk assessment is required before use of Presumptive Remedy can be approved on site, and risk assessments are typically difficult and costly to perform, the following questions should be asked before proceeding:

1. Does the site exceed GPS at compliance wells? If so, can use of APC be requested such that the risk assessment can be conducted at an alternate point other than the edge of waste? If APC cannot be requested, risk assessment may not be feasible to pursue.
2. Does the site exceed GPS at a property boundary well(s)? If so, approval to implement Presumptive Remedy would be unlikely and risk assessment should not be pursued.
3. Does the site contain an ecologic receptor in between the waste mass edge (or APC) and the property boundary? If so, does impaired groundwater discharge to this receptor at concentrations above GPS? If so, Presumptive Remedy would not be approvable and risk assessment should not be pursued.
4. Does the site contain surface water (as defined by Regulation) in between the edge of waste and the property boundary to which the groundwater plume is discharging landfill contaminants? If so, Presumptive Remedy would not be approvable because it would not alleviate the unpermitted discharge to State Waters and further risk assessment should not be pursued.

Because of the importance of the risk assessment in the presumptive remedy decision making, owner/operators should consult the Department's most recent risk assessment guidance available at www.deq.virginia.gov for further information on preparing an adequate risk submission. Owner/operators are also encouraged to meet with the Department prior to undertaking a risk assessment work plan to ensure the planned actions are adequate to provide the required data.

Phase 4 – Selection of Remedy Component Options

Landfill sites which meet the criteria for potential Presumptive Remedy application may select one or more of the following presumptive remedies for use [9 VAC 20-81-260.C.2]:

- Containment of the landfill waste mass which, at a minimum, must include an impermeable cap [b.(1)]. The cap must be impermeable as defined in the VSWMR. If any portion of the groundwater plume originates from a waste disposal unit which lacks an impermeable cover on site, then source area containment via an impermeable cap cannot be demonstrated.
- Collection and treatment of landfill gas [b.(4)]. Use of this allowance requires installation of engineering controls which prevent the lateral and vertical migration of landfill gas away from the waste mass. It is important to note that the term 'treatment' does not include passive venting of landfill gas to the atmosphere as this method does not 'treat' the venting landfill gas.
- Control of landfill leachate [b.(2)]. Use of this allowance requires installation of some engineering controls to prevent the lateral and vertical migration of leachate away from the waste mass to the groundwater or surface water. At most unlined landfills which lack a basal leachate collection system, this would entail installation of some form of a leachate collection trench, installed to the greatest depth allowed by the geologic composition of the aquifer and excavation technology available for use at the edge of the waste mass.
- Control of the migration of contaminated groundwater [b.(3)]. Use of this allowance requires installation of some engineering controls to prevent the lateral and vertical migration of contaminated groundwater away from the waste mass. EPA's 1993 CERCLA presumptive remedy guidance noted installation of slurry walls or groundwater extraction systems as two such control migration examples. Of note, installation of an impermeable cap does not control the migration of contaminated groundwater, it only reduces the likelihood of new leachate releases to the aquifer.
- Reduction of saturation on the landfill mass. [b.(5)]. Use of this allowance requires installation of some engineering control which removes existing moisture from the waste mass, or prevents upgradient water from entering the waste mass. This is a separate action which will likely act in conjunction with the emplacement of an impermeable cover which should prevent future infiltration of precipitation recharge into the waste mass. Please note that pumping water collected in waste mass gas vent bore holes cannot be considered 'dewatering' of the waste mass unless those vents are installed to the base of the waste mass and thus 'drain' the entire waste profile.

In EPA's 1993 CERCLA presumptive remedy document, EPA considered the first and second noted items above to be the 'default' presumptive remedies which should be put in place on all municipal solid waste landfill sites. With respect to

the other potential Presumptive Remedy options EPA considered them to be add-on features which potentially would boost the overall performance of the main Presumptive Remedy(ies) applied, noting:

"In addition, measures to control landfill leachate, affected groundwater at the perimeter of the landfill, and/or upgradient groundwater which is causing saturation of the landfill mass may be implemented as part of the presumptive remedy."

The Department defers to EPA's use of the term "*in addition*" and "*may be*" as evidence it considered these options secondary augmentations of the main presumptive remedy technologies. As a result, these additional technical actions should not be considered primary options which can substitute for the installation of impermeable cover (and landfill gas collection/treatment systems if applicable based on site LFG data).

Phase 5 – Proposed Schedule

9 VAC 20-81-260.C.2.d.(3) requires the owner/operator submit a schedule containing the anticipated timeframes for installing any presumptive remedy technology not currently in place on site, and the anticipated date upon which presumptive remedy based remedial activities will be complete [i.e., the remedial requirements of 9 VAC 20-81-260.C.3.c.(1) will be achieved]. Any timeframes proposed for the presumptive remedy being able to achieve the remedial endpoints should be based on the current trends seen in groundwater quality and an interpolation of when those trends will intercept all applicable groundwater protection standards. This is one of the regulatory factors that makes use of presumptive remedy untenable at sites with upward groundwater impact trends as no remedial endpoint can be calculated when the contamination trends are worsening.

Phase 6 – Development of Proposed Monitoring Program

9 VAC 20-81-260.E requires an owner/operator implement a corrective action monitoring program which will have the ability to demonstrate compliance with the requirements of 9 VAC 20-81-260.C.2.f and H.1.a, and ensure conditions of 9 VAC 20-81-260.C.2.c.(2) have not been violated after the remedy has been implemented. Presumptive remedy sites must also meet this requirement and as a result must monitor the changes in groundwater quality within the plume, and at the downgradient permitted facility boundary (or nearest onsite downgradient risk receptor) in an appropriate array of monitoring wells. The well network proposed must be able to provide the sampling data used to determine/measure plume

response to the Presumptive Remedy implemented over the course of successive three year performance periods. Any wells which are needed, but are not yet installed at the time of remedy implementation must be installed on a schedule approved by the Department.

Phase 7 – Public Meeting Results

In its 1993 CERCLA presumptive remedy guidance, EPA required that public participation be part of the presumptive remedy process, noting:

“The community, state, and potentially responsible parties ... should be notified that a presumptive remedy is being considered for the site”

“The notification may take the form of a fact sheet, a notice in a local newspaper and/or a public meeting.”

Consistent with EPA’s guidance, the VSWMR [9 VAC 20-81-260.C.4] require the owner/operator advertise and hold a public meeting to gather comment on the proposed implementation of presumptive remedy on site before the proposal is officially submitted to the Department. A copy of the newspaper notice, and copies of any public comments received during the comment period should be included in the presumptive remedy submittal with the facility’s responses to the comments received in order to demonstrate compliance with the regulatory requirements noted above.

SUBMISSION FORMAT

Once all phases of presumptive remedy development have been completed, the presumptive remedy proposal can be submitted to the Department for review. The submission must be a stand-alone technical document that is certified by a qualified groundwater professional [9 VAC 20-81-260.C.2.d] and submitted in a timeframe meeting requirements of 9 VAC 20-81-260.C.1.f.

For the sake of consistency and to ensure an expeditious review, the information (technical content) of the presumptive remedy should be arranged in the order presented below. The sections discussed herein shall be considered standard technical content. 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 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 limits on the quantity of 'additional' content as long as the information included directly pertains to that required of the conclusion presented in the presumptive remedy.

Cover Page – Provide the following information:

- Landfill Name and Permit #
- Landfill location
- DEQ Region
- Name & Address of the Consultant
- Name & Address of the Permittee
- Date report submitted

Signature Page – This page should contain the signature & seal (if applicable) of a qualified groundwater professional certifying the content & findings of the presumptive remedy.

Table of Contents – Specify the order and organization of the report sections.

Executive Summary – Provide a brief summary of the following technical findings of the PPR:

- Date of initial GPS exceedance
- General location of all GPS exceeding wells
- Description of exceeding constituent(s)
- Plume delineation summary, including any historical trends in CoCs
- Risk assessment summary
- Public meeting results
- Description of the presumptive remedy types applicable to the site

Introduction – Discuss the physical setting of the site. Describe adjacent land use, including the use of any private groundwater wells. Discuss the characteristics of the onsite aquifer. Discuss the compliance well network noting the wells responsible for triggering the plume delineation and remedy assessment work. The section should describe any limitations, as well as definitions for any technical or laboratory terminology used in the report.

Nature and Extent Study – If not submitted under separate cover, the presumptive remedy proposal should describe the constituent(s) which triggered the need to perform plume delineation, a discussion of any new wells installed onsite to characterize the release and the sampling results obtained from those wells, noting, and if applicable, any apparent trends in constituent concentration data downgradient of the waste mass. The physical characteristics of the constituent(s) of concern (water solubility, density, biodegradability, etc.,) should be included.

Groundwater Quality Trend Analysis – Provide a summary of the last five years worth of sampling data for the groundwater constituents of concern with respect to their groundwater protection standards.

Presumptive Remedy Selection – Describe the presumptive remedy technologies selected for use on site and their date of installation, or anticipated date of installation.

Schedule – Provide the anticipated schedule for achievement of all groundwater remedial endpoints on site. This will typically be based on a review of the current trends in groundwater sampling data.

Public Meeting – Provide a summary of the public meeting actions held to advertise the proposed use of presumptive remedy on site including, if applicable, any formal responses to public comment received during the process.

Figures – Provide 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 to document adjoining land use.
- 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.
- Groundwater potentiometric map.
- Groundwater plume map (both vertical and horizontal delineations).
- Constituent specific, groundwater trend graphics.
- Optional figures - may include copies of published geologic maps, US Department of Agriculture soils maps, geologic cross-sections, etc.

Appendices – Provide at a minimum, copies of the following:

- Risk Assessment
- Groundwater Monitoring Plan
- Boring logs for any newly installed NES wells/borings.
- Field Sampling Sheets.
- Chain of Custody Records.
- Laboratory Analytical Results for the initial suspect event and any verification events or ASD related sampling events.
- All calculations associated with the risk assessment.

SUBMISSION TIMELINES

The proposal for use of presumptive remedy must be submitted under the timeframes established by *9 VAC 20-81-260.C.1.f*. The submittal date triggers off

the date the Department is notified of the initial exceedance of a groundwater protection standard. The Permittee may petition the Director to extend the deadline for submittal if based on good cause [*9 VAC 20-81-260.C.1.g*], as long as the request is received in a manner that allows the Director to render a decision on the extension request prior to the close of the normal submission timeframe.

Any revisions to the presumptive remedy submittal required to address the Department's technical review comments shall be submitted in a manner consistent with the time-frames defined in the Department's review letter.

REFERENCES CITED

USEPA, 1993. Presumptive Remedy for CERCLA Municipal Landfill Sites, Office of Solid Waste and Emergency Response, EPA-540-F-93-035, 14p.

USEPA, 1996. Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills, Office of Solid Waste and Emergency Response, EPA-540-F-96-0202, 18p.