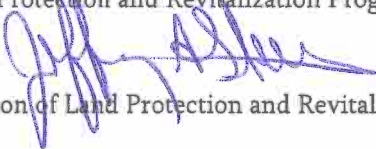


COMMONWEALTH OF VIRGINIA
Department of Environmental Quality

Subject: Division of Land Protection and Revitalization Guidance Memo
LPR-GWSI- 2011-09
SUBMISSION INSTRUCTIONS FOR GROUNDWATER ANNUAL REPORTS

To: Regional Land Protection and Revitalization Program Managers

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

Date: December 16, 2011

Copies: Regional Directors

Summary

This guidance provides owner/operators of regulated solid waste management facilities with an overview of the information applicable to the development and submission of groundwater Annual Reports for solid waste sites undergoing groundwater monitoring in accordance with 9 VAC 20-81-250 of the Virginia Solid Waste Management Regulations (VSWMR).

Electronic Copy

An electronic copy of this guidance applicable to 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 Annual Report Submissions

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

I - 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. The SI has been designed in a manner consistent with the regulatory language in Amendment 7 of the VSWMR, effective March 16th 2011 and it supersedes those previously issued by the Department in September of 2003.

II - DEVELOPMENT

This SI has been developed to assist the owner/operator in the preparation of a groundwater Annual Report (AR) required by *9 VAC 20-81-250.E.2*. The SI defined herein provides an outline of the suggested minimum technical content that should be included within an AR. It is ultimately the responsibility of the owner/operator to include all the groundwater data or sampling information necessary to support each of the conclusions presented in the submission.

The AR is intended to be a stand-alone technical document. While the Department recognizes that some forms of the technical information within these instructions may have been submitted under separate cover as part of Permit applications or major or minor modifications, a short summary of such technical information shall still be included in the AR. The AR is not intended to contain other facility topics or technical information more properly submitted to the Department under separate cover, such as an Alternate Source Demonstration (ASD), a request to establish a Subset of Wells, a Wetlands demonstration, a Petition for Variance from groundwater sampling requirements, or any part of a major or minor modification to a facility's Permit.

III – LIMITATIONS / DISCLAIMER

This SI has not been developed as Department rule or policy. It has not gone through public comment. It does not supersede any regulatory requirement found in the VSWMR. Its use is not mandated under the VSWMR. If used, the Department recognizes that it may need to be altered to fit facility-specific conditions that cannot be adequately accounted for in a boilerplate SI. The final content of any AR submitted to the Department will likely include 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.

The requirement to submit an annual summary of the groundwater monitoring actions at a regulated landfill was established within the 1988 Solid Waste Management Regulations [*VR 672-20-10 et seq.*] and is currently found in the VSWMR under *9 VAC 20-81-250.E.2.a.*

IV - TECHNICAL CONSIDERATIONS / FORMAT

The AR is a technical summary of the groundwater sampling actions undertaken at a solid waste landfill during the proceeding calendar year and a historical summary of the trends in groundwater quality on site. It is a submission that requires the conclusions presented within be supported by site-specific facts, not conjecture or professional opinion.

Form ARSC-01, which has been designed as a self completing checklist the owner/operator is required to fill out (*9 VAC 20-81-250.E.5.2.a.(1).(b)*), must be submitted within with the AR. If an item is not checked off as being included in the submission, the owner/operator should address the missing information prior to submitting the document to the Department so that the Department does not have to issue a deficiency letter for the missing information. A copy of the form (current at the time of SI issuance) is attached to this SI and is also available electronically at the Commonwealth's 'Townhall' website. While use of this SI may assist the Permittee in development of a complete AR, use of the SI does not imply any guarantee of final Department approval of the content or conclusions contained within the AR.

The completed AR must be submitted to the Department within 120-days of the issuance of the analytical results from the last sampling event conducted in the proceeding calendar year (*9 VAC 20-81-250.E.5.2.a.(1)*). Unless otherwise arranged via contact with the Regional Office, one bound copy should be submitted to the applicable Regional Office by the due date described above while a 'PDF' (electronic) or CDROM copy may be submitted to Groundwater Program Coordinator in the Department's Central Office in Richmond, Virginia.

A complete AR must contain the technical items listed under *9 VAC 20-81-250.E.2.a.(2)*. Annual report submissions that are found to lack sections that are required by the regulations shall be considered incomplete and returned for revision. For the sake of consistency and to ensure an expeditious review, the information (technical content) of the AR should be arranged in the order presented below. The sections discussed herein shall be considered standard technical content. AR 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 instructions 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 an AR. The administrative and technical content required for each section of the annual report is briefly described below.

Cover Page

Provide the following information:

- Calendar Year for which the report applies.
- Landfill Name and location.
- DEQ Permit number.
- Date report submitted.

Signature Page

- Signature (and stamp if applicable) of the report preparer.

Table of Contents

Specify the order and organization of the report sections. A recommended format is provided in Attachment 1 of these SI.

Annual Report Summary

Provide a brief summary of the following technical findings:

- Status of groundwater monitoring program during the prior calendar year.
- Results of the past year's statistical analysis.
- Required (and/or anticipated) actions for the upcoming sampling year.

Site Description/Background

Provide the following information presented as text, a table-format, or as bulleted items:

1. Site Background Information

- Identify the current owner/operator.
- Identify landfill type (i.e. Sanitary, CD&D, etc.).
- Identify landfill design (lined vs. unlined; trench fill vs. area fill; etc.).
- State when the facility began waste acceptance and if applicable, date of last receipt of waste and date of final regulatory approved closure.
- Describe the surrounding property land use noting any use of the aquifer as a water source.

2. Aquifer

- Identify the geologic setting of the landfill.
- Note the nature of the uppermost aquifer (i.e. unconsolidated overburden, saprolite, bedrock, etc.).

- Identify the nature of the groundwater table (i.e. confined, semi-confined, unconfined) and whether or not surface water is present on site or forms any site boundary.

3. *Groundwater Monitoring History*

- Identify all upgradient and downgradient monitoring wells within the compliance network which should match those described in Permit Module X and XI.
- Name the program under which the facility monitored groundwater during the previous year and when the sampling events were undertaken (including any verification events).
- Identify when facility entered each phase of groundwater monitoring during its history of groundwater sampling actions.
- Identify (if applicable) when Groundwater Protection Standards (GPS) were initially established including the timing of issuance of the most recent updated and approved ACL or background-based GPS.

4. *Variances or Other Director Approvals*

- Describe whether the facility monitored groundwater under any Department approved Variance (which may include an Alternate Point of Compliance) or well subset which supersedes Regulatory requirements.
- Give date (if applicable) of Variance or well subset approval(s).

Hydrologic/Groundwater Quality Evaluation

A calculation of the groundwater flow rate must be provided, derived from site-specific data collected during the prior calendar year. Complete calculations used to determine the groundwater flow rate shall be provided in the Appendix of the AR. Units of flow rate must correspond to the units of map scale used on the site plan drawing (i.e. english – english, or metric - metric). Flow rate data should be presented in a “distance/per year” measurement. Include language (based on the review of potentiometric surface information) stating whether the monitoring well network did (or did not) function as designed during the previous calendar year and had the ability to determine the facility’s impact (if any) on the quality of groundwater in the uppermost aquifer.

For any upgradient monitoring well determined to be impacted by the landfill, or any downgradient monitoring well, that due to a change in groundwater flow direction or internal damage, has become unable to function as designed, a proposal for replacement well installation shall be provided in the AR if the problem has not already been rectified.

Statistical Evaluation

Define the methods by which the analytical data were statistically compared noting the level

of significance and confidence level at which the data was evaluated. This section must also state how the facility has treated any censored data, outlier data points, missing data, and data below the laboratory quantitation limits. The section must also clearly state what type of verification sampling strategy has been employed (if applicable).

This section must state whether or not there has been any statistically significant increases (SSI's) in any organic or inorganic compound noted during the previous calendar year. Constituents identified at concentrations considered SSI's must be listed in table format with the corresponding monitoring well and sampling event date shown. If the SSI's were reported to the Department, the dates should be referenced in the AR.

Conclusions

Provide a summary of findings corresponding to the content included in the AR. This section must also include a summary of recommended actions the Permittee will undertake during the upcoming calendar year's groundwater sampling events.

Figures

The figures included in the AR submission should be presented in a clear and readable fashion. When possible, graphics should be presented at a scale which will fit on a folded 11" x 17" sheet. Color should be utilized whenever possible. While some sites (because of the size of the facility) will require the use of larger folded maps (which typically cannot be bound within the report), use of such maps should be limited as a means of reducing overall report cost.

This section must contain, at a minimum, a US Geological Survey 7.5' topographic map for site location, a site plan showing potentiometric surface contours and including topographic (land surface) contours, permanent structures, surface water features, a bar scale, north arrow, facility boundary, waste management unit boundary, all monitoring wells – labeled with ID #, and groundwater flow direction arrows for those sites located above all aquifer types other than fractured bedrock. Please note that site topography should be current for landfills which have completed final closure with final grading and cover. Topography should be updated every five (5) years for operating landfills such that active cells are accurately reflected on the base map used to show the potentiometric surface.

Optional figures in the AR may include a recent aerial photograph covering the site (clearly list the date of photography), land use / zoning maps covering the site and surrounding properties, a US Department of Agriculture Soil Conservation Service (SCS) soils map, published geologic map, etc.

Attachments

This section should contain, at a minimum, a copy of the QA/QC Form ARSC-01, as well as a table of all historic constituent detections at each well, statistical calculations, groundwater flow rate calculations. Field data sheets, laboratory analytical results from the calendar year, and a copy of the lab's DCLS certification (for all ARs submitted for the 2012 calendar year and forward) can be presented on a CDROM.

ATTACHMENT I – Table of Contents

EXAMPLE TABLE OF CONTENTS		
1.0	Executive Summary	
2.0	Introduction	
	2.1	Purpose
	2.2	Limitations
	2.3	Definitions
3.0	Site Description	
	3.1	Site Background
	3.2	Physical Setting
	3.3	Aquifer Recognition
	3.4	Monitoring History
	3.5	Variations or Other Director Approvals
	3.6	HB 2471 Wetland Requirements
	3.7	Monitoring Well Network
4.0	Hydrologic Evaluation	
	4.1	Annual Review of Monitoring Network
	4.2	Groundwater Flow Direction
	4.3	Groundwater Flow Rate Calculation
5.0	Groundwater Evaluation	
	5.1	Sampling Events
	5.2	Laboratory procedures
	5.3	Detections of Inorganic Constituents
	5.4	Detections of Organic Constituents
	5.5	Verification Events (if applicable)
	5.6	Review of Prior Detections
6.0	Statistical Evaluation	
	6.1	Methodology
	6.2	Discussion of Verified Exceedances
7.0	Conclusions	
	7.1	Summary of Findings
	7.2	Recommended Actions
8.0	Figures	
	1	Location Map
	2	Potentiometric Surface Map

ATTACHMENT II – QA/QC Checklist

Annual Report QA/QC Submission Checklist [filled out by the report author or Peer reviewer]

INCLUDED WITHIN ANNUAL REPORT?	YES	NO
Signature of a qualified groundwater professional		
Solid waste facility permit number & facility name		
Name of current owner/operator & type of facility		
Dates LF began operations and was deemed closed (if applicable)		
Date of last waste receipt (if applicable) [2.b]		
Identified if site is lined or unlined [2.b]		
Identified waste disposal method (trench fill/area fill/etc.) [2.b]		
Total site acreage, and acreage used for waste disposal [2.b]		
Adjoining land use described including any aquifer users [2.c]		
Topographic map included as <i>Figure 1</i> [2.a]		
<i>Figure 1</i> shows facility location, includes a bar scale, and north arrow		
Discuss the type, name & age of the geologic unit(s) on site [2.d]		
Description of general site topography [2.d]		
Name of nearest permanent water body, perennial stream, etc. [2.d]		
Description of the uppermost aquifer [2.d]		
Description of the aquifer type (confined vs unconfined) [2.d]		
Date facility entered detection or phase I monitoring [2.b]		
Date facility entered assessment or phase II monitoring [2.b]		
Identified if the facility monitors groundwater under a variance		
Identified the dates of any groundwater variance approvals		
Approval date for wetlands demonstration (if applicable)		
Identified all upgradient and downgradient monitoring wells [2.e]		
Identified if all monitoring wells were sampled during the year [2.e]		
Identified reasons for failure to sample (if applicable) [2.e]		
Identified if any monitoring wells have been abandoned [2.e]		
Identified if any wells require replacement [2.e]		
Included network performance certification statement [2.e]		
Identified groundwater sampling dates during past year [2.f]		
Included site plan drawing as <i>Figure 2</i> [2.h]		
<i>Figure 2</i> contains current topographic contours		
<i>Figure 2</i> contains facility and waste mgmt unit boundaries		
<i>Figure 2</i> includes all monitoring wells		
<i>Figure 2</i> includes potentiometric surface contours		
<i>Figure 2</i> includes groundwater flow direction arrows		
<i>Figure 2</i> includes all surface water bodies		
<i>Figure 2</i> includes all structures on site, a bar scale, and north arrow		
Listing of groundwater elevation readings in past year [2.h]		
Table of historical groundwater elevation data as <i>Appendix A</i>		
Calculated rate of groundwater flow (distance/year) [2.h]		
Flow rate calculations included as <i>Appendix B</i>		
Identified the name of the analytical laboratory [2.h]		
Identified whether the lab is DCLS Certified		
Identified type of analytical methods used [2.h]		
Identified those constituents found above the LOD and LOQ		
Identified if verification sampling was used during any event		
Identified statistical methods used to analyze groundwater data		
Identified any SSI's noted during prior year of monitoring		
Table of prior detected constituent concentrations in each well [2.g]		
Field data sheet copies included as <i>Appendix C</i>		
Laboratory results & certificates of analysis as CDROM in <i>Appendix D</i>		
Included historical summary of laboratory results in <i>Appendix E</i>		
Full list of References		
Copy of this QA/QC checklist		