



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Blue Ridge Regional Office

www.deq.virginia.gov

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SOLID WASTE FACILITY PERMIT SWP582

Facility Name: Botetourt County Landfill

Facility Type: Sanitary Landfill

Latitude: N 37° 28' 19"

Site Location: Botetourt County, Virginia

Longitude: W 80° 48' 01"

Location Description: The facility is located at 259 Landfill Road in Troutville, Virginia. Access to the landfill is provided from Catawba Road (Route 779), approximately 7.4 miles west of Fincastle and approximately 7 miles from Roanoke Road (Route 220), just across from Roanoke Cement.

Background: The facility is a publicly owned/operated sanitary landfill that serves Botetourt County. The wastes accepted include those wastes identified in Module II.

The facility encompasses approximately 60 acres. This permit supersedes SWP 519 for Botetourt County Sanitary Landfill No. 2 and incorporates the landfill previously permitted under SWP 319. Approximately 26 acres have been permitted for waste disposal.

SWP 319 was originally permitted in February 4, 1981 and consisted of approximately 20 acres. The unit received waste until July 1, 1996, and was closed January 25, 1999. The Part A facility boundary for SWP 319 was amended on January 30, 2003, for landfill gas compliance as shown in Figure 2, Permit Attachment III-8. SWP 319 was incorporated into SWP 582 during permit amendment 3 as part of combining the groundwater and gas monitoring networks.

SWP 519 was issued for the northern portion of the existing active fill area. This permit was issued on March 10, 1988. SWP 519 was incorporated into SWP 582 when it was issued on May 11, 1995.

The landfill volume of the active landfill unit, excluding the volume in trench 1, is 814,000 cubic yards which includes the volumes used for the landfill liner and cap systems.

Permit Modification: This permit modification incorporates the Groundwater Corrective Action Program including the Corrective Action Plan (CAP) and Corrective Action Monitoring Plan (CAMP) into the permit. The permit format has also been streamlined. All previous permit modifications are outlined in detail in Module I, Section I.G.

Permit Variance: No variances were associated with this modification of the permit. Past variance approvals are outlined in detail in Module I, Section I.H.

THIS IS TO CERTIFY THAT:

*Botetourt County
30 West Back Street, #4
Fincastle, Virginia 24090*

is hereby granted a permit to construct, operate, and maintain the facility as described in the attached Permit Modules I, II, III, X, XI, XII, XIII and XIV and Permit Documents incorporated by reference. These Permit Modules and Permit Documents 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 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. Variances that have been approved for this facility are included in Permit Attachment I-1.

Issued: May 11, 1995
Modification(s): July 2, 2002 (Minor)
May 7, 2007 (Major)
April 20, 2011

APPROVED:

DRAFT

Robert J. Weld, Director

DATE:

DRAFT

Modification 4

PERMIT MODULES REFERENCE LIST

PERMIT MODULE I – GENERAL PERMIT CONDITIONS

PERMIT ATTACHMENT I-1 PREVIOUS PERMIT APPROVAL LETTERS

PERMIT MODULE II – CONDITIONS OF OPERATION

PERMIT MODULE III – SANITARY LANDFILL DESIGN

PERMIT MODULE X – DETECTION MONITORING

PERMIT MODULE XI – ASSESSMENT MONITORING

PERMIT MODULE XII – CLOSURE

PERMIT MODULE XIII – POST CLOSURE CARE

PERMIT MODULE XIV – CORRECTIVE ACTION

PERMIT DOCUMENTS

The documents listed below are hereby incorporated into this permit and the permittee is subject to all conditions contained therein. It is the responsibility of the permittee to properly maintain and update these documents. Any version with a revision date other than as listed below is not considered to be the official approved version and is subject to Department review and approval prior to being recognized as the “permitted” version.

1. *Landfill Design Plans and Report for the Botetourt County Landfill Part B Application*, prepared by Draper Aden Associates, Inc., last revised November 10, 1994.
2. *Design Report for the Botetourt County Sanitary Landfill*, prepared by Draper Aden Associates, Inc., last revised September 12, 2006.
3. *Botetourt County Landfill Part B Application (Design Drawings)*, prepared by Draper Aden Associates, Inc., last revised November 10, 1994.
4. *Closure Modifications Botetourt County Sanitary Landfill (Design Drawings)*, prepared by Draper Aden Associates, Inc., last revised September 19, 2005.
5. *Specifications for the Botetourt County Landfill*, prepared by Draper Aden Associates, Inc., last revised September 12, 2006.
6. *Landfill Gas Management Plan (Appendix F to Operations Manual)*, originally prepared by Draper Aden Associates, Inc. and later revised by Engineering Concepts, Inc., last revised February 1, 1997;
7. *Landfill Gas Remediation Plan Botetourt County Sanitary Landfill Permit Nos 582 & 319*, prepared by Law Engineering and Environmental Services, Inc., dated May 15, 1998.
8. *Closure and Post Closure Plan*, prepared by Draper Aden Associates, Inc., last revised September 12, 2006.
9. *Quality Control / Quality Assurance Manual for the Botetourt County Sanitary Landfill*, prepared by Draper Aden Associates, dated September 6, 2004.
10. *Groundwater Monitoring Plan*, prepared by ECS Mid-Atlantic, LLC, last revised February 22, 2006.
11. *Corrective Action Plan*, prepared by ECS, last revised June 27, 2016.
12. *Corrective Action Monitoring Plan*, prepared by ECS Mid-Atlantic LLC, last revised June 28, 2016.

The following documents have been submitted to satisfy permit or regulatory requirements; however, are considered reference documents and are not incorporated into SWP582. This list may not be all-inclusive.

1. *Permit Modification Part A Information SWP519*, prepared by Draper Aden Associates, dated December 21, 1990.
2. *Permit Application for Modification Facility Property Boundary for Gas Monitoring Botetourt County, Sanitary Landfill Permit Number 319*, prepared by ECS Ltd, dated October 24, 2002.
3. *Construction Quality Assurance Report, Cell 4*, prepared by Engineering Concepts, Inc., dated June 6, 2000.

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, 9VAC20-81), 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 9VAC20-81. The effect of this permit is detailed in 9VAC20-81-490, and it shall be the duty of the permittee to ensure the applicable requirements are met. Additionally, the permittee is subject to the recording and reporting requirements detailed in 9VAC20-81-530. In addition to these requirements, the following additional conditions are invoked per 9VAC20-81-430, and shall be complied with:

- I.B.1. Noncompliance may be authorized by a schedule of compliance [9VAC20-81-490.D. and 9VAC20-81-490.H.]. 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 [9VAC20-81-570 and 9VAC20-81-600].
- 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, if available.
- Laboratory samples shall be analyzed in accordance with 1 VAC 30-45, Certification for Noncommercial Environmental Laboratories, or 1 VAC 30-46, Accreditation for Commercial Environmental Laboratories.
- 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 9VAC20-81-490.G. 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 III and V, of the Virginia Solid Waste Management Regulations, the Financial Assurance Regulations, 9VAC20-70, 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.
- 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.12. Recirculation of collected leachate shall not be allowed, in accordance with 9VAC20-81-210.D.3., except when the area to be irrigated is underlain by a composite liner system. Furthermore, in accordance with 9VAC20-81-200.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 III of VSWMR. A composite liner system is a system designed to meet the requirements of 9VAC20-81-130.J.1.
- I.B.13. The closure cost estimate must reflect the maximum cost of closure at all times. The owner has the responsibility to maintain the closure, post closure and corrective action cost estimates and associated financial assurance funding as conditions change.
- I.B.14. Land-clearing, excavation, and construction activities that involve the disturbance of wetlands or streams shall not commence without authorization from the Virginia Water Protection (VWP) Program and/or Army Corps of Engineers.
- I.B.15. Blasting operations shall be conducted to avoid changes in the hydrogeologic character of the remaining underlying formations, and to avoid creation of instabilities or irregularities in these that might potentially lead to damage to the impermeable membrane to be installed. It shall be ensured that adjacent landfill facilities not be damaged, which includes the geosynthetic landfill liner and gas and groundwater compliance monitoring locations.
- I.B.16. The facility shall maintain and follow an approved Erosion & Sediment Control Plan for all land-disturbing activities in accordance with the Erosion and Sediment Control Regulations, 9 VAC 25-840.

I.C. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The permittee shall maintain a complete copy of the Solid Waste Permit and incorporated Permit 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. In addition, the facility shall maintain the following additional documents:

- I.C.1. Operations Manual with annual certification by Responsible Official
- I.C.2. Detailed, written estimate, in current dollars, of the cost of closing the facility, post-closure care and corrective action measures
- I.C.3. All other documents/records required and applicable from the following:
 - I.C.3.a. Monitoring records from leachate, gas, and groundwater monitoring.
 - I.C.3.b. Inspection records as required from construction/installation, operational, closure, post-closure inspection requirements.

- I.C.3.c. Personnel training records
- I.C.3.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.3.e. Construction quality assurance reports, record drawings and engineers certifications for all new liner and/or final cover construction
- I.C.4. An approved copy of the complete Part A permit application
- I.C.5. Documentation of the authorization to discharge leachate into the publicly/privately owned treatment works, leachate volumes sent to the POTW, and periodic leachate sampling analytical results

I.D. DOCUMENTS TO BE SUBMITTED

In addition to the documents/records/reports to be submitted per the requirements of this permit or 9VAC20-81, 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 9VAC20-81-490.A., and:
 - I.D.1.a. Authorization from an owner of a permitted sewage 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 9VAC20-81-490.A., certification from a design engineer, who must be a professional engineer licensed to practice in the Commonwealth, 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 9VAC20-81-130.Q. 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.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:

Virginia Department of Environmental Quality
Division of Land Protection & Revitalization
Blue Ridge Regional Office - Roanoke
3019 Peters Creek Road
Roanoke, Virginia 24019

I.F. SITE SPECIFIC CONDITIONS

The provisions of this section are in addition to the permit conditions and regulatory requirements and are specifically developed for this facility. The permittee shall comply with all conditions of this section, as follows:

- I.F.1 The facility shall comply with seasonal restrictions on open burning as contained in Article 40 [Emission Standards for Open Burning (Rule 4-40)] of Part II of 9 VAC 5 Chapter 40, specifically 9 VAC 5-40-5630, as applicable.
- I.F.2 Due to the legal status of the James spiny mussel present downstream in Catawaba Creek, the facility shall comply with all protected species legislation, as applicable.
- I.F.3 The facility shall comply with all state and local erosion and sediment control/storm water management laws and regulations to ensure continued protection of Catawba Creek and associated tributaries.
- I.F.4 Statistical analyses and comparisons of groundwater monitoring data to approved Groundwater Protection Standards (GPS) shall be performed in accordance with the Virginia Solid Waste Management Regulations and DEQ Technical Paper: Data Analysis for Solid Waste Facilities.

I.G. PERMIT MODIFICATIONS

- I.G.1. The first permit amendment modified the Operations Manual to allow the facility to operate two working faces concurrently – one working face for commercial vehicles and one working face for local citizens.
- I.G.2. This second permit modification was a major modification and included elimination of Cell 2B from the landfill design, changes to the closure cap, updates to facility operations, and incorporation of landfill gas remediation activities. Modifications to the approved closure cap included: changing the final slope closure grades from 4(H):1(V) to 3(H):1(V); modifying of the closure cap to remove the gas venting layer and replace the stone drainage layer with a geonet/geocomposite; and replacing the 40 mil VLDPE in the closure cap with 40 mil LLDPE geomembrane. Operational updates included adjusting

unauthorized waste inspection frequency per regulatory requirements and other modifications to agree with current operations at the facility. Landfill gas remediation included incorporation of two landfill gas remediation plans which include installation of passive gas vents, modification of the compliance monitoring network, and extension of the facility boundary through a Part A amendment approved on January 3, 2003. With this amendment GP-4 was replaced by GP-4a, 4b and 4c and GP-9 was replaced by GP-12 and 13.

- I.G.3. The third modification incorporated SWP319 into sWP582 and combined the landfill groundwater monitoring networks for the disposal units.
- I.G.4. This modification streamlines the permit and incorporates the Groundwater Corrective Action Program including the Corrective Action Plan (CAP) and Corrective Action Monitoring Plan (CAMP) into the permit.

I.H. PERMIT VARIANCES

- I.H.1 A variance petition approved on March 10, 2014, removes the requirement to submit semi-annual or quarterly reports while in corrective action provided the following conditions are met:

- I.H.1.a This approval shall remain in effect until such time as corrective action requirements of **9 VAC 20-81-260** are no longer applicable to addressing exceedances of groundwater protection standards at the facility or the facility has been granted full termination of post-closure care groundwater monitoring requirements by the Director.

- I.H.1.b This approval shall be terminated if:

- I.H.1.b(1) the owner/operator fails to notify the Department of GPS exceedances during future sampling events within the appropriate timeframes after each groundwater sampling event as otherwise required under **9 VAC 20-81-250.B.3.f.(3).(a)** or **260.C.3.e.(3).(a)**, or

- I.H.1.b(2) the owner/operator fails to submit the groundwater Annual report within appropriate timeframes of **9 VAC 20-81-250.E.2.a.(1)**, or

- I.H.1.b(3) the owner/operator fails to include the technical items of **9 VAC 20-81-250.E.2.b.(1).(c); (f); and (g)** which are normally included within the semi-annual or quarterly report, within the Annual report defined under **9 VAC 20-81-250.E.2.a.**

- I.H.2 A variance petition to allow use of ACLs, in lieu of background data, as groundwater protection standards was approved on October 13, 2010. This variance allows automatic updating for REAMS-based ACL values when the values change as a result of modification to the risk data used by USEPA.

PERMIT MODULE II CONDITIONS OF OPERATION

II.A. HOURS OF OPERATION

II.A.1. The normal operating hours are:

- Monday through Friday: 8:00 a.m. to 5:00 p.m.
- Saturday: 8:00 a.m. to 12:00 p.m.
- Sundays and Holidays: Landfill is typically closed. The landfill is closed on the following holidays: New Year's Day, July 4th, Thanksgiving and Christmas.

Operational hours may be altered by the facility upon notification to the Department.

II.A.2. Emergency conditions or unusual circumstances that require accepting waste outside of the normal operating hours shall be reported orally to the DEQ Blue Ridge Regional Office at (540) 562-6700 within 24 hours followed by a formal written submission within 5 days.

II.B. WASTES ACCEPTED

The Botetourt County Sanitary Landfill may receive the following wastes, as defined by 9VAC20-81-10, or described below:

II.B.1 Agricultural waste.

II.B.2. Animal carcasses. Small carcasses (e.g. dogs and cats) may be handled with incoming waste. Large animals and small volumes of animal carcasses (<20 cubic yards) may be received by the facility, but must be placed in a separate area within the disposal unit and provided with a cover of compacted soil or other suitable material. Disposal of large volumes of animal carcasses must be approved by the Department prior to disposal.

II.B.3. Ashes and air pollution control residues that are not classified as hazardous waste. Incinerator and air pollution and control residues should be incorporated into the working face and covered at such intervals as necessary to keep them from becoming airborne.

II.B.4. Commercial Waste.

II.B.5. Construction, demolition and debris waste.

II.B.6. Contaminated Soil that are not classified as hazardous and in accordance with 9 VAC 20-81-660, as applicable.

II.B.7. Fossil Fuel Combustion Products.

II.B.8. Industrial Waste

- II.B.9. Institutional Waste except regulated medical waste as specified in the Regulated Medical Waste Management Regulations (9 VAC 20-120).
- II.B.10. Municipal solid wastes, including garbage, household waste, refuse, residential waste, rubbish and trash.
- II.B.11. Non-regulated hazardous wastes and treated wastes rendered nonhazardous, upon approval from the Department.
- II.B.12. Scrap metal.
- II.B.13. Sludge, industrial and/or POTW. Municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, and air pollution control facility sludges that have been dewatered.

Sludges shall be disposed of by mixing with other solid wastes, placed, and compacted at the working face in a manner to prevent localized pockets of sludge or conditions which might result in future instability of the waste mass.

- II.B.14. Vegetative and yard waste, including stumps that are less than 12 inches in diameter.
- II.B.15. Waste Tires. Tires shall be stored at the waste tire storage area in an appropriate manner in accordance with 9 VAC 20-81-640. Tires may also be split, cut, or shredded and then beneficially used or dispersed in the workface with other solid wastes for disposal.
- II.B.16. White goods, provided that all appliances are free of chlorofluorocarbons, hydrochlorofluorocarbons, and PCBs prior to placement on the working face. White goods may be accumulated at the facility in accordance with 9VAC20-81-650.

UNAUTHORIZED WASTE – The Botetourt County Sanitary Landfill may not receive any unauthorized wastes identified in 9 VAC 20-81-140.B.4. or any of the following: waste oil that has not been adequately absorbed through site cleanup; radioactive wastes; lead acid batteries; pressurized tanks or pressurized containers; automobile gas tanks; friable and some non-friable asbestos-containing waste materials as defined by 9VAC20-81-620; regulated medical waste; explosives or other dangerous materials; and junked automobiles.

II.C. PERMIT LIMITS

The facility has a disposal limit of 150 tons per day. This limit is based on the design, infrastructure, equipment, and staffing maintained by this facility.

II.D. COMPACTION & COVER

II.D.1. Daily cover consisting of six inches of compacted soil or other approved material shall be placed upon and maintained on all exposed solid waste prior to the end of each operating day, or at more frequent intervals if necessary, to control disease vectors, fires, odors, blowing litter, and scavenging. Approved alternate daily cover materials include

- II.D.1.a. 6 mil geosynthetic tarp (30 ft. x 70 ft.)

- II.D.1.b. Other alternate materials that have been approved by the Director for use at this facility.
- II.D.1.c. The use of an ADC material shall cease if the material is not effective at achieving the purposes of daily cover set forth in 9 VAC 20-81-140.B.1.c., if the use results in nuisances, or if the material is erodible and results in waste being exposed.
- II.D.2. Intermediate cover shall be applied when another lift of waste will not be placed for more than 30 days or to areas which exhibit erosion, cracking, or settlement.
- II.D.3. Before placement of new waste in areas with low permeability daily cover soil or alternate daily covers, or in areas with intermediate cover, cover materials shall be removed or penetrated such that leachate can flow downward unimpeded to the leachate collection system.
- II.D.4. Final cover construction as outlined in Permit Module XII shall be initiated when the requirements of 9 VAC 20-81-140.B.1.e. are met.

II.E. HOUSEKEEPING

- II.E.1. The facility shall control odors in accordance with 9VAC20-81-200.D. and/or as necessary to protect human health and the environment.
- II.E.2. The facility shall use fencing or other suitable control means to control litter migration. All litter blown from the operations shall be collected on a weekly basis.
- II.E.3. Fugitive dust and mud deposits on main offsite roads and access roads shall be limited at all time to limit nuisances. Dust shall be controlled to meet the requirements of 9VAC20-81-140.A.12.
- II.E.4. Salvaging may only be performed in areas of the facility designated for salvaging or recycling. Salvaging operations must not interfere with the operations of the landfill or create hazards or nuisances.
- II.E.5. Open burning at active landfills shall comply with the requirements of 9VAC20-81-140.A.4. Open burning is prohibited at areas where waste has been disposed or is being used for active disposal.

II.F. SAFETY PROGRAM

Safety hazards to operating personnel shall be controlled through an active safety program consistent with the requirements of 29 CFR Part 1910. Safety training shall be performed annually, at a minimum.

II.G. SELF-INSPECTION PROGRAM

The landfill shall implement an inspection routine including a schedule for inspecting all applicable major aspects of facility operations necessary to ensure compliance with the requirements of this chapter. Records of these inspections must be maintained in the operating record and available for review. At a minimum, the following aspects of the facility shall be

inspected on a monthly basis: erosion and sediment controls, storm water conveyance system, leachate collection system, safety and emergency equipment, internal roads, and operating equipment.

II.H. OPERATIONS MANUAL REQUIREMENTS

II.H.1. The facility shall be operated in accordance with 9 VAC 20-81-140, Module II, and an operations manual which has been certified by a responsible official and placed in the facility's operating record.

II.H.2. The operations manual shall include the following items as required by 9 VAC 20-81-485:

- A certification page;
- Operations Plan;
- Inspection Plan;
- Health and Safety Plan;
- Unauthorized Waste Control Plan;
- Emergency Contingency Plan; and
- Landscaping Plan.

II.H.3. The operations manual shall be reviewed and recertified annually to ensure consistency with the current operations and regulatory requirements.

II.I. LEACHATE MANAGEMENT

Leachate shall be managed in accordance with 9 VAC 20-81-210, Module III, and the facility's Leachate Management Plan, if applicable. If a leachate seep(s) occurs, the owner or operator shall repair the seep(s) and follow the procedures outlined in 9 VAC20-81-210.F.

II.J. LANDFILL GAS MANAGEMENT

Landfill gas shall be monitored in accordance with 9VAC20-81-200, Module III, and the facility's Landfill Gas Management and Remediation Plans. The gas management system shall be inspected at a rate consistent with the system's monitoring frequency.

II.K. GROUNDWATER MONITORING

Groundwater shall be monitored in accordance with 9VAC20-81-250 and 9 VAC 20-81-260; Modules X, XI, and XIV; and the respective groundwater permit documents, as applicable. The groundwater monitoring system shall be inspected at a rate consistent with the system's monitoring frequency.

PERMIT MODULE III SANITARY LANDFILL DESIGN

III.A. LINER DESIGN

The two (2) disposal cells previously permitted under SWP319 are unlined.

The three (3) disposal cells, previously permitted under SWP519 and commonly referred to as Trenches 1, 2 & 3, are constructed with a soil liner consisting of 12 inches of compacted clay with permeability of 1×10^{-7} cm/s.

Cells 1, 2A, 3 and 4, permitted under SWP582, of the landfill are underlain with the composite liner system described below from top to bottom:

- A leachate collection layer consisting of an 18-inch VDOT #8 stone
- a primary 60-mil High Density Polyethylene (HDPE) geomembrane;
- two feet of compacted clay soil with permeability of 1×10^{-7} cm/sec

III.B. LINER CONSTRUCTION & CERTIFICATION

The landfill base liner was constructed in accordance with the approved Design Plans, Technical Specifications, and Construction Quality Assurance Plan, as applicable at the time.

Prior to expansion into each new Cell, the permittee submitted all required certification documents as indicated in Permit Module I Section I.D.1 – 3 as required by 9 VAC 20-81-490.A. Once this documentation was submitted and approved by the Department, and a site inspection of the new Phase/Cell had been conducted, a Certificate to Operate (CTO) was issued by the Regional Office prior to the facility accepting waste in the newly constructed Phase/Cell.

III.C. LANDFILL GAS MANAGEMENT SYSTEM

III.C.1. The facility shall implement and maintain a gas management plan in accordance with 9 VAC 20-81-200 to provide for the protection of public health, safety, and the environment during the periods of operation, closure, and post-closure care, in accordance with the following requirements:

III.C.1.a. The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane (1.25% methane) in facility structures (excluding gas control or recovery system components); and

III.C.1.b. The concentration of methane gas does not exceed the lower explosive limit for methane (5.0% methane) at the facility boundary.

III.C.2. The facility shall perform quarterly landfill gas monitoring of the perimeter gas monitoring wells and occupied structures in accordance with 9 VAC 20-81-200.B.4.

III.C.3. Perimeter Gas Monitoring Network

III.C.3.a. The facility shall install and maintain perimeter gas monitoring probes at the locations specified in the Landfill Gas System Site Plan on Figure 2 of

the 2005 Landfill Gas Remediation Plan. The current perimeter gas monitoring network consists of a series of fourteen landfill gas monitoring probes [GP-1, GP-2, GP-3, G-4a, GP-4b, GP-4c, GP5, GP-6, GP-7, GP-8, GP-10, GP-11, GP-12, and GP-13] located along the property boundary.

III.C.3.b. If the perimeter gas monitoring network is expanded with the installation of new or replacement gas monitoring wells, the facility shall submit copies of the well boring logs for inclusion in Appendix IV of the 2005 Landfill Gas Remediation Plan within 30 days following construction completion.

III.C.4. Landfill Gas Management

The existing and planned gas management system at the landfill consists of passive landfill gas vents. The compliance boundary for landfill gas monitoring was extended through a Part A modification approved on January 3, 2003.

III.C.5. Landfill Gas Remediation

III.C.5.a. Should the results of landfill gas monitoring indicate concentrations of methane in excess of the methane action level (4% methane or 80% of the lower explosive limit (LEL) at the facility boundary or 1.25% or 25% LEL in facility structures), the Operator shall take immediate steps to protect public health and safety and provide written notification to DEQ within 5 working days and include what they plan to do to resolve the issue. This 5-day written notification is required for every occurrence where the LEL exceeds an action level but is below the compliance level.

III.C.5.b. Should the results of landfill gas monitoring indicate concentrations of methane in excess of the methane compliance level (5% methane or 100% of the LEL at the facility boundary or 1.25% methane or 25% LEL in facility structures), the Operator shall take steps to protect public health and safety and provide oral notification within 24 hours and written notification within 5 working days for every occurrence when they exceed the compliance level. Additionally, the facility shall implement a remediation plan within 60 days and submit the plan to DEQ for approval.

III.C.5.c. The facility shall implement monthly gas monitoring at the noncompliant well(s) and/or occupied structures and those wells/structures immediately adjacent. Monthly monitoring shall continue until 3 consecutive monthly readings yield methane concentrations below 80% LEL. At that time, the facility can return to quarterly monitoring.

III.D. LEACHATE MANAGEMENT

III.D.1. Leachate Storage

All leachate collected in the leachate collection system flows by gravity to the 400,000 gallon above ground storage tank which discharges to the sanitary sewer system.

III.D.2. Leachate Disposal

Collected leachate will be discharged to the sanitary sewer system which then flows to

the Roanoke Regional Wastewater Treatment Plant. Leachate can also be pumped and hauled if the leachate storage tank becomes full and the locality pump station serving the facility cannot handle the flow.

Leachate which will be pumped and hauled will be analyzed and characterized in accordance with the Virginia Hazardous Waste Management Regulations (9VAC20-60) to determine if it is a characteristic hazardous waste.

PERMIT MODULE X

DETECTION GROUNDWATER MONITORING REQUIREMENTS

The purpose of Detection monitoring is to ensure the earliest possible recognition of a landfill impact to the uppermost aquifer at levels which exceed background.

X.A. GROUNDWATER COMPLIANCE POINT

X.A.1. Uppermost Aquifer

The compliance point for groundwater monitoring is the uppermost aquifer [250.A.2.a] which encompasses the entire thickness between the first encounter with groundwater (not to include any perched water) and the first encounter with a confining unit forming the lower boundary of the uppermost aquifer [A.3.f.(1).(b/c)].

X.A.2. Monitoring Well Locations

All wells in the monitoring network, including those at the disposal unit boundary, or at an alternate compliance point [250.A.3.a.(3)], shall be installed within the permitted facility boundary and be screened within the uppermost aquifer unless a variance [250.A.3.a.(2)] meeting the requirements of 740.B has been granted.

X.A.3. Location Restrictions

No monitoring well serving the function defined under 250.A.3.a.(2) can be:

X.A.3.a. located at a distance more than 500 feet away from the disposal unit boundary or

X.A.3.b. outside of the facility boundary [740.A].

X.B. MONITORING NETWORK REQUIREMENTS

X.B.1. The following Performance Standards shall be met:

X.B.1.a. Network requirements of 250.A.2.a and A.3.a, b, f.

X.B.1.b. Wells requiring replacement due to non-performance shall be reported to the Department within 30 days of recognizing the non-performance. The notification shall include a site plan depicting the proposed location for the replacement well(s) for Department review [530.C.1].

X.B.1.c. Wells that require replacement must be replaced prior to the next regularly scheduled groundwater sampling event unless the Director has granted an extension to meeting the monitoring system compliance requirements under 250.A.3.a.

X.B.1.d. Any wells that require abandonment shall be sealed and abandoned in accordance with existing EPA Resource Conservation and Recovery Act (RCRA) guidance as well as any applicable state or local requirements.

X.B.2. Installation, Operations and Maintenance

All wells shall be installed, operated and maintained during the life of the monitoring program in accordance with requirements of 250.A.3.c-e.

X.B.3. Well Designations

The following wells shall be included in the groundwater monitoring network:

Upgradient Well(s)	Downgradient Wells	Piezometers
MW-101	MW-1R	MW-102
MW-4R*	MW-3RB	MW-103
	MW-5	MW-104
	MW-7	MW-105

*MW-4R serves as an upgradient compliance well and shall not be used to calculate background levels at the site.

X.C. AQUIFER INFORMATION

X.C.1. Aquifer Data Acquisition - Requirements

X.C.1.a. Static groundwater elevations [250.A.4.c] shall be:

- X.C.1.a.(1). measured in all monitoring wells.
- X.C.1.a.(2). measured to an accuracy of 0.01 foot.
- X.C.1.a.(3). measured each time groundwater is sampled on site.
- X.C.1.a.(4). obtained from all wells in the network within a single 24 hour period to avoid temporal variations/fluctuations in the groundwater table.

X.C.1.b Groundwater flow rate and direction [250.A.4.c] shall be:

- X.C.1.b.(1). determined each time groundwater is sampled on site,
- X.C.1.b.(2). calculated using technical methods accepted for use in EPA RCRA groundwater programs.

X.C.2. Aquifer Data Acquisition - Response

X.C.2.a. The Permittee shall evaluate the function of each monitoring network well each time groundwater is sampled. If the evaluation shows that one or more of the well(s) no longer functions in a manner that meets the requirements of 250.A.3.e, the Permittee shall:

- X.C.2.a.(1). Within 30 days of recognizing the non-performance, notify the Department of the need to modify the number, location, or depth of the monitoring wells, and provide for Department review, proposed locations for new (replacement) monitoring

wells keyed to a site plan.

- X.C.2.a.(2). Complete additions or modifications to the network, prior to the next regularly scheduled groundwater sampling event, unless an extension has been granted by the Director for meeting the monitoring system compliance requirements under 250.A.3.a.

X.D. SAMPLING ACTIONS

The Permittee shall:

- X.D.1. Meet the field sampling and laboratory procedures of 250.A.4.a.
- X.D.2. Use the analytical methods of EPA SW-846 as amended [250.A.4.b].
- X.D.3. Not filter groundwater samples prior to analysis [250.A.4.b].
- X.D.4. Sample all Detection constituents referenced under Table 3.1 Column A [250.B.2.a].

X.E. SAMPLING FREQUENCY

- X.E.1. The Permittee shall, during the active life and post-closure care periods, sample groundwater and analyze for the required Table 3.1 constituents in all monitoring wells on at least a semi-annual basis [250.B.2.a.(2)] unless the quarterly wetlands provisions apply to an active sanitary landfill [250.B.1.e.].
- X.E.2. The length of the semi-annual sampling period shall not conflict with the requirements of 9 VAC 20-81-10.

X.F. DETERMINATION OF BACKGROUND

- X.F.1. The Permittee shall establish site background values [250.A.4.d -f] for all Detection monitoring constituents within the timeframes of 250.B.2.a.(1).

X.G. STATISTICAL PROCEDURES

When evaluating the groundwater sampling event results, the Permittee shall:

- X.G.1 within 30 days of completion of the laboratory analysis for each sampling event [250.A.4.h.(2)], determine whether or not there is a statistically significant increase over site background for each monitoring constituent using a method meeting the requirements of 250.A.4.h.(1) and A.4.g and D.
- X.G.2. For the purpose of this Permit, laboratory analysis is considered complete upon issuance of the final analytical report under laboratory signature.

X.H. BACKGROUND EXCEEDANCE ACTIONS

If the statistical comparisons required under the monitoring program show no exceedances, the Permittee shall continue monitoring groundwater within the current program.

When a Permittee has determined there has been a SSI exceedance over site background for one or more of the Detection monitoring constituents, the Permittee shall upon the end of the 30-day SSI determination period allowed by 250.A.4.h.(2), notify the Director within the timeframes of 250.B.2.b.(1)(a). The notification must indicate which groundwater monitoring constituents have shown statistically significant increases over background and describe whether the Permittee shall:

- X.H.1. initiate Assessment monitoring described under 250.B.3 within the timeframes of 250.B.3.a., or
- X.H.2. submit an Alternate Source Demonstration meeting the content requirements and timeframes of 250.A.5.a., b. Unless Director approval of the demonstration is obtained, the Permittee shall follow the sampling requirements and timeframes required of Assessment monitoring.

X.I. RECORD-KEEPING REQUIREMENTS

The Permittee shall retain all records identified under 250.E.1 as well as 530.B.1 and B.2 throughout the facility active life (including closure) and post-closure care period. The records shall be retained at the facility or another location approved by the Director.

X.J. REPORTING REQUIREMENTS

- X.J.1. Annual groundwater reports containing, at a minimum, content under 250.E.2.a.(2), shall be submitted to the Director within the timeframes of 250.E.2.a.(1).
- X.J.2. Semi-annual groundwater reports containing at a minimum, groundwater flow rate and direction determinations [250.A.4.c], statistical comparison results [250.B.2] and content defined under 250.E.2.b.(1), shall be submitted to the Department within the timeframes of 250.E.2.b.(1) unless qualifying facilities have received a variance from this requirement.
- X.J.3. Within 44 days of well completion, the Permittee shall supply the Director a Well Installation Report containing the well number, surveyed elevation, boring log [250.A.3.d], casing length, total depth, and a completion diagram [250.E.1.c] for each monitoring well, along with a certification [250.A.3.g] from a qualified groundwater scientist that the monitoring wells have been installed in accordance with the submitted plans.
- X.J.4. Within 44 days of well abandonment, the Permittee shall supply the Director a Well Abandonment Report containing information including field methods utilized, and a certification from a qualified groundwater scientist verifying the well abandonment activities met all applicable requirements [250.E.1.c].

X.K. NOTIFICATION REQUIREMENTS

- X.K.1. Background SSI Notifications shall be submitted to the Director within the timeframes noted under 250.B.2.b.(1)(a).
- X.K.2. Well Non-Performance Notifications shall be submitted to the Director within 30 days of recognizing the non-performance issue in order to meet 530.C.1 - 3.

X.L. MISCELLANEOUS ALLOWANCES

- X.L.1. Use of Alternate Site Background. The Permittee may request the Director allow site background to be developed using wells that are not hydrologically upgradient of the disposal unit as long as the request addresses the technical criteria contained under 250.A.4.e and is certified by a qualified groundwater scientist. Until such time as Director approval is obtained, background shall be determined by sampling wells which are upgradient of the disposal unit and meet the requirements of 250.A.3.f.(2).
- X.L.2. Use of Alternate Statistical Method. The Permittee may request the Director allow the use of an Alternate Statistical Method as long as the Permittee can demonstrate the alternate method can meet the technical criteria defined under 250.D.2. Until such time as Director approval is obtained, the statistical test(s) applied to site groundwater data shall be from 250.D.1. Whichever method is approved for use at the site, the method should be listed in the facility Groundwater Monitoring Plan as required under 250.A.4.g.
- X.L.3. Verification Sampling. The Permittee, at any time within the 30 day statistical determination period defined under 250.A.4.h.(2), may obtain verification samples. Undertaking verification sampling shall not alter the timeframes associated with determining or reporting a statistically significant increase as otherwise defined under 250.A.4.i.
- X.L.4. Data Validation. The owner or operator may at any time within the 30 day statistical determination period defined under 250.A.4.h.(2) undertake third-party data validation of the analytical data received from the laboratory. Undertaking such validation efforts shall not alter the timeframes associated with determining or reporting a statistically significant increase as otherwise defined under 250.A.4.j.
- X.L.5. When the Permittee recognizes a failure to submit any relevant facts or has submitted incorrect information in any groundwater monitoring report to the Director, he shall, within 7 days, submit such omitted facts or the correct information with a full explanation [530.E].

X.M. MISCELLANEOUS DEMONSTRATIONS

- X.M.1. To address an exceedance which is the result of something other than a release of solid waste constituents, the Permittee may submit a report entitled Alternate Source Demonstration, certified by a qualified groundwater scientist, for review by the Director within 90 days of providing the SSI notification unless the submission and approval timeframe has been extended by the Director for good cause [250.A.5.b].
- X.M.1.a. If a successful demonstration of an alternate source for the noted increase is made by the Permittee and approved by the Director within the 90 day timeframe, the Permittee may continue in the applicable monitoring program as defined in this Permit Module.
- X.M.1.b. If a successful demonstration of an alternate source for the noted increase is not made by the Permittee within the 90 day timeframe, the Permittee shall take actions required under 250.A.5.c.(3) within Regulatory timeframes unless an extension has been granted by the Director.

- X.M.2. The Permittee may submit to the Director a Multi-unit Groundwater Monitoring System Demonstration containing the content defined under A.3.b and certified by a qualified groundwater scientist, when he feels that the implementation of such a monitoring system will be as protective of human health and the environment as individual systems would be.
- X.M.2.a. If a successful demonstration is made and approved by the Director, the Permittee may discontinue use of individual monitoring systems and institute the monitoring of a multi-unit system.
- X.M.2.b. If a successful demonstration is not made, the Permittee shall initiate (or continue) to monitor individual networks under the applicable monitoring program.
- X.M.3. The Permittee may request the Director suspend groundwater monitoring requirements by submitting a No-Potential-Migration Demonstration, certified by a qualified groundwater scientist, meeting the technical requirements of 250.A.1.c.
- X.M.3.a. If a successful demonstration is made and approved by the Director, the Permittee may suspend groundwater monitoring actions.
- X.M.3.b. If a successful demonstration is not made, the Permittee shall continue monitoring as required under B.2.

X.N. PERMIT DOCUMENTS

As required under 470.A.1, the Permittee must have Design Plans that include detailed instructions concerning groundwater monitoring [470.A.1.g]. These detailed groundwater monitoring instructions must at a minimum cover the items listed under 250.A.4.a and applicable information under 250 and 260. The document containing these instructions, called the Groundwater Monitoring Plan, shall be placed in the file record.

It shall be the responsibility of the Permittee to update this monitoring plan as needed [250.B.3.e], which may include actions otherwise defined under 600.A – F, if changes to the monitoring program have taken place since original Plan development.

X.O. LIMITATIONS/AUTHORITIES

- X.O.1. Solid waste shall not be deposited in or permitted to enter any surface waters or groundwater [240.C.10].
- X.O.2. Should information contained in any Permittee authored document referenced in this Module conflict with any requirement or condition of this Module, or requirements found within 9 VAC 20-81-10 et seq., as amended, the Module condition and/or Regulatory requirement shall prevail over the language in the Permittee supplied document [35.D and 490.E] unless it can be demonstrated that a Variance from that regulatory requirement has been granted by the Director following the procedures under 700 et seq.
- X.O.3. The groundwater monitoring and reporting requirements set forth here are minimum requirements. The Director may require, by amending the Permit, any owner or operator to install, operate, and maintain a groundwater monitoring system and program

that contains requirements more stringent than those of the Regulations whenever it is determined that such requirements are necessary to prevent significant adverse effects on public health or the environment [250.A.2.c].

PERMIT MODULE XI

ASSESSMENT GROUNDWATER MONITORING REQUIREMENTS

The purpose of Assessment monitoring is to ensure the earliest possible recognition of a landfill impact to the uppermost aquifer at levels which exceed groundwater protection standards and therefore may trigger potential groundwater remediation.

XI.A. GROUNDWATER COMPLIANCE POINT

XI.A.1. Uppermost Aquifer

The groundwater monitoring compliance point is the uppermost aquifer [250.A.2.a] which encompasses the entire thickness between the first encounter with groundwater (not to include any perched water) and the first encounter with a confining unit forming the lower boundary of the uppermost aquifer [A.3.f.(1).(b/c)].

XI.A.2. Monitoring Well Locations

All wells in the monitoring network, including those at the disposal unit boundary, or at an alternate compliance point [250.A.3.a.(3)], shall be installed within the permitted facility boundary and be screened within the uppermost aquifer unless a variance [250.A.3.a.(2)] meeting the requirements of 740.B has been granted.

XI.A.3. Location Restrictions

No monitoring well serving the function defined under 250.A.3.a.(2) can be:

XI.A.3.a. located at a distance more than 500 feet away from the disposal unit boundary or

XI.A.3.b. outside of the facility boundary [740.A].

XI.B. MONITORING NETWORK REQUIREMENTS

XI.B.1. The following Performance Standards shall be met:

XI.B.1.a. Network requirements of 250.A.2.a and A.3.a, b, f.

XI.B.1.b. Wells requiring replacement due to non-performance shall be reported to the Department within 30 days of recognizing the non-performance. The notification shall include a site plan depicting the proposed location for the replacement well(s) for Department review [530.C.1].

XI.B.1.c. Wells that require replacement must be replaced prior to the next regularly scheduled groundwater sampling event unless the Director has granted an extension to meeting the monitoring system compliance requirements under 250.A.3.a.

XI.B.1.d. Any wells that require abandonment shall be sealed and abandoned in accordance with existing EPA Resource Conservation and Recovery Act (RCRA) guidance as well as any applicable state or local requirements.

XI.B.2. Installation, Operations and Maintenance

All wells shall be installed, operated and maintained during the life of the monitoring program in accordance with requirements of 250.A.3.c-e.

XI.B.3. Well Designations

The following wells shall be included in the groundwater monitoring network:

Upgradient Well(s)	Downgradient Wells	Piezometers
MW-101	MW-1R	MW-102
MW-4R*	MW-3RB	MW-103
	MW-5	MW-104
	MW-7	MW-105

*MW-4R serves as an upgradient compliance well and shall not be used to calculate background levels at the site.

XI.C. AQUIFER INFORMATION

XI.C.1. Aquifer Data Acquisition - Requirements

XI.C.1.a. Static groundwater elevations [250.A.4.c] shall be:

- XI.C.1.a.(1). measured in all monitoring wells.
- XI.C.1.a.(2). measured to an accuracy of 0.01 foot.
- XI.C.1.a.(3). measured each time groundwater is sampled on site.
- XI.C.1.a.(4) obtained from all wells in the network within a single 24 hour period to avoid temporal variations/fluctuations in the groundwater table.

XI.C.1.b Groundwater flow rate and direction [250.A.4.c] shall be:

- XI.C.1.b.(1). determined each time groundwater is sampled on site,
- XI.C.1.b.(2). calculated using technical methods accepted for use in EPA RCRA groundwater programs.

XI.C.2. Aquifer Data Acquisition - Response

XI.C.2.a. The Permittee shall evaluate the function of each monitoring network well each time groundwater is sampled. If the evaluation shows that one or more of the well(s) no longer functions in a manner that meets the requirements of 250.A.3.e, the Permittee shall:

- XI.C.2.a.(1). Within 30 days of recognizing the non-performance, notify the Department of the need to modify the number, location, or depth of the monitoring wells, and provide for Department

review, proposed locations for new (replacement) monitoring wells keyed to a site plan.

- XI.C.2.a.(2). Complete additions or modifications to the network, prior to the next regularly scheduled groundwater sampling event, unless an extension has been granted by the Director for meeting the monitoring system compliance requirements under 250.A.3.a.

XI.D. SAMPLING ACTIONS

The Permittee shall:

- XI.D.1. Meet the field sampling and laboratory procedures of 250.A.4.a.
- XI.D.2. Use the analytical methods of EPA SW-846 as amended [250.A.4.b].
- XI.D.3. Not filter groundwater samples prior to analysis [250.A.4.b].
- XI.D.4. Sample all Assessment constituents referenced under Table 3.1 Column B [250.B.3.a] during annual sampling events and all Detection constituents referenced under Table 3.1 Column A as well as those constituents in Column B that were previously detected [250.B.3.c.(2)] during semiannual sampling events.

XI.E. SAMPLING FREQUENCY

- XI.E.1. The Permittee shall, during the active life and post-closure care periods, sample groundwater and analyze for the required Table 3.1 constituents in all monitoring wells on at least a semi-annual basis [250.B.3.c.(2)] unless the quarterly wetlands provisions apply to an active sanitary landfill.
- XI.E.2. The length of the semi-annual sampling period shall not conflict with the requirements of 9 VAC 20-81-10.
- XI.E.3. Upon triggering the need for Assessment monitoring, the initial Assessment sampling event shall be completed in a timeframe meeting the requirements of 250.B.3.a.

XI.F. DETERMINATION OF BACKGROUND & GPS

- XI.F.1. The Permittee shall establish site-specific Assessment background values [250.A.4.d. – f.] for all detected constituents within the timeframes of 250.B.3.c.(3)
- XI.F.2. Groundwater Protection Standards (GPS) established using the process defined under 250.A.6.b, for each detected Assessment monitoring constituent shall be:
 - X.F.1.a. proposed within timelines of 250.B.3.d., and
- XI.F.3. Groundwater Protection Standards shall be updated as follows:
 - XI.F.3.a. Federal Maximum Contaminant Level-based GPS or department approved background by following the process under 250.A.6.d.

- XI.F.3.b. Alternate Concentration Limit-based GPS by following the process under 250.A.6.e.

XI.G. STATISTICAL PROCEDURES

When evaluating the groundwater sampling event results, the Permittee shall:

- XI.G.1 within 30 days of completion of the laboratory analysis for each sampling event [250.A.4.h.(2)], determine whether or not there is a statistically significant increase over site background and GPS for each monitoring constituent using a method meeting the requirements of 250.A.4.h.(1) and A.4.g and D.

XI.G.1.a. For GPS based on Federal Maximum Contaminant Level or ACLs, the comparison of analytical results from the downgradient wells shall be based on either a point to point comparison to the GPS, or a statistical comparison using 95% Lower Confidence Limit derived from at a minimum four independent sampling events completed during the compliance period.

XI.G.1.b. For GPS based on statistically calculated site background, the comparison of analytical results from the downgradient wells shall be based on a point to point comparison to the GPS.

- XI.G.2. For the purpose of this Permit, laboratory analysis is considered complete upon issuance of the final analytical report under laboratory signature.

XI.H. GPS EXCEEDANCE ACTIONS

If the statistical comparisons required under the monitoring program show no exceedances, the Permittee shall continue monitoring groundwater within the current program.

When a Permittee has determined there has been a SSI exceedance over GPS for one or more of the Assessment monitoring constituents, the Permittee shall notify the Director within the timeframe of 250.B.3.f.(3)(a). The notification must indicate which groundwater monitoring constituents have shown statistically significant increases over GPS and describe whether the Permittee shall:

- XI.H.1. initiate Corrective Actions described under 260.C within the timeframes of 260.C.1 including defining the horizontal and lateral extent of the GPS exceeding release [260.C.1.a], as well as the actions described under 260.C.1.b-e. or

XI.H.2. submit an Alternate Source Demonstration meeting the content requirements and timeframes of 250.A.5.a., b. Unless Director approval for the demonstration is obtained, the Permittee shall follow the sampling requirements and timeframes required of Corrective Action Program [260.C.] in response to a GPS exceedance.

XI.I. RECORD-KEEPING REQUIREMENTS

The Permittee shall retain all records identified under 250.E.1 as well as 530.B.1 and B.2 throughout the facility active life (including closure) and post-closure care period. The records shall be retained at the facility or another location approved by the Director.

XI.J. REPORTING REQUIREMENTS

- XI.J.1. Annual groundwater reports containing, at a minimum, content under 250.E.2.a.(2), shall be submitted to the Director within the timeframes of 250.E.2.a.(1).
- XI.J.2. Semi-annual groundwater reports containing at a minimum, groundwater flow rate and direction determinations [250.A.4.c], statistical comparison results [250.B.3] and content defined under 250.E.2.b.(1), shall be submitted to the Department within the timeframes of 250.E.2.b.(1) unless qualifying facilities have received a variance from this requirement.
- XI.J.3. Within 30 days of establishing facility background, or re-establishing background due to the installation of new monitoring wells, or a change in sampling technique, the Permittee shall report the background values and statistical computations forming the basis for those values in a report entitled Facility Background Determination Report.
- XI.J.4. Within 44 days of well completion, the Permittee shall supply the Director a Well Installation Report containing the well number, surveyed elevation, boring log [250.A.3.d], casing length, total depth, and a completion diagram [250.E.1.c] for each monitoring well, along with a certification [250.A.3.g] from a qualified groundwater scientist that the monitoring wells have been installed in accordance with the submitted plans.
- XI.J.5. Within 44 days of well abandonment, the Permittee shall supply the Director a Well Abandonment Report containing information including field methods utilized, and a certification from a qualified groundwater scientist verifying the well abandonment activities met all applicable requirements [250.E.1.c].
- XI.J.6. Upon issuance of GPS, the Permittee shall place the GPS listing in the operating record [250.A.6.c] and update that record as needed upon any changes in GPS.

XI.K. NOTIFICATION REQUIREMENTS

- XI.K.1. GPS SSI Notifications shall be submitted to the Director within the timeframes noted under 250.B.3.f.(3)(a).
- XI.K.2. Well Non-Performance Notifications shall be submitted to the Director within 30 days of recognizing the non-performance issue in order to meet 530.C.1 - 3.
- XI.K.3. Off-site Plume Notifications shall be submitted to the affected landowner [260.C.1.b] and copied to the Director within 15 days of identifying the impacts.
- XI.K.4. Table 3.1 Column B Detect Notifications shall be submitted to the Director within the timeframes noted under B.3.c.(1).
- XI.K.5. Return to Detection Monitoring Notification shall be submitted to the Director [B.3.f.(1)] no less than 30-days prior to re-instating Detection monitoring.

XI.L. MISCELLANEOUS ALLOWANCES

- XI.L.1. Use of Alternate Site Background. The Permittee may request the Director allow site background to be developed using wells that are not hydrologically upgradient of the

disposal unit as long as the request addresses the technical criteria contained under 250.A.4.e and is certified by a qualified groundwater scientist. Until such time as Director approval is obtained, background shall be determined by sampling wells which are upgradient of the disposal unit and meet the requirements of 250.A.3.f.(2).

- XI.L.2. Use of Alternate Statistical Method. The Permittee may request the Director allow the use of an Alternate Statistical Method as long as the Permittee can demonstrate the alternate method can meet the technical criteria defined under 250.D.2. Until such time as Director approval is obtained, the statistical test(s) applied to site groundwater data shall be from 250.D.1. Whichever method is approved for use at the site, the method should be listed in the facility Groundwater Monitoring Plan as required under 250.A.4.g.
- XI.L.3. Verification Sampling. The Permittee, at any time within the 30 day statistical determination period defined under 250.A.4.h.(2), may obtain verification samples. Undertaking verification sampling shall not alter the timeframes associated with determining or reporting a statistically significant increase as otherwise defined under 250.A.4.i.
- XI.L.4. Data Validation. The owner or operator may at any time within the 30 day statistical determination period defined under 250.A.4.h.(2) undertake third-party data validation of the analytical data received from the laboratory. Undertaking such validation efforts shall not alter the timeframes associated with determining or reporting a statistically significant increase as otherwise defined under 250.A.4.j.
- XI.L.5. When the Permittee recognizes a failure to submit any relevant facts or has submitted incorrect information in any groundwater monitoring report to the Director, he shall, within 7 days, submit such omitted facts or the correct information with a full explanation [530.E].
- XI.L.6. The Permittee may request the Director allow an alternate frequency for the repeated sampling of the full Table 3.1 Column B constituent list as long as the request addresses the technical items contained under 250.B.3.b.(3), and is certified by a qualified groundwater scientist. Until such time as Director Approval is obtained, sampling for the full Table 3.1 Column B shall continue on an annual basis consistent with 250.B.3.a.
- XI.L.7. In an effort to reduce sampling costs, the Permittee may request the Director:
- XI.L.7.a. allow a subset of wells to be sampled for the annual full Table 3.1 Column B constituent list [250.B.3.b.(1)] as long as the request contains information showing that wells not included in the subset are 1] devoid of any Table 3.1 column B detects, 2] the well shows no exceedances over background for any Table 3.1 Column A constituents, and 3] the request is certified by a qualified groundwater scientist. Until such time as Director Approval is obtained, all site wells shall be sampled annually for the Table 3.1 Column B constituent list consistent with 250.B.3.a, and/or
 - XI.L.7.b. allow for the deletion of certain Table 3.1 Column B constituents from the sampling list [250.B.3.b.(2)] as long as the request contains information showing that the constituents are not reasonably expected to be in or derived from the waste mass, and the request is certified by a qualified groundwater scientist. Until such time as Director Approval is obtained, all site wells

shall be sampled annually for the full Table 3.1 Column B constituent list consistent with 250.B.3.a.

XI.M. MISCELLANEOUS DEMONSTRATIONS

XI.M.1. To address an exceedance which is the result of something other than a release of solid waste constituents, the Permittee may submit a report entitled Alternate Source Demonstration, certified by a qualified groundwater scientist, for review by the Director within 90 days of providing the SSI notification unless the submission and approval timeframe has been extended by the Director for good cause [250.A.5.b].

XI.M.1.a. If a successful demonstration of an alternate source for the noted increase is made by the Permittee and approved by the Director within the 90 day timeframe, the Permittee may continue in the applicable monitoring program as defined in this Permit Module.

XI.M.1.b. If a successful demonstration of an alternate source for the noted increase is not made by the Permittee within the 90 day timeframe, the Permittee shall take actions required under 250.A.5.c.(3) within Regulatory timeframes unless an extension has been granted by the Director.

XI.M.2. The Permittee may submit to the Director a Multi-unit Groundwater Monitoring System Demonstration containing the content defined under A.3.b and certified by a qualified groundwater scientist, when he feels that the implementation of such a monitoring system will be as protective of human health and the environment as individual systems would be.

XI.M.2.a. If a successful demonstration is made and approved by the Director, the Permittee may discontinue use of individual monitoring systems and institute the monitoring of a multi-unit system.

XI.M.2.b. If a successful demonstration is not made, the Permittee shall initiate (or continue) to monitor individual networks under the applicable monitoring program.

XI.M.3. The Permittee may request the Director suspend groundwater monitoring requirements by submitting a No-Potential-Migration Demonstration, certified by a qualified groundwater scientist, meeting the technical requirements of 250.A.1.c.

XI.M.3.a. If a successful demonstration is made and approved by the Director, the Permittee may suspend groundwater monitoring actions.

XI.M.3.b. If a successful demonstration is not made, the Permittee shall continue monitoring as required under B.3.

XI.N. PERMIT DOCUMENTS

As required under 470.A.1, the Permittee must have Design Plans that include detailed instructions concerning groundwater monitoring [470.A.1.g]. These detailed groundwater monitoring instructions must at a minimum cover the items listed under 250.A.4.a and applicable information under 250 and 260. The document containing these instructions, called the Groundwater Monitoring Plan, shall be placed in the file record.

It shall be the responsibility of the Permittee to update this monitoring plan as needed [250.B.3.e], which may include actions otherwise defined under 600.A – F, if changes to the monitoring program have taken place since original Plan development.

XI.O. LIMITATIONS/AUTHORITIES

- XI.O.1. Solid waste shall not be deposited in or permitted to enter any surface waters or groundwater [240.C.10].
- XI.O.2. Should information contained in any Permittee authored document referenced in this Module conflict with any requirement or condition of this Module, or requirements found within 9 VAC 20-81-10 et seq., as amended, the Module condition and/or Regulatory requirement shall prevail over the language in the Permittee supplied document [35.D and 490.E] unless it can be demonstrated that a Variance from that regulatory requirement has been granted by the Director following the procedures under 700 et seq.
- XI.O.3. The groundwater monitoring and reporting requirements set forth here are minimum requirements. The Director may require, by amending the Permit, any owner or operator to install, operate, and maintain a groundwater monitoring system and program that contains requirements more stringent than those of the Regulations whenever it is determined that such requirements are necessary to prevent significant adverse effects on public health or the environment [250.A.2.c].

PERMIT MODULE XII CLOSURE

XII.A. CLOSURE PLAN MODIFICATION

- XII.A.1. The closure plan shall be amended any time changes in operating plans or landfill design affect the closure plan.
- XII.A.2. Amended closure plans shall be submitted to the department at least 180 days before the date the facility expects to begin construction activities related to closure.

XII.B. TIME ALLOWED FOR CLOSURE

The facility shall close Cells 1, 2A, 3 and 4, and install a final cover system in accordance with the timeframes specified in 9 VAC 20-81-140.B.1.e and 9 VAC 20-81-160. Trench 2 & 3 of the area previously permitted under SWP519 shall close by 12/31/2020 in accordance with HB1205 closure schedule outlined in 9 VAC 20-81-35.B.3.d.

XII.C. FINAL COVER SYSTEM

The area previously permitted under SWP391 was closed with 2 feet of compacted clay in January of 1999.

Trench 1 of the area previously permitted under SWP519 was closed with 2 feet of compacted clay plus 6 inches of topsoil

The final cover design for Trench 2 & 3, of the area previously permitted under SWP519, is as follows from top to bottom:

- 6 inches vegetative cover,
- 18" soil cushion layer,
- geonet/geocomposite drainage layer,
- 40 mil LLDPE geomembrane,
- 18 inches soil cap material with permeability 1×10^{-5} cm/s,
- 12" of intermediate cover

The landfill final cover design profile for Cells 1, 2A, 3 and 4, from top to bottom is as follows:

- 6 inches vegetative cover,
- 18" soil cushion layer,
- geonet/geocomposite drainage layer,
- 40 mil LLDPE geomembrane,
- 18 inches soil cap material with permeability 1×10^{-5} cm/s,
- 12" of intermediate cover

XII.D. CLOSURE CERTIFICATION

- XII.D.1. Following construction of the final cover system for each unit, certification, signed by a registered professional engineer, shall be submitted verifying that closure has been completed in accordance with the permit, approved plans, and specifications. A certification will be required for each capped landfill phase and shall include the results of the CQA/QC requirements under 9VAC20-81-130.Q.1.b.(6).

XII.D.2. Following the closure of all units, certification, signed by a registered professional engineer, shall be submitted verifying that closure has been completed in accordance with the requirements of 9VAC20-81-160.D.5.a through 5.c., which require posting a sign at the facility entrance and erecting suitable barriers to prevent access; submitting a survey plat to the local land reporting authority; and recording a notation on the deed to the facility property.

PERMIT MODULE XIII POST-CLOSURE CARE

XIII.A. POST-CLOSURE CARE REQUIREMENTS

XIII.A.1. The facility shall conduct post-closure care of the landfill in accordance with its approved Post-closure Care Plan.

XIII.A.1.a. Leachate shall be managed in accordance with 9 VAC 20-81-210 and the facility's Leachate Management Plan, if applicable. If a leachate seep(s) occurs, the owner or operator shall repair the seep(s) and follow the procedures outlined in 9 VAC20-81-210.F.

XIII.A.1.b. Landfill gas shall be monitored in accordance with 9VAC20-81-200 and the facility's Landfill Gas Management and Remediation Plans. The gas management system shall be inspected at a rate consistent with the system's monitoring frequency.

XIII.A.1.c. Groundwater shall be monitored in accordance with 9VAC20-81-250, Module X, and Module XI and the respective groundwater permit documents as applicable. The groundwater monitoring system shall be inspected at a rate consistent with the system's monitoring frequency.

XIII.A.2. Amended Post-closure Care Plans shall be submitted to the department for review and approval by the director.

XIII.B. POST-CLOSURE PERIOD

XIII.B.1. Post-closure care shall be conducted for 30 years.

XIII.B.2. The length of the post-closure care period may be decreased by the director if the owner or operator demonstrates that the reduced period is equally protective of human health and the environment and the demonstration is approved by the director. This demonstration shall contain:

XIII.B.2.a. Certification, signed by the owner or operator and a professional engineer licensed in the Commonwealth, verifying that decreasing the post-closure care period will be equally protective of human health and the environment; and

XIII.B.2.b. An evaluation prepared by a professional engineer or professional geologist licensed in the Commonwealth, 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.

XIII.B.3. The facility shall continue post-closure care and monitoring until such time that the department approves termination or the post-closure care and/or monitoring activity.

XIII.C. CERTIFICATION OF COMPLETION OF POST-CLOSURE CARE

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:

- XIII.C.1. Certification, signed by the owner or operator and a professional engineer licensed in the Commonwealth, verifying that post-closure monitoring and maintenance have been completed in accordance with the facility's Post-closure Care Plan; and
- XIII.C.2. An evaluation prepared by a professional engineer or professional geologist licensed in the Commonwealth, 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.

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.

PERMIT MODULE XIV MNA-BASED CORRECTIVE ACTION 9 VAC 20-81-260

XIV.A. PURPOSE

This Module describes the requirements applicable to the remedial technology implemented on site as a result of an exceedance of groundwater protection standards (GPS).

The following permit documents outline the proposed remediation:

- Corrective Action Plan
- Corrective Action Groundwater Monitoring Plan

XIV.B. INTERIM MEASURES

At any time during the Corrective Action process, the Permittee or Director may determine that interim measures are required. Nothing in this Permit shall preclude the Permittee from performing interim measures at any time if required to reduce or eliminate the risk to human health and the environment, as long as the interim measures are consistent with the goal(s) of the Corrective Action Plan. If interim measures are required by the Director, the Permittee will respond with a plan for interim measures within 60 days of the Director's notification of the need for the requirement.

XIV.C. REMEDY REQUIREMENTS

The remedy applied to the impacted aquifer shall be able to meet each of the criteria defined under 260.C.3.c.(1).

XIV.D. REMEDY DESCRIPTION

Monitored Natural Attenuation (MNA) may be appropriate for implementation in those instances where source control is in place, current trends in groundwater quality are acceptable and display evidence of biologic attenuation of the contaminant mass, the plume remains within the permitted facility boundary or off-site impacted landowners agree with its use, there is no risk to receptors on off-site property(ies) and no evidence of any current or expected cross-media transfer of groundwater contaminants to surface waters.

XIV.E. REMEDY IMPLEMENTATION

XIV.E.1. Implementation of the Corrective Action Plan and its related monitoring program begins on the date the Permit is amended to incorporate this Permit Module.

XIV.E.2. If any remedy components are not in place at the time this permit is issued:

XIV.E.2.a. the Corrective Action Plan shall contain a schedule which details each phase of the remedy implementation [260.D.1.b],

XIV.E.2.b. during the schedule period, the Permittee shall provide to the Director, updates every 30 days during the site preparation and installation phase of any remedy component installed after permit issuance [260.D.1.b.(8).a],

XIV.E.2.c. design plans for any remedy component should be submitted for Department review no less than 180-days prior to component installation.

XIV.E.3. If any condition causes a delay in the completion of the implementation schedule as outlined in the Corrective Action Plan, the Permittee must notify the Director of the problem within 7-days of recognizing the delay and amend the schedule accordingly.

XIV.E.4. Any changes in the implementation of the remedy design or groundwater monitoring program will require a modification to the facility's Permit.

XIV.E.5. The Director has the authority to modify the Permit for any changes to Corrective Action if any conditions of 600.E.5 or E.8, and 260.G.2 are found to be applicable.

XIV.F. ALTERNATE REMEDY PROVISIONS

Monitored Natural Attenuation (MNA) has been selected as the remedy of choice on site.

The Permittee or Director may determine, based on information obtained after Corrective Action has been implemented, that compliance with the requirements of 260.C.3.c.(1) are not being achieved by the remedy selected. In such cases, the Permittee shall, within 90-days of the determination:

XIV.F.1. unless the alternate remedy is already described in the Corrective Action Plan, submit a revised Corrective Action Plan describing the alternate remedy for Department review,

XIV.F.2. if the alternate remedy is already described in the existing Corrective Action Plan, submit any detailed design plans or monitoring component changes to the Department for review,

XIV.F.3. modify the facility's Permit to implement an alternate remedy, unless the Permittee submits and receives Director approval for the demonstration allowed under 260.G.3.

XIV.G. REMEDY PERFORMANCE MONITORING

The permittee shall operate and maintain the groundwater monitoring wells on site as specified below, in a manner which at a minimum meets the requirements of 250.A.3.e and 260.D.1.c. Unless otherwise specified, the upgradient well as listed in Module XI shall act as the upgradient well for groundwater remediation sampling purposes as well.

GPS Exceeding Compliance Well(s)	The Associated Performance Well(s)	The Associated Sentinel Well(s)
MW-102	MW-102	MW-107
MW-103	MW-103	MW-106
MW-104	MW-104	MW-105
VWCB*	MW-104	MW-105

*The VWCB is not part of the compliance network but is currently monitored for informational purposes. If VOCs are detected the facility will monitor the VWCB well at the same frequency and for the same parameters as the rest of the corrective action network.

Any additional wells which the Department requires for the Corrective Action network shall be installed prior to the implementation of the site remedy, or in the timeframe identified in the Monitoring Well Installation Schedule.

The groundwater remediation effort shall be coupled with a monitoring system designed, capable, and operated to demonstrate:

- XIV.G.1. the areal extent (both vertical and horizontal) of the plume at concentrations which exceed background [260.D.1.c.(2)]. Because both the horizontal and vertical aspects of the plume must be monitored, the well network must include wells installed to a depth appropriate to intersect all groundwater flow paths in the aquifer.
- XIV.G.2. the effectiveness of the implemented Corrective Action Program [260.D.1.c.(3)].
- XIV.G.3. compliance with groundwater protection standards [260.D.1.c.(4)].
- XIV.G.4. whether the plume has expanded (and remains onsite) since remedy implementation.
- XIV.G.5. in the case of MNA use, successful biologic destruction of the waste mass.

XIV.H. WELL NETWORK

- XIV.H.1. Because both the horizontal and vertical aspects of the plume must be monitored, the well network must include wells installed to a depth which will intersect all groundwater flow paths.
- XIV.H.2. The permittee shall operate and maintain the Corrective Action groundwater monitoring wells on site in a manner which is at a minimum, meets 250.A.3.e and allows the network to be operated as designed for the length of the Corrective Action Program.
- XIV.H.3. Any new wells installed on site shall be constructed meeting the requirements of EPA's RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD).
- XIV.H.4. The Director must be notified prior to the abandonment of any site wells utilized during Corrective Action. Wells shall be abandoned following the general requirements of EPA's RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD) and a well abandonment report shall be transmitted under signature of a qualified groundwater professional to the Department within 30-days of completion of field activities.
- XIV.H.5. *Upgradient wells* are those which provide site-specific background data as required under 250.A.3.a.(1).
- XIV.H.6. *Compliance wells* are those which determine whether the landfill has impacted groundwater quality at the waste management unit boundary as required by 250.A.3.a.(2).

- XIV.H.7. *Sentinel wells* are those which ensure there is no expansion of the plume or impact to sensitive receptors as a result of changes in plume migration post remedy implementation. These wells should intercept groundwater which shows no impact over background such that the data obtained from them can assist in delineating the full extent of the landfill-impacted groundwater. For organics, no impact means concentrations less than the limit of detection (LOD).
- XIV.H.8. *Performance wells* are those which measure or quantify the success of the remedy implemented. These wells, installed downgradient of each GPS exceeding well, should intercept groundwater which displays GPS exceedances. Data obtained from these wells is used to draw a line around that portion of the aquifer which continues to exceed GPS and thus require remediation.
- XIV.H.9. Sentinel and Performance wells must be located along the same groundwater flow path as the corresponding impacted compliance well. EPA (1999) has previously stated that any inferences about attenuation based on apparent decreases in contaminant concentrations in the downgradient direction will likely be incorrect unless wells are located along the downgradient groundwater flow path and monitored at the appropriate frequency.
- XIV.H.10. For sites implementing MNA, the Sentinel and Performance wells shall be positioned in a manner which allows providing the data defined by USEPA (1999) as being required to measure the progress or effectiveness of MNA-based remediation (USEPA, 2004). The data required by USEPA includes that which: (1) demonstrates MNA is occurring as expected, (2) can detect any changes in the geochemistry of the aquifer which may hinder MNA effectiveness, (3) identify any MNA breakdown products, (4) verifies the plume is not expanding either vertically or horizontally, (5) verifies no unacceptable impact to on site or off site receptors, (6) can detect any new releases to the environment, (7) can demonstrate the effectiveness of any institutional controls put in place to protect potential receptors, and (8) verifies clean-up goals have been met.

XIV.I. MONITORING CONSTITUENTS

- XIV.I.1. The permittee shall monitor all wells utilized during the Corrective Action Program for the constituents and frequencies defined in the tables below. Other wells on site shall be monitored as required under Permit Modules X and XI.

GPS Constituents of Concern (COC) are defined as any constituent on the Table 3.1 Column B sampling list which has been identified at concentrations which exceed its respective GPS. Daughter Products are defined as any constituent resulting from the biodegradation of a COC.

Monitoring Well Type	Monitoring Frequency	Constituent List	Compare Results To
Performance Wells	Quarterly for the 1 st two years, Semi-annually after that	As required under Assessment or Phase II Programs, plus MNA Performance Parameters and applicable daughter products	GPS
Sentinel Wells	Same as Compliance Wells, unless as specified in a Director approved Variance	GPS COC's, Daughter Products	GPS

MNA Performance Parameters, and the purpose they serve, are listed in the table below. To make comparisons appropriate for the understanding of the MNA process, these parameters may need to be added to the sampling list at the site background and downgradient compliance well.

Depleted Electron Acceptors	Metabolic By-Products	Miscellaneous
Dissolved Oxygen (DO)	Iron II	ORP
Nitrate	Methane	TOC
Sulfate	Chloride	pH
	Alkalinity	Conductivity
		Temp

- XIV.I.2. For the purposes of corrective action groundwater sampling:
 - XIV.I.2.a. the semi-annual sampling period shall be 180 days plus or minus 30 days between sampling events unless authorized by the Director,
 - XIV.I.2.b. the annual sampling period shall not exceed 360 days between sampling events unless authorized by the Director, and
 - XIV.I.2.c. the quarterly sampling period shall not exceed 90 days between sampling events unless authorized by the Director.
- XIV.I.3. Constituent Detects - Refers to any constituent found above the laboratory limit of detection (LOD) during any sampling event.
- XIV.I.4. If a Permittee employs verification sampling, the alpha value shall be modified as outlined in the Department's most recent technical memorandum for Data Analysis Guidelines for Solid Waste Facilities. Such samples shall be obtained within the timeframe defined under 250.A.4.h.(2). Verification sampling events conducted outside this timeframe, but within the compliance period, may be submitted in the form of an Alternate Source Demonstration meeting the requirements of 250.A.5.

XIV.J. REMEDY PERFORMANCE DEMONSTRATIONS

XIV.J.1. *Engineered System Evaluation Reports (SER)*

Sites which implement a remedy based on Presumptive Remedy or MNA do not normally require submission of monthly SER's, unless the component of the Presumptive Remedy is being constructed as part of CAP implementation. The frequency of the SER submittal (if described below), may be reduced by the Director after the initial CASE evaluation period has been completed.

An SER is not required for the currently proposed corrective action remediation strategy.

XIV.J.2. *Corrective Action Site Evaluations (CASE)*

A report titled Corrective Action Site Evaluation (CASE) shall be submitted to the Director, with a copy provided under separate cover to the Public Data Repository, once every three years, due on the calendar date the Permit was amended to implement the chosen remedy. The Permittee shall utilize the Department's Submission Instructions for CASE reports (2009 as amended) when putting together the CASE report for submission.

The CASE reports, signed by a qualified groundwater professional, will include the material requested for within the Submission Instructions, including but not limited to:

- XIV.J.2.a. The remedy type in place [260.D.1.b.(8).(d)].
- XIV.J.2.b. The concentrations of all sampled constituents identified above their respective detection limits since remedy implementation [260.D.1.b.(8).(b)].
- XIV.J.2.c. Plume maps showing the lateral and vertical extent of each constituent of concern found at levels above GPS and background [260.D.1.c.(2)].
- XIV.J.2.d. Calculated rate of contaminant migration during the CASE period [260.D.1.c.(1)].
- XIV.J.2.e. A groundwater potentiometric surface map based on the most recent groundwater elevation data.
- XIV.J.2.f. A discussion of the progress during the CASE period toward reaching GPS including any revisions needed to the timelines initially provided in the Corrective Action Plan [260.D.1.b.(8).(c, e, and f)].
- XIV.J.2.g. Copies of the field sampling records laboratory reports for all sampling events conducted during the CASE period [260.D.1.b.(8).(g)].

XIV.K. REMEDY COMPLETION DEMONSTRATION

XIV.K.1. *Certificate Submission*

Within 14-days of completing the groundwater remedy, the Permittee shall submit a Certification, signed and certified by the Permittee and a qualified groundwater scientist stating all requirements of 260.H.1 have been met, (a copy of the Certification shall also be placed at the Public Data repository).

XIV.K.2. *CACR Submission*

With submission of the Certification, the Permittee shall submit for approval by the Director, a Corrective Action Completion Report (CACR), signed and certified by a qualified groundwater scientist, demonstrating that the remedial actions have been successful in meeting the requirements Permit Module XIV and 260.C.3.(c).(1):

XIV.K.2.a. Documentation that groundwater protection standards have been achieved at all Performance and Sentinel monitoring points within the plume of contamination beyond the compliance well network established under Permit Module XI during the last three years of groundwater monitoring [260.H.1.a].

XIV.K.2.b. Documentation that groundwater protection standards have been achieved at all Compliance monitoring points at the waste unit boundary during the last three years of groundwater monitoring [260.H.1.a].

XIV.K.2.c. All actions required as part of the remedy have been satisfied or completed [260.H.1.b].

XIV.K.2.d. Documentation that all technical actions and certifications required to complete the remedy have been satisfied [260.H.2-3].

XIV.K.3. If, after review of the Certification and the CACR, the Director agrees that Corrective Action requirements have been met, the Permittee shall be released from the remedial requirements of 260 and the financial assurance requirements of 9 VAC 20-70-10 et seq. If the Director finds that the presented materials do not substantiate that Corrective Action goals have been achieved, the Permittee shall remain under the Corrective Action requirements until such time as these requirements have been met [260.H.4.b].

XIV.L. REMEDY ABANDONMENT

The Permittee may submit to the Director a Technical Infeasibility Report (TIR) describing the technical reasons why the clean-up objectives cannot be practically met on site using the chosen remedy. The TIR shall be submitted within the timeframe specified in 260.G.3 and include:

XIV.L.1. The certification of a qualified groundwater scientist [260.G.3.a].

XIV.L.2. A discussion of the reasons why the chosen remedy, and any applicable back-up remedy were not successful in meeting the Corrective Action requirements.

If the Director approves of the TIR demonstration:

- XIV.L.3. Within 180 days of the Director approval, but no later than 14 days prior to implementing any alternative measures [260.G.3.b], the Permittee shall submit to the Director an Alternate Measures Report (AMR), signed by a qualified groundwater scientist, describing the Alternate Measures to meet the requirements of 260.G.3.d. A copy of the AMR shall also be placed at the Public Data Repository.
- XIV.L.4. If, after review of the AMR, the Director agrees that the measures applied to the site meet the requirements of 260.G.3.b, the Permittee shall be released from the Corrective Action requirements and financial assurance requirements of 9 VAC 20-70-10 et seq. If the Director finds that the presented measures do not meet the regulatory requirements, upon the Director's notification, the Permittee shall revise the AMR submission until such time as regulatory conformance is demonstrated.

If the Director disapproves of the TIR demonstration:

- XIV.L.5. Within 180 days of the Director's decision, the Permittee shall submit to the Director a revised Corrective Action Plan, signed and certified by a qualified groundwater scientist, describing a new remedy to be applied on site to meet the requirements of 260.C.3.(c).(1) and shall remain in Corrective Action until those requirements are met.

XIV.M. REMEDY RECORD-KEEPING REQUIREMENTS

- XIV.M.1. The Permittee shall record in the facility operating record all actions related to the remedy installed on site, including but not limited to any manifests related to investigatively derived wastes, as well as any design plans, construction reports, as-built documentation, and waste manifests, where applicable.
- XIV.M.2. Throughout the life of the Corrective Action Monitoring Program, the Permittee must place on file, in a location accessible to the public, copies of any Corrective Action program materials submitted to the Department including copies of the final Nature and Extent, Presumptive Remedy and/or Assessment of Corrective Measures reports. Consistent with the US EPA's RCRA Public Participation Policy, the location chosen by the Permittee shall serve as the public data repository for all monitoring reports generated during the Corrective Action process and shall in part satisfy the requirements for public participation established under RCRA. The location of the public data repository is listed below.

Location Name: Botetourt County Dept. of General Services
Location Address: 30 West Back Street, #4
Location City: Fincastle, Virginia 24090
Location Phone Number: (540) 473-8316

XIV.N. CORRECTIVE ACTION NOTIFICATION REQUIREMENTS

XIV.N.1. *System Preparation Update Notification*

During any site preparation phase concerning implementation of a surface water mitigation system, or monitoring well installation phase, the Permittee shall provide written or electronic status updates to the Director every 30 days until such time as the construction of the components is considered complete [260.D.1.b.(8).(a)].

XIV.N.2. *System Component Failure*

Emergency Modification Notification

Within 7 days of noting any Corrective Action remedy component failure, the Permittee shall submit to the Director, a notification describing the cause of the failure [260.D.1.b.(8).(e)].

XIV.N.3. *System Modification*

If modifications other than those described in the Corrective Action Plan are required to correct deficiencies or enhance monitoring system performance after implementation of the remedy, the Permittee shall submit a written request to the Director for approval of the proposed changes no later than 60 days prior to the date of the proposed modification. The notification must include a description and drawings of the proposed modification; justification for the modification; and evaluation of the performance improvements.

XIV.N.4. *System Design "As-builts"*

Well installation diagrams, boring logs, and the certification required from the groundwater professional shall be submitted as required under 250.A.3.g. As-builts for any other Remedy component which will be installed after remedy implementation should be submitted within 30-days of construction completion.

XIV.N.5. *Miscellaneous Groundwater Notifications*

Notifications regarding new background determinations, GPS exceedances, background exceedances, off-site impacts, dry wells, well abandonment, well installation, etc., must be reported in a manner consistent with requirements of 9 VAC 20-81-10 et seq., unless otherwise defined in this Module.

XIV.O. INVESTIGATIVELY DERIVED WASTES

If applicable, based on the remedy implemented onsite, all investigatively derived waste shall be managed in a manner that is protective of human health and the environment, compliant with all applicable state and federal requirements, and is consistent with the methods outlined in the Corrective Action Plan [260.C.3.(c).(1).(d)].

XIV.P. SURFACE WATER INVESTIGATION

XIV.P.1. Surface water monitoring is not a component of the site remediation

XIV.Q. PERMIT DOCUMENTS

It shall be the responsibility of the Permittee to update any permit documents as needed. This may trigger Permit modifications.

XIV.R. LIMITATIONS

Should information contained in any Permittee-authored Permit Document conflict with any requirement or condition contained herein, or language found within 9 VAC 20-81-10 et seq., as amended; the Module condition and/or Regulatory requirement shall prevail over the language in the Permittee supplied document unless it can be demonstrated that a variance from that regulatory requirement has been granted by the Director.

When the Permittee becomes aware that he failed to submit any relevant facts or submitted incorrect information in any groundwater monitoring report to the Director, he shall promptly submitted such omitted facts or the correct information with an explanation [530.E].