

Underdrain Monitoring Plan

Virginia Electric and Power Company
d/b/a Dominion Energy Virginia
Curley Hollow Solid Waste Management Facility (SWP 608)
Virginia City Hybrid Energy Center
Wise County, Virginia

GAI Project Number: C170212.00, Task 001

Revised March 2020



Prepared by: GAI Consultants, Inc.
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Homestead, Pennsylvania 15120-5005

Prepared for: Dominion Energy Services, Inc.
5000 Dominion Boulevard
Glen Allen, Virginia 23060-3308

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1.0 Introduction

This Underdrain Monitoring Plan (UDMP) for Virginia Electric and Power Company d/b/a Dominion Energy Virginia (Dominion) Curley Hollow Solid Waste Management Facility, was prepared in accordance with the Virginia (VA) Department of Environmental Quality (VDEQ), Division of Land Protection and Revitalization Guidance Memo No. 2016-02, Permitting, Sampling, Analysis, and Data Reporting associated with Solid Waste Landfill Underdrain Systems, (Guidance Memo) dated October 18, 2016 (VDEQ, 2016). The UDMP is meant to serve as the primary reference for monitoring the underdrains at the onsite Coal Combustion Residuals (CCR) Landfill.

A copy of this Plan will be retained onsite and available for reference to those individuals who collect underdrain samples.

2.0 Site Location and Information

Curley Hollow Solid Waste Management Facility serves as a captive industrial solid waste disposal site for the Virginia City Hybrid Energy Center, located in Wise County, VA and is not authorized to accept outside waste at the facility.

The CCR site is located in Curley Hollow (Part A Drawing No. 1), adjacent to the generating station location, in eastern Wise County, VA. The site is approximately 1.7 miles west of Saint Paul, VA along U.S. Alternate Highway 58 and totals approximately 330 acres, which is part of a larger collection of land, about 1,700 acres in size, currently owned by Dominion. The center of the facility is located approximately at N36°55'49" latitude and W82°20'36" longitude. The approximate location of Curley Hollow is shown on the St. Paul, VA United States Geological Survey 7.5-minute Quadrangle Map in Part A Drawing No. 1.

3.0 Underdrain Design

The underdrain system is shown on the attached Engineering Modification Plan (Drawing No. ST1A1B-4). The underdrain system consists of two separate collection systems beneath the landfill that carry flow from groundwater springs to surface drainage for Meade Creek (UD-1) and Brush Hollow (UD-2) respectively. The drains are installed below the landfill liner up to a depth of 107 feet below the liner at its deepest point.

3.1 UD-1 Underdrain System

The UD-1 underdrain system consists of approximately 4,300 linear feet of nominal 12-inch diameter high-density polyethylene (HDPE) header pipe installed in the base of the main north-south trending valley of the landfill construction area and beneath the liner and leachate collection system. The header pipe is installed within a geotextile lined drainage trench and backfilled with No. 57 aggregate or equivalent.

Several east-west trending lateral drainage trenches discharge to the header pipe. Lateral drainage trenches are either constructed as geotextile lined and aggregate backfilled drainage trenches with no piping or as similar drainage trenches containing nominal six-inch diameter HDPE perforated piping.

A single blanket drain is installed in the eastern central portion of the main valley east of the header pipe. The blanket drain consists of geotextile wrapped No.1 aggregate across the drainage area. A nominal six-inch diameter perforated HDPE "T" is installed on the downgradient side of the blanket drain, which connects to a lateral drain. The lateral drains to the west and discharges to the header pipe.

The blanket drain is installed to intercept water from within a former standing water area within the landfill footprint. The remaining laterals and header intercept and collect spring water from beneath the landfill footprint. The final outfall of the header pipe is located at the southern toe of the landfill and identified as UD-1 on the attached Site Monitoring Plan (Part B Drawing No. 13).

3.2 UD-2 Underdrain System

The UD-2 underdrain system consists of approximately 600 linear feet of nominal 12-inch diameter HDPE header pipe installed in the base of a north-south trending valley, east of the main valley, in the landfill construction footprint. The second underdrain is also installed beneath the liner and leachate collection system. The header pipe is installed within a geotextile lined drainage trench and backfilled with No. 57 aggregate or equivalent.

UD-2 intercepts and collects spring water from beneath the landfill footprint. The final outfall of the header pipe is located to the south of the eastern portion of the landfill and discharges to a north-south trending valley. The outfall of UD-2 is identified on the attached Site Monitoring Plan (Part B Drawing No. 13).

4.0 Sampling and Analysis

4.1 Monitoring Network

The underdrain performance monitoring system consists of two downgradient discharge points (UD-1 and UD-2) where a representative water sample is collected and analyzed to detect whether constituents consistent with landfill leachate in type and concentration are potentially present. The underdrain collection discharge points will be monitored in parallel with the site compliance groundwater monitoring wells. The locations of the underdrain monitoring points are shown on the attached Site Monitoring Plan (Part B Drawing No. 13).

The current comparison points for the underdrain system are cross-gradient groundwater monitoring wells MW-7, MW-12, and MW-14H. As there are no true upgradient comparisons to the underdrain system, a better assessment of actual potential influence is to evaluate performance of the two UD systems against themselves by performing intra-drain statistical analysis to look for specific changes over time.

4.2 Monitoring Frequency

The underdrain monitoring program sampling schedule will be performed on a semi-annual schedule. The underdrain monitoring program will involve sampling of the underdrain monitoring points at the same frequency and in parallel with sampling of the site compliance groundwater monitoring wells.

4.3 Monitoring Constituents

Underdrain monitoring points will be sampled for the same list of water quality parameters as required in the CCR Landfill groundwater monitoring system and as documented in the Groundwater Monitoring Plan. These include the list of constituents required by the CCR Rule Appendices III parameters, the CCR Rule Appendix IV parameters, and the constituents listed in VA Solid Waste Management Regulations (VSWMR) Table 3.1 Columns A and B, as applicable, and as presented in Table 2. Typical analytical methods and associated Limits of Quantitation/Quantitation Limits (LOQ/QL) for these parameters are also presented in Table 2. Total recoverable metals will be measured for the metal constituents listed.

For all permit-required monitoring constituents, SW-846 methods, if available, will be used. The samples will be analyzed by VA Environmental Laboratory Accreditation Program (VELAP) certified/accredited labs.

5.0 Underdrain Water Quality

The background data set will be analyzed by appropriate statistical methods and site background will be established as detailed below. The methods will incorporate standard statistical techniques in accordance with the requirements of the CCR Rule and in general conformance with United States Environmental Protection Agency (USEPA) guidance documents (USEPA, 2009).

It is anticipated statistical interval methods (prediction or tolerance) will be applied for the background data unless this test is inappropriate with the background data. If one or more alternative statistical tests are used, the Facility operator will ensure an adequate number of independent samples for the statistical method are collected within the compliance period such that the level of significance for individual well comparisons will be no less than 0.01 and no less than 0.05 for multiple comparisons for any statistical test.

5.1 Underdrain Water Quality Evaluation

Within 30-days of receipt of the laboratory analysis results for each semi-annual sampling event, Dominion will conduct a statistically significant increase (SSI) determination for each detected parameter in the underdrain monitoring points. Comparisons to the background value established from the background groundwater monitoring wells will be performed for each detected parameter at each underdrain monitoring point.

- If the statistical analyses indicate no SSI of underdrain monitoring program parameters over background, Dominion may continue the underdrain monitoring program.
- If the statistical analyses indicate there is a SSI over background, Dominion will notify the regional VDEQ office within 14 days of making the SSI determination (44 days of receipt of laboratory analysis). The written notification will include either:
 - ▶ A plan to submit an Alternate Source Demonstration (ASD) as described in Section 5.4, below; or
 - ▶ A statement that the underdrain discharge containing landfill constituents will be handled in a manner consistent with the requirements of 9 VAC 20-81-210.D, as specified in the Department's Underdrain Guidance, within 60 days.

The notification will also outline any interim steps Dominion is taking to minimize risk to human health or the environment. A sample evaluation flow diagram is presented as Figure 1.

5.2 Verification Sampling

Verification re-sampling is an integral part of statistical analysis for maintaining the desired site-wide false positive rates. For the underdrain monitoring program, if a potential SSI or suspect result is identified during a semi-annual monitoring event, a verification sample may be collected. If conducted, verification re-sampling will be completed within 30 days of receipt of laboratory analysis, within the SSI determination timeframe. Verification sample(s) will be analyzed for the parameter or parameters of concern indicating a potential SSI.

If the result of the verification sample remains statistically significant, then statistical significance will be considered verified and must be recorded. If the verification sample is not statistically significant, then no statistical significance will be recorded for the monitoring event. If verification sampling was conducted to refute a suspect SSI, verification sampling results will be submitted to the VDEQ regional office within 14 days of receipt of laboratory analyses.

5.3 Data Validation

Dominion may at any time within the SSI determination period, undertake third-party data validation of the analytical data received from the laboratory. The data validation will be used to determine if a SSI

resulted from an error in sampling procedures, analysis, statistical procedures, or natural variation in underdrain water quality. The data validation efforts will not alter the timeframes associated with determining or reporting a SSI discussed above.

5.4 Alternate Source Demonstration

Dominion may make an ASD to determine if a source other than the Landfill caused the observed SSI, or that a SSI resulted from an error in sampling procedures, analysis, statistical procedures, or natural variation in underdrain water quality. The written ASD must be submitted and approved within 90 days of confirming the SSI.

If the completed ASD is successful for the underdrain monitoring program, then Dominion will continue to implement underdrain monitoring. If the ASD is not successful for a SSI determination, Dominion will initiate an assessment of Corrective Measures as discussed in Section 7.0, below.

6.0 Recordkeeping and Reporting

If the statistical analyses indicate there is an SSI over background, Dominion will notify the regional VDEQ office within 44 days of receipt of the laboratory analysis results and SSI determination for each event. The written notification will include either:

- ▶ A plan to submit an ASD; or
- ▶ A request to meet with Regional staff to discuss options for addressing the underdrain sampling results.

By December 31st of each year, Dominion will complete and submit an Annual Landfill Underdrain Monitoring Summary (ALUMS) Report to the regional VDEQ office. The ALUMS Report form provided in Appendix A will summarize the underdrain sampling activities completed during the calendar year and include lab analyses sheets, data interpretation, and other specified attachments.

Dominion will retain inspection, monitoring, testing, and analytical data obtained throughout the active life of the facility and the post-closure period in the Operating Record.

7.0 Corrective Actions

If a SSI over background is verified through verification sampling and/or data validation, Dominion will notify the VDEQ about the discharge and the intent to capture or mitigate the discharge in accordance with 9VAC20-81-210.D. A plan and compliance schedule for completing the rerouting or mitigation of the underdrain discharge water will be developed with VDEQ concurrent with the ASD timeframe.

8.0 Operations and Maintenance

The underdrains intercept and collect spring water from beneath the landfill footprint. The underdrains transport and discharge intercepted water by gravity flow. Based on the design and operation, there are no specific operations or periodic maintenance activities associated with the underdrain system. However, should inspections identify any issues; repairs should be made to accessible system components to make the underdrain system function as designed.

9.0 Inspection Plan

The underdrain system and outfall monitoring points UD-1 and UD-2 will be visually inspected during each semi-annual monitoring event. Results of the underdrain inspection will be recorded in the sampling field notes.

10.0 Plan Revisions

Revisions to this UDMP may be required in the future due to changes in the performance monitoring system, changes in sampling requirements or parameters of concern, changes or revisions to the VSWMR, changes or revisions to the Guidance Memo, or as requested by Dominion. If conditions arise that necessitate a revision to this plan, Dominion will notify the regional VDEQ office of the requested or required revision. The revised plan will be submitted to the VDEQ regional office within 30 days of notification of the required or requested revision.

11.0 References

- United States Environmental Protection Agency. 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. Office of Resource Conservation and Recovery - Program Implementation and Information Division, March.
- Virginia Department of Environmental Quality, Division of Land Protection and Revitalization, 2016. *Guidance Memo No. 2016-02, Permitting, Sampling, Analysis, and Data Reporting associated with Solid Waste Landfill Underdrain Systems*, October.

TABLES

Table 1
Summary of Underdrain Monitoring Constituents

Parameter	Class	CASRN	Typical Method	Units	Typical LOQ/QL
CCR Appendix III					
Boron	metal	7440-42-8	6010C/6020B	mg/L	0.05
Calcium	metal	7440-70-2	6010C/6020B	mg/L	5
Chloride	anion	16887-00-6	9056A	mg/L	1
Fluoride	anion	16984-48-8	9056A	mg/L	0.1
pH	field parameter	NA	9040C	S.U.	NA
Sulfate	anion	18785-72-3	9056A	mg/L	1
Total Dissolved Solids (TDS)	Dissolved cations/anions	total	SM2540C	mg/L	50
CCR Appendix IV					
Antimony	metal	7440-36-0	6010C/6020B	µg/L	5
Arsenic	metal	7440-38-2	6010C/6020B	µg/L	1
Barium	metal	7440-39-3	6010C/6020B	µg/L	5
Beryllium	metal	7440-41-7	6010C/6020B	µg/L	1
Cadmium	metal	7440-43-9	6010C/6020B	µg/L	1
Chromium	metal	7440-47-3	6010C/6020B	µg/L	5
Cobalt	metal	7440-48-4	6010C/6020B	µg/L	1
Fluoride	anion	16984-48-8	9056A	µg/L	100
Lead	metal	7439-92-1	6010C/6020B	µg/L	1
Lithium	metal	7439-93-2	6010C/6020B	µg/L	50
Mercury	metal	7439-97-6	7470A	µg/L	2
Molybdenum	metal	7439-98-7	6010C/6020B	µg/L	10
Selenium	metal	7782-49-2	6010C/6020B	µg/L	5
Thallium	metal	7440-28-0	6010C/6020B	µg/L	1
Radium 226 & 228 combined	radionuclide	13982-63-3/15262-20-1	9315/9320	pCi/L	1
VSWMR Table 3.1 Metals and Inorganics					
Copper	metal	7440-50-8	6010C/6020B	µg/L	5
Cyanide	inorganic	57-12-5	9012B	µg/L	100
Nickel	metal	7440-02-0	6010C/6020B	µg/L	5
Silver	metal	7440-22-4	6010C/6020B	µg/L	5
Sulfide	anion	18496-25-8	9030/9215B	µg/L	100
Tin	metal	7440-31-5	6010C/6020B	µg/L	10
Vanadium	metal	7440-62-2	6010C/6020B	µg/L	5
Zinc	metal	7440-66-6	6010C/6020B	µg/L	20
Other Analytes					
Chromium (hexavalent)	metal	18540-29-9	7196A	µg/L	5

Notes:

CASRN = Chemical Abstracts Service Registry Number. Metal class represent total species.

LOQ = Limit of Quantitation

mg/L = Milligrams per liter

NA = Not applicable

µg/L = Micrograms per liter

QL = Quantitation Limit

SW-846 methods, if available, will be used for all permit-required monitoring constituents. The samples will be analyzed by VELAP certified/accredited labs.

Table 2
Underdrain Water Analysis: Container, Preservation and Holding Time Requirements

Parameter or Parameter Group	Approximate ¹ Required Sample Volume	Container Type	Preservative	Holding Time
pH	125 ml	Flow-through cell or Plastic	None	None, Field Measured
Specific Conductance	250 ml	Flow-through cell or Plastic	None	None, Field Measured
Turbidity	250 ml	Flow-through cell or Plastic	None	None, Field Measured
Temperature	250 ml	Flow-through cell or Plastic	None	None, Field Measured
Mercury	250 ml	Glass or Plastic	Cool to 4° C, pH < 2 with Nitric Acid (HNO ₃)	28 Days
Metals	250 ml	Glass or Plastic	Cool to 4° C, pH < 2 with Nitric Acid (HNO ₃)	180 Days
Chromium (Hexavalent)	250 ml	Glass or Plastic	Cool to 4° C	24 hours
Cyanide, Total	1 L	Glass or Plastic	Cool to 4° C, pH > 12 with Sodium Hydroxide (NaOH)	14 days
Sulfide, Total	125 ml	Glass or Plastic	Cool to 4° C, Zinc Acetate (ZnAc ₂) and pH > 9 with Sodium Hydroxide (NaOH)	7 days
Total Dissolved Solids (TDS)	250 ml	Glass or Plastic	Cool to 4° C	7 days
Fluoride, Chloride, Sulfate	500 ml	Glass or Plastic	Cool to 4° C	28 Days
Radium 226/228	2 L	Plastic	Cool to 4° C, Preserved upon receipt at laboratory	180 days

Notes:

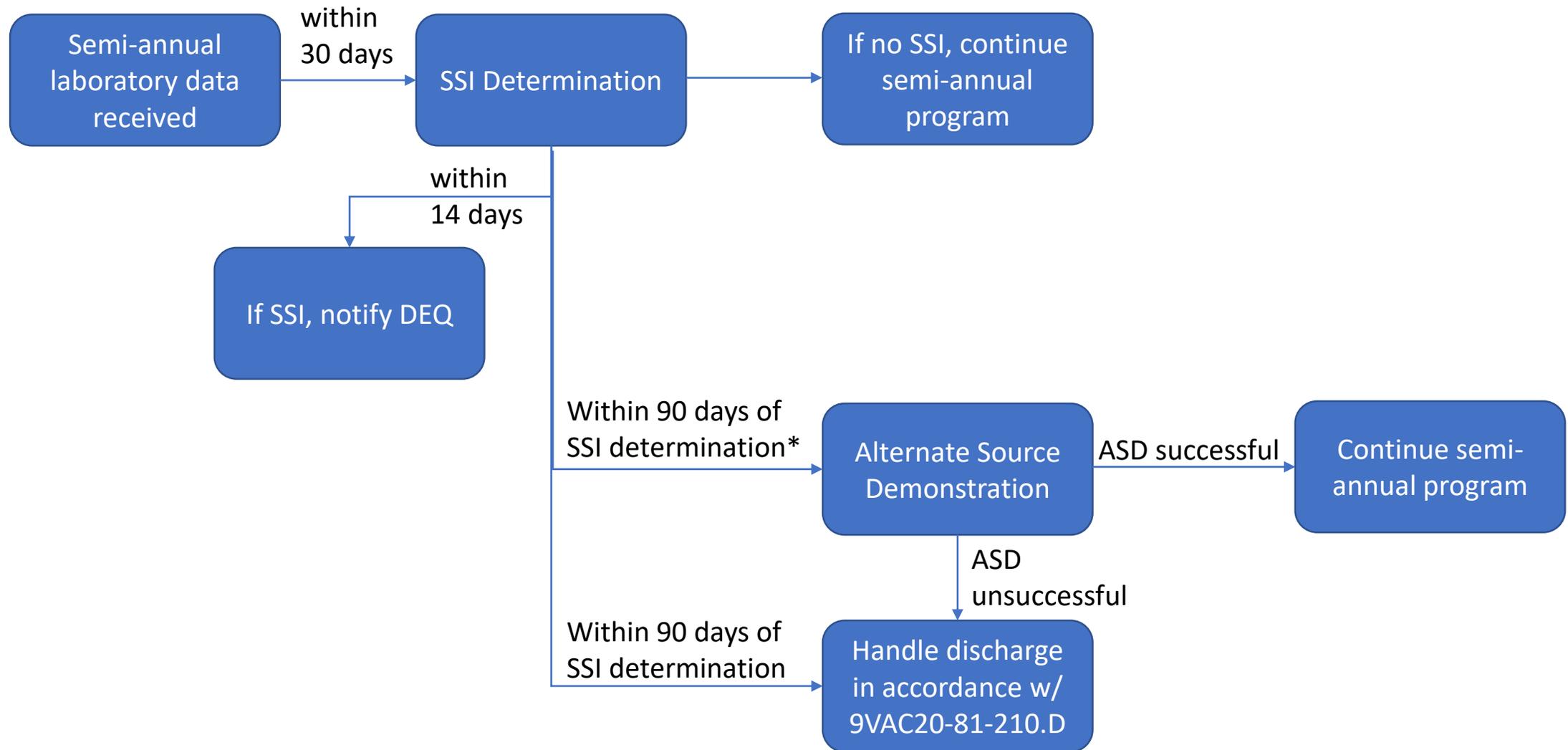
¹ ml = milliliters and L= Liters. Samples are not filtered.

FIGURE 1

Underdrain Sample Evaluation Flow Chart

Figure 1

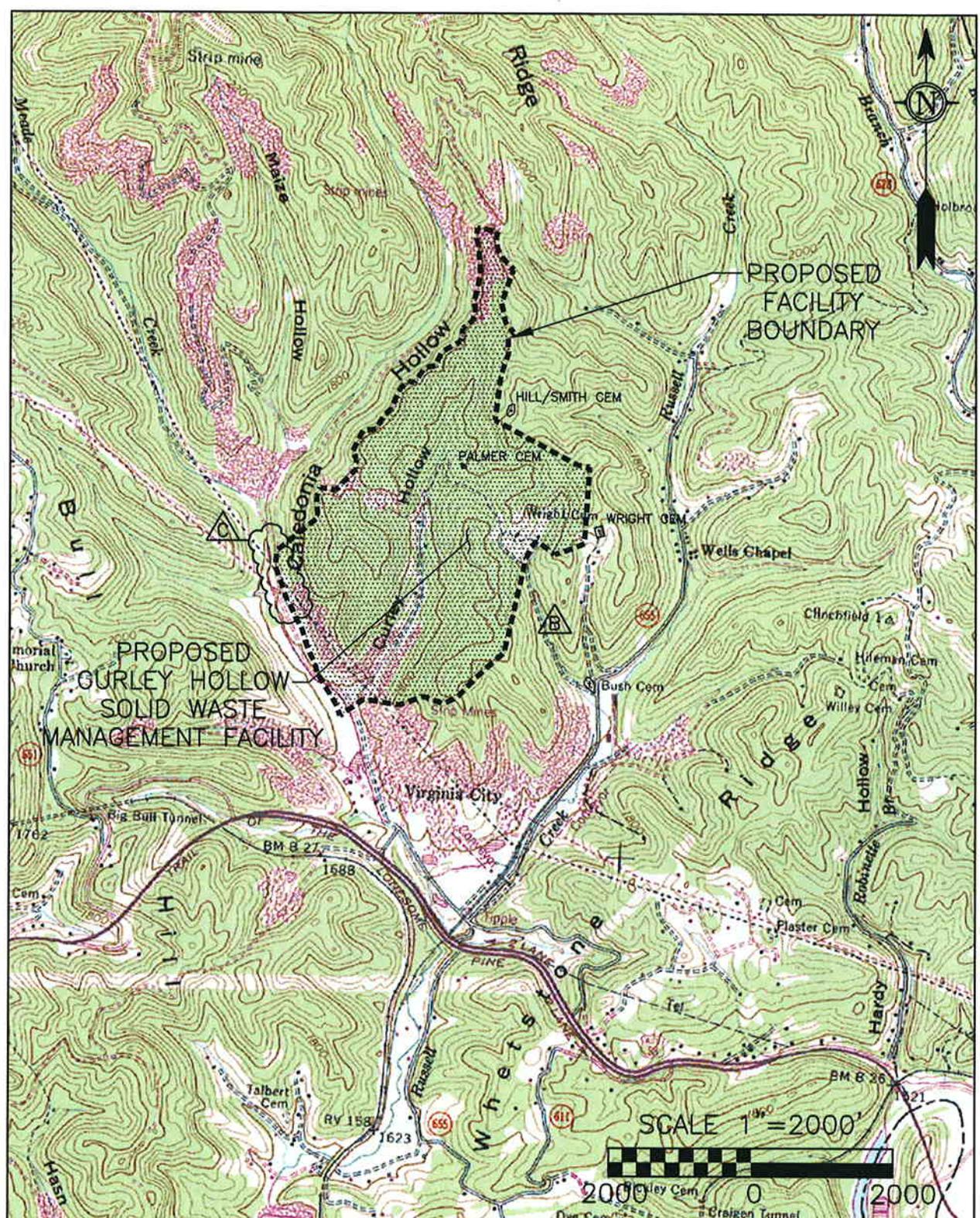
Underdrain Sample Evaluation Flow Chart



*ASD and handling of discharge water should be conducted concurrently until DEQ communication of successful/unsuccessful ASD has been received

DRAWINGS

TASK NO. 004
 DATE: 08/29/07
 PROJ. NO./DASH NO. C060702.00
 DRAWING NO. DRAWING 1
 APPROVED: TNK
 ENVIRONMENTAL-CTB
 PLOTTER FILE:
 CHECKED: DLM
 DRAWN: FJC
 CAD FILE NAME: C060702-00-004-00-E-A001.DWG



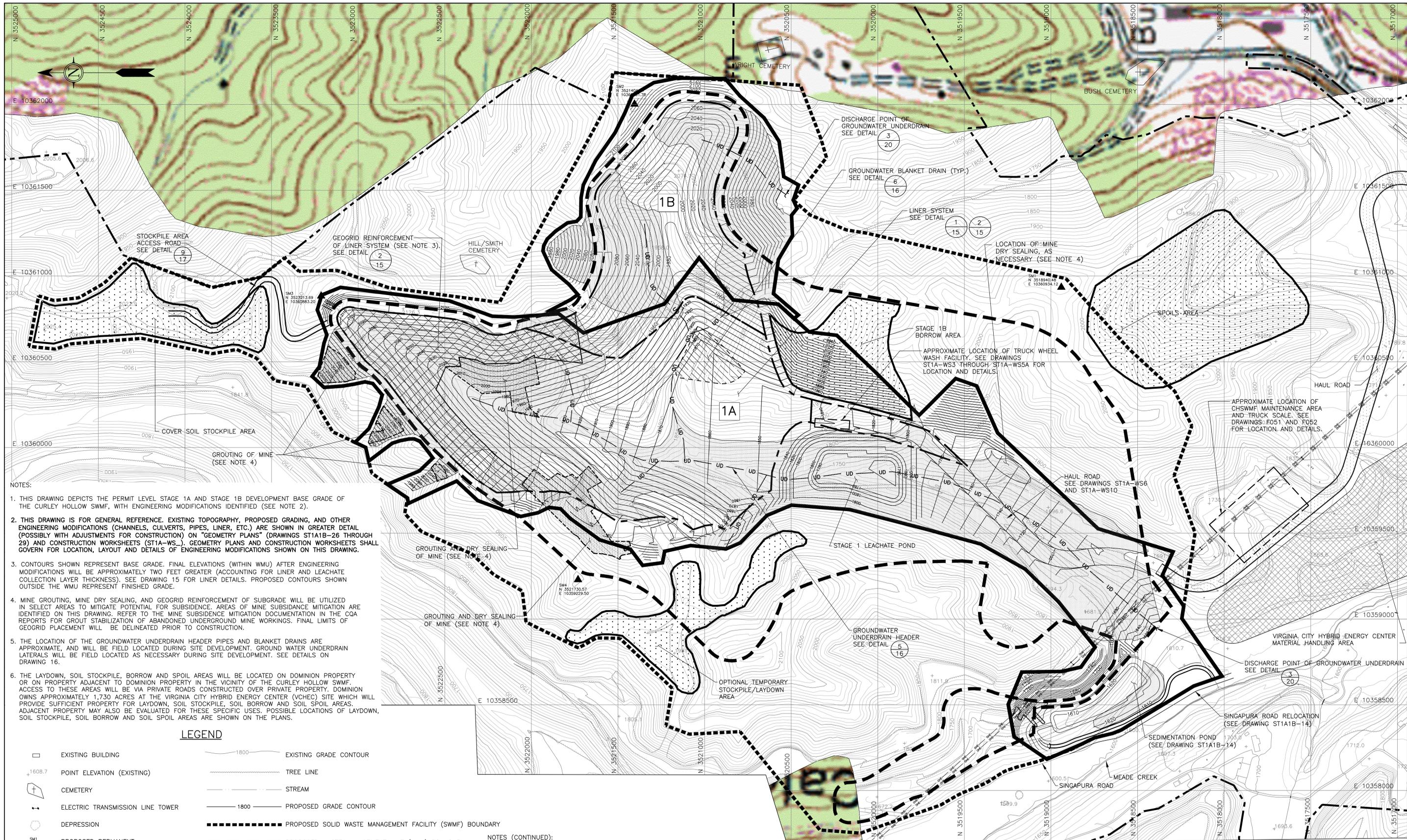
MAP REFERENCES:
 ST. PAUL, VA., USGS 7.5 MINUTE
 QUADRANGLE MAP PHOTOREVISED 1991.

NO.	DATE	DWN	CHKD	APPVD	DESCRIPTION
C	7/08/08	DLM	DLM	TNK	REVISED SWMF BOUNDARY.
B	3/21/08	JCN	DLM	TNK	REVISED SWMF BOUNDARY.
A	8/29/07	FJC	DLM	TNK	RELEASED FOR APPROVAL.
					REVISIONS

NOI/PART A DRAWING 1



AREA MAP
 PROPOSED CURLEY HOLLOW
 SOLID WASTE MANAGEMENT FACILITY
 WISE COUNTY, VIRGINIA
 DOMINION
 GLEN ALLEN, VIRGINIA

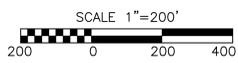


- NOTES:
- THIS DRAWING DEPICTS THE PERMIT LEVEL STAGE 1A AND STAGE 1B DEVELOPMENT BASE GRADE OF THE CURLY HOLLOW SWMF, WITH ENGINEERING MODIFICATIONS IDENTIFIED (SEE NOTE 2).
 - THIS DRAWING IS FOR GENERAL REFERENCE. EXISTING TOPOGRAPHY, PROPOSED GRADING, AND OTHER ENGINEERING MODIFICATIONS (CHANNELS, CULVERTS, PIPES, LINER, ETC.) ARE SHOWN IN GREATER DETAIL (POSSIBLY WITH ADJUSTMENTS FOR CONSTRUCTION) ON "GEOMETRY PLANS" (DRAWINGS ST1A1B-26 THROUGH 29) AND CONSTRUCTION WORKSHEETS (ST1A-WS...). GEOMETRY PLANS AND CONSTRUCTION WORKSHEETS SHALL GOVERN FOR LOCATION, LAYOUT AND DETAILS OF ENGINEERING MODIFICATIONS SHOWN ON THIS DRAWING.
 - CONTOURS SHOWN REPRESENT BASE GRADE. FINAL ELEVATIONS (WITHIN WMU) AFTER ENGINEERING MODIFICATIONS WILL BE APPROXIMATELY TWO FEET GREATER (ACCOUNTING FOR LINER AND LEACHATE COLLECTION LAYER THICKNESS). SEE DRAWING 15 FOR LINER DETAILS. PROPOSED CONTOURS SHOWN OUTSIDE THE WMU REPRESENT FINISHED GRADE.
 - MINE GROUTING, MINE DRY SEALING, AND GEOGRID REINFORCEMENT OF SUBGRADE WILL BE UTILIZED IN SELECT AREAS TO MITIGATE POTENTIAL FOR SUBSIDENCE. AREAS OF MINE SUBSIDENCE MITIGATION ARE IDENTIFIED ON THIS DRAWING. REFER TO THE MINE SUBSIDENCE MITIGATION DOCUMENTATION IN THE COA REPORTS FOR GROUT STABILIZATION OF ABANDONED UNDERGROUND MINE WORKINGS. FINAL LIMITS OF GEOGRID PLACEMENT WILL BE DELINEATED PRIOR TO CONSTRUCTION.
 - THE LOCATION OF THE GROUNDWATER UNDERDRAIN HEADER PIPES AND BLANKET DRAINS ARE APPROXIMATE, AND WILL BE FIELD LOCATED DURING SITE DEVELOPMENT. GROUND WATER UNDERDRAIN LATERALS WILL BE FIELD LOCATED AS NECESSARY DURING SITE DEVELOPMENT. SEE DETAILS ON DRAWING 16.
 - THE LAYDOWN, SOIL STOCKPILE, BORROW AND SPOIL AREAS WILL BE LOCATED ON DOMINION PROPERTY OR ON PROPERTY ADJACENT TO DOMINION PROPERTY IN THE VICINITY OF THE CURLY HOLLOW SWMF. ACCESS TO THESE AREAS WILL BE VIA PRIVATE ROADS CONSTRUCTED OVER PRIVATE PROPERTY. DOMINION OWNS APPROXIMATELY 1,730 ACRES AT THE VIRGINIA CITY HYBRID ENERGY CENTER (VCHEC) SITE WHICH WILL PROVIDE SUFFICIENT PROPERTY FOR LAYDOWN, SOIL STOCKPILE, SOIL BORROW AND SOIL SPOIL AREAS. ADJACENT PROPERTY MAY ALSO BE EVALUATED FOR THESE SPECIFIC USES. POSSIBLE LOCATIONS OF LAYDOWN, SOIL STOCKPILE, SOIL BORROW AND SOIL SPOIL AREAS ARE SHOWN ON THE PLANS.

LEGEND

- EXISTING BUILDING
- POINT ELEVATION (EXISTING)
- CEMETERY
- ELECTRIC TRANSMISSION LINE TOWER
- DEPRESSION
- PROPOSED PERMANENT SURVEY CONTROL POINT
- AREA OF STRUCTURAL FILL AND MINE STABILIZATION
- AREA OF STRUCTURAL FILL
- AREA OF MINE STABILIZATION
- AREA OF GEOGRID REINFORCEMENT
- GROUNDWATER UNDERDRAIN HEADER
- GROUNDWATER BLANKET DRAIN
- EXISTING GRADE CONTOUR
- TREE LINE
- STREAM
- PROPOSED GRADE CONTOUR
- PROPOSED SOLID WASTE MANAGEMENT FACILITY (SWMF) BOUNDARY
- PROPOSED WASTE MANAGEMENT UNIT (WMU) BOUNDARY
- APPROXIMATE LIMIT OF LINER/WASTE PLACEMENT PER STAGE
- EXISTING OVERHEAD ELECTRIC LINE
- DOMINION PROPERTY LINE
- DETAIL (5/22) DETAIL NUMBER DRAWING NUMBER
- STAGE 1A AND 1B CONSTRUCTION LIMITS (SEE NOTE 9)
- STOCKPILE, BORROW AND SPOILS AREAS

- NOTES (CONTINUED):
- DRAWING COORDINATE SYSTEM IS US STATE PLANE 1983, VIRGINIA SOUTHERN ZONE, NORTH AMERICAN DATUM 1983 (NAD83). DRAWING IS ROTATED 90 DEGREES COUNTER CLOCKWISE.
 - AN IMAGE OF THE SAINT PAUL, VIRGINIA, U.S.G.S. QUADRANGLE MAP HAS BEEN INSERTED INTO THE DRAWING TO SHOW TOPOGRAPHY AND LAND FEATURES WITHIN THE DRAWING BORDER, BUT OUTSIDE OF THE LIMIT OF MAPPING.
 - MATERIAL PLACEMENT IN SPOILS AREA SHALL BE IN ACCORDANCE WITH SPECIFICATIONS BY SHAW, STONE AND WEBSTER, INC., INCLUDED WITH THE BID DOCUMENTS.
 - STAGE 1A AND 1B CONSTRUCTION LIMITS MAY BE ADJUSTED DUE TO FIELD AND CONSTRUCTION CONDITIONS.
 - REFER TO DRAWING ST1A-WS15 FOR AS-BUILT GROUNDWATER MONITORING WELL INFORMATION.
 - REFER TO DRAWING ST1A-WS2 FOR RAIN COVER PLAN AND DETAILS. SEE DRAWING ST1A-WS FOR STAGE 1A HAUL ROAD AND DETAILS.



MAP REFERENCES:
 1. AERIAL PHOTOGRAPHY AND EXISTING TOPOGRAPHY PREPARED BY TUCK MAPPING SOLUTIONS, INC. DATED 8-15-06 PROJECT NO. A06-5691.33 CONTOUR INTERVAL 10'.
 2. SAINT PAUL, VIRGINIA, U.S.G.S. 7.5 MINUTE QUADRANGLE MAP PHOTOREVISED 1991.

NO.	DATE	DWN	CHKD	APP'VD	DESCRIPTION
2	11/15/11	RSE	DLM	JDP	FINAL STAGE 1A RECORD DRAWING.
1	1/29/10	WDM	DLM	JDP	ADDED NOTES. REVISED MONITORING WELL LOCATIONS. REVISED LIMIT OF GEOGRID.
C	01/23/09	EJM	DLM	TNK	REVISED LOCATION OF UNDERDRAIN DISCHARGE POINT AND REVISED LOCATIONS OF MONITORING WELLS.
B	11/07/08	JAR	DLM	TNK	GENERAL REVISIONS.
A	09/16/08	DES	TML	TNK	OUT FOR BID.

ENGINEERING MODIFICATION PLAN
CURLY HOLLOW SOLID WASTE MANAGEMENT FACILITY
 WISE COUNTY, VIRGINIA

DOMINION
 GLEN ALLEN, VIRGINIA

DRAWN DES	APPROVED TNK
CHECKED TML	DATE 09/03/08
DRAWING NUMBER	
ST1A1B-4	
SHT. NO. 2 OF 2	

gai consultants

PITTSBURGH OFFICE • 385 EAST WATERFRONT DRIVE, HOMESTEAD, PA 15120-5005
 GAI DRAWING FILE NO. CO60702-00-006-00-E-F004

APPENDIX A

ALUMS Report Form

Annual Landfill Underdrain Monitoring Summary (ALUMS) Report

		1] DEQ Region: Choose an item.	
		2] DEQ Regional Contact:	
		3] Submittal Date: Click here to enter a date.	
4] Permit Number:		5] Landfill Name:	
6] GW Program Status: Choose an item.		7] Landfill Operational Status: Choose an item.	
8] Underdrain Details: 8-a] Type of Underdrain: Choose an item. 8-b] Sampled Media: Choose an item. 8-c] Description of Discharge:			
9] Monitoring Frequency: Choose an item.		10] Is Sampled Discharge Covered by VPDES: <input type="checkbox"/> Yes <input type="checkbox"/> No	
11] # of Monitoring Points Sampled:		12] # of Upgradient Monitoring Points Sampled:	
Sampling Specifics			
13] Date Samples were collected?	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.
14] Were any monitoring points unable to be sampled?			<input type="checkbox"/> Yes <input type="checkbox"/> No
For monitoring points not sampled during the sampling event; provide the reason below and note whether this was a first time occurrence, or whether it has been observed on site before at that particular location.			
14-a] Damage (Initial occurrence? <input type="checkbox"/>)			<input type="checkbox"/> Yes <input type="checkbox"/> No
14-b] Failure to yield sufficient sampling volume (Initial occurrence? <input type="checkbox"/>)			<input type="checkbox"/> Yes <input type="checkbox"/> No
14-c] Totally Dry, could not be sampled (Initial occurrence? <input type="checkbox"/>)			<input type="checkbox"/> Yes <input type="checkbox"/> No
14-d] Other, please explain:			
15] Were sampling parameters measured in field? If yes, include data in Attachment VI			<input type="checkbox"/> Yes <input type="checkbox"/> No
Analytical Lab Information			
16] Dates samples were sent to analytical lab:	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.
17] Were samples submitted under Chain of Custody?			<input type="checkbox"/> Yes <input type="checkbox"/> No
18] Dates samples were received at analytical lab:	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.
19] Were samples submitted to a VELAP accredited facility?			<input type="checkbox"/> Yes <input type="checkbox"/> No
20] Were samples analyzed using SW-846 (as updated) methods?			<input type="checkbox"/> Yes <input type="checkbox"/> No
21] Date signed/certified analytical report issued by lab:	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.
22] Date signed/certified analytical reports received by consultant/facility:	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.

Interpretation and Response to Analytical Results				
23] For groundwater sampled, do any constituents exceed background levels determined at the upgradient monitoring well(s) on site?				<input type="checkbox"/> Yes <input type="checkbox"/> No
24] For surface water sampled, do any constituents exceed background?				<input type="checkbox"/> Yes <input type="checkbox"/> No
25] For sampling lists that contain VOC, were any VOCs identified above their LOQ?				<input type="checkbox"/> Yes <input type="checkbox"/> No
(if yes) 25-a] Were any of the detections for new VOC constituents or sample points?				<input type="checkbox"/> Yes <input type="checkbox"/> No
26] Was verification sampling undertaken?				<input type="checkbox"/> Yes <input type="checkbox"/> No
(if yes) 26-a] Dates of the verification event?	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.	E4: Click here to enter a date.
(if yes) 26-b] Dates verification results were released by the analytical lab?	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.	E4: Click here to enter a date.
(if yes) 27] Did verification events confirm VOC detection?				<input type="checkbox"/> Yes <input type="checkbox"/> No
28] Dates DEQ was notified (if applicable) of the exceedance(s) on lines 23, 24 or 25?	E1: Click here to enter a date.	E2: Click here to enter a date.	E3: Click here to enter a date.	E4: Click here to enter a date.
29] Will the facility pursue an ASD for any of the exceedances?				<input type="checkbox"/> Yes <input type="checkbox"/> No
30] Do the sampling results, as presented in this certified submission, indicate landfill leachate has entered into the collection system being sampled?				<input type="checkbox"/> Yes <input type="checkbox"/> No
(if yes) 30-a] Has the discharge of collected media changed due to sampling results?				<input type="checkbox"/> Yes <input type="checkbox"/> No
(if yes) 30-b] What facility actions are planned to address the exceedances?				
Attachments. The following attachments must be submitted in the order prescribed				
Attachment I: Site Identified on a USGS 7 1/2-minute Topographic Map				
Attachment II: Site Plan, 11" x 17"				
Attachment III: Table of constituents exceeding background levels				
Attachment IV: Complete Laboratory Analytical Reports (including Verification events)				
Attachment V: Chain of Custody documentation (including Verification events)				
Attachment VI: Field book documentation (including Verification events)				
Attachment VII: Statistical Data Sheets				
Responsible Official Signature:				
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision by qualified personnel who properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the submitted information, to the best of my knowledge and belief, the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.				
Name:		Title:		
Signature:			Date:	

Instructions for Completing the ALUMS Report

The Annual Landfill Underdrain Monitoring Summary (ALUMS) Report form was developed to provide a consistent annual report format that should enable an expeditious review of the submitted technical content by DEQ staff. To provide an annual report summarizing all sampling events during the calendar year, up to four date boxes are provided for questions 13, 16, 18, 21, 22, 26, and 28 to allow for reporting dates for up to four sampling events during the year, consistent with quarterly monitoring. If the underdrain system was only sampled once or twice during the calendar year, enter the appropriate dates in the E1 and E2 boxes and leave the remaining boxes (E3 and E4) blank.

The report should be filled out by the Owner/Operator, or their representative, and certified by a Responsible Official. Completed ALUMS Reports shall be addressed to the facility's Regional Office contact and received before December 31st of each calendar year. The descriptions below are listed in the order as they appear on the ALUMS Report.

General Facility Information

Line 1 DEQ Regional Office to which you submit monitoring reports. Select from drop-down: BRRO/L (Blue Ridge – Lynchburg), BRRO/R (Blue Ridge - Roanoke), NRO (Northern), PRO (Piedmont), SWRO (Southwest), TRO (Tidewater), and VRO (Valley).

Line 2 List the name of your DEQ Regional Office contact.

Line 3 Select date of the submittal.

Line 4 Permit number, SWP###.

Line 5 Identify the landfill name.

Line 6 Select the groundwater sampling program status, (i.e., Detection, Assessment, Modified Assessment, First Determination, or Phase II). This is a general indicator of whether there has been a landfill impact on the aquifer identified to date.

Line 7 Select the landfill operational status: active, closing, or post-closure.

Line 8a Identify the system being sampled (e.g., drain system, dewatering or gradient control system, witness zone, piped stream, seep/spring collection system, or other).

Line 8b Identify the type of media being sampled (i.e., perched water, groundwater, stormwater, surface water, mix of groundwater and surface water, or witness zone).

Line 8c Describe the underdrain discharge, indicating how and where (e.g., storm water basin, stormwater ditch, receiving stream, etc) the collected discharge is managed.

Line 9 Identify the underdrain sampling frequency.

Line 10 Yes or No.

Line 11 List total number of system monitoring points sampled.

Line 12 For piped stream collection systems, list total number of any upgradient monitoring points sampled. For groundwater collection systems, if applicable, list the number of upgradient monitoring wells sampled. Use 'NA' if not applicable.

Sampling Specifics

Line 13 List the date(s) the system was sampled. Boxes are provided for up to four sampling events for the calendar year. If the underdrain was only sampled semi-annually or annually, enter sampling dates within the calendar quarter the sample was taken.

Line 14 Yes or no. If the answer is yes, please fill out lines 'a' through 'c' with a yes or no as appropriate and check the initial occurrence box if applicable.

Line 15 Were any parameters measured directly in the field? Yes or No.

Analytical Lab Information

Line 16 Provide the dates the samples were sent to the analytical lab.

Line 17 Yes or no.

Line 18 Provide the dates the samples were received at the lab.

Line 19 Yes or no.

Line 20 Yes or no. Please note, SW-846 methods are only required for constituents that are listed on Table 3.1 of 9 VAC 20-81-250.E.

Line 21 Provide the dates the analytical reports were issued by the lab under the signature of the lab manager/director.

Line 22 Provide the dates the analytical report was received by the consultant/facility.

Interpretation and Response to Analytical Results

Line 23 Yes or no. Please note that for some system designs, it may be more appropriate for a facility to compare the point of sampling data against its own background level (similar in concept to intrawell analysis) if data from the upgradient groundwater monitoring well(s) is not considered truly representative of the media being collected in the underdrain system.

Line 24 Yes or no. Please note that for surface water, an entity which can be highly variable, background level, shall consist of upgradient samples (at least four independent samples) obtained the same day as the downgradient samples are obtained. Background level shall not consist of historical upstream sampling data.

Line 25 Yes or no.

Line 26 Yes or no.

Line 27 Yes or no.

Line 28 Provide dates of notification (if applicable).

Line 29 Yes or no.

Line 30 Yes or no. If yes complete Line 30a and Line 30b

Line 30a Indicate (yes or no) whether the discharge method as identified in 8c has changed due to sampling results indicating landfill leachate has entered the underdrain collection system.

Line 30b Identify planned facility actions to address the exceedance(s).

Attachments

Att-I Provide a USGS topographic map showing site location.
It is not appropriate to identify the site solely on a 3rd party electronic mapping database unless the software uses seamless digitized versions of USGS 7.5 minute topographic quadrangle maps.

- Att-II Provide a site plan showing sampling location(s), scaled to fit a page no larger than 11" x 17".
- Att-III Provide a simple table which lists each sampling point by 'ID' and its corresponding list of groundwater constituents found to exceed facility background (or VOC above LOQ).
- Any constituents found to exceed for the initial time should be presented in **bold italics**.
- Att-IV Attach a copy of the laboratory report, including the cover and signature pages, as well information concerning VELAP lab accreditation/certification.
- Att-V Attach a copy of the Chain of Custody documentation related to the sampling event.
- Att-VI Attach a copy of the field book documentation concerning sampling actions.
- Att-VII Attach statistical analysis (if applicable).

Responsible Official Signature

The form must be signed by a responsible official. A responsible official is defined in the Virginia Solid Waste Management Regulations (9 VAC 20-81-10 *et seq.*) as:

- “1. For a business entity, such as a corporation, association, limited liability company, or cooperative: a duly authorized representative of such business entity if the representative is responsible for the overall operation of one or more operating facilities applying for or subject to a permit. The authority to sign documents must be assigned or delegated to such representative in accordance with procedures of the business entity;
2. For a partnership or sole proprietorship: a general partner or the proprietor, respectively; or
3. For a municipality, state, federal, or other public agency: a duly authorized representative of the locality if the representative is responsible for the overall operation of one or more operating facilities applying for or subject to a permit. The authority to sign documents must be assigned or delegated to such representative in accordance with procedures of the locality.”