ASSESSMENT OF CORRECTIVE MEASURES

GIN HILL LANDFILL
DEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Submitted to:

Virginia Department of Environmental Quality
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August 12, 2011
Revised August 2, 2012

EEE Job No. 11-071

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Environmental, Engineering and Educational Solutions

SIGNATURE/CERTIFICATION

Virginia Professional Certification:

I certify that I have prepared or supervised preparation of the attached reports, that they have been prepared in accordance with industry standards and practices, and that the information contained herein is truthful and accurate to the best of my knowledge.

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ACRONYMS

ASD	Alternative Source Demonstration
ACM	Assessment of Corrective Measures
COPC	Constituents of Potential Concern
CAMP	Corrective Action Monitoring Plan
CAP	Corrective Action Plan
CERCLA	Comprehensive Environmental Restoration, Compensation, and Liability Act
DEQ	Virginia Department of Environmental Quality
EEE	EEE Consulting, Inc.
EPA	U.S. Environmental Protection Agency
GPS	Groundwater Protection Standards
MNA	Monitored Natural Attenuation
NES	Nature and Extent Study
PPR	Proposal for Presumptive Remedy
VOC	Volatile Organic Constituents
VSWMR	Virginia Solid Waste Management Regulations

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EXECUTIVE SUMMARY

This document presents a revision to the Assessment of Corrective Measures (ACM) for the Sussex County Gin Hill Landfill (Virginia Department of Environmental Quality (DEQ) Permit No. 193) that was submitted to DEQ on August 8, 2011. This revision addresses the DEQ comments presented in the 1st Technical Review in the DEQ letter dated January 31, 2012.

EEE Consulting, Inc. (EEE) previously submitted Nature and Extent Study (NES) and Proposal for Presumptive Remedy (PPR) reports for the Gin Hill Landfill in 2006, 2008, and 2010. In a letter dated May 12, 2011, DEQ indicated that the PPR may not be appropriate for the site due to the lack of applicable remedies, and that a full ACM should be prepared for the facility.

Over the last three years only arsenic, cobalt, lead, and thallium have been detected above the current facility GPS. All of these GPS exceedances have occurred at GH1. Former upgradient monitoring well GH1 is a unique Assessment monitoring well due to its proximity to the landfill waste. Although this well is hydraulically upgradient of the landfill waste, groundwater monitoring data indicate that water quality at GH1 is affected by the landfill waste. Monitoring wells GH4 and GH6 are downgradient of GH1.

Lead and thallium concentrations at GH1 exceeded their respective GPS in groundwater samples collected in November 2009, and October 2008. These metals were either not detected or their concentrations were well below their respective GPS since those times. Over the last six years, lead and thallium have either not been detected or found at concentrations well below the Limits of Quantitation (LOQ) at wells GH4 and GH6 located downgradient from GH. Therefore, lead and thallium are not considered to be contaminants of potential concern (COPC).

Arsenic and cobalt were detected above the GPS at GH1 in the November 2011 samples. No metals were detected above the GPS in the June 2012 sampling event. The historical monitoring data show that arsenic and cobalt concentrations at GH1 have varied over the years of monitoring. The Sen's Slope trend analysis presented in the 2011 Annual Report indicates that arsenic levels at GH1 and GH4 are generally increasing and that the increasing trend at GH4 was statistically significant at a 95% confidence level. No significant trends in arsenic concentrations are evident at the other monitoring wells. Cobalt concentration trends are generally flat or decreasing at the monitoring wells.

No organic target analytes have been found above the respective GPS since 1995 until the November 2010 sampling event when vinyl chloride and beta-BHC were detected above the GPS at well GH4. The detection of beta-BHC, a rare pesticide, is attributed to laboratory or field variability. Beta-BHC has never been detected at any of the Gin Hill assessment wells before and was not detected in the 2011 and June 2012 monitoring events. The vinyl chloride concentration at GH4 is generally consistent with the vinyl chloride concentrations detected at GH4 over the last seven years. Vinyl chloride concentrations at GH4 were found to be increasing at a 95% confidence level. Vinyl chloride concentrations over the last several years indicate a statistically significant increasing trend at GH4 due to the concentrations detected in the last three monitoring events. No vinyl chloride was detected in GH6 located downgradient of GH4.

Based on the recent monitoring data presented above, the contaminants of potential concern are arsenic, cobalt, beta-BHC, and vinyl chloride. The extent of contaminants exceeding the GPS concentrations is limited to the uppermost water-bearing unit of the Bacons Castle Formation in northern and northwest portions of the landfill lease area and a small area immediately north of the lease area.

There are no complete exposure pathways for groundwater observed in the near vicinity of the landfill. As a result, there is negligible risk to human health and the environment resulting from groundwater at the landfill.

The objectives of this ACM are to identify and evaluate the potential effectiveness, and technical and cost feasibility of various remedies at reducing the constituents of concern below GPS within a reasonable time frame based on potential risk to human health and the environment. The selection and feasibility of potentially applicable remedial technologies is primarily dependent on the site specific hydrogeologic setting, the concentrations and characteristics of the contaminants of concern, and potential risks to human health and the environment. This ACM was prepared in accordance with 9VAC20-81-260 and Submission Instruction 16.

Multiple corrective measures are potentially applicable to mitigate the offsite release and migration of contaminated groundwater and the reduction of contaminant concentrations over a reasonable time frame. The potentially applicable corrective measures were evaluated using a screening matrix to evaluate the applicability, effectiveness/performance, feasibility/implementability, cost, and other factors in meeting objectives of the corrective measures.

Some technologies such as leachate and landfill gas control are not applicable as there is no evidence that the waste materials are saturated or that landfill gas is migrating offsite. Most of the potentially applicable technologies have high installation/capital and operation & maintenance costs and do not result in a reduction in the already negligible risk to human health & environment.

Based on the limited groundwater impacts and absence of potential risk, a combination of the following two corrective measure alternatives provide the best cost/benefit for the Gin Hill Landfill:

- Monitored Natural Attenuation
- Institutional Controls

If monitored natural attenuation is implemented, a Corrective Action Monitoring Plan (CAMP) and Corrective Action Plan (CAP) will be submitted to DEQ for review, approval, and incorporation into the facility's permit via a major permit amendment. Existing monitoring wells would be utilized for the CAMP. Existing compliance monitoring well GH4 is located in the plume just north of the waste disposal area, and would be used as a performance monitoring well to demonstrate the reduction in vinyl chloride concentrations over time. NES well GH6, located downgradient of GH4, would be used as a sentinel well to verify attenuation of the vinyl chloride and demonstrate that the plume is not expanding.

1.0 INTRODUCTION

This document presents a revision to the Assessment of Corrective Measures (ACM) for the Sussex County Gin Hill Landfill (Virginia Department of Environmental Quality (DEQ) Permit No. 193) that was submitted to DEQ on August 8, 2011. This revision addresses the DEQ comments presented in the 1st Technical Review in the DEQ letter dated January 31, 2012.

EEE Consulting, Inc. (EEE) previously submitted Nature and Extent Study (NES) and Proposal for Presumptive Remedy (PPR) reports for the Gin Hill Landfill in 2006, 2008, and 2010. In a letter dated May 12, 2011, DEQ indicated that the PPR may not be appropriate for the site due to the lack of applicable remedies, and that a full ACM should be prepared for the facility.

Over the last six years, concentrations of arsenic, beryllium, chromium, cobalt, lead, thallium, vanadium, beta-BHC, and vinyl chloride were detected at least one time in one or more monitoring wells above the Groundwater Protection Standards (GPS) in effect at the time of monitoring. An Alternative Source Demonstration (ASD) and request to use background concentrations of arsenic and cobalt for GPS values was submitted to DEQ on March 29, 2011. DEQ approved the proposed GPS values for these constituents in a letter dated May 20, 2011. An ASD and request to use background concentrations of lead and vanadium for GPS values was submitted to DEQ on May 31, 2011. On August 15, 2011, DEQ approved a background based GPS value of 37 ug/L for vanadium and maintained the Alternative Concentration Level (ACL) of 15 ug/L for lead.

The 2011 and June 2012 monitoring data are generally consistent with previous monitoring events. The principal contaminant of concern is vinyl chloride, which is the only constituent detected above the facility GPS in the downgradient Assessment wells in June 2012. Arsenic and cobalt concentrations which were above the GPS in GH1 in November 2011 were well below the GPS in the June 2012. The monitoring data at GH1 have been highly variable due to its proximity to the landfill waste. Based on the historical monitoring data, the nature and extent of groundwater with constituent concentrations above GPS has been determined to be limited to the uppermost water-bearing unit beneath and immediately downgradient of the northern portion of the landfill.

The landfill is located in a very rural area of Sussex County. Areas north and west of the landfill consist of woodlands and bottomland wetlands. There are no potential human receptors located downgradient of the landfill. Therefore, the potential risk to human health and the environment is negligible.

The objectives of this ACM are to identify and evaluate the potential effectiveness and technical and cost feasibility of various remedies at reducing the constituents of concern below GPS within a reasonable time frame based on potential risk to human health and the environment. This ACM was prepared in accordance with 9VAC20-81-260 and DEQ Submission Instruction 16.

2.0 SITE DESCRIPTION

The closed Gin Hill Landfill is located in Sussex County, approximately 25 miles south of Petersburg and approximately 0.25 mile east of Interstate 95 in the Nottoway River Basin (Figure 1). The site is accessed from secondary State Route 640 by way of a dirt road through a locked gate. Coordinates for the facility are latitude N36°53'30" and longitude W77°23'30".

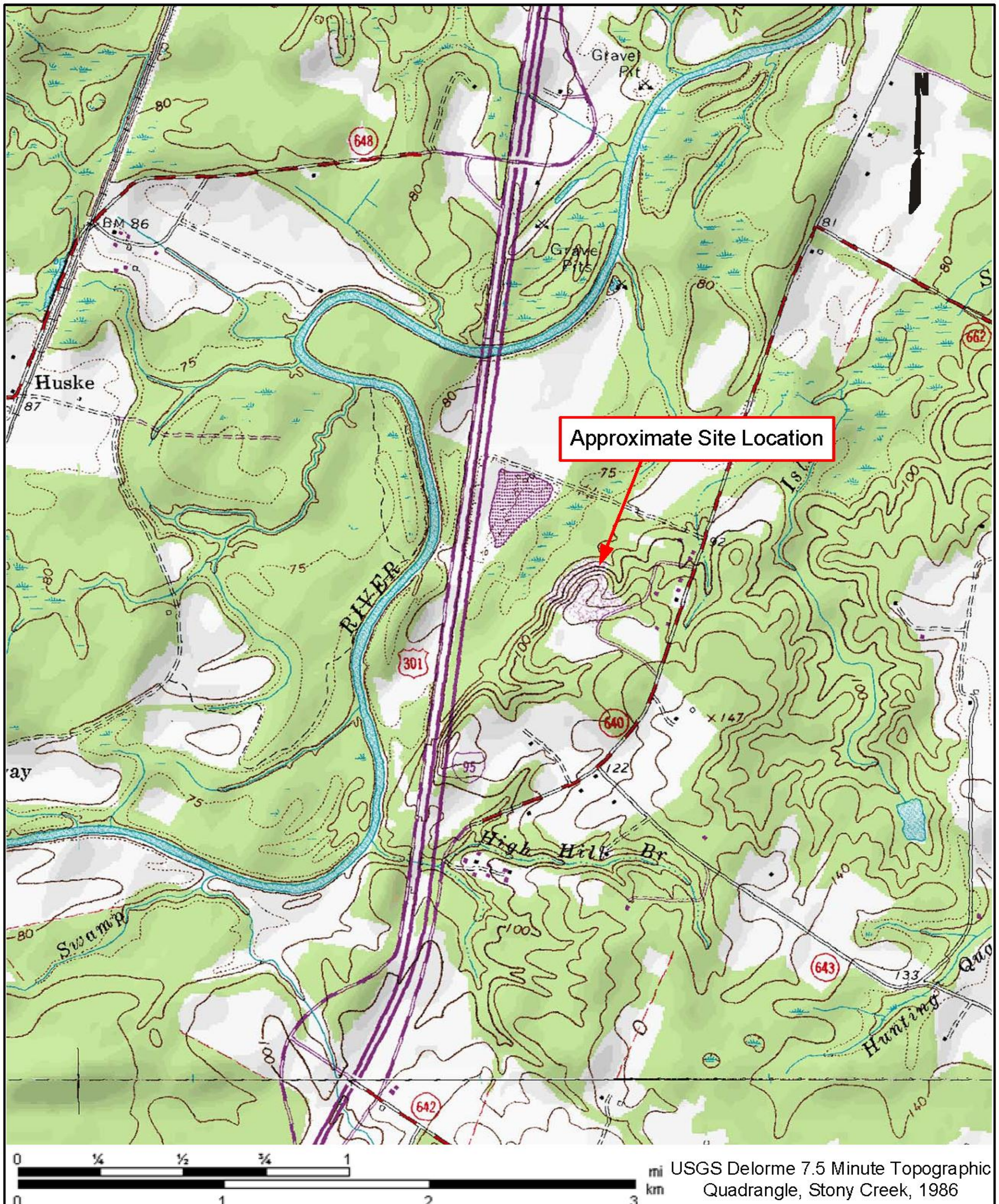
The Gin Hill Landfill is located on an approximately 11.5-acres property. Waste disposal occurred on approximately 10-acres of the property. The 10-acres were capped with natural soils. Figure 2 shows the site topography, site features, and the groundwater and landfill gas monitoring network. A vegetative ground cover is well developed over the cap. No areas of settlement, subsidence, or displacement are observed.

The County entered into a lease agreement on or about October 1, 1972, with a Thomas P. Lassell, who died on November 1, 2008. The 1972 lease agreement provides for the County to use the "Gin Hill ten acre landsite" for the purpose of a "Refuse Disposal Site" operated under the rules and regulations of the Virginia State Department of Health and government purposes in connection with the use of said premises. On October 05, 2001, the Lassell land tract, including the 11.5 landfill area, was sold to B & F, LLC. The County is in the process of either revising the lease agreement or obtaining ownership of the lease area including additional land to the north and west of the landfill disposal area outside the current lease area.

The facility was permitted on October 30, 1975 to accept municipal solid waste. The facility operated until August 24, 1990 probably using the trench and fill method. Nine acres of the site were closed prior to December 1988. One additional acre was used between December 1988 and August 1990. Municipal solid waste was not accepted at the Gin Hill Landfill after August 24, 1990. The facility achieved certified closure in August 1991.

The surrounding area is characterized by mostly gentle topography and typical dendritic drainage patterns. Topographic relief of the area is low, ranging from approximately 80 feet to 140 feet above mean sea level. The landfill is located in a very rural area of the County. There are several residences located along State Route 640. Areas north and west of the facility consist of woodlands and bottomland wetlands (Figure 3). Interstate 95 is located approximately 0.5 miles to the west (See Figures 1 and 3).

Storm water runoff is diverted from the landfill cap through lined diversion channels filled with riprap. There is a very small detention pond located at the northwest corner of the property. Surface water drainage from the landfill is to the northwest toward the Nottoway River located just west of Interstate 95 (Figure 1).



USGS Delorme 7.5 Minute Topographic Quadrangle, Stony Creek, 1986

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FIGURE 1
Site Location Map
Gin Hill Landfill, DEQ Permit #193
Sussex County, VA

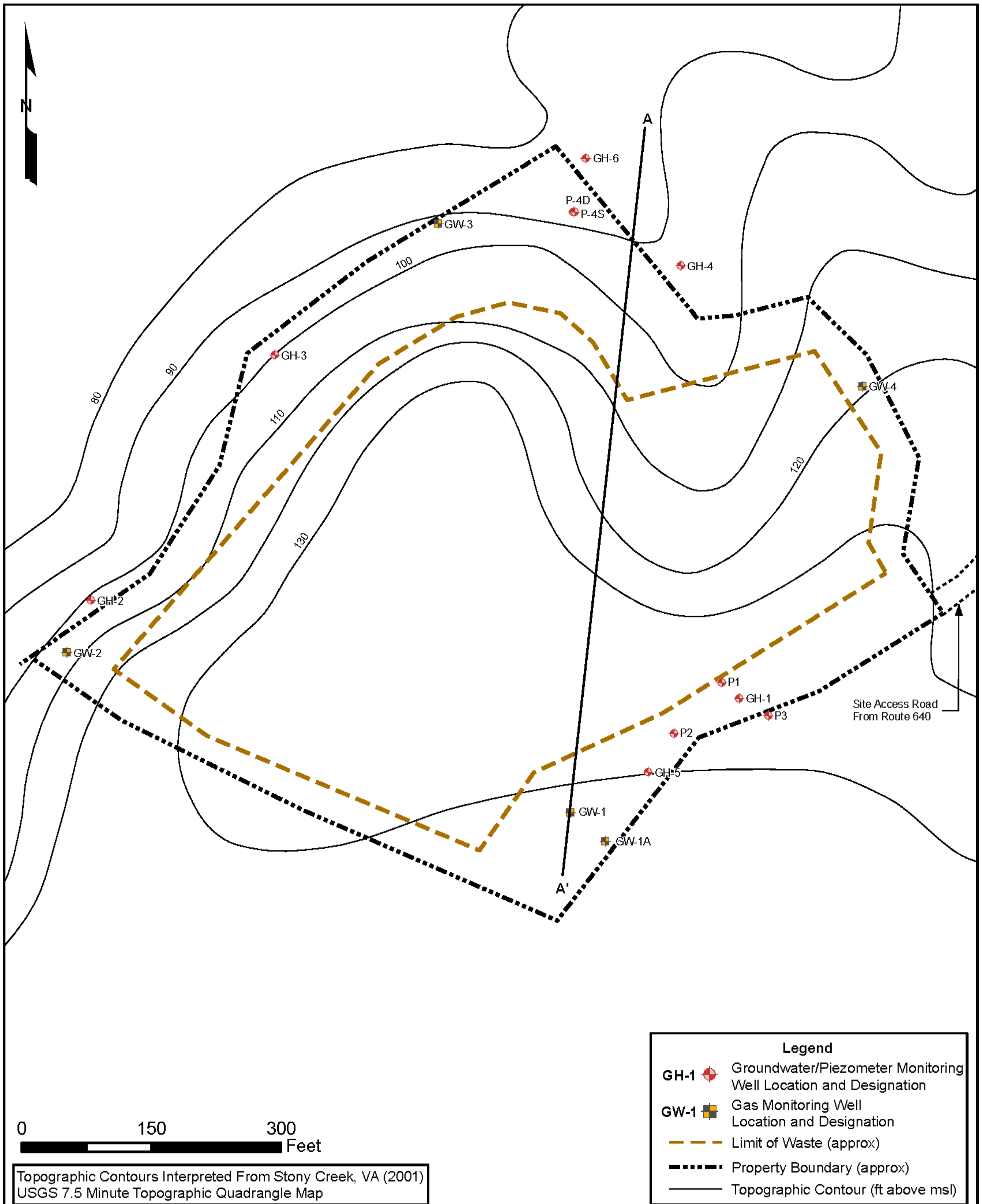

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Figure 2
Site Plan and Cross Section Location Map
Gin Hill Landfill, Sussex County, Virginia

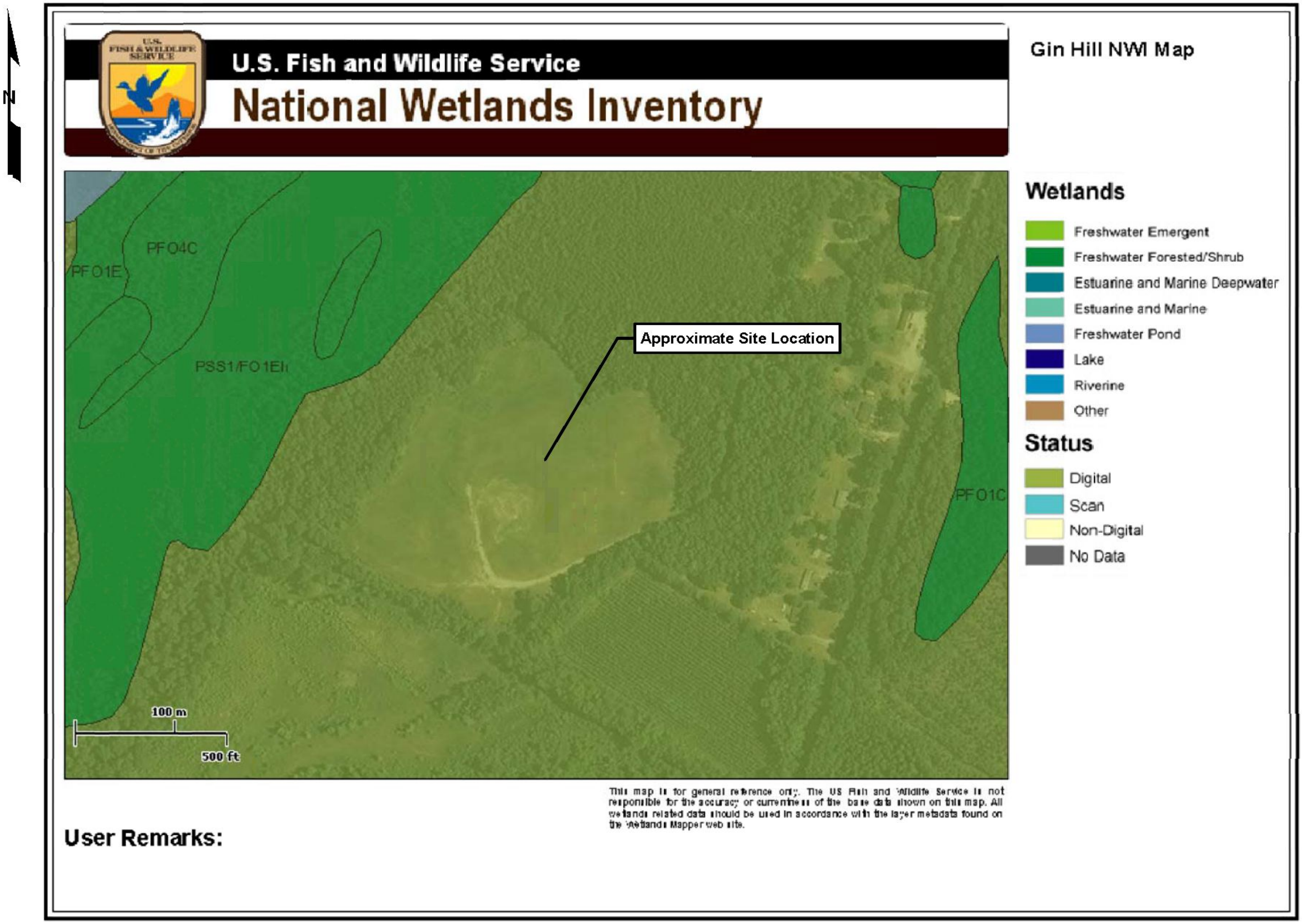

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Figure 3
NWI Wetlands Map
Gin Hill Landfill, Sussex County, Virginia

2.1 Summary of Site Hydrogeology

The closed Gin Hill Landfill is located within the western part of the Atlantic Coastal Plain Physiographic Province immediately east of the Piedmont Physiographic Province. The Atlantic Coastal Plain Province is underlain by an eastward thickening wedge of fluvial-marine sediments ranging in age from the Cretaceous to the present.

The surficial geology of the area is presented in Figure 4**.** The uppermost geologic unit at the site is the Bacons Castle Formation, which consists mainly of sand and silty sand interbedded with layers of sandy clay. The Bacons Castle Formation is the surficial water-bearing unit in the area of the site. The landfill waste is believed to be within the upper part of this formation and may have been placed in relatively shallow trenches or possibly in an old sand pit that may have pre-dated the landfill. The Yorktown-Eastover Formation, which consists mainly of bluish gray clay with shell fragments, is part of the Chesapeake Group and underlies the Bacons Castle Formation. The Chesapeake Group includes several formations that can extend up to several hundred feet thick. The Yorktown Eastover Formation is underlain by the Potomac Formation and the Petersburg Granite (basement rock).

Groundwater occurs at the Gin Hill Landfill under unconfined (water table) conditions within the Bacons Castle Formation. Figure 5 shows groundwater flow at the site is generally to the west toward the Nottoway River, a regional groundwater discharge area. Table 1 presents a summary of the monitoring well completion data. Table 2 presents the water level data from the 2012 monitoring events. Groundwater flow direction at the facility has not changed significantly since Assessment monitoring activities began in 1994. The groundwater flow rate is estimated to range from 24 to 122 ft/year.

Groundwater elevation data indicate vertical hydraulic gradients are upward in the area of temporary piezometers P-4 and monitoring wells GH4 and GH6 in the northwest portion of the site. The potentiometric contours shown on the generalized hydrogeologic cross sections of the site presented in Section 3 indicate an upward hydraulic gradient between the Yorktown-Eastover Formation and the overlying Bacons Castle Formation downgradient of GH4. The upward hydraulic gradients in this area are due to the wetlands immediately adjacent to the site and the Nottoway River located approximately 1,200 feet to the east, which is a regional groundwater discharge zone.

2.2 Monitoring Well Network and NES Investigations

The Assessment monitoring wells for the Gin Hill Landfill were initially installed in 1992, and included upgradient monitoring well MW101 and downgradient monitoring wells MW102, MW103, and MW104. (Note, groundwater monitoring wells have been referred to as GH# in recent convention). Groundwater monitoring data from 2003 through 2004 indicated acetone concentrations in upgradient monitoring well GH1 exceeding the GPS (as approved at that time). Subsequent monitoring at GH1 and additional subsurface investigations has

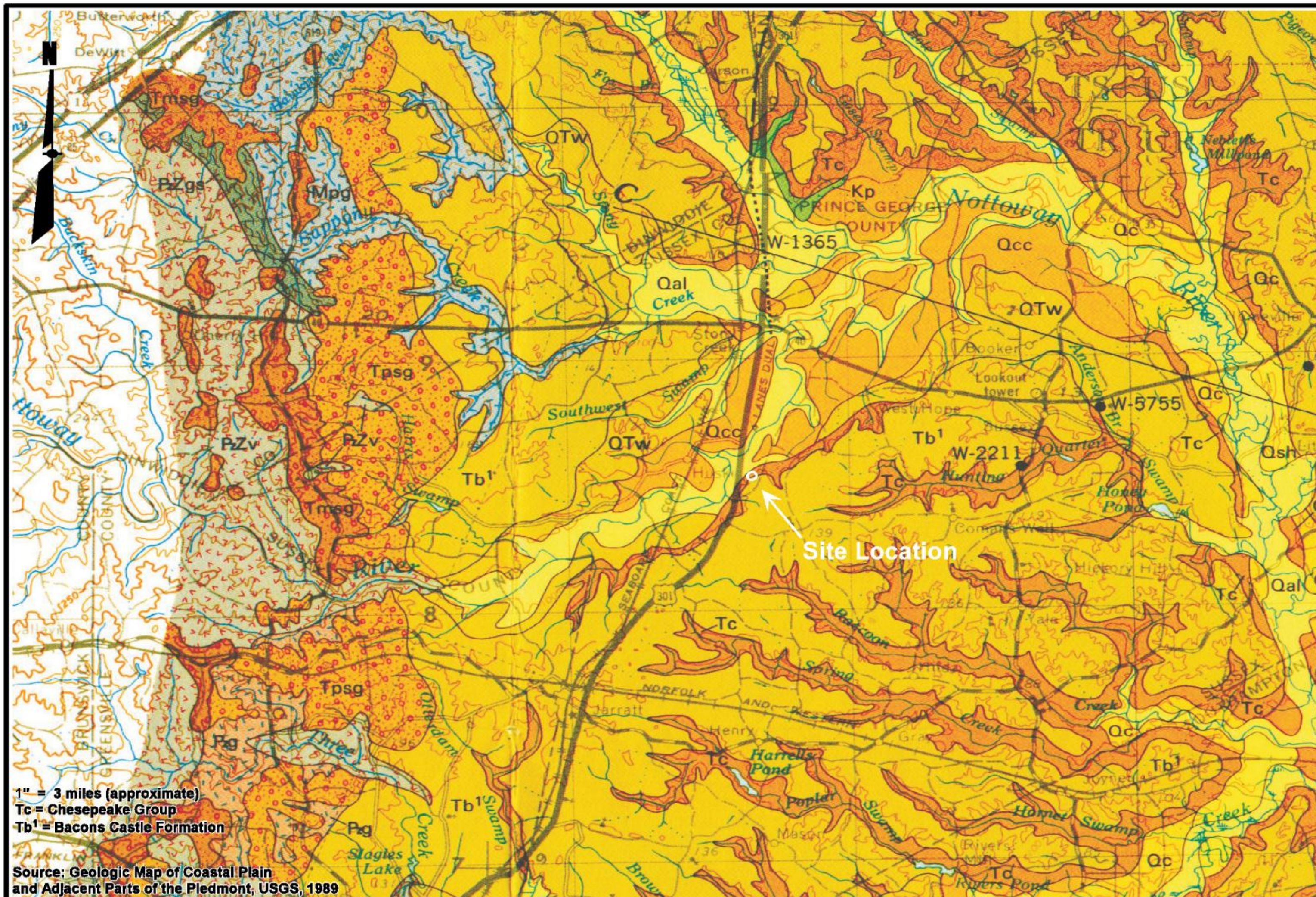

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Figure 4
Geologic Map
Gin Hill Landfill
Sussex County, Virginia

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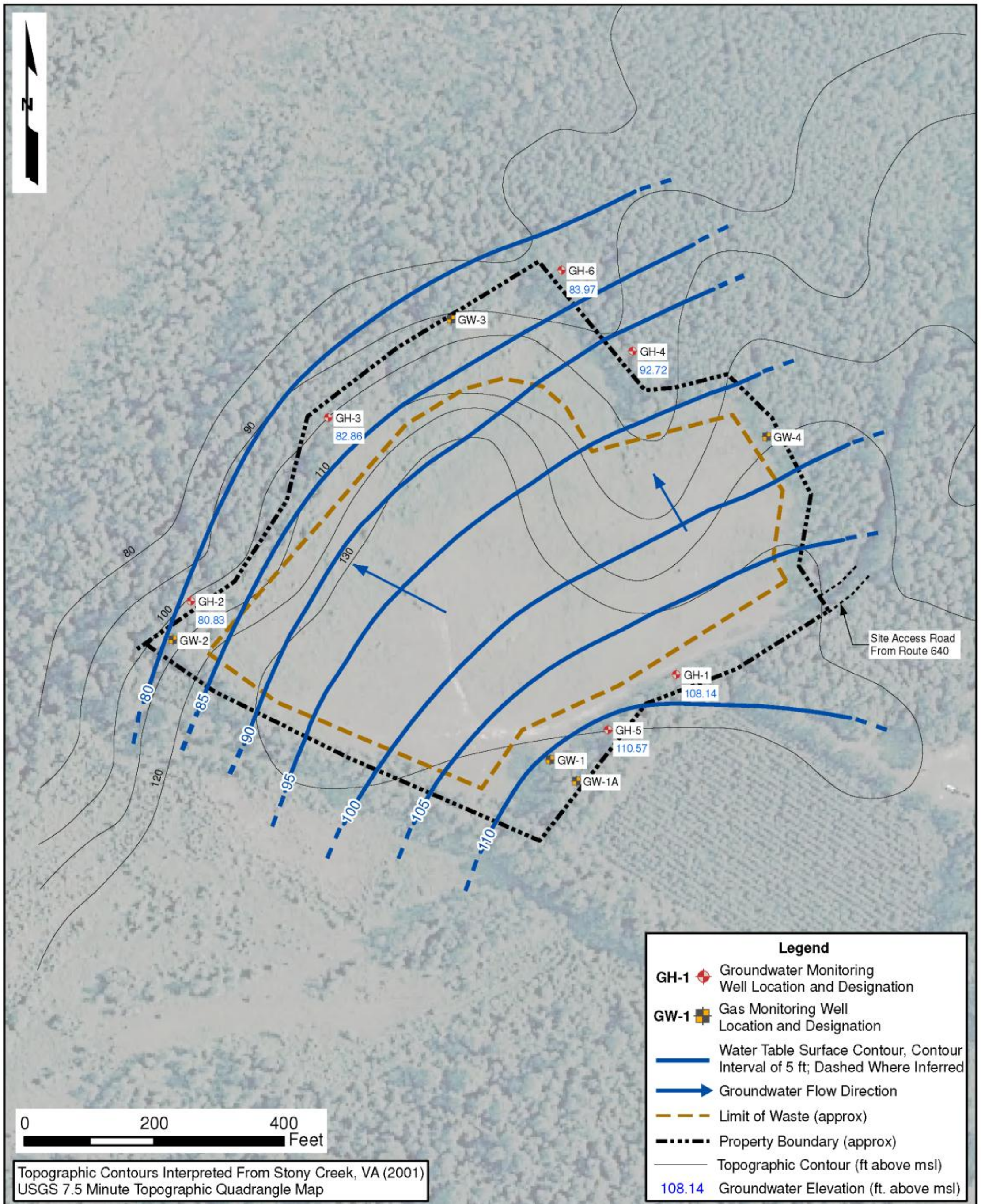

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Figure 5
Water Table Surface Map
June 14 and15, 2012
Gin Hill Landfill, Sussex County, Virginia

TABLE 1
MONITORING WELL COMPLETION DATA
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

MONITORING WELL ID	COORDINATES		DATE INSTALLED (mm/dd/yy)	GROUND ELEVATION (ft. abv. msl)	TOC ELEVATION (ft. abv. msl)	TOTAL DEPTH OF BORING (ft. bgs)	TOTAL DEPTH OF WELL (ft. bgs)	TOTAL DEPTH OF WELL (ft. below TOC)	SCREENED INTERVAL DEPTH (ft. bgs)
	X	Y							
GH1	11805997.82	3485589.47	01/17/92	131.3	134.38	30.5	30.0	33.4	15.0 to 30.0
GH2	11805248.21	3485702.22	01/22/92	99.7	102.74	24.0	22.8	28.4	7.8 to 22.8
GH3	11805460.7	3485985.61	01/18/92	98.4	100.75	24.0	23.0	25.0	8.0 to 23.0
GH4	11805930.24	3486088.21	01/21/92	94.4	97.43	22.0	22.0	24.5	7.0 to 22.0
GH5	18805892.6	3485504.3	04/12/06	129.4	131.89	31.0	30.0	31.2	15.0 to 30.0
GH6	11805820.54	3486212.27	09/20/10	90.3	93.32	15.0	15.0	18.0	5.0 to 15.0

NOTES:
ft. abv. msl = Feet Above Mean Sea Level
ft. below TOC - Feet Below Top of Well Casing
ft. bgs - Feet Below the Ground Surface

TABLE 2
2012 GROUNDWATER ELEVATION DATA
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Well	Top of Casing Elevation (ft. abv msl)	June 14 & 15, 2012	
		Measured Depth to Groundwater (ft.)	Groundwater Elevation (ft. abv msl)
GH-1	134.38	26.24	108.14
GH-2	102.74	21.91	80.83
GH-3	100.75	17.89	82.86
GH-4	97.43	4.71	92.72
GH-5	131.89	21.37	110.52
GH-6	93.32	9.35	83.97

NOTES:

All groundwater data was collected using a Solinst Water Level Meter capable of measuring within 0.01 feet.

ft. abv. msl = Feet Above Mean Sea Level

ND = No Data

demonstrated that although GH1 is located on the upgradient side of the landfill, groundwater quality at GH1 is influenced by the landfill waste material and is not representative of upgradient groundwater quality). A NES/PPR was prepared and submitted to the DEQ in 2006. A new upgradient well (GH5) was installed on April 12, 2006 as part of the initial NES.

Groundwater monitoring data from 2006 and 2007 indicated that several inorganic constituents were detected at concentrations above their respective GPS in effect at the time of sampling in the downgradient and background wells. Because of these exceedances, an updated NES/PPR was submitted to DEQ on September 17, 2008.

In the fall of 2010, EEE completed a preliminary subsurface investigation at the site prior to installation of additional NES wells. The objectives of this investigation were to:

- Determine the proximal location of solid waste to monitoring well GH1
- Determine groundwater flow conditions around GH1, and more specifically determine if GH1 is located downgradient of the landfill material and whether nature and extent wells are necessary northeast or east of GH1
- Determine groundwater flow conditions around GH4, and more specifically determine vertical hydraulic gradients in this area and whether a deep nature and extent well is necessary downgradient of GH4

The results of the subsurface investigation indicated monitoring well GH1 is upgradient from the landfill waste. The water level data confirmed groundwater flow is to the north-northwest toward the landfill and there is no flow of impacted groundwater to the northeast or east away from the landfill. Therefore, the installation and sampling of a nature and extent monitoring well northeast or east of GH1 was not recommended.

The subsurface investigation downgradient of GH4 indicated upward hydraulic gradients; therefore, a deep nature and extent monitoring well in this area was not recommended. EEE recommended the installation of a shallow nature and extent monitoring well downgradient of temporary piezometer P-4S to determine potential impacts to the surficial aquifer downgradient from GH4. In a letter dated August 25, 2010, DEQ concurred with these conclusions and recommendations as presented in the subsurface investigation report.

A new downgradient NES well (GH6) was installed on September 20, 2010 using a hollow stem auger ATV drill rig approximately 165 feet downgradient (northwest) of monitoring well GH4. Therefore, the groundwater monitoring well network at the closed Gin Hill landfill consists of one upgradient well (GH5), four downgradient Assessment wells (GH1, GH2, GH3 and GH4), and one NES or Corrective Action well (GH6). Table 1 presents a summary of the monitoring well completion data.

3.0 GROUNDWATER MONITORING RESULTS

The following discussion summarizes groundwater monitoring results in the context of updating the list of constituents of potential concern (COPC) at the Gin Hill Landfill. The following analysis is mainly based on the groundwater quality data collected since 2006 when the monitoring of the new background well began, and the 2010 to 2012 data from the Assessment wells and the new NES well GH6.

Table 3 summarizes the final field water quality parameters and laboratory alkalinity concentrations for 2012. Target analyte results for calendar year 2012 are summarized on Tables 4A (metals, semi-volatiles, pesticides, and herbicides) and 4B (volatile organic compounds). These tables also present the historical monitoring data.

Concentrations of arsenic, beryllium, chromium, cobalt, lead, thallium, and vanadium have been detected above the GPS in effect at the time of sampling at one or more wells, including the background well GH5, over the last six years of monitoring. Over the last three years only arsenic, cobalt, lead, and thallium have been detected above the current facility GPS. All of these GPS exceedances have occurred at GH1.

Lead and thallium concentrations at GH1 exceeded their respective GPS in groundwater samples collected in November 2009, and October 2008. These metals were either not detected or their concentrations were well below their respective GPS since those times. Over the last six years, lead and thallium have either not been detected or found at concentrations well below the Limits of Quantitation (LOQ) at wells GH4 and GH6 located downgradient from GH. In addition, former upgradient monitoring well GH1 is a unique Assessment monitoring well due to its proximity to the landfill waste. Although GH1 is hydraulically upgradient of the landfill waste, groundwater monitoring data indicate that water quality at GH1 is affected by the landfill waste. Wells GH4 and GH6 monitor water quality downgradient from GH1. Therefore, lead and thallium are not considered to be contaminants of potential concern (COPC).

Arsenic and cobalt were detected above the GPS at GH1 in the November 2011 samples. No metals were detected above the GPS in the June 2012 sampling event. The historical monitoring data on Table 4A show that arsenic and cobalt concentrations at GH1 have varied over the years of monitoring. The Sen’s Slope trend analysis presented in the 2011 Annual Report indicates that arsenic levels at GH1 and GH4 are generally increasing and that the increasing trend at GH4 was statistically significant at a 95% confidence level. No significant trends in arsenic concentrations are evident at the other monitoring wells. Cobalt concentration trends are generally flat or decreasing at the monitoring wells.

No organic target analytes have been found above the respective GPS since 1995 until the November 2010 sampling event when vinyl chloride and beta-BHC were detected above the GPS at well GH4. The detection of beta-BHC, a rare pesticide, is attributed to laboratory or field variability. Beta-BHC has never been detected at any of the Gin Hill assessment wells before

TABLE 3

FINAL FIELD WATER QUALITY PARAMETERS AND ALKALINITY
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Parameters / Wells	Date	Temperature (°C)	pH (S.U.)	Oxidation Reduction Potential (mV)	Specific Conductivity (umhos/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Total Dissolved Solids (mg/L)	Alkalinity (mg/L)
GH-1	6/14/2012	18.28	6.04	-19	0.177	0	0	114	49.4
GH-2	6/15/2012	18.96	4.00	340	0.109	0	0	71	ND
GH-3	6/15/2012	15.00	4.48	321	0.148	0	0.6	96	31.6
GH-4	6/15/2012	15.75	6.21	-99	0.641	0	0	410	78.9
GH-5	6/14/2012	16.12	4.69	333	0.021	0	0.88	14	ND
GH-6	6/15/2012	16.67	5.25	169	0.195	0	0	127	64.6

ND - No Data

TABLE 4A
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Analyte		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Diethyl phthalate	Di-n-butyl phthalate	2-Chlorophenol	Bis(2-ethylhexyl)phthalate	Cresol, o	Cresol, p	beta-BHC	Dieldrin	Endosulfan I	4,4'-DDE	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Silvex (2,4,5-TP)
		Concentrations (µg/l)																													
		Metals																Semi-Volatiles						Pesticides							Herbicides
Laboratory Quantitation Limit		5	10	2	2	1	4	4	10	5	0.2	10	15	3	1	5	10	5	5	10	10	10	10	0.01	0.047	0.050	0.050	0.05	0.050	0.050	0.49
2011 GPS		**6**	**23.5***	**2000**	**4**	**5**	**100**	**21***	**624**	**15**	**2**	**312**	**50**	**78**	**2**	**37***	**4680**	**12480**	**1560**	**78**	**6**	**780**	**78**	**0.04**	**0.004**	**0.05****	**0.197**	**0.05****	**0.4**	**0.2**	**50**
Sample Location	Date																														
GH1 (aka MW101) (former upgradient)	01/23/95	~	~	200	~	~	~	~	~	27	~	~	~	~	~	~	34	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	321	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	286	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	249	~	1	~	~	~	~	~	~	~	~	~	~	25	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	15	~	~	~	20	~	10	15	~	11	~	~	~	36	50	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	5	15	~	2	0.6	20	15	15	**18**	~	16	~	~	~	31	29	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	2	8	5	~	~	~	~	~	~	~	30	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	**40**	370	~	~	~	20	~	~	~	~	~	~	~	~	20	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	310	~	~	~	14	~	~	~	4.7	~	~	~	4.1	11	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	330	~	~	4	14	4.9	~	~	5.7	~	~	~	5.7	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	690	**6.5**	~	24	**34**	47	**99**	~	39	~	~	~	210	44	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	270	~	~	3	13	~	~	~	4.6	~	~	~	3.1	27	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	260	~	~	8.4	13	5.3	~	~	6.5	~	~	~	11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	310	~	~	10	19	7.2	8.2	~	7.1	~	~	~	15	16	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	420	1.2	~	25	**29**	14	**19**	~	11	~	~	~	41	45	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	290	~	~	~	15	6	~	~	~	~	~	~	~	10	~	~	~	~	~	49	~	~	~	~	~	~	~	~
	10/31/03	~	~	340	1	~	27	17	16	**20**	~	11	~	~	~	44	39	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	~	~	320	~	~	12	14	12	8.4	~	5.2	~	~	~	20	19	~	~	~	~	~	~	~	0.021J	~	~	~	~	~	~
	11/30/04	~	~	290	~	~	3.7	13	8	~	~	~	~	~	~	8.4	12	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/06/05	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/16/06	~	11	170	~	~	~	14	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	13	220	~	~	5	17	~	~	~	~	~	~	~	9.6	14	~	~	~	~	~	~	~	~	~	~	0.012J	~	~	~
	05/29/07	~	**58**	720	**7**	~	**170**	**51**	58	**110**	~	48	~	~	**4.5**	**250**	200	~	~	~	~	~	~	~	~	~	~	~	0.012J	~	~
	10/23/07	~	~	170	~	~	~	11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	14	380	~	1.4	15	**28**	14	13	~	~	~	~	~	23	160	~	0.30J	~	~	~	3.0J	~	~	0.011J	~	~	~	~	~
	10/16/08	~	21	240	~	~	12	16	~	8.2	~	~	~	~	**2.4**	18	79	~	0.60J	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	17	309	~	~	~	**23.8**	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	22	942	2.9	~	19.1	19.2	18.7	**67.4**	~	~	~	~	~	78.1	38.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/17/10	~	**24.7**	357	~	~	~	17.2	~	~	~	~	~	~	0.2J,B	1.6J	2.8J	~	0.47J,B	0.52J	~	4.8J	70 ID7	~	~	0.018J	~	~	~	~	~
	11/04/10	~	21.8	310	~	0.4J	~	11.9	2.1J	~	~	~	~	~	0.01J	1.3J	~	~	~	~	~	~	~	~	~	0.031J	~	~	~	~	4.4
	06/07/11	~	14	250	~	~	~	9.7	5J	~	~	~	~	~	~	1.5J	7.0JB	~	~	~	~	~	~	~	~	~	~	~	~	0.019J	~
	11/18/11	~	**34**	380	0.65	~	13	**22**	75	11	~	5.4J	~	~	.18J	18	51J	~	~	~	~	~	38H		~	~	~	~	~	~	~
	06/14/12	~	15	270	~	~	~	11	3.2J	~	~	~	~	~	~	~	3.9J	~	~	~	~	~	~	~	~	~	.011J	~	~	.014J	~

TABLE 4A
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Concentrations (µg/l)

Analyte		Metals																Semi-Volatiles						Pesticides							Herbicides
		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Diethyl phthalate	Di-n-butyl phthalate	2-Chlorophenol	Bis(2-ethylhexyl)phthalate	Cresol, o	Cresol, p	beta-BHC	Dieldrin	Endosulfan I	4,4'-DDE	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Silvex (2,4,5-TP)
Laboratory Quantitation Limit		5	10	2	2	1	4	4	10	5	0.2	10	15	3	1	5	10	5	5	10	10	10	10	0.01	0.047	0.050	0.050	0.05	0.050	0.050	0.49
2011 GPS		**6**	**23.5***	**2000**	**4**	**5**	**100**	**21***	**624**	**15**	**2**	**312**	**50**	**78**	**2**	**37***	**4680**	**12480**	**1560**	**78**	**6**	**780**	**78**	**0.04**	**0.004**	**0.05****	**0.197**	**0.05****	**0.4**	**0.2**	**50**
Sample Location	Date																														
GH2 (aka MW102)	01/23/95	~	~	~	~	~	~	~	~	10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	215	~	~	26	20	~	**23**	~	~	~	13	~	32	42	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	333	~	~	52	~	25	**61**	~	35	~	~	~	50	145	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	107	~	~	~	~	~	~	~	~	~	~	~	~	42	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	17	~	~	~	30	~	15	15	~	16	~	~	~	55	70	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	~	5	~	0.5	~	20	6	17	11	~	12	~	~	~	23	44	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	6	~	8	~	~	6	~	~	~	8	30	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	~	100	~	~	10	~	10	~	~	~	~	~	~	10	30	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	65	~	~	3.4	~	4.4	~	~	5.4	~	~	~	5.3	22	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	260	2.8	~	57	11	30	**26**	~	22	~	~	~	78	90	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	150	~	~	27	5.3	15	**16**	~	10	~	~	~	38	52	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	170	~	~	26	6.4	21	14	~	13	~	~	~	35	50	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	84	~	~	~	~	~	~	~	5.4	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	90	~	~	~	3.6	7.9	~	~	0.5	~	~	~	3.7	28	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	77	~	1.2	~	~	5.3	~	~	~	~	~	~	3.5	27	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	90	~	~	~	3.5	~	~	~	4.4	~	~	~	~	19	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	~	~	160	~	~	23	5.5	12	11	~	11	~	~	~	34	38	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	~	~	100	~	~	3	3.6	~	~	~	5.9	~	~	20	5.2	25	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/30/04	~	~	91	~	~	~	3.6	~	~	~	4.6	~	~	~	~	29	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/01/05	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/16/06	~	~	89	~	~	9.8	~	~	~	~	~	~	~	~	14	19	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	91	~	~	~	~	~	~	~	~	~	~	~	~	21	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	160	~	~	22	4.9	12	9.3	~	11	~	~	~	29	59	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	92	~	~	~	~	~	~	~	~	~	~	~	~	87	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	~	96	~	~	~	~	~	~	~	~	~	~	~	~	18	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	77	~	~	~	~	~	~	~	~	~	~	1.6	~	20	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	76	~	~	~	~	~	~	~	~	~	~	~	~	21	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	120	~	~	12.6	5	~	5.4	~	~	~	~	~	17.4	30	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	61.8	~	~	~	2.8J	~	~	~	5.7J	~	~	0.1JB	~	7.1J	~	0.57J	~	4.9J	~	~	~	~	~	~	~	~	0.030J	~
	11/04/10	~	~	70.6	~	0.3J	~	2.7J	~	3.8J	~	3.0J	~	~	0.039J	~	14.5	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/10/11	~	~	86	~	~	~	3.3J	2.2J	~	~	2.9J	~	~	0.040J	~	35	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/18/11	~	~	84	~	~	1.1J	3.3J	1.8J	~	~	3.8J	~	~	0.036J	~	20	~	~	~	~	~	~		~	~	~	~	~	~	~
	06/15/12	.27J	~	190	.31J	~	~	8.4J	~	~	~	9J	~	~	.067J	~	41	0.38	~	~	~	~	~	~	~	~	~	~	~	.015J	~

TABLE 4A
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Analyte		Concentrations (µg/l)																													
		Metals																Semi-Volatiles						Pesticides							Herbicides
		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Diethyl phthalate	Di-n-butyl phthalate	2-Chlorophenol	Bis(2-ethylhexyl)phthalate	Cresol, o	Cresol, p	beta-BHC	Dieldrin	Endosulfan I	4,4'-DDE	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Silvex (2,4,5-TP)
Laboratory Quantitation Limit		5	10	2	2	1	4	4	10	5	0.2	10	15	3	1	5	10	5	5	10	10	10	10	0.01	0.047	0.050	0.050	0.05	0.050	0.050	0.49
2011 GPS		**6**	**23.5***	**2000**	**4**	**5**	**100**	**21***	**624**	**15**	**2**	**312**	**50**	**78**	**2**	**37***	**4680**	**12480**	**1560**	**78**	**6**	**780**	**78**	**0.04**	**0.004**	**0.05****	**0.197**	**0.05****	**0.4**	**0.2**	**50**
Sample Location	Date																														
GH3 (aka MW103)	01/23/95	~	~	81	~	~	~	~	~	~	~	~	~	~	~	~	42	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	261	2	20	20	~	11	**23**	~	28	~	~	~	22	103	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	180	~	~	~	~	~	**19**	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	86	~	1.5	~	~	~	~	~	~	~	~	~	~	29	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	~	~	~	~	6	~	~	~	~	8	~	~	~	19	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	~	9	~	1.2	0.8	9	11	19	6	~	33	~	~	~	14	79	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	2	~	~	~	~	10	~	~	~	~	50	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	~	100	~	~	~	~	~	~	~	~	~	~	~	~	20	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	130	3	2.6	11	9.3	4.2	7.2	~	21	~	~	~	14	47	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	230	1.2	~	16	10	11	5.6	~	28	~	~	~	21	58	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	120	~	~	5.6	8.1	~	~	~	19	~	~	~	7.2	50	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	140	~	~	14	4.3	~	5.8	~	9.6	~	~	~	19	38	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	92	~	~	4.4	4	~	~	~	14	~	~	~	4.8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	170	~	~	9.1	8.1	7.5	~	~	22	~	~	~	12	48	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	210	~	~	23	9.3	9.3	11	~	20	~	~	~	30	61	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	130	~	~	6.8	9.9	~	~	~	23	~	~	~	7.9	57	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	~	~	110	~	~	7	3.8	~	~	~	8.9	~	~	~	9.9	24	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	~	~	200	~	~	7	9.3	~	~	~	23	~	~	~	9	64	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/30/04	~	~	61	~	~	~	~	~	~	~	6.4	~	~	~	~	23	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/17/06	~	~	200	~	~	8.6	7.9	~	~	~	20	~	~	~	11	45	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	65	~	~	~	~	~	~	~	~	~	~	~	~	12	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	69	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	88	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	~	66	~	~	~	5.8	~	~	~	17	~	~	~	~	32	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	53	~	~	~	4.2	~	~	~	12	~	~	1.5	~	34	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	85	~	~	~	6.6	~	~	~	17.8	~	~	~	~	40.3	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	204	~	~	29.9	8.8	~	11.8	~	16.4	~	~	~	39	66.4	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	64.3	~	~	1.0J	1.9J	~	~	~	9.3J	~	~	0.4B	~	22.3	~	0.34J	~	3.7J,H4	~	~	~	~	~	~	~	~	0.012J	~
	11/04/10	~	~	80.0	0.5J	0.4J	2.0J	5.4	3.4J	4.1J	~	12.5	~	~	0.146J	1.4J	34.7	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/10/11	~	~	85	~	0.36J	1.6J	~	~	4.2J	~	2.7J	~	~	0.048J	1.2J	17	~	~	~	~	~	~	~	~	~	~	~	~	0.019J	~
	11/18/11	~	~	66	~	~	1.2J	4.9	1.5J	~	~	10	~	~	.13J	~	27	~	~	~	~	~	~		~	~	~	~	~	~	~
	06/15/12	~	~	90	.39J	~	2.2J	4.5	1.6J	5.4J	~	15	~	~	.080J	2.2J	27	NDH	NDH	NDH	NDH	NDH	NDH	~	~	~	~	~	~	~	~

TABLE 4A
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Analyte		Concentrations (µg/l) Metals																Semi-Volatiles						Pesticides							Herbicides
		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Diethyl phthalate	Di-n-butyl phthalate	2-Chlorophenol	Bis(2-ethylhexyl)phthalate	Cresol, o	Cresol, p	beta-BHC	Dieldrin	Endosulfan I	4,4'-DDE	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Silvex (2,4,5-TP)
Laboratory Quantitation Limit		5	10	2	2	1	4	4	10	5	0.2	10	15	3	1	5	10	5	5	10	10	10	10	0.01	0.047	0.050	0.050	0.05	0.050	0.050	0.49
2011 GPS		**6**	**23.5***	**2000**	**4**	**5**	**100**	**21***	**624**	**15**	**2**	**312**	**50**	**78**	**2**	**37***	**4680**	**12480**	**1560**	**78**	**6**	**780**	**78**	**0.04**	**0.004**	**0.05****	**0.197**	**0.05****	**0.4**	**0.2**	**50**
Sample Location	Date																														
GH4 (aka MW104)	01/23/95	~	~	71	~	~	~	~	~	~	~	~	~	~	~	~	51	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	14	~	127	~	15	~	~	~	**86**	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	111	~	~	~	~	~	13	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	127	~	58	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	14	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	~	14	~	~	~	~	13	~	~	~	7	~	~	~	~	21	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	5	~	~	~	3	7	5	7	~	~	~	~	~	~	380	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	20	200	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	170	~	~	~	9.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	160	~	~	~	11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	200	~	~	~	18	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	160	~	~	~	12	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	160	~	~	~	12	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	140	~	~	~	9	5.2	~	~	~	~	~	~	~	7.7	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	130	~	~	~	7.7	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	150	~	~	~	9.3	~	~	~	~	~	~	~	~	7	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	~	~	180	~	~	~	10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	~	~	170	~	~	~	11	~	~	~	~	~	~	~	~	8.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/30/04	~	~	160	~	~	~	8.7	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/09/05	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.045J	~	~	~
	05/17/06	~	14	150	~	~	~	9	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/18/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	15	140	~	~	~	7.3	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.012J	~	~	~
	05/29/07	~	16	160	~	~	~	8	~	~	~	~	~	~	~	~	~	0.5J	~	~	~	~	~	~	0.020J	0.025J	~	0.022J	~	0.031	~
	10/23/07	~	16	160	~	~	~	7.4	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/1/2007	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.4J	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	13	150	~	~	~	5.8	~	~	~	~	~	~	~	~	~	0.4J	0.3J	~	~	~	~	~	0.015J	0.028J	~	~	~	~	0.048J
	10/16/08	~	14	160	~	~	~	10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	14.5	150	~	~	~	6.7	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.033J	0.017J	~	~
	11/02/09	~	19.4	176	~	~	~	8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	21.4	173	~	~	~	7.8	~	~	~	~	~	~	0.4B	~	~	0.75J	0.58J	~	3.5J,H4	~	~	~	~	~	~	~	~	0.040J	~
	11/04/10	~	20.9	178	0.4J	~	~	6.2	~	3.2J	~	~	~	~	0.0155J	2.1J	~	~	~	~	~	~	~	**0.049**	~	~	0.046J	~	~	~	~
	06/10/11	~	16	190	~	0.45J	~	7.5	1.5J	3.9J	~	~	~	~	~	3J	2.6J	0.39J	~	~	~	~	~	~	~	~	~	0.028J	~	~	~
	11/18/11	~	19	180	~	~	~	7.3	2.8J	~	~	~	~	~	~	2.3J	3.7J	.68J	~	~	~	~	~		~	~	~	0.029J	~	~	~
	06/15/12	~	18	190	~	~	~	7	2.1J	5.7J	~	~	~	~	~	1.6J	3.1J	.48J	~	~	~	~	~	~	~	~	.014J	~	~	~	~

TABLE 4A
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Concentrations (µg/l)

Sample Location	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
		Metals															
Laboratory Quantitation Limit		5	10	2	2	1	4	4	10	5	0.2	10	15	3	1	5	10
2011 GPS		**6**	**23.5***	**2000**	**4**	**5**	**100**	**21***	**624**	**15**	**2**	**312**	**50**	**78**	**2**	**37***	**4680**
GH5 (new upgradient)	05/16/06	~	11	130	~	~	26	21	~	13	~	20	~	~	~	37	52
	12/11/06	~	~	36	~	~	~	5.3	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	46	~	~	~	4.1	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	44	~	~	~	4.4	~	~	~	~	~	~	~	~	~
	05/28/08	~	~	31	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	34	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	29.1	~	~	~	~	~	~	0.3 CF6	~	~	~	~	~	~
	11/02/09	~	23.5	145	2.1	~	53.8	11.4	14.4	**27.5**	~	11.7	~	~	~	83.2	61.7
	06/18/10	~	~	28.4	~	~	~	2.6J	~	~	~	~	~	~	0.1J,B	~	2.8J
	11/03/10	~	~	31.0	~	~	~	3.8J	2.4J	~	~	1.7J	~	~	0.04J	~	3.0J
	06/09/11	~	~	33	~	~	~	2.9J	~	~	~	~	~	~	0.029J	~	8.2JB
	11/18/11	~	~	31	~	~	~	2.4J	~	~	~	~	~	~	.034J	~	3.6J
	06/14/12	~	~	28	~	~	~	2.3J	~	~	0.23	1.3J	~	~	.022J	~	2.1J
GH6 (New NES Well 2010)	10/14/10	~	~	89.8	~	~	~	6	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	86.1	~	0.5J	1.1J	4.7	~	~	~	3.9J	~	~	0.0774J	~	7.7J
	06/10/11	~	~	68	~	~	~	3.4J	~	~	~	~	~	~	0.058J	~	19
	11/28/11	~	~	100	~	~	0.98J	8.4	1.6J	~	~	3.2J	~	~	0.084J	1.3J	8.7JB
	06/15/12	~	~	57	~	~	~	3.6J	~	3.0J	~	1.7J	~	~	.054J	~	4.4J

Sample Location	Date	Diethyl phthalate	Di-n-butyl phthalate	2-Chlorophenol	Bis(2-ethylhexyl)phthalate	Cresol, o	Cresol, p	beta-BHC	Dieldrin	Endosulfan I	4,4'-DDE	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Silvex (2,4,5-TP)
		Semi-Volatiles						Pesticides							Herbicides
Laboratory Quantitation Limit		5	5	10	10	10	10	0.01	0.047	0.050	0.050	0.05	0.050	0.050	0.49
2011 GPS		**12480**	**1560**	**78**	**6**	**780**	**78**	**0.04**	**0.004**	**0.05****	**0.197**	**0.05****	**0.4**	**0.2**	**50**
GH5 (new upgradient)	05/16/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	0.4J	~	~	~	~	~	0.014J	~	~	~	~	~	~
	10/16/08	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	~	3.8J,H4	~	~	~	~	~	~	~	~	~	~
	11/03/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/09/11	~	0.35JB	~	~	~	~	~	~	~	~	~	~	0.029J	~
	11/18/11	~	~	~	~	~	~		~	~	~	~	~	~	~
	06/14/12	~	~	~	~	~	~	~	~	~	~	~	~	~	~
GH6 (New NES Well 2010)	10/14/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	~	~	~	~	~	0.045J	~	~	0.021J	0.049J	~	~
	06/10/11	.83J	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/28/11	1.2	0.31	~	~	~	~		~	~	~	.049J	~	~	~
	06/15/12	.93J	~	~	~	~	~	~	~	~	~	~	~	.0094J	~

NOTES:

New upgradient well GH5 was installed on April 12, 2006, as part of the Nature and Extent Study for the facility. New downgradient well GH-6 was installed on September 20, 2010.

Detected groundwater monitoring constituents are those detected at concentrations equal to or exceeding their respective laboratory Quantitation Limits (LQLs) or Reporting Limits (RLs). It is noted that LQLs listed in table are for TestAmerica, the analytical laboratory since 2008. LQLs prior to 2008 may not be the same.

~: Not detected in the sample

Bold & Underlined: indicates exceedance of a Groundwater Protection Standard (See notes below).

Groundwater Protection Standards (GPSs) were revised January 31, 2011.

*GPS for arsenic, cobalt, lead, and vanadium are based on site specific background values

** LOQ substituted for ACL

DATA QUALIFIERS AND DEFINITIONS:

B - Analyte was detected in the associated Method Blank.

B9 - The analyte was detected in the Method / Calibration Blank at a level above the reporting limit. The sample was non-detect for this analyte, therefore, no corrective action was necessary.

D02 - Dilution required due to sample matrix effects

D10 - Dilution required due to sample color

H - Sample was prepped (re-extracted) or analyzed beyond the specific holding time due to surrogate results outside calibration range. **H1** - Sample analysis performed past the method-specified holding time per client's approval.

H4 - Sample was extracted past holding time, but analyzed within analysis holding time.

ID7 - The analytes 3-Methylphenol and 4-Methylphenol coelute and cannot be analytically separated. This reported concentration is a sum of these isomers.

J - Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.

M1 - The MS and/or MSD were outside the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

QSU - Sulfur (EPA 3660) clean-up performed on extract.

TABLE 4A
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Concentrations (µg/l) — Metals

Sample Location	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
	Laboratory Detection Limit																
	Laboratory Quantitation Limit	5	10	2	2	1	4	4	10	5	0.2	10	15	3	1	5	10
	2011 GPS	**6**	**23.5***	**2000**	**4**	**5**	**100**	**21***	**624**	**15**	**2**	**312**	**50**	**78**	**2**	**37***	**4680**
GH5 (new upgradient)	05/16/06	~	11	130	~	~	26	21	~	13	~	20	~	~	~	37	52
	12/11/06	~	~	36	~	~	~	5.3	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	46	~	~	~	4.1	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	44	~	~	~	4.4	~	~	~	~	~	~	~	~	~
	05/28/08	~	~	31	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	34	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	29.1	~	~	~	~	~	~	0.3 CF6	~	~	~	~	~	~
	11/02/09	~	23.5	145	2.1	~	53.8	11.4	14.4	**27.5**	~	11.7	~	~	~	83.2	61.7
	06/18/10	~	~	28.4	~	~	~	2.6J	~	~	~	~	~	~	0.1J,B	~	2.8J
	11/03/10	~	~	31.0	~	~	~	3.8J	2.4J	~	~	1.7J	~	~	0.04J	~	3.0J
	06/09/11	~	~	33	~	~	~	2.9J	~	~	~	~	~	~	0.029J	~	8.2JB
	11/18/11	~	~	31	~	~	~	2.4J	~	~	~	~	~	~	.034J	~	3.6J
	06/14/12	~	~	28	~	~	~	2.3J	~	~	0.23	1.3J	~	~	.022J	~	2.1J
GH6 (New NES Well 2010)	10/14/10	~	~	89.8	~	~	~	6	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	86.1	~	0.5J	1.1J	4.7	~	~	~	3.9J	~	~	0.0774J	~	7.7J
	06/10/11	~	~	68	~	~	~	3.4J	~	~	~	~	~	~	0.058J	~	19
	11/28/11	~	~	100	~	~	0.98J	8.4	1.6J	~	~	3.2J	~	~	0.084J	1.3J	8.7JB
	06/15/12	~	~	57	~	~	~	3.6J	~	3.0J	~	1.7J	~	~	.054J	~	4.4J

Concentrations (µg/l) — Semi-Volatiles, (pesticides), Herbicides

Sample Location	Date	Diethyl phthalate	Di-n-butyl phthalate	2-Chlorophenol	Bis(2-ethylhexyl)phthalate	Cresol, o	Cresol, p	beta-BHC	Dieldrin	Endosulfan I	4,4'-DDE	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Silvex (2,4,5-TP)
	Laboratory Detection Limit														
	Laboratory Quantitation Limit	5	5	10	10	10	10	0.01	0.047	0.050	0.050	0.05	0.050	0.050	0.49
	2011 GPS	**12480**	**1560**	**78**	**6**	**780**	**78**	**0.04**	**0.004**	**0.05****	**0.197**	**0.05****	**0.4**	**0.2**	**50**
GH5 (new upgradient)	05/16/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	0.4J	~	~	~	~	~	0.014J	~	~	~	~	~	~
	10/16/08	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	~	3.8J,H4	~	~	~	~	~	~	~	~	~	~
	11/03/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/09/11	~	0.35JB	~	~	~	~	~	~	~	~	~	~	0.029J	~
	11/18/11	~	~	~	~	~	~		~	~	~	~	~	~	~
	06/14/12	~	~	~	~	~	~	~	~	~	~	~	~	~	~
GH6 (New NES Well 2010)	10/14/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	~	~	~	~	~	0.045J	~	~	0.021J	0.049J	~	~
	06/10/11	.83J	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/28/11	1.2	0.31	~	~	~	~		~	~	~	.049J	~	~	~
	06/15/12	.93J	~	~	~	~	~	~	~	~	~	~	~	.0094J	~

NOTES:

New upgradient well GH5 was installed on April 12, 2006, as part of the Nature and Extent Study for the facility. New downgradient well GH-6 was installed on September 20, 2010.

Detected groundwater monitoring constituents are those detected at concentrations equal to or exceeding their respective laboratory Quantitation Limits (LQLs) or Reporting Limits (RLs). It is noted that LQLs listed in table are for TestAmerica, the analytical laboratory since 2008. LQLs prior to 2008 may not be the same.

~: Not detected in the sample

Bold & Underlined: indicates exceedance of a Groundwater Protection Standard (See notes below).

Groundwater Protection Standards (GPSs) were revised January 31, 2011.

* GPS for arsenic, cobalt, lead, and vanadium are based on site specific background values

** LOQ substituted for ACL

DATA QUALIFIERS AND DEFINITIONS:

B - Analyte was detected in the associated Method Blank.
B9 - The analyte was detected in the Method / Calibration Blank at a level above the reporting limit. The sample was non-detect for this analyte, therefore, no corrective action was necessary.
D02 - Dilution required due to sample matrix effects
D10 - Dilution required due to sample color
H - Sample was prepped (re-extracted) or analyzed beyond the specific holding time due to surrogate results outside calibration range. **H1** - Sample analysis performed past the method-specified holding time per client's approval.
H4 - Sample was extracted past holding time, but analyzed within analysis holding time.
ID7 - The analytes 3-Methylphenol and 4-Methylphenol coelute and can not be analytically separated. This reported concentration is a sum of these isomers.
J - Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
M1 - The MS and/or MSD were outside the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
QSU - Sulfur (EPA 3660) clean-up performed on extract.

TABLE 4B
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Analyte		Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	2-Butanone (Methyl Ethyl Ketone)	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	Dibromochloromethane	Dibromomethane (Methylene Bromide)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane	1,2-Dichlorobenzene (O-Dichlorobenzene)	1,4-Dichlorobenzene (P-Dichlorobenzene)	Trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	Trans-1,2-Dichloroethylene	1,2-Dichloropropane	Cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone / Methyl Butyl Ketone	Methylene Chloride	Methyl Iodide	4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene (PCE)	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl chloride	Xylene (Total)	Total VOCs
		Concentrations (µg/l)																																															
		Volatiles																																															
Laboratory Quantitation Limit		5	20	1	1	1	1	1	5	1	1	1	1	1	1	1	1	0.01	0.01	1	1	5	1	1	1	1	1	1	1	1	1	5	1	1	5	1	1	1	1	1	1	1	1	1	1	5	1	3	N/A
2011 GPS		**11561.2**	**0.05**	**5**	**1***	**80**	**80**	**7.07**	**4939.8**	**755**	**5**	**100**	**20800**	**80**	**187**	**80**	**7.06**	**0.05**	**0.2**	**600**	**75**	**5***	**2.4**	**5**	**7**	**70**	**100**	**5**	**1***	**1***	**700**	**34.8**	**5**	**1***	**1042.9**	**100**	**0.5**	**0.07**	**5**	**1000**	**200**	**5**	**5**	**1114**	**0.0007**	**406**	**2**	**10000**	**N/A**
Sample Location	Date																																																
GH1 (aka MW101) (former upgradient)	01/23/95	~	~	~	~	~	~	~	~	~		~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	1300	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	3.2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	13	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	750	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	180 D	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	3.8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	150	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	82	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	61	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	410 D	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	190	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	280 D	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	2.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	1300 D	~	~	~	~	~	~	60	9	~	2	1	~	~	~	~	~	~	~	3	~	~	~	~	1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	240	~	~	~	~	~	~	~	9.4	~	2.4	~	~	~	~	~	~	~	~	3.5	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	400	~	~	~	~	~	~	~	~	~	3	~	~	~	~	~	~	~	~	4	~	~	~	~	1	~	~	~	~	~	~	1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/30/04	580 D	~	~	~	~	~	~	~	~	~	3.5	1.5	~	~	~	~	~	~	~	53	~	~	~	~	1.5	~	~	~	~	~	~	1.4	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/06/05	~	~	~	~	~	~	~	~	~	~	~	0.80J	~	~	~	~	~	~	~	~	~	.60J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/01/05	~	~	~	~	~	~	~	~	~	~	0.50J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/16/06	100	~	~	~	~	~	~	~	~	~	0.40J	~	~	~	~	~	~	~	~	1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	270	~	~	~	~	~	~	12	~	~	3.6	~	~	~	~	~	~	~	~	4.6	~	.52J	~	~	1.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	~	~	~	~	~	1.0J	~	~	4	2	~	~	~	~	~	~	~	5	~	.5J	~	~	1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	4.9J	~	~	~	~	~	~	~	~	~	0.89J	~	~	~	~	~	~	~	~	12	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	260	~	~	~	~	~	~	11	~	~	4	2	~	~	~	~	~	~	~	5	~	.6J	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	73	~	~	~	~	~	~	~	~	~	2.3	~	~	~	~	~	~	~	~	2.6	~	~	~	~	.8J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	21	~	~	~	~	~	~	~	0.61J	~	2.0	~	~	~	~	~	~	~	~	2.1	~	~	~	~	1.0	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	24	~	~	~	~	~	~	~	~	~	2.6	~	~	~	~	~	~	~	~	2.5	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/17/10	80	~	~	~	~	~	~	14	~	~	3.3	0.79J	~	~	~	~	~	~	~	4.4	~	~	~	~	1.2	~	~	~	~	~	~	~	~	~	~	~	~	~	230	~	~	~	~	~	~	~	~	~
	11/04/10	7.0	~	~	~	~	~	~	14	~	~	2.4	0.53J	~	~	~	~	~	~	~	2.8	~	~	~	~	.91J	~	~	~	~	~	~	~	~	~	~	~	~	~	1.8	~	~	~	~	~	~	~	~	~
	06/07/11	4.8J	~	~	~	~	~	~	~	~	~	1.8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	6.6
	11/18/11	65	~	~	~	~	~	~	3.7J	~	~	3.3	0.66J	~	~	~	~	~	~	~	4.2	~	~	~	~	1.2	~	~	~	~	~	~	~	~	~	~	~	~	~	27	~	~	~	~	~	~	~	~	105.06
	06/14/12	9.5	~	~	~	~	~	~	~	~	~	2.7	.56J	~	~	~	~	~	~	~	4.2	~	~	~	~	1.1	~	~	~	~	~	~	~	~	~	~	~	~	~	.73J	~	~	~	~	~	~	~	~	18.79

TABLE 4B
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO.193
SUSSEX COUNTY, VIRGINIA

Concentrations (µg/l) — Volatiles

Analyte		Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	2-Butanone (Methyl Ethyl Ketone)	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	Dibromochloromethane	Dibromomethane (Methylene Bromide)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane	1,2-Dichlorobenzene (O-Dichlorobenzene)	1,4-Dichlorobenzene (P-Dichlorobenzene)	Trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	Trans-1,2-Dichloroethylene	1,2-Dichloropropane	Cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone / Methyl Butyl Ketone	Methylene Chloride	Methyl Iodide	4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene (PCE)	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl chloride	Xylene (Total)	Total VOCs
Laboratory Quantitation Limit		5	20	1	1	1	1	1	5	1	1	1	1	1	1	1	1	0.01	0.01	1	1	5	1	1	1	1	1	1	1	1	1	5	1	1	5	1	1	1	1	1	1	1	1	1	1	5	1	3	NA
2011 GPS		11561.2	0.05	5	1*	80	80	7.07	4939.8	755	5	100	20800	80	187	80	7.06	0.05	0.2	600	75	5*	2.4	5	7	70	100	5	1*	1*	700	34.8	5	1*	1042.9	100	0.5	0.07	5	1000	200	5	5	1114	0.0007	406	2	10000	NA
Sample Location	Date																																																
GH2 (aka MW102)	01/23/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	200	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	7.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	~	~	~	~	~	~	32	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	~	~	~	~	~	~	~	~	1	1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	~	~	~	~	~	~	~	~	1.1	~	0.28J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/30/04	~	~	~	~	~	~	~	~	~	~	0.57J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/01/05	~	~	~	~	~	~	~	~	~	~	0.64J	0.56J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/16/06	~	~	~	~	~	~	~	~	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	~	~	~	~	~	~	~	~	0.56J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	2.0J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	~	~	~	~	~	~	0.68J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	~	~	~	~	~	~	~	~	~	0.60J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/10/11	~	~	~	~	~	~	~	~	~	~	1.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.3J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.9
	11/18/11	~	~	~	~	~	~	~	~	~	~	1.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.6
	06/15/12	~	~	.79J	~	~	~	~	~	~	~	6.3	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	7.09

TABLE 4B
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Concentrations (µg/l)
Volatiles

Analyte		Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	2-Butanone (Methyl Ethyl Ketone)	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	Dibromochloromethane	Dibromomethane (Methylene Bromide)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane	1,2-Dichlorobenzene (O-Dichlorobenzene)	1,4-Dichlorobenzene (P-Dichlorobenzene)	Trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	Trans-1,2-Dichloroethylene	1,2-Dichloropropane	Cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone / Methyl Butyl Ketone	Methylene Chloride	Methyl Iodide	4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene (PCE)	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl chloride	Xylene (Total)	Total VOCs
Laboratory Quantitation Limit		5	20	1	1	1	1	1	5	1	1	1	1	1	1	1	1	0.01	0.01	1	1	5	1	1	1	1	1	1	1	1	1	5	1	1	5	1	1	1	1	1	1	1	1	1	1	5	1	3	N/A
2011 GPS		**11561.2**	**0.05**	**5**	**1***	**80**	**80**	**7.07**	**4939.8**	**755**	**5**	**100**	**20800**	**80**	**187**	**80**	**7.06**	**0.05**	**0.2**	**600**	**75**	**5***	**2.4**	**5**	**7**	**70**	**100**	**5**	**1***	**1***	**700**	**34.8**	**5**	**1***	**1042.9**	**100**	**0.5**	**0.07**	**5**	**1000**	**200**	**5**	**5**	**1114**	**0.0007**	**406**	**2**	**10000**	**N/A**
Sample Location	Date																																																
GH3 (aka MW103)	01/23/95	~	~	~	~	~	~	~	~	~		~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	~	~	~	~	~	~	~	~	0.46 J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/04	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/30/04	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/17/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	2.0J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	2.9J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/10/11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/18/11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/15/12	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0
GH4 (aka MW104)	01/23/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/16/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/07/95	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	03/29/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	09/26/96	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	04/29/97	~	~	~	~	~	~	~	~	~	~	3.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/10/97	~	~	~	~	~	~	~	~	~	~	4.3	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/03/98	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/22/99	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/31/00	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/19/00	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/21/01	~	~	~	~	~	~	~	~	5	~	5	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/08/01	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/15/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	08/06/02	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/22/02	~	~	~	~	~	~	~	~	~	~	6.1	1	~	~	~	~	~	~	~	13	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/20/03	~	~	1	~	~	~	~	~	~	~	12	2	~	~	~	~	~	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/31/03	~	~	1.4	~	~	~	~	~	1.7	~	9.3	2.1	~	~	~	~	~	~	~	2.6	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.91J	~	~
	05/28/04	~	~	1	~	~	~	~	~	0.2 J	~	9	2	~	~	~	~	~	~	~	3	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1	~	~
	11/30/04	~	~	1.4	~	~	~	~	~	0.4 J	~	11	1.9	~	~	~	~	~	~	~	2.8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.5	~	~
	05/09/05	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/17/06	~	~	1	~	~	~	~	~	~	~	6	2	~	~	~	~	~	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1	~	~
	10/18/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	0.97J	~	~
	12/11/06	~	~	1.3	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.3	~	~
	05/29/07	1.0J	~	1	~	~	~	~	~	~	~	8	3	~	~	~	~	~	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1	~	~
	10/23/07	~	~	~	~	~	~	~	~	~	~	5.7	~	~	~	~	~	~	~	~	13	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1	~	~
	11/1/2007	~	~	0.90J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	3.0J	~	1	~	~	~	~	~	~	~	7	1	~	~	~	~	~	~	~	2	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	2	~	~
	10/16/08	~	~	0.89J	~	~	~	~	~	~	~	4	1.2	~	~	~	~	~	~	~	1.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	1.3	~	~	~	~	~	~	~	9.5	3.9	~	~	~	~	~	~	~	1.8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.4	~	~
	11/02/09	~	~	1.4	~	~	~	~	~	~	~	11	~	~	~	~	~	~	~	~	1.9	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.6	~	~
	06/18/10	~	~	1.7	~	~	~	~	~	~	~	13	2.4	~	~	~	~	~	~	~	1.9	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.7	~	~
	11/04/10	~	~	1.5	~	~	~	~	~	~	~	8.8	1.6	~	~	~	~	~	~	~	1.8	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	**3.4**	~	~
	06/10/11	~	~	1.6	~	~	~	~	~	~	~	9.3	1.9	~	~	~	~	~	~	~	2.1	~	0.73J	~	~	0.97J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	**3.3**	~	17.8
	11/28/11	~	~	1.3	~	~	~	~	~	~	~	11	1.4	~	~	~	~	~	~	~	2.8	~	0.90J	~	~	1.9	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	**4.4**	~	23.7
	06/15/12	~	~	1.5	~	~	~	~	~	~	~	9.9	2.4	~	~	~	~	~	~	~	3	~	.90J	~	~	2.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	**5.1**	~	22.8

TABLE 4B
TARGET ANALYTE RESULTS
GIN HILL LANDFILL, VDEQ PERMIT NO. 193
SUSSEX COUNTY, VIRGINIA

Concentrations (µg/l) — Volatiles

Sample Location	Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	2-Butanone (Methyl Ethyl Ketone)	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	Dibromochloromethane	Dibromomethane (Methylene Bromide)	1,2-Dibromoethane	1,2-Dibromo-3-Chloropropane	1,2-Dichlorobenzene (O-Dichlorobenzene)	1,4-Dichlorobenzene (P-Dichlorobenzene)	Trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	Trans-1,2-Dichloroethylene	1,2-Dichloropropane	Cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone / Methyl Butyl Ketone	Methylene Chloride	Methyl Iodide	4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene (PCE)	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl chloride	Xylene (Total)	Total VOCs
Laboratory Quantitation Limit		5	20	1	1	1	1	1	5	1	1	1	1	1	1	1	1	0.01	0.01	1	1	5	1	1	1	1	1	1	1	1	1	5	1	1	5	1	1	1	1	1	1	1	1	1	1	5	1	3	~~N/A~~
2011 GPS		**11561.2**	**0.05**	**5**	**1***	**80**	**80**	**7.07**	**4939.8**	**755**	**5**	**100**	**20800**	**80**	**187**	**80**	**7.06**	**0.05**	**0.2**	**600**	**75**	**5***	**2.4**	**5**	**7**	**70**	**100**	**5**	**1***	**1***	**700**	**34.8**	**5**	**1***	**1042.9**	**100**	**0.5**	**0.07**	**5**	**1000**	**200**	**5**	**5**	**1114**	**0.0007**	**406**	**2**	**10000**	~~N/A~~
GH5 (new upgradient)	05/16/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	12/11/06	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/29/07	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/23/07	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/28/08	4.0J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	10/16/08	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	05/12/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/02/09	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/18/10	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/03/10	~	~	~	~	~	~	~	~	~		~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/09/11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	11/18/11	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/14/12	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	2.1
GH6 (New NES Well 2010)	10/14/10	~	~	~	~	~	~	~	~	~		6.7	~	~	~	~	~	~	~	~	12	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	1.1	~	~	~	~	~	~	~	~	~
	11/04/10	~	~	~	~	~	~	~	~	~		2.3	~	~	~	~	~	~	~	~	0.85J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~
	06/10/11	~	~	0.84J	~	~	~	~	~	~	~	8.4	~	~	~	~	~	~	~	~	.99J	~	~	~	~	1.9	~	~	~	~	~	~	~	0.90J	~	~	~	~	~	~	~	~	~	~	~	~	~	~	12.04
	11/28/11	~	~	0.94J	~	~	~	~	~	~	~	12	~	~	~	~	~	~	~	~	13	~	~	~	~	2.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	16.34
	06/15/12	~	~	1.1	~	~	~	~	~	~	~	12	~	~	~	~	~	~	~	~	13	~	~	~	~	2.1	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	16.5

NOTES:

New upgradient well GH5 was installed on April 12, 2006, as part of the Nature and Extent Study for the facility. New downgradient well GH-6 was installed on September 20, 2010.

Detected groundwater monitoring constituents are those detected at concentrations equal to or exceeding their respective laboratory Quantitation Limits (LQLs) or Reporting Limits (RLs). It is noted that LQLs listed in table are for TestAmerica, the analytical laboratory since 2008. LQLs prior to 2008 may not be the same.

~: Not detected in the sample

Bold & Underlined: indicates exceedance of a Groundwater Protection Standard (See notes below).

Groundwater Protection Standards (GPSs) were revised January 31, 2011.

* LCQ substituted for ACL

DATA QUALIFIERS AND DEFINITIONS:

B - Analyte was detected in the associated Method Blank.

B9 - The analyte was detected in the Method / Calibration Blank at a level above the reporting limit. The sample was non-detect for this analyte, therefore, no corrective action was necessary.

D02 - Dilution required due to sample matrix affects

D10 - Dilution required due to sample color

H1 - Sample analysis performed past the method-specified holding time per client's approval.

H4 - Sample was extracted past holding time, but analyzed within analysis holding time.

ID7 - The analytes 3-Methylphenol and 4-Methylphenol coelute and can not be analytically separated. This reported concentration is a sum of these isomers.

J - Analyte detected at a level less than the Reporting Limit (RL) and greater than or and was not detected in the 2011 and June 2012 monitoring events. The vinyl chloride concentration at GH4 is generally consistent with the vinyl chloride concentrations detected at GH4 over the last seven years. Vinyl chloride concentrations at GH4 were found to be increasing at a 95% confidence level. Vinyl chloride concentrations over the last several years indicate a statistically significant increasing trend at GH4 due to the concentrations detected in the last three monitoring events. No vinyl chloride was detected in GH6 located downgradient of GH4.

Low concentrations of other volatile organic constituents (VOC) (primarily 1,4-dichlorobenzene, benzene, chlorobenzene, chloroethane, and cis-1, 2-dichloroethene) have been historically detected at GH4 at very low concentrations just above the LOQ but below their respective GPS. These constituents along with dichlorodifluoromethane and the probable laboratory contaminants acetone, 2-butanone, and methylene chloride have also been detected historically at GH1 at concentrations below the GPS. Chlorobenzene, 1, 4-dichlorobenzene, toluene, and cis-1, 2-dichloroethene were detected in at least one of the samples collected at GH6 at very low concentrations below the GPS.

3.1 Contaminants of Potential Concern

Based on the recent monitoring data presented above, the contaminants of potential concern are arsenic, cobalt, beta-BHC, and vinyl chloride. The chemical characteristics and historical use of these constituents is presented below.

Arsenic is a trace element that occurs primarily in association with sulfur-containing minerals such as realgar (AsS), orpiment (As_2S_3) and arsenopyrite (FeAsS). Arsenic has historically been used in various industries, agriculture, and medicine. Until the 1940s, inorganic arsenic compounds were often used as agricultural pesticides. Now most uses of arsenic in farming are banned in the United States.

Elemental arsenic is essentially insoluble in groundwater, Arsenic compounds have variable solubility (solubility can range from 0.5 mg/L to 20,000 mg/L) that depends upon arsenic valence and groundwater pH and redox state (Eh). A general review of scientific and governmental literature related to arsenic occurrence and migration in groundwater indicated that natural waters may contain low levels of ambient total-fraction arsenic with concentrations typically ranging from 1 to 10 µg/L (can be much higher in unique hydrogeologic environments). Arsenic mobility in natural waters is often limited in large measure due to co-precipitation reactions or adsorption of arsenic with iron and manganese hydroxides.

Cobalt is a trace element that is usually associated with sulfide ore deposits but is found within most sedimentary deposits. Cobalt does not occur naturally as a base metal, but is a component of many naturally occurring minerals, including various sulfides, arsenides, sulfoarsenides, hydrates, and oxides. Cobalt is used in pigments for ceramics, glass, paints, and varnishes, enamel coatings on steel batteries, and as a feed and fertilizer additive.

The solubility of cobalt compounds in natural waters is generally low. With the exception of certain complex ions, aqueous species of cobalt are not thermodynamically stable under Eh and pH conditions common in natural water. Like arsenic, cobalt mobility in natural waters is often limited in large measure due to co-precipitation reactions or adsorption of cobalt with iron and manganese hydroxides.

Beta-BHC (β-hexachlorocyclohexane) is a byproduct of the organochloride pesticide lindane (γ-HCH). Lindane was widely used in the 1960's and 1970's mainly on cotton plants. Lindane has not been produced or used in the United States for several decades. Lindane and beta-BHC are relatively persistent in the environment. However, they have low solubilities and are readily sorbed to soil.

Based on the agricultural nature of Sussex County, the source of the arsenic, cobalt and beta-BHC is likely agricultural products.

Vinyl chloride is used to make polyvinyl chloride pipes, wire coatings, vehicle upholstery, and plastic kitchenware. Vinyl chloride can also be formed in the environment from the breakdown of other chlorinated compounds and is a common landfill contaminant. The most common mechanism for vinyl chloride production in the environment is reductive de-chlorination of more chlorinated compounds. Vinyl chloride in turn may undergo de-chlorination to form ethene or ethane and/or oxidation to form carbon dioxide.

The source of the vinyl chloride at the landfill is not known. Other than low concentrations of 1, 4 dichlorobenzene, no poly chlorinated constituents have been detected at the landfill.

3.2 Nature and Extent of Groundwater Impacts

Figure 6 shows the spatial distribution of vinyl chloride and total VOCs. Figure 7 presents the vinyl chloride and total VOC concentrations on a hydrogeologic cross section through the landfill. Figure 8 presents an isoconcentration map of arsenic and cobalt concentrations.

These figures and data indicate the extent of groundwater with constituent concentrations exceeding the GPS is limited to the uppermost water-bearing unit of the Bacons Castle Formation in northern and northwest portions of the landfill lease area and a small area immediately north of the lease area.

4.0 ASSESSMENT OF POTENTIAL RISKS FROM SOLID WASTE IMPACT

Potential risks to human health and the environmental from the closed Gin Hill Landfill are negligible due to low contaminant concentrations and absence of potential receptors.

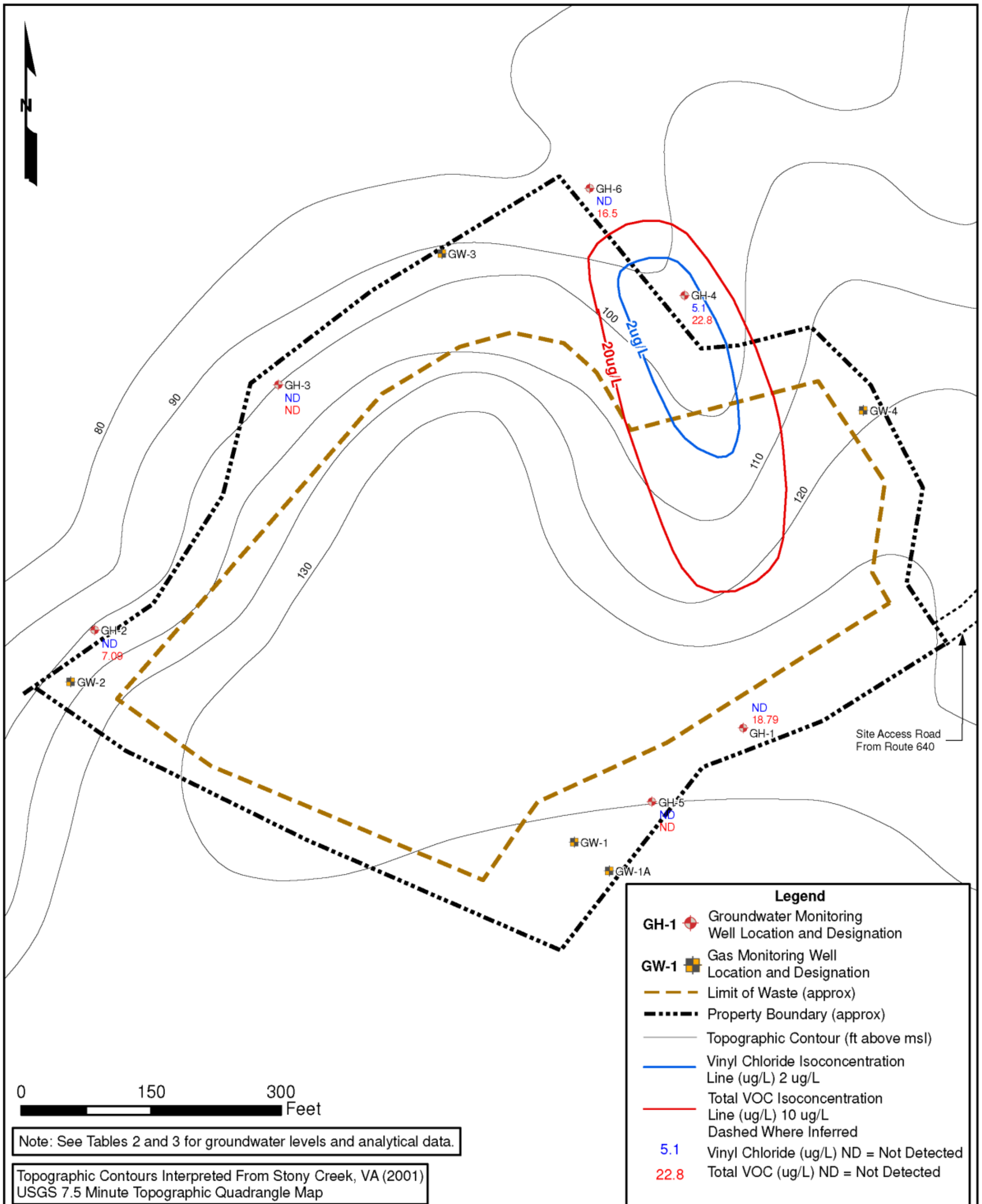

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Figure 6
Vinyl Chloride and Total VOC Concentrations
June 2012
Gin Hill Landfill, Sussex County, Virginia

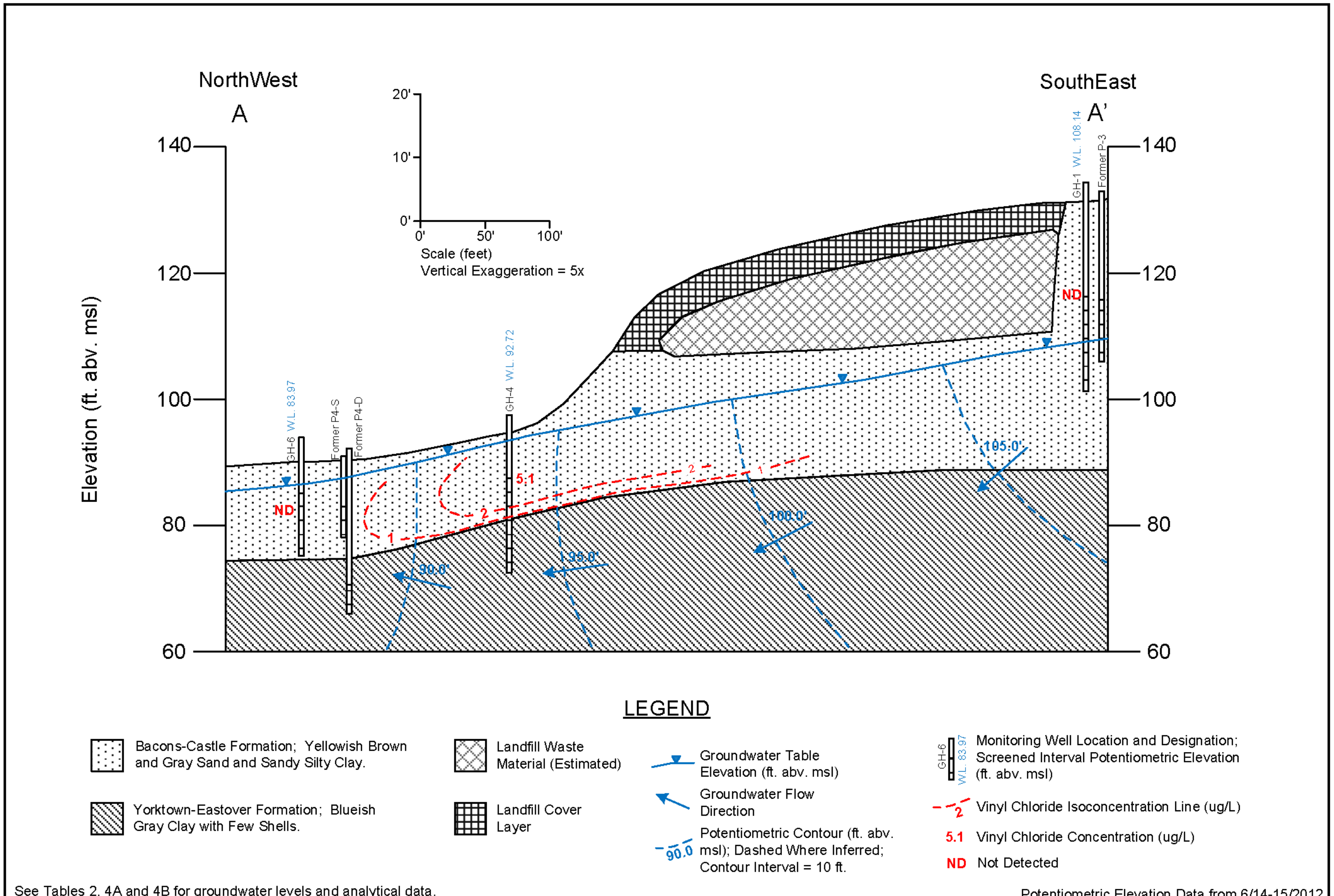

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FIGURE 7
Vinyl Chloride Concentrations
Cross Section A – A'
Gin Hill Landfill, Sussex County, Virginia

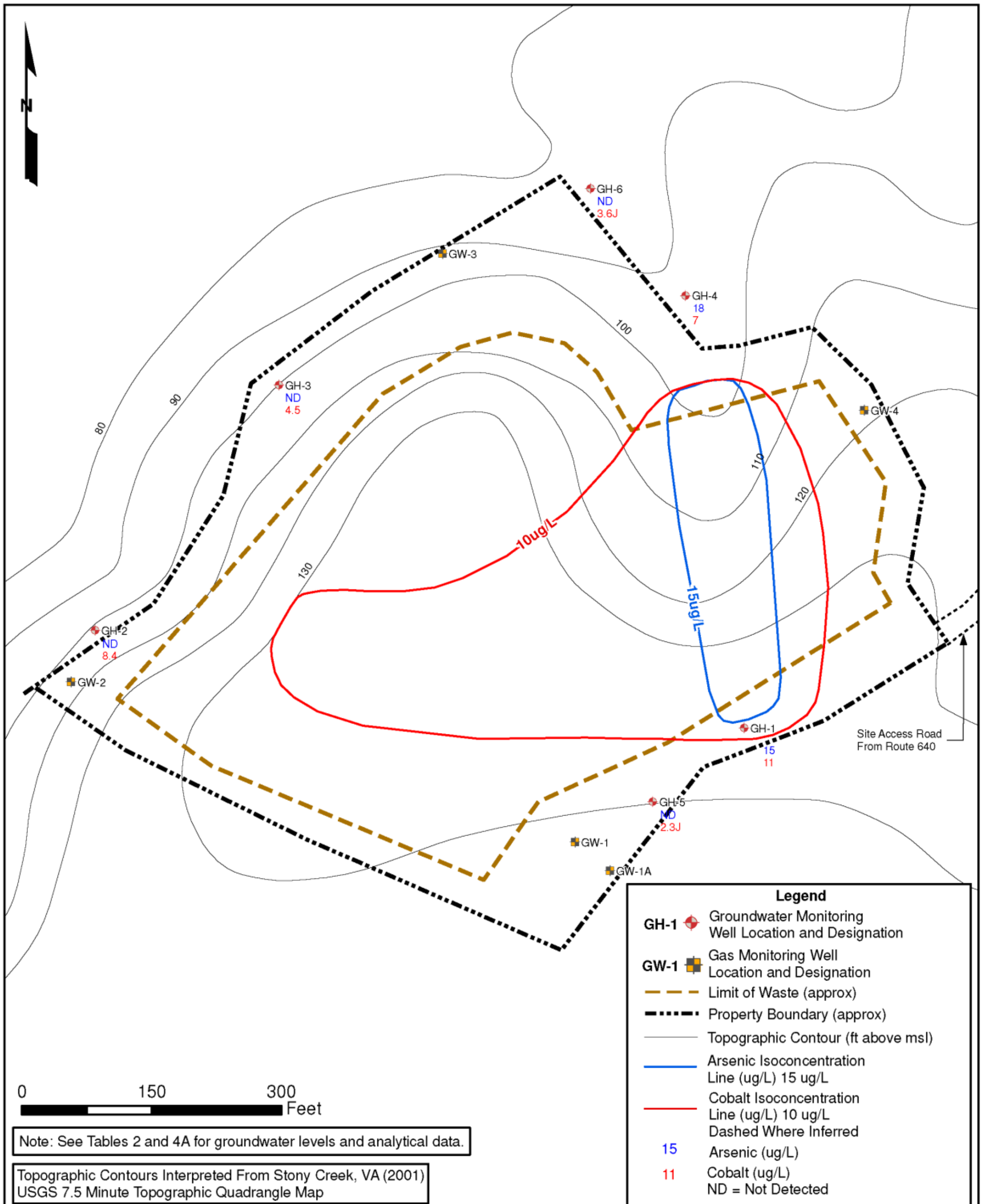

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Figure 8
Arsenic and Cobalt Isoconcentration Map
June 2012
Gin Hill Landfill, Sussex County, Virginia

An exposure route evaluation for soil, surface water, and air indicates that risks are negligible due to incomplete pathways, as follows:

1) Sussex County controls the landfill property by a lease agreement with B & F, LLC. Sussex County is in the process of notifying B & F, LLC of the GPS exceedances and initiating action to take legal ownership of the property
2) Access to the site is limited by its location and locked-gated access road
3) Access and physical exposure to waste and underlying soil is prevented by the landfill cap
4) There are no natural surface water bodies (streams, rivers, lakes) present at the landfill. Precipitation and runoff/run-on is diverted from the landfill via the landfill cap and grading
5) There are no downgradient receptors between the landfill and the regional groundwater discharge area along the Nottoway River located approximately ½- mile west and northwest of the landfill

In summary, there are no complete exposure pathways for groundwater observed in the near vicinity of the landfill. As a result, there is negligible risk to human health and the environment resulting from groundwater at the landfill.

5.0 ASSESSMENT OF CORRECTIVE MEASURES

In accordance with 9VAC20-81-260 Corrective Action Program, a PPR was previously submitted to DEQ in the 2008 NES/PPR. The PPR proposed to monitor groundwater at the landfill until concentrations of the COPC are below GPS at all groundwater monitoring wells currently located at the landfill (monitored natural attenuation). The PPR included:

1) Solid waste containment via maintenance of the existing landfill cap
2) Reduction of infiltration to waste (reduce leachate formation) by surface water management and maintenance of the existing landfill cap
3) Continued monitoring to evaluate COPC concentration trends

All of these elements are currently in-place and active at the landfill. The PPR provided a performance monitoring plan to assess the effectiveness of the proposed remedy. No comments were received during the public comment period and hearing that occurred in February 2008.

The March 2010 Notice of Violation (NOV) from DEQ apparently rejected the PPR included in the 2008 NES/PPR report. In a May 12, 2011 response letter to the revised 2010 NES/PPR, DEQ noted that the remedies proposed in the 2008 NES/PPR did not meet the requirements of presumptive remedies specified in 9VAC20-81-260.C.2.b and applicable EPA guidance.

Therefore, this section presents an assessment, including the technical and cost feasibility, of potentially applicable corrective measures technologies to prevent the offsite migration of contaminated groundwater and the reduction of contaminant concentrations over a reasonable time frame. The selection and feasibility of potentially applicable remedial technologies is primarily dependent on the site specific hydrogeologic setting, the concentrations and characteristics of the contaminants of concern, and potential risks to human health and the environment.

As noted above, the extent of groundwater with constituent (vinyl chloride) concentrations exceeding the GPS is limited to the uppermost water-bearing unit of the Bacons Castle Formation in northern and northwest portions of the landfill lease area and a small area immediately north of the lease area. The downgradient extent has been defined and a sentinel well (GH6) is in place. Potential risks to the public health and environment are negligible due to the lack of receptors and a complete exposure pathway. Therefore, there are no risk factors driving an expeditious/short term corrective measure.

This ACM was prepared in accordance with 9VAC20-81-260 and Submission Instruction 16. 9VAC20-81-260.C.3.c (1) states that "The selected remedies to be included in the corrective action plan shall:

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

Under 9VAC20-81-260.H, the groundwater remedy is complete when:

a. The owner or operator complies with the groundwater protection standards at all points within the plume of contamination that lie at or beyond the disposal unit boundary by demonstrating that no Table 3.1 Column B constituents have exceeded groundwater protection standards for a period of three consecutive years using the appropriate statistical procedures and performance standards as described under 9VAC20-81-250 D; and,
b. All other actions required as part of the remedy have been satisfied or completed, and the owner or operator obtains the certification required under subdivision 9VAC20-81-260.H .2 of this section.

Multiple corrective measures are potentially applicable to mitigate the offsite release and migration of contaminated groundwater and the reduction of contaminant concentrations over a reasonable time frame. The potentially applicable corrective measures were evaluated using a screening matrix (Table 5) to evaluate the applicability, effectiveness/performance, feasibility/implementability, cost, and other factors in meeting objectives of the corrective measures.

Table 5
Remediation Technologies Screening Matrix
Assessment of Corrective Measures
Gin Hill Landfill (Permit No. 193)

Corrective Measure	Technology Description	Applicability	Effectiveness/Performance						Feasibility/Implementability				Cost		Other			Comments
			Achieve GPS Levels	Protective of Human Health & Environment	Long-Term Effectiveness	Reduction in Contaminant Toxicity, Mobility, or Volume	Time to Implement	Time to Meet GPS	Constructability	Technical Practibility	Reliability	Regulatory	Capital Costs	O&M Costs	Safety Impacts	Community Acceptance	Cross-Media Impacts	
			Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	Good Fair Poor Unknown	
Monitored Natural Attenuation																		
Monitored Natural Attenuation	Maintain existing post closure care and implement corrective action monitoring program.	Applicable	Fair	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good	Analytical results demonstrate ongoing physical natural attenuation processes and probability of biochemical attenuation processes. Additional cost to demonstrate/quantify natural attenuation processes are not justified given the already negligible risk.
Presumptive Remedies																		
Containment (impermeable cap)	Construct impermeable cap over entire 10 acre waste mass using low permeability soils or synthetic materials.	Applicable	Fair	Good	Good	Poor	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Fair	Good	The landfill waste is adequately contained by the existing soil cap. The main deficiency of the cap is that is does not provide a low permeability barrior to infiltrating precipitation. The existing cap is in good condition and does promote runoff and prevents run-on. High capital and O&M Costs do not justify slight reduction in already negligible risks.
Leachate Control	Use of dewatering wells or landfill toe drains to collect leachate for treatment	Not applicable as it is unlikely that waste mass is saturated.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No evidence that waste materials is permanently saturated.
Groundwater Migration Control	Install dewatering or injection wells, or barrier walls to control migration of contaminated groundwater	Not applicable as there are no receptors to divert groundwater from.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No reduction in potential risk
LFG Collection and Treatment	Install active or passive LFG control system	Not applicable as there is no evidence of landfill gas generation and migration.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No evidence of landfill gas migration.
Dewatering of Waste Mass	See leachate control																	
Institution Controls																		
Site Access Restrictions	Install perimeter fence around waste mass to prevent unauthorized access to site	Applicable	NA	Good	Good	NA	Good	NA	Good	Good	Good	Good	Good	Good	Good	Good	NA	Landfill cap in good condition so that trespassers are not exposed to waste material. Install additonal no trespassing signs and possibly perimeter fence.
Land Acquisition	Acquire property from current owners	Applicable	NA	Good	Good	NA	Good	NA	NA	Good	Good	Good	Good	Good	Good	Good	NA	County should take full ownership of landfill property.
Source Control																		
Excavate Landfill	Excavate entire landfill mass (approx. 325,000 cubic yards) and dispose at permitted Subtitle D landfill.	Applicable	Good	Good	Good	Good	Poor	Fair	Poor	Poor	Good	Fair	Poor	Good	Poor	Poor	Poor	Slight reduction in already negligible risks do not justify the extreme cost of landfill excavation.
Subtitle D Landfill Cap	See Presumptive Remedies	See Presumptive Remedies																
In-Situ - Groundwater Treatment																		
Enhanced Bioremediation (EB)	Use of indigenous or inoculated micro-organisms (e.g., fungi, bacteria, and other microbes) to degrade (metabolize) organic contaminants in groundwater, converting them to innocuous end products. Nutrients, oxygen, or other amendments may be used to enhance bioremediation.	Applicable to organic contaminants	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Good	May be effective given the small area of groundwater impacts. High capital and O&M Costs do not justify slight reduction in already negligible risks.
Passive Treatment Wall	Use of permeable reactive wall typically composed of granulated (zero valent) iron, and/or activated carbon installed across the contaminated groundwater plume to degrade or absorb groundwater contaminants.	Applicable to both inorganic and organic contaminants	Good	Good	Fair	Good	Fair	Fair	Poor	Poor	Fair	Fair	Poor	Poor	Fair	Fair	Good	Biofouling or loss of reactive capacity, may require replacement. High capital and O&M Costs do not justify slight reduction in already negligible risks.
Phytoremediation	Use of plants to bioaccumulate, degrade, or render harmless contaminants in water.	Applicable; Already in place. Could allow tree species to grow in northwest corner of landfill.	Poor	Fair	Unknown	Unknown	Fair	Unknown	Good	Good	Unknown	Good	Good	Good	Good	Good	Good	Existing downgradient woodlands and wetlands already performing this function. Negligible benefit from additional trees in northwest corner.
Air Sparging	Air injection wells within groundwater plume to volatilize organics, promote aerobic degradation and raise the redox potential for precipitation of Inorganics.	Applicable	Good	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Poor	Limited by contaminanat plume area. Slight reduction in already negligible risks do not justify the cost.
Chemical Oxidation	Injecting oxidants such as hydrogen peroxide (Fenton's agent), potassium and sodium permanganate, or ozone directly into contaminated groundwater to oxygenate organic compounds. and other amendments as required directly into the source zone and downgradient plume.	Applicable	Good	Good	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Good	Limited effectiveness on halogenated volatiles and inorganics. May require multiple injections over long period of time. Significant safety concerns. High capital and O&M Costs do not justify slight reduction in already negligible risks.
Dual Phase Extraction	Co-extraction of groundwater and soil gas for subsequent treatment and discharge	Applicable	Good	Good	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Dual Phase extraction requires both groundwater and vapor treatment. Vapor is not a substantial concern at this facility. Significant O & M costs. / No full scale success has been achieved; fouling of system may occur by oxidized constituents in groundwater. High capital and O&M Costs do not justify slight reduction in already negligible risks.
Groundwater Recovery and Treatment																		
Pump/Treat/Discharge	Use of groundwater recovery wells to capture contaminated groundwater for subsequent treatment and discharge under a VPDES permit	Applicable	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	High capital and O&M Costs do not justify slight reduction in already negligible risks.
Pump and Haul	Use of groundwater recovery wells to capture contaminated groundwater for subsequent transportation offsite for treatment and discharge at a POTW or commercial water treatment facility.	Applicable	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	High capital and O&M Costs do not justify slight reduction in already negligible risks.

Some technologies such as leachate and landfill gas control are not applicable as there is no evidence that the waste materials are saturated or that landfill gas is migrating offsite. Most of the potentially applicable technologies have high installation/capital and operation & maintenance cost and do not result in a significant reduction in the already negligible risk to human health and the environment.

Two options were carried forward for further evaluation:

- Monitored Natural Attenuation
- Institutional Controls

5.1 Monitored Natural Attenuation

Monitored natural attenuation (MNA) relies on natural processes such as dilution, adsorption, dispersion, biodegradation/biotransformation, and chemical reactions to eliminate/reduce contaminant concentrations. These natural attenuation processes essentially occur in all groundwater contaminant plumes to one degree or another. In an unconfined groundwater system such as at the Gin Hill Landfill, the processes of dilution, adsorption, and dispersion are the principal natural attenuation processes. The main objective of monitored natural attenuation is to determine the degree to which these natural processes are reducing contaminant concentrations, and whether the natural processes are sufficient to prevent any increase in future potential risk to human health and the environment.

According to EPA (1999), the following items are typically required to demonstrate natural attenuation:

- Groundwater data demonstrating decreasing contaminant mass and/or concentration over time.
- Hydrogeologic and geochemical data that indirectly demonstrate the type of natural attenuation processes active at the site, and the rate at which such processes are reducing contaminant concentrations.
- Data from field studies that demonstrate the occurrence of a particular natural attenuation process at the site and its ability to degrade the contaminants of concern.

As presented in Section 4, the extent of groundwater with constituent concentrations exceeding the GPS is limited to the uppermost water-bearing unit of the Bacons Castle Formation in northern and northwest portions of the landfill lease area and a small area immediately north of the lease area. Arsenic, cobalt, beta-BHC, and vinyl chloride are the only constituents exceeding GPS over the last two years.

5.1.1 Performance and Reliability

Monitored natural attenuation is a proven remedial alternative to address impacted groundwater when there is no identified risk, or when more active remediation does not effectively reduce potential risks to human health and the environment. The performance and reliability of MNA is dependent on the contaminants of concern and the site specific hydrogeological/geochemical conditions. Natural attenuation process for inorganic constituents is generally different than for organic constituents. Metals are not transformed to other less toxic constituents. Therefore, the principal natural attenuation mechanisms for metals are dilution, dispersion, and adsorption. The principal natural attenuation mechanisms for organic constituents are biodegradation/biotransformation, and other chemical reactions.

Arsenic and cobalt in groundwater may be derived from either natural (i.e., geologic) or anthropogenic sources. Given the localized high concentrations of arsenic and cobalt observed, the source of these metals at Gin Hill Landfill is presumed to be anthropogenic.

Arsenic and cobalt have very low solubilities in groundwater under most conditions. The principal attenuation mechanisms for both metals are precipitation as oxyhydroxides or as sulfides or sulfates, co-precipitation with iron and manganese oxyhydroxides or sulfides, or adsorption to iron or manganese oxyhydroxides, iron sulfides, or other mineral surfaces (EPA 2007). Recent research (Ford 2006) of metals in groundwater impacted from solid waste landfills indicate that trace metals like arsenic and cobalt may be mobilized by dissolution from iron and manganese oxyhydroxides typically under reducing conditions which may in turn be caused by high carbon or sulfide levels that are an electron source. Dissolution of the trace metals will occur with the within and immediately downgradient of areas with reducing conditions creating a type of chemical front or zone. This area or zone of dissolved metals is typically limited by chemical changes along the flow path to more oxidizing conditions which causes the iron and manganese oxyhydroxides to re-precipitate and the trace metals to co-precipitate or be adsorbed.

The monitoring data support this model of trace metal mobilization/natural attenuation. The highest and most variable trace metal concentrations have been historically detected at GH1 and GH4 which typically have negative oxidation-reduction potential (ORP) indicating reducing conditions. The ORP values at the other site monitoring wells are typically positive. Trace metals concentrations at these wells are substantially less than at GH1 and GH4.

There is little information in the public literature on natural attenuation of beta-BHC. Beta-BHC is a degradation by product of the pesticide lindane. Adsorption is a principal process limiting the mobility of beta-BHC. De-chlorination through biodegradation and biotransformation processes is also reported to be an important process.

Laboratory and field studies indicate that although complete reduction of vinyl chloride to ethene is possible, reductive dechlorination usually stops at dichloroethene or vinyl chloride in the majority of groundwater systems. Recent USGS investigations have demonstrated that microbial oxidation of these reduced daughter products can be significant under anaerobic redox conditions. Oxidation of vinyl chloride can occur under anaerobic conditions, if sufficiently strong oxidants, such as iron oxides, are available to drive microbial degradation.

Appendix A presents a trend analysis through 2011 for vinyl chloride and four other volatile organic constituents (benzene, chlorobenzene, chloroethane, and 1, 4-Dichlorobenzene) that have been periodically detected at monitoring well GH4. At the 95% confidence level, benzene and vinyl chloride has a statistically significant upward trend. The upward trend in vinyl chloride concentrations is mainly due to the concentrations (3.4 and 3.3 ug/L) found in the last two monitoring events. No data are available on the degradation products of vinyl chloride.

Trend analyses are also presented for chlorobenzene, chloroethane, and 1, 4-Dichlorobenzene at GH1. Benzene and vinyl chloride have not been detected at GH1. The trend analysis indicates no statistically significant trends in these constituents at GH1.

Table 3 presents the values for field water quality parameters measured during the June 2011 monitoring event. Laboratory alkalinity values are also presented on Table 3. Dissolved oxygen levels in all the wells was zero, suggesting there is sufficient organic matter within the water bearing unit to consume the available oxygen and to function as electron donors. The negative oxidation-reduction potential at GH1 and GH4 indicates reduced conditions and the probability of anaerobic biodegradation.

The available data indicate that natural attenuation is occurring at the landfill and is preventing groundwater contamination from migrating further to the northwest. The available data do not allow for an accurate estimation of when GPS will be achieved. Furthermore, it is highly unlikely that additional analysis of the groundwater chemistry will provide an accurate estimation of natural attenuation rates.

5.1.2 Implementation Requirements

Monitored natural attenuation would be implemented through a Corrective Action Monitoring Plan (CAMP) designed to ensure protection of human health and the environment. The CAMP would be designed to:

- Verify the extent of contamination is not expanding and potential risk to any offsite receptors is not increasing
- Identify any potentially toxic and/or mobile transformation products
- Detect releases of other contaminants to the environment
- Verify attainment of the corrective measure objectives

If monitored natural attenuation is implemented, a CAMP and Corrective Action Plan (CAP) will be submitted to DEQ for review, approval, and incorporation into the facility's permit via a major permit amendment. Existing monitoring wells would be utilized for the CAMP. Existing compliance monitoring well GH4 is located in the plume just north of the waste disposal area, and would be used as a performance monitoring well to demonstrate the reduction in vinyl chloride concentrations over time and compliance with the GPS. NES well GH6, located downgradient of GH4, would be used as a sentinel well to verify attenuation of the vinyl chloride and demonstrate that the plume is not expanding.

5.1.3 MNA Impacts

No adverse impacts are associated with MNA. There is probably a minimal amount of cross media transfer from groundwater to soil and air. Given the extremely low concentrations and small impact area, the amount of contaminant transfer on a mass basis is negligible.

5.1.4 Remediation Timeframe

The timeframe for achieving objectives is difficult to estimate but is considered to be reasonable compared due to the low risk associated with the release. The historical data indicate no significant trends in arsenic concentrations are evident at the other monitoring wells. Cobalt concentration trends are generally flat or decreasing at the monitoring wells. Vinyl chloride concentrations at GH4 have a statistically increasing trend. The fact that it took approximately 15 years for vinyl chloride levels at GH4 to exceed the GPS suggests that the landfill is still undergoing chemical modifications. The vinyl chloride concentration only needs to decrease by approximately 3 ug/L to achieve the GPS. However, achieving the GPS will likely require at least 15 years.

5.1.5 MNA Cost Estimates

The costs associated with MNA include preparing the Corrective Action Plan and CAMP, monitoring wells (as required), sampling and analysis costs, and reporting. The estimated costs are summarized below:

- Corrective Action Plan/CAMP: $15,000
- DEQ Permitting Costs: $ 0
- Well Installation Costs (contingency): $10,000
- Monitoring and Reporting Costs (Annual): $30,000
- Corrective Action Status Evaluation Reports (minimum every three years) $5,000
- Contingency $10,000

Total estimated (+/- 20%) costs assuming a 15 year corrective action period: $500,000

The above costs do not include any costs associated with acquisition of the property, long term care and maintenance of the property, or other miscellaneous incidental costs that may be incurred by Sussex County for management of the property. The actual cost and design of the MNA program will be determined if MNA is selected as a remedial alternative.

5.2 Institutional Controls

The institutional controls of property ownership and site fencing were selected for further analysis to address the legal control over the land and the possibility for trespassers to access the site and be potentially exposed to landfill waste materials. According to a review of the lease agreement by the Sussex County attorney, the lease agreement provides "clear and non-equivocal permission … for the County to use the Gin Hill ten acre landsite for the purpose of a Refuse Disposal Site operated under the rules and regulations of the Virginia State Department of Health and government purposes in connection with the use of said premises. The County was also given the right to do or perform such acts as it in its sole discretion may deem advisable including but not limited to the posting of signs, the erection of fences, the removal of trees, any acts necessary for the protection against fire, excavation and removal of dirt or earth, and the spraying or scattering of chemicals necessary to keep the premises in a sanitary and healthful manner".

Sussex County is the process of notifying the current landowner and either revising the lease agreement or taking full ownership of the property. DEQ will be provided progress reports and notification on the negotiations with the property owner.

Given the very rural nature of the property, and the landfill cover, construction of a perimeter fence around the landfill is probably unnecessary. Fencing the entire landfill with a six-foot high chain link fence with a new gate is estimated to cost approximately $50,000. The County should install additional no trespassing signs informing trespassers of the property condition.

6.0 PUBLIC NOTICE AND HEARING

As previously noted a public hearing was held in March 2008 on the 2008 NES/PPR. No comments were received during the public comment period and hearing that occurred in February 2008.

In accordance with 9VAC20-81-260.C.4 a new public hearing on this ACM is scheduled for September 20, 2012. Public notices will be published in Sussex-Surry Dispatch. A copy of the public notice is provided in Appendix B.

Once the public comment period and hearing is completed, a final ACM will be submitted to DEQ.

7.0 CONCLUSIONS/RECOMMENDATIONS

The available site data indicate that only vinyl chloride was detected at low concentrations just above the GPS in the most recent (June 2012) monitoring event. Other potential contaminants of concern include arsenic, cobalt, and beta-BHC which have exceeded their respective GPS at one or more wells over the last two years. The groundwater impacts is limited to the uppermost water-bearing unit of the Bacons Castle Formation in northern and northwest portions of the landfill lease area and a small area immediately north of the lease area. There are no complete exposure pathways for groundwater observed in the near vicinity of the landfill. As a result, there is negligible risk to human health and the environment resulting from groundwater at the landfill.

Most of the potentially applicable corrective measure technologies have high installation/capital and operation & maintenance cost and do not result in a reduction in the already negligible risk to human health & environment. Based on the limited groundwater impacts and absence of potential risk, a combination of the two corrective measures alternatives provide the best cost/benefit for the Gin Hill Landfill:

- Monitored Natural Attenuation
- Institutional Controls

As discussed above and as presented in the 2008 and 2010 NES/PPR for the landfill, shallow groundwater in the upper most water bearing unit flows toward the wetlands, open water, and bottomland woodlands along the Nottoway River located immediately west of the landfill. This land is essentially undevelopable due to the wetlands and Interstate 95 right of way. Groundwater is not reasonably expected to be a source of drinking water.

Monitored natural attenuation (MNA) is a proven remedial alternative to address impacted groundwater when there is no identified risk, or when more active remediation does not effectively reduce potential risks to human health and the environment. Monitored natural attenuation would be implemented through a CAMP designed to ensure protection of human health and the environment.

Continuation of the current post closure care and monitoring under MNA provides for continued maintenance of the landfill cap to prevent any exposure of waste materials and to minimize (to the extent practicable) infiltration of precipitation into the waste material. Continuation of the environmental monitoring would include submittal of a revised groundwater monitoring plan patterned after the CAMP under 9VAC20-81-260.D. This monitoring plan would provide for an early determination of any increase in potential risk to human health and the environment, and monitoring contaminant concentrations over time.

Additional institutional Controls should be implemented at the Gin Hill Landfill. Sussex County should expeditiously continue with taking ownership of the landfill lease area and an additional 100 to 200 foot buffer area along the northern and western lease area boundaries. Additional no-trespassing signs should be posted to minimize the potential for trespassers to access the property.

8.0 REFERENCES

Stockholm Convention on Persistent Organic Pollutants Persistent Organic Pollutants Review Committee (POPRC) DRAFT RISK PROFILE For Beta-Hexachlorocyclohexane, Draft prepared by: The ad hoc working group on alpha and beta hexachlorocyclohexane, May, 2007

USEPA, February 1991, Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, OSWER Directive 9355.3-11, EPA/540/P-91/001.

USEPA, 1998, Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600-R-98/128, National Risk Management Research Laboratory, Ada, Oklahoma.

USEPA, EPA Publication 9203.1-02I, SACM Bulletins, *Presumptive Remedies for Municipal Landfill Sites*, April 1992, Vol. 1, No. 1, and February 1993, Vol. 2, No. 1, and SACM Bulletin *Presumptive Remedies*, August 1992, Vol. 1, No. 3.

USEPA, 1999, Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, Final OSWER Directive, Publication EPA/540/R-99/009.

USEPA, 2004, Performance Monitoring of MNA Remedies for VOCs in Ground Water, National Risk Management Research Laboratory (NRMRL), Ada, Oklahoma, Publication EPA/600/R-04/027.

USEPA, 2002, Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 2, Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium, EPA/600/R-07/140., October 2007

USEPA, 2006, Arsenic in Ground Water at Waste Sites, Robert Ford, U.S. Environmental Protection Agency Office of Research and Development, SBRP Arsenic in Landfills -Boston, MA, October 4, 2006

USGS, 2011, Microbial Degradation of Chloroethenes in Ground Water Systems, U. S. Geological Survey web site, Toxic Substances Hydrology Program

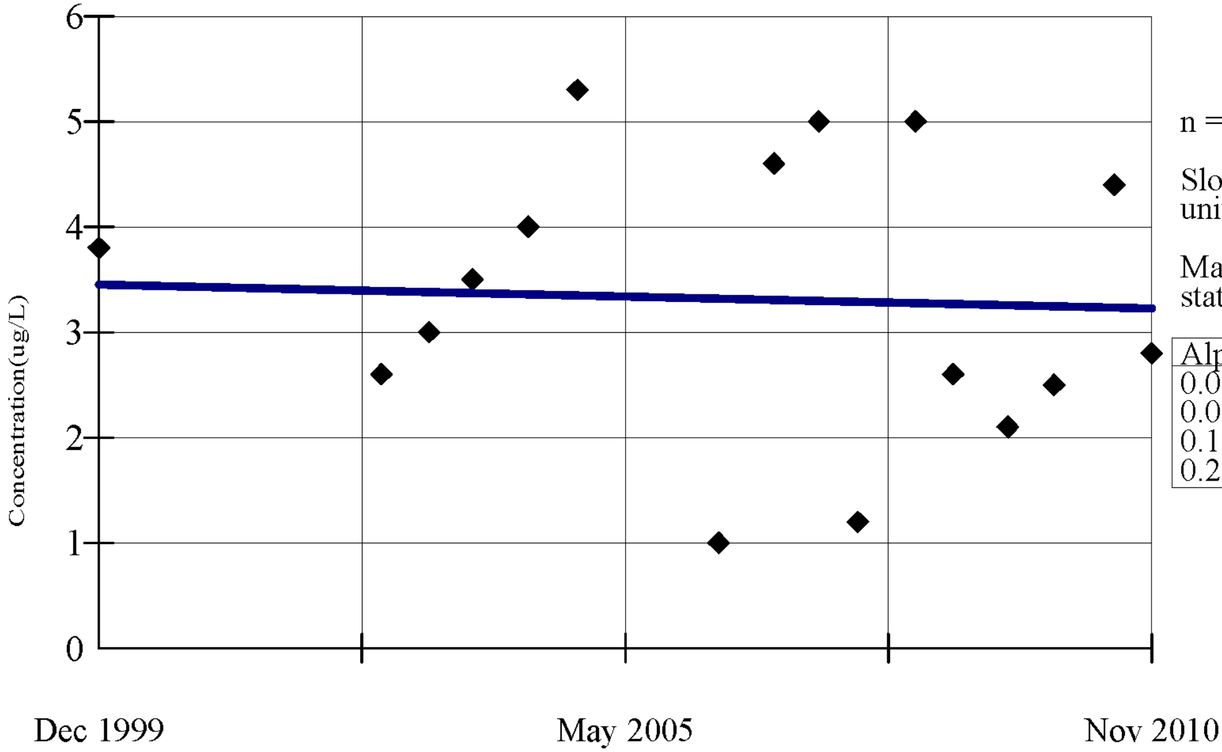
Virginia Department of Environmental Quality, 2011, Virginia Solid Waste Management Regulations, 9VAC20-81, Richmond, VA.

APPENDICES

APPENDIX A

SENS SLOPE ANALYSIS OF VOC CONSTITUENTS AT GH1 AND GH4

SEN'S SLOPE ESTIMATOR
GH1

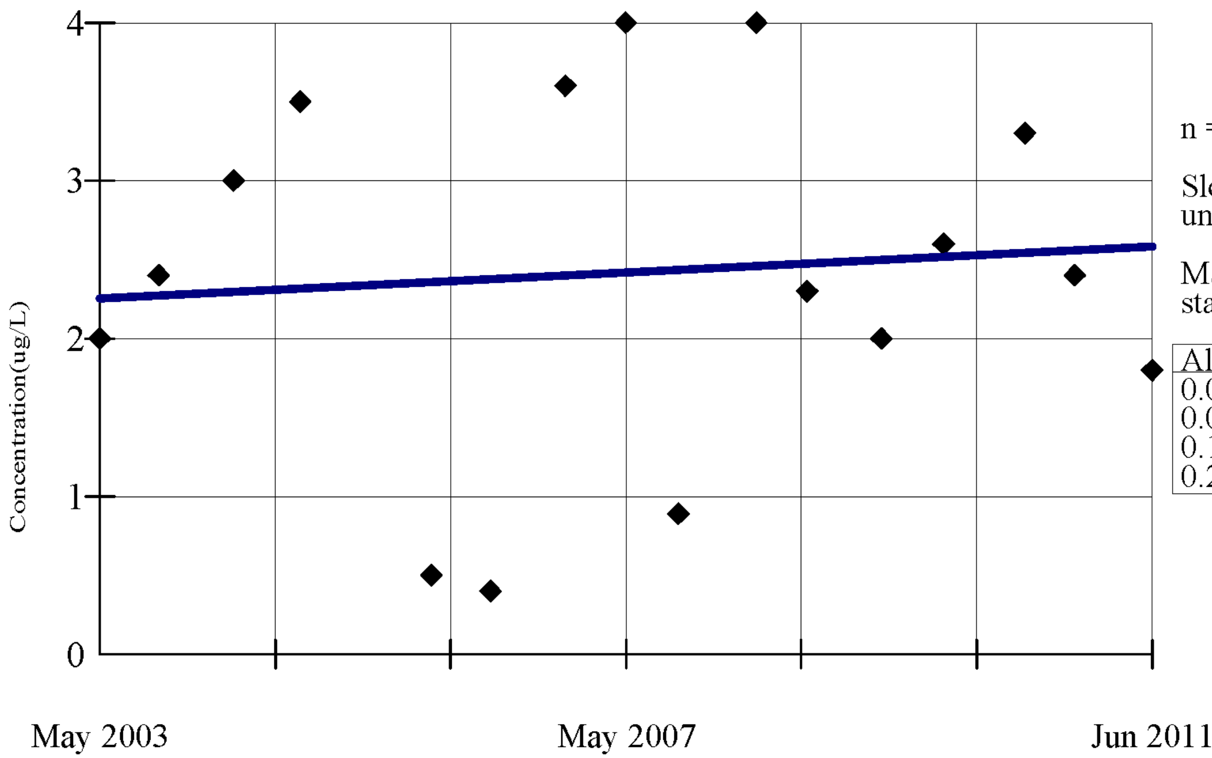


Alpha	Critical	Signif.
0.01	-58	No
0.05	-45	No
0.1	-38	No
0.2	-30	No

Constituent: 1,4-Dichlorobenzene (ug/L)   Facility: 11-071-GH   Data File: GHHIST~1

Date: 8/9/11   Time: 10:46 AM   View: gh

SEN'S SLOPE ESTIMATOR
GH1



n = 16

Slope = 0.041 units per year.

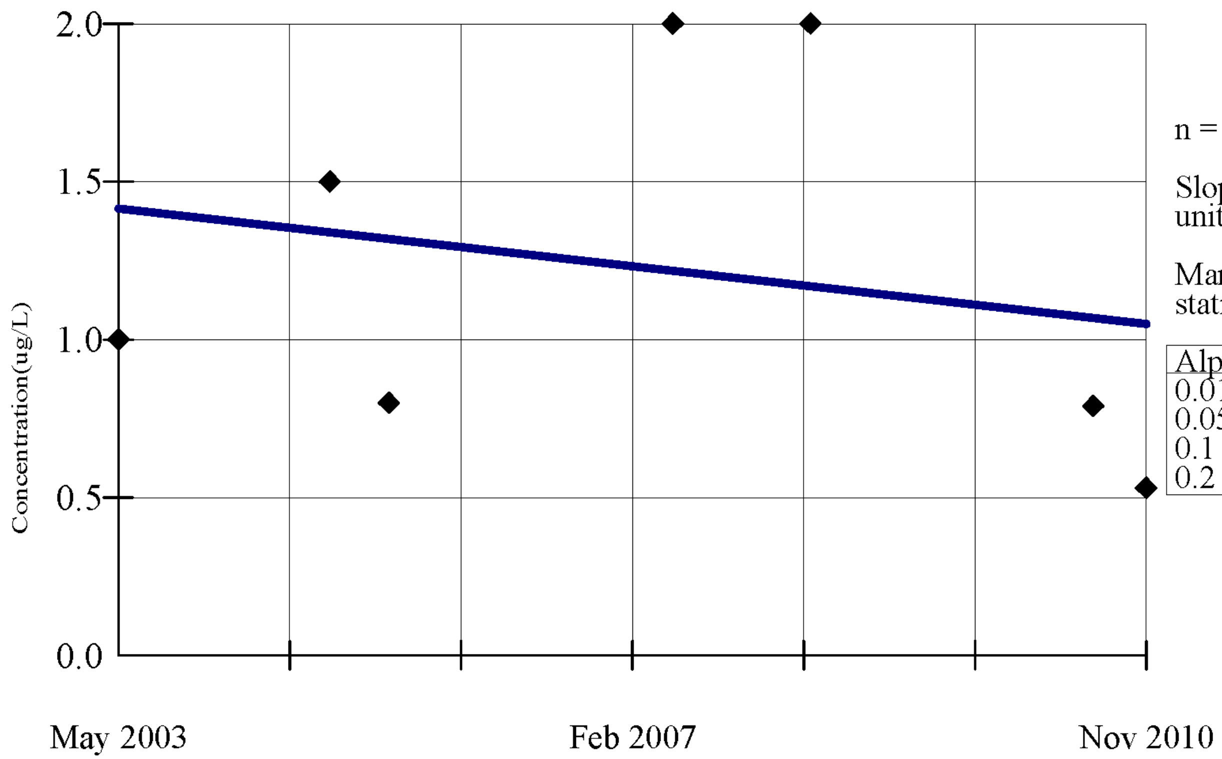
Mann Kendall statistic = 5

Alpha	Critical	Signif.
0.01	58	No
0.05	45	No
0.1	38	No
0.2	30	No

Constituent: Chlorobenzene (ug/L) Facility: 11-071-GH Data File: GHHIST~1

Date: 8/9/11 Time: 10:34 AM View: gh

SEN'S SLOPE ESTIMATOR
GH1



n = 7

Slope = -0.049
units per year.

Mann Kendall
statistic = -6

Alpha	Critical	Signif.
0.01	-18	No
0.05	-15	No
0.1	-13	No
0.2	-10	No

Constituent: Chloroethane (ug/L)

Facility: 11-071-GH

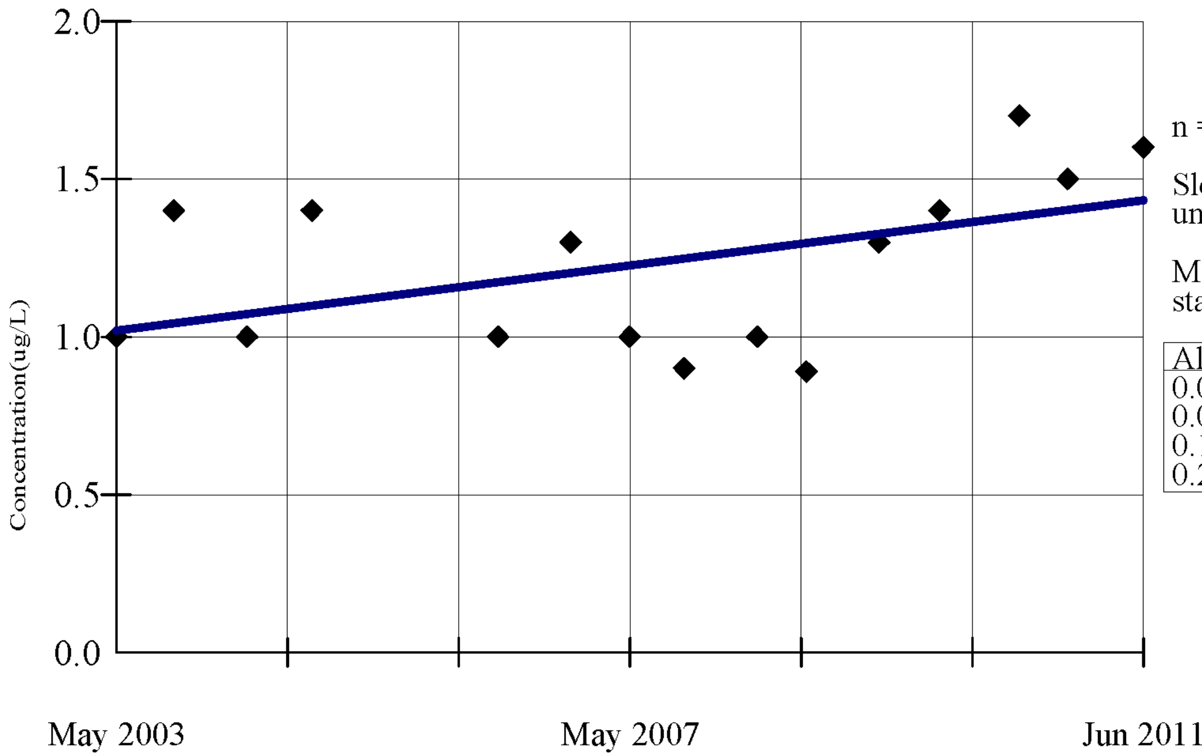
Data File: GHHIST~1

Date: 8/9/11

Time: 10:47 AM

View: gh

SEN'S SLOPE ESTIMATOR
GH4



n = 15

Slope = 0.051
units per year.

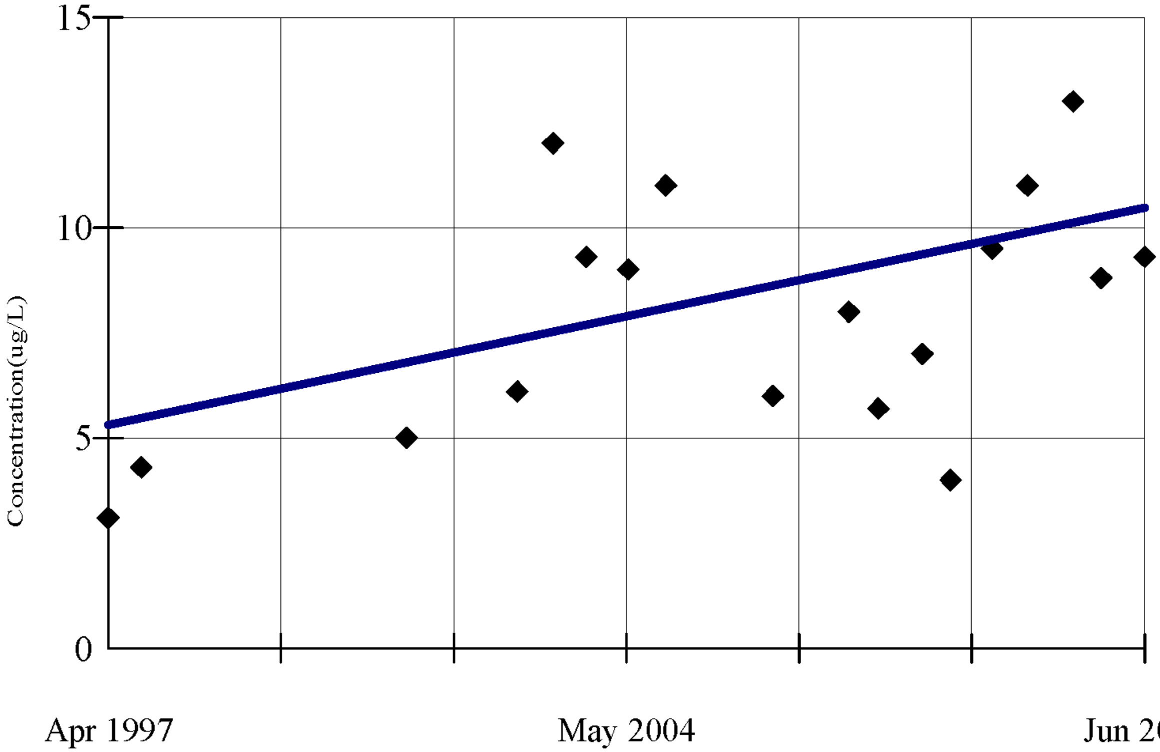
Mann Kendall
statistic = 29

Alpha	Critical	Signif.
0.01	53	No
0.05	41	No
0.1	35	No
0.2	28	Up

Constituent: Benzene (ug/L) Facility: 11-071-GH Data File: GHHIST~1

Date: 8/9/11 Time: 10:37 AM View: gh

SEN'S SLOPE ESTIMATOR
GH4



n = 18

Slope = 0.366
units per year.

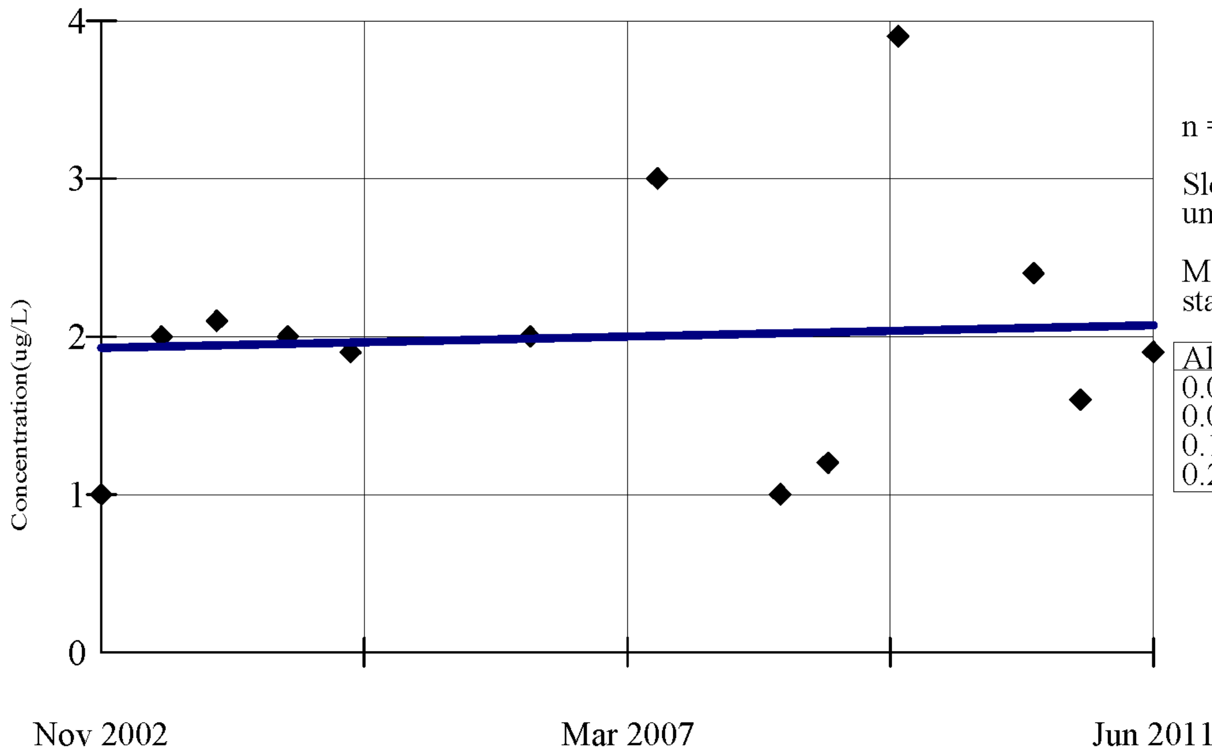
Mann Kendall
statistic = 49

Alpha	Critical	Signif.
0.01	68	No
0.05	53	No
0.1	45	Up
0.2	36	Up

Constituent: Chlorobenzene (ug/L) Facility: 11-071-GH Data File: GHHIST~1

Date: 8/9/11 Time: 10:39 AM View: gh

SEN'S SLOPE ESTIMATOR
GH4

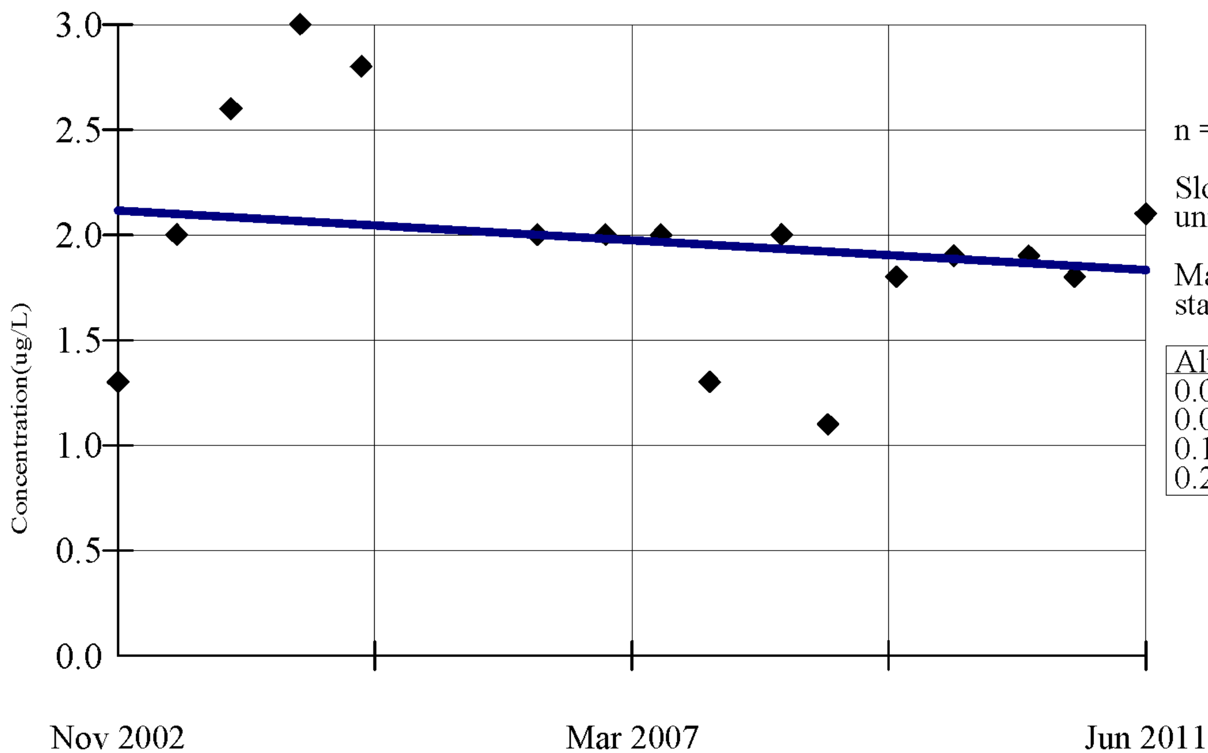


Alpha	Critical	Signif.
0.01	43	No
0.05	34	No
0.1	29	No
0.2	23	No

Constituent: Chloroethane (ug/L) Facility: 11-071-GH Data File: GHHIST~1

Date: 8/9/11 Time: 10:40 AM View: gh

SEN'S SLOPE ESTIMATOR
GH4

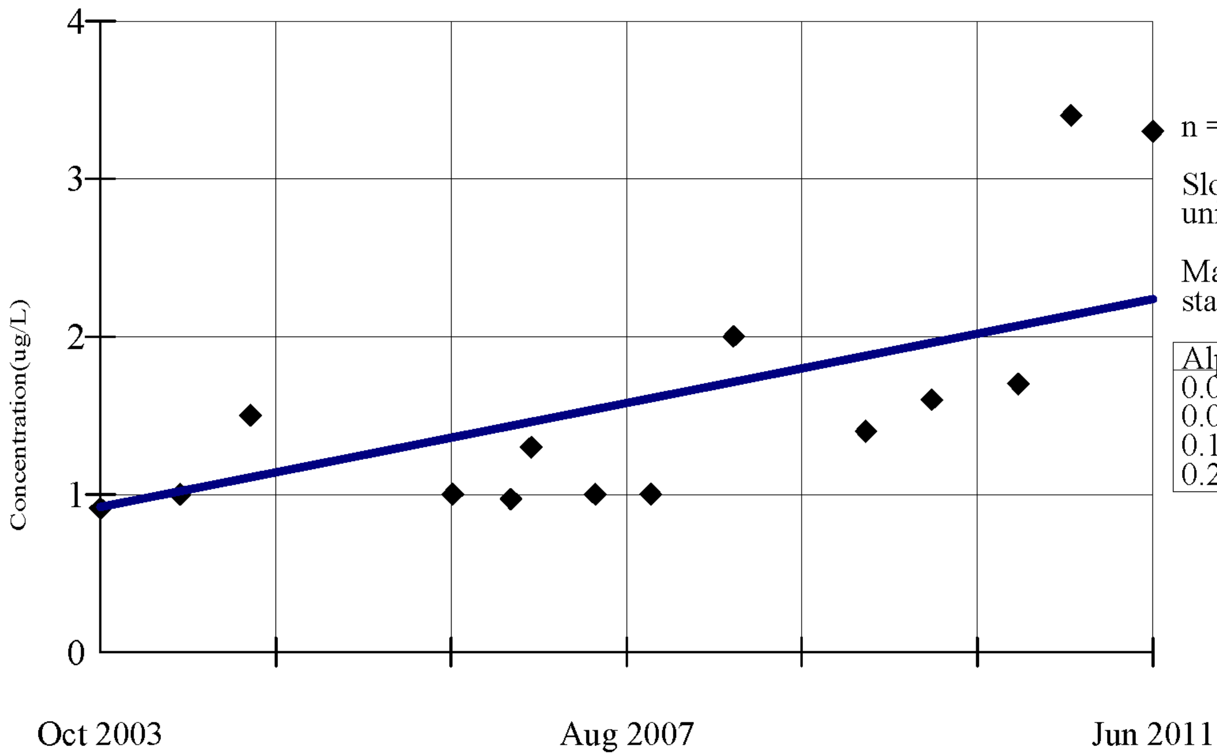


Alpha	Critical	Signif.
0.01	-58	No
0.05	-45	No
0.1	-38	No
0.2	-30	No

Constituent: 1,4-Dichlorobenzene (ug/L) Facility: 11-071-GH Data File: GHHIST~1

Date: 8/9/11 Time: 10:40 AM View: gh

SEN'S SLOPE ESTIMATOR
GH4



n = 14

Slope = 0.173
units per year.

Mann Kendall
statistic = 57

Alpha	Critical	Signif.
0.01	48	Up
0.05	37	Up
0.1	32	Up
0.2	25	Up

Constituent: Vinyl chloride (ug/L)

Facility: 11-071-GH

Data File: GHHIST~1

Date: 8/9/11

Time: 10:41 AM

View: gh

Appendix B

ACM Public Notice

NOTICE OF PUBLIC HEARING
SUSSEX COUNTY BOARD OF SUPERVISORS

NOTICE IS HEREBY GIVEN THAT THE BOARD OF SUPERVISORS OF SUSSEX COUNTY, VIRGINIA, on October 18, 2012 in the Sussex County General District Courtroom, 15098 Courthouse Road, Sussex, Virginia, 23884, at 7:00 P.M. will hold a public hearing on the following:

GIN HILL (CLOSED) LANDFILL, DILLARD ROAD, SUSSEX COUNTY, VIRGINIA
ASSESSMENT OF CORRECTIVE MEASURES (ACM)

An Assessment of Corrective Measures (ACM) has been prepared for the closed Gin Hill Landfill (DEQ Permit No. 193) in accordance with 9VAC20-81-260 and DEQ Submission Instruction 16. Groundwater at the facility currently is monitored under an Assessment program in accordance with Virginia Solid Waste Management Regulations (VSWMR 9 VAC 20-81-250.C. Assessment groundwater monitoring was initiated at the facility in April 1994. The ACM was completed because of statistically significant exceedance of the facility Groundwater Protection Standard (GPS) in the downgradient monitoring wells. The ACM identifies and evaluates the potential effectiveness, and technical and cost feasibility of various remedies at reducing the constituents of concern below GPS within a reasonable time frame based on potential risk to human health and the environment.

Copies of the ACM are available for review in the Sussex County Administrator's Office, at 20135 Princeton Road, Sussex, Virginia, 23884, 8:30 A.M. to 5:00 P.M., Monday, thru Friday. Public comment is invited and welcome.

If assistance or special accommodations are needed in order to participate in the hearing, please contact the County Administrator's Office at least seven (7) days before the hearing.

Written comments will be accepted for a period of thirty (30) days, ending November 19, 2012 5:00 P.M. in the Sussex County Administrator's Office, 20135 Princeton Road, Sussex, Virginia, 23884. For additional information, comments or questions, please contact Mr. Thomas Harris, Sussex County Administrator at 434 246 1000, 8:30 A.M. until 5:00 P.M. Monday thru Friday.

Authorized by:

Mr. Thomas Harris
Sussex County Administrator