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Received
OCT 2004
Solid Waste Section

Fac/Perm/Co ID #	Date	Doc ID#
8c	10/20/04	DIN

October 14, 2004

Mr. Larry Rose, Environmental Technician
NC Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

Re: Haywood County Francis Farm Landfill

Dear Mr. Rose:

I am writing in response to your letter concerning the groundwater assessment for the above referenced landfill. We are requesting additional time before we submit a schedule to you for implementation of the assessment plan prepared by Municipal Engineering Services Company, PA. The reason for this request is that we want to negotiate with the property owner of the adjoining property before we commit to a schedule.

If you have any questions or need additional information, please do not hesitate to call.

Sincerely,

C. Jack Horton
County Manager

CJH:bdr

215 NORTH MAIN STREET • COURTHOUSE ANNEX • WAYNESVILLE, NORTH CAROLINA 28786
PHONE: 828.452.6625 • FAX: 828.452.6715

NCDENR

North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director

Division of Waste Management

Michael F. Easley, Governor
William G. Ross Jr., Secretary

August 23, 2004

Mr. Bobby Cogdill, Director
Haywood County Solid Waste
278 Recycle Road
Clyde, NC 28786

RE: Groundwater Assessment Monitoring Plan – Haywood County Francis Farm Landfill (Permit # 44-03)

Dear Mr. Cogdill:

The Solid Waste Section has received the proposed Groundwater Assessment Monitoring Plan for the Francis Farm closed landfill. Municipal Engineering Services Company P.A. submitted the plan on behalf of Haywood County. Before the review process can be completed and approval granted to proceed with implementation of the plan some additional information must be provided. Please respond to the following comments and concerns.

1. A large measure of the proposed assessment of the contaminant release at the landfill is based on the installation of additional monitoring wells and piezometers on adjacent private properties. Because the county does not own these properties, permission from the owners will be necessary to gain access before any assessment activities on the properties are taken. Please provide the Solid Waste Section with information about how Haywood County proposes to accomplish this action. In the event access is denied, how will the county proceed with the assessment?

2. Five assessment monitoring wells and six piezometers are proposed with locations identified on the plan map. Please provide technical rationale for the proposed locations and construction specifications (e.g. proposed depths, etc.). If hydrogeologic work components such as fracture trace analysis, a lineament study, lithologic analysis, geologic mapping, or contaminant fate and transport mechanisms have been factors in deciding on the proposed well locations, submit those results for review. Before well locations are determined there should be a basic understanding of the relationship of the site groundwater flow regime to local and regional hydrogeologic features.

3. Please provide a schedule for implementation of the proposed plan.

4. Because some of the detected contaminants are components of landfill gas, it may be worthwhile to explore the role that landfill gas plays in the current situation. The landfill has had a history of methane gas migration at concentrations exceeding the regulatory limit and remedial efforts have been made to correct the problem. Submit any monitoring results verifying that corrective actions have been effective in controlling methane migration and returning the landfill to compliance with respect to explosive gases. If methane concentrations have not been reduced to less than 5% at the compliance boundary additional steps will be necessary.

Within thirty days of receipt of this letter please provide a response to the above questions and concerns. Include any additional pertinent information related to the site that may aid in expediting the review process.

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Phone 919-733-4996 \ FAX 919-715-3605 \ Internet http://wastenotnc.org
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Groundwater Assessment Monitoring Plan

Prepared for

Haywood County Closed Landfill, Francis Farms
Waynesville, North Carolina

August, 2004

Received
AUG 2004
Waste
Management

MESCO Project Number: G04002.0

Completed on August 12, 2004

Municipal Services Garner, NC
Engineering Company, P.A. Boone, NC
Municipal Engineering Services Company, P.A.
Garner, Boone and Morehead City, North Carolina

OPERATION/CONSTRUCTION MANAGERS

Municipal Services

CIVIL/SANITARY ENGINEERS

Engineering Company, P.A.

August 11, 2004

Mr. Larry Rose
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, NC 27605

Re: Groundwater Assessment & Corrective Measures
Haywood County Closed Landfill, Francis Farms (permit # 44-03)
MESCO Project No. G04002.0

Dear Mr. Rose:

Introduction

On behalf of Haywood County, Municipal Engineering Company, P.A. (MESCO) has completed a groundwater assessment monitoring plan for the Francis Farms Closed Landfill located near Waynesville, North Carolina. This report is completed in response to concerns raised by the facility and the Solid Waste Section on the issue of possible leachate migration contaminating the aquifer in both the south and north portions of the site. The purpose of this report is to make recommendations in order to improve the monitoring capability of the existing system. Through implementation of the proposed monitoring plan the nature, extent, and concentration of leachate migration should be able to be determined.

Site Description

Location

The closed landfill is located approximately 2 miles northeast of Waynesville off of Francis Farms Road. The current landfill property line is located very close to the waste limit therefore the current monitoring wells are confined along the boundary. A small stream named Ratcliffe Cove Branch is the closest surface water. The branch flows in a western direction in which it meets with Racoon Creek which drains into Richland Creek north of Waynesville. The enclosed plate presents a general site plan with appropriate buffers, boundaries, and existing monitoring wells, proposed monitoring wells, and proposed piezometers.

The area surrounding the facility is very sparsely developed and is mostly agricultural fields to the north and forest to the south. No residences or water supply wells are located between the landfill and Ratcliffe Cove Branch to the north but a single known residential supply well still exists north of Ratcliffe Cove Branch. At least 3 structures are located south of the property but it is unknown at this time if these structures utilize any type of well(s).

PO Box 97, Garner, North Carolina 27529 (919) 772-5393
PO Box 828, Morehead City, NC 28557 (252) 726-9481 PO Box 349, Boone, North Carolina 28607 (828) 262-1767

Geology and Hydrogeology

The Francis Farms Closed Landfill subsurface conditions typically consists of an uppermost sand/silt stratum underlain by fractured gneissic bedrock. Between these two layers is a layer of Partially Weathered Rock (PWR) acting as a transition zone. The groundwater exists within the rock along the north property boundary. Background MW-5 is screened in PWR but MW-4 may possibly be screened in rock. The boring log for MW-4 is incomplete therefore the material the well is screened in is unknown. It has always been inferred that the groundwater flow across the entire site was in a north east direction towards Ratcliffe Cove Branch. However, laboratory data and the difference in strata the 2 background wells are screened in may prove that the flow may be in the opposite direction along the north property boundary.

Site Operations

The closed unlined landfill contains approximately 10 acres of municipal solid waste. The cap is consistently maintained and offices and a school bus service center are utilized adjacent to the waste.

The site currently has 2 background wells MW-4 and 5 compliance wells (MW-1A, MW-2A, and MW-3A) and 3 surface water monitoring sites (SW-1, SW-2, and Blanton Branch) that are sampled semiannually.

Detection Trend

North Portion

The closed landfill has continuously been sampled semiannually since the detection monitoring program was implemented but we have only secured data since February 1999. Over the years various inorganics have been detected in fluctuating concentrations with several found in exceedance of the Standard. However, VOCs have historically been detected within all of the compliance wells in this region. The VOCs consist of primarily low concentrations of DNAPL. VOC concentrations have not been increasing with time and no VOCs were found above the Standard during the latest sampling event conducted in February 2004. MW-3A has historically contained the highest VOC concentrations in the area with toluene and 1,2 dichloroethene being the most prevalent.
A complete list of metals and VOCs detected within all of the monitoring locations since 1999 is presented in the enclosed data summary table.

South Portion

The south portion comprises the 2 background wells MW-4 and MW-5. This area has historically been found to contain the highest concentrations of VOCs upon the entire site. The detected constituents have been found to be generally consistent between the two but in lower concentrations further from the waste boundary. The VOCs detected within these 2 wells are comprised of the DNAPL's TCE, PCE, and the aromatic benzene. The VOC detections may be attributed to LFG migration as speculated in a previous assessment progress report dated October 6, 2000. However, the groundwater flow in this region may actually be flowing more southwest contrary to the potentiometric maps which indicate a northeast flow. In an effort to more accurately determine the flow direction piezometers are proposed to be installed south of MW-5.

Conclusions and Recommendations

A comprehensive assessment monitoring plan has been developed in an effort to delineate the limits and extents of the known contaminates originating from the closed landfill. The property currently owned by Haywood County is insufficient to conduct any explorations therefore it is imperative that rights to access adjoining property is procured prior to commencement of the study. All the recommendations are contingent upon having access to all properties surrounding the site.

- Install five (5) monitoring wells (MW-6, MW-7, MW-8, MW-9, and MW-10) approximately 250 feet downgradient of the north boundary but south of the Blanton Branch stream. The locations of the proposed monitoring wells are shown in the enclosed drawing. These monitoring wells will be sampled simultaneously with the existing compliance wells during the first regularly scheduled assessment monitoring event. After the initial results are interpreted the county may petition for discontinuation of the sampling requirement for the present monitoring wells MW-1A, MW-2A, and MW-3A and begin to use the new monitoring wells instead.

- Install three (3) piezometers (P-1, P-2, and P-3) south of MW-5. The locations are shown in the enclosed plate. These piezometers will be constructed identically to monitoring wells and will be sampled during the first regularly scheduled assessment monitoring. Water levels in these piezometers will be utilized to determine the true direction of flow in the north portion of the property. These piezometers will potentially be converted into monitoring wells dependent upon the initial laboratory results. If the piezometers are indeed converted into monitoring wells the county may petition for MW-4 and MW-5 to be eliminated from the sampling requirement.

- Install two (3) permanent piezometers (PZ-1, PZ-2, and PZ-3) within the existing property boundaries to the east and west of the waste boundary. These piezometers will be used as permanent water level reading sites in order to determine groundwater flow across the entire site.

- Investigate the actual status of the private well located at the residence across Ratcliffe Cove Branch north of the site. If the supply well is indeed operational a single sample should be procured for the Appendix 1 list of parameters during the first assessment monitoring event. This is proposed to ensure that the DNAPLs have not migrated past Ratcliffe Cove Branch.

In conclusion based upon the facts and observations presented to this point, we recommend that assessment monitoring continue and that improvements to the groundwater monitoring program be initiated.

The landfill is scheduled for next sampling in August 2004. If you have any questions regarding this report, please contact either myself of Wayne Sullivan at (919) 772-5393.

Sincerely,
MUNICIPAL ENGINEERING SERVICES CO., P.A.

Jonathan Pfohl
Environmental Specialist

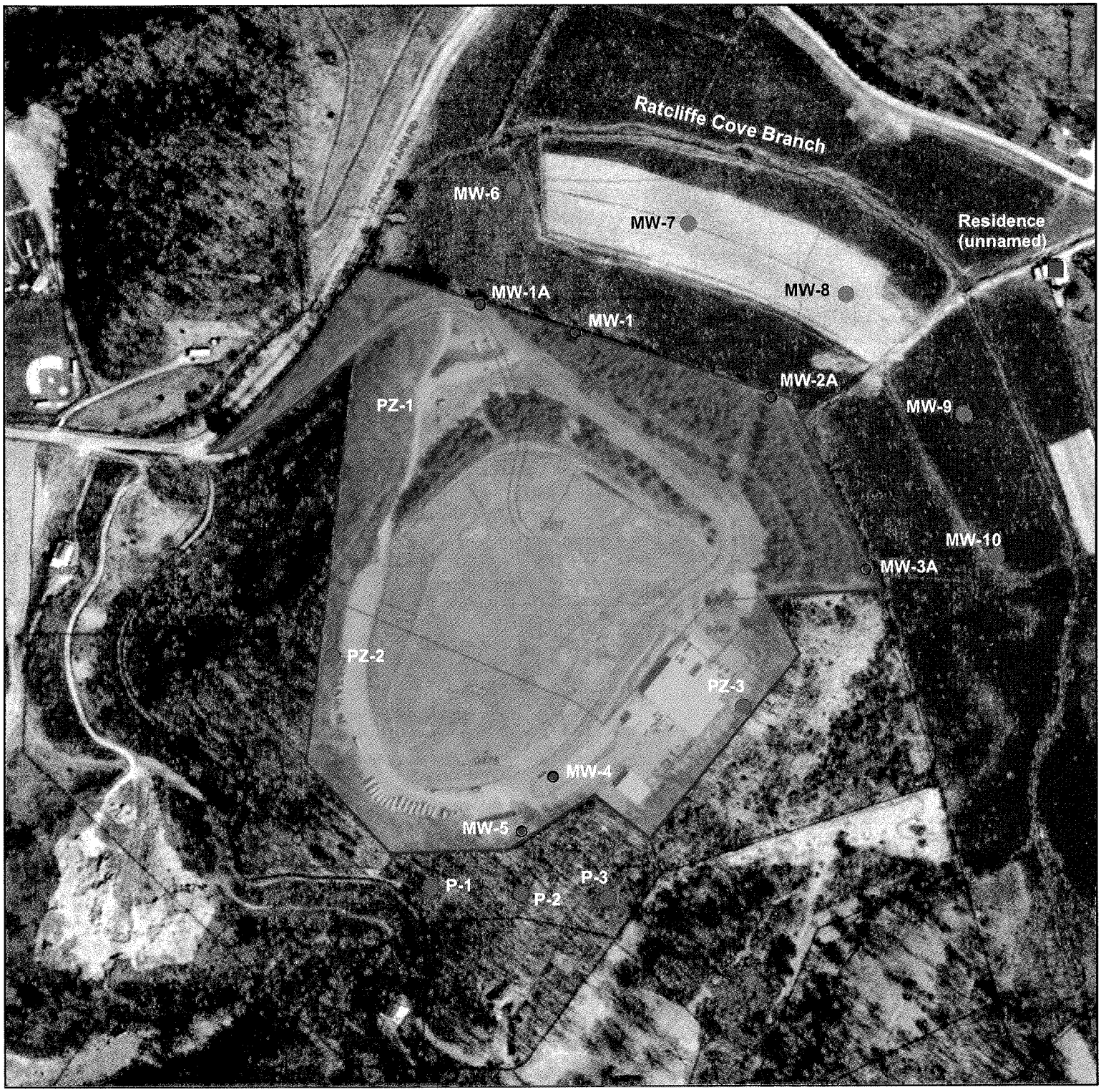
Attachments:

Historical Laboratory Data Summary Table
Historical VOC Detection Table
Time Series plot of VOCs detected in MW-4, MW-5, MW-3A
Site Map, Proposed Assessment Plan
Potentiometric Map

cc: Mr. Bobby Cogdill,
Haywood County

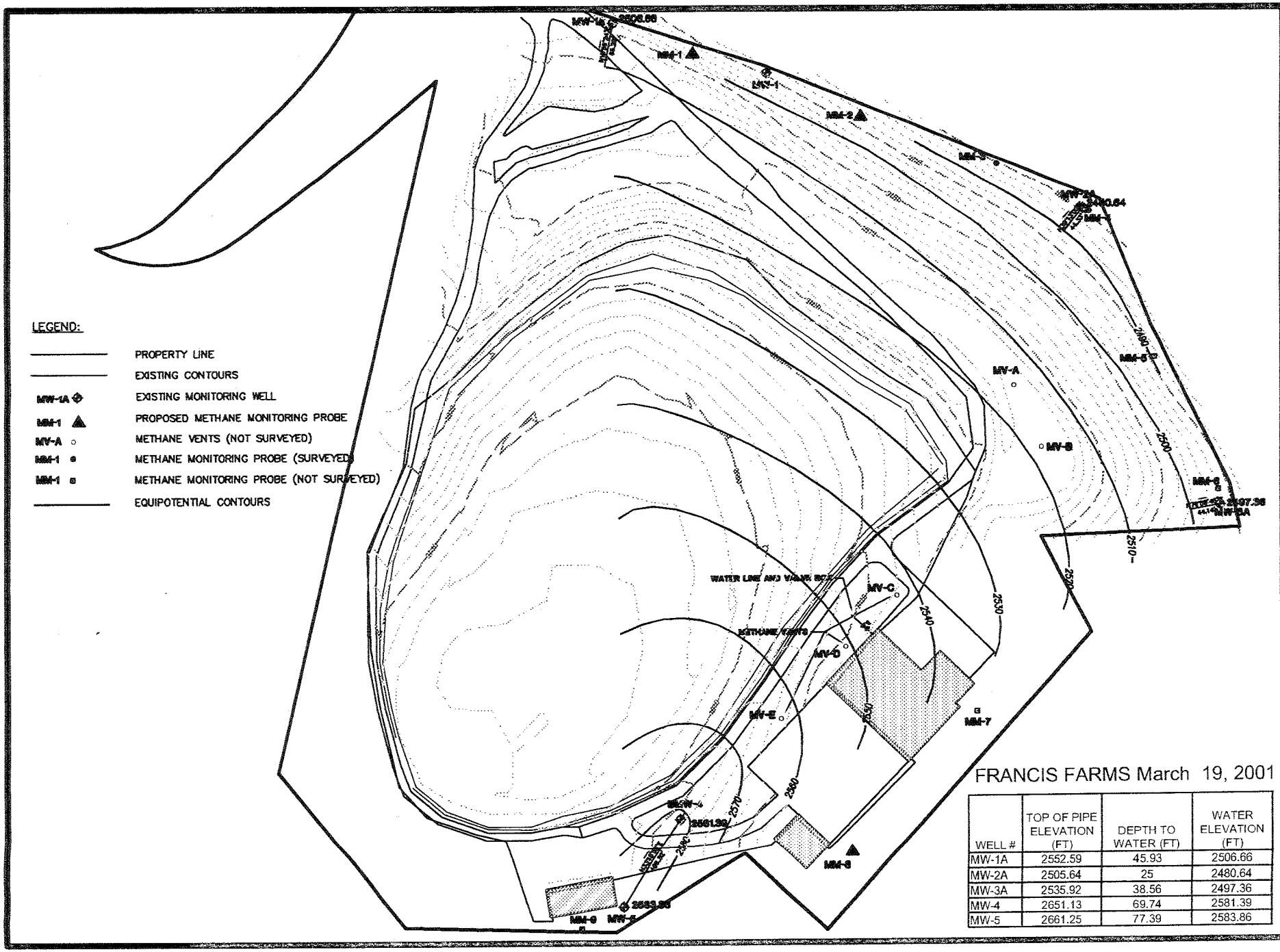
Proposed Assessment Plan

Francis Farm Landfill, Haywood County, North Carolina



1000 FT

- Residential Well
- Existing Monitoring Well
- Proposed Monitoring Well
- Proposed Piezometer



FRANCIS FARMS March 19, 2001

WELL #	TOP OF PIPE ELEVATION (FT)	DEPTH TO WATER (FT)	WATER ELEVATION (FT)
MW-1A	2552.59	45.93	2506.66
MW-2A	2505.64	25	2480.64
MW-3A	2535.92	38.56	2497.36
MW-4	2651.13	69.74	2581.39
MW-5	2661.25	77.39	2583.86

Exceedance Scan
Historical VOC Detections (2/18/99 - 2/9/04)
Haywood County Closed Landfill, Francis Farms

Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
B.BRANCH	Acetone	2/9/2004	14	ug/l	10	700	
B.BRANCH	Carbon disulfide	8/16/1999	14	ug/l	5	-	
B.BRANCH	**Dichloromethane**	**2/14/2000**	**5.8**	**ug/l**	**5**	**5**	**0.8**
MW-1A	1,1-Dichloroethane	8/16/1999	16	ug/l	5	700	
MW-1A	1,1-Dichloroethane	2/14/2000	16	ug/l	5	700	
MW-1A	1,1-Dichloroethane	8/14/2000	15	ug/l	5	700	
MW-1A	1,1-Dichloroethane	3/19/2001	10.5	ug/l	2	700	
MW-1A	1,1-Dichloroethane	8/29/2001	12	ug/l	5	700	
MW-1A	1,1-Dichloroethane	2/21/2002	15	ug/l	5	700	
MW-1A	1,1-Dichloroethane	8/27/2002	5.6	ug/l	5	700	
MW-1A	1,1-Dichloroethane	2/24/2003	8.7	ug/l	5	700	
MW-1A	1,1-Dichloroethane	8/11/2003	8.8	ug/l	5	700	
MW-1A	1,1-Dichloroethane	2/9/2004	6.2	ug/l	5	700	
MW-1A	**1,1-Dichloroethene**	**2/18/1999**	**16**	**ug/l**	**5**	**7**	**9**
MW-1A	**1,2-Dichloroethane**	**2/18/1999**	**12**	**ug/l**	**5**	**0.38**	**11.62**
MW-1A	**1,2-Dichloroethane**	**8/16/1999**	**9**	**ug/l**	**5**	**0.38**	**8.62**
MW-1A	**1,2-Dichloroethane**	**2/14/2000**	**8.8**	**ug/l**	**5**	**0.38**	**8.42**
MW-1A	**1,2-Dichloroethane**	**8/14/2000**	**8.2**	**ug/l**	**5**	**0.38**	**7.82**
MW-1A	**1,2-Dichloroethane**	**8/29/2001**	**6.3**	**ug/l**	**5**	**0.38**	**5.92**
MW-1A	Acetone	2/24/2003	34	ug/l	10	700	
MW-1A	Carbon disulfide	2/9/2004	12	ug/l	10	-	
MW-1A	Chlorobenzene	8/16/1999	5.5	ug/l	5	50	
MW-1A	Chlorobenzene	2/14/2000	6.2	ug/l	5	50	
MW-1A	Chlorobenzene	8/14/2000	5.4	ug/l	5	50	
MW-1A	Chlorobenzene	3/19/2001	5.38	ug/l	2	50	
MW-1A	Chlorobenzene	8/29/2001	5.4	ug/l	5	50	
MW-1A	Chlorobenzene	2/24/2003	8.8	ug/l	5	50	
MW-1A	Chloroethane	3/19/2001	6.25	ug/l	2	-	
MW-1A	Chloroethane	2/24/2003	16	ug/l	10	-	
MW-1A	Chloroethane	8/11/2003	20	ug/l	10	-	
MW-1A	cis-1,2-Dichloroethene	2/18/1999	15	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	8/16/1999	16	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	2/14/2000	39	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	8/14/2000	28	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	3/19/2001	33.5	ug/l	2	70	
MW-1A	cis-1,2-Dichloroethene	8/29/2001	30	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	2/21/2002	26	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	8/27/2002	17	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	2/24/2003	24	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	8/11/2003	13	ug/l	5	70	
MW-1A	cis-1,2-Dichloroethene	2/9/2004	11	ug/l	5	70	
MW-1A	**Dichloromethane**	**2/14/2000**	**7.5**	**ug/l**	**5**	**5**	**2.5**
MW-1A	Trichloroethylene	3/19/2001	2.02	ug/l	2	2.8	
MW-1A	**Vinyl chloride**	**3/19/2001**	**12.1**	**ug/l**	**2**	**0.015**	**12.085**

Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
MW-2A	1,1-Dichloroethane	3/19/2001	4.5	ug/l	2	700	
MW-2A	1,1-Dichloroethane	8/29/2001	6.5	ug/l	5	700	
MW-2A	1,1-Dichloroethane	8/27/2002	6.1	ug/l	5	700	
MW-2A	1,1-Dichloroethane	8/11/2003	5.2	ug/l	5	700	
MW-2A	1,4-Dichlorobenzene	8/29/2001	12	ug/l	5	75	
MW-2A	1,4-Dichlorobenzene	2/21/2002	8.5	ug/l	5	75	
MW-2A	1,4-Dichlorobenzene	8/11/2003	22	ug/l	5	75	
MW-2A	1,4-Dichlorobenzene	2/9/2004	5.9	ug/l	5	75	
MW-2A	Acetone	2/24/2003	16	ug/l	10	700	
MW-2A	Acetone	2/9/2004	25	ug/l	10	700	
MW-2A	Chloroethane	3/19/2001	6.65	ug/l	2	-	
MW-2A	Chloroethane	8/11/2003	11	ug/l	10	-	
MW-2A	cis-1,2-Dichloroethene	3/19/2001	29.8	ug/l	2	70	
MW-2A	cis-1,2-Dichloroethene	8/29/2001	30	ug/l	5	70	
MW-2A	cis-1,2-Dichloroethene	2/21/2002	18	ug/l	5	70	
MW-2A	cis-1,2-Dichloroethene	8/27/2002	13	ug/l	5	70	
MW-2A	cis-1,2-Dichloroethene	8/11/2003	50	ug/l	5	70	
MW-2A	cis-1,2-Dichloroethene	2/9/2004	7.6	ug/l	5	70	
MW-3A	1,1-Dichloroethane	2/18/1999	16	ug/l	5	700	
MW-3A	1,1-Dichloroethane	8/16/1999	15	ug/l	5	700	
MW-3A	1,1-Dichloroethane	2/14/2000	17	ug/l	5	700	
MW-3A	1,1-Dichloroethane	8/14/2000	18	ug/l	5	700	
MW-3A	1,1-Dichloroethane	3/19/2001	11.5	ug/l	2	700	
MW-3A	1,1-Dichloroethane	8/29/2001	14	ug/l	5	700	
MW-3A	1,1-Dichloroethane	2/21/2002	21	ug/l	5	700	
MW-3A	1,1-Dichloroethane	2/24/2003	10	ug/l	5	700	
MW-3A	1,1-Dichloroethane	8/11/2003	10	ug/l	5	700	
MW-3A	1,1-Dichloroethane	2/9/2004	8.2	ug/l	5	700	
MW-3A	**1,2-Dichloroethane**	**2/18/1999**	**24**	**ug/l**	**5**	**0.38**	**23.62**
MW-3A	**1,2-Dichloroethane**	**8/16/1999**	**19**	**ug/l**	**5**	**0.38**	**18.62**
MW-3A	**1,2-Dichloroethane**	**2/14/2000**	**21**	**ug/l**	**5**	**0.38**	**20.62**
MW-3A	**1,2-Dichloroethane**	**8/14/2000**	**24**	**ug/l**	**5**	**0.38**	**23.62**
MW-3A	**1,2-Dichloroethane**	**8/29/2001**	**13**	**ug/l**	**5**	**0.38**	**12.62**
MW-3A	**1,2-Dichloroethane**	**2/21/2002**	**9.7**	**ug/l**	**5**	**0.38**	**9.32**
MW-3A	**1,2-Dichloroethane**	**8/11/2003**	**5**	**ug/l**	**5**	**0.38**	**4.62**
MW-3A	Acetone	2/24/2003	65	ug/l	10	700	
MW-3A	Carbon disulfide	8/16/1999	9	ug/l	5	-	
MW-3A	Carbon disulfide	2/14/2000	7.3	ug/l	5	-	
MW-3A	Chloroethane	3/19/2001	6.93	ug/l	2	-	
MW-3A	cis-1,2-Dichloroethene	8/11/2003	5.6	ug/l	5	70	
MW-3A	**Dichloromethane**	**2/14/2000**	**8.6**	**ug/l**	**5**	**5**	**3.6**
MW-3A	**Toluene**	**2/18/1999**	**2500**	**ug/l**	**250**	**1000**	**1500**
MW-3A	Toluene	8/16/1999	41	ug/l	5	1000	
MW-3A	Toluene	2/14/2000	79	ug/l	5	1000	
MW-3A	Toluene	8/14/2000	110	ug/l	5	1000	
MW-3A	Toluene	3/19/2001	81.3	ug/l	2	1000	
MW-3A	Toluene	8/29/2001	41	ug/l	5	1000	
MW-3A	Toluene	2/24/2003	69	ug/l	5	1000	
MW-3A	**Toluene**	**8/11/2003**	**4500**	**ug/l**	**120**	**1000**	**3500**
MW-3A	Toluene	2/9/2004	34	ug/l	5	1000	

Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
MW-4	1,1,1-Trichloroethane	3/19/2001	2.36	ug/l	2	200	
MW-4	1,1-Dichloroethane	2/18/1999	25	ug/l	5	700	
MW-4	1,1-Dichloroethane	8/16/1999	33	ug/l	5	700	
MW-4	1,1-Dichloroethane	2/14/2000	38	ug/l	5	700	
MW-4	1,1-Dichloroethane	8/14/2000	43	ug/l	5	700	
MW-4	1,1-Dichloroethane	3/19/2001	43.2	ug/l	2	700	
MW-4	1,1-Dichloroethane	8/29/2001	45	ug/l	5	700	
MW-4	1,1-Dichloroethane	2/21/2002	64	ug/l	5	700	
MW-4	1,1-Dichloroethane	8/27/2002	59	ug/l	5	700	
MW-4	1,1-Dichloroethane	2/24/2003	47	ug/l	5	700	
MW-4	1,1-Dichloroethane	8/11/2003	22	ug/l	5	700	
MW-4	1,1-Dichloroethane	2/9/2004	40	ug/l	5	700	
MW-4	**Benzene**	**2/18/1999**	**6.2**	**ug/l**	**5**	**1**	**5.2**
MW-4	**Benzene**	**8/16/1999**	**8.3**	**ug/l**	**5**	**1**	**7.3**
MW-4	**Benzene**	**2/14/2000**	**9.4**	**ug/l**	**5**	**1**	**8.4**
MW-4	**Benzene**	**8/14/2000**	**9.5**	**ug/l**	**5**	**1**	**8.5**
MW-4	**Benzene**	**3/19/2001**	**12.1**	**ug/l**	**2**	**1**	**11.1**
MW-4	**Benzene**	**8/29/2001**	**12**	**ug/l**	**5**	**1**	**11**
MW-4	**Benzene**	**2/21/2002**	**12**	**ug/l**	**5**	**1**	**11**
MW-4	**Benzene**	**8/27/2002**	**20**	**ug/l**	**5**	**1**	**19**
MW-4	**Benzene**	**2/24/2003**	**12**	**ug/l**	**5**	**1**	**11**
MW-4	**Benzene**	**8/11/2003**	**7.2**	**ug/l**	**5**	**1**	**6.2**
MW-4	**Benzene**	**2/9/2004**	**14**	**ug/l**	**5**	**1**	**13**
MW-4	Carbon disulfide	2/14/2000	6.9	ug/l	5	-	
MW-4	Chloroethane	2/18/1999	18	ug/l	10	-	
MW-4	Chloroethane	8/16/1999	15	ug/l	10	-	
MW-4	Chloroethane	2/14/2000	18	ug/l	10	-	
MW-4	Chloroethane	8/14/2000	18	ug/l	10	-	
MW-4	Chloroethane	3/19/2001	17.2	ug/l	2	-	
MW-4	Chloroethane	8/29/2001	17	ug/l	10	-	
MW-4	Chloroethane	2/21/2002	16	ug/l	10	-	
MW-4	Chloroethane	8/27/2002	22	ug/l	10	-	
MW-4	Chloroethane	2/24/2003	12	ug/l	10	-	
MW-4	Chloroethane	8/11/2003	52	ug/l	10	-	
MW-4	cis-1,2-Dichloroethene	2/18/1999	12	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	8/16/1999	15	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	2/14/2000	18	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	8/14/2000	19	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	3/19/2001	22.5	ug/l	2	70	
MW-4	cis-1,2-Dichloroethene	8/29/2001	22	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	2/21/2002	20	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	8/27/2002	33	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	2/24/2003	36	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	8/11/2003	16	ug/l	5	70	
MW-4	cis-1,2-Dichloroethene	2/9/2004	24	ug/l	5	70	

Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
MW-4	**Dichloromethane**	**2/14/2000**	**10**	**ug/l**	**5**	**5**	**5**
MW-4	**Dichloromethane**	**2/21/2002**	**24**	**ug/l**	**5**	**5**	**19**
MW-4	**Dichloromethane**	**8/27/2002**	**22**	**ug/l**	**5**	**5**	**17**
MW-4	**Dichloromethane**	**2/24/2003**	**5.7**	**ug/l**	**5**	**5**	**0.7**
MW-4	**Tetrachloroethylene**	**2/18/1999**	**7.4**	**ug/l**	**5**	**0.7**	**6.7**
MW-4	**Tetrachloroethylene**	**8/16/1999**	**7.8**	**ug/l**	**5**	**0.7**	**7.1**
MW-4	**Tetrachloroethylene**	**2/14/2000**	**9.1**	**ug/l**	**5**	**0.7**	**8.4**
MW-4	**Tetrachloroethylene**	**8/14/2000**	**6.5**	**ug/l**	**5**	**0.7**	**5.8**
MW-4	**Tetrachloroethylene**	**3/19/2001**	**8.97**	**ug/l**	**2**	**0.7**	**8.27**
MW-4	**Tetrachloroethylene**	**8/29/2001**	**5.2**	**ug/l**	**5**	**0.7**	**4.5**
MW-4	**Tetrachloroethylene**	**2/21/2002**	**5.6**	**ug/l**	**5**	**0.7**	**4.9**
MW-4	**Tetrachloroethylene**	**8/27/2002**	**11**	**ug/l**	**5**	**0.7**	**10.3**
MW-4	**Tetrachloroethylene**	**2/24/2003**	**6.5**	**ug/l**	**5**	**0.7**	**5.8**
MW-4	**Tetrachloroethylene**	**2/9/2004**	**9.6**	**ug/l**	**5**	**0.7**	**8.9**
MW-4	Toluene	3/19/2001	40.8	ug/l	2	1000	
MW-4	Toluene	2/21/2002	36	ug/l	5	1000	
MW-4	Toluene	8/27/2002	34	ug/l	5	1000	
MW-4	**Trichloroethylene**	**2/18/1999**	**8.6**	**ug/l**	**5**	**2.8**	**5.8**
MW-4	**Trichloroethylene**	**8/16/1999**	**10**	**ug/l**	**5**	**2.8**	**7.2**
MW-4	**Trichloroethylene**	**2/14/2000**	**11**	**ug/l**	**5**	**2.8**	**8.2**
MW-4	**Trichloroethylene**	**8/14/2000**	**11**	**ug/l**	**5**	**2.8**	**8.2**
MW-4	**Trichloroethylene**	**3/19/2001**	**12.3**	**ug/l**	**2**	**2.8**	**9.5**
MW-4	**Trichloroethylene**	**8/29/2001**	**13**	**ug/l**	**5**	**2.8**	**10.2**
MW-4	**Trichloroethylene**	**2/21/2002**	**10**	**ug/l**	**5**	**2.8**	**7.2**
MW-4	**Trichloroethylene**	**8/27/2002**	**16**	**ug/l**	**5**	**2.8**	**13.2**
MW-4	**Trichloroethylene**	**2/24/2003**	**10**	**ug/l**	**5**	**2.8**	**7.2**
MW-4	**Trichloroethylene**	**8/11/2003**	**5.6**	**ug/l**	**5**	**2.8**	**2.8**
MW-4	**Trichloroethylene**	**2/9/2004**	**13**	**ug/l**	**5**	**2.8**	**10.2**
MW-4	Xylene	3/19/2001	14.1	ug/l	2	530	
MW-5	1,1-Dichloroethane	3/19/2001	8.03	ug/l	2	700	
MW-5	1,1-Dichloroethane	8/29/2001	9.5	ug/l	5	700	
MW-5	1,1-Dichloroethane	2/21/2002	8.4	ug/l	5	700	
MW-5	1,1-Dichloroethane	8/27/2002	15	ug/l	5	700	
MW-5	1,1-Dichloroethane	2/24/2003	16	ug/l	5	700	
MW-5	1,1-Dichloroethane	8/11/2003	23	ug/l	5	700	
MW-5	1,1-Dichloroethane	2/9/2004	11	ug/l	5	700	
MW-5	**Benzene**	**3/19/2001**	**2.8**	**ug/l**	**2**	**1**	**1.8**
MW-5	**Benzene**	**2/21/2002**	**5.1**	**ug/l**	**5**	**1**	**4.1**
MW-5	**Benzene**	**8/27/2002**	**6.1**	**ug/l**	**5**	**1**	**5.1**
MW-5	**Benzene**	**2/24/2003**	**5.4**	**ug/l**	**5**	**1**	**4.4**
MW-5	**Benzene**	**8/11/2003**	**9**	**ug/l**	**5**	**1**	**8**
MW-5	Chloroethane	3/19/2001	7.32	ug/l	2	-	
MW-5	Chloroethane	2/21/2002	70	ug/l	10	-	
MW-5	Chloroethane	8/27/2002	13	ug/l	10	-	
MW-5	Chloroethane	2/24/2003	12	ug/l	10	-	
MW-5	Chloroethane	8/11/2003	33	ug/l	10	-	
MW-5	cis-1,2-Dichloroethene	3/19/2001	5.79	ug/l	2	70	
MW-5	cis-1,2-Dichloroethene	8/29/2001	7.4	ug/l	5	70	
MW-5	cis-1,2-Dichloroethene	2/21/2002	11	ug/l	5	70	
MW-5	cis-1,2-Dichloroethene	8/27/2002	13	ug/l	5	70	
MW-5	cis-1,2-Dichloroethene	2/24/2003	18	ug/l	5	70	
MW-5	cis-1,2-Dichloroethene	8/11/2003	21	ug/l	5	70	
MW-5	cis-1,2-Dichloroethene	2/9/2004	8.1	ug/l	5	70	

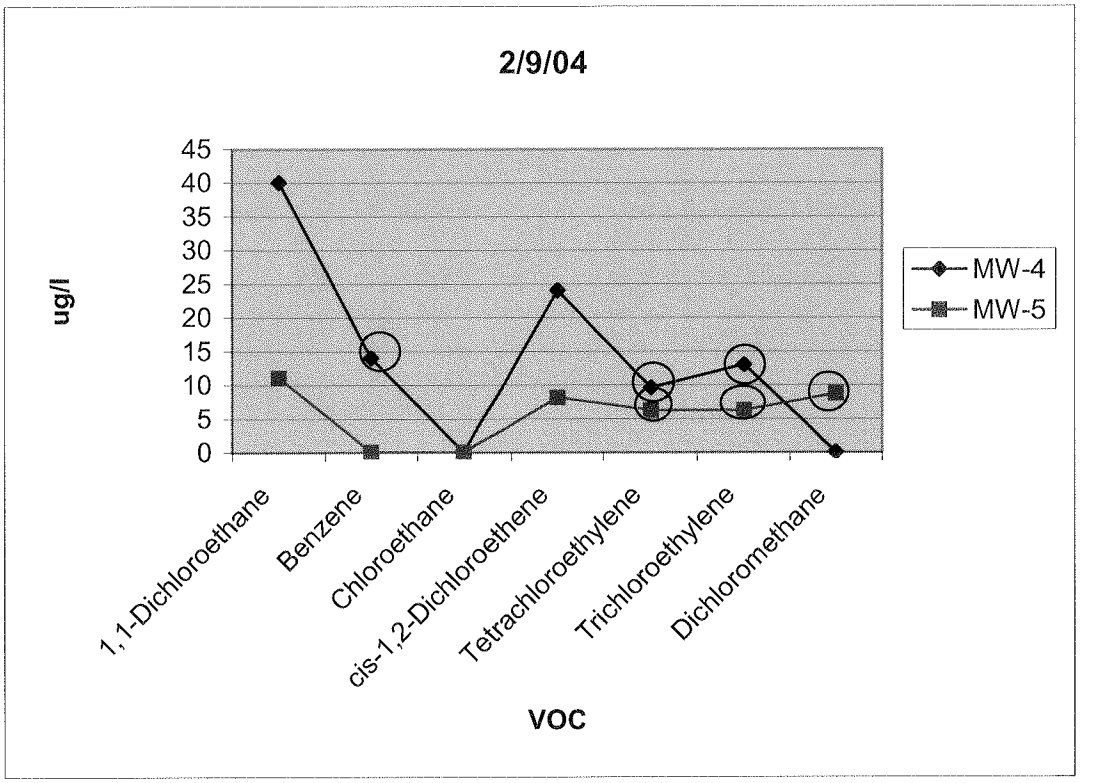
Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
MW-5	**Dichloromethane**	**8/29/2001**	**35**	**ug/l**	**5**	**5**	**30**
MW-5	**Dichloromethane**	**2/21/2002**	**37**	**ug/l**	**5**	**5**	**32**
MW-5	**Dichloromethane**	**8/27/2002**	**27**	**ug/l**	**5**	**5**	**22**
MW-5	**Dichloromethane**	**2/24/2003**	**26**	**ug/l**	**5**	**5**	**21**
MW-5	**Dichloromethane**	**8/11/2003**	**21**	**ug/l**	**5**	**5**	**16**
MW-5	**Dichloromethane**	**2/9/2004**	**8.7**	**ug/l**	**5**	**5**	**3.7**
MW-5	**Tetrachloroethylene**	**3/19/2001**	**4.12**	**ug/l**	**2**	**0.7**	**3.42**
MW-5	**Tetrachloroethylene**	**2/21/2002**	**5.9**	**ug/l**	**5**	**0.7**	**5.2**
MW-5	**Tetrachloroethylene**	**8/27/2002**	**7.1**	**ug/l**	**5**	**0.7**	**6.4**
MW-5	**Tetrachloroethylene**	**8/11/2003**	**8.9**	**ug/l**	**5**	**0.7**	**8.2**
MW-5	**Tetrachloroethylene**	**2/9/2004**	**6.2**	**ug/l**	**5**	**0.7**	**5.5**
MW-5	**Trichloroethylene**	**3/19/2001**	**3.52**	**ug/l**	**2**	**2.8**	**0.72**
MW-5	**Trichloroethylene**	**2/21/2002**	**5.3**	**ug/l**	**5**	**2.8**	**2.5**
MW-5	**Trichloroethylene**	**8/27/2002**	**7**	**ug/l**	**5**	**2.8**	**4.2**
MW-5	**Trichloroethylene**	**2/24/2003**	**5.9**	**ug/l**	**5**	**2.8**	**3.1**
MW-5	**Trichloroethylene**	**8/11/2003**	**11**	**ug/l**	**5**	**2.8**	**8.2**
MW-5	**Trichloroethylene**	**2/9/2004**	**6.2**	**ug/l**	**5**	**2.8**	**3.4**
MW-5	Xylene	3/19/2001	19.9	ug/l	2	530	
SW-1	Carbon disulfide	8/16/1999	5.1	ug/l	5	-	
SW-1	**Dichloromethane**	**2/14/2000**	**6.5**	**ug/l**	**5**	**5**	**1.5**
SW-2	Dichloromethane	2/14/2000	5	ug/l	5	5	

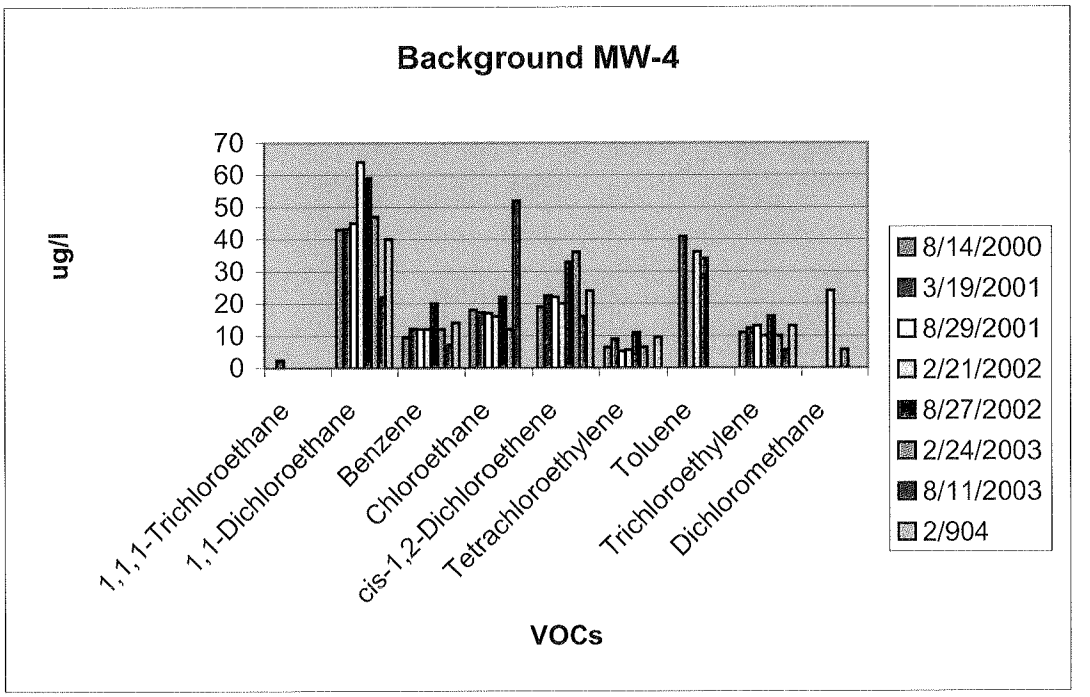
[1] Table only contains detected constituents.

[2] PQL = Practical Quantitation Limit

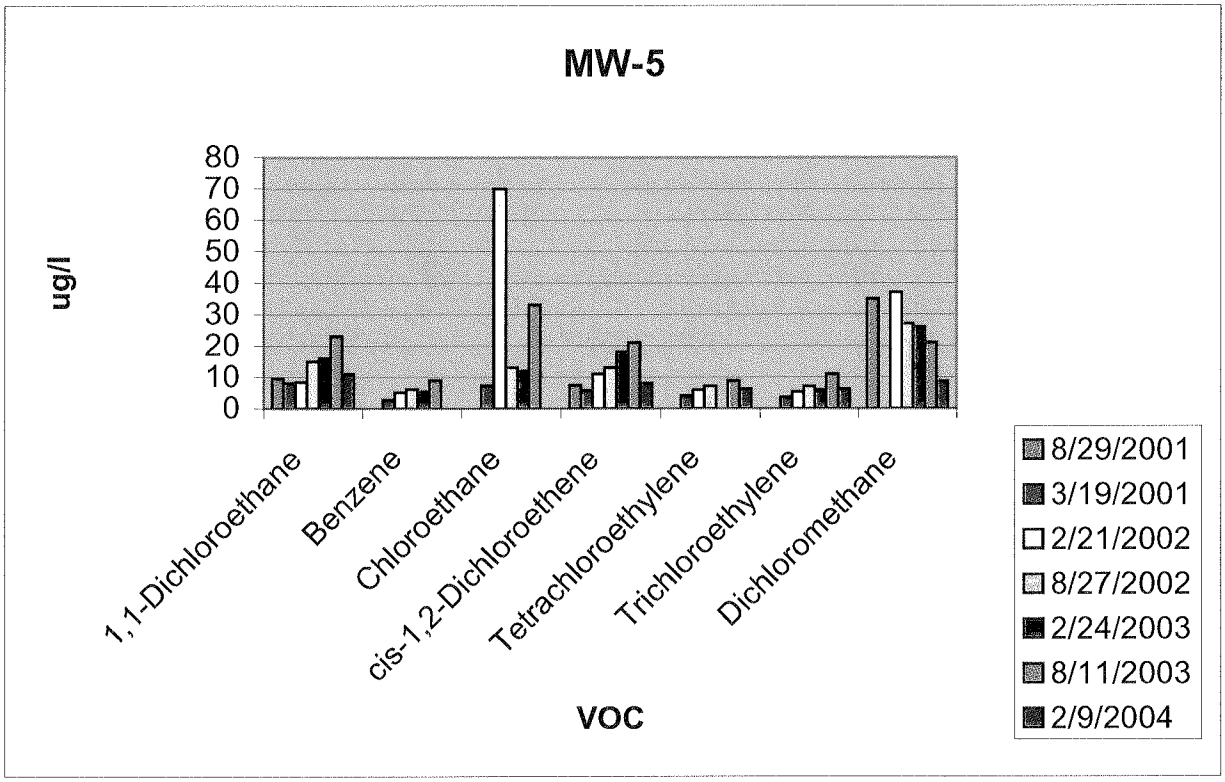
[3] MCL = Maximum Contaminant Level (North Carolina Groundwater Standard)

VOC Detections within Background Well(s)
Francis Farms Closed Sanitary Landfill





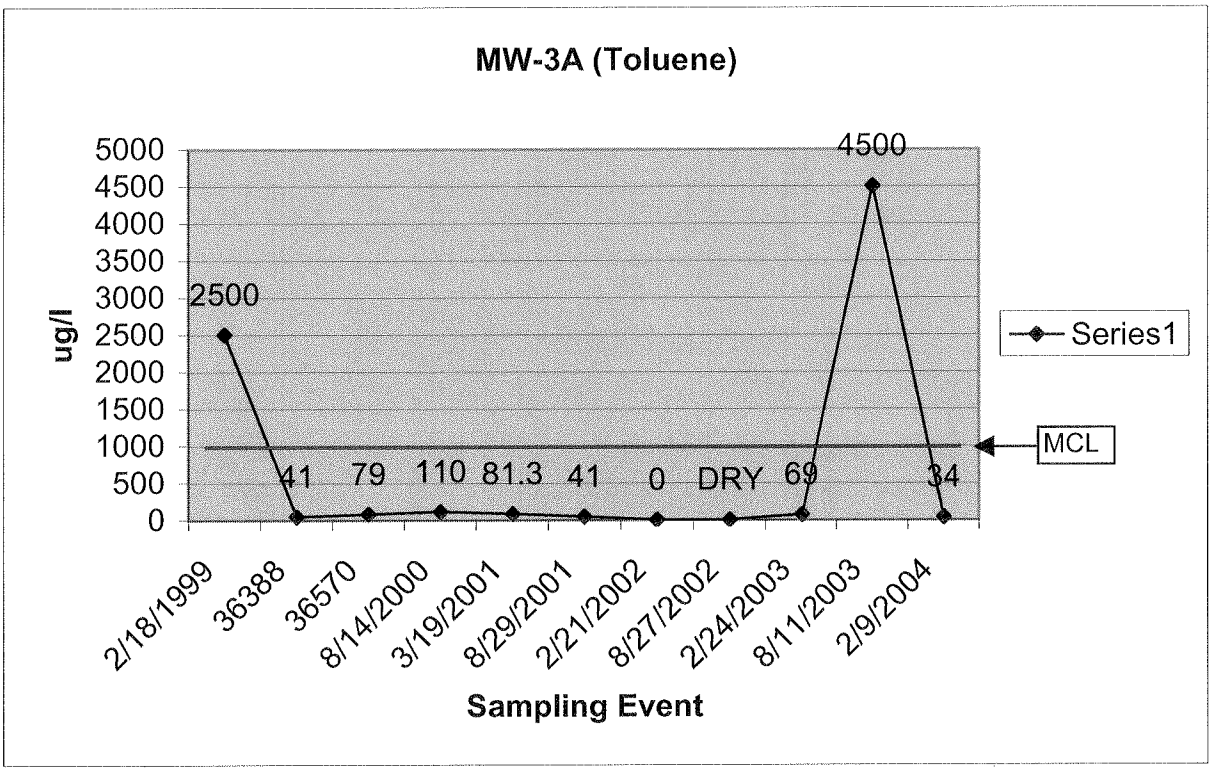
VOC Detections within Background Well(s)
Francis Farms Closed Sanitary Landfill



	8/29/2001	3/19/2001	2/21/2002	8/27/2002	2/24/2003	8/11/2003	2/9/2004
1,1-Dichloroethane	9.5	8.03	8.4	15	16	23	11
Benzene	ND	**2.8**	**5.1**	**6.1**	**5.4**	**9**	0
Chloroethane	ND	7.32	70	13	12	33	0
cis-1,2-Dichloroethene	7.4	5.79	11	13	18	21	8.1
Tetrachloroethylene	ND	**4.12**	**5.9**	**7.1**	ND	**8.9**	**6.2**
Trichloroethylene	ND	**3.52**	**5.3**	**7**	**5.9**	**11**	**6.2**
Dichloromethane	**35**	ND	**37**	**27**	**26**	**21**	**8.7**

BOLD = >MCL

Time Series Plot for Toluene within MW-3A
Francis Farms Closed Sanitary Landfill



Haywood County Closed Landfill, Francis Farms
Historical Laboratory Data Summary

Date	Well	Metals Tesed	VOC Tested	Metals Detected	VOC Detected	Metals Exceedance	VOC Exceedance	Arsenic, total	Barium, total	Cadmium, total	Chromium, total	Lead, total	Mercury	Selenium, total	Silver, total	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	1,4-Dichlorobenzene	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroethane	Dichloromethane	Tetrachloroethylene	Toluene	Trichloroethylene	Vinyl chloride	Xylene	cis-1,2-Dichloroethene
	MW-1A																															
02/18/1999	MW-1A	8	47	1	3	0	2		x									O	O													x
08/16/1999	MW-1A	8	47	3	4	1	1		x	x	O						x		O					x								x
02/14/2000	MW-1A	8	47	4	5	0	2		x	x	x				x		x		O					x		O						x
08/14/2000	MW-1A	8	47	5	4	0	1		x	x	x		x		x		x		O					x								x
03/19/2001	MW-1A	8	47	3	6	0	1		x	x	x						x							x	x				x	O		x
08/29/2001	MW-1A	8	47	2	4	0	1		x	x							x		O					x								x
02/21/2002	MW-1A	8	47	2	2	0	0		x	x							x															x
08/27/2002	MW-1A	8	47	1	2	0	0		x								x															x
02/24/2003	MW-1A	9	47	4	5	0	0		x	x	x				x		x				x			x	x							x
08/11/2003	MW-1A	9	47	4	3	0	0		x	x	x	x					x								x							x
02/09/2004	MW-1A	8	47	2	3	0	0		x					x			x						x									x
Subtotal		90	517	31	41	1	8																									
	MW-2A																															
03/19/2001	MW-2A	8	47	6	3	2	0		x	O	x	O	x		x		x								x							x
08/29/2001	MW-2A	8	47	5	3	1	0		x	O	x	x			x		x			x												x
02/21/2002	MW-2A	8	47	5	2	2	0		x	O	x	O			x					x												x
08/27/2002	MW-2A	8	47	5	2	4	0	x	O	O	O	O					x															x
02/24/2003	MW-2A	8	47	6	1	3	0	x	x	O	O	O			x						x											
08/11/2003	MW-2A	8	47	6	4	1	0	x	x	x	x	O		x			x			x					x							x
02/09/2004	MW-2A	8	47	4	3	0	0		x		x	x		x						x	x												x
Subtotal		56	329	37	18	13	0																									
	MW-3A																															
02/18/1999	MW-3A	8	47	1	3	0	2		x								x		O									O				
08/16/1999	MW-3A	8	47	3	4	1	1		x	O	x						x		O				x					x				
02/14/2000	MW-3A	8	47	4	5	1	2		x	O	x				x		x		O				x			O		x				
08/14/2000	MW-3A	8	47	4	3	1	1	x	x	O					x		x		O									x				
03/19/2001	MW-3A	8	47	4	3	1	0		x	O	x				x		x								x			x				
08/29/2001	MW-3A	8	47	2	3	1	1		x	O							x		O									x				
02/21/2002	MW-3A	8	47	3	2	0	1		x	x					x		x		O													
02/24/2003	MW-3A	8	47	4	3	1	0		x	O	x				x		x				x							x				
08/11/2003	MW-3A	8	47	3	4	1	2		x		x	O					x		O									O				x
02/05/2004	MW-3A	8	47	4	2	0	0		x		x	x		x			x											x				
Subtotal		80	470	32	32	7	10																									
	MW-4																															
02/18/1999	MW-4	8	47	1	6	0	3		x								x					O			x		O		O			x
08/16/1999	MW-4	8	47	2	6	0	3		x		x						x					O			x		O		O			x
02/14/2000	MW-4	8	47	3	8	0	4		x	x	x						x					O	x		x	O	O		O			x
08/14/2000	MW-4	8	47	4	6	0	3		x	x	x				x		x					O			x		O		O			x
03/19/2001	MW-4	8	47	2	9	0	3		x		x					x	x					O			x		O	x	O		x	x
08/29/2001	MW-4	8	47	2	8	0	3		x	x							x					O			x		O		O			x
02/21/2002	MW-4	8	47	1	8	0	4		x								x					O			x	O	O	x	O			x
08/27/2002	MW-4	8	47	3	8	0	4	x	x		x						x					O			x	O	O	x	O			x
02/24/2003	MW-4	8	47	2	7	0	4		x						x		x					O			x	O	O		O			x
08/11/2003	MW-4	8	47	2	5	0	2		x		x						x					O			x				O			x
02/09/2004	MW-4	8	47	1	5	0	3		x								x					O					O		O			x
Subtotal		88	517	23	74	0	36																									
	MW-5																															
03/19/2001	MW-5	8	47	5	7	3	3	x	x	O	O	O					x					O			x		O		O		x	x
08/29/2001	MW-5	8	47	5	3	4	1	x	O	O	O	O					x									O						x
02/21/2002	MW-5	8	47	5	7	4	4	x	O	O	O	O					x					O			x	O	O		O			x
08/27/2002	MW-5	8	47	5	7	4	4	x	O	O	O	O					x					O			x	O	O		O			x
02/24/2003	MW-5	8	47	5	6	4	3	x	O	O	O	O					x					O			x	O			O			x
08/11/2003	MW-5	8	47	4	7	2	4	x	x		O	O					x					O			x	O	O		O			x
02/09/2004	MW-5	8	47	4	5	2	3	x	x		O	O					x									O	O		O			x
Subtotal		56	329	33	42	23	22																									
	SW-1																															
02/18/1999	SW-1	8	47	0	0	0	0																									
08/16/1999	SW-1	8	47	1	1	0	0		x														x									
02/14/2000	SW-1	8	47	1	1	0	1		x																	O						
08/14/2000	SW-1	8	47	2	0	0	0		x						x																	
03/19/2001	SW-1	8	47	1	0	0	0		x																							
08/29/2001	SW-1	8	47	1	0	0	0		x																							
02/21/2002	SW-1	8	47	1	0	0	0		x																							
08/27/2002	SW-1	8	47	1	0	0	0		x																							
02/24/2003	SW-1	8	47	2	0	0	0		x						x																	
08/11/2003	SW-1	8	47	1	0	0	0		x																							
02/09/2004	SW-1	8	47	1	0	0	0		x																							
Subtotal		88	517	12	2	0	1																									
	SW-2																															
02/18/1999	SW-2	8	47	0	0	0	0																									
08/16/1999	SW-2	8	47	1	0	0	0		x																							
02/14/2000	SW-2	8	47	2	1	0	0		x		x															x						
08/14/2000	SW-2	8	47	2	0	0	0		x						x																	
03/19/2001	SW-2	8	47	1	0	0	0		x																							
08/29/2001	SW-2	8	47	1	0	0	0		x																							
02/21/2002	SW-2	8	47	1	0	0	0		x																							
08/27/2002	SW-2	8	47	1	0	0	0		x																							
02/24/2003	SW-2	8	47	2	0	0	0		x						x																	
08/11/2003	SW-2	8	47	2	0	0	0		x		x																					
02/09/2004	SW-2	8	47	1	0	0	0		x																							
Subtotal		88	517	14	1	0	0																									
	B.BRANCH																															
02/18/1999	B.BRANCH	8	47	0	0	0	0																									
08/16/1999	B.BRANCH	8	47	1	1	0	0		x														x									
02/14/2000	B.BRANCH	8	47	1	1	0	1		x																	O						
08/14/2000	B.BRANCH	8	47	2	0	0	0		x						x																	
03/19/2001	B.BRANCH	8	47	1	0	0	0		x																							
08/29/2001	B.BRANCH	8	47	1	0	0	0		x																							
02/21/2002	B.BRANCH	8	47	1	0	0	0		x																							
08/27/2002	B.BRANCH	8	47	1	0	0	0		x																							
02/24/2003	B.BRANCH	8	47	2	0	0	0		x						x																	
08/11/2003	B.BRANCH	8	47	1	0	0	0		x																							
02/09/2004	B.BRANCH	8	47	1	1	0	0		x												x											
Subtotal		88	517	12	3	0	1																									
	EB																															
02/18/1999	EB	0	47	0	0	0	0																									
02/14/2000	EB	0	47	0	0	0	0																									
08/14/2000	EB	8	47	1	0	0	0								x																	
03/19/2001	EB	8	47	0	0	0	0																									
08/29/2001	EB	8	47	0	0	0	0																									
02/21/2002	EB	8	47	0	0	0	0																									
08/27/2002	EB	8	47	0	0	0	0																									
02/24/2003	EB	8	47	1	0	0	0								x																	
08/11/2003	EB	8	47	0	0	0	0																									
02/09/2004	EB	8	47	0	0	0	0																									
Subtotal		64	470	2	0	0	0																									
	TB																															
02/18/1999	TB	0	47	0	0	0	0																									
02/14/2000	TB	0	47	0	0	0	0																									
08/14/2000	TB	0	47	0	0	0	0																									
03/19/2001	TB	0	47	0	0	0	0																									
08/29/2001	TB	0	47	0	0	0	0																									
02/21/2002	TB	0	47	0	0	0	0																									
08/27/2002	TB	0	47	0	0	0	0																									
02/24/2003	TB	0	47	0	0	0	0																									
08/11/2003	TB	0	47	0	0	0	0																									
02/09/2004	TB	0	47	0	0	0	0																									
Subtotal		0	470	0	0	0	0																									
Total		698	4653	196	213	44	78	12	76	29	34	17	2	4	22	1	42	1	12	4	5	16	6	6	21	15	15	12	18	1	2	36

x = Detected below MCL
O = Detected in Exceedance of MCL