

July 26, 2012

Mrs. Martha Hynson, Chief
Landfill Operations
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

Dear Mrs. Hynson:

Please find enclosed the results of the latest water quality monitoring performed at the Gude Landfill for September 2009. This report has been developed based on the recently approved Groundwater and Surface Water Monitoring Plan (G&SWM) to monitor the water quality contamination in and around the Gude Landfill in Montgomery County. This report is submitted in fulfillment of the G&SWM requirements approved by Maryland Department of the Environment in May 11, 2009.

This report provides a summary of the results for water quality monitoring performed for the semiannual period from April 2009 to September 2009. It contains sampling results and analysis for 20 monitoring wells and 5 stream locations. Overall, results obtained for this reporting period are consistent with the prior monitoring results with respect to the types and concentrations of pollutants. The results represent typical fluctuations in water quality that have been observed previously during the past several years. The following provides a brief overview of the results obtained from the laboratory analyses for all the monitoring sites for this reporting period. Please refer to attached tables, diagrams, and enclosed CD for additional information.

VOLATILE ORGANIC COMPOUNDS:

The highlights of the results for this reporting period are listed below. Please refer to Table 1 of this report for all the VOC results.

- No VOCs were detected above recommended Maximum Contamination Level (MCL) in monitoring wells OB01, OB02, OB02A, OB04, OB06, OB07, OB07A, OB102, and OB105.

- No VOCs were detected above the recommended MCL in any of the monitored stream locations.
- A total of 34 VOCs exceeded the recommended MCL in monitoring locations OB03 (with 4 exceedances), OB03A (with 5 exceedances), OB04A (with 2 exceedances), (OB08 (with 1 exceedance), OB08A (with 1 exceedance), OB10 (with 2 exceedances) OB11 (with 7 exceedances), OB11A (with 6 exceedances), OB12(with 5 exceedances), OB015 (with 1 exceedance), and OB025 (with 1 exceedance).
- 38% of the MCL exceedances were detected at observation well OB11/OB11A located on the south side (front side) of the landfill and 26% of MCL exceedances were detected at observation well OB03/OB03A located on the north side (back side) of the landfill.
- 1,2-Dichloropropane concentration exceeded the MCL of 5 ug/l observation wells OB03, OB03A, OB11, OB11A and OB12. Concentrations exceeding MCL for this compound ranged from 5.55 ug/l to 15.8 ug/l .
- Benzene concentration exceeded the MCL of 5 ug/l in OB11 at 9.37 ug/l and OB11A at 7.51 ug/l.
- cis-1,2-Dichloroethene concentration exceeded the MCL of 70 ug/l in observation wells OB03, OB03A, OB11, and OB11A. Concentrations exceeding the MCL for this compound ranged from 84.9 ug/l to 184 ug/l.
- Tetrachloroethene concentration exceeded the MCL of 5 ug/l in observation wells OB11, OB11A, and OB12. Concentrations exceeding MCL for this compound ranged from 7.95 ug/l in OB12, 44.75 ug/l in OB11A, and 67.92 ug/l in OB11.
- Dichloromethane concentration exceeded the MCL of 5 ug/l in OB11 at 30.6 ug/l and OB12 at 8.27 ug/l.
- Tetrachloroethene concentration exceeded the MCL of 5 ug/l in observation wells OB03A, OB11, OB11A and OB12. Concentrations exceeding the MCL for this compound ranged from 7.11 ug/l at OB03A to 43.9 ug/l at OB11.
- Trichloroethene concentration exceeded the MCL of 5 ug/l in observation wells OB03, OB03A, OB11, OB11A, OB10 and OB12. Concentrations exceeding the MCL for this compound ranged from 13.3 ug/l at OB10 to 131 ug/l at OB03.
- Vinyl Chloride concentration exceeded the MCL of 2 ug/l in observation wells OB03, OB03A, OB04A, OB08, OB08A, OB10, OB11, OB11A, OB12, and OB015. Concentrations exceeding the MCL for this compound ranged from 2.12 ug/l at OB04A to 30.5 ug/l at OB03.

METALS AND INDICATORS:

The highlights of the results for this reporting period are listed below. Please refer to Table 3 of this report for all the metals and other water quality parameters results.

- A total of 10 metal analysis exceeded the recommended MCL in monitoring locations OB105 (with 3 exceedances), OB11 (with 2 exceedances), OB015 (with 1 exceedance), and OB025 (with 4 exceedances).
- No metal contaminants were detected above the recommended MCL in any of the monitored stream locations.

- Arsenic with a recommended MCL of 0.01 mg/l was exceeded in OB105 with a concentration of 0.012 mg/l.
- Beryllium with a recommended MCL of 0.004 mg/l was exceeded in OB025 with a concentration of 0.0137 mg/l.
- Cadmium concentrations above the recommended MCL of 0.005 mg/l were detected in OB11 at 0.0088 mg/l and in OB025 with a concentration of 0.0174 mg/l.
- Chromium with a recommended MCL of 0.1 mg/l was exceeded in OB025 with a concentration of 0.1050 mg/l.
- Lead with concentrations above the recommended MCL of 0.015 mg/l detected in samples collected from observation wells OB105 at 0.0268 mg/l, OB015 at 0.017 mg/l, and OB025 at 0.148 mg/l.
- Mercury with concentrations above the recommended MCL of 0.002 mg/l detected in samples collected from observation wells OB105 at 0.0038 mg/l and OB11 at 0.0022 mg/l.

Overall, data collected during this reporting period represent typical seasonal fluctuations in water quality with respect to monitored parameters for this landfill. Based on the latest monitoring and sample analysis obtained during this reporting period, there are no indications of any unexpected or unusual results that would require special attention and therefore no further actions are recommended at this time. The County continues to closely monitor the presence of VOCs and other contaminants and will notify MDE prior to the next report in the event that any detection is found to be significantly different from previous levels.

Please contact Nasser Kamazani at (240) 777-7717 with any questions about this report.

Sincerely,

David Lake, Manager
Water and Wastewater Policy Group

cc: Robert Hoyt, Director,
Department of Environmental Protection

Dan Locke, Chief
Division of Solid Waste Services,
Department of Environmental Protection

**WATER QUALITY
MONITORING REPORT**

for

Gude LANDFILL

Montgomery County, Maryland

December 2009

Report Period: September 2009

Prepared by Montgomery County Department of Environmental Protection

Prepared for Maryland Department of Environment, Solid Waste Program

July 26, 2012

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Introduction:

The Gude Landfill is located on the north side of Gude Drive near Southlawn Lane, northeast of the City of Rockville in Montgomery County. The site encompasses approximately 160 acres, of which approximately 100 acres have been used for the disposal of municipal waste and incinerator residues. It operated from the early 1960s until June 1, 1982. The Gude Landfill was constructed prior to the promulgation of regulations for landfill lining and leachate collection systems.

To monitor the quality of ground and surface water, the Montgomery County Department of Environmental Protection (DEP) collects samples at a total of 25 monitoring sites, which include 20 observation wells and 5 stream locations. Locations of these monitoring sites can be found on the attached aerial photo titled Groundwater and Surface Water Monitoring Locations in Appendix A. Sampling and analysis are conducted semi-annually and include laboratory analysis for Volatile Organic Compounds (VOCs), Heavy Metals, field parameters (temperature, pH, conductivity) and other water quality parameters and indicators.

This report is organized into four sections, which discuss the results and observations based on the landfill water quality monitoring program. The four sections include a discussion of:

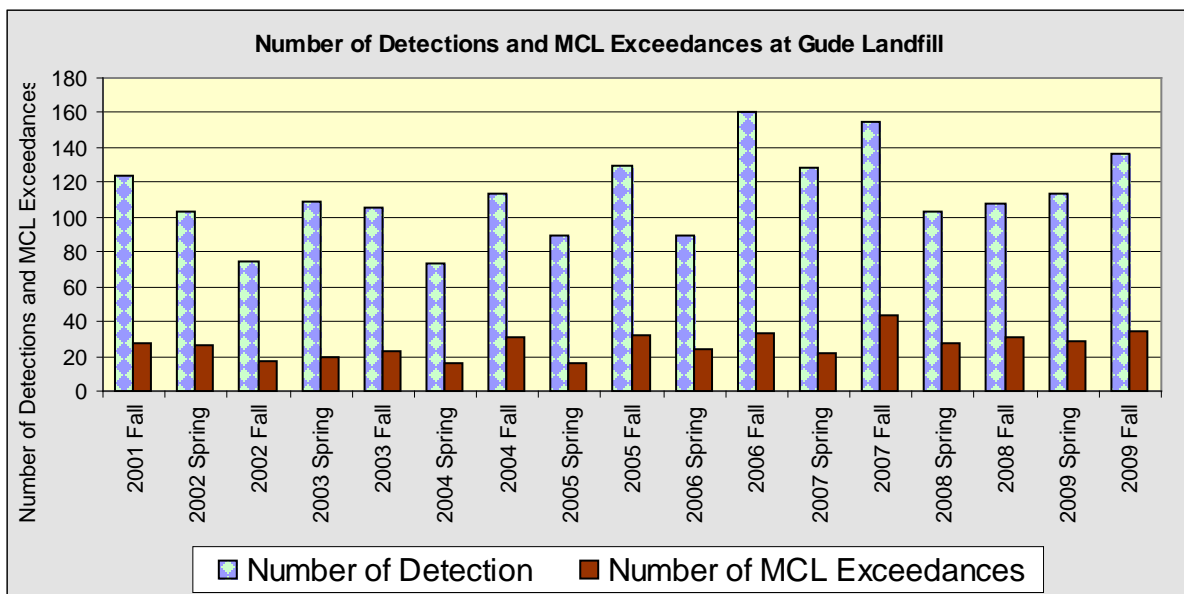
- VOC sampling results;
- Metals sampling results;
- Groundwater elevation and flow;
- Trends Analysis/Conclusions

The appendices provide data tables for reference, as well as aerial photos and maps.

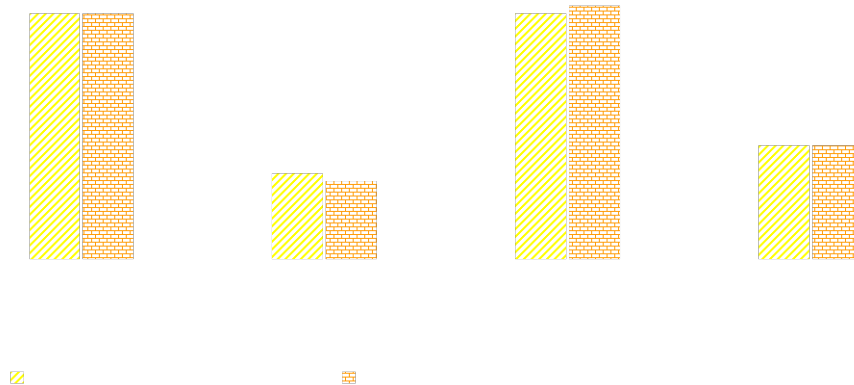
1. Volatile Organic Chemical Sampling Results:

The following is a summary of monitoring results obtained for this reporting period.

- The concentrations of VOCs in groundwater are similar to those that were recorded during the past monitoring activities.
- Results obtained for this reporting period are comparable with previously recorded observations in both number of detections and concentrations of contaminants for both PQL (practical quantitative limit) and MCL (maximum contaminate limit).



- No VOCs were detected above recommended Maximum Contamination Level (MCL) in monitoring wells OB01, OB02, OB02A, OB04, OB06, OB07, OB07A, OB102, and OB105.
- No VOCs were detected above the recommended MCL in any of the monitored stream locations.
- A total of 34 VOCs exceeded the recommended MCL in monitoring locations OB03 (with 4 exceedances), OB03A (with 5 exceedances), OB04A (with 2 exceedances), OB08 (with 1 exceedance), OB08A (with 1 exceedance), OB10 (with 2 exceedances) OB11 (with 7 exceedances), OB11A (with 6 exceedances), OB12 (with 5 exceedances), OB15 (with 1 exceedance), and OB25 (with 1 exceedance).
- 38% of the MCL exceedances were detected at observation well OB11/OB11A located on the south side (front side) of the landfill and 26% of MCL exceedances were detected at observation well OB03/OB03A located on the north side (back side) of the landfill.



- 1,2-Dichloropropane concentration exceeded the MCL of 5 ug/l observation wells OB03, OB03A, OB11, OB11A and OB12. Concentrations exceeding MCL for this compound ranged from 5.55 ug/l to 15.8 ug/l .
- Benzene concentration exceeded the MCL of 5 ug/l in OB11 at 9.37 ug/l and OB11A at 7.51 ug/l.
- cis-1,2-Dichloroethene concentration exceeded the MCL of 70 ug/l in observation wells OB03, OB03A, OB11, and OB11A. Concentrations exceeding the MCL for this compound ranged from 84.9 ug/l to 184 ug/l.
- Tetrachloroethene concentration exceeded the MCL of 5 ug/l in observation wells OB11, OB11A, and OB12. Concentrations exceeding MCL for this compound ranged from 7.95 ug/l in OB12, 44.75 ug/l in OB11A, and 67.92 ug/l in OB11.
- Dichloromethane concentration exceeded the MCL of 5 ug/l in OB11 at 30.6 ug/l and OB12 at 8.27 ug/l.
- Tetrachloroethene concentration exceeded the MCL of 5 ug/l in observation wells OB03A, OB11, OB11A and OB12. Concentrations exceeding the MCL for this compound ranged

- from 7.11 ug/l at OB03A to 43.9 ug/l at OB11.
- Trichloroethene concentration exceeded the MCL of 5 ug/l in observation wells OB03, OB03A, OB11, OB11A, OB10 and OB12. Concentrations exceeding the MCL for this compound ranged from 13.3 ug/l at OB10 to 131 ug/l at OB03.
 - Vinyl Chloride concentration exceeded the MCL of 2 ug/l in observation wells OB03, OB03A, OB4A, OB08, OB08A, OB10, OB11, OB11A, OB12, and OB015. Concentrations exceeding the MCL for this compound ranged from 2.12 ug/l at OB04A to 30.5 ug/l at OB03.
 - The presence of the above listed compounds, in terms of number and concentration, is similar and consistent with prior monitoring results. Results for all of the VOCs can be found in Table-1 and Table-2 in Appendix B of this report. Table-1 contains the results from the April 2009 sampling event. Table 2 shows the monitoring results for the past several years.

2. Inorganic and Metals Sampling Results:

The highlights of the results for this reporting period are listed below.

- A total of 10 metal analysis exceeded the recommended MCL in monitoring locations OB105 (with 3 exceedances), OB11 (with 2 exceedances), OB015 (with 1 exceedance), and OB025 (with 4 exceedances).
- No metal contaminants were detected above the recommended MCL in any of the monitored stream locations.
- Arsenic with a recommended MCL of 0.01 mg/l was exceeded in OB105 with a concentration of 0.012 mg/l.
- Beryllium with a recommended MCL of 0.004 mg/l was exceeded in OB025 with a concentration of 0.0137 mg/l.
- Cadmium concentrations above the recommended MCL of 0.005 mg/l were detected in OB11 at 0.0088 mg/l and in OB025 with a concentration of 0.0174 mg/l.
- Chromium with a recommended MCL of 0.1 mg/l was exceeded in OB025 with a concentration of 0.1050 mg/l.
- Lead with concentrations above the recommended MCL of 0.015 mg/l detected in samples collected from observation wells OB105 at 0.0268 mg/l, OB015 at 0.017 mg/l, and OB025 at 0.148 mg/l.
- Mercury with concentrations above the recommended MCL of 0.002 mg/l detected in samples collected from observation wells OB105 at 0.0038 mg/l and OB11 at 0.0022 mg/l.

Overall, the results indicate comparable concentrations for metals from the last reporting period. Laboratory results for these metals are included in Appendix D, Tables 3 and 4 of this report.

3. Physical Water Quality Measurements:

Additional physical water quality parameter measurements and analysis were conducted during the latest monitoring period and the results are included in this report for the first time. These new water quality parameters are based on the monitoring requirements specified in the approved G&SWM Plan and include the followings:

Alkalinity	Ammonia
Calcium	Chloride
Nitrate	pH
Potassium	Sodium
Specific Conductance.	Sulfate
TDS	Turbidity

Results for the above water quality parameters are included in Appendix D, Tables 3 and 4 of this report.

4. Groundwater Elevations and Flow:

The groundwater elevation measurements of all the monitoring wells for the past two monitoring rounds are included in Table-5 of this report. The results indicate that the groundwater elevation at Gude Landfill has decreased by an overall average of 0.7 ft from April to September 2009. This is consistent with reduced seasonal groundwater elevation during the fall. Based on the groundwater elevation measurements obtained from the limited number of observation wells down gradient from the perimeter of the landfill, it appears that the groundwater flow at Gude Landfill is consistent with the topography in this area.

5. Conclusions/Trend Analysis:

Results obtained from the latest monitoring activities (April to September 2009) are similar and comparable to those collected from prior monitoring results for the past several years. Major findings indicate that:

- I. There are indications of some low level groundwater and surface water contamination in the vicinity of Gude Landfill.
- II. Detected contaminants at Gude Landfill involve mainly chlorinated solvent degradation products including 1,1-Dichloroethane, 1,2-Dichloropropane, cis-1,2-Dichloroethene, Tetrachloroethene, Trichloroethene, and Vinyl Chloride.
- III. Most of the contaminants (about 70%) are detected at observation wells OB11/OB11A located on the south side (front side) of the landfill and observation wells OB03/OB03A located on the north side (back side) of the landfill. (Observation wells OBxx/OBxxA are adjacent wells with different depths and are constructed within several feet apart.)

To provide an overall perspective on the quality of groundwater and surface water around the Gude Landfill, a summary of statistical trend analyses and observations are provided below and are included in Appendix C of this report. Please refer to the attached tables and diagrams for additional information.

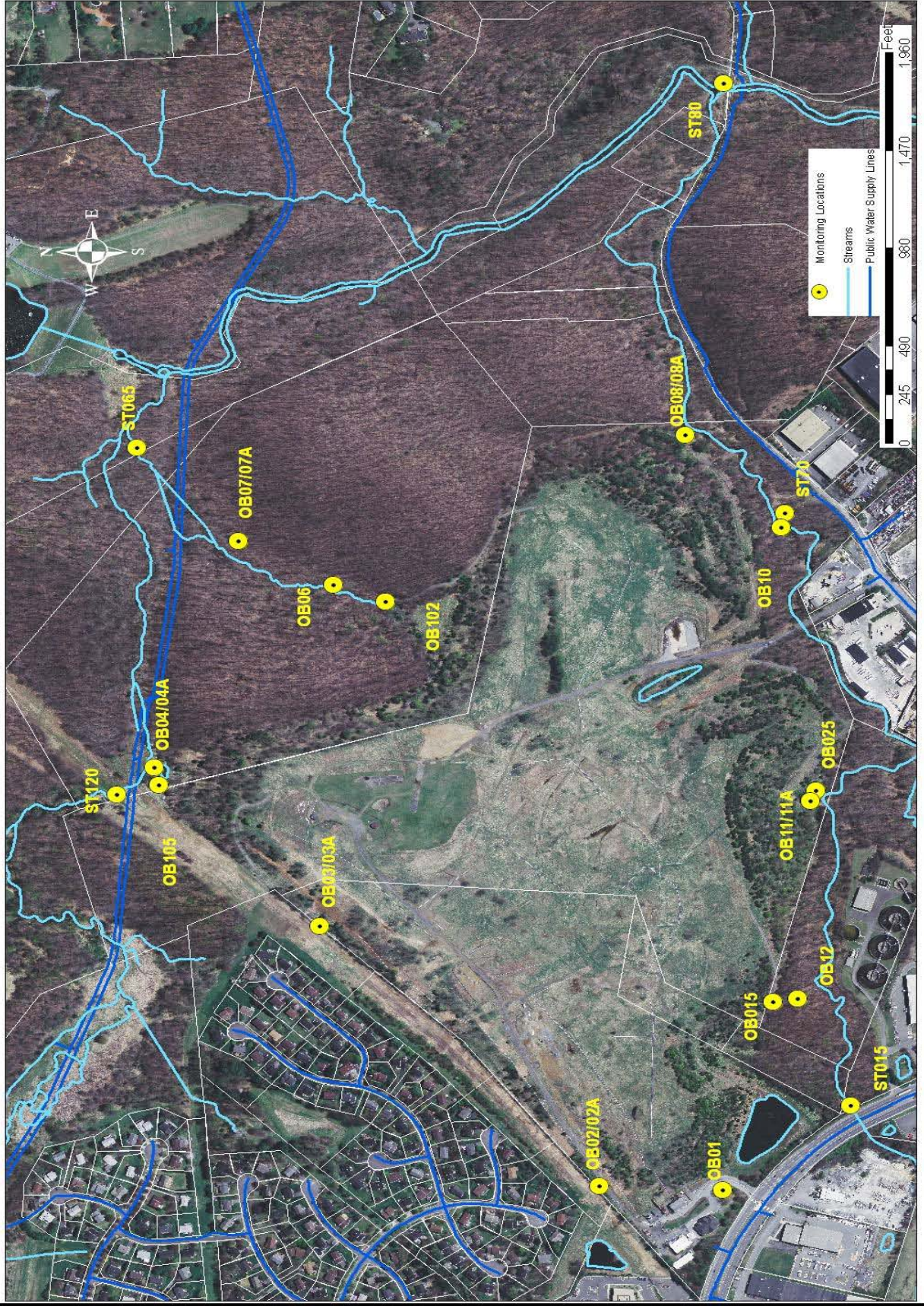
- Most of the detected groundwater contaminants at Gude Landfill are Volatile Organic Compounds (VOCs). These low levels of VOCs detected in groundwater are generally not transported to surface waters.
- The overall number of detections per year has remained relatively constant over the past 7-8 year time period. However, the number of detections exceeding established MCLs appears to be increasing slightly over the same period.
- While some detected VOC concentrations appear to be trending upwards, the concentration for other VOCs seem to be decreasing over the same period.
- Since April 2001, about 70 % of all detections exceeding MCL have occurred in observation wells OB03-OB03A and OB11-OB11A.

Appendix A

Gude Landfill Aerial Photo and Sample

Locations

Groundwater and Surface Water Monitoring Locations Gude Landfill



Appendix B

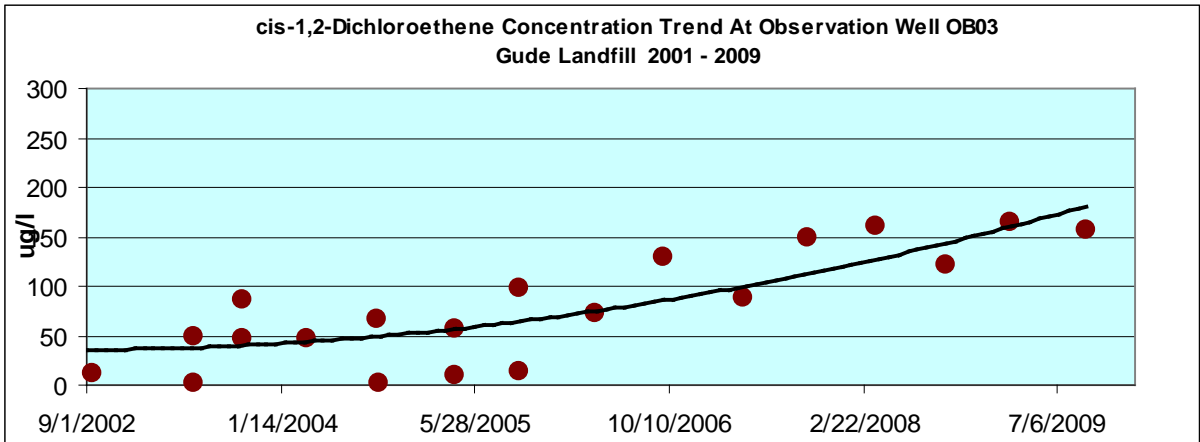
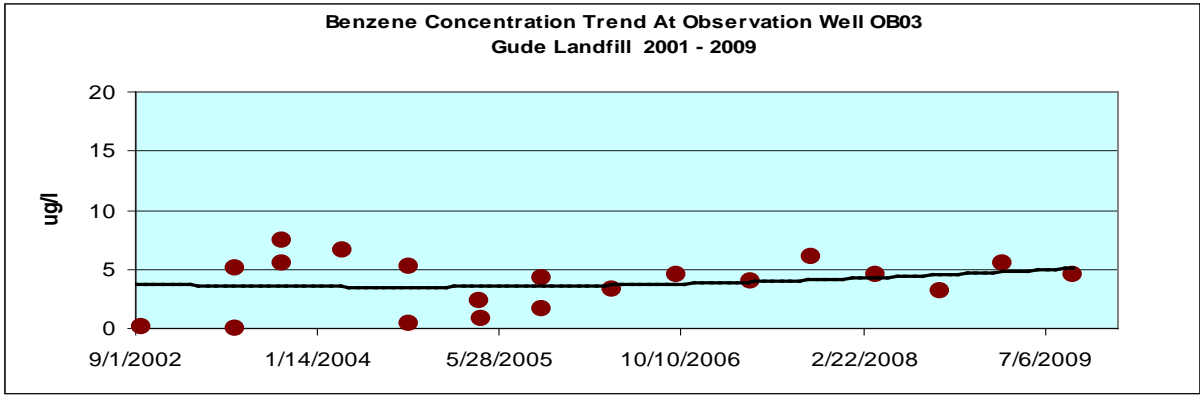
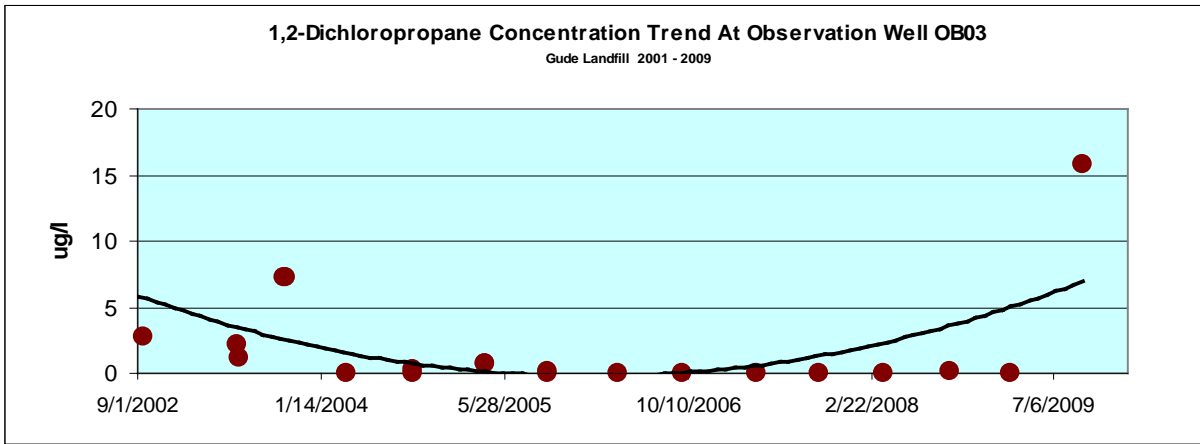
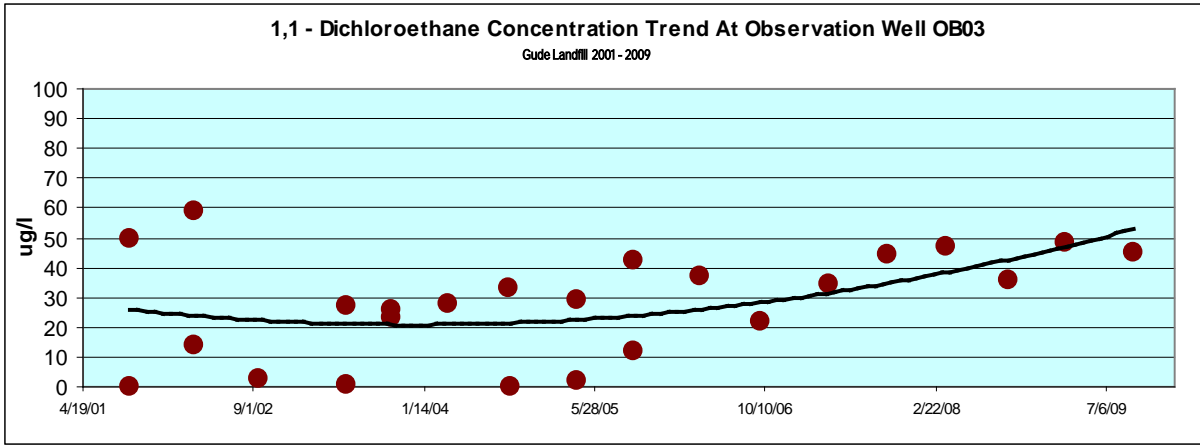
Tables of Volatile Organic Compounds

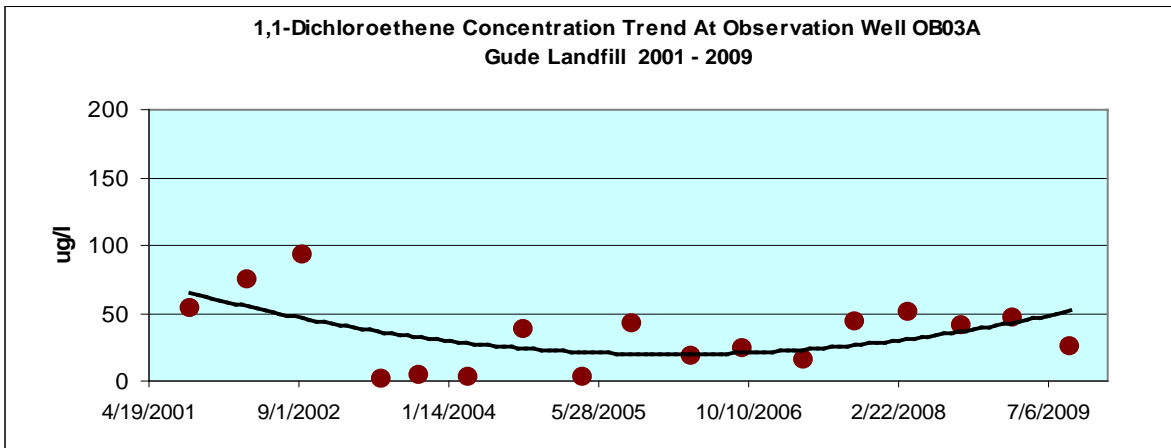
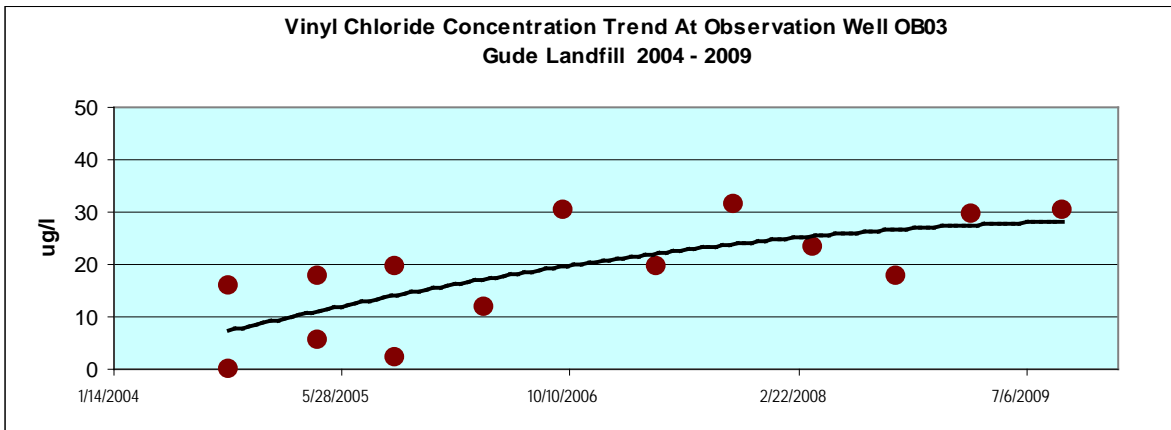
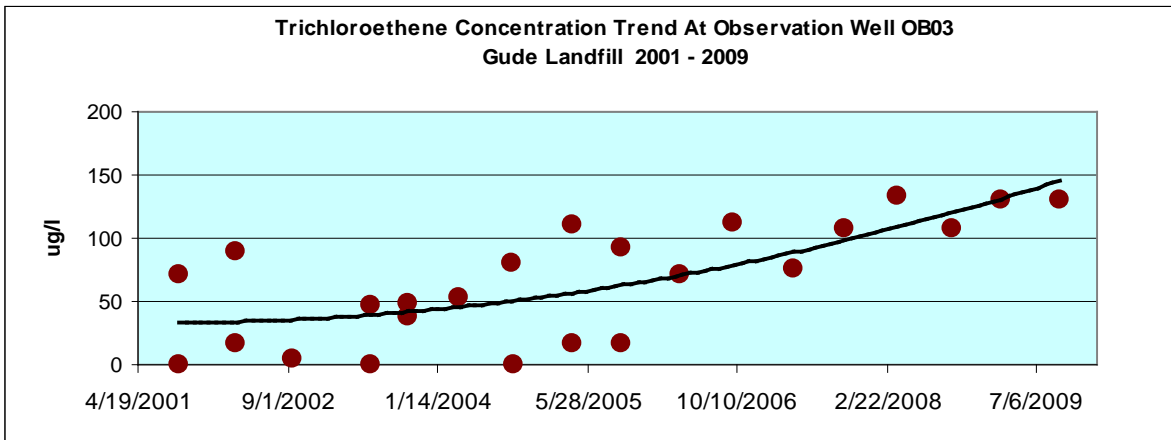
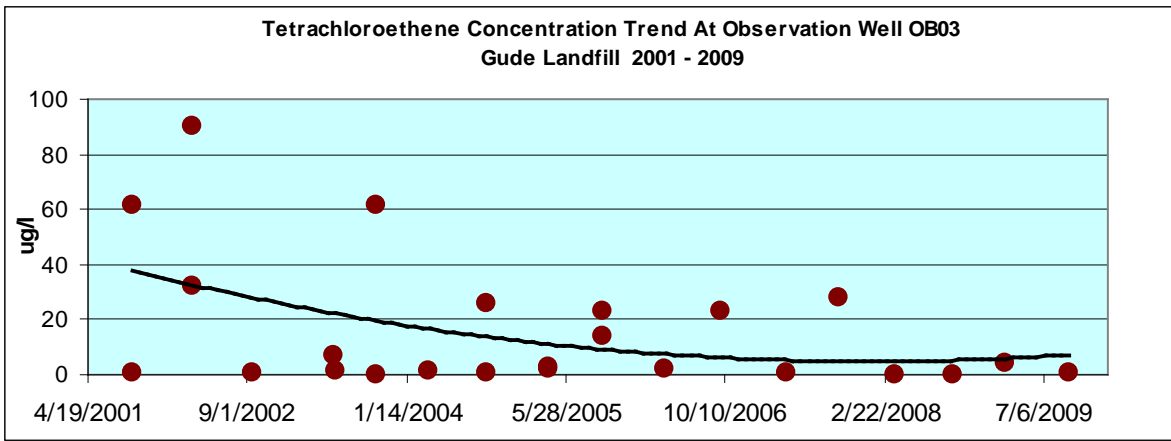
Results in ($\mu\text{g/l}$)

Appendix C

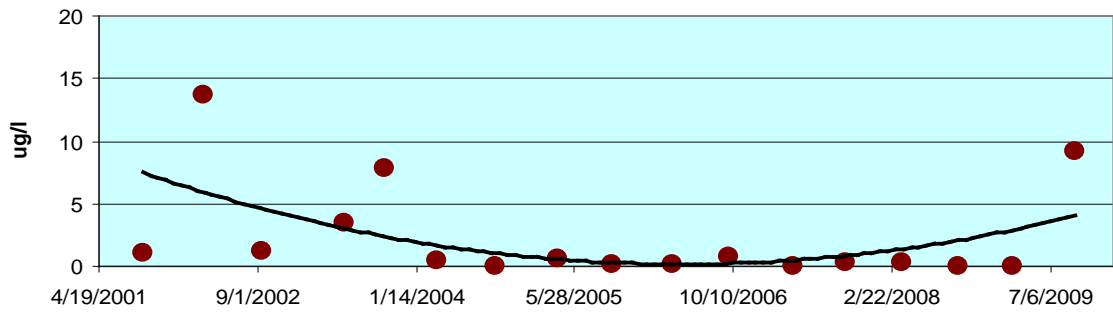
Volatile Organic Compounds

Trend Analysis

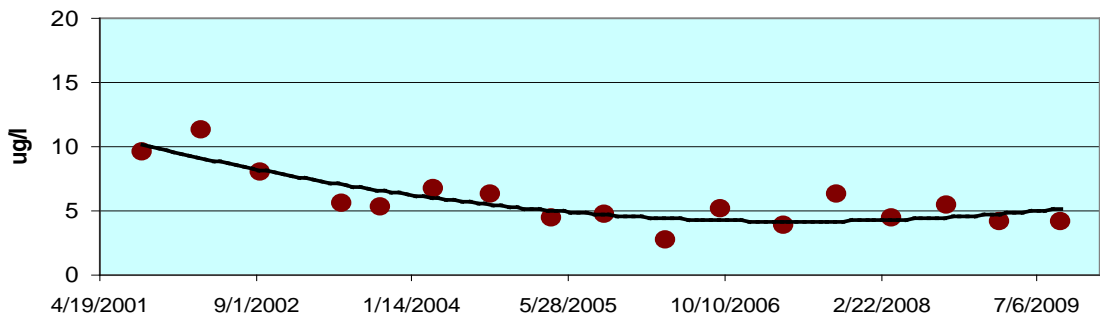




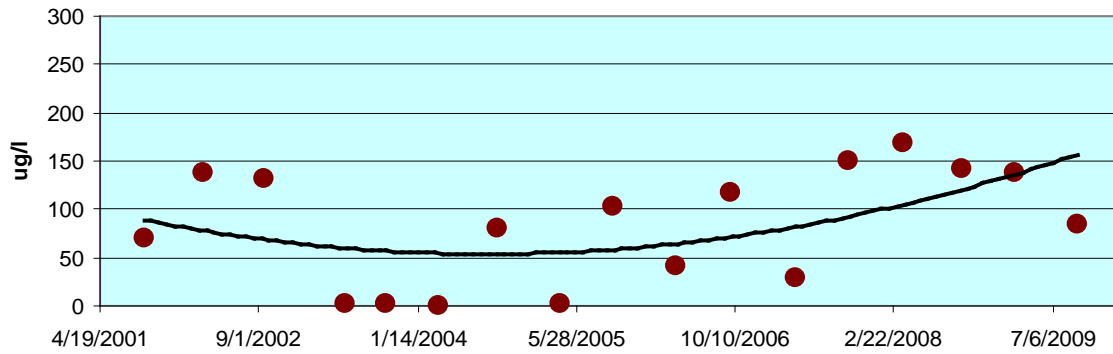
**1,2-Dichloropropane Concentration Trend At Observation Well OB03A
Gude Landfill 2001 - 2009**



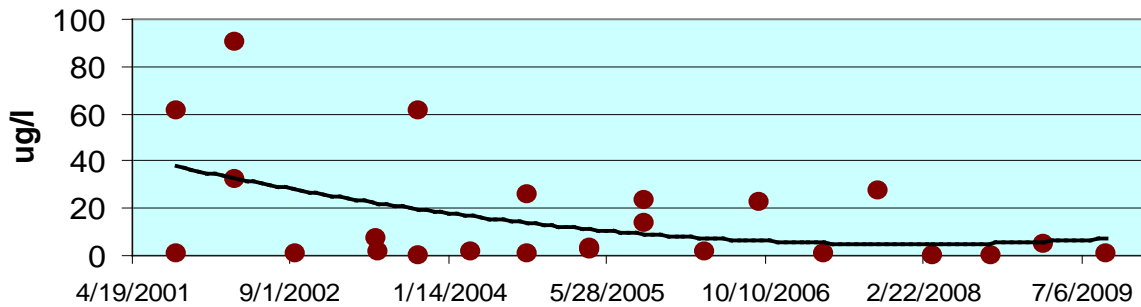
**Benzene Concentration Trend At Observation Well OB03A
Gude Landfill 2001 - 2009**

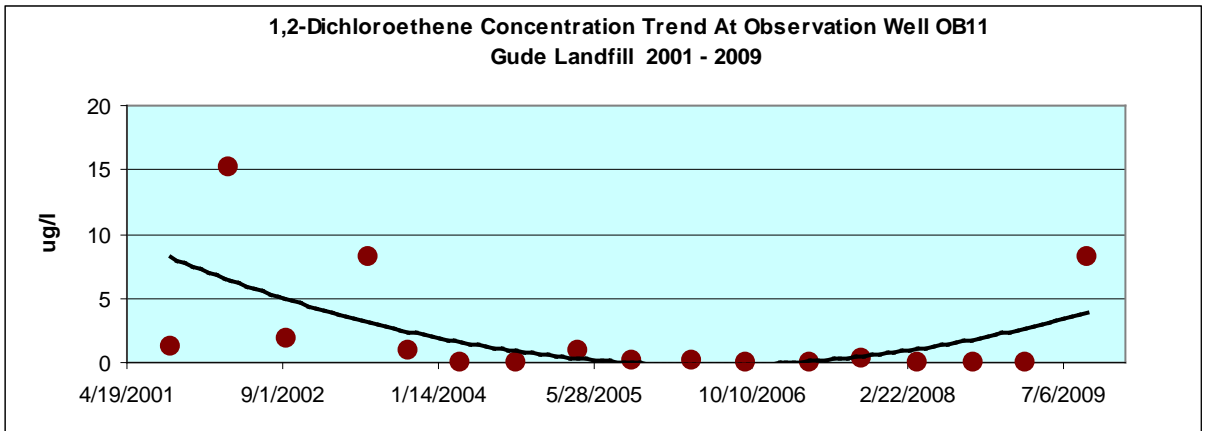
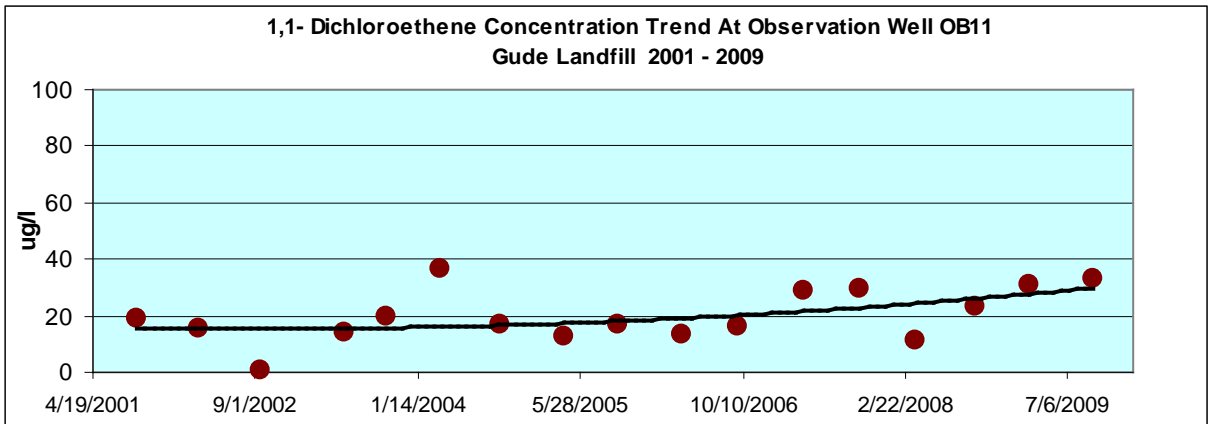
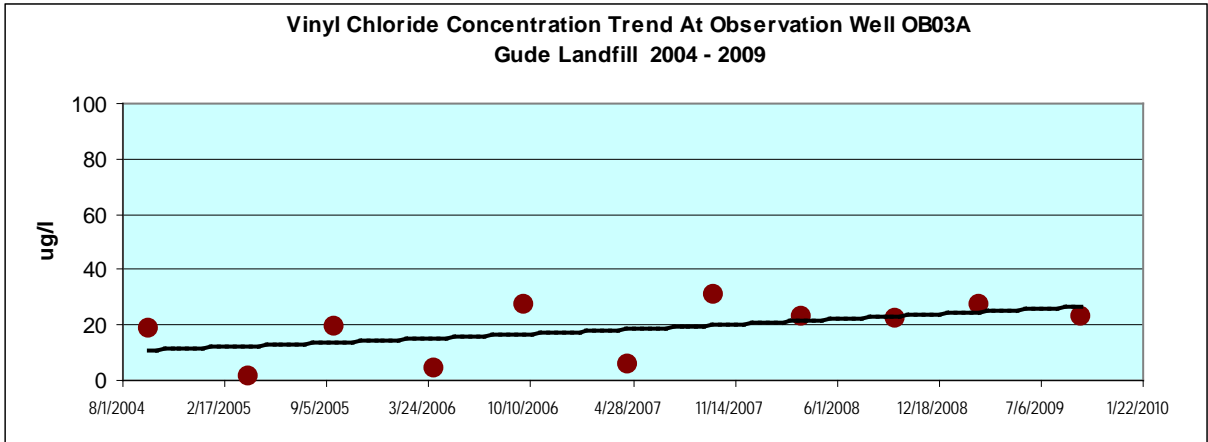
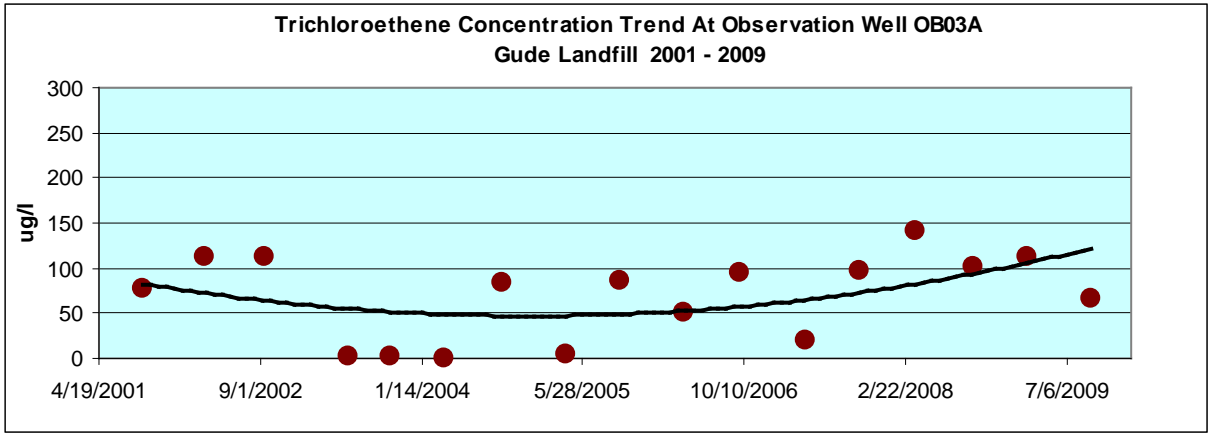


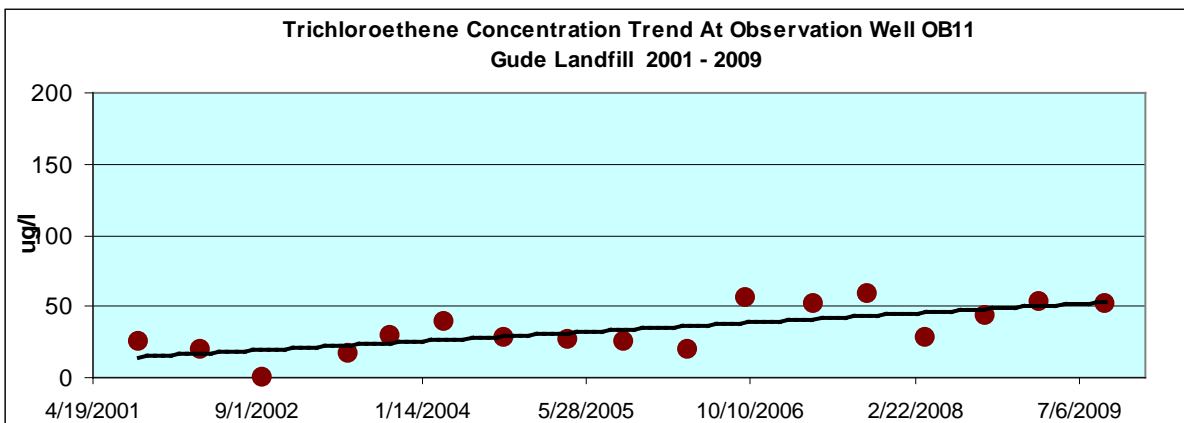
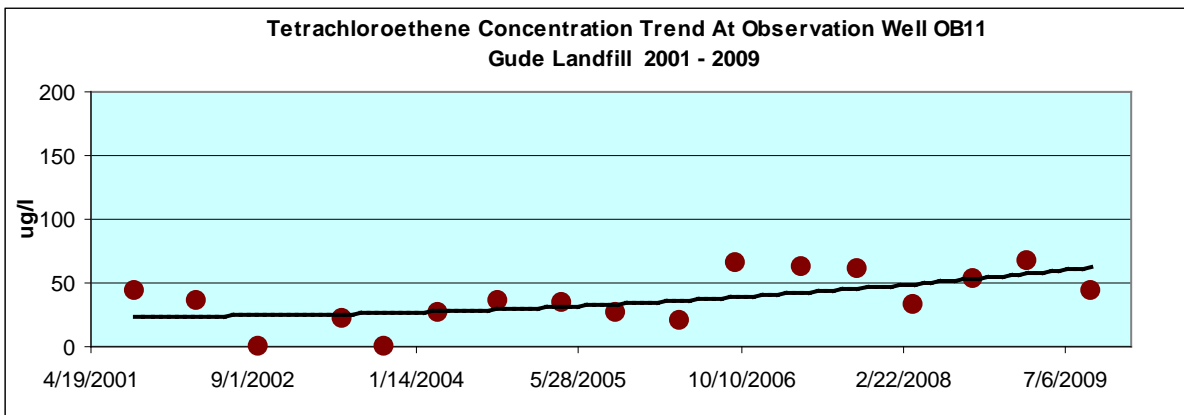
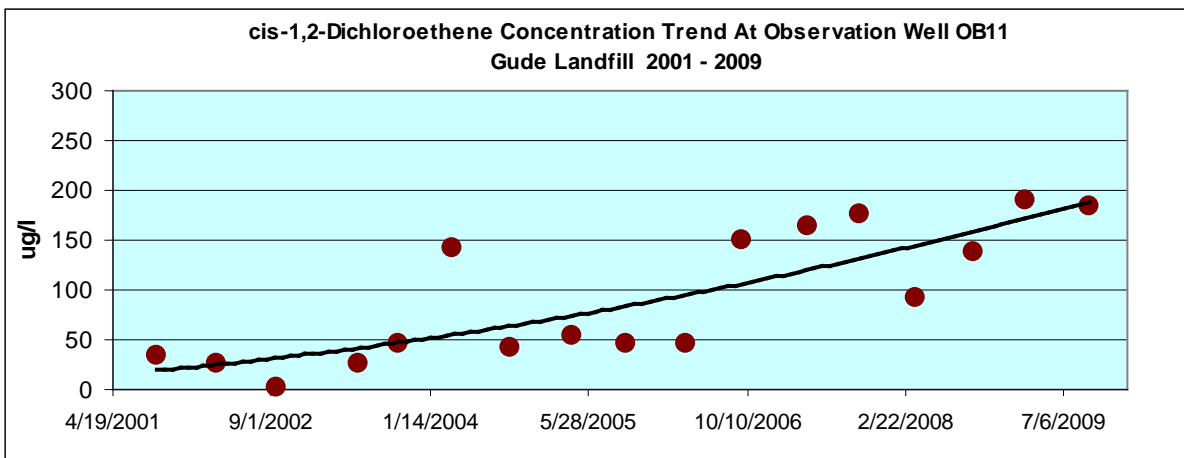
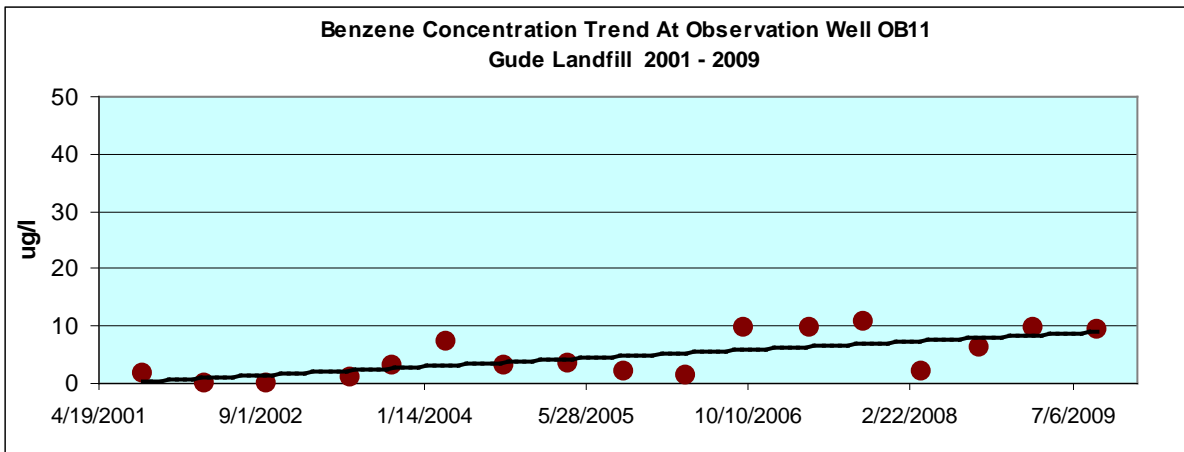
**cis-1,2-Dichloroethene Concentration Trend At Observation Well OB03A
Gude Landfill 2001 - 2009**

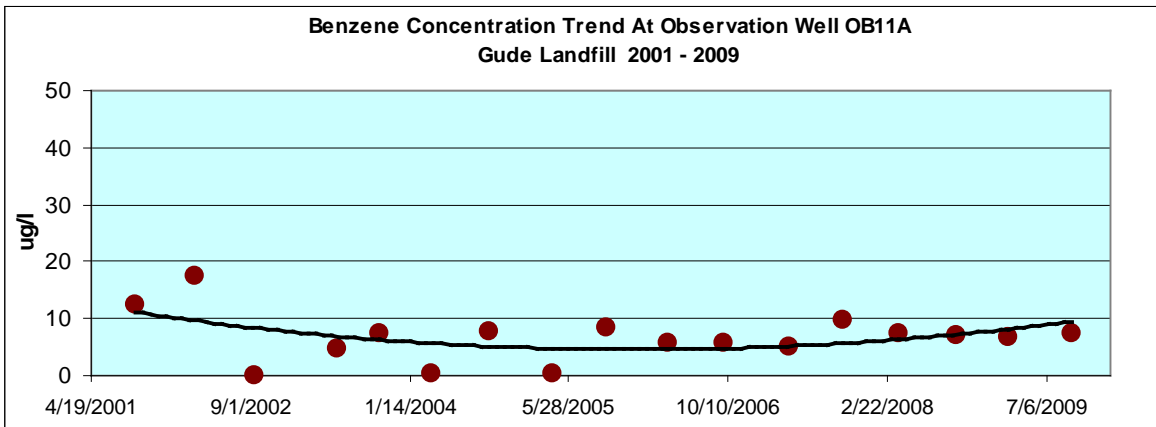
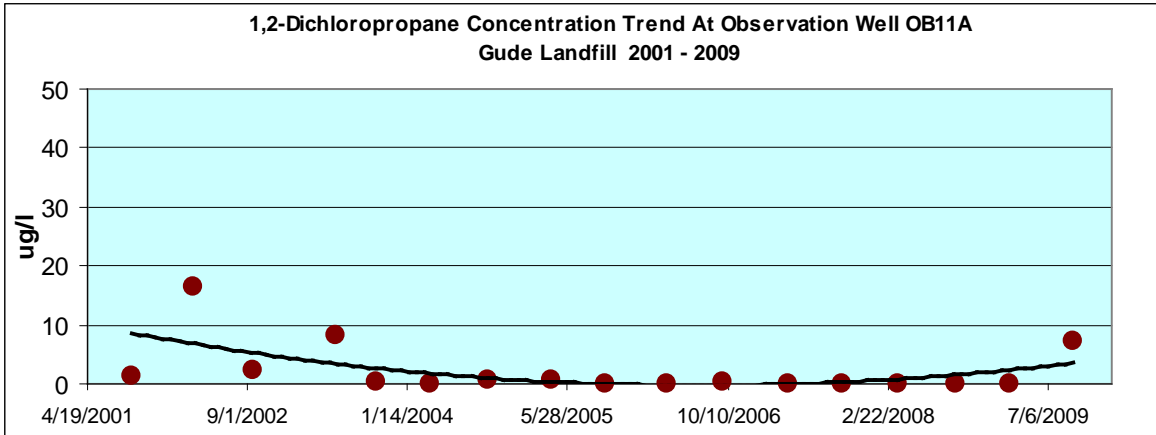
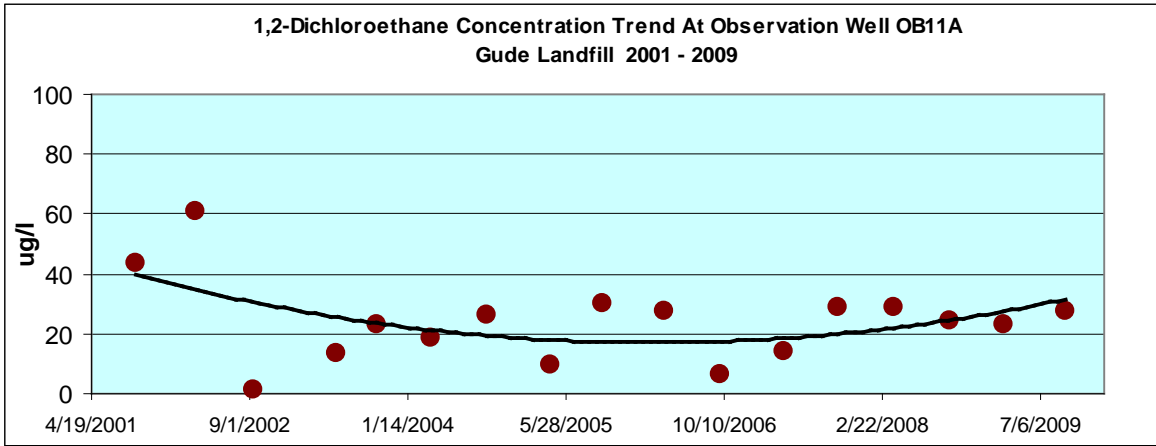
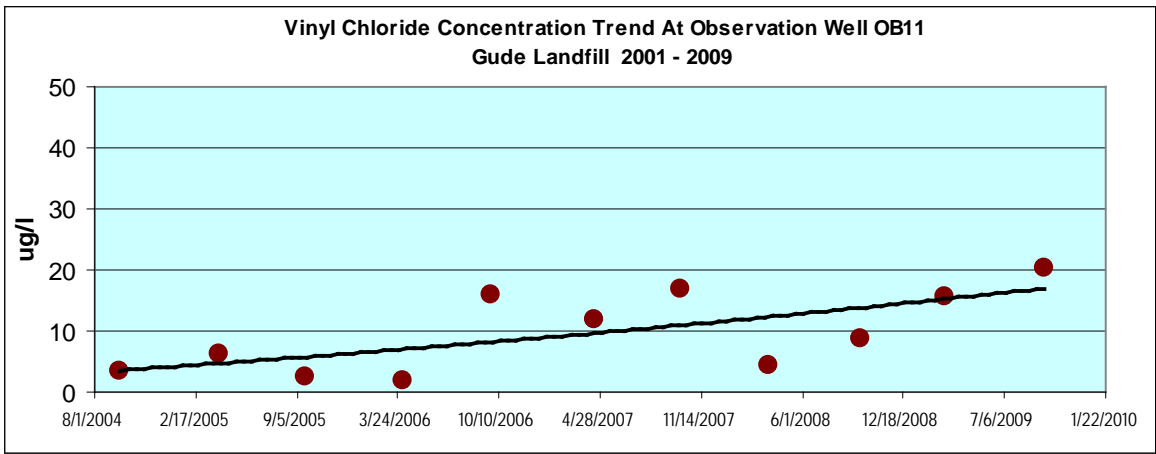


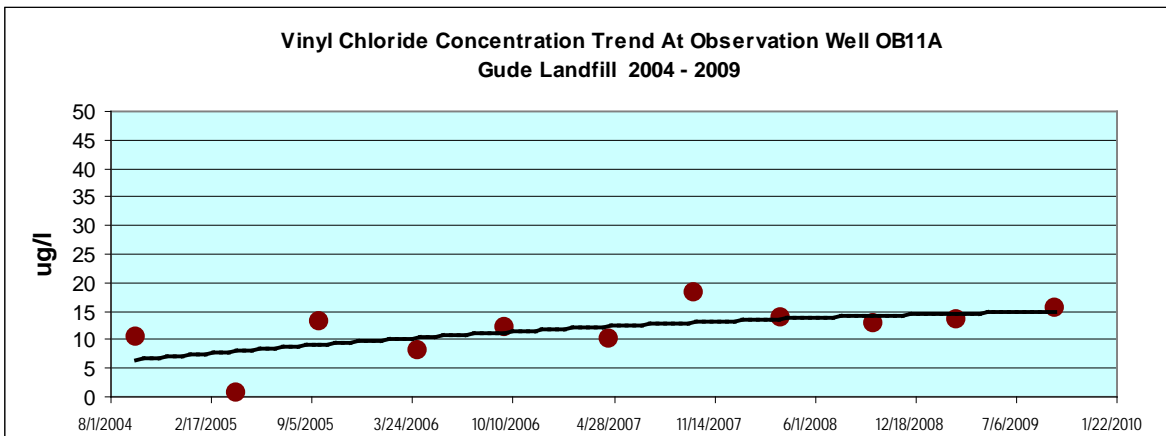
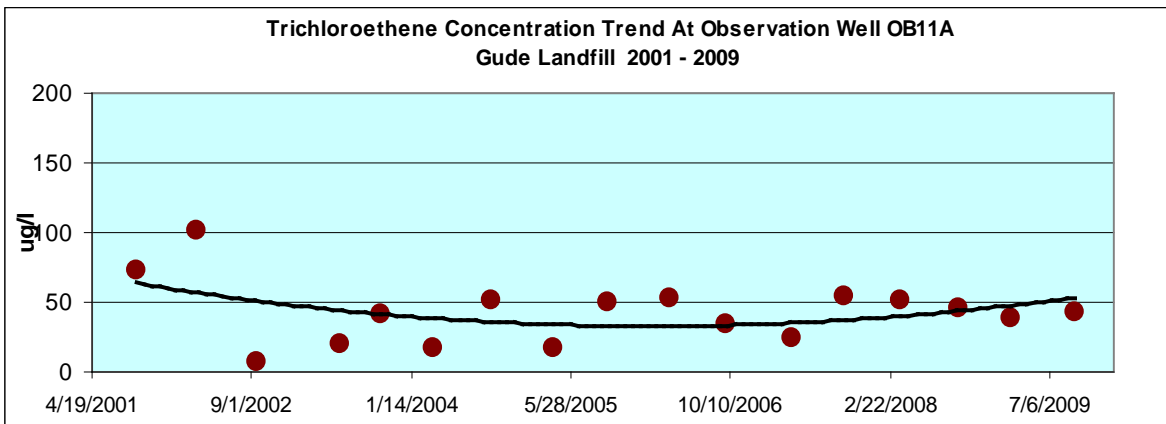
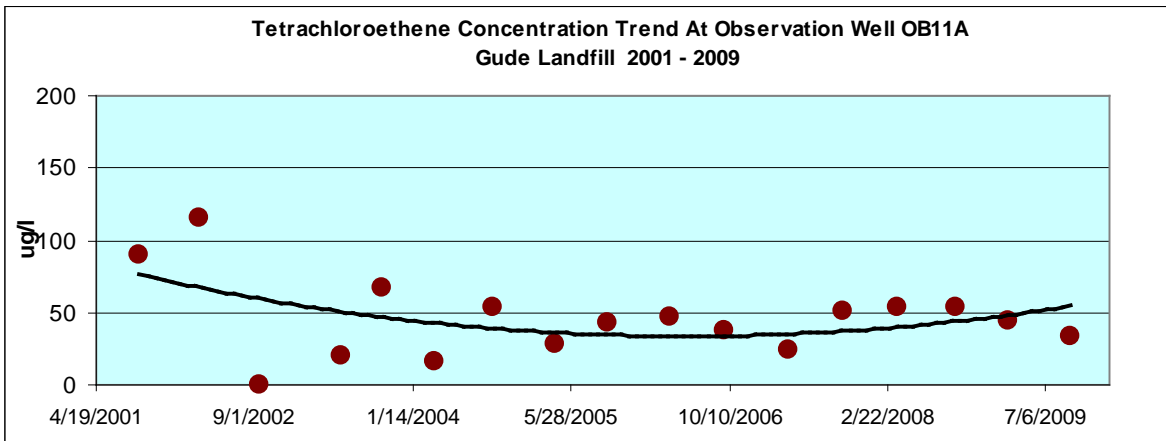
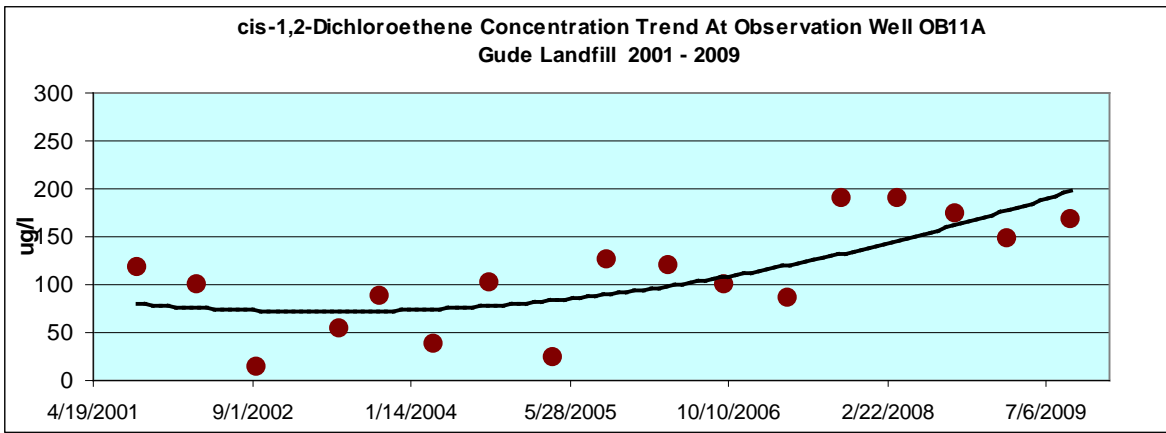
**Tetrachloroethene Concentration Trend At Observation Well OB03
Gude Landfill 2001 - 2009**





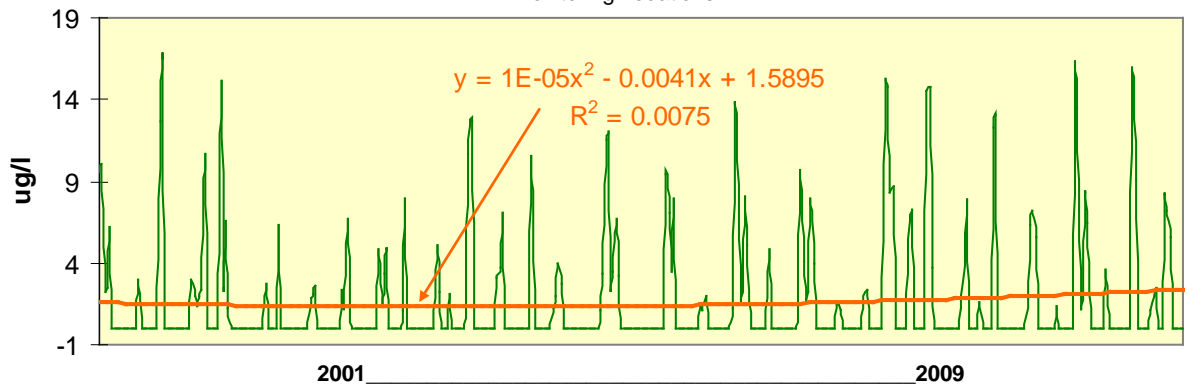






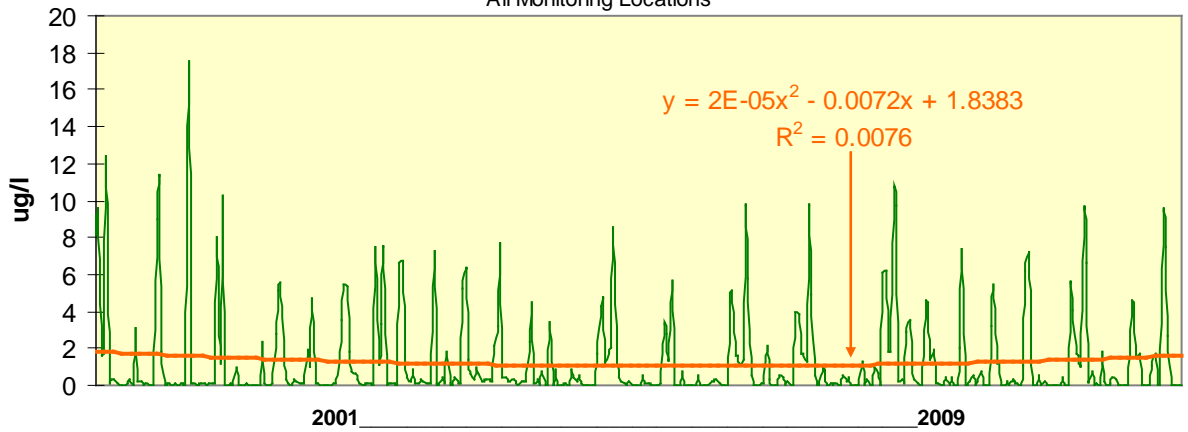
1,2-Dichloropropane Concentration Trend at Gude Landfill

All Monitoring Locations



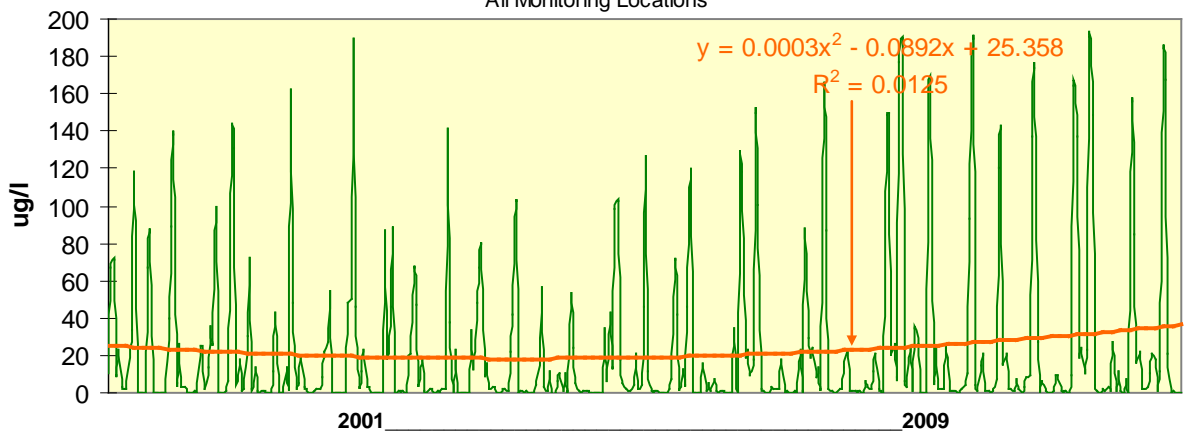
Benzene Concentration Trend at Gude Landfill

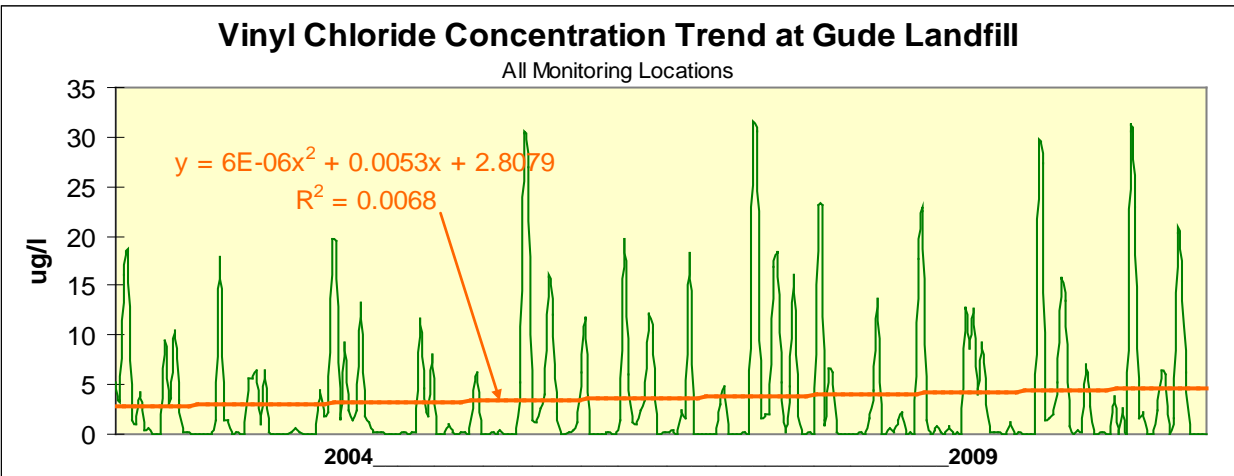
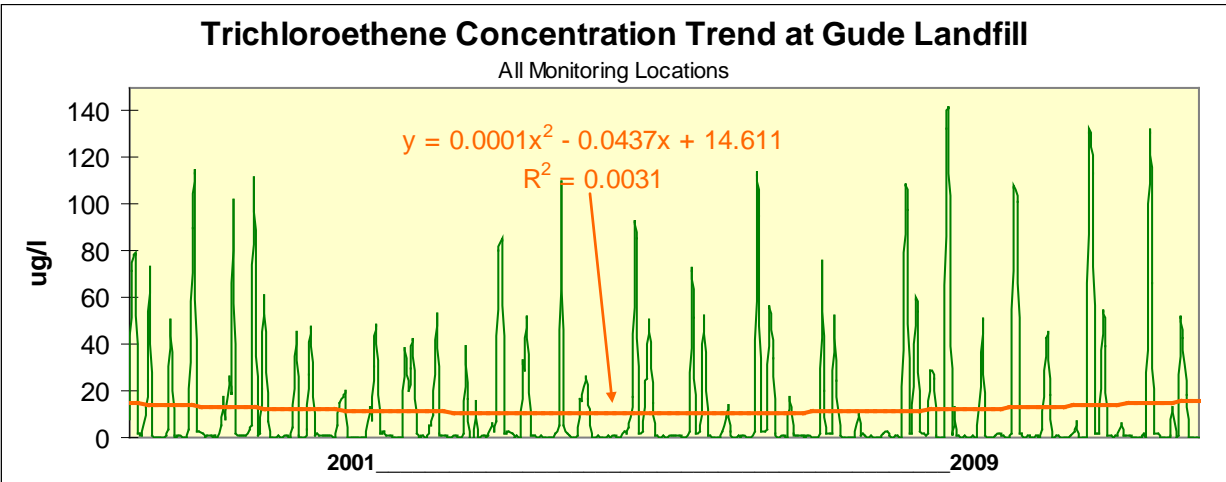
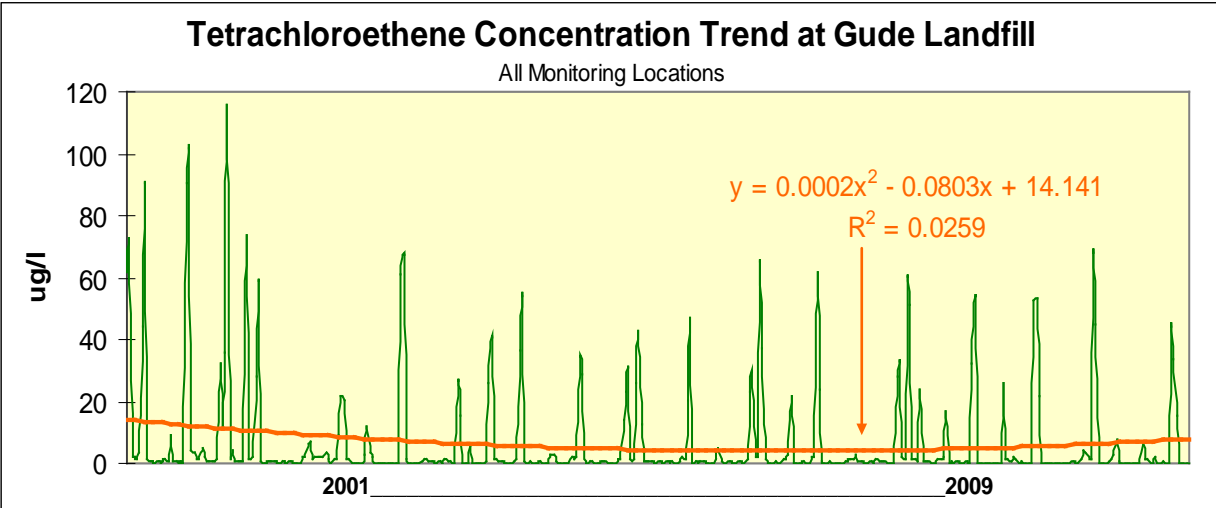
All Monitoring Locations



cis-1,2-Dichloroethane Concentration Trend at Gude Landfill

All Monitoring Locations





Appendix D

Tables of Metals

Results in (mg/l)

Appendix E

Table of Groundwater Elevations and Groundwater Elevation Contour Map

Results in (ft. AMSL)

General Groundwater Flow Direction at Gude Landfill September 2009

