2017 Annual Report

Land & Gas Reclamation Landfill
WDNR License No. 01118
Dodge County, Wisconsin

Prepared For:
Advanced Disposal Services
Glacier Ridge Landfill
N7296 Highway V
Horicon, WI 53032

Prepared By:
Environmental Sampling Corporation
P.O. Box 12
Muskego, WI 53150-0012

April 2018

Advanced Disposal

April 13, 2018

Mr. Mike Schmoller
Wisconsin Dept. of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

RE: 2017 Annual Report
Land & Gas Reclamation Landfill, WDNR Lic. #01118
Dodge County, WI

Dear Mr. Schmoller:

On behalf of Advanced Disposal Services Glacier Ridge Landfill LLC., Environmental Sampling Corporation (ESC) is submitting one copy of the 2017 Annual Report for the closed Land & Gas Reclamation Landfill.

If you have any questions regarding this report, please contact Frank Perugini of ESC at (414) 427-5033 or the undersigned at (920) 387-0949.

Sincerely,

Lonn Walter
General Manager

Attachment

cc: Ann Bekta, WDNR-SCR Janesville
Sheila Desai, USEPA Region 5
Adam Hogan, WDNR-SCR Fitchburg
WDNR-SCR Horicon, File Copy
WDNR Madison, File Copy
ADS-Glacier Ridge Landfill, File Copy
Jacob Margelofsky, ADS-Glacier Ridge Landfill (electronic copy)
Tim Curry, ADS-Midwest (electronic copy)
Kari Rabideau, ADS-Midwest (electronic copy)
Tyler Field, Cornerstone Environmental Group (electronic copy)
Sherren Clark, SCS Engineers (electronic copy)
Frank Perugini, ESC (electronic copy)

2017 ANNUAL REPORT
LAND & GAS RECLAMATION LANDFILL, LICENSE #01118
DODGE COUNTY, WISCONSIN

TABLE OF CONTENTS

APPENDICES

Appendix A: **Facility Information**

Attachment A-1: WDNR Correspondence

- Annual Reports for the Advanced Disposal Services Glacier Ridge Landfill, (Lic. #3068), Biopile (Lic. #3792) and Land and Gas Reclamation Landfill (Lic. #1118), dated May 2, 2017
- Phase 3 Investigation Update – P429D Drilling Status and Proposed Well Installation, Land & Gas Reclamation Landfill, Dodge County, Wisconsin, dated July 12, 2017

Appendix B: **2017 Groundwater Data Assessment (SCS Engineers)**

Attachment B-1: Groundwater Monitoring Results: April 2017
Groundwater Monitoring Results: October 2017
Attachment B-2: Historic VOC Monitoring Results and Concentrations vs. Time Plots
Figure 1: Groundwater Table Map: October 2017

2017 ANNUAL REPORT
LAND & GAS RECLAMATION LANDFILL, LICENSE #01118
DODGE COUNTY, WISCONSIN

Section 1. Introduction

This annual report addresses the 2017 annual report requirements for the former Land and Gas Reclamation Landfill (LGRL) facility. LGRL was a closed landfill located in the W ½ of Section 35, Township 12-North, Range 16-East, in the Town of Williamstown, Dodge County, Wisconsin. Beginning in 2014, in accordance with the WDNR approved LGRL Waste Relocation Project, the waste from LGRL was removed and relocated to the adjacent Advanced Disposal Services Glacier Ridge Landfill (ADS-GRL).

The LGRL Waste Relocation Project began during first quarter 2014. Phase A of removal began on March 3, 2014 and was completed on July 21, 2014. A total of 625,784 cubic yards of waste was relocated during Phase A of the project. Phase B of the waste relocation project began on February 3, 2015 and was completed on May 21, 2015 and a total of 523,244 cubic yards of waste were relocated. Phase C of the waste relocation project was started on January 4, 2016 and was completed on March 23, 2016 and an estimated 388,550 cubic yards of waste were relocated.

Since all waste from LGRL has been removed and relocated to the active ADS-GRL, the Department determined that several annual report requirements listed in the May 19, 2000 Plan of Operation Approval Modification dated were no longer necessary. The current reporting requirements are outlined in the May 2, 2017 correspondence provided as **Appendix A, Attachment A-1.**

The format of this 2017 annual report restates the relevant annual report requirements for LGRL. The approval references are presented below in bold italic font followed by ADS-GRL's response in normal font.

Section 2. Annual Report Requirements

Approval Reference
May 19, 2000
Plan of Operation Approval Modification, Superior Glacier Ridge Landfill (Lic. No. 3068), Biopile (Lic. No. 3792), Land and Gas Reclamation Landfill (Lic. No. 1118), and Demolition Landfill (Lic. No. 3568)

3. Superior shall submit an annual report to the Department by April 15th of each year which contains the following information about the Land and Gas Reclamation Landfill:

Response
To meet this requirement Advanced Disposal Services (previously known as Veolia Environmental Services, Onyx, and Superior Services) is providing the WDNR with this annual report for Land and Gas Reclamation Landfill (LGRL), which discusses the results of the 2017 environmental monitoring program for the facility. Annual report requirements provided as Conditions 3.b., 3 h., and 3.i. of the May 19, 2000 Approval Modification are discussed below. As indicated in the May 2, 2017 correspondence (**Appendix A, Attachment A-1**), the remaining annual report requirements are no longer necessary.

Approval Reference
May 19, 2000
Plan of Operation Approval Modification, Superior Glacier Ridge Landfill (Lic. No. 3068), Biopile (Lic. No. 3792), Land and Gas Reclamation Landfill (Lic. No. 1118), and Demolition Landfill (Lic. No. 3568)

b. ***An evaluation of the monitoring data generated for the facility, including groundwater gradients and quality, leachate head and quality data, gas quality and extraction rate data, condensate volume data, and settlement data.***

Response
An evaluation of the groundwater monitoring data for the facility is summarized below. Due to the completion of the LGRL Waste Relocation Project, there was no leachate head, leachate quality, gas extraction, gas condensate, or settlement monitoring during 2017.

Groundwater Monitoring Program
The groundwater monitoring program is performed in accordance with the WDNR Plan Modification approval for monitoring at Land and Gas Reclamation Landfill dated April 14, 1995 and the WDNR Expedited Plan Modification, Land and Gas Reclamation Landfill, dated February 22, 2002. Additional groundwater monitoring was conducted, beyond the scope of the permit,

in accordance with the WDNR approved Off-Site Investigation of Chlorinated VOC Plume in Bedrock, Land and Gas Reclamation Landfill, dated April 11, 2012.

The routine semi-annual monitoring is conducted in April and October. Routine annual monitoring is conducted in October. During 2017, the additional investigation monitoring was conducted in conjunction with the routine monitoring events. The LGRL groundwater monitoring network is outlined below.

- Seventeen monitoring wells are monitored semi-annually for inorganics (hardness, alkalinity, chloride, and arsenic) in addition to water elevations and field parameters (i.e. specific conductance, pH, and temperature).
- VOC analyses are conducted semi-annually at seven of these monitoring wells (MW-1RR, MW-1AR, W-3R, W-3AR, MW-210, MW-210A, and MW-210B) and annually at five of these monitoring wells (A-3A, W-163, W-163A, W-214, and W-214A). No VOC analysis is required at the remaining five wells (MW-6R, MW-203A, MW-7R, MW-8R, and MW-204A).
- Three additional monitoring wells (MW-201, MW-201A, and MW-201B) are monitored semi-annually for water elevation and field parameters only.
- Investigation groundwater monitoring includes semi-annual monitoring at eight monitoring wells (MW-1B, P-401D, P-402E, P-422B, P-423D, P-424D, P424SS, and P-426D) for inorganics (hardness, alkalinity, and chloride), VOCs, water elevations, and field parameters. A new investigation groundwater monitoring well, P-429SS, was installed in October 2017 and will be added to the semi-annual monitoring program in 2018.
- Investigation private well monitoring includes monthly monitoring for VOCs at one private well (PW-21RR), semi-annual monitoring for VOCs and inorganics (hardness, alkalinity, and chloride) at seven private wells (PW-19, PW-20, PW-21RR, PW-23, PW-28, PW-32, and PW-38), and annual monitoring for VOCs and inorganics at three additional private wells (PW-42, PW-43, and PW-44). Field parameters are also recorded during each sampling event.

During 2017, groundwater monitoring was conducted by Environmental Sampling Corporation (ESC) of Muskego, Wisconsin. Samples were analyzed by Pace Analytical Services of Green Bay, Wisconsin (Wisconsin Laboratory Certification No. 999407970).

SCS Engineers prepared and submitted a summary of the groundwater monitoring results and an electronic data submission for each semi-annual monitoring event. The semi-annual monitoring reports are provided as **Appendix B, Attachment B-1**. Private well results were provided to the homeowners and the WDNR throughout the reporting period.

Additionally, SCS Engineers prepared the Phase 3 Investigation Update - P429D Drilling Status and Proposed Well Installation, dated June 22, 2017. This update detailed the installation of the P-429D borehole and proposed that the existing borehole be used for the installation of a deeper well (P-429SS) in the upper sandstone. In a letter dated July 12, 2017 (**Appendix A,**

Attachment A-1), WDNR concurred with the recommendations. The well was installed in October 2017 and monitored in November 2017 and February 2018. Additional information regarding the Phase 3 Investigation will be provided by SCS Engineers in 2018.

Historic VOC Monitoring Results and Concentrations vs. Time Plots for total DCE, TCE and vinyl chloride for selected routine monitoring wells were prepared by SCS Engineers and are included as **Appendix B, Attachment B-2**. Additional discussion regarding the groundwater quality trends is provided below in response to approval condition 3.i.

In general, the groundwater flow direction trends to the north across the site with gradients ranging from 0.01 ft/ft to 0.02 ft/ft in the area of the former LGRL facility as shown on the Groundwater Table Map (**Appendix B, Figure 1**).

Approval Reference
May 19, 2000
Plan of Operation Approval Modification, Superior Glacier Ridge Landfill (Lic. No. 3068), Biopile (Lic. No. 3792), Land and Gas Reclamation Landfill (Lic. No. 1118), and Demolition Landfill (Lic. No. 3568)

h. ***A listing of all monitoring points or monitoring periods where sampling was not conducted as required. The annual report shall propose a schedule to supplement the approved monitoring program to compensate for the missing monitoring points or periods.***

Response
In accordance with the WDNR approved Waste Relocation Project, the LGRL gas collection system components, leachate head monitoring points, gas probes, and settlement hubs were abandoned prior to 2017.

Groundwater wells and staff gauges are the only monitoring points that currently remain at the facility. During 2017, these points were monitored in accordance with the facility permit and approvals; no supplemental monitoring for missed points was necessary.

One of the supplemental monitoring wells installed as part of the on-going groundwater investigation was obstructed during the April 2017 event and could not be sampled. Attempts were made by SCS Engineers personnel to repair the well prior to the October 2017 event; however, there remained a slight obstruction in the well that did not allow for the insertion of sampling equipment utilized by ESC during the October 2017 event. ESC personnel collected a sample from P-401D in December 2017 utilizing different sampling equipment.

Approval Reference

May 19, 2000

Plan of Operation Approval Modification, Superior Glacier Ridge Landfill (Lic. No. 3068), Biopile (Lic. No. 3792), Land and Gas Reclamation Landfill (Lic. No. 1118), and Demolition Landfill (Lic. No. 3568)

i. ***An overall evaluation of the effectiveness of the remedy in reducing environmental impacts of the site.***

Response

As of March 23, 2016, and the completion of the WDNR approved Waste Relocation Project, all of the LGRL waste has been exhumed and disposed of in the active ADS Glacier Ridge Landfill thus removing the source of the environmental impacts.

An assessment of environmental impacts over time is presented in the Historic VOC Monitoring Results and Concentrations vs. Time Plots prepared by SCS Engineers (**Appendix B, Attachment B-2**). Plots for total DCE, TCE and Vinyl Chloride show concentrations to be stable or trending downward in the sample collected from MW-1AR, MW-1RR, W-3AR, MW-210, and MW-214. Concentrations of DCE and TCE in the samples collected from W-3R, MW-210B, and MW-214A have been stable or not detected, but concentrations of vinyl chloride have been variable (W-3R) or displayed an increasing trend (MW-210B and MW-214A). Concentrations of TCE and VC in the samples collected from MW-210A have been stable or trending downward, but the DCE concentrations have increased slightly in recent years.

The Groundwater Monitoring Results (April and October 2017) in **Appendix B, Attachment B-1** prepared by SCS Engineers provides further data interpretation related to the April and October 2017 groundwater monitoring events.

APPENDIX A

Facility Information

Attachment A-1

WDNR Correspondence

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
3911 Fish Hatchery Road
Fitchburg WI 53711-5397

Scott Walker, Governor
Cathy Stepp, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

May 2, 2017

FILE REF: FID# 114063950
FID# 114052290
Dodge County
SW Approvals

Mr. Lonn Walter
Advanced Disposal Services Glacier Ridge Landfill, LLC
N7296 Highway V
Horicon, WI 53032

SUBJECT: Annual Reports for the Advanced Disposal Services Glacier Ridge Landfill, (Lic. #3068), Biopile (Lic. #3792) and Land and Gas Reclamation Landfill (Lic. #1118)

Dear Mr. Walter:

The Department has received the annual reports for the Glacier Ridge Landfill, the biopile processing facility (Biopile) and the Land and Gas Reclamation Landfill (LGRL). These reports are required by the Department's May 19, 2000 plan of operation approval modification and October 13, 2013 southeast expansion plan of operation approval.

The May 19, 2000 approval contains annual report requirements for Glacier Ridge Landfill, Biopile, LGRL and Demolition Landfill. The annual report requirements for the Glacier Ridge landfill have been superseded by the October 13, 2013 plan of operation approval. The Biopile requirements are still active and should continue to be followed. The Demolition landfill was removed as part of the south expansion of the Glacier Ridge landfill and the annual reports are no longer necessary.

As approved by the October 13, 2013 southeast expansion plan of operation approval, the waste from LGRL was removed and relocated to the adjacent Glacier Ridge Landfill. The waste relocation project began in 2014 and was completed in 2016. All the waste has been removed and relocated; therefore some of the LGRL annual reporting requirements in the May 19, 2000 approval will not be needed in future annual reports. Reporting requirements for the LGRL final cover (conditions 3a and 3d) and gas extraction system (conditions 3c, e, f and g) are no longer necessary. However, the evaluation of the groundwater monitoring data (condition 3b), the list of monitoring points (condition 3h), and the evaluation of the effectiveness of the remedy (condition 3i) will continue to be required in annual reports to the Department.

If you have any questions regarding this letter, please contact Ann Bekta at (608)743-4845.

Sincerely,

Cynthia Moore

Cynthia Moore, Supervisor
Waste and Materials Management Program
South Central Region

cc: Ann Bekta – Janesville
Adam Hogan - SCR
Jake Margelofsky - jacob.margelofsky@advanceddisposal.com
Tyler Field - Tyler.Field@Cornerstoneeg.com

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711-5397

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July 12, 2017

Lonn Walter
Advance Disposal
N7296 County Road V
Horicon, Wisconsin 53032

RE: Phase 3 Investigation Update - P429D Drilling Status and Proposed Well Installation, Land & Gas Reclamation Landfill, Dodge County, Wisconsin

Dear Mr. Walter:

The Department of Natural Resources reviewed the June 22, 2017 Technical Memorandum submitted by SCS Engineers regarding the drilling P429D borehole as part of Phase 3 Investigation of the deep aquifer. The report summarizes the activities conducted for the P429D borehole. In addition, the report summarizes groundwater results including data from groundwater samples collected during April 2017.

The objective of the monitoring well P429 is to define the downgradient extent of the plume and to be a sentinel well for the downgradient water supply wells. The planned intent was to intercept the fracture zone identified in the upper dolomite in several monitoring wells. The well was drilled to a depth of 380 feet. Groundwater flow in the open borehole was insufficient for the installation of a monitoring well in the dolomite. The dolomite appears massive and relatively unfractured.

Based on the results of the drilling the Department concurs with the recommendation to extend P429 borehole into the top of the sandstone and install a monitoring well in the upper 15 of sandstone.in addition the Department reviewed and concurs with the recommendations:

- Collect a groundwater sample from the new monitoring sell approximately one month after the installation, and then include the new well in the semiannual monitoring program.
- Continue the semiannual monitoring program for the monitoring wells and water supply wells.
- Evaluate the need for a well screened in the dolomite.

However, the Department recommends an evaluation of the need for monitoring wells screened in the sandstone at other locations near the source and to define the extent of the plume.

It is understood that this may not be the final phase of the deep aquifer investigation.

The Department appreciates the efforts by Advanced Disposal to investigate the impacts to groundwater. If you have any questions or concerns, please contact me at (608) 275-3220.

Sincerely,

Jon Heberer
Hydrogeologist
Remediation and Redevelopment Program

cc: Sherren Clark, SCS Engineers
Eric Oelkers, SCS Engineers
Mark Torresani, Cornerstone Engineering
Tim Curry, Advance Disposal

APPENDIX B

2017 Groundwater Data Assessment (SCS Engineers)

Attachment B-1

Groundwater Monitoring Results: April 2017
Groundwater Monitoring Results: October 2017

Environmental Consultants
and Contractors

2830 Dairy Drive
Madison, WI 53718-6751

608 224-2830
FAX 608 224-2839
www.scsengineers.com

SCS ENGINEERS

June 27, 2017
File No. 25217008.00

GEMS Data Submittal Contact – WA/5
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

Subject: Groundwater Monitoring Results – April 2017
Land & Gas Reclamation Landfill – Horicon, Wisconsin
WDNR License #1118
FID #114052290

Dear GEMS Data Submittal Contact:

Enclosed are the electronic data file, NR 140 exceedance summary, and monitoring data certification form for monitoring performed in April 2017 at the former Land & Gas Reclamation Landfill (LGRL) site. Monitoring data in this submittal include laboratory results and associated field data from the following monitoring points in the required LGRL monitoring program:

- Monitoring wells (MW1AR – 214A)
- Surface water staff gauges (SW2 – SW5)

The landfill gas blower and gas condensate were not monitored because the landfill gas collection system was shut down in late 2015 as part of the LGRL waste removal project. Removal of all waste from LGRL has now been completed.

The groundwater samples were collected by Environmental Sampling Corporation (ESC). Laboratory analysis was performed by Pace Analytical laboratory.

The data CD also includes monitoring data for some of the wells that were installed for the ongoing investigation of volatile organic compounds (VOCs) in the bedrock aquifer. Investigation wells that have been assigned DNR IDs and are included on the data CD include bedrock monitoring wells P-401D, P-402E, and P-423D; and deep unconsolidated aquifer monitoring wells MW-1B and P-422B. These wells are not part of the routine LGRL monitoring program. Additional investigation wells P-424D, P-424SS, and P-426D have not been assigned DNR IDs and are not included on the data CD. Results for all groundwater monitoring associated with the VOC investigation will be provided to the Wisconsin Department of Natural Resources (WDNR) in the next investigation update report, in accordance with the approved investigation work plan.

This letter provides a preliminary analysis of the cause and significance of the NR 140 groundwater standard exceedances. An explanation of any deviations from the approved sampling plan is also included in the Sampling Comments section of this letter.

NR 140 EXCEEDANCES

NR 140 standard exceedances for the April 2017 sampling round are listed in the attached NR 140 Exceedance Summary table. The following discussion addresses the NR 140 enforcement standard (ES) and preventive action limit (PAL) exceedances for this event.

Public Health Parameters

Arsenic was reported at concentrations less than the ES, but above the PAL of 1 microgram per liter (µg/L), in samples from the following wells: MW-1AR, MW-1RR, MW-8R, MW-203A, MW-204A, MW-210, MW-210A, MW-214, W-3R, W-3AR, and W-163A. Arsenic concentrations within this range have been detected in samples collected from many wells around the former LGRL site and the adjacent Glacier Ridge Landfill, and are likely attributable to naturally occurring arsenic. Arsenic was reported in the sample from W-163 at an estimated concentration above the PAL, but below the limit of quantitation (LOQ) ("J" flag). This result is not considered a PAL exceedance without additional confirmation in accordance with NR 140.14(3).

VOCs including benzene, cis-1,2-dichloroethene (DCE), trichloroethylene, and/or vinyl chloride were detected at concentrations exceeding the PAL or ES and the LOQ in samples collected from the following wells: MW-1AR, MW-1B, MW-1RR, MW-210A, MW-210B, P-402E, P-422B, P-423D, P-424D, W-3AR, and W-3R. The specific VOCs exceeding the PAL or ES at each well are shown in the attached NR 140 Exceedance Summary (**Table 1**). All of these wells are located downgradient from the former LGRL site, and the VOCs are likely due to LGRL.

In addition to the NR 140 standard exceedances described above, there were some VOC results reported at estimated concentrations above the PAL or ES, but below the LOQ ("J" flag). These results are not considered PAL or ES exceedances without additional confirmation in accordance with NR 140.14(3). VOCs reported at concentrations above the PAL, but below the LOQ, included 1,1-dichloroethylene, tetrahydrofuran, and/or trichloroethylene in samples from the following wells: MW-1AR, MW-210A, P-423D, and W-3AR. 1,1-dichloroethylene was detected in the sample from MW-1AR at an estimated concentration equaling the ES but below the LOQ.

These wells are located adjacent to or downgradient from the former LGRL site, and the detected VOCs are likely due to LGRL.

The PAL exceedances and reported concentrations for VOCs were generally consistent with previous results; however, the PAL exceedance for cis-1,2-DCE in the sample from P-422B was the first PAL exceedance for that well. P-422B was installed for the groundwater VOC investigation and samples the deepest part of the unconsolidated aquifer, above the bedrock. The reported concentration was equal to the PAL, which is considered an exceedance under NR 140.

Public Welfare Parameters

Chloride was reported above the NR 140 ES of 250 µg/L in the sample from MW-1AR. Chloride was reported above the PAL of 125 µg/L in the samples from MW-210A, MW-214A, and W-3AR. All of these wells are located downgradient of LGRL, and the chloride detections may be associated with LGRL.

Surface Water Staff Gauges

The surface water elevations could not be measured at staff gauges SW3 and SW5 because the staff gauges need repair. Surface water elevations for April 2017 at these two gauges were measured using a GPS survey unit rather than the gauges.

SAMPLING PROGRAM COMMENTS

As noted previously, deeper monitoring wells installed for the ongoing VOC investigation were monitored in addition to the required routine monitoring program, including MW-1B, P-401D, P-402E, P-422B, P-423D, P-424D, P-424SS, and P-426D. Results for the additional monitoring wells with GEMS ID numbers assigned (all except P-424D, P-424SS, and P-426D) are included on the data CD.

The third and final phase of waste removal from the LGRL site was completed in 2016. The April 2017 monitoring data for the LGRL monitoring wells do not appear to show any effects in groundwater quality from the waste removal.

If you have any questions regarding this submittal, please call Sherren Clark at 608.216.7323.

Sincerely,

Sherren Clark, PE, PG
Project Director
SCS ENGINEERS

Betty J. Socha, PhD, PG
Senior Project Manager
SCS ENGINEERS

SCC/jsn/BJS

cc: Adam Hogan, WDNR (without CD)
Lonn Walter, Advanced Disposal Services (2 copies of letter, 1 CD)
Kari Rabideau, Advanced Disposal Services (via email)
Tim Curry, Advanced Disposal Services (via email)
Frank Perugini, Environmental Sampling Corp. (without CD)

Enclosures: Table 1 - NR 140 Exceedance Summary
Groundwater Monitoring Data Certification Form
GEMS Data CD

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Table 1
NR 140 Exceedance Summary

Site ID: 1118
Site Name: Land and Gas Reclamation Landfill
Reporting Period: April 2017

Groundwater Results Exceeding NR 140 Standards

Well	Parameter	Result	PAL	ES	Exceedance Type
MW-001AR (LGRL)	Arsenic, dissolved (ug/l As)	3.2	1	10	PAL
	Chloride, dissolved (mg/l as Cl)	551	125	250	ES
	cis-1,2-Dichloroethene (ug/l)	1140	7	70	ES
	Vinyl chloride (ug/l)	1540	0.02	0.2	ES
MW-001B	Vinyl chloride (ug/l)	1.9	0.02	0.2	ES
MW-001RR (LGRL)	Arsenic, dissolved (ug/l As)	7	1	10	PAL
	Vinyl chloride (ug/l)	5.2	0.02	0.2	ES
MW-008R (LGRL)	Arsenic, dissolved (ug/l As)	2.2	1	10	PAL
MW-203A	Arsenic, dissolved (ug/l As)	7.5	1	10	PAL
MW-204A (LGRL)	Arsenic, dissolved (ug/l As)	1.1	1	10	PAL
MW-210	Arsenic, dissolved (ug/l As)	2.3	1	10	PAL
MW-210A	Arsenic, dissolved (ug/l As)	8.8	1	10	PAL
	Chloride, dissolved (mg/l as Cl)	160	125	250	PAL
	cis-1,2-Dichloroethene (ug/l)	461	7	70	ES
	Vinyl chloride (ug/l)	71.7	0.02	0.2	ES
MW-210B	Vinyl chloride (ug/l)	3.7	0.02	0.2	ES
MW-214	Arsenic, dissolved (ug/l As)	1.3	1	10	PAL
MW-214A	Chloride, dissolved (mg/l as Cl)	197	125	250	PAL
P-402E (LGRL)	cis-1,2-Dichloroethene (ug/l)	324	7	70	ES
	Trichloroethylene (ug/l)	3.3	0.5	5	PAL
	Vinyl chloride (ug/l)	29.7	0.02	0.2	ES
P-422B	cis-1,2-Dichloroethene (ug/l)	7	7	70	PAL
P-423D	cis-1,2-Dichloroethene (ug/l)	47.9	7	70	PAL
	Vinyl chloride (ug/l)	1.1	0.02	0.2	ES
P-424D	cis-1,2-Dichloroethene (ug/l)	119	7	70	ES
	Trichloroethylene (ug/l)	2.1	0.5	5	PAL
	Vinyl chloride (ug/l)	7.6	0.02	0.2	ES

Well	Parameter	Result	PAL	ES	Exceedance Type
W-003AR (LGRL)	Arsenic, dissolved (ug/l As)	1.4	1	10	PAL
	Benzene (ug/l)	1.3	0.5	5	PAL
	Chloride, dissolved (mg/l as Cl)	135	125	250	PAL
	cis-1,2-Dichloroethene (ug/l)	92.6	7	70	ES
	Vinyl chloride (ug/l)	78.4	0.02	0.2	ES
W-003R (LGRL)*	Arsenic, dissolved (ug/l As)	1.0	1	10	PAL
	Vinyl chloride (ug/l)	5.1	0.02	0.2	ES
	Vinyl chloride (ug/l)	5.1	0.02	0.2	ES
W-163A (LGRL)	Arsenic, dissolved (ug/l As)	2.9	1	10	PAL

Groundwater Results with Estimated Concentration Above an NR 140 PAL or ES and Below the LOQ

Note: If both the result and the PAL or ES are above the limit of detection but below the limit of quantitation, the result is not considered a PAL or ES exceedance under NR 140.14(3)(c). If the PAL or ES is below the limit of detection and the result is below the limit of quantitation, the result is not considered a PAL or ES exceedance without additional confirmation as described in NR 140.14(3)(b).

Well	Parameter	Result	LOD/LOQ	PAL	ES
MW-001AR (LGRL)	1,1-Dichloroethylene (ug/l)	7 J	4.1/10	0.7	7
	Tetrahydrofuran (ug/l)	46.7 J	20.3/50	10	50
MW-210A	1,1-Dichloroethylene (ug/l)	2.1 J	1/2.5	0.7	7
	Trichloroethylene (ug/l)	2 J	0.83/2.5	0.5	5
P-423D	Trichloroethylene (ug/l)	0.73 J	0.33/1	0.5	5
W-003AR (LGRL)	1,1-Dichloroethylene (ug/l)	0.92 J	0.41/1	0.7	7
W-163 (LGRL)	Arsenic, dissolved (ug/l As)	2.8 J	0.5/5	1	10

Notes:
PAL = Preventive Action Limit
ES = Enforcement Standard
LOQ = Limit of Quantitation
LOD = Limit of Detection
J = Result is an estimated value below the laboratory's limit of quantitation.
* = Two results indicate duplicate samples.
ug/l = micrograms per liter
mg/l = milligrams per liter

Prepared by: AV, 5/31/2017
Checked by: BJS, 6/22/2017

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Environmental Monitoring Data Certification

Form 4400-231 (R 5/17)

Notice: Personally identifiable information collected will be used for program administration and enforcement purposes. The Department may also provide this information to requesters as required under Wisconsin's Open Records law, ss. 19.31 to 19.39, Wis. Stats.
When submitting monitoring data, the owner or operator of the facility, practice or activity is required to notify the Department in writing that a groundwater standard or an explosive gas level has been attained or exceeded, as specified in ss. NR 140.24(1)(a); NR 140.26(1)(a); NR 507.30NR 635.14(9)(a); NR 635.18(20) and NR 507.30, Wis. Adm. Code. Failure to report may result in fines, forfeitures or other penalties resulting from enforcement under ss. 289.97, 291.97 or 299.95, Wis. Stats

Instructions:

- **Prepare one form for each license or monitoring ID.**
- **Please type or print legibly.**
- Attach a notification of any values that attain or exceed groundwater standards (that is, preventive action limits, enforcement standards or alternative concentration limits). The notification must include a preliminary analysis of the cause and significance of each value.
- Attach a notification of any gas values that attain or exceed explosive gas levels.
- Send the original signed form, any notification, and Electronic Data Deliverable [EDD] to:

GEMS Data Submittal Contact - WA/5
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner)
SCS Engineers

Contact for questions about data formatting. Include data preparer's name, telephone number and Email address:

Name	Phone No. (include area code)
Mari Bull	(830) 644-2130

Email
mbull@scsengineers.com

Facility Name
Land & Gas Reclamation Landfill

License # / Monitoring ID	Facility ID (FID)
1118	114052290

Actual sampling dates (e.g., July 2-6, 2003)	The enclosed results are for sampling required in the month(s) of: (e.g., June 2003)
April 3-7, 2017	April 2017

Type of Data Submitted (Check all that apply):

- [x] Groundwater monitoring data from monitoring wells
- [ ] Groundwater monitoring data from private water supply wells
- [ ] Leachate monitoring data
- [ ] Gas monitoring data
- [ ] Air monitoring data
- [x] Other (specify): Staff Gauge

Notification attached?

- [ ] No. No groundwater standards or explosive gas limits were exceeded.
- [x] Yes, a notification of values exceeding a groundwater standard is attached. It includes a list of monitoring points, dates, sample values, groundwater standard and preliminary analysis of the cause and significance of any concentration.
- [ ] Yes, a notification of values exceeding an explosive gas limit is attached. It includes the monitoring points, dates, sample values and explosive gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards.

Facility Representative Name (Print)	Title	Phone No. (include area code)
Sherren Clark, SCS Engineers	Project Manager	(608) 216-7323

Signature

6-22-17
Date Signed (mm/dd/yyyy)

For DNR Use Only

Check action taken, and record date and your initials. Describe on back side if necessary.

- [ ] Found uploading problems on _____ Initials
- [ ] Notified contact of problems on _____ Uploaded data successfully on _____

EDD format(s): [ ] Diskette [ ] CD (initial submittal and follow-up) [ ] E-mail (follow-up only) [ ] Other: _____

Environmental Consultants
and Contractors

2830 Dairy Drive
Madison, WI 53718-6751

608 224-2830
FAX 608 224-2839
www.scsengineers.com

SCS ENGINEERS

January 2, 2018
File No. 25217008.00

GEMS Data Submittal Contact – WA/5
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

Subject: Groundwater Monitoring Results – October 2017
Land & Gas Reclamation Landfill – Horicon, Wisconsin
WDNR License #1118
FID #114052290

Dear GEMS Data Submittal Contact:

Enclosed are the electronic data file, NR 140 exceedance summary, and monitoring data certification form for monitoring performed in October 2017 at the former Land & Gas Reclamation Landfill (LGRL) site. Monitoring data in this submittal include laboratory results and associated field data from the following monitoring points in the required LGRL monitoring program:

- Monitoring wells (MW1AR through MW214A)
- Surface water staff gauges (SW2 through SW5)

The groundwater samples were collected by Environmental Sampling Corporation (ESC). Laboratory analysis was performed by Pace Analytical laboratory.

The data CD also includes monitoring data for some of the wells that were installed for the ongoing investigation of volatile organic compounds (VOCs) in the bedrock aquifer and were sampled in October 2017. Investigation wells that have been assigned DNR IDs and are included on the data CD include bedrock monitoring wells P-401D, P-402E, and P-423D; and deep unconsolidated aquifer monitoring wells MW-1B and P-422B. These wells are not part of the routine LGRL monitoring program. Additional investigation wells P-424D, P-424SS, and P-426D have not been assigned DNR IDs and are not included on the data CD. Results for all groundwater monitoring associated with the VOC investigation will be provided to the Wisconsin Department of Natural Resources (WDNR) in the next investigation update report, in accordance with the approved investigation work plan.

This letter provides a preliminary analysis of the cause and significance of the NR 140 groundwater standard exceedances for the submitted results. An explanation of any deviations from the approved sampling plan is also included in the Sampling Comments section of this letter.

NR 140 EXCEEDANCES

NR 140 standard exceedances for the October 2017 sampling round are listed in the attached NR 140 Exceedance Summary table. The following discussion addresses the NR 140 enforcement standard (ES) and preventive action limit (PAL) exceedances for this event.

Public Health Parameters

Arsenic was reported at concentrations less than the ES, but above the PAL of 1 microgram per liter (µg/L), in samples from the following wells: MW-1AR, MW-1RR, MW-7R, MW-8R, MW-203A, MW-210, MW-210A, MW-214, W-3R, W-3AR, W-163, and W-163A. Arsenic concentrations within this range have been detected in samples collected from many wells around the former LGRL site and the adjacent Glacier Ridge Landfill, and are likely attributable to naturally occurring arsenic. Arsenic was reported in the sample from A-3A at an estimated concentration above the PAL, but below the limit of quantitation (LOQ) ("J" flag). This result is not considered a PAL exceedance without additional confirmation in accordance with NR 140.14(3).

VOCs including benzene, cis-1,2-dichloroethene (DCE), tetrahydrofuran, trichloroethylene, and/or vinyl chloride were detected at concentrations exceeding the PAL or ES and the LOQ in samples collected from the following wells: MW-1AR, MW-1B, MW-1RR, MW-210A, MW-210B, MW-214A, P-402E, P-423D, P-424D, W-3AR, and W-3R. The specific VOCs exceeding the PAL or ES at each well are shown in the attached NR 140 Exceedance Summary (**Table 1**). All of these wells are located downgradient from the former LGRL site, and the VOCs are likely due to LGRL.

In addition to the NR 140 standard exceedances described above, there were some VOC results reported at estimated concentrations above the PAL or ES, but below the LOQ ("J" flag). These results are not considered PAL or ES exceedances without additional confirmation in accordance with NR 140.14(3). VOCs reported at concentrations above the PAL, but below the LOQ, included 1,1-dichloroethylene, tetrahydrofuran, trichloroethylene and/or vinyl chloride in samples from the following wells: MW-1AR, MW-210, MW-210A, P-402E, and P-423D. 1,1-Dichloroethylene was detected in the sample from MW-1AR at an estimated concentration equaling the ES but below the LOQ.

These wells are located adjacent to or downgradient from the former LGRL site, and the detected VOCs are likely due to LGRL.

The PAL exceedances and reported concentrations for VOCs were generally consistent with previous results. The PAL exceedance reported for the April 2017 result for cis-1,2-DCE in the sample from P-422B was not confirmed in the October 2017 sampling. The reported concentration for April 2017 was equal to the PAL (7 µg/L), which is considered an exceedance under NR 140, and the October 2017 result was well below the PAL at 0.85 µg/L. P-422B was installed for the groundwater VOC

investigation and samples the deepest part of the unconsolidated aquifer, above the bedrock.

Public Welfare Parameters

Chloride was reported above the NR 140 ES of 250 µg/L in the sample from MW-1AR. Chloride was reported above the PAL of 125 µg/L in the samples from MW-210A, MW-214A, and W-3AR. All of these wells are located downgradient of LGRL, and the chloride detections may be associated with LGRL.

SAMPLING PROGRAM COMMENTS

As noted previously, deeper monitoring wells installed for the ongoing VOC investigation were monitored in addition to the required routine monitoring program, including MW-1B, P-401D, P-402E, P-422B, P-423D, P-424D, P-424SS, and P-426D. Although these wells are not part of the landfill monitoring program, results for the additional monitoring wells with GEMS ID numbers assigned (all except P-424D, P-424SS, and P-426D) are included on the data CD. Results for all groundwater monitoring associated with the VOC investigation will be provided to the WDNR in the next investigation update report, in accordance with the approved investigation work plan.

The third and final phase of waste removal from the LGRL site was completed in 2016. The October 2017 monitoring data for the LGRL monitoring wells do not appear to show any effects on groundwater quality from the waste removal.

If you have any questions regarding this submittal, please call Sherren Clark at 608.216.7323.

Sincerely,

Sherren Clark, PE, PG
Project Director
SCS ENGINEERS

Betty J. Socha, PhD, PG
Senior Project Manager
SCS ENGINEERS

SCC/AJR/BJS

cc: Adam Hogan, WDNR (without CD)
Lonn Walter, Advanced Disposal Services (2 copies of letter, 1 CD)
Kari Rabideau, Advanced Disposal Services (via email)
Tim Curry, Advanced Disposal Services (via email)
Frank Perugini, Environmental Sampling Corp. (without CD)

Enclosures: Table 1 - NR 140 Exceedance Summary
Groundwater Monitoring Data Certification Form
GEMS Data CD

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Table 1
NR 140 Exceedance Summary

Site ID: **1118**
Site Name: **Land and Gas Reclamation Landfill**
Reporting Period: **October 2017**

Groundwater Results Exceeding NR 140 Standards

Well	Parameter	Result *	PAL	ES	Exceedance Type
MW-001AR (LGRL)	Arsenic, dissolved (ug/l As)	2.9 / 3	1	10	PAL
	Chloride, dissolved (mg/l as Cl)	526 / 507	125	250	ES
	cis-1,2-Dichloroethene (ug/l)	1030 / 1380	7	70	ES
	Vinyl chloride (ug/l)	1480/ 1760	0.02	0.2	ES
MW-001B	Vinyl chloride (ug/l)	2	0.02	0.2	ES
MW-001RR (LGRL)	Arsenic, dissolved (ug/l As)	7.8	1	10	PAL
	Vinyl chloride (ug/l)	2.5	0.02	0.2	ES
MW-007R	Arsenic, dissolved (ug/l As)	2	1	10	PAL
MW-008R (LGRL)	Arsenic, dissolved (ug/l As)	3.7 / 3.7	1	10	PAL
MW-203A	Arsenic, dissolved (ug/l As)	8.8	1	10	PAL
MW-210	Arsenic, dissolved (ug/l As)	4.8	1	10	PAL
MW-210A	Arsenic, dissolved (ug/l As)	9.4	1	10	PAL
	Chloride, dissolved (mg/l as Cl)	136	125	250	PAL
	cis-1,2-Dichloroethene (ug/l)	440	7	70	ES
	Vinyl chloride (ug/l)	64.7	0.02	0.2	ES
MW-210B	Vinyl chloride (ug/l)	3.4	0.02	0.2	ES
MW-214	Arsenic, dissolved (ug/l As)	1.6	1	10	PAL
MW-214A	Chloride, dissolved (mg/l as Cl)	201	125	250	PAL
	Vinyl chloride (ug/l)	41	0.02	0.2	ES
P-402E (LGRL)	cis-1,2-Dichloroethene (ug/l)	290	7	70	ES
	Trichloroethylene (ug/l)	3.5	0.5	5	PAL
	Vinyl chloride (ug/l)	27.2	0.02	0.2	ES
P-423D	cis-1,2-Dichloroethene (ug/l)	58.6	7	70	PAL
	Vinyl chloride (ug/l)	2.5	0.02	0.2	ES
P-424D	cis-1,2-Dichloroethene (ug/l)	151	7	70	ES
	Trichloroethylene (ug/l)	2	0.5	5	PAL
	Vinyl chloride (ug/l)	9.4	0.02	0.2	ES

Well	Parameter	Result *	PAL	ES	Exceedance Type
W-003AR (LGRL)	Arsenic, dissolved (ug/l As)	1.4	1	10	PAL
	Benzene (ug/l)	1.2	0.5	5	PAL
	Chloride, dissolved (mg/l as Cl)	140	125	250	PAL
	cis-1,2-Dichloroethene (ug/l)	53.5	7	70	PAL
	Tetrahydrofuran (ug/l)	10.2	10	50	PAL
	Vinyl chloride (ug/l)	47.7	0.02	0.2	ES
W-003R (LGRL)	Arsenic, dissolved (ug/l As)	1.1	1	10	PAL
	Vinyl chloride (ug/l)	12.9	0.02	0.2	ES
W-163 (LGRL)	Arsenic, dissolved (ug/l As)	5.3	1	10	PAL
W-163A (LGRL)	Arsenic, dissolved (ug/l As)	3.2	1	10	PAL

Groundwater Results with Estimated Concentration Above an NR 140 PAL or ES and Below the LOQ

Note: If both the result and the PAL or ES are above the limit of detection but below the limit of quantitation, the result is not considered a PAL or ES exceedance under NR 140.14(3)(c). If the PAL or ES is below the limit of detection and the result is below the limit of quantitation, the result is not considered a PAL or ES exceedance without additional confirmation as described in NR 140.14(3)(b).

Well	Parameter	Result	LOD/LOQ	PAL	ES
A-3A (LGRL)	Arsenic, dissolved (ug/l As)	8.4 J	5.4 / 20	1	10
MW-001AR (LGRL)	1,1-Dichloroethylene (ug/l)	9.8 J	4.1 / 10	0.7	7
	Tetrahydrofuran (ug/l)	33 J	20.3 / 50	10	50
MW-204A (LGRL)	Arsenic, dissolved (ug/l As)	5.5 J	5.4 / 20	1	10
MW-210	Vinyl chloride (ug/l)	0.2 J	0.18 / 1	0.02	0.2
MW-210A	1,1-Dichloroethylene (ug/l)	2.2 J	1 / 2.5	0.7	7
	Trichloroethylene (ug/l)	2.3 J	0.83 / 2.5	0.5	5
P-402E (LGRL)	1,1-Dichloroethylene (ug/l)	1.5 J	1 / 2.5	0.7	7
P-423D	Trichloroethylene (ug/l)	0.59 J	0.33 / 1	0.5	5

Notes:
PAL = Preventive Action Limit
ES = Enforcement Standard
LOQ = Limit of Quantitation
LOD = Limit of Detection
J = Result is an estimated value below the laboratory's limit of quantitation.
* = Two results indicate duplicate samples.
ug/l = micrograms per liter
mg/l = milligrams per liter

Prepared by: AJR, 12/22/2017
Checked by: NDK 12/27/2017

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Environmental Monitoring Data Certification

Form 4400-231 (R 5/17)

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Instructions:

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- **Please type or print legibly.**
- Attach a notification of any values that attain or exceed groundwater standards (that is, preventive action limits, enforcement standards or alternative concentration limits). The notification must include a preliminary analysis of the cause and significance of each value.
- Attach a notification of any gas values that attain or exceed explosive gas levels.
- Send the original signed form, any notification, and Electronic Data Deliverable [EDD] to: GEMS Data Submittal Contact - WA/5, Wisconsin Department of Natural Resources, P.O. Box 7921, Madison, WI 53707-7921

Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner)
SCS Engineers

Contact for questions about data formatting. Include data preparer's name, telephone number and Email address:

Name	Phone No. (include area code)
Ashley Radunzel	(608) 224-2830

Email
aradunzel@scsengineers.com

Facility Name
Land & Gas Reclamation Landfill

License # / Monitoring ID	Facility ID (FID)
1118	114052290

Actual sampling dates (e.g., July 2-6, 2003)	The enclosed results are for sampling required in the month(s) of: (e.g., June 2003)
October 2-6, 27, 2017	October 2017

Type of Data Submitted (Check all that apply):

- [x] Groundwater monitoring data from monitoring wells
- [ ] Groundwater monitoring data from private water supply wells
- [ ] Leachate monitoring data
- [ ] Gas monitoring data
- [ ] Air monitoring data
- [x] Other (specify): Staff Gauge

Notification attached?

- [ ] No. No groundwater standards or explosive gas limits were exceeded.
- [x] Yes, a notification of values exceeding a groundwater standard is attached. It includes a list of monitoring points, dates, sample values, groundwater standard and preliminary analysis of the cause and significance of any concentration.
- [ ] Yes, a notification of values exceeding an explosive gas limit is attached. It includes the monitoring points, dates, sample values and explosive gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards.

Facility Representative Name (Print)	Title	Phone No. (include area code)
Sherren Clark, SCS Engineers	Project Manager	(608) 216-7323

Signature

12-27-17
Date Signed (mm/dd/yyyy)

For DNR Use Only

Check action taken, and record date and your initials. Describe on back side if necessary.

- [ ] Found uploading problems on _____ Initials
- [ ] Notified contact of problems on _____ Uploaded data successfully on _____

EDD format(s): [ ] Diskette [ ] CD (initial submittal and follow-up) [ ] E-mail (follow-up only) [ ] Other: _____

Attachment B-2

Historic VOC Monitoring Results and Concentrations vs. Time Plots

Historic VOC Monitoring Results
Land and Gas Reclamation Landfill
(concentrations in ug/L)

MW-1RR				MW-1AR			
Date	**cis-1,2-DCE**	**TCE**	**VC**	**Date**	**cis-1,2-DCE**	**TCE**	**VC**
NR 140 ES	**70**	**5**	**0.2**	**NR 140 ES**	**70**	**5**	**0.2**
11/21/1991		1,900	2,900	11/19/1991		130	3,000
5/29/1992		2,800	4,300	5/29/1992		100	2,800
6/17/1993		580	1,800	6/17/1993		30	2,200
6/21/1994		10.7	198	6/21/1994		24.9	1,160
4/14/1995	1,500	2,000	3,800	4/14/1995	7,100	200	2,900
10/4/1995	6,400	620	3,400	10/4/1995	6,100	180	2,800
4/4/1996	1,900	130	1,300	4/4/1996	6,600	150	2,600
10/12/1996	16,000	1,600	3,600	10/12/1996	8,500	200	2,300
4/10/1997	3,800	80	3,100	4/10/1997	6,000	86	2,400
10/3/1997	2,500	190	1,600	10/3/1997	6,300	0	2,700
4/10/1998	2,800	120	2,300	4/10/1998	7,200	150	2,500
10/14/1998	11,000	820	3,100	10/15/1998	6,500	95	1,900
4/6/1999	2,100	0	2,300	4/6/1999	5,500	0	2,300
10/7/1999	13,000	6,800	3,400	10/8/1999	6,100	0	2,000
4/3/2000	2,400	77	1,500	4/3/2000	5,700	54	2,200
10/4/2000	4,600	0	1,210	10/5/2000	4,920	0	1,190
4/4/2001	2,260	0	1,240	4/4/2001	5,040	0	1,300
10/3/2001	6,090	411	2,300	10/3/2001	4,910	0	2,000
4/3/2002	4,890	274	535	4/3/2002	5,320	0	795
10/1/2002	4,800	525	1,180	10/1/2002	5,660	0	1,220
4/2/2003	1,260	29.2	593	4/2/2003	4,860	17	1,100
10/9/2003	2,020	0	700	10/9/2003	4,470	0	1,200
4/5/2004	1,220	26.7	1,220	4/5/2004	4,130	16.8	1,550
10/4/2004	4,590	440	2,060	10/4/2004	3,950	0	1,800
4/1/2005	2,510	0	736	4/1/2005	3,990	0	882
10/1/2005	5,130	351	1,150	10/1/2005	4,420	0	951
4/6/2006	2,680	0	785	4/6/2006	3,820	0	659
10/5/2006	4,340	295	1,160	10/5/2006	3,590	0	1,020
4/5/2007	708	0	360	4/5/2007	2,020	0	887
10/22/2007	605	8.46	351	10/22/2007	2,280	<20	1,060
4/10/2008	265	1.92	207	4/10/2008	590	0.51	196
10/9/2008	199	<4	221	10/9/2008	2,020	<40	1,070
4/8/2009	145	<4.0	245	4/8/2009	2,260	<4.0	1,780
10/6/2009	90.2	<4	232	10/6/2009	1,610	<40	1,520
4/6/10	77.5	<4	152	4/6/10 [1]	24,000	<4.0	17,500
10/26/10	94.4	1.41	190	10/26/10	2,370	1.49	1,630
4/7/11	63.6	<4	137	4/7/11	1,700	<40	1,170
10/5/11	90.3	<4	168	10/5/11	1,400	<40	1,110
4/12/12	62.7	<4	136	4/12/12	2,090	<4	1,620
10/2/12	49.9	0.68	107	10/2/12	2,090	<4.8	1,390
4/1/13	23.1	0.58	75.1	4/1/13	1,940	<12	1,310
10/3/13	29.5	0.65	85.7	10/1/13	1,620	<3.6	1,580
4/2/14	13.1	0.37	63.7	4/2/14	1,610	<3.3	1,630
10/6/14	8.4	<0.33	35.9	10/6/14	1,720	<6.6	1,400
4/16/15	14.4	0.53	56.6	4/16/15	1,450	<3.3	1,190
10/7/15	3.9	<0.33	18.3	10/8/15	808	<3.3	1,050
4/6/16	2.4	<0.33	11.6	4/6/16	1,240	<3.3	1,960
10/5/16	4.8	<0.33	24	10/5/16	1,050	<3.3	1,980
4/6/17	1.3	<0.33	5.2	4/6/17	1,140	<3.3	1,540
10/5/17	<0.26	<0.33	2.5	10/5/17	1,030	<3.3	1,480

Historic VOC Monitoring Results
Land and Gas Reclamation Landfill
(concentrations in ug/L)

W-3R				W-3AR			
Date	**cis-1,2-DCE**	**TCE**	**VC**	**Date**	**cis-1,2-DCE**	**TCE**	**VC**
NR 140 ES	**70**	**5**	**0.2**	**NR 140 ES**	**70**	**5**	**0.2**
11/13/1991		0	0	11/14/1991		5	770
5/29/1992		0	0	5/29/1992		78	1,000
6/17/1993		0	0.5	6/17/1993		57	1,300
6/21/1994		0	0	6/21/1994		12	720
4/14/1995	0	0	2.2	4/14/1995	1,200	6.6	110
10/4/1995	0	0	1.2	10/4/1995	1,200	12	1,400
4/4/1996	0	0	0	4/4/1996	1,000	0	550
10/12/1996	0	0	4	10/12/1996	1,800	13	1,100
4/10/1997	0	0	0.56	4/10/1997	1,100	0	740
10/3/1997	0	0	1.5	10/3/1997	1,200	0	780
4/7/1998	0.44	0	0.89	4/7/1998	1,000	0	720
10/14/1998	0	0	6.4	10/14/1998	1,200	0	660
4/6/1999	0.3	0	0.65	4/6/1999	900	0	710
10/6/1999	0.27	0	2.9	10/7/1999	1,200	0	650
4/3/2000	0.29	0	0.17	4/3/2000	1,000	0	890
10/3/2000	0	0	0.133	10/3/2000	1,100	0	404
4/3/2001	0	0	0	4/3/2001	1,050	0	554
10/2/2001	0	0	2.74	10/2/2001	1,130	0	901
4/4/2002	0	0	0	4/4/2002	1,150	0	375
10/1/2002	0	0	14.1	10/1/2002	1,230	0	446
4/1/2003	0	0	0.703	4/1/2003	674	0	601
10/8/2003	0	0	1.98	10/8/2003	712	0	407
4/7/2004	0	0	0	4/7/2004	753	0	519
10/4/2004	0	0	0	10/4/2004	685	0	626
4/1/2005	0	0	0	4/1/2005	567	0	265
10/1/2005	0	0	0	10/1/2005	628	0	258
4/6/2006	0	0	0	4/6/2006	700	1.15	352
10/5/2006	0	0	0	10/4/2006	450	0	279
4/4/2007	0	0	0	4/4/2007	418	0	402
10/22/2007	<0.2	<0.2	3.20	10/22/2007	421	<2	410
4/11/2008	<0.3	<0.4	14.30	4/11/2008	476	<4	382
10/9/2008	<0.3	<0.4	5.32	10/9/2008	322	<4	281
4/7/2009	<0.3	<0.4	2.48	4/7/2009	351	0.8	357
10/7/2009	<0.4	<0.4	<0.2	10/7/2009	339	<4.0	358
4/7/10	<0.4	<0.4	0.95	4/7/10	339	<4	334
10/27/10	<0.4	<0.4	2.46	10/27/10	257	<4	194
4/6/11	<0.4	<0.4	3.14	4/6/11	201	0.51	256
10/5/11	<0.4	<0.4	1.45	10/5/11	170	<4	181
4/11/12	<0.4	<0.4	3.18	4/11/12	190	0.51	205
10/2/12	<0.83	<0.48	18.50	10/2/12	183	0.55	190
4/1/13	<0.83	<0.48	2.90	4/4/13	164	<0.48	146
10/3/13	<0.42	<0.36	3.40	10/3/13	87.8	<0.33	99.3
1/9/14	<0.42	<0.36	3.70	1/9/14	146	<0.36	211
4/2/14	0.26	<0.33	2.00	4/2/14	145	0.39	175
10/7/14	0.35	<0.33	4.00	10/7/14	145	<0.33	196
4/17/15	<0.26	<0.33	1.50	4/17/15	111	<0.33	112
10/7/15	0.27	<0.33	1.70	10/7/15	110	<0.33	118
4/6/16	<0.26	<0.33	<0.18	4/6/16	121	<0.33	129
10/6/16	0.39	<0.33	2.5	10/6/16	125	0.5	178
4/5/17	<0.26	<0.33	5.10	4/5/17	92.6	<0.33	78.4
10/3/17	<0.26	<0.33	12.90	10/3/17	53.5	<0.33	47.7

Historic VOC Monitoring Results
Land and Gas Reclamation Landfill
(concentrations in ug/L)

MW-210				MW-210A				MW-210B			
Date	**cis-1,2-DCE**	**TCE**	**VC**	**Date**	**cis-1,2-DCE**	**TCE**	**VC**	**Date**	**cis-1,2-DCE**	**TCE**	**VC**
NR 140 ES	**70**	**5**	**0.2**	**NR 140 ES**	**70**	**5**	**0.2**	**NR 140 ES**	**70**	**5**	**0.2**
12/6/1991		0	0	12/6/1991		0	180	12/6/1991		0	0
5/28/1992		0	0	5/28/1992		0	200	5/27/1992		0	0
				6/17/1993		7	370				
7/6/1994		0	28.3	7/6/1994		8.6	220	7/6/1994		0	0
4/14/1995	41	0	27	4/14/1995	1,400	13	350	4/14/1995	0	0	0
10/4/1995	26	0	22	10/4/1995	1,600	20	600	10/4/1995	0	0	0
4/4/1996	32	0	27	4/4/1996	1,900	35	450	4/4/1996	0	0	0
10/12/1996	12	0	7.9	10/12/1996	2,300	47	670	10/12/1996	0	0	0
4/10/1997	13	0	20	4/10/1997	1,900	38	420	4/10/1997	0	0	0
10/3/1997	10	0	23	10/3/1997	1,700	66	480	10/3/1997	0	0	0
4/7/1998	6.5	0	14	4/7/1998	1,600	57	540	4/7/1998	0	0	0
10/15/1998	46	0	44	10/15/1998	1,600	47	510	10/15/1998	0	0	no data
4/6/1999	7.3	0	10	4/6/1999	1,200	40	500	4/6/1999	0	0	0
10/11/1999	98	0	240	10/11/1999	800	40	440	10/11/1999	0	0	0
4/4/2000	2.9	0	6.3	4/4/2000	820	32	440	4/4/2000	0	0	0
10/5/2000	1.61	0	5.3	10/5/2000	372	0	157	10/5/2000	0	0	0
4/5/2001	1.12	0	2.47	4/5/2001	421	0	214	4/5/2001	0	0	0
10/3/2001	1.21	0	13.2	10/3/2001	520	55.9	425	10/3/2001	0	0	0
4/4/2002	0.384	0	3.22	4/4/2002	730	0	206	4/4/2002	0	0	0
10/3/2002	1.59	0	12.8	10/3/2002	940	0	327	10/3/2002	0	0	0
4/2/2003	0	0	0.386	4/2/2003	401	0	233	4/2/2003	0	0	0.591
10/8/2003	0	0	1.02	10/8/2003	293	10	29.2	10/8/2003	0	0	0.274
4/7/2004	0	0	0.383	4/7/2004	272	0	76.3	4/7/2004	0	0	0.891
10/5/2004	0	0	1.46	10/5/2004	230	7.38	45.6	10/5/2004	0	0	1.15
4/1/2005	0	0	0	4/1/2005	220	0	52.7	4/1/2005	0	0	0.549
10/1/2005	0	0	0	10/1/2005	220	0	29.5	10/1/2005	0	0	0.706
5/6/2006	0.82	0	0	5/6/2006	252	7.32	109	5/6/2006	0	0	1.13
10/4/2006	0.49	0	0.45	10/4/2006	184	5.62	45.2	10/4/2006	0	0	1.65
5/30/2007	0.28	0	0.23	5/30/2007	198	5.66	33.7	5/30/2007	0	0	1.42
10/25/2007	0.23	<0.2	<0.2	10/25/2007	251	5.71	73.2	10/25/2007	<2	<2	<2
5/27/2008	<0.3	<0.4	<0.2	5/27/2008	237	8.1	74.1	5/27/2008	0.51	<0.4	<0.2
10/9/2008	0.41	<0.4	<0.2	10/9/2008	325	7.72	124	10/9/2008	<0.3	<0.4	2.26
10/7/2009	0.63	<0.4	0.65	10/7/2009	284	5.3	125	10/7/2009	<0.4	<0.4	2.72
4/7/10	0.56	<0.4	0.43	4/7/10	222	4.66	111	4/7/10	<0.4	<0.4	2.64
11/29/10	0.64	<0.4	<0.2	11/29/10	192	<4	87.6	11/29/10	<0.4	<0.4	2.5
4/8/11	0.66	<0.4	0.46	4/8/11	163	<4	94.7	4/8/11	<0.4	<0.4	2.76
10/6/11	0.64	<0.4	0.48	10/6/11	177	<4	120	10/6/11	<0.4	<0.4	2.52
4/11/12	0.66	<0.4	0.54	4/11/12	164	3.54	74.3	4/11/12	<0.4	<0.4	2.5
10/1/12	<0.83	<0.48	1.1	10/1/12	182	3.8	28.3	10/1/12	<0.83	<0.48	2.2
4/2/13	<0.83	<0.48	0.21	4/2/13	169	2.6	102	4/2/13	<0.2	<0.48	3.5
10/2/13	<0.42	<0.36	0.19	10/2/13	221	2.2	97.4	10/2/13	<0.29	<0.36	3.4
5/20/14	0.32	<0.33	<0.18	5/20/14	215	2.1	95.3	5/20/14	<0.26	<0.33	3.6
10/8/14	0.43	<0.33	<0.18	10/8/14	235	2.3	103	10/8/14	<0.26	<0.33	3.2
4/16/15	<0.50	<0.33	<0.18	4/16/15	296	1.7	149	4/16/15	<0.26	<0.33	4.1
10/9/15	<0.26	<0.33	<0.18	10/9/15	332	1.5	124	10/9/15	<0.26	<0.33	3.3
4/7/16	0.36	<0.33	0.19	4/7/16	360	1.9	104	4/7/16	<0.26	<0.33	3.6
10/6/16	0.44	<0.33	0.23	10/6/16	542	2.4	85.5	10/6/16	<0.26	<0.33	4.4
4/5/17	<0.26	<0.33	<0.18	4/5/17	461	2	71.7	4/5/17	<0.26	<0.33	3.7
10/6/17	0.32	<0.33	0.2	10/6/17	440	2.3	64.7	10/6/17	<0.26	<0.33	3.4

Historic VOC Monitoring Results
Land and Gas Reclamation Landfill
(concentrations in ug/L)

MW-214				MW-214A			
Date	**cis-1,2-DCE**	**TCE**	**VC**	**Date**	**cis-1,2-DCE**	**TCE**	**VC**
NR 140 ES	**70**	**5**	**0.2**	**NR 140 ES**	**70**	**5**	**0.2**
6/9/1992		0	0	6/9/1992		0	0
7/6/1994		0	0	7/6/1994		0	0
10/4/1995	0	0	0	10/4/1995	0	0	0
4/4/1996	0	0	0	4/4/1996	0	0	0
10/12/1996	0	0	0	10/12/1996	0	0	0
4/10/1997	0	0	0	4/10/1997	0	0	0
4/7/1998	0	0	0	4/7/1998	0	0	0
4/6/1999	0	0	0	4/6/1999	0	0	0
4/6/2000	0	0	0	4/6/2000	0	0	0
10/4/2001	0	0	0	10/4/2001	0	0	0
10/3/2002	0	0	0	10/3/2002	0	0	0
10/8/2003	0	0	0	10/8/2003	0	0	0.225
10/6/2004	0	0	0	10/6/2004	0	0	0.912
10/1/2005	0	0	0	10/1/2005	0	0	0.488
10/5/2006	0	0	0	10/4/2006	0	0	1.67
10/24/07 (2)	<0.2	<0.2	2.93	10/24/07 (2)	<0.2	<0.2	<0.2
3/14/2008	<0.3	<0.4	<0.2	3/14/2008	<0.3	<0.4	4.74
10/9/2008	<0.3	<0.3	<0.4	10/9/2008	<0.3	<0.4	6.54
10/7/2009	<0.4	<0.4	<0.2	10/7/2009	<0.4	<0.4	15.1
10/27/10	<0.4	<0.4	<0.2	10/27/10	<0.4	<0.4	16.9
10/6/11	<0.4	<0.4	<0.2	10/3/11	<0.4	<0.4	23.4
10/1/12	<0.83	<0.48	<0.18	10/1/12	<0.83	<0.48	29.6
10/3/13	<0.42	<0.36	<0.18	10/1/13	<0.42	<0.36	19.3
10/7/14	<0.26	<0.33	<0.18	10/7/14	<0.26	<0.33	45.6
10/7/15	<0.26	<0.33	<0.18	10/7/15	<0.26	<0.33	37
10/6/16	<0.26	<0.33	<0.18	10/6/16	<0.26	<0.33	34.5
10/3/17	<0.26	<0.33	<0.18	10/3/17	<0.26	<0.33	41

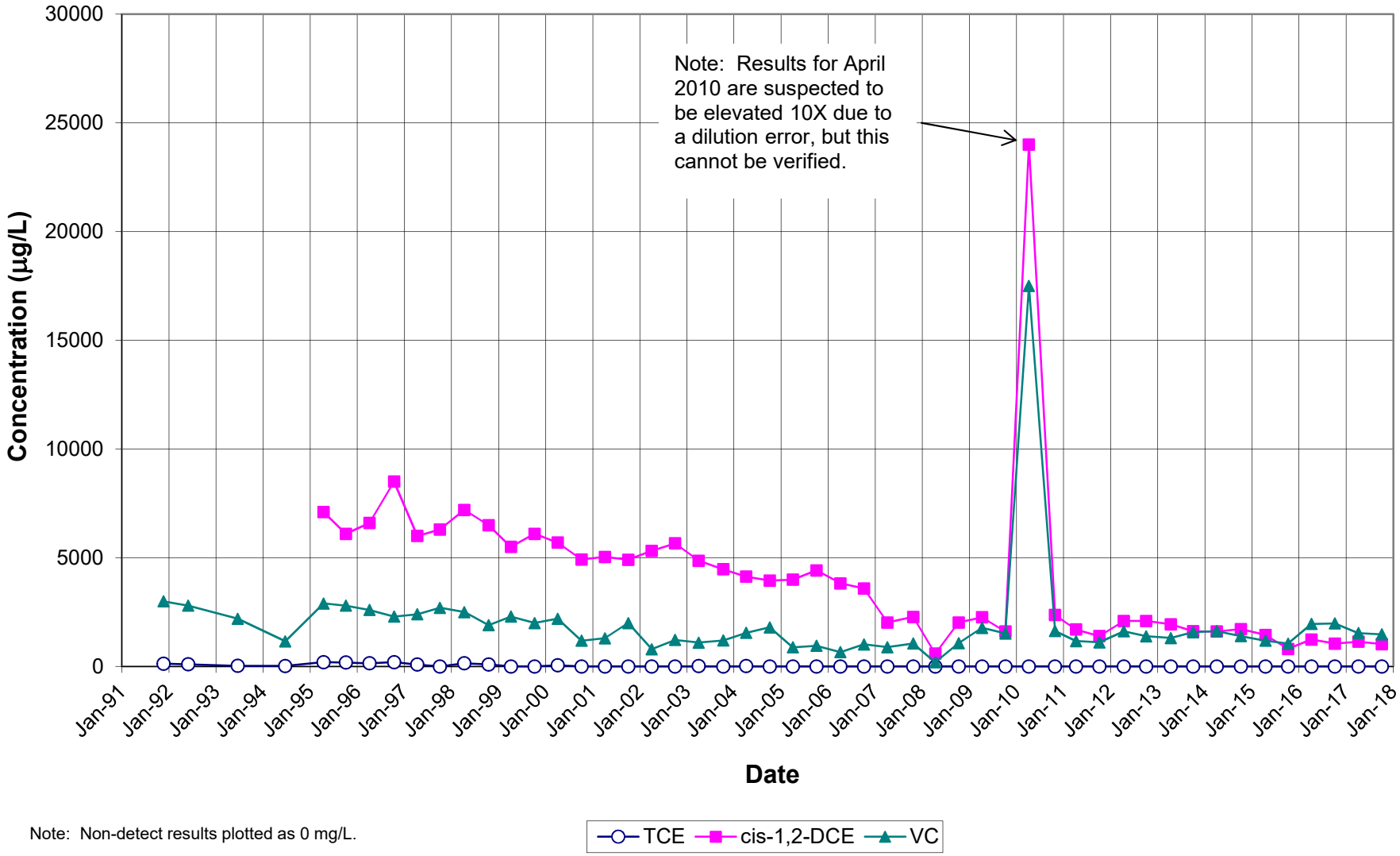
Notes: (1) Results for MW-1AR for April 2010 are suspected to be elevated 10 times due to a dilution error, but this cannot be verified.
(2) Based on sample results for MW-214 and MW-214A for October 2007, it appears that the sample vials were switched, but this cannot be confirmed.

Updated for 2017 by: AJR, 3/27/2018
Checked for 2017 by: NDK, 3/27/2018
Reviewed for 2017 by: SCC, 3/29/2018

Shaded cell indicates well was not sampled on a date when one or more other wells in the table were sampled

I:\25218008.00\Deliverables\Annual Report\VOC Annual Graphs\[LGRL VOC graphs 2017.xls]Data Table for Report

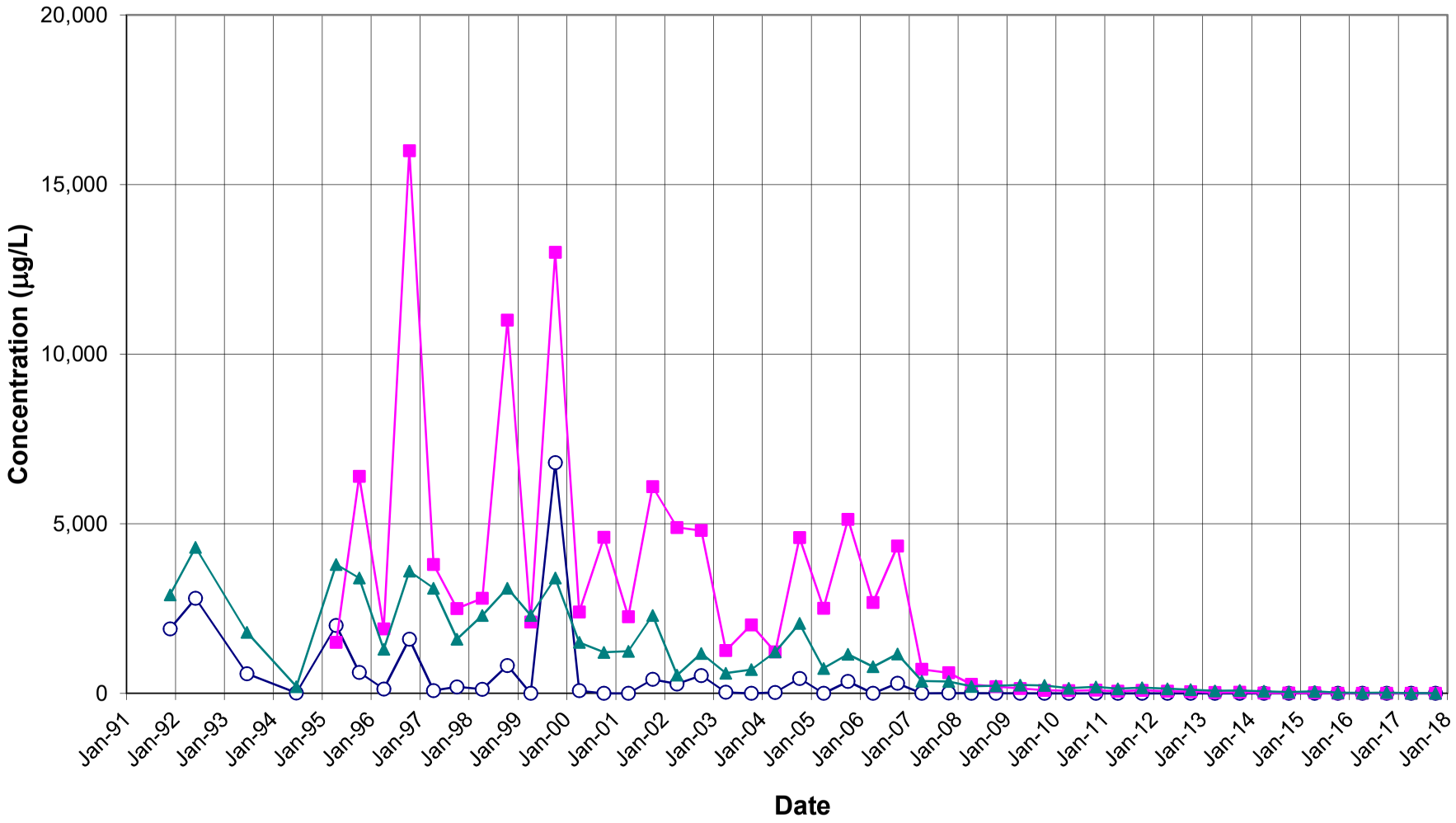
MW-1AR



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

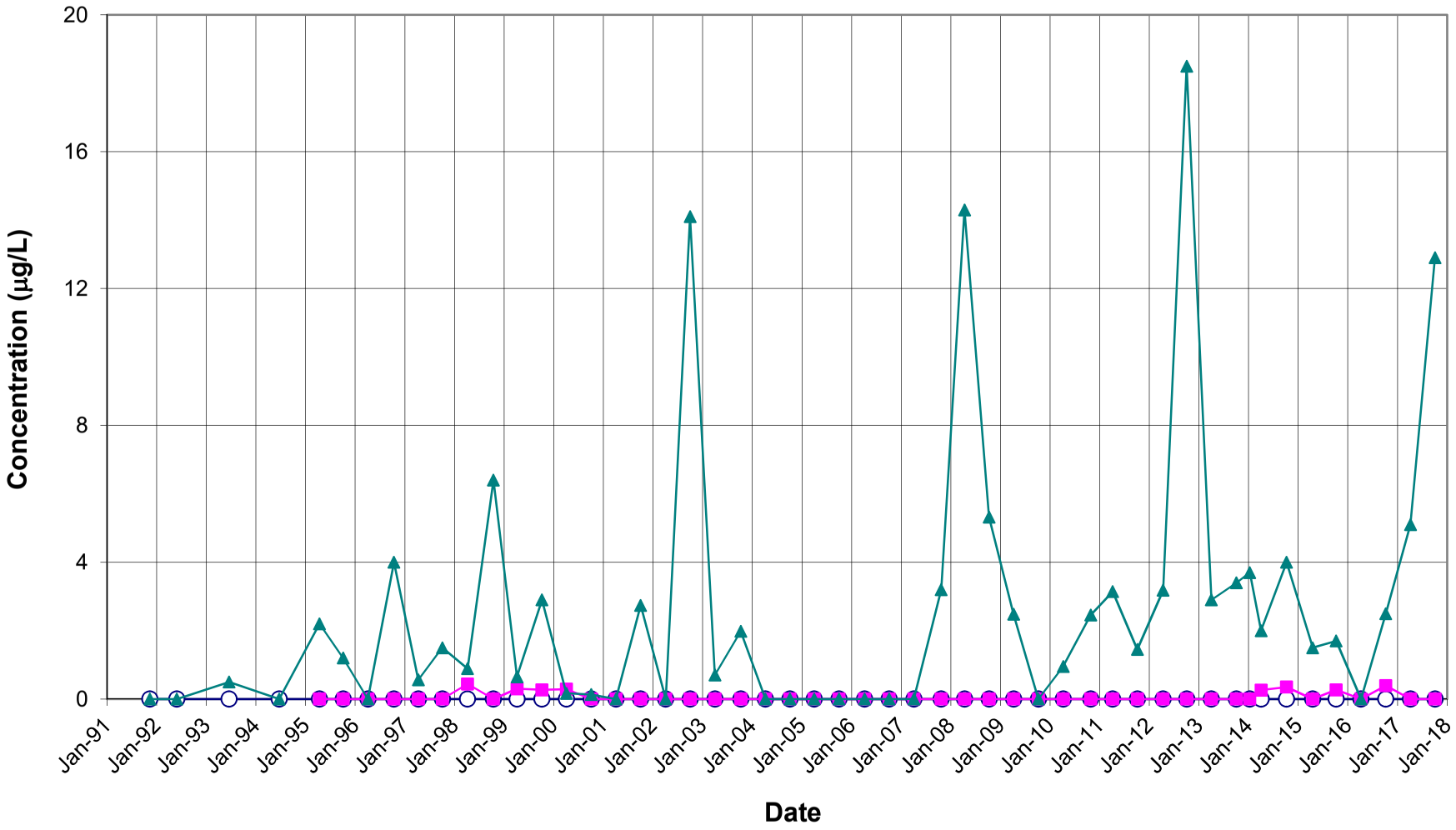
MW-1RR



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

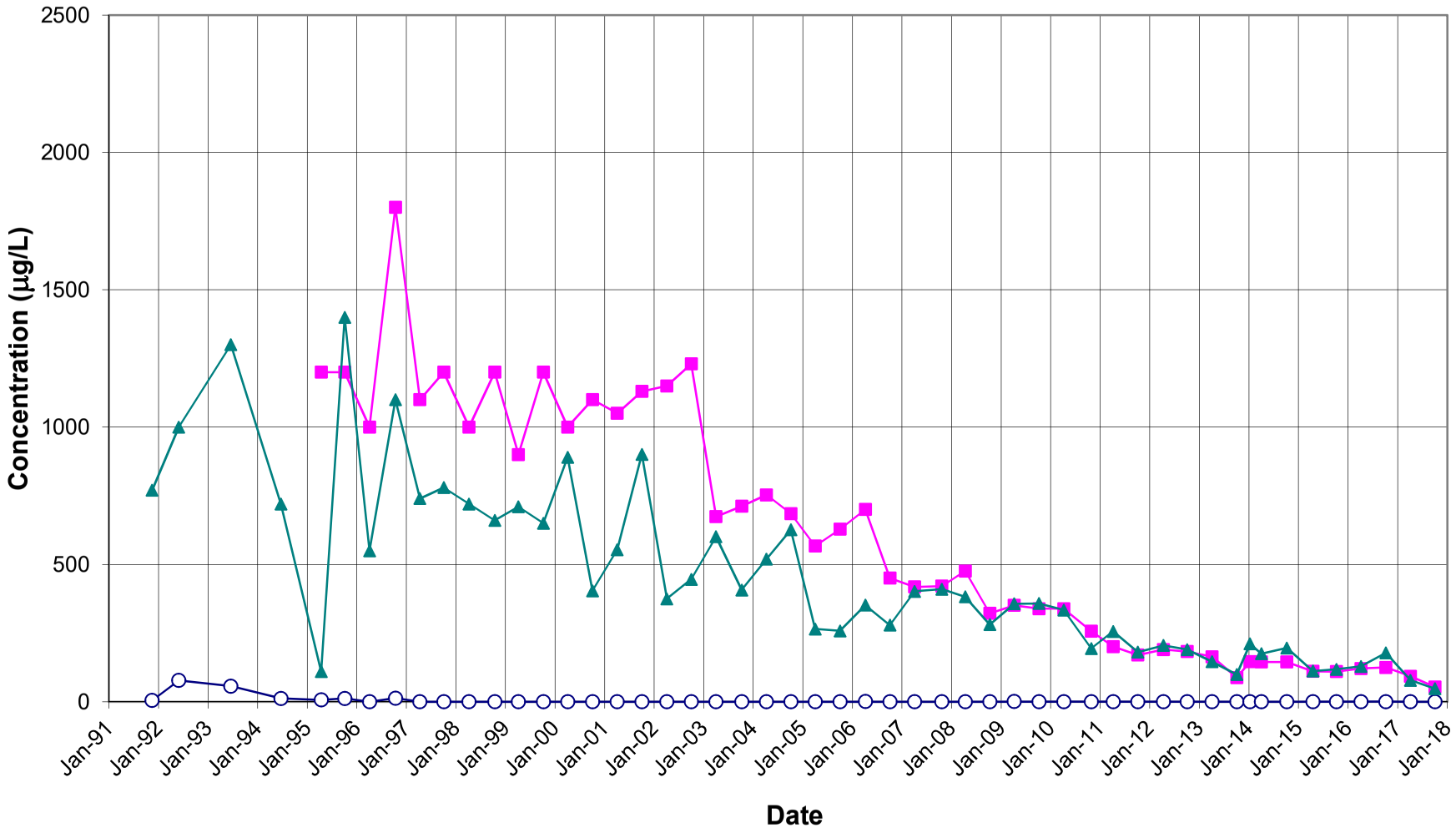
W-3R



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

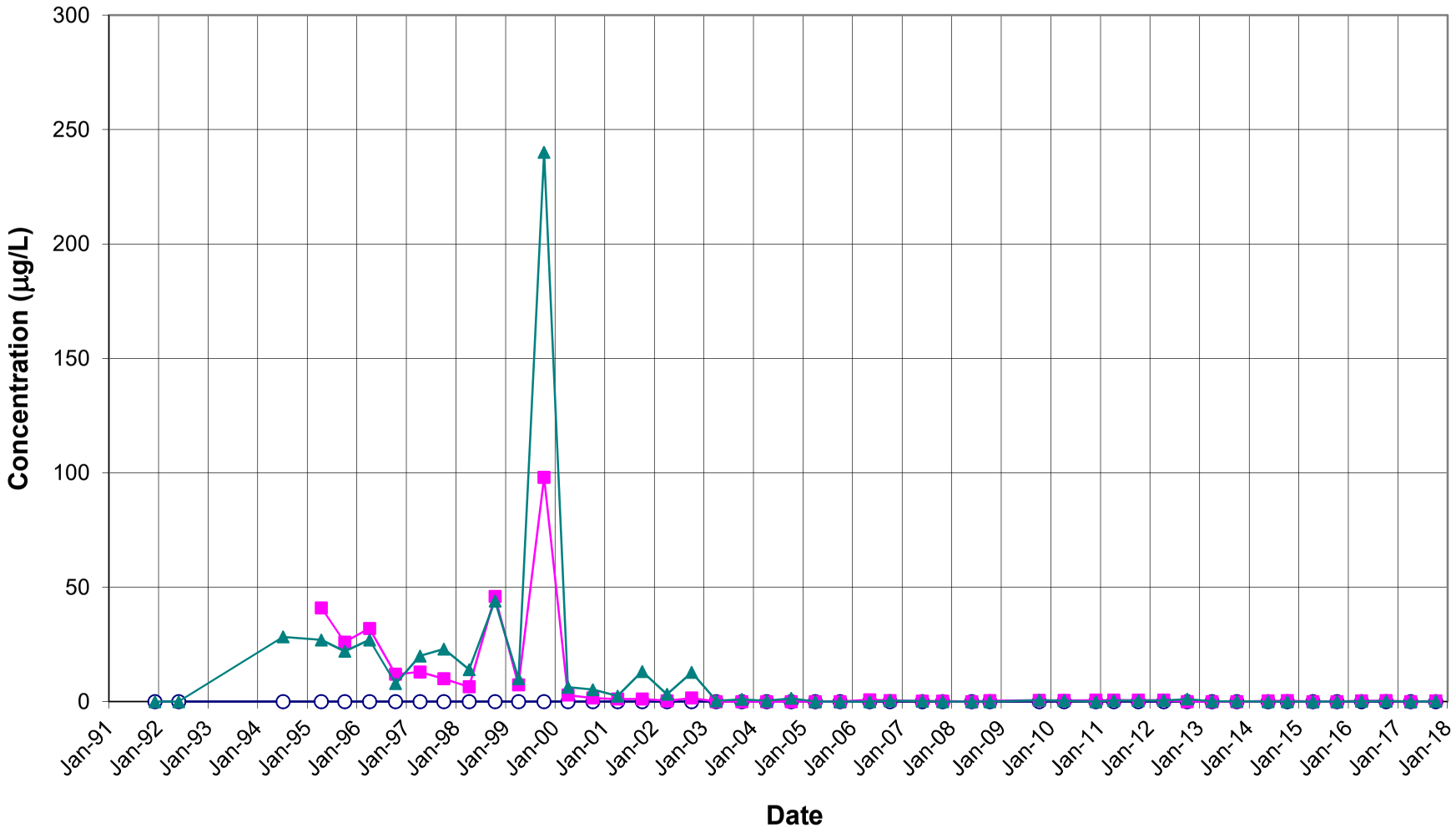
W-3AR



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

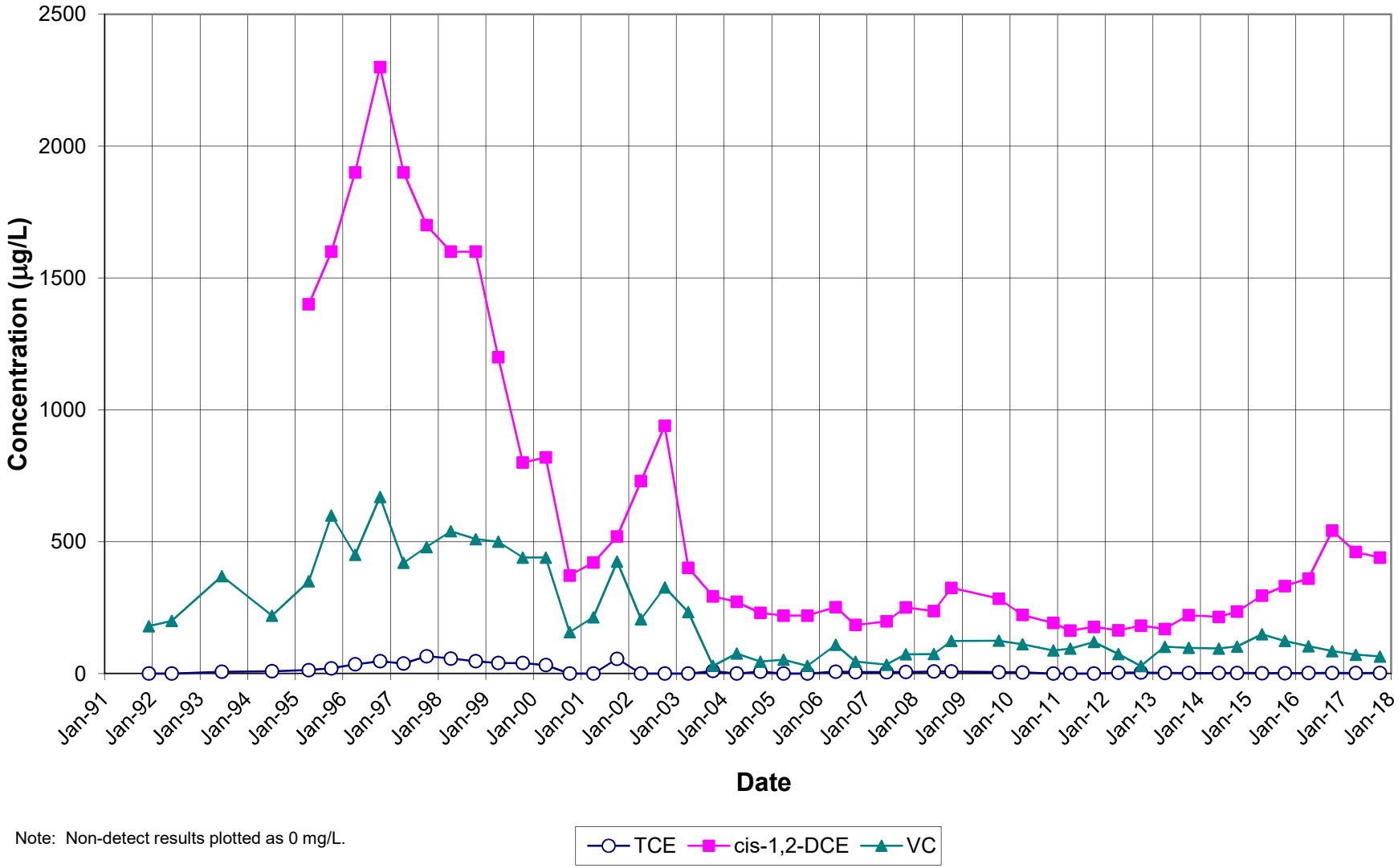
MW-210



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

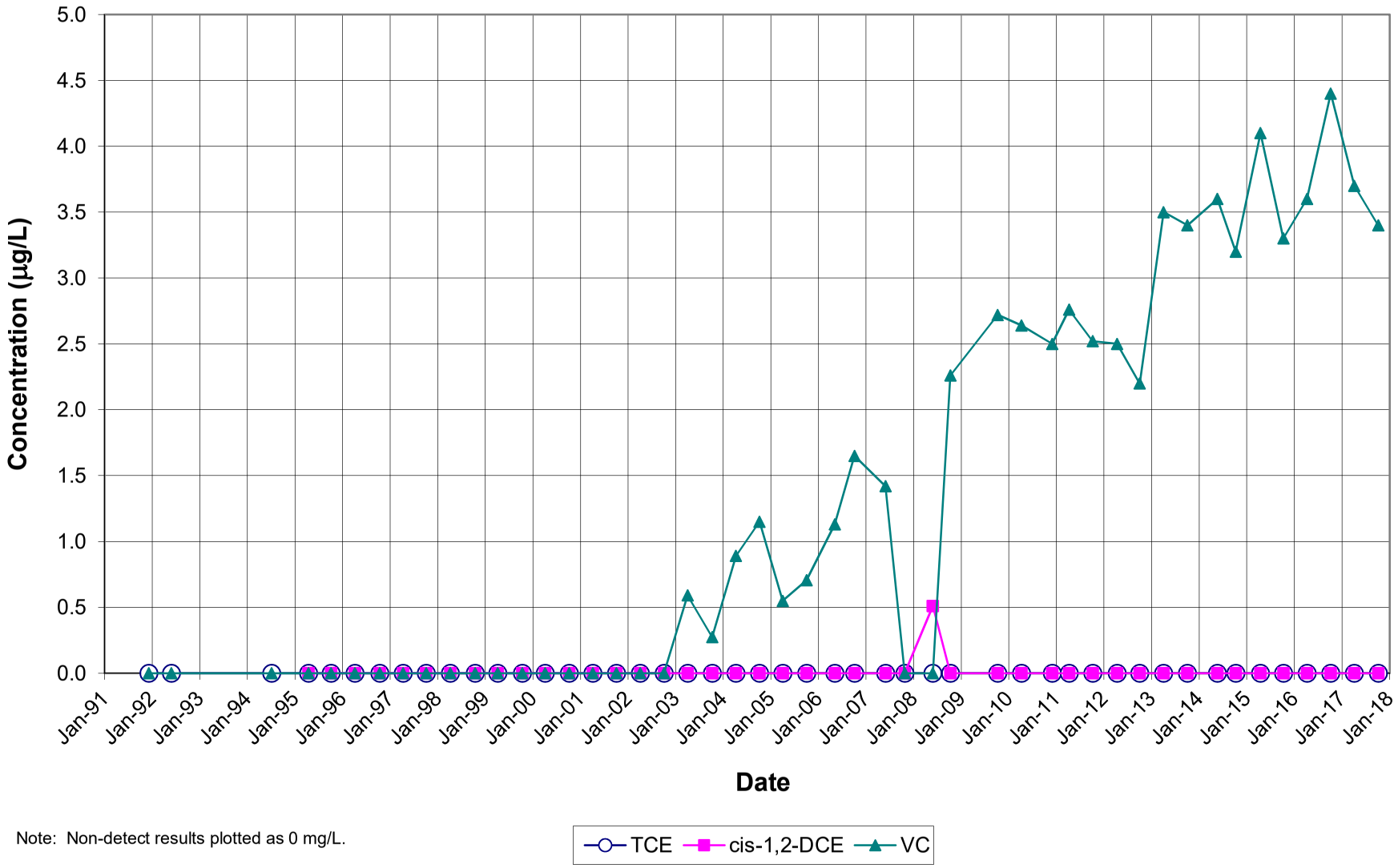
MW-210A



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

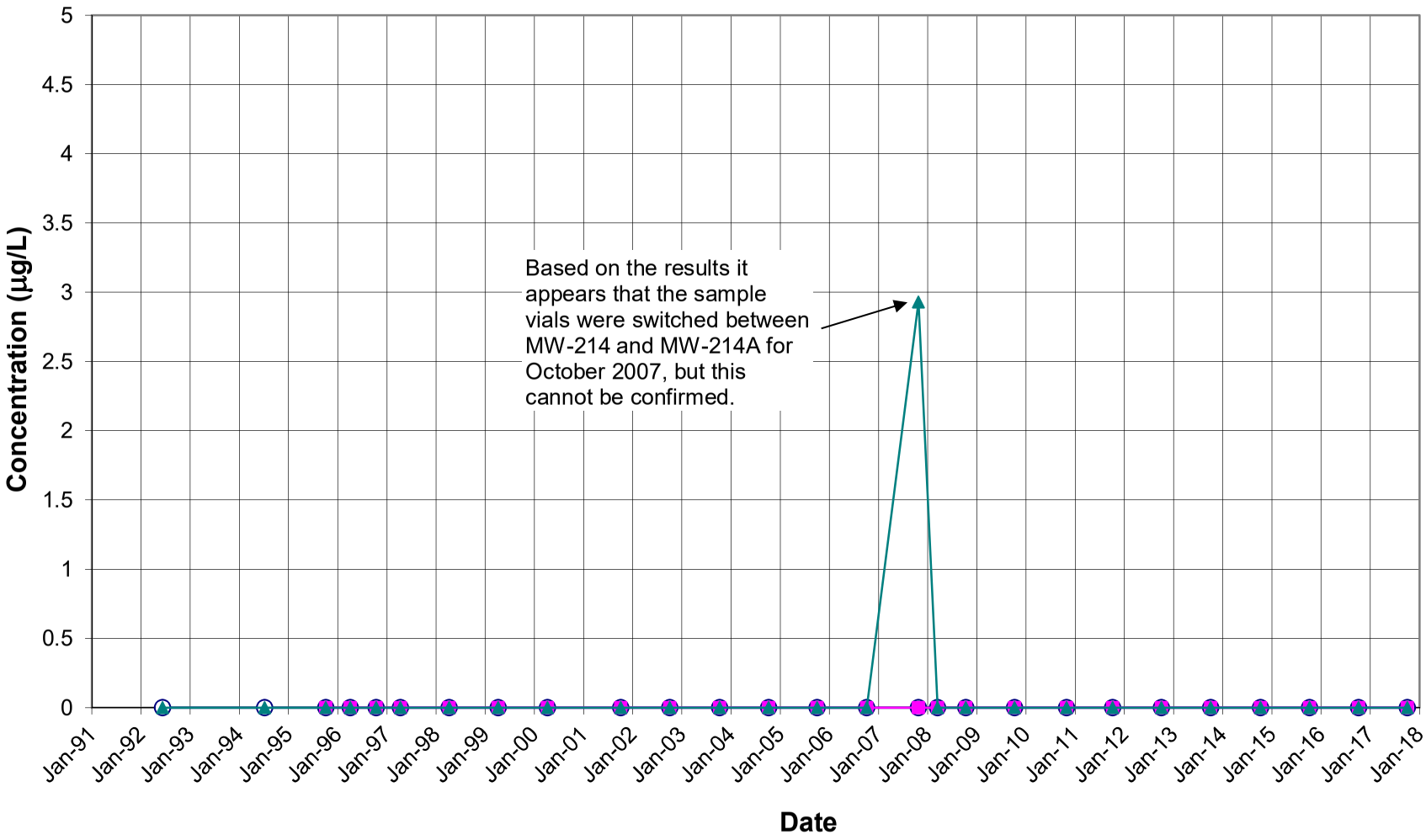
MW-210B



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

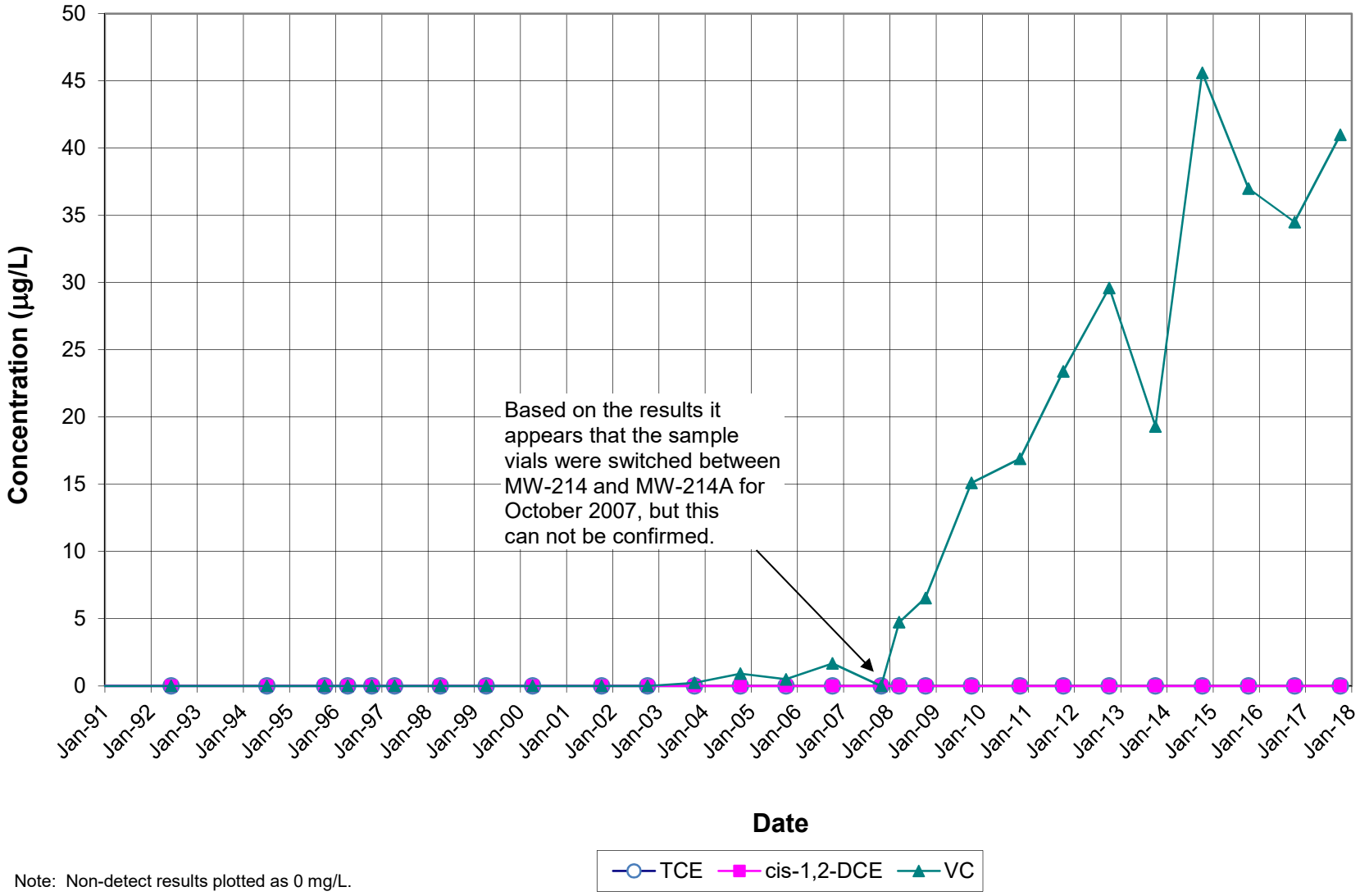
MW-214



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

MW-214A



Note: Non-detect results plotted as 0 mg/L.

3/29/2018

APPENDIX B

Figure

Figure 1: Groundwater Table Map: October 2017

FORMER LIMITS OF LAND AND GAS RECLAMATION LANDFILL

GLACIER RIDGE LANDFILL (CLOSED NORTH AREA)

GLACIER RIDGE LANDFILL SOUTH EXPANSION AND SOUTHEAST EXPANSION

NORTHEAST SEDIMENTATION BASIN (NO. 3)

SOUTHEAST SEDIMENTATION BASIN (NO. 2)

NORTH SEDIMENTATION BASIN (NO. 4)

SOUTHWEST SEDIMENTATION BASIN (NO. 1)

WEST SEDIMENTATION BASIN (NO. 5)

EAST CENTRAL WETLAND

WEST CENTRAL WETLAND

BIOFILTER

HIGHWAY V

RAASCHS HILL ROAD

CITY OF MAYVILLE

TOWN OF WILLIAMSTOWN
TOWN OF HUBBARD

OFFICES, MAINTENANCE AND SCALE BUILDING

PHASE 1
PHASE 1B
PHASE 1C
PHASE 2
PHASE 2A
PHASE 2B EAST
PHASE 2B WEST
PHASE 2C
PHASE 3
PHASE 3A
PHASE 3B EAST
PHASE 3B WEST
PHASE 3C
PHASE 4 (FUTURE)
PHASE 5 (FUTURE)
PHASE 8
PHASE 10
PHASE 10 (FUTURE)
PHASE (FUTURE)
UDM

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE MUNICIPAL BOUNDARY
- EXISTING GROUND SURFACE (10' CONTOUR)
- EXISTING GROUND SURFACE (2' CONTOUR)
- EXISTING SPOT ELEVATION
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING RAILROAD
- EXISTING DRAINAGE SWALE
- WATER/WETLAND
- EXISTING VEGETATION
- EXISTING BUILDING
- EXISTING FENCE
- CONSTRUCTED LANDFILL LIMITS OF WASTE
- PERMITTED LANDFILL LIMITS OF WASTE
- PHASE LINE
- LIMITS OF FINAL COVER AREAS
- WATER TABLE MONITORING WELL
- STAFF GAUGE
- GROUNDWATER CONTROL TRENCH AND COLLECTION PIPE
- GROUNDWATER CONTROL TRENCH DISCHARGE PIPE
- 922.67 — WATER TABLE ELEVATION MEASURED ON OCTOBER 2–6, 2017
- [928.26] — SURFACE WATER ELEVATION AT STAFF GAUGE MEASURED ON OCTOBER 2–27, 2017
- WATER TABLE CONTOUR (5' INTERVAL)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. TOPOGRAPHIC BASE MAP WAS COMPILED FROM THE FOLLOWING AERIAL SURVEY SOURCES: AYRES ASSOCIATES, EAU CLAIRE, WI, APRIL 20, 2013; SOUTHERN RESOURCES MAPPING CORPORATION AND CORNERSTONE ENVIRONMENTAL, MADISON, WI, MARCH 7, 2017; KBM, INC., GRAND FORKS, NORTH DAKOTA, OCTOBER 3, 2000. WEST SEDIMENTATION BASIN FROM JUNE 2006 AS-BUILT. TOPOGRAPHIC CONTOUR INTERVAL IS TWO FEET.
2. THE GRID SYSTEM IS BASED ON W1/4 CORNER: 30+00.00N, 30+00.00E; AND SW CORNER: 03+46.59N, 30+23.97E. BOTH IN SECTION 35, T12N, R16E, TOWN OF WILLIAMSTOWN, DODGE COUNTY, WISCONSIN (COORDINATES PROVIDED BY WELSH, HANSON & ASSOCIATES, INC., OCONOMOWOC, WISCONSIN, AND ARE BASED ON LOCAL GRID).
3. ELEVATIONS ARE BASED ON U.S.G.S. DATUM.
4. WETLAND LIMITS FROM SOUTH EXPANSION PLAN OF OPERATION EXISTING CONDITIONS MAP PREPARED BY RMT, APRIL 2005. DELINEATION BY AYRES & ASSOC. IN 2001 AND 2002. NATURAL RESOURCES CONSULTING, INC. UPDATED THE WETLAND DELINEATION ALONG THE EAST SIDE OF GLACIER RIDGE LANDFILL AND LAND AND GAS RECLAMATION LANDFILL BETWEEN N 2850 AND S 650 IN OCTOBER 2009. ADDITIONAL LIMITS DIGITIZED FROM THE WISCONSIN WETLAND INVENTORY MAP, PREPARED BY THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES BUREAU OF PLANNING DATED APRIL 16 & JULY 1, 1982.
5. MONITORING WELL LOCATIONS FOR THE LAND AND GAS RECLAMATION, INC. LANDFILL AND DEMOLITION LANDFILL AREAS ARE BASED ON DATA PROVIDED TO BT SQUARED BY RMT ON MARCH 15, 2000 AND LOCATIONS PROVIDED IN APPENDIX D OF THE 1998 LAND AND GAS RECLAMATION LANDFILL ANNUAL REPORT PREPARED BY ENVIRONMENTAL SAMPLING CORP. MONITORING WELLS INSTALLED FOR THE SOUTHEAST EXPANSION FEASIBILITY REPORT AND LGRL INVESTIGATION IN 2009–2010 SURVEYED BY CQM.
6. MONITORING WELL LOCATIONS FOR THE GLACIER RIDGE AREA ARE BASED ON LOCATIONS PROVIDED IN K. SINGH & ASSOCIATES INC., MONTGOMERY WATSON'S 1998 PLAN OF OPERATION FOR HORIZONTAL AND VERTICAL EXPANSION, GLACIER RIDGE LANDFILL DRAWING NUMBER 1242051-27350101-F13 AND APPENDIX K, AND RMT'S 2004 SOUTH EXPANSION PLAN OF OPERATION EXISTING CONDITIONS MAP.
7. THE LOCATIONS OF GH6 AND GH7 ARE BASED ON INFORMATION PROVIDED BY NORTH SHORE ENGINEERING.
8. MONITORING WELLS FORMERLY WITHIN THE GRL FOOTPRINT HAVE BEEN ABANDONED. THERE WERE NO ADDITIONAL WELL ABANDONMENTS IN 2017.
9. STAFF GAUGES SW2, SW3, SW4, SW5, SW8, AND SW9 WERE RESURVEYED IN JANUARY 2011.

N 5,000 N 4,500 N 4,000 N 3,500 N 3,000 N 2,500 N 2,000 N 1,500 N 1,000 N 500 N 0 S 500

E 6,000 E 5,500 E 5,000 E 4,500 E 4,000 E 3,500 E 3,000 E 2,500

N

200 0 200

SCALE: 1" = 200'

FIGURE 1

WATER TABLE MAP – OCTOBER 2017
2017 ANNUAL REPORT

GLACIER RIDGE LANDFILL/LGRL
DODGE COUNTY, WISCONSIN

3 of 5

ADVANCED DISPOSAL SERVICES
GLACIER RIDGE LANDFILL, LLC

CLIENT

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

PROJECT NO.	25218008	DRAWN BY:	BJM/KP
DRAWN:	04/05/17	CHECKED BY:	NK
REVISED:	03/27/18	APPROVED BY:	SCC, 03/29/18

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