

**Groundwater Monitoring Report, March 2021
Butler Green Industrial Landfill, Parcel 175(5)
(Permit No. 08-02)
McClellan, Anniston, Alabama**

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LIST OF ABBREVIATIONS AND ACRONYMS

ADEM	Alabama Department of Environmental Management
<i>ADEM Division 7 Regulations</i>	<i>Alabama Department of Environmental Management Water Division Water Supply Program Division 335-7</i>
<i>ADEM Division 13 Regulations</i>	<i>Alabama Department of Environmental Management (ADEM) Land Division Solid Waste Program Division 13 Regulations</i>
AGMRG	<i>Alabama Groundwater Monitoring Reporting Guidance for Solid Waste Facilities</i>
ARBCA	<i>Alabama Risk-Based Corrective Action Guidance Manual</i>
Army	United States Department of the Army
BTOC	Below top of casing
CA	Cleanup agreement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CUSUM	Shewhart Cumulative Sum
DO	Dissolved oxygen
DQS	Data Quality Summary
EPA	United States Environmental Protection Agency
ESCA	Environmental Services Cooperative Agreement
<i>Fill Area Definition Report</i>	<i>Draft Final Site Investigation and Fill Area Definition Report, Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7), 227(7), 126(7), 229(7), 231(7), 233(7), and 82(7), Fort McClellan, Calhoun County, Alabama, Revision 1</i>
<i>Final EE/CA</i>	<i>Final Revision 1 Engineering Evaluation/Cost Analysis Landfills and Fill Areas, Landfills 1, 2, 4, and Industrial Landfill, Parcels 78(6), 79(6), 81(5), 175(5), McClellan, Anniston, Alabama</i>
ft	feet
ft/ft	feet per foot
GWMR	Groundwater monitoring report
h	decision internal value
ICP	Inductively-coupled plasma
Industrial Landfill	Butler Green Industrial Landfill, Parcel 175(5)
IT	IT Corporation
k	reference value
Landfill 4	Landfill 4, Parcel 81(5)
McClellan	McClellan, Anniston, Alabama
MCL	Maximum contaminant level
MDA	McClellan Development Authority
MDL	Method detection limit
MES	Matrix Environmental Services, LLC
µg/L	micrograms per liter
ORP	Oxidation-reduction potential
Permit	Solid Waste Disposal Facility Permit No. 08-02
<i>QAP</i>	<i>Quality Assurance Plan</i>
RBTL	Risk-based target level
RL	Reporting limit
SCL	Shewhart control limit

Shaw	Shaw Environmental, Inc.
Site	Landfill 4, Parcel 81(5) and the Butler Green Industrial Landfill, 175(5)
SSI	Statistically Significant Increase
TCE	trichloroethene
TDS	Total dissolved solids
U.S.	United States
VOC	Volatile Organic Compound
Zi	standardized means

EXECUTIVE SUMMARY

Matrix Environmental Services, L.L.C. (MES) has prepared this groundwater monitoring report (GWMR) on behalf of the McClellan Development Authority (MDA) to meet the requirements of the Solid Waste Disposal Facility Permit No. 08-02 (permit) for the Butler Green Industrial Landfill, formerly the McClellan Industrial Landfill, Parcel 175(5) located within McClellan, Anniston, Alabama (McClellan), formerly known as Fort McClellan. Figure 1-1 shows a map of McClellan and Figure 1-2 shows the parcel location. As shown in Figure 1-2, the Butler Green Industrial Landfill, Parcel 175(5) (Industrial Landfill) is located in the northeast corner of Landfill 4, Parcel 81(5) (Landfill 4). The area was permitted as the McClellan Industrial Landfill (Permit No. 08-02). In July 2017, the MDA requested the Alabama Department of Environmental Management (ADEM) to change the name of the Industrial Landfill from the McClellan Industrial Landfill to the Butler Green Industrial Landfill. This request was granted in a letter from the Department dated August 23, 2017. In this GWMR Landfill 4 and the Industrial Landfill will collectively be referred to as “the Site”.

This GWMR presents results related to the implementation of groundwater monitoring under the requirements of the permit and the *Alabama Department of Environmental Management Land Division Solid Waste Program Division 13 Regulations (ADEM Division 13 Regulations)* for solid waste facilities.

The March 2021 monitoring event was performed under the Assessment Monitoring program, described in Section 2.4.3. Groundwater samples were collected from five residuum monitoring wells at the Site on March 4, 2021. The groundwater samples were analyzed for the constituents listed in *Appendix I* of ADEM Admin. Code r 335-13-4-27 of the *ADEM Division 13 Regulations* (Table 2-2).

Groundwater elevations showed groundwater at the Site flowed in a north and northwesterly direction. The horizontal hydraulic gradients were low over the Site, ranging from 0.006 feet per foot (ft/ft) to 0.018 ft/ft, averaging 0.013 ft/ft Site-wide.

During the March 2021 monitoring event, volatile organic compounds chlorobenzene, cis-1,2-dichloroethene, and trichloroethene were detected in well LF4-MW4. All VOC detections are considered statistically significant increase (SSI) occurrences. VOC concentrations detected in LF4-MW4 were consistent with historical results and below maximum contaminant levels (MCLs).

To evaluate whether there were any SSI occurrences for metal constituents in groundwater at the Site, a statistical analysis was performed on the metals data using Shewhart Cumulative Sum (CUSUM) control charts in accordance with Code Rule 335-13-4-27, subparagraph (2) of the *ADEM Division 13 Regulations* and applicable United States Environmental Protection Agency (EPA) guidance. The statistical analysis showed SSI occurrences for cobalt and nickel in well LF4-MW1 and cobalt, nickel and zinc in well LF4-MW2. All results were consistent with historical data.

The concentrations of the SSI constituents were compared to the groundwater protection

standards for the Site. MCLs, as listed in the *Alabama Department of Environmental Management Water Division Water Supply Program Division 335-7 Regulations (ADEM Division 7 Regulations)*, were used as the groundwater protection standards for the SSIs. Nickel, zinc, chlorobenzene, cis-1,2-dichloroethene, and trichloroethene concentrations were all below MCLs. Because there is no promulgated MCL for cobalt, the concentration for the cobalt SSI in wells LF4-MW1 and LF4-MW2 were compared to the cobalt concentration for background well LF4-MW5. The concentration for metal SSI constituent cobalt in LF4-MW1 (36 µg/L) and LF4-MW2 (65 µg/L) were greater than the background concentration (10.5 µg/L).

MDA recommends that natural attenuation and land use controls be allowed to continue, and the site continue to be monitored on a semi-annual basis under the assessment monitoring program.

1.0 INTRODUCTION

Matrix Environmental Services, L.L.C. (MES) has prepared this groundwater monitoring report (GWMR) on behalf of the McClellan Development Authority (MDA) to meet the requirements of the Solid Waste Disposal Facility Permit No. 08-02 (permit) for the Butler Green Industrial Landfill, formerly the McClellan Industrial Landfill, Parcel 175(5) located within McClellan, Anniston, Alabama (McClellan), formerly known as Fort McClellan. Figure 1-1 shows a map of McClellan and Figure 1-2 shows the parcel location. As shown in Figure 1-2, the Butler Green Industrial Landfill, Parcel 175(5) (Industrial Landfill) is located in the northeast corner of Landfill 4, Parcel 81(5) (Landfill 4). The area was permitted as the McClellan Industrial Landfill (Permit No. 08-02). In July 2017, the MDA requested the Alabama Department of Environmental Management (ADEM) to change the name of the Industrial Landfill from the McClellan Industrial Landfill to the Butler Green Industrial Landfill. This request was granted in a letter from the Department dated August 23, 2017 (ADEM, 2017). In this GWMR Landfill 4 and the Industrial Landfill will collectively be referred to as “the Site”.

This GWMR presents results related to the implementation of groundwater monitoring under the requirements of the permit and the *Alabama Department of Environmental Management (ADEM) Land Division Solid Waste Program Division 13 Regulations (ADEM Division 13 Regulations)* for solid waste facilities.

1.1 Purpose and Objectives

The purpose of this GWMR is to describe the activities performed and present the results of the March 2021 groundwater monitoring event. The objectives of the March 2021 groundwater monitoring event and this GWMR include the following:

- Summarize data from previous monitoring events and present analytical results for the March 2021 monitoring event.
- Evaluate the groundwater analytical data and demonstrate compliance with the permit and the *ADEM Division 13 Regulations*.

1.2 Report Organization

Section 2.0 of this report presents a summary of the background information including the parcel location, description, and physical characteristics. Section 3.0 presents a summary of the March 2021 sampling activities. Section 4.0 describes the results of the March 2021 sampling activities. Section 5.0 presents the evaluation of the groundwater data. Section 6.0 presents the conclusions and recommendations. Section 7.0 provides the references cited in this report. Tables and figures follow the text and the appendices are organized as follow:

- Appendix A Groundwater Sample Collection Logs, March 2021
- Appendix B Chains-of-Custody, March 2021
- Appendix C Data Quality Summary and Laboratory Report
- Appendix D Statistical Evaluation of Metals Data, March 2021

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2.0 BACKGROUND

This section provides background information about the Site. Parts of this section are adapted from the *Final Revision 1 Engineering Evaluation/Cost Analysis Landfills and Fill Areas, Landfills 1, 2, 4, and Industrial Landfill, Parcels 78(6), 79(6), 81(5), 175(5), McClellan, Anniston, Alabama (Final EE/CA)* (MES, 2006) and the *Draft Final Site Investigation and Fill Area Definition Report, Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7), 227(7), 126(7), 229(7), 231(7), 233(7), and 82(7), Fort McClellan, Calhoun County, Alabama, Revision 1 (Fill Area Definition Report)* (IT Corporation [IT], 2002a).

2.1 Site Location and Description

Landfill 4 operated as the main sanitary landfill for McClellan from 1967 to 1994. The unlined landfill used trench and fill as the method of disposal and was not equipped with a leachate collection system. The landfill reportedly received the McClellan household garbage, construction and demolition debris, oil-contaminated soil, and dead animals. One pound of waste Diazinon dust (pesticide) was also reportedly disposed at Landfill 4 and the Industrial Landfill (IT, 2002).

The landfill was closed in April 1994 because of changes in the permit requirements governing sanitary landfills, including that sanitary landfills be lined. A temporary permit was issued to the Army in 1993 to dispose of industrial and construction debris at the landfill. A permanent industrial landfill permit allowing the disposal of waste with a 30-ton per day limit in a previously unused section of the landfill property was issued in October 1995. This permit was transferred from the Army to the MDA (MES, 2006). The permit was renewed by the MDA on January 5, 2016, effective January 9, 2016, and expired on January 8, 2021. The permit for the Industrial Landfill allowed 3,204 cubic yards per day of disposal. The total permitted disposal area for the Industrial Landfill is approximately 53 acres. In the near future, the MDA plans to formally cap the remaining approximately 12 acres that are still active.

2.2 Site Characterization

This subsection summarizes the physical setting, geology and hydrogeology at the Site.

2.2.1 Physical Setting

With the exception of the Industrial Landfill, Landfill 4 is covered with an engineered, low-permeability clay cover that met the landfill closure requirements at the time of closure. Landfill 4 is devoid of natural vegetation, but is currently covered with seeded grasses and vegetation. A concrete-lined drainage swale runs from west to east across most of the Site. The Site is bound on the north by mixed coniferous/deciduous forest and the Fill Area Northwest of Reilly Airfield, Parcel 229(7) (FANWR), on the east by mixed coniferous/deciduous forest, on the south by a soil borrow area, on the west by a road, and on the northwest by Landfill 3, Parcel 80(6) (Landfill 3). Much of the perimeter of the Site is enclosed by chain-link fence that restricts access to the Site (MES, 2006).

Surface water generally follows the sloping surface topography collecting in drainage ditches on the south, east and north sides of the landfill before converging into an unnamed creek that flows toward the northwest. Surface water is also diverted through a concrete ditch that runs through the center of the landfill toward the east and converging into the unnamed creek.

2.2.2 Site Geology and Hydrogeology

The bedrock mapped beneath the Site is the Cambrian Conasauga Formation. The Cambrian Conasauga Formation is comprised of dark gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (IT, 2002). A geologic map of the Site is presented in Figure 2-1.

Underlying soils at the Site include the Cumberland loam, Purdy silt loam, Tyler silt loam, and the Anniston Gravelly loam. These soils were derived mainly from limestone, shale, and sandstone and are classified generally as silts to silty and clayey sands. The color of these soils are generally brown to dark brown with lesser amount of reddish-brown, grayish-brown, and yellowish-brown (IT, 2002).

The topography of the combined Landfill 4 and Industrial Landfill area is relatively flat of which a portion is within the floodplain of Cave Creek (Figure 2-2). Groundwater flow has generally been to the northwest and north (MES, 2006). Static groundwater levels measured during the historical monitoring events at the Site are presented in Table 4-1. See Section 4.1 for further details concerning groundwater elevations, groundwater flow, and gradients at the Site.

2.3 Groundwater Monitoring System

Five monitoring wells (LF4-MW1, LF4-MW2, LF4-MW3, LF4-MW4, and LF4-MW5) were installed at the Site in 1994 and completed in the residuum zone, i.e., first zone of saturation. None of the borings for these wells penetrated fill material (IT, 2002). A monitoring well construction summary is included in Table 2-1. Figure 1-2 shows the well locations.

Well LF4-MW5 is the upgradient background monitoring well used for the detection of representative background groundwater quality at the Site. Wells LF4-MW1, LF4-MW2, LF4-MW3, and LF4-MW4 are the downgradient monitoring wells used for the detection of representative groundwater quality at the Site.

2.4 Groundwater Monitoring History

The groundwater monitoring history of the Site including detection monitoring and assessment monitoring sampling events are summarized in this section.

2.4.1 Previous Monitoring Events

Semi-annual groundwater monitoring was conducted at the Site by the Army, pursuant to the permit, from March 2000 through September 2003. The MDA assumed the semi-annual groundwater monitoring at the Site in March 2004 and has continued the long-term groundwater

monitoring to the present. The MDA conducted a detection monitoring program at the Site from March 2004 through September 2009 and an assessment monitoring program from March 2010 to the present. A summary of the historical detected volatile organic compound (VOC) and metals data are presented in Tables 4-4 and 4-5 (see Section 4.4 for details concerning Tables 4-4 and 4-5). A summary of the Detection Monitoring and Assessment Monitoring programs performed at the Site is described below.

2.4.2 Detection Monitoring Program

During the detection monitoring events from March 2004 through September 2009, groundwater samples were collected at wells LF4-MW1, LF4-MW2, LF4-MW3, LF4-MW4, and LF4-MW5 and analyzed for the constituents listed in *Appendix I* of ADEM Admin. Code r 335-13-4-27 of the *ADEM Division 13 Regulations* (ADEM, 2016). The *Appendix I* constituents are shown in Table 2-2 of this report.

The detection monitoring data at the Site demonstrated compliance with the permit and *ADEM Division 13 Regulations* until the March 2009 sampling event when a SSI occurred for zinc in downgradient well LF4-MW2. Please see Section 5.1 for details concerning the statistical analysis performed on the semi-annual groundwater monitoring results collected. Pursuant to subparagraph (2)(n) of Rule 335-13-4-27, a letter was sent by the MDA informing ADEM of the SSI. Because this was the first SSI occurrence, and because the groundwater sample with the SSI showed a high level of turbidity (145 NTU), the detection monitoring program continued with the September 2009 monitoring event to confirm whether the SSI from the March 2009 monitoring event was an isolated occurrence, a result of an error in sampling or analysis, or due to natural variation in groundwater quality. The September 2009 sampling round confirmed the SSI occurrence of zinc in downgradient well LF4-MW2. In accordance with Rule 335-13-4-27 subparagraph (3)(c) of the *ADEM Division 13 Regulations*, an assessment monitoring program was initiated pursuant to subparagraphs (4)(a) through (4)(j).

2.4.3 Assessment Monitoring Program

An Assessment Monitoring program was initiated during the March 2010 groundwater monitoring event and conducted in accordance with the permit and *ADEM Division 13 Regulations*, which continues to the present.

Pursuant to subparagraph (4)(b)1 of the *ADEM Division 13 Regulations*, during an Assessment Monitoring program groundwater must be sampled and analyzed for the constituents listed in *Appendix II* of the *ADEM Division 13 Regulations*. However, the Industrial Landfill is a nonhazardous solid waste disposal facility that allows for the disposal of only nonhazardous industrial wastes and construction/demolition wastes, pursuant to the permit (Permit No. 08-02). No additional constituents from the *Appendix II* list that were not already on the *Appendix I* list were detected during previous groundwater sampling events performed by the Army and the MDA, as indicated in the *Final EE/CA* (MES, 2006). Therefore, during the assessment monitoring March 2010 and September 2010 events at the Industrial Landfill, the *Appendix I* list of constituents were sampled and analyzed in lieu of the *Appendix II* list, as allowed by subparagraph (4)(b)2 of the *ADEM Division 13 Regulations*.

For the March 2010 and September 2010 groundwater monitoring events, metal constituents cobalt, nickel, and zinc were determined to be SSIs in well LF4-MW2. Although there were some VOC detections, no organic constituents were considered to be SSIs during any of the previous monitoring events at the Site. Because historical statistical analyses showed SSIs for only metal constituents, only metals were sampled and analyzed during the March 2011 monitoring event. The concentrations of constituents detected in groundwater samples collected during past and current monitoring events are presented in Tables 4-4 (VOCs) and 4-5 (metals).

In March 2011 ADEM issued the *Alabama Groundwater Monitoring Reporting Guidance for Solid Waste Facilities (AGMRG)* (ADEM, 2011) to be used in conjunction with the *ADEM Division 13 Regulations*. Subparagraph 2.2.10.3.7 of the *AGMRG* stated “the detection of any organic constituents is considered an SSI”. Because historical sampling events showed metal and VOC detections in groundwater at the Site, in a letter dated August 5, 2011 the MDA proposed to analyze groundwater samples collected at the Site under the Assessment Monitoring program for the *Appendix I* list of constituents (Table 2-2), which include metals and VOCs, starting with the September 2011 monitoring event. The MDA received concurrence from ADEM in a letter dated August 16, 2011 to use the *Appendix I* list of constituents (Table 2-2) for the Assessment Monitoring program at the Site.

In a letter dated September 13, 2016, ADEM issued comments on the March 2016 GWMR requesting MDA conduct an assessment of corrective measures (ACM) in accordance with ADEM Admin. Code r. 335-13-4-.27(4)(g) related to the detection of cobalt in LF4-MW2 and trichloroethene in LF4-MW4 and include surface water samples from the stream downgradient of LF4-MW4. In December 2016, MDA responded to ADEM comments and explained the stream is an ephemeral feature that channels storm water around the site and does not influence groundwater flow to which ADEM concurred on April 20, 2017. MDA also collected three surface water samples in January 2017 for *Appendix I* constituents and all were non-detect for chlorinated VOCs. Cobalt was detected at 11.6 µg/L which is well below the site-wide surface water risk-based target level (RBTL) of 30 µg/L. These findings were provided to ADEM in a letter dated February 8, 2017.

In the December 2016 response to ADEM comments, MDA proposed an alternate groundwater protection standard (GWPS) for cobalt of 5400 µg/L based on a site-specific risk-based evaluation of exposure pathways. ADEM responded in a letter dated April 20, 2017 that the proposed 5400 µg/L GWPS was not applicable and cobalt concentration should be compared to the highest detected concentration in background well LF4-MW5. The highest detected cobalt concentration in LF4-MW5 is 10.5 µg/L sampled on September 21, 2010. ADEM also requested that MDA comply with ADEM Admin. Code r. 335-13-4-.27(4)(g) and conduct an ACM. In June 2017, MDA responded to ADEM and summarized the ACM conducted to date and existing land use controls and proposed that natural attenuation be allowed to continue and the site continue to be monitored on a semi-annual basis under the assessment monitoring program. ADEM concurred with MDA’s proposal in June 2017.

3.0 SUMMARY OF MARCH 2021 ACTIVITIES

During the March 2021 monitoring event, groundwater samples were collected and analyzed for the parameters on the *Appendix I* of ADEM Admin. Code r 335-13-4-27 of the *ADEM Division 13 Regulations* (Table 2-2). The March 2021 monitoring event was performed under the Assessment Monitoring program, discussed in Section 2.4.3.

To meet the recommended actions outlined in the permit, *ADEM Division 13 Regulations*, and applicable United States Environmental Protection Agency (EPA) guidance, the following activities were performed during the March 2021 monitoring event:

- Measured groundwater levels in the monitoring wells.
- Collected groundwater samples from five monitoring wells.
- Analyzed the groundwater samples for the constituents listed in *Appendix I* of Code Rule 335-13-4-27 of the *ADEM Division 13 Regulations* (Table 2-2) by Methods SW8260B (VOCs), SW6020B (Inductively Coupled Plasma-Atomic Emission Spectrometry [ICP-MS metals], and SW7470A (mercury).
- Performed statistical analysis on the metals results (described in Section 5.0).

3.1 Groundwater Sampling

To address the issues with high turbidity concentrations in the groundwater at the Site, the groundwater samples are collected from each well using the sampling technique described below.

- The day before groundwater samples are to be collected, water levels are measured to the nearest hundredth of a foot using a Solinst™ water level indicator and recorded. Total well depths are also measured and recorded.
- After the water levels are taken, the wells are purged and allowed to recharge overnight, approximately 24 hours before sampling.
- The following day, groundwater levels, chemical and physical field screening parameters including pH, conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), total dissolved solids (TDS), turbidity, and temperature are measured using a YSI 556 MPS Water Quality Meter. The field parameters are measured 24 hours after the wells are purged and before sampling.
- Using disposable bailers, groundwater samples are collected directly into laboratory-supplied sample bottles with the appropriate preservatives.

Groundwater samples were collected on March 4, 2021 from five residuum monitoring wells, LF4-MW1 through LF4-MW5. The sample containers were labeled, placed in a chilled cooler and shipped under chain-of-custody procedures to TestAmerica in Savannah, Georgia. The groundwater samples for monitoring wells LF4-MW1 through LF4-MW5 were analyzed for VOCs and metals. Figure 1-2 shows the groundwater sampling locations. The groundwater sample collection logs are provided in Appendix A and the chain-of-custody forms for the groundwater samples collected during the March 2021 monitoring event are provided in Appendix B.

3.2 Data Quality Review

MES reviewed the analytical data for the groundwater samples collected during the March 2021 monitoring event. The data quality review was performed in accordance with the *Quality Assurance Plan (QAP)* in *Appendix A* of the *Final Installation-Wide Sampling and Analysis Plan* (MES, 2013) to assess compliance with quality assurance objectives, and to assess hard copy and electronic deliverable consistency and integrity. *Appendix C* presents the analytical data collected during the March 2021 monitoring event. The Data Quality Summary (DQS) for the March 2021 groundwater samples is included in *Appendix C*. The laboratory data forms showing the validated results are also included in *Appendix C*.

4.0 RESULTS OF MARCH 2021 GROUNDWATER SAMPLING

This section discusses the results of the March 2021 groundwater monitoring event at the Site.

4.1 Groundwater Levels

Groundwater elevations measured during the March 2021 groundwater monitoring event are presented in Table 4-1. Groundwater elevations from previous monitoring events are also shown in Table 4-1. Figure 4-1 shows groundwater elevations and potentiometric surface contours for the residuum monitoring wells based on the March 2021 water level measurements. As indicated in Figure 4-1, groundwater flowed in a north and northwesterly direction.

To further aid in assessing groundwater flow at the Site, horizontal hydraulic gradients were calculated using the groundwater data collected during the March 2021 monitoring event, presented in Table 4-2. The horizontal hydraulic gradients were low over the Site, ranging from 0.006 feet per foot (ft/ft) to 0.018 ft/ft. Site-wide horizontal hydraulic gradients averaged 0.013 ft/ft. The highest horizontal hydraulic gradient occurred between wells LF4-MW4 and LF4-MW3 in the north-eastern portion of the Site.

Based on the groundwater flow direction (Figure 4-1) and horizontal hydraulic gradients (Table 4-2), the groundwater monitoring well network at the Site is functioning as intended and is sufficient for determining the facility's impact on the quality of groundwater in the first zone of saturation at the Site.

4.2 Analytical Data and Data Quality Review

The analytical data for the March 2021 samples is provided in Appendix C. Groundwater samples were analyzed for VOCs and metals. MES reviewed the analytical data in accordance with the *QAP* (MES, 2013). Based on the data quality review, the analytical data generated for these monitoring events are adequate to fulfill program objectives and are suitable for preparation of this report. A more detailed discussion of the analytical results can be found in the DQS provided in Appendix C.

4.3 Groundwater Field Parameter Results

Field screening parameters, including pH, conductivity, DO, ORP, TDS, turbidity, and temperature, and other sampling data (e.g., groundwater depths, well depths, sampling conditions, etc.) were recorded on the Groundwater Sampling Logs included in Appendix A. The field parameters for the groundwater samples are summarized in Table 4-3.

4.4 Summary of Groundwater Analytical Results

Groundwater samples were collected from five monitoring wells during the March 2021 monitoring event and analyzed for VOCs and metals. This section describes the analytical results for the groundwater samples.

4.4.1 Volatile Organic Compounds Analytical Results

Chlorobenzene, cis-1,2-dichloroethene, and trichloroethene were detected in well LF4-MW4 during the March 2021 sampling event. The analytical results for VOCs including historical data are presented in Table 4-4. Review of the current and historical analytical results indicate concentrations detected were all within the range of previous detections for LF4-MW4.

4.4.2 Metals Analytical Results

The analytical results for metals in the groundwater samples during the March 2021 monitoring event are presented in Table 4-5. Eleven of the 16 target metals, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, vanadium, and zinc were detected in groundwater samples from at least one of the monitoring wells during March 2021 monitoring event. Antimony, mercury, selenium, silver, and thallium were not detected during the March 2021 monitoring event. All reporting limits (RLs) and method detection limits (MDLs) were below the MCL. Table C6-1 compares RLs and MDLs to MCLs.

To simplify the presentation of historical analytical results and facilitate identification of downward or upward trends in metal concentrations, analytical results from previous sampling events are also presented in Table 4-5. Further details concerning trends in metal concentrations over time are described in Section 5.0.

5.0 EVALUATION OF GROUNDWATER ANALYTICAL DATA

The analytical results for groundwater collected during the March 2021 groundwater monitoring event were evaluated to determine whether there was an SSI over background groundwater quality at the Site.

5.1 Evaluation of Groundwater VOCs Quality Data

Detections of organic constituents are considered SSIs, as per the *Alabama Groundwater Monitoring Report Guidance for Solid Waste Facilities* (2011). During the March 2021 groundwater sampling event, chlorobenzene, cis-1,2-dichloroethene, and trichloroethene were detected. All VOCs detected are considered SSIs. Concentrations of chlorobenzene, cis-1,2-dichloroethene, and trichloroethene were below MCLs.

5.2 Evaluation of Groundwater Metals Quality Data

To evaluate whether there were any SSI occurrences for metal constituents in groundwater at the Site a statistical analysis was performed on the metals data using control charts in accordance with ADEM Admin. Code r 335-13-4-27, subparagraph (2) of the *ADEM Division 13 Regulations* and applicable United States Environmental Protection Agency (EPA) guidance.

Control charts are used to monitor the inherent statistical variation of the data collected within a single well. Because intrawell comparisons involve a single well, significant changes in the level of contamination in a well cannot be attributed to spatial and/or hydrogeological differences between wells. Intrawell control charts employ historical measurements from a compliance point well as background. Control charts are mostly appropriate for analytes with a reasonably high detection frequency in monitoring wells. Control charts allow data from a well to be viewed graphically over time (EPA, 2009).

The combined Shewhart Cumulative Sums (CUSUMs) control charts assesses two statistical quantities at every sampling event, both the new individual measurement and the CUSUM of past and current measurements. The Shewhart portion compares compliance measurements against a background limit. The CUSUM portion sequentially analyzes each new measurement with prior compliance data. Both portions are used to assess the similarity of compliance data to background. The baseline parameters for the chart, estimates of the mean and standard deviation, are obtained from historical background data collected from the specific compliance well. These baseline measurements characterize the expected background concentrations at compliance wells. As future compliance observations are collected, the baseline parameters are used to standardize the newly gathered data (EPA, 2009).

The combined CUSUM control chart is declared out-of-control in one of two ways. First, the standardized means (Z_i) computed at each sampling period may cross the Shewhart control limit (SCL). Such a change signifies a rapid increase in well concentration levels among the most recent sample data. Second, the CUSUM of the standardized means (Z_i) may become too large, crossing the "decision internal value" (h). Crossing the h threshold can mean either a sudden rise in concentration levels or a gradual increase over a longer span of time. A gradual increase or

trend is particularly indicated if the CUSUM crosses its threshold but the standardized mean Z_i does not. The reason for this is that several consecutive small increases in Z_i will not trigger the SCL threshold but may trigger the CUSUM threshold. As such, the control chart can indicate the onset of either sudden or gradual contamination at the compliance point. Three parameters are necessary to construct a CUSUM control chart, a reference value (k), h , and SCL. The combination of $k = 1$, $h = 5$ and $SCL = 4.5$ was determined to be the most appropriate for the application of CUSUM control charts for groundwater monitoring (EPA, 2009).

The CUSUM control charts are constructed with respect to a log scale. The lognormal distribution is a frequently used model in groundwater statistics and is generally more appropriate as a default statistical model than the normal distribution (EPA, 2009). The log-mean and the log-standard deviation represent the sample mean and standard deviation computed using log-transformed values instead of the raw measurements.

5.2.1 Metals Background Groundwater Quality Data

For the statistical analyses performed on the March 2004 to March 2007 semi-annual groundwater sampling events, the results from the March 2000 to the September 2003 sampling events were used for the background data. However, several metals had only one or no background results out of the eight sampling events from March 2000 to September 2003. As of the September 2007 groundwater sampling event, four additional metals (cobalt, copper, nickel, and zinc) had 9 sampling events and at least one groundwater sample with nondetects less than 50%. However, these metals only had one background result out of the eight sampling events from March 2000 to September 2003. ADEM Admin. Code r 335-13-4-27, subparagraphs (3)(b) and (4)(b) of the *ADEM Division 13 Regulations* and the permit requires that a minimum of four independent samples from each well be used to establish background. In addition, the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance* (EPA, 2009) recommends that if control charts remain “in control” for a long period of time the baseline parameters should be updated to include more recent background data.

A two-sample t-test was performed comparing the March 2004 through September 2005 data with the previous background data set from March 2000 through September 2003 data to ensure there were no significant differences at the 95 percent confidence level between the two data sets. Details of the t-test are presented in the *Statistical Analysis of Semi-Annual Groundwater Sampling Results September 2008 Groundwater Sampling Event, Fort McClellan Industrial Landfill (Permit No. 08-02), Ft. McClellan, Anniston, Calhoun County, Alabama* (MDA, 2008). The t-tests showed there were no significant differences at the 95 percent confidence level between the March 2004 to September 2005 data set and the March 2000 to September 2003 data set. Therefore, the data from the twelve sampling events from March 2000 to September 2005 were used for the background during the statistical analysis of metal constituents in wells that had 9 or more sampling events and percentages of nondetects less than 50%, starting with the September 2007 sampling event and continuing to the present.

5.2.2 March 2021 Metals Groundwater Quality Data

Statistical analysis was performed for the March 2021 groundwater metals data using CUSUM

control charts in accordance with ADEM Admin. Code r 335-13-4-27, subparagraph (2) of the *ADEM Division 13 Regulations* and applicable EPA guidance. Because control charts must be constructed from a data set large enough to characterize the behavior of a specific well and because control charts do not efficiently handle data sets with a significant fraction of nondetects (EPA, 2009), control charts were developed for those metal constituents in wells that had nine (9) or more sampling events and the percentage of nondetects was less than 50%. The results of the statistical analysis performed for the March 2021 groundwater metals data are provided in Appendix D. Attachment D1 summarizes the number of analyses and percentage of nondetects. Attachment D2 provides the calculations for the CUSUMs and Attachment D3 provides the CUSUM control charts for the statistical analyses.

The CUSUMs for cobalt (12.13) and nickel (25.66) in well LF4-MW1; and cobalt (36.32), nickel (27.45), and zinc (102.56) in well LF4-MW2 were above the threshold value of 5 and are therefore considered SSI occurrences.

5.3 SSI Occurrences in Groundwater for the March 2021 Sampling Event

Table 5-1 presents a summary of the SSI occurrences for the March 2021 groundwater sampling event. The concentrations of the SSI constituents were compared to the groundwater protection standards (Table 5-1). In accordance with Code Rule 335-13-4-27, subparagraph (4)(h), the maximum contaminant levels (MCLs) were used as the groundwater protection standards for the SSIs. For constituents for which MCLs have not been promulgated (cobalt), the background well concentrations were used as the groundwater protection standards, as per ADEM Admin. Code r 335-13-4-27, subparagraph (4)(h)2.

SSI occurrences of nickel, zinc, chlorobenzene, cis-1,2-dichloroethene, and trichloroethene were all below the groundwater protection standards or MCLs. The concentrations for metal SSI constituent cobalt (36 µg/L) in LF4-MW1 and (65 µg/L) in well LF4-MW2, were greater than the background concentration in LF4-MW5 (10.5 µg/L).

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6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the activities performed and the results of the March 2021 monitoring event, and provides conclusions and recommendations based on the results of the groundwater monitoring activities.

6.1 Summary of Activities and Results

The March 2021 monitoring event was performed under the Assessment Monitoring program. Groundwater samples were collected from five residuum monitoring wells at the Site on March 4, 2021. The groundwater samples were analyzed for the constituents listed in *Appendix I* of ADEM Admin. Code r 335-13-4-27 of the *ADEM Division 13 Regulations* (Table 2-2).

Groundwater elevations showed groundwater at the Site flowed in a north and northwesterly direction. The horizontal hydraulic gradients were low over the Site, ranging from 0.006 ft/ft to 0.018 ft/ft.

During the March 2021 monitoring event, three VOCs in well LF4-MW4 were detected and considered SSIs. To evaluate whether there were any SSI occurrences for metal constituents in groundwater at the Site a statistical analysis was performed on the metals data using CUSUM control charts in accordance with ADEM Admin. Code r 335-13-4-27, subparagraph (2) of the *ADEM Division 13 Regulations* and applicable EPA guidance. The statistical analysis showed SSI occurrences for cobalt and nickel in well LF4-MW1; and cobalt, nickel and zinc in well LF4-MW2 during March 2021 groundwater monitoring event. Concentrations were consistent with historical data.

The concentrations of the SSI constituents were compared to the groundwater protection standards for the Site (Table 5-1). MCLs, as listed in the *ADEM Division 7 Regulations*, were used as the groundwater protection standards for the SSIs. Because there is no promulgated MCL for cobalt, the concentration for the cobalt SSI in wells were compared to the cobalt concentration for background well LF4-MW5.

6.2 Conclusions and Recommendations

The concentrations for metal SSI constituent cobalt (36 µg/L) in LF4-MW1 and (65 µg/L) in well LF4-MW2, were greater than the groundwater protection standard or background concentration (10.5 µg/L). All other SSI constituents were below groundwater protection standards. MDA recommends that natural attenuation and land use controls be allowed to continue, and the site continue to be monitored on a semi-annual basis under the assessment monitoring program.

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7.0 REFERENCES

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8.0 Professional Groundwater Scientist Certification

I certify that I currently hold an active license in the State of Alabama and the groundwater monitoring report activities undertaken by Matrix Environmental Services, LLC. as described in this report were performed in general accordance with the requirements of the Solid Waste Disposal Facility Permit No. 08-02 and Alabama Department of Environmental Management Land Division Solid Waste Program Division 13 Regulations (ADEM Division 13 Regulations).



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Tables

**Table 2-1. Monitoring Well Construction Summary
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Well ID	Permit Design	Northing	Easting	Ground Elevation (ft msl)	TOC Elevation (ft msl)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Well Material
LF4-MW1	CMP	1180041.4	669625.24	737.13	739.79	15	40	40	4" ID PVC
LF4-MW2	CMP	1180244.71	670492.08	738.5	738.5	6	36	36	4" ID PVC
LF4-MW3	CMP	1180197.72	671013.48	739.78	739.78	11	31	31	4" ID PVC
LF4-MW4	CMP	1179683.62	671522.79	743.35	743.35	5	25	25	4" ID PVC
LF4-MW5	BKG	1178445.5	669747.69	753.32	753.32	12	32	32	4" ID PVC

Notes:

bgs = below ground surface
 BKG = Background well
 CMP = Compliance/downgradient well
 ft = feet
 msl = Mean sea level
 NM = Not Measured
 TOC = Top of Casing
 4" ID = 4-inch inside diameter
 PVC = polyvinyl chloride

**Table 2-2. Analyte List
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Method	Parameters	CAS No.	Method	Parameters	CAS No.
Volatile Organic Compounds			Metals		
SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	SW6020A	Antimony	7440-36-0
SW8260B	1,1,1-Trichloroethane	71-55-6	SW6020A	Arsenic	7440-38-2
SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	SW6020A	Barium	7440-39-3
SW8260B	1,1,2-Trichloroethane	79-00-5	SW6020A	Beryllium	7440-41-7
SW8260B	1,1-Dichloroethane	75-34-3	SW6020A	Cadmium	7440-43-9
SW8260B	1,1-Dichloroethene	75-35-4	SW6020A	Chromium	7440-47-3
SW8260B	1,2,3-Trichloropropane	96-18-4	SW6020A	Cobalt	7440-48-4
SW8260B	1,2-Dibromo-3-Chloropropane	96-12-8	SW6020A	Copper	7440-50-8
SW8260B	1,2-Dibromoethane	106-93-4	SW6020A	Lead	7439-92-1
SW8260B	1,2-Dichlorobenzene	95-50-1	SW6020A	Nickel	7440-02-0
SW8260B	1,2-Dichloroethane	107-06-2	SW6020A	Selenium	7782-49-2
SW8260B	1,2-Dichloropropane	78-87-5	SW6020A	Silver	7440-22-4
SW8260B	1,4-Dichlorobenzene	106-46-7	SW6020A	Thallium	1314-32-5
SW8260B	2-Butanone (MEK)	78-93-3	SW6020A	Vanadium	7440-62-2
SW8260B	2-Hexanone	591-78-6	SW6020A	Zinc	7440-66-6
SW8260B	4-Methyl-2-Pentanone (MIBK)	108-10-1	SW7470A	Mercury	7487-94-7
SW8260B	Acetone	67-64-1			
SW8260B	Acrylonitrile	107-13-1			
SW8260B	Benzene	71-43-2			
SW8260B	Bromochloromethane	74-97-5			
SW8260B	Bromodichloromethane	75-27-4			
SW8260B	Bromoform	75-25-2			
SW8260B	Bromomethane	74-83-9			
SW8260B	Carbon Disulfide	75-15-0			
SW8260B	Carbon Tetrachloride	56-23-5			
SW8260B	Chlorobenzene	108-90-7			
SW8260B	Chloroethane	75-00-3			
SW8260B	Chloroform	67-66-3			
SW8260B	Chloromethane	74-87-3			
SW8260B	Cis-1,2-Dichloroethene	156-59-2			
SW8260B	Cis-1,3-Dichloropropene	10061-01-5			
SW8260B	Dibromochloromethane	124-48-1			
SW8260B	Dibromomethane	74-95-3			
SW8260B	Ethylbenzene	100-41-4			
SW8260B	Iodomethane	74-88-4			
SW8260B	Methylene Chloride	75-09-2			
SW8260B	Styrene	100-42-5			
SW8260B	Tetrachloroethene	127-18-4			
SW8260B	Toluene	108-88-3			
SW8260B	Trans-1,2-Dichloroethene	156-60-5			
SW8260B	Trans-1,3-Dichloropropene	10061-02-6			
SW8260B	Trans-1,4-Dichloro-2-Butene	110-57-6			
SW8260B	Trichloroethene	79-01-6			
SW8260B	Trichlorofluoromethane	75-69-4			
SW8260B	Vinyl Acetate	108-05-4			
SW8260B	Vinyl Chloride	75-01-4			
SW8260B	Xylenes (Total)	1330-20-7			

µg/L = micrograms per liter

mg/L = milligrams per liter

Analyte list from Appendix I of Code Rule 335-13-4-27 of the Alabama Department of Environmental Management Land Division Solid Waste Program Division 13 Regulations

**Table 4-1: Groundwater Elevations
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Measurement Date	Well Depth (ft BTOC)	Depth to Water (ft BTOC)	Groundwater Elevation (ft msl)
LF4-MW1	3/4/21	42.5	16.66	723.13
LF4-MW2	3/4/21	40.25	20.90	717.60
LF4-MW3	3/4/21	34.2	12.75	727.03
LF4-MW4	3/4/21	26.8	5.37	737.98
LF4-MW5	3/4/21	34.6	10.90	742.42

ft BTOC = feet below top of casing
ft msl = feet above mean sea level.

**Table 4-2: Horizontal Hydraulic Gradients, March 2021
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Upgradient Well	Groundwater Elevation	Downgradient Well	Groundwater Elevation	Estimated Groundwater Flow Direction	Horizontal Distance	Groundwater Elevation Difference (feet)	Horizontal Gradient (ft/ft)
LF4-MW5	742.42	LF4-MW1	723.13	north	1601	19.29	0.012
LF4-MW4	737.98	LF4-MW3	727.03	northwest	724	10.95	0.015
LF4-MW3	727.03	LF4-MW2	717.60	west	524	9.43	0.018
LF4-MW1	723.13	LF4-MW2	717.60	northeast	890	5.53	0.006
Average Horizontal Gradient:							0.013

Notes:

Elevations in feet above mean sea level.

ft/ft = feet per foot

**Table 4-3: Groundwater Field Parameters, March 2021
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Sample Location	Sample Date	Temperature (°C)	Conductivity (µs/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	pH
LF4-MW1	3/4/21	16.4	122	1.2	142	0.08	67	4.6
LF4-MW2	3/4/21	16.4	331	0.8	45	0.22	102	5.7
LF4-MW3	3/4/21	15.8	69	3.6	250	0.04	81	4.4
LF4-MW4	3/4/21	13.6	599	1.2	25	0.39	15	6.0
LF4-MW5	3/4/21	15.8	25	2.1	274	0.02	55	4.2

Notes:

°C = Degrees Celsius

µs/cm = Microsiemens per centimeter

mg/L = Milligrams per liter

mV = Millivolts

NM = Not measured

NTU = Nephelometric turbidity units

ORP = Oxidation-reduction potential

TDS = Total Dissolved Solids

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
LF4-MW1	3/29/00	< 0.5	< 0.5	< 5	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
LF4-MW1	9/26/00	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW1	4/24/01	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW1	9/28/01	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	0.7	1.9	< 0.5	< 0.5	--
LF4-MW1	4/2/02	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW1	9/18/02	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW1	3/5/03	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW1	9/26/03	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW1	3/31/04	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	9/29/04	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	3/16/05	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	9/28/05	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	3/13/06	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	9/13/06	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	3/6/07	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	9/24/07	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	3/26/08	< 1	< 1	< 10 (UJC)	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
LF4-MW1	9/16/08	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/17/09	< 1	< 1	8.4 J	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/17/09	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/17/10	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/21/10	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/8/11	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/14/12	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/6/12	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/5/13	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/11/13	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/5/14	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/4/14	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/13/15	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/16/15	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/16/16	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/21/16	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	3/15/17	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8
LF4-MW1	9/8/17	< 1	< 1	< 10	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 0.8

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
LF4-MW1	3/8/18	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW1	9/11/18	<1	<1	<10	<1	<2	<1	<5	<1	1.1	<1	<1	<1	<1	<1
LF4-MW1	3/7/19	<1	<1	<10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW1	9/5/19	<1	<1	<10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW1	3/12/20	<1	<1	<10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW1	9/15/20	<1	<1	<10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW1	3/4/21	<1	<1	<10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/29/00	<0.5	<0.5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
LF4-MW2	9/26/00	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW2	4/24/01	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW2	9/28/01	<0.5	--	--	<0.5	--	<0.5	--	--	--	0.6	2	<0.5	<0.5	--
LF4-MW2	4/2/02	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW2	9/18/02	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW2	3/5/03	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW2	9/26/03	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW2	3/31/04	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/29/04	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/16/05	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/28/05	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/13/06	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/13/06	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/6/07	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/24/07	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/26/08	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/16/08	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	3/17/09	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	9/17/09	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	3/17/10	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	9/21/10	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	9/8/11	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	3/14/12	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	9/6/12	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	3/5/13	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	9/11/13	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8
LF4-MW2	3/5/14	<1	<1	<10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<0.8

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
LF4-MW2	9/4/14	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	3/13/15	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	9/16/15	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	3/16/16	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	9/21/16	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	3/15/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	9/8/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	3/8/18	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW2	9/11/18	<1	<1	< 10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/7/19	<1	<1	< 10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/5/19	<1	<1	< 10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/12/20	<1	<1	< 10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	9/15/20	<1	<1	< 10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW2	3/4/21	<1	<1	< 10	<1	<2	<1	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	3/29/00	< 0.5	< 0.5	< 5	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
LF4-MW3	9/26/00	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	4/24/01	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	9/28/01	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	4/2/02	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	9/18/02	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	3/5/03	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	9/26/03	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW3	3/31/04	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	9/29/04	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	3/16/05	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	9/29/05	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	3/13/06	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	9/14/06	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	3/6/07	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	9/25/07	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	3/26/08	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW3	9/16/08	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/17/09	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/17/09	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/17/10	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
LF4-MW3	9/21/10	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/8/11	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/14/12	<1	<1	< 10	<1	<1	<1	<2	0.46 J	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/6/12	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/5/13	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/11/13	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/5/14	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/4/14	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/13/15	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/16/15	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/16/16	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/21/16	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/15/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/8/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	3/8/18	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW3	9/11/18	<1	<1	< 10 (UJL)	<1	<2	<1	< 5 (UJL)	<1	<1	<1	<1	<1	<1	< 1
LF4-MW3	3/7/19	<1	<1	< 10	<1	<2	<1	< 5	<1	<1	<1	<1	<1	<1	< 1
LF4-MW3	9/5/19	<1	<1	< 10	<1	<2	<1	< 5	<1	< 1 (UJM)	<1	<1	<1	<1	< 1
LF4-MW3	3/12/20	< 1 H (UJH)	< 1 (JH)	< 10 (JH)	< 1 (JH)	< 2 (JH)	< 1 (JH)	< 5 (JH)	< 1 (JH)	< 1 (JH)	< 1 (JH)	< 1 (JH)	< 1 (JH)	< 1 (JH)	< 1
LF4-MW3	9/15/20	<1	<1	< 10	<1	<2	<1	< 5	<1	<1	<1	<1	<1	<1	< 1
LF4-MW3	3/4/21	<1	<1	< 10	<1	<2	<1	< 5	<1	<1	<1	<1	<1	<1	< 1
LF4-MW4	3/29/00	< 0.5	< 0.5	< 5	< 0.5	< 5	3.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
LF4-MW4	9/26/00	< 0.5	--	--	< 0.5	--	4.1	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW4	4/24/01	< 0.5	--	--	< 0.5	--	2.6	--	--	--	< 0.5	< 0.5	< 0.5	10.4	--
LF4-MW4	9/28/01	< 0.5	--	--	< 0.5	--	7.8	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW4	4/2/02	< 0.5	--	--	< 0.5	--	5.6	--	--	--	< 0.5	< 0.5	< 0.5	6	--
LF4-MW4	9/18/02	< 0.5	--	--	< 0.5	--	6.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW4	3/5/03	< 0.5	--	--	< 0.5	--	1.9	--	--	--	< 0.5	< 0.5	< 0.5	7.2	--
LF4-MW4	9/26/03	< 0.5	--	--	< 0.5	--	7.4	--	--	--	< 0.5	< 0.5	< 0.5	0.6	--
LF4-MW4	3/31/04	<1	<1	< 10	<1	<1	3.7	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	9/29/04	<1	0.99 J	< 10	0.5 J	<1	8.5	0.35 J	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	3/15/05	<1	<1	2.9 J	<1	<1	1.4	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	9/29/05	<1	0.36 J	< 10	<1	<1	4.1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	3/14/06	<1	<1	< 10	<1	<1	0.82 J	<2	<1	1.3	<1	<1	<1	7	<1
LF4-MW4	9/14/06	<1	<1	< 10	<1	<1	1.7	<2	<1	<1	<1	<1	<1	<1	<1

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
LF4-MW4	3/7/07	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	9/25/07	<1	0.7 J	< 10	0.37 J	2.8	13	0.25 J	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	3/26/08	<1	<1	< 10 (UJC)	<1	<1	1.9	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	9/17/08	<1	0.93 J	< 10	0.42 J	< 1 (UJCL)	15	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	3/17/09	<1	0.39 J	< 10	<1	<1	4.9	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	9/21/09	<1	0.24 J	< 10	<1	<1	3.6	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	3/17/10	0.22 J	<1	< 10	<1	<1	2.1	<2	<1	16	<1	<1	2.4	61	0.21 J
LF4-MW4	9/21/10	<1	0.53 J	< 10	<1	<1	7.6	<2	<1	<1	<1	<1	<1	0.22 J	< 0.8
LF4-MW4	9/8/11	<1	0.54 J	< 10	<1	<1	7.5	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	3/14/12	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	9/6/12	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	3/5/13	<1	0.23 J	< 10	<1	<1	2.8	<2	<1	16	<1	<1	1.6	40	< 0.8
LF4-MW4	9/11/13	<1	0.5 J	< 10	<1	<1	7.7	<2	<1	2.9	<1	<1	<1	1.7	< 0.8
LF4-MW4	3/5/14	<1	0.28 J	< 10	<1	<1	3.7	<2	<1	19	<1	<1	1.3	17	0.25 J
LF4-MW4	9/4/14	<1	0.21 J	< 10	<1	<1	4.6	<2	<1	7.7	<1	<1	0.45 J	6.1	< 0.8
LF4-MW4	3/13/15	<1	<1	< 10	<1	<1	1.3	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	9/16/15	<1	0.33 J	< 10	<1	<1	5.6	<2	<1	0.38 J	<1	<1	<1	0.33 J	< 0.8
LF4-MW4	3/16/16	<1	<1	< 10	<1	<1	1	<2	<1	30	<1	<1	2.3	32	< 0.8
LF4-MW4	9/21/16	<1	0.31 J	< 10	<1	<1	5	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	3/15/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW4	9/8/17	<1	<1	< 10	<1	<1	2.6	<2	<1	2.1	<1	<1	<1	1	< 0.8
LF4-MW4	3/8/18	<1	<1	< 10	<1	<1	1.6	<2	<1	20	<1	<1	1.6	27	< 0.8
LF4-MW4	9/11/18	<1	<1	< 10	<1	<2	3.2	<5	<1	0.6 J	<1	<1	<1	<1	<1
LF4-MW4	3/7/19	<1	<1	< 10	<1	<2	1.2	<5	<1	35	<1	<1	2.8	34	<1
LF4-MW4	9/5/19	<1	<1	< 10	<1	<2	3.5	<5	<1	<1	<1	<1	<1	<1	<1
LF4-MW4	3/12/20	<1	<1	< 10	<1	<2	1.3	<5	<1	25	<1	<1	2.2	30	<1
LF4-MW4	9/15/20	<1	<1	< 10	<1	<2	2.4	<5	<1	1.5	<1	<1	<1	1.2	<1.0
LF4-MW4	3/4/21	<1	<1	< 10	<1	<2	0.71 J	<5	<1	2.1	<1	<1	<1	1.9	<1.0
LF4-MW5	3/29/00	<0.5	<0.5	< 5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
LF4-MW5	9/26/00	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW5	4/24/01	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW5	9/28/01	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW5	4/2/02	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW5	9/18/02	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--
LF4-MW5	3/5/03	<0.5	--	--	<0.5	--	<0.5	--	--	--	<0.5	<0.5	<0.5	<0.5	--

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
LF4-MW5	9/26/03	< 0.5	--	--	< 0.5	--	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
LF4-MW5	3/31/04	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/29/04	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/16/05	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/29/05	<1	<1	< 10 (UJI)	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/14/06	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/14/06	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/7/07	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/24/07	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/26/08	<1	<1	< 10 (UJC)	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/16/08	<1	<1	< 10	<1	< 1 (UJC)	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/18/09	<1	<1	5.5 J	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/17/09	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/17/10	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/21/10	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/8/11	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/14/12	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/6/12	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	0.67 J	<1	<1	< 0.8
LF4-MW5	3/5/13	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/11/13	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/5/14	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/4/14	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/13/15	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/16/15	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/16/16	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/21/16	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/15/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/8/17	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	3/8/18	<1	<1	< 10	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	< 0.8
LF4-MW5	9/11/18	<1	<1	< 10	<1	< 2	<1	< 5	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/7/19	<1	<1	< 10	<1	< 2	<1	< 5	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/5/19	<1	<1	< 10	<1	< 2	<1	< 5	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/12/20	<1	<1	7.0 J	<1	< 2	<1	< 5	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	9/15/20	<1	<1	< 10	<1	< 2	<1	< 5	<1	<1	<1	<1	<1	<1	<1
LF4-MW5	3/4/21	<1	<1	< 10	<1	< 2	<1	< 5	<1	<1	<1	<1	<1	<1	<1

**Table 4-4: Analytical Data for VOCs Detected in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well ID	Sample Date	1,1-DCE	1,4-DCB	Acetone	Benzene	Carbon Disulfide	Chloro-benzene	Chloro-ethane	Chloro-form	c-1,2-DCE	Ethyl-benzene	Toluene	t-1,2-DCE	TCE	VC
---------	-------------	---------	---------	---------	---------	------------------	----------------	---------------	-------------	-----------	---------------	---------	-----------	-----	----

Notes:

-- = Not analyzed
 < = Indicates the analyte was not detected at the reported quantitation limit shown.
 1,1-DCE = 1,1-Dichloroethene
 1,4-DCB = 1,4-Dichlorobenzene
 c-1,2-DCE = Cis-1,2-Dichloroethene
 t-1,2-DCE = Trans-1,2-Dichloroethene
 TCE = Trichloroethene
 VC = Vinyl Chloride
 VOC = Volatile organic compound

Data reported in micrograms per liter (µg/L)
 Samples collected 2000 through 2003 by IT Corporation/Shaw Environmental.
 Samples collected in 2004 to the present by Matrix Environmental Services, LLC (MES).

Lab Flag:

J = Estimated detection. Concentration is between the method detection limit and the practical quantitation limit.

Validation Flags:

(JH) = Data is estimated. Analytical method holding time exceeded.
 (UJC) = Reported quantitation limit is estimated; continuing calibration was outside method-specific control limits.
 (UJI) = Reported quantitation limit is estimated; initial calibration was outside method-specific control limits.
 (UJL) = Reported quantitation limit is estimated; the LCS and LCSD recoveries were outside laboratory historical control limits.
 (UJM) = Reported quantitation limit is estimated; the MS and MSD recoveries were outside laboratory historical control limits.

**Table 4-5: Analytical Data for Metals in Groundwater
Industrial Landfill, Parcel 175(5)
McClellan, Anniston Alabama**

Well	Sample	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
LF4-MW1	3/4/21	< 5	< 3	49	0.35 J	< 0.5	1.9 J	36	3.7 J	2.6	< 0.2	23	< 2.5	< 1	< 1	< 10	86
LF4-MW2	3/4/21	< 5	3.3	62	0.25 J	0.18 J	1.9 J	65	6.9	7.4	< 0.2	33	< 2.5	< 1	< 1	< 10	210
LF4-MW3	3/4/21	< 5	< 3	83	0.81	< 0.5	< 5	2.4	5.8	5.8	< 0.2 F1	5.6	< 2.5	< 1	< 1	0.44 F1	44
LF4-MW4	3/4/21	< 5	2.9 J	190	< 0.5	< 0.5	< 5	3.3	< 5	1.1 J	< 0.2	2.4 J	< 2.5	< 1	< 1	< 10	< 20
LF4-MW5	3/4/21	< 5	< 3	21	0.38 J	< 0.5	3.2 J	4.4	3.7 J	3.5	< 0.2	5.3	< 2.5	< 1	< 1	6.7 J	28

Notes:

-- = Not analyzed

< = Indicates the analyte was not detected at the reported quantitation limit shown.

µg/L = micrograms per liter

mg/L = milligrams per liter

Samples collected 2000 through 2003 by IT Corporation/Shaw Environmental.

Samples collected in 2004 to the present by Matrix Environmental Services, LLC.

Lab Flags:

J = Estimated detection. Concentration is between the method detection limit and the practical quantitation limit.

U^ = Analyte is not detected above the reporting limit. Lab flag updated by MES data reviewer.

^ = ICV, CCV, ICB, CCB, ISA, CRL, CRA, DLCK or MRL standard, instrument related QC is outside acceptance limits.

Validation Flags:

(B) = Analyte was detected in an associated blank.

(UB) = Value is considered a non-detection due to a detection of the analyte in an associated blank.

(JM) = Estimated detection; the MS and MSD recoveries were outside laboratory historical control limits.

(UJM) = Reported quantitation limit is estimated; the MS and MSD recoveries were outside laboratory historical control limits.

(J-) = Analyte was reported as a negative concentration in the method or continuing calibration blank; affected sample detects may be biased low.

(UJ-) = Analyte was reported as a negative concentration in the method or continuing calibration blank; affected sample non-detects may be potential false negatives.

**Table 5-1 - Summary of Statistically Significant Increases, March 2021
 Sampling Event
 Industrial Landfill, Parcel 175(5)
 McClellan, Anniston, Alabama**

Well Location	SSI Analyte	CUSUM	Sample Concentration	MCL	BKG Concentration	Units
LF4-MW1	cobalt	12.13	36	NA	10.5	µg/L
	nickel	25.66	24	100	--	µg/L
LF4-MW2	cobalt	36.32	65	NA	10.5	µg/L
	nickel	27.45	33	100	--	µg/L
	zinc	102.56	210	5000*	--	µg/L
LF4-MW4	chlorobenzene	NA	0.71 J	100	--	µg/L
	cis-1,2-dichloroethene	NA	2.1	70	--	µg/L
	trichloroethene	NA	1.9	5	--	µg/L

Notes:

-- = Not applicable or not established

µg/L = micrograms per liter

BKG = Background well LF4-MW5

CUSUM = Shewhart Cumulative Sum

MCL = Maximum contaminant level (Codes 335-7-2-.03, 335-7-2-.05, and 335-7-3-.02 of the *ADEM Division 7 Regulations* [ADEM, 2014])

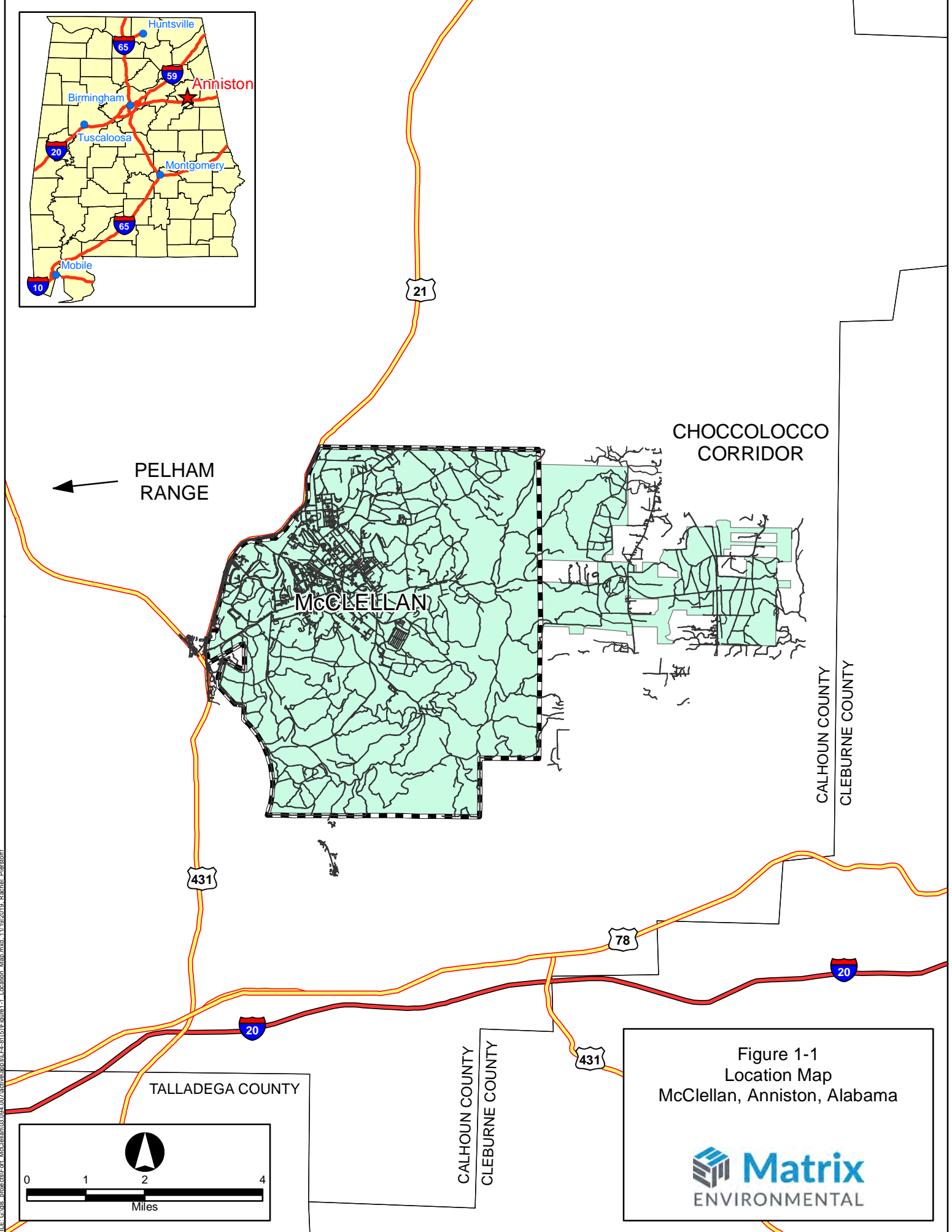
NA = Promulgated MCL not available

SSI = Statistically Significant Increase

* Secondary MCL (Code 335-7-3-.02 of the *ADEM Division 7 Regulations* [ADEM, 2014])

Sample concentration > MCL or BKG Concentration

Figures



FILE: G:\ms_anne\csl\Fort_McClellan\03_094_007\active\gaps\F4-81\5\Figure1-1_Location_Map.mxd, 11/19/2019, Rachel_Pierstorff

← PELHAM RANGE

CHOCOLOCCO CORRIDOR

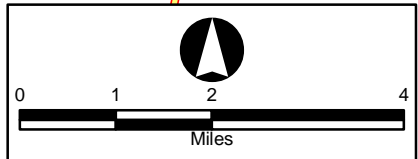
McCLELLAN

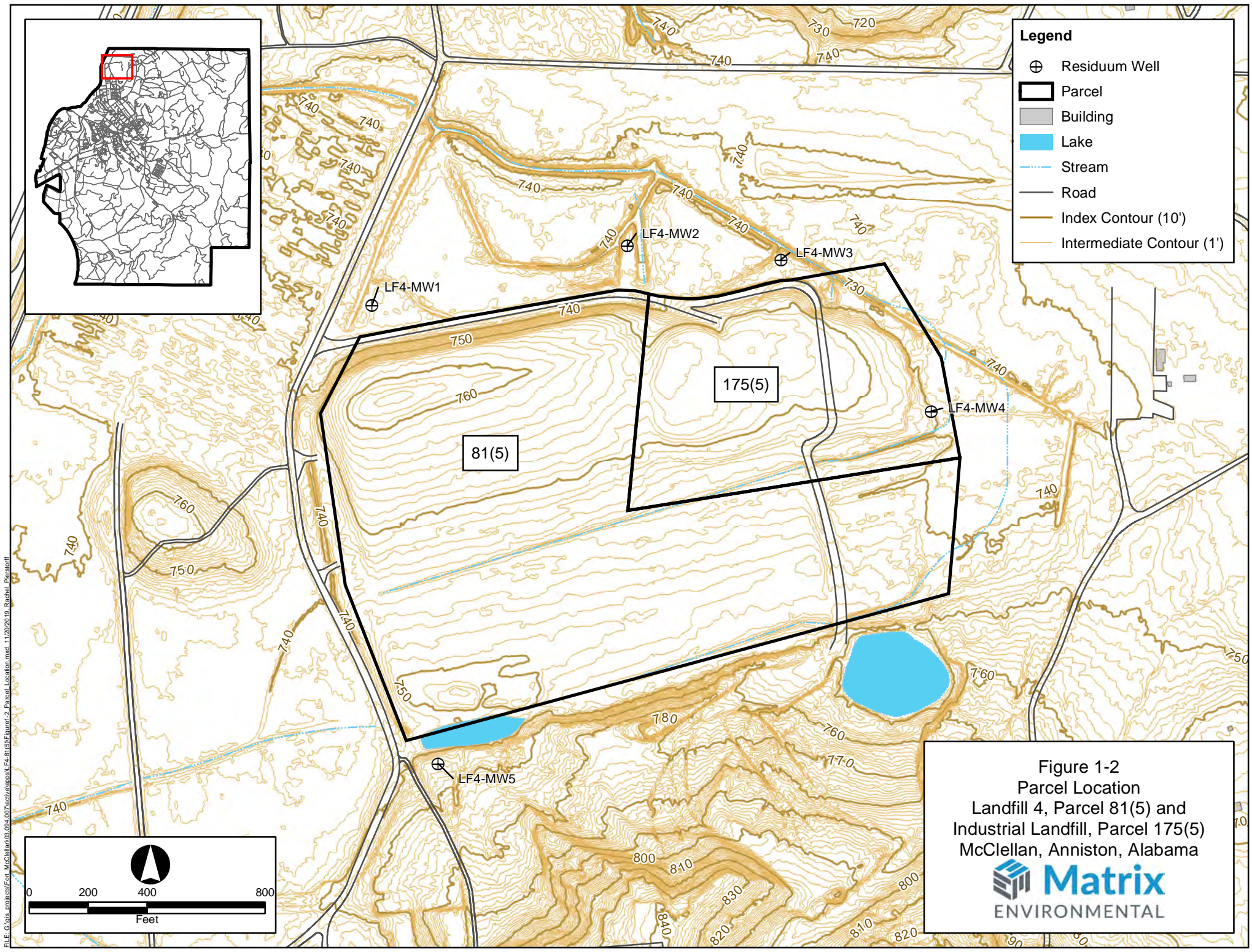
CALHOUN COUNTY
CLEBURNE COUNTY

TALLADEGA COUNTY

CALHOUN COUNTY
CLEBURNE COUNTY

Figure 1-1
Location Map
McClellan, Anniston, Alabama






Legend

- ⊕ Residuum Well
- ▭ Parcel
- Building
- Lake
- - - Stream
- Road
- Index Contour (10')
- Intermediate Contour (1')

Figure 1-2
Parcel Location
Landfill 4, Parcel 81(5) and
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama



FILE: G:\gis_mw\proj\Fort_McClellan\03_024_007\active\gpo\1_F4-81(5)\Figure1-2_Parcel_Location.mxd, 11/20/2010, E:\anal_Petersoff

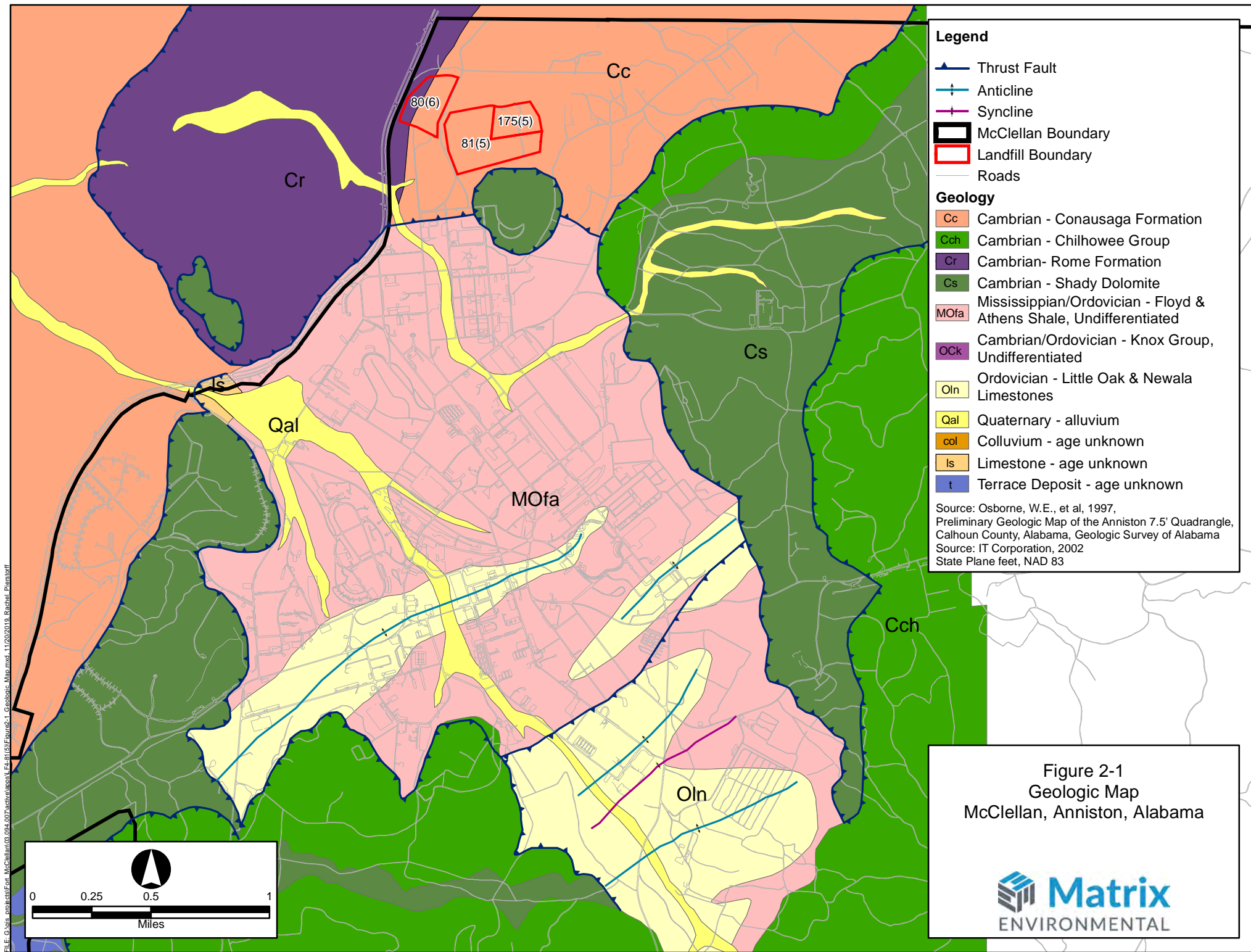
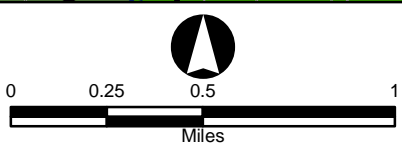
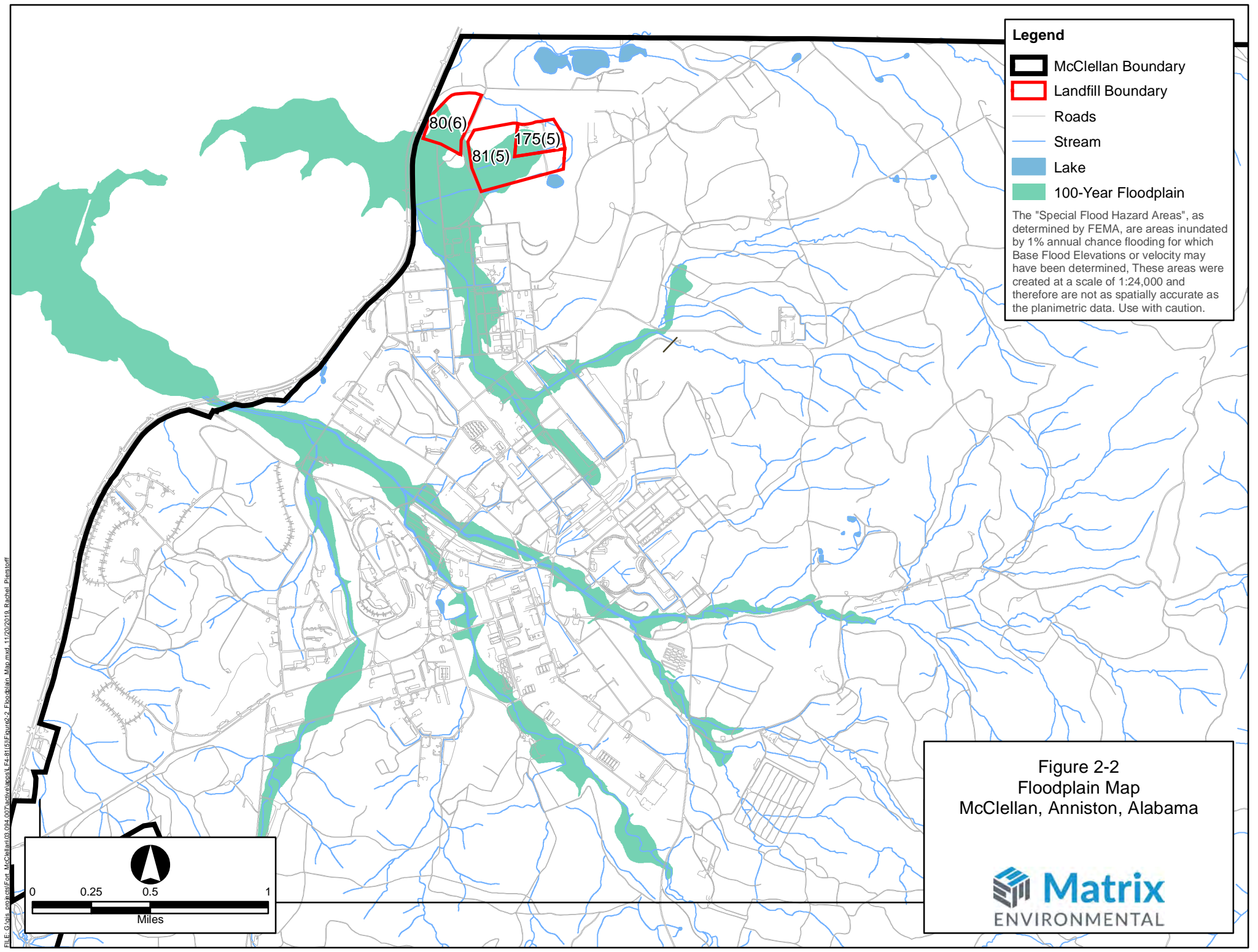








Figure 2-1
 Geologic Map
 McClellan, Anniston, Alabama





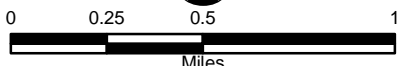


Legend

-  McClellan Boundary
-  Landfill Boundary
-  Roads
-  Stream
-  Lake
-  100-Year Floodplain

The "Special Flood Hazard Areas", as determined by FEMA, are areas inundated by 1% annual chance flooding for which Base Flood Elevations or velocity may have been determined. These areas were created at a scale of 1:24,000 and therefore are not as spatially accurate as the planimetric data. Use with caution.

Figure 2-2
Floodplain Map
 McClellan, Anniston, Alabama

Miles

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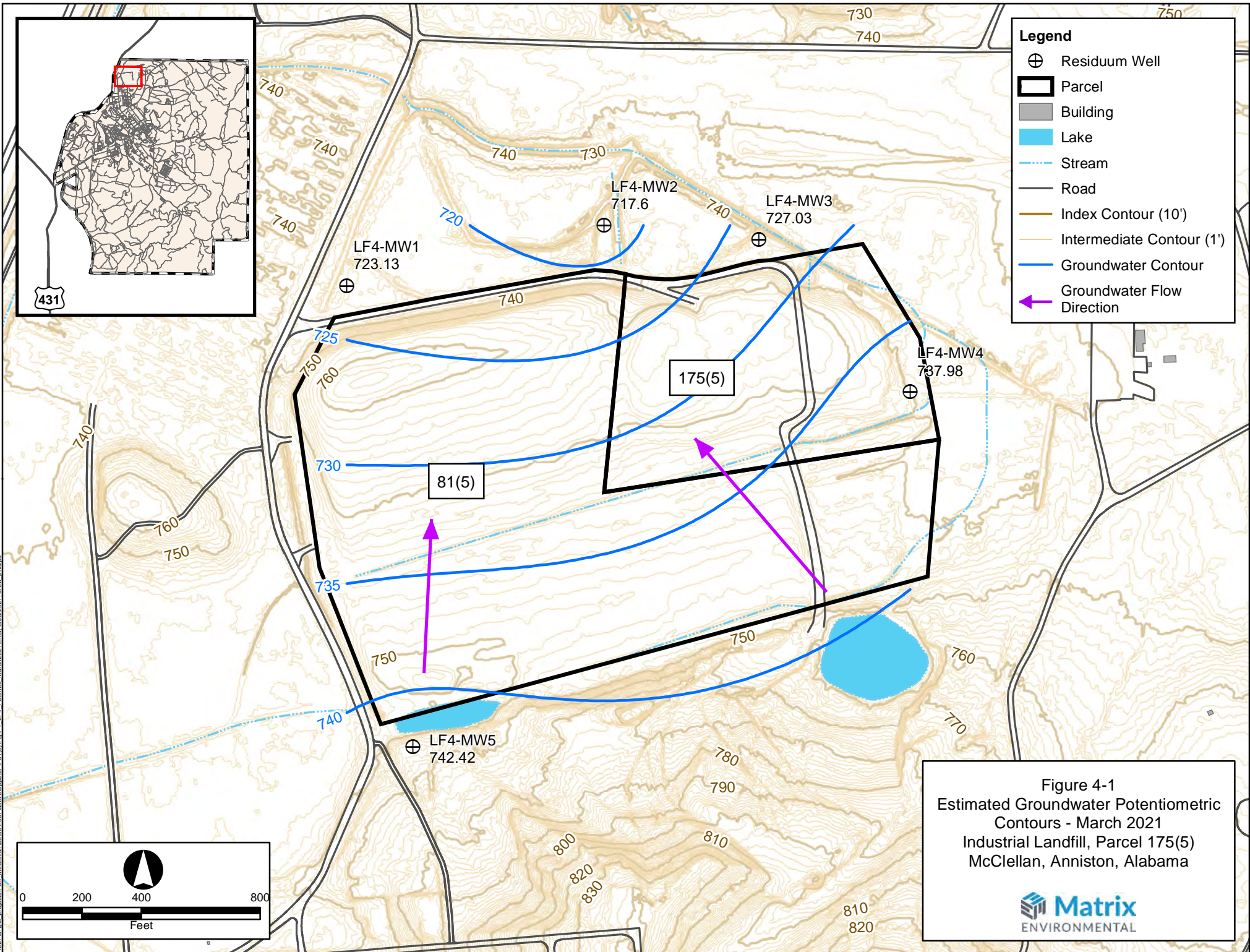


Figure 4-1
 Estimated Groundwater Potentiometric
 Contours - March 2021
 Industrial Landfill, Parcel 175(5)
 McClellan, Anniston, Alabama

Matrix
 ENVIRONMENTAL

FILE: G:\vis_projects\Fort_McClellan\03_094_007_active\pos\LF4-81(5)\Fig4-1_LF4_Potentio_March2021.mxd, 3/25/2021, draw_dhllips

APPENDICES

**Groundwater Monitoring Report, March 2021
Butler Green Industrial Landfill, Parcel 175(5)
(Permit No. 08-02)
McClellan, Anniston, Alabama**

APPENDIX A

Groundwater Sample Logs



Matrix Environmental Services
283 Rucker Street
Anniston, Alabama 36205
(256) 847-0780

Station Name/Sample ID

LF4-MW01

Project

McClellan

Project Number

21.094.21-07.1

GROUNDWATER SAMPLING LOG

Groundwater Depth (TOC) 16.66 feet	Equipment <input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Check Valve <input type="checkbox"/> Grundfos <input type="checkbox"/> Peristaltic <input type="checkbox"/> Bladder Pump <input type="checkbox"/> PID/FID <input type="checkbox"/> Other (describe)	Sampler J. Tulley & D. Abernathy	Date 3/4/2021	
Well Depth (TOC) 42.5 feet		Location (Site) Landfill 4	Begin Time 9:05	
Water Column Thickness 25.84 feet		Laboratory TestAmerica	Sample Depth Bailer	
Casing Diameter 4 inches		Sample Suite See COCs		
Casing Volume 16.80 gallons <small>1"=x0.04 2"=x0.16 4"=x0.65 6"=x1.47 8"=x10.4</small>		Meters YSI 556 MPS		Serial numbers Solinst Water Level
		Conditions (temp, weather, precip) Sunny, 70°F		Calibration 3/4/2021
Well Elevation (TOC) 739.79 feet	Product Observed (yes/no) No		Ferrous Iron (Fe II) (mg/L) (for MNA sampling) Not Applicable	
Groundwater Elevation 723.13 feet	Parameter Stabilization temp +/- 1° DO +/- 10% Turbidity +/- 10% cond +/- 3% ORP +/- 10mV pH +/- 0.1 unit	Depth to product Not Applicable		

Time	Volume removed (gallon)	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	pH	Description (e.g. odor, clarity, color)
9:05	0.25	16.4	122	1.2	142	0.08	67	4.6	cloudy, slightly yellow, no odor

Total Time (min.) Not Applicable	Total Volume Removed 0.25 gallons	Well pumped dry (yes/no) No	Notes N/A
--	---	---------------------------------------	---------------------

QA/QC Samples DUP370	Signature
--------------------------------	----------------------



Matrix Environmental Services
283 Rucker Street
Anniston, Alabama 36205
(256) 847-0780

Station Name/Sample ID
LF4-MW02
Project
McClellan
Project Number
20.094.21-07.1

GROUNDWATER SAMPLING LOG

Groundwater Depth (TOC) 20.9 feet	Equipment <input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Check Valve <input type="checkbox"/> Grundfos <input type="checkbox"/> Peristaltic <input type="checkbox"/> Bladder Pump <input type="checkbox"/> PID/FID <input type="checkbox"/> Other (describe)	Sampler J. Tulley & D. Abernathy	Date 3/4/2021
Well Depth (TOC) 40.25 feet		Location (Site) Landfill 4	Begin Time 9:55
Water Column Thickness 19.35 feet		Laboratory Test America	Sample Depth Bailer
Casing Diameter 4 inches		Sample Suite See COCs	
Casing Volume 12.58 gallons <small>1"=x0.04 2"=x0.16 4"=x0.65 6"=x1.47 8"=x10.4</small>		Meters YSI 556 MPS Serial numbers Solinst Water Level	
Well Elevation (TOC) 738.5 feet		Conditions (temp, weather, precip) Sunny, 70°F	Calibration 3/4/2021
Groundwater Elevation 717.6 feet	Parameter Stabilization temp +/- 1° DO +/- 10% Turbidity +/- 10% cond +/- 3% ORP +/- 10mV pH +/- 0.1 unit	Product Observed (yes/no) No	Depth to product Not Applicable

Time	Volume removed (gallon)	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	pH	Description (e.g. odor, clarity, color)
9:55	0.25	16.4	331	0.8	45	0.22	102	5.7	clear, colorless, no odor

Total Time (min.) Not Applicable	Total Volume Removed 0.25 gallons	Well pumped dry (yes/no) No	Notes N/A
QA/QC Samples N/A			Signature



Matrix Environmental Services
 283 Rucker Street
 Anniston, Alabama 36205
 (256) 847-0780

Station Name/Sample ID LF4-MW03	
Project McClellan	Project Number 20.094.21-07.1

GROUNDWATER SAMPLING LOG

Groundwater Depth (TOC) 12.75 feet	Equipment <input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Check Valve <input type="checkbox"/> Grundfos <input type="checkbox"/> Peristaltic <input type="checkbox"/> Bladder Pump <input type="checkbox"/> PID/FID <input type="checkbox"/> Other (describe) Conditions (temp, weather, precip) <p style="text-align: center;">Sunny, 70°F</p>	Sampler J. Tulley & D. Abernathy	Date 3/4/2021
Well Depth (TOC) 34.2 feet		Location (Site) Landfill 4	Begin Time 10:40
Water Column Thickness 21.45 feet		Laboratory Test America	Sample Depth Bailer
Casing Diameter 4 inches		Sample Suite See COCs	
Casing Volume 13.94 gallons <small>1"=x0.04 2"=x0.16 4"=x0.65 6"=x1.47 8"=x10.4</small>		Meters YSI 556 MPS Solinst Water Level	Serial numbers
Well Elevation (TOC) 739.78 feet		Calibration 3/4/2021	Ferrous Iron (Fe II) (mg/L) (for MNA sampling) Not Applicable
Groundwater Elevation 727.03 feet	Parameter Stabilization temp +/- 1° DO +/- 10% Turbidity +/- 10% cond +/- 3% ORP +/- 10mV pH +/- 0.1 unit	Product Observed (yes/no) No	Depth to product Not Applicable

Time	Volume removed (gallon)	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	pH	Description (e.g. odor, clarity, color)
10:40	0.25	15.8	69	3.6	250	0.04	81	4.4	clear, colorless, no odor
Total Time (min.) Not Applicable	Total Volume Removed 0.25 gallons	Well pumped dry (yes/no) No		Notes					

QA/QC Samples
MS/MSD

Signature



Matrix Environmental Services
 283 Rucker Street
 Anniston, Alabama 36205
 (256) 847-0780

Station Name/Sample ID
 LF4-MW04

Project
 McClellan

Project Number
 20.094.21-07.1

GROUNDWATER SAMPLING LOG

Groundwater Depth (TOC) 5.37 feet	Equipment <input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Check Valve <input type="checkbox"/> Grundfos <input type="checkbox"/> Peristaltic <input type="checkbox"/> Bladder Pump <input type="checkbox"/> PID/FID <input type="checkbox"/> Other (describe)	Sampler J. Tulley & D. Abernathy	Date 3/4/2021
Well Depth (TOC) 26.8 feet		Location (Site) Landfill 4	Begin Time 11:40
Water Column Thickness 21.43 feet		Laboratory TestAmerica	Sample Depth Bailer
Casing Diameter 4 inches		Sample Suite See COCs	
Casing Volume 13.93 gallons <small>1"=x0.04 2"=x0.16 4"=x0.65 6"=x1.47 8"=x10.4</small>		Meters YSI 556 MPS Solinst Water Level	
Well Elevation (TOC) 743.35 feet	Conditions (temp, weather, precip) Sunny, 70°F		Calibration 3/4/2021
Groundwater Elevation 737.98 feet	Parameter Stabilization temp +/- 1° DO +/- 10% Turbidity +/- 10% cond +/- 3% ORP +/- 10mV pH +/- 0.1 unit		Ferrous Iron (Fe II) (mg/L) (for MNA sampling) Not Applicable
		Product Observed (yes/no) No	Depth to product Not Applicable

Time	Volume removed (gallon)	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	pH	Description (e.g. odor, clarity, color)
11:40	0.25	13.6	599	1.2	25	0.39	15	6.0	clear, colorless, no odor

Total Time (min.) Not Applicable	Total Volume Removed 0.25 gallons	Well pumped dry (yes/no) No	Notes N/A
QA/QC Samples N/A			Signature



Matrix Environmental Services
 283 Rucker Street
 Anniston, Alabama 36205
 (256) 847-0780

Station Name/Sample ID

LF4-MW05

Project

McClellan

Project Number

20.094.21-07.1

GROUNDWATER SAMPLING LOG

Groundwater Depth (TOC) 10.9 feet	Equipment <input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Check Valve <input type="checkbox"/> Grundfos <input type="checkbox"/> Peristaltic <input type="checkbox"/> Bladder Pump <input type="checkbox"/> PID/FID <input type="checkbox"/> Other (describe)	Sampler J. Tulley & D. Abernathy	Date 3/4/2021
Well Depth (TOC) 34.6 feet		Location (Site) Landfill 4	Begin Time 12:15
Water Column Thickness 23.7 feet		Laboratory TestAmerica	Sample Depth Bailer
Casing Diameter 4 inches		Sample Suite See COCs	
Casing Volume 15.41 gallons <small>1"=x0.04 2"=x0.16 4"=x0.65 6"=x1.47 8"=x10.4</small>		Meters YSI 556 MPS Solinst Water Level	Serial numbers
Well Elevation (TOC) 753.32 feet		Conditions (temp, weather, precip) Sunny, 70°F	
Groundwater Elevation 742.42 feet	Calibration 3/4/2021	Ferrous Iron (Fe II) (mg/L) (for MNA sampling) Not Applicable	
	Parameter Stabilization temp +/- 1° DO +/- 10% Turbidity +/- 10% cond +/- 3% ORP +/- 10mV pH +/- 0.1 unit	Product Observed (yes/no) No	Depth to product Not Applicable

Time	Volume removed (gallon)	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	TDS (g/L)	Turbidity (NTU)	pH	Description (e.g. odor, clarity, color)
12:15	0.25	15.8	25	2.1	274	0.02	55	4.2	clear, colorless, no odor

Total Time (min.) Not Applicable	Total Volume Removed 0.25 gallons	Well pumped dry (yes/no) No	Notes N/A
--	---	---------------------------------------	---------------------

QA/QC Samples N/A	Signature
-----------------------------	----------------------

APPENDIX B

Chains-of-Custody, March 2021

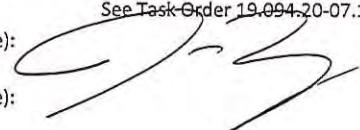
MATRIX ENVIRONMENTAL SERVICES CHAIN OF CUSTODY RECORD

Laboratory TestAmerica
 Lab Contact Jon Lawhon, Amy Ragnaldsen
 MES Contact Betty Van Pelt
 MES Phone 801-699-1246
 Project Parcel 81(5), Landfill 4
 Task # 20.094.21-07.1
 Lab contract: 20.094.21-07.1 500

COC Number 6320
 Cooler ID 1 of 1
 Page 1 of 1

SWMU	Station ID	QC Code	Station Code	Matrix	Sample Method	Date Collected	Sample Time	Analysis					
								SW8260 - VOC 3 - 40 ml vials, HCl	6020A/7470A Metals (Total) 1 - 250 ml poly HNO3	SW8260 - VOC 2 - 40 ml vials, HCl			
Parcel 81(5), Landfill 4	LF4-MW1	NS	MW	WQ	Grab	3-4-21	905	X	X				
Parcel 81(5), Landfill 4	LF4-MW2	NS	MW	WQ	Grab	3-4-21	955	X	X				
Parcel 81(5), Landfill 4	LF4-MW3	NS	MW	WQ	Grab	3-4-21	1040	X	X				
Parcel 81(5), Landfill 4	LF4-MW3	MS/MSD	MW	WQ	Grab	3-4-21	1040	X	X				
Parcel 81(5), Landfill 4	LF4-MW4	NS	MW	WQ	Grab	3-4-21	1140	X	X				
Parcel 81(5), Landfill 4	LF4-MW5	NS	MW	WQ	Grab	3-4-21	1215	X	X				
Parcel 81(5), Landfill 4	DUP370	FD	MW	WQ	Grab	3-4-21	N/A	X	X				
Parcel 81(5), Landfill 4	TB575	TB	WQ	W	Grab		1330			X			

NOTES:
 QC Code: NS = Investigative Sample, FD = Field Duplicate, MS/MSD = Matrix Spike/Matrix Spike Duplicate, EB = Equipment Blank, TB = Trip Blank, WQ = Water Quality, WS = Source Water
 Station Type = MW = Monitoring Well, BH = Bore Hole, SD = Sediment, SW = Surface Water, SS = Surface Soil, SU = Sump, WS = Waste Solid/Soil, WW = Waste Water
 White Copy = Lab COC, Yellow COC = Field Copy, Pink COC = Data Mgmt

COMMENTS: See Task Order 19.094.20-07.1 500 for required list of VOCs and metals
 Relinquished by (Signature):  Date/Time: 3-4-21 1400
 Received by (Signature): FedEx
 Relinquished by (Signature): Date/Time: Received by (Signature):

DUP370 is LF4-MW1

APPENDIX C

Data Quality Summary, March 2021

Appendix C
Data Quality Summary:
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama
March 2021 Monitoring Event

Prepared for:



Prepared by:



March 2021

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ATTACHMENTS

C1	Laboratory Report
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LIST OF ABBREVIATIONS AND ACRONYMS

ADEM	Alabama Department of Environmental Management
<i>ADEM Division 13 Regulations</i>	<i>Alabama Department of Environmental Management (ADEM) Land Division Solid Waste Program Division 13 Regulations</i>
ARBCA	<i>Alabama Risk-Based Corrective Action Guidance Manual</i>
CCAL	Continuing calibration
CCB	Continuing calibration blank
COC	Chain-of-custody
DQO	Data Quality Objective
DQS	Data Quality Summary
EPA	United States Environmental Protection Agency
FD	Field duplicate
GC/MS	Gas chromatography/mass spectrometry
ICAL	Initial calibration
ID	Identification
IDL	Instrument detection limit
IS	Internal standard
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MCL	Maximum contaminant level
MDA	McClellan Development Authority
MDL	Method detection limit
MES	Matrix Environmental Services, LLC
MS	Matrix spike
MSD	Matrix spike duplicate
PARCCS	Precision, accuracy, representativeness, completeness, comparability, and sensitivity
Permit	Solid Waste Disposal Facility Permit No. 08-02
QA	Quality assurance
<i>QAP</i>	<i>Quality Assurance Plan</i>
QC	Quality control
%R	Percent recovery
RL	Reporting limit
RPD	Relative percent difference
RSD	Relative standard deviation
Site	Butler Green Industrial Landfill, Parcel 175(5)
SOP	Standard Operating Procedure
TB	Trip blank
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Matrix Environmental Services, LLC (MES) has prepared this Data Quality Summary (DQS) on behalf of the McClellan Development Authority (MDA) in support of the groundwater monitoring at Butler Green Industrial Landfill, Parcel 175(5) (Site) within McClellan, Anniston, Alabama, formerly known as Fort McClellan. The purpose of this monitoring event was to collect data to support the implementation of groundwater monitoring under the requirements of the Solid Waste Disposal Facility Permit No. 08-02 (permit) and the *Alabama Department of Environmental Management (ADEM) Land Division Solid Waste Program Division 13 Regulations (ADEM Division 13 Regulations)* for solid waste facilities (ADEM, 2016).

This DQS addresses the data quality review for groundwater samples collected during the March 2021 monitoring event. The approved methods used to conduct the investigations are discussed in the *Quality Assurance Plan (QAP)* in *Appendix A* of the *Final Installation-Wide Sampling and Analysis Plan* (MES, 2013) which details the specifics of quality assurance (QA) and quality control (QC) with respect to sampling and data evaluation.

2.0 PROJECT DESCRIPTION

Project objectives and QA objectives in terms of precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) are described in this section.

2.1 PROJECT OBJECTIVES

The objective of the environmental sampling at the Site is to evaluate the groundwater analytical data and demonstrate compliance with the permit and the *ADEM Division 13 Regulations*. To support this objective, groundwater samples were collected from five residuum monitoring wells using quiescent sampling techniques and analyzed for volatile organic compounds (VOCs) and metals.

2.2 DATA QUALITY LEVELS

During the field program, groundwater samples were collected and analyzed with screening level methods for field parameters and definitive level methods for specific chemical analytes. Screening and definitive level data are defined as follows (United States Environmental Protection Agency [EPA], 1994):

- Screening Level Data – Screening level data are subject to minimal QC requirements. Results are often not compound-specific and not quantitative, but results are available in real time. Obtaining screening level data is less costly than obtaining definitive level data, but the results are less defensible because of the greater potential for error and the inherent precision and accuracy limitations. This level is normally used for field investigation health and safety screening but can also be used to identify media or samples for consideration for further analyses. Field pH, conductivity, temperature, turbidity, total dissolved solids, dissolved oxygen, and oxidation/reduction potential measurements collected during this investigation are considered screening level data.
- Definitive Level Data - Analyses performed using established analytical procedures and strict QC procedures produce definitive level data. Applicable EPA test methods (EPA, 1986) were used to collect definitive level data for the Site. Analytical results produced were analyte-specific with confirmation of analyte identity and concentration. Definitive level data meeting quality criteria are suitable for site assessments, risk assessments, remedial design, and remediation efforts.

2.3 DATA QUALITY OBJECTIVES

QA objectives in terms of PARCCS are outlined below.

Precision is a measure of the reproducibility of a set of duplicate analytical results, usually under prescribed similar conditions. Precision, as discussed in Section A3.3.1 in the *QAP*, is expressed in terms of the relative percent difference (RPD) between duplicate determinations, or in terms of the relative standard deviation (RSD) when three or more determinations are made. Various measures of precision exist depending on the prescribed similar conditions.

Overall sampling and analysis precision was assessed using RPDs for duplicate environmental samples and matrix spike/matrix spike duplicates (MS/MSDs). The RPDs for laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results were used to assess laboratory precision. RPD is defined as the difference between two measurements divided by their mean and expressed as a percent as shown in the following equation:

$$\text{RPD} = \frac{|X - Y|}{(X + Y) / 2} \times 100\%$$

where:

- X = Primary sample concentration (primary field investigative sample, MS, or LCS)
- Y = Duplicate sample concentration (laboratory duplicate, field duplicate [FD], MSD, or LCSD)

To evaluate precision, the RPDs for MS/MSDs, laboratory duplicates, and LCS/LCSDs were compared to laboratory historical limits. The RPDs for FDs were compared to the project precision goal of 50 percent for aqueous samples.

The RSD is the standard deviation of a set of values divided by the average value expressed as a percent as shown in the following equation:

$$\text{RSD} = S / \bar{X} \times 100$$

where:

- S = The standard deviation of the sample data
- \bar{X} = The arithmetic mean of the sample data

RSDs can be used to evaluate the linearity of the initial calibration (EPA, 1986).

Accuracy is a measure of the agreement of an analytical result with the true value. Accuracy, as discussed in Section A3.3.2 in the *QAP*, is typically expressed as a percent recovery (%R) calculated by the ratio of the measurement and accepted true value as shown in the following equation:

$$\%R = ((X_s - X_u) / K) \times 100\%$$

where:

- X_s = Measured value of the spiked sample
- X_u = Measured value of the unspiked sample
- K = Known amount of the spike in the sample

Analytical accuracy is assessed through the analysis of spikes such as surrogates, MS/MSDs and LCS/LCSDs, performance evaluation samples, standard reference materials and calibration check samples. Surrogates and MS/MSDs are spiked into the actual sample matrix and are accuracy indicators that take into account the nature of the matrix in question and the native concentration of the analyte spiked. Matrix variability or interferences from high concentrations of native compounds may adversely affect spike recovery and yield less than conclusive data. Accuracy checks that focus on analytical method and consist of compounds

spiked in a blank or non-interfering matrix (e.g., LCSs or calibration check samples) address the accuracy of the method or instrumentation at detecting the target analyte(s) at a certain quantification level and are not considered to be subject to matrix effects. The accuracy of sample results can also be affected by holding time violations.

Representativeness, as described in Section A3.3.3 in the *QAP*, is a qualitative parameter that expresses the degree to which sample data actually represent the matrix conditions. For example, in conducting groundwater monitoring, representativeness requires proper location of wells and the collection of samples under consistent, documented procedures. Wells are located based upon the results of the hydrogeologic study in progress and are designed to provide maximum coverage of the flow conditions. Requirements and procedures for sample collection and handling are designed to maximize sample representativeness. Representativeness can also be monitored by reviewing field documentation and by performing field QA audits.

Completeness, as discussed in Section A3.3.4 in the *QAP*, represents the percentage of valid data collected from a sampling/analytical program or measurement system compared to the amount achieved under optimal conditions. The completeness goal for investigative samples is 95 percent. Completeness is calculated using the following formula:

$$\text{Percent Complete} = \frac{\text{Valid Data}}{\text{Total Data}} \times 100\%$$

Valid data are identified during the data review process as being acceptable for use or usable as qualified. Invalid data are identified as rejected.

Comparability, as discussed in Section A3.3.5 of the *QAP*, is a qualitative parameter expressing the confidence with which one data set can be compared with another. Comparability for sampling and analysis tasks is achieved by:

- Specifying well-recognized techniques and accepted standard methods for sampling and analysis, and using well-trained sampling and analysis technicians to execute the prescribed methods consistently.
- Requiring that sampling and analysis personnel produce adequate documentation to record how the prescribed methods were actually executed.
- Noting non-conformances and corrective measures taken.

Specifying standardized laboratory methods helps to ensure that the data generated for a sampling event are comparable to past and future sampling events.

Sensitivity is used broadly here to describe the method detection limits (MDLs) or reporting limits (RLs) established to meet project-specific data quality objectives (DQOs). In addition, sensitivity can be used to describe the capability of a method for instrument to discriminate between measurement responses. Several limits have been established to describe sensitivity requirements as specified in Section A3.3.6 of the *QAP*. Reported instrument detection limits (IDLs) and MDLs are typically based upon a reagent water matrix or purified solid, and ignore sample matrix interferences and the resulting effects on the limits. For this reason, published

MDLs or IDLs may not be achievable for environmental samples. The *QAP* RLs were generated by the laboratory and may exceed Maximum Contaminant Levels (MCLs) due to instrument limitations. Section 6.2 discusses the comparisons between the MCLs and the laboratory RLs and MDLs for this sampling event.

2.4 ANALYTICAL SERVICES

TestAmerica Laboratories, Inc, Savannah, Georgia, provided analytical services for the sampling conducted by MES.

2.4.1 Analytical Program

The *QAP* lists the EPA analytical methods used to meet definitive data requirements. Based on activities conducted at the Site during the March 2021 monitoring event, the methods used to analyze constituents of concern in samples during this sampling event were:

- Method SW8260B - VOCs by Gas Chromatography/Mass Spectrometry (GC/MS)
- Method SW6020B – Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP/AES)
- Method SW7470A - Mercury by Cold Vapor Atomic Absorption

2.4.2 Quality Control

The *QAP* describes the analytical QC requirements. The results of the analytical QC data review for this sampling event are presented in Section 5.0.

3.0 DEVIATIONS FROM PLANNED FIELD ACTIVITIES

No deviations from the planned field activities were noted during the preparation of this DQS. Metals were analyzed by SW6020B for this sampling round, reporting limits which are listed on Table C6-1.

4.0 ASSESSMENT OF DATA QUALITY

Data quality is assessed through two review processes. The contracted analytical laboratory performs the first data review to assess compliance with *QAP*-approved analytical methods (MES, 2013) and with laboratory standard operating procedures. MES performs the second data review to assess compliance with the QA objectives, and to assess hard copy and electronic deliverable consistency and integrity.

4.1 LABORATORY DATA QUALITY ASSESSMENT

The laboratory data quality assessment includes an analytical data review to ensure accurate and complete data reporting and compliance with the analytical method specifications.

4.1.1 Laboratory Qualification of Data

The laboratory will flag analytical results, when necessary, to indicate potential impacts to data usability and to alert the user to special analytical conditions. More than one qualifier may be used to indicate multiple conditions or situations that apply to an individual result. The following laboratory qualifiers were used during this investigation:

FLAG	DESCRIPTION
B	Analyte detected in an associated blank.
F1	MS and/or MSD recoveries outside criteria.
F2	MS/MSD RPD outside criteria.
J	Estimated value. The analyte is positively identified and the concentration is less than the RL but greater than the MDL.
U	Analyte is not detected above the RL.

4.2 MES DATA QUALITY AND USABILITY ASSESSMENT

The following sections describe the procedures that MES followed to assess the quality and usability of both field measurement and definitive data. Data assessment is complete when 100 percent of the information have been collected and reviewed. Based on the results of the review process, data are categorized as fully usable, usable as qualified, or rejected.

4.2.1 Data Review and Validation

MES reviewed the analytical data in accordance with the *QAP* (MES, 2013), analytical methods (EPA, 1986), and *USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review* (EPA, 2014a and 2014b). The data review process included reviewing and evaluating 100 percent of the hard copy data for (1) extraction and analysis holding times, (2) surrogate recoveries, (3) blank detections, (4) LCS/LCSD recoveries and RPDs, (5) MS/MSD recoveries and RPDs, (6) FD RPDs, (7) laboratory duplicate RPDs, if applicable, (8) initial and continuing calibrations (ICALs and CCALs), (9) instrument tuning and performance, (10) reporting limits, and (11) completeness of the chain-of-custody (COC) forms.

Hard copy data packages were checked to verify that the following items were included:

- Case narrative
- Data summary sheets
- ICALs and CCALs
- Method or preparation blanks (at least one per QC batch)
- MS/MSD (5 percent of client samples)
- LCS/LCSD (one per QC batch)
- Duplicate analyses (laboratory duplicate sample, LCS/LCSD, MS/MSD, as applicable)
- Holding times
- Retention time window calculation (if applicable)
- Standard preparation sheets
- Linear range calculations (correlation coefficients)

The results of the review of the chemical data obtained during this investigation are included in Section 5.0. The laboratory data forms showing the validated results are included in Attachment D1.

4.2.2 MES Qualification of Data

Based on the data review, MES may assign final qualifiers to analytical results on both the hard copy results and in the database. The following final qualifiers may be assigned to the results to describe data quality and usability:

FLAG	DESCRIPTION
J	Estimated detection. The associated numerical value is the approximate concentration of the analyte in the sample.
UJ	Analyte was analyzed for, but was not detected. The reported quantitation limit is estimated.
U	Result was qualified as not detected above the RL or reported sample quantitation limit.

In addition to the qualifier, a sub-qualifier is applied to describe the specific multiple conditions or situations that apply to an individual result. These qualifiers and sub-qualifiers are collectively referred to as validation codes.

FLAG	DESCRIPTION
A	Internal standard area was outside method-specific control limits.
B	Result was qualified based on method blank, continuing calibration blank, or trip blank contamination.
C	Continuing calibration was outside method-specific control limits.
H	Holding time exceeded method criteria.
I	Initial calibration was outside method-specific control limits.
L	The LCS and LCSD recoveries were outside laboratory historical control limits.
M	The MS and MSD recoveries were outside laboratory historical control limits.

FLAG	DESCRIPTION
S	Surrogate recovery was outside laboratory historical control limits.
X	Result exceeded the calibration range of the instrument.
Q	Result was qualified based on reviewer judgment.

Whenever duplicate sets of results were reported by the laboratory due to dilutions, re-analyses, re-extractions, or dual column analytical methods, the MES reviewer chose the “most-preferred” results based on the data review. In the “Reportable Result” column shown on the hard copy sample data reports and the database, MES assigned a “Y” flag for the “most-preferred” results, and an “N” flag for the “least-preferred” results. When there was only one set of laboratory reported results, MES assigned a “Y” flag in the “Reportable Data” column. In Section 5.0, only the reportable data (flagged “Y”) are shown in Tables C5-2 to C5-6.

5.0 RESULTS OF QUALITY CONTROL ANALYSES

Table C5-1 lists samples and analytical methods included in the sampling event for the Site. To evaluate the data quality, the results were compared to method requirements and laboratory historical control limits.

Based on the data review process, six analytes were qualified. None of the data were rejected. The results of the data review process are discussed further in the following sections. Due to analysis issues at the laboratory the trip blank was not reported.

5.1 QUALITY CONTROL PROCEDURES AND RESULTS OF QUALITY CONTROL ANALYSES

Two types of QC results were used to evaluate data quality: field QC samples were collected and analyzed to evaluate field sampling activities, and laboratory QC samples were analyzed to evaluate laboratory analytical procedures and maintain control of the analytical methods.

5.1.1 Field Quality Control Procedures and Analyses

Field QC samples included MS/MSD samples, FDs, material blanks, and trip blanks (TBs). The *QAP* was used as the guidance document to identify the appropriate number of field QC samples, procedures for their collection and analysis, and evaluation of results required for this sampling event. The evaluation procedures for the field QC sample analyses are summarized below.

5.1.1.1 Matrix Spike/Matrix Spike Duplicate Samples

MS and MSD samples are investigative samples spiked by the laboratory with known concentrations of target analytes. MS and MSD sample results are used to evaluate possible matrix interferences. The formulas used to calculate the percent recoveries and RPDs are presented in Section 2.3.

Accuracy was assessed by calculating the MS and MSD %Rs of the concentrations of the target analytes added to the investigative sample. The %Rs were then compared to laboratory historical control limits. When both the MS and MSD %Rs were outside laboratory historical control limits, MS/MSD qualifiers were applied only to the results for the investigative sample used for the MS/MSD. When only an MS was analyzed, qualifiers were applied when the MS %R was outside laboratory historical control limits. Low recoveries in an MS/MSD may indicate the matrix has negatively influenced the results. Constituent concentrations could be potentially higher in samples with low MS/MSD recoveries. High MS/MSD recoveries may indicate the matrix has positively influenced the results. Constituent concentrations may be potentially lower in samples with high MS/MSD recoveries.

Precision was assessed by calculating the RPDs for the MS/MSD sample pairs and laboratory duplicate samples. The MS/MSD and laboratory duplicate RPD values were reviewed to assess the precision of the analytical results based on the magnitude of the RPD values. In cases

where a target analyte was not detected in at least one of the MS/MSD sample pair or laboratory duplicate sample pair, an RPD would not be valid, and therefore, was not calculated. Qualifiers were not applied based on the MS/MSD or laboratory duplicate RPD values, however, the MS/MSD and laboratory duplicate RPD values were compared to laboratory historical control limits to assess if further evaluation of the data was warranted.

For this investigation, sample LF4-MW3 was collected and analyzed for the MS and MSD for Methods SW8260B, SW6020B, and SW7470A. A summary of the MS/MSD %R and RPD data is shown in Table C5-3. All recoveries met criteria with the following exceptions. Zinc had MSD below criteria. Zinc MS met criteria; no data qualified. Chloroethane had MS and MSD recoveries above criteria. Chloroethane was not detected; therefore, chloroethane is not qualified. All RPD criteria were met. The overall accuracy of the analytical results and variability of the precision measurements are considered to be acceptable.

5.1.1.2 Field Duplicate Samples

FD samples were collected and analyzed as specified in the *QAP* (Section A6.3.5). FD samples are independent samples collected simultaneously or in immediate succession with the original investigative samples such that they are expected to be equally representative of the medium at the time of sampling. These samples provide precision information for the entire measurement system, including sample collection, handling, shipping, storage, preparation, and analysis. The precision of FD pairs was assessed by calculating the RPDs using the equation in Section 2.3. In cases where a target analyte was not detected in either sample or was detected in only one of the samples, an RPD would not be valid, and therefore, was not calculated.

One groundwater FD sample was collected for this sampling event. The original station name from the COC forms (i.e. COC identifications (IDs) used to disguise the sample’s identity when the sample was sent to the laboratory), the parent station name, and the methods analyzed are shown below.

Matrix	COC ID	Parent Station Name	Sample Date	Delivery Group	Method
WG	DUP370	LF4-MW1	3/4/21	680-195939-1	SW6020B
WG	DUP370	LF4-MW1	3/4/21	680-195939-1	SW7470A
WG	DUP370	LF4-MW1	3/4/21	680-195939-1	SW8260B

The results for the FD and associated investigative sample analyses were reviewed to assess the precision of the analytical results based on the magnitude of the RPD values. Table C5-4 shows the RPDs calculated for the investigative and FD sample pair. The criterion of 50 percent for aqueous samples was used to assess if further evaluation of the data was warranted. Two of the RPD values exceeded 50 percent (chromium and lead): all less than five times the reporting limit. No data were qualified based on field duplicate results. Therefore, the overall variability of the precision measurements is considered acceptable.

5.1.1.3 Trip Blanks Analyses

TBs are used to assess the potential introduction of contaminants from sample containers or during the sampling, transportation, and storage procedures (MES, 2013). A TB sample consists of VOC sample vials filled in the laboratory with American Society of Testing and Materials Type II reagent grade water, transported to the sampling site, handled like an environmental sample and returned to the laboratory for analysis. TBs are not opened in the field and are only prepared when aqueous VOC samples are scheduled to be collected and analyzed by the laboratory. Sample results are considered affected by TB contamination when the sample concentration is less than five times the blank concentration (ten times for common laboratory contaminants acetone, methylene chloride, and 2-butanone). Affected sample results less than the reporting limit and less than five times the associated blank concentration are considered non-detects at the reporting limit. Affected sample results greater than the reporting limit and less than five times the blank concentration are considered non-detects at the concentration observed in the sample. One TB was collected for this sampling event. No analytes were detected. Based on review of the samples there is no apparent contamination in associated samples.

5.1.2 Laboratory Quality Control Procedures and Analyses

Laboratory QC checks include internal system checks and QC samples used to monitor the possible effect of laboratory activities on sample results. The analytical method and method-specific standard operating procedures (SOPs) developed by the laboratory define the types of laboratory QC checks required. QC procedures followed by the laboratory include sample container inspection, COC documentation review, sample holding time review, LCS/LCSD analyses, method blank analyses, and surrogate spike percent recovery evaluation. The laboratories are also responsible for analytical instrument calibration, which includes method-specific criteria for initial and continuing calibrations for external and internal standard calibration procedures.

5.1.2.1 Initial Sample Inspection and Chain-of-Custody Documentation

The laboratory inspected the shipping containers upon receipt and compared the contents with the COC forms associated with each cooler. Information from the sample check-in procedure was recorded on the Sample Receipt Form, including sample receipt anomalies. These forms were used by the laboratory to document that sample identifications listed on the COC forms agreed with the samples contained in the coolers. The laboratory verified that COC forms were filled out properly, sample containers were not broken, custody seals were intact, the pH method-specific criteria for water samples (if applicable), and cooler temperatures were maintained 0 - 6 degrees Celsius. The completed forms are included in the laboratory analytical packages and were reviewed during the data review process. The samples arrived at the laboratory at the proper temperature, and no sample containers were damaged during transit.

MES compared the data on the COC forms with the laboratory reports and documented any differences. If minor discrepancies were found and verified by the laboratory, the laboratory reports and MES electronic databases were corrected. In addition to the COC checks, MES reviewers verified approximately 10 percent of the laboratory hard copy reports against the laboratory electronic data deliverables.

5.1.2.2 Holding Times

Samples were shipped regularly in coordination with the analytical laboratory to ensure analyses were conducted within the required holding times. The time elapsed between sample collection and sample extraction/analysis was calculated as part of the review process to evaluate if holding times were met. Holding time criteria were met for this sampling event. Data are consistent with historical data. Accuracy of the analytical results is acceptable with regards to holding time.

5.1.2.3 Laboratory Control Sample/Laboratory Control Sample Duplicate

The laboratory analyzed LCS/LCSD pairs with each analytical batch of field samples to assess internal precision and accuracy. LCS/LCSD pairs consisted of analyte-free water spiked with selected target constituents of known concentration. The LCS/LCSD %Rs and RPDs are used to determine laboratory accuracy and precision, respectively. The formulas used to calculate the %Rs and RPDs are presented in Section 2.3. The %Rs and RPDs were then compared to laboratory historical control limits. When the LCS and LCSD %Rs were outside laboratory historical control limits, the LCS/LCSD qualifications were applied to investigative samples within the same analytical batch. Qualifiers were applied only when both the LCS and LCSD %Rs were outside laboratory historical control limits. In cases where only an LCS was analyzed, qualifiers were applied when the LCS %R was outside laboratory historical control limits. Qualifiers were not applied based on LCS/LCSD RPD values, however, the LCS/LCSD RPD values were compared to laboratory historical control limits to assess if further evaluation of the data was warranted. For this sampling event, MES reviewed the LCS/LCSD %Rs and RPDs for Methods SW8260B, SW6010C, and SW7470A.

Table C5-5 shows the LCS/LCSD percent recovery and RPD data. The LCS and LCSD percent recoveries met criteria with the below exceptions.

Chloroethane LCS or LCSD recoveries were above criteria. Chloroethane was not detected in any of the samples. Results are presented in Table C5-5. No data were qualified. Greater than 99 percent of the LCS/LCSD percent recoveries and greater than 99 percent of the RPD results were within the laboratory control limits, therefore, the overall accuracy and precision measurements are considered to be acceptable.

5.1.2.4 Method Blank and Continuing Calibration Blank Samples

Method blanks are prepared and analyzed by the laboratory to assess the level of background interferences and possible contamination in the analytical system. The method blank must be carried through the complete procedure and contain analyte-free reagents in the same volumes

as used in processing the samples. The goal is to conduct investigative sample analysis in such a manner that sample contamination is not introduced by the analytical methods, equipment, or reagents. If such contamination occurs, it is usually identified by the detection of target analytes at trace or low concentrations in the method blanks. When these detections are found, the laboratory investigates the source, qualifies the affected data as appropriate according to the magnitude of the detections, and implements corrective measures as appropriate. For this investigation, method blanks were prepared and analyzed with each analytical batch for Methods SW6020B, SW8260B, and SW7470A.

Continuing calibration blanks (CCBs) are used to check the instrument calibration and level of background interferences. CCBs are prepared by acidifying reagent water to the same concentrations of the acids used in the calibration standards and investigative samples. For this investigation, CCBs were analyzed for Methods SW6010C and SW7470A to evaluate if any analytes detected in the CCBs impacted the concentrations of the associated samples.

The following are descriptions of the qualifiers that may be used based on blank contamination:

- When a VOC target analyte was detected in the sample and associated method blank, affected sample results with concentrations less than five times the blank concentration (ten times for common laboratory contaminants acetone, methylene chloride, and 2-butanone) were qualified as non-detect (UB) at the reporting limit (when the sample concentration was less than the reporting limit) or qualified as non-detect (UB) at the concentration observed in the sample (when the sample concentration was greater than the reporting limit).
- When an inorganic target analyte was detected in the sample and associated method blank or CCB, affected sample results with concentrations $> \text{MDL}$ but $\leq \text{RL}$ were qualified as non-detect (UB) at the RL; associated sample results with concentrations $> \text{RL}$ but $< 5x$ the blank concentration were qualified as non-detect (UB) at the sample concentration; for sample results with concentrations $> \text{RL}$ and $> 5x$ the blank concentration, no qualifiers were required.

No analytes were detected in the method blank. Cobalt was detected about the RL in the interference check standard but since not in the method blank no data were qualified.

5.1.2.5 Surrogate Recovery

Surrogate spike compounds were added to investigative samples during organic analyses to assess the individual matrix effect of investigative samples and to monitor overall analytical system performance. Surrogate recoveries that are outside the laboratory historical control limits may indicate performance problems with the analytical system and extraction procedures, or significant matrix effects when evaluated in conjunction with the MS/MSD results. MES reviewers used laboratory historical control limits to assess percent recoveries for surrogate spike constituents. For sample results affected by surrogate percent recoveries less than the lower control limit, detects were qualified as estimated (JS) and may be biased low, and non-detects were qualified as estimated (UJS) and may be potential false negatives. For

sample results affected by surrogate percent recoveries greater than the upper control. No qualifiers are required; all surrogates were within acceptance criteria.

A summary of the surrogate percent recovery data is provided in Table C5-6.

5.1.2.6 Internal Standards

Adherence to method-specific internal standards (ISs) criteria ensures that GC/MS sensitivity and response are stable during each analysis. *SW-846* (EPA, 1986) recommended ISs are often brominated, fluorinated, or stable isotopically labeled analogs of specific target compounds, or are closely related compounds whose presence in environmental samples is unlikely. The IS spike solution is added after the preparation or extraction of a sample. ISs are used in internal calibration methods to correct sample results affected by column injection loss, purging loss, or viscosity effects. ISs are added to environmental samples, control standards, and blanks, in accordance with method requirements and laboratory SOPs (MES, 2013). No qualifiers were required for samples based on the IS data.

5.1.2.7 Initial and Continuing Calibration

The calibration of an analytical instrument involves the delineation of the relationship between the response of the instrument and the concentration of an analyte introduced into the instrument. An ICAL is performed on an analytical instrument prior to the analysis of samples to ensure that the equipment is capable of producing acceptable qualitative and quantitative data. The CCAL is the verification of the ICAL at periodic intervals. The CCAL demonstrates that the instrument is capable of acceptable performance during the course of the analytical analysis. Review of the ICAL data included the evaluation of the correlation coefficients and relative standard deviations. Review of the CCAL data included the evaluation of the percent difference between the concentration of the CCAL standard and the expected concentration. All calibration data meet acceptance criteria.

5.2 SUMMARY OF DATA QUALITY INDICATORS

A summary of the data quality indicators in terms of the PARCCS are described in this section.

5.2.1 Precision

As discussed in Section 2.3, the precision evaluation included field precision (FDs), laboratory precision (LCS/LCSDs), and combined field/laboratory precision (MS/MSDs). The MS/MSD, FD, and LCS/LCSD RPDs are discussed in Sections 5.1.1.1, 5.1.1.2, and 5.1.2.3 of this report, respectively. Based on this evaluation, the precision of the data is acceptable for its intended use.

5.2.2 Accuracy

As discussed in Section 2.3, the accuracy evaluation included a comparison of spike recoveries from field samples (surrogate and MS/MSD spikes) and laboratory QC samples (LCS and

LCSD) and assessing holding time. The MS/MSD, LCS/LCSD, and surrogate spike recoveries are discussed in Sections 5.1.1.1, 5.1.2.3, and 5.1.2.5, respectively, and holding time is discussed in Section 5.1.2.2. Recoveries from MS/MSDs, LCS/LCSD and surrogate percent recoveries were compared to laboratory historical control limits to determine a laboratory's ability to accurately determine both qualitative and quantitative results. The investigative sample results were within the required percent recovery limits. The investigative sample results were within the required holding time limits. Based on this evaluation, the accuracy of the data is acceptable for its intended use.

5.2.3 Representativeness

Representativeness is the degree to which the data accurately and precisely portray the environmental conditions being studied. For this investigation, sampling procedures and locations were selected to accurately represent overall Site conditions and were biased toward areas that were likely to exhibit evidence of past releases. Sampling was conducted using known, approved field procedures to minimize variability introduced during field sampling. The investigative and FD analyses indicate that the overall combined variability introduced by the sampling procedures, sample matrix, and laboratory analysis is acceptable, and the FD samples are representative of the data associated with the investigative sample.

5.2.4 Completeness

Completeness refers to the amount of valid data obtainable from a measurement system compared to the expected amount of data. Data that have not been qualified as rejected during the data validation process are considered to be valid. As presented in the *QAP* (MES, 2013), a completeness goal of 95 percent was established for investigations. Of the 180 investigative and field duplicate sample records from the sampling event, no records were qualified as rejected based on MES' review of the data. Therefore, a completeness of 100 percent was calculated for the sampling event, which exceeds project goals. One hundred percent of the results are usable and are acceptable for their intended use.

5.2.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. Comparability objectives were met by minimizing the number of contract laboratories used, using EPA methods for analyses, and reporting results in standardized units. The comparability objective for the project was fulfilled. Sample reanalyzed and result confirmed.

6.0 REPORTING LIMITS AND DATA USES

This section discusses the laboratory reporting limits and how they compare to MCLs.

6.1 LABORATORY REPORTING LIMITS

TestAmerica Laboratories, Inc. confirms reporting limits on an annual or quarterly basis by performing MDL studies. The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is generated from the analysis of a sample in a given matrix containing the analyte (40 Code of Federal Regulations, Chapter 1, Part 136, Appendix B). The reporting limit is defined as the lowest concentration of the target analyte required to be reported. This value is based on project-specific criteria.

The laboratory reports detections that are below the reporting limit as estimated values by assigning a flag to the analytical result. This flag is assigned because the laboratory cannot accurately quantify analyte concentrations at levels below the reporting limit. For detections in the concentration range between the MDL and the reporting limit, the laboratory is confident of the analyte identification and detection but can only estimate the analyte concentration.

6.2 COMPARISON OF LABORATORY REPORTING LIMITS TO MCLs

For this assessment, the laboratory RLs and MDLs were compared to MCLs, shown in Table C6-1. The laboratory RLs and MDLs for the investigative samples were equal to or lower than the MCLs. If a MCL was not available for comparison, the target analyte was not shown in Table C6-1.

7.0 CONCLUSIONS

This DQS presents in specific terms the QA and QC practices used to achieve the project objectives for the Site during the March 2021 sampling event. Samples were collected and analyzed in accordance with EPA methods and using laboratory-specific QA/QC procedures. These procedures were followed to generate legally and technically defensible data.

Some of the quality issues addressed in Section 5.0 of this report resulted in qualification of investigative sample results. Six analytes were qualified, no data were rejected. Based on this review, the analytical data generated for this sampling event are acceptable and adequate to fulfill program objectives.

8.0 REFERENCES

- Alabama Department of Environmental Management (ADEM). 2017. *Alabama Risk-Based Corrective Action Guidance Manual (ARBCA), Revision 3*. February.
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- U.S. Environmental Protection Agency (EPA). 1986. *Test Methods for Evaluating Solid Waste-Physical Chemical Methods*. Office of Solid Waste, Washington, D.C., SW-846, 3rd Edition. Updates I, II, IIA, III, IIIA, IIIB, IVA, IVB, V, and subsequent updates.
- EPA. 1994. *Guidance for the Data Quality Objectives Process*, EPA/600/R-96/055. September.
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TABLES

**Table C5-1: Sample Index
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Site Name	Station Name	Matrix	QC Code	Sample Date	Lab	Delivery Group	Laboratory Sample ID	Method
PARCEL 81(5), LANDFILL 4	LF4-MW1	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-1	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW1	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-1	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW1	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-1	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW1	WG	FD	3/4/2021	TALSAV	680-195939-1	680-195939-6	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW1	WG	FD	3/4/2021	TALSAV	680-195939-1	680-195939-6	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW1	WG	FD	3/4/2021	TALSAV	680-195939-1	680-195939-6	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW2	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-2	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW2	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-2	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW2	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-2	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-3	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-3	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-3	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	MS	3/4/2021	TALSAV	680-195939-1	680-195939-3 MS	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	MS	3/4/2021	TALSAV	680-195939-1	680-195939-3 MS	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	MS	3/4/2021	TALSAV	680-195939-1	680-195939-3 MS	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	MSD	3/4/2021	TALSAV	680-195939-1	680-195939-3 MSD	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	MSD	3/4/2021	TALSAV	680-195939-1	680-195939-3 MSD	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW3	WG	MSD	3/4/2021	TALSAV	680-195939-1	680-195939-3 MSD	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW4	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-4	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW4	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-4	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW4	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-4	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW5	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-5	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW5	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-5	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW5	WG	NS	3/4/2021	TALSAV	680-195939-1	680-195939-5	SW8260B
MCCLELLAN FIELD QC	TRIP BLANK (TB575)	W	TB	3/4/2021	TALSAV	680-195939-1	680-195939-7	SW8260B

Notes:

TALSAV = TestAmerica, Savannah, GA

ID = Identification

MS = Matrix spike

MSD = Matrix spike duplicate

NS = Normal sample

QC = Quality Control

TB = Trip blank

W = Water

WG = Groundwater

**Table C5-2: Summary of Qualified Data
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Station Name	QC Code	Matrix	Sample Date	Delivery Group	Laboratory Sample ID	Method	LongName	Value	Flag	Validation Flag	Reporting Units
None											

Notes:

µg/L = micrograms per liter

FD = Field duplicate

ID = Identification

MS = Matrix spike

MSD = Matrix spike duplicate

NS = Normal sample

QC = Quality control

Lab Flag:

B = Analyte detected in an associated sample.

F1 = MS and MSD outside acceptance criteria.

Validation Flag:

B = Analyte detected in an associated blank.

JM = Result is estimated due to MS and MSD recoveries outside acceptance criteria.

**Table C5-3: Summary of MS/MSD Recoveries and RPDs
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Station Name	Matrix	Sample			Method	Parameter Name	MS	MSD	%R	%R	RPD	RPD Limit
		Date	Delivery Group				%R	%R	LCL	UCL		
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Antimony	97	91	75	125	6	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Arsenic	111	105	75	125	5.6	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Barium	116	100	75	125	14.8	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Beryllium	117	112	75	125	4.4	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Cadmium	112	106	75	125	5.5	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Chromium	114	107	75	125	6.3	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Cobalt	115	107	75	125	7.2	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Copper	115	107	75	125	7.2	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Lead	109	103	75	125	5.7	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Nickel	115	108	75	125	6.3	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Selenium	112	105	75	125	6	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Silver	113	107	75	125	5.5	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Thallium	112	107	75	125	4.6	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Vanadium	116	107	75	125	8.1	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW6020B	Zinc	82	73	75	125	12	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW7470A	Mercury	122	120	80	120	1.7	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	1,1-Dichloroethene	107	99	74	125	7.8	30	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	1,4-Dichlorobenzene	99	96	80	120	3	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Acetone	84	90	60	154	6.9	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Benzene	109	101	73	131	7.6	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Carbon Disulfide	107	100	73	127	6.8	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Chlorobenzene	105	99	80	120	5.9	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Chloroethane	177	175	50	151	1.1	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Chloroform	102	96	79	122	6.1	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Cis-1,2-Dichloroethene	105	97	80	122	7.9	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Ethylbenzene	104	98	80	120	5.9	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Toluene	106	100	80	122	5.8	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Trans-1,2-Dichloroethene	107	99	78	123	7.8	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Trichloroethene	113	106	80	123	6.4	20	
LF4-MW3	WG	3/4/21	680-195939-1	SW8260B	Vinyl Chloride	113	115	68	132	1.8	20	

Notes:

%R = Percent recovery
LCL = Lower control limit
UCL = Upper control limit
MS = Matrix spike
MSD = Matrix spike duplicate
RPD = Relative percent difference
WG = Groundwater

Blue text and outlined indicates value above acceptance criteria.

Shade indicates value below acceptance criteria.

**Table C5-4: Comparison of Investigative and Field Duplicate Sample Detections
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Station Name	Matrix	Sample Date	Delivery Group	Method	Parameter Name	FD	NS	NS	NS	Units	RPD	MDL	RL
						Value	Lab Flag	Value	Lab Flag				
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Barium	49		53		µg/L	7.8	0.61	5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Beryllium	0.35	J	0.47	J	µg/L	29.3	0.17	0.5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Chromium	1.9	J	3.8	J	µg/L	67	1.6	5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Cobalt	35		36		µg/L	2.8	0.12	0.5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Copper	3.7	J	5.6		µg/L	40.9	1.7	5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Lead	2.6		4.4		µg/L	51.4	0.98	2.5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Nickel	23		24		µg/L	4.3	1.9	5
LF4-MW1	WG	3/4/21	680-195939-1	SW6020B	Zinc	86		120		µg/L	33.0	9.6	20

Notes:

FD = Field duplicate

MDL = Method detection limit

µg/L = micrograms per liter

NS = Normal sample

RL = Reporting limit

RPD = Relative percent difference

WG = Groundwater

Blue text and outlined indicates RPD outside acceptance criteria of 50%.

Lab Flag:

B = Analyte detected in an associated blank.

J = Estimated value. The analyte is positively identified and the concentration is less than the reporting limit, but greater than the method detection limit.

**Table C5-5: Summary of LCS/LCSD Recoveries and RPDs
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Method	Delivery Group	Analysis Date	Analytical Batch	Matrix	Parameter Name	LCS %R	LCSD %R	LCL	UCL	RPD	RPD Limit
SW6020B	680-195939-1	3/10/21	680-658995	W	Antimony	94	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Arsenic	103	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Barium	101	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Beryllium	109	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Cadmium	103	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Chromium	104	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Cobalt	107	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Copper	110	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Lead	102	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Nickel	109	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Selenium	104	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Silver	104	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Thallium	103	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Vanadium	103	NA	80	120	NA	20
SW6020B	680-195939-1	3/10/21	680-658995	W	Zinc	105	NA	80	120	NA	20
SW7470A	680-195939-1	3/13/21	680-659515	W	Mercury	100	NA	80	120	NA	20
SW8260B	680-195939-1	3/12/21	680-659185	W	1,1-Dichloroethene	102	101	76	120	1	30
SW8260B	680-195939-1	3/12/21	680-659185	W	1,4-Dichlorobenzene	110	108	80	120	2	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Acetone	113	106	70	135	6	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Benzene	109	107	80	120	2	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Carbon Disulfide	108	106	80	120	2	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Chlorobenzene	111	111	80	120	0	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Chloroethane	161	158	66	135	2	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Chloroform	104	101	80	120	3	20
SW8260B	680-195939-1	3/12/21	680-659185	W	cis-1,2-Dichloroethene	102	100	80	120	2	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Ethylbenzene	109	108	80	120	1	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Toluene	107	106	80	113	1	20
SW8260B	680-195939-1	3/12/21	680-659185	W	trans-1,2-Dichloroethene	103	103	80	120	0	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Trichloroethene	113	112	80	120	1	20
SW8260B	680-195939-1	3/12/21	680-659185	W	Vinyl Chloride	100	98	71	128	2	20

Notes:

LCL = Lower control limit

LCS = Laboratory control sample

LCSD = Laboratory control sample duplicate

NA = not applicable

W = Water

%R = Percent recovery

Blue text and outlined indicates value above acceptance criteria.

Shade indicates value below acceptance criteria.

RPD = Relative percent difference

UCL = Upper control limit

**Table C5-6: Summary of Surrogate Recoveries
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Station Name	Sample Date	Matrix	QC Code	Delivery Group	Method	Parameter Name	%R	LCL	UCL
LF4-MW1	3/4/21	WG	NS	680-195939-1	SW8260B	1,2-Dichloroethane-D4	105	73	131
LF4-MW1	3/4/21	WG	NS	680-195939-1	SW8260B	4-Bromofluorobenzene	102	80	120
LF4-MW1	3/4/21	WG	NS	680-195939-1	SW8260B	Dibromofluoromethane	120	80	122
LF4-MW1	3/4/21	WG	NS	680-195939-1	SW8260B	Toluene-D8	116	80	120
LF4-MW1	3/4/21	WG	FD	680-195939-1	SW8260B	1,2-Dichloroethane-D4	103	73	131
LF4-MW1	3/4/21	WG	FD	680-195939-1	SW8260B	4-Bromofluorobenzene	103	80	120
LF4-MW1	3/4/21	WG	FD	680-195939-1	SW8260B	Dibromofluoromethane	117	80	122
LF4-MW1	3/4/21	WG	FD	680-195939-1	SW8260B	Toluene-D8	110	80	120
LF4-MW2	3/4/21	WG	NS	680-195939-1	SW8260B	1,2-Dichloroethane-D4	106	73	131
LF4-MW2	3/4/21	WG	NS	680-195939-1	SW8260B	4-Bromofluorobenzene	105	80	120
LF4-MW2	3/4/21	WG	NS	680-195939-1	SW8260B	Dibromofluoromethane	121	80	122
LF4-MW2	3/4/21	WG	NS	680-195939-1	SW8260B	Toluene-D8	113	80	120
LF4-MW3	3/4/21	WG	NS	680-195939-1	SW8260B	1,2-Dichloroethane-D4	105	73	131
LF4-MW3	3/4/21	WG	NS	680-195939-1	SW8260B	4-Bromofluorobenzene	104	80	120
LF4-MW3	3/4/21	WG	NS	680-195939-1	SW8260B	Dibromofluoromethane	120	80	122
LF4-MW3	3/4/21	WG	NS	680-195939-1	SW8260B	Toluene-D8	115	80	120
LF4-MW4	3/4/21	WG	NS	680-195939-1	SW8260B	1,2-Dichloroethane-D4	109	73	131
LF4-MW4	3/4/21	WG	NS	680-195939-1	SW8260B	4-Bromofluorobenzene	104	80	120
LF4-MW4	3/4/21	WG	NS	680-195939-1	SW8260B	Dibromofluoromethane	122	80	122
LF4-MW4	3/4/21	WG	NS	680-195939-1	SW8260B	Toluene-D8	118	80	120
LF4-MW5	3/4/21	WG	NS	680-195939-1	SW8260B	1,2-Dichloroethane-D4	105	73	131
LF4-MW5	3/4/21	WG	NS	680-195939-1	SW8260B	4-Bromofluorobenzene	106	80	120
LF4-MW5	3/4/21	WG	NS	680-195939-1	SW8260B	Dibromofluoromethane	120	80	122
LF4-MW5	3/4/21	WG	NS	680-195939-1	SW8260B	Toluene-D8	118	80	120

Notes:

FD = Field duplicate

LCL = Lower control limit

NS = Normal sample

QC = Quality control

%R = Percent recovery

UCL = Upper control limit

WG = Groundwater

**Table C6-1: Reporting Limits and Method Detection Limits Compared to MCLs
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Matrix	Method	Parameter Name	MDL	RL	Units	MCL
WG	SW6020B	Antimony	0.5	5	µg/L	6.0
WG	SW6020B	Arsenic	1.5	3	µg/L	10
WG	SW6020B	Barium	0.61	5	µg/L	2000
WG	SW6020B	Beryllium	0.17	0.5	µg/L	4.0
WG	SW6020B	Cadmium	0.15	0.5	µg/L	5.0
WG	SW6020B	Chromium	1.6	5	µg/L	100
WG	SW6020B	Copper	1.7	5	µg/L	1300
WG	SW6020B	Lead	0.98	2.5	µg/L	15
WG	SW6020B	Nickel	1.9	5	µg/L	100
WG	SW6020B	Selenium	1	2.5	µg/L	50
WG	SW6020B	Silver	0.1	1	µg/L	100
WG	SW6020B	Thallium	0.49	1	µg/L	2.0
WG	SW6020B	Zinc	9.6	20	µg/L	5000
WG	SW7470A	Mercury	0.08	0.2	µg/L	2.0
WG	SW8260B	1,1-Dichloroethene	0.36	1	µg/L	7.0
WG	SW8260B	1,4-Dichlorobenzene	0.46	1	µg/L	75
WG	SW8260B	Benzene	0.43	1	µg/L	5.0
WG	SW8260B	Chlorobenzene	0.26	1	µg/L	100
WG	SW8260B	Cis-1,2-Dichloroethene	0.41	1	µg/L	70
WG	SW8260B	Ethylbenzene	0.33	1	µg/L	700
WG	SW8260B	Toluene	0.48	1	µg/L	1000
WG	SW8260B	Trans-1,2-Dichloroethene	0.37	1	µg/L	100
WG	SW8260B	Trichloroethene	0.48	1	µg/L	5.0
WG	SW8260B	Vinyl Chloride	0.5	1	µg/L	2.0

Notes:

MDL = Method detection limit

µg/L = micrograms per liter

mg/L = milligrams per liter

MCL = Maximum contaminant level (Codes 335-7-2-.03, 335-7-2-.05, and 335-7-3-.02 of the *ADEM Division 7 Regulations* [ADEM, 2014])

RL = Reporting limit

WG = Groundwater

Indicates the limit is greater than the MCL.

ATTACHMENT C1

Laboratory Data, March 2021

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-195939-1
Client Project/Site: Parcel 81(5), Landfill 4
Revision: 2

For:
Matrix Environmental Services, LLC
1601 Blake Street
Suite 200
Denver, Colorado 80202

Attn: Ms. Betty Van Pelt



Authorized for release by:
4/1/2021 1:23:56 PM

Ken Hayes, Project Manager II
(615)301-5035
Ken.Hayes@Eurofinset.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Definitions/Glossary

Client: Matrix Environmental Services, LLC
Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Sample Summary

Client: Matrix Environmental Services, LLC
Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-195939-1	LF4-MW1	Water	03/04/21 09:05	03/08/21 11:00	
680-195939-2	LF4-MW2	Water	03/04/21 09:55	03/08/21 11:00	
680-195939-3	LF4-MW3	Water	03/04/21 10:40	03/08/21 11:00	
680-195939-4	LF4-MW4	Water	03/04/21 11:40	03/08/21 11:00	
680-195939-5	LF4-MW5	Water	03/04/21 12:15	03/08/21 11:00	
680-195939-6	DUP370	Water	03/04/21 00:00	03/08/21 11:00	
680-195939-7	TB575	Water	03/04/21 13:30	03/08/21 11:00	

Case Narrative

Client: Matrix Environmental Services, LLC
Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Job ID: 680-195939-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

**Job Narrative
680-195939-1**

Revision

The report being provided is a revision of the original report sent on 3/16/2021. The report (revision 1) is being revised due to: Revised to Site Specific list for Metals and VOCs.

Comments

No additional comments.

Receipt

The samples were received on 3/8/2021 11:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3° C.

GC/MS VOA

Method 8260B: The initial calibration verification (ICV) result for batch Chloroethane was above the upper control limit. Chloroethane has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified.

Method 8260B: The continuing calibration verification (CCV) associated with batch 680-659185 recovered above the upper control limit for Chloroethane. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCVIS 680-659185/3).

Method 8260B: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 680-659185 recovered outside control limits for the following analytes: CHloromethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW1

Lab Sample ID: 680-195939-1

Date Collected: 03/04/21 09:05

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 17:11	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 17:11	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 17:11	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 17:11	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 17:11	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 17:11	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 17:11	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 17:11	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 17:11	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 17:11	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 17:11	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 17:11	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 17:11	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 17:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		70 - 130		03/12/21 17:11	1
Dibromofluoromethane (Surr)	120		70 - 130		03/12/21 17:11	1
1,2-Dichloroethane-d4 (Surr)	105		60 - 124		03/12/21 17:11	1
Toluene-d8 (Surr)	116		70 - 130		03/12/21 17:11	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 16:23	1
Arsenic	1.5	J	3.0	1.5	ug/L		03/10/21 10:28	03/10/21 16:23	1
Barium	53		5.0	0.61	ug/L		03/10/21 10:28	03/10/21 16:23	1
Beryllium	0.47	J	0.50	0.17	ug/L		03/10/21 10:28	03/10/21 16:23	1
Cadmium	0.16	J	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 16:23	1
Chromium	3.8	J	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 16:23	1
Cobalt	36		0.50	0.12	ug/L		03/10/21 10:28	03/10/21 16:23	1
Copper	5.6		5.0	1.7	ug/L		03/10/21 10:28	03/10/21 16:23	1
Lead	4.4		2.5	0.98	ug/L		03/10/21 10:28	03/10/21 16:23	1
Nickel	24		5.0	1.9	ug/L		03/10/21 10:28	03/10/21 16:23	1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 16:23	1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 16:23	1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 16:23	1
Vanadium	5.3	U	10	5.3	ug/L		03/10/21 10:28	03/10/21 16:23	1
Zinc	120		20	9.6	ug/L		03/10/21 10:28	03/10/21 16:23	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:17	1

Client Sample ID: LF4-MW2

Lab Sample ID: 680-195939-2

Date Collected: 03/04/21 09:55

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 17:36	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 17:36	1

Eurofins TestAmerica, Savannah

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW2

Lab Sample ID: 680-195939-2

Date Collected: 03/04/21 09:55

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 17:36	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 17:36	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 17:36	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 17:36	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 17:36	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 17:36	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 17:36	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 17:36	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 17:36	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 17:36	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 17:36	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 17:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130					03/12/21 17:36	1
Dibromofluoromethane (Surr)	121		70 - 130					03/12/21 17:36	1
1,2-Dichloroethane-d4 (Surr)	106		60 - 124					03/12/21 17:36	1
Toluene-d8 (Surr)	113		70 - 130					03/12/21 17:36	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 16:25	1
Arsenic	3.3		3.0	1.5	ug/L		03/10/21 10:28	03/10/21 16:25	1
Barium	62		5.0	0.61	ug/L		03/10/21 10:28	03/10/21 16:25	1
Beryllium	0.25	J	0.50	0.17	ug/L		03/10/21 10:28	03/10/21 16:25	1
Cadmium	0.18	J	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 16:25	1
Chromium	1.9	J	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 16:25	1
Cobalt	65		0.50	0.12	ug/L		03/10/21 10:28	03/10/21 16:25	1
Copper	6.9		5.0	1.7	ug/L		03/10/21 10:28	03/10/21 16:25	1
Lead	7.4		2.5	0.98	ug/L		03/10/21 10:28	03/10/21 16:25	1
Nickel	33		5.0	1.9	ug/L		03/10/21 10:28	03/10/21 16:25	1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 16:25	1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 16:25	1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 16:25	1
Vanadium	5.3	U	10	5.3	ug/L		03/10/21 10:28	03/10/21 16:25	1
Zinc	210		20	9.6	ug/L		03/10/21 10:28	03/10/21 16:25	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:22	1

Client Sample ID: LF4-MW3

Lab Sample ID: 680-195939-3

Date Collected: 03/04/21 10:40

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 18:53	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 18:53	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 18:53	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 18:53	1

Eurofins TestAmerica, Savannah

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW3

Lab Sample ID: 680-195939-3

Date Collected: 03/04/21 10:40

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 18:53	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 18:53	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 18:53	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 18:53	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 18:53	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 18:53	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 18:53	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 18:53	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 18:53	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 18:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		03/12/21 18:53	1
Dibromofluoromethane (Surr)	120		70 - 130		03/12/21 18:53	1
1,2-Dichloroethane-d4 (Surr)	105		60 - 124		03/12/21 18:53	1
Toluene-d8 (Surr)	115		70 - 130		03/12/21 18:53	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 15:47	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/10/21 10:28	03/10/21 15:47	1
Barium	83		5.0	0.61	ug/L		03/10/21 10:28	03/10/21 15:47	1
Beryllium	0.81		0.50	0.17	ug/L		03/10/21 10:28	03/10/21 15:47	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 15:47	1
Chromium	1.6	U	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 15:47	1
Cobalt	2.4		0.50	0.12	ug/L		03/10/21 10:28	03/10/21 15:47	1
Copper	5.8		5.0	1.7	ug/L		03/10/21 10:28	03/10/21 15:47	1
Lead	5.8		2.5	0.98	ug/L		03/10/21 10:28	03/10/21 15:47	1
Nickel	5.6		5.0	1.9	ug/L		03/10/21 10:28	03/10/21 15:47	1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 15:47	1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 15:47	1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 15:47	1
Vanadium	5.3	U	10	5.3	ug/L		03/10/21 10:28	03/10/21 15:47	1
Zinc	44	F1	20	9.6	ug/L		03/10/21 10:28	03/10/21 15:47	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U F1	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:26	1

Client Sample ID: LF4-MW4

Lab Sample ID: 680-195939-4

Date Collected: 03/04/21 11:40

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 18:02	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 18:02	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 18:02	1
Chlorobenzene	0.71	J	1.0	0.26	ug/L			03/12/21 18:02	1
cis-1,2-Dichloroethene	2.1		1.0	0.41	ug/L			03/12/21 18:02	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 18:02	1

Eurofins TestAmerica, Savannah

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW4

Lab Sample ID: 680-195939-4

Date Collected: 03/04/21 11:40

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 18:02	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 18:02	1
Trichloroethene	1.9		1.0	0.48	ug/L			03/12/21 18:02	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 18:02	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 18:02	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 18:02	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 18:02	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 18:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130		03/12/21 18:02	1
Dibromofluoromethane (Surr)	122		70 - 130		03/12/21 18:02	1
1,2-Dichloroethane-d4 (Surr)	109		60 - 124		03/12/21 18:02	1
Toluene-d8 (Surr)	118		70 - 130		03/12/21 18:02	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 16:28	1
Arsenic	2.9	J	3.0	1.5	ug/L		03/10/21 10:28	03/10/21 16:28	1
Barium	190		5.0	0.61	ug/L		03/10/21 10:28	03/10/21 16:28	1
Beryllium	0.17	U	0.50	0.17	ug/L		03/10/21 10:28	03/10/21 16:28	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 16:28	1
Chromium	1.6	U	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 16:28	1
Cobalt	3.3		0.50	0.12	ug/L		03/10/21 10:28	03/10/21 16:28	1
Copper	1.7	U	5.0	1.7	ug/L		03/10/21 10:28	03/10/21 16:28	1
Lead	1.1	J	2.5	0.98	ug/L		03/10/21 10:28	03/10/21 16:28	1
Nickel	2.4	J	5.0	1.9	ug/L		03/10/21 10:28	03/10/21 16:28	1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 16:28	1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 16:28	1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 16:28	1
Vanadium	5.3	U	10	5.3	ug/L		03/10/21 10:28	03/10/21 16:28	1
Zinc	9.6	U	20	9.6	ug/L		03/10/21 10:28	03/10/21 16:28	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:40	1

Client Sample ID: LF4-MW5

Lab Sample ID: 680-195939-5

Date Collected: 03/04/21 12:15

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 18:27	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 18:27	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 18:27	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 18:27	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 18:27	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 18:27	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 18:27	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 18:27	1

Eurofins TestAmerica, Savannah

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW5

Lab Sample ID: 680-195939-5

Date Collected: 03/04/21 12:15

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 18:27	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 18:27	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 18:27	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 18:27	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 18:27	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 18:27	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130		03/12/21 18:27	1
Dibromofluoromethane (Surr)	120		70 - 130		03/12/21 18:27	1
1,2-Dichloroethane-d4 (Surr)	105		60 - 124		03/12/21 18:27	1
Toluene-d8 (Surr)	118		70 - 130		03/12/21 18:27	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 16:31	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/10/21 10:28	03/10/21 16:31	1
Barium	21		5.0	0.61	ug/L		03/10/21 10:28	03/10/21 16:31	1
Beryllium	0.38	J	0.50	0.17	ug/L		03/10/21 10:28	03/10/21 16:31	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 16:31	1
Chromium	3.2	J	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 16:31	1
Cobalt	4.4		0.50	0.12	ug/L		03/10/21 10:28	03/10/21 16:31	1
Copper	3.7	J	5.0	1.7	ug/L		03/10/21 10:28	03/10/21 16:31	1
Lead	3.5		2.5	0.98	ug/L		03/10/21 10:28	03/10/21 16:31	1
Nickel	5.3		5.0	1.9	ug/L		03/10/21 10:28	03/10/21 16:31	1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 16:31	1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 16:31	1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 16:31	1
Vanadium	6.7	J	10	5.3	ug/L		03/10/21 10:28	03/10/21 16:31	1
Zinc	28		20	9.6	ug/L		03/10/21 10:28	03/10/21 16:31	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:45	1

Client Sample ID: DUP370

Lab Sample ID: 680-195939-6

Date Collected: 03/04/21 00:00

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 14:37	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 14:37	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 14:37	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 14:37	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 14:37	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 14:37	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 14:37	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 14:37	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 14:37	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 14:37	1

Eurofins TestAmerica, Savannah

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: DUP370

Lab Sample ID: 680-195939-6

Date Collected: 03/04/21 00:00

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/12/21 14:37	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 14:37	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 14:37	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 14:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		03/12/21 14:37	1
Dibromofluoromethane (Surr)	117		70 - 130		03/12/21 14:37	1
1,2-Dichloroethane-d4 (Surr)	103		60 - 124		03/12/21 14:37	1
Toluene-d8 (Surr)	110		70 - 130		03/12/21 14:37	1

Method: 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 16:33	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/10/21 10:28	03/10/21 16:33	1
Barium	49		5.0	0.61	ug/L		03/10/21 10:28	03/10/21 16:33	1
Beryllium	0.35	J	0.50	0.17	ug/L		03/10/21 10:28	03/10/21 16:33	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 16:33	1
Chromium	1.9	J	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 16:33	1
Cobalt	35		0.50	0.12	ug/L		03/10/21 10:28	03/10/21 16:33	1
Copper	3.7	J	5.0	1.7	ug/L		03/10/21 10:28	03/10/21 16:33	1
Lead	2.6		2.5	0.98	ug/L		03/10/21 10:28	03/10/21 16:33	1
Nickel	23		5.0	1.9	ug/L		03/10/21 10:28	03/10/21 16:33	1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 16:33	1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 16:33	1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 16:33	1
Vanadium	5.3	U	10	5.3	ug/L		03/10/21 10:28	03/10/21 16:33	1
Zinc	86		20	9.6	ug/L		03/10/21 10:28	03/10/21 16:33	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:50	1

Client Sample ID: TB575

Lab Sample ID: 680-195939-7

Date Collected: 03/04/21 13:30

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 15:02	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 15:02	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 15:02	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 15:02	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 15:02	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 15:02	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 15:02	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 15:02	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 15:02	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 15:02	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 15:02	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 15:02	1

Eurofins TestAmerica, Savannah

Client Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: TB575

Lab Sample ID: 680-195939-7

Date Collected: 03/04/21 13:30

Matrix: Water

Date Received: 03/08/21 11:00

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 15:02	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 15:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130		03/12/21 15:02	1
Dibromofluoromethane (Surr)	117		70 - 130		03/12/21 15:02	1
1,2-Dichloroethane-d4 (Surr)	104		60 - 124		03/12/21 15:02	1
Toluene-d8 (Surr)	109		70 - 130		03/12/21 15:02	1

QC Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 680-659185/9
Matrix: Water
Analysis Batch: 659185

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/12/21 11:22	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/12/21 11:22	1
Benzene	0.43	U	1.0	0.43	ug/L			03/12/21 11:22	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/12/21 11:22	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/12/21 11:22	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/12/21 11:22	1
Toluene	0.48	U	1.0	0.48	ug/L			03/12/21 11:22	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/12/21 11:22	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/12/21 11:22	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/12/21 11:22	1
Acetone	7.0	U	10	7.0	ug/L			03/12/21 11:22	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/12/21 11:22	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/12/21 11:22	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/12/21 11:22	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
4-Bromofluorobenzene (Surr)	107		70 - 130		03/12/21 11:22	1
Dibromofluoromethane (Surr)	116		70 - 130		03/12/21 11:22	1
1,2-Dichloroethane-d4 (Surr)	103		60 - 124		03/12/21 11:22	1
Toluene-d8 (Surr)	109		70 - 130		03/12/21 11:22	1

Lab Sample ID: LCS 680-659185/4
Matrix: Water
Analysis Batch: 659185

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
1,1-Dichloroethene	50.0	50.9		ug/L		102	70 - 130
1,4-Dichlorobenzene	50.0	55.2		ug/L		110	70 - 130
Benzene	50.0	54.7		ug/L		109	70 - 130
Chlorobenzene	50.0	55.6		ug/L		111	70 - 130
cis-1,2-Dichloroethene	50.0	50.9		ug/L		102	70 - 130
Ethylbenzene	50.0	54.6		ug/L		109	70 - 130
Toluene	50.0	53.4		ug/L		107	70 - 130
trans-1,2-Dichloroethene	50.0	51.3		ug/L		103	70 - 130
Trichloroethene	50.0	56.4		ug/L		113	70 - 130
Vinyl chloride	50.0	50.1		ug/L		100	66 - 129
Acetone	250	284		ug/L		113	67 - 113
Carbon disulfide	50.0	53.8		ug/L		108	70 - 130
Chloroethane	50.0	80.6		ug/L		161	31 - 213
Chloroform	50.0	51.9		ug/L		104	70 - 130

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	94		70 - 130
Dibromofluoromethane (Surr)	106		70 - 130
1,2-Dichloroethane-d4 (Surr)	101		60 - 124
Toluene-d8 (Surr)	103		70 - 130

Eurofins TestAmerica, Savannah

QC Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 680-659185/5
Matrix: Water
Analysis Batch: 659185

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	50.0	50.5		ug/L		101	70 - 130	1	20
1,4-Dichlorobenzene	50.0	53.8		ug/L		108	70 - 130	3	30
Benzene	50.0	53.6		ug/L		107	70 - 130	2	30
Chlorobenzene	50.0	55.5		ug/L		111	70 - 130	0	30
cis-1,2-Dichloroethene	50.0	49.9		ug/L		100	70 - 130	2	30
Ethylbenzene	50.0	54.1		ug/L		108	70 - 130	1	20
Toluene	50.0	53.2		ug/L		106	70 - 130	0	30
trans-1,2-Dichloroethene	50.0	51.6		ug/L		103	70 - 130	1	30
Trichloroethene	50.0	56.1		ug/L		112	70 - 130	1	30
Vinyl chloride	50.0	49.2		ug/L		98	66 - 129	2	30
Acetone	250	264		ug/L		106	67 - 113	7	30
Carbon disulfide	50.0	52.9		ug/L		106	70 - 130	2	30
Chloroethane	50.0	79.1		ug/L		158	31 - 213	2	30
Chloroform	50.0	50.7		ug/L		101	70 - 130	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
4-Bromofluorobenzene (Surr)	92		70 - 130
Dibromofluoromethane (Surr)	103		70 - 130
1,2-Dichloroethane-d4 (Surr)	96		60 - 124
Toluene-d8 (Surr)	102		70 - 130

Lab Sample ID: 680-195939-3 MS
Matrix: Water
Analysis Batch: 659185

Client Sample ID: LF4-MW3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	0.36	U	50.0	53.4		ug/L		107	70 - 130
1,4-Dichlorobenzene	0.46	U	50.0	49.3		ug/L		99	70 - 130
Benzene	0.43	U	50.0	54.5		ug/L		109	70 - 130
Chlorobenzene	0.26	U	50.0	52.4		ug/L		105	70 - 130
cis-1,2-Dichloroethene	0.41	U	50.0	52.4		ug/L		105	70 - 130
Ethylbenzene	0.33	U	50.0	51.8		ug/L		104	70 - 130
Toluene	0.48	U	50.0	53.0		ug/L		106	70 - 130
trans-1,2-Dichloroethene	0.37	U	50.0	53.4		ug/L		107	70 - 130
Trichloroethene	0.48	U	50.0	56.7		ug/L		113	70 - 130
Vinyl chloride	0.50	U	50.0	56.7		ug/L		113	66 - 129
Acetone	7.0	U	250	210		ug/L		84	67 - 113
Carbon disulfide	1.0	U	50.0	53.6		ug/L		107	70 - 130
Chloroethane	2.5	U	50.0	88.3		ug/L		177	31 - 213
Chloroform	0.50	U	50.0	51.2		ug/L		102	70 - 130

Surrogate	MS %Recovery	MS Qualifier	MS Limits
4-Bromofluorobenzene (Surr)	89		70 - 130
Dibromofluoromethane (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	99		60 - 124
Toluene-d8 (Surr)	104		70 - 130

QC Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 680-195939-3 MSD
Matrix: Water
Analysis Batch: 659185

Client Sample ID: LF4-MW3
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		
1,1-Dichloroethene	0.36	U	50.0	49.7		ug/L		99	70 - 130	7	20
1,4-Dichlorobenzene	0.46	U	50.0	48.0		ug/L		96	70 - 130	3	30
Benzene	0.43	U	50.0	50.7		ug/L		101	70 - 130	7	30
Chlorobenzene	0.26	U	50.0	49.6		ug/L		99	70 - 130	6	30
cis-1,2-Dichloroethene	0.41	U	50.0	48.3		ug/L		97	70 - 130	8	30
Ethylbenzene	0.33	U	50.0	48.8		ug/L		98	70 - 130	6	20
Toluene	0.48	U	50.0	50.1		ug/L		100	70 - 130	6	30
trans-1,2-Dichloroethene	0.37	U	50.0	49.6		ug/L		99	70 - 130	7	30
Trichloroethene	0.48	U	50.0	53.2		ug/L		106	70 - 130	6	30
Vinyl chloride	0.50	U	50.0	57.6		ug/L		115	66 - 129	2	30
Acetone	7.0	U	250	226		ug/L		90	67 - 113	7	30
Carbon disulfide	1.0	U	50.0	49.8		ug/L		100	70 - 130	7	30
Chloroethane	2.5	U	50.0	87.3		ug/L		175	31 - 213	1	30
Chloroform	0.50	U	50.0	47.8		ug/L		96	70 - 130	7	30

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
4-Bromofluorobenzene (Surr)	83		70 - 130
Dibromofluoromethane (Surr)	99		70 - 130
1,2-Dichloroethane-d4 (Surr)	91		60 - 124
Toluene-d8 (Surr)	98		70 - 130

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 680-658853/1-A
Matrix: Water
Analysis Batch: 658995

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 658853

Analyte	MB	MB	RL	MDL	Unit	D	Prepared		Analyzed		Dil Fac
	Result	Qualifier									
Antimony	0.50	U	5.0	0.50	ug/L		03/10/21 10:28	03/10/21 15:42			1
Arsenic	1.5	U	3.0	1.5	ug/L		03/10/21 10:28	03/10/21 15:42			1
Barium	0.61	U	5.0	0.61	ug/L		03/10/21 10:28	03/10/21 15:42			1
Beryllium	0.17	U	0.50	0.17	ug/L		03/10/21 10:28	03/10/21 15:42			1
Cadmium	0.15	U	0.50	0.15	ug/L		03/10/21 10:28	03/10/21 15:42			1
Chromium	1.6	U	5.0	1.6	ug/L		03/10/21 10:28	03/10/21 15:42			1
Cobalt	0.12	U	0.50	0.12	ug/L		03/10/21 10:28	03/10/21 15:42			1
Copper	1.7	U	5.0	1.7	ug/L		03/10/21 10:28	03/10/21 15:42			1
Lead	0.98	U	2.5	0.98	ug/L		03/10/21 10:28	03/10/21 15:42			1
Nickel	1.9	U	5.0	1.9	ug/L		03/10/21 10:28	03/10/21 15:42			1
Selenium	1.0	U	2.5	1.0	ug/L		03/10/21 10:28	03/10/21 15:42			1
Silver	0.10	U	1.0	0.10	ug/L		03/10/21 10:28	03/10/21 15:42			1
Thallium	0.49	U	1.0	0.49	ug/L		03/10/21 10:28	03/10/21 15:42			1
Vanadium	5.3	U	10	5.3	ug/L		03/10/21 10:28	03/10/21 15:42			1
Zinc	9.6	U	20	9.6	ug/L		03/10/21 10:28	03/10/21 15:42			1

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QC Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-658853/2-A
Matrix: Water
Analysis Batch: 658995

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 658853
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	50.0	47.0		ug/L		94	80 - 120
Arsenic	100	103		ug/L		103	80 - 120
Barium	100	101		ug/L		101	80 - 120
Beryllium	50.0	54.7		ug/L		109	80 - 120
Cadmium	50.0	51.4		ug/L		103	80 - 120
Chromium	100	104		ug/L		104	80 - 120
Cobalt	50.0	53.2		ug/L		107	80 - 120
Copper	99.1	109		ug/L		110	80 - 120
Lead	454	462		ug/L		102	80 - 120
Nickel	99.0	108		ug/L		109	80 - 120
Selenium	100	104		ug/L		104	80 - 120
Silver	50.0	52.1		ug/L		104	80 - 120
Thallium	40.0	41.1		ug/L		103	80 - 120
Vanadium	99.8	103		ug/L		103	80 - 120
Zinc	100	105		ug/L		105	80 - 120

Lab Sample ID: 680-195939-3 MS
Matrix: Water
Analysis Batch: 658995

Client Sample ID: LF4-MW3
Prep Type: Total/NA
Prep Batch: 658853
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Antimony	0.50	U	50.0	48.6		ug/L		97	75 - 125
Arsenic	1.5	U	100	111		ug/L		111	75 - 125
Barium	83		100	198		ug/L		116	75 - 125
Beryllium	0.81		50.0	59.2		ug/L		117	75 - 125
Cadmium	0.15	U	50.0	56.2		ug/L		112	75 - 125
Chromium	1.6	U	100	114		ug/L		114	75 - 125
Cobalt	2.4		50.0	59.6		ug/L		115	75 - 125
Copper	5.8		99.1	120		ug/L		115	75 - 125
Lead	5.8		454	502		ug/L		109	75 - 125
Nickel	5.6		99.0	120		ug/L		115	75 - 125
Selenium	1.0	U	100	112		ug/L		112	75 - 125
Silver	0.10	U	50.0	56.6		ug/L		113	75 - 125
Thallium	0.49	U	40.0	44.6		ug/L		112	75 - 125
Vanadium	5.3	U	99.8	116		ug/L		116	75 - 125
Zinc	44	F1	100	127		ug/L		82	75 - 125

Lab Sample ID: 680-195939-3 MSD
Matrix: Water
Analysis Batch: 658995

Client Sample ID: LF4-MW3
Prep Type: Total/NA
Prep Batch: 658853
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Antimony	0.50	U	50.0	45.2		ug/L		91	75 - 125	7	20
Arsenic	1.5	U	100	105		ug/L		105	75 - 125	6	20
Barium	83		100	183		ug/L		100	75 - 125	8	20
Beryllium	0.81		50.0	57.0		ug/L		112	75 - 125	4	20
Cadmium	0.15	U	50.0	53.0		ug/L		106	75 - 125	6	20
Chromium	1.6	U	100	107		ug/L		107	75 - 125	7	20
Cobalt	2.4		50.0	55.8		ug/L		107	75 - 125	7	20

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QC Sample Results

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-195939-3 MSD
Matrix: Water
Analysis Batch: 658995

Client Sample ID: LF4-MW3
Prep Type: Total/NA
Prep Batch: 658853

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.		RPD
	Result	Qualifier		Result	Qualifier				Limits	Limit	
Copper	5.8		99.1	112		ug/L		107	75 - 125	7	20
Lead	5.8		454	471		ug/L		103	75 - 125	6	20
Nickel	5.6		99.0	112		ug/L		108	75 - 125	7	20
Selenium	1.0	U	100	106		ug/L		105	75 - 125	6	20
Silver	0.10	U	50.0	53.3		ug/L		107	75 - 125	6	20
Thallium	0.49	U	40.0	42.8		ug/L		107	75 - 125	4	20
Vanadium	5.3	U	99.8	107		ug/L		107	75 - 125	8	20
Zinc	44	F1	100	118	F1	ug/L		73	75 - 125	7	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 680-659302/1-A
Matrix: Water
Analysis Batch: 659515

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 659302

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	0.080	U	0.20	0.080	ug/L		03/12/21 13:20	03/13/21 17:08	1

Lab Sample ID: LCS 680-659302/2-A
Matrix: Water
Analysis Batch: 659515

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 659302

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
Mercury	2.50	2.49		ug/L		100	80 - 120

Lab Sample ID: 680-195939-3 MS
Matrix: Water
Analysis Batch: 659515

Client Sample ID: LF4-MW3
Prep Type: Total/NA
Prep Batch: 659302

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	
	Result	Qualifier		Result	Qualifier				Limits	Limit
Mercury	0.080	U F1	1.00	1.22	F1	ug/L		122	80 - 120	

Lab Sample ID: 680-195939-3 MSD
Matrix: Water
Analysis Batch: 659515

Client Sample ID: LF4-MW3
Prep Type: Total/NA
Prep Batch: 659302

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.		RPD
	Result	Qualifier		Result	Qualifier				Limits	Limit	
Mercury	0.080	U F1	1.00	1.20		ug/L		120	80 - 120	2	20

QC Association Summary

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

GC/MS VOA

Analysis Batch: 659185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195939-1	LF4-MW1	Total/NA	Water	8260B	
680-195939-2	LF4-MW2	Total/NA	Water	8260B	
680-195939-3	LF4-MW3	Total/NA	Water	8260B	
680-195939-4	LF4-MW4	Total/NA	Water	8260B	
680-195939-5	LF4-MW5	Total/NA	Water	8260B	
680-195939-6	DUP370	Total/NA	Water	8260B	
680-195939-7	TB575	Total/NA	Water	8260B	
MB 680-659185/9	Method Blank	Total/NA	Water	8260B	
LCS 680-659185/4	Lab Control Sample	Total/NA	Water	8260B	
LCS D 680-659185/5	Lab Control Sample Dup	Total/NA	Water	8260B	
680-195939-3 MS	LF4-MW3	Total/NA	Water	8260B	
680-195939-3 MSD	LF4-MW3	Total/NA	Water	8260B	

Metals

Prep Batch: 658853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195939-1	LF4-MW1	Total/NA	Water	3010A	
680-195939-2	LF4-MW2	Total/NA	Water	3010A	
680-195939-3	LF4-MW3	Total/NA	Water	3010A	
680-195939-4	LF4-MW4	Total/NA	Water	3010A	
680-195939-5	LF4-MW5	Total/NA	Water	3010A	
680-195939-6	DUP370	Total/NA	Water	3010A	
MB 680-658853/1-A	Method Blank	Total/NA	Water	3010A	
LCS 680-658853/2-A	Lab Control Sample	Total/NA	Water	3010A	
680-195939-3 MS	LF4-MW3	Total/NA	Water	3010A	
680-195939-3 MSD	LF4-MW3	Total/NA	Water	3010A	

Analysis Batch: 658995

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195939-1	LF4-MW1	Total/NA	Water	6020B	658853
680-195939-2	LF4-MW2	Total/NA	Water	6020B	658853
680-195939-3	LF4-MW3	Total/NA	Water	6020B	658853
680-195939-4	LF4-MW4	Total/NA	Water	6020B	658853
680-195939-5	LF4-MW5	Total/NA	Water	6020B	658853
680-195939-6	DUP370	Total/NA	Water	6020B	658853
MB 680-658853/1-A	Method Blank	Total/NA	Water	6020B	658853
LCS 680-658853/2-A	Lab Control Sample	Total/NA	Water	6020B	658853
680-195939-3 MS	LF4-MW3	Total/NA	Water	6020B	658853
680-195939-3 MSD	LF4-MW3	Total/NA	Water	6020B	658853

Prep Batch: 659302

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195939-1	LF4-MW1	Total/NA	Water	7470A	
680-195939-2	LF4-MW2	Total/NA	Water	7470A	
680-195939-3	LF4-MW3	Total/NA	Water	7470A	
680-195939-4	LF4-MW4	Total/NA	Water	7470A	
680-195939-5	LF4-MW5	Total/NA	Water	7470A	
680-195939-6	DUP370	Total/NA	Water	7470A	
MB 680-659302/1-A	Method Blank	Total/NA	Water	7470A	
LCS 680-659302/2-A	Lab Control Sample	Total/NA	Water	7470A	

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QC Association Summary

Client: Matrix Environmental Services, LLC
Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Metals (Continued)

Prep Batch: 659302 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195939-3 MS	LF4-MW3	Total/NA	Water	7470A	
680-195939-3 MSD	LF4-MW3	Total/NA	Water	7470A	

Analysis Batch: 659515

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-195939-1	LF4-MW1	Total/NA	Water	7470A	659302
680-195939-2	LF4-MW2	Total/NA	Water	7470A	659302
680-195939-3	LF4-MW3	Total/NA	Water	7470A	659302
680-195939-4	LF4-MW4	Total/NA	Water	7470A	659302
680-195939-5	LF4-MW5	Total/NA	Water	7470A	659302
680-195939-6	DUP370	Total/NA	Water	7470A	659302
MB 680-659302/1-A	Method Blank	Total/NA	Water	7470A	659302
LCS 680-659302/2-A	Lab Control Sample	Total/NA	Water	7470A	659302
680-195939-3 MS	LF4-MW3	Total/NA	Water	7470A	659302
680-195939-3 MSD	LF4-MW3	Total/NA	Water	7470A	659302

Lab Chronicle

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW1

Lab Sample ID: 680-195939-1

Date Collected: 03/04/21 09:05

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 17:11	EMA	TAL SAV
Instrument ID: CMSAA										
Total/NA	Prep	3010A			50 mL	250 mL	658853	03/10/21 10:28	BCB	TAL SAV
Total/NA	Analysis	6020B		1			658995	03/10/21 16:23	BWR	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7470A			50 mL	50 mL	659302	03/12/21 13:20	JKL	TAL SAV
Total/NA	Analysis	7470A		1			659515	03/13/21 17:17	BCB	TAL SAV
Instrument ID: LEEMAN2										

Client Sample ID: LF4-MW2

Lab Sample ID: 680-195939-2

Date Collected: 03/04/21 09:55

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 17:36	EMA	TAL SAV
Instrument ID: CMSAA										
Total/NA	Prep	3010A			50 mL	250 mL	658853	03/10/21 10:28	BCB	TAL SAV
Total/NA	Analysis	6020B		1			658995	03/10/21 16:25	BWR	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7470A			50 mL	50 mL	659302	03/12/21 13:20	JKL	TAL SAV
Total/NA	Analysis	7470A		1			659515	03/13/21 17:22	BCB	TAL SAV
Instrument ID: LEEMAN2										

Client Sample ID: LF4-MW3

Lab Sample ID: 680-195939-3

Date Collected: 03/04/21 10:40

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 18:53	EMA	TAL SAV
Instrument ID: CMSAA										
Total/NA	Prep	3010A			50 mL	250 mL	658853	03/10/21 10:28	BCB	TAL SAV
Total/NA	Analysis	6020B		1			658995	03/10/21 15:47	BWR	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7470A			50 mL	50 mL	659302	03/12/21 13:20	JKL	TAL SAV
Total/NA	Analysis	7470A		1			659515	03/13/21 17:26	BCB	TAL SAV
Instrument ID: LEEMAN2										

Client Sample ID: LF4-MW4

Lab Sample ID: 680-195939-4

Date Collected: 03/04/21 11:40

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 18:02	EMA	TAL SAV
Instrument ID: CMSAA										

Eurofins TestAmerica, Savannah

Lab Chronicle

Client: Matrix Environmental Services, LLC
 Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Client Sample ID: LF4-MW4

Lab Sample ID: 680-195939-4

Date Collected: 03/04/21 11:40

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			50 mL	250 mL	658853	03/10/21 10:28	BCB	TAL SAV
Total/NA	Analysis	6020B		1			658995	03/10/21 16:28	BWR	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7470A			50 mL	50 mL	659302	03/12/21 13:20	JKL	TAL SAV
Total/NA	Analysis	7470A		1			659515	03/13/21 17:40	BCB	TAL SAV
Instrument ID: LEEMAN2										

Client Sample ID: LF4-MW5

Lab Sample ID: 680-195939-5

Date Collected: 03/04/21 12:15

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 18:27	EMA	TAL SAV
Instrument ID: CMSAA										
Total/NA	Prep	3010A			50 mL	250 mL	658853	03/10/21 10:28	BCB	TAL SAV
Total/NA	Analysis	6020B		1			658995	03/10/21 16:31	BWR	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7470A			50 mL	50 mL	659302	03/12/21 13:20	JKL	TAL SAV
Total/NA	Analysis	7470A		1			659515	03/13/21 17:45	BCB	TAL SAV
Instrument ID: LEEMAN2										

Client Sample ID: DUP370

Lab Sample ID: 680-195939-6

Date Collected: 03/04/21 00:00

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 14:37	EMA	TAL SAV
Instrument ID: CMSAA										
Total/NA	Prep	3010A			50 mL	250 mL	658853	03/10/21 10:28	BCB	TAL SAV
Total/NA	Analysis	6020B		1			658995	03/10/21 16:33	BWR	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7470A			50 mL	50 mL	659302	03/12/21 13:20	JKL	TAL SAV
Total/NA	Analysis	7470A		1			659515	03/13/21 17:50	BCB	TAL SAV
Instrument ID: LEEMAN2										

Client Sample ID: TB575

Lab Sample ID: 680-195939-7

Date Collected: 03/04/21 13:30

Matrix: Water

Date Received: 03/08/21 11:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	659185	03/12/21 15:02	EMA	TAL SAV
Instrument ID: CMSAA										

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Eurofins TestAmerica, Savannah

Accreditation/Certification Summary

Client: Matrix Environmental Services, LLC
Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	03-29-21

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12

Method Summary

Client: Matrix Environmental Services, LLC
Project/Site: Parcel 81(5), Landfill 4

Job ID: 680-195939-1

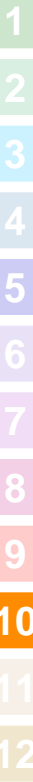
Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
6020B	Metals (ICP/MS)	SW846	TAL SAV
7470A	Mercury (CVAA)	SW846	TAL SAV
3010A	Preparation, Total Metals	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
7470A	Preparation, Mercury	SW846	TAL SAV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



MATRIX ENVIRONMENTAL SERVICES CHAIN OF CUSTODY RECORD

COC Number 6320
Cooler ID 1 of 1

Page 1 of 1

Laboratory TestAmerica
Lab Contact Jon Lawhon, Amy Ragnaldsen
MES Contact Betty Van Pelt
MES Phone 801-699-1246
Project Parcel 81(5), Landfill 4
Task # 20.094.21-07.1
Lab contract: 20.094.21-07.1 500

Date Collected	Sample Time	3 - 40 ml vials, HCl SW8260 - VOC	1 - 250 ml poly HNO3 (Total) 6020A/7470A Metals	2 - 40 ml vials, HCl SW8260 - VOC

SWMU	Station ID	QC Code	Station Code	Matrix	Sample Method
Parcel 81(5), Landfill 4	LF4-MW1	NS	MW	WQ	Grab
Parcel 81(5), Landfill 4	LF4-MW2	NS	MW	WQ	Grab
Parcel 81(5), Landfill 4	LF4-MW3	NS	MW	WQ	Grab
Parcel 81(5), Landfill 4	LF4-MW3	MS/MSD	MW	WQ	Grab
Parcel 81(5), Landfill 4	LF4-MW4	NS	MW	WQ	Grab
Parcel 81(5), Landfill 4	LF4-MW5	NS	MW	WQ	Grab
Parcel 81(5), Landfill 4	DUP370	FD	MW	WQ	Grab
Parcel 81(5), Landfill 4	TB575	TB	WQ	W	Grab

NOTES:

QC Code: NS = Investigative Sample, FD = Field Duplicate, MS/MSD = Matrix Spike/Matrix-Spike Duplicate, EB = Equipment Blank, TB = Trip Blank, WQ = Water Quality, WS = Source Water
Station Type = MW = Monitoring Well, BH = Bore Hole, SD = Sediment, SW = Surface Water, SS = Surface Soil, SU = Sump, WS = Waste Solid/Soil, WW = Waste Water
White Copy = Lab COC, Yellow COC = Field Copy, Pink COC = Data Mgmt

COMMENTS: See Task Order 19-094-20-07.1 500 for required list of VOCs and metals

Relinquished by (Signature): 

Date/Time: 3-4-21 1400

Received by (Signature): 

FedEx

Caranda 08-08-21 1100
3.1/3.30c



680-195939 Chain of Custody



Login Sample Receipt Checklist

Client: Matrix Environmental Services, LLC

Job Number: 680-195939-1

Login Number: 195939

List Source: Eurofins TestAmerica, Savannah

List Number: 1

Creator: Banda, Christy S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX D

Statistical Evaluation of Metals Data March 2021

**Attachment D1. Analyses and Percent Non-Detects
McClellan Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Well ID	Antimony			Arsenic			Barium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	36	36	100%	43	34	79%	44	5	11%
LF4-MW2	36	34	94%	43	25	58%	43	0	0%
LF4-MW3	36	36	100%	43	30	70%	43	2	5%
LF4-MW4	36	32	89%	43	26	60%	43	0	0%
LF4-MW5	36	36	100%	43	38	88%	43	9	21%

Well ID	Beryllium			Cadmium			Chromium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	35	19	54%	42	36	86%	42	42	100%
LF4-MW2	35	16	46%	42	30	71%	42	23	55%
LF4-MW3	35	21	60%	42	36	86%	42	28	67%
LF4-MW4	35	32	91%	42	33	79%	42	37	88%
LF4-MW5	35	27	77%	42	41	98%	42	34	81%

Well ID	Cobalt			Copper			Lead		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	35	0	0%	36	12	33%	43	14	33%
LF4-MW2	35	0	0%	36	10	28%	43	11	26%
LF4-MW3	35	13	37%	36	13	36%	43	16	37%
LF4-MW4	35	8	23%	36	22	61%	43	10	23%
LF4-MW5	35	5	14%	36	23	64%	43	19	44%

Well ID	Mercury			Nickel			Selenium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	43	43	100%	36	5	14%	43	43	100%
LF4-MW2	43	42	98%	36	3	8%	43	39	91%
LF4-MW3	43	43	100%	36	9	25%	43	42	98%
LF4-MW4	43	43	100%	36	13	36%	43	41	95%
LF4-MW5	43	43	100%	36	14	39%	43	43	100%

Well ID	Silver			Thallium			Vanadium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	35	36	103%	36	34	94%	36	32	89%
LF4-MW2	35	35	100%	36	34	94%	36	27	75%
LF4-MW3	35	35	100%	36	35	97%	36	29	81%
LF4-MW4	35	34	97%	36	33	92%	36	27	75%
LF4-MW5	35	35	100%	36	34	94%	36	29	81%

Well ID	Zinc		
	Sample #	# of NDs	%NDs
LF4-MW1	36	2	6%
LF4-MW2	36	2	6%
LF4-MW3	36	8	22%
LF4-MW4	36	12	33%
LF4-MW5	36	15	42%

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Barium					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-2.638	1.86	0.86	0.86
LF4-MW1	9/13/06	-3.180	0.37	-0.63	0.23
LF4-MW1	3/6/07	-3.219	0.26	-0.74	0.00
LF4-MW1	9/24/07	-3.439	-0.34	-1.34	0.00
LF4-MW1	3/26/08	-2.990	0.89	-0.11	0.00
LF4-MW1	9/16/08	-3.464	-0.41	-1.41	0.00
LF4-MW1	3/17/09	-3.551	-0.65	-1.65	0.00
LF4-MW1	9/17/09	-3.408	-0.26	-1.26	0.00
LF4-MW1	3/17/10	-3.427	-0.31	-1.31	0.00
LF4-MW1	9/21/10	-3.510	-0.54	-1.54	0.00
LF4-MW1	3/15/11	-3.197	0.32	-0.68	0.00
LF4-MW1	9/8/11	-3.242	0.20	-0.80	0.00
LF4-MW1	3/14/12	-3.053	0.72	-0.28	0.00
LF4-MW1	9/6/12	-3.066	0.68	-0.32	0.00
LF4-MW1	3/5/13	-3.043	0.75	-0.25	0.00
LF4-MW1	9/11/13	-3.321	-0.02	-1.02	0.00
LF4-MW1	3/5/14	-3.294	0.06	-0.94	0.00
LF4-MW1	9/4/14	-3.324	-0.03	-1.03	0.00
LF4-MW1	3/13/15	-3.135	0.49	-0.51	0.00
LF4-MW1	9/16/15	-3.163	0.42	-0.58	0.00
LF4-MW1	3/16/16	-3.154	0.44	-0.56	0.00
LF4-MW1	9/21/16	-3.202	0.31	-0.69	0.00
LF4-MW1	3/15/17	-3.090	0.62	-0.38	0.00
LF4-MW1	9/8/17	-3.124	0.52	-0.48	0.00
LF4-MW1	3/8/18	-3.110	0.56	-0.44	0.00
LF4-MW1	9/11/18	-3.058	0.71	-0.29	0.00
LF4-MW1	3/7/19	-3.058	0.71	-0.29	0.00
LF4-MW1	9/5/19	-3.124	0.53	-0.47	0.00
LF4-MW1	3/12/20	-3.079	0.65	-0.35	0.00
LF4-MW1	9/15/20	-3.079	0.65	-0.35	0.00
LF4-MW1	3/4/21	-3.016	0.82	-0.18	0.00
Background					
LF4-MW1	MEAN	-3.315			
LF4-MW1	STDEV	0.364			

Barium					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-3.673	-3.70	-4.70	0.00
LF4-MW2	9/13/06	-2.198	0.41	-0.59	0.00
LF4-MW2	3/6/07	-2.357	-0.03	-1.03	0.00
LF4-MW2	9/24/07	-2.501	-0.44	-1.44	0.00
LF4-MW2	3/26/08	-2.017	0.91	-0.09	0.00
LF4-MW2	9/16/08	-2.327	0.05	-0.95	0.00
LF4-MW2	3/17/09	-2.079	0.74	-0.26	0.00
LF4-MW2	9/17/09	-2.371	-0.07	-1.07	0.00
LF4-MW2	3/17/10	-2.410	-0.18	-1.18	0.00
LF4-MW2	9/21/10	-2.306	0.11	-0.89	0.00
LF4-MW2	3/15/11	-2.283	0.17	-0.83	0.00
LF4-MW2	9/8/11	-2.235	0.31	-0.69	0.00
LF4-MW2	3/14/12	-2.235	0.31	-0.69	0.00
LF4-MW2	9/6/12	-2.216	0.36	-0.64	0.00
LF4-MW2	3/5/13	-2.056	0.80	-0.20	0.00
LF4-MW2	9/11/13	-2.585	-0.67	-1.67	0.00
LF4-MW2	3/5/14	-2.765	-1.17	-2.17	0.00
LF4-MW2	9/4/14	-2.854	-1.42	-2.42	0.00
LF4-MW2	3/13/15	-2.609	-0.74	-1.74	0.00
LF4-MW2	9/16/15	-2.537	-0.54	-1.54	0.00
LF4-MW2	3/16/16	-2.834	-1.36	-2.36	0.00
LF4-MW2	9/21/16	-2.664	-0.89	-1.89	0.00
LF4-MW2	3/15/17	-2.711	-1.02	-2.02	0.00
LF4-MW2	9/8/17	-2.438	-0.26	-1.26	0.00
LF4-MW2	3/8/18	-2.564	-0.61	-1.61	0.00
LF4-MW2	9/11/18	-2.604	-0.72	-1.72	0.00
LF4-MW2	3/7/19	-2.830	-1.35	-2.35	0.00
LF4-MW2	9/5/19	-2.688	-0.96	-1.96	0.00
LF4-MW2	3/12/20	-2.765	-1.17	-2.17	0.00
LF4-MW2	9/15/20	-2.674	-0.92	-1.92	0.00
LF4-MW2	3/4/21	-2.781	-1.22	-2.22	0.00
Background					
LF4-MW2	MEAN	-2.344			
LF4-MW2	STDEV	0.359			

Barium					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW3	3/13/06	-2.865	0.37	-0.63	0.00
LF4-MW3	9/14/06	-2.727	0.74	-0.26	0.00
LF4-MW3	3/6/07	-3.030	-0.08	-1.08	0.00
LF4-MW3	9/25/07	-2.818	0.49	-0.51	0.00
LF4-MW3	3/26/08	-2.662	0.92	-0.08	0.00
LF4-MW3	9/16/08	-2.958	0.11	-0.89	0.00
LF4-MW3	3/17/09	-2.928	0.19	-0.81	0.00
LF4-MW3	9/17/09	-2.573	1.16	0.16	0.16
LF4-MW3	3/17/10	-2.839	0.44	-0.56	0.00
LF4-MW3	9/21/10	-3.239	-0.65	-1.65	0.00
LF4-MW3	3/15/11	-2.671	0.90	-0.10	0.00
LF4-MW3	9/8/11	-2.863	0.37	-0.63	0.00
LF4-MW3	3/14/12	-2.800	0.54	-0.46	0.00
LF4-MW3	9/6/12	-2.830	0.46	-0.54	0.00
LF4-MW3	3/5/13	-2.581	1.14	0.14	0.14
LF4-MW3	9/11/13	-2.953	0.13	-0.87	0.00
LF4-MW3	3/5/14	-2.906	0.26	-0.74	0.00
LF4-MW3	9/4/14	-2.700	0.82	-0.18	0.00
LF4-MW3	3/13/15	-2.471	1.44	0.44	0.44
LF4-MW3	9/16/15	-2.325	1.84	0.84	1.28
LF4-MW3	3/16/16	-2.870	0.35	-0.65	0.63
LF4-MW3	9/21/16	-2.444	1.51	0.51	1.14
LF4-MW3	3/15/17	-2.808	0.52	-0.48	0.66
LF4-MW3	9/8/17	-2.825	0.47	-0.53	0.14
LF4-MW3	3/8/18	-2.846	0.42	-0.58	0.00
LF4-MW3	9/11/18	-2.865	0.37	-0.63	0.00
LF4-MW3	3/7/19	-2.688	0.85	-0.15	0.00
LF4-MW3	9/5/19	-2.617	1.04	0.04	0.04
LF4-MW3	3/12/20	-2.465	1.46	0.46	0.50
LF4-MW3	9/15/20	-3.170	-0.46	-1.46	0.00
LF4-MW3	3/4/21	-2.489	1.39	0.39	0.89
Background					
LF4-MW3	MEAN	-3.000			
LF4-MW3	STDEV	0.367			

Barium					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW4	3/14/06	-1.931	-1.61	-2.61	0.00
LF4-MW4	9/14/06	-1.715	-0.52	-1.52	0.00
LF4-MW4	3/7/07	-2.129	-2.60	-3.60	0.00
LF4-MW4	9/25/07	-1.565	0.22	-0.78	0.00
LF4-MW4	3/26/08	-1.945	-1.68	-2.68	0.00
LF4-MW4	9/17/08	-1.645	-0.17	-1.17	0.00
LF4-MW4	3/17/09	-1.973	-1.82	-2.82	0.00
LF4-MW4	9/21/09	-2.163	-2.77	-3.77	0.00
LF4-MW4	3/17/10	-2.048	-2.19	-3.19	0.00
LF4-MW4	9/21/10	-1.732	-0.61	-1.61	0.00
LF4-MW4	3/15/11	-2.410	-4.01	-5.01	0.00
LF4-MW4	9/8/11	-1.778	-0.84	-1.84	0.00
LF4-MW4	3/14/12	-1.995	-1.93	-2.93	0.00
LF4-MW4	9/6/12	-2.163	-2.77	-3.77	0.00
LF4-MW4	3/5/13	-1.820	-1.05	-2.05	0.00
LF4-MW4	9/11/13	-1.604	0.03	-0.97	0.00
LF4-MW4	3/5/14	-1.749	-0.69	-1.69	0.00
LF4-MW4	9/4/14	-1.671	-0.31	-1.31	0.00
LF4-MW4	3/13/15	-2.189	-2.90	-3.90	0.00
LF4-MW4	9/16/15	-1.749	-0.69	-1.69	0.00
LF4-MW4	3/16/16	-1.682	-0.36	-1.36	0.00
LF4-MW4	9/21/16	-1.833	-1.12	-2.12	0.00
LF4-MW4	3/15/17	-2.064	-2.27	-3.27	0.00
LF4-MW4	9/8/17	-1.492	0.59	-0.41	0.00
LF4-MW4	3/8/18	-1.625	-0.07	-1.07	0.00
LF4-MW4	9/11/18	-1.833	-1.11	-2.11	0.00
LF4-MW4	3/7/19	-1.715	-0.52	-1.52	0.00
LF4-MW4	9/5/19	-1.833	-1.11	-2.11	0.00
LF4-MW4	3/12/20	-1.772	-0.81	-1.81	0.00
LF4-MW4	9/15/20	-2.303	-3.47	-4.47	0.00
LF4-MW4	3/4/21	-1.661	-0.25	-1.25	0.00
Background					
LF4-MW4	MEAN	-1.610			
LF4-MW4	STDEV	0.200			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Barium					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW5	3/14/06	-3.892	0.21	-0.79	0.00
LF4-MW5	9/14/06	-3.873	0.27	-0.73	0.00
LF4-MW5	3/7/07	-4.234	-0.73	-1.73	0.00
LF4-MW5	9/24/07	-3.887	0.23	-0.77	0.00
LF4-MW5	3/26/08	-4.406	-1.20	-2.20	0.00
LF4-MW5	9/16/08	-4.538	-1.56	-2.56	0.00
LF4-MW5	3/18/09	-4.335	-1.00	-2.00	0.00
LF4-MW5	9/17/09	-4.685	-1.97	-2.97	0.00
LF4-MW5	3/17/10	-4.298	-0.90	-1.90	0.00
LF4-MW5	9/21/10	-4.382	-1.13	-2.13	0.00
LF4-MW5	3/15/11	-3.544	1.17	0.17	0.17
LF4-MW5	9/8/11	-4.063	-0.26	-1.26	0.00
LF4-MW5	3/14/12	-4.382	-1.13	-2.13	0.00
LF4-MW5	9/6/12	-4.501	-1.46	-2.46	0.00
LF4-MW5	3/5/13	-4.423	-1.25	-2.25	0.00
LF4-MW5	9/11/13	-5.298	-3.65	-4.65	0.00
LF4-MW5	3/5/14	-4.457	-1.34	-2.34	0.00
LF4-MW5	9/4/14	-4.595	-1.72	-2.72	0.00
LF4-MW5	3/13/15	-4.305	-0.92	-1.92	0.00
LF4-MW5	9/16/15	-4.528	-1.54	-2.54	0.00
LF4-MW5	3/16/16	-4.123	-0.42	-1.42	0.00
LF4-MW5	9/21/16	-4.220	-0.69	-1.69	0.00
LF4-MW5	3/15/17	-4.213	-0.67	-1.67	0.00
LF4-MW5	9/8/17	-4.440	-1.29	-2.29	0.00
LF4-MW5	3/8/18	-4.051	-0.22	-1.22	0.00
LF4-MW5	9/11/18	-4.510	-1.48	-2.48	0.00
LF4-MW5	3/7/19	-3.772	0.54	-0.46	0.00
LF4-MW5	9/5/19	-4.343	-1.03	-2.03	0.00
LF4-MW5	3/12/20	-4.017	-0.13	-1.13	0.00
LF4-MW5	9/15/20	-4.135	-0.45	-1.45	0.00
LF4-MW5	3/4/21	-3.863	0.29	-0.71	0.00
Background					
LF4-MW5	MEAN	-3.970			
LF4-MW5	STDEV	0.364			

Beryllium					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-6.041	-0.58	-1.58	0.00
LF4-MW2	9/13/06	-5.298	0.56	-0.44	0.00
LF4-MW2	3/6/07	-5.298	0.56	-0.44	0.00
LF4-MW2	9/24/07	-5.298	0.56	-0.44	0.00
LF4-MW2	3/26/08	-5.298	0.56	-0.44	0.00
LF4-MW2	9/16/08	-5.298	0.56	-0.44	0.00
LF4-MW2	3/17/09	-6.849	-1.83	-2.83	0.00
LF4-MW2	9/17/09	-5.298	0.56	-0.44	0.00
LF4-MW2	3/17/10	-6.205	-0.84	-1.84	0.00
LF4-MW2	9/21/10	-5.298	0.56	-0.44	0.00
LF4-MW2	3/15/11	-5.298	0.56	-0.44	0.00
LF4-MW2	9/8/11	-5.298	0.56	-0.44	0.00
LF4-MW2	3/14/12	-5.298	0.56	-0.44	0.00
LF4-MW2	9/6/12	-5.298	0.56	-0.44	0.00
LF4-MW2	3/5/13	-5.298	0.56	-0.44	0.00
LF4-MW2	9/11/13	-5.298	0.56	-0.44	0.00
LF4-MW2	3/5/14	-7.131	-2.27	-3.27	0.00
LF4-MW2	9/4/14	-9.115	-5.33	-6.33	0.00
LF4-MW2	3/13/15	-7.252	-2.45	-3.45	0.00
LF4-MW2	9/16/15	-8.818	-4.87	-5.87	0.00
LF4-MW2	3/16/16	-7.972	-3.57	-4.57	0.00
LF4-MW2	9/21/16	-8.874	-4.96	-5.96	0.00
LF4-MW2	3/15/17	-9.036	-5.21	-6.21	0.00
LF4-MW2	9/8/17	-9.071	-5.26	-6.26	0.00
LF4-MW2	3/8/18	-7.520	-2.87	-3.87	0.00
LF4-MW2	9/11/18	-8.805	-4.85	-5.85	0.00
LF4-MW2	3/7/19	-6.645	-1.52	-2.52	0.00
LF4-MW2	9/5/19	-8.335	-4.13	-5.13	0.00
LF4-MW2	3/12/20	-7.131	-2.27	-3.27	0.00
LF4-MW2	9/15/20	-7.775	-3.26	-4.26	0.00
LF4-MW2	3/4/21	-8.294	-4.06	-5.06	0.00
Background					
LF4-MW1	MEAN	-5.663			
LF4-MW1	STDEV	0.648			

Cobalt					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-4.029	0.50	-0.50	0.00
LF4-MW1	9/13/06	-4.734	-0.87	-1.87	0.00
LF4-MW1	3/6/07	-4.784	-0.97	-1.97	0.00
LF4-MW1	9/24/07	-4.641	-0.69	-1.69	0.00
LF4-MW1	3/26/08	-3.554	1.42	0.42	0.42
LF4-MW1	9/16/08	-4.547	-0.51	-1.51	0.00
LF4-MW1	3/17/09	-3.917	0.72	-0.28	0.00
LF4-MW1	9/17/09	-4.220	0.13	-0.87	0.00
LF4-MW1	3/17/10	-4.374	-0.17	-1.17	0.00
LF4-MW1	9/21/10	-3.830	0.89	-0.11	0.00
LF4-MW1	3/15/11	-3.623	1.29	0.29	0.29
LF4-MW1	9/8/11	-3.445	1.63	0.63	0.92
LF4-MW1	3/14/12	-3.417	1.69	0.69	1.61
LF4-MW1	9/6/12	-3.302	1.91	0.91	2.52
LF4-MW1	3/5/13	-3.411	1.70	0.70	3.22
LF4-MW1	9/11/13	-3.812	0.92	-0.08	3.14
LF4-MW1	3/5/14	-3.634	1.27	0.27	3.41
LF4-MW1	9/4/14	-3.717	1.11	0.11	3.51
LF4-MW1	3/13/15	-3.393	1.73	0.73	4.25
LF4-MW1	9/16/15	-3.689	1.16	0.16	4.41
LF4-MW1	3/16/16	-3.231	2.05	1.05	5.46
LF4-MW1	9/21/16	-3.493	1.54	0.54	6.00
LF4-MW1	3/15/17	-3.390	1.74	0.74	6.74
LF4-MW1	9/8/17	-3.278	1.96	0.96	7.70
LF4-MW1	3/8/18	-3.579	1.37	0.37	8.07
LF4-MW1	9/11/18	-3.411	1.70	0.70	8.77
LF4-MW1	3/7/19	-3.270	1.97	0.97	9.74
LF4-MW1	9/5/19	-3.381	1.76	0.76	10.50
LF4-MW1	3/12/20	-3.352	1.81	0.81	11.31
LF4-MW1	9/15/20	-3.270	1.97	0.97	11.47
LF4-MW1	3/4/21	-3.352	1.81	0.81	12.13
Background					
LF4-MW1	MEAN	-4.286			
LF4-MW1	STDEV	0.515			

Cobalt					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-5.053	-1.17	-2.17	0.00
LF4-MW2	9/13/06	-4.200	0.12	-0.88	0.00
LF4-MW2	3/6/07	-4.227	0.08	-0.92	0.00
LF4-MW2	9/24/07	-4.366	-0.13	-1.13	0.00
LF4-MW2	3/26/08	-4.626	-0.53	-1.53	0.00
LF4-MW2	9/16/08	-3.942	0.50	-0.50	0.00
LF4-MW2	3/17/09	-2.339	2.92	1.92	1.92
LF4-MW2	9/17/09	-2.180	3.16	2.16	4.08
LF4-MW2	3/17/10	-2.442	2.77	1.77	5.85
LF4-MW2	9/21/10	-3.464	1.23	0.23	6.08
LF4-MW2	3/15/11	-3.751	0.79	-0.21	5.87
LF4-MW2	9/8/11	-3.705	0.86	-0.14	5.73
LF4-MW2	3/14/12	-3.917	0.54	-0.46	5.28
LF4-MW2	9/6/12	-3.979	0.45	-0.55	4.73
LF4-MW2	3/5/13	-1.952	3.51	2.51	7.23
LF4-MW2	9/11/13	-2.216	3.11	2.11	9.34
LF4-MW2	3/5/14	-1.743	3.82	2.82	12.16
LF4-MW2	9/4/14	-2.401	2.83	1.83	13.99
LF4-MW2	3/13/15	-1.973	3.47	2.47	16.46
LF4-MW2	9/16/15	-2.584	2.55	1.55	18.01
LF4-MW2	3/16/16	-2.377	2.86	1.86	19.88
LF4-MW2	9/21/16	-2.389	2.85	1.85	21.73
LF4-MW2	3/15/17	-2.888	2.09	1.09	22.82
LF4-MW2	9/8/17	-2.970	1.97	0.97	23.79
LF4-MW2	3/8/18	-2.079	3.31	2.31	26.10
LF4-MW2	9/11/18	-2.303	2.98	1.98	28.08
LF4-MW2	3/7/19	-1.833	3.68	2.68	30.77
LF4-MW2	9/5/19	-2.120	3.25	2.25	33.02
LF4-MW2	3/12/20	-2.303	2.98	1.98	34.99
LF4-MW2	9/15/20	-2.040	3.37	2.37	35.39
LF4-MW2	3/4/21	-2.733	2.33	1.33	36.32
Background					
LF4-MW2	MEAN	-4.277			
LF4-MW2	STDEV	0.663			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Cobalt					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW3	3/13/06	-4.605	-0.50	-1.50	0.00
LF4-MW3	9/14/06	-4.269	2.75	1.75	1.75
LF4-MW3	3/6/07	-4.605	-0.50	-1.50	0.25
LF4-MW3	9/25/07	-4.905	-3.40	-4.40	0.00
LF4-MW3	3/26/08	-4.605	-0.50	-1.50	0.00
LF4-MW3	9/16/08	-4.605	-0.50	-1.50	0.00
LF4-MW3	3/17/09	-4.605	-0.50	-1.50	0.00
LF4-MW3	9/17/09	-4.605	-0.50	-1.50	0.00
LF4-MW3	3/17/10	-4.605	-0.50	-1.50	0.00
LF4-MW3	9/21/10	-5.687	-10.95	-11.95	0.00
LF4-MW3	3/15/11	-5.836	-12.39	-13.39	0.00
LF4-MW3	9/8/11	-5.900	-13.01	-14.01	0.00
LF4-MW3	3/14/12	-4.605	-0.50	-1.50	0.00
LF4-MW3	9/6/12	-4.605	-0.50	-1.50	0.00
LF4-MW3	3/5/13	-4.605	-0.50	-1.50	0.00
LF4-MW3	9/11/13	-4.628	-0.72	-1.72	0.00
LF4-MW3	3/5/14	-6.342	-17.28	-18.28	0.00
LF4-MW3	9/4/14	-5.514	-9.28	-10.28	0.00
LF4-MW3	3/13/15	-6.432	-18.14	-19.14	0.00
LF4-MW3	9/16/15	-4.034	5.02	4.02	4.02
LF4-MW3	3/16/16	-6.509	-18.89	-19.89	0.00
LF4-MW3	9/21/16	-6.888	-22.55	-23.55	0.00
LF4-MW3	3/15/17	-6.502	-18.83	-19.83	0.00
LF4-MW3	9/8/17	-6.287	-16.75	-17.75	0.00
LF4-MW3	3/8/18	-6.586	-19.63	-20.63	0.00
LF4-MW3	9/11/18	-5.051	-4.81	-5.81	0.00
LF4-MW3	3/7/19	-6.645	-20.21	-21.21	0.00
LF4-MW3	9/5/19	-7.435	-27.84	-28.84	0.00
LF4-MW3	3/12/20	-6.502	-18.83	-19.83	0.00
LF4-MW3	9/15/20	-6.812	-21.82	-22.82	0.00
LF4-MW3	3/4/21	-6.032	-14.28	-15.28	0.00
Background					
LF4-MW3	MEAN	-4.553			
LF4-MW3	STDEV	0.104			

Cobalt					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW4	3/14/06	-4.605	0.50	-0.50	0.00
LF4-MW4	9/14/06	-4.605	0.50	-0.50	0.00
LF4-MW4	3/7/07	-4.605	0.50	-0.50	0.00
LF4-MW4	9/25/07	-5.440	-3.31	-4.31	0.00
LF4-MW4	3/26/08	-4.969	-1.16	-2.16	0.00
LF4-MW4	9/17/08	-5.444	-3.33	-4.33	0.00
LF4-MW4	3/17/09	-5.242	-2.40	-3.40	0.00
LF4-MW4	9/21/09	-4.605	0.50	-0.50	0.00
LF4-MW4	3/17/10	-5.941	-5.59	-6.59	0.00
LF4-MW4	9/21/10	-5.406	-3.15	-4.15	0.00
LF4-MW4	3/15/11	-5.802	-4.96	-5.96	0.00
LF4-MW4	9/8/11	-5.461	-3.40	-4.40	0.00
LF4-MW4	3/14/12	-5.542	-3.77	-4.77	0.00
LF4-MW4	9/6/12	-4.605	0.50	-0.50	0.00
LF4-MW4	3/5/13	-5.857	-5.21	-6.21	0.00
LF4-MW4	9/11/13	-5.064	-1.59	-2.59	0.00
LF4-MW4	3/5/14	-5.793	-4.92	-5.92	0.00
LF4-MW4	9/4/14	-5.711	-4.54	-5.54	0.00
LF4-MW4	3/13/15	-5.233	-2.36	-3.36	0.00
LF4-MW4	9/16/15	-5.410	-3.17	-4.17	0.00
LF4-MW4	3/16/16	-6.161	-6.60	-7.60	0.00
LF4-MW4	9/21/16	-5.468	-3.44	-4.44	0.00
LF4-MW4	3/15/17	-4.949	-1.07	-2.07	0.00
LF4-MW4	9/8/17	-4.787	-0.33	-1.33	0.00
LF4-MW4	3/8/18	-5.911	-5.45	-6.45	0.00
LF4-MW4	9/11/18	-5.449	-3.35	-4.35	0.00
LF4-MW4	3/7/19	-6.266	-7.07	-8.07	0.00
LF4-MW4	9/5/19	-5.521	-3.68	-4.68	0.00
LF4-MW4	3/12/20	-6.119	-6.40	-7.40	0.00
LF4-MW4	9/15/20	-5.684	-4.42	-5.42	0.00
LF4-MW4	3/4/21	-5.714	-4.56	-5.56	0.00
Background					
LF4-MW4	MEAN	-4.715			
LF4-MW4	STDEV	0.219			

Cobalt					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW5	3/14/06	-4.949	-2.04	-3.04	0.00
LF4-MW5	9/14/06	-5.048	-2.78	-3.78	0.00
LF4-MW5	3/7/07	-4.605	0.50	-0.50	0.00
LF4-MW5	9/24/07	-5.461	-5.83	-6.83	0.00
LF4-MW5	3/26/08	-5.956	-9.49	-10.49	0.00
LF4-MW5	9/16/08	-5.705	-7.63	-8.63	0.00
LF4-MW5	3/18/09	-5.840	-8.63	-9.63	0.00
LF4-MW5	9/17/09	-5.442	-5.69	-6.69	0.00
LF4-MW5	3/17/10	-5.077	-2.99	-3.99	0.00
LF4-MW5	9/21/10	-4.556	0.86	-0.14	0.00
LF4-MW5	3/15/11	-5.826	-8.53	-9.53	0.00
LF4-MW5	9/8/11	-4.925	-1.87	-2.87	0.00
LF4-MW5	3/14/12	-5.754	-7.99	-8.99	0.00
LF4-MW5	9/6/12	-6.058	-10.24	-11.24	0.00
LF4-MW5	3/5/13	-5.893	-9.02	-10.02	0.00
LF4-MW5	9/11/13	-4.605	0.50	-0.50	0.00
LF4-MW5	3/5/14	-5.516	-6.24	-7.24	0.00
LF4-MW5	9/4/14	-5.732	-7.83	-8.83	0.00
LF4-MW5	3/13/15	-5.760	-8.04	-9.04	0.00
LF4-MW5	9/16/15	-6.071	-10.33	-11.33	0.00
LF4-MW5	3/16/16	-5.431	-5.60	-6.60	0.00
LF4-MW5	9/21/16	-5.027	-2.62	-3.62	0.00
LF4-MW5	3/15/17	-5.926	-9.26	-10.26	0.00
LF4-MW5	9/8/17	-5.793	-8.28	-9.28	0.00
LF4-MW5	3/8/18	-5.499	-6.11	-7.11	0.00
LF4-MW5	9/11/18	-5.915	-9.18	-10.18	0.00
LF4-MW5	3/7/19	-5.499	-6.11	-7.11	0.00
LF4-MW5	9/5/19	-5.006	-2.46	-3.46	0.00
LF4-MW5	3/12/20	-5.627	-7.06	-8.06	0.00
LF4-MW5	9/15/20	-5.655	-7.26	-8.26	0.00
LF4-MW5	3/4/21	-5.426	-5.57	-6.57	0.00
Background					
LF4-MW5	MEAN	-4.673			
LF4-MW5	STDEV	0.135			

Copper					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-4.193	1.14	0.14	0.14
LF4-MW1	9/13/06	-4.595	0.43	-0.57	0.00
LF4-MW1	3/6/07	-4.637	0.35	-0.65	0.00
LF4-MW1	9/24/07	-5.003	-0.29	-1.29	0.00
LF4-MW1	3/26/08	-4.699	0.24	-0.76	0.00
LF4-MW1	9/16/08	-5.048	-0.37	-1.37	0.00
LF4-MW1	3/17/09	-5.373	-0.95	-1.95	0.00
LF4-MW1	9/17/09	-5.375	-0.95	-1.95	0.00
LF4-MW1	3/17/10	-5.352	-0.91	-1.91	0.00
LF4-MW1	9/21/10	-6.156	-2.33	-3.33	0.00
LF4-MW1	3/15/11	-4.029	1.43	0.43	0.43
LF4-MW1	9/8/11	-4.605	0.41	-0.59	0.00
LF4-MW1	3/14/12	-4.605	0.41	-0.59	0.00
LF4-MW1	9/6/12	-4.605	0.41	-0.59	0.00
LF4-MW1	3/5/13	-4.605	0.41	-0.59	0.00
LF4-MW1	9/11/13	-5.773	-1.66	-2.66	0.00
LF4-MW1	3/5/14	-5.900	-1.88	-2.88	0.00
LF4-MW1	9/4/14	-5.911	-1.90	-2.90	0.00
LF4-MW1	3/13/15	-6.536	-3.00	-4.00	0.00
LF4-MW1	9/16/15	-5.325	-0.86	-1.86	0.00
LF4-MW1	3/16/16	-6.331	-2.64	-3.64	0.00
LF4-MW1	9/21/16	-6.138	-2.30	-3.30	0.00
LF4-MW1	3/15/17	-6.638	-3.18	-4.18	0.00
LF4-MW1	9/8/17	-6.623	-3.16	-4.16	0.00
LF4-MW1	3/8/18	-6.106	-2.24	-3.24	0.00
LF4-MW1	9/11/18	-4.605	0.41	-0.59	0.00
LF4-MW1	3/7/19	-6.377	-2.72	-3.72	0.00
LF4-MW1	9/5/19	-6.075	-2.19	-3.19	0.00
LF4-MW1	3/12/20	-5.952	-1.97	-2.97	0.00
LF4-MW1	9/15/20	-5.991	-2.04	-3.04	0.00
LF4-MW1	3/4/21	-5.599	-1.35	-2.35	0.00
Background					
LF4-MW1	MEAN	-4.836			
LF4-MW1	STDEV	0.566			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Copper

Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-4.538	0.00	-1.00	0.00
LF4-MW2	9/13/06	-4.129	0.37	-0.63	0.00
LF4-MW2	3/6/07	-4.663	-0.11	-1.11	0.00
LF4-MW2	9/24/07	-5.956	-1.29	-2.29	0.00
LF4-MW2	3/26/08	-5.302	-0.69	-1.69	0.00
LF4-MW2	9/16/08	-5.473	-0.85	-1.85	0.00
LF4-MW2	3/17/09	-5.684	-1.04	-2.04	0.00
LF4-MW2	9/17/09	-5.644	-1.00	-2.00	0.00
LF4-MW2	3/17/10	-3.717	0.75	-0.25	0.00
LF4-MW2	9/21/10	-6.215	-1.52	-2.52	0.00
LF4-MW2	3/15/11	-4.605	-0.06	-1.06	0.00
LF4-MW2	9/8/11	-4.605	-0.06	-1.06	0.00
LF4-MW2	3/14/12	-4.605	-0.06	-1.06	0.00
LF4-MW2	9/6/12	-5.341	-0.73	-1.73	0.00
LF4-MW2	3/5/13	-4.440	0.09	-0.91	0.00
LF4-MW2	9/11/13	-4.605	-0.06	-1.06	0.00
LF4-MW2	3/5/14	-3.751	0.72	-0.28	0.00
LF4-MW2	9/4/14	-6.287	-1.59	-2.59	0.00
LF4-MW2	3/13/15	-4.193	0.31	-0.69	0.00
LF4-MW2	9/16/15	-6.024	-1.35	-2.35	0.00
LF4-MW2	3/16/16	-4.566	-0.02	-1.02	0.00
LF4-MW2	9/21/16	-5.976	-1.31	-2.31	0.00
LF4-MW2	3/15/17	-6.071	-1.39	-2.39	0.00
LF4-MW2	9/8/17	-6.161	-1.47	-2.47	0.00
LF4-MW2	3/8/18	-4.519	0.02	-0.98	0.00
LF4-MW2	9/11/18	-6.075	-1.40	-2.40	0.00
LF4-MW2	3/7/19	-3.612	0.84	-0.16	0.00
LF4-MW2	9/5/19	-5.426	-0.81	-1.81	0.00
LF4-MW2	3/12/20	-3.963	0.52	-0.48	0.00
LF4-MW2	9/15/20	-5.279	-0.67	-1.67	0.00
LF4-MW2	3/4/21	-4.976	-0.40	-1.40	0.00
Background					
LF4-MW2	MEAN	-4.539			
LF4-MW2	STDEV	1.100			

Copper

Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW3	3/13/06	-5.039	0.53	-0.47	0.00
LF4-MW3	9/14/06	-4.959	0.60	-0.40	0.00
LF4-MW3	3/6/07	-6.215	-0.49	-1.49	0.00
LF4-MW3	9/25/07	-6.215	-0.49	-1.49	0.00
LF4-MW3	3/26/08	-6.008	-0.31	-1.31	0.00
LF4-MW3	9/16/08	-5.594	0.05	-0.95	0.00
LF4-MW3	3/17/09	-6.119	-0.41	-1.41	0.00
LF4-MW3	9/17/09	-6.215	-0.49	-1.49	0.00
LF4-MW3	3/17/10	-6.200	-0.48	-1.48	0.00
LF4-MW3	9/21/10	-6.215	-0.49	-1.49	0.00
LF4-MW3	3/15/11	-5.104	0.47	-0.53	0.00
LF4-MW3	9/8/11	-4.605	0.91	-0.09	0.00
LF4-MW3	3/14/12	-5.735	-0.08	-1.08	0.00
LF4-MW3	9/6/12	-5.793	-0.13	-1.13	0.00
LF4-MW3	3/5/13	-5.666	-0.02	-1.02	0.00
LF4-MW3	9/11/13	-4.605	0.91	-0.09	0.00
LF4-MW3	3/5/14	-6.354	-0.62	-1.62	0.00
LF4-MW3	9/4/14	-6.395	-0.65	-1.65	0.00
LF4-MW3	3/13/15	-6.250	-0.53	-1.53	0.00
LF4-MW3	9/16/15	-6.812	-1.01	-2.01	0.00
LF4-MW3	3/16/16	-6.261	-0.53	-1.53	0.00
LF4-MW3	9/21/16	-6.092	-0.39	-1.39	0.00
LF4-MW3	3/15/17	-6.645	-0.87	-1.87	0.00
LF4-MW3	9/8/17	-5.696	-0.04	-1.04	0.00
LF4-MW3	3/8/18	-6.450	-0.70	-1.70	0.00
LF4-MW3	9/11/18	-4.605	0.91	-0.09	0.00
LF4-MW3	3/7/19	-5.991	-0.30	-1.30	0.00
LF4-MW3	9/5/19	-5.991	-0.30	-1.30	0.00
LF4-MW3	3/12/20	-5.497	0.13	-0.87	0.00
LF4-MW3	9/15/20	-6.377	-0.64	-1.64	0.00
LF4-MW3	3/4/21	-6.032	-0.34	-1.34	0.00
Background					
LF4-MW3	MEAN	-5.647			
LF4-MW3	STDEV	1.150			

Lead

Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-5.298	0.21	-0.79	0.00
LF4-MW1	9/13/06	-5.857	-0.33	-1.33	0.00
LF4-MW1	3/6/07	-5.345	0.17	-0.83	0.00
LF4-MW1	9/24/07	-5.661	-0.14	-1.14	0.00
LF4-MW1	3/26/08	-4.935	0.56	-0.44	0.00
LF4-MW1	9/16/08	-5.298	0.21	-0.79	0.00
LF4-MW1	3/17/09	-5.298	0.21	-0.79	0.00
LF4-MW1	9/17/09	-5.684	-0.16	-1.16	0.00
LF4-MW1	3/17/10	-5.238	0.27	-0.73	0.00
LF4-MW1	9/21/10	-5.809	-0.28	-1.28	0.00
LF4-MW1	3/15/11	-5.298	0.21	-0.79	0.00
LF4-MW1	9/8/11	-5.754	-0.23	-1.23	0.00
LF4-MW1	3/14/12	-5.751	-0.22	-1.22	0.00
LF4-MW1	9/6/12	-5.298	0.21	-0.79	0.00
LF4-MW1	3/5/13	-5.726	-0.20	-1.20	0.00
LF4-MW1	9/11/13	-4.912	0.59	-0.41	0.00
LF4-MW1	3/5/14	-8.408	-2.80	-3.80	0.00
LF4-MW1	9/4/14	-7.881	-2.29	-3.29	0.00
LF4-MW1	3/13/15	-8.174	-2.57	-3.57	0.00
LF4-MW1	9/16/15	-5.581	-0.06	-1.06	0.00
LF4-MW1	3/16/16	-7.891	-2.30	-3.30	0.00
LF4-MW1	9/21/16	-7.233	-1.66	-2.66	0.00
LF4-MW1	3/15/17	-7.659	-2.07	-3.07	0.00
LF4-MW1	9/8/17	-7.907	-2.31	-3.31	0.00
LF4-MW1	3/8/18	-6.395	-0.85	-1.85	0.00
LF4-MW1	9/11/18	-5.298	0.21	-0.79	0.00
LF4-MW1	3/7/19	-6.377	-0.83	-1.83	0.00
LF4-MW1	9/5/19	-6.502	-0.95	-1.95	0.00
LF4-MW1	3/12/20	-6.438	-0.89	-1.89	0.00
LF4-MW1	9/15/20	-6.348	-0.80	-1.80	0.00
LF4-MW1	3/4/21	-5.952	-0.42	-1.42	0.00
Background					
LF4-MW1	MEAN	-5.518			
LF4-MW1	STDEV	1.034			

Lead

Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-4.595	0.39	-0.61	0.00
LF4-MW2	9/13/06	-4.415	0.54	-0.46	0.00
LF4-MW2	3/6/07	-4.855	0.16	-0.84	0.00
LF4-MW2	9/24/07	-5.415	-0.32	-1.32	0.00
LF4-MW2	3/26/08	-4.928	0.10	-0.90	0.00
LF4-MW2	9/16/08	-5.296	-0.22	-1.22	0.00
LF4-MW2	3/17/09	-5.298	-0.22	-1.22	0.00
LF4-MW2	9/17/09	-5.298	-0.22	-1.22	0.00
LF4-MW2	3/17/10	-4.678	0.32	-0.68	0.00
LF4-MW2	9/21/10	-5.809	-0.66	-1.66	0.00
LF4-MW2	3/15/11	-5.298	-0.22	-1.22	0.00
LF4-MW2	9/8/11	-5.298	-0.22	-1.22	0.00
LF4-MW2	3/14/12	-5.298	-0.22	-1.22	0.00
LF4-MW2	9/6/12	-5.298	-0.22	-1.22	0.00
LF4-MW2	3/5/13	-5.589	-0.47	-1.47	0.00
LF4-MW2	9/11/13	-5.447	-0.35	-1.35	0.00
LF4-MW2	3/5/14	-6.119	-0.93	-1.93	0.00
LF4-MW2	9/4/14	-6.921	-1.62	-2.62	0.00
LF4-MW2	3/13/15	-6.175	-0.98	-1.98	0.00
LF4-MW2	9/16/15	-6.266	-1.05	-2.05	0.00
LF4-MW2	3/16/16	-5.482	-0.38	-1.38	0.00
LF4-MW2	9/21/16	-6.320	-1.10	-2.10	0.00
LF4-MW2	3/15/17	-6.101	-0.91	-1.91	0.00
LF4-MW2	9/8/17	-6.250	-1.04	-2.04	0.00
LF4-MW2	3/8/18	-5.544	-0.43	-1.43	0.00
LF4-MW2	9/11/18	-5.298	-0.22	-1.22	0.00
LF4-MW2	3/7/19	-5.360	-0.27	-1.27	0.00
LF4-MW2	9/5/19	-6.119	-0.93	-1.93	0.00
LF4-MW2	3/12/20	-4.135	0.78	-0.22	0.00
LF4-MW2	9/15/20	-5.083	-0.03	-1.03	0.00
LF4-MW2	3/4/21	-4.906	0.12	-0.88	0.00
Background					
LF4-MW2	MEAN	-5.045			
LF4-MW2	STDEV	1.159			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Lead					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW3	3/13/06	-5.216	0.40	-0.60	0.00
LF4-MW3	9/14/06	-5.806	-0.32	-1.32	0.00
LF4-MW3	3/6/07	-6.041	-0.61	-1.61	0.00
LF4-MW3	9/25/07	-5.298	0.30	-0.70	0.00
LF4-MW3	3/26/08	-5.341	0.25	-0.75	0.00
LF4-MW3	9/16/08	-5.298	0.30	-0.70	0.00
LF4-MW3	3/17/09	-5.298	0.30	-0.70	0.00
LF4-MW3	9/17/09	-3.537	2.46	1.46	1.46
LF4-MW3	3/17/10	-5.298	0.30	-0.70	0.76
LF4-MW3	9/21/10	-5.298	0.30	-0.70	0.06
LF4-MW3	3/15/11	-5.298	0.30	-0.70	0.00
LF4-MW3	9/8/11	-5.298	0.30	-0.70	0.00
LF4-MW3	3/14/12	-5.298	0.30	-0.70	0.00
LF4-MW3	9/6/12	-5.298	0.30	-0.70	0.00
LF4-MW3	3/5/13	-5.404	0.17	-0.83	0.00
LF4-MW3	9/11/13	-5.767	-0.28	-1.28	0.00
LF4-MW3	3/5/14	-6.210	-0.82	-1.82	0.00
LF4-MW3	9/4/14	-6.210	-0.82	-1.82	0.00
LF4-MW3	3/13/15	-5.444	0.12	-0.88	0.00
LF4-MW3	9/16/15	-6.482	-1.15	-2.15	0.00
LF4-MW3	3/16/16	-6.028	-0.60	-1.60	0.00
LF4-MW3	9/21/16	-5.757	-0.26	-1.26	0.00
LF4-MW3	3/15/17	-5.793	-0.31	-1.31	0.00
LF4-MW3	9/8/17	-6.975	-1.76	-2.76	0.00
LF4-MW3	3/8/18	-5.840	-0.36	-1.36	0.00
LF4-MW3	9/11/18	-5.298	0.30	-0.70	0.00
LF4-MW3	3/7/19	-5.497	0.06	-0.94	0.00
LF4-MW3	9/5/19	-6.502	-1.18	-2.18	0.00
LF4-MW3	3/12/20	-4.722	1.01	0.01	0.01
LF4-MW3	9/15/20	-6.215	-0.83	-1.83	0.00
LF4-MW3	3/4/21	-5.150	0.48	-0.52	0.00
Background					
LF4-MW3	MEAN	-5.542			
LF4-MW3	STDEV	0.816			

Lead					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW4	3/14/06	-4.457	1.08	0.08	0.08
LF4-MW4	9/14/06	-3.558	2.12	1.12	1.21
LF4-MW4	3/7/07	-5.298	0.11	-0.89	0.31
LF4-MW4	9/25/07	-5.298	0.11	-0.89	0.00
LF4-MW4	3/26/08	-5.298	0.11	-0.89	0.00
LF4-MW4	9/17/08	-5.181	0.24	-0.76	0.00
LF4-MW4	3/17/09	-5.310	0.09	-0.91	0.00
LF4-MW4	9/21/09	-5.298	0.11	-0.89	0.00
LF4-MW4	3/17/10	-5.708	-0.37	-1.37	0.00
LF4-MW4	9/21/10	-5.632	-0.28	-1.28	0.00
LF4-MW4	3/15/11	-5.638	-0.28	-1.28	0.00
LF4-MW4	9/8/11	-5.602	-0.24	-1.24	0.00
LF4-MW4	3/14/12	-5.298	0.11	-0.89	0.00
LF4-MW4	9/6/12	-5.298	0.11	-0.89	0.00
LF4-MW4	3/5/13	-5.298	0.11	-0.89	0.00
LF4-MW4	9/11/13	-5.339	0.06	-0.94	0.00
LF4-MW4	3/5/14	-6.898	-1.74	-2.74	0.00
LF4-MW4	9/4/14	-5.499	-0.12	-1.12	0.00
LF4-MW4	3/13/15	-7.417	-2.34	-3.34	0.00
LF4-MW4	9/16/15	-4.519	1.01	0.01	0.01
LF4-MW4	3/16/16	-7.807	-2.80	-3.80	0.00
LF4-MW4	9/21/16	-5.745	-0.41	-1.41	0.00
LF4-MW4	3/15/17	-7.249	-2.15	-3.15	0.00
LF4-MW4	9/8/17	-4.731	0.77	-0.23	0.00
LF4-MW4	3/8/18	-7.511	-2.45	-3.45	0.00
LF4-MW4	9/11/18	-4.934	0.53	-0.47	0.00
LF4-MW4	3/7/19	-6.725	-1.54	-2.54	0.00
LF4-MW4	9/5/19	-5.259	0.15	-0.85	0.00
LF4-MW4	3/12/20	-5.714	-0.37	-1.37	0.00
LF4-MW4	9/15/20	-5.259	0.15	-0.85	0.00
LF4-MW4	9/15/20	-6.812	-1.64	-2.64	0.00
Background					
LF4-MW4	MEAN	-5.392			
LF4-MW4	STDEV	0.864			

Lead					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW5	3/14/06	-5.401	0.29	-0.71	0.00
LF4-MW5	9/14/06	-4.538	1.36	0.36	0.36
LF4-MW5	3/7/07	-5.745	-0.13	-1.13	0.00
LF4-MW5	9/24/07	-5.298	0.42	-0.58	0.00
LF4-MW5	3/26/08	-5.298	0.42	-0.58	0.00
LF4-MW5	9/16/08	-5.298	0.42	-0.58	0.00
LF4-MW5	3/18/09	-5.298	0.42	-0.58	0.00
LF4-MW5	9/17/09	-5.298	0.42	-0.58	0.00
LF4-MW5	3/17/10	-5.298	0.42	-0.58	0.00
LF4-MW5	9/16/10	-5.440	0.24	-0.76	0.00
LF4-MW5	3/15/11	-4.695	1.17	0.17	0.17
LF4-MW5	9/8/11	-5.298	0.42	-0.58	0.00
LF4-MW5	3/14/12	-5.298	0.42	-0.58	0.00
LF4-MW5	9/6/12	-5.298	0.42	-0.58	0.00
LF4-MW5	3/5/13	-5.298	0.42	-0.58	0.00
LF4-MW5	9/11/13	-5.298	0.42	-0.58	0.00
LF4-MW5	3/5/14	-6.966	-1.65	-2.65	0.00
LF4-MW5	9/4/14	-7.357	-2.13	-3.13	0.00
LF4-MW5	3/13/15	-6.988	-1.67	-2.67	0.00
LF4-MW5	9/16/15	-7.419	-2.21	-3.21	0.00
LF4-MW5	3/16/16	-6.084	-0.55	-1.55	0.00
LF4-MW5	9/21/16	-7.343	-2.11	-3.11	0.00
LF4-MW5	3/15/17	-6.693	-1.31	-2.31	0.00
LF4-MW5	9/8/17	-7.243	-1.99	-2.99	0.00
LF4-MW5	3/8/18	-5.751	-0.14	-1.14	0.00
LF4-MW5	9/11/18	-5.298	0.42	-0.58	0.00
LF4-MW5	3/7/19	-6.075	-0.54	-1.54	0.00
LF4-MW5	9/5/19	-6.685	-1.30	-2.30	0.00
LF4-MW5	3/12/20	-6.502	-1.07	-2.07	0.00
LF4-MW5	9/15/20	-5.809	-0.21	-1.21	0.00
LF4-MW5	3/4/21	-5.655	-0.02	-1.02	0.00
Background					
LF4-MW2	MEAN	-5.637			
LF4-MW2	STDEV	0.807			

Nickel					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-4.605	-0.59	-1.59	0.00
LF4-MW1	9/13/06	-4.351	0.46	-0.54	0.00
LF4-MW1	3/6/07	-4.605	-0.59	-1.59	0.00
LF4-MW1	9/24/07	-4.585	-0.51	-1.51	0.00
LF4-MW1	3/26/08	-4.117	1.42	0.42	0.42
LF4-MW1	9/16/08	-4.595	-0.55	-1.55	0.00
LF4-MW1	3/17/09	-4.398	0.26	-0.74	0.00
LF4-MW1	9/17/09	-4.510	-0.20	-1.20	0.00
LF4-MW1	3/17/10	-4.994	-2.19	-3.19	0.00
LF4-MW1	9/21/10	-4.283	0.74	-0.26	0.00
LF4-MW1	3/15/11	-3.958	2.07	1.07	1.07
LF4-MW1	9/8/11	-3.958	2.07	1.07	2.15
LF4-MW1	3/14/12	-3.887	2.36	1.36	3.51
LF4-MW1	9/6/12	-3.673	3.24	2.24	5.75
LF4-MW1	3/5/13	-3.768	2.85	1.85	7.61
LF4-MW1	9/11/13	-4.173	1.19	0.19	7.80
LF4-MW1	3/5/14	-4.034	1.76	0.76	8.56
LF4-MW1	9/4/14	-4.220	1.00	0.00	8.55
LF4-MW1	3/13/15	-3.942	2.14	1.14	9.69
LF4-MW1	9/16/15	-4.110	1.45	0.45	10.14
LF4-MW1	3/16/16	-3.812	2.67	1.67	11.81
LF4-MW1	9/21/16	-4.001	1.90	0.90	12.70
LF4-MW1	3/15/17	-3.826	2.62	1.62	14.32
LF4-MW1	9/8/17	-3.777	2.82	1.82	16.14
LF4-MW1	3/8/18	-4.001	1.90	0.90	17.04
LF4-MW1	9/11/18	-3.772	2.84	1.84	18.87
LF4-MW1	3/7/19	-3.772	2.84	1.84	20.71
LF4-MW1	9/5/19	-3.863	2.46	1.46	22.17
LF4-MW1	3/12/20	-3.817	2.65	1.65	23.83
LF4-MW1	9/15/20	-3.772	2.84	1.84	24.01
LF4-MW1	3/4/21	-3.772	2.84	1.84	25.66
Background					
LF4-MW1	MEAN	-4.462			
LF4-MW1	STDEV	0.243			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Nickel					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-4.605	-0.82	-1.82	0.00
LF4-MW2	9/13/06	-3.979	0.46	-0.54	0.00
LF4-MW2	3/6/07	-4.528	-0.66	-1.66	0.00
LF4-MW2	9/24/07	-4.528	-0.66	-1.66	0.00
LF4-MW2	3/26/08	-4.628	-0.86	-1.86	0.00
LF4-MW2	9/16/08	-4.213	-0.02	-1.02	0.00
LF4-MW2	3/17/09	-2.684	3.11	2.11	2.11
LF4-MW2	9/17/09	-2.658	3.16	2.16	4.27
LF4-MW2	3/17/10	-2.736	3.00	2.00	6.26
LF4-MW2	9/21/10	-3.887	0.65	-0.35	5.91
LF4-MW2	3/15/11	-4.227	-0.04	-1.04	4.87
LF4-MW2	9/8/11	-4.200	0.01	-0.99	3.88
LF4-MW2	3/14/12	-4.457	-0.51	-1.51	2.37
LF4-MW2	9/6/12	-4.173	0.07	-0.93	1.44
LF4-MW2	3/5/13	-2.484	3.51	2.51	3.95
LF4-MW2	9/11/13	-2.787	2.90	1.90	5.85
LF4-MW2	3/5/14	-2.313	3.86	2.86	8.71
LF4-MW2	9/4/14	-3.119	2.22	1.22	9.93
LF4-MW2	3/13/15	-2.585	3.31	2.31	12.24
LF4-MW2	9/16/15	-3.192	2.07	1.07	13.31
LF4-MW2	3/16/16	-2.922	2.62	1.62	14.93
LF4-MW2	9/21/16	-3.014	2.43	1.43	16.36
LF4-MW2	3/15/17	-3.594	1.25	0.25	16.61
LF4-MW2	9/8/17	-3.677	1.08	0.08	16.69
LF4-MW2	3/8/18	-2.736	3.00	2.00	18.69
LF4-MW2	9/11/18	-2.937	2.59	1.59	20.27
LF4-MW2	3/7/19	-2.343	3.80	2.80	23.08
LF4-MW2	9/5/19	-2.765	2.94	1.94	25.02
LF4-MW2	3/12/20	-2.830	2.81	1.81	26.83
LF4-MW2	9/15/20	-2.733	3.01	2.01	27.02
LF4-MW2	3/4/21	-3.411	1.62	0.62	27.45
Background					
LF4-MW2	MEAN	-4.206			
LF4-MW2	STDEV	0.490			

Nickel					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW3	3/13/06	-4.605	0.45	-0.55	0.00
LF4-MW3	9/14/06	-4.173	1.14	0.14	0.14
LF4-MW3	3/6/07	-4.605	0.45	-0.55	0.00
LF4-MW3	9/25/07	-4.989	-0.17	-1.17	0.00
LF4-MW3	3/26/08	-5.093	-0.34	-1.34	0.00
LF4-MW3	9/16/08	-5.537	-1.06	-2.06	0.00
LF4-MW3	3/17/09	-5.658	-1.25	-2.25	0.00
LF4-MW3	9/17/09	-4.981	-0.16	-1.16	0.00
LF4-MW3	3/17/10	-4.605	0.45	-0.55	0.00
LF4-MW3	9/21/10	-5.929	-1.69	-2.69	0.00
LF4-MW3	3/15/11	-5.555	-1.08	-2.08	0.00
LF4-MW3	9/8/11	-5.658	-1.25	-2.25	0.00
LF4-MW3	3/14/12	-5.675	-1.28	-2.28	0.00
LF4-MW3	9/6/12	-5.621	-1.19	-2.19	0.00
LF4-MW3	3/5/13	-5.431	-0.88	-1.88	0.00
LF4-MW3	9/11/13	-4.605	0.45	-0.55	0.00
LF4-MW3	3/5/14	-5.860	-1.58	-2.58	0.00
LF4-MW3	9/4/14	-5.684	-1.29	-2.29	0.00
LF4-MW3	3/13/15	-5.693	-1.31	-2.31	0.00
LF4-MW3	9/16/15	-5.116	-0.38	-1.38	0.00
LF4-MW3	3/16/16	-5.836	-1.54	-2.54	0.00
LF4-MW3	9/21/16	-5.539	-1.06	-2.06	0.00
LF4-MW3	3/15/17	-5.802	-1.48	-2.48	0.00
LF4-MW3	9/8/17	-5.675	-1.28	-2.28	0.00
LF4-MW3	3/8/18	-5.864	-1.58	-2.58	0.00
LF4-MW3	9/11/18	-5.360	-0.77	-1.77	0.00
LF4-MW3	3/7/19	-5.714	-1.34	-2.34	0.00
LF4-MW3	9/5/19	-5.655	-1.25	-2.25	0.00
LF4-MW3	3/12/20	-5.404	-0.84	-1.84	0.00
LF4-MW3	9/15/20	-5.915	-1.67	-2.67	0.00
LF4-MW3	3/4/21	-5.185	-0.49	-1.49	0.00
Background					
LF4-MW3	MEAN	-4.882			
LF4-MW3	STDEV	0.620			

Nickel					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW4	3/14/06	-4.605	0.45	-0.55	0.00
LF4-MW4	9/14/06	-4.605	0.45	-0.55	0.00
LF4-MW4	3/7/07	-5.267	-0.62	-1.62	0.00
LF4-MW4	9/25/07	-5.468	-0.94	-1.94	0.00
LF4-MW4	3/26/08	-5.300	-0.67	-1.67	0.00
LF4-MW4	9/17/08	-5.428	-0.88	-1.88	0.00
LF4-MW4	3/17/09	-5.428	-0.88	-1.88	0.00
LF4-MW4	9/21/09	-5.867	-1.59	-2.59	0.00
LF4-MW4	3/17/10	-5.384	-0.81	-1.81	0.00
LF4-MW4	9/21/10	-5.539	-1.06	-2.06	0.00
LF4-MW4	3/15/11	-4.605	0.45	-0.55	0.00
LF4-MW4	9/8/11	-5.594	-1.15	-2.15	0.00
LF4-MW4	3/14/12	-4.605	0.45	-0.55	0.00
LF4-MW4	9/6/12	-4.605	0.45	-0.55	0.00
LF4-MW4	3/5/13	-4.605	0.45	-0.55	0.00
LF4-MW4	9/11/13	-4.751	0.21	-0.79	0.00
LF4-MW4	3/5/14	-5.964	-1.74	-2.74	0.00
LF4-MW4	9/4/14	-5.591	-1.14	-2.14	0.00
LF4-MW4	3/13/15	-6.161	-2.06	-3.06	0.00
LF4-MW4	9/16/15	-5.438	-0.90	-1.90	0.00
LF4-MW4	3/16/16	-6.119	-2.00	-3.00	0.00
LF4-MW4	9/21/16	-5.757	-1.41	-2.41	0.00
LF4-MW4	3/15/17	-6.079	-1.93	-2.93	0.00
LF4-MW4	9/8/17	-5.619	-1.19	-2.19	0.00
LF4-MW4	3/8/18	-6.522	-2.65	-3.65	0.00
LF4-MW4	9/11/18	-5.339	-0.74	-1.74	0.00
LF4-MW4	3/7/19	-5.991	-1.79	-2.79	0.00
LF4-MW4	9/5/19	-5.684	-1.29	-2.29	0.00
LF4-MW4	3/12/20	-6.119	-1.99	-2.99	0.00
LF4-MW4	9/15/20	-5.952	-1.73	-2.73	0.00
LF4-MW4	3/4/21	-6.032	-1.85	-2.85	0.00
Background					
LF4-MW4	MEAN	-4.882			
LF4-MW4	STDEV	0.620			

Nickel					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW5	3/14/06	-4.605	0.45	-0.55	0.00
LF4-MW5	9/14/06	-4.605	0.45	-0.55	0.00
LF4-MW5	3/7/07	-4.605	0.45	-0.55	0.00
LF4-MW5	9/24/07	-5.741	-1.39	-2.39	0.00
LF4-MW5	3/26/08	-5.896	-1.64	-2.64	0.00
LF4-MW5	9/16/08	-5.960	-1.74	-2.74	0.00
LF4-MW5	3/18/09	-4.605	0.45	-0.55	0.00
LF4-MW5	9/17/09	-4.605	0.45	-0.55	0.00
LF4-MW5	3/17/10	-5.754	-1.41	-2.41	0.00
LF4-MW5	9/16/10	-5.526	-1.04	-2.04	0.00
LF4-MW5	3/15/11	-5.265	-0.62	-1.62	0.00
LF4-MW5	9/8/11	-5.764	-1.42	-2.42	0.00
LF4-MW5	3/14/12	-4.605	0.45	-0.55	0.00
LF4-MW5	9/6/12	-4.605	0.45	-0.55	0.00
LF4-MW5	3/5/13	-4.605	0.45	-0.55	0.00
LF4-MW5	9/11/13	-4.605	0.45	-0.55	0.00
LF4-MW5	3/5/14	-6.049	-1.88	-2.88	0.00
LF4-MW5	9/4/14	-6.432	-2.50	-3.50	0.00
LF4-MW5	3/13/15	-6.271	-2.24	-3.24	0.00
LF4-MW5	9/16/15	-6.529	-2.66	-3.66	0.00
LF4-MW5	3/16/16	-5.941	-1.71	-2.71	0.00
LF4-MW5	9/21/16	-5.714	-1.34	-2.34	0.00
LF4-MW5	3/15/17	-6.180	-2.09	-3.09	0.00
LF4-MW5	9/8/17	-6.529	-2.66	-3.66	0.00
LF4-MW5	3/8/18	-5.889	-1.62	-2.62	0.00
LF4-MW5	9/11/18	-5.547	-1.07	-2.07	0.00
LF4-MW5	3/7/19	-5.547	-1.07	-2.07	0.00
LF4-MW5	9/5/19	-5.776	-1.44	-2.44	0.00
LF4-MW5	3/12/20	-6.032	-1.85	-2.85	0.00
LF4-MW5	9/15/20	-5.952	-1.73	-2.73	0.00
LF4-MW5	3/4/21	-5.240	-0.58	-1.58	0.00
Background					
LF4-MW5	MEAN	-4.882			
LF4-MW5	STDEV	0.620			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

Zinc					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-2.488	1.28	0.28	0.28
LF4-MW1	9/13/06	-3.493	-0.35	-1.35	0.00
LF4-MW1	3/6/07	-3.231	0.08	-0.92	0.00
LF4-MW1	9/24/07	-2.996	0.46	-0.54	0.00
LF4-MW1	3/26/08	-3.177	0.16	-0.84	0.00
LF4-MW1	9/16/08	-3.734	-0.74	-1.74	0.00
LF4-MW1	3/17/09	-3.355	-0.12	-1.12	0.00
LF4-MW1	9/17/09	-3.464	-0.30	-1.30	0.00
LF4-MW1	3/17/10	-4.335	-1.71	-2.71	0.00
LF4-MW1	9/21/10	-3.189	0.14	-0.86	0.00
LF4-MW1	3/15/11	-2.720	0.91	-0.09	0.00
LF4-MW1	9/8/11	-2.955	0.53	-0.47	0.00
LF4-MW1	3/14/12	-2.941	0.55	-0.45	0.00
LF4-MW1	9/6/12	-2.884	0.64	-0.36	0.00
LF4-MW1	3/5/13	-2.766	0.83	-0.17	0.00
LF4-MW1	9/11/13	-3.242	0.06	-0.94	0.00
LF4-MW1	3/5/14	-3.140	0.23	-0.77	0.00
LF4-MW1	9/4/14	-3.237	0.07	-0.93	0.00
LF4-MW1	3/13/15	-2.822	0.74	-0.26	0.00
LF4-MW1	9/16/15	-3.206	0.12	-0.88	0.00
LF4-MW1	3/16/16	-2.805	0.77	-0.23	0.00
LF4-MW1	9/21/16	-3.058	0.36	-0.64	0.00
LF4-MW1	3/15/17	-2.886	0.64	-0.36	0.00
LF4-MW1	9/8/17	-2.799	0.78	-0.22	0.00
LF4-MW1	3/8/18	-2.990	0.47	-0.53	0.00
LF4-MW1	9/11/18	-2.617	1.07	0.07	0.07
LF4-MW1	3/7/19	-2.847	0.70	-0.30	0.00
LF4-MW1	9/5/19	-1.897	2.24	1.24	1.24
LF4-MW1	3/12/20	-2.865	0.67	-0.33	0.91
LF4-MW1	9/15/20	-2.501	1.26	0.26	1.50
LF4-MW1	3/4/21	-2.453	1.34	0.34	1.25
Background					
LF4-MW1	MEAN	-3.278			
LF4-MW1	STDEV	0.616			

Zinc					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-2.915	-0.16	-1.16	0.00
LF4-MW2	9/13/06	-2.343	1.59	0.59	0.59
LF4-MW2	3/6/07	-3.338	-1.46	-2.46	0.00
LF4-MW2	9/24/07	-2.996	-0.41	-1.41	0.00
LF4-MW2	3/26/08	-4.069	-3.70	-4.70	0.00
LF4-MW2	9/16/08	-3.487	-1.91	-2.91	0.00
LF4-MW2	3/17/09	-0.691	6.66	5.66	5.66
LF4-MW2	9/17/09	-0.498	7.26	6.26	11.92
LF4-MW2	3/17/10	-0.120	8.41	7.41	19.33
LF4-MW2	9/21/10	-2.254	1.87	0.87	20.20
LF4-MW2	3/15/11	-2.655	0.64	-0.36	19.84
LF4-MW2	9/8/11	-2.608	0.78	-0.22	19.62
LF4-MW2	3/14/12	-2.902	-0.12	-1.12	18.50
LF4-MW2	9/6/12	-2.774	0.27	-0.73	17.77
LF4-MW2	3/5/13	-0.311	7.83	6.83	24.60
LF4-MW2	9/11/13	-0.892	6.05	5.05	29.65
LF4-MW2	3/5/14	0.020	8.84	7.84	37.49
LF4-MW2	9/4/14	-1.168	5.20	4.20	41.69
LF4-MW2	3/13/15	-0.191	8.20	7.20	48.89
LF4-MW2	9/16/15	-1.269	4.89	3.89	52.78
LF4-MW2	3/16/16	-0.835	6.22	5.22	58.00
LF4-MW2	9/21/16	-0.944	5.89	4.89	62.88
LF4-MW2	3/15/17	-1.743	3.44	2.44	65.32
LF4-MW2	9/8/17	-1.715	3.52	2.52	67.84
LF4-MW2	3/8/18	-0.312	7.82	6.82	74.67
LF4-MW2	9/11/18	-0.942	5.89	4.89	79.56
LF4-MW2	3/7/19	0.182	9.34	8.34	87.90
LF4-MW2	9/5/19	-0.654	6.78	5.78	93.68
LF4-MW2	3/12/20	-0.616	6.89	5.89	99.57
LF4-MW2	9/15/20	-0.777	6.40	5.40	99.07
LF4-MW2	3/4/21	-1.561	3.99	2.99	102.56
Background					
LF4-MW2	MEAN	-2.863			
LF4-MW2	STDEV	0.326			

Zinc					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW3	3/13/06	-3.858	-0.21	-1.21	0.00
LF4-MW3	9/14/06	-3.685	-0.05	-1.05	0.00
LF4-MW3	3/6/07	-3.642	-0.01	-1.01	0.00
LF4-MW3	9/25/07	-4.160	-0.48	-1.48	0.00
LF4-MW3	3/26/08	-4.141	-0.47	-1.47	0.00
LF4-MW3	9/16/08	-4.820	-1.09	-2.09	0.00
LF4-MW3	3/17/09	-4.200	-0.52	-1.52	0.00
LF4-MW3	9/17/09	-3.627	0.00	-1.00	0.00
LF4-MW3	3/17/10	-4.892	-1.15	-2.15	0.00
LF4-MW3	9/21/10	-5.124	-1.36	-2.36	0.00
LF4-MW3	3/15/11	-3.882	-0.23	-1.23	0.00
LF4-MW3	9/8/11	-4.595	-0.88	-1.88	0.00
LF4-MW3	3/14/12	-4.220	-0.54	-1.54	0.00
LF4-MW3	9/6/12	-4.069	-0.40	-1.40	0.00
LF4-MW3	3/5/13	-4.098	-0.43	-1.43	0.00
LF4-MW3	9/11/13	-2.996	0.58	-0.42	0.00
LF4-MW3	3/5/14	-4.605	-0.89	-1.89	0.00
LF4-MW3	9/4/14	-4.605	-0.89	-1.89	0.00
LF4-MW3	3/13/15	-4.206	-0.53	-1.53	0.00
LF4-MW3	9/16/15	-4.605	-0.89	-1.89	0.00
LF4-MW3	3/16/16	-4.605	-0.89	-1.89	0.00
LF4-MW3	9/21/16	-4.492	-0.79	-1.79	0.00
LF4-MW3	3/15/17	-4.566	-0.85	-1.85	0.00
LF4-MW3	9/8/17	-4.017	-0.35	-1.35	0.00
LF4-MW3	3/8/18	-4.255	-0.57	-1.57	0.00
LF4-MW3	9/11/18	-4.200	-0.52	-1.52	0.00
LF4-MW3	3/7/19	-4.135	-0.46	-1.46	0.00
LF4-MW3	9/5/19	-3.194	0.40	-0.60	0.00
LF4-MW3	3/12/20	-3.963	-0.30	-1.30	0.00
LF4-MW3	9/15/20	-2.937	0.63	-0.37	0.00
LF4-MW3	3/4/21	-3.124	0.46	-0.54	0.00
Background					
LF4-MW3	MEAN	-3.629			
LF4-MW3	STDEV	1.096			

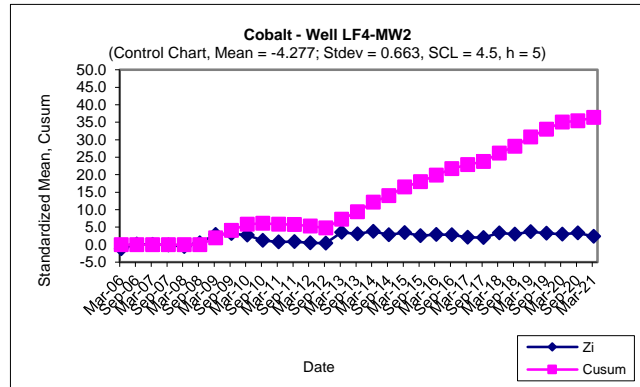
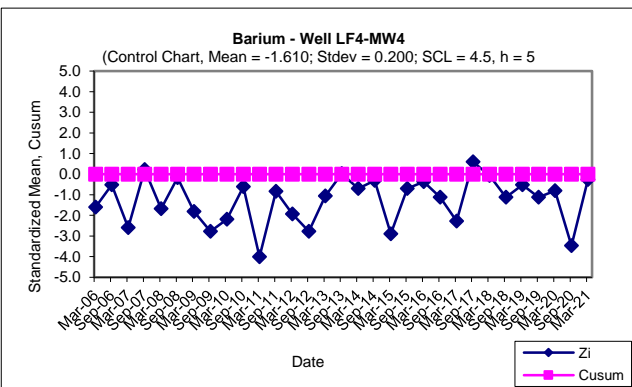
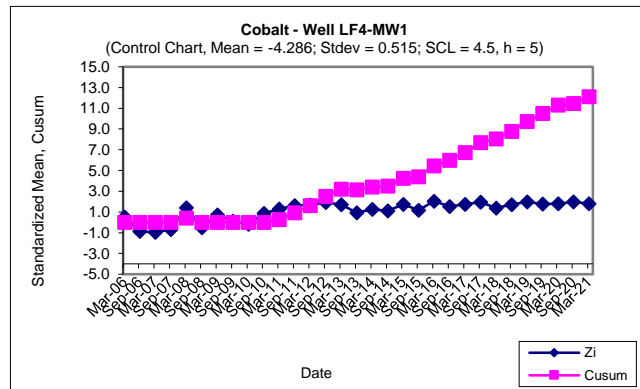
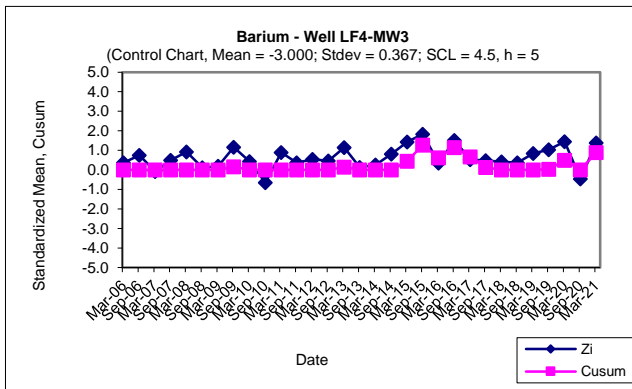
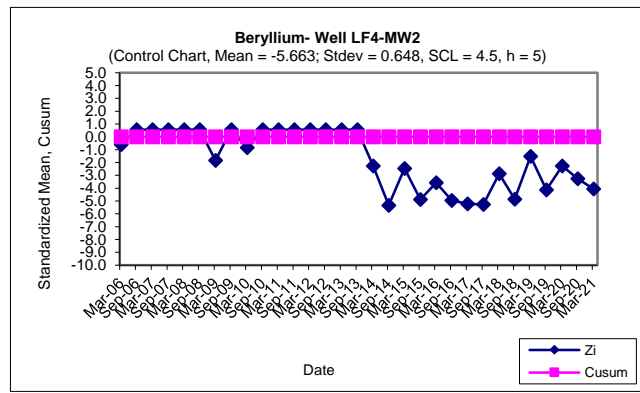
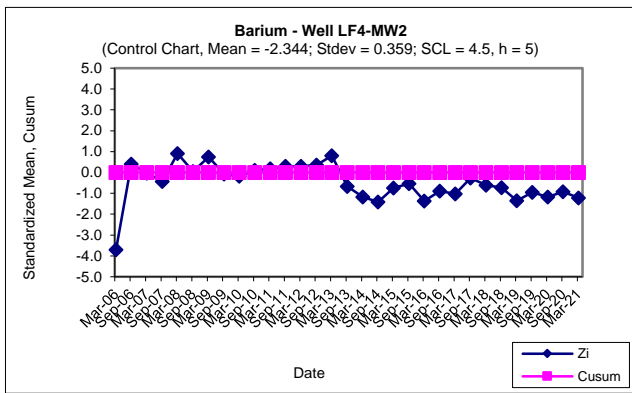
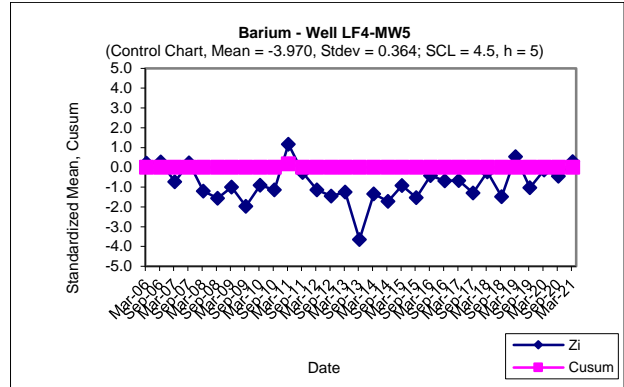
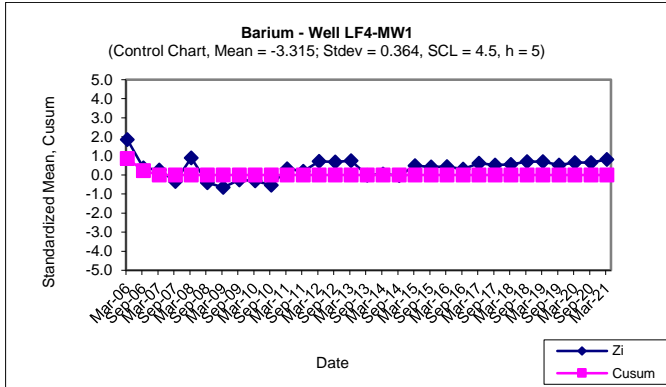
Zinc					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW4	3/14/06	-3.669	0.13	-0.87	0.00
LF4-MW4	9/14/06	-3.101	0.48	-0.52	0.00
LF4-MW4	3/7/07	-4.623	-1.17	-2.17	0.00
LF4-MW4	9/25/07	-4.269	-0.79	-1.79	0.00
LF4-MW4	3/26/08	-4.946	-1.52	-2.52	0.00
LF4-MW4	9/17/08	-4.029	-0.52	-1.52	0.00
LF4-MW4	3/17/09	-3.948	-0.44	-1.44	0.00
LF4-MW4	9/21/09	-4.941	-1.51	-2.51	0.00
LF4-MW4	3/17/10	-4.991	-1.57	-2.57	0.00
LF4-MW4	9/21/10	-4.351	-0.87	-1.87	0.00
LF4-MW4	3/15/11	-4.366	-0.89	-1.89	0.00
LF4-MW4	9/8/11	-4.585	-1.13	-2.13	0.00
LF4-MW4	3/14/12	-2.996	0.59	-0.41	0.00
LF4-MW4	9/6/12	-2.996	0.59	-0.41	0.00
LF4-MW4	3/5/13	-4.366	-0.89	-1.89	0.00
LF4-MW4	9/11/13	-4.440	-0.97	-1.97	0.00
LF4-MW4	3/5/14	-4.605	-1.15	-2.15	0.00
LF4-MW4	9/4/14	-4.605	-1.15	-2.15	0.00
LF4-MW4	3/13/15	-4.605	-1.15	-2.15	0.00
LF4-MW4	9/16/15	-4.057	-0.56	-1.56	0.00
LF4-MW4	3/16/16	-4.605	-1.15	-2.15	0.00
LF4-MW4	9/21/16	-4.069	-0.57	-1.57	0.00
LF4-MW4	3/15/17	-4.605	-1.15	-2.15	0.00
LF4-MW4	9/8/17	-3.423	0.13	-0.87	0.00
LF4-MW4	3/8/18	-4.605	-1.15	-2.15	0.00
LF4-MW4	9/11/18	-3.079	0.50	-0.50	0.00
LF4-MW4	3/7/19	-2.880	0.72	-0.28	0.00
LF4-MW4	9/5/19	-2.386	1.25	0.25	0.25
LF4-MW4	3/12/20	-4.422	-0.95	-1.95	0.00
LF4-MW4	9/15/20	-3.612	-0.07	-1.07	0.00
LF4-MW4	3/4/21	-4.605	-1.15	-2.15	0.00
Background					
LF4-MW4	MEAN	-3.761			
LF4-MW4	STDEV	0.723			

**Attachment D2. Calculations for CUSUM Control Charts
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama**

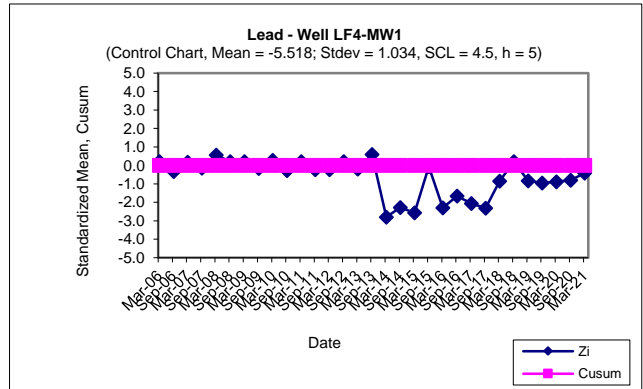
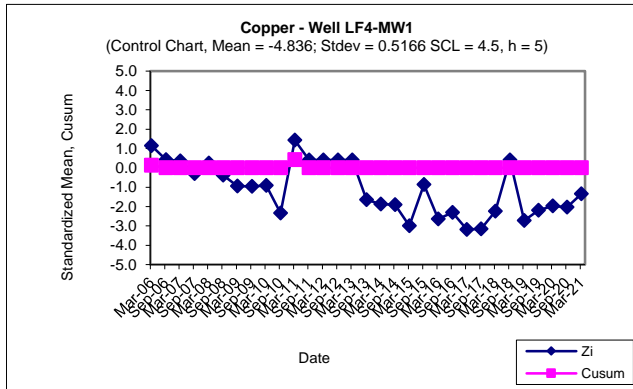
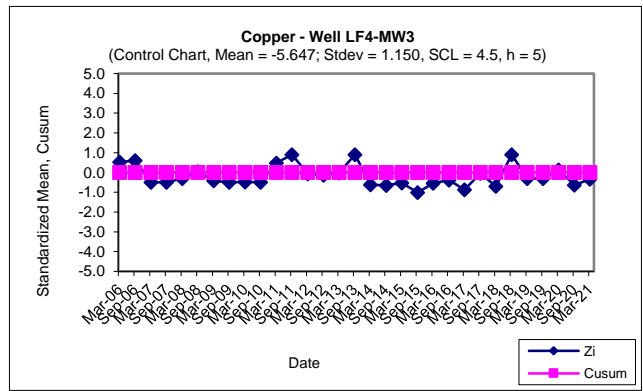
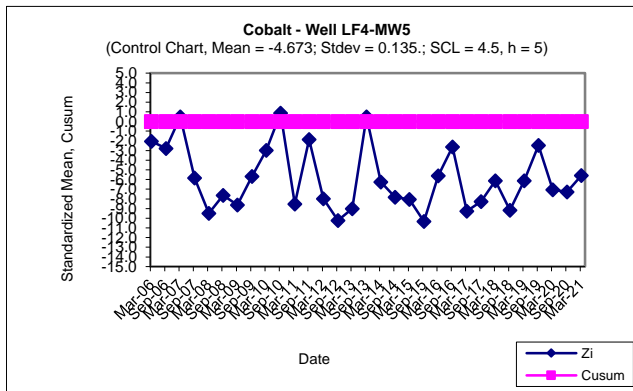
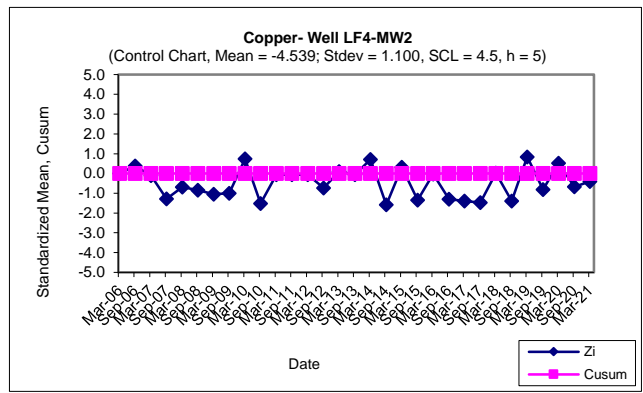
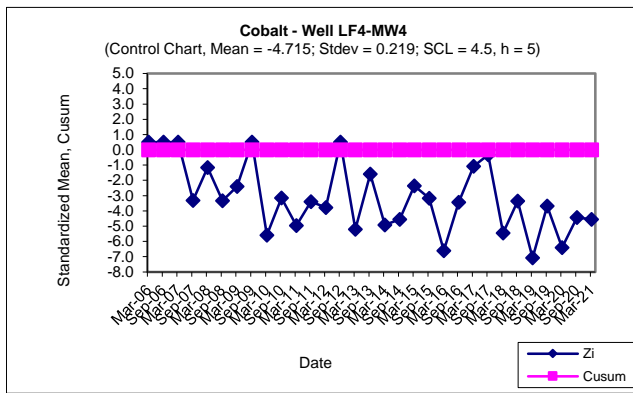
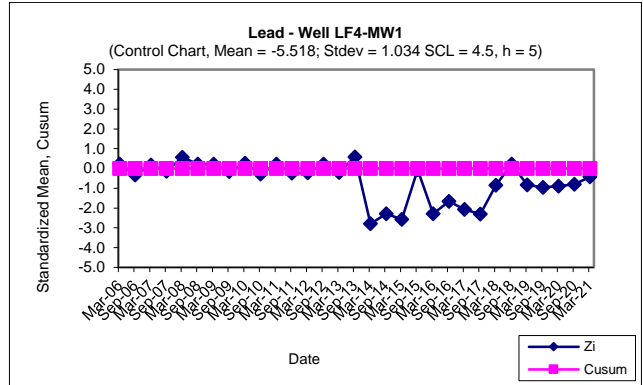
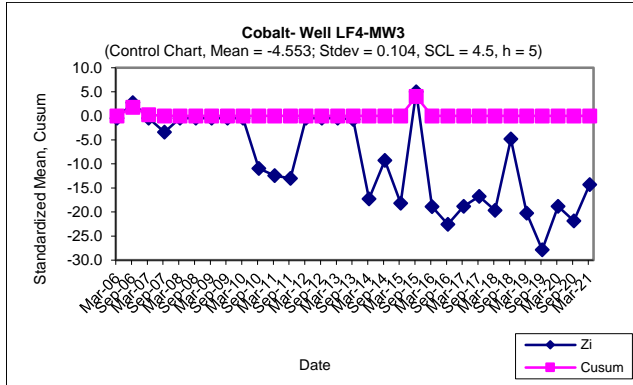
Zinc					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW5	3/14/06	-4.358	-0.88	-1.88	0.00
LF4-MW5	9/14/06	-3.868	-0.35	-1.35	0.00
LF4-MW5	3/7/07	-3.974	-0.47	-1.47	0.00
LF4-MW5	9/24/07	-2.996	0.59	-0.41	0.00
LF4-MW5	3/26/08	-5.028	-1.61	-2.61	0.00
LF4-MW5	9/16/08	-5.067	-1.65	-2.65	0.00
LF4-MW5	3/18/09	-4.753	-1.31	-2.31	0.00
LF4-MW5	9/17/09	-5.176	-1.77	-2.77	0.00
LF4-MW5	3/17/10	-2.996	0.59	-0.41	0.00
LF4-MW5	9/16/10	-4.683	-1.23	-2.23	0.00
LF4-MW5	3/15/11	-4.200	-0.71	-1.71	0.00
LF4-MW5	9/8/11	-2.996	0.59	-0.41	0.00
LF4-MW5	3/14/12	-4.465	-1.00	-2.00	0.00
LF4-MW5	9/6/12	-2.996	0.59	-0.41	0.00
LF4-MW5	3/5/13	-4.510	-1.05	-2.05	0.00
LF4-MW5	9/11/13	-2.996	0.59	-0.41	0.00
LF4-MW5	3/5/14	-4.605	-1.15	-2.15	0.00
LF4-MW5	9/4/14	-4.605	-1.15	-2.15	0.00
LF4-MW5	3/13/15	-4.605	-1.15	-2.15	0.00
LF4-MW5	9/16/15	-4.605	-1.15	-2.15	0.00
LF4-MW5	3/16/16	-4.457	-0.99	-1.99	0.00
LF4-MW5	9/21/16	-4.605	-1.15	-2.15	0.00
LF4-MW5	3/15/17	-4.605	-1.15	-2.15	0.00
LF4-MW5	9/8/17	-4.605	-1.15	-2.15	0.00
LF4-MW5	3/8/18	-2.818	0.79	-0.21	0.00
LF4-MW5	9/11/18	-2.120	1.54	0.54	0.54
LF4-MW5	3/7/19	-3.863	-0.35	-1.35	0.00
LF4-MW5	9/5/19	-4.510	-1.05	-2.05	0.00
LF4-MW5	3/12/20	-4.343	-0.87	-1.87	0.00
LF4-MW5	9/15/20	0.000	3.84	2.84	2.84
LF4-MW5	3/4/21	-3.576	-0.03	-1.03	0.00
Background					
LF4-MW2	MEAN	-3.544			
LF4-MW2	STDEV	0.923			

Attachment D3. Control Charts

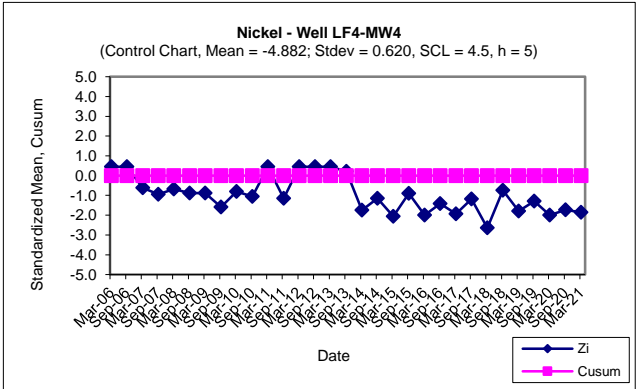
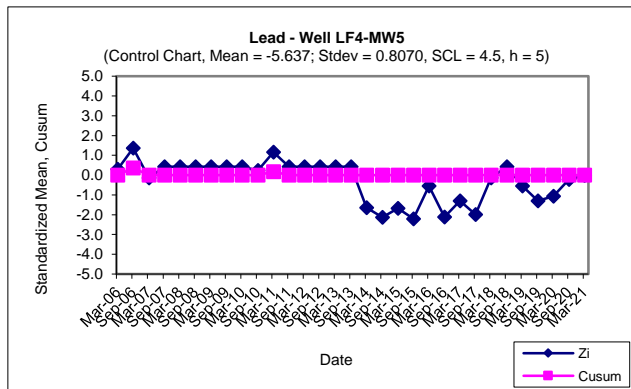
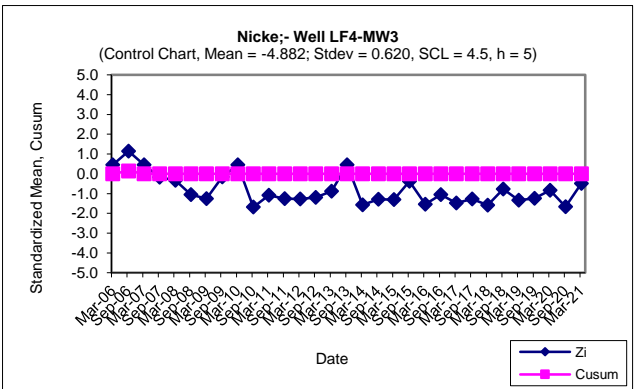
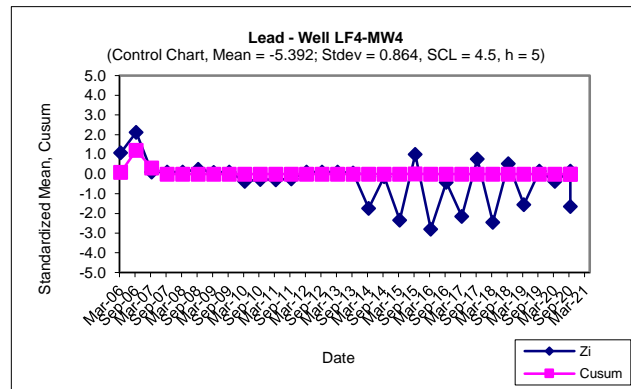
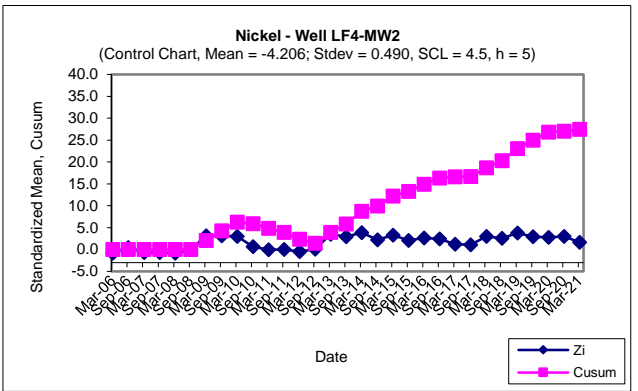
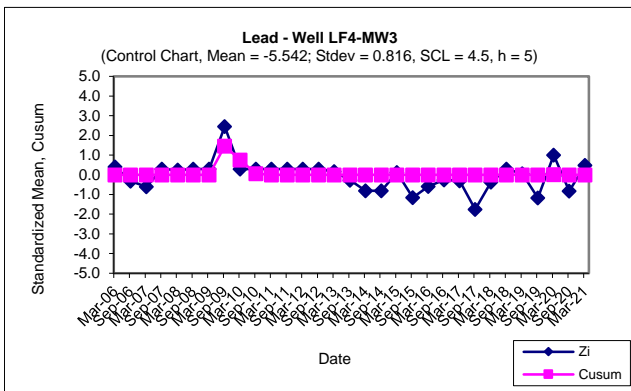
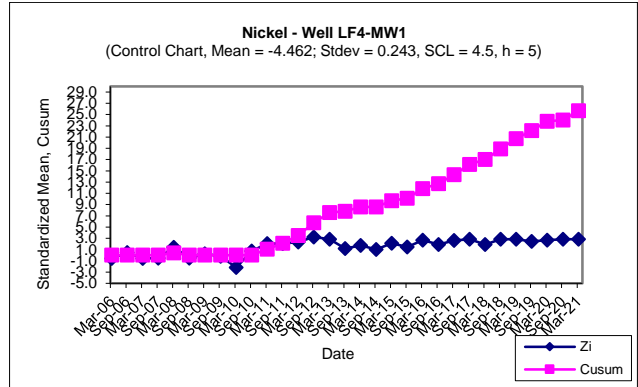
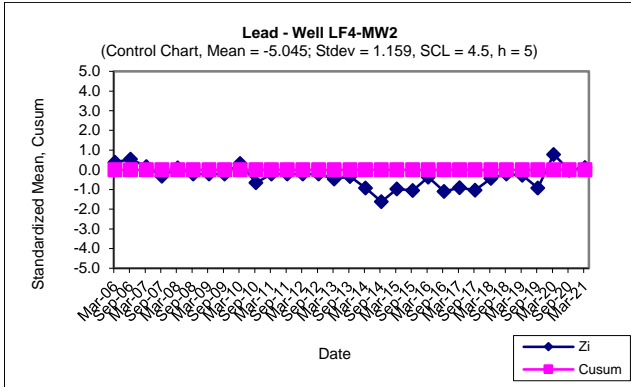
Butler Green Industrial Landfill, Parcel 175(5), McClellan, Anniston, Alabama



Attachment D3. Control Charts
Butler Green Industrial Landfill, Parcel 175(5), McClellan, Anniston, Alabama



Attachment D3. Control Charts
Butler Green Industrial Landfill, Parcel 175(5), McClellan, Anniston, Alabama



Attachment D3. Control Charts
Butler Green Industrial Landfill, Parcel 175(5), McClellan, Anniston, Alabama

