

**Groundwater Monitoring Report, March 2019
Butler Green Industrial Landfill, Parcel 175(5)
(Permit No. 08-02)
McClellan, Anniston, Alabama**

Prepared for:



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LIST OF ABBREVIATIONS AND ACRONYMS

ADEM	Alabama Department of Environmental Management
ADEM Division 7 Regulations	Alabama Department of Environmental Management Water Division Water Supply Program Division 335-7
ADEM Division 13 Regulations	Alabama Department of Environmental Management (ADEM) Land Division Solid Waste Program Division 13 Regulations
AGMRG	Alabama Groundwater Monitoring Reporting Guidance for Solid Waste Facilities
ARBCA	Alabama Risk-Based Corrective Action Guidance Manual
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
Fill Area Definition Report	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
Final EE/CA	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
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
QAP	Quality Assurance Plan
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 2019 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 7, 2019. 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 0.007 feet per foot (ft/ft) to 0.014 ft/ft, averaging 0.010 ft/ft Site-wide.

During the March 2019 monitoring event, chlorobenzene cis-1,2-dichloroethene, trans-1,2-dichloroethene and trichloroethene were detected in well LF4-MW4 and as such are considered SSI occurrences. LF4-MW4 results were consistent with historical data and below the MC with the exception of trichloroethene.

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 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 trans-1,2-dichloroethene concentrations were all below MCLs. Trichloroethene (34 µg/L) was above the MCL (5 µg/L) but within historical results. Because there is no promulgated MCL for cobalt, the concentration for the cobalt SSI in well LF4-MW2 was compared to the cobalt concentration for background well LF4-MW5. The concentration for metal SSI constituent LF4-MW2 (160 µg/L) was 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). 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 2019 groundwater monitoring event. The objectives of the March 2019 groundwater monitoring event and this GWMR include the following:

- Summarize data from previous monitoring events and present analytical results for the March 2019 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 2019 sampling activities. Section 4.0 describes the results of the March 2019 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 2019
Appendix B	Chains-of-Custody, March 2019
Appendix C	Data Quality Summary
Appendix D	Statistical Evaluation of Metals Data, March 2019

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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 will expire on January 8, 2021. The revised permit for the Industrial Landfill allows 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 east to west 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 is diverted around the Site by concrete ditches that drain into a settling pond at the southeastern end of the Site. Drainage exits the Site to the north into a culvert under Reilly Airfield (MES, 2006).

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 Statistically Significant Increase (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 by the MDA at the Site. 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 2019 ACTIVITIES

During the March 2019 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 2019 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 2019 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 7, 2019 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 2019 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 2019 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 2019 monitoring event. The Data Quality Summary (DQS) for the March 2019 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 2019 GROUNDWATER SAMPLING

This section discusses the results of the March 2019 groundwater monitoring event at the Site.

4.1 Groundwater Levels

Groundwater elevations measured during the March 2019 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 2019 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 2019 monitoring event, presented in Table 4-2. The horizontal hydraulic gradients were low over the Site, ranging from 0.007 feet per foot (ft/ft) to 0.014 ft/ft. Site-wide horizontal hydraulic gradients averaged 0.010 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 2019 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 2019 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, trans-1,2-dichloroethene, and trichloroethene were detected in well LF4-MW4 during the March 2019 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 2019 monitoring event are presented in Table 4-5. Twelve of the 16 target metals, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, vanadium, and zinc were detected in groundwater samples from at least one of the monitoring wells during March 2019 monitoring event. Antimony, mercury, silver, and thallium were not detected during the March 2019 monitoring event; sample reporting limits were higher for this sampling event due analysis by Method 6020B. All reporting limits (RL) and MDLs were below the MCL. Table D6-1 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 2019 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). For the March 2019 groundwater sampling event, chlorobenzene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, and trichloroethene were detected in the groundwater samples. Therefore, there were four SSIs for VOCs. The concentrations of the VOCs were below their respective MCLs with the exception of trichloroethene. Trichloroethene was within historical range of previous detections in monitoring well LF-MW4.

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 2019 Metals Groundwater Quality Data

Statistical analysis was performed for the March 2019 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 2019 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 nickel (12.63) in well LF4-MW1; and cobalt (25.51), nickel (19.41), and zinc (73.66) 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 2019 Sampling Event

Table 5-1 presents a summary of the SSI occurrences for the March 2019 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 trans-1,2-dichloroethene were all below the groundwater protection standards or MCLs. The concentration for metal SSI constituent cobalt (160 µg/L) in well LF4-MW2, was greater than the background concentration in LF4-MW5 (10.5 µg/L) and trichloroethene (34 µg/L) in well LF4-MW4, was greater than the MCL (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 2019 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 2019 monitoring event was performed under the Assessment Monitoring program. Groundwater samples were collected from five residuum monitoring wells at the Site on March 7, 2019. 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 0.007 ft/ft to 0.014 ft/ft.

During the March 2019 monitoring event, four 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 nickel in well LF4-MW1; and cobalt, nickel and zinc in well LF4-MW2 during March 2019 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 (160 µg/L) in well LF4-MW2, was greater than the groundwater protection standard or background concentration (10.5 µg/L) and trichloroethene (34 µg/L) in well LF4-MW4 was greater than the MCL (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.
<u>Volatile Organic Compounds</u>			<u>Metals</u>		
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	Permit Design	Measurement Date	Well Depth (ft BTOC)	Depth to Water (ft BTOC)	Groundwater Elevation (ft msl)
LF4-MW1	CMP	3/14/00	--	20.9	718.89
LF4-MW1		3/22/04	--	--	--
LF4-MW1		3/16/05	42.57	10.95	728.84
LF4-MW1		9/28/05	42.57	16.68	723.11
LF4-MW1		3/13/06	41.8	13.46	726.33
LF4-MW1		9/12/06	41.8	20.83	718.96
LF4-MW1		3/6/07	41.8	16.88	722.91
LF4-MW1		9/24/07	41.8	23.58	716.21
LF4-MW1		3/26/08	41.8	24.97	714.82
LF4-MW1		9/16/08	41.8	24.61	715.18
LF4-MW1		3/17/09	41.95	21.67	718.12
LF4-MW1		9/17/09	42.05	21.81	717.98
LF4-MW1		3/17/10	42	9.3	730.49
LF4-MW1		9/20/10	42.38	27.2	712.59
LF4-MW1		3/15/11	--	--	--
LF4-MW1		9/7/11	42.45	22.59	717.2
LF4-MW1		3/13/12	42.45	20.29	719.5
LF4-MW1		9/5/12	42.46	21.62	718.17
LF4-MW1		3/4/13	42.5	20.85	718.94
LF4-MW1		9/10/13	42.5	12.72	727.07
LF4-MW1		3/4/14	42.5	11.00	728.79
LF4-MW1		10/24/14	42.4	20.75	719.04
LF4-MW1		3/12/15	42.5	14.90	724.89
LF4-MW1		9/15/15	42.5	19.55	720.24
LF4-MW1		3/16/16	42.5	10.05	729.74
LF4-MW1		9/21/16	42.5	21.85	717.94
LF4-MW1		3/14/17	42.5	23.90	715.89
LF4-MW1		9/8/17	42.5	19.21	720.58
LF4-MW1		3/8/18	42.5	14.74	725.05
LF4-MW1		9/11/18	42.5	17.58	722.21
LF4-MW1		3/7/19	42.5	9.86	729.93
LF4-MW2	CMP	3/14/00	--	27.8	710.7
LF4-MW2		3/22/04	--	--	719
LF4-MW2		3/16/05	39.85	16.48	722.02
LF4-MW2		9/28/05	39.85	22.2	716.3
LF4-MW2		3/13/06	36	18.81	719.69
LF4-MW2		9/12/06	36	26.49	712.01
LF4-MW2		3/6/07	36	22.06	716.44
LF4-MW2		9/24/07	36	28.6	709.9
LF4-MW2		3/26/08	36	26.11	712.39
LF4-MW2		9/16/08	36	27.98	710.52
LF4-MW2		3/17/09	39	22.68	715.82
LF4-MW2		9/17/09	39.06	26.51	711.99
LF4-MW2		3/17/10	39.15	15.65	722.85
LF4-MW2		9/20/10	40.25	27.33	711.17
LF4-MW2		3/15/11	--	--	--
LF4-MW2		9/7/11	40.23	25.6	712.9
LF4-MW2		3/13/12	40.23	23.19	715.31
LF4-MW2		9/5/12	40.25	24.83	713.67

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

Well ID	Permit Design	Measurement Date	Well Depth (ft BTOC)	Depth to Water (ft BTOC)	Groundwater Elevation (ft msl)
LF4-MW2		3/4/13	40.25	23.66	714.84
LF4-MW2		9/10/13	40.25	20.35	718.15
LF4-MW2		3/4/14	40.25	18.90	719.60
LF4-MW2		10/24/14	40.2	26.01	712.49
LF4-MW2		3/12/15	40.25	19.14	719.36
LF4-MW2		9/15/15	40.28	24.95	713.55
LF4-MW2		3/16/16	40.25	17.11	721.39
LF4-MW2		9/21/16	40.25	27.28	711.22
LF4-MW2		3/14/17	40.25	23.30	715.20
LF4-MW2		9/8/17	40.25	24.24	716.14
LF4-MW2		3/8/18	40.25	17.26	721.24
LF4-MW2		9/11/18	40.25	23.65	714.85
LF4-MW2		3/7/19	40.25	14.90	723.60
LF4-MW3	CMP	3/14/00	--	21.6	718.18
LF4-MW3		3/22/04	--	--	727.18
LF4-MW3		3/16/05	34.41	11.69	728.09
LF4-MW3		9/29/05	34.41	17.33	722.45
LF4-MW3		3/13/06	31	11.21	728.57
LF4-MW3		9/14/06	31	17.9	721.88
LF4-MW3		3/6/07	31	12.33	727.45
LF4-MW3		9/25/07	31	21.63	718.16
LF4-MW3		3/26/08	31	12.63	727.15
LF4-MW3		9/16/08	31	16.27	723.51
LF4-MW3		3/17/09	34.13	12.05	727.73
LF4-MW3		9/17/09	34.12	17.2	722.58
LF4-MW3		3/17/10	34.05	11.8	727.98
LF4-MW3		9/20/10	34.1	26.8	712.98
LF4-MW3		3/15/11	--	--	--
LF4-MW3		9/7/11	34.15	16.4	723.38
LF4-MW3		3/13/12	34.15	12.51	727.27
LF4-MW3		9/5/12	34.2	13.7	726.08
LF4-MW3		3/4/13	34.2	17.3	722.48
LF4-MW3		9/10/13	34.2	13.15	726.63
LF4-MW3		3/4/14	34.2	12.45	727.33
LF4-MW3		10/24/14	34.2	19.90	719.88
LF4-MW3		3/12/15	34.2	11.71	728.07
LF4-MW3		9/15/15	34.19	16.85	722.93
LF4-MW3		3/16/16	34.2	12.13	727.65
LF4-MW3		9/21/16	34.2	20.17	719.61
LF4-MW3		3/14/17	34.2	13.15	726.63
LF4-MW3		9/8/17	34.2	15.41	724.37
LF4-MW3		3/8/18	34.2	11.91	728.27
LF4-MW3		9/11/18	34.2	21.74	718.04
LF4-MW3		3/7/19	34.2	10.91	728.87
LF4-MW4	CMP	3/14/00	--	8.45	734.9
LF4-MW4		3/22/04	--	--	736.95
LF4-MW4		3/15/05	27.27	5.24	738.11
LF4-MW4		9/29/05	27.27	10.6	732.75

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

Well ID	Permit Design	Measurement Date	Well Depth (ft BTOC)	Depth to Water (ft BTOC)	Groundwater Elevation (ft msl)
LF4-MW4		3/14/06	25	4.36	738.99
LF4-MW4		9/14/06	25	12.41	730.94
LF4-MW4		3/7/07	25	6.95	736.4
LF4-MW4		9/25/07	25	14.42	728.93
LF4-MW4		3/26/08	25	7.81	735.54
LF4-MW4		9/17/08	25	10.19	733.16
LF4-MW4		3/17/09	26.74	5.35	738
LF4-MW4		9/21/09	26.55	9.8	733.55
LF4-MW4		3/17/10	26.65	4.93	738.42
LF4-MW4		9/20/10	26.65	14.26	729.09
LF4-MW4		3/15/11	--	--	--
LF4-MW4		9/7/11	26.6	13.4	729.95
LF4-MW4		3/13/12	26.6	7.06	736.29
LF4-MW4		9/5/12	26.81	8.31	735.04
LF4-MW4		3/4/13	26.8	10.5	732.85
LF4-MW4		9/10/13	26.8	6.35	737.0
LF4-MW4		3/4/14	26.8	5.50	737.85
LF4-MW4		10/24/14	25	13.95	729.40
LF4-MW4		3/12/15	26.8	5.79	737.56
LF4-MW4		9/15/15	26.82	11.91	731.44
LF4-MW4		3/16/16	26.8	4.77	738.58
LF4-MW4		9/21/16	26.8	14.21	729.14
LF4-MW4		3/14/17	26.8	6.37	736.98
LF4-MW4		9/8/17	26.8	9.11	734.24
LF4-MW4		3/8/18	26.8	4.68	738.67
LF4-MW4		9/11/18	26.8	9.36	733.99
LF4-MW4		3/7/19	26.8	4.23	739.12
LF4-MW5	BKG	3/14/00	--	12.27	741.05
LF4-MW5		3/22/04	--	--	742.02
LF4-MW5		3/16/05	34.76	10.44	742.88
LF4-MW5		9/29/05	34.76	14.39	738.93
LF4-MW5		3/14/06	32	5.35	747.97
LF4-MW5		9/14/06	32	15.62	737.7
LF4-MW5		3/7/07	32	11.5	741.82
LF4-MW5		9/24/07	32	19.58	733.74
LF4-MW5		3/26/08	32	11.64	741.68
LF4-MW5		9/16/08	32	14.29	739.03
LF4-MW5		3/18/09	34.28	10.3	743.02
LF4-MW5		9/17/09	34.25	13.8	739.52
LF4-MW5		3/17/10	34.2	10.25	743.07
LF4-MW5		9/20/10	34.6	18.75	734.57
LF4-MW5		3/15/11	--	--	--
LF4-MW5		9/7/11	34.6	17.54	735.78
LF4-MW5		3/13/12	34.6	11.95	741.37
LF4-MW5		9/5/12	34.6	12.1	741.22
LF4-MW5		3/4/13	34.6	16.1	737.22
LF4-MW5		9/10/13	34.6	11.58	741.74
LF4-MW5		3/4/14	34.6	10.65	742.67
LF4-MW5		10/24/14	34.6	17.32	736.00

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

Well ID	Permit Design	Measurement Date	Well Depth (ft BTOC)	Depth to Water (ft BTOC)	Groundwater Elevation (ft msl)
LF4-MW5		3/12/15	34.6	9.97	743.35
LF4-MW5		9/15/15	34.55	15.57	737.75
LF4-MW5		3/16/16	34.6	10.11	743.21
LF4-MW5		9/21/16	34.6	19.77	733.55
LF4-MW5		3/14/17	34.6	12.44	740.88
LF4-MW5		9/8/17	34.6	13.59	739.73
LF4-MW5		3/8/18	34.6	9.69	743.63
LF4-MW5		9/11/18	34.6	13.27	740.05
LF4-MW5		3/7/19	34.6	9.74	743.58

Notes:

-- = Not available or not measured

bgs = below ground surface

BKG = Background well

BTOC = Below top of casing

CMP = Compliance/downgradient well

ft = feet

msl = Mean sea level

**Table 4-2: Horizontal Hydraulic Gradients, March 2019
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	743.58	LF4-MW1	729.93	north	1601	13.65	0.009
LF4-MW4	739.12	LF4-MW3	728.87	northwest	724	10.25	0.014
LF4-MW3	728.87	LF4-MW2	723.60	west	524	5.27	0.010
LF4-MW1	729.93	LF4-MW2	723.60	northeast	890	6.33	0.007
Average Horizontal Gradient:							0.010

Notes:

Elevations in feet above mean sea level.

ft/ft = feet per foot

**Table 4-3: Groundwater Field Parameters, March 2019
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	3/7/19	18.18	152	7.43	61.3	0.999	37.60	6.03
LF4-MW2	3/7/19	15.62	399	7.35	128.4	0.259	34.17	5.44
LF4-MW3	3/7/19	14.85	70	7.59	165.4	0.045	61.99	5.47
LF4-MW4	3/7/19	14.42	787	6.70	58.9	0.512	9.74	6.90
LF4-MW5	3/7/19	15.02	53	6.76	126.6	0.034	32.46	5.92

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

**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	3/15/17	<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
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-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-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
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

**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	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-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
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

**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	3/17/09	<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-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	--
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

**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	9/14/06	<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

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

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.

**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
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t-1,2-DCE = Trans-1,2-Dichloroethene

TCE = Trichloroethene

VC = Vinyl Chloride

VOC = Volatile organic compound

Validation Flags:

(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.

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
LF4-MW1	3/29/00	< 5.0	< 5.0	< 50	< 1.0	< 1.0	< 5.0	< 500	< 5.0	< 3.0	< 1	18	< 5.0	--	< 2.0	< 100	71
LF4-MW1	9/26/00	--	< 5.0	60	--	< 1.0	12.4	--	--	28.4	< 1	--	< 5.0	--	--	--	--
LF4-MW1	4/24/01	--	< 5.0	< 50	--	< 1.0	17.8	--	--	21.1	< 1	--	< 5.0	--	--	--	--
LF4-MW1	9/28/01	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1	--	< 5.0	--	--	--	--
LF4-MW1	4/2/02	--	< 5.0	60	--	< 1.0	< 5.0	--	--	< 3.0	< 1	--	< 5.0	--	--	--	--
LF4-MW1	9/18/02	--	< 5.0	60	--	< 1.0	< 5.0	--	--	3.0	< 1	--	< 5.0	--	--	--	--
LF4-MW1	3/5/03	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1	--	< 5.0	--	--	--	--
LF4-MW1	9/26/03	--	< 5.0	< 50	--	1.0	< 5.0	--	--	13	< 1	--	< 5.0	--	--	--	--
LF4-MW1	3/31/04	< 100	< 10	40.8	< 10	< 10	< 20 (UJ-)	8.81 J (J-)	< 20	2.1 J (J-)	< 0.4	< 20	< 10	< 20 (UJ-)	< 10	< 10	21.6 J
LF4-MW1	9/29/04	< 100	< 10	41.2	< 10	2.31 J	< 20	30.5	< 20	2.25 J (J-)	< 0.4	13.1 J	< 10	5.11 J	< 10	< 10	51.9 J
LF4-MW1	3/16/05	< 100	< 10	29.1	< 10	< 10	< 20	8.6 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	14.4 J
LF4-MW1	9/28/05	< 100	< 10	43.2	< 10	< 10	< 20	14.6 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW1	3/13/06	< 100	< 10	71.5	1.62 J	< 10	7.94 J	17.8 J	15.1 J	< 10	< 0.4	20 U^ (UB)	< 10	20 U^ (UB)	< 10	14.3	83.1 J
LF4-MW1	9/13/06	< 100	5.07 J	41.6	1.13 J	< 10	< 20	8.79 J	10.1 J	2.86 J	< 0.4	12.9 J	< 10	38	< 10	< 10	30.4 J
LF4-MW1	3/6/07	< 100	< 10	40	< 10	< 10	< 20	8.36 J	9.69 J	4.77 J	< 0.4	< 20	< 10	< 20	< 10	< 10	39.5 J
LF4-MW1	9/24/07	< 100	< 10	32.1	< 10	< 10	< 20	9.65 J	6.72 J	3.48 J	< 0.4	10.2 J	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW1	3/26/08	< 100	< 10	50.3	< 10	< 10	< 20	28.6	9.1 J	7.19 J	< 0.4	16.3 J	< 10	< 20	< 10	< 10	41.7 J
LF4-MW1	9/16/08	< 100	< 10	31.3	< 10	< 10	< 20	10.6 J	6.42 J	< 10	< 0.4	10.1 J	< 10	< 20	< 10	< 10	23.9 J
LF4-MW1	3/17/09	< 100	< 10	28.7	< 10	< 10	< 20	19.9 J	4.64 J	< 10	< 0.8	12.3 J	< 10	< 20	6.41 J	< 10	34.9 J
LF4-MW1	9/17/09	< 100	< 10	33.1	< 10	< 10	< 20	14.7 J	4.63 J	3.4 J	< 0.4	11 J	< 10	< 20	< 10	< 10	31.3 J
LF4-MW1	3/17/10	< 100	< 10	32.5	< 10	< 10	< 20	12.6 J	4.74 J	5.31 J	< 0.4	6.78 J	< 10	< 20	< 10	< 10	13.1 J
LF4-MW1	9/21/10	100 U^ (UB)	< 10	29.9	< 10	< 10	< 20	21.7	2.12 J	< 10	< 0.4	13.8 J	< 10	< 20	< 10	< 10	41.2 J
LF4-MW1	3/15/11	< 100	< 10	40.9	< 10	< 10	< 20	26.7	17.8 J	< 10	< 0.4	19.1 J	< 10	< 20	< 10	< 10	65.9 J
LF4-MW1	9/8/11	< 100	< 10	39.1	< 10	< 10	< 20	31.9	< 20	3.17 J	< 2	19.1 J	< 10	< 20	< 10	< 10	52.1 J
LF4-MW1	3/14/12	< 100	< 10	47.2	< 10	< 10	< 20	32.8	< 20	3.18 J	< 0.4	20.5	< 10	< 20	< 10	< 10	52.8 J
LF4-MW1	9/6/12	< 100	< 10	46.6	< 10	< 10	< 20	36.8	< 20	< 10	< 0.4	25.4	< 10	< 20	< 10	< 10	55.9 J
LF4-MW1	3/5/13	< 100	< 10	47.7	< 10	< 10	< 20	33.0	< 20	3.26 J	< 0.4	23.1	< 10	< 20	< 10	< 10	62.9 J
LF4-MW1	9/11/13	< 100	< 10	36.1	< 10	< 10	< 20	22.1	3.11 J	7.36 J	< 0.4	15.4 J	< 10	< 20	< 10	< 10	39.1 J
LF4-MW1	3/5/14	< 1.0	0.258 J	37.1	0.284 J	< 1.0	< 1.0	26.4	2.74	0.223 J	< 0.4	17.7	< 1.0	< 1.0	< 1.0	< 1.0	43.3
LF4-MW1	9/4/14	< 1.0	0.263 J	36.0	0.391 J	< 1.0	0.296 J	24.3	2.71	0.378 J	< 0.4	14.7	< 1.0	< 1.0	< 1.0	< 1.0	39.3
LF4-MW1	3/13/15	< 1.0	0.227 J	43.5	0.289 J	< 1.0	< 1.0	33.6	1.45	0.282 J	< 0.4	19.4	< 1.0	< 1.0	< 1.0	< 1.0	59.5
LF4-MW1	9/16/15	< 1.0	0.513 J	42.3	0.497 J	< 1.0	1.89	25	4.87	3.77	< 0.4	16.4	< 1.0	< 1.0	< 1.0	1.77	40.5
LF4-MW1	3/16/16	< 1.0	< 1.0	42.7	0.275 J	0.201 J	< 1.0	39.5	1.78	0.374 J	< 0.4	22.1	< 1.0	< 1.0	< 1.0	< 1.0	60.5

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
LF4-MW1	9/21/16	< 1.0	0.314 J	40.7	0.429 J	< 1.0	0.408 J	30.4	2.16	0.722 J	< 0.4	18.3	<1.0	<1.0	<1.0	<1.0	47
LF4-MW1	3/15/17	< 1.0	0.309 J	45.5	0.276 J	0.249 J	0.481 J	33.7	1.31	0.472 J	< 0.4	21.8	<1.0	<1.0	<1.0	<1.0	55.8
LF4-MW1	9/8/17	< 1	0.346 J	44	0.224 J	< 1	0.377 J	37.7	1.33	0.368 J	< 0.4	22.9	< 1	< 1	< 1	< 1	60.9
LF4-MW1	3/8/18	< 1	1.48	44.6	0.207 J	< 1	1.45	27.9	2.23	1.67	< 0.4	18.3	< 1	< 1	< 1	1.58	50.3
LF4-MW1	9/11/18	< 20	< 20	47	0.19 J	< 5	< 10	33	< 20	< 10	< 0.2	23 J	< 20	< 10	6.5 J	1.1 J	73
LF4-MW1	3/7/19	< 5	< 3	47	0.17 J	< 0.5	1.7 J	38	1.7 J	1.7 J	< 0.2	23	< 2.5	< 1	< 1	< 10	58
LF4-MW2	3/29/00	< 5.0	< 5.0	96.5	< 1.0	< 1.0	< 5.0	< 500	< 5.0	< 3.0	< 1.0	15	< 5.0	--	< 2.0	< 100	39.5
LF4-MW2	9/26/00	--	< 5.0	120	--	< 1.0	7.4	--	--	23.9	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	4/24/01	--	< 5.0	100	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	9/28/01	--	< 5.0	70	--	< 1.0	5.77	--	--	8.14	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	4/2/02	--	< 5.0	120	--	< 1.0	< 5.0	--	--	5.69	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	9/18/02	--	< 5.0	110	--	< 1.0	< 5.0	--	--	3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	3/5/03	--	< 5.0	60	--	< 1.0	9.0	--	--	10	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	9/26/03	--	< 5.0	90	--	1.0	< 5.0	--	--	15	< 1.0	--	< 5.0	--	--	--	--
LF4-MW2	3/31/04	< 100	< 10	87.2	< 10	< 10	< 20 (UJ-)	7.27 J (J-)	< 20	4.27 J (J-)	< 0.4	< 20	< 10	< 20 (UJ-)	< 10	< 10	50.4 J
LF4-MW2	9/29/04	< 100	15.2	227	4.41 J	< 10	30.1	27.2	55.6	78.8	0.188 J	33.2	< 10	< 20	< 10	101	92.9 J
LF4-MW2	3/16/05	< 100	< 10	60.3	< 10	< 10	< 20	8.53 J	< 20	2.71 J	< 0.4	< 20	< 10	< 20	< 10	< 10	65.6 J
LF4-MW2	9/28/05	< 100	< 10	87.7	1.32 J	< 10	< 20	22.0	< 20	< 10	< 0.4	14.8 J	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW2	3/13/06	< 100	< 10	25.4	< 10	< 10	< 20	6.39 J	10.7 J	10.1	< 0.4	< 20	< 10	20 U^ (UB)	< 10	< 10	54.2 J
LF4-MW2	9/13/06	46.2 J	6.34 J	111	2.38 J	< 10	5.68 J	15 J	16.1 J	12.1	< 0.4	18.7 J	< 10	20 U^ (UB)	10 U^ (UB)	18.7	96 J
LF4-MW2	3/6/07	< 100	< 10	94.7	< 10	< 10	< 20	14.6 J	9.44 J	7.79 J	< 0.4	10.8 J	< 10	< 20	< 10	6.95 J	35.5 J
LF4-MW2	9/24/07	< 100	< 10	82	< 10	< 10	< 20	12.7 J	2.59 J	4.45 J	< 0.4	10.8 J	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW2	3/26/08	< 100	< 10	133	< 10	< 10	< 20	9.79 J	4.98 J	7.24 J	< 0.4	9.77 J	< 10	< 20	< 10	< 10	17.1 J
LF4-MW2	9/16/08	< 100	< 10	97.6	< 10	< 10	< 20	19.4 J	4.2 J	5.01 J	< 0.4	14.8 J	< 10	< 20	< 10	< 10	30.6 J
LF4-MW2	3/17/09	< 100	< 10	125	1.06 J	< 10	< 20	96.4	3.4 J	< 10	< 0.8	68.3	< 10	< 20	5.84 J	< 10	501
LF4-MW2	9/17/09	< 100	< 10	93.4	< 10	< 10	< 20	113	3.54 J	< 10	< 0.4	70.1	< 10	< 20	6.54 J	< 10	608
LF4-MW2	3/17/10	< 100	< 10	89.8	2.02 J	1.01 J	3.36 J	87	24.3	9.3 J	< 0.4	64.8	< 10	< 20	< 10	< 10	887
LF4-MW2	9/21/10	< 100	8.3 J	99.7	< 10	< 10	< 20	31.3	< 20	< 10	< 0.4	20.5	< 10	< 20	< 10	< 10	105
LF4-MW2	3/15/11	< 100	< 10	102	< 10	< 10	< 20	23.5	< 20	< 10	< 0.4	14.6 J	< 10	< 20	< 10	< 10	703 J
LF4-MW2	9/8/11	< 100	5.4 J	107	< 10	< 10	< 20	24.6	< 20	< 10	< 2.0	15 J	< 10	< 20	< 10	< 10	73.7 J
LF4-MW2	3/14/12	< 100	< 10	107	< 10	< 10	< 20	19.9 J	< 20	< 10	< 0.4	11.6 J	< 10	< 20	< 10	< 10	54.9 J
LF4-MW2	9/6/12	< 100	< 10	109	< 10	< 10	< 20	18.7 J	4.79 J	< 10	< 0.4	15.4 J	< 10	< 20	< 10	< 10	62.4 J
LF4-MW2	3/5/13	< 100	< 10	128	< 10	< 10	< 20	142	11.8 J	3.74 J	< 0.4	83.4	< 10	< 20	< 10	< 10	733

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
LF4-MW2	9/11/13	< 100	< 10	75.4	< 10	< 10	< 20	109	< 20	4.31 J	< 0.4	61.6	< 10	< 20	< 10	< 10	410
LF4-MW2	3/5/14	< 1.0	1.38	63	0.8 J	1.08	2.4	175	23.5	2.2	< 0.4	99	0.771 J	< 1.0	< 1.0	< 1.0	1020
LF4-MW2	9/4/14	< 1.0	1.96	57.6	0.11 J	0.303 J	0.667 J	90.6	1.86	0.987 J	< 0.4	44.2	< 1.0	< 1.0	< 1.0	0.639 J	311
LF4-MW2	3/13/15	< 1.0	2.36	73.6	0.709 J	0.715 J	2.04	139	15.1	2.08	< 0.4	75.4	1.04	< 1.0	< 1.0	< 1.0	826
LF4-MW2	9/16/15	< 1.0	4.05	79.1	0.148 J	0.232 J	0.972 J	75.5	2.42	1.9	< 0.4	41.1	< 1.0	< 1.0	< 1.0	0.8 J	281
LF4-MW2	3/16/16	< 1.0	2.46	58.8	0.345 J	0.5 J	1.83	92.8	10.4	4.16	< 0.4	53.8	< 1.0	< 1.0	< 1.0	1.4	434
LF4-MW2	9/21/16	< 1.0	3.33	69.7	0.14 J	0.282 J	1	91.7	2.54	1.8	< 0.4	49.1	< 1.0	< 1.0	< 1.0	0.895 J	389
LF4-MW2	3/15/17	< 1.0	2.85	66.5	0.119 J	< 1.0	0.854 J	55.7	2.31	2.24	< 0.4	27.5	< 1.0	< 1.0	< 1.0	1.4	175
LF4-MW2	9/8/17	< 1	5.43	87.3	0.115 J	< 1	1.22	51.3	2.11	1.93	< 0.4	25.3	< 1	< 1	< 1	1.96	180
LF4-MW2	3/8/18	< 1	2.74	77	0.542 J	0.915 J	2.97	125	10.9	3.91	< 0.4	64.8	0.608 J	< 1	< 1	2.52	732
LF4-MW2	9/11/18	< 20	9.9 J	74	0.15 J	< 5	< 10	100	2.3 J	< 10	< 0.2	53	< 20	< 10	< 25	< 10	390
LF4-MW2	3/7/19	< 5	< 3	59	1.3	1.3	4.7 J	160	27	4.7	< 0.2	96	1.3 J	< 1	< 1	< 10	1200
LF4-MW3	3/29/00	< 5.0	< 5.0	< 50	< 1.0	< 1.0	< 5.0	< 500	< 5.0	4.0	< 1.0	< 5.0	< 5.0	--	< 2.0	< 100	< 30
LF4-MW3	9/26/00	--	< 5.0	60	--	< 1.0	6.23	--	--	11.4	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	4/24/01	--	< 5.0	60	--	< 1.0	< 5.0	--	--	5.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	9/28/01	--	6.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	4/2/02	--	< 5.0	60	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	9/18/02	--	< 5.0	70	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	3/5/03	--	< 5.0	50	--	< 1.0	7.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	9/26/03	--	< 5.0	70	--	< 1.0	< 5.0	--	--	17	< 1.0	--	< 5.0	--	--	--	--
LF4-MW3	3/31/04	< 100	< 10	53.7	< 10	< 10	< 20 (UJ-)	< 20 (UJ-)	27.4	5.34 J (J-)	< 0.4	< 20	< 10	< 20 (UJ-)	< 10 (UJ-)	< 10	69.4 J
LF4-MW3	9/29/04	< 100	< 10	66.8	< 10	< 10	< 20	12.3 J	< 20	< 10 (UJ-)	< 0.4	< 20	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW3	3/16/05	< 100	< 10	36.3	< 10	< 10	< 20	< 20	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	5.05 J
LF4-MW3	9/29/05	< 100	< 10	54.1	< 10	< 10	< 20	< 20	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW3	3/13/06	< 100	< 10	57	< 10	< 10	< 20	< 20	6.48 J	5.43 J	< 0.4	< 20	< 10	20 U^ (UB)	< 10	7.06 J	21.1 J
LF4-MW3	9/14/06	< 100	5.12 J	65.4	< 10	< 10	20 U^ (UB)	14 J	7.02 J	3.01 J	< 0.4	15.4 J	< 10	< 20 (UJ-)	5.41 J	5.79 J	25.1 J
LF4-MW3	3/6/07	< 100	< 10	48.3	< 10	< 10	< 20	< 20	< 20	2.38 J	< 0.4	< 20	< 10	< 20 (UJM)	< 10	< 10	26.2 J
LF4-MW3	9/25/07	< 100	< 10	59.7	< 10	< 10	< 20	7.41 J	< 20	< 10	< 0.4	6.81 J	< 10	< 20	< 10	< 10	15.6 J
LF4-MW3	3/26/08	< 100	< 10	69.8	< 10	< 10	< 20	< 20	2.46 J	4.79 J	< 0.4	6.14 J	< 10	< 20	< 10	< 10	15.9 J
LF4-MW3	9/16/08	< 100	< 10	51.9	< 10	< 10	< 20	< 20	3.72 J	< 10	< 0.4	3.94 J	< 10	< 20	< 10	< 10	8.07 J
LF4-MW3	3/17/09	< 100	< 10	53.5	< 10	< 10	< 20	< 20	2.2 J	< 10	< 0.8	3.49 J	< 10	< 20	< 10	< 10	15 J
LF4-MW3	9/17/09	< 100	22.4	76.3	< 10	< 10	< 20	< 20	< 20	29.1	< 0.4	6.87 J	< 10	< 20	< 10	< 10	26.6 J
LF4-MW3	3/17/10	< 100	< 10	58.5	< 10	< 10	< 20	< 20	2.03 J	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	7.51 J

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
LF4-MW3	9/21/10	< 100	< 10	39.2	< 10	< 10	< 20	3.39 J	< 20	< 10	< 0.4	2.66 J	< 10	< 20	< 10	< 10	5.95 J
LF4-MW3	3/15/11	< 100	< 10	69.2	< 10	< 10	< 20	2.92 J	6.07 J	5.0 J	< 0.4	3.87 J	< 10	< 20	< 10	< 10	20.6 J
LF4-MW3	9/8/11	< 100	< 10	57.1	< 10	< 10	< 20	2.74 J	< 20	< 10	< 2.0	3.49 J	< 10	< 20	< 10	< 10	10.1 J
LF4-MW3	3/14/12	< 100	< 10	60.8	< 10	< 10	< 20	< 20	3.23 J	< 10	< 0.4	3.43 J	< 10	< 20	< 10	< 10	14.7 J
LF4-MW3	9/6/12	< 100	< 10	59	< 10	< 10	< 20	< 20	3.05 J	< 10	< 0.4	3.62 J	< 10	< 20	< 10	< 10	17.1 J
LF4-MW3	3/5/13	< 100	< 10	75.7	< 10	< 10	< 20	< 20	3.46 J	4.5 J	< 0.4	4.38 J	< 10	< 20	< 10	< 10	16.6 J
LF4-MW3	9/11/13	< 100	< 10	52.2	< 10	< 10	< 20	9.77 J	< 20	3.13 J	< 0.4	< 20	< 10	< 20	< 10	< 10	< 100
LF4-MW3	3/5/14	< 1.0	0.272 J	54.7	0.27 J	< 1.0	0.256 J	1.76	1.74	2.01	< 0.4	2.85	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW3	9/4/14	< 1.0	679 J	67200	0.35 J	0.243 J	0.654 J	4.03	1.67	2.01	< 0.4	3.4	< 1.0	< 1.0	< 1.0	1.28	< 20
LF4-MW3	3/13/15	< 1.0	0.648 J	84.5	0.597 J	< 1.0	0.356 J	1.61	1.93	4.32	< 0.4	3.37	< 1.0	< 1.0	< 1.0	< 1.0	14.9 J
LF4-MW3	9/16/15	< 1.0	0.432 J	97.8	0.308 J	0.248 J	0.406 J	17.7	1.1	1.53	< 0.4	6.0	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW3	3/16/16	< 1.0	0.352 J	56.7	0.31 J	< 1.0	0.34 J	1.49	1.91	2.41	< 0.4	2.9	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW3	9/21/16	<1.0	0.992 J	86.8	0.508 J	0.262 J	1.19	1.02	2.26	3.16	< 0.4	3.93	<1.0	<1.0	<1.0	1.83	11.2 J
LF4-MW3	3/15/17	<1.0	0.782 J	60.3	0.373 J	< 1.0	0.786 J	1.5	1.3	3.05	< 0.4	3.0	<1.0	<1.0	<1.0	0.949 J	10.4 J
LF4-MW3	9/8/17	< 1	0.207 J	59.3	0.224 J	< 1	0.591 J	1.86	3.36	0.935 J	< 0.4	3.4	< 1	< 1	< 1	< 1	18 J
LF4-MW3	3/8/18	< 1 (UJM)	0.715 J	58.1	0.329 J	< 1	0.841	1.38	1.58	2.91	< 0.4	2.8	< 1	< 1	< 1	0.898 J	14.2 J
LF4-MW3	9/11/18	< 20	< 20	57	0.28 J	< 5	< 10	6.4 J	< 20	< 10	< 0.2	4.7 J	< 20	< 10	< 25	1.2 J	15J F1 F2
LF4-MW3	3/7/19	< 5	< 3	68	0.44 J	< 0.5	2.4 J	1.3	2.5 J	4.1	< 0.2	3.3 J	< 2.5	< 1	< 1	< 10	16 J
LF4-MW4	3/29/00	< 5.0	< 5.0	245	< 1	< 1.0	< 5.0	< 500	< 5.0	6.0	< 1.0	< 5.0	< 5.0	--	< 2.0	< 100	< 30
LF4-MW4	9/26/00	--	< 5.0	200	--	< 1.0	5.55	--	--	22.3	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	4/24/01	--	< 5.0	140	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	9/28/01	--	6.0	250	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	4/2/02	--	< 5.0	250	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	9/18/02	--	< 5.0	240	--	< 1.0	< 5.0	--	--	5.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	3/5/03	--	< 5.0	170	--	< 1.0	< 5.0	--	--	5.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	9/26/03	--	< 5.0	230	--	2.0	< 5.0	--	--	15	< 1.0	--	< 5.0	--	--	--	--
LF4-MW4	3/31/04	< 100	< 10	197	< 10	< 10	< 20 (UJ-)	6.45 J (J-)	< 20	< 10 (UJ-)	< 0.4	< 20	< 10	< 20 (UJ-)	< 10 (UJ-)	< 10	17.5 J
LF4-MW4	9/29/04	< 100	< 10	181	< 10	< 10	< 20	< 20	< 20	6.94 J (J-)	< 2.0	< 20	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW4	3/15/05	< 100	< 10	152	< 10	< 10	< 20	< 20 (UJ-)	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	10.4 J
LF4-MW4	9/29/05	< 100	< 10	186	< 10	< 10	< 20	< 20	< 20	2.7 J	< 0.4	< 20	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW4	3/14/06	< 100	< 10	145	< 10	< 10	< 20	< 20	< 20	11.6	< 0.4	< 20	< 10	< 20	< 10	6.87 J	25.5 J
LF4-MW4	9/14/06	< 100	5.18 J	180	< 10	< 10	20 U^ (UB)	< 20	8.16 J	28.5	< 0.4	< 20	< 10	< 20 (UJ-)	< 10	12.5	45 J
LF4-MW4	3/7/07	< 100	5.59 J	119	< 10	< 10	< 20	< 20	< 20	5.62 J	< 0.4	< 20	< 10	< 20	< 10	< 10	9.82 J

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
LF4-MW4	9/25/07	< 100	< 10	209	< 10	< 10	< 20	4.34 J	< 20	5 J	< 0.4	5.16 J	< 10	< 20	< 10	< 10	14 J
LF4-MW4	3/26/08	< 100	< 10	143	< 10	< 10	< 20	6.95 J	< 20	< 10	< 0.4	4.22 J	< 10	< 20	8.84 J	< 10	7.11 J
LF4-MW4	9/17/08	68.6 J	< 10	193	< 10	< 10	< 20	4.32 J	2.4 J	5.62 J	< 0.4	4.99 J	< 10	3.37 J (JM)	10.7	< 10	17.8 J
LF4-MW4	3/17/09	< 100	< 10	139	< 10	< 10	< 20	5.29 J	< 20	4.94 J	< 0.8	4.39 J	< 10	< 20	11.8	< 10	19.3 J
LF4-MW4	9/21/09	< 100	< 10	115	< 10	< 10	< 20	< 20	2.06 J	5.62 J	< 0.4	2.83 J	< 10	< 20	< 10	< 10	7.15 J
LF4-MW4	3/17/10	36.7 J	< 10	129	< 10	< 10	< 20	2.63 J	2 U^ (UB)	3.32 J	< 0.4 (UJM)	4.59 J	< 10	< 20	< 10	< 10	6.8 J
LF4-MW4	9/21/10	< 100	< 10	177	< 10	1.62 J	< 20	4.49 J	< 20	3.58 J	< 0.4	3.93 J	< 10	< 20	< 10	< 10	12.9 J
LF4-MW4	3/15/11	< 100	< 10	89.8	< 10	< 10	< 20	3.02 J	3.05 J	3.56 J	< 0.4	< 20	< 10	< 20	< 10	< 10	12.7 J
LF4-MW4	9/8/11	< 100	< 10	169	< 10	< 10	< 20	4.25 J	< 20	3.69 J	< 2.0	3.72 J	< 10	< 20	< 10	2.75 J	10.2 J
LF4-MW4	3/14/12	< 100	< 10	136	< 10	< 10	< 20	3.92 J	3.03 J	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	< 100
LF4-MW4	9/6/12	< 100	< 10	115	< 10	< 10	< 20	< 20	4.83 J	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	< 100
LF4-MW4	3/5/13	< 100	< 10	162	< 10	< 10	< 20	2.86 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	12.7 J
LF4-MW4	9/11/13	< 100	< 10	201	< 10	< 10	< 20	6.32 J	< 20	4.8 J	< 0.4	8.64 J	< 10	< 20	< 10	< 10	11.8 J
LF4-MW4	3/5/14	< 1.0	2.03	174	< 1.0	< 1.0	< 1.0	3.05	1.37	1.01	< 0.4 (UJM)	2.57	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW4	9/4/14	< 1.0	2720	188000	0.114 J	0.926 J	< 1.0	3.31	0.889 J	4.09	< 0.4	3.73	< 1.0	< 1.0	< 1.0	2.33	< 20
LF4-MW4	3/13/15	< 1.0	2.29	112	< 1.0	< 1.0	0.22 J	5.34	< 1.0	0.601 J	< 0.4	2.11	< 1.0	< 1.0	< 1.0	1.28	< 20
LF4-MW4	9/16/15	< 1.0	1.3	174	0.196 J	1.5	1.95	4.47	2.53	10.9	< 0.4	4.35	0.308 J	< 1.0	< 1.0	7.32	17.3 J
LF4-MW4	3/16/16	< 1.0	5.22	186	< 1.0	< 1.0	< 1.0	2.11	< 1.0	0.407 J	< 0.4	2.2	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW4	9/21/16	<1.0	1.02	160	<1.0	0.508 J	<1.0	4.22	1.17	3.2	< 0.4	3.16	<1.0	<1.0	<1.0	2.91	17.1 J
LF4-MW4	3/15/17	<1.0	3.28	127	<1.0	< 1.0	0.289 J	7.09	0.501 J	0.711 J	< 0.4	2.29	<1.0	<1.0	<1.0	2.09	< 20
LF4-MW4	9/8/17	< 1	6.17	225	0.103 J	0.892 J	0.709 J	8.34	1.28	8.82	< 0.4	3.63	0.463 J	< 1	< 1	3.91	23.5
LF4-MW4	3/8/18	< 1	2.47	197	< 1	< 1	0.253 J	2.71	< 1	0.547 J	< 0.4	1.47	< 1	< 1	< 1	0.799 J	< 20
LF4-MW4	9/11/18	< 20	7.0 J	160	< 4	< 5	< 10	4.3 J	< 20	7.2 J	< 0.2	4.8 J	< 20	< 10	< 25	< 10	46
LF4-MW4	3/7/19	< 5	5	180	< 0.5	< 0.5	< 5	1.9	< 5	1.2 J	< 0.2	< 5	< 2.5	< 1	< 1	< 10	56
LF4-MW5	3/29/00	< 5.0	< 5.0	< 50	< 1	< 1.0	< 5.0	< 500	< 5.0	3.0	< 1.0	< 5.0	< 5.0	--	< 2.0	< 100	< 30
LF4-MW5	9/26/00	--	< 5.0	< 20	--	< 1.0	< 5.0	--	--	11.2	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	4/24/01	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	9/28/01	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	4/2/02	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	9/18/02	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	3/5/03	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	< 3.0	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	9/26/03	--	< 5.0	< 50	--	< 1.0	< 5.0	--	--	17	< 1.0	--	< 5.0	--	--	--	--
LF4-MW5	3/31/04	< 100	< 10	14.4	< 10	< 10	< 20 (UJ-)	< 20 (UJ-)	29.2	4.98 J (J-)	< 0.4	< 20	< 10	< 20 (UJ-)	< 10 (UJ-)	< 10	67.5 J

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
LF4-MW5	9/29/04	< 100	< 10	12.7	< 10	< 10	< 20	7.63 J	< 20	< 10 (UJ-)	< 0.4	< 20	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW5	3/16/05	< 100	< 10	15.8	< 10	< 10	< 20	< 20	< 20	3.87 J	< 0.4	< 20	< 10	< 20	< 10	< 10	7.98 J
LF4-MW5	9/29/05	< 100	< 10	11.6	< 10	< 10	< 20	< 20	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	< 100
LF4-MW5	3/14/06	< 100	< 10	20.4	< 10	< 10	< 20	7.09 J	< 20	4.51 J	< 0.4	< 20	< 10	20 U^ (UB)	6.92 J	9.47 J	12.8 J
LF4-MW5	9/14/06	< 100	< 10	20.8	< 10	< 10	< 20	6.42 J	< 20	10.7	< 0.4	< 20	< 10	< 20 (UJ-)	8.76 J	7.5 J	20.9 J
LF4-MW5	3/7/07	< 100	< 10	14.5	< 10	< 10	< 20	< 20	< 20	3.2 J	< 0.4	< 20	< 10	< 20	< 10	< 10	18.8 J
LF4-MW5	9/24/07	< 100	< 10	20.5	< 10	< 10	< 20	4.25 J	2.14 J	5 J	< 0.4	3.21 J	< 10	< 20	< 10	< 10	100 U^ (UB)
LF4-MW5	3/26/08	< 100	< 10	12.2	< 10	< 10	< 20	2.59 J	< 20	< 10	< 0.4	2.75 J	< 10	< 20	< 10	< 10	6.55 J
LF4-MW5	9/16/08	< 100	< 10	10.7	< 10	< 10	< 20	3.33 J	< 20	< 10	< 0.4	2.58 J	< 10	< 20	< 10	< 10	6.3 J
LF4-MW5	3/18/09	< 100	< 10	13.1	< 10	< 10	< 20	2.91 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	8.63 J
LF4-MW5	9/17/09	< 100	< 10	9.23 J	< 10	< 10	< 20	4.33 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	5.65 J
LF4-MW5	3/17/10	< 100	< 10	13.6	< 10	< 10	< 20	6.24 J	< 20	< 10	< 0.4	3.17 J	< 10	< 20	< 10	< 10	< 100
LF4-MW5	9/21/10	100 U^ (UB)	< 10	12.5	< 10	< 10	< 20	10.5 J	< 20	< 10	< 0.4	3.69 J	< 10	< 20	< 10	< 10	8.21 J
LF4-MW5	3/15/11	< 100	< 10	28.9	< 10	< 10	4.91 J	2.95 J	4.69 J	9.14 J	< 0.4	5.17 J	< 10	< 20	< 10	12.5	15 J
LF4-MW5	9/8/11	< 100	< 10	17.2	< 10	< 10	< 20	7.26 J	< 20	< 10	< 2.0	3.14 J	< 10	< 20	< 10	< 10	< 100
LF4-MW5	3/14/12	< 100	< 10	12.5	< 10	< 10	< 20	3.17 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	11.5 J
LF4-MW5	9/6/12	< 100	< 10	11.1	< 10	< 10	< 20	2.34 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	< 100
LF4-MW5	3/5/13	< 100	< 10	12	< 10	< 10	< 20	2.76 J	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	11 J
LF4-MW5	9/11/13	< 100	< 10	< 10	< 10	< 10	< 20	< 20	< 20	< 10	< 0.4	< 20	< 10	< 20	< 10	< 10	< 100
LF4-MW5	3/5/14	< 1.0	0.21 J	11.6	< 1.0	< 1.0	< 1.0	4.02	1.1	0.943 J	< 0.4	2.36	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW5	9/4/14	< 1.0	226 J	10100	0.101 J	< 1.0	< 1.0	3.24	0.788 J	0.638 J	< 0.4	1.61	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW5	3/13/15	< 1.0	< 1.0	13.5	0.102 J	< 1.0	< 1.0	3.15	0.624 J	0.923 J	< 0.4	1.89	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW5	9/16/15	< 1.0	< 1.0	10.8	< 1.0	< 1.0	0.206 J	2.31	< 1.0	0.6 J	< 0.4	1.46	< 1.0	< 1.0	< 1.0	< 1.0	< 20
LF4-MW5	3/16/16	< 1.0	0.284 J	16.2	0.101 J	< 1.0	0.402 J	4.38	1.13	2.28	< 0.4	2.63	< 1.0	< 1.0	< 1.0	1.0 J	11.6 J
LF4-MW5	9/21/16	<1.0	<1.0	14.7	0.163 J	<1.0	<1.0	6.56	0.616 J	0.647 J	< 0.4	3.3	<1.0	<1.0	<1.0	<1.0	< 20
LF4-MW5	3/15/17	<1.0	<1.0	14.8	0.125 J	<1.0	0.477 J	2.67	1.22	1.24	< 0.4	2.07	<1.0	<1.0	<1.0	0.903 J	< 20
LF4-MW5	9/8/17	< 1	0.232 J	11.8	0.124 J	< 1	0.388 J	3.05	1.15	0.715 J	< 0.4	1.46	< 1	< 1	< 1	< 1	< 20
LF4-MW5	3/8/18	< 1	0.658 J	17.4	0.123 J	< 1	0.796	4.09	1.7	3.18	< 0.4	2.77	< 1	< 1	< 1	2.46	59.7
LF4-MW5	9/11/18	<20	< 20	11	< 4	< 5	< 10	2.7 J	< 20	< 10	< 0.2	3.9 J	< 20	< 10	< 25	<10	120
LF4-MW5	3/7/19	< 5	< 3	23	< 0.5	< 0.5	2.6 J	4.3	2 J	2.3 J	< 0.2	3.9 J	< 2.5	< 1	< 1	5.4 J	21

Notes:
-- = Not analyzed

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

Table 4-5

Well ID	Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
---------	-------------	-----------------	----------------	---------------	------------------	----------------	-----------------	---------------	---------------	-------------	----------------	---------------	-----------------	---------------	-----------------	-----------------	-------------

< = 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.

Validation Flags:

(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 2019
Sampling Event
Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama

Well Location	SSI Analyte	CUSUM	Sample Concentration	MCL	BKG Concentration	Units
LF4-MW1	nickel	12.63	23	100	--	µg/L
LF4-MW2	cobalt	25.51	160	NA	10.5	µg/L
	nickel	19.41	96	100	--	µg/L
	zinc	73.66	1200	5000*	--	µg/L
LF4-MW4	chlorobenzene	NA	1.2	100	--	µg/L
	cis-1,2-dichloroethene	NA	35	70	--	µg/L
	trans-1,2-dichloroethene	NA	2.8	100		µg/L
	trichloroethene	NA	34	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])

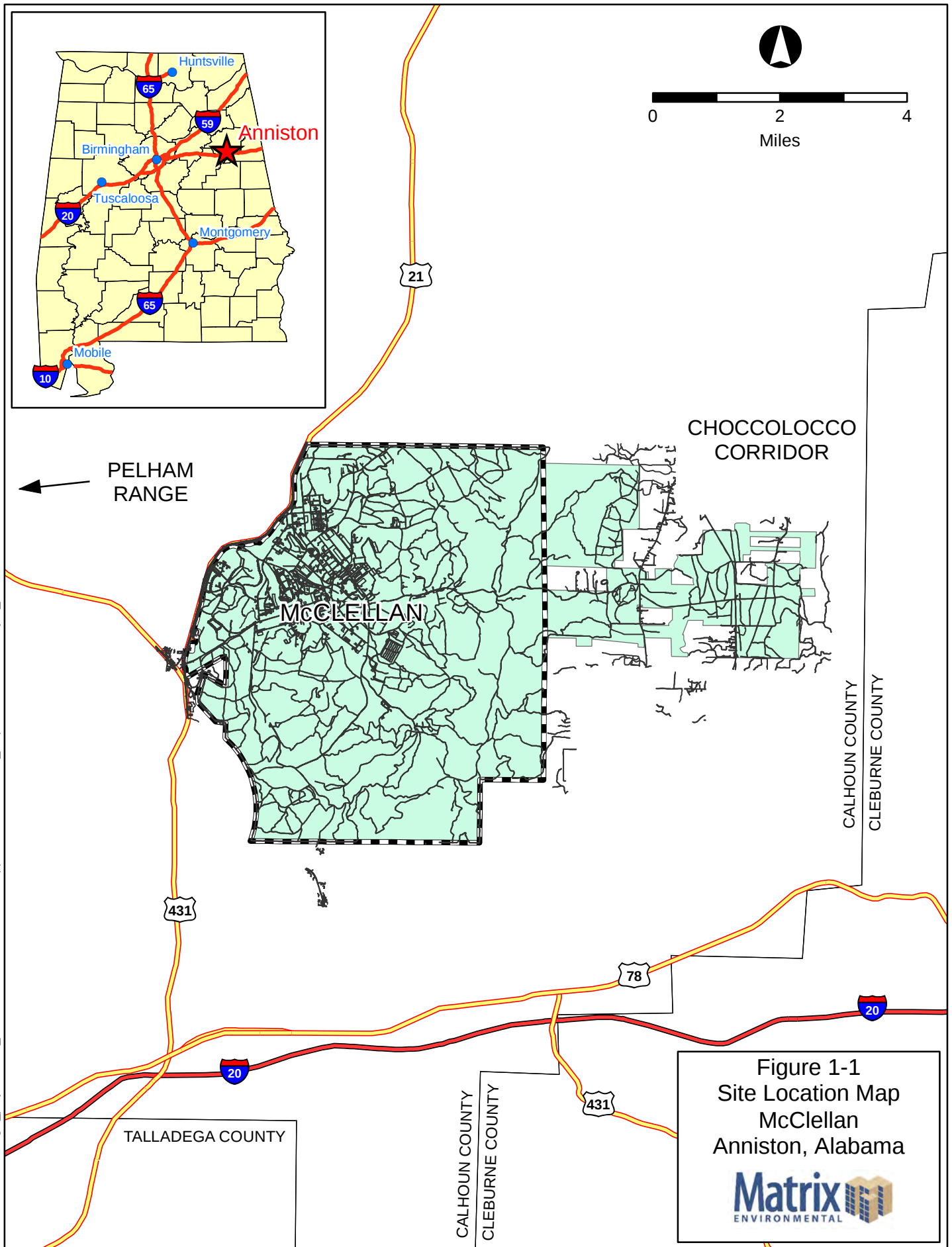
NA = Promulgated MCL not available

SSI = Statistically Significant Increase

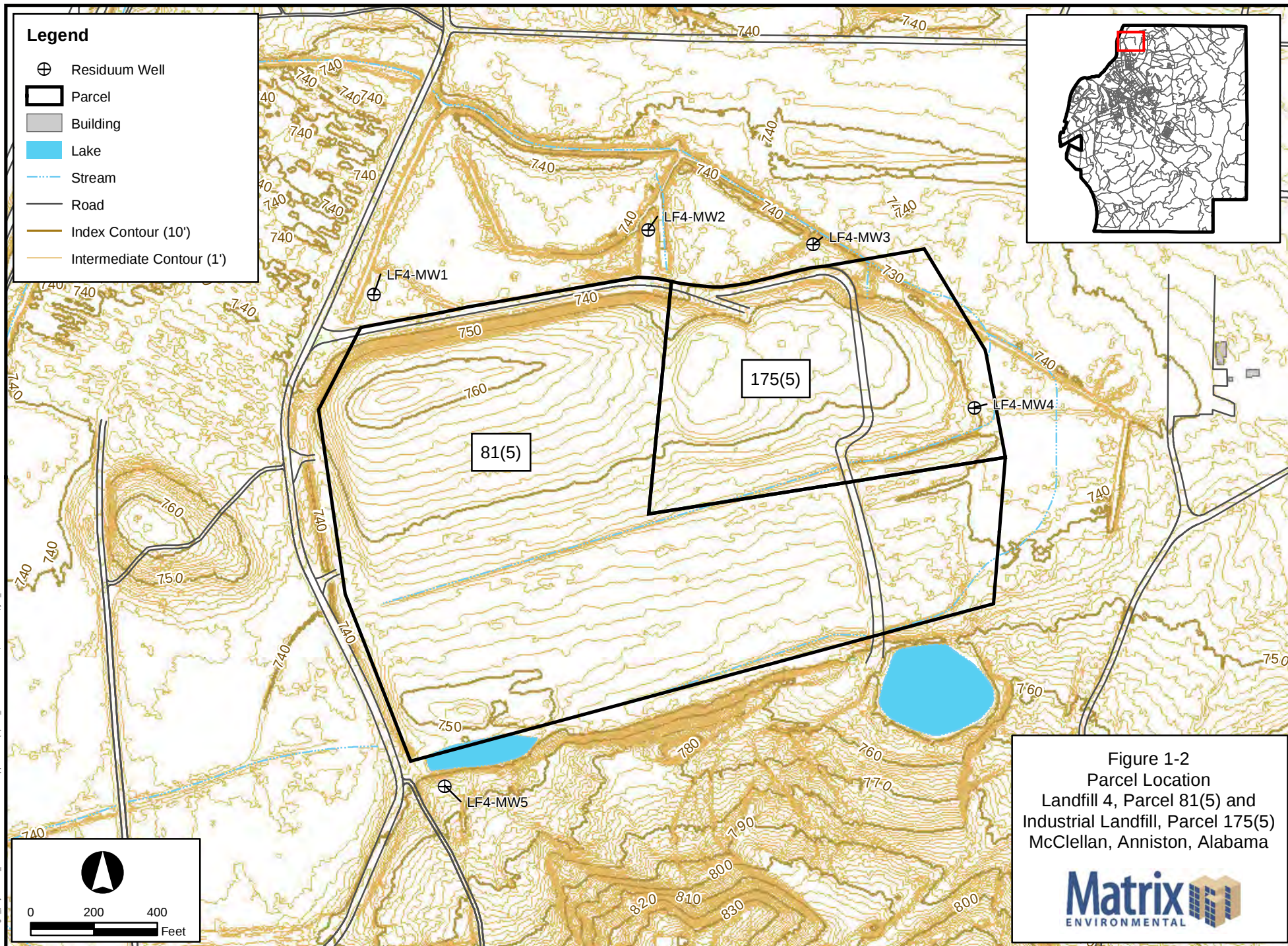
* Secondary MCL (Code 335-7-3-.02 of the *ADEM Division 7 Regulations* [ADEM, 2014])

Sample concentration > MCL or BKG Concentration

FIGURES



FILE: C:\gis_projects\For_McClellan\03_094_007\active\apps\LF4-81(5)\LF4_ParcelLocation.mxd, 11/24/2011, jpf, doris



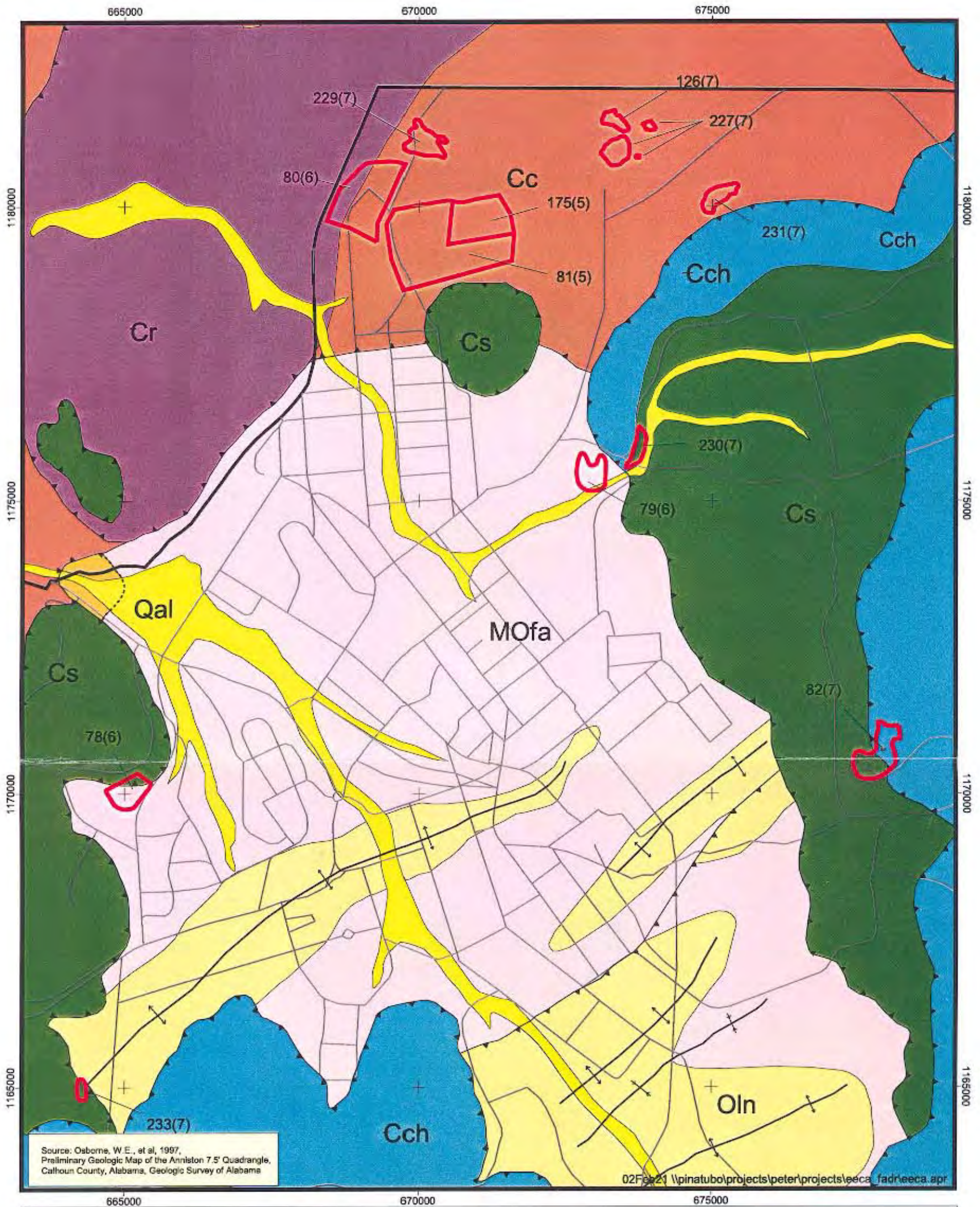


Figure 2-1 Geologic Map



0 2000 4000
State Plane feet, NAD 83

Source: IT Corporation, 2002

Matrix
ENVIRONMENTAL



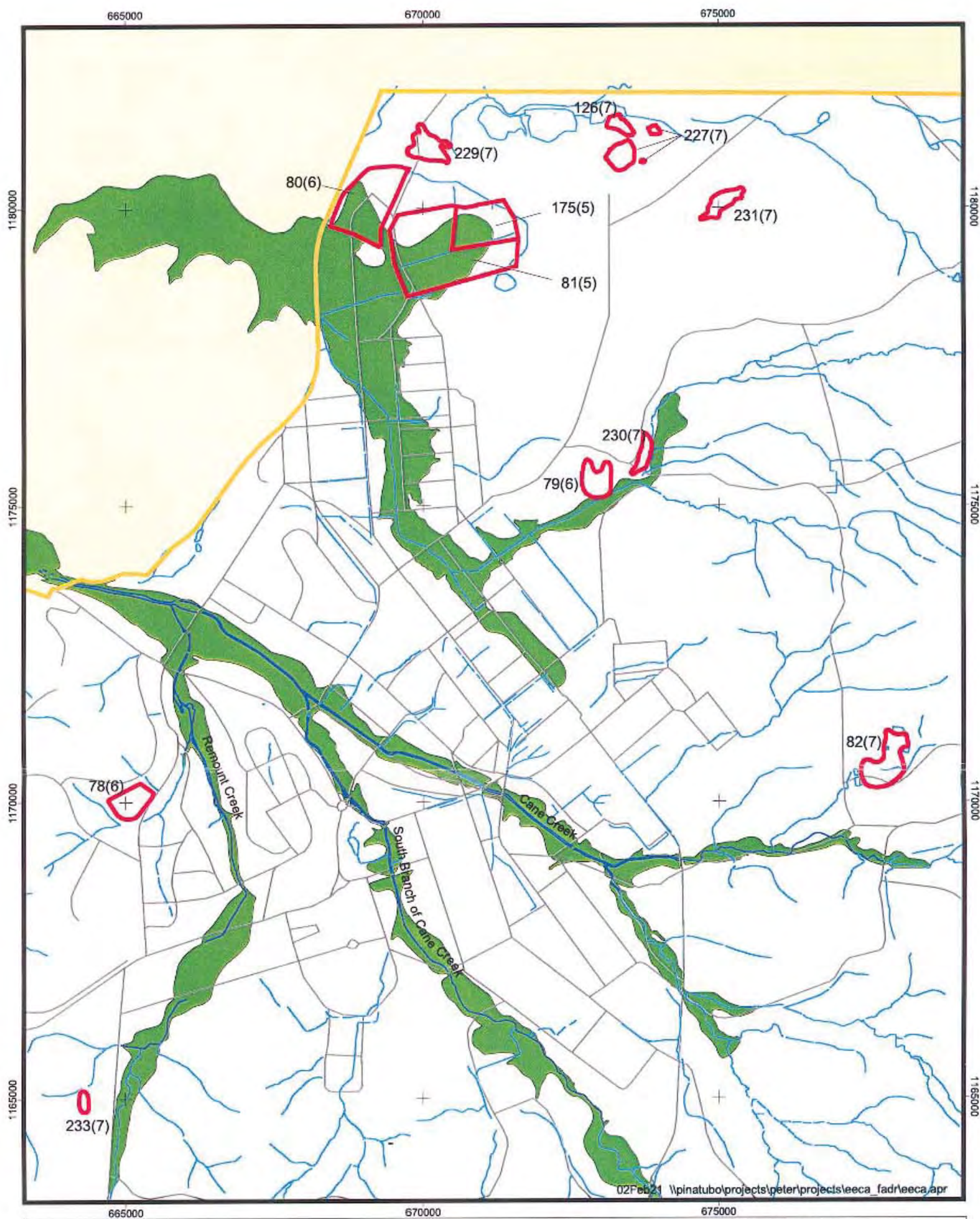
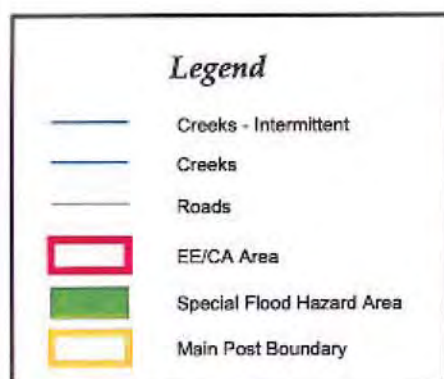
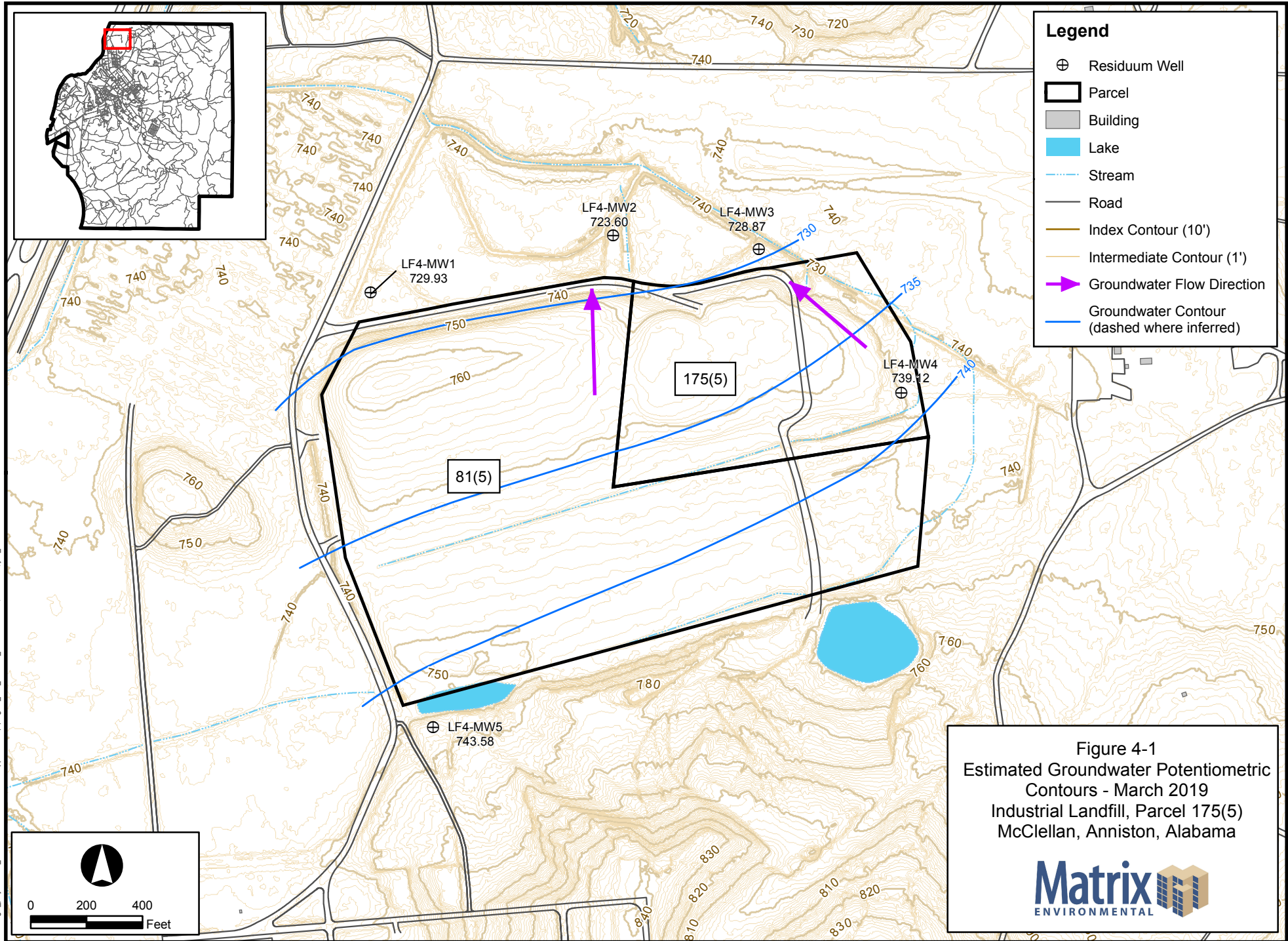


Figure 2-2 Floodplain Map

The "Special Flood Hazard Areas", as determined by FEMA, is an area 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.



Source: IT Corporation, 2002



APPENDICES

**Groundwater Monitoring Report, March 2019
Butler Green Industrial Landfill, Parcel 175(5)
(Permit No. 08-02)
McClellan, Anniston, Alabama**

APPENDIX A

Groundwater Sample Logs

APPENDIX B

Chains-of-Custody, September 2018

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 # 17.094.18-07.1 500
 Lab contract: 18.094.19-07.1 500

COC Number 5684
 Cooler ID 1 of 1
 Page 1 of 1

Samplers Signature [Signature]

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	3/7/19	1220	X	X		
Parcel 81(5), Landfill 4	LF4-MW2	NS	MW	WQ	Grab		1320	X	X		
Parcel 81(5), Landfill 4	LF4-MW3	NS	MW	WQ	Grab		1410	X	X		
Parcel 81(5), Landfill 4	LF4-MW3	MS/MSD	MW	WQ	Grab		1410	X	X		
Parcel 81(5), Landfill 4	LF4-MW4	NS	MW	WQ	Grab		1525	X	X		
Parcel 81(5), Landfill 4	LF4-MW5	NS	MW	WQ	Grab		1635	X	X		
Parcel 81(5), Landfill 4	DUP316	FD	MW	WQ	Grab		N/A	X	X		
Parcel 81(5), Landfill 4	TB522	TB	WQ	W	Grab		1640			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

Double the number of bottles for MS/MSD

COMMENTS:

See Task Order 18.094.19-07.1 500 for required list of VOCs and metals

Relinquished by (Signature): [Signature]

Date/Time: 3/7/19

Received by (Signature): [Signature]

FedEx

Relinquished by (Signature): [Signature]

Date/Time: 3/8/19

Received by (Signature): [Signature]

3.8/40



680-165602 Chain of Custody

APPENDIX C

Data Quality Summary, March 2019

Appendix C
Data Quality Summary:
Butler Green Industrial Landfill, Parcel 175(5)
McClellan, Anniston, Alabama
March 2019 Monitoring Event

Prepared for:



Prepared by:



283 Rucker Street, Bldg. 3165
Anniston, Alabama 36205
(256) 847-0780
Fax (256) 847-0905

May 2019

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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>
<i>ARBCA</i>	<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 2019 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:

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

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:

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

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 2019 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 SW6010C – 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 instead of SW6020A for this sampling round, which resulted in higher 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
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.
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 C5-5.

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, one analyte was 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 C5-2. All recoveries within criteria. 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	DUP316	LF4-MW1	3/7/19	680-165602-1	SW6020B
WG	DUP316	LF4-MW1	3/7/19	680-165602-1	SW7470A
WG	DUP316	LF4-MW1	3/7/19	680-165602-1	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 C5-3 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. None of the RPD values exceeded 50 percent. 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, therefore, 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 C5-4 shows the LCS/LCSD percent recovery and RPD data. The LCS and LCSD percent recoveries met criteria.

One hundred percent of the LCS/LCSD percent recoveries and one hundred 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 target analytes were detected in the method blanks or CCBs for this sampling event.

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 C5-5. No qualifiers were required for sample results based on surrogate recoveries.

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.

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 2019 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. No 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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- Matrix Environmental Services, LLC (MES). 2004. *Quality Assurance Project Plan (Appendix A of the Installation Wide Sampling and Analysis Plan)*. January.
- 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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- EPA. 2017b. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. January.

TABLES

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

Site Name	Station Name	QC Code	Matrix	Sample Date	Lab	Delivery Group	Laboratory Sample ID	Method
PARCEL 81(5), LANDFILL 4	LF4-MW1	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-1	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW1	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-1	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW1	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-1	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW1	FD	WG	3/7/2019	TALSAV	680-165602-1	680-165602-6	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW1	FD	WG	3/7/2019	TALSAV	680-165602-1	680-165602-6	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW1	FD	WG	3/7/2019	TALSAV	680-165602-1	680-165602-6	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW2	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-2	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW2	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-2	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW2	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-2	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW3	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW3	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW3	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW3	MS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3 MS	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW3	MS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3 MS	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW3	MS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3 MS	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW3	MSD	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3 MSD	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW3	MSD	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3 MSD	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW3	MSD	WG	3/7/2019	TALSAV	680-165602-1	680-165602-3 MSD	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW4	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-4	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW4	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-4	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW4	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-4	SW8260B
PARCEL 81(5), LANDFILL 4	LF4-MW5	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-5	SW6020B
PARCEL 81(5), LANDFILL 4	LF4-MW5	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-5	SW7470A
PARCEL 81(5), LANDFILL 4	LF4-MW5	NS	WG	3/7/2019	TALSAV	680-165602-1	680-165602-5	SW8260B
TRIP								
MCCLELLAN FIELD QC	BLANK (TB522)	TB	W	3/7/2019	TALSAV	680-165602-1	680-165602-7	SW8260B

Notes:

TALSAV = TestAmerica, Savannah, GA

FD = Field duplicate

ID = Identification

MS = Matrix spike

MSD = Matrix spike duplicate

NS = Normal sample

QC = Quality Control

TB = Trip blank

W = Water

WG = Groundwater

WS = Material Blank

* TB not reported; instrument malfunction first run, mis-spike second attempt; no additional sample.

**Table C5-2: 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		
		Date	Delivery Group			%R	%R	LCL	UCL	RPD	Limit	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Antimony	106	97	75	125	8.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Arsenic	104	102	75	125	1.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Barium	94	100	75	125	6.2	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Beryllium	101	100	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Cadmium	104	103	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Chromium	102	101	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Cobalt	104	102	75	125	1.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Copper	101	99	75	125	2.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Lead	100	99	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Nickel	104	102	75	125	1.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Selenium	104	101	75	125	2.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Silver	99	98	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Thallium	106	104	75	125	1.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Vanadium	104	103	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW6020B	Zinc	100	99	75	125	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW7470A	Mercury	85	91	80	120	6.8	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	1,1-Dichloroethene	106	99	63	143	6.8	30	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	1,4-Dichlorobenzene	98	98	70	127	0.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Acetone	97	88	68	129	9.7	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Benzene	102	102	79	136	0.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Carbon Disulfide	100	96	80	133	4.1	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Chlorobenzene	96	94	75	125	2.1	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Chloroethane	101	98	65	139	3.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Chloroform	101	100	75	132	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Cis-1,2-Dichloroethene	101	100	80	127	1.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Ethylbenzene	103	106	73	120	3	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Toluene	99	99	67	132	0.0	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B	Trans-1,2-Dichloroethene	109	107	77	127	1.9	20	
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B		Trichloroethene	105	103	74	123	2	20
LF4-MW3	WG	3/7/19	680-165602-1	SW8260B		Vinyl Chloride	116	104	45	150	10.9	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 C5-3: 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 Value	FD Lab Flag	NS Value	NS Lab Flag	Units	RPD	MDL	RL
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Barium	50		47		µg/L	5.0	0.61	5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Beryllium	0.38	J	0.17	J	µg/L	0.5	0.17	0.5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Chromium	1.9	J	1.7	J	µg/L	5.0	1.6000	5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Cobalt	38		38		µg/L	0.5	0.12	0.5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Copper	2	J	1.7	J	µg/L	5.0	1.7	5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Lead	2	J	1.7	J	µg/L	2.5	0.98	2.5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Nickel	23		23		µg/L	5.0	1.9	5
LF4-MW1	WG	3/7/19	680-165602-1	SW6020B	Zinc	66		58		µg/L	20.0	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:

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

V = Detected value.

**Table C5-4: 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
SW6010C	680-165602-1	3/7/19	680-56991	W	Antimony	105	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Arsenic	102	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Barium	105	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Beryllium	101	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Cadmium	105	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Chromium	103	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Cobalt	104	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Copper	101	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Lead	99	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Nickel	103	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Selenium	101	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Silver	101	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Thallium	104	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Vanadium	101	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-56991	W	Zinc	101	NA	80	120	NA	20
SW7470A	680-165602-1	3/7/19	680-540061	W	Mercury	95	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Antimony	114	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Arsenic	111	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Barium	111	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Beryllium	106	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Cadmium	113	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Chromium	112	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Cobalt	114	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Copper	110	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Lead	109	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Nickel	113	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Selenium	112	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Silver	109	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Thallium	114	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Vanadium	110	NA	80	120	NA	20
SW6010C	680-165602-1	3/7/19	680-540207	W	Zinc	111	NA	80	120	NA	20
SW8260B	680-165602-1	3/16/19	680-562273	W	1,1-Dichloroethene	89	94	76	120	5	30
SW8260B	680-165602-1	3/16/19	680-562273	W	1,4-Dichlorobenzene	102	101	80	120	1	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Acetone	95	102	70	135	7	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Benzene	101	97	80	120	4	20

**Table C5-4: 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
SW8260B	680-165602-1	3/16/19	680-562273	W	Carbon Disulfide	89	99	80	120	11	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Chlorobenzene	96	96	80	120	0	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Chloroethane	88	91	68	135	3	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Chloroform	99	94	80	120	5	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Cis-1,2-Dichloroethene	99	94	80	120	5	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Ethylbenzene	103	104	80	120	1	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Toluene	98	100	67	132	2	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Trans-1,2-Dichloroethene	100	108	80	120	8	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Trichloroethene	100	101	80	120	1	20
SW8260B	680-165602-1	3/16/19	680-562273	W	Vinyl Chloride	99	94	71	128	5	20
SW8260B	680-165602-1	3/18/19	680-562427	W	1,1-Dichloroethene	105	107	76	120	2	20
SW8260B	680-165602-1	3/18/19	680-562427	W	1,4-Dichlorobenzene	99	101	80	120	2	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Acetone	106	103	70	135	3	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Benzene	101	102	80	120	1	30
SW8260B	680-165602-1	3/18/19	680-562427	W	Carbon Disulfide	95	95	80	120	0	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Chlorobenzene	103	103	80	120	0	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Chloroethane	109	110	68	135	1	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Chloroform	102	103	80	120	1	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Cis-1,2-Dichloroethene	102	103	80	120	1	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Ethylbenzene	102	104	80	120	2	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Toluene	102	103	71	132	1	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Trans-1,2-Dichloroethene	101	101	80	120	0	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Trichloroethene	101	103	80	120	2	20
SW8260B	680-165602-1	3/18/19	680-562427	W	Vinyl Chloride	103	104	71	128	1	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 C5-5: 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	3/7/19	WG	NS	680-165602-1	SW8260B	1,2-Dichloroethane-D4	97	73	131
LF4-MW1	3/7/19	WG	NS	680-165602-1	SW8260B	4-Bromofluorobenzene	109	80	120
LF4-MW1	3/7/19	WG	NS	680-165602-1	SW8260B	Dibromofluoromethane	95	80	122
LF4-MW1	3/7/19	WG	NS	680-165602-1	SW8260B	Toluene-D8	99	80	120
LF4-MW1	3/7/19	WG	FD	680-165602-1	SW8260B	1,2-Dichloroethane-D4	96	73	131
LF4-MW1	3/7/19	WG	FD	680-165602-1	SW8260B	4-Bromofluorobenzene	98	80	120
LF4-MW1	3/7/19	WG	FD	680-165602-1	SW8260B	Dibromofluoromethane	100	80	122
LF4-MW1	3/7/19	WG	FD	680-165602-1	SW8260B	Toluene-D8	89	80	120
LF4-MW2	3/7/19	WG	NS	680-165602-1	SW8260B	1,2-Dichloroethane-D4	96	73	131
LF4-MW2	3/7/19	WG	NS	680-165602-1	SW8260B	4-Bromofluorobenzene	109	80	120
LF4-MW2	3/7/19	WG	NS	680-165602-1	SW8260B	Dibromofluoromethane	101	80	122
LF4-MW2	3/7/19	WG	NS	680-165602-1	SW8260B	Toluene-D8	99	80	120
LF4-MW3	3/7/19	WG	NS	680-165602-1	SW8260B	1,2-Dichloroethane-D4	95	73	131
LF4-MW3	3/7/19	WG	NS	680-165602-1	SW8260B	4-Bromofluorobenzene	108	80	120
LF4-MW3	3/7/19	WG	NS	680-165602-1	SW8260B	Dibromofluoromethane	100	80	122
LF4-MW3	3/7/19	WG	NS	680-165602-1	SW8260B	Toluene-D8	99	80	120
LF4-MW4	3/7/19	WG	NS	680-165602-1	SW8260B	1,2-Dichloroethane-D4	96	73	131
LF4-MW4	3/7/19	WG	NS	680-165602-1	SW8260B	4-Bromofluorobenzene	111	80	120
LF4-MW4	3/7/19	WG	NS	680-165602-1	SW8260B	Dibromofluoromethane	115	80	122
LF4-MW4	3/7/19	WG	NS	680-165602-1	SW8260B	Toluene-D8	100	80	120
LF4-MW5	3/7/19	WG	NS	680-165602-1	SW8260B	1,2-Dichloroethane-D4	92	73	131
LF4-MW5	3/7/19	WG	NS	680-165602-1	SW8260B	4-Bromofluorobenzene	108	80	120
LF4-MW5	3/7/19	WG	NS	680-165602-1	SW8260B	Dibromofluoromethane	94	80	122
LF4-MW5	3/7/19	WG	NS	680-165602-1	SW8260B	Toluene-D8	101	80	120
TRIP BLANK	3/7/19	W	TB	680-165602-1	SW8260B	1,2-Dichloroethane-D4	92	73	131
TRIP BLANK	3/7/19	W	TB	680-165602-1	SW8260B	4-Bromofluorobenzene	100	80	120
TRIP BLANK	3/7/19	W	TB	680-165602-1	SW8260B	Dibromofluoromethane	95	80	122
TRIP BLANK	3/7/19	W	TB	680-165602-1	SW8260B	Toluene-D8	102	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 2019

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Savannah

5102 LaRoche Avenue

Savannah, GA 31404

Tel: (912)354-7858

TestAmerica Job ID: 680-165602-1

Client Project/Site: Parcel 81(5), Landfill 4

For:

Matrix Environmental Services, LLC

1601 Blake Street

Suite 200

Denver, Colorado 80202

Attn: Ms. Betty Van Pelt



Authorized for release by:

3/20/2019 3:07:06 PM

Jon Lawhon, Project Manager I

(912)250-0283

jon.lawhon@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 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

TestAmerica Job ID: 680-165602-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Metals

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

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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Sample Summary

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

TestAmerica Job ID: 680-165602-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-165602-1	LF4-MW1	Water	03/07/19 12:20	03/08/19 09:40
680-165602-2	LF4-MW2	Water	03/07/19 13:20	03/08/19 09:40
680-165602-3	LF4-MW3	Water	03/07/19 14:10	03/08/19 09:40
680-165602-4	LF4-MW4	Water	03/07/19 15:25	03/08/19 09:40
680-165602-5	LF4-MW5	Water	03/07/19 16:35	03/08/19 09:40
680-165602-6	DUP316	Water	03/07/19 00:00	03/08/19 09:40
680-165602-7	TB522	Water	03/07/19 16:40	03/08/19 09:40

Case Narrative

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

TestAmerica Job ID: 680-165602-1

Job ID: 680-165602-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

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

Report Number: 680-165602-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 3/8/2019 9:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.0° C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples LF4-MW1 (680-165602-1), LF4-MW2 (680-165602-2), LF4-MW3 (680-165602-3), LF4-MW4 (680-165602-4), LF4-MW5 (680-165602-5), DUP316 (680-165602-6) and TB522 (680-165602-7) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/16/2019 and 03/18/2019.

The trip blank associated with batch 562273 contains a detection for Acetone above the method detection limit (MDL). The detection was below the reporting limit (RL) therefore; the data has been qualified and reported.

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

METALS (ICP-MS)

Samples LF4-MW1 (680-165602-1), LF4-MW2 (680-165602-2), LF4-MW3 (680-165602-3), LF4-MW4 (680-165602-4), LF4-MW5 (680-165602-5) and DUP316 (680-165602-6) were analyzed for Metals (ICP-MS) in accordance with EPA SW-846 Method 6020B. The samples were prepared on 03/14/2019 and 03/15/2019 and analyzed on 03/15/2019.

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

TOTAL MERCURY

Samples LF4-MW1 (680-165602-1), LF4-MW2 (680-165602-2), LF4-MW3 (680-165602-3), LF4-MW4 (680-165602-4), LF4-MW5 (680-165602-5) and DUP316 (680-165602-6) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 03/13/2019 and analyzed on 03/15/2019.

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

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW1

Date Collected: 03/07/19 12:20

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 13:53	1
Benzene	0.43	U	1.0	0.43	ug/L			03/16/19 13:53	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 13:53	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/16/19 13:53	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/16/19 13:53	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 13:53	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/16/19 13:53	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 13:53	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 13:53	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 13:53	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 13:53	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/16/19 13:53	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/16/19 13:53	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 13:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	109		80 - 120		03/16/19 13:53	1
Dibromofluoromethane (Surr)	95		80 - 122		03/16/19 13:53	1
1,2-Dichloroethane-d4 (Surr)	97		73 - 131		03/16/19 13:53	1
Toluene-d8 (Surr)	99		80 - 120		03/16/19 13:53	1

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/14/19 15:32	03/15/19 19:26	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/14/19 15:32	03/15/19 19:26	1
Barium	47		5.0	0.61	ug/L		03/14/19 15:32	03/15/19 19:26	1
Beryllium	0.17	J	0.50	0.17	ug/L		03/14/19 15:32	03/15/19 19:26	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/14/19 15:32	03/15/19 19:26	1
Chromium	1.7	J	5.0	1.6	ug/L		03/14/19 15:32	03/15/19 19:26	1
Cobalt	38		0.50	0.12	ug/L		03/14/19 15:32	03/15/19 19:26	1
Copper	1.7	J	5.0	1.7	ug/L		03/14/19 15:32	03/15/19 19:26	1
Lead	1.7	J	2.5	0.98	ug/L		03/14/19 15:32	03/15/19 19:26	1
Nickel	23		5.0	1.9	ug/L		03/14/19 15:32	03/15/19 19:26	1
Selenium	1.0	U	2.5	1.0	ug/L		03/14/19 15:32	03/15/19 19:26	1
Silver	0.10	U	1.0	0.10	ug/L		03/14/19 15:32	03/15/19 19:26	1
Thallium	0.49	U	1.0	0.49	ug/L		03/14/19 15:32	03/15/19 19:26	1
Vanadium	5.3	U	10	5.3	ug/L		03/14/19 15:32	03/15/19 19:26	1
Zinc	58		20	9.6	ug/L		03/14/19 15:32	03/15/19 19:26	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		03/13/19 12:51	03/15/19 09:16	1

Client Sample ID: LF4-MW2

Date Collected: 03/07/19 13:20

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 14:16	1

TestAmerica Savannah

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW2

Date Collected: 03/07/19 13:20

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-2

Matrix: Water

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			03/16/19 14:16	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 14:16	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/16/19 14:16	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/16/19 14:16	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 14:16	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/16/19 14:16	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 14:16	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 14:16	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 14:16	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 14:16	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/16/19 14:16	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/16/19 14:16	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 14:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	109		80 - 120		03/16/19 14:16	1
Dibromofluoromethane (Surr)	101		80 - 122		03/16/19 14:16	1
1,2-Dichloroethane-d4 (Surr)	96		73 - 131		03/16/19 14:16	1
Toluene-d8 (Surr)	99		80 - 120		03/16/19 14:16	1

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/14/19 15:32	03/15/19 19:15	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/14/19 15:32	03/15/19 19:15	1
Barium	59		5.0	0.61	ug/L		03/14/19 15:32	03/15/19 19:15	1
Beryllium	1.3		0.50	0.17	ug/L		03/14/19 15:32	03/15/19 19:15	1
Cadmium	1.3		0.50	0.15	ug/L		03/14/19 15:32	03/15/19 19:15	1
Chromium	4.7	J	5.0	1.6	ug/L		03/14/19 15:32	03/15/19 19:15	1
Cobalt	160		0.50	0.12	ug/L		03/14/19 15:32	03/15/19 19:15	1
Copper	27		5.0	1.7	ug/L		03/14/19 15:32	03/15/19 19:15	1
Lead	4.7		2.5	0.98	ug/L		03/14/19 15:32	03/15/19 19:15	1
Nickel	96		5.0	1.9	ug/L		03/14/19 15:32	03/15/19 19:15	1
Selenium	1.3	J	2.5	1.0	ug/L		03/14/19 15:32	03/15/19 19:15	1
Silver	0.10	U	1.0	0.10	ug/L		03/14/19 15:32	03/15/19 19:15	1
Thallium	0.49	U	1.0	0.49	ug/L		03/14/19 15:32	03/15/19 19:15	1
Vanadium	5.3	U	10	5.3	ug/L		03/14/19 15:32	03/15/19 19:15	1
Zinc	1200		20	9.6	ug/L		03/14/19 15:32	03/15/19 19:15	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		03/13/19 12:51	03/15/19 09:20	1

Client Sample ID: LF4-MW3

Date Collected: 03/07/19 14:10

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 19:10	1
Benzene	0.43	U	1.0	0.43	ug/L			03/16/19 19:10	1

TestAmerica Savannah

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW3

Date Collected: 03/07/19 14:10

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 19:10	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/16/19 19:10	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/16/19 19:10	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 19:10	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/16/19 19:10	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 19:10	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 19:10	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 19:10	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 19:10	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/16/19 19:10	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/16/19 19:10	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 19:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	108		80 - 120		03/16/19 19:10	1
Dibromofluoromethane (Surr)	100		80 - 122		03/16/19 19:10	1
1,2-Dichloroethane-d4 (Surr)	95		73 - 131		03/16/19 19:10	1
Toluene-d8 (Surr)	99		80 - 120		03/16/19 19:10	1

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/15/19 09:16	03/15/19 17:17	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/15/19 09:16	03/15/19 17:17	1
Barium	68		5.0	0.61	ug/L		03/15/19 09:16	03/15/19 17:17	1
Beryllium	0.44	J	0.50	0.17	ug/L		03/15/19 09:16	03/15/19 17:17	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/15/19 09:16	03/15/19 17:17	1
Chromium	2.4	J	5.0	1.6	ug/L		03/15/19 09:16	03/15/19 17:17	1
Cobalt	1.3		0.50	0.12	ug/L		03/15/19 09:16	03/15/19 17:17	1
Copper	2.5	J	5.0	1.7	ug/L		03/15/19 09:16	03/15/19 17:17	1
Lead	4.1		2.5	0.98	ug/L		03/15/19 09:16	03/15/19 17:17	1
Nickel	3.3	J	5.0	1.9	ug/L		03/15/19 09:16	03/15/19 17:17	1
Selenium	1.0	U	2.5	1.0	ug/L		03/15/19 09:16	03/15/19 17:17	1
Silver	0.10	U	1.0	0.10	ug/L		03/15/19 09:16	03/15/19 17:17	1
Thallium	0.49	U	1.0	0.49	ug/L		03/15/19 09:16	03/15/19 17:17	1
Vanadium	5.3	U	10	5.3	ug/L		03/15/19 09:16	03/15/19 17:17	1
Zinc	16	J	20	9.6	ug/L		03/15/19 09:16	03/15/19 17:17	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		03/13/19 12:51	03/15/19 09:23	1

Client Sample ID: LF4-MW4

Date Collected: 03/07/19 15:25

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 14:38	1
Benzene	0.43	U	1.0	0.43	ug/L			03/16/19 14:38	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 14:38	1

TestAmerica Savannah

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW4

Date Collected: 03/07/19 15:25

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	1.2		1.0	0.26	ug/L			03/16/19 14:38	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/16/19 14:38	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 14:38	1
cis-1,2-Dichloroethene	35		1.0	0.41	ug/L			03/16/19 14:38	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 14:38	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 14:38	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 14:38	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 14:38	1
trans-1,2-Dichloroethene	2.8		1.0	0.37	ug/L			03/16/19 14:38	1
Trichloroethene	34		1.0	0.48	ug/L			03/16/19 14:38	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 14:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	111		80 - 120		03/16/19 14:38	1
Dibromofluoromethane (Surr)	115		80 - 122		03/16/19 14:38	1
1,2-Dichloroethane-d4 (Surr)	96		73 - 131		03/16/19 14:38	1
Toluene-d8 (Surr)	100		80 - 120		03/16/19 14:38	1

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/15/19 09:16	03/15/19 17:36	1
Arsenic	5.0		3.0	1.5	ug/L		03/15/19 09:16	03/15/19 17:36	1
Barium	180		5.0	0.61	ug/L		03/15/19 09:16	03/15/19 17:36	1
Beryllium	0.17	U	0.50	0.17	ug/L		03/15/19 09:16	03/15/19 17:36	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/15/19 09:16	03/15/19 17:36	1
Chromium	1.6	U	5.0	1.6	ug/L		03/15/19 09:16	03/15/19 17:36	1
Cobalt	1.9		0.50	0.12	ug/L		03/15/19 09:16	03/15/19 17:36	1
Copper	1.7	U	5.0	1.7	ug/L		03/15/19 09:16	03/15/19 17:36	1
Lead	1.2	J	2.5	0.98	ug/L		03/15/19 09:16	03/15/19 17:36	1
Nickel	1.9	U	5.0	1.9	ug/L		03/15/19 09:16	03/15/19 17:36	1
Selenium	1.0	U	2.5	1.0	ug/L		03/15/19 09:16	03/15/19 17:36	1
Silver	0.10	U	1.0	0.10	ug/L		03/15/19 09:16	03/15/19 17:36	1
Thallium	0.49	U	1.0	0.49	ug/L		03/15/19 09:16	03/15/19 17:36	1
Vanadium	5.3	U	10	5.3	ug/L		03/15/19 09:16	03/15/19 17:36	1
Zinc	56		20	9.6	ug/L		03/15/19 09:16	03/15/19 17:36	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		03/13/19 12:51	03/15/19 09:35	1

Client Sample ID: LF4-MW5

Date Collected: 03/07/19 16:35

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 15:01	1
Benzene	0.43	U	1.0	0.43	ug/L			03/16/19 15:01	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 15:01	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/16/19 15:01	1

TestAmerica Savannah

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW5

Lab Sample ID: 680-165602-5

Date Collected: 03/07/19 16:35

Matrix: Water

Date Received: 03/08/19 09:40

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			03/16/19 15:01	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 15:01	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/16/19 15:01	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 15:01	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 15:01	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 15:01	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 15:01	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/16/19 15:01	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/16/19 15:01	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 15:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	108		80 - 120		03/16/19 15:01	1
Dibromofluoromethane (Surr)	94		80 - 122		03/16/19 15:01	1
1,2-Dichloroethane-d4 (Surr)	92		73 - 131		03/16/19 15:01	1
Toluene-d8 (Surr)	101		80 - 120		03/16/19 15:01	1

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/15/19 09:16	03/15/19 17:40	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/15/19 09:16	03/15/19 17:40	1
Barium	23		5.0	0.61	ug/L		03/15/19 09:16	03/15/19 17:40	1
Beryllium	0.17	U	0.50	0.17	ug/L		03/15/19 09:16	03/15/19 17:40	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/15/19 09:16	03/15/19 17:40	1
Chromium	2.6	J	5.0	1.6	ug/L		03/15/19 09:16	03/15/19 17:40	1
Cobalt	4.3		0.50	0.12	ug/L		03/15/19 09:16	03/15/19 17:40	1
Copper	2.0	J	5.0	1.7	ug/L		03/15/19 09:16	03/15/19 17:40	1
Lead	2.3	J	2.5	0.98	ug/L		03/15/19 09:16	03/15/19 17:40	1
Nickel	3.9	J	5.0	1.9	ug/L		03/15/19 09:16	03/15/19 17:40	1
Selenium	1.0	U	2.5	1.0	ug/L		03/15/19 09:16	03/15/19 17:40	1
Silver	0.10	U	1.0	0.10	ug/L		03/15/19 09:16	03/15/19 17:40	1
Thallium	0.49	U	1.0	0.49	ug/L		03/15/19 09:16	03/15/19 17:40	1
Vanadium	5.4	J	10	5.3	ug/L		03/15/19 09:16	03/15/19 17:40	1
Zinc	21		20	9.6	ug/L		03/15/19 09:16	03/15/19 17:40	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		03/13/19 12:51	03/15/19 09:39	1

Client Sample ID: DUP316

Lab Sample ID: 680-165602-6

Date Collected: 03/07/19 00:00

Matrix: Water

Date Received: 03/08/19 09:40

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 15:24	1
Benzene	0.43	U	1.0	0.43	ug/L			03/16/19 15:24	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 15:24	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/16/19 15:24	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/16/19 15:24	1

TestAmerica Savannah

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: DUP316

Date Collected: 03/07/19 00:00

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 15:24	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/16/19 15:24	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 15:24	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 15:24	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 15:24	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 15:24	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/16/19 15:24	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/16/19 15:24	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 15:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		80 - 120					03/16/19 15:24	1
Dibromofluoromethane (Surr)	100		80 - 122					03/16/19 15:24	1
1,2-Dichloroethane-d4 (Surr)	96		73 - 131					03/16/19 15:24	1
Toluene-d8 (Surr)	89		80 - 120					03/16/19 15:24	1

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/14/19 15:32	03/15/19 19:38	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/14/19 15:32	03/15/19 19:38	1
Barium	50		5.0	0.61	ug/L		03/14/19 15:32	03/15/19 19:38	1
Beryllium	0.38	J	0.50	0.17	ug/L		03/14/19 15:32	03/15/19 19:38	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/14/19 15:32	03/15/19 19:38	1
Chromium	1.9	J	5.0	1.6	ug/L		03/14/19 15:32	03/15/19 19:38	1
Cobalt	38		0.50	0.12	ug/L		03/14/19 15:32	03/15/19 19:38	1
Copper	2.0	J	5.0	1.7	ug/L		03/14/19 15:32	03/15/19 19:38	1
Lead	2.0	J	2.5	0.98	ug/L		03/14/19 15:32	03/15/19 19:38	1
Nickel	23		5.0	1.9	ug/L		03/14/19 15:32	03/15/19 19:38	1
Selenium	1.0	U	2.5	1.0	ug/L		03/14/19 15:32	03/15/19 19:38	1
Silver	0.10	U	1.0	0.10	ug/L		03/14/19 15:32	03/15/19 19:38	1
Thallium	0.49	U	1.0	0.49	ug/L		03/14/19 15:32	03/15/19 19:38	1
Vanadium	5.3	U	10	5.3	ug/L		03/14/19 15:32	03/15/19 19:38	1
Zinc	66		20	9.6	ug/L		03/14/19 15:32	03/15/19 19:38	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		03/13/19 12:51	03/15/19 09:42	1

Client Sample ID: TB522

Date Collected: 03/07/19 16:40

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/18/19 19:25	1
Benzene	0.43	U	1.0	0.43	ug/L			03/18/19 19:25	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/18/19 19:25	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/18/19 19:25	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/18/19 19:25	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/18/19 19:25	1

TestAmerica Savannah

Client Sample Results

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: TB522

Date Collected: 03/07/19 16:40

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-7

Matrix: Water

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			03/18/19 19:25	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/18/19 19:25	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/18/19 19:25	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/18/19 19:25	1
Toluene	0.48	U	1.0	0.48	ug/L			03/18/19 19:25	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/18/19 19:25	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/18/19 19:25	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/18/19 19:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		80 - 120					03/18/19 19:25	1
Dibromofluoromethane (Surr)	95		80 - 122					03/18/19 19:25	1
1,2-Dichloroethane-d4 (Surr)	92		73 - 131					03/18/19 19:25	1
Toluene-d8 (Surr)	102		80 - 120					03/18/19 19:25	1

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

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

Lab Sample ID: MB 680-562273/8

Matrix: Water

Analysis Batch: 562273

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/16/19 12:23	1
Benzene	0.43	U	1.0	0.43	ug/L			03/16/19 12:23	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/16/19 12:23	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/16/19 12:23	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/16/19 12:23	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/16/19 12:23	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/16/19 12:23	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/16/19 12:23	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/16/19 12:23	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/16/19 12:23	1
Toluene	0.48	U	1.0	0.48	ug/L			03/16/19 12:23	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/16/19 12:23	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/16/19 12:23	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/16/19 12:23	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	108		80 - 120		03/16/19 12:23	1
Dibromofluoromethane (Surr)	99		80 - 122		03/16/19 12:23	1
1,2-Dichloroethane-d4 (Surr)	95		73 - 131		03/16/19 12:23	1
Toluene-d8 (Surr)	104		80 - 120		03/16/19 12:23	1

Lab Sample ID: LCS 680-562273/3

Matrix: Water

Analysis Batch: 562273

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	236		ug/L		95	70 - 135
Benzene	50.0	50.6		ug/L		101	80 - 120
Carbon disulfide	50.0	44.3		ug/L		89	80 - 120
Chlorobenzene	50.0	47.8		ug/L		96	80 - 120
Chloroethane	50.0	43.9		ug/L		88	66 - 135
Chloroform	50.0	49.6		ug/L		99	80 - 120
cis-1,2-Dichloroethene	50.0	49.3		ug/L		99	80 - 120
1,4-Dichlorobenzene	50.0	50.8		ug/L		102	80 - 120
1,1-Dichloroethene	50.0	44.3		ug/L		89	76 - 120
Ethylbenzene	50.0	51.6		ug/L		103	80 - 120
Toluene	50.0	49.2		ug/L		98	80 - 113
trans-1,2-Dichloroethene	50.0	49.8		ug/L		100	80 - 120
Trichloroethene	50.0	50.1		ug/L		100	80 - 120
Vinyl chloride	50.0	49.5		ug/L		99	71 - 128

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	106		80 - 120
Dibromofluoromethane (Surr)	96		80 - 122
1,2-Dichloroethane-d4 (Surr)	96		73 - 131
Toluene-d8 (Surr)	94		80 - 120

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

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

Lab Sample ID: LCSD 680-562273/4

Matrix: Water

Analysis Batch: 562273

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
Acetone	250	254		ug/L		102	70 - 135	7	30
Benzene	50.0	48.7		ug/L		97	80 - 120	4	20
Carbon disulfide	50.0	49.5		ug/L		99	80 - 120	11	20
Chlorobenzene	50.0	48.2		ug/L		96	80 - 120	1	20
Chloroethane	50.0	45.6		ug/L		91	66 - 135	4	20
Chloroform	50.0	47.0		ug/L		94	80 - 120	5	20
cis-1,2-Dichloroethene	50.0	46.9		ug/L		94	80 - 120	5	20
1,4-Dichlorobenzene	50.0	50.6		ug/L		101	80 - 120	1	20
1,1-Dichloroethene	50.0	47.1		ug/L		94	76 - 120	6	20
Ethylbenzene	50.0	52.1		ug/L		104	80 - 120	1	20
Toluene	50.0	49.9		ug/L		100	80 - 113	1	20
trans-1,2-Dichloroethene	50.0	53.9		ug/L		108	80 - 120	8	20
Trichloroethene	50.0	50.7		ug/L		101	80 - 120	1	20
Vinyl chloride	50.0	47.1		ug/L		94	71 - 128	5	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	102		80 - 120
Dibromofluoromethane (Surr)	93		80 - 122
1,2-Dichloroethane-d4 (Surr)	91		73 - 131
Toluene-d8 (Surr)	96		80 - 120

Lab Sample ID: 680-165602-3 MS

Matrix: Water

Analysis Batch: 562273

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
Acetone	7.0	U	250	242		ug/L		97	60 - 154
Benzene	0.43	U	50.0	51.1		ug/L		102	73 - 131
Carbon disulfide	1.0	U	50.0	49.9		ug/L		100	73 - 127
Chlorobenzene	0.26	U	50.0	47.8		ug/L		96	80 - 120
Chloroethane	2.5	U	50.0	50.5		ug/L		101	50 - 151
Chloroform	0.50	U	50.0	50.7		ug/L		101	79 - 122
cis-1,2-Dichloroethene	0.41	U	50.0	50.5		ug/L		101	80 - 122
1,4-Dichlorobenzene	0.46	U	50.0	48.8		ug/L		98	80 - 120
1,1-Dichloroethene	0.36	U	50.0	52.9		ug/L		106	74 - 125
Ethylbenzene	0.33	U	50.0	51.7		ug/L		103	80 - 120
Toluene	0.48	U	50.0	49.5		ug/L		99	80 - 122
trans-1,2-Dichloroethene	0.37	U	50.0	54.6		ug/L		109	78 - 123
Trichloroethene	0.48	U	50.0	52.3		ug/L		105	80 - 123
Vinyl chloride	0.50	U	50.0	57.9		ug/L		116	68 - 132

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		80 - 120
Dibromofluoromethane (Surr)	100		80 - 122
1,2-Dichloroethane-d4 (Surr)	94		73 - 131
Toluene-d8 (Surr)	97		80 - 120

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

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

Lab Sample ID: 680-165602-3 MSD

Matrix: Water

Analysis Batch: 562273

Client Sample ID: LF4-MW3

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acetone	7.0	U	250	221		ug/L		88	60 - 154	9	30
Benzene	0.43	U	50.0	51.2		ug/L		102	73 - 131	0	20
Carbon disulfide	1.0	U	50.0	48.0		ug/L		96	73 - 127	4	20
Chlorobenzene	0.26	U	50.0	47.0		ug/L		94	80 - 120	2	20
Chloroethane	2.5	U	50.0	49.2		ug/L		98	50 - 151	3	20
Chloroform	0.50	U	50.0	50.1		ug/L		100	79 - 122	1	20
cis-1,2-Dichloroethene	0.41	U	50.0	49.9		ug/L		100	80 - 122	1	20
1,4-Dichlorobenzene	0.46	U	50.0	48.9		ug/L		98	80 - 120	0	20
1,1-Dichloroethene	0.36	U	50.0	49.3		ug/L		99	74 - 125	7	20
Ethylbenzene	0.33	U	50.0	53.0		ug/L		106	80 - 120	3	20
Toluene	0.48	U	50.0	49.3		ug/L		99	80 - 122	0	20
trans-1,2-Dichloroethene	0.37	U	50.0	53.7		ug/L		107	78 - 123	2	20
Trichloroethene	0.48	U	50.0	51.7		ug/L		103	80 - 123	1	20
Vinyl chloride	0.50	U	50.0	52.0		ug/L		104	68 - 132	11	20

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		80 - 120
Dibromofluoromethane (Surr)	98		80 - 122
1,2-Dichloroethane-d4 (Surr)	94		73 - 131
Toluene-d8 (Surr)	96		80 - 120

Lab Sample ID: MB 680-562427/7

Matrix: Water

Analysis Batch: 562427

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	7.0	U	10	7.0	ug/L			03/18/19 12:08	1
Benzene	0.43	U	1.0	0.43	ug/L			03/18/19 12:08	1
Carbon disulfide	1.0	U	2.0	1.0	ug/L			03/18/19 12:08	1
Chlorobenzene	0.26	U	1.0	0.26	ug/L			03/18/19 12:08	1
Chloroethane	2.5	U	5.0	2.5	ug/L			03/18/19 12:08	1
Chloroform	0.50	U	1.0	0.50	ug/L			03/18/19 12:08	1
cis-1,2-Dichloroethene	0.41	U	1.0	0.41	ug/L			03/18/19 12:08	1
1,4-Dichlorobenzene	0.46	U	1.0	0.46	ug/L			03/18/19 12:08	1
1,1-Dichloroethene	0.36	U	1.0	0.36	ug/L			03/18/19 12:08	1
Ethylbenzene	0.33	U	1.0	0.33	ug/L			03/18/19 12:08	1
Toluene	0.48	U	1.0	0.48	ug/L			03/18/19 12:08	1
trans-1,2-Dichloroethene	0.37	U	1.0	0.37	ug/L			03/18/19 12:08	1
Trichloroethene	0.48	U	1.0	0.48	ug/L			03/18/19 12:08	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			03/18/19 12:08	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		80 - 120		03/18/19 12:08	1
Dibromofluoromethane (Surr)	96		80 - 122		03/18/19 12:08	1
1,2-Dichloroethane-d4 (Surr)	92		73 - 131		03/18/19 12:08	1
Toluene-d8 (Surr)	102		80 - 120		03/18/19 12:08	1

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

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

Lab Sample ID: LCS 680-562427/3

Matrix: Water

Analysis Batch: 562427

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acetone	250	265		ug/L		106	70 - 135
Benzene	50.0	50.6		ug/L		101	80 - 120
Carbon disulfide	50.0	47.4		ug/L		95	80 - 120
Chlorobenzene	50.0	51.4		ug/L		103	80 - 120
Chloroethane	50.0	54.7		ug/L		109	66 - 135
Chloroform	50.0	50.8		ug/L		102	80 - 120
cis-1,2-Dichloroethene	50.0	51.0		ug/L		102	80 - 120
1,4-Dichlorobenzene	50.0	49.3		ug/L		99	80 - 120
1,1-Dichloroethene	50.0	52.5		ug/L		105	76 - 120
Ethylbenzene	50.0	51.2		ug/L		102	80 - 120
Toluene	50.0	50.8		ug/L		102	80 - 113
trans-1,2-Dichloroethene	50.0	50.7		ug/L		101	80 - 120
Trichloroethene	50.0	50.6		ug/L		101	80 - 120
Vinyl chloride	50.0	51.6		ug/L		103	71 - 128

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	99		80 - 120
Dibromofluoromethane (Surr)	101		80 - 122
1,2-Dichloroethane-d4 (Surr)	99		73 - 131
Toluene-d8 (Surr)	101		80 - 120

Lab Sample ID: LCSD 680-562427/4

Matrix: Water

Analysis Batch: 562427

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
Acetone	250	258		ug/L		103	70 - 135	3	30
Benzene	50.0	51.1		ug/L		102	80 - 120	1	20
Carbon disulfide	50.0	47.7		ug/L		95	80 - 120	1	20
Chlorobenzene	50.0	51.5		ug/L		103	80 - 120	0	20
Chloroethane	50.0	55.2		ug/L		110	66 - 135	1	20
Chloroform	50.0	51.3		ug/L		103	80 - 120	1	20
cis-1,2-Dichloroethene	50.0	51.5		ug/L		103	80 - 120	1	20
1,4-Dichlorobenzene	50.0	50.7		ug/L		101	80 - 120	3	20
1,1-Dichloroethene	50.0	53.5		ug/L		107	76 - 120	2	20
Ethylbenzene	50.0	51.9		ug/L		104	80 - 120	1	20
Toluene	50.0	51.3		ug/L		103	80 - 113	1	20
trans-1,2-Dichloroethene	50.0	50.5		ug/L		101	80 - 120	0	20
Trichloroethene	50.0	51.3		ug/L		103	80 - 120	1	20
Vinyl chloride	50.0	52.0		ug/L		104	71 - 128	1	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		80 - 120
Dibromofluoromethane (Surr)	102		80 - 122
1,2-Dichloroethane-d4 (Surr)	98		73 - 131
Toluene-d8 (Surr)	102		80 - 120

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 680-561991/1-A

Matrix: Water

Analysis Batch: 562413

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 561991

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/14/19 15:32	03/15/19 17:55	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/14/19 15:32	03/15/19 17:55	1
Barium	0.61	U	5.0	0.61	ug/L		03/14/19 15:32	03/15/19 17:55	1
Beryllium	0.17	U	0.50	0.17	ug/L		03/14/19 15:32	03/15/19 17:55	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/14/19 15:32	03/15/19 17:55	1
Chromium	1.6	U	5.0	1.6	ug/L		03/14/19 15:32	03/15/19 17:55	1
Cobalt	0.12	U	0.50	0.12	ug/L		03/14/19 15:32	03/15/19 17:55	1
Copper	1.7	U	5.0	1.7	ug/L		03/14/19 15:32	03/15/19 17:55	1
Lead	0.98	U	2.5	0.98	ug/L		03/14/19 15:32	03/15/19 17:55	1
Nickel	1.9	U	5.0	1.9	ug/L		03/14/19 15:32	03/15/19 17:55	1
Selenium	1.0	U	2.5	1.0	ug/L		03/14/19 15:32	03/15/19 17:55	1
Silver	0.10	U	1.0	0.10	ug/L		03/14/19 15:32	03/15/19 17:55	1
Thallium	0.49	U	1.0	0.49	ug/L		03/14/19 15:32	03/15/19 17:55	1
Vanadium	5.3	U	10	5.3	ug/L		03/14/19 15:32	03/15/19 17:55	1
Zinc	9.6	U	20	9.6	ug/L		03/14/19 15:32	03/15/19 17:55	1

Lab Sample ID: LCS 680-561991/2-A

Matrix: Water

Analysis Batch: 562413

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 561991

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	52.5		ug/L		105	80 - 120
Arsenic	100	102		ug/L		102	80 - 120
Barium	100	105		ug/L		105	80 - 120
Beryllium	50.0	50.4		ug/L		101	80 - 120
Cadmium	50.0	52.6		ug/L		105	80 - 120
Chromium	100	103		ug/L		103	80 - 120
Cobalt	50.0	51.9		ug/L		104	80 - 120
Copper	100	101		ug/L		101	80 - 120
Lead	500	496		ug/L		99	80 - 120
Nickel	100	103		ug/L		103	80 - 120
Selenium	100	101		ug/L		101	80 - 120
Silver	50.0	50.3		ug/L		101	80 - 120
Thallium	40.0	41.8		ug/L		104	80 - 120
Vanadium	100	101		ug/L		101	80 - 120
Zinc	100	101		ug/L		101	80 - 120

Lab Sample ID: MB 680-562084/1-A

Matrix: Water

Analysis Batch: 562413

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 562084

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.50	U	5.0	0.50	ug/L		03/15/19 09:16	03/15/19 16:51	1
Arsenic	1.5	U	3.0	1.5	ug/L		03/15/19 09:16	03/15/19 16:51	1
Barium	0.61	U	5.0	0.61	ug/L		03/15/19 09:16	03/15/19 16:51	1
Beryllium	0.17	U	0.50	0.17	ug/L		03/15/19 09:16	03/15/19 16:51	1
Cadmium	0.15	U	0.50	0.15	ug/L		03/15/19 09:16	03/15/19 16:51	1
Chromium	1.6	U	5.0	1.6	ug/L		03/15/19 09:16	03/15/19 16:51	1

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

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

Lab Sample ID: MB 680-562084/1-A

Matrix: Water

Analysis Batch: 562413

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 562084

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.12	U	0.50	0.12	ug/L		03/15/19 09:16	03/15/19 16:51	1
Copper	1.7	U	5.0	1.7	ug/L		03/15/19 09:16	03/15/19 16:51	1
Lead	0.98	U	2.5	0.98	ug/L		03/15/19 09:16	03/15/19 16:51	1
Nickel	1.9	U	5.0	1.9	ug/L		03/15/19 09:16	03/15/19 16:51	1
Selenium	1.0	U	2.5	1.0	ug/L		03/15/19 09:16	03/15/19 16:51	1
Silver	0.10	U	1.0	0.10	ug/L		03/15/19 09:16	03/15/19 16:51	1
Thallium	0.49	U	1.0	0.49	ug/L		03/15/19 09:16	03/15/19 16:51	1
Vanadium	5.3	U	10	5.3	ug/L		03/15/19 09:16	03/15/19 16:51	1
Zinc	9.6	U	20	9.6	ug/L		03/15/19 09:16	03/15/19 16:51	1

Lab Sample ID: LCS 680-562084/2-A

Matrix: Water

Analysis Batch: 562413

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 562084

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	57.1		ug/L		114	80 - 120
Arsenic	100	111		ug/L		111	80 - 120
Barium	100	111		ug/L		111	80 - 120
Beryllium	50.0	52.9		ug/L		106	80 - 120
Cadmium	50.0	56.5		ug/L		113	80 - 120
Chromium	100	112		ug/L		112	80 - 120
Cobalt	50.0	56.8		ug/L		114	80 - 120
Copper	100	110		ug/L		110	80 - 120
Lead	500	546		ug/L		109	80 - 120
Nickel	100	113		ug/L		113	80 - 120
Selenium	100	112		ug/L		112	80 - 120
Silver	50.0	54.4		ug/L		109	80 - 120
Thallium	40.0	45.5		ug/L		114	80 - 120
Vanadium	100	110		ug/L		110	80 - 120
Zinc	100	111		ug/L		111	80 - 120

Lab Sample ID: 680-165602-3 MS

Matrix: Water

Analysis Batch: 562413

Client Sample ID: LF4-MW3

Prep Type: Total Recoverable

Prep Batch: 562084

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.50	U	50.0	53.2		ug/L		106	75 - 125
Arsenic	1.5	U	100	104		ug/L		104	75 - 125
Barium	68		100	161		ug/L		94	75 - 125
Beryllium	0.44	J	50.0	50.8		ug/L		101	75 - 125
Cadmium	0.15	U	50.0	52.0		ug/L		104	75 - 125
Chromium	2.4	J	100	105		ug/L		102	75 - 125
Cobalt	1.3		50.0	53.2		ug/L		104	75 - 125
Copper	2.5	J	100	104		ug/L		101	75 - 125
Lead	4.1		500	503		ug/L		100	75 - 125
Nickel	3.3	J	100	107		ug/L		104	75 - 125
Selenium	1.0	U	100	104		ug/L		104	75 - 125
Silver	0.10	U	50.0	49.4		ug/L		99	75 - 125
Thallium	0.49	U	40.0	42.4		ug/L		106	75 - 125

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

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

Lab Sample ID: 680-165602-3 MS

Matrix: Water

Analysis Batch: 562413

Client Sample ID: LF4-MW3

Prep Type: Total Recoverable

Prep Batch: 562084

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Vanadium	5.3	U	100	104		ug/L		104	75 - 125
Zinc	16	J	100	116		ug/L		100	75 - 125

Lab Sample ID: 680-165602-3 MSD

Matrix: Water

Analysis Batch: 562413

Client Sample ID: LF4-MW3

Prep Type: Total Recoverable

Prep Batch: 562084

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Antimony	0.50	U	50.0	48.6		ug/L		97	75 - 125	9	20
Arsenic	1.5	U	100	102		ug/L		102	75 - 125	2	20
Barium	68		100	168		ug/L		100	75 - 125	4	20
Beryllium	0.44	J	50.0	50.5		ug/L		100	75 - 125	1	20
Cadmium	0.15	U	50.0	51.4		ug/L		103	75 - 125	1	20
Chromium	2.4	J	100	103		ug/L		101	75 - 125	1	20
Cobalt	1.3		50.0	52.2		ug/L		102	75 - 125	2	20
Copper	2.5	J	100	101		ug/L		99	75 - 125	2	20
Lead	4.1		500	501		ug/L		99	75 - 125	0	20
Nickel	3.3	J	100	106		ug/L		102	75 - 125	1	20
Selenium	1.0	U	100	101		ug/L		101	75 - 125	3	20
Silver	0.10	U	50.0	48.8		ug/L		98	75 - 125	1	20
Thallium	0.49	U	40.0	41.4		ug/L		104	75 - 125	2	20
Vanadium	5.3	U	100	103		ug/L		103	75 - 125	1	20
Zinc	16	J	100	115		ug/L		99	75 - 125	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 680-561746/1-A

Matrix: Water

Analysis Batch: 562109

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 561746

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.080	U	0.20	0.080	ug/L		03/13/19 12:51	03/14/19 19:44	1

Lab Sample ID: LCS 680-561746/2-A

Matrix: Water

Analysis Batch: 562109

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 561746

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.37		ug/L		95	80 - 120

Lab Sample ID: 680-165602-3 MS

Matrix: Water

Analysis Batch: 562109

Client Sample ID: LF4-MW3

Prep Type: Total/NA

Prep Batch: 561746

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.080	U	1.00	0.845		ug/L		85	80 - 120

TestAmerica Savannah

QC Sample Results

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

TestAmerica Job ID: 680-165602-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 680-165602-3 MSD

Matrix: Water

Analysis Batch: 562109

Client Sample ID: LF4-MW3

Prep Type: Total/NA

Prep Batch: 561746

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.080	U	1.00	0.907		ug/L	—	91	80 - 120	7	20

QC Association Summary

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

TestAmerica Job ID: 680-165602-1

GC/MS VOA

Analysis Batch: 562273

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-1	LF4-MW1	Total/NA	Water	8260B	
680-165602-2	LF4-MW2	Total/NA	Water	8260B	
680-165602-3	LF4-MW3	Total/NA	Water	8260B	
680-165602-4	LF4-MW4	Total/NA	Water	8260B	
680-165602-5	LF4-MW5	Total/NA	Water	8260B	
680-165602-6	DUP316	Total/NA	Water	8260B	
MB 680-562273/8	Method Blank	Total/NA	Water	8260B	
LCS 680-562273/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-562273/4	Lab Control Sample Dup	Total/NA	Water	8260B	
680-165602-3 MS	LF4-MW3	Total/NA	Water	8260B	
680-165602-3 MSD	LF4-MW3	Total/NA	Water	8260B	

Analysis Batch: 562427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-7	TB522	Total/NA	Water	8260B	
MB 680-562427/7	Method Blank	Total/NA	Water	8260B	
LCS 680-562427/3	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-562427/4	Lab Control Sample Dup	Total/NA	Water	8260B	

Metals

Prep Batch: 561746

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-1	LF4-MW1	Total/NA	Water	7470A	
680-165602-2	LF4-MW2	Total/NA	Water	7470A	
680-165602-3	LF4-MW3	Total/NA	Water	7470A	
680-165602-4	LF4-MW4	Total/NA	Water	7470A	
680-165602-5	LF4-MW5	Total/NA	Water	7470A	
680-165602-6	DUP316	Total/NA	Water	7470A	
MB 680-561746/1-A	Method Blank	Total/NA	Water	7470A	
LCS 680-561746/2-A	Lab Control Sample	Total/NA	Water	7470A	
680-165602-3 MS	LF4-MW3	Total/NA	Water	7470A	
680-165602-3 MSD	LF4-MW3	Total/NA	Water	7470A	

Prep Batch: 561991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-1	LF4-MW1	Total Recoverable	Water	3005A	
680-165602-2	LF4-MW2	Total Recoverable	Water	3005A	
680-165602-6	DUP316	Total Recoverable	Water	3005A	
MB 680-561991/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-561991/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 562084

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-3	LF4-MW3	Total Recoverable	Water	3005A	
680-165602-4	LF4-MW4	Total Recoverable	Water	3005A	
680-165602-5	LF4-MW5	Total Recoverable	Water	3005A	
MB 680-562084/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 680-562084/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
680-165602-3 MS	LF4-MW3	Total Recoverable	Water	3005A	

TestAmerica Savannah

QC Association Summary

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

TestAmerica Job ID: 680-165602-1

Metals (Continued)

Prep Batch: 562084 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-3 MSD	LF4-MW3	Total Recoverable	Water	3005A	

Analysis Batch: 562109

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-1	LF4-MW1	Total/NA	Water	7470A	561746
680-165602-2	LF4-MW2	Total/NA	Water	7470A	561746
680-165602-3	LF4-MW3	Total/NA	Water	7470A	561746
680-165602-4	LF4-MW4	Total/NA	Water	7470A	561746
680-165602-5	LF4-MW5	Total/NA	Water	7470A	561746
680-165602-6	DUP316	Total/NA	Water	7470A	561746
MB 680-561746/1-A	Method Blank	Total/NA	Water	7470A	561746
LCS 680-561746/2-A	Lab Control Sample	Total/NA	Water	7470A	561746
680-165602-3 MS	LF4-MW3	Total/NA	Water	7470A	561746
680-165602-3 MSD	LF4-MW3	Total/NA	Water	7470A	561746

Analysis Batch: 562413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-165602-1	LF4-MW1	Total Recoverable	Water	6020B	561991
680-165602-2	LF4-MW2	Total Recoverable	Water	6020B	561991
680-165602-3	LF4-MW3	Total Recoverable	Water	6020B	562084
680-165602-4	LF4-MW4	Total Recoverable	Water	6020B	562084
680-165602-5	LF4-MW5	Total Recoverable	Water	6020B	562084
680-165602-6	DUP316	Total Recoverable	Water	6020B	561991
MB 680-561991/1-A	Method Blank	Total Recoverable	Water	6020B	561991
MB 680-562084/1-A	Method Blank	Total Recoverable	Water	6020B	562084
LCS 680-561991/2-A	Lab Control Sample	Total Recoverable	Water	6020B	561991
LCS 680-562084/2-A	Lab Control Sample	Total Recoverable	Water	6020B	562084
680-165602-3 MS	LF4-MW3	Total Recoverable	Water	6020B	562084
680-165602-3 MSD	LF4-MW3	Total Recoverable	Water	6020B	562084

Lab Chronicle

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW1

Date Collected: 03/07/19 12:20

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-1

Matrix: Water

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 g	5 g	562273	03/16/19 13:53	Y1S	TAL SAV
	Instrument ID: CMSAA									
Total Recoverable	Prep	3005A			50 mL	250 mL	561991	03/14/19 15:32	AJR	TAL SAV
Total Recoverable	Analysis	6020B		1			562413	03/15/19 19:26	BWR	TAL SAV
	Instrument ID: ICPMSD									
Total/NA	Prep	7470A			50 mL	50 mL	561746	03/13/19 12:51	PEP	TAL SAV
Total/NA	Analysis	7470A		1			562109	03/15/19 09:16	BCB	TAL SAV
	Instrument ID: LEEMAN2									

Client Sample ID: LF4-MW2

Date Collected: 03/07/19 13:20

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-2

Matrix: Water

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 g	5 g	562273	03/16/19 14:16	Y1S	TAL SAV
	Instrument ID: CMSAA									
Total Recoverable	Prep	3005A			50 mL	250 mL	561991	03/14/19 15:32	AJR	TAL SAV
Total Recoverable	Analysis	6020B		1			562413	03/15/19 19:15	BWR	TAL SAV
	Instrument ID: ICPMSD									
Total/NA	Prep	7470A			50 mL	50 mL	561746	03/13/19 12:51	PEP	TAL SAV
Total/NA	Analysis	7470A		1			562109	03/15/19 09:20	BCB	TAL SAV
	Instrument ID: LEEMAN2									

Client Sample ID: LF4-MW3

Date Collected: 03/07/19 14:10

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-3

Matrix: Water

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 g	5 g	562273	03/16/19 19:10	Y1S	TAL SAV
	Instrument ID: CMSAA									
Total Recoverable	Prep	3005A			50 mL	250 mL	562084	03/15/19 09:16	AJR	TAL SAV
Total Recoverable	Analysis	6020B		1			562413	03/15/19 17:17	BWR	TAL SAV
	Instrument ID: ICPMSD									
Total/NA	Prep	7470A			50 mL	50 mL	561746	03/13/19 12:51	PEP	TAL SAV
Total/NA	Analysis	7470A		1			562109	03/15/19 09:23	BCB	TAL SAV
	Instrument ID: LEEMAN2									

Client Sample ID: LF4-MW4

Date Collected: 03/07/19 15:25

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-4

Matrix: Water

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 g	5 g	562273	03/16/19 14:38	Y1S	TAL SAV

TestAmerica Savannah

Lab Chronicle

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: LF4-MW4

Lab Sample ID: 680-165602-4

Date Collected: 03/07/19 15:25

Matrix: Water

Date Received: 03/08/19 09:40

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 g	5 g	562273	03/16/19 14:38	Y1S	TAL SAV
		Instrument ID: CMSAA								
Total Recoverable	Prep	3005A			50 mL	250 mL	562084	03/15/19 09:16	AJR	TAL SAV
Total Recoverable	Analysis	6020B		1			562413	03/15/19 17:36	BWR	TAL SAV
		Instrument ID: ICPMSD								
Total/NA	Prep	7470A			50 mL	50 mL	561746	03/13/19 12:51	PEP	TAL SAV
Total/NA	Analysis	7470A		1			562109	03/15/19 09:35	BCB	TAL SAV
		Instrument ID: LEEMAN2								

Client Sample ID: LF4-MW5

Lab Sample ID: 680-165602-5

Date Collected: 03/07/19 16:35

Matrix: Water

Date Received: 03/08/19 09:40

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 g	5 g	562273	03/16/19 15:01	Y1S	TAL SAV
		Instrument ID: CMSAA								
Total Recoverable	Prep	3005A			50 mL	250 mL	562084	03/15/19 09:16	AJR	TAL SAV
Total Recoverable	Analysis	6020B		1			562413	03/15/19 17:40	BWR	TAL SAV
		Instrument ID: ICPMSD								
Total/NA	Prep	7470A			50 mL	50 mL	561746	03/13/19 12:51	PEP	TAL SAV
Total/NA	Analysis	7470A		1			562109	03/15/19 09:39	BCB	TAL SAV
		Instrument ID: LEEMAN2								

Client Sample ID: DUP316

Lab Sample ID: 680-165602-6

Date Collected: 03/07/19 00:00

Matrix: Water

Date Received: 03/08/19 09:40

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 g	5 g	562273	03/16/19 15:24	Y1S	TAL SAV
		Instrument ID: CMSAA								
Total Recoverable	Prep	3005A			50 mL	250 mL	561991	03/14/19 15:32	AJR	TAL SAV
Total Recoverable	Analysis	6020B		1			562413	03/15/19 19:38	BWR	TAL SAV
		Instrument ID: ICPMSD								
Total/NA	Prep	7470A			50 mL	50 mL	561746	03/13/19 12:51	PEP	TAL SAV
Total/NA	Analysis	7470A		1			562109	03/15/19 09:42	BCB	TAL SAV
		Instrument ID: LEEMAN2								

Client Sample ID: TB522

Lab Sample ID: 680-165602-7

Date Collected: 03/07/19 16:40

Matrix: Water

Date Received: 03/08/19 09:40

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	562427	03/18/19 19:25	UI	TAL SAV

TestAmerica Savannah

Lab Chronicle

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

TestAmerica Job ID: 680-165602-1

Client Sample ID: TB522

Date Collected: 03/07/19 16:40

Date Received: 03/08/19 09:40

Lab Sample ID: 680-165602-7

Matrix: Water

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	562427	03/18/19 19:25	UI	TAL SAV
Instrument ID: CMSP2										

Laboratory References:

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 680-165602-1

Laboratory: TestAmerica Savannah

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Florida	NELAP	4	E87052	06-30-19

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Method Summary

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

TestAmerica Job ID: 680-165602-1

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
3005A	Preparation, Total Recoverable or Dissolved 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 = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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 # 17.094.18-07.1.500
 Lab contract: 18.094.19-07.1.500

COC Number 5684
 Cooler ID 1 of 1
 Page 1 of 1

Samplers Signature	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	3/7/19	1220	X	X		
	Parcel 81(5), Landfill 4	LF4-MW2	NS	MW	WQ	Grab		1320	X	X		
	Parcel 81(5), Landfill 4	LF4-MW3	NS	MW	WQ	Grab		1410	X	X		
	Parcel 81(5), Landfill 4	LF4-MW3	MS/MSD	MW	WQ	Grab		1410	X	X		
	Parcel 81(5), Landfill 4	LF4-MW4	NS	MW	WQ	Grab		1525	X	X		
	Parcel 81(5), Landfill 4	LF4-MW5	NS	MW	WQ	Grab		1635	X	X		
	Parcel 81(5), Landfill 4	DUP316	FD	MW	WQ	Grab		N/A	X	X		
	Parcel 81(5), Landfill 4	TBS22	TB	WQ	W	Grab		1640			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

See Task Order 18.094.19-07.1.500 for required list of VOCs and metals

COMMENTS:

Relinquished by (Signature):

[Signature]

Date/Time: 3/7/19 1655

Date/Time: 3/18/19 940

Received by (Signature):

[Signature]

FedEx

Relinquished by (Signature):

3.8/40



680-165602 Chain of Custody

Login Sample Receipt Checklist

Client: Matrix Environmental Services, LLC

Job Number: 680-165602-1

Login Number: 165602

List Source: TestAmerica Savannah

List Number: 1

Creator: Weston, Pamela

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ 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.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
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 2019

**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	32	32	100%	39	30	77%	40	5	13%
LF4-MW2	32	31	97%	39	25	64%	39	0	0%
LF4-MW3	32	32	100%	39	27	69%	39	2	5%
LF4-MW4	32	30	94%	39	25	64%	39	0	0%
LF4-MW5	32	32	100%	39	34	87%	39	9	23%

Well ID	Beryllium			Cadmium			Chromium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	31	19	61%	38	33	87%	38	29	76%
LF4-MW2	31	16	52%	38	30	79%	38	23	61%
LF4-MW3	31	21	68%	38	34	89%	38	27	71%
LF4-MW4	31	28	90%	38	31	82%	38	33	87%
LF4-MW5	31	25	81%	38	37	97%	38	32	84%

Well ID	Cobalt			Copper			Lead		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	31	0	0%	32	11	34%	39	13	33%
LF4-MW2	31	0	0%	32	10	31%	39	11	28%
LF4-MW3	31	13	42%	32	12	38%	39	16	41%
LF4-MW4	31	8	26%	32	18	56%	39	10	26%
LF4-MW5	31	5	16%	32	21	66%	39	18	46%

Well ID	Mercury			Nickel			Selenium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	39	39	100%	32	5	16%	39	39	100%
LF4-MW2	39	38	97%	32	3	9%	39	35	90%
LF4-MW3	39	39	100%	32	9	28%	39	39	100%
LF4-MW4	39	39	100%	32	13	41%	39	37	95%
LF4-MW5	39	39	100%	32	14	44%	39	39	100%

Well ID	Silver			Thallium			Vanadium		
	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs	Sample #	# of NDs	%NDs
LF4-MW1	31	29	94%	32	30	94%	32	28	88%
LF4-MW2	31	31	100%	32	30	94%	32	23	72%
LF4-MW3	31	31	100%	32	31	97%	32	26	81%
LF4-MW4	31	30	97%	32	29	91%	32	23	72%
LF4-MW5	31	31	100%	32	30	94%	32	26	81%

Well ID	Zinc		
	Sample #	# of NDs	%NDs
LF4-MW1	32	2	6%
LF4-MW2	32	2	6%
LF4-MW3	32	8	25%
LF4-MW4	32	11	34%
LF4-MW5	32	15	47%

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	1.84	0.84	0.84
LF4-MW1	9/13/06	-3.180	0.40	-0.60	0.23
LF4-MW1	3/6/07	-3.219	0.29	-0.71	0.00
LF4-MW1	9/24/07	-3.439	-0.29	-1.29	0.00
LF4-MW1	3/26/08	-2.990	0.90	-0.10	0.00
LF4-MW1	9/16/08	-3.464	-0.36	-1.36	0.00
LF4-MW1	3/17/09	-3.551	-0.59	-1.59	0.00
LF4-MW1	9/17/09	-3.408	-0.21	-1.21	0.00
LF4-MW1	3/17/10	-3.427	-0.26	-1.26	0.00
LF4-MW1	9/21/10	-3.510	-0.48	-1.48	0.00
LF4-MW1	3/15/11	-3.197	0.35	-0.65	0.00
LF4-MW1	9/8/11	-3.242	0.23	-0.77	0.00
LF4-MW1	3/14/12	-3.053	0.73	-0.27	0.00
LF4-MW1	9/6/12	-3.066	0.70	-0.30	0.00
LF4-MW1	3/5/13	-3.043	0.76	-0.24	0.00
LF4-MW1	9/11/13	-3.321	0.02	-0.98	0.00
LF4-MW1	3/5/14	-3.294	0.09	-0.91	0.00
LF4-MW1	9/4/14	-3.324	0.01	-0.99	0.00
LF4-MW1	3/13/15	-3.135	0.52	-0.48	0.00
LF4-MW1	9/16/15	-3.163	0.44	-0.56	0.00
LF4-MW1	3/16/16	-3.154	0.47	-0.53	0.00
LF4-MW1	9/21/16	-3.202	0.34	-0.66	0.00
LF4-MW1	3/15/17	-3.090	0.64	-0.36	0.00
LF4-MW1	9/8/17	-3.124	0.55	-0.45	0.00
LF4-MW1	3/8/18	-3.110	0.58	-0.42	0.00
LF4-MW1	9/11/18	-3.058	0.72	-0.28	0.00
LF4-MW1	3/7/19	-3.058	0.72	-0.28	0.00
Background					
LF4-MW1	MEAN	-3.329			
LF4-MW1	STDEV	0.377			

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
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	0.62
LF4-MW3	3/8/18	-2.846	0.42	-0.58	0.56
LF4-MW3	9/11/18	-2.865	0.37	-0.63	0.51
LF4-MW3	3/7/19	-2.688	0.85	-0.15	0.51
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
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
Background					
LF4-MW5	MEAN	-3.970			
LF4-MW5	STDEV	0.364			

Cobalt					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW1	3/13/06	-4.029	0.46	-0.54	0.00
LF4-MW1	9/13/06	-4.734	-0.73	-1.73	0.00
LF4-MW1	3/6/07	-4.784	-0.81	-1.81	0.00
LF4-MW1	9/24/07	-4.641	-0.57	-1.57	0.00
LF4-MW1	3/26/08	-3.554	1.26	0.26	0.26
LF4-MW1	9/16/08	-4.547	-0.41	-1.41	0.00
LF4-MW1	3/17/09	-3.917	0.65	-0.35	0.00
LF4-MW1	9/17/09	-4.220	0.14	-0.86	0.00
LF4-MW1	3/17/10	-4.374	-0.12	-1.12	0.00
LF4-MW1	9/21/10	-3.830	0.79	-0.21	0.00
LF4-MW1	3/15/11	-3.623	1.14	0.14	0.14
LF4-MW1	9/8/11	-3.445	1.44	0.44	0.59
LF4-MW1	3/14/12	-3.417	1.49	0.49	1.08
LF4-MW1	9/6/12	-3.302	1.68	0.68	1.76
LF4-MW1	3/5/13	-3.411	1.50	0.50	2.26
LF4-MW1	9/11/13	-3.812	0.82	-0.18	2.08
LF4-MW1	3/5/14	-3.634	1.12	0.12	2.21
LF4-MW1	9/4/14	-3.717	0.98	-0.02	2.19
LF4-MW1	3/13/15	-3.393	1.53	0.53	2.72
LF4-MW1	9/16/15	-3.689	1.03	0.03	2.75
LF4-MW1	3/16/16	-3.231	1.80	0.80	3.56
LF4-MW1	9/21/16	-3.493	1.36	0.36	3.92
LF4-MW1	3/15/17	-3.390	1.54	0.54	4.46
LF4-MW1	9/8/17	-3.278	1.72	0.72	4.64
LF4-MW1	3/8/18	-3.579	1.22	0.22	4.14
LF4-MW1	9/11/18	-3.411	1.50	0.50	4.42
LF4-MW1	3/7/19	-3.270	1.74	0.74	5.19
Background					
LF4-MW1	MEAN	-4.301			
LF4-MW1	STDEV	0.593			

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	22.70
LF4-MW2	3/8/18	-2.079	3.31	2.31	24.04
LF4-MW2	9/11/18	-2.303	2.98	1.98	23.70
LF4-MW2	3/7/19	-1.833	3.68	2.68	25.51
Background					
LF4-MW2	MEAN	-4.277			
LF4-MW2	STDEV	0.663			

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
Background					
LF4-MW4	MEAN	-4.715			
LF4-MW4	STDEV	0.219			

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-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
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	1.11	0.11	0.11
LF4-MW1	9/13/06	-4.595	0.46	-0.54	0.00
LF4-MW1	3/6/07	-4.637	0.40	-0.60	0.00
LF4-MW1	9/24/07	-5.003	-0.19	-1.19	0.00
LF4-MW1	3/26/08	-4.699	0.30	-0.70	0.00
LF4-MW1	9/16/08	-5.048	-0.27	-1.27	0.00
LF4-MW1	3/17/09	-5.373	-0.79	-1.79	0.00
LF4-MW1	9/17/09	-5.375	-0.79	-1.79	0.00
LF4-MW1	3/17/10	-5.352	-0.76	-1.76	0.00
LF4-MW1	9/21/10	-6.156	-2.05	-3.05	0.00
LF4-MW1	3/15/11	-4.029	1.38	0.38	0.38
LF4-MW1	9/8/11	-4.605	0.45	-0.55	0.00
LF4-MW1	3/14/12	-4.605	0.45	-0.55	0.00
LF4-MW1	9/6/12	-4.605	0.45	-0.55	0.00
LF4-MW1	3/5/13	-4.605	0.45	-0.55	0.00
LF4-MW1	9/11/13	-5.773	-1.44	-2.44	0.00
LF4-MW1	3/5/14	-5.900	-1.64	-2.64	0.00
LF4-MW1	9/4/14	-5.911	-1.66	-2.66	0.00
LF4-MW1	3/13/15	-6.536	-2.67	-3.67	0.00
LF4-MW1	9/16/15	-5.325	-0.71	-1.71	0.00
LF4-MW1	3/16/16	-6.331	-2.34	-3.34	0.00
LF4-MW1	9/21/16	-6.138	-2.03	-3.03	0.00
LF4-MW1	3/15/17	-6.638	-2.83	-3.83	0.00
LF4-MW1	9/8/17	-6.623	-2.81	-3.81	0.00
LF4-MW1	3/8/18	-6.106	-1.97	-2.97	0.00
LF4-MW1	9/11/18	-4.605	0.45	-0.55	0.00
LF4-MW1	3/7/19	-6.377	-2.41	-3.41	0.00
Background					
LF4-MW1	MEAN	-4.882			
LF4-MW1	STDEV	0.620			

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
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
Background					
LF4-MW3	MEAN	-5.647			
LF4-MW3	STDEV	1.150			

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-MW1	3/13/06	-5.298	0.22	-0.78	0.00
LF4-MW1	9/13/06	-5.857	-0.30	-1.30	0.00
LF4-MW1	3/6/07	-5.345	0.18	-0.82	0.00
LF4-MW1	9/24/07	-5.661	-0.12	-1.12	0.00
LF4-MW1	3/26/08	-4.935	0.56	-0.44	0.00
LF4-MW1	9/16/08	-5.298	0.22	-0.78	0.00
LF4-MW1	3/17/09	-5.298	0.22	-0.78	0.00
LF4-MW1	9/17/09	-5.684	-0.14	-1.14	0.00
LF4-MW1	3/17/10	-5.238	0.28	-0.72	0.00
LF4-MW1	9/21/10	-5.809	-0.25	-1.25	0.00
LF4-MW1	3/15/11	-5.298	0.22	-0.78	0.00
LF4-MW1	9/8/11	-5.754	-0.20	-1.20	0.00
LF4-MW1	3/14/12	-5.751	-0.20	-1.20	0.00
LF4-MW1	9/6/12	-5.298	0.22	-0.78	0.00
LF4-MW1	3/5/13	-5.726	-0.18	-1.18	0.00
LF4-MW1	9/11/13	-4.912	0.58	-0.42	0.00
LF4-MW1	3/5/14	-8.408	-2.67	-3.67	0.00
LF4-MW1	9/4/14	-7.881	-2.18	-3.18	0.00
LF4-MW1	3/13/15	-8.174	-2.45	-3.45	0.00
LF4-MW1	9/16/15	-5.581	-0.04	-1.04	0.00
LF4-MW1	3/16/16	-7.891	-2.19	-3.19	0.00
LF4-MW1	9/21/16	-7.233	-1.57	-2.57	0.00
LF4-MW1	3/15/17	-7.659	-1.97	-2.97	0.00
LF4-MW1	9/8/17	-7.907	-2.20	-3.20	0.00
LF4-MW1	3/8/18	-6.395	-0.80	-1.80	0.00
LF4-MW1	9/11/18	-5.298	0.22	-0.78	0.00
LF4-MW1	3/7/19	-6.377	-0.78	-1.78	0.00
Background					
LF4-MW1	MEAN	-5.537			
LF4-MW1	STDEV	1.077			

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
Background					
LF4-MW2	MEAN	-5.045			
LF4-MW2	STDEV	1.159			

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
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
Background					
LF4-MW4	MEAN	-5.392			
LF4-MW4	STDEV	0.864			

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-MW1	3/13/06	-4.605	-0.66	-1.66	0.00
LF4-MW1	9/13/06	-4.351	0.32	-0.68	0.00
LF4-MW1	3/6/07	-4.605	-0.66	-1.66	0.00
LF4-MW1	9/24/07	-4.585	-0.58	-1.58	0.00
LF4-MW1	3/26/08	-4.117	1.22	0.22	0.22
LF4-MW1	9/16/08	-4.595	-0.62	-1.62	0.00
LF4-MW1	3/17/09	-4.398	0.14	-0.86	0.00
LF4-MW1	9/17/09	-4.510	-0.29	-1.29	0.00
LF4-MW1	3/17/10	-4.994	-2.15	-3.15	0.00
LF4-MW1	9/21/10	-4.283	0.58	-0.42	0.00
LF4-MW1	3/15/11	-3.958	1.83	0.83	0.83
LF4-MW1	9/8/11	-3.958	1.83	0.83	1.65
LF4-MW1	3/14/12	-3.887	2.10	1.10	2.75
LF4-MW1	9/6/12	-3.673	2.92	1.92	4.67
LF4-MW1	3/5/13	-3.768	2.56	1.56	6.23
LF4-MW1	9/11/13	-4.173	1.00	0.00	6.23
LF4-MW1	3/5/14	-4.034	1.53	0.53	6.76
LF4-MW1	9/4/14	-4.220	0.82	-0.18	6.58
LF4-MW1	3/13/15	-3.942	1.89	0.89	7.47
LF4-MW1	9/16/15	-4.110	1.24	0.24	7.71
LF4-MW1	3/16/16	-3.812	2.39	1.39	9.09
LF4-MW1	9/21/16	-4.001	1.66	0.66	9.76
LF4-MW1	3/15/17	-3.826	2.33	1.33	11.09
LF4-MW1	9/8/17	-3.777	2.52	1.52	11.28
LF4-MW1	3/8/18	-4.001	1.66	0.66	10.42
LF4-MW1	9/11/18	-3.772	2.54	1.54	11.30
LF4-MW1	3/7/19	-3.772	2.54	1.54	12.63
Background					
LF4-MW1	MEAN	-4.434			
LF4-MW1	STDEV	0.260			

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	16.44
LF4-MW2	3/8/18	-2.736	3.00	2.00	18.36
LF4-MW2	9/11/18	-2.937	2.59	1.59	17.95
LF4-MW2	3/7/19	-2.343	3.80	2.80	19.41
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
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
Background					
LF4-MW4	MEAN	-4.882			
LF4-MW4	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	1.26	0.26	0.26
LF4-MW1	9/13/06	-3.493	-0.24	-1.24	0.00
LF4-MW1	3/6/07	-3.231	0.15	-0.85	0.00
LF4-MW1	9/24/07	-2.996	0.51	-0.49	0.00
LF4-MW1	3/26/08	-3.177	0.23	-0.77	0.00
LF4-MW1	9/16/08	-3.734	-0.59	-1.59	0.00
LF4-MW1	3/17/09	-3.355	-0.03	-1.03	0.00
LF4-MW1	9/17/09	-3.464	-0.19	-1.19	0.00
LF4-MW1	3/17/10	-4.335	-1.49	-2.49	0.00
LF4-MW1	9/21/10	-3.189	0.22	-0.78	0.00
LF4-MW1	3/15/11	-2.720	0.92	-0.08	0.00
LF4-MW1	9/8/11	-2.955	0.57	-0.43	0.00
LF4-MW1	3/14/12	-2.941	0.59	-0.41	0.00
LF4-MW1	9/6/12	-2.884	0.67	-0.33	0.00
LF4-MW1	3/5/13	-2.766	0.85	-0.15	0.00
LF4-MW1	9/11/13	-3.242	0.14	-0.86	0.00
LF4-MW1	3/5/14	-3.140	0.29	-0.71	0.00
LF4-MW1	9/4/14	-3.237	0.15	-0.85	0.00
LF4-MW1	3/13/15	-2.822	0.76	-0.24	0.00
LF4-MW1	9/16/15	-3.206	0.19	-0.81	0.00
LF4-MW1	3/16/16	-2.805	0.79	-0.21	0.00
LF4-MW1	9/21/16	-3.058	0.41	-0.59	0.00
LF4-MW1	3/15/17	-2.886	0.67	-0.33	0.00
LF4-MW1	9/8/17	-2.799	0.80	-0.20	0.00
LF4-MW1	3/8/18	-2.990	0.51	-0.49	0.00
LF4-MW1	9/11/18	-2.617	1.07	0.07	0.07
LF4-MW1	3/7/19	-2.847	0.73	-0.27	0.00
Background					
LF4-MW1	MEAN	-3.335			
LF4-MW1	STDEV	0.671			

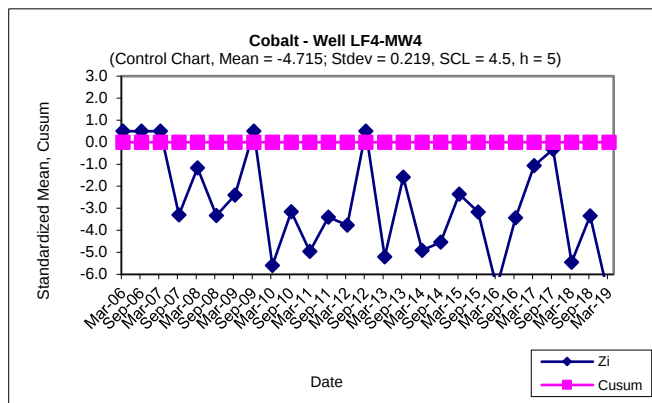
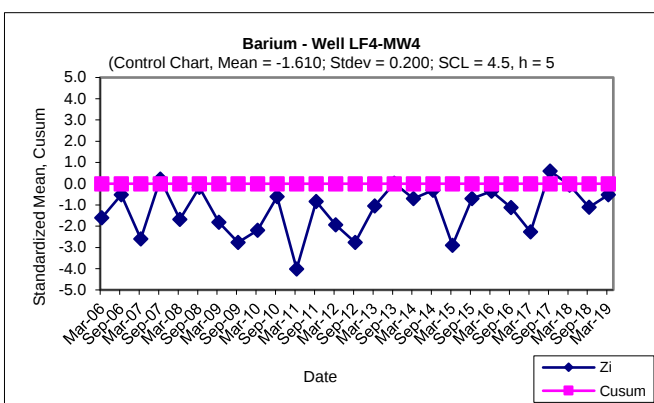
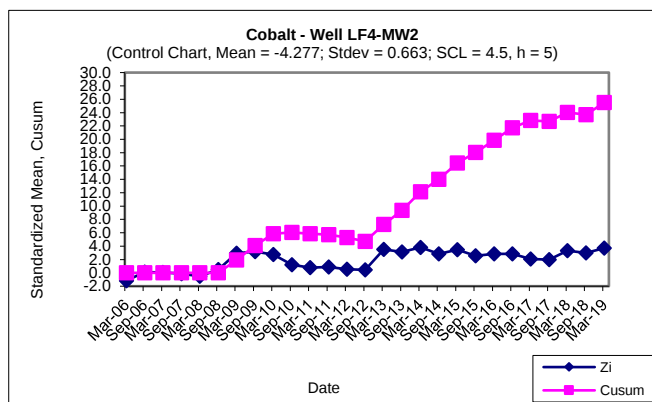
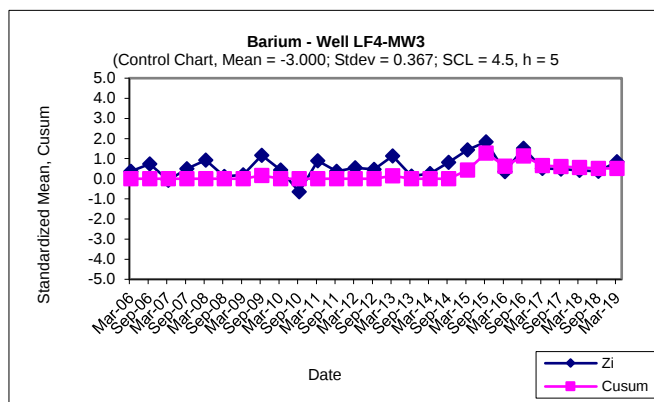
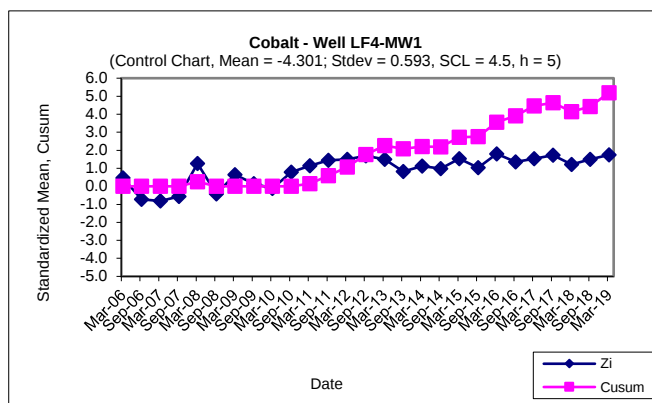
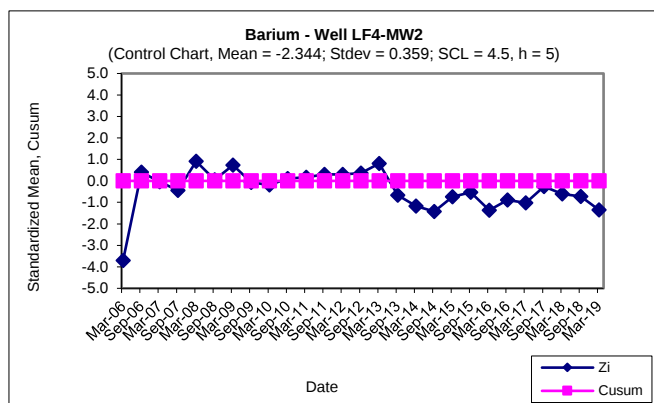
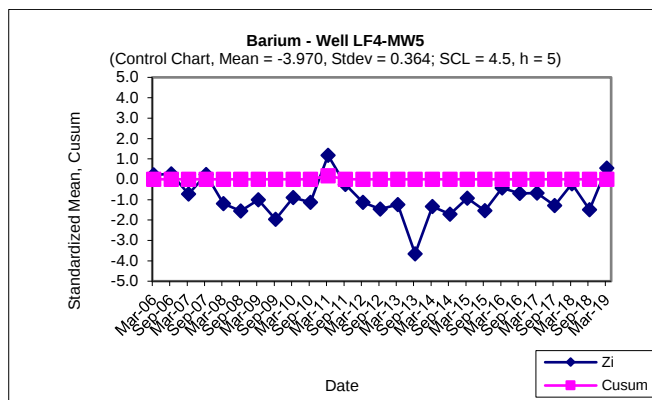
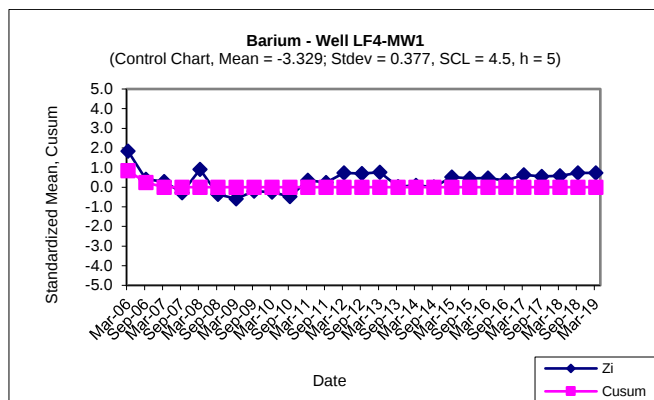
Zinc					
Well ID	Date	Ln Conc	Zi	Zi - k	Cusum
LF4-MW2	3/13/06	-2.915	-0.16	-1.16	0.00
LF4-MW2	9/13/06	-2.343	1.59	0.59	0.59
LF4-MW2	3/6/07	-3.338	-1.46	-2.46	0.00
LF4-MW2	9/24/07	-2.996	-0.41	-1.41	0.00
LF4-MW2	3/26/08	-4.069	-3.70	-4.70	0.00
LF4-MW2	9/16/08	-3.487	-1.91	-2.91	0.00
LF4-MW2	3/17/09	-0.691	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	65.41
LF4-MW2	3/8/18	-0.312	7.82	6.82	69.71
LF4-MW2	9/11/18	-0.942	5.89	4.89	67.78
LF4-MW2	3/7/19	0.182	9.34	8.34	73.66
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
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	0.91	-0.09	0.00
LF4-MW4	3/7/07	-4.623	-1.19	-2.19	0.00
LF4-MW4	9/25/07	-4.269	-0.70	-1.70	0.00
LF4-MW4	3/26/08	-4.946	-1.64	-2.64	0.00
LF4-MW4	9/17/08	-4.029	-0.37	-1.37	0.00
LF4-MW4	3/17/09	-3.948	-0.26	-1.26	0.00
LF4-MW4	9/21/09	-4.941	-1.63	-2.63	0.00
LF4-MW4	3/17/10	-4.991	-1.70	-2.70	0.00
LF4-MW4	9/21/10	-4.351	-0.82	-1.82	0.00
LF4-MW4	3/15/11	-4.366	-0.84	-1.84	0.00
LF4-MW4	9/8/11	-4.585	-1.14	-2.14	0.00
LF4-MW4	3/14/12	-2.996	1.06	0.06	0.06
LF4-MW4	9/6/12	-2.996	1.06	0.06	0.11
LF4-MW4	3/5/13	-4.366	-0.84	-1.84	0.00
LF4-MW4	9/11/13	-4.440	-0.94	-1.94	0.00
LF4-MW4	3/5/14	-4.605	-1.17	-2.17	0.00
LF4-MW4	9/4/14	-4.605	-1.17	-2.17	0.00
LF4-MW4	3/13/15	-4.605	-1.17	-2.17	0.00
LF4-MW4	9/16/15	-4.057	-0.41	-1.41	0.00
LF4-MW4	3/16/16	-4.605	-1.17	-2.17	0.00
LF4-MW4	9/21/16	-4.069	-0.43	-1.43	0.00
LF4-MW4	3/15/17	-4.605	-1.17	-2.17	0.00
LF4-MW4	9/8/17	-3.423	0.47	-0.53	0.00
LF4-MW4	3/8/18	-4.605	-1.17	-2.17	0.00
LF4-MW4	9/11/18	-3.079	0.94	-0.06	0.00
LF4-MW4	3/7/19	-2.880	1.22	0.22	0.22
Background					
LF4-MW4	MEAN	-3.761			
LF4-MW4	STDEV	0.723			

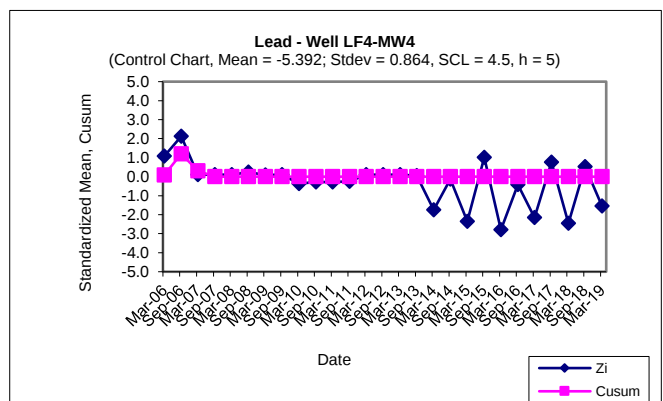
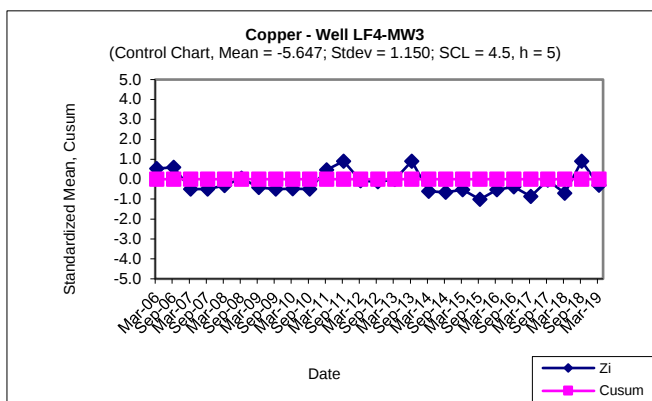
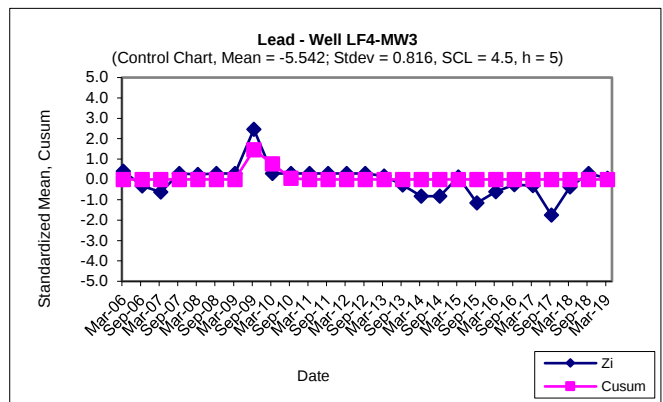
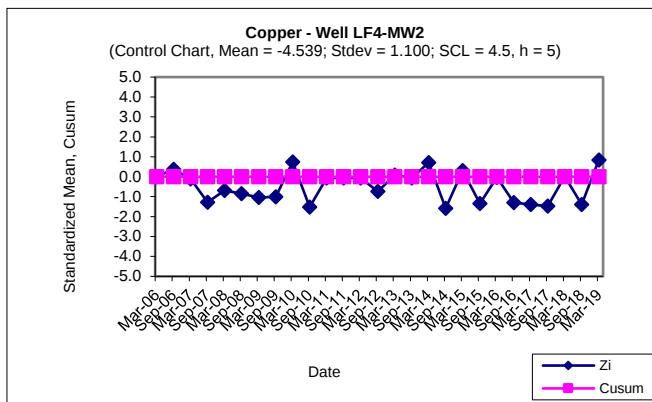
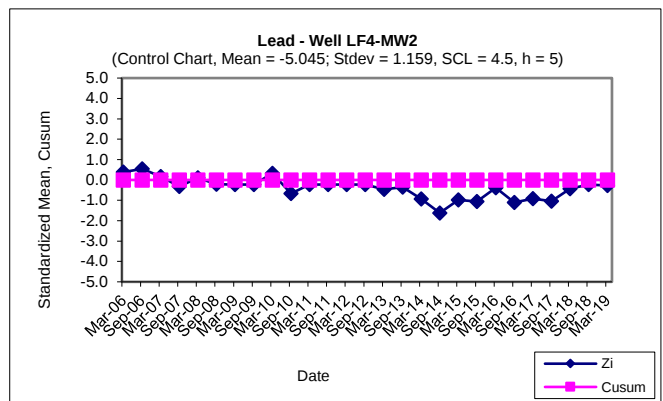
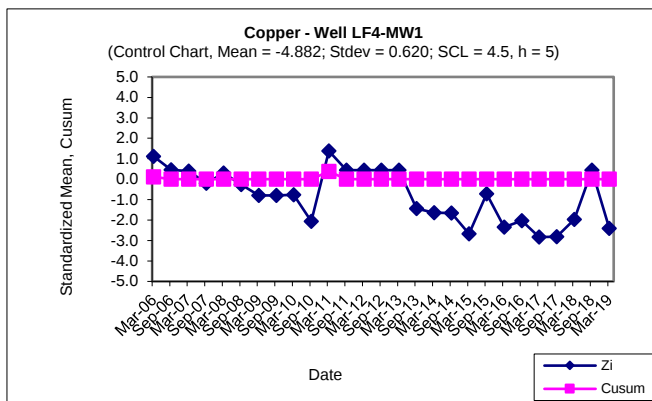
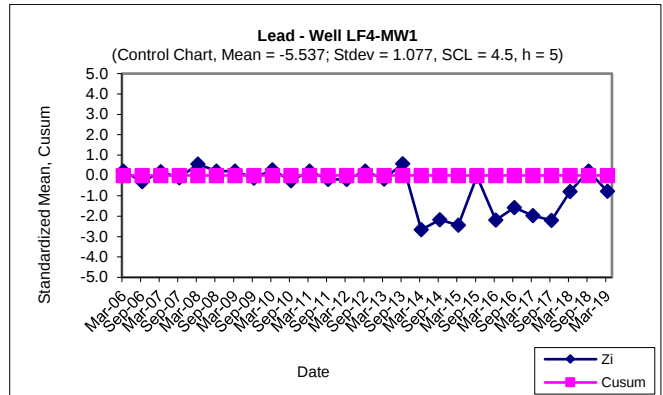
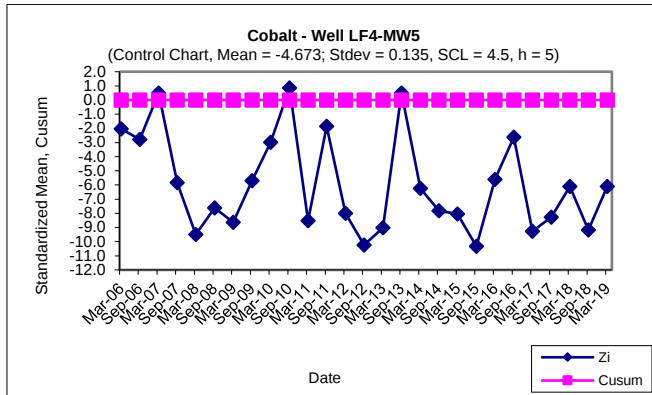
Attachment D3. Control Charts

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

