

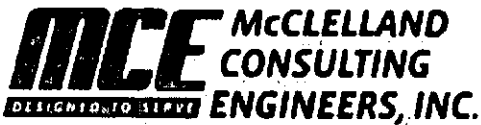
**Arkansas Department of Corrections  
North Central Arkansas Unit**

10 Prison Circle  
Calico Rock, Arkansas 72159

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**50<sup>TH</sup> ANNIVERSARY**  
Integrity. Community. Excellence.

Prepared By: McClelland Consulting Engineers, Inc.

  
\_\_\_\_\_  
Mr. Danny Blankenship,  
ADOC-North Central Arkansas Regional Unit

  
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Sam Gates,  
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Annual Report  
2014

Arkansas Department of Corrections  
North Central Arkansas Unit  
10 Prison Circle  
Calico Rock, AR 72159

Permit No. 5124-WR-1

Prepared By:

McClelland Consulting Engineers, Inc.  
900 W. Markham Street  
Little Rock, Arkansas 72201  
501-371-0272

May, 2015

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Appendix 1: Biosolids Analysis

Appendix 2: Land Application Site Soil Analysis

Appendix 3: Calculations

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## 1.0 Land Application Dates

In the year 2014 the ADOC-East Arkansas Unit land applied biosolids from the treatment of sanitary and food preparation waste on sites listed in Condition No. 5 of Part II of the permit at 326 Lee 601 Brickeys, AR 72320 in Lee County, AR. The land applications are summarized below:

Land Application Dates	
Date	Location
3-20-14	East
10-24-14	North
12-30-14	North
1-30-15	East
2-6-15	East
2-12-15	East
3-3-15	East
3-6-15	North
3-10-15	North
3-16-15	North
3-17-15	North
3-19-15	North
3-30-15	East

Although some of the land applications took place in the year 2015 they will be used for the 2014 annual report because the land applications are over the course of 12 months.

## 2.0 Land Application Locations

As stated under Land Application Dates no land application of biosolids occurred in the year 2014. The following table lists the land application locations as described under Permit No. 5226-W:

Biosolids Application Sites			
Field No.	Lat	Long	Acres
1-North	36° 10' 18.89"N	92° 08' 09.96"W	19.91
2-East	36° 09' 50.46"N	92° 08' 35.67"W	22.43

## 3.0 Quantities of Biosolids Applied

The ADOC-East Arkansas Unit reported land applications beginning in March 2014 and ending in March 2015, therefore the quantity of applied biosolids is representative of this time period. To derive the dry tons-per acre-per year it was assumed that the dry sludge density was 8% of the wet sludge density. Therefore the assumed dry sludge density was 112 kg/m<sup>3</sup>. The amount of dry sludge applied to each location was recorded by the Maintenance Supervisor and is attached in Appendix 4. Through simple conversions the amount of dry tons per year was calculated for each

application site. It was also assumed that this dry sludge was uniformly applied at the application site. Assuming this allowed the calculation of dry tons-per acre-per year by simply dividing the dry tons per year by each application sites acreage. The calculation of biosolids applied in gallons-per acre-per year was done by taking the sum of the reported amount of wet sludge applied and dividing it by the application sites acreage. The East application site did not have any reported application of wet sludge. See Appendix 3 for calculations.

Quantity of Applied Biosolids		
Location	Biosolids Dry Tons/Acre-Year	Biosolids Gallons/Acre-Year
North	.171	1115.02
East	.215	NA

#### 4.0 Methods of Application

The method of application used by the ADOC-North Central Arkansas Unit follows ADEQ guidelines to prevent any undesired effects due to the land application of biosolids. Typically the existing permit requires Class B Biosolids be transported to the land application site in a closed container and surface applied with a manure spreader. The surface applied biosolids were evenly distributed over the entire application area using a small tractor. The biosolids were applied in two forms; dry biosolids and a biosolids sludge, both of which were covered with soil afterward. The property boundaries, buffer zone lines, and an interior grid of the site were marked during land application. No biosolids were stored at the land application sites, and any remaining biosolids were returned to the drying beds at the wastewater treatment plant.

#### 5.0 Cover Crop Information

The cover crop at the land application sites are comprised mainly of fescue and other field grasses. The expected nitrogen uptake for these grasses is 175 – 300 kg/ha annually based on Soil Science Society of America – “Nutrient Uptake by Warm Seasonal Perennial Grass”-2003.

#### 6.0 Amount of Nitrogen Applied

In the year 2014 the ADOC-North Central Arkansas Unit land application rates were .617 Dry Tons/Acre-Yr at the north land application site and .215 Dry Tons/Acre-Yr at the east land application site. Using these land application rates it was determined that approximately 50.4 lb/Acre-Yr of organic nitrogen was applied to the north land application site. Of the 50.4 lb/Acre of applied nitrogen approximately 20.8 lb/Acre is considered Plant Available Nitrogen (PAN). For the east land application site it was determined that approximately 15.8 lb/Acre of organic nitrogen was applied to the north land application site. Of the 15.8 lb/Acre of applied nitrogen approximately 6.5 lb/Acre is considered Plant Available Nitrogen (PAN). Calculations for this summary can be found

in Appendix 3.

## 7.0 Total Elements Added in 2014

In the year 2014 the ADOC-North Central Arkansas Unit land application rates were .687 Dry Tons/Acre-Yr at the north land application site and .215 Dry Tons/Acre-Yr at the east land application site. Based on these land application rates the amount of each element added in 2014 is summarized below:

Parameter	North Pounds/Year	East Pounds /Year
Arsenic	0.137	0.048
Cadmium	0.011	0.004
Copper	5.471	1.929
Lead	0.109	0.039
Mercury	0.009	0.003
Molybdenum	0.145	0.051
Nickel	0.301	0.106
Selenium	0.191	0.068
Zinc	6.839	2.411
PCB's	0.001	0.000
PCB – Decachlorobiphenyl	3.119	1.100
Nitrate	0.055	0.019
Nitrite	0.055	0.019
Ammonia	227.058	80.053
TKN	1231.035	434.021
Total Phosphorus	355.632	125.384
Total Potassium	38.299	13.503
Sodium Absorption Rate (SAR Units)	2.1	
Total Solids(Percent Weight)	31	
pH (pH Scale 0-14)	6.9	

The derivation of these numbers can be summarized by converting the concentrations of each parameter given in mg/kg to lb/Ton. Then multiplying by the calculated land application rate in Dry Ton/Acre-Yr gives the lb/Acre-Yr application rate. By multiplying the number of acres of each land application site the lb/Yr is determined for each parameter. Calculations are summarized in Appendix 3.

## 8.0 Total Elements Applied

The sludge analysis information is adequate for the year 2013 and 2014, however in the years 2011 & 2012 there is not enough information to attribute to this annual report of total elements

applied. Therefore the amount of each element below is only representative of the years 2013 & 2014:

Parameter	North Pounds	East Pounds
Arsenic	0.236	0.138
Cadmium	0.019	0.011
Copper	6.936	3.260
Lead	0.189	0.111
Mercury	0.011	0.005
Molybdenum	0.248	0.145
Nickel	0.439	0.232
Selenium	2.171	1.866
Zinc	6.855	2.426
PCB's	0.017	0.015
PCB – Decachlorobiphenyl	42.700	37.077
Nitrate	237.541	215.886
Nitrite	73.280	66.578
Ammonia	242.692	94.264
TKN	1231.035	434.021
Total Phosphorus	355.632	125.384
Total Potassium	38.299	13.503
Average Total Solids(Percent Weight)	47	
Average pH (pH Scale 0-14)	7.65	

## 9.0 Biosolids Analysis, Soil Analysis and Biosolids Certification

Biosolids Analysis was conducted for the treated sludge in January 2015 and Soil Analysis was conducted for the land application sites in February 2015 (both are attached in the Appendix). No biosolids certification information was readily available and will not be included in this annual report.

## **APPENDIX 1: BIOSOLIDS ANALYSIS**

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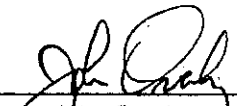
May 13, 2015  
Control No. 190302  
Page 1 of 7

McClelland Consulting Engineers, Inc.  
ATTN: Mr. Matt Bienvenu  
Post Office Box 34087  
Little Rock, AR 72203-4087

This report contains the analytical results and supporting information for the sample submitted on May 8, 2015. Attached please find a copy of the Chain of Custody and/or other documents received. Note that any remaining sample will be discarded two weeks from the original report date unless other arrangements are made.

This report is intended for the sole use of the client listed above. Assessment of the data requires access to the entire document.

This report has been reviewed by the Laboratory Director or a qualified designee.

  
\_\_\_\_\_  
John Overbey  
Laboratory Director

This document has been distributed to the following:

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Little Rock, AR 72203-4087

**SAMPLE INFORMATION**

**Project Description:**

One (1) sludge sample(s) received on May 8, 2015

**Receipt Details:**

A Chain of Custody was provided. The samples were delivered in one (1) ice chest.

Each sample container was checked for proper labeling, including date and time sampled. Sample containers were reviewed for proper type, adequate volume, integrity, temperature, preservation, and holding times. Any exceptions are noted below:

**Sample Identification:**

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Sampled Date/Time</u>	<u>Notes</u>
190302-1	Calico Rock Sludge	06-May-2015 1131	1

**Notes:**

1. Holding time was expired at time of receipt

**Qualifiers:**

- H Analytical holding time exceeded regulatory requirements
- X Spiking level is invalid due to the high concentration of analyte in the spiked sample

**Case Narrative:**

Analysis of soils/sludges are reported on a dry-weight basis unless otherwise specified.

**References:**

- "Methods for Chemical Analysis of Water and Wastes", EPA/600/4-79-020 (Mar 1983) with updates and supplements EPA/600/5-91-010 (Jun 1991), EPA/600/R-92-129 (Aug 1992) and EPA/600/R-93-100 (Aug 1993).
- "Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)", Third Edition.
- "Standard Methods for the Examination of Water and Wastewaters", (SM).
- "American Society for Testing and Materials" (ASTM).
- "Association of Analytical Chemists" (AOAC).



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**ANALYTICAL RESULTS**

AIC No. 190302-1

Sample Identification: Calico Rock Sludge 06-May-2015 1131

Analyte	Result	RL	Units	Qualifier
<b>pH</b> EPA 9045C	<b>6.9</b>		<b>Units</b>	<b>H</b>
Prep: 08-May-2015 1545 by 93	Analyzed: 08-May-2015 1815 by 93		Batch: W51864	
<b>Electrical Conductivity</b> Mod. EPA 9050A	<b>2800</b>	<b>2</b>	<b>umho/cm</b>	
Prep: 12-May-2015 1044 by 93	Analyzed: 12-May-2015 1245 by 93		Batch: W51891	
<b>Cation-Exchange Capacity</b> Mod. EPA 9080	<b>34</b>	<b>0.4</b>	<b>meq/100g</b>	
	Analyzed: 12-May-2015 0840 by 308		Batch: W51889	
<b>Total Solids</b> SM 2540 G 1997	<b>31</b>	<b>0.01</b>	<b>wt %</b>	
Prep: 08-May-2015 1521 by 100	Analyzed: 11-May-2015 1014 by 100		Batch: W51868	
<b>Volatile Solids</b> SM 2540 G 1997	<b>63</b>	<b>0.01</b>	<b>wt %</b>	
Prep: 08-May-2015 1522 by 100	Analyzed: 11-May-2015 1014 by 100		Batch: W51868	
<b>Ammonia as N</b> SM 4500-NH3 B,G 1997	<b>8300</b>	<b>2000</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1222 by 93	Analyzed: 12-May-2015 0922 by 308		Batch: W51881	
<b>Total Kjeldahl Nitrogen</b> SM 4500-Norg D 1997	<b>45000</b>	<b>20000</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1648 by 308	Analyzed: 12-May-2015 1249 by 308		Batch: W51885	
<b>Arsenic</b> EPA 3051A, 6010C	<b>&lt; 5</b>	<b>5</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Cadmium</b> EPA 3051A, 6010C	<b>&lt; 0.4</b>	<b>0.4</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Copper</b> EPA 3051A, 6010C	<b>200</b>	<b>0.6</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Lead</b> EPA 3051A, 6010C	<b>&lt; 4</b>	<b>4</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Magnesium</b> EPA 3051A, 6010C	<b>4300</b>	<b>3</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Molybdenum</b> EPA 3051A, 6010C	<b>5.3</b>	<b>0.8</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Nickel</b> EPA 3051A, 6010C	<b>11</b>	<b>1</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Phosphorus</b> EPA 3051A, 6010C	<b>13000</b>	<b>100</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1654 by 302		Batch: S38914	
<b>Potassium</b> EPA 3051A, 6010C	<b>1400</b>	<b>100</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Selenium</b> EPA 3051A, 6010C	<b>&lt; 7</b>	<b>7</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Sodium Absorption Ratio</b> EPA 3051A, 6010C	<b>2.1</b>			
	Analyzed: 11-May-2015 1541 by 302		Batch: S38914	
<b>Zinc</b> EPA 3051A, 6010C	<b>250</b>	<b>0.2</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1540 by 313	Analyzed: 12-May-2015 1510 by 302		Batch: S38914	
<b>Mercury</b> EPA 7471B	<b>0.33</b>	<b>0.1</b>	<b>mg/Kg</b>	
Prep: 11-May-2015 1050 by 313	Analyzed: 11-May-2015 1411 by 302		Batch: S38909	



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Little Rock, AR 72203-4087

**ANALYTICAL RESULTS**

AIC No. 190302-1 (Continued)

Sample Identification: Calico Rock Sludge 06-May-2015 1131

Analyte	Result	RL	Units	Qualifier
<b>Nitrate as N</b> EPA 9056A Prep: 08-May-2015 1501 by 07	< 2 Analyzed: 08-May-2015 1640 by 302	2	mg/Kg Batch: C17697	H
<b>Nitrite as N</b> EPA 9056A Prep: 08-May-2015 1501 by 07	< 2 Analyzed: 08-May-2015 1640 by 302	2	mg/Kg Batch: C17697	H
<b>Polychlorinated Biphenyls (PCBs) By EPA 3550C, 8082A</b>				
<b>PCB 1016</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
<b>PCB 1221</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
<b>PCB 1232</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
<b>PCB 1242</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
<b>PCB 1248</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
<b>PCB 1254</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
<b>PCB 1260</b> EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	< 0.041 Analyzed: 11-May-2015 1635 by 306	0.041	mg/Kg Batch: G10120	
Surrogate: Decachlorobiphenyl (15.5-146%) EPA 3550C, 8082A Prep: 11-May-2015 0948 by 285	114 Analyzed: 11-May-2015 1635 by 306		% Batch: G10120	



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**DUPLICATE RESULTS**

Analyte	AIC No.	Result	RPD	RPD Limit	Preparation Date	Analysis Date	Dil	Qual
pH	190275-1	7.1 Units			08May15 1113 by 93	08May15 1245 by 93		
	Batch: W51864 Duplicate	7.2 Units	0.559	5.00	08May15 1113 by 93	08May15 1245 by 93		
Total Solids	190246-1	5.2 wt %			08May15 1500 by 100	11May15 1014 by 100		
	Batch: W51868 Duplicate	5.2 wt %	1.81	10.0	08May15 1501 by 100	11May15 1014 by 100		
Volatile Solids	190246-1	84 wt %			08May15 1501 by 100	11May15 1014 by 100		
	Batch: W51868 Duplicate	84 wt %	0.757	20.0	08May15 1501 by 100	11May15 1014 by 100		
Cation-Exchange Capacity	190302-1	34 meq/100g				12May15 0840 by 308		
	Batch: W51889 Duplicate	36 meq/100g	5.91	20.4		12May15 0840 by 308		
Electrical Conductivity	190306-1	510 umho/cm			12May15 1044 by 93	12May15 1245 by 93		
	Batch: W51891 Duplicate	520 umho/cm	1.93	20.0	12May15 1045 by 93	12May15 1245 by 93		

**LABORATORY CONTROL SAMPLE RESULTS**

Analyte	Spike Amount	%	Limits	RPD	Limit	Batch	Preparation Date	Analysis Date	Dil	Qual
pH	-	100	98.0-102			W51864	08May15 1113 by 93	08May15 1245 by 93		
Electrical Conductivity	1410 umho/cm	102	97.1-105			W51891	12May15 1045 by 93	12May15 1245 by 93		
Ammonia as N	20.0 mg/Kg	106	80.0-120			W51881	11May15 1222 by 93	11May15 1825 by 93		
Total Kjeldahl Nitrogen	50.0 mg/Kg	113	80.0-120			W51885	11May15 1648 by 308	12May15 1244 by 308		
Arsenic	500 mg/Kg	99.4	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Cadmium	500 mg/Kg	101	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Copper	50.0 mg/Kg	100	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Lead	500 mg/Kg	103	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Magnesium	1000 mg/Kg	102	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Molybdenum	50.0 mg/Kg	98.9	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Nickel	50.0 mg/Kg	102	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Phosphorus	500 mg/Kg	97.0	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Potassium	1000 mg/Kg	101	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Selenium	500 mg/Kg	99.5	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Zinc	50.0 mg/Kg	102	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Mercury	1.25 mg/Kg	105	85.0-115			S38909	11May15 1050 by 313	11May15 1324 by 302		
Nitrate as N	40.0 mg/Kg	99.4	90.0-110			C17697	08May15 0906 by 07	08May15 1236 by 07		
Nitrite as N	40.0 mg/Kg	99.5	90.0-110			C17697	08May15 0906 by 07	08May15 1236 by 07		
<b>Polychlorinated Biphenyls (PCBs)</b>										
PCB 1254	0.167 mg/Kg	94.2	31.1-126			G10120	11May15 0948 by 285	11May15 1535 by 306		
<b>Polychlorinated Biphenyls (PCBs) Surrogates:</b>										
Decachlorobiphenyl	50.0 ug/Kg	109	7.20-146			G10120	11May15 0948 by 285	11May15 1535 by 306		



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**MATRIX SPIKE SAMPLE RESULTS**

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Ammonia as N	190306-1	20.1 mg/Kg	-	80.0-120	W51881	11May15 1222 by 93	11May15 2013 by 93		X
	190306-1	20.1 mg/Kg	-	80.0-120	W51881	11May15 1222 by 93	11May15 2014 by 93		X
	Relative Percent Difference:		1.11	25.0	W51881				
Total Kjeldahl Nitrogen	190275-1	172 mg/Kg	-	80.0-120	W51885	11May15 1648 by 308	12May15 1315 by 308		X
	190275-1	166 mg/Kg	-	80.0-120	W51885	11May15 1648 by 308	12May15 1316 by 308		X
	Relative Percent Difference:		7.83	20.0	W51885				
Arsenic	190305-1	497 mg/Kg	95.7	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	97.1	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		1.45	20.0	S38914				
Cadmium	190305-1	497 mg/Kg	83.6	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	83.8	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		0.306	20.0	S38914				
Copper	190305-1	49.7 mg/Kg	105	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	102	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		2.69	20.0	S38914				
Lead	190305-1	497 mg/Kg	99.4	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	99.9	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		0.502	20.0	S38914				
Magnesium	190305-1	994 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		X
	190305-1	995 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		X
	Relative Percent Difference:		7.78	20.0	S38914				
Molybdenum	190305-1	49.7 mg/Kg	94.8	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	96.1	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		1.31	20.0	S38914				
Nickel	190305-1	49.7 mg/Kg	103	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	102	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		0.665	20.0	S38914				
Phosphorus	190305-1	497 mg/Kg	92.3	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	80.1	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		6.94	20.0	S38914				
Potassium	190305-1	994 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		X
	190305-1	995 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		X
	Relative Percent Difference:		0.650	20.0	S38914				
Selenium	190305-1	497 mg/Kg	90.8	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	91.9	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		1.29	20.0	S38914				
Zinc	190305-1	49.7 mg/Kg	110	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	102	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		4.79	20.0	S38914				
Mercury	190305-1	2.34 mg/Kg	105	70.0-130	S38909	11May15 1050 by 313	11May15 1328 by 302		
	190305-1	2.49 mg/Kg	106	70.0-130	S38909	11May15 1050 by 313	11May15 1332 by 302		
	Relative Percent Difference:		1.10	20.0	S38909				
Nitrate as N	190241-1	38.9 mg/Kg	85.3	80.0-120	C17697	08May15 0906 by 07	08May15 1301 by 07		
	190241-1	38.9 mg/Kg	86.0	80.0-120	C17697	08May15 0906 by 07	08May15 1325 by 07		
	Relative Percent Difference:		0.780	10.0	C17697				
Nitrite as N	190241-1	38.9 mg/Kg	88.2	80.0-120	C17697	08May15 0906 by 07	08May15 1301 by 07		
	190241-1	38.9 mg/Kg	86.8	80.0-120	C17697	08May15 0906 by 07	08May15 1325 by 07		
	Relative Percent Difference:		1.64	10.0	C17697				



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Little Rock, AR 72203-4087

**MATRIX SPIKE SAMPLE RESULTS**

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
<b>Polychlorinated Biphenyls (PCBs)</b>									
PCB 1254	190258-1	0.1667 mg/Kg	86.1	29.1-103	G10120	11May15 0948 by 285	11May15 1550 by 306		
	190258-1	0.1667 mg/Kg	94.5	29.1-103	G10120	11May15 0948 by 285	11May15 1805 by 306		
	Relative Percent Difference:		9.35	42.6	G10120				
<b>Polychlorinated Biphenyls (PCBs) Surrogates:</b>									
Decachlorobiphenyl	190258-1	50 ug/Kg	109	15.5-146	G10120	11May15 0948 by 285	11May15 1550 by 306		
	190258-1	50 ug/Kg	84.6	15.5-146	G10120	11May15 0948 by 285	11May15 1805 by 306		

**LABORATORY BLANK RESULTS**

Analyte	Result	RL	PQL	QC Sample	Preparation Date	Analysis Date	Qual
Electrical Conductivity	< 2 umho/cm	2	2	W51891-1	12May15 1045 by 93	12May15 1245 by 93	
Cation-Exchange Capacity	< 0.1 meq/100g	0.1	0.1	W51889-1		12May15 0840 by 308	
Total Solids	< 0.01 wt %	0.01	0.01	W51868-1	08May15 1501 by 100	11May15 1014 by 100	
Volatile Solids	< 0.01 wt %	0.01	0.01	W51868-1	08May15 1501 by 100	11May15 1014 by 100	
Ammonia as N	< 2 mg/Kg	2	2	W51881-1	11May15 1222 by 93	11May15 1823 by 93	
Total Kjeldahl Nitrogen	< 10 mg/Kg	10	10	W51885-1	11May15 1646 by 308	12May15 1243 by 308	
Arsenic	< 5 mg/Kg	5	5	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Cadmium	< 0.4 mg/Kg	0.4	0.4	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Copper	< 0.6 mg/Kg	0.6	0.6	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Lead	< 4 mg/Kg	4	4	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Magnesium	< 3 mg/Kg	3	3	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Molybdenum	< 0.8 mg/Kg	0.8	0.8	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Nickel	< 1 mg/Kg	1	1	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Phosphorus	< 10 mg/Kg	10	10	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Potassium	< 100 mg/Kg	100	100	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Selenium	< 7 mg/Kg	7	7	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Zinc	< 0.2 mg/Kg	0.2	0.2	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Mercury	< 0.1 mg/Kg	0.1	0.1	S38909-1	11May15 1050 by 313	11May15 1320 by 302	
Nitrate as N	< 0.5 mg/Kg	0.5	0.5	C17697-1	08May15 0906 by 07	08May15 1212 by 07	
Nitrite as N	< 0.5 mg/Kg	0.5	0.5	C17697-1	08May15 0906 by 07	08May15 1212 by 07	
<b>Polychlorinated Biphenyls (PCBs)</b>							
PCB 1016	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1221	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1232	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1242	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1248	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1254	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1260	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
<b>Polychlorinated Biphenyls (PCBs) Surrogates:</b>							
Decachlorobiphenyl (7.20-146%)	83.4 %			G10120-1	11May15 0948 by 285	11May15 1520 by 306	



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

AIC CONTROL NO: 190302

AIC PROPOSAL NO:

Carrier:

Received Temperature C  
5.4

Remarks

Field pH calibration

on 0

Buffer:

Client: MCE			PO No.		NO OF BOTTLES	ANALYSES REQUESTED																									
Project Reference: Matt B.			SAMPLE MATRIX			PH	Total Solids	Volatiles Solids	Ammonia as N	Arsenic	Cadmium	Copper	Lead	Magnesium	Nickel	Phosphorus	Potassium	Selenium	Zinc	Mercury	PCBs	Total Kjeldahl Nitrogen	Nitrate as N	Nitrite as N	Molybdenum	Sodium Absorption Calc.	Section - Ecological	Electrical Conductivity			
AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	Sludge	PH	Total Solids	Volatiles Solids	Ammonia as N	Arsenic	Cadmium	Copper	Lead	Magnesium	Nickel	Phosphorus	Potassium	Selenium	Zinc	Mercury	PCBs	Total Kjeldahl Nitrogen	Nitrate as N	Nitrite as N	Molybdenum	Sodium Absorption Calc.	Section - Ecological	Electrical Conductivity	
1	Calico Rock	5/6/15 11:51	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Container Type			Preservative		P																										
G = Glass NO = none			P = Plastic S = Sulfuric acid pH2		V = VOA vials N = Nitric acid pH2			H = HCl to pH2 B = NaOH to pH12					T = Sodium Thiosulfate Z = Zinc acetate																		
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS								Relinquished By: James Brown		Date/Time: 5/6/15 1540		Received By: James Brown		Date/Time: 5/6/15 1540																	
Expedited results requested by: _____								Relinquished By: James Brown		Date/Time: 5/8/15 1300		Received in Lab By: D. Brown		Date/Time: 5-8-15 1300																	
Who should AIC contact with questions: _____								Comments:																							
Phone: _____ Fax: _____																															
Report Attention to: _____																															
Report Address to: _____																															



## **APPENDIX 2: LAND APPLICATION SITE SOIL ANALYSIS**

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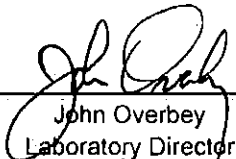


McClelland Consulting Engineers, Inc.  
ATTN: Mr. Matt Bienvenu  
Post Office Box 34087  
Little Rock, AR 72203-4087

This report contains the analytical results and supporting information for the sample submitted on May 8, 2015. Attached please find a copy of the Chain of Custody and/or other documents received. Note that any remaining sample will be discarded two weeks from the original report date unless other arrangements are made.

This report is intended for the sole use of the client listed above. Assessment of the data requires access to the entire document.

This report has been reviewed by the Laboratory Director or a qualified designee.

  
\_\_\_\_\_  
John Overbey  
Laboratory Director

This document has been distributed to the following:

PDF cc: McClelland Consulting Engineers, Inc.  
ATTN: Mr. Matt Bienvenu  
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McClelland Consulting Engineers, Inc.  
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**SAMPLE INFORMATION**

**Project Description:**

One (1) soil sample(s) received on May 8, 2015

**Receipt Details:**

A Chain of Custody was provided. The samples were delivered in one (1) ice chest.

Each sample container was checked for proper labeling, including date and time sampled. Sample containers were reviewed for proper type, adequate volume, integrity, temperature, preservation, and holding times. Any exceptions are noted below:

**Sample Identification:**

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Sampled Date/Time</u>	<u>Notes</u>
190305-1	Calico Rock Soil	06-May-2015 1131	1

**Notes:**

1. Holding time was expired at time of receipt

**Qualifiers:**

- H Analytical holding time exceeded regulatory requirements
- X Spiking level is invalid due to the high concentration of analyte in the spiked sample

**Case Narrative:**

Analysis of soils/sludges are reported on a dry-weight basis unless otherwise specified.

**References:**

- "Methods for Chemical Analysis of Water and Wastes", EPA/600/4-79-020 (Mar 1983) with updates and supplements EPA/600/5-91-010 (Jun 1991), EPA/600/R-92-129 (Aug 1992) and EPA/600/R-93-100 (Aug 1993).
- "Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)", Third Edition.
- "Standard Methods for the Examination of Water and Wastewaters", (SM).
- "American Society for Testing and Materials" (ASTM).
- "Association of Analytical Chemists" (AOAC)



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**ANALYTICAL RESULTS**

AIC No. 190305-1

Sample Identification: Calico Rock Soil 06-May-2015 1131

Analyte	Result	RL	Units	Qualifier
<b>pH</b> EPA 9045C Prep: 08-May-2015 1545 by 93	<b>6.5</b> Analyzed: 08-May-2015 1815 by 93		<b>Units</b> Batch: W51864	<b>H</b>
<b>Electrical Conductivity</b> Mod. EPA 9050A Prep: 12-May-2015 1044 by 93	<b>48</b> Analyzed: 12-May-2015 1245 by 93	<b>2</b>	<b>umho/cm</b> Batch: W51891	
<b>Cation-Exchange Capacity</b> Mod. EPA 9080	<b>7.2</b> Analyzed: 12-May-2015 0840 by 308	<b>0.2</b>	<b>meq/100g</b> Batch: W51889	
<b>Total Solids</b> SM 2540 G 1997 Prep: 08-May-2015 1521 by 100	<b>94</b> Analyzed: 11-May-2015 1014 by 100	<b>0.01</b>	<b>wt %</b> Batch: W51868	
<b>Volatile Solids</b> SM 2540 G 1997 Prep: 08-May-2015 1522 by 100	<b>5.0</b> Analyzed: 11-May-2015 1014 by 100	<b>0.01</b>	<b>wt %</b> Batch: W51868	
<b>Ammonia as N</b> SM 4500-NH3 B,G 1997 Prep: 11-May-2015 1222 by 93	<b>89</b> Analyzed: 11-May-2015 1931 by 93	<b>20</b>	<b>mg/Kg</b> Batch: W51881	
<b>Total Kjeldahl Nitrogen</b> SM 4500-Norg D 1997 Prep: 11-May-2015 1648 by 308	<b>2100</b> Analyzed: 12-May-2015 1318 by 308	<b>400</b>	<b>mg/Kg</b> Batch: W51885	
<b>Arsenic</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>&lt; 5</b> Analyzed: 12-May-2015 1446 by 302	<b>5</b>	<b>mg/Kg</b> Batch: S38914	
<b>Cadmium</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>&lt; 0.4</b> Analyzed: 12-May-2015 1446 by 302	<b>0.4</b>	<b>mg/Kg</b> Batch: S38914	
<b>Copper</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>12</b> Analyzed: 12-May-2015 1446 by 302	<b>0.6</b>	<b>mg/Kg</b> Batch: S38914	
<b>Lead</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>8.3</b> Analyzed: 12-May-2015 1446 by 302	<b>4</b>	<b>mg/Kg</b> Batch: S38914	
<b>Magnesium</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>550</b> Analyzed: 12-May-2015 1446 by 302	<b>3</b>	<b>mg/Kg</b> Batch: S38914	
<b>Molybdenum</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>&lt; 0.8</b> Analyzed: 12-May-2015 1446 by 302	<b>0.8</b>	<b>mg/Kg</b> Batch: S38914	
<b>Nickel</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>3.5</b> Analyzed: 12-May-2015 1446 by 302	<b>1</b>	<b>mg/Kg</b> Batch: S38914	
<b>Phosphorus</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>440</b> Analyzed: 12-May-2015 1446 by 302	<b>10</b>	<b>mg/Kg</b> Batch: S38914	
<b>Potassium</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>330</b> Analyzed: 12-May-2015 1446 by 302	<b>100</b>	<b>mg/Kg</b> Batch: S38914	
<b>Selenium</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>&lt; 7</b> Analyzed: 12-May-2015 1446 by 302	<b>7</b>	<b>mg/Kg</b> Batch: S38914	
<b>Sodium Absorption Ratio</b> EPA 3051A, 6010C	<b>0.42</b> Analyzed: 11-May-2015 1541 by 302		Batch: S38914	
<b>Zinc</b> EPA 3051A, 6010C Prep: 11-May-2015 1540 by 313	<b>34</b> Analyzed: 12-May-2015 1446 by 302	<b>0.2</b>	<b>mg/Kg</b> Batch: S38914	
<b>Mercury</b> EPA 7471B Prep: 11-May-2015 1050 by 313	<b>&lt; 0.1</b> Analyzed: 11-May-2015 1336 by 302	<b>0.1</b>	<b>mg/Kg</b> Batch: S38909	



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**ANALYTICAL RESULTS**

AIC No. 190305-1 (Continued)

Sample Identification: Calico Rock Soil 06-May-2015 1131

Analyte	Result	RL	Units	Qualifier
<b>Nitrate as N</b> EPA 9056A	<b>0.73</b>	0.5	<b>mg/Kg</b>	H
Prep: 08-May-2015 1510 by 07	Analyzed: 08-May-2015 1704 by 302		Batch: C17697	
<b>Nitrite as N</b> EPA 9056A	<b>&lt; 0.5</b>	0.5	<b>mg/Kg</b>	H
Prep: 08-May-2015 1510 by 07	Analyzed: 08-May-2015 1704 by 302		Batch: C17697	
<b>Polychlorinated Biphenyls (PCBs) By EPA 3550C, 8082A</b>				
<b>PCB 1016</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
<b>PCB 1221</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
<b>PCB 1232</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
<b>PCB 1242</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
<b>PCB 1248</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
<b>PCB 1254</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
<b>PCB 1260</b> EPA 3550C, 8082A	<b>&lt; 0.014</b>	0.014	<b>mg/Kg</b>	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	
Surrogate: Decachlorobiphenyl (15.5-146%) EPA 3550C, 8082A	105		%	
Prep: 11-May-2015 0948 by 285	Analyzed: 11-May-2015 1650 by 306		Batch: G10120	



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**DUPLICATE RESULTS**

Analyte	AIC No.	Result	RPD	RPD Limit	Preparation Date	Analysis Date	Dil	Qual
pH	190275-1	7.1 Units			08May15 1113 by 93	08May15 1245 by 93		
	Batch: W51864 Duplicate	7.2 Units	0.559	5.00	08May15 1113 by 93	08May15 1245 by 93		
Total Solids	190246-1	5.2 wt %			08May15 1500 by 100	11May15 1014 by 100		
	Batch: W51868 Duplicate	5.2 wt %	1.81	10.0	08May15 1501 by 100	11May15 1014 by 100		
Volatile Solids	190246-1	84 wt %			08May15 1501 by 100	11May15 1014 by 100		
	Batch: W51868 Duplicate	84 wt %	0.757	20.0	08May15 1501 by 100	11May15 1014 by 100		
Cation-Exchange Capacity	190302-1	34 meq/100g				12May15 0840 by 308		
	Batch: W51889 Duplicate	36 meq/100g	5.91	20.4		12May15 0840 by 308		
Electrical Conductivity	190306-1	510 umho/cm			12May15 1044 by 93	12May15 1245 by 93		
	Batch: W51891 Duplicate	520 umho/cm	1.93	20.0	12May15 1045 by 93	12May15 1245 by 93		

**LABORATORY CONTROL SAMPLE RESULTS**

Analyte	Spike Amount	%	Limits	RPD	Limit	Batch	Preparation Date	Analysis Date	Dil	Qual
pH	-	100	98.0-102			W51864	08May15 1113 by 93	08May15 1245 by 93		
Electrical Conductivity	1410 umho/cm	102	97.1-105			W51891	12May15 1045 by 93	12May15 1245 by 93		
Ammonia as N	20.0 mg/Kg	106	80.0-120			W51881	11May15 1222 by 93	11May15 1825 by 93		
Total Kjeldahl Nitrogen	50.0 mg/Kg	113	80.0-120			W51885	11May15 1648 by 308	12May15 1244 by 308		
Arsenic	500 mg/Kg	99.4	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Cadmium	500 mg/Kg	101	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Copper	50.0 mg/Kg	100	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Lead	500 mg/Kg	103	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Magnesium	1000 mg/Kg	102	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Molybdenum	50.0 mg/Kg	98.9	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Nickel	50.0 mg/Kg	102	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Phosphorus	500 mg/Kg	97.0	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Potassium	1000 mg/Kg	101	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Selenium	500 mg/Kg	99.5	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Zinc	50.0 mg/Kg	102	85.0-115			S38914	11May15 1541 by 313	12May15 1430 by 302		
Mercury	1.25 mg/Kg	105	85.0-115			S38909	11May15 1050 by 313	11May15 1324 by 302		
Nitrate as N	40.0 mg/Kg	99.4	90.0-110			C17697	08May15 0906 by 07	08May15 1236 by 07		
Nitrite as N	40.0 mg/Kg	99.5	90.0-110			C17697	08May15 0906 by 07	08May15 1236 by 07		
<b>Polychlorinated Biphenyls (PCBs)</b>										
PCB 1254	0.167 mg/Kg	94.2	31.1-126			G10120	11May15 0948 by 285	11May15 1535 by 306		
<b>Polychlorinated Biphenyls (PCBs) Surrogates:</b>										
Decachlorobiphenyl	50.0 ug/Kg	109	7.20-146			G10120	11May15 0948 by 285	11May15 1535 by 306		



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**MATRIX SPIKE SAMPLE RESULTS**

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Ammonia as N	190306-1	20.1 mg/Kg	-	80.0-120	W51881	11May15 1222 by 93	11May15 2013 by 93		X
	190306-1	20.1 mg/Kg	-	80.0-120	W51881	11May15 1222 by 93	11May15 2014 by 93		X
	Relative Percent Difference:		1.11	25.0	W51881				
Total Kjeldahl Nitrogen	190275-1	172 mg/Kg	-	80.0-120	W51885	11May15 1648 by 308	12May15 1315 by 308		X
	190275-1	166 mg/Kg	-	80.0-120	W51885	11May15 1648 by 308	12May15 1316 by 308		X
	Relative Percent Difference:		7.83	20.0	W51885				
Arsenic	190305-1	497 mg/Kg	95.7	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	97.1	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		1.45	20.0	S38914				
Cadmium	190305-1	497 mg/Kg	83.6	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	83.8	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		0.306	20.0	S38914				
Copper	190305-1	49.7 mg/Kg	105	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	102	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		2.69	20.0	S38914				
Lead	190305-1	497 mg/Kg	99.4	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	99.9	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		0.502	20.0	S38914				
Magnesium	190305-1	994 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		X
	190305-1	995 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		X
	Relative Percent Difference:		7.78	20.0	S38914				
Molybdenum	190305-1	49.7 mg/Kg	94.8	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	96.1	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		1.31	20.0	S38914				
Nickel	190305-1	49.7 mg/Kg	103	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	102	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		0.665	20.0	S38914				
Phosphorus	190305-1	497 mg/Kg	92.3	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	80.1	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		6.94	20.0	S38914				
Potassium	190305-1	994 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		X
	190305-1	995 mg/Kg	-	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		X
	Relative Percent Difference:		0.650	20.0	S38914				
Selenium	190305-1	497 mg/Kg	90.8	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	497 mg/Kg	91.9	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		1.29	20.0	S38914				
Zinc	190305-1	49.7 mg/Kg	110	75.0-125	S38914	11May15 1541 by 313	12May15 1435 by 302		
	190305-1	49.7 mg/Kg	102	75.0-125	S38914	11May15 1541 by 313	12May15 1441 by 302		
	Relative Percent Difference:		4.79	20.0	S38914				
Mercury	190305-1	2.34 mg/Kg	105	70.0-130	S38909	11May15 1050 by 313	11May15 1328 by 302		
	190305-1	2.49 mg/Kg	106	70.0-130	S38909	11May15 1050 by 313	11May15 1332 by 302		
	Relative Percent Difference:		1.10	20.0	S38909				
Nitrate as N	190241-1	38.9 mg/Kg	85.3	80.0-120	C17697	08May15 0906 by 07	08May15 1301 by 07		
	190241-1	38.9 mg/Kg	86.0	80.0-120	C17697	08May15 0906 by 07	08May15 1325 by 07		
	Relative Percent Difference:		0.780	10.0	C17697				
Nitrite as N	190241-1	38.9 mg/Kg	88.2	80.0-120	C17697	08May15 0906 by 07	08May15 1301 by 07		
	190241-1	38.9 mg/Kg	86.8	80.0-120	C17697	08May15 0906 by 07	08May15 1325 by 07		
	Relative Percent Difference:		1.64	10.0	C17697				



McClelland Consulting Engineers, Inc.  
Post Office Box 34087  
Little Rock, AR 72203-4087

**MATRIX SPIKE SAMPLE RESULTS**

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	DII	Qual
<b>Polychlorinated Biphenyls (PCBs)</b>									
PCB 1254	190258-1	0.1667 mg/Kg	86.1	29.1-103	G10120	11May15 0948 by 285	11May15 1550 by 306		
	190258-1	0.1667 mg/Kg	94.5	29.1-103	G10120	11May15 0948 by 285	11May15 1605 by 306		
	Relative Percent Difference:		9.35	42.6	G10120				
<b>Polychlorinated Biphenyls (PCBs) Surrogates:</b>									
Decachlorobiphenyl	190258-1	50 ug/Kg	109	15.5-146	G10120	11May15 0948 by 285	11May15 1550 by 306		
	190258-1	50 ug/Kg	84.6	15.5-146	G10120	11May15 0948 by 285	11May15 1605 by 306		

**LABORATORY BLANK RESULTS**

Analyte	Result	RL	PQL	QC Sample	Preparation Date	Analysis Date	Qual
Electrical Conductivity	< 2 umho/cm	2	2	W51891-1	12May15 1045 by 93	12May15 1245 by 93	
Cation-Exchange Capacity	< 0.1 meq/100g	0.1	0.1	W51889-1		12May15 0840 by 308	
Total Solids	< 0.01 wt %	0.01	0.01	W51868-1	08May15 1501 by 100	11May15 1014 by 100	
Volatile Solids	< 0.01 wt %	0.01	0.01	W51868-1	08May15 1501 by 100	11May15 1014 by 100	
Ammonia as N	< 2 mg/Kg	2	2	W51881-1	11May15 1222 by 93	11May15 1823 by 93	
Total Kjeldahl Nitrogen	< 10 mg/Kg	10	10	W51885-1	11May15 1648 by 308	12May15 1243 by 308	
Arsenic	< 5 mg/Kg	5	5	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Cadmium	< 0.4 mg/Kg	0.4	0.4	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Copper	< 0.6 mg/Kg	0.6	0.6	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Lead	< 4 mg/Kg	4	4	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Magnesium	< 3 mg/Kg	3	3	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Molybdenum	< 0.8 mg/Kg	0.8	0.8	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Nickel	< 1 mg/Kg	1	1	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Phosphorus	< 10 mg/Kg	10	10	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Potassium	< 100 mg/Kg	100	100	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Selenium	< 7 mg/Kg	7	7	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Zinc	< 0.2 mg/Kg	0.2	0.2	S38914-1	11May15 1541 by 313	12May15 1425 by 302	
Mercury	< 0.1 mg/Kg	0.1	0.1	S38909-1	11May15 1050 by 313	11May15 1320 by 302	
Nitrate as N	< 0.5 mg/Kg	0.5	0.5	C17697-1	08May15 0906 by 07	08May15 1212 by 07	
Nitrite as N	< 0.5 mg/Kg	0.5	0.5	C17697-1	08May15 0906 by 07	08May15 1212 by 07	
<b>Polychlorinated Biphenyls (PCBs)</b>							
PCB 1016	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1221	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1232	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1242	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1248	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1254	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
PCB 1260	< 0.013 mg/Kg	0.013	0.013	G10120-1	11May15 0948 by 285	11May15 1520 by 306	
<b>Polychlorinated Biphenyls (PCBs) Surrogates:</b>							
Decachlorobiphenyl (7.20-146%)	83.4 %			G10120-1	11May15 0948 by 285	11May15 1520 by 306	





### CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 1 OF 1

AIC CONTROL NO: 190305

AIC PROPOSAL NO:

Carrier:

Received Temperature C: 5.4

Remarks:

Field pH calibration on \_\_\_\_\_  
Buffer: \_\_\_\_\_

Client: MCE			PO No.		NO OF BOTTLES	ANALYSES REQUESTED																					
Project Reference:			SAMPLE MATRIX			PH	Total Solids	Volatiles Solids	Ammonia as N	Arsenic	Cadmium	Copper	Lead	Magnesium	Nickel	Phosphorus	Potassium	Selenium	Zinc	Mercury	PCBs	Total Kjeldahl Nitrogen	Nitrate as N	Nitrite as N	Molybdenum	Sodium Absorption Coefficient - Exchange Capacity	Electrical Conductivity
Project Manager: Matt B.			GRAB	COMP	WATER		SOIL																				
Sample: Jessica Brown																											
AIC No.	Sample Identification	Date/Time Collected																									
1	calico rock	5/6/15 1300	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Container Type			Preservative		V = VOA vials N = Nitric acid pH2		H = HCl to pH2 B = NaOH to pH12				T = Sodium Thiosulfate Z = Zinc acetate																
G = Glass NO = none			P = Plastic S = Sulfuric acid pH2																								
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS						Relinquished By: Charles Brown		Date/Time: 5/6/15 1540		Received By: Jessica Brown		Date/Time: 5/6/15 1540															
Expedited results requested by: _____						Relinquished By: Jessica Brown		Date/Time: 5/8/15 1300		Received In Lab By: P. Brown		Date/Time: 5-8-15 1300															
Who should AIC contact with questions: _____						Comments:																					
Phone: _____ Fax: _____																											
Report Attention to: _____																											
Report Address to: _____																											

WS 5981 B/02

FORM 0060

## **APPENDIX 3: CALCULATIONS**

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- ① Assume Dry Sludge Density is 8% of Wet Sludge Density (1400 kg/m<sup>3</sup>)  
∴ Dry Sludge Density = 112 kg/m<sup>3</sup>

$$\frac{112 \text{ kg}}{\text{m}^3} \cdot \frac{1 \text{ m}^3}{1.308 \text{ cy}} \cdot \frac{2.204 \text{ lb}}{1 \text{ kg}} \cdot \frac{1 \text{ TON}}{2000 \text{ lb}} = .09439 \text{ TON/cy}$$

- ② East Location DRYTON/ACRE-YR

Dry Sludge Vol = 51 cy/YR  
Acreage = 22.43 ACRE

$$51 \text{ cy} \cdot .09439 \text{ TON/cy} = 4.814 \text{ TON/YR}$$

$$\frac{4.814 \text{ TON/YR}}{22.43 \text{ ACRE}} = .2146 \text{ DRYTON/ACRE-YR}$$

- ③ North Location DRYTON/ACRE-YR

Dry Sludge Vol = 36 cy/YR  
Acreage = 19.91 ACRE

$$36 \text{ cy/YR} \cdot .09439 \text{ TON/cy} = 3.39804 \text{ TON/YR}$$

$$\frac{3.39804 \text{ TON/YR}}{19.91 \text{ ACRE}} = .1707 \text{ DRYTON/ACRE-YR}$$

Σ Wet Sludge Applied = 22000 gal

$$\frac{22000 \text{ gal}}{19.91 \text{ ACRE-YR}} \cdot \frac{.0049511 \text{ cy}}{1 \text{ gal}} \cdot \frac{.09439 \text{ TON}}{1 \text{ cy}}$$

$$= .516 \text{ DRYTON/ACRE-YR}$$

TOTAL = .1707 + .516 = .687 DRYTON/ACRE-YR

Calico Park  
2014

Ammonia as N  $8300 \text{ mg/kg} = 8300 \text{ mg/kg} \times .002 = 16.6 \text{ lb/TON}$   
 Total Kjeldahl Nitrogen  $45000 \text{ mg/kg} = 45000 \text{ mg/kg} \times .002 = 90 \text{ lb/TON}$   
 Nitrate as N  $< 2 \text{ mg/kg} = 2 \text{ mg/kg} \times .002 = .004 \text{ lb/TON}$   
 Nitrite as N  $< 2 \text{ mg/kg} = 2 \text{ mg/kg} \times .002 = .004 \text{ lb/TON}$

Org N<sup>2</sup> = TKN - (Nitrate + Ammonia) =  $45000 \text{ mg/kg} - (2 \text{ mg/kg} + 8300 \text{ mg/kg})$   
 $= 36698 \text{ mg/kg}$

$36698 \cdot .002 = 73.4 \text{ lb/TON}$

$K_{min} = .30$  (0-1<sup>yr</sup> Mineralization Rate)

$K_{min} = .15$  (1-2<sup>yr</sup> Mineralization Rate)

$K_{min} = .08$  (2-3<sup>yr</sup> Mineralization Rate)

$K_{min} = .04$  (3-4<sup>yr</sup> Mineralization Rate)

$K_{vol} = 0.5$

PAN = Nitrate + ( $K_{vol} \cdot$  Ammonia) +  $K_{min}$  (Org N<sup>2</sup>)  
 $= .004 \text{ lb/TON} + (.5 \cdot 16.6 \text{ lb/TON}) + .30 (73.4 \text{ lb/TON}) = 30.324 \text{ lb/TON}$

North Land Application =  $.687 \text{ DRY TON/ACRE-YR}$

East Land Application =  $.215 \text{ DRY TON/ACRE-YR}$

PAN  $.687 \text{ DRY TON/ACRE-YR} \times 30.324 \text{ lb/TON} = 20.8 \text{ lb/ACRE-YR}$

$.215 \times 30.324 = 6.5 \text{ lb/ACRE-YR}$

TOTAL NITROGEN  $.687 \times 73.4 = 50.4 \text{ lb/ACRE-YR}$

$.215 \times 73.4 = 15.8 \text{ lb/ACRE-YR}$

Calico Rock 2013

conversion factor  
 .002

Ammonia as N  $2000 \text{ mg/kg} = 4 \text{ lb/TON}$

TKN  $12000 \text{ mg/kg} = 24 \text{ lb/TON}$

Nitrate  $4.8 \text{ mg/kg} = .0016 \text{ lb/TON}$

Nitrite  $4.8 \text{ mg/kg} = .0016 \text{ lb/TON}$

$\text{Org N}^2 = \text{TKN} - (\text{Nitrate} + \text{Ammonia}) = 12000 - (.8 + 2000) = 9999.2 \text{ mg/kg}$   
 $= 20 \text{ lb/TON}$

$K_{min} = .15$  (1-2% Mineralization Rate)

$\text{PAN} = \text{Nitrate} + (K_{vol} \cdot \text{Ammonia}) + K_{min} (\text{Org N}^2)$   
 $= .0016 \text{ lb/TON} + (.5 \cdot 4 \text{ lb/TON}) + .15 (24 \text{ lb/TON}) = \boxed{5.6016 \text{ lb/TON}}$





## Calico Rock Sludge Land Application Summary

<b>Parameter</b>	<b>North</b>	<b>East</b>
Arsenic	0.236	0.138
Cadmium	0.019	0.011
Copper	6.936	3.260
Lead	0.189	0.111
Mercury	0.011	0.005
Molybdenum	0.248	0.145
Nickel	0.439	0.232
Selenium	2.171	1.866
Zinc	6.855	2.426
PCB-1254	0.017	0.015
PCB-Decachlorobiphenyl	42.700	37.077
Nitrate	237.541	215.886
Nitrite	73.280	66.578
Ammonia	242.692	94.264
TKN	1231.035	434.021
Total Phosphorus	355.632	125.384
Total Potassium	38.299	13.503
Sodium Absorption Rate		
Total Solids	47	
pH	7.65	



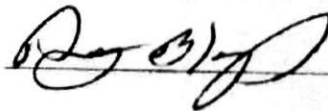
## **APPENDIX 4: LAND APPLICATION SUMMARIES**

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## Statement Required For Record Keeping

"I certify under penalty of law that the requirements under Regulation 503 (40 CRF Part 503) for the Land Application of Sludge from Treatment Works Treating Domestic Sewage under Class A- Alternative 4 (503.32): (Fecal coliform- 9222D), (Helminth Ova- EPIV6- 1-97 014), (Recovery of Viruses from Suspended Solids In Water and Wastewater-951 0 F) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements have been met I am aware that there are significant penalties for false certification, including the possibility of fine and imprisonment."

Danny Blankenship Maint. Supervisor



Date	Loads Hauled	Cubic Yards	Location
1-30-15	2	6	East
2-6-15	1	3	East
2-12-15	2	6	East
3-3-15	1	3	East
3-6-15	5 Liquid	3000 gal	North
3-10-15	7 Liquid	4200 gal	North
3-16-15	4 Liquid	2400 gal	North
3-17-15	10 Liquid	6000 gal	North
3-19-15	11 Liquid	6600 gal	North
3-30-15	5	15	East



